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FEASIBILITY STUDY REPORT FOR OPERABLE UNIT 2, DRAFT AUGUST 1994 - VOLUME 5 OF 6

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FEASIBILITY STUDY REPORT FOR OPERABLE UNIT 2

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

VOLUME 5 OF 6
APPENDICES E, F, G AND H

AUGUST 1994

U.S. DEPARTMENT OF ENERGY
FERNALD FIELD OFFICE

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APPENDIX E

ENGINEERING CALCULATIONS AND TYPICAL SECTIONS

APPENDIX E

ENGINEERING CALCULATIONS AND TYPICAL SECTIONS

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APPENDIX E

LIST OF ACRONYMS AND ABBREVIATIONS

ARAR	applicable and relevant or appropriate requirement
COC	contaminant of concern
DOT	U.S. Department of Transportation
GMA	Great Miami Aquifer
HELP	Hydraulic Evaluation of Landfill Performance
HOC	halogenated organic compound
HDPE	high density polyethylene
ILCR	incremental lifetime cancer risk
LARM	low activity radioactive material
LDR	land disposal restriction
LLW	low-level waste
LRA	leading remedial alternative
MW	mixed waste
NORM	normally occurring radioactive material
NTS	Nevada Test Site
PCB	polychlorinated biphenyl
PPE	personal protective equipment
PRL	preliminary remediation level
RCRA	Resource Conservation and Recovery Act
TCLP	toxicity characteristic leaching procedure
TRU	transuranic waste
TRUMW	transuranic mixed waste
WAC	waste acceptance criteria

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APPENDIX E.1

REMEDIATION VOLUMES

APPENDIX E.1.1
REMEDIATION VOLUME SUMMARY

TABLE E.1-1

ALTERNATIVE 2 - CONSOLIDATION AND CAPPING
FEDERAL OWNERSHIP (EXPANDED TRESPASSER, 10^{-6} RISK LEVEL)
CONSOLIDATION AND OFF-SITE DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Off-Site Disposal Volume (yd^3)	Consolidation Volume (yd^3)			Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavcation		Excavation Volume to On-Site Disposal	Generated Waste Volume	Total Consolidation Volume		
	PPE Level - D (< 125 pCi/g)	PPE Level - C (> 125 pCi/g)	Total								
Solid Waste Landfill	10,400	1,700	12,100	1,200	13,300	0	13,300	3,000	16,300	5,300	0
Lime Sludge Ponds	1,600	0	1,600	200	1,800	0	1,800	3,000	4,800	100	0
Inactive Flyash Piles	84,800	9,200	94,000	9,400	103,400	0	103,400	3,000	106,400	4,000	0
South Field	41,600	500	42,100	4,200	46,300	300	46,000	3,000	49,000	6,500	0
Active Flyash Pile	65,100	0	65,100	6,500	71,600	0	71,600	3,000	74,600	0	0
Total	203,500	11,400	214,900	21,500	236,400	300	236,100	15,000	251,100	15,900	0

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

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TABLE E.1-2

ALTERNATIVE 3 - EXCAVATION AND OFF-SITE DISPOSAL (ENVIROCARE) FEDERAL OWNERSHIP (EXPANDED TRESPASSER, 10^{-6} RISK LEVEL) REMEDIATION AND OFF-SITE DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Generated Waste Volume (yd^3)	Total Off-Site Disposal Volume (yd^3)	Debris Volume (yd^3)	Drying Volume yd^3
	Remediation Volume			Additional Excavation	Total Excavcation				
	PPE Level - D (< 125 pCi/g)	PPE Level - C (> 125 pCi/g)	Total						
Solid Waste Landfill	19,500	1,700	21,200	2,100	23,300	3,000	26,300	5,300	7,000
Lime Sludge Ponds	16,800	0	16,800	1,700	18,500	3,000	21,500	0	7,100
Inactive Flyash Piles	84,800	9,200	94,000	9,400	103,400	3,000	106,400	4,000	6,900
South Field	771,00	500	77,600	7,800	85,400	3,000	88,400	6,500	11,000
Active Flyash Pile	651,00	0	65,100	6,500	71,600	3,000	74,600	0	700
Total	263,300	11,400	274,700	27,500	302,200	15,000	317,200	15,800	32,700

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

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TABLE E.1-3

ALTERNATIVE 6 - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION ABOVE WASTE ACCEPTANCE CRITERIA EXPANDED TRESPASSER AND 10^{-6} RISK LEVEL REMEDIATION AND DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Off-Site Disposal Volume (yd^3)	On-site Disposal Volume (yd^3)			Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavation		Excavation Volume to On-Site Disposal	Generated Waste Volume	Total On-Site Disposal Volume		
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total								
Solid Waste Landfill	19,500	1,700	21,200	3,000	24,200	0	24,200	3,000	27,200	5,300	0
Lime Sludge Ponds	16,800	0	16,800	1,700	18,500	0	18,500	3,000	21,500	0	0
Inactive Flyash Piles	84,800	9,200	94,000	9,400	103,400	3,100	100,300	3,000	103,300	4,000	0
South Field	77,100	500	77,600	7,800	85,400	300	85,100	3,000	88,100	6,500	0
Active Flyash Pile	65,100	0	65,100	6,500	71,600	0	71,600	3,000	74,600	0	0
Total	263,300	11,400	274,700	28,400	303,100	3,400	299,700	15,000	314,700	15,800	0

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

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TABLE E.1-4

ALTERNATIVE 3 - EXCAVATION AND OFF-SITE DISPOSAL (ENVIROCARE) PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, 10^{-6} RISK LEVEL) REMEDIATION AND OFF-SITE DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Generated Waste Volume (yd^3)	Total Off-Site Disposal Volume (yd^3)	Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavation				
	PPE Level - D (<125 pCi/g)	PPE Level C (>125 pCi/g)	Total						
Solid Waste Landfill	96,700	1,700	98,400	13,800	112,200	3,000	115,200	5,300	7,000
Lime Sludge Ponds	81,600	0	81,600	8,200	89,800	3,000	92,800	0	7,100
Inactive Flyash Piles	91,700	9,200	100,900	10,100	111,000	3,000	114,000	4,000	6,900
South Field	338,900	500	339,400	34,000	373,400	3,000	376,400	6,500	11,000
Active Flyash Pile	74,900	0	74,900	7,500	82,400	3,000	85,400	0	700
Total	683,800	11,400	695,200	73,600	768,800	15,000	783,800	15,800	32,500

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

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TABLE E.1-5

ALTERNATIVE 6 - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION ABOVE WASTE ACCEPTANCE CRITERIA PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, 10^{-6} RISK LEVEL) REMEDIATION AND DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Off-Site Disposal Volume (yd^3)	On-Site Disposal Volume (yd^3)			Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavation		Excavation Volume to On-Site Disposal	Generated Waste Volume	Total On-Site Disposal Volume		
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total								
Solid Waste Landfill	96,700	1,700	98,400	13,800	112,200	0	112,200	3,000	115,200	5,300	0
Lime Sludge Ponds	81,600	0	81,600	8,200	89,800	0	89,800	3,000	92,800	0	0
Inactive Flyash Piles	91,700	9,200	100,900	10,100	111,000	3,100	107,900	3,000	110,900	4,000	0
South Field	338,900	500	339,400	34,000	376,400	300	373,100	3,000	373,100	6,500	0
Active Flyash Pile	74,900	0	74,900	7,500	85,400	0	82,400	3,000	82,400	0	0
Total	683,800	11,400	695,200	73,600	780,400	3,400	765,400	15,000	765,400	15,800	0

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

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TABLE E.1-6

ALTERNATIVE 2 - CONSOLIDATION AND CAPPING
FEDERAL OWNERSHIP (EXPANDED TRESPASSER, 10^{-5} RISK LEVEL)
CONSOLIDATION AND OFF-SITE DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Off-Site Disposal Volume (yd^3)	Consolidation Volume (yd^3)			Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation (yd^3)	Total Excavation (yd^3)		Excavation Volume to On-Site Disposal	Generated Waste Volume	Total Consolidation Volume		
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total								
Solid Waste Landfill	10,400	1,700	12,100	1,200	13,300	0	13,300	3,000	16,300	5300	0
Lime Sludge Ponds	1,600	0	1,600	200	1,800	0	1,800	3,000	4,800	100	0
Inactive Flyash Piles	76,600	9,200	85,800	8,600	94,400	0	94,400	3,000	97,400	4000	0
South Field	18,000	500	18,500	1,900	20,400	300	20,100	3,000	23,100	6500	0
Active Flyash Pile	65,000	0	65,000	6,500	71,500	0	71,500	3,000	74,500	0	0
Total	171,600	11,400	183,000	18,400	201,400	300	201,200	15,000	216,000	15900	0

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

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TABLE E.1-7

ALTERNATIVE 3 - EXCAVATION AND OFF-SITE DISPOSAL (ENVIROCARE) FEDERAL OWNERSHIP (EXPANDED TRESPASSER, 10^{-5} RISK LEVEL) REMEDIATION AND OFF-SITE DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Generated Waste Volume (yd^3)	Total Off-Site Disposal Volume (yd^3)	Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavation				
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total						
Solid Waste Landfill	19,500	1,700	21,200	2,100	23,300	3,000	26,300	5,300	7,000
Lime Sludge Ponds	16,800	0	16,800	1,700	18,500	3,000	21,500	0	7,100
Inactive Flyash Piles	76,700	9,200	85,900	8,600	94,500	3,000	97,500	4,000	6,900
South Field	35,900	500	36,400	3,600	40,000	3,000	43,000	6,500	11,000
Active Flyash Pile	65,000	0	65,000	6,500	71,500	3,000	74,500	0	700
Total	213,900	11,400	225,300	22,500	247,800	15,000	262,800	15,800	32,700

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

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TABLE E.1-8

ALTERNATIVE 6 - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION ABOVE WASTE ACCEPTANCE CRITERIA FEDERAL OWNERSHIP (EXPANDED TRESPASSER, 10^{-5} RISK LEVEL)

Subunit	Excavation Volumes (yd^3)					Off-Site Disposal Volume (yd^3)	On-Site Disposal Volume (yd^3)			Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavation		Excavation Volume to On-Site Disposal	Generated Waste Volume	Total On-Site Disposal Volume		
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total								
Solid Waste Landfill	19,500	1,700	21,200	3,000	24,200	0	24,200	3,000	27,200	5,300	0
Lime Sludge Ponds	16,800	0	16,800	1,700	18,500	0	18,500	3,000	21,500	0	0
Inactive Flyash Piles	76,700	9,200	85,900	8,600	94,500	3,100	91,400	3,000	94,400	4,000	0
South Field	35,900	500	36,400	3,600	40,000	,300	39,700	3,000	42,700	6,500	0
Active Flyash Pile	65,000	0	65,000	6,500	71,500	0	71,500	3,000	74,500	0	0
Total	213,900	11,400	225,300	23,400	248,700	3,400	245,300	15,000	260,300	15,800	0

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

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TABLE E.1-9

ALTERNATIVE 3 - EXCAVATION AND OFF-SITE DISPOSAL (ENVIROCARE) PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, 10^{-5} RISK LEVEL) REMEDIATION AND OFF-SITE DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Generated Waste Volume (yd^3)	Total Off-Site Disposal Volume (yd^3)	Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavation				
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total						
Solid Waste Landfill	78,800	1,700	80,500	8,000	88,500	3,000	91,500	5,300	7,000
Lime Sludge Ponds	36,300	0	36,300	3,600	39,900	3,000	42,900	0	7,100
Inactive Flyash Piles	91,200	9,200	100,400	10,000	110,400	3,000	113,400	4,000	6,900
South Field	186,400	500	186,900	19,000	205,900	3,000	208,900	6,500	11,000
Active Flyash Pile	74,900	0	74,900	7,500	82,400	3,000	85,400	0	500
Total	468,900	11,400	479,000	48,100	527,100	15,000	543,600	15,800	32,700

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

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TABLE E.1-10

ALTERNATIVE 6 - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION ABOVE WASTE ACCEPTANCE CRITERIA PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, 10^{-5} RISK LEVEL)

Subunit	Excavation Volumes (yd^3)					Off-Site Disposal Volume (yd^3)	On-Site Disposal Volume (yd^3)			Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavation		Excavation Volume to On-Site Disposal	Generated Waste Volume	Total On-Site Disposal Volume		
	PPE Level - D (< 125 pCi/g)	PPE Level - C (> 125 pCi/g)	Total								
Solid Waste Landfill	78,800	1,700	80,500	8,000	88,500	0	88,500	3,000	91,500	5,300	0
Lime Sludge Ponds	36,300	0	36,300	3,600	39,900	0	39,900	3,000	42,900	0	0
Inactive Flyash Piles	91,200	9,200	100,400	10,000	110,400	3,100	107,300	3,000	110,300	4,000	0
South Field	186,400	500	186,900	19,000	205,900	300	205,600	3,000	208,600	6,500	0
Active Flyash Pile	74,900	0	74,900	7,500	82,400	0	82,400	3,000	85,400	0	0
Total	468,900	11,400	479,000	48,100	527,100	3,400	523,700	15,000	538,700	15,800	0

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

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APPENDIX E.1.2
REMEDIATION VOLUME CALCULATIONS—
GENERAL CRITERIA AND METHODOLOGY

E.1.2 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS GENERAL CRITERIA AND METHODOLOGY

E.1.2.1 INTRODUCTION

This section defines the general criteria and provides an overview of the methodology used to produce the remediation and excavation volumes that are summarized in section E.1.1 and calculated in sections E.1.3 through E.1.10. The remediation volumes have been produced primarily by block model analysis with screening for the COCs that were not included in the model.

The critical receptors which drive the remediation volumes under Federal ownership and private ownership scenarios are the expanded trespasser and on-site resident farmer, respectively. Because of that, the receptor names are frequently used synonymously with the scenario names. Throughout Appendix E, the reader should simply equate the receptor and ownership scenario as follows:

- Expanded Trespasser = Federal Ownership
- On-Site Resident Farmer = Private Ownership

E.1.2.2 GENERAL CRITERIA

The following items represent general criteria used in evaluation of the COCs and calculation of remediation volumes:

- Primary risk receptors are the on-property resident farmer and expanded trespasser.
- Incremental lifetime cancer risk (ILCR) criteria are 10^{-5} and 10^{-6}.
- Modeling parameters are radium-228, thorium-228, and uranium-238.
- PRLs used for modeling and screening are those developed in Section 2.0 of the Feasibility Study.
- All flyash and lime sludge present within the subunits are considered solid waste; thus, the entire volume of those materials will be remediated.
- Material exceeding the on-site waste acceptance criteria (see Section E.2) will not be placed in the on-site disposal cell.
- Material to be disposed off site must not exceed the off-site waste acceptance criteria set forth in Section E.2.
- DOE 5400.5 was included as a screening parameter for applicable radium and thorium isotopic COCs.

E.1.2.3 ORDER OF CALCULATION

In determining remediation volumes, a specific order was used to provide consistency to the calculations and to assist in the development of Section 3. The order used to calculate remediation volumes is as follows:

- Volume based on block modeling
- Volume based on other COCs (not addressed directly in the block model)
- Any remaining flyash and lime sludge

In addition, volumes of material required to facilitate cap construction and to support the removal of contaminated material were calculated.

E.1.2.4 BLOCK MODEL ANALYSIS

A block model was used to determine a remediation volume for each subunit/alternative. The block model was based on the three radiological COCs most representative of contamination in the Operable Unit 2 subunits. These radiological COCs were radium-228, thorium-228, and uranium-238. Data based on sampling results from the Operable Unit 2 Remedial Investigation and corresponding to the three radiological COCs are contained in a three-dimensional array within the block model. The model was used to determine the volumes of material exceeding various radiological contaminant levels for each of the three modeled COCs. These radiological contaminant levels correspond to the governing PRLs applicable to each subunit/alternative.

E.1.2.5 SCREENING FOR OTHER COCs

In addition to the modeled COCs, other COCs may require additional remediation. Tables E.1-11 through E.1-30 (in Sections E.1.3 through E.1.7) were developed so that the concentration term for each COC (in various layers) could be compared with the corresponding PRL. Wherever a concentration term for other COCs exceeded its corresponding PRL, the concentration term was highlighted (bold with a shaded background on the corresponding table) to signify that further analysis was necessary. Other concentration terms (not highlighted) were eliminated from further consideration. The concentration terms for the modeled COCs were not highlighted when they were found to exceed PRLs, since these COCs were accounted for in the block model.

Many of the highlighted concentration terms were immediately screened out because entire subunit layers were included in the modeled volume. For the remaining COCs corresponding to the

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highlighted concentration terms, further screening was performed to determine if individual sample points (where the COCs exceeded the concentration terms) were included within the modeled volume.

For each sample location with a COC level above an established PRL, the modeled COC levels at that location were assessed. Whenever a sample location was determined to have a contaminant level above one of the modeled COC's PRL (signifying that sample location was already included within the modeled volume), all other COCs at that location were eliminated from further consideration. To be concise, these comparisons are not included in sections E.1.3 through E.1.7, however, information necessary to make these comparisons is available in Appendix A.

For sample locations where other COCs were not screened out by the methods listed above, each sample point's coordinates were compared to the block model volume. COC locations corresponding with the modeled volume were excluded. The remaining COC locations were assessed in Sections E.1.3 through E.1.7 and additional volumes added to the modeled excavation.

E.1.2.6 TOTAL URANIUM

Total uranium was not screened in the same manner as the other COCs. Based on the results of the Remedial Investigation, it was assumed that uranium contamination in the Operable Unit 2 subunits had an isotopic arrangement similar to that of natural (non-enriched/non-depleted) uranium (99.27 percent uranium-238, 0.72 percent uranium-235, and 0.0055 percent uranium-234). Therefore, a correlation could be used between total uranium concentrations and uranium-238 radiological contaminant levels. Based on this assumption, an equation (balanced for the natural uranium isotopic relationship) was used to convert total uranium concentrations in milligrams per kilogram (mg/kg) to equivalent uranium-238 radiological contaminant levels in pico curies per gram (pCi/g). Uranium-238 radiological contamination levels converted from total uranium could then be used directly in the block model.

Based on data obtained from the Remedial Investigation, the highest uranium-238 radiological contamination level for each sample location from either uranium-238 converted from total-uranium or uranium-238 derived directly from analysis was used to develop the block model.

Also, PRLs based on total-uranium (identified in Section 2) were converted to equivalent uranium-238 radiological contamination levels for use in the remedial volume calculations. These total-uranium PRLs include:

- surface soil PRLs based on groundwater 20 percent of the Hazard Index (0.2 HI)
- surface soil PRLs based on groundwater ARAR
- surface soil PRLs based on perched groundwater 20 percent of the Hazard Index (0.2 HI)
- surface soil PRLs based on perched groundwater ARAR.

E.1.2.7 BASE VOLUME CALCULATIONS

A separate calculation subsection is provided for each subunit, receptor, and incremental lifetime cancer risk (ILCR) criteria. Under each subsection, the modeling parameters are summarized and the modeled volumes totaled. Justification is then made for additional remediation as a result of other COCs. Any additional remediation volumes are combined with the modeled value and totaled. The total represents a base remediation volume.

E.1.2.8 SPECIFIC VOLUME CALCULATIONS FOR EACH REMEDIAL ALTERNATIVE

Following the base calculation, the remedial alternatives are summarized, and any adjustments to the general case that apply to a particular alternative are made. The feasibility study considered the following eight remediation alternatives:

- Alternative 1—No action
- Alternative 2—Consolidation and capping
- Alternative 3—Excavation and off-site disposal
- Alternative 4—Excavation and off-site disposal with treatment of fraction exceeding waste acceptance criteria
- Alternative 5—Excavation and on-site disposal
- Alternative 6—Excavation and on-site disposal with off-site disposal of fraction exceeding waste acceptance criteria
- Alternative 7—Excavation and on-site disposal with treatment of fraction exceeding waste acceptance criteria
- Alternative 8—Excavation and treatment with on-site disposal

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Of these alternatives, Alternative 1 required no calculations to be performed. For the expanded trespasser and ILCR level of 10^{-6}, remediation volumes were calculated for Alternatives 2 through 8. For the expanded trespasser and ILCR level of 10^{-5}, remediation volumes were calculated for Alternatives 2, 3, and 6. For the resident farmer and both ILCR levels of 10^{-6} and 10^{-5}, remediation volumes were calculated for Alternatives 3 and 6.

E.1.2.9 TOTAL EXCAVATION VOLUME

The remediation volumes summarized in Tables E.1-1 through E.1-10 were adjusted to account for construction considerations such as safe side slopes, which require that additional materials be excavated within the five Operable Unit 2 subunits. The total excavation includes remediation volume plus the excavation of the additional materials.

Estimates of additional excavation required to enable removal of the remediation volume at each subunit is based on preliminary excavation limits. The following percentages of the remediation volume were developed to estimate additional excavation:

- Solid Waste Landfill—14 percent
- Lime Sludge Ponds—10 percent
- Inactive Flyash Pile—10 percent
- South Field—10 percent
- Active Flyash Pile—10 percent

Additionally, a waste volume is included for contaminated materials generated during remedial action. This material includes generated waste at the decontamination facilities; sediments deposited in the sedimentation tanks from contaminated construction runoff and construction water; and contamination removed during site restoration activities at the decontamination facilities, staging and storage areas, and waste haul roads. Estimated generated waste volume varies between 4,800 yd^3 and 26,800 yd^3. For cost estimating purposes, total volume of generated waste is assumed to be 15,000 yd^3 (3000 yd^3 per subunit).

E.1.2.10 URANIUM-238 VOLUME TABLES

The tables included in Section E.1.8 indicate the volume of material above various uranium-238 concentrations. The values shown in these tables were determined through the use of the block model based only on uranium-238. Since these tables were not based on the three modeling isotopes (uranium-238, radium-228, and thorium-228), they have not been used to determine remediation

volumes; however, these tables can be used to approximate specific volumes based only on the uranium-238 isotope, namely:

- On-site disposal cell waste acceptance criteria volumes
- Remediation volumes requiring different levels of personal protective equipment
- Volumes available for construction of the on-site disposal cell berm

Appendix E.1.9 summarizes these volumes for each Operable Unit 2 subunit.

E.1.2.11 FIRING RANGE CALCULATIONS

Appendix E.1.10 provides the calculations for determining the quantity of lead in the South Field and the volume of material considered to be contaminated with lead at concentrations above hazardous waste requirements.

APPENDIX E.1.3
REMEDIATION VOLUME CALCULATIONS—
SOLID WASTE LANDFILL

E.1.3.1 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS SOLID WASTE LANDFILL, FEDERAL OWNERSHIP (EXPANDED TRESPASSER 10^{-6} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

For all layers

Uranium-238 ..... 12.9 pCi/g (soil PRL based on perched groundwater ARAR)

For material within and above source/impacted till

Radium-228 ..... 2.0 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 1.8 pCi/g (surface soil exposure pathways PRL)

the following volumes were modeled for the Solid Waste Landfill:

FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	TOTAL
15,046 yd^3	4,282 yd^3	1,736 yd^3	0 yd^3	21,064 yd^3

VOLUME FROM OTHER COCs

Other COCs have been detected at levels above their respective PRLs in the fill. Since total fill volume is 15,220 yd^3 and modeled volume is 15,046 yd^3, only 174 yd^3 of fill is not modeled. Including this 174 yd^3 will ensure all COCs present above established PRLs in the fill are removed.

TOTAL VOLUME

MODELED	OTHER COCs	TOTAL
21,064 yd^3	174 yd^3	21,238 yd^3

ALTERNATIVE 1

Under this alternative, no material will be removed.

ALTERNATIVE 2

For Alternative 2, a separate analysis was performed modeling only materials outside the area to be capped. The same PRLs as listed above were used. The results are as follows:

FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	TOTAL
1,389 yd^3	579 yd^3	0 yd^3	0 yd^3	1,968 yd^3

There are no other COCs present at levels above their respective PRLs at locations beyond the cap limit; therefore, no additional volume results from other COCs. However, to facilitate construction of the cap, a trench will have to be excavated between the Solid Waste Landfill and the adjacent railroad track. A total of 10,100 yd^3 of trench material will have to be excavated and placed under the cap. Thus, the total volume for Alternative 2 will be 1,968 yd^3 + 10,100 yd^3 = 12,100 yd^3 (rounded to nearest 100 yd^3).

ALTERNATIVES 3, 4, 5, 6, 7, and 8

No volume adjustments need to be made for Alternatives 3, 4, 5, 6, 7, and 8. Thus, the remedial volume for these alternatives is 21,200 yd^3 (rounded to nearest 100 yd^3).

TABLE E.1-11 SOLID WASTE LANDFILL
FEDERAL OWNERSHIP (EXPANDED TRESPASSER, RISK BASE = 10^{-6} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS			
				FILL	IMPACTED TILL	OTHER TILL	GMA SOIL
Radium-226	pCi/g	2.0E+03	1.8	2.3	1.6	1.0	--
Radium-228[c]	pCi/g	1.8E+03	2.0	3.2	1.5	0.9	--
Thorium-228[c]	pCi/g	--[d]	1.8	2.0	2.0	1.1	0.7
Thorium-232	pCi/g	6.8E+02	1.5	1.7	1.2	0.9	--
Uranium-234	pCi/g	3.7E+04	62.9	54.2	30.6	1.3	--
Uranium-235/236	pCi/g	7.7E+02[e]	63.1	3.8	2.5	0.1	--
Uranium-238[c]	pCi/g	2.8E+04[f]	12.9	98.4	47.7	3.6	--
Total Uranium[c]	mg/kg	--[g]	38.6	272.3	146.0	7.7	--

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

[a]Criteria for off-site disposal at Envirocare
[b]Represents governing PRL for each constituent (refer to Section 2)
[c]Modeled constituent (except total uranium which, correlates directly with modeling of uranium-238)
[d]Thorium-228 is a daughter of thorium 232 (assume at same concentration in equilibrium).
[e]Off-site waste acceptance criteria for uranium-235. Uranium-236 acceptance criteria is 3.6E+04 pCi/g.
[f]For on-site disposal, activity for uranium-238 is limited to 300 pCi/g.
[g]Acceptance criteria for uranium-natural is 1.8E+4 pCi/g and for uranium-depleted is 1.1E+05 pCi/g.

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E.1.3.2 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS SOLID WASTE LANDFILL, EXPANDED TRESPASSER (10^{-5} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

For all layers

Uranium-238 ..... 12.9 pCi/g (soil PRL based on groundwater ARAR)

For material within and above source/impacted till

Radium-228 ..... 8.9 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 5.4 pCi/g (surface soil exposure pathways PRL)

the following volumes were modeled for the Solid Waste Landfill:

FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	TOTAL
15,046 yd^3	4,282 yd^3	1,736 yd^3	0 yd^3	21,064 yd^3

VOLUME FROM OTHER COCs

Other COCs have not been detected above their respective PRLs in any layer of the solid waste landfill; however, since only 174 yd^3 of material from the fill layer is excluded from the model, this volume will be added to the modeled volume.

TOTAL VOLUME

MODELED	OTHER COCs	TOTAL
21,064 yd^3	174 yd^3	21,238 yd^3

ALTERNATIVE 1

Under this alternative, no material will be removed.

ALTERNATIVE 2

For Alternative 2, a separate analysis was performed modeling only materials outside the area to be capped. The same PRLs as listed above were used. The results are as follows:

FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	TOTAL
1,389 yd^3	579 yd^3	0 yd^3	0 yd^3	1,968 yd^3

There are no other COCs present at levels above their respective PRLs at locations beyond the cap limit; therefore, no additional volume results from other COCs. However, to facilitate construction of the cap, a trench will have to be excavated between the Solid Waste Landfill and the adjacent railroad track. A total of 10,100 yd^3 of material will have to be excavated and placed under the cap. Thus, the total volume for Alternative 2 will be 1,968 yd^3 + 10,100 yd^3 = 12,100 yd^3 (rounded to nearest 100 yd^3).

ALTERNATIVES 3 and 6

There is no variance between these alternatives. Thus, the remedial volume for these alternatives is 21,200 yd^3 (rounded to nearest 100 yd^3).

ALTERNATIVES 4, 5, 7, and 8

These alternatives do not apply to the expanded trespasser risk base 10^{-5}.

TABLE E.1-12 SOLID WASTE LANDFILL
FEDERAL OWNERSHIP (EXPANDED TRESPASSER, RISK BASE = 10^{-5} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS			
				FILL	IMPACTED TILL	OTHER TILL	GMA SOIL
Radium-226	pCi/g	2.0E+03	5.1	2.3	1.6	1.0	--
Radium-228[c]	pCi/g	1.8E+03	8.9	3.2	1.5	0.9	--
Thorium-228[c]	pCi/g	--[d]	5.4	2.0	2.0	1.1	0.7
Thorium-232	pCi/g	6.8E+02	3.9	1.7	1.2	0.9	--
Uranium-234	pCi/g	3.7E+04	620	54.2	30.6	1.3	--
Uranium-235/236	pCi/g	7.7E+02[e]	619	3.8	2.5	0.1	--
Uranium-238[c]	pCi/g	2.8E+04[f]	12.9	98.4	47.7	3.6	--
Total Uranium[c]	mg/kg	--[g]	38.6	272.3	146.0	7.7	--

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

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E.1.3.3 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS SOLID WASTE LANDFILL, PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER 10^{-6} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

For all layers within and above the perched groundwater

Uranium-238 ..... 1.12 pCi/g (soil PRL based on perched groundwater ARAR/0.2 HI)

For all layers below the perched groundwater

Uranium-238 ..... 1.47 pCi/g (surface soil exposure pathways PRL)

For all layers

Radium-228 ..... 1.26 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 1.43 pCi/g (surface soil exposure pathways PRL)

the following remedial volumes were modeled for the Solid Waste Landfill:

FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	TOTAL
15,220 yd^3	4,282 yd^3	58,160 yd^3	0 yd^3	77,662 yd^3

VOLUME FROM OTHER COCs

Other COCs have been detected at levels above their respective PRLs in the fill, impacted till, and other till; however, the entire fill and impacted till layers are included in the modeled volume. Thus, the only layer that may require further remediation is the other till. Of the COCs present above established PRLs, only neptunium-237 and beryllium were identified in material outside the modeled excavation. As a result of widespread contamination from neptunium-237 and beryllium, all material within/above the sand and gravel will be removed. From the block model it was determined that there is 54,456 yd^3 of material above/within the sand and gravel in the till layer, and that 33,681 yd^3 of that material was included in the modeled volume. Thus, an additional excavation of 54,456 yd^3 - 33,681 yd^3 = 20,775 yd^3 will be required from the till layer.

TOTAL VOLUME

MODELED	OTHER COCs	TOTAL
77,662 yd^3	20,775 yd^3	98,437 yd^3

ALTERNATIVE 1

Under this alternative, no material will be removed.

ALTERNATIVES 2, 4, 5, 7, and 8

Alternatives 2, 4, 5, 7, and 8 do not apply to the on-property resident farmer scenario.

ALTERNATIVE 3 and 6

No material was detected that exceeds on-site or off-site disposal facility waste acceptance criteria; therefore, no volume adjustments are required. Thus, the remedial volume for alternatives 3 and 6 is 98,400 yd^3 (rounded to nearest 100 yd^3).

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TABLE E.1-13 SOLID WASTE LANDFILL
PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, RISK BASE = 10^{-6} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS			
				FILL	IMPACTED TILL	OTHER TILL	GMA SOIL
Neptunium-237	pCi/g	2.0E+03	0.043	1.7	--	0.4	--
Plutonium-238	pCi/g	1.0E+04	0.40	0.4	--	0.2	--
Radium-226	pCi/g	2.0E+03	1.43	2.3	1.6	1.0	--
Radium-228 [c]	pCi/g	1.8E+03	1.26	3.2	1.5	0.9	--
Strontium-90	pCi/g	2.0E+04	0.016	1.99	1.42	0.73	--
Technetium-99	pCi/g	1.0E+05	0.00189	0.8	--	--	--
Thorium-228 [c]	pCi/g	-- [d]	1.43	2.0	2.0	1.1	0.7
Thorium-230	pCi/g	1.5E+04	2.74	15.4	3.8	3.1	0.7
Thorium-232	pCi/g	6.8E+02	1.36	1.7	1.2	0.9	--
Uranium-234	pCi/g	3.7E+04	1.12	54.2	30.6	1.3	--
Uranium-235/236	pCi/g	7.7E+02 [e]	0.23	3.8	2.5	0.1	--
Uranium-238 [c]	pCi/g	2.8E+04 [f]	1.12	98.4	47.7	3.6	--
Uranium-238 [c] (below perched groundwater)	pCi/g	2.8E+04 [f]	1.47	98.4	47.7	3.6	--
Total Uranium [c]	mg/kg	-- [g]	3.4	272.3	146	7.7	--
Antimony	mg/kg	--	1.33	16.4	11.9	22.6	--
Arsenic	mg/kg	1.0E+02	8.2	7.1	15.4	7.7	--

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TABLE E.1-13 SOLID WASTE LANDFILL
PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, RISK BASE = 10^{-6} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS			
				FILL	IMPACTED TILL	OTHER TILL	GMA SOIL
Beryllium	mg/kg	--	0.6	1.1	1.0	1.0	--
Benzo(a)anthracene	mg/kg	--	0.023	18	--	0.29	--
Benzo(a)pyrene	mg/kg	--	0.0015	13	--	0.29	--
Benzo(b)fluoranthene	mg/kg	--	0.014	15	--	0.26	--
Carbazole	mg/kg	--	0.00643	4.2	--	0.21	--
Dibenzo(a,h)anthracene	mg/kg	--	0.00046	3	--	0.11	--
Indeno(1,2,3-cd)pyrene	mg/kg	--	0.0073	6.5	--	0.21	--

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

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E.1.3.4 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS SOLID WASTE LANDFILL, FEDERAL OWNERSHIP (ON-PROPERTY RESIDENT FARMER 10^{-5} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria:

For all layers within and above the perched groundwater

Uranium-238 ..... 1.12 pCi/g (soil PRL based on perched groundwater ARAR/02 HI)

For all layers below the perched groundwater

Uranium-238 ..... 3.72 pCi/g (surface soil exposure pathways PRL)

For all layers

Radium-228 ..... 1.33 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 1.44 pCi/g (surface soil exposure pathways PRL)

the following volumes were modeled for the Solid Waste Landfill:

FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	TOTAL
15,220 yd^3	4,282 yd^3	51,042 yd^3	0 yd^3	70,544 yd^3

VOLUME FROM OTHER COCs

Other COCs have been detected at levels above their respective PRLs in the fill, impacted till, and other till; however, the entire fill and impacted till layers are included in the modeled volume. Thus, the only layer that may require further remediation is the other till. Of the COCs detected in the other till, only strontium-90 and beryllium do not correlate with the modeled excavation. It is assumed that an additional excavation of 10,000 yd^3 will be sufficient to remove these COCs located outside the modeled volume.

TOTAL VOLUME

MODELED	OTHER COCs	TOTAL
70,544 yd^3	10,000 yd^3	80,544 yd^3

ALTERNATIVE 1

Under this alternative, no material will be removed.

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ALTERNATIVES 2, 4, 5, 7, and 8

Alternatives 2, 4, 5, 7, and 8 do not apply to the on-property resident farmer scenario.

ALTERNATIVES 3 and 6

No material was detected that exceeds on-site or off-site disposal facility waste acceptance criteria; therefore, no volume adjustments are required. Thus, the remedial volume for alternatives 3 and 6 is 80,500 yd^3 (rounded to nearest 100 yd^3).

TABLE E.1-14 SOLID WASTE LANDFILL
PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, RISK BASE = 10^{-5} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS			
				FILL	IMPACTED TILL	OTHER TILL	GMA SOIL
Neptunium-237	pCi/g	2.0E+03	0.43	1.7	--	0.4	--
Plutonium-238	pCi/g	1.0E+04	4.0	0.4	--	0.2	--
Radium-226	pCi/g	2.0E+03	1.46	2.3	1.6	1.0	--
Radium-228 [c]	pCi/g	1.8E+03	1.33	3.2	1.5	0.9	--
Strontium-90	pCi/g	2.0E+04	0.16	1.99	1.42	0.73	--
Technetium-99	pCi/g	1.0E+05	0.0189	0.8	--	--	--
Thorium-228 [c]	pCi/g	-- [d]	1.44	2.0	2.0	1.1	0.7
Thorium-230	pCi/g	1.5E+04	6.97	15.4	3.8	3.1	0.7
Thorium-232	pCi/g	6.8E+02	1.39	1.7	1.2	0.9	--
Uranium-234	pCi/g	3.7E+04	1.86	54.2	30.6	1.3	--
Uranium-235/236	pCi/g	7.7E+02 [e]	0.97	3.8	2.5	0.1	--
Uranium-238 [c]	pCi/g	2.8E+04 [f]	1.12	98.4	47.7	3.6	--
Uranium-238 [c] (below perched groundwater)	pCi/g	2.8E+04 [f]	3.72	98.4	47.7	3.6	--
Total Uranium [c]	mg/kg	-- [g]	3.4	272.3	146	7.7	--
Antimony	mg/kg	--	1.33	16.4	11.9	22.6	--
Arsenic	mg/kg	1.0E+02	8.2	7.1	15.4	7.7	--
Beryllium	mg/kg	--	0.6	1.1	1.0	1.0	--

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TABLE E.1-14 SOLID WASTE LANDFILL
PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, RISK BASE = 10^{-5} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS			
				FILL	IMPACTED TILL	OTHER TILL	GMA SOIL
Benzo(a)anthracene	mg/kg	--	0.23	18	--	0.29	--
Benzo(a)pyrene	mg/kg	--	0.015	13	--	0.29	--
Benzo(b)fluoranthene	mg/kg	--	0.14	15	--	0.26	--
Carbazole	mg/kg	--	0.0643	4.2	--	0.21	--
Dibenzo(a,h)anthracene	mg/kg	--	0.0046	3	--	0.11	--
Indeno(1,2,3-cd)pyrene	mg/kg	--	0.073	6.5	--	0.21	--

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

APPENDIX E.1.4
REMEDIATION VOLUME CALCULATIONS—
LIME SLUDGE PONDS

E.1.4.1 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS LIME SLUDGE PONDS, FEDERAL OWNERSHIP (EXPANDED TRESPASSER, 10^{-6} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

For all layers

Uranium-238 ..... 38.3 pCi/g (soil PRL based on groundwater 0.2 HI)

For material above till

Radium-228 ..... 2.0 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 1.8 pCi/g (surface soil exposure pathways PRL)

the volume modeled for the Lime Sludge Ponds is 0 yd^3.

VOLUME FROM OTHER COCs

One sample within the berm and two surface sample locations on the road adjacent to the Lime Sludge Ponds have radium-226 concentrations above the PRL for that constituent. To remove material contaminated with radium-226 will require excavation of 300 yd^3.

LIME SLUDGE VOLUME

All lime sludge will be removed. Total lime sludge volume is 16,493 yd^3.

TOTAL VOLUME

MODELED	OTHER COCs	LIME SLUDGE	TOTAL
0 yd^3	300 yd^3	16,493 yd^3	16,793 yd^3

ALTERNATIVE 1

Under this alternative, no material will be removed.

ALTERNATIVE 2

An area of 13,500 sq ft (the area outside the capped area but inside the battery limits) that includes berm material and material along the road will be leveled and moved to the center of the Lime Sludge Ponds to facilitate construction of the cap. An average depth of 3 ft will be removed. The volume to be excavated will be 13,500 sq ft x 3 ft x 1 $yd^3/27\ ft^3$ = 1,500 yd^3.

Additionally, the K-65 trench will be excavated and the material placed under the cap. It is estimated that 100 yd^3 of material from the K-65 trench will require removal.

Thus, the total volume to be excavated for Alternative 2 is 1,500 yd^3 + 100 yd^3 = 1,600 yd^3.

ALTERNATIVES 3, 4, 5, 6, 7, and 8

No volume adjustments need to be made for Alternatives 3, 4, 5, 6, 7 and 8. Thus, the remedial volume for these alternatives is 16,800 yd^3 (rounded to nearest 100 yd^3).

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TABLE E.1-15 LIME SLUDGE PONDS
FEDERAL OWNERSHIP (EXPANDED TRESPASSER, RISK BASE = 10^{-6} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS		
				BERM	TILL	GMA SOIL
Radium-226	pCi/g	2.0E+03	1.8	3.15	1.19	0.40
Radium-228 [c]	pCi/g	1.8E+03	2.0	1.38	1.11	--
Thorium-228 [c]	pCi/g	-- [d]	1.8	1.17	0.97	1.30
Thorium-232	pCi/g	6.8E+02	1.5	1.06	1.05	--
Uranium-234	pCi/g	3.7E+04	196	13.40	1.10	--
Uranium-235/236	pCi/g	7.7E+02 [e]	195	0.77	0.15	--
Uranium-238 [c]	pCi/g	2.8E+04 [f]	45.3	8.45	1.14	--
Total Uranium [c]	mg/kg	-- [g]	136	29.36	14.30	--

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

E.1.4.2 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS LIME SLUDGE PONDS, FEDERAL OWNERSHIP (EXPANDED TRESPASSER 10^{-5} ILCR)

MODELED VOLUME; RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria:

For all layers

Uranium-238 ..... 38.3 pCi/g (soil PRL based on groundwater 0.2 HI)

For material above till:

Radium-228 ..... 8.9 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 5.4 pCi/g (surface soil exposure pathways PRL)

the volume modeled for the Lime Sludge Ponds is 0 yd^3.

VOLUME FROM OTHER CONTAMINANTS

Two surface sample locations on the road adjacent to the Lime Sludge Ponds have radium-226 concentrations above the PRL for that constituent. To remove material contaminated with radium-226 will require an excavation of 300 yd^3.

LIME SLUDGE VOLUME

All lime sludge will be removed. Total sludge volume is 16,493 yd^3.

TOTAL VOLUME

MODELED	OTHER COCs	LIME SLUDGE	TOTAL
0 yd^3	300 yd^3	16,493 yd^3	16,793 yd^3

ALTERNATIVE 1

Under this alternative, no material will be removed.

ALTERNATIVE 2

An area of 13,500 sq ft (the area outside the capped area but inside the battery limit) that includes berm material and material along the road will be leveled and moved to the center of the Lime Sludge Ponds to facilitate construction of the cap. An average depth of 3 ft will be removed. The volume to be excavated will be 13,500 sq ft x 3 ft x 1 $yd^3/27\ ft^3$ = 1,500 yd^3.

Additionally, the K-65 trench will be excavated and the material placed under the cap. It is estimated that 100 yd^3 of material from the K-65 trench will require removal.

Thus, the total volume to be excavated for Alternative 2 is 1,500 yd^3 + 100 yd^3 = 1,600 yd^3.

ALTERNATIVES 3, and 6

There is no variance between these alternatives. Thus, the remedial volume for these alternatives is 16,800 yd^3 (rounded to nearest 100 yd^3).

ALTERNATIVES 4, 5, 7, and 8

These alternatives do not apply to the expanded trespasser risk base 10^{-5}.

TABLE E.1-16 LIME SLUDGE PONDS
FEDERAL OWNERSHIP (EXPANDED TRESPASSER, RISK BASE = 10^{-5} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS		
				BERM	TILL	GMA SOIL
Radium-226	pCi/g	2.0E+03	5.1	3.15	1.19	0.40
Radium-228 [c]	pCi/g	1.8E+03	8.9	1.38	1.11	--
Thorium-228 [c]	pCi/g	-- [d]	5.4	1.17	0.97	1.30
Thorium-232	pCi/g	6.8E+02	3.9	1.06	1.05	--
Uranium-234	pCi/g	3.7E+04	1951	13.40	1.10	--
Uranium-235/236	pCi/g	7.7E+02 [e]	1950	0.77	0.15	--
Uranium-238 [c]	pCi/g	2.8E+04 [f]	45.3	8.45	1.14	--
Total Uranium [c]	mg/kg	-- [g]	136	29.36	14.30	--

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

E.1.4.3 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS LIME SLUDGE PONDS, PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER 10^{-6} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

For all layers within and above the perched groundwater

Uranium-238 ..... 1.12 pCi/g (soil PRL based on perched groundwater 0.2 HI)

For all layers below the perched groundwater

Uranium-238 ..... 1.47 pCi/g (surface soil exposure pathways PRL)

For all layers

Radium-228 ..... 1.26 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 1.43 pCi/g (surface soil exposure pathways PRL)

the following volumes were modeled for the Lime Sludge Ponds:

SLUDGE	BERM	TILL	GMA SOIL	SEDIMENT	TOTAL
15,451 yd^3	5,556 yd^3	15,056 yd^3	0 yd^3	0 yd^3	36,053 yd^3

VOLUME FROM OTHER COCs

Other COCs have been detected at levels above their respective PRLs in the berm and till; however, the entire berm is included in the modeled volume. Thus, the till is the only layer that may require further remediation. Neptunium-237, strontium-90, and technetium-99 were present above established PRLs in various samples within the till layer above/within the sand and gravel. To ensure removal of all COCs, all material above/within the sand and gravel will be excavated. From the block model it was determined that there is 59,548 yd^3 of material above/within the sand and gravel in the till layer. Thus, an additional excavation of 59,548 yd^3 - 15,046 yd^3 = 44,502 yd^3 will be required from the till layer.

OTHER LIME SLUDGE VOLUME

All lime sludge will be removed. Volume not modeled is 16,493 yd^3 - 15,451 yd^3 = 1,042 yd^3.

TOTAL VOLUME

MODELED	OTHER COCs	OTHER LIME SLUDGE	TOTAL
36,053 yd^3	44,502 yd^3	1,042 yd^3	81,597 yd^3

ALTERNATIVE 1

Under this alternative, no material will be removed.

ALTERNATIVES 2, 4, 5, 7, and 8

Alternatives 2, 4, 5, 7, and 8 do not apply to the on-property resident farmer option.

ALTERNATIVES 3 and 6

No material was detected that exceeds on-site disposal or off-site acceptance criteria; therefore, no volume adjustments are required. Thus, remedial volume for Alternatives 3 and 6 is 81,600 yd^3 (rounded to nearest 100 yd^3).

TABLE E.1-17 LIME SLUDGE PONDS
PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, RISK BASE = 10^{-6} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS		
				BERM	TILL	GMA SOIL
Cesium-137	pCi/g	5.6E+02	0.72	0.18	--	--
Neptunium-237	pCi/g	2.0E+03	0.0051	0.31	0.13	--
Radium-226	pCi/g	2.0E+03	1.43	3.15	1.19	0.40
Radium-228 [c]	pCi/g	1.8E+02	1.26	1.38	1.11	--
Strontium-90	pCi/g	2.0E+04	0.0056	0.96	0.54	--
Technetium-99	pCi/g	1.0E+05	0.00189	1.05	0.45	--
Thorium-228 [c]	pCi/g	-- [d]	1.43	1.17	0.97	1.30
Thorium-230	pCi/g	1.5E+04	2.74	12.25	2.49	--
Thorium-232	pCi/g	6.8E+02	1.36	1.06	1.05	--
Uranium-234	pCi/g	3.7E+04	1.26	13.40	1.10	--
Uranium-235/236	pCi/g	7.7E+02 [e]	0.24	0.77	0.15	--
Uranium-238 [c]	pCi/g	2.8E+04 [f]	1.12	8.45	1.14	--
Uranium-238 [c] (below perched groundwater)	pCi/g	2.8E+04 [f]	1.47	8.45	1.14	--
Total Uranium [c]	mg/kg	-- [g]	3.4	29.36	14.30	--

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

E.1.4.4 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS LIME SLUDGE PONDS, PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER (10^{-5} ILCR)

MODELED VOLUME; RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria:

For all layers within and above the perched groundwater

Uranium-238 ..... 1.12 pCi/g (soil PRL based on perched groundwater ARAR)

For all layers below the perched groundwater

Uranium-238 ..... 3.72 pCi/g (surface soil exposure pathways PRL)

For all layers

Radium-228 ..... 1.33 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 1.44 pCi/g (surface soil exposure pathways PRL)

the following volumes were modeled for the Lime Sludge Ponds:

SLUDGE	BERM	TILL	GMA SOIL	SEDIMENT	TOTAL
15,451 yd^3	5,556 yd^3	13,484 yd^3	0 yd^3	0 yd^3	34,491 yd^3

VOLUME FROM OTHER COCs

Other COCs were detected in the berm and till at levels above their respective PRLs; however, the entire berm is included in the modeled volume. Thus, the till is the only layer that may require further remediation. Of the COCs detected in the till, only one sample location for neptunium-237 did not correlate with the modeled excavation. This sample location is 17.5 ft below the surface with no material above it removed. Assume 800 yd^3 will be required to remediate neptunium-237 contamination.

LIME SLUDGE VOLUME

All lime sludge will be removed. Lime sludge not modeled is 16,493 yd^3 - 15,451 yd^3 = 1,042 yd^3.

TOTAL VOLUME

MODELED	OTHER COCs	LIME SLUDGE	TOTAL
34,491 yd^3	800 yd^3	1,042 yd^3	36,333 yd^3

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ALTERNATIVE 1

Under this alternative, no material will be removed.

ALTERNATIVES 2, 4, 5, 7, and 8

Alternatives 2, 4, 5, 7, and 8 do not apply to the on-property resident farmer scenario.

ALTERNATIVES 3 and 6

No material was detected that exceeds on-site or off-site disposal facility waste acceptance criteria; therefore, no volume adjustments are required. Thus, the remedial volume for Alternatives 3 and 6 is 36,300 yd^3.

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TABLE E.1-18 LIME SLUDGE PONDS
PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, RISK BASE = 10^{-5} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS		
				BERM	TILL	GMA SOIL
Cesium-137	pCi/g	5.6E+02	0.89	0.18	--	--
Neptunium-237	pCi/g	2.0E+03	0.051	0.31	0.13	--
Radium-226	pCi/g	2.0E+03	1.46	3.15	1.19	0.40
Radium-228 [c]	pCi/g	1.8E+02	1.33	1.38	1.11	--
Strontium-90	pCi/g	2.0E+04	0.056	0.96	0.54	--
Technetium-99	pCi/g	1.0E+05	0.0189	1.05	0.45	--
Thorium-228 [c]	pCi/g	-- [d]	1.44	1.17	0.97	1.30
Thorium-230	pCi/g	1.5E+04	6.97	12.25	2.49	--
Thorium-232	pCi/g	6.8E+02	1.39	1.06	1.05	--
Uranium-234	pCi/g	3.7E+04	3.24	13.40	1.10	--
Uranium-235/236	pCi/g	7.7E+02 [e]	1.05	0.77	0.15	--
Uranium-238 [c]	pCi/g	2.8E+04 [f]	1.12	8.45	1.14	--
Uranium-238 [c] (below perched groundwater)	pCi/g	2.8E+04 [f]	3.72	8.45	1.14	--
Total Uranium [c]	mg/kg	-- [g]	3.4	29.36	14.30	--

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

APPENDIX E.1.5
REMEDIATION VOLUME CALCULATIONS—
INACTIVE FLYASH PILE

E.1.5.1 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS INACTIVE FLYASH PILE, FEDERAL OWNERSHIP (EXPANDED TRESPASSER, 10^{-6} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

Over the till (greater than 18 ft of till)

For material within and above the interbedded sand layer

Uranium-238 ..... 3.2 pCi/g (cross media modified groundwater PRL)

For material below the interbedded sand layer

Uranium-238 ..... 71 pCi/g (cross media modified groundwater PRL)

Over the GMA (less than 18 ft of till)

Uranium-238 ..... 6.12 pCi/g (cross media modified groundwater PRL)

For all material (over entire subunit) within and above the fill/impacted till

Radium-228 ..... 2.0 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 1.8 pCi/g (surface soil exposure pathways PRL)

the following volumes were modeled for the Inactive Flyash Pile:

COVER	FLYASH	FILL/DEBRIS	IMPACTED TILL	OTHER TILL	GMA SOIL	TOTAL
1,042 yd^3	43,229 yd^3	45,891 yd^3	3,472 yd^3	0 yd^3	0 yd^3	93,634 yd^3

VOLUME FROM OTHER COCs

Other COCs have been detected at levels above their respective PRLs in the fill/debris and other till. All locations where these COCs were detected correspond to areas modeled for removal; therefore, no additional excavation is necessary.

OTHER FLYASH

All flyash will be removed. Volume of flyash not modeled is 43,634 yd^3 - 43,229 yd^3 = 405 yd^3.

TOTAL VOLUME

MODELED	OTHER COCs	OTHER FLYASH	TOTAL
93,634 yd^3	0 yd^3	405 yd^3	94,039 yd^3

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ALTERNATIVE 1

Under this alternative, no material will be removed.

ALTERNATIVE 2

For Alternative 2, a separate model analysis was performed for material outside the area to be capped. The same PRLs as listed above were used. Modeling results were no different from previous results. Thus, total volume for Alternative 2 is 94,000 yd^3 (rounded to nearest 100 yd^3).

ALTERNATIVES 3, 4, 5, and 8

No volume adjustments need to be made for Alternatives 3, 4, 5, and 8. Thus, the remedial volume for these alternatives is 94,000 yd^3 (rounded to nearest 100 yd^3).

ALTERNATIVE 6

For Alternative 6 material with uranium-238 activity above 300 pCi/g will be disposed off site. Based on model analysis, 3,100 yd^3 of material must be disposed off-site. Thus, 94,039 yd^3 - 3,100 yd^3 = 90,900 yd^3 (rounded to nearest 100 yd^3) will be disposed on site.

ALTERNATIVE 7

For Alternative 7, material with uranium-238 activity above 300 pCi/g will be treated prior to on-site disposal. Based on block model analysis, 3,100 yd^3 of material must be treated. Bulking due to treatment is assumed to increase volume by 20 percent. Thus, on-site disposal volume will be 93,981 yd^3 + 3,100 yd^3 x 0.20 = 94,600 yd^3 (rounded to nearest 100 yd^3). Excavation volume remains 94,000 yd^3.

TABLE E.1-19 INACTIVE FLYASH PILE
FEDERAL OWNERSHIP (EXPANDED TRESPASSER, RISK BASE = 10^{-6} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS					
				COVER	FILL/DEBRIS	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT
Radium-226	pCi/g	2.0E+03	1.8	1.22	**37.8**	**36.0**	1.01	0.87	--
Radium-228 [c]	pCi/g	1.8E+03	2.0	1.20	2.048	3.12	0.730	0.53	--
Thorium-228 [c]	pCi/g	-- [d]	1.8	--	2.279	3.03	0.833	0.41	--
Thorium-232	pCi/g	6.8E+02	1.5	--	**2.118**	**3.28**	0.732	0.36	--
Uranium-234	pCi/g	3.7E+04	4.24	6.18	**771**	**187**	0.77	1.29	--
Uranium-234 (less than 18 ft of till)	pCi/g	3.7E+04	8.68	6.18	**771**	**187**	0.77	1.29	--
Uranium-235/236	pCi/g	7.7E+02 [e]	3.35	0.276	**49.1**	**18.5**	0.052	0.08	--
Uranium-235/236 (less than 18 ft of till)	pCi/g	7.7E+02 [e]	7.79	0.276	**49.1**	**18.5**	0.052	0.08	--
Uranium-238 [c]	pCi/g	2.8E+04 [f]	3.22	6.12	1570	191	0.850	1.44	--
Uranium-238 [c] (less than 18 ft of till)	pCi/g	2.8E+04 [f]	6.12	6.12	1570	191	0.850	1.44	--
Uranium-238 [c] (below sand layer)	pCi/g	2.8E+04 [f]	71	6.12	1570	191	0.850	1.44	--
Total Uranium [c]	mg/kg	-- [g]	24.8	19.7	2280	873	4.39	5.86	--
Arsenic	mg/kg	1.0E+02	16.9	5.1	**49.7**	5.0	6.9	5.1	6.3

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

000061

5861

E.1.5.2 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS INACTIVE FLYASH PILE, FEDERAL OWNERSHIP (EXPANDED TRESPASSER 10^{-5} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

Over the till (greater than 18 ft of till)

For material within and above the interbedded sand layer

Uranium-238 ..... 8.3 pCi/g (soil PRL based on groundwater ARAR)

For material below the interbedded sand layer

Uranium-238 ..... 150 pCi/g (soil PRL based on groundwater ARAR)

Over the GMA (less than 18 ft of till)

Uranium-238 ..... 8.3 pCi/g (soil PRL based on groundwater ARAR)

For all material (over entire subunit) within and above the fill/impacted till

Radium-228 ..... 8.9 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 5.4 pCi/g (surface soil exposure pathways PRL)

the following volumes were modeled for the Inactive Flyash Pile:

FLYASH	COVER	FILL/DEBRIS	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT	TOTAL
15,336 yd^3	984 yd^3	38,368 yd^3	2,720 yd^3	0 yd^3	0 yd^3	0 yd^3	57,408 yd^3

VOLUME FROM OTHER COCs

Other COCs have been detected above their respective PRLs in the fill/debris and other till layers. All locations where these COCs were detected correspond to areas modeled for removal. For the cover, only 173 yd^3 of material within that layer is excluded from the modeled volume. Because it would be difficult to segregate this volume, it will be added to the total excavation volume.

FLYASH VOLUME

All flyash will be removed. Volume of flyash not modeled is 43,634 yd^3 - 15,336 yd^3 = 28,298 yd^3.

000062

TOTAL VOLUME

MODELED	OTHER COCs	OTHER FLYASH	TOTAL
57,408 yd^3	173 yd^3	28,298 yd^3	85,879 yd^3

ALTERNATIVE 1

Under this alternative, no material will be removed.

ALTERNATIVE 2

For Alternative 2, a separate analysis was performed modeling only material outside the area to be capped. The same PRLs as listed above were used. Based on that criterion, only 58 yd^3 of material previously modeled in the impacted till is now excluded from excavation. Thus, the remediation volume for Alternative 2 is 85,879 yd^3 - 58 yd^3 = 85,800 yd^3 (rounded to nearest 100 yd^3).

ALTERNATIVE 3

No material was detected that exceeds off-site disposal facilty waste acceptance criteria; therefore, no volume adjustments are required. Thus, the remedial volume for Alternative 3 is 85,900 yd^3 (rounded to the nearest 100 yd^3).

ALTERNATIVES 4, 5, 7, and 8

Alternatives 4, 5, 7, and 8 do not apply to expanded trespasser risk base 10^{-5}.

ALTERNATIVE 6

For Alternative 6, material with uranium-238 activity above 300 pCi/g will be disposed off site. Based on model analysis, 3,100 yd^3 of material must be disposed off site. Thus 85,879 yd^3 - 3,100 yd^3 = 82,800 yd^3 (rounded to nearest 100 yd^3) will be disposed on site.

TABLE E.1-20 INACTIVE FLYASH PILE
FEDERAL OWNERSHIP (EXPANDED TRESPASSER, RISK BASE = 10^{-5} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS					
				COVER	FILL/DEBRIS	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT
Radium-226	pCi/g	2.0E+03	5.1	1.22	37.8	36.0	1.01	0.87	--
Radium-228 [c]	pCi/g	1.8E+03	8.9	1.20	2.048	3.12	0.730	0.53	--
Thorium-228 [c]	pCi/g	-- [d]	5.4	--	2.279	3.03	0.833	0.41	--
Thorium-232	pCi/g	6.8E+02	3.9	--	2.118	3.28	0.732	0.36	--
Uranium-234	pCi/g	3.7E+04	33	6.18	771	187	0.77	1.29	--
Uranium-234 (less than 18 ft of till)	pCi/g	3.7E+04	92	6.18	771	187	0.77	1.29	--
Uranium-235/236	pCi/g	7.7E+02 [e]	32	0.276	49.1	18.5	0.052	0.08	--
Uranium-235/236 (less than 18 ft of till)	pCi/g	7.7E+02 [e]	91	0.276	49.1	18.5	0.052	0.08	--
Uranium-238 [c]	pCi/g	2.8E+04 [f]	8.3	6.12	1570	191	0.850	1.44	--
Uranium-238 [c] (below sand layer)	pCi/g	2.8E+04 [f]	150	6.12	1570	191	0.850	1.44	--
Total Uranium [c]	mg/kg	-- [g]	24.8	19.7	2280	873	4.39	5.86	--
Arsenic	mg/kg	1.0E+02	169	5.1	49.7	5.0	6.9	5.1	6.3

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

000064

E.1.5.3 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS INACTIVE FLYASH PILE, PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER 10^{-6} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

For all layers

Uranium-238 ..... 1.47 pCi/g (surface soil exposure pathways PRL)

Radium-228 ..... 1.26 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 1.43 pCi/g (surface soil exposure pathways PRL)

the following volumes were modeled for the Inactive Flyash Pile

FLYASH	COVER	FILL/DEBRIS	IMPACTED TILL	OTHER TILL	GMA SOIL	TOTAL
43,634 yd^3	1,157 yd^3	50,752 yd^3	4,514 yd^3	0 yd^3	463 yd^3	100,520 yd^3

VOLUME FROM OTHER COCs

Other COCs have been detected at levels above their respective PRLs in the cover, fill/debris, and impacted till; however, the entire cover and impacted till layers are included in the modeled volume. Thus, the only layer that may require further remediation is the fill/debris. Since the total volume of the fill/debris layer is 51,100 yd^3, and the volume modeled for removal is 50,752 yd^3, only 342 yd^3 of material in the fill/debris layer is not included in the modeled volume. Including this 348 yd^3 volume will ensure that all COCs present above established PRLs in the fill/debris layer are removed.

OTHER FLYASH VOLUME

The total flyash volume has been modeled; therefore, no additional volume needs to be added.

TOTAL VOLUME

MODELED	OTHER COCs	TOTAL
100,520 yd^3	348 yd^3	100,868 yd^3

ALTERNATIVE 1

Under this alternative, no material will be removed.

000065

ALTERNATIVES 2, 4, 5, 7, and 8

Alternatives 2, 4, 5, 7, and 8 do not apply to the on-property resident farmer scenario.

ALTERNATIVE 3

No material was detected that exceeds off-site disposal facility waste acceptance criteria; therefore, no volume adjustments are required. Thus, the remedial volume for Alternative 3 is 100,900 yd^3 (rounded to nearest 100 yd^3).

ALTERNATIVE 6

For Alternative 6, material with uranium-238 activity above 300 pCi/g will be disposed off site. Based on model analysis, 3,100 yd^3 of material must be disposed off site. Thus 100,900 yd^3 - 3,100 yd^3 = 97,800 yd^3 of material will be disposed on site.

TABLE E.1-21 INACTIVE FLYASH PILE
PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, RISK BASE = 10^{-6} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS					
				COVER	FILL/DEBRIS	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT
Radium-226	pCi/g	2.0E+03	1.43	1.22	37.8	36.0	1.01	0.87	--
Radium-228 [c]	pCi/g	1.8E+03	1.26	1.20	2.048	3.12	0.730	0.53	--
Thorium-228 [c]	pCi/g	-- [d]	1.43	--	2.279	3.03	0.833	0.41	--
Thorium-232	pCi/g	6.8E+02	1.36	--	2.118	3.28	0.732	0.36	--
Uranium-234	pCi/g	3.7E+04	2.0	6.18	771	187	0.77	1.29	--
Uranium-235/236	pCi/g	7.7E+02 [e]	0.24	0.276	49.1	18.5	0.052	0.08	--
Uranium-238 [c]	pCi/g	2.8E+04 [f]	1.47	6.12	1570	191	0.850	1.44	--
Total Uranium [c]	mg/kg	-- [g]	21	19.7	2280	873	4.39	5.86	--
Arsenic	mg/kg	1.0E+02	8.2	5.1	49.7	5.0	6.9	5.1	6.3
Dibenzo(a,h)anthracene	mg/kg	--	4.6E-04	--	2.2	--	--	--	--

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

E.1.5.4 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS INACTIVE FLYASH PILE, PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER 10^{-5} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

For all layers at all depths

Uranium-238 ..... 3.72 pCi/g (surface soil exposure pathways PRL)

Radium-228 ..... 1.33 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 1.44 pCi/g (surface soil exposure pathways PRL)

the following volume were modeled for the Inactive Flyash Pile:

FLYASH	COVER	FILL/DEBRIS	IMPACTED TILL	OTHER TILL	SEDIMENT	TOTAL
43,576 yd^3	1,157 yd^3	50,463 yd^3	4,514 yd^3	0 yd^3	0 yd^3	99,710 yd^3

VOLUME FROM OTHER CONTAMINANTS

Other COCs were detected at levels above their respective PRLs in the fill/debris and impacted till; however, the entire impacted till layer is included in the modeled volume. Thus, the only layer that may require further remediation is the fill/debris. To ensure that all COCs present above established PRLs are removed, the entire fill/debris layer will be removed. The additional excavation required to remove this entire layer is 51,100 yd^3 - 50,463 yd^3 = 637 yd^3.

OTHER FLYASH VOLUME

All flyash will be removed. Flyash not modeled equals 43,634 yd^3 - 43,576 yd^3 = 58 yd^3.

TOTAL VOLUME

MODELED	OTHER COCs	OTHER FLYASH	TOTAL
99,710 yd^3	637 yd^3	58 yd^3	100,405 yd^3

ALTERNATIVE 1

Under this alternative, no material will be removed.

000068

ALTERNATIVES 2, 4, 5, 7, and 8

Alternatives 2, 4, 5, 7, and 8 do not apply to the on-property resident farmer scenario.

ALTERNATIVE 3

No material was detected that exceeds off-site disposal facility waste acceptance criteria; therefore, no volume adjustments are required. Thus, the remedial volume for Alternative 3 is 100,400 yd^3 (rounded to nearest 100 yd^3).

ALTERNATIVE 6

For Alternative 6, material with uranium-238 activity above 300 pCi/g will be disposed off site. Based on model analysis, 3,100 yd^3 of material must be disposed off site. Thus, 100,405 yd^3 - 3,100 yd^3 = 97,300 yd^3 (rounded to nearest 100 yd^3) can be disposed on site.

TABLE E.1-22 INACTIVE FLYASH PILE
PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, RISK BASE = 10^{-5} ILCR)

CONSTITUENT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS					
				COVER	FILL/DEBRIS	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT
Radium-226	pCi/g	2.0E+03	1.46	1.22	37.8	36.0	1.01	0.87	--
Radium-228 [c]	pCi/g	1.8E+03	1.33	1.20	2.048	3.12	0.730	0.53	--
Thorium-228 [c]	pCi/g	-- [d]	1.44	--	2.279	3.03	0.833	0.41	--
Thorium-232	pCi/g	6.8E+02	1.39	--	2.118	3.28	0.732	0.36	--
Uranium-234	pCi/g	3.7E+04	8.9	6.18	771	187	0.77	1.29	--
Uranium-235/236	pCi/g	7.7E+02 [e]	1.05	0.276	49.1	18.5	0.052	0.08	--
Uranium-238 [c]	pCi/g	2.8E+04 [f]	3.72	6.12	1570	191	0.850	1.44	--
Total Uranium [c]	mg/kg	-- [g]	21	19.7	2280	873	4.39	5.86	--
Arsenic	mg/kg	1.0E+02	8.2	5.1	49.7	5.0	6.9	5.1	6.3
Dibenzo(a,h)anthracene	mg/kg	--	0.0046	--	2.2	--	--	--	--

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

APPENDIX E.1.6
REMEDIATION VOLUME CALCULATIONS—
SOUTH FIELD

E.1.6.1 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS SOUTH FIELD, FEDERAL OWNERSHIP (EXPANDED TRESPASSER 10^{-6} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

Over the till (greater than 18 ft of till)

For material within and above the interbedded sand layer

Uranium-238 ..... 3.22 pCi/g (cross media modified groundwater PRL)

For material below the interbedded sand layer

Uranium-238 ..... 71 pCi/g (cross media modified groundwater PRL)

Over the GMA (less than 18 ft of till)

Uranium-238 ..... 6.12 pCi/g (cross media modified groundwater PRL)

For all material (over entire subunit) within and above the fill/impacted till

Radium-228 ..... 2.0 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 1.8 pCi/g (surface soil exposure pathways PRL)

the following volumes were modeled for the South Field:

FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	TOTAL
48,553 yd^3	24,363 yd^3	4,340 yd^3	0 yd^3	77,256 yd^3

VOLUME FROM OTHER COCs

Material contaminated with lead at concentrations above RCRA land disposal levels has been detected at the Firing Range in the South Field. Lead-contaminated material is estimated to be 300 yd^3 (see section E.1.10). For all alternatives this material will be treated and disposed off site.

Other COCs have been detected at levels above their respective PRLs in the fill and impacted fill. All locations where these COCs were detected correspond to areas modeled for removal. Thus, no additional volume will be excavated for these COCs.

TOTAL VOLUME

MODELED	OTHER COCs	TOTAL
77,256 yd^3	300 yd^3	77,556 yd^3

ALTERNATIVE 1

Under this alternative, no material will be excavated.

ALTERNATIVE 2

Under this alternative contaminated material in areas where less than 18 feet of till overlie the GMA will be excavated and consolidated. In order to calculate this volume a separate model analysis was performed. The results of the analysis are as follows:

FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	TOTAL
33,333 yd^3	8,449 yd^3	0 yd^3	0 yd^3	41,782 yd^3

All COCs present at levels above their respective PRLs at locations beyond the cap limit are included in the modeled volume. Thus, the total volume for Alternative 2 will be 41,800 yd^3 (rounded to nearest 100 yd^3).

Additionally, 300 yd^3 of waste from the Firing Range will be treated and disposed off site.

ALTERNATIVES 3 and 4

No volume adjustment need to be made for Alternatives 3 and 4. Thus, the remedial volume for these alternatives is 77,600 yd^3 (rounded to nearest 100 yd^3).

ALTERNATIVES 5, 6, and 7

Under these alternatives, 300 yd^3 of material will be treated and disposed off site. Thus, the on-site disposal volume will be 77,556 yd^3 - 300 yd^3 = 77,300 yd^3 (rounded to nearest 100 yd^3).

ALTERNATIVE 8

Under this alternative, 300 yd^3 of material will be treated and disposed off site. The remaining material will be treated before being placed in the disposal cell. The excavated volume for treatment and on-site disposal will be 77,300 yd^3.

TABLE E.1-23 SOUTH FIELD
FEDERAL OWNERSHIP (EXPANDED TRESPASSER, RISK BASE = 10^{-6} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS				
				FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT
Radium-226	pCi/g	2.0E+03	1.8	9.21	1.99	1.057	0.676	--
Radium-228 [c]	pCi/g	1.8E+03	2.0	3.74	1.444	1.022	0.461	--
Technetium-99	pCi/g	1.0E+05	71	0.90	0.90	--	--	--
Thorium-228 [c]	pCi/g	-- [d]	1.8	13.40	1.426	0.875	0.33	--
Thorium-230	pCi/g	1.5E+04	6.97	13.80	4.41	1.094	1.37	--
Thorium-232	pCi/g	6.8E+02	1.5	12.90	1.332	0.792	0.33	--
Uranium-234	pCi/g	3.7E+04	4.24	78.3	17.20	3.51	0.585	--
Uranium-234 (less than 18 ft of till)	pCi/g	3.7E+04	8.68	78.3	17.20	3.51	0.585	--
Uranium-235/236	pCi/g	7.7E+02 [e]	3.37	4.05	2.73	0.219	0.02	--
Uranium-235/236 (less than 18 ft of till)	pCi/g	7.7E+02 [e]	7.79	4.05	2.73	0.219	0.02	--
Uranium-238 [c]	pCi/g	2.8E+04 [f]	3.22	82.7	17.888	4.55	0.66	--
Uranium-238 [c] (less than 18 ft of till)	pCi/g	2.8E+04 [f]	6.12	82.7	17.888	4.55	0.66	--
Uranium-238 [c] (below sand layer)	pCi/g	2.8E+04 [f]	71	82.7	17.888	4.55	0.66	--
Total Uranium [c]	mg/kg	-- [g]	24.8	297	189	16.8	10.30	--
Benzo(a)pyrene	mg/kg	--	2.86	1.8	--	--	--	0.11
Dibenzo(a,h)anthracene	mg/kg	--	13	0.44	--	--	--	--

TABLE E.1-23 SOUTH FIELD
FEDERAL OWNERSHIP (EXPANDED TRESPASSER, RISK BASE = 10^{-6} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS				
				FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT
Indeno(1,2,3-cd)pyrene	mg/kg	--	200	0.62	--	--	--	0.099
Aroclor-1260	mg/kg	--	25	0.038	--	--	--	--

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

000075

E.1.6.2 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS SOUTH FIELD, FEDERAL OWNERSHIP (EXPANDED TRESPASSER 10^{-5} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

Over the till (greater than 18 ft of till)

For material within and above the interbedded sand layer

Uranium-238 ..... 8.3 pCi/g (soil PRL based on groundwater ARAR)

For material below the interbedded sand layer

Uranium-238 ..... 150 pCi/g (soil PRL based on groundwater ARAR)

Over the GMA (less than 18 ft of till)

Uranium-238 ..... 8.3 pCi/g (soil PRL based on groundwater ARAR)

For all material (over entire subunit) within and above the fill/impacted till

Radium-228 ..... 8.9 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 5.4 pCi/g (surface soil exposure pathways PRL)

the following volumes were modeled for the South Field:

FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT	TOTAL
22,512 yd^3	13,542 yd^3	0 yd^3	0 yd^3	0 yd^3	36,054 yd^3

VOLUME FROM OTHER COCs

Material contaminated with lead at concentrations above RCRA land disposal levels has been detected at the Firing Range in the South Field. Lead contaminated material is estimated to be 300 yd^3 (see section E.1.10). For all alternatives this material will be treated and disposed off site.

Other COCs have been detected at levels above their respective PRLs in the fill. All locations where these COCs were detected correspond to areas modeled for removal. Thus, no additional volume will be excavated for these COCs.

TOTAL VOLUME

MODELED	OTHER COCs	TOTAL
36,054 yd^3	300 yd^3	36,354 yd^3

ALTERNATIVE 1

Under this alternative, no material will be excavated.

ALTERNATIVE 2

Under this alternative, contaminated material in areas where less than 18 feet of till overlie the GMA will be excavated and consolidated. In order to calculate this volume, a separate model analysis was performed. The results of the analysis are as follows:

FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT	TOTAL
13,947 yd^3	4,225 yd^3	0 yd^3	0 yd^3	0 yd^3	18,172 yd^3

All COCs present at levels above their respective PRLs at locations beyond the cap limit are included in the modeled volume. Thus, the total volume for Alternative 2 will be 18,200 yd^3 (rounded to nearest 100 yd^3).

Additionally, 300 yd^3 of waste from the Firing Range will be treated and disposed off site.

ALTERNATIVE 3

No materials were detected that exceed off-site disposal facility waste acceptance criteria; therefore, no volume adjustments are required. Thus, the remedial volume for this alternative is 36,400 yd^3 (rounded to nearest 100 yd^3).

ALTERNATIVES 4, 5, 7, and 8

These alternatives do not apply to expanded trespasser risk base 10^{-5}.

ALTERNATIVE 6

Under this alternative, 300 yd^3 of material will be treated and disposed off site. Thus, the on-site disposal volume will be 36,354 yd^3 - 300 yd^3 = 36,100 yd^3 (rounded to nearest 100 yd^3).

000077

TABLE E.1-24 SOUTH FIELD
FEDERAL OWNERSHIP (EXPANDED TRESPASSER, RISK BASE = 10^{-5} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS				
				FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT
Radium-226	pCi/g	2.0E+03	5.1	9.21	1.99	1.057	0.676	--
Radium-228 [c]	pCi/g	1.8E+03	8.9	3.74	1.444	1.022	0.461	--
Technetium-99	pCi/g	1.0E+05	710	0.90	0.90	--	--	--
Thorium-228 [c]	pCi/g	-- [d]	5.4	13.40	1.426	0.875	0.33	--
Thorium-230	pCi/g	1.5E+04	6.97	13.80	4.41	1.094	1.37	--
Thorium-232	pCi/g	6.8E+02	3.9	12.90	1.332	0.792	0.33	--
Uranium-234	pCi/g	3.7E+04	33	78.3	17.20	3.51	0.585	--
Uranium-234 (less than 18 ft of till)	pCi/g	3.7E+04	92	78.3	17.20	3.51	0.585	--
Uranium-235/236	pCi/g	7.7E+02 [e]	32	4.05	2.73	0.219	0.02	--
Uranium-235/236 (less than 18 ft of till)	pCi/g	7.7E+02 [e]	91	4.05	2.73	0.219	0.02	--
Uranium-238 [c]	pCi/g	2.8E+04 [f]	8.3	82.7	17.888	4.55	0.66	--
Uranium-238 [c] (below sand layer)	pCi/g	2.8E+04 [f]	150	82.7	17.888	4.55	0.66	--
Total Uranium [c]	mg/kg	-- [g]	24.8	297	189	16.8	10.30	--
Benzo(a)pyrene	mg/kg	--	28.6	1.8	--	--	--	0.11
Dibenzo(a,h)anthracene	mg/kg	--	130	0.44	--	--	--	--
Indeno(1,2,3-cd)pyrene	mg/kg	--	0.496	0.62	--	--	--	0.099
Aroclor-1260	mg/kg	--	250	0.038	--	--	--	--

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

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E.1.6.3 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS SOUTH FIELD, PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER 10^{-6} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

For all layers at all depths

Uranium-238 ..... 1.47 pCi/g (surface soil exposure pathways PRL)

Radium-228 ..... 1.26 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 1.43 pCi/g (surface soil exposure pathways PRL)

the following volumes modeled for the South Field:

FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT	TOTAL
115,047 yd^3	51,331 yd^3	47,570 yd^3	0 yd^3	0 yd^3	213,948 yd^3

VOLUME FROM OTHER COCs

Other COCs were detected at levels above their respective PRLs in the fill, impacted till, other till, GMA soil, and sediment. Because of the number of samples containing COCs above established PRLs (primarily neptunium-237 and beryllium), all material in the fill, impacted till, other till, and sediment will be excavated. Additional volumes to be excavated for these layers will be:

Fill = 120,081 yd^3 - 115,047 yd^3 = 5,034 yd^3

Impacted Till = 55,903 yd^3 - 51,331 yd^3 = 4,570 yd^3

Other Till = 162,789 yd^3 - 47,570 yd^3 = 115,219 yd^3

Sediment = 23 yd^3

In addition, one sample location within the GMA soil contained strontium-90 at a level above its PRL. While a precise areal extent of contamination cannot be ascertained based on one sample location, a remediation volume of 637 yd^3 was assumed to account for removal of strontium-90 based on contamination at this location.

The total volume as a result of other COCs is thus:

5,034 yd^3 + 4,570 yd^3 + 115,219 yd^3 + 23 yd^3 + 637 yd^3 = 125,483 yd^3.

TOTAL VOLUME

MODELED	OTHER COCs	TOTAL
213,948 yd^3	125,483 yd^3	339,431 yd^3

Since all the material located above the GMA will be removed, the estimated 300 yd^3 of lead-contaminated material from the Firing Range will be included in this total volume.

ALTERNATIVE 1

Under this alternative, no material will be removed.

ALTERNATIVES 2, 4, 5, 7, and 8

Alternatives 2, 4, 5, 7, and 8 do not apply to the on-property resident farmer scenario.

ALTERNATIVE 3

No material was detected that exceeds off-site disposal facility waste acceptance criteria; therefore, no volume adjustments are required. Thus, the remedial volume for Alternative 3 is 339,400 yd^3 (rounded to nearest 100 yd^3).

ALTERNATIVE 6

The 300 yd^3 of lead-contaminated materials at the Firing Range that exceeds RCRA disposal criteria cannot be disposed on site. Thus, this additional 300 yd^3 volume must be disposed off site separately from other materials. Thus, 339,100 yd^3 (rounded to nearest 100 yd^3) will be disposed on site with an additional 300 yd^3 disposed off site.

TABLE E.1-25 SOUTH FIELD
PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, RISK BASE = 10^{-6} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS				
				FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT
Cesium-137	pCi/g	5.6E+02	0.72	0.692	--	--	--	--
Neptunium-237	pCi/g	2.0E+03	0.043	0.369	0.291	5.696	--	--
Radium-226	pCi/g	2.0E+03	1.43	9.21	1.99	1.057	0.676	--
Radium-228 [c]	pCi/g	1.8E+03	1.26	3.74	1.444	1.022	0.461	--
Strontium-90	pCi/g	2.0E+04	0.016	1.36	1.1	0.95	0.7	1.01
Technetium-99	pCi/g	1.0E+05	0.017	0.90	0.90	--	--	--
Thorium-228 [c]	pCi/g	-- [d]	1.43	13.40	1.426	0.875	0.33	--
Thorium-230	pCi/g	1.5E+04	2.74	13.80	4.41	1.094	1.37	--
Thorium-232	pCi/g	6.8E+02	1.36	12.90	1.332	0.792	0.33	--
Uranium-234	pCi/g	3.7E+04	2.0	78.3	17.20	3.51	0.585	--
Uranium-235/236	pCi/g	7.7E+02 [e]	0.24	4.05	2.73	0.219	0.02	--
Uranium-238 [c]	pCi/g	2.8E+04 [f]	1.47	82.7	17.888	4.55	0.66	--
Total Uranium [c]	mg/kg	-- [g]	21	297	189	16.8	10.30	--
Arsenic	mg/kg	1.0E+02	8.2	6.975	11.9	7.64	6.20	75.6
Beryllium	mg/kg	--	0.6	0.88	0.85	0.779	--	4.6
Benzo(a)anthracene	mg/kg	--	0.023	1.1	--	--	--	0.066
Benzo(a)pyrene	mg/kg	--	0.0015	1.8	--	--	--	0.11

000064

TABLE E.1-25 SOUTH FIELD
PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, RISK BASE = 10^{-6} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS				
				FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT
Benzo(b)fluoranthene	mg/kg	--	0.014	1.6	--	--	--	--
Benzo(k)fluoranthene	mg/kg	--	0.047	1.6	--	--	--	0.12
Dibenzo(a,h)anthracene	mg/kg	--	0.00046	0.44	--	--	--	--
Indeno(1,2,3-cd)pyrene	mg/kg	--	0.0073	0.62	--	--	--	0.099
Aroclor-1254	mg/kg	--	0.0015	0.43	0.041	--	--	0.096
Aroclor-1260	mg/kg	--	0.00023	0.038	--	--	--	--
Dieldrin	mg/kg	0.13	0.00004	0.0097	--	--	--	--

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

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E.1.6.4 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS SOUTH FIELD, PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER 10^{-5} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria:

For all layers

Uranium-238 ..... 3.72 pCi/g (surface soil exposrue pathways PRL)

Radium-228 ..... 1.33 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 1.44 pCi/g (surface soil exposure pathways PRL)

the following volumes were modeled for the south field:

FILL	IMPACT. TILL	OTHER TILL	GMA SOIL	SEDIMENT	TOTAL
82,234 yd^3	33,275 yd^3	3,415 yd^3	0 yd^3	0 yd^3	118,924 yd^3

VOLUME FROM OTHER CONTAMINANTS

Other COCs were detected at levels above their respective PRLs in the fill, impacted till, other till, GMA soil, and sediment. Because contamination within the fill, impacted till, and sediment is widespread, each of these layers shall be entirely removed. Additional volumes to be excavated for these layers will be:

Fill = 120,081 yd^3 - 82,234 yd^3 = 37,847 yd^3

Impacted Till = 55,903 yd^3 - 33,275 yd^3 = 22,628 yd^3

Sediment = 23 yd^3

For the other till, six sample locations have levels of strontium-90 or beryllium above the respective PRLs for those COCs. A volume of 6,500 yd^3 is estimated to remove contamination resulting from these constituents.

In the GMA soil, one sample location was detected that contains strontium-90 at a level above its PRL. While a precise areal extent of contamination cannot be assertained based on one sample location, a remedial volume of 637 yd^3 was assumed to account for removal of contamination resulting from strontium-90 at this location.

000083

Material contaminated with lead at concentrations above RCRA land disposal levels has been detected at the Firing Range in the South Field. Lead-contaminated material is estimated to be 300 yd^3 (see section E.1.10). For all alternatives this material will be treated and disposed off site.

Total volume from other COCs is:

37,847 yd^3 + 22,628 yd^3 + 23 yd^3 + 6,500 yd^3 + 637 yd^3 + 300 yd^3 = 67,935 yd^3.

TOTAL VOLUME

MODELED	OTHER COCs	TOTAL
118,924 yd^3	67,935 yd^3	186,859 yd^3

ALTERNATIVE 1

Under this alternative, no material will be removed.

ALTERNATIVES 2, 4, 5, 7, and 8

Alternatives 2, 4, 5, 7, and 8 do not apply to the on-property resident farmer scenario.

ALTERNATIVE 3

No volume adjustments need to be made for Alternative 3. Thus, the remedial volume for this alternative is 186,900 yd^3 (rounded to nearest 100 yd^3).

ALTERNATIVE 6

Under this alternative, 300 yd^3 of material will be treated and disposed off site. Thus, the on-site disposal volume will be 186,859 yd^3 - 300 yd^3 = 186,600 yd^3 (rounded to nearest 100 yd^3).

TABLE E.1-26 SOUTH FIELD
PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, RISK BASE = 10^{-5} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS				
				FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT
Cesium-137	pCi/g	5.6E+02	0.89	0.692	--	--	--	--
Neptunium-237	pCi/g	2.0E+03	0.43	0.369	0.291	5.696	--	--
Radium-226	pCi/g	2.0E+03	1.46	9.21	1.99	1.057	0.676	--
Radium-228 [c]	pCi/g	1.8E+03	1.33	3.74	1.444	1.022	0.461	--
Strontium-90	pCi/g	2.0E+04	0.16	1.36	1.1	0.95	0.7	1.01
Technetium-99	pCi/g	1.0E+05	0.17	0.90	0.90	--	--	--
Thorium-228 [c]	pCi/g	-- [d]	1.44	13.40	1.426	0.875	0.33	--
Thorium-230	pCi/g	1.5E+04	6.97	13.80	4.41	1.094	1.37	--
Thorium-232	pCi/g	6.8E+02	1.39	12.90	1.332	0.792	0.33	--
Uranium-234	pCi/g	3.7E+04	8.9	78.3	17.20	3.51	0.585	--
Uranium-235/236	pCi/g	7.7E+02 [e]	1.05	4.05	2.73	0.219	0.02	--
Uranium-238 [c]	pCi/g	2.8E+04 [f]	3.72	82.7	17.888	4.55	0.66	--
Total Uranium [c]	mg/kg	-- [g]	21	297	189	16.8	10.30	--
Arsenic	mg/kg	1.0E+02	8.2	6.975	11.9	7.64	6.20	75.6
Beryllium	mg/kg	--	0.6	0.88	0.85	0.779	--	4.6
Benzo(a)anthracene	mg/kg	--	0.23	1.1	--	--	--	0.066
Benzo(a)pyrene	mg/kg	--	0.015	1.8	--	--	--	0.11

000085

TABLE E.1-26 SOUTH FIELD
PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, RISK BASE = 10^{-5} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS				
				FILL	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT
Benzo(b)fluoranthene	mg/kg	--	0.14	1.6	--	--	--	0.11
Benzo(k)fluoranthene	mg/kg	--	0.47	1.6	--	--	--	0.12
Dibenzo(a,h)anthracene	mg/kg	--	0.0046	0.44	--	--	--	--
Indeno(1,2,3-cd)pyrene	mg/kg	--	0.073	0.62	--	--	--	0.099
Aroclor-1254	mg/kg	--	0.015	0.43	0.041	--	--	0.096
Aroclor-1260	mg/kg	--	0.0023	0.038	--	--	--	--
Dieldrin	mg/kg	0.13	0.0004	0.0097	--	--	--	--

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

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APPENDIX E.1.7
REMEDIATION VOLUME CALCULATIONS—
ACTIVE FLYASH PILE

E.1.7.1 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS
ACTIVE FLYASH PILE, FEDERAL OWNERSHIP
(EXPANDED TRESPASSER, 10^{-6} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

For all layers

Uranium-238 ..... 6.12 pCi/g (cross media modified groundwater PRL)

For material within and above flyash/impacted till

Radium-228 ..... 2.0 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 1.8 pCi/g (surface soil exposure pathways PRL)

the following volumes were modeled for the Active Flyash Pile:

FLYASH	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT	TOTAL
63,137 yd^3	0 yd^3	0 yd^3	0 yd^3	0 yd^3	63,137 yd^3

VOLUME FROM OTHER COCs

One sample within the impacted till has an arsenic concentration above the PRL for that COC. Assume an excavation of 50 yd^3 removes this contaminated material.

OTHER FLYASH VOLUME

All flyash will be removed. Volume of flyash not modeled is 65,046 yd^3 - 63,137 yd^3 = 1,909 yd^3.

TOTAL VOLUME

MODELED	OTHER COCs	OTHER FLYASH	TOTAL
63,137 yd^3	50 yd^3	1,909 yd^3	65,096 yd^3

ALTERNATIVE 1

Under this alternative, no material will be removed.

ALTERNATIVES 2, 3, 4, 5, 6, 7, and 8

There is no variance between these alternatives. Excavated volume will be 65,100 yd^3 (rounded to nearest 100 yd^3). For Alternative 2, it is assumed that all excavated material will be consolidation under the cap.

000089

TABLE E.1-27 ACTIVE FLYASH PILE
FEDERAL OWNERSHIP (EXPANDED TRESPASSER, RISK BASE = 10^{-6} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS			
				IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT
Neptunium-237	pCi/g	2.0E+03	4.99	0.40	0.19	--	0.038
Radium-226	pCi/g	2.0E+03	1.8	1.73	1.14	0.594	1.32
Radium-228 [c]	pCi/g	1.8E+03	2.0	1.33	0.90	0.537	1.08
Thorium-228 [c]	pCi/g	-- [d]	1.8	1.40	1.76	1.19	0.824
Thorium-232	pCi/g	6.8E+02	1.5	1.35	1.20	0.965	0.883
Uranium-234	pCi/g	3.7E+04	8.64	1.27	1.00	0.921	2.77
Uranium-235/236	pCi/g	7.7E+02 [e]	7.75	0.069	0.034	--	0.163
Uranium-238 [c]	pCi/g	2.8E+04 [f]	6.12	2.60	1.05	0.754	2.9
Total Uranium [c]	mg/kg	-- [g]	28	7.17	4.27	8.416	51.8
Arsenic	mg/kg	1.0E+02	16.9	18.70	14.00	--	10.9

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

E.1.7.2 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS ACTIVE FLYASH PILE, FEDERAL OWNERSHIP (EXPANDED TRESPASSER 10^{-5} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

For all layers

Uranium-238 ..... 8.0 pCi/g (soil PRL based on groundwater 0.2 HI)

For all material above the remaining till

Radium-228 ..... 8.9 pCi/g (surface soil exposure pathway PRL)

Thorium-228 ..... 5.4 pCi/g (surface soil exposure pathway PRL)

the following volumes were modeled for the Active Flyash Pile:

FLYASH	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT	TOTAL
300 yd^3	0 yd^3	0 yd^3	0 yd^3	0 yd^3	300 yd^3

VOLUME FROM OTHER COCs

There were no other COCs that exceeded their respective PRLs for the Active Flyash Pile.

OTHER FLYASH VOLUME

All flyash will be removed. Volume of flyash not modeled is 65,046 yd^3 - 300 yd^3 = 64,746 yd^3.

TOTAL VOLUME

MODELED	OTHER COCs	OTHER FLYASH	TOTAL
300 yd^3	0 yd^3	64,746 yd^3	65,046 yd^3

ALTERNATIVE 1

Under this alternative, no material will be removed.

ALTERNATIVES 2, 3, and 6

There is no variance between these alternatives. Excavated volume will be 65,000 yd^3 (rounded to nearest 100 yd^3). For Alternative 2, it is assumed that all excavated material will be consolidated under the cap.

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ALTERNATIVES 4, 5, 7, and 8

These alternatives do not apply to expanded trespasser risk base 10^{-5}.

TABLE E.1-28 ACTIVE FLYASH PILE
FEDERAL OWNERSHIP (EXPANDED TRESPASSER, RISK BASE = 10^{-5} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS			
				IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT
Neptunium-237	pCi/g	2.0E+03	49.9	0.40	0.19	--	0.038
Radium-226	pCi/g	2.0E+03	5.1	1.73	1.14	0.594	1.32
Radium-228 [c]	pCi/g	1.8E+03	8.9	1.33	0.90	0.537	1.08
Thorium-228 [c]	pCi/g	-- [d]	5.4	1.40	1.76	1.19	0.824
Thorium-232	pCi/g	6.8E+02	3.9	1.35	1.20	0.965	0.883
Uranium-234	pCi/g	3.7E+04	77.0	1.27	1.00	0.921	2.77
Uranium-235/236	pCi/g	7.7E+02 [e]	76.2	0.069	0.034	--	0.163
Uranium-238 [c]	pCi/g	2.8E+04 [f]	9.3	2.60	1.05	0.754	2.9
Total Uranium [c]	mg/kg	-- [g]	28	7.17	4.27	8.416	51.8
Arsenic	mg/kg	1.0E+02	169	18.70	14.00	--	10.9

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

E.1.7.3 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS ACTIVE FLYASH PILE, PRIVATE OWNERSHIP (RESIDENT FARMER 10^{-6} ILCR)

5861

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

For all layers

Uranium-238 ..... 1.47 pCi/g (surface soil exposure pathways PRL)

Radium-228 ..... 1.26 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 1.43 pCi/g (surface soil exposure pathways PRL)

the following volumes were modeled for the Active Flyash Pile:

FLYASH	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT	TOTAL
65,046 yd^3	1,968 yd^3	1,679 yd^3	0 yd^3	0 yd^3	68,693 yd^3

VOLUME FROM OTHER COCs

Other COCs have been detected at levels above their respective PRLs in the impacted till, other till, and sediment. Contamination from other COCs within the impacted till is widespread; therefore, the entire layer will be removed. Excavation of an additional 8,160 yd^3 - 1,968 yd^3 = 6,192 yd^3 will be required to remove all impacted till. For the other till layer, only one location where COCs were detected corresponds to an area not included in the modeled volume. That location contains levels for neptunium-237 and beryllium that are above the respective PRLs for those COCs. To remove that material an additional excavation of 30 yd^3 will be required. Because of the topographic layout of the active flyash pile, sediment was included within the impacted till for modeling purposes. Thus, the COCs detected in the sediment will be removed, since the entire impacted till layer will be removed. Total volume from other COCs therefore equals 6,192 yd^3 + 30 yd^3 = 6,222 yd^3.

FLYASH VOLUME

All flyash was modeled. Thus, no additional material requires removal.

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TOTAL VOLUME

MODELED	OTHER COCs	TOTAL
68,693 yd^3	6,222 yd^3	74,915 yd^3

ALTERNATIVE 1

Under this alternative, no material will be removed.

ALTERNATIVES 2, 4, 5, 7, and 8

Alternatives 2, 4, 5, 7, and 8 do not apply to the on-property resident farmer scenario.

ALTERNATIVES 3 and 6

No material was detected that exceeds on-site or off-site disposal facility waste acceptance criteria; therefore, no volume adjustments are required. Thus, the remedial volume for Alternatives 3 and 6 is 74,900 yd^3 (rounded to nearest 100 yd^3).

TABLE E.1-29 ACTIVE FLYASH PILE
PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER (RISK BASE = 10^{-6} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS			
				IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT
Cesium-137	pCi/g	5.6E+02	0.72	--	--	--	0.086
Neptunium-237	pCi/g	2.0E+03	0.043	**0.40**	**0.19**	--	0.038
Radium-226	pCi/g	2.0E+03	1.43	**1.73**	1.14	0.594	1.32
Radium-228 [c]	pCi/g	1.8E+03	1.26	1.33	0.90	0.537	1.08
Thorium-228 [c]	pCi/g	-- [d]	1.43	1.40	1.76	1.19	0.824
Thorium-232	pCi/g	6.8E+02	1.36	1.35	1.20	0.965	0.883
Uranium-234	pCi/g	3.7E+04	2.0	1.27	1.00	0.921	2.77
Uranium-235/236	pCi/g	7.7E+02 [e]	0.24	0.069	0.034	--	0.163
Uranium-238 [c]	pCi/g	2.8E+04 [f]	1.47	2.60	1.05	0.754	2.9
Total Uranium [c]	mg/kg	-- [g]	24	7.17	4.27	8.416	51.8
Arsenic	mg/kg	1.0E+02	8.2	**18.70**	**14.00**	--	**10.9**
Beryllium	mg/kg	--	0.6	**1.40**	**1.10**	--	**1.4**

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

E.1.7.4 OPERABLE UNIT 2 REMEDIATION VOLUME CALCULATIONS ACTIVE FLYASH PILE, PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, 10^{-5} ILCR)

MODELED VOLUME: RADIUM-228, THORIUM-228, URANIUM-238

Based on the following criteria

for all layers

Uranium-238 ..... 3.72 pCi/g (surface soil exposure pathways PRL)

Radium-228 ..... 1.33 pCi/g (surface soil exposure pathways PRL)

Thorium-228 ..... 1.44 pCi/g (surface soil exposure pathways PRL)

the following volumes were modeled for the Active Flyash Pile:

FLYASH	IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT	TOTAL
65,046 yd^3	0 yd^3	1,679 yd^3	0 yd^3	0 yd^3	66,725 yd^3

VOLUME FROM OTHER COCs

Other COCs have been detected at levels above their respective PRLs in the impacted till, other till, and sediment. Contamination from other COCs within the impacted till is widespread; therefore, the entire layer will be removed. The total volume of impacted till is 8,160 yd^3. For the other till layer, only one location where COCs were detected corresponds to an area not included in the modeled volume. That location contains levels for neptunium-237 and beryllium that are above the respective PRLs for those COCs. To remove that material, an additional excavation of 30 yd^3 will be required. Because of the topographical layout of the Active Flyash Pile, sediment was included within the impacted till for modeling purposes. Thus, the COCs detected in the sediment will be removed, since the entire impacted till layer will be removed. Total volume from other COCs, therefore, equals 8,160 yd^3 + 30 yd^3 = 8,190 yd^3.

OTHER FLYASH VOLUME

All flyash was modeled. Thus, no additional material requires removal.

TOTAL VOLUME

MODELED	OTHER COCs	TOTAL
66,725 yd^3	8,190 yd^3	74,915 yd^3

ALTERNATIVE 1

Under this alternative, no material will be removed.

ALTERNATIVES 2, 4, 5, 7, and 8

Alternatives 2, 4, 5, 7, and 8 do not apply to the on-property resident farmer scenario.

ALTERNATIVES 3 and 6

No material was detected that exceeds on-site or off-site disposal facility waste acceptance criteria; therefore, no volume adjustments are required. Thus, the remedial volume for Alternatives 3 and 6 is 74,900 yd^3 (rounded to nearest 100 yd^3).

000038

TABLE E.1-30 ACTIVE FLYASH PILE
PRIVATE OWNERSHIP (ON-PROPERTY RESIDENT FARMER, RISK BASE = 10^{-5} ILCR)

CONTAMINANT OF CONCERN	UNIT	OFF-SITE DISPOSAL CRITERIA [a]	PRELIM. REMED. LEVEL [b]	CONCENTRATION TERMS			
				IMPACTED TILL	OTHER TILL	GMA SOIL	SEDIMENT
Cesium-137	pCi/g	5.6E+02	0.89	--	--	--	0.086
Neptunium-237	pCi/g	2.0E+03	0.43	0.40	0.19	--	0.038
Radium-226	pCi/g	2.0E+03	1.46	1.73	1.14	0.594	1.32
Radium-228 [c]	pCi/g	1.8E+03	1.33	1.33	0.90	0.537	1.08
Thorium-228 [c]	pCi/g	-- [d]	1.44	1.40	1.76	1.19	0.824
Thorium-232	pCi/g	6.8E+02	1.39	1.35	1.20	0.965	0.883
Uranium-234	pCi/g	3.7E+04	8.9	1.27	1.00	0.921	2.77
Uranium-235/236	pCi/g	7.7E+02 [e]	1.05	0.069	0.034	--	0.163
Uranium-238 [c]	pCi/g	2.8E+04 [f]	3.72	2.60	1.05	0.754	2.9
Total Uranium [c]	mg/kg	-- [g]	24	7.17	4.27	8.416	51.8
Arsenic	mg/kg	1.0E+02	8.2	18.70	14.00	--	10.9
Beryllium	mg/kg	--	0.6	1.40	1.10	--	1.4

Concentration terms exceeding PRLs (Concentration terms for modeled COCs exceeding PRLs are not shaded.)

For notes refer to Table E.1-11.

APPENDIX E.1.8

BLOCK MODEL VOLUME SUMMARY FOR URANIUM-238

E.1.8 BLOCK MODEL VOLUME SUMMARY FOR URANIUM-238

The tables included in this section indicate the volume of material above various uranium-238 concentrations. The values shown in these tables have been determined through the use of the block model based on uranium-238. These tables are not based on the three modeling isotopes (uranium-238, radium-228, and thorium-228); therefore, these tables have not been used to determine remediation volumes. However, these tables have been used to determine certain support volumes which are based only on the uranium-238 isotope, namely:

- On-site disposal cell waste acceptance criteria volumes
- PPE remediation volumes
- Volumes not available for construction of the on-site disposal cell berm

TABLE E.1-31
TOTAL VOLUME
SOLID WASTE LANDFILL

		Volumes in Cubic Yards; U-238 in pCi/g								
		Fill		Impacted Till		Remaining Till		GMA Soil		TOTAL
U-238 Concentration		Volume	Avg.U-238	Volume	Avg.U-238	Volume	Avg.U-238	Volume	Avg.U-238	Volume
Above	0 pCi/g:	15220	52.0	4282	49.5	92187	2.8	---	---	---
Above	1.12 pCi/g:	15220	52.0	4282	49.5	59780	3.9	0	0	79282
Above	2.5 pCi/g:	15220	52.0	4282	49.5	27315	6.7	0	0	46817
Above	5 pCi/g:	15220	52.0	4282	49.5	15973	8.9	0	0	35475
Above	7.5 pCi/g:	15220	52.0	4282	49.5	10243	10.6	0	0	29745
Above	15 pCi/g:	14873	52.9	4167	50.5	347	15.8	0	0	19387
Above	30 pCi/g:	8738	73.9	2373	70.6	0	0	0	0	11111
Above	40 pCi/g:	6134	91.0	1505	91.3	0	0	0	0	7639
Above	50 pCi/g:	5093	100.1	1215	102.0	0	0	0	0	6308
Above	60 pCi/g:	4282	108.3	926	117.4	0	0	0	0	5208
Above	90 pCi/g:	2662	129.0	637	137.2	0	0	0	0	3299
Above	125 pCi/g:	1273	159.9	405	159.3	0	0	0	0	1678
Above	250 pCi/g:	0	0	0	0	0	0	0	0	0
Above	500 pCi/g:	0	0	0	0	0	0	0	0	0
Above	1000 pCi/g:	0	0	0	0	0	0	0	0	0

000102

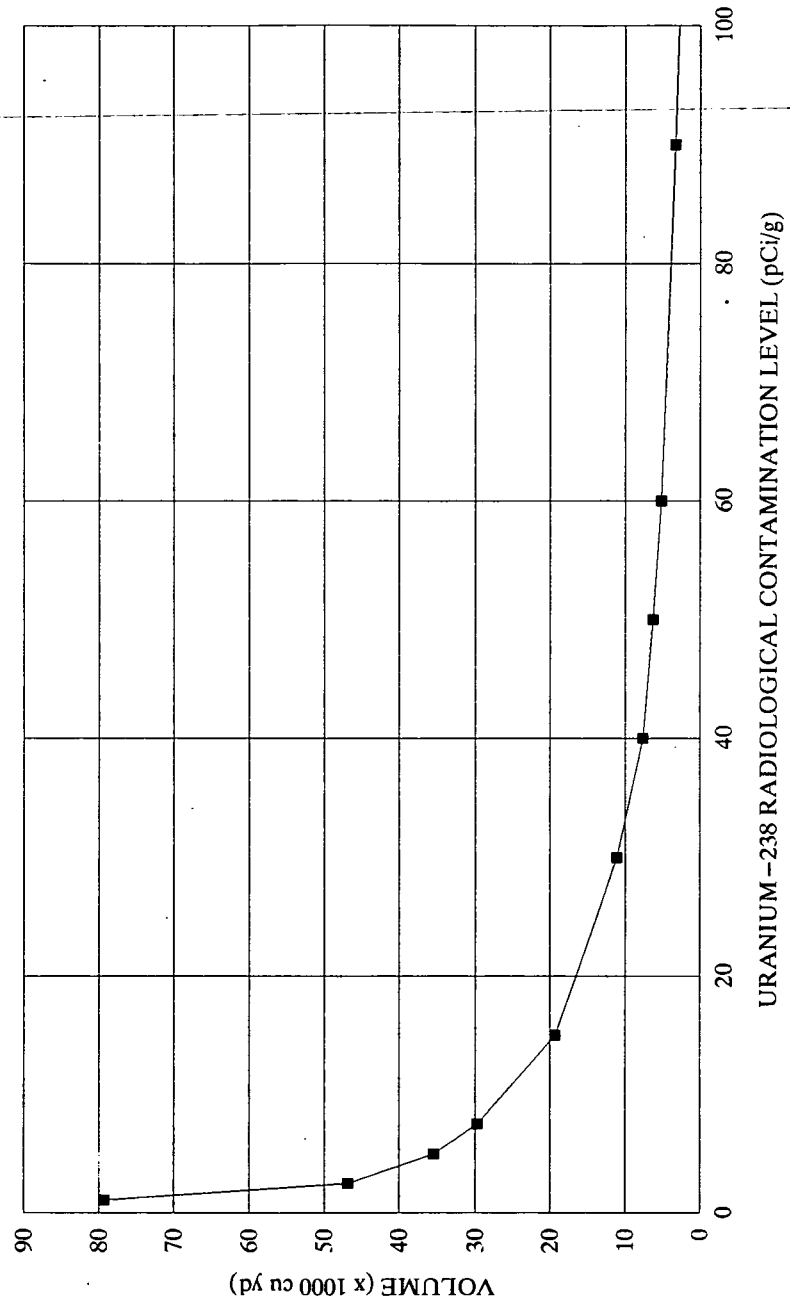

FIGURE E.1.8-1
SOLID WASTE LANDFILL
URANIUM-238 CONTAMINATED VOLUMES

000103

TABLE E.1–32
TOTAL VOLUME
LIME SLUDGE PONDS

		Volumes in Cubic Yards; U–238 in pCi/g								
		Berm		Sludge		Till		GMA Soil		Total
U–238 Concentration		Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume
Above	0 pCi/g :	5556	6.1	16493	2.2	119560	0.8	– – –	– – –	– – –
Above	1.12 pCi/g :	5556	6.1	15451	2.3	13425	1.2	0	0	34432
Above	2.5 pCi/g :	5556	6.1	4456	3.5	0	0	0	0	10012
Above	5 pCi/g :	3762	6.9	231	5.8	0	0	0	0	3993
Above	7.5 pCi/g :	1042	9.5	0	0	0	0	0	0	1042
Above	15 pCi/g :	0	0	0	0	0	0	0	0	0
Above	30 pCi/g :	0	0	0	0	0	0	0	0	0
Above	40 pCi/g :	0	0	0	0	0	0	0	0	0
Above	50 pCi/g :	0	0	0	0	0	0	0	0	0
Above	60 pCi/g :	0	0	0	0	0	0	0	0	0
Above	90 pCi/g :	0	0	0	0	0	0	0	0	0
Above	125 pCi/g :	0	0	0	0	0	0	0	0	0
Above	250 pCi/g :	0	0	0	0	0	0	0	0	0
Above	500 pCi/g :	0	0	0	0	0	0	0	0	0
Above	1000 pCi/g :	0	0	0	0	0	0	0	0	0

000104

5861

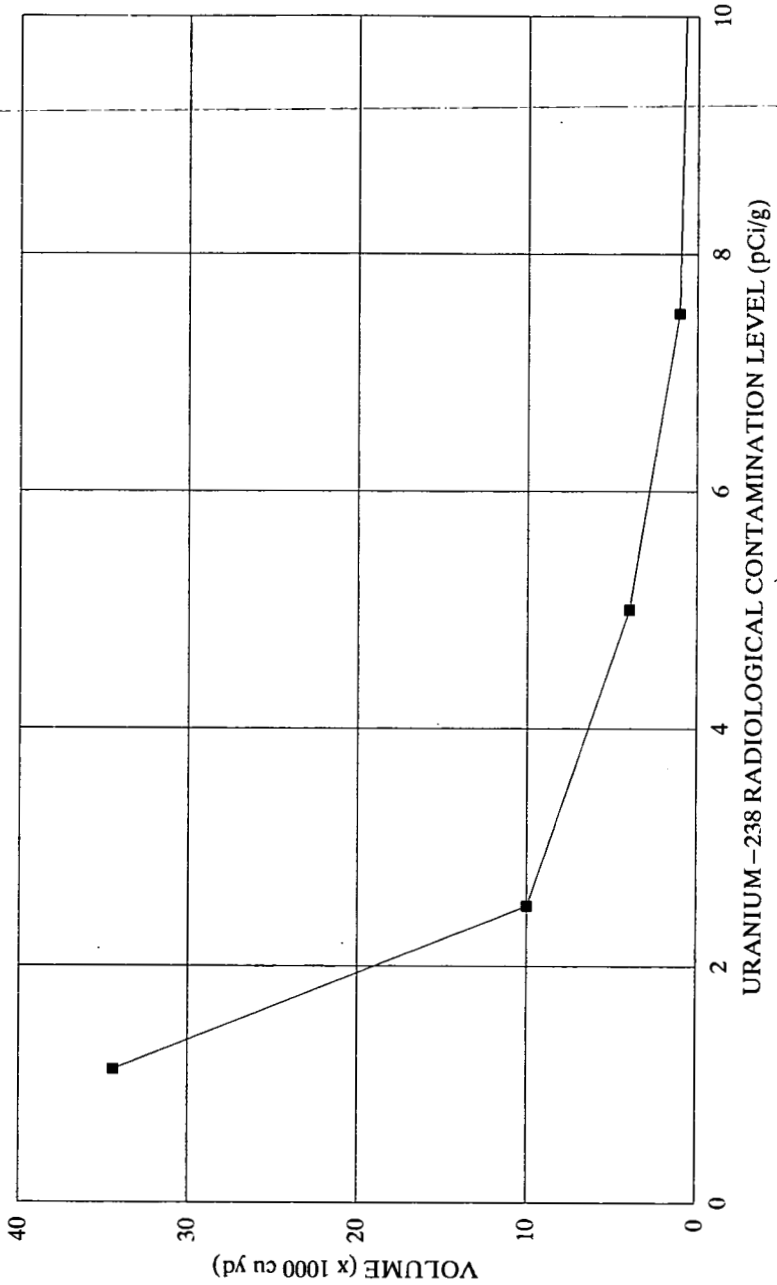

FIGURE E.1.8-2
LIME SLUDGE PONDS
URANIUM-238 CONTAMINATED VOLUMES

000105

TABLE E.1-33
TOTAL VOLUME
INACTIVE FLYASH PILE

		Inactive Flyash Pile (Volumes in Cubic Yards, U-238 in pCi/g)							
		Cover Material		Flyash		Fill/Debris		Impacted Till	
U-238	Concentration	Volume	Avg.U-238	Volume	Avg.U-238	Volume	Avg.U-238	Volume	Avg.U-238
Above	0 pCi/g:	1157	19.3	43634	7.2	51100	67.4	4514	93.0
Above	1.12 pCi/g:	1042	21.5	43634	7.2	46412	74.2	3299	127.2
Above	2.5 pCi/g:	1042	21.5	42593	7.3	45486	75.7	3241	129.4
Above	5 pCi/g:	1042	21.5	21528	10.9	41898	81.8	3183	131.7
Above	7.5 pCi/g:	984	22.4	16435	12.4	38947	87.5	2836	147.0
Above	15 pCi/g:	637	28.6	3299	19.1	30729	108.0	2431	169.7
Above	30 pCi/g:	289	37.9	0	0	21644	144.4	1505	261.3
Above	40 pCi/g:	58	48.3	0	0	18229	164.9	1331	290.9
Above	50 pCi/g:	0	0	0	0	15856	182.9	1215	314.0
Above	60 pCi/g:	0	0	0	0	13947	200.5	1215	314.0
Above	90 pCi/g:	0	0	0	0	10590	240.4	1042	352.7
Above	125 pCi/g:	0	0	0	0	8275	277.6	926	383.6
Above	250 pCi/g:	0	0	0	0	3530	426.9	637	476.6
Above	500 pCi/g:	0	0	0	0	926	683.7	231	676.7
Above	1000 pCi/g:	0	0	0	0	0	0	0	0

000105

TABLE E.1 – 33, Continued
TOTAL VOLUME
INACTIVE FLYASH PILE

		Inactive Flyash Pile (Continued)				
		Remaining Till		GMA		TOTAL
U – 238 Concentration		Volume	Avg.U – 238	Volume	Avg.U – 238	Volume
Above	0 pCi/g:	12268	0.6	– – –	– – –	– – –
Above	1.122 pCi/g:	0	0	984	1.4	95371
Above	2.5 pCi/g:	0	0	0	0	92362
Above	5 pCi/g:	0	0	0	0	67651
Above	7.5 pCi/g:	0	0	0	0	59202
Above	15 pCi/g:	0	0	0	0	37096
Above	30 pCi/g:	0	0	0	0	23438
Above	40 pCi/g:	0	0	0	0	19618
Above	50 pCi/g:	0	0	0	0	17071
Above	60 pCi/g:	0	0	0	0	15162
Above	90 pCi/g:	0	0	0	0	11632
Above	125 pCi/g:	0	0	0	0	9201
Above	250 pCi/g:	0	0	0	0	4167
Above	500 pCi/g:	0	0	0	0	1157
Above	1000 pCi/g:	0	0	0	0	0

000107

5861

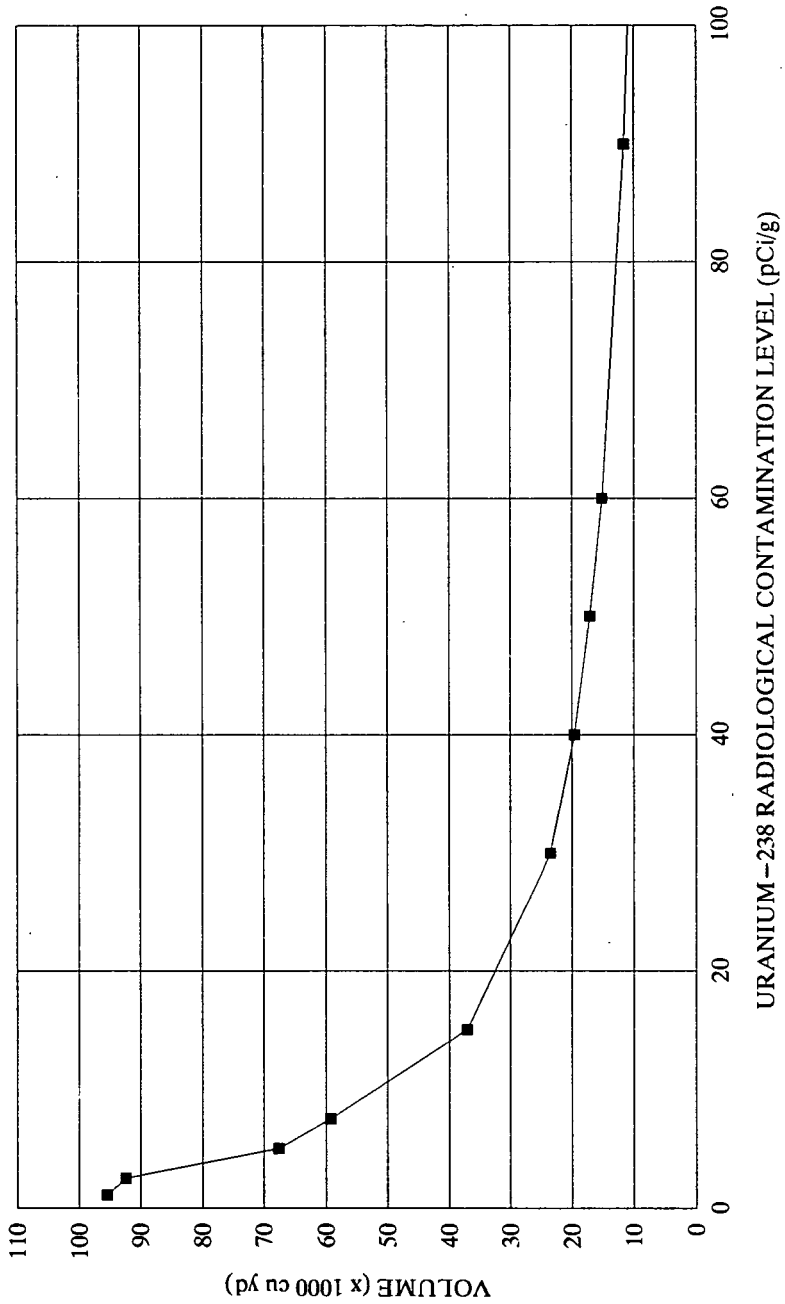

FIGURE E.1.8-3
INACTIVE FLYASH PILE
URANIUM-238 CONTAMINATED VOLUMES

000108

TABLE E.1–34
TOTAL VOLUME
SOUTH FIELD

	South Field (Volumes in Cubic Yards, U–238 in pCi/g)								
	Fill/Debris		Impacted Till		Remaining Till		GMA Soil		Total
U–238 Concentration	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume
Above 0 pCi/g:	120081	8.5	55903	10.0	162789	1.2	– – –	– – –	– – –
Above 1.12 pCi/g:	109896	9.2	49421	11.3	56771	2.3	637	1.2	216609
Above 2.5 pCi/g:	95660	10.3	40509	13.3	21181	3.2	0	0	157234
Above 5 pCi/g:	44618	17.9	18576	24.8	0	0	0	0	63136
Above 7.5 pCi/g:	22049	30.0	14063	30.9	0	0	0	0	36112
Above 15 pCi/g:	13252	43.2	9144	41.9	0	0	0	0	22396
Above 30 pCi/g:	8275	56.2	5266	57.5	0	0	0	0	13541
Above 40 pCi/g:	5324	67.8	3299	71.1	0	0	0	0	8623
Above 50 pCi/g:	3762	77.4	2488	79.9	0	0	0	0	6250
Above 60 pCi/g:	2720	85.9	1447	97.9	0	0	0	0	4167
Above 90 pCi/g:	868	111.6	579	134.4	0	0	0	0	1447
Above 125 pCi/g:	174	140.1	347	154.9	0	0	0	0	521
Above 250 pCi/g:	0	0	0	0	0	0	0	0	0
Above 500 pCi/g:	0	0	0	0	0	0	0	0	0
Above 1000 pCi/g:	0	0	0	0	0	0	0	0	0

000109

5861

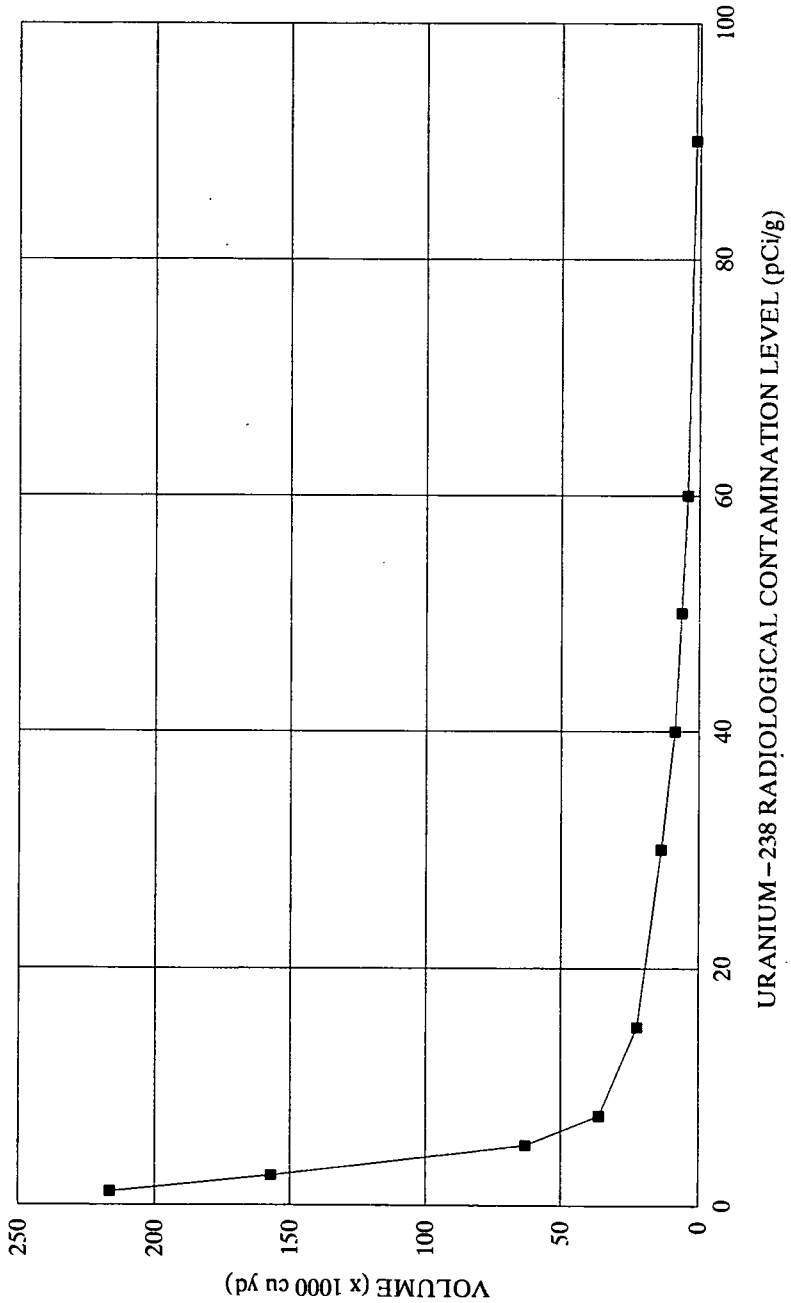

FIGURE E.1.8-4
SOUTH FIELD
URANIUM-238 CONTAMINATED VOLUMES

000110

TABLE E.1–35
TOTAL VOLUME
ACTIVE FLYASH PILE

		Active Flyash Pile (Volumes in Cubic Yards, U–238 in pCi/g)								
		Flyash		Impacted Till		Remaining Till		GMA		TOTAL
U–238 Concentration		Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume
Above	0 pCi/g:	65046	4.4	8160	1.3	39873	0.8	– – –	– – –	– – –
Above	1.12 pCi/g:	65046	4.4	6424	1.4	0	0	0	0	71470
Above	2.5 pCi/g:	65046	4.4	58	2.7	0	0	0	0	65104
Above	5 pCi/g:	14120	5.7	0	0	0	0	0	0	14120
Above	7.5 pCi/g:	289	10.1	0	0	0	0	0	0	289
Above	15 pCi/g:	0	0	0	0	0	0	0	0	0
Above	30 pCi/g:	0	0	0	0	0	0	0	0	0
Above	40 pCi/g:	0	0	0	0	0	0	0	0	0
Above	50 pCi/g:	0	0	0	0	0	0	0	0	0
Above	60 pCi/g:	0	0	0	0	0	0	0	0	0
Above	90 pCi/g:	0	0	0	0	0	0	0	0	0
Above	125 pCi/g:	0	0	0	0	0	0	0	0	0
Above	250 pCi/g:	0	0	0	0	0	0	0	0	0
Above	500 pCi/g:	0	0	0	0	0	0	0	0	0
Above	1000 pCi/g:	0	0	0	0	0	0	0	0	0

5861

000131

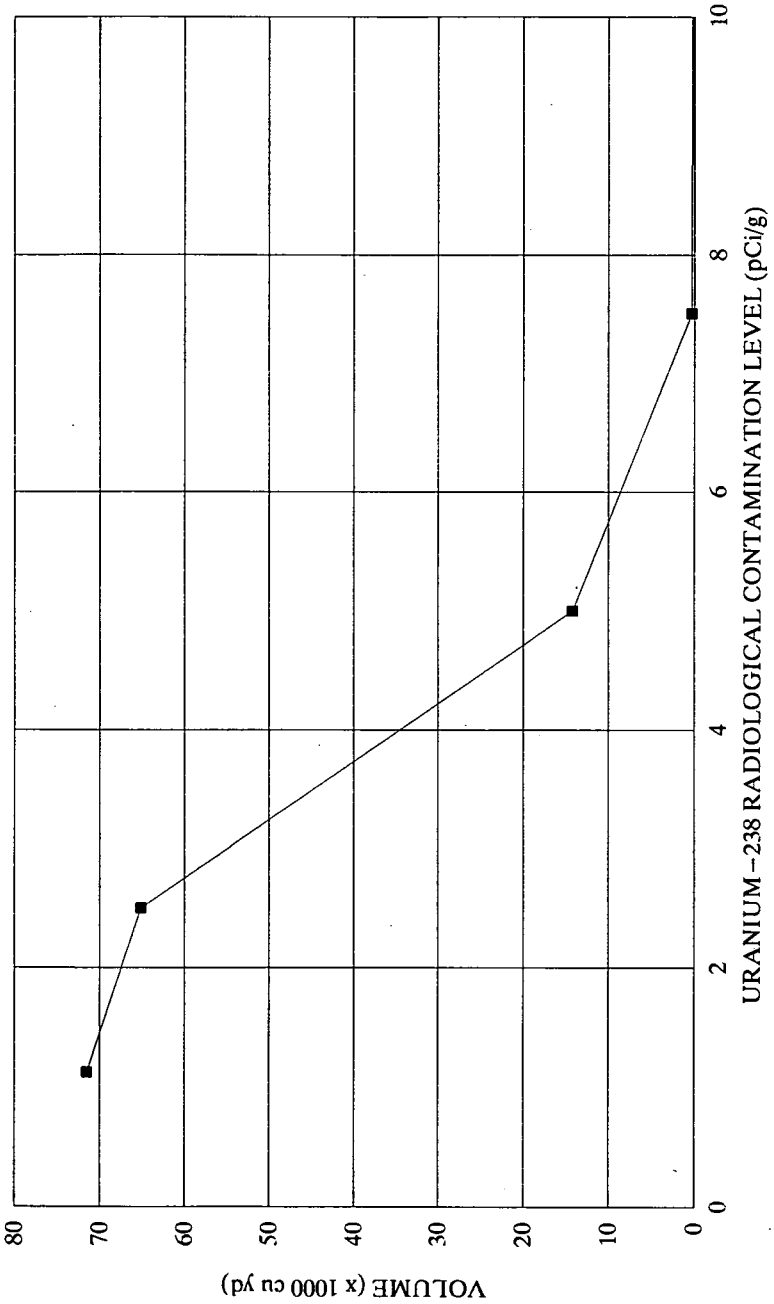

FIGURE E.1.8-5
ACTIVE FLYASH PILE
URANIUM-238 CONTAMINATED VOLUMES

000112

TABLE E.1–36
Till–Based Volume
(More Than 18 Feet of Till)

	Cover Material		Volumes in Cubic Yards; U–238 in pCi/g				Other Fill & Debris		Volumes in Cubic Yards; U–238 in pCi/g			
	Inactive Flyash Pile		South Field		Active Flyash Pile		Inactive Flyash Pile		South Field		Active Flyash Pile	
U–238 Concentration	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238
Above 0 pCi/g:	0	0	0	0	0	0	0	0	19908	14.3	0	0
Above 1.12 pCi/g:	0	0	0	0	0	0	0	0	17882	15.9	0	0
Above 2.5 pCi/g:	0	0	0	0	0	0	0	0	16667	16.9	0	0
Above 5 pCi/g:	0	0	0	0	0	0	0	0	12442	21.4	0	0
Above 7.5 pCi/g:	0	0	0	0	0	0	0	0	9433	26.2	0	0
Above 15 pCi/g:	0	0	0	0	0	0	0	0	5671	36.8	0	0
Above 30 pCi/g:	0	0	0	0	0	0	0	0	3183	48.8	0	0
Above 40 pCi/g:	0	0	0	0	0	0	0	0	1736	60.1	0	0
Above 50 pCi/g:	0	0	0	0	0	0	0	0	1100	69.4	0	0
Above 60 pCi/g:	0	0	0	0	0	0	0	0	694	77.3	0	0
Above 90 pCi/g:	0	0	0	0	0	0	0	0	116	90.6	0	0
Above 125 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 250 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 500 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 1000 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0

001113

5861

TABLE E.1–36, Continued
Till–Based Volume
(More Than 18 Feet of Till)

	Flyash		Volumes in Cubic Yards; U–238 in pCi/g				Impacted Till		Volumes in Cubic Yards; U–238 in pCi/g			
	Inactive Flyash Pile		South Field		Active Flyash Pile		Inactive Flyash Pile		South Field		Active Flyash Pile	
U–238 Concentration	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238
Above 0 pCi/g:	0	0	0	0	10706	3.9	58	32.6	23090	12.8	1968	1.3
Above 1.12 pCi/g:	0	0	0	0	10706	3.9	58	32.6	19734	14.9	1852	1.3
Above 2.5 pCi/g:	0	0	0	0	10706	3.9	58	32.6	17535	16.5	0	0
Above 5 pCi/g:	0	0	0	0	1331	6	58	32.6	13021	20.9	0	0
Above 7.5 pCi/g:	0	0	0	0	58	7.5	58	32.6	10069	25.3	0	0
Above 15 pCi/g:	0	0	0	0	0	0	58	32.6	6019	35.4	0	0
Above 30 pCi/g:	0	0	0	0	0	0	58	32.6	3183	48.7	0	0
Above 40 pCi/g:	0	0	0	0	0	0	0	0	1852	58.4	0	0
Above 50 pCi/g:	0	0	0	0	0	0	0	0	1331	64.3	0	0
Above 60 pCi/g:	0	0	0	0	0	0	0	0	637	74.6	0	0
Above 90 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 125 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 250 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 500 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 1000 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0

000414

TABLE E.1–36, Continued
Till–Based Volume
(More Than 18 Feet of Till)

		Other Till		Volumes in Cubic Yards; U–238 in pCi/g				Sand & Gravel		Volumes in Cubic Yards; U–238 in pCi/g			
		Inactive Flyash Pile		South Field		Active Flyash Pile		Inactive Flyash Pile		South Field		Active Flyash Pile	
U–238 Concentration		Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238
Above	0 pCi/g:	405	0.8	90856	1.5	15220	0.8	0	0	13715	1.6	0	0
Above	1.12 pCi/g:	0	0	46586	2.3	0	0	0	0	7639	2.2	0	0
Above	2.5 pCi/g:	0	0	17998	3.2	0	0	0	0	2662	3.2	0	0
Above	5 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above	7.5 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above	15 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above	30 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above	40 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above	50 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above	60 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above	90 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above	125 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above	250 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above	500 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above	1000 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0

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TABLE E.1–36, Continued
Till–Based Volume
(More Than 18 Feet of Till)

		GMA Sand & Gravel Volumes in Cubic Yards; U–238 in pCi/g					
		Inactive Flyash Pile		South Field		Active Flyash Pile	
U–238 Concentration		Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238
Above	0 pCi/g:	637	0.3	184954	0	24769	0
Above	1.12 pCi/g:	0	0	0	0	0	0
Above	2.5 pCi/g:	0	0	0	0	0	0
Above	5 pCi/g:	0	0	0	0	0	0
Above	7.5 pCi/g:	0	0	0	0	0	0
Above	15 pCi/g:	0	0	0	0	0	0
Above	30 pCi/g:	0	0	0	0	0	0
Above	40 pCi/g:	0	0	0	0	0	0
Above	50 pCi/g:	0	0	0	0	0	0
Above	60 pCi/g:	0	0	0	0	0	0
Above	90 pCi/g:	0	0	0	0	0	0
Above	125 pCi/g:	0	0	0	0	0	0
Above	250 pCi/g:	0	0	0	0	0	0
Above	500 pCi/g:	0	0	0	0	0	0
Above	1000 pCi/g:	0	0	0	0	0	0

000316

TABLE E.1–37
Till–Based Volume
(Less Than 18 Feet of Till)

		Cover Material		Volumes in Cubic Yards; U–238 in pCi/g				Other Fill & Debris		Volumes in Cubic Yards; U–238 in pCi/g			
		Inactive Flyash Pile		South Field		Active Flyash Pile		Inactive Flyash Pile		South Field		Active Flyash Pile	
U–238 Concentration		Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238
Above	0 pCi/g:	1157	19.3	0	0	0	0	51100	67.4	100174	7.3	0	0
Above	0.844 pCi/g:	1042	21.5	0	0	0	0	46528	74	92419	7.9	0	0
Above	1.122 pCi/g:	1042	21.5	0	0	0	0	46412	74.2	92014	7.9	0	0
Above	2.5 pCi/g:	1042	21.5	0	0	0	0	45486	75.7	78993	8.9	0	0
Above	5 pCi/g:	1042	21.5	0	0	0	0	41898	81.8	32176	16.5	0	0
Above	7.5 pCi/g:	984	22.4	0	0	0	0	38947	87.5	12616	32.8	0	0
Above	15 pCi/g:	637	28.6	0	0	0	0	30729	108	7581	48	0	0
Above	30 pCi/g:	289	37.9	0	0	0	0	21644	144.4	5093	60.8	0	0
Above	40 pCi/g:	58	48.3	0	0	0	0	18229	164.9	3588	71.6	0	0
Above	50 pCi/g:	0	0	0	0	0	0	15856	182.9	2662	80.7	0	0
Above	60 pCi/g:	0	0	0	0	0	0	13947	200.5	2025	88.9	0	0
Above	90 pCi/g:	0	0	0	0	0	0	10590	240.4	752	114.8	0	0
Above	125 pCi/g:	0	0	0	0	0	0	8275	277.6	174	140.1	0	0
Above	250 pCi/g:	0	0	0	0	0	0	3530	426.9	0	0	0	0
Above	500 pCi/g:	0	0	0	0	0	0	926	683.7	0	0	0	0
Above	1000 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0

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TABLE E.1–37, Continued
Till–Based Volume
(Less Than 18 Feet of Till)

	Flyash		Volumes in Cubic Yards; U–238 in pCi/g				Impacted Till		Volumes in Cubic Yards; U–238 in pCi/g			
	Inactive Flyash Pile		South Field		Active Flyash Pile		Inactive Flyash Pile		South Field		Active Flyash Pile	
U–238 Concentration	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238
Above 0 pCi/g:	43634	7.2	0	0	54340	4.6	4456	93.8	32813	8.1	6192	1.4
Above 0.844 pCi/g:	43634	7.2	0	0	54340	4.6	3241	128.9	29977	8.8	6192	1.4
Above 1.122 pCi/g:	43634	7.2	0	0	54340	4.6	3241	128.9	29688	8.9	4572	1.5
Above 2.5 pCi/g:	42593	7.3	0	0	54340	4.6	3183	131.2	22975	10.9	58	2.7
Above 5 pCi/g:	21528	10.9	0	0	12789	5.6	3125	133.5	5556	33.9	0	0
Above 7.5 pCi/g:	16435	12.4	0	0	231	10.7	2778	149.4	3993	44.9	0	0
Above 15 pCi/g:	3299	19.1	0	0	0	0	2373	173.1	3125	54.6	0	0
Above 30 pCi/g:	0	0	0	0	0	0	1447	270.4	2083	71.1	0	0
Above 40 pCi/g:	0	0	0	0	0	0	1331	290.9	1447	87.3	0	0
Above 50 pCi/g:	0	0	0	0	0	0	1215	314	1157	97.9	0	0
Above 60 pCi/g:	0	0	0	0	0	0	1215	314	810	116.2	0	0
Above 90 pCi/g:	0	0	0	0	0	0	1042	352.7	579	134.4	0	0
Above 125 pCi/g:	0	0	0	0	0	0	926	383.6	347	154.9	0	0
Above 250 pCi/g:	0	0	0	0	0	0	637	476.6	0	0	0	0
Above 500 pCi/g:	0	0	0	0	0	0	231	676.7	0	0	0	0
Above 1000 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0

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TABLE E.1–37, Continued
Till–Based Volume
(Less Than 18 Feet of Till)

	Other Till		Volumes in Cubic Yards; U–238 in pCi/g				Sand & Gravel		Volumes in Cubic Yards; U–238 in pCi/g			
	Inactive Flyash Pile		South Field		Active Flyash Pile		Inactive Flyash Pile		South Field		Active Flyash Pile	
U–238 Concentration	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238
Above 0 pCi/g:	10127	0.6	54572	0.6	24653	0.8	1736	0.7	3646	0.8	0	0
Above 0.844 pCi/g:	0	0	14641	1.2	14931	0.9	0	0	2257	0.9	0	0
Above 1.122 pCi/g:	0	0	2546	2.2	0	0	0	0	0	0	0	0
Above 2.5 pCi/g:	0	0	521	2.8	0	0	0	0	0	0	0	0
Above 5 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 7.5 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 15 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 30 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 40 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 50 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 60 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 90 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 125 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 250 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 500 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0
Above 1000 pCi/g:	0	0	0	0	0	0	0	0	0	0	0	0

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TABLE E.1–37, Continued
Till–Based Volume
(Less Than 18 Feet of Till)

		GMA Sand & Gravel Volumes in Cubic Yards; U–238 in pCi/g					
		Inactive Flyash Pile		South Field		Active Flyash Pile	
U–238 Concentration		Volume	Avg.U–238	Volume	Avg.U–238	Volume	Avg.U–238
Above	0 pCi/g:	131887	0.1	284954	0	87095	0
Above	0.844 pCi/g:	3877	1.1	637	1.2	0	0
Above	1.122 pCi/g:	984	1.4	637	1.2	0	0
Above	2.5 pCi/g:	0	0	0	2.7	0	0
Above	5 pCi/g:	0	0	0	0	0	0
Above	7.5 pCi/g:	0	0	0	0	0	0
Above	15 pCi/g:	0	0	0	0	0	0
Above	30 pCi/g:	0	0	0	0	0	0
Above	40 pCi/g:	0	0	0	0	0	0
Above	50 pCi/g:	0	0	0	0	0	0
Above	60 pCi/g:	0	0	0	0	0	0
Above	90 pCi/g:	0	0	0	0	0	0
Above	125 pCi/g:	0	0	0	0	0	0
Above	250 pCi/g:	0	0	0	0	0	0
Above	500 pCi/g:	0	0	0	0	0	0
Above	1000 pCi/g:	0	0	0	0	0	0

APPENDIX E.1.9

SUPPORTING VOLUME CALCULATIONS FOR URANIUM-238

E.1.9.1 ON-SITE DISPOSAL CELL WASTE ACCEPTANCE CRITERIA VOLUMES

In accordance with the preliminary waste acceptance criteria (WAC) for on-site disposal listed in Appendix E.2, material remediated from the Operable Unit 2 subunits containing uranium-238 at concentrations exceeding 360 pCi/g will not be placed in the on-site disposal cell. Block modeling results were used to estimate the volume exceeding WAC. However, block modeling smooths high and low sample results in its interpolation process. In order to ensure conservative quantities for cost estimating purposes, 300 pCi/g was used as the cutoff for calculating volume. For each subunit, Table E.1-38 identifies the volume, obtained from block model analysis, that exceeds the 300 pCi/g criterion.

TABLE E.1-38
SUMMARY OF VOLUME EXCEEDING ON-SITE WAC

SUBUNIT	VOLUME EXCEEDING ON-SITE WAC
Solid Waste Landfill	0 yd^3
Lime Sludge Ponds	0 yd^3
Inactive Flyash Pile	3,100 yd^3
South Field	0 yd^3
Active Flyash Pile	0 yd^3
TOTAL	3,100 yd^3

E.1.9.2 PPE REMEDIATION VOLUME

In support of the cost estimates, it will be assumed that material excavated from the Operable Unit 2 subunits containing uranium-238 at concentrations exceeding 125 pCi/g will require level C personnel protective equipment (PPE). For each subunit, Table E.1-39 indentifies the volume, obtained from block model analysis, that will require level C PPE during excavation and handling.

TABLE E.1-39
SUMMARY OF VOLUME EXCEEDING LEVEL C PPE

SUBUNIT	VOLUME EXCEEDING 125 pCi/g
Solid Waste Landfill	1,678 yd^3
Lime Sludge Ponds	0 yd^3
Inactive Flyash Pile	9,201 yd^3
South Field	521 yd^3
Active Flyash Pile	0 yd^3
TOTAL	11,400 yd^3

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E.1.9.3 REMEDIATION BERM VOLUMES

For Alternative 6 (Excavation and On-Site Disposal with Off-Site Disposal of Fraction Exceeding WAC), the on-site disposal cell's exterior berm will be constructed from structurally sound clays and soils excavated from the subunits. Material used to construct the berm must not include any of the following:

- Material with uranium-238 concentration above surface soil exposure pathways PRL (55 pCi/g)
- Material contaminated with other COCs above established surface soil exposure pathways PRL
- Flyash
- Lime sludge
- Cover material
- Debris
- Sand or gravel
- Hazardous waste

The following volumes having a uranium-238 concentration above the surface soil exposure pathways PRL (55 pCi/g) have been interpolated from the tables in Section E.1.8.

TABLE E.1-40
VOLUME EXCEEDING URANIUM-238 SURFACE SOIL
EXPOSURE PATHWAYS PRL (55 pCi/g)

SUBUNIT	VOLUME EXCEEDING 55 pCi/g
Solid Waste Landfill	5,800 yd^3
Lime Sludge Ponds	0 yd^3
Inactive Flyash Pile	16,100 yd^3
South Field	5,200 yd^3
Active Flyash Pile	0 yd^3
TOTAL	27,100 yd^3

Based on the aforementioned criteria, the following volumes have been calculated for each subunit.

000124

Solid Waste Landfill:

Remediation Volume		21,200 yd^3
Exceeding 55 pCi/g	-	5,800 yd^3
Debris	-	5,300 yd^3
Total		10,100 yd^3

Lime Sludge Ponds:

Remediation Volume		16,800 yd^3
Exceeding 55 pCi/g	-	0 yd^3
Lime Sludge	-	16,500 yd^3
Other COCs	-	300 yd^3
Total		0 yd^3

Inactive Flyash Pile:

Remediation Volume		94,000 yd^3
Exceeding 55 pCi/g	-	16,100 yd^3
Debris	-	4,000 yd^3
Flyash	-	43,600 yd^3
Cover Material	-	1,000 yd^3
Total		29,300 yd^3

South Field:

Remediation Volume		77,600 yd^3
Exceeding 55 pCi/g	-	5,200 yd^3
Debris	-	6,500 yd^3
Sand and Gravel	-	1,200 yd^3
Hazardous Waste	-	300 yd^3
Total		64,400 yd^3

Active Flyash Pile:

Remediation Volume		65,100 yd^3
Exceeding 55 pCi/g	-	0 yd^3
Flyash	-	65,000 yd^3
Other COCs	-	100 yd^3
Total		0 yd^3

Table E.1-41 presents a summary of the remediation berm volumes.

TABLE E.1-41
SUMMARY OF VOLUME AVAILABLE FOR BERM CONSTRUCTION
FOR ALTERNATIVE 6 WITH AN ILCR OF 10^{-6}

SUBUNIT	VOLUME EXCEEDING 55 pCi/g
Solid Waste Landfill	10,100 yd^3
Lime Sludge Ponds	0 yd^3
Inactive Flyash Pile	29,300 yd^3
South Field	64,400 yd^3
Active Flyash Pile	0 yd^3
TOTAL	103,800 yd^3

APPENDIX E.1.10
REMEDIATION VOLUME CALCULATIONS—
FIRING RANGE LEAD

E.1.10 REMEDIATION VOLUME CALCULATIONS FIRING RANGE LEAD

Surface area of firing range is divided into three sectional grids (left, center, right) each 33.33 ft x 25 ft

Two borings taken in each grid in upper and lower center of grid (6 borings total).

boring dia. = 3 1/4 inch (or 0.058 ft^2)
boring depth = 5 ft
boring volume = 0.058 ft^2 x 5 ft = 0.29 ft^3

The two borings in the right grid produced no lead. The two borings in the left grid had lead in the first foot of the depth. The two borings in the center grid had lead at depths throughout the 5-foot boring.

	LEFT	CENTER	RIGHT
Boring No.	Sp-I, Sp-4	Sp-2, Sp-5	Sp-3, Sp-6
Depth of Lead	1 ft, 1 ft	5 ft, 5 ft	-0-, -0-

Average depth of lead

1 + 1 + 5 + 5 + 0 + 0 = 12/6 = 2 ft.

Volume of Lead Contaminated Soil

3 sections x section area x avg. depth of lead =
3 x (33.33 ft x 25 ft) x 2 ft = 5000 ft^3 OR 185 yd^3

Center Section had lead to 5 ft. So, additional volume of soil:

33.33 ft x 25 ft x (5-2)ft = 2500 ft^3 or 93 yd^3

Total volume of soil:

000128

185 cyd + 93 cyd = 278 cyd
say 300 cyd

Quantity of Lead

Sample	SP-1	SP-2	SP-3SP-4SP-5SP-6
	367g	941g	-0-10g509g-0-

Lead in borings: SP-1 & SP-4 are in left grid and contain lead to a 1-foot depth.

SP-2 & SP-5 are in middle grid and contain lead to a 5-foot depth.

SP-3 & SP-6 do not contain lead.

Quantity of lead in left grid:

Avg. lead per boring: (367g + 10g)/2 = 189g = .42 lb

borehole vol: $\frac{\pi\ (.27)^2}{4}$ x 1 ft = .06 cf

density of lead per boring = .42 lb/.06 cf = 7 lb/cf

Qty lead = 7 lb/cf x (33.33' x 25' x 1') = 5833 lb
say ⇒ 5850 lb

Quantity of lead in middle grid:

Avg. lead per boring = (941g + 509g)/2 = 725g = 1.6 lb

Borehole Vol: = $\frac{\pi\ (.27)^2}{4}$ x 5 ft = .29 cf

density of lead per boring = 1.6 lb/.29 cf = 5.5 lb/cf

Qty lead = 5.5 lb/cf x (33.33' x 25' x 5') = 22914 lb
say ⇒ 22950 lb

Qty lead in right grid:

0 lb

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Total lead: 5850 lb + 22950 lb = 28800 lb

Quantity of Lead

Sample	Sp-1	Sp-2	Sp-3	Sp-4	Sp-5	Sp-6
Lead Qt.	367 g	941 g	-0-	10 g.	509 g	-0-

Avg. lead per boring $= \frac{1827}{6} = 304.5g$

apparent density per borehole:

$$\frac{0.67 \text{ lb}}{0.29 \text{ ft}^3} = 2.31 \text{ lb/ft}^3$$

Use 2.31 lb/ft^3 density of lead

Amount of soil is 300 cyd or 8100 ft^3

Quantity of lead = 8100 ft^3 x 2.31 lb/ft^3

= 18,711 lbs.

say 19,000 lbs.

000130

APPENDIX E.2

WASTE ACCEPTANCE CRITERIA

APPENDIX E.2.1

WASTE ACCEPTANCE CRITERIA FOR OFF-SITE DISPOSAL

APPENDIX E.2.1

WASTE ACCEPTANCE CRITERIA FOR OFF-SITE DISPOSAL

Envirocare, Inc. of Clive, Utah (Envirocare) and the Nevada Test Site (NTS) have been identified as potential off-site disposal facilities for contaminated material from Operable Unit 2. For contaminated material from Operable Unit 2 to be accepted at either disposal site, samples from each shipment must be provided to the disposal site. Samples must pass the toxicity characteristic leaching procedure (TCLP) for eight metals and 32 organics as defined in 40 CFR 261.24. Furthermore, materials that have free-standing moisture in excess of 0.5 percent by volume of the container cannot be accepted at either disposal facility. Free moisture, however, does not include in-situ moisture. Free moisture can be measured by the paint filter liquid test or may be assessed by visual inspection at the discretion of the disposal site. For transport, contaminated materials must meet Department of Transportation (DOT) requirements (49 CFR 173.431).

Mixed waste from Operable Unit 2 can be accepted at either of the proposed off-site facilities provided the material meets certain disposal criteria. Table E.2.1-1 presents the metals, semivolatile organic compounds, and pesticides listed as contaminants of concern (COCs) for Operable Unit 2. Where applicable, the regulatory level associated with each compound is also presented. This regulatory level is one of two values:

- Twenty times the toxicity characteristic concentration (40 CFR 261.24). If the concentration in a sample exceeds this value, a TCLP test must be conducted.
- Maximum allowable concentrations in wastes for land disposal (40 CFR 268.43).

The following sections discuss the two proposed off-site disposal facilities and the acceptance criteria particular to each facility.

<u>Envirocare of Utah</u>

Envirocare can dispose of mixed waste (MW), normally occurring radioactive material (NORM), and low activity radioactive material (LARM). Envirocare can handle bulk materials or materials packaged in bags, drums, boxes, or roll-off containers. Transportation to the site can be via truck or rail.

TABLE E.2.1-1

REGULATORY LEVEL COMPARED TO MAXIMUM CONCENTRATIONS DETECTED

Contaminant of Concern	Regulatory Level (mg/kg)	Maximum Detected Concentration (mg/kg) by Operable Unit 2 Subunit [a,b]				
		Solid Waste Landfill	Lime Sludge Pond	Inactive Flyash Pile	South Field	Active Flyash Pile
METALS						
Antimony	NA	2.73E+01	2.92E+01	1.63E+01	2.97E+01	3.11E+01
Arsenic	1.00E+02 [c]	1.54E+01	1.46E+01	8.18E+01 [f]	7.56E+01 [f]	1.45E+02 [f]
Beryllium	NA	1.80E+00	2.10E+00	8.70E+00	4.60E+00	6.40E+00
SEMIVOLATILE ORGANICS						
Benzo(a)anthracene	NA	3.10E+02	9.10E-01	1.30E-01	5.50E+00	1.10E-01
Benzo(a)pyrene	NA	2.60E+02	1.10E+00	1.30E-01	9.40E+00	1.20E-01
Benzo(b)fluoranthene	NA	2.20E+02	1.00E+00	3.60E-01	6.20E+00	1.80E-01
Benzo(k)fluoranthene	NA	1.40E+02	8.00E-01	2.60E-01	7.30E+00	7.30E-02
Dibenzo(a,h)anthracene	NA	7.9E+01	3.20E-01	2.00E-03	1.90E+00	ND
Indeno(1,2,3-cd)pyrene	NA	1.50E+02	7.20E-01	6.30E-02	6.00E+00	7.40E-02
PESTICIDES [d]						
Aroclor-1254	NA	1.50E-01	5.90E-01	5.70E-01	1.10E+00	ND
Aroclor-1260	NA	6.10E-01	ND	3.90E-01	8.90E-02	ND
Dieldrin	1.3E-01 [e]	1.30E-02	ND	ND	1.60E-02	ND

Contaminant of Concern ND -- Non-Detect NA -- Not Applicable

[a]Concentrations represent maximum detected value for surface soil, subsoil, or sediment for each subunit.
[b]Some samples from the Firing Range in the South Field failed TCLP analysis for lead. Maximum detected lead concentration was 2.82E+03 mg/kg. Regulatory limit for lead is 1.00E+02 mg/kg (see Note c). However, lead is not a contaminant of concern for Operable Unit 2.
[c]This is total concentration based on 20 times toxicity characteristic concentration (40 CFR 261.24) to account for dilution during TCLP test.
[d]Maximum allowable concentration of total halogenated organic compounds (HOCs) is 1000 mg/kg (40 CFR 268.32)
[e]Maximum allowable concentration in waste for land disposal (40 CFR 268.43)
[f]Although the maximum detected concentration was near or above the regulatory level, all samples were below TCLP limits for classification as a hazardous waste.

As indicated on Table E.2.1-1, at least one sample from the Active Flyash Pile exceeded the waste acceptance criteria (WAC) for arsenic and samples from the Inactive Flyash Pile and South Field approach it. However, all samples were below the TCLP limit for arsenic for classification as a hazardous waste. Therefore, none of this material is expected to exceed these criteria, although testing would have to be conducted to confirm this. Samples from the Firing Range exceeded the TCLP limit for lead. Therefore, it is estimated that approximately 300 cubic yards of this material will require treatment prior to disposal.

Low level radioactive waste must also meet acceptance criteria for each radionuclide present. Table E.2.1-2 lists acceptance criteria for Envirocare and maximum activity levels detected in each Operable Unit 2 subunit for the complete list of radioactive COCs (across all five subunits).

As indicated on Table E.2.1-2, maximum activity levels of radionuclides detected within the five subunits are generally 1 to 3 orders of magnitude lower than the acceptance criteria for Envirocare. The only exceptions are that activity levels for radium-228, thorium-232, and thorium-228 in the South Field have been detected in isolated samples on the same order of magnitude as the acceptance criteria. However, none of the contaminants have been shown to exceed the acceptance criteria for Envirocare. Also, contaminant levels may be averaged over a shipment to Envirocare, thus providing flexibility should activity levels for individual samples be detected above the acceptance limits. Therefore, it is assumed that all material from the Operable Unit 2 subunits will meet the average radiological waste acceptance criteria for a shipment.

Samples are to be provided in advance of shipment and will be analyzed by Envirocare for the incoming-shipment parameters listed in Table E.2.1-3. Shipments failing any of the listed parameters will not be accepted for disposal.

Nevada Test Site

NTS will accept low-level waste (LLW) and MW for disposal. Transuranic waste (TRU) and transuranic mixed waste (TRUMW) will only be accepted for storage. NTS cannot accept bulk shipments of MW, so such material from Operable Unit 2 will have to be containerized.

TABLE E.2.1-2

ENVIROCARE ACCEPTANCE CRITERIA COMPARED TO MAXIMUM ACTIVITIES DETECTED

Contaminant of Concern	Acceptance Criteria for Envirocare [b] (pCi/g)	Maximum Detected Activity (pCi/g) by Operable Unit 2 Subunit [a]				
		Solid Waste Landfill	Lime Sludge Pond	Inactive Flyash Pile	South Field	Active Flyash Pile
Cesium-137	< 5.6E+02	5.22E-01	8.90E-01	6.41E-01	8.36E-01	9.19E-01
Neptunium-237	< 2.0E+03	3.11E+00	7.20E-01	3.73E+01	6.53E+00	4.50E-01
Plutonium-238	< 1.0E+04	9.02E-01	6.62E-01	1.85E+00	7.35E-01	1.29E+00
Radium-226	< 2.0E+03	1.13E+02	5.93E+00	4.23E+01	3.12E+01	6.22E+00
Radium-228	< 1.8E+03	6.65E+00	2.92E+00	3.13E+00	6.75E+02	5.32E+00
Thorium-228	-- [c]	9.36E+00	2.91E+00	4.10E+00	5.95E+02	5.79E+00
Thorium-230	< 1.5E+04	7.20E+02	4.48E+01	1.21E+02	5.73E+01	6.74E+00
Thorium-232	< 6.8E+02	8.22E+00	2.75E+00	4.00E+00	6.00E+02	5.08E+00
Uranium-234	< 3.7E+04	5.53E+02	2.65E+01	1.38E+03	3.78E+02	1.73E+01
Uranium-235/236	< 7.7E+02 [d]	2.89E+01	1.83E+00	6.88E+01	2.06E+01	4.12E+00
Uranium-238	< 2.8E+04	5.77E+02	8.40E+01	1.57E+03	3.97E+02	1.26E+01
Uranium-Total (mg/kg)	-- [e]	1.77E+03	2.44E+02	3.58E+03	1.17E+03	5.18E+01

Contaminant of Concern

[a] Activity levels represent maximum detected value for surface soil, subsoil, or sediment for each subunit.
[b] Acceptance criteria for Envirocare is the maximum average value permitted for a shipment of waste.
[c] Thorium 228 is a daughter of Thorium 232 (assumed at same concentration in equilibrium).
[d] Acceptance criteria provided is for uranium-235. Uranium-236 acceptance criteria is 3.6E+04 pCi/g.
[e] Acceptance criteria for uranium-natural is 1.8E+04 pCi/g and for uranium-depleted is 1.1E+05 pCi/g.

TABLE E.2.1-3

INCOMING-SHIPMENT PARAMETERS FOR OFF-SITE DISPOSAL FACILITIES

ENVIROCARE		NEVADA TEST SITE	
Parameter	Test Method [a]	Parameter	Test Method
Paint Filter Liquid Test	EC-0725	Free Liquid (Paint Filter Test)	EPA Method 9095
Cyanide Test	EC-0775	Cyanides	EPA Method 9010 or 9012
Sulfide Test	EC-0775	Sulfides	EPA Method 9030
Pyrophoricity	EC-1350	Reactivity	As Described in 40 CFR 261.23
Air Reactivity	EC-1400		
Water Reactivity	EC-1425		
Solid/Soil pH	EC-0700		
Oxydizer/Reducer Test	EC-0750		
Photoionizer "sniffer" Test	EC-0800		
Shock Sensitivity	EC-1375		
		Ignitability	EPA Method 1010 or 1020
		Corrosivity	EPA Method 9040
		Toxicity Characteristic	EPA Method 1311
		Land Disposal Restriction--Solvents	TCLP (F001-F005)
		Land Disposal Restriction--Halogenated Organic Compounds	EPA Method 9020
		PCBs	EPA Method 8080

[a] Tests must be performed to specific criteria provided by Envirocare.

LLW is defined as radioactive waste not classified as high-level waste, spent nuclear fuel, TRU, uranium mill tailings, MW, or 11e(2) by-product material as defined in DOE Order 5820.2a. LLW must have a transuranic nuclide activity level less than 100 nCi/g.

MW is defined as waste containing both radioactive and hazardous components, as defined by the Atomic Energy Act and the Resource Conservation and Recovery Act, respectively. MW must meet land disposal restrictions (LDRs) (40 CFR 268).

NTS has not provided a breakdown based on the particular radioactive contaminants of concern present in Operable Unit 2, as was provided by Envirocare. However, the external radiation level for packages must not exceed 200 millirem per hour on contact during handling, shipment, and disposal.

Samples are to be provided in advance of shipment and will be analyzed by NTS for the incoming-shipment parameters listed in Table E.2.1-3. Shipments failing any of the listed parameters will not be accepted for disposal.

APPENDIX E.2.2

PRELIMINARY WASTE ACCEPTANCE CRITERIA FOR ON-SITE DISPOSAL

APPENDIX E.2.2

PRELIMINARY WASTE ACCEPTANCE CRITERIA FOR ON-SITE DISPOSAL

An on-site engineered disposal facility is an option for disposal of contaminated material from Operable Unit 2. To be protective of groundwater in the Great Miami Aquifer over the 1,000 year modeling timeframe, the contaminated material must meet certain acceptance criteria. Preliminary WAC were developed for uranium. The preliminary WAC were developed based on a conservative groundwater modeling approach that is presented in Appendix D.1.6. The final WAC will be determined during design of the disposal facility. Due to cap or liner modifications during design and the conservatism employed in the current modeling, the final WAC could be higher than the preliminary WAC that are presented.

Table E.2.2-1 presents the preliminary WAC for the on-site disposal facility and compares it with maximum levels of the respective contaminants detected in the Operable Unit 2 subunits. As indicated in the table, only material from the Solid Waste Landfill, Inactive Flyash Pile, and South Field is expected to exceed the criteria. It is estimated that a maximum of 3100 cubic yards of material will require off-site disposal or treatment prior to disposal in the on-site cell (see Appendix E.1).

The preliminary WAC presented here are based on a desorption distribution coefficient of 15 mL, which is lower than any actually measured in the Operable Unit 2 materials. Therefore, the assumed leachability is considerably higher than the measured leachability and results in a lower associated uranium concentration. Hence, the assumption of the lower desorption distribution coefficient serves to cause a conservative WAC and minimize concerns about the relationship between leachability and uranium concentration for Operable Unit 2 wastes during remediation.

TABLE E.2.2-1

PRELIMINARY WASTE ACCEPTANCE CRITERIA FOR ON-SITE DISPOSAL COMPARED TO MAXIMUM DETECTED VALUE

Contaminant of Concern	Units	Preliminary Waste Acceptance Criteria for On-Site Disposal (pCi/g)	Maximum Detected Value by Operable Unit 2 Subunit [a]				
			Solid Waste Landfill	Lime Sludge Pond	Inactive Flyash Pile	South Field	Active Flyash Pile
Uranium-238	pCi/g	< 3.6E+02	5.77E+02	8.40E+01	1.57E+03	3.97E+02	1.26E+01
Total Uranium	ppm	< 1.1E+0.3	1.77E+03	2.44E+02	3.58E+3	1.17E+03	3.13E+01

Contaminant of Concern

[a] Activity levels represent maximum detected value for surface soil, subsoil, or sediment for each subunit.
[b] Acceptance criteria for on-site disposal is the maximum value permitted (see Appendix D.1 for development).

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E.3

APPENDIX E.3

OPERABLE UNIT 2 ON-SITE DISPOSAL CELL

APPENDIX E.3.1
ON-SITE DISPOSAL CELL

E.3.1 ON-SITE DISPOSAL CELL

E.3.1.1 SITING CRITERIA

E.3.1.1.1 General

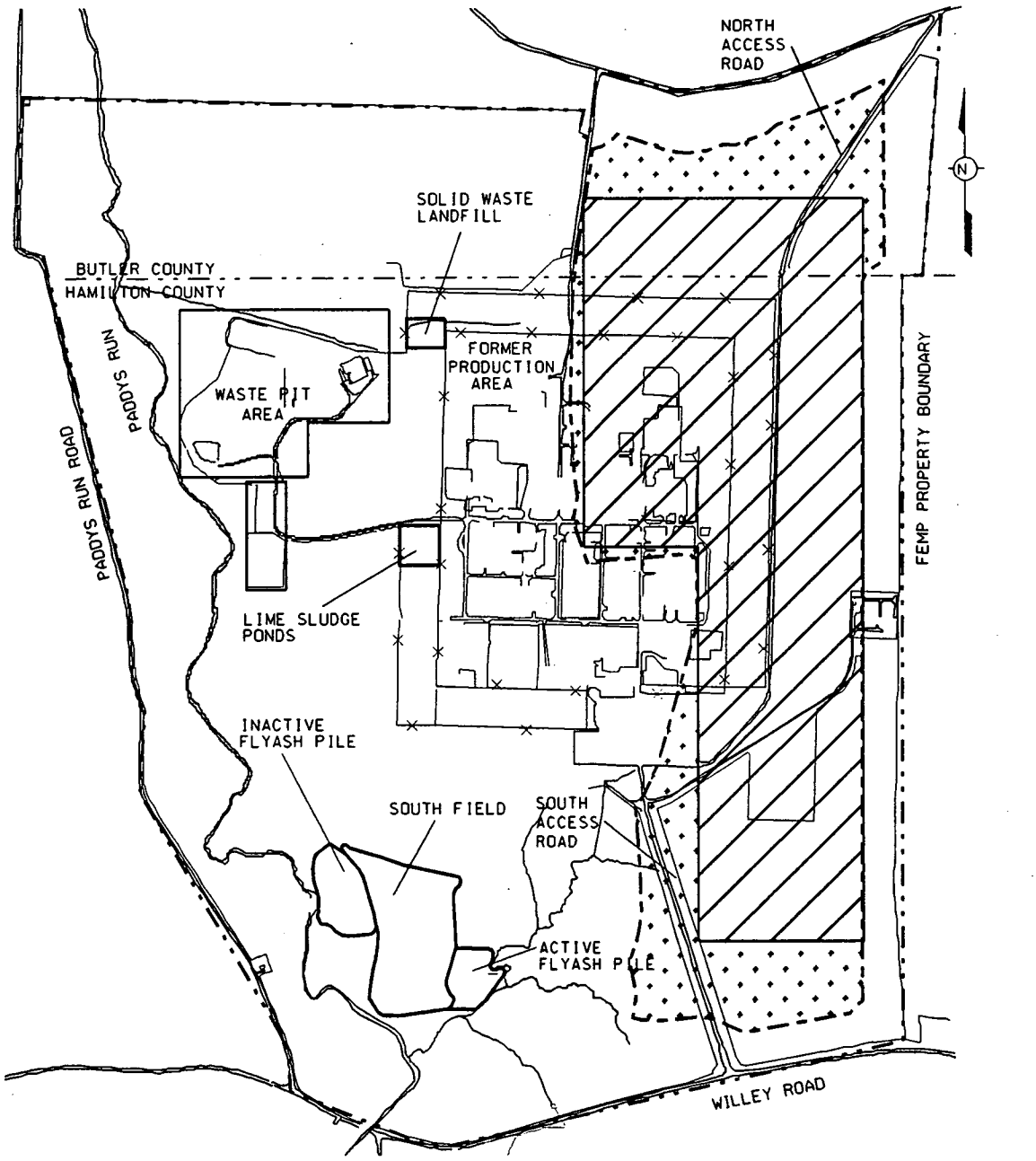
Siting of an on-site disposal facility is limited by certain physical and administrative constraints. Figure E.3.1-1 presents the area that is potentially acceptable for siting a disposal facility. This area was determined based on the following physical constraints:

- Underlying gray till in excess of 10 feet.
- Boundaries of the waste at least 1,000 feet from residences or residential wells [OAC 3745-27-07(B)11) and (B)(13)].
- Boundaries of the waste offset at least 300 feet from the site property lines [OAC 3745-27-07(B)(12)].

In addition to these considerations, siting of a disposal facility avoids the western portion of the property for four general reasons:

- The presence of a stream (Paddys Run) and its associated floodplain [OAC 3745-27-07 (A)(3) & (B)(10)].
- The presence of wetlands at various locations [OAC 3745-27-07 (B)(14)].
- A geologic basin feature (as described in Section 3.5 of the Operable Unit 5 RI) dominates the southwestern portion of the property.
- Sands interbedded in the glacial till are more frequently encountered in the western portion of the property (these sands are also described in the Operable Unit 5 RI).

Figure E.3.1-1 also shows an area sufficient to site a FEMP-wide disposal facility that would accept the maximum anticipated volume of material generated from Operable Units 2, 3, and 5. This conceptual cell would have side slopes of 5:1, 40 feet high at the top of the side slopes, and a maximum central height of about 70 feet. This represents an extreme case, and any actual facility is likely to be much smaller than this footprint. This footprint is presented to show that the maximum anticipated waste volume can conceptually be fit into the area that is potentially acceptable for locating an on-site facility. Suitable hydrogeology in this area would be verified during design of the on-site disposal facility.



SCALE

0 1200 2400 FEET

0 288 576 METER

LEGEND

AREA FOR 8,500,000 CU. YD. SITE-WIDE FACILITY

POTENTIALY ACCEPTABLE REGION

FEMP BOUNDARY

FIGURE E.3.1-1
SITE PLAN
POTENTIALLY ACCEPTABLE REGION
FOR SITEWIDE ON-SITE DISPOSAL

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E.3.1.1.2 Siting of Operable Unit 2 Disposal Cell

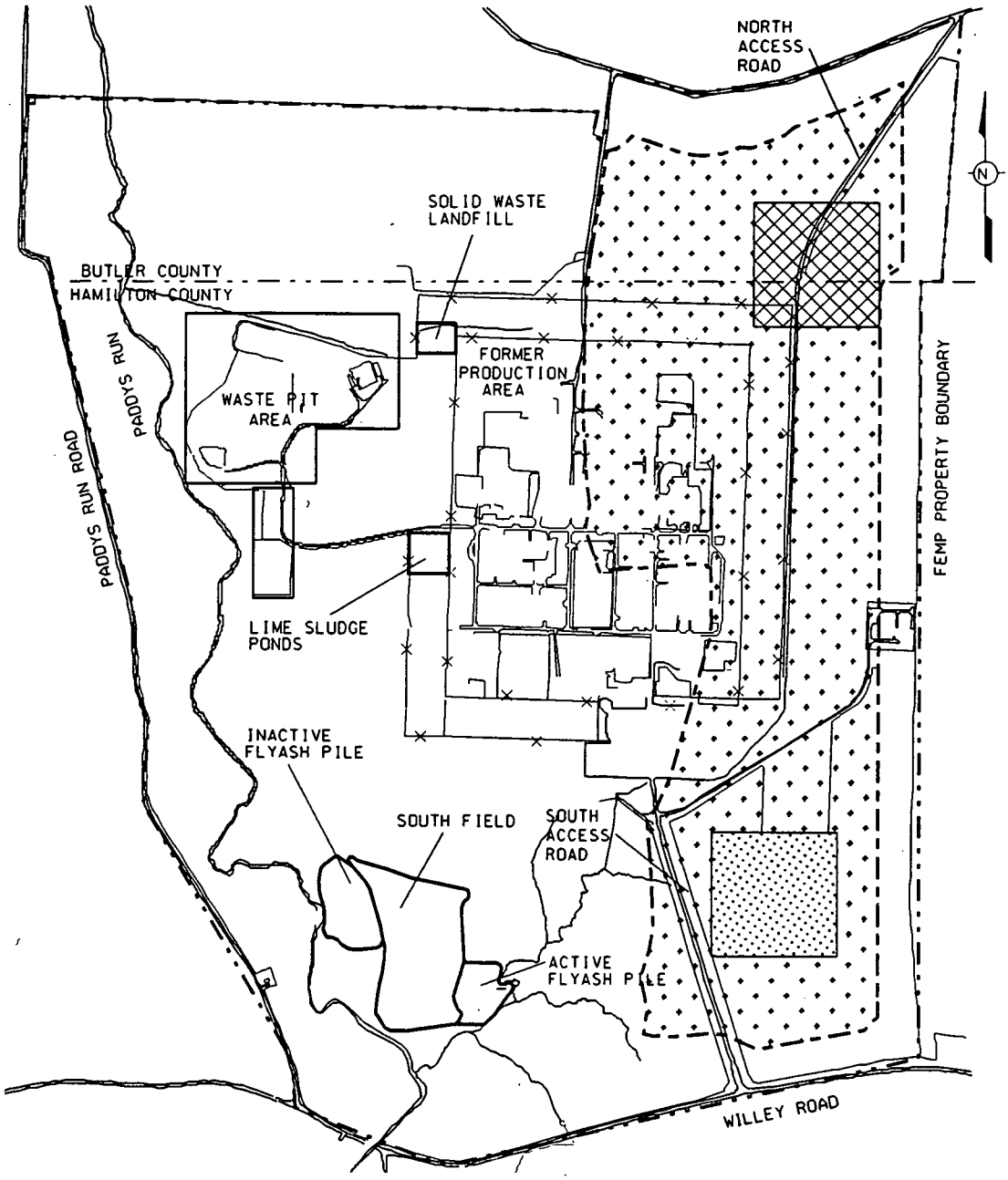
Figure E.3.1-2 presents a feasible proposed location for an Operable Unit 2 disposal cell and a possible alternate location. The proposed location was chosen based on the following:

- The site selection was coordinated with the leading remedial alternatives (LRA) of other Operable Units in order to minimize potential conflicts over on-site disposal needs.
- The area is located outside the process area, thus allowing Operable Unit 2 to maintain an acceptable remedial action schedule.
- The location of this specific area would minimize waste transport time/distance due to its proximity to the larger Operable Unit 2 subunits (the South Field and the flyash piles).
- Operable Unit 2 has performed additional field exploration and geotechnical testing in this area to further confirm its feasibility (see E.3.2 and E.3.3).

If the Operable Unit 2 cell is constructed as part of a larger site-wide facility or if the Operable Unit 3 LRA does not include on-site disposal along the east side of the FEMP, the Operable Unit 2 disposal cell would likely be placed elsewhere. The Operable Unit 2 schedule would make Operable Unit 2 materials the first to enter a site-wide facility, and, hence, the Operable Unit 2 cell would go in the initial cell to be constructed as part of such a facility. As part of a larger facility, it would likely be located in the northeast corner (the area identified as a possible alternate location in Figure E.3-2) in order to allow construction of the site-wide facility to progress from north to south. Surface drainage on the eastern portion of the FEMP property runs approximately from the north toward the south. Therefore, drainage control features would best be started on the north and expanded southward. Starting in the northeast outside the process area also provides the additional advantage of minimizing the double handling of materials from the process area by other operable units.

E.3.1.1.3 Ongoing Studies

Three ongoing efforts at the FEMP will serve to clarify the disposal cell location. Two of these efforts are the feasibility study reports for Operable Units 3 and 5. Those reports will give refinements to the volume of material suitable for on-site disposal and determine engineering requirements (protectiveness and ARARs) for on-site disposal. The third effort is the On-site Disposal Facility Predesign Investigation, which is an activity of the Operable Unit 2 remedial design process. This effort will gather additional information for the design of the on-site disposal facility.



SCALE

0 1200 2400 FEET

0 288 576 METER

LEGEND

- PROPOSED OU2 ON-SITE DISPOSAL CELL LOCATION
- ALTERNATE OU2 DISPOSAL CELL LOCATION, AS PART OF SITE-WIDE FACILITY
- POTENTIALY ACCEPTABLE REGION
- FEMP BOUNDARY

FIGURE E.3.1-2
SITE PLAN
FEASIBLE LOCATIONS
FOR OPERABLE UNIT 2 ON-SITE DISPOSAL

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E.3.1.2 DISPOSAL CELL DESIGN

E.3.1.2.1 General Design Considerations

The disposal cell configuration is depicted in plan and cross section in Figures E.3.1-3 and E.3.1-4, respectively. The cell configuration will be finalized during remedial design. The disposal cell conceptual design includes the following considerations:

- Attainment of regulatory design criteria.
- Effectiveness for up to 1,000 years, to the extent practical and reasonably achievable, and in any case, for at least 200 years (40 CFR 192.02).
- Protection against animal and plant intrusion, and minimization of the potential for human intrusion though the use of stone barriers.
- Reduction of potential for settlement through compaction of the contaminated soil placed in the cell.

The primary components of the disposal cell are the cap and liner. In general, material disposed of by Operable Unit 2 can be classified as low-level radioactive solid waste. In developing the conceptual cap and liner, design components of typical solid waste and RCRA caps and liners were incorporated with the above criteria. A comparison of the Operable Unit 2 conceptual cap and liner with typical solid waste and Resource Conseration and Revovery Act (RCRA) caps and liners is presented on Figure E.3.1-5. The Operable Unit 2 cap and liner provide additional safeguards against infiltration and leakage, respectively, than the typical solid waste and RCRA caps and liners. In the cap, the biotic layer provides a barrier to burrowing animals and a basically water-free zone that will discourage root growth. The liner provides an added bentonite geocomposite in the primary liner. Although the compacted clay thickness of the secondary liner is less than in a typical soil waste liner, the addition of an high density polyethlene (HDPE) geomembrane and bentonite geocomposite result in a composite secondary liner that is less permeable. The individual components of the conceptual cap and liner are discussed in the following sections.

E.3.1.2.2 Cell Cap

The details of the cap configuration are depicted in Figure E.3.1-6. The cap is based on a composite design employing both natural materials, such as sand, gravel and clay, and synthetic materials, such

as polyethylene. The cap would slope at 4 percent from the crown out to the perimeter berms. The cap system includes the following design components:

- A 6-inch thick topsoil layer planted with grass to reduce the potential for erosion.
- A 21-inch thick soil cover layer to accommodate moisture retention in order to maintain the vegetative cover.
- A 6-inch thick gravel filter layer between top and bottom layers of geotextile separator to protect the underlying biotic barrier from infiltration of fine-grained soil particles.
- A 3-foot thick biotic barrier consisting of cobbles to prevent animal and plant intrusion.
- A 12-inch thick sand drainage layer between top and bottom layers of geotextile separator to intercept infiltrating water. (This layer could be replaced with a geosynthetic drainage layer such as a geonet.)
- A layer of HDPE and a bentonite geocomposite to impede infiltration.
- A 24-inch thick compacted clay soil layer, with a maximum hydraulic conductivity of 1×10^{-7} cm/sec, to impede infiltration.
- A 12-inch thick (typical) layer of compacted contouring fill immediately above the contaminated materials to support the installation of cover materials.

E.3.1.2.3 Cell Liner

The details of the disposal cell liner configuration are depicted in Figure E.3.1-6. The composite liner consists of the following components:

- A 12-inch-thick protective layer consisting of a material such as soil or flyash to protect the liner when waste containing debris is placed.
- An 12-inch-thick leachate collection system of gravel with 6-inch diameter perforated pipe to collect leachate and direct it to a collection point. A geonet is considered an alternative to the gravel and pipe system. Collected leachate would go to the AWWT facility for treatment.
- A primary geomembrane liner consisting of HDPE above and a composite bentonite liner below.
- An 12-inch-thick leachate detection system of gravel and 6-inch diameter perforated pipe to collect leachate and direct it to a monitoring and collection point. A geonet is considered an alternative to this gravel system.
- A secondary liner consisting of HDPE, composite bentonite, and 24-inches of compacted native clay soil with a maximum permeability of 1×10^{-7} cm/sec.

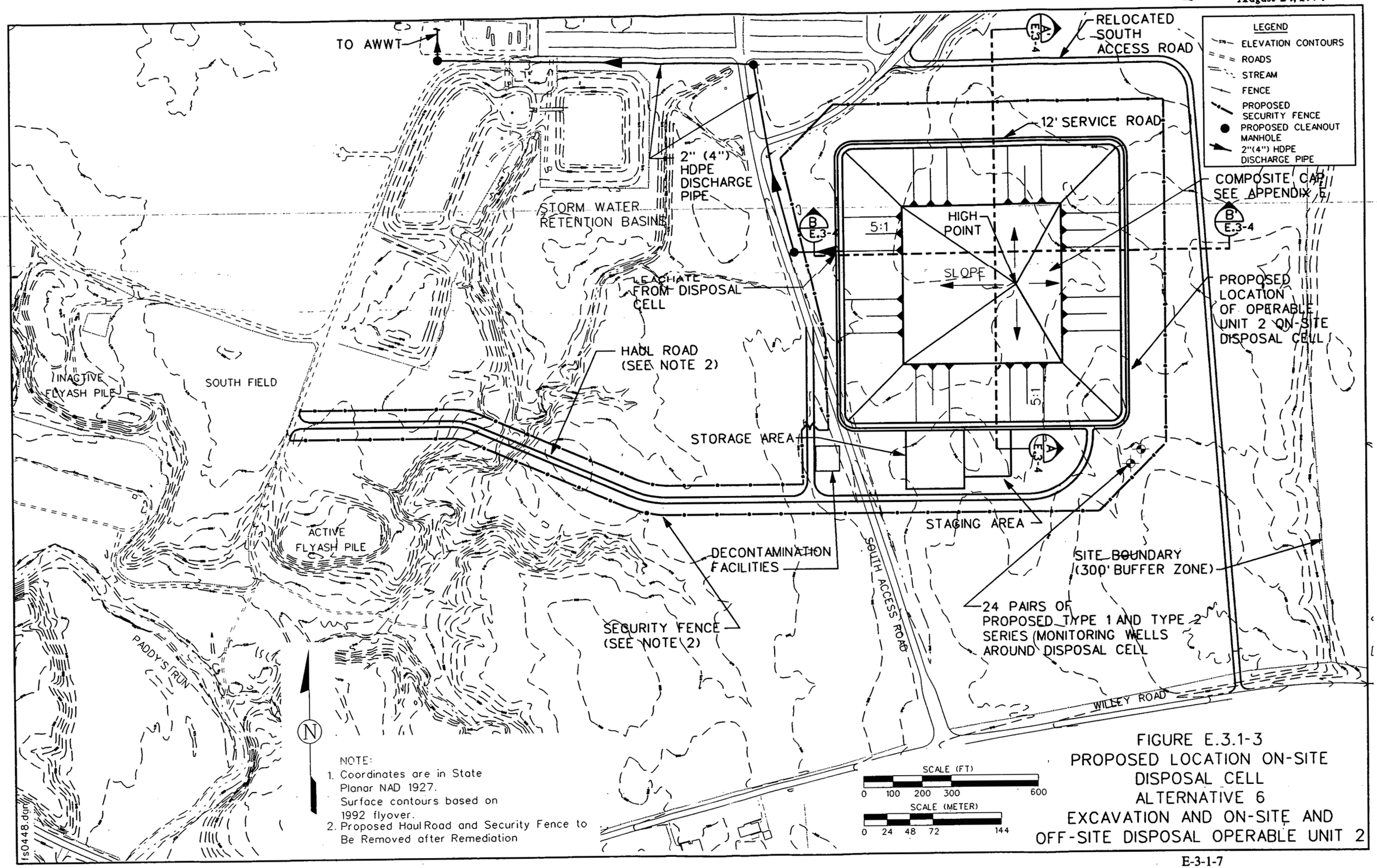
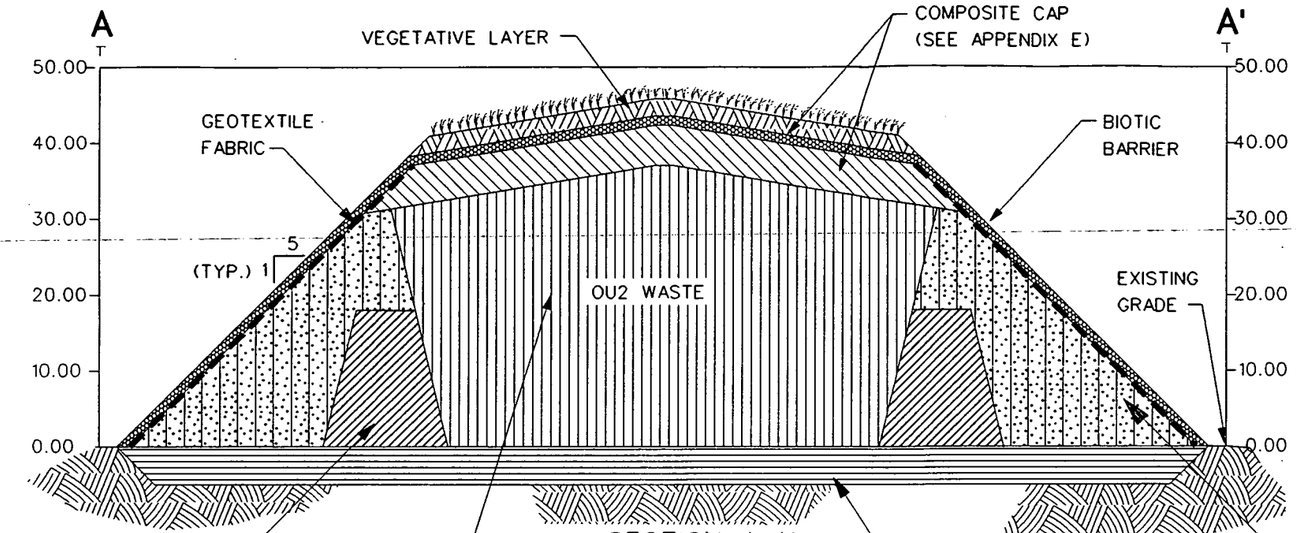


FIGURE E.3.1-3
PROPOSED LOCATION ON-SITE DISPOSAL CELL
ALTERNATIVE 6
EXCAVATION AND ON-SITE AND OFF-SITE DISPOSAL OPERABLE UNIT 2



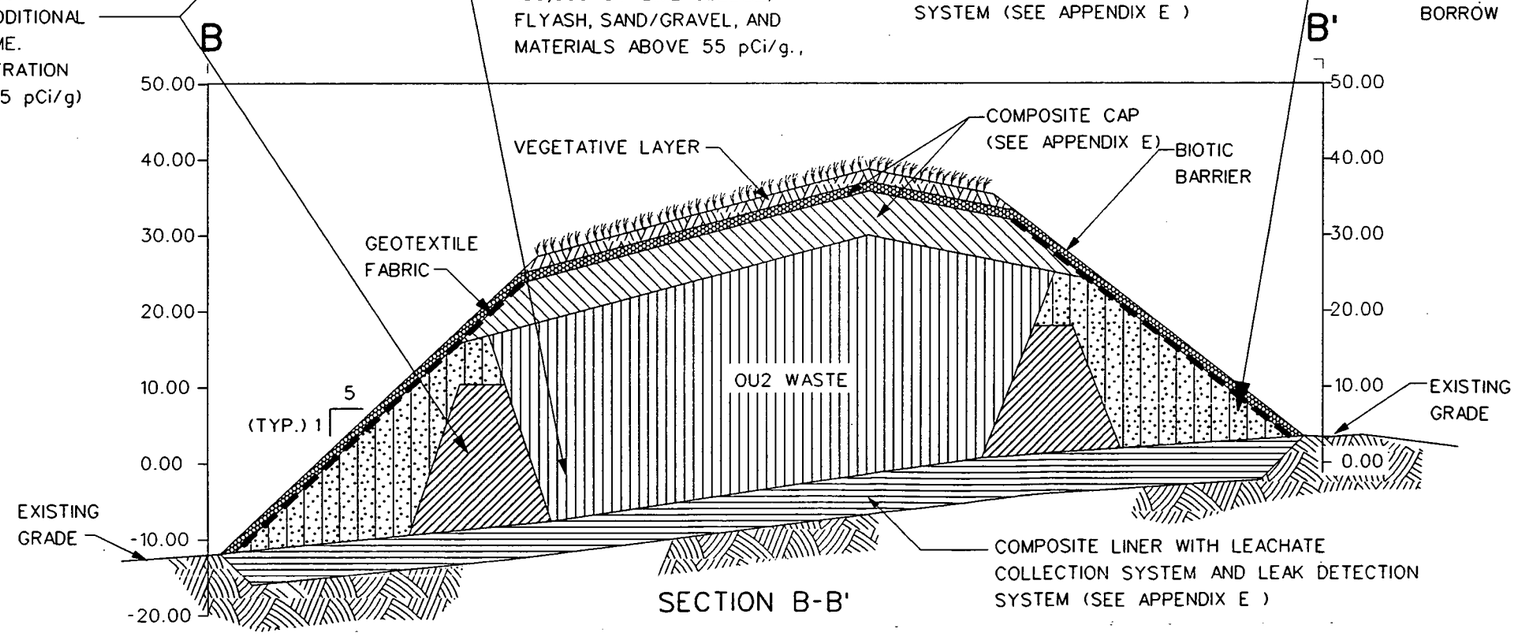
SECTION A-A'

DIKE: APPROXIMATELY 104,000 CY OF FILL AND TILL AND 28,000 CY ADDITIONAL EXCAVATION VOLUME. (MAXIMUM CONCENTRATION NOT TO EXCEED 55 pCi/g)

INTERIOR: APPROXIMATELY 183,000 CY LIME SLUDGE, FLYASH, SAND/GRAVEL, AND MATERIALS ABOVE 55 pCi/g.,

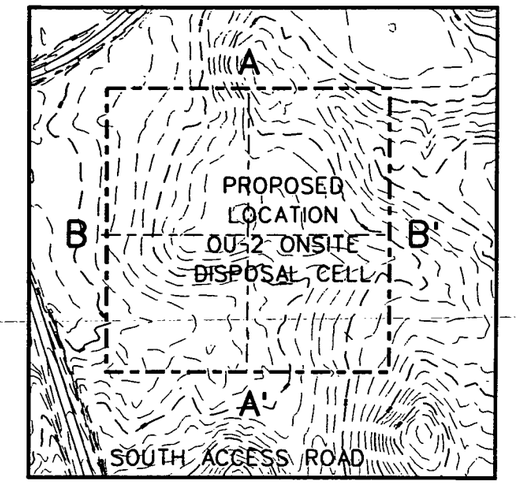
COMPOSITE LINER WITH LEACHATE COLLECTION AND LEAK DETECTION SYSTEM (SEE APPENDIX E)

BORROW FOR DIKE APPROXIMATELY 201,700 CY OF CLEAN BORROW



SECTION B-B'

COMPOSITE LINER WITH LEACHATE COLLECTION SYSTEM AND LEAK DETECTION SYSTEM (SEE APPENDIX E)



LOCATION KEY (1" = 400')

NOTE:
Surface contours based on 1992 flyover.

N

LEGEND

- VEGETATIVE LAYER
- FILL AND TILL
- COMPOSITE CAP
- BIOTIC BARRIER
- GEOTEXTILE FABRIC
- OU2 WASTE
- BORROW FOR DIKE
- COMPOSITE LINER
- EXISTING GRADE/ PREPARED SUBGRADE

HORIZONTAL SCALE: 0 50' 100' 200'
VERTICAL 0 10' 20' 40'

HORIZONTAL SCALE: 0 12 m 24 m 48 m
VERTICAL 0 2.4 m 4.8 m 9.6 m

FIGURE E.3.1-4
TYPICAL SECTIONS
OPERABLE UNIT 2
ON-SITE DISPOSAL CELL

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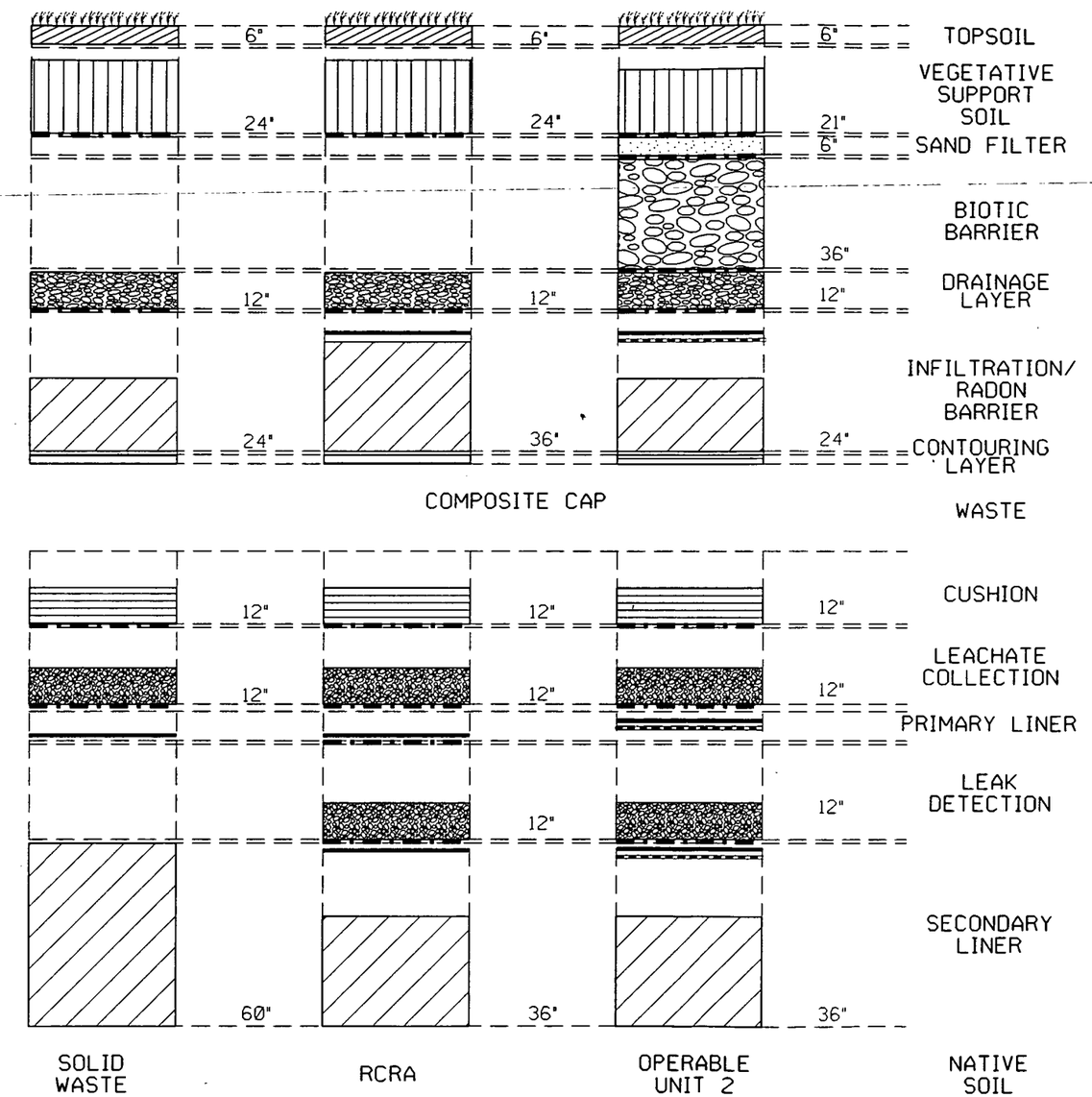

LEGEND

- TOPSOIL
- VEGETATIVE SUPPORT
- SAND
- COBBLES
- PEA GRAVEL
- COMPACTED CLAY
- CONTOURING LAYER
- GEOTEXTILE FABRIC
- BENTONITE GEOCOMPOSITE
- HDPE FLEXIBLE MEMBRANCE LINER

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FIGURE E.3.1-5
TYPICAL DETAILS
COMPOSITE CAPS AND LINERS

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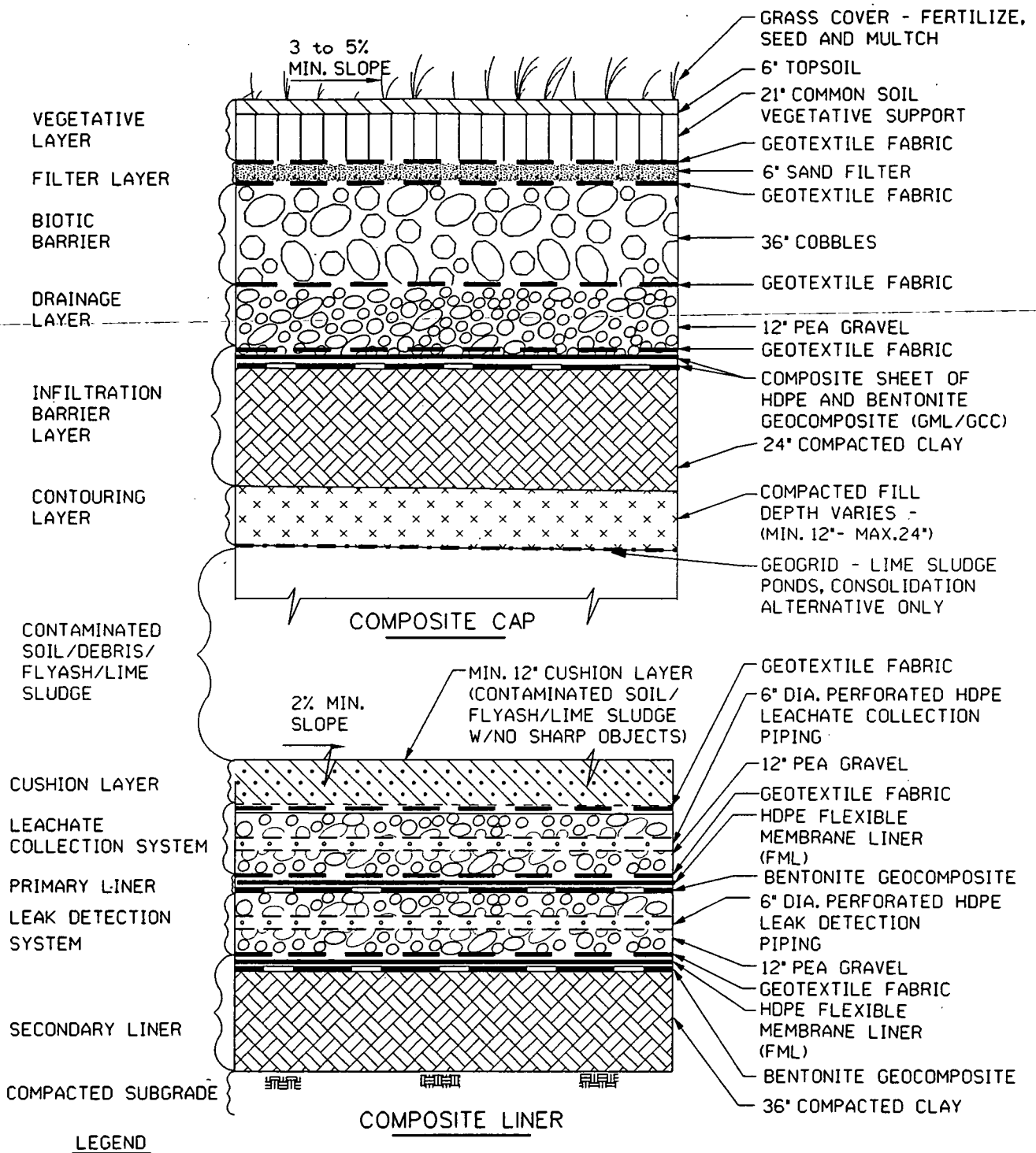

FIGURE E.3.1-6
TYPICAL DETAIL
COMPOSITE CAP AND LINER
(NOT TO SCALE)

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E.3.1.2.4 Waste Placement

The waste material placed in the disposal cell would consist of contaminated soil, flyash, dewatered lime sludge, and debris. The contaminated soil, flyash, lime sludge, and debris would be loaded at the excavation site and delivered to the cell construction site. A staging facility would be constructed for the receipt of contaminated soils. After unloading at the staging facility, the trucks would pass through a radiological screening and washing station to reduce the spread of contaminants to clean areas of the FEMP site. After screening/washing, the truck would return to the soil excavation site.

The contaminated soil would be transported from the staging facility to the disposal cell by standard earth-moving equipment. The soil would be placed in 8- to 10-inch loose lifts and compacted to achieve the desired 95 percent Standard Proctor density. The working face and lift area would be limited to minimize the area exposed to the environment. Appropriate control measures would be employed to mitigate dust releases during soil placement. Periodic monitoring, including sampling and analysis of airborne particulates, would be conducted to ensure the effectiveness of dust control measures.

Scheduling of material removal from the Operable Unit 2 subunits would be done so that flyash and lime sludge would be delivered to the cell at the same time. This allows for mixing during placement, resulting in a stabilized composite material due to the natural cementing of these materials.

Crushed debris would be mixed with soil or flyash at the cell to form a more homogeneous fill. The overall dimensions of larger debris would be limited in length to accommodate the spreading and compaction equipment and to a height less than the compactual lift thickness. Debris would not be placed in the initial fill lifts.

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APPENDIX E.3.2
ON-SITE DISPOSAL CELL GEOLOGY

E.3.2 ON-SITE DISPOSAL CELL GEOLOGY

The geology underlying the proposed on-site disposal cell was derived from a review of boring logs and geotechnical data from 22 soil borings installed at the vicinity of cell site. These boring logs and geotechnical data are presented in Section E.3.3 of this appendix. The geology consists of a layer of glacial overburden overlying glacial outwash deposits, as shown in the sections in Figures E.3.2-1, E.3.2-2, and E.3.2-3. The glacial overburden encountered ranges in thickness from approximately 24 to 35 feet. The overburden is a glacial till, consisting primarily of a dense silty clay with some admixed sand and gravel. The surficial clay is dark yellowish brown that lightens in color with depth and grades to an olive and gray color.

Scattered sand and gravel lenses were encountered in some of the borings located in the northern and eastern portions of the site. Sand lenses encountered in the glacial water-bearing overburden are localized and discontinuous across the site. Sand lens thicknesses range from a few inches to 6 feet. Three apparent sand lenses were observed in the proposed disposal cell location and adjacent areas and are described below.

- Soil Boring G2-206, located near the southeast corner of the proposed on-site disposal cell, contains a 6.5-foot thick, dark gray silty sand (SM) lens from 16 to 22 feet below grade. This sand unit is believed to be correlative with a water-bearing 4.5-foot thick, dark gray silty sand lens observed at a depth of 16 to 20.5 feet below grade in Soil Boring G2-204 (located east of the proposed on-site disposal cell), based on similarity of depth, lithology, moisture content, and color. These sands may also be correlative with a 0.5-foot thick sand lens reported in Lysimeter 11130 (also located east of the proposed on-site disposal cell) at a depth of 15 to 15.5 feet below grade. This apparently correlative sand unit, termed the "A" Sand, was not observed in Lysimeter 11131 and Soil Borings G2-209, 1749, G2-208, 1747, G2-207, G2-205, G2-203, and 1750, which surround the area of Soil Borings G2-206 and G2-204 and Lysimeter 11130. The "A" Sand unit appears to have a lobate form, elongated in a north-northeast to south-southwest direction. The southwestern extent of the "A" Sand lens (i.e., in the direction of Boring G2-205) is not well documented due to sparsity of data in this area.

- A moist 2-foot thick olive gray unit consisting of sand with admixed silt and gravel (GW-GM) was observed at a depth of 20 to 22 feet below grade in Soil Boring G2-202, which is located near the northern perimeter of the proposed on-site disposal cell. This sand unit is believed to be correlative with a 1.5-foot thick sand lens observed at a depth of 24 to 25.5 feet below grade in Soil Boring 3431 (located northeast of the proposed on-site disposal cell), based on similarity of depth. This apparently correlative sand unit, termed the "B" Sand, was not observed in Lysimeter 11130 and Soil Borings 1745, G2-203, and 1750, which are located to the south of the area of Soil Borings G2-202 and 3431.

The "B" Sand unit appears to have a lobate form, elongated in an east-northeast to west-southwest direction. The southern extent of the "B" Sand lens (i.e., in the direction of Soil Boring G2-203) is not well documented due to sparsity of data in this area.

- A 2.5-foot thick sand lens was observed at a depth of 7 to 9.5 feet below grade in Soil Boring 1746. No sands were observed at corresponding depths in surrounding Soil Borings G2-206, G2-208, 1747, G2-205, and G2-203, indicating that this sand, termed the "C" Sand, is of limited areal extent.

The glacial outwash deposits of the Great Miami Aquifer underlie the glacial overburden. The Great Miami Aquifer consists of yellowish to brown fine to medium sand with gravel. The top of the Great Miami Aquifer is encountered approximately 22 to 31 feet below grade at an elevation of approximately 555 feet. The upper portion of the Great Miami Aquifer is unsaturated. Groundwater is encountered 61 to 74 feet below grade at an approximate elevation of 516 feet. Soil Boring 2400, the deepest boring at the site, was terminated 57 feet into the Great Miami Aquifer.

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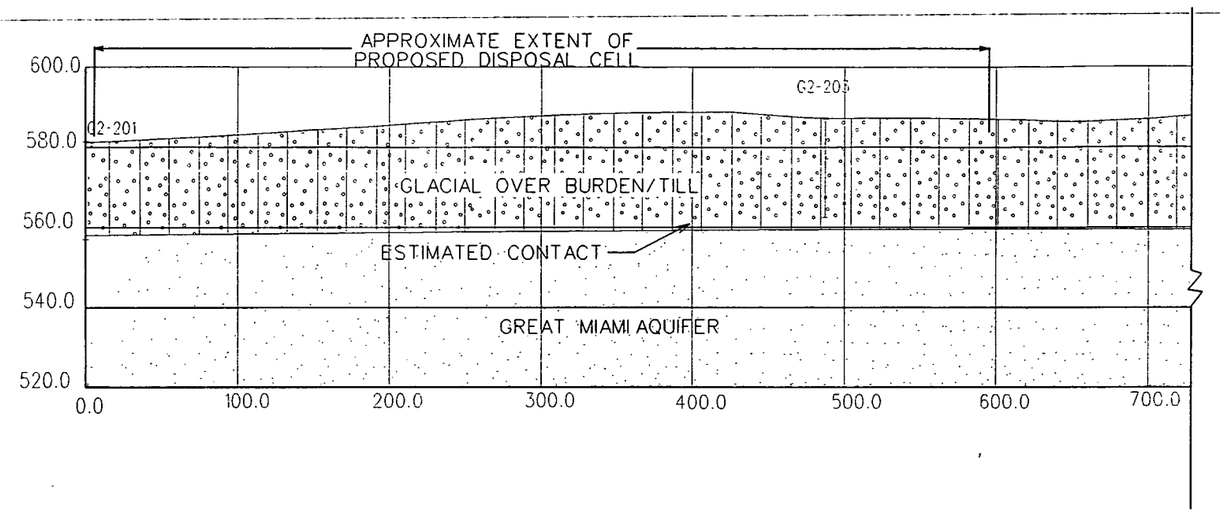
SCALE:
HORIZONTAL 1" = 100'
VERTICAL 1" = 40'

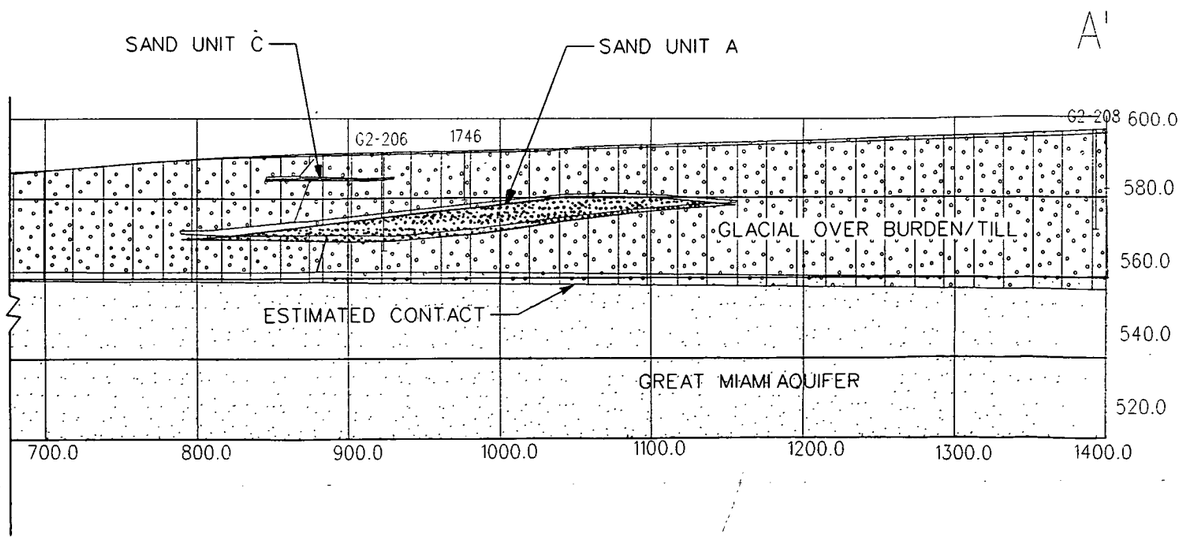
SCALE:
HORIZONTAL 1 cm = 12 m
VERTICAL 1 cm = 4.8 m

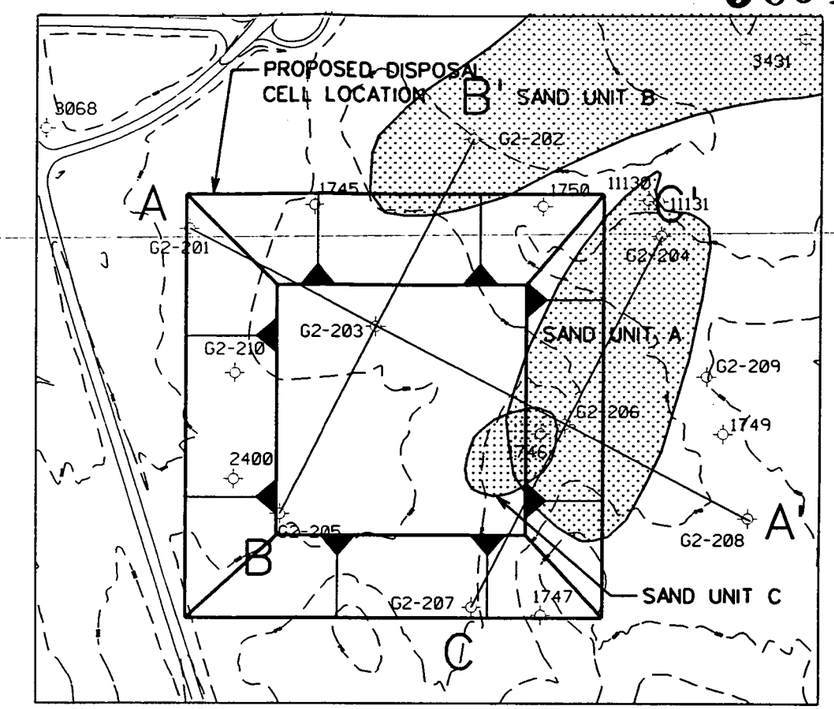
SCALE:
0 50 100 200

SCALE:
0 12 24 48

NOTE:
Coordinates are in State Planar NAD 1927.
Surface contours based on 1992 flyover.







LEGEND
- ELEVATION CONTOURS
- ROADS
- STREAM
- BATTERY LIMITS
- FENCE
- RAILROAD
- SOIL BORING
- SAND/GRAVEL
- GLACIAL OVERBURDEN/TILL
- GREAT MIAMI AQUIFER

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FIGURE E.3.2-1
GEOLOGIC CROSS SECTIONS
ON-SITE DISPOSAL CELL
SHEET 1 OF 3

rs0796.dgn

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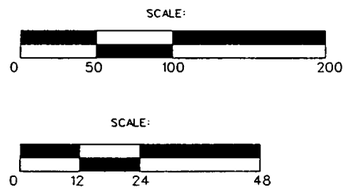
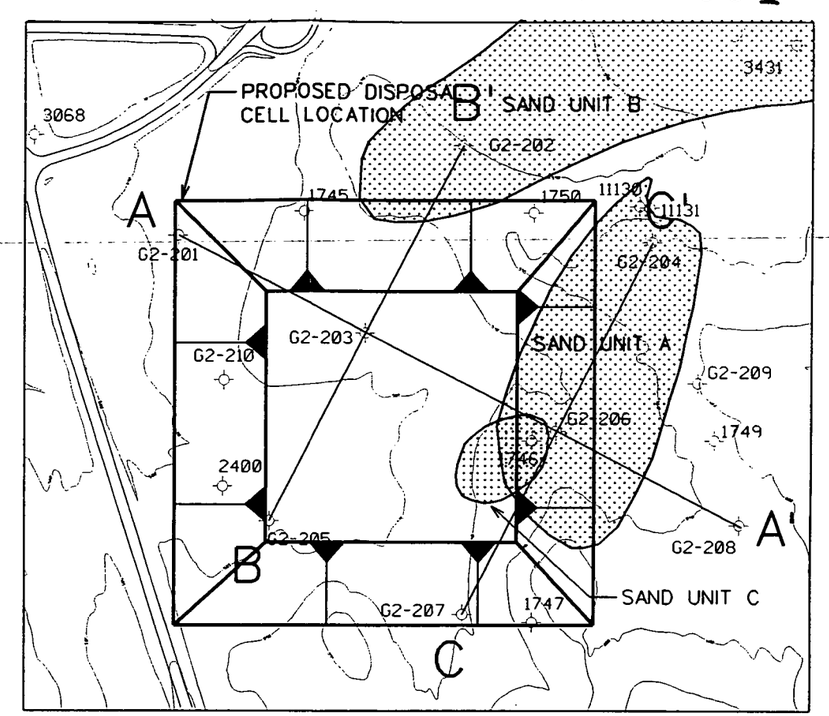
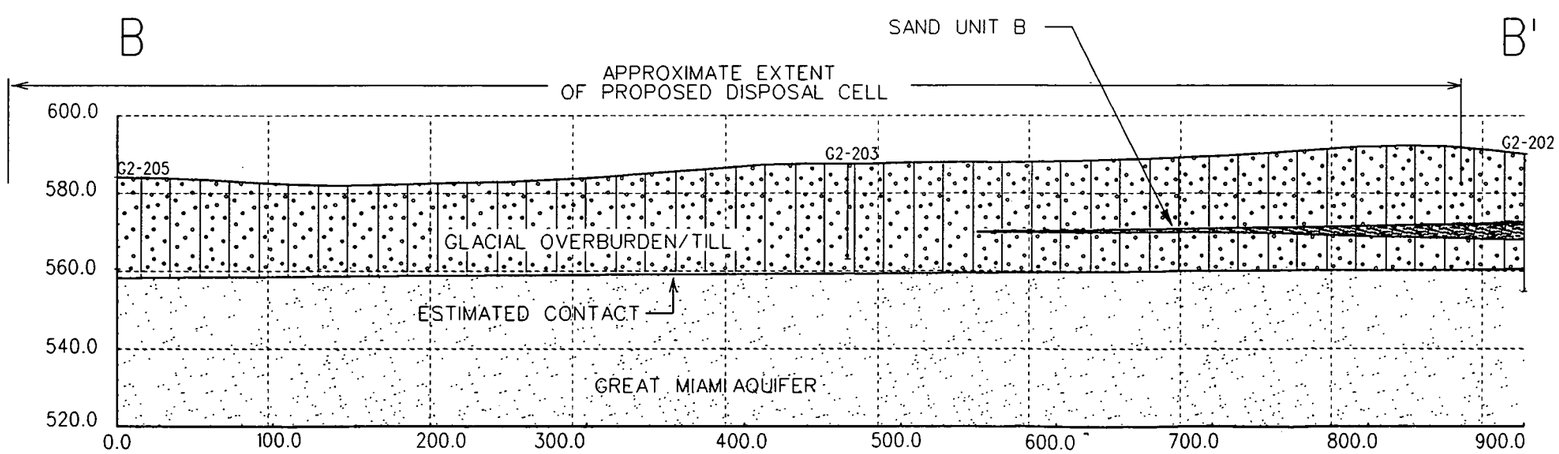
NOTE:
Coordinates are in State Planar NAD 1927.
Surface contours based on 1992 flyover.

SCALE:
HORIZONTAL 1" = 100'
VERTICAL 1" = 40'

SCALE:
HORIZONTAL 1 cm = 12 m
VERTICAL 1 cm = 4.8 m







LEGEND
- ELEVATION CONTOURS
- ROADS
- STREAM
- BATTERY LIMITS
- FENCE
- RAILROAD
- SOIL BORING
- SAND/GRAVEL
- GLACIAL OVERBURDEN/TILL
- GREAT MIAMI AQUIFER

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FIGURE E.3.2-2
GEOLOGIC CROSS SECTIONS
ON-SITE DISPOSAL CELL
SHEET 2 OF 3

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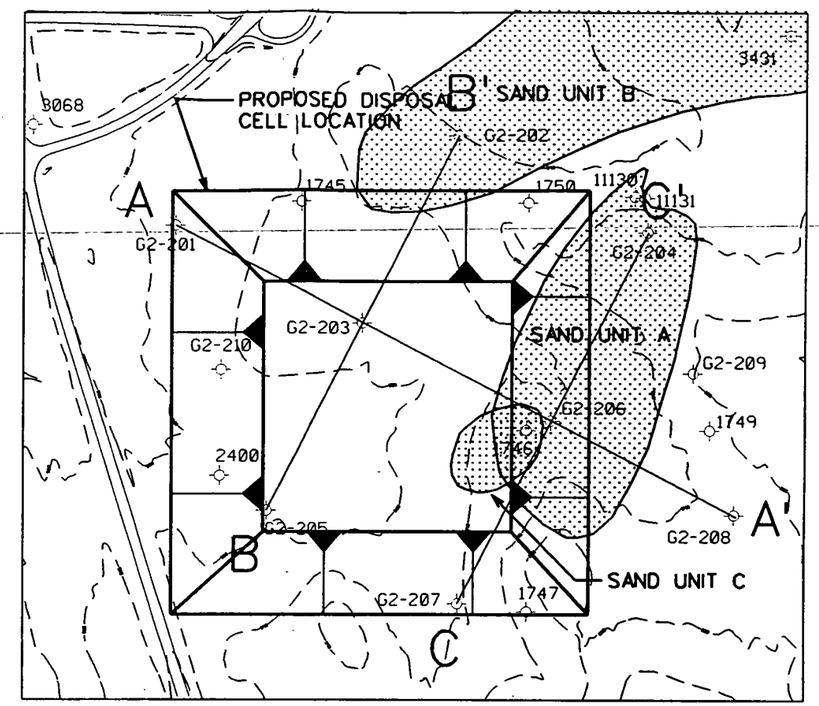
SCALE:
HORIZONTAL 1" = 100'
VERTICAL 1" = 40'

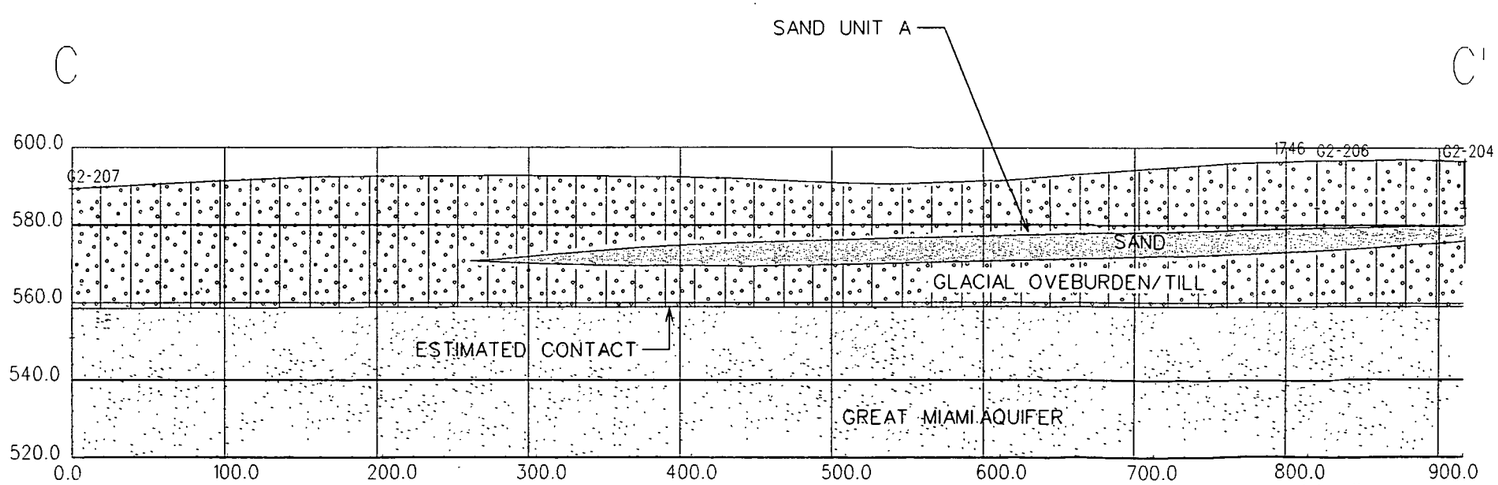
SCALE:
0 50 100 200

SCALE:
HORIZONTAL 1 cm = 12 m
VERTICAL 1 cm = 4.8 m

SCALE:
0 12 24 48

NOTE:
Coordinates are in State Planar NAD 1927.
Surface contours based on 1992 flyover.





LEGEND
- ELEVATION CONTOURS
- ROADS
- STREAM
- BATTERY LIMITS
- FENCE
- RAILROAD
- SOIL BORING
- SAND/GRAVEL
- GLACIAL OVERBURDEN/TILL
- GREAT MIAMI AQUIFER

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FIGURE E.3.2-3.
GEOLOGIC CROSS SECTIONS
ON SITE DISPOSAL CELL
SHEET 3 OF 3

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APPENDIX E.3.3

GEOTECHNICAL DATA REPORT AND ADDITIONAL BORING LOGS

5861

On-Site Disposal Cell
Pre-Design Activities Engineering Report

Operable Unit 2
Project Order 101
April 1994
Revision 0

Environmental Remedial Action Project
Fernald Environmental Management Project
Fernald, Ohio
FERMCO Subcontract No. 2-21487

PARSONS

Fairfield Executive Center
6120 South Gilmore Road
Fairfield, Ohio 45014

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APPENDIX E.6.3

ON-SITE DISPOSAL CELL PRE-DESIGN ACTIVITIES ENGINEERING REPORT

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1.0	Introduction	E-6-3-6
2.0	Background	E-6-3-7
3.0	Field Program	E-6-3-9
3.1	Soil Test Borings	E-6-3-9
3.2	Environmental Soil Sampling	E-6-3-12
4.0	Geotechnical Laboratory Testing Program	E-6-3-13
4.1	Laboratory Methods and Procedures	E-6-3-13
4.2	Laboratory Test Results	E-6-3-16
5.0	Environmental Laboratory Testing	E-6-3-35
6.0	Recommendations and Additional Testing	E-6-3-36
6.1	Generalized Site Conditions	E-6-3-36
6.2	Bearing Capacity	E-6-3-36
6.3	Additional Testing	E-6-3-38
7.0	References	E-6-3-39

The entire On-Site Disposal Cell Pre-Design Activities Engineering Report by Parsons has been incorporated into this Appendix (Section E.6.3). The page numbers of the report have been revised accordingly.

CONTENTS (Continued)

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APPENDICES

A Boring Logs

B Grain-Size Distribution Curves

C Moisture-Density Relationships

D Mohr Strength Envelopes

E Consolidation Test Results

F Environmental Laboratory Test Results

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4-1 Plasticity Chart
4-2 Grain-Size Distribution, Fine-Grained Brown Glacial Till CL Samples
4-3 Grain-Size Distribution, Fine-Grained Gray Glacial Till CL Samples
4-4 Remolded Sample Hydraulic Conductivity Results vs. Standard Proctor Compaction Curve
4-5 Behavior of Compacted Cohesive Soils

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3-1 Field Test Program Soil Borings Depth and Location
3-2 Existing Soil Borings - Depth and Location

4-1 Summary of Geotechnical Laboratory Program
4-2 Summary of Index Properties
4-3 Summary of Unit Weight
4-4 Summary of Standard Proctor Tests
4-5 Summary of Consolidated-Undrained Triaxial Compression Tests
4-6 Summary of Mohr Circle Construction Results
4-7 Summary of Laboratory Permeability Tests
4-8 Summary of Consolidation Tests

6-1 Design Parameters

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LIST OF ACRONYMS AND ABBREVIATIONS

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ASTM	American Society for Testing and Materials
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
FEMP	Fernald Environmental Management Project
FERMCO	Fernald Environmental Restoration Management Corporation
LL	Liquid Limit
OCR	Overconsolidation Ratio
ODC	On-Site Disposal Cell
OU	Operable Unit
pcf	pounds per cubic foot
PI	Plasticity Index
PL	Plastic Limit
psf	pounds per square foot
SWL	Solid Waste Landfill

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SECTION 1

INTRODUCTION

This report presents the results of the subsurface exploration performed to evaluate the subsurface soil conditions at the proposed location for the Operable Unit 2 (OU-2) On-Site Disposal Cell (ODC). The objectives of the subsurface exploration were to (1) characterize the subsurface materials, (2) determine physical and engineering properties of the subsurface soils, and (3) provide geotechnical parameters for subsequent design of the ODC. Limited environmental sampling and testing activities were also performed in conjunction with the geotechnical activities.

The generalized scope of work was as follows:

1) Drill, sample, and test soil at locations around the perimeter of the proposed ODC.

2) Prepare boring logs indicating the subsurface strata and other applicable features.

3) Perform geotechnical laboratory analyses to aid in the classification and determination of engineering properties, including shear strength and consolidation properties, of the subsurface soils.

4) Perform geotechnical evaluations and recommendations to be used for assessment of the slope stability and settlement of the ODC.

5) Prepare a summary of findings, including geotechnical engineering considerations.

The following sections discuss in more detail the scope and methods used for drilling, laboratory analyses, characterization of the subsurface materials, and geotechnical evaluations and recommendations for the design of the ODC.

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SECTION 2

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BACKGROUND

The alternative remedial concepts being considered by the Fernald Environmental Restoration Management Corporation (FERMCO) include an on-site disposal cell designed for receipt of contaminated materials from the OU-2 subunits (i.e., OU-2 ODC). The proposed disposal cell would be an essentially aboveground, encapsulated containment structure with a soil/geosynthetics composite liner, bio-intrusion barrier with a sacrificial soil erosional layer, and cap.

The proposed site for the OU-2 Disposal Cell is situated at the southeast corner of the Fernald Environmental Management Project (FEMP) as shown in Figure 2-1. The area currently is a gently rolling, grassed field that has no buildings and was not involved in any production activities. The site is bounded by the South Access Road to the west, the North Access Road, and the East Property Line. The parking lot and former production facilities are located north of this area. Drainage from the area is towards the east and progresses to the outfall ditch, which discharges into Paddy's Run. The proposed disposal cell footprint (interior bottom) is approximately 400 feet square. The disposal cell, with its proposed 5 Horizontal to 1 Vertical (5H:1V) outer slopes, occupies approximately 13 acres of land. The perimeter drainage channels could occupy as much as an additional 25 acres around the disposal cell.

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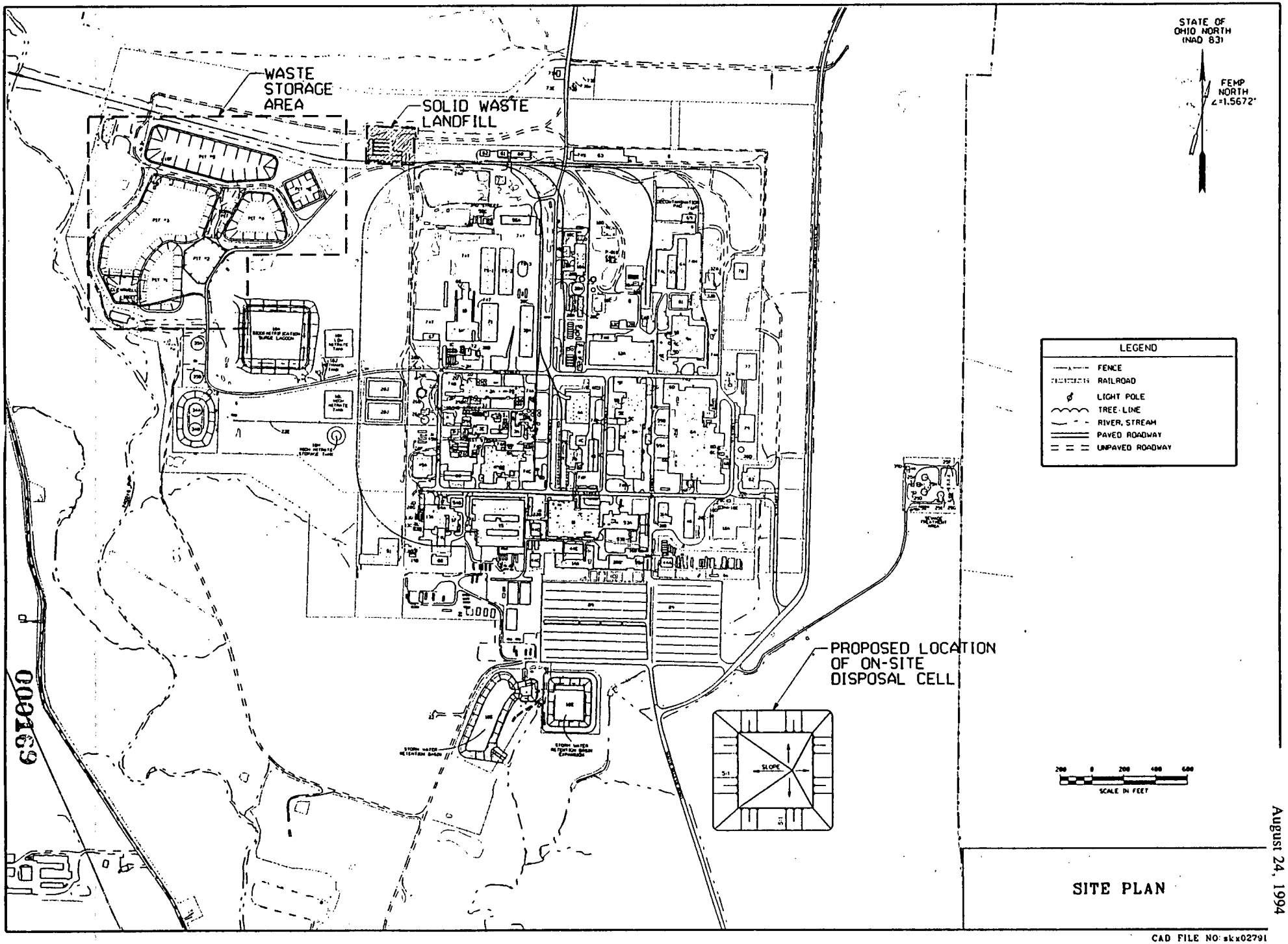

Figure 2-1 - Site Plan

SECTION 3

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FIELD PROGRAM

This section describes the geotechnical field test program implemented per the *Solid Waste Landfill and On-Site Waste Disposal Cell Geotechnical Sampling and Testing Plan* (PARSONS 1993) at the proposed ODC site during November and December 1993. In conjunction with the geotechnical field investigation, FERMCO site media sampling technicians collected surface soil samples for environmental analysis.

3.1 Soil Test Borings

Ten soil test borings were advanced at the locations shown on Figure 3-1. The boring locations for Borings G2-201 through G2-208 were established in the field by the survey crew. Locations of Borings G2-209 and G2-210 were established in the field by using the surveyed borehole locations as references. Upon completion of the soil borings, the location and elevation of each were surveyed. All surveying was performed by Woolpert Consultants.

The borings were advanced with 3-1/4-inch inside-diameter, hollow-stem augers to depths of approximately 24.5 feet with the exception of borings G2-202 and G2-207, which were advanced with 4-1/4-inch inside-diameter, hollow-stem augers to depths of approximately 75 feet.

Soil samples were recovered in the undisturbed material below the bottom of the augers using the Standard Method for Penetration Resistance and Split-barrel Sampling (American Society for Testing and Materials [ASTM] D 1586). In lieu of the standard 18-inch interval, the split-barrel sampler was driven 24 inches into the undisturbed material below the augers. Therefore, the standard penetration resistance value (N) is taken as the number of blows required to drive the sampler the middle 12 inches. The split-barrel samples were collected at 2.5-foot intervals to approximate depths of either 20 feet or 24.5 feet. Borings G2-202 and G2-207 were sampled at 5-foot intervals below a depth of 20 feet. Boring G2-209 and G2-210 were augured without sampling. Additional sampling included obtaining relatively undisturbed 3-inch-diameter, thin-walled Shelby tube samples (ASTM D 1587) and bulk samples of the drill cuttings. A summary of the boring depths, sample intervals, elevations, and Ohio State Plane Coordinates for test borings completed during the geotechnical field test program are presented in Table 3-1. Table 3-2 summarizes the coordinates and boring depths of existing borings in the vicinity of the proposed site.

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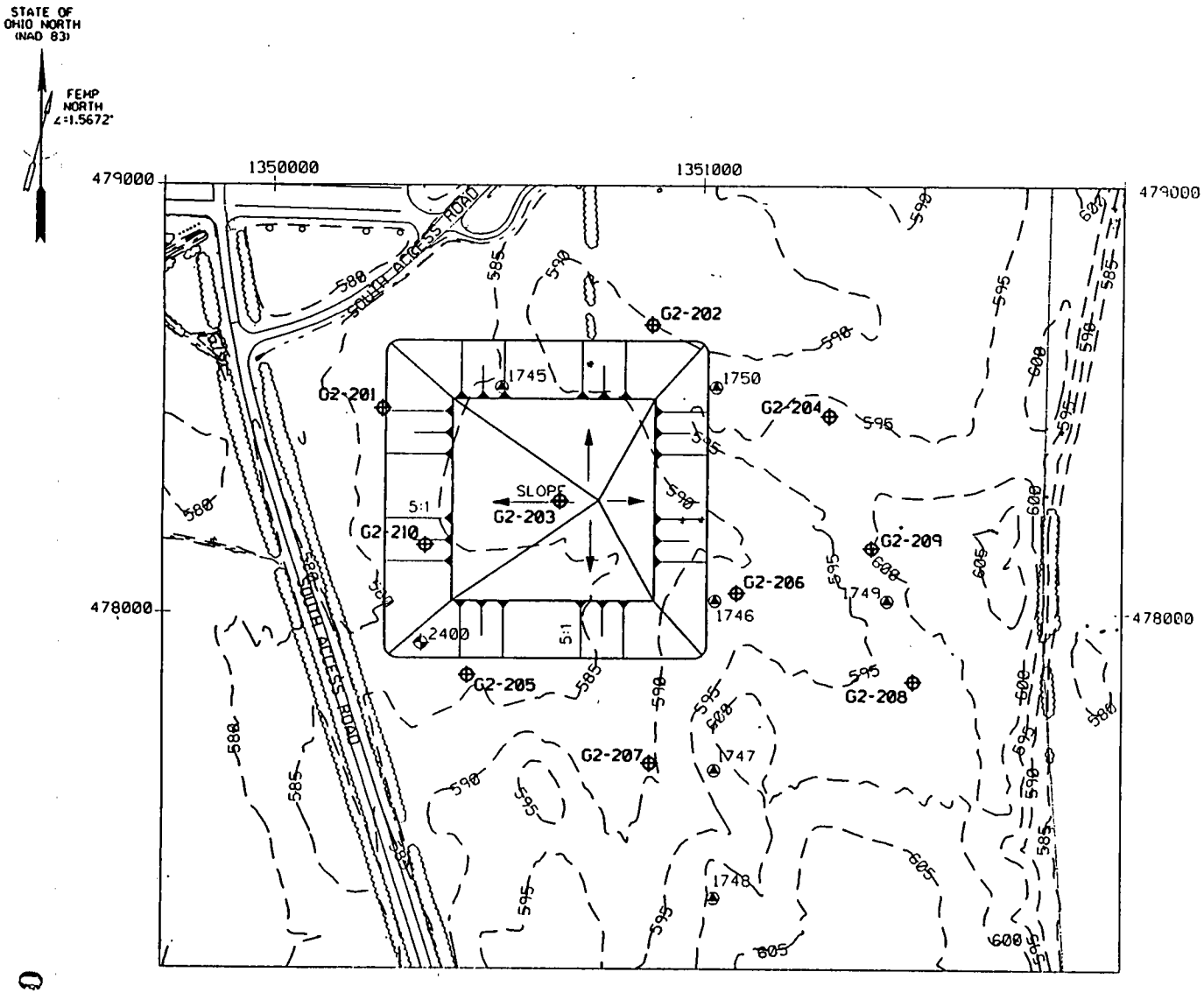

LEGEND	
2400	EXISTING MONITORING WELL
1748	EXISTING SOIL BORING
G2-209	GEOTECHNICAL BORING
— 600 —	SURFACE CONTOUR (FT ABOVE MEAN SEA LEVEL)

BORINGS COMPLETED DURING ODC FIELD TEST PROGRAM (PO101)			
BORING NO	NORTH	EAST	ELEVATION
G2-201	478479.253	1350255.013	580.567
G2-202	478676.083	1350881.046	590.103
G2-203	478264.290	1350667.588	587.597
G2-204	478463.156	1351295.595	596.152
G2-205	477852.362	1350454.876	583.491
G2-206	478048.670	1351081.497	591.426
G2-207	477646.512	1350879.507	588.990
G2-208	477838.168	1351493.018	596.274
G2-209	478155.044	1351394.371	598.783
G2-210	478161.692	1350355.363	583.181

EXISTING BORINGS			
BORING NO	NORTH	EAST	ELEVATION
1745	478529.38	1350531.00	586.00
1746	478029.38	1351031.01	591.80
1747	477629.38	1351031.01	597.40
1748	477329.38	1351031.01	601.00
1749	478029.37	1351431.00	597.50
1750	478529.39	1351031.00	593.00
2400	477928.86	1350346.82	580.70

NOTE: COORDINATES ARE NAD 1983

SCALE IN FEET

ON-SITE DISPOSAL CELL SOIL BORING PLAN

CAD FILE NO: skx02792

E-3-3-10

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FEMP-OU02-5 DRAFT
August 24, 1994

Figure 3-1 - Soil Boring Plan

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Table 3-1 - Field Test Program Soil Borings Depth and Location

Boring No.	Coordinates (NAD[1] 1983)		Coordinates (NAD 1927)		Ground Surface Elevation (feet)	Depth of Boring (feet)	Split-Spoon Samples	Shelby Tubes
	Northing	Easting	Northing	Easting				
G2-201	478479.25	1350255.01	478449.83	1381723.93	580.57	24.5	5	5
G2-202	478676.08	1350881.05	478646.65	1382349.97	590.10	75.0	15	5
G2-203	478264.29	1350667.59	478234.86	1382136.51	587.60	24.5	5	5
G2-204	478463.15	1351295.60	478433.71	1382764.52	596.15	24.2	5	5
G2-205	477852.36	1350454.88	477822.93	1381923.79	583.49	23.7	5	5
G2-206	478048.67	1351081.50	478019.24	1382550.42	591.43	24.5	5	5
G2-207	477646.51	1350879.51	477617.08	1382348.42	589.00	77.0	16	5
G2-208	477838.17	1351493.02	477808.73	1382961.93	596.27	24.2	5	5
G2-209	478155.04	1351394.37	478125.60	1382863.29	598.78	25	0	0
G2-210	478161.69	1350355.36	478132.27	1381824.28	583.18	25	0	0

(1) NAD: North American Datum

Table 3-2 - Existing[2] Soil Borings - Depth and Location

Boring No.	Coordinates (NAD[1] 1983)		Coordinates (NAD 1927)		Ground Surface Elevation (feet)	Depth of Boring (feet)
	Northing	Easting	Northing	Easting		
1745	478529.38	1350531.00	478500.00	1382000.00	586.00	27.0
1746	478029.38	1351031.01	478000.00	1382500.00	591.80	12.5
1747	477629.38	1351031.01	477600.00	1382500.00	597.40	21.5
1748	477329.38	1351031.01	477300.00	1382500.00	601.00	32.0
1749	478029.37	1351431.00	478000.00	1382900.00	597.50	30.0
1750	478529.39	1351031.00	478500.00	1382500.00	593.00	30.0
2400	477928.86	1350346.82	477899.48	1381815.81	580.70	81.5

(1) NAD: North American Datum
(2) Soil borings completed prior to November 1993 in conjunction with FEMP Remedial Investigation and Feasibility Study

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During drilling a geologist was on site to visually classify the soil samples, log the borings, and record water levels if groundwater was encountered. During sampling activities, FERMCO Environmental Monitoring Technicians screened the soil samples and drill cuttings for volatile organics and radiation with hand-held instruments. Screening readings for organics and beta/gamma radiation were at or below background levels.

Boring logs are presented in Appendix A. Underlying materials investigated and sampled broadly consist of varying mixtures of fine-grained and coarse-grained soils typical of glacial till deposits. Fine-grained soils are predominantly clay, whereas coarse-grained soils are predominantly silty and clayey sand. Directly below the till are sands and gravels of the Great Miami Aquifer. Borings G2-202 and G2-207 encountered the sands and gravels of the Great Miami Aquifer at depths of approximately 29.5 and 30.5 feet, respectively. For purposes of description in this report, the glacial till at the proposed site is discussed in two broad categories: (1) brown glacial till and (2) gray glacial till. As shown in the boring logs, the brown till overlays the gray till. Additionally, following the method of ASTM D 2487, the glacial till samples collected and tested are classified as fine-grained soil if 50 percent or more of the material passed the No. 200 sieve (.075 mm), or coarse-grained soil if more than 50 percent is retained on the No. 200 sieve.

Steam cleaning of drilling equipment and tools associated with drilling operations was performed prior to arrival at the site to avoid contamination of soils and/or groundwater from off-site sources. Within the same boring, the sampling devices were rinsed between samples by FERMCO site media sampling technicians.

Upon completion of each boring, the soil test borings were backfilled throughout the entire length of the boring with cement-bentonite grout. Borings G2-202 and G2-207 which extended into the Great Miami Aquifer were grouted with an expansive grout using C150 Type K Portland Cement (ASTM D 5299).

3.2 Environmental Soil Sampling

The environmental field work consisted of collecting surface soil samples in the immediate vicinity of each of the soil test borings. A total of eight surface soil samples were collected to be analyzed for herbicide and pesticide contamination. The surface soils were collected by FERMCO Environmental Sampling Technicians, using FERMCO sampling procedures per the *Sitewide CERCLA Quality Assurance Project Plan* (DOE 1993).

SECTION 4

GEOTECHNICAL LABORATORY TESTING PROGRAM

This section summarizes the results of geotechnical laboratory tests performed on subsurface soil samples collected during the ODC field program. Geotechnical laboratory testing was performed by Advanced Terra Testing, Inc., in Lakewood, Colorado, from December 1993 through March 1994. The laboratory data sheets from this testing are compiled in a two-volume reported entitled *On-Site Waste Disposal Cell Soil Investigation Data Report* (SAIC 1994).

4.1 Laboratory Methods and Procedures

The laboratory testing program was directed toward the classification of the in situ soils and determining their engineering properties. A variety of index tests were performed on selected samples to aid in soil classification and to extend the utility of the more sophisticated strength and permeability tests. Table 4-1 presents a list of the number of tests performed and the laboratory test methods. The laboratory testing was performed on split-spoon samples (disturbed sample), bulk samples (collected from auger cuttings), and Shelby tube samples (relatively undisturbed samples) obtained during the field exploration program. A PARSONS geotechnical engineer assigned laboratory tasks after reviewing the field boring logs and sample recovery. Prior to sample shipment to the geotechnical laboratory, alpha/beta screenings with laboratory counting equipment were performed at the FERMCO Sample Processing Lab on portions of the samples collected by the Site Media Sampling technicians. Upon completion of the alpha/beta screenings, the samples were packaged and shipped to Advanced Terra Testing, Inc., in Lakewood, Colorado, for geotechnical laboratory testing.

4.1.1 Water Content (ASTM D 2216)

The natural water (moisture) content of a soil is calculated by determining the mass of water removed by drying the moist material test specimen to a constant mass in a drying oven controlled at 110 $\pm$ 5 degrees C. The water content is then given as the mass of water in the test specimen divided by the mass of the solids remaining.

4.1.2 Liquid Limit, Plastic Limit, and Plasticity Index (ASTM D 4318)

The liquid and plastic limits are used for identification and classification. These tests are performed on material that passes through a No. 40 sieve (0.425 mm). The liquid limit (LL) is calculated by determining the water content at which a standard 1/2-inch wide groove cut in a pat of soil placed in a standard cup will flow together at 25 blows of the cup being dropped 1 centimeter. Similarly, the plastic limit (PL) is the water content at which a soil can no longer be deformed by rolling into 1/8-inch

diameter threads without crumbling. The Plasticity Index (PI) is calculated as the difference between the liquid limit and the plastic limit (PI = LL - PL).

Table 4-1 - Summary of Geotechnical Laboratory Program

Test Method	Title	Number Performed
ASTM D 2216	Method for Laboratory Determination of Water content of Soil, Rock, and Soil-Aggregate	30(2)
ASTM D 4318	Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils	35
ASTM D 422	Method for Particle-Size Analysis of Soils	37
ASTM D 854	Test Method for Specific Gravity of Soils	37(1)
ASTM D 698	Test Method for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-lb Hammer and 12-in. Drop	4
ASTM D 5084	Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter	6
ASTM D 4767	Test Method for Consolidated Undrained Triaxial Compressive Strength Test on Cohesive Soils	10
ASTM D 2435	Test Method for One-Dimensional Consolidation Properties of Soil	3

(1) Specific gravity tests were performed in conjunction with hydrometer (i.e., grain-size analyses) and consolidation tests.

(2) Additional moisture contents were determined in conjunction with permeability, consolidation, and triaxial compression tests.

4.1.3 Particle-Size Analysis (ASTM D 422)

A quantitative determination of the distribution of the particle sizes in soils is obtained by this test. the distribution of the particle sizes larger than the No. 200 sieve (0.075 mm) is determined by passing the material through a stack of progressively smaller-sized sieves. The distribution of particle sizes smaller than the No. 200 sieve is determined by a sedimentation process, using a hydrometer.

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4.1.4 Specific Gravity of Soils (ASTM D 854)

The specific gravity of soils finer than the No. 4 sieve (4.75 mm) is determined using a pycnometer. Specific gravity is calculated as the ratio of the mass of a unit volume of a material at a stated temperature to the mass in air of the same volume of gas-free distilled water at a stated temperature.

4.1.5 Moisture -Density Relationships (ASTM D 698)

Standard Proctor compaction tests are used to determine the relationship between the moisture content and density of soils. The soil is compacted in a mold having a capacity of 1/30 cubic foot. The results of these tests are generally used to determine the extent to which the material should be compacted and the degree of drying/wetting required during earthwork operations.

For a Standard Proctor test, the soil is mixed with varying amounts of water and then compacted in three equal layers by a hammer that weighs 5.5 pounds. The hammer is used to deliver 25 blows to each layer with a drop of 12 inches.

4.1.6 Permeability Tests (ASTM D 5084)

The permeability of fine-grained soils (fine sands to fat clays) is determined by the falling-head type test where the head of the inflow water is allowed to fall during the test. The specimen can be enclosed in a thin flexible rubber membrane under a constant confining pressure or in a metal or polyvinyl chloride fixed wall mold. The sample is completely saturated prior to permeation. The test is terminated when the sample has reached equilibrium (i.e., the measured coefficient of permeability is approximately constant for a period of at least 48 hours).

4.1.7 Consolidated-Undrained Triaxial Compression Test (ASTM D 4767)

This test method covers the determination of strength and stress-strain relationships for a soil specimen either in undisturbed or remolded state. The soil specimen is enclosed in a thin rubber membrane and is then saturated under back pressure. The sample is then allowed to drain under a constant confining pressure usually equal to the effective overburden pressure. At the end of the consolidation phase, the specimen is axially loaded to failure at a nearly constant rate of strain with pore-pressure measurements. No drainage is permitted during axial loading. The axial load is applied to the specimen using a rate of strain that will produce approximate equalization of pore pressures throughout the specimen at failure.

The tests are typically performed on three specimens under different confining pressures to develop Mohr strength envelopes. The shear strength parameters, cohesion, and internal friction angle are then estimated from the Mohr strength envelopes.

4.1.8 Incremental Consolidation Test (ASTM D 2435)

The rate and magnitude of the consolidation of the soils is determined by the incremental consolidation test. The data from the consolidation test can be used to develop an estimate of both differential and total settlement of a structure or landfill. In this test, a specimen of undisturbed cohesive soil is trimmed to fit inside a rigid ring with a height of 0.75 inches and 2.5-inch diameter. Porous discs are placed on the exposed ends of the specimen and the entire assembly is immersed in water. Increments of vertical loads are then applied to the specimen through a loading head on the top porous disc.

The change in thickness of the specimen is observed and recorded at selected time intervals. The sample is permitted to consolidate completely under each load increment before application of the next load. After consolidation due to final loading has occurred, loads are removed incrementally and the change in sample height due to rebound is measured and recorded. The results of the tests are presented as curves of percent vertical strain versus applied vertical effective pressure. This test method also provides data to determine the preconsolidation pressure (the maximum pressure to which the soil was ever subjected in the past) and the rate at which compression can occur.

4.2 Laboratory Test Results

Specific laboratory testing was conducted to determine the physical properties and engineering characteristics of the subsurface soils. Index properties are used to classify soils, to group soils in major strata, to obtain estimates of physical properties, and to correlate the results of physical property tests in one portion of a stratum with other portions of the same stratum or other similar soils where only index test data are available. Physical properties such as undrained shear strength and consolidation characteristics provide data for use in bearing capacity, stability, and settlement calculations.

4.2.1 Index/Classification Tests

The natural moisture content was determined as routine parts of test procedures for strength, consolidation, and permeability. Additional moisture tests were performed on selected samples to complete soil moisture profiles of the borings. Table 4-2 presents a summary of the natural moisture content test results along with the LL, PL, PI, grain-size, and specific gravity of the soil. For the samples tested, the moisture content of the soil samples of brown glacial till ranged from 8 percent to 26 percent with an average value of about 16 percent. The moisture content of the gray glacial till samples tested ranged from 9 percent to 14 percent with an average value of 13 percent. The average natural moisture content for both the brown and gray glacial till are higher than the optimum moisture content of 12.3 percent determined from Standard Proctor Compaction tests (see Subsection 4.2.2.).

Table 4-2 - Summary of Index Properties

Boring No.	Sample No.	Depth (feet)	Description[6]	USCS Symbol[6]	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	Grain Size				Specific Gravity
									% Gravel	% Sand	% Silt	% Clay[7]	
G2-201	2	2.5-4.5	Yellowish Brown Lean Clay	CL	19[2]	49	18	31	0	3	49	48	2.70
G2-201	4	7.5-9.5	Yellowish Brown Lean Clay	CL	16	30	17	13	2	10	46	42	2.73
G2-201	7	15-17	Gray Sandy Lean Clay[1]	CL[1]	13	NA	NA	NA	NA	NA	NA	NA	NA
G2-201	9	20-22	Gray Sandy Lean Clay[1]	CL[1]	14	NA	NA	NA	NA	NA	NA	NA	NA
G2-201	10	22.5-24.5	Gray Sandy Lean Clay	CL	13[2]	24	14	10	8	29	39	24	2.75
G2-202	1	0-2	Brown Sandy Lean Clay[1]	CL[1]	25	NA	NA	NA	NA	NA	NA	NA	NA
G2-202	3	5-7	Yellowish Brown Sandy Silty Clay	CL-ML	13	20	14	6	10	29	43	18	2.85
G2-202	4	7.5-9.5	Yellowish Brown Sandy Lean Clay	CL	14[2]	27	15	12	10	25	38	27	2.81
G2-202	5	10-12	Yellowish Brown Sandy Lean Clay	CL	12	25	14	11	7	24	42	27	2.84
G2-202	7	15-17	Gray Sandy Lean Clay	CL	14	25	14	11	10	25	39	26	2.81
G2-202	9	20-22	Gray Silty Gravel with Sand	GM[1]	NA	NA	NA	NA	40	38	17	5	2.80
G2-203	5	10-12	Yellowish Brown Clayey Sand with Gravel	SC	8	21	13	8	18	41	26	15	2.74
G2-203	7	15-17	Yellowish Brown Sandy Lean Clay	CL	17	28	16	12	7	27	39	27	2.76
G2-203	8	17.5-19.5	Yellowish Brown Sandy Lean Clay	CL	17[3]	27	16	11	7	31	32	30	2.74
G2-203	9	20-22	Gray Sandy Lean Clay	CL	12	21	13	8	5	35	39	21	2.77
G2-203	10	22.5-24.5	Gray Sandy Lean Clay	CL	14[4]	23	14	9	7	28	40	25	2.79
G2-204	1	0-2	Brown Sandy Lean Clay[1]	CL[1]	19	NA	NA	NA	NA	NA	NA	NA	NA
G2-204	4	7.5-9.5	Yellowish Brown Sandy Lean Clay	CL	14[4]	27	15	12	6	26	39	29	2.74
G2-204	6	12.5-14.5	Gray Lean Clay with Sand	CL	13[2]	24	14	10	4	25	44	27	2.76
G2-204	7	15-17	Gray Sandy Lean Clay	CL	10	25	14	11	4	26	45	25	2.74
G2-204	8	17.5-19.5	Gray Silty Sand	SM	9	13	12	1	8	51	32	9	2.78

Table 4-2 - Summary of Index Properties (Continued)

Boring No.	Sample No.	Depth (feet)	Description[6]	USCS Symbol[6]	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	Grain Size				Specific Gravity
									% Gravel	% Sand	% Silt	% Clay[7]	
G2-204	9	20-22	Gray Sandy Lean Clay[1]	CL[1]	12	NA	NA	NA	NA	NA	NA	NA	NA
G2-204	10	22.5-24.5	Gray Sandy Lean Clay	CL	12[3]	24	14	10	7	29	38	26	2.78
G2-205	2	2.5-4.5	Yellowish Brown Lean Clay	CL	11[3]	41	23	18	1	12	51	36	2.68
G2-205	3	5-7	Yellowish Brown Lean Clay[1]	CL[1]	12	NA	NA	NA	NA	NA	NA	NA	NA
G2-205	5	10-12	Yellowish Brown Sandy Lean Clay	CL	14	28	16	12	10	25	38	27	2.79
G2-205	8	17.5-19.5	Gray Sandy Lean Clay	CL	13[2]	23	14	9	16	27	37	20	2.77
G2-206	1	0-2	Grayish Brown Lean Clay with Sand[1]	CL[1]	20	NA	NA	NA	NA	NA	NA	NA	NA
G2-206	2	2.5-4.5	Yellowish Brown Lean Clay with Sand	CL	11[4]	35	17	18	5	19	41	35	2.76
G2-206	3	5-7	Yellowish Brown Lean Clay with Sand[1]	CL[1]	13	NA	NA	NA	10	18	35	37	2.76
G2-206	4	7.5-9.5	Yellowish Brown Sandy Lean Clay	CL	14[3]	28	15	13	9	23	38	30	2.75
G2-206	5	10-12	Yellowish Brown Sandy Lean Clay	CL	14	26	15	11	8	28	38	26	2.76
G2-206	6	12.5-14.5	Yellowish Brown Lean Clay With Sand[1]	CL[1]	12	NA	NA	NA	NA	NA	NA	NA	NA
G2-206	7	15-17	Gray Sandy Lean Clay	CL	12	22	13	9	6	33	39	22	2.73
G2-206	8	17.5-19.5	Gray Silty Sand [1]	SM[1]	13	NA	NA	NA	NA	NA	NA	NA	NA
G2-206	10	22.5-24.5	Gray Sandy Lean Clay	CL	13[2]	25	15	10	7	28	41	24	2.73
G2-207	1	0-2	Brown Sandy Lean Clay[1]	CL[1]	25	NA	NA	NA	NA	NA	NA	NA	NA
G2-207	5	10-12	Yellowish Brown Sandy Lean Clay	CL	13	26	16	10	6	27	40	27	2.83
G2-207	11	25-27	Gray Sandy Silty Clay	CL-ML	14	19	13	6	16	32	38	14	2.81
G2-208	2	2.5-4.5	Yellowish Brown Lean Clay	CL	23[2]	44	20	24	0	2	63	35	2.76
G2-208	3	5-7	Yellowish Brown Sandy Lean Clay	CL	26	40	17	23	1	29	39	31	2.74
G2-208	4	7.5-9.5	Yellowish Brown Sandy Lean Clay	CL	17[2]	31	15	16	1	30	42	27	2.76

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Table 4-2 - Summary of Index Properties (Continued)

Boring No.	Sample No.	Depth (feet)	Description[6]	USCS Symbol[6]	Moisture Content (%)	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	Grain Size				Specific Gravity
									% Gravel	% Sand	% Silt	% Clay[7]	
G2-208	5	10-12	Gray Sandy Lean Clay[1]	CL[1]	13	NA	NA	NA	NA	NA	NA	NA	NA
G2-208	9	20-22	Gray Sandy Lean Clay	CL	13	24	14	10	6	33	39	22	2.80
G2-209	BULK	0-25	Brown and Gray Sandy Lean Clay	CL	6[5]	28	13	15	3	27	40	30	2.80
G2-210	BULK	0-25	Brown and Gray Lean Clay with Sand	CL	7 [5]	28	14	14	3	22	44	31	2.76
G2-201 G2-202 G2-203 G2-204	BULK	0-24.5	Brown and Gray Lean Clay with Sand	CL	N/A	27	15	12	3	25	44	28	2.79
G2-205 G2-206 G2-207 G2-208	BULK	0-24.5	Brown and Gray Sandy Lean Clay	CL	NA	27	14	13	3	27	42	28	2.81

NA Not Analyzed
(1) Visual Classification
(2) Average moisture content from CU triaxial test specimens
(3) Moisture content from permeability test specimen
(4) Moisture content from consolidation test specimen
(5) Moisture content of auger cuttings; not representative of natural moisture content
(6) Description (excluding color) and USCS symbol assigned per ASTM D 2487 based on laboratory grain-size analyses (ASTM D 422) and plasticity tests (ASTM D 4318) except as noted (see Note 1).
(7) Clay size particles defined as those smaller than 0.005 mm (reference ASTM D 422)

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Plastic and liquid limits, collectively termed Atterberg Limits, were determined for 35 samples to provide classification information. Table 4-2 summarizes the Atterberg Limit results. Figure 4-1 presents a Plasticity Chart with LL and PI results for the fine-grained (50 percent or more passing the No. 200 sieve) glacial till samples.

The plasticity chart indicates that the fine-grained samples of both the brown and gray glacial till predominantly classify as CL in accordance with ASTM D 2487 (Unified Soil Classification System). The liquid limit for fine-grained samples of brown glacial till ranged from 20 to 49, with an average of 31; and that of the fine-grained gray glacial till ranged from 13 to 25, with an average of 23. Similarly, the plasticity indices of the fine-grained brown glacial till samples ranged from 6 to 31, with an average of 15; and that of the fine-grained gray glacial till samples ranged from 9 to 11, with an average of 9.

Figure 4-2 presents a generalized summary of the grain-size distribution of the fine-grained CL soil samples from the brown glacial till. The grain-size distribution tests indicate that the fine-grained CL brown glacial till samples consist predominantly of silt-size particles. The grain-size distribution analyses show that about 62 percent to 98 percent by weight of the brown glacial till classifying as CL passes the No. 200 sieve, with the majority of the particles falling within the silt-size range (0.005 to 0.074 mm). Figure 4-3 presents a generalized summary of the grain-size distribution of the fine-grained CL gray glacial till soil samples. The grain-size analyses for these soil samples classifying as CL show that about 57 percent to 71 percent of this material by weight passed the No. 200 sieve. About 37 percent to 45 percent of the material fell within the silt size range for the gray glacial till samples.

Two fine-grained samples were classified as CL-ML. A fine-grained brown glacial till sample from Boring G2-202 (5-7 feet) were classified as CL-ML as was a fine-grained gray glacial till sample from Boring G2-207 (25-27 feet).

Four samples were classified as coarse-grained (more than 50 percent retained in the No. 200 sieve). Samples from Boring G2-204 (17.5-19.5 feet) and Boring G2-206 (17.5-19.5 feet) were classified as silty sand (SM). A sample from G2-202 (20-22 feet) was classified as a silty gravel with sand (GM). These three samples were within the gray glacial till. A sample from within the brown glacial till, G2-203 (5-7 feet), was classified as a clayey sand with gravel (SC).

Appendix B presents individual grain-size distribution curves.

Specific gravity tests were performed on samples of both the brown and gray glacial tills. The average specific gravity of the brown till was 2.76 and the average specific gravity of the gray till was 2.77. Table 4-2 presents the results of specific gravity tests.

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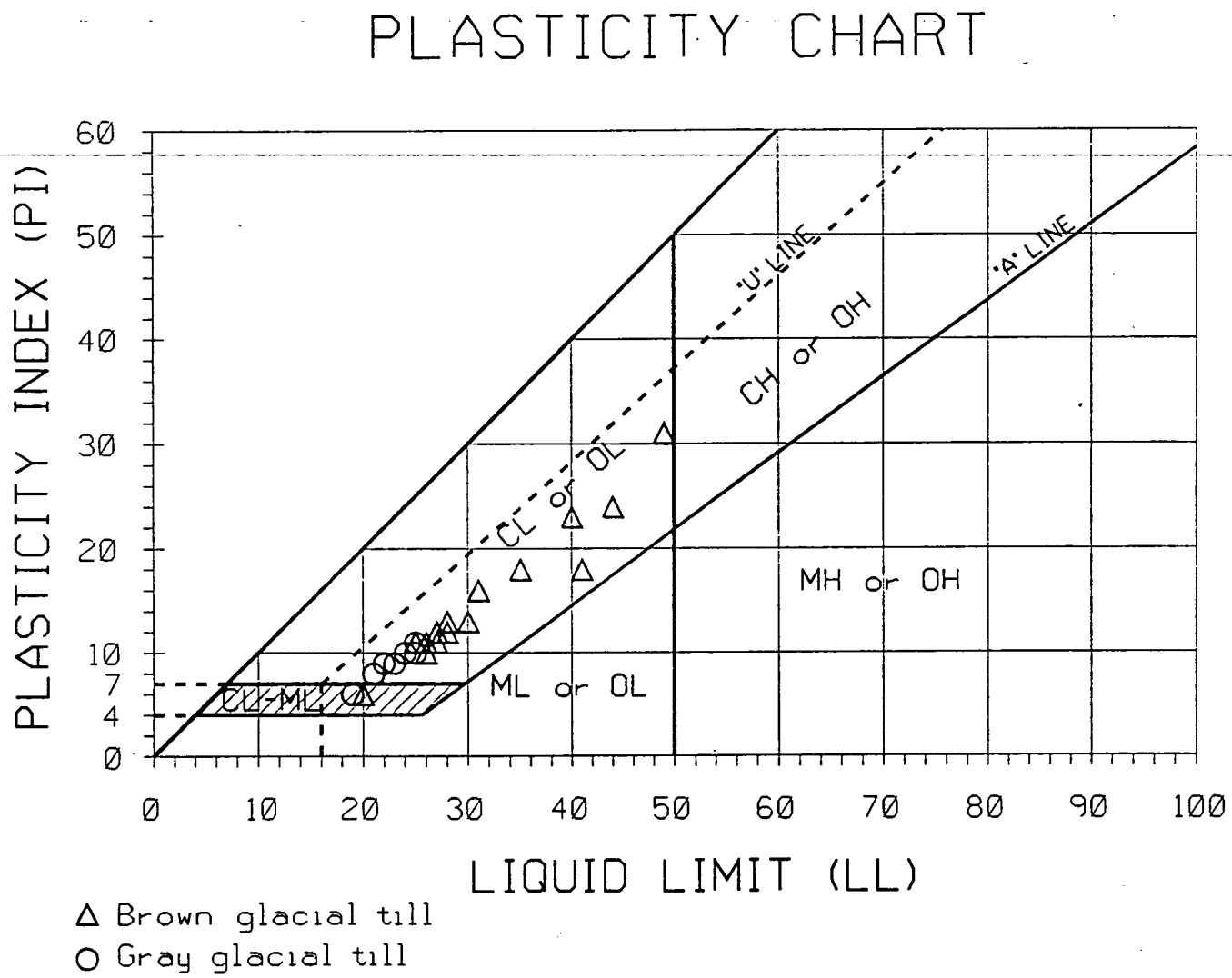

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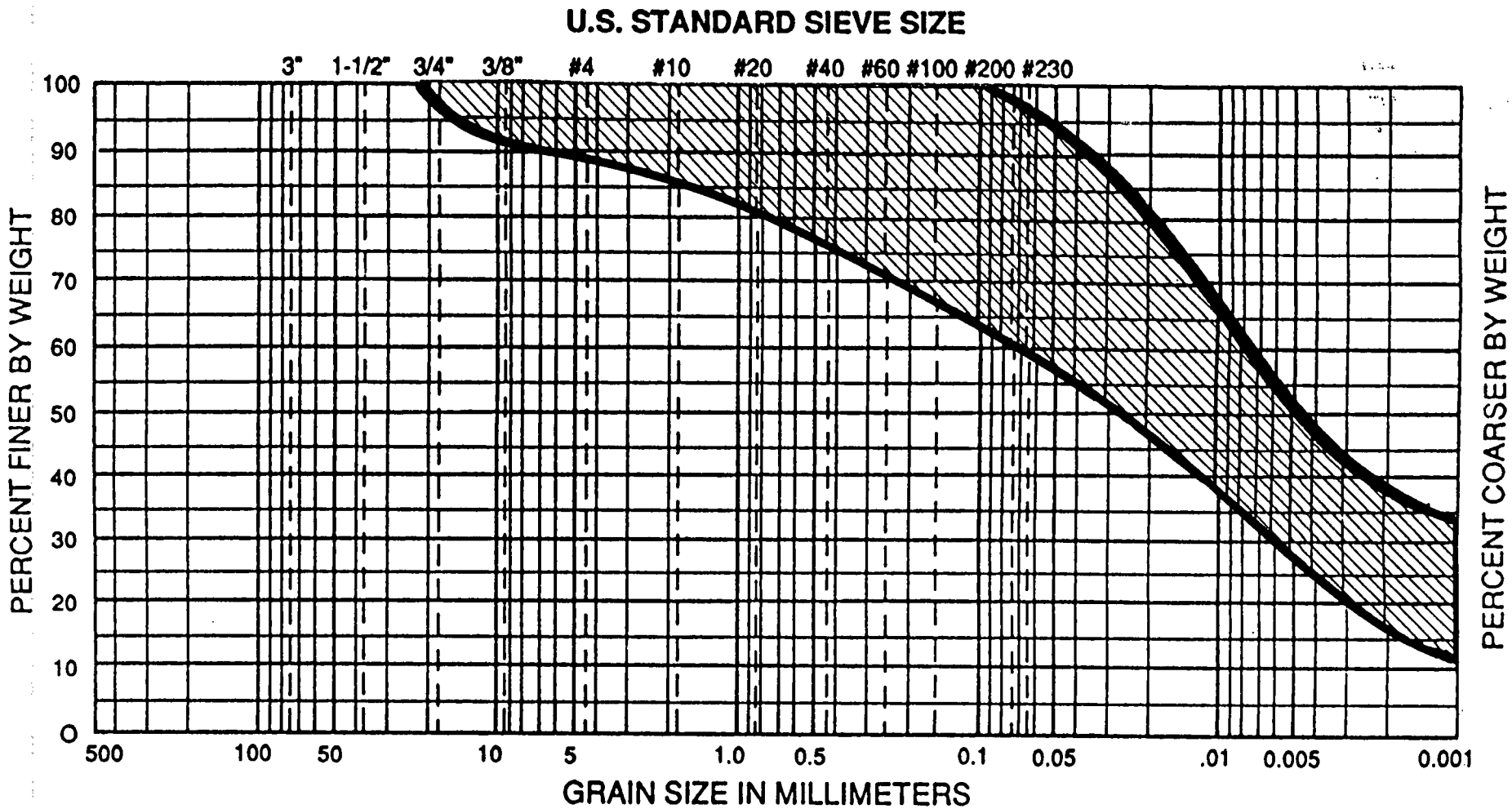
Source of Chart: ASTM D 2487

CAD FILE: skx02711

Figure 4-1 - Plasticity Chart



ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

PROJECT NO.: PO-101

Figure 4-2 - Grain-Size Distribution, Fine-Grained Brown Glacial Till CL Samples

ADVANCED TERRA TESTING

E-3-3-22

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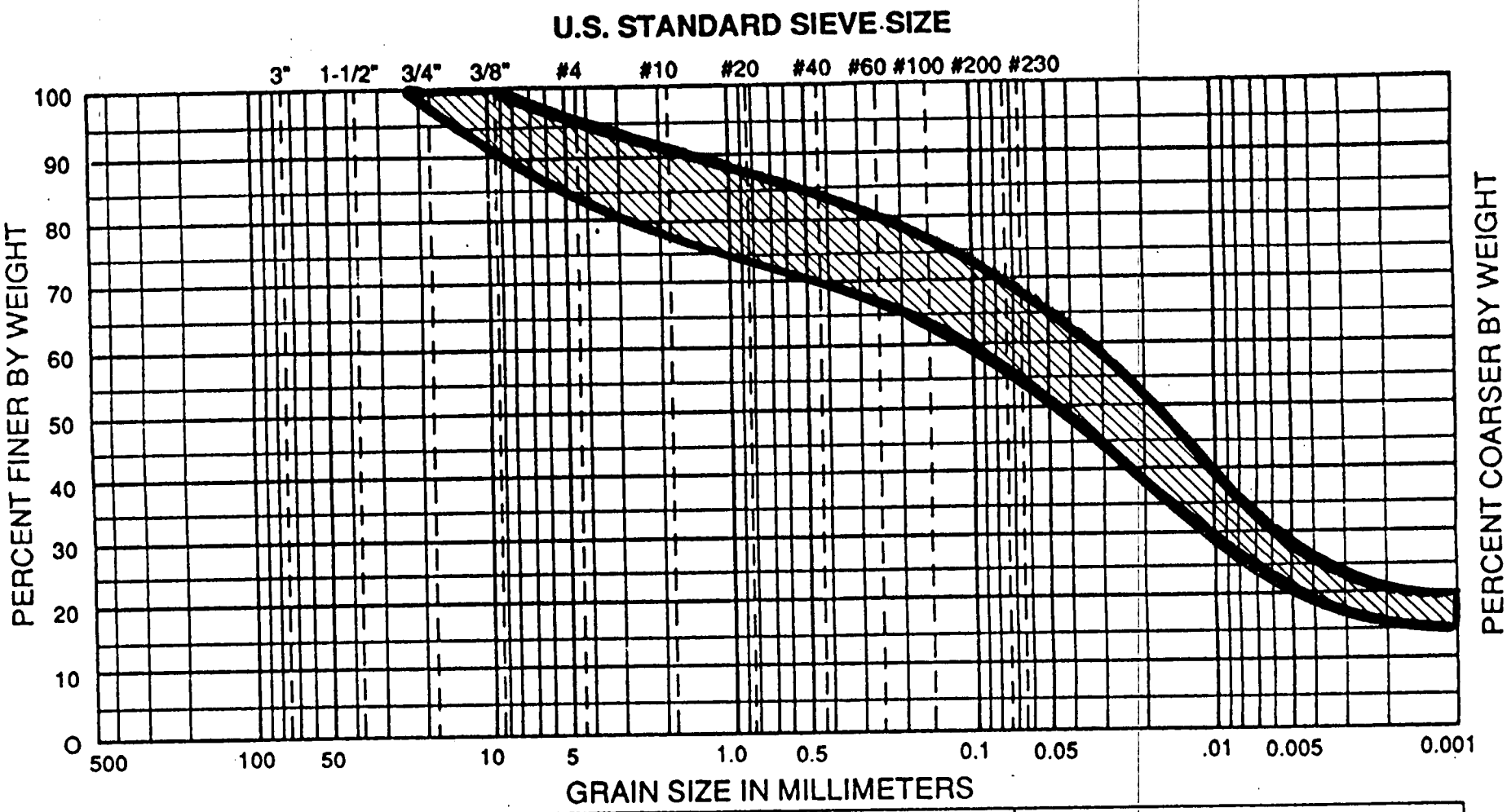

ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

PROJECT NO.: PO-101

Figure 4-3 - Grain-Size Distribution, Fine-Grained Gray Glacial Till CL Samples

ADVANCED TERRA TESTING

E-3-3-23

FEMP-OU02-5 DRAFT
August 24, 1994

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The total and dry unit weight of the soils were determined in conjunction with other laboratory tests (i.e., consolidation, permeability, and triaxial shear tests) and are presented in Table 4-3. The dry unit weight of the brown glacial till ranged between 99 pounds per cubic foot (pcf) and 131 pcf, with an average value of 117 pcf. For the gray glacial till, the dry unit weight ranged between 122 pcf and 129 pcf, with an average value of 127 pcf.

4.2.2 Moisture-Density Relationships

Standard Proctor compaction tests were performed on bulk samples collected from auger cuttings to determine the maximum dry density and the optimum moisture content of the proposed site's soils. The amount of compaction and degree of wetting/drying operations required during earthwork operations can be estimated from the compaction test results. The average maximum dry density of the bulk samples is 123 pcf and the average optimum moisture content is 12.3 percent. Table 4-4 summarizes the results of the Standard Proctor tests. Appendix C presents the moisture-density relationships of the samples tested.

4.2.3 Consolidated-Undrained Triaxial Compression Tests

Consolidated-undrained compressive strength tests were performed on relatively undisturbed Shelby tube samples and remolded soil samples compacted to 95 percent of the Standard Proctor maximum dry density. For each soil sample, two to three specimens were tested under varying confining pressures to determine the shear strength parameters. Table 4-5 provides a summary of the triaxial test results used to construct Mohr failure circles. Table 4-6 summarizes the cohesion and friction angles from Mohr circle constructions. Appendix D contains the Mohr strength envelopes. Some of these envelopes show bi-linearity. The break points in these curves correspond to the transition from overconsolidated conditions (low confining pressures) to normally consolidated conditions (high confining pressures).

4.2.4 Permeability Tests

Laboratory permeability tests were performed on six Shelby tube samples and two remolded samples using flexible wall equipment and the falling head method. Results of the permeability tests performed on Shelby tube samples of brown glacial till ranged from 7.8×10^{-8} cm/sec to 9.4×10^{-9} cm/sec. The Shelby tube sample of gray glacial till had a permeability of 6.3×10^{-9} cm/sec. Two permeability tests were performed on remolded samples compacted to 95 percent of the Standard Proctor maximum dry density. The average permeability for the remolded samples was about 1.8×10^{-6} cm/sec. Table 4-7 summarizes the results of the permeability tests.

Table 4-3 - Summary of Unit Weight

Boring No.	Depth (feet)	Soil Description	Moisture Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)
G2-201	2.5-4.5	Yellowish Brown Lean Clay	19(1)	124(1)	104(1)
GS-201	7.5-9.5	Yellowish Brown Lean Clay	16	137	118
G2-201	22.5-24.5	Gray Sandy Lean Clay	13(1)	143(1)	127(1)
G2-202	7.5-9.5	Yellowish Brown Sandy Lean Clay	14(1)	141(1)	124(1)
G2-203	17.5-19.5	Yellowish Brown Sandy Lean Clay	17(3)	139(3)	119(3)
G2-203	22.5-24.5	Gray Sandy Lean Clay	14(2)	139(2)	122(2)
G2-204	7.5-9.5	Yellowish Brown Sandy Lean Clay	14(2)	139(2)	122(2)
G2-204	12.5-14.5	Gray Lean Clay with Sand	13(1)	144(1)	128(1)
G2-204	22.5-24.5	Gray Sandy Lean Clay	12(3)	144(3)	129(3)
G2-205	2.5-4.5	Yellowish Brown Lean Clay	11(3)	138(3)	124(3)
G2-205	17.5-19.5	Gray Sandy Lean Clay	13(1)	144(1)	128(1)
G2-206	2.5-4.5	Yellowish Brown Lean Clay With Sand	11(2)	123(2)	110(2)
G2-206	7.5-9.5	Yellowish Brown Sandy Lean Clay	14(3)	139(3)	122(3)
G2-206	12.5-14.5	Yellowish Brown Lean Clay with Sand	12	146	131(1)
G2-206	22.5-24.5	Gray Sandy Lean Clay	23(1)	122(1)	131(1)
G2-208	2.5-4.5	Yellowish Brown Lean Clay	23(1)	122(1)	99(1)
G2-208	7.5-9.5	Yellowish Brown Sandy Lean Clay	17(1)	137(1)	117(1)

(1) Average values from two or three point triaxial tests.
(2) Values obtained from consolidation test results.
(3) Values from Permeability test results.

Table 4-4 - Summary of Standard Proctor Tests

Boring No.	Depth (feet)	Soil Description and Classification	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
G2-209	0-25	Brown and Gray Sandy Lean Clay (CL)	122	12.3
G2-210	0-25	Brown and Gray Lean Clay with Sand (CL)	122	12.4
G2-201 G2-202 G2-203 G2-204	0-24.5	Brown and Gray Lean Clay with Sand (CL)	123	12.0
G2-205 G2-206 G2-207 G2-208	0-24.5	Brown and Gray Sandy Lean Clay (CL)	123	12.3

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Table 4-5 - Summary of Consolidated-Undrained Triaxial Compression Tests

Boring No.	Depth (feet)	Stage	Moisture Content (%)		Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Axial Strain (%)	Deviator Stress (psf)	Pore Pressure (psf)	Effective Confining Pressure ($sigma_3$) (psf)	Major Principal Stress ($sigma_1$) (psf)	Principal Stress Ratio
			Initial	Final								
G2-201	2.5-4.5	1	18.2	27.5	119.4	101.1	0.33	1953	259	29	1982	68.82
		2	17.7	25.7	120.9	102.8	1.37	2472	504	648	3120	4.82
		3	20.4	24.7	130.2	108.2	3.33	3711	605	1555	5266	3.39
G2-201	22.5-24.5	1	12.6	12.2	143.7	127.6	6.17	3595	835	1325	4919	3.71
		2	13.0	12.1	143.4	126.9	5.14	4566	994	1886	6453	3.42
		3	13.8	12.5	142.4	125.2	6.06	5938	2218	2102	8041	3.82
G2-202	7.5-9.5	1	14.2	14.4	139.6	122.3	3.60	2673	835	1325	3997	3.02
		2	14.1	14.7	142.4	124.8	0.96	2001	245	907	2908	3.21
G2-204	12.5-14.5	1	12.5	13.2	142.9	127.0	6.18	2838	-518	1238	4076	3.29
		2	12.9	12.8	144.0	127.6	3.56	3888	806	1354	5242	3.87
		3	12.7	12.1	145.9	129.5	4.43	5366	1397	2203	7569	3.44
G2-205	17.5-19.5	1	12.2	12.6	143.3	127.7	2.68	1797	202	518	2316	4.47
		2	13.0	12.5	143.1	126.6	6.75	4344	619	1541	5885	3.82
		3	12.6	12.6	144.4	128.2	5.97	5395	1498	2102	7498	3.57

Table 4-5 - Summary of Consolidated-Undrained Triaxial Compression Tests (Continued)

Boring No.	Depth (feet)	Stage	Moisture Content (%)		Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Axial Strain (%)	Deviator Stress (psf)	Pore Pressure (psf)	Effective Confining Pressure ($sigma_3$) (psf)	Major Principal Stress ($sigma_1$) (psf)	Principal Stress Ratio
			Initial	Final								
G2-206	22.5-24.5	1	12.8	13.0	143.5	127.2	2.51	1932	115	605	2537	4.20
		2	12.7	12.4	144.2	128.0	5.87	4072	634	1526	5598	3.67
		3	12.7	12.1	144.4	128.1	6.92	5638	1613	1987	7625	3.84
G2-208	2.5-4.5	1	22.9	27.3	122.6	99.7	0.70	1103	216	72	1175	16.31
		2	21.8	28.8	120.7	99.1	2.01	2317	634	518	2835	5.47
		3	25.4	27.2	123.0	98.1	5.09	3182	1008	1152	4334	3.76
G2-208	7.5-9.5	1	13.5	14.5	140.0	123.4	1.00	1024	29	259	1283	4.95
		2	14.3	13.7	143.4	125.4	2.55	2700	389	763	3463	4.54
		3	23.4	23.0	126.6	102.6	5.10	2444	1238	922	3365	3.65
G2-209[1]	0-25	1	12.0	17.6	131.4	117.3	3.36	770	461	259	1030	3.97
		2	12.1	16.0	131.6	117.4	9.33	1827	1195	965	2791	2.89
		3	12.1	15.2	130.6	116.5	10.12	2665	2002	1598	4263	2.67
G2-210[1]	0-25	1	12.0	18.1	131.4	117.3	1.67	1102	432	288	1390	4.83
		2	12.0	16.1	133.1	118.9	10.28	1986	1051	1109	3095	2.79
		3	11.9	14.8	133.2	119.1	6.86	2861	1958	1642	4503	2.74

[1] Tests performed on remolded samples compacted to 95% Standard Proctor maximum dry density.

Table 4-6 - Summary of Mohr Circle Construction Results

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Boring No.	Depth (ft)	Soil Description	Normally Consolidated			
			Effective		Total	
			Cohesion (psf)	Angle of Internal Friction (degrees)	Cohesion (psf)	Angle of Internal Friction (degrees)
G2-201 (1)	2.5-4.5	Yellowish Brown Lean Clay (CL)	500	24	300	22
G2-202	7.5-9.5	Yellowish Brown Sandy Lean Clay (CL)	200	26	450	15
G2-208	2.5-4.5	Yellowish Brown Lean Clay (CL)	300	30	250	22
G2-208	7.5-9.5	Yellowish Brown Sandy Lean Clay (CL)	150	31	300	16
G2-201	22.5-24.5	Gray Sandy Lean Clay (CL)	400	28	250	24
G2-204(1)	12.5-14.5	Gray Sandy Lean Clay (CL)	450	270	600	20
G2-205	17.5-19.5	Gray Sandy Lean Clay (CL)	200	32	300	23
G2-206	22.5-24.5	Gray Sandy Lean Clay (CL)	250	31	200	26
G2-209	0-25	Brown and Gray Sandy Lean Clay (CL)	150	25	100	15
G2-210	0-25	Brown and Gray Lean Clay with Sand (CL)	300	21	250	13
		Estimated Preconsolidation Pressure (psf)	Over Consolidated			
G2-201(1)	2.5-4.5	1075	800	12	700	12
G2-204(1)	12.5-14.5	1500	450	27	850	16

(1) Mohr circle constructions for these samples show soil to be over-consolidated

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Table 4-7 - Summary of Laboratory Permeability Tests

Boring No.	Sample No.	Sample Depth (feet)	Soil Description and Classification	Initial Water Content (%)	Final Water Content	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Sample Preparation	Permeability (cm/sec)
203	8	17.5-19.5	Yellowish Brown Sandy Lean Clay (CL)	16.7	15.4	138.6	118.8	in situ	1.6×10^{-8}
204	10	22.5-24.5	Gray Sandy Lean Clay (CL)	12.1	11.8	144.3	128.7	in situ	6.3×10^{-9}
205	2	2.5-4.5	Yellowish Brown Lean Clay (CL)	11.3	16.9	138.3	124.2	in situ	7.8×10^{-8}
206	4	7.5-9.5	Yellowish Brown Sandy Lean Clay (CL)	13.7	14.7	138.5	121.8	in situ	9.4×10^{-9}
209	bulk	0-25	Brown and Gray Sandy Lean Clay (CL)	11.7	16.7	130.0	116.3	remold[1]	1.4×10^{-6}
210	bulk	0-25	Brown and Gray Lean Clay with Sand (CL)	11.8	17.0	130.2	116.5	remold[1]	2.1×10^{-6}

[1]Remolded samples compacted to 95% Standard Proctor maximum dry density.

Figure 4-4 shows the dry density, molding water content, and corresponding hydraulic conductivity for the remolded samples plotted in relation to a Standard Proctor compaction curve (Bulk Sample G2-210) for the glacial till at the proposed site. As described above, the laboratory permeability tests were performed on samples recompacted to 95 percent of Standard Proctor maximum dry density. The molding water contents for the two samples were near or at the optimum moisture content.

Figure 4-5 illustrates the behavior of compacted, cohesive soils with respect to molding water content, dry density, compactive effort and hydraulic conductivity. In general, if the compactive effort is increased, the hydraulic conductivity decreases because the void ratio decreases (increasing dry density). Hydraulic conductivity at constant compactive effort decreases with increasing water content and reaches a minimum at about the optimum. However, clay particle arrangement can also have a significant effect on hydraulic conductivity. Often the dispersed clay structure achieved by compacting cohesive soils wet of optimum conditions additionally lowers the vertical hydraulic conductivity in compacted clay liners. This behavior suggests that the hydraulic conductivity of the recompacted glacial tills could be decreased by compacting the soil wet of optimum and/or by using a greater compactive effort (increasing the dry density).

4.2.5 Incremental Consolidation Tests

Three consolidation tests were performed on Shelby tube samples. The preconsolidation pressure for the samples varied from approximately 1,500 pounds per square foot (psf) to 4,900 psf. The overconsolidation ratio (OCR) for the samples of brown till was 4. The sample of gray glacial till is normally consolidated, hence it has an OCR of approximately 1. The change from overconsolidation in the shallow portion (0-10 feet depth) of the till to normal consolidation in the deeper portion of the till (greater than 20 feet) is not readily explainable, but may be due to many different factors (e.g., mode of deposition, sample disturbance, etc.). Table 4-8 presents a summary of the consolidation test results. Consolidation test curves may be found in Appendix E.

COMPACTION TEST DATA

Sample No. G2-210 Depth 0 - 25 Elevation _____

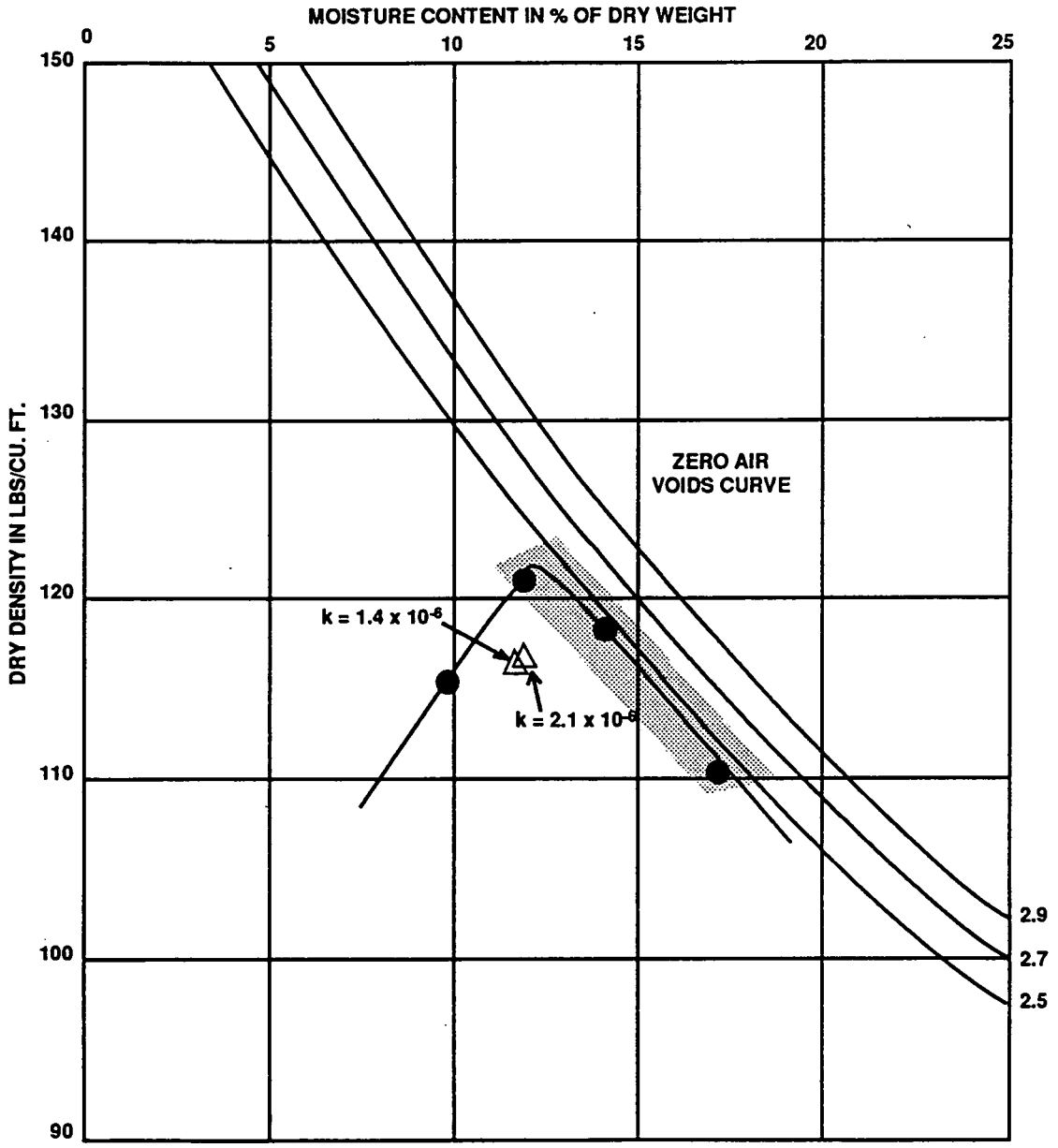
Soil Brown and Gray Lean Clay with Sand (CL)

Location Proposed On-Site Disposal Cell (PO-101)

Optimum Moisture Content 12.4%

Maximum Dry Density 122.3 pcf

Method of Compaction ASTM D 698, Method A



△ REMOLDED SAMPLE

EXPECTED MOISTURE-DENSITY ZONE FOR PERMEABILITIES IN THE ORDER OF 10^{-7} cm/sec

k = MEASURED LABORATORY PERMEABILITY (cm/sec)

*ILLUS\OU-2\PO-10\COMPACT TEST.EPS

Figure 4-4 - Remolded Sample Hydraulic Conductivity Results vs. Standard Proctor Compaction Curve

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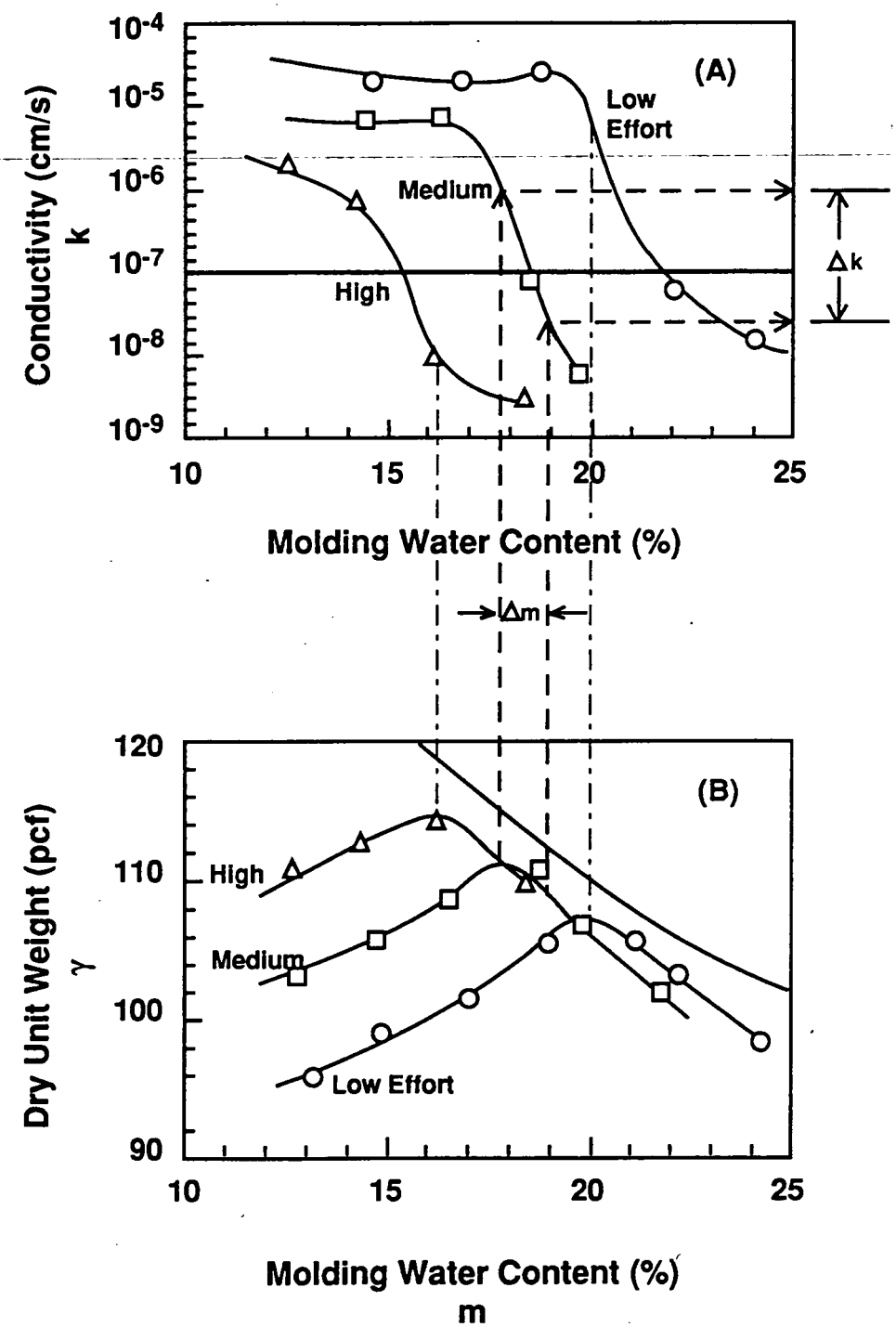

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^\ILLUS\OU-2\PO-101\MOLDING WATER CONT.EPS

Figure 4-5 - Behavior of Compacted Cohesive Soils

Table 4-8 - Summary of Consolidation Tests

Boring No.	Sample Depth (feet)	Soil Type	Initial Moisture Content (%)	Dry Unit Weight (pcf)	Initial Void Ratio	Overburden Pressure (psf)	Maximum Past Pressure (psf)	Average Coefficient of Consolidation Cv (sq. in/min)	Compression Index Cc	Recompression Index Cr	Over-Consolidation Ratio (OCR)
203	22.5-24.5	Gray Sandy Lean Clay	14.0	122.4	0.4234	3279	2398	0.1426	0.100	0.028	1
204	7.5-9.5	Yellowish Brown Sandy Lean Clay	14.2	122.0	0.4023	1184	4898	0.1651	0.084	0.023	4
206	2.5-4.5	Yellowish Brown Lean Clay with Sand	11.4	110.2	0.5631	429	1514	0.2086	0.141	0.038	4

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SECTION 5

ENVIRONMENTAL LABORATORY TESTING

Surface soil samples collected at ODC borehole locations by FERMCO Site Media Sampling Technicians were packaged and shipped to a FERMCO contract analytical laboratory for testing. The samples were analyzed for herbicide and pesticide contamination. Results of the analyses are contained in Appendix F.

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SECTION 6

RECOMMENDATIONS AND ADDITIONAL TESTING

This section presents geotechnical engineering recommendations to support preliminary design and analysis of the cell. The preliminary geotechnical engineering analyses conducted for the proposed ODC included (1) evaluation of the generalized site conditions, (2) an estimate of the bearing capacity of the soils underlying the on-site cell, and (3) recommendations for additional testing. Data presented in Subsection 4.2 provide the basis for additional geotechnical engineering design considerations and analyses as design of the ODC progresses.

6.1 Generalized Site Conditions

The soil boring locations are shown on Figure 3-1. Appendix A contains the soil boring logs which include Standard Penetration Test data. Generalized soil parameters to be used for the geotechnical engineering evaluation of the site were interpreted from these data and the laboratory test results. For evaluation purposes, the subsurface soils were placed in two broad classifications: (a) brown glacial till and (b) gray glacial till. Design parameters were established for in situ and remolded states for the two soil classifications and also for remolded composite samples of brown and gray till. The design parameters are presented in Table 6-1. These design parameters represent a conservative estimate based on our interpretation of the index/classification tests, strength tests, and consolidation tests performed on the site soils. These design parameters may be used as the basis for slope stability calculations. Actual parameters selected for stability analyses will be based on the individual slope section to be analyzed. The consolidation parameters presented in Table 4-8 can be used for estimating settlements of the ODC. Once again, the actual parameters selected for settlement calculations will be dependent on each individual loading condition analyzed. A summary of the laboratory testing program and the discussion of the results are available in Section 4.

6.2 Bearing Capacity

Methods developed by Meyerhof (Bowles 1988) were used to evaluate bearing capacity for soils in the area of the proposed cell. The soils in the vicinity of the ODC were estimated to have a net allowable bearing pressure of 5,000 psf based on a Safety Factor of 3. This estimate is preliminary. Data contained in Subsection 4.2 provide the basis for further bearing capacity evaluation once the specific details of ODC geometry, foundation, and loading are finalized. It should be noted that bearing capacity really only has relevance when used in relation to a specific set of foundation dimensions. In the present context, the concept of bearing capacity is not readily applicable.

Table 6-1 - Design Parameters

Soil Description	Moisture Content (%)	Dry Unit Weight (pcf)	Effective Strength Parameters		Total Strength Parameters	
			Cohesion	Friction Angle (degrees)	Cohesion	Friction Angle (degrees)
Brown Till	16	117	200	28	300	20
Gray Till	13	127	200	29	250	24
Soil Recompacted to 95% Standard Proctor	12[1]	123[2]	225	23	175	14

(1) Optimum Moisture Content

(2) Maximum Dry Density

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6.3 Additional Testing

Permeability test results for the remolded glacial till samples suggest that lower permeabilities could be achieved by compacting the soil wet of optimum and/or by increasing the dry density (see Subsection 4.2.4). A series of additional permeability tests performed to evaluate the moisture-density-permeability relationship for recompacted glacial till has been planned to provide additional hydraulic conductivity data for design. Additionally, any further subsurface exploration at the proposed site should include particle-size analysis, plastic limit, and plasticity index tests to allow for identification and classification of the soils.

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SECTION 7

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REFERENCES

(ASTM 1991) American Society for Testing and Materials, 1991. Annual Book of ASTM Standards, *Volume 4.08, Soil and Rock, Building Stones, and Geotextiles, 1991 Edition*. Philadelphia, Pennsylvania: ASTM.

(Bowles 1988) Bowles, Joseph E., 1988. *Foundation Analysis and Design*, 4th Edition. New York: McGraw-Hill Publishing Company.

(DOE 1993) United States Department of Energy, April 1993. *Sitewide CERCLA Quality Assurance Project Plan*, Revision 0.1. Fernald, Ohio: DOE.

(PARSONS 1993) PARSONS ERA Project, October 1993. *Solid Waste Landfill and On-Site Disposal Cell Geotechnical Sampling and Testing Plan*, Revision 0. Fairfield, Ohio: PARSONS.

(SAIC 1994) Science Applications International Corporation, March 3, 1994. *On-Site Waste Disposal Cell Soil Investigation Data Report*. Volumes 1 and 2. Golden, Colorado: SAIC.

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APPENDIX A

BORING LOGS

000201

ct No: PO-101	Project Title: On-Site Waste Disposal Cell Predesign Field Investigation - Geotechnical Sampling and Tesing Exploration	
Boring No. G2-201	Drilling Method: 3-1/4" Inside-diameter Hollow Stem Augers	Date Started: 11-02-93
Coordinates: N478479.25 E1350255.01	Geologist: J. Haney	Date Completed: 11-02-93
Ground Surface Elevation: 580.57	GWL/DATE: NA	Page 1 of 1

Notes: Samples collected per ASTM D 1586 and ASTM D 1587. Colors identified using Munsell Color Chart. Consistency based on Standard Penetration Resistance Value. Screening readings are in units above background levels. Soils visual description per ASTM D 2488 and soil classification per ASTM D 2487. Soil descriptions interpreted from field logs and laboratory results.
SS = Split-spoon Sample ST = Shelby Tube Sample

Depth (ft)	Description [ASTM Symbol]	Sample No.	Sample Depth (ft)	Sample Type	Blows per 6"	Recovery (in)	Field Screening
0.0	Light to dark yellowish brown lean clay [CL], moist - stiff to very stiff (brown glacial till).	1	0.0-2.0	SS	6-7-8-6	12	beta/gamma = 0 cpm PID = 0.0 ppm
		2	2.5-4.5	ST		24	beta/gamma = 0 cpm PID = 0.3 ppm
		3	5.0-7.0	SS	5-7-9-12	6	beta/gamma = 0 cpm PID = 0.4 ppm
		4	7.5-9.5	ST		8	beta/gamma = 0 cpm PID = 0.4 ppm
		5	10.0-12.0	SS	7-10-7-10	6	beta/gamma = 0 cpm PID = 0.1 ppm
		6	12.5-14.5	ST		2	beta/gamma = 0 cpm PID = NA
15.0	Dark gray sandy lean clay [CL], moist - stiff (gray glacial till).	7	15.0-17.0	SS	14-6-8-15	12	beta/gamma = 0 cpm PID = 0.4 ppm
		8	17.5-19.5	ST		6	No sample
		9	20.0-22.0	SS	3-4-5-7	15	beta/gamma = 0 cpm PID = 0.3 ppm
		10	22.5-24.5	ST		24	beta/gamma = 0 cpm PID = 0.0 ppm
24.5	Boring terminated at 24.5 feet.						

000202

Project No: PO-101	Project Title: On-Site Waste Disposal Cell Predesign Field Investigation - Geotechnical Sampling and Tesing Exploration	
Boring No. G2-202	Drilling Method: 4-1/4" Inside-diameter Hollow Stem Augers	Date Started: 12-13-93
Coordinates: N478676.08 E1350881.05	Geologist: J. Haney	Date Completed: 12-13-93
Ground Surface Elevation: 590.10	GWL/DATE: 72.0 ft / 12-13-93	Page 1 of 2

Notes: Samples collected per ASTM D 1586 and ASTM D 1587. Colors identified using Munsell Color Chart. Consistency based on Standard Penetration Resistance Value. Screening readings are in units above background levels. Soils visual description per ASTM D 2488 and soil classification per ASTM D 2487. Soil descriptions interpreted from field logs and laboratory results.
SS = Split-spoon Sample ST = Shelby Tube Sample

Depth (ft)	Description [ASTM Symbol]	Sample No.	Sample Depth (ft)	Sample Type	Blows per 6"	Recovery (in)	Field Screening
0.0	Yellowish brown to brown sandy silty clay [CL-ML], moist - stiff to very stiff (brown glacial till). Clayey sand encountered at 3.0 to 3.5 feet. Sand increases with depth.	1	0.0-2.0	SS	3-5-8-7	11	beta/gamma = 0 cpm PID = 2.5 ppm
		2	2.5-4.5	ST		20	beta/gamma = 0 cpm PID = 7.0 ppm
		3	5.0-7.0	SS	6-7-10-12	24	beta/gamma = 0 cpm PID = 6.5 ppm
7.0	Yellowish brown sandy lean clay [CL], moist - very stiff (brown glacial till)	4	7.5-9.5	ST		18	beta/gamma = 0 cpm PID = 5.4 ppm
		5	10.0-12.0	SS	9-15-18-19	12	beta/gamma = 0 cpm PID = 6.3 ppm
10.5	Olive gray to dark gray sandy lean clay [CL], moist - very stiff (gray glacial till).	6	12.5-14.5	ST		2	beta/gamma = 0 cpm PID = 1.3 ppm
		7	15.0-17.0	SS	6-7-9-13	14	beta/gamma = 0 cpm PID = 0.8 ppm
		8	17.5-19.5	ST		2	
20.0	Olive gray poorly graded gravel with silt and sand [GM], moist - medium dense	9	20.0-22.0	SS	15-15-8-11	16	beta/gamma = 0 cpm PID = 0.9 ppm
22.5	Olive gray to dark gray sandy lean clay, moist - hard (gray glacial till).	10	22.5-24.5	ST		3	beta/gamma = 0 cpm PID = 2.1 ppm
		11	28.0-30.0	SS	7-10-20-18	24	beta/gamma = 0 cpm PID = 0.0 ppm
29.5	Dark gray to brownish gray poorly graded to well graded sand, moist to wet - dense to very dense (GMA)	12	33.0-35.0	SS	34-31-29-30	13	beta/gamma = 0 cpm PID = 0.0 ppm
		13	38.0-40.0	SS	17-21-21-24	19	beta/gamma = 0 cpm PID = 0.0 ppm
		14	43.0-45.0	SS	37-50/4	10	beta/gamma = 0 cpm PID = 0.0 ppm
		15	48.0-50.0	SS	14-17-18-17	16	beta/gamma = 0 cpm PID = 0.0 ppm
		16	53.0-55.0	SS	10-30-50/3	12	beta/gamma = 0 cpm PID = 0.0 ppm

ct No: PO-101	Project Title: On-Site Waste Disposal Cell Predesign Field Investigation - Geotechnical Sampling and Tesing Exploration	
Boring No. G2-202	Drilling Method: 4-1/4" Inside-diameter Hollow Stem Augers	Date Started: 12-13-93
Coordinates: N478676.08 E1350881.05	Geologist: J. Haney	Date Completed: 12-13-93
Ground Surface Elevation: 590.10	GWL/DATE: 72.0 ft / 12-13-93	Page 2 of 2

Notes: Samples collected per ASTM D 1586 and ASTM D 1587. Colors identified using Munsell Color Chart. Consistency based on Standard Penetration Resistance Value. Screening readings are in units above background levels. Soils visual description per ASTM D 2488 and soil classification per ASTM D 2487. Soil descriptions interpreted from field logs and laboratory results.
SS = Split-spoon Sample ST = Shelby Tube Sample

		17	58.0-60.0	SS	17-34-42-50/4	14	beta/gamma = 0 cpm PID = 0.0 ppm
		18	63.0-65.0	SS	37-50/5	10	beta/gamma = 0 cpm PID = 0.0 to 0.5 ppm
		19	68.0-70.0	SS	27-43-50/3	11	beta/gamma = 0 cpm PID = 0.0 to 4.5 ppm
		20	73.0-75.0	SS	12-18-29-28	21	beta/gamma = 0 cpm PID = 0.0 ppm
75.0	Boring terminated at 75.0 feet.						

Project No: PO-101	Project Title: On-Site Waste Disposal Cell Predesign Field Investigation - Geotechnical Sampling and Tesing Exploration	
Boring No. G2-203	Drilling Method: 3-1/4" Inside-diameter Hollow Stem Augers	Date Started: 11-03-93
Coordinates: N478264.29 E1350667.59	Geologist: J. Haney	Date Completed: 11-03-93
Ground Surface Elevation: 587.60	GWL/DATE: NA	Page 1 of 1

Notes: Samples collected per ASTM D 1586 and ASTM D 1587. Colors identified using Munsell Color Chart. Consistency based on Standard Penetration Resistance Value. Screening readings are in units above background levels. Soils visual description per ASTM D 2488 and soil classification per ASTM D 2487. Soil descriptions interpreted from field logs and laboratory results.
SS = Split-spoon Sample ST = Shelby Tube Sample

Depth (ft)	Description [ASTM Symbol]	Sample No.	Sample Depth (ft)	Sample Type	Blows per 6"	Recovery (in)	Field Screening
0.0	Yellowish brown sandy lean clay, moist - stiff to very hard (brown glacial till). ¼ to ½ inch wet clayey sand lense encountered at 18 feet.	1	0.0-2.0	SS	5-7-9-11	16	beta/gamma = 0 cpm PID = 0.0 ppm
		2	2.5-4.5	ST		2	beta/gamma = 0 cpm PID = 0.0 ppm
		3	5.0-7.0	SS	10-10-10-13	2	beta/gamma = 0 cpm PID = 0.0 ppm
		4	7.5-9.5	ST		5	beta/gamma = 0 cpm PID = 0.0 ppm
10.0	Yellowish brown clayey sand with gravel [SC], moist - very dense	5	10.0-12.0	SS	5-20-50/3	12	beta/gamma = 0 cpm PID = 0.1 ppm
12.5	Yellowish brown sandy lean clay [CL], moist - stiff (brown glacial till)	6	12.5-14.5	ST		2	beta/gamma = 0 cpm PID = 0.0 ppm
		7	15.0-17.0	SS	3-4-5-6	14	beta/gamma = 0 cpm PID = 0.0 ppm
		8	17.5-19.5	ST		18	beta/gamma = 0 cpm PID = 0.0 ppm
18.5	Dark gray sandy lean clay [CL], moist - stiff (gray glacial till).	9	20.0-22.0	SS	4-4-5-8	14	beta/gamma = 0 cpm PID = 0.2 ppm
	¼ to ¾ inch wet sand seam encountered at 20.5 feet.	10	22.5-24.5	ST		24	beta/gamma = 0 cpm PID = 0.3 ppm
24.5	Boring terminated at 24.5 feet.						

ect No: PO-101	Project Title: On-Site Waste Disposal Cell Predesign Field Investigation - Geotechnical Sampling and Tesing Exploration	
Boring No. G2-204	Drilling Method: 3-1/4" Inside-diameter Hollow Stem Augers	Date Started: 11-05-93
Coordinates: N478463.16 E1351295.60	Geologist: J. Haney	Date Completed: 11-05-93
Ground Surface Elevation: 596.15	GWL/DATE: NA	Page 1 of 1

Notes: Samples collected per ASTM D 1586 and ASTM D 1587. Colors identified using Munsell Color Chart. Consistency based on Standard Penetration Resistance Value. Screening readings are in units above background levels. Soils visual description per ASTM D 2488 and soil classification per ASTM D 2487. Soil descriptions interpreted from field logs and laboratory results.
SS = Split-spoon Sample ST = Shelby Tube Sample

Depth (ft)	Description [ASTM Symbol]	Sample No.	Sample Depth (ft)	Sample Type	Blows per 6"	Recovery (in)	Field Screening
0.0	Yellowish brown to brown sandy lean clay [CL], moist - stiff to very stiff (brown glacial till).	1	0.0-2.0	SS	3-6-8-11	15	beta/gamma = 0 cpm PID = 0.2 ppm
		2	2.5-4.5	ST		3	beta/gamma = 0 cpm PID = 0.1 ppm
		3	5.0-7.0	SS	10-11-10-12	3	beta/gamma = 0 cpm PID = 0.3 ppm
		4	7.5-9.5	ST		15	beta/gamma = 0 cpm PID = 0.2 ppm
		5	10.0-12.0	SS	6-9-12-13	20	beta/gamma = 0 cpm PID = 0.0 ppm
11.5	Dark gray lean clay with sand to sandy lean clay [CL], moist - very stiff (gray glacial till). sand increases with depth	6	12.5-14.5	ST		24	beta/gamma = 0 cpm PID = 0.0 ppm
		7	15.0-17.0	SS	4-9-11-22	14	beta/gamma = 0 cpm PID = 0.0 ppm
16.0	Dark gray silty sand [SM], wet - medium dense.	8	17.5-19.5	ST		4	beta/gamma = 0 cpm PID = 0.0 ppm
20.5	Dark gray sandy lean clay [CL], moist - very stiff (gray glacial till).	9	20.0-22.0	SS	5-8-10-12	17	beta/gamma = 0 cpm PID = 0.0 ppm
		10	22.5-24.5	ST		18	beta/gamma = 0 cpm PID = 0.2 ppm
24.2	Boring terminated at 24.2 feet.						

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Project No: PO-101	Project Title: On-Site Waste Disposal Cell Predesign Field Investigation - Geotechnical Sampling and Tesing Exploration	
Boring No. G2-205	Drilling Method: 3-1/4" Inside-diameter Hollow Stem Augers	Date Started: 11-03-93
Coordinates: N477852.36 E1350454.88	Geologist: J. Haney	Date Completed: 11-03-93
Ground Surface Elevation: 583.49	GWL/DATE: NA	Page 1 of 1

Notes: Samples collected per ASTM D 1586 and ASTM D 1587. Colors identified using Munsell Color Chart. Consistency based on Standard Penetration Resistance Value. Screening readings are in units above background levels. Soils visual description per ASTM D 2488 and soil classification per ASTM D 2487. Soil descriptions interpreted from field logs and laboratory results.
SS = Split-spoon Sample ST = Shelby Tube Sample

Depth (ft)	Description [ASTM Symbol]	Sample No.	Sample Depth (ft)	Sample Type	Blows per 6"	Recovery (in)	Field Screening
0.0	Light to dark yellowish brown lean clay [CL], moist - stiff to very stiff (brown glacial till).	1	0.0-2.0	SS	4-7-8-10	12	beta/gamma = 0 cpm PID = 0.0 ppm
		2	2.5-4.5	ST		12	beta/gamma = 0 cpm PID = 0.0 ppm
		3	5.0-7.0	SS	7-8-11-12	16	beta/gamma = 0 cpm PID = 0.0 ppm
6.0	Dark yellowish brown clayey sand, wet - medium dense.						
7.0	Yellowish brown sandy lean clay [CL], moist - very stiff (brown glacial till).	4	7.5-9.5	ST		6	beta/gamma = 0 cpm PID = 0.0 ppm
		5	10.0-12.0	SS	16-16-9-13	8	beta/gamma = 0 cpm PID = 0.0 ppm
		6	12.5-14.5	ST		0	No recovery
15.5	Dark gray sandy lean clay [CL], moist - very stiff (gray glacial till). 1 inch wet clayey sand lense encountered at 20.5 feet.	7	15.0-17.0	SS	6-8-11-15	12	beta/gamma = 0 cpm PID = 0.0 ppm
		8	17.5-19.5	ST		24	beta/gamma = 0 cpm PID = 0.0 ppm
		9	20.0-22.0	SS	6-9-18-15	10	beta/gamma = 0 cpm PID = 0.0 ppm
		10	22.5-24.5	ST		14	beta/gamma = 0 cpm PID = 0.0 ppm
23.7	Boring terminated at 23.7 feet.						

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ect No: PO-101	Project Title: On-Site Waste Disposal Cell Predesign Field Investigation - Geotechnical Sampling and Tesing Exploration	
Boring No. G2-206	Drilling Method: 3-1/4" Inside-diameter Hollow Stem Augers	Date Started: 11-05-93
Coordinates: N478048.67 E1351081.50	Geologist: J. Haney	Date Completed: 11-05-93
Ground Surface Elevation: 591.43	GWL/DATE: NA	Page 1 of 1

Notes: Samples collected per ASTM D 1586 and ASTM D 1587. Colors identified using Munsell Color Chart. Consistency based on Standard Penetration Resistance Value. Screening readings are in units above background levels. Soils visual description per ASTM D 2488 and soil classification per ASTM D 2487. Soil descriptions interpreted from field logs and laboratory results.
SS = Split-spoon Sample ST = Shelby Tube Sample

Depth (ft)	Description [ASTM Symbol]	Sample No.	Sample Depth (ft)	Sample Type	Blows per 6"	Recovery (in)	Field Screening
0.0	Grayish brown to yellowish brown lean clay with sand to sandy lean clay [CL], moist - stiff to very stiff (brown glacial till). Sand increases with depth	1	0.0-2.0	SS	4-6-6-8	12	beta/gamma = 0 cpm PID = 0.0 ppm
		2	2.5-4.5	ST		12	beta/gamma = 0 cpm PID = 0.0 ppm
		3	5.0-7.0	SS	15-15-13-14	10	beta/gamma = 0 cpm PID = 0.0 ppm
		4	7.5-9.5	ST		18	beta/gamma = 0 cpm PID = 0.0 ppm
		5	10.0-12.0	SS	16-12-10-17	18	beta/gamma = 0 cpm PID = 0.0 ppm
		6	12.5-14.5	ST		18	beta/gamma = 0 cpm PID = 0.0 ppm
13.5	Dark gray lean clay, moist - stiff (gray glacial till).	7	15.0-17.0	SS	3-4-8-42	17	beta/gamma = 0 cpm PID = 0.0 ppm
16.0	Dark gray silty sand, wet - medium dense.	8	17.5-19.5	ST		6	beta/gamma = 0 cpm PID = 0.0 ppm
		9	20.0-22.0	SS	5-7-10-11	2	beta/gamma = 0 cpm PID = 0.0 ppm
22.5	Dark gray sandy lean clay [CL], moist - very stiff (gray glacial till).	10	22.5-24.5	ST		24	beta/gamma = 0 cpm PID = 0.0 ppm
24.5	Boring terminated at 24.5 feet.						

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Project No: PO-101	Project Title: On-Site Waste Disposal Cell Predesign Field Investigation - Geotechnical Sampling and Tesing Exploration	
Boring No. G2-207	Drilling Method: 4-1/4" Inside-diameter Hollow Stem Augers	Date Started: 12-09-93
Coordinates: N477646.51 E1350879.51	Geologist: J. Haney	Date Completed: 12-09-93
Ground Surface Elevation: 588.99	GWL/DATE: 74 ft. / 12-09-93	Page 1 of 2

Notes: Samples collected per ASTM D 1586 and ASTM D 1587. Colors identified using Munsell Color Chart. Consistency based on Standard Penetration Resistance Value. Screening readings are in units above background levels. Soils visual description per ASTM D 2488 and soil classification per ASTM D 2487. Soil descriptions interpreted from field logs and laboratory results.
SS = Split-spoon Sample ST = Shelby Tube Sample

Depth (ft)	Description [ASTM Symbol]	Sample No.	Sample Depth (ft)	Sample Type	Blows per 6"	Recovery (in)	Field Screening
0.0	Yellowish brown to brown sandy lean clay [CL], moist - medium stiff to very stiff (brown glacial till).	1	0.0-2.0	SS	3-3-5-8	14	beta/gamma = 0 cpm PID = 1.2 ppm
		2	2.5-4.5	ST		17	beta/gamma = 0 cpm PID = 0.8 ppm
		3	5.0-7.0	SS	15-16-11-10	3	beta/gamma = 0 cpm PID = 2.1 ppm
		4	7.5-9.5	ST		15	beta/gamma = 0 cpm PID = 0.0 ppm
		5	10.0-12.0	SS	9-10-17-19	19	beta/gamma = 0 cpm PID = 0.0 ppm
13.0	Dark gray sandy silty clay [CL-ML], moist - medium stiff to very stiff (brown glacial till).	6	12.5-14.5	ST		3	beta/gamma = 0 cpm PID = 0.0 ppm
		7	15.0-17.0	SS	10-8-11-15	1	
	1 inch sand lense encountered at 26.5 feet.	8	17.5-19.5	ST		16	beta/gamma = 0 cpm PID = 0.0 ppm
		9	20.0-22.0	SS	7-9-12-11	5	beta/gamma = 0 cpm PID = 0.0 ppm
		10	22.5-24.5	ST		19	beta/gamma = 0 cpm PID = 0.0 ppm
		11	25.0-27.0	SS	6-7-17-16	24	beta/gamma = 0 cpm PID = 0.0 ppm
30.5	Yellowish brown to dark yellowish brown silty sand with gravel, moist - medium dense to very dense. Sand wet at 75.0 feet.	12	30.0-32.0	SS	5-6-10-13	22	beta/gamma = 0 cpm PID = 0.0 ppm
		13	35.0-37.0	SS	6-26-50/4	16	beta/gamma = 0 cpm PID = 0.2 ppm
		14	40.0-42.0	SS	21-35-29-39	19	beta/gamma = 0 cpm PID = 0.0 ppm
		15	45.0-47.0	SS	19-24-30-39	24	beta/gamma = 0 cpm PID = 0.0 ppm
		16	50.0-52.0	SS	11-12-14-19	24	beta/gamma = 0 cpm PID = 0.0 ppm

ct No: PO-101	Project Title: On-Site Waste Disposal Cell Predesign Field Investigation - Geotechnical Sampling and Tesing Exploration	
Boring No. G2-207	Drilling Method: 4-1/4" Inside-diameter Hollow Stem Augers	Date Started: 12-09-93
Coordinates: N477646.51 E1350879.51	Geologist: J. Haney	Date Completed: 12-09-93
Ground Surface Elevation: 588.99	GWL/DATE: 74 ft. / 12-09-93	Page 2 of 2

Notes: Samples collected per ASTM D 1586 and ASTM D 1587. Colors identified using Munsell Color Chart. Consistency based on Standard Penetration Resistance Value. Screening readings are in units above background levels. Soils visual description per ASTM D 2488 and soil classification per ASTM D 2487. Soil descriptions interpreted from field logs and laboratory results.
SS = Split-spoon Sample ST = Shelby Tube Sample

		17	55.0-57.0	SS	6-20-44-50/4	16	beta/gamma = 0 cpm PID = 0.0 ppm
		18	60.0-62.0	SS	15-15-14-19	19	beta/gamma = 0 cpm PID = 0.0 ppm
		19	65.0-67.0	SS	20-50/4	10	beta/gamma = 0 cpm PID = 0.0 ppm
		20	70.0-72.0	SS	14-25-35-50/5	15	beta/gamma = 0 cpm PID = 0.0 ppm
		21	75.0-77.0	SS	19-24-27-30	17	beta/gamma = 0 cpm PID = 0.0 ppm
77.0	Boring terminated at 77.0 feet.						

Project No: PO-101	Project Title: On-Site Waste Disposal Cell Predesign Field Investigation - Geotechnical Sampling and Tesing Exploration	
Boring No. G2-208	Drilling Method: 3-1/4" Inside-diameter Hollow Stem Augers	Date Started: 11-04-93
Coordinates: N477838.17 E1351493.02	Geologist: J. Haney	Date Completed: 11-04-93
Ground Surface Elevation: 596.27	GWL/DATE: NA	Page 1 of 1

Notes: Samples collected per ASTM D 1586 and ASTM D 1587. Colors identified using Munsell Color Chart. Consistency based on Standard Penetration Resistance Value. Screening readings are in units above background levels. Soils visual description per ASTM D 2488 and soil classification per ASTM D 2487. Soil descriptions interpreted from field logs and laboratory results.
SS = Split-spoon Sample ST = Shelby Tube Sample

Depth (ft)	Description [ASTM Symbol]	Sample No.	Sample Depth (ft)	Sample Type	Blows per 6"	Recovery (in)	Field Screening
0.0	Yellowish brown to dark brown lean clayto sandy lean clay [CL], moist - medium stiff to stiff (brown glacial till). Clayey sand lense encountered at 6.0 feet. Sand increases with depth.	1	0.0-2.0	SS	4-6-8-10	8	beta/gamma = 0 cpm PID = 0.0 ppm
		2	2.5-4.5	ST		24	beta/gamma = 0 cpm PID = 0.0 ppm
		3	5.0-7.0	SS	4-3-3-3	20	beta/gamma = 0 cpm PID = 0.0 ppm
		4	7.5-9.5	ST		21	beta/gamma = 0 cpm PID = 0.0 ppm
10.5	Dark gray sandy lean clay [CL], moist - stiff to very stiff (gray glacial till). Clayey sand encountered at 21.0 to 21.5 feet.	5	10.0-12.0	SS	8-10-12-13	15	beta/gamma = 0 cpm PID = 0.0 ppm
		6	12.5-14.5	ST		24	beta/gamma = 0 cpm PID = 0.0 ppm
		7	15.0-17.0	SS	6-8-11-14	20	beta/gamma = 0 cpm PID = 0.0 ppm
		8	17.5-19.5	ST		24	beta/gamma = 0 cpm PID = 0.0 ppm
		9	20.0-22.0	SS	4-5-6-6	20	beta/gamma = 0 cpm PID = 0.0 ppm
		10	22.5-24.5	ST		20	beta/gamma = 0 cpm PID = 0.0 ppm
24.2	Boring terminated at 24.2 feet.						

ct No: PO-101	Project Title: On-Site Waste Disposal Cell Predesign Field Investigation - Geotechnical Sampling and Tesing Exploration	
Boring No. G2-209	Drilling Method: 3-1/4" Inside-diameter Hollow Stem Augers	Date Started: 11-09-93
Coordinates: N478155.04 E1351394.37	Geologist: J. Haney	Date Completed: 11-09-93
Ground Surface Elevation: 598.78	GWL/DATE: NA	Page 1 of 1

Notes: Samples collected per ASTM D 1586 and ASTM D 1587. Colors identified using Munsell Color Chart. Consistency based on Standard Penetration Resistance Value. Screening readings are in units above background levels. Soils visual description per ASTM D 2488 and soil classification per ASTM D 2487. Soil descriptions interpreted from field logs and laboratory results.
SS = Split-spoon Sample ST = Shelby Tube Sample

Depth (ft)	Description [ASTM Symbol]	Sample No.	Sample Depth (ft)	Sample Type	Blows per 6"	Recovery (in)	Comments/ Field Screening
							Augured 0 to 25 ft. Bulk sample collected.
0.0	Dark yellowish brown sandy lean clay [CL], moist (brown glacial till).		2.0-2.5				beta/gamma = 0 cpm PID = 4.4 ppm
			4.5-5.0				beta/gamma = 0 cpm PID = 3.3 ppm
			7.0-7.5				beta/gamma = 0 cpm PID = 5.3 ppm
			9.5-10.0				beta/gamma = 0 cpm PID = 5.1 ppm
12.0	Olive gray to dark gray sandy lean clay [CL], moist (gray glacial till).		12.0-12.5				beta/gamma = 0 cpm PID = 4.9 ppm
			14.5-15.0				beta/gamma = 0 cpm PID = 8.7 ppm
			17.0-17.5				beta/gamma = 0 cpm PID = 1.8 ppm
			19.5-20.0				beta/gamma = 0 cpm PID = 0.7 ppm
			22.0-22.5				beta/gamma = 0 cpm PID = 0.0 ppm
			24.5-25.0				beta/gamma = 0 cpm PID = 2.7 ppm
25.0	Boring terminated at 25.0 feet.						

Project No: PO-101	Project Title: On-Site Waste Disposal Cell Predesign Field Investigation - Geotechnical Sampling and Tesing Exploration	
Boring No. G2-210	Drilling Method: 3-1/4" Inside-diameter Hollow Stem Augers	Date Started: 11-08-93
Coordinates: N478161.69 E1350355.36	Geologist: J. Haney	Date Completed: 11-08-93
Ground Surface Elevation: 583.18	GWL/DATE: NA	Page 1 of 1

Notes: Samples collected per ASTM D 1586 and ASTM D 1587. Colors identified using Munsell Color Chart. Consistency based on Standard Penetration Resistance Value. Screening readings are in units above background levels. Soils visual description per ASTM D 2488 and soil classification per ASTM D 2487. Soil descriptions interpreted from field logs and laboratory results.
SS = Split-spoon Sample ST = Shelby Tube Sample

Depth (ft)	Description [ASTM Symbol]	Sample No.	Sample Depth (ft)	Sample Type	Blows per 6"	Recovery (in)	Comments/ Field Screening
							Augured 0 to 25 ft. Bulk sample collected.
0.0	Dark yellowish brown sandy lean clay [CL], moist (brown glacial till).		2.0-2.5				beta/gamma = 0 cpm PID = 33.0 ppm
			4.5-5.0				beta/gamma = 0 cpm PID = 24.0 ppm
			7.0-7.5				beta/gamma = 0 cpm PID = 7.0 ppm
			9.5-10.0				beta/gamma = 0 cpm PID = 12.5 ppm
14.5	Olive gray to dark sandy lean clay [CL], moist (gray glacial till).		12.0-12.5				beta/gamma = 0 cpm PID = 30.0 ppm
			14.5-15.0				beta/gamma = 0 cpm PID = 16.0 ppm
			17.0-17.5				beta/gamma = 0 cpm PID = 26.5 ppm
			19.5-20.0				beta/gamma = 0 cpm PID = 20.0 ppm
			22.0-22.5				beta/gamma = 0 cpm PID = 25.1 ppm
			24.5-25.0				beta/gamma = 0 cpm PID = 26.5 ppm
25.0	Boring terminated at 25.0 feet.						

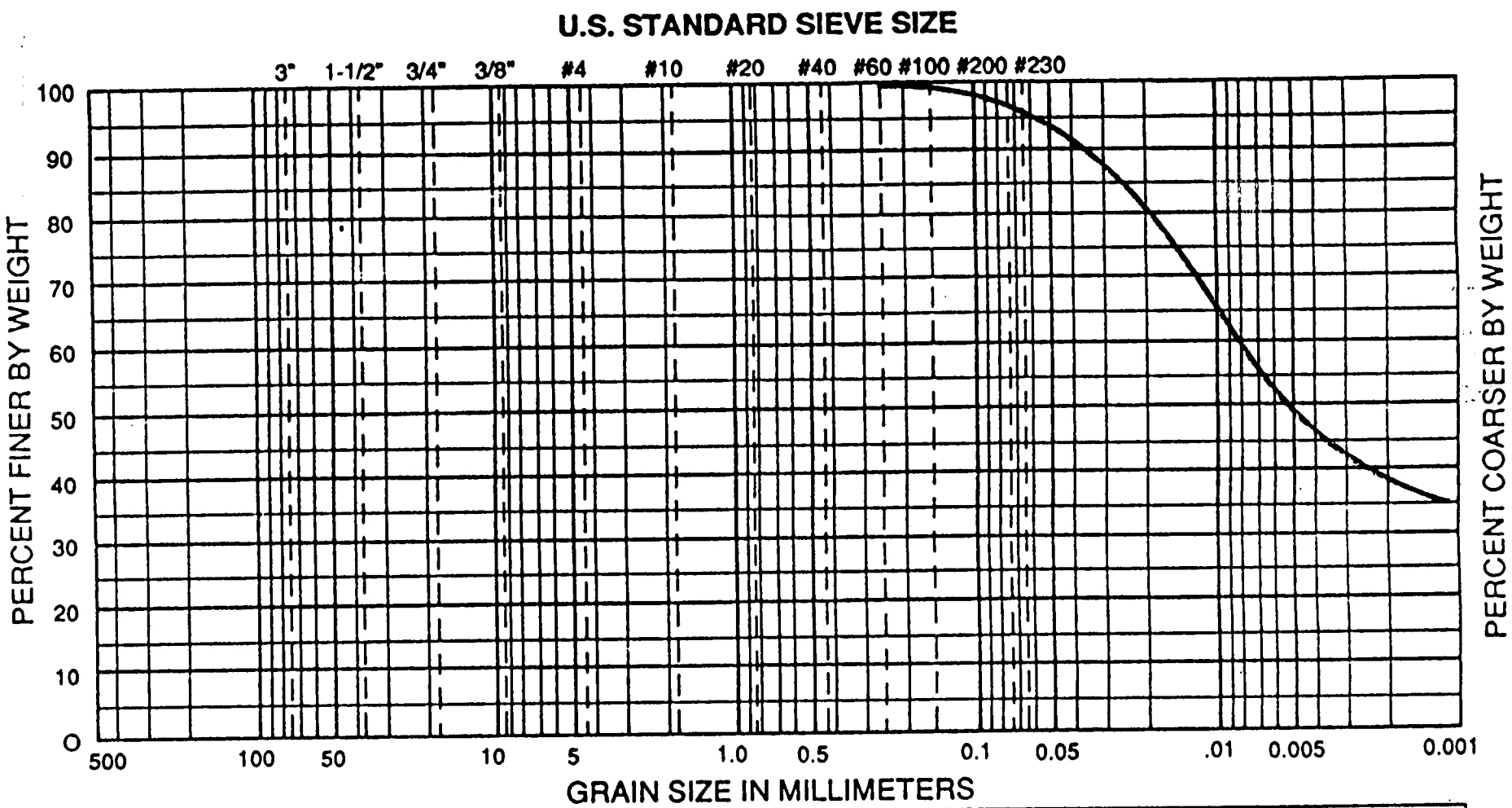
000213

5861

APPENDIX B

GRAIN SIZE DISTRIBUTION CURVES

000214



ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

WELLNAME: G2-201 SAMPLE NO.: 2 DATE: 1-3-94 PROJECT NO.: PO-101

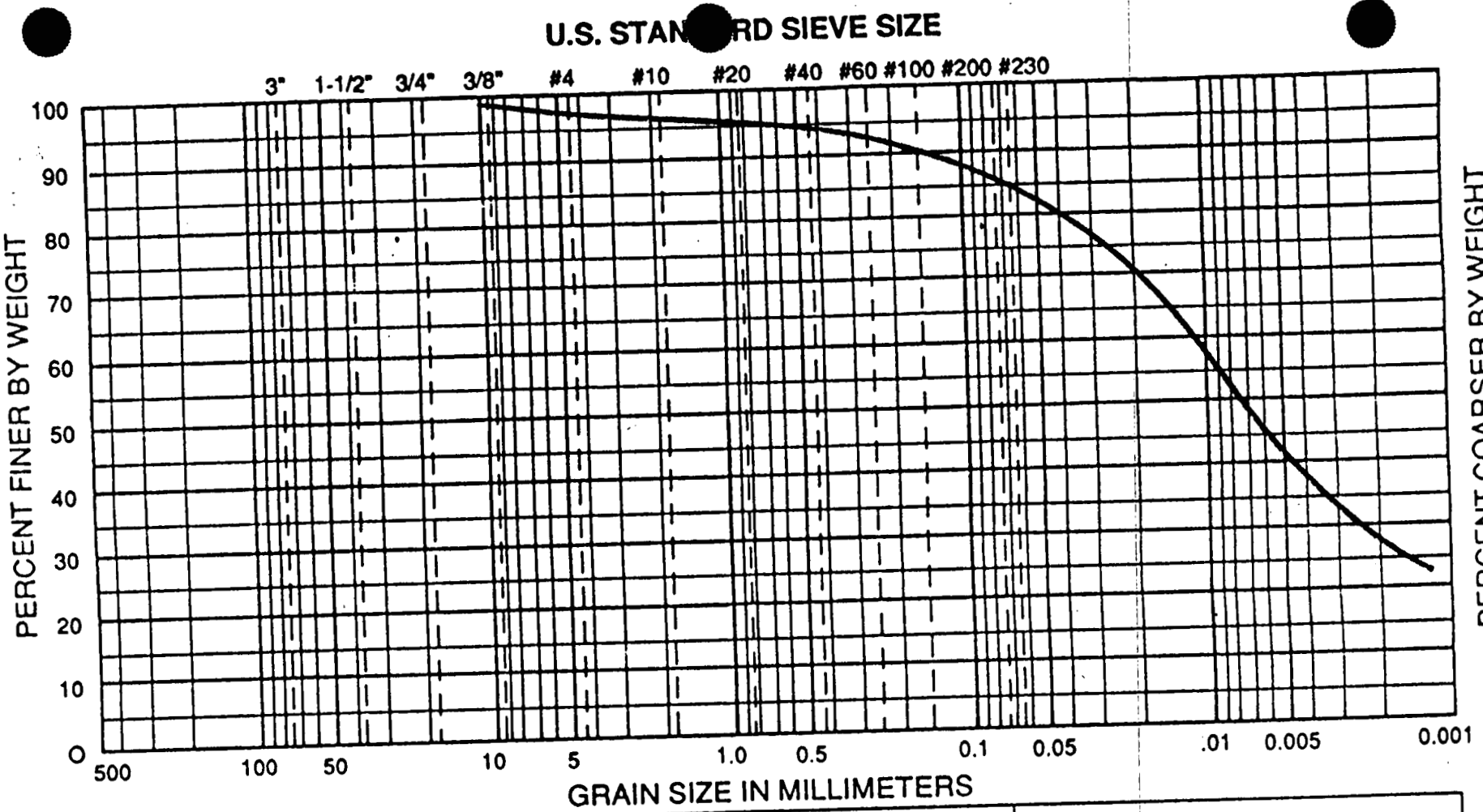
AREA	DEPTH	CLASSIFICATION
On-Site Cell	2.5 - 4.5 ft	Yellowish Brown Lean Clay (CL)

ADVANCED TERRA TESTING

E-3-3-54

000215

FEMP-OU02-5 DRAFT
August 24, 1994



ADVANCED TERRA TESTING

E-3-3-55

ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

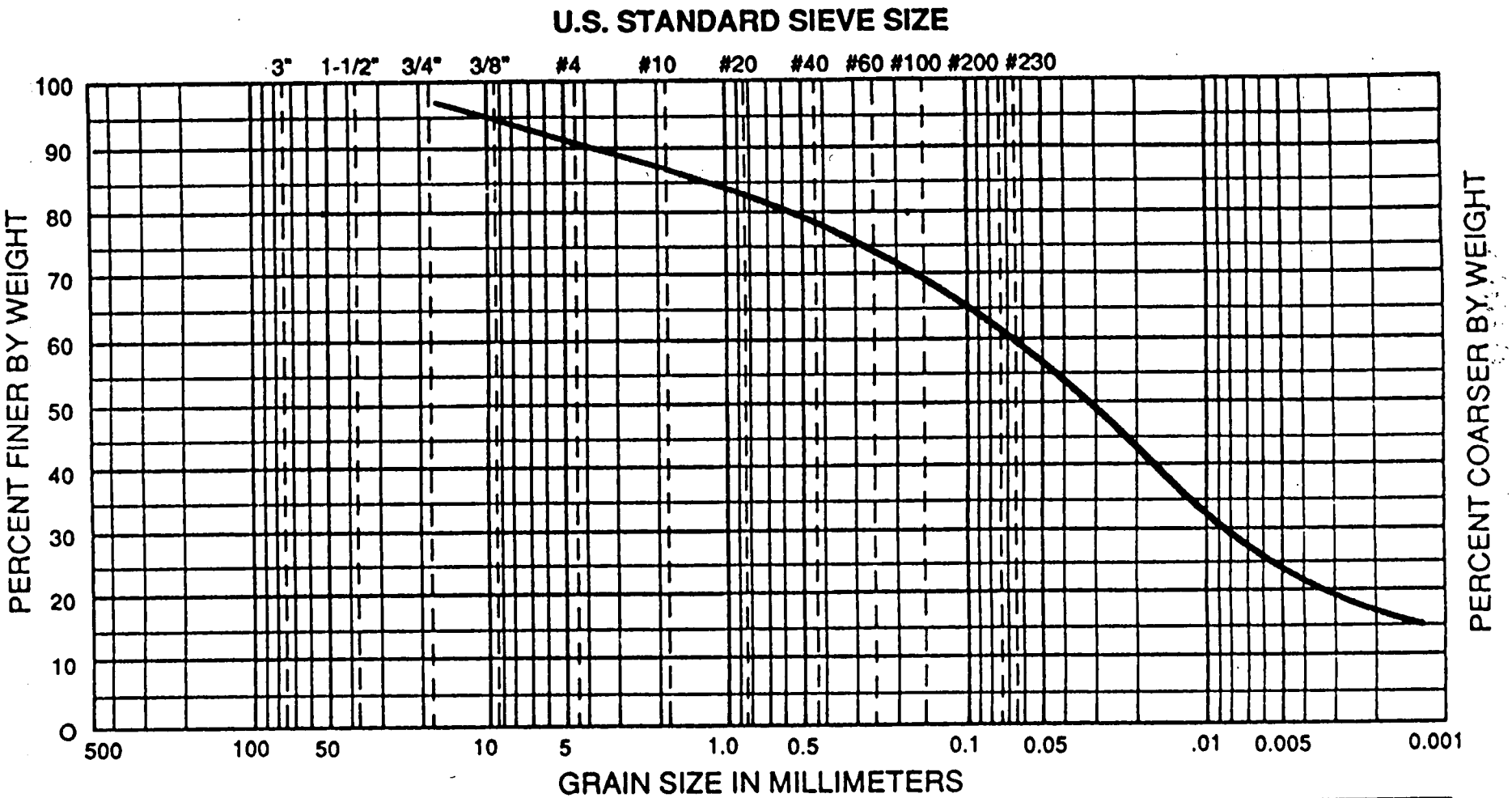
5861

FEMP-OU02-5 DRAFT
August 24, 1994

WELL NAME: G2-201 SAMPLE NO.: 4 DATE: 1-17-94 PROJECT NO.: PO-101

000216

AREA	DEPTH	CLASSIFICATION
On-Site Cell	7.5 - 9.5 ft	Yellowish Brown Lean Clay (CL)



ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

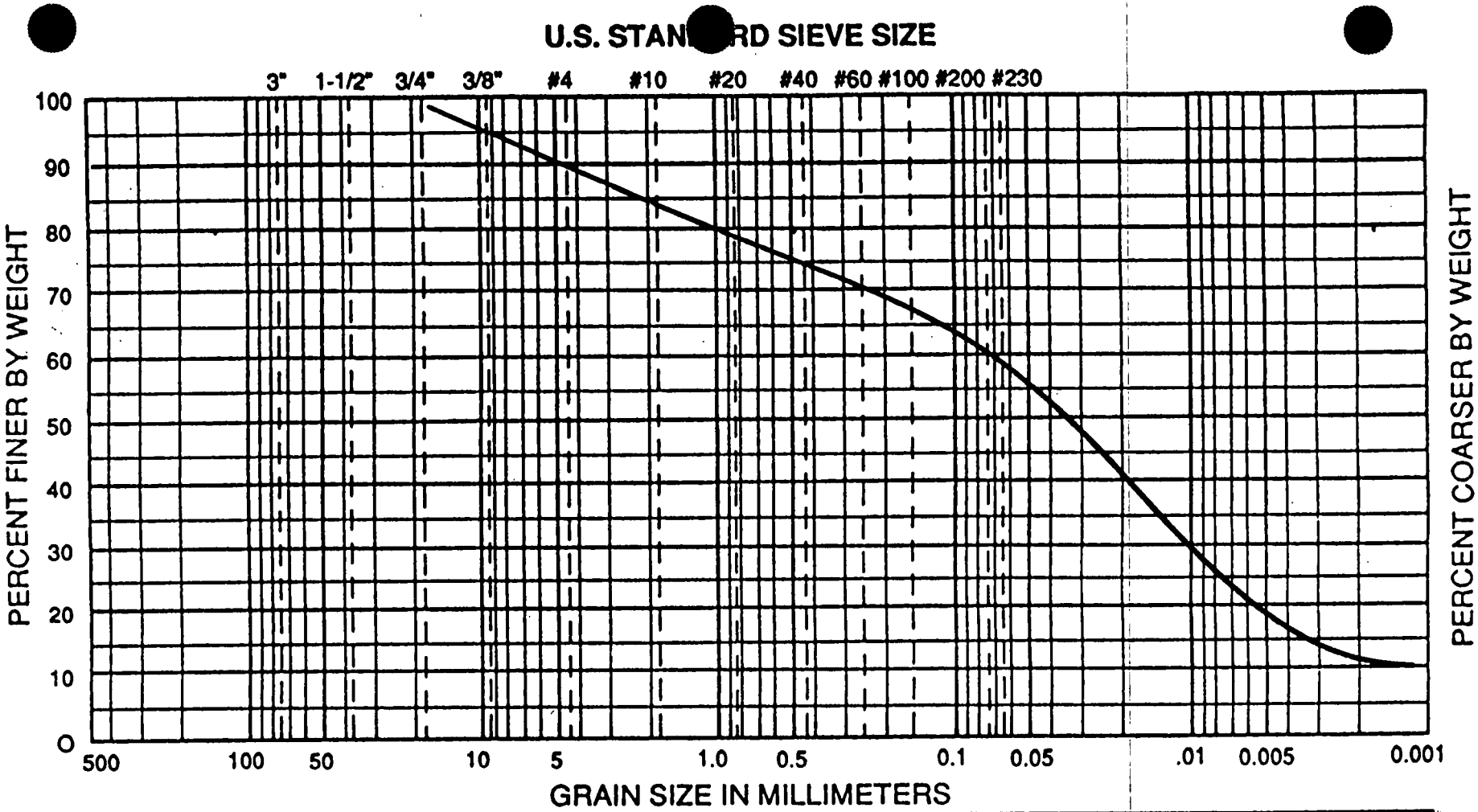
Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

E-3-3-56

00022

WELLNAME: G2-201 SAMPLE NO.: 10 DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	22.5 - 24.5 ft	Gray Sandy Lean Clay (CL)



ADVANCED TERRA TESTING

E-3-3-57

ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

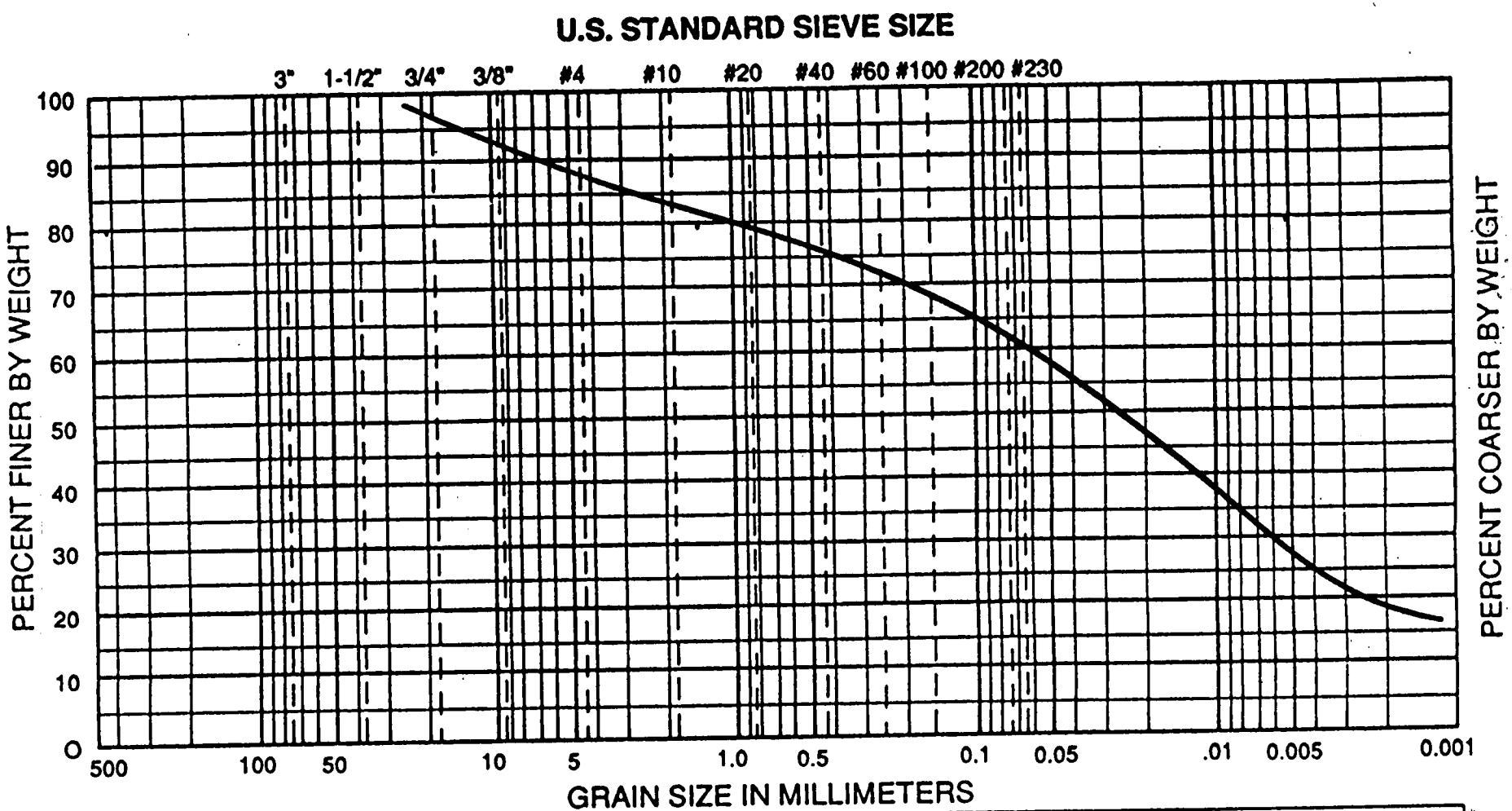
WELLNAME: G2-202 SAMPLE NO.: 3 DATE: 2-10-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	5 - 7 ft	Yellowish Brown Sandy Silty Clay (CL)

000218

5861

FEMP-OU02-5 DRAFT
August 24, 1994



ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

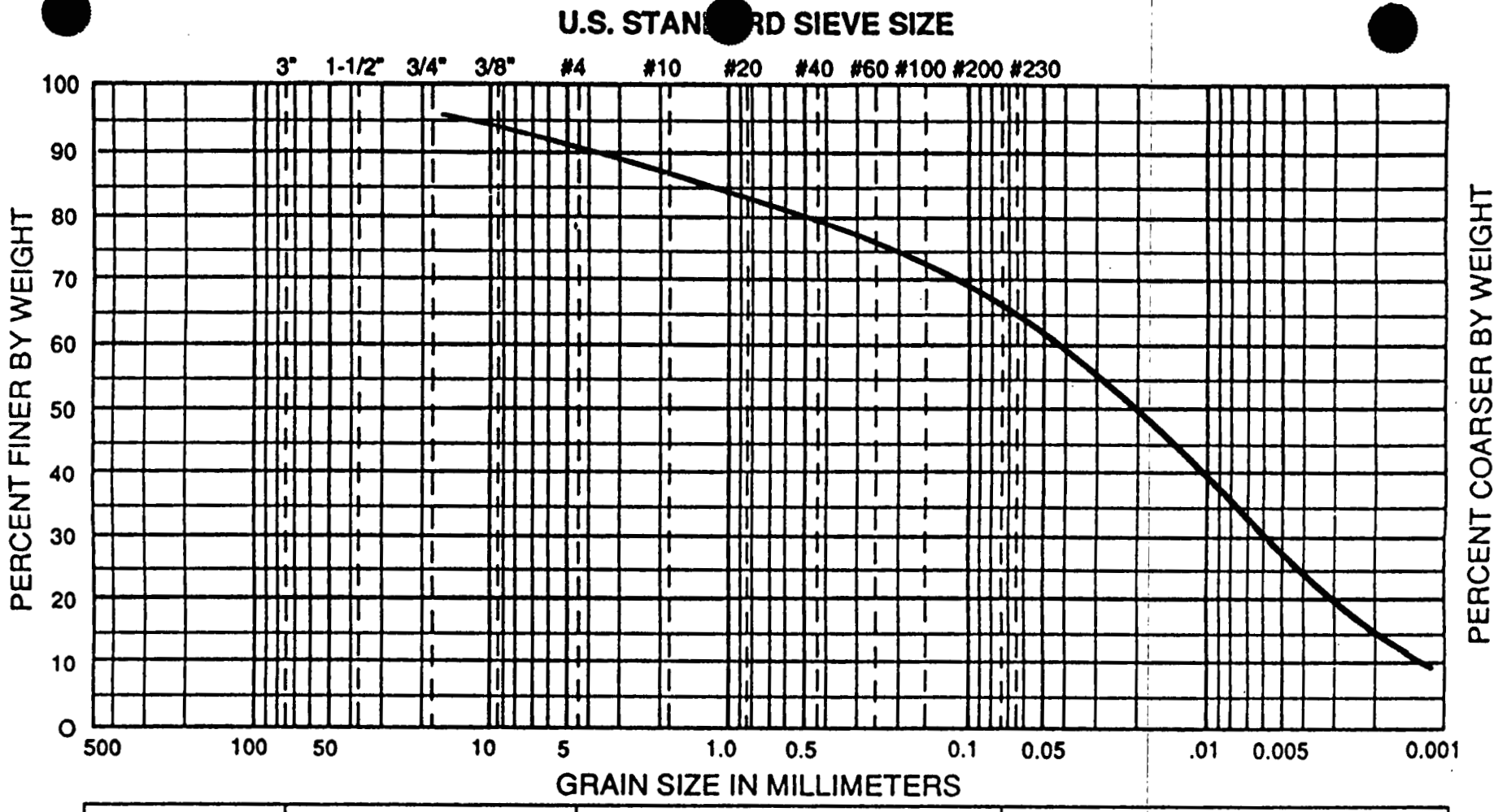
WELLNAME: G2-202 SAMPLE NO.: 4 DATE: 2-10-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	7.5 - 9.5 ft	Yellowish Brown Sandy Lean Clay (CL)

ADVANCED TERRA TESTING

E-3-3-58

00219



ADVANCED TERRA TESTING

E-3-3-59

ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

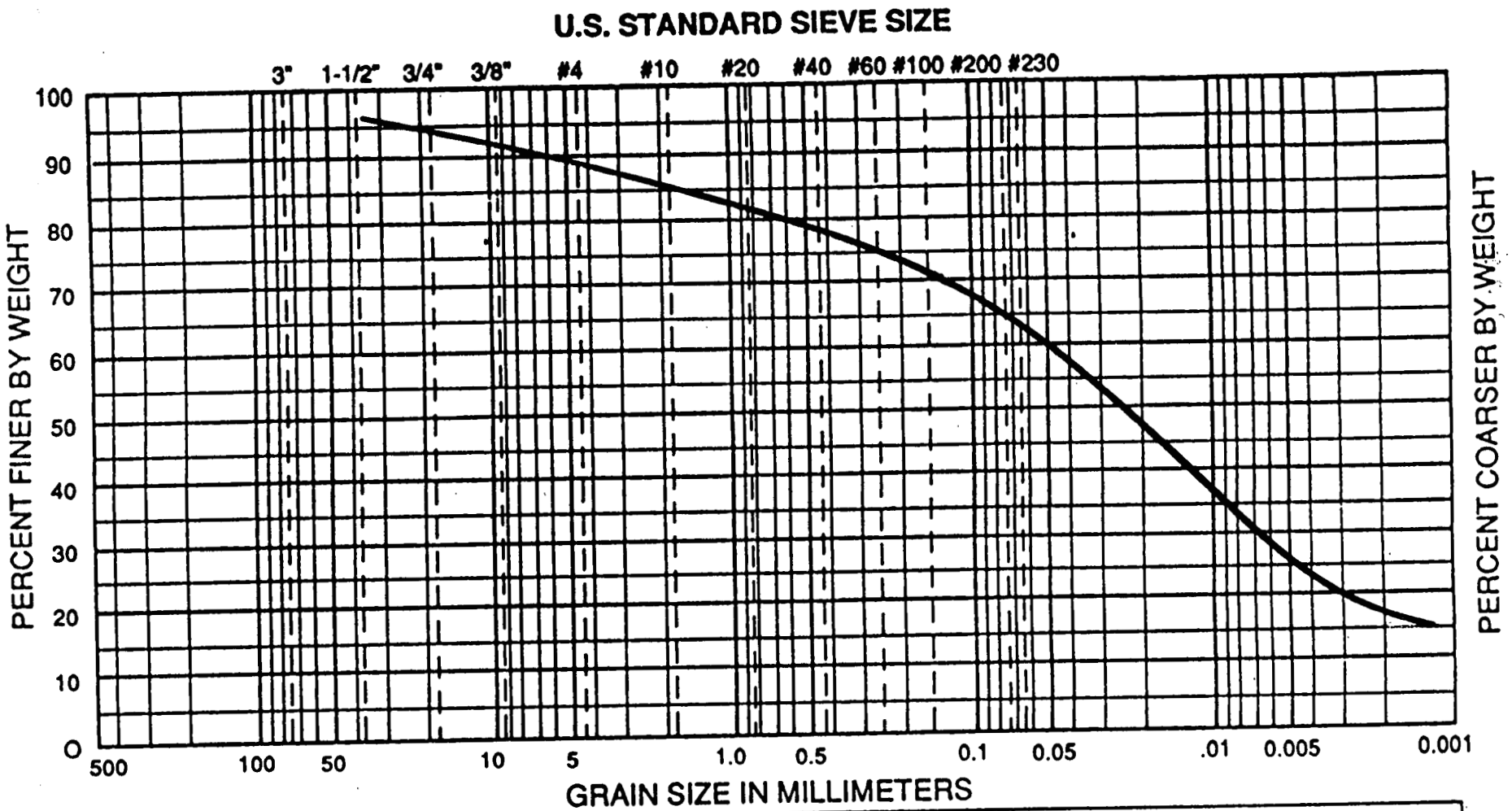
WELLNAME: G2-202 SAMPLE NO.: 5 DATE: 2-10-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	10 - 12 ft	Yellowish Brown Sandy Lean Clay (CL)

000220

5861

FEMP-OU02-5 DRAFT
August 24, 1994



ADVANCED TERRA TESTING

E-3-3-60

ASTM D 2487 (USCS)

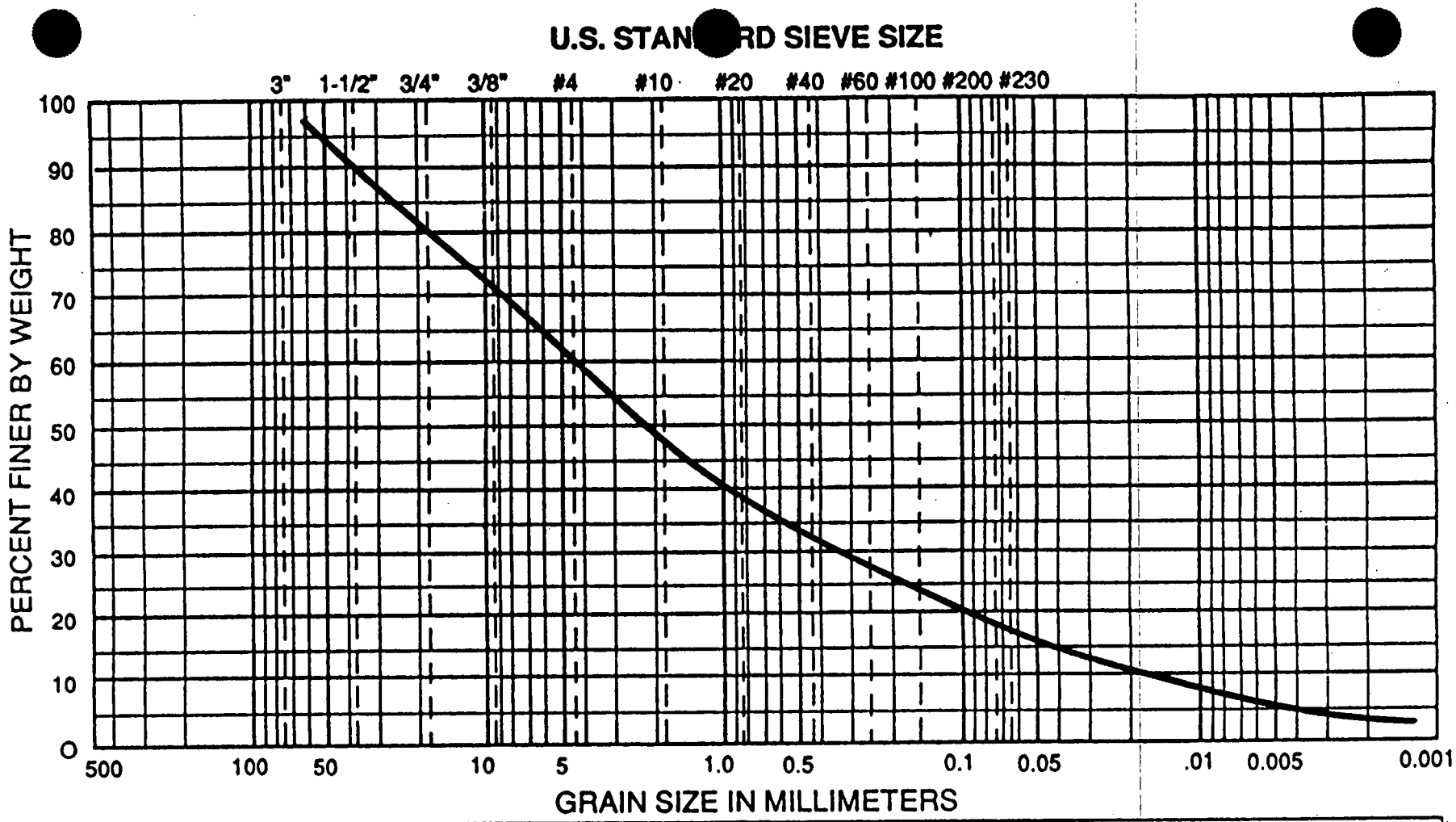
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

000521

WELLNAME: G2-202 SAMPLE NO.: 7 DATE: 2-10-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	15 - 17 ft	Gray Sandy Lean Clay (CL)



ADVANCED TERRA TESTING

E-3-3-61

ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

5861

WELLNAME: G2-202 SAMPLE NO.: 9 DATE: 2-10-94 PROJECT NO.: PO-101

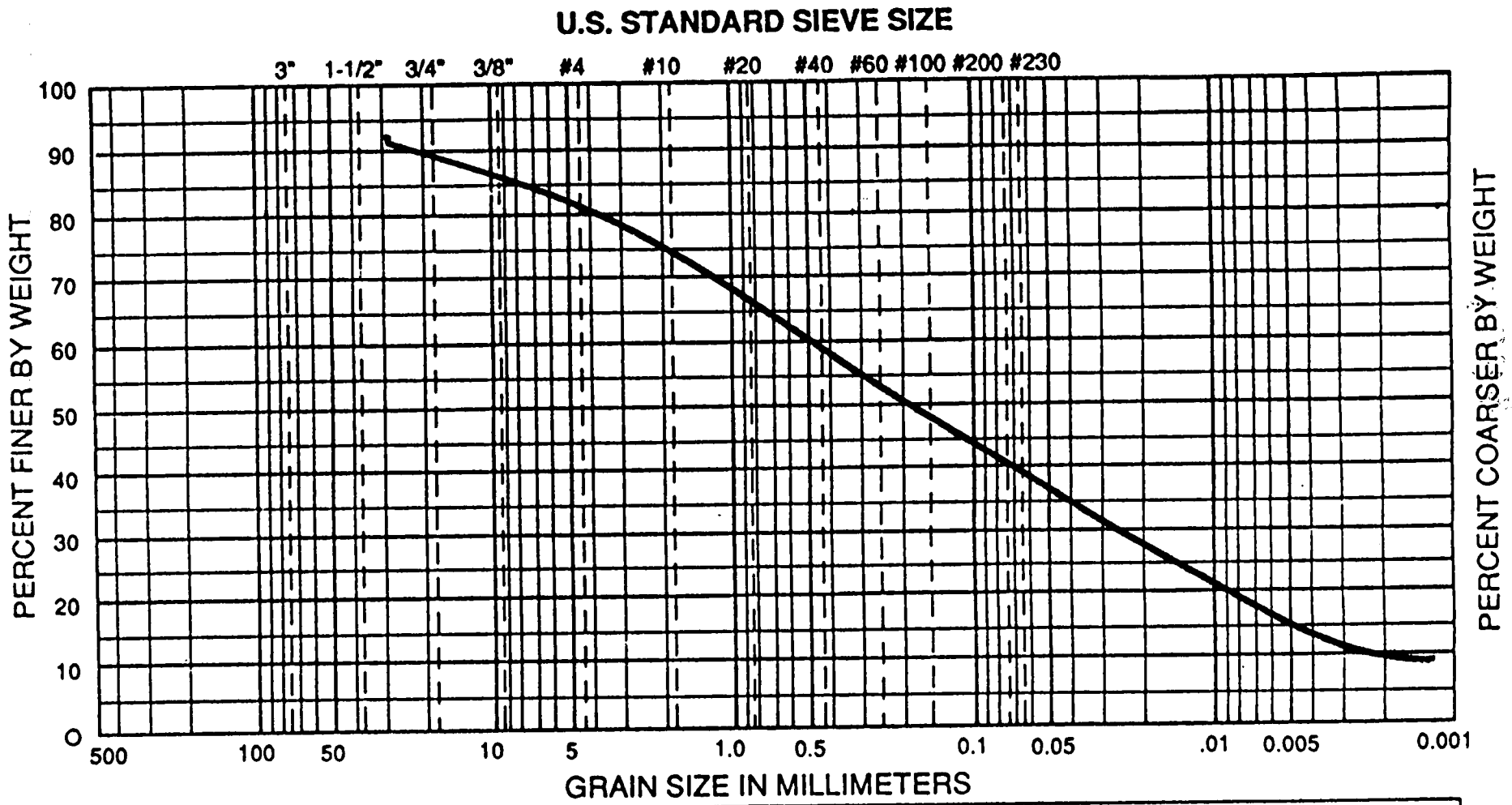
AREA	DEPTH	CLASSIFICATION
On-Site Cell	20 - 22 ft	Gray Poorly-Graded Gravel with Silt and Sand (GW-GM)

000222

FEMP-OU02-5 DRAFT
August 24, 1994

ADVANCED TERRA TESTING

E-3-3-62



ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

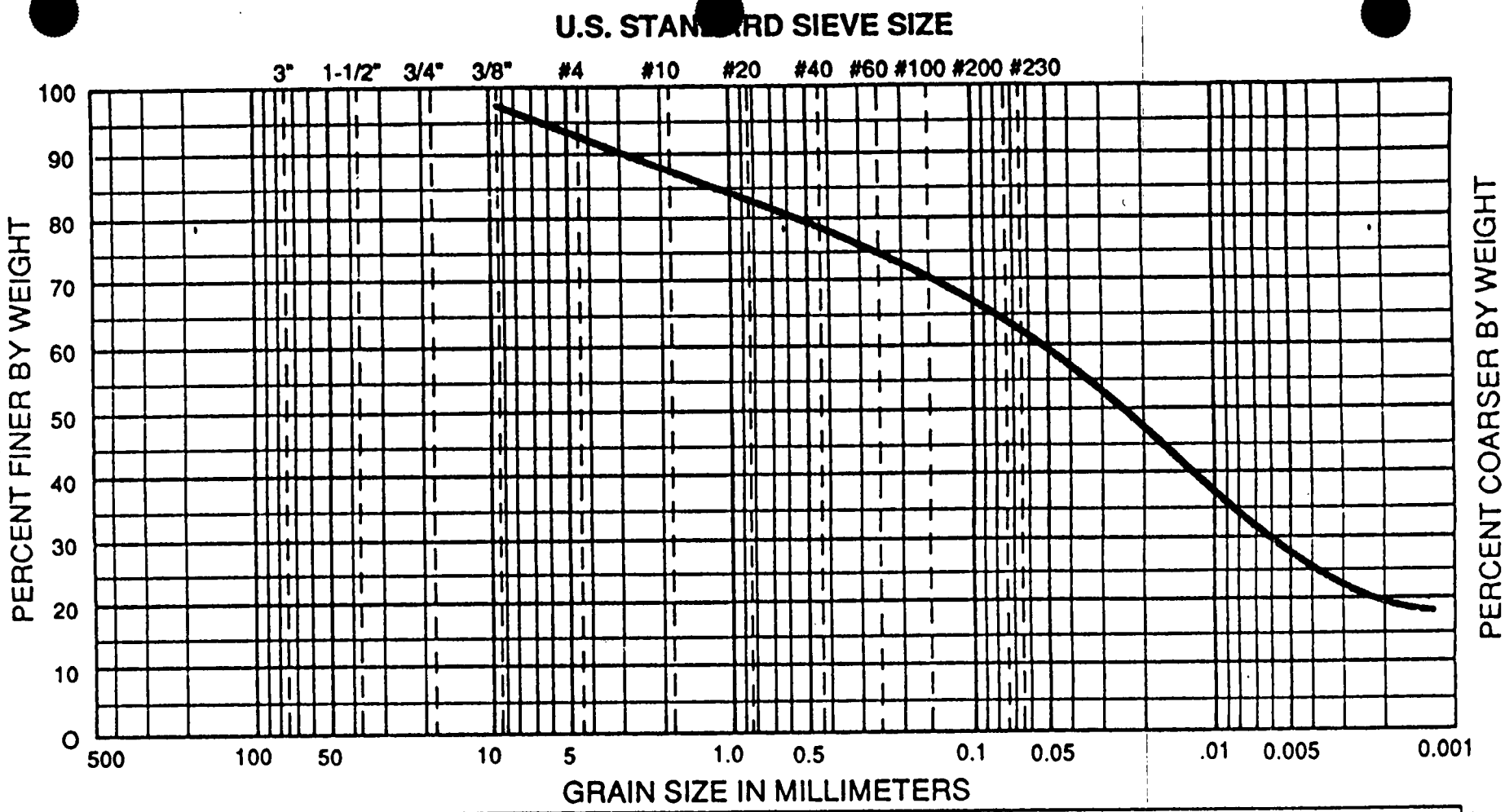
C22000

WELLNAME: G2-203 SAMPLE NO.: 5 DATE: 1-17-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	10 - 12 ft	Yellowish Brown Clayey Sand with Gravel (SC)

ADVANCED TERRA TESTING

E-3-3-63



ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

5861

WELLNAME: G2-203 SAMPLE NO.: 7 DATE: 1-17-94 PROJECT NO.: PO-101

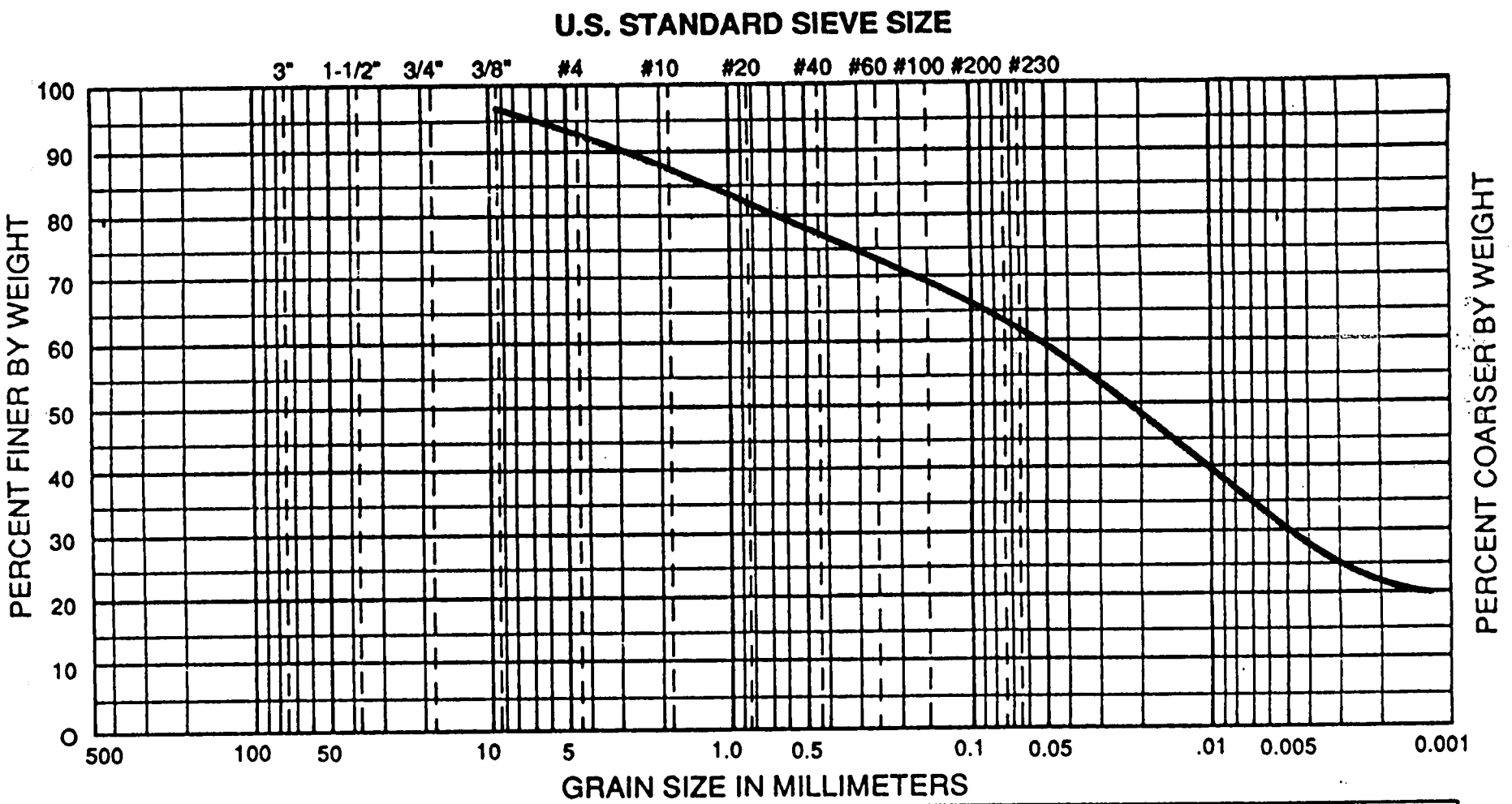
AREA	DEPTH	CLASSIFICATION
On-Site Cell	15 - 17 ft	Yellowish Brown Sandy Lean Clay (CL)

000224

FEMP-OU02-5 DRAFT
August 24, 1994

ADVANCED TERRA TESTING

E-3-3-64



ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

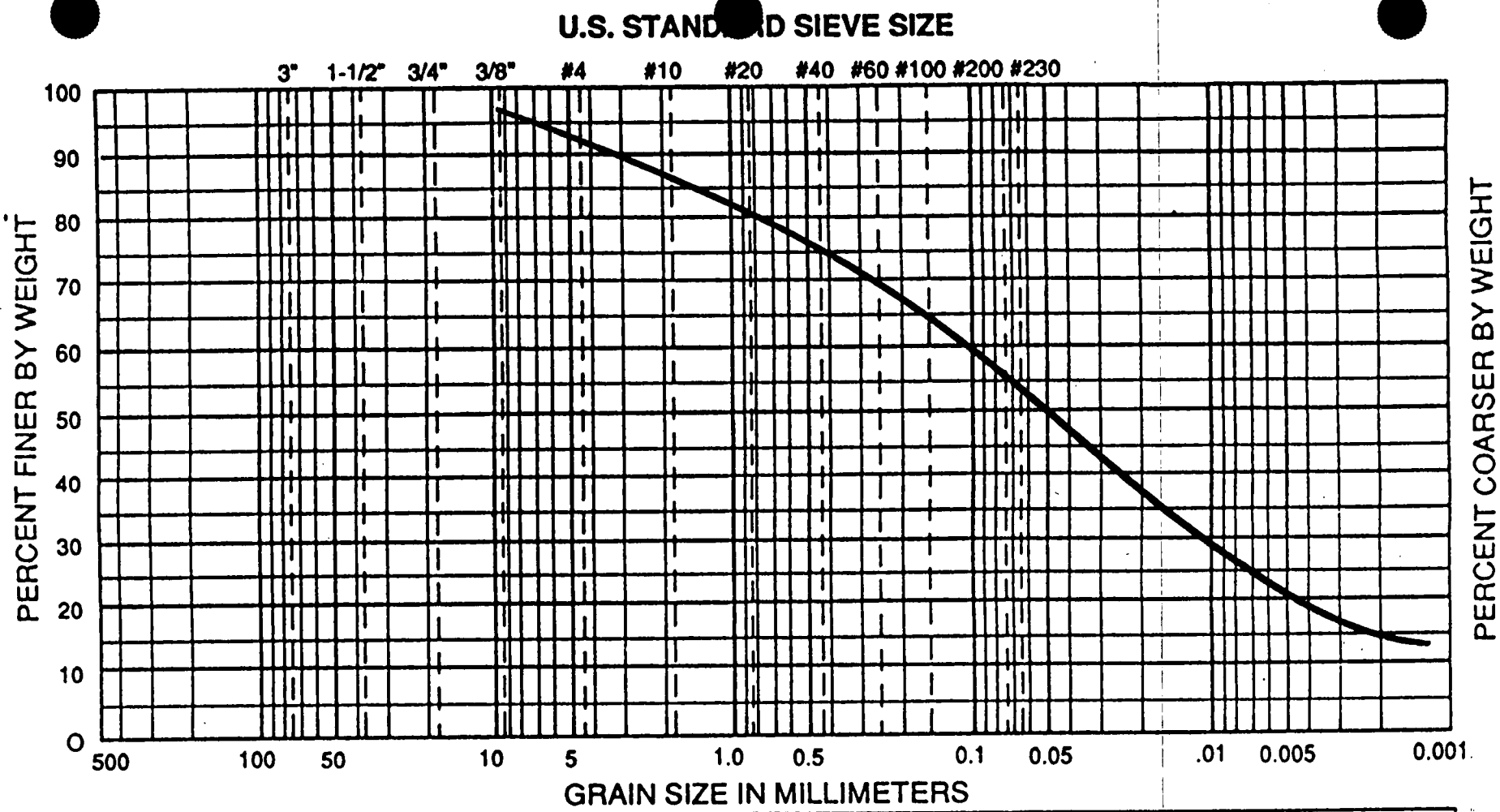
Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

000225

WELLNAME: G2-203 SAMPLE NO.: 8 DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	17.5 - 19.5 ft	Yellowish Brown Sandy Lean Clay (CL)

FEMP-OU02-5 DRAFT
August 24, 1994



ADVANCED TERRA TESTING

E-3-3-65

ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

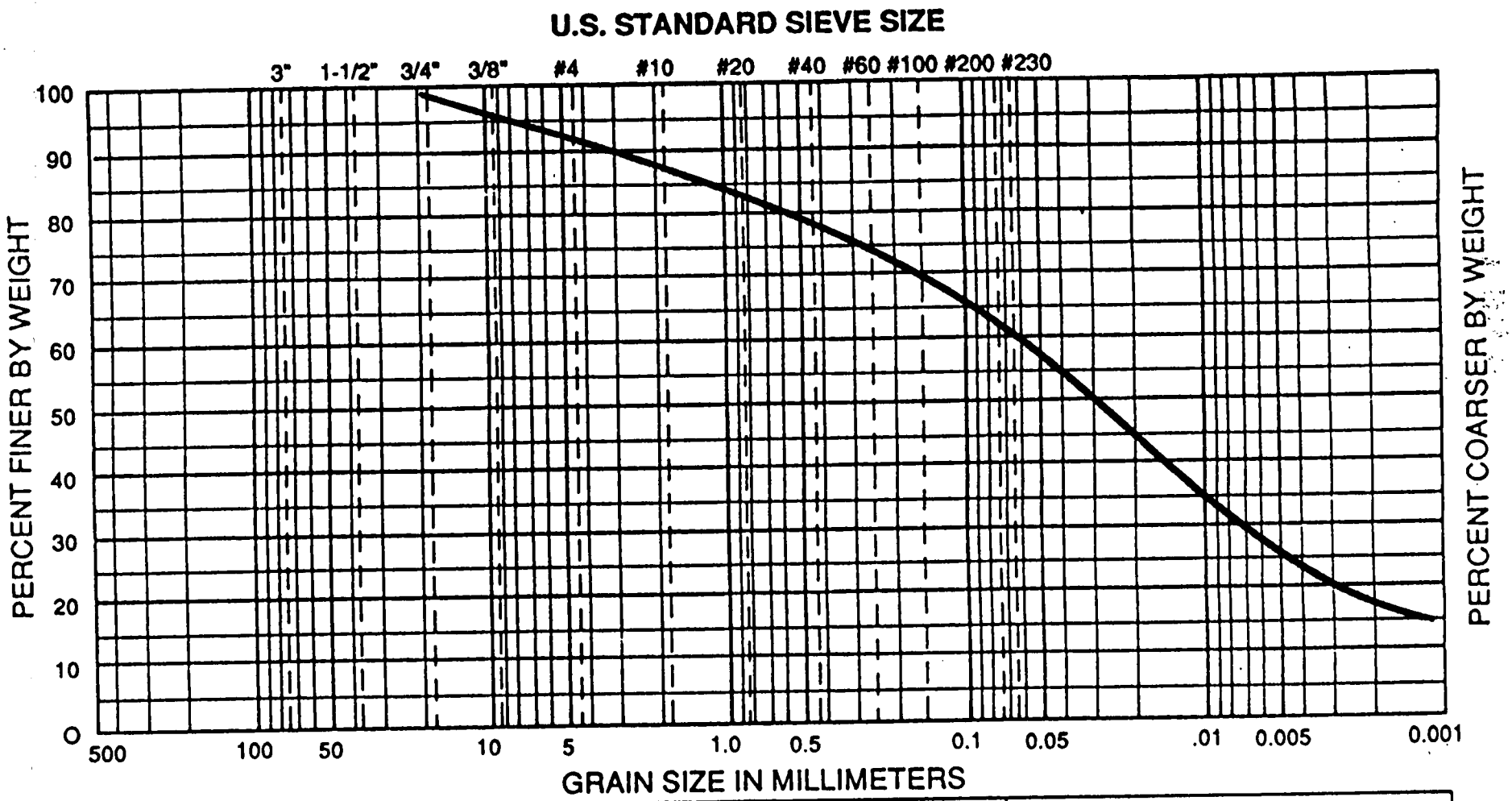
WELLNAME: G2-203 SAMPLE NO.: 9 DATE: 2-10-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	20 - 22 ft	Gray Sandy Lean Clay (CL)

000226

5861

FEMP-OU02-5 DRAFT
August 24, 1994



ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

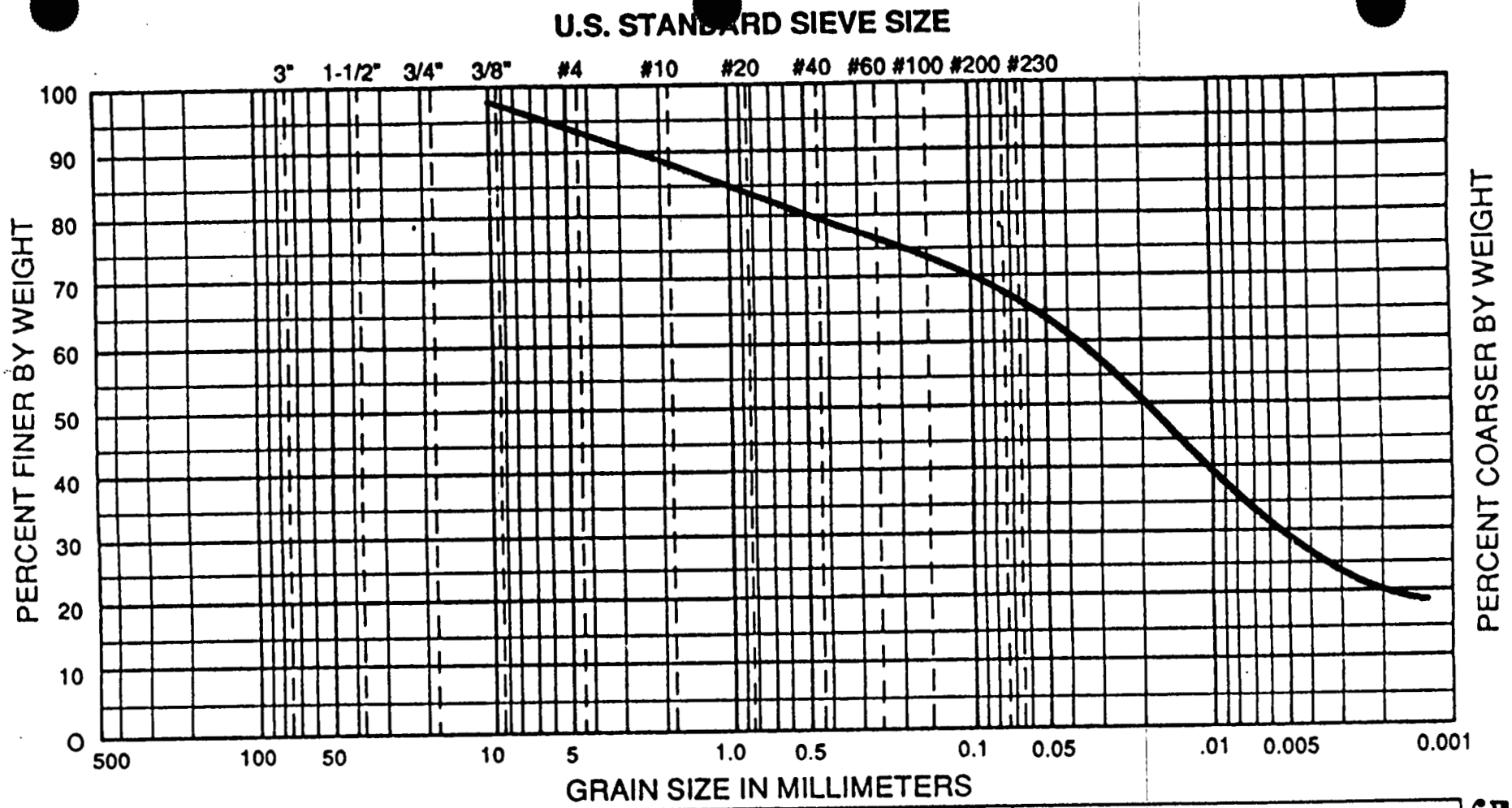
Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

WELLNAME: G2-203 SAMPLE NO.: 10 DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	22.5 - 24.5 ft	Gray Sandy Lean Clay (CL)

ADVANCED TERRA TESTING

E-3-3-66



ADVANCED TERRA TESTING

E-3-3-67

ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

586 I

FEMP-OU02-5 DRAFT
August 24, 1994

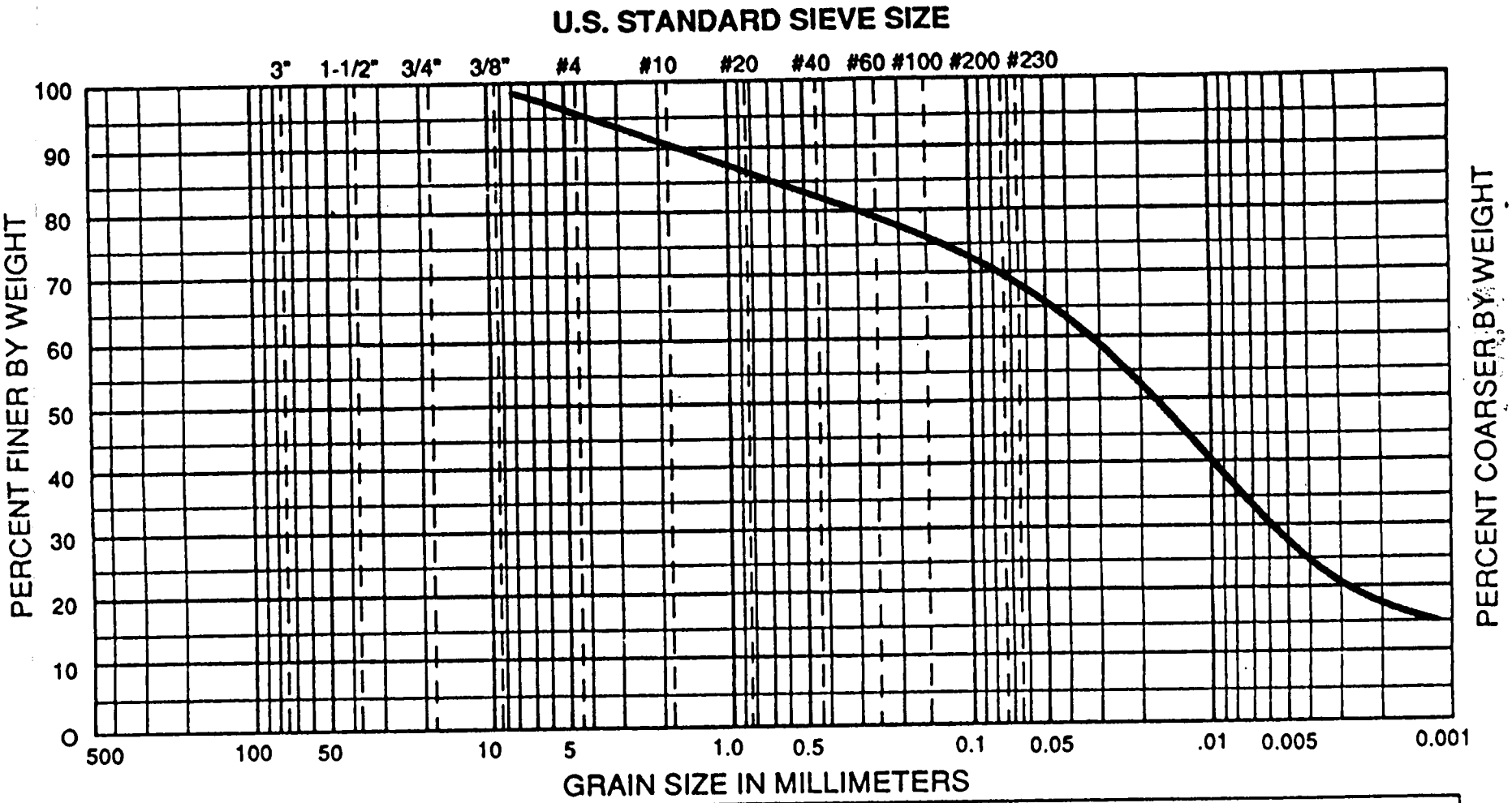
WELLNAME: G2-204 SAMPLE NO.: 4 DATE: 1-3-94 PROJECT NO.: PO-101

000228

AREA	DEPTH	CLASSIFICATION
On-Site Cell	7.5 - 9.5 ft	Yellowish Brown Sandy Lean Clay (CL)

ADVANCED TERRA TESTING

E-3-3-68



ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

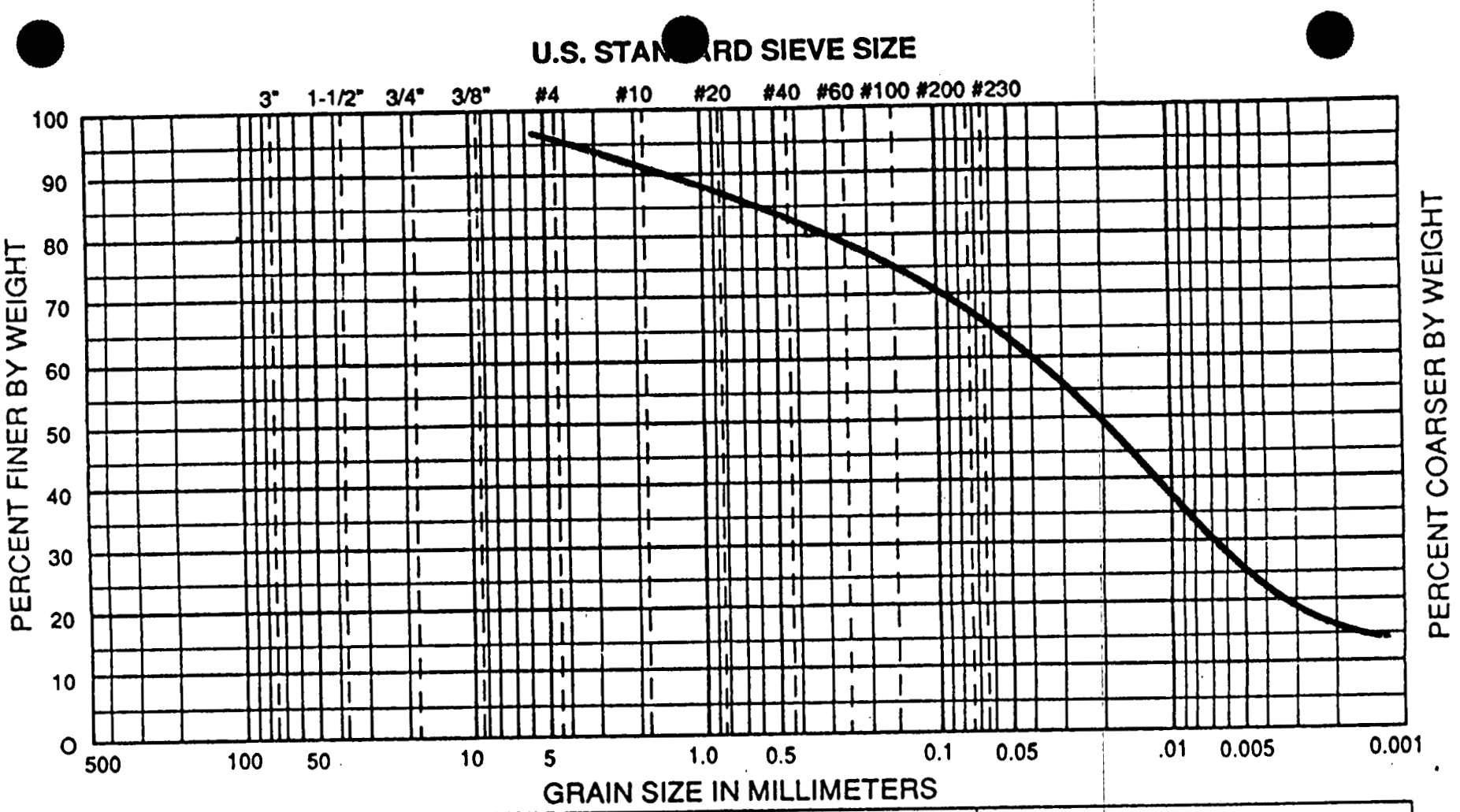
Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

WELLNAME: G2-204 SAMPLE NO.: 6 DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	12.5 - 14.5 ft	Gray Lean Clay with Sand (CL)

FEMP-OU02-5 DRAFT
August 24, 1994

000229



ADVANCED TERRA TESTING

E-3-3-69

ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

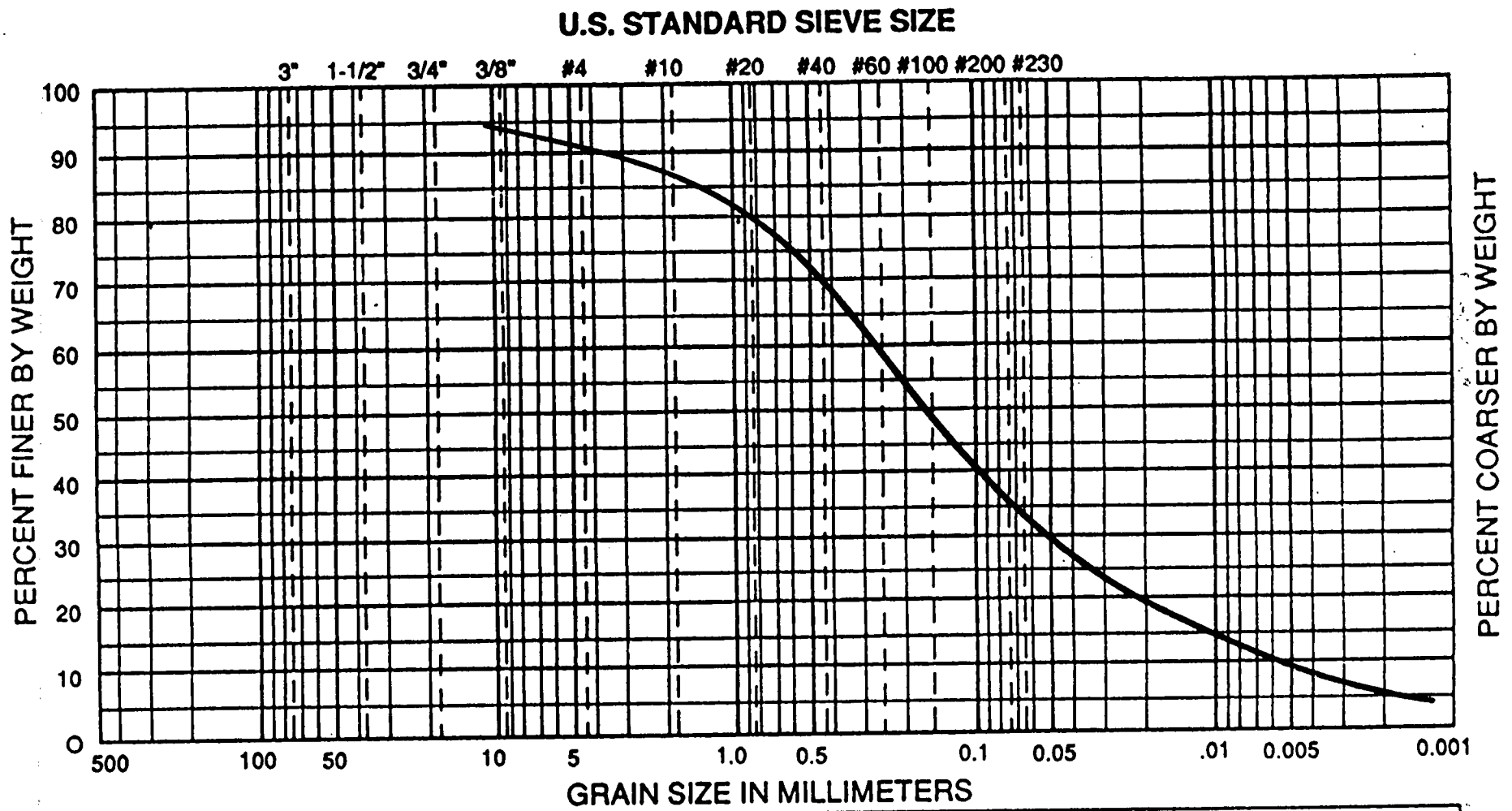
Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

586 1

WELLNAME: G2-204 SAMPLE NO.: 7 DATE: 1-17-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	15 - 17 ft	Gray Sandy Lean Clay (CL)

000230



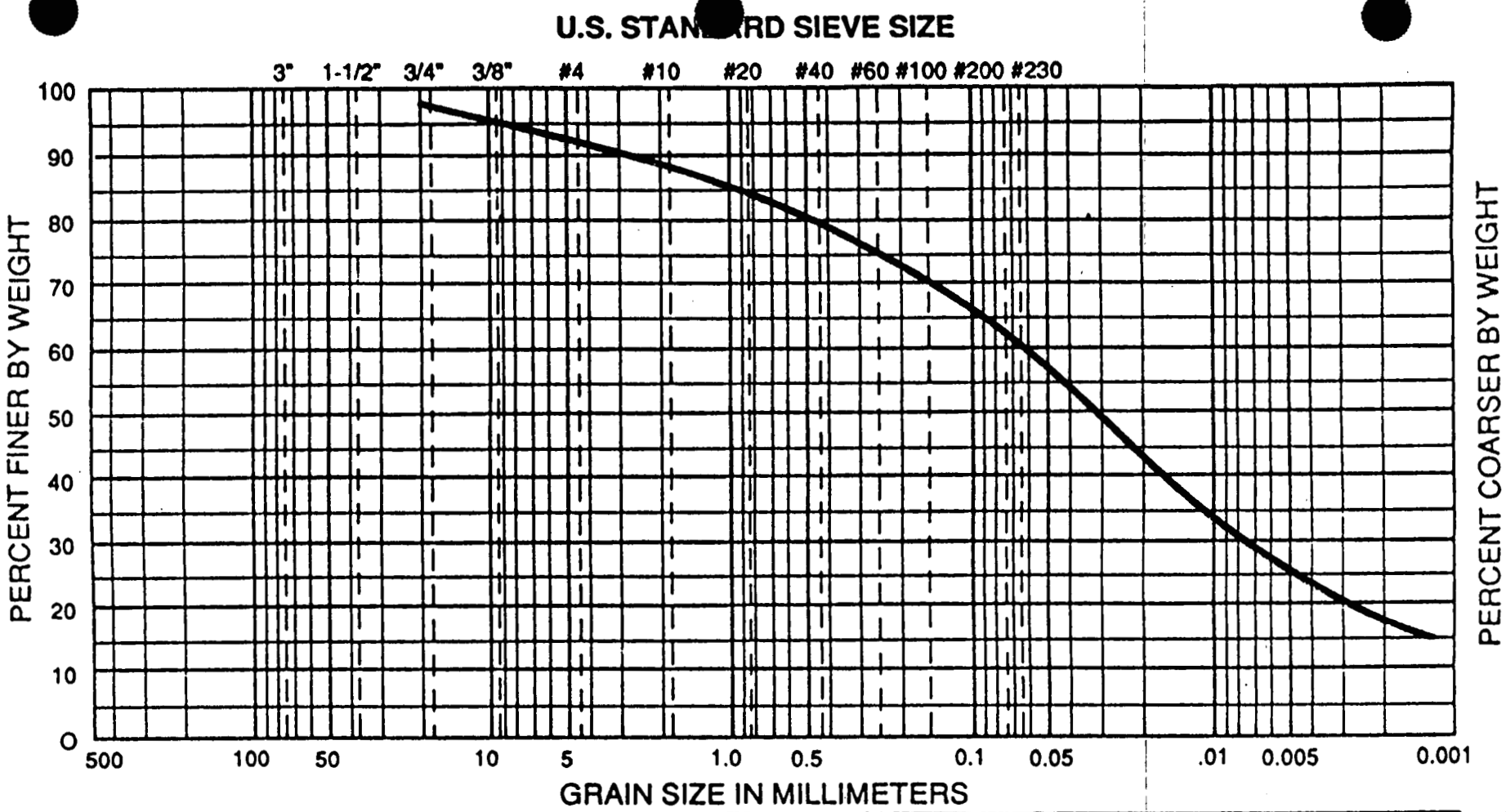
ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

WELLNAME: G2-204 SAMPLE NO.: 8 DATE: 2-10-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	17.5 - 19.5 ft	Gray Silty Sand (SM)



ADVANCED TERRA TESTING

E-3-3-71

ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

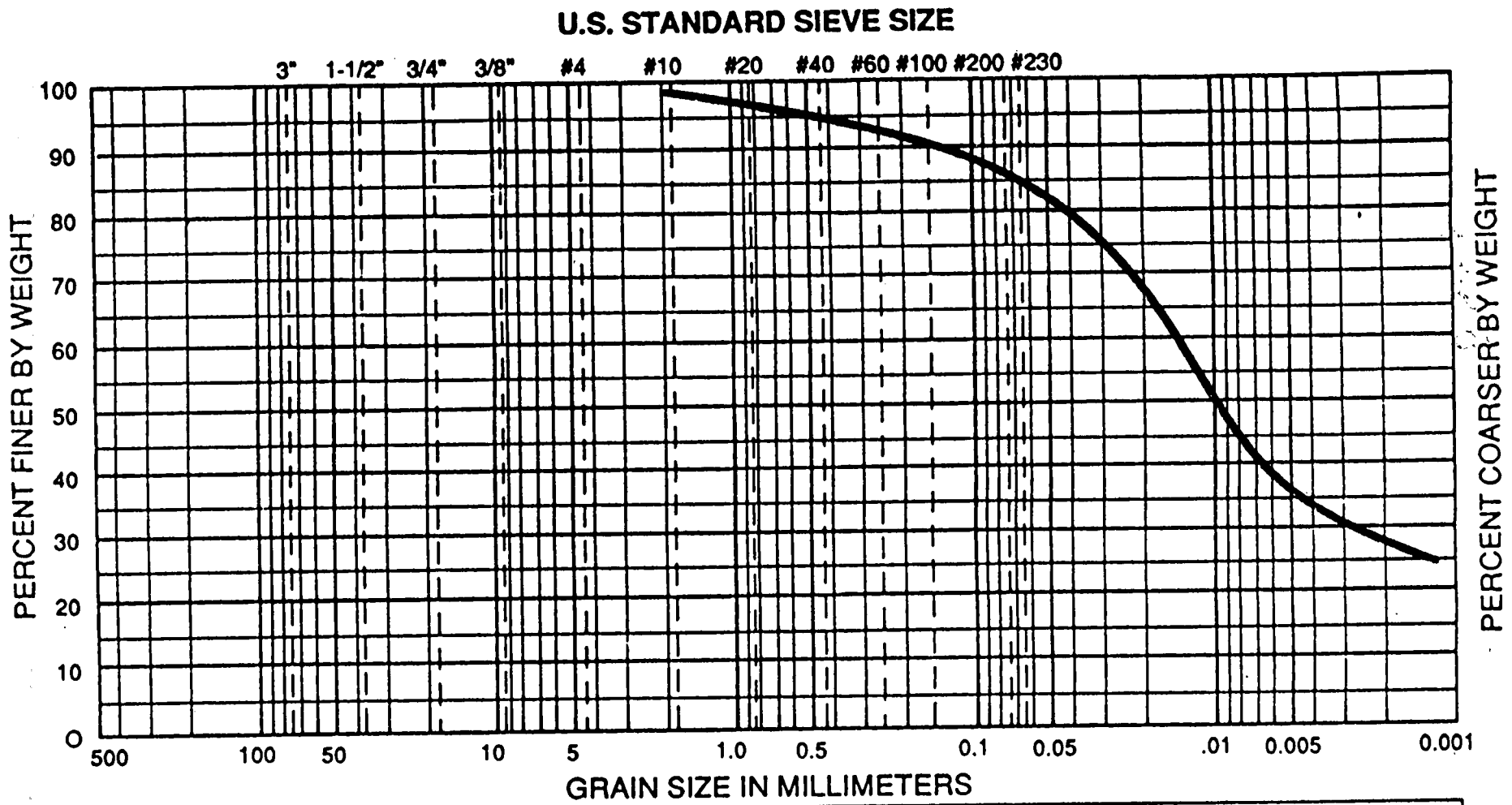
5861

WELLNAME: G2-204 SAMPLE NO.: 10 DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	22.5 - 24.5 ft	Gray Sandy Lean Clay (CL)

00023

FEMP-OU02-5 DRAFT
August 24, 1994

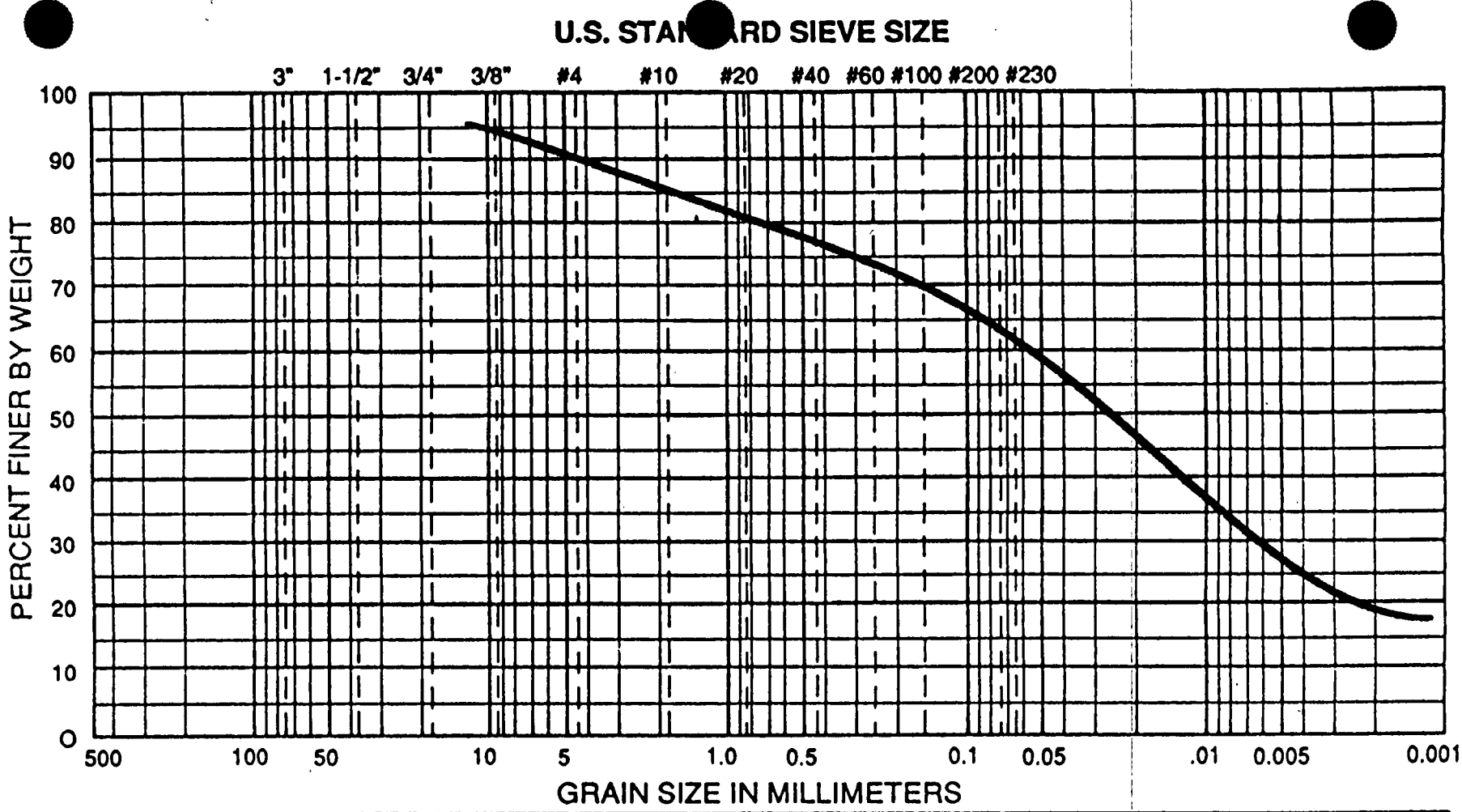


ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

WELLNAME: G2-205 SAMPLE NO.: 2 DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	2.5 - 4.5 ft	Yellowish Brown Lean Clay (CL)



ADVANCED TERRA TESTING

E-3-3-73

ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

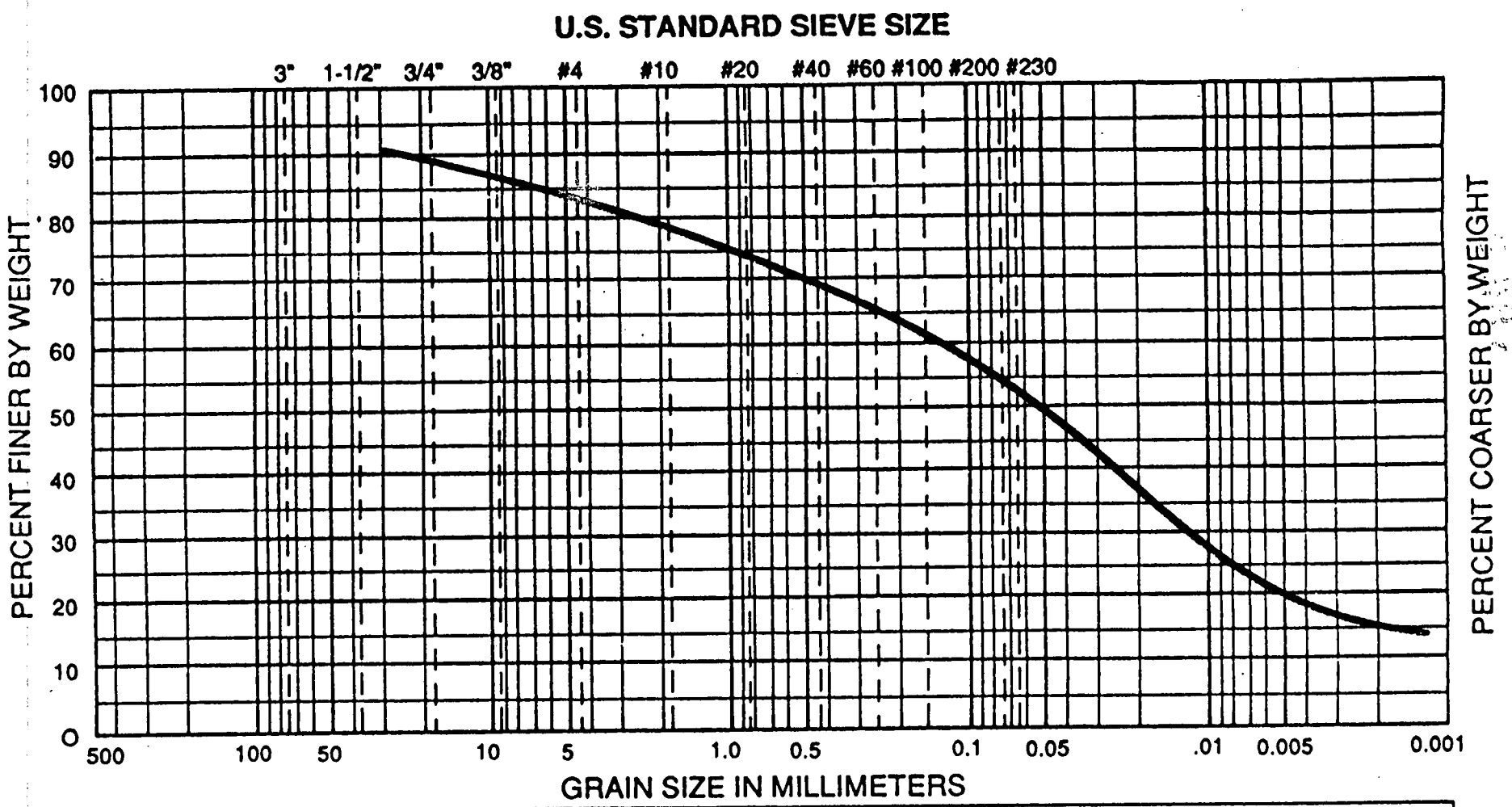
WELLNAME: G2-205 SAMPLE NO.: 5 DATE: 1-17-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	10 - 12 ft	Yellowish Brown Sandy Lean Clay (CL)

000234

586

FEMP-OU02-5 DRAFT
August 24, 1994



ADVANCED TERRA TESTING

E-3-3-74

ASTM D 2487 (USCS)

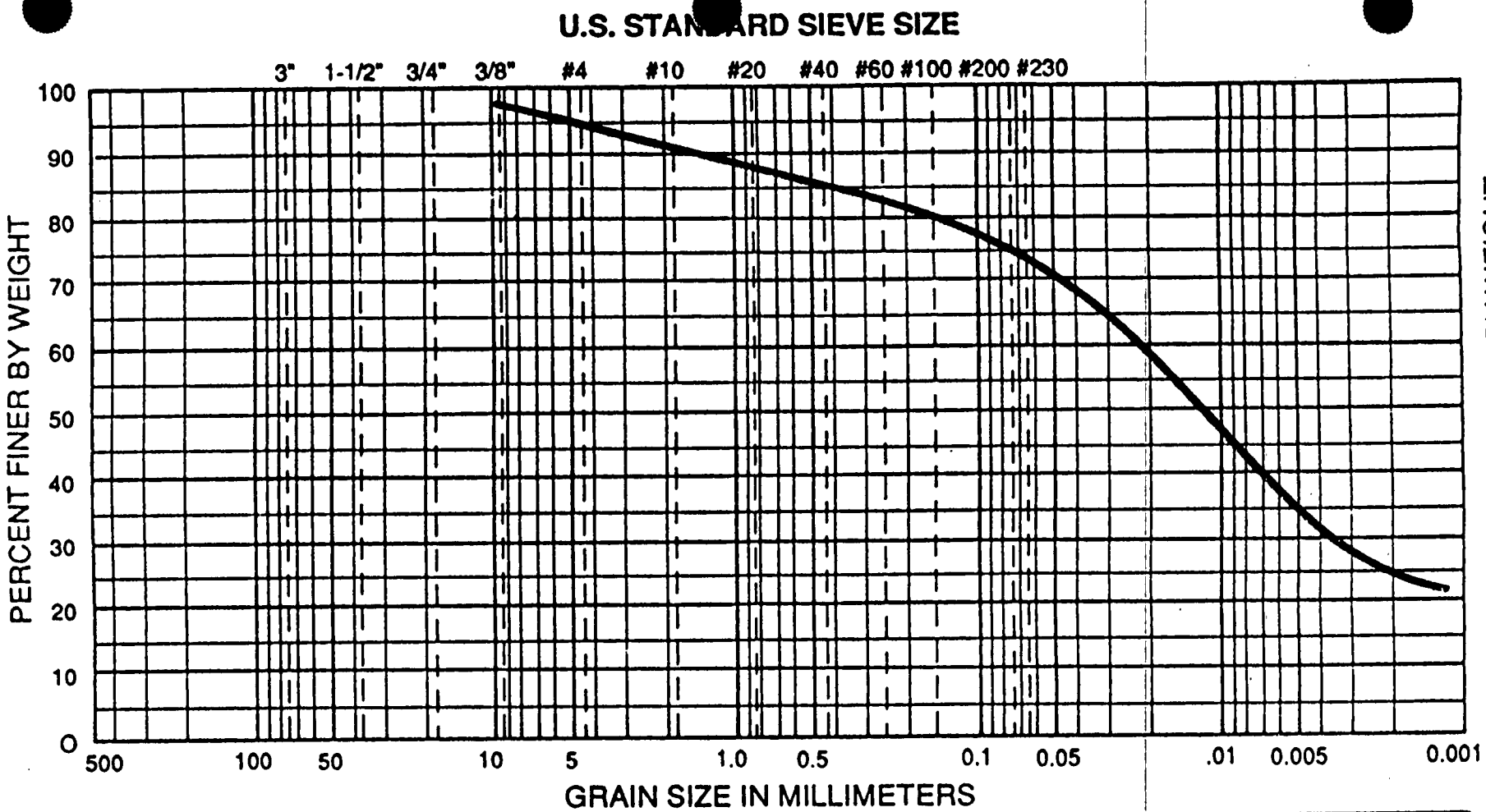
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

000235

WELLNAME: G2-205 SAMPLE NO.: 8 DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	17.5 - 19.5 ft	Gray Sandy Lean Clay (CL)



ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

WELLNAME: G2-206 SAMPLE NO.: 2 DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	2.5 - 4.5 ft	Yellowish Brown Lean Clay with Sand (CL)

ADVANCED TERRA TESTING

E-3-3-75

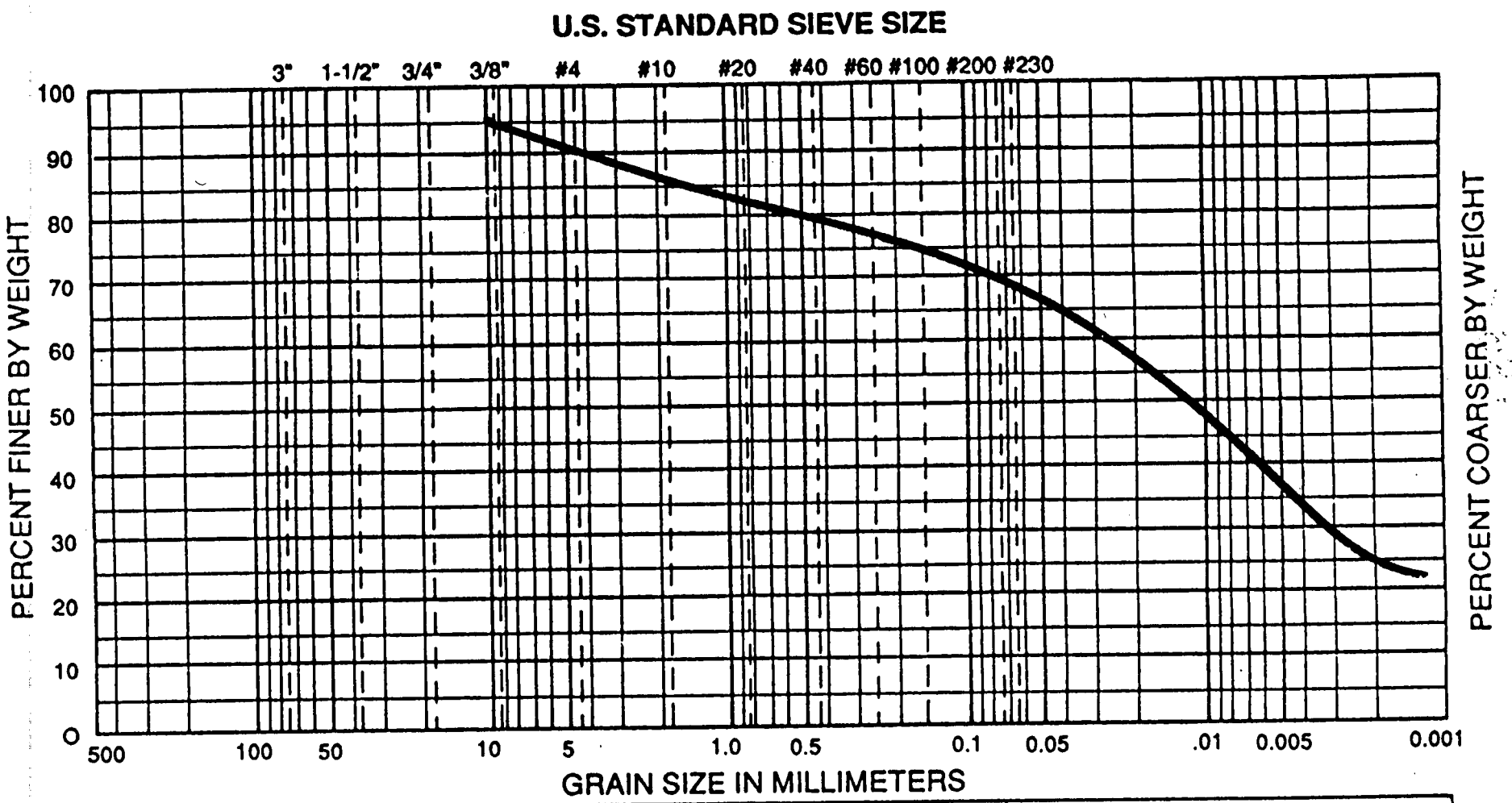
5861

FEMP-OU02-5 DRAFT
August 24, 1994

000236

ADVANCED TERRA TESTING

E-3-3-76



ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

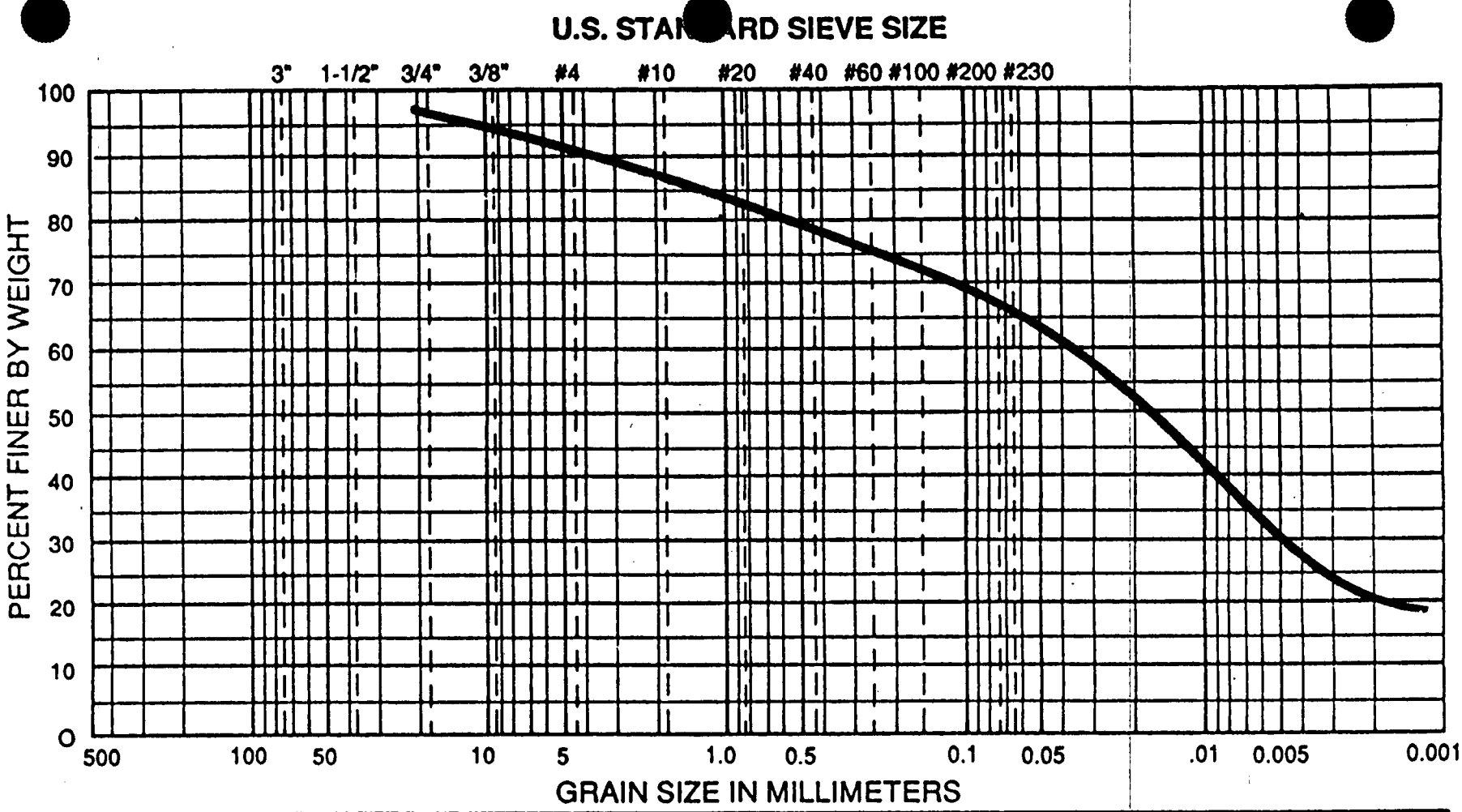
Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

00237

WELLNAME: G2-206 SAMPLE NO.: 3 DATE: 1-17-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	5 - 7 ft	Yellowish Brown Lean Clay with Sand (CL)

FEMP-OU02-5 DRAFT
August 24, 1994



ADVANCED TERRA TESTING

E-3-3-77

ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

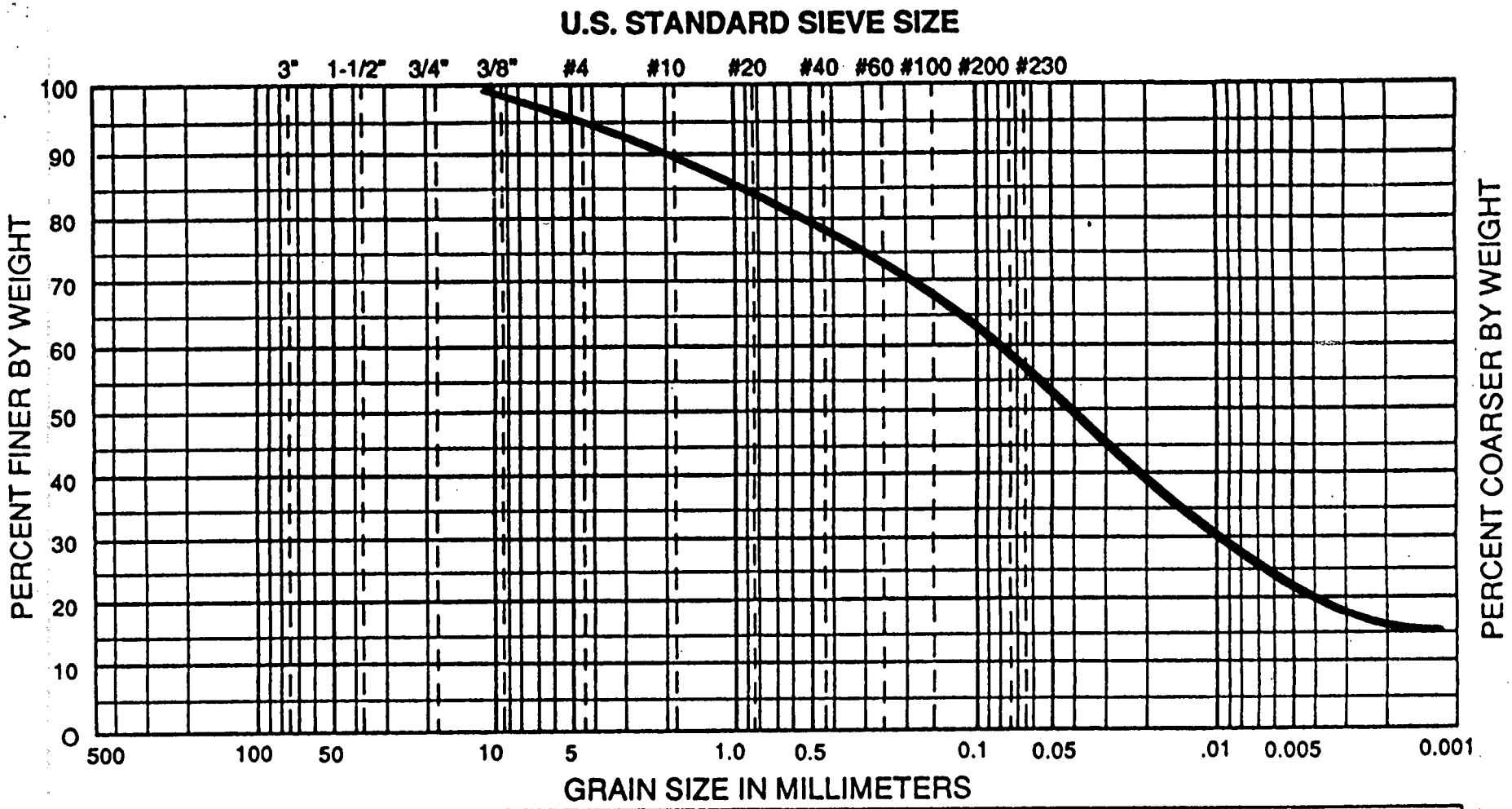
WELLNAME: G2-206 SAMPLE NO.: 4 DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	7.5 - 9.5 ft	Yellowish Brown Sandy Lean Clay (CL)

000238

5861

FEMP-OU02-5 DRAFT
August 24, 1994



ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

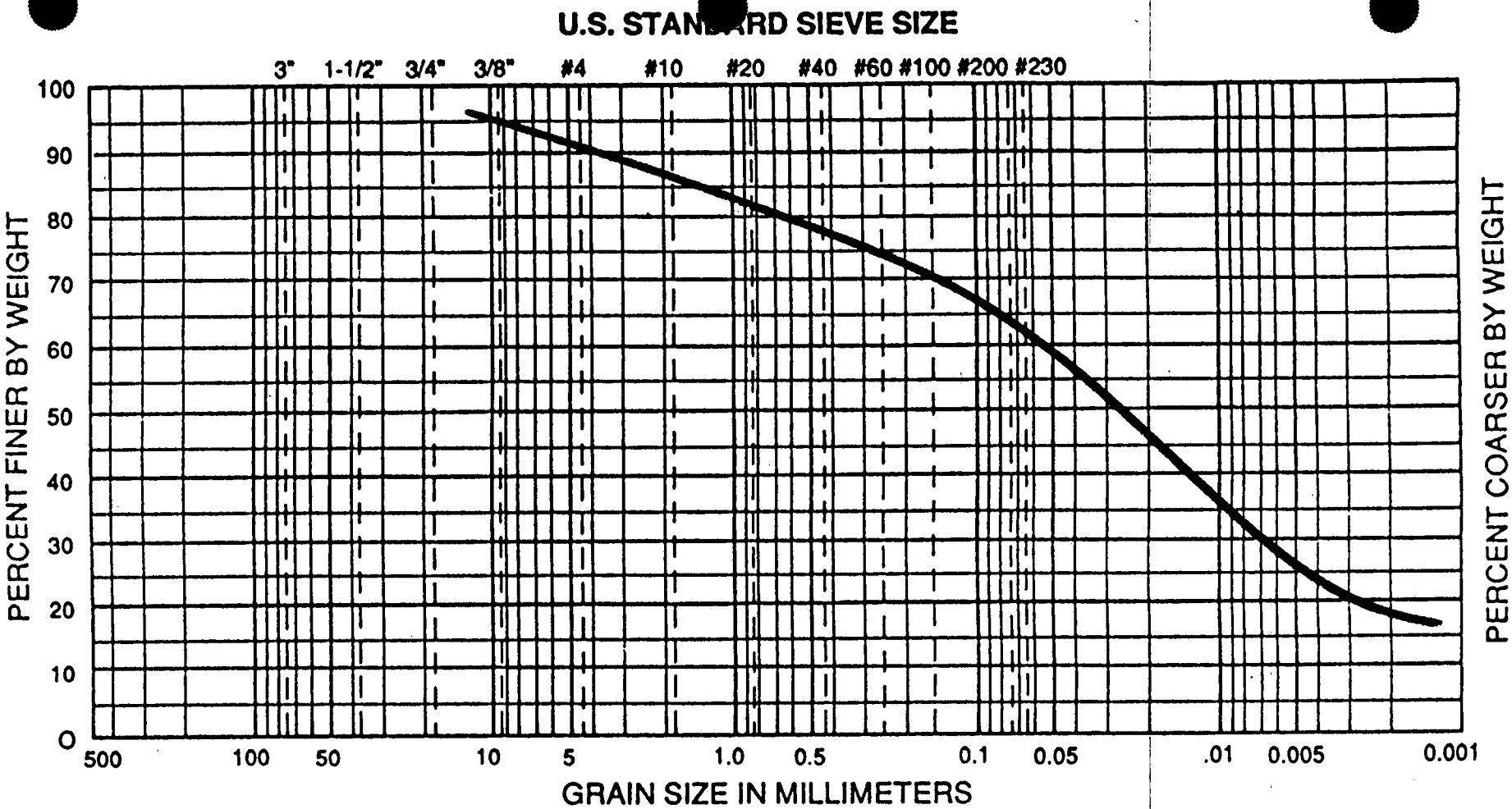
WELLNAME: G2-206 SAMPLE NO.: 7 DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	15 - 17 ft	Gray Lean Clay (CL)

ADVANCED TERRA TESTING

E-3-3-78

000239



ADVANCED TERRA TESTING

E-3-3-79

ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

5861

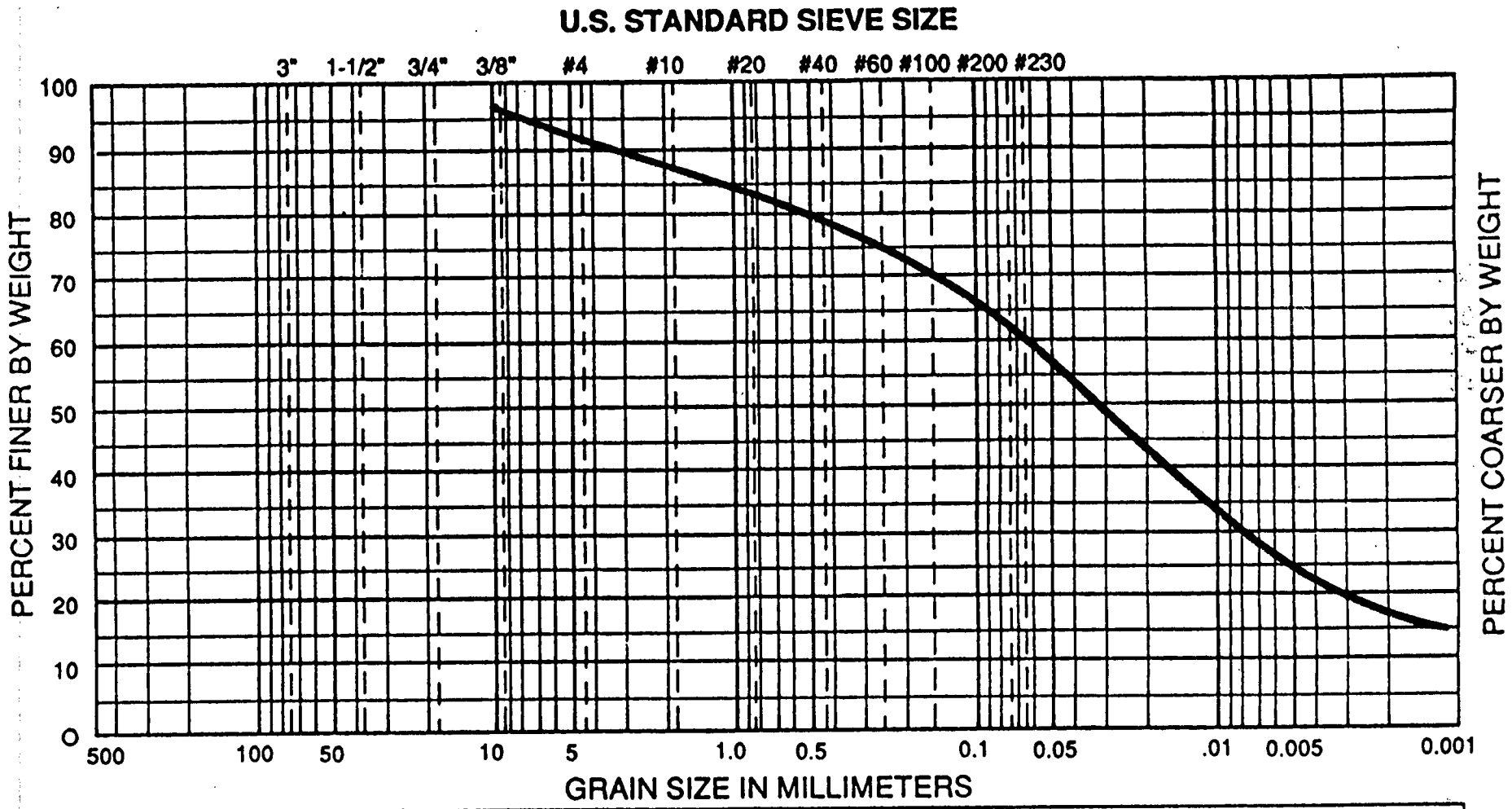
WELLNAME: G2-206 SAMPLE NO.: 5 DATE: 1-17-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	10 - 12 ft	Yellowish Brown Sandy Lean Clay (CL)

000240

FEMP-OU02-5 DRAFT
August 24, 1994

ADVANCED TERRA TESTING



ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

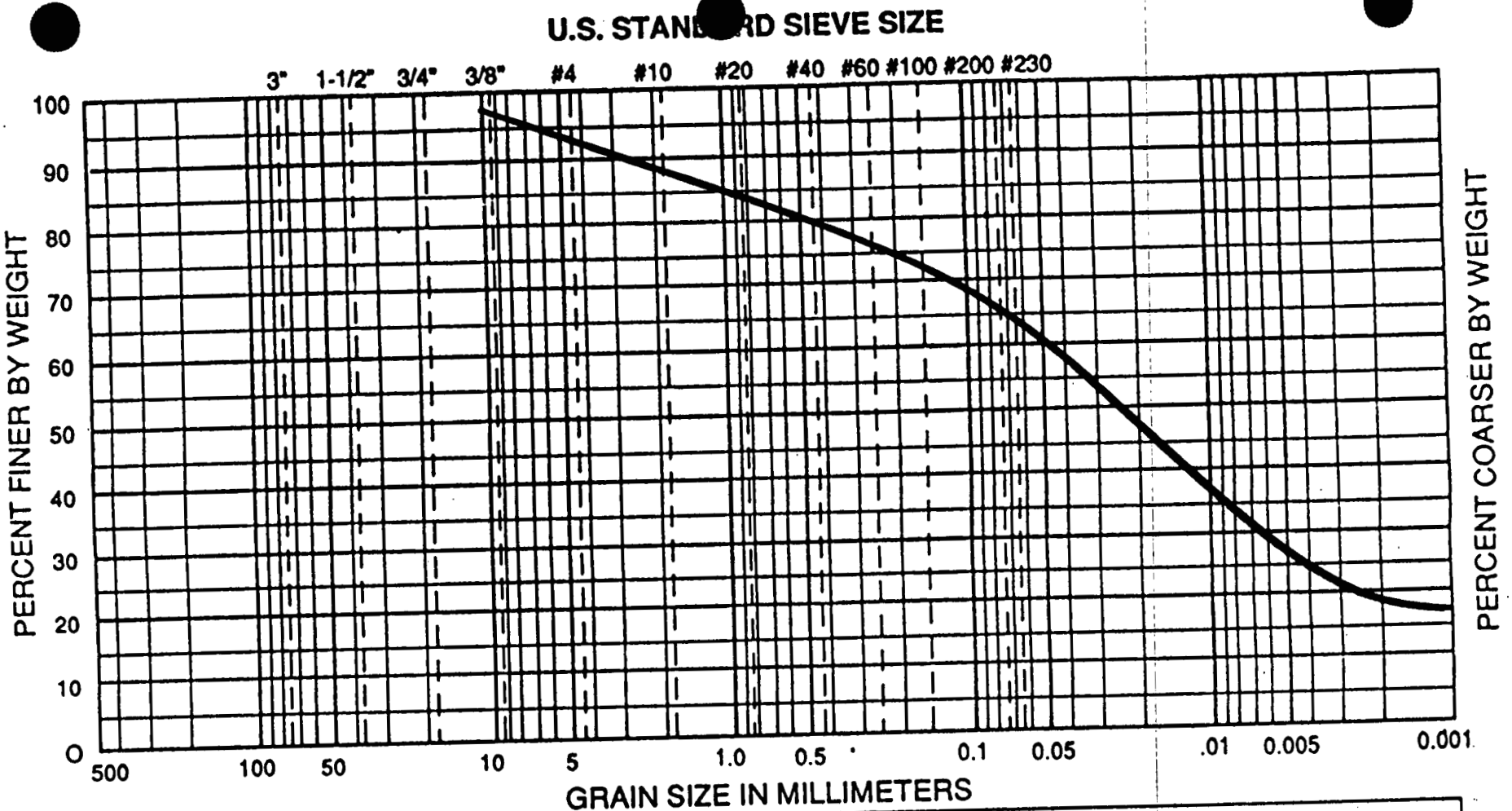
Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

WELLNAME: G2-206 SAMPLE NO.: 10 DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	22.5 - 24.5 ft	Gray Sandy Lean Clay (CL)

E-3-3-80

000241



ADVANCED TERRA TESTING

E-3-81

ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

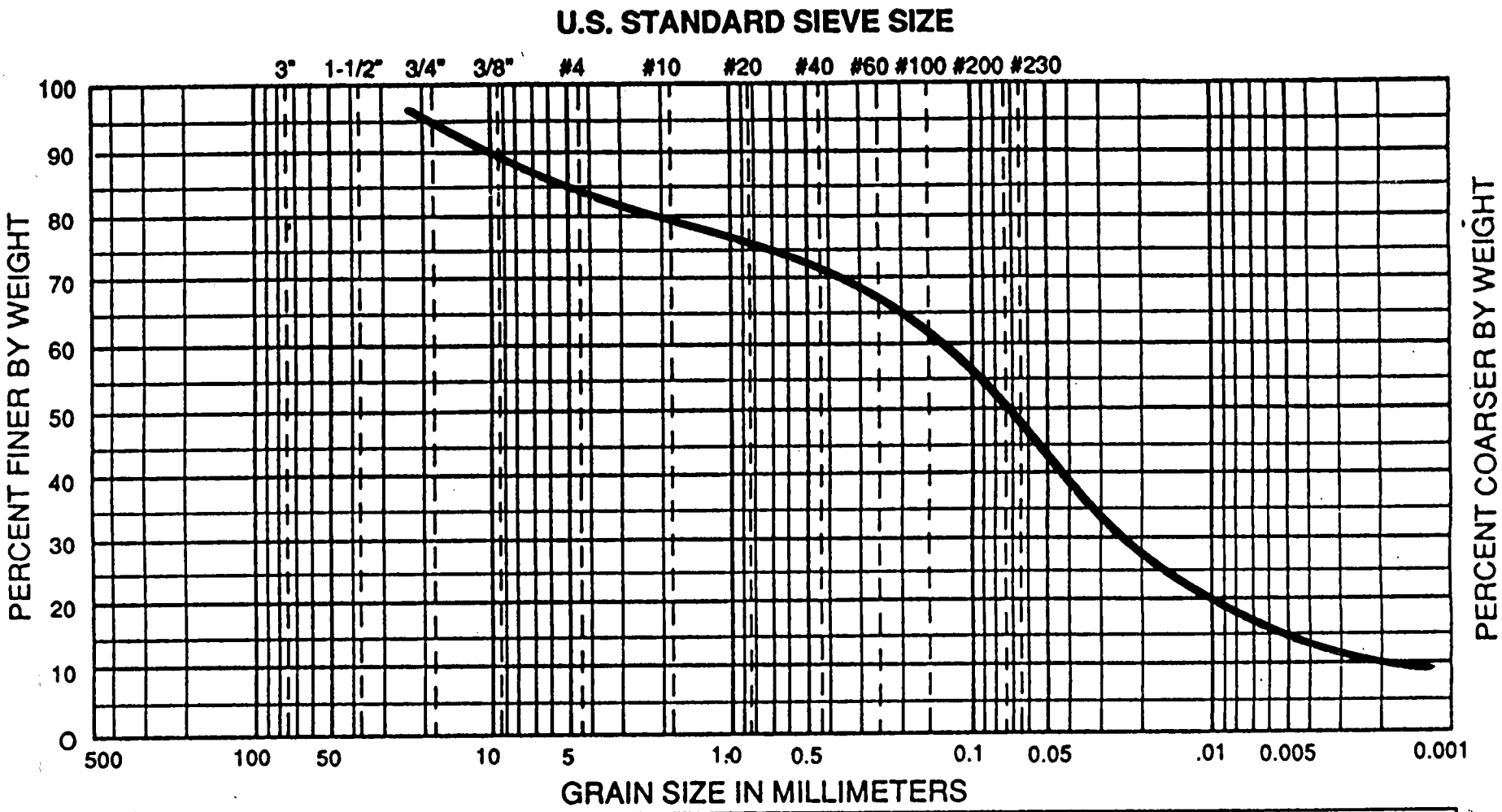
WELLNAME: G2-207 SAMPLE NO.: 5 DATE: 2-10-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	10 - 12 ft	Yellowish Brown Sandy Lean Clay (CL)

000242

5861

FEMP-OU02-5 DRAFT
August 24, 1994



ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

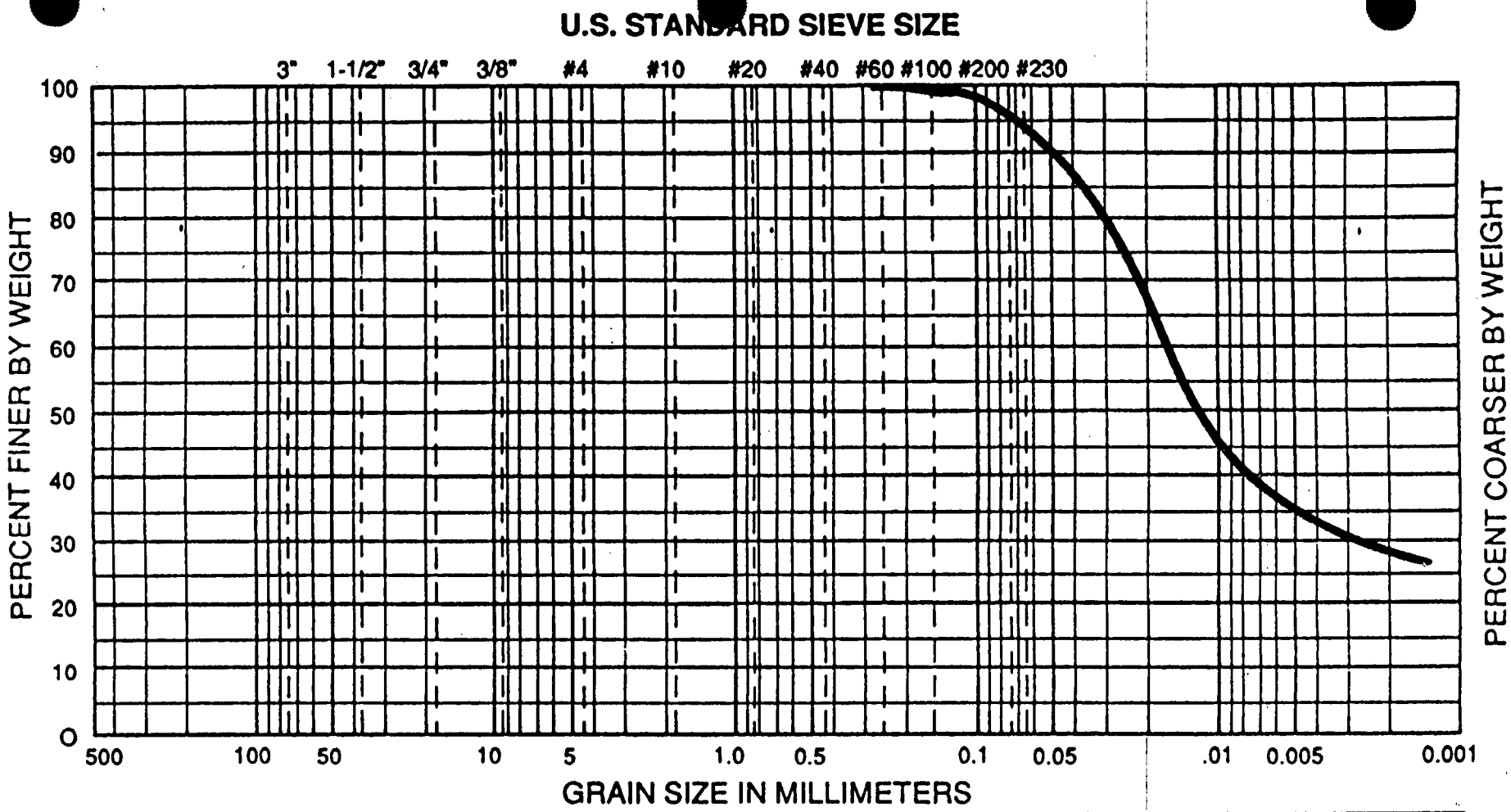
Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

WELLNAME: G2-207 SAMPLE NO.: 11 DATE: 2-10-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	25 - 27 ft	Gray Sandy Silty Clay (CL-ML)

ADVANCED TERRA TESTING

E-3-3-83



ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

WELLNAME: G2-208 SAMPLE NO.: 2 DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	2.5 - 4.5 ft	Yellowish Brown Lean Clay (CL)

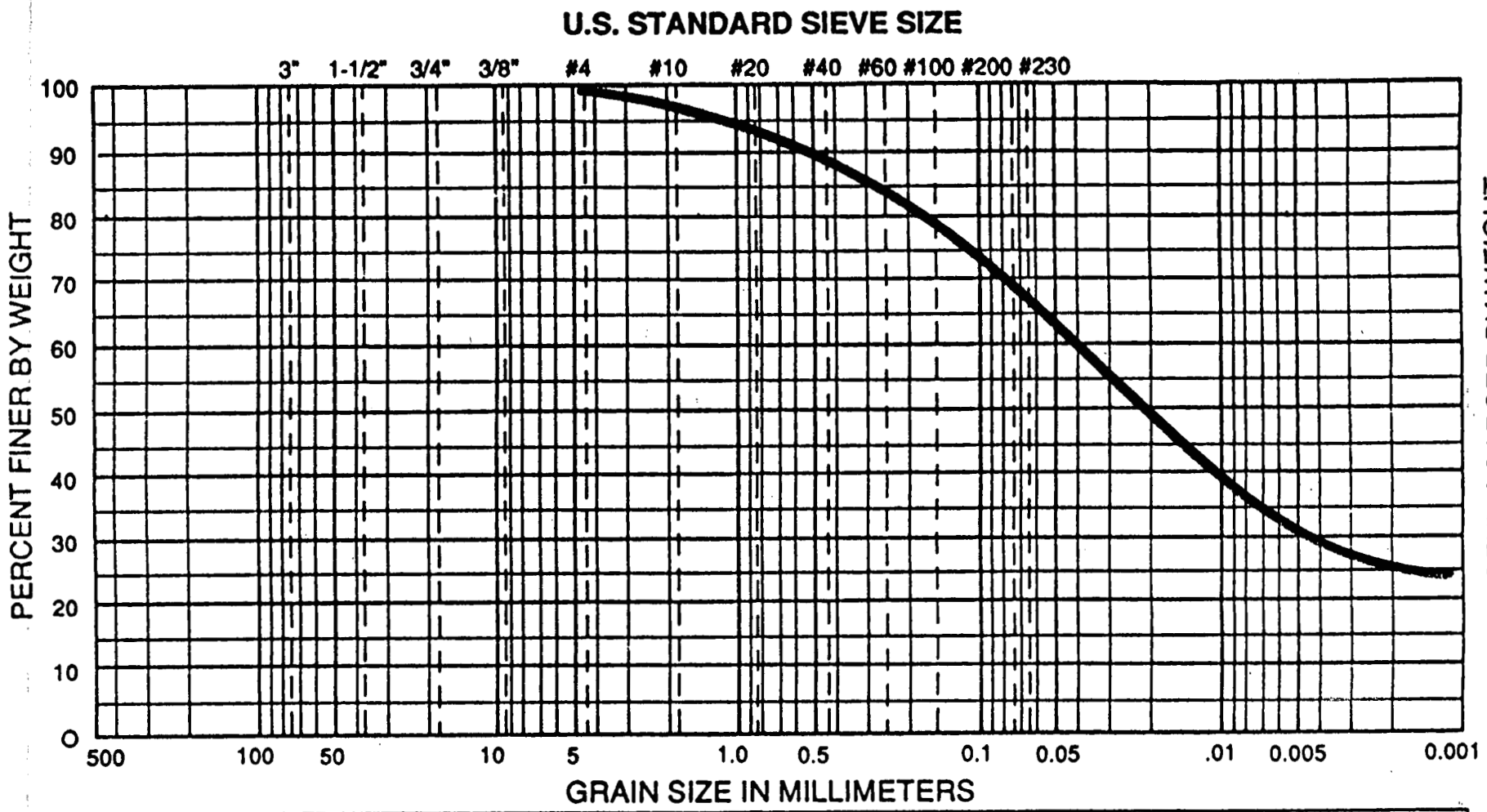
000244

5861

FEMP-OU02-5 DRAFT
August 24, 1994

ADVANCED TERRA TESTING

E-3-3-84



ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

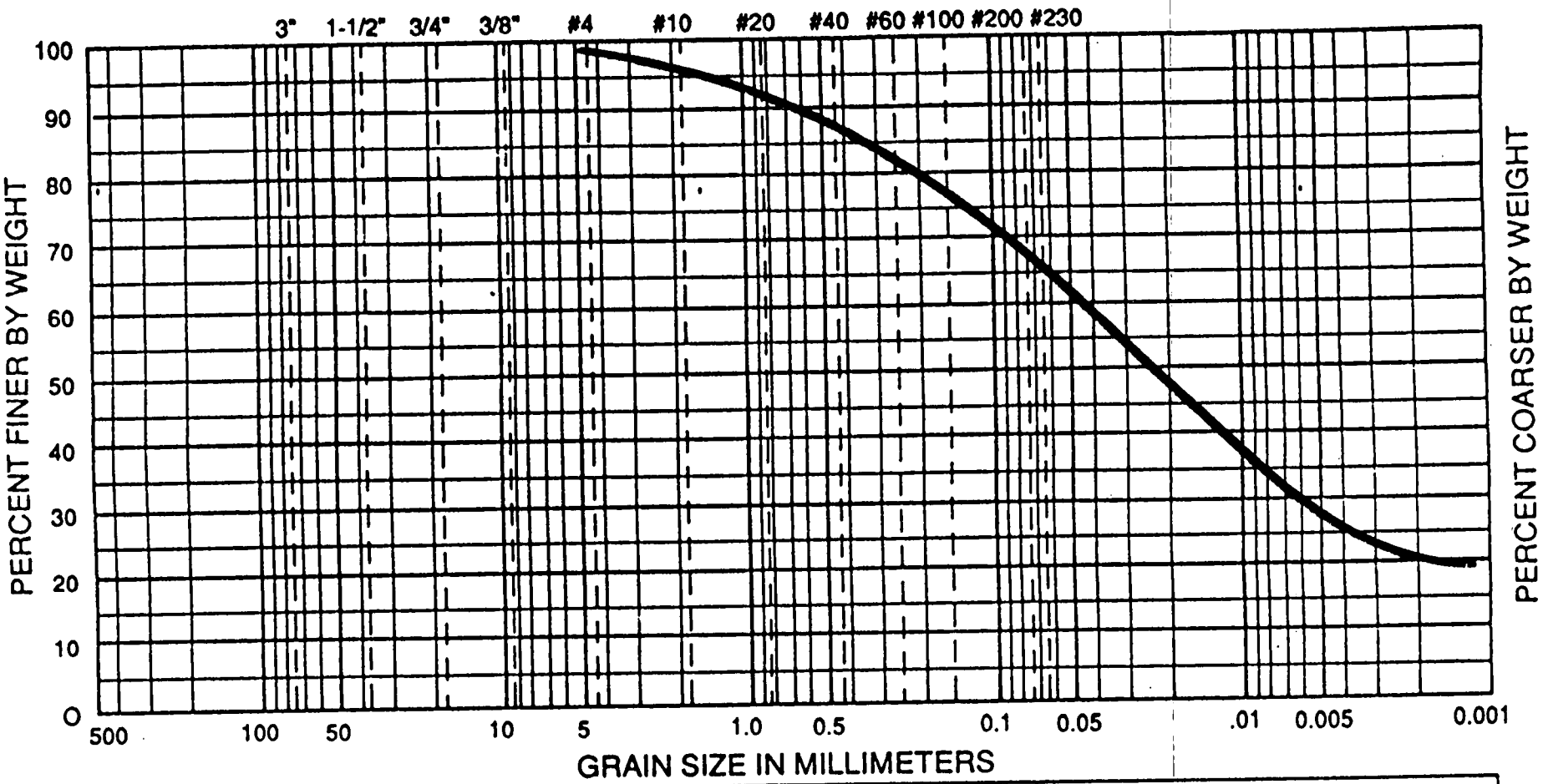
Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

WELLNAME: G2-208 SAMPLE NO.: 3 DATE: 1-17-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	5 - 7 ft	Yellowish Brown Sandy Lean Clay (CL)

000235

FEMP-OU02-5 DRAFT
August 24, 1994



ADVANCED TERRA TESTING

E-3-3-85

ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

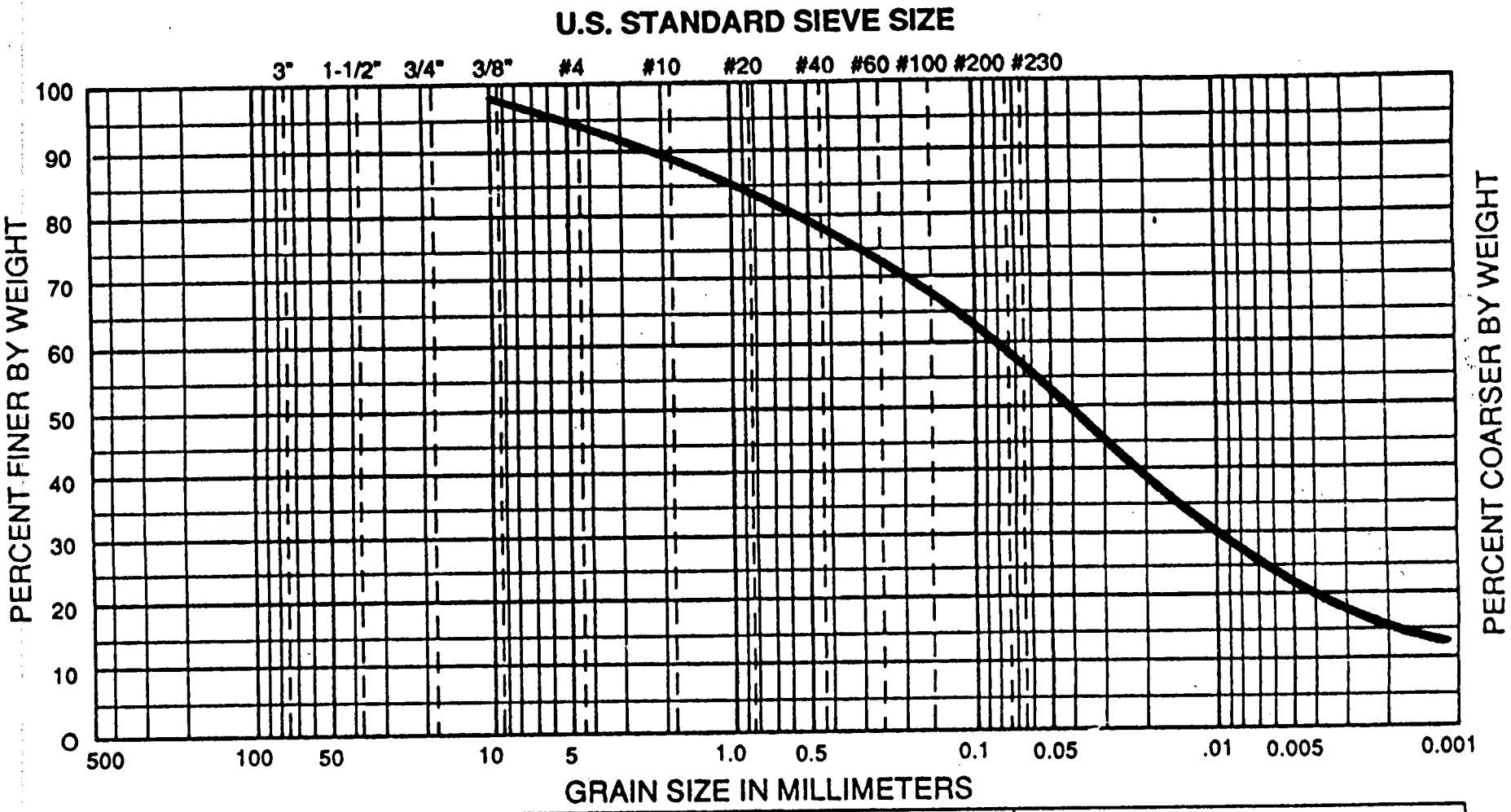
586 1

WELLNAME: G2-208 SAMPLE NO.: 4 DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	7.5 - 9.5 ft	Yellowish Brown Sandy Lean Clay (CL)

000246

FEMP-OU02-5 DRAFT
August 24, 1994



ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

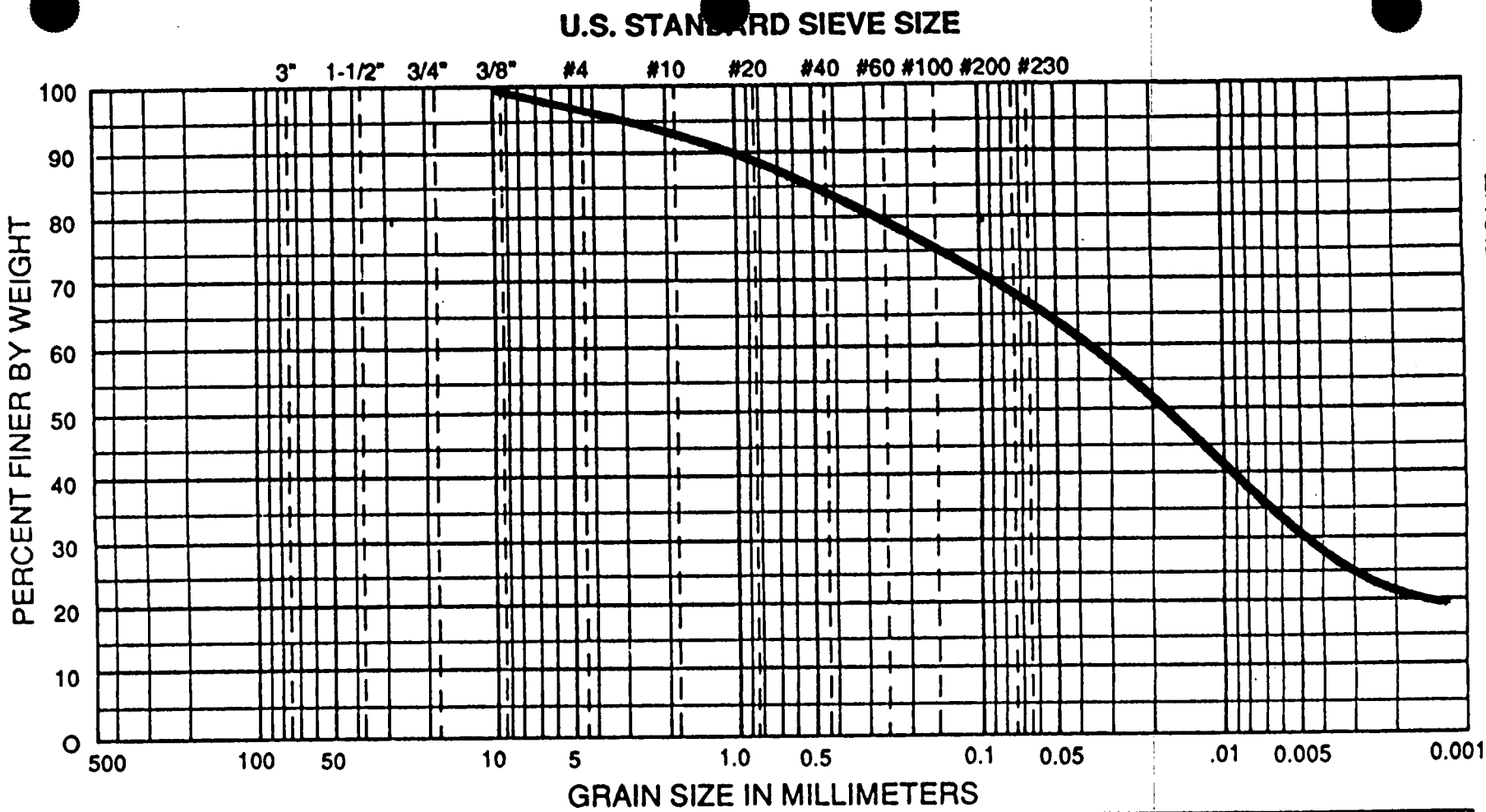
WELLNAME: G2-208 SAMPLE NO.: 9 DATE: 1-17-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	20 - 22 ft	Gray Sandy Lean Clay (CL)

ADVANCED TERRA TESTING

E-3-3-86

000227



ADVANCED TERRA TESTING

E-3-3-87

ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

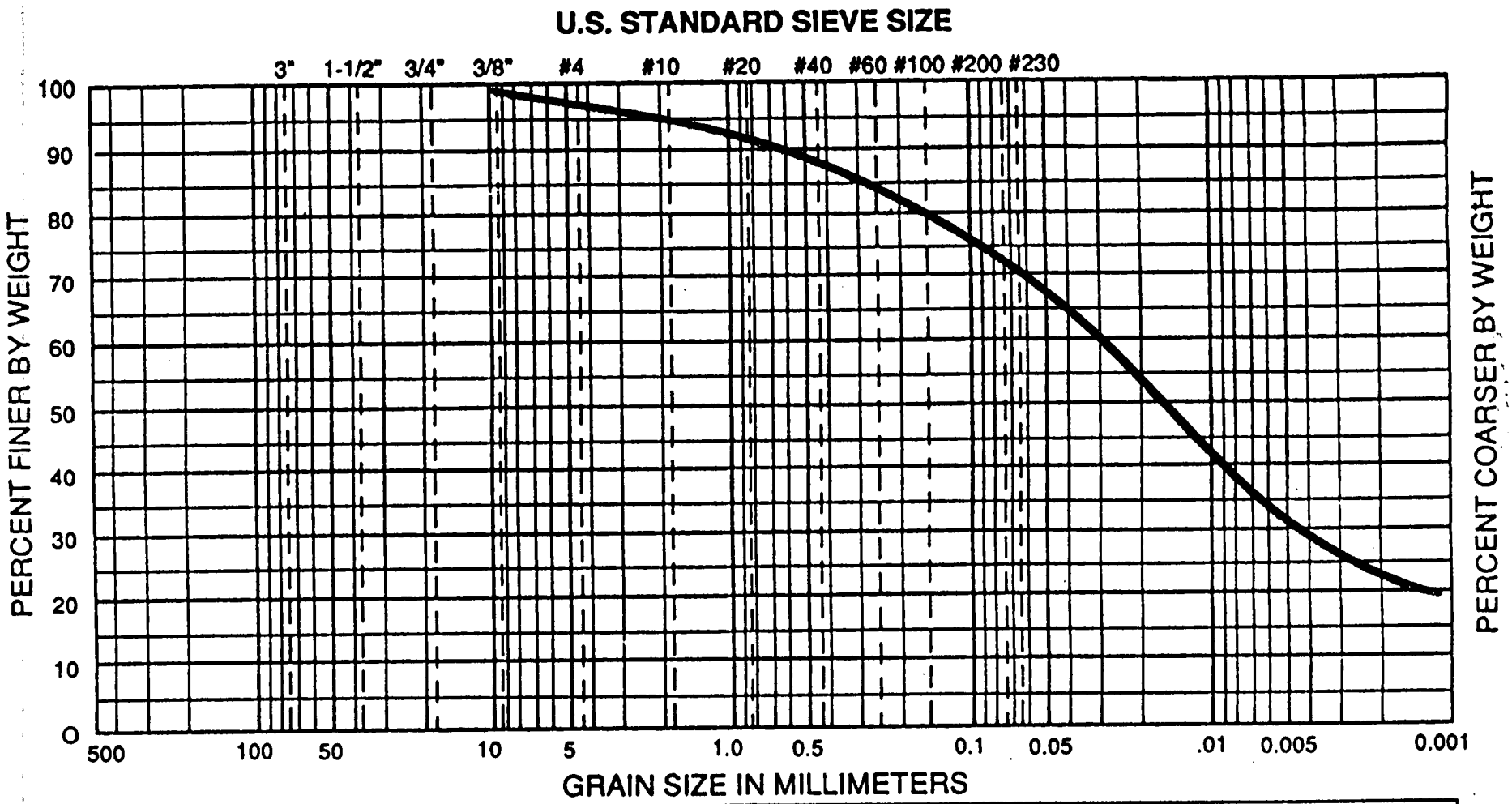
5861

FEMP-OU02-5 DRAFT
August 24, 1994

WELLNAME: G2-209 SAMPLE NO.: BULK DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	0 - 25 ft	Brown and Gray Sandy Lean Clay (CL)

000248



ADVANCED TERRA TESTING

E-3-3-88

ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

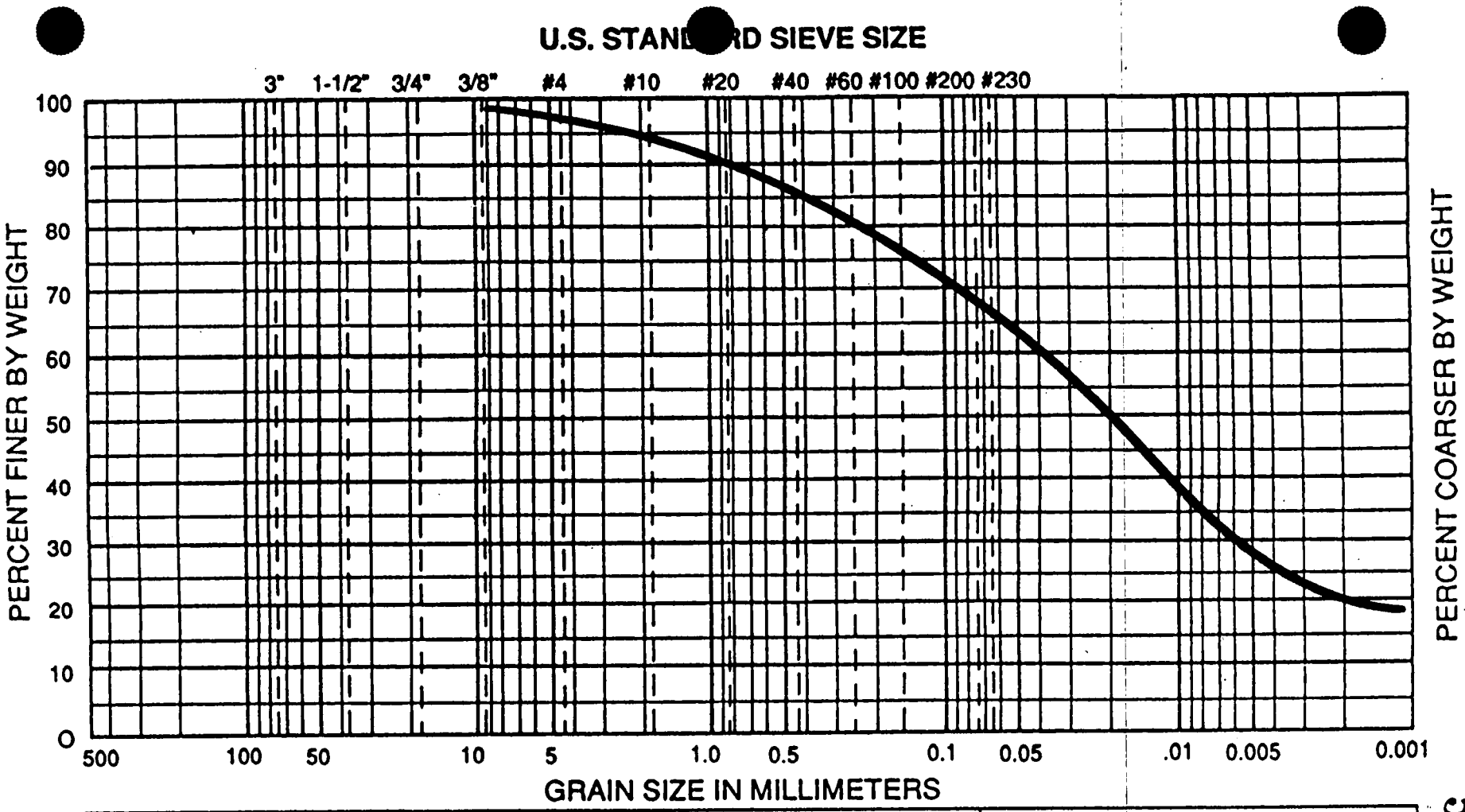
WELLNAME: G2-210 SAMPLE NO.: BULK DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	0 - 25 ft	Brown and Gray Lean Clay with Sand (CL)

000249

ADVANCED TERRA TESTING

E-3-3-89



ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

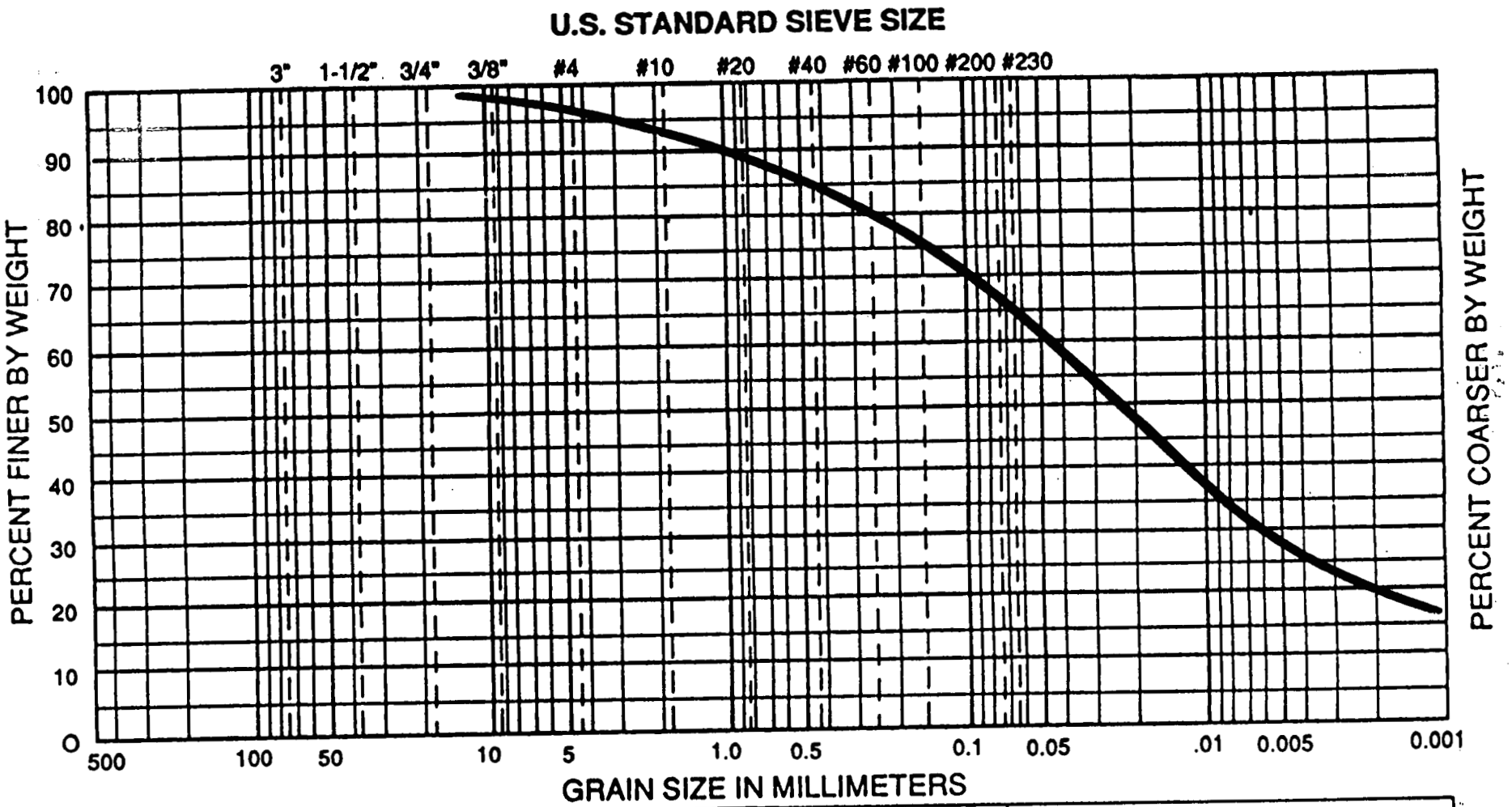
5861

WELLNAME: G2-201-204 SAMPLE NO.: BULK DATE: 2-9-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	0 - 24.5 ft	Brown and Gray Lean Clay with Sand (CL)

000250

FEMP-OU02-5 DRAFT
August 24, 1994



ADVANCED TERRA TESTING

E-3-3-90

ASTM D 2487 (USCS)

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

WELLNAME: G2-205-208 SAMPLE NO.: BULK DATE: 2-9-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	0 - 24.5 ft	Brown and Gray Sandy Lean Clay (CL)

000251

APPENDIX C

MOISTURE DENSITY RELATIONSHIPS

000252

861

Sample No. G2-205-208 Depth 0 - 24.5 Elevation

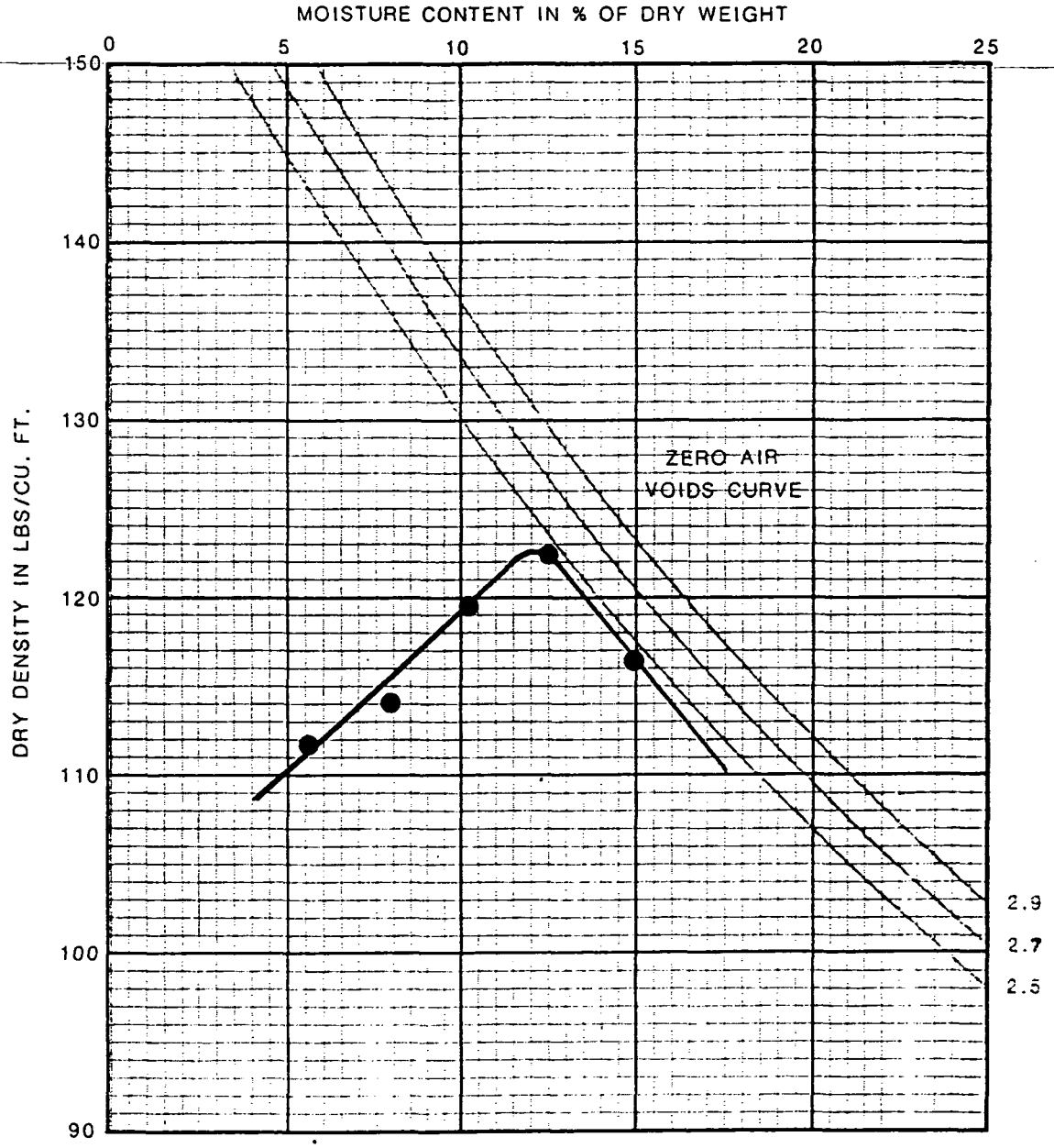
Soil Composite 205, 206, 207, 208

Location Proposed On-Site Disposal Cell (PO-101)

Optimum Moisture Content 12.3%

Maximum Dry Density 122.5 pcf

Method of Compaction ASTM D 698, Method A



File

000253

COMPACTION TEST DATA

ADVANCED TERRA TESTING

Sample No. G2-201-204 Depth 0 - 24.5 Elevation _____

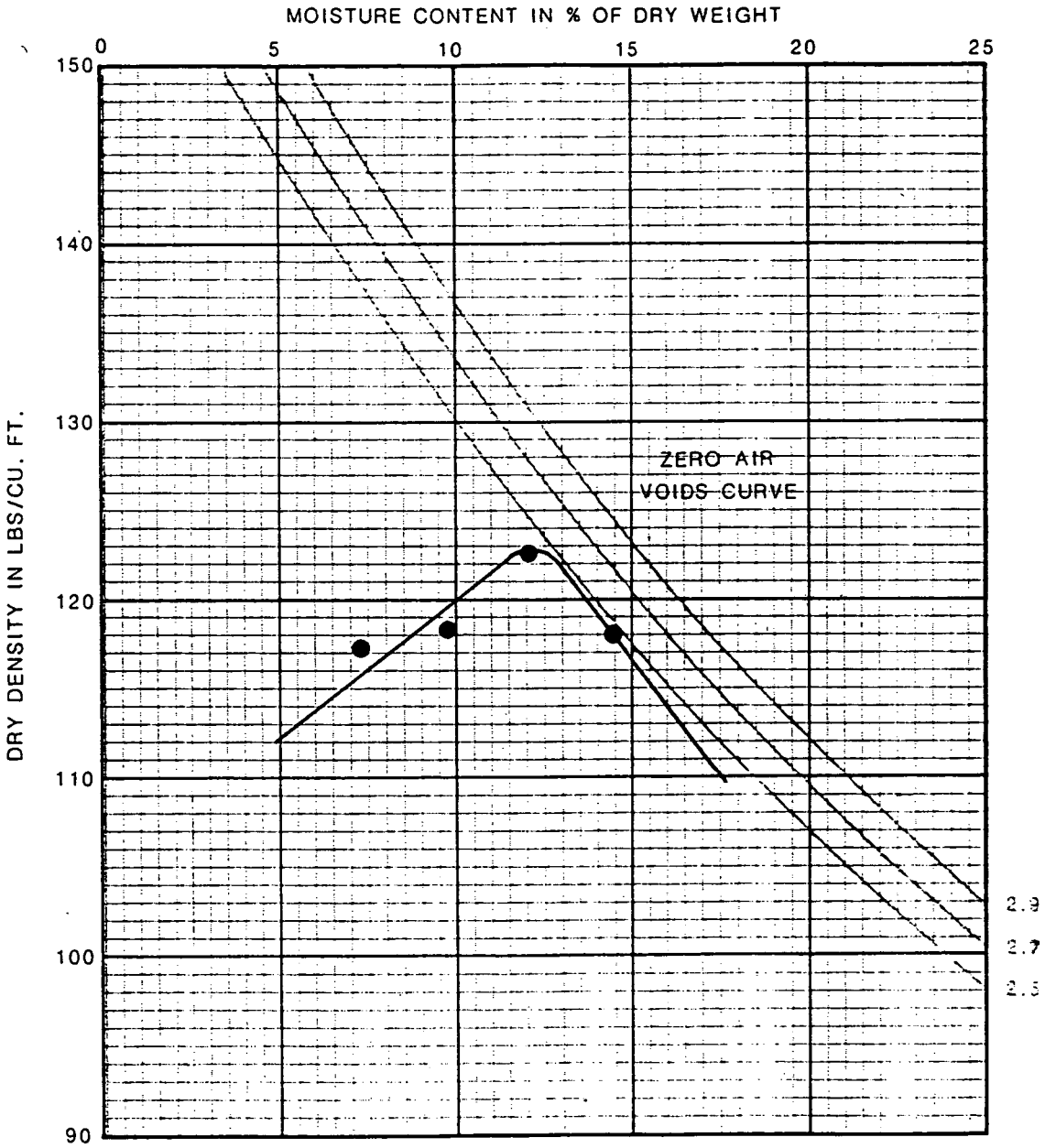
Soil Composite 201, 202, 203, 204

Location Proposed On-Site Disposal Cell (PO-101)

Optimum Moisture Content 12.0%

Maximum Dry Density 122.7 pcf

Method of Compaction ASTM D 698, Method A



File

COMPACTION TEST DATA 000254

ADVANCED TERRA TESTING

Sample No. G2-210 Depth 0 - 25 Elevation 5861

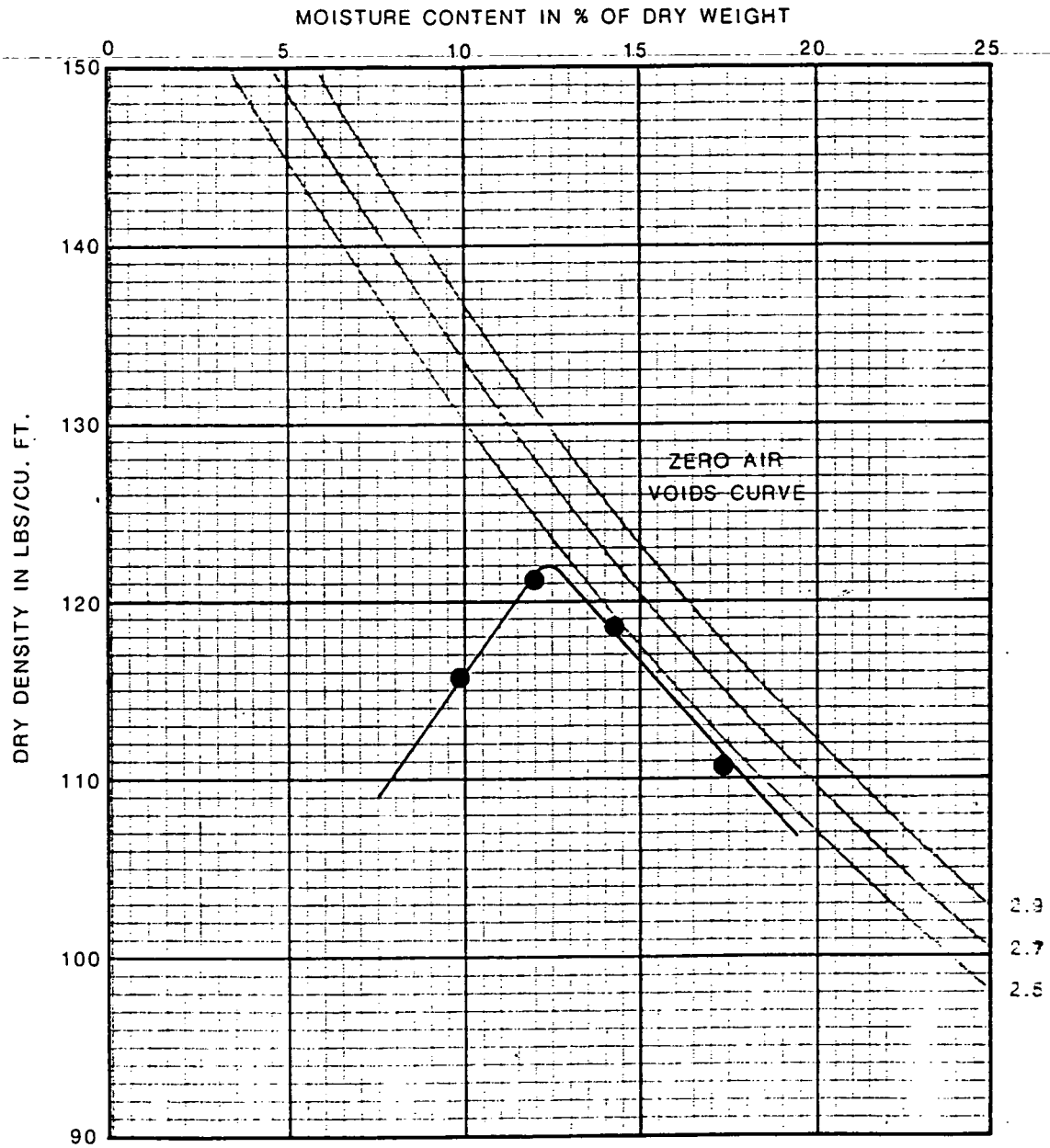
Soil Brown and Gray Lean Clay with Sand (CL)

Location Proposed On-Site Disposal Cell (PO-101)

Optimum Moisture Content 12.4%

Maximum Dry Density 122.3 pcf

Method of Compaction ASTM D 698, Method A



File

000255

COMPACTION TEST DATA

ADVANCED TERRA TESTING

Sample No. G2-209 Depth 0 - 25 Elevation _____

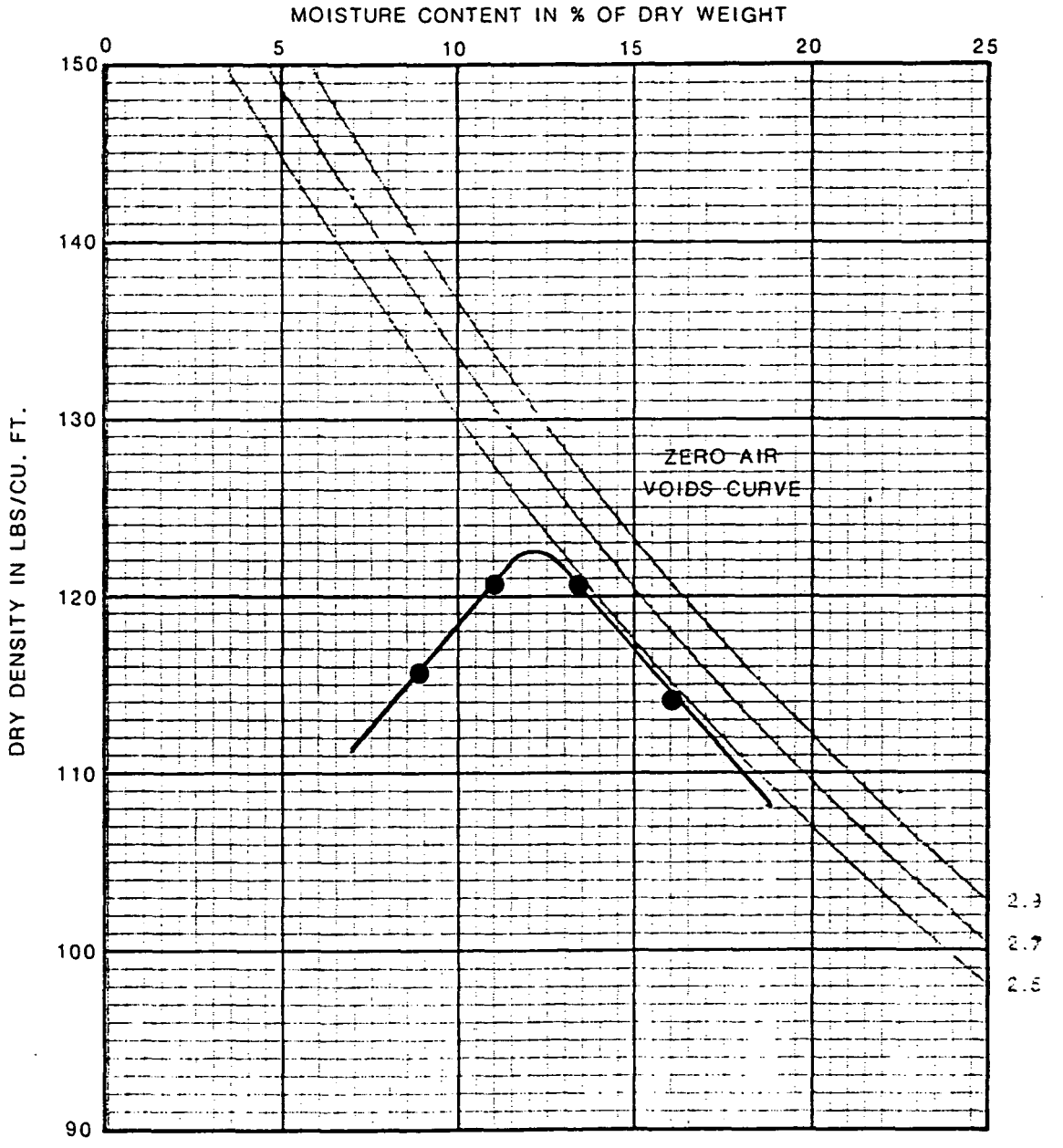
Soil Brown and Gray Sandy Lean Clay (CL)

Location Proposed On-Site Disposal Cell (PO-101)

Optimum Moisture Content 12.3%

Maximum Dry Density 122.3 pcf

Method of Compaction ASTM D 698, Method A



File _____

COMPACTION TEST DATA

000256

ADVANCED TERRA TESTING

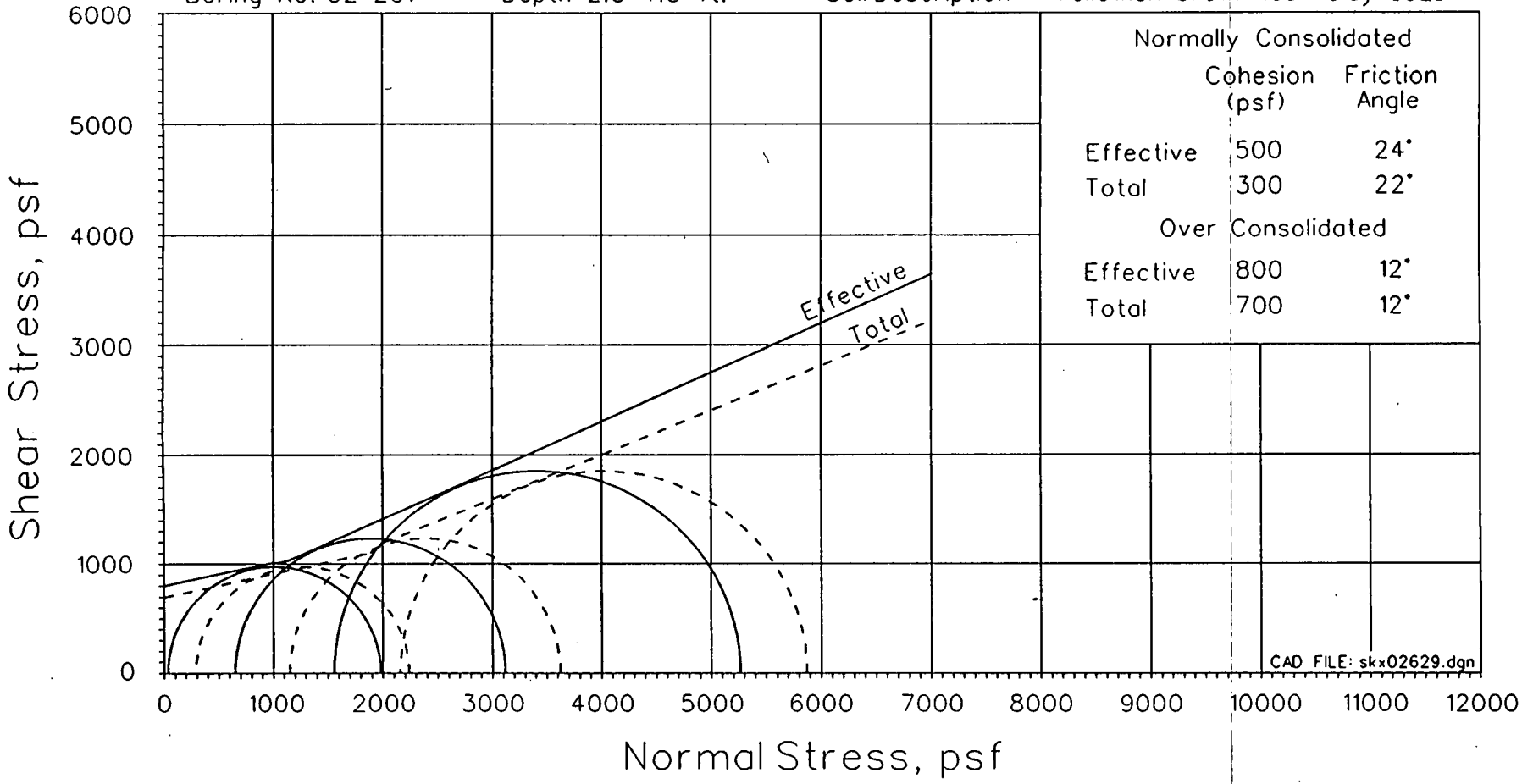
APPENDIX D

MOHR STRENGTH ENVELOPES

000257

Triaxial Compression Test Report

Boring No. G2-201 Depth 2.5-4.5 ft. Soil Description - Yellowish brown lean clay [CL]

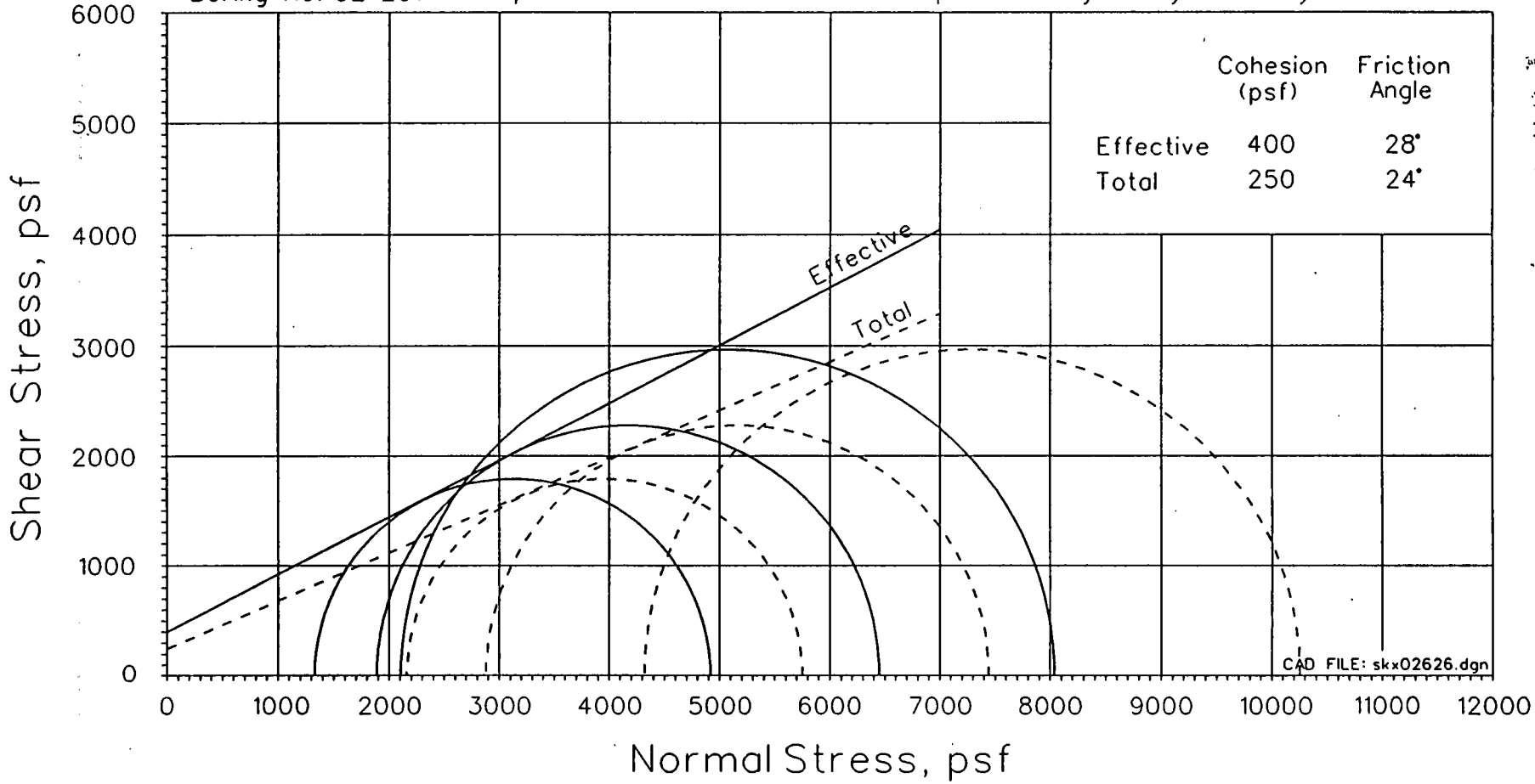


Type of Test: CU w/pp Sample Type: Insitu

Boring No.	Depth (feet)	Stage	Moisture Content (%) Initial	Moisture Content (%) Final	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Axial Strain (%)	Deviator Stress (psf)	Pore Pressure (psf)	Effective Confining Pressure ($sigma_3$) (psf)	Major Principal Stress ($sigma_1$) (psf)	Principal Stress Ratio
G2-201	2.5-4.5	1	18.2	27.5	119.4	101.1	0.33	1953	259	29	1982	68.82
		2	17.7	25.7	120.9	102.8	1.37	2472	504	648	3120	4.82
		3	20.4	24.7	130.2	108.2	3.33	3711	605	1555	5266	3.39

Triaxial Compression Test Report

Boring No. G2-201 Depth 22.5-24.5 ft. Soil Description - Gray sandy lean clay [CL]



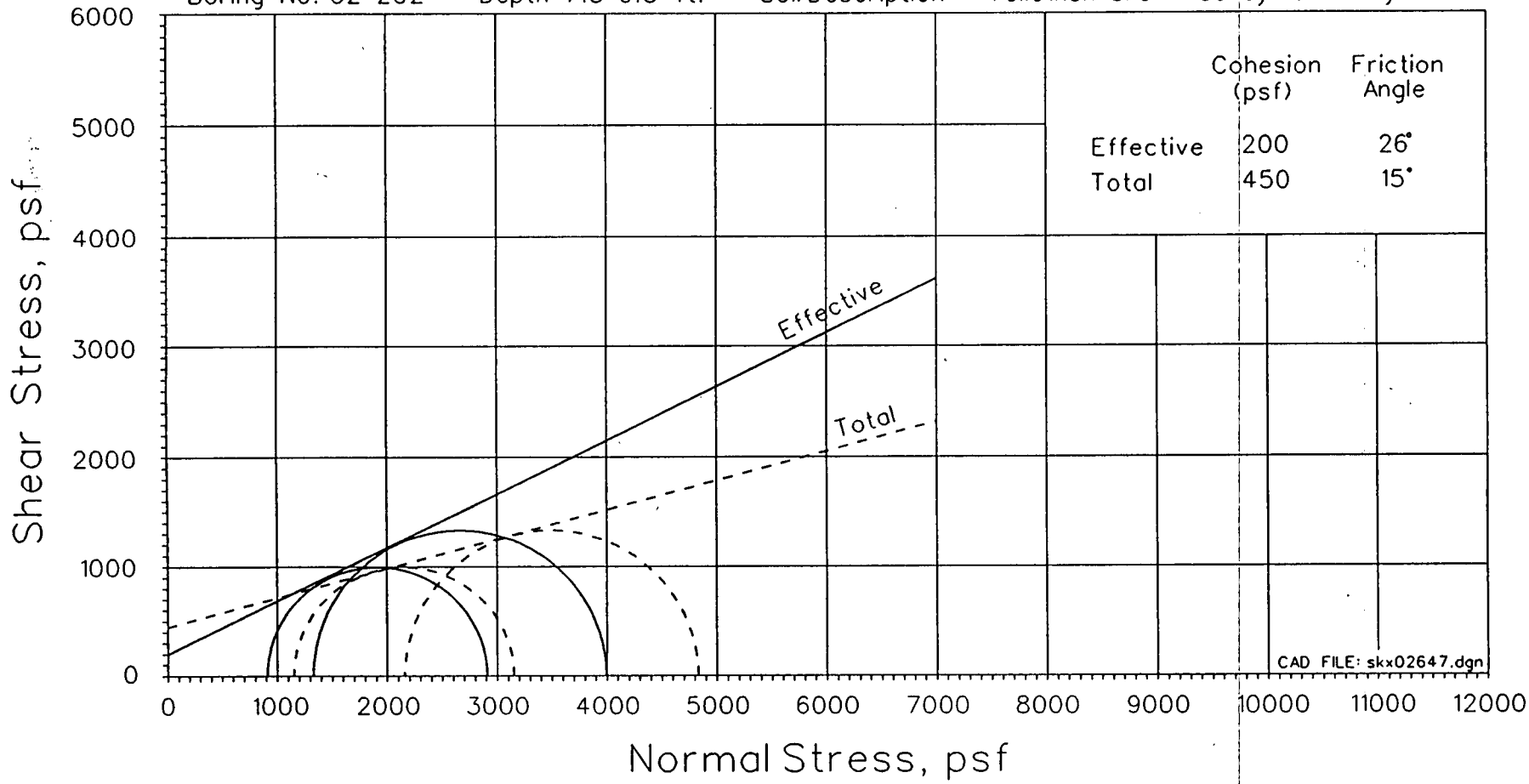
Type of Test: CU w/pp Sample Type: Insitu

Boring No.	Depth (feet)	Stage	Moisture Content (%) Initial	Moisture Content (%) Final	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Axial Strain (%)	Deviator Stress (psf)	Pore Pressure (psf)	Effective Confining Pressure ($sigma_3$) (psf)	Major Principal Stress ($sigma_1$) (psf)	Principal Stress Ratio
G2-201	22.5-24.5	1	12.6	12.2	143.7	127.6	6.17	3595	835	1325	4919	3.71
		2	13.0	12.1	143.4	126.9	5.14	4566	994	1886	6453	3.42
		3	13.8	12.5	142.4	125.2	6.06	5938	2218	2102	8041	3.82

000259

Triaxial Compression Test Report

Boring No. G2-202 Depth 7.5-9.5 ft. Soil Description - Yellowish brown sandy lean clay [CL]



Type of Test: CU w/pp Sample Type: Insitu

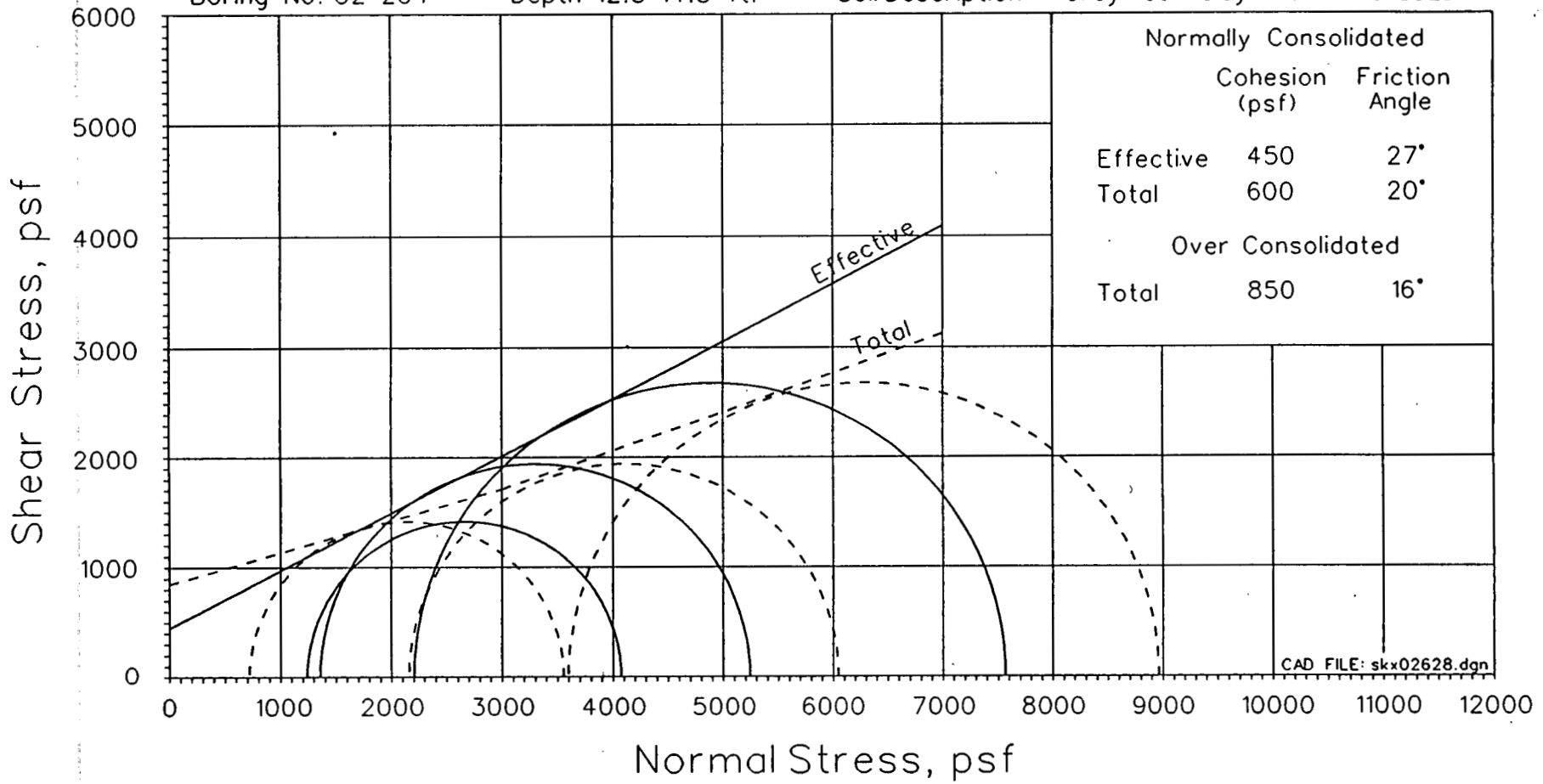
Boring No.	Depth (feet)	Stage	Moisture Content (%)		Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Axial Strain (%)	Deviator Stress (psf)	Pore Pressure (psf)	Effective Confining Pressure ($sigma_3$) (psf)	Major Principal Stress ($sigma_1$) (psf)	Principal Stress Ratio
			Initial	Final								
G2-202	7.5-9.5	1	14.2	14.4	139.6	122.3	3.60	2673	835	1325	3997	3.02
		2	14.1	14.7	142.4	124.8	0.96	2001	245	907	2908	3.21

002260

1861

Triaxial Compression Test Report

Boring No. G2-204 Depth 12.5-14.5 ft. Soil Description - Gray lean clay with sand [CL]

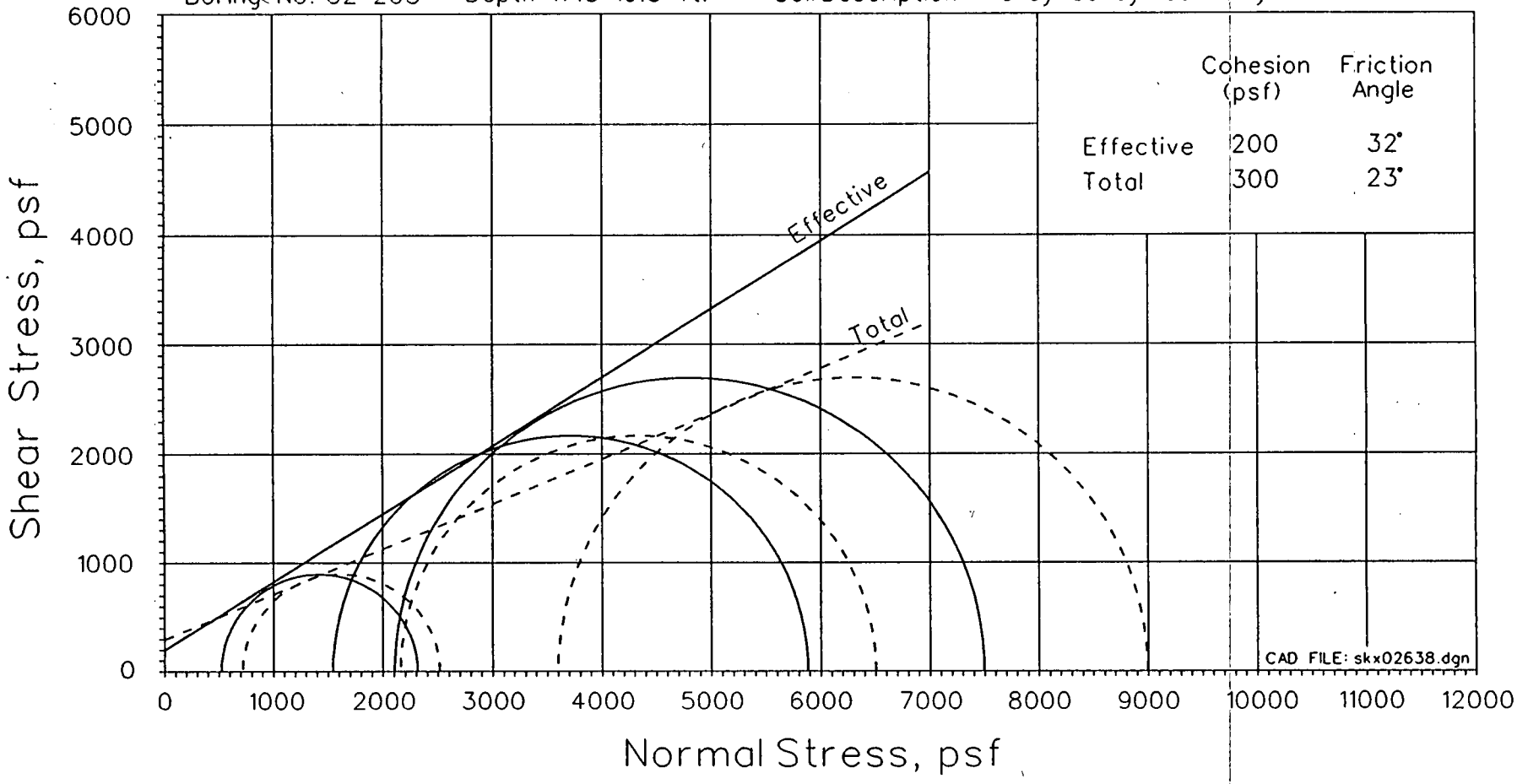


Type of Test: CU w/pp Sample Type: Insitu

Boring No.	Depth (feet)	Stage	Moisture Content (%) Initial	Moisture Content (%) Final	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Axial Strain (%)	Deviator Stress (psf)	Pore Pressure (psf)	Effective Confining Pressure ($sigma_3$) (psf)	Major Principal Stress ($sigma_1$) (psf)	Principal Stress Ratio
G2-204	12.5-14.5	1	12.5	13.2	142.9	127.0	6.18	2838	-518	1238	4076	3.29
		2	12.9	12.8	144.0	127.6	3.56	3888	806	1354	5242	3.87
		3	12.7	12.1	145.9	129.5	4.43	5366	1397	2203	7569	3.44

Triaxial Compression Test Report

Boring No. G2-205 Depth 17.5-19.5 ft. Soil Description - Gray sandy lean clay [CL]



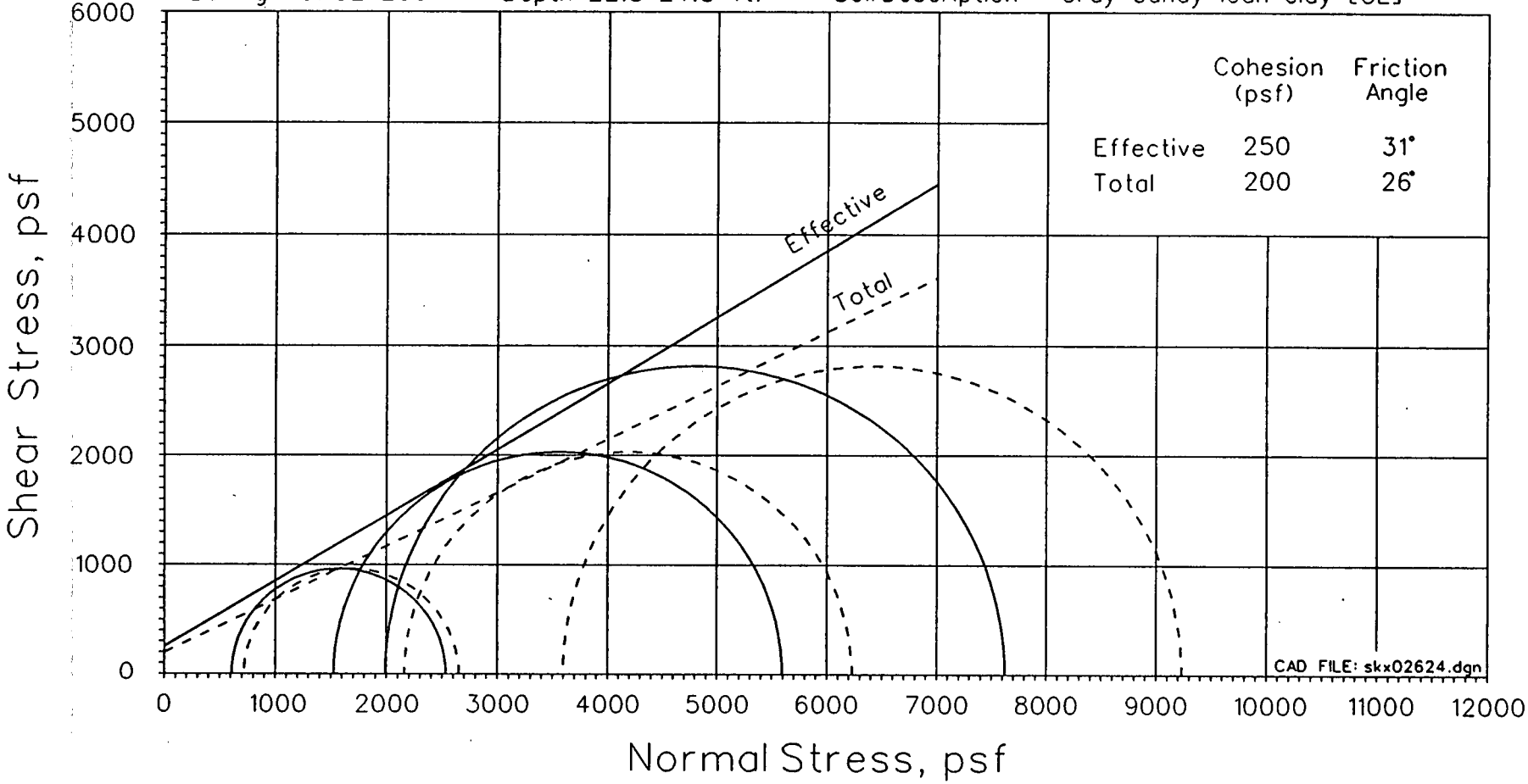
Type of Test: CU w/pp Sample Type: Insitu

Boring No.	Depth (feet)	Stage	Moisture Content (%)		Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Axial Strain (%)	Deviator Stress (psf)	Pore Pressure (psf)	Effective Confining Pressure ($sigma_3$) (psf)	Major Principal Stress ($sigma_1$) (psf)	Principal Stress Ratio
			Initial	Final								
G2-205	17.5-19.5	1	12.2	12.6	143.3	127.7	2.68	1797	202	518	2316	4.47
		2	13.0	12.5	143.1	126.6	6.75	4344	619	1541	5885	3.82
		3	12.6	12.6	144.4	128.2	5.97	5395	1498	2102	7498	3.57

000262

Triaxial Compression Test Report

Boring No. G2-206 Depth 22.5-24.5 ft. Soil Description - Gray sandy lean clay [CL]



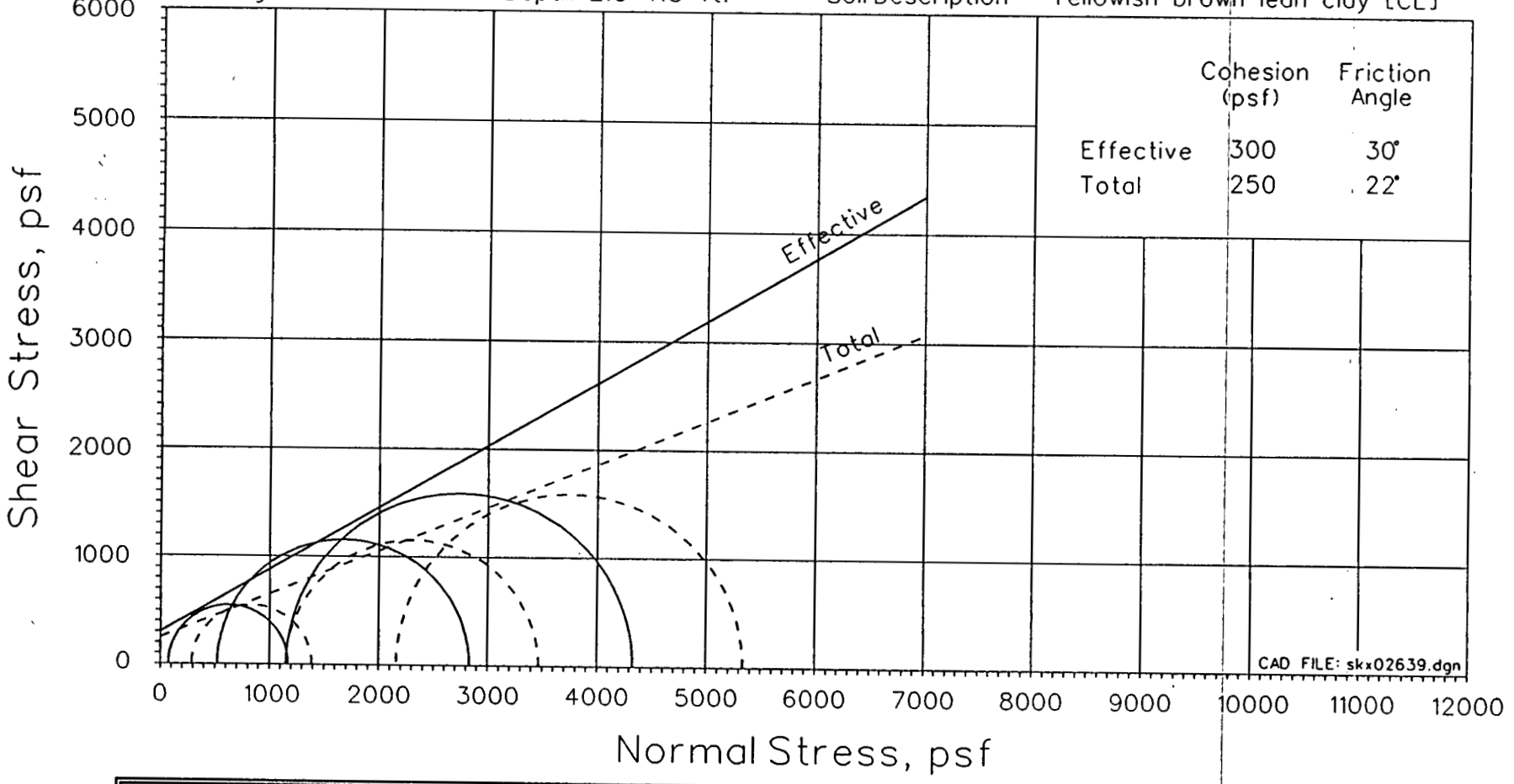
Type of Test: CU w/pp Sample Type: Insitu

Boring No.	Depth (feet)	Stage	Moisture Content (%) Initial	Moisture Content (%) Final	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Axial Strain (%)	Deviator Stress (psf)	Pore Pressure (psf)	Effective Confining Pressure ($sigma_3$) (psf)	Major Principal Stress ($sigma_1$) (psf)	Principal Stress Ratio
G2-206	22.5-24.5	1	12.8	13.0	143.5	127.2	2.51	1932	115	605	2537	4.20
		2	12.7	12.4	144.2	128.0	5.87	4072	634	1526	5598	3.67
		3	12.7	12.1	144.4	128.1	6.92	5638	1613	1987	7625	3.84

000263

Triaxial Compression Test Report

Boring No. G2-208 Depth 2.5-4.5 ft. Soil Description - Yellowish brown lean clay [CL]

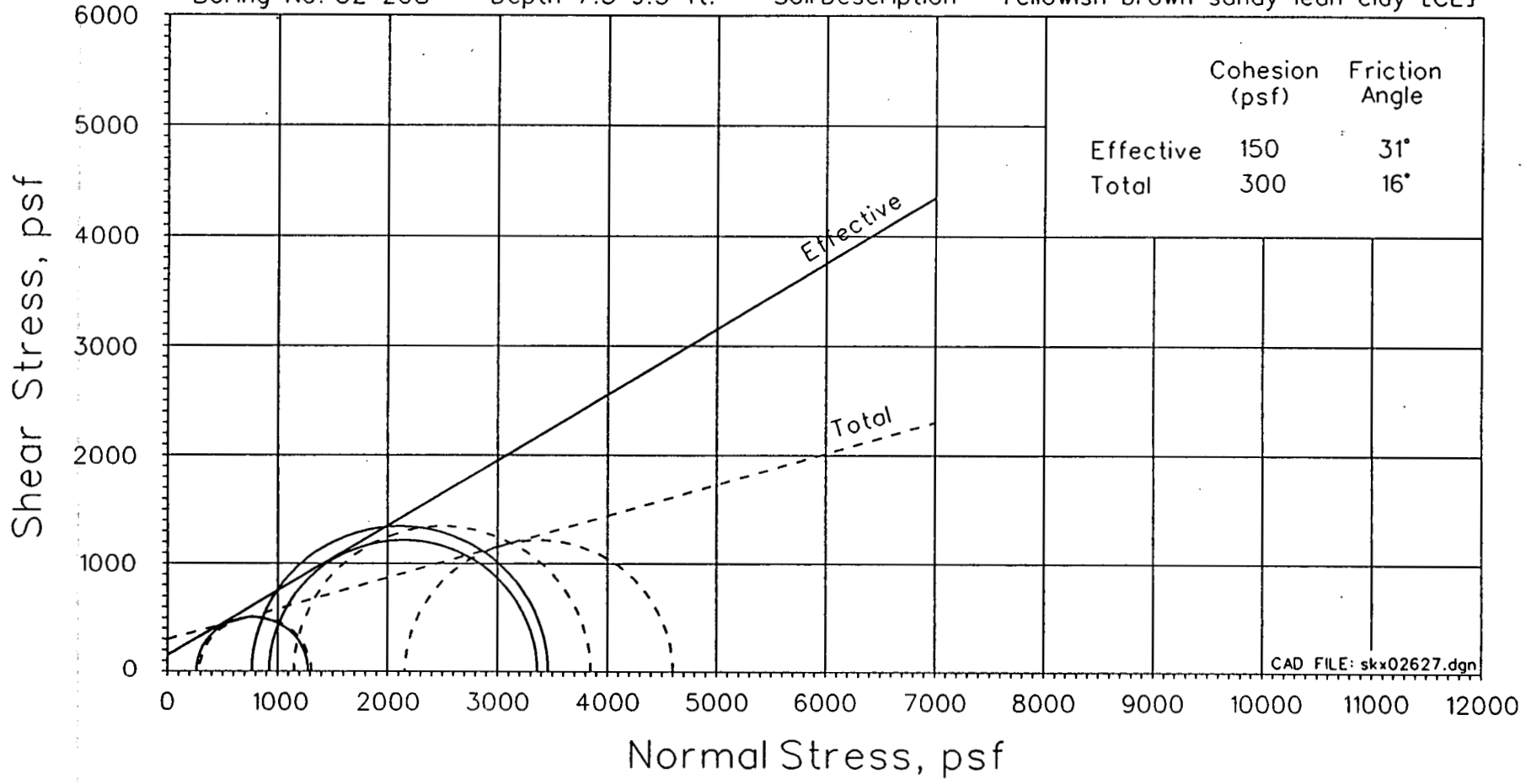


Type of Test: CU w/pp Sample Type: Insitu

Boring No.	Depth (feet)	Stage	Moisture Content (%) Initial	Moisture Content (%) Final	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Axial Strain (%)	Deviator Stress (psf)	Pore Pressure (psf)	Effective Confining Pressure ($sigma_3$) (psf)	Major Principal Stress ($sigma_1$) (psf)	Principal Stress Ratio
G2-208	2.5-4.5	1	22.9	27.3	122.6	99.7	0.70	1103	216	72	1175	16.31
		2	21.8	28.8	120.7	99.1	2.01	2317	634	518	2835	5.47
		3	25.4	27.2	123.0	98.1	5.09	3182	1008	1152	4334	3.76

Triaxial Compression Test Report

Boring No. G2-208 Depth 7.5-9.5 ft. Soil Description - Yellowish brown sandy lean clay [CL]

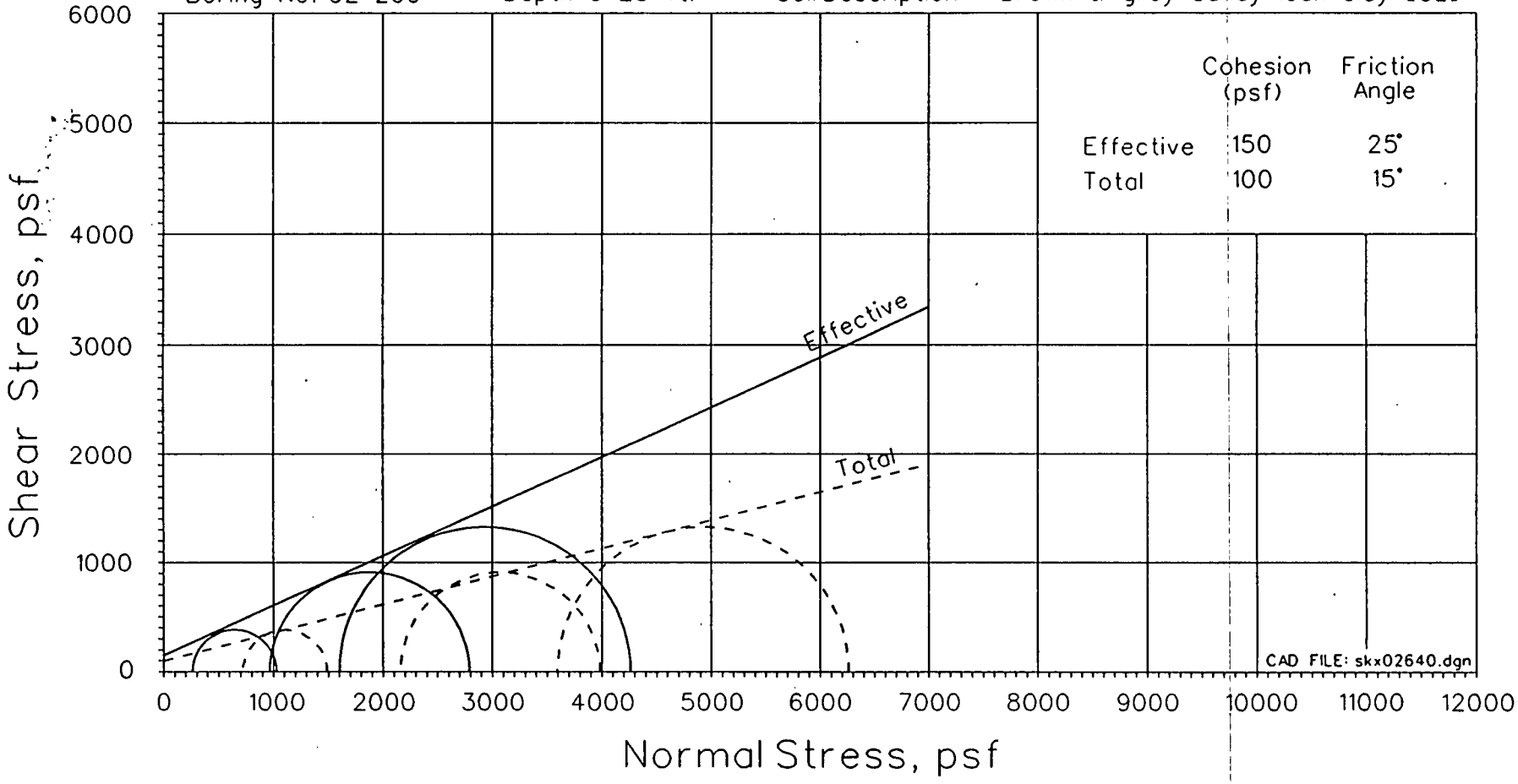


Type of Test: CU w/pp Sample Type: Insitu

Boring No.	Depth (feet)	Stage	Moisture Content (%)		Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Axial Strain (%)	Deviator Stress (psf)	Pore Pressure (psf)	Effective Confining Pressure ($sigma_3$) (psf)	Major Principal Stress ($sigma_1$) (psf)	Principal Stress Ratio
			Initial	Final								
G2-208	7.5-9.5	1	13.5	14.5	140.0	123.4	1.00	1024	29	259	1283	4.95
		2	14.3	13.7	143.4	125.4	2.55	2700	389	763	3463	4.54
		3	23.4	23.0	126.6	102.6	5.10	2444	1238	922	3365	3.65

Triaxial Compression Test Report

Boring No. G2-209 Depth 0-25 ft. Soil Description - Brown & gray sandy lean clay [CL]

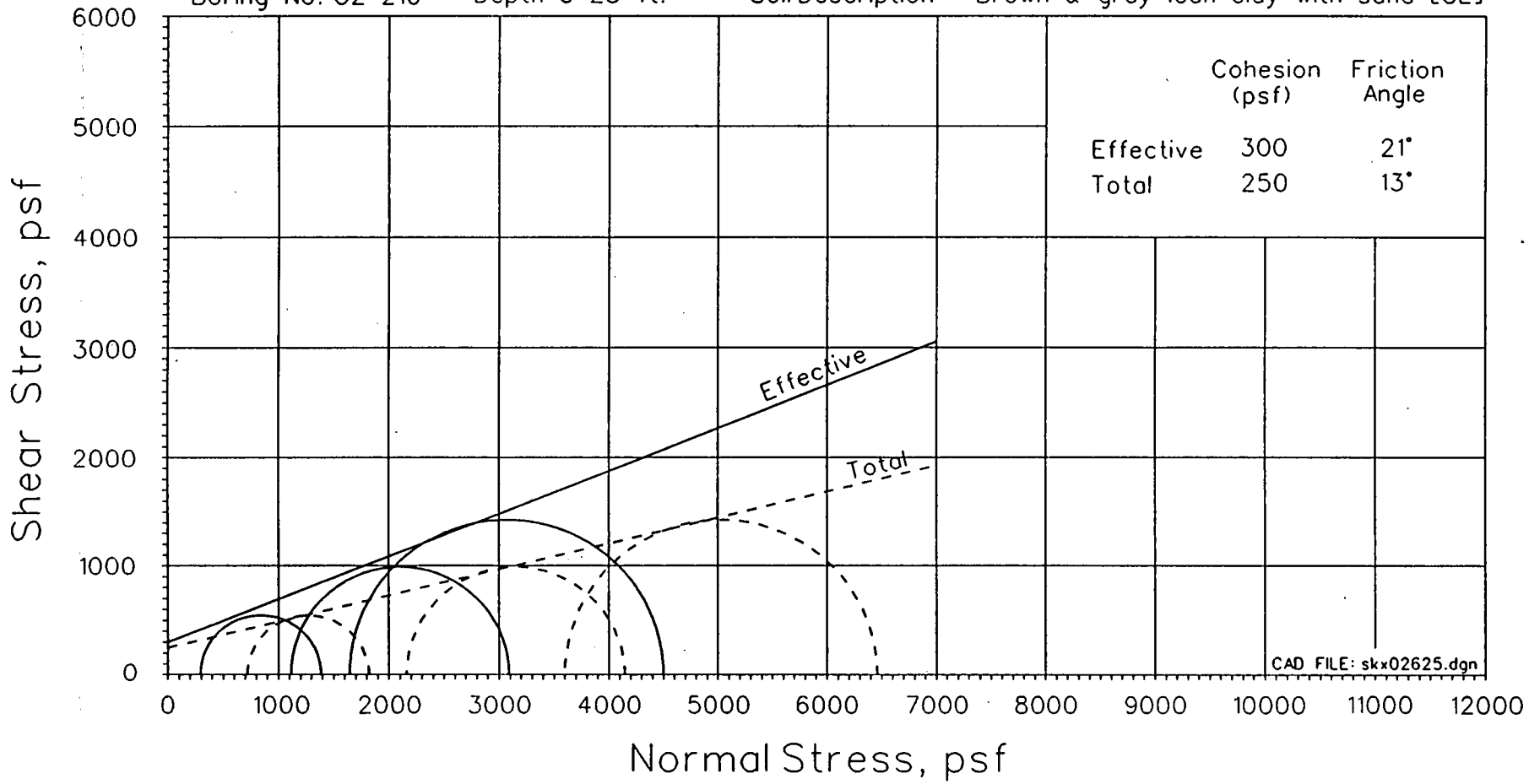


Type of Test: CU w/pp Sample Type: Remold

Boring No.	Depth (feet)	Stage	Moisture Content (%) Initial	Moisture Content (%) Final	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Axial Strain (%)	Deviator Stress (psf)	Pore Pressure (psf)	Effective Confining Pressure ($sigma_3$) (psf)	Major Principal Stress ($sigma_1$) (psf)	Principal Stress Ratio
G2-209	0-25	1	12.0	17.6	131.4	117.3	3.36	770	461	259	1030	3.97
		2	12.1	16.0	131.6	129.4	9.33	1827	1195	965	2791	2.89
		3	12.1	15.2	130.6	116.5	10.12	2665	2002	1598	4263	2.67

Triaxial Compression Test Report

Boring No. G2-210 Depth 0-25 ft. Soil Description - Brown & gray lean clay with sand [CL]



Type of Test: CU w/pp Sample Type: Remold

Boring No.	Depth (feet)	Stage	Moisture Content (%)		Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Axial Strain (%)	Deviator Stress (psf)	Pore Pressure (psf)	Effective Confining Pressure ($sigma_3$) (psf)	Major Principal Stress ($sigma_1$) (psf)	Principal Stress Ratio
			Initial	Final								
G2-210	0-25	1	12.0	18.1	131.4	117.3	1.67	1102	432	288	1390	4.83
		2	12.0	16.1	133.1	118.9	10.28	1986	1051	1109	3095	2.79
		3	11.9	14.8	133.2	119.1	6.86	2861	1958	1642	4503	2.74

002267

5861

APPENDIX E

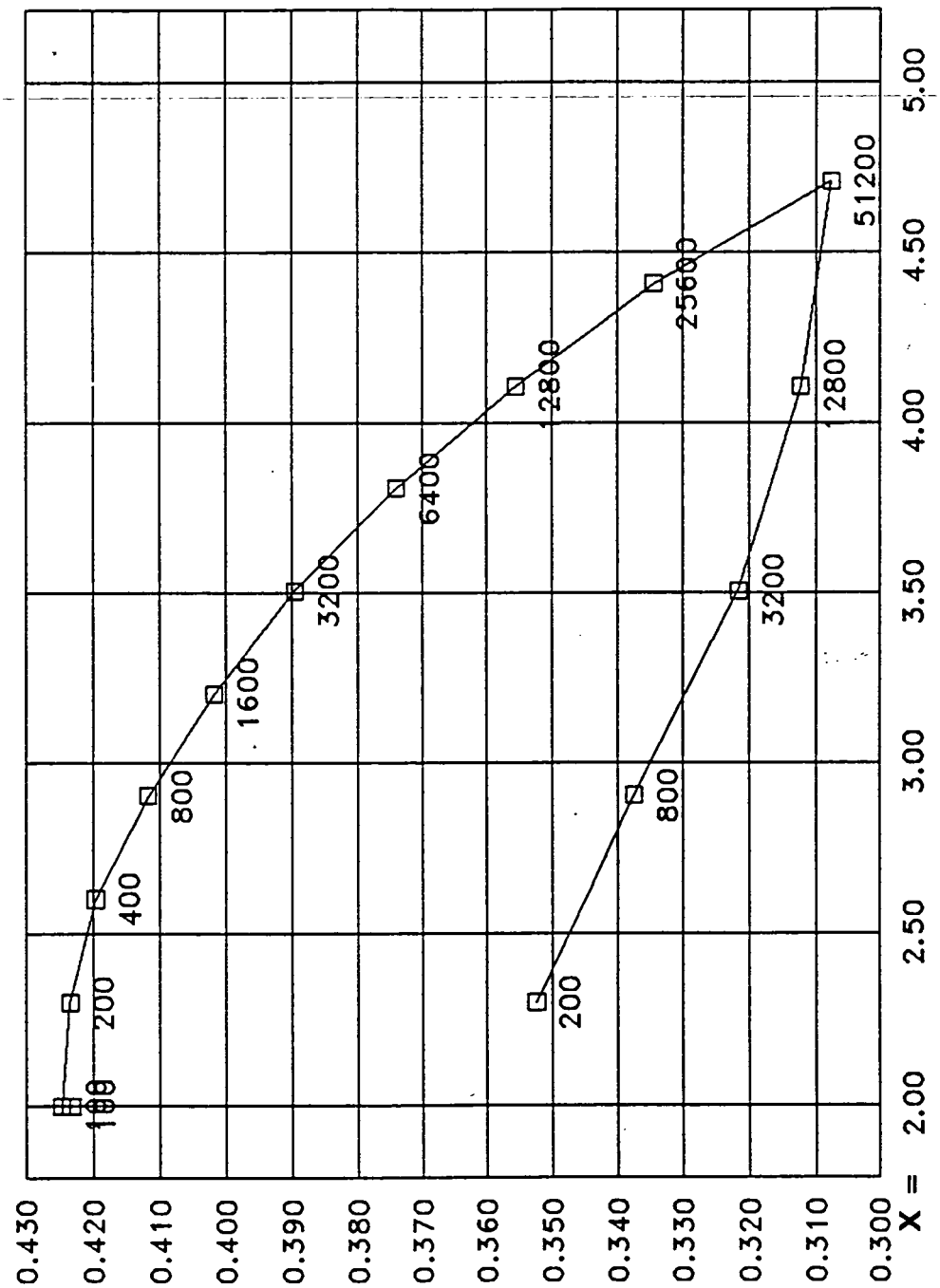
CONSOLIDATION TEST RESULTS

000268

5861

CONSOLIDATION TEST DATA

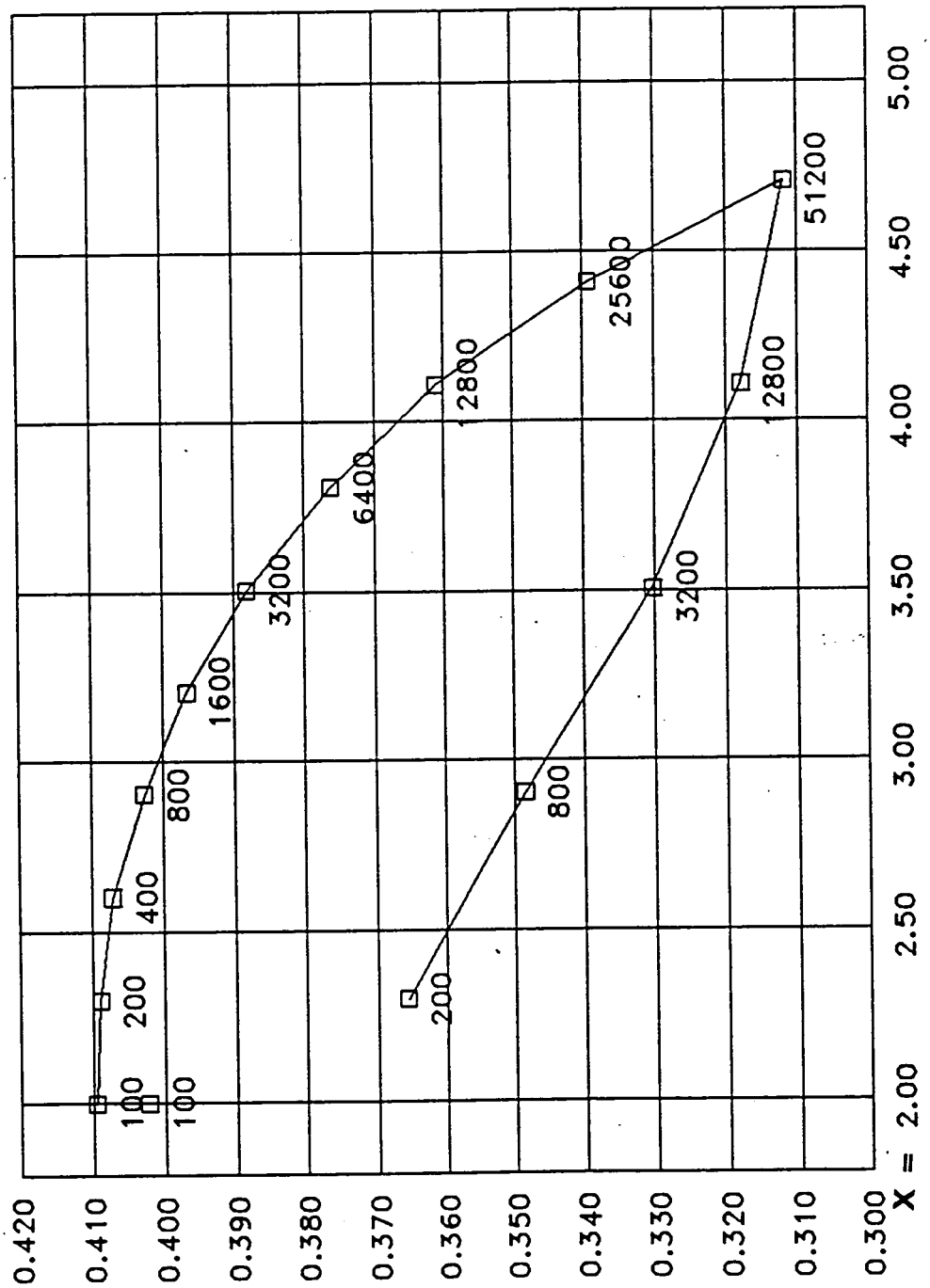
G2-203 931110-139 10A @22.5-24.5'



000269

CONSOLIDATION TEST DATA

G2-204 931110-123 4A @7.5-9.5'



LOG P = X

P = Pressure (psf)

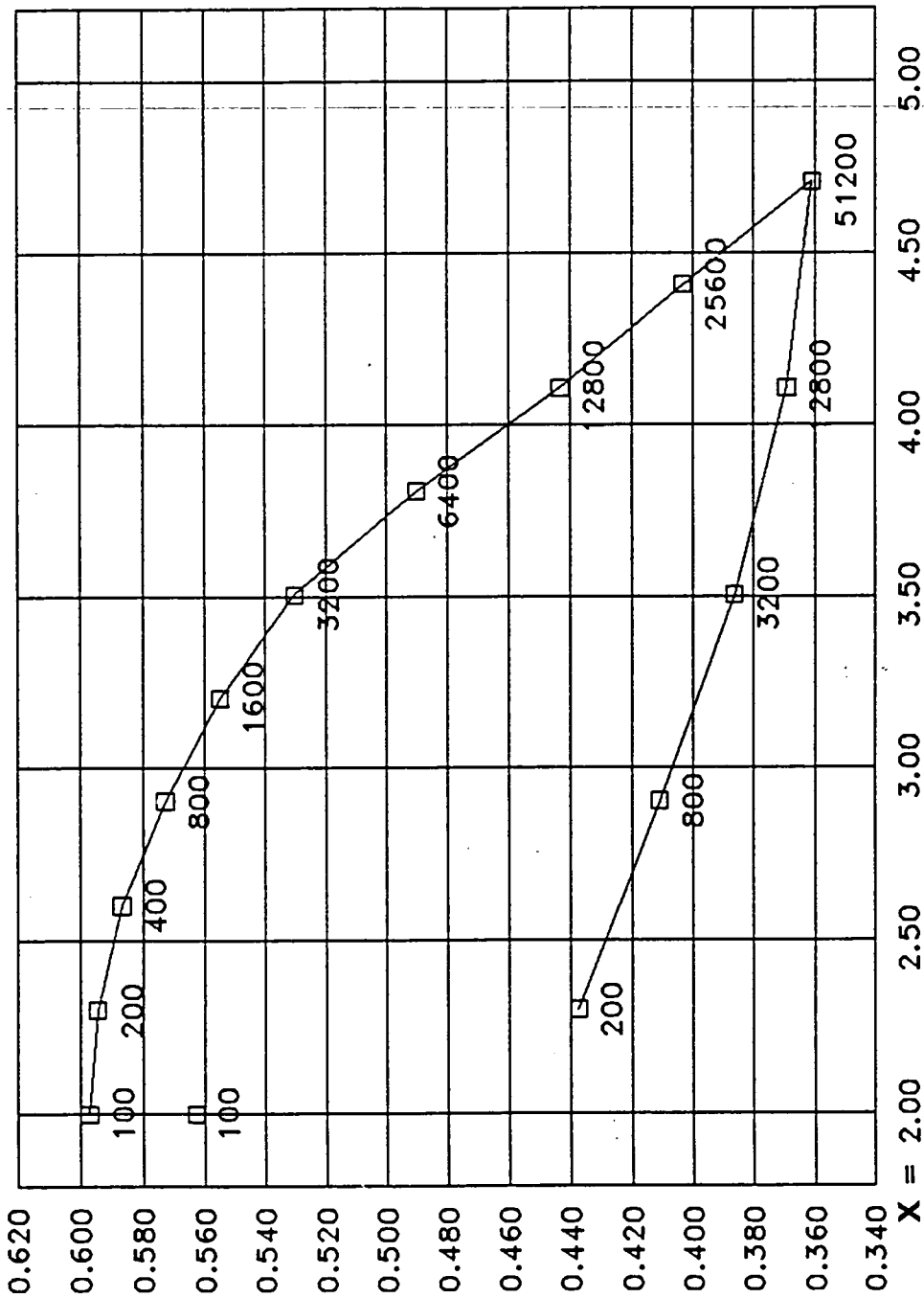
VOID RATIO e

000270

5861

CONSOLIDATION TEST DATA

G2-206 931110-111 2A @2.5-4.5'



000271

VOID RATIO e

APPENDIX F

ENVIRONMENTAL LABORATORY TEST RESULTS

000272

APPENDIX F

PESTICIDE/HERBICIDE RESULTS FROM SURFACE SOIL SAMPLES

This Appendix presents the results of sampling for pesticides and herbicides in surface soil samples from the vicinity of the proposed OU2 disposal cell. These data were provided by FERMCO. Following the sampling results tables are two tables from the draft OU2 Remedial Investigation report which explain the validation qualifiers and validation levels on the sampling results.

The pesticides and herbicides analyzed for were below detectable limits in all samples except as follows: 4,4'-DDT was detected in three samples in concentrations ranging from 0.7 to 1 ug/kg; Endosulfan Sulfate was detected in four samples in concentrations ranging from 1.1 to 1.6 ug/kg; and Endrin was detected in two samples in concentrations ranging from 0.8 to 1.5 ug/kg.

Pesticide/Herbicide Results
Surface Soil Samples
Proposed OU2 Disposal Cell Vicinity

Sample	Parameter	Sample Date	Boring	QA Type	Result	Units	Validation Qualifier	Validation Level
200026066	2,4,5-TP (Silvex)	12/01/93	G2-202	NORMAL	9.4	ug/kg	U	B
200026065	2,4,5-TP (Silvex)	12/01/93	G2-204	NORMAL	9.4	ug/kg	U	B
200026070	2,4,5-TP (Silvex)	12/01/93	G2-209	NORMAL	9.4	ug/kg	UJ	B
200026063	2,4,5-TP (Silvex)	12/01/93	G2-201	NORMAL	9.4	ug/kg	U	B
200026068	2,4,5-TP (Silvex)	12/01/93	G2-206	NORMAL	9.4	ug/kg	U	B
200026069	2,4,5-TP (Silvex)	12/01/93	G2-207	NORMAL	9.4	ug/kg	UJ	B
200026067	2,4,5-TP (Silvex)	12/01/93	G2-208	NORMAL	9.4	ug/kg	U	B
200026060	2,4,5-TP (Silvex)	12/01/93	G2-205	NORMAL	9.4	ug/kg	U	B
200026064	2,4,5-TP (Silvex)	12/01/93	G2-203	NORMAL	9.4	ug/kg	U	B
200026064	2,4-D	12/01/93	G2-203	NORMAL	43.6	ug/kg	U	B
200026069	2,4-D	12/01/93	G2-207	NORMAL	43.6	ug/kg	UJ	B
200026065	2,4-D	12/01/93	G2-204	NORMAL	43.6	ug/kg	U	B
200026066	2,4-D	12/01/93	G2-202	NORMAL	43.6	ug/kg	U	B
200026068	2,4-D	12/01/93	G2-206	NORMAL	43.6	ug/kg	U	B
200026070	2,4-D	12/01/93	G2-209	NORMAL	43.6	ug/kg	UJ	B
200026067	2,4-D	12/01/93	G2-208	NORMAL	43.6	ug/kg	U	B
200026060	2,4-D	12/01/93	G2-205	NORMAL	43.6	ug/kg	U	B
200026063	2,4-D	12/01/93	G2-201	NORMAL	43.6	ug/kg	U	B
200026079	4,4'-DDD	12/01/93	G2-209	NORMAL	4.3	ug/kg	U	C
200026074	4,4'-DDD	12/01/93	G2-204	NORMAL	4.5	ug/kg	U	C
200026073	4,4'-DDD	12/01/93	G2-203	NORMAL	4.5	ug/kg	U	C
200026061	4,4'-DDD	12/01/93	G2-205	NORMAL	4.6	ug/kg	U	C
200026075	4,4'-DDD	12/01/93	G2-202	NORMAL	4.7	ug/kg	U	C
200026078	4,4'-DDD	12/01/93	G2-207	NORMAL	4.7	ug/kg	U	C
200026077	4,4'-DDD	12/01/93	G2-206	NORMAL	4.7	ug/kg	U	C
200026072	4,4'-DDD	12/01/93	G2-201	NORMAL	5	ug/kg	U	C
200026076	4,4'-DDD	12/01/93	G2-208	NORMAL	5	ug/kg	U	C
200026079	4,4'-DDE	12/01/93	G2-209	NORMAL	4.3	ug/kg	U	C
200026074	4,4'-DDE	12/01/93	G2-204	NORMAL	4.5	ug/kg	U	C
200026073	4,4'-DDE	12/01/93	G2-203	NORMAL	4.5	ug/kg	U	C

Pesticide/Herbicide Results
Surface Soil Samples
Proposed OU2 Disposal Cell Vicinity

Sample	Parameter	Sample Date	Boring	QA Type	Result	Units	Validation Qualifier	Validation Level
200026061	4,4'-DDE	12/01/93	G2-205	NORMAL	4.6	ug/kg	U	C
200026078	4,4'-DDE	12/01/93	G2-207	NORMAL	4.7	ug/kg	U	C
200026077	4,4'-DDE	12/01/93	G2-206	NORMAL	4.7	ug/kg	U	C
200026075	4,4'-DDE	12/01/93	G2-202	NORMAL	4.7	ug/kg	U	C
200026072	4,4'-DDE	12/01/93	G2-201	NORMAL	5	ug/kg	U	C
200026076	4,4'-DDE	12/01/93	G2-208	NORMAL	5	ug/kg	U	C
200026075	4,4'-DDT	12/01/93	G2-202	NORMAL	0.7	ug/kg	J	C
200026074	4,4'-DDT	12/01/93	G2-204	NORMAL	0.82	ug/kg	J	C
200026073	4,4'-DDT	12/01/93	G2-203	NORMAL	0.88	ug/kg	J	C
200026078	4,4'-DDT	12/01/93	G2-207	NORMAL	1	ug/kg	J	C
200026079	4,4'-DDT	12/01/93	G2-209	NORMAL	4.3	ug/kg	U	C
200026061	4,4'-DDT	12/01/93	G2-205	NORMAL	4.6	ug/kg	U	C
200026077	4,4'-DDT	12/01/93	G2-206	NORMAL	4.7	ug/kg	U	C
200026076	4,4'-DDT	12/01/93	G2-208	NORMAL	5	ug/kg	U	C
200026072	4,4'-DDT	12/01/93	G2-201	NORMAL	5	ug/kg	U	C
200026079	Aldrin	12/01/93	G2-209	NORMAL	2.2	ug/kg	U	C
200026074	Aldrin	12/01/93	G2-204	NORMAL	2.3	ug/kg	U	C
200026073	Aldrin	12/01/93	G2-203	NORMAL	2.3	ug/kg	U	C
200026077	Aldrin	12/01/93	G2-206	NORMAL	2.4	ug/kg	U	C
200026078	Aldrin	12/01/93	G2-207	NORMAL	2.4	ug/kg	U	C
200026075	Aldrin	12/01/93	G2-202	NORMAL	2.4	ug/kg	U	C
200026061	Aldrin	12/01/93	G2-205	NORMAL	2.4	ug/kg	U	C
200026076	Aldrin	12/01/93	G2-208	NORMAL	2.6	ug/kg	U	C
200026072	Aldrin	12/01/93	G2-201	NORMAL	2.6	ug/kg	U	C
200026079	alpha-BHC	12/01/93	G2-209	NORMAL	2.2	ug/kg	U	C
200026073	alpha-BHC	12/01/93	G2-203	NORMAL	2.3	ug/kg	U	C
200026074	alpha-BHC	12/01/93	G2-204	NORMAL	2.3	ug/kg	U	C
200026078	alpha-BHC	12/01/93	G2-207	NORMAL	2.4	ug/kg	U	C
200026061	alpha-BHC	12/01/93	G2-205	NORMAL	2.4	ug/kg	U	C
200026077	alpha-BHC	12/01/93	G2-206	NORMAL	2.4	ug/kg	U	C

Pesticide/Herbicide Results
Surface Soil Samples
Proposed OU2 Disposal Cell Vicinity

Sample	Parameter	Sample Date	Boring	QA Type	Result	Units	Validation Qualifier	Validation Level
200026075	alpha-BHC	12/01/93	G2-202	NORMAL	2.4	ug/kg	U	C
200026076	alpha-BHC	12/01/93	G2-208	NORMAL	2.6	ug/kg	U	C
200026072	alpha-BHC	12/01/93	G2-201	NORMAL	2.6	ug/kg	U	C
200026079	alpha-Chlordane	12/01/93	G2-209	NORMAL	2.2	ug/kg	U	C
200026074	alpha-Chlordane	12/01/93	G2-204	NORMAL	2.3	ug/kg	U	C
200026073	alpha-Chlordane	12/01/93	G2-203	NORMAL	2.3	ug/kg	U	C
200026061	alpha-Chlordane	12/01/93	G2-205	NORMAL	2.4	ug/kg	U	C
200026078	alpha-Chlordane	12/01/93	G2-207	NORMAL	2.4	ug/kg	U	C
200026075	alpha-Chlordane	12/01/93	G2-202	NORMAL	2.4	ug/kg	U	C
200026077	alpha-Chlordane	12/01/93	G2-206	NORMAL	2.4	ug/kg	U	C
200026072	alpha-Chlordane	12/01/93	G2-201	NORMAL	2.6	ug/kg	U	C
200026076	alpha-Chlordane	12/01/93	G2-208	NORMAL	2.6	ug/kg	U	C
200026079	Aroclor-1016	12/01/93	G2-209	NORMAL	43	ug/kg	U	C
200026073	Aroclor-1016	12/01/93	G2-203	NORMAL	45	ug/kg	U	C
200026074	Aroclor-1016	12/01/93	G2-204	NORMAL	45	ug/kg	U	C
200026061	Aroclor-1016	12/01/93	G2-205	NORMAL	46	ug/kg	U	C
200026077	Aroclor-1016	12/01/93	G2-206	NORMAL	47	ug/kg	U	C
200026078	Aroclor-1016	12/01/93	G2-207	NORMAL	47	ug/kg	U	C
200026075	Aroclor-1016	12/01/93	G2-202	NORMAL	47	ug/kg	U	C
200026076	Aroclor-1016	12/01/93	G2-208	NORMAL	50	ug/kg	U	C
200026072	Aroclor-1016	12/01/93	G2-201	NORMAL	50	ug/kg	U	C
200026079	Aroclor-1221	12/01/93	G2-209	NORMAL	88	ug/kg	U	C
200026073	Aroclor-1221	12/01/93	G2-203	NORMAL	91	ug/kg	U	C
200026074	Aroclor-1221	12/01/93	G2-204	NORMAL	91	ug/kg	U	C
200026061	Aroclor-1221	12/01/93	G2-205	NORMAL	94	ug/kg	U	C
200026077	Aroclor-1221	12/01/93	G2-206	NORMAL	96	ug/kg	U	C
200026078	Aroclor-1221	12/01/93	G2-207	NORMAL	96	ug/kg	U	C
200026075	Aroclor-1221	12/01/93	G2-202	NORMAL	96	ug/kg	U	C
200026076	Aroclor-1221	12/01/93	G2-208	NORMAL	100	ug/kg	U	C
200026072	Aroclor-1221	12/01/93	G2-201	NORMAL	100	ug/kg	U	C

Pesticide/Herbicide Results
Surface Soil Samples
Proposed OU2 Disposal Cell Vicinity

Sample	Parameter	Sample Date	Boring	QA Type	Result	Units	Validation Qualifier	Validation Level
200026079	Aroclor-1232	12/01/93	G2-209	NORMAL	43	ug/kg	U	C
200026073	Aroclor-1232	12/01/93	G2-203	NORMAL	45	ug/kg	U	C
200026074	Aroclor-1232	12/01/93	G2-204	NORMAL	45	ug/kg	U	C
200026061	Aroclor-1232	12/01/93	G2-205	NORMAL	46	ug/kg	U	C
200026077	Aroclor-1232	12/01/93	G2-206	NORMAL	47	ug/kg	U	C
200026075	Aroclor-1232	12/01/93	G2-202	NORMAL	47	ug/kg	U	C
200026078	Aroclor-1232	12/01/93	G2-207	NORMAL	47	ug/kg	U	C
200026076	Aroclor-1232	12/01/93	G2-208	NORMAL	50	ug/kg	U	C
200026072	Aroclor-1232	12/01/93	G2-201	NORMAL	50	ug/kg	U	C
200026079	Aroclor-1242	12/01/93	G2-209	NORMAL	43	ug/kg	U	C
200026074	Aroclor-1242	12/01/93	G2-204	NORMAL	45	ug/kg	U	C
200026073	Aroclor-1242	12/01/93	G2-203	NORMAL	45	ug/kg	U	C
200026061	Aroclor-1242	12/01/93	G2-205	NORMAL	46	ug/kg	U	C
200026078	Aroclor-1242	12/01/93	G2-207	NORMAL	47	ug/kg	U	C
200026077	Aroclor-1242	12/01/93	G2-206	NORMAL	47	ug/kg	U	C
200026075	Aroclor-1242	12/01/93	G2-202	NORMAL	47	ug/kg	U	C
200026072	Aroclor-1242	12/01/93	G2-201	NORMAL	50	ug/kg	U	C
200026076	Aroclor-1242	12/01/93	G2-208	NORMAL	50	ug/kg	U	C
200026079	Aroclor-1248	12/01/93	G2-209	NORMAL	43	ug/kg	U	C
200026074	Aroclor-1248	12/01/93	G2-204	NORMAL	45	ug/kg	U	C
200026073	Aroclor-1248	12/01/93	G2-203	NORMAL	45	ug/kg	U	C
200026061	Aroclor-1248	12/01/93	G2-205	NORMAL	46	ug/kg	U	C
200026075	Aroclor-1248	12/01/93	G2-202	NORMAL	47	ug/kg	U	C
200026078	Aroclor-1248	12/01/93	G2-207	NORMAL	47	ug/kg	U	C
200026077	Aroclor-1248	12/01/93	G2-206	NORMAL	47	ug/kg	U	C
200026076	Aroclor-1248	12/01/93	G2-208	NORMAL	50	ug/kg	U	C
200026072	Aroclor-1248	12/01/93	G2-201	NORMAL	50	ug/kg	U	C
200026079	Aroclor-1254	12/01/93	G2-209	NORMAL	43	ug/kg	U	C
200026074	Aroclor-1254	12/01/93	G2-204	NORMAL	45	ug/kg	U	C
200026073	Aroclor-1254	12/01/93	G2-203	NORMAL	45	ug/kg	U	C

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Sample	Parameter	Sample Date	Boring	QA Type	Result	Units	Validation Qualifier	Validation Level
200026061	Aroclor-1254	12/01/93	G2-205	NORMAL	46	ug/kg	U	C
200026078	Aroclor-1254	12/01/93	G2-207	NORMAL	47	ug/kg	U	C
200026075	Aroclor-1254	12/01/93	G2-202	NORMAL	47	ug/kg	U	C
200026077	Aroclor-1254	12/01/93	G2-206	NORMAL	47	ug/kg	U	C
200026072	Aroclor-1254	12/01/93	G2-201	NORMAL	50	ug/kg	U	C
200026076	Aroclor-1254	12/01/93	G2-208	NORMAL	50	ug/kg	U	C
200026079	Aroclor-1260	12/01/93	G2-209	NORMAL	43	ug/kg	U	C
200026073	Aroclor-1260	12/01/93	G2-203	NORMAL	45	ug/kg	U	C
200026074	Aroclor-1260	12/01/93	G2-204	NORMAL	45	ug/kg	U	C
200026061	Aroclor-1260	12/01/93	G2-205	NORMAL	46	ug/kg	U	C
200026077	Aroclor-1260	12/01/93	G2-206	NORMAL	47	ug/kg	U	C
200026078	Aroclor-1260	12/01/93	G2-207	NORMAL	47	ug/kg	U	C
200026075	Aroclor-1260	12/01/93	G2-202	NORMAL	47	ug/kg	U	C
200026072	Aroclor-1260	12/01/93	G2-201	NORMAL	50	ug/kg	U	C
200026076	Aroclor-1260	12/01/93	G2-208	NORMAL	50	ug/kg	U	C
200026079	beta-BHC	12/01/93	G2-209	NORMAL	2.2	ug/kg	U	C
200026074	beta-BHC	12/01/93	G2-204	NORMAL	2.3	ug/kg	U	C
200026073	beta-BHC	12/01/93	G2-203	NORMAL	2.3	ug/kg	U	C
200026078	beta-BHC	12/01/93	G2-207	NORMAL	2.4	ug/kg	U	C
200026077	beta-BHC	12/01/93	G2-206	NORMAL	2.4	ug/kg	U	C
200026061	beta-BHC	12/01/93	G2-205	NORMAL	2.4	ug/kg	U	C
200026075	beta-BHC	12/01/93	G2-202	NORMAL	2.4	ug/kg	U	C
200026072	beta-BHC	12/01/93	G2-201	NORMAL	2.6	ug/kg	U	C
200026076	beta-BHC	12/01/93	G2-208	NORMAL	2.6	ug/kg	U	C
200026079	delta-BHC	12/01/93	G2-209	NORMAL	2.2	ug/kg	U	C
200026073	delta-BHC	12/01/93	G2-203	NORMAL	2.3	ug/kg	U	C
200026074	delta-BHC	12/01/93	G2-204	NORMAL	2.3	ug/kg	U	C
200026077	delta-BHC	12/01/93	G2-206	NORMAL	2.4	ug/kg	U	C
200026075	delta-BHC	12/01/93	G2-202	NORMAL	2.4	ug/kg	U	C
200026078	delta-BHC	12/01/93	G2-207	NORMAL	2.4	ug/kg	U	C

Pesticide/Herbicide Results
Surface Soil Samples
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Sample	Parameter	Sample Date	Boring	QA Type	Result	Units	Validation Qualifier	Validation Level
200026061	delta-BHC	12/01/93	G2-205	NORMAL	2.4	ug/kg	U	C
200026072	delta-BHC	12/01/93	G2-201	NORMAL	2.6	ug/kg	U	C
200026076	delta-BHC	12/01/93	G2-208	NORMAL	2.6	ug/kg	U	C
200026079	Dieldrin	12/01/93	G2-209	NORMAL	4.3	ug/kg	U	C
200026073	Dieldrin	12/01/93	G2-203	NORMAL	4.5	ug/kg	U	C
200026074	Dieldrin	12/01/93	G2-204	NORMAL	4.5	ug/kg	U	C
200026061	Dieldrin	12/01/93	G2-205	NORMAL	4.6	ug/kg	U	C
200026077	Dieldrin	12/01/93	G2-206	NORMAL	4.7	ug/kg	U	C
200026078	Dieldrin	12/01/93	G2-207	NORMAL	4.7	ug/kg	U	C
200026075	Dieldrin	12/01/93	G2-202	NORMAL	4.7	ug/kg	U	C
200026072	Dieldrin	12/01/93	G2-201	NORMAL	5	ug/kg	U	C
200026076	Dieldrin	12/01/93	G2-208	NORMAL	5	ug/kg	U	C
200026088	Disulfoton	12/01/93	G2-209	NORMAL	0.28	ug/kg	UJ	B
200026084	Disulfoton	12/01/93	G2-202	NORMAL	0.28	ug/kg	U	B
200026082	Disulfoton	12/01/93	G2-203	NORMAL	0.28	ug/kg	U	B
200026081	Disulfoton	12/01/93	G2-201	NORMAL	0.28	ug/kg	U	B
200026083	Disulfoton	12/01/93	G2-204	NORMAL	0.28	ug/kg	UJ	B
200026086	Disulfoton	12/01/93	G2-206	NORMAL	0.28	ug/kg	U	B
200026085	Disulfoton	12/01/93	G2-208	NORMAL	0.28	ug/kg	U	B
200026062	Disulfoton	12/01/93	G2-205	NORMAL	0.28	ug/kg	U	B
200026087	Disulfoton	12/01/93	G2-207	NORMAL	0.28	ug/kg	U	B
200026079	Endosulfan II	12/01/93	G2-209	NORMAL	4.3	ug/kg	U	C
200026073	Endosulfan II	12/01/93	G2-203	NORMAL	4.5	ug/kg	U	C
200026074	Endosulfan II	12/01/93	G2-204	NORMAL	4.5	ug/kg	U	C
200026061	Endosulfan II	12/01/93	G2-205	NORMAL	4.6	ug/kg	U	C
200026077	Endosulfan II	12/01/93	G2-206	NORMAL	4.7	ug/kg	U	C
200026075	Endosulfan II	12/01/93	G2-202	NORMAL	4.7	ug/kg	U	C
200026078	Endosulfan II	12/01/93	G2-207	NORMAL	4.7	ug/kg	U	C
200026076	Endosulfan II	12/01/93	G2-208	NORMAL	5	ug/kg	U	C
200026072	Endosulfan II	12/01/93	G2-201	NORMAL	5	ug/kg	U	C

Pesticide/Herbicide Results
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Sample	Parameter	Sample Date	Boring	QA Type	Result	Units	Validation Qualifier	Validation Level
200026073	Endosulfan sulfate	12/01/93	G2-203	NORMAL	1.1	ug/kg	J	C
200026079	Endosulfan sulfate	12/01/93	G2-209	NORMAL	1.1	ug/kg	J	C
200026072	Endosulfan sulfate	12/01/93	G2-201	NORMAL	1.6	ug/kg	J	C
200026078	Endosulfan sulfate	12/01/93	G2-207	NORMAL	1.6	ug/kg	J	C
200026074	Endosulfan sulfate	12/01/93	G2-204	NORMAL	4.5	ug/kg	U	C
200026061	Endosulfan sulfate	12/01/93	G2-205	NORMAL	4.6	ug/kg	U	C
200026077	Endosulfan sulfate	12/01/93	G2-206	NORMAL	4.7	ug/kg	U	C
200026075	Endosulfan sulfate	12/01/93	G2-202	NORMAL	4.7	ug/kg	U	C
200026076	Endosulfan sulfate	12/01/93	G2-208	NORMAL	5	ug/kg	U	C
200026079	Endosulfan-I	12/01/93	G2-209	NORMAL	2.2	ug/kg	U	C
200026073	Endosulfan-I	12/01/93	G2-203	NORMAL	2.3	ug/kg	U	C
200026074	Endosulfan-I	12/01/93	G2-204	NORMAL	2.3	ug/kg	U	C
200026077	Endosulfan-I	12/01/93	G2-206	NORMAL	2.4	ug/kg	U	C
200026078	Endosulfan-I	12/01/93	G2-207	NORMAL	2.4	ug/kg	U	C
200026075	Endosulfan-I	12/01/93	G2-202	NORMAL	2.4	ug/kg	U	C
200026061	Endosulfan-I	12/01/93	G2-205	NORMAL	2.4	ug/kg	U	C
200026076	Endosulfan-I	12/01/93	G2-208	NORMAL	2.6	ug/kg	U	C
200026072	Endosulfan-I	12/01/93	G2-201	NORMAL	2.6	ug/kg	U	C
200026072	Endrin	12/01/93	G2-201	NORMAL	0.8	ug/kg	J	C
200026078	Endrin	12/01/93	G2-207	NORMAL	1.5	ug/kg	J	C
200026079	Endrin	12/01/93	G2-209	NORMAL	4.3	ug/kg	U	C
200026074	Endrin	12/01/93	G2-204	NORMAL	4.5	ug/kg	U	C
200026073	Endrin	12/01/93	G2-203	NORMAL	4.5	ug/kg	U	C
200026061	Endrin	12/01/93	G2-205	NORMAL	4.6	ug/kg	U	C
200026077	Endrin	12/01/93	G2-206	NORMAL	4.7	ug/kg	U	C
200026075	Endrin	12/01/93	G2-202	NORMAL	4.7	ug/kg	U	C
200026076	Endrin	12/01/93	G2-208	NORMAL	5	ug/kg	U	C
200026079	Endrin aldehyde	12/01/93	G2-209	NORMAL	4.3	ug/kg	U	C
200026074	Endrin aldehyde	12/01/93	G2-204	NORMAL	4.5	ug/kg	U	C
200026073	Endrin aldehyde	12/01/93	G2-203	NORMAL	4.5	ug/kg	U	C

Pesticide/Herbicide Results
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Sample	Parameter	Sample Date	Boring	QA Type	Result	Units	Validation Qualifier	Validation Level
200026061	Endrin aldehyde	12/01/93	G2-205	NORMAL	4.6	ug/kg	U	C
200026077	Endrin aldehyde	12/01/93	G2-206	NORMAL	4.7	ug/kg	U	C
200026075	Endrin aldehyde	12/01/93	G2-202	NORMAL	4.7	ug/kg	U	C
200026078	Endrin aldehyde	12/01/93	G2-207	NORMAL	4.7	ug/kg	U	C
200026076	Endrin aldehyde	12/01/93	G2-208	NORMAL	5	ug/kg	U	C
200026072	Endrin aldehyde	12/01/93	G2-201	NORMAL	5	ug/kg	U	C
200026079	Endrin ketone	12/01/93	G2-209	NORMAL	4.3	ug/kg	U	C
200026073	Endrin ketone	12/01/93	G2-203	NORMAL	4.5	ug/kg	U	C
200026074	Endrin ketone	12/01/93	G2-204	NORMAL	4.5	ug/kg	U	C
200026061	Endrin ketone	12/01/93	G2-205	NORMAL	4.6	ug/kg	U	C
200026075	Endrin ketone	12/01/93	G2-202	NORMAL	4.7	ug/kg	U	C
200026078	Endrin ketone	12/01/93	G2-207	NORMAL	4.7	ug/kg	U	C
200026077	Endrin ketone	12/01/93	G2-206	NORMAL	4.7	ug/kg	U	C
200026072	Endrin ketone	12/01/93	G2-201	NORMAL	5	ug/kg	U	C
200026076	Endrin ketone	12/01/93	G2-208	NORMAL	5	ug/kg	U	C
200026083	Famphur	12/01/93	G2-204	NORMAL	23	ug/kg	UJ	B
200026082	Famphur	12/01/93	G2-203	NORMAL	23	ug/kg	U	B
200026088	Famphur	12/01/93	G2-209	NORMAL	23	ug/kg	UJ	B
200026084	Famphur	12/01/93	G2-202	NORMAL	24	ug/kg	U	B
200026062	Famphur	12/01/93	G2-205	NORMAL	24	ug/kg	U	B
200026087	Famphur	12/01/93	G2-207	NORMAL	24	ug/kg	U	B
200026081	Famphur	12/01/93	G2-201	NORMAL	25	ug/kg	U	B
200026086	Famphur	12/01/93	G2-206	NORMAL	25	ug/kg	U	B
200026085	Famphur	12/01/93	G2-208	NORMAL	26	ug/kg	U	B
200026079	gamma-BHC (Lindane)	12/01/93	G2-209	NORMAL	2.2	ug/kg	U	C
200026073	gamma-BHC (Lindane)	12/01/93	G2-203	NORMAL	2.3	ug/kg	U	C
200026074	gamma-BHC (Lindane)	12/01/93	G2-204	NORMAL	2.3	ug/kg	U	C
200026078	gamma-BHC (Lindane)	12/01/93	G2-207	NORMAL	2.4	ug/kg	U	C
200026061	gamma-BHC (Lindane)	12/01/93	G2-205	NORMAL	2.4	ug/kg	U	C
200026077	gamma-BHC (Lindane)	12/01/93	G2-206	NORMAL	2.4	ug/kg	U	C

Pesticide/Herbicide Results
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Sample	Parameter	Sample Date	Boring	QA Type	Result	Units	Validation Qualifier	Validation Level
200026075	gamma-BHC (Lindane)	12/01/93	G2-202	NORMAL	2.4	ug/kg	U	C
200026072	gamma-BHC (Lindane)	12/01/93	G2-201	NORMAL	2.6	ug/kg	U	C
200026076	gamma-BHC (Lindane)	12/01/93	G2-208	NORMAL	2.6	ug/kg	U	C
200026079	gamma-Chlordane	12/01/93	G2-209	NORMAL	2.2	ug/kg	U	C
200026073	gamma-Chlordane	12/01/93	G2-203	NORMAL	2.3	ug/kg	U	C
200026074	gamma-Chlordane	12/01/93	G2-204	NORMAL	2.3	ug/kg	U	C
200026075	gamma-Chlordane	12/01/93	G2-202	NORMAL	2.4	ug/kg	U	C
200026077	gamma-Chlordane	12/01/93	G2-206	NORMAL	2.4	ug/kg	U	C
200026078	gamma-Chlordane	12/01/93	G2-207	NORMAL	2.4	ug/kg	U	C
200026061	gamma-Chlordane	12/01/93	G2-205	NORMAL	2.4	ug/kg	U	C
200026072	gamma-Chlordane	12/01/93	G2-201	NORMAL	2.6	ug/kg	U	C
200026076	gamma-Chlordane	12/01/93	G2-208	NORMAL	2.6	ug/kg	U	C
200026079	Heptachlor	12/01/93	G2-209	NORMAL	2.2	ug/kg	U	C
200026073	Heptachlor	12/01/93	G2-203	NORMAL	2.3	ug/kg	U	C
200026074	Heptachlor	12/01/93	G2-204	NORMAL	2.3	ug/kg	U	C
200026075	Heptachlor	12/01/93	G2-202	NORMAL	2.4	ug/kg	U	C
200026078	Heptachlor	12/01/93	G2-207	NORMAL	2.4	ug/kg	U	C
200026077	Heptachlor	12/01/93	G2-206	NORMAL	2.4	ug/kg	U	C
200026061	Heptachlor	12/01/93	G2-205	NORMAL	2.4	ug/kg	U	C
200026072	Heptachlor	12/01/93	G2-201	NORMAL	2.6	ug/kg	U	C
200026076	Heptachlor	12/01/93	G2-208	NORMAL	2.6	ug/kg	U	C
200026079	Heptachlor epoxide	12/01/93	G2-209	NORMAL	2.2	ug/kg	U	C
200026073	Heptachlor epoxide	12/01/93	G2-203	NORMAL	2.3	ug/kg	U	C
200026074	Heptachlor epoxide	12/01/93	G2-204	NORMAL	2.3	ug/kg	U	C
200026061	Heptachlor epoxide	12/01/93	G2-205	NORMAL	2.4	ug/kg	U	C
200026078	Heptachlor epoxide	12/01/93	G2-207	NORMAL	2.4	ug/kg	U	C
200026077	Heptachlor epoxide	12/01/93	G2-206	NORMAL	2.4	ug/kg	U	C
200026075	Heptachlor epoxide	12/01/93	G2-202	NORMAL	2.4	ug/kg	U	C
200026076	Heptachlor epoxide	12/01/93	G2-208	NORMAL	2.6	ug/kg	U	C
200026072	Heptachlor epoxide	12/01/93	G2-201	NORMAL	2.6	ug/kg	U	C

Pesticide/Herbicide Results
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Sample	Parameter	Sample Date	Boring	QA Type	Result	Units	Validation Qualifier	Validation Level
200026079	Methoxychlor	12/01/93	G2-209	NORMAL	22	ug/kg	U	C
200026073	Methoxychlor	12/01/93	G2-203	NORMAL	23	ug/kg	U	C
200026074	Methoxychlor	12/01/93	G2-204	NORMAL	23	ug/kg	U	C
200026077	Methoxychlor	12/01/93	G2-206	NORMAL	24	ug/kg	U	C
200026061	Methoxychlor	12/01/93	G2-205	NORMAL	24	ug/kg	U	C
200026075	Methoxychlor	12/01/93	G2-202	NORMAL	24	ug/kg	U	C
200026078	Methoxychlor	12/01/93	G2-207	NORMAL	24	ug/kg	U	C
200026072	Methoxychlor	12/01/93	G2-201	NORMAL	26	ug/kg	U	C
200026076	Methoxychlor	12/01/93	G2-208	NORMAL	26	ug/kg	U	C
200026088	Methyl parathion	12/01/93	G2-209	NORMAL	23	ug/kg	UJ	B
200026083	Methyl parathion	12/01/93	G2-204	NORMAL	23	ug/kg	UJ	B
200026082	Methyl parathion	12/01/93	G2-203	NORMAL	23	ug/kg	U	B
200026062	Methyl parathion	12/01/93	G2-205	NORMAL	24	ug/kg	U	B
200026084	Methyl parathion	12/01/93	G2-202	NORMAL	24	ug/kg	U	B
200026087	Methyl parathion	12/01/93	G2-207	NORMAL	24	ug/kg	U	B
200026086	Methyl parathion	12/01/93	G2-206	NORMAL	25	ug/kg	U	B
200026081	Methyl parathion	12/01/93	G2-201	NORMAL	25	ug/kg	U	B
200026085	Methyl parathion	12/01/93	G2-208	NORMAL	26	ug/kg	U	B
200026062	Phorate	12/01/93	G2-205	NORMAL	0.23	ug/kg	U	B
200026081	Phorate	12/01/93	G2-201	NORMAL	0.23	ug/kg	U	B
200026084	Phorate	12/01/93	G2-202	NORMAL	0.23	ug/kg	U	B
200026087	Phorate	12/01/93	G2-207	NORMAL	0.23	ug/kg	U	B
200026082	Phorate	12/01/93	G2-203	NORMAL	0.23	ug/kg	U	B
200026085	Phorate	12/01/93	G2-208	NORMAL	0.23	ug/kg	U	B
200026086	Phorate	12/01/93	G2-206	NORMAL	0.23	ug/kg	U	B
200026083	Phorate	12/01/93	G2-204	NORMAL	0.23	ug/kg	UJ	B
200026079	Toxaphene	12/01/93	G2-209	NORMAL	220	ug/kg	U	C
200026073	Toxaphene	12/01/93	G2-203	NORMAL	230	ug/kg	U	C
200026074	Toxaphene	12/01/93	G2-204	NORMAL	230	ug/kg	U	C
200026061	Toxaphene	12/01/93	G2-205	NORMAL	240	ug/kg	U	C

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Sample	Parameter	Sample Date	Boring	QA Type	Result	Units	Validation Qualifier	Validation Level
200026078	Toxaphene	12/01/93	G2-207	NORMAL	240	ug/kg	U	C
200026075	Toxaphene	12/01/93	G2-202	NORMAL	240	ug/kg	U	C
200026077	Toxaphene	12/01/93	G2-206	NORMAL	240	ug/kg	U	C
200026076	Toxaphene	12/01/93	G2-208	NORMAL	260	ug/kg	U	C
200026072	Toxaphene	12/01/93	G2-201	NORMAL	260	ug/kg	U	C

TABLE 2-16

Data Qualifiers and Definitions

DATA QUALIFIERS AND DEFINITIONS	
J	Analyte was analyzed for and positively identified, but the associated numerical value may not be consistent with the amount present in the environmental sample. Data should be seriously considered for making decisions and are usable for many purposes.
N	Analysis indicates that an analyte is present and there are strong indications that the identity is correct.
R	Data are unusable for any purpose. Analyte was analyzed for, but the presence or absence of the analyte was not verified. Resampling and reanalysis are necessary to confirm or deny presence of the analyte.
U	Analyte was analyzed for and was not present above the level of the associated value. Associated numerical value indicates the approximate concentration necessary to detect the analyte in the sample.
UJ	This is a combination of the "U" and "J" qualifiers. Analyte was analyzed for and was not present above the level of the associated value. The associated value may not accurately or precisely represent the concentration necessary to detect the analyte in the sample. If a decision requires quantitation of the analyte close to the associated numerical level, reanalysis or alternative analytical methods should be considered.

(Notation from QAPP March 1992)

TABLE 2-17

ANALYTICAL SUPPORT LEVELS

5861

Support Level	Description	Typical Data Uses
A	*Qualitative Field Analysis* - This level is characterized by the use of portable instruments that can provide real-time data to assist in the optimization of sampling point locations and in providing health and safety support. Data can be generated regarding the presence or absence of contaminants (e.g., radionuclides, volatiles) at sampling locations. Analogous to EPA analytical level 1.	• Site characterization • Monitoring during implementation • Establishing worker protective equipment
B	*Qualitative, Semi-Quantitative, and Quantitative Analyses* - This level may include the use of more sophisticated screening techniques, such as portable analytical instruments that can be used on site (close-support laboratories). Depending upon the types of contaminants, sample matrix, and QC checks applied, qualitative and quantitative data can be obtained. Analogous to EPA analytical level 2.	• Site characterization • Evaluation of alternatives • Engineering design • Monitoring during implementation
C	*Quantitative with fully defined QA/QC* - Laboratory analyses generated with full QA/QC checks of types and frequencies specified for ASL D according to FEMP-specified analytical protocols for radiological and nonradiological parameters. The analytical methods are identical to ASL D for QA/QC sample analysis and method performance criteria. However, the data package does not typically contain raw instrument output but does include summaries of QA/QC sample results. ASL C may be used when analyses require a rigid, well-defined protocol, but where other information is available, so that a complete raw data package validation effort is not required. Laboratories are required to retain raw instrument data to upgrade ASL C reports to ASL D in the project file. Analogous to EPA analytical level 3.	• Risk assessment • Site characterization • Evaluation of alternatives • Engineering design • Monitoring during implementation
D	*Confirmational with complete QA/QC and reporting* - Provides data generated with a full complement of QA/QC checks of specified types and frequencies according to FEMP-specified analytical protocols for radiological and nonradiological parameters. The data package includes raw instrument output for validation. These data may be used to confirm data gathered at ASLs B and C, and when full validation of raw data is required. Analogous to EPA analytical level 4.	• Risk assessment • Evaluation of alternatives • Engineering design
E	*Nonstandard* - Analyses by nonstandard protocols that often require method development or validation (e.g., when extracting detection limits or analysis of an unusual chemical compound is required). New methods may be developed for ASL E data to allow for parameters or matrices that cannot be analyzed by existing standard methods. Analogous to EPA analytical level 5.	• Risk assessment

ADDITIONAL BORING LOGS

1745
1746
1747
1748
1749
1750
2399
2400
3068
3431
11130
11131

000287

PAGE 1 OF 1

PROJECT NO: 313327
DATE BEGAN: 12-16-91
DRILLER: E. GARDNER, D. JAMESON
GROUND SURFACE ELEV.: 586.00'
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: PENN DRILLING

BORING NO: 1755
DATE FINISHED: 12-17-91
N: 478500.00'
GWL DATE/TIME: NA

PROJECT NAME: FERNALD
FIELD ENGINEER: D. O'BRIEN
E: 1392000.00'
GWL DEPTH: NA
EQUIPMENT: MOBILE DRILL 80
CHECKED BY: D. AMBROSE

0861

ELEV (FT)	DEPTH (FT)	SAMPLE TYPE AND NO.	SPT BLOWS PER (0.5')	REC (FT)	PROFILE	DESCRIPTION	USCS	OVA (ppm)	REMARKS
	0.00	S 1253	5	0.5		Firm, (10YR 5/4), yellowish-brown, silty CLAY, low plasticity, moist 1.0'	CL	1.0	HNU - 0 ppm βγ - 0 cpm
			5	0.42				1.0	
585.0			7	0		No recovery 2.0'	NA	NA	
			8	0				NA	
			5	0.5		Very firm, (10YR 5/4), yellowish-brown, silty CLAY, low plasticity, moist 3.0'	CL	2.75	HNU - 0 ppm βγ - 0 cpm
			11	0.5				2.75	
			14	0.08		Hard, (10YR 5/4), yellowish-brown, silty CLAY, low plasticity, moist 3.5'		4.5	
			17	0		No recovery 4.5'	NA	NA	
			8	0				NA	HNU - 0 ppm βγ - 0 cpm
		S 1254	16	0.33		Firm, (10YR 5/4), yellowish-brown, silty CLAY with sand and gravel, low plasticity, moist 5.0'	CL	2.0	
	-5.00	S 1255	18	0.5		Hard, (10YR 5/4), yellowish-brown, silty CLAY with sand and gravel, moist 6.0'		>4.5	
		S 1258	20	0.5				4.5	
580.0		S	SHELBY TUBE	2.5		Firm, (10YR 5/4), yellowish-brown, silty CLAY with some sand, low plasticity, moist 10.5'	CL	1.75	HNU - 0 ppm βγ - 0 cpm
		1260 S 1263	11	0.5				1.75	HNU - 0 ppm βγ - 0 cpm
			47	0.5				1.5	
	-10.00		9	0.5				2.75	
			14	0		No recovery 11.0'	NA	NA	
575.0			15	0.5		Firm, (10YR 5/4), yellowish-brown, silty CLAY with some sand, low plasticity, moist 11.5'	CL	1.5	HNU - 0 ppm βγ - 0 cpm
			21	0.5		Very firm, (10YR 5/4), yellowish-brown, silty CLAY with some sand, low plasticity, moist 12.0'		3.0	
		S 1264	20	0.42		Firm, (5Y 5/3), olive, silty CLAY with some sand, low plasticity, moist 12.5'		1.75	HNU - 0 ppm βγ - 0 cpm
			13	0		No recovery 14.0'	NA		
		S 1265	3	0					
			7	0					
			9	0.5		Very firm, (5Y 5/3), olive, silty CLAY with sand and gravel, low plasticity, moist 15.0'	CL	2.5	HNU - 0 ppm βγ - 0 cpm
			17	0.08				2.75	
	-15.00		5	0		No recovery 16.0'	NA		HNU - 0 ppm βγ - 0 cpm
			11	0					
570.0		S 1268	14	0.5		Very firm, (5Y 5/3), olive, silty CLAY with sand and gravel, low plasticity, moist 16.5'		2.75	
		S 1268	17	0.5		Hard, (5Y 5/3), olive, silty CLAY with sand and gravel, low plasticity, moist 17.0'		4.25	

000288

PAGE 2 OF 2

PROJECT NO: 313327
DATE BEGAN: 12-16-91
DRILLER: E. GARDNER, D. JAMESON
GROUND SURFACE ELEV.: 586.00'
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: PENN DRILLING

BORING NO: 1745
DATE FINISHED: 12-17-91
N: 478500.00'
GWL DATE/TIME: NA

PROJECT NAME: FERNALD
FIELD ENGINEER: D. O'BRIEN
E: 1382000.00'
GWL DEPTH: NA
EQUIPMENT: MOBILE DRILL 80
CHECKED BY: D. AMBROSE

ELEV (FT)	DEPTH (FT)	SAMPLE TYPE AND NO.	SPT BLOWS PER (0.5')	REC (FT)	PROFILE	DESCRIPTION	USCS	<0.074 mm (%)	REMARKS
		S 1270	SHELBY TUBE	2.33		Very firm, (5Y 5/3), olive, silty CLAY with sand and gravel, low plasticity, moist 20.0'	CL	2.5	HNU - 0 ppm βγ - 0 cpm
	-20.00		6	0		No recovery			
565.0			14	0					
			14	0					
			19	0					
			9	0					
			18	0			NA	NA	
			21	0					
			24	0					
			9	0					
			14	0		25.0'			
	-25.00	S 1273	9	0.5		Very firm, (5Y 5/3), olive, silty CLAY with sand and gravel, low plasticity, moist 25.5'	CL	2.0	HNU - 0 ppm βγ - 0 cpm
560.0		S 1275	18	0.5		Hard, (5Y 5/3), olive, silty CLAY with sand and gravel, low plasticity, moist 26.0'		4.5	
		S 1277	21	0.5		Very firm, (5Y 5/3), olive, silty CLAY with sand and gravel, low plasticity, moist		2.5	
		S 1279	24	0.5				3.0	
						BOTTOM OF BORING AT 27.0'			
	-30.00								
555.0									

000209

NOTE:
ALL SAMPLE NUMBERS ARE INCREMENTED BY 100,000
ie. 1253 IS 101253

5861

PAGE 1 OF 1

PROJECT NO:	313327	BORING NO:	1746	PROJECT NAME:	FERNALD
DATE BEGAN:	12-16-91	DATE FINISHED:	12-16-91	FIELD ENGINEER:	G. MARSHALL
DRILLER:	B. YOST, K. MYERS	N:	478000.00'	E:	1382500.00'
GROUND SURFACE ELEV.:	EST 593.0'	GWL DATE/TIME:	NA	GWL DEPTH:	NA
DRILLING METHOD:	HOLLOW STEM AUGER			EQUIPMENT:	MOBILE DRILL 80
CONTRACTOR:	PENN DRILLING			CHECKED BY:	D. AMBROSE

ELEV (FT)	DEPTH (FT)	SAMPLE TYPE AND NO.	SPT BLOWS PER (0.5')	REC (FT)	PROFILE	DESCRIPTION	USCS	OVA (PPM)	REMARKS
	0.00	S 0687	5	0.5		Firm, (10YR 3/6), yellowish-brown, silty CLAY with rootlets, no plasticity, dry 0.5'	cl	1.5	HNU - 0 ppm βγ - 0 cpm
			7	0		No recovery	NA	NA	
			7	0		1.5'		NA	
		S 0689	13	0.5		Hard, (10YR 4/6), dark yellowish-brown, silty CLAY, trace of gravel, no plasticity, dry 2.0'	cl	>4.5	HNU - 0 ppm βγ - 0 cpm
			12	0		No recovery	NA	NA	
			16	0		3.0'		NA	
590.0		S 0689	16	0.5		Hard, (10YR 6/4), light yellowish-brown, silty CLAY with gravel, no plasticity, dry	cl	>4.5	HNU - 0 ppm βγ - 0 cpm
			28	0.5		4.15'		>4.5	
			27	0.25		Hard, (10YR 4/4), dark yellowish-brown, silty CLAY with some gravel, no plasticity, dry		>4.5	
		S 0690	12	0.5				>4.5	HNU - 0 ppm βγ - 0 cpm
	-5.00	S 0691	13	0.5				>4.5	
		S 0692	14	0.42		6.0'		>4.5	
			13	0		No recovery 6.5'	NA	NA	
		S 0698	18	0.5		Hard, (10YR 5/6), yellowish-brown, gravelly CLAY, no plasticity, dry 7.0'	cl	>4.5	HNU - 0 ppm βγ - 0 cpm
		S 0697	19	0.5		Medium firm, (10YR 5/4), yellowish-brown, very fine, clayey SAND, no plasticity, moist 8.0'	sc	1.0	
585.0		S 0697	16	0.33				1.0	HNU - 0 ppm βγ - 0 cpm
		S 0697	20	0.5		Very soft, (10YR 5/4), yellowish-brown mottled with (10YR 5/1), gray, very fine, clayey SAND, no plasticity, wet 8.5'		0.25	HIT PERCHED WATER AT 8
			22	0.33		Very soft, (10YR 5/4), yellowish-brown, very fine, clayey SAND, no plasticity, moist 9.0'		0.25	
		S 0698	17	0		No recovery 9.5'	NA	NA	
	-10.00	S 0699	SHELBY TUBE	1.58		Very firm, (2.5Y 4/3), olive brown, gravelly CLAY, low plasticity, wet 9.75'	cl	2.75	HNU - 0 ppm βγ - 0 cpm
						Very soft, (2.5Y 4/3), olive brown, clayey GRAVEL, no plasticity, wet 10.5'	gc	0.25	
						Very firm, (2.5Y 4/3), olive brown, gravelly CLAY, low plasticity, moist 10.75'	cl	2.25	
						No recovery	NA		
580.0						BOTTOM OF BORING AT 12.5'			
	-15.00								

000290

NOTE:
ALL SAMPLE NUMBERS ARE INCREMENTED BY 100.00
i.e. 687 IS 100687

PAGE 1 OF 2

PROJECT NO: 313327
DATE BEGAN: 12-10-91
DRILLER: E GARDNER D JAMISON
GROUND SURFACE ELEV.: NA
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: PENN DRILLING

BORING NO: 1747
DATE FINISHED: 12-11-91
N: 477600 00'
GWL DATE/TIME: NA

PROJECT NAME: FERNALD
FIELD ENGINEER: P CASSIDAY
E: 1382500 00'
GWL DEPTH: NA
EQUIPMENT: NA
CHECKED BY: D AMBROSE

ELEV (FT)	DEPTH (FT)	SAMPLE TYPE AND NO	BPT BLOWS PER (0.5')	REC (FT)	PROFILE	DESCRIPTION	USCS	OVA (PPM)	REMARKS
0.0	0.00	S 1228	2	0.5		Med Firm, (10YR 4/6), dark yellowish-brown, silty CLAY, abundant roots and organic material, slightly moist 0.5'	cl	0.5	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
			3	0.5		Very Firm, (10YR 4/6), dark yellowish-brown, silty CLAY, less organic material, low plasticity, slightly moist 1.0'		3.5	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
			5	0.25		Hard, (10YR 4/6), dark yellowish brown, silty CLAY, less organic material, low plasticity, slightly moist 1.5'		>4.0	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
		S 1225	12	0		No recovery 2.0'	NA	NA	
		S 1227	15	0.5		Dense, (2.5Y 6/6), olive yellow, clayey SILT with minor sand, low plasticity, trace gravel, dry 3.0'	ml	NA	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
			21	0.5		Dense, (2.5Y 6/6), olive yellow, clayey SILT with minor sand and some gravel, dry		NA	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
			28	0.5				NA	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
			20	0				NA	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
			20	0.17				NA	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
			20	0.5				NA	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
-5.0	-5.00		20	0.5		5.5'		NA	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
		S 1228	24	0.17		Firm, (10YR 5/4), yellowish brown, silty CLAY with trace of sand, plastic, moist 6.0'	cl	1.5	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
			22	0.5		Medium Firm, (10YR 5/4), yellowish brown, silty CLAY trace sand, some intermittent gravel, slightly plastic, moist		0.75	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
			22	0.5				0.75	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
			26	0.5		7.5'		0.75	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
			14	0.5		Medium Firm, (10YR 5/4), yellowish brown, silty CLAY, trace sand, some intermittent gravel, slightly plastic, some larger chunks of gravel, moist		0.75	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
			16	0		8.5'		1.5	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
			21	0.5		Very Firm, (10YR 5/4), yellowish brown, silty CLAY, trace sand, some Intermittent gravel, slightly plastic, some larger chunks of gravel, moist 9.0'		3.5	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
		S 1229	NA	1.0		Medium Firm, (10YR 4/4), dark yellowish brown, clayey SILT, some small gravel, slightly moist	ml	NA	
-10.0	-10.00		NA	1.0		11.0'		NA	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
			NA	0.33		Firm, (10YR 5/6), yellowish brown, silty CLAY with some gravel, and plastic, moist 12.0'	cl	1.25	
		S 1230	SHELBY TUBE	2.5		Medium Firm, (10YR 5/6), yellowish brown, silty CLAY with some gravel, plastic, moist		1.0	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
						Firm, (5Y 5/1), gray CLAY with some large gravel, plastic, moist 14.5'		1.5	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
		S 1248	15	0		No recovery 15.0'	NA	NA	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
-15.0	-15.00	S 1233	6	0.5		Firm, (5Y 5/1), gray CLAY with minor silt and some gravel, plastic, moist 15.5'	cl	1.75	HNU - 0 ppm βγ - 20 cpm α - 0 cpm
		S 1247	0	0		No recovery	NA	NA	

000291

PAGE 2 OF 2

PROJECT NO:	313327	BORING NO:	1747	PROJECT NAME:	FERNALD
DATE BEGAN:	12-10-91	DATE FINISHED:	12-11-91	FIELD ENGINEER:	P. CABSIDAY
DRILLER:	E. GARDNER, D. JAMISON	N:	477600.00'	E:	1382500.00'
GROUND SURFACE ELEV.:	NA	GWL DATE/TIME:	NA	GWL DEPTH:	NA
DRILLING METHOD:	HOLLOW STEM AUGER			EQUIPMENT:	NA
CONTRACTOR:	PENN DRILLING			CHECKED BY:	D. AMBROSE

ELEV (FT)	DEPTH (FT)	SAMPLE TYPE AND NO.	BPT BLOWS PER (0.5')	REC (FT)	PROFILE	DESCRIPTION	USCS	(OVA/HNU/200 ppm)	REMARKS
			11	0			NA	NA	
			21	0		17.0'		NA	
		S 1234	34	0.5		Very firm, (5Y 5/1), gray CLAY, some silt and gravel, plastic, moist		2.5	HNU - 0 ppm βY - 20 cpm α - 0 cpm
		S 1236	30	0.5		18.0'	cl	3.0	HNU - 0 ppm βY - 20 cpm α - 0 cpm
		S 1238	27	0.5		Very firm, (5Y 5/1), gray CLAY, grading into a clayey silt with gravel, moist		3.0	HNU - 0 ppm βY - 20 cpm α - 0 cpm
		S 1240	21	0.5		Very firm, (5Y 5/1), gray CLAY, grading into a clayey silt with gravel, moist		3.0	HNU - 0 ppm βY - 20 cpm α - 0 cpm
20.0	-20.00	S 1242	SHELBY TUBE	2.5		19.0' Very firm, (5Y 5/1), gray, sandy SILT, some gravel, very wet	ml	3.0	HNU - 0 ppm βY - 20 cpm α - 0 cpm
25.0	-25.00					BOTTOM OF BORING AT 21.5'			
30.0	-30.00								

NOTE:
ALL SAMPLE NUMBERS ARE INCREMENTED BY 100,000
i.e. 1226 IS 101226

000292

PAGE 1 OF 2

PROJECT NO: 313327
DATE BEGAN: 12-9-91
DRILLER: B. YOST, K. MEYERS
GROUND SURFACE ELEV.: NA
DRILLING METHOD: AUGER
CONTRACTOR: PENN DRILLING

BORING NO: 1748
DATE FINISHED: 12-12-91
N: 477300.00'
GWL DATE/TIME: NA

PROJECT NAME: FERNALD
FIELD ENGINEER: B. MARSHALL
E: 1382500.00'
GWL DEPTH: NA
EQUIPMENT: MOBILE DRILLING R
CHECKED BY: D. AMBROSE

ELEV (FT)	DEPTH (FT)	SAMPLE TYPE AND NO.	SPT BLOWS PER (0.5')	REC (FT)	PROFILE	DESCRIPTION	USCS	OVA (0ZH+0B0ZH) 10.6	REMARKS
0.0	0.00	S 0651	3	0.5		Firm, (10YR 3/6), dark yellowish-brown, silty CLAY, silt, rootlets, no plasticity, dry 0.5'	cl	1.5	TRIP/FIELD BLANK NO. 10052
			5	0.5		Medium firm, (10YR 3/6), dark yellowish-brown, silty CLAY, no plasticity, dry		1.0	HNU - 0 ppm
								1.75	γY - 0 cpm ABOVE BACKGROUND
			3	0		Firm, (10YR 5/8), yellowish-brown silty CLAY, no plasticity, dry 1.0'	NA	NA	
		S 0652	6	0.5			cl	>4	HNU - 0 ppm γY - 0 cpm ABOVE BACKGROUND
			12	0		No recovery 1.5'	NA	NA	
			15	0		Hard, (10YR 5/8), yellowish-brown, silty CLAY, no plasticity, dry 2.0' No recovery 3.0'			
		S 0653	12	0.5		Hard, (10YR 5/8), yellowish-brown, silty CLAY, no plasticity, dry	cl	>4	HNU - 0 ppm γY - 0 cpm ABOVE BACKGROUND
		S 0653	22	0.5		4.0'			
			21	0.8		Hard, (10YR 5/6), yellowish-brown, silty CLAY with traces of gravel, no plasticity, dry			HNU - 0 ppm γY - 0 cpm ABOVE BACKGROUND
		S 0653	21	0.5		5.0'			
-5.0	-5.00		18	0		No recovery	NA	NA	
			12	0		6.0'			
		S 0654	11	0.5		Very firm, (10YR 5/3), brown, CLAY with sand and gravel, high plasticity, moist	cl	3.5	HNU - 0 ppm γY - 0 cpm ABOVE BACKGROUND
		S 0654	13	0.5		Firm, (10YR 5/3), brown, CLAY with sand and gravel, high plasticity, moist		1.75	
			11	0.5		Very firm, (10YR 5/3), brown, CLAY with sand and gravel, high plasticity, moist		2.75	HNU - 0 ppm γY - 0 cpm ABOVE BACKGROUND
		S 0654	11	0.5				1.0	
			13	0.5		Firm, (10YR 5/3), brown, CLAY with sand and gravel, high plasticity, moist		2.0	
			11	0.5		Very firm, (10YR 5/3), brown, CLAY with sand and gravel, high plasticity, moist		4.0	
		S 0655	SHELBY TUBE	4.5		Hard, (10YR 5/3), brown, CLAY with sand and gravel, high plasticity, moist		1.5	HNU - 0 ppm γY - 0 cpm ABOVE BACKGROUND
-10.0	-10.00					Firm, (10YR 5/1), gray CLAY with sand and gravel, no plasticity, dry 12.0'		>4.0	HNU - 0 ppm γY - 0 cpm ABOVE BACKGROUND
		S 0656	9	0.5		Hard, (5YR 5/8), yellowish-red, silty CLAY with some sand and gravel, low plasticity, moist		3.0	HNU - 0 ppm γY - 0 cpm ABOVE BACKGROUND
			10	0.5		13.0'		2.5	
			16	0.5		Very hard, (10YR 5/1), gray mottled with (5YR 5/8), yellowish-red CLAY with sand and gravel, low plasticity, moist 13.5'		>4.5	HNU - 0 ppm γY - 0 cpm ABOVE BACKGROUND
			20	0		No recovery 14.0'	NA	NA	
		S 0664	4	0.5		Firm, (5YR 4/4), reddish-brown, silty CLAY with sand and gravel, low plasticity, moist	cl	1.25	HNU - 0 ppm γY - 0 cpm ABOVE BACKGROUND
			9	0.5		15.0'	cl	2.5	
-15.0	-15.00		13	0		No recovery 15.5'	NA	NA	
		S 0665	9	0.5		Firm, (10YR 5/1), gray, gravelly CLAY with sand, low plasticity, moist	cl	1.5	HNU - 0 ppm γY - 0 cpm ABOVE BACKGROUND
			12	0.5		Very firm, (10YR 5/1), gray, gravelly CLAY with sand, low plasticity, moist	cl	2.75	
			16	0.17		17.0'	cl	2.75	

000293

PROJECT NO: 213327
DATE BEGAN: 12-9-91
DRILLER: B. TOOT, K. METERS
GROUND SURFACE ELEV.: NA
DRILLING METHOD: AUGER
CONTRACTOR: PENN DRILLING

BORING NO: 1749
DATE FINISHED: 12-12-91
N: 477300.00'
GWL DATE/TIME: NA

PAGE 2 OF 2
PROJECT NAME: FERNALD
FIELD ENGINEER: G. MARSHALL
E: 1392500.00'
GWL DEPTH: NA
EQUIPMENT: MOBILE DRILLING RIG 60
CHECKED BY: D. AMBROSE

ELEV (FT)	DEPTH (FT)	SAMPLE TYPE AND NO.	BPT BLOWS PER (0.5')	REC (FT)	PROFILE	DESCRIPTION	UNIFIED	OVA (ppm)	REMARKS
		S 0681	11	0.5		Very firm, (5Y 5/1), gray, gravelly CLAY with sand, low plasticity, moist		2.75	HNU - 0 ppm
			20	0.5				2.50	βγ - 0 cpm ABOVE BACKGROUND
			23	0.5		18.5'		2.50	SAMPLE INTERVAL USED FOR DISTURBED GEOTECH
		S 0665	SHELBY TUBE	1.83		Very firm, (5Y 5/1), gray, gravelly CLAY with sand, low plasticity, moist		3.0	HNU - 0 ppm βγ - 0 cpm ABOVE BACKGROUND
-20.0	-20.00	S	TUBE	1.33			cl	2.5	HNU - 0 ppm βγ - 0 cpm ABOVE BACKGROUND
						21.5'			
						No recovery 22.0'	NA	NA	DRILLED AN EXTRA 6" TO TRY TO GET PAST COBBLE
		S 0665	SHELBY TUBE	2.0		Very firm, (5Y 5/1), gray, gravelly CLAY with sand, low plasticity, moist 25.0'	cl	3.0	HNU - 0 ppm βγ - 0 cpm ABOVE BACKGROUND TUBE CRUSHED. LOW RECOVERY. ARCHIVE SAMPLE
-25.0	-25.00	S 0666	7	0.5		Firm, (5Y 5/1), gray, gravelly CLAY with sand, low plasticity, moist			
		S 0667	11	0.5			cl	>4.5	
		S 0668	14	0.5		26.5'			
			18			No recovery 27.0'	NA	NA	
		S 0672	SHELBY TUBE	1.33		Firm, (5Y 5/2), olive gray, gravelly CLAY with sand (fine), low plasticity, moist 30.0'	cl	>4.5	
-30.0	-30.00	S 0676	5	0.5		Very firm, (5Y 5/1), gray, gravelly CLAY, with medium sand, low plasticity, moist		3.0	HNU - 0 ppm βγ - 0 cpm ABOVE BACKGROUND
		S 0676	17	0.5				2.5	
		S 0677	22	0.5				2.75	
		S 0678	27	0.5				2.75	
						BOTTOM OF BORING AT 32.0'			
	-35.00								

000294

PAGE 1 OF 2

PROJECT NO: 313327
DATE BEGAN: 2-10-92
DRILLER: J BARILE C COULTER
GROUND SURFACE ELEV.: NA
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: PENN DRILLING

BORING NO: 1749
DATE FINISHED: 2-11-92
N: 479000.00'
GWL DATE/TIME: NA

PROJECT NAME: FERNALD
FIELD ENGINEER: D. O'BRIEN
E: 1392900.00'
GWL DEPTH: NA
EQUIPMENT: MOBILE DRILL 80
CHECKED BY: D. AMBROSE

ELEV (FT)	DEPTH (FT)	SAMPLE TYPE AND NO.	SPT BLOWS PER (0.5')	REC (FT)	PROFILE	DESCRIPTION	USCS	(OZAKIDOSO 104)	REMARKS
0.0	0.00	S 1501	2	0.5		Firm, (10YR 5/4), yellowish-brown, silty CLAY, no plasticity, slightly moist		1.0	HNU - 0 ppm, βγ - 50 cpm
			3	0.5		1.0'	CI	1.25	HNU - 0 ppm, βγ - 60 cpm
			4	0.25		Very firm, (10YR 5/4), yellowish-brown, silty CLAY, no plasticity, slightly moist 1.5'		2.5	HNU - 0 ppm, βγ - 60 cpm
			6	0		No recovery 2.0'	NA	NA	
		S 1502	5	0.5		Firm, (10YR 5/4), yellowish-brown silty CLAY, no plasticity, slightly moist		2.0	HNU - 0 ppm, βγ - 40 cpm
		S 1504	7	0.5		3.0'	CI	2.0	HNU - 0 ppm, βγ - 40 cpm
		S 1508	9	0.5		Very firm, (10YR 5/4), yellowish-brown, silty CLAY, no plasticity, slightly moist 3.5'		3.0	HNU - 0 ppm, βγ - 60 cpm
			11	0		No recovery 4.0'	NA	NA	
		S 1506	6	0.5		Very firm, (2.5Y 6/3), light yellowish-brown, silty CLAY with gravel, no plasticity, dry		2.0	HNU - 0 ppm, βγ - 50 cpm
			9	0.5			CI	2.25	HNU - 0 ppm, βγ - 50 cpm
-5.0	-5.00		13	0.5		5.5'		2.25	HNU - 0 ppm, βγ - 40 cpm
			17	0.5		Hard, (2.5Y 6/3), light yellowish-brown, silty CLAY with gravel, no plasticity, dry		4.0	HNU - 0 ppm, βγ - 40 cpm
		S 1508	6	0.5		6.5'		4.0	HNU - 0 ppm, βγ - 40 cpm
			11	0		No recovery		NA	
			14	0			NA	NA	
			18	0		8.0'		NA	
		S 1509	SHELBY TUBE	1.5		Very firm, (2.5Y 6/3), light yellowish-brown, silty CLAY with gravel, low plasticity, slightly moist 11.0'		3.5	HNU - 0 ppm, βγ - 60 cpm
-10.0	-10.00	S 1510	14	0.5		Very firm, (5Y 5/1), gray CLAY with gravel, low plasticity, dry	CI	2.0	HNU - 0 ppm, βγ - 60 cpm
			18	0.5		12.0'		3.25	HNU - 0 ppm, βγ - 40 cpm
			27	0.5		Hard, (5Y 5/1), gray CLAY with gravel, no plasticity, dry 12.5'		>4.0	HNU - 0 ppm, βγ - 40 cpm
			36	0.5		Very firm, (5Y 5/1), gray CLAY with gravel, no plasticity, dry 13.0'		2.75	HNU - 0 ppm, βγ - 40 cpm
		S 1511	6	0.5		Firm, (5Y 5/1), gray CLAY with gravel, no plasticity, dry 13.5'		2.0	HNU - 0 ppm, βγ - 60 cpm
		S 1513	7	0.5		Very firm, (5Y 5/1), gray CLAY with gravel, no plasticity, dry		2.25	HNU - 0 ppm, βγ - 60 cpm
		S 1513	14	0.25		14.5'		2.25	HNU - 0 ppm, βγ - 60 cpm
			22	0		No recovery 15.0'	NA	NA	
-15.0	-15.00	S 1517	4	0.5		Very firm, (5Y 5/1), gray CLAY with pockets of poorly graded, coarse sand, low plasticity, wet	CI	2.0	HNU - 0 ppm, βγ - 60 cpm
			9	0.25		16.0'		2.0	HNU - 0 ppm, βγ - 50 cpm
			11	0		No recovery	NA	NA	
			20	0		17.0'		NA	

000295

5861

PAGE 2 OF 2

PROJECT NO: 313327
DATE BEGAN: 3-10-92
DRILLER: J. BARILE C. COULTER
GROUND SURFACE ELEV.: NA
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: PENN DRILLING

BORING NO: 1749
DATE FINISHED: 3-11-92
N: 178000.00'
GWL DATE/TIME: NA

PROJECT NAME: FERNALD
FIELD ENGINEER: D. O'BRIEN
E: 1382900.00'
GWL DEPTH: NA
EQUIPMENT: MOBILE DRILL 80
CHECKED BY: D. AMBROSE

ELEV (FT)	DEPTH (FT)	SAMPLE TYPE AND NO.	SPT BLOWS PER (0.5')	REC (FT)	PROFILE	DESCRIPTION	USCS	OVA (PPM)	REMARKS
		S 1518	7	0.5		Very firm, (5Y 5/1), gray CLAY, some gravel, low plasticity, wet		2.0	HNU - 0 ppm, βγ - 50 cpm
			14	0.5				2.0	HNU - 0 ppm, βγ - 50 cpm
			15	0.5		18.5'		2.0	HNU - 0 ppm, βγ - 60 cpm
			18	0.5		Medium firm, (5Y 5/1), gray CLAY, some gravel, low plasticity, wet 19.0'		0.75	HNU - 0 ppm, βγ - 60 cpm
-20.0	-20.00	6 1521	SHELBY TUBE	2.58		Firm, (5Y 5/1), gray CLAY, some gravel, low plasticity, wet 22.0'	CI	1.75	HNU - 0 ppm, βγ - 60 cpm
		S 1524	8	0.5		Medium firm, (5Y 5/1), gray CLAY, low plasticity, slightly moist 22.5'		0.5	HNU - 0 ppm, βγ - 40 cpm
			12	0.17		Firm, (5Y 5/1), gray CLAY, low plasticity, slightly moist 23.0'		1.0	HNU - 0 ppm, βγ - 40 cpm
			13	0		No recovery	NA	NA	
			15	0		24.0'		NA	
		S 1524	6	0.5		Firm, (5Y 5/1), gray CLAY, some gravel, high plasticity, slightly moist.		1.25	HNU - 0 ppm, βγ - 40 cpm
			8	0.5		25.0'		1.0	HNU - 0 ppm, βγ - 40 cpm
-25.0	-25.00		11	0.5		Medium firm, (5Y 5/1), gray CLAY, some gravel, high plasticity, slightly moist		0.5	HNU - 0 ppm, βγ - 40 cpm
			14	0.5			CI	0.5	HNU - 0 ppm, βγ - 40 cpm
		S 1524	4	0.5				0.75	HNU - 0 ppm, βγ - 40 cpm
			5	0.5		27.0'		0.75	HNU - 0 ppm, βγ - 40 cpm
			7	0.33		Soft, (5Y 5/1), gray CLAY, high plasticity, moist 27.5'		<0.5	HNU - 0 ppm, βγ - 50 cpm
			9	0		No recovery 28.0'	NA	NA	
		S 1528	11	0.5		Soft, (5Y 5/1), gray CLAY, medium plasticity, moist 28.5'		<0.5	HNU - 0 ppm, βγ - 40 cpm
		S 1528	14	0.5		Medium firm, (5Y 5/1), gray CLAY, medium plasticity, moist	CI	.75	HNU - 0 ppm, βγ - 40 cpm
		S 1530	27	0.5		29.5'		0.75	HNU - 0 ppm, βγ - 40 cpm
			31	0		No recovery	NA	NA	
-30.0	-30.00					BOTTOM OF BORING AT 30.0'			

000296

NOTE:
ALL SAMPLE NUMBERS ARE INCREMENTED BY 100,000
ie. 1501 IS 101501

PAGE 1 OF 2

PROJECT NO: 212327
DATE BEGAN: 2-12-92
DRILLER: J. BARILE C. COULTER
GROUND SURFACE ELEV.: NA
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: PENN DRILLING

BORING NO: 1750
DATE FINISHED: 2-13-92
N: 478500.00'
GWL DATE/TIME: NA

PROJECT NAME: FERNALD
FIELD ENGINEER: D. O'BRIEN
E: 1362500.00'
GWL DEPTH: NA
EQUIPMENT: MOBILE DRILL 80
CHECKED BY: D. AMBROSE

ELEV (FT)	DEPTH (FT)	SAMPLE TYPE AND NO.	SPT BLOWS PER (0.5')	REC (FT)	PROFILE	DESCRIPTION	USCS	OVA (BZ=HNU, BZ=OVA)	REMARKS
0.0	0.00	S 1534	2	0.5		Medium firm, (10YR 5/4), yellowish-brown, silty CLAY, low plasticity, slightly moist 0.5'		0.75	HNU - 0 ppm; βγ - 40 cpm
			4	0.5		Firm, (10YR 5/4), yellowish-brown, silty CLAY, low plasticity, slightly moist	CI	1.0	HNU - 0 ppm; βγ - 40 cpm
			6	0.33		1.5'		1.75	HNU - 0 ppm; βγ - 40 cpm
			8	0		No recovery 2.0'	NA	NA	HNU - NA ppm; βγ - NA cpm
		S 1535	3	0.25		Medium firm, (10YR 5/10), yellowish-brown, silty CLAY, low plasticity, slightly moist		0.5	HNU - 0 ppm; βγ - 50 cpm
		S 1537	7	0.5			CI	0.5	HNU - 0 ppm; βγ - 50 cpm
		S 1539	9	0.5		3.5'		0.5	HNU - 0 ppm; βγ - 50 cpm
			12	0		No recovery 4.0'	NA	NA	HNU - NA ppm; βγ - NA cpm
		S 1541	8	0.5		Soft, (2.5Y 5/4), light olive-brown, silty CLAY, some gravel, medium plasticity, moist 4.5'		<.5	HNU - 0 ppm; βγ - 40 cpm
			12	0.5		Very firm, (2.5Y 5/4), light olive-brown, silty CLAY, some gravel, medium plasticity, moist		2.25	HNU - 0 ppm; βγ - 40 cpm
-5.0	-5.00		15	0.5				3.0	HNU - 0 ppm; βγ - 40 cpm
			18	0.5				3.0	HNU - 0 ppm; βγ - 40 cpm
		S 1541	3	0.5				2.0	HNU - 0 ppm; βγ - 50 cpm
			6	0.5				2.0	HNU - 0 ppm; βγ - 50 cpm
			10	0.5			CI	2.5	HNU - 0 ppm; βγ - 50 cpm
			10	0.17				2.5	HNU - 0 ppm; βγ - 50 cpm
		S 1543	SHELBY TUBE	2.08		11.0'		3.5	HNU - 0 ppm; βγ - 50 cpm; HNU - NA ppm; βγ - NA cpm; HNU - NA ppm; βγ - NA cpm; HNU - NA ppm; βγ - NA cpm
-10.0	-10.00		8	0		No recovery		NA	HNU - 0 ppm; βγ - 0 cpm
			11	0			NA	NA	HNU - NA ppm; βγ - NA cpm
			15	0				NA	HNU - NA ppm; βγ - NA cpm
			19	0		13.0'		NA	HNU - NA ppm; βγ - NA cpm
		S 1546	6	0.5		Medium firm, (2.5Y 5/4), light olive-brown, silty CLAY with gravel, medium plasticity, moist 13.5'		0.75	HNU - 0 ppm; βγ - 50 cpm
			6	0.5		Very firm, (2.5Y 5/4), light olive-brown, silty CLAY with gravel, medium plasticity, moist 14.0'		2.25	HNU - 0 ppm; βγ - 50 cpm
		S 1547	11	0.5		Firm, (5Y 5/1), gray CLAY with gravel, low plasticity, slightly moist 14.5'	CI	1.5	HNU - 0 ppm; βγ - 50 cpm
			20	0.33		Medium firm, (5Y 5/1), gray CLAY with gravel, low plasticity, slightly moist 15.0'		0.75	HNU - 0 ppm; βγ - 50 cpm
-15.0	-15.00	S 1548	6	0.5		Very firm, (2.5Y 5/4), light olive-brown, silty CLAY, low plasticity, moist 15.5'		2.25	HNU - 0 ppm; βγ - 60 cpm
		S 1549	7	0.5		Very firm, (5Y 5/1), gray CLAY with gravel, low plasticity, moist 16.0'		2.5	HNU - 0 ppm; βγ - 60 cpm
			9	0		No recovery	NA	NA	HNU - NA ppm; βγ - NA cpm
			14	0		17.0'		NA	HNU - NA ppm; βγ - NA cpm

PAGE 2 OF 2

PROJECT NO: 313327
DATE BEGAN: 3-12-92
DRILLER: J. BARILE C. COULTER
GROUND SURFACE ELEV.: NA
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: PENN DRILLING

BORING NO: 1750
DATE FINISHED: 3-13-92
N: 478500.00'
GWL DATE/TIME: NA

PROJECT NAME: FERNALD
FIELD ENGINEER: D. O'BRIEN
E: 1382500.00'
GWL DEPTH: NA
EQUIPMENT: MOBILE DRILL 80
CHECKED BY: D. AMBROSE

ELEV (FT)	DEPTH (FT)	SAMPLE TYPE AND NO.	SPT BLOWS PER (0.5')	REC (FT)	PROFILE	DESCRIPTION	USCS	OVA (PPM)	REMARKS
		S 1550	6	0.5		Very Firm, (5Y 5/1), gray CLAY with gravel, low plasticity, wet	cl	2.5	HNU - 0 ppm, βγ - 50 cpm
			10	0.25		18.0'		2.5	HNU - 0 ppm, βγ - 50 cpm
			13	0		No recovery	NA	NA	HNU - NA ppm, βγ - NA cpm
			15	0		19.0'		NA	HNU - NA ppm, βγ - NA cpm
		S 1551	SHELBY TUBE	1.42		Hard, (5Y 5/1), gray CLAY with gravel, low plasticity, moist 22.0'	cl	>4.0	HNU - 0 ppm, βγ - 50 cpm; HNU - 0 ppm, βγ - 50 cpm; HNU - 0 ppm, βγ - 50 cpm; HNU - NA ppm, βγ - NA cpm; HNU - NA ppm, βγ - NA cpm; HNU - NA ppm, βγ - NA cpm
-20.0	-20.00								
		S 1552	10	0.5		Hard, (5Y 5/1), gray, gravelly CLAY, no plasticity, moist		>4.0	HNU - 0 ppm, βγ - 60 cpm
		S 1554	12	0.5		23.0'		>4.0	HNU - 0 ppm, βγ - 60 cpm
		S 1556	14	0.5		Very Firm, (5Y 5/1), gray, gravelly CLAY, no plasticity, moist 23.5'		3.5	HNU - 0 ppm, βγ - 60 cpm
		S 1558	18	0.5		Hard, (5Y 5/1), gray, gravelly CLAY, no plasticity, moist 24.0'		>4.0	HNU - 0 ppm, βγ - 60 cpm
		S 1560	10	0.5		Firm, (5Y 5/1) gray, gravelly CLAY, no plasticity		1.75	HNU - 0 ppm, βγ - 40 cpm
			11	0.33		25.0'		1.5	HNU - 0 ppm, βγ - 40 cpm
-25.0	-25.00		14	0		No recovery	NA	NA	HNU - NA ppm, βγ - NA cpm
			13	0		26.0'		NA	HNU - NA ppm, βγ - NA cpm
		S 1560	4	0.5		Firm, (5Y 5/1), gray, gravelly CLAY, low plasticity, wet	cl	1.25	HNU - 0 ppm, βγ - 40 cpm
			4	0.5		27.0'		1.25	HNU - 0 ppm, βγ - 40 cpm
			6	0		No recovery	NA	NA	HNU - NA ppm, βγ - NA cpm
			7	0		28.0'		NA	HNU - NA ppm, βγ - NA cpm
		S 1562	6	0.5		Very Firm, (5Y 5/1), gray, gravelly CLAY, low plasticity, wet	cl	2.0	HNU - 0 ppm, βγ - 60 cpm
		S 1564	8	0.5				2.0	HNU - 0 ppm, βγ - 60 cpm
		S 1566	9	0.5				2.0	HNU - 0 ppm, βγ - 60 cpm
		S 1568	11	0.5				2.5	HNU - 0 ppm, βγ - 60 cpm
-30.0	-30.00					BOTTOM OF BORING AT 30.0'			

000298

NOTE:
ALL SAMPLE NUMBERS ARE INCREMENTED BY 100,000 i.e. 1534 IS 101534

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER. 602.3.23	PROJECT NAME. FEMP RI/FS	
BORING NUMBER: 2399	COORDINATES:	DATE 11-19-91
ELEVATION:	GWL: Depth 64.04 Date/Time 11-22-91	DATE STARTED: 11-19-91
ENGINEER/GEOLOGIST. J. Lear	Depth 63.12 Date/Time 12-9-91	DATE COMPLETED: 12-10-91
DRILLING METHODS: Cable Tool		PAGE 1 OF 8

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1	33581 0950 11-19-91	4 7 9	8	Med dense, Pale brown (10yr, 6/3) Silt, Some organics, dry	ML	NA	Hno - 0 ppm BD - 40 cpm α - 0 cpm
2 3	33582 0955 11-19-91	6 9 12	2	Hard, yellowish brown (10yr, 5/8) silty clay, Low plasticity, Sl. moist.	CL	>4.0	Hno - 0 ppm BD - 40 cpm α - 0 cpm
4	33583 1000 11-19-91	7 13 16	10	Hard, yellowish brown, (10yr, 5/4) silty clay, Some gravel, Low plasticity, Sl. moist.	CL	>4.0	Hno - 0 ppm BD - 40 cpm α - 0 cpm
5 6	33584 1005 11-19-91	25 28 30	13	S.A.A. add 10yr, 5/8	CL	>4.0	Hno - 0 ppm BD - 40 cpm α - 0 ppm
7	33585 1010 11-19-91	4 11 36	12	Hard, Pale Brown to yellowish brown (10yr, 6/3) silty clay, trace gravel, laminar sand, (10yr, 5/4) dry to sl. moist.	CL	>4.0	Hno - 0 ppm BD - 40 cpm α - 0 cpm
8 9	33586 1015 11-19-91	50/4	4	Hard, Pale brown to brown, (10yr, 6/3 to 10yr 5/3) silty clay, trace gravel, low plast. dry to sl. moist.	CL	>4.0	Hno - 0 ppm BD - 40 cpm α - 0 cpm
10	33587 1025 11-19-91	11 11 26	6	V. stiff, yellowish brown, (10yr, 5/4) silty clay. Trace gravel, Low to mod plasticity, moist.	CL	2.5	Hno - 0 ppm BD - 40 cpm α - 0 cpm
11 12	33588 1040 11-19-91	9 14 18	9	Hard, gray to yellowish brown, (10yr, 5/1 to 10yr 5/4) silty clay, Trace sand, Trace gravel, ~~med~~ Low plasticity, sl moist.	CL	>4.0	Hno - 0 ppm BD - 40 cpm α - 0 cpm
13	33589 1335 11-19-91	10 30 29	10	V. stiff, gray (10yr, 5/1) silty clay, Some gravel, trace sand, Low plasticity, Sl. moist	CL	3.5	Hno - 0 ppm BD - 40 cpm α - 0 cpm
14	33590 1340 11-19-91	10 10 26	12	J.L 11-19-91 Hard, S.A.A 14.0 ft	CL	3.5	Hno - 0 ppm BD - 50 cpm α - 0 cpm
15				Hard, yellowish brown, (10yr, 5/4) silty clay, Some sand, laminar gravel, moist. Low plast.	CL	4.5	

NOTES
Drilling Contractor - Penn Drilling
Drilling Equipment - Cyclone 45
Driller - Craig Coulter
Asst - Gary Dye

S.A.A. Same as Above
N.R. No Recovery
Sl. - Slightly

Background
Hno - 0 ppm
BY - 40 cpm
α - 0 cpm

000299

402-11-86

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2399	COORDINATES:	DATE 11-19-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 11-19-91
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED: 12-10-91
DRILLING METHODS: Cable Tool		PAGE 2 OF 8

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
16	33592 J.L. 11-19-91 1345 11-19-91	14 16 20	7	v. stiff, gray (10yr, 5/1) silty clay, trace gravel, low plasticity, sl. moist.	CL	3.25	Hnu - 0 ppm Bz - 40 cpm α - 0 cpm
17	33593 J.L. 11-19-91 1400 11-19-91	3 6 13	10	v stiff, gray, (10yr, 5/1) silty clay, some gravel, laminar sand, low plast. sl moist.	CL	3.5	Hnu - 0 ppm Bz - 40 cpm α - 0 cpm
18							
19	33599 1415 11-19-91	10 16 25	6	S.A.A. no sand.	CL	3.5	Hnu - 0 ppm Bz - 40 cpm α - 0 cpm
20	33594 J.L. 11-19-91 1420 11-19-91	4 6 9	11	stiff, gray, (10yr, 5/1) silty clay, trace gravel med. plasticity, moist.	CL	1.75	Hnu - 0 ppm Bz - 40 cpm α - 0 cpm
21							
22	33595 J.L. 11-19-91 1425 11-19-91	6 9 13	15	S.A.A. -21.75 FT med. dense, gray (10yr, 6/1) clayey silt, trace sand, moist.	CL / ML	1.75 / NA	Hnu - 0 ppm Bz - 40 cpm α - 0 ppm
23	33596 J.L. 11-19-91 1435 11-19-91	7 8 15	0	N.R	NA	NA	NA
24							
25	33598 J.L. 11-21-91 0920 11-21-91	9 15 22	8	very stiff, gray, (10yr, 5/1) silty clay, trace gravel, med plasticity, moist.	CL	5.75	Hnu - 0 ppm Bz - 50 cpm α - 0 cpm
26	33598 0930 11-21-91	4 6 9	J.L. 11-21-91 8 12	med dense, gray, (10yr 5/1) silt, very moist -26.0' very stiff, gray (10yr, 5/1) silt clay, trace gravel, low to med plasticity, moist.	ML / CL	NA / 2.75	Hnu - 0 ppm Bz - 50 cpm α - 0 cpm
27							
28	~~33600~~ 33599 0940 11-21-91	50/4 J.L. 11-21-91	4	v. dense, yellowish brown, (10yr, 5/6) well sorted med sand, trace gravel, moist.	SP	NA	Hnu - 0 ppm Bz - 50 cpm α - 0 cpm
29				Sand and gravel Aquifer met at 27.0 ft. Samples will be taken at 5.0 ft intervals starting at 30.0 ft			
30							

NOTES see pg 1

000300

402-11-86

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS		
BORING NUMBER: 2399	COORDINATES:		DATE 11-21-91
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 11-19-91
ENGINEER/GEOLOGIST: J. Lear	Depth	Date/Time	DATE COMPLETED: 12-10-91
DRILLING METHODS: cable tool			PAGE 3 OF 8

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
30							
31	33600 0955 11-21-91	21 35 31	15	V. dense, gray (10yr, 6/1) gravel clay sand mixture, V. moist. -30.7 ft V. dense, yellowish brown (10yr, 5/6) well sorted med sand some gravel, moist.	GC SP	NA NA	H_{AV} - 0 ppm Bg - 50 cpm α - 0 cpm
32							
33							
34							
35	J.L. 11-21-91						
36	33602 1600 11-21-91	50/5	3	S.A.A	SP	NA	H_{AV} - 0 ppm Bg - 50 cpm α - 0 cpm
37							
38							
39							
40	J.L. 11-21-91						
41	33602 1630 11-21-91	50/5	5	S.A.A.	SP	NA	H_{AV} - 0 ppm Bg - 50 cpm α - 0 cpm
42							
43							
45							
45							

NOTES: See page 1

000301

402-11-01

5861

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.5.23	PROJECT NAME: FEMP RI/FS		
BORING NUMBER: 2399	COORDINATES:		DATE 11-21-91
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 11-19-91
ENGINEER/GEOLOGIST: J. Lear	Depth	Date/Time	DATE COMPLETED: 12-10-91
DRILLING METHODS: Cable Tool			PAGE 4 OF 8

DEPTH (Ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
45	J.L. 11-21-91						
46	33605 1715 11-21-91	11 50/4	8	v. dense, yellowish brown (10yr. 5/4) well sorted, fine sand, trace gravel, moist	SP	NA	Hnu - 0 ppm; βδ - 50 cpm; α - 0 cpm
47							
48							
49							
50	J.L. 11-21-91						
51	33606 1730 11-21-91	13 50/5	10	S.A.A	SP	NA	Hnu - 0 ppm; βδ - 50 cpm; α - 0 cpm
52							
53							
54							
55	J.L. 11/22/91						
56	33607 0855 11-22-91	25 50/3	4	S.A.A	SP	NA	Hnu - 0 ppm; βδ - 50 cpm; α - 0 cpm
57							
58							
59							
60							

NOTES see pg 1

000302

402-11-86

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS		
BORING NUMBER: 2399	COORDINATES:		DATE 11-22-91
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 11-19-91
ENGINEER/GEOLOGIST: J. Lear	Depth	Date/Time	DATE COMPLETED: 12-10-91
DRILLING METHODS:			PAGE 5 OF 8

DEPTH (Ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
60							
61	33608 0925 11-22-91	20 50/5	7	V. dense, dark yellowish brown (10yr 4/4) well sorted sand, some gravel, some silt, moist.	SP	NA	Hnu - 0 ppm BB - 50cpm α - 0cpm
62							
63							
64							
65	11-22-91						
66	33608 1005 11-22-91	22 31 37	6	V. dense, grayish brown, (10yr. 5/2) poorly sorted gravelly sand, trace silt, wet.	SW	NA	Hnu - 0 ppm BB - 50cpm α - 0cpm
67							
68							
69							
70	33608 1045 11-22-91	28 50/5	7	S.A.A	SW	NA	Hnu - 0 ppm BB - 50cpm α - 0cpm
71							
72							
73							
74							
75							

NOTES: See page 1

000303

402-11-8

VISUAL CLASSIFICATION OF SOILS

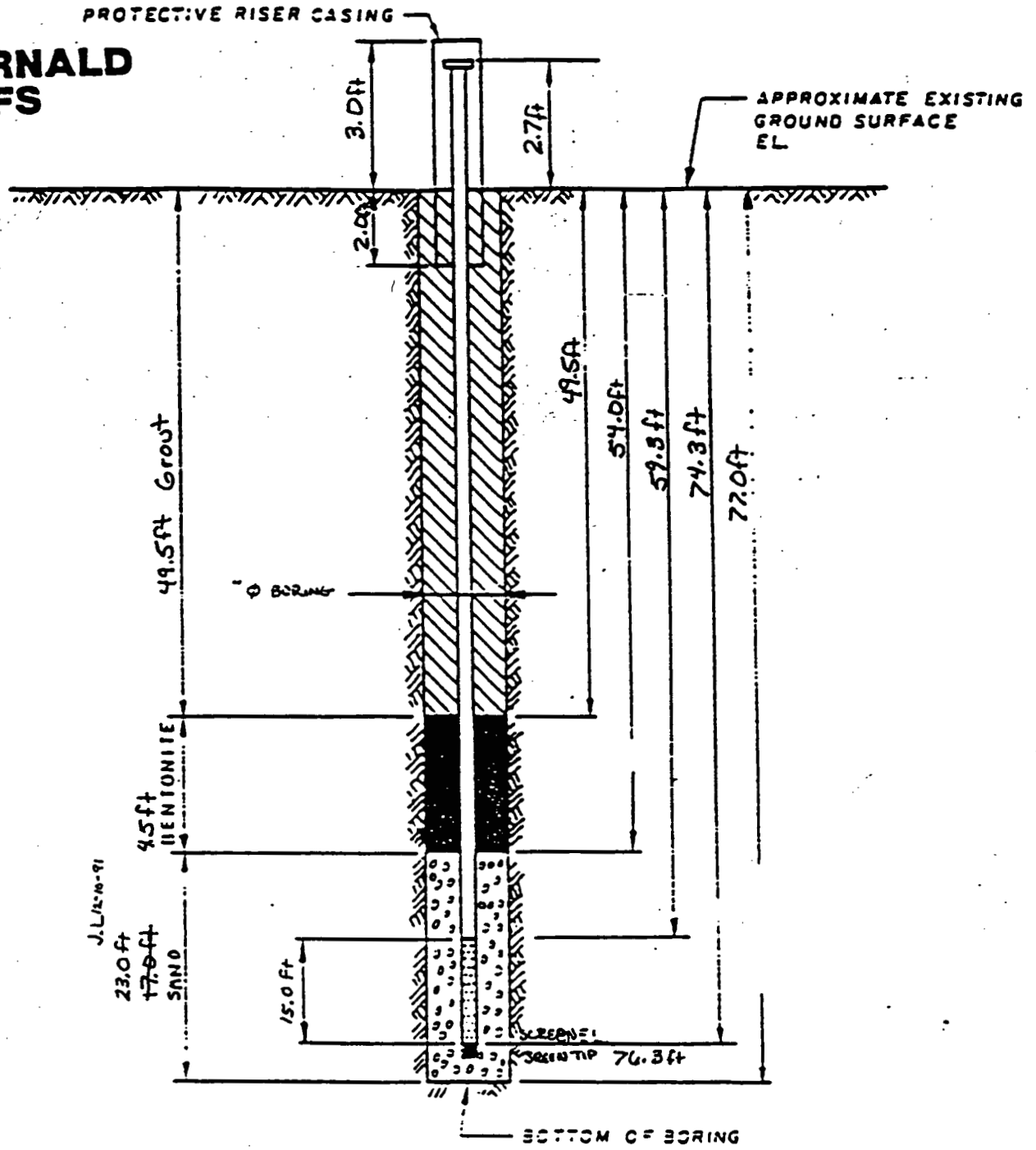
PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2399	COORDINATES:	DATE 11-22-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 11-19-91
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED: 12-10-91
DRILLING METHODS: cable tool		PAGE 6 OF 8

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
75							
76	33609 1120 11-22-91	6 10 10	13	med dense, dark grayish brown, (10yr. 4/2) sandy gravel, trace silt, wet.	GW	NA	Hnu - 0 ppm BB - 50 cpm α - 0 cpm
77				Drilling ends at ~~73~~.0 ft J.L. 11-22-91 Sampling ends at 76.5 ft			

NOTES: See page 1

000304

FERNALD RI/FS



DRAWING NUMBER	
CHECKED BY	
APPROVED BY	
J. Lear 12-10-91	
DRAWN BY	

NOTES:

1. RISER PIPE IS 9.0 IN ID SCHEDULE 40 PIPE, THREADED, FLUSH-JOINTED.
2. SCREEN IS 9.0 IN I.D SS PIPE CONTINUOUS SLOT SCREEN (0.010 IN SLOT SIZE).
3. LOWER END OF SCREEN IS CAPPED.
4. ELEVATION OF WATER LEVEL 63.12 Ft.
5. WATER LEVEL READING ON 12-9-91

500 gals H_2O used
11 80 lb bags of 10x20 sand used
17 bags (50 lb) volclay grout used
4 5 gal buckets of bentonite used

INSTALLATION DETAILS
MONITORING WELL
2399
PREPARED FOR
Fernald RI/FS

000.05

FERNALD RI/FS

PIEZOMETER INSTALLATION SHEET 5861

PROJECT NAME FEMP RI/FS FIELD ENG./GEO. J. Lear DATE 12-10-91
PROJECT NO. 1602.3.23 CHECKED BY _____ DATE _____
BORING NO. 2399
PIEZOMETER NO. 2399 DATE OF INSTALLATION 12-9-91 - 12-10-91

BOREHOLE DRILLING

DRILLING METHOD Cable Tool
DRILLING FLUID (S) USED:
FLUID H_2O FROM 0 ft TO 77 ft
FLUID NA FROM NA TO NA

TYPE OF BIT Cable Tool
CASING SIZE (S) USED:
SIZE 8 in FROM 0 ft TO 80 ft
SIZE NA FROM NA TO NA

PIEZOMETER DESCRIPTION

TYPE 4 in Schedule 40 stainless
DIAMETER OF PERFORATED SECTION 4.0 in
PERFORATION TYPE:
SLOTS ☐ HOLES ☐ Slotted SCREEN ☑
AVERAGE SIZE OF PERFORATIONS .010 in
TOTAL PERFORATED AREA 15 ft

RISER PIPE MATERIAL Schedule 40 Stainless
RISER PIPE DIAMETERS:
O.D. 4.35 I.D. 4.0
LENGTH OF PIPE SECTIONS 10 ft, 5 ft, 2 ft
JOINING METHOD Threaded flush Jointed

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5.0 ft
PROTECTIVE PIPE O.D. 10.75

OTHER PROTECTION Hinged Cap, Locked. Well cap, vented

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION ( )	
TOP OF RISER PIPE	2.7			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.0			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 0.5	BOTTOM 49.0	TOP	BOTTOM
BENTONITE	TOP J.L. 12-10-91 49.5	BOTTOM 54.0	TOP	BOTTOM
SAND	TOP 54.0	BOTTOM 77.0	TOP	BOTTOM
J.L. 12-10-91 ~~GRAVEL~~	TOP NA	BOTTOM NA	TOP	BOTTOM
PERFORATED SECTION	TOP 59.3	BOTTOM 74.3	TOP	BOTTOM
PIEZOMETER TIP	76.3			
BOTTOM OF BOREHOLE	77.0			
GWL AFTER INSTALLATION	63.12			

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES ☐ NO ☑
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES ☐ NO ☑

REMARKS _____

000306

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2400	COORDINATES:	DATE 12-12-91
ELEVATION:	GWL: Depth 63.4 Date/Time 12-21-91/1230	DATE STARTED: 12-12-91
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 12-20-91
DRILLING METHODS: Cable Tool 10" drill bit		PAGE 1 OF 8/10

K.M. 1-16-92

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0	12-12-91 1410 53625	3 5 5	11	Stiff yellowish brown (10 YR, 5/4) CLAYEY SILT with organic matter, moist	ML	1.5	Hnu = .2 ppm Br = 60 cpm α = 0 cpm
.9 / 1.5	12-12-91 1415 53626	5 13 15	10	Hard yellowish brown (10YR, 5/4) SILTY CLAY with sand and some black weathering, a little organic matter, damp, non plastic	CL	>4.5	Hnu = .2 ppm Br = 60 cpm α = 0 cpm
2.3 / 3.0	12-12-91 1420 53627	15 16 20	6	Hard light yellowish brown (2.5Y, 6/4) SILTY CLAY with sand and a little fine gravel, dry, non plastic	CL	>4.5	Hnu = .2 ppm Br = 60 cpm α = 0 cpm
3.5 / 4.5	12-12-91 1430 53628	18 18 18	10	Hard light yellowish brown (2.5Y, 6/4) SILTY CLAY with sand and trace fine gravel, damp, non plastic	CL	4.5	Hnu = .2 ppm Br = 60 cpm α = 0 cpm
5.3 / 6.0	12-12-91 1435 53629	17 17 16	10	Hard light yellowish brown (2.5Y, 6/4) SILTY CLAY with sand and a little gravel, damp, non plastic	CL	4.5	Hnu = .2 ppm Br = 60 cpm α = 0 cpm
6.8 / 7.5							

NOTES:
Drilling Company: Pennsylvania Drilling
Driller: Dave Newman
Assistant Driller: Bob Johnson

Samples Collected per ASTM Standard Penetration Test
Colors Identified using Munsell Color Chart

Hnu = A01343	.2 ppm	Background Levels
Br S/N: 73937	60 cpm	
α S/N: 73908	0 cpm	

-02-11-66

000207

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS 5861	DATE: 12-12-91
BORING NUMBER: 2400	COORDINATES:	DATE STARTED: 12-12-91
ELEVATION:	GWL: Depth 63.4 Date/Time 12-21-91/1230	DATE COMPLETED: 12-20-91
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	PAGE 2 OF 8/10
DRILLING METHODS: CABLE Tool 10" drill bit		

K.M. 1-16-92

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
7.5	12-12-91 1440 53630	13 12 21	0	No Recovery	N/A	N/A	Hnu= Br= α= N/A
9.0 9.5	12-12-91 1450 53631	13 21 30	6	Stiff light yellowish brown (2.5Y, 6/4) CLAY with some sand and fine gravel, moist, medium plasticity	CL	1.5	Hnu= .2 ppm Br= 60 cpm α= 0 cpm
10.5 11	12-16-91 1314 53632	8 12 18	6	Stiff light yellowish brown (2.5Y, 6/4) SANDY CLAY with gravel, moist medium plasticity	CL	1.5	Hnu= .2 ppm Br= 40 cpm α= 0 cpm
12	12-16-91 1325 53633	12 28 31	18	Very stiff gray (2.5Y, 5/0) SANDY CLAY with gravel, damp, low plasticity	CL	3.0	Hnu= .2 ppm Br= 40 cpm α= 0 cpm
13.5 13.75	12-16-91 1345 53634	7 9 12	3	Same as above	CL	3.0	Hnu= .2 ppm Br= 40 cpm α= 0 cpm
15							

NOTES:

On 12-16-91 Gary Dye was the Assistant Driller

12-16-91
Hnu S/N: A01343 .2 ppm
Br S/N: 73937 40 cpm
α S/N: 73908 0 cpm
} Background Levels

-02-11-66

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS		DATE 12-16-91
BORING NUMBER: 2400	COORDINATES:		DATE STARTED: 12-12-91
ELEVATION:	GWL: Depth 63.4	Date/Time 12-21-91/1230	DATE COMPLETED: 12-20-91
ENGINEER/GEOLOGIST: Ken Marion	Depth	Date/Time	PAGE 3 OF 8 10
DRILLING METHODS: CABLE Tool 10" Drill Bit			

.. K.M. 1-16-92

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15 – 16	12-16-91 1400 53635	3 5 8	12	Very stiff gray (5Y, 5/1) SANDY CLAY with gravel, damp, low plasticity	CL	3.0	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
16.5 – 17	12-16-91 1410 53636	3 4 8	6	Same as above	CL	3.0	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
18 – 19	12-16-91 1430 53637	3 8 10	12	Very stiff gray (5Y, 5/1) SANDY CLAY with gravel, damp, medium plasticity	CL	2.0	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
19.5	12-16-91 1540 53638	3 6 9	0	No Recovery	N/A	N/A	N/A
21 – 22 – 22.5	12-16-91 1645 53639	5 9 9	12	Very stiff gray (5Y, 5/1) SANDY CLAY with gravel, damp, medium plasticity	CL	2.5	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm

NOTES

VISUAL CLASSIFICATION OF SOILS

5861

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	K.M. 1-16-91
BORING NUMBER: 2400	COORDINATES:	DATE 12-16-91
ELEVATION:	GWL: Depth 63.4 Date/Time 12-21-91 1230	DATE STARTED: 12-12-91
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 12-20-91
DRILLING METHODS: Cable Tool 10" drill bit		PAGE 4 OF 8/10

K.M. 1-16-92

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
22.5	12-16-91 1655 53640	2 4 5	14	Loose olive brown (2.5Y, 4/3) medium SAND with trace gravel, dry	SP	N/A	Hnu = .2 ppm BγI = 40 cpm α = 0 cpm
23.7							
24	12-17-91 0900 53641	4 6 12	12	Medium dense grayish brown (2.5Y, 5/2) medium SAND with trace gravel, dry	SP	N/A	Hnu = .2 ppm BγI = 40 cpm α = 0 cpm
25							
				Samples will be taken at 5 ft. intervals			
30							

NOTES:

12-17-91

Hnu S/N: 711111	.2 ppm	Background Levels
BγI S/N: 73937	40 cpm	
α S/N: 73908	0 cpm	

402-11-86

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2400	COORDINATES:	DATE: 12-17-91
ELEVATION:	GWL: Depth 63.4 Date/Time 12-21-91/1250	DATE STARTED: 12-12-91
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 12-20-91
DRILLING METHODS: Cable Tool 10" drill bit		PAGE 5 OF 8/10

K.M. 1-6-92

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
30	12-17-91 0945 53642	39 45 49	14	Very dense light yellowish brown (2.5Y, 6/3) gravelly SAND, dry	SW	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
31.5							
35	12-17-91 1015 53643	19 18 23	18	Same as above but dense	SW	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
36.5							
40	12-17-91 1120 53644	10 17 20	15	Same as above	SW	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
41.5							
45							

NOTES:

00311

402-11-66

VISUAL CLASSIFICATION OF SOILS

861

PROJECT NUMBER: 602-3-23	PROJECT NAME: FEMP RI/FS		
BORING NUMBER: 2400	COORDINATES:	DATE 12-17-91	
ELEVATION:	GWL: Depth 63.4 Date/Time 12-21-91 / 1230	DATE STARTED: 12-12-91	
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 12-20-91	
DRILLING METHODS: Cable Tool 10" drill bit		PAGE 6 OF ~~8~~ 10	

K.M. 1-6-92

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
45	12-17-91 1430 53645	17 49 50	18	Same as above but very dense	SW	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
46.5							
50	12-17-91 1520 53646	6 15 27	14	Same as above but dense	SW	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
55	12-17-91 1600 53647	39 50	12	Very dense light yellowish brown (2.5Y, 6/3) Sandy Gravel dry	GW	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
56							
56.5							
60							

NOTES:

000312

402-11-88

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3-23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2400	COORDINATES:	DATE 12-18-91
ELEVATION:	GWL: Depth 63.4 Date/Time 12-21-91/1230	DATE STARTED: 12-12-91
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 12-20-91
DRILLING METHODS: Cable Tool 10" drill bit		PAGE 7 OF 8/10

K.M. 1-16-92

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
60							
60.8 / 61.5	12-18-91 0915 53648	3 6 9	10	Medium dense grayish brown (2.5Y, 5/2) medium sand with fine gravel, damp	SP	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
63.4				Water Level ▽			The water level = 63.4 ft below the ground surface on 12-21-91 at 1230
65	12-18-91 1030 53649	5 6 13	10	Medium dense grayish brown (2.5Y, 5/2) fine gravel with sand, wet	GW ~~SW~~ KM 12-18-91	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
66							
70	12-18-91 1417 53650	2 3 5	18	~~Medium dense~~ KM 12-18-91 Loose grayish brown (2.5Y, 5/2) SAND with ~~fine~~ KM 12-18-91 a little gravel, wet	SW	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
71.5							
75							

NOTES:

000013

12-18-91

Hnu S/N: 711111	.2 ppm	Background Levels
Bγ S/N: 73937	40 cpm	
α S/N: 73800	0 cpm	

402-11-86

VISUAL CLASSIFICATION OF SOILS

5861

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS		
BORING NUMBER: 2400	COORDINATES:	DATE 12-18-91	
ELEVATION:	GWL: Depth 63.4 Date/Time 12-21-91 1230	DATE STARTED: 12-12-91	
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 12-20-91	
DRILLING METHODS: Cable Tool 10" drill bit		PAGE 8 OF 8/10	

K.M. 1-16-92

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
75	12-18-91 1500 53651	3 6 9	14	Medium dense gray with brown (2.5Y, 5/2) SAND with fine gravel, wet	SW	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
76.5							
80	12-18-91 1549 53652	5 7 6	5	Same as above	SW	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
8...				Bottom of Bore Hole Drilled to 80 ft. Depth of sampling - 81.5 ft.			

NOTES:

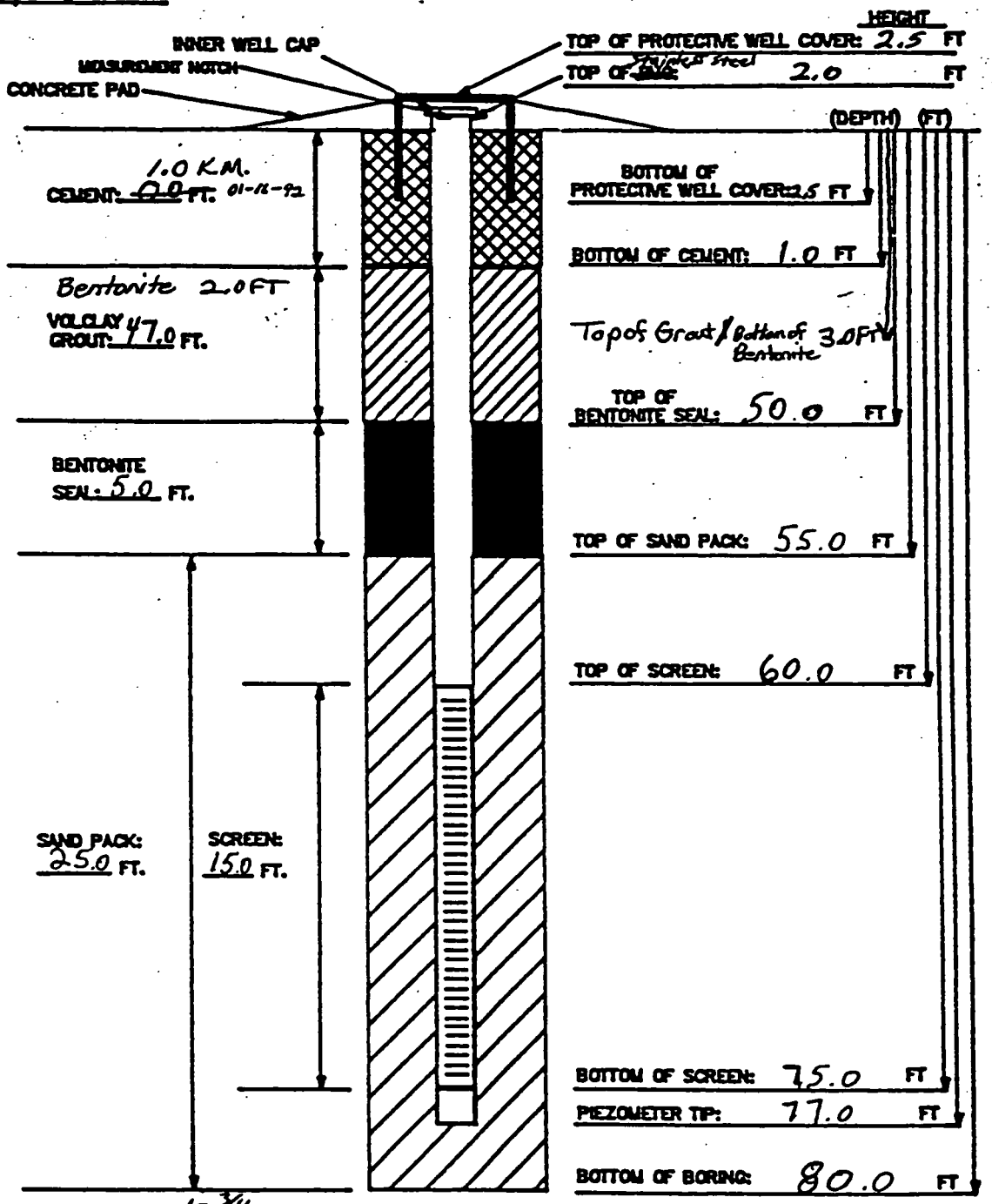
000314

402-11-86

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO. 2400

INSTALLATION DATE: 12-20-91



BOREHOLE DIAMETER: 10 3/4 INCHES

MATERIALS USED:
SAND TYPE AND QUANTITY: 430 Sand, 14 bags
BENTONITE PELLETS (5-GALLON BUCKETS): 11
BAGS OF VOLCLAY GROUT: 9
AMOUNT OF CEMENT: 1/2 bag
AMOUNT OF WATER USED: 800 gallons
OTHER:

NOTES:
1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE; FLUSH-THREADED JOINTS.
2) SCREEN IS 2-INCH I.D. SCHEDULE 40 PVC PIPE WITH 0.020-INCH SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH/DATE: 63.4 ft. / 12-21-91
5) TOP OF PVC IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK.
6) PARENTHESES INDICATE DEPTH BELOW GROUND LEVEL.

TASK: 602.3.23 GEOLOGIST/ENGINEER: Ken Marion

000315

5861

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FEMP RI/FS FIELD ENG./GEO Ken Marion DATE 12-22-91
PROJECT NO. 602 3.23 CHECKED BY C Gula DATE 01/16/92
BORING NO. 2400
PIEZOMETER NO. ~~2400~~ ~~N/A~~ 2400 K.M. 12-22-91 DATE OF INSTALLATION 12-20-91

BOREHOLE DRILLING

DRILLING METHOD Cable Tool	TYPE OF BIT 10" churn bit
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID Water FROM 0.0 TO 80.0	SIZE 10 3/4 in FROM 0.0 TO 80.0
FLUID ____ FROM ____ TO ____	SIZE ____ FROM ____ TO ____

PIEZOMETER DESCRIPTION

TYPE Cable Tool	RISER PIPE MATERIAL 316 Stainless Steel
DIAMETER OF PERFORATED SECTION 40 in. I.D.	RISER PIPE DIAMETERS:
PERFORATION TYPE:	O.D. 4 3/8" I.D. 40
SLOTS ☑ HOLES ☐ SCREEN ☐	LENGTH OF PIPE SECTIONS 60 (6 - 10 ft. Section, 1 - 2 ft. Section)
AVERAGE SIZE OF PERFORATIONS .010	JOINING METHOD flush - Joint Threaded
TOTAL PERFORATED AREA 15 ft.	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5 ft.	OTHER PROTECTION Steel Well Cover with lock
PROTECTIVE PIPE O.D. 10 3/4 in.	

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft.)		ELEVATION (ft.)	
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS:	Top 0.0	Bottom 1.0		
CEMENT GROUT/SLURRY	TOP 3.0	BOTTOM 50.0	TOP	BOTTOM
BENTONITE	TOP 1.8 30.0	BOTTOM 3.0 55.0	TOP	BOTTOM
SAND	TOP 55.0	BOTTOM 80.0	TOP	BOTTOM
GRAVEL	TOP N/A	BOTTOM N/A	TOP N/A	BOTTOM N/A
PERFORATED SECTION	TOP 60.0	BOTTOM 75.0	TOP	BOTTOM
PIEZOMETER TIP	77.0			
BOTTOM OF BOREHOLE	80.0			
GWL AFTER INSTALLATION	63.4 ft. on 12-21-91			

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES ☐ NO ☑
SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES ☐ NO ☑
REMARKS The temporary casing was removed during the installation of the well

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2	PROJECT NAME: Fernald RI/FS	
BORING NUMBER: B368	COORDINATES:	DATE: Jan 20, 1988
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: Jan 20, 1988
ENGINEER/GEOLOGIST: Lowell/Wilke	Depth Date/Time	DATE COMPLETED: Jan. 28, 1988
DRILLING METHODS: Cable Tool		PAGE 1 OF 12

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (1/2 ft)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1	07764 945	1 6 6	11	soft black 7½YR 2/0 silty clay some sand-moist	ol	0.5	HNU=0ppm γβ=80cpm α=0cpm
2	07765 950	4 5 5	9	stiff yellowish brown 10YR 5/6 clay some silt, trace sand-moist; stiff brownish yellow 10YR 6/6 silty clay trace sand, caliche lens at 3.0 ft, moist	cl	2.0	HNU=0ppm γβ=60cpm α=0cpm
3						2.0	
4	07766 955	3 3 4	11	stiff brownish yellow 10YR 6/6 clay trace sand and silt-moist		<1	HNU=0ppm γβ=80cpm α=0cpm
5	07767 1000	6 6 8	12	Stiff brownish yellow 10YR 6/6 silty clay trace sand-moist		1.5	HNU=0ppm γβ=60cpm α=0cpm
6							
7	07768 1005	10 11 13	14	very stiff brownish yellow 10YR 6/6 silty clay, trace sand-moist		2.5	HNU=0ppm γβ=60cpm α=0cpm
8	07769 1125	7 10 25	15	very stiff brownish yellow 10YR 6/6 clay with trace silt and sand-moist 9.0		3.5	HNU=0ppm γβ=60cpm α=0cpm
9							
10	07980 1145	6 12 12	11	very stiff gray 7½YR 5/0 clay trace sand and gravel-moist	cl	3.5	HNU=0ppm γβ=60cpm α=0cpm
11	NO	SAMPLE					Tried Shelby tube-No Return
12	07981 1430	4 7 5	6	Stiff gray 7½YR 5/0 silty clay ~~with~~ some gravel and sand-moist		1.25	HNU=0ppm γβ=40cpm α=0cpm
13	NO	SAMPLE					Tried Shelby Tube No Return
14	07982 1515	8 9 15	9	very stiff gray 7½YR 5/0 clay some gravel and sand, trace pebbles-moist		3.5	HNU=0ppm γβ=60cpm α=0cpm

NOTES: Pennsylvania Drilling Co.
Driller Don Neeman
Helper Bob Johson

Background
HNU = 0ppm
γβ = 80cpm
α = 2cpm

Blows on sampler follow ASTM for Standard penetration test for 2in diameter by 2 ft length standard split spoon
Soil color discriptions follow Munsell color chart

water added to boring (5 gallon buckets) ~~IIII IIII IIII IIII IIII IIII IIII IIII IIII IIII~~

FERNALD RI/FS

5861

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2	PROJECT NAME: Fernald RI/FS	
BORING NUMBER: B368	COORDINATES:	DATE: Jan 20, 1988
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: Jan 20, 1988
ENGINEER/GEOLOGIST: L. Wille/J. O'Connor	Depth Date/Time	DATE COMPLETED: Jan 28, 1988
DRILLING METHODS: Cable Tool		PAGE 2 OF ~~(2)~~ 12

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (1/2 FT)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
16	7983 1530	5 11 16	14	~~gray~~ very stiff gray 7½YR 4/0 clay, some silt, gravel, trace sand - moist		4.5	HNU = 0ppm βB = 100cpm α = 2cpm
17 18	7984 1550	5 11 18	18	very stiff gray 7½YR 5/0 clay ~~trace~~ some gravel, trace silt and sand - moist	cl	4.0	HNU = 0ppm βB = 100cpm α = 2cpm
19	7985 1610	12 21 20	18	very stiff dark gray 7½YR 4/0 silty clay some sand and gravel - moist		3.0	HNU = 0ppm βB = 60cpm α = 0cpm
20 21	7986 820	5 6 10	11	stiff dark gray 7½YR 4/0 silty clay with some sand and gravel - moist	cl	1.5	HNU = 0ppm βB = 40 cpm α = 0 cpm
22	7987 845	3 16 40	15	very stiff gray 7½YR 5/0 silty clay some sand and trace gravel - moist 21½		2.0	HNU = 0ppm βB = 60 cpm α = 2 cpm
23 24	7988 930	34 37 32	12	loose gray 2½Y 5/0 silty sand trace gravel - dry	SM	NA	HNU = 0ppm βB 40 α = 0 cpm
25	7989 945	16 23 33	12	dense gray 5Y 5/1 sand some gravel and silt, trace pebbles - moist	SW	NA	HNU = 0ppm βB = 60 cpm α = 4 cpm
26							
27							
28							
29							

NOTES:

000318

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2	PROJECT NAME: Fernald RI/FS	
BORING NUMBER: B368	COORDINATES:	DATE: Jan 21, 1988
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: Jan 20, 1988
ENGINEER/GEOLOGIST: L Wille/J O'Connor	Depth Date/Time	DATE COMPLETED: Jan 28, 1988
DRILLING METHODS: Cable Tool		PAGE 3 OF ~~10~~ 12

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (½ ft)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
31	7990 1405	8 16 16	9	dense gray 5Y 6/1 sand, some gravel trace silt and pebbles-dry	SP	NA	HNU=0ppm γβ=60cpm α=20cpm
32							
33							
34							wood encountered while drilling 30-35 ft
35	7991 1550	8 45 50r	17	very dense gray 5Y 6/1 sand some gravel ~~trace~~ silt-dry	SP	NA	HNU=0ppm γβ=80cpm α=0cpm
36							
37							
38							
39							
40	7992 1600	12 24 22	17	medium dense gray 5YR 6/1 medium to coarse sand, some coarse sand silt and clay - dry	SP SW	NA	HNU=0ppm γβ=60cpm α=0cpm
41							
42							
43							
44							

NOTES:

000319

FERNALD RI/FS

5861

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2	PROJECT NAME: Fernald RI/FS	
BORING NUMBER: B368	COORDINATES:	DATE: Jan 21, 1988
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: Jan 20, 1988
ENGINEER/GEOLOGIST: L. Wille/J. O'Connor	Depth Date/Time	DATE COMPLETED: Jan. 28, 1988
DRILLING METHODS: Cable tool		PAGE 4 OF ~~#~~ 12

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (½ FT)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
46	7993 1645	27 25 35	14	very dense gray 5YR 6/1 gravelly sand some pebbles, trace silt-dry	SM GP	NA	HNU = 0 ppm ββ: 60 cpm α = 0 cpm
47							
48							
49							
50	7994 950	30 28 23	14	very dense gray 7½YR 6/ sand and gravel, some silt and clay dry	SM GP	NA	HNU = 0 ppm ββ = 60 cpm α = 0 cpm
51							
52							
53							
54							
55	7995 1155	9 24 50+	18	very dense gray 7½YR 6/ sand and gravel, some silt and clay - dry	SM	NA	HNU = 0 ppm ββ = 60 cpm α = 0 cpm
56							
57							
58							
59							

NOTES:

000320

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.32	PROJECT NAME: Fernald RI/FS	
BORING NUMBER: 13368	COORDINATES:	DATE: Jan 22, 1988
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: Jan 20, 1988
ENGINEER/GEOLOGIST: L. Wille/T. O'Connor	Depth Date/Time	DATE COMPLETED: Jan 28, 1988
DRILLING METHODS: Cable tool		PAGE 5 OF ~~17~~ 12

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (½ ft)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
61	7996 1400	12 15 11	11	medium dense gray 10YR 5/1 gravelly coarse sand some pebbles, silt and fine to medium sand - wet	gm	NA	HNU = 0 ppm γβ = 70 cpm α = 0 cpm
62							
63							
64							
65	7997 1540	25 40 40	18	very dense gray 5Y 5/1 sandy gravel some pebbles and silt wet	gm	NA	HNU = 0 ppm γβ = 80 cpm α = 0 cpm
66							
67							
68							
69							
70	7998 1630	7 10 10	10	dense gray 5YR 5/1 sand and gravel some silt, clay and pebbles - wet	gm	NA	HNU = 0 ppm γβ = 60 cpm α = 0 cpm
71							
72							
73							
74							

NOTES:

000221

FERNALD RI/FS

5861

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 60232	PROJECT NAME: Fernald RI/FS	
BORING NUMBER: B358	COORDINATES:	DATE: Jan 23, 1988
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: Jan 20, 1988
ENGINEER/GEOLOGIST: L.W. Ile / J.O. Camp	Depth Date/Time	DATE COMPLETED: Jan 28, 1988
DRILLING METHODS: Cable Tool		PAGE 6 OF ~~12~~ 12

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 1½ (ft)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
76	7999 930	6 15 23	14	dense olive gray 5Y 5/2 sandy gravel some pebbles, trace silt and clay - wet	gm	NA	HNU = 0 ppm; γβ = 80 cpm; α = 0 cpm
77							
78							
79							
80	8000 1015	6 5 8	14	medium dense gray 7½YR 5/0 sandy gravel some silt, clay and pebbles - wet	gm	NA	HNU = 0 ppm; γβ = 20 cpm; α = 0 cpm
81							
82							
83							
84							
85	8001 1335	17 36 32	12	very dense gray 7½YR 5/0 gravelly sand some pebbles, trace silt and clay - wet	gm	NA	HNU = 0 ppm; γβ = 40 cpm; α = 0 cpm
86							
87							
88							
89							

NOTES:

000322

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2	PROJECT NAME: Fernald RI/FS	
BORING NUMBER: B368	COORDINATES:	DATE: Jan 23, 1988
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: Jan 20, 1988
ENGINEER/GEOLOGIST: L. Wille/J. O'Connor	Depth Date/Time	DATE COMPLETED: Jan 28, 1988
DRILLING METHODS: Cable ~~Int~~ Tool		PAGE 7 OF ~~10~~ 12

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (1/2 FT)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
91	1500 8002	9 19 21	18	dense gray 10YR 5/1 sandy gravel with some pebbles, trace silt-wet			HNU=0ppm γβ=40cpm α=0cpm
92							
93							
94							
95	910 8003	29 72	12	very dense gray 7½YR 5/1 coarse sand with some silt and trace clay-wet			HNU=0ppm γβ=40cpm α=0cpm
96							
97							
98							
99							
100	945 8004	4 6 11	18	medium dense gray 5YR 5/1 gravelly sand, some silt, trace clay and pebbles-wet			HNU=0cpm γβ=80cpm α=0cpm
101							
102							
103							
104							

NOTES:

000323

402-11-86

FERNALD RI/FS

5861

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2	PROJECT NAME: Fernald RI/FS	
BORING NUMBER: B368	COORDINATES:	DATE: Jan 24, 1988
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: Jan 20, 1988
ENGINEER/GEOLOGIST: L. Wille/J O'Connor	Depth Date/Time	DATE COMPLETED: Jan 28, 1988
DRILLING METHODS: Cable Tool		PAGE 8 OF 12

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (1/2 FT)	RECOVERY (FT)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
106	8005 1100	6 32 54/4	15	very dense gray 10YR 5/0 sand, some gravel, silt and clay, trace pebbles - wet	SM	NA	HNU = 0 ppm γβ = 60 cpm α = 2 cpm
107							
108							
109							
110	8006 1145	5 7 7	13	medium dense gray 7½YR 5/1 sand and gravel, some silt and clay, trace pebbles - wet	SM	NA	HNU = 0 ppm γβ = 4 cpm α = 2 cpm
111							
112							
113							
114							
115	8007 1445	12 32 54	18	very dense 7½YR 5/0 sand some gravel, silt and clay - wet	SM	NA	HNU = 0 ppm γβ = 60 cpm α = 1 cpm
116							
117							
118							
119							

NOTES:

000324

402-11-86

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2	PROJECT NAME: Fernald RI/FS	
BORING NUMBER: B368	COORDINATES:	DATE: Jan 25, 1988
ELEVATION:	GWL: Depth 60.3 Date/Time 1/25/88 2200	DATE STARTED: Jan 20 1988
ENGINEER/GEOLOGIST: T. Sullivan	Depth Date/Time	DATE COMPLETED: Jan 28 1988
DRILLING METHODS: Cable Tool		PAGE 9 OF 12

DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (1/2 ft.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
121	1/25/88 0345 08002	7 6 7	8	med. dense, gray 10YR 4/1 sand with some gravel, trace pebbles, trace silt and clay wet.	Sm	NA	HNU = 0ppm HB = 60ppm α = 2cpm
122							
123							
124							
125	1/25/88 10:35 08007	13 17 8	11	med. dense, gray 10YR 4/1 gravelly sand, some pebbles, trace silt and clay, wet.	Sm	NA	HNU = 0ppm HB = 30ppm α = 2cpm
126							
127							
128							
129							
130	1/25/88 1345 08010	10 17 12	12	med. dense, gray 10YR 4/1, gravelly sand, some pebbles, some silt, WET.	Sm	NA	HNU = 0ppm HB = 60ppm α = unknown, not functioning.
131							
132							
133							
134							

NOTES:

000325

402-11-86

5861

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 606.3.2	PROJECT NAME: Fernald RI/FS	
BORING NUMBER: 3363	COORDINATES:	DATE: Jan. 25, 1988
ELEVATION:	GWL: Depth 60.45 Date/Time 1/26/88 0715	DATE STARTED: Jan. 20, 1988
ENGINEER/GEOLOGIST: T. Sullivan	Depth Date/Time	DATE COMPLETED: Jan 28, 1988
DRILLING METHODS: Cable Tool		PAGE 10 OF 12

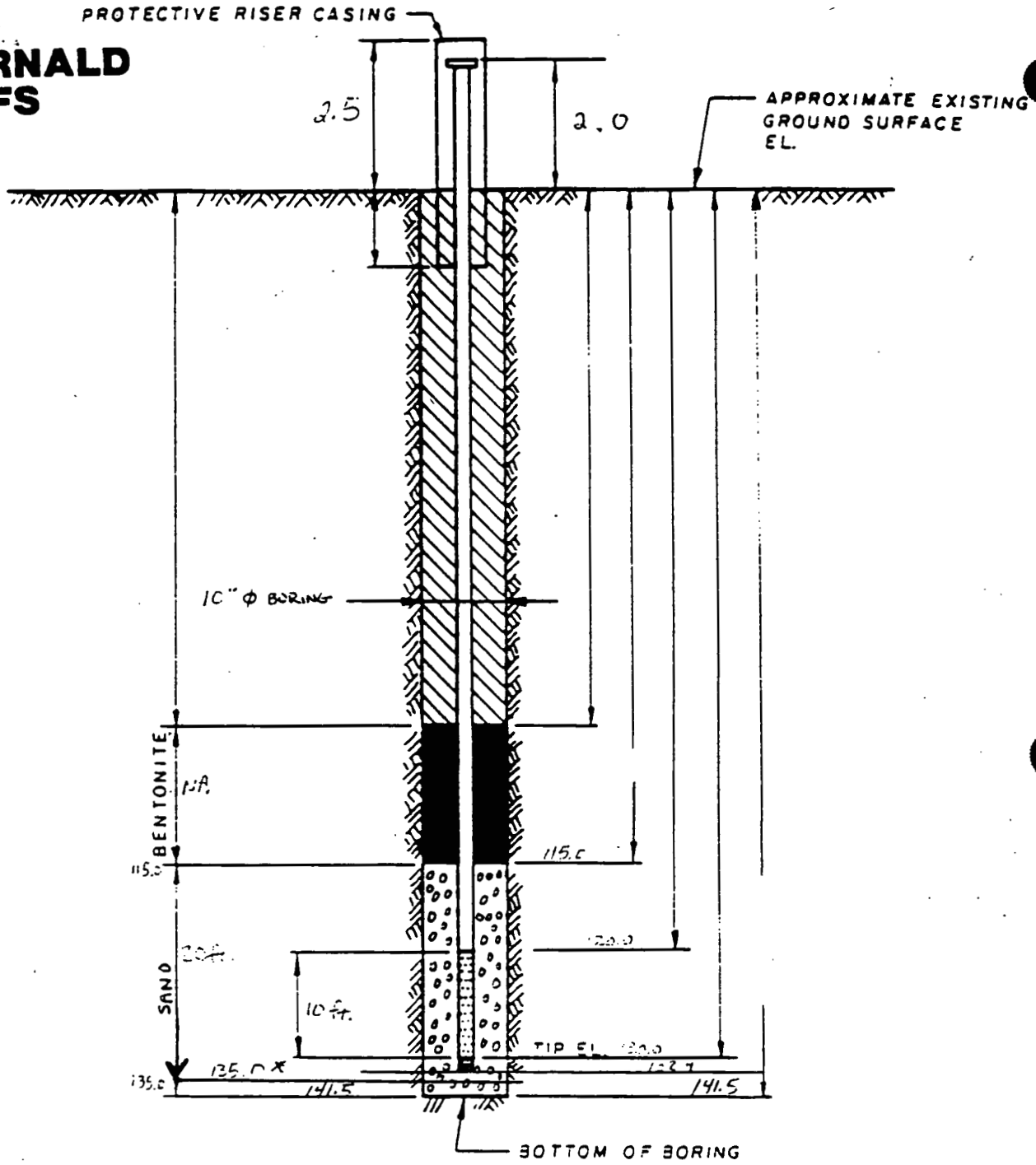
DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (1/2 ft.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
135	1/25/88 1505 08011	6 6 12	3	med. dense, gray 10YR4/1, sand, trace gravel and silt, wet.	SM	NA	HNU = 0ppm HB = 60cpm α = 2cpm
136							
137							
138							
139							
140	1/25/88 1630 08012	42 44 45	16	very dense, gray 10YR4/1 sand, some silt, trace gravel, wet. 140.5	SM	NA	HNU = 0ppm HB = 100cpm α = 2cpm
				very dense, gray 10YR4/1 sandy gravel, some pebbles, some silt, wet	SP		
142				Bottom of Boring 141½ ft			
				E.O.B. 141.5			

NOTES:

000326

402-11-86

FERNALD RI/FS



DRAWING NUMBER

CHECKED BY

APPROVED BY

DRAWN BY

NOTES:

1. RISER PIPE IS 4 IN I.D. SCHEDULE PIPE, THREADED, FLUSH-JOINTED.
2. SCREEN IS 4 IN I.D S.S. PIPE CONTINUOUS SLOT SCREEN (0.010 IN SLOT SIZE).
3. LOWER END OF SCREEN IS CAPPED.
4. ELEVATION OF WATER LEVEL 61.65 ft.
5. WATER LEVEL READING ON 2/3/82, 16:30

INSTALLATION DETAILS
MONITORING WELL B368

PREPARED FOR

000327

* Bottom 5 ft. of boring caved in with natural formation sand and gravel, sand pack placed above cave in.

12/12 PAC

FERNALD RI/FS

5861

PIEZOMETER INSTALLATION SHEET

PROJECT NAME Fernald RI/FS FIELD ENG./GEO. T. Sullivan DATE 2/3/93
PROJECT NO. 602.3.8 CHECKED BY _____ DATE _____
BORING NO. B368
PIEZOMETER NO. 368 DATE OF INSTALLATION 1/26/93 – 2/3/93

BOREHOLE DRILLING

DRILLING METHOD Cable Tool	TYPE OF BIT Drive Shoe
DRILLING FLUID (S) USED: NA	CASING SIZE (S) USED: NA
FLUID _____ FROM _____ TO _____	SIZE _____ FROM _____ TO _____
FLUID _____ FROM _____ TO _____	SIZE _____ FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE Monitoring Well	RISER PIPE MATERIAL Stainless steel
DIAMETER OF PERFORATED SECTION 4in.	RISER PIPE DIAMETERS:
PERFORATION TYPE:	O.D. 4 3/8 in. I.D. 4in.
SLOTS ☐ HOLES ☐ SCREEN ☒	LENGTH OF PIPE SECTIONS 10 ft./2 ft.
AVERAGE SIZE OF PERFORATIONS 0.010 in.	JOINING METHOD Screw joints.
TOTAL PERFORATED AREA 3 in²/ft.	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5 ft.	OTHER PROTECTION Padlock on cap
PROTECTIVE PIPE O.D. 10 3/4 in.	of protective pipe.

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft.)		ELEVATION ( )	
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 0	BOTTOM 115.0	TOP	BOTTOM
BENTONITE	TOP NA	BOTTOM NA	TOP	BOTTOM
SAND	TOP 115.0	BOTTOM 135.0	TOP	BOTTOM
GRAVEL	TOP NA	BOTTOM NA	TOP	BOTTOM
PERFORATED SECTION	TOP 120.0	BOTTOM 130.0	TOP	BOTTOM
PIEZOMETER TIP	132.4			
BOTTOM OF BOREHOLE	141.5			
GWL AFTER INSTALLATION	61.65			

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES ☐ NO ☒
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES ☐ NO ☒

000328

REMARKS _____

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 3431	COORDINATES:	DATE 11-4-92
ELEVATION: 591.6	GWL: Depth 73.3 FT Date/Time 11-24-92/1400	DATE STARTED: 11-4-92
ENGINEER/GEOLOGIST: Michael Worley	Depth Date/Time	DATE COMPLETED: 11-24-92
DRILLING METHODS: Cable Tool		PAGE 1 OF 15 16

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 (in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1	0920 103215 11-4-92	3 4 7	15	medium stiff (10YR, 4/4) dark yellowish brown silty clay, trace organics, moist, medium plasticity	Cl	1.0	OVM = 0 ppm Bγ = 20 cpm α = 0 cpm
2 3	0925 103216 11-4-92	5 14 14	10	~~SAA~~ Medium stiff (10YR, 5/6) yellowish brown silty clay, medium plasticity, moist	Cl	1.0	OVM = 0 ppm Bγ = 20 cpm α = 0 cpm
4	0930 103217 11-4-92	14 26 50/.4	8	stiff (10YR, 5/6) yellowish brown clay, trace gray mottling, low plasticity, trace limestone gravel, slightly moist	Cl	2.0	OVM = 0 ppm Bγ = 20 cpm α = 0 cpm
5 6	0935 ~~103~~ 11-4-92 11-4-92	50/0	0.	NO RECOVERY	N/A	N/A	OVM = N/A ppm Bγ = N/A cpm α = N/A cpm
7	1300 103218 11-4-92	12 28 36	5	stiff (10YR, 5/6) yellowish brown silty clay, trace gravel, low plasticity, slightly moist	Cl	2.0	OVM = 0 ppm Bγ = 20 cpm α = 0 cpm
8 9	1305 103219 11-4-92	50/.3	6	Very stiff, SAA	Cl	2.5	OVM = 0 ppm Bγ = 20 cpm α = 0 cpm
10	1330 103220 11-4-92	10 17 25	14	SAA, gray mottling	Cl	3.0	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm
11 12	1340 103221 11-4-92	16 26 40	16	Very stiff (10YR, 5/1) gray clay trace gravel, low plasticity, slightly moist	Cl	3.0	OVM = 0 ppm Bγ = 20 cpm α = 0 cpm
13	1400 103222 11-4-92	16 21 26	18	Very stiff ~~SAA~~ (10YR, 4/1) dark gray clay, trace gravel, low plasticity, slightly moist	Cl	3.5	OVM = 0 ppm Bγ = 20 cpm α = 0 cpm
14 15	1410 103223 11-4-92	40 50 36	18	Very stiff (10YR 4/1) dark gray ~~SAA~~ silty clay, trace gravel, low plasticity, slightly moist	Cl	3.5	OVM = 0 ppm Bγ = 20 cpm α = 0 cpm

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: 72 Speedstar

Driller: Joe Barile
Rick Pierce

SAA - SAME AS ABOVE
NA - NOT Applicable

Background { OVM = 0 ppm, Bγ = 20 cpm, α = 0 cpm

* Samples collected per ASTM Standard Penetration Test
* All Colors identified by Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I		
BORING NUMBER: 3431	COORDINATES:	DATE 11-4-92	
ELEVATION:	GWL: Depth 73.3 FT Date/Time 11-24-92/1430	DATE STARTED: 11-4-92	
ENGINEER/GEOLOGIST: Michael Worley	Depth: Date/Time	DATE COMPLETED: 11-24-92	
DRILLING METHODS: Cable Tool		PAGE 2 OF ~~13~~ 16	

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 (IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
16	1420 103224 11-4-92	13 26 21	12	Very stiff (10YR, 5/1) gray Clay, trace sand and gravel, low plasticity, slightly moist	Cl	2.5	OVM = 0 ppm Bγ = 20 cpm α = 0 cpm
17 18	1505 103225 11-4-92	7 12 21	12	Very stiff (10YR 5/1) ~~SAA~~ gray silty clay, trace gravel, ~~SAA~~ low plasticity, slightly moist	Cl	2.5	OVM = 0 ppm Bγ = 20 cpm α = 0 cpm
19	1515 103226 11-4-92	18 28 18	12	Very stiff (10YR, 5/1) gray clay trace silt, trace gravel, low plasticity, slightly moist	Cl	2.75	OVM = 0 ppm Bγ = 20 cpm α = 0 cpm
20 21	1640 103227 11-4-92	45 10 10	3	Stiff (10YR, 5/1) gray gravely Clay, trace sand, medium plasticity, moist	Cl	1.5	OVM = 0 ppm Bγ = 20 cpm α = 0 cpm
22	1650 N/A 11-4-92	2 5 7	0	NO RECOVERY	N/A	N/A	N/A
23 24	1700 103228 11-4-92	2 5 11	4	medium stiff (10YR, 5/1) gray gravely clay, medium plasticity, moist	Cl	1.0	OVM = 0 ppm Bγ = 20 cpm α = 0 cpm
25	1720 103229 11-4-92	6 7 9	3	medium dense (10YR, 5/1) gray Clayey gravel, no plasticity, wet	GC	N/A	OVM = 0 ppm Bγ = 20 cpm α = 0 cpm
26 27	1400 N/A 11-5-92	3 5 6	0	NO RECOVERY	N/A	N/A	N/A
28	1410 103230 11-5-92	4 7 11	3	Soft (10YR, 5/1) gray gravely clay, medium plasticity, moist.	Cl	0.5	OVM = 0 ppm Bγ = 20 cpm α = 0 cpm
29 30	1600 N/A 11-5-92	5 5 9	0	NO RECOVERY	N/A	N/A	OVM = N/A ppm Bγ = N/A cpm α = N/A cpm

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: 72 Speedstar

Driller: Joe Barile
Rick Pierce

* Samples collected per ASTM Standard Penetration Test.
* All colors identified by the Munsell Color Chart.

SAA - SAME AS ABOVE
NA - NOT Applicable

Background { OVM = 0 ppm, Bγ = 30 cpm, α = 0 cpm

000330

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 6002.04.07	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 3431	COORDINATES:	DATE: 11-5-92
ELEVATION:	GWL: Depth 73.3 FT Date/Time 11-24-92/1430	DATE STARTED: 11-4-92
ENGINEER/GEOLOGIST: Michael Worley	Depth Date/Time	DATE COMPLETED: 11-24-92
DRILLING METHODS: Cable Tool		PAGE 3 OF ~~13~~ 16

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 (in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (tsf)	REMARKS
31	1605 103231 11-5-92	14 12 12	12	Stiff (10YR, 5/1) gray clay, trace sand, trace gravel, medium plasticity, moist	CI	1.0	ovm = 0 ppm Bγ = 30 cpm α = 0 cpm Base of fill
32 33	1620 103232 11-5-92	50/.4	8	Very dense (2.5Y, 5/6) light olive brown well graded sand, trace gravel, dry	SW	N/A	ovm = 0 ppm Bγ = 30 cpm α = 0 cpm
34 35				* Next sample at 35.0 feet. Samples will be collected at 5.0 feet intervals from 35.0 feet.			
36	1645 103233 11-5-92	50/.5	3	Very dense (2.5Y, 5/6) light olive brown well graded sand, trace gravel, dry	SW	N/A	ovm = 0 ppm Bγ = 30 cpm α = 0 cpm
37 38 39							
40 41	0950 103234 11-6-92	5 50/.4	5	Very dense (2.5Y, 5/6) light olive brown well graded coarse sand, trace gravel, dry	SW	N/A	ovm = 0 ppm Bγ = 30 cpm α = 0 cpm
42 43 44 45							

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: 72 Speed star

Driller: Joe Barile
Rick Pierce

* Samples collected per ASTM Standard Penetration Test
* All colors identified by the Munsell Color Chart

SAA - SAME AS ABOVE
NA - NOT APPLICABLE

Background { ovm = 0 ppm, Bγ = 30 cpm, α = 0 cpm

000331

VISUAL CLASSIFICATION OF SOILS

586

PROJECT NUMBER. 602.04.27	PROJECT NAME. RCRA Phase I	
BORING NUMBER: 3431	COORDINATES:	DATE 11-6-92
ELEVATION:	GWL: Depth 73.3 FT Date/Time 11-24-92/1430	DATE STARTED: 11-4-92
ENGINEER/GEOLOGIST. Michael Worley	Depth Date/Time	DATE COMPLETED: 11-24-92
DRILLING METHODS: Cable Tool		PAGE 4 OF ~~13~~ 16

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 (in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
46	1320 103235 11-6-92	13 50/.4	6	Very dense (2.5Y, 5/6) light olive brown well graded gravelly sand, slightly moist	SW	N/A	ovm = 0 ppm βγ = 30 cpm α = 0 cpm
47							
48							
49							
50	1355 103236 11-6-92	18 45 40	18	SAA	SW	N/A	ovm = 0 ppm βγ = 30 cpm α = 0 cpm
51							
52							
53							
54							
55	1500 103237 11-6-92	7 50/.4	6	Very dense (2.5Y, 5/4) light olive brown well graded sand, trace gravel, slightly moist	SW	N/A	ovm = 0 ppm βγ = 30 cpm α = 0 cpm
56							
57							
58							
59							
60							

NOTES:

Drilling Contractor Pennsylvania Drilling

Drilling Equipment 72 Speedstar

Driller: Joe Barile
Rick Pierce

SAA - SAME AS ABOVE
NA - NOT Applicable

Background { ovm = 0 ppm, βα = 30 cpm, α = 0 cpm

*Samples collected per ASTM Standard Penetration Test
*Colors identified by the Munsell Color Chart

000332

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER. 602.04.27	PROJECT NAME. RCRA Phase I	
BORING NUMBER: 3431	COORDINATES:	DATE 11-6-92
ELEVATION:	GWL: Depth 73.3 FT Date/Time 11-24-92/1430	DATE STARTED: 11-4-92
ENGINEER/GEOLOGIST. Michael Worley	Depth Date/Time	DATE COMPLETED: 11-24-92
DRILLING METHODS: Cable Tool		PAGE 5 OF ~~13~~ 16

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 (IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
61	1530 103238 11-6-92	14 40 40	15	Very dense (2.5Y, 5/3) light olive brown well graded sand, trace gravel, slightly moist	SW	N/A	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm
62							
63							
64							
65	1630 103239 11-6-92	7 40 50/.0	12	Very Dense (2.5Y 5/3) light olive brown, SAA, well graded gravelly sand, slightly moist.	SW	N/A	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm
66							
67							
68							
69							
70	1720 103240 11-6-92	10 50/.4	10	SAA, moist	SW	N/A	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm
71							
72							
73							
74							
75				▼ * water table at 75.0 FT			

NOTES:

Drilling Contractor Pennsylvania Drilling

Drilling Equipment 72 Speedstar

Driller: Joe Barile
Rick Pierce

SAA - SAME AS ABOVE
NA - NOT APPLICABLE

Background { OVM = 0 ppm, Bα = 30 cpm, α = 0 cpm

*Samples collected per ASTM standard Penetration Test
*Colors identified by the Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

5861

PROJECT NUMBER. 602.04.27	PROJECT NAME. RCRA Phase I		
BORING NUMBER: 3431	COORDINATES:	DATE 11-19-92	
ELEVATION:	GWL: Depth 73.3 FT Date/Time 11-24-92/1430	DATE STARTED: 11-4-92	
ENGINEER/GEOLOGIST. Michael Worley	Depth Date/Time	DATE COMPLETED: 11-24-92	
DRILLING METHODS: Cable Tool		PAGE 6 OF ~~13~~ 16	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 (in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
76	1425 105201 11-10-92	21 50/.4	8	Very dense (2.5Y, 5/3) light olive brown well graded gravel, trace sand, wet	GW	N/A	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm
77							
78							
79							
80	1615 105202 11-10-92	40 21 20	10	SAA	GW	N/A	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm
81							
82							
83							
84							
85	0950 105203 11-11-92	50/.3	2	Very dense (2.5Y, 5/3) light olive brown clayey gravel, wet.	GC	N/A	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm
86							
87							
88							
89							
90							

NOTES:

Drilling Contractor Pennsylvania Drilling

Drilling Equipment 72 Speedstar

Driller: Joe Barile
Rick Pierce

SAA - SAME AS ABOVE
NA - NOT APPLICABLE

Background { OVM = 0 ppm, Bα = 30 cpm, α = 0 cpm

- Samples collected per ASTM Standard Penetration Test
* Colors identified by the Munsell Color Chart

000334

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I		
BORING NUMBER: 3431	COORDINATES:	DATE 11-11-92	
ELEVATION:	GWL: Depth 73.3 FT Date/Time 11-24-92/1430	DATE STARTED: 11-4-92	
ENGINEER/GEOLOGIST: Michael Worley	Depth Date/Time	DATE COMPLETED: 11-24-92	
DRILLING METHODS: Cable Tool		PAGE 7 OF ~~13~~ 16	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	REC/VERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
91	1020 105204 11-11-92	26 31 27	13	Very dense (2.5Y, 5/3) light olive brown, well graded sand, trace gravel, wet	SW	N/A	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm
92							
93							
94							
95							
96	1320 105205 11-11-92	50/.3	4	SAA	SW	N/A	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm
97							
98							
99							
100							
101	1345 105206 11-11-92	5 17 21	8	Dense (2.5Y, 5/3) light olive brown well graded gravel, trace coarse sand, wet	GW	N/A	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm
102							
103							
104							
105							

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: 72 Speedstar

Driller: Joe Barile
Rick Pierce

SAA - SAME AS ABOVE
NA - NOT Applicable

Background { OVM = 0 ppm, Bα = 30 cpm, α = 0 cpm

* Samples collected per ASTM Standard Penetration Test
* Colors identified by the Munsell Color Chart

000335

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 3431	COORDINATES:	DATE 11-11-92
ELEVATION:	GWL: Depth 73.3 FT Date/Time 11-24-92/1430	DATE STARTED: 11-4-92
ENGINEER/GEOLOGIST: Michael Worley	Depth: Date/Time	DATE COMPLETED: 11-24-92
DRILLING METHODS: Cable Tool		PAGE 8 OF 15 16

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 (IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
106	1510 105207 11-11-92	50/.3	4	Very dense (2.5Y, 5/3) light olive brown poorly graded coarse sand, trace gravel, wet	SP	N/A	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm
107							
108							
109							
110							
111	1550 105208 11-11-92	25 25 25	7	Dense (2.5Y, 5/3) light olive brown gravely sand, well graded MW 11-13-92	SW	N/A	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm
112							
113							
114							
115							
116	0900 105211 11-13-92	10 29 36	14	Very dense (2.5Y, 5/3) light olive brown well graded sand, trace gravel, wet	SW	N/A	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm
117							
118							
119							
120							

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: 72 Speedstar

Driller: Joe Barile
Rick Pierce

SAA - SAME AS ABOVE
NA - NOT Applicable

Background { OVM = 0 ppm, Bα = 30 cpm, α = 0 cpm

- Samples collected per ASTM Standard Penetration Test
* Colors identified by the Munsell Color Chart

000330

VISUAL CLASSIFICATION OF SOILS

NUMBER. 602.04.20	PROJECT: RCRA Phase I		
NUMBER: 3431			DATE 11-13-92
	GWL	Date/Time 11-24-92/1430	DATE STARTED: 11-4-92
GEOLOGIST. Michael Worley		Date/Time	DATE COMPLETED: 11-24-92
METHODS: Cable Tool			PAGE 9 OF 15 16

	SAMPLE NO.	BLOWS PER 6 IN	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	3 7 9	6	Medium dense (2.5Y, 5/4) light olive brown well graded sand, trace gravel. Moist	SW	N/A	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm
	3 6 11	8	SAA	SW	N/A	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm
		12	Very dense, SAA	SW	N/A	OVM = 0 ppm Bγ = 30 cpm α = 0 cpm

SAA - SAME AS ABOVE
NA - NOT Applicable

Background { OVM = 0 ppm, Bα = 30 cpm, α = 0 cpm

Pennsylvania Drilling
Cable
Rock Rebold
collected per ASTM standard Penetration Test
identified by the Munsell Color Chart

000337

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 3431	COORDINATES:	DATE: 11-16-92
ELEVATION:	GWL: Depth 73.3 FT Date/Time 11-24-92/1430	DATE STARTED: 11-4-92
ENGINEER/GEOLOGIST: Michael Worley	Depth: Date/Time	DATE COMPLETED: 11-24-92
DRILLING METHODS: Cable Tool		PAGE 10 OF ~~13~~ 16

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 (IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
136	1025 105216 11-16-92	12 15 42	18	Very dense (2.5Y, 5/3) light olive brown well graded sand, trace gravel, wet	SW	N/A	OVM = 0 ppm Bσ = 30 cpm α = 0 cpm
137	N/A	N/A	N/A	Continuous sampling will resume at 138.0 - 148.0 FT for screend interval of this well.	N/A	N/A	OVM Bσ α N/A
138 139	1100 105217 11-16-92	21 35 42	18	Very dense (2.5Y, 5/3) light olive brown poorly graded sand, wet	SP	N/A	OVM = 0 ppm Bσ = 30 cpm α = 0 cpm
140 141	1525 105218 11-16-92	25 50/.2	9	SAA, trace gravel	SP	N/A	OVM = 0 ppm Bσ = 30 cpm α = 0 cpm
142	1615 105219 11-16-92	50/.4	5	SAA	SP	N/A	OVM = 0 ppm Bσ = 30 cpm α = 0 cpm
143 144	1630 105220 11-16-92	50/.5 50/0	6	SAA	SP	N/A	OVM = 0 ppm Bσ = 30 cpm α = 0 cpm
145	1645 105221 11-16-92	50/.5 50/.2	9	Very dense (2.5Y, 5/4) light olive brown well graded sand, trace gravel, wet	SW	N/A	OVM = 0 ppm Bσ = 30 cpm α = 0 cpm
146 147	1715 105222 11-16-92	25 32 45	15	SAA	SW	N/A	OVM = 0 ppm Bσ = 30 cpm α = 0 cpm
148	1725 105223 11-16-92	50/.4	7	Very dense (2.5Y, 5/4) light olive brown poorly graded sand, trace gravel, wet	SP	N/A	OVM = 0 ppm Bσ = 30 cpm α = 0 cpm
~~148~~ 149 150	N/A	N/A	N/A	NO SAMPLE TAKEN. NEXT SAMPLE AT 150.0 - 151.5 FT	N/A	N/A	N/A

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: 72 Speedstar

Driller: Joe Barile
Rick Pierce

SAA - SAME AS ABOVE
NA - NOT Applicable

Background { OVM = 0 ppm, Bσ = 30 cpm, α = 0 cpm

L Samples collected per ASTM Standard Penetration Test.
* All colors identified by the Munsell Color Chart.

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 3431	COORDINATES:	DATE: 11-17-92
ELEVATION:	GWL: Depth 73.3 FT Date/Time 11-24-92/1430	DATE STARTED: 11-4-92
ENGINEER/GEOLOGIST: Michael Worley	Depth Date/Time	DATE COMPLETED: 11-24-92
DRILLING METHODS: Cable Tool		PAGE 11 OF 15

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
151	1500 105225 11-17-92	39 40 31	18	Very dense (2.5Y, 5/3) light olive brown well graded sand, trace gravel, wet	SW	N/A	OVM = 0 ppm β γ = 30 cpm α = 0 cpm
152				Bottom of sampling at 151.5 FT			
153							
154							
155				Bottom of boring at 155.0 FT			

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: 72 Speedstar

Driller: Joe Barile
Rick Pierce

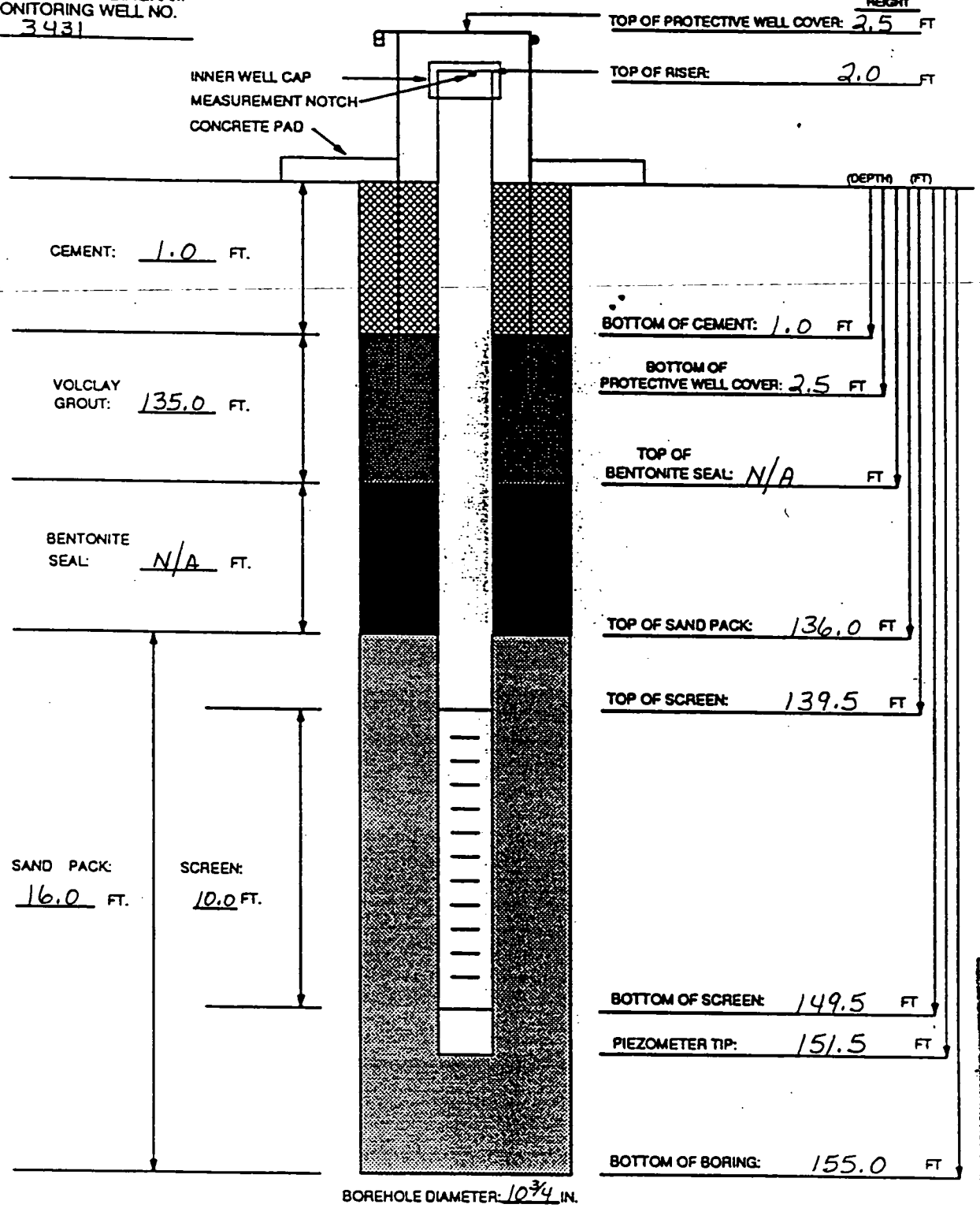
SAA - SAME AS ABOVE
NA - NOT Applicable

Background { OVM = 0 ppm, β γ = 30 cpm, α = 0 cpm

* Samples collected per ASTM Standard Penetration Test
* Colors identified by the Munsell Color Chart

FERNALD RI/FS
INSTALLATION DIAGRAM
MONITORING WELL NO. 3431

INSTALLATION DATE: 11-24-92



MATERIALS USED

SAND TYPE AND QUANTITY: 10/20, 10 bags
BENTONITE PELLETS (5-GALLON BUCKETS): NONE USED
BAGS OF VOLCLAY GROUT: 30 - 50 lb.
AMOUNT OF CEMENT: 80 lbs.
AMOUNT OF WATER USED: 1,800 gallons
OTHER: 1 water drum, 26 soil drums
TASK: RCRA Phase I

NOTES:

1) RISER PIPE IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE, FLUSH-THREADED JOINTS.
2) SCREEN IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE WITH 0.010 IN. SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH AND DATE 73.3 FT/ 11-24-
5) TOP OF CASING IS SECURED WITH A STAINLESS STEEL CAP.
6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL
7) WELL CASING HAS A PROTECTIVE COVER WITH PADLOCK

GEOLOGIST/ENGINEER: Michael Worley

000340

ASI FORM 0157 REV. (0)

PIEZOMETER INSTALLATION SHEET

PROJECT NAME RCRA Phase I
PROJECT NO. 602.04.27
BORING NO. 3431
PIEZOMETER NO. 3431

FIELD ENG./GEO. Michael Worley DATE 11
CHECKED BY C. Brier DATE 12/94
DATE OF INSTALLATION 11-24-92

BOREHOLE DRILLING

DRILLING METHOD Cable Tool
DRILLING FLUID (S) USED:
FLUID WATER FROM 0.0 FT TO 150.0 FT.
FLUID N/A FROM N/A TO N/A

TYPE OF BIT Hammer Percussion Bit
CASING SIZE (S) USED:
SIZE 10.0 in I.D. FROM 0.0 FT TO 155.0 F
SIZE N/A FROM N/A TO N/A

PIEZOMETER DESCRIPTION

TYPE Monitoring Well
DIAMETER OF PERFORATED SECTION 4.0 in. I.D.
PERFORATION TYPE:
SLOTS ☒ HOLES ☐ SCREEN ☐
AVERAGE SIZE OF PERFORATIONS 0.010 in.
TOTAL PERFORATED AREA 10.0 FT

RISER PIPE MATERIAL 316 Stainless Ste
RISER PIPE DIAMETERS:
O.D. 4 3/8 in I.D. 4.0 in.
LENGTH OF PIPE SECTIONS 1-1.5 FT, 1-2 FT, 14-
JOINING METHOD Screw type - flush joint threaded

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5.0 FT
PROTECTIVE PIPE O.D. 10 3/4 in.

OTHER PROTECTION Hinged locking cover with padlock

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (FT)		ELEVATION ( )	
TOP OF RISER PIPE	CB 2-22-93 ~~2.5~~ 2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS: VOLCLAY GROUT / ~~SLURRY~~ CEMENT M.W. 11-24-92	TOP 0.0 FT TOP 1.0 FT	BOTTOM 1.0 FT BOTTOM 136.0 FT	TOP	BOTTOM
BENTONITE NONE USED	TOP N/A	BOTTOM N/A	TOP	BOTTOM
SAND 10/20	TOP 136.0 FT	BOTTOM 152.0 FT	TOP	BOTTOM
GRAVEL NONE USED	TOP N/A	BOTTOM N/A	TOP	BOTTOM
PERFORATED SECTION	TOP 139.5 FT	BOTTOM 149.5 FT	TOP	BOTTOM
PIEZOMETER TIP	151.5 FT			
BOTTOM OF BOREHOLE	155.0 FT			
GWL AFTER INSTALLATION	73.3 FT			

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES ☐ NO ☒
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES ☐ NO ☒
REMARKS Cement placed 0.0 to 1.0 FT to hold protective cover in place.

 14/16

Boring - #3431
Screen Sieve Analysis

5861 11-18-92

1. 90% = .006
   50% = .018
   40% = .022

2. $\frac{.022}{.006} = 3.7$, 3.7 > 3 so use a factor of 4.

3. 4 x .018 = .072

4. .072 most closely fits the curve for ~~fine~~ medium sand pack with a .010 slotted well screen CB 8/20/93

000342

mw-3431

Customer Number 105124

MATERIAL: _____ SAMPLE NUMBER: 921117-137

DETERMINATION: Particle Size METHOD: Sieve Analysis

Sample weight: 233.5

Sieve Number	Weight Retained, g	% Retained	Cumulative % Retained	Grain Size, 1/1000 inch
10	11.35	4.9	4.9	78.7
20	18.66	8.0	12.9	33.5
40	84.74	36.3	49.2	16.7
60	73.15	31.3	80.5	9.8
100	22.12	9.5	90.0	5.9
200	12.55	5.4	95.4	3.0
Pan	9.91	4.2	99.6	

$$\frac{W_2 \times 100\%}{W_1} = R \qquad \left|\frac{\text{Original} - \text{Duplicate}}{\text{Average}}\right| \times 100\% = \text{RPD}$$

Analyzed by:	Checked by:	Date analyzed:
John Roberts	OK	11-17-92

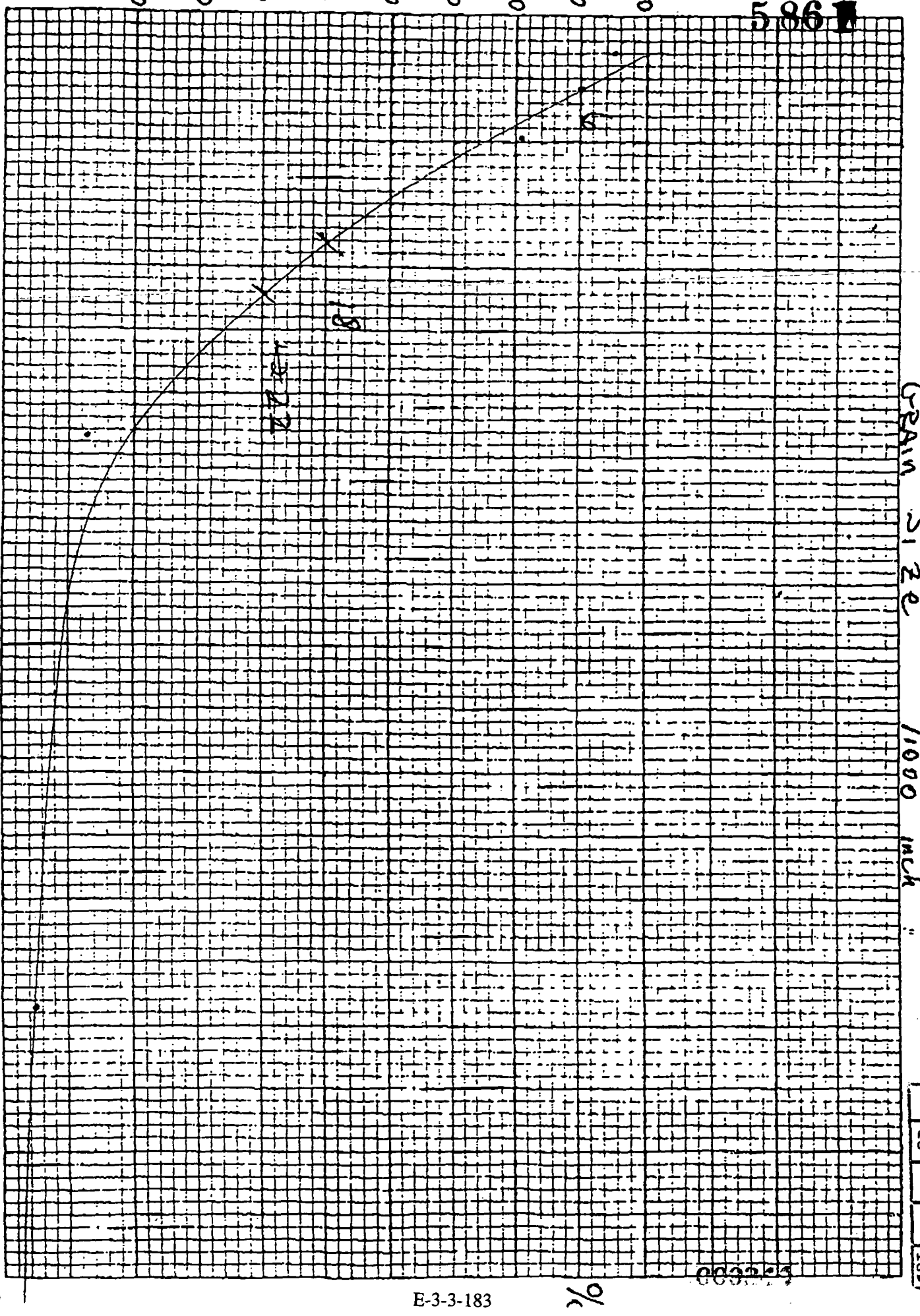
GRAIN SIZE 40% RETAINED 22 .001 inch

50% 18

90% 6

000343

5861



VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 50.03.24	PROJECT NAME Glacial Till/Vadose Zone Investigation	
BORING NUMBER 11130 (BL1)	COORDINATES	DATE 09-22-93/09-23-93
ELEVATION:	GWL: Depth Date/Time	DATE STARTED 09-22-93
ENGINEER/GEOLOGIST P. McCarron/Riley	Depth Date/Time	DATE COMPLETED 09-25-93
DRILLING METHODS Cable Tool (16" casing)		PAGE 1 OF 4

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6"	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0.0				PRELIMINARY			SEE BORING LOG FOR 11131 FOR FULL LITHOLOGIC DESCRIPTION 0.0'-13.0'
2.5							
5.0							
7.5							
10.0							
12.5							
13.0							
	NA	40 48 50 50/3	18"	HARD (2.5Y 5/1-4/1) GREY TO DARK GREY finely interbedded clay, silt & fine sand trace well rounded small pebbles, medium to no plasticity, moist	CL ML SP	4.5	Drove ~~slightly~~ ~~more~~ split spoon 13.0'-15.0'
15.0							

NOTES

Drilling Contractor: Pennsylvania Drilling
Drilling Equipment: Cable Tool
Driller: Dave Newman
Helper: Mike Leon

SAA - Same as above
N/A - Not applicable

* Samples collected per ASTM Standard Penetration Test
* All colors identified by a Munsell color chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 50.08.24	PROJECT NAME: CRU 5 VADOSE ZONE		
BORING NUMBER: 11130	COORDINATES:		DATE: 9-25-93
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 9-23-93
ENGINEER/GEOLOGIST: PATRICK RILEY	Depth	Date/Time	DATE COMPLETED: 9-25-93
DRILLING METHODS: HOLLOWSTEM AUGER			PAGE 2 OF 4

DEPTH (FEET)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 INCH)	RECOVERY (INCH)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15.5							MICROTIP = ppm BG = cpm
16.0							
16.5	30926A11130-01 1105 9-25-93	10	6	VERY STIFF, GRAY (2.5Y 5/1) SILTY CLAY WITH SOME MED SAND AND MEDIUM ANGULAR GRAVEL, MEDIUM PLASTIC, MOIST	CL	3.0	
17.0	30926A11130-02 1105 9-25-93	12	6	SAA	CL	3.25	MICROTIP = 0.0 ppm BG = 40 cpm
17.5	30926A11130-03 1105 9-25-93	13	6	SAA	CL	3.5	
18.0	1105 30926A11130-04 9-25-93	12	4	SAA	CL	4.0	
							MICROTIP = ppm BG = cpm
				LYSIMETER TIP SET AT 22.5 FT			
23.0				TOTAL DEPTH 23.0 FT (NO SAMPLES RECOVERED (18.0-23.0))			
							MICROTIP = ppm BG = cpm

NOTES

Drilling Contractor: Pennsylvania Drilling
Drilling Equipment: MOBILE B-80
Driller: JIM GACCINI
Helper: DOUG NELSON

SAA = Same As Above
N/A = Not Applicable

Background =
MT = 0.0 ppm
BG = 30 cpm

• Samples collected per ASTM Standard Penetration Test.
* All colors identified by the Munsell Color Chart.

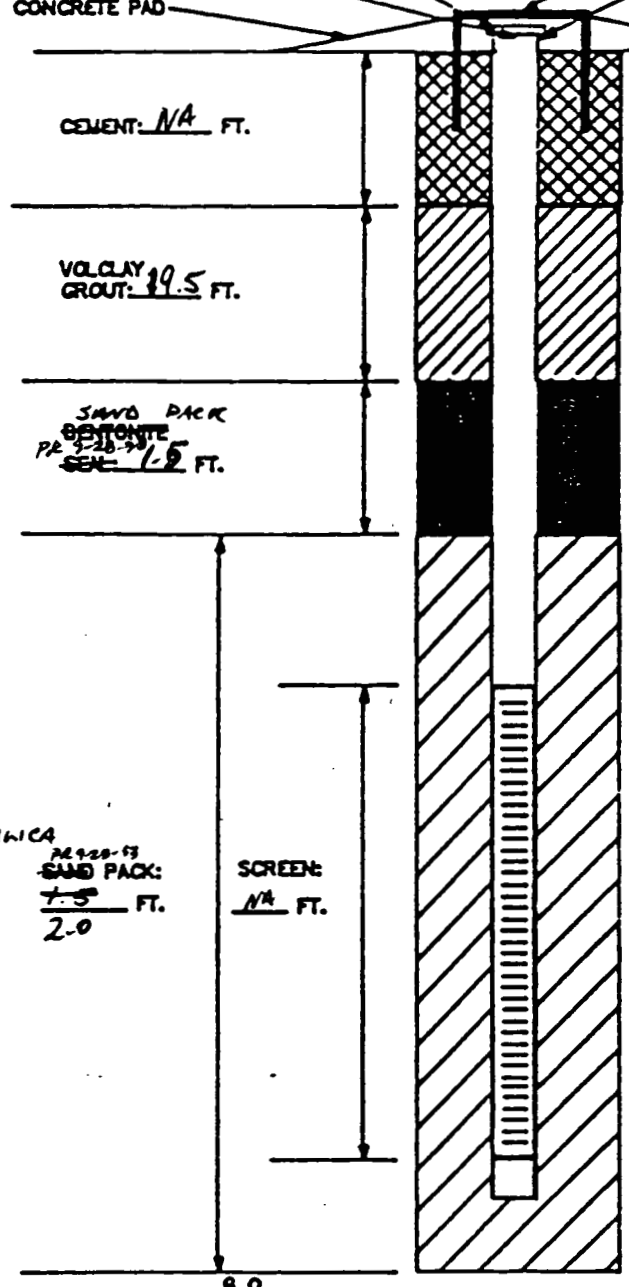
PAGE 3 OF 4

FERNALD RI/FS

INSTALLATION DATE: 9-25-93

INSTALLATION DIAGRAM

PZ ~~MONITORING~~ LYSIMETER WELL NO. 11130



	HEIGHT	
TOP OF PROTECTIVE WELL COVER:	NA	FT
TOP OF PVC:	2.5	FT

	(DEPTH)	(FT)
BOTTOM OF PROTECTIVE WELL COVER:		FT
BOTTOM OF CEMENT:	NA	FT
TOP OF ~~BENTONITE SEAL~~ PR 9-28-93 SAND PACK	19.5	FT
TOP OF SILICA ~~SAND~~ PACK: PR 9-28-93	21.0	FT
TOP OF SCREEN:	NA	FT
BOTTOM OF SCREEN:	NA	FT
~~PIEZOMETER~~ LYSIMETER TIP:	22.5	FT
BOTTOM OF BORING:	23.0	FT

BOREHOLE DIAMETER: 8.0 INCHES

MATERIALS USED:

SAND TYPE AND QUANTITY: 1 BAG
BENTONITE PELLETS (5-GALLON BUCKETS): NA
BAGS OF VOLCLAY GROUT: 8 BAGS
AMOUNT OF CEMENT: NA
AMOUNT OF WATER USED: 100 GALLONS
OTHER:

NOTES:

1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS.
2) SCREEN IS 2-INCH I.D. SCHEDULE 40 PVC PIPE WITH 0.020-INCH SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH/DATE:
5) TOP OF PVC IS SECURED WITH NA EXPANDABLE RUBBER PLUG AND PADLOCK.
6) PARENTHESES INDICATE DEPTH BELOW GROUND LEVEL.

000347

TASK: 50.03.29 GEOLOGIST/ENGINEER:

PIEZOMETER INSTALLATION SHEET 5861

PROJECT NAME CRU 5 VADOSE ZONE FIELD ENG./GEO. PATRICK RILEY DATE 9-25-93
PROJECT NO. 50-03.24 CHECKED BY _____ DATE _____
BORING NO. 11130
PR 5-23-93 ~~PIEZOMETER~~ LYSIMETER NO. 11130 DATE OF INSTALLATION 9-25-93

BOREHOLE DRILLING

DRILLING METHOD AUGER	TYPE OF BIT AUGER
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID NA FROM NA TO NA	SIZE NA FROM NA TO NA
FLUID NA FROM NA TO NA	SIZE NA FROM NA TO NA

PIEZOMETER DESCRIPTION

TYPE _____	RISER PIPE MATERIAL PVC
DIAMETER OF PERFORATED SECTION _____	RISER PIPE DIAMETERS:
PERFORATION TYPE:	O.D. 1 3/8 IN I.D. 1 5/8 IN
SLOTS ☐ HOLES ☐ SCREEN ☐	LENGTH OF PIPE SECTIONS 5 FEET
AVERAGE SIZE OF PERFORATIONS _____	JOINING METHOD SCREW TYPE - FLUSH
TOTAL PERFORATED AREA _____	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH NA	OTHER PROTECTION NA
PROTECTIVE PIPE O.D. NA	

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (FT)		ELEVATION ( )	
TOP OF RISER PIPE	2.5			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	NA			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 0.0	BOTTOM 19.5	TOP	BOTTOM
BENTONITE	TOP NA	BOTTOM NA	TOP	BOTTOM
SAND	TOP 19.5 ~~NA~~	BOTTOM 21.0	TOP	BOTTOM
~~GRAVEL~~ PR 9-28-93 SILICA PACK	TOP 21.0	BOTTOM 23.0	TOP	BOTTOM
PERFORATED SECTION	TOP NA	BOTTOM NA	TOP	BOTTOM
~~PIEZOMETER~~ LYSIMETER TIP PR 9-28-93	22.5			
BOTTOM OF BOREHOLE	23.0			
GWL AFTER INSTALLATION	NA			

WAS THE ~~PIEZOMETER~~ LYSIMETER FLUSHED AFTER INSTALLATION? PR 9-28-93 YES ☒ NO ~~☒~~ PR 5-28-93
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES ☐ NO ☒
REMARKS NA

000348

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 50.03 24	PROJECT NAME: GLACIAL till / VADOSE ZONE HYDROLOGY [illegible]	
BORING NUMBER: 1113 (BLZ)	COORDINATES:	DATE: 07-15-93
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 07-15-93
ENGINEER/GEOLOGIST: P. McLaren	Depth Date/Time	DATE COMPLETED: 9-22-93
DRILLING METHODS: Cable tool (10" casing) continuous sampling		PAGE 1 OF 10

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6"	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0 .5	Soil 07/15/93 0930	11	6"	HARD (2.5Y 6/3) Light Yellowish Brown SILT, LOIT ZONE. TRACE small pebbles DAMP.	ML	4.5	MICROTIP = .2 ppm BZ = 40-60 cpm
1.0		29	∅	NO RECOVERY			
1.5		30	∅	NO RECOVERY 1.5			Sample No 30915 - 1131-01
2.0	Soil 07/15/93 0940	23	6"	HARD (2.5Y 6/3) Light Yellowish Brown SILT, TRACE small angular gravels DAMP	ML	4.5	MICROTIP = .2 ppm BZ = 40-60 cpm
2.5		24	∅	NO RECOVERY			
3.0		31	∅	NO RECOVERY 3.0			Sample No 30915 - 1131-02
3.5	Soil 07/15/93 0945	45	6"	HARD (2.5Y 5/4) Light olive Brown SILT, ~~[illegible]~~ TRACE small angular gravels DAMP	ML	4.5	MICROTIP = .2 ppm BZ = 40-60 cpm
4.0		50	3"	SAA - Fe STAINING	ML	4.5	
4.5		51	∅	NO RECOVERY 4.5			Sample No 30915 - 1131-03 30915A 1131-04
5.0	Soil 07/15/93 0950	46	6"	HARD (2.5Y 4/4) Olive Brown SILT with CLAY AND TRACE small to medium angular gravels. DAMP. Low plasticity	ML	4.5	MICROTIP = .2 ppm BZ = 40-60 cpm

PRELIMINARY

NOTES

Drilling Contractor: Pennsylvania Drilling
Drilling Equipment :
Driller : Dave Newman
Helper : Mike Leon

SAA = Same As Above
N/A = Not Applicable
Background = MICROTIP = 0 or 0.2 ppm, BZ = 40-60 cpm

* Samples collected per ASTM Standard Penetration Test.
* All colors identified by the Munsell Color Chart.

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 50.03.24	PROJECT NAME: Glacial till / Vadose Zone Hydraulic Investigation	
BORING NUMBER: 11131 (BL2)	COORDINATES:	DATE: 09-15-93
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 09-15-93
ENGINEER/GEOLOGIST: D. McCarren	Depth Date/Time	DATE COMPLETED: 9-22-93
DRILLING METHODS: Cable tool (10") continuous sampling		PAGE 2 OF 10

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6")	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
5.0		47	4"	SAA	ML	4.5	SEE PREVIOUS PAGE
5.5		50	ϕ	NO RECOVERY 6.0			Sample no. 30915 A 11131-05 30915 A 11131-06
6.0	Soil 09/15/93 0955	39	6"	Very stiff (2.5Y 4/4) olive brown clayey silt, trace small gravels moist, slight plasticity	ML	3.5	MICROTIP = .2 BY = 40-60 PAM CAM
6.5		40	6"	SAA	ML	3.5	
7.0		41	6"	SAA 7.5	ML	3.5	Sample no. 30915 - 11131-07 30915 A 11131-08 30915 A 11131-09
7.5	Soil 09/15/93 1005	25	6"	Very stiff (2.5Y 4/3) olive brown clayey silt trace fine sand and small angular gravels, medium plasticity, moist	ML	3.0	MICROTIP = .2 BY = 40-60 PAM CAM
8.0		27	6"	SAA	ML	3.0	
8.5		26	6"	SAA 9.0	ML	3.0	Sample no 30915 - 11131-10 30915 A 11131-11 30915 A 11131-12
9.0	Soil 09/15/93 1015	20	6"	SAA	ML	3.0	MICROTIP = .2 BY = 40-60 PAM CAM
9.5		25	6"	SAA	ML	3.0	Sample no 30915 A 11131-13 30915 A 11131-14
10.0							

NOTES

Drilling Contractor: Pennsylvania Drilling
Drilling Equipment :
Driller : Dave Newman
Helper : Mike Cow

SAA = Same As Above
N/A = Not Applicable
Background =

* Samples collected per ASTM Standard Penetration Test.
* All colors identified by the Munsell Color Chart.

PRELIMINARY

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 50.03.29	PROJECT NAME: Glacial till / Vadose Zone Hydraulic Investigation	
BORING NUMBER: 11131 (BL2)	COORDINATES:	DATE: 09/15-16/93
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 09-15-93
ENGINEER/GEOLOGIST: P. McCarren	Depth Date/Time	DATE COMPLETED: 9-22-93
DRILLING METHODS: Cable tool (16" casing) continuous sampling		PAGE 3 OF 10

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6"	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	* REMARKS
10.0		26	4"	SAA Cast 1 1/2" of spoon 2.5 5/2 grayish brown silty clay low plasticity moist 10.5	ML	3.0	See previous page Sample no. 30915 A 11131-15
10.5	Soil cuttings 1010	9	6"	Very stiff (2.5 Y 5/2) grayish brown silty clay medium plasticity moist	CL	3.5	MICROTIP = .2 ppm Bg = 40-60 cpm Brown silty clay 10.5-13.0 30916-11131-13 N/B screen = 30916-11131-14
11.0		18	3"	Hard (2.5 Y 4/1) dark gray clay, trace silt, trace small angular gravels medium plasticity moist	CL	4.5	Sample no. 30916 - 11131-01 30916 - 11131-02
11.5		28	Ø	NO RECOVERY			
12.0	Soil cuttings 1520	6	6"	Hard (2.5 Y 5/1) gray clay, trace fine sand and silt, trace well rounded pebbles, medium plasticity moist	CL	3.75	MICROTIP = .2 ppm Bg = 40-60 cpm
12.5		13	6"	SAA	CL	3.75	Sample no. 30916 - 11131-03 30916 A 11131-04 30916 A 11131-05
13.0		26	2"	SAA 13.5	CL	3.75	
13.5	Soil cuttings 1535	46	6"	Hard (2.5 Y 5/1-4/1) gray to dark gray finely interbedded clay silt (fine sand) trace well rounded small pebbles medium to no plasticity moist		4.5	MICROTIP = .2 ppm Bg = 40-60 cpm
14.0		50	4" ~~Ø~~	SAA ~~No recovery~~		4.5	Sample no 30916 - 11131-06 30916A 11131-07
14.5		w/5"	Ø	NO RECOVERY			
15.0							

NOTES

Drilling Contractor: Pennsylvania Drilling
Drilling Equipment :
Driller : Dave Newington
Helper : Mike Ison

SAA = Same As Above
N/A = Not Applicable
Background =

* Samples collected per ASTM Standard Penetration Test.
* All colors identified by the Munsell Color Chart.

PRELIMINARY

000351

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 50.03.24	PROJECT NAME: GLACIAL TILL/VADOSE ZONE HYDRAULIC INVESTIGATION	
BORING NUMBER: 1131 (BL2)	COORDINATES:	DATE: 09/16-17/93
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 09-15-93
ENGINEER/GEOLOGIST: P. McCARREN	Depth Date/Time	DATE COMPLETED: 9-22-93
DRILLING METHODS: CABLE TOOL (16" CASING) CONTINUOUS SAMPLING		PAGE 4 OF 10

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6"	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	* REMARKS
15.0	SOIL 09/16/93 1550	36	6"	DENSE, (2.5Y 4/1) DARK GREY, POORLY GRADED FINE & MEDIUM SAND	SP	NA	MICROTIP = 0 PPM BG = 40-60 CPM
15.5		47	Ø	NO RECOVERY	/	/	SAMPLE NO. 30916 - 1131-08
16.0		51	Ø	NO RECOVERY	/	/	
16.5	SOIL 09/16/93 1510	7	6"	VERY STIFF (2.5Y 5/1) GREY CLAY SOME ROCK FRAGS & WELL ROUNDED SMALL PEBBLES TRACE FINE SAND AND SILT MEDIUM PLASTICITY MOIST	CL	3.0	MICROTIP = 0 PPM BG = 40-60 CPM
17.0		11	6"	SAA LAST 1" (2.5Y 4/1) DARK GREY POORLY GRADED FINE & MEDIUM SAND	CL	3.0	SAMPLE NO 30916 - 1131-09 30916A 1131-10
17.5		22	Ø	NO RECOVERY	/	/	
18.0	SOIL 09/16/93 1825	5	6"	VERY STIFF (2.5Y 5/1) GREY SILTY CLAY SOME ROCK FRAGS & SMALL WELL ROUNDED PEBBLES, HIGH PLASTICITY MOIST	CL	2.75	MICROTIP = 0 PPM BG = 40-60 CPM
19.0		9	6"	SAA	CL	2.75	SAMPLE NO 30916 - 1131-11 30916A 1131-12
19.5		14	Ø	NO RECOVERY	/	/	
20.0	SOIL 09/17/93 1325	6	6"	SAA	CL	3.25	MICROTIP = 0 PPM BG = 40-60 CPM

NOTES

Drilling Contractor: Pennsylvania Drilling
Drilling Equipment :
Driller : MARK NEUMAN
Helper : MIKE LEWIN

SAA = Same As Above
N/A = Not Applicable
Background =

* Samples collected per ASTM Standard Penetration Test.
* All colors identified by the Munsell Color Chart.

PRELIMINARY

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 50.03.24	PROJECT NAME: Glacial till / Vadose Zone Hydraulic Investigation	
BORING NUMBER: 11131 (BL2)	COORDINATES:	DATE: 9-17-93
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 09-15-93
ENGINEER/GEOLOGIST: P. McCarren	Depth Date/Time	DATE COMPLETED: 9-22-93
DRILLING METHODS: Cable Tool (16" casing) Continuous sample / Auger		PAGE 5 OF 10

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6"	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
20.0 – 20.5		9	ϕ	NO RECOVERY	/	/	See Previous Page
20.5 – 21.0		17	ϕ	NO RECOVERY 21.0	/	/	Sample No. 30917 A 11131-01
21.0 – 21.5	S.L. 09/17/93 1335	12	6"	SAA.	CL	3.0	MICROTIP = 0 PPM BY = 40-60 CPM
21.5 – 22.0		24	ϕ	NO RECOVERY	/	/	
22.0 – 22.5		27	ϕ	NO RECOVERY 22.5	/	/	Sample No. 30917 A 11131-02
22.5 – 23.0	1530 9-20-93	6	0	No Recovery 23.0	NA	NA	~~MICROTIP =~~ ~~PPM~~ ~~BY =~~ ~~CPM~~ Above Shelby tubes 18.0 - 20.5 30917 - 11131 - 03 A/B 30917 - 11131 - 04
23.0 – 23.5	1530 9-20-93	8	0	No Recovery	NA	NA	20.5 - 23.0 30917 - 11131 - 05 A/B 30917 - 11131 - 06
23.5 – 24.0	1530 9-20-93	10	0	No Recovery	NA	NA	
24.0 – 24.5	30920 - 11131-01 1535 9-20-93	5	6	Medium Dense (5Y, 5/1) Gray, Clayey Silt with trace sand and gravel, low plasticity, moist	ML	NA	MICROTIP = 0.0 PPM BY = 70 CPM
24.5 – 25.0	30920A 11131-02 1535 9-20-93	6	6	SAA	ML	NA	

NOTES

Drilling Contractor: Pennsylvania Drilling
Drilling Equipment :
Driller : Dave Neuman / Joe Rank
Helper : Mike Leon / James Anderson

SAA = Same As Above
N/A = Not Applicable

Background = M-tip = 0.0 ppm
BY = 50 cpm

- Samples collected per ASTM Standard Penetration Test.
- All colors identified by the Munsell Color Chart.

PRELIMINARY

000353

VISUAL CLASSIFICATION OF SOILS

5861

PROJECT NUMBER 50.03.24	PROJECT NAME GT/V2 Hydraulic Investigation	
BORING NUMBER 11131	COORDINATES:	DATE 9-20-93
ELEVATION:	GWL. Depth Date/Time	DATE STARTED 9-15-93
ENGINEER/GEOLOGIST K. Payne	Depth Date/Time	DATE COMPLETED 9-22-93
DRILLING METHODS Hollow Stem Auger		PAGE 6 OF 10

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ISI)	REMARKS
25.5	30926A 11131-03 1535 9-20-93	9	1	SAA	ML	NA	
26.0	30926A 11131-04 1540 9-20-93	4	5	SAA	ML	NA	m-t.p = 0.0 ppm BZ = 60 cpm
26.5	1540 9-20-93	5	0	No Recovery	NA	NA	
	1540 9-20-93	7	0	No Recovery	NA	NA	
27.5	30926 - 11131-05 1610 9-20-93	4	6	Loose (5Y, 5/1) Gray, clayey Silt with trace Sand, medium plasticity, moist	ML	NA	m-t.p = 0.0 ppm BZ = 60 cpm
28.0	1610 9-20-93	4	0	No Recovery	NA	NA	
28.5	1610 9-20-93	5	0	No Recovery	NA	NA	
29.0	1615 9-20-93	4	0	No Recovery	NA	NA	m-t.p = NA ppm BZ = NA cpm
29.5	1615 9-20-93	8	0	No Recovery	NA	NA	
30.0	1615 9-20-93	10	0	No Recovery	NA	NA	

NOTES

Drilling Contractor Pennsylvania Drilling
Drilling Equipment Acker
Driller Joe Rouh
James Anderson

SAA - Same as above
NA - Not Applicable

Samples collected per ASTM standard penetration test
Colors identified using Munsell Color Chart

Background Readings 9-20-93 { BZ - 60 cpm
m-t.p 0.0 ppm

PRELIMINARY

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 50.03.24	PROJECT NAME GT/V2 Hydraulic Investigation	
DRILLING NUMBER 11131	COORDINATES:	DATE 9-20-93
ELEVATION:	GWL. Depth Date/Time	DATE STARTED 9-15-93
ENGINEER/GEOLOGIST K. Payne	Depth Date/Time	DATE COMPLETED 9-22-93
DRILLING METHODS Hollow Stem Auger		PAGE 7 OF 10

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
30.5	1620 9-20-93	15	0	No Recovery	NA	NA	m.i.p = NA ppm BZ = NA cpm
31.0	1620 9-20-93	16	0	No Recovery	NA	NA	
31.5	1620 9-20-93	14	0	No Recovery	NA	NA	
	30920-11131-06 1630 9-20-93	38	6	Very Dense (5Y, 5/1) Gray Clayey Silt with trace sand, slight plasticity, moist	ML	NA	m.i.p - 0.0 ppm BZ - 0.0 cpm
32.5	30920A 11131-07 1630 9-20-93	42	6	SAA	ML	NA	
33.0	30920-11131-08 1630 9-20-93	53	5	Very Dense (10YR 6/6) brownish yellow clayey silt with trace sand, slight plasticity, moist KP 9-20-93	ML	NA	
33.5	30921-11131-01 0900 9-21-93	9	6	Very Soft (5Y, 6/1) light gray, silty clay, medium plasticity, moist	CL	.25	m.i.p - 0.0 ppm BZ - 50 cpm
				Dense (2.5Y, 5/4) light olive brown, medium sand, slightly moist 2 IN	SP	NA	
34.0	30921A 11131-02 0900 9-21-93	19	6	Dense (2.5Y, 5/6) light olive brown, medium sand, slightly moist	SP	NA	
34.5	30921A 11131-03 0900 9-21-93	22	2	SAA	SP	NA	
35.0	30921A 11131-04 0920 9-21-93	22	6	Dense (2.5Y, 6/6) olive yellow, well Graded Sand, Moist	SW	NA	m.i.p 0.0 ppm BZ [illegible] cpm

NOTES

Drilling Contractor Pennsylvania Drilling
Drilling Equipment Hollow Stem Auger
Driller Joe Kerb
Jamie Anderson

SAA - Same as above
NA - Not Applicable

Samples collected per ASTM standard penetration test
Colors identified using Munsell Color Chart

Background Readings m.i.p. = 50 ppm
BZ = [illegible] cpm

PRELIMINARY

VISUAL CLASSIFICATION OF SOILS

5861

PROJECT NUMBER 50.03.24	PROJECT NAME GT/V2 Hydraulic Investigation	
BORING NUMBER 11131	COORDINATES:	DATE 9-21-93
ELEVATION:	GWL. Depth Date/Time	DATE STARTED 9-15-93
ENGINEER/GEOLOGIST K. Payne	Depth Date/Time	DATE COMPLETED 9-22-93
DRILLING METHODS Hollow Stem Auger		PAGE 8 OF 10

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
35.5	30921A 11131-05 0920 9-21-93	34	6	SAA	SW	NA	
36.0	30921A 11131-06 0920 9-21-93	56	6	Very Dense (2.5Y, 6/6) Olive Yellow, Well Graded Sand with trace angular gravel, moist	SW	NA	
36.5	30921A 11131-07 0930 9-21-93	62	6	SAA	SW	NA	m.t.p = 0.0 ppm BZ = 70 cpm
	30921A 11131-08 0930 9-21-93	73	6	SAA	SW	NA	
37.5	30921A 11131-09 0930 9-21-93	40	6	SAA	SW	NA	
38.0	30921A 11131-10 1005 9-21-93	16	6	SAA	SW	NA	m.t.p = 0.0 ppm BZ = 50 cpm
38.5	30921A 11131-11 1005 9-21-93	32	6	SAA	SW	NA	
39.0	30921A 11131-12 1005 9-21-93	20	3	SAA	SW	NA	
				Bottom of Boring 39.0 FT			

PRELIMINARY

NOTES

Drilling Contractor Pennsylvania Drilling

Drilling Equipment Acker

Driller Joe Rush

Jeff Hanson

SAA - Same as above

NA - Not Applicable

Samples collected per ASTM standard penetration test

Colors identified using Munsell Color Chart

Background = BZ 50 cpm

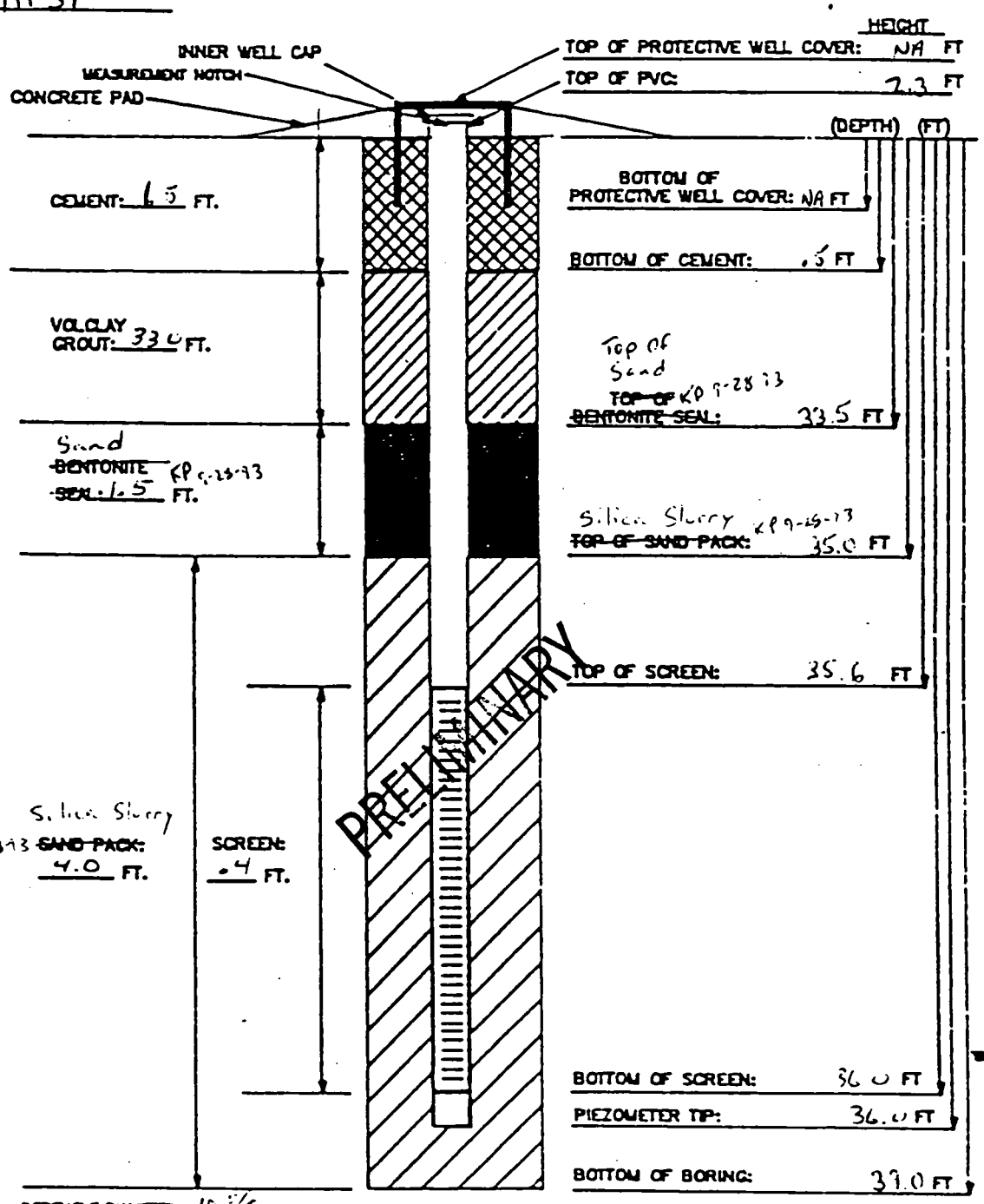
m.t.p. = 0.0 ppm

000350

FERNALD RI/FS

INSTALLATION DATE: 9-22-93

INSTALLATION DIAGRAM
MONITORING WELL NO.
1131



BOREHOLE DIAMETER: 10 3/4 INCHES

MATERIALS USED:
SAND TYPE AND QUANTITY: 35 lbs of #7
BENTONITE PELLETS (5-GALLON BUCKETS): NA
BAGS OF VOLCLAY GROUT: [illegible] KP 9-28-93
AMOUNT OF CEMENT: 270 lbs KP 9-28-93
AMOUNT OF WATER USED: 70 [illegible]
OTHER: 60 lbs of silica flour

NOTES:
1) ~~RISER PIPE IS 2-INCH SCHEDULE 40~~ KP 9-28-93
2) ~~SCREEN IS 2-INCH I.D. SCHEDULE 40~~ KP 9-28-93 ~~PVC PIPE WITH 0.020-INCH SLOTS~~ KP 9-28-93
3) ~~LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED PLUG~~ KP 9-28-93
4) WATER DEPTH/DATE:
5) ~~TOP OF PVC IS SECURED WITH~~ KP 9-28-93 EXPANDABLE RUBBER PLUG AND PADLOCK
6) PARENTHESES INDICATE DEPTH BELOW GROUND LEVEL

TASK: 50.03.24 GEOLOGIST/ENGINEER: Keith Payne

FERNALD RI/FS

FEMP-OU02-5 DRAFT
August 24, 1994

PIEZOMETER INSTALLATION SHEET

5861

PROJECT NAME GT/V2 Hydraulic Investigation FIELD ENG./GEO. Keith Payne DATE 9-28-93
PROJECT NO. 50.03.24 CHECKED BY _____ DATE _____
BORING NO. 11131
~~PIEZOMETER~~ Lysimeter NO. 11131 DATE OF INSTALLATION 9-22-93

BOREHOLE DRILLING

DRILLING METHOD Cable Tool/Hollow Stem Auger	TYPE OF BIT Hammer Percussion/Hollow Stem Auger
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID Water FROM 0.0 FT TO 22.5 FT	SIZE 16.0 IN FROM 0.0 FT TO 20.4 FT
FLUID NA FROM NA TO NA	SIZE NA FROM NA TO NA

PIEZOMETER DESCRIPTION

TYPE Lysimeter	RISER PIPE MATERIAL PVC
DIAMETER OF PERFORATED SECTION NA	RISER PIPE DIAMETERS:
PERFORATION TYPE: NA	O.D. 1 7/8 IN I.D. 1 5/8 IN
SLOTS ☐ HOLES ☐ SCREEN ☐	LENGTH OF PIPE SECTIONS 7-5FT, 1-1.2 FT
AVERAGE SIZE OF PERFORATIONS NA	JOINING METHOD Screw type - flush joint threaded
TOTAL PERFORATED AREA NA	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH NA	OTHER PROTECTION None
PROTECTIVE PIPE O.D. NA	

PRELIMINARY

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE ( )		ELEVATION ( )	
TOP OF RISER PIPE	2.3 FT			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	NA			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP .5 FT	BOTTOM 33.5 FT	TOP	BOTTOM
~~BENTONITE~~ cement 9-28-93	TOP 1.0 FT	BOTTOM .5 FT	TOP	BOTTOM
SAND	TOP 33.5 FT	BOTTOM 35.0 FT	TOP	BOTTOM
~~GRAVEL~~ silica flour KP 9-28-93	TOP 35.0 FT	BOTTOM 39.0 FT	TOP	BOTTOM
PERFORATED SECTION	TOP 35.6	BOTTOM 36.0	TOP	BOTTOM
PIEZOMETER TIP	36.0			
BOTTOM OF BOREHOLE	39.0			
GWL AFTER INSTALLATION	NA			

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES ☐ NO ☒
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES ☐ NO ☒
REMARKS None

000358

5861

On-Site Disposal Cell Pre-Design Activities Engineering Supplemental Report

Operable Unit 2
Project Order 101

July 1994
Revision 0

Environmental Remedial Action Project
Fernald Environmental Management Project
Fernald, Ohio
FERMCO Subcontract No. 2-21487

PARSONS

Fairfield Executive Center
6120 South Gilmore Road
Fairfield, Ohio 45014

On-Site Disposal Cell Pre-Design Activities Engineering Supplemental Report

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LIST OF ACRONYMS AND ABBREVIATIONS

cm	Centimeters
ODC	On-Site Disposal Cell
ODC PAER	On-Site Disposal Cell Pre-Design Activities Engineering Report
OU	Operable Unit
pcf	Pounds per cubic foot
sec	Second

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SECTION 1

INTRODUCTION

This report presents the results of supplemental geotechnical laboratory permeability testing performed on compacted specimens of soil from the proposed location of the Operable Unit 2 (OU-2) On-Site Disposal Cell (ODC). The purpose of the testing is to provide pre-design geotechnical data regarding the permeability of soil samples compacted wet of optimum moisture content and compacted with Standard and Modified Proctor compactive efforts. This report supplements geotechnical data for the proposed ODC site contained in *On-Site Disposal Cell Pre-Design Activities Engineering Report*, Revision 0, April 1994 (PARSONS 1994).

SECTION 2

BACKGROUND

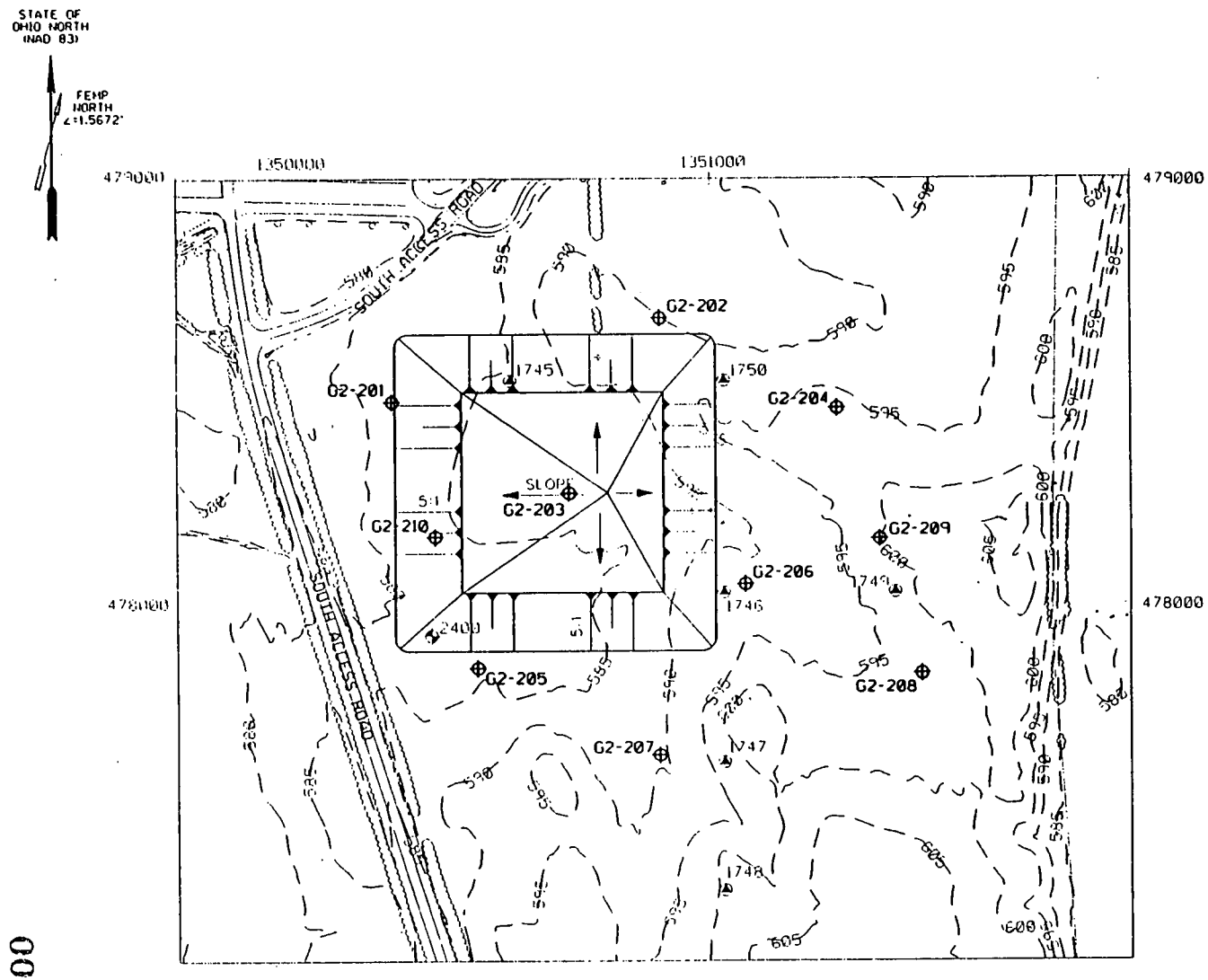
The alternative remedial concepts being considered by the Fernald Environmental Restoration Management Corporation include an on-site disposal cell designed for receipt of contaminated materials from the OU-2 subunits (i.e., OU-2 ODC). The proposed cell would essentially be an aboveground, encapsulated containment structure with a soil/geosynthetics composite liner, bio-intrusion barrier with a sacrificial soil erosional layer and cap.

A proposed site for the OU-2 Disposal Cell is situated at the southeast corner of the Fernald Environmental Management Project site (Figure 2-1). The area is currently a gently rolling, grassed field that has no buildings and was not involved in any production activities.

A geotechnical field test program was implemented per the *Solid Waste Landfill and On-Site Waste Disposal Cell Geotechnical Sampling and Testing Plan* (PARSONS 1993) at the proposed ODC site during November and December 1993. Subsurface soil samples were collected at the G2-series boring locations shown on Figure 2-1. Samples collected during the field program were packaged and shipped to Advanced Terra Testing, Inc., in Lakewood, Colorado for geotechnical laboratory testing. The laboratory testing program was directed toward the classification of the soils and determining their engineering properties. The laboratory data sheets from this testing are compiled in a two-volume report entitled *On-Site Waste Disposal Cell Soil Investigation Data Report, Volume 1 and 2* (SAIC 1994a). The results of the geotechnical field and laboratory programs are summarized in the *On-Site Disposal Cell Pre-Design Activities Engineering Report* (ODC PAER), Revision 0, April 1994 (PARSONS 1994).

Permeability test results from the ODC PAER for remolded glacial till samples suggested that lower permeabilities could be achieved by compacting the soil wet of optimum moisture content and/or by increasing the dry density.

This document reports the results of a series of additional laboratory permeability tests performed to evaluate the moisture-density-permeability relationship of compacted glacial till samples collected at the proposed ODC site.



LEGEND	
2400	EXISTING MONITORING WELL
1748	EXISTING SOIL BORING
G2-209	GEOTECHNICAL BORING
— 600 —	SURFACE CONTOUR (FT ABOVE MEAN SEA LEVEL)

BORINGS COMPLETED DURING ODC FIELD TEST PROGRAM (PO101)			
BORING NO	NORTH	EAST	ELEVATION
G2-201	478479.253	1350255.013	580.567
G2-202	478676.083	1350881.046	590.103
G2-203	478264.290	1350667.588	587.597
G2-204	478463.156	1351295.595	596.152
G2-205	477852.362	1350454.876	583.491
G2-206	478048.670	1351081.497	591.426
G2-207	477646.512	1350879.507	588.990
G2-208	477838.168	1351493.018	596.274
G2-209	478155.044	1351394.371	598.783
G2-210	478161.692	1350355.363	583.181

EXISTING BORINGS			
BORING NO	NORTH	EAST	ELEVATION
1745	478529.38	1350531.00	586.00
1746	478029.38	1351031.01	591.80
1747	477629.38	1351031.01	597.40
1748	477329.38	1351031.01	601.00
1749	478029.37	1351431.00	597.50
1750	478529.39	1351031.00	593.00
2400	477928.86	1350346.82	580.70

NOTE: COORDINATES ARE NAD 1983

ON-SITE DISPOSAL CELL SOIL BORING PLAN

CAD FILE NO sk:02792

Figure 2-1 - Proposed On-Site Disposal Cell Site and Soil Boring Plan

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SECTION 3

SUPPLEMENTAL GEOTECHNICAL LABORATORY TESTING

This section summarizes the results of geotechnical laboratory permeability testing performed on specimens of recompacted glacial till from subsurface soil samples G2-209 and G2-210 which were collected during the ODC field program. Geotechnical laboratory testing was performed by Advanced Terra Testing, Inc., in Lakewood, Colorado from April through June 1994. The laboratory data sheets for this supplemental testing are compiled in a report entitled *On-Site Waste Disposal Cell Soil Investigation Data Report, Volume 3*, June 30, 1994 (SAIC 1994b).

3.1 Geotechnical Properties of Permeability Test Soil Samples

Bulk samples of auger cuttings were collected from a depth interval of 0 to 25 feet at borings G2-209 and G2-210 during the ODC field program (see Figure 2-1). The cuttings were placed in 5-gallon drums and shipped to the geotechnical laboratory. Index properties for these sample materials were determined during the December 1993 through March 1994 geotechnical testing period. Sample G2-209 is classified as a sandy lean clay (CL). Sample G2-210 is classified as a lean clay with sand (CL). Table 3-1 summarizes the results of the index properties tests.

Also during the December 1993 through March 1994 testing period, Standard Proctor compaction tests (ASTM D 698), and laboratory permeability tests (ASTM D 5084) were performed on the sample material. Table 3-2 summarizes the results of the Standard Proctor compaction tests. The results of the permeability tests are included in Subsection 3.3. Appendix A contains the grain-size curves, compaction curves, and laboratory data sheets for Samples G2-209 and G2-210 from the ODC PAER and *On-Site Waste Disposal Cell Soil Investigation Data Report, Volumes 1 and 2* (SAIC 1994).

As part of the supplemental geotechnical laboratory testing conducted during April through June 1994, Atterberg limits tests (ASTM D 4318) were performed on the soil materials from bulk samples G2-209 and G2-210 prior to performing compaction and permeability tests in order to verify chain of custody and expected material properties. Table 3-3 summarizes the results of these tests.

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Table 3-1 - Summary of Index Properties of Bulk Samples from Borings G2-209 and G2-210[1]

Boring No.	G2-209	G2-210
Depth (feet)	0-25	0-25
Sample Type	Auger Cuttings	Auger Cuttings
Description[2]	Brown and Gray Sandy Lean Clay	Brown and Gray Lean Clay with Sand
USCS Group Symbol[2]	CL	CL
Moisture Content[3]	6	7
Liquid Limit	28	28
Plastic Limit	13	14
Plasticity Index	15	14
Percent Gravel	3	3
Percent Sand	27	22
Percent Silt	40	44
Percent Clay[4]	30	31
Specific Gravity	2.80	2.76

Notes:

(1) Data Source: *On-Site Disposal Cell Pre-Design Activities Engineering Report*, April 1994 (PARSONS 1994)

(2) Description (excluding color) and USCS Group Symbol assigned per ASTM D 2487 based on grain size analyses and plasticity tests.

(3) Moisture content of auger cuttings; not representative of natural moisture content.

(4) Clay size particles defined as those smaller than 0.005 mm (reference ASTM D 422)

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Table 3-2 - Summary of Standard Proctor Compaction Test Results[1]

Boring No.	G2-209	G2-210
Depth (feet)	0-25	0-25
Sample Type	Auger Cuttings	Auger Cuttings
Description and Classification	Brown and Gray Sandy Lean Clay (CL)	Brown and Gray Lean Clay with Sand (CL)
Maximum Dry Density (pcf)	122.3	122.3
Optimum Moisture Content (% dry weight)	12.3	12.4

Note:

(1) Data Source: *On-Site Disposal Cell Pre-Design Activities Engineering Report*, April 1994 (PARSONS 1994) moisture content. The test plan for performing the supplemental compaction-permeability testing is contained in Appendix C.

Table 3-3 - Summary of Atterberg Limit Test Results for Bulk Samples G2-209 and G2-210 Conducted During Supplemental Geotechnical Testing[1]

Boring No.	G2-209	G2-210
Depth (feet)	0-25	0-25
Sample Type	Auger Cuttings	Auger Cuttings
Liquid Limit	28	28
Plastic Limit	17	15
Plasticity Index	11	13
USCS Symbol	CL	CL

Note:

(1) Data Source: *On-site Waste Disposal Cell Soil Investigation Data Report, Volume 3*, June 30, 1994 (SAIC 1994b)

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3.2 Laboratory Plan for Supplemental Geotechnical Testing

The supplemental geotechnical laboratory testing was conducted in two phases. The objective of the first phase was to provide permeability data for the proposed ODC site soil recompacted using Standard Proctor compactive effort at moisture contents ranging from optimum to wet of optimum moisture content. The objective of the second phase was to provide permeability data for proposed ODC site soil recompacted using the Modified Proctor compactive effort at moisture contents ranging from optimum to wet of optimum.

3.2.1 Phase 1 Testing

In the first phase (Phase 1), Atterberg limits tests were performed on the soil materials from bulk sample G2-209 and G2-210 to verify expected material index properties. Three laboratory permeability tests (ASTM D 5084) were then performed on test specimens of bulk sample G2-210 soil that was prepared at moisture contents ranging from optimum moisture content to 5 percent wet of optimum and compacted using the Standard Proctor compaction method (ASTM D 698). The "target" moisture contents for permeability testing were at or near optimum, 2 percent wet of optimum, and 5 percent wet of optimum moisture content. Prior to permeability testing, the dry density of the G2-210 soil sample was checked by the laboratory to fall within the limits of acceptable dry densities shown in Appendix B, Figure B-1.

3.2.2 Phase 2 Testing

For the second phase (Phase 2), a Modified Proctor compaction test was performed on the G2-209 sample soil to establish the Modified Proctor Compaction Curve for the material. Three laboratory permeability tests (ASTM D 5084) were then performed on test specimens of bulk sample G2-209 soil that was prepared at moisture contents ranging from optimum moisture content to 5 percent wet of optimum and compacted using the Modified Proctor compaction method (ASTM D 1557). The "target" moisture contents for permeability testing were at or near optimum, 2 percent wet of optimum, and 5 percent wet of optimum moisture content. Prior to permeability testing, the dry density of the G2-209 soil sample was checked by the laboratory to fall within the limits of acceptable dry densities shown in Appendix B, Figure B-2.

3.3 Results of Supplemental Geotechnical Laboratory Testing

This subsection summarizes the results of the Atterberg limits tests, compaction tests and permeability tests conducted during April through June 1994. The associated laboratory data sheets are contained in Appendix D.

3.3.1 Atterberg Limits Tests

Table 3-3 summarizes the results of the Atterberg limits tests performed of Samples G2-209 and G2-210. As expected, the materials tested (fines) classified as CL. In general, the plastic and liquid limits of the samples were consistent with those of the December 1993 through March 1994 testing period considering the nature of the index test performed on a portion of a bulk soil sample.

3.3.2 Standard Proctor Compaction Test

Standard Proctor compaction curves for samples G2-209 and G2-210 were obtained previously and were presented in the *On-Site Disposal Cell Pre-Design Activities Engineering Report* (ODC PAER), Revision 0, April 1994 (PARSONS 1994). Table 3-2 summarizes the results. The compaction curves are contained in Appendix A. For practical purposes, maximum dry density was 122.3 pounds per cubic foot (pcf) and optimum moisture content was 12.4 percent.

3.3.3 Modified Proctor Compaction Test

Table 3-4 summarizes the results of the Modified Proctor compaction test performed on Sample G2-209. The maximum dry density was 133.6 pcf and the optimum moisture content was 10.3 percent. The compaction curve is contained in Appendix D.

Table 3-4 - Summary of Modified Proctor Compaction Test Results

Boring No.	**G2-209**
Depth (feet)	0-25
Sample Type	Auger Cuttings
Description and Classification(1)	Brown and Gray Sandy Lean Clay (CL)
Maximum Dry Density (pcf)(2)	133.6
Optimum Moisture Content (% dry weight)(2)	10.3

Notes:

(1) Data Source: *On-Site Disposal Cell Pre-Design Activities Engineering Report*, April 1994 (PARSONS 1994)

(2) Data Source: *On-site Waste Disposal Cell Soil Investigation Data Report, Volume 3*, June 30, 1994 (SAIC 1994b)

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3.3.4 Permeability Tests (Phase 1: Standard Proctor)

Table 3-5 summarizes the results of permeability tests of Sample G2-210 test specimens compacted using Standard Proctor compactive effort. The results of the permeability tests for Samples G2-209 and G2-210 conducted during the December 1993 through March 1994 testing period are also shown on Table 3-5.

The specimen (120 pcf @ 12.4 percent) compacted at or near the optimum moisture content had a coefficient of permeability (k) of 2.4×10^{-6} cm/sec. For practical purposes, this is the same as the results of the Samples G2-209 (1.4×10^{-6} cm/sec) and G2-210 (2.1×10^{-6} cm/sec) compacted to 95 percent Standard Proctor at or near optimum during the December through March geotechnical testing. The specimen (118 pcf @ 14.4 percent) compacted approximately 2 percent wet of optimum had a k of 7.7×10^{-6}, which is slightly more permeable than the specimens compacted at or near optimum. This increase in conductivity was not expected and may be an erratic result since the usual trend displays decreasing permeability as moisture content increases wet of the optimum moisture content. The specimen (112 pcf @ 17.4 percent) compacted at 5 percent wet of optimum moisture content had a k of 3.7×10^{-8} cm/sec.

Table 3-5 - Summary of Laboratory Permeability Results for Test Specimens Compacted Using Standard Proctor Compactive Effort

Boring No.	Depth (feet)	Specimen	Soil Description and Classification[1]	Specimen Preparation(6)	Initial Moisture Content (%)	Final Moisture Content (%)	Dry Density (pcf)	Wet Density (pcf)	Coefficient of Permeability (cm/sec)
209	0-25	bulk[2]	Brown and Gray Sandy Lean Clay (CL)	Compacted to 95% Standard Proctor max. dry density[6]	11.7	16.7	116.3	130.0	1.4×10^{-6}
210	0-25	bulk[2]	Brown and Gray Lean Clay with Sand (CL)	Compacted to 95% Standard Proctor max. dry density[6]	11.8	17.0	116.5	130.2	2.1×10^{-6}
210	0-25	120 pcf @ 12.4%[3]	Brown and Gray Lean Clay with Sand (CL)	Compacted at or near optimum moisture content[4] and dry density within limits of Figure B-1	12.0	16.6	120.0	134.4	2.4×10^{-6}
210	0-25	118 pcf @ 14.4%[3]	Brown and Gray Lean Clay with Sand (CL)	Compacted 2% wet of optimum moisture content[5] and dry density within limits of Figure B-1	13.8	16.6	118.0	134.3	7.7×10^{-6}
210	0-25	112 pcf @ 17.4%[3]	Brown and Gray Lean Clay with Sand (CL)	Compacted 5% wet of optimum moisture content[5] and dry density within limits of Figure B-1	16.9	17.7	113.5	132.6	3.7×10^{-8}

Notes:

(1) Soil description and classification from *On-Site Disposal Cell Pre-Design Activities Engineering Report*, April 1994 (PARSONS 1994)

(2) Data source for test specimen: *On-Site Disposal Cell Pre-Design Activities Engineering Report*, April 1994 (PARSONS 1994)

(3) Data source for test specimen: *On-Site Waste Disposal Cell Soil Investigation Data Report, Volume 3*, June 30, 1994 (SAIC 1994b)

(4) Tolerance for moisture content: -0.5%, +1.5%

(5) Tolerance for moisture content: $\pm$1.0%

(6) Standard Proctor compaction data: Sample G2-209: maximum dry density = 122.3 pcf, optimum moisture content = 12.3%; Sample G2-210: maximum dry density = 122.3 pcf, optimum moisture content = 12.4%

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3.3.5 Permeability Tests (Phase 2: Modified Proctor}

Table 3-6 summarizes the results of permeability tests of Sample G2-209 test specimens compacted using Modified Proctor compactive effort. The test specimen (#3 at OMC) compacted at or near optimum moisture content had a k of 2.5 x 10^{-8} cm/sec. The specimen (#4 +2 OMC) compacted at 2 percent wet of optimum was the least permeable of the six specimens tested during the supplemental testing program with a k of 9.5 x 10^{-9} cm/sec. The test specimen (#5 @ 5 percent OMC) compacted at 5 percent wet of optimum had a k of 2.1 x 10^{-8} cm/sec.

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Table 3-6 - Summary of Laboratory Permeability Results for Test Specimens Compacted Using Modified Proctor Compactive Effort

Boring No.	Depth (feet)	Specimen No.	Soil Description and Classification[1]	Specimen Preparation(5)	Initial Moisture Content (%)	Final Moisture Content (%)	Dry Density (pcf)	Wet Density (pcf)	Coefficient of Permeability (cm/sec)
G2-209	0-25	3 at OMC[2]	Brown and Gray Sandy Lean Clay (CL)	Compacted at or near optimum moisture content[3] and dry density within limits of Figure B-2	10.0	13.3	131.8	145.0	2.5×10^{8}
G2-209	0-25	4 +2% OMC[2]	Brown and Gray Sandy Lean Clay (CL)	Compacted 2% wet of optimum moisture content[4] and dry density within limits of Figure B-2	12.1	13.3	128.4	144.0	9.5×10^{9}
G2-209	0-25	5 @ +5% OMC[2]	Brown and Gray Sandy Lean Clay (CL)	Compacted 5% wet of optimum moisture content[4] and dry density within limits of Figure B-2	14.9	15.6	120.9	138.9	2.1×10^{8}

Notes:

(1) Soil description and classification from *On-Site Disposal Cell Pre-Design Activities Engineering Report*, April 1994 (PARSONS 1994)

(2) Data source for test specimen: *On-Site Waste Disposal Cell Soil Investigation Data Report, Volume 3*, June 30, 1994 (SAIC 1994b)

(3) Tolerance for moisture content: -0.5%, +1.5%

(4) Tolerance for moisture content: ±1.0%

(5) Modified Proctor compaction data: Sample G2-209: maximum dry density = 133.6 pcf, optimum moisture content = 10.3%

SECTION 4

CONCLUSIONS

Based on the laboratory permeability test results of five test specimens compacted using Standard Proctor compactive effort:

1) The laboratory k ranges from approximately 10^{-6} to 10^{-5} cm/sec in test specimens with molding water contents that range from at or near optimum to approximately 2 percent wet of optimum.

2) The test data, though not conclusive, indicate that the laboratory k decreases from the 10^{-6} to 10^{-5} cm/sec range at approximately 2 percent wet of optimum to an approximate 10^{-8} to 10^{-7} range at 5 percent wet of optimum.

Based on the laboratory permeability test results of three test specimens compacted using Modified Proctor compactive effort:

1) The laboratory k of three specimens tested within a range of molding water contents of at or near optimum to 5 percent wet of optimum fall within an approximate range of 1×10^{-8} to 5×10^{-8} cm/sec.

2) The least permeable specimen ($k = 9.5 \times 10^{-9}$ cm/sec) was the test specimen compacted at 2 percent wet of optimum moisture content.

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SECTION 5

REFERENCES

(ASTM 1991) American Society for Testing and Materials, 1991. Annual Book of ASTM Standards, *Volume 4.08, Soil and Rock, Building Stones and Geotextiles, 1991 Edition*. Philadelphia, Pennsylvania: ASTM.

(PARSONS 1993) PARSONS ERA Project, October 1993. *Solid Waste Landfill and On-Site Waste Disposal Cell Geotechnical Sampling and Testing Plan*, Revision 0. Fairfield: PARSONS.

(PARSONS 1994) PARSONS ERA Project, April 1994. *On-Site Disposal Cell Pre-Design Activities Engineering Report*, Revision 0. Fairfield: PARSONS.

(SAIC 1994a) Science Applications International Corporation, March 3, 1994. *On-Site Waste Disposal Cell Soil Investigation Data Report, Volume 1 and 2*. Golden, Colorado: SAIC.

(SAIC 1994b) Science Applications International Corporation, June 30, 1994. *On-Site Waste Disposal Cell Soil Investigation Data Report, Volume 3*. Golden, Colorado: SAIC.

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APPENDIX A

GEOTECHNICAL DATA FOR SAMPLES G2-209 AND G2-210 FROM PREVIOUS (DECEMBER 1993 THROUGH MARCH 1994) GEOTECHNICAL TESTING

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APPENDIX A

Contents

Item **Page**

Soil Boring Logs
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Boring No. G2-210 . . . . . A-12

Moisture Content
Boring No. G2-209 . . . . . A-14
Boring No. G2-210 . . . . . A-14

Grain Size Analysis
Boring No. G2-209 . . . . . A-16
Boring No. G2-210 . . . . . A-20

Atterberg Limits
Boring No. G2-209 . . . . . A-25
Boring No. G2-210 . . . . . A-26

Proctor Compaction - Standard
Boring No. G2-209 . . . . . A-28
Boring No. G2-210 . . . . . A-30

Triaxial, Back-Pressure Permeability(Tx/Pbp)
Boring No. G2-209 . . . . . A-33
Boring No. G2-210 . . . . . A-37

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SOIL BORING LOGS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: P.O. 101 (PARSONS)	PROJECT NAME: SOLID WASTE LANDFILL AND ON-SITE WASTE DISPOSAL CELL PREDESIGN FIELD INVESTIGATIONS - GEOTECHNICAL SAMPLING AND TESTING SUBSURFACE EXPLORATION	
BORING NUMBER: G2 - 209		
GEOLOGIST: J. HANEY	COORDINATES: NORTH 478155.04 EAST 1351394.37	DATE STARTED: 09NOV93
DRILLING METHOD: AUGER (HOLLOW STEM)	GROUND ELEVATION: 598.78 FT	DATE COMPLETED: 09NOV93
REPORT DATE: 10JAN94	GWL / DATE: NA	PAGE NUMBER: 1 of 4

DEPTH (ft)	SAMPLE # TIME			DESCRIPTION OF SOIL	USCS SYM	TSF	REMARKS
0.0 to 0.5							AUGERED 0 TO 25 FT BULK SAMPLE COLLECTED
0.5 to 1.0							
1.0 to 1.5							
1.5 to 2.0							
2.0 to 2.5	0900 hrs			SILTY CLAY - FIRM, LOW TO MEDIUM PLASTICITY, DARK YELLOWISH BROWN (10YR 4/4), TRACE SAND - FINE TO COARSE GRAINED, TRACE GRAVEL - 1/4 TO 1/2", DRY.	CL		BETA / GAMMA - 0 CPM PID - 4.4 PPM
2.5 to 3.0							
3.0 to 3.5							
3.5 to 4.0							
4.0 to 4.5							
4.5 to 5.0	0905 hrs			SILTY CLAY - FIRM, LOW TO MEDIUM PLASTICITY, DARK YELLOWISH BROWN (10YR 4/4), TRACE SAND - FINE TO COARSE GRAINED, TRACE GRAVEL - 1/4 TO 1/2", DRY.	CL		BETA / GAMMA - 0 CPM PID - 3.3 PPM
5.0 to 5.5							
5.5 to 6.0							
6.0 to 6.5							
6.5 to 7.0							
7.0 to 7.5	0910 hrs			SILTY CLAY - FIRM, MEDIUM PLASTICITY, DARK YELLOWISH BROWN (10 YR 4/4), TRACE SAND - FINE TO MEDIUM GRAINED, SLIGHTLY MOIST.	CL		BETA / GAMMA - 0 CPM PID - 5.3 PPM

NOTES: COLORS IDENTIFIED USING MUNSELL COLOR CHART. ALL FERMCO READINGS FOR ORGANIC VOLATILES AND BETA/GAMMA GIVEN IN UNITS ABOVE BACKGROND LEVELS. SOIL DESCRIPTION AND CLASSIFICATION PER ASTM D-2488.

VISUAL CLASSIFICATION OF SOILS

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PROJECT NUMBER: P.O. 101	PROJECT NAME: SOLID WASTE LANDFILL AND ON-SITE WASTE DISPOSAL CELL PREDESIGN FIELD INVESTIGATIONS - GEOTECHNICAL SAMPLING AND TESTING SUBSURFACE EXPLORATION	
BORING NUMBER: G2 - 209		
GEOLOGIST: J. HANEY	COORDINATES: NORTH 478155.04 EAST 1351394.37	DATE STARTED: 09NOV93
DRILLING METHOD: AUGER (HOLLOW STEM)	GROUND ELEVATION: 598.78	DATE COMPLETED: 09NOV93
REPORT DATE: 10JAN94	GWL / DATE: NA	PAGE NUMBER: 2 of 4

DEPTH (ft)	SAMPLE # TIME			DESCRIPTION OF SOIL	USCS SYM	TSF	REMARKS
7.5 to 8.0							
8.0 to 8.5							
8.5 to 9.0							
9.0 to 9.5							
9.5 to 10.0	0915 hrs			SILTY CLAY - FIRM, MEDIUM PLASTICITY, DARK YELLOWISH BROWN (10YR 4/4), TRACE SAND - FINE TO COARSE GRAINED, TRACE GRAVEL - 1/4 TO 1", MOIST.	CL		BETA / GAMMA - 0 CPM PID - 5.1 PPM
10.0 to 10.5							
10.5 to 11.0							
11.0 to 11.5							
11.5 to 12.0							
12.0 to 12.5	0920 hrs			SILTY CLAY - SOFT TO FIRM, MEDIUM PLASTICITY, OLIVE GRAY (5Y 4/2), TRACE SAND - FINE TO COARSE GRAINED, TRACE GRAVEL 1/4 TO 1/2", MOIST.	CL		BETA / GAMMA - 0 CPM PID - 4.9 PPM
12.5 to 13.0							APPROXIMATE TOP OF GRAY CLAY
13.0 to 13.5							
13.5 to 14.0							
14.0 to 14.5							
14.5 to 15.0	0925 hrs			SILTY CLAY - SOFT TO FIRM, MEDIUM TO HIGH PLASTICITY, DARK GRAY (5Y 4/1), TRACE SAND - FINE TO MEDIUM GRAINED, MOIST.	CL		BETA / GAMMA - 0 CPM PID - 8.7 PPM

NOTES: COLORS IDENTIFIED USING MUNSELL COLOR CHART. ALL FERMCO READINGS FOR ORGANIC VOLATILES AND BETA/GAMMA GIVEN IN UNITS ABOVE BACKGROUND LEVELS.

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: P.O. 101	PROJECT NAME: SOLID WASTE LANDFILL AND ON-SITE WASTE DISPOSAL CELL PREDESIGN FIELD INVESTIGATIONS - GEOTECHNICAL SAMPLING AND TESTING SUBSURFACE EXPLORATION	
BORING NUMBER: G2 - 209		
GEOLOGIST: J. HANEY	COORDINATES: NORTH 478155.04 EAST 1351394.37	DATE STARTED: 09NOV93
DRILLING METHOD: AUGER (HOLLOW STEM)	GROUND ELEVATION: 598.78 FT	DATE COMPLETED: 09NOV93
REPORT DATE: 10JAN94	GWL / DATE: NA	PAGE NUMBER: 3 of 4

DEPTH (ft)	SAMPLE # TIME			DESCRIPTION OF SOIL	USCS SYM	TSF	REMARKS
15.0 to 15.5							
15.5 to 16.0							
16.0 to 16.5							
16.5 to 17.0							
17.0 to 17.5	0928 hrs			SILTY CLAY - SOFT, MEDIUM TO HIGH PLASTICITY, DARK GRAY (5Y 4/1), TRACE SAND - FINE TO MEDIUM GRAINED, TRACE GRAVEL 1/4 TO 1/2", MOIST.	CL		BETA / GAMMA - 0 CPM PID - 1.8 PPM
17.5 to 18.0							
18.0 to 18.5							
18.5 to 19.0							
19.0 to 19.5							
19.5 to 20.0	0932 hrs			SILTY CLAY - SOFT TO FIRM, MEDIUM TO HIGH PLASTICITY, DARK GRAY (5Y 4/1), TRACE SNAD - FINE TO COARSE GRAINED, TRACE GRAVEL - 1/4 TO 1/2", MOIST.	CL		BETA / GAMMA - 0 CPM PID - 0.7 PPM
20.0 to 20.5							
20.5 to 21.0							
21.0 to 21.5							
21.5 to 22.0							
22.0 to 22.5	0935 hrs			SILTY CLAY - SOFT TO FIRM, MEDIUM TO HIGH PLASTICITY, DARK GRAY (5Y 4/1), TRACE SAND - FINE TO MEDIUM GRAINED, TRACE GRAVEL - 1/4 TO 1", MOIST.	CL		BETA / GAMMA - 0 CPM PID - 0.0 PPM

NOTES: COLORS IDENTIFIED USING MUNSELL COLOR CHART. ALL FERMCO READINGS FOR ORGANIC VOLATILES AND BETA/GAMMA GIVEN IN UNITS ABOVE BACKGROND LEVELS.

000382

VISUAL CLASSIFICATION OF SOILS

5861

PROJECT NUMBER: P.O. 101	PROJECT NAME: SOLID WASTE LANDFILL AND ON-SITE WASTE DISPOSAL CELL PREDESIGN FIELD INVESTIGATIONS - GEOTECHNICAL SAMPLING AND TESTING SUBSURFACE EXPLORATION	
BORING NUMBER: G2 - 209		
GEOLOGIST: J. HANEY	COORDINATES: NORTH 478155.04 EAST 1351394.37	DATE STARTED: 09NOV93
DRILLING METHOD: AUGER (HOLLOW STEM)	GROUND ELEVATION: 598.78 FT	DATE COMPLETED: 09NOV93
REPORT DATE: 10JAN94	GWL / DATE: NA	PAGE NUMBER: 4 of 4

DEPTH (ft)	SAMPLE # TIME			DESCRIPTION OF SOIL	USCS SYM	TSF	REMARKS
22.5 to 23.0							
23.0 to 23.5							
23.5 to 24.0							
24.0 to 24.5							
24.5 to 25.0	0940 hrs			SILTY CLAY - SOFT TO FIRM, MEDIUM TO HIGH PLASTICITY, DARK GRAY (5Y 4/1), TRACE SAND - FINE TO COARSE GRAINED, TRACE GRAVEL - 1/4 TO 1", MOIST	CL		BETA / GAMMA - 0 CPM PID - 2.7 PPM
25.0 to 25.5				TOTAL DEPTH - 25.0 FT			
25.5 to 26.0							
26.0 to 26.5							
26.5 to 27.0							
27.0 to 27.5							
27.5 to 28.0							
28.0 to 28.5							
28.5 to 29.0							
29.0 to 29.5							
29.5 to 30.0							

NOTES: COLORS IDENTIFIED USING MUNSELL COLOR CHART. ALL FERMCO READINGS FOR ORGANIC VOLATILES AND BETA/GAMMA GIVEN IN UNITS ABOVE BACKGROUND LEVELS.

000383

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: P.O. 101 (PARSONS)	PROJECT NAME: SOLID WASTE LANDFILL AND ON-SITE WASTE DISPOSAL CELL PREDESIGN FIELD INVESTIGATIONS - GEOTECHNICAL SAMPLING AND TESTING SUBSURFACE EXPLORATION	
BORING NUMBER: G2 - 210		
GEOLOGIST: J. HANEY	COORDINATES: NORTH 478161.69 EAST 1350355.36	DATE STARTED: 08NOV93
DRILLING METHOD: AUGER (HOLLOW STEM)	GROUND ELEVATION: 583.18 FT	DATE COMPLETED: 08NOV93
REPORT DATE: 10JAN94	GWL / DATE: NA	PAGE NUMBER: 1 of 4

DEPTH (ft)	SAMPLE # TIME			DESCRIPTION OF SOIL	USCS SYM	TSF	REMARKS
0.0 to 0.5							AUGERED 0 TO 25' BULK SAMPLE COLLECTED
0.5 to 1.0							
1.0 to 1.5							
1.5 to 2.0							
2.0 to 2.5	1532 hrs			SILTY CLAY - FIRM, LOW TO MEDIUM PLASTICITY, DARK YELLOWISH BROWN (10YR 4/6), DRY.	CL		BETA / GAMMA - 0 CPM PID - 33.0 PPM
2.5 to 3.0							
3.0 to 3.5							
3.5 to 4.0							
4.0 to 4.5							
4.5 to 5.0	1537 hrs			SANDY SILTY CLAY - SOFT TO FIRM, MEDIUM PLASTICITY, DARK YELLOWISH BROWN (10YR 4/6), SAND - FINE TO MEDIUM GRAINED, DRY.	CL		BETA / GAMMA - 0 CPM PID - 24.0 PPM
5.0 to 5.5							
5.5 to 6.0							
6.0 to 6.5							
6.5 to 7.0							
7.0 to 7.5	1625 hrs			SANDY SILTY CLAY - SOFT TO FIRM, MEDIUM PLASTICITY, DARK YELLOWISH BROWN (10YR 4/6), SAND - FINE TO MEDIUM GRAINED, SLIGHTLY MOIST.	CL		BETA / GAMMA - 0 CPM PID - 7.0 PPM

NOTES: COLORS IDENTIFIED USING MUNSELL COLOR CHART. ALL FERMCO READINGS FOR ORGANIC VOLATILES AND BETA/GAMMA GIVEN IN UNITS ABOVE BACKGROUND LEVELS. SOIL DESCRIPTION AND CLASSIFICATION PER ASTM D-2488.

000384

VISUAL CLASSIFICATION OF SOILS

586 T

PROJECT NUMBER: P.O. 101	PROJECT NAME: SOLID WASTE LANDFILL AND ON-SITE WASTE DISPOSAL CELL PREDESIGN FIELD INVESTIGATIONS - GEOTECHNICAL SAMPLING AND TESTING SUBSURFACE EXPLORATION	
BORING NUMBER: G2 - 210		
GEOLOGIST: J. HANEY	COORDINATES: NORTH 478161.69 EAST 1350355.36	DATE STARTED: 08NOV93
DRILLING METHOD: AUGER (HOLLOW STEM)	GROUND ELEVATION: 583.19 FT	DATE COMPLETED: 08NOV93
REPORT DATE: 10JAN94	GWL / DATE: NA	PAGE NUMBER: 2 of 4

DEPTH (ft)	SAMPLE # TIME			DESCRIPTION OF SOIL	USCS SYM	TSF	REMARKS
7.5 to 8.0							
8.0 to 8.5							
8.5 to 9.0							
9.0 to 9.5							
9.5 to 10.0	1633 hrs			SILTY CLAY - SOFT, MEDIUM PLASTICITY, DARK YELLOWISH BROWN (10YR 4/6), TRACE SAND - FINE TO MEDIUM GRAINED, MOIST.	CL		BETA / GAMMA - 0 CPM PID - 12.5 PPM
10.0 to 10.5							
10.5 to 11.0							
11.0 to 11.5							
11.5 to 12.0							
12.0 to 12.5	1639 hrs			SILTY CLAY - SOFT TO FIRM, MEDIUM PLASTICITY, DARK YELLOWISH BROWN (10YR 4/6), TRACE SAND - FINE TO MEDIUM GRAINED, TRACE GRAVEL - 1/4 TO 1/2", MOIST.	CL		BETA / GAMMA - 0 CPM PID - 30.0 PPM
12.5 to 13.0							
13.0 to 13.5							
13.5 to 14.0							
14.0 to 14.5							
14.5 to 15.0	1642 hrs			GRAVELLY SILTY CLAY - SOFT, MEDIUM PLASTICITY, OLIVE GRAY (5Y 4/2), GRAVEL - 1/4 TO 1 1/2", TRACE SAND - FINE TO COARSE, MOIST.	CL		BETA / GAMMA - 0 CPM PID - 16.0 PPM

NOTES: COLORS IDENTIFIED USING MUNSELL COLOR CHART. ALL FERMCO READINGS FOR ORGANIC VOLATILES AND BETA/GAMMA GIVEN IN UNITS ABOVE BACKGROUND LEVELS.

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: P.O. 101	PROJECT NAME: SOLID WASTE LANDFILL AND ON-SITE WASTE DISPOSAL CELL PREDESIGN FIELD INVESTIGATIONS - GEOTECHNICAL SAMPLING AND TESTING SUBSURFACE EXPLORATION	
BORING NUMBER: G2 - 210		
GEOLOGIST: J. HANEY	COORDINATES: NORTH 478161.69 EAST 1350355.36	DATE STARTED: 08NOV93
DRILLING METHOD: AUGER (HOLLOW STEM)	GROUND ELEVATION: 583.18 FT	DATE COMPLETED: 08NOV93
REPORT DATE: 10JAN94	GWL / DATE: NA	PAGE NUMBER: 3 of 4

DEPTH (ft)	SAMPLE # TIME			DESCRIPTION OF SOIL	USCS SYM	TSF	REMARKS
15.0 to 15.5							APPROXIMATE TOP OF GRAY CLAY
15.5 to 16.0							
16.0 to 16.5							
16.5 to 17.0							
17.0 to 17.5	1647 hrs			GRAVELLY SILTY CLAY - SOFT TO FIRM, MEDIUM PLASTICITY, DARK GRAY (5Y 4/1), GRAVEL - 1/4 TO 1", TRACE SAND - FINE TO MEDIUM GRAINED, MOIST.	CL		BETA / GAMMA - 0 CPM PID - 26.5 PPM
17.5 to 18.0							
18.0 to 18.5							
18.5 to 19.0							
19.0 to 19.5							
19.5 to 20.0	1652 hrs			SILTY CLAY - SOFT TO FIRM, MEDIUM PLASTICITY, DARK GRAY (5Y 4/1), TRACE GRAVEL - 1/4 TO 1/2", TRACE SAND - FINE TO MEDIUM GRAINED, MOIST.	CL		BETA / GAMMA - 0 CPM PID - 20.0 PPM
20.0 to 20.5							
20.5 to 21.0							
21.0 to 21.5							
21.5 to 22.0							
22.0 to 22.5	1657 hrs			SILTY CLAY - SOFT, MEDIUM TO HIGH PLASTICITY, DARK GRAY (5Y 4/1), TRACE SAND - FINE TO MEDIUM GRAINED, MOIST.	CL		BETA / GAMMA - 0 CPM PID - 25.1 PPM

NOTES: COLORS IDENTIFIED USING MUNSELL COLOR CHART. ALL FERMCO READINGS FOR ORGANIC VOLATILES AND BETA/GAMMA GIVEN IN UNITS ABOVE BACKGROUND LEVELS.

000286

VISUAL CLASSIFICATION OF SOILS

5861

PROJECT NUMBER: P.O. 101	PROJECT NAME: SOLID WASTE LANDFILL AND ON-SITE WASTE DISPOSAL CELL PREDESIGN FIELD INVESTIGATIONS - GEOTECHNICAL SAMPLING AND TESTING SUBSURFACE EXPLORATION	
BORING NUMBER: G2 - 210		
GEOLOGIST: J. HANEY	COORDINATES: NORTH 478161.69 EAST 1350355.36	DATE STARTED: 08NOV93
DRILLING METHOD: AUGER (HOLLOW STEM)	GROUND ELEVATION: 583.18 FT	DATE COMPLETED: 08NOV93
REPORT DATE: 10JAN94	GWL / DATE: NA	PAGE NUMBER: 4 of 4

DEPTH (ft)	SAMPLE # TIME			DESCRIPTION OF SOIL	USCS SYM	TSP	REMARKS
22.5 to 23.0							
23.0 to 23.5							
23.5 to 24.0							
24.0 to 24.5							
24.5 to 25.0	1700 hrs			SILTY CLAY - SOFT TO FIRM, MEDIUM TO HIGH PLASTICITY, DARK GRAY (5Y 4/1), TRACE SAND - FINE TO MEDIUM GRAINED, MOIST.	CL		BETA - GAMMA - 0 CPM PID - 26.5 PPM
25.0 to 25.5				TOTAL DEPTH 25.0 FT			
25.5 to 26.0							
26.0 to 26.5							
26.5 to 27.0							
27.0 to 27.5							
27.5 to 28.0							
28.0 to 28.5							
28.5 to 29.0							
29.0 to 29.5							
29.5 to 30.0							

NOTES: COLORS IDENTIFIED USING MUNSELL COLOR CHART. ALL FERMCO READINGS FOR ORGANIC VOLATILES AND BETA/GAMMA GIVEN IN UNITS ABOVE BACKGROUND LEVELS.

000387

SPECIFIC GRAVITY
ASTM D 854

5861

Page ____ of ____

ADVANCED TERRA TESTING

Specific Gravity Tests

Job No. 24-59-08

Location Paducah PCICI

Boring No.	G2-209	G2-210				
~~Sample No.~~ Depth	0-24.5	0-24.5				
Sampled	11-9-93	11-8-93				
By:	JPH	JPH				
Tested	12-14-93	→				
By:	SR	→				
Checked	2-14-94	→				
By:	MW					
Specific Gravity Flask #	1	2				
Weight of flask (g)	62.227	62.4465				
Weight of oven dry soil (g) (Wo)	25.769	25.431				
Weight of flask, soil and water (g) (Wb)	178.321	178.552				
Temperature (deg. C) (Tx)	24.5	24.6				
Weight of water & flask at Tx (from cal. curve) (Wa)	161.740	162.030				
Specific Gravity *	2.80 MW ~~2.68~~	2.76				
Pan No.	7C13	13C				

* Specific Gravity = Wo/[Wo+(Wa−Wb)]

000389

MOISTURE CONTENT
ASTM D 2216

MOISTURE AND DENSITY DETERMINATIONS

5861

CLIENT Parsons ADVANCED TERRA TESTING

JOB NO. 2054.08

LOCATION Proposed Cell Dry Stack Disposal Cell

PAGE 1 OF 1

SAMPLE & SOIL TYPE	BORING	G2-209	G2-210						
	SAMPLE NO.								
	SAMPLE DEPTH	0-24.5'	0-24.5						
	DATE SAMPLED BY								
	DATE TESTED BY	12-20-93	12-20-93						
	SOIL TYPE								
	LABORATORY IDENTIFICATION								
DENSITY	NO OF RINGS								
	WT. OF WET SOIL & RINGS								
	WT. OF RINGS								
	WT. OF WET SOIL								
	WET DENSITY (LBS./CU.FT.)								
	DRY DENSITY (LBS./CU.FT.)								
MOISTURE CONTENT	DISH NO.	12A	6A						
	WT. OF WET SOIL & DISH	131.75	115.34						
	WT. OF DRY SOIL & DISH	124.44	108.46						
	NET LOSS OF MOISTURE	7.31	7.38						
	WT. OF DISH	8.20	8.17						
	WT. OF DRY SOIL	116.24	100.29						
	MOISTURE CONTENT (% DRY WT.)	6.3	7.4						

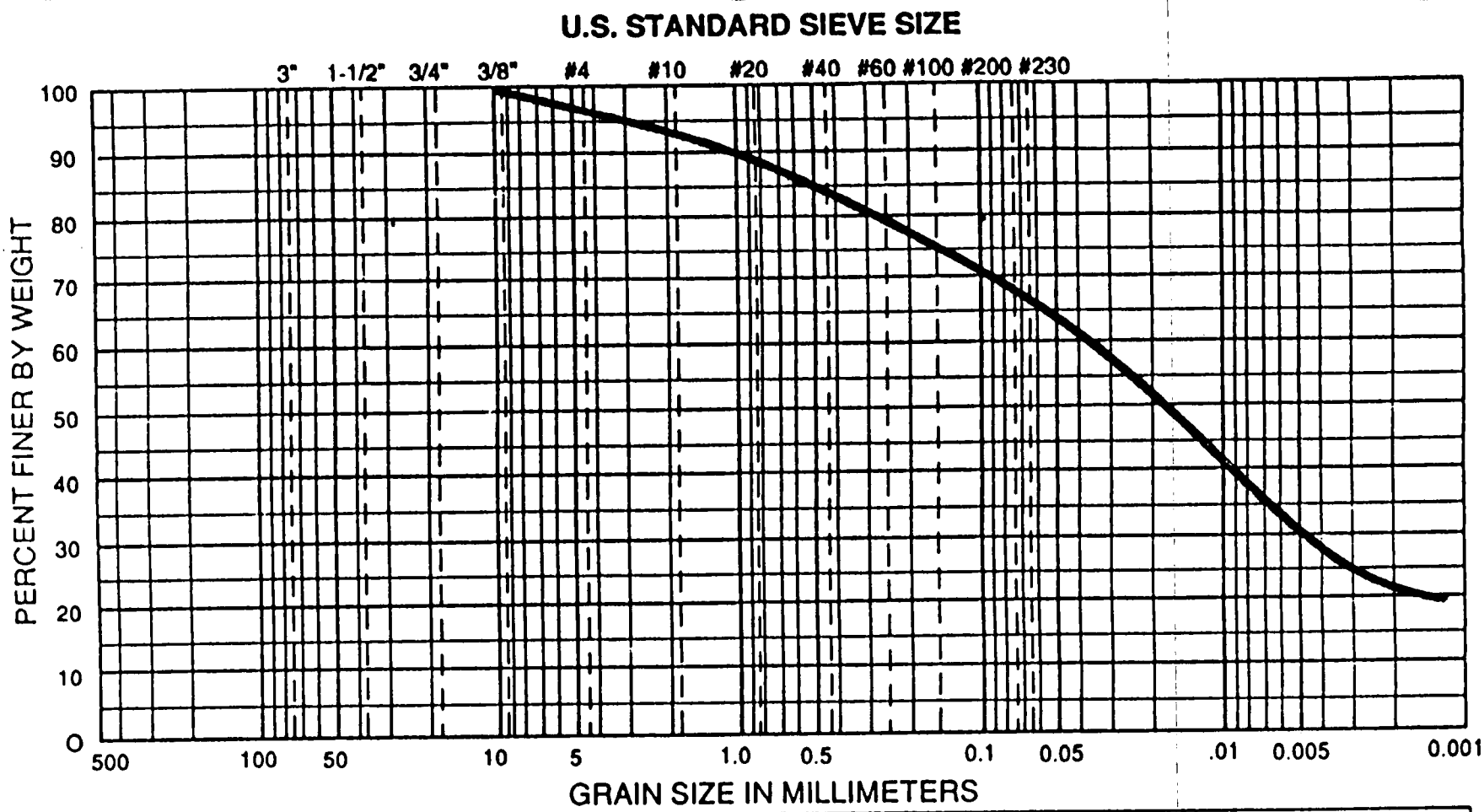
11-91

E-3-3-230

000394

12-20-93

GRAIN SIZE ANALYSIS WITH HYDROMETER
ASTM D 422



ADVANCED TERRA TESTING

E-3-3-232

ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

WELLNAME: G2-209 SAMPLE NO.: BULK DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	0 - 25 ft	Brown and Gray Sandy Lean Clay (CL)

000393

5861

TEMP-00023 DRAFT
August 24, 1994

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	Parsons	JOB NO.	2059-08
BORING NO.	G2-209	SAMPLED	
DEPTH	0 - 24.5'	DATE TESTED	12/20/93 TNU
SAMPLE NO.	931110-133	WASH SIEVE	Yes
SOIL DESCR.	PO 101	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	64.25
Wt. Dry Soil & Pan	(g)	60.66
Wt. Lost Moisture	(g)	3.59
Wt. of Pan Only	(g)	3.65
Wt. of Dry Soil	(g)	57.01
Moisture Content	%	6.3
Wt. Hydrom. Sample Wet	(g)	55.24
Wt. Hydrom. Sample Dry	(g)	51.96

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1188.00
Weight of + #10 Before Washing (g)	111.10
Weight of + #10 After Washing (g)	81.97
Weight of - #10 Wet (g)	1076.90
Weight of - #10 Dry (g)	1040.51
Wt. Total Sample Dry (g)	1122.48
Calc. Wt. "W" (g)	56.06
Calc. Mass + #10	4.09

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	13.66	13.66	13.66	1.2	98.8
#4	0.00	21.87	21.87	35.53	3.2	96.8
#10	0.00	46.44	46.44	81.97	7.3	92.7
#20	1.56	4.04	2.48	2.48	11.7	88.3
#40	1.58	3.78	2.20	4.68	15.7	84.3
#60	1.57	3.64	2.07	6.75	19.3	80.7
#100	1.58	4.16	2.58	9.33	23.9	76.1
#200	1.56	5.03	3.47	12.80	30.1	69.9

ADVANCED TERRA TESTING, INC.

000394

586

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Parsons	JOB NO.	2059-08
BORING NO.	G2-209	SAMPLED	
DEPTH	0 - 24.5'	DATE TESTED	12/20/93 TNU
SAMPLE NO.	931110-133	WASH SIEVE	Yes
SOIL DESCR.	PO 101	DRY SIEVE	No

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.80	Temp. Coef. K	0.01261
Value of "a"	0.97	Wt. Dry Sample "W"	56.057
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Deflocc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	44.00	38.00	65.8	65.8	9.07	0.0537
1.0	41.00	35.00	60.6	60.6	9.57	0.0390
2.0	38.50	32.50	56.2	56.2	9.98	0.0282
5.0	36.00	30.00	51.9	51.9	10.39	0.0182
15.0	30.50	24.50	42.4	42.4	11.29	0.0109
30.0	28.00	22.00	38.1	38.1	11.70	0.0079
60.0	25.00	19.00	32.9	32.9	12.19	0.0057
120.0	23.00	17.00	29.4	29.4	12.52	0.0041
250.0	20.75	14.75	25.5	25.5	12.89	0.0029
1440.0	18.00	12.00	20.8	20.8	13.34	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC. 000395

PAH4 ~~0~~22~~0~~9

ADVANCED TERRA TESTING

COMBINED MECHANICAL ANALYSIS

Page ____ of ____

CLIENT Parsons PO 101
JOB NO. 12054-081 BORING NO. G2-209 SAMPLE NO. ____ DEPTH 0-24.5'
DATE SAMPLED 11-4-93 BY JPM DATE TESTED ____ BY ____ COMPUTER ____
SOIL TYPE (Field Classification) ____

MOISTURE DETERMINATION (Dish No. 5/C.)

Wt. of wet soil & dish	64.25g
Wt. of dry soil & dish	60.66g
Wt. of water	
Wt. of dish	3.65
Wt. of dry soil	
Moisture Content, %	

TEST CONTENTS

Hydrometer No.	ASTM 152H
Spec. Grav. of Soil	~~2.68~~ 2.80
Value of "a"	~~.999~~ .970
Deflocculant	~~125~~ cc. of $(NaPO_3)_6$
Defloc. Correction	5.0
Meniscus Corr'n	-1.0

Temperature, °C	23.0		
Temperature Corr'n	~~.01265~~ .01261		

SIEVE ANALYSIS (Dish No. ____)

Wt. of total sample (wet)	1188.0
Wt. of total sample (dry)	
Wt. of + #10 (wet) 4A	111.10g (+)
Wt. of + #10 (dry)	81.97
Wt. of - #10 (wet) 013	1076.9g (+)
Wt. of - #10 (dry)	

Tyler Sieve Size	Ind. Wt. Dry Soil Retained (g)	Cum. Wt. Dry Soil Retained	% Finer Than	% Total Sample
3/8	13.66			
4	21.87			
10	46.44			

AFTER HYDROMETER ANALYSIS (Dish No. ____)
Wt. of dry sample "W" ____
% of total sample ____

Tyler Sieve Size	Pan # A37	Pan wt.	Dry Soil & Pan	Cum. Wt. Dry Soil Retained	% Finer Than	% Total Sample
20	82P	1.56	4.04			
40	18P	1.58	3.78			
60	X8	1.57	3.68			
100	26	1.58	4.16			
200	78	1.56	5.03			

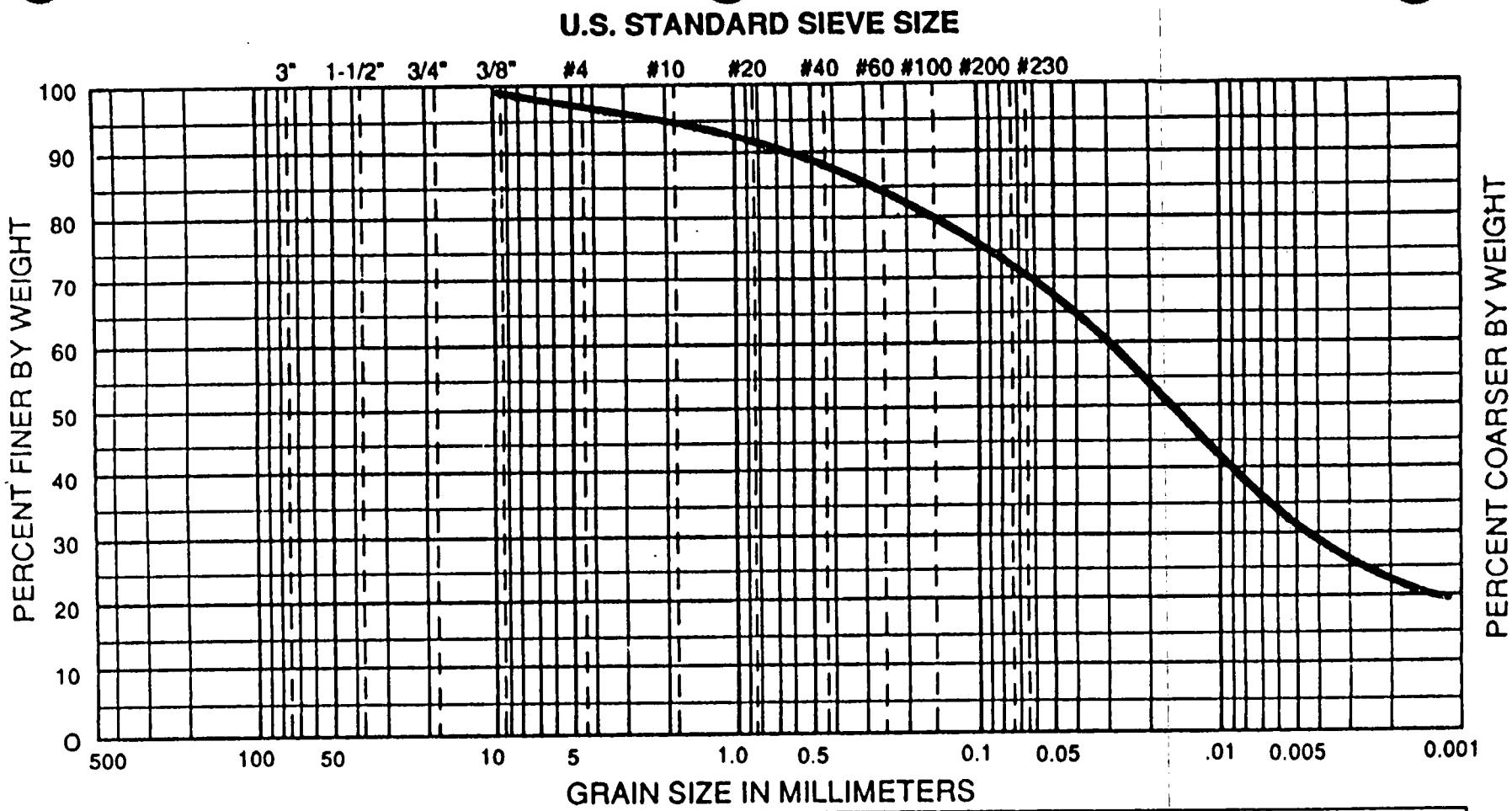
HYDROMETER ANALYSIS (Cylinder No. ____)

Wt. of wet sample (Passing # sieve) 55.23x.g(+) SR 2-16-94
Wt. of dry sample (Passing # sieve) ____ "W" ____ % of total sample ____

Observed Time	Elapsed Time (min)	Temp. (°C)	Hyd. Reading Original	Hyd. Reading Corrected "R"	100Ra W	% Total Sample	Grain Diam. (mm.)	Corr'n Coef L	Corr'n Coef k	Corr'n Coef	Corrected Diameter (mm.)
1236	0	22.3	....	....	....	....	.....	...	...	...	.....
	½		44.0								
1237	1		41.0								
1238	2		38.5								
1241	5		36.0								
1251	15		30.5								
1306	30		28.0								
1336	60		25.0								
1436	120		23.0								
1646	250	23.3	20.75								
1936	1440	22.8	18.0								

~~000396~~

On reverse side-Notes ☐ Calculation ☐



ASTM D 2487 (USCS)	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

Note: Clay size particles defined as those smaller than 0.005 mm (Ref: ASTM D 422)

5861

WELLNAME: G2-210 SAMPLE NO.: BULK DATE: 1-3-94 PROJECT NO.: PO-101

AREA	DEPTH	CLASSIFICATION
On-Site Cell	0 - 25 ft	Brown and Gray Lean Clay with Sand (CL)

MECHANICAL ANALYSIS - SIEVE TEST DATA

CLIENT	Parsons	JOB NO.	2059-08
BORING NO.	G2-210	SAMPLED	11/08/93 JPH
DEPTH	0 - 24.5'	DATE TESTED	12/20/93 TNU
SAMPLE NO.	931110-132	WASH SIEVE	Yes
SOIL DESCR.	PO 101	DRY SIEVE	No

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	56.80
Wt. Dry Soil & Pan	(g)	53.26
Wt. Lost Moisture	(g)	3.54
Wt. of Pan Only	(g)	3.60
Wt. of Dry Soil	(g)	49.66
Moisture Content	%	7.1
Wt. Hydrom. Sample Wet	(g)	55.31
Wt. Hydrom. Sample Dry	(g)	51.63

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1111.46
Weight of + #10 Before Washing (g)	98.06
Weight of + #10 After Washing (g)	62.58
Weight of - #10 Wet (g)	1013.40
Weight of - #10 Dry (g)	979.09
Wt. Total Sample Dry (g)	1041.67
Calc. Wt. "W" (g)	54.93
Calc. Mass + #10	3.30

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	9.76	9.76	9.76	0.9	99.1
#4	0.00	20.30	20.30	30.06	2.9	97.1
#10	0.00	32.52	32.52	62.58	6.0	94.0
#20	1.56	3.29	1.73	1.73	9.2	90.8
#40	1.56	3.37	1.81	3.54	12.5	87.5
#60	1.57	3.32	1.75	5.29	15.6	84.4
#100	1.57	3.67	2.10	7.39	19.5	80.5
#200	1.56	4.47	2.91	10.30	24.8	75.2

ADVANCED TERRA TESTING, INC 000398

HYDROMETER ANALYSIS - SEDIMENTATION DATA

5861

CLIENT Parsons

JOB NO. 2059-08

BORING NO.	G2-210	SAMPLED	11/08/93 JPH
DEPTH	0 - 24.5'	DATE TESTED	12/20/93 TNU
SAMPLE NO.	931110-132	WASH SIEVE	Yes
SOIL DESCR.	PO 101	DRY SIEVE	No

Hydrometer #	ASTM 152-H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.76	Temp. Coef. K	0.01275
Value of "a"	0.98	Wt. Dry Sample "W"	54.930
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	44.50	38.50	68.5	68.5	8.99	0.0541
1.0	42.00	36.00	64.1	64.1	9.40	0.0391
2.0	39.50	33.50	59.6	59.6	9.81	0.0282
5.0	36.00	30.00	53.4	53.4	10.39	0.0184
15.0	30.00	24.00	42.7	42.7	11.37	0.0111
30.0	28.00	22.00	39.2	39.2	11.70	0.0080
60.0	25.50	19.50	34.7	34.7	12.11	0.0057
120.0	23.00	17.00	30.3	30.3	12.52	0.0041
250.0	21.00	15.00	26.7	26.7	12.85	0.0029
1440.0	17.50	11.50	20.5	20.5	13.42	0.0012

Grain Diameter = K*(SQRT(L/T))

ADVANCED TERRA TESTING, INC.

000399

ADVANCED TERRA TESTING

COMBINED MECHANICAL ANALYSIS

Page ____ of ____

CLIENT Parsons PO101
JOB NO. 1305-051 BORING NO. 42-210 SAMPLE NO. ____ DEPTH 0-24.5'
DATE SAMPLED 11-8-93 BY JPH DATE TESTED ____ BY ____ COMPUTER ____
SOIL TYPE (Field Classification) 95110-132

MOISTURE DETERMINATION (Dish No. 72)

Wt. of wet soil & dish	56.80 g
Wt. of dry soil & dish	53.26 g
Wt. of water	
Wt. of dish	3.60 g
Wt. of dry soil	
Moisture Content, %	

TEST CONTENTS

Hydrometer No.	ASTM 152 H
Spec. Grav. of Soil	2.76
Value of "a"	.978
Deflocculant	125 cc. of $(NaPO_3)_6$
Defloc. Correction	5.0
Meniscus Corr'n	-1.0

Temperature, °C	23°		
Temperature Corr'n	.01275		

SIEVE ANALYSIS (Dish No. ____)

Wt. of total sample (wet)	1111.46
Wt. of total sample (dry)	
Wt. of + #10 (wet) 53	48.06 g (T)
Wt. of + #10 (dry)	62.58
Wt. of - #10 (wet) 015	1013.4 g (T)
Wt. of - #10 (dry)	

Tyler Sieve Size	Ind. Wt. Dry Soil Retained g (t)	Cum. Wt. Dry Soil Retained	% Finer Than	% Total Sample
3/8	9.76			
4	20.30			
10	32.52			

AFTER HYDROMETER ANALYSIS (Dish No. ____)

Wt. of dry sample "W"	
% of total sample	

Tyler Sieve Size	Pan # 202	Pan wt.	Dry Soil & Pan	Cum. Wt. Dry Soil Retained	% Finer Than	% Total Sample
20	80P	1.30	3.29			
40	46	1.50	3.37			
60	07	1.57	3.32			
100	11P	1.57	3.67			
200	X1	1.30	4.47			

Test by ____ Date ____
Checked by DCL Date 2-10-94

HYDROMETER ANALYSIS (Cylinder No. ____)

Wt. of wet sample (Passing # sieve) 50.310 g (t)
Wt. of dry sample (Passing # sieve) ____ "W" ____ % of total sample ____

Observed Time	Elapsed Time (min)	Temp. (°C)	Hyd. Reading Original	Hyd. Reading Corrected "R"	100Ra W	% Total Sample	Grain Diam. (mm.)	Corr'n Coef L	Corr'n Coef k	Corr'n Coef	Corrected Diameter (mm.)
1154	0	22.1	....	....	....	....	.....	...	...	...	.....
	½		44.5								
1155	1		42.0								
1156	2		39.5								
1159	5		36.0								
1209	15		30.0								
1224	30	22.2	28.0								
1254	60	22.4	25.5								
1354	120		23.0								
1604	250	23.2	21.0								
1154	1440	22.8	17.5								

000400

On reverse side-Notes ☐ Calculation ☐

5861

ATTERBERG LIMITS
ASTM D 4318

ATTERBERG LIMITS TEST DATA

JOB NO. 2059-08
CLIENT/OWNER Parsons PO 101
LOCATION
BORING 62-209 SAMPLE ____ DEPTH 0-24.5'

FIELD CLASSIFICATION
LABORATORY CLASSIFICATION

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL g		
WT OF RINGS g	—	—
WT OF WET SOIL g		
FIELD DENSITY PCF		
DRY DENSITY PCF		

THIS IS AN 1/8-INCH THREAD

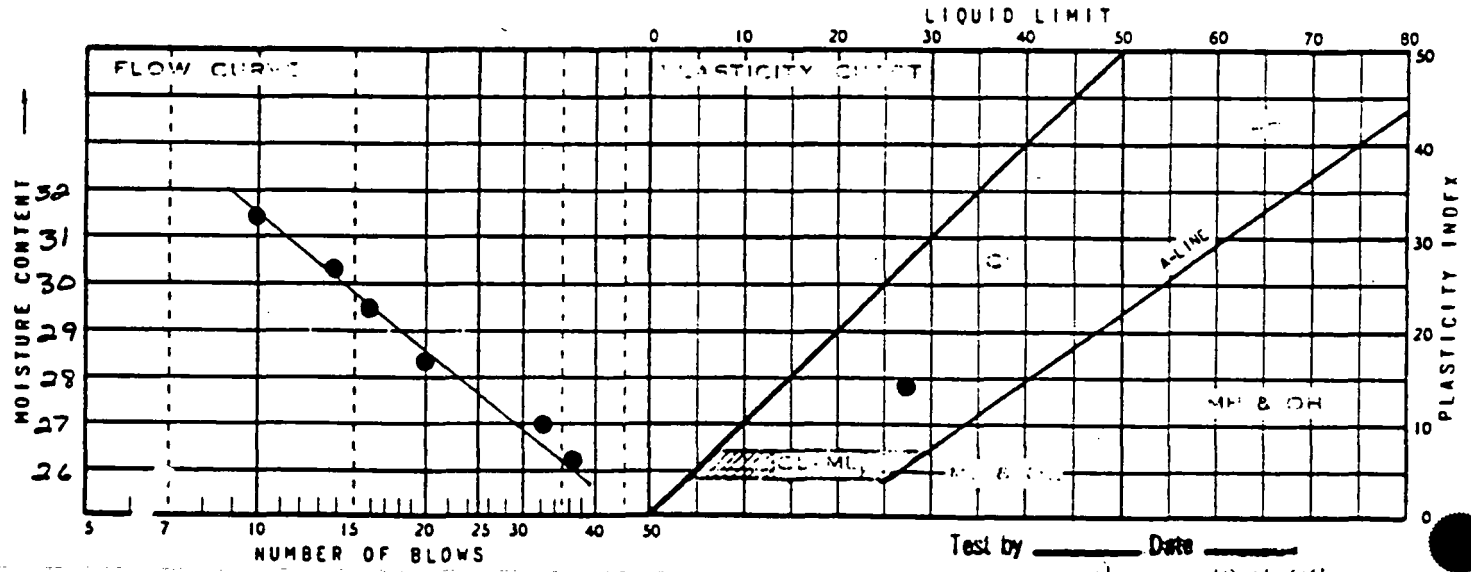
DETERMINATION	1	2
DISH#		
WT OF DISH + WET SOIL g		
WT OF DISH + DRY SOIL g	—	—
WT OF MOISTURE g		
WT OF DISH g	—	—
WT OF DRY SOIL g		
FIELD MOISTURE CONTENT %		

PLASTIC LIMIT BY SR. 12/15/93.

DETERMINATION	1	2	3	4	5	6
DISH	200 8	43 C	7 C			
WT OF DISH + WET SOIL g	3.19	3.72	3.47			
WT OF DISH + DRY SOIL g	2.95	3.40	3.19	—	—	—
WT OF MOISTURE g	.24	.32	.28			
WT OF DISH g	1.07	1.06	1.07	—	—	—
WT OF DRY SOIL g	1.88	2.34	2.12			
MOISTURE CONTENT %	12.8	13.7	13.2			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2023	B44	B43	2061	B13	29C
NUMBER OF BLOWS	37	33	20	16	14	10
WT OF DISH + WET SOIL g	10.11	10.39	11.40	13.08	10.75	13.14
WT OF DISH + DRY SOIL g	9.82	9.98	9.11	10.34	8.50	10.25
WT OF MOISTURE g	2.29	2.41	2.29	2.74	22.50	2.89
WT OF DISH g	1.08	1.07	1.06	1.04	1.09	1.07
WT OF DRY SOIL g	8.74	8.91	8.05	9.30	7.41	9.18
MOISTURE CONTENT %	26.2	27.0	28.4	29.5	30.4	31.5



Test by ____ Date ____
Checked by [illegible] Date 12-16-93

SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		27.7	13.2	14.5	CL	

ADVANCED TERRA TESTING INC

ATTERBERG LIMITS TEST DATA

FIELD CLASSIFICATION _____

LABORATORY CLASSIFICATION _____

JOB NO. 2C5-7-28
CLIENT/OWNER Parsons
LOCATION PO 101
BORING G2-210 SAMPLE 931110-132 DEPTH 6-24.5'

FIELD DENSITY BY ___/___/___

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL g		
WT OF RINGS g	—	—
WT OF WET SOIL g		
FIELD DENSITY PCF		
DRY DENSITY PCF		

THIS IS AN 1-1/8-INCH THREAD

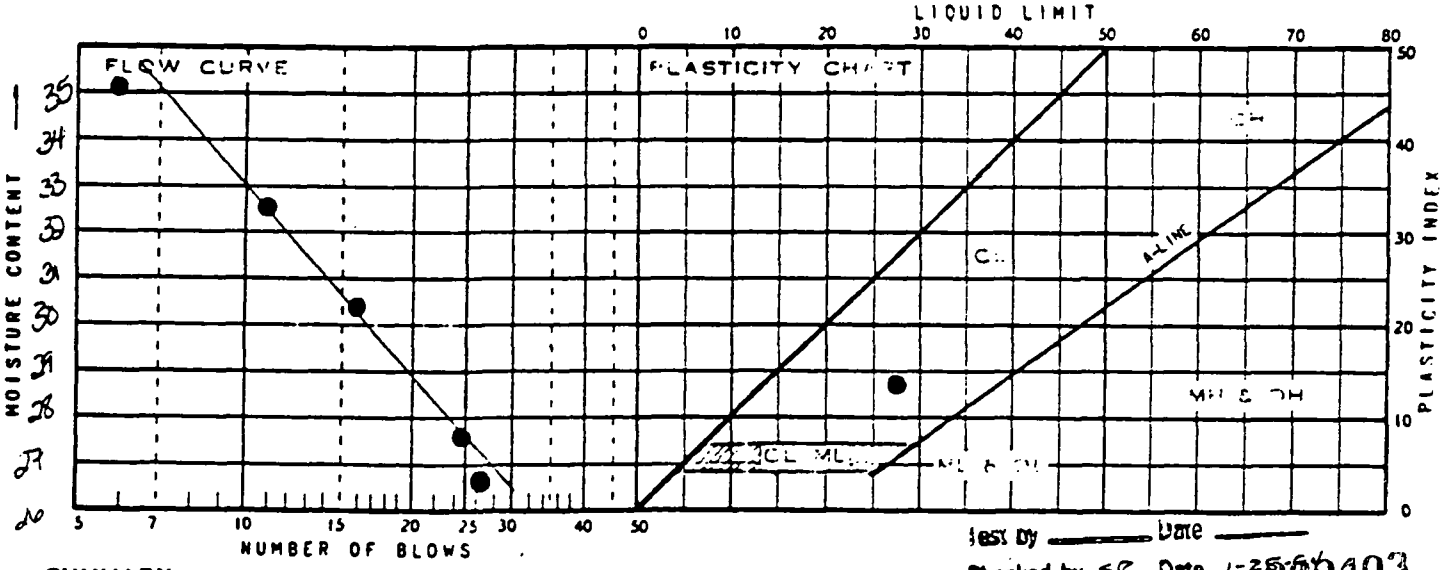
DETERMINATION	1	2
DISH #		
WT OF DISH + WET SOIL g		
WT OF DISH + DRY SOIL g	—	—
WT OF MOISTURE g		
WT OF DISH g	—	—
WT OF DRY SOIL g		
FIELD MOISTURE CONTENT %		

PLASTIC LIMIT BY MW 1/24/94

DETERMINATION	1	2	3	4	5	6
DISH	B5	4	2C17			
WT OF DISH + WET SOIL g	4.27	5.38	4.72			
WT OF DISH + DRY SOIL g	3.88	4.85	4.26	—	—	—
WT OF MOISTURE g	.39	.53	.46			
WT OF DISH g	1.06	1.07	1.07	—	—	—
WT OF DRY SOIL g	2.82	3.78	3.19			
MOISTURE CONTENT %	13.8	14.0	14.4			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	15C	2051	B17	2007	2024	
NUMBER OF BLOWS	27	25	16	11	6	
WT OF DISH + WET SOIL g	10.68	12.52	14.54	15.29	12.60	
WT OF DISH + DRY SOIL g	8.66	10.04	11.41	11.80	9.61	—
WT OF MOISTURE g	2.02	2.48	3.13	3.49	2.99	
WT OF DISH g	1.08	1.06	1.08	1.09	1.08	—
WT OF DRY SOIL g	7.58	8.98	10.33	10.71	8.53	
MOISTURE CONTENT %	26.6	27.6	30.3	32.6	35.1	



Test by _____ Date _____
Checked by SR Date 1-25-94

SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		27.6	14.1	13.5	CL	

ADVANCED TERRA TESTING INC

PROCTOR COMPACTION - STANDARD
ASTM D 698

Sample No. G2-209 Depth 0 - 25 Elevation 5861

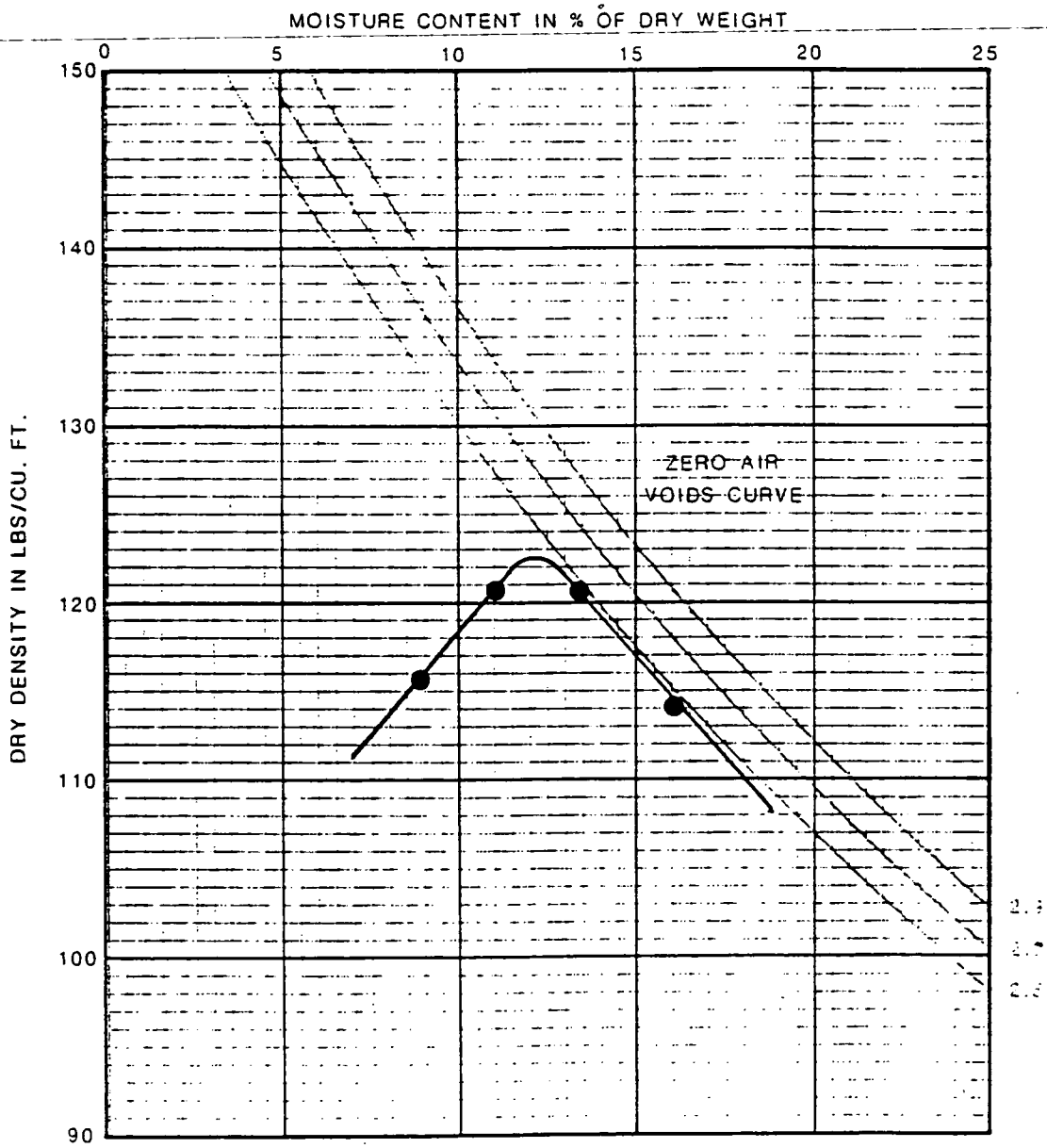
Soil Brown and Gray Sandy Lean Clay (CL)

Location Proposed On-Site Disposal Cell (PO-101)

Optimum Moisture Content 12.3%

Maximum Dry Density 122.3 pcf

Method of Compaction ASTM D 698, Method A



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COMPACTION TEST DATA

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ADVANCED TERRA TESTING

COMPACTION TEST DATA

PAGE NO.____ OF____

ADVANCED TERRA TESTING

Job No. 2059-08 Client Parsons - P0101 Location Proposed On-Site Disposal C.

Sampled 11/9/93 By JPH Tested 12-11-93 By DL Checked 12-13-93 By SR

SAMPLE DESCRIPTION	Soil				Sample No. G2-209	
	Specific Gravity				Depth or Elevation 0-24.5'	
	% Passing 3/4"				% Passing ~~1/4"~~ #4 ~95%	
TEST SPECIFICATIONS ASTM D 698 METHOD A	Compaction method (F, G)	☐ Proctor	☒ Standard AASHO	☐ Modified AASHO	☐ Calif.	
	Cylinder - cu. ft.	1/20	1/30	1/30	Variable	
	Rammer - lbs.	5 1/2	5 1/2	10	10	
	Drop - inches	18	12	18	18	
	Layers	3	3	5	5	
	Blows per layer	25	25	25	20 *	
	Wt. of moisture added ml	50	100	150	200	
MOISTURE DETERMINATION	Dish number	26A	Z3	4E	29A	7E
	Wt. of soil & dish g	264.93	410.83	237.41	188.96	
	Dry wt. soil & dish g	243.95	370.77	210.09	163.78	
	Net loss of moisture (B) g	20.98	40.06	27.32	25.18	
	Wt. of dish only g	7.20	8.41	8.04	7.32	8.13
	Net wt. of dry soil (A) g	236.75	362.36	202.05	156.5	
	Moisture, % of dry wt. (C)	8.9	11.1	13.5	16.1	
DENSITY DETERMINATION	Wt. of soil & mold #	14.57	14.83	14.93	14.78	
	Wt. of mold only #	10.37	10.37	10.37	10.37	10.37
	Net wt. of wet soil (D) #	4.20	4.46	4.56	4.41	
	Net wt. of dry soil (E) #	3.86	4.02	4.02	3.80	
	Ht. of sample - Calif. (G)					
	Dry Density, lbs/cu ft (H)	115.7	120.5	120.5	114.0	
PENETROMETER	Needle Size					
	Resistance Reading					
	Resistance, lbs/sq in					

000405

Then add piston and ...

5861

Sample No. G2-210 Depth 0 - 25 Elevation _____

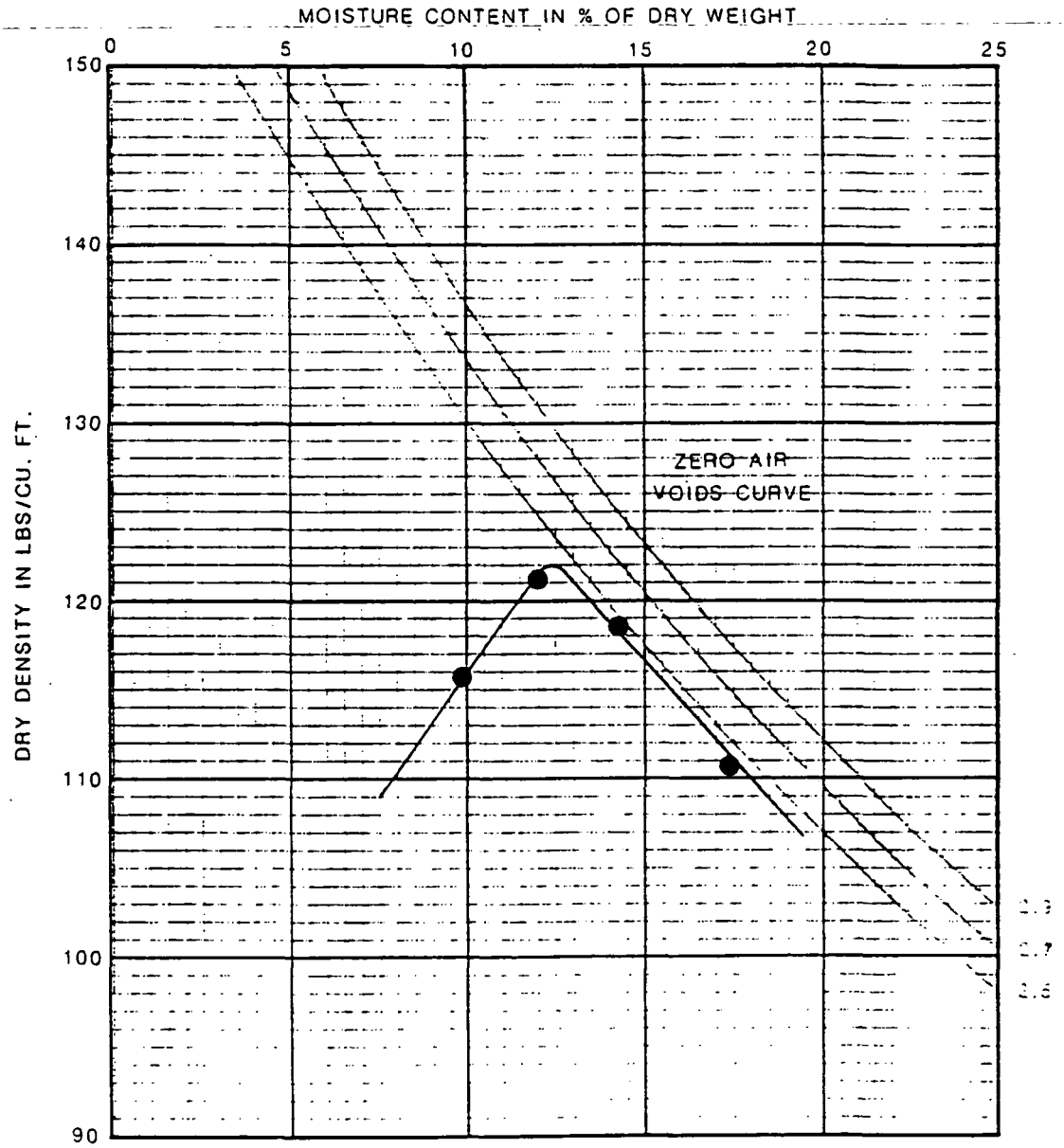
Soil Brown and Gray Lean Clay with Sand (CL)

Location Proposed On-Site Disposal Cell (PO-101)

Optimum Moisture Content 12.4%

Maximum Dry Density 122.3 pcf

Method of Compaction ASTM D 698, Method A



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COMPACTION TEST DATA

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ADVANCED TERRA TESTING

COMPACTION TEST DATA

PAGE NO.____ OF____

ADVANCED TERRA TESTING, INC.

Job No. 2059-08 Client Parsons Policy Location Proposed On-Site Disposal C.

Sampled 11/8/93 By TPH Tested 12-11-93 By DW Checked 12-13-93 By JE

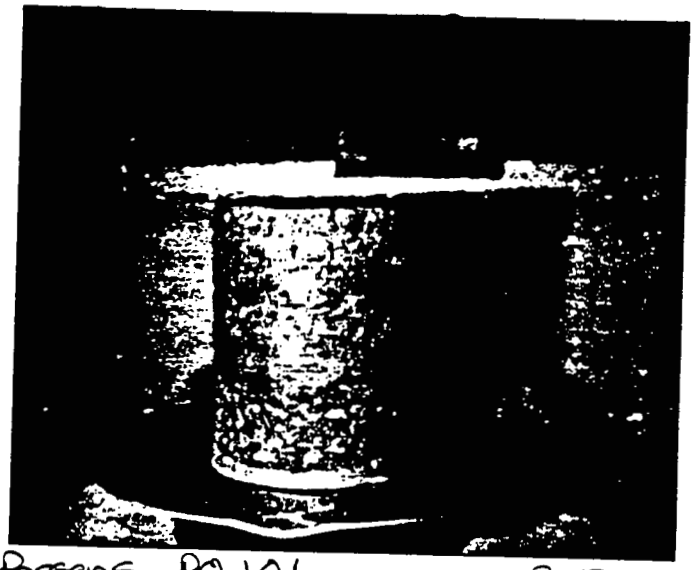
SAMPLE DESCRIPTION	Soil ____ Sample No. E2-210					
	Specific Gravity ____ Depth or Elevation 0-24.5'					
	% Passing 3/4" ____ % Passing ~~1/4~~ #4 ~92.0%					
TEST SPECIFICATIONS ASTM D 698 METHOD A	Compaction method (F, G)	☐ Proctor	☒ Standard AASHO	☐ Modified AASHO	☐ Calif.	
	Cylinder - cu. ft.	1/20	1/30	1/30	Variable	
	Rammer - lbs.	5 1/2	5 1/2	10	10	
	Drop - inches	18	12	18	18	
	Layers	3	3	5	5	
	Blows per layer	25	25	25	20 *	
	Wt. of moisture added ml	50	100	150	200	
MOISTURE DETERMINATION	Dish number	12A	6A	7A	018	
	Wt. of soil & dish g	374.11	356.26	315.90	227.46	
	Dry wt. soil & dish g	341.31	319.00	277.31	195.35	
	Net loss of moisture (B) g	32.80	37.26	38.59	32.11	
	Wt. of dish only g	8.22	5.17	8.20	9.65	
	Net wt. of dry soil (A) g	333.09	310.83	269.11	185.70	
	Moisture, % of dry wt. (C)	9.8	12.0	14.3	17.3	
DENSITY DETERMINATION	Wt. of soil & mold #	14.61	14.89	14.89	14.69	
	Wt. of mold only #	10.37	10.37	10.37	10.37	
	Net wt. of wet soil (D) #	4.24	4.52	4.52	4.32	
	Net wt. of dry soil (E) #	3.86	4.04	3.95	3.68	
	Ht. of sample - Calif. (G)					
	Dry Density, lbs/cu ft (H)	115.8	121.1	115.6	110.5	
PENETROMETER	Needle Size					
	Resistance Reading					
	Resistance, lbs/sq in					

000408

5861

TRIAXIAL, BACK-PRESSURE PERMEABILITY, TX/Pbp
ASTM D 5084

000409



Parsons PO 101 2059-08
G2-209 @ 0-24'
TX/PDP
σ_3 = 1440 PSF

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

5861

CLIENT	Parsons	JOB NO.	2059-08
BORING NO.	G2-209	SAMPLED	11/09/93
DEPTH	0-24'	TEST STARTED	12/18/93 DCW
SAMPLE NO.	931110-133	TEST FINISHED	12/31/93
SOIL DESCR.	PO 101	SETUP NO.	7S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1440	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA		BEFORE TEST	AFTER TEST
Wt. Soil + Moisture	(g)	467.8	488.8
Wt. Wet Soil & Pan	(g)	475.9	496.9
Wt. Dry Soil & Pan	(g)	426.8	426.8
Wt. Lost Moisture	(g)	49.1	70.1
Wt. of Pan Only	(g)	8.1	8.1
Wt. of Dry Soil	(g)	418.7	418.7
Moisture Content %		11.7	16.7
Wet Density PCF		130.0	144.0
Dry Density PCF		116.3	123.4

Init. Diameter	(in)	2.399	(cm)	6.093
Init. Area	(sq in)	4.520	(sq cm)	29.164
Init. Height	(in)	3.033	(cm)	7.704
Vol. Bef. Consol.	(cu ft)	0.00793		
Vol. After Consol.	(cu ft)	0.00748		
Porosity %		33.09		
Constant Head	(PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
756.0	45360	50.0	11.1	36.1	2.2E-06
694.0	41640	49.5	12.3	35.6	2.3E-06
519.0	31140	49.9	19.7	31.4	2.4E-06
847.0	50820	49.7	9.5	37.0	2.1E-06
493.0	29580	49.8	22.6	29.9	2.3E-06
934.0	56040	49.9	5.9	38.9	2.1E-06
592.0	35520	50.0	19.4	31.6	2.1E-06
885.0	53100	49.9	10.2	36.6	2.0E-06
530.0	31800	49.9	27.3	27.4	1.7E-06
824.0	49440	50.0	20.6	30.9	1.5E-06
670.0	40200	49.9	25.2	28.5	1.5E-06
847.0	50820	49.5	21.1	30.9	1.4E-06
1348.0	80880	49.9	7.7	37.9	1.4E-06

000411

ADVANCED TERRA TESTING, INC.

TRIAXAL COMPRESSION TEST DATA

CLIENT	Parsons	JOB NO.	2059-08
BORING NO.	G2-209	SAMPLED	11/09/93
DEPTH	0-24'	TEST STARTED	12/18/93 DCW
SAMPLE NO.	931110-133	TEST FINISHED	12/31/93
SOIL DESCR.	PO 101	SETUP NO.	7S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1440	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	2.0	12.2				
50.0	48.0	12.7	13.7	38.9	47.5	8.6	0.86
60.0	58.0	14.0	14.9	49.1	57.9	8.8	0.88
70.0	68.0	14.9	15.7	58.5	67.7	9.2	0.92
80.0		16.1	16.3	68.8	78.3	9.5	0.95

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.00	0.00
0.25	0.50	3.50	-3.50
0.5	0.71	4.25	-4.25
1	1.00	4.90	-4.90
2	1.41	5.40	-5.40
4	2.00	5.80	-5.80
9	3.00	6.15	-6.15
16	4.00	6.30	-6.30
30	5.48	6.50	-6.50
60	7.75	6.60	-6.60
120	10.95	6.78	-6.78
240	15.49	6.80	-6.80
360	18.97	6.85	-6.85

Initial Height	(in)	3.033	Init. Vol.	(CC)	224.70
Height Change	(in)	0.042	Vol. Change	(CC)	22.10
Ht. After Cons.	(in)	2.991	Cell Exp.	(CC)	9.30
Initial Area	(sq in)	4.520	Net Change	(CC)	12.80
Area After Cons.	(sq in)	4.322	Cons. Vol.	(CC)	211.90

ADVANCED TERRA TESTING, INC.

000412

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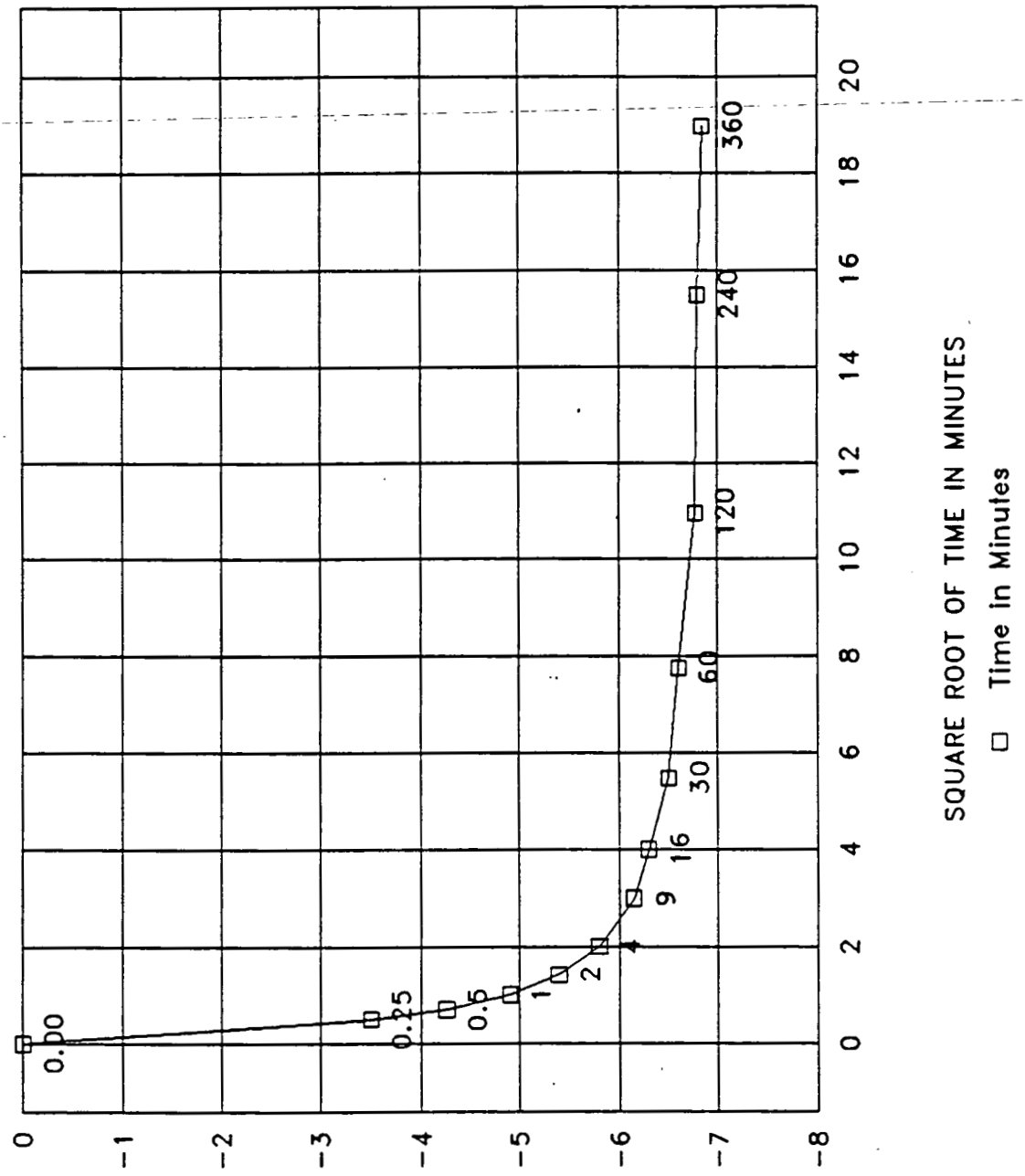
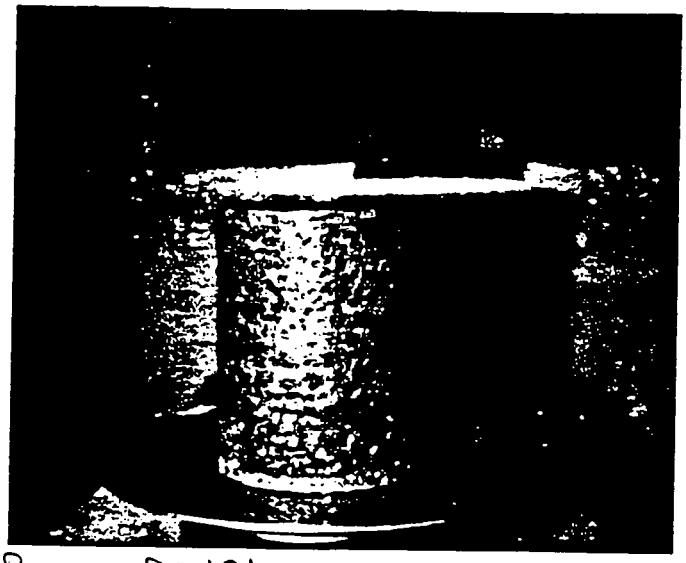
CONSOLIDATION DATA

G2-209 @ 0 - 24' 1440 psf Conf.



000413



Parsons PO 101
G2-210 @ 0-24.5'
2059-08
TX/Pbp
$\bar{\sigma}_3$ = 1440 PSF

000414

5861

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT	Parsons	JOB NO.	2059-08
BORING NO.	G2-210	SAMPLED	
DEPTH	0 - 24.5'	TEST STARTED	12/19/93 DCW
SAMPLE NO.	931110-132	TEST FINISHED	12/30/93
SOIL DESCR.	PO 101	SETUP NO.	13S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1440	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA		BEFORE TEST	AFTER TEST
Wt. Soil + Moisture	(g)	468.4	490.4
Wt. Wet Soil & Pan	(g)	476.6	498.6
Wt. Dry Soil & Pan	(g)	427.2	427.2
Wt. Lost Moisture	(g)	49.4	71.4
Wt. of Pan Only	(g)	8.1	8.1
Wt. of Dry Soil	(g)	419.1	419.1
Moisture Content %		11.8	17.0
Wet Density PCF		130.2	138.5
Dry Density PCF		116.5	118.3

Init. Diameter	(in)	2.399	(cm)	6.093
Init. Area	(sq in)	4.520	(sq cm)	29.164
Init. Height	(in)	3.031	(cm)	7.699
Vol. Bef. Consol.	(cu ft)	0.00793		
Vol. After Consol.	(cu ft)	0.00781		
Porosity %		32.28		
Constant Head	(PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
395.0	23700	49.9	28.5	26.7	2.1E-06
880.0	52800	49.9	5.7	39.0	2.2E-06
542.0	32520	49.9	18.6	32.0	2.3E-06
814.0	48840	49.9	8.3	37.6	2.2E-06
680.0	40800	49.9	15.1	33.9	2.1E-06
840.0	50400	49.7	8.7	37.5	2.1E-06

ADVANCED TERRA TESTING, INC.

TRIAXAL COMPRESSION TEST DATA

CLIENT Parsons

JOB NO. 2059-08

BORING NO.	G2-210	SAMPLED	
DEPTH	0 - 24.5'	TEST STARTED	12/19/93 DCW
SAMPLE NO.	931110-132	TEST FINISHED	12/30/93
SOIL DESCR.	PO 101	SETUP NO.	13S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	1440	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.9	6.1				
50.0	48.0	6.1	6.9	39.2	47.3	8.1	0.81
60.0	58.0	6.8	7.3	49.3	57.9	8.6	0.86
70.0	68.0	7.5	8.1	59.6	68.5	8.9	0.89
80.0	78.0	8.1	8.7	70.4	79.5	9.1	0.91
90.0		8.9	8.9	80.2	89.8	9.6	0.96

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	10.30	0.00
0.25	0.50	12.30	-2.00
0.5	0.71	12.78	-2.47
1	1.00	13.20	-2.90
2	1.41	13.55	-3.25
4	2.00	13.78	-3.47
9	3.00	13.95	-3.65
16	4.00	14.03	-3.72
30	5.48	14.13	-3.82
60	7.75	14.28	-3.97
120	10.95	14.33	-4.02
240	15.49	14.33	-4.02
360	18.97	14.33	-4.02

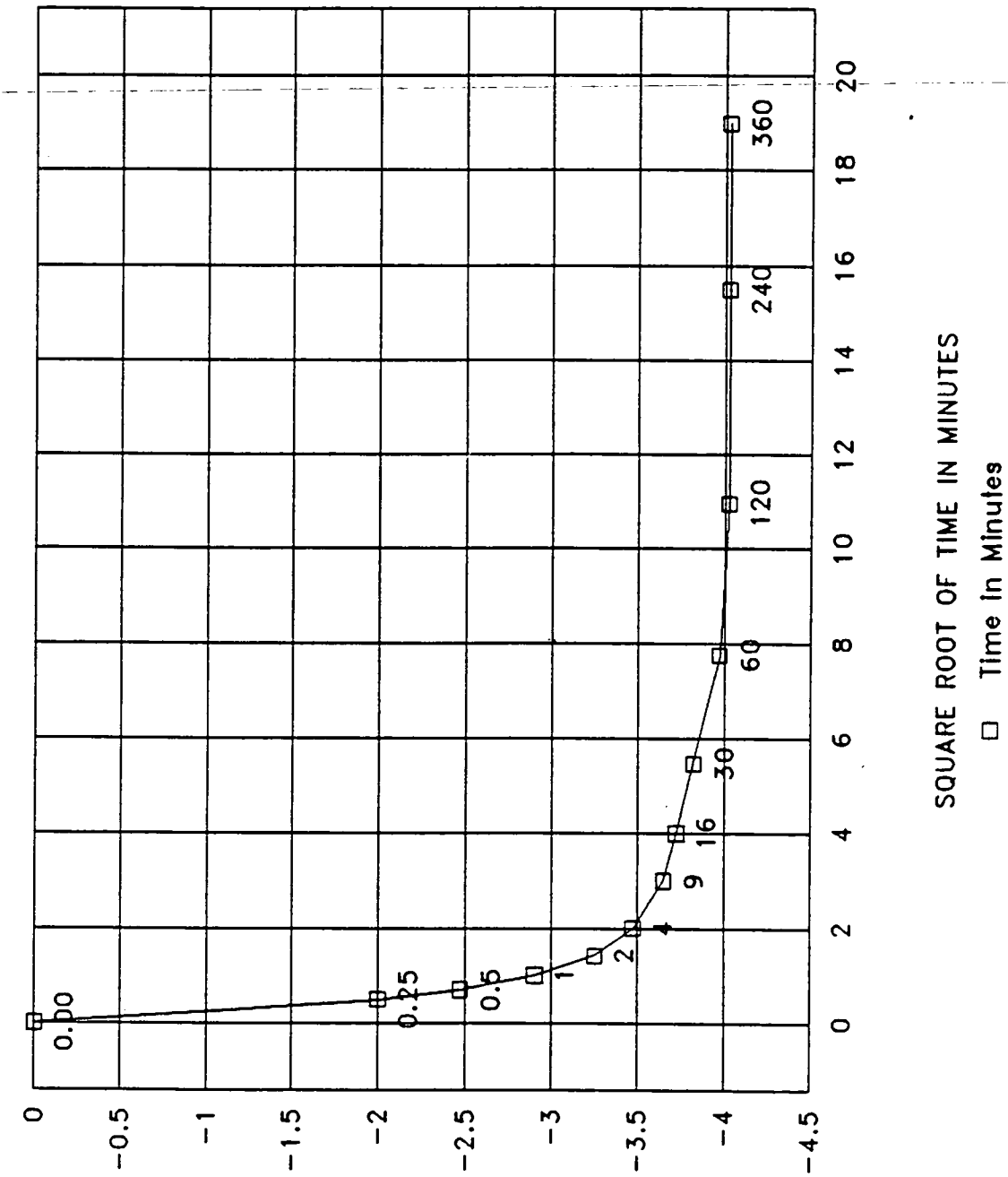
Initial Height	(in)	3.031	Init. Vol.	(CC)	224.55
Height Change	(in)	0.021	Vol. Change	(CC)	12.95
Ht. After Cons.	(in)	3.010	Cell Exp.	(CC)	9.50
Initial Area	(sq in)	4.520	Net Change	(CC)	3.45
Area After Cons.	(sq in)	4.482	Cons. Vol.	(CC)	221.10

ADVANCED TERRA TESTING, INC.

5861

CONSOLIDATION DATA

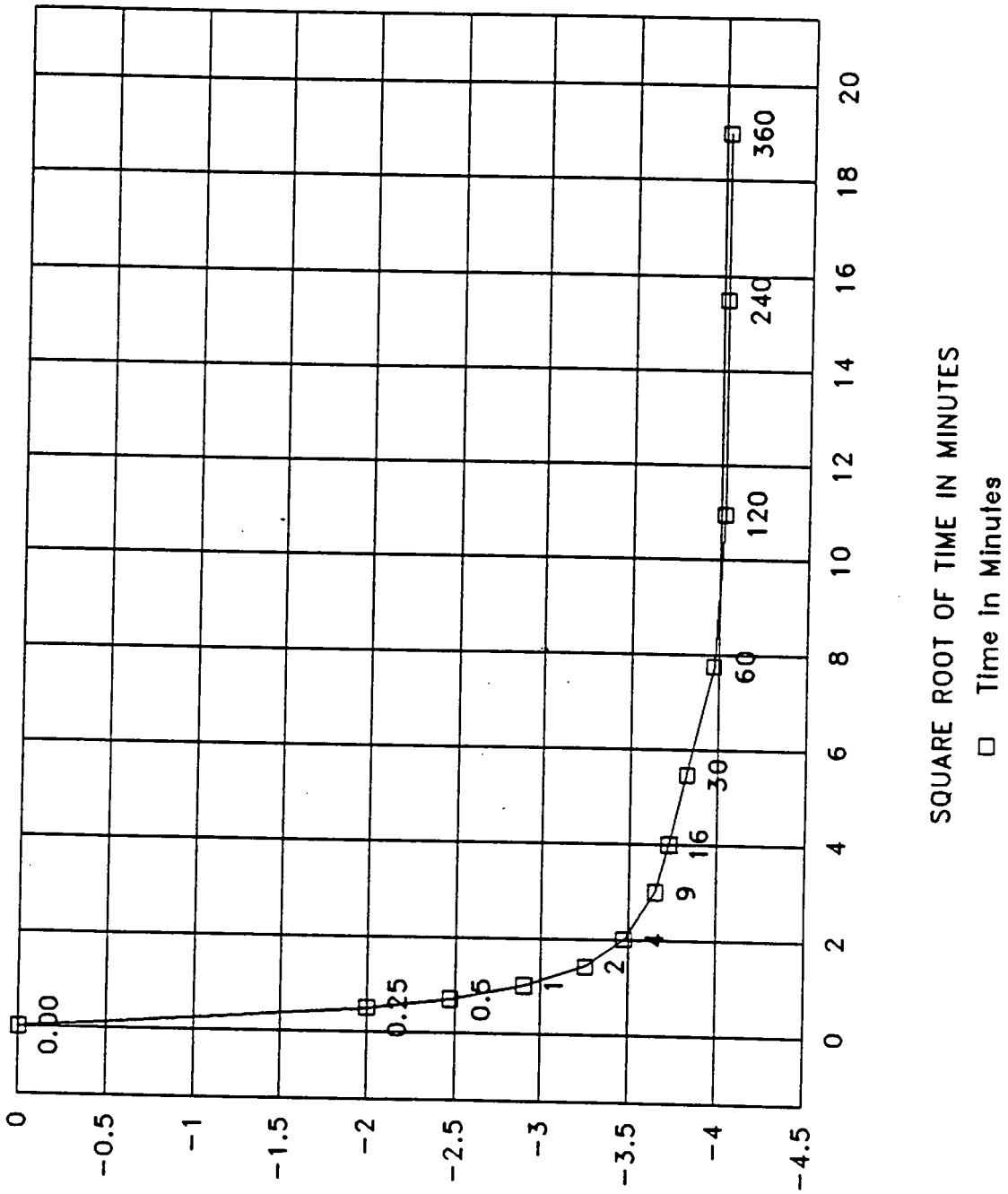
G2-210 @ 0-24.5' 1440 psf Conf.



000417

CONSOLIDATION DATA

G2-210 @ 0-24.5' 1440 psf Conf.



VOLUME DEFLECTION - cc

000 18

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APPENDIX B

LIMITS OF ACCEPTABLE DRY DENSITIES FOR PERMEABILITY TESTING FOR SAMPLES G2-209 (MODIFIED PROCTOR) AND G2-210 (STANDARD PROCTOR)

Sample No. G--210 Depth 0 - 25 Elevation _____

Soil Brown and Gray Lean Clay with Sand (CL)

Location Proposed On-Site Disposal Cell

Optimum Moisture Content 12.4%

Maximum Dry Density 122.3 PCF

Method of Compaction ASTM D698, Method A

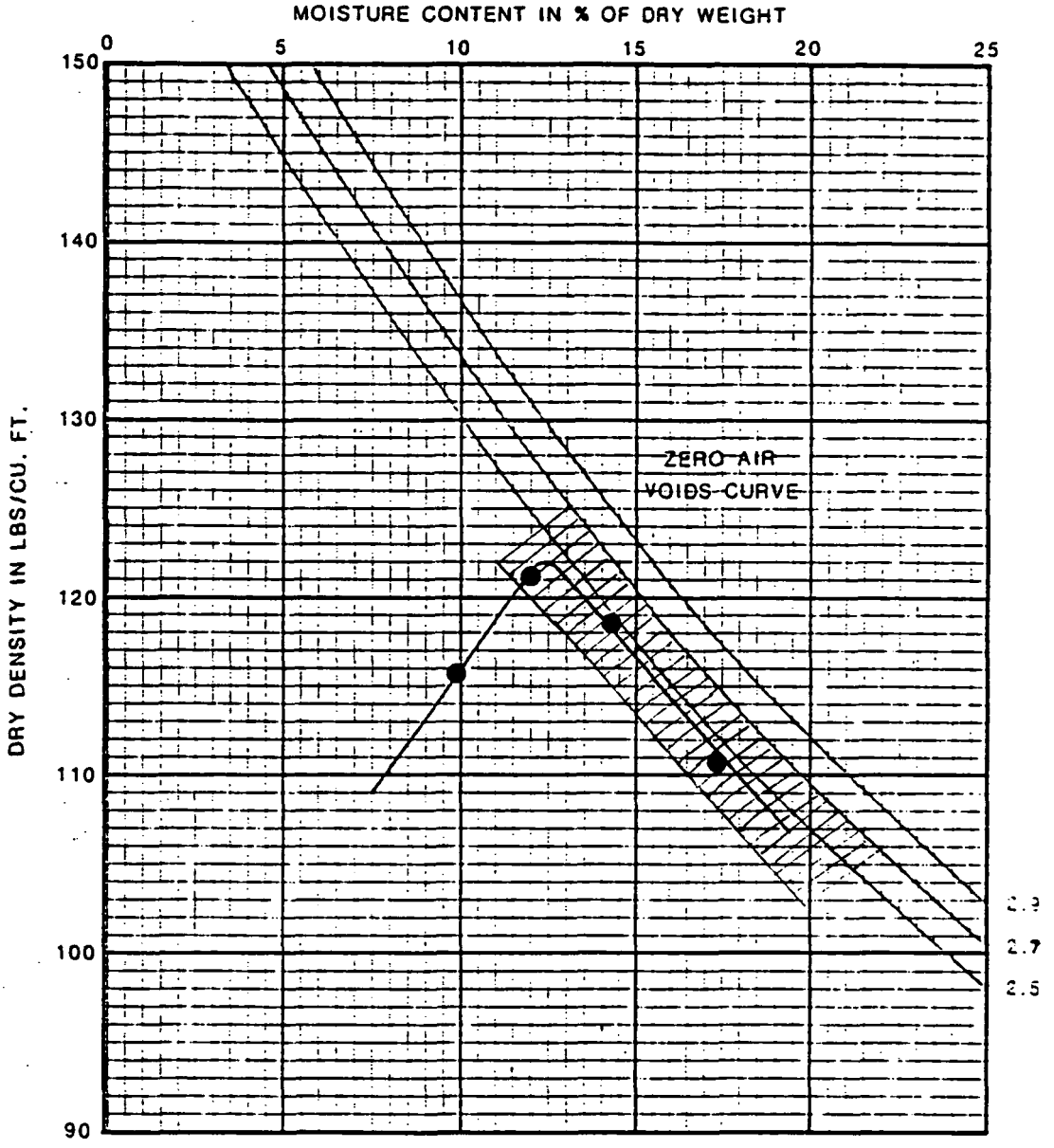

Figure B-1: G2-210 Dry Density Band

COMPACTION TEST DATA

000420

= ZONE OF ACCEPTABLE SPECIMEN DRY DENSITY FOR PERMEABILITY TESTING

ADVANCED TERRA TESTING

File

K. Ernst 3/29/94

Sample No. G2-209 Depth 0-24.5' Elevation _____

Soil Bulk

Location Onsite Waste Disposal Cell

Optimum Moisture Content ~ 10.3 %

Maximum Dry Density ~ 133.8 pcf

Method of Compaction ASTM D 1557 A

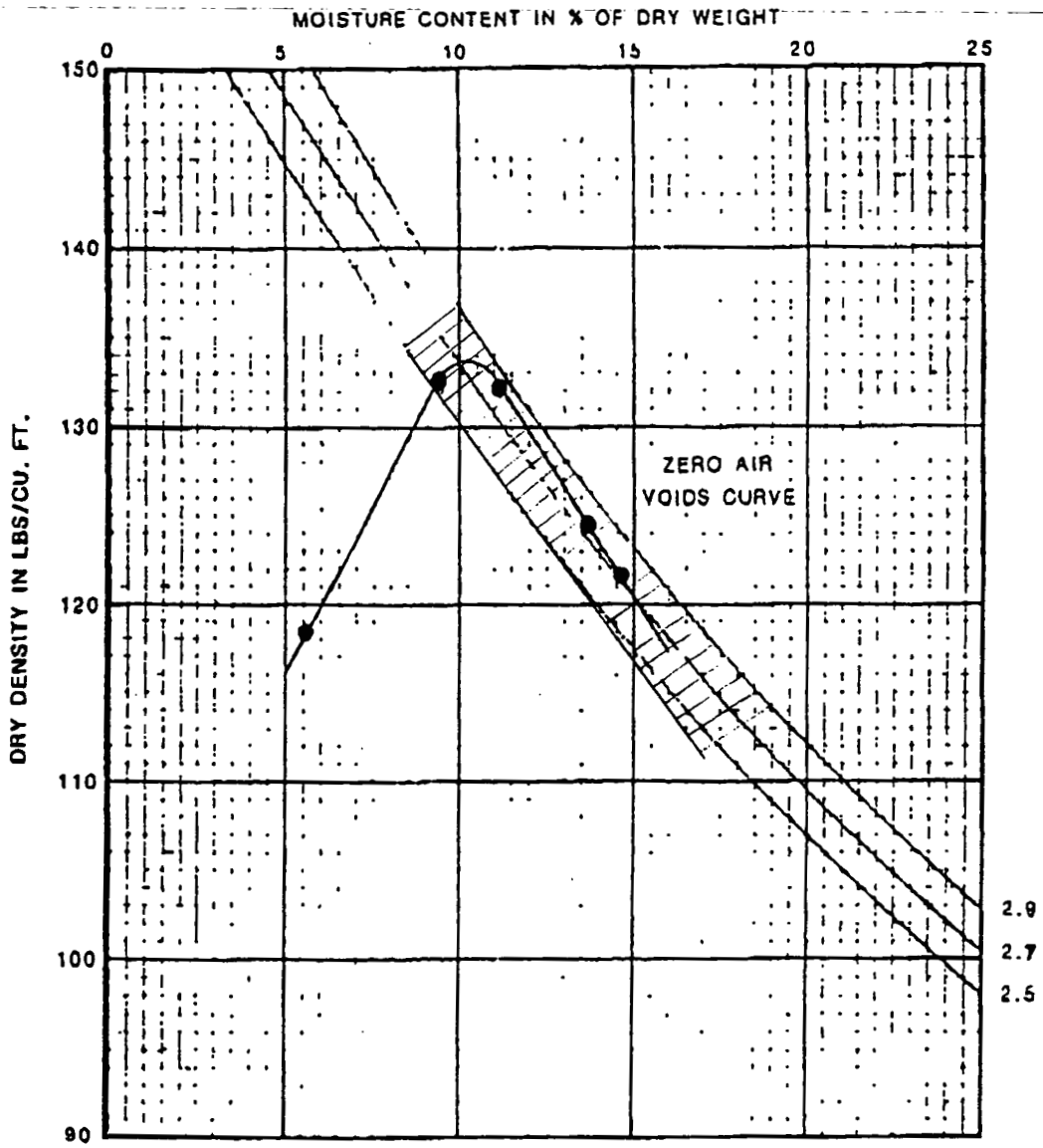

Figure B-2: G2-209 Modified Proctor Dry Density Band

File Parsons PO 101 2059-10

000421

COMPACTION TEST DATA

= ZONE OF ACCEPTABLE SPECIMEN DRY DENSITY FOR PERMEABILITY TESTING

ADVANCED TERRA TESTING

K. Ernst 5-11-94

APPENDIX C

TEST PLAN FOR SUPPLEMENTAL GEOTECHNICAL LABORATORY TESTING

000422

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PO 101 On-Site Disposal Cell
Supplemental Geotechnical Laboratory Testing Program
Revision 0
3/29/94

Prepared by PARSONS ERA Project

The supplemental geotechnical laboratory testing described herein consists of laboratory permeability testing on recompacted samples prepared from soil samples (auger cuttings) collected at Borings G2-209 and G2-210 in November 1993 during implementation of the *Solid Waste Landfill and On-site Waste Disposal Cell Geotechnical Sampling and Testing Plan* (PARSONS 1993). The samples are currently in storage at Advanced Terra Testing, Inc., Lakewood, Colorado. The purpose of the additional testing is to provide pre-design data regarding the permeability of recompacted samples, compacted wet of optimum moisture content (Phase 1); and, compacted with higher compactive energies (Phase 2).

1. Testing Plan for Sample G2-210 (PHASE 1 testing)

Attachment A, from *On-site Waste Disposal Cell Soil Investigation Data Report* (SAIC 1994) contains compaction test data for a standard proctor test (ASTM D 698) performed on Sample G2-210 (0-25 feet). Optimum moisture content was 12.4% ; maximum dry density was 122.3 pcf.

Test G2-210-#1:

1) Perform Atterberg limits test (ASTM D 4318) on representative soil material from Sample G2-210. Compare results with those of previous results for Sample G2-210 in SAIC 1994.

2) Compact soil from Sample G2-210 using standard proctor method at a moisture content of 12.4% (-0.5, +1.5%).

3) Verify that dry density falls within the band shown on Figure 1 prior to testing.

4) Perform a Triaxial, Back-Pressure Permeability Test on a compacted soil test specimen per ASTM D 5084.

Test G2-210-#2:

1) Compact soil from Sample G2-210 using standard proctor method at a moisture content of 14.4% ($\pm$1.0%).

2) Verify that dry density falls within the band shown on Figure 1 prior to testing.

3) Perform a Triaxial, Back-Pressure Permeability Test on a compacted soil test specimen per ASTM D 5084.

Test G2-210-#3:

1) Compact soil from Sample G2-210 using standard proctor method at a moisture content of 17.4% ($\pm$1.0%).

2) Verify that dry density falls within the band shown on Figure 1 prior to testing.

3) Perform a Triaxial, Back-Pressure Permeability Test on a compacted soil test specimen per ASTM D 5084.

4) Transmit test results for Tests #1, 2 and #3 above to PARSONS for review. Do not proceed with testing plan for Sample G2-209 without PARSONS authorization.

2. Testing Plan for Sample G2-209 (PHASE 2 testing)

Attachment B, from *On-site Waste Disposal Cell Soil Investigation Data Report* (SAIC 1994) contains compaction test data for a standard proctor test (ASTM D 698) performed on sample G2-209 (0-25 feet). Optimum moisture content was 12.3% ; maximum dry density was 122.3 pcf. Based on the results of Sample G2-210 testing of PHASE 1, either an additional permeability test (G2-209-#1) for confirmation will be conducted, or a modified proctor (G2-209-#2) and a series of permeability tests (G2-209-#3 through #5) will be performed.

Test G2-209-#1:

1) Perform Atterberg limits test (ASTM D 4318) on representative soil material from Sample G2-209. Compare results with those of previous results for Sample G2-209 in SAIC 1994.

2) Compact soil from Sample G2-209 using standard proctor method at a moisture content to be provided by PARSONS.

3) Verify that dry density falls within the band shown on Figure 2.

4) Perform a Triaxial, Back-Pressure Permeability Test on a compacted soil test specimen per ASTM D 5084.

Test G2-209-#2:

1) Perform Atterberg limits test (ASTM D 4318) on representative soil material from Sample G2-209. Compare results with those of previous results for Sample G2-209 in SAIC 1994.

2) Perform a modified proctor test (ASTM D 1557) on soil from Sample G2-209.

3) Transmit moisture-density data from the modified proctor test to PARSONS for review. Do not proceed with tests #3, #4 and #5 listed below without PARSONS authorization.

Test G2-209-#3:

1) Compact soil from Sample G2-209 using modified proctor method at optimum moisture content (-0.5, +1.5%).

2) Verify that dry density falls within the band shown on Figure to be provided by PARSONS prior to testing.

3) Perform a Triaxial, Back-Pressure Permeability Test on a compacted soil test specimen

per ASTM D 5084.

Test G2-209-#4:

1) Compact soil from Sample G2-209 using modified proctor method at a moisture content 2%(±1.0%) wet of optimum.

2) Verify that dry density falls within the band shown on Figure to be provided by PARSONS prior to testing.

3) Perform a Triaxial, Back-Pressure Permeability Test on a compacted soil test specimen per ASTM D 5084.

Test G2-209-#5:

1) Compact soil from Sample G2-209 using modified proctor method at a moisture content 5%(±1.0%) wet of optimum.

2) Verify that dry density falls within the band shown on Figure to be provided by PARSONS prior to testing.

3) Perform a Triaxial, Back-Pressure Permeability Test on a compacted soil test specimen per ASTM D 5084.

5861

3. References:

Annual Book of ASTM Standards, *Vol. 4.08 Soil and Rock, Building Stones, Geotextiles, 1993 Edition.* American Society for Testing and Materials: Philadelphia, Pennsylvania.

(PARSONS 1993) PARSONS ERA Project, October 1993. *Solid Waste Landfill and On-Site Disposal Cell Geotechnical Sampling and Testing Plan*, Revision 0. Fairfield, Ohio: PARSONS.

(SAIC 1994) Science Applications International Corporation, March 3, 1994. *On-Site Disposal Cell Soil Investigation Data Report.* Volumes 1 and 2. Golden, Colorado: SAIC.

Sample No. G2-209 Depth 0 - 25 Elevation _____

Soil Brown and Gray Sandy Lean Clay (CL)

Location On-Site Disposal Cell

Optimum Moisture Content 12.3%

Maximum Dry Density 122.3 PCF

Method of Compaction ASTM D698, Method A

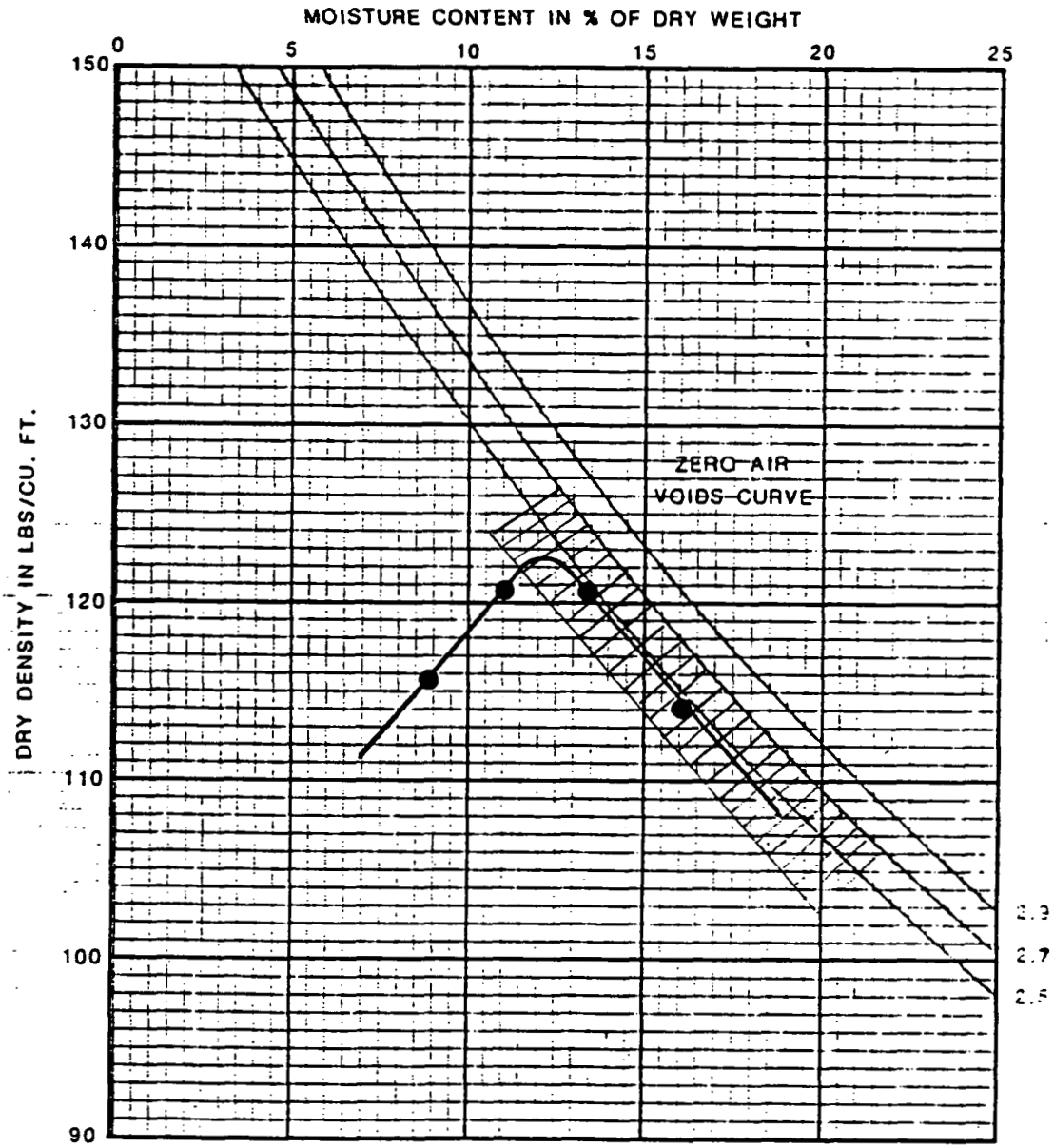


Figure 2: G2-209 Dry Density Band

File _____

COMPACTION TEST DATA

000428

= ZONE OF ACCEPTABLE SPECIMEN DRY DENSITY FOR PERMEABILITY TESTING

ADVANCED TERRA TESTING

5861

Sample No. G2-210 Depth 0 - 25 Elevation _____

Soil Brown and Gray Lean Clay with Sand (CL)

Location Proposed On-Site Disposal Cell

Optimum Moisture Content 12.4%

Maximum Dry Density 122.3 PCF

Method of Compaction ASTM D698, Method A

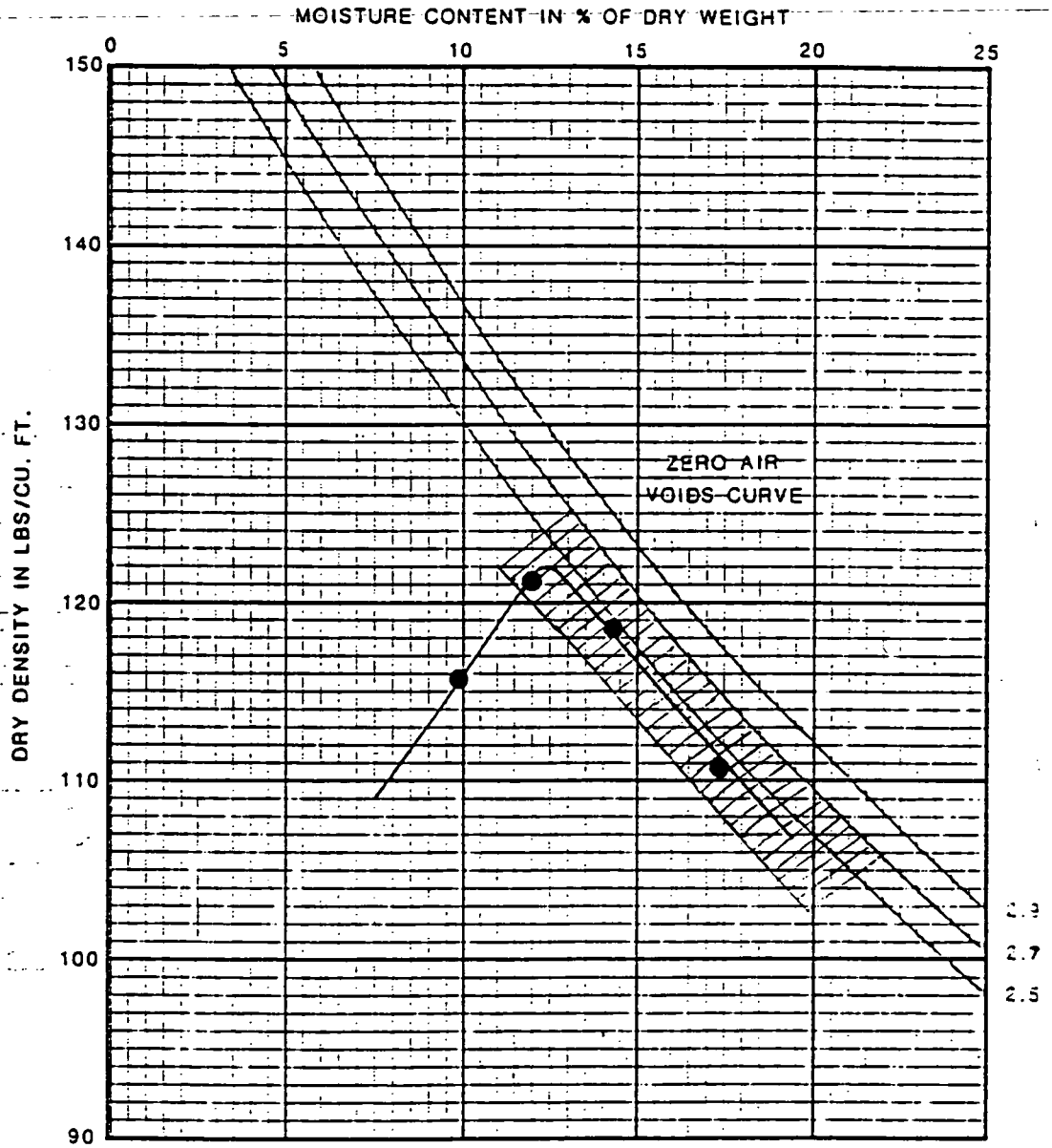


Figure 1: G2-210 Dry Density Band

000429

COMPACTION TEST DATA

= ZONE OF ACCEPTABLE SPECIMEN DRY DENSITY FOR PERMEABILITY TESTING

ADVANCED TERRA TESTING

File

PO-101 OSWDC SUPP. GEOTECH LAB
TESTING PROG., REV. 0 E-3-3-268

K. Einst 3/29/94

COMPACTION TEST DATA

PAGE NO.____ OF____

ADVANCED TERRA TESTING, INC.

Job No. 2059-03 Client Parsons PO101 Location Proposed On-Site Disposal

Sampled 11/8/93 By JPH Tested 12-11-93 By [illegible] Checked 12-13-93 By SR

SAMPLE DESCRIPTION	Soil ____ Sample No. 62-210					
	Specific Gravity ____ Depth or Elevation 0-24.5'					
	% Passing 3/4" ____ % Passing ~~1/4"~~ #4 ~92.0%					
TEST SPECIFICATIONS ASTM D 698 METHOD A	Compaction method (F, G)	☐ Proctor	☒ Standard AASHO	☐ Modified AASHO	☐ Calif.	
	Cylinder - cu. ft.	1/20	1/30	1/30	Variable	
	Rammer - lbs.	5 1/2	5 1/2	10	10	
	Drop - inches	18	12	18	18	
	Layers	3	3	5	5	
	Blows per layer	25	25	25	20 *	
	Wt. of moisture added ml	50	100	150	200	
MOISTURE DETERMINATION	Dish number	12A	6A	7A	018	
	Wt. of soil & dish g	374.11	356.26	315.90	227.46	
	Dry wt. soil & dish g	341.31	319.00	277.31	195.35	
	Net loss of moisture (B) g	32.80	37.26	38.59	32.11	
	Wt. of dish only g	8.22	5.17	8.20	9.65	
	Net wt. of dry soil (A) g	333.09	310.83	269.11	185.70	
	Moisture, % of dry wt. (C)	9.8	12.0	14.3	17.3	
DENSITY DETERMINATION	Wt. of soil & mold #	14.61	14.89	14.89	14.69	
	Wt. of mold only #	10.37	10.37	10.37	10.37	
	Net wt. of wet soil (D) #	4.24	4.52	4.52	4.32	
	Net wt. of dry soil (E) #	3.86	4.04	3.95	3.68	
	Ht. of sample - Calif. (G)					
	Dry Density, lbs/cu ft (H)	115.8	121.1	118.6	110.5	
PENETROMETER	Needle Size					
	Resistance Reading					
	Resistance, lbs/sq in					

000430

5861

Sample No. G2-210 Depth 0-24.5' Elevation _____

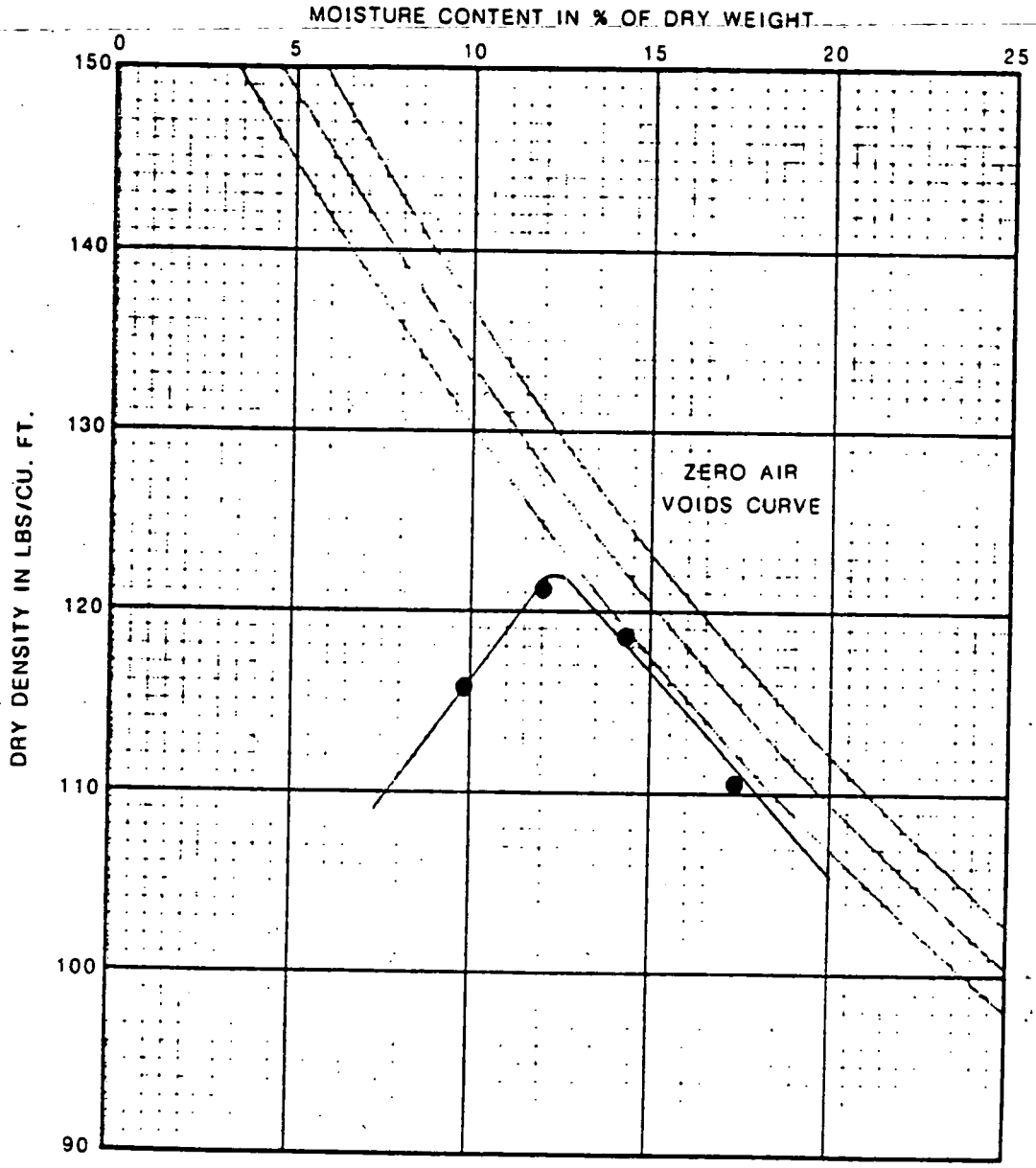
Soil _____

Location Proposed On-Site Disposal Cell

Optimum Moisture Content 12.4 %

Maximum Dry Density 122.3 PCF

Method of Compaction ASTM D698 Method A



File Parsons 26101 2059-08

COMPACTION TEST DATA

000431

ADVANCED TERRA TESTING

COMPACTION TEST DATA

PAGE NO.____ OF____

ADVANCED TERRA TESTING, INC

Job No. 2059-08 Client Parsons - P0101 Location Proposed On-Site Disposal C.

Sampled 11/9/93 By JPH Tested 12-11-93 By Du. Checked 12-13-93 By SR

SAMPLE DESCRIPTION	Soil ____ Sample No. G2-209					
	Specific Gravity ____ Depth or Elevation 0-24.5'					
	% Passing 3/4" ____ % Passing ~~1/4"~~ #4 ~95%					
TEST SPECIFICATIONS ASTM D 698 METHOD A	Compaction method (F, G)	☐ Proctor	☒ Standard AASHO	☐ Modified AASHO	☐ Calif.	
	Cylinder - cu. ft.	1/20	1/30	1/30	Variable	
	Rammer - lbs.	5 1/2	5 1/2	10	10	
	Drop - inches	18	12	18	18	
	Layers	3	3	5	5	
	Blows per layer	25	25	25	20 *	
	Wt. of moisture added ml	50	100	150	200	
MOISTURE DETERMINATION	Dish number	26A	Z3	4E	29A	72
	Wt. of soil & dish g	264.99	410.83	237.41	188.96	
	Dry wt. soil & dish g	243.95	370.77	210.09	163.78	
	Net loss of moisture (B) g	20.98	40.06	27.32	25.18	
	Wt. of dish only g	7.20	8.41	8.04	7.32	8.13
	Net wt. of dry soil (A) g	236.75	362.36	202.05	156.5	
	Moisture, % of dry wt. (C)	8.9	11.1	13.5	16.1	
DENSITY DETERMINATION	Wt. of soil & mold #	14.57	14.83	14.93	14.78	
	Wt. of mold only #	10.37	10.37	10.37	10.37	10.37
	Net wt. of wet soil (D) #	4.20	4.46	4.56	4.41	
	Net wt. of dry soil (E) #	3.86	4.02	4.02	3.80	
	Ht. of sample - Calif. (G)					
	Dry Density, lbs/cu ft (H)	115.7	120.5	120.5	114.0	
PENETROMETER	Needle Size					
	Resistance Reading					
	Resistance, lbs/sq in				000432	

Then add piston and ...

Sample No. G2-309 Depth 0-24.5' Elevation 5861

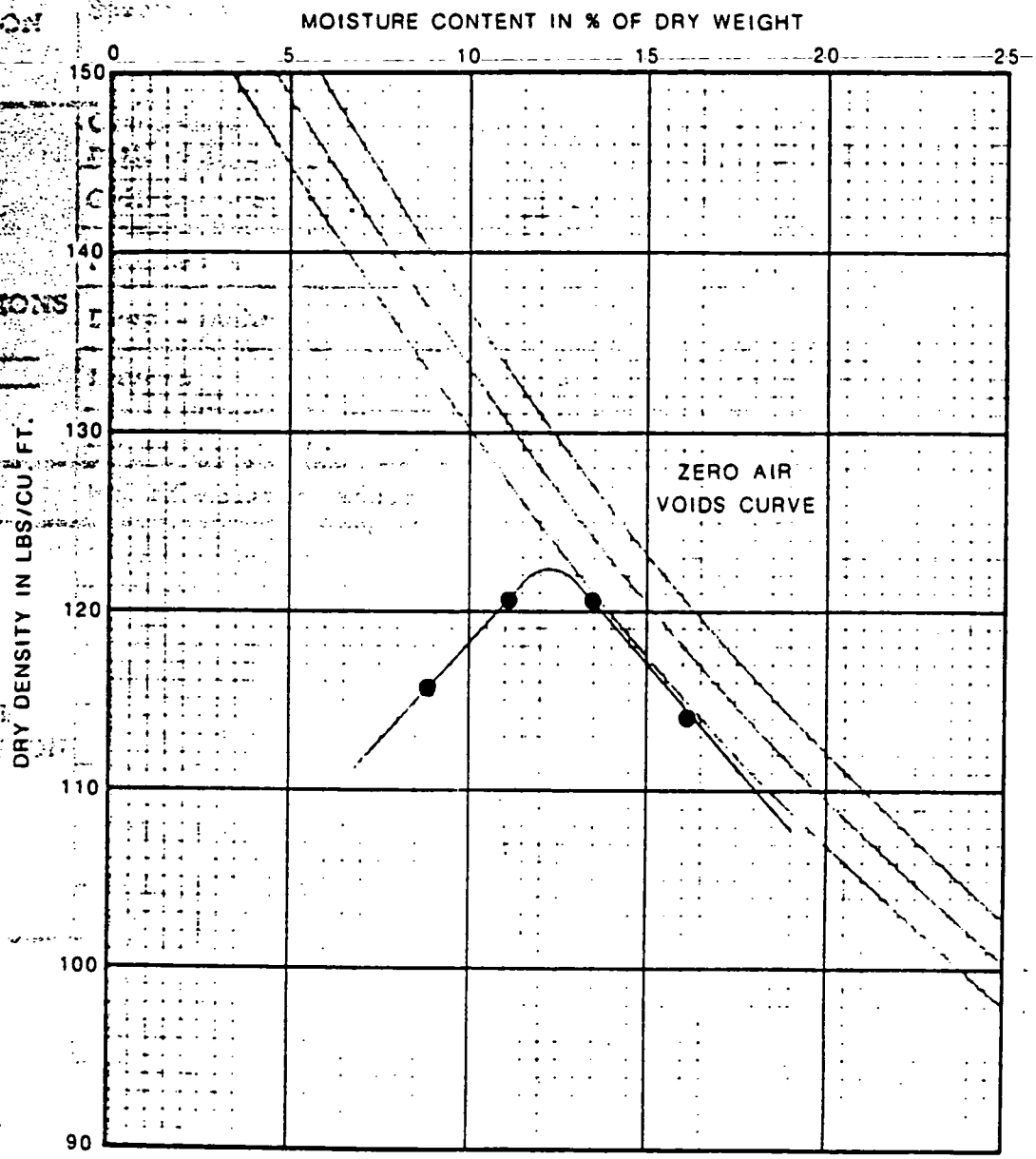
Soil

Location Proposed On-Site Disposal Cell

Optimum Moisture Content 12.3%

Maximum Dry Density 122.3 PCF

Method of Compaction ASTM D 698 Method A



File Parsons PO101 2059-08

000433

COMPACTION TEST DATA

ADVANCED TERRA TESTING

TECHNICAL DIRECTION MEMORANDUM

PROJECT: P.O. 101 Supplemental Laboratory Testing

DATE: 5/11/94

FROM: Kevin Ernst, PARSONS ERA Project, Fairfield, OH KE

TO: Dermot Ross-Brown, SAIC, Golden, CO

REFERENCE:

1. *P.O. 101 On-Site Disposal Cell Supplemental Geotechnical Laboratory Testing Program*, Revision 0, 3/29/94. PARSONS ERA Project.

2. SAIC FAX Memorandum: May 9-94 1739 SAIC ENV 3032788624, Subj; Preliminary Data for Phase 1 Testing. Science Applications International, Inc., Golden, CO.

MESSAGE:

Dermot,

Please proceed with Phase 2 of the P.O. 101 On-site Disposal Cell supplemental geotechnical laboratory testing of Reference 1. The following direction is provided:

1. Perform Tests G2-209-#3, -#4, and -#5 (Modified Proctor - permeability tests) as described in the Reference 1. From review of the information copy of the Modified Proctor curve for Sample G2-209 in your fax (Reference 2) the optimum moisture content appears to be 10.3%. Please use your reviewed (QA) compaction data to select the optimum moisture content. The hydraulic conductivity tests should then be performed as described in Reference 1 (i.e., at optimum moisture content, 2% wet of optimum, and 5% wet of optimum) Use Figure 3 (attached) to verify that the dry density of the specimen falls within the acceptable band prior to the hydraulic conductivity testing.

2. Do not perform Test G2-209-#1 at this time. Instead, this confirmatory hydraulic conductivity test will be performed on a specimen from either G2-209 (Modified Proctor compactive effort) or G2-210 (Standard Proctor Compactive effort) at a moisture content specified by PARSONS upon review of data from the Modified Proctor-permeability data.

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000434

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Sample No. G2-209 Depth 0-24.5' Elevation _____

Soil Bulk

Location Onsite Waste Disposal Cell

Optimum Moisture Content ~ 10.3 %

Maximum Dry Density ~ 133.8 pcf

Method of Compaction ASTM D 1557 A

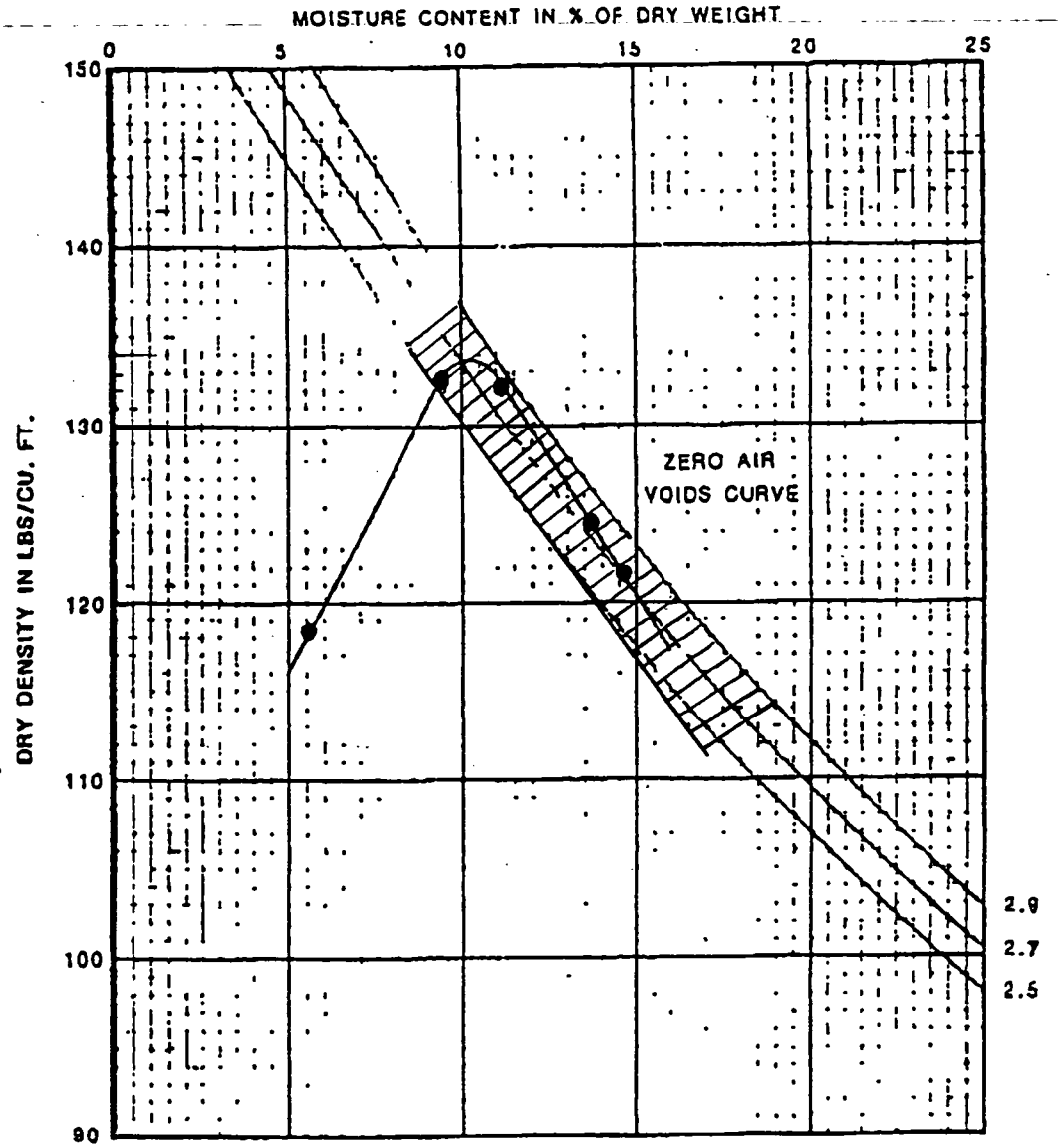


Figure 3: G2-209 Modified Proctor
Dry Density Band

File Parsons PO 101
2059-10

000435

COMPACTION TEST DATA

= ZONE OF ACCEPTABLE SPECIMEN DRY DENSITY FOR PERMEABILITY TESTING

ADVANCED TERRA TESTING

K. Ernst 5-11-94

APPENDIX D

SUPPLEMENTAL LABORATORY TESTING DATA SHEETS

Index of Tests **Page**

PHASE 1
Atterberg Limits
Boring No. G2-209 . . . . . D-4
Boring No. G2-210 . . . . . D-5

Triaxial, Back-Pressure Permeability (Tx/Pbp)
Boring No. G2-210 (112pcf @ 17.4%) D-7
Boring No. G2-210 (118pcf @ 14.4%) D-11
Boring No. G2-210 (120pcf @ 12.4%) D-15

PHASE 2
Proctor Compaction - Modified
Boring No. G2-209 . . . . . D-20

Triaxial, Back-Pressure Permeability (Tx/Pbp)
Boring No. 209 (@ OMC) D-23
Boring No. 209 (@ OMC + 2%) D-27
Boring No. 209 (@ OMC + 5%) D-31

List of Tests Conducted

Test	Boring No.	Depth (ft)	Sample No.
PHASE 1			
Atterberg Limits	G2-209 G2-210	0-24.5 "	Composite "
Triaxial, Back-Pressure Permeability (TX/Pbp)	G2-210 G2-210 G2-210	" " "	112pcf @ 17.4% 118pcf @ 14.4% 120pcf @ 12.4%
PHASE 2			
Proctor Compaction - Modified	G2-209	"	Composite
Triaxial, Back-Pressure Permeability (TX/Pbp)	G2-209 G2-209 G2-209	" " "	3 (@ OMC) 4 (@ OMC + 2%) 5 (@ OMC + 5%)

5861

ATTERBERG LIMITS
ASTM D 4318

ATTERBERG LIMITS TEST DATA

JOB NO. 2059-10
CLIENT/OWNER PARSONS PD 101
LOCATION
BORING ____ SAMPLE 62-209 DEPTH 0-24.5

FIELD CLASSIFICATION
LABORATORY CLASSIFICATION

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL g		
WT OF RINGS g	—	—
WT OF WET SOIL g		
FIELD DENSITY PCF		
DRY DENSITY PCF		

THIS IS AN 1/8-INCH THREAD [redacted]

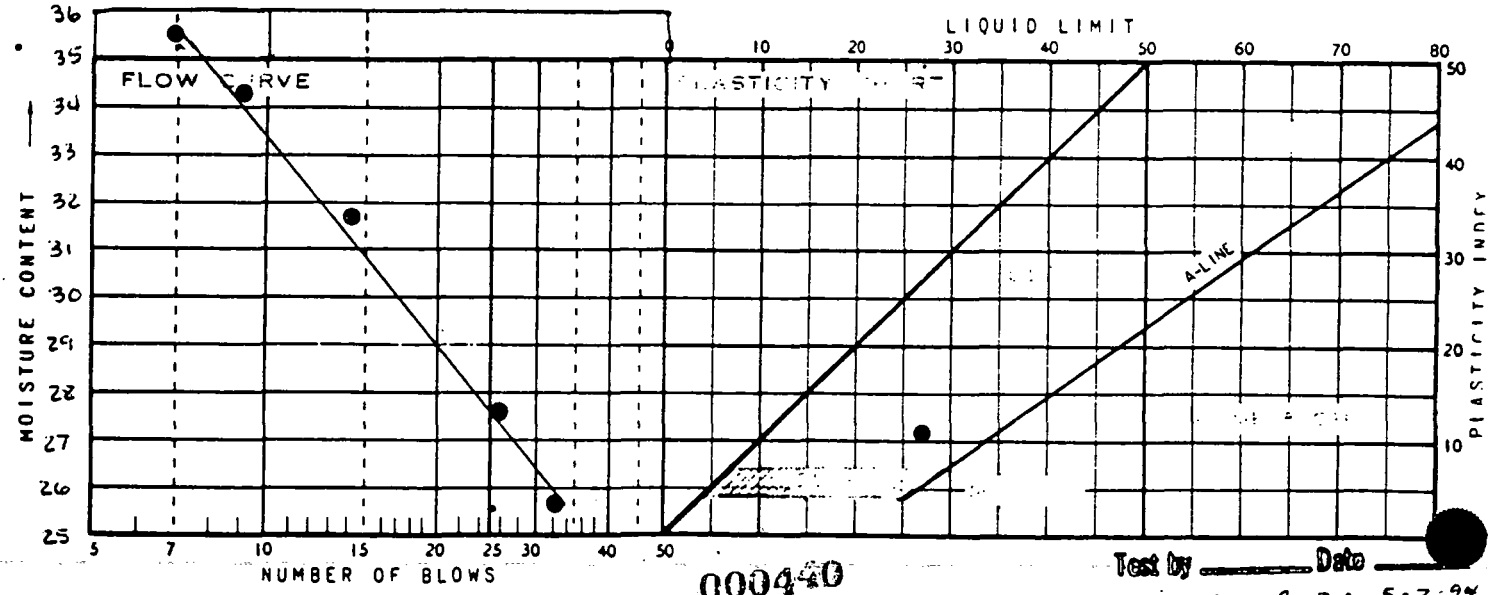
DETERMINATION	1	2
DISH #		
WT OF DISH + WET SOIL g		
WT OF DISH + DRY SOIL g	—	—
WT OF MOISTURE g		
WT OF DISH g	—	—
WT OF DRY SOIL g		
FIELD MOISTURE CONTENT %		

PLASTIC LIMIT BY RB 4/25/94

DETERMINATION	1	2	3	4	5	6
DISH	54C	B57	2035			
WT OF DISH + WET SOIL g	4.40	5.39	4.78			
WT OF DISH + DRY SOIL g	3.94	4.77	4.25	—	—	—
WT OF MOISTURE g	.46	.62	.53			
WT OF DISH g	1.09	1.09	1.08	—	—	—
WT OF DRY SOIL g	2.25	3.68	3.17			
MOISTURE CONTENT %	16.14	16.85	16.72			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	2012	2059	B8	2011	1356	
NUMBER OF BLOWS	32	27	14	9	7	
WT OF DISH + WET SOIL g	9.29	10.34	11.73	13.01	13.01	
WT OF DISH + DRY SOIL g	7.61	8.34	9.20	9.97	9.87	—
WT OF MOISTURE g	1.68	2.00	2.53	3.04	3.14	
WT OF DISH g	1.07	1.07	1.06	1.07	1.07	—
WT OF DRY SOIL g	6.54	7.27	8.14	8.90	8.20	
MOISTURE CONTENT %	25.69	27.51	31.02	34.16	35.68	



000440

Test by ____ Date ____
Checked by [illegible] Date 5-2-94

SUMMARY

DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		27.5	16.57	10.93	CL	

ADVANCED TERRA TESTING INC

August 24, 1994

ATTERBERG LIMITS TEST DATA

JOB NO. 2059-10

CLIENT/OWNER PARSONS POICI

LOCATION

BORING ____ SAMPLE G2-2 DEPTH 0-24.5

FIELD CLASSIFICATION

LABORATORY CLASSIFICATION

FIELD DENSITY BY ___/__/__

DETERMINATION	1	2
NUMBER OF RINGS		
WT OF RINGS + WET SOIL g		
WT OF RINGS g	—	—
WT OF WET SOIL g		
FIELD DENSITY PCF		
DRY DENSITY PCF		

THIS IS AN 1/8-INCH THREAD [redacted]

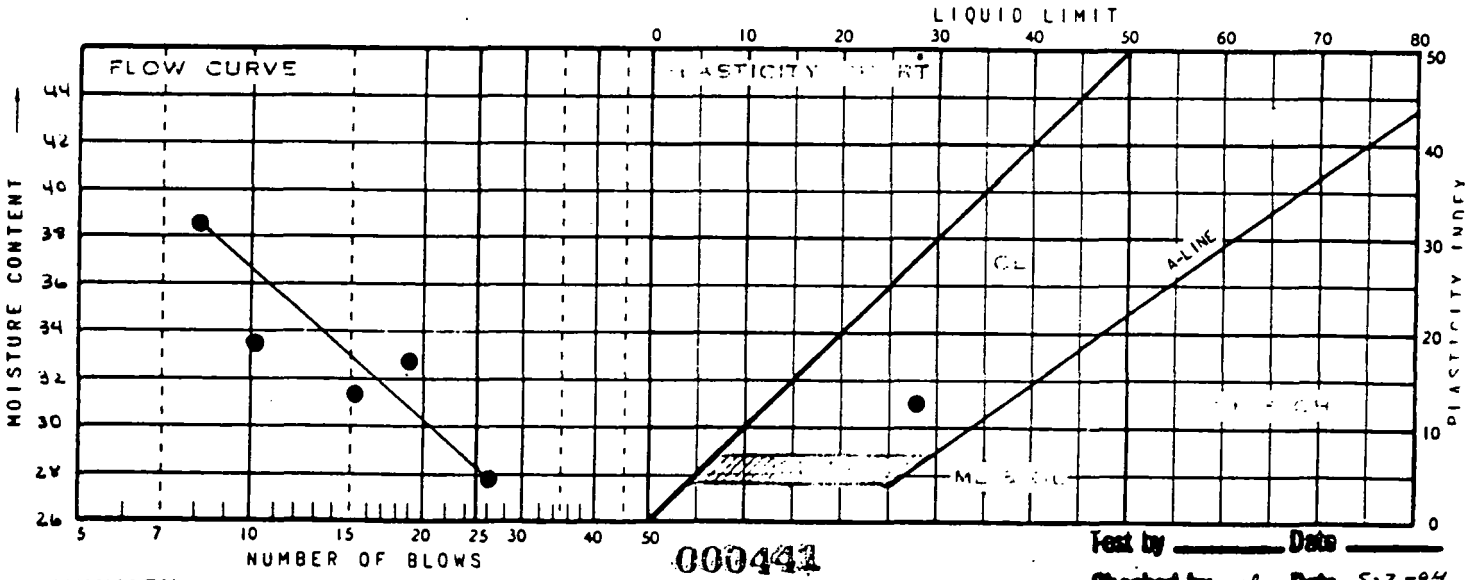
DETERMINATION	1	2
DISH#		
WT OF DISH + WET SOIL g		
WT OF DISH + DRY SOIL g	—	—
WT OF MOISTURE g		
WT OF DISH g	—	—
WT OF DRY SOIL g		
FIELD MOISTURE CONTENT %		

PLASTIC LIMIT BY MB 4/25/94

DETERMINATION	1	2	3	4	5	6
DISH	17C	1C	B3C			
WT OF DISH + WET SOIL g	4.93	5.52	4.87			
WT OF DISH + DRY SOIL g	4.42	4.93	4.37	—	—	—
WT OF MOISTURE g	.51	.59	.50			
WT OF DISH g	1.07	1.07	1.06	—	—	—
WT OF DRY SOIL g	3.35	3.86	3.31			
MOISTURE CONTENT %	15.22	15.29	15.11			

LIQUID LIMIT

DETERMINATION	1	2	3	4	5	6
DISH	B62	B72	B12	B61	B17	
NUMBER OF BLOWS	26	19	15	10	8	
WT OF DISH + WET SOIL g	10.41	11.93	10.99	11.85	12.21	
WT OF DISH + DRY SOIL g	8.38	9.29	8.62	9.16	9.14	—
WT OF MOISTURE g	2.03	2.64	2.37	2.69	3.07	
WT OF DISH g	1.08	1.06	1.08	1.08	1.12	—
WT OF DRY SOIL g	7.30	8.23	7.54	8.08	8.02	
MOISTURE CONTENT %	27.81	32.08	31.43	33.29	38.28	



000441

Test by ____ Date ____

Checked by ____ Date 5-2-94

SUMMARY

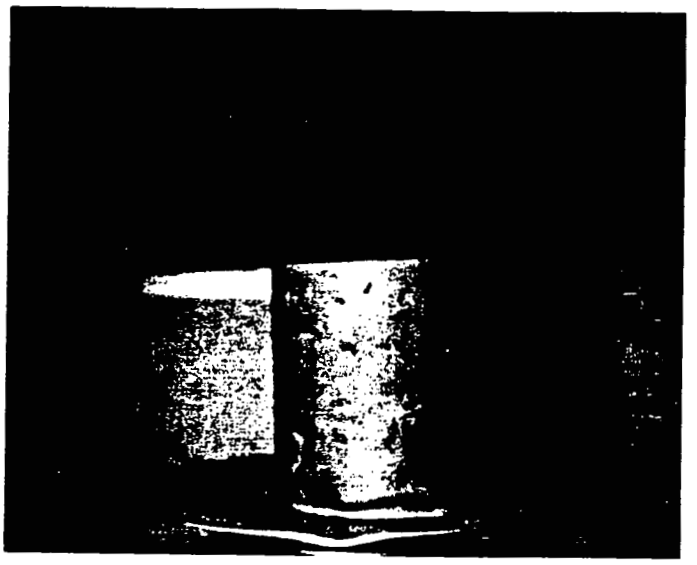
DRY DENSITY	MOISTURE CONTENT	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	IDENTIFICATION	
		28.4	15.21	13.19	CL	

ADVANCED TERRA TESTING INC

TRIAXIAL, BACK-PRESSURE PERMEABILITY, TX/Pbp
ASTM D 5084

000442

5861



PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT Parsons

JOB NO. 2059-10

BORING NO.	G2-210	SAMPLED	
DEPTH	0-24.5'	TEST STARTED	04-23-94 DCW
SAMPLE NO.	112 pcf @ 17.4%	TEST FINISHED	05-6-94
SOIL DESCR.	PO 101	SETUP NO.	5P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	720	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA		BEFORE TEST	AFTER TEST
Wt. Soil + Moisture	(g)	469.5	472.7
Wt. Wet Soil & Pan	(g)	477.8	480.9
Wt. Dry Soil & Pan	(g)	410.0	410.0
Wt. Lost Moisture	(g)	67.8	70.9
Wt. of Pan Only	(g)	8.2	8.2
Wt. of Dry Soil	(g)	401.7	401.7
Moisture Content %		16.9	17.7
Wet Density PCF		132.6	140.1
Dry Density PCF		113.5	119.1

Init. Diameter	(in)	2.415	(cm)	6.134
Init. Area	(sq in)	4.581	(sq cm)	29.554
Init. Height	(in)	2.945	(cm)	7.480
Vol. Bef. Consol.	(cu ft)	0.00781		
Vol. After Consol.	(cu ft)	0.00744		
Porosity %		33.68		
Constant Head	(PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
1363.0	81780	49.1	47.5	16.9	4.2E-08
1440.0	86400	47.5	46.1	18.5	3.5E-08
1440.0	86400	46.1	44.6	20.1	3.8E-08
1474.0	88440	44.6	43.2	21.6	3.5E-08
1400.0	84000	43.2	41.9	23.1	3.5E-08
1400.0	84000	41.9	40.6	24.5	3.5E-08

000444

ADVANCED TERRA TESTING, INC.

TRIAXAL COMPRESSION TEST DATA

861

CLIENT	Parsons	JOB NO.	2059-10
BORING NO.	G2-210	SAMPLED	
DEPTH	0-24.5'	TEST STARTED	04-23-94 DCW
SAMPLE NO.	112 pcf @ 17.4%	TEST FINISHED	05-6-94
SOIL DESCR.	PO 101	SETUP NO.	5P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	720	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	2.0	14.2				
50.0	48.0	15.1	16.8	39.2	48.3	9.1	0.91
60.0	58.0	16.9	17.9	49.3	58.7	9.4	0.94
70.0		18.0	18.2	59.2	68.8	9.6	0.96

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	18.20	0.00
0.25	0.50	18.58	-0.38
0.5	0.71	18.58	-0.38
1	1.00	18.60	-0.40
2	1.41	18.60	-0.40
4	2.00	18.63	-0.43
9	3.00	18.70	-0.50
16	4.00	18.73	-0.53
30	5.48	18.80	-0.60
60	7.75	18.88	-0.68
120	10.95	18.95	-0.75
240	15.49	19.05	-0.85
360	18.97	19.10	-0.90

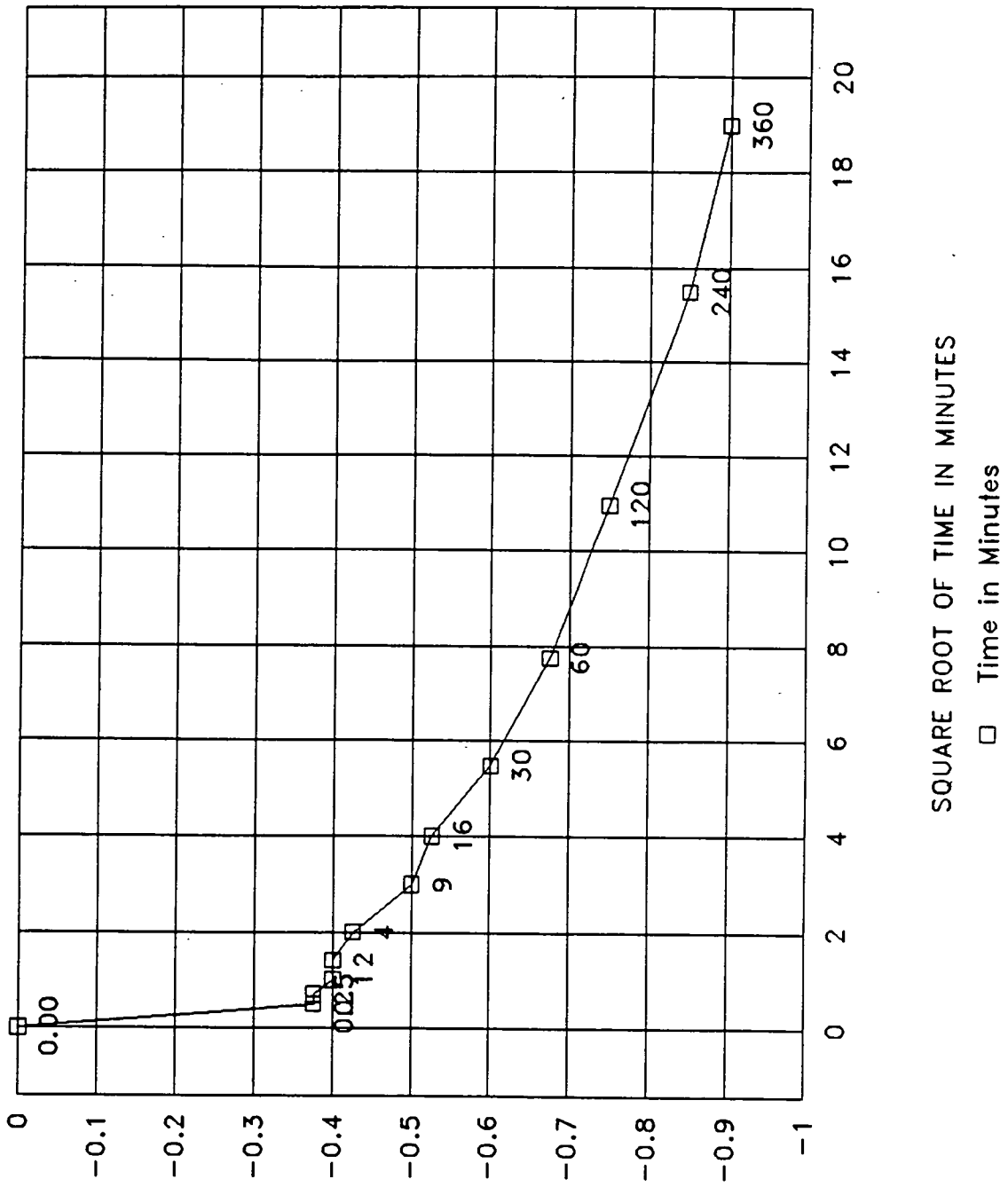
Initial Height	(in)	2.945	Init. Vol.	(CC)	221.10
Height Change	(in)	0.013	Vol. Change	(CC)	18.30
Ht. After Cons.	(in)	2.932	Cell Exp.	(CC)	7.80
Initial Area	(sq in)	4.581	Net Change	(CC)	10.50
Area After Cons.	(sq in)	4.382	Cons. Vol.	(CC)	210.60

ADVANCED TERRA TESTING, INC.

000445

CONSOLIDATION DATA

G2-210 112PCF @ 17.4%, 0-24.5'



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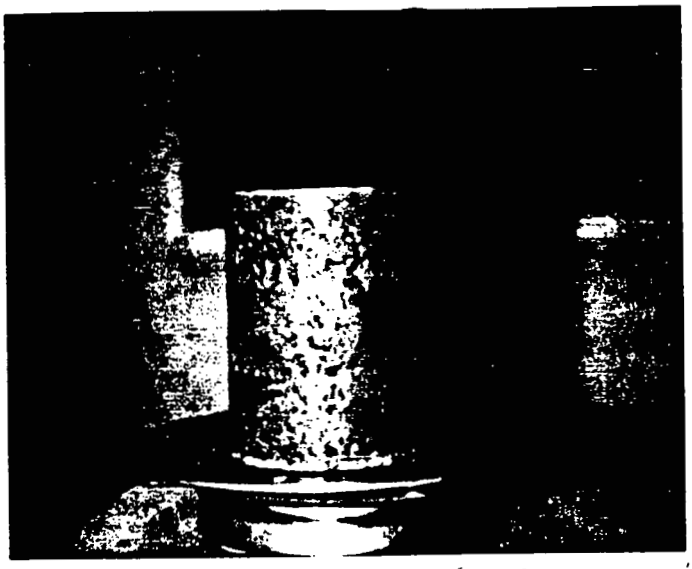
586



PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT	Parsons	JOB NO.	2059-10
BORING NO.	G2-210	SAMPLED	
DEPTH	0-24.5'	TEST STARTED	04-24-94 DCW
SAMPLE NO.	118 pcf @ 14.4%	TEST FINISHED	05-06-94 DCW
SOIL DESCR.	PO 101	SETUP NO.	6P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	720	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA		BEFORE TEST	AFTER TEST
Wt. Soil + Moisture	(g)	484.5	496.5
Wt. Wet Soil & Pan	(g)	492.0	503.9
Wt. Dry Soil & Pan	(g)	433.3	433.3
Wt. Lost Moisture	(g)	58.7	70.6
Wt. of Pan Only	(g)	7.5	7.5
Wt. of Dry Soil	(g)	425.8	425.8
Moisture Content %		13.8	16.6
Wet Density PCF		134.3	139.3
Dry Density PCF		118.0	119.5

Init. Diameter	(in)	2.401	(cm)	6.099
Init. Area	(sq in)	4.528	(sq cm)	29.212
Init. Height	(in)	3.036	(cm)	7.711
Vol. Bef. Consol.	(cu ft)	0.00795		
Vol. After Consol.	(cu ft)	0.00786		
Porosity %		31.75		
Constant Head	(PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
116.0	6960	49.1	11.5	36.3	1.4E-05
188.0	11280	49.3	0.0	42.4	1.2E-05
190.0	11400	50.0	6.7	38.4	9.9E-06
194.0	11640	49.5	12.6	35.5	8.0E-06
309.0	18540	49.9	0.7	41.7	7.1E-06
240.0	14400	50.0	12.6	35.2	6.5E-06
303.0	18180	49.9	5.3	39.2	6.4E-06
240.0	14400	49.9	11.4	35.9	6.8E-06
346.0	20760	49.9	-0.4	42.3	6.5E-06
241.0	14460	49.9	12.5	35.3	6.5E-06
240.0	14400	50.2	10.5	36.2	7.0E-06
260.0	15600	50.0	6.6	38.4	7.2E-06
240.0	14400	49.9	5.7	39.0	8.0E-06
240.0	14400	48.7	9.0	37.9	7.1E-06
240.0	14400	49.9	9.9	36.7	7.1E-06
240.0	14400	50.0	12.5	35.3	6.6E-06
326.0	19560	50.0	3.7	40.0	6.2E-06
240.0	14400	49.7	14.4	34.4	6.1E-06

ADVANCED TERRA TESTING, INC.

TRIAXAL COMPRESSION TEST DATA

5861

CLIENT	Parsons	JOB NO.	2059-10
BORING NO.	G2-210	SAMPLED	
DEPTH	0-24.5'	TEST STARTED	04-24-94 DCW
SAMPLE NO.	118 pcf @ 14.4%	TEST FINISHED	05-06-94 DCW
SOIL DESCR.	PO 101	SETUP NO.	6P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	720	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	1.1	7.7				
50.0	48.0	7.6	8.5	39.3	48.3	9.0	0.90
60.0		8.6	8.6	49.3	58.8	9.5	0.95

CONSOLIDATION DATA

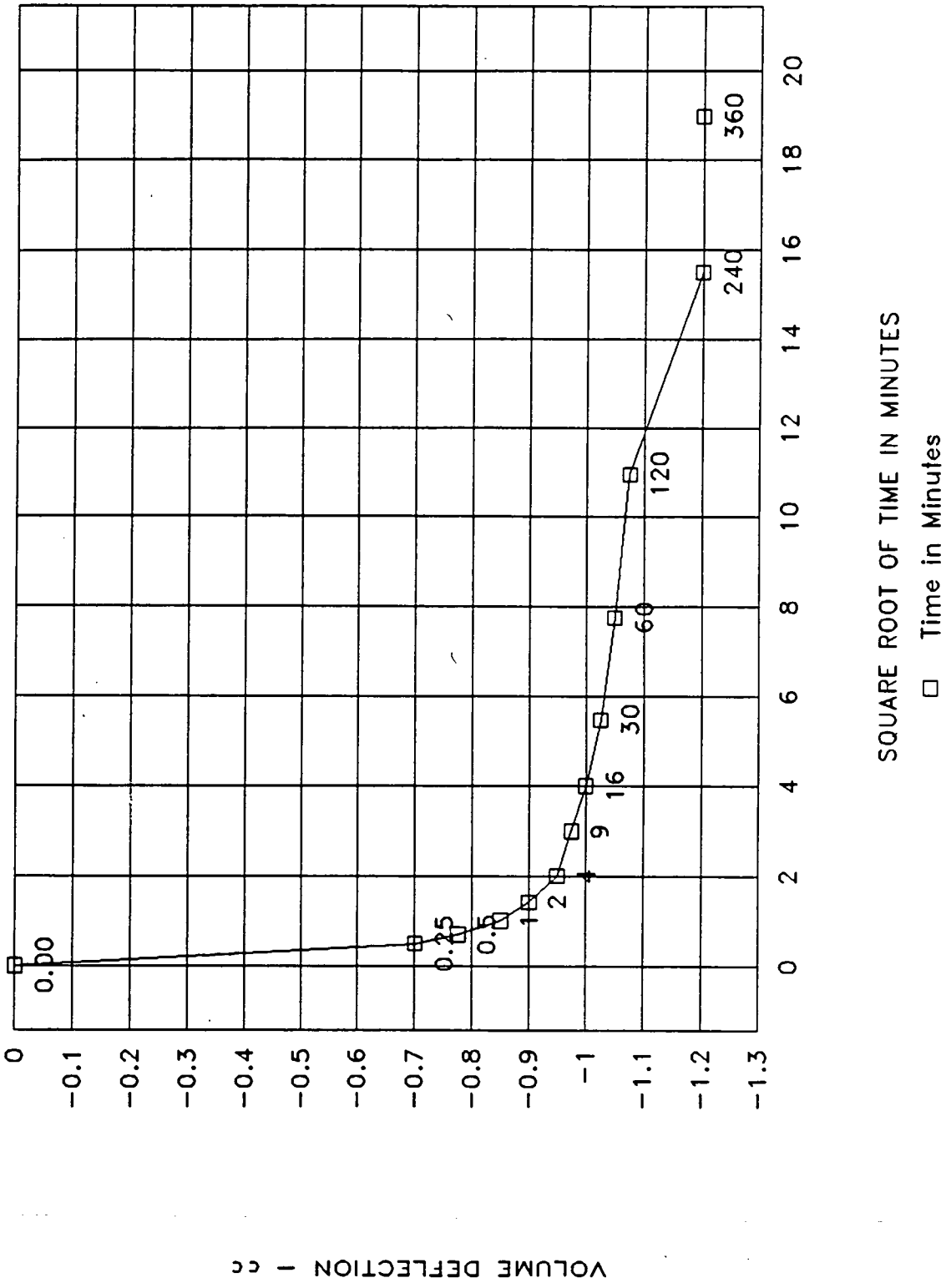
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	8.60	0.00
0.25	0.50	9.30	-0.70
0.5	0.71	9.38	-0.78
1	1.00	9.45	-0.85
2	1.41	9.50	-0.90
4	2.00	9.55	-0.95
9	3.00	9.58	-0.97
16	4.00	9.60	-1.00
30	5.48	9.63	-1.03
60	7.75	9.65	-1.05
120	10.95	9.68	-1.08
240	15.49	9.80	-1.20
360	18.97	9.80	-1.20

Initial Height	(in)	3.036	Init. Vol.	(CC)	225.30
Height Change	(in)	0.009	Vol. Change	(CC)	10.40
Ht. After Cons.	(in)	3.027	Cell Exp.	(CC)	7.60
Initial Area	(sq in)	4.528	Net Change	(CC)	2.80
Area After Cons.	(sq in)	4.485	Cons. Vol.	(CC)	222.50

ADVANCED TERRA TESTING, INC.

CONSOLIDATION DATA

G2-210 118 PCF @ 18%, 720 psf Conf.



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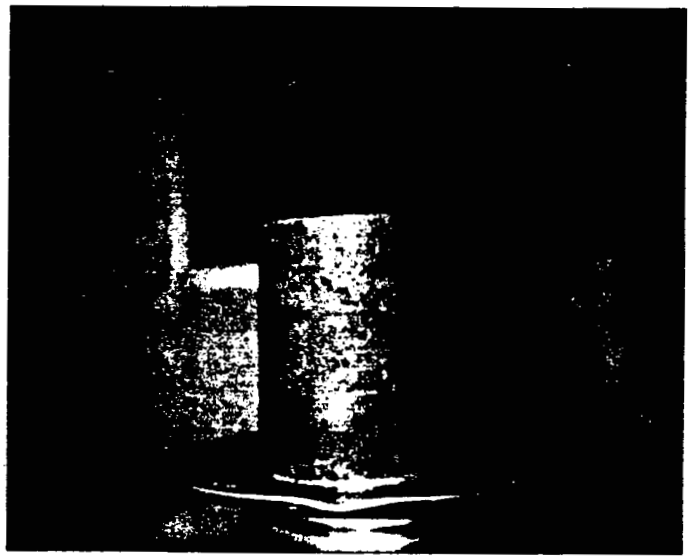
5861



Parsons PO101
2059-10

GZ-21020-24.5'
Tx/PbP
120 PCE @ 12.4%

000451

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT	Parsons	JOB NO.	2059-10
BORING NO.	G2-210	SAMPLED	
DEPTH	0-24.5'	TEST STARTED	04-24-94 DCW
SAMPLE NO.	120 pcf @ 12.4%	TEST FINISHED	05-06-94
SOIL DESCR.	PO 101	SETUP NO.	4P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	720	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA		BEFORE TEST	AFTER TEST
Wt. Soil + Moisture	(g)	484.3	504.0
Wt. Wet Soil & Pan	(g)	492.7	512.5
Wt. Dry Soil & Pan	(g)	440.9	440.9
Wt. Lost Moisture	(g)	51.8	71.6
Wt. of Pan Only	(g)	8.4	8.4
Wt. of Dry Soil	(g)	432.4	432.4
Moisture Content %		12.0	16.6
Wet Density PCF		134.4	141.1
Dry Density PCF		120.0	121.0

Init. Diameter	(in)	2.401	(cm)	6.099
Init. Area	(sq in)	4.528	(sq cm)	29.212
Init. Height	(in)	3.032	(cm)	7.701
Vol. Bef. Consol.	(cu ft)	0.00794		
Vol. After Consol.	(cu ft)	0.00788		
Porosity %		32.09		
Constant Head	(PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
240.0	14400	49.7	25.7	28.3	3.9E-06
296.0	17760	49.4	22.7	30.1	3.6E-06
240.0	14400	49.6	34.0	23.9	2.5E-06
540.0	32400	49.5	17.9	32.6	2.4E-06
685.0	41100	49.6	14.3	34.5	2.1E-06
614.0	36840	49.4	18.9	32.1	2.0E-06
763.0	45780	49.7	15.6	33.8	1.8E-06
540.0	32400	49.6	23.9	29.3	1.9E-06
860.0	51600	49.8	12.6	35.3	1.8E-06
360.0	21600	49.8	31.6	25.1	1.9E-06

ADVANCED TERRA TESTING, INC.

TRIAXAL COMPRESSION TEST DATA

586

CLIENT	Parsons	JOB NO.	2059-10
BORING NO.	G2-210	SAMPLED	
DEPTH	0-24.5'	TEST STARTED	04-24-94 DCW
SAMPLE NO.	120 pcf @ 12.4%	TEST FINISHED	05-06-94
SOIL DESCR.	PO 101	SETUP NO.	4P
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	720	AT FIELD MOIST.	No

SATURATION DATA

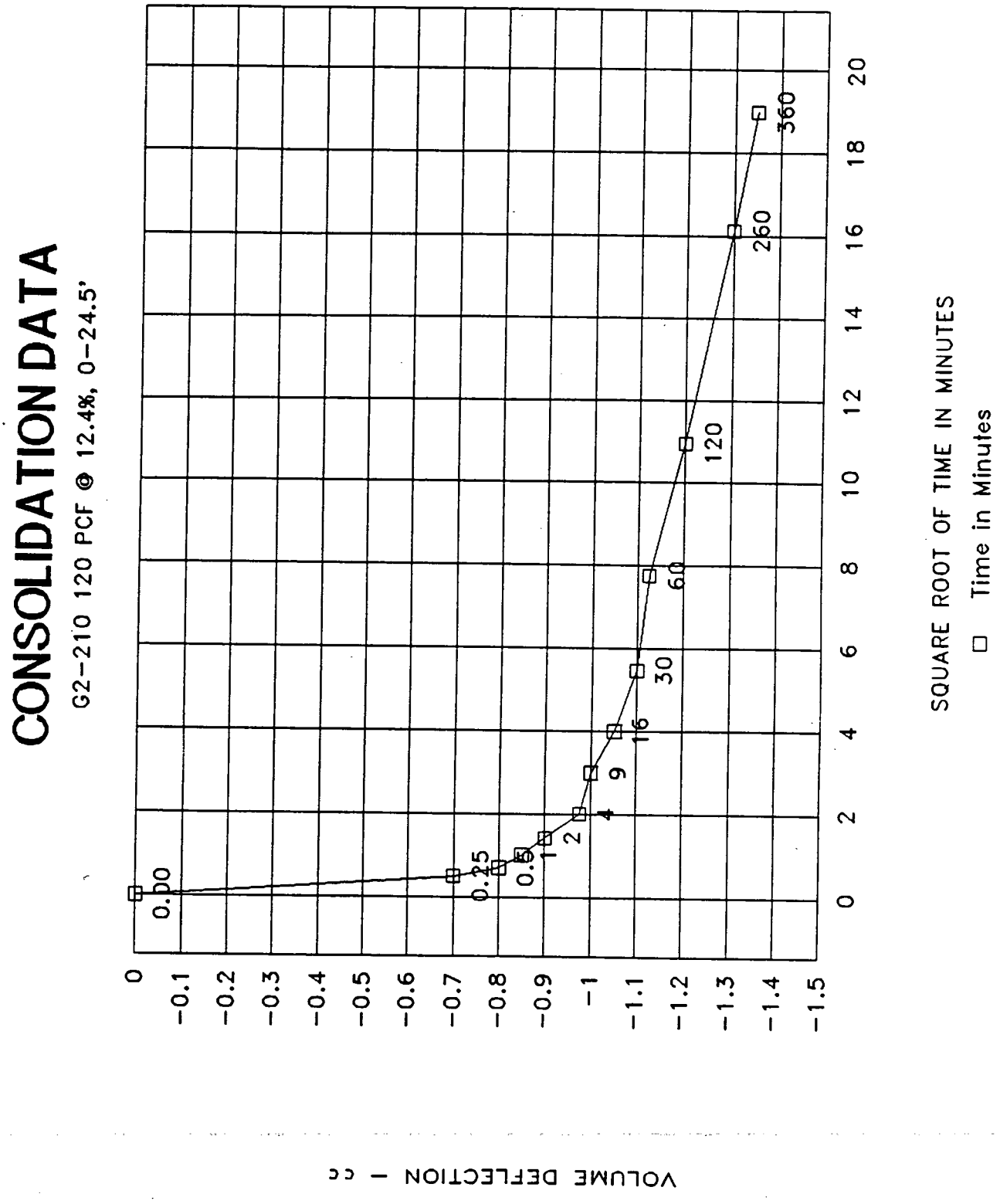
Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	1.0	7.0				
50.0	48.0	5.6	6.4	39.2	47.2	8.0	0.80
60.0	58.0	6.6	7.2	49.2	57.8	8.6	0.86
70.0	68.0	7.6	8.4	59.1	68.2	9.1	0.91
80.0	78.0	9.0	9.9	69.1	78.4	9.3	0.93
90.0		10.0	10.1	79.0	88.5	9.5	0.95

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	10.10	0.00
0.25	0.50	10.80	-0.70
0.5	0.71	10.90	-0.80
1	1.00	10.95	-0.85
2	1.41	11.00	-0.90
4	2.00	11.08	-0.97
9	3.00	11.10	-1.00
16	4.00	11.15	-1.05
30	5.48	11.20	-1.10
60	7.75	11.23	-1.13
120	10.95	11.30	-1.20
260	16.12	11.40	-1.30
360	18.97	11.45	-1.35

Initial Height	(in)	3.032	Init. Vol.	(CC)	225.00
Height Change	(in)	0.008	Vol. Change	(CC)	11.70
Ht. After Cons.	(in)	3.024	Cell Exp.	(CC)	9.80
Initial Area	(sq in)	4.528	Net Change	(CC)	1.90
Area After Cons.	(sq in)	4.501	Cons. Vol.	(CC)	223.10

ADVANCED TERRA TESTING, INC.


CONSOLIDATION DATA
G2-210 120 PCF @ 12.4%, 0-24.5'
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
-1
-1.1
-1.2
-1.3
-1.4
-1.5
VOLUME DEFLECTION - cc
0
2
4
6
8
10
12
14
16
18
20
SQUARE ROOT OF TIME IN MINUTES
Time in Minutes
0.00
0.25
0.5
1
2
4
9
16
30
60
120
260
360

5861

PROCTOR COMPACTION - MODIFIED
ASTM D 1557

000455

COMPACTION TEST DATA

ADVANCED TERRA TESTING inc

Job No. 2059.10 Client PARSONS PO 101 Location ONSITE WASTE DISPOSAL

Sampled 11/9/93 By JPH Tested 4-15-94 By MV Checked 4/19/94 By MV

SAMPLE DESCRIPTION	Soil			Sample No. G 2-209		
	Specific Gravity			Depth or Elevation 0-24.5'		
	% Passing 3/4"			% Passing ~~1/4"~~ #4 ~95%		
TEST SPECIFICATIONS ASTM D 1557 METHOD A	Compaction method (F, G)	☐ Proctor	☐ Standard AASHO	☒ Modified AASHO	☐ Calif.	
	Cylinder - cu. ft.	1/20	1/30	1/30	Variable	
	Rammer - lbs.	5 1/2	5 1/2	10	10	
	Drop - inches	18	12	18	18	
	Layers	3	3	5	5	
	Blows per layer	25	25	25	20 *	
	Wt. of moisture added ml	ϕ	100	150	200	225
MOISTURE DETERMINATION	Dish number	11 B	4B	2B	0 11	7B
	Wt. of soil & dish g	429.05	461.60	674.66	555.22	522.35
	Dry wt. soil & dish g	407.55	423.41	609.00	490.45	457.89
	Net loss of moisture (B) g	21.50	38.19	65.66	64.77	64.46
	Wt. of dish only g	15.84	15.88	15.94	15.61	15.89
	Net wt. of dry soil (A) g	391.71	407.53	593.06	474.84	442.00
	Moisture, % of dry wt. (C)	5.5	9.4	11.1	13.6	14.6
DENSITY DETERMINATION	Wt. of soil & mold #	10.53	15.21	15.26	15.09	15.02
	Wt. of mold only #	10.37	10.37	10.37	10.37	10.37
	Net wt. of wet soil (D) #	4.16	4.84	4.89	4.72	4.65
	Net wt. of dry soil (E) #	3.94	4.43	4.40	4.15	4.06
	Ht. of sample - Calif. (G)					
	Dry Density, lbs/cu ft (H)	118.3	132.8	132.1	124.6	121.7
PENETROMETER	Needle Size					
	Resistance Reading					
	Resistance, lbs/sq in					

000456

* Then add piston and seat with 5 blows

5861

Sample No. 62-209 Depth 0-24.5' Elevation _____

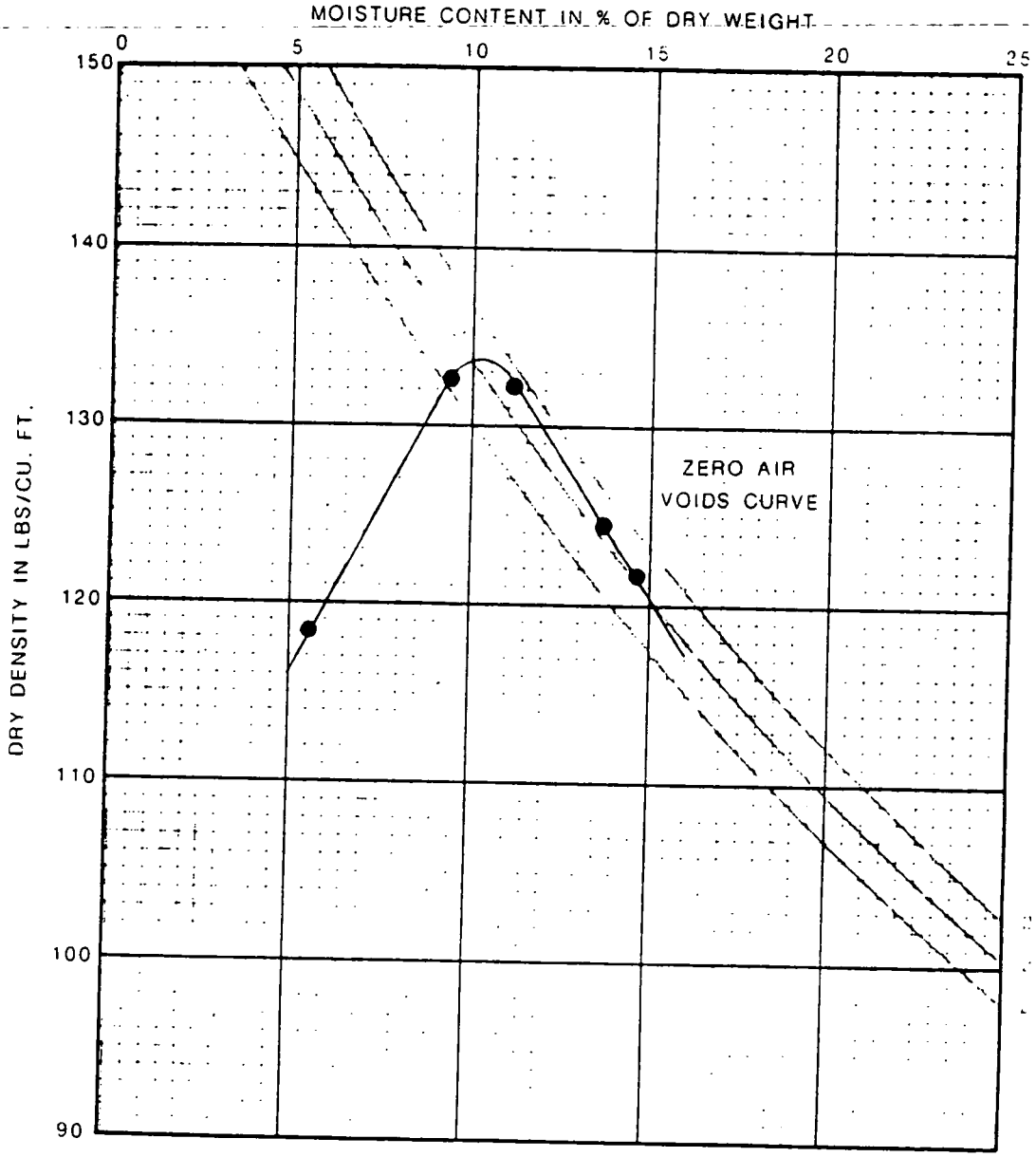
Soil Bulk

Location Onsite Waste Disposal Cell

Optimum Moisture Content 10.3 %

Maximum Dry Density 133.6 pcf

Method of Compaction ASTM D 1557 A



File Parsons PO 101
2059-10

COMPACTION TEST DATA

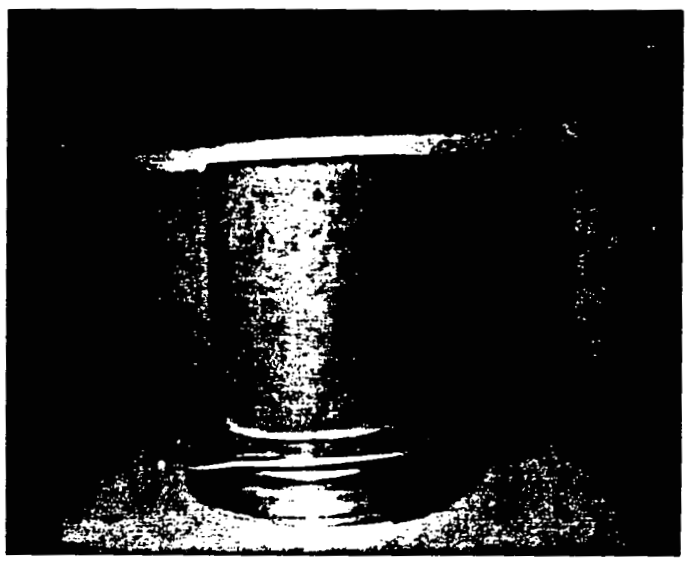
000457

ADVANCED TERRA TESTING

TRIAXIAL, BACK-PRESSURE PERMEABILITY, TX/Pbp
ASTM D 5084

000459

586



PARSONS PO 101 2059-10
GZ-209,
0-24.5'
3 @ 1MC

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT	Parsons PO 101	JOB NO.	2059-10
BORING NO.	G2-209	SAMPLED	
DEPTH	0-24.5'	TEST STARTED	5-26-94 CAL
SAMPLE NO.	3 at OMC	TEST FINISHED	6-7-94
SOIL DESCR.	On Site Disposal Cell	SETUP NO.	20S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	720	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA		BEFORE TEST	AFTER TEST
Wt. Soil + Moisture	(g)	522.3	538.0
Wt. Wet Soil & Pan	(g)	530.7	546.4
Wt. Dry Soil & Pan	(g)	483.2	483.2
Wt. Lost Moisture	(g)	47.5	63.2
Wt. of Pan Only	(g)	8.4	8.4
Wt. of Dry Soil	(g)	474.8	474.8
Moisture Content %		10.0	13.3
Wet Density PCF		145.0	145.9
Dry Density PCF		131.8	128.8

Init. Diameter	(in)	2.399	(cm)	6.093
Init. Area	(sq in)	4.520	(sq cm)	29.164
Init. Height	(in)	3.036	(cm)	7.711
Vol. Bef. Consol.	(cu ft)	0.00794		
Vol. After Consol.	(cu ft)	0.00813		
Porosity %		27.45		
Constant Head	(PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
1514.0	90840	49.9	48.7	15.8	2.7E-08
1445.0	86700	48.7	47.6	17.1	2.6E-08
1440.0	86400	47.6	46.6	18.2	2.4E-08
1431.0	85860	46.6	45.6	19.3	2.5E-08
1447.0	86820	45.6	44.6	20.4	2.5E-08

000480

ADVANCED TERRA TESTING, INC.

TRIAXAL COMPRESSION TEST DATA

5861

CLIENT	Parsons PO 101	JOB NO.	2059-10
BORING NO.	G2-209	SAMPLED	
DEPTH	0-24.5'	TEST STARTED	5-26-94 CAL
SAMPLE NO.	3 at OMC	TEST FINISHED	6-7-94
SOIL DESCR.	On Site Disposal Cell	SETUP NO.	20S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	720	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	0.3	8.1				
50.0	48.0	1.2	2.1	39.4	47.2	7.8	0.78
60.0	58.0	1.7	2.4	49.2	57.7	8.5	0.85
70.0	68.0	2.6	3.3	59.2	68.1	8.9	0.89
80.0	78.0	3.3	4.0	69.1	78.3	9.2	0.92
90.0	88.0	4.1	4.8	79.1	88.4	9.3	0.93
100.0		5.0	5.1	89.2	98.7	9.5	0.95

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	5.10	0.00
0.25	0.50	5.35	-0.25
0.5	0.71	5.38	-0.28
1	1.00	5.40	-0.30
2	1.41	5.43	-0.33
4	2.00	5.45	-0.35
9	3.00	5.48	-0.38
16	4.00	5.50	-0.40
30	5.48	5.55	-0.45
60	7.75	5.60	-0.50
120	10.95	5.65	-0.55
240	15.49	5.70	-0.60
360	18.97	5.73	-0.63

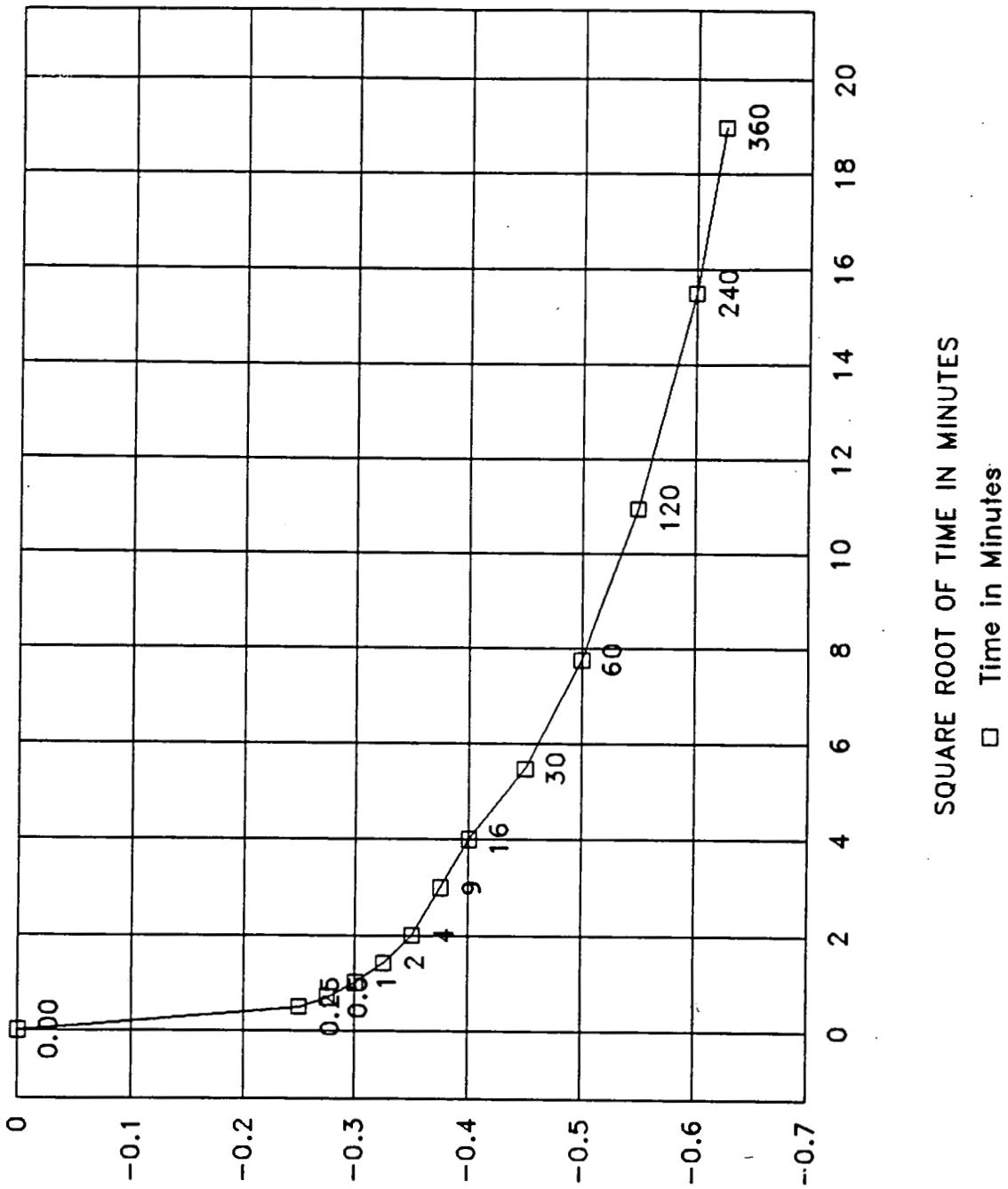
Initial Height	(in)	3.036	Init. Vol.	(CC)	224.92
Height Change	(in)	0.009	Vol. Change	(CC)	5.90
Ht. After Cons.	(in)	3.027	Cell Exp.	(CC)	11.20
Initial Area	(sq in)	4.520	Net Change	(CC)	-5.30
Area After Cons.	(sq in)	4.640	Cons. Vol.	(CC)	230.22

ADVANCED TERRA TESTING, INC.

000461

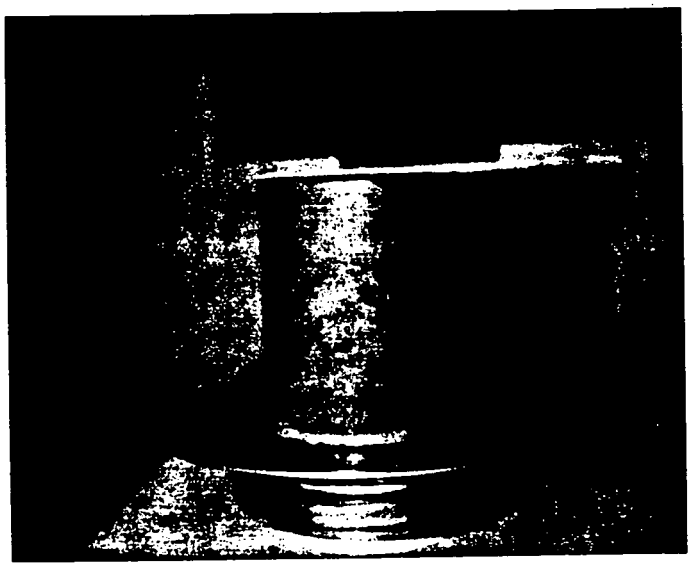
CONSOLIDATION DATA

G2-209 @0-24.5' #3 720 psf Conf.



000462

5861



Farsons P.O.101
2059-10
TX/Pbp σ_3 720psf

62-209
=4 (+2% ome)
0-24.5'

000463

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT	Parsons PO 101	JOB NO.	2059-01
BORING NO.	G2-209	SAMPLED	
DEPTH	0-24.0'	TEST STARTED	5-26-94 DCW
SAMPLE NO.	4 +2% OMC	TEST FINISHED	05-25-91
SOIL DESCR.	On Site Disposal Cell	SETUP NO.	9S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	720	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA		BEFORE TEST	AFTER TEST
Wt. Soil + Moisture	(g)	519.3	524.8
Wt. Wet Soil & Pan	(g)	527.9	533.5
Wt. Dry Soil & Pan	(g)	471.9	471.9
Wt. Lost Moisture	(g)	56.0	61.6
Wt. of Pan Only	(g)	8.6	8.6
Wt. of Dry Soil	(g)	463.2	463.2
Moisture Content %		12.1	13.3
Wet Density PCF		144.0	144.6
Dry Density PCF		128.4	127.6

Init. Diameter	(in)	2.400	(cm)	6.10
Init. Area	(sq in)	4.524	(sq cm)	29.19
Init. Height	(in)	3.037	(cm)	7.71
Vol. Bef. Consol.	(cu ft)	0.00795		
Vol. After Consol.	(cu ft)	0.00800		
Porosity %		27.17		
Constant Head	(PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
1291.0	77460	49.8	49.3	15.6	1.3E-08
1426.0	85560	49.3	48.9	16.0	9.7E-09
2870.0	172200	48.9	48.1	16.7	9.7E-09
1476.0	88560	48.1	47.6	17.4	1.2E-08
1437.0	86220	47.6	47.3	17.8	7.4E-09
1440.0	86400	47.3	47.0	18.2	8.6E-09
1440.0	86400	47.0	46.7	18.5	7.4E-09
1455.0	87300	46.7	46.3	18.9	8.6E-09
1442.0	86520	46.3	46.0	19.3	8.7E-09

000464

ADVANCED TERRA TESTING, INC.

TRIAXAL COMPRESSION TEST DATA

5861

CLIENT	Parsons PO 101	JOB NO.	2059-01
BORING NO.	G2-209	SAMPLED	
DEPTH	0-24.0'	TEST STARTED	5-26-94 DCW
SAMPLE NO.	4 +2% OMC	TEST FINISHED	05-25-91
SOIL DESCR.	On Site Disposal Cell	SETUP NO.	9S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	720	AT FIELD MOIST.	No

SATURATION DATA

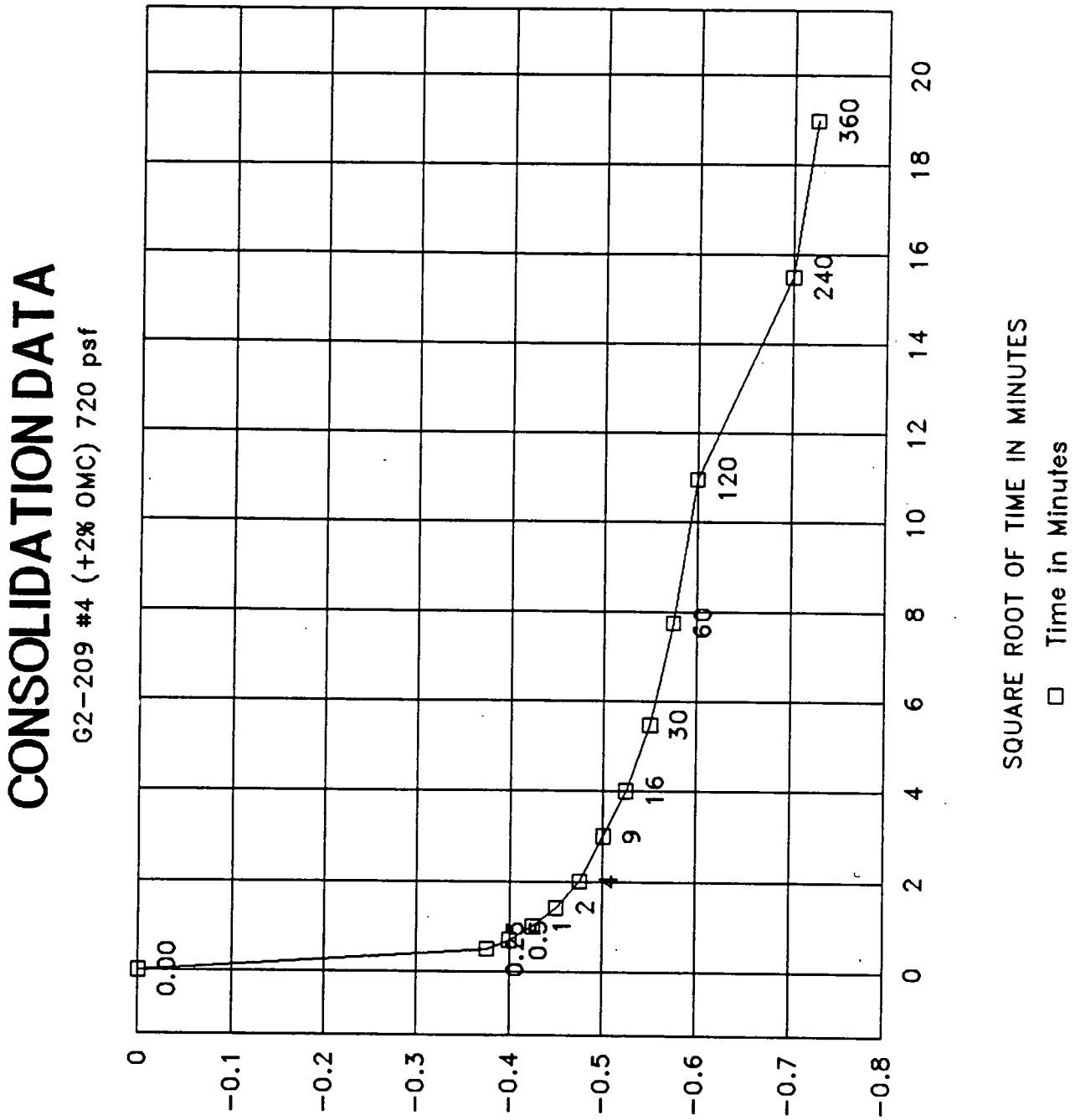
Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	1.1	8.3				
50.0	48.0	6.1	7.0	39.5	48.5	9.0	0.90
60.0	58.0	6.5	7.3	49.4	58.5	9.1	0.91
70.0	68.0	7.5	8.2	59.1	68.5	9.4	0.94
80.0	78.0	8.1	8.8	69.2	78.5	9.3	0.93
90.0	88.0	8.9	9.6	79.1	88.5	9.4	0.94
100.0		9.8	9.8	89.1	98.6	9.5	0.95

CONSOLIDATION DATA

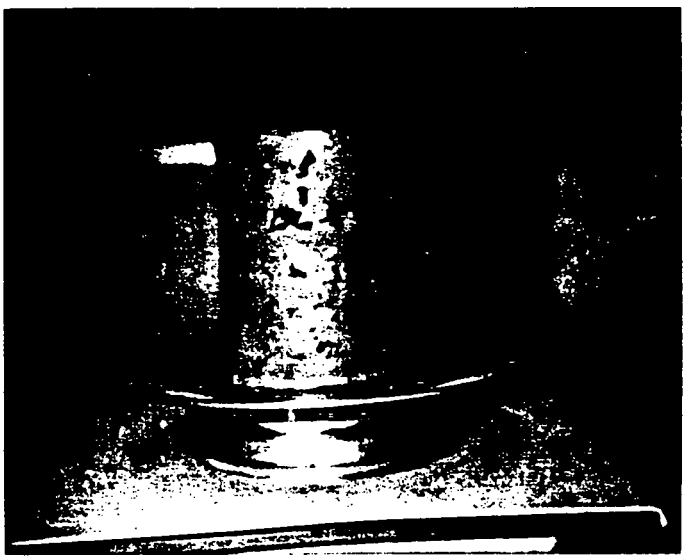
Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	9.80	0.00
0.25	0.50	10.18	-0.38
0.5	0.71	10.20	-0.40
1	1.00	10.23	-0.42
2	1.41	10.25	-0.45
4	2.00	10.28	-0.47
9	3.00	10.30	-0.50
16	4.00	10.33	-0.52
30	5.48	10.35	-0.55
60	7.75	10.38	-0.57
120	10.95	10.40	-0.60
240	15.49	10.50	-0.70
360	18.97	10.53	-0.72

Initial Height	(in)	3.04	Init. Vol.	(CC)	225.18
Height Change	(in)	0.02	Vol. Change	(CC)	10.80
Ht. After Cons.	(in)	3.02	Cell Exp.	(CC)	12.30
Initial Area	(sq in)	4.52	Net Change	(CC)	-1.50
Area After Cons.	(sq in)	4.58	Cons. Vol.	(CC)	226.68

ADVANCED TERRA TESTING, INC.


CONSOLIDATION DATA
G2-209 #4 (+2% OMC) 720 psf
VOLUME DEFLECTION - cc
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
0
2
4
6
8
10
12
14
16
18
20
SQUARE ROOT OF TIME IN MINUTES
Time in Minutes
0.00
0.25
0.5
1
2
4
9
16
30
60
120
240
360

586



Parsons P.O. [illegible]
CAST-10

PERMEABILITY TEST - BACK PRESSURE CONSTANT HEAD

CLIENT	Parsons PO 101	JOB NO.	2059-01
BORING NO.	G2-209	SAMPLED	
DEPTH	0-24.5'	TEST STARTED	5-26-94 DCW
SAMPLE NO.	5 @5% OMC	TEST FINISHED	6-10-94
SOIL DESCR.	On Site Disposal Cell	SETUP NO.	19S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	720	AT FIELD MOIST.	No

MOISTURE/DENSITY DATA		BEFORE TEST	AFTER TEST
Wt. Soil + Moisture	(g)	490.3	493.4
Wt. Wet Soil & Pan	(g)	498.8	501.8
Wt. Dry Soil & Pan	(g)	435.3	435.3
Wt. Lost Moisture	(g)	63.5	66.6
Wt. of Pan Only	(g)	8.4	8.4
Wt. of Dry Soil	(g)	426.8	426.8
Moisture Content %		14.9	15.6
Wet Density PCF		138.9	144.7
Dry Density PCF		120.9	125.2

Init. Diameter	(in)	2.382	(cm)	6.050
Init. Area	(sq in)	4.456	(sq cm)	28.752
Init. Height	(in)	3.017	(cm)	7.663
Vol. Bef. Consol.	(cu ft)	0.00778		
Vol. After Consol.	(cu ft)	0.00752		
Porosity %		31.27		
Constant Head	(PSI)	2.00	(cm)	140.79

Time Min	Time Sec	Init. Burette CC	Final Burette CC	Head Corr. CC	Permeability k cm/sec
1443.0	86580	49.8	48.8	15.8	2.5E-08
1413.0	84780	48.8	48.0	16.8	2.1E-08
1443.0	86580	48.0	47.2	17.7	2.0E-08
1465.0	87900	47.2	46.3	18.6	2.3E-08
1455.0	87300	46.3	45.4	19.5	2.3E-08
1439.0	86340	45.4	44.2	20.7	3.1E-08
1441.0	86460	44.2	43.9	21.5	7.8E-09
1430.0	85800	43.9	43.2	22.1	2.0E-08
1448.0	86880	43.2	42.4	22.9	2.0E-08
1459.0	87540	42.4	41.7	23.6	1.8E-08
1440.0	86400	41.7	41.0	24.4	1.9E-08

ADVANCED TERRA TESTING, 000468

TRIAXAL COMPRESSION TEST DATA

5861

CLIENT	Parsons PO 101	JOB NO.	2059-01
BORING NO.	G2-209	SAMPLED	
DEPTH	0-24.5'	TEST STARTED	5-26-94 DCW
SAMPLE NO.	5 @5% OMC	TEST FINISHED	6-10-94
SOIL DESCR.	On Site Disposal Cell	SETUP NO.	19S
TEST TYPE	TX/Pbp	SATURATED TEST	Yes
CONF. PRES. PSF	720	AT FIELD MOIST.	No

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	1.1	11.4				
50.0	48.0	10.7	11.6	39.7	49.0	9.3	0.93
60.0		11.7	11.7	49.5	59.1	9.6	0.96

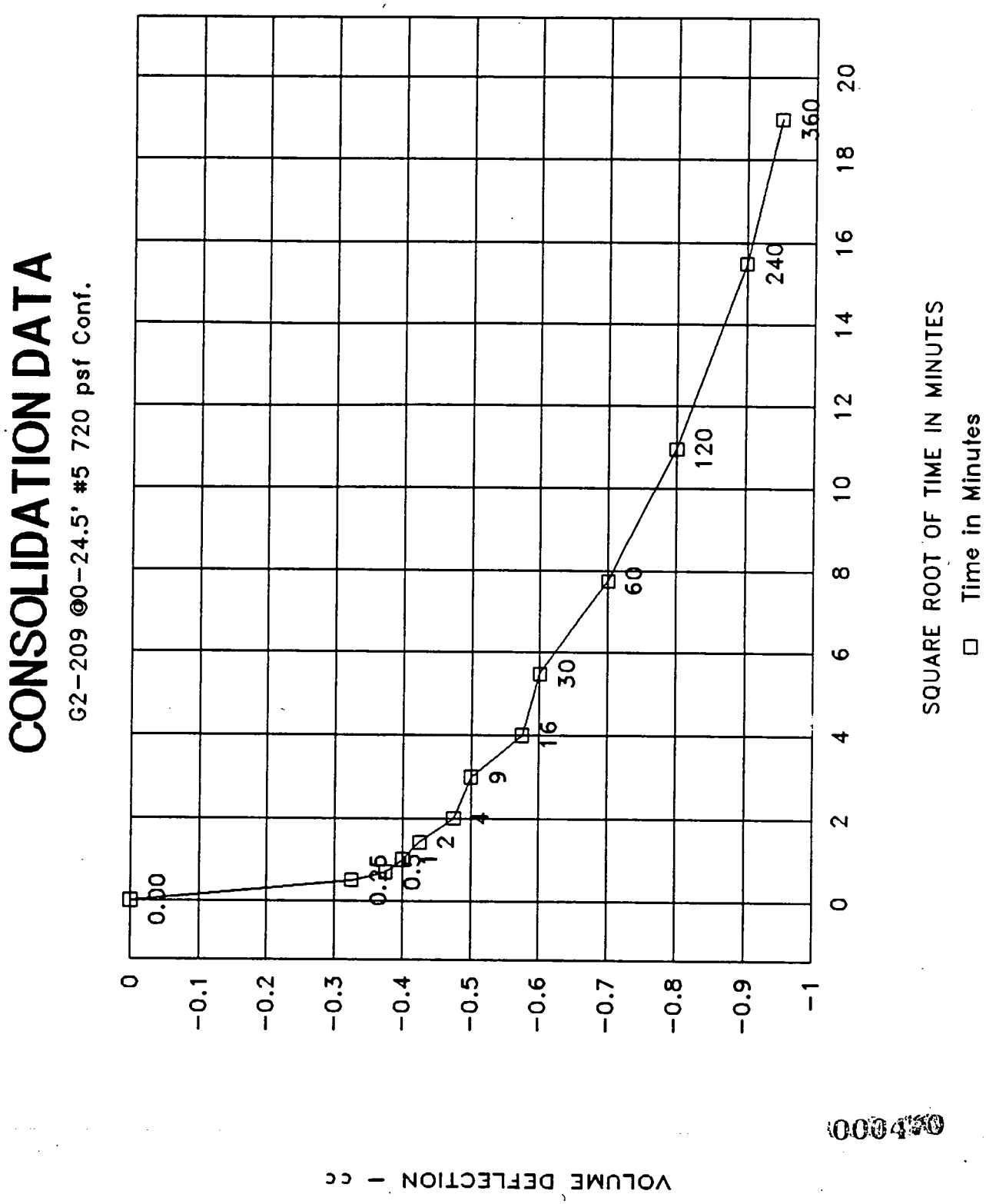
CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	11.80	0.00
0.25	0.50	12.13	-0.32
0.5	0.71	12.18	-0.38
1	1.00	12.20	-0.40
2	1.41	12.23	-0.42
4	2.00	12.28	-0.47
9	3.00	12.30	-0.50
16	4.00	12.38	-0.57
30	5.48	12.40	-0.60
60	7.75	12.50	-0.70
120	10.95	12.60	-0.80
240	15.49	12.70	-0.90
360	18.97	12.75	-0.95

Initial Height	(in)	3.017	Init. Vol.	(CC)	220.36
Height Change	(in)	0.035	Vol. Change	(CC)	13.90
Ht. After Cons.	(in)	2.982	Cell Exp.	(CC)	6.40
Initial Area	(sq in)	4.456	Net Change	(CC)	7.50
Area After Cons.	(sq in)	4.355	Cons. Vol.	(CC)	212.86

000489

ADVANCED TERRA TESTING, INC.


CONSOLIDATION DATA
G2-209 @0-24.5' #5 720 psf Conf.
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
-1
0
2
4
6
8
10
12
14
16
18
20
0.00
0.25
0.5
1
2
4
9
16
30
60
120
240
360
SQUARE ROOT OF TIME IN MINUTES
Time in Minutes
VOLUME DEFLECTION - cc

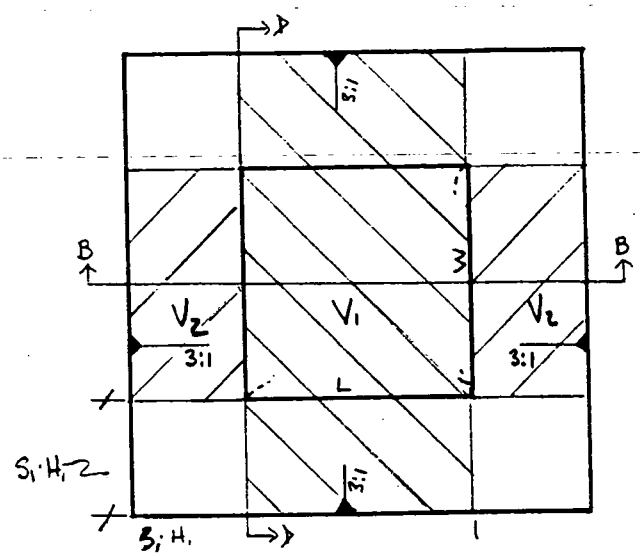
APPENDIX E.3.4

DISPOSAL CELL VOLUME CALCULATIONS

ON-SITE DISPOSAL CELL GEOMETRY

6861

EXPANDED TRESPASSER



PLAN VIEW w/o TOP COVER

ASSUME A SQUARE SHAPE. *

ASSUME VOLUME OF TOP & CORNERS ARE APPROXIMATELY EQUAL TO A PYRAMID.

ASSUME V_2 APPROXIMATELY EQUAL TO A TRIANGLE X LENGTH.

$$V_{TOTAL} = V_1 + \Sigma V_2 + V_{CORNE} + V_{TOP}$$

$$V_{PYRAMID} = 1/3 \cdot (\text{area base}) \cdot (\text{altitude})$$

SEE X-SECTIONS NEXT SHEET

$$V_1 = L \times \left(\frac{W + (W + 2(S_1 \cdot H_1))}{2} \right) \times H_1$$

(By average end area. using Top & Bottom)

$$\Sigma V_2 = 2 \times \left(1/2 \times (S_1 \cdot H_1)(H_1) \right) \times W$$

$$V_{CORNER} = 1/3 \times \left(2(S_1 \cdot H_1) \right)^2 \cdot (H_1)$$

(NOTE EACH CORNER WHEN COMBINED WILL MAKE A PYRAMID).

$$V_{TOP} = 1/3 \times \left(L + 2(S_1 \cdot H_1) \right)^2 \left(\frac{(L + 2(S_1 \cdot H_1))}{2} \times 0.04 \right)$$

(FOR THIS CALCULATION, ASSUME ALTITUDE HT = 4% of 1/2 WIDTH AND L = W.)

000472

* NOTE THAT SIMPLIFING GEOMETRY ASSUMPTIONS ARE MADE TO OBTAIN APPROXIMATE QUANTITIES.

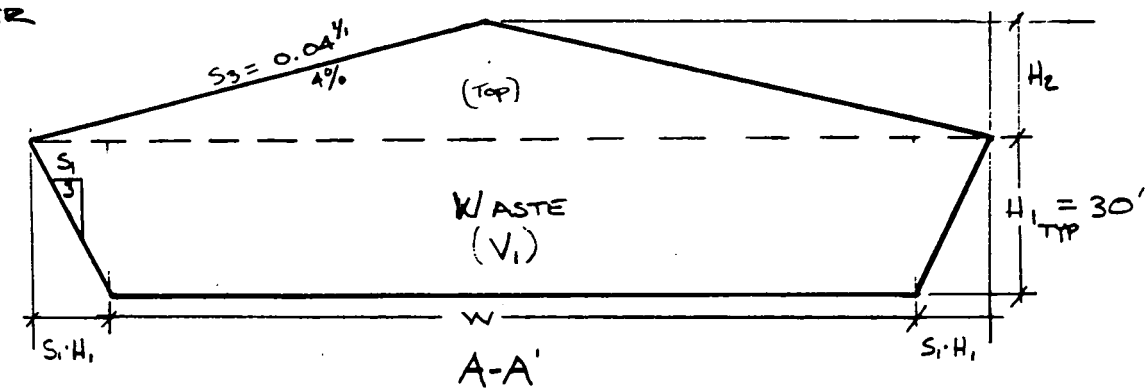
CLIENT		DEPARTMENT CRU2	
PROJECT		ORIGINATED BY KG	DATE 7-27-94
ENG. COMM NO.	PROJECT NO.	CHECKED BY	DATE
AREA		REVISION NUMBER	DATE
SUBJECT ON-SITE DISPOSAL CELL ~ EXPANDED TRESPASSER			

Form E53-2 2-91

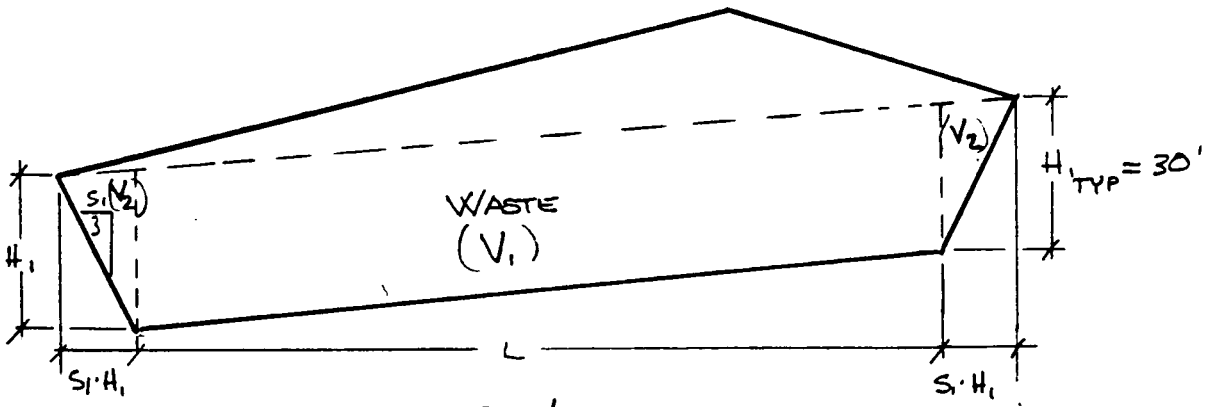
SHEET 1 OF

EXPANDED TRESPASSER

X-SECTIONS
w/o COVER



A-A'



B-B'

CALCULATIONS

The following calculations (LOTUS 1·2·3 File ONSDC .WK3 A:) will generate a waste volume given W, L, H_1. This volume is to be compared to a given volume to see which W & L yields the closest value. (adjust the 1ST ROW values of W & L to make changes throughout this worksheet)

000493

CLIENT		DEPARTMENT CRU·L	
PROJECT		ORIGINATED BY K.G.	DATE 7-27-94
ENG. COMM. NO.	PROJECT NO.	CHECKED BY	DATE
AREA		REVISION NUMBER	DATE
SUBJECT ON-SITE DISPOSAL CELL ~ EXPANDED TRESPASSER		REVISED BY	

Form E53-2 (2-90)

SHEET 2 OF

ON-SITE DISPOSAL - EXPANDED TRESPASSER (10^{-5})
INTERIOR WASTE GEOMETRY BASED ON VOLUME

On-Site Disposal Cell

W = width of base
L = length of base
H = height of 3:1 interior slope
H2 = height of top = (0.5)*(W+(2*W2)*S1
S1 = top slope = 0.04 ft/ft
W2 = side slope top width
W2 = 90 ft

Divide all volumes by 27 cf/cy

Volume 1 = L*((W+(W+(3*H)*2))/2)*H (ave end area w/ top & bottom areas)
Volume 2 = 2700*W
Volume 3 = 1/3*(S1*H*2) ^ 2*H
Volume 4 = 1/3*(W+180) ^ 2*(0.02*W+3.60) (assumes H2 = 4% of 1/2 W & W=L)

W	L	H	H2	V1	V2	V3	V4	TOTAL (cy)
272	272	30	9.04	109,404	27,200	12,000	22,801	171,406
273	273	30	9.06	110,110	27,300	12,000	22,953	172,363
274	274	30	9.08	110,818	27,400	12,000	23,105	173,323
275	275	30	9.1	111,528	27,500	12,000	23,258	174,286
276	276	30	9.12	112,240	27,600	12,000	23,412	175,252
277	277	30	9.14	112,954	27,700	12,000	23,566	176,221
278	278	30	9.16	113,671	27,800	12,000	23,721	177,193
279	279	30	9.18	114,390	27,900	12,000	23,877	178,167
280	280	30	9.2	115,111	28,000	12,000	24,034	179,145
281	281	30	9.22	115,834	28,100	12,000	24,191	180,125
282	282	30	9.24	116,560	28,200	12,000	24,348	181,108
283	283	30	9.26	117,288	28,300	12,000	24,507	182,095
284	**284**	30	9.28	118,018	28,400	12,000	24,666	**183,084**
285	285	30	9.3	118,750	28,500	12,000	24,826	184,076
286	286	30	9.32	119,484	28,600	12,000	24,986	185,071
287	287	30	9.34	120,221	28,700	12,000	25,148	186,069
288	288	30	9.36	120,960	28,800	12,000	25,309	187,069
289	289	30	9.38	121,701	28,900	12,000	25,472	188,073
290	290	30	9.4	122,444	29,000	12,000	25,635	189,080
291	291	30	9.42	123,190	29,100	12,000	25,799	190,089
292	292	30	9.44	123,938	29,200	12,000	25,964	191,102
293	293	30	9.46	124,688	29,300	12,000	26,129	192,117
294	294	30	9.48	125,440	29,400	12,000	26,295	193,135
295	295	30	9.5	126,194	29,500	12,000	26,462	194,157
296	296	30	9.52	126,951	29,600	12,000	26,630	195,181
297	297	30	9.54	127,710	29,700	12,000	26,798	196,208

ON-SITE DISPOSAL - EXPANDED TRESPASSER (10^{-6})
INTERIOR WASTE GEOMETRY BASED ON VOLUME

CRU2 FS
8/9/94

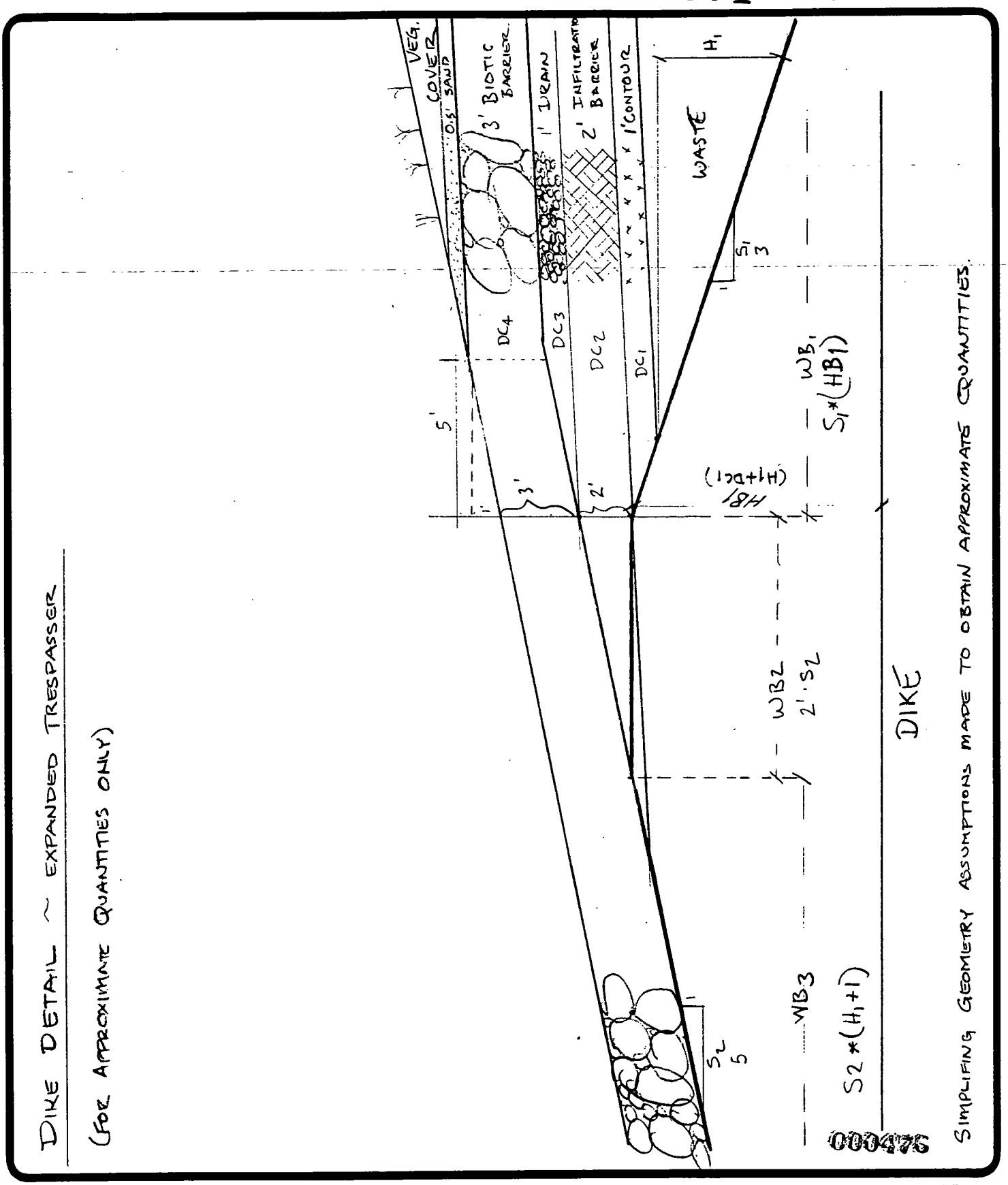
On-Site Disposal Cell

W = width of base
L = length of base
H = height of 3:1 interior slope
H2 = height of top = (0.5)*(W+(2*W2)*S1
S1 = top slope = 0.04 ft/ft
W2 = side slope top width
W2 = 90 ft

Divide all volumes by 27 cf/cy

Volume 1 = L*((W+(W+(3*H)*2))/2)*H (ave end area w/ top & bottom areas)
Volume 2 = 2700*W
Volume 3 = 1/3*(S1*H*2) ^ 2*H
Volume 4 = 1/3*(W+180) ^ 2*(0.02*W+3.60) (assumes H2 = 4% of 1/2 W & W=L)

W	L	H	H2	V1	V2	V3	V4	TOTAL (cy)
272	272	30	9.04	109,404	27,200	12,000	22,801	171,406
273	273	30	9.06	110,110	27,300	12,000	22,953	172,363
274	274	30	9.08	110,818	27,400	12,000	23,105	173,323
275	275	30	9.1	111,528	27,500	12,000	23,258	174,286
276	276	30	9.12	112,240	27,600	12,000	23,412	175,252
277	277	30	9.14	112,954	27,700	12,000	23,566	176,221
278	278	30	9.16	113,671	27,800	12,000	23,721	177,193
279	279	30	9.18	114,390	27,900	12,000	23,877	178,167
280	280	30	9.2	115,111	28,000	12,000	24,034	179,145
281	281	30	9.22	115,834	28,100	12,000	24,191	180,125
282	282	30	9.24	116,560	28,200	12,000	24,348	181,108
283	283	30	9.26	117,288	28,300	12,000	24,507	182,095
284	**284**	30	9.28	118,018	28,400	12,000	24,666	**183,084**
285	285	30	9.3	118,750	28,500	12,000	24,826	184,076
286	286	30	9.32	119,484	28,600	12,000	24,986	185,071
287	287	30	9.34	120,221	28,700	12,000	25,148	186,069
288	288	30	9.36	120,960	28,800	12,000	25,309	187,069
289	289	30	9.38	121,701	28,900	12,000	25,472	188,073
290	290	30	9.4	122,444	29,000	12,000	25,635	189,080
291	291	30	9.42	123,190	29,100	12,000	25,799	190,089
292	292	30	9.44	123,938	29,200	12,000	25,964	191,102
293	293	30	9.46	124,688	29,300	12,000	26,129	192,117
294	294	30	9.48	125,440	29,400	12,000	26,295	193,135
295	295	30	9.5	126,194	29,500	12,000	26,462	194,157
296	296	30	9.52	126,951	29,600	12,000	26,630	195,181
297	297	30	9.54	127,710	29,700	12,000	26,798	196,208



000476

CLIENT		DEPARTMENT CRU 2	
PROJECT		ORIGINATED BY KG	DATE 8/9/94
ENG. COMM. NO.	PROJECT NO.	CHECKED BY	DATE
AREA		REVISION NUMBER	DATE
SUBJECT ON-SITE DISPOSAL CELL ~ EXPANDED TRESPASSER		REVISED BY	

Form E53-2 (2-90)

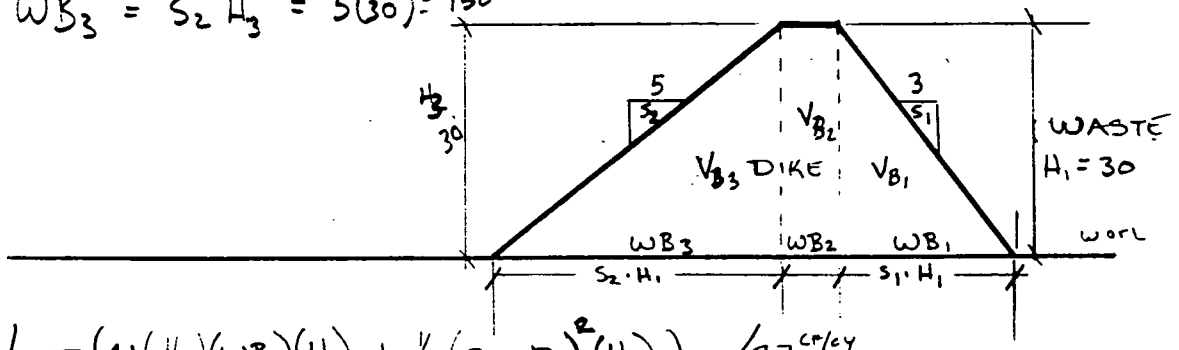
SHEET 5 OF

DIKE / BERM VOLUME

$WB_1 = S_1 \cdot H_1 = 3 \cdot 30' = 90'$

$WB_2 = 27'$ (see CAP/SIDE SLOPE DETAIL)

$WB_3 = S_2 H_3 = 5(30') = 150'$

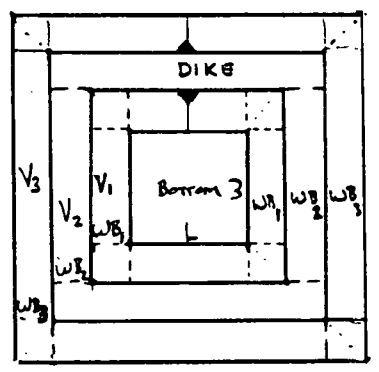


(COVER NOT SHOWN)

$$V_{B_1} = \left(4 \cdot L\left(\tfrac{1}{2}\right)(WB_1)(H_1) + \tfrac{1}{3}\left(2 \cdot WB_1\right)^2 (H_1)\right) / 27^{CF/CY}$$

$(L = W)$ $\quad$ (Σ Corners = pyramid w/ base $= (2 \cdot WB)^2$)

$$V_{B2} = \left(2 \cdot \left(\overset{L}{L + 2(WB_1) + 2(WB_2)}\right) \times \overset{W}{WB_2} \times \overset{H}{H_1} + 2\left(W + 2(WB_1)\right) \times WB_2 \times H_1\right) / 27$$



$$V_{B3} = \left(2 \cdot \left(L + 2(WB_1 + WB_2\right) \cdot \tfrac{1}{2}(WB_3)(H_1) + 2 \cdot \left(W + 2(WB_1 + WB_2)\right) \cdot \tfrac{1}{2}(WB_3)(H_1) + \tfrac{1}{3}\left(2 \cdot WB_3\right)^2 (H_3)\right) / 27$$

000477

CLIENT		DEPARTMENT CRU 2	
PROJECT		ORIGINATED BY KG	DATE 7-27-94
ENG. COMM. NO.	PROJECT NO.	CHECKED BY	DATE
AREA		REVISION NUMBER	DATE
SUBJECT ON-SITE DISPOSAL CELL ~		REVISED BY	

Form 553-2 (2-90)

ON-SITE DISPOSAL - EXPANDED TRESPASSER (10^{-5})
BERM VOLUME OF ON-SITE DISPOSAL CELL

CRU2 FS
8/10/94

S1 =	3	3:1 interior side slope
S2 =	5	5:1 exterior side slope
HB1 =	31	ft, height of interior berm (Waste Ht. + 1' Contour Layer)
WB =		width of berm
WB1 =	93	ft, S1*(HB1) see sketch
WB2 =	10	ft, S2*2', see sketch
WB3 =	155	ft, S2*(HB1), see sketch
WB12 =	103	ft, WB1 + WB2

VB1 = 4*(L)*(1/2*WB1*HB1)+1/3*(2*WB1)*HB1
VB2 = ((2*(L+(2*WB1)+(2*WB2))*HB1*WB1)+(2*(W+(2*WB1))*WB1*WB2))/27
VB3 = (((2*0.5*(L+(2*WB12))*WB3*HB1)+(2*0.5*(W+(2*WB12))*WB3*HB1)))+
+((1/3)*((2*WB3)^2)*(HB1)))/27

W	L	H1	WB	H4	VB1	VB2	VB3	TOTAL (cy)
272	272	31	155	25	71,328	21,493	206,912	299,732
273	273	31	155	25	71,541	21,539	207,268	300,348
274	274	31	155	25	71,755	21,585	207,623	300,963
275	275	31	155	25	71,968	21,631	207,979	301,579
276	276	31	155	25	72,182	21,677	208,335	302,194
277	277	31	155	25	72,395	21,723	208,691	302,810
278	278	31	155	25	72,609	21,769	209,047	303,425
279	279	31	155	25	72,822	21,815	209,403	304,040
280	280	31	155	25	73,036	21,861	209,759	304,656
281	281	31	155	25	73,250	21,907	210,115	305,271
282	282	31	155	25	73,463	21,953	210,471	305,887
283	283	31	155	25	73,677	21,999	210,827	306,502
284	**284**	31	155	25	73,890	22,044	211,183	**307,117**
285	285	31	155	25	74,104	22,090	211,539	307,733
286	286	31	155	25	74,317	22,136	211,895	308,348
287	287	31	155	25	74,531	22,182	212,250	308,964
288	288	31	155	25	74,744	22,228	212,606	309,579
289	289	31	155	25	74,958	22,274	212,962	310,194
290	290	31	155	25	75,172	22,320	213,318	310,810
291	291	31	155	25	75,385	22,366	213,674	311,425
292	292	31	155	25	75,599	22,412	214,030	312,041
293	293	31	155	25	75,812	22,458	214,386	312,656
294	294	31	155	25	76,026	22,504	214,742	313,271
295	295	31	155	25	76,239	22,550	215,098	313,887
296	296	31	155	25	76,453	22,596	215,454	314,502
297	297	31	155	25	76,666	22,641	215,810	315,118

NOTE: The formulas assume some simplification of the geometry of the cell. See sketches.
The cap is assumed to be a pyramid.

ONSDCET.WK3 E:

ON-SITE DISPOSAL - EXPANDED TRESPASSER (10^{-6})
BERM VOLUME OF ON-SITE DISPOSAL CELL

CRU2 FS
8/9/94

S1 =	3	3:1 interior side slope
S2 =	5	5:1 exterior side slope
HB1 =	31	ft, height of interior berm (Waste Ht. + 1' Contour Layer)
WB =		width of berm
WB1 =	93	ft, S1*(HB1) see sketch
WB2 =	10	ft, S2*2', see sketch
WB3 =	155	ft, S2*(HB1), see sketch
WB12 =	103	ft, WB1 + WB2

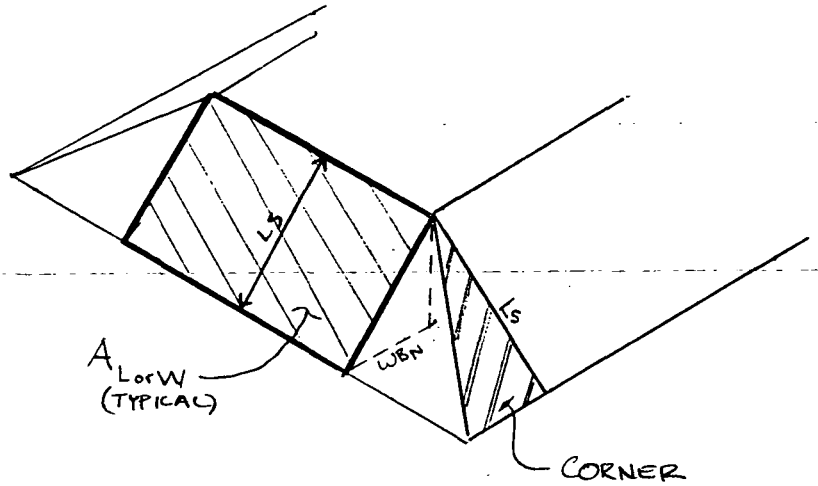
VB1 = 4*(L)*(1/2*WB1*HB1)+1/3*(2*WB1)*HB1
VB2 = ((2*(L+(2*WB1)+(2*WB2))*HB1*WB1)+(2*(W+(2*WB1))*WB1*WB2))/27
VB3 = (((2*0.5*(L+(2*WB12))*WB3*HB1)+(2*0.5*(W+(2*WB12))*WB3*HB1)))+
+((1/3)*((2*WB3) ^ 2)*(HB1)))/27

W	L	H1	WB	H4	VB1	VB2	VB3	TOTAL (cy)
272	272	31	155	25	71,328	21,493	206,912	299,732
273	273	31	155	25	71,541	21,539	207,268	300,348
274	274	31	155	25	71,755	21,585	207,623	300,963
275	275	31	155	25	71,968	21,631	207,979	301,579
276	276	31	155	25	72,182	21,677	208,335	302,194
277	277	31	155	25	72,395	21,723	208,691	302,810
278	278	31	155	25	72,609	21,769	209,047	303,425
279	279	31	155	25	72,822	21,815	209,403	304,040
280	280	31	155	25	73,036	21,861	209,759	304,656
281	281	31	155	25	73,250	21,907	210,115	305,271
282	282	31	155	25	73,463	21,953	210,471	305,887
283	283	31	155	25	73,677	21,999	210,827	306,502
284	284	31	155	25	73,890	22,044	211,183	307,117
285	285	31	155	25	74,104	22,090	211,539	307,733
286	286	31	155	25	74,317	22,136	211,895	308,348
287	287	31	155	25	74,531	22,182	212,250	308,964
288	288	31	155	25	74,744	22,228	212,606	309,579
289	289	31	155	25	74,958	22,274	212,962	310,194
290	290	31	155	25	75,172	22,320	213,318	310,810
291	291	31	155	25	75,385	22,366	213,674	311,425
292	292	31	155	25	75,599	22,412	214,030	312,041
293	293	31	155	25	75,812	22,458	214,386	312,656
294	294	31	155	25	76,026	22,504	214,742	313,271
295	295	31	155	25	76,239	22,550	215,098	313,887
296	296	31	155	25	76,453	22,596	215,454	314,502
297	297	31	155	25	76,666	22,641	215,810	315,118

NOTE: The formulas assume some simplification of the geometry of the cell. See sketches.
The cap is assumed to be a pyramid.

000479

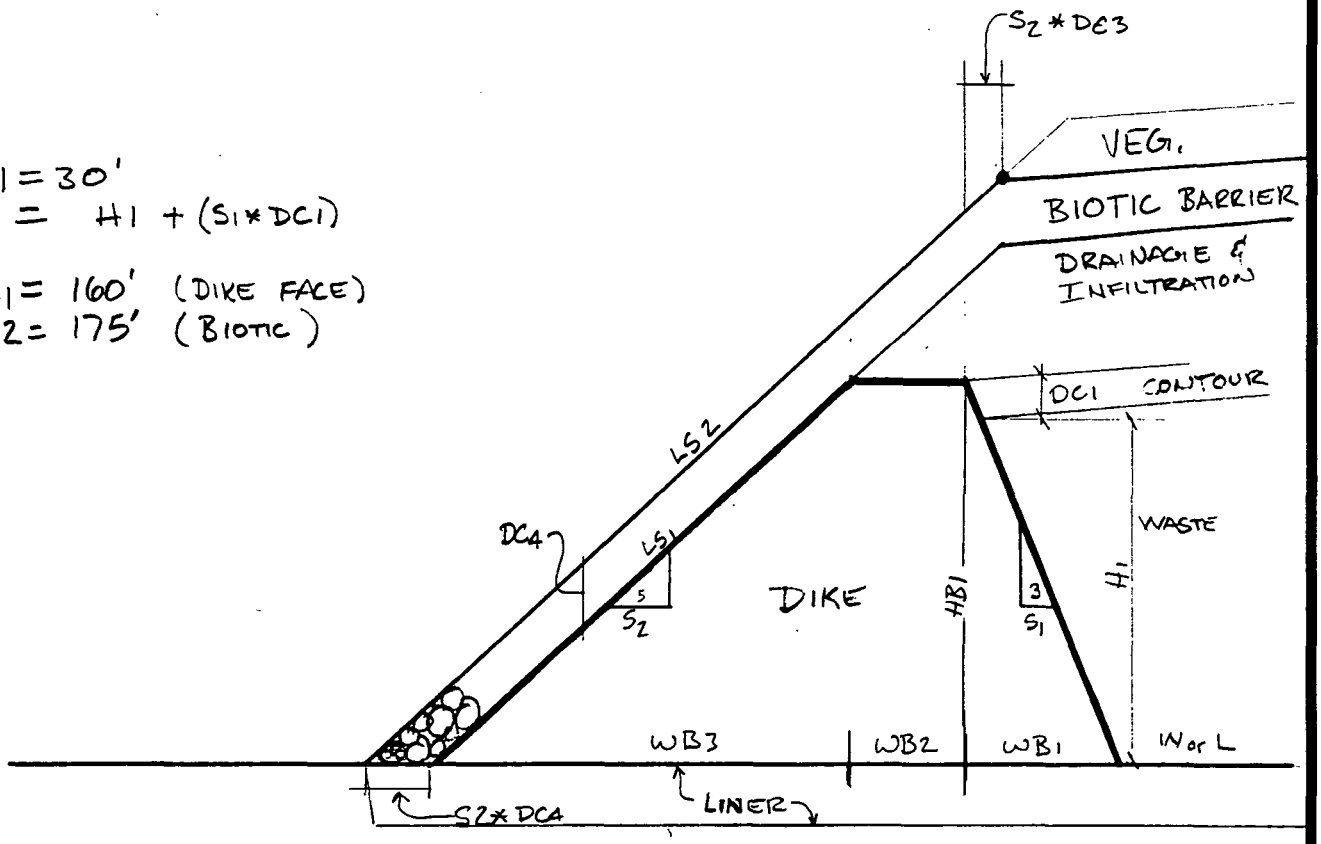
SLOPE QUANTITIES



ISOMETRIC w/o TOP nts

H1 = 30'
HB1 = H1 + (S1 * DC1)

LS1 = 160' (DIKE FACE)
LS2 = 175' (BIOTIC)



DIKE SECTION nts

000080

ASSUME THIS COVER/DIKE GEOMETRY TO SIMPLIFY QUANTITY CALCULATIONS

CLIENT		DEPARTMENT CRUZ	
PROJECT		ORIGINATED BY KG	DATE 8-9-94
ENG. COMM. NO.	PROJECT NO.	CHECKED BY	DATE
AREA		REVISION NUMBER	DATE
SUBJECT ON-SITE DISPOSAL CELL ~ EXPANDED TRESPASSER		REVISED BY	

CRU2 FS

ON-SITE DISPOSAL - EXPANDED TRESPASSER (10^{-5})
SLOPE, COVER, AND LINER QUANTITIES

Given:

W =	284	ft	From Waste Geometry Calculations
L =	284	ft	From Waste Geometry Calculations
H1 =	30	ft	Waste Height
HB1 =	31	ft	top height of dike
HTotal =	40.5	ft	height at hinge point (+/-)
LS1 =	160	ft	(slope length rounded up for dike)
LS2 =	175	ft	(slope length rounded up for biotic barrier)
S1 =	3 : 1		
S2 =	5 : 1		
WB1 =	93	ft	S1*HB1
WB2 =	10	ft	(width at top of berm see sketch)
WB3 =	155	ft	= S2*HB1 see sketch
WL =	170	ft	(S2*DC3)+WB2+WB3 (see sketch)
DC1 =	1	ft	Contour fill +/-
DC2 =	2	ft	Infiltration Varrier
DC3 =	1	ft	Drainage Layer
DC4 =	3	ft	Biotic Barrier

ON-SITE DISPOSAL - EXPANDED TRESPASSER (10^{-5})
SLOPE, COVER, AND LINER QUANTITIES - Con't

BIOTIC BARRIER

AREA AL = LS2*(L+2(WB1-(S2*DC3)))
AREA AL = 80,500 sf 2*AL = 161,000 sf

AREA AW =LS2*(W+2(WB1-(S2*DC3)))
AREA AW = 80,500 sf 2*AW = 161,000 sf

AREA C = "Corner Area" = 1/2*LS*WL
AREA C = 14,875 sf 8*AREA C = 119,000 sf
Subtotal = 441,000 sf

BIOTIC BARRIER VOL. = AREA * DC4 1,323,000 cf 49,000 cy

Cap area, assume pyramid, and L = W

Base = L+2(WB1-(S2*DC3))
Base = 460 ft
altitude = slope length = (((base/2)*4%) ^2+(base/2) ^2) ^0.5
Alt = 230.2 ft
Cap Area = 1/2*(base)*(altitude)*4 sides/(9sf/sy)
Cap Area = 23,530 sy

Liner area, assume L = W

AreaL = ((L+2(WB1+WB2+WB3+(S2*DC4))) ^2)/(9sf/sy)
AreaL = 76,544 sy

Toe to Toe Width, assume level ground & L=W.

Width = L + 2(WB1+WB2+WB3+(S2*DC4))
Width = 830 ft

CRU2 FS

ON-SITE DISPOSAL - EXPANDED TRESPASSER (10^{-5})
SLOPE, COVER, AND LINER QUANTITIES - Con't

1. 261,000 cy = Design Capacity (waste including dike)

2. 52,000 cy = Volume of soil (Fill & Till) w/ ave. U238 approx. 15 pCi/g (56 pCi/g max) available from excav.
   26,000 cy = additional excavation volume
   78,000 cy = Total available soil for dike

3. 183,000 cy = Interior cell volume required (Item 1 - Item 2)
   284 ft From above calculations, bottom L & W will yield approx 183,000 cy

4. 76,544 sy = Liner Area (bottom + dike bottom width) ^ 2 / 9

5. 23,530 sy = Cap Area (top slope only)

6. 307,117 cy = Total Dike (Berm) Volume (see Berm Vol Calc)

7. 229,117 cy = Borrow Required for Dike (Total Berm Vol - Item 2)

11. 830 ft = Toe to Toe Width

NOTE: The following quantites for cap and liner areas and borrow for dike are shown on the figures and included in the cost estimates. They are based on conservative cap/dike interface.

4. 77,562 sy Liner area

5. 26,482 sy Cap Area

6. 333,720 cy Total Dike Volume

7. 201,720 cy Borrow required for dike

8. 893 ft Toe to Toe

ONSDCET.WK3 F:

8/9/94

000483

CRU2 FS

5861

ON-SITE DISPOSAL - EXPANDED TRESPASSER (10^{-6})
SLOPE, COVER, AND LINER QUANTITIES

Given:

W =	284	ft	From Waste Geometry Calculations
L =	284	ft	From Waste Geometry Calculations
H1 =	30	ft	Waste Height
HB1 =	31	ft	top height of dike
HTotal =	40.5	ft	height at hinge point (+/-)
LS1 =	160	ft	(slope length rounded up for dike)
LS2 =	175	ft	(slope length rounded up for biotic barrier)
S1 =	3 : 1		
S2 =	5 : 1		
WB1 =	93	ft	S1*HB1
WB2 =	10	ft	(width at top of berm see sketch)
WB3 =	155	ft	= S2*HB1 see sketch
WL =	170	ft	(S2*DC3)+WB2+WB3 (see sketch)
DC1 =	1	ft	Contour fill +/-
DC2 =	2	ft	Infiltration Varrier
DC3 =	1	ft	Drainage Layer
DC4 =	3	ft	Biotic Barrier

ON-SITE DISPOSAL - EXPANDED TRESPASSER (10^{-6}) CRU2 FS
SLOPE, COVER, AND LINER QUANTITIES - Con't

BIOTIC BARRIER

AREA AL = LS2*(L+2(WB1-(S2*DC3)))
AREA AL = 80,500 sf 2*AL = 161,000 sf

AREA AW =LS2*(W+2(WB1-(S2*DC3)))
AREA AW = 80,500 sf 2*AW = 161,000 sf

AREA C = "Corner Area" = 1/2*LS*WL
AREA C = 14,875 sf 8*AREA C = 119,000 sf
Subtotal = 441,000 sf

BIOTIC BARRIER VOL. = AREA * DC4 = 1,323,000 cf 49,000 cy

Cap area, assume pyramid, and L = W

Base = L+2(WB1-(S2*DC3))
Base = 460 ft
altitude = slope length = (((base/2)*4%) ^ 2+(base/2) ^ 2) ^ 0.5
Alt = 230.2 ft
Cap Area = 1/2*(base)*(altitude)*4 sides/(9sf/sy)
Cap Area = 23,530 sy

Liner area, assume L = W

AreaL = ((L+2(WB1+WB2+WB3+(S2*DC4))) ^ 2)/(9sf/sy)
AreaL = 76,544 sy

Toe to Toe Width, assume level ground & L=W.

Width = L + 2(WB1+WB2+WB3+(S2*DC4))
Width = 830 ft

CRU2 FS

5861

ON-SITE DISPOSAL - EXPANDED TRESPASSER (10^{-6})
SLOPE, COVER, AND LINER QUANTITIES - Con't

1. 261,000 cy = Design Capacity (waste including dike)

2. 104,000 cy = Volume of soil (Fill & Till) w/ ave. U238 approx. 15 pCi/g (56 pCi/g max) available from excav.
   28,000 cy = additional excavation volume
   132,000 cy = Total available soil for dike

3. 129,000 cy = Interior cell volume required (Item 1 - Item 2)
   284 ft From above calculations, bottom L & W will yield approx 183,000 cy

4. 76,544 sy = Liner Area (bottom + dike bottom width) ^ 2 / 9

5. 23,530 sy = Cap Area (top slope only)

6. 307,117 cy = Total Dike (Berm) Volume (see Berm Vol Calc)

7. 175,117 cy = Borrow Required for Dike (Total Berm Vol - Item 2)

11. 830 ft = Toe to Toe Width

NOTE: The following quantites for cap and liner areas and borrow for dike are shown on the figures and included in the cost estimates. They are based on conservative cap/dike interface.

4. 77,562 sy Liner area

5. 26,482 sy Cap Area

6. 333,720 cy Total Dike Volume

7. 201,720 cy Borrow required for dike

8. 893 ft Toe to Toe

ON-SITE DIS[illegible] CELL FOR ALTERNATIVE 6 (EXPANDED TRESPASSER) [redacted]

ALTERNATIVE 6: EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WAC

RECEPTOR: EXPANDED TRESPASSER

CLEAR & GRUB AREA = 35 AC
STAGING AREA = 670 CY
TOTAL # OF WELLS = 24
TOTAL LINER AREA = 77,562 SY
TOTAL CAP AR[illegible] = 26,482 SY

SUBUNIT	WASTE* VOLUME TO CELL (CY)	PERCENT OF TOTAL WASTE VOLUME	CELL LINER: LINER AREA (SY)	CELL LINER: CLAY QUANTITY (CY)	CELL LINER: PEA GRAVEL (CY)	CELL CAP: CAP AREA (SY)	CELL CAP: CONTOURING LAYER (CY)	CELL CAP: CLAY CAP (CY)	CELL CAP: COMMON SOIL (CY)	CELL CAP: TOP SOIL (CY)	CELL CAP: PEA GRAVEL (CY)	CELL CAP: COBBLES (CY)	CELL CAP: SAND LAYER (CY)	NUMBER OF MONITORING WELLS
SWL	27,100	8	6,205	6,205	2,048	2,119	1,059	1,419	1,229	360	699	2,119	360	2
LSP	21,200	7	5,429	5,429	1,792	1,854	927	1,242	1,075	315	612	1,854	315	2
IFP	103,300	33	25,595	25,595	8,447	8,739	4,370	5,855	5,069	1,486	2,884	8,739	1,486	8
SF	88,000	28	21,717	21,717	7,167	7,415	3,707	4,968	4,301	1,261	2,447	7,415	1,261	7
AFP	74,600	24	18,615	18,615	6,143	6,356	3,178	4,258	3,686	1,080	2,097	6,356	1,080	6
TOTAL	314,200	100	77,562	77,562	25,595	26,482	13,241	17,743	15,360	4,502	8,739	12,711	2,161	24

* WASTE VOLUME = REMEDIATION VOLUME + ADDITIONAL EXCAVATION REQUIRED TO REMOVE REMEDIATION VOLUME**
+ 3,000 CY OF GENERATED WASTE (15,000 CY/5 = 3,000 CY)

** 14% FOR SWL AND 10% FOR LSP, IFP, SF, AND AFP

000487

ALTERNATIVE 6: EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WAC

RECEPTOR: EXPANDED TRESPASSER

FENCE	=	5,000 LF
6" PERFORATED PIPE	=	4,500 LF
6/10 HDPE PIPE TO AWWT	=	3,500 LF
HDPE MANHOLES	=	10

BORROW FOR DIKE	=	201,720 CY
DIKE COVER	=	~~18,978 CY~~
VEGETATIVE ZONE	=	~~36,669 CY~~
TOP SOIL	=	~~10,485 CY~~

GEOTEXTILE	=	58,868 SY
COBBLES	=	58,868 CY
SAND	=	~~9,811 CY~~
DRAINAGE PIPE	=	4,000 LF

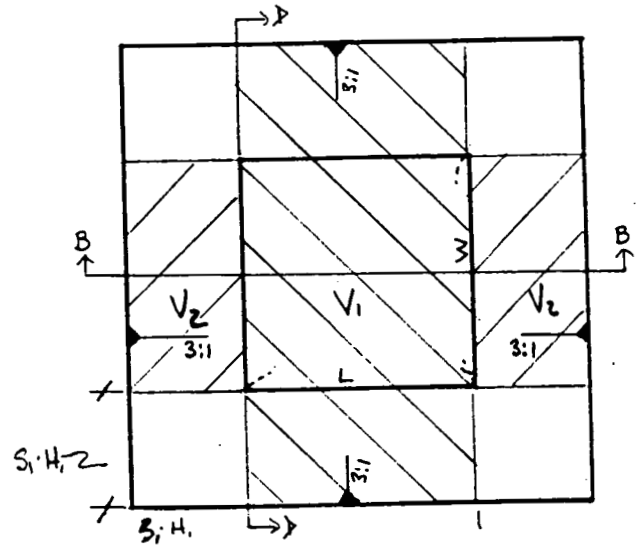
		LEACHATE COLLECTION SYSTEM				SIDE SLOPE DIKE							
SUBUNIT	PERCENT OF TOTAL WASTE VOLUME	6" PIPE PERFORATED (LF)	10/6-HDPE PIPE TO AWWT (CY)	MANHOLES (EA)	FENCE (LF)	BORROW FOR DIKE (CY)	DIKE COVER (CY)	VEGETATIVE ZONE (CY)	TOP SOIL (CY)	GEOTEXTILE (SY)	COBBLES (CY)	SAND LAYER (CY)	DRAINAGE PIPE (LF)
SWL	8	360	280	1	400	16,138	1,518	2,934	839	4,709	4,709	785	320
LSP	7	315	245	1	350	14,120	1,328	2,567	734	4,121	4,121	687	280
IFP	33	1,485	1,155	2	1650	66,568	6,263	12,101	3,460	19,426	19,426	3,238	1,320
SF	28	1,260	980	4	1400	56,482	5,314	10,267	2,936	16,483	16,483	2,747	1,120
AFP	24	1,080	840	2	1200	48,413	4,555	8,801	2,516	14,128	14,128	2,355	960
TOTAL	100	4,500	3,500	10	5,000	201,720	18,978	36,669	10,485	58,868	58,868	9,811	4,000

000488

5861

ON-SITE DISPOSAL CELL GEOMETRY

ALT 6 ~ EXCAVATION & ON-SITE DISPOSAL
OFF-SITE DISPOSAL > WAC (RESIDENT FARMER)



PLAN VIEW w/o TOP COVER

ASSUME A SQUARE SHAPE. *

ASSUME VOLUME OF TOP & CORNERS ARE APPROXIMATELY EQUAL TO A PYRAMID.

ASSUME V_2 APPROXIMATELY EQUAL TO A TRIANGLE X LENGTH.

$$V_{TOTAL} = V_1 + \Sigma V_2 + V_{CORNE} + V_{TOP}$$

$$V_{PYRAMID} = 1/3 \cdot (\text{area base}) \cdot (\text{altitude})$$

SEE X-SECTIONS NEXT SHEET

$$V_1 = L \times \left(\frac{W + (W + 2(S_1 \cdot H_1))}{2} \right) \times H_1$$

(By average end area. using Top & Bottom)

$$\Sigma V_2 = 2 \times \left(1/2 \times (S_1 \cdot H_1)(H_1) \right) \times W$$

$$V_{CORNER} = 1/3 \times (2(S_1 \cdot H_1))^2 \cdot (H_1)$$

(NOTE EACH CORNER WHEN COMBINED WILL MAKE A PYRAMID).

$$V_{TOP} = 1/3 \times (L + 2(S_1 \cdot H_1))^2 \left(\frac{(L + 2(S_1 \cdot H_1))}{2} \times 0.04 \right)$$

(FOR THIS CALCULATION, ASSUME ALTITUDE HT = 4% of 1/2 WIDTH AND L = W.)

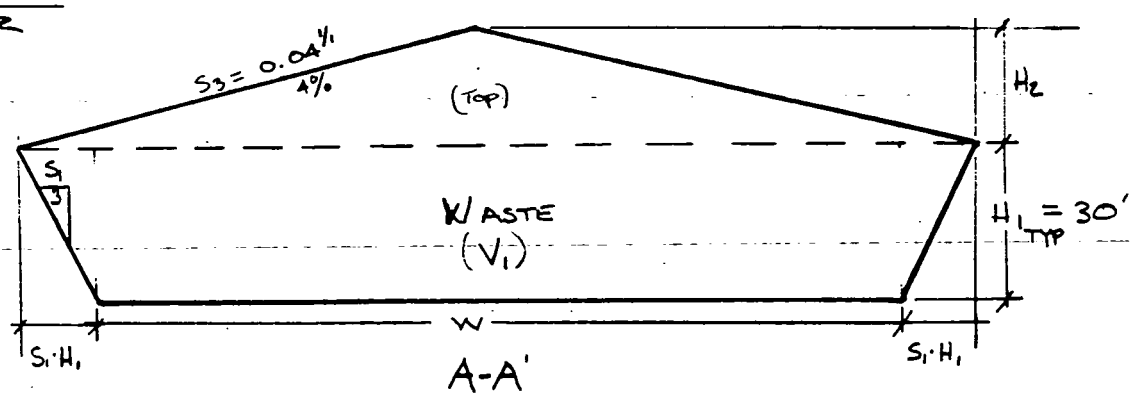
* NOTE THAT SIMPLIFING GEOMETRY ASSUMPTIONS ARE MADE TO OBTAIN APPROXIMATE QUANTITIES.

00048

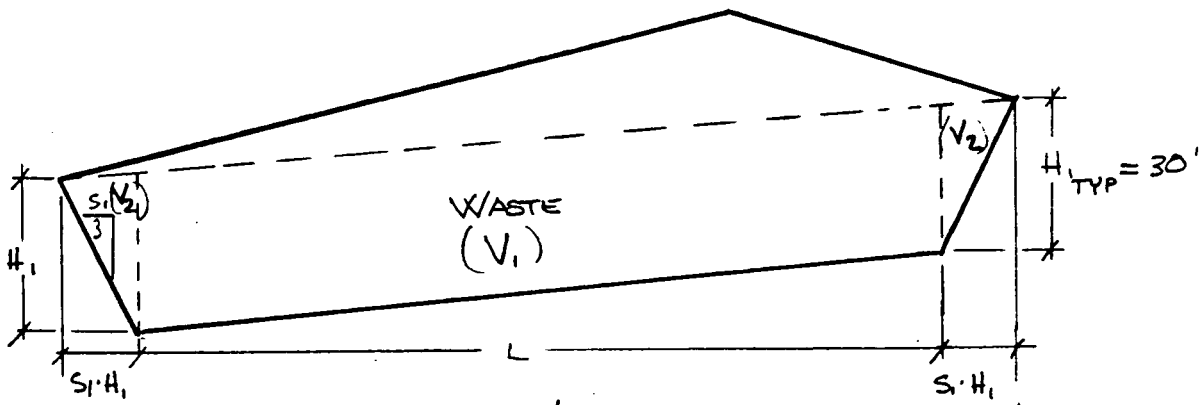
CLIENT		DEPARTMENT CRU2	
PROJECT		ORIGINATED BY KG	DATE 7-27-94
ENG. COMM. NO.	PROJECT NO.	CHECKED BY	DATE
AREA		REVISION NUMBER	DATE
SUBJECT ON-SITE DISPOSAL CELL ~ RESIDENT FARMER			SHEET / OF

ALT 6 (RESIDENT FARMER)

X-SECTIONS
w/o COVER



A-A'



B-B'

CALCULATIONS

The following calculations (LOTUS 1.2.3 File ONSDC6RF.WK3 A:) will generate a waste volume given W, L, H_1. This volume is to be compared to a given volume to see which W & L yields the closest value. (adjust the 1ST ROW values of W & L to make changes throughout this worksheet)

ALTERNATIVE 6 **Excavation and On-Site Disposal w/ Off-Site Disposal of Fraction Exceeding WAC (Resident Farmer) (10^{-5})**

Interior Waste Geometry (Based on Volume)

W = width of base
L = length of base
H = height of 3:1 interior slope
H2 = height of top = (0.5)*(W+(2*W2)*S1
S1 = top slope = 0.04 ft/ft
W2 = side slope top width
W2 = 90 ft

Divide all volumes by 27 cf/cy
(ave end area w/ top & bottom areas)

Volume 1 = L*((W+(W+(3*H)*2))/2)*H
Volume 2 = 2700*W
Volume 3 = 1/3*(S1*H*2)^2*H
Volume 4 = 1/3*(W+180)^2*(0.02*W+3.60) (assumes H2 = 4% of 1/2 W & W=L)

W	L	H	H2	V1	V2	V3	V4	Interior TOTAL (cy)	Dike (cy)	Interior + Dike (cy)
283	283	30	9.26	117,288	28,300	12,000	24,507	182,095	336,779	518,874
284	284	30	9.28	118,018	28,400	12,000	24,666	183,084	337,438	520,522
285	285	30	9.3	118,750	28,500	12,000	24,826	184,076	338,097	522,173
286	286	30	9.32	119,484	28,600	12,000	24,986	185,071	338,756	523,827
287	287	30	9.34	120,221	28,700	12,000	25,148	186,069	339,415	525,483
288	288	30	9.36	120,960	28,800	12,000	25,309	187,069	340,074	527,143
289	289	30	9.38	121,701	28,900	12,000	25,472	188,073	340,733	528,806
290	290	30	9.4	122,444	29,000	12,000	25,635	189,080	341,391	530,471
291	291	30	9.42	123,190	29,100	12,000	25,799	190,089	342,050	532,140
292	292	30	9.44	123,938	29,200	12,000	25,964	191,102	342,709	533,811
293	293	30	9.46	124,688	29,300	12,000	26,129	192,117	343,368	535,485
294	294	30	9.48	125,440	29,400	12,000	26,295	193,135	344,027	537,162
295	295	30	9.5	126,194	29,500	12,000	26,462	194,157	344,686	538,842
296	**296**	30	9.52	126,951	29,600	12,000	26,630	**195,181**	345,345	**540,526**
297	297	30	9.54	127,710	29,700	12,000	26,798	196,208	346,004	542,211
298	298	30	9.56	128,471	29,800	12,000	26,967	197,238	346,663	543,900
299	299	30	9.58	129,234	29,900	12,000	27,136	198,271	347,321	545,592
300	300	30	9.6	130,000	30,000	12,000	27,307	199,307	347,980	547,287
301	301	30	9.62	130,768	30,100	12,000	27,478	200,345	348,639	548,985
302	302	30	9.64	131,538	30,200	12,000	27,649	201,387	349,298	550,685
303	303	30	9.66	132,310	30,300	12,000	27,822	202,432	349,957	552,389
304	304	30	9.68	133,084	30,400	12,000	27,995	203,479	350,616	554,095
305	305	30	9.7	133,861	30,500	12,000	28,169	204,530	351,275	555,805
306	306	30	9.72	134,640	30,600	12,000	28,344	205,584	351,934	557,517
307	307	30	9.74	135,421	30,700	12,000	28,519	206,640	352,593	559,232
308	308	30	9.76	136,204	30,800	12,000	28,695	207,699	353,251	560,951

Note: See next Sheet for Dike Volume Calculations.

ALTERNATIVE 6 **Excavation and On-Site Disposal w/ Off-Site Disposal of Fraction Exceeding WAC (Resident Farmer) (10^{-6})**

Interior Waste Geometry (Based on Volume)

W = width of base
L = length of base
H = height of 3:1 interior slope
H2 = height of top = (0.5)*(W+(2*W2)*S1
S1 = top slope = 0.04 ft/ft
W2 = side slope top width
W2 = 90 ft

Divide all volumes by 27 cf/cy

Volume 1 = L*((W+(W+(3*H)*2))/2)*H (ave end area w/ top & bottom areas)
Volume 2 = 2700*W
Volume 3 = 1/3*(S1*H*2)^2*H
Volume 4 = 1/3*(W+180)^2*(0.02*W+3.60) (assumes H2 = 4% of 1/2 W & W=L)

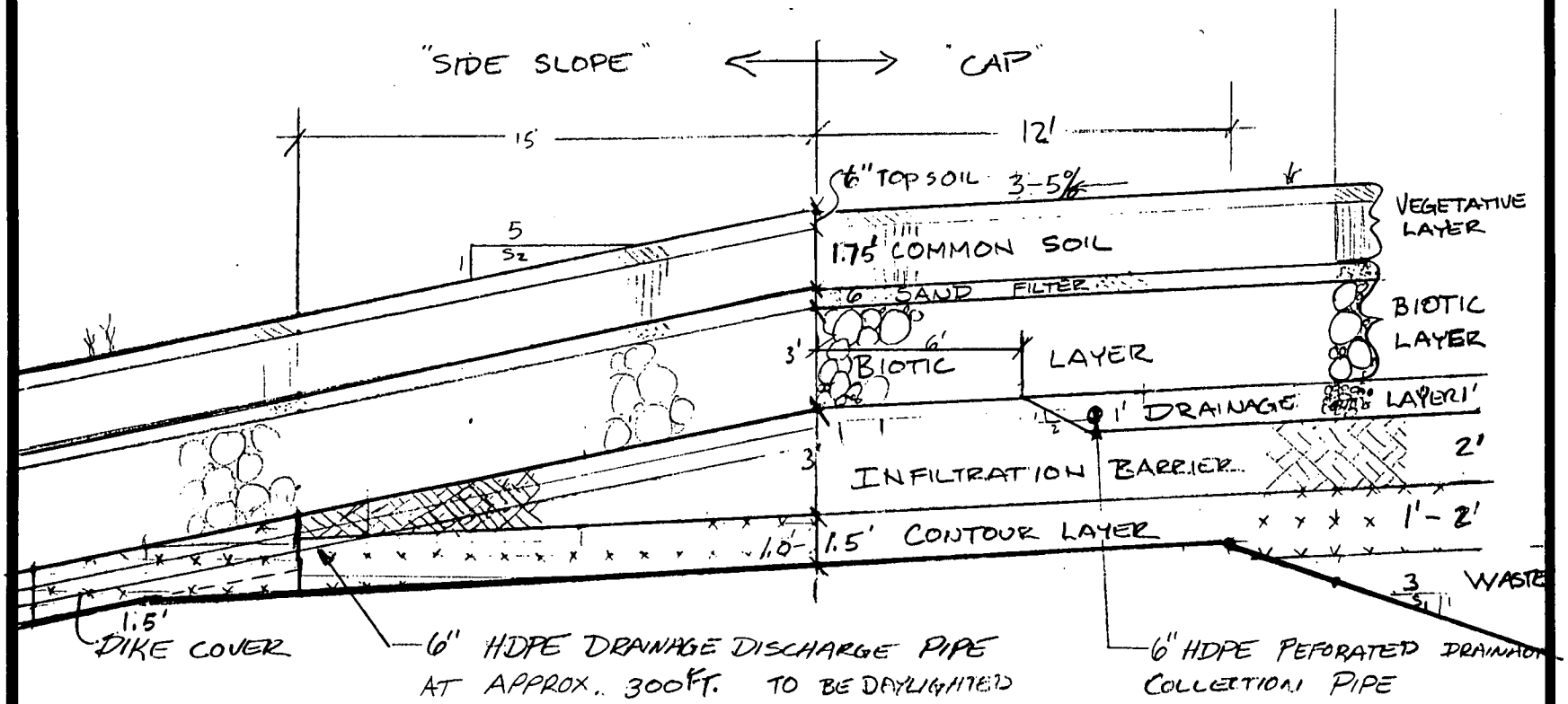
W	L	H	H2	V1	V2	V3	V4	Interior TOTAL (cy)	Dike (cy)	Interior + Dike (cy)
411	411	30	11.82	228,790	41,100	12,000	50,969	332,859	421,117	753,976
412	412	30	11.84	229,804	41,200	12,000	51,228	334,233	421,776	756,009
413	413	30	11.86	230,821	41,300	12,000	51,488	335,609	422,435	758,044
414	414	30	11.88	231,840	41,400	12,000	51,749	336,989	423,094	760,083
415	415	30	11.9	232,861	41,500	12,000	52,011	338,372	423,753	762,125
416	416	30	11.92	233,884	41,600	12,000	52,274	339,758	424,411	764,170
417	417	30	11.94	234,910	41,700	12,000	52,537	341,147	425,070	766,218
418	418	30	11.96	235,938	41,800	12,000	52,802	342,540	425,729	768,269
419	419	30	11.98	236,968	41,900	12,000	53,067	343,935	426,388	770,323
420	420	30	12	238,000	42,000	12,000	53,333	345,333	427,047	772,380
421	421	30	12.02	239,034	42,100	12,000	53,600	346,735	427,706	774,441
422	422	30	12.04	240,071	42,200	12,000	53,868	348,140	428,365	776,504
423	423	30	12.06	241,110	42,300	12,000	54,137	349,547	429,024	778,571
424	**424**	30	12.08	242,151	42,400	12,000	54,407	**350,958**	**429,683**	**780,641**
425	425	30	12.1	243,194	42,500	12,000	54,678	352,372	430,341	782,714
426	426	30	12.12	244,240	42,600	12,000	54,949	353,789	431,000	784,790
427	427	30	12.14	245,288	42,700	12,000	55,222	355,210	431,659	786,869
428	428	30	12.16	246,338	42,800	12,000	55,495	356,633	432,318	788,951
429	429	30	12.18	247,390	42,900	12,000	55,770	358,060	432,977	791,036
430	430	30	12.2	248,444	43,000	12,000	56,045	359,489	433,636	793,125
431	431	30	12.22	249,501	43,100	12,000	56,321	360,922	434,295	795,217
432	432	30	12.24	250,560	43,200	12,000	56,598	362,358	434,954	797,311
433	433	30	12.26	251,621	43,300	12,000	56,876	363,797	435,613	799,409
434	434	30	12.28	252,684	43,400	12,000	57,154	365,239	436,271	801,510
435	435	30	12.3	253,750	43,500	12,000	57,434	366,684	436,930	803,614
436	436	30	12.32	254,818	43,600	12,000	57,715	368,133	437,589	805,722

Note: See next Sheet for Dike Volume Calculations.

(GEOSYNTHETICS NOT SHOWN)

CAP / SIDE SLOPE DETAIL

n.t.s.



DIKE / BERM

(ASSUMES AVE. 15 pCi/g w/ < 56 pCi/g max.)

USED TO ILLUSTRATE DIMENSIONS FOR APPROXIMATE QUANTITIES.

ASSUMES SIMPLIFIED GEOMETRY TO OBTAIN APPROXIMATE QUANTITIES.

CLIENT
PROJECT ON-SITE DISPOSAL CELL
ENG. COMM. NO. PROJECT NO.
AREA
SUBJECT RESIDENT FARMER

DEPARTMENT CRU2
ORIGINATED BY K.G. DATE
CHECKED BY DATE
REVISION NUMBER DATE
REVISED BY

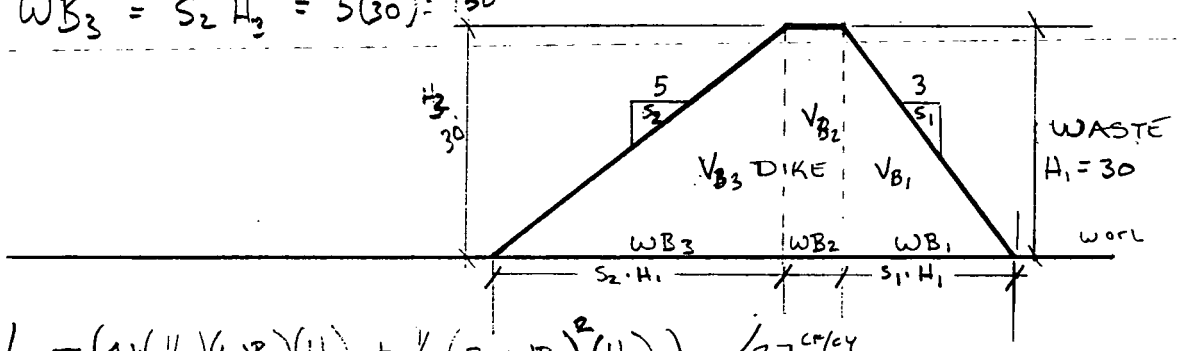
Form ES3-2 (2-90)

DIKE / BERM VOLUME

$WB_1 = S_1 \cdot H_1 = 3 \cdot 30' = 90'$

$WB_2 = 27'$ (see CAP/SIDE SLOPE DETAIL)

$WB_3 = S_2 H_3 = 5(30') = 150'$

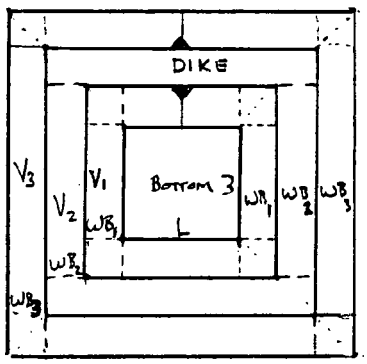


(COVER NOT SHOWN)

$$V_{B_1} = \left(4 \cdot L\left(\tfrac{1}{2}\right)(WB_1)(H_1) + \tfrac{1}{3}\left(2 \cdot WB_1\right)^2 (H_1)\right) / 27^{CY/CY}$$

$(L = W)$ $\quad$ (Σ Corners = pyramid w/ base $= (2 \cdot WB)^2$)

$$V_{B2} = \left(2 \cdot \left(\overset{L}{L + 2(WB_1) + 2(WB_2)}\right) \times \overset{W}{WB_2} \times \overset{H}{H_1} + 2\left(W + 2(WB_1)\right) \times WB_2 \times H_1\right) / 27$$



$$V_{B3} = \left(2 \cdot \left(L + 2(WB_1 + WB_2\right) \cdot \tfrac{1}{2}(WB_3)(H_1) + 2 \cdot \left(W + 2(WB_1 + WB_2)\right) \cdot \tfrac{1}{2}(WB_3)(H_1) + \tfrac{1}{3}\left(2 \cdot WB_3\right)^2 (H_3)\right) / 27$$

000494

CLIENT		DEPARTMENT CRU 2	
PROJECT		ORIGINATED BY KG	DATE
ENG. COMM. NO.	PROJECT NO.	CHECKED BY	DATE
AREA		REVISION NUMBER	DATE
SUBJECT ON-SITE DISPOSAL CELL ~		REVISED BY	

ALTERNATIVE 6 **Excavation and On-Site Disposal w/ Off-Site Disposal of Fraction Exceeding WAC (Resident Farmer) (10^{-5})**

BERM VOLUME OF ON-SITE DISPOSAL CELL

S1 =	3	3:1 interior side slope
S2 =	5	5:1 exterior side slope
H1 =	30	ft, height of interior berm
WB =		width of berm
WB1 =	90	ft, (S1*H1)
WB2 =	28.25	ft, assumed width, see sketch
WB3 =	150	ft, (S2*H1)
WB12 =	118.25	ft, WB1 + WB2

VB1 = 4*(L)*(1/2*WB1*H1)+1/3*(2*WB1)*H1
VB2 = ((2*(L+(2*WB1)+(2*WB2))*H1*WB1)+(2*(W+(2*WB1))*WB1*WB2))/27
VB3 = (((2*0.5*(L+(2*WB12))*WB3*H1)+(2*0.5*(W+(2*WB12))*WB3*H1)))+
+((1/3)*((2*WB3)^2)*(H1)))/27

W	L	H1	WB	H4	VB1	VB2	VB3	TOTAL (cy)
283	283	30	150	24	68,600	61,679	206,500	336,779
284	284	30	150	24	68,800	61,805	206,833	337,438
285	285	30	150	24	69,000	61,930	207,167	338,097
286	286	30	150	24	69,200	62,056	207,500	338,756
287	287	30	150	24	69,400	62,181	207,833	339,415
288	288	30	150	24	69,600	62,307	208,167	340,074
289	289	30	150	24	69,800	62,433	208,500	340,733
290	290	30	150	24	70,000	62,558	208,833	341,391
291	291	30	150	24	70,200	62,684	209,167	342,050
292	292	30	150	24	70,400	62,809	209,500	342,709
293	293	30	150	24	70,600	62,935	209,833	343,368
294	294	30	150	24	70,800	63,060	210,167	344,027
295	295	30	150	24	71,000	63,186	210,500	344,686
296	296	30	150	24	71,200	63,311	210,833	345,345
297	297	30	150	24	71,400	63,437	211,167	346,004
298	298	30	150	24	71,600	63,563	211,500	346,663
299	299	30	150	24	71,800	63,688	211,833	347,321
300	300	30	150	24	72,000	63,814	212,167	347,980
301	301	30	150	24	72,200	63,939	212,500	348,639
302	302	30	150	24	72,400	64,065	212,833	349,298
303	303	30	150	24	72,600	64,190	213,167	349,957
304	304	30	150	24	72,800	64,316	213,500	350,616
305	305	30	150	24	73,000	64,441	213,833	351,275
306	306	30	150	24	73,200	64,567	214,167	351,934
307	307	30	150	24	73,400	64,693	214,500	352,593
308	308	30	150	24	73,600	64,818	214,833	353,251

NOTE: The formulas assume some simplification of the geometry of the cell. See sketches.
The cap is assumed to be a pyramid.

ALTERNATIVE 6 **Excavation and On-Site Disposal w/ Off-Site Disposal of Fraction Exceeding WAC (Resident Farmer) (10^{-6})**

BERM VOLUME OF ON-SITE DISPOSAL CELL

S1 =	3	3:1 interior side slope
S2 =	5	5:1 exterior side slope
H1 =	30	ft, height of interior berm
WB =		width of berm
WB1 =	90	ft, (S1*H1)
WB2 =	28.25	ft, assumed width, see sketch
WB3 =	150	ft, (S2*H1)
WB12 =	118.25	ft, WB1 + WB2

VB1 = 4*(L)*(1/2*WB1*H1)+1/3*(2*WB1)*H1

VB2 = ((2*(L+(2*WB1)+(2*WB2))*H1*WB1)+(2*(W+(2*WB1))*WB1*WB2))/27

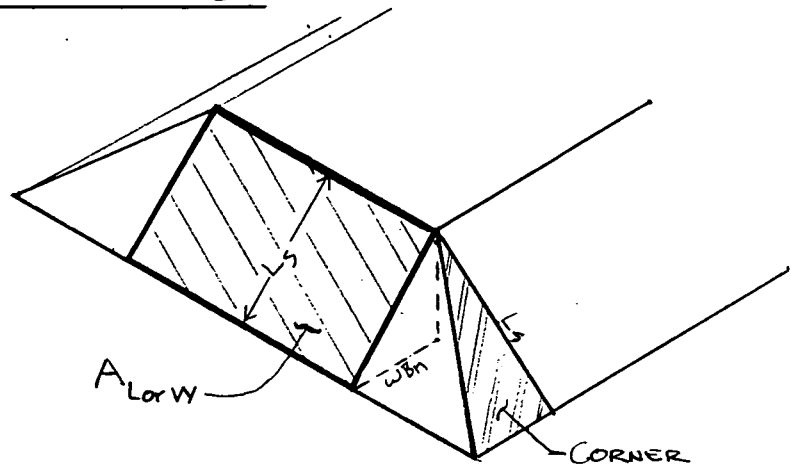
VB3 = (((2*0.5*(L+(2*WB12))*WB3*H1)+(2*0.5*(W+(2*WB12))*WB3*H1)))+
+((1/3)*((2*WB3)^2)*(H1)))/27

W	L	H1	WB	H4	VB1	VB2	VB3	TOTAL (cy)
411	411	30	150	24	94,200	77,750	249,167	421,117
412	412	30	150	24	94,400	77,876	249,500	421,776
413	413	30	150	24	94,600	78,001	249,833	422,435
414	414	30	150	24	94,800	78,127	250,167	423,094
415	415	30	150	24	95,000	78,253	250,500	423,753
416	416	30	150	24	95,200	78,378	250,833	424,411
417	417	30	150	24	95,400	78,504	251,167	425,070
418	418	30	150	24	95,600	78,629	251,500	425,729
419	419	30	150	24	95,800	78,755	251,833	426,388
420	420	30	150	24	96,000	78,880	252,167	427,047
421	421	30	150	24	96,200	79,006	252,500	427,706
422	422	30	150	24	96,400	79,131	252,833	428,365
423	423	30	150	24	96,600	79,257	253,167	429,024
424	**424**	30	150	24	96,800	79,383	253,500	**429,683**
425	425	30	150	24	97,000	79,508	253,833	430,341
426	426	30	150	24	97,200	79,634	254,167	431,000
427	427	30	150	24	97,400	79,759	254,500	431,659
428	428	30	150	24	97,600	79,885	254,833	432,318
429	429	30	150	24	97,800	80,010	255,167	432,977
430	430	30	150	24	98,000	80,136	255,500	433,636
431	431	30	150	24	98,200	80,261	255,833	434,295
432	432	30	150	24	98,400	80,387	256,167	434,954
433	433	30	150	24	98,600	80,513	256,500	435,613
434	434	30	150	24	98,800	80,638	256,833	436,271
435	435	30	150	24	99,000	80,764	257,167	436,930
436	436	30	150	24	99,200	80,889	257,500	437,589

NOTE: The formulas assume some simplification of the geometry of the cell. See sketches. The cap is assumed to be a pyramid.

000435

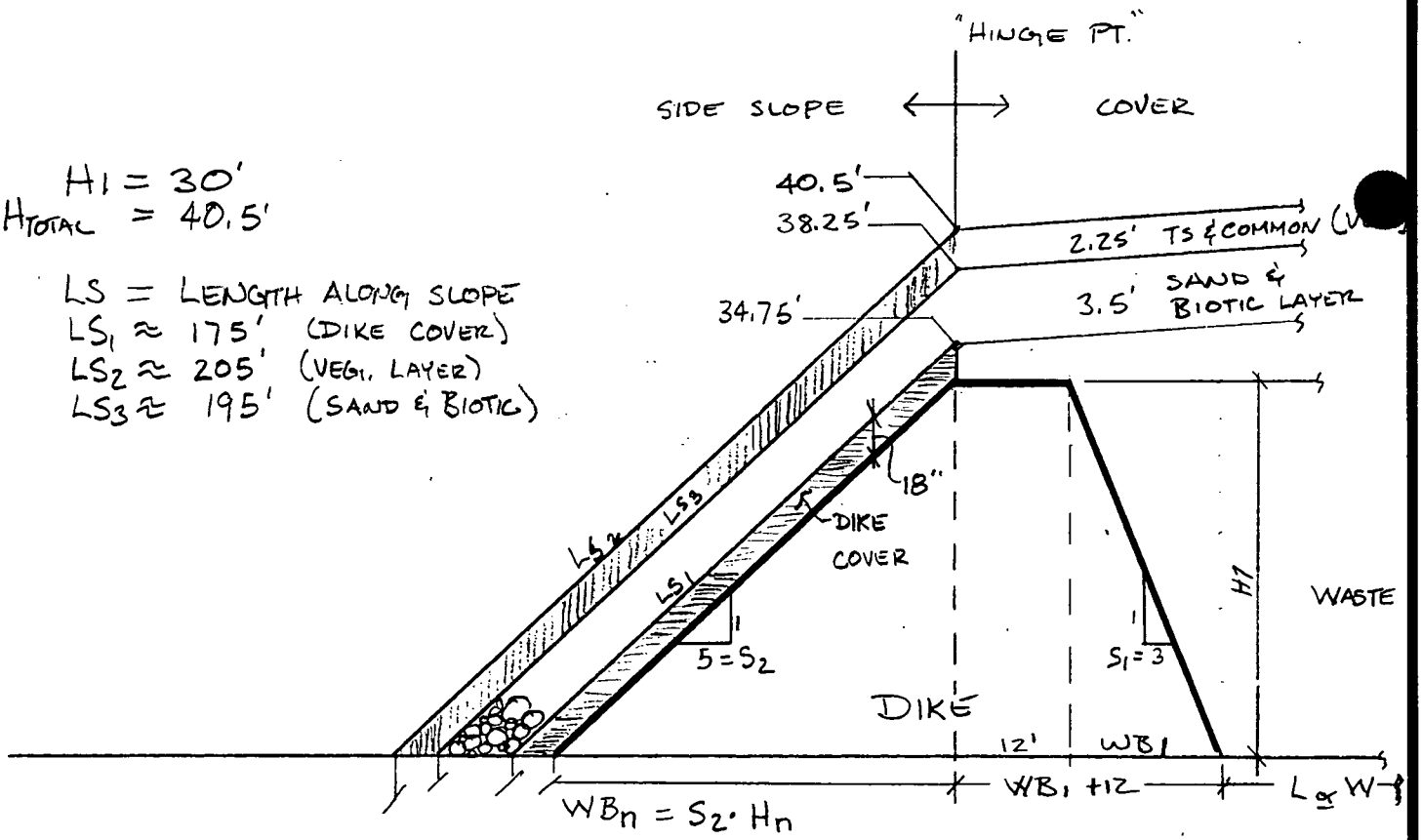
SLOPE QUANTITIES



ISOMETRIC w/o TOP n.t.s.

$H_1 = 30'$
$H_{TOTAL} = 40.5'$

LS = LENGTH ALONG SLOPE
$LS_1 \approx 175'$ (DIKE COVER)
$LS_2 \approx 205'$ (VEG. LAYER)
$LS_3 \approx 195'$ (SAND & BIOTIC)



SECTION n.t.s.

ASSUME THIS COVER GEOMETRY TO SIMPLIFY QUANTITY CALCULATIONS

000497

CLIENT		DEPARTMENT CRU 2	
PROJECT		ORIGINATED BY KG	DATE 8-5-94
ENG. COMM. NO.	PROJECT NO.	CHECKED BY	DATE
AREA		REVISION NUMBER	DATE
SUBJECT ON-SITE DISPOSAL CELL		REVISED BY	

Form E53-2 (2-90)

ALTERNATIVE 6 **Excavation and On-Site Disposal w/ Off-Site Disposal of Fraction Exceeding WAC (Resident Farmer) (10^{-5})** **5861**

SLOPE, COVER, AND LINER QUANTITIES

Given:

W =	296	ft	From Waste Geometry Calculations
L =	296	ft	From Waste Geometry Calculations
H1 =	30	ft	Waste/Dike Ht.
Hb =	38.25	ft	height of sand/biotic layer HTotal-Veg
HTotal =	40.5	ft	height at hinge point (+/-)
LS1 =	175	ft	(slope length rounded up for dike cover)
LS2 =	205	ft	(slope length rounded up for vegetative layers)
LS3 =	195	ft	(slope length rounded up for sand & biotic)
S1 =	3 : 1		
S2 =	5 : 1		
WB1 =	90	ft	S1*H1
WB2 =	28.25	ft	(width at top of berm see sketch)
WB1+12 =	102	ft	= S1*H1 + 12' see sketch
WB2-12 =	16.25	ft	(see sketch)
DC1 =	1.5	ft	Dike Cover
DC2 =	1.75	ft	Common Soil
DC3 =	0.5	ft	Top Soil and Sand Filter
DC4 =	3	ft	Biotic Layer

DIKE COVER

AREA AL = LS1*(L+2(WB1+12))
AREA AL = 87,500 sf 2*AL = 175,000 sf

AREA AW =LS1*(W+2(WB1+12))
AREA AW = 87,500 sf 2*AW = 175,000 sf

AREA C = "Corner Area" = 1/2*LS*LH
AREA C = 2,250 sf 8*AREA C = 18,000 sf
Subtotal = 350,000 sf 38,889 sy

DIKE COVER VOLUME = AREA * DC1 = 525,000 cf 19,444 cy

COMMON SOIL & TOP SOIL

AREA AL = LS2*(L+2(WB1+12))
AREA AL = 102,500 sf 2*AL = 205,000 sf

AREA AW =LS2*(W+2(WB1+12))
AREA AW = 102,500 sf 2*AW = 205,000 sf

AREA C = "Corner Area" = 1/2*LS*LH
AREA C = 20,756 sf 8*AREA C = 166,050 sf
Subtotal = 576,050 sf

COMMON SOIL VOLUME = AREA * DC2 = 1,008,088 cf 37,337 cy

TOP SOIL VOLUME = AREA * DC3 = 288,025 cf 10,668 cy

ALTERNATIVE 6 **Excavation and On-Site Disposal w/ Off-Site Disposal of Fraction Exceeding WAC (Resident Farmer) (10^{-5})**

SLOPE, COVER, AND LINER QUANTITIES – Con't

SAND & BIOTIC LAYERS

AREA AL = LS3*(L+2(WB1+12))
AREA AL = 97,500 sf 2*AL = 195,000 sf

AREA AW =LS3*(W+2(WB1+12))
AREA AW = 97,500 sf 2*AW = 195,000 sf

AREA C = "Corner Area" = 1/2*LS*LH
AREA C = 18,647 sf 8*AREA C = 149,175 sf
Subtotal = 539,175 sf

BIOTIC LAYER VOLUME	=	AREA * DC4 =	1,617,525	cf	59,908 cy
SAND LAYER VOLUME	=	AREA * DC3 =	269,588	cf	9,985 cy

Cap area, assume pyramid, and L = W

Base = L+2(WB1+12)
Base = 500 ft
altitude = slope length = (((base/2)*4%) ^ 2+(base/2) ^ 2) ^ 0.5
Alt = 250.2 ft
Cap Area = 1/2*(base)*(altitude)*4 sides/(9sf/sy)
Cap Area = 27,800 sy

Liner area, assume L = W

AreaL = ((L+2(WB1+12+(Hb-(DC3+DC4))*S2)) ^ 2)/(9sf/sy)
AreaL = 79,806 sy

ALTERNATIVE 6 **Excavation and On-Site Disposal w/ Off-Site Disposal of Fraction Exceeding WAC (Resident Farmer) (10^{-5})**

SLOPE, COVER, AND LINER QUANTITIES - Con't

1. 540,000 cy = Design Capacity (waste including dike)

2. 353,100 cy = Volume of soil (Fill & Till) w/ ave. U238 approx. 15 pCi/g (56 pCi/g max) available from excav.
   54,000 cy = additional excavation volume
   407,100 cy = Total available soil for dike

3.a. 132,900 cy = Minimum Interior cell volume required (Item 1 - Item 2)
   424 ft From above calculations, bottom L & W will yield the following:

b. 540,526 cy Total Volume (Interior + Dike)
c. 195,181 cy Total Interior Volume Available (>132,900 cy therefore OK)
d. 345,345 cy Total Berm Volume
e. 62,281 cy Interior Volume available for Excess soil (3c-3a)

4. 79,806 sy = Liner Area (bottom + dike bottom width) ^ 2 / 9

5. 27,800 sy = Cap Area (top slope only)

6. 19,444 cy = Dike Cover (Clean Borrow) see above sheet

7. 37,337 cy = Vegetative Cover (Common Soil, 18" thick) on 5:1 slope

8. 10,668 cy = Top Soil (6" thick) on 5:1 slope

ALTERNATIVE 6 **Excavation and On-Site Disposal w/ Off-Site Disposal of Fraction Exceeding WAC (Resident Farmer) (10^{-6})**

SLOPE, COVER, AND LINER QUANTITIES

Given:

W =	424	ft	From Waste Geometry Calculations
L =	424	ft	From Waste Geometry Calculations
H1 =	30	ft	Waste/Dike Ht.
Hb =	38.25	ft	height of sand/biotic layer HTotal-Veg
HTotal =	40.5	ft	height at hinge point (+/-)
LS1 =	175	ft	(slope length rounded up for dike cover)
LS2 =	205	ft	(slope length rounded up for vegetative layers)
LS3 =	195	ft	(slope length rounded up for sand & biotic)
S1 =	3 : 1		
S2 =	5 : 1		
WB1 =	90	ft	S1*H1
WB2 =	28.25	ft	(width at top of berm see sketch)
WB1+12 =	102	ft	= S1*H1 + 12' see sketch
WB2-12 =	16.25	ft	(see sketch)
DC1 =	1.5	ft	Dike Cover
DC2 =	1.75	ft	Common Soil
DC3 =	0.5	ft	Top Soil and Sand Filter
DC4 =	3	ft	Biotic Layer

DIKE COVER

AREA AL = LS1*(L+2(WB1+12))
AREA AL = 109,900 sf 2*AL = 219,800 sf

AREA AW =LS1*(W+2(WB1+12))
AREA AW = 109,900 sf 2*AW = 219,800 sf

AREA C = "Corner Area" = 1/2*LS*LH
AREA C = 2,250 sf 8*AREA C = 18,000 sf
Subtotal = 439,600 sf 48,844 sy

DIKE COVER VOLUME = AREA * DC1 = 659,400 cf 24,422 cy

COMMON SOIL & TOP SOIL

AREA AL = LS2*(L+2(WB1+12))
AREA AL = 128,740 sf 2*AL = 257,480 sf

AREA AW =LS2*(W+2(WB1+12))
AREA AW = 128,740 sf 2*AW = 257,480 sf

AREA C = "Corner Area" = 1/2*LS*LH
AREA C = 20,756 sf 8*AREA C = 166,050 sf
Subtotal = 681,010 sf

COMMON SOIL VOLUME = AREA * DC2 = 1,191,768 cf 44,140 cy

TOP SOIL VOLUME = AREA * DC3 = 340,505 cf 12,611 cy

ALTERNATIVE 6 **Excavation and On-Site Disposal w/ Off-Site Disposal of Fraction Exceeding WAC (Resident Farmer) (10^{-6})** **5861**

SLOPE, COVER, AND LINER QUANTITIES - Con't

SAND & BIOTIC LAYERS

AREA AL = LS3*(L+2(WB1+12))
AREA AL = 122,460 sf 2*AL = 244,920 sf

AREA AW =LS3*(W+2(WB1+12))
AREA AW = 122,460 sf 2*AW = 244,920 sf

AREA C = "Corner Area" = 1/2*LS*LH
AREA C = 18,647 sf 8*AREA C = 149,175 sf
Subtotal = 639,015 sf

BIOTIC LAYER VOLUME	=	AREA * DC4 =	1,917,045	cf	71,002 cy
SAND LAYER VOLUME	=	AREA * DC3 =	319,508	cf	11,834 cy

Cap area, assume pyramid, and L = W

Base = L+2(WB1+12)
Base = 628 ft
altitude = slope length = (((base/2)*4%) ^ 2+(base/2) ^ 2) ^ 0.5
Alt = 314.3 ft
Cap Area = 1/2*(base)*(altitude)*4 sides/(9sf/sy)
Cap Area = 43,855 sy

Liner area, assume L = W

AreaL = ((L+2(WB1+12+(Hb-(DC3+DC4))*S2)) ^ 2)/(9sf/sy)
AreaL = 105,733 sy

ALTERNATIVE 6 **Excavation and On-Site Disposal w/ Off-Site Disposal of Fraction Exceeding WAC (Resident Farmer) (10^{-6})**

SLOPE, COVER, AND LINER QUANTITIES - Con't

1. 780,000 cy = Design Capacity (waste including dike)

2. 519,500 cy = Volume of soil (Fill & Till) w/ ave. U238 approx. 15 pCi/g (56 pCi/g max) available from excav.
   73,600 cy = additional excavation volume
   593,100 cy = Total available soil for dike

3.a. 186,900 cy = Minimum Interior cell volume (Item 1 - Item 2)
   424 ft From above calculations, bottom L & W will yield the following:

b. 780,641 cy Total Volume (Interior + Dike)
c. 350,958 cy Total Interior Volume Available (>186,900 cy therefore OK)
d. 429,683 cy Total Berm Volume
e. 164,058 cy Interior Volume available for Excess soil (3c-3a)

4. 105,733 sy = Liner Area (bottom + dike bottom width) ^ 2 / 9

5. 43,855 sy = Cap Area (top slope only)

6. 24,422 cy = Dike Cover (Clean Borrow) see above sheet

7. 44,140 cy = Vegetative Cover (Common Soil, 18" thick) on 5:1 slope

8. 12,611 cy = Top Soil (6" thick) on 5:1 slope

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08/08/94 am

ON-SITE DISPOSAL CELL FOR ALTERNATIVE 5 (RESIDENT FARMER)

ALTERNATIVE 6: EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WAC
RECEPTOR: RESIDENT FARMER

CLEAR & GRUB AREA = 60 AC
STAGING AREA = 670 CY
TOTAL # OF WELLS = 32
TOTAL LINER AREA = 105,733 SY
TOTAL CAP AREA = 43,855 SY

SUBUNIT	WASTE* VOLUME TO CELL (CY)	PERCENT OF TOTAL WASTE VOLUME	CELL LINER: LINER AREA (SY)	CELL LINER: CLAY QUANTITY (CY)	CELL LINER: PEA GRAVEL (CY)	CELL CAP: CAP AREA (SY)	CELL CAP: CONTOURING LAYER (CY)	CELL CAP: CLAY CAP (CY)	CELL CAP: COMMON SOIL (CY)	CELL CAP: TOP SOIL (CY)	CELL CAP: PEA GRAVEL (CY)	CELL CAP: COBBLES (CY)	CELL CAP: SAND LAYER (CY)	NUMBER OF MONITORING WELLS
SWL	115,200	15	15,860	15,860	5,234	6,578	3,289	4,407	3,815	1,118	2,171	6,578	1,118	5
LSP	92,800	12	12,688	12,688	4,187	5,263	2,631	3,526	3,052	895	1,737	5,263	895	4
IFP	110,900	14	14,803	14,803	4,885	6,140	3,070	4,114	3,561	1,044	2,026	6,140	1,044	4
SF	376,400	48	50,752	50,752	16,748	21,050	10,525	14,104	12,209	3,579	6,947	21,050	3,579	15
AFP	85,400	11	11,631	11,631	3,838	4,824	2,412	3,232	2,798	820	1,592	4,824	820	4
TOTAL	780,700	100	105,733	105,733	34,892	43,855	21,928	29,383	25,436	7,455	14,472	17,981	3,057	32

* WASTE VOLUME = REMEDIATION VOLUME + ADDITIONAL EXCAVATION REQUIRED TO REMOVE REMEDIATION VOLUME**
+ 3,000 CY OF GENERATED WASTE (15,000 CY/5 = 3,000 CY)

** 14% FOR SWL AND 10% FOR LSP, IFP, SF, AND AFP

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ON-SITE DISPOSAL CELL FOR ALTERNATIVE 6 (RESIDENT FARMER) (PAGE 2 OF 2)

ALTERNATIVE 6: EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WAC

RECEPTOR: RESIDENT FARMER

FENCE	=	7,000 LF
6" PERFORATED PIPE	=	8,000 LF
6/10 HDPE PIPE TO AWWT	=	3,500 LF
HDPE MANHOLES	=	10

BORROW FOR DIKE	=	0 CY
DIKE COVER	=	24,422 CY
VEGETATIVE ZONE	=	0 CY
TOP SOIL	=	0 CY

GEOTEXTILE	=	71,002 SY
COBBLES	=	71,002 CY
SAND	=	0 CY
DRAINAGE PIPE	=	9,000 LF

		LEACHATE COLLECTION SYSTEM				SIDE SLOPE DIKE							
SUBUNIT	PERCENT OF TOTAL WASTE VOLUME	6" PIPE PERFORATED (LF)	10/6-HDPE PIPE TO AWWT (CY)	MANHOLES (EA)	FENCE (LF)	BORROW FOR DIKE (CY)	DIKE COVER (CY)	VEGETATIVE ZONE (CY)	TOP SOIL (CY)	GEOTEXTILE (SY)	COBBLES (CY)	SAND LAYER (CY)	DRAINAGE PIPE (LF)
SWL	15	1,200	525	1	1050	0	3,663	0	0	10,650	10,650	0	1,350
LSP	12	960	420	1	840	0	2,931	0	0	8,520	8,520	0	1,080
IFP	14	1,120	490	2	980	0	3,419	0	0	9,940	9,940	0	1,260
SF	48	3,840	1,680	4	3360	0	11,723	0	0	34,081	34,081	0	4,320
AFP	11	880	385	2	770	0	2,686	0	0	7,810	7,810	0	990
TOTAL	100	8,000	3,500	10	7,000	0	24,422	0	0	71,002	71,002	0	9,000

000505

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APPENDIX E.4

PERCHED GROUNDWATER COLLECTION AND CONTROL

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APPENDIX E.4

PERCHED GROUNDWATER COLLECTION AND CONTROL

Alternatives involving consolidation and capping at the South Field include provisions for passive perched water collection and treatment at the AWWT facility. Perched groundwater at all the subunits will require control during the construction period. The following sections describe groundwater collection and control measures applicable for these requirements.

E.4.1 PASSIVE PERCHED WATER COLLECTION AT SOUTH FIELD AREA

Long-term perched groundwater collection will be provided by a downgradient subsurface drain consisting of a trench backfilled with granular material located along the southeast and southwest facing sides of the facility. The 1,800 foot total length of trench will be divided into three segments with centrally located sumps. The trench will be 3 feet wide and vary in depth. Bottom of trench elevation will range from El 560 to El 557 to provide gravity drainage to the sumps. A typical section of the trench is shown in the attached calculation package.

The trench bottom elevations were established so that the trench would extend a minimum of 1 foot below the base of the natural sand layer encountered throughout the area between El 564 and El 561. (See Figures 3-6 through 3-10 for cross sections of the sand layer). A 6-inch diameter perforated pipe wrapped with a nonwoven geotextile will be placed in the trench prior to backfilling to increase the flow capacity of the trench. Provisions will be made for intermediate risers along the length of the trench to allow for cleanout and flushing of the system. Ten feet of fine concrete aggregate (ASTM C-33) will be placed in the bottom of the trench to form the primary interception zone. Select sand backfill will be placed above the primary interception zone to within 3 feet of the ground surface. Clay will be placed in the top 3 feet of the trench to prevent the infiltration of surface water.

Flow rates along the trench will be several orders of magnitude greater than through native soil on the downgradient side of the trench. However, to provide a higher degree of cutoff, a downgradient liner consisting of 40 mil HDPE is included. Figure E.4-1 details the typical trench section.

Sumps will consist of a 12-inch diameter riser slotted and wrapped with a nonwoven geotextile over the bottom 10 feet with a submersible pump. Each sump will drain approximately 600 linear feet of trench. A typical section at the sump location is shown in the attached calculation package. Initial

000507

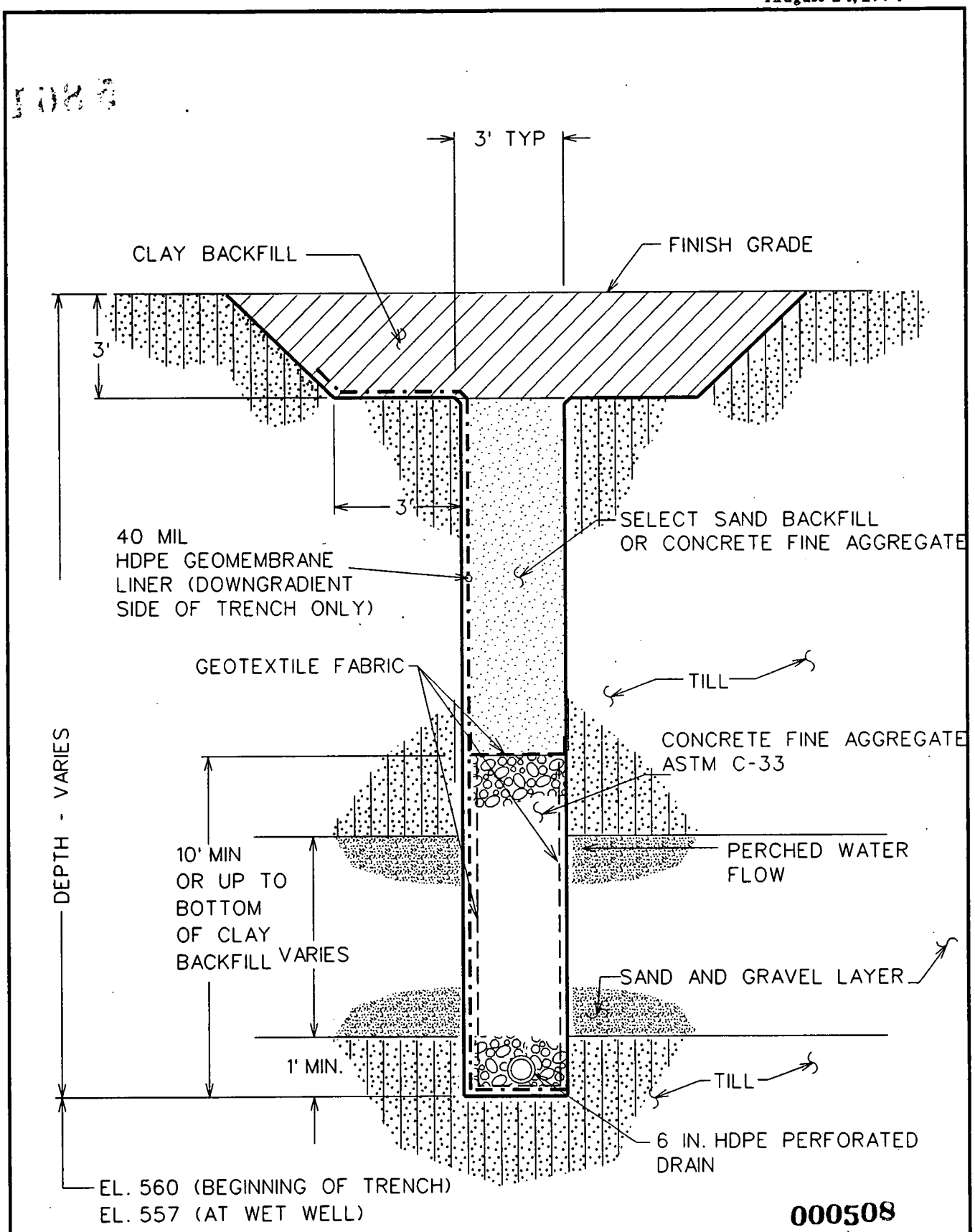

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FIGURE E.4-1
TYPICAL SECTION - SUBSURFACE DRAIN

5861

computed flow rate from each 600-foot trench segment is on the order of 5 to 7 gpm. Steady-state flow rate will be about 2 to 3 gpm. Following periods of heavy rain, flow rate will increase to 3 to 4 gpm. Water from the sumps will be pumped to a sedimentation/holding tank before being sent to the AWWT facility.

The sedimentation/holding tank will be partitioned into three sections with a capacity of 10,000 gallons each. This capacity will provide a 24 hour hold time for sedimentation during steady-state flow from all three trench segments. Section 1 will receive water from the trenches during periods of steady-state flow. A weir will decant water into Section 2 where it will be continuously pumped to the AWWT facility. During peak flows, such as startup, the discharge from the trenches may have to be piped to both Sections 1 and 3 if the water cannot be pumped from the sedimentation tank to the AWWT facility. Section 3 will be used in place of Section 1 when sediment is being removed from Section 1. The sediment will be screened prior to removal and disposed of appropriately. Additionally, Section 3 can be used as a secondary sedimentation tank for surface runoff while material is being placed in the consolidation/capping area. A schematic of the tank setup is shown in the attached calculation package. Flow into the tank at startup of the interceptor trench and after extended periods of rain will be about 12 to 18 gpm. Steady-state flow should average about 8 gpm. All piping will be 2-inch PVC.

E.4.2 EXCAVATION-PERIOD GROUNDWATER CONTROL

E.4.2.1 Solid Waste Landfill

The highest recorded perched water levels in the Solid Waste Landfill range from El 580 (east) to El 575 (west) across the site. Excavation levels over all but a limited area near the south and southwest portion of the site will be above these elevations. Therefore, excavation "in the dry" can be expected. The bottom of the excavation should be sloped to a sump to collect rainwater.

In the south and southeast portion of the site, excavation below the perched water level can proceed with the bottom of the excavation sloped to a sump to collect any water seeping through the side walls or from the bottom. The sump can also be used to collect rainwater falling into the excavation. Due to the low hydraulic conductivity of the soils in this area, seepage volumes are expected to be small. The excavation can continue to El 568 without the risk of "blow out" of the bottom due to the proximity of the intermediate sand layer (at El 562) in the glacial overburden.

000509

The excavation will need to extend to at least El 564 in the southeast corner of the site. Several pressure relief wells can be advanced into the sand at the perimeter of this excavation or other excavations extending deeper than El 568 prior to digging. These wells can be pumped if the excavation has to extend into or through the sand. Individual wells will have flows of about 0.25 to 0.3 gpm.

E.4.2.2 Lime Sludge Ponds

The highest recorded perched water levels at the Lime Sludge Ponds range from El 574 (east) to El 572 (west) across the site. Excavation levels over all but a limited area near the southwest portion of the South Pond will be to about El 570. Excavation to El 568 can be made without the risk of "blow out" of the bottom due to the proximity of the intermediate sand layer (at El 562) in the glacial overburden. Excavation below the perched water level can proceed with the bottom of the excavation sloped to a sump to collect any water seeping through the side walls or bottom. The sump can also be used to collect rainwater falling into the excavation. Due to the low hydraulic conductivity of the soils in this area, seepage volumes are expected to be small.

In the southwest portion of the South Pond the excavation needs to extend to at least El 568; however, the intermediate sand is at El 566. Several pressure relief wells can be advanced into the sand prior to advancing the excavation. These wells can be pumped if the excavation has to extend into or through the sand. Individual wells will have flows of about 0.25 to 0.3 gpm.

E.4.2.3 Inactive Flyash Pile

Perched water in the Inactive Flyash Pile is expected to accumulate at the interface of the fill material and the underlying glacial overburden. Therefore, no pre-excavation dewatering is planned. Pockets of waterbearing materials are expected to be encountered as excavation proceeds. The limited amounts of water in these zones can be handled by sloping the bottom of the excavation to a sump and pumping from that location. The sump can also be used to collect rainwater falling into the excavation.

E.4.2.4 South Field

The highest recorded perched water levels in the South Field range from El 555 to El 570. Ground-surface elevation over most of the area is El 575. Therefore, depending on location, excavation "in the dry" to depths of 5 to 15 feet can be expected. Excavation below the perched water level can

proceed with the bottom of the excavation sloped to a sump to collect any water seeping through the side walls or from the bottom. The sump can also be used to collect rainwater falling into the excavation. Due to the low hydraulic conductivity of the soils in this area, seepage volumes are expected to be small.

E.4.2.5 Active Flyash Pile

Perched water in the Active Flyash Pile is expected to accumulate at the interface of the fill material and the underlying glacial overburden. Therefore, no pre-excavation dewatering is planned. Pockets of waterbearing materials are expected to be encountered as excavation proceeds. The limited amounts of water in these zones can be handled by sloping the bottom of the excavation to a sump and pumping from that location. The sump can also be used to collect rainwater falling into the excavation.

E.4.3 CALCULATIONS (calculations begin on following page)

CALCULATION WORKSHEET Order No. 19116 (01-91)

CLIENT	JOB NUMBER		
DOE	—		
SUBJECT: INTERCEPTOR TRENCHES			
BASED ON: —	DRAWING NUMBER		
BY: T Albers	CHECKED BY: WJO	APPROVED BY	DATE: 15 MARCH 1994

TYPICAL INTERCEPTOR TRENCH FLOW CALCULATION

FLOW FROM INTERCEPTOR TRENCH – LONG TERM NORMAL FLOW

$$\frac{Q}{x} = \frac{K(H^2 - h^2)}{2(1440\,\text{min})(L)}$$

WHERE:
- L = RADIUS OF INFLUENCE, FT
- K = HYDRAULIC CONDUCTIVITY (1×10^{-4} cm/sec OR 2.13 gpd/ft^2)
- H = WATER HEIGHT IN FREE FIELD, FT
- h = WATER HEIGHT AT TRENCH, FT

$$\frac{Q}{x} = \frac{2.13(10^2 - 0^2)}{2(1440)(20)}$$

$$= 3.7 \times 10^{-3}\ \text{gpm/ft}$$ (unconfined one sided flow)

FLOW FROM INTERCEPTOR TRENCH – INITIAL DRAWDOWN NORMAL

$$\frac{Q}{x}(D) = 2 \times \frac{Q}{x}\,(\text{single side})$$

$$= 7.4 \times 10^{-3}\ \text{gpm/ft}$$

NOTE: HIGH WATER LEVEL INCREASES H TO 15' FOR PERIODS AFTER LONG PERIODS OF RAIN

$$\frac{Q}{x} = \frac{2.13(15^2 - 0^2)}{2(1440)(20)} = 8 \times 10^{-3}\ \text{gpm/ft}$$

FOR DRAWDOWN, USE $2\left(\frac{Q}{x}\ \text{single side}\right)$

$$\frac{Q}{x}(D) = 2 \times (8 \times 10^{-3}\ \text{gpm/ft})$$
$$= 1.6 \times 10^{-2}\ \text{gpm/ft}$$

000512

CALCULATION WORKSHEET Order No. 19116 (01-91) 5861 PAGE 2 OF

CLIENT DOE		JOB NUMBER	
SUBJECT INTERCEPTOR TRENCH			
BASED ON		DRAWING NUMBER	
BY T Allen	CHECKED BY WJO	APPROVED BY	DATE 15 MARCH 1994

FOR 600 FT TRENCH SEGMENTS:

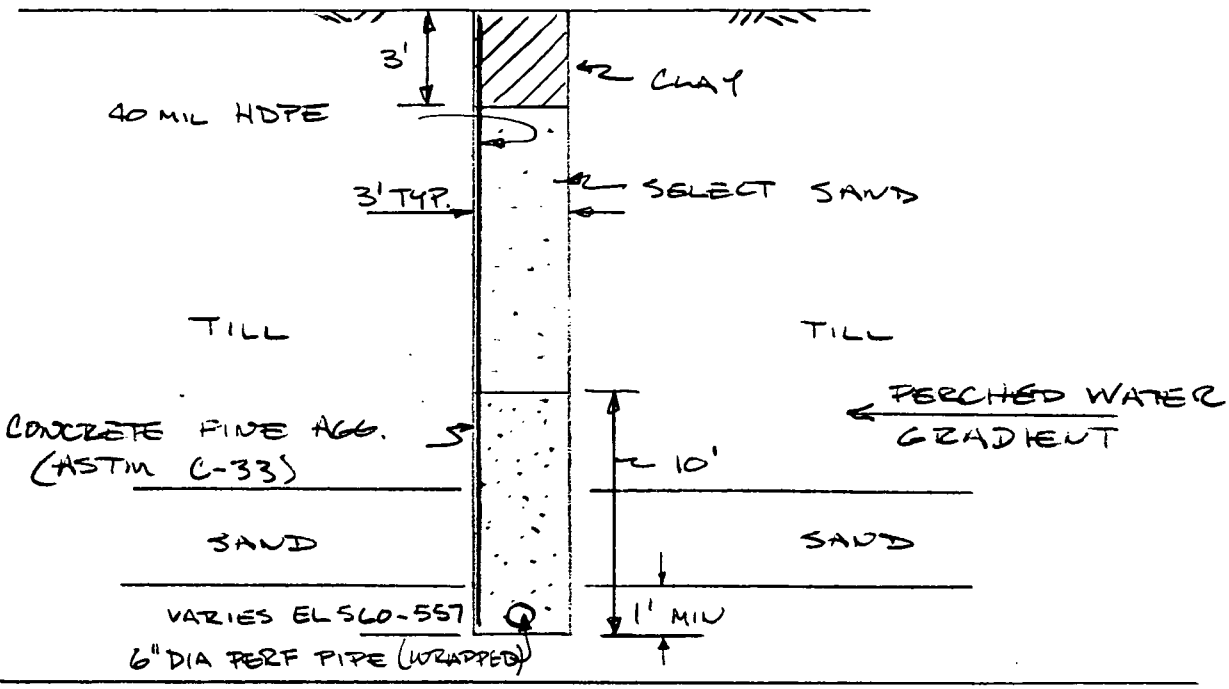
	NORMAL LEVEL	HIGH LEVEL
LONGTERM	2.2 gpm	5.0 gpm
DRAWDOWN	4.4 gpm	9.6 gpm

000513

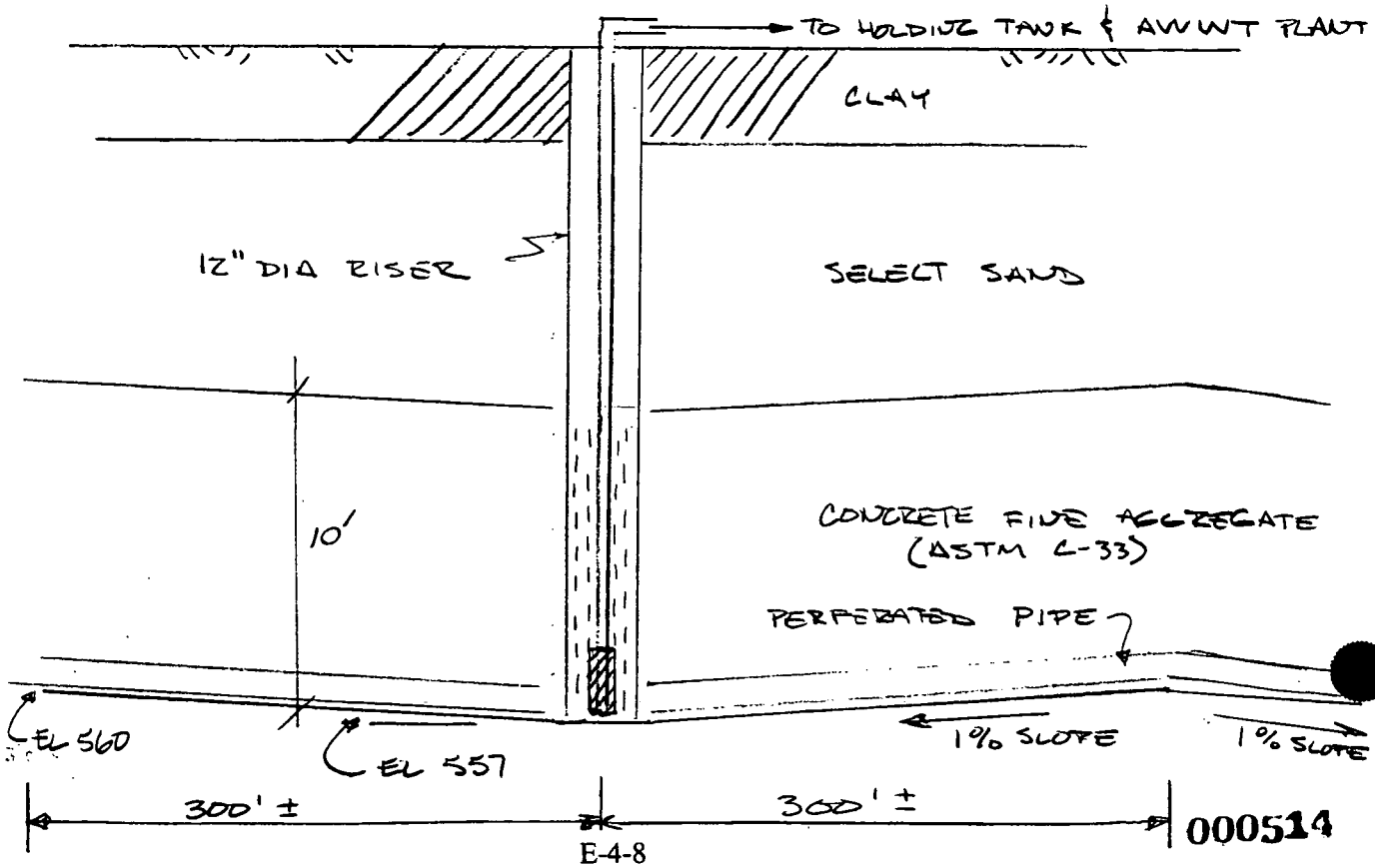
CALCULATION WORKSHEET Order No. 19116 (01-91)

CLIENT DOE	JOB NUMBER —
SUBJECT INTERCEPTOR TRENCH	
BASED ON	DRAWING NUMBER
BY T Allen / CHECKED BY WO	APPROVED BY / DATE 15 MARCH 1994

TYPICAL TRENCH SECTION



TYPICAL SECTION AT SUMP



000514

CALCULATION WORKSHEET Order No. 19116 (01-91) **5861** PAGE 4 OF

CLIENT DOE		JOB NUMBER —	
SUBJECT INTERCEPTOR TRENCH			
BASED ON —		DRAWING NUMBER	
BY T Allen	CHECKED BY WJO	APPROVED BY	DATE 15 MARCH 1994

SOLID WASTE LANDFILL

Recorded top of perched water varies from El 580 to El 575 east to west accross site. Except for a portion of southern edge of site, excavation will not extend below these levels to remove waste.
Intermediate sand layer is located at about EL 562
Using general rule of 1' of cover for each 2' of water head, excavation can be taken to El 568 without "blowout" of bottom.

2-3 pressure relief wells located near the areas of limited excavation should provide bottom stability. These wells can be pumped to control water infiltration if excavation has to extend into the sand.
Inflow into wells:

$$Q_w = \frac{k\,(H^2 - h^2)}{458\,\ln(R_0/d)} \text{ gpm}$$

where k = hydraulic conductivity 1×10^{-4} cm sec or 2.13 gpd/ft^2
H = water height in free field, ft
h = water height at well, ft
R_0 = radius of influence, ft
d = well diameter, ft

$$Q_w = \frac{2.13\,(15^2 - 0^2)}{458\,\ln(20/.5)}$$

$$= 0.28 \Rightarrow \text{say } 0.3 \text{ gpm}$$

000515

CALCULATION WORKSHEET Order No. 19116 (01-91)

CLIENT DOE		JOB NUMBER —	
SUBJECT INTERCEPTOR TRENCH			
BASED ON		DRAWING NUMBER	
BY T Allen	CHECKED BY WJO	APPROVED BY	DATE 15 MARCH 1994

Lime Sludge Pond

Maximum perched water levels vary from EL 574 to 572

Bottom of sludge ≈ El 570

Sump and pump as required

Sand layer typically at El 560 ∴ no bottom blowout

Exception:

SW quadrant of southern pond

Bottom of sludge at 568±

Top of sand at 566±

∴ at high water, bottom instability a problem

Alternates:

1) Line of well points 150' north and east from southwest corner.
See page 6-11 for calcs

2) Pressure relief wells adjacent to smaller excavation
See page 4 calcs

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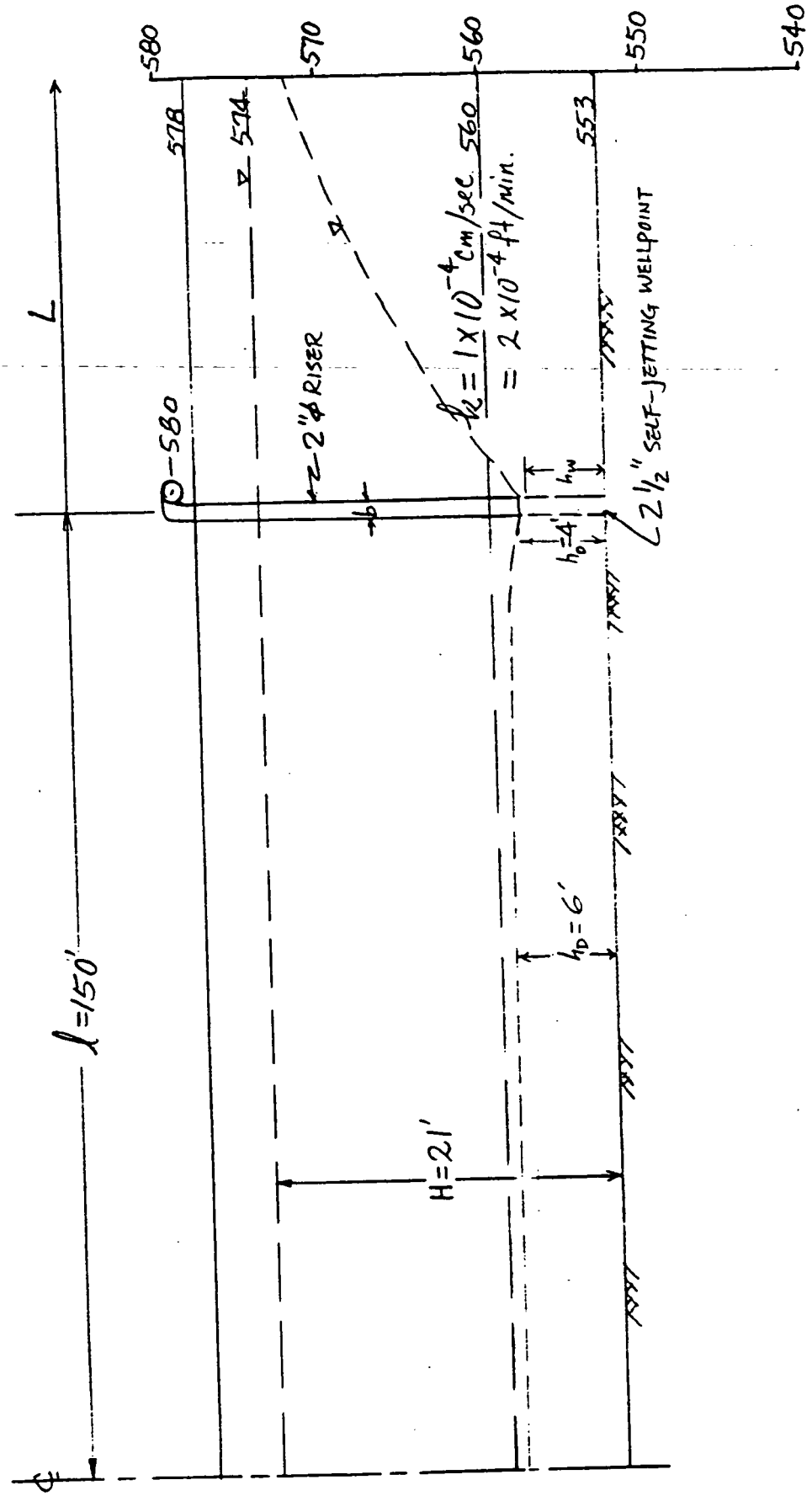

LINE SLURGE PONDS

$L = C'(H - h_w)\sqrt{k}$

$C' = 3$

$H = 21'$

$h_w = 5'$

$k = 1$ (in 10^{-4} cm/sec)

$L = 3(21-5)\sqrt{1} = 48'$

$h_D = 6'$

Assume $h_0 = 5'$, $H - h_D = 21' - 6' = 15'$

$l/h_0 = 150/5 = 30$ $C_1 = 1.02$

Since b so small, can be assume 0 for well points.

$b/H = 0$ $C_2 = 1.45$

$$h_D = h_0\left[\frac{C_1 C_2}{L}(H - h_0) + 1\right]$$

$$h_D = 5'\left\{\frac{1.02 \times 1.45 \times 16'}{48} + 1\right\} = 7.5' > 6' \text{ N.G.}$$

Assume $h_0 = 4'$

$$h_D = 4\left\{\frac{1.02 \times 1.45 \times 17}{48} + 1\right\}$$

$= 6'$ O.K.

Thus $h_D = 6'$, $h_0 = 4'$ $H - h_0 = 17'$

Assume $h_0 - h_w = 0.001H = 0.02'$ $\therefore h_w = h_0 - 0.02' = 3.98'$

From $$\frac{h_0^2 - h_w^2}{H^2 - h_0^2} = \frac{a}{2\pi L} \ln \frac{a}{2\pi r_w}$$

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$$\frac{4^2 - 3.98^2}{21^2 - 4^2} = \frac{a}{2\pi 48} \ln \frac{a}{2\pi(0.1)}$$

$$a \ln \frac{a}{0.628} = 0.1133$$

Try $a = 0.74$

$$a \ln \frac{a}{0.628} = 0.74 \ln \frac{0.74}{0.628} = 0.121 \quad \text{OK.}$$

Use $a = 0.74'$

Then flow per wellpoint for a line of wellpoints (infinite)

$$Q_W = aQ_p = 0.74\left(0.73 + 0.27\frac{H-h_0}{H}\right)\frac{k\pi}{2L}(H^2 - h_0^2)$$

$$= 0.74\left(0.73 + 0.27\frac{21-4}{21}\right)\frac{0.0002\times10'}{2\times48}(21^2 - 4^2)$$

$$= 0.0062 \text{ cfm}$$

$$= 0.047 \text{ gpm.} \qquad (1 \text{ cfm} = 7.54 \text{ gpm})$$

For a finite line of wellpoints

$$Q_W = 1.35 \times 0.047 \text{ gpm} = 0.063 \text{ gpm.}$$

Hydraulic head losses:

$H_e = 0.02'$ from Fig 3-41a curve 4 wire mesh on perforated pipe

$H_s = 0.1'$ from Fig 3-41b

$H_r + H_v = 0.1'$ from Fig 3-41c

Total Head loss $H_W = 0.02 + 0.1 + 0.1 = 0.22'$

Thus $h_W - H_W = 3.98' - 0.22' = 3.76'$

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Required vacuum at pump intake:

$V = M + H_c + H_w - h_w$

where $M = 580 - 553 = 27'$ = distance from base of pervious substratum to pump intake, ft.

H_c = Average head loss in header pipe up to pump intake, ft.

H_w = total head loss in wellpoint to header pipe $= 0.22'$.

$h_w = 3.98'$

Required effective vacuum is:

$V - H_c = M + H_w - h_w$

$= 27' + 0.22' - 3.98' = 23.24'$

Estimated well point spacing from Fig 3-46

$s = 6.5'$ for water level lowering of 15'.

Total line length of wellpoints

$= 150' + 150'$

$= 300'$

Total number of wellpoints:

$= 300'/6.5' = 46.15 = 46$ wellpoints.

Total discharge from all wellpoints:

$Q_T = 0.063$ gpm $\times 46 = 2.9$ gpm.

$= 4176$ gpd.

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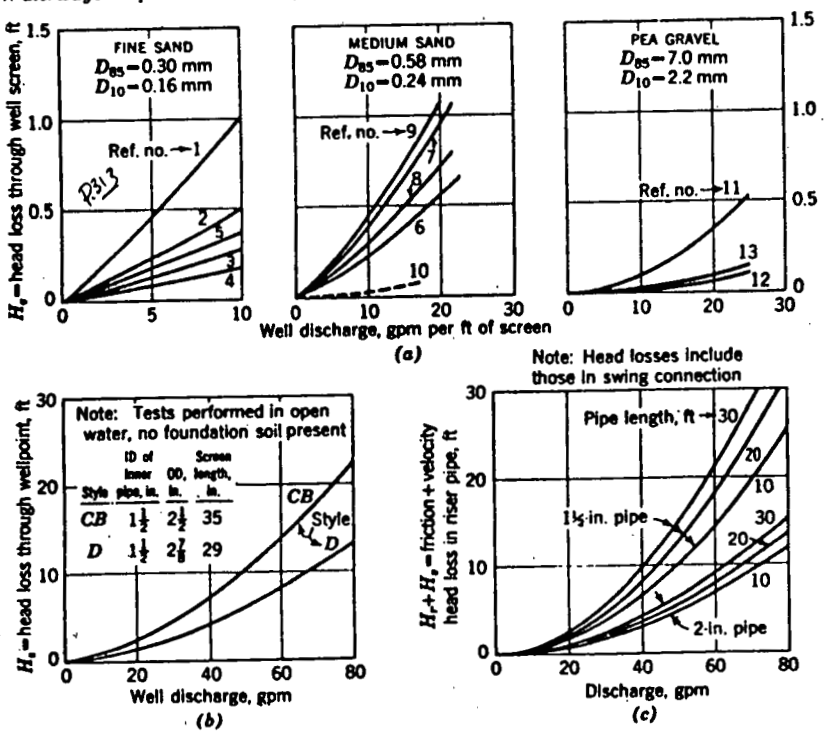
loss H_s. The total head loss in the well, H_w, is the sum of these individual head losses, and therefore

$$H_w = H_e + H_s + H_r + H_v \tag{3-101}$$

Procedures for estimating these head losses are given below.

Entrance head loss H_e is that required to force the flow through the gravel filter of the well, if the well has a filter, and the well screen. This loss depends on the flow per unit length of well screen, the type of sand adjacent to the screen, permeability of gravel filter, the number, size, and type openings in the well screen, and the diameter of the screen. Entrance head losses for various types of wellpoints installed in fine and medium sand and pea gravel determined from laboratory tests are plotted for various well flows in Fig. 3-41. Entrance head losses for two types of self-jetting wellpoints obtained from tests by the Moretrench Corporation also are shown in Fig. 3-41. Similar data for large-diameter wood-stave well screens with graded gravel filters obtained from labora-

FIG. 3-41. Entrance head loss for typical wellpoints, and velocity and friction head loss in wellpoint riser pipes. (a) 2½-in.-ID plain-tip wellpoints; (b) self-jetting wellpoints; (c) head losses in wellpoint riser pipes, $C = 110$. [(a) *U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.* (b) *Moretrench Corp.*]



Ref.	Wellpoint	Slot or mesh	
		No.	Opening in mm
1	A and B, grooved slot	12	0.30
2	C, wire wrap on perforated pipe	20	0.51
3	D, wire mesh on perforated pipe	28	0.59
4	E, wire mesh on perforated pipe	28	0.59
5	B, grooved slot	25	0.63
6	A, grooved slot	25	0.63
7	D, wire mesh on perforated pipe	28	0.59
8	A, grooved slot	50	1.27
9	B, grooved slot	30	0.76
10	F, perforated pipe with 6-in. pea-gravel filter	5/32 in.	3.97
11	A, grooved slot	12	0.30
12	A, grooved slot	100	2.54
13	E, perforated pipe	5/32 in.	3.97
CB	Moretrench, commercial bronze, self-jetting, mesh SF	40 × 45	0.31 × 0.38
D	Moretrench, stainless steel style D, self-jetting, mesh E	12 × 68	0.30 × 1.73

tory tests and pumping tests on wells installed in pervious sand strata in the alluvial valley of the lower Mississippi River are shown in Fig. 3-42. Data for several other types of well screens are presented by Petersen, Rohwer, and Albertson (29). When estimating the entrance head loss, a weighted average flow per foot of screen should be used.

Friction loss in well screens can be estimated from the screen length and distribution of flow in the screen from hydraulic formulas for flow of water through pipes. For example, if a well fully penetrates a uniform pervious artesian stratum, the flow in the screen will increase approximately linearly from zero at the bottom to the full well flow Q_w at the top of the screen. In this case the friction loss can be computed assuming the entire well flow Q_w to be flowing through one-third the length of the well screen. If the pervious stratum grades coarser in grain size with depth or if the well only partially penetrates a uniform stratum, the flow in the lower portion of the screen will be greater than that assumed above, in which case the head loss can be estimated assuming a flow of $0.9Q_w$ through one-half of the length of well screen (30).

The friction head loss H_r in the riser pipe can be computed from the well flow Q_w and the length of riser pipe through which flow takes place using ordinary hydraulic formulas. Head losses in the connecting pipe between the well or wellpoint and collector pipe also should be included. For estimating loss in standard steel swing connections for wellpoints (including that in the cock valve in the swing), the swing can be replaced by the following equivalent lengths of riser pipe:

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$$h_D = 16\left[1 + \frac{1.02(1.45)(40 - 16)}{700}\right] = 16.8 \text{ ft}$$

Since $h_D - h_w = 0.8$ ft, assume $h_w = 15.2$ ft and recompute h_D. $l/h_w = 62/15.2 = 4.1$, and $C_1 = 1.02$ from Fig. 3-22.

$$h_D = 15.2\left[1 + \frac{1.02(1.45)(40 - 15.2)}{700}\right] = 16.0 \text{ ft}$$

Thus $h_D = 16.0$ ft, $h_w = 15.2$ ft. Assume $h_w - h_w = 0.001H = 0.04$ ft; $h_w = 15.2 - 0.04 = 15.16$ ft. Substitute h_w for h_D and h_w, H, L, and r_w in Eq. (3-45a):

$$\frac{15.2^2 - 15.16^2}{40^2 - 15.2^2} = \frac{a}{2\pi(700)} \ln \frac{a}{2\pi(0.12)}$$

Solving this equation gives $a = 3$ ft. From Eq. (3-24) the flow per wellpoint is

$$Q_w = aQ_p = 3\left(0.73 + 0.27 \times \frac{24.8}{40}\right)\frac{0.20}{2 \times 700}(40^2 - 15.2^2) = 0.53 \text{ cfm}$$

$= 4.0$ gpm for an infinite line of wellpoints

or $1.35 \times 4.0 = 5.4$ gpm for the finite line

For this discharge $H_w = 0.26$ ft; thus $h_w - H_w = 15.16 - 0.26 = 14.90$ ft. From Eq. (3-102) the required vacuum at the wellpoint is 13.1 ft. Therefore, if the vacuum in the header is maintained at 13 ft, wellpoints on 3-ft centers would lower the ground water to el 16. However, since the available vacuum in the header is 20 ft and since generally it is not practicable to operate the pump to reduce the vacuum, the wellpoints would be installed with 20-ft-long riser pipes on about 3-ft centers. This would prevent excess air from entering the system which might otherwise occur had 13-ft-long riser pipes been used. With such a system $Q_w = 6.2$ gpm, $H_w = 0.35$ ft, and $h_w - H_w = 8.1$ ft, and the ground water would be lowered to about el 9.

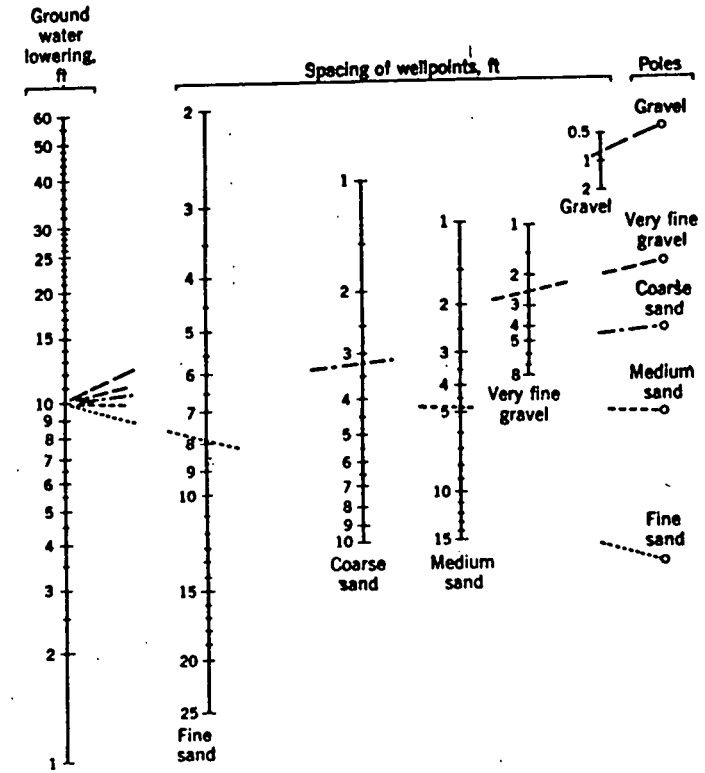
In the above case it would be advisable to observe ground-water levels before and during pumping of the upper stage and to measure the discharge. From these data the design of the lower stage could be adjusted if it is found that the observed flow per foot drawdown differs appreciably from the computed values. Such differences can occur because of limitations in accuracy of k, L, and H_w used in design.

would be installed with 20-ft risers to prevent possible reduction in efficiency of the stage due to excess air entering the system.

In lieu of the detailed computations shown in Fig. 3-45, the approximate spacing of wellpoints required to produce a given ground-water lowering in various soils can be estimated from the nomographs shown in Figs. 3-46 and 3-47. However, these nomographs should be used with caution since they are based on empirical data and are for average conditions. Nevertheless, they may be used as a guide in selecting the spacing of wellpoints.

In some cases, wellpoints alone cannot entirely eliminate seepage into an excavation and supplemental measures are necessary. For example, where a pervious stratum is underlain by rock and it is necessary to lower the ground-water level to the top of rock, some seepage will pass between

FIG. 3-46. Wellpoint spacing for uniform clean sands and gravels. (*Moretrench Corp.*)



the wellpoints even though they extend to the rock. In such cases it may be necessary to intercept this seepage with ditches or French drains and install automatic "mops" in the bottom of the ditches. In cases where the pervious stratum is immediately underlain by clay, the wellpoints can be installed in holes penetrating 3 or 4 ft into the clay and backfilled with sand so that the water level in the wellpoints during pumping can be maintained at or below the bottom of the pervious stratum. This procedure will reduce or eliminate seepage that would otherwise bypass the wellpoints had they only been installed with their tips at the top of the clay stratum.

Deep Wells. Deep wells can be used effectively for dewatering slopes and excavations where the required lowering is fairly large. Such wells can be located near or at the top of the excavation and pumped by deep-well turbine pumps, or they can be located on the excavation slope and pumped by a centrifugal pump connected to a common header pipe.

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APPENDIX E.5
INFILTRATION CALCULATIONS

E.5 INFILTRATION CALCULATIONS

Infiltration rates through the waste to the Great Miami Aquifer for the Operable Unit 2 disposal cell conceptual cap and liner model were calculated using the Hydraulic Evaluation of Landfill Performance (HELP) model. The HELP model is a quasi-two-dimensional hydrologic modeling tool used to estimate infiltration and lateral drainage. The model accepts climatologic, soil, and design data and simulates a number of hydraulic processes including surface storage, runoff, infiltration, percolation, evapotranspiration, soil moisture storage, and lateral drainage.

The HELP model was run in 5-year steps using the climatologic data (precipitation and mean monthly temperatures) from 1975 to 1978 for Cincinnati, Ohio. These data were obtained from the HELP model database. The HELP model was run to "steady state," that is, until successive simulations showed less than 0.005 percent change between initial- and final-year soil moisture content in any of the layers. A successive substitution procedure was used to reach steady-state conditions.

Physical properties of waste, glacial till, and the Great Miami Aquifer soils were the same as properties used in the Operable Unit 2 Remedial Investigation fate and transport modeling (Appendix A.2 of RI Report). These values were defined based upon RI sampling activities.

Topsoil, vegetative soil support, sand filter, cobbles, gravel, recompacted clay, and compacted structural fill were simulated as HELP soil texture nos. 6, 5, 2, 1, 1, 18, and 17, respectively. HELP default hydraulic conductivities were modified to match the design. Hydraulic conductivities for these layers were $1x10^{-3}$, $5x10^{-4}$, $1x10^{-3}$, 10.0, $1x10^{-3}$, $1x10^{-7}$, and $2x10^{-4}$ cm/sec, respectively. Grass cover was assumed to be fair, and the evaporative zone depth was conservatively estimated to be 12 inches.

Bentonite geocomposite was assumed to be 0.25 inch thick with properties of recompacted clay. Geomembrane overlying a bentonite geocomposite is considered as a single layer in the HELP model. This layer is simulated with the properties of the bentonite geocomposite and a leakage factor. Leakage factor for the 60 mil HDPE geomembrane was calculated from the charts provided in the HELP model documentation for pinhole spacing of a 100 feet. The estimated leakage factor for the geomembrane was 0.003.

The HELP model output consists of input data echo, optional simulation details, and a summary of results. The summary includes average monthly totals, average annual totals, peak daily values, and final moisture contents in all layers modeled. The average totals include precipitation, runoff, evapotranspiration, percolation, and lateral drainage for appropriate layers.

The HELP model outputs (Attachment E.5-I) are attached to this appendix. The outputs provide infiltrations through the cap and liner and through the berm of the disposal cell.

ATTACHMENT E.5-I
HELP MODEL OUTPUTS

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LOW LEVEL RADIOACTIVE WASTE DISPOSAL FACILITY FOR OPERABLE UNIT 2
GEOCOMPOSITE CAP AND LINER - NO HDPE LINER AND FAILED LEACHATE COLLECTION SY
MINIMUM WASTE THICKNESS                                February 28, 1994

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                          FAIR GRASS

                          LAYER  1
                          --------

                   VERTICAL PERCOLATION LAYER
   THICKNESS                          =      6.00 INCHES
   POROSITY                           =      0.4530 VOL/VOL
   FIELD CAPACITY                     =      0.1901 VOL/VOL
   WILTING POINT                      =      0.0848 VOL/VOL
   INITIAL SOIL WATER CONTENT         =      0.3243 VOL/VOL
   SATURATED HYDRAULIC CONDUCTIVITY   =      0.001000000047 CM/SEC


                          LAYER  2
                          --------

                   VERTICAL PERCOLATION LAYER
   THICKNESS                          =     21.00 INCHES
   POROSITY                           =      0.4570 VOL/VOL
   FIELD CAPACITY                     =      0.1309 VOL/VOL
   WILTING POINT                      =      0.0580 VOL/VOL
   INITIAL SOIL WATER CONTENT         =      0.2440 VOL/VOL
   SATURATED HYDRAULIC CONDUCTIVITY   =      0.000500000024 CM/SEC
```

LAYER 3

VERTICAL PERCOLATION LAYER

THICKNESS	=	6.00 INCHES
POROSITY	=	0.4370 VOL/VOL
FIELD CAPACITY	=	0.0624 VOL/VOL
WILTING POINT	=	0.0245 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1581 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.001000000047 CM/SEC

LAYER 4

VERTICAL PERCOLATION LAYER

THICKNESS	=	36.00 INCHES
POROSITY	=	0.4170 VOL/VOL
FIELD CAPACITY	=	0.0454 VOL/VOL
WILTING POINT	=	0.0200 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0454 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	10.000000000000 CM/SEC

LAYER 5

LATERAL DRAINAGE LAYER

THICKNESS	=	12.00 INCHES
POROSITY	=	0.4170 VOL/VOL
FIELD CAPACITY	=	0.0454 VOL/VOL
WILTING POINT	=	0.0200 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4170 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.009999999776 CM/SEC
SLOPE	=	4.00 PERCENT
DRAINAGE LENGTH	=	800.0 FEET

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LAYER 6

BARRIER SOIL LINER

THICKNESS	=	0.25 INCHES
POROSITY	=	0.4000 VOL/VOL
FIELD CAPACITY	=	0.3560 VOL/VOL
WILTING POINT	=	0.2899 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4000 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000000010000 CM/SEC

LAYER 7

VERTICAL PERCOLATION LAYER

THICKNESS	=	2.00 INCHES
POROSITY	=	0.4170 VOL/VOL
FIELD CAPACITY	=	0.0454 VOL/VOL
WILTING POINT	=	0.0200 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0564 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	10.000000000000 CM/SEC

LAYER 8

BARRIER SOIL LINER

THICKNESS	=	24.00 INCHES
POROSITY	=	0.4300 VOL/VOL
FIELD CAPACITY	=	0.3663 VOL/VOL
WILTING POINT	=	0.2802 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4300 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000000100000 CM/SEC

LAYER 9

VERTICAL PERCOLATION LAYER

THICKNESS	=	12.00 INCHES
POROSITY	=	0.3808 VOL/VOL
FIELD CAPACITY	=	0.1924 VOL/VOL
WILTING POINT	=	0.1043 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2523 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000026000000 CM/SEC

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LAYER 10

VERTICAL PERCOLATION LAYER

THICKNESS	=	12.00 INCHES
POROSITY	=	0.5200 VOL/VOL
FIELD CAPACITY	=	0.2942 VOL/VOL
WILTING POINT	=	0.1400 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2794 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000199999995 CM/SEC

LAYER 11

VERTICAL PERCOLATION LAYER

THICKNESS	=	12.00 INCHES
POROSITY	=	0.4170 VOL/VOL
FIELD CAPACITY	=	0.0454 VOL/VOL
WILTING POINT	=	0.0200 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0454 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.009999999776 CM/SEC

LAYER 12

BARRIER SOIL LINER

THICKNESS	=	60.00 INCHES
POROSITY	=	0.4300 VOL/VOL
FIELD CAPACITY	=	0.3663 VOL/VOL
WILTING POINT	=	0.2802 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4300 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000000100000 CM/SEC

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GENERAL SIMULATION DATA

SCS RUNOFF CURVE NUMBER	=	68.00
TOTAL AREA OF COVER	=	1102500. SQ FT
EVAPORATIVE ZONE DEPTH	=	12.00 INCHES
UPPER LIMIT VEG. STORAGE	=	5.4600 INCHES
INITIAL VEG. STORAGE	=	3.4098 INCHES
INITIAL SNOW WATER CONTENT	=	0.0000 INCHES
INITIAL TOTAL WATER STORAGE IN SOIL AND WASTE LAYERS	=	58.2148 INCHES

SOIL WATER CONTENT INITIALIZED BY USER.

CLIMATOLOGICAL DATA

DEFAULT RAINFALL WITH SYNTHETIC DAILY TEMPERATURES AND SOLAR RADIATION FOR CINCINNATI OHIO

MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	133
END OF GROWING SEASON (JULIAN DATE)	=	300

NORMAL MEAN MONTHLY TEMPERATURES, DEGREES FAHRENHEIT

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
28.90	32.10	41.80	53.50	63.00	71.40
75.40	74.10	67.50	55.30	43.40	33.80

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 74 THROUGH 78

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.33	1.59	3.86	3.11	3.36	4.79
	3.54	4.80	2.89	3.33	2.69	3.36
STD. DEVIATIONS	0.56	1.34	1.71	0.63	1.78	1.24
	2.04	1.04	2.17	1.37	1.35	1.99
RUNOFF						
TOTALS	0.000	0.004	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.001	0.000	0.005
STD. DEVIATIONS	0.000	0.009	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.002	0.000	0.011
EVAPOTRANSPIRATION						
TOTALS	0.853	1.535	2.424	2.871	2.814	4.791
	3.826	4.116	2.198	1.959	1.683	0.905
STD. DEVIATIONS	0.188	0.312	0.120	0.265	1.712	1.202
	1.451	0.997	1.704	0.567	0.120	0.179
LATERAL DRAINAGE FROM LAYER 5						
TOTALS	1.3155	1.4678	1.1784	0.9902	0.6175	0.5255
	0.5178	0.4965	0.6843	0.4741	0.4245	0.7490
STD. DEVIATIONS	0.6603	1.2556	1.1494	0.6790	0.1245	0.0628
	0.0694	0.0626	0.4737	0.1049	0.1121	0.7123
PERCOLATION FROM LAYER 6						
TOTALS	0.1141	0.1071	0.1175	0.1157	0.1173	0.1063
	0.1024	0.0937	0.0851	0.0842	0.0811	0.0921
STD. DEVIATIONS	0.0405	0.0405	0.0441	0.0333	0.0261	0.0272
	0.0269	0.0232	0.0273	0.0336	0.0341	0.0355

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PERCOLATION FROM LAYER 8

TOTALS	0.1077	0.0983	0.1082	0.1048	0.1084	0.0978
	0.1012	0.1018	0.0970	0.0983	0.0918	0.1010
STD. DEVIATIONS	0.0025	0.0034	0.0023	0.0024	0.0026	0.0179
	0.0184	0.0169	0.0194	0.0236	0.0257	0.0161

PERCOLATION FROM LAYER 12

TOTALS	0.1050	0.0919	0.0998	0.0975	0.1018	0.0994
	0.1035	0.1042	0.1013	0.1050	0.1017	0.1051
STD. DEVIATIONS	0.0016	0.0088	0.0120	0.0100	0.0084	0.0064
	0.0050	0.0036	0.0024	0.0017	0.0013	0.0014

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 74 THROUGH 78

	(INCHES)		(CU. FT.)	PERCENT
PRECIPITATION	40.64	(6.929)	3733984.	100.00
RUNOFF	0.010	(0.014)	920.	0.02
EVAPOTRANSPIRATION	29.974	(2.728)	2753890.	73.75
LATERAL DRAINAGE FROM LAYER 5	9.4411	(3.7889)	867399.	23.23
PERCOLATION FROM LAYER 6	1.2163	(0.3337)	111743.	2.99
PERCOLATION FROM LAYER 8	1.2162	(0.1433)	111743.	2.99
PERCOLATION FROM LAYER 12	1.2162	(0.0607)	111741.	2.99
CHANGE IN WATER STORAGE	0.000	(3.907)	34.	0.00

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PEAK DAILY VALUES FOR YEARS 74 THROUGH 78

	(INCHES)	(CU. FT.)
PRECIPITATION	2.40	220500.0
RUNOFF	0.025	2269.9
LATERAL DRAINAGE FROM LAYER 5	0.5774	53045.4
PERCOLATION FROM LAYER 6	0.0045	415.1
HEAD ON LAYER 6	12.2	
PERCOLATION FROM LAYER 8	0.0036	331.4
HEAD ON LAYER 8	1.4	
PERCOLATION FROM LAYER 12	0.0034	314.4
HEAD ON LAYER 12	0.4	
SNOW WATER	1.18	108843.8

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.3497

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.0711

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000534

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FINAL WATER STORAGE AT END OF YEAR 78

LAYER	(INCHES)	(VOL/VOL)
1	1.95	0.3243
2	5.12	0.2440
3	0.95	0.1581
4	1.64	0.0454
5	5.00	0.4170
6	0.40	0.4000
7	0.11	0.0564
8	10.32	0.4300
9	3.03	0.2523
10	3.35	0.2794
11	0.55	0.0454
12	25.80	0.4300
SNOW WATER	0.00	

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000535

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GRAY TILL ONLY
SOLID WASTE LANDFILL

July 12, 1994

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FAIR GRASS

LAYER 1

VERTICAL PERCOLATION LAYER

THICKNESS	=	12.00 INCHES
POROSITY	=	0.5200 VOL/VOL
FIELD CAPACITY	=	0.2942 VOL/VOL
WILTING POINT	=	0.1400 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3970 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000199999995 CM/SEC

LAYER 2

VERTICAL PERCOLATION LAYER

THICKNESS	=	99.00 INCHES
POROSITY	=	0.5200 VOL/VOL
FIELD CAPACITY	=	0.2942 VOL/VOL
WILTING POINT	=	0.1400 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3140 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000199999995 CM/SEC

LAYER 3

BARRIER SOIL LINER

THICKNESS	=	155.00 INCHES
POROSITY	=	0.4100 VOL/VOL
FIELD CAPACITY	=	0.3710 VOL/VOL
WILTING POINT	=	0.2510 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4100 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000001900000 CM/SEC

5861

LAYER 4

VERTICAL PERCOLATION LAYER

THICKNESS	=	384.00 INCHES
POROSITY	=	0.3900 VOL/VOL
FIELD CAPACITY	=	0.0454 VOL/VOL
WILTING POINT	=	0.0200 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0762 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.015900000930 CM/SEC

GENERAL SIMULATION DATA

SCS RUNOFF CURVE NUMBER	=	68.00
TOTAL AREA OF COVER	=	46000. SQ FT
EVAPORATIVE ZONE DEPTH	=	12.00 INCHES
UPPER LIMIT VEG. STORAGE	=	6.2400 INCHES
INITIAL VEG. STORAGE	=	4.7640 INCHES
INITIAL SNOW WATER CONTENT	=	0.0000 INCHES
INITIAL TOTAL WATER STORAGE IN SOIL AND WASTE LAYERS	=	128.6608 INCHES

SOIL WATER CONTENT INITIALIZED BY USER.

CLIMATOLOGICAL DATA

DEFAULT RAINFALL WITH SYNTHETIC DAILY TEMPERATURES AND
SOLAR RADIATION FOR CINCINNATI OHIO

MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	133
END OF GROWING SEASON (JULIAN DATE)	=	300

NORMAL MEAN MONTHLY TEMPERATURES, DEGREES FAHRENHEIT

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
28.90	32.10	41.80	53.50	63.00	71.40
75.40	74.10	67.50	55.30	43.40	33.80

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 74 THROUGH 78

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.33	1.59	3.86	3.11	3.36	4.79
	3.54	4.80	2.89	3.33	2.69	3.36
STD. DEVIATIONS	0.56	1.34	1.71	0.63	1.78	1.24
	2.04	1.04	2.17	1.37	1.35	1.99
RUNOFF						
TOTALS	0.000	0.020	0.000	0.019	0.000	0.027
	0.022	0.043	0.008	0.027	0.000	0.016
STD. DEVIATIONS	0.000	0.044	0.000	0.042	0.000	0.061
	0.048	0.096	0.014	0.046	0.000	0.036
EVAPOTRANSPIRATION						
TOTALS	0.848	1.534	2.470	2.879	3.165	4.809
	4.073	4.272	2.250	1.983	1.672	0.892
STD. DEVIATIONS	0.189	0.311	0.128	0.331	1.635	1.381
	1.402	1.207	1.767	0.526	0.138	0.170
PERCOLATION FROM LAYER 3						
TOTALS	1.6208	1.6289	1.5251	1.1168	0.5161	0.2535
	0.1939	0.0844	0.3983	0.5914	0.3213	1.3635
STD. DEVIATIONS	0.8551	0.6425	0.5794	1.0308	0.9119	0.4921
	0.4335	0.1746	0.8906	0.6639	0.4839	0.8907
PERCOLATION FROM LAYER 4						
TOTALS	0.7604	0.8614	1.1076	1.1059	1.0855	0.9203
	0.7868	0.6540	0.5747	0.5912	0.5591	0.6059
STD. DEVIATIONS	0.3140	0.3531	0.4679	0.4935	0.5676	0.5443
	0.3844	0.2586	0.2095	0.2819	0.2379	0.2442

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 74 THROUGH 78

	(INCHES)		(CU. FT.)	PERCENT
PRECIPITATION	40.64	(6.929)	155794.	100.00
RUNOFF	0.181	(0.096)	694.	0.45
EVAPOTRANSPIRATION	30.847	(2.971)	118246.	75.90
PERCOLATION FROM LAYER 3	9.6141	(3.8484)	36854.	23.66
PERCOLATION FROM LAYER 4	9.6128	(3.9916)	36849.	23.65
CHANGE IN WATER STORAGE	0.001	(4.532)	5.	0.00

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PEAK DAILY VALUES FOR YEARS 74 THROUGH 78

	(INCHES)	(CU. FT.)
PRECIPITATION	2.40	9200.0
RUNOFF	0.214	819.0
PERCOLATION FROM LAYER 3	0.0719	275.7
HEAD ON LAYER 3	17.5	
PERCOLATION FROM LAYER 4	0.0613	234.8
SNOW WATER	1.18	4541.3

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.4811

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.1391

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FINAL WATER STORAGE AT END OF YEAR 78

LAYER	(INCHES)	(VOL/VOL)
1	4.76	0.3970
2	31.09	0.3140
3	63.55	0.4100
4	29.27	0.0762
SNOW WATER	0.00	

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ATTACHMENT E.5-I
(Continued)

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LOW LEVEL RADIOACTIVE WASTE DISPOSAL FACILITY FOR OU-2
BERM WITH COBBLE LAYER AND LINER
INEFFECTIVE HDPE LINER AND GEOCOMPOSITE                    August 8, 1994
COBBLE CONDUCTIVITY = 1 CM/SEC

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LAYER 1

VERTICAL PERCOLATION LAYER

THICKNESS	=	9.00 INCHES
POROSITY	=	0.4170 VOL/VOL
FIELD CAPACITY	=	0.0454 VOL/VOL
WILTING POINT	=	0.0200 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1152 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	1.000000000000 CM/SEC

LAYER 2

LATERAL DRAINAGE LAYER

THICKNESS	=	27.00 INCHES
POROSITY	=	0.4170 VOL/VOL
FIELD CAPACITY	=	0.0454 VOL/VOL
WILTING POINT	=	0.0200 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0455 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	1.000000000000 CM/SEC
SLOPE	=	20.00 PERCENT
DRAINAGE LENGTH	=	200.0 FEET

LAYER 3

BARRIER SOIL LINER

THICKNESS	=	18.00 INCHES
POROSITY	=	0.4100 VOL/VOL
FIELD CAPACITY	=	0.3710 VOL/VOL
WILTING POINT	=	0.2510 VOL/VOL

000541

ATTACHMENT E.5-I
(Continued)

INITIAL SOIL WATER CONTENT	=	0.4100 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000000100000 CM/SEC

LAYER 4

VERTICAL PERCOLATION LAYER

THICKNESS	=	2.00 INCHES
POROSITY	=	0.4170 VOL/VOL
FIELD CAPACITY	=	0.0454 VOL/VOL
WILTING POINT	=	0.0200 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0454 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.100000001490 CM/SEC

LAYER 5

BARRIER SOIL LINER

THICKNESS	=	36.00 INCHES
POROSITY	=	0.4300 VOL/VOL
FIELD CAPACITY	=	0.3663 VOL/VOL
WILTING POINT	=	0.2802 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4300 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000001000000 CM/SEC

LAYER 6

VERTICAL PERCOLATION LAYER

THICKNESS	=	6.00 INCHES
POROSITY	=	0.4100 VOL/VOL
FIELD CAPACITY	=	0.3710 VOL/VOL
WILTING POINT	=	0.2510 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3710 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.100000001490 CM/SEC

LAYER 7

BARRIER SOIL LINER

THICKNESS	=	286.00 INCHES
POROSITY	=	0.4100 VOL/VOL
FIELD CAPACITY	=	0.3710 VOL/VOL
WILTING POINT	=	0.2510 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4100 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.000001900000 CM/SEC

ATTACHMENT E.5-I
(Continued)

5861

LAYER 8

VERTICAL PERCOLATION LAYER

THICKNESS	=	420.00 INCHES
POROSITY	=	0.3900 VOL/VOL
FIELD CAPACITY	=	0.0454 VOL/VOL
WILTING POINT	=	0.0200 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0443 VOL/VOL
SATURATED HYDRAULIC CONDUCTIVITY	=	0.015900000930 CM/SEC

GENERAL SIMULATION DATA

SCS RUNOFF CURVE NUMBER	=	68.00
TOTAL AREA OF COVER	=	1102500. SQ FT
EVAPORATIVE ZONE DEPTH	=	9.00 INCHES
UPPER LIMIT VEG. STORAGE	=	3.7530 INCHES
INITIAL VEG. STORAGE	=	1.0368 INCHES
INITIAL SNOW WATER CONTENT	=	0.0000 INCHES
INITIAL TOTAL WATER STORAGE IN SOIL AND WASTE LAYERS	=	163.3081 INCHES

SOIL WATER CONTENT INITIALIZED BY USER.

CLIMATOLOGICAL DATA

DEFAULT RAINFALL WITH SYNTHETIC DAILY TEMPERATURES AND
SOLAR RADIATION FOR CINCINATTI OHIO

MAXIMUM LEAF AREA INDEX	=	0.00
START OF GROWING SEASON (JULIAN DATE)	=	133
END OF GROWING SEASON (JULIAN DATE)	=	300

NORMAL MEAN MONTHLY TEMPERATURES, DEGREES FAHRENHEIT

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
28.90	32.10	41.80	53.50	63.00	71.40
75.40	74.10	67.50	55.30	43.40	33.80

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 74 THROUGH 78

000543

ATTACHMENT E.5-I
(Continued)

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.33	1.59	3.86	3.11	3.36	4.79
	3.54	4.80	2.89	3.33	2.69	3.36
STD. DEVIATIONS	0.56	1.34	1.71	0.63	1.78	1.24
	2.04	1.04	2.17	1.37	1.35	1.99
RUNOFF						
TOTALS	0.467	0.232	0.469	0.502	0.515	0.968
	0.693	1.049	0.468	0.718	0.417	0.583
STD. DEVIATIONS	0.254	0.391	0.370	0.156	0.425	0.442
	0.620	0.408	0.502	0.367	0.276	0.549
EVAPOTRANSPIRATION						
TOTALS	0.787	0.735	1.687	1.410	1.724	2.462
	1.709	2.032	1.144	0.970	0.794	0.760
STD. DEVIATIONS	0.243	0.381	0.425	0.186	1.004	0.507
	0.347	0.480	0.738	0.328	0.352	0.174
LATERAL DRAINAGE FROM LAYER 2						
TOTALS	2.1446	0.9627	1.6235	1.2102	0.6701	1.7737
	1.2024	1.8978	0.9956	1.6679	1.0560	2.0025
STD. DEVIATIONS	0.6049	1.3176	0.9727	0.4932	0.5336	0.5868
	1.0627	0.8180	1.1213	0.8844	0.5051	1.3169
PERCOLATION FROM LAYER 3						
TOTALS	0.0253	0.0101	0.0166	0.0120	0.0085	0.0110
	0.0059	0.0114	0.0036	0.0089	0.0088	0.0186
STD. DEVIATIONS	0.0085	0.0093	0.0039	0.0042	0.0039	0.0055
	0.0020	0.0042	0.0026	0.0065	0.0044	0.0114
PERCOLATION FROM LAYER 5						
TOTALS	0.0251	0.0103	0.0166	0.0125	0.0081	0.0112
	0.0060	0.0120	0.0032	0.0087	0.0084	0.0187
STD. DEVIATIONS	0.0084	0.0094	0.0038	0.0045	0.0040	0.0057
	0.0027	0.0047	0.0024	0.0061	0.0043	0.0116
PERCOLATION FROM LAYER 7						
TOTALS	0.0249	0.0104	0.0166	0.0128	0.0080	0.0111
	0.0063	0.0120	0.0030	0.0087	0.0083	0.0187
STD. DEVIATIONS	0.0084	0.0095	0.0038	0.0046	0.0040	0.0058
	0.0028	0.0049	0.0025	0.0060	0.0041	0.0117
PERCOLATION FROM LAYER 8						

ATTACHMENT E.5-I
(Continued)

TOTALS	0.0116	0.0106	0.0117	0.0113	0.0117	0.0113
	0.0117	0.0117	0.0113	0.0116	0.0112	0.0116
STD. DEVIATIONS	0.0001	0.0003	0.0001	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 74 THROUGH 78

	(INCHES)		(CU. FT.)	PERCENT
PRECIPITATION	40.64	(6.929)	3733984.	100.00
RUNOFF	7.080	(1.505)	650495.	17.42
EVAPOTRANSPIRATION	16.214	(1.301)	1489672.	39.89
LATERAL DRAINAGE FROM LAYER 2	17.2070	(3.8407)	1580889.	42.34
PERCOLATION FROM LAYER 3	0.1408	(0.0351)	12938.	0.35
PERCOLATION FROM LAYER 5	0.1408	(0.0352)	12937.	0.35
PERCOLATION FROM LAYER 7	0.1408	(0.0349)	12937.	0.35
PERCOLATION FROM LAYER 8	0.1373	(0.0014)	12613.	0.34
CHANGE IN WATER STORAGE	0.003	(0.792)	315.	0.01

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PEAK DAILY VALUES FOR YEARS 74 THROUGH 78

	(INCHES)	(CU. FT.)
PRECIPITATION	2.40	220500.0
RUNOFF	0.895	82248.8
LATERAL DRAINAGE FROM LAYER 2	1.0923	100352.2
PERCOLATION FROM LAYER 3	0.0024	218.5
HEAD ON LAYER 3	0.5	

ATTACHMENT E.5-I
(Continued)

PERCOLATION FROM LAYER 5	0.0020	180.6
HEAD ON LAYER 5	0.0	
PERCOLATION FROM LAYER 7	0.0022	197.8
HEAD ON LAYER 7	0.0	
PERCOLATION FROM LAYER 8	0.0004	35.2
SNOW WATER	1.18	108843.8

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.1558

MINIMUM VEG. SOIL WATER (VOL/VOL) -0.0137

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FINAL WATER STORAGE AT END OF YEAR 78

LAYER	(INCHES)	(VOL/VOL)
1	1.04	0.1152
2	1.23	0.0455
3	7.38	0.4100
4	0.09	0.0454
5	15.48	0.4300
6	2.23	0.3710
7	117.26	0.4100
8	18.62	0.0443
SNOW WATER	0.00	

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E.6

APPENDIX E.6

TYPICAL SECTIONS AND DETAILS

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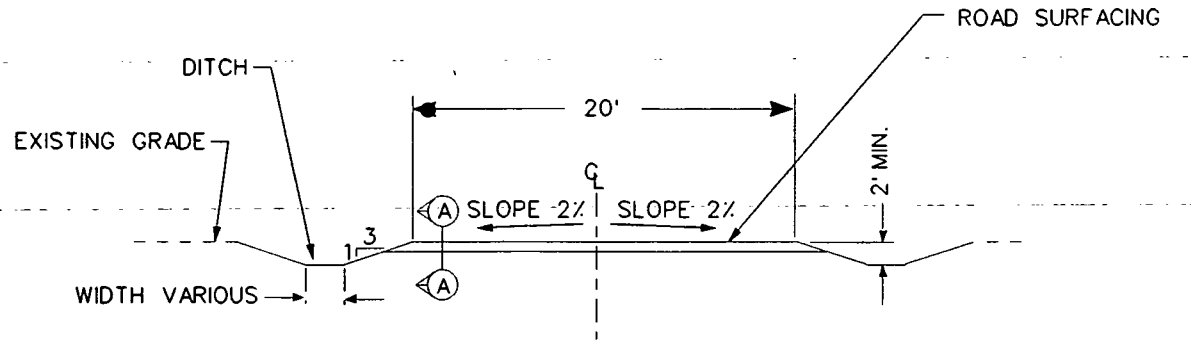
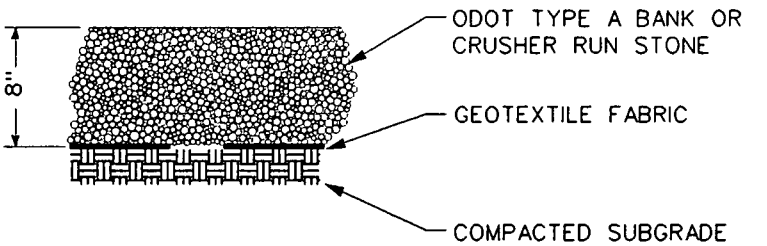


TYPICAL SECTION - ACCESS ROAD



SECTION A-A
ROAD SURFACING

LEGEND

OHDOT TYPE A BANK OR CRUSHER RUN STONE

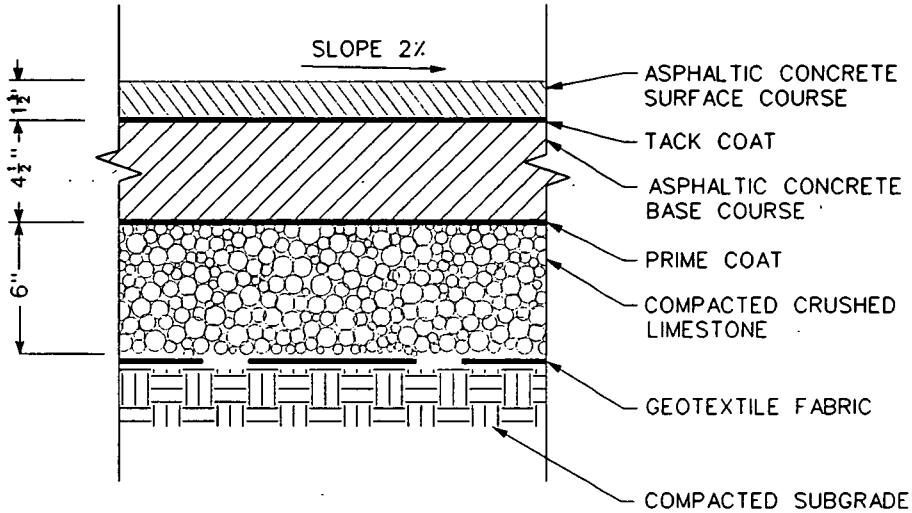
GEOTEXTILE FABRIC

COMPACTED SUBGRADE

FIGURE E.6-1
TYPICAL SECTION
ACCESS ROAD
(NOT TO SCALE)

000548

fs1033.dgn



LEGEND

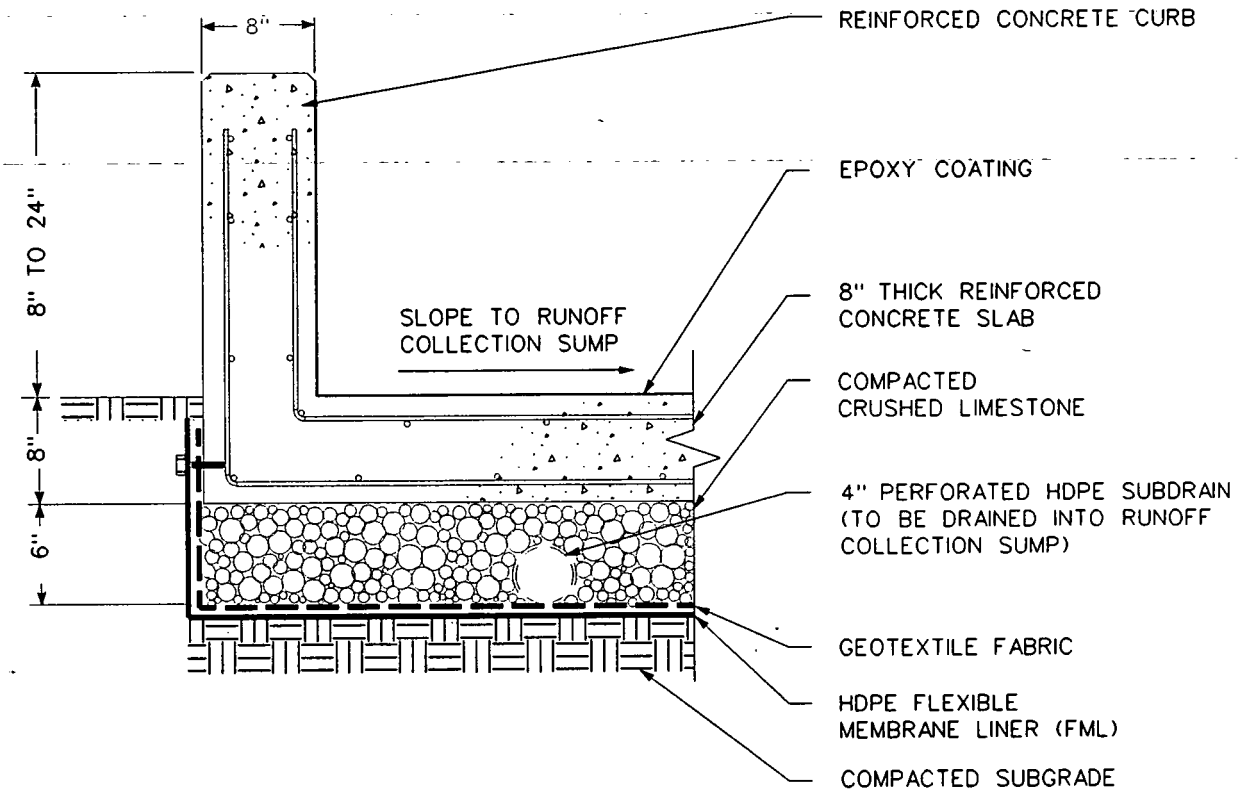
- ASPHALTIC CONCRETE SURFACE COURSE
- ASPHALTIC CONCRETE BASE COURSE
- COMPACTED CRUSHED LIMESTONE
- COMPACTED SUBGRADE
- PRIME COAT/ TACK COAT
- GEOTEXTILE FABRIC

000549

FIGURE E.6-2
TYPICAL SECTION
SURFACING AT EQUIPMENT STORAGE AREA
(NOT TO SCALE)

fs1035.dgn

5861



LEGEND

- COMPACTED CRUSHED LIMESTONE
- COMPACTED SUBGRADE
- GEOTEXTILE FABRIC
- HDPE FLEXIBLE MEMBRANE LINER (FML)

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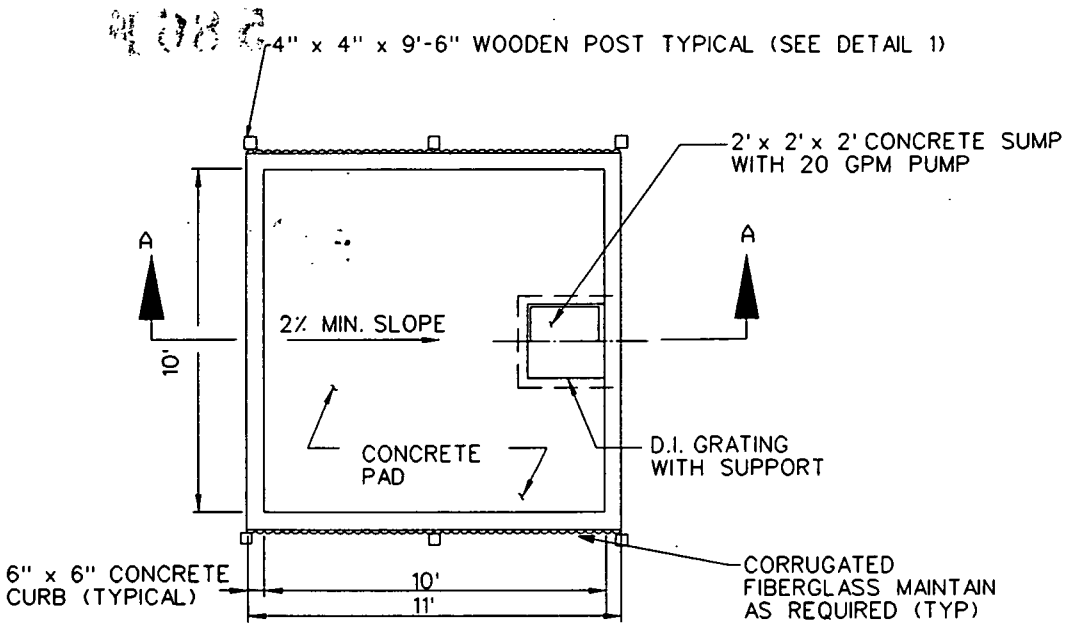
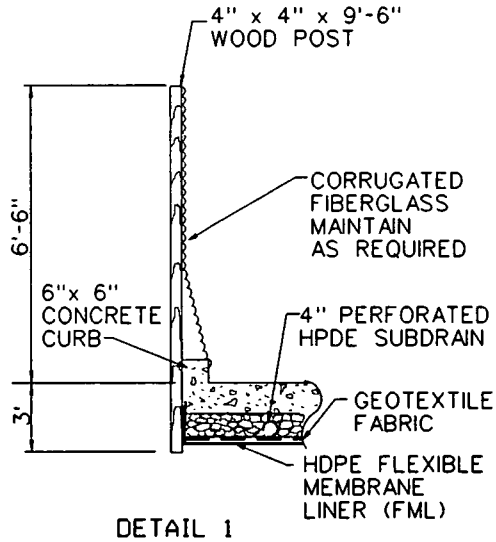
FIGURE E.6-3
TYPICAL SECTION-STAGING AREA
(NOT TO SCALE)

fs1036.dgn



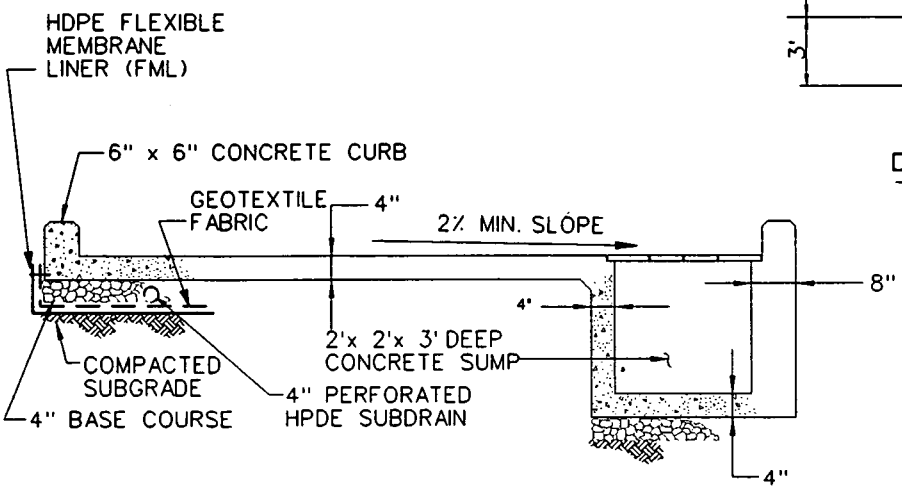
PERSONNEL DECONTAMINATION FACILITY

NTS



DETAIL 1

NTS



SECTION A - A

NTS

FIGURE E.6-4
TYPICAL DETAIL
PERSONNEL DECONTAMINATION FACILITY
(NOT TO SCALE)

fs1081.dgn

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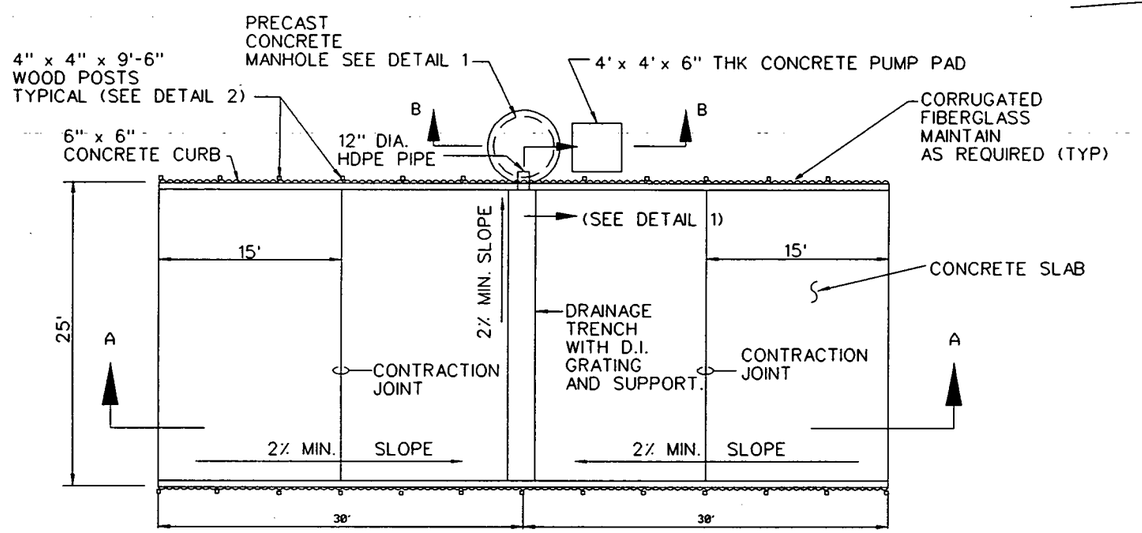
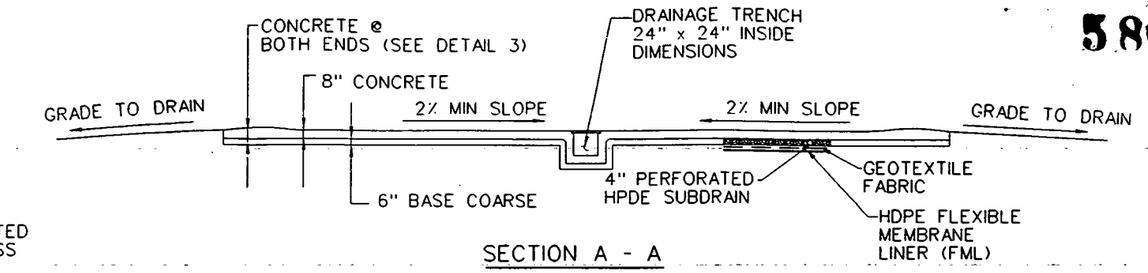
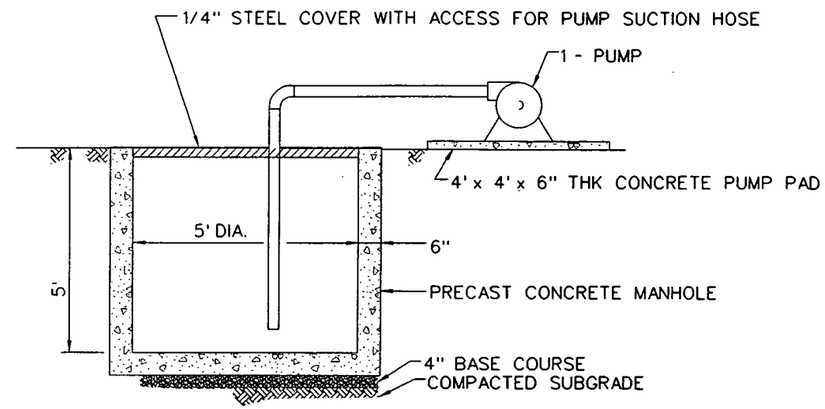


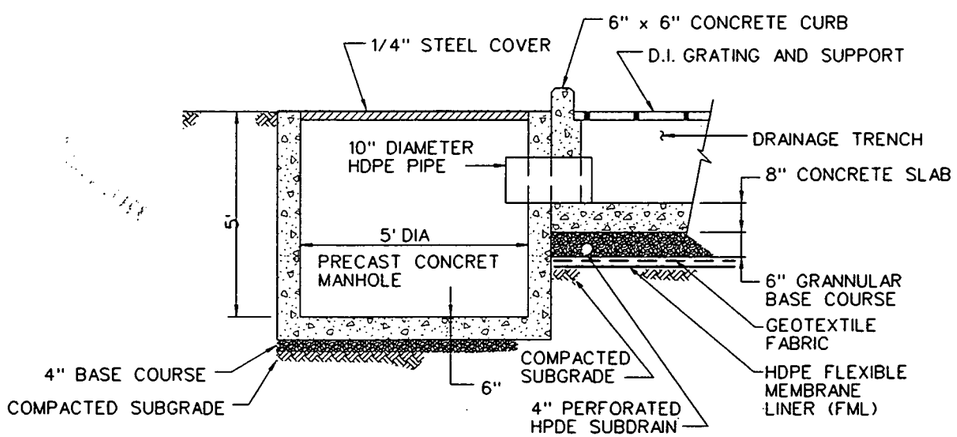
CONSTRUCTION EQUIPMENT DECONTAMINATION FACILITY



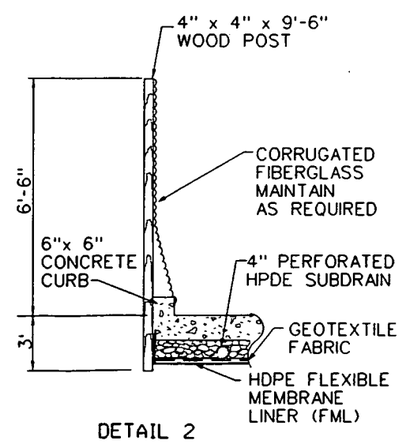
SECTION A - A



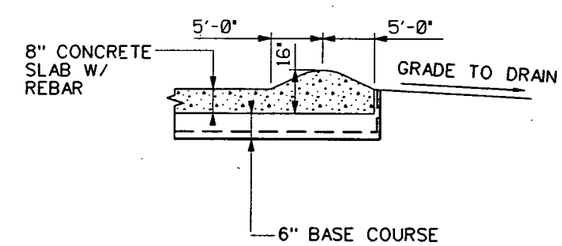
SECTION B - B
PRECAST CONCRETE MANHOLE



DETAIL 1



DETAIL 2
NTS

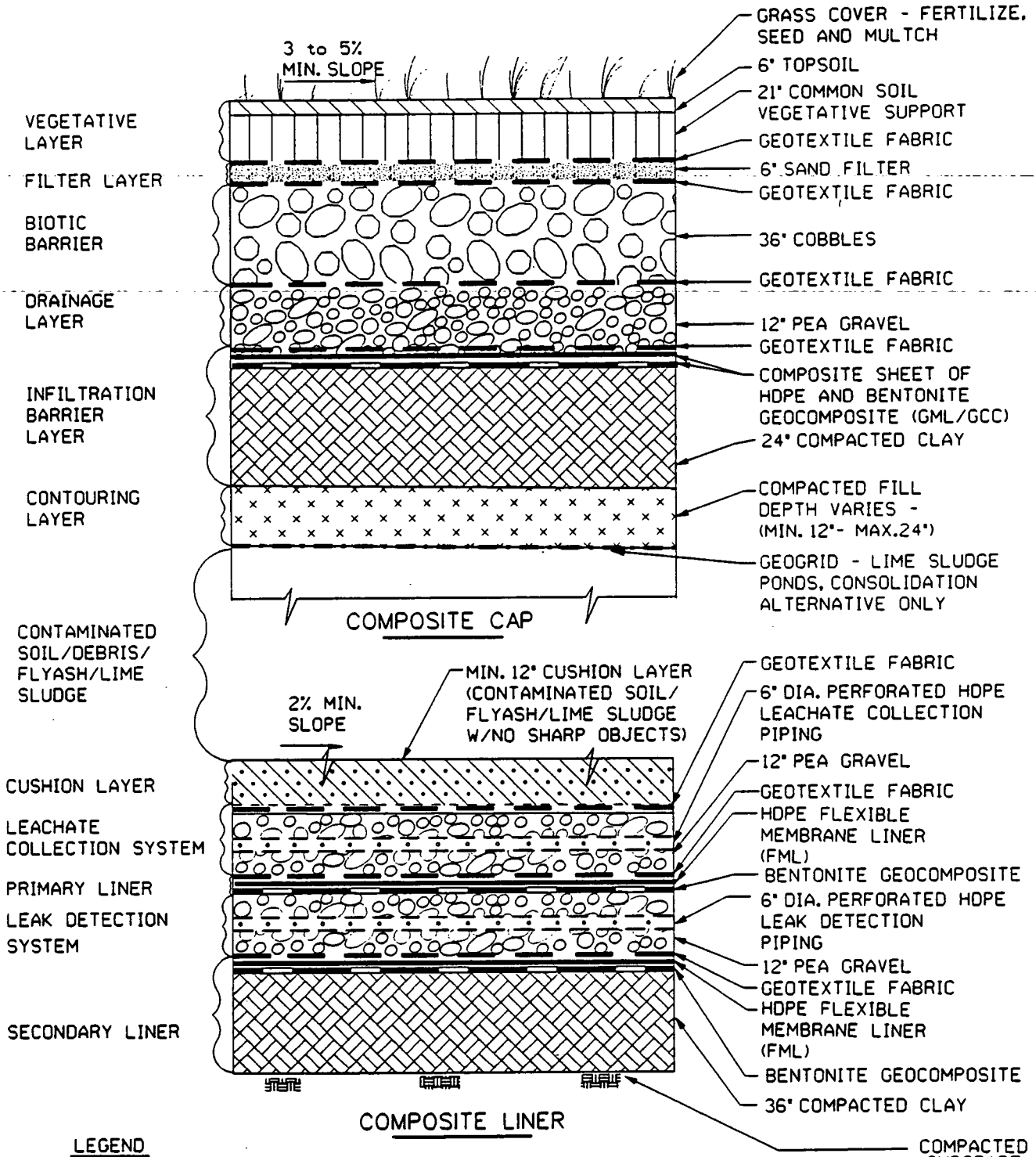


DETAIL 3
NTS

000552

FIGURE E.6-5
TYPICAL DETAIL
EQUIPMENT DECONTAMINATION FACILITY
(NOT TO SCALE)

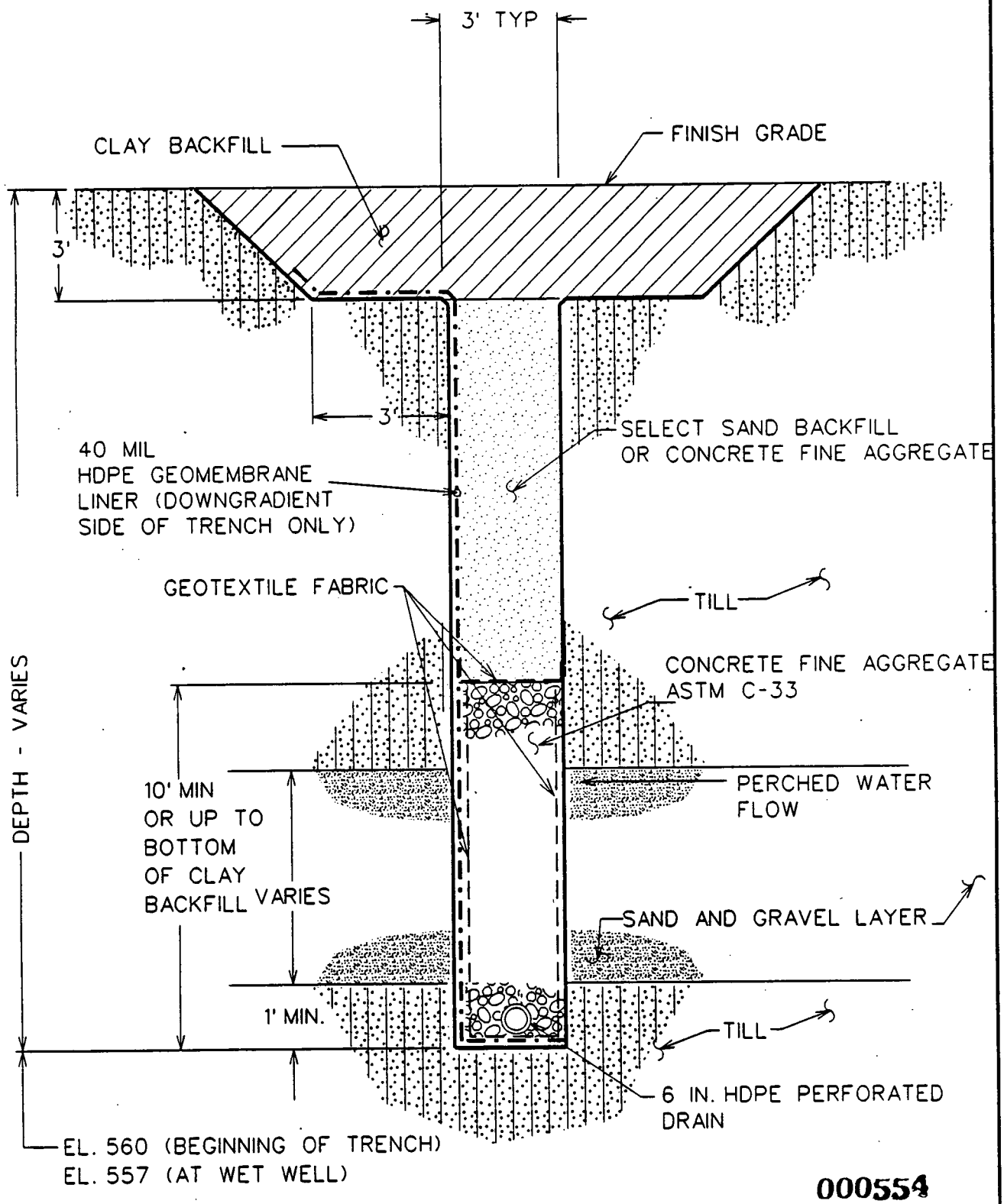
f:s1080.dgn



000553

FIGURE E.6-6
TYPICAL DETAIL
COMPOSITE CAP AND LINER
(NOT TO SCALE)

fs0450.dgn



000554

fs1085.dgn

FIGURE E.6-7
TYPICAL SECTION - SUBSURFACE DRAIN

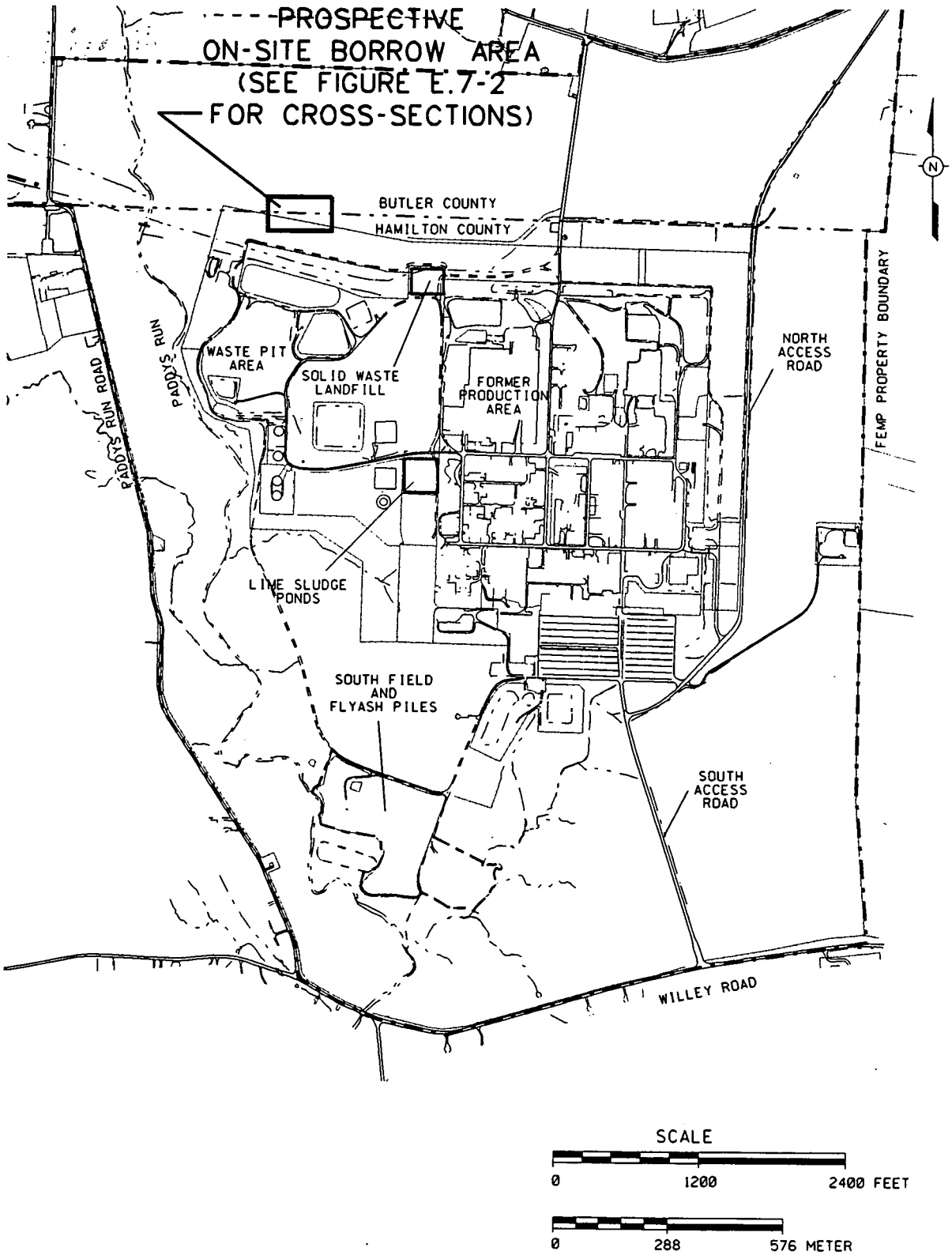
APPENDIX E.7
ON-SITE BORROW SOURCE

APPENDIX E.7
ON-SITE BORROW SOURCE

5861

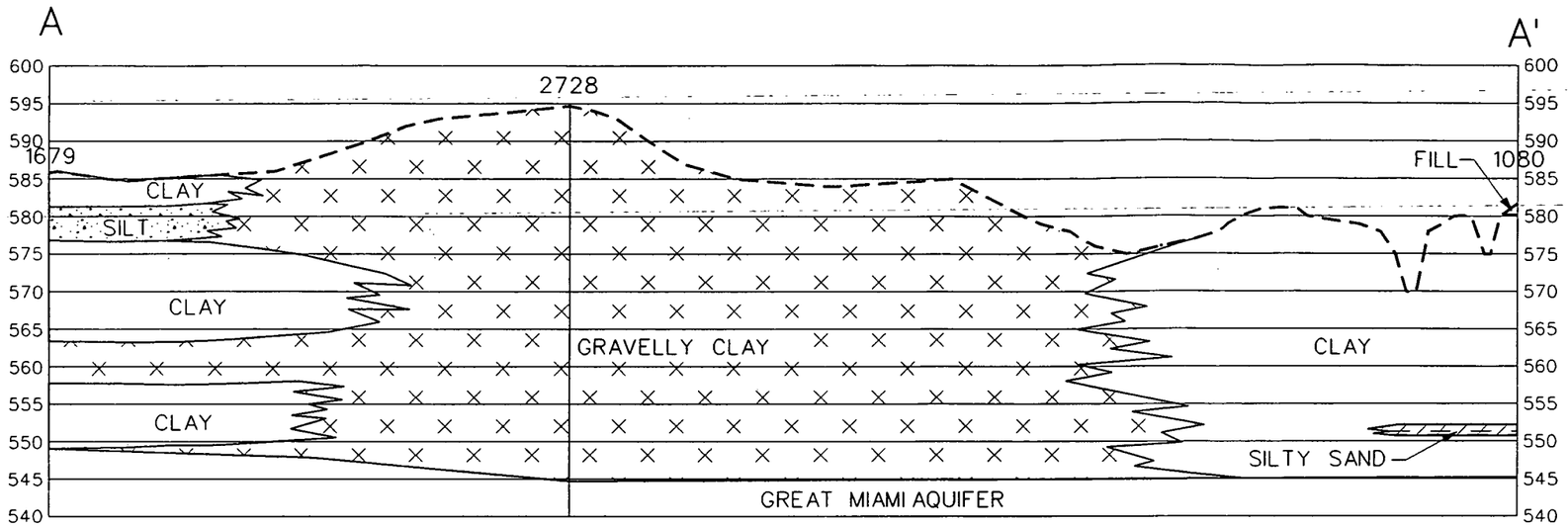
An on-site borrow source is being considered for material to be used in the proposed on-site disposal cell. A location in the northwest portion of the FEMP (see Figure E.7-1) has been identified as a prospective source area. As indicated by the cross sections (Figure E.7-2) the soils in this area consist of clay, gravelly clay, silt, and sand. The boring logs on which the cross sections are based are included following Figure E.7.2. Additional information is needed to adequately describe the lithology and geotechnical properties in the prospective borrow source area. Therefore, additional soil borings will be considered to obtain this information. If it is determined that this area is not adequate as a borrow source, then other on-site or off-site locations may be considered.

000556



fs0991.dgn

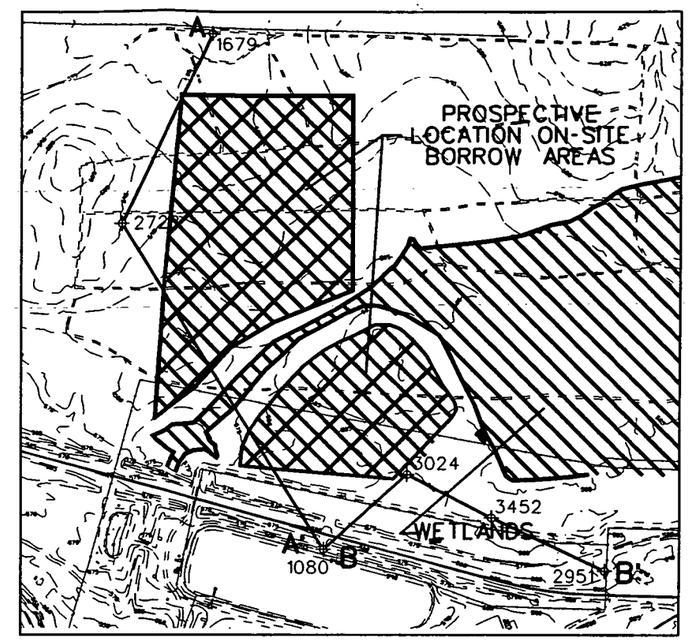
FIGURE E.7-1
LOCATION OF PROSPECTIVE ON-SITE BORROW AREA



SECTION A-A'

SCALE:
HOR 1"=200'
VER 1"=20'

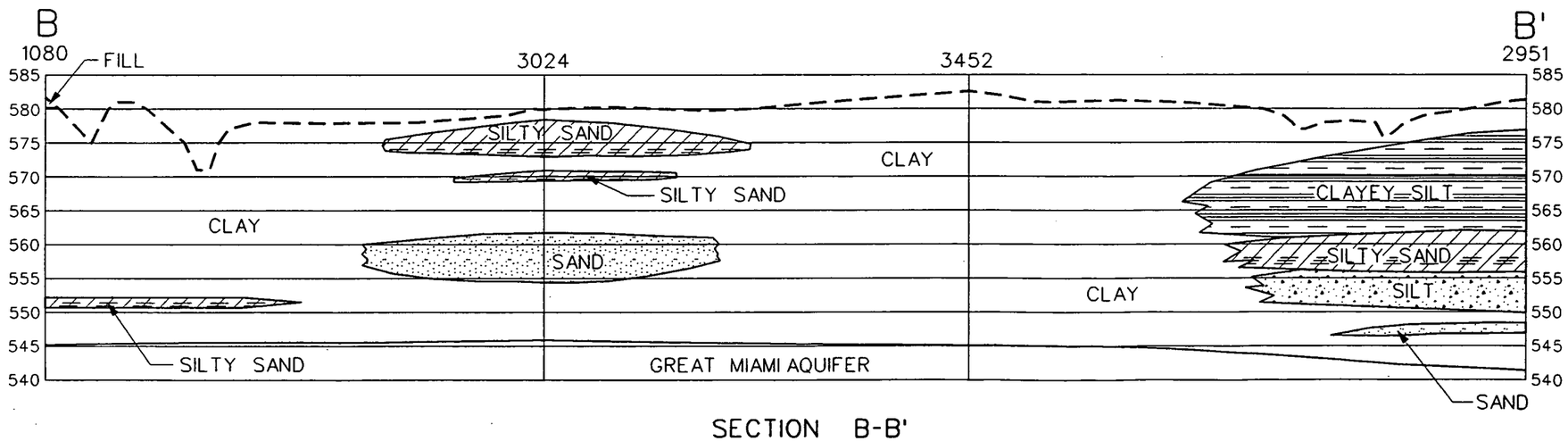
SCALE:
HORIZONTAL 1 cm = 24 m
VERTICAL 1 cm = 2.4 m



LOCATION MAP (1"=500')

LEGEND

- ELEVATION CONTOURS
- ROADS
- STREAM
- FENCE
- RAILROAD
- PROSPECTIVE BORROW AREA
- WETLANDS



SECTION B-B'

SCALE:
HORIZONTAL 1"=100'
VERTICAL 1"=20'

SCALE (FT)
0 50 100 200

SCALE:
HORIZONTAL 1 cm = 24 m
VERTICAL 1 cm = 2.4 m

SCALE (METER)
0 12 24 48

NOTE:
Coordinates are in State Planar NAD 1927.
Surface contours based on 1992 flyover.

000558

FIGURE E.7-2
PROSPECTIVE LOCATION AND CROSS-SECTIONS ON-SITE BORROW AREA

fs0998.dgn

VISUAL CLASSIFICATION OF SOILS

5861

PROJECT NUMBER 20.03.05 RDC 11	PROJECT NAME CRU 2 Phase II	
BORING NUMBER 2951	COORDINATES	DATE 4-13-93
ELEVATION:	GWL: Depth 61.7 Date/Time 4/27/93 1020	DATE STARTED 4-12-93
ENGINEER/GEOLOGIST K. Payne	Depth Date/Time	DATE COMPLETED 4-23-93
DRILLING METHODS Cable Tool		PAGE 1 OF 10

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1	111389 0930 4-13-93	1 4 6	12	Stiff (2.5Y, 4/3) Olive Brown Silty Clay with mottling, non-plastic, slightly moist	CL	1.5	HNU = 0 ppm; βγ = 100 cpm; α = 0 cpm
2 3	111390 0933 4-13-93	6 10 2	12	Very Stiff (2.5Y, 5/6) light olive brown Silty Clay with trace gravel, non-plastic, slightly moist	CL	4.0	HNU = 0 ppm; βγ = 100 cpm; α = 0 cpm
4	111391 0940 4-13-93	6 21 25	14	Hard (2.5Y, 5/6) light olive brown, Silty Clay with trace gravel, non-plastic, slightly moist	CL	4.5	HNU = 0 ppm; βγ = 60 cpm; α = 0 cpm
5 6	111392 0945 4-13-93	30 33 30	15	Very Dense (2.5Y, 6/2) light brownish gray, clayey Silt with trace gravel, non-plastic, slightly moist	ML	N/A	HNU = 0 ppm; βγ = 100 cpm; α = 0 cpm
7	111393 0955 4-13-93	21 27 31	16	Very Dense (2.5Y, 5/3) light olive brown, clayey Silt with trace gravel, slightly plastic, moist	ML	N/A	HNU = 0 ppm; βγ = 100 cpm; α = 0 cpm
8 9	111394 1005 4-13-93	34 37 30	17	Very Dense (2.5Y, 5/3) light olive brown, clayey Silt with trace gravel, non-plastic, slightly moist	ML	N/A	HNU = 0 ppm; βγ = 70 cpm; α = 0 cpm
10	111395 1500 4-13-93	9 18 23	6	Dense (10YR, 6/6) Brownish Yellow, Clayey Silt, mottling, non-plastic, slightly moist	ML	N/A	HNU = 0 ppm; βγ = 80 cpm; α = 0 cpm
11 12	111396 1500 4-13-93	16 15 15	14	Medium Dense (2.5Y, 6/3) light yellowish Brown, Clayey Silt, non-plastic, slightly moist	ML	N/A	HNU = 0 ppm; βγ = 80 cpm; α = 0 cpm
13	111397 1535 4-13-93	4 5 8	7	Medium Dense (2.5Y, 4/2) dark grayish Brown, clayey Silt, slight plasticity, moist	ML	N/A	HNU = 0 ppm; βγ = 60 cpm; α = 0 cpm
14 15	111398 1550 4-13-93	1 4 7	6	Medium Dense (2.5Y, N4/) dark gray, Clayey Silt, low plasticity, moist	ML	N/A	HNU = 0 ppm; βγ = 80 cpm; α = 0 cpm

NOTES
Drilling Contractor Pennsylvania Drilling
Drilling Equipment Cyclone 42
Driller Bob Johnson
Lonnie McGloklin

SAA - Same As Above
NA - Not Applicable
Samples collected per ASTM standard penetration test
Colors identified using Munsell Color Chart

Background Readings HNU = 0 ppm
βγ = 80 cpm

000559

VISUAL CLASSIFICATION OF SOILS

OJECT NUMBER 10.03.05 RDC 11	PROJECT NAME. CRU 2 Phase II		
NG NUMBER 2951	COORDINATES.		DATE 4-13-93
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED 4-12-93
ENGINEER/GEOLOGIST K. Payne	Depth	Date/Time	DATE COMPLETED. 4-23-93
DRILLING METHODS Cable Tool			PAGE 2 OF 10

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
16	111399 1610 4-13-93	2 4 8	5	Medium Dense (5Y, 5/2) Olive Gray, Clayey Silt, low plasticity, moist	ML	N/A	HNU = 0 ppm; βγ = 60 cpm; α = 0 cpm
17–18	111400 1630 4-13-93	1 4 8	7	SAA	ML	N/A	HNU = 0 ppm; βγ = 60 cpm; α = 0 cpm
19	111401 1640 4-13-93	2 4 8	6	Medium Dense (5Y, 5/2) Olive Gray, Clayey Silt with trace gravel, low plasticity, moist	ML	N/A	HNU = 0 ppm; βγ = 60 cpm; α = 0 cpm
20–1	111402 0850 4-15-93	25 27 8	14	Dense (5Y, 5/1) Gray Silty Sand with trace gravel, non-plastic, moist	SM	N/A	HNU = 0 ppm; βγ = 120 cpm; α = 0 cpm
22	111403 0910 4-15-93	8 16 45	6	Very Dense (5Y, 4/2) Olive Gray Silty Sand, non-plastic, moist	SM	N/A	HNU = 0 ppm; βγ = 60 cpm; α = 0 cpm
23–24	111404 0925 4-15-93	31 21 35	8	Very Dense (5Y, 5/2) Olive Gray Silty Sand with trace gravel, non-plastic, moist	SM	N/A	HNU = 0 ppm; βγ = 60 cpm; α = 0 cpm
25	111405 0945 4-15-93	11 25 31	5	Very Dense (5Y, 5/2) Olive Gray Silty Sand with trace gravel, non-plastic, moist	SM	N/A	HNU = 0 ppm; βγ = 60 cpm; α = 0 cpm
26–27	111406 1005 4-15-93	12 19 50/.3	9	Very Dense (5Y, 5/1) Gray Clayey Silt, non-plastic, moist	ML	N/A	HNU = 0 ppm; βγ = 60 cpm; α = 0 cpm
28	111407 1030 4-15-93	10 12 14	13	Medium Dense (5Y, 5/1) Gray Clayey Silt with trace organics and gravel, slightly plasticity, moist	ML	N/A	HNU = 0 ppm; βγ = 60 cpm; α = 0 cp
29–30	111408 1040 4-15-93	11 11 17	12	Medium Dense (5Y, 5/1) Gray Clayey Silt, slight plasticity, moist	ML	N/A	HNU = 0 ppm; βγ = 80 cpm; α = 0 cpm

NOTES

Drilling Contractor Pennsylvania Drilling
Drilling Equipment Cyclone 42
Driller Bob Johnson
Lonnie McGloklin

SAA - Same as above
NA - Not Applicable

Samples collected per ASTM standard penetration
Colors identified using Munsell Color Chart

Background Readings
4-13-93 HNU = 0 ppm 4-15-93 { HNU = 0 ppm, βγ = 60 cpm

000560

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 20.03.05	PROJECT NAME CRU 2 Phase II	
BORING NUMBER 2951	COORDINATES	DATE 4-15-93
ELEVATION:	GWL: Depth Date/Time	DATE STARTED 4-12-93
ENGINEER/GEOLOGIST Keith Payne	Depth Date/Time	DATE COMPLETED 4-27-93
DRILLING METHODS Cable Tool		PAGE 3 of 10

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 (in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
31.0	111409 1350 4-15-93	10 11 15	14	Medium dense (5Y, 4/1) dark gray clayey silt, non plastic, moist	MC	N/A	HNU = 0 ppm $\beta\gamma$ = 100 cpm α = 0 cpm
32.0 33.0	111410 1405 4-15-93	5 6 15	8	Medium dense (5Y, 4/1) dark gray silty sand, non plastic, moist	SM	N/A	HNU = 0 ppm $\beta\gamma$ = 60 cpm α = 0 cpm
34.0	111411 0910 4-16-93	12 30 25	18	Hard (5Y, 4/1) dark gray, silty gravelly, medium plasticity clay, moist	CL	4.5	HNU = 0 ppm $\beta\gamma$ = 60 cpm α = 0 cpm
35.0 36.0	111412 0930 4-16-93	17 21 30	13	Very Dense (2.5Y, 4/4) olive brown, well graded, pebbly sand, dry	SW	N/A	HNU = 0 ppm $\beta\gamma$ = 60 cpm α = 0 cpm
37.0	111413 0940 4-16-93	22 28 25	11	Very Dense (2.5Y, 6/3) light yellowish brown, well graded sand, dry	SW	N/A	HNU = 0 ppm $\beta\gamma$ = 60 cpm α = 0 cpm
38.0 39.0	111414 0955 4-16-93	16 15 21	9	Dense (10YR, 6/3) pale brown well graded sand, dry	SW	N/A	HNU = 0 ppm $\beta\gamma$ = 60 cpm α = 0 cpm
40.0							
41.0	111415 1045 4-16-93	9 9 9	10	Very soft (2.5Y, 5/2) grayish brown silty, sandy, medium plasticity clay, wet	CL	<0.25	HNU = 0 ppm $\beta\gamma$ = 60 cpm α = 0 cpm
42.0 43.0	111416 1330 4-16-93	27 50/.4	10	Very dense (2.5Y, 6/3) light yellowish brown, well graded pebbly sand, dry	SW	N/A	HNU = 0 ppm $\beta\gamma$ = 60 cpm α = 0 cpm
44.0 45.0				Resumed sampling at 5 ft intervals			

Drilling Subcontractor: Pennsylvanian Drilling
Drilling Equipment: Cyclone 42
Driller: Bob Johnson
Lonnie McGlocklin

4-16-93
$\beta\gamma$ background = 40-60 cpm
α background = 0 cpm
HNU background = 0 ppm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 20.03.05	PROJECT NAME. CLU 2 Phase II	
BORING NUMBER 2951	COORDINATES.	DATE 4-16-93
ELEVATION:	GWL: Depth Date/Time	DATE STARTED 4-12-93
ENGINEER/GEOLOGIST Keith Payne	Depth Date/Time	DATE COMPLETED 4-17-93
DRILLING METHODS Cable tool		PAGE 4 OF 10

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 (in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
45.0							
46.0	111417 1350 4-16-93	7 21 45	7	Very Dense (10YR, 6/2) light brownish gray, well graded, gravelly sand, dry	SW	N/A	HNU = 0ppm $\beta\gamma$ = 60cpm α = 0cpm
47.0							
48.0							
49.0							
50.0							
51.0	111418 1440 4-16-93	11 10 21	10	Dense (10YR, 4/2) dark grayish brown, well graded, silty, clayey sand, wet	SC	N/A	HNU = 0ppm $\beta\gamma$ = 60cpm α = 0cpm
52.0							
53.0							
54.0							
55.0							
56.0	111419 1500 4-16-93	21 19 50/4	10	Very Dense (2.5Y, 6/2) light grayish brown, poorly graded, gravelly sand, dry	SP	N/A	HNU = 0ppm $\beta\gamma$ = 60cpm α = 0 cpm
57.0				Begin continuous sampling for sieve analysis and total U			
58.0							
59.0	111420 0910 4-17-93	18 29 30	8	Very Dense (2.5Y, 6/2) light brownish gray, poorly graded, gravelly sand, dry	SP	N/A	Microtip(MT) = 5.2 ppm $\beta\gamma$ = 60cpm α = 0cpm
60.0	111421			See Page 5			

NOTES
Drilling Contractor: Pennsylvania Drilling
Drilling Equipment: Cyclone 42
Driller: Bob Johnson
Lonnie McGlocklin

4-17-93
MT background = 2-3 ppm
$\beta\gamma$ background = 60cpm
α background = 0cpm

000562

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 20.03.05	PROJECT NAME CRU 2 Phase II	
BORING NUMBER 2951	COORDINATES	DATE 4-17-93
ELEVATION:	GWL: Depth Date/Time	DATE STARTED 4-12-93
ENGINEER/GEOLOGIST Keith Payne	Depth Date/Time	DATE COMPLETED 4-17-93
DRILLING METHODS Cable Tool		PAGE 5 OF 10

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
61.0	111421 0930 4-17-93	4 9 10	9	Medium dense (2.5Y, 5/4) light olive brown, well graded, gravelly sand, wet	SW	N/A	MT = 6.6 ppm βγ = 60 cpm α = 0 cpm
62.0	111422 0945 4-17-93	9 10 12	16	Medium dense (2.5Y, 4/2) dark grayish brown, well graded, gravelly sand, wet	SW	N/A	MT = 8 ppm βγ = 60 cpm α = 0 cpm
63.0 64.0	111423 1000 4-17-93	14 13 14	12	Medium Dense (5Y, 5/1) gray, well graded sand with some gravel, wet	SW	N/A	MT = 7 ppm βγ = 60 cpm α = 0 cpm
66.0	111424 1030 4-17-93	18 23 16	11	Dense (5Y, 5/1) gray, well graded sand with some gravel, wet	SW	N/A	MT = 4.9 ppm βγ = 60 cpm α = 0 cpm
66.0	111425 1315 4-17-93	32 50/3	10	Very Dense (10YR, 4/1) dark gray well graded sand with some gravel wet	SW	N/A	MT = 0 ppm βγ = 60 cpm α = 0 cpm
67.0 68.0	111426 1335 4-17-93	13 15 35	15	Dense (10YR, 4/1) dark gray well graded sand with some gravel, wet	SW	N/A	MT = 0 ppm βγ = 60 cpm α = 0 cpm
69.0 70.0	111427 1400 4-17-93	12 18 18	16	Dense (5Y, 4/2) olive gray, well graded, sand with some gravel, wet	SW	N/A	MT = 0 ppm βγ = 60 cpm α = 0 cpm
71.0	111428 1415 4-17-93	10 11 12	15	Medium Dense (5Y, 4/2) olive gray, well graded sand with some gravel, wet	SW	N/A	MT = 0 ppm βγ = 60 cpm α = 0 cpm
72.0 73.0	111429 1500 4-17-93	50 50/3	10	Very Dense (5Y, 4/2) olive gray well graded sand with some gravel wet	SW	N/A	MT = 0 ppm βγ = 60 cpm α = 0 cpm
74.0 75.0				Bottom of Casing at 75.0' Bottom of boring at 75.0			

NOTES
Drilling Contractor: Pennsylvania Drilling
Drilling Equipment: Cyclone 42
Driller: Bob Johnson
Lonnie McGlocklin

See Page 4 for background readings

PIEZOMETER INSTALLATION SHEET

PROJECT NAME CRU 2 Phase II
FIELD ENG./GEO. K. Payne DATE 4-26
PROJECT NO. 20.03.05 RDC11
CHECKED BY _____ DATE _____
BORING NO. 2951
PIEZOMETER NO. ~~NA~~ 2951 SR 4-21-93
DATE OF INSTALLATION 4-23-93

BOREHOLE DRILLING

DRILLING METHOD Cable Tool
DRILLING FLUID (S) USED:
FLUID Water FROM 0.0 FT TO 65.0 FT
FLUID N/A FROM N/A TO N/A

TYPE OF BIT Hammer Percussion Bit
CASING SIZE (S) USED:
SIZE 10.0 in ID FROM 0.0 FT TO 75.0 FT
SIZE N/A FROM N/A TO N/A

PIEZOMETER DESCRIPTION

TYPE Monitoring Well
DIAMETER OF PERFORATED SECTION 4.0 ID
PERFORATION TYPE:
SLOTS [X] HOLES [ ] SCREEN [ ]
AVERAGE SIZE OF PERFORATIONS .010 IN
TOTAL PERFORATED AREA 15.0 FT

RISER PIPE MATERIAL 316 Stainless Steel
RISER PIPE DIAMETERS:
O.D. 4 3/8 IN I.D. 4.0 IN
LENGTH OF PIPE SECTIONS 5-10 FT; 1-5 FT; 2-7
JOINING METHOD Screw type - flush joint threaded

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5.0 FT
PROTECTIVE PIPE O.D. 10 3/4 IN

OTHER PROTECTION Hinged locking cover with padlock

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (FT)		ELEVATION ( )	
TOP OF RISER PIPE	2.0 FT			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.5 FT			
BOREHOLE FILL MATERIALS:	TOP 0.0 FT	BOTTOM .8 FT		
Cement GROUT/SLURRY	TOP .8 FT	BOTTOM 45.0 FT	TOP	BOTTOM
BENTONITE	TOP 45.0 FT	BOTTOM 50.0 FT	TOP	BOTTOM
SAND	TOP 50.0 FT	BOTTOM 75.0 FT	TOP	BOTTOM
GRAVEL	TOP N/A	BOTTOM N/A	TOP	BOTTOM
PERFORATED SECTION	TOP 55.0 FT	BOTTOM 70.0 FT	TOP	BOTTOM
PIEZOMETER TIP	72.0 FT			
BOTTOM OF BOREHOLE	75.0 FT			
GWL AFTER INSTALLATION	61.7 FT (Top of Riser)			

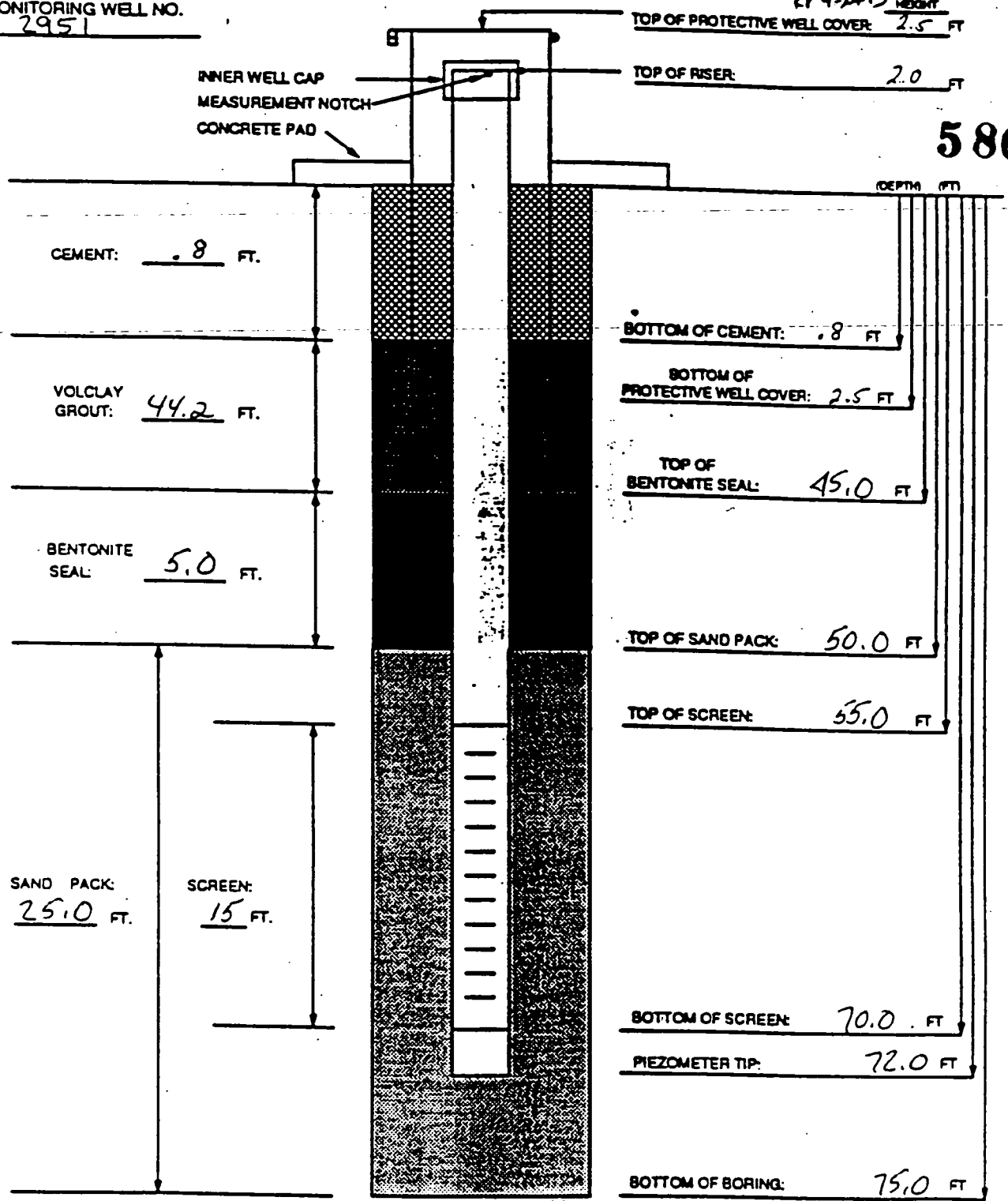
WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES [ ] NO [X]
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES [ ] NO [X]
REMARKS Cement was placed from 0.0 to .8 ft to hold the protective cover in place.

FERNALD RI/FS
INSTALLATION DIAGRAM
MONITORING WELL NO. 2951

INSTALLATION DATE: ~~4/14/95~~ 9-23-93
KP 4-24-93

7/10

5861



000565

MATERIALS USED

SAND TYPE AND QUANTITY: 10/20, 25 bags @ 50lb
BENTONITE PELLETS (5-GALLON BUCKETS): 4
BAGS OF VOLCLAY GROUT: 10.5
AMOUNT OF CEMENT: 1 bag @ 94lb.
AMOUNT OF WATER USED: 900 gal
WASTE: 13 Drums Soil ; 1 Drum Alconox/Water
TASK: 20.03.05 ROC 11

NOTES:

1) RISER PIPE IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE, FLUSH-THREADED JOINTS.
2) SCREEN IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE WITH 0.010 IN. SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH AND DATE: 4/23/93 FT: 61.7
5) TOP OF CASING IS SECURED WITH A STAINLESS STEEL CAP.
6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL.
7) WELL CASING HAS A PROTECTIVE COVER WITH PADLOCK.

GEOLOGIST/ENGINEER: Keith Payne

ISI FORM 0157 REV 10

8/10

MW2951

930419-048

4-20-93 Tom McCullough

***** CHAIN OF CUSTODY *****

Analysis ID: 930419-048 Project No.: 0020-0001 Charge: RDC11
Customer No.: 111430 Customer Name: FERMCO
Matl. Descr.: OU-2 PHASE 2 Deadline: 26-APR-1993
Sample Matrix: SOIL Date Sampled: 17-APR-1993
Comments: SEND RESULTS TO: MIKE FRANK FAX: (513)738-0145

Sample Logged By: KS FRENCH Modified By: KS FRENCH
Sampled From: B2951 Date Modified: 19-APR-1993 13:25

ENVIRONMENTAL & PROCESS MATERIALS LABORATORY

Analysis	Units	Activ.	Prep Proc No	Analys Proc No
SIEVE ANALYSIS, 40% RETAINED	.001 INCH	9158	42	9158
SIEVE ANALYSIS, 50% RETAINED	.001 INCH	9158	32	9158
SIEVE ANALYSIS, 90% RETAINED	.001 INCH	9158	8	9158

Crosschecked by: _____ FAXED
Entered on Computer by: _____ Dated by _____
Approved and Printed by: _____

000566

Customer Number: 111750

MATERIAL: 930419-048 SAMPLE NUMBER:

DETERMINATION: Particle Size METHOD: Sieve Analysis

Sample weight: 191.9

Sieve Number	Weight Retained, g	% Retained	Cumulative % Retained	Grain Size, 1/1000 inch
10	45.4	~~23.6~~ 23.7	~~23.6~~ 23.7	78.7
20	47.3	24.6	48.3	33.5
40	53.0	27.6	75.9	16.7
60	25.8	13.4	89.3	9.8
100	8.3	4.3	93.6	5.9
200	4.8	2.5	96.0	3.0
Pan	6.9	3.6	99.6	

$\frac{W_2 \times 100\%}{W_1} = R$ 191.5

$\frac{\text{Original - Duplicate}}{\text{Average}} \times 100\% = \text{RPD}$

Analyzed by: Tom McCullough

Checked by: [signature]

Date analyzed: 4-20-93

GRAIN SIZE RETAINED

40 % 42

50 % 32

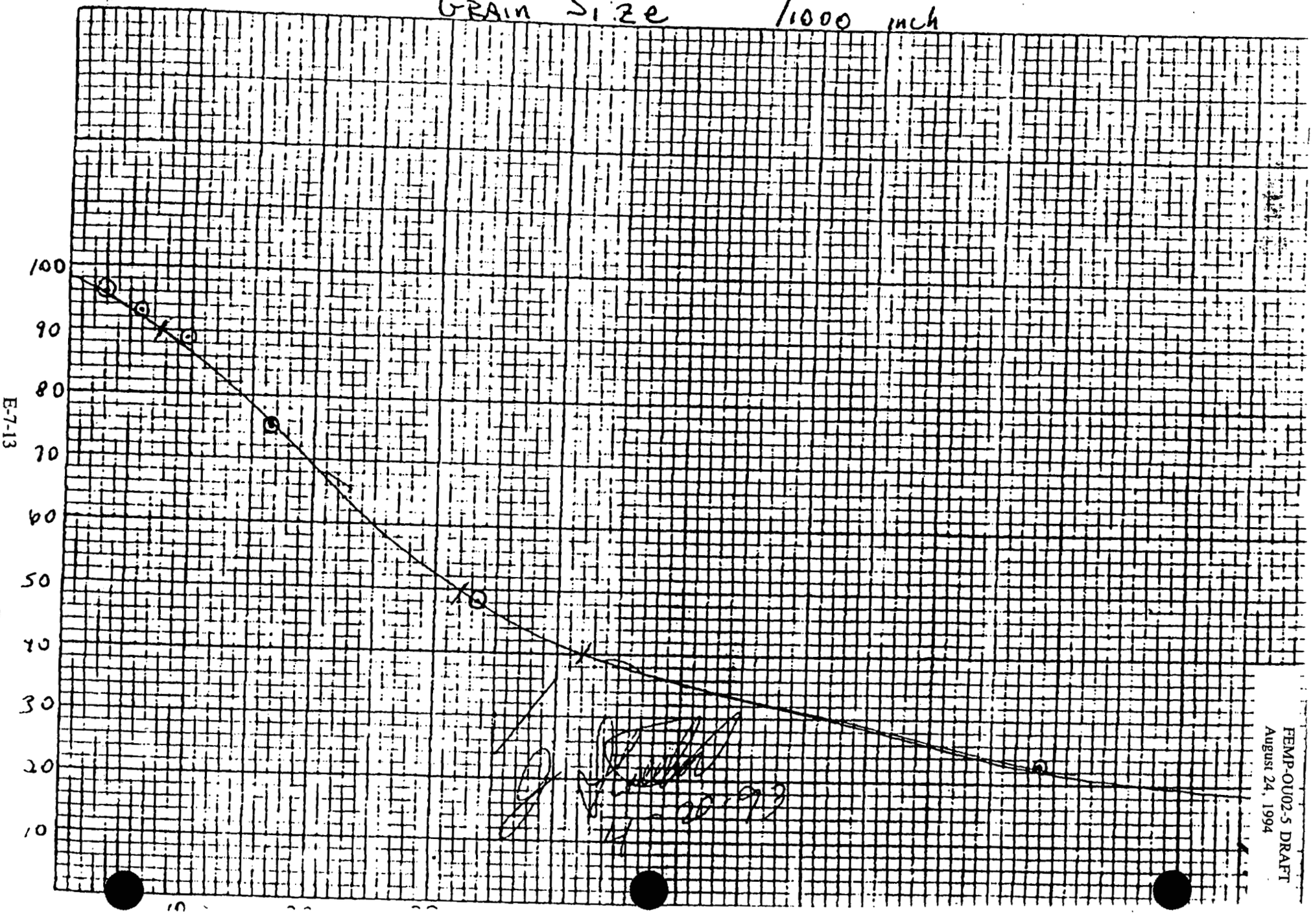
90 % 8

000567

NO 3407 .10 DIETZGEN GRAPH PAPER
10 X 10 PER INCH

930719-048 EUGENE DIETZGEN CO MADE IN U. S. A. Tom McDough

GRAIN SIZE 1/1000 inch



000568

VISUAL CLASSIFICATION OF SOILS

5861

PROJECT NUMBER. 602 04 28 WBA-40	PROJECT NAME. RCRA Phase II	
BORING NUMBER. 3452	COORDINATES: /	DATE 1/27/93
ELEVATION:	GWL: Depth 63.5' Date/Time 2/5/93/750	DATE STARTED 1/27/93
ENGINEER/GEOLOGIST. Ken Geiger	Depth 61.7' Date/Time 2/17/93/1550	DATE COMPLETED: 2/16/93
DRILLING METHODS: Cable Tool		PAGE 1 OF ~~13~~ 16

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0	107000 1330 1/27/93	1 2 3	18	Soft, Dark Yellowish Brown (10YR 4/4) Silty Clay with a Trace of ~~silt~~ sand, med Plasticity, Moist RG 1/27/93	RG 1/27/93 .5 CL	.5	Hnu = 0ppm Bg = 40 cpm α = 0 cpm Some Grass + Roots in Sample
1.5	107001 1340 1/27/93	1 1 1	13	Stiff Yellowish Brown (10YR 5/6) Silty Sandy Clay with Some Gravel Low Plasticity, moist	CL	1.5	Hnu = 0 ppm Bg = 40 cpm α = 0 cpm
3.0	107002 1350 1/27/93	2 3 5	18	Stiff, Yellowish Brown (10YR 5/6) Silty Clay with Some Sand and Gravel Low Plasticity, moist	CL	1.5	Hnu = 0 ppm Bg = 40 cpm α = 0 cpm
4.5	107003 1400 1/27/93	19 23 28	18	Same As Above	CL	1.5	Hnu = 0 ppm Bg = 40 cpm α = 0 cpm
				Stiff Gray (2.5Y 5/1) Silty Sandy Clay with Some Gravel Low Plasticity, moist	CL	1.5	
6.0	107004 1410 1/27/93	19 28 32	12	Very Soft Gray (2.5Y 5/1) Silty Sandy Clay with Some Gravel Low Plasticity, moist	CL	.25	Hnu = 0ppm Bg = 40cpm α = 0cpm
7.5							

PRELIMINARY

NOTES:
Drilling Company: Pennsylvania Drilling
Driller: Dave Newman
Assistant Driller:

Samples collected per ASTM standard penetration test. Colors identified using Munsell Color Chart.
Background Levels
Hnu = 0 ppm
Bg = 20-40 cpm
α = 0 cpm

000569

402-11-6

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 602 04 25 WBA-40	PROJECT NAME: RCRA Phase II	
BORING NUMBER: 3452	COORDINATES:	DATE 1/27/93
ELEVATION:	GWL: Depth 63.5 Ft Date/Time 2/5/93/950	DATE STARTED: 1/27/93
ENGINEER/GEOLOGIST: Ken Geiger	Depth 61.7 Ft Date/Time 2/17/93/1550	DATE COMPLETED: 2/16/93
DRILLING METHODS: Cable Tool		PAGE 2 OF 13/6

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
7.5	107005 1420 1/27/93	14 23 45	12	Very Soft Gray (2.5Y, 5/1) Silty Sandy Clay with Some Gravel Low Plasticity, Moist	CL	.25	Hnu = 0 ppm Br = 40 cpm α = 0 cpm
9.0	107006 1430 1/27/93	33 45 49	18	Very Soft Gray (2.5Y, 5/1) Silty Sandy Clay with Some Gravel medium Plasticity, Moist	CL	.25	Hnu = 0 ppm Br = 40 cpm α = 0 cpm
10.5	107007 1600 1/27/93	2 4 4	13	Very Soft Gray (2.5Y, 5/1) Silty Sandy Clay with a Trace of Gravel, Medium Plasticity, Moist	CL	.25	Hnu = 0 ppm Br = 40 cpm α = 0 cpm
12.0	107008 830 1/28/93	4 6 9	14	Stiff Dark Gray (2.5Y 4/1) Silty Sandy Clay with Some Gravel, Medium Plasticity, Moist	CL	1.0	Hnu = 0 ppm Br = 60 cpm α = 0 cpm
13.5	107009 840 1/28/93	4 6 8	7	Same As Above	CL	1.0	Hnu = 3.0 ppm Br = 60 cpm α = 0 cpm
15.0							

NOTES:

See Page 1

Background Levels 1/27/93
Hnu = 0 ppm
Br = 20-40 cpm
α = 0 cpm

Background Levels 1/28/93
Hnu = 0 ppm
Br = 40-60
α = 0 cpm

PRELIMINARY

402-11-8

VISUAL CLASSIFICATION OF SOILS

5861

PROJECT NUMBER 602.04.28 WBA-40	PROJECT NAME RCRA Phase II	
BORING NUMBER 3452	COORDINATES:	DATE 1/28/93
ELEVATION:	GWL: Depth 63.5 ft Date/Time 2/5/93/ 750	DATE STARTED 1/27/93
ENGINEER/GEOLOGIST Ken Geiger	Depth 61.7 ft Date/Time 2/17/93/ 1550	DATE COMPLETED: 2/16/93
DRILLING METHODS Cable Tool		PAGE 3 OF ~~13~~ 16

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15.0	107010 850 1/28/93	7 8 7	6	Very Soft Dark Gray (2.5Y, 4/1) Silty clay with some Sand and Gravel, medium Plasticity, Moist	CL	.25	HNU = 1ppm βγ = 40 cpm α = 0 cpm
16.5	107011 905 1/28/93	5 5 7	14	Very Soft, Dark Gray (2.5Y, 4/1) Silty clay with some Sand and Gravel, medium Plasticity, Moist	CL	.25	HNU = 1ppm βγ = 40cpm α = 0 cpm
18.0	107012 920 1/28/93	6 9 12	18	Same As Above	CL	.25	HNU = 1ppm βγ = 40cpm α = 0 cpm
19.5	107013 1030 1/28/93	7 12 14	14	Very Soft Dark Gray (2.5Y, 4/1) Silty clay with a Trace of sand and Gravel, medium Plasticity, Moist	CL	.25	HNU = 1ppm βγ = 40cpm α = 0 cpm
21.0	107014 1050 1/28/93	7 13 14	13	Same As Above	CL	.25	HNU = 0ppm βγ = 40 cpm α = 0 cpm
22.5							

NOTES

See Page 1

Background Levels
HNU = 0ppm
βγ = 40-60 cpm
α = 0 cpm

PRELIMINARY

000571

402-11

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 02.04.28 WBA-40	PROJECT NAME: RCRA Phase II	
BORING NUMBER: 3452	COORDINATES:	DATE 1/28/93
ELEVATION:	GWL: Depth 63.5 ft Date/Time 2/5/93/750	DATE STARTED: 1/27/93
ENGINEER/GEOLOGIST: Ken Geiger	Depth 61.4 ft Date/Time 2/17/93/1550	DATE COMPLETED: 2/16/93
DRILLING METHODS: Cable Tool		PAGE 4 OF ~~15~~ 16

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
22.5	107015 1340 1/28/93	1 1 50	6	Hard Dark Gray (2.5Y 4/1) Gravelly, Sandy, Clay Low plasticity, slightly moist	CL	4.5	Hnu = 0 ppm Bγ = 40 cpm α = 0 cpm
24.0	107016 1430 1/28/93	32 50/4	8	Same As Above	CL	4.5	Hnu = 0 ppm Bγ = 40 cpm α = 0 cpm
25.5	107017 1510 1/28/93	19 25 35	12	Very Stiff Dark Gray (2.5Y, 4/1) Gravelly Clay with Some Sand, medium plasticity, slightly moist	CL	3.5	Hnu = 0 ppm Bγ = 40 cpm α = 0 cpm
27.0	107018 1540 1/28/93	13 17 21	17	Very Stiff Dark Gray (2.5Y, 4/1) Sandy Clay with Some Gravel, medium plasticity, slightly moist	CL	3.5	Hnu = 0 ppm Bγ = 40 cpm α = 0 cpm
28.5	107019 1600 1/28/93	10 12 12	18	Stiff, Dark Gray (2.5Y, 4/1) Sandy Clay with Some Gravel and a Trace of organic material (wood), medium plasticity, slightly moist	CL	2.0	Hnu = 0 ppm Bγ = 40 cpm α = 0 cpm
30.0							

NOTES:

See Page 1

Background Levels
Hnu = 0 ppm
Bγ = 40-60 cpm
α = 0 cpm

PRELIMINARY

000572

402-11

VISUAL CLASSIFICATION OF SOILS

5861

PROJECT NUMBER 6020428 WBA-40	PROJECT NAME. RCRA Phase II	
BORING NUMBER. 3452	COORDINATES:	DATE 1/29/93
ELEVATION:	GWL: Depth 63.5 Ft Date/Time 2/5/93/750	DATE STARTED 1/29/93
ENGINEER/GEOLOGIST Ken Geiger	Depth 61.7 Ft Date/Time 2/17/93/1550	DATE COMPLETED: 2/16/93
DRILLING METHODS: Cable Tool		PAGE 5 OF 6

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
30.0	107020 950 1/29/93	8 11 13	6	Stiff Dark Gray (2.5Y, 4/1) Sandy clay with some Gravel, medium Plasticity moist	CL	2.0	HNU = 0ppm Bg = 40cpm α = 0cpm
31.5	107021 1020 1/29/93	8 10 12	18	Very Stiff Dark Gray (2.5Y, 4/1) Sandy clay with some Gravel medium plasticity, moist	CL	3.5	HNU = 0ppm Bg = 40cpm α = 0cpm
33.0	107022 1050 1/29/93	10 14 17	18	Stiff Dark Gray (2.5Y, 4/1) Sandy Clay with some Gravel medium plasticity, moist	CL	1.5	HNU = 0ppm Bg = 40cpm α = 0cpm
34.5	107023 1330 1/29/93	9 13 17	17	Same As Above	CL	1.5	HNU = 0ppm Bg = 40cpm α = 0cpm
36.0	107024 1350 1/29/93	5 7 9	18	Stiff Dark Gray (2.5Y, 4/1) Sandy Clay with some Gravel, medium Plasticity, moist	CL	1.0	HNU = 0ppm Bg = 40cpm α = 0cpm
37.5							

NOTES:

See Page 1

Background Levels
HNU = 0 ppm
Bg = 40-60cpm
α = 0cpm

PRELIMINARY

000573

402-11

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 602.04.28 WBA-40	PROJECT NAME RCRA Phase II	
BORING NUMBER 3452	COORDINATES:	DATE 1/29/93
ELEVATION:	GWL: Depth 63.5 ft Date/Time 2/15/93/750	DATE STARTED 1/27/93
ENGINEER/GEOLOGIST Ken Gerger	Depth 61.7 ft Date/Time 2/17/93/1550	DATE COMPLETED 2/16/93
DRILLING METHODS Cable Tool		PAGE 6 OF 13/6

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6")	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
37.5	107025 1410 1/29/93	29 32 45	13	Very Dense Dark Yellowish Brown (10YR,4/4) well Graded medium Sand with a Trace of Gravel, Dry	SW	N/A	Hnu = 0 ppm Bγ = 40 cpm α = 0 cpm
39.0	107026 1530 1/29/93	41 50/5	8	Same As Above	SW	N/A	Hnu = 0 ppm Bγ = 40 cpm α = 0 cpm
40.5				No Samples Taken. Samples To Be Taken Every 5' Starting at 45'			
45.0	107027 1645 1/29/93	50/.5	5	Very Dense, Dark Yellowish Brown, (10YR,4/4) well Graded medium Sand with a Trace of Gravel, Dry	SW	N/A	Hnu = 0 ppm Bγ = 40 cpm α = 0 cpm
46.5							
50.0	107028 930 2/1/93	41 49 50/.5	14	Very Dense, Dark Yellowish Brown (10YR,4/4) well Graded medium Sand with Some Gravel, Dry	SW	N/A	Hnu = 0 ppm Bγ = 65 cpm α = 0 cpm
51.5							
52.5							

NOTES:

See Page 1

Background Levels 1/29/93
Hnu = 0 ppm
Bγ = 40-60 cpm
α = 0 cpm

Background Levels 2/1/93
Hnu = 0 ppm
Bγ = 40-60 cpm
α = 0 cpm

VISUAL CLASSIFICATION OF SOILS

5861

PROJECT NUMBER 602,0428 WBA-40	PROJECT NAME. RCRA Phase II	
BORING NUMBER. 3452	COORDINATES:	DATE 2/3/93
ELEVATION:	GWL: Depth 63.5 Ft Date/Time 2/5/93/750	DATE STARTED 1/27/93
ENGINEER/GEOLOGIST Ken Geiger	Depth 61.7 Ft Date/Time 2/17/93/1550	DATE COMPLETED: 2/16/93
DRILLING METHODS: Cable Tool		PAGE 7 OF 13 16

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
52.5							
55.0	107029 840 2/3/93	32 50 50/5	4	Very Dense Dark Yellowish Brown (10YR 4/4) well Graded medium Sand with a Trace of Gravel and clay, Dry	SW	N/A	Hnu = 0 ppm Bg = 46 cpm α = 0 cpm Some moisture, Appears To Be from Drilling fluid.
56.5							
60.0	107030 950 2/3/93	32 50/5	8	Very Dense Dark Yellowish Brown (10YR, 4/4) Poorly Graded medium sand, with Some Gravel, Dry	SP	N/A	Hnu = 0 ppm Bg = 40 cpm α = 0 cpm Some moisture Appears To Be from Drilling fluid.
61.5				▽ WATER TABLE 61.7'			
65.0	107031 1335 2/3/93	35 50/3	8	Very Dense, Dark Gray (10YR, 4/1) well Graded medium Sand, with Some Gravel, wet	SW	N/A	Hnu = 0 ppm Bg = 40 cpm α = 0 cpm
66.5							
67.5							

NOTES:

See Page 1

Background Levels
Hnu = 0 ppm
Bg = 46-60 cpm
α = 0 cpm

000575

402-11

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER. 6020428 WBA-40	PROJECT NAME. RCRA Phase II	
BORING NUMBER. 3452	COORDINATES:	DATE 2/3/93
ELEVATION:	GWL: Depth 63.5 ft Date/Time 2/5/93 / 750	DATE STARTED 1/27/93
ENGINEER/GEOLOGIST Ken Geiger	Depth 61.7 ft Date/Time 2/17/93 / 1550	DATE COMPLETED: 2/16/93
DRILLING METHODS: Cable Tool		PAGE 8 OF 13/16

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
69.5							
70.0	107032 1355 2/3/93	12 10 12	14	Medium Dense Dark Gray (10YR, 4/1) well Graded Fine Sand with a Trace of Gravel, WET	SW	N/A	HNu = 0ppm Br = 40cpm α = 0cpm
71.5							
75.0	107033 1500 2/3/93	32 50/3	6	Very Dense Dark Gray (10YR, 4/1) well Graded Fine Sand with a Trace of Gravel, WET	SW	N/A	HNu = 0ppm Br = 40-60cpm α = 0cpm
76.5							
80.0	107035 1410 2/4/93	6 10 17	12	Medium Dense Dark Gray (10YR, 4/1) Poorly Graded Sand with Some Gravel, WET	SP	N/A	HNu = 0ppm Br = 40-60cpm α = 0cpm
81.5							
82.5							

NOTES:

See Page 1

Background Levels 2/3/93
HNu = 0ppm
Br = 40-60cpm
α = 0cpm

Background Levels 2/4/93
HNu = 0ppm
Br = 40-60cpm
α = 0cpm

402-11-86

VISUAL CLASSIFICATION OF SOILS

5861

PROJECT NUMBER 602.04.29 WBA-40	PROJECT NAME: RCRA Phase II	
BORING NUMBER: 3452	COORDINATES:	DATE 2/4/93
ELEVATION:	GWL: Depth 63.5 ft Date/Time 2/5/93/950	DATE STARTED: 1/27/93
ENGINEER/GEOLOGIST Ken Geiger	Depth 61.7 ft Date/Time 2/17/93/1550	DATE COMPLETED: 2/16/93
DRILLING METHODS: Cable Tool		PAGE 9 OF 16

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
82.5							
85.0	107036 1505 2/4/93	9 17 21	13	Dense Dark Gray (10YR, 4/1) Poorly Graded Gravelly Sand, wet	SP	N/A	HNU = 0 ppm BY = 40-60 cpm α = 0 cpm
86.5							
90.0	107037 1625 2/4/93	9 12 15	18	Medium Dense Dark Gray (10YR, 4/1) Poorly Graded Gravelly Sand, wet	SP	N/A	HNU = 0 ppm BY = 40-60 cpm α = 0 cpm
91.5							
95.0	107038 940 2/5/93	25 25 25	18	Dense Dark Gray (10YR, 4/1) Poorly Graded Gravelly Sand, wet	SP	N/A	HNU = 0 ppm BY = 40 cpm α = 0 cpm
96.5							
97.5							

NOTES:

See Page 1

Background Levels 2/4/93
HNU = 0 ppm
BY = 40-60 cpm
α = 0 cpm

Background Levels 2/5/93
HNU = 0 ppm
BY = 40-60 cpm
α = 0 cpm

000577

402-11-88

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 602.04.28 WBA-40	PROJECT NAME RCRA Phase II	
BORING NUMBER 3452	COORDINATES:	DATE 2/5/93
ELEVATION:	GWL: Depth 63.5 ft Date/Time 2/5/93/750	DATE STARTED 1/27/93
ENGINEER/GEOLOGIST Ken Geiger	Depth 61.7 ft Date/Time 2/17/93/1550	DATE COMPLETED: 2/16/93
DRILLING METHODS Cable Tool		PAGE 10 OF 13 16

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
99.5							
100.0	107039 1020 2/5/93	5 7 10	17	Medium Dense, Dark Gray (10YR, 4/1) Poorly Graded Sand with Some Gravel, wet	SP	N/A	Hnu = 0ppm Bγ = 40-60cpm α = 0cpm
101.5							
105.0	107041 1425 2/5/93	20 25 31	18	V. Dense, Dark Gray (10YR, 4/1) Poorly Graded Gravelly Sand with Some Clay, wet V. Dense, Dark Gray (5Y, 4/1) Clayey Silt with a Trace of Gravel, wet	SP ML	N/A N/A	Hnu = 0ppm Bγ = 40-60cpm α = 0cpm
106.5	107042 1520 2/5/93	17 24 32	10	Very Dense, Dark Gray (5Y, 4/1) Well Graded Fine Sand with a Trace of Gravel, wet	SW	N/A	Hnu = 0ppm Bγ = 40-60cpm α = 0cpm
108.0	107043 1535 2/5/93	12 16 21	12	Dense, Dark Gray (5Y, 4/1) Well Graded Fine Sand with a Trace of Gravel, wet	SW	N/A	Hnu = 0ppm Bγ = 60cpm α = 0cpm
109.5	107044 1600 2/5/93	9 12 17	14	Medium Dense, Dark Gray (5Y, 4/1) Well Graded Fine Sand with a Trace of Gravel, wet	SW	N/A	Hnu = 0ppm Bγ = 40-60cpm α = 0cpm
111.0	107045 935 2/8/93	10 32 50	14	Very Dense, Dark Gray (5Y, 4/1) Well Graded Fine Sand with a Trace of Gravel, wet Very Dense, Brown (10YR, 4/3) Well Graded Fine Sand with a Trace of Gravel, wet	SW SW	N/A N/A	Hnu = 0ppm Bγ = 60cpm α = 0cpm
112.5							

NOTES:

See Page 1

Background Levels 2/5/93
Hnu = 0ppm
Bγ = 40-60cpm
α = 0cpm

Background Levels 2/8/93
Hnu = 0ppm
Bγ = 40-60 cpm
α = 0 cpm

402-11-86

VISUAL CLASSIFICATION OF SOILS

5861

PROJECT NUMBER 602.04.28 WBA-40	PROJECT NAME. RCRA Phase II	
BORING NUMBER. 3452	COORDINATES:	DATE 2/8/93
ELEVATION:	GWL: Depth 63.5 ft Date/Time 2/5/93/750	DATE STARTED: 1/27/93
ENGINEER/GEOLOGIST Ken Geiger	Depth 61.7 ft Date/Time 2/17/93/1550	DATE COMPLETED: 2/16/93
DRILLING METHODS: Cable Tool		PAGE 11 OF 15/16

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 (in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
112.5	107046 955 2/8/93	10 24 24	12	Dense Brown (10YR, 4/3) well Graded Fine Sand with a Trace of Gravel, wet	SW	N/A	Hnu = 0ppm Bγ = 60cpm α = 0cpm
114.0				Soft, Dark Gray (10YR, 4/1) Silty clay with a Trace of Sand, Low Plasticity, moist	CL	.5	
	107047 1020 2/8/93	12 12 42	9	Very Soft, Dark Gray (10YR, 4/1) Silty Sandy clay, Low Plasticity, moist	CL	.25	Hnu = 0ppm Bγ = 60cpm α = 0cpm
115.5	107048 1340 2/8/93	10 13 24	18	Very Stiff, Dark Gray (5Y, 4/1) Silty clay with Some black (5Y, 2.5/1) mottling, medium Plasticity, moist	CL	2.0	Hnu = 0ppm Bγ = 60cpm α = 0cpm
117.0	107050 1515 2/8/93	Shelby N/A Tube	18	Very Stiff, Dark Gray (5Y, 4/1) Silty Clay with a Trace of Sand and Gravel, medium Plasticity, moist	CL	2.0	Hnu = 0ppm Bγ = 60cpm α = 0cpm Shelby Tube
119.0				Bottom of Boring at 117.0 ft. Pushed Shelby Tube From 117.0 ft - 119.0 ft.			Composite Sieve Sample #107049

NOTES:

See Page 1

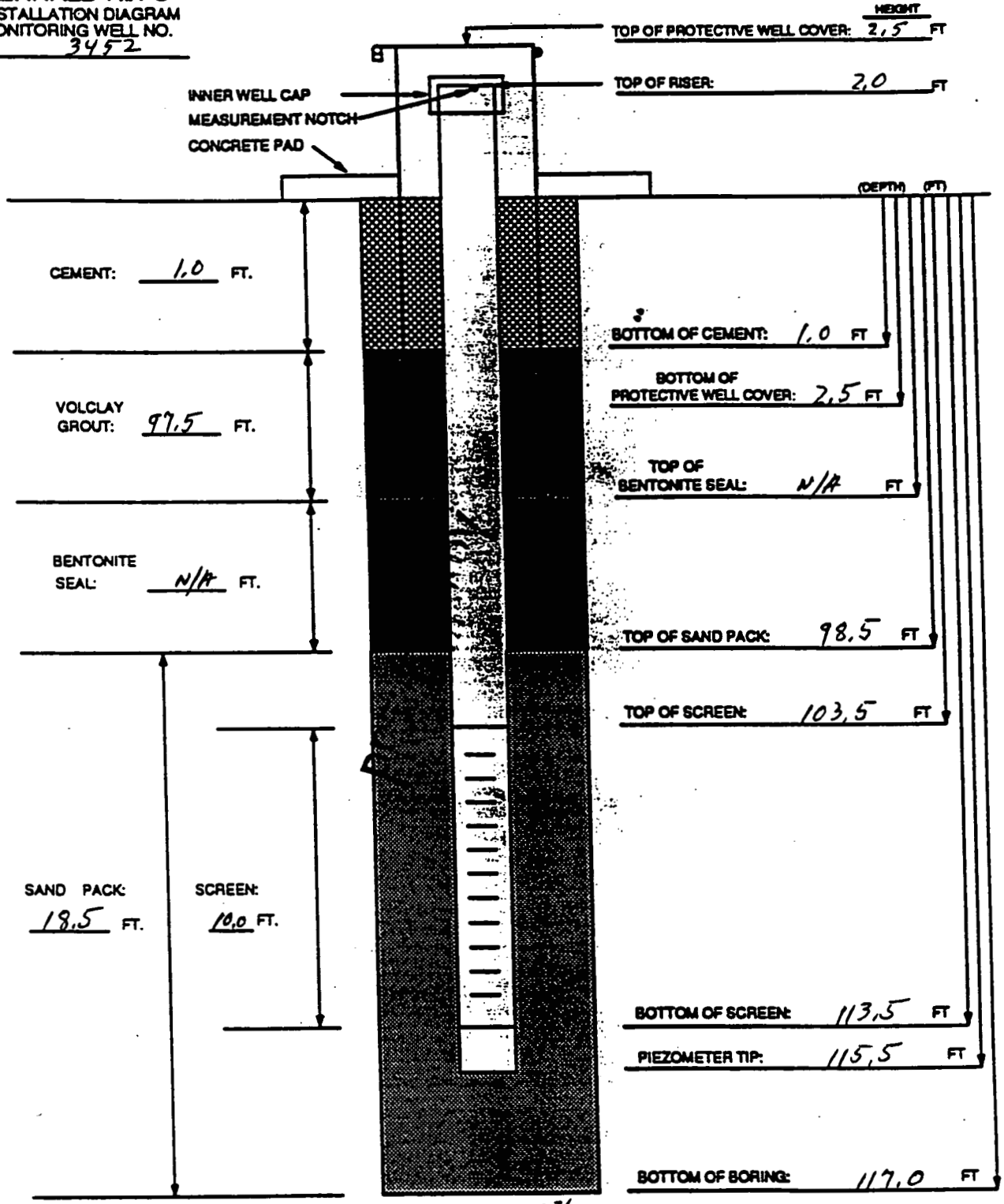
Background Levels
Hnu = 0ppm
Bγ = 40-60cpm
α = 0cpm

000579

402-11-8

FERNALD RI/FS
INSTALLATION DIAGRAM
MONITORING WELL NO. 3452

INSTALLATION DATE: 2/16/93



BOREHOLE DIAMETER: 10 3/4 IN.

MATERIALS USED

SAND TYPE AND QUANTITY: 10/20, 14/80 lb bags
BENTONITE PELLETS (5-GALLON BUCKETS): N/A
BAGS OF VOLCLAY GROUT: 20 - 50 lb bags
AMOUNT OF CEMENT: 1 Bag
AMOUNT OF WATER USED: 860 Gallons
OTHER: Riser Pipe Sections 1-10 Screen with 2 Bags, 10-10 ft, 1-3.5 ft
TASK: (602.64.28) WBR-40

NOTES:

1) RISER PIPE IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE, FLUSH-THREADED JOINTS.
2) SCREEN IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE WITH 0.010 IN. SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH AND DATE 61.7 FT/ 3/17/93
5) TOP OF CASING IS SECURED WITH A STAINLESS STEEL CAP.
6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL.
7) WELL CASING HAS A PROTECTIVE COVER WITH PADLOCK.

GEOLOGIST/ENGINEER: Ken Geiger

ASI FORM 0157 REV. (0)

5861

PIEZOMETER INSTALLATION SHEET

PROJECT NAME RCRA Phase II
PROJECT NO. (602.04.28) WBA-40
BORING NO. 3452
~~PIEZOMETER NO.~~ Monitoring well 3452

FIELD ENG./GEO Ken Geiger DATE 2/17/93
CHECKED BY (Brier) DATE 3/01/93
DATE OF INSTALLATION 2/16/93

BOREHOLE DRILLING

DRILLING METHOD Cable Tool
DRILLING FLUID (S) USED:
FLUID Water FROM 0.0 ft TO 65.0 ft
FLUID N/A FROM N/A TO N/A

TYPE OF BIT Hammer Percussion Bit
CASING SIZE (S) USED:
SIZE 10.0 in ID FROM 0.0 ft TO 115.0 ft
SIZE N/A FROM N/A TO N/A

PIEZOMETER DESCRIPTION

TYPE Monitoring well
DIAMETER OF PERFORATED SECTION 4.0 in I.D.
PERFORATION TYPE:
SLOTS [X] HOLES [ ] SCREEN [ ]
AVERAGE SIZE OF PERFORATIONS .010
TOTAL PERFORATED AREA 10.0 ft

RISER PIPE MATERIAL 316 Stainless Steel
RISER PIPE DIAMETERS:
O.D. 4 3/8 in I.D. 4.0 in
LENGTH OF PIPE SECTIONS 10-10 ft, 1-3.5 ft (1-10' Screen with 2' Sump)
JOINING METHOD Screw Type - Flush Joint Threaded

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5.0 ft
PROTECTIVE PIPE O.D. 10 3/4 in

OTHER PROTECTION Hinged well cover with lock

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION ( )	
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS:	TOP 0.0	BOTTOM 1.0		
CONCRETE GROUT/SLURRY	TOP 1.0	BOTTOM 98.5	TOP	BOTTOM
BENTONITE	TOP N/A	BOTTOM N/A	TOP	BOTTOM
SAND	TOP 98.5	BOTTOM 117.0	TOP	BOTTOM
GRAVEL	TOP N/A	BOTTOM N/A	TOP	BOTTOM
PERFORATED SECTION	TOP 103.5	BOTTOM 113.5	TOP	BOTTOM
PIEZOMETER TIP	115.5			
BOTTOM OF BOREHOLE	117.0			
GWL AFTER INSTALLATION	61.7			

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES [ ] NO [X]
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES [ ] NO [X]

200581

REMARKS

Sieve Analysis

Well #3452
Ken Geiger

2/9/93
sample #107049

Retained Values

90% = .003
50% = .010
40% = .013

$\frac{.013}{.003} = 4.3$ 4.3 use a factor of 4

4X .010 = .040

.040 most closely fits the medium Grain Sand and The .010 Screen size.

PRELIMINARY

000582

FEB- 9-93 TUE 15:23 WMCO ANALYTICAL FAX NO. 5137386667 P.01

Ken Geiger
MW 3452

5861 MW 345

Customer Number: 107049

MATERIAL: _____ SAMPLE NUMBER: 930208-112

DETERMINATION: Particle Size METHOD: Sieve Analysis

Sample weight: 142.8

Sieve Number	Weight Retained, g	% Retained	Cumulative % Retained	Grain Size, 1/1000 inch
10	10.25	7.2	7.2	78.7
20	10.24	7.2	14.4	39.5
40	20.36	14.3	28.7	16.7
60	41.63	29.2	57.9	9.8
100	31.63	22.1	80.0	5.9
200	9.66	6.8	86.8	3.0
Pan	16.26	11.4	98.2	

$$\frac{W_2 \times 100\%}{W_1} = R \qquad \left| \frac{\text{Original} - \text{Duplicate}}{\text{Average}} \right| \times 100\% = \text{RPD}$$

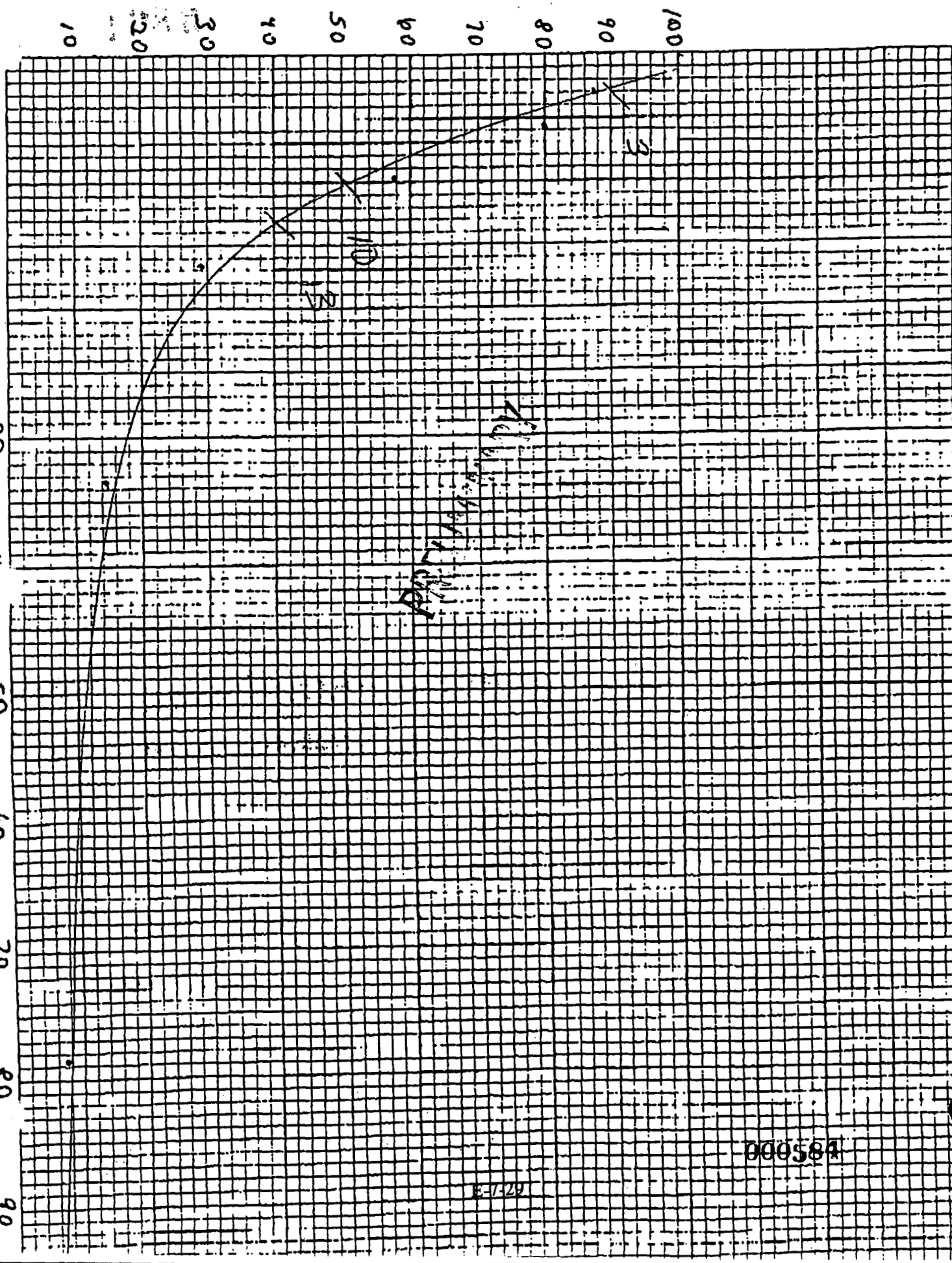
Analyzed by:	Checked by:	Date analyzed:
John Folsom	J. Hooker	

Grain Size Retained

40 %	13
50 %	10
90 %	3

Ken Geiger
MW 3452
Sample #107049

FEB-9-93 TUE 15:24 WMCO ANALYTICAL FAX NO. 5137386667 P. 02



Black Ink corrections and White out corrections were made by Brad Dunning while the log was being completed. WPK 4/24/88

	Initial	Date
1st Key In		
2nd Key In		
Hard Copy Verification		

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602	PROJECT NAME: FMPC RI/FS	
BORING NUMBER: ~~324~~ 3024 BB	COORDINATES: N 482477.17 E 1378902.23	DATE: 9-14-87
ELEVATION: 579.9 ground	GWL: Depth — Date/Time —	DATE STARTED: 9-14-87 @ 1330
ENGINEER/GEOLOGIST: B. Dunning	Depth — Date/Time —	DATE COMPLETED: 10/3/87
DRILLING METHODS: Cable Tool - Split Spoon Samples		PAGE 1 OF ~~X~~ 13

DEPTH (Ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6"	RECOVERY (Inches)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
.5 1.0'	S 07089	5 11 10	12"	Medium stiff, yellowish-brown clay with some sand, moist	CL		Background Gas $\gamma\beta$ = 40-60 α = 0 hmm = 0 Sample Caught (1345)
2' 3'	S 07090	12 17 19	24"	Stiff, dark yellowish-brown silty sand with some fine gravel moist	SM		Background Levels (1400)
4'	S 07091	12 25 32	18	Medium dense dark yellowish-brown silty sand with some gravel moist; 4.3' Coarse Gravel - yellowish-brown	SP / GW		Background Levels (1440)
5' 6'	S 07092	22 12 15	14"	Medium dense dark yellowish-brown silty sandy gravel, moist.; 5.5' Stiff yellowish-brown silty clay, moist	GC / CL		Background Levels (1445)
7'	S 07093	10 21 23	16"	Dense yellowish-brown silty gravel grading downward to a: 7' Hard dark gray clay with a trace of coarse sand and gravel moist 7'	GC / CL	4.5	Background Levels (1545)
8' 9'	S 07095	16 19 23	12"	Very stiff gray clay with a trace of fine gravel (slightly damp) moist.	CL	4.0	Background Levels End of Day 9-14-87 (1625)
10'	S 07096	6 11 15	6"	Medium dense, grayish-brown gravel moist.	GC		Start of Day 9-15-87 gravel is actually very loosely consolidated Background (0830)
11' 12'	S 07097	4 5 8	12"	Medium stiff olive-gray clay with a trace of fine gravel, moist.	CL	1.0	Background Lost entire first sample and had to use spring catcher (0935)
13	S 07098	6 11 17	18"	13.2' Loose gray, fine sand, moist. 13.2.	CL / SM	.75	Background (0942)
14' 15'	S 07100	2 2 3	18"	Soft olive-gray clay with a trace of fine gravel, moist.	CL	.50	Background (1030)

NOTES: Background Levels 9-14-87 $\gamma\beta$ = 40-140 cpm α = 0 hmm = 0

Background Levels 9-15-87 $\gamma\beta$ = 40-80 cpm α = 0 hmm = 0

Used 40 gallons of H_2O 9-14-87

402-11-86

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FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602	PROJECT NAME: FMPC RI/FS	TASK 3.2
BORING NUMBER: ~~324~~ 3024	COORDINATES: See p1	DATE: 9-15 & 9-16-87
ELEVATION: See p1	GWL: Depth 17.2 Date/Time 9-15 @ 1450	DATE STARTED: 9-14-87
ENGINEER/GEOLOGIST: B. Dunning	Depth 11.3 Date/Time 9-15 / 1600	DATE COMPLETED: 10-3-87
DRILLING METHODS: CABLE TOOL		PAGE 2 OF ~~11~~ 13

DEPTH (Ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6"	RECOVERY (Inch)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15							
16'	S 07101	6 6 9	18"	Soft, olive gray clay with a trace to some sand and gravel, MOIST	CL	.50	Background Levels (1040)
17'	S 07102	2 3 12	6"			.50	Background Levels (1350)
18'				18.2' Soft olive gray clay, MOIST. 18.2'		.50	
19'	S 07103	20 45 40	18"	Very dense gray fine gravel MOIST	GP		Background levels (1355)
20'	S 07104	46 30 27	18"	18.8 Dark yellowish-brown coarse sand 18.8	SW	–	Background
				Very dense gray coarse gravel, MOIST Wet	GP	–	End of Day 9-15-87 (1530)
21'				21.5 21.5			Start Day 9-16-87
22'	S 07105	16 33 47	18"	21.8 Very dense gray fine to medium sand MOIST 21.8	SC	–	Sand is actually Medium dense
				22 Hard olive-gray clay, trace of gravel MOIST. 22	CL	>4.0	(0905)
23'	S 07106	14 16 22	18"	Dense gray unconsolidated gravel, MOIST. grading downwards to a:	GW		Background
				23.5 Hard gray clay, some gravel MOIST 23.5			(1005)
24' 25'	S 07107	20 50 (3")	12"	Medium dense grayish-brown fine to medium sand with trace of large quatz rock fragments Wet	SP		Background Split Spoon jammed with large rock (1420)
26' 27'	S 07108	8 18 30	18"	Hard, dark gray olive-gray clay with some sand and fine gravel	CL	>4.5	Background (1440)
				27.5 Very stiff, grayish-brown silty clay 27.5	ML	3.5	Background
28	S 07110	35 52 30	18"	28 Very hard, gray clay 28	CL	>4.5	(1500)
29' 30'	S 07111	46 50 –	12"	Very stiff, gray clay with twig-like fragments ?? and a trace of gravel	CL		Background End Day 9-16-87 (1520)

NOTES: Background levels 9-15-87 $\gamma\beta$ = 40-80 cpm α = 0 $h_{\gamma\beta}$ = 0

Background Levels 9-16-87 $\gamma\beta$ = 40-80 cpm α = 0 $h_{\gamma\beta}$ = 0

Water level 9-15-87 @ 1600 was 11.3'
" " 9-16-87 @ 0800 " 9.3'

There appears to be a substantial aquafer at 18'-21.5'

000586

402-11-86

FERNALD RI/FS

5861

	Initial	Date
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2nd Key In		
Hard Copy		

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602	PROJECT NAME: FMPC RI/FS	
BORING NUMBER: ~~324~~ 3024	COORDINATES: see p1	DATE: 9-17-87
ELEVATION: see p1	GWL: Depth 41.2 Date/Time 9-17-87 @ 1730	DATE STARTED: 9-14-87
ENGINEER/GEOLOGIST: B. Dunning	Depth — Date/Time —	DATE COMPLETED: 10-3-87
DRILLING METHODS: CABLE TOOL		PAGE 3 OF 13

DEPTH (Ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6"	RECOVERY (Inch)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
30'							Start Day 9-17-87
31'	S 07112	12 20 24	6"	Stiff olive gray clay with a trace of fine gravel moist	CL	2.0	Background Levels (1045)
32' 33'	S 07113	10 11 16	18"	Very stiff gray clay with trace of gravel. moist			Background Levels - (B.G.) (1050)
34'	S 07114	10 25 37	24"	33.7 Stiff gray clay moist 33.7; 34 Very stiff olive-yellow clay moist 34'; Very dense yellow-brownish sand moist		1.5; 4.0	B.G. (1105)
35' 36'	S 07115	23 33 36	12"	Very dense yellowish-brown Sand moist.	SW	–	B.G. Sand is moist, but not saturated. (1400)
37'	S 07116	50 – –	9"	37' Medium stiff brownish-yellow. silt clayey moist 37'	SM	–	B.G. (1530)
38' 39'	S 07117	9 24 42	13"	Very dense yellowish-brown, well sorted. fine grain sand Moist, but basically dry.			B.G. Very friable Sand Actually (1555)
40' 41' 42' 43' 44'					SW	–	Begin catching 5' Samples. Loose Unconsolidated Sand
45'	S 07118	25 43 45	18"				B.G. Sample 44'-45.5' End Day 9-18-87 1715

NOTES: Background Levels for 9-17-87 γB = 40-60 cpm, α = 0 hnu = 0

000587

402-11-86

	Initial	Date
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2nd Key In		8/12
Hard Copy Verification		

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602	PROJECT NAME: FMPC RI / FS	
BORING NUMBER: DB 1-5-59 ~~3224~~ 3024	COORDINATES: see p1	DATE: 9-18-87
ELEVATION: see p1	GWL: Depth Date/Time	DATE STARTED: 9-14-87
ENGINEER/GEOLOGIST: B. Dunning	Depth Date/Time	DATE COMPLETED: 10-3-87
DRILLING METHODS: Cable Tool		PAGE 4 OF ~~11~~ 13

DEPTH 45' (Ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6"	RECOVERY (Inch)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	07118	26 43 45	18"	SAND - As Described above	SW		End Day 9-17-87 (1715)
46'				Very dense yellowish-brown well sorted fine grain sand moist.			Start Day 9-18-87
47'							
48'							
49'					SW	-	
50'							
51'	S 07119	15 20 21	18"	Dense yellowish-brown, well sorted, damp, but not wet sand			B.G. Loose unconsolidated Sand (1345)
52'							
53'							
54'							
55'							
56'	S 07120	13 27 (4")-50	12"	55.8 Loose grayish-brown coarse sand, moist 55.8 / 56.1 Hard gray clay moist. 56.1	CL		B.G. (1415)
57'	S 07121	13 23 43	12"	Very dense gray, salt & pepper looking, medium to coarse grain sand with trace of fine gravel. moist	SW		B.G. Sand is actually loose & unconsolidated. (1440)
58'							
59'							
60'							

NOTES:

000588

402-11-86

	Initial	Date
1st Key In		
2nd Key In		
Hard Copy Verification		

FERNALD RI/FS

861

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602	PROJECT NAME: FMPC RI/FS	
BORING NUMBER: 3024	COORDINATES: see p1	DATE: 9-19-87
ELEVATION: see p1	GWL: Depth 51.6 Date/Time 9-19/1030	DATE STARTED: 9-14-87
ENGINEER/GEOLOGIST: B. Dunning	Depth 62.6 Date/Time 9-19/1730	DATE COMPLETED: 10-3-87
DRILLING METHODS:		PAGE 5 OF 13

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6"	RECOVERY (Inch)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
60							
61	S 07122	13 25 28	18"	Very dense, dark gray coarse sand with some fine gravel WET	SW		Background End of 9-18-87 (1515)
62							End of 9-19-87 Start
63							
64	S 07123	6 3 3	14"	Loose gray, lightly salt & peppered looking fine to coarse grain sand with a trace of gravel WET	SW		Borehole drilled down to 70'. Blow sand came up hole to 63' where this sample was taken. B.G. Levels (1545)
65							
66	S None	5 2 2	0"	Sand pump indicates very loose, grayish-brown unconsolidated sand, WET	SM ?		Blow Sand coming into hole. Could not obtain a sample even with catcher End Day 9-19-87
67							Start Day 9-20-87
68							
69							
70							10" Temporary Casing driven to 80' to cut off blow sand.
71	S 07124	6 14 21	12"	Dense, gray coarse sand with some fine & coarse gravel. Wet	SP		Background Levels Only (1000)
72							Bailer - Sand Pump bringing up large cobbles ie. 1½" x 2½" large - Diameter - ± 1½"
73							
74							
75							

NOTES: Background Levels 9-19-87 δB = 40-80 α = 0 hnu = 0
" " 9-20-87 δB = 40-70 α = 0 hnu = 0

000589

402-11-86

	Initial	Date
1st Key In		
2nd Key In		
Hard Copy Verification		

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602	PROJECT NAME: FMPC RI/FS	
BORING NUMBER: ~~3024~~ 3024	COORDINATES: See p1	DATE: ~~9-19-87~~ & 9-20
ELEVATION: See p1	GWL: Depth 61.5' Date/Time 9-20/0900	DATE STARTED: 9-14-87
ENGINEER/GEOLOGIST: B. Dunning	Depth Date/Time	DATE COMPLETED: 10-3-87
DRILLING METHODS: Cable Tool		PAGE 6 OF 13

DEPTH (FT.) 75'	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6"	RECOVERY (Ft.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
76'	S 07125	16 31 46	14"	Very dense grayish-brown gravel (Color: 2.5 Y, 5/2) and Coarse Sand See Remarks →	GP		Background levels (B.G.) (1140)
77' 78' 79'							Sand pump collecting large carbonate cobbles & gravel rocks with fossil Inclusions.
80' 81'	S 07126	2 6 16	18"	Medium dense, gray, very coarse grain sand with some fine gravel 80.8 / Medium dense grayish-brown fine gravel with some coarse gravel	SW / GW		Background levels (1350)
82' 83' 84' 85'							Drove 10" Temporary Casing to 90'. Sand Pump bringing up fine to coarse gravel
86'	S 07127	20 50 (3"-50)	12"	Very dense, dark gray, sandy gravel with fine to coarse sand. (Color: 2.5 Y, N4/) & large cobbles ie. 1" x 2" x 1½".	GP		Large rock jammed in Split Spoon. Actually a loose gravel. Background levels (1600)
87' 88' 89' 90'							

NOTES: Background levels 9-20-87 : $\gamma\beta$ = 40-75 cpm. α=0, hmu=0

000590

402-11-88

	Initial	Date
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2nd Key In	RKA	2/4/91
Hard Copy Verification		

RKA 2/4/91

FERNALD RI/FS

5861

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602	PROJECT NAME: FMPC RI/FS	
BORING NUMBER: 1-5-59 BB 3024	COORDINATES: See p. 1	DATE: 9-20 & 9/21/87
ELEVATION: See p. 1	GWL: Depth 52' Date/Time 9-20/1400	DATE STARTED: 9-14-87
ENGINEER/GEOLOGIST: B. Dunning	Depth 52' Date/Time 9-21/0730	DATE COMPLETED: 10-3-87
DRILLING METHODS: Cable Tool		PAGE 7 OF 13

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6")	RECOVERY (")	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
90'							
91'		2 2 5 3 8 4	0"	Sand Pump collecting fine grain Sand	SW		Lost Sample both times even with Catcher In.
92'							End 9-20-87 Start 9-21-87
93'				93 ± ? ? ?	?		Approximate depth of material change.
94'							
95'				Very Dark Gray, fine gravel with coarse sand (10YR 3/1)	GW		
96'	S 07128	18 29 36	24"	95.5 Dense gray fine to coarse gravel (2.5 Y N5) 95.5	GW		Background levels
				96.25 Very dense, grayish-brown silty sand moist. 96.25 (Color: 2.5 Y, 5/2)	GM		1350
97'							
98'							Sand pump quit sucking up sand. Sample Taken.
99'							
100'	S 07129	17 ~~13~~ 20	18"	Very Stiff, dark gray clay moist (Color: 5 Y, 4/1)	CL	3.5	Background levels (1500)
101'							
102'				? ? ?	?		
103'							
104'							
105'							

NOTES: Background Levels 9-21-87 $\gamma\beta$ = 40-80 cpm, α = 0, hnu = 0.

000591

402-11-86

	Initial	Date
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2nd Key In		
Hard Copy Verification		

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602	PROJECT NAME: FMPC RI/FS	
BORING NUMBER: ~~3024~~ 3024	COORDINATES: See p1	DATE: 9-22-87
ELEVATION: See p1	GWL: Depth 52' Date/Time 9-21/1700	DATE STARTED: 9-14-87
ENGINEER/GEOLOGIST: B. Dunning	Depth 64.5' Date/Time 9-22/1550	DATE COMPLETED: 10-3-87
DRILLING METHODS: CABLE Tool	92' 9-22/1715	PAGE 8 OF 13

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6"	RECOVERY (INCH)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
105'							
106'	S 07130	6 7 14	6"	Medium dense, grayish-brown fine grain, well graded, silty Sand (Color: 2.5 Y, 5/2)	SM		Background levels (1620)
107'							End 9-21-87
108'							
109'							
110'							
111'	S 07131	6 10 11	12"				Background levels (1035)
				111.4' Soft, dark gray silty clay (Color: 5Y, 4/2) 111.4'	CL	~~.95~~ .5	
112'							
113'							Picking Up clay On hammer 113' - 115'
114'							
115'				Medium Stiff, Olive-Gray Clay (5Y, 4/2) 115.5' 115.5'			
116'	S 07132	9 14 18	18"	Very Stiff, olive gray clay (Color: 5Y, 4/2)	CL	.75 3.5	Background levels (1338)
117'							Casing Driven Down To 120'
118'							
119'							
120'							

NOTES: Background Levels 9-22-87: $\gamma\beta$ = 40-80 cpm, α = 0, hnu = 0

000592

402-11-86

	Initial	Date
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2nd Key In		
Hard Copy Verification		

RKA 2/4/5

FERNALD RI/FS

5861

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602	PROJECT NAME: FMPC RI / FS	
BORING NUMBER: BB 1-5-59 324 3024	COORDINATES: all pl	DATE: 9/22 & 9/23/87
ELEVATION: all pl	GWL: Depth 64.5' Date/Time 9-22/1550	DATE STARTED: 9-14-87
ENGINEER/GEOLOGIST: B. Dunning	Depth 92' Date/Time 9-22/1715	DATE COMPLETED: 10-3-87
DRILLING METHODS: CABLE TOOL	75' 9-23/1750	PAGE 9 OF 13

DEPTH (Ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6"	RECOVERY (Inch)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
120'							
121'	S 07133	2 3 6	18"	Medium Stiff, gray (5Y, 5/1) to Olive gray (5Y, 5/2) clay with some fine gravel wet	CL		Moderately gravelly Sand. Background levels (1650)
122'							End Day 9-22-87 Start Day 9-23-87
123'				123.5'			
124'							Noticed Sand & Gravel On Sticking On Hammer
125'							
126'	S 07134	27 17 10	6"	Medium Dense, Olive-~~Gray~~-Brown, fine to coarse gravel wet (Color: 2.5 Y, 4/4)	GP		Scanned - Background Readings Only (1025)
127'							
128'							
129'							
130'							
131'	S 07135	18 33 19	5"	Very Dense, Olive-Brown Fine Gravel (Color: 2.5 Y, 4/4) wet	GW		Background levels. Spoon Plugged with light Olive-brown carbonate rock fragment (2.5 Y, 5/4) (1108)
132'							132' Drilling became more difficult Lithology Change
133'							
134'							Drilled Down To 135' & Sand blew In To 124'
135'							Drive 10" Csg to 140'

NOTES: Water Level checked at 1550, 9-22-87 when temporary Casing was at 121'.

Background Levels 9-23-87: $\gamma\beta$ = 40-120 cpm hnu = 0

α = 0

Smelled Some Brackish, Semi-Petroliferous odor observed at 125'

Hole Monitored with LLE & hnu. No Readings Detected.

000593

402-11-86

	Initial	Date
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2nd Key In		
Hard Copy Verification		

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602	PROJECT NAME: FMPC RI/FS	
BORING NUMBER: BB 3024	COORDINATES: See p1	DATE: 9-24-87 / 9-29-87
ELEVATION: See p1	GWL: Depth 66.4' Date/Time 9-24/1245	DATE STARTED: 9-14-87
ENGINEER/GEOLOGIST: B. Dunning	Depth 58.5 Date/Time 9/29/0900	DATE COMPLETED: 10-3-87
DRILLING METHODS: CABLE TOOL		PAGE 10 OF 13

DEPTH (Ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6"	RECOVERY (In.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
135'							End Day 9-23-87
136'		#1 #2 11 5 13 7 14 10	0"				Start Day 9-24-87 Attempted twice to obtain sample.
137'							Sand Pump indicates Fine Sand
138'							
139'							Drilled Down to 140', but sand blew in to 135'. Drive Csg to 145'
140'		#1					
141'	S 07136	50-(4") #2 45 (3")-50	12"	Very Dense, very Dark Grayish-Brown Sand & Fine Gravel wet (Color: 2.5 Y, 3/2)	SW		B.G. Felt we hit a Rock (1115)
142'							
143'							Hammer Driving Hard Feels like we were pounding a large rock.
144'							
145'							End Day 9/29
146'	S 07137	38 (3") 50	12"	Very Dense, very dark brownish-gray sand with fine gravel - generally as above (Color: 2.5 Y, 3/2) wet	SP		Start Day 9/29 Background - Scanned. (1050)
147'							
148'							
149'							
150'							

NOTES: Water level with Csg at 145' 9-24 @ 1245 = 66.4'
" " " " " " 9-29 @ 58.5' after well sitting 4 days

Background Levels 9/29/87: $\gamma\beta$ = 60-120
α = 0
hmu = 0

000594

402-11-86

	Initial	Date
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2nd Key In		
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RKO 2/24/97

FERNALD RI/FS

5861

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602	PROJECT NAME: FMPC RI/FS	
BORING NUMBER: BB ~~3024~~ 3024	COORDINATES: See p1	DATE: 9-29-87
ELEVATION: See p1	GWL: Depth 60.7 Date/Time 9-29/1615	DATE STARTED: 9-14-87
ENGINEER/GEOLOGIST: B. Dunning	Depth 58.6 Date/Time 9-30/1340	DATE COMPLETED: 10-3-87
DRILLING METHODS: CABLE TOOL		PAGE 11 OF ~~14~~ 13

DEPTH (Ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6")	RECOVERY (Inch)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
150							
151'	S 07138	20 37 (4")50	14"	Medium Dense, Gray Silty Sand grading downwards into: (Color 2.5 Y, N5/) 150.6	SM		Scanned - Background levels (1415)
				Very Dense, black fine gravel wet (Color: 2.5 Y, N2/)	GW		
152'							
153'							
154'							
155'							BOB.
156'	S 07139	7 22 45	18"	Very Dense, Dark gray coarse Sand w/ some fine gravel wet (Color: 5 Y, 4/1)			Scanned - Background levels (1540)
157'				Bottom of Borehole (10") = 155' Bottom of last Split Spoon = 156.5'			
158'							
159'							
160'							

NOTES: Blow Sand coming into hole with Csg @ 150' to a depth of 147'
10" Csg Driven to 155' to obtain 150-151.5' Split Spoon Sample.

Used a total of 500 gallons to Drill Entire Well.

000595

402-11-86

	Initial	Date
1st Key In		
2nd Key In		
Hard Copy Verification		

DMC
KKA 2/4/6
12/13

out
white corrections were made by Brad Dunning at the time the form was completed.
WPK 4/23/88

FERNALD RI/FS

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS FIELD ENG./GEO. B. Dunning DATE 10/18/87
PROJECT NO. 602 CHECKED BY RM Zollinger DATE 2/6/89
BORING NO. BB15-89 ~~324~~ 3024
PIEZOMETER NO. ~~324~~ 3024 DATE OF INSTALLATION 10-3-87

BOREHOLE DRILLING

DRILLING METHOD Cable Tool
DRILLING FLUID (S) USED:
FLUID H_2O FROM 0 TO 155'
FLUID NA FROM NA TO NA

TYPE OF BIT Hammer
CASING SIZE (S) USED:
SIZE 10" FROM 0' TO 155'
SIZE NA FROM NA TO NA

PIEZOMETER DESCRIPTION

TYPE Stainless Steel MONITORING WELL
DIAMETER OF PERFORATED SECTION 4"
PERFORATION TYPE:
SLOTS ☐ HOLES ☐ SCREEN ☒
AVERAGE SIZE OF PERFORATIONS .010"
TOTAL ~~PERFORATED AREA~~ SCREEN LENGTH 10'

RISER PIPE MATERIAL Stainless Steel (316)
RISER PIPE DIAMETERS:
O.D. 4 3/8" I.D. 4"
LENGTH OF PIPE SECTIONS 10'
JOINING METHOD Flush Joint Threaded

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5'
PROTECTIVE PIPE ~~Ø~~ I.D. 10"

OTHER PROTECTION LOCKING CAP AND LOCK

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (Ft.)		ELEVATION (FT) MSL	
TOP OF RISER PIPE	+ 2.4'		582.3	
GROUND SURFACE	0.0		579.9	
BOTTOM OF PROTECTIVE PIPE	- ~~2.4~~ 2.6' RMZ 2/6/89		577.3	
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 0	BOTTOM 80'	TOP 579.9	BOTTOM 497.3
BENTONITE	TOP 80'	BOTTOM 92'	TOP 497.3	BOTTOM 485.3
SAND	TOP 92	BOTTOM 110'	TOP 485.3	BOTTOM 467.3
BENTONITE PELLETS	TOP 110'	BOTTOM 125'	TOP 467.3	BOTTOM 452.3
PERFORATED SECTION	TOP 97.5'	BOTTOM 107.5'	TOP 482.4	BOTTOM 472.4
PIEZOMETER TIP	~~NA~~ ~110'		467.3	
BOTTOM OF BOREHOLE	~~155.5~~ 155.0' WPK 4/24/88		422.3	
GWL AFTER INSTALLATION	58'		521.9	

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES ☐ NO ☑
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES ☐ NO ☑

000596

E-7-41

REMARKS Hole was drilled to 155' to clearly define stratigraphy. Casing was pulled up to 125' and sand-hole was allowed to collapse in. The well was then plugged from 125' to 110' with bentonite to insure that no communication through "Blue Clay" was present. Well was then set from 110'.

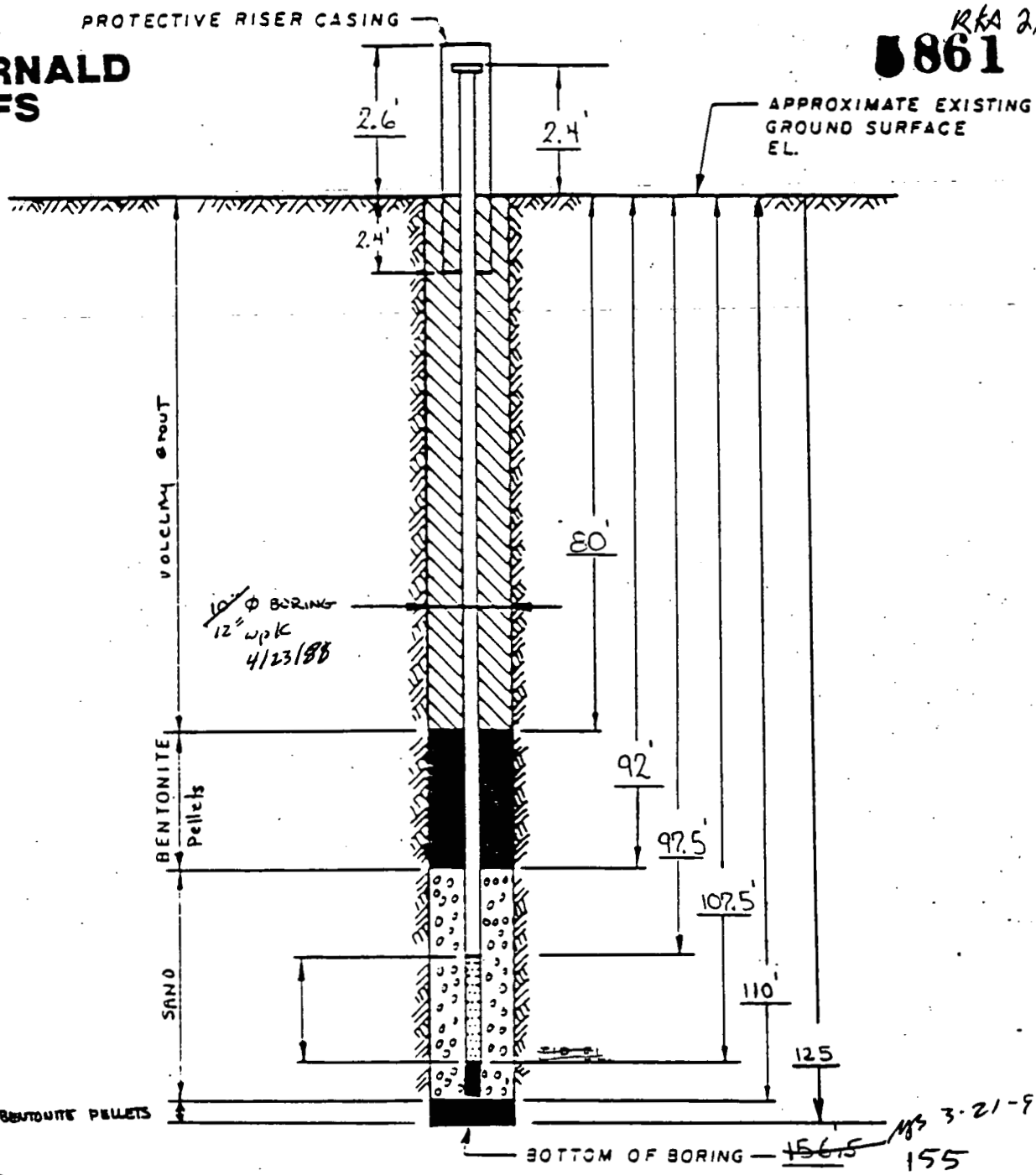
13/13

WELL # ~~324~~ 3024 OB#-5

RKA 2/4/89

861

FERNALD RI/FS



NOTE: HOLE WAS ALLOWED TO COLLAPSE TO 125'. PLUGGED WITH BENTONITE 125'-110'.

NOTES:

1. RISER PIPE IS 4 IN I.D. SCHEDULE PIPE, THREADED, FLUSH-JOINTED.
2. SCREEN IS 4 IN I.D SS PIPE CONTINUOUS SLOT SCREEN (0.010 IN. SLOT SIZE).
3. LOWER END OF SCREEN IS CAPPED.
4. ELEVATION OF WATER LEVEL
5. WATER LEVEL READING ON

white out corrections were made by B. Dunning at the time the form was completed
WPK
4/23/88

INSTALLATION DETAILS
MONITORING WELL ~~324~~ 3024 RMG 2/6/89

PREPARED FOR

FMPC RI/FS

DRAWING NUMBER

CHECKED BY

APPROVED BY

DR BY

000597

FEMP-OU02-5 DRAFT
August 24, 1994

FERNALD RI/FS

REVIEWED BY QA KG DATE 81

	Date
1st Key In	
2nd Key In	
Hard Copy	

RKA 2/4/89

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2	PROJECT NAME: FERNALD RI/FS	
BORING NUMBER: 180 1080 80 1-5-89	COORDINATES: 482229.86N 1378630.45E	DATE: 4/26/88
ELEVATION: 581.7 GROUND	GWL: Depth N/A Date/Time N/A	DATE STARTED: 4/26/88
ENGINEER/GEOLOGIST: DAVIES	Depth N/A Date/Time N/A	DATE COMPLETED: 4/27/88
DRILLING METHODS: CABLE TOOL		PAGE 1 OF 6

DEPTH (Ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0.0	08780	3 7 5	6	M. Dense, Very Pale Brown (10YR 8/4) Gravelly Sand. Fill. Dry			t = 0918 Hnu = 0ppm α = 2cpm γ/β = 40cpm
2.5	08781	4 5 6	4	Very Stiff, Dark Yellowish Brown (10YR 4/4) Clay, some silt. Moist.	CL		t = 0924 Hnu = 0ppm α = 2cpm γ/β = 40cpm Pebble blocked spoon.
	08782	5 9 11	12	Very Stiff, Dark Brown (10YR 3/3) Silty Clay, trace sand, trace gravel. Moist	CL	3.7	t = 0928 Hnu = 0ppm α = 2cpm γ/β = 40cpm
5.0	08783	8 10 14	13	Very Stiff, Dark Yellowish Brown (10YR 4/4) with gray mottled Silty Clay, trace gravel, trace sand. Moist.	CL	2.7	t = 0933 Hnu = 0ppm α = 2cpm γ/β = 40cpm
	08784	14 17 19	13	Very Stiff, Very Dark Brown (10YR 2/2) Silty Clay, trace gravel, trace sand. Moist.	CL	3.3	t = 0940 Hnu = 0ppm α = 2cpm γ/β = 40cpm
7.5	08785	5 11 15	14	Very Stiff, Dark Gray (2.5Y 4/0) Clay, some silt, trace gravel, trace sand. Moist.	CL	3.5	t = 1118 Hnu = 0ppm α = 2cpm γ/β = 40cpm
10.0	08786	2 10 17	12	Very Stiff, Very Dark Gray (2.5Y 3/0) Clay, some silt, trace sand. Moist	CL	2.8	t = 1142 Hnu = 0ppm α = 2cpm γ/β = 55cpm
	ST 08787	NA	12				t = 1327 Pushed Shelby 1.5 Ft 1.0 Ft recovery
12.5	08788	16 24 32	18	Hard, Yellowish Brown (10YR 5/6) Silty Clay, trace sand and gravel. Moist	CL	4.1	t = 1339 Hnu = 0ppm α = 2cpm γ/β = 40cpm
15.0	08789	4 14 25	9	Very Stiff, Brownish Yellow (10YR 6/8) Silty Clay, trace sand and gravel. ~~Moist~~ B.D Dry	CL	2.5	t = 1355 Hnu = 0ppm α = 2 cpm γ/β = 40cpm

NOTES: Drilling Contractor: Pennsylvania Drilling
Driller: Joe Barile
Helper: John Vandine
Rig: 72 Speedstar

Water Used During Drilling = 350 gallons
Soil Sampling as per ASTM
Color Descriptions as per Munsell
Field Measurements: Hnu, γ/β, α

000598

402-11-86

FERNALD RI/FS

REVIEWED BY QA K.G. DATE 8/1/11

1st Key In		
2nd Key In		
Hard Copy Verification		

PAC

RKA 2/4/89

5861

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2	PROJECT NAME: Fernald RI/FS	
BORING NUMBER: L80 1080 BB 1-5-90	COORDINATES: See p1	DATE: 4/26/88
ELEVATION: See p1	GWL: Depth NA Date/Time N/A	DATE STARTED: 4/26/88
ENGINEER/GEOLOGIST: DAVIES	Depth NA Date/Time N/A	DATE COMPLETED: 4/27/88
DRILLING METHODS: CABLE TOOL		PAGE 2 OF 4

DEPTH (Ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15.0	08790	9 34 14	16	Hard, Yellowish Brown (10YR 5/4) Silty Clay, trace sand and gravel. Moist 16.4	CL	>4.5	t: 1416 Hm: 0ppm α: 2cpm γ/β: 60cpm
17.5	08791	3 8 11	12	Very Stiff, Gray (2.5Y 5/0) Silty Clay, trace sand and gravel. Moist.	CL	2.5	t: 1430 Hm: 0ppm α: 2cpm γ/β: 40cpm
	08792	4 8 13	17	Stiff, Dark Gray (2.5Y 4/0) Silty Clay trace sand and gravel. Moist	CL	1.6	t: 1450 Hm: 0ppm α: 2cpm γ/β: 40cpm
20.0	08793	2 5 8	14	Stiff, Gray (2.5Y 5/0) Silty Clay trace sand and gravel. Moist.	CL	1.6	t: 1501 Hm: 0ppm α: 2cpm γ/β: 40cpm
							t: 1605 Pushed Shelby no recovery
22.5	08668	8 10 15	13	Stiff, Gray (2.5Y 5/0) Silty Clay trace sand and gravel. Moist.	CL	1.1	t: 1629 Hm: 0ppm α: 2cpm γ/β: 40cpm
25.0	08794	NA	21				t: 1715 Pushed Shelby 2.0 Ft ~~into~~ 8.0. 1.75 Ft recovery
	08795	5 9 40	5	Stiff, Gray (2.5Y 5/0) Silty Clay, some gravel, trace sand. Moist	CL	1.5	t: 0743 4/27/88 Hm: 0ppm α: 2cpm γ/β: 40cpm
27.5	08796 08797 08798	12 36 58	14	Hard, Dark Gray (2.5Y 4/0) Silty Clay, some gravel, trace sand. Moist.	CL	>4.5	t: 0805 Hm: 0ppm α: 2cpm γ/β: 40cpm
30.0	08799	15 50 50/4"	16	Hard, Gray (2.5Y 5/0) Silty Clay, trace sand and gravel. Moist. 29.6	CL	>4.5	t: 0833 Hm: 0ppm α: 2 γ/β: 40cpm
				~~Hard~~ V. Dense, Gray 2.5Y 5/0 Fine sand some silt 29.8	SW		

NOTES:

See Following page

Pushed Shelby from 21.0-23.0 Feet. No recovery.

000599

402-11-86

FERNALD RI/FS

REVIEWED BY QA K.G. DATE 8/1/91

1st Key In		
2nd Key In		
Hard Copy Verification		

RKA 2/4/

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2	PROJECT NAME: Fernald RI/FS	
BORING NUMBER: ~~180~~ 1080 BB 1-5-89	COORDINATES: See 1	DATE: 4/27/88
ELEVATION: See 1	GWL: Depth N/A Date/Time N/A	DATE STARTED: 4/26/88
ENGINEER/GEOLOGIST: DAVIES	Depth N/A Date/Time N/A	DATE COMPLETED: 4/27/88
DRILLING METHODS: CABLE TOOL		PAGE 3 OF ~~5~~ 6

DEPTH (Ft.) 30.0	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	08800	38 50/4	10 30.9	Hard, Dark Gray (5Y 4/1) Sandy Silt, some clay. moist ~31 Ft.	ML	>4.5	t: 0857 Hm: 0ppm α: 2cpm γ/β: 40cpm
32.5	08801	14 24 29	18	Very Stiff, Dark Gray (5Y 4/1) Clay, some silt, trace sand and gravel. Moist	CL	3.5	t: 0958 Hm: 0ppm α: 2cpm γ/β: 40
	08802	5 11 18	4	Dark Gray (5Y 4/1) Clay, some silt and gravel. Moist.	CL		t: 1015 Hm: 0cpm α: 2cpm γ/β: 40cpm Rock in end of sampler
35.0	08803	5 9 12	17	Very Stiff Dark Gray (5Y 4/1) Silty Clay trace sand and gravel. moist			t: 1027 Hm: 0ppm α: 2cpm γ/β: 40cpm
	08804	7 21 27	15	Very Stiff, Dark Gray (5Y 4/1) Silty Clay trace sand and gravel moist. 36.6 Hard, Brownish Yellow (10YR 6/8) Silty Clay. Moist. 36.8	CL CL SW	2.1 >4.5	t: 1042 Hm: 0ppm α: 2cpm γ/β: 50cpm
37.5				Very Dense, Very Pale Brown (10YR 7/4) Fine sand, well sorted, trace silt. Dry			
40.0	08665	16 36 50	16	Very Dense, Very Pale Brown (10YR 7/4) Fine Sand, well sorted, trace silt. Slightly Moist.	SW		t: 1100 Hm: 0ppm α: 2cpm γ/β: 50cpm
42.5							
45.0							

NOTES: Bottom of hill 36.8 Feet

000600

402-11-86

FERNALD RI/FS

REVIEWED BY QA K.G. DATE 8/1/91 **5861**

Key In | Date
2nd Key In
Hard Copy Verification

RKA 2/4/95

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2	PROJECT NAME: Fernald RI/FS	
BORING NUMBER: 1080	COORDINATES: See p1	DATE: 4/27/88
ELEVATION: See p1	GWL: Depth N/A Date/Time N/A	DATE STARTED: 4/26/88
ENGINEER/GEOLOGIST: DAVIES	Depth N/A Date/Time N/A	DATE COMPLETED: 4/27/88
DRILLING METHODS:		PAGE 4 OF ~~4~~ 6

DEPTH (Ft.) 45.0	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	08666	35 49 44	18	Very Dense, Very Pale Brown (10YR 7/4) fine sand, trace med. sand to fine gravel, trace silt. Slightly Moist	SW		t: 1258 Hm: 0ppm α: 2cpm γ/β: 40cpm
47.5							
50.0	08667	22 33 50	17	Very Dense Brownish Yellow (10YR 6/6) fine sand, trace med. sand to fine gravel, trace silt, Moist.			t: 1411 Hm: 0ppm α: 2cpm γ/β: 40cpm
51.5				END OF BORING 51.5 Ft.			

NOTES:

000601

402-11-86

FERNALD RI/FS

REVIEWED BY QA K.G. DATE 8/1/91

Key In	K.J.
2nd Key In	
Hard Copy Verification	

RKA 2/

PIEZOMETER INSTALLATION SHEET

PROJECT NAME Fernald RI/FS FIELD ENG./GEO. DAVIES DATE 4/28/88
PROJECT NO. 602.3.2 CHECKED BY R Galbraith DATE 2/7/89
BORING NO.: ~~180~~ 1080 BD 1-5-89
PIEZOMETER NO. 1080 DATE OF INSTALLATION 4/28/88

BOREHOLE DRILLING

DRILLING METHOD CABLE TOOL	TYPE OF BIT Steel
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID 350 gallon H_2O FROM 0 TO 51.5	SIZE ~~4 in~~ BD FROM ~~30.9~~ BD TO
FLUID - FROM - TO -	SIZE 10 in FROM 0.0 TO 46.0 Ft

PIEZOMETER DESCRIPTION

TYPE Monitoring Well	RISER PIPE MATERIAL Stainless Steel
DIAMETER OF PERFORATED SECTION 4 in	RISER PIPE DIAMETERS:
PERFORATION TYPE:	O.D. 4 3/8 in I.D. 4.0 in
SLOTS ☐ HOLES ☐ SCREEN ☒	LENGTH OF PIPE SECTIONS 10 Ft.
AVERAGE SIZE OF PERFORATIONS 0.010 in	JOINING METHOD Screw wrench tight
TOTAL PERFORATED AREA 10 Ft	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5 Ft	OTHER PROTECTION Steel cover, lockable
PROTECTIVE PIPE O.D. 10 3/4 in	Stainless Steel vented cap.

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (Ft)		ELEVATION (ft)	
TOP OF RISER PIPE	2.0		K.G. 8/1/91 ~~589.7~~ 583.7	
GROUND SURFACE	0.0		581.7	
BOTTOM OF PROTECTIVE PIPE	2.6		579.4	
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 0.0	BOTTOM 9.1	TOP 581.7	BOTTOM 572.6
BENTONITE	TOP 9.1	BOTTOM 14.1	TOP ~~567.6~~ 572.6	BOTTOM 567.6
SAND	TOP 14.1	BOTTOM 31.3	TOP 567.6	BOTTOM 550.9
~~GRAVEL~~ Bentonite Grout	TOP 31.3 31.9	BOTTOM 31.9 49.3	TOP 550.4 549.8	BOTTOM ~~549.8~~ 532.2
PERFORATED SECTION	TOP 18.5 JMT 2/7/89	BOTTOM 28.5 JMT 2/7/89	TOP 563.2	BOTTOM 534.7
PIEZOMETER TIP	30.9		550.8	
BOTTOM OF BOREHOLE	51.5		530.2	
GWL AFTER INSTALLATION	NA		N/A	

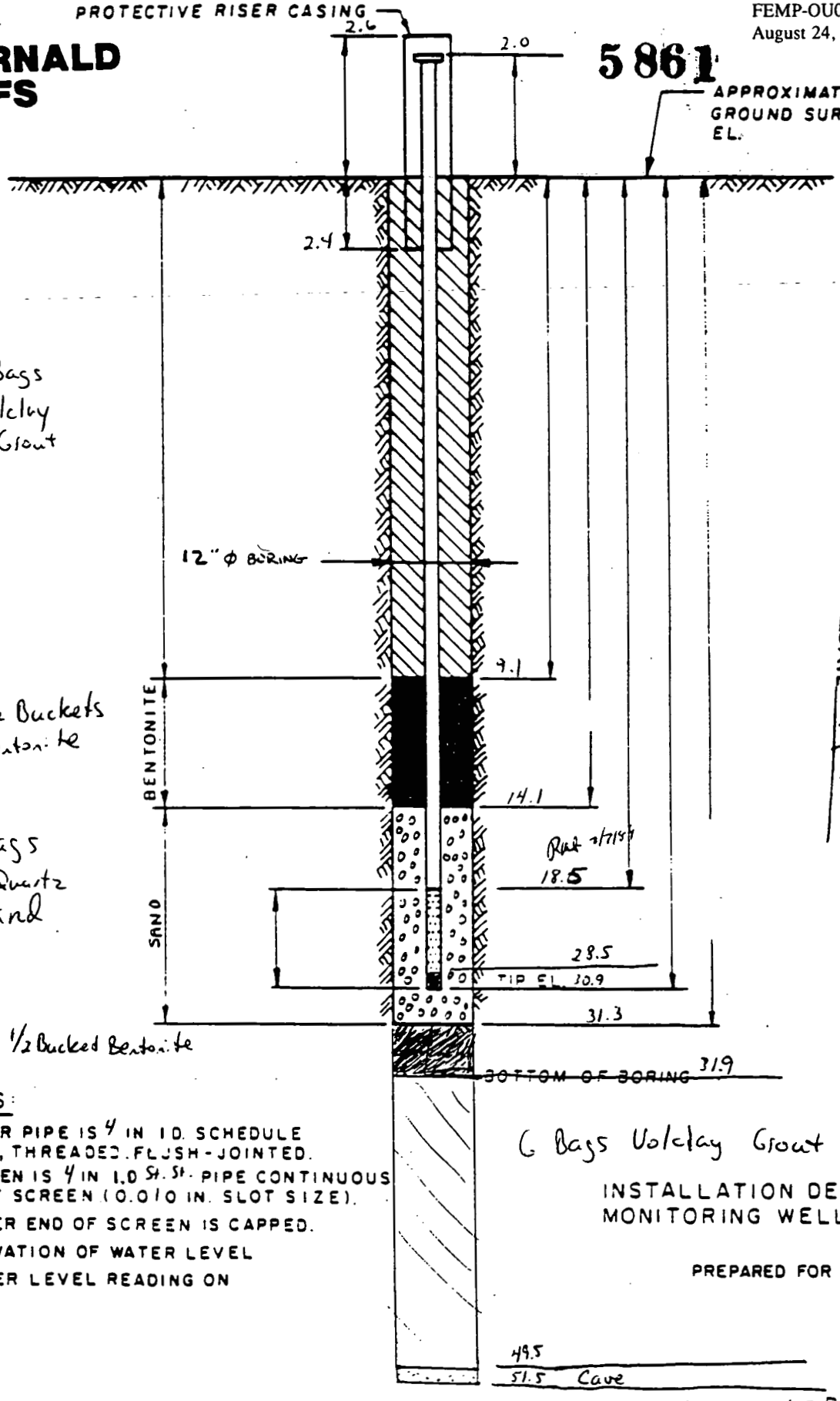
WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES ☐ NO ☒
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES ☐ NO ☒
REMARKS Screen section measured 10.5 Ft with 10.0 Ft perforated

Boring #150 1050 BB 1-5-59 6/6 RKA 2/4

FEMP-OU02-5 DRAFT
August 24, 1994

FERNALD RI/FS

5861



DRAWING NUMBER

CHECKED BY

APPROVED BY

BD

DRAWN BY

REVIEWED BY QA K.G. DATE 8/1/91

NOTES:

1. RISER PIPE IS 4 IN I.D. SCHEDULE PIPE, THREADED, FLUSH-JOINTED.
2. SCREEN IS 4 IN I.D. St. St. PIPE CONTINUOUS SLOT SCREEN (0.010 IN. SLOT SIZE).
3. LOWER END OF SCREEN IS CAPPED.
4. ELEVATION OF WATER LEVEL
5. WATER LEVEL READING ON

INSTALLATION DETAILS
MONITORING WELL

PREPARED FOR

000603

Bottom of Boring 51.5 Ft

VISUAL CLASSIFICATION OF SOILS

100365

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS EGWMF	DATE: 1-15-92
DRILLING NUMBER: 2728	COORDINATES:	DATE STARTED: 1-15-92
ELEVATION: ≈593.5 ft	GWL: Depth 73.8 ft Date/Time 1/30/92/1530	DATE COMPLETED: 1-30-92
ENGINEER/GEOLOGIST: P. CASSEDAY	Depth Date/Time	PAGE 1 OF 1
DRILLING METHODS: CABLE TOOL		

DEPTH (Ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS Background βγ=60 cpm
0	100365 1-15-92 9:20	2	6	CB 2/2/92 VERY SOFT, ~~LOOSE~~ (10 YR, 4/2) DARK GRAYISH BROWN SILTY CLAY. MINOR SAND. SOME ORGANIC MATERIAL (ROOTS). SLIGHTLY MOIST. NOT VERY PLASTIC	CL	0.5	βγ=0 cpm α=NA HNU=0 ppm
	100366 1-15-92 9:20	6	6	CB 2/2/92 VERY STIFF, ~~HOMOGENEOUS~~ (10 YR, 5/6) YELLOWISH BROWN CLAY. SLIGHTLY PLASTIC. SLIGHTLY MOIST LITTLE SILT, NO SAND.	CL	2.5	βγ=0 cpm α=NA HNU=0 ppm
1	1-15-92 9:20	9	0 ~~NR~~ CB 2/2/92	NR	NA	NA	βγ=0 cpm α=NA HNU=0 ppm
	1-15-92 9:20	10	0 ~~NR~~ 2/2/92	~~NR~~ PC 1-15 NR	NA	NA	βγ=0 cpm α=NA HNU=0 ppm
2	100366 1-15-92 9:35	5	6	SAA	CL	2.75	βγ=0 cpm α=NA HNU=0 ppm
	100366 1-15-92 9:35	7	3	SAA	CL	2.5	βγ=0 cpm α=NA HNU=0 ppm
3							

NOTES: DRILLER - PENNSYLVANIA DRILLING
JOE BARILE - DRILLER
RICK PIERLE - HELPER

SAA - SAME AS ABOVE
NR - NO RECOVERY
NA - NOT APPLICABLE

Please note: Sample numbers 100311 to 100376 were not used for this well

SAMPLE TECH - CHRIS JOHNSON

402-11-86

RI/FS

5861 P/17

FEMP-OU02-5 DRAFT
August 24, 1994

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS EWMF		
BORING NUMBER: 2728	COORDINATES:	DATE:	
ELEVATION:	GWL: Depth: Date/Time:	DATE STARTED:	
ENGINEER/GEOLOGIST: P. CASSEDAY	Depth: Date/Time:	DATE COMPLETED:	
DRILLING METHODS: CABLE TOOL		PAGE 2 OF 4	

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 in.	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
3	1-15-92 9:35	11	0	NR	NA	NA	βγ = 0 cpm α = NA HNU = 0 ppm
	1-15-92 9:35	13	0	NR	NA	NA	βγ = 0 cpm α = NA HNU = 0 ppm
4	1-15-92 100367 9:45	17	6	MEDIUM STIFF, ~~VERY DENSE~~ (2.5Y, 6/6) OLIVE YELLOW SILTY CLAY WITH SOME GRAVEL PIECES. SLIGHTLY MOIST, PLASTIC. (CJ 2/3/92)	CL	1.5	βγ = 0 cpm α = NA HNU = 0 ppm
	1-15-92 9:45 100367	19	6	SAA	CL	1.5	βγ = 0 cpm α = NA HNU = 0 ppm
5	1-15-92 9:45 100368	31	6	HARD, ~~VERY DENSE~~ (2.5Y, 6/6) OLIVE YELLOW CLAY WITH MORE EXTENSIVELY INTERSPERSED GRAVEL THAN 4'-5'. SLIGHTLY MOIST, SLIGHTLY PLASTIC (CJ 2/3/92)	CL	>4.0	βγ = 0 cpm α = NA HNU = 0 ppm
	1-15-92 9:45 100368	41	2	SAA	CL	>4.0	βγ = 0 cpm α = NA HNU = 0 ppm
6							

NOTES: DRILLER - PENNSYLVANIA DRILLING
JOE BARILE - DRILLER
RICK PIERLE - HELPER

SAA - SAME AS ABOVE
NA - NOT APPLICABLE
NR - NO RECOVERY

SAMPLE TECH - CHRIS JOHNSON

000605

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER. 602.3.22	PROJECT NAME. FEMP RI/FS		DATE 1-15-92
BORING NUMBER: 2728	COORDINATES:		DATE STARTED 1/13/92
ELEVATION:	GWL: Depth	Date/Time	DATE COMPLETED 1-30-92
ENGINEER/GEOLOGIST. P. Casseday	Depth	Date/Time	PAGE 3 OF 3
DRILLING METHODS: CABLE TOOL			

CH 2/3/92

DEPTH (Ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
6	1-15-92 ~~100368~~ 100369 9:50	PL1-15 50/5	6	CH 2/3/92 HARD, ~~VERY DENSE~~ (2.5Y, 6/4) LIGHT YELLOWISH BROWN CLAY WITH GRAVEL. SOME DARK MOTTLING. LITTLE SILT OR SAND. SLIGHTLY MOIST. INCREASING PLASTICITY	CL	>4.0	ATTEMPTED GEOCHEM. INSUFFICIENT RECOVERY SO BOTTLED AND ARCHIVED βγ = 0 cpm α = NA HNu = 0 ppm
	1-15-92 9:50	NA	NR	N.R	NA	NA	βγ = NA α = NA HNu = NA
7	1-15-92 9:50	NA	NR	N R	NA	NA	βγ = NA α = NA HNu = NA
	1-15-92 9:50	NA	NR	N R	NA	NA	βγ = NA α = NA HNu = NA
8	1-15-92 1310 100370	10	6	CH 2/3/92 MEDIUM STIFF, ~~DENSE~~ (2.5Y, 5/3) LIGHT OLIVE BROWN SILTY CLAY WITH NUMEROUS CHERT FRAGMENTS. LITTLE SAND. SLIGHTLY MOIST, LOW PLASTICITY.	CL	0.75	βγ = 0 cpm α = NA HNu = 0 ppm
	1-15-92 1310 100370	15	6	SAA, ONLY HARD.	CL	>4.0	βγ = 0 cpm α = NA HNu = 0 ppm
9							

NOTES: DRILLER - PENNSYLVANIA DRILLING
JOE BARILE - DRILLER
RICK PIERCE - HELPER

SAA - SAME AS ABOVE
NR - NO RECOVERY
NA - NOT APPLICABLE

SAMPLE TECH - CHRIS JOHNSON

402-11-86

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3 DD	PROJECT NAME: FEMP RI/FS OU#5	
BORING NUMBER: DD08	COORDINATES:	DATE: 1-15-92
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 1-15-92
ENGINEER/GEOLOGIST: P. CASSEDY	Depth Date/Time	DATE COMPLETED: 1-15-92
DRILLING METHODS: HOLLOW STEM AUGER		PAGE 1 OF 3

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
9	1-15-92 1310 100370	32	6	MEDIUM HARD ~~DENSE~~ (2.5Y, 5/3) LIGHT OLIVE BROWN SILTY CLAY WITH MUCH FRAGMENTED CHERT & LIMESTONE. LITTLE SAND. SLIGHTLY MOIST, LOW PLASTICITY	CL	>4.0	β γ = 0 cpm α = NA HNU = 0 ppm
	1-15-92 1310	50	0 ~~NR~~	NR	NA	NA	β γ = NA α = NA HNU = NA
10	~~2/10~~ 1-15 1-15-92 1415 100377		6	(2.5Y 5/4) LIGHT OLIVE BROWN SILTY CLAY WITH (5Y, 5/2) OLIVE GRAY MOTTLING. SLIGHTLY MOIST LOTS OF INTERSPERSED GRAVEL, SOME QUITE LARGE. LOW PLASTICITY	CL	NA	SHELBY TUBE 10'-12' INSUFFICIENT RECOVERY. SAMPLE PULLED AND ARCHIVED. CALLED CATE GRUBE. INFORMS ME NOT TO ATTEMPT ANOTHER SHELBY UNTIL WE REACH SOFTER MATERIAL.
		SHELBY TUBE ATTEMPTED	6	SAA	CL	NA	
11			0	NR	NA	NA	β γ = 0 cpm α = NA HNU = 0 ppm
	RAD SCREEN PC 1-15 ~~100376~~ 100377		0	NR	NA	NA	
12							

NOTES:
DRILLER - PENNSYLVANIA DRILLING
JOE BARILE - DRILLER
RICK PIERLE - HELPER
SAMPLE TECH - CHRIS JOHNSON

SAA - SAME AS ABOVE
NR - NO RECOVERY
NA - NOT APPLICABLE

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS		
BORING NUMBER: 2720	COORDINATES:		DATE: 1/21/92
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 1/21/92
ENGINEER/GEOLOGIST: P. Gassaway	Depth	Date/Time	DATE COMPLETED: 1/30/92
DRILLING METHODS: Cable Tool			PAGE 3 OF 5

DEPTH (Ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 1 Gin.	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
12							
	1-15-92 1435 100377	21	6	HARD ~~VERY DENSE~~ (5Y, 5/2) OLIVE GRAY SILTY CLAY, WITH NUMEROUS ROCK FRAGMENTS. LITTLE SAND. Brown MOTTLING, SLIGHTLY MOIST, LOW PLASTICITY. (CM 2/3/92)	CL	>4.0	βγ = 0 cpm α = NA; HNu = 0 ppm
		31	6	SAA	CL	>4.0	βγ = 0 cpm α = NA; HNu = 0 ppm
13		33	6	SAA	CL	>4.0	βγ = 0 cpm α = NA; HNu = 0 ppm
		39	0	NR	NA	NA	βγ = PC ØNA MS α = NA; HNu = NA
14	1-15-92 1500 100378	10	6	VERY STIFF, ~~VERY DENSE~~ (5Y, 5/1) GRAY CLAY WITH NUMEROUS GRAVEL PIECES. PLASTIC AND SLIGHTLY MOIST, WITH LITTLE TO NO SILT OR SAND (CM 02/05/92)	CL	3.0	βγ = 0 cpm α = NA; HNu = 0 ppm
	1-15-92 1500	25	0	NR	NA	NA	βγ = NA α = NA; HNu = NA
15							

TOTAL U/γ SPEC RAD SCREEN

NOTES: PENNSYLVANIA DRILLING
JOE BARILE - DRILLER
RICK PIERCE - HELPER

SAA - SAME AS ABOVE
NR - NO RECOVERY
NA - NOT APPLICABLE

SAMPLE TECH - CHRIS JOHNSON

402-11-86

RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS EOMF		
BORING NUMBER: 2728	COORDINATES:	DATE: 1-15-92	
ELEVATION:	GWL: Depth: Date/Time:	DATE STARTED: 1-15-92	
ENGINEER/GEOLOGIST: R.P. Cassedy	Depth: Date/Time:	DATE COMPLETED: 1-30-92	
DRILLING METHODS: CABLE TOOL		PAGE 6 OF 45/12	

DEPTH (Ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15	1-15-92 1500	30	0	NR	NA	NA	βγ = NA α = NA HNU = NA
	1-15-92 1500	35	0	NR	NA	NA	βγ = NA α = NA HNU = NA
16	1-15-92 1530 100379	13	6	VERY ~~STIFF~~, ~~VERY DENSE~~ (5Y, 5/1) GRAY CLAY WITH NUMEROUS GRAVEL PIECES, SOME LARGE, MOIST AND PLASTIC (CB 8/31/92)	CL	3.5	βγ = 0 cpm α = NA ATTEMPTED GEOTECH SAMPLE. INSUFFICIENT RECOVERY. BOTRED & ARCHIVED. HNU = 0 ppm
	1-15-92 1530	20	PC1-15 ~~N~~0	NR	NA	NA	βγ = NA α = NA HNU = NA
17	1-15-92 1530	25	0	NR	NA	NA	βγ = NA α = NA HNU = NA
	1-15-92 1530	50/4	0	NR	NA	NA	βγ = NA α = NA HNU = NA
18							

NOTES
PENNSYLVANIA DRILLING
JOE BARICE - DRILLER
RICK PIERCE - HELPER

SAA - SAME AS ABOVE
NA - NOT APPLICABLE
NR - NO RECOVERY

SAMPLE TECH - CHRIS JOHNSON

402-11-86

RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS EWMF		
BORING NUMBER: 2728	COORDINATES:	DATE: 1-15-92	
ELEVATION:	GWL: Depth: Date/Time	DATE STARTED: 1-15-92	
ENGINEER/GEOLOGIST: P. Cassidy	Depth: Date/Time	DATE COMPLETED: 1-30-92	
DRILLING METHODS: Cable Tool		PAGE: 1 OF 1	

DEPTH (Ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 in	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
18	1-15-92 1600 100379	4	6	STIFF, MEDIUM DENSE (5Y, 5/1) GRAY CLAY WITH NUMEROUS INTERSPERSED GRAVEL MOIST AND PLASTIC. LITTLE SILT AND SAND.	CL	2.0	βγ = 0 cpm α = NA HNU = 0 ppm
Auger	1-15-92 1600 100379	6	6	SAA	CL	1.5	βγ = 0 cpm α = NA HNU = 0 ppm
19	1-15-92 1600 100379	11	6	SAA	CL	1.5	βγ = 0 cpm α = NA HNU = 0 ppm
	1-15-92 1600 100379	13	2	SAA	CL	1.5	βγ = 0 cpm α = NA HNU = 0 ppm
20 Alluvive	1-15-92 1656 100380	4	4	STIFF, MEDIUM DENSE (5Y, 5/1) GRAY CLAY WITH GRAVEL. LITTLE SILT, NO SAND. VERY PLASTIC AND SLIGHTLY MOIST.	CL	2.0	βγ = 0 cpm α = NA HNU = 0 ppm NOTE: SHELBY TUBE DRIVEN 20-23 NO RECOVERY - SO SAMPLED 20-22 AND SHELBY AGAIN AT 22-25
	1-15-92 1656	6	0	NR	NA	NA	βγ = NA α = NA HNU = NA
21							

NOTES

DRILLER: PENNSYLVANIA DRILLING
JOE BARILE - DRILLER
RICK PIERCE - ASSISTANT

SAMPLE TECH - CHRIS JOHNSON

NA - NOT APPLICABLE
SAA - SAME AS ABOVE
NR - NO RECOVERY

402-11-66

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER. 602.3.22	PROJECT NAME. FEMP RI/FS EWMF		
BORING NUMBER: 2728	COORDINATES:	DATE 1-15-92	
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 1-15-92	
ENGINEER/GEOLOGIST. P. CASSEDAY	Depth Date/Time	DATE COMPLETED: 1-30-92	
DRILLING METHODS: CABLE TOOL		PAGE 8 OF 18	

2/3/92

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
21	1-15-92 1656	18	0	NR	NA	NA	βγ = NA α = NA HNu = NA
	1-15-92 1656	15	0	NR	NA	NA	βγ = NA α = NA HNu = NA
92 22	1-21-92 1050 100381		27	MEDIUM STIFF (5Y, 5/1) GRAY CLAY WITH GRAVEL. SOME SILT, NO SAND. VERY PLASTIC AND MOIST	CL	Yield 0.5 tsf	ATTEMPTED TO PUSH SHELBY TUBE 22.0'-25.0' βγ = 0cpm α = NA HNu = 0ppm
	RAD SCREEN TOP 100382	SHELBY TUBE PUSHED					
23	RAD SCREEN BOTTOM 100383					NA	
24							

NOTES:
PENNSYLVANIA DRILLING
JOE BARILE - DRILLER
RICK PIERCE - HELPER

SAA - SAME AS ABOVE
NA - NOT APPLICABLE
NR - NO RECOVERY

SAMPLE TECH - CHRIS JOHNSON

402-11-86

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER. 602.3.22	PROJECT NAME. FEMP RI/FS EWMF		DATE 1-21-92
BORING NUMBER: 2728	COORDINATES:		DATE STARTED 1-15-92
ELEVATION:	GWL: Depth	Date/Time	DATE COMPLETED 1-30-92
ENGINEER/GEOLOGIST. P. CASSEDAY	Depth	Date/Time	PAGE 9 OF 15
DRILLING METHODS: CABLE TOOL			CJ 2/3/92

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
24	1-21-92 1050 100381 R.S TOP 100382 RS. BOTTOM 100383	SHELBY TUBE PUSHED		MEDIUM STIFF (2.5Y, 5/1) GRAY CLAY AND GRAVEL MIX. SOME SILT, NO SAND. PLASTIC AND MOIST	CL	NA	
25	1-21-92 1315 100384	8	6	VERY STIFF, ~~MOTTLED~~ (2.5Y, 4/2) DARK GRAYISH BROWN CLAY MIXED WITH GRAVEL, SOME SILT, NO SAND. SLIGHTLY MOIST PLASTIC.	CL	3.0	βγ = 0 cpm α = NA HNu = 0 ppm
		14	6	SAA	CL	3.5	βγ = 0 cpm α = NA HNu = 0 ppm
26		16	3	SAA	CL	>4.0	βγ = 0 cpm α = NA HNu = 0 ppm
		20	0	NR	NA	NA	βγ = NA α = NA HNu = NA
27							

NOTES: PENNSYLVANIA DRILLING
JOE BARILE - DRILLER
RICK PIERCE - HELPER

SAA - SAME AS ABOVE
NA - NOT APPLICABLE
NR - NO RECOVERY

SAMPLE TECH - CHRIS JOHNSON

402-11-86

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 682.3.22	PROJECT NAME: FEMP RI/FS EWMF		
BORING NUMBER: 2428	COORDINATES:		DATE: 1-21-92
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 1-15-92
ENGINEER/GEOLOGIST: J. Gasbeday	Depth	Date/Time	DATE COMPLETED: 1-30-92
DRILLING METHODS: CABLE TOOL			PAGE 10 OF 25

DEPTH (Ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 in.	RECOVERY (IN)	DESCRIPTION (GB 2/3/92)	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS (GB 2/3/92)
27	1-21-92 1335 100384	7	6	~~DENSE~~, VERY STIFF (2.5Y, 4/2) DARK GRAYISH BROWN CLAY WITH INTERMIXED GRAVEL. LITTLE SILT, NO SAND. MOIST AND PLASTIC.	CL	3.0	βγ = 0 cpm α = NA HNU = 0 ppm
TURBED BOTCLH		19	6	SAA	CL	3.5	βγ = 0 cpm α = NA HNU = 0 ppm
28		29	0	NR	NA	NA	βγ = NA α = NA HNU = NA
		40	0	NR	NA	NA	βγ = NA α = NA HNU = NA
29 RCHIVE	1-21-92 1413 100385	14	6	DENSE, VERY STIFF (2.5Y, 4/2) DARK GRAYISH BROWN CLAY WITH VARIOUS PIECES OF GRAVEL INTERSPERSED; SOME SILT, NO SAND, MOIST AND PLASTIC	CL	3.0	ATTEMPT GEOCHEM SLEEVE SAMPLE 29'-31'. INSUFFICIENT RECOVERY SAMPLE ARCHIVED βγ = 0 cpm α = NA HNU = 0 ppm
	1-21-92 1413	25	0	NR	NA	NA	βγ = NA α = NA HNU = NA
30							

NOTES:
PENNSYLVANIA DRILLING
JOE BARILE - DRILLER
RICK PIERCE - HELPER
SAMPLE TECH - CHRIS JOHNSON

SAA - SAME AS ABOVE
NR - NO RECOVERY
NA - NOT APPLICABLE

-02-11-86

11/17

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 6623-22	PROJECT NAME: FEMP RI/FS OU5		
BORING NUMBER: 2728	COORDINATES:		DATE: 1/21/92
ELEVATION:	GWL: Depth: Date/Time		DATE STARTED: 1/15/92
ENGINEER/GEOLOGIST: P. Cassidy	Depth: Date/Time		DATE COMPLETED: 1/22/92
DRILLING METHODS: Core/Box			PAGE: 1 OF 3

CB 2/3/92

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
30	1-21-92 1413	38	0	NR	NA	NA	BR = NA α = NA HNU = NA
	1-21-92 1413	20	0	NR	NA	NA	BR = NA α = NA HNU = NA
31	1-21-92 1535 100386	7	6	CB 2/3/92 STIFF, ~~VERY DENSE~~ (2.5Y, 4/2) DARK GRAYISH BROWN CLAY WITH SILT, SAND AND GRAVEL INTERMIXED. MOIST AND VERY PLASTIC.	CL	2.5	BR = 0cpm α = NA HNU = 0 ppm
		27	6	SAA - SAND ENCOUNTERED IN SHOE (BASE OF TILL)	CL	2.5	BR = 0cpm α = NA HNU = 0 ppm
32		40	0	NR			SAND ENCOUNTERED - BASE OF TILL BR = NA α = NA HNU = NA
		50/2	0	NR			BR = NA α = NA HNU = NA
33							

NOTES

PENNSYLVANIA DRILLING
JOE BARILE - DRILLER
RICK PIERCE - HELPER

SAMPLE TECH. CHRIS JOHNSON

SAA - SAME AS ABOVE
NR - NO RECOVERY
NA - NOT APPLICABLE

402-11-46

12/17

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602-3.22	PROJECT NAME: FEMP RTV-EX SEWAF		
BORING NUMBER: 2728	COORDINATES:		DATE: 1-21-92 / 1-22-92
ELEVATION:	GWL: Depth: Date/Time		DATE STARTED: 1-15-92
ENGINEER/GEOLOGIST: P. GASSEDAY	Depth: Date/Time		DATE COMPLETED: 1-30-92
DRILLING METHODS: CABLE SPIN BOLT			PAGE: 2 OF 15

CB 3/3/92

DEPTH (Ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 in.	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
33							
34							
35	1-21-92 1700	50/.2	0	NR	NA	NA	HNu = NA α = NA βN = NA
36							
37							
38							
39							
				CB 2/3/92			
	1-22-92 1015 100887	11 12 11	18	~~STAFF~~ MEDIUM DENSE (10YR, 3/6) DARK YELLOWISH BROWN CLAYEY SILT. NO SAND, SOME SMALL GRAVEL PIECES. FAIRLY WELL SORTED. MOIST	ML	NA ~~2.0~~ CB 2/3/92	HNu = 0ppm α = NA βN = 0 ppm CB 2/3/92
41							
42							
43							
44							
45				CB 2/3/92			
	1-22-92 1025 100888	5 7 12	18	STIFF, ~~MEDIUM DENSE~~ (2.5Y 4/2) DARK GRAYISH BROWN CLAY WITH GRAVEL, SOME SILT, MOIST OVERLYING A ~~MEDIUM STIFF~~ MEDIUM DENSE (7.5YR, 4/6) STRONG BROWN CLAYEY SILT WITH INTERSPERSED SAND AND GRAVEL; MOIST	CL ML	1.5 0.5	~~HNu = 0ppm~~ α = NA βN = 0 ppm CB 2/3/92
46							
47							
48							

NOTES:
DRILLING - PENNSYLVANIA DRILLING
JOE BARILE - DRILLER
RICK PERLE - HELPER

SAMPLE TECH - CHRIS JOHNSON

SAA - SAME AS ABOVE
NR - NO RECOVERY
NA - NOT APPLICABLE

402-11-66

RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS EWMF		
BORING NUMBER: 2728	COORDINATES:		DATE: 1-22-92
ELEVATION:	GWL: (Depth)	Date/Time	DATE STARTED: 1/15/92
ENGINEER/GEOLOGIST: P. GASSEDAY	Depth:	Date/Time	DATE COMPLETED: 1/28/92
DRILLING METHODS: CABLE TOOL			PAGE 13 OF 45

DEPTH (Ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
48							
49							
50				CB 2/3/92			
51	1-22-92 1325 100389	8 8 8	18	~~SOFT~~, MEDIUM DENSE (10YR, 5/6) YELLOWISH BROWN SAND, SOME SILT AND GRAVEL. POORLY SORTED ~~AND GRADED~~. MOIST CB 2/5/92	SW ~~SP~~	NA ~~0.5~~ CB 02/02/92	HNu = 0 ppm α = NA βγ = 0 cpm
52							
53							
54							
55				CB 2/3/92			
56	1-22-92 1400 100390	12 32 42	18	~~VERY SOFT~~ VERY DENSE (10YR, 6/6) BROWNISH YELLOW SAND WITH MUCH GRAVEL. POORLY ~~GRADED AND~~ SORTED WITH APPRECIABLE SILT MOIST CB 2/3/92	SW ~~GM~~	NA ~~0.25~~ CB 2/3/92	HNu = 0 ppm α = NA βγ = 0 cpm
57							
58							
59							
60				CB 2/5/92 CB 2/5/92			
61	1-22-92 1425 100391	15 30 50/2	14	VERY ~~SOFT~~, DENSE (10YR, 5/4) YELLOWISH BROWN SILTY GRAVEL OVERLAIN BY A ~~SOFT~~, VERY DENSE, POORLY SORTED (10YR, 6/6) BROWNISH YELLOW GRAVELLY SAND. BOTH ARE MOIST	GM SP	NA ~~0.25~~ CB 2/3/92 NA	HNu = 0 ppm α = NA βγ = 0 cpm
62							
63							

NOTES
DRILLER - PENNSYLVANIA DRILLING
JOE BARILE - DRILLER
RICK PIERCE - HELPER
CHRIS JOHNSON - SAMPLE TECH

SAA - SAME AS ABOVE
NA - NOT APPLICABLE
NR - NO RECOVERY

RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.22	PROJECT NAME: FEMP RI/FS EWMF		
BORING NUMBER: 2228	COORDINATES:	DATE: 1-22-92/1-23-92	
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 1-15-92	
ENGINEER/GEOLOGIST: DGSSEDAY	Depth Date/Time	DATE COMPLETED: 1-28-92	
DRILLING METHODS: CABLE & TOOL		PAGE 4 OF 5	

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
63							
64							
65	1-22-92 1615 100392	50/4	6	CW 2/3/92 ~~SOFT~~, VERY DENSE (2.5Y, 5/6) LIGHT OLIVE BROWN SANDY GRAVEL. POORLY SORTED ~~AND GRADED~~. SOME SILT AND LITTLE TO NO CLAY ~~MOIST~~ SLIGHTLY MOIST PC 1-22	1/4/92 GW ~~GP~~	NA ~~0.25~~ CW 2/3/92	HNu = 0 ppm. α = NA βγ = 0 cpm.
66							
67							
68							
69				CW 2/3/92			
70	1-22-92 1650 100393	50/6	6	~~SOFT~~ VERY DENSE (2.5Y, 4/4) OLIVE BROWN SANDY GRAVEL POORLY SORTED ~~AND GRADED~~ WITH LITTLE TO NO SILT OR CLAY. SLIGHTLY MOIST CW 2/3/92	GW ~~GP~~	NA ~~0.25~~ CW 2/3/92	HNu = 0 ppm α = NA βγ = 0 cpm
71							
72							
73							
74							
75	1-23-92 920 100394	35 45 35	8	CW 2/3/92 ~~VERY SOFT~~, VERY DENSE (2.5Y, 5/3) LIGHT OLIVE BROWN SANDY GRAVEL. POORLY SORTED ~~AND GRADED~~ WITH LITTLE TO NO SILT OR CLAY. WET (HIT WATER TABLE) CW 2/3/92	GW ~~GP~~	NA ~~0.25~~ CW 2/3/92	HNu = 0 ppm α = NA βγ = 0 cpm
76							
77							
78							

NOTES

PENNSYLVANIA DRILLING
JOE BARILE - DRILLER
RICK PIERCE - HELPER

SAA - SAME AS ABOVE
NA - NOT APPLICABLE
NR - NO RECOVERY

SAMPLE TECH - CHRIS JOHNSON

000617

402-11-86

15/17

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP		
BORING NUMBER: 2728	COORDINATES:		DATE: 1-23-92
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 1-15-92
ENGINEER/GEOLOGIST:	Depth	Date/Time	DATE COMPLETED: 1-30-92
DRILLING METHODS: CABLE TOOL			PAGE 5 OF 5

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 in.	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
78							
79							
80				CW 2/3/92			
81	1-23-92 1350 100395	35 18 16	12 CW 2/3/92	~~VERY SOFT~~, DENSE (2.5Y, 5/2) GRAYISH BROWN GRAVEL WITH SAND, POORLY SORTED ~~AND GRADED~~, WITH LITTLE TO NO CLAY OR SILT. WET	GW ~~GP~~	NA ~~<0.25~~ CW 2/3/92	HNu = 0 ppm α = NA βγ = 0 cpm
82							
83							
84				CW 2/3/92			
85	1-23-92 1520 100396	45 44 35	12	~~VERY SOFT~~, VERY DENSE (5Y, 5/1) GRAY CLAYEY SANDY GRAVEL. POOR SORTING ~~AND GRADING~~. SOME SILT. WET. PETROLEUM ODOR FROM CLAYS WITHIN SAMPLE. CW 2/3/92	GC	NA ~~<0.25~~ CW 2/3/92	HNu = 1.0 ppm α = NA βγ = 0 cpm
87							*HNu HIT - PETROLEUM ODOR FROM SAMPLE.
88							
89							
90				CW 2/3/92			
91	1-23-92 1640 100397	17 16 14	18	~~VERY SOFT~~, MEDIUM DENSE (5Y, 5/1) GRAY SANDY GRAVEL WITH A LENS OF CLAY POORLY SORTED ~~AND GRADED~~. WET. PETROLEUM ODOR IN CLAY LENS. CW 2/3/92	GC	NA ~~<0.25~~ CW 2/3/92	HNu = 1.0 ppm α = NA βγ = 0 cpm
92				BOTTOM OF BORE HOLE - 92.0 ft Bottom of Sampling - 91.5 ft			PETROLEUM ODOR AGAIN
93							

NOTES:
PENNSYLVANIA DRILLING
JOE BARILE - DRILLER
RICK PIERCE - HELPER

SAA - SAME AS ABOVE
NR - NO RECOVERY
NA - NOT APPLICABLE

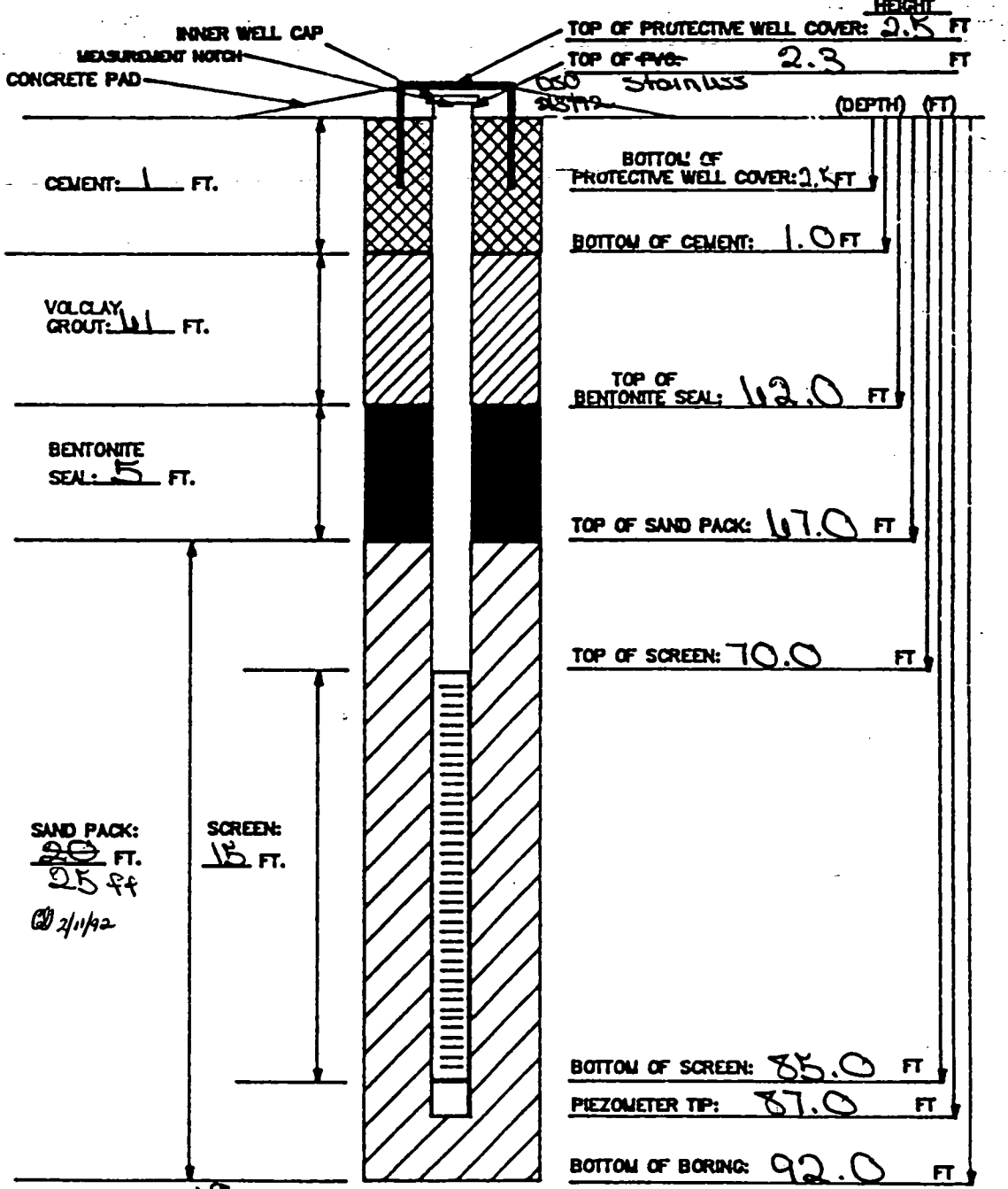
SAMPLE TECH - CHRIS JOHNSON

-02-11-86

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO. 2728

INSTALLATION DATE: 1/30/92



BOREHOLE DIAMETER: 10 INCHES

MATERIALS USED:
SAND TYPE AND QUANTITY: 17 bag
BENTONITE PELLETS (5-GALLON BUCKETS): 4
BAGS OF VOLCLAY GROUT: 15 bag
AMOUNT OF CEMENT:
AMOUNT OF WATER USED: 400 gallons
OTHER: NA

NOTES: 4 inch 316 Stainless steel/Steel
1) RISER PIPE IS ~~2-INCH SCHEDULE-40~~ SS
2) SCREEN IS ~~2-INCH I.D. SCHEDULE-40~~ SS ~~PVC PIPE WITH 0.020-INCH SLOTS~~ 0.010 in
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP or welded cap
4) WATER DEPTH/DATE: 73.8 ft
5) TOP OF ~~PVC~~ IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK.
6) PARENTHESES INDICATE DEPTH BELOW GROUND LEVEL.

TASK: 3.22 GEOLOGIST/ENGINEER: D. O'Brien

FERNALD RI/FS

17/17

FEMP-OU02-5 DRAFT
August 24, 1994

PIEZOMETER INSTALLATION SHEET

PROJECT NAME Fernald RI/FS FLUME FIELD ENG./GEO. D. O'Brien DATE 11/30/92
PROJECT NO. 602.3.22 CHECKED BY [illegible] DATE 02/11/92
BORING NO. 2728
PIEZOMETER NO. 2728 DATE OF INSTALLATION 11/30/92

BOREHOLE DRILLING

DRILLING METHOD Cable Tool	TYPE OF BIT Churn Bit
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID H_2O FROM 0 TO 92.0	SIZE 10 3/4 o.d. FROM 0 TO 92.0
FLUID NA FROM NA TO NA	SIZE NA FROM NA TO NA

PIEZOMETER DESCRIPTION

TYPE Monitoring Well	RISER PIPE MATERIAL 316 stainless steel
DIAMETER OF PERFORATED SECTION 4.0 in	RISER PIPE DIAMETERS:
PERFORATION TYPE:	O.D. 4 3/8 in. I.D. 4.0 in
SLOTS ☐ HOLES ☐ SCREEN ☒	LENGTH OF PIPE SECTIONS 7 10's, 1 17ft screen, 25ft RCW
AVERAGE SIZE OF PERFORATIONS 0.010 in.	JOINING METHOD flush joint threaded
TOTAL PERFORATED AREA 15 ft.	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5.0 ft	OTHER PROTECTION hinged locking cap
PROTECTIVE PIPE O.D. 10 3/4 in.	

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION ( )	
TOP OF RISER PIPE	2.3 ft			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.5 ft			
BOREHOLE FILL MATERIALS: Cement GROUT/SLURRY	Top 0 TOP 1	Bottom 1 BOTTOM 67	TOP	BOTTOM
BENTONITE	TOP 62	BOTTOM 67	TOP	BOTTOM
SAND	TOP 67	BOTTOM 92	TOP	BOTTOM
GRAVEL	TOP ~~NA~~ 67 11/30/92	BOTTOM ~~NA~~ 92 11/30/92	TOP	BOTTOM
PERFORATED SECTION	TOP 70	BOTTOM 85	TOP	BOTTOM
PIEZOMETER TIP	87			
BOTTOM OF BOREHOLE	92			
GWL AFTER INSTALLATION	73.8			

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES ☐ NO ☒
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES ☐ NO ☒

REMARKS

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: Femp RI/FS		
BORING NUMBER: 1679	COORDINATES:	DATE 1-23-92	
ELEVATION:	GWL: Depth Dry Date/Time 1-28-92, 0945	DATE STARTED: 1-23-92	
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED: 1-27-92	
DRILLING METHODS: Cable tool		PAGE 1 OF 7	

DEPTH (Ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1	100400 100401 1530 1-23-92	3 7 8	7	Stiff, dark brown (10yr. 3/3) silty clay, some organics, moist, low plasticity	CL	1.25	Hnu - 0 ppm Bg - 40cpm
2	100400 1535 1-23-92	7 8 10	12	Stiff yellowish brown, (10yr. 5/8) silty clay, some gravel, med. plasticity, v. moist.	CL	1.25	Hnu - 0 - ppm Bg - 40 cpm
4	100400 1540 1-23-92	8 10 10	12	S.A.A.	CL	1.5	Hnu - 0 ppm Bg - 40cpm
5	100402 1600 1-23-92	Shelby Attempt Recovery Not Ample to use	16 Shelby	yellowish brown, (10yr. 5/8) clay silt sand gravel, mix, ↓ 5.75 N R	GC	NA	Hnu - 0 ppm Bg - 40cpm
6	1600	for Sample Recovery is Archived	Pushed 2.7ft	↑ J.L. N.R	NA	NA	Hnu - 0 ppm Bg - 50 cpm
7							

NOTES
Drilling Contractor - Penn Drilling
Drilling Equipment - Cyclone 43
Driller - Craig Coulter
Asst. - Gary Dye

S.A.A - Same As Above
N.R. - No Recovery

Background
Hnu - 0 ppm
Bg - 50 cpm

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FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 1679	COORDINATES:	DATE 1-23-92
ELEVATION:	GWL: Depth see pg1 Date/Time	DATE STARTED: 1-23-92
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED: 1-27-92
DRILLING METHODS: cable tool		PAGE 2 OF 7

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
8	100403 100404	9		S.A.A	GC	NA	Hnu - 0 ppm
	100405 100406 1625	10	12	~~S.A.A~~ S.A.A	GC	NA	Bg - 50 cpm
9	1-23-92	10		N.R.			
	100407 1630	12 13	8	V. stiff, brown to gray, (10yr. 5/3) to (10yr. 5/1) silty clay, trace gravel, moist. Low plasticity.	CL	3.5	Hnu - 0 ppm
10	1-23-92	21					Bg - 50 cpm
11	100407 1635	10 12	6	Hard, gray, (10yr, 5/1) silty clay, trace gravel, sl. moist. Low plasticity	CL	4.0	Hnu - 0 ppm
12	1-23-92	18					Bg - 50 cpm
	100407 1640	12 16	8	V. stiff, gray to brown, (10yr, 5/1) to (10yr, 5/3) silty clay, some gravel, moist.	CL	3.5	Hnu - 0 ppm
13	1-27-92	25					Bg - 50 cpm
14	100407 6900	12 15	0	N.R	NA	NA	Hnu, Bg } NA
15	1-24-92	19					

NOTES: See page 1

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FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 602.3.22	COORDINATES:	DATE 1-24-92
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 1-23-92
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED: 1-27-92
DRILLING METHODS: cable tool		PAGE 3 OF 7

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	See Above 1-24-92	21	0	N.R.	NA	NA	See Above
16	100408 100409	5	6	Stiff, gray, (10yr, 5/1) silty clay, some gravel, low to med plasticity, moist to very moist.	CL	3.5	Hnu - 0 ppm
	100410 100411 0905	33	3	S.A.A	CL	2.5	
17		50/3	0	NR	NA	NA	Bd - 50 cpm
	1-24-92	NR	0	J.L 1-24-92 NR	NA	NA	
	100412 0910 1-24-92	9 10 11	2	Stiff, gray to grayish brown, (10yr, 5/1) to (2.5y, 5/2) silty gravelly clay, low to med plast. moist. to v. moist.	CL	J.L 1-24-92 2.0	Hnu - 0 ppm Bd - 40 cpm
19	100413 0915 1-24-92	4 7 10	9	Stiff, grayish brown, (2.5y, 5/2) silty clay, some gravel, low to med plast. moist.	CL	1.5	Hnu - 0 ppm Bd - 40 cpm
20	100414 100415 0930 1-24-92	5 7 16	8	S. A. A.	CL	1.5	Hnu - 0 ppm Bd - 50 cpm
22				cont. page 4			

NOTES
See page 1

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 1679	COORDINATES:	DATE 1-24-92
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 1-23-92
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED: 1-27-92
DRILLING METHODS: Cable Tool		PAGE 3 4 OF 7

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
22	100414	5		Stiff, gray, (10yr, 5/1) silty clay, some gravel, low plasticity, sl. moist. 22.4'	CL	1.5	Hnu - 0 ppm
23	0940	12	8	med dense, sandy, clayey, well graded gravel, sl. moist.	GC	NA	Bb - 40 cpm
	1-24-92	16					
24	1015	8 / 12	0	N.R.	NA	NA	Hnu - 0 ppm
	1-24-92	20					Bb - 40 cpm
	1020	10 / 15	0	N.R.	NA	NA	Hnu - NA
	1-24-92	19					Bb - NA
27	1040	8 / 12	0	N.R.	NA	NA	Hnu - NA
28	1-29-92	12					Bb - NA
	~~100416~~ 1-29-92 100416	2		med stiff, dark grayish brown, (2.5y, 4/2) silty clay, some sand, some gravel, med plasticity, moist.			
29	1050	8	15		CL	.75	Hnu - 0 ppm
	1-24-92	12					Bb - 40 cpm

NOTES: See page 1

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FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 1679	COORDINATES:	DATE 1-24-92
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 1-23-92
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED: 1-27-92
DRILLING METHODS: Cable tool		PAGE 5 OF 7

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	100417 100418 100419 J.L 1-26-92						QA 2/2/92
30	10419	No blows on shelby tube	Pushed 3.0 ft Recovery 34 in	Stiff, olive brown, (2.5Y, 4/3) silty clay, some gravel, trace sand, med plasticity, moist	CL	1.5	Hnu - 0 ppm
31	1100						
32	1-24-92						Bb - 40cpm
33	100419 100420 100421 1110	5	5	med stiff, olive brown (2.5Y, 4/3) sandy silty clay, low to med plast. moist to v. moist.	CL	.75	Hnu - 0 ppm
		6	0	NR.			
34		10	0	NR.			Bb - 40cpm
	1-24-92	15	0	N.R			
35				Sampling ends a ~~34.5 ft~~ 34.5 ft J.L 1-24-92			
				Drilling ends at 35.0 ft.			

NOTES: See page 1
100422 - Full HSL
100423 - Trip Blank
100424 - Total U Wenco
100425 - Total U Th. II

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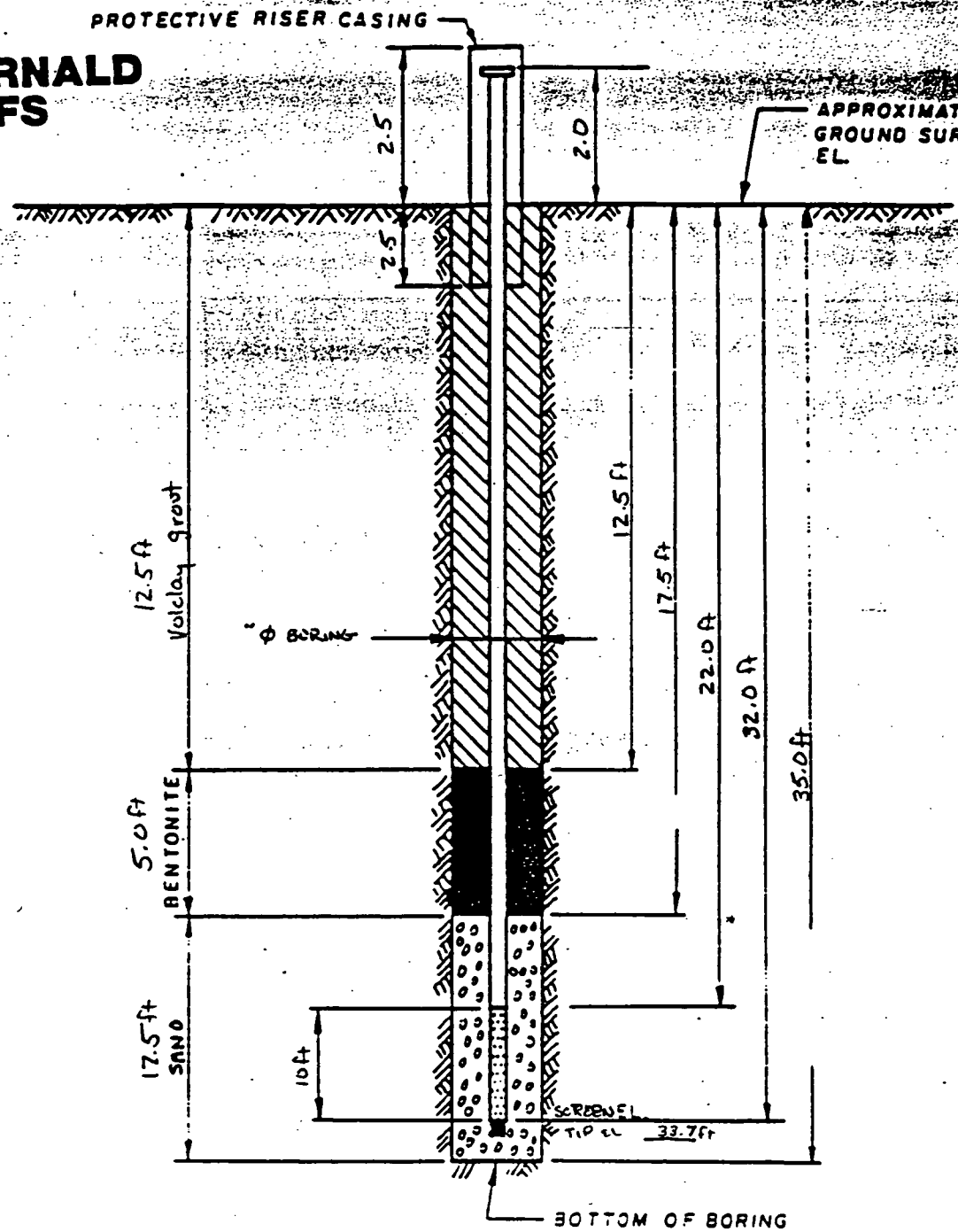
FERNALD RI/FS



DRAWING NUMBER	
CHECKED BY	
APPROVED BY	
DRAWN BY	J. Lear 1-28-92

NOTES:

1. RISER PIPE IS 4 DIN I.D. SCHEDULE 316 Stainless steel PIPE, THREADED, FLUSH-JOINTED.
2. SCREEN IS 4 DIN I.D SS PIPE CONTINUOUS SLOT SCREEN (0.010 IN SLOT SIZE).
3. LOWER END OF SCREEN IS CAPPED.
4. ELEVATION OF WATER LEVEL No water encountered
5. WATER LEVEL READING ON NA (Dry well)

6 bags of 10x20 sand

4 buckets (5 gal) bentonite

2 bags Volday grout

200 gals H_2O used while Drilling

INSTALLATION DETAILS
MONITORING WELL
1679
PREPARED FOR
Fernald RI/FS

Appendix F
Cost Estimates

APPENDIX F

COST ESTIMATES

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SUMMARY OF APPENDIX F

Appendix F.1: Basis of Cost Estimate

The basis of cost estimate provides the backup data, assumptions, general cost estimating criteria, scope of work, and list of inclusions and exclusions. The basis of cost estimate was used to prepare the cost estimates for the Operable Unit 2 remedial alternatives.

Appendix F.2: Off-Site Disposal - Cost Comparison

Off-site disposal costs for transporting same quantity of waste to NTS and Envirocare disposal facilities are evaluated in this appendix to provide direct comparison of disposal costs and to provide unit cost data in screening preliminary remediation alternatives presented in Section 4.0 of the Feasibility Study.

Appendix F.3: Screening Alternatives - Comparison of Estimated Costs

Estimates for cost components common to screening alternatives, unit costs for cost components unique to each screening alternative, and indirect costs are developed in this appendix to provide cost evaluation data in screening the preliminary remedial alternatives presented in Section 4.0 of the Feasibility Study. Costs for screening alternatives were developed for the federal ownership land-use scenario and 10^{-6} risk criteria.

Appendices F.4 through F.7: Detailed Cost Estimates

Detailed cost estimates to support screening of preliminary remediation alternatives and the detailed analysis of selected alternatives are presented in this appendix. The detailed cost estimate for each alternative includes basis of cost estimate, summary of remediation and excavation volumes, present-worth analysis, risk analysis, construction schedule, direct costs for the construction activities, operations and maintenance costs, and summary of estimated costs.

Detailed cost estimates are based on alternative descriptions presented in Sections 4.0 and 5.0 of the Feasibility Study.

Detailed cost estimates presented in this appendix also provide the primary balancing criteria required in a comparative analysis of the final remediation alternatives.

Detailed cost estimates are presented for the federal ownership land-use scenario for the consolidation alternative and for both the federal and private ownership land-use scenarios for the on-site and off-site disposal alternatives.

Appendix F.8: Cost Comparison of 10^{-5} and 10^{-6} Risk Criteria

Net present-worth costs for 10^{-5} risk criteria for the alternatives selected for the detailed analysis in Section 5.0 of the Feasibility Study are presented in this appendix to compare costs with the net present-worth costs for the 10^{-6} risk criteria. Costs for 10^{-5} risk criteria were estimated based on unit costs calculated from the 10^{-6} risk criteria cost estimates (Appendices F.4 through F.7) and remediation volumes derived from solid block modeling. Remediation and excavation volumes for each alternative for 10^{-5} risk criteria are also included in this appendix.

APPENDIX - F.1

BASIS OF COST ESTIMATE

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BASIS OF ESTIMATE

PROJECT DESCRIPTION: OU2 FEASIBILITY STUDIES
WBS NUMBER: 1.1.1.1.2.3.__
PROJECT LOCATION: FERNALD, OHIO
PROJECT ENGINEER: GREG JONES
ESTIMATOR: KEN KEPLER
ESTIMATE NUMBER: C29407__ __

SUPPORTING DOCUMENTATION:

Verbal Scope	X	P & ID's		Work Plan	
Drawings	X	Equipment List		Site Walk	
Sketch	X	Specifications		Eng Mtg	
Flow Diagrams		Site H & S Plan		Price Quotes	X

TYPE OF ESTIMATE:

Plan/Feasbl	X	Budg/Concpt		Title I Des	
Title II Des		Government		Independent	
Construction		Baseline			

BASIS OF ESTIMATE:

This Basis of Estimate represents the five Operable Unit 2 subunits (SWL - Solid Waste Landfill, LSP - Lime Sludge Ponds, SF - South Field, AFP - Active Flyash Pile, IFP - In-active Flyash Pile) supporting all alternatives for the OU2 Feasibility Studies based on federal ownership (expanded trespasser) or private ownership (resident farmer) scenarios to determine the level of clean-up for each sub-unit. All alternates include costs for site preparation (new or existing road up-grades, clearing, grubbing, grading and earthwork for and construction of support facilities such as office trailers, parking, staging and storage facilities and equipment and personnel decontamination facilities); erosion and sediment controls (silt fencing, diversion berms and ditches, sediment traps and tanks, collection sumps, pumps and piping, etc.); perched groundwater collection if needed (interceptor trench, wetwell, pumps and piping); excavation of waste for consolidation and in-place disposal (ALT.2), excavation of waste to be disposed at an on-site disposal cell (ALT6A and B), or excavation of waste for off-site disposal to Envirocare by rail gondola car (ALT-3A and B);

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BASIS OF ESTIMATE

PROJECT DESCRIPTION:	OU2 FEASIBILITY STUDIES
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

treatment of solid waste by shredding/crushing for in-place consolidation or placement in an on-site disposal cell, drying of necessary waste to be shipped to Envirocare, flyash/limesludge mixing for in place consolidation, solidification of lead contaminated soil at the SF firing range for off-site disposal to Envirocare; construction of an on-site disposal cell (site preparation and support facilities at the Cell site, construction of the liner, placement of excavated and generated waste, construction of the cap and dike); site restoration of each subunit with backfill, top soil, seeding and mulch; demolition and removal of all support facilities/utilities (generated waste) to either the on-Site disposal cell or off-site to Envirocare.

Site maintenance, groundwater monitoring, and O&M costs for a 30-year period following remediation are included.

Comments in this basis will be typical of all subunits with the main objective being to clarify the estimating philosophy and procedures applied. In all cases where a common facility is described that supports two or more subunits, the quantities either represent a prorated quantity in relationship to the volume of remediated soil/waste to each other, such as appear in the liner, cap and dike sections or as a percentage applied to the total quantities representing a common support facility. These estimates are considered to be within a -30% to +50% range of accuracy (including Risk Budget), based on the level of information provided at this time.

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	OU2 FEASIBILITY STUDIES
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

EXECUTION:

These projects are estimated to be performed by a subcontractor working a 40-hour week, 10 hours a day, no overtime or holidays. Construction start and finish dates are indicated in Appendix D (Construction Activity Duration) for each alternative. Months indicated for some common support facilities span the time from the start of one subunit to the end of the last subunit to be completed.

WAGE RATES:

Wage rates within the estimates are based on the current rates furnished by the local Craft Labor Board and developed into a craft mix. All Labor Dollars are considered constant 1994 dollars.

ENGINEERING:

Engineering costs are based on the percentage of Direct and Indirect Field Costs that resulted in the Baseline estimates, dated November,1993. Refer to CRU2 Baseline Summary. Also, included in the Titles I & II Engineering allowance, is cost for the Cultural Resource Surveys, Phases I & II.

PRODUCTIVITY:

A site specific factor of 1.29 has been applied to Net Chart manhours. See Appendices A and B for development and application.
Task-specific factors were applied as necessary when identified.
PPE-specific factors were applied based on level identified. See Appendix B.
An allowance for delays caused by monitoring and radiation checking is included. See Appendix C, Health Physics.
No exposure/burnout rates have been identified for this work.

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NOTE: All references to "See Appendix" refer to cost estimate Appendices only..

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	OU2 FEASIBILITY STUDIES
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

ESCALATION:

Escalation has been excluded from these estimates. Costs are considered to be constant 1994 dollars.

UNIT RATES:

In general, the unit manhours, subcontract dollars, equipment dollars, and material dollars were based on 1993 MEANS. In most cases, a site productivity factor of 1.29 was applied to the Net chart unit manhours. The unit material and subcontract dollars were escalated 3% to arrive at 1994 constant dollars. Some costs were taken directly from the previous estimates.

The Low Level Thermal Destruction Unit costs were derived from B&RE quotational information.

Solidification costs for lead contaminated soil with portland cement have been formulated from information provided in "Hazardous Waste Cost Control" by R.A. Selg.

Waste container costs to purchase gondola liners and covers provided by FERMCO Recycling and Technology Dept.

Transportation and burial costs represent RSO's cost to transport waste by rail in gondola cars and bury the OU2 waste at Envirocare in Clive, Utah. Unit costs provided by FERMCO Recycling and Technology Dept. Certification costs by RSO are based on costs to certify a typical Sealand container. See Appendix E and estimate detail sheets for unit cost breakdown.

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Waste Water Treatment costs are provided by OU5 to cover the cost of processing waste streams produced by OU2 construction activities.

Screening and confirmatory testing requirements and pricing were provided by CRU2 engineering.

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	OU2 FEASIBILITY STUDIES
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

UNIT QUANTITIES:

Quantities of soil, flyash, lime sludge and solid waste to be remediated were provided by CRU2 Engineering Dept. See Tables in section F.8. The "Additional Excavation" volume required to excavate the remediation quantity of waste material at each subunit is based on the preliminary layout of excavation limits. The percent of the remediated quantity for the "Additional Excavation" is 14% for SWL and 10% each for the other subunits.
All other quantities, volumes, sizes, etc., were provided by CRU2 Engineering. All volumes of waste were considered bank cubic yards (BCY) at 10^{-6} risk level.

SWELL, DENSITY & SHRINKAGE FACTORS:

A swell or shrinkage factor was applied to the BCYs provided by CRU2 Engineering when applicable, resulting in loose cubic yards (LCY) or in-place or compacted cubic yards (ICY). Factors used are estimators judgement based on data provided in 'Fundamentals of Earthmoving' by Caterpillar Tractor Co. Density factors were applied for converting LCYs to Tons for costing out the shredding/crushing operation, solidification of the lead-contaminated soil at the Firing Range, and for determining the maximum allowable volume by weight for material to be shipped to Envirocare by rail in 90-ton gondola cars. Density factors used are estimator's judgment based on 'Weights and Specific Gravities' in the American Institute of Steel Construction book. Weights are for bulk, heaped, or loose materials. The following factors were used:

MAT'L.	SWELL	DENSITY	SHRINKAGE
EARTH	1.25	1.275	1.2
CLAY	1.23	1.25	1.18
GRAVEL	1.12	1.275	1.075
SAND	1.12	1.275	1.075
GEN.WASTE	1.15	2.00	1.15

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24 AUGUST 94

ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	OU2 FEASIBILITY STUDIES
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

HEALTH PHYSICS: (See Appendix C)

All workers at the site will participate in the Medical Monitoring & Surveillance Program and the FEMP Radiation In-Vivo & Bioassay Testing Program. Costs are for the workers' time to participate in these programs based on the Number of Workers and the Duration of Construction Activity information.
Material dollars are included in this section to provide PPEs for the worker when required. Disposable PPEs are to be provided by the subcontractor. Washable PPEs will be provided by the subcontractor for the initial changeout for each required worker, with subsequent changeouts and cost for washing and decontamination provided by FERMCO. Labor dollars are included in this section for work delays caused by monitoring and rad checking.

NUMBER OF WORKERS:

Calculation: Total Direct Manhours Div. By 1813 Hours (1 Man Year) x 1.25 (attrition) Div. By the Duration of Construction in Months x 12 = number of workers per year.

(Use number of workers per year to determine CERCLA/SAT and Health Physics costs.)

G&A (Home Office Expense):

G&A are excluded from the target estimate. The G&A costs are calculated within the Micro-Frame computer system according to the plan for rebaselining.

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	OU2 FEASIBILITY STUDIES
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

RISK BUDGET:

A cost element, based on a risk analysis calculated for this estimate to cover a statistical probability of a 50% chance of overrun/underrun to the project. The target estimate is the sum of the base estimate and the risk budget. The target estimate is the basis for the Performance Baseline. The risk budget for these projects will vary according to the results of the analysis. See the Risk Analysis at the end of each estimated alternative and refer to the Estimate Summary Sheets.

CONTINGENCY:

An amount budgeted to cover costs that may result from incomplete design, unforeseen and unpredictable conditions, or uncertainties. The amount of the contingency will depend on the status of design, procurement, construction, and the complexity and uncertainties of the component parts of the project. Contingency is not to be used to avoid making an accurate assessment of expected costs.

Contingency is calculated as the delta between the 50% chance of overrun and the 5% chance of overrun, indicated on the risk analysis. Contingency for these alternatives will vary based on the results of the risk analysis. See the risk analysis at the end of each estimated alternative and refer to the Estimate Summary Sheets.

PRESENT WORTH ANALYSIS:

An economic evaluation that compares the sums of discounted dollar costs or benefits of capital investments, replacements, operations, maintenance, decommission, and salvage of two or more systems or operations over the expected useful life span. The analysis identifies the system or operation considered to be the least-cost alternative for satisfying a particular purpose.
(SEE Present Worth Analysis Study "SUMMARY")

000638

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FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	OU2 FEASIBILITY STUDIES
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

INCLUSIONS:

Costs have been included in the Field Directs for:

SITE PREPARATION
- Construction Survey
- Temporary Construction Fencing
- Clearing and Grubbing
- Dewatering
- General grading and surfacing for new roads, office/parking area, decontamination facilities and staging and/or Storage Areas
- Relocating diversion ditch for SWL

DECONTAMINATION FACILITIES AT SUBUNITS
- Decon. trailer rental at 39 mo.'s for SWL and LSP
- Decon. trailer rental at 51 mo.'s for SF, AFP and IFP
- Construction equipment decon.facility common for subunits SWL and LSP and one common for FS, AFP & IFP - 25' x 60'
- Personnel decon.facility common for sub-units SWL and LSP and one common for SF, AFP & IFP - 11' x 11'

EROSION AND SEDIMENT CONTROLS
- Diversion of clean run-off
- Diversion, collection and pumping of contaminated run-off to AWWT Facility
- Erosion and sediment control measures

OFF-SITE DISPOSAL
- Excavate contaminated soils/waste and lead-contaminated soil exceeding WAC
- Solidify lead-contaminated soil at firing range - 300 BCY
- Dry waste - low level thermal destruction (if required)
- Shred and crush waste (if required)

000639

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION: OU2 FEASIBILITY STUDIES
WBS NUMBER: 1.1.1.1.2.3.__
PROJECT LOCATION: FERNALD, OHIO
PROJECT ENGINEER: GREG JONES
ESTIMATOR: KEN KEPLER
ESTIMATE NUMBER: C29407__ __

LOAD AND HAUL FOR OFF-SITE DISPOSAL

- Haul treated lead-contaminated soil from SF to OU1 rail loading facility
- Haul soil/waste exceeding WAC from subunits to OU1 rail loading facility
- Load waste into 90-ton capacity gondola rail cars
- Certify and ship to Envirocare

EXCAVATE, LOAD AND HAUL FOR ON-SITE DISPOSAL

- Excavate, sort and haul level D, C and additional soil/waste from subunits to on-site disposal cell

SITE PREP. FOR DISPOSAL CELL

- Clear and grub surrounding area - 45 acres
- Relocate South Access Road - 7,333 yd^2
- New haul road - 5,778 yd^2
- Temporary fencing - 5,200 linear feet
- Storage area - 200' x 200', asphalt
- Staging area - 160' x 160', concrete
- Decontamination trailer rental - 51 mo.'s
- Decontamination facilities - equipment - 25' x 60'
- Decontamination facilities - personnel - 11' x 11'
- Shredding/crushing equipment and operation at SWL and SF Staging areas

COMPOSITE LINER -

- Subgrade preparation - remove top soil, grade/compact
- Construct liner w/borrow materials
- Install leachate collection system
- Install leak detection system
- Install leachate discharge system
- Backfill and compact - impacted cushion layer 12" thick
- Backfill and compact - remaining impacted fill
- Backfill and compact - level C impacted fill
- Backfill generated waste

000640

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

861

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION: OU2 FEASIBILITY STUDIES
WBS NUMBER: 1.1.1.1.2.3.__
PROJECT LOCATION: FERNALD, OHIO
PROJECT ENGINEER: GREG JONES
ESTIMATOR: KEN KEPLER
ESTIMATE NUMBER: C29407__ __

COMPOSITE CAP
- Construct composite cap w/borrow materials
- Top soil - 6" thick
- Grass cover - seed, mulch
- Security fence

DIKE FOR DISPOSAL CELL
- Construct dike w/borrow materials
- Construct dike cover and HDPE piping
- Top Soil and grass cover - seed, mulch

GENERATED WASTE REMOVAL
- Office/parking facilities common to SWL and LSP
- Office/parking facilities common to AFP, IFP and SF
- Equip.and personnel decon. facilities common to SWL and LSP
- Equip.and personnel decon facilities common to AFP, IFP and SF
- Equip.and personnel decon facilities common to on-site disposal cell
- Staging area common to SWL and LSP
- Staging area common to AFP, IFP and SF
- Staging area common to on-site disposal cell
- Storage area common to on-site disposal cell
- All temporary construction fencing
- Relocated South Access Road
- Haul road

SITE RESTORATION - ALL SUBUNITS AND SUPPORT FACILITIES AT CELL
- Borrowed cmmon soil for backfill
- Final grade
- Borrowed top soil
- Grass cover, seed, fertilize, mulch
- Security fence and gates at each subunit

000641

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION: OU2 FEASIBILITY STUDIES
WBS NUMBER: 1.1.1.1.2.3.__
PROJECT LOCATION: FERNALD, OHIO
PROJECT ENGINEER: GREG JONES
ESTIMATOR: KEN KEPLER
ESTIMATE NUMBER: C29407__ __

MONITORING WELLS

- Abandon existing wells at subunits
- Install new wells at subunits
- Install new wells at on-site disposal cell

Costs have been included in the Indirect Field Costs for:

- Contractor supervision
- Small tools and consumables
- Equipment rental
- Temporary construction facilities
- Temporary utilities and hook-up
- Job clean-up
- Safety
- Health Physics
- CERCLA and site access training
- Bond
- Subcontractor overhead and profit (Includes insurance and reserve fund)
- Subcontractor payroll burdens and benefits

Costs have been included as FERMCO Field Support Costs for:

- Transportation and burial to Envirocare
- Purchase cost of liners and covers for rail gondola cars
- Waste water treatment cost (OU5)
- Screening and confirmatory testing
- FERMCO construction management

000642

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

5 86 F

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	OU2 FEASIBILITY STUDIES
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

Costs included for Engineering are:

- Emission modeling
- PSAR/FSAR Reports
- Titles I,II and III (Includes cultural resource surveys, Phases I and II)
- CDR and DCR

Costs have been included for Ohio State sales tax

- at 6%

Costs have been included for Risk Budget.

Costs have been included for Contingency.

ALL OF THE ABOVE REPRESENTS SCOPE FOR THE CAPITAL COST FOR THE ALTERNATIVES.

ALT2, ALT-3A and ALT-6A represents quantities based on criteria for federal ownership (Expanded Trespasser).

ALT-3B and ALT-6B represents quantities based on criteria for private ownership (Resident Farmer).

ALT-5A represents quantities based on criteria for federal ownership (Expanded Trespasser) for an onsite disposal cell.

Operations and maintenance costs were developed for a 30-year period following the remediation of each subunit. These costs, along with the capital cost, were used to develop the Life Cycle Cost Analysis Report in 1994 constant dollars to determine the Net Present Value (NPV).

000643

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	OU2 FEASIBILITY STUDIES
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

EXCLUSIONS:

- Permits and fees
- Landlord costs
- Escalation
- G&A (home office expense)
- Rail loading facility provided in CRU1 baseline.

000644

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

PRESENT WORTH ANALYSIS

PROJECT DESCRIPTION:	OU2 FEASIBILITY STUDIES
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

PURPOSE

The objective of the Present Worth (PW) Analysis is to use a method of economic evaluation that compares the sums of discounted dollar costs or benefits of capital investments, replacements, operations, maintenance, and dismantlement of two or more systems or operations over their anticipated useful life span. This analysis technique will identify the system or operation considered to be the lowest-cost alternative for satisfying a particular need. The analysis complies with the requirements described by the Office of Management and Budget (OMB) Circular No. A-94, the National Bureau of Standards Handbook 135 prepared for DOE, U.S. Environmental Protection Agency (EPA) OSWER Directive 9355.3-01, and DOE Order 5700.2D.

BACKGROUND

The five Operable Unit 2 (OU2) remedial projects were evaluated for each of the alternatives considered. The remedial alternatives were:

1) Alternate 2 - Consolidation and capping
2) Alternate 3A - Off-site disposal to Envirocare - federal ownership (expanded trespasser)
3) Alternate 3B - Off-site disposal to Envirocare - private ownership (resident farmer)
4) Alternate 5A - Excavate and on-site disposal w/waste exceeding WAC disposed off-site to Envirocare - federal ownership (expanded trespasser). This alternate was developed as a base case for the screening alternatives 6, 7 and 8 in section F.3. The screening alternatives were evaluated in constant 1994 dollars and no present worth analysis was performed for these alternates.
5) Alternate 6A - Excavate and on-site disposal w/waste exceeding WAC disposed off-site to Envirocare - federal ownership (expanded trespasser)
6) Alternate 6B - Excavate and on-site disposal w/waste exceeding WAC disposed off-site to Envirocare - private ownership (resident farmer)

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

PRESENT WORTH ANALYSIS

PROJECT DESCRIPTION:	OU2 FEASIBILITY STUDIES
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

ANALYSIS APPROACH

Total Life-Cycle Cost (TLCC) approach was applied in the analysis to evaluate the alternative cases for each remedial project. The TLCC technique sums all significant time-equivalent dollar costs attributable to each of the economic alternatives in each project. The positive cash flows (salvage value) are treated as negative costs; therefore, the positive cash flows are discounted to the base year and subtracted from the total.

All cash flow amounts are stated in present value constant dollars; hence, all dollars will have the same purchasing power. Constant dollars indicate what the same good or service would cost at different times if no inflation or deflation exists to change the purchasing power of the dollar. A straight forward means was used to express cash flows in constant dollars by establishing a reference (base) year for which the value of the dollar is set.

The constant dollar cash flows are adjusted for opportunity cost associated with their different times of occurrence. The adjustment for opportunity cost, called "discounting of cash flows" allows to convert the constant dollar cash flows occurring at different times to a time-equivalent lump-sum amount evaluated as of the beginning of the base year. This is done by using an interest rate or "real discount rate" which reflects the opportunity cost apart from any change in the purchasing power of the dollar. Real discount rates do not include the rate of inflation or deflation since cash flows are expressed in constant dollars. The real discount rate was obtained from appendix "C" of OMB Circular No. A-94. The discount rate identified in the OMB Circular for a thirty year are longer study period is 2.8%. This discount rate was applied to calculate the net present value (NPV). The NPV of the alternative cases for each project were compared in order to identify the least-cost option.

000646

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

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PRESENT WORTH ANALYSIS

PROJECT DESCRIPTION:	OU2 FEASIBILITY STUDIES
WBS NUMBER:	1.1.1.1.2:3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

ASSUMPTIONS

The data accumulated for each of the cost elements used in the PW analysis supporting estimates were taken from the best information currently available at the time the analysis was performed.

The estimated costs reflected in the supporting estimates for the alternatives of each project were dispersed equally by month over the cash flow year. The cash flows that pertain to each year were established from when the expenditures were scheduled to occur throughout the total study period.

CONCLUSION

This economic evaluation compared the sums of the discounted constant dollar cash flows, or the NPV, between the alternatives in the base year, FY94, to distinguish the least-cost option. The least-cost option for each of remedial alternatives was determined.
However, unquantifiable effects should always be considered and addressed before the final recommendation is reached.

000647

PROJECT: OU2 FEASIBILITY STUDIES
PROJ.LOCATION: FERNALD PLANT
ESTIMATOR : KEN KEPLER

SITE SPECIFIC
EFFICIENCY / MULTIPLIER ANALYSIS

WBS NO. : 1.1.1.1.2.3._ EST.NO.: C29407 _ _
TASK I.D. :2C _ _ DATE : 24-Aug-94

	PERCENT OF INFLUENCE ON CHART MANHOURS						CHART MANHOURS			% OF INFLUENCE	WT'D VALUE	PROD. RESULT
	40%	50%	60%	70%	80%	90%	100%	105%	110%			
CRAFT SKILL (NOTE 1)	POOR			FAIR			STD	V.GOOD	EXCELLENT	80.00%	12.0%	9.60%
CRAFT AVAIL.(NOTE 1)		POOR		FAIR			STD			90.00%	8.0%	7.20%
CLIMATE (NOTE 2)	SEVERE	ICE/SNOW			RAIN		+40 TO +85			60.00%	20.0%	12.00%
PLANT ELEVATION		OVER 10,000FT			5,000' TO 10,000 FT		UNDER 5,000 FT			100.00%	5.0%	5.00%
WORK SPACE	<---- MULTIPLE SHIFTS-			200 SF	250 SF	300 SF	350 SF			70.00%	10.0%	7.00%
WORK WEEK							4-10s / 5-8s			100.00%	15.0%	15.00%
50 HOUR WORK WEEK	//// MULTIPLE-SHIFT ////			OVER 7 WEEKS	3 TO 7 WEEKS	UP TO 3 WEEKS						
60 HOUR WORK WEEK			OVER 7 WEEKS	3 TO 7 WEEKS	UP TO 3 WEEKS							
SHIFTWORK												
2ND SHIFT					2ND SHIFT		ONE SHIFT ONLY			100.00%	3.0%	3.00%
3RD SHIFT			3RD SHIFT							100.00%	5.0%	5.00%
PROJECT SIZE					400M MH AND UP	300M TO 400M MH	200M TO 300M MH	200M MH OR LESS		105.00%	4.0%	4.20%
PLANT TYPE				REVAMP ONLY	REVAMP & NEW	NEW IN EXIST PLT	GRASS ROOTS			70.00%	8.0%	5.60%
AREA/UNION INFLUENCE	STRONG		MILD		SOME		NONE			40.00%	10.0%	4.00%
											100.0%	77.6%

NOTES.....

1. TURNOVER HAS BEEN CONSIDERED

2. FOR EXTERIOR WORK ONLY

EFFICIENCY (AS A % OFF CHART MANHOURS) 77.6%

MULTIPLIER – (TO BE APPLIED TO CHART M.H.'S TO OBTAIN SITE M.H.'S) 1.29

EFFICIENCY FACTORS

CONTRACT NO. :	4424321
PROJECT DESC. :	OU2 FEASIBILITY STUDIES
PROJECT CONTROLS :	CRU2
PROJ. LOCATION :	FERNALD
PROJ. ENGINEER :	GREG JONES
ESTIMATOR :	KEN KEPLER
ESTIMATE NO. :	C29407
WBS NO. :	1.1.1.1.2.3.
TASK I.D. :	2C

EXAMPLE:

STANDARD CHART MANHOURS =	NET	100
EFFICIENCY FACTORS:		
*SITE SPECIFIC (SEE APPENDIX A)	29%	29
S/T = BASE UNIT MANHOURS		129

*TASK SPECIFIC (BASED ON LABOR CHARTS OR EST.KNOWLEDGE)

SEE DETAIL SHEETS or M.H.CHARTS	0%	0	N/A
S/T = NEW BASE UNIT MANHOURS		129	

*PPE SPECIFIC (BASED ON CURRENT DATA & EST. KNOWLEDGE)

	LEVEL	D	Mod.'D'		C		B	
PRODUCTIVITY HOURS (AS ADDER TO BASE MH's)	0	0	1.1	142	1.5	194	1.75	226
TOTAL HOURS WITH PRODUCTIVITY		129	2.1	271	2.5	323	2.75	355

NOTE : Use a Default Productivity Factor of 2.1 for working in a contaminated area if Safety Level cannot be determined.
(SEE FERMCO ESTIMATING SERVICES REFERENCE MANUAL IM-6006 8.10)

Total hours with productivity divided by 10 hour working days = (PPE) ManDays to determine material cost of PPE's. (SEE APPENDIX C -HEALTH PHYSICS)

27 MD	32 MD	36 MD

THESE EFFICIENCY FACTORS WERE APPLIED INDIVIDUALLY THROUGHOUT THE ESTIMATE AT A TASK SPECIFIC LEVEL TO OBTAIN A MORE ACCURATE ACCOUNT OF OVERALL EFFICIENCY IMPACT DUE TO PPE REQUIREMENTS IN HANDLING CONTAMINATED AND HAZARDOUS WASTE.

DATE: 24-Aug-94

PROJECT TITLE:
OU2 FEASIBILITY STUDIES
WBS#:
1.1.1.1.2.3. _

HEALTH PHYSICS

EST.NO.: C29407 _ _
EST. : KEN KEPLER
TASK I.D. : 2C _ _

PPE'S – PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY / MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT – DISPOSABLE	EA	3.20	4	1000	$12,800	C/B		
TYVEK HOOD – DISPOSABLE	EA	6.00	4	1000	$24,000	C/B		
TYVEK BOOT COVER – DISPOSABLE	EA	1.30	4	1000	$5,200	C/B		
GLOVE LINER – DISPOSABLE	PR	1.40	4	1000	$5,600	C/B		
GLOVE, LASTEX – DISPOSABLE	PR	1.50	4	1000	$6,000	C/B		
GLOVE, WORK – DISPOSABLE	PR	0.90	4	1000	$3,600	C/B		
APR CARTRIDGES – DISPOSABLE	PR	17.50	4	1000	$70,000	C/B		
SUB–TOTAL		31.80	4		$127,200			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT – DISPOSABLE	EA	3.20	4	2000	$25,600	D		
TYVEK HOOD – DISPOSABLE	EA	6.00	4	2000	$48,000	D		
TYVEK BOOT COVER – DISPOSABLE	EA	1.30	4	2000	$10,400	D		
GLOVE LINER – DISPOSABLE	PR	1.40	4	2000	$11,200	D		
GLOVE, LASTEX – DISPOSABLE	PR	1.50	4	2000	$12,000	D		
GLOVE, WORK – DISPOSABLE	PR	0.90	4	2000	$7,200	D		
SUB–TOTAL		14.30	4		$114,400			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS–(1)PR.PER WORKER	PR	12.70	50		$640	D/C/B		
APR w/HALF FACE MASK – (1) PER WORKER	EA	22.30	30		$670	C		
APR w/FULL FACE MASK – (1) PER WORKER	EA	174.00	20		$3,480	C		
SCBA	EA	1894.00	5		$9,470	B		
COOL VESTS	EA	137.50	10		$1,380	C/B		
THERMO STRIPS	EA	50.00	100		$5,000	C/B		
SUB–TOTAL					$20,640			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$262,200			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE.
COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

EXAMPLE ONLY

000650

DATE: 24-Aug-94

PROJECT TITLE:
OU2 FEASIBILITY STUDIES
WBS#:
1.1.1.1.2.3. _

HEALTH PHYSICS

EST.NO.: C29407 _ _
EST. : KEN KEPLER
TASK I.D. : 2C _ _

MEDICAL MONITORING – IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE – LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	24	96	$16.97	$1,630		
ANNUAL PHYSICALS	1	3	24	72	$16.97	$1,220		
EXIT (TERMINATION) PHYSICALS	1	4	24	96	$16.97	$1,630		
SUB-TOTAL						$4,480		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE – LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	24	1	24	583	$16.97	$9,900		
YEARLY IN-VIVO	1	4	24	96	$16.97	$1,630		
EXIT (END OF PROJECT / TERMINATION)	1	4	24	96	$16.97	$1,630		
SUB-TOTAL						$13,160		
WORK DELAYS CAUSED BY MONITORING	5%				$1,492,900	$74,645		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$1,492,900	$74,645		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS – FORWARD TO ESTIMATE SUMMARY SHEET	$166,900	$262,200	$429,100

EXAMPLE ONLY

000651

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – OU2 FEASIBILITY STUDIES
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. – 2C _ _

WBS NO. – 1.1.1.1.2.3. _
EST. NO. – C29407 _ _
BY – K. KEPLER
DATE – 24–Aug–94

OU2 SUB–UNIT CONSTRUCTION ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	CONSTRUCTION ACTIVITY	DURATION
SOLID WASTE LANDFILL	24–Aug–94	01–Jul–99	30–Jan–2000	31–Aug–2000	14	MONTHS
LIME SLUDGE PONDS	24–Aug–94	01–Jun–97	30–Jan–98	30–Sep–98	16	MONTHS
IN–ACTIVE FLYASH PILE	24–Aug–94	01–Nov–97	02–Apr–99	31–Aug–2000	34	MONTHS
SOUTH FIELD	24–Aug–94	01–Jun–96	16–May–97	30–Apr–98	23	MONTHS
ACTIVE FLYASH PILE	24–Aug–94	01–Jun–97	31–May–98	30–May–99	24	MONTHS
TOTAL OU2 S/U's	24–Aug–94	01–Jun–96	17–Jul–98	31–Aug–2000	51	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
65	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

000652

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – OU2 FEASIBILITY STUDIES
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3. _

EST.NO. C29407
BY KEN KEPLER
DATE 24–Aug–94
TASK ID 2C _ _

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR) CAR	LINER	COVER	CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE TONS/CY	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS 141 TONS (90 TON MIN.)	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	$120 DEMURAGE $/DAY (>5 DAYS)	ENVIROCARE BURIAL COSTS (1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							$80.15 PER TON						
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045
	$0	$400	$395	$340	LEAD/SOIL	1.810	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 125, 141, or 200 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

000653

1961

APPENDIX E

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – OU2 FEASIBILITY STUDIES
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3. _

EST.NO. C29407
BY KEN KEPLER
DATE 24–Aug–94
TASK ID 2C _ _

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf A	MAXIMUM CAPACITY cf B	MAXIMUM LOADED WEIGHT C	EMPTY WEIGHT D	ALLOWABLE LBS. OF WASTE PER CONTAINER (C –D) E	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A) F	USE CY OF WASTE PER CONTAINER G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0
	LEAD/SOIL	1.810	134.00	1971.0	196,000	0	196,000	1462.7	54.2

INPUT

000654

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – OU2 FEASIBILITY STUDIES
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3. _

EST.NO. C29407
BY KEN KEPLER
DATE 24–Aug–94
TASK ID 2C _ _

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	0.0	0	$23,816	$0	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	0.0	0	$24,180	$0	$493.47		
	LEAD/SOIL	54.20	0.0	0	$24,180	$0	$446.13		
						**			

INPUT

** NOTE:
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

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FEMP-OU02-5 DRAFT
August 24, 1994

F-1-24

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

CONSTRUCTION SCHEDULE

PROJECT DESCRIPTION: OU2 FEASIBILITY STUDIES
WBS NUMBER: 1.1.1.1.2.3.__
PROJECT LOCATION: FERNALD, OHIO
PROJECT ENGINEER: GREG JONES
ESTIMATOR: KEN KEPLER
ESTIMATE NUMBER: C29407__ __

CONSTRUCTION SCHEDULE

Estimated construction durations for Alternatives 2, 3, and 6 range from 45 months to 72 months. The construction durations are primarily based on the following rates for excavation, crew size for the excavation activity, and loading rate of gondola cars for off-site disposal:

* General Excavation Rate - 500 cubic yards per day
* Consolidation Rate - 400 cubic yards per day
* Crew size for excavation activity - varies between 4 to 8 persons per crew
* Loading rate of gondola cars - 350 cubic yards per day (6 cars per day, 6-days per week)

Following table summarizes the estimated duration for each alternative and for each land-use scenario:

Estimated Duration in Months		
Alternative	Federal Ownership	Private Ownership
2	45	Not Applicable
3	46	72[a]
6	47	47[b]

a Controlled by the loading rate of the gondola cars
b Assumes increase in crew size and excavation rate to 1000 cubic yards per day

000656

To account for unforeseen schedule delays, additional time was added to the construction durations. Cost Estimates (Net Present Worth Analysis) were prepared using average construction duration of 51 months.

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APPENDIX - F.2

OFF-SITE DISPOSAL - COST COMPARISON

NTS VS ENVIROCARE

CONTR. NO.	4424321	CONTR.NO.	4424321
CLIENT	U.S.DEPT. OF ENERGY	EST.NO.	C29406_ _
PROJECT	EXCAVATION OFFSITE DISPOSAL TO NTS VS. ENVIROCARE	DATE	24-Aug-94
LOCATION	FERNALD, OHIO	BY	KEN KEPLER
PROJ.CTL.	CRU2	TASK ID	2C _ _

OU2 FEASIBILITY STUDIES

	TOTAL ESTIMATE – CONSTANT 1994 DOLLARS					NET PRESENT VALUE				
TITLE	CAPITAL COST	O & M DURING REMEDIATION	O & M POST REMEDIATION	TOTAL CONSTANT 1994 $'s	TOTAL UNIT COST PER BCY OF EXCAV.& GEN. WASTE	CAPITAL COST	O & M DURING REMEDIATION	O & M POST REMEDIATION	TOTAL NPV DOLLARS	TOTAL UNIT COST PER BCY OF EXCAV.& GEN. WASTE
SWL – NTS	$169,512,600			$169,512,600	$2,045.20	$144,491,200			$144,491,200	$1,743.32
SF – NTS	$404,600,000			$404,600,000	$1,841.26	$371,157,900			$371,157,900	$1,689.07
LSP – NTS	$80,666,100			$80,666,100	$2,036.77	$72,735,800			$72,735,800	$1,836.53
AFP – NTS	$127,457,500			$127,457,500	$1,646.16	$113,624,600			$113,624,600	$1,467.51
IFP – NTS	$192,270,800			$192,270,800	$1,820.04	$167,515,500			$167,515,500	$1,585.71
TOTAL NTS	$974,507,000			$974,507,000	$1,855.15	$869,525,000			$869,525,000	$1,655.30
SWL – ENVIROCARE	$72,848,400			$72,848,400	$878.93	$62,095,400			$62,095,400	$749.19
SF – ENVIROCARE	$156,529,200			$156,529,200	$712.33	$143,591,300			$143,591,300	$653.46
LSP – ENVIROCARE	$39,962,600			$39,962,600	$1,009.03	$35,998,100			$35,998,100	$908.93
AFP – ENVIROCARE	$52,824,200			$52,824,200	$682.25	$47,091,200			$47,091,200	$608.20
IFP – ENVIROCARE	$75,694,800			$75,694,800	$716.53	$65,948,900			$65,948,900	$624.27
TOTAL ENVIRO	$397,859,200			$397,859,200	$757.40	$354,724,900			$354,724,900	$675.28

F-2-1

000658

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CONTR. NO. 4424321
CLIENT U.S.DEPT. OF ENERGY
PROJECT EXCAVATION OFFSITE DISPOSAL TO NTS VS. ENVIROCARE
LOCATION FERNALD, OHIO
PROJ.CTL. CRU2

CONTR.NO. 4424321
EST.NO. C29406_ _
DATE 24-Aug-94
BY KEN KEPLER
TASK ID 2C _ _

OU2 FEASIBILITY STUDIES

TITLE	BCY EXCAVATED		SUB-TOTAL	GENERATED WASTE TOTAL	TOTAL BCY's OF EXCAV. & GENERATED WASTE
	LEVEL D	LEVEL C			
SWL - NTS	77600	1700	79300	3583	82883
SF - NTS	216500	600	217100	2641	219741
LSP - NTS	35500		35500	4105	39605
AFP - NTS	75300		75300	2127	77427
IFP - NTS	93800	9200	103000	2641	105641
TOTAL NTS	498700	11500	510200	15097	525297
SWL - ENVIROCARE	77600	1700	79300	3583	82883
SF - ENVIROCARE	216500	600	217100	2641	219741
LSP - ENVIROCARE	35500		35500	4105	39605
AFP - ENVIROCARE	75300		75300	2127	77427
IFP - ENVIROCARE	93800	9200	103000	2641	105641
TOTAL ENVIRO.	498700	11500	510200	15097	525297

F-3

APPENDIX - F.3

SCREENING ALTERNATIVES - COMPARISON OF ESTIMATED COSTS

TABLE F.3-1
COMPARATIVE ESTIMATED COSTS

OU2 SCREENING ALTERNATIVES
(EXPANDED TRESPASSER) 10E-6

5861

24-Aug-94

COST COMPONENT						DIRECT FIELD COSTS – 1994 CONSTANT DOLLARS ($ M)						
						ALT-2	ALT-3	ALT-4	ALT-5	ALT-6	ALT-7	ALT-8
Site Preparation						2.016	1.011	1.011	1.017	1.017	1.017	1.017
Decon. Facilities						0.223	0.222	0.222	0.222	0.222	0.222	0.222
Erosion & Sediment Controls						0.327	0.365	0.365	0.344	0.344	0.344	0.344
Sub-surface Drain System						0.322						
Excavation & Consolidation – On-site						1.488						
Excav/Dry/Crush-Off-Site Dispsl.						0.254	5.207	5.207				
Excav. & Treat.-Off-Site Dispsl.									0.254	0.254	0.254	0.254
Load & Haul for Off-Site Dispsl.						0.002	1.396	1.396	0.002	0.002	0.002	0.002
Excav/Crush On-Site Disposal									1.724	1.724	1.724	1.724
Composite Liner									8.210	8.210	8.210	8.210
Composite Cap						5.894			2.160	2.160	2.160	2.160
Disposal Cell Dike									2.772	2.772	2.772	2.772
Generated Waste Disposal						0.068	0.131	0.131	0.277	0.277	0.277	0.277
Site Restoration						1.084	1.672	1.672	1.787	1.787	1.787	1.787
Monitoring Wells						1.390	1.348	1.348	1.980	1.980	1.980	1.980
Direct Field Cost Sub-Total						13.068	11.351	11.351	20.751	20.751	20.751	20.751
ADDED COST COMPONENTS		**UNIT COST**		**QTY**	**UNIT**							
Loading Gondola Cars for Off-site Disposal to ENVIROCARE	$/BCY	$5.66	a.	3,100	BCY					a. 0.02		
2. On-site Disposal to Cell	$/BCY	$49.94	a.	(3,100)	BCY					a. −0.15		
			b.	620	BCY						b. 0.03	
			c.	90,900	BCY							c. 4.54
3. Stabilization/Solidification	$/BCY	$220.88	a.	3,100	BCY						a. 0.68	
			b.	303,000	BCY							b. 66.93
Direct Field Cost Total $'s						13.068	11.351	11.351	20.751	20.613	21.466	92.217
Indirect Field Cost Factor						1.783	1.931	1.931	1.809	1.809	1.809	1.809
Total Direct + Indirect Field Cost $'s						23.305	21.917	21.917	37.542	37.294	38.837	166.839
Construction Mgmt. Cost						4.637	4.723	4.723	8.046	7.992	8.323	8.262
Engineering Cost						12.695	12.061	12.061	21.155	21.015	21.885	21.725
SUB-TOTAL						40.637	38.701	38.701	66.743	66.301	69.044	196.826
Screening & Confirmation test $'s						7.727	10.342	10.342	9.985	9.985	9.985	9.985
Sales Tax @ 6% of Mat'l.Cost $'s						0.612	0.978	0.978	1.026	1.022	1.061	4.559
Construction Water Treatment Costs $'s						0.289	0.289	0.289	0.289	0.289	0.289	0.289
Purchase of Waste Container $'s	$/BCY	$13.72	a.	3,100	BCY	0.006	4.266	4.266	0.006	a. 0.043	0.006	0.006
Transportation Costs to Envirocare	$/BCY	$397.40	a.	3,100	BCY	0.187	123.582	123.582	0.187	a. 1.232	0.187	0.187
Base Estimate Total Dollars						49.458	178.158	178.158	78.286	78.871	80.573	211.853
30 Year O & M Costs						23.844	21.376	21.376	32.762	32.762	32.762	32.762
TOTAL 1994 CONSTANT DOLLARS						73.302	199.534	199.534	111.048	111.633	113.335	244.615
ADDITIONAL UNIT COSTS												
Sub-surface Drain System	$/LF	$205.44			LF							
Excavate & Haul to On-site Cell	$/BCY	$7.23			BCY							

NOTE : Alternate 5 is base case for on-site disposal estimates ALT-6, ALT-7 and ALT-8.

LOTUS31\FS2\SCREENEX.WK3-KEPLER

000661

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – SCREENING UNIT COSTS
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3

PRELIMINARY

UNIT COSTS FOR OU2 SCREENING ALTERNATIVES

CONTR.NO. 4424321
EST. NO. N/A
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: N/A

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE AVG	COST/UNIT TOTAL	COST/UNIT SUB	COST/UNIT EQUIP	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
UNIT COST DESCRIPTION SUMMARY														
1.) OFF–SITE DISPOSAL TO ENVIROCARE Loading of Gondola Cars at rail loading facility. Installing liners & covers per BCY of excav.& gen.waste.	281919	BCY	0.15	41854	$16.97	$5.66		$3.14		$710,260		$886,410		$1,596,670
2.) ON–SITE DISPOSAL TO CELL Construction of liner, cap & dike, backfill & compaction per CY of excavated & generated waste.	90917	BCY	0.49	44741	$16.97	$49.94	$10.07	$11.34	$20.19	$759,060	$915,170	$1,031,120	$1,835,270	$4,540,620
3.) STABILIZATION/SOLIDIFICATION Treat waste w/30% portland cement & 2% sodium silicate; 10% pumpable, 90% unpumpable	3100	BCY				$220.88	$220.88				$684,740			$684,740
4.) SUB–SURFACE DRAIN SYSTEM Clay interceptor trench.	1575	LF	3.19	5022	$18.00	$205.44	$29.57	$35.90	$82.59	$90,380	$46,570	$56,540	$130,080	$323,570
5.) EXCAVATE/HAUL TO ON–SITE CELL Level 'D'	84900	BCY	0.22	18823	$16.97	$7.23		$3.46		$319,430		$294,100		$613,530
PURCHASE COSTS by FERMCO (Gondola Car Liners & Covers)	86926	BCY				$13.72	$13.72						$1,192,500	$1,192,500
OFF–SITE TRANSPORTATION COSTS (To ENVIROCARE; Cert.,Rail Transp.,Burial)	86926	BCY				$397.40	$397.40				$34,544,300			$34,544,300

000692

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – SCREENING UNIT COSTS
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3

PRELIMINARY

UNIT COSTS FOR OU2 SCREENING ALTERNATIVES

CONTR.NO. 4424321
EST. NO. N/A
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: N/A

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT TOTAL	COST/UNIT SUB	COST/UNIT EQUIP	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
1.) OFF–SITE DISPOSAL TO ENVIROCARE														
Loading of Gondola Cars at rail loading facility.														
Installing liners & covers.														
LOADING GONDOLA														
Excavated level D, C & Addn. Soils LCY														
Excavate level D, C & Additional = 378500														
Allowable CY's of waste per Gondola 73.0														
Solidified lead/soil/cement LCY														
Excav. 300 BCY x 1.25 swell factor = 396														
Allowable CY's of waste per Gondola 54.2														
Generated Waste LCY														
Gen. Waste BCY + a swell factor @ 15% 8302														
Allowable CY's of waste per Gondola 49.0														
Install Liner in Gondola car														
Excavated level D, C & Addn. Soils	5185	EA	0.75	5,016	16.97			32.21		$85,120		$167,010		$252,130
Solidified lead/soil/cement	8	EA	0.75	8	16.97			32.21		$140		$260		$400
Generated Waste	170	EA	0.75	164	16.97			32.21		$2,780		$5,480		$8,260
Load Gondola – 6/day, 2 workers	894	DAYS	16.00	18,449	16.97			15.00		$313,080		$13,410		$326,490
Seal liner, Install Cover														
Excavated level D, C & Addn. Soils	5185	EA	0.75	5,016	16.97			32.21		$85,120		$167,010		$252,130
Solidified lead/soil/cement	8	EA	0.75	8	16.97			32.21		$140		$260		$400
Generated Waste	170	EA	0.75	164	16.97			32.21		$2,780		$5,480		$8,260
Dust control – light	894	DAYS	8.00	9,224	16.97			500.00		$156,530		$446,920		$603,450
(RSO takes ownership at this time.)														
(See: Off–Site Disposal Wksht. & App.E)														
BCY														
Excavated level D 263000														
Excavated level C 11400														
Excavated lead/soil 300														
Generated Waste 7219														
TOTAL 281919														
SUB–TOTAL(1.– OFF–SITE DISPOSAL TO ENVIROCARE)	281919	BCY	0.13	38,049		5.15		2.86		$645,690		$805,830		$1,451,520
TAKE–OFF ALLOWANCE 10%				3805						64570		80580		$145,150
TOTAL (1.– OFF–SITE DISPOSAL TO ENVIROCARE)	281919	BCY	0.15	41,854		$5.66		3.14		$710,260		$886,410		$1,596,670

1.) Off–Site Disposal to Envirocare Details

PAGE 2 of 10

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – SCREENING UNIT COSTS
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3

PRELIMINARY

UNIT COSTS FOR OU2 SCREENING ALTERNATIVES

CONTR.NO. 4424321
EST. NO. N/A
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: N/A

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT TOTAL	SUB	EQUIP	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
2.) ON–SITE DISPOSAL TO CELL														
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.														
COMPOSITE LINER														
a. Subgrade Preparation – includes removal of top soil, grading & comp.	21717	SY	0.024	672	16.97			0.86		$11,400		$19,240		$30,640
b. 95% Clay – 5% Bentonite 36" Thk BCY 21717	25626	ICY	0.260	8595	16.97			11.19	20.35	$145,860		$295,360	$537,140	$978,360
c. Composite Clay Liner	21717	SY					7.38				$160,270			$160,270
d. HDPE Liner 60 mil	21717	SY					4.75				$103,160			$103,160
e. Geotextile Fabric	21717	SY					2.25				$48,860			$48,860
f. Pea Gravel 12" Thk; In–place BCY 7167	7705	ICY	0.11	1093	16.97			0.77	17.00	$18,550		$6,110	$134,910	$159,570
g. Composite Clay Liner	21717	SY					7.38				$160,270			$160,270
h. HDPE Liner 60 mil	21717	SY					4.75				$103,160			$103,160
i. Geotextile Fabric	21717	SY					2.25				$48,860			$48,860
j. Pea Gravel 12" Thk; In–place BCY 7167	7705	ICY	0.11	1093	16.97			0.77	17.00	$18,550		$6,110	$134,910	$159,570
k. Geotextile Fabric	21717	SY					2.25				$48,860			$48,860
l. HDPE Perforated Pipe – leachate collection 6" Dia.	1260	LF	0.30	488	16.97			1.05	6.56	$8,280		$1,360	$8,510	$18,150
m. HDPE Perforated Pipe – leak detection 6" Dia.	1260	LF	0.30	488	16.97			1.05	6.56	$8,280		$1,360	$8,510	$18,150
n. Leachate Discharge Piping														
i. HDPE Carrier & containment Pipe 6" x 10" Includes Trench Excav/Backfill, sand bedding and compaction.	980	LF	0.86	1087	16.97			11.37	22.33	$18,450		$11,480	$22,540	$52,470
ii. HDPE Manhole – 4' dia. x 8' deep	4	EA	8.00	41	16.97			28.00	8300.00	530.00		$120	$34,200	$34,850
o. Impacted Fill–Cusion Layer 12" Thk BCY 7167	8959	LCY	0.06	693	16.97			1.67		$11,760		$15,410		$27,170
p. Impacted Fill–Spread and Compact BCY 77733	97166	LCY	0.06	7521	16.97			1.67		$127,630		$167,140		$294,770
q. Generated Waste		LCY	0.06		16.97			1.67						
PPE LEVEL C Allowance is added to the following BCY														
r. Impacted fill 500	625	LCY	0.06	48	16.97			1.67		$810		$1,080		$1,890
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	48	HRS	150% S/T	72	16.97					$1,220				$1,220
				120										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	12	MD												
SUB–TOTAL (COMPOSITE LINER)	1	LOT		21,891						$371,320	$673,440	$524,770	$880,720	$2,450,250

Composite Liner Details

PAGE 3 of 10

CONTR.NO.– [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – SCREENING UNIT COSTS
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3

PRELIMINARY

UNIT COSTS FOR OU2 SCREENING ALTERNATIVES

CONTR.NO. 4424321
EST. NO. N/A
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: N/A

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT TOTAL	COST/UNIT SUB	COST/UNIT EQUIP	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
2.) ON–SITE DISPOSAL TO CELL (CON'T.)															
Common for SWL, LSP, IFP, SF, and AFP															
Cap and Liner quantities are prorated based on waste volume to be disposed .															
COMPOSITE CAP															
a. Contouring Layer 18" Thk.	BCY 3707	4448	ICY	0.06	344	16.97			1.67	3.50	$5,840		$7,650	$16,040	$29,530
b. 95% Clay – 5% Bentonite 24" Thk	BCY 4968	5341	ICY	0.260	1791	16.97			11.19	20.35	$30,390		$61,550	$111,940	$203,880
c. GML\GCC – composite Liner		7415	SY					7.38				$54,720			$54,720
d. Geotextile Fabric		7415	SY					2.25				$16,680			$16,680
e. Pea gravel 12" Thk, In–place	BCY 2447	2631	ICY	0.11	373	16.97			0.77	17.00	$6,330		$2,090	$46,060	$54,480
f. Geotextile Fabric		7415	SY					2.25				$16,680			$16,680
g. Cobbels 36" Thk; In–place	BCY 7415	7971	ICY	0.258	2653	16.97			7.15	10.10	$45,020		$58,700	$82,920	$186,640
h. Geotextile Fabric		7415	SY					2.25				$16,680			$16,680
i. Sand Layer 6" Thk; In–place	BCY 1261	1356	ICY	0.052	91	16.97			1.76	5.00	$1,540		$2,460	$6,980	$10,980
j. Geotextile Fabric		7415	SY					2.25				$16,680			$16,680
k. Common Soil 21" Thk; In–place	BCY 4301	5161	ICY	0.06	399	16.97			1.67	3.50	$6,770		$8,880	$18,610	$34,260
l. Top Soil 6" Thk; In–place	BCY 1261	1513	ICY	0.053	103	16.97			1.82	12.10	$1,750		$2,840	$18,860	$23,450
m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding	SY 7415	67	MSF	0.30	26	16.97			6.75	25.00	$440		$470	$1,730	$2,640
n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized		1400	LF	0.17	307	16.97			2.28	13.40	$5,210		$3,290	$19,320	$27,820
SUB–TOTAL (COMPOSITE CAP)		1	LOT		6,087						$103,290	$121,440	$147,930	$322,460	$695,120

Composite Cap Details

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FEMP-OU02-5 DRAFT
August 24, 1994

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – SCREENING UNIT COSTS
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.2.3

PRELIMINARY

UNIT COSTS FOR OU2 SCREENING ALTERNATIVES

CONTR.NO. 4424321
EST. NO. N/A
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: N/A

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT TOTAL	COST/UNIT SUB	COST/UNIT EQUIP	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
2.) ON–SITE DISPOSAL TO CELL (CON'T.)															
Common for SWL, LSP, IFP, SF, and AFP															
Cap and Liner quantities are prorated based on waste volume to be disposed.															
DIKE FOR DISPOSAL CELL															
a. Borrow Common Soil – Dike	BCY 56482	67778	ICY	0.06	5246	16.97			1.67	3.50	$89,020		$116,590	$244,340	$449,950
b. Geotextile Fabric		16483	SY					2.25				$37,090			$37,090
c. Cobbels 36" Thk; In–place	BCY 16483	19780	ICY	0.258	6583	16.97			7.15	10.10	$111,710		$145,670	$205,770	$463,150
d. Drainage Piping – HDPE	6" Dia.	2240	LF	0.30	867	16.97			1.05	6.56	$14,710		$2,420	$15,140	$32,270
	BCY														
Excavated level D	84900														
Excavated level C	500														
Excavated lead/soil	300														
Generated Waste	5217														
TOTAL	90917														
SUB–TOTAL (DIKE – DISPOSAL CELL)					12,696						$215,440	$37,090	$264,680	$465,250	$982,460
SUB–TOTAL (2.– ON–SITE DISPOSAL TO CELL)		90917	BCY		40,674						$690,050	$831,970	$937,380	$1,668,430	$4,127,830
TAKE–OFF ALLOWANCE	10%				4067						69010	83200	93740	166840	$412,790
TOTAL (2.– ON–SITE DISPOSAL TO CELL)		90917	BCY	0.49	44,741		$49.94	10.07	11.34	20.19	$759,060	$915,170	$1,031,120	$1,835,270	$4,540,620

2.) On–Site Disposal to Cell Details

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CONTR.NO. – [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – SCREENING UNIT COSTS
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3

PRELIMINARY

UNIT COSTS FOR OU2 SCREENING ALTERNATIVES

CONTR.NO. 4424321
EST. NO. N/A
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: N/A

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT TOTAL	COST/UNIT SUB	COST/UNIT EQUIP	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
3.) STABILIZATION/SOLIDIFICATION															
Costs per ton of waste treated.															
Treat waste w/30% portland cement and 2% sodium silicate PLant mix – 10% pumpable/90% unpumpable								'91$'s				escltd. to 94 $'s			
Reagent cost:															
Portland cement & sodium silicate	10%	4921	TON					24.19				$12,980			$12,980
in proportion to weight of waste.	90%	4921	TON					24.19				$116,780			$116,780
Labor & per diem	10%	4921	TON					4.52				$2,420			$2,420
Labor & per diem	90%	4921	TON					8.18				$39,490			$39,490
Equip. Rental	10%	4921	TON					4.63				$2,480			$2,480
Equip. Rental	90%	4921	TON					8.90				$42,960			$42,960
Mob/Demob	10%	4921	TON					1.68				$900			
Mob/Demob	90%	4921	TON					2.67				$12,890			$12,890
Cost of Treatment Process	10%	4921	TON					45.66				$24,490			$24,490
Cost of Treatment Process	90%	4921	TON					57.12				$275,750			$275,750
Profit & O.H. (30%)	10%	4921	TON					13.70				$7,350			$7,350
Profit & O.H. (30%)	90%	4921	TON					17.40				$84,000			$84,000
Cost per ton of waste treated, in '94 $'s w/10% take–off allowance based on 3100 BCY of waste x 1.25 swell factor to = 3875 LCY's x a 1.275 Density factor to = 4921 tons of waste to be treated.		1	TON				$139.15	139.15							
SUB–TOTAL (3.– STABILIZATION/SOLIDIFICATION)		3100	BCY									$622,490			$622,490
TAKE–OFF ALLOWANCE	10%											$62,250			$62,250
TOTAL (3.– STABILIZATION/SOLIDIFICATION)		3100	BCY				$220.88	$220.88				$684,740			$684,740

Stabilization/Solidification Details

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FEMP-OU02-5 DRAFT
August 24, 1994

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – SCREENING UNIT COSTS
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3

PRELIMINARY

UNIT COSTS FOR OU2 SCREENING ALTERNATIVES

CONTR.NO. 4424321
EST. NO. N/A
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: N/A

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT TOTAL	COST/UNIT SUB	COST/UNIT EQUIP	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
4.) SUB–SURFACE DRAIN SYSTEM														
a. Interceptor Trench														
i. Trench Excavation														
1575' x 3'w x 25' deep + 20% for slope BCY	5244	BCY	0.05	338	16.97			1.80		$5,740		$9,720		$15,460
Load & Haul 5244	6555	LCY	0.064	541	16.97			2.52		$9,180		$17,010		$26,190
ii. HDPE Liner 40 mil														
29' x 1575 lf + 20% for slope	6090	SY					6.75				$42,340			$42,340
iii. HDPE Perforated Pipe Buried in Pea Gravel 6" Dia.	1575	LF	0.30	610	16.97			1.05	6.56	$10,350		$1,700	$10,640	$22,690
iv. Geotextile Fabric wrapped around 6" Pipe 2' x 1575 lf	3150	SY	0.020	81	16.97			0.02	1.46	$1,370		$60	$4,740	$6,170
v. Pea Gravel Layer BCY														
10' x 3' x 1575' + 20% 2098	2255	ICY	0.11	320	16.97			0.77	17.00	$5,430		$1,790	$39,490	$46,710
vi. Sand BCY														
12' x 3' x 1575' + 20% 2518	2707	ICY	0.052	182	16.97			1.76	5.00	$3,090		$4,910	$13,940	$21,940
vii. Clay Backfill														
3' x 6' x 1575' +20% BCY														
3' x 3' x 1575'x .5 +20% 1259	1486	ICY	0.063	121	16.97			2.18	3.70	$2,050		$3,340	$5,660	$11,050
viii. Precast Wetwell 4ft Sq. x 8 ft Deep	1	EA	12.00	15	16.97			100.00	445.00	$250		$100	$460	$810
a. Excavate 6' x 6' x 8.5' – 11.3 CY	11.3	BCY	0.178	3	16.97			5.05		$50		$60		$110
b. Backfill / Compact 6.6	8	ICY	0.069	1	16.97			0.72		$20		$10		$30
ix. Pump 20 gpm w/ piping, controls & elect.	1800	LF	0.68	1579	19.95			2.38	19.50	$31,500		$4,410	$36,150	$72,060
x. 2"/4" HDPE Carrier/Container Pipe Includes Trench Excav/Backfill, Sand Pipe Bedding, Compaction	1575	LF	0.381	774	16.97			5.11	4.42	$13,130		$8,290	$7,170	$28,590
SUB–TOTAL (4.– SUB–SURFACE DRAIN SYSTEM)	1575	LF		4,565						$82,160	$42,340	$51,400	$118,250	$294,150
TAKE–OFF ALLOWANCE 10%				457						$8,220	$4,230	$5,140	$11,830	$29,420
TOTAL (4.– SUB–SURFACE DRAIN SYSTEM)	1575	LF	3.19	5,022		$205.44	$29.57	35.90	82.59	$90,380	$46,570	$56,540	$130,080	$323,570

Sub–Surface Drain System Details

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – SCREENING UNIT COSTS
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3

PRELIMINARY

UNIT COSTS FOR OU2 SCREENING ALTERNATIVES

CONTR.NO.: 4424321
EST. NO. N/A
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: N/A

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT TOTAL	COST/UNIT SUB	COST/UNIT EQUIP	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
5.)EXCAVATE & HAUL TO ONSITE CELL (LEVEL D)															
Excavate Contaminated Soil															
Excavate and Load – Level D		77100	BCY	0.055	5470	16.97			1.17		$92,830		$92,910		$185,740
Excavate Additional Soil		7800	BCY	0.055	553	16.97			1.17		$9,380		$9,400		$18,780
Haul to Onsite Disposal Cell	BCY														
– 12" thk. Cushion Layer	7167	8959	LCY	0.081	936	16.97			1.51		$15,880		$13,930		$29,810
– Impacted Fill	77733	97166	LCY	0.081	10153	16.97			1.51		$172,300		$151,120		$323,420
SUB–TOTAL (5.– EXCAVATE & HAUL TO ONSITE CELL)		84900	BCY		17,112						$290,390		$267,360		$557,750
TAKE–OFF ALLOWANCE	10%				1711						$29,040		$26,740		$55,780
TOTAL (5.– EXCAVATE & HAUL TO ONSITE CELL)		84900	BCY	0.22	18,823		$7.23		3.46		$319,430		$294,100		$613,530

5.)Excavate & Haul to Onsite Cell Details

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – SCREENING UNIT COSTS
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3

PRELIMINARY

UNIT COSTS FOR OU2 SCREENING ALTERNATIVES

CONTR.NO. 4424321
EST. NO. N/A
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: N/A

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT TOTAL	COST/UNIT SUB	COST/UNIT EQUIP	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO															
PURCHASE															
Bulk Gondola Rail Car	N/A	0	EA												
	BCY														
SF – EXCAVATED LEAD\SOIL	300	396	LCY												
SF – EXCAVATED WASTE	85500	106875	LCY												
SF – GENERATED WASTE	1126	1295	LCY												
Liner for Gondola															
Excavated Waste – level C,D & Additional		1465	EA							400.00				$586,000	$586,000
Excavated Waste – lead/soil		8	EA							400.00				$3,200	$3,200
Generated Waste		27	EA							400.00				$10,800	$10,800
Cover for Gondola															
Excavated Waste – level C,D & Additional		1465	EA							395.00				$578,680	$578,680
Excavated Waste – lead/soil		8	EA							395.00				$3,160	$3,160
Generated Waste		27	EA							395.00				$10,670	$10,670
(Also See Appendix E)															
TOTALS FORWARD TO ESTIMATE SUMMARY No.24															
TOTAL (PURCHASE COSTS – FERMCO)		86926	BCY				$13.72	$13.72						$1,192,500	$1,192,500

Purchase Waste Container Details

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CONTR.NO. – [redacted]21
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – SCREENING UNIT COSTS
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3

PRELIMINARY

UNIT COSTS FOR OU2 SCREENING ALTERNATIVES

CONTR.NO. 4424321
EST. NO. N/A
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: N/A

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT TOTAL	COST/UNIT SUB	COST/UNIT EQUIP	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF–SITE TRANSPORTATION COSTS TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas	1500	EA					340.00				$510,000			$510,000
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additional	1465	EA					22681.00				$33,227,670			$33,227,670
Excavated Waste – lead/soil	8	EA					23045.00				$184,360			$184,360
Generated Waste	27	EA					23045.00				$622,220			$622,220
(Also See Appendix E)														
TOTALS FORWARD TO ESTIMATE SUMMARY No.23														
TOTAL (OFF–SITE TRANSPORT. COSTS – FERMCO)	86926	BCY				$397.40	$397.40				$34,544,300			$34,544,300

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ENVIROCARE Transportation Details

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APPENDIX - F.4

DETAILED COST ESTIMATE

ALTERNATIVE 2 - CONSOLIDATION AND CAPPING, FEDERAL OWNERSHIP (Expanded Trespasser)

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

BASIS OF ESTIMATE

PROJECT DESCRIPTION: ALT-2 - CONSOLIDATION AND CAPPING
WBS NUMBER: 1.1.1.1.2.3.__
PROJECT LOCATION: FERNALD, OHIO
PROJECT ENGINEER: GREG JONES
ESTIMATOR: KEN KEPLER
ESTIMATE NUMBER: C29407__ __

SUPPORTING DOCUMENTATION:

Verbal Scope	X	P & ID's		Work Plan	
Drawings	X	Equipment List		Site Walk	
Sketch	X	Specifications		Eng Mtg	
Flow Diagrams		Site H & S Plan		Price Quotes	X

TYPE OF ESTIMATE:

Plan/Feasbl	X	Budg/Concpt		Title I Des	
Title II Des		Government		Independent	
Construction		Baseline			

BASIS OF ESTIMATE:

This Basis of Estimate represents the five Operable Unit 2 subunits (SWL - Solid Waste Landfill, LSP - Lime Sludge Ponds, SF - South Field, AFP - Active Flyash Pile, IFP - In-active Flyash Pile) supporting all alternatives for the OU2 Feasibility Studies based on the federal ownership (expanded trespasser) scenario to determine the level of clean-up for each subunit. All alternates include costs for site preparation (new or existing road upgrades, clearing, grubbing, grading and earthwork for and construction of support facilities such as office trailers, parking, staging and storage facilities and equipment and personnel decontamination facilities); erosion and sediment controls (silt fencing, diversion berms and ditches, sediment traps and tanks, collection sumps, pumps and piping, etc.); perched groundwater collection (interceptor trench, wetwell, pumps and piping); excavation of waste for consolidation and in-place disposal, treatment of solid waste by shredding/crushing for in-place consolidation, flyash/limesludge stabilization for LSP and solidification of lead- contaminated soil at the SF firing range for off-site disposal to Envirocare; site restoration of each subunit with backfill, top soil, seeding and mulch; demolition and removal of all support facilities/utilities (generated waste) to be disposed of on site.

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FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

BASIS OF ESTIMATE

PROJECT DESCRIPTION:	ALT-2 - CONSOLIDATION AND CAPPING
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

Site maintenance, groundwater monitoring, and O&M costs for a 30-year period following remediation are included.

Comments in this basis will be typical of all subunits with the main objective being to clarify the estimating philosophy and procedures applied. In all cases where a common facility is described that supports two or more subunits, the quantities either represent a prorated quantity in relationship to the volume of remediated soil/waste to each other, or as a percentage applied to the total quantities representing a common support facility. These estimates are considered to be within a -30% to +50% range of accuracy (including Risk Budget), based on the level of information provided at this time.

000674

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-2 - CONSOLIDATION AND CAPPING
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407_ _

EXECUTION:

These projects are estimated to be performed by a subcontractor working a 40-hour week, 10 hours a day, no overtime or holidays. Construction start and finish dates are indicated in Appendix D (Construction Activity Duration) for each alternative. Months indicated for some common support facilities span the time from the start of one subunit to the end of the last subunit to be completed.

WAGE RATES:

Wage rates within the estimates are based on the current rates furnished by the local Craft Labor Board and developed into a craft mix. All Labor Dollars are considered constant 1994 dollars.

ENGINEERING:

Engineering costs are based on the percentage of Direct and Indirect Field Costs that resulted in the Baseline estimates, dated November,1993. Refer to CRU2 Baseline Summary. Also, included in the Titles I & II Engineering allowance, is cost for the Cultural Resource Surveys, Phases I & II.

PRODUCTIVITY:

A site specific factor of 1.29 has been applied to Net Chart manhours. See Appendices A and B for development and application.
Task-specific factors were applied as necessary when identified.
PPE-specific factors were applied based on level identified. See Appendix B.
An allowance for delays caused by monitoring and radiation checking is included. See Appendix C, Health Physics.
No exposure/burnout rates have been identified for this work.

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NOTE: All references to "See Appendix" refer to cost estimate Appendices only..

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-2 - CONSOLIDATION AND CAPPING
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

ESCALATION:

Escalation has been excluded from these estimates. Costs are considered to be constant 1994 dollars.

UNIT RATES:

In general, the unit manhours, subcontract dollars, equipment dollars, and material dollars were based on 1993 MEANS. In most cases, a site productivity factor of 1.29 was applied to the Net chart unit manhours. The unit material and subcontract dollars were escalated 3% to arrive at 1994 constant dollars. Some costs were taken directly from the previous estimates.

The Low Level Thermal Destruction Unit costs were derived from B&RE quotational information.

Solidification costs for lead contaminated soil with portland cement have been formulated from information provided in "Hazardous Waste Cost Control" by R.A. Selg.

Waste container costs to purchase gondola liners and covers provided by FERMCO Recycling and Technology Dept.

Transportation and burial costs represent RSO's cost to transport waste by rail in gondola cars and bury the OU2 waste at Envirocare in Clive, Utah. Unit costs provided by FERMCO Recycling and Technology Dept. Certification costs by RSO are based on costs to certify a typical Sealand container. See Appendix E and estimate detail sheets for unit cost breakdown.

Waste Water Treatment costs are provided by OU5 to cover the cost of processing waste streams produced by OU2 construction activities.

Screening and confirmatory testing requirements and pricing were provided by CRU2 engineering.

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-2 - CONSOLIDATION AND CAPPING
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

UNIT QUANTITIES:

Quantities of soil, flyash, lime sludge and solid waste to be remediated were provided by CRU2 Engineering Dept. See Tables in section F.8. The "Additional Excavation" volume required to excavate the remediation quantity of waste material at each subunit is based on the preliminary layout of excavation limits. The percent of the remediated quantity for the "Additional Excavation" is 14% for SWL and 10% each for the other subunits.
All other quantities, volumes, sizes, etc., were provided by CRU2 Engineering. All volumes of waste were considered bank cubic yards (BCY) at 10^{-6} risk level.

SWELL, DENSITY & SHRINKAGE FACTORS:

A swell or shrinkage factor was applied to the BCYs provided by CRU2 Engineering when applicable, resulting in loose cubic yards (LCY) or in-place or compacted cubic yards (ICY). Factors used are estimators judgement based on data provided in 'Fundamentals of Earthmoving' by Caterpillar Tractor Co. Density factors were applied for converting LCYs to Tons for costing out the shredding/crushing operation, solidification of the lead-contaminated soil at the Firing Range, and for determining the maximum allowable volume by weight for material to be shipped to Envirocare by rail in 90-ton gondola cars. Density factors used are estimator's judgment based on 'Weights and Specific Gravities' in the American Institute of Steel Construction book. Weights are for bulk, heaped, or loose materials. The following factors were used:

MAT'L.	SWELL	DENSITY	SHRINKAGE
EARTH	1.25	1.275	1.2
CLAY	1.23	1.25	1.18
GRAVEL	1.12	1.275	1.075
SAND	1.12	1.275	1.075
GEN.WASTE	1.15	2.00	1.15

000677

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION: ALT-2 - CONSOLIDATION AND CAPPING
WBS NUMBER: 1.1.1.1.2.3.__
PROJECT LOCATION: FERNALD, OHIO
PROJECT ENGINEER: GREG JONES
ESTIMATOR: KEN KEPLER
ESTIMATE NUMBER: C29407__ __

HEALTH PHYSICS: (See Appendix C)

All workers at the site will participate in the Medical Monitoring & Surveillance Program and the FEMP Radiation In-Vivo & Bioassay Testing Program. Costs are for the workers' time to participate in these programs based on the Number of Workers and the Duration of Construction Activity information.
Material dollars are included in this section to provide PPEs for the worker when required. Disposable PPEs are to be provided by the subcontractor. Washable PPEs will be provided by the subcontractor for the initial changeout for each required worker, with subsequent changeouts and cost for washing and decontamination provided by FERMCO. Labor dollars are included in this section for work delays caused by monitoring and rad checking.

NUMBER OF WORKERS:

Calculation: Total Direct Manhours Div. By 1813 Hours (1 Man Year) x 1.25 (attrition) Div. By the Duration of Construction in Months x 12 = number of workers per year.

(Use number of workers per year to determine CERCLA/SAT and Health Physics costs.)

G&A (Home Office Expense):

G&A are excluded from the target estimate. The G&A costs are calculated within the Micro-Frame computer system according to the plan for rebaselining.

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-2 - CONSOLIDATION AND CAPPING
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

RISK BUDGET:

A cost element, based on a risk analysis calculated for this estimate to cover a statistical probability of a 50% chance of overrun/underrun to the project. The target estimate is the sum of the base estimate and the risk budget. The target estimate is the basis for the Performance Baseline. The risk budget for these projects will vary according to the results of the analysis. See the Risk Analysis at the end of each estimated alternative and refer to the Estimate Summary Sheets.

CONTINGENCY:

An amount budgeted to cover costs that may result from incomplete design, unforeseen and unpredictable conditions, or uncertainties. The amount of the contingency will depend on the status of design, procurement, construction, and the complexity and uncertainties of the component parts of the project. Contingency is not to be used to avoid making an accurate assessment of expected costs.

Contingency is calculated as the delta between the 50% chance of overrun and the 5% chance of overrun, indicated on the risk analysis. Contingency for these alternatives will vary based on the results of the risk analysis. See the risk analysis at the end of each estimated alternative and refer to the Estimate Summary Sheets.

PRESENT WORTH ANALYSIS:

An economic evaluation that compares the sums of discounted dollar costs or benefits of capital investments, replacements, operations, maintenance, decommission, and salvage of two or more systems or operations over the expected useful life span. The analysis identifies the system or operation considered to be the least-cost alternative for satisfying a particular purpose.
(SEE Present Worth Analysis Study "SUMMARY")

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FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-2 - CONSOLIDATION AND CAPPING
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

INCLUSIONS:

Costs have been included in the Field Directs for:

SITE PREPARATION
- Construction Survey
- Temporary Construction Fencing
- Clearing and Grubbing
- Dewatering
- General grading and surfacing for new roads, office/parking area, decontamination facilities and staging and/or Storage Areas
- Relocating diversion ditch for SWL

DECONTAMINATION FACILITIES AT SUBUNITS
- Decon. trailer rental at 39 mo.'s for SWL and LSP
- Decon. trailer rental at 51 mo.'s for SF, AFP and IFP
- Construction equipment decon.facility common for subunits SWL and LSP and one common for FS, AFP & IFP - 25' x 60'
- Personnel decon.facility common for sub-units SWL and LSP and one common for SF, AFP & IFP - 11' x 11'

EROSION AND SEDIMENT CONTROLS
- Diversion of clean run-off
- Diversion, collection and pumping of contaminated run-off to AWWT Facility
- Erosion and sediment control measures

OFF-SITE DISPOSAL
- Excavate contaminated lead-contaminated soil
- Solidify lead-contaminated soil at firing range - 300 BCY
- Shred and crush waste (if required)

000680

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-2 - CONSOLIDATION AND CAPPING
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

LOAD AND HAUL FOR OFF-SITE DISPOSAL
- Haul treated lead-contaminated soil from SF to OU1 rail loading facility
- Load waste into 90-ton capacity gondola rail cars
- Certify and ship to Envirocare

EXCAVATE, LOAD AND HAUL FOR ON-SITE DISPOSAL
- Excavate, and consolidate waste in place for each subunit

GENERATED WASTE REMOVAL
- Office/parking facilities common to SWL and LSP
- Office/parking facilities common to AFP, IFP and SF
- Equip.and personnel decon. facilities common to SWL and LSP
- Equip.and personnel decon facilities common to AFP, IFP and SF
- Staging area common to SWL and LSP
- Staging area common to AFP, IFP and SF
- All temporary construction fencing
- Relocated South Access Road

SITE RESTORATION - ALL SUBUNITS AND SUPPORT FACILITIES AT CELL
- Borrowed cmmon soil for backfill
- Final grade
- Borrowed top soil
- Grass cover, seed, fertilize, mulch
- Security fence and gates at each subunit

MONITORING WELLS
- Abandon existing wells at subunits
- Install new wells at subunits
- Install new wells at on-site disposal cell

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FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-2 - CONSOLIDATION AND CAPPING
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

Costs have been included in the Indirect Field Costs for:

- Contractor supervision
- Small tools and consumables
- Equipment rental
- Temporary construction facilities
- Temporary utilities and hook-up
- Job clean-up
- Safety
- Health Physics
- CERCLA and site access training
- Bond
- Subcontractor overhead and profit (Includes insurance and reserve fund)
- Subcontractor payroll burdens and benefits

Costs have been included as FERMCO Field Support Costs for:

- Transportation and burial to Envirocare
- Purchase cost of liners and covers for rail gondola cars
- Waste water treatment cost (OU5)
- Screening and confirmatory testing
- FERMCO construction management

Costs included for Engineering are:

- Emission modeling
- PSAR/FSAR Reports
- Titles I,II and III (Includes cultural resource surveys, Phases I and II)
- CDR and DCR

Costs have been included for Ohio State sales tax

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- at 6%

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-2 - CONSOLIDATION AND CAPPING
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

Costs have been included for Risk Budget.

Costs have been included for Contingency.

ALL OF THE ABOVE REPRESENTS SCOPE FOR THE CAPITAL COST FOR THE ALTERNATIVES.

ALT2 represents quantities based on criteria for Federal ownership (Expanded Trespasser).

Operations and maintenance costs were developed for a 30-year period following the remediation of each subunit. These costs, along with the capital cost, were used to develop the Life Cycle Cost Analysis Report in 1994 constant dollars to determine the Net Present Value (NPV).

000683

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-2 - CONSOLIDATION AND CAPPING
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

EXCLUSIONS:

- Permits and fees
- Landlord costs
- Escalation
- G&A (home office expense)
- Rail loading facility provided in CRU1 baseline.

000684

CONTR. NO.	4424321	CONTR.NO.	4424321
CLIENT	U.S.DEPT. OF ENERGY	EST.NO.	C29407_ _
PROJECT	ALT-2 - CONSOLIDATION & CAPPING - EXPANDED TRESPASSER	DATE	24-Aug-94
LOCATION	FERNALD, OHIO	BY	KEN KEPLER
PROJ.CTL.	CRU2	TASK ID	2C _ _

OU2 FEASIBILITY STUDIES

TITLE	TOTAL ESTIMATE - CONSTANT 1994 DOLLARS					NET PRESENT VALUE: 37 YEAR STUDY PERIOD - 2.8% REAL DISC.RATE				
	CAPITAL COST	O & M DURING REMEDIATION	O & M POST REMEDIATION	TOTAL CONSTANT 1994 $'s	TOTAL UNIT COST PER BCY OF EXCAV.& GEN. WASTE	CAPITAL COST	O & M DURING REMEDIATION	O & M POST REMEDIATION	TOTAL NPV DOLLARS	TOTAL UNIT COST PER BCY OF EXCAV.& GEN. WASTE
ALT2 - SWL	$6,996,900		$3,570,100	$10,567,000	$727.15	$5,964,100		$2,123,700	$8,087,800	$556.55
ALT2 - SF	$10,121,100		$3,907,400	$14,028,500	$296.14	$9,284,500		$2,434,400	$11,718,900	$247.39
ALT2 - LSP	$8,566,800		$3,630,400	$12,197,200	$1,619.38	$7,724,600		$2,275,400	$10,000,000	$1,327.67
ALT2 - AFP	$17,262,200		$3,922,300	$21,184,500	$292.72	$15,388,700		$2,364,800	$17,753,500	$245.31
ALT2 - IFP	$19,840,200		$8,813,600	$28,653,800	$275.07	$17,285,700		$4,798,200	$22,083,900	$212.00
TOTAL ALT-2	$62,787,200		$23,843,800	$86,631,000	$352.19	$55,647,600		$13,996,500	$69,644,100	$283.13

O & M POST REMEDIATION - 30 YEARS

TITLE	ANNUAL COST			FACILITY REVIEW	TOTAL
	YEAR 1	YEARS 2 - 5	YEARS 6 - 30	@ 5 YR. INTERV.'s	CONSTANT
FREQUENCY	1	4	25	6	'94 $'s
ALT2 - SWL	$209,052	$187,623	$99,623	$20,000	$3,570,100
ALT2 - SF	$211,127	$189,698	$112,698	$20,000	$3,907,400
ALT2 - LSP	$193,211	$190,247	$102,247	$20,000	$3,630,400
ALT2 - AFP	$202,459	$181,030	$115,030	$20,000	$3,922,300
ALT2 - IFP	$141,771	$124,201	$322,201	$20,000	$8,813,600
TOTAL ALT-2	$957,620	$872,799	$751,799	$100,000	$23,843,800

F-4-13

000685

FERMCO ESTIMATING SERVICES

SUMMARY SHEET

EST FILE #: C294007_ _
CLIENT: US DOE
PROJECT TITLE: ALT-2 – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
WBS#: 1.1.1.1.2.3._

DATE: 24-Aug-94
ESTIMATOR: KEN KEPLER
LOCATION: FERNALD
TASK#: 2C_ _

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ONSITE CONSOLIDATION IN-PLACE COMPOSITE CAP	215,300		3,690,700	3,534,400	5,842,700	$13,067,800
2		IN-PLACE MIXING OF LIME SLUDGE						
3		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		215,300		$3,690,700	$3,534,400	$5,842,700	$13,067,800
11	SUPERVISION – CONTRACTOR				627,000			$627,000
12	SM TOOLS/CONSM'BLS						221,500	$221,500
13	EQUIPMENT RENTAL						3,604,400	$3,604,400
14	TEMP. FACILITIES				77,600		143,900	$221,500
15	TEMP UTL'S HOOK-UP				38,800		72,000	$110,800
16	JOB CLEAN-UP				77,600		143,900	$221,500
17	SAFETY				38,800		72,000	$110,800
18	HEALTH PHYSICS S/C				512,600		16,700	$529,300
19	CERCLA/SAT	$1,500 PER PERSON				120,000		$120,000
20	BOND					130,800		$130,800
21	OVERHEAD & PROFIT					1,706,900		$1,706,900
22	PAYRL BRD.&BENFT.				2,632,700			$2,632,700
	INDIRECT FIELD COSTS				$4,005,100	$1,957,700	$4,274,400	$10,237,200
	DIRECT & INDIRECT FIELD COSTS				$7,695,800	$5,492,100	$10,117,100	$23,305,000
23	TRANSPORTATION & BURIAL					187,100		$187,100
24	WASTE CONTAINERS						6,400	$6,400
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					288,800		$288,800
25	SCREENING & CONFIRMATION TESTING					7,726,600		$7,726,600
26	PROJ.MGMT-FERMCO – OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				4,636,900			$4,636,900
	FERMCO FIELD SUPPORT COSTS				$4,636,900	$8,202,500	$6,400	$12,845,800
28	EMISSION MODELING				40,900		75,800	$116,700
29	PSAR/FSAR(SAFETY RPT)				972,600			$972,600
30	ENGINEERING	TITLE I&II 4,340,000 TITLE III	4,454,700	CDR	1,650,000	DCR	1,161,200	$11,605,800
	ENGINEERING COSTS							$12,695,200
31	SALES TAX	6.0% SUB-TOTAL MATERIAL DOLLARS					10,205,700	612,400
	SUB-TOTAL	(BASE ESTIMATE)						$49,458,400
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	19.5%						9,649,000
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$59,107,400
35	CONTINGENCY	7.4%						3,679,800
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$62,787,200

000686

PRELIMINARY

LOTUS31\FS2\INDALT2.WK3 – FEASIBILITY STUDY

CONTR.NO.- [redacted]4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C29407
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2C

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE CONSOLIDATION & CAPPING (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		60,642						1,046,470	135,000	313,460	651,530	$2,146,460
DECONTAMINATION FACILITIES/SERVICES	1	LS		1,765						32,170	137,430	7,490	32,860	$209,950
EROSION AND SEDIMENT CONTROLS	1	LS		6,486						120,680		39,770	176,860	$337,310
PERCHED GROUNDWATER COLLECTION	1	LS		5,654						95,940	49,380	67,590	147,490	$360,400
EXCAV./SORT/SHRED/DRY – OFFSITE DISPOSAL	1	LS		77						1,310	229,730	1,750		$232,790
LOAD/HAUL – OFF–SITE DISPOSAL	1	LS		79						1,360		1,880		$3,240
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE	1	LS		39,162						667,930	172,630	751,200	512,430	$2,104,190
COMPOSITE LINER	N/A													
COMPOSITE CAP	1	LS		59,701						1,013,130	1,224,910	1,495,980	3,119,840	$6,853,860
DIKE	N/A													
GENERATED WASTE REMOVAL	1	LS		3,616						61,350		27,990		$89,340
SITE RESTORATION	1	LS		18,547						314,770		569,630	670,570	$1,554,970
MONITORING WELLS	1	LS									1,264,000			$1,264,000
SUB TOTAL (DIRECT FIELD COSTS)	1	LOT		195,729						$3,355,110	$3,213,080	$3,276,740	$5,311,580	$15,156,510
TAKE–OFF ALLOWANCE 10%	1	LOT		19,573						$335,510	$321,310	$327,670	$531,160	$1,515,650
TOTAL (DIRECT FIELD COSTS)	1	LOT		215,302						$3,690,600	$3,534,400	$3,604,400	$5,842,700	$16,672,100

Alt–2 – Consolidation & Capping – Expanded Trespasser – SUMMARY

TABLE F.4-1

ALTERNATIVE 2 - CONSOLIDATION AND CAPPING EXPANDED TRESPASSER AND 10^{-6} RISK LEVEL CONSOLIDATION AND OFF-SITE DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Off-Site Disposal Volume (yd^3)	Consolidation Volume (yd^3)			Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavcation		Excavation Volume to On-Site Disposal	Generated Waste Volume	Total Consolidation Volume		
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total								
Solid Waste Landfill	10,400	1,700	12,100	1,200	13,300	0	13,300	3,000	16,300	5,300	0
Lime Sludge Ponds	1,600	0	1,600	200	1,800	0	1,800	3,000	4,800	100	0
Inactive Flyash Piles	84,800	9,200	94,000	9,400	103,400	0	103,400	3,000	106,400	4,000	0
South Field	41,600	500	42,100	4,200	46,300	300	46,000	3,000	49,000	6,500	0
Active Flyash Pile	65,100	0	65,100	6,500	71,600	0	71,600	3,000	74,600	0	0
Total	203,500	11,400	214,900	21,500	236,400	300	236,100	15,000	251,100	15,900	0

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

000688

LCC ANALYSIS TITLE:	SWL - CONSOLIDATION & CAPPING - (EXPANDED TRESPASSER)			
WBS NO.:	1.1.1.1.2.3.1		TASK NO.:	2CSW
ALTERNATIVE:	2		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	37 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	07-Aug-94
DOCUMENT NO.:	LCC-94-03-01	EST. NO. C2-94-07-46 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$0	$0	$0	$0	1997
$0	$0	$0	$0	1998
$1,499,336	$0	$0	$1,499,300	1999
$5,497,564	$0	$0	$5,497,600	2000
$0	$209,052	$0	$209,100	2001
$0	$187,623	$0	$187,600	2002
$0	$187,623	$0	$187,600	2003
$0	$187,623	$0	$187,600	2004
$0	$207,623	$0	$207,600	2005
$0	$99,623	$0	$99,600	2006
$0	$99,623	$0	$99,600	2007
$0	$99,623	$0	$99,600	2008
$0	$99,623	$0	$99,600	2009
$0	$119,623	$0	$119,600	2010
$0	$99,623	$0	$99,600	2011
$0	$99,623	$0	$99,600	2012
$0	$99,623	$0	$99,600	2013
$0	$99,623	$0	$99,600	2014
$0	$119,623	$0	$119,600	2015
$0	$99,623	$0	$99,600	2016
$0	$99,623	$0	$99,600	2017
$0	$99,623	$0	$99,600	2018
$0	$99,623	$0	$99,600	2019
$0	$119,623	$0	$119,600	2020
$0	$99,623	$0	$99,600	2021
$0	$99,623	$0	$99,600	2022
$0	$99,623	$0	$99,600	2023
$0	$99,623	$0	$99,600	2024
$0	$119,623	$0	$119,600	2025
$0	$99,623	$0	$99,600	2026
$0	$99,623	$0	$99,600	2027
$0	$99,623	$0	$99,600	2028
$0	$99,623	$0	$99,600	2029
$0	$119,623	$0	$119,600	2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$6,996,900	$3,570,100	$0	$10,566,400	TOTAL
$5,964,100	$2,123,700	$0	$8,087,400	<====(@NPV)

000689

EST FILE #: C2940746

FERMCO ESTIMATING SERVICES

SUMMARY SHEET

DATE: 07-Aug-94

CLIENT: US DOE

ESTIMATOR: KEN KEPLER

PROJECT TITLE: ALT-2, SWL - CONSOLIDATION & CAPPING

LOCATION: FERNALD

WBS#: 1.1.1.1.2.3.1

TASK#: 2CSW

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1			22,807		$397,800	$416,500	$800,900	$1,615,200
2		ON-SITE DISPOSAL - IN-PLACE						
3		NO TREATMENT - COMPOSITE CAP						
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		22,807		$397,800	$416,500	$800,900	$1,615,200
11	SUPERVISION - CONTRACTOR				$68,000			$68,000
12	SM TOOLS/CONSM'BLS						$23,900	$23,900
13	EQUIPMENT RENTAL						$401,800	$401,800
14	TEMP. FACILITIES				$8,400		$15,500	$23,900
15	TEMP UTL'S HOOK-UP				$4,200		$7,800	$12,000
16	JOB CLEAN-UP				$8,400		$15,500	$23,900
17	SAFETY				$4,200		$7,800	$12,000
18	HEALTH PHYSICS S/C				$56,400		$14,400	$70,800
19	CERCLA/SAT	$1,500 PER PERSON				$19,500		$19,500
20	BOND					$16,200		$16,200
21	OVERHEAD & PROFIT					$205,800		$205,800
22	PAYRL BRD.&BENFT.				$284,600			$284,600
	INDIRECT FIELD COSTS				$434,200	$241,500	$486,700	$1,162,400
	DIRECT & INDIRECT FIELD COSTS				$832,000	$658,000	$1,287,600	$2,777,600
23	TRANSPORTATION & BURIAL	N/A						
24	WASTE CONTAINERS	N/A						
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$9,000		$9,000
25	SCREENING & CONFIRMATION TESTING					$457,800		$457,800
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$577,700			$577,700
	FERMCO FIELD SUPPORT COSTS				$577,700	$468,800		$1,044,500
28	EMISSION MODELING				$4,900		$9,000	$13,900
29	PSAR/FSAR(SAFETY RPT)				$133,300			$133,300
30	ENGINEERING	TITLE I&II $491,600 TITLE III	$552,700	CDR	$269,400	DCR	$105,500	$1,419,200
	ENGINEERING COSTS							$1,566,400
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$1,296,600	$77,800
	SUB-TOTAL	(BASE ESTIMATE)						$5,466,300
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	20.5%						$1,120,600
	TARGET ESTIMATE (BASE ESTIMATE PLUS RISK BUDGET)							$6,586,900
35	CONTINGENCY	7.5%						$410,000
								PRELIMINARY
	TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY)							$6,996,900

LOTUS31\FS2\ALT2\SWL\INDSUM.WK3 - FEASABILITY STUDY

Alternative 2 – Consolidation and Capping
(Expanded Trespasser)

Solid Waste Landfill

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	1	1	5	sample	$5,500.00	32	NA	$176,000	8 wells x 4 samples/year
Long Term	1	6	30	sample	$5,500.00	16	NA	$88,000	8 wells x 2 samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	2	2.58	$1,001	Inspect all wells twice/year. Repair 1 out of 8.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Long Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Well Inspect & Maint.	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
OU2 Waste Cell Leachate									
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Facility Maint. at Subunit									
Cap Maint. & Repairs	1	1	30	acre	$2,183.32	1.64	2.12	$4,619	Approx. 1.6 Acres
Mowing	1	1	30	acre	$1,861.92	1.64	2.12	$3,939	Approx. 1.6 Acres
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.54	0.70	$1,373	Approx. 1080 ft perimeter
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Fence Repair	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of Subunit	5	5	30	lump Sum	$20,000.00	1	NA	$20,000	Total divided among 5 subunits
Facility Review of OU2 Cell	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative

Annual Costs, Year 1 (excluding facility review)	$209,052
Annual Costs, Years 2–5 (excluding facility review)	$187,623
Annual Costs, Years 6–30 (excluding facility review)	$99,623
Facility Review Costs, Every 5 Years	$20,000

PROJECT TITLE:
ALT-2, SWL - CONSOLIDATION & CAPPING
WBS#:
1.1.1.1.2.3.1

HEALTH PHYSICS

DATE: 04-Aug-94
EST.NO.: C2940746
EST. : KEN KEPLER
TASK I.D. :
2CSW

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY / MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	98	$1,250	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	98	$2,350	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	98	$510	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	98	$550	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	98	$590	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	98	$350	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	98	$6,860	C/B		
SUB-TOTAL		31.80	4		$12,460			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	5		$60	mD/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	7		$160	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	7		$1,220	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$1,920			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$14,400			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

DATE: 04-Aug-94

PROJECT TITLE:
ALT-2, SWL - CONSOLIDATION & CAPPING
WBS#:
1.1.1.1.2.3.1

HEALTH PHYSICS

EST.NO.: C2940746
EST. : KEN KEPLER
TASK I.D. :
2CSW

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	13	52	$16.97	$880		
ANNUAL PHYSICALS	1	3	13	39	$16.97	$660		
EXIT (TERMINATION) PHYSICALS	1	4	13	52	$16.97	$880		
SUB-TOTAL						$2,420		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	14	1	13	185	$16.97	$3,140		
YEARLY IN-VIVO	1	4	13	52	$16.97	$880		
EXIT (END OF PROJECT / TERMINATION)	1	4	13	52	$16.97	$880		
SUB-TOTAL						$4,900		
WORK DELAYS CAUSED BY MONITORING	5%				$491,000	$24,550		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$491,000	$24,550		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$56,400	$14,400	$70,800

000693

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT-2, SWL – CONSOLIDATION & CAPPING
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CSW

WBS NO. – 1.1.1.1.2.3.1
EST. NO. – C2940746
BY – K. KEPLER
DATE – 08/04/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25-Mar-94	01-Jul-99	30-Jan-2000	31-Aug-2000	14	MONTHS

EST.DATE TO MID-POINT OF ACTIVITY	
70	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO. [redacted]4321
CLIENT – [redacted]S. DEPT. OF ENERGY
PROJECT – ALT-2, SWL – CONSOLIDATION & CAPPING
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940746
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON-SITE DISPOSAL CONSOLIDATION & CAPPING														
SITE PREPARATION	1	LS		4,948						$85,720	$15,000	$33,270	$122,960	$256,950
DECONTAMINATION FACILITIES/SERVICES	1	LS		419						$7,610	$29,880	$1,630	$8,050	$47,170
EROSION AND SEDIMENT CONTROLS	1	LS		1616						$30,200		$10,350	$50,320	$90,870
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT/DRY – OFFSITE DISPOSAL	N/A													N/A
LOAD/HAUL – OFF-SITE DISPOSAL	N/A													N/A
EXCAVATE/CONSOLIDATE/CONTAIN	1	LS		3102						$57,370		$50,870	$113,060	$221,300
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	1	LS		6315						$107,170	$110,780	$164,970	$315,270	$698,190
GENERATED WASTE REMOVAL – ON-SITE	1	LS		918						$15,570		$7,090		$22,660
SITE RESTORATION	1	LS		3416						$57,970		$97,110	$118,460	$273,540
MONITORING WELLS	1	LS									$223,000			$223,000
SUB-TOTAL (DIRECT FIELD COSTS)				20734						$361,610	$378,660	$365,290	$728,120	$1,833,680
TAKE-OFF ALLOWANCE 10%	1	LS		2,073						$36,160	$37,870	$36,530	$72,810	$183,370
TOTAL (DIRECT FIELD COSTS)	1	LS		22,807						$397,800	$416,500	$401,800	$800,900	$2,017,000

On-Site Disposal of SWL – Consolidation & Capping – SUMMARY

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, SWL – CONSOLIDATION & CAPPING
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940746
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	1500	LF	0.213	412	16.97				6.25	$6,990			$9,660	$16,650
c. Clear and Grub														
i. Remediation Site	3.35	AC	41.40	179	16.97			2575.00		$3,040		$8,890		$11,930
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas														
d. Dewatering														
i. Excavate Dewatering Trench	233	CY	0.50	150	16.97			1.49		$2,550		$360		$2,910
ii. Pump – w/4" Suction Hose	100	DAYS	3.00	387	16.97			19.55		$6,570		$2,010		$8,580
iii. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
iv. Remove Sediment fm. Tank – 1cy/trip	1	CY	4.00	5	16.97			100.00		$80		$100		$180
e. General Grading														
i. New Roads	6400	SY	0.001	8	16.97			0.07		$140		$460		$600
50%														
ii. Office/Parking Area 2222	1111	SY	0.010	14	16.97			0.32		$240		$370		$610
iii. Const.Equip.Decon.Pad Area 234	117	SY	0.010	2	16.97			0.32		$30		$40		$70
iv. Pers.Decon.Pad Area 17	9	SY	0.010		16.97			0.32						
v. Staging Area @ S/U 2845	1423	SY	0.010	18	16.97			0.32		$310		$470		$780
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	5334	SY	0.030	206	16.97			1.08	6.66	$3,500		$5,930	$36,590	$46,020
50%														
ii. Office/Parking – 8" Gravel W/ Geotext 2222	1111	SY	0.030	43	16.97			1.08	6.66	$730		$1,240	$7,620	$9,590
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc.Slat 2845	1423	SY	0.041	75	16.97			1.45	5.51	$1,270		$2,120	$8,070	$11,460
Concrete Slab 160 x 160' x 8"thk. 631	316	CY	4.07	1656	17.98			18.38	67.00	$29,770		$5,970	$21,770	$57,510
Concrete Curb – 2'h x 480 lf x 8" thk. 24	12	CY	15.30	237	17.98			69.08	275.90	$4,260		$850	$3,410	$8,520
HDPE Perf.Sub–grade Piping – 4" 500	250	LF	0.21	68	16.97			0.74	3.02	$1,150		$190	$780	$2,120
Epoxy Coating 2845	1423	SY	0.22	404	16.97			0.77	7.56	$6,860		$1,130	$11,080	$19,070
Backfill & Compact around Slab 183	92	ICY	0.086	10	16.97			1.38				$130		$130
Mob/Demob.Equip. 1	1	LS	2.00	1	16.97			184.00		$20		$90		$110
g. Relocated Diversion Ditch 100%														
i. Excavation – Ditch	3150	CY	0.24	975	16.97			0.84	7.50	$16,550		$2,650	$23,630	$42,830
SY														
ii. Grass Cover: Seed, Fertilize, Mulch 11000	99	MSF	0.30	38	16.97			6.75	25.00	$640		$690	$2,550	$3,880
TOTAL (SITE PREPARATION)	1	LS		4,948						$85,720	$15,000	$33,270	$122,960	$256,950

Site Preparation Details

FEMP-OU02-5 DRAFT August 24, 1994

000696

CONTR.NO.– [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, SWL – CONSOLIDATION & CAPPING
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940746
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	50%														
a. Decon Trailer – Rental	39	20	MO					1500.00				$29,250			$29,250
	50%														
b. Construction Equipment Decon. Facility 25 ft x 60 ft															
i. Excavation – Structural	175	88	BCY	0.021	2	16.97			0.64		$30		$60		$90
ii. Sub–grade Prep.	167	84	SY	0.041	4	16.97		6.75	1.45	5.51	$70	$580	$120	$470	$1,240
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	8	SF	0.32	3	19.21			0.73	12.55	$60		$10	$100	$170
Metal Grating 2 ft wide x 25 lf	25	13	LF	0.53	9	19.21			1.86	46.67	$170		$20	$600	$790
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	20	CY	4.07	102	17.98			14.25	67.00	$1,830		$290	$1,350	$3,470
Decon Pad Trench – 2' x 2' x 25 lf, 8"thk.	5	3	CY	28.22	91	17.98			98.77	202.30	$1,640		$250	$520	$2,410
Decon Pad Curb – 6" x 6" x 120 lf	5	3	CY	15.30	49	17.98			53.55	275.90	$880		$140	$710	$1,730
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	2	17.98			37.24	97.20	$40		$10	$20	$70
Epoxy Coating	167	84	SY	0.22	24	17.00			0.77	7.56	$410		$70	$650	$1,130
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	1	EA	12.00	8	17.98			100.00	525.00	$140		$50	$270	$460
vi. HDPE Piping	100	50	LF	0.38	25	19.95			5.11	4.42	$500		$260	$230	$990
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Gu	720	360	SF	0.04	17	16.97			0.03	1.55	$290		$10	$570	$870
4" x 4" x 9'–6" Wood Posts set in	27	14	EA	0.480	8	16.97			1.68	5.75	$140		$20	$80	$240
viii. Air Diaphragm Pump 50 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$400	$630
ix. Suction and Discharge Piping	10	5	LF	0.11	1	19.95			0.39	0.84	$20				$20
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	2	LF	0.47	1	19.95			1.65	14.91	$20			$20	$40
	BCY														
x. Backfill & Compaction around concrete slab	129	77	ICY	0.086	9	16.97			1.38		$150		$110		$260
SUB–TOTAL (EQUIP. DECON. FACILITY)					365						$6,590	$29,830	$1,450	$5,990	$43,860

Equipment Decon. Facility Details

000697
5861
F-4-25
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, SWL – CONSOLIDATION & CAPPING
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940746
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	50%														
i. Excavation – Structural	19	10	BCY	0.021		16.97			0.64				$10		$10
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	7	SY	0.041		16.97		6.75	1.45	5.51		$50	$10	$40	$100
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	2	SF	0.32	1	16.97			0.73	12.55	$20			$30	$50
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	1	CY	4.07	4	17.98			14.25	67.00	$70		$10	$50	$130
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	6	17.98			111.44	250.70	$110		$20	$40	$170
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	4	17.98			53.55	275.90	$70		$10	$60	$140
Epoxy Coating	14	7	SY	0.22	2	17.00			0.77	7.56	$30		$10	$50	$90
v. Corrugated Fiberglass Splash Guard	132	66	SF	0.04	3	16.97			0.03	1.55	$50			$110	$160
4" x 4" x 9'–6" Wood Posts set in con	6	3	EA	0.480	2	16.97			1.68	5.75	$30		$10	$20	$60
vi. Pump 20 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$410	$640
vii. Clean Wtr.Strg.Tank W/Piping– 1500 gal.	1	1	LS	32.00	21	19.95			112.00	2500.00	$420		$60	$1,250	$1,730
viii. Backfill & Compaction around concrete slab	BCY 17	10	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		54						$1,020	$50	$180	$2,060	$3,310
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		419						$7,610	$29,880	$1,630	$8,050	$47,170

000698

F-4-26

FEMP-OU02-5 DRAFT
August 24, 1994

Personnel Decon.Facilities/Services Details

CONTR.NO. – [redacted]4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, SWL – CONSOLIDATION & CAPPING
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940746
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	880	LF	0.017	19	16.97			0.06	0.65	$320		$50	$590	$960
ii. Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	500	EA	0.24	155	16.97			1.53	1.35	$2,630		$790	$700	$4,120
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. Sedimentation/Decon. Tank 10000 gal	1	LS	53.40	69	19.95			186.90	7100.00	$1,380		$190	$7,100	$8,670
iv. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1600	LF	0.38	786	19.95			5.11	4.42	$15,680		$8,180	$7,070	$30,930
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	3	EA	8.00	31	16.97			28.00	8300.00	$530		$80	$24,900	$25,510
vi. 50 gal. Pump Includes Controls & Electrical	2	EA	60.00	155	16.97			210.00	2500.00	$2,630		$420	$5,000	$8,050
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,616						$30,200		$10,350	$50,320	$90,870

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Erosion Control Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, SWL – CONSOLIDATION & CAPPING
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940746
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE–CONSOLIDATE FOR ON–SITE DISPOSAL														
EXCAVATION														
Excavate Contaminated Soil – Level C	1700	BCY	0.055	121	16.97			1.17		$2,050		$1,990		$4,040
BCY														
Backfill & Compact – level C 1700	2040	ICY	0.06	158	16.97			1.67		$2,680		$3,410		$6,090
			S/T	279										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	279	HRS	150%	419	16.97					$7,110				$7,110
			S/T	977										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) SEE APPENDIX C	98	MD												
Excavate Contaminated Soil – Level D	10400	BCY	0.055	738	16.97			1.17		$12,520		$12,170		$24,690
Excavate Additional Soil – Level D	1200	BCY	0.055	85	16.97			1.17		$1,440		$1,400		$2,840
(SHREDDING COMMON TO SWL, IFP & SF)														
k. Shredder/Crusher – Purchase/Install 33.3%	0.3	LOT	280.0	120	16.97			8400.00	317800.00	$2,040		$2,880	$109,000	$113,920
60 Ton per Hour														
Excavated Debris BCY 5300														
Generated Waste BCY 1232														
Excavated Debris TONS 8447														
(Percent of Gen.Waste to be Shredded 25%														
Generated Waste TONS 708.2														
TOTAL TONS 9155														
Operating Costs	153	HRS							25.75				$4,060	$4,060
(2) Operators	306	HRS	1.00	395	16.97					$6,700				$6,700
On–Site Consolidation BCY														
Impacted Fill 13300	15960	ICY	0.06	1,235	16.97			1.67		$20,960		$26,650		$47,610
Generated Waste 1232	1416	ICY	0.06	110	16.97			1.67		$1,870		$2,370		$4,240
BCY = BANK CUBIC YARDS : The Volume of 1 Cubic Yard of material in its natural state OR Volume/Void to be filled. LCY = LOOSE CUBIC YARDS (w/Swell Factor) Volume of material after being excavated. ICY = IN–PLACE CUBIC YARDS (w/Shrinkage Factor) Volume of material it takes to fill a 1 Cubic Yard space.														
TOTAL (EXCAVATE–CONSOLIDATE)	1	LS		3,102						$57,370		$50,870	$113,060	$221,300

Excavate–Consolidate Details

CONTR.NO.– [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, SWL – CONSOLIDATION & CAPPING
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940746
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE CAP															
a. Contouring Layer 18" Thk.	BCY 3920	4704	ICY	0.06	364	16.97			1.67	3.50	$6,180		$8,090	$16,960	$31,230
b. 95% Clay – 5% Bentonite 24" Thk	BCY 5226	6167	ICY	0.260	2068	16.97			11.19	20.35	$35,090		$71,080	$129,260	$235,430
c. GML/GCC Composite Liner		7840	SY					7.38				$57,860			$57,860
d. Geotextile Fabric		7840	SY					2.25				$17,640			$17,640
e. Pea gravel 12" Thk, In–place	BCY 498	535	ICY	0.11	76	16.97			0.77	17.00	$1,290		$420	$9,370	$11,080
f. Geotextile Fabric		7840	SY					2.25				$17,640			$17,640
g. Cobbels 36" Thk; In–place	BCY 7840	9408	ICY	0.258	3131	16.97			7.15	10.10	$53,130		$69,290	$97,870	$220,290
h. Geotextile Fabric		7840	SY						0.02	1.46			$160	$11,790	$11,950
i. Sand Layer 6" Thk; In–place	1306	1404	ICY	0.052	94	16.97			1.76	5.00	$1,600		$2,550	$7,230	$11,380
j. Geotextile Fabric		7840	SY					2.25				$17,640			$17,640
k. Common Soil 21" Thk; In–place	BCY 4574	5718	ICY	0.06	443	16.97			1.67	3.50	$7,520		$9,830	$20,610	$37,960
l. Top Soil 6" Thk; In–place	BCY 1306	1633	ICY	0.053	112	16.97			1.82	12.10	$1,900		$3,060	$20,350	$25,310
m. Grass Cover – Seed, Fertilize, Mulc Utility Mix – Hydro/Air Seeding	SY 7840	71	MSF	0.30	27	16.97			6.75	25.00	$460		$490	$1,830	$2,780
TOTAL (COMPOSITE CAP)		1	LOT		6,315						$107,170	$110,780	$164,970	$315,270	$698,190

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Composite Cap Details

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, SWL – CONSOLIDATION & CAPPING
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940746
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL															
Demo. /Load/Haul/Dump/Compact															
a. Office/Parking Area	50%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	247	BCY	0.292	93	16.97			9.16		$1,580		$2,330		$3,910
Geo–Fabric & Liner	2222	1111	SY	0.002	3	16.97			0.02		$50		$20		$70
Consolidate & Dump Rubble	185	93	BCY	0.30	36	16.97			2.51		$610		$240		$850
b. Const.Equip.Decon Area @ Excav.Site															
Demo/Remove Concrete	49.3	25	BCY	1.2	38	16.97			3.62		$640		$90		$730
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	14	BCY	0.292	5	16.97			9.16		$80		$130		$210
Geo–Fabric & Liner	167	84	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	27	14	EA	0.48	8	16.97			1.68		$140		$20		$160
Splash Guard	702	351	SF	0.04	18	16.97			0.03		$310		$10		$320
Consolidate & Dump Rubble	24.9	12	BCY	0.30	5	16.97			2.51		$80		$30		$110
c. Staging Pad at S/U															
Demo/Remove Concrete	655	328	BCY	1.2	507	16.97			3.62		$8,600		$1,220		$9,820
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	475	238	BCY	0.292	89	16.97			9.16		$1,510		$2,240		$3,750
Geo–Fabric & Liner	2845	1423	SY	0.002	1	16.97			0.02		$20		$30		$50
Consolidate & Dump Rubble	395.5	198	BCY	0.30	77	16.97			2.51		$1,310		$510		$1,820
d. Personnel Decon. Area @ S/U															
Demo/Remove Concrete	2.2	1	BCY	1.2	2	16.97			3.62		$30				$30
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo–Fabric & Liner	14	7	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	6	3	EA	0.48	2	16.97			1.68		$30		$10		$40
Splash Guard	132	66	SF	0.04	3	16.97			0.03		$50				$50
Consolidate & Dump Rubble	152.0	76	BCY	0.30	29	16.97			2.51		$490		$200		$690
(TOTAL BCY OF GEN. WASTE)	1232														
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		918						$15,570		$7,090		$22,660

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Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. - [redacted]4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-2, SWL – CONSOLIDATION & CAPPING
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940746
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off-site source															
a. Borrow Common Soil, Backfill	BCY														
Solid Waste Landfill	10010	12012	ICY	0.09	1395	16.97			3.21	3.50	$23,670		$39,720	$43,300	$106,690
	50%														
Office/Parking	494	296	ICY												
Const.Equip.Decon.Area	78	47	ICY												
Personnel Decon.Area	7	4	ICY												
Staging Area @ S/U	1099	659	ICY												
	S/T	13019	ICY	0.09	1512	16.97			3.21	3.50	$25,660		$43,040	$46,930	$115,630
b. Final Grade for SWL (Excludes Cap)		1670	SY	0.02	43	16.97			0.70		$730		$1,200		$1,930
c. Borrow Top Soil 6" Thk., Spread															
Solid Waste Landfill		1667	SY												
	50%														
Office/Parking	2222	1111	SY												
Const.Equip.Decon.Area	167	84	SY												
Personnel Decon.Area	14	7	SY												
Staging Area @ S/U	2845	1423	SY												
	S/T	4291	SY	0.036	199	16.97			2.33	2.88	$3,380		$10,300	$12,730	$26,410
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Solid Waste Landfill	1670	15	MSF												
	50%														
Office/Parking	2222	10	MSF												
Const.Equip.Decon.Area	167	1	MSF												
Personnel Decon.Area	14		MSF												
Staging Area @ S/U	2845	13	MSF												
	S/T	39	MSF	0.30	15	16.97			6.75	25.00	$250		$270	$1,000	$1,520
SUB-TOTAL (SITE RESTORATION)		1	LOT		3,164						$53,690		$94,530	$103,960	$252,180

Site Restoration Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, SWL – CONSOLIDATION & CAPPING
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940746
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION (CON'T.) Backfill and top soil to be borrowed from the off–site source														
e. Security Fence – 6ga aluminized – 6' high	1400	LF	0.13	231	16.97			1.64	9.80	$3,920		$2,360	$14,130	$20,410
i. Corner posts – 3" dia.	4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces	8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening	1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
SUB–TOTAL (SITE RESTORATION)	1	LOT		252						$4,280		$2,580	$14,500	$21,360
TOTAL (SITE RESTORATION)	1	LOT		3,416						$57,970		$97,110	$118,460	$273,540

Site Restoration Details

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CONTR.NO.- [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-2, SWL – CONSOLIDATION & CAPPING
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940746
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at Restoration Site: 8 Pairs x 120 ft.	8	PAIR					23,000				$184,000			$184,000
b. Abandon Existing Wells	3	EA					13,000				$39,000			$39,000
TOTAL (MONITORING WELLS)	1	LOT									$223,000			$223,000

Monitoring Wells Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, SWL – CONSOLIDATION & CAPPING
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940746
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	45000	GAL					0.01				$500			$500
Runnoff from the Exclusion Zone.	850000	GAL					0.01				$8,500			$8,500
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$9,000			$9,000

Waste Water Treatment Operations Cost Details

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000706
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. - [redacted]4321
CLIENT - U.S. DEPT. OF ENERGY
PROJECT - ALT-2, SWL - CONSOLIDATION & CAPPING
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940746
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	67	EA					2,002				$134,100			$134,100
Rad	67	EA					2,000				$134,000			$134,000
Confirmatory Tests	34	EA												
Full Rad Tests	14	EA					3,101				$43,400			$43,400
Full HSL	14	EA					1,500				$21,000			$21,000
Full TCLP	10	EA					2,000				$20,000			$20,000
2 Technicians per Month	8	MO					13,163				$105,300			$105,300
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS)	1	LOT									$457,800			$457,800

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Screening & Confirmation Testing Details

PAGE 13 of 13

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

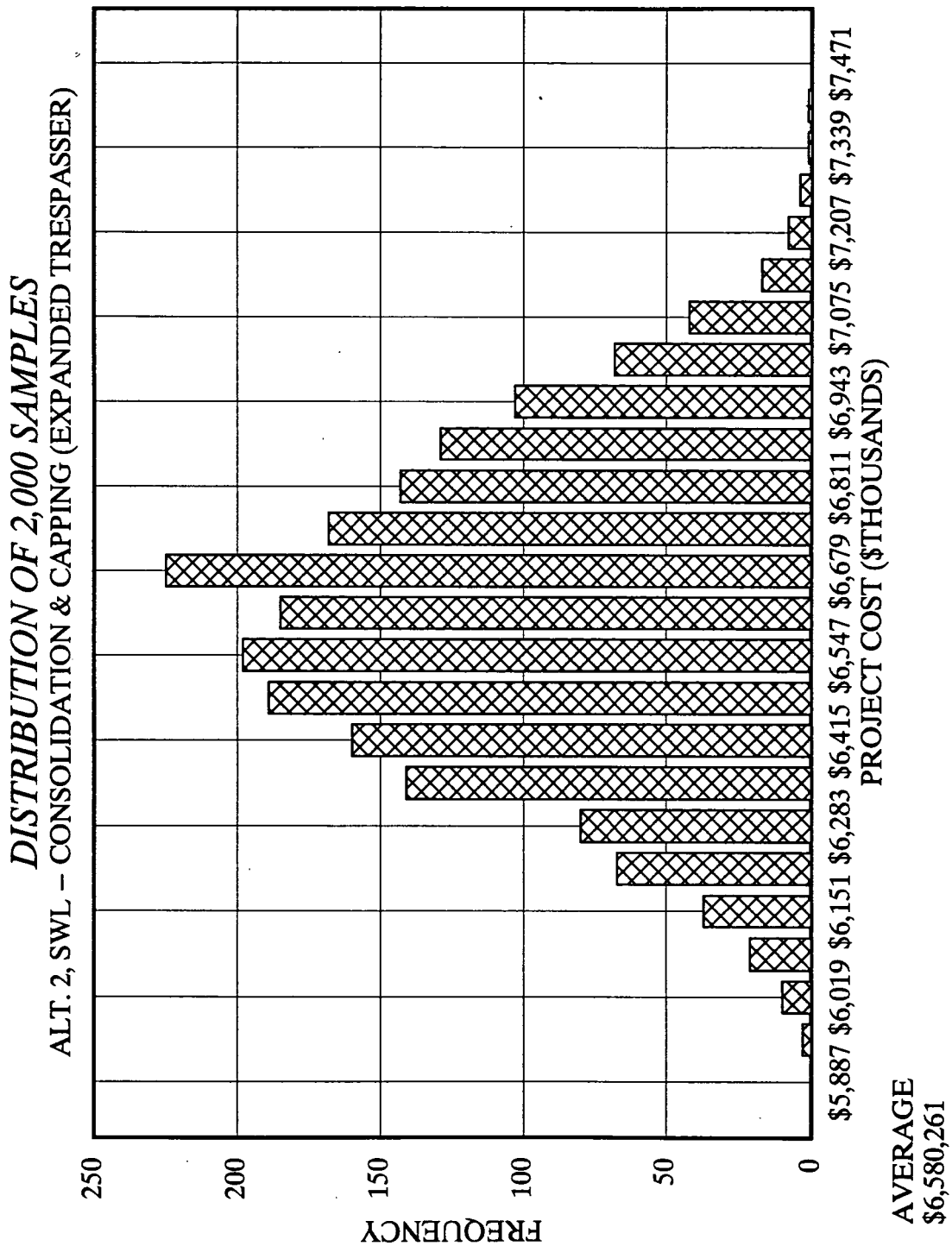
PROJECT: ALT. 2, SWL – CONSOLIDATION & CAPPING (EXPANDED TRESPASSER)
CLIENT: DOE DATE: 07–Aug–94
CONTRACT: C2–94–07–46 BASE ESTIMATE: $5,466,300

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$7,993,591	$2,527,291	46.2%
0.05%	$7,249,632	$1,783,332	32.6%
5.00%	$6,978,675	$1,512,375	27.7%
10.00%	$6,903,676	$1,437,376	26.3%
15.00%	$6,844,614	$1,378,314	25.2%
20.00%	$6,796,159	$1,329,859	24.3%
25.00%	$6,751,817	$1,285,517	23.5%
30.00%	$6,715,576	$1,249,276	22.9%
35.00%	$6,675,522	$1,209,222	22.1%
40.00%	$6,645,204	$1,178,904	21.6%
45.00%	$6,615,834	$1,149,534	21.0%
50.00%	$6,578,527	$1,112,227	20.3%
55.00%	$6,543,920	$1,077,620	19.7%
60.00%	$6,509,605	$1,043,305	19.1%
65.00%	$6,478,280	$1,011,980	18.5%
70.00%	$6,444,472	$978,172	17.9%
75.00%	$6,408,326	$942,026	17.2%
80.00%	$6,370,382	$904,082	16.5%
85.00%	$6,323,390	$857,090	15.7%
90.00%	$6,269,131	$802,831	14.7%
95.00%	$6,183,392	$717,092	13.1%
99.95%	$5,912,157	$445,857	8.2%
100.00%	$5,166,805	($299,495)	–5.5%

FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

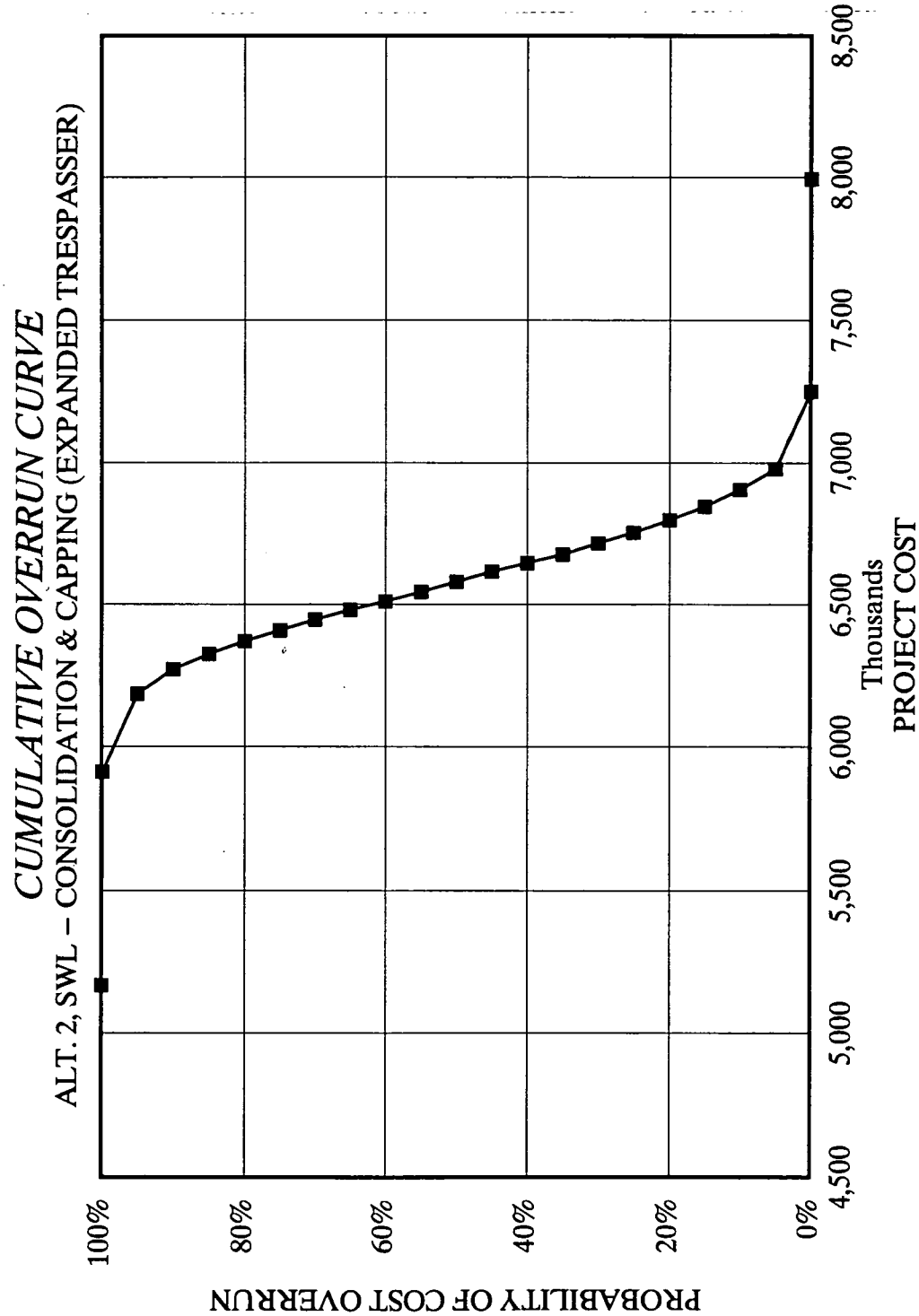
PROJECT: ALT. 2, SWL – CONSOLIDATION & CAPPING (EXPANDED TRESPASSER)
CLIENT: DOE
CONTRACT: C2-94-07-46

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$94,290	-5.0%	$89,576	30%	$122,577	U		14%
2	SITE PREPERATION S/C	16,500	-5.0%	15,675	30%	21,450	U		14%
3	SITE PREPERATION MAT'L	135,260	-5.0%	128,497	20%	162,312	U		20%
4	DECON FACILITIES/SERVICES LABOR	8,370	-2.0%	8,203	80%	15,066	U		2%
5	DECON FACILITIES/SERVICES S/C	32,870	-6.0%	30,898	80%	59,166	U		7%
6	DECON FACILITIES/SERVICES MAT'L	8,860	-6.0%	8,328	60%	14,176	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	33,220	-5.0%	31,559	50%	49,830	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	55,350	-5.0%	52,583	30%	71,955	U		14%
9	EXC & CONT ON-SITE DSPSL LBR	63,110	-2.0%	61,848	150%	157,775	U		1%
10	EXC & CONT ON-SITE DSPSL MAT'L	124,370	-2.0%	121,883	150%	310,925	U		1%
11	COMPOSITE CAP LABOR	117,890	-6.0%	110,817	100%	235,780	U		6%
12	COMPOSITE CAP S/C	121,860	-6.0%	114,548	100%	243,720	U		6%
13	COMPOSITE CAP MAT'L	346,740	-6.0%	325,936	80%	624,132	U		7%
14	GENERATED WASTE REMVL LABOR	17,130	-5.0%	16,274	50.0%	25,695	U		9%
15	SITE RESTORATION LABOR	63,770	-5.0%	60,582	30.0%	82,901	U		14%
16	SITE RESTORATION MAT'L	130,310	-5.0%	123,795	30.0%	169,403	U		14%
17	MONITORING WELLS S/C	245,300	-5.0%	233,035	50.0%	367,950	U		9%
18	INDIRECT FIELD COSTS LABOR	434,200	-5.0%	412,490	50.0%	651,300	U		9%
19	INDIRECT FIELD COSTS S/C	241,500	-5.0%	229,425	100.0%	483,000	U		5%
20	INDIRECT FIELD COSTS MAT'L	486,700	-5.0%	462,365	50.0%	730,050	U		9%
21	FIELD SUPPORT COSTS LABOR	577,700	-10.0%	519,930	30.0%	751,010	U		25%
22	FIELD SUPPORT COSTS S/C	466,800	-5.0%	443,460	30.0%	606,840	U		14%
23	ENGINEERING COSTS	1,566,400	-5.0%	1,488,080	25.0%	1,958,000	U		17%
24	SALES TAX MAT'L	77,800	-1.0%	77,022	1.0%	78,578	U		50%
25				0		0			0%
26				0		0			0%
27				0		0			0%
28				0		0			0%
29				0		0			0%
30				0		0			0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$5,466,300		$5,166,805		$7,993,591			


DISTRIBUTION OF 2,000 SAMPLES
ALT. 2, SWL – CONSOLIDATION & CAPPING (EXPANDED TRESPASSER)
FREQUENCY
250
200
150
100
50
0
$5,887 $6,019 $6,151 $6,283 $6,415 $6,547 $6,679 $6,811 $6,943 $7,075 $7,207 $7,339 $7,471
PROJECT COST ($THOUSANDS)
AVERAGE
$6,580,261

000710

5861



BASE ESTIMATE:
$5,466,300

000711

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SWL – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940746
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$5,466,300	BASE EST:	$94,290	BASE EST:	$16,500	BASE EST:	$135,260	BASE EST:	$8,370	BASE EST:	$32,870	BASE EST:	$8,860
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	30%	-5%	20%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	30%	-5%	20%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$89,576	$122,577	$15,675	$21,450	$128,497	$162,312	$8,203	$15,066	$30,898	$59,166	$8,328	$14,176

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SWL – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940746
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$33,220	BASE EST:	$0	BASE EST:	$55,350	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$31,559	$49,830	$0	$0	$52,583	$71,955	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SWL – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940746
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–2, SWL – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940746
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

	EXCAVATE & CONTAIN. ON–SITE DISPOSAL LABOR $'s		EXCAVATE & CONTAIN ON–SITE DISPOSAL S/C $'s		EXCAVATE & CONTAIN ON–SITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$63,110	BASE EST:	$0	BASE EST:	$124,370	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–1%	100%			–1%	100%						
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	50%			–1%	50%						
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–2%	150%	0%	0%	–2%	150%	0%	0%	0%	0%	0%	0%
TOTAL $	$61,848	$157,775	$0	$0	$121,883	$310,925	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SWL - CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940746
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		CLAY CAP LABOR $'s		CLAY CAP S/C $'s		CLAY CAP MAT'L. $'s	
	BASE EST:	$117,890	BASE EST:	$121,860	BASE EST:	$346,740	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING			-5%	50%	-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%	-1%	50%	-1%	50%						
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	100%	-6%	100%	-6%	80%	0%	0%	0%	0%	0%	0%
TOTAL $	$110,817	$235,780	$114,548	$243,720	$325,936	$624,132	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000716

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SWL – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940746
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$17,130	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$16,274	$25,695	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000717

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SWL – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940746
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW-

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$63,770	BASE EST:	$0	BASE EST:	$130,310	BASE EST:	$0	BASE EST:	$245,300	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$60,582	$82,901	$0	$0	$123,795	$169,403	$0	$0	$233,035	$367,950	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-4-46

000718

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SWL - CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940746
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$434,200	BASE EST:	$241,500	BASE EST:	$486,700	BASE EST:	$577,700	BASE EST:	$466,800	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-10%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-5%	30%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-10%	30%	-5%	30%	0%	0%
TOTAL $	$412,490	$651,300	$229,425	$483,000	$462,365	$730,050	$519,930	$751,010	$443,460	$606,840	$0	$0
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SWL – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940746
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$1,566,400	BASE EST:	$77,800	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-5%	25%										
(OTHER)												
TOTAL %	-5%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$1,488,080	$1,958,000	$77,022	$78,578	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000720

LCC ANALYSIS TITLE:	LSP - CONSOLIDATION AND CAPPING (EXPANDED TRESPASSER)			
WBS NO.:	1.1.1.1.2.3.3		TASK NO.:	2CLS
ALTERNATIVE:	2		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	35 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	07-Aug-94
DOCUMENT NO.:	LCC-94-03-02	EST. NO. C2-94-07-47 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$2,141,700	$0	$0	$2,141,700	1997
$6,425,100	$0	$0	$6,425,100	1998
$0	$193,211	$0	$193,200	1999
$0	$190,247	$0	$190,200	2000
$0	$190,247	$0	$190,200	2001
$0	$190,247	$0	$190,200	2002
$0	$210,247	$0	$210,200	2003
$0	$102,247	$0	$102,200	2004
$0	$102,247	$0	$102,200	2005
$0	$102,247	$0	$102,200	2006
$0	$102,247	$0	$102,200	2007
$0	$122,247	$0	$122,200	2008
$0	$102,247	$0	$102,200	2009
$0	$102,247	$0	$102,200	2010
$0	$102,247	$0	$102,200	2011
$0	$102,247	$0	$102,200	2012
$0	$122,247	$0	$122,200	2013
$0	$102,247	$0	$102,200	2014
$0	$102,247	$0	$102,200	2015
$0	$102,247	$0	$102,200	2016
$0	$102,247	$0	$102,200	2017
$0	$122,247	$0	$122,200	2018
$0	$102,247	$0	$102,200	2019
$0	$102,247	$0	$102,200	2020
$0	$102,247	$0	$102,200	2021
$0	$102,247	$0	$102,200	2022
$0	$122,247	$0	$122,200	2023
$0	$102,247	$0	$102,200	2024
$0	$102,247	$0	$102,200	2025
$0	$102,247	$0	$102,200	2026
$0	$102,247	$0	$102,200	2027
$0	$122,247	$0	$122,200	2028
				2029
				2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$8,566,800	$3,630,400	$0	$12,195,800	TOTAL
$7,724,600	$2,275,400	$0	$9,999,200	<====(@NPV)

F ERMC O
ESTIMATING SERVICES

EST FILE #: C2940747 | DATE: 07-Aug-94
CLIENT: US DOE | ESTIMATOR: KEN KEPLER
PROJECT TITLE: ALT-2, LSP - CONSOLIDATION & CAPPING | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.3 EXPANDED TRESPASSER | TASK#: 2CLS

SUMMARY SHEET

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1			34,159		$596,000	$795,700	$1,025,000	$2,416,700
2		ON-SITE DISPOSAL - IN-PLACE MIXING 10%LIME,10% CEMENT						
3		COMPOSITE CAP (SEE CONSTRUCTION ACTIVITY SUMMARY)						
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		34,159		$596,000	$795,700	$1,025,000	$2,416,700
11	SUPERVISION - CONTRACTOR				$101,000			$101,000
12	SM TOOLS/CONSM'BLS						$35,800	$35,800
13	EQUIPMENT RENTAL						$533,100	$533,100
14	TEMP. FACILITIES				$12,500		$23,200	$35,700
15	TEMP UTL'S HOOK-UP				$6,300		$11,600	$17,900
16	JOB CLEAN-UP				$12,500		$23,200	$35,700
17	SAFETY				$6,300		$11,600	$17,900
18	HEALTH PHYSICS S/C				$83,600			$83,600
19	CERCLA/SAT	$1,500 PER PERSON				$25,500		$25,500
20	BOND					$24,200		$24,200
21	OVERHEAD & PROFIT					$299,400		$299,400
22	PAYRL BRD.&BENFT.				$425,500			$425,500
	INDIRECT FIELD COSTS				$647,700	$349,100	$638,500	$1,635,300
	DIRECT & INDIRECT FIELD COSTS				$1,243,700	$1,144,800	$1,663,500	$4,052,000
23	TRANSPORTATION & BURIAL	N/A						
24	WASTE CONTAINERS	N/A						
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$10,500		$10,500
25	SCREENING & CONFIRMATION					$220,000		$220,000
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$741,500			$741,500
	FERMCO FIELD SUPPORT COSTS				$741,500	$230,500		$972,000
28	EMISSION MODELING				$7,100		$13,200	$20,300
29	PSAR/FSAR(SAFETY RPT)				$113,500			$113,500
30	ENGINEERING	TITLE I&II $563,200 TITLE III	$530,800	CDR	$194,500	DCR	$145,900	$1,434,400
	ENGINEERING COSTS							$1,568,200
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$1,676,700	$100,600
	SUB-TOTAL	(BASE ESTIMATE)						$8,692,800
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	20.5%						$1,372,000
	TARGET ESTIMATE (BASE ESTIMATE PLUS RISK BUDGET)							$8,064,800
35	CONTINGENCY	7.5%						$502,000
								PRELIMINARY
	TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY)							$8,566,800

LOTUS31\FS2\ALT2\LSP\INDSUM.WK3 - FEASABILITY STUDY

Alternative 2 – Consolidation and Capping
(Expanded Trespasser)

Lime Sludge Ponds

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	1	1	5	sample	$5,500.00	32	NA	$176,000	8 wells x 4 samples/year
Long Term	1	6	30	sample	$5,500.00	16	NA	$88,000	8 wells x 2 samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	2	2.58	$1,001	Inspect all wells twice/year. Repair 1 out of 8.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Long Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Well Inspect & Maint.	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
OU2 Waste Cell Leachate									
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Facility Maint. at Subunit									
Cap Maint. & Repairs	1	1	30	acre	$2,183.32	2.5	3.23	$7,041	Approx. 2.3 Acres
Mowing	1	1	30	acre	$1,861.92	3	3.87	$7,206	Approx. 3 Acres
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.65	0.84	$1,653	Approx. 1300 ft perimeter
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Fence Repair	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of Subunit	5	5	30	lump Sum	$20,000.00	1	NA	$20,000	Total divided among 5 subunits
Facility Review of OU2 Cell	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative

Annual Costs, Year 1 (excluding facility review)	$193,211
Annual Costs, Years 2–5 (excluding facility review)	$190,247
Annual Costs, Years 6–30 (excluding facility review)	$102,247
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 B:

8/3/94

DATE: 04-Aug-94

PROJECT TITLE:
ALT-2, LSP - CONSOLIDATION & CAPPING
WBS#:
1.1.1.1.2.3.3

HEALTH PHYSICS

EST.NO.: C2940747
EST. : KEN KEPLER
TASK I.D. :
2CLS

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	0	$0	C/B		
SUB-TOTAL		31.80	4		$0			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	0		$0	mD/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	0		$0	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	0		$0	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	0		$0	C/B		
THERMO STRIPS	EA	50.00	0		$0	C/B		
SUB-TOTAL		327.21			$0			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$0			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE.
COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

DATE: 04-Aug-94

PROJECT TITLE:
ALT-2, LSP - CONSOLIDATION & CAPPING
WBS#:
1.1.1.1.2.3.3

HEALTH PHYSICS

EST.NO.: C2940747
EST. : KEN KEPLER
TASK I.D. :
2CLS

5861

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	17	68	$16.97	$1,150		
ANNUAL PHYSICALS	1	3	17	51	$16.97	$870		
EXIT (TERMINATION) PHYSICALS	1	4	17	68	$16.97	$1,150		
SUB-TOTAL						$3,170		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	16	1	17	275	$16.97	$4,670		
YEARLY IN-VIVO	1	4	17	68	$16.97	$1,150		
EXIT (END OF PROJECT / TERMINATION)	1	4	17	68	$16.97	$1,150		
SUB-TOTAL						$6,970		
WORK DELAYS CAUSED BY MONITORING	5%				$734,600	$36,730		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$734,600	$36,730		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$83,600	$0	$83,600

000725

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT-2, LSP – CONSOLIDATION & CAPPING
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CLS

WBS NO. – 1.1.1.1.2.3.3
EST. NO. – C2940747
BY – K. KEPLER
DATE – 08/04/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25-Mar-94	01-Jun-97	30-Jan-98	30-Sep-98	16	MONTHS

EST.DATE TO MID-POINT OF ACTIVITY	
46	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO. - [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-2, LSP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940747
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY (EXPANDED TRESPASSER) CONSOLIDATION & CAPPING (In-Place Mixing)														
SITE PREPARATION	1	LS		12,558						$225,330	$75,000	$26,440	$117,770	$444,540
DECONTAMINATION FACILITIES/SERVICES	1	LS		443						$8,090	$29,880	$1,900	$8,280	$48,150
EROSION AND SEDIMENT CONTROLS	1	LS		1138						$21,300		$7,390	$20,320	$49,010
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT – OFFSITE DISPOSAL	N/A													N/A
LOAD/HAUL – OFF-SITE DISPOSAL	N/A													N/A
EXCAVATE & CONSOLIDATE – ON-SITE DISPOSAL (Onsite – In-Place Mixing – 10% Lime & 10% Cement)	1	LS									$172,630	$8,080	$64,190	$244,900
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	1	LS		9369						$159,010	$196,850	$236,930	$493,470	$1,086,260
GENERATED WASTE REMOVAL – ON-SITE	1	LS		919						$15,600		$7,100		$22,700
SITE RESTORATION	1	LS		6627						$112,500		$196,800	$227,800	$537,100
MONITORING WELLS	1	LS									$249,000			$249,000
SUB-TOTAL (DIRECT FIELD COSTS)				31054						$541,830	$723,360	$484,640	$931,830	$2,681,660
TAKE-OFF ALLOWANCE 10%	1	LS		3,105						$54,180	$72,340	$48,460	$93,180	$268,160
TOTAL (DIRECT FIELD COSTS)	1	LS		34,159						$596,000	$795,700	$533,100	$1,025,000	$2,949,800

Alt.2, Consolidation & Capping Detail Summary

PAGE 1 of 14

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000727

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, LSP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

CONTR.NO. 4424321
EST. NO. C2940747
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION															
a. Construction Survey		1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing		1500	LF	0.213	412	16.97				6.25	$6,990			$9,660	$16,650
c. Clear and Grub															
i. Remediation Site		4.00	AC	41.40	214	16.97			2575.00		$3,630		$10,610		$14,240
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Staging Area @ Sub–unit															
d. Dewatering															
i. Excavate Dewatering Trench		233	CY	0.50	150	16.97			1.49		$2,550		$360		$2,910
ii. Pump – w/4" Suction Hose		100	DAYS	3.00	387	16.97			19.55		$6,570		$2,010		$8,580
iii. HDPE Pipe to Sedimentation Tank		400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
iv. Remove Sediment fm. Tank – 1cy/trip		1	CY	4.00	5	16.97			100.00		$80		$100		$180
e. General Grading															
i. New Roads		6400	SY	0.001	8	16.97			0.07		$140		$460		$600
ii. Office/Parking Area	50% 2222	1111	SY	0.010	14	16.97			0.32		$240		$370		$610
iii. Const.Equip.Decon.Pad Area	234	117	SY	0.010	2	16.97			0.32		$30		$40		$70
iv. Pers.Decon.Pad Area	17	9	SY	0.010		16.97			0.32						
v. Staging Area @ S/U	2845	1423	SY	0.010	18	16.97			0.32		$310		$470		$780
f. Surfacing/Paving/Concrete Slab															
i. New Roads – 8" Gravel W/Geotextile		5334	SY	0.030	206	16.97			1.08		$3,500		$5,930		$9,430
ii. Office/Parking – 8" Gravel W/ Geotext	50% 2222	1111	SY	0.030	43	16.97			1.08		$730		$1,240		$1,970
iii. Staging Area @ Sub–Unit – 160' x160' Concrete															
Sub–Grade & Sub–Base for Conc.Slab	2845	1423	SY	0.041	75	16.97			1.45		$1,270		$2,120		$3,390
Concrete Slab 160 x 160' x 8"thk.	631	316	CY	4.07	1656	17.98					$29,770				$29,770
Concrete Curb – 2'h x 480 lf x 8" thl	24	12	CY	15.30	237	17.98					$4,260				$4,260
HDPE Perf.Sub–grade Piping – 4"	500	250	LF	0.21	68	16.97			0.74		$1,150		$190		$1,340
Epoxy Coating	2845	1423	SY	0.22	404	16.97			0.77		$6,860		$1,130		$7,990
Backfill & Compact around Slab	183	92	ICY	0.086	10	16.97			1.38		$170		$130		$300
Mob/Demob.Equip.	1	1	LS	2.00	1	16.97			184.00		$20		$90		$110
SUB–TOTAL (SITE PREPARATION)		1	LS		4,008						$69,930	$15,000	$25,520	$10,010	$120,460

Site Preparation Details

CONTR.NO.- [redacted]321
CLIENT - [redacted]. DEPT. OF ENERGY
PROJECT - ALT-2, LSP - CONSOLIDATION & CAPPING - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940747
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

	DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	SITE PREPARATION														
	g. Demolish exist.k-65 slurry trench 100%														
	i. Concrete Trench	100	CY	0.50	65	16.97			1.49		$1,100				$1,100
	ii. (5) Pipelines @ 300' EA.	1500	LF	0.645	1248	16.97			1.49		$21,180				$21,180
	iii. Backfill & Compact Clean Soil 225	270	ICY	0.06	21	16.97			1.67	3.50	$360		$460	$970	$1,790
	h. Construct K-65 Concrete Slurry Trench														
	i. Concrete Trench	85	CY	15.30	1678	17.98			69.08	275.90	$30,170			$24,160	$54,330
	ii. D. I. Pipe 8"	1200	LF	0.54	839	19.95			2.45	9.73	$16,740			$12,030	$28,770
	iii. D. I. Pipe 3"	400	LF	0.27	139	19.95			1.22	2.83	$2,770			$1,170	$3,940
	iv. D. I. Pipe 1"	400	LF	0.25	129	19.95			1.13	2.03	$2,570			$840	$3,410
	v. Gravel Base	30	CY	0.04	1	17.98			0.17	9.25	$20			$290	$310
	vi. Steel Plate	100	sy	1.20	155	17.98			5.42	140.00	$2,790			$14,420	$17,210
	vii. Remove & Relocate Electrical Conduit	1	LS					30000.00				$30,000			$30,000
	SUB-TOTAL (SITE PREPARATION)	1	LS		4,275						$77,700	$30,000	$460	$53,880	$162,040
	TOTAL (SITE PREPARATION)	1	LS		12,558						$225,330	$75,000	$26,440	$117,770	$444,540

Site Preparation Details

PAGE 3 of 14

FEMP-OU02-5 DRAFT
August 24, 1994

5861

000729

F-4-57

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, LSP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940747
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	50%														
a. Decon Trailer – Rental	39	20	MO					1500.00				$29,250			$29,250
b. Construction Equipment Decon. Facility 25 ft x 60 ft															
i. Excavation – Structural	175	88	BCY	0.021	2	16.97			0.64		$30		$60		$90
ii. Sub–grade Prep.	167	84	SY	0.041	4	16.97		6.75	1.45	5.51	$70	$580	$120	$470	$1,240
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	8	SF	0.32	3	19.21			0.73	12.55	$60		$10	$100	$170
Metal Grating 2 ft wide x 25 lf	25	13	LF	0.53	9	19.21			1.86	46.67	$170		$20	$600	$790
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	20	CY	4.07	102	17.98			14.25	67.00	$1,830		$290	$1,350	$3,470
Decon Pad Trench – 2'x2'i.d.x 25lfx8	5	3	CY	28.22	91	17.98			98.77	202.30	$1,640		$250	$520	$2,410
Decon Pad Curb – 6" x 6" x 120 lf	5	3	CY	15.30	49	17.98			53.55	275.90	$880		$140	$710	$1,730
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	2	17.98			37.24	97.20	$40		$10	$20	$70
Epoxy Coating	167	84	SY	0.22	24	17.00			0.77	7.56	$410		$70	$650	$1,130
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	1	EA	12.00	8	17.98			100.00	525.00	$140		$50	$270	$460
vi. HDPE Piping	200	100	LF	0.38	49	19.95			5.11	4.42	$980		$530	$460	$1,970
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	360	SF	0.04	17	16.97			0.03	1.55	$290		$10	$570	$870
4" x 4" x 9'–6" Wood Posts set in con	27	14	EA	0.480	8	16.97			1.68	5.75	$140		$20	$80	$240
viii. Air Diaphragm Pump 50 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$400	$630
ix. Suction and Discharge Piping	10	5	LF	0.11	1	19.95			0.39	0.84	$20				$20
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	2	LF	0.47	1	19.95			1.65	14.91	$20			$20	$40
x. Backfill & Compaction around concrete slab	BCY 129	77	ICY	0.086	9	16.97			1.38		$150		$110		$260
SUB–TOTAL (EQUIP. DECON. FACILITY)					389						$7,070	$29,830	$1,720	$6,220	$44,840

Equipment Decon. Facility Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, LSP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940747
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	50%														
i. Excavation – Structural	19	10	BCY	0.021		16.97			0.64				$10		$10
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	7	SY	0.041		16.97		6.75	1.45	5.51		$50	$10	$40	$100
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	2	SF	0.32	1	16.97			0.73	12.55	$20			$30	$50
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	1	CY	4.07	4	17.98			14.25	67.00	$70		$10	$50	$130
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	6	17.98			111.44	250.70	$110		$20	$40	$170
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	4	17.98			53.55	275.90	$70		$10	$60	$140
Epoxy Coating	14	7	SY	0.22	2	17.00			0.77	7.56	$30		$10	$50	$90
v. Corrugated Fiberglass Splash Guard	132	66	SF	0.04	3	16.97			0.03	1.55	$50			$110	$160
4" x 4" x 9'–6" Wood Posts set in con	6	3	EA	0.480	2	16.97			1.68	5.75	$30		$10	$20	$60
vi. Pump 20 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$410	$640
vii. Clean Wtr.Strg.Tank W/Piping– 1500 gal.	1	1	LS	32.00	21	19.95			112.00	2500.00	$420		$60	$1,250	$1,730
viii. Backfill & Compaction around concrete slab	BCY 17	10	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		54						$1,020	$50	$180	$2,060	$3,310
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		443						$8,090	$29,880	$1,900	$8,280	$48,150

Personnel Decon.Facilities/Services Details

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FEMP-OU02-5 DRAFT August 24, 1994

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, LSP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940747
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	2000	LF	0.017	44	16.97			0.06	0.65	$750		$120	$1,340	$2,210
ii. Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	300	EA	0.24	93	16.97			1.53	1.35	$1,580		$470	$420	$2,470
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1200	LF	0.38	590	19.95			5.11	4.42	$11,770		$6,130	$5,300	$23,200
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	1	EA	8.00	10	16.97			28.00	8300.00	$170		$30	$8,300	$8,500
TOTAL (EROSION & SEDIMENT CONTROL)	1	LOT		1,138						$21,300		$7,390	$20,320	$49,010

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FEMP-OU02-5 DRAFT
August 24, 1994

Erosion Control Details

CONTR.NO.- [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-2, LSP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940747
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE AND CONSOLIDATE														
IN-PLACE MIXING														
Excavate Contaminated Soil – Level C	N/A	BCY	0.055					1.17						
BCY														
Backfill & Compact – level C N/A		ICY	0.06					1.67						
			S/T											
**PPE PRODUCTIVITY ALLOWANCE – LEVEL (		HRS												
			S/T											
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) SEE APPENDIX C		MD												
Excavate Contaminated Soil – Level D	1600	BCY	0.055					1.17				$1,870		$1,870
Excavate Additional Soil – Level D	200	BCY	0.055					1.17				$230		$230
(SHREDDING COMMON TO SWL, IFP & SF)														
k. Shredder/Crusher – Purchase/Install N/A		LOT	280.0					8400.00	317800.00					
60 Ton per Hour														
Excavated Debris BCY 100														
Generated Waste BCY 1232														
Excavated Debris TONS 159														
(Percent of Gen.Waste to be Shredded 25%														
Generated Waste TONS 708.2														
TOTAL TONS 868														
Operating Costs	14	HRS							25.75				$360	$360
(2) Operators	28	HRS	1.00											
On-Site Consolidation BCY														
Impacted Fill 1800	2160	ICY	0.06					1.67				$3,610		$3,610
Generated Waste 1232	1416	ICY	0.06					1.67				$2,370		$2,370
Flyash/Limesludge Stabilization														
In-Place Mixing BCY														
10% Cement 4500	5625	LCY												
10% Lime	7172	TON					24.07		8.90		$172,630		$63,830	$236,460
TOTAL (EXCAV/CONSOL.-INPLACE MIXING)	1	LOT									$172,630	$8,080	$64,190	$244,900

Excavate/Consolidate – In-Place Mixing Details

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, LSP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940747
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE CAP															
a. Contouring Layer 18" Thk.	BCY 5834	7001	ICY	0.06	542	16.97			1.67	3.50	$9,200		$12,040	$25,240	$46,480
b. 95% Clay – 5% Bentonite 24" Thk	BCY 7817	9224	ICY	0.260	3094	16.97			11.19	20.35	$52,510		$106,310	$193,340	$352,160
c. GML/GCC Composite Liner		11667	SY					7.38				$88,690			$88,690
d. Geotextile Fabric		11667	SY					2.25				$27,040			$27,040
e. Pea gravel 12" Thk, In–place	BCY 3850	4139	ICY	0.11	587	16.97			0.77	17.00	$9,960		$3,280	$72,470	$85,710
f. Geotextile Fabric		11667	SY					2.25				$27,040			$27,040
g. Cobbels 36" Thk; In–place	BCY 11667	12542	ICY	0.258	4174	16.97			7.15	10.10	$70,830		$92,370	$130,470	$293,670
h. Geotextile Fabric		11667	SY					2.25				$27,040			$27,040
i. Sand Layer 6" Thk; In–place	1944	2090	ICY	0.052	140	16.97			1.76	5.00	$2,380		$3,790	$10,760	$16,930
j. Geotextile Fabric		11667	SY					2.25				$27,040			$27,040
k. Common Soil 21" Thk; In–place	BCY 6802	8162	ICY	0.06	632	16.97			1.67	3.50	$10,730		$14,040	$29,420	$54,190
l. Top Soil 6" Thk; In–place	BCY 1944	2332	ICY	0.053	159	16.97			1.82	12.10	$2,700		$4,370	$29,070	$36,140
m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding	SY 11667	105	MSF	0.30	41	16.97			6.75	25.00	$700		$730	$2,700	$4,130
BCY = BANK CUBIC YARDS : The Volume of 1 Cubic Yard of material in its natural state OR Volume/Void to be filled. LCY = LOOSE CUBIC YARDS (w/Swell Factor) Volume of material after being excavated. ICY = IN–PLACE CUBIC YARDS (w/Shrinkage Factor) Volume of material it takes to fill a 1 Cubic Yard space.															
TOTAL (COMPOSITE CAP)		1	LOT		9,369						$159,010	$196,850	$236,930	$493,470	$1,086,260

Composite Cap Details

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August 24, 1994

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CONTR.NO. – 4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, LSP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940747
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL															
a. Office/Parking Area	50%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	247	BCY	0.292	93	16.97			9.16		$1,580		$2,330		$3,910
Geo–Fabric & Liner	2222	1111	SY	0.002	3	16.97			0.02		$50		$20		$70
Consolidate & Dump Rubble	185	93	BCY	0.30	36	16.97			2.51		$610		$240		$850
b. Const.Equip.Decon Area @ Excav.Site															
Demo/Remove Concrete	49.3	25	BCY	1.2	38	16.97			3.62		$640		$90		$730
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	14	BCY	0.292	5	16.97			9.16		$80		$130		$210
Geo–Fabric & Liner	167	84	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	14	EA	0.48	8	16.97			1.68		$140		$20		$160
Splash Guard	702	351	SF	0.04	18	16.97			0.03		$310		$10		$320
Consolidate & Dump Rubble	24.9	12	BCY	0.30	5	16.97			2.51		$80		$30		$110
c. Staging Pad at S/U															
Demo/Remove Concrete	655	328	BCY	1.2	507	16.97			3.62		$8,600		$1,220		$9,820
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	475	238	BCY	0.292	89	16.97			9.16		$1,510		$2,240		$3,750
Geo–Fabric & Liner	2845	1423	SY	0.002	4	16.97			0.02		$70		$30		$100
Consolidate & Dump Rubble	395.5	198	BCY	0.30	77	16.97			2.51		$1,310		$510		$1,820
d. Personnel Decon. Area @ S/U															
Demo/Remove Concrete	2.2	1	BCY	1.2	2	16.97			3.62		$30				$30
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo–Fabric & Liner	14	7	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	6	3	EA	0.48	2	16.97			1.68		$30		$10		$40
Splash Guard	132	66	SF	0.04	3	16.97			0.03		$50				$50
Consolidate & Dump Rubble	152.0	76	BCY	0.30	29	16.97			2.51		$490		$200		$690
(TOTAL BCY OF GEN. WASTE)	1232														
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		919						$15,600		$7,100		$22,700

Generated Waste Removal Details

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August 24, 1994

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, LSP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940747
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
Solid Waste Landfill	20000	24000	ICY	0.09	2786	16.97			3.21	3.50	$47,280		$79,350	$86,520	$213,150
	50%														
Office/Parking	494	593	ICY												
Const.Equip.Decon.Area	78	94	ICY												
Personnel Decon.Area	7	8	ICY												
Staging Area @ S/U	1099	1319	ICY												
	S/T	26014	ICY	0.09	3020	16.97			3.21	3.50	$51,250		$86,010	$93,780	$231,040
b. Final Grade for SWL (Excludes Cap)		4000	SY	0.02	103	16.97			0.70		$1,750		$2,880		$4,630
c. Borrow Top Soil 6" Thk., Spread															
Solid Waste Landfill		4000	SY	0.036	186	16.97			2.33	2.88	$3,160		$9,600	$11,870	$24,630
	50%														
Office/Parking	2222	1111	SY												
Const.Equip.Decon.Area	167	84	SY												
Personnel Decon.Area	14	7	SY												
Staging Area @ S/U	2845	1423	SY												
	S/T	6624	SY	0.036	308	16.97			2.33	2.88	$5,230		$15,900	$19,650	$40,780
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Solid Waste Landfill	4000	36	MSF	0.30	14	16.97			6.75	25.00	$240		$250	$930	$1,420
	50%														
Office/Parking	2222	10	MSF												
Const.Equip.Decon.Area	167	1	MSF												
Personnel Decon.Area	14		MSF												
Staging Area @ S/U	2845	13	MSF												
	S/T	60	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,550	$2,360
SUB–TOTAL (SITE RESTORATION)		1	LOT		6440						$109,300		$194,410	$214,300	$518,010

Site Restoration Details

FEMP-OU02-5 DRAFT
August 24, 1994

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CONTR.NO.- [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, LSP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940747
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION (CON'T.) Backfill and top soil to be borrowed from the off–site source														
e. Security Fence – 6ga aluminized – 6' high	1300	LF	0.13	171	16.97			1.64	9.80	$2,900		$2,200	$13,120	$18,220
i. Corner posts – 3" dia.	4	EA	0.80	3	16.97			10.65	0.55	$50		$40		$90
ii. Braces	8	EA	0.40	3	16.97			5.35	14.95	$50		$40	$120	$210
iii. Double swing gates 12' opening	1	PR	10.00	10	16.97			133.00	240.00	$170		$140	$250	$560
SUB–TOTAL (SITE RESTORATION)	1	LOT		187						$3,170		$2,420	$13,490	$19,080
TOTAL (SITE RESTORATION)	1	LOT		6,627						$112,500		$196,800	$227,800	$537,100

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Site Restoration Details

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, LSP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940747
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at Restoration Site: 8 Pairs x 120 ft.	8	EA					23000				$184,000			$184,000
b. Abandon Existing Wells MW 1 Pair x 120 ft/pair	5	EA					13000				$65,000			$65,000
TOTAL (MONITORING WELLS)											$249,000			$249,000

Monitoring Wells Details

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August 24, 1994

CONTR.NO. [redacted]4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-2, LSP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940747
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	50000	GAL					0.01				$500			$500
Runnoff from the Exclusion Zone.	1000000	GAL					0.01				$10,000			$10,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$10,500			$10,500

000739

5881

Waste Water Treatment Operations Cost Details

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2, LSP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940747
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	9	EA					2,002				$18,000			$18,000
Rad	9	EA					2,000				$18,000			$18,000
Confirmatory Tests														
Full Rad tests	5	EA					3,101				$15,500			$15,500
Full HSL	3	EA					1,500				$4,500			$4,500
Full TCLP	3	EA					2,000				$6,000			$6,000
2 Technicians	12	MO					13,163				$158,000			$158,000
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS)	1	LOT									$220,000			$220,000

000740

F-4-68

FEMP-OU02-5 DRAFT
August 24, 1994

Screening & Confirmation Testing Details

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 2, LSP – CONSOLIDATION & CAPPING (EXPANDED TRESPASSER)
CLIENT: DOE DATE: 07–Aug–94
CONTRACT: C2–94–07–47 BASE ESTIMATE: $6,692,800

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$9,840,357	$3,147,557	47.0%
0.05%	$8,942,163	$2,249,363	33.6%
5.00%	$8,577,169	$1,884,369	28.2%
10.00%	$8,465,516	$1,772,716	26.5%
15.00%	$8,398,318	$1,705,518	25.5%
20.00%	$8,340,983	$1,648,183	24.6%
25.00%	$8,293,158	$1,600,358	23.9%
30.00%	$8,242,265	$1,549,465	23.2%
35.00%	$8,190,432	$1,497,632	22.4%
40.00%	$8,151,043	$1,458,243	21.8%
45.00%	$8,108,804	$1,416,004	21.2%
50.00%	$8,063,355	$1,370,555	20.5%
55.00%	$8,032,349	$1,339,549	20.0%
60.00%	$7,997,047	$1,304,247	19.5%
65.00%	$7,952,346	$1,259,546	18.8%
70.00%	$7,903,558	$1,210,758	18.1%
75.00%	$7,855,986	$1,163,186	17.4%
80.00%	$7,800,186	$1,107,386	16.5%
85.00%	$7,742,803	$1,050,003	15.7%
90.00%	$7,671,835	$979,035	14.6%
95.00%	$7,566,945	$874,145	13.1%
99.95%	$7,216,851	$524,051	7.8%
100.00%	$6,320,604	($372,196)	–5.6%

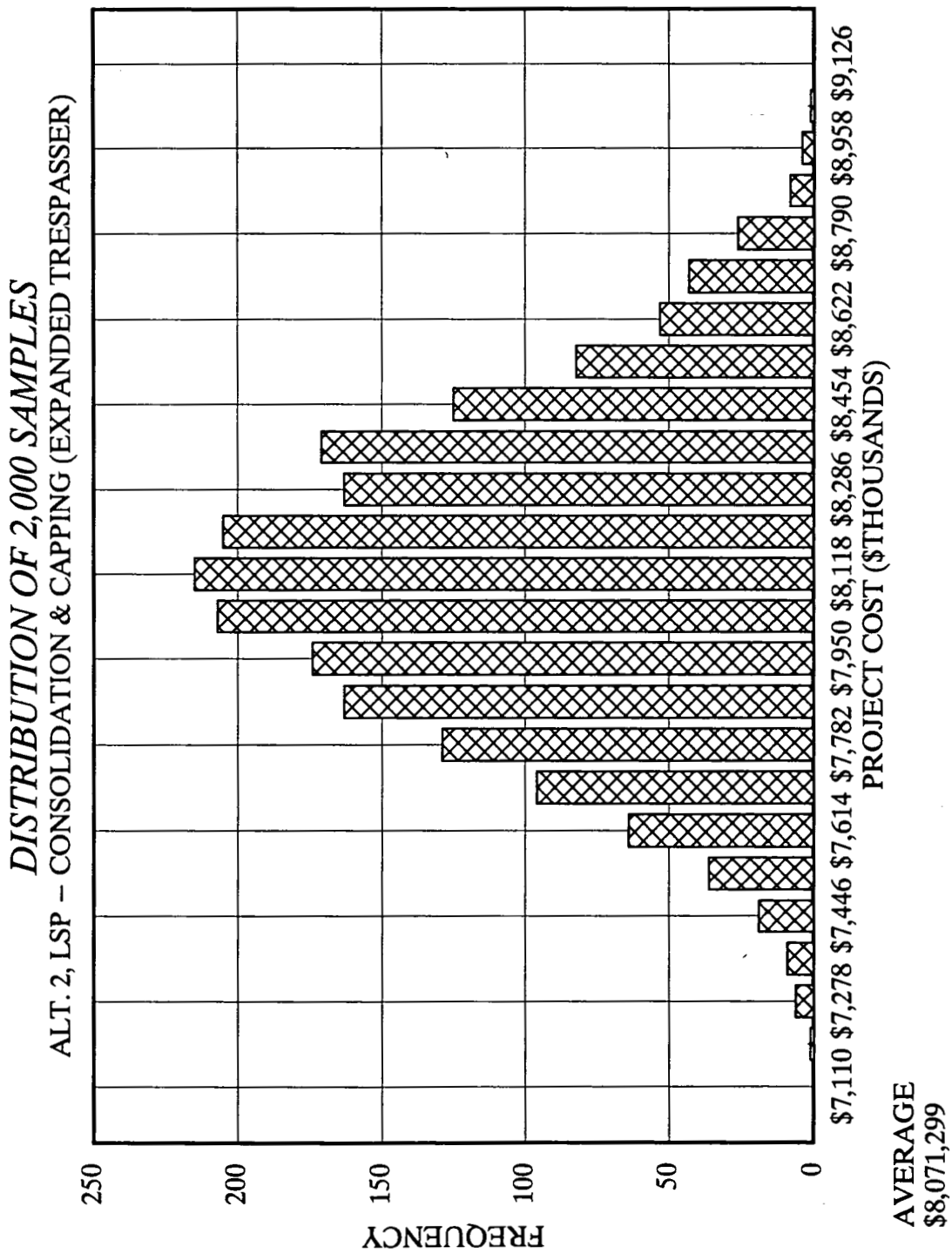
FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

PROJECT: ALT. 2, LSP – CONSOLIDATION & CAPPING (EXPANDED TRESPASSER)
CLIENT: DOE
CONTRACT: C2–94–07–47

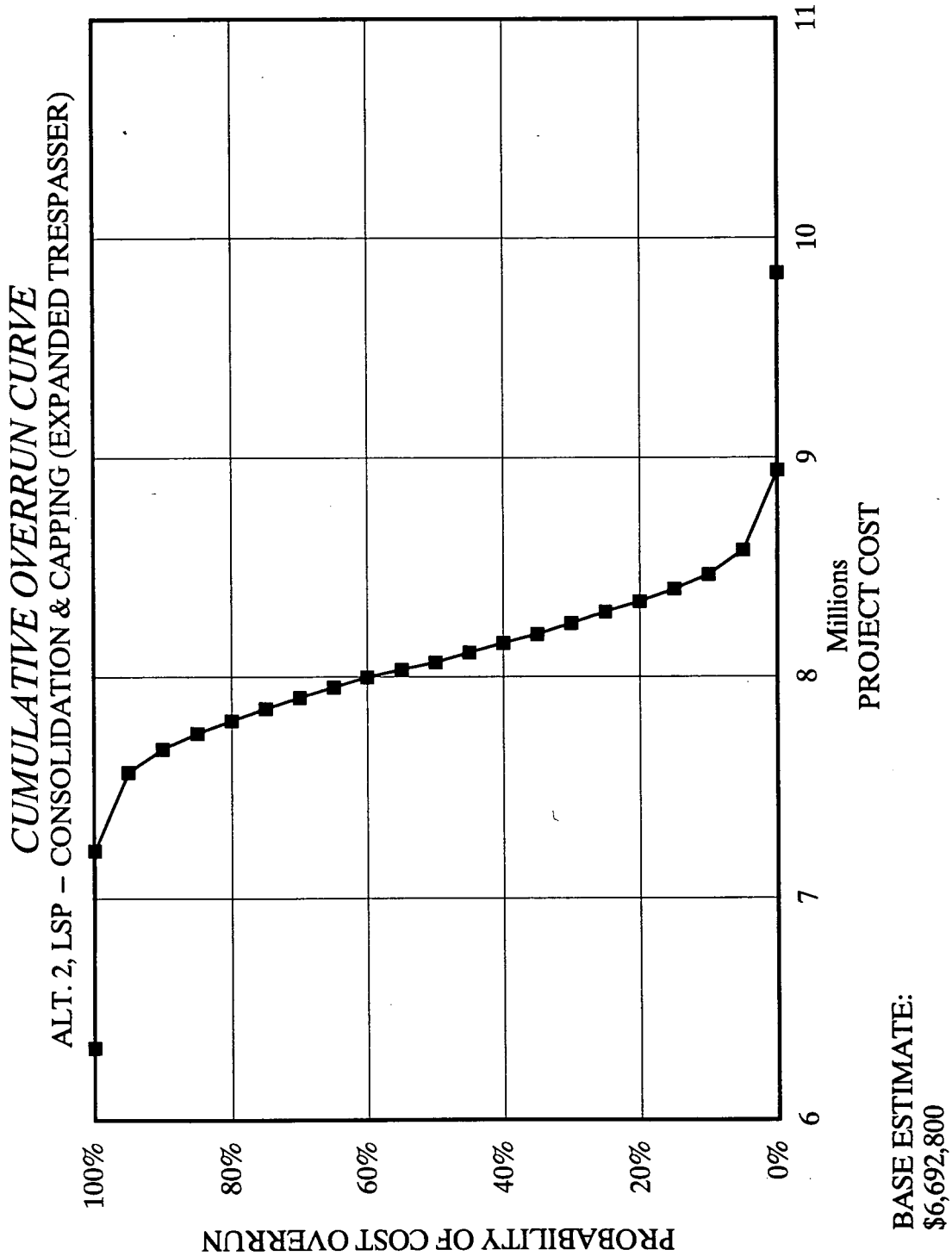
ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA–TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$247,860	–5.0%	$235,467	30%	$322,218	U		14%
2	SITE PREPERATION S/C	82,500	–5.0%	78,375	30%	107,250	U		14%
3	SITE PREPERATION MAT'L	129,550	–5.0%	123,073	20%	155,460	U		20%
4	DECON FACILITIES/SERVICES LABOR	8,900	–2.0%	8,722	80%	16,020	U		2%
5	DECON FACILITIES/SERVICES S/C	32,870	–6.0%	30,898	80%	59,166	U		7%
6	DECON FACILITIES/SERVICES MAT'L	9,110	–6.0%	8,563	60%	14,576	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	23,430	–5.0%	22,259	50%	35,145	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	22,350	–5.0%	21,233	30%	29,055	U		14%
9	EXC & CONT ON–SITE DISP S/C	189,890	–2.0%	186,092	80%	341,802	U		2%
10	EXC & CONT ON–SITE DISP MAT'L	70,610	–6.0%	66,373	75%	123,568	U		7%
11	COMPOSITE CAP LABOR	174,910	–6.0%	164,415	100.0%	349,820	U		6%
12	COMPOSITE CAP S/C	216,540	–6.0%	203,548	100.0%	433,080	U		6%
13	COMPOSITE CAP MAT'L	542,790	–6.0%	510,223	80.0%	977,022	U		7%
14	GENERATED WASTE REMVL LABOR	17,160	–5.0%	16,302	50.0%	25,740	U		9%
15	SITE RESTORATION LABOR	123,750	–5.0%	117,563	30.0%	160,875	U		14%
16	SITE RESTORATION MAT'L	250,580	–5.0%	238,051	30.0%	325,754	U		14%
17	MONITORING WELLS S/C	273,900	–5.0%	260,205	50.0%	410,850	U		9%
18	INDIRECT FIELD COSTS LABOR	647,700	–5.0%	615,315	50.0%	971,550	U		9%
19	INDIRECT FIELD COSTS S/C	349,100	–5.0%	331,645	100.0%	698,200	U		5%
20	INDIRECT FIELD COSTS MAT'L	638,500	–5.0%	606,575	50.0%	957,750	U		9%
21	FIELD SUPPORT COSTS LABOR	741,500	–10.0%	667,350	30.0%	963,950	U		25%
22	FIELD SUPPORT COSTS S/C	230,500	–5.0%	218,975	30.0%	299,650	U		14%
23	ENGINEERING COSTS	1,568,200	–5.0%	1,489,790	25.0%	1,960,250	U		17%
24	SALES TAX	100,600	–1.0%	99,594	1.0%	101,606	U		50%
25				0		0			0%
26				0		0			0%
27				0		0			0%
28				0		0			0%
29				0		0			0%
30				0		0			0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$6,692,800		$6,320,604		$9,840,357			

000742

5861


DISTRIBUTION OF 2,000 SAMPLES
ALT. 2, LSP – CONSOLIDATION & CAPPING (EXPANDED TRESPASSER)
FREQUENCY
250
200
150
100
50
0
$7,110 $7,278 $7,446 $7,614 $7,782 $7,950 $8,118 $8,286 $8,454 $8,622 $8,790 $8,958 $9,126
PROJECT COST ($THOUSANDS)
AVERAGE
$8,071,299

000743


CUMULATIVE OVERRUN CURVE
ALT. 2, LSP – CONSOLIDATION & CAPPING (EXPANDED TRESPASSER)
PROBABILITY OF COST OVERRUN
100%
80%
60%
40%
20%
0%
6
7
8
9
10
11
Millions
PROJECT COST
BASE ESTIMATE:
$6,692,800

000744

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, LSP – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940747
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$6,692,800	BASE EST:	$247,860	BASE EST:	$82,500	BASE EST:	$129,550	BASE EST:	$8,900	BASE EST:	$32,870	BASE EST:	$9,110
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	30%	-5%	20%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	30%	-5%	20%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$235,467	$322,218	$78,375	$107,250	$123,073	$155,460	$8,722	$16,020	$30,898	$59,166	$8,563	$14,576

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000745

5 86 1

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, LSP -- CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940747
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$23,430	BASE EST:	$0	BASE EST:	$22,350	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$22,259	$35,145	$0	$0	$21,233	$29,055	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–2, LSP – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940747
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-4-75

000747

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, LSP – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940747
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	EXCAVATE & CONTAIN. ON-SITE DISPOSAL LABOR $'s		EXCAVATE & CONTAIN ON-SITE DISPOSAL S/C $'s		EXCAVATE & CONTAIN ON-SITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$189,890	BASE EST:	$70,610	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY			-1%	30%								
MATERIAL PRICING					-5%	25%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION			-1%	50%	-1%	50%						
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	-2%	80%	-6%	75%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$186,092	$341,802	$66,373	$123,568	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000748

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–2, LSP – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940747
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		CLAY CAP LABOR $'s		CLAY CAP S/C $'s		CLAY CAP MAT'L. $'s	
	BASE EST:	$174,910	BASE EST:	$216,540	BASE EST:	$542,790	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%										
MATERIAL PRICING			–5%	50%	–5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	50%	–1%	50%	–1%	50%						
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	100%	–6%	100%	–6%	80%	0%	0%	0%	0%	0%	0%
TOTAL $	$164,415	$349,820	$203,548	$433,080	$510,223	$977,022	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000749

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, LSP - CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940747
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$17,160	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$16,302	$25,740	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–2, LSP – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940747
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$123,750	BASE EST:	$0	BASE EST:	$250,580	BASE EST:	$0	BASE EST:	$273,900	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	30%										
MATERIAL PRICING					–5%	30%			–5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	30%	0%	0%	–5%	30%	0%	0%	–5%	50%	0%	0%
TOTAL $	$117,563	$160,875	$0	$0	$238,051	$325,754	$0	$0	$260,205	$410,850	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-4-79

000751

FEMP-OU02-5 DRAFT
August 24, 1994

861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, LSP – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940747
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$647,700	BASE EST:	$349,100	BASE EST:	$638,500	BASE EST:	$741,500	BASE EST:	$230,500	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-10%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-5%	30%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-10%	30%	-5%	30%	0%	0%
TOTAL $	$615,315	$971,550	$331,645	$698,200	$606,575	$957,750	$667,350	$963,950	$218,975	$299,650	$0	$0
RISK PROFILE & CORRELATION FOR	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
EACH COST ELEMENT	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, LSP - CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940747
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$1,568,200	BASE EST:	$100,600	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-5%	25%										
(OTHER)												
TOTAL %	-5%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$1,489,790	$1,960,250	$99,594	$101,606	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

LCC ANALYSIS TITLE:	IFP - CONSOLIDATION AND CAPPING (EXPANDED TRESPASSER)			
WBS NO.:	1.1.1.1.2.3.5		TASK NO.:	2CNF
ALTERNATIVE:	2		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	37 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	07-Aug-94
DOCUMENT NO.:	LCC-94-03-04	EST. NO. C2-94-07-41 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$0	$0	$0	$0	1997
$6,418,888	$0	$0	$6,418,900	1998
$7,002,424	$0	$0	$7,002,400	1999
$6,418,888	$0	$0	$6,418,900	2000
$0	$141,771	$0	$141,800	2001
$0	$124,201	$0	$124,200	2002
$0	$124,201	$0	$124,200	2003
$0	$124,201	$0	$124,200	2004
$0	$144,201	$0	$144,200	2005
$0	$322,201	$0	$322,200	2006
$0	$322,201	$0	$322,200	2007
$0	$322,201	$0	$322,200	2008
$0	$322,201	$0	$322,200	2009
$0	$342,201	$0	$342,200	2010
$0	$322,201	$0	$322,200	2011
$0	$322,201	$0	$322,200	2012
$0	$322,201	$0	$322,200	2013
$0	$322,201	$0	$322,200	2014
$0	$342,201	$0	$342,200	2015
$0	$322,201	$0	$322,200	2016
$0	$322,201	$0	$322,200	2017
$0	$322,201	$0	$322,200	2018
$0	$322,201	$0	$322,200	2019
$0	$342,201	$0	$342,200	2020
$0	$322,201	$0	$322,200	2021
$0	$322,201	$0	$322,200	2022
$0	$322,201	$0	$322,200	2023
$0	$322,201	$0	$322,200	2024
$0	$342,201	$0	$342,200	2025
$0	$322,201	$0	$322,200	2026
$0	$322,201	$0	$322,200	2027
$0	$322,201	$0	$322,200	2028
$0	$322,201	$0	$322,200	2029
$0	$342,201	$0	$342,200	2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$19,840,200	$8,813,600	$0	$28,653,800	TOTAL
$17,285,700	$4,798,200	$0	$22,084,000	<====(@NPV)

F ERMC O
ESTIMATING SERVICES

SUMMARY SHEET

EST FILE #: C2940748
CLIENT: US DOE
PROJECT TITLE: ALT-2, IFP - CONSOLIDATION & CAPPING - EXPANDED TRESPASSER
WBS#: 1.1.1.1.2.3.5

DATE: 07-Aug-94
ESTIMATOR: KEN KEPLER
LOCATION: FERNALD
TASK#: 2CNF

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL - IN PLACE COMPOSITE CAP	48,008		$818,600	$772,000	$1,698,500	$3,289,100
2		CONSOLIDATION (SEE CONSTRUCTION ACTIVITY SUMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		48,008		$818,600	$772,000	$1,698,500	$3,289,100
11	SUPERVISION - CONTRACTOR				$139,000			$139,000
12	SM TOOLS/CONSM'BLS						$49,100	$49,100
13	EQUIPMENT RENTAL						$998,300	$998,300
14	TEMP. FACILITIES				$17,200		$31,900	$49,100
15	TEMP UTL'S HOOK-UP				$8,600		$16,000	$24,600
16	JOB CLEAN-UP				$17,200		$31,900	$49,100
17	SAFETY				$8,600		$16,000	$24,600
18	HEALTH PHYSICS S/C				$113,200		$1,400	$114,600
19	CERCLA/SAT $1,500 PER PERSON					$18,000		$18,000
	BOND					$32,900		$32,900
	OVERHEAD & PROFIT					$431,000		$431,000
22	PAYRL BRD.&BENFT.				$583,600			$583,600
	INDIRECT FIELD COSTS				$887,400	$481,900	$1,144,600	$2,513,900
	DIRECT & INDIRECT FIELD COSTS				$1,706,000	$1,253,900	$2,843,100	$5,803,000
23	TRANSPORTATION & BURIAL	N/A						
24	WASTE CONTAINERS	N/A						
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$58,600		$58,600
25	SCREENING & CONFIRMATION TESTING					$3,099,100		$3,099,100
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$1,590,000			$1,590,000
	FERMCO FIELD SUPPORT COSTS				$1,590,000	$3,157,700		$4,747,700
28	EMISSION MODELING				$10,200		$18,900	$29,100
29	PSAR/FSAR(SAFETY RPT)				$313,400			$313,400
30	ENGINEERING	TITLE I&II $1,769,900 TITLE III	$1,752,500	CDR	$638,300	DCR	$458,400	$4,619,100
	ENGINEERING COSTS							$4,981,600
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$2,862,000	$171,700
	SUB-TOTAL	(BASE ESTIMATE)						$15,684,000
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	18.5%						$2,901,500
	TARGET ESTIMATE (BASE ESTIMATE PLUS RISK BUDGET)							$18,585,500
	CONTINGENCY	8.0%						$1,254,700
								PRELIMINARY
	TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY)							$19,840,200

LOTUS31\FS2\ALT2\IFP\INDSUM.WK3 - FEASABILITY STUDY

Alternative 2 – Consolidation and Capping
(Expanded Trespasser)

Inactive Flyash Pile

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	1	1	5	sample	$5,500.00	36	NA	$198,000	9 wells x 4 samples/year
Long Term	1	6	30	sample	$5,500.00	18	NA	$99,000	9 wells x 2 samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	2.25	2.90	$1,127	Inspect all wells twice/year. Repair 1 out of 8.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Long Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Well Inspect & Maint.	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Perched Groundwater (South Field Vicinity)									
Pumping	1	1	30	lump sum	$300.00	1	1.29	$387	
Pump Maintenance	1	1	30	lump sum	$1,088.26	1	1.29	$1,404	
Pipeline Maintenance	1	1	30	lump sum	$922.36	1	1.29	$1,190	
Treatment & Disposal	1	1	30	gallons	$0.01	1590000	NA	$15,900	
OU2 Waste Cell Leachate									
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Facility Maint. at Subunit									
Cap Maint. & Repairs	1	1	30	acre	$2,183.32	3.5	4.52	$9,858	Approx. 3.5 Acres
Mowing	1	1	30	acre	$1,861.92	4.2	5.42	$10,088	Approx. 4.2 Acres
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.8	1.03	$2,034	Approx. 1850 ft perimeter
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Fence Repair	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of Subunit	5	5	30	lump Sum	$20,000.00	1	NA	$20,000	Total divided among 5 subunits
Facility Review of OU2 Cell	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative

Annual Costs, Year 1 (excluding facility review)	$141,771
Annual Costs, Years 2–5 (excluding facility review)	$124,201
Annual Costs, Years 6–30 (excluding facility review)	$322,201
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 B:

8/3/94

000756

DATE: 05-Aug-94

PROJECT TITLE:
ALT-2, IFP - CONSOLIDATION & CAPPING
WBS#:
1.1.1.1.2.3.5

HEALTH PHYSICS

EST.NO.: C2940748
EST. : KEN KEPLER
TASK I.D. :
2CNF

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	0	$0	C/B		
SUB-TOTAL		31.80	4		$0			
					ERR	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					ERR	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	7		$90	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	4		$90	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	4		$700	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$1,360			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$1,400			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE.
COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

000757

DATE: 05-Aug-94

PROJECT TITLE:
ALT-2, IFP - CONSOLIDATION & CAPPING
WBS#:
1.1.1.1.2.3.5

HEALTH PHYSICS

EST.NO.: C2940748
EST. : KEN KEPLER
TASK I.D. :
2CNF

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	12	48	$16.97	$810		
ANNUAL PHYSICALS	2	3	12	72	$16.97	$1,220		
EXIT (TERMINATION) PHYSICALS	1	4	12	48	$16.97	$810		
SUB-TOTAL						$2,840		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	34	1	12	414	$16.97	$7,020		
YEARLY IN-VIVO	2	4	12	96	$16.97	$1,630		
EXIT (END OF PROJECT / TERMINATION)	1	4	12	48	$16.97	$810		
SUB-TOTAL						$9,460		
WORK DELAYS CAUSED BY MONITORING	5%				$1,009,200	$50,460		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$1,009,200	$50,460		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$113,200	$1,400	$114,600

000758

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT –ALT–2, IFP – CONSOLIDATION & CAPPING
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CNF

WBS NO. – 1.1.1.1.2.3.5
EST. NO. – C2940216
BY – K. KEPLER
DATE – 07/13/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25–Mar–94	01–Nov–97	02–Apr–99	31–Aug–2000	34	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
60	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940748
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		3,438						$59,490	$15,000	$35,750	$90,860	$201,100
DECONTAMINATION FACILITIES/SERVICES	1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210
EROSION AND SEDIMENT CONTROLS	1	LS		1005						$19,040		$7,370	$19,940	$46,350
PERCHED GROUNDWATER SYSTEM	1	LS		2348						$39,840	$22,000	$28,340	$64,670	$154,850
EXCAVATE – OFFSITE DISPOSAL	N/A													N/A
LOAD/HAUL – OFF–SITE DISPOSAL	N/A													N/A
EXCAVATE & HAUL TO ON–SITE DISPOSAL (In–Place Consolidation)	1	LS		15799						$268,110		$312,500	$330,350	$910,960
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	1	LS		17806						$302,160	$366,910	$439,760	$936,980	$2,045,810
DIKE FOR DISPOSAL CELL	N/A													N/A
GENERATED WASTE REMOVAL	1	LS		593						$10,060		$4,600		$14,660
SITE RESTORATION	1	LS		2354						$39,950		$77,910	$95,760	$213,620
MONITORING WELLS	1	LS									$272,000			$272,000
SUB–TOTAL (DIRECT FIELD COSTS)				43644						$744,140	$701,800	$907,550	$1,544,070	$3,897,560
TAKE–OFF ALLOWANCE 10%	1	LS		4,364						$74,410	$70,180	$90,760	$154,410	$389,760
TOTAL (DIRECT FIELD COSTS)	1	LS		48,008						$818,600	$772,000	$998,300	$1,698,500	$4,287,400

On–Site Disposal of Active Flyash Pile – No Treatment – SUMMARY

FEMP-OU02-5 DRAFT August 24, 1994

000276

CONTR.NO.- [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-2 – IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940748
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 33.3% ARE COMMON TO SF, AFP & IFP)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	2000	LF	0.213	550	16.97				6.25	$9,330			$12,880	$22,210
c. Clear and Grub														
i. Remediation Site	6.50	AC	41.40	347	16.97			2575.00		$5,890		$17,240		$23,130
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Staging Area @ Sub-unit														
d. Dewatering														
i. Excavate Dewatering Trench	250	CY	0.50	161	16.97			1.49		$2,730		$380		$3,110
ii. Pump – w/4" Suction Hose	100	DAYS	3.00	387	16.97			19.55		$6,570		$2,010		$8,580
iv. HDPE Pipe to Sedimentation Tank	200	LF	0.19	49	16.97			0.67	0.84	$830		$140	$170	$1,140
v. Remove Sediment fm. Tank – 1cy/trip	2	CY	4.00	10	16.97			100.00		$170		$210		$380
e. General Grading														
i. New Roads	6222	SY	0.001	8	16.97			0.07		$140		$450		$590
33.3%														
ii. Office/Parking Area 2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area 272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area 49	16	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub-Unit 2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	6222	SY	0.030	241	16.97			1.08	6.66	$4,090		$6,920	$42,680	$53,690
33.3%														
ii. Office/Parking – 8" Gravel W/ Geot 2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub-Unit – 160' x160' Concrete														
Sub-Grade & Sub-Base for Conc.Slab 2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk. 631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" thl 24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub-grade Piping – 4" 500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating 2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab 183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip. 1	0.33	LS	2.00	1	16.97			184.00		$20		$60		$80
TOTAL (SITE PREPARATION)	1	LS		3,438						$59,490	$15,000	$35,750	$90,860	$201,100

Site Preparation Details

FEMP-OU02-5 DRAFT
August 24, 1994
000761

CONTR.NO. – 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

CONTR.NO. 4424321
EST. NO. C2940748
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	33.3%														
a. Decon Trailer – Rental	51	17	MO					1500.00				$25,470			$25,470
b. Construction Equipment Decon. Facility	33.3%														
25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'i.d.x 25lfx8	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in con	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
x. Backfill & Compaction around concrete slab	BCY 258	103	ICY	0.086	11	16.97			1.38		$190		$150		$340
SUB–TOTAL (EQUIP. DECON. FACILITY)					265						$4,810	$25,860	$1,210	$4,140	$36,020

Equipment Decon. Facility Details

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FEMP-OU02-5 DRAFT
August 24, 1994

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CONTR.NO. – [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940748
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	COST/UNIT RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	33.3%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Gua	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in (	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	0	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210

Personnel Decon.Facilities/Services Details

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940748
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	3000	LF	0.017	66	16.97			0.06	0.65	$1,120		$180	$2,010	$3,310
ii. Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	10	EA	8.00	103	16.97			5.00	70.00	$1,750		$50	$700	$2,500
v. Hay Bales	300	EA	0.24	93	16.97			1.53	1.35	$1,580		$470	$420	$2,470
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1200	LF	0.38	590	19.95			5.11	4.42	$11,770		$6,130	$5,300	$23,200
iv. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhol W/Cleanout	1	EA	8.00	10	16.97			28.00	8300.00	$170		$30	$8,300	$8,500
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,005						$19,040		$7,370	$19,940	$46,350

Erosion Control Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940748
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PERCHED GROUNDWATER COLLECTION														
a. Interceptor Trench														
i. Trench Excavation 950' x 3'w x 25' deep + 20% for slope BCY 3165	3165	BCY	0.05	204	16.97			1.80		$3,460		$5,870		$9,330
Load & Haul	3956	LCY	0.064	327	16.97			2.52		$5,550		$10,270		$15,820
ii. HDPE Liner 40 mil 29' x 950 lf + 20% for slope	3165	SY					6.75				$22,000			$22,000
iii. HDPE Perforated Pipe Buried in Pea Gravel 6" Dia.	950	LF	0.30	368	16.97			1.05	6.56	$6,240		$1,030	$6,420	$13,690
iv. Geotextile Fabric wrapped around 6" Pipe 2' x 950 lf	217	SY	0.020	6	16.97			0.02	1.46	$100			$330	$430
v. Pea Gravel Layer 10' x 3' x 950' + 20% BCY 1268	1363	ICY	0.11	193	16.97			0.77	17.00	$3,280		$1,080	$23,870	$28,230
vi. Sand 12' x 3' x 950' + 20% BCY 1520	1634	ICY	0.052	110	16.97			1.76	5.00	$1,870		$2,960	$8,420	$13,250
vii. Clay Backfill 3' x 6' x 950' +20% BCY 3' x 3' x 950'x .5 +20% 950	1121	ICY	0.063	91	16.97			2.18	3.70	$1,540		$2,520	$4,270	$8,330
viii. Precast Wetwell 4ft Sq. x 8 ft Deep	1	EA	12.00	15	16.97			100.00	445.00	$250		$100	$460	$810
a. Excavate 6' x 6' x 8.5' – 11.3 CY	11.3	BCY	0.178	3	16.97			5.05		$50		$60		$110
b. Backfill / Compact 6.6	8	ICY	0.069	1	16.97			0.72		$20		$10		$30
ix. Pump 20 gpm w/ piping, controls & elect.	950	LF	0.68	833	16.97			2.38	19.50	$14,140		$2,330	$19,080	$35,550
x. 2"/4" HDPE Carrier/Container Pipe Includes Trench Excav/Backfill, Sand Pipe Bedding, Compaction	400	LF	0.381	197	16.97			5.11	4.42	$3,340		$2,110	$1,820	$7,270
TOTAL(PERCHED GROUNDWATER COLLECTION)	1	LOT		2,348						$39,840	$22,000	$28,340	$64,670	$154,850

Perched Groundwater Collection Details

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August 24, 1994

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ALT–2 – IFP – CONSOLIDATION & CAPPING

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940748
BY: KEN KEELER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	COST/UNIT RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE AND CONSOLIDATE														
(NO TREATMENT)														
Excavate Flyash														
Excavate Flyash/Soil – Level D	84800	BCY	0.055	6017	16.97			1.17		$102,110		$102,190		$204,300
Excavate Additional Soil	9400	BCY	0.055	667	16.97			1.17		$11,320		$11,330		$22,650
(SHREDDING COMMON TO SWL, IFP & SF)														
k. Shredder/Crusher – Purchase/Install 33.3%	1	LOT	280.0					8400.00	317800.00			$8,650	$327,330	$335,980
60 Ton per Hour														
Excavated Debris BCY 4000														
Generated Waste BCY 771														
Excavated Debris TONS 6375														
(Percent of Gen.Waste to be Shredded 25%														
Generated Waste TONS 443.3														
TOTAL TONS 6818														
Operating Costs	114	HRS							25.75				$3,020	$3,020
(2) Operators	228	HRS	1.00	294	16.97					$4,990				$4,990
On–Site Consolidation BCY														
Impacted Fill 94200	113040	ICY	0.06	8749	16.97			1.67		$148,470		$188,780		$337,250
Generated Waste 771	925	ICY	0.06	72	16.97			1.67		$1,220		$1,550		$2,770
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load – Level C	N/A	BCY	0.055		16.97			1.17						
Haul to Onsite Disposal Cell BCY N/A		LCY	0.081		16.97			1.51						
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C		HRS	S/T 150% S/T		16.97			1.51						
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)		MD												
TOTAL (EXCAV/NO TREATMENT–ONSITE DISPOSAL)	1	LOT		15,799						$268,110		$312,500	$330,350	$910,960

Excavate – No Treatment – AFP Onsite Disposal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

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CONTR.NO. [redacted]4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940748
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

	DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	COMPOSITE CAP															
	COMPOSITE CAP															
	a. Contouring Layer 18" Thk.	BCY 11200	13440	ICY	0.06	1040	16.97			1.67	3.50	$17,650		$23,120	$48,450	$89,220
	b. 95% Clay – 5% Bentonite 24" Thk	BCY 14933	16053	ICY	0.260	5384	16.97			11.19	20.35	$91,370		$185,020	$336,480	$612,870
	c. GML\GCC – composite Liner		22400	SY					7.38				$165,310			$165,310
	d. Geotextile Fabric		22400	SY					2.25				$50,400			$50,400
	e. Pea gravel 12" Thk, In–place	BCY 7467	8027	ICY	0.11	1139	16.97			0.77	17.00	$19,330		$6,370	$140,550	$166,250
	f. Geotextile Fabric		22400	SY					2.25				$50,400			$50,400
	g. Cobbels 36" Thk; In–place	BCY 22400	24080	ICY	0.258	8014	16.97			7.15	10.10	$136,000		$177,340	$250,500	$563,840
	h. Geotextile Fabric		22400	SY					2.25				$50,400			$50,400
	i. Sand Layer 6" Thk; In–place	BCY 3733	4013	ICY	0.052	269	16.97			1.76	5.00	$4,560		$7,270	$20,670	$32,500
	j. Geotextile Fabric		22400	SY					2.25				$50,400			$50,400
	k. Common Soil 21" Thk; In–place	BCY 13067	15680	ICY	0.06	1214	16.97			1.67	3.50	$20,600		$26,970	$56,530	$104,100
	l. Top Soil 6" Thk; In–place	BCY 3733	4480	ICY	0.053	306	16.97			1.82	12.10	$5,190		$8,400	$55,830	$69,420
	m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding	SY 22400	202	MSF	0.30	78	16.97			6.75	25.00	$1,320		$1,400	$5,200	$7,920
	n. Security Fence – 8' tall w/3–strands wire 6 ga. Aluminized		1650	LF	0.17	362	16.97			2.28	13.40	$6,140		$3,870	$22,770	$32,780
	TOTAL (COMPOSITE CAP)		1	LOT		17,806						$302,160	$366,910	$439,760	$936,980	$2,045,810

Composite Cap Details

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August 24, 1994

F-4-95

000267

06–Aug–94

ALT–2 – IFP – CONSOLIDATION & CAPPING

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CONTR.NO. – 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

CONTR.NO. 4424321
EST. NO. C2940748
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL															
a. Office/Parking Area @ S/U	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo–Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Facil.@ S/U	33%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo–Fabric & Liner	167	56	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Facil. @ S/U	33%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292					9.16				$10		$10
Geo–Fabric & Liner	14	5	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
d. Staging Pad at S/U															
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excavate, Load, Haul, Backfill, Compact						16.97									
Sub–grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo–Fabric & Liner	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Consolidate & Dump Rubble	395.5	132	BCY	0.30	51	16.97			2.51		$870		$340		$1,210
TOTAL GENERATED WASTE	BCY 771 LCY 887														
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		593						$10,060		$4,600		$14,660

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT August 24, 1994

CONTR.NO.- [redacted]321
CLIENT - U.S. DEPT. OF ENERGY
PROJECT - ALT-2 - IFP - CONSOLIDATION & CAPPING - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940748
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off-site source															
a. Borrow Common Soil, Backfill	BCY														
Active Flyash Pile	6000	7200	ICY	0.09	836	16.97			3.21	3.50	$14,190		$23,810	$25,960	$63,960
	33.3%														
Office/Parking	494	197	ICY												
Decon.Facil.- Const.Equip. @ S/U	78	31	ICY												
Decon.Facil.- Personnel @ S/U	7	3	ICY												
Staging Area @ S/U	1099	439	ICY												
	S/T	670.5	ICY	0.09	78	16.97			3.21	3.50	$1,320		$2,220	$2,420	$5,960
b. Final Grade for AFP		14000	SY	0.02	361	16.97			0.70		$6,130		$10,090		$16,220
c. Borrow Top Soil 6" Thk., Spread															
Active Flyash Pile		14000	SY	0.036	650	16.97			2.33	2.88	$11,030		$33,600	$41,530	$86,160
	33.3%														
Office/Parking	2222	740	SY												
Decon.Facil.- Const.Equip. @ S/U	167	56	SY												
Decon.Facil.- Personnel @ S/U	14	5	SY												
Staging Area @ S/U	2845	947	SY												
	S/T	1747.6	SY	0.036	81	16.97			2.33	2.88	$1,370		$4,190	$5,180	$10,740
d. Grass Cover - Seed, Fertilize, Mulch															
Utility Mix - Hydro/Air Seeding	SY														
Active Flyash Pile	14000	126	MSF	0.30	49	16.97			6.75	25.00	$830		$880	$3,240	$4,950
	33.3%														
Office/Parking	2222	6.7	MSF												
Decon.Facil.- Const.Equip. @ S/U	167	0.5	MSF												
Decon.Facil.- Personnel @ S/U	14		MSF												
Staging Area @ S/U	2845	8.5	MSF												
	S/T	15.7	MSF	0.30	6	16.97			6.75	25.00	$100		$110	$400	$610
e. Security Fence - 6ga aluminized - 6' high		1650	LF	0.13	272	16.97			1.64	9.80	$4,620		$2,790	$16,660	$24,070
i. Corner posts - 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
TOTAL (SITE RESTORATION)		1	LOT		2,354						$39,950		$77,910	$95,760	$213,620

Site Restoration Details

000769

F-4-97

5861 FEMP-OU02-5 DRAFT August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940748
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility	9	PR					23000.00				$207,000			$207,000
b. Abandon Existing Wells	5	EA					13000.00				$65,000			$65,000
TOTAL (MONITORING WELLS)	1	LOT									$272,000			$272,000

Monitoring Wells Details

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000770

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [illegible]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940748
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	155000	GAL					0.01				$1,600			$1,600
Runnoff from the Exclusion Zone.	5700000	GAL					0.01				$57,000			$57,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$58,600			$58,600

Waste Water Treatment Operations Cost Details

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000771

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FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940748
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	471	EA					2,002				$942,900			$942,900
Rad	471	EA					2,000				$942,000			$942,000
Confirmatory Tests														
Full Rad Tests	236	EA					3,101				$731,800			$731,800
Full HSL	25	EA					1,500				$37,500			$37,500
Full TCLP	25	EA					2,000				$50,000			$50,000
2 Technicians per Month	30	MO					13,163				$394,900			$394,900
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS	1	LOT									$3,099,100			$3,099,100

Screening & Confirmation Testing Details

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 2, IFP – CONSOLIDATION AND CAPPING – EXPANDED TRESPASSER
CLIENT: DOE DATE: 07–Aug–94
CONTRACT: C2–94–07–48 BASE ESTIMATE: $15,684,000

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$22,367,045	$6,683,045	42.6%
0.05%	$20,555,909	$4,871,909	31.1%
5.00%	$19,826,312	$4,142,312	26.4%
10.00%	$19,516,259	$3,832,259	24.4%
15.00%	$19,345,933	$3,661,933	23.3%
20.00%	$19,214,224	$3,530,224	22.5%
25.00%	$19,085,667	$3,401,667	21.7%
30.00%	$18,986,369	$3,302,369	21.1%
35.00%	$18,876,327	$3,192,327	20.4%
40.00%	$18,775,395	$3,091,395	19.7%
45.00%	$18,681,624	$2,997,624	19.1%
50.00%	$18,574,119	$2,890,119	18.4%
55.00%	$18,480,965	$2,796,965	17.8%
60.00%	$18,375,802	$2,691,802	17.2%
65.00%	$18,286,196	$2,602,196	16.6%
70.00%	$18,187,651	$2,503,651	16.0%
75.00%	$18,086,298	$2,402,298	15.3%
80.00%	$17,969,017	$2,285,017	14.6%
85.00%	$17,825,686	$2,141,686	13.7%
90.00%	$17,689,677	$2,005,677	12.8%
95.00%	$17,397,096	$1,713,096	10.9%
99.95%	$16,269,298	$585,298	3.7%
100.00%	$14,797,756	($886,244)	–5.7%

000773

5861

FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

PROJECT: ALT. 2, IFP – CONSOLIDATION AND CAPPING – EXPANDED TRESPASSER
CLIENT: DOE
CONTRACT: C2–94–07–48

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$65,440	–5.0%	$62,168	30%	$85,072	U		14%
2	SITE PREPERATION S/C	16,500	–5.0%	15,675	25%	20,625	U		17%
3	SITE PREPERATION MAT'L	99,950	–10.0%	89,955	30%	129,935	U		25%
4	DECON FACILITIES/SERVICES LABOR	6,040	–2.0%	5,919	80%	10,872	U		2%
5	DECON FACILITIES/SERVICES S/C	28,480	–6.0%	26,771	80%	51,264	U		7%
6	DECON FACILITIES/SERVICES MAT'L	6,060	–6.0%	5,696	60%	9,696	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	20,950	–5.0%	19,903	50%	31,425	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	21,950	–5.0%	20,853	30%	28,535	U		14%
9	PERCHED GROUNDWATER LABOR	43,830	–5.0%	41,639	50%	65,745	U		9%
10	PERCHED GROUNDWATER S/C	24,200	–5.0%	22,990	50%	36,300	U		9%
11	PERCHED GROUNDWATER MAT'L	71,150	–5.0%	67,593	30%	92,495	U		14%
12	EXC/SRT/CRSH ON–SITE DISP LABOI	294,920	–6.0%	277,225	150.0%	737,300	U		4%
13	EXC/SRT/CRSH ON–SITE DISP MAT'L	363,390	–6.0%	341,587	80.0%	654,102	U		7%
14	COMPOSITE CAP LABOR	332,400	–6.0%	312,456	100.0%	664,800	U		6%
15	COMPOSITE CAP S/C	403,600	–6.0%	379,384	80.0%	726,480	U		7%
16	COMPOSITE CAP MAT'L	1,030,680	–6.0%	968,839	75.0%	1,803,690	U		7%
17	GENERATED WASTE REMVL LABOR	11,070	–5.0%	10,517	50.0%	16,605	U		9%
18	SITE RESTORATION LABOR	43,950	–5.0%	41,753	30.0%	57,135	U		14%
19	SITE RESTORATION MAT'L	105,340	–5.0%	100,073	30.0%	136,942	U		14%
20	MONITORING WELLS S/C	299,200	–5.0%	284,240	50.0%	448,800	U		9%
21	INDIRECT FIELD COSTS LABOR	887,400	–5.0%	843,030	50.0%	1,331,100	U		9%
22	INDIRECT FIELD COSTS S/C	481,900	–5.0%	457,805	100.0%	963,800	U		5%
23	INDIRECT FIELD COSTS MAT'L	1,144,600	–5.0%	1,087,370	50.0%	1,716,900	U		9%
24	FIELD SUPPORT COSTS LABOR	1,590,000	–10.0%	1,431,000	30.0%	2,067,000	U		25%
25	FIELD SUPPORT COSTS S/C	3,157,700	–5.0%	2,999,815	30.0%	4,105,010	U		14%
26	ENGINEERING COSTS	4,961,600	–5.0%	4,713,520	25.0%	6,202,000	U		17%
27	SALES TAX MAT'L	171,700	–1.0%	169,983	1.0%	173,417	U		50%
28				0		0			0%
29				0		0			0%
30				0		0			0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$15,684,000		$14,797,756		$22,367,045			

000774

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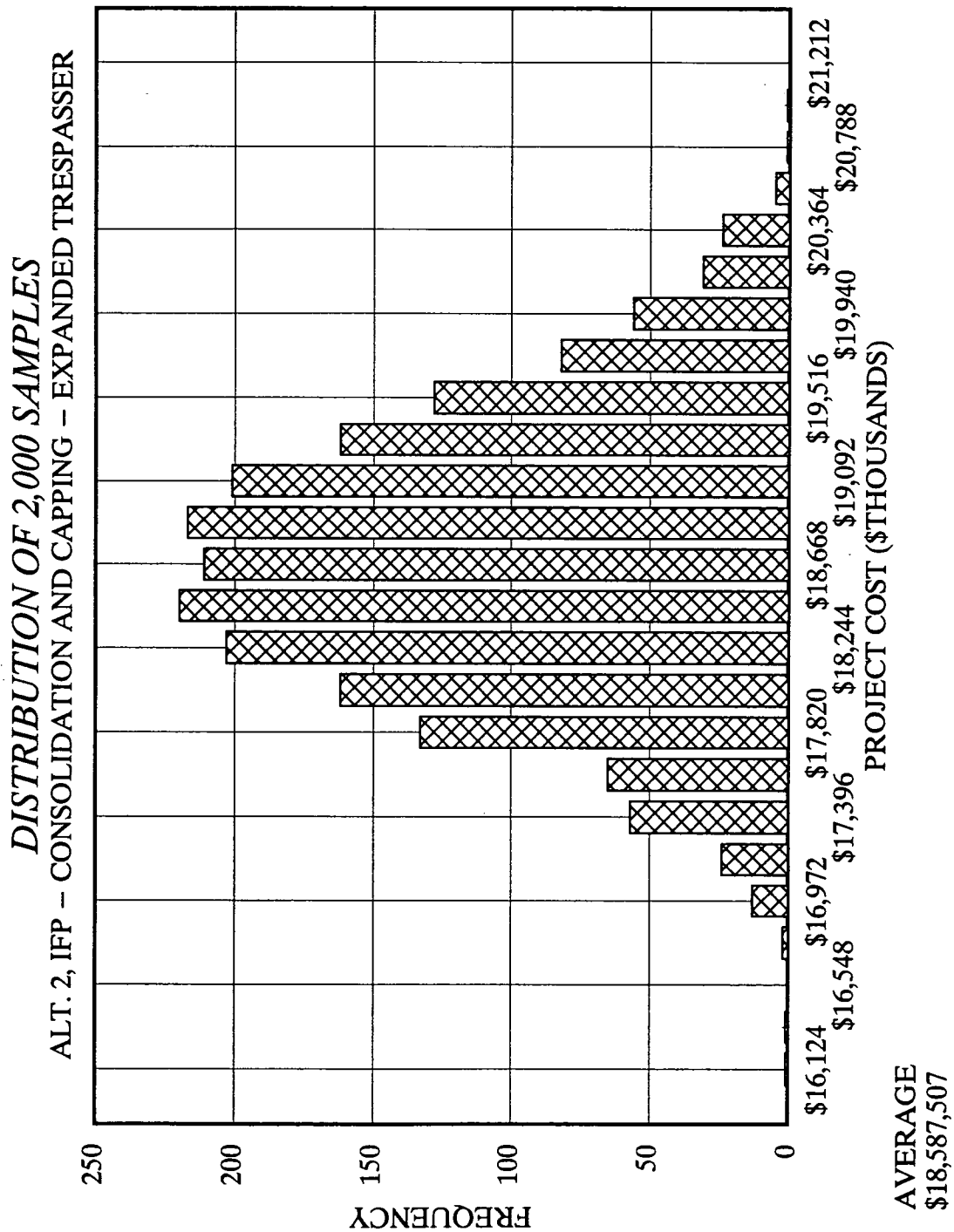
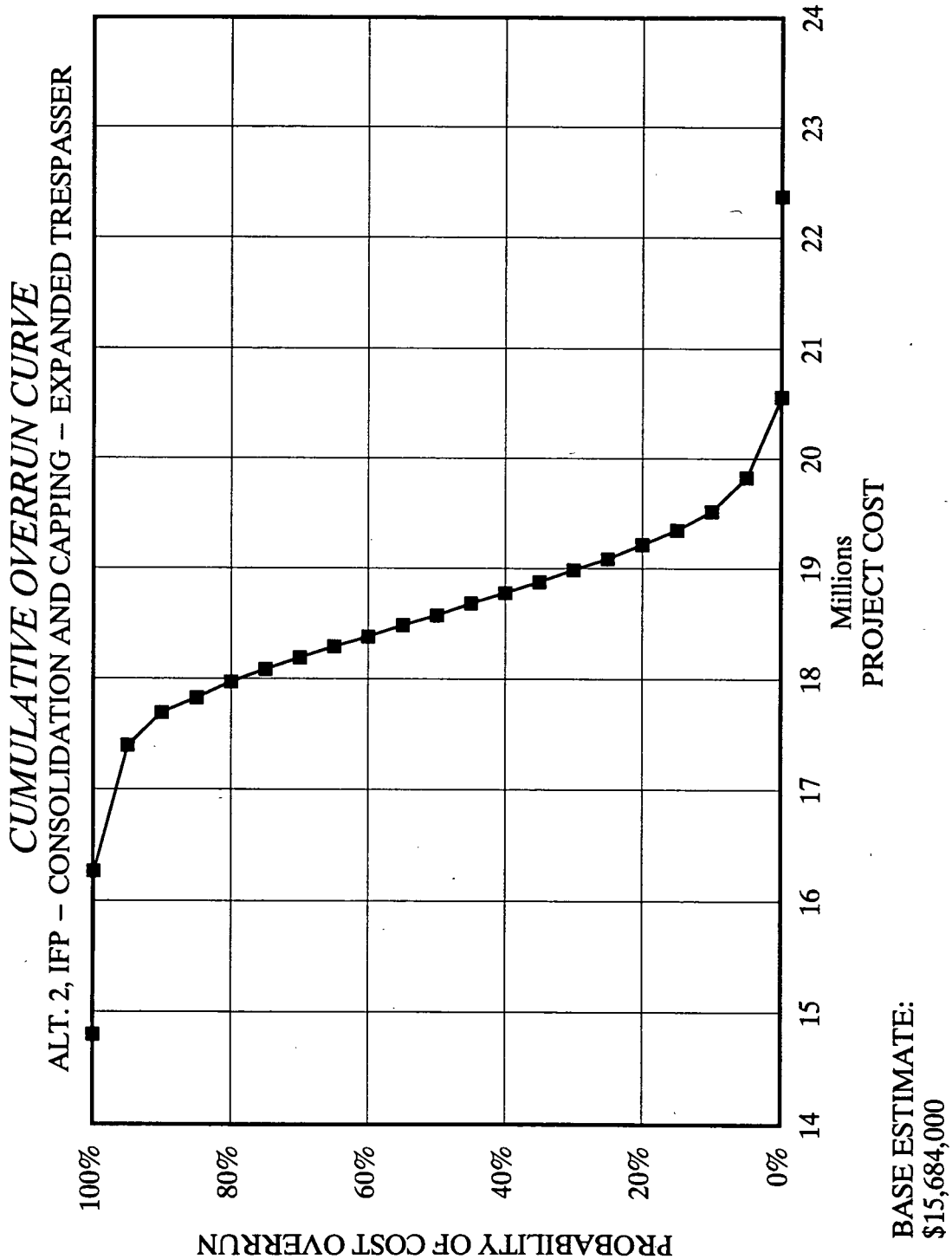

DISTRIBUTION OF 2,000 SAMPLES
ALT. 2, IFP – CONSOLIDATION AND CAPPING – EXPANDED TRESPASSER
FREQUENCY
250
200
150
100
50
0
$16,124
$16,548
$16,972
$17,396
$17,820
$18,244
$18,668
$19,092
$19,516
$19,940
$20,364
$20,788
$21,212
PROJECT COST ($THOUSANDS)
AVERAGE
$18,587,507

000775



BASE ESTIMATE:
$15,684,000

000776

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940748
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$15,684,000	BASE EST:	$65,440	BASE EST:	$16,500	BASE EST:	$99,950	BASE EST:	$6,040	BASE EST:	$28,480	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	30%					–1%	30%				
MATERIAL PRICING			–5%	25%	–10%	30%			–5%	30%	–5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)							–1%	50%	–1%	50%	–1%	40%
TOTAL %	–5%	30%	–5%	25%	–10%	30%	–2%	80%	–6%	80%	–6%	60%
TOTAL $	$62,168	$85,072	$15,675	$20,625	$89,955	$129,935	$5,919	$10,872	$26,771	$51,264	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-4-105

000777

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940748
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$20,950	BASE EST:	$0	BASE EST:	$21,950	BASE EST:	$43,830	BASE EST:	$24,200	BASE EST:	$71,150
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-5%	50%				
MATERIAL PRICING					-5%	30%			-5%	50%	-5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	-5%	50%	-5%	50%	-5%	30%
TOTAL $	$19,903	$31,425	$0	$0	$20,853	$28,535	$41,639	$65,745	$22,990	$36,300	$67,593	$92,495

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–2, IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940748
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-4-107

000779

5861

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940748
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	EXCAV/SORT/CRUSH ONSITE DISPOSAL LABOR $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL S/C $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$294,920	BASE EST:	$0	BASE EST:	$363,390	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	100%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%			-1%	50%						
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	150%	0%	0%	-6%	80%	0%	0%	0%	0%	0%	0%
TOTAL $	$277,225	$737,300	$0	$0	$341,587	$654,102	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000780

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940748
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		CLAY CAP LABOR $'s		CLAY CAP S/C $'s		CLAY CAP MAT'L. $'s	
	BASE EST:	$332,400	BASE EST:	$403,600	BASE EST:	$1,030,680	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING			-5%	30%	-5%	25%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%	-1%	50%	-1%	50%						
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	100%	-6%	80%	-6%	75%	0%	0%	0%	0%	0%	0%
TOTAL $	$312,456	$664,800	$379,384	$726,480	$968,839	$1,803,690	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000781

F-4-109

FEMP-OU02-5 DRAFT
August 24, 1994

561

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–2, IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940748
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$11,070	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							–5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	–5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$10,517	$16,605	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940748
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$43,950	BASE EST:	$0	BASE EST:	$105,340	BASE EST:	$0	BASE EST:	$299,200	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$41,753	$57,135	$0	$0	$100,073	$136,942	$0	$0	$284,240	$448,800	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

000783

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940748
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$887,400	BASE EST:	$481,900	BASE EST:	$1,144,600	BASE EST:	$1,590,000	BASE EST:	$3,157,700	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-10%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-5%	30%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-10%	30%	-5%	30%	0%	0%
TOTAL $	$843,030	$1,331,100	$457,805	$963,800	$1,087,370	$1,716,900	$1,431,000	$2,067,000	$2,999,815	$4,105,010	$0	$0
RISK PROFILE & CORRELATION FOR	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
EACH COST ELEMENT	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000784

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, IFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940748
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$4,961,600	BASE EST:	$171,700	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-5%	25%										
(OTHER)												
TOTAL %	-5%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$4,713,520	$6,202,000	$169,983	$173,417	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000785

5861

LCC ANALYSIS TITLE:	SF - CONSOLIDATION & CAPPING - (EXPANDED TRESPASSER)			
WBS NO.:	1.1.1.1.2.3.2		TASK NO.:	2CSF
ALTERNATIVE:	2		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	35 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	07-Aug-94
DOCUMENT NO.:	LCC-94-03-05	EST. NO. C2-94-07-49/FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$1,760,191	$0	$0	$1,760,200	1996
$5,280,574	$0	$0	$5,280,600	1997
$3,080,335	$0	$0	$3,080,300	1998
$0	$211,127	$0	$211,100	1999
$0	$189,698	$0	$189,700	2000
$0	$189,698	$0	$189,700	2001
$0	$189,698	$0	$189,700	2002
$0	$209,698	$0	$209,700	2003
$0	$112,698	$0	$112,700	2004
$0	$112,698	$0	$112,700	2005
$0	$112,698	$0	$112,700	2006
$0	$112,698	$0	$112,700	2007
$0	$132,698	$0	$132,700	2008
$0	$112,698	$0	$112,700	2009
$0	$112,698	$0	$112,700	2010
$0	$112,698	$0	$112,700	2011
$0	$112,698	$0	$112,700	2012
$0	$132,698	$0	$132,700	2013
$0	$112,698	$0	$112,700	2014
$0	$112,698	$0	$112,700	2015
$0	$112,698	$0	$112,700	2016
$0	$112,698	$0	$112,700	2017
$0	$132,698	$0	$132,700	2018
$0	$112,698	$0	$112,700	2019
$0	$112,698	$0	$112,700	2020
$0	$112,698	$0	$112,700	2021
$0	$112,698	$0	$112,700	2022
$0	$132,698	$0	$132,700	2023
$0	$112,698	$0	$112,700	2024
$0	$112,698	$0	$112,700	2025
$0	$112,698	$0	$112,700	2026
$0	$112,698	$0	$112,700	2027
$0	$132,698	$0	$132,700	2028
				2029
				2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$10,121,100	$3,907,400	$0	$14,028,500	TOTAL
$9,284,500	$2,434,400	$0	$11,719,000	<====(@NPV)

F ERMC O
ESTIMATING SERVICES

SUMMARY SHEET

EST FILE #: C2940749
CLIENT: US DOE
PROJECT TITLE: ALT-2, SOUTH FIELD - CONSOLIDATION & CAPPING
WBS#: 1.1.1.1.2.3.2 EXPANDED TRESPASSER

DATE: 06-Aug-94
ESTIMATOR: KEN KEPLER
LOCATION: FERNALD
TASK#: 2CSF

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL - IN-PLACE COMPOSITE CAP	29,285		$499,500	$839,800	$758,300	$2,097,600
2		OFF-SITE DISPOSAL TO LOCAL LANDFILL LEAD/SOIL FROM FIRING RANGE						
3		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		29,285		$499,500	$839,800	$758,300	$2,097,600
11	SUPERVISION - CONTRACTOR				$85,000			$85,000
12	SM TOOLS/CONSM'BLS						$30,000	$30,000
13	EQUIPMENT RENTAL						$549,200	$549,200
14	TEMP. FACILITIES				$10,500		$19,500	$30,000
15	TEMP UTL'S HOOK-UP				$5,200		$9,700	$14,900
16	JOB CLEAN-UP				$10,500		$19,500	$30,000
17	SAFETY				$5,200		$9,700	$14,900
18	HEALTH PHYSICS S/C				$68,800		$900	$69,700
19	CERCLA/SAT $1,500 PER PERSON					$15,000		$15,000
	BOND					$21,000		$21,000
	OVERHEAD & PROFIT					$266,200		$266,200
22	PAYRL BRD.&BENFT.				$356,000			$356,000
	INDIRECT FIELD COSTS				$541,200	$302,200	$638,500	$1,481,900
	DIRECT & INDIRECT FIELD COSTS				$1,040,700	$1,142,000	$1,396,800	$3,579,500
23	TRANSPORTATION & BURIAL					$187,100		$187,100
24	WASTE CONTAINERS						$6,400	$6,400
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$198,700		$198,700
25	SCREENING & CONFIRMATION TESTING					$1,628,600		$1,628,600
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$834,000			$834,000
	FERMCO FIELD SUPPORT COSTS				$834,000	$2,014,400	$6,400	$2,854,800
28	EMISSION MODELING				$6,300		$11,600	$17,900
29	PSAR/FSAR(SAFETY RPT)				$107,400			$107,400
30	ENGINEERING	TITLE I&II $486,800 TITLE III	$554,800	CDR	$179,000	DCR	$103,800	$1,324,400
	ENGINEERING COSTS							$1,449,700
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$1,421,200	$85,300
	SUB-TOTAL (BASE ESTIMATE)							$7,969,300
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	20.0%						$1,593,900
	TARGET ESTIMATE (BASE ESTIMATE PLUS RISK BUDGET)							$9,563,200
	CONTINGENCY	7.0%						$557,900
								PRELIMINARY
	TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY)							$10,121,100

LOTUS31\FS2\ALT2\SF\INDSUM.WK3 - FEASABILITY STUDY

Alternative 2 – Consolidation and Capping
(Expanded Trespasser)

South Field

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	1	1	5	sample	$5,500.00	28	NA	$154,000	7 wells x 4 samples/year
Long Term	1	6	30	sample	$5,500.00	14	NA	$77,000	7 wells x 2 samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	1.75	2.26	$876	Inspect all wells twice/year. Repair 1 out of 8.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Long Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Well Inspect & Maint.	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Perched Groundwater (South Field Vicinity)									
Pumping	1	1	30	lump sum	$300.00	1	1.29	$387	
Pump Maintenance	1	1	30	lump sum	$1,088.26	1	1.29	$1,404	
Pipeline Maintenance	1	1	30	lump sum	$922.36	1	1.29	$1,190	
Treatment & Disposal	1	1	30	gallons	$0.01	1,590,000	NA	$15,900	
OU2 Waste Cell Leachate									
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Facility Maint. at Subunit									
Cap Maint. & Repairs	1	1	30	acre	$2,183.32	2.4	3.10	$6,760	Approx. 2.4 Acres
Mowing	1	1	30	acre	$1,861.92	2.9	3.74	$6,965	Approx. 2.9 Acres
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.6	0.77	$1,526	Approx. 1200 ft perimeter
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Fence Repair	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of Subunit	5	5	30	lump Sum	$20,000.00	1	NA	$20,000	Total divided among 5 subunits
Facility Review of OU2 Cell	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative

Annual Costs, Year 1 (excluding facility review)	$211,127
Annual Costs, Years 2–5 (excluding facility review)	$189,698
Annual Costs, Years 6–30 (excluding facility review)	$112,698
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 B:

8/3/94

000788

DATE: 05-Aug-94

PROJECT TITLE:
ALT-2, SOUTH FIELD - CONSOLIDATION & CAPPING
WBS#:
1.1.1.1.2.3.2

HEALTH PHYSICS

EST.NO.: C2940749
EST. : KEN KEPLER
TASK I.D. :
2CSF

5861

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	• NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			•	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	0	$0	C/B		
SUB-TOTAL		31.80	4		$0			
					ERR	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	3		$40	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	2		$40	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	2		$350	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$910			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$900			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE.
COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

000789

DATE: 05-Aug-94

HEALTH PHYSICS

PROJECT TITLE:
ALT-2, SOUTH FIELD - CONSOLIDATION & CAPPING
WBS#:
1.1.1.1.2.3.2

EST.NO.: C2940749
EST. : KEN KEPLER
TASK I.D. :
2CSF

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	10	40	$16.97	$680		
ANNUAL PHYSICALS	1	3	10	30	$16.97	$510		
EXIT (TERMINATION) PHYSICALS	1	4	10	40	$16.97	$680		
SUB-TOTAL						$1,870		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	23	1	10	233	$16.97	$3,950		
YEARLY IN-VIVO	1	4	10	40	$16.97	$680		
EXIT (END OF PROJECT / TERMINATION)	1	4	10	40	$16.97	$680		
SUB-TOTAL						$5,310		
WORK DELAYS CAUSED BY MONITORING	5%				$588,600	$29,430		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$588,600	$29,430		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$66,000	$900	$66,900

000790

5861

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT –ALT–2, SOUTH FIELD – CONSOLIDATION & CAPPING
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CSF

WBS NO. – 1.1.1.1.2.3.2
EST. NO. – C2940749
BY – K. KEPLER
DATE – 08/05/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25–Mar–94	01–Jun–96	16–May–97	30–Apr–98	23	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
38	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

APPENDIX E

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – SF – CONSOLIDATION & CAPPING
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940740
BY KEN KEPLER
DATE 05–Aug–94
TASK ID 2CSF

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR)			CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS 141				ENVIROCARE BURIAL COSTS		TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							$80.15 PER TON (90 TON MIN.)	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	$120 DEMURAGE $/DAY (>5 DAYS)	(1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	
	CAR	LINER	COVER			TONS/CY	TONS						
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045
	$0	$400	$395	$340	LEAD/SOIL	1.810	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 125, 141, or 200 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

000792

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – SF – CONSOLIDATION & CAPPING
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940749
BY KEN KEPLER
DATE 05–Aug–94
TASK ID 2CSF

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C – D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0
	LEAD/SOIL	1.810	134.00	1971.0	196,000	0	196,000	1462.7	54.2

INPUT

F-4-121

000793

FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – SF – CONSOLIDATION & CAPPING
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940749
BY KEN KEPLER
DATE 05–Aug–94
TASK ID 2CSF

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	0.0	0	$23,816	$0	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	0.0	0	$24,180	$0	$493.47		
	LEAD/SOIL	54.20	396.0	8	$24,180	$193,400	$446.13		
						**			

INPUT

** **NOTE:**
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

000794

CONTR.NO.- [redacted]321
CLIENT - U.S. DEPT. OF ENERGY
PROJECT - ALT-2 - SF - CONSOLIDATION & CAPPING - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON-SITE DISPOSAL (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		4,856						$83,540	$15,000	$60,310	$97,010	$255,860
DECONTAMINATION FACILITIES/SERVICES	1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210
EROSION AND SEDIMENT CONTROLS	1	LS		1428						$26,380		$8,320	$47,700	$82,400
PERCHED GROUNDWATER SYSTEM	1	LS		565						$9,590	$5,380	$6,700	$14,510	$36,180
EXCAVATE - OFFSITE DISPOSAL (REMOVE LEAD/SOIL FROM FIRING RANGE)	1	LS		77						$1,310	$229,730	$1,750		$232,790
LOAD/HAUL - OFF-SITE DISPOSAL (LEAD/SOIL FROM FIRING RANGE)	1	LS		79						$1,360		$1,880		$3,240
EXCAVATE & HAUL TO ON-SITE DISPOSAL (Onsite)	1	LS		8441						$141,870		$148,430	$4,640	$294,940
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	1	LS		8767						$148,770	$183,460	$218,430	$459,910	$1,010,570
DIKE FOR DISPOSAL CELL	N/A													N/A
GENERATED WASTE REMOVAL	1	LS		593						$10,060		$4,600		$14,660
SITE RESTORATION	1	LS		1516						$25,720		$47,510	$60,090	$133,320
MONITORING WELLS	1	LS									$304,000			$304,000
SUB-TOTAL (DIRECT FIELD COSTS)				26623						$454,090	$763,460	$499,250	$689,370	$2,406,170
TAKE-OFF ALLOWANCE 10%	1	LS		2,662						$45,410	$76,350	$49,930	$68,940	$240,630
TOTAL (DIRECT FIELD COSTS)	1	LS		29,285						$499,500	$839,800	$549,200	$758,300	$2,646,800

ALT-2 SF - Consolidation & Capping w/Off-site Option - SUMMARY

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861
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – SF – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 33.3% ARE COMMON TO SF, AFP & IFP)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	3400	LF	0.213	934	16.97				6.25	$15,850			$21,890	$37,740
c. Clear and Grub														
i. Remediation Site	15.00	AC	41.40	801	16.97			2575.00		$13,590		$39,780		$53,370
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Staging Area @ Sub–unit														
d. Dewatering														
i. Excavate Dewatering Trench	500	CY	0.50	323	16.97			1.49		$5,480		$770		$6,250
ii. Pump – w/4" Suction Hose	200	DAYS	3.00	774	16.97			19.55		$13,130		$4,030		$17,160
iv. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip	2	CY	4.00	10	16.97			100.00		$170		$210		$380
e. General Grading														
i. New Roads	5778	SY	0.001	7	16.97			0.07		$120		$420		$540
33.3%														
ii. Office/Parking Area 2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area 272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area 49	16	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub–Unit 2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	5778	SY	0.030	224	16.97			1.08	6.66	$3,800		$6,430	$39,640	$49,870
33.3%														
ii. Office/Parking – 8" Gravel W/ Geot 2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc.Slab 2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk. 631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" thl 24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub–grade Piping – 4" 500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating 2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab 183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip. 1	0.33	LS	2.00	1	16.97			184.00		$20		$60		$80
TOTAL (SITE PREPARATION)	1	LS		4,856						$83,540	$15,000	$60,310	$97,010	$255,860

Site Preparation Details

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000796
FEMP-OU02-5 DRAFT August 31, 1994

CONTR.NO. – 4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – SF – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	33.3%														
a. Decon Trailer – Rental	51	17	MO					1500.00				$25,470			$25,470
	33.3%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'i.d.x 25lfx8	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in con	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
	BCY														
x. Backfill & Compaction around concrete slab	258	103	ICY	0.086	11	16.97			1.38		$190		$150		$340
SUB–TOTAL (EQUIP. DECON. FACILITY)					265						$4,810	$25,860	$1,210	$4,140	$36,020

Equipment Decon. Facility Details

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000797

FEMP-OU02-5 DRAFT
August 26, 1994

5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – SF – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	33.3%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Gua	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in (	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	0	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210

Personnel Decon.Facilities/Services Details

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F-4-126

000798

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – SF – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	2000	LF	0.017	44	16.97			0.06	0.65	$750		$120	$1,340	$2,210
ii. Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	500	EA	0.24	155	16.97			1.53	1.35	$2,630		$790	$700	$4,120
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. Sedimentation/Decon. Tank 13000 gal	1	LS	40.00	52	19.95			140.00	5500.00	$1,040		$140	$5,500	$6,680
iv. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1200	LF	0.38	590	19.95			5.11	4.42	$11,770		$6,130	$5,300	$23,200
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	3	EA	8.00	31	16.97			28.00	8300.00	$530		$80	$24,900	$25,510
vi. 50 gal. Pump Includes Controls & Electrical	2	EA	60.00	155	16.97			210.00	2500.00	$2,630		$420	$5,000	$8,050
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,428						$26,380		$8,320	$47,700	$82,400

Erosion Control Details

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000799
5861
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – SF – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PERCHED GROUNDWATER SYSTEM														
a. Interceptor Trench														
i. Trench Excavation														
200' x 3'w x 25' deep + 20% for slope	666	BCY	0.05	43	16.97			1.80		$730		$1,230		$1,960
Load & Haul BCY 666	833	LCY	0.064	69	16.97			2.52		$1,170		$2,160		$3,330
ii. HDPE Liner 40 mil														
29' x 200 lf + 20% for slope	774	SY					6.75				$5,380			$5,380
iii. HDPE Perforated Pipe														
Buried in Pea Gravel 6" Dia.	200	LF	0.30	77	16.97			1.05	6.56	$1,310		$220	$1,350	$2,880
iv. Geotextile Fabric wrapped around 6" Pipe														
2' x 200 lf	46	SY	0.020	1	16.97			0.02	1.46	$20			$70	$90
v. Pea Gravel Layer BCY														
10' x 3' x 200' + 20% 267	287	ICY	0.11	41	16.97			0.77	17.00	$700		$230	$5,030	$5,960
vi. Sand BCY														
12' x 3' x 200' + 20% 320	344	ICY	0.052	23	16.97			1.76	5.00	$390		$620	$1,770	$2,780
vii. Clay Backfill														
3' x 6' x 200' +20% BCY														
3' x 3' x 200'x .5 +20% 200	236	ICY	0.063	19	16.97			2.18	3.70	$320		$530	$900	$1,750
viii. Precast Wetwell 4ft Sq. x 8 ft Deep	1	EA	12.00	15	16.97			100.00	445.00	$250		$100	$460	$810
a. Excavate 6' x 6' x 8.5' – 11.3 CY	11.3	BCY	0.178	3	16.97			5.05		$50		$60		$110
b. Backfill / Compact 6.6	8	ICY	0.069	1	16.97			0.72		$20		$10		$30
ix. Pump 20 gpm w/ piping, controls & elect.	200	LF	0.68	175	16.97			2.38	19.50	$2,970		$490	$4,020	$7,480
x. 2"/4" HDPE Carrier/Container Pipe Includes Trench Excav/Backfill, Sand Pipe Bedding, Compaction	200	LF	0.381	98	16.97			5.11	4.42	$1,660		$1,050	$910	$3,620
TOTAL (PERCHED GROUNDWATER COLLECT.)	1	LOT		565						$9,590	$5,380	$6,700	$14,510	$36,180

Perched Groundwater Collection Details

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CONTR.NO.- [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-2 – SF – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

	DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	EXCAVATE														
	OFF-SITE DISPOSAL														
	Excavate Lead Contaminated Soil at Firing Range														
	Excavate	300	BCY	0.20	77	16.97			5.65		$1,310		$1,750		$3,060
	Solidification of lead cont.soil w/Portland Cement 30% Portland Cement, 2% Sodium Silicate in drums. 300 CY @ 1.5 Tons =	450	TONS					510.50				$229,730			$229,730
	TOTAL (EXCAVATE OFFSITE DISPOSAL)	1	LOT		77						$1,310	$229,730	$1,750		$232,790

Excavate – Offsite Disposal Details

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F-4-129

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – SF – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
LOAD & HAUL														
OFF–SITE DISPOSAL														
Lead Removal at Firing Range														
HAUL														
From excavation site to rail loading facility														
6 CY dump truck 1/2 mi rt.														
Solidified lead/soil/cement	396	LCY	0.04	21	16.97			1.65		$360		$670		$1,030
LOADING GONDOLA														
Solidified lead/soil/cement LCY														
Excav. 300 BCY x 1.25 swell factor = 396														
Allowable CY's of waste per Gondola 54.2														
Install Liner in Gondola car														
Solidified lead/soil/cement	8	EA	0.75	8	16.97			32.21		$140		$260		$400
Load Gondola – 6/day, 2 workers	1	DAYS	16.00	28	16.97			15.00		$480		$20		$500
Seal liner, Install Cover														
Solidified lead/soil/cement	8	EA	0.75	8	16.97			32.21		$140		$260		$400
Dust control – light	1	DAYS	8.00	14	16.97			500.00		$240		$670		$910
(RSO takes ownership at this time.)														
(See: Off–Site Disposal Wksht. & App.E)														
TOTAL (LOAD & HAUL – OFFSITE DISPOSAL	1	LOT		79						$1,360		$1,880		$3,240

008002

Load & Haul – Offsite Disposal Details

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CONTR.NO.– [redacted]321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – SF – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE – CONSOLIDATE FOR IN–PLACE DISPOSAL														
Excavate Contaminated Soil – Level C	500	BCY	0.055	35	16.97			1.17		$590		$590		$1,180
BCY														
Backfill & Compact – level C 500	600	ICY	0.06	46	16.97			1.67		$780		$1,000		$1,780
			S/T	81										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL (	81	HRS	150%	122	16.97					$2,070				$2,070
			S/T	284										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) SEE APPENDIX C	28	MD												
Excavate Contaminated Soil – Level D	41600	BCY	0.055	2,952	16.97			1.17		$50,100		$48,670		$98,770
Excavate Additional Soil – Level D	4200	BCY	0.055	298	16.97			1.17		$5,060		$4,910		$9,970
(SHREDDING COMMON TO SWL, IFP & SF)														
k. Shredder/Crusher – Purchase/Install 33.3%	0.3	LOT	280.0	120	16.97			8400.00	317800.00	$2,040				$2,040
60 Ton per Hour														
Excavated Debris BCY 6500														
Generated Waste BCY 771														
Excavated Debris TONS 10359														
(Percent of Gen.Waste to be Shredded) 25%														
Generated Waste TONS 443.3														
TOTAL TONS 10803														
Operating Costs	180	HRS							25.75				$4,640	$4,640
(2) Operators	360	HRS	1.00	464	16.97					$7,870				$7,870
On–Site Consolidation BCY														
Impacted Fill 45800	54960	ICY	0.06	4,254	16.97			1.67		$72,190		$91,780		$163,970
Generated Waste 771	887	ICY	0.06	69	16.97			1.67		$1,170		$1,480		$2,650
TOTAL (EXCAV/NO TREATMENT–ONSITE DISPOSAL)	1	LOT		8,441						$141,870		$148,430	$4,640	$294,940

Excavate – No Treatment – South Field Onsite Disposal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

000803

861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – SF – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE CAP															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
COMPOSITE CAP															
a. Contouring Layer 18" Thk.	BCY 5600	6720	ICY	0.06	520	16.97			1.67	3.50	$8,820		$11,560	$24,230	$44,610
b. 95% Clay – 5% Bentonite 24" Thk	BCY 7467	8027	ICY	0.260	2692	16.97			11.19	20.35	$45,680		$92,520	$168,250	$306,450
c. GML\GCC – composite Liner		11200	SY					7.38				$82,660			$82,660
d. Geotextile Fabric		11200	SY					2.25				$25,200			$25,200
e. Pea gravel 12" Thk, In–place	BCY 3734	4014	ICY	0.11	570	16.97			0.77	17.00	$9,670		$3,180	$70,290	$83,140
f. Geotextile Fabric		11200	SY					2.25				$25,200			$25,200
g. Cobbels 36" Thk; In–place	BCY 11200	12040	ICY	0.258	4007	16.97			7.15	10.10	$68,000		$88,670	$125,250	$281,920
h. Geotextile Fabric		11200	SY					2.25				$25,200			$25,200
i. Sand Layer 6" Thk; In–place	BCY 1867	2007	ICY	0.052	135	16.97			1.76	5.00	$2,290		$3,640	$10,340	$16,270
j. Geotextile Fabric		11200	SY					2.25				$25,200			$25,200
k. Common Soil 21" Thk; In–place	BCY 6534	7841	ICY	0.06	607	16.97			1.67	3.50	$10,300		$13,490	$28,270	$52,060
l. Top Soil 6" Thk; In–place	BCY 1867	2240	ICY	0.053	153	16.97			1.82	12.10	$2,600		$4,200	$27,920	$34,720
m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding	SY 11200	101	MSF	0.30	39	16.97			6.75	25.00	$660		$700	$2,600	$3,960
n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized		200	LF	0.17	44	16.97			2.28	13.40	$750		$470	$2,760	$3,980
TOTAL (COMPOSITE CAP)		1	LOT		8,767						$148,770	$183,460	$218,430	$459,910	$1,010,570

Composite Cap Details

000804

F-4-132
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. - [illegible]321
CLIENT - U.S. DEPT. OF ENERGY
PROJECT - ALT-2 - SF - CONSOLIDATION & CAPPING - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL															
a. Office/Parking Area @ S/U	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo-Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Facil.@ S/U	33%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo-Fabric & Liner	167	56	SY	0.002					0.02						
Posts - 4" x 4" x 9'-6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Facil. @ S/U	33%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	2.4	1	BCY	0.292					9.16				$10		$10
Geo-Fabric & Liner	14	5	SY	0.002					0.02						
Posts - 4" x 4" x 9'-6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
d. Staging pad @ S/U	33.3%														
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excav., Load, Haul, Backfill, Compact															
Sub-grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo-Fabric & Liner 105 cy	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	395.5	132	BCY	0.30	51	16.97			2.51		$870		$340		$1,210
TOTAL GENERATED WASTE	BCY 771 LCY 887														
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		593						$10,060		$4,600		$14,660

Generated Waste Removal Details

000805

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – SF – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
South Field	5000	6000	ICY	0.09	697	16.97			3.21	3.50	$11,830		$19,840	$21,630	$53,300
	33.3%														
Office/Parking	494	197	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	31	ICY												
Decon.Facil.– Personnel @ S/U	7	3	ICY												
Staging Area @ S/U	1099	439	ICY												
	S/T	670.5	ICY	0.09	78	16.97			3.21	3.50	$1,320		$2,220	$2,420	$5,960
b. Final Grade for SF		6000	SY	0.02	155	16.97			0.70		$2,630		$4,330		$6,960
c. Borrow Top Soil 6" Thk., Spread															
South Field		6000	SY	0.036	279	16.97			2.33	2.88	$4,730		$14,400	$17,800	$36,930
	33.3%														
Office/Parking	2222	740	SY												
Decon.Facil.– Const.Equip. @ S/U	167	56	SY												
Decon.Facil.– Personnel @ S/U	14	5	SY												
Staging Area @ S/U	2845	947	SY												
	S/T	1747.6	SY	0.036	81	16.97			2.33	2.88	$1,370		$4,190	$5,180	$10,740
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
South Field	6000	54	MSF	0.30	21	16.97			6.75	25.00	$360		$380	$1,390	$2,130
	33.3%														
Office/Parking	2222	6.7	MSF												
Decon.Facil.– Const.Equip. @ S/U	167	0.5	MSF												
Decon.Facil.– Personnel @ S/U	14		MSF												
Staging Area @ S/U	2845	8.5	MSF												
	S/T	15.7	MSF	0.30	6	16.97			6.75	25.00	$100		$110	$400	$610
e. Security Fence – 6ga aluminized – 6' high		1080	LF	0.13	178	16.97			1.64	9.80	$3,020		$1,820	$10,900	$15,740
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
TOTAL (SITE RESTORATION)		1	LOT		1,516						$25,720		$47,510	$60,090	$133,320

Site Restoration Details

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CONTR.NO. – [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – SF – CONSOLIDATION & CAPPING –. EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility	7	PR					23000.00				$161,000			$161,000
b. Abandon Existing Wells	11	EA					13000.00				$143,000			$143,000
TOTAL (MONITORING WELLS)	1	LOT									$304,000			$304,000

Monitoring Wells Details

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000807

FEMP-OU02-5 DRAFT
August 24, 1994

06–Aug–94

ALT–2 – SF – CONSOLIDATION & CAPPING

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – SF – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO															
PURCHASE															
Bulk Gondola Rail Car	N/A	0	EA												
Liner for Gondola															
Excavated Waste – level C,D & Additio	N/A		EA							400.00					
Excavated Waste – lead/soil		8	EA							400.00				$3,200	$3,200
Generated Waste	N/A		EA							400.00					
Cover for Gondola															
Excavated Waste – level C,D & Additio	N/A		EA							395.00					
Excavated Waste – lead/soil		8	EA							395.00				$3,160	$3,160
Generated Waste	N/A		EA							395.00					
(Also See Appendix E)															
TOTALS FORWARD TO ESTIMATE SUMMARY No.24															
TOTAL (PURCHASE COSTS – FERMCO)		1	LOT											$6,400	$6,400

Purchase Waste Container Details

000808

CONTR.NO.- [redacted]4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-2 – SF – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF-SITE TRANSPORTATION COSTS TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas	8	EA					340.00				$2,720			$2,720
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additional		EA					22681.00							
Excavated Waste – lead/soil	8	EA					23045.00				$184,360			$184,360
Generated Waste		EA					23045.00							
(Also See Appendix E)														
TOTALS FORWARD TO ESTIMATE SUMMARY No.23														
TOTAL (OFF-SITE TRANSPORT. COSTS – FERMCO)	1	LOT									$187,100			$187,100

ENVIROCARE Transportation Details

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000809

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – SF – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	165000	GAL					0.01				$1,700			$1,700
Runnoff from the Exclusion Zone.	19700000	GAL					0.01				$197,000			$197,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$198,700			$198,700

Waste Water Treatment Operations Cost Details

PAGE 16 of 17

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000810

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]321
CLIENT - U.S. DEPT. OF ENERGY
PROJECT - ALT-2 - SF - CONSOLIDATION & CAPPING - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940749
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	233	EA					2,002				$466,500			$466,500
Rad	233	EA					2,000				$466,000			$466,000
Confirmatory Tests														
Full Rad Tests	117	EA					3,101				$362,800			$362,800
Full HSL	20	EA					1,500				$30,000			$30,000
Full TCLP	20	EA					2,000				$40,000			$40,000
2 Technicians per Month	20	MO					13,163				$263,300			$263,300
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING/CONFIRMATION TESTS)	1	LOT									$1,628,600			$1,628,600

Screening & Confirmation Testing Details

FEMP-OU02-5 DRAFT
August 24, 1994

5881

000811

F-4-139

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 2, SOUTH FIELD – CONSOLIDATION AND CAPPING
CLIENT: DOE DATE: 07–Aug–94
CONTRACT: C2–94–07–49 BASE ESTIMATE: $7,969,300

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$11,569,593	$3,600,293	45.2%
0.05%	$10,537,764	$2,568,464	32.2%
5.00%	$10,119,217	$2,149,917	27.0%
10.00%	$9,996,866	$2,027,566	25.4%
15.00%	$9,916,481	$1,947,181	24.4%
20.00%	$9,847,171	$1,877,871	23.6%
25.00%	$9,794,700	$1,825,400	22.9%
30.00%	$9,741,486	$1,772,186	22.2%
35.00%	$9,684,669	$1,715,369	21.5%
40.00%	$9,638,203	$1,668,903	20.9%
45.00%	$9,596,439	$1,627,139	20.4%
50.00%	$9,550,460	$1,581,160	19.8%
55.00%	$9,504,983	$1,535,683	19.3%
60.00%	$9,460,419	$1,491,119	18.7%
65.00%	$9,413,802	$1,444,502	18.1%
70.00%	$9,366,849	$1,397,549	17.5%
75.00%	$9,306,800	$1,337,500	16.8%
80.00%	$9,249,731	$1,280,431	16.1%
85.00%	$9,176,180	$1,206,880	15.1%
90.00%	$9,106,928	$1,137,628	14.3%
95.00%	$8,975,580	$1,006,280	12.6%
99.95%	$8,519,962	$550,662	6.9%
100.00%	$7,504,322	($464,978)	–5.8%

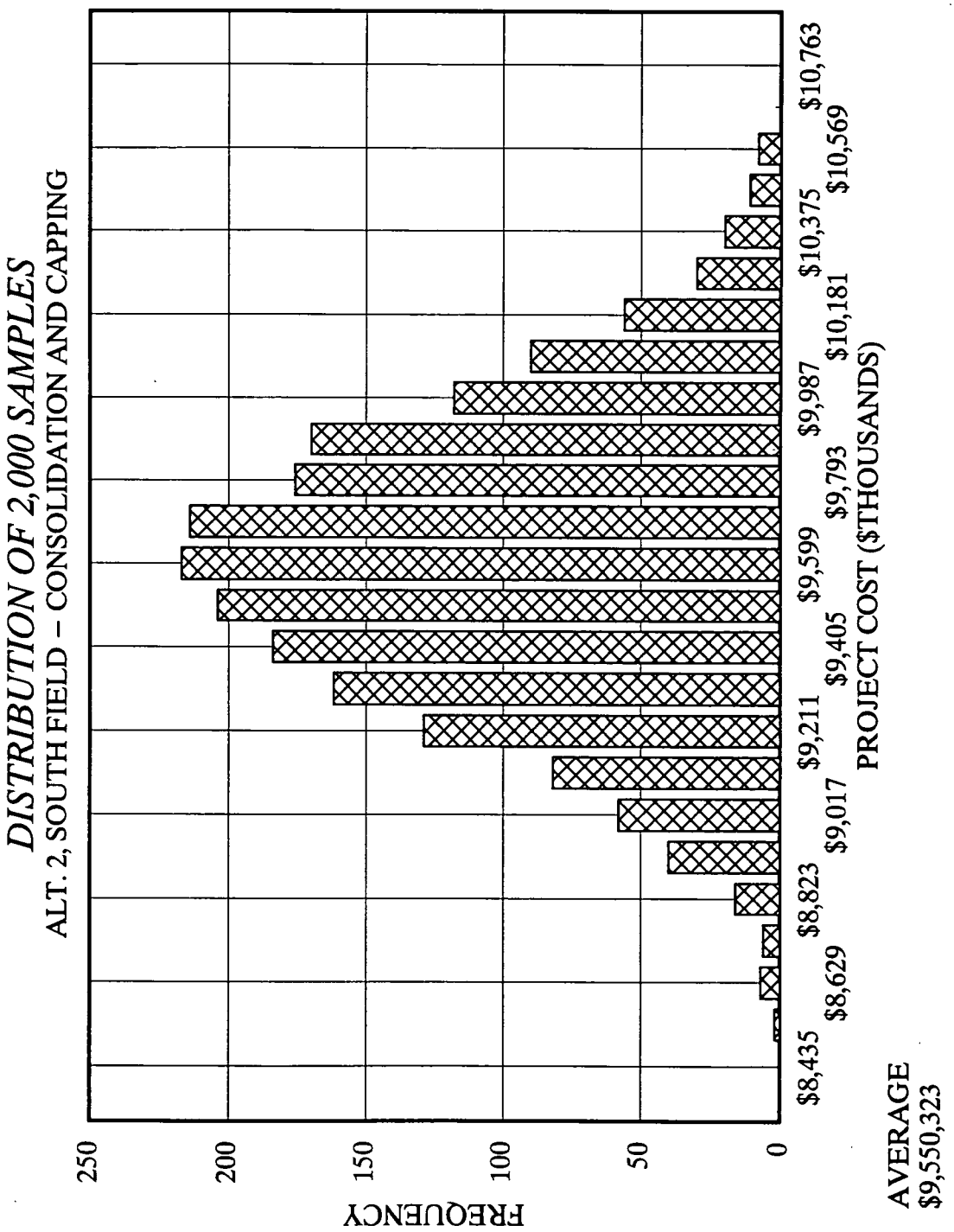
FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

PROJECT: ALT. 2, SOUTH FIELD – CONSOLIDATION AND CAPPING
CLIENT: DOE
CONTRACT: C2–94–07–49

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$91,890	–5.0%	$87,296	30%	$119,457	U		14%
2	SITE PREPERATION S/C	16,500	–5.0%	15,675	25%	20,625	U		17%
3	SITE PREPERATION MAT'L	106,710	–10.0%	96,039	30%	138,723	U		25%
4	DECON FACILITIES/SERVICES LABOR	6,050	–2.0%	5,929	80%	10,890	U		2%
5	DECON FACILITIES/SERVICES S/C	28,480	–6.0%	26,771	80%	51,264	U		7%
6	DECON FACILITIES/SERVICES MAT'L	6,060	–6.0%	5,696	60%	9,696	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	29,020	–5.0%	27,569	50%	43,530	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	52,470	–5.0%	49,847	30%	68,211	U		14%
9	PERCHED GROUNDWATER LABOR	10,550	–5.0%	10,023	50%	15,825	U		9%
10	PERCHED GROUNDWATER S/C	5,920	–5.0%	5,624	50%	8,880	U		9%
11	PERCHED GROUNDWATER MAT'L	15,960	–5.0%	15,162	30%	20,748	U		14%
12	EXC/SORT/DRY OFF–SITE LABOR	1,440	–6.0%	1,354	125.0%	3,240	U		5%
13	EXC/SORT/DRY OFF–SITE S/C	252,700	–10.0%	227,430	100.0%	505,400	U		9%
14	LOAD & HAUL OFF–SITE DISP LABOR	1,500	–2.0%	1,470	150.0%	3,750	U		1%
15	EXC/SRT/CRSH ON–SITE DISP LABOR	156,060	–6.0%	146,696	100.0%	312,120	U		6%
16	EXC/SRT/CRSH ON–SITE DISP MAT'L	5,100	–2.0%	4,998	130.0%	11,730	U		2%
17	COMPOSITE CAP LABOR	163,650	–6.0%	153,831	100.0%	327,300	U		6%
18	COMPOSITE CAP S/C	201,810	–6.0%	189,701	80.0%	363,258	U		7%
19	COMPOSITE CAP MAT'L	505,870	–6.0%	475,518	80.0%	910,566	U		7%
20	GENERATED WASTE REMVL LABOR	11,070	–5.0%	10,517	50.0%	16,605	U		9%
21	SITE RESTORATION LABOR	28,290	–5.0%	26,876	30.0%	36,777	U		14%
22	SITE RESTORATION MAT'L	66,100	–5.0%	62,795	30.0%	85,930	U		14%
23	MONITORING WELLS S/C	334,400	–5.0%	317,680	50.0%	501,600	U		9%
24	INDIRECT FIELD COSTS LABOR	541,200	–5.0%	514,140	50.0%	811,800	U		9%
25	INDIRECT FIELD COSTS S/C	302,200	–5.0%	287,090	100.0%	604,400	U		5%
26	INDIRECT FIELD COSTS MAT'L	638,500	–5.0%	606,575	50.0%	957,750	U		9%
27	FIELD SUPPORT COSTS LABOR	834,000	–10.0%	750,600	30.0%	1,084,200	U		25%
28	FIELD SUPPORT COSTS S/C	2,014,400	–5.0%	1,913,680	30.0%	2,618,720	U		14%
29	FIELD SUPPORT COSTS MAT'L	6,400	–5.0%	6,080	30.0%	8,320	U		14%
30	ENGINEERING COSTS	1,449,700	–5.0%	1,377,215	25.0%	1,812,125	U		17%
31	SALES TAX MAT'L	85,300	–1.0%	84,447	1.0%	86,153	U		50%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$7,969,300		$7,504,322		$11,569,593			

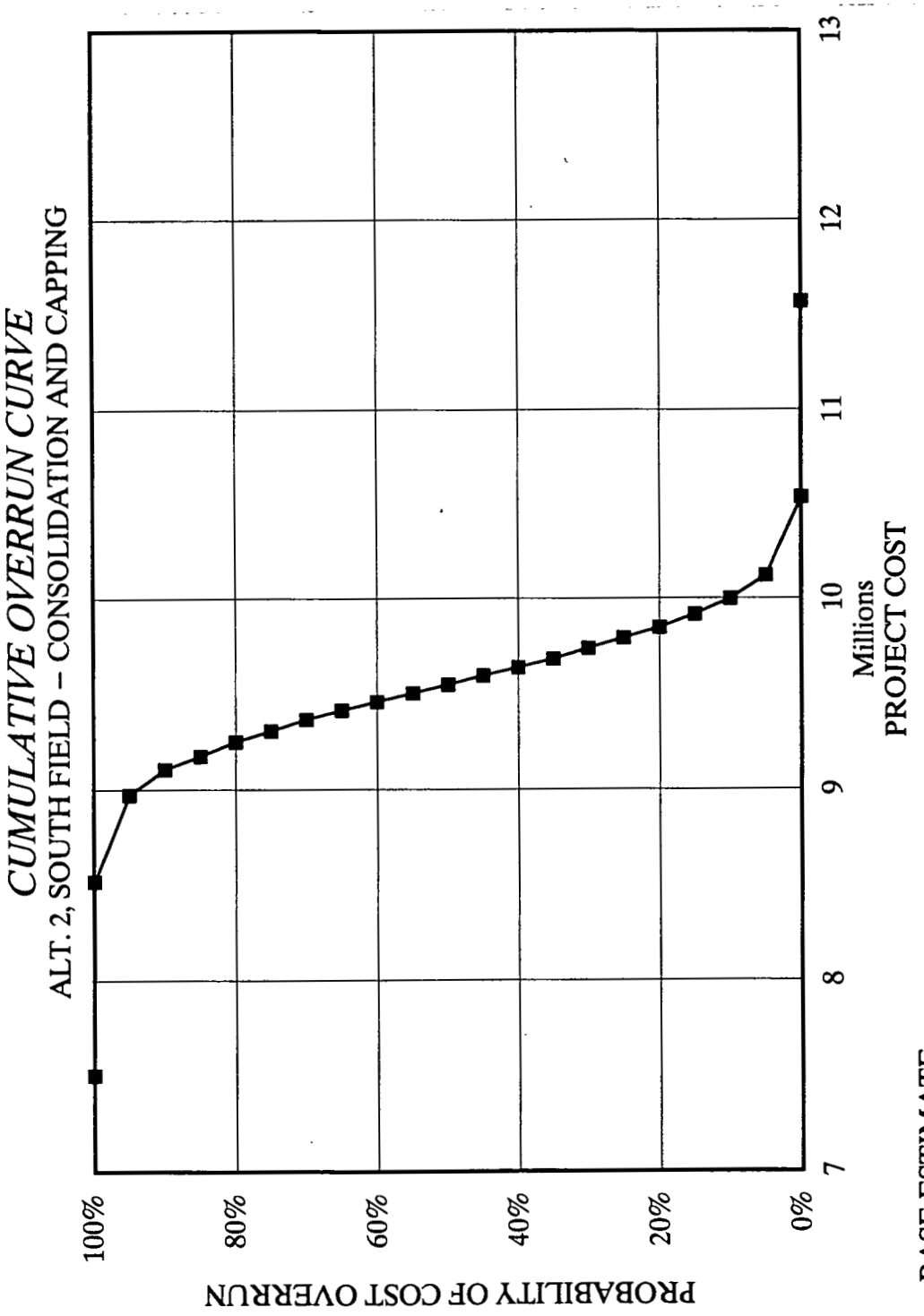
000813

5861


DISTRIBUTION OF 2,000 SAMPLES
ALT. 2, SOUTH FIELD – CONSOLIDATION AND CAPPING
FREQUENCY
250
200
150
100
50
0
$8,435
$8,629
$8,823
$9,017
$9,211
$9,405
$9,599
$9,793
$9,987
$10,181
$10,375
$10,569
$10,763
PROJECT COST ($THOUSANDS)
AVERAGE
$9,550,323

000814

5 8 8



BASE ESTIMATE:
$7,969,300

000815

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SOUTH FIELD – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940749
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$7,969,300	BASE EST:	$91,890	BASE EST:	$16,500	BASE EST:	$106,710	BASE EST:	$6,050	BASE EST:	$28,480	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	25%	-10%	30%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	25%	-10%	30%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$87,296	$119,457	$15,675	$20,625	$96,039	$138,723	$5,929	$10,890	$26,771	$51,264	$5,696	$9,696
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000816

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SOUTH FIELD – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940749
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$29,020	BASE EST:	$0	BASE EST:	$52,470	BASE EST:	$10,550	BASE EST:	$5,920	BASE EST:	$15,960
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-5%	50%				
MATERIAL PRICING					-5%	30%			-5%	50%	-5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	-5%	50%	-5%	50%	-5%	30%
TOTAL $	$27,569	$43,530	$0	$0	$49,847	$68,211	$10,023	$15,825	$5,624	$8,880	$15,162	$20,748

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000817

F-4-145

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SOUTH FIELD – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940749
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$1,440	BASE EST:	$252,700	BASE EST:	$0	BASE EST:	$1,500	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	100%					-1%	100%				
MATERIAL PRICING			-5%	50%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-5%	25%	-5%	50%			-1%	50%				
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	125%	-10%	100%	0%	0%	-2%	150%	0%	0%	0%	0%
TOTAL $	$1,354	$3,240	$227,430	$505,400	$0	$0	$1,470	$3,750	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SOUTH FIELD - CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940749
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

	EXCAV/SORT/CRUSH ONSITE DISPOSAL LABOR $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL S/C $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$156,060	BASE EST:	$0	BASE EST:	$5,100	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-1%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%			-1%	100%						
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	100%	0%	0%	-2%	130%	0%	0%	0%	0%	0%	0%
TOTAL $	$146,696	$312,120	$0	$0	$4,998	$11,730	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000819

5861

FEMP-OU02-5 DRAFT
August 24, 1994

F-4-147

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SOUTH FIELD – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940749
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		CLAY CAP LABOR $'s		CLAY CAP S/C $'s		CLAY CAP MAT'L. $'s	
	BASE EST:	$163,650	BASE EST:	$201,810	BASE EST:	$505,870	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING			-5%	30%	-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%	-1%	50%	-1%	50%						
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	100%	-6%	80%	-6%	80%	0%	0%	0%	0%	0%	0%
TOTAL $	$153,831	$327,300	$189,701	$363,258	$475,518	$910,566	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SOUTH FIELD – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940749
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST: $0		BASE EST: $0		BASE EST: $0		BASE EST: $11,070		BASE EST: $0		BASE EST: $0	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							−5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	−5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$10,517	$16,605	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SOUTH FIELD – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940749
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$28,290	BASE EST:	$0	BASE EST:	$66,100	BASE EST:	$0	BASE EST:	$334,400	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$26,876	$36,777	$0	$0	$62,795	$85,930	$0	$0	$317,680	$501,600	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-4-150

000822

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SOUTH FIELD – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940749
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$541,200	BASE EST:	$302,200	BASE EST:	$638,500	BASE EST:	$834,000	BASE EST:	$2,014,400	BASE EST:	$6,400
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–10%	30%				
MATERIAL PRICING			–5%	100%	–5%	50%			–5%	30%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	–5%	100%	–5%	50%	–10%	30%	–5%	30%	–5%	30%
TOTAL $	$514,140	$811,800	$287,090	$604,400	$606,575	$957,750	$750,600	$1,084,200	$1,913,680	$2,618,720	$6,080	$8,320
RISK PROFILE & CORRELATION FOR	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
EACH COST ELEMENT	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-4-151

000823

FEMP-OU02-5 DRAFT
August 24, 1994

861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2, SOUTH FIELD – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940749
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$1,449,700	BASE EST:	$85,300	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			–1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	–5%	25%										
(OTHER)												
TOTAL %	–5%	25%	–1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$1,377,215	$1,812,125	$84,447	$86,153	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

LCC ANALYSIS TITLE:	AFP - CONSOLIDATION AND CAPPING (EXPANDED TRESPASSER)			
WBS NO.:	1.1.1.1.2.3.4		TASK NO.:	2CAF
ALTERNATIVE:	2		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	36 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	07-Aug-94
DOCUMENT NO.:	LCC-94-03-03	EST. NO. C2-94-07-50 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$2,877,033	$0	$0	$2,877,000	1997
$8,631,100	$0	$0	$8,631,100	1998
$5,754,067	$0	$0	$5,754,100	1999
$0	$202,459	$0	$202,500	2000
$0	$181,030	$0	$181,000	2001
$0	$181,030	$0	$181,000	2002
$0	$181,030	$0	$181,000	2003
$0	$201,030	$0	$201,000	2004
$0	$115,030	$0	$115,000	2005
$0	$115,030	$0	$115,000	2006
$0	$115,030	$0	$115,000	2007
$0	$115,030	$0	$115,000	2008
$0	$135,030	$0	$135,000	2009
$0	$115,030	$0	$115,000	2010
$0	$115,030	$0	$115,000	2011
$0	$115,030	$0	$115,000	2012
$0	$115,030	$0	$115,000	2013
$0	$135,030	$0	$135,000	2014
$0	$115,030	$0	$115,000	2015
$0	$115,030	$0	$115,000	2016
$0	$115,030	$0	$115,000	2017
$0	$115,030	$0	$115,000	2018
$0	$135,030	$0	$135,000	2019
$0	$115,030	$0	$115,000	2020
$0	$115,030	$0	$115,000	2021
$0	$115,030	$0	$115,000	2022
$0	$115,030	$0	$115,000	2023
$0	$135,030	$0	$135,000	2024
$0	$115,030	$0	$115,000	2025
$0	$115,030	$0	$115,000	2026
$0	$115,030	$0	$115,000	2027
$0	$115,030	$0	$115,000	2028
$0	$135,030	$0	$135,000	2029
				2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$17,262,200	$3,922,300	$0	$21,183,700	TOTAL
$15,388,700	$2,364,800	$0	$17,753,100	<====(@NPV)

EST FILE #: C2940750

F ERMC O
ESTIMATING SERVICES

DATE: 07-Aug-94

CLIENT: US DOE

SUMMARY SHEET

ESTIMATOR: KEN KEPLER

PROJECT TITLE: ALT-2 - AFP - CONSOLIDATION & CAPPING

LOCATION: FERNALD

WBS#: 1.1.1.1.2.3.4 EXPANDED TRESPASSER

TASK#: 2CAF

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL CONSOLIDATION & CONTAINMENT - CLAY CAP	81,041		$1,378,800	$710,400	$1,560,000	$3,649,200
2		PERCHED GROUNDWATER SYS. - INTERCEPTOR TRENCH (SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		81,041		$1,378,800	$710,400	$1,560,000	$3,649,200
11	SUPERVISION - CONTRACTOR				$234,000			$234,000
12	SM TOOLS/CONSM'BLS						$82,700	$82,700
13	EQUIPMENT RENTAL						$1,122,000	$1,122,000
14	TEMP. FACILITIES				$29,000		$53,800	$82,800
15	TEMP UTL'S HOOK-UP				$14,500		$26,900	$41,400
16	JOB CLEAN-UP				$29,000		$53,800	$82,800
17	SAFETY				$14,500		$26,900	$41,400
18	HEALTH PHYSICS S/C				$190,600			$190,600
19	CERCLA/SAT $1,500 PER PERSON					$42,000		$42,000
20	BOND					$36,500		$36,500
21	OVERHEAD & PROFIT					$504,500		$504,500
22	PAYRL BRD.&BENFT.				$983,000			$983,000
	INDIRECT FIELD COSTS				$1,494,600	$583,000	$1,368,100	$3,443,700
	DIRECT & INDIRECT FIELD COSTS				$2,873,400	$1,293,400	$2,926,100	$7,092,900
23	TRANSPORTATION & BURIAL	N/A						
24	WASTE CONTAINERS	N/A						
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$12,000		$12,000
25	SCREENING & CONFIRMATION TESTING					$2,321,100		$2,321,100
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$893,700			$893,700
	FERMCO FIELD SUPPORT COSTS				$893,700	$2,333,100		$3,226,800
28	EMISSION MODELING				$12,400		$23,100	$35,500
29	PSAR/FSAR(SAFETY RPT)				$305,000			$305,000
30	ENGINEERING	TITLE I&II $1,028,500 TITLE III	$1,063,800	CDR	$368,800	DCR	$347,600	$2,808,800
	ENGINEERING COSTS							$3,149,300
31	SALES TAX	6.0% SUB-TOTAL MATERIAL DOLLARS					$2,949,200	$177,000
	SUB-TOTAL	(BASE ESTIMATE)						$13,648,000
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	19.5%						$2,661,000
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$16,307,000
35	CONTINGENCY	7.0%						$955,200
								PRELIMINARY
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$17,262,200

LOTUS31\FS2\ALT2\AFP\INDSUM.WK3 - FEASABILITY STUDY

Alternative 2 – Consolidation and Capping
(Expanded Trespasser)

Active Flyash Pile

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	1	1	5	sample	$5,500.00	24	NA	$132,000	9 wells x 4 samples/year
Long Term	1	6	30	sample	$5,500.00	12	NA	$66,000	9 wells x 2 samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	1.5	1.94	$751	Inspect all wells twice/year. Repair 1 out of 8.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Long Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Well Inspect & Maint.	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Perched Groundwater (South Field Vicinity)									
Pumping	1	1	30	lump sum	$300.00	1	1.29	$387	
Pump Maintenance	1	1	30	lump sum	$1,088.26	1	1.29	$1,404	
Pipeline Maintenance	1	1	30	lump sum	$922.36	1	1.29	$1,190	
Treatment & Disposal	1	1	30	gallons	$0.01	1,590,000	NA	$15,900	
OU2 Waste Cell Leachate									
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Facility Maint. at Subunit									
Cap Maint. & Repairs	1	1	30	acre	$2,183.32	4.7	6.06	$13,237	Approx. 4.7 Acres
Mowing	1	1	30	acre	$1,861.92	5.7	7.35	$13,691	Approx. 5.7 Acres
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.7	0.90	$1,780	Approx. 1400 ft perimeter
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Fence Repair	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of Subunit	5	5	30	lump Sum	$20,000.00	1	NA	$20,000	Total divided among 5 subunits
Facility Review of OU2 Cell	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative

Annual Costs, Year 1 (excluding facility review)	$202,459
Annual Costs, Years 2–5 (excluding facility review)	$181,030
Annual Costs, Years 6–30 (excluding facility review)	$115,030
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 B:

8/3/94

DATE: 05-Aug-94

PROJECT TITLE:
ALT-2 - AFP - CONSOLIDATION & CAPPING
WBS#:
1.1.1.1.2.3.4

HEALTH PHYSICS

EST.NO.: C2940750
EST. : KEN KEPLER
TASK I.D. :
2CAF

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS) *	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	0	$0	C/B		
SUB-TOTAL		31.80	4		$0			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	0		$0	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	0		$0	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	0		$0	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	0		$0	C/B		
THERMO STRIPS	EA	50.00	0		$0	C/B		
SUB-TOTAL		327.21			$0			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$0			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE.
COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

000828

DATE: 05-Aug-94

PROJECT TITLE:
ALT-2 - AFP - CONSOLIDATION & CAPPING
WBS#:
1.1.1.1.2.3.4

HEALTH PHYSICS

EST.NO.: C2940750
EST. : KEN KEPLER
TASK I.D. :
2CAF

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	28	112	$16.97	$1,900		
ANNUAL PHYSICALS	1	3	28	84	$16.97	$1,430		
EXIT (TERMINATION) PHYSICALS	1	4	28	112	$16.97	$1,900		
SUB-TOTAL						$5,230		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	24	1	28	680	$16.97	$11,550		
YEARLY IN-VIVO	1	4	28	112	$16.97	$1,900		
EXIT (END OF PROJECT / TERMINATION)	1	4	28	112	$16.97	$1,900		
SUB-TOTAL						$15,350		
WORK DELAYS CAUSED BY MONITORING	5%				$1,699,800	$84,990		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$1,699,800	$84,990		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$190,600	$0	$190,600

000829

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT –ALT–2 – AFP – CONSOLIDATION & CAPPING
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CAF

WBS NO. – 1.1.1.1.2.3.4
EST. NO. – C2940750
BY – K. KEPLER
DATE – 08/05/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25–Mar–94	01–Jun–97	31–May–98	31–May–99	24	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
50	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

000830

CONTR.NO.- [redacted]321
CLIENT - U.S. DEPT. OF ENERGY
PROJECT - ALT-2 - AFP - CONSOLIDATION & CAPPING - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940750
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON-SITE DISPOSAL (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		34,842						$592,390	$15,000	$157,690	$222,930	$988,010
DECONTAMINATION FACILITIES/SERVICES	1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210
EROSION AND SEDIMENT CONTROLS	1	LS		1299						$23,760		$6,340	$38,580	$68,680
PERCHED GROUNDWATER SYSTEM	1	LS		2741						$46,510	$22,000	$32,550	$68,310	$169,370
EXCAVATE - OFFSITE DISPOSAL	N/A													N/A
LOAD/HAUL - OFF-SITE DISPOSAL	N/A													N/A
EXCAVATE & HAUL TO ON-SITE DISPOSAL (In-Place Consolidation)	1	LS		11820						$200,580		$231,320	$190	$432,090
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	1	LS		17444						$296,020	$366,910	$435,890	$914,210	$2,013,030
DIKE FOR DISPOSAL CELL	N/A													N/A
GENERATED WASTE REMOVAL	1	LS		593						$10,060		$4,600		$14,660
SITE RESTORATION	1	LS		4634						$78,630		$150,300	$168,460	$397,390
MONITORING WELLS	1	LS									$216,000			$216,000
SUB-TOTAL (DIRECT FIELD COSTS)				73674						$1,253,440	$645,800	$1,020,010	$1,418,190	$4,337,440
TAKE-OFF ALLOWANCE 10%	1	LS		7,367						$125,340	$64,580	$102,000	$141,820	$433,740
TOTAL (DIRECT FIELD COSTS)	1	LS		81,041						$1,378,800	$710,400	$1,122,000	$1,560,000	$4,771,200

On-Site Disposal of Active Flyash Pile - No Treatment - SUMMARY

PAGE 1 of 1

F-4-159

000831

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – AFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940750
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 33.3% ARE COMMON TO SF, AFP & IFP)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	4000	LF	0.213	1099	16.97				6.25	$18,650			$25,750	$44,400
c. Clear and Grub														
i. Remediation Site	5.70	AC	41.40	304	16.97			2575.00		$5,160		$15,120		$20,280
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Staging Area @ Sub–unit														
d. Dewatering														
i. Excavate Dewatering Trench	400	CY	0.50	258	16.97			1.49		$4,380		$610		$4,990
ii. Pump – w/4" Suction Hose	120	DAYS	3.00	464	16.97			19.55		$7,870		$2,420		$10,290
iv. HDPE Pipe to Sedimentation Tank	300	LF	0.19	74	16.97			0.67	0.84	$1,260		$210	$260	$1,730
v. Remove Sediment fm. Tank – 1cy/trip	1	CY	4.00	5	16.97			100.00		$80		$100		$180
e. General Grading														
i. New Roads	4667	SY	0.001	6	16.97			0.07		$100		$340		$440
33.3%														
ii. Office/Parking Area 2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area 272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area 49	16	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub–Unit 2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	4667	SY	0.030	181	16.97			1.08	6.66	$3,070		$5,190	$32,010	$40,270
33.3%														
ii. Office/Parking – 8" Gravel W/ Geot 2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc.Slab 2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk. 631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" thl 24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub–grade Piping – 4" 500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating 2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab 183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip. 1	0.33	LS	2.00	1	16.97			184.00		$20		$60		$80
SUB–TOTAL (SITE PREPARATION)	1	LS		4,076						$70,310	$15,000	$32,390	$93,150	$210,850

Site Preparation Details

F-4-160
000832
FEMP-OU02-5 DRAFT
August 21, 1994

CONTR.NO. – [illegible]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-2 – AFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940750
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION (CON'T.) (ITEMS @ 33.3% ARE COMMON TO SF, AFP & IFP)															
h. Rerouted Drainage Ditch	100%														
i. Excavation	BCY	5100	BCY	0.50	3290	16.97			1.49		$55,830		$7,830		$63,660
ii. Backfill	15000	18000	ICY	0.06	1393	16.97			1.67	3.50	$23,640		$30,960	$64,890	$119,490
i. Removal of existing piping	100%														
i. Excavate HDPE Water Line	6"	804	CY	0.846	877	16.97			0.80		$14,880		$660		$15,540
ii. Excavate HDPE South Flume Line	24"	1128	CY	1.24	1809	16.97			0.54		$30,700		$630		$31,330
iii. Remove HDPE Water Line	6"	1200	LF	0.16	248	16.97			0.56		$4,210		$690		$4,900
iv. Remove HDPE South Flume Line	24"	1200	LF	0.94	1455	16.97			3.29		$24,690		$4,070		$28,760
v. Load,Haul,Dump HDPE Water Line	6"	31	CY	0.30	12	16.97			2.51		$200		$80		$280
vi. Load,Haul,Dump HDPE S.Flume Li	24"	102	CY	0.30	39	16.97			2.51		$660		$260		$920
j. New Piping – Rerouted	100%														
i. Exc.&Bkf.HDPE Water Line	6"	1139	CY	0.40	588	16.97			1.40		$9,980		$1,640		$11,620
ii. Exc.& Bkf. HDPE South Flume Lin	24"	1598	CY	0.40	825	16.97			1.40		$14,000		$2,300		$16,300
iii. Install New HDPE Water Line	6"	1700	LF	0.32	702	16.97			1.12		$11,910		$1,960		$13,870
iv. Install New HDPE South Flume Li	24"	1700	LF	1.89	4145	16.97			6.61		$70,340		$11,570		$81,910
SUB-TOTAL (SITE PREPARATION)		1	LS		15,383						$261,040		$62,650	$64,890	$388,580
TOTAL (SITE PREPARATION)		1	LS		34,842						$592,390	$15,000	$157,690	$222,930	$988,010

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Site Preparation Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-4-161

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – AFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940750
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	33.3%														
a. Decon Trailer – Rental	51	17	MO					1500.00				$25,470			$25,470
	33.3%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'i.d.x 25lfx8	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in con	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
	BCY														
x. Backfill & Compaction around concrete slab	258	103	ICY	0.086	11	16.97			1.38		$190		$150		$340
SUB–TOTAL (EQUIP. DECON. FACILITY)					265						$4,810	$25,860	$1,210	$4,140	$36,020

Equipment Decon. Facility Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted]. DEPT. OF ENERGY
PROJECT – ALT–2 – AFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940750
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	33.3%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Gua	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in (	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	0	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210

Personnel Decon.Facilities/Services Details

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F-4-163

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – AFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940750
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	2500	LF	0.017	55	16.97			0.06	0.65	$930		$150	$1,670	$2,750
ii.Diversion Berms	100	CY	0.24	31	16.97			0.84	7.50	$530		$80	$750	$1,360
iii. Diversion Ditches	100	CY	0.24	31	16.97			0.84	7.50	$530		$80	$750	$1,360
iv. Sediment Traps	50	EA	8.00	516	16.97			5.00	70.00	$8,760		$250	$3,500	$12,510
v. Hay Bales	100	EA	0.24	31	16.97			1.53	1.35	$530		$160	$140	$830
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1000	LF	0.38	491	19.95			5.11	4.42	$9,800		$5,110	$4,420	$19,330
iv. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhol W/Cleanout	3	EA	8.00	31	16.97			28.00	8300.00	$530		$80	$24,900	$25,510
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,299						$23,760		$6,340	$38,580	$68,680

Erosion Control Details

PAGE 6 of 14

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000836

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-2 – AFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940750
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PERCHED GROUNDWATER COLLECTION														
a. Interceptor Trench														
i. Trench Excavation														
950' x 3'w x 25' deep + 20% for slope BCY	3165	BCY	0.05	204	16.97			1.80		$3,460		$5,870		$9,330
Load & Haul 3165	3956	LCY	0.064	327	16.97			2.52		$5,550		$10,270		$15,820
ii. HDPE Liner 40 mil														
29' x 950 lf + 20% for slope	3165	SY					6.75				$22,000			$22,000
iii. HDPE Perforated Pipe														
Buried in Pea Gravel 6" Dia.	950	LF	0.30	368	16.97			1.05	6.56	$6,240		$1,030	$6,420	$13,690
iv. Geotextile Fabric wrapped around 6" Pipe														
2' x 950 lf	217	SY	0.020	6	16.97			0.02	1.46	$100			$330	$430
v. Pea Gravel Layer BCY														
10' x 3' x 950' + 20% 1268	1363	ICY	0.11	193	16.97			0.77	17.00	$3,280		$1,080	$23,870	$28,230
vi. Sand BCY														
12' x 3' x 950' + 20% 1520	1634	ICY	0.052	110	16.97			1.76	5.00	$1,870		$2,960	$8,420	$13,250
vii. Clay Backfill														
3' x 6' x 950' +20% BCY														
3' x 3' x 950'x .5 +20% 950	1121	ICY	0.063	91	16.97			2.18	3.70	$1,540		$2,520	$4,270	$8,330
viii. Precast Wetwell 4ft Sq. x 8 ft Deep	1	EA	12.00	15	16.97			100.00	445.00	$250		$100	$460	$810
a. Excavate 6' x 6' x 8.5' – 11.3 CY	11.3	BCY	0.178	3	16.97			5.05		$50		$60		$110
b. Backfill / Compact 6.6	8	ICY	0.069	1	16.97			0.72		$20		$10		$30
ix. Pump 20 gpm w/ piping, controls & elect.	950	LF	0.68	833	16.97			2.38	19.50	$14,140		$2,330	$19,080	$35,550
x. 2"/4" HDPE Carrier/Container Pipe Includes Trench Excav/Backfill, Sand Pipe Bedding, Compaction	1200	LF	0.381	590	16.97			5.11	4.42	$10,010		$6,320	$5,460	$21,790
TOTAL(PERCHED GROUNDWATER COLLECTION)	1	LOT		2,741						$46,510	$22,000	$32,550	$68,310	$169,370

Perched Groundwater Collection Details

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – AFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940750
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE AND CONSOLIDATE														
(NO TREATMENT)														
Excavate Flyash														
Excavate Flyash – Level D	65100	BCY	0.055	4619	16.97			1.17		$78,380		$78,450		$156,830
Excavate Additional Soil	6500	BCY	0.055	461	16.97			1.17		$7,820		$7,830		$15,650
(SHREDDING COMMON TO SWL, IFP & SF)														
k. Shredder/Crusher – Purchase/Install	N/A	LOT	280.0					8400.00	317800.00					
60 Ton per Hour														
Excavated Debris BCY N/A														
Generated Waste BCY 771														
Excavated Debris TONS N/A														
(Percent of Gen.Waste to be Shredded 25%														
Generated Waste TONS 443.3														
TOTAL TONS 443														
Operating Costs	7	HRS							25.75				$190	$190
(2) Operators	14	HRS	1.00	18	16.97					$310				$310
On–Site Consolidation BCY														
Impacted Fill 71600	85920	ICY	0.06	6650	16.97			1.67		$112,850		$143,490		$256,340
Generated Waste 771	925	ICY	0.06	72	16.97			1.67		$1,220		$1,550		$2,770
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load – Level C	N/A	BCY	0.055		16.97			1.17						
Haul to Onsite Disposal Cell BCY N/A		LCY	0.081		16.97			1.51						
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C		HRS	S/T 150% S/T		16.97			1.51						
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)		MD												
TOTAL (EXCAV/NO TREATMENT–ONSITE DISPOSAL)	1	LOT		11,820						$200,580		$231,320	$190	$432,090

Excavate – No Treatment – AFP Onsite Disposal Details

PAGE 8 of 14

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CONTR.NO.– [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – AFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940750
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

	DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	COMPOSITE CAP															
	COMPOSITE CAP															
	a. Contouring Layer 18" Thk.	BCY 11200	13440	ICY	0.06	1040	16.97			1.67	3.50	$17,650		$23,120	$48,450	$89,220
	b. 95% Clay – 5% Bentonite 24" Thk	BCY 14933	16053	ICY	0.260	5384	16.97			11.19	20.35	$91,370		$185,020	$336,480	$612,870
	c. GML\GCC – composite Liner		22400	SY					7.38				$165,310			$165,310
	d. Geotextile Fabric		22400	SY					2.25				$50,400			$50,400
	e. Pea gravel 12" Thk, In–place	BCY 7467	8027	ICY	0.11	1139	16.97			0.77	17.00	$19,330		$6,370	$140,550	$166,250
	f. Geotextile Fabric		22400	SY					2.25				$50,400			$50,400
	g. Cobbels 36" Thk; In–place	BCY 22400	24080	ICY	0.258	8014	16.97			7.15	10.10	$136,000		$177,340	$250,500	$563,840
	h. Geotextile Fabric		22400	SY					2.25				$50,400			$50,400
	i. Sand Layer 6" Thk; In–place	BCY 3733	4013	ICY	0.052	269	16.97			1.76	5.00	$4,560		$7,270	$20,670	$32,500
	j. Geotextile Fabric		22400	SY					2.25				$50,400			$50,400
	k. Common Soil 21" Thk; In–place	BCY 13067	15680	ICY	0.06	1214	16.97			1.67	3.50	$20,600		$26,970	$56,530	$104,100
	l. Top Soil 6" Thk; In–place	BCY 3733	4480	ICY	0.053	306	16.97			1.82	12.10	$5,190		$8,400	$55,830	$69,420
	m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding	SY 22400	202	MSF	0.30	78	16.97			6.75	25.00	$1,320		$1,400	$5,200	$7,920
	TOTAL (COMPOSITE CAP)		1	LOT		17,444						$296,020	$366,910	$435,890	$914,210	$2,013,030

Composite Cap Details

FEMP-OU02-5 DRAFT
August 24, 1994

000839

5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – AFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940750
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL															
a. Office/Parking Area @ S/U	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo–Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Facil.@ S/U	33%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo–Fabric & Liner	167	56	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Facil. @ S/U	33%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292					9.16				$10		$10
Geo–Fabric & Liner	14	5	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
d. Staging Pad at S/U															
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excavate, Load, Haul, Backfill, Compact						16.97									
Sub–grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo–Fabric & Liner	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Consolidate & Dump Rubble	395.5	132	BCY	0.30	51	16.97			2.51		$870		$340		$1,210
TOTAL GENERATED WASTE	BCY 771 LCY 887														
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		593						$10,060		$4,600		$14,660

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-2 – AFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940750
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off-site source															
a. Borrow Common Soil, Backfill	BCY														
Active Flyash Pile	20000	24000	ICY	0.09	2786	16.97			3.21	3.50	$47,280		$79,350	$86,520	$213,150
	33.3%														
Office/Parking	494	197	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	31	ICY												
Decon.Facil.– Personnel @ S/U	7	3	ICY												
Staging Area @ S/U	1099	439	ICY												
	S/T	670.5	ICY	0.09	78	16.97			3.21	3.50	$1,320		$2,220	$2,420	$5,960
b. Final Grade for AFP		19600	SY	0.02	506	16.97			0.70		$8,590		$14,130		$22,720
c. Borrow Top Soil 6" Thk., Spread															
Active Flyash Pile		19600	SY	0.036	910	16.97			2.33	2.88	$15,440		$47,040	$58,140	$120,620
	33.3%														
Office/Parking	2222	740	SY												
Decon.Facil.– Const.Equip. @ S/U	167	56	SY												
Decon.Facil.– Personnel @ S/U	14	5	SY												
Staging Area @ S/U	2845	947	SY												
	S/T	1747.6	SY	0.036	81	16.97			2.33	2.88	$1,370		$4,190	$5,180	$10,740
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Active Flyash Pile	19600	176	MSF	0.30	68	16.97			6.75	25.00	$1,150		$1,220	$4,530	$6,900
	33.3%														
Office/Parking	2222	6.7	MSF												
Decon.Facil.– Const.Equip. @ S/U	167	0.5	MSF												
Decon.Facil.– Personnel @ S/U	14		MSF												
Staging Area @ S/U	2845	8.5	MSF												
	S/T	15.7	MSF	0.30	6	16.97			6.75	25.00	$100		$110	$400	$610
e. Security Fence – 6ga aluminized – 6' high		1080	LF	0.13	178	16.97			1.64	9.80	$3,020		$1,820	$10,900	$15,740
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
TOTAL (SITE RESTORATION)		1	LOT		4,634						$78,630		$150,300	$168,460	$397,390

Site Restoration Details

PA[redacted]1 of 14

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000841

FEMP-OU02-5 DRAFT
August 24, 1994

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – AFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940750
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility	6	PR					23000.00				$138,000			$138,000
b. Abandon Existing Wells	6	EA					13000.00				$78,000			$78,000
TOTAL (MONITORING WELLS)	1	LOT									$216,000			$216,000

Monitoring Wells Details

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000842

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – AFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940750
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	95000	GAL					0.01				$1,000			$1,000
Runnoff from the Exclusion Zone.	1100000	GAL					0.01				$11,000			$11,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$12,000			$12,000

Waste Water Treatment Operations Cost Details

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FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–2 – AFP – CONSOLIDATION & CAPPING – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940750
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	358	EA					2,002				$716,700			$716,700
Rad	358	EA					2,000				$716,000			$716,000
Confirmatory Tests														
Full Rad Tests	179	EA					3,101				$555,100			$555,100
Full HSL	20	EA					1,500				$30,000			$30,000
Full TCLP	20	EA					2,000				$40,000			$40,000
2 Technicians per Month	20	MO					13,163				$263,300			$263,300
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS	1	LOT									$2,321,100			$2,321,100

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Screening & Confirmation Testing Details

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FEMP-OU02-5 DRAFT
August 24, 1994

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 2, AFP – CONSOLIDATION AND CAPPING (EXPANDED TRESPASSER)
CLIENT: DOE DATE: 07–Aug–94
CONTRACT: C2–94–07–50 BASE ESTIMATE: $13,646,000

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$19,718,149	$6,072,149	44.5%
0.05%	$17,983,428	$4,337,428	31.8%
5.00%	$17,280,743	$3,634,743	26.6%
10.00%	$17,051,016	$3,405,016	25.0%
15.00%	$16,932,885	$3,286,885	24.1%
20.00%	$16,813,026	$3,167,026	23.2%
25.00%	$16,695,302	$3,049,302	22.3%
30.00%	$16,614,128	$2,968,128	21.8%
35.00%	$16,527,643	$2,881,643	21.1%
40.00%	$16,449,350	$2,803,350	20.5%
45.00%	$16,370,393	$2,724,393	20.0%
50.00%	$16,297,447	$2,651,447	19.4%
55.00%	$16,235,336	$2,589,336	19.0%
60.00%	$16,155,790	$2,509,790	18.4%
65.00%	$16,076,681	$2,430,681	17.8%
70.00%	$15,987,016	$2,341,016	17.2%
75.00%	$15,905,049	$2,259,049	16.6%
80.00%	$15,800,655	$2,154,655	15.8%
85.00%	$15,702,304	$2,056,304	15.1%
90.00%	$15,534,171	$1,888,171	13.8%
95.00%	$15,324,319	$1,678,319	12.3%
99.95%	$14,579,925	$933,925	6.8%
100.00%	$12,897,772	($748,228)	–5.5%

FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

PROJECT: ALT. 2, AFP – CONSOLIDATION AND CAPPING (EXPANDED TRESPASSER)
CLIENT: DOE
CONTRACT: C2-94-07-50

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$651,630	-5.0%	$619,049	30%	$847,119	U		14%
2	SITE PREPERATION S/C	16,500	-5.0%	15,675	30%	21,450	U		14%
3	SITE PREPERATION MAT'L	245,220	-5.0%	232,959	20%	294,264	U		20%
4	DECON FACILITIES/SERVICES LABOR	6,040	-2.0%	5,919	80%	10,872	U		2%
5	DECON FACILITIES/SERVICES S/C	28,480	-6.0%	26,771	80%	51,264	U		7%
6	DECON FACILITIES/SERVICES MAT'L	6,060	-6.0%	5,696	60%	9,696	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	26,140	-5.0%	24,833	50%	39,210	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	42,440	-5.0%	40,318	30%	55,172	U		14%
9	PERCHED GROUNDWATER LABOR	51,160	-5.0%	48,602	50%	76,740	U		9%
10	PERCHED GROUNDWATER S/C	24,200	-5.0%	22,990	50%	36,300	U		9%
11	PERCHED GROUNDWATER MAT'L	75,140	-5.0%	71,383	30%	97,682	U		14%
12	EXC & CONT ON-SITE DISP LABOR	220,640	-4.0%	211,814	125.0%	496,440	U		3%
13	EXC & CONT ON-SITE DISP MAT'L	210	-1.0%	208	100.0%	420	U		1%
14	COMPOSITE CAP LABOR	325,620	-10.0%	293,058	100.0%	651,240	U		9%
15	COMPOSITE CAP S/C	403,600	-6.0%	379,384	80.0%	726,480	U		7%
16	COMPOSITE CAP MAT'L	1,005,650	-6.0%	945,311	80.0%	1,810,170	U		7%
17	GENERATED WASTE REMVL LABOR	11,070	-5.0%	10,517	50.0%	16,605	U		9%
18	SITE RESTORATION LABOR	86,490	-5.0%	82,166	30.0%	112,437	U		14%
19	SITE RESTORATION MAT'L	185,310	-5.0%	176,045	30.0%	240,903	U		14%
20	MONITORING WELLS S/C	237,600	-5.0%	225,720	50.0%	356,400	U		9%
21	INDIRECT FIELD COSTS LABOR	1,494,600	-5.0%	1,419,870	50.0%	2,241,900	U		9%
22	INDIRECT FIELD COSTS S/C	583,000	-5.0%	553,850	100.0%	1,166,000	U		5%
23	INDIRECT FIELD COSTS MAT'L	1,366,100	-5.0%	1,297,795	50.0%	2,049,150	U		9%
24	FIELD SUPPORT COSTS LABOR	893,700	-10.0%	804,330	30.0%	1,161,810	U		25%
25	FIELD SUPPORT COSTS S/C	2,333,100	-5.0%	2,216,445	30.0%	3,033,030	U		14%
26	ENGINEERING COSTS	3,149,300	-5.0%	2,991,835	25.0%	3,936,625	U		17%
27	SALES TAX MAT'L	177,000	-1.0%	175,230	1.0%	178,770	U		50%
28				0		0			0%
29				0		0			0%
30				0		0			0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$13,646,000		$12,897,772		$19,718,149			

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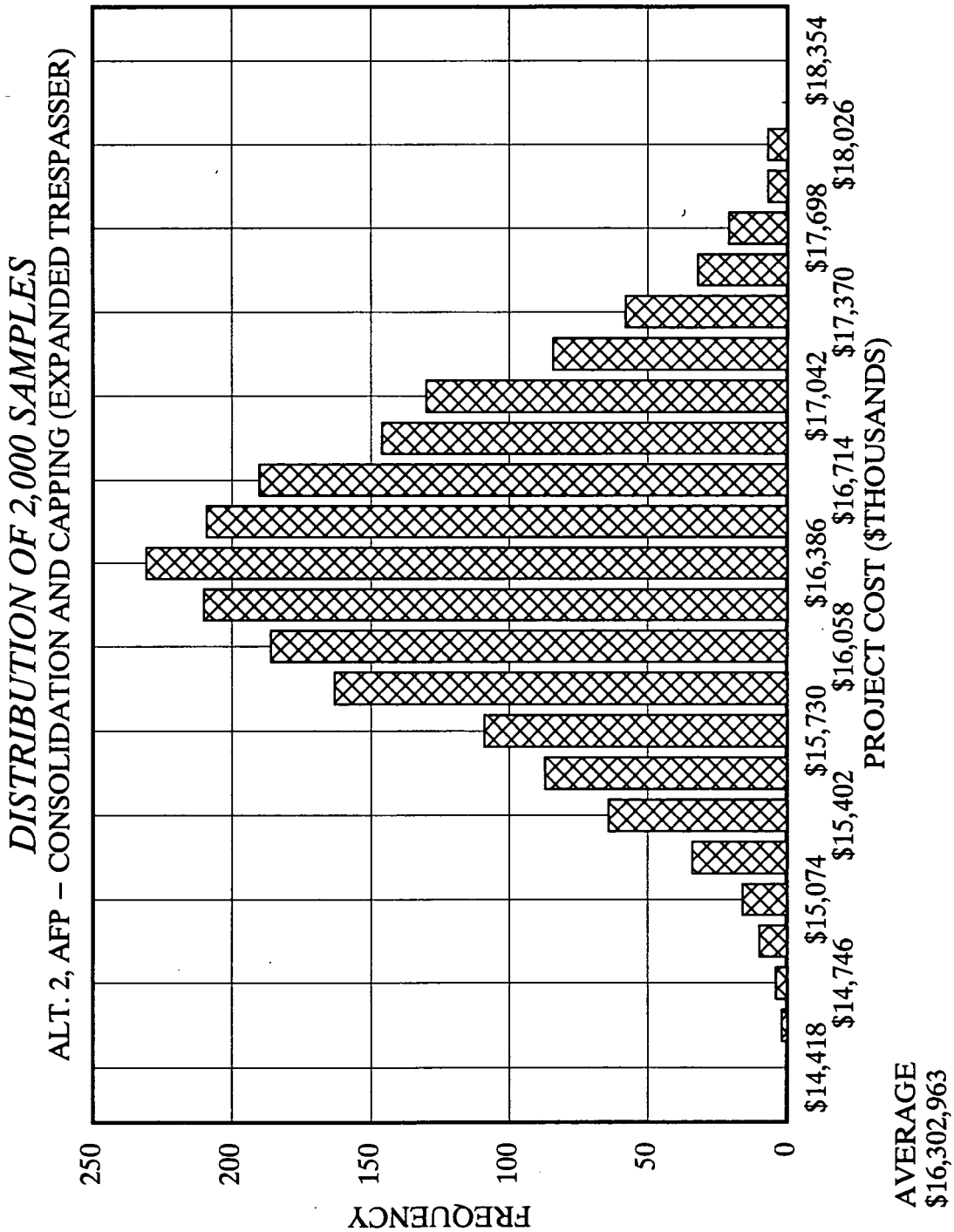
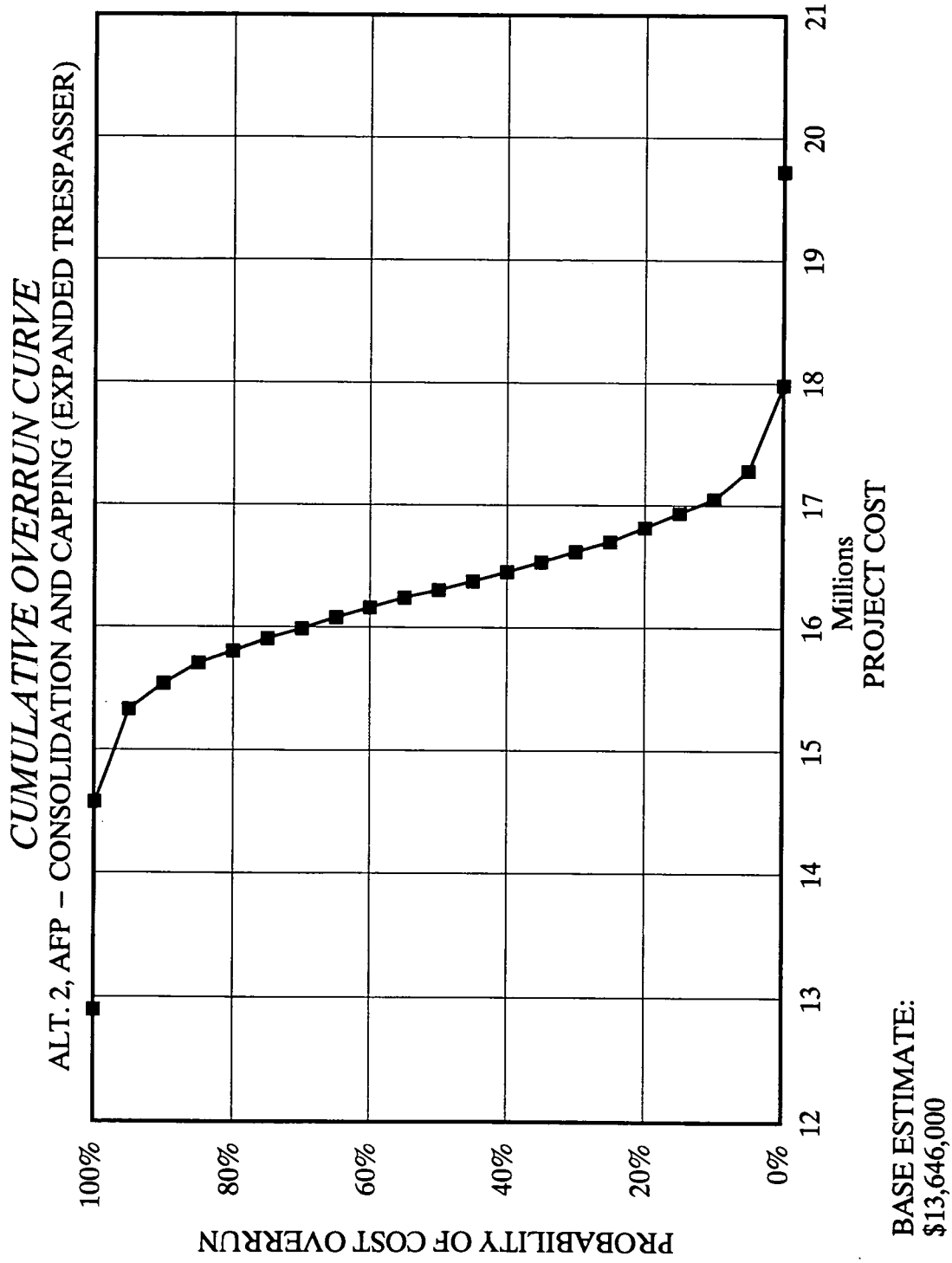

DISTRIBUTION OF 2,000 SAMPLES
ALT. 2, AFP – CONSOLIDATION AND CAPPING (EXPANDED TRESPASSER)
FREQUENCY
250
200
150
100
50
0
$14,418
$14,746
$15,074
$15,402
$15,730
$16,058
$16,386
$16,714
$17,042
$17,370
$17,698
$18,026
$18,354
PROJECT COST ($THOUSANDS)
AVERAGE
$16,302,963

000847



BASE ESTIMATE:
$13,646,000

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2 – AFP – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940750
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$13,646,000	BASE EST:	$651,630	BASE EST:	$16,500	BASE EST:	$245,220	BASE EST:	$6,040	BASE EST:	$28,480	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	30%					–1%	30%				
MATERIAL PRICING			–5%	30%	–5%	20%			–5%	30%	–5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							–1%	50%	–1%	50%	–1%	40%
(OTHER)												
TOTAL %	–5%	30%	–5%	30%	–5%	20%	–2%	80%	–6%	80%	–6%	60%
TOTAL $	$619,049	$847,119	$15,675	$21,450	$232,959	$294,264	$5,919	$10,872	$26,771	$51,264	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000849

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F-4-177

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2 – AFP – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940750
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$26,140	BASE EST:	$0	BASE EST:	$42,440	BASE EST:	$51,160	BASE EST:	$24,200	BASE EST:	$75,140
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-5%	50%				
MATERIAL PRICING					-5%	30%			-5%	50%	-5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	-5%	50%	-5%	50%	-5%	30%
TOTAL $	$24,833	$39,210	$0	$0	$40,318	$55,172	$48,602	$76,740	$22,990	$36,300	$71,383	$97,682

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-4-178

000850

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2 – AFP – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940750
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2 – AFP – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940750
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

	EXCAVATE & CONTAIN. ON-SITE DISPOSAL LABOR $'s		EXCAVATE & CONTAIN ON-SITE DISPOSAL S/C $'s		EXCAVATE & CONTAIN ON-SITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$220,640	BASE EST:	$0	BASE EST:	$210	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	5%	75%										
MATERIAL PRICING					-1%	100%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%										
PROJECT DEFINITION												
(OTHER)												
TOTAL %	4%	125%	0%	0%	-1%	100%	0%	0%	0%	0%	0%	0%
TOTAL $	$229,466	$496,440	$0	$0	$208	$420	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000852

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2 – AFP – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940750
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		CLAY CAP LABOR $'s		CLAY CAP S/C $'s		CLAY CAP MAT'L. $'s	
	BASE EST:	$325,620	BASE EST:	$403,600	BASE EST:	$1,005,650	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%										
MATERIAL PRICING			–5%	30%	–5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–5%	50%	–1%	50%	–1%	50%						
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–10%	100%	–6%	80%	–6%	80%	0%	0%	0%	0%	0%	0%
TOTAL $	$293,058	$651,240	$379,384	$726,480	$945,311	$1,810,170	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–2 – AFP – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940750
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$11,070	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							–5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	–5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$10,517	$16,605	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000854

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2 – AFP – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940750
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$86,490	BASE EST:	$0	BASE EST:	$185,310	BASE EST:	$0	BASE EST:	$237,600	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$82,166	$112,437	$0	$0	$176,045	$240,903	$0	$0	$225,720	$356,400	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2 – AFP – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940750
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$1,494,600	BASE EST:	$583,000	BASE EST:	$1,366,100	BASE EST:	$893,700	BASE EST:	$2,333,100	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–10%	30%				
MATERIAL PRICING			–5%	100%	–5%	50%			–5%	30%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	–5%	100%	–5%	50%	–10%	30%	–5%	30%	0%	0%
TOTAL $	$1,419,870	$2,241,900	$553,850	$1,166,000	$1,297,795	$2,049,150	$804,330	$1,161,810	$2,216,445	$3,033,030	$0	$0
RISK PROFILE & CORRELATION FOR	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
EACH COST ELEMENT	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000856

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-2 – AFP – CONSOLIDATION & CAPPING
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940750
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$3,149,300	BASE EST:	$177,000	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			−1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	−5%	25%										
(OTHER)												
TOTAL %	−5%	25%	−1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$2,991,835	$3,936,625	$175,230	$178,770	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

APPENDIX - F.5

DETAILED COST ESTIMATE

ALTERNATIVE 3 - EXCAVATION AND OFF-SITE DISPOSAL

A. FEDERAL OWNERSHIP (Expanded Trespasser)

B. PRIVATE OWNERSHIP (Residential Farmer)

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BASIS OF ESTIMATE

PROJECT DESCRIPTION: ALT-3A AND ALT-3B - EXCAVATION AND OFF-SITE DISPOSAL TO ENVIROCARE
WBS NUMBER: 1.1.1.1.2.3.__
PROJECT LOCATION: FERNALD, OHIO
PROJECT ENGINEER: GREG JONES
ESTIMATOR: KEN KEPLER
ESTIMATE NUMBER: C29407__ __

SUPPORTING DOCUMENTATION:

Verbal Scope	X	P & ID's		Work Plan	
Drawings	X	Equipment List		Site Walk	
Sketch	X	Specifications		Eng Mtg	
Flow Diagrams		Site H & S Plan		Price Quotes	X

TYPE OF ESTIMATE:

Plan/Feasbl	X	Budg/Concpt		Title I Des	
Title II Des		Government		Independent	
Construction		Baseline			

BASIS OF ESTIMATE:

This Basis of Estimate represents the five Operable Unit 2 subunits (SWL - Solid Waste Landfill, LSP - Lime Sludge Ponds, SF - South Field, AFP - Active Flyash Pile, IFP - In-active Flyash Pile) supporting alternatives 3A and 3B for the OU2 Feasibility Studies based on federal ownership (expanded trespasser) or private ownership (resident farmer) scenarios to determine the level of clean-up for each sub-unit. All alternates include costs for site preparation (new or existing road up-grades, clearing, grubbing, grading and earthwork for and construction of support facilities such as office trailers, parking, staging and storage facilities and equipment and personnel decontamination facilities); erosion and sediment controls (silt fencing, diversion berms and ditches, sediment traps and tanks, collection sumps, pumps and piping, etc.); perched groundwater collection if needed (interceptor trench, wetwell, pumps and piping); excavation of waste for off-site disposal to Envirocare by rail gondola car (ALT-3A and B);

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BASIS OF ESTIMATE

PROJECT DESCRIPTION:	ALT-3A AND ALT-3B - EXCAVATION AND OFF-SITE DISPOSAL TO ENVIROCARE
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

drying of necessary waste to be shipped to Envirocare, solidification of lead contaminated soil at the SF firing range for off-site disposal to Envirocare; site restoration of each subunit with backfill, top soil, seeding and mulch; demolition and removal of all support facilities/utilities (generated waste) and disposed of at Envirocare.

Site maintenance, groundwater monitoring, and O&M costs for a 30-year period following remediation are included for ALt-3A only, due to the level of cleanup required for a federal ownership remediation. O&M is not required if site is remediated to level of private ownership.

Comments in this basis will be typical of all subunits with the main objective being to clarify the estimating philosophy and procedures applied. In all cases where a common facility is described that supports two or more subunits, the quantities either represent a prorated quantity in relationship to the volume of remediated soil/waste to each other, or as a percentage applied to the total quantities representing a common support facility. These estimates are considered to be within a -30% to +50% range of accuracy (including Risk Budget), based on the level of information provided at this time.

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-3A AND ALT-3B - EXCAVATION AND OFF-SITE DISPOSAL TO ENVIROCARE
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

EXECUTION:

These projects are estimated to be performed by a subcontractor working a 40-hour week, 10 hours a day, no overtime or holidays. Construction start and finish dates are indicated in Appendix D (Construction Activity Duration) for each alternative. Months indicated for some common support facilities span the time from the start of one subunit to the end of the last subunit to be completed.

WAGE RATES:

Wage rates within the estimates are based on the current rates furnished by the local Craft Labor Board and developed into a craft mix. All Labor Dollars are considered constant 1994 dollars.

ENGINEERING:

Engineering costs are based on the percentage of Direct and Indirect Field Costs that resulted in the Baseline estimates, dated November,1993. Refer to CRU2 Baseline Summary. Also, included in the Titles I & II Engineering allowance, is cost for the Cultural Resource Surveys, Phases I & II.

PRODUCTIVITY:

A site specific factor of 1.29 has been applied to Net Chart manhours. See Appendices A and B for development and application.
Task-specific factors were applied as necessary when identified.
PPE-specific factors were applied based on level identified. See Appendix B.
An allowance for delays caused by monitoring and radiation checking is included. See Appendix C, Health Physics.
No exposure/burnout rates have been identified for this work.

000861

NOTE: All references to "See Appendix" refer to cost estimate Appendices only..

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-3A AND ALT-3B - EXCAVATION AND OFF-SITE DISPOSAL TO ENVIROCARE
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

ESCALATION:

Escalation has been excluded from these estimates. Costs are considered to be constant 1994 dollars.

UNIT RATES:

In general, the unit manhours, subcontract dollars, equipment dollars, and material dollars were based on 1993 MEANS. In most cases, a site productivity factor of 1.29 was applied to the Net chart unit manhours. The unit material and subcontract dollars were escalated 3% to arrive at 1994 constant dollars. Some costs were taken directly from the previous estimates.

The Low Level Thermal Destruction Unit costs were derived from B&RE quotational information.

Solidification costs for lead contaminated soil with portland cement have been formulated from information provided in "Hazardous Waste Cost Control" by R.A. Selg.

Waste container costs to purchase gondola liners and covers provided by FERMCO Recycling and Technology Dept.

Transportation and burial costs represent RSO's cost to transport waste by rail in gondola cars and bury the OU2 waste at Envirocare in Clive, Utah. Unit costs provided by FERMCO Recycling and Technology Dept. Certification costs by RSO are based on costs to certify a typical Sealand container. See Appendix E and estimate detail sheets for unit cost breakdown.

Waste Water Treatment costs are provided by OU5 to cover the cost of processing waste streams produced by OU2 construction activities.

Screening and confirmatory testing requirements and pricing were provided by CRU2 engineering.

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION: ALT-3A AND ALT-3B - EXCAVATION AND OFF-SITE DISPOSAL TO ENVIROCARE
WBS NUMBER: 1.1.1.1.2.3.__
PROJECT LOCATION: FERNALD, OHIO
PROJECT ENGINEER: GREG JONES
ESTIMATOR: KEN KEPLER
ESTIMATE NUMBER: C29407__ __

UNIT QUANTITIES:

Quantities of soil, flyash, lime sludge and solid waste to be remediated were provided by CRU2 Engineering Dept. See Tables in section F.8. The "Additional Excavation" volume required to excavate the remediation quantity of waste material at each subunit is based on the preliminary layout of excavation limits. The percent of the remediated quantity for the "Additional Excavation" is 14% for SWL and 10% each for the other subunits.
All other quantities, volumes, sizes, etc., were provided by CRU2 Engineering. All volumes of waste were considered bank cubic yards (BCY) at 10^{-6} risk level.

SWELL, DENSITY & SHRINKAGE FACTORS:

A swell or shrinkage factor was applied to the BCYs provided by CRU2 Engineering when applicable, resulting in loose cubic yards (LCY) or in-place or compacted cubic yards (ICY). Factors used are estimators judgement based on data provided in 'Fundamentals of Earthmoving' by Caterpillar Tractor Co. Density factors were applied for converting LCYs to Tons for costing out the shredding/crushing operation, solidification of the lead-contaminated soil at the Firing Range, and for determining the maximum allowable volume by weight for material to be shipped to Envirocare by rail in 90-ton gondola cars. Density factors used are estimator's judgment based on 'Weights and Specific Gravities' in the American Institute of Steel Construction book. Weights are for bulk, heaped, or loose materials. The following factors were used:

MAT'L.	SWELL	DENSITY	SHRINKAGE
EARTH	1.25	1.275	1.2
CLAY	1.23	1.25	1.18
GRAVEL	1.12	1.275	1.075
SAND	1.12	1.275	1.075
GEN.WASTE	1.15	2.00	1.15

000863

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ESTIMATING SERVICES

24 AUGUST 94

ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-3A AND ALT-3B - EXCAVATION AND OFF-SITE DISPOSAL TO ENVIROCARE
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

HEALTH PHYSICS: (See Appendix C)

All workers at the site will participate in the Medical Monitoring & Surveillance Program and the FEMP Radiation In-Vivo & Bioassay Testing Program. Costs are for the workers' time to participate in these programs based on the Number of Workers and the Duration of Construction Activity information.
Material dollars are included in this section to provide PPEs for the worker when required. Disposable PPEs are to be provided by the subcontractor. Washable PPEs will be provided by the subcontractor for the initial changeout for each required worker, with subsequent changeouts and cost for washing and decontamination provided by FERMCO. Labor dollars are included in this section for work delays caused by monitoring and rad checking.

NUMBER OF WORKERS:

Calculation: Total Direct Manhours Div. By 1813 Hours (1 Man Year) x 1.25 (attrition) Div. By the Duration of Construction in Months x 12 = number of workers per year.

(Use number of workers per year to determine CERCLA/SAT and Health Physics costs.)

G&A (Home Office Expense):

G&A are excluded from the target estimate. The G&A costs are calculated within the Micro-Frame computer system according to the plan for rebaselining.

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-3A AND ALT-3B - EXCAVATION AND OFF-SITE DISPOSAL TO ENVIROCARE
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407_ _

RISK BUDGET:

A cost element, based on a risk analysis calculated for this estimate to cover a statistical probability of a 50% chance of overrun/underrun to the project. The target estimate is the sum of the base estimate and the risk budget. The target estimate is the basis for the Performance Baseline. The risk budget for these projects will vary according to the results of the analysis. See the Risk Analysis at the end of each estimated alternative and refer to the Estimate Summary Sheets.

CONTINGENCY:

An amount budgeted to cover costs that may result from incomplete design, unforeseen and unpredictable conditions, or uncertainties. The amount of the contingency will depend on the status of design, procurement, construction, and the complexity and uncertainties of the component parts of the project. Contingency is not to be used to avoid making an accurate assessment of expected costs.

Contingency is calculated as the delta between the 50% chance of overrun and the 5% chance of overrun, indicated on the risk analysis. Contingency for these alternatives will vary based on the results of the risk analysis. See the risk analysis at the end of each estimated alternative and refer to the Estimate Summary Sheets.

PRESENT WORTH ANALYSIS:

An economic evaluation that compares the sums of discounted dollar costs or benefits of capital investments, replacements, operations, maintenance, decommission, and salvage of two or more systems or operations over the expected useful life span. The analysis identifies the system or operation considered to be the least-cost alternative for satisfying a particular purpose.
(SEE Present Worth Analysis Study "SUMMARY")

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-3A AND ALT-3B - EXCAVATION AND OFF-SITE DISPOSAL TO ENVIROCARE
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407_ _

INCLUSIONS:

Costs have been included in the Field Directs for:

SITE PREPARATION
- Construction Survey
- Temporary Construction Fencing
- Clearing and Grubbing
- Dewatering
- General grading and surfacing for new roads, office/parking area, decontamination facilities and staging and/or Storage Areas

DECONTAMINATION FACILITIES AT SUBUNITS
- Decon. trailer rental at 39 mo.'s for SWL and LSP
- Decon. trailer rental at 51 mo.'s for SF, AFP and IFP
- Construction equipment decon.facility common for subunits SWL and LSP and one common for FS, AFP & IFP - 25' x 60'
- Personnel decon.facility common for sub-units SWL and LSP and one common for SF, AFP & IFP - 11' x 11'

EROSION AND SEDIMENT CONTROLS
- Diversion of clean run-off
- Diversion, collection and pumping of contaminated run-off to AWWT Facility
- Erosion and sediment control measures

OFF-SITE DISPOSAL
- Excavate contaminated soils/waste and lead-contaminated soil exceeding WAC
- Solidify lead-contaminated soil at firing range - 300 BCY
- Dry waste - low level thermal destruction (if required)
- Shred and crush waste (if required)

000866

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-3A AND ALT-3B - EXCAVATION AND OFF-SITE DISPOSAL TO ENVIROCARE
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

LOAD AND HAUL FOR OFF-SITE DISPOSAL
- Haul treated lead-contaminated soil from SF to OU1 rail loading facility
- Haul soil/waste exceeding WAC from subunits to OU1 rail loading facility
- Load waste into 90-ton capacity gondola rail cars
- Certify and ship to Envirocare

GENERATED WASTE REMOVAL
- Office/parking facilities common to SWL and LSP
- Office/parking facilities common to AFP, IFP and SF
- Equip.and personnel decon. facilities common to SWL and LSP
- Equip.and personnel decon facilities common to AFP, IFP and SF
- Staging area common to SWL and LSP
- Staging area common to AFP, IFP and SF
- All temporary construction fencing
- Relocated South Access Road
- Haul road

SITE RESTORATION - ALL SUBUNITS AND SUPPORT FACILITIES AT CELL
- Borrowed cmmon soil for backfill
- Final grade
- Borrowed top soil
- Grass cover, seed, fertilize, mulch
- Security fence and gates at each subunit

MONITORING WELLS
- Abandon existing wells at subunits
- Install new wells at subunits
- Install new wells at on-site disposal cell

000867

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-3A AND ALT-3B - EXCAVATION AND OFF-SITE DISPOSAL TO ENVIROCARE
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

Costs have been included in the Indirect Field Costs for:

- Contractor supervision
- Small tools and consumables
- Equipment rental
- Temporary construction facilities
- Temporary utilities and hook-up
- Job clean-up
- Safety
- Health Physics
- CERCLA and site access training
- Bond
- Subcontractor overhead and profit (Includes insurance and reserve fund)
- Subcontractor payroll burdens and benefits

Costs have been included as FERMCO Field Support Costs for:

- Transportation and burial to Envirocare
- Purchase cost of liners and covers for rail gondola cars
- Waste water treatment cost (OU5)
- Screening and confirmatory testing
- FERMCO construction management

Costs included for Engineering are:

- Emission modeling
- PSAR/FSAR Reports
- Titles I,II and III (Includes cultural resource surveys, Phases I and II)
- CDR and DCR

000868

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-3A AND ALT-3B - EXCAVATION AND OFF-SITE DISPOSAL TO ENVIROCARE
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

Costs have been included for Ohio State sales tax

- at 6%

Costs have been included for Risk Budget.

Costs have been included for Contingency.

ALL OF THE ABOVE REPRESENTS SCOPE FOR THE CAPITAL COST FOR THE ALTERNATIVES.

ALT-3A represents quantities based on criteria for Federal ownership (Expanded Trespasser).

ALT-3B represents quantities based on criteria for Private Ownership (Resident Farmer).

Operations and maintenance costs were developed for a 30-year period following the remediation of each subunit for ALT-3A. These costs, along with the capital cost, were used to develop the Life Cycle Cost Analysis Report in 1994 constant dollars to determine the Net Present Value (NPV).

000869

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-3A AND ALT-3B - EXCAVATION AND OFF-SITE DISPOSAL TO ENVIROCARE
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

EXCLUSIONS:

- Permits and fees
- Landlord costs
- Escalation
- G&A (home office expense)
- Rail loading facility provided in CRU1 baseline.

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DETAILED COST ESTIMATE

ALTERNATIVE 3 - EXCAVATION AND OFF-SITE DISPOSAL

A. FEDERAL OWNERSHIP (Expanded Trespasser)

000871

CONTR. NO. 4424321
CLIENT U.S.DEPT. OF ENERGY
PROJECT ALT-3A - ALL QTY'S. - OFF-SITE TO ENVIROCARE - EXPANDED TRESPASSER
LOCATION FERNALD, OHIO
PROJ.CTL. CRU2

CONTR.NO. 4424321
EST.NO. C29407
DATE 24-Aug-94
BY KEN KEPLER
TASK ID 2C --

OU2 FEASIBILITY STUDIES

TITLE	TOTAL ESTIMATE - CONSTANT 1994 DOLLARS					NET PRESENT VALUE: 37 YEAR STUDY PERIOD - 2.8% REAL DISC.RATE				
	CAPITAL COST	O & M DURING REMEDIATION	O & M POST REMEDIATION	TOTAL CONSTANT 1994 $'s	TOTAL UNIT COST PER BCY OF EXCAV.& GEN. WASTE	CAPITAL COST	O & M DURING REMEDIATION	O & M POST REMEDIATION	TOTAL NPV DOLLARS	TOTAL UNIT COST PER BCY OF EXCAV.& GEN. WASTE
ALT3A - SWL	$22,214,200		$3,431,500	$25,645,700	$1,007.14	$18,935,200		$2,044,900	$20,980,100	$823.91
ALT3A - SF	$62,442,500		$3,138,200	$65,580,700	$754.44	$57,281,300		$1,972,600	$59,253,900	$681.66
ALT3A - LSP	$18,596,600		$3,419,100	$22,015,700	$1,064.85	$16,768,400		$2,148,600	$18,917,000	$914.97
ALT3A - AFP	$47,938,200		$2,958,800	$50,897,000	$699.84	$42,735,500		$1,802,100	$44,537,600	$612.39
ALT3A - IFP	$74,063,500		$8,428,400	$82,491,900	$789.19	$64,527,600		$4,579,400	$69,107,000	$661.14
TOTAL ALT-3A	$225,255,000		$21,376,000	$246,631,000	$794.77	$200,248,000		$12,547,600	$212,795,600	$685.73

O & M POST REMEDIATION - 30 YEARS

TITLE	ANNUAL COST			FACILITY REVIEW	TOTAL
	YEAR 1	YEARS 2 - 5	YEARS 6 - 30	@ 5 YR. INTERV.'s	CONSTANT
FREQUENCY	1	4	25	6	'94 $'s
ALT3A - SWL	$204,433	$183,004	$95,004	$20,000	$3,431,500
ALT3A - SF	$185,487	$164,058	$87,058	$20,000	$3,138,200
ALT3A - LSP	$186,170	$183,206	$95,206	$20,000	$3,419,100
ALT3A - AFP	$170,341	$148,912	$82,912	$20,000	$2,958,800
ALT3A - IFP	$128,933	$111,362	$309,362	$20,000	$8,428,400
TOTAL ALT-3A	$875,364	$790,542	$669,542	$100,000	$21,376,000

F-5-14

000872

FEMP-OU02-5 DRAFT
August 24, 1994

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F ERMC O
ESTIMATING SERVICES

SUMMARY SHEET

EST FILE #: C29407_ _
CLIENT: US DOE
PROJECT TITLE: ALT-3A - EXCAVATION & OFF-SITE DISPOSAL to ENVIROCARE
WBS#: 1.1.1.1.2.3._ EXPANDED TRESPASSER

DATE: 24-Aug-94
ESTIMATOR: KEN KEPLER
LOCATION: FERNALD
TASK#: 2C_ _

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		OFF-SITE DISPOSAL - ENVIROCARE	189,294		3,231,900	5,640,200	2,478,400	$11,350,500
2								
3		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		189,294		$3,231,900	$5,640,200	$2,478,400	$11,350,500
11	SUPERVISION - CONTRACTOR				549,000			$549,000
12	SM TOOLS/CONSM'BLS						194,000	$194,000
13	EQUIPMENT RENTAL						4,595,100	$4,595,100
14	TEMP. FACILITIES				67,900		126,000	$193,900
15	TEMP UTL'S HOOK-UP				34,000		63,100	$97,100
16	JOB CLEAN-UP				67,900		126,000	$193,900
17	SAFETY				34,000		63,100	$97,100
18	HEALTH PHYSICS S/C				448,500		56,700	$505,200
19	CERCLA/SAT	$1,500 PER PERSON				103,500		$103,500
	BOND					113,500		$113,500
	OVERHEAD & PROFIT					1,619,400		$1,619,400
22	PAYRL BRD.&BENFT.				2,305,300			$2,305,300
	INDIRECT FIELD COSTS				$3,506,600	$1,836,400	$5,224,000	$10,567,000
	DIRECT & INDIRECT FIELD COSTS				$6,738,500	$7,476,600	$7,702,400	$21,917,500
23	TRANSPORTATION & BURIAL					123,581,500		$123,581,500
24	WASTE CONTAINERS						4,266,000	$4,266,000
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					288,800		$288,800
25	SCREENING & CONFIRMATION TESTING					10,342,400		$10,342,400
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				4,723,000			$4,723,000
	FERMCO FIELD SUPPORT COSTS				$4,723,000	$134,212,700	$4,266,000	$143,201,700
28	EMISSION MODELING				38,300		71,200	$109,500
29	PSAR/FSAR(SAFETY RPT)				894,600			$894,600
30	ENGINEERING	TITLE I&II 4,124,600 TITLE III	4,290,900	CDR	1,597,700	DCR	1,043,500	$11,056,700
	ENGINEERING COSTS							$12,060,800
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				16,305,600	978,300
	SUB-TOTAL	(BASE ESTIMATE)						$178,158,300
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	14.3%						25,504,700
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$203,663,000
	CONTINGENCY	12.1%						21,592,000
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$225,255,000

000873 PRELIMINARY

LOTUS31\FS2\INDALT3A.WK3 - FEASIBILITY STUDY

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C29407_ _
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2C

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY (EXPANDED TRESPASSER) OFF–SITE DISPOSAL TO ENVIROCARE														
SITE PREPARATION	1	LS		19,983						346,490	75,000	191,950	497,210	$1,110,650
DECONTAMINATION FACILITIES/SERVICES	1	LS		1,766						32,180	136,450	7,470	32,860	$208,960
EROSION AND SEDIMENT CONTROLS	1	LS		6,776						126,570		43,840	205,170	$375,580
PERCHED GROUNDWATER COLLECTION	N/A													N/A
EXCAV./SORT/SHRED/DRY – OFFSITE DISPOSAL	1	LS		41,886						703,540	3,690,930	1,339,480	339,070	$6,073,020
LOAD/HAUL – OFF–SITE DISPOSAL	1	LS		66,059						1,124,870		1,600,200	143,850	$2,868,920
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE	N/A													N/A
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	N/A													N/A
DIKE	N/A													N/A
GENERATED WASTE REMOVAL	1	LS		7,019						119,090		71,460		$190,550
SITE RESTORATION	1	LS		28,596						485,320		922,930	1,034,930	$2,443,180
MONITORING WELLS	1	LS									1,225,000			$1,225,000
SUB TOTAL (DIRECT FIELD COSTS)	1	LOT		172,085						$2,938,060	$5,127,380	$4,177,330	$2,253,090	$14,495,860
TAKE–OFF ALLOWANCE 10%	1	LOT		17,209						$293,810	$512,740	$417,730	$225,310	$1,449,590
TOTAL (DIRECT FIELD COSTS)	1	LOT		189,294						$3,231,900	$5,640,100	$4,595,100	$2,478,400	$15,945,500

Alt–3A – Excavation & Off–Site Disposal to ENVIROCARE – Expanded Trespasser – SUMMARY

000874

TABLE F.4-2

ALTERNATIVE 3 - EXCAVATION AND OFF-SITE DISPOSAL (ENVIROCARE) EXPANDED TRESPASSER AND 10^{-6} RISK LEVEL REMEDIATION AND OFF-SITE DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Generated Waste Volume (yd^3)	Total Off-Site Disposal Volume (yd^3)	Debris Volume (yd^3)	Drying Volume yd^3
	Remediation Volume			Additional Excavation	Total Excavcation				
	PPE Level - D (< 125 pCi/g)	PPE Level - C (> 125 pCi/g)	Total						
Solid Waste Landfill	19,500	1,700	21,200	2,100	23,300	3,000	26,300	5,300	7,000
Lime Sludge Ponds	16,800	0	16,800	1,700	18,500	3,000	21,500	0	7,100
Inactive Flyash Piles	84,800	9,200	94,000	9,400	103,400	3,000	106,400	4,000	6,900
South Field	771,00	500	77,600	7,800	85,400	3,000	88,400	6,500	11,000
Active Flyash Pile	651,00	0	65,100	6,500	71,600	3,000	74,600	0	700
Total	263,300	11,400	274,700	27,500	302,200	15,000	317,200	15,800	32,700

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

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LCC ANALYSIS TITLE:	SWL - EXCAVATE & OFF-SITE DISPOSAL - (EXPANDED TRESPASSER)			
WBS NO.:	1.1.1.1.2.3.1		TASK NO.:	2CSW
ALTERNATIVE:	3A		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	37 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	07-Aug-94
DOCUMENT NO.:	LCC-94-03-01	EST. NO. C2-94-07-01/FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$0	$0	$0	$0	1997
$0	$0	$0	$0	1998
$4,760,186	$0	$0	$4,760,200	1999
$17,454,014	$0	$0	$17,454,000	2000
$0	$204,433	$0	$204,400	2001
$0	$183,004	$0	$183,000	2002
$0	$183,004	$0	$183,000	2003
$0	$183,004	$0	$183,000	2004
$0	$203,004	$0	$203,000	2005
$0	$95,004	$0	$95,000	2006
$0	$95,004	$0	$95,000	2007
$0	$95,004	$0	$95,000	2008
$0	$95,004	$0	$95,000	2009
$0	$115,004	$0	$115,000	2010
$0	$95,004	$0	$95,000	2011
$0	$95,004	$0	$95,000	2012
$0	$95,004	$0	$95,000	2013
$0	$95,004	$0	$95,000	2014
$0	$115,004	$0	$115,000	2015
$0	$95,004	$0	$95,000	2016
$0	$95,004	$0	$95,000	2017
$0	$95,004	$0	$95,000	2018
$0	$95,004	$0	$95,000	2019
$0	$115,004	$0	$115,000	2020
$0	$95,004	$0	$95,000	2021
$0	$95,004	$0	$95,000	2022
$0	$95,004	$0	$95,000	2023
$0	$95,004	$0	$95,000	2024
$0	$115,004	$0	$115,000	2025
$0	$95,004	$0	$95,000	2026
$0	$95,004	$0	$95,000	2027
$0	$95,004	$0	$95,000	2028
$0	$95,004	$0	$95,000	2029
$0	$115,004	$0	$115,000	2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$22,214,200	$3,431,500	$0	$25,645,600	TOTAL
$18,935,200	$2,044,900	$0	$20,980,100	<====(@NPV)

F E R M C O
ESTIMATING SERVICES

EST FILE #: C2940701 | DATE: 07-Aug-94 | 5 86 F
CLIENT: US DOE | SUMMARY SHEET | ESTIMATOR: KEN KEPLER
PROJECT TITLE: ALT-3A, SWL - EXCAV. & OFF-SITE DISPOSAL TO ENVIROCARE | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.1 EXPANDED TRESSPASSER | TASK#: 2CSW

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		OFF-SITE DISPOSAL TO ENVIROCARE BY RAIL	23,749		$408,700	$1,153,700	$458,000	$2,020,400
		EXCAVATE, SORT, DRY, SHRED/CRUSH, LOAD, HAUL						
2		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		23,749		$408,700	$1,153,700	$458,000	$2,020,400
11	SUPERVISION - CONTRACTOR				$69,000			$69,000
12	SM TOOLS/CONSM'BLS						$24,500	$24,500
13	EQUIPMENT RENTAL						$537,700	$537,700
14	TEMP. FACILITIES				$8,600		$15,900	$24,500
15	TEMP UTL'S HOOK-UP				$4,300		$8,000	$12,300
16	JOB CLEAN-UP				$8,600		$15,900	$24,500
17	SAFETY				$4,300		$8,000	$12,300
18	HEALTH PHYSICS S/C				$58,200		$8,900	$67,100
19	CERCLA/SAT	$1,500 PER PERSON				$21,000		$21,000
	BOND					$20,200		$20,200
	OVERHEAD & PROFIT					$255,000		$255,000
22	PAYRL BRD.&BENFT.				$292,100			$292,100
	INDIRECT FIELD COSTS				$445,100	$296,200	$618,900	$1,360,200
	DIRECT & INDIRECT FIELD COSTS				$853,800	$1,449,900	$1,076,900	$3,380,600
23	TRANSPORTATION & BURIAL					$10,279,400		$10,279,400
24	WASTE CONTAINERS						$354,600	$354,600
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$9,000		$9,000
25	SCREENING & CONFIRMATION TESTING					$889,000		$889,000
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$703,200			$703,200
	FERMCO FIELD SUPPORT COSTS				$703,200	$11,177,400	$354,600	$12,235,200
28	EMISSION MODELING				$5,900		$11,000	$16,900
29	PSAR/FSAR(SAFETY RPT)				$162,300			$162,300
30	ENGINEERING	TITLE I&II $598,400 TITLE III	$672,700	CDR	$327,900	DCR	$128,500	$1,727,500
	ENGINEERING COSTS							$1,906,700
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$1,797,100	$107,800
	SUB-TOTAL	(BASE ESTIMATE)						$17,630,300
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	15.5%						$2,732,700
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$20,363,000
	CONTINGENCY	10.5%						$1,851,200
								PRELIMINARY
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$22,214,200

LOTUS31\FS2\ALT3A\SWL\INDSUM.WK3 - FEASABILITY STUDY

Alternative 3 – Excavation and Off-Site Disposal
(Expanded Trespasser)

Solid Waste Landfill

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	1	1	5	sample	$5,500.00	32	NA	$176,000	8 wells x 4 samples/year
Long Term	1	6	30	sample	$5,500.00	16	NA	$88,000	8 wells x 2 samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	2	2.58	$1,001	Inspect all wells twice/year. Repair 1 out of 8.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Long Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Well Inspect & Maint.	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
OU2 Waste Cell Leachate									
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Facility Maint. at Subunit									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	1	1	30	acre	$1,861.92	1.64	2.12	$3,939	Approx. 1.6 Acres
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.54	0.70	$1,373	Approx. 1080 ft perimeter
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Fence Repair	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of Subunit	5	5	30	lump Sum	$20,000.00	1	NA	$20,000	Total divided among 5 subunits
Facility Review of OU2 Cell	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative

Annual Costs, Year 1 (excluding facility review)	$204,433
Annual Costs, Years 2–5 (excluding facility review)	$183,004
Annual Costs, Years 6–30 (excluding facility review)	$95,004
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 C:

8/3/94

DATE: 06-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940701

ALT-3A, SWL - EXCAV. & OFF-SITE DISPOSAL TO ENVIROCARE

EST. : KEN KEPLER

WBS#: EXPANDED TRESSPASSER

TASK I.D. :

1.1.1.1.2.3.1

2CSW

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

867

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS) *	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	53	$680	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	53	$1,270	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	53	$280	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	53	$300	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	53	$320	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	53	$190	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	53	$3,710	C/B		
SUB-TOTAL		31.80	4		$6,750			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	8		$100	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	8		$180	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	8		$1,390	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$2,150			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$8,900			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

000879

DATE: 06-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940701

ALT-3A, SWL - EXCAV. & OFF-SITE DISPOSAL TO ENVIROCARE

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.1

EXPANDED TRESSPASSER

TASK I.D. : 2CSW

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	14	56	$16.97	$950		
ANNUAL PHYSICALS	1	3	14	42	$16.97	$710		
EXIT (TERMINATION) PHYSICALS	1	4	14	56	$16.97	$950		
SUB-TOTAL						$2,610		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	14	1	14	199	$16.97	$3,380		
YEARLY IN-VIVO	1	4	14	56	$16.97	$950		
EXIT (END OF PROJECT / TERMINATION)	1	4	14	56	$16.97	$950		
SUB-TOTAL						$5,280		
WORK DELAYS CAUSED BY MONITORING	5%				$503,500	$25,175		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$503,500	$25,175		
						TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET						$58,200	$8,900	$67,100

000880

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT–3A, SWL – EXCAV. & OFF–SITE DISPOSAL TO ENVIROCARE
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CSW

WBS NO. – 1.1.1.1.2.3.1
EST. NO. – C2940701
BY – K. KEPLER
DATE – 08/06/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	30–Jun–94	01–Jul–99	30–Jan–2000	31–Aug–2000	14	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
67	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.1

EST.NO. C2940701
BY KEN KEPLER
DATE 06–Aug–94
TASK ID 2CSW

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR)			CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS				ENVIROCARE BURIAL COSTS		TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							$80.15 PER TON (90 TON MIN.)	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	141 $120 DEMURAGE $/DAY (>6 DAYS)	(1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	
	CAR	LINER	COVER			TONS/CY	TONS						
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 125, 141, or 200 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

000882

F-5-24

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.1

EST.NO. C2940701
BY KEN KEPLER
DATE 06–Aug–94
TASK ID 2CSW

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C –D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0

INPUT

FEMP-OU02-5 DRAFT
August 24, 1994

5861

000883

APPENDIX E

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.1

EST.NO. C2940701
BY KEN KEPLER
DATE 06–Aug–94
TASK ID 2CSW

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	30125.0	413	$23,816	$9,836,000	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	1569.0	33	$24,180	$797,900	$493.47		
						**			

INPUT

** NOTE:
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

000084

CONTR.NO. [redacted]24321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940701
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
OFF–SITE DISPOSAL TO ENVIROCARE (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		3,490						$61,140	$15,000	$29,080	$87,470	$192,690
DECONTAMINATION FACILITIES/SERVICES	1	LS		419						$7,610	$29,880	$1,630	$8,050	$47,170
EROSION AND SEDIMENT CONTROLS	1	LS		1244						$22,710		$6,320	$63,600	$92,630
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT/SHRED/DRY – OFFSITE DISPOSAL	1	LS		3826						$65,280	$780,940	$108,800	$113,080	$1,068,100
LOAD/HAUL – OFF–SITE DISPOSAL TO ENVIROCARE	1	LS		8059						$137,510		$232,030	$28,770	$398,310
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE (Onsite)	N/A													N/A
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	N/A													N/A
DIKE	N/A													N/A
GENERATED WASTE REMOVAL	1	LS		1372						$23,270		$13,440		$36,710
SITE RESTORATION	1	LS		3180						$53,980		$97,480	$115,430	$266,890
MONITORING WELLS	1	LS									$223,000			$223,000
SUB–TOTAL (DIRECT FIELD COSTS)				21590						$371,500	$1,048,820	$488,780	$416,400	$2,325,500
TAKE–OFF ALLOWANCE 10%	1	LS		2,159						$37,150	$104,880	$48,880	$41,640	$232,550
TOTAL (DIRECT FIELD COSTS)	1	LS		23,749						$408,700	$1,153,700	$537,700	$458,000	$2,558,100

OFF–Site Disposal of SWL to ENVIROCARE – SUMMARY

PAGE 1 of 5

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940701
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
a. Construction Survey		1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing		1500	LF	0.213	412	16.97				6.25	$6,990			$9,660	$16,650
c. Clear and Grub															
i. Remediation Site		3.35	AC	41.40	179	16.97			2575.00		$3,040		$8,890		$11,930
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Storage Area, &/or Staging Area @ Sub–unit															
d. Dewatering															
i. Excavate Dewatering Trench		233	CY	0.50	150	16.97			1.49		$2,550		$360		$2,910
ii. Pump – w/4" Suction Hose		100	DAYS	3.00	387	16.97			19.55		$6,570		$2,010		$8,580
iv. HDPE Pipe to Sedimentation Tank		400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip		1	CY	4.00	5	16.97			100.00		$80		$100		$180
e. General Grading															
i. New Roads		6400	SY	0.001	8	16.97			0.07		$140		$460		$600
	50%														
ii. Office/Parking Area	2222	1111	SY	0.010	14	16.97			0.32		$240		$370		$610
iii. Const.Equip.Decon.Pad Area	234	117	SY	0.010	2	16.97			0.32		$30		$40		$70
iv. Pers.Decon.Pad Area	14	7	SY	0.010		16.97			0.32						
vi. Staging Area @ Sub–Unit	2845	1423	SY	0.010	18	16.97			0.32		$310		$470		$780
f. Surfacing/Paving/Concrete Slab															
i. New Roads – 8" Gravel W/Geotextile		5334	SY	0.030	206	16.97			1.08	6.66	$3,500		$5,930	$36,590	$46,020
	50%														
ii. Office/Parking – 8" Gravel W/ Geot	2222	1111	SY	0.030	43	16.97			1.08	6.66	$730		$1,240	$7,620	$9,590
iii. Staging Area @ Sub–Unit – 160' x160' Concrete															
Sub–Grade & Sub–Base for Conc	2845	1423	SY	0.041	75	16.97			1.45	5.51	$1,270		$2,120	$8,070	$11,460
Concrete Slab 160 x 160' x 8"thk.	631	316	CY	4.07	1656	17.98			18.38	67.00	$29,770		$5,970	$21,770	$57,510
Concrete Curb – 2'h x 480 lf x 8" tl	24	12	CY	15.30	237	17.98			69.08	275.90	$4,260		$850	$3,410	$8,520
HDPE Perf.Sub–grade Piping – 4"	500	250	LF	0.21	68	17.98			0.74	3.02	$1,220		$190	$780	$2,190
Epoxy Coating	2845	1423	SY	0.22	404	17.98			0.77	7.56	$7,260		$1,130	$11,080	$19,470
Backfill & Compact around Slab	183	92	ICY	0.086	10	17.98			1.38		$180		$130		$310
Mob/Demob.Equip.	1	1	LS	2.00	1	17.98			184.00		$20		$90		$110
TOTAL (SITE PREPARATION)		1	LS		3,490						$61,140	$15,000	$29,080	$87,470	$192,690

Site Preparation Details

PAGE 2 of 15

F-5-28

000888

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. 24321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940701
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
	50%														
a. Decon Trailer – Rental	39	20	MO					1500.00				$29,250			$29,250
b. Construction Equipment Decon. Facility															
25 ft x 60 ft	50%														
i. Excavation – Structural	175	88	BCY	0.021	2	16.97			0.64		$30		$60		$90
ii. Sub–grade Prep.	167	84	SY	0.041	4	16.97		6.75	1.45	5.51	$70	$580	$120	$470	$1,240
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	8	SF	0.32	3	19.21			0.73	12.55	$60		$10	$100	$170
Metal Grating 2 ft wide x 25 lf	25	13	LF	0.53	9	19.21			1.86	46.67	$170		$20	$600	$790
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	20	CY	4.07	102	17.98			14.25	67.00	$1,830		$290	$1,350	$3,470
Decon Pad Trench – 2'x2'i.d.x 25l	5	3	CY	28.22	91	17.98			98.77	202.30	$1,640		$250	$520	$2,410
Decon Pad Curb – 6" x 6" x 120 lf	5	3	CY	15.30	49	17.98			53.55	275.90	$880		$140	$710	$1,730
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	2	17.98			37.24	97.20	$40		$10	$20	$70
Epoxy Coating	167	84	SY	0.22	24	17.00			0.77	7.56	$410		$70	$650	$1,130
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	1	EA	12.00	8	17.98			100.00	525.00	$140		$50	$270	$460
vi. HDPE Piping 2" X 4"	100	50	LF	0.38	25	19.95			5.11	4.42	$500		$260	$230	$990
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Gu:	720	360	SF	0.04	17	16.97			0.03	1.55	$290		$10	$570	$870
4" x 4" x 9'–6" Wood Posts set in (	27	14	EA	0.480	8	16.97			1.68	5.75	$140		$20	$80	$240
viii. Air Diaphragm Pump 50 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$400	$630
ix. Suction and Discharge Piping 2"	10	5	LF	0.11	1	19.95			0.39	0.84	$20				$20
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	2	LF	0.47	1	19.95			1.65	14.91	$20			$20	$40
	BCY														
x. Backfill & Compaction	129														
around concrete slab	ICY														
	155	78	ICY	0.086	9	16.97			1.38		$150		$110		$260
SUB–TOTAL (EQUIP. DECON. FACILITY)					365						$6,590	$29,830	$1,450	$5,990	$43,860

Equipment Decon. Facility Details

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FEMP-OU02-5 DRAFT August 24, 1994
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5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940701
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
c. Personnel Decon. Facility	50%														
i. Excavation – Structural	19	10	BCY	0.021		16.97			0.64				$10		$10
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric, – Gravel, & Compact Sub–grade	14	7	SY	0.041		16.97		6.75	1.45	5.51		$50	$10	$40	$100
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	2	SF	0.32	1	16.97			0.73	12.55	$20			$30	$50
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	1	CY	4.07	4	17.98			14.25	67.00	$70		$10	$50	$130
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	6	17.98			111.44	250.70	$110		$20	$40	$170
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	4	17.98			53.55	275.90	$70		$10	$60	$140
Epoxy Coating	14	7	SY	0.22	2	17.00			0.77	7.56	$30		$10	$50	$90
v. Corrugated Fiberglass Splash Gua	132	66	SF	0.04	3	16.97			0.03	1.55	$50			$110	$160
4" x 4" x 9'–6" Wood Posts set in (	6	3	EA	0.480	2	16.97			1.68	5.75	$30		$10	$20	$60
vi. Pump 20 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$410	$640
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	1	LS	32.00	21	19.95			112.00	2500.00	$420		$60	$1,250	$1,730
viii. Backfill & Compaction around concrete slab	BCY 17 ICY 20	10	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		54						$1,020	$50	$180	$2,060	$3,310
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		419						$7,610	$29,880	$1,630	$8,050	$47,170

Personnel Decon.Facilities/Services Details

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FEMP-OU02-5, DRAFT
August 24, 1994

CONTR.NO. [redacted]4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940701
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	880	LF	0.017	19	16.97			0.06	0.65	$320		$50	$590	$960
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	500	EA	0.24	155	16.97			1.53	1.35	$2,630		$790	$700	$4,120
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 300 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. Sedimentation/Decon. Tank 10000 gal	1	LS	53.40	69	19.95			186.90	7100.00	$1,380		$190	$7,310	$8,880
iv. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	800	LF	0.38	393	19.95			5.11	4.42	$7,840		$4,090	$3,540	$15,470
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	5	EA	8.00	52	16.97			28.00	8300.00	$880		$140	$41,500	$42,520
vi. 50 gal. Pump Includes Controls & Electrical	2	EA	60.00	155	16.97			210.00	2500.00	$2,630		$420	$5,000	$8,050
TOTAL (EROSION & SEDIMENT CONTROL)	1	LOT		1,244						$22,710		$6,320	$63,600	$92,630

Erosion Control Details

FEMP-OU02-5 DRAFT
August 24, 1994

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000889

5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940701
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE/SORT/DRY														
FOR OFF–SITE DISPOSAL TO ENVIROCARE														
EXCAVATION														
Excavate Contaminated Soil	19400	BCY	0.055	1,376	16.97			1.17		$23,350		$22,700		$46,050
Excavate Additional Soil	3000	BCY	0.055	213	16.97			1.17		$3,610		$3,510		$7,120
BCY														
Sort Contaminated Soil 22400	28000	LCY	0.033	1,192	16.97			2.58		$20,230		$72,240		$92,470
BCY														
Low Level Thermal Destruction Unit 7000	11156	TON					70.00				$780,940			$780,940
Sub–contract cost for Drying Operation and moisture test Only.														
(SHREDDING COMMON TO SWL,IFP & SF)														
Shredder/Crusher – Purchase/Install 33.3%	0.33	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY 5300														
Generated Waste BCY 1364														
Excavated Debris TONS 8447														
(Percent of Ge.Waste to be Shredded) 25%														
Generated Waste TONS 784														
TOTAL TONS 9231														
Operating Costs	154	HRS							25.75				$4,080	$4,080
(2) Operators	308	HRS	1.00	397	16.97					$6,740				$6,740
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil	1700	BCY	0.055	121	16.97			1.17		$2,050		$1,990		$4,040
BCY														
Sort Contaminated Soil 1700	2125	LCY	0.033	90	16.97			2.58		$1,530		$5,480		$7,010
			S/T	211										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	211	HRS	150%	317	16.97					$5,380				$5,380
			S/T	528										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) SEE APPENDIX C	53	MD												
BCY = BANK CUBIC YARDS : The Volume of 1 Cubic Yard of material in its natural state OR Volume/Void to be filled. LCY = LOOSE CUBIC YARDS (w/Swell Factor) Volume of material after being excavated. ICY = IN–PLACE CUBIC YARDS (w/Shrinkage Factor) Volume of material it takes to fill a 1 Cubic Yard space.														
TOTAL (EXCAVATE/SORT/DRY)	1	LS		3,826						$65,280	$780,940	$108,800	$113,080	$1,068,100

Excavate/Sort/Dry Details

CONTR.NO. 24321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940701
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
LOAD & HAUL FOR OFF-SITE DISPOSAL TO ENVIROCARE															
(ITEMS @ 20% ARE COMMON TO SWL,LSP,SF,AFP & IFP)															
Install Loading Equipment for LLW	20%														
Hopper	1	0.20	EA	177.0	35	16.97	3000.00			6000.00	$590			$1,200	$1,790
Loading Conveyor	1	0.20	EA	147.0	29	16.97	2500.00			8500.00	$490			$1,700	$2,190
Scale	1	0.20	EA	589.0	118	16.97	10000.00			15000.00	$2,000			$3,000	$5,000
Railroad Loading Facility	20%														
a. 160' x 160 'Concrete Pad															
i. Clear & Grub	1	0.12	AC	41.40	6	16.97			2575.00		$100		$320		$420
ii. Grading	2845	569.00	SY	0.010	7	16.97			0.32		$120		$190		$310
iii. Sub-Grade & Sub-Base for Conc.Slab	2845	569.00	SY	0.041	30	16.97			1.45	5.51	$510		$850	$3,230	$4,590
iv. Concrete Slab 160 x 160' x 8"thk.	631	126.20	CY	4.07	663	17.98			18.38	67.00	$11,920		$2,390	$8,710	$23,020
v. Concrete Curb – 2'h x 480 lf x 8" thk.	24	4.80	CY	15.30	95	17.98			69.08	275.90	$1,710		$340	$1,360	$3,410
vi. Wood Ties, Ballast, 100# Rail Derailer, Turnout, Bumper Car Stops	600	120.00	LF	1.06	164	16.97			4.43	77.40	$2,780		$550	$9,570	$12,900
vii. Grading for track	800	160.00	SY	0.010	2	16.97			0.32		$30		$50		$80
HAUL															
From excavation site to rail loading facility															
6 CY dump truck 1/2 mi r.t.		30125	LCY	0.041	1,593	16.97			1.65		$27,030		$49,710		$76,740
LOADING GONDOLA	LCY														
Excavated level D, C & Additional =	30125														
Allowable CY's of waste per Gondola	73.0														
Install Liner in Gondola car		413	EA	0.75	400	16.97			32.21		$6,790		$13,300		$20,090
Load Gondola – 6/day, 2 workers		69	DAYS	16.00	1,421	16.97			15.00		$24,110		$1,030		$25,140
Seal liner, Install Cover		413	EA	0.75	400	16.97			32.21		$6,790		$13,300		$20,090
Dust control – light		300	DAYS	8.00	3,096	16.97			500.00		$52,540		$150,000		$202,540
(RSO takes ownership at this time.)															
(See: Off-Site Disposal Wksht. and Appendix E)															
TOTAL (LOAD & HAUL OFF-SITE DISPOSAL)		1	LS		8,059						$137,510		$232,030	$28,770	$398,310

Offsite Load/Haul/Disposal Details

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August 24, 1994

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940701
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ENVIROCARE															
Demo. /Load/Haul to rail loading facility															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
(ITEMS @ 20% ARE COMMON TO SWL,LSP,SF,AFP & IFP)															
a. Office/Parking Area	50%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	247	BCY	0.292	93	16.97			9.16		$1,580		$2,330		$3,910
Geo–Fabric & Liner	2222	1111	SY	0.002	3	16.97			0.02		$50		$20		$70
Haul & Dump Rubble	185	93	BCY	0.30	36	16.97			2.51		$610		$240		$850
b. Const.Equip.Decon Area @ Excav.Sit	50%														
Demo/Remove Concrete	49.3	25	BCY	1.2	38	16.97			3.62		$640		$90		$730
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	14	BCY	0.292	5	16.97			9.16		$80		$130		$210
Geo–Fabric & Liner	167	84	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	27	14	EA	0.48	8	16.97			1.68		$140		$20		$160
Splash Guard	702	351	SF	0.04	18	16.97			0.03		$310		$10		$320
Haul & Dump Rubble	24.9	12	BCY	0.30	5	16.97			2.51		$80		$30		$110
c. Personnel Decon. Area @ Excav. Site	50%														
Demo/Remove Concrete	2.2	1	BCY	1.2	2	16.97			3.62		$30				$30
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo–Fabric & Liner	14	7	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	6	3	EA	0.48	2	16.97			1.68		$30		$10		$40
Splash Guard	132	66	SF	0.04	3	16.97			0.03		$50				$50
Haul & Dump Rubble	3.5	2	BCY	0.30	1	16.97			2.51		$20				$20
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		216						$3,660		$2,890		$6,550

Generated Waste Removal Details

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August 24, 1994

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008592

CONTR.NO. [illegible]4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940701
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ENVIROCARE (CON'T.)														
Demo. /Load/Haul to rail loading facility														
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)														
(ITEMS @ 20% ARE COMMON TO SWL,LSP,SF,AFP & IFP)														
d. Staging Area @ S/U 50%														
Demo/Remove Concrete 655	328	BCY	1.2	507	16.97			3.62		$8,600		$1,220		$9,820
Excavate, Load, Haul, Backfill, Compact														
Sub-grade Stone 474	237	BCY	0.292	89	16.97			9.16		$1,510		$2,240		$3,750
Geo-Fabric & Liner SY 2844	1422	SY	0.002	1	16.97			0.02		$20		$30		$50
Haul & Dump Rubble 316	158	BCY	0.30	61	16.97			2.51		$1,040		$410		$1,450
d. Staging Area @ Rail Siding 20%														
Demo/Remove Concrete 655	131	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excavate, Load, Haul, Backfill, Compact														
Sub-grade Stone 474	95	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Geo-Fabric & Liner SY 2844	569	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble 105	21	BCY	0.30	8	16.97			2.51		$140		$50		$190
LOADING GONDOLA BCY														
Generated Waste 1364														
Plus a swell factor of 15% 1569														
Allowable CY's of waste per Gondola 49.0														
Install Liner in Gondola car	33	EA	0.75	32	16.97			32.21		$540		$1,060		$1,600
Load Gondola – 6/day, 2 workers	6	DAYS	16.00	124	16.97			15.00		$2,100		$90		$2,190
Seal liner, Install Cover	33	EA	0.75	32	16.97			32.21		$540		$1,060		$1,600
Dust control – light	6	DAYS	8.00	62	16.97			500.00		$1,050		$3,000		$4,050
SUB-TOTAL (GENERATED WASTE REMOVAL)	1	LOT		1,156						$19,610		$10,550		$30,160
TOTAL (GENERATED WASTE REMOVAL)	1	LOT		1,372						$23,270		$13,440		$36,710

Generated Waste Removal Details

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August 24, 1994

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5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940701
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION (ITEMS @ 50% ARE COMMON TO SWL & LSP's) Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
Solid Waste Landfill	15600	18720	ICY	0.09	2173	16.97			3.21	3.50	$36,880		$61,890	$67,490	$166,260
	50%														
Office/Parking	494	296	ICY	0.09	34	16.97			3.21	3.50	$580		$980	$1,070	$2,630
Const.Equip.Decon.Area	78	47	ICY	0.09	5	16.97			3.21	3.50	$80		$150	$170	$400
Personnel Decon.Area	7	4	ICY	0.09		16.97			3.21	3.50			$10	$20	$30
Staging Area at Sub–Unit	475	285	ICY	0.09	33	16.97			3.21	3.50	$560		$940	$1,030	$2,530
b. Final Grade for SWL (Excludes Cap)		7333	SY	0.02	189	16.97			0.70		$3,210		$5,290		$8,500
c. Borrow Top Soil 6" Thk., Spread															
Solid Waste Landfill		7333	SY	0.036	341	16.97			2.33	2.88	$5,790		$17,600	$21,750	$45,140
	50%														
Office/Parking	2222	1333	SY	0.036	62	16.97			2.33	2.88	$1,050		$3,200	$3,950	$8,200
Const.Equip.Decon.Area	234	140	SY	0.036	7	16.97			2.33	2.88	$120		$340	$420	$880
Personnel Decon.Area	14	8	SY	0.036		16.97			2.33	2.88			$20	$20	$40
Staging Area at Sub–Unit	2845	1707	SY	0.036	79	16.97			2.33	2.88	$1,340		$4,100	$5,060	$10,500
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Solid Waste Landfill	7333	66	MSF	0.30	26	16.97			6.75	25.00	$440		$460	$1,700	$2,600
	50%														
Office/Parking	2222	20	MSF	0.30	8	16.97			6.75	25.00	$140		$140	$520	$800
Const.Equip.Decon.Area	234	2	MSF	0.30	1	16.97			6.75	25.00	$20		$10	$50	$80
Personnel Decon.Area	14		MSF	0.30		16.97			6.75	25.00					
Staging Area at Sub–Unit	2845	26	MSF	0.30	10	16.97			6.75	25.00	$170		$180	$670	$1,020
e. Security Fence – 6ga aluminized – 6' high		1080	LF	0.13	178	16.97			1.64	9.80	$3,020		$1,820	$10,900	$15,740
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		2	PR	10.00	26	16.97			133.00	240.00	$440		$270	$490	$1,200
TOTAL (SITE RESTORATION)		1	LOT		3,180						$53,980		$97,480	$115,430	$266,890

Site Restoration Details

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000894

FEMP-OU02-5 DRAFT August 24, 1994

CONTR.NO. [illegible]4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940701
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT				LABOR	S/C	EQUIP.	MATERIAL	TOTAL
			UNIT	TOTAL	RATE	LABOR	SUB	EQUIP.	MAT'L					
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at Restoration Site: 8 Pairs x 120 ft.	8	PAIR					23,000				$184,000			$184,000
b. Abandon Existing Wells	3	EA					13,000				$39,000			$39,000
TOTAL (MONITORING WELLS)	1	LOT									$223,000			$223,000

Monitoring Wells Details

000895

F-5-37
FEMP-OU02-5 DRAFT
August 24, 1994
5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2040701
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO														
PURCHASE														
Bulk Gondola Rail Car N/A	0	EA												
Liner for Gondola														
Excavated Waste – level C,D & Additional	413	EA							400.00				$165,200	$165,200
Excavated Waste – lead/soil N/A	0	EA												
Generated Waste –	33	EA							400.00				$13,200	$13,200
Cover for Gondola														
Excavated Waste – level C,D & Additional	413	EA							395.00				$163,140	$163,140
Excavated Waste – lead/soil N/A	0	EA												
Generated Waste –	33	EA							395.00				$13,040	$13,040
TOTALS FORWARD TO No. 24 ESTIMATE SUMMARY														
TOTAL (PURCHASE COSTS by FERMCO)	1	LOT											$354,600	$354,600

Purchase Cost by FERMCO Details

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CONTR.NO. [redacted]24321
CLIENT – [redacted].S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940701
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF–SITE TRANSPORTATION COST TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas's	446	EA					340.00				$151,640			$151,640
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additional	413	EA					22681.00				$9,367,250			$9,367,250
Excavated Waste – lead/soil N/A	0	EA												
Generated Waste –	33	EA					23045.00				$760,490			$760,490
TOTALS FORWARD TO No. 23 ESTIMATE SUMMARY														
TOTAL (OFF–SITE DISPOSAL COST)	1	LOT									$10,279,400			$10,279,400

Off–Site Transportation Cost to ENVIROCARE Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-5-39

000897

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940701
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT				LABOR	S/C	EQUIP.	MATERIAL	TOTAL
			UNIT	TOTAL	RATE	LABOR	SUB	EQUIP.	MAT'L					
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	45000	GAL					0.01				$500			$500
Runnoff from the Exclusion Zone.	850000	GAL					0.01				$8,500			$8,500
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$9,000			$9,000

008838

Waste Water Treatment Operations Cost Details

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CONTR.NO. 24321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SWL – EXCAVATION & OFFSITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940701
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTS														
Excavation														
Full TCLP	121	EA					2,002				$242,200			$242,200
Rad	121	EA					2,000				$242,000			$242,000
Confirmatory Tests														
Full Rad Test	61	EA					3,101				$189,200			$189,200
Full HSL	24	EA					1,500				$36,000			$36,000
Full TCLP	24	EA					2,000				$48,000			$48,000
2 Technician per month	10	MO					13,163				$131,600			$131,600
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS)	1	LOT									$889,000			$889,000

Screening & Confirmation Testing Details

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5861

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 3A, SWL – EXCAVATION AND OFF–SITE DISPOSAL (EXPANDED TRES
CLIENT: DOE DATE: 07–Aug–94
CONTRACT: C2–94–07–01 BASE ESTIMATE: $17,630,300

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$24,028,357	$6,398,057	36.3%
0.05%	$23,036,368	$5,406,068	30.7%
5.00%	$22,232,100	$4,601,800	26.1%
10.00%	$21,969,412	$4,339,112	24.6%
15.00%	$21,752,186	$4,121,886	23.4%
20.00%	$21,556,281	$3,925,981	22.3%
25.00%	$21,386,120	$3,755,820	21.3%
30.00%	$21,169,151	$3,538,851	20.1%
35.00%	$20,967,395	$3,337,095	18.9%
40.00%	$20,757,220	$3,126,920	17.7%
45.00%	$20,570,300	$2,940,000	16.7%
50.00%	$20,397,066	$2,766,766	15.7%
55.00%	$20,200,730	$2,570,430	14.6%
60.00%	$19,994,916	$2,364,616	13.4%
65.00%	$19,769,831	$2,139,531	12.1%
70.00%	$19,558,282	$1,927,982	10.9%
75.00%	$19,349,661	$1,719,361	9.8%
80.00%	$19,171,938	$1,541,638	8.7%
85.00%	$18,970,683	$1,340,383	7.6%
90.00%	$18,758,763	$1,128,463	6.4%
95.00%	$18,463,056	$832,756	4.7%
99.95%	$17,899,715	$269,415	1.5%
100.00%	$16,707,219	($923,082)	–5.2%

FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

PROJECT: ALT. 3A, SWL – EXCAVATION AND OFF–SITE DISPOSAL (EXPANDED TRESPASSER)
CLIENT: DOE
CONTRACT: C2–94–07–01

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$67,250	–5.0%	$63,888	30%	$87,425	U		14%
2	SITE PREPERATION S/C	16,500	–5.0%	15,675	30%	21,450	U		14%
3	SITE PREPERATION MAT'L	96,220	–5.0%	91,409	20%	115,464	U		20%
4	DECON FACILITIES/SERVICES LABOR	8,370	–2.0%	8,203	80%	15,066	U		2%
5	DECON FACILITIES/SERVICES S/C	32,870	–6.0%	30,898	80%	59,166	U		7%
6	DECON FACILITIES/SERVICES MAT'L	8,860	–6.0%	8,328	60%	14,176	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	24,980	–5.0%	23,731	30%	32,474	U		14%
8	EROSION/SEDIMENT CNTRLS MAT'L	69,960	–5.0%	66,462	30%	90,948	U		14%
9	EXC/SORT/DRY/CRSH OFF–SITE LBR	71,810	–6.0%	67,501	100%	143,620	U		6%
10	EXC/SORT/DRY/CRSH OFF–SITE S/C	859,030	–6.0%	807,488	100%	1,718,060	U		6%
11	EXC/SORT/DRY/CRSH OFF–SITE MTL	124,390	–6.0%	116,927	55%	192,805	U		10%
12	LOAD & HAUL OFF–SITE DISP LABOR	151,260	–5.0%	143,697	75%	264,705	U		6%
13	LOAD & HAUL OFF–SITE DISP MAT'L	31,650	–5.0%	30,068	20.0%	37,980	U		20%
14	GENERATED WASTE REMVL LABOR	25,600	–5.0%	24,320	50.0%	38,400	U		9%
15	SITE RESTORATION LABOR	59,380	–5.0%	56,411	30.0%	77,194	U		14%
16	SITE RESTORATION MAT'L	126,970	–5.0%	120,622	30.0%	165,061	U		14%
17	MONITORING WELLS S/C	245,300	–5.0%	233,035	50.0%	367,950	U		9%
18	INDIRECT FIELD COSTS LABOR	445,100	–5.0%	422,845	50.0%	667,650	U		9%
19	INDIRECT FIELD COSTS S/C	296,200	–5.0%	281,390	100.0%	592,400	U		5%
20	INDIRECT FIELD COSTS MAT'L	618,900	–5.0%	587,955	50.0%	928,350	U		9%
21	FIELD SUPPORT COSTS LABOR	703,200	–10.0%	632,880	30.0%	914,160	U		25%
22	FIELD SUPPORT COSTS S/C	11,177,400	–5.0%	10,618,530	30.0%	14,530,620	U		14%
23	FIELD SUPPORT COSTS MAT'L	354,600	–5.0%	336,870	30.0%	460,980	U		14%
24	ENGINEERING COSTS	1,906,700	–5.0%	1,811,365	25.0%	2,383,375	U		17%
25	SALES TAX MAT'L	107,800	–1.0%	106,722	1.0%	108,878	U		50%
26				0		0			0%
27				0		0			0%
28				0		0			0%
29				0		0			0%
30				0		0			0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$17,630,300		$16,707,219		$24,028,357			

000901

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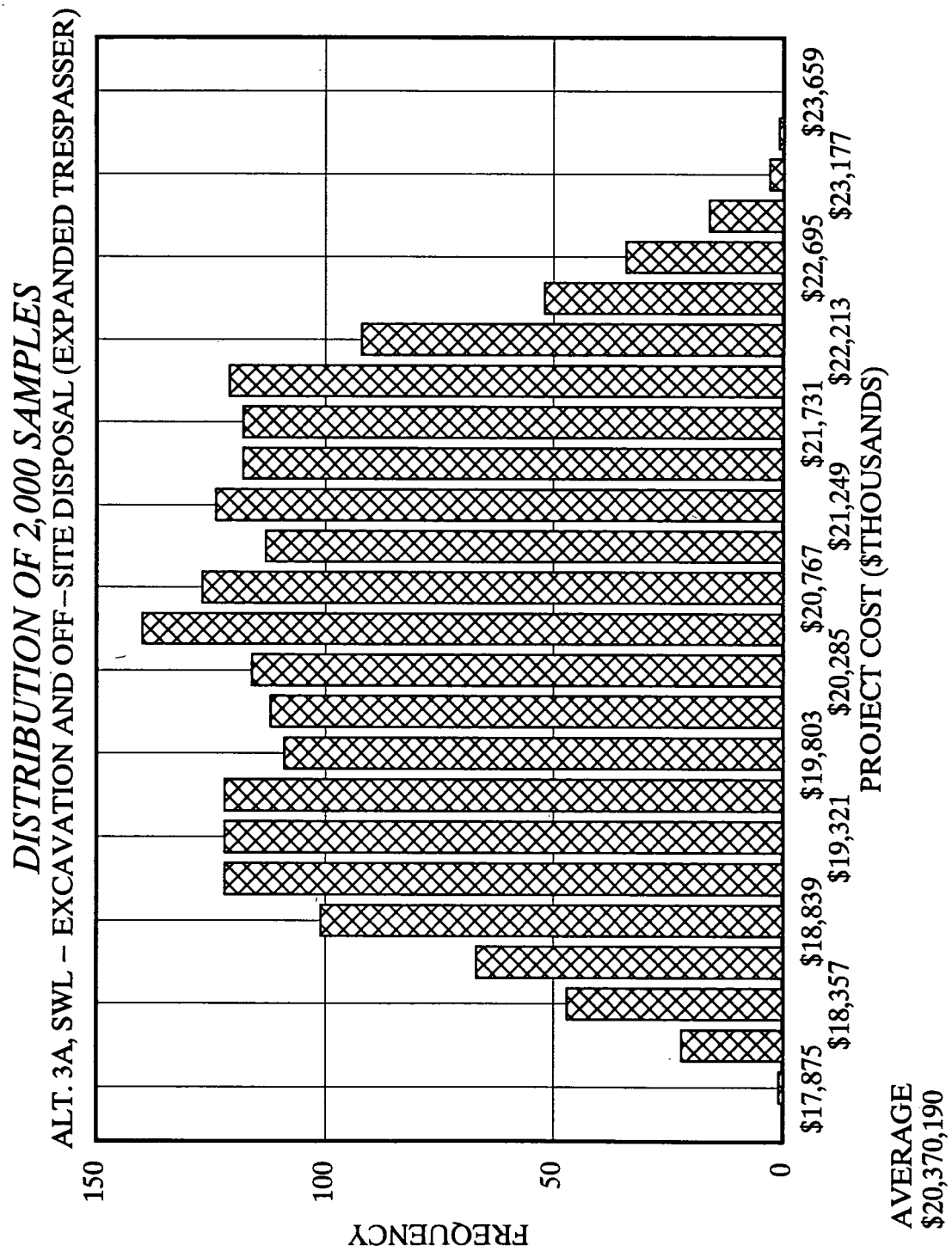
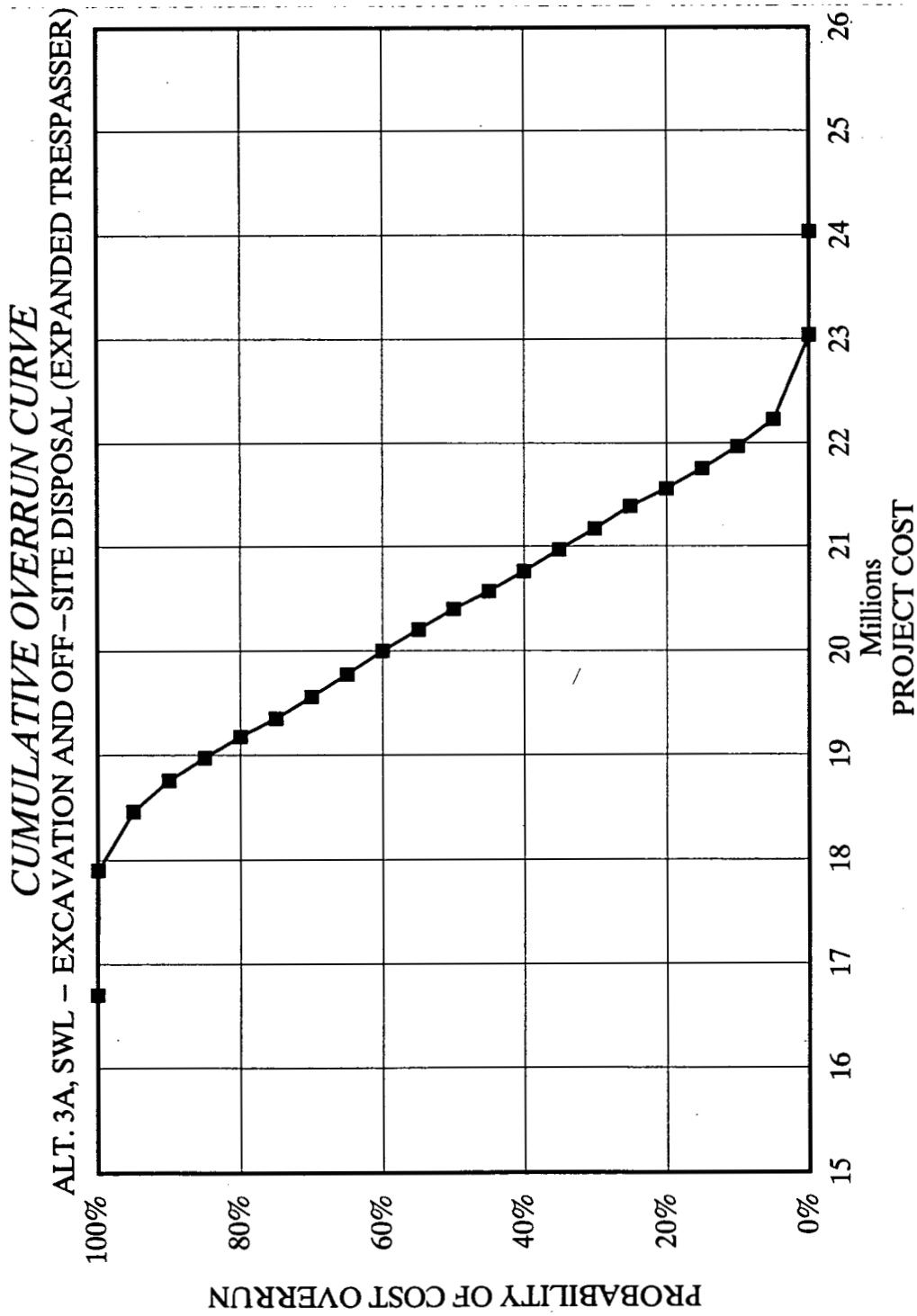

DISTRIBUTION OF 2,000 SAMPLES
ALT. 3A, SWL – EXCAVATION AND OFF–SITE DISPOSAL (EXPANDED TRESPASSER)
FREQUENCY
150
100
50
0
$17,875
$18,357
$18,839
$19,321
$19,803
$20,285
$20,767
$21,249
$21,731
$22,213
$22,695
$23,177
$23,659
PROJECT COST ($THOUSANDS)
AVERAGE
$20,370,190

000902

5861



BASE ESTIMATE:
$17,630,300

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SWL - EXCAV. & OFF-SITE DISPOSAL TO ENVIROCARE
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940701
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$17,630,300	BASE EST:	$67,250	BASE EST:	$16,500	BASE EST:	$96,220	BASE EST:	$8,370	BASE EST:	$32,870	BASE EST:	$8,860
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	30%	-5%	20%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	30%	-5%	20%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$63,888	$87,425	$15,675	$21,450	$91,409	$115,464	$8,203	$15,066	$30,898	$59,166	$8,328	$14,176

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-5-46

006904

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SWL - EXCAV. & OFF-SITE DISPOSAL TO ENVIROCARE
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940701
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$24,980	BASE EST:	$0	BASE EST:	$69,960	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$23,731	$37,470	$0	$0	$66,462	$90,948	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-5-47

000905

586

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SWL - EXCAV. & OFF-SITE DISPOSAL TO ENVIROCARE
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940701
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

	EXCAVATE/SORT/DRY/CRUSH OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY/CRUSH OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY/CRUSH OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$71,810	BASE EST:	$859,030	BASE EST:	$124,390	BASE EST:	$151,260	BASE EST:	$0	BASE EST:	$31,650
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	75%					-5%	75%				
MATERIAL PRICING			-5%	75%	-5%	30%					-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	25%	-1%	25%	-1%	25%						
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	100%	-6%	100%	-6%	55%	-5%	75%	0%	0%	-5%	20%
TOTAL $	$67,501	$143,620	$807,488	$1,718,060	$116,927	$192,805	$143,697	$264,705	$0	$0	$30,068	$37,980

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U	A	U	A	U	A	U	A	U		U	A

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SWL - EXCAV. & OFF-SITE DISPOSAL TO ENVIROCARE
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940701
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

	EXCAVATE & CONTAIN. ON-SITE DISPOSAL LABOR $'s		EXCAVATE & CONTAIN ON-SITE DISPOSAL S/C $'s		EXCAVATE & CONTAIN ON-SITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

000907

F-5-49

FEMP-OU02-5 DRAFT
August 24, 1994

586

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SWL - EXCAV. & OFF-SITE DISPOSAL TO ENVIROCARE
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940701
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		CLAY CAP LABOR $'s		CLAY CAP S/C $'s		CLAY CAP MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-5-50

000308

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SWL - EXCAV. & OFF-SITE DISPOSAL TO ENVIROCARE
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940701
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$25,600	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$24,320	$38,400	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-5-51

000909

5 of 8

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SWL - EXCAV. & OFF-SITE DISPOSAL TO ENVIROCARE
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940701
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$59,380	BASE EST:	$0	BASE EST:	$126,970	BASE EST:	$0	BASE EST:	$245,300	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$56,411	$77,194	$0	$0	$120,622	$165,061	$0	$0	$233,035	$367,950	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-5-52

000310

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SWL - EXCAV. & OFF-SITE DISPOSAL TO ENVIROCARE
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940701
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$445,100	BASE EST:	$296,200	BASE EST:	$618,900	BASE EST:	$703,200	BASE EST:	$11,177,400	BASE EST:	$354,600
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-10%	30%				
MATERIAL PRICING			-5%	50%	-5%	50%			-5%	30%	-5%	10%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION							-5%	25%	-5%	25%	-5%	25%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	50%	-5%	50%	-15%	55%	-10%	55%	-10%	35%
TOTAL $	$422,845	$667,650	$281,390	$444,300	$587,955	$928,350	$597,720	$1,089,960	$10,059,660	$17,324,970	$319,140	$478,710
RISK PROFILE & CORRELATION FOR	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
EACH COST ELEMENT	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-5-53

FEMP-OU02-5 DRAFT
August 24, 1994

5861

000911

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SWL - EXCAV. & OFF-SITE DISPOSAL TO ENVIROCARE
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940701
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSW

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$1,906,700	BASE EST:	$107,800	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-5%	25%										
(OTHER)												
TOTAL %	-5%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$1,811,365	$2,383,375	$106,722	$108,878	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-5-54

000912

LCC ANALYSIS TITLE:	LSP - EXCAVATE & OFF-SITE DISPOSAL - (EXPANDED TRESPASSER)			
WBS NO.:	1.1.1.1.2.3.3		TASK NO.:	2CLS
ALTERNATIVE:	3A		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	35 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	07-Aug-94
DOCUMENT NO.:	LCC-94-03-02	EST. NO. C2-94-07-05 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$4,649,150	$0	$0	$4,649,200	1997
$13,947,450	$0	$0	$13,947,500	1998
$0	$186,170	$0	$186,200	1999
$0	$183,206	$0	$183,200	2000
$0	$183,206	$0	$183,200	2001
$0	$183,206	$0	$183,200	2002
$0	$203,206	$0	$203,200	2003
$0	$95,206	$0	$95,200	2004
$0	$95,206	$0	$95,200	2005
$0	$95,206	$0	$95,200	2006
$0	$95,206	$0	$95,200	2007
$0	$115,206	$0	$115,200	2008
$0	$95,206	$0	$95,200	2009
$0	$95,206	$0	$95,200	2010
$0	$95,206	$0	$95,200	2011
$0	$95,206	$0	$95,200	2012
$0	$115,206	$0	$115,200	2013
$0	$95,206	$0	$95,200	2014
$0	$95,206	$0	$95,200	2015
$0	$95,206	$0	$95,200	2016
$0	$95,206	$0	$95,200	2017
$0	$115,206	$0	$115,200	2018
$0	$95,206	$0	$95,200	2019
$0	$95,206	$0	$95,200	2020
$0	$95,206	$0	$95,200	2021
$0	$95,206	$0	$95,200	2022
$0	$115,206	$0	$115,200	2023
$0	$95,206	$0	$95,200	2024
$0	$95,206	$0	$95,200	2025
$0	$95,206	$0	$95,200	2026
$0	$95,206	$0	$95,200	2027
$0	$115,206	$0	$115,200	2028
				2029
				2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$18,596,600	$3,419,100	$0	$22,015,700	TOTAL
$16,768,400	$2,148,600	$0	$18,917,000	<====(@NPV)

F ERMC O
ESTIMATING SERVICES

EST FILE #: C2940702 | DATE: 07-Aug-94
CLIENT: US DOE | SUMMARY SHEET | ESTIMATOR: KEN KEPLER
PROJECT TITLE: ALT-3A, LSP - EXCAVATION & OFF-SITE DISPOSAL | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.3 EXPANDED TRESPASSER | TASK#: 2CLS

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		OFF-SITE DISPOSAL TO ENVIROCARE BY RAIL	24,631		$424,500	$1,020,300	$437,100	$1,881,900
2		EXCAVATE, SORT, DRY, LOAD, HAUL						
		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		24,631		$424,500	$1,020,300	$437,100	$1,881,900
11	SUPERVISION - CONTRACTOR				$72,000			$72,000
12	SM TOOLS/CONSM'BLS						$25,500	$25,500
13	EQUIPMENT RENTAL						$475,200	$475,200
14	TEMP. FACILITIES				$8,900		$16,600	$25,500
15	TEMP UTL'S HOOK-UP				$4,500		$8,300	$12,800
16	JOB CLEAN-UP				$8,900		$16,600	$25,500
17	SAFETY				$4,500		$8,300	$12,800
18	HEALTH PHYSICS S/C				$60,100			$60,100
19	CERCLA/SAT	$1,500 PER PERSON				$19,500		$19,500
20	BOND					$18,800		$18,800
21	OVERHEAD & PROFIT					$236,700		$236,700
22	PAYRL BRD.&BENFT.				$303,400			$303,400
	INDIRECT FIELD COSTS				$482,300	$275,000	$550,500	$1,287,800
	DIRECT & INDIRECT FIELD COSTS				$886,800	$1,295,300	$987,600	$3,169,700
23	TRANSPORTATION & BURIAL					$8,538,900		$8,538,900
24	WASTE CONTAINERS						$294,200	$294,200
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$10,500		$10,500
25	SCREENING & CONFIRMATION TESTING					$727,800		$727,800
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$580,100			$580,100
	FERMCO FIELD SUPPORT COSTS				$580,100	$9,277,200	$294,200	$10,151,500
28	EMISSION MODELING				$5,500		$10,300	$15,800
29	PSAR/FSAR(SAFETY RPT)				$88,800			$88,800
30	ENGINEERING	TITLE I&II $440,600 TITLE III	$415,200	CDR	$152,100	DCR	$114,100	$1,122,000
	ENGINEERING COSTS							$1,226,600
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$1,586,300	$95,200
	SUB-TOTAL	(BASE ESTIMATE)						$14,643,000
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	16.0%						$2,342,900
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$16,985,900
35	CONTINGENCY	11.0%						$1,610,700
								PRELIMINARY
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$18,596,600

LOTUS31\FS2\ALT3A\LSP\INDSUM.WK3 - FEASIBILITY STUDY

000914

Alternative 3 – Excavation and Off-Site Disposal
(Expanded Trespasser)

Lime Sludge Ponds

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	1	1	5	sample	$5,500.00	32	NA	$176,000	8 wells x 4 samples/year
Long Term	1	6	30	sample	$5,500.00	16	NA	$88,000	8 wells x 2 samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	2	2.58	$1,001	Inspect all wells twice/year. Repair 1 out of 8.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Long Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Well Inspect & Maint.	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
OU2 Waste Cell Leachate									
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Facility Maint. at Subunit									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	1	1	30	acre	$1,861.92	3	3.87	$7,206	Approx. 3 Acres
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.65	0.84	$1,653	Approx. 1300 ft perimeter
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Fence Repair	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of Subunit	5	5	30	lump Sum	$20,000.00	1	NA	$20,000	Total divided among 5 subunits
Facility Review of OU2 Cell	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative

Annual Costs, Year 1 (excluding facility review)	$186,170
Annual Costs, Years 2–5 (excluding facility review)	$183,206
Annual Costs, Years 6–30 (excluding facility review)	$95,206
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 C:

8/3/94

DATE: 06-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940702
EST. : KEN KEPLER
TASK I.D. : 2CLS

ALT-3A, LSP - EXCAVATION & OFF-SITE DISPOSAL
WBS#:
1.1.1.1.2.3.3

EXPANDED TRESPASSER

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	• NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			•	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	0	$0	C/B		
SUB-TOTAL		31.80	4		$0			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	0		$0	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	0		$0	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	0		$0	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	0		$0	C/B		
THERMO STRIPS	EA	50.00	0		$0	C/B		
SUB-TOTAL		327.21			$0			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$0			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

000916

DATE: 06-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940702

ALT-3A, LSP - EXCAVATION & OFF-SITE DISPOSAL

EST. : KEN KEPLER

WBS#:

TASK I.D. :

1.1.1.1.2.3.3

EXPANDED TRESPASSER

2CLS

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	13	52	$16.97	$880		
ANNUAL PHYSICALS	1	3	13	39	$16.97	$660		
EXIT (TERMINATION) PHYSICALS	1	4	13	52	$16.97	$880		
SUB-TOTAL						$2,420		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	16	1	13	211	$16.97	$3,570		
YEARLY IN-VIVO	1	4	13	52	$16.97	$880		
EXIT (END OF PROJECT / TERMINATION)	1	4	13	52	$16.97	$880		
SUB-TOTAL						$5,330		
WORK DELAYS CAUSED BY MONITORING	5%				$523,300	$26,165		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$523,300	$26,165		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$60,100	$0	$60,100

000917

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT–3A, LSP – EXCAVATION & OFF–SITE DISPOSAL
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CLS

WBS NO. – 1.1.1.1.2.3.3
EST. NO. – C2940702
BY – K. KEPLER
DATE – 08/06/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	30–Jun–94	01–Jun–97	30–Jan–98	30–Sep–98	16	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
43	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – LSP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.3

EST.NO. C2940702
BY KEN KEPLER
DATE 06–Aug–94
TASK ID 2CLS

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR)			CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS				ENVIROCARE BURIAL COSTS		TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							$80.15 PER TON (90 TON MIN.)	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	141 $120 DEMURAGE $/DAY (>6 DAYS)	(1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	
	CAR	LINER	COVER			TONS/CY	TONS						
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 125, 141, or 200 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

000919

F-5-61

FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – LSP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.3

EST.NO. C2940702
BY KEN KEPLER
DATE 06–Aug–94
TASK ID 2CLS

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C – D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0

INPUT

000920

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – LSP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.3

EST.NO. C2940702
BY KEN KEPLER
DATE 06–Aug–94
TASK ID 2CLS

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	22750.0	312	$23,816	$7,430,600	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	2846.0	58	$24,180	$1,402,400	$493.47		
						**			

INPUT

** **NOTE:**
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

000921

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – LSP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940702
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: X2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY (EXPANDED TRESPASSER) OFF–SITE DISPOSAL TO ENVIROCARE														
SITE PREPARATION	1	LS		4,502						$78,130	$15,000	$38,970	$125,360	$257,460
DECONTAMINATION FACILITIES/SERVICES	1	LS		443						$8,090	$29,880	$1,900	$8,280	$48,150
EROSION AND SEDIMENT CONTROLS	1	LS		1433						$27,190		$10,460	$22,980	$60,630
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT/DRY –OFF–SITE DISPOSAL	1	LS		2322						$39,400	$633,680	$80,000		$753,080
LOAD/HAUL – OFF–SITE DISPOSAL TO ENVIROCARE	1	LS		4566						$78,240		$89,110	$28,770	$196,120
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE	N/A													N/A
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	N/A													N/A
DIKE	N/A													N/A
GENERATED WASTE REMOVAL	1	LS		2629						$44,610		$24,230		$68,840
SITE RESTORATION	1	LS		6497						110270		187280	211990	509540
MONITORING WELLS	1	LS									$249,000			$249,000
SUB–TOTAL (DIRECT FIELD COSTS)				22392						$385,930	$927,560	$431,950	$397,380	$2,142,820
TAKE–OFF ALLOWANCE 10%	1	LS		2,239						$38,590	$92,760	$43,200	$39,740	$214,290
TOTAL (DIRECT FIELD COSTS)	1	LS		24,631						$424,500	$1,020,300	$475,200	$437,100	$2,357,100

Off–Site Disposal of Lime Sludge Ponds to ENVIROCARE – SUMMARY

PAGE 1 of 15

CONTR.NO. - [redacted]4321 PRELIMINARY
CLIENT - U.S. DEPT. OF ENERGY
PROJECT - ALT-3A - LSP - EXCAVATION & OFF-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.3

CONTR.NO. 4424321
EST. NO. C2940702
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	1500	LF	0.213	412	16.97				6.25	$6,990			$9,660	$16,650
c. Clear and Grub														
i. Remediation Site	4.00	AC	41.40	214	16.97			2575.00		$3,630		$10,610		$14,240
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Storage Area, &/or Staging Area @ Sub-unit														
d. Dewatering														
i. Excavate Dewatering Trench	335	CY	0.50	216	16.97			1.49		$3,670		$510		$4,180
ii. Pump - w/4" Suction Hose	150	DAYS	3.00	581	16.97			19.55		$9,860		$3,020		$12,880
iv. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank - 1cy/trip	1	CY	4.00	5	16.97			100.00		$80		$100		$180
e. General Grading														
i. New Roads	4445	SY	0.001	6	16.97			0.07		$100		$320		$420
50%														
ii. Office/Parking Area 2222	1111	SY	0.010	14	16.97			0.32		$240		$370		$610
iii. Const.Equip.Decon.Pad Area 272	136	SY	0.010	2	16.97			0.32		$30		$40		$70
iv. Pers.Decon.Pad Area 49	25	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub-Unit 2845	1423	SY	0.010	18	16.97			0.32		$310		$470		$780
v. Storage Area 100%	2222	SY	0.010	29	16.97			0.32		$490		$730		$1,220
f. Surfacing/Paving/Concrete Slab														
i. New Roads - 8" Gravel W/Geotextile	4445	SY	0.030	172	16.97			1.08	6.66	$2,920		$4,940	$30,490	$38,350
50%														
ii. Office/Parking - 8" Gravel W/ Geot 2222	1111	SY	0.030	43	16.97			1.08	6.66	$730		$1,240	$7,620	$9,590
iii. Staging Area @ Sub-Unit - 160' x160' Concrete														
Sub-Grade & Sub-Base for Conc 2845	1423	SY	0.041	75	16.97			1.45	5.51	$1,270		$2,120	$8,070	$11,460
Concrete Slab 160 x 160' x 8"thk. 631	316	CY	4.07	1656	17.98			18.38	67.00	$29,770		$5,970	$21,770	$57,510
Concrete Curb - 2'h x 480 lf x 8" tl 24	12	CY	15.30	237	17.98			69.08	275.90	$4,260		$850	$3,410	$8,520
HDPE Perf.Sub-grade Piping - 4" 500	250	LF	0.21	68	16.97			0.74	3.02	$1,150		$190	$780	$2,120
Epoxy Coating 2845	1423	SY	0.22	404	16.97			0.77	7.56	$6,860		$1,130	$11,080	$19,070
Backfill & Compact around Slab 183	92	ICY	0.086	10	16.97			1.38				$130		$130
Mob/Demob.Equip. 1	1	LS	2.00	1	16.97			184.00		$20		$90		$110
iv. Storage Area - 100' x200' Asphal 100%														
Includes Compacted Sub-Grade Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4-1/2" Asph.Conc.Base course, Tack Coat, 1-1/2" Asph.Conc.Surface Coat	2222	SY	0.084	241	16.97			2.56	14.04	$4,090		$5,860	$32,130	$42,080
TOTAL (SITE PREPARATION)	1	LS		4,502						$78,130	$15,000	$38,970	$125,360	$257,460

Site Preparation Details

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000923

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – LSP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940702
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
	50%														
a. Decon Trailer – Rental	39	20	MO					1500.00				$29,250			$29,250
	50%														
b. Construction Equipment Decon. Facility 25 ft x 60 ft															
i. Excavation – Structural	175	88	BCY	0.021	2	16.97			0.64		$30		$60		$90
ii. Sub–grade Prep.	167	84	SY	0.041	4	16.97		6.75	1.45	5.51	$70	$580	$120	$470	$1,240
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	8	SF	0.32	3	19.21			0.73	12.55	$60		$10	$100	$170
Metal Grating 2 ft wide x 25 lf	25	13	LF	0.53	9	19.21			1.86	46.67	$170		$20	$600	$790
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	20	CY	4.07	102	17.98			14.25	67.00	$1,830		$290	$1,350	$3,470
Decon Pad Trench – 2'x2'i.d.x 25l	5	3	CY	28.22	91	17.98			98.77	202.30	$1,640		$250	$520	$2,410
Decon Pad Curb – 6" x 6" x 120 lf	5	3	CY	15.30	49	17.98			53.55	275.90	$880		$140	$710	$1,730
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	2	17.98			37.24	97.20	$40		$10	$20	$70
Epoxy Coating	167	84	SY	0.22	24	17.00			0.77	7.56	$410		$70	$650	$1,130
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	1	EA	12.00	8	17.98			100.00	525.00	$140		$50	$270	$460
vi. HDPE Piping	200	100	LF	0.38	49	19.95			5.11	4.42	$980		$530	$460	$1,970
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Gu:	720	360	SF	0.04	17	16.97			0.03	1.55	$290		$10	$570	$870
4" x 4" x 9'–6" Wood Posts set in (	27	14	EA	0.480	8	16.97			1.68	5.75	$140		$20	$80	$240
viii. Air Diaphragm Pump 50 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$400	$630
ix. Suction and Discharge Piping	10	5	LF	0.11	1	19.95			0.39	0.84	$20				$20
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	2	LF	0.47	1	19.95			1.65	14.91	$20			$20	$40
	BCY 129 ICY														
x. Backfill & Compaction around concrete slab	155	78	ICY	0.086	9	16.97			1.38		$150		$110		$260
SUB–TOTAL (EQUIP. DECON. FACILITY)		1	LS		389						$7,070	$29,830	$1,720	$6,220	$44,840

Equipment Decon. Facility Details

CONTR.NO.- [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – LSP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940702
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
c. Personnel Decon. Facility	50%														
i. Excavation – Structural	19	10	BCY	0.021		16.97			0.64				$10		$10
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	7	SY	0.041		16.97		6.75	1.45	5.51		$50	$10	$40	$100
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	2	SF	0.32	1	16.97			0.73	12.55	$20			$30	$50
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	1	CY	4.07	4	17.98			14.25	67.00	$70		$10	$50	$130
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	6	17.98			111.44	250.70	$110		$20	$40	$170
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	4	17.98			53.55	275.90	$70		$10	$60	$140
Epoxy Coating	14	7	SY	0.22	2	17.00			0.77	7.56	$30		$10	$50	$90
v. Corrugated Fiberglass Splash Gua	132	66	SF	0.04	3	16.97			0.03	1.55	$50			$110	$160
4" x 4" x 9'–6" Wood Posts set in (	6	3	EA	0.480	2	16.97			1.68	5.75	$30		$10	$20	$60
vi. Pump 20 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$410	$640
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	1	LS	32.00	21	19.95			112.00	2500.00	$420		$60	$1,250	$1,730
viii. Backfill & Compaction around concrete slab	BCY 17 ICY 20	10	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		54						$1,020	$50	$180	$2,060	$3,310
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		443						$8,090	$29,880	$1,900	$8,280	$48,150

Personnel Decon.Facilities/Services Details

PAGE 4 of 15

FEMP-OU02-5 DRAFT August 24, 1994

F-5-67

000925

586

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – LSP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940702
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	2000	LF	0.017	44	16.97			0.06	0.65	$750		$120	$1,340	$2,210
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	300	EA	0.24	93	16.97			1.53	1.35	$1,580		$470	$420	$2,470
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1800	LF	0.38	885	19.95			5.11	4.42	$17,660		$9,200	$7,960	$34,820
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	1	EA	8.00	10	16.97			28.00	8300.00	$170		$30	$8,300	$8,500
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,433						$27,190		$10,460	$22,980	$60,630

000926

Erosion Control Details

CONTR.NO.- [redacted]4321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – LSP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

CONTR.NO. 4424321
EST. NO. C2940702
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE/SORT/DRY FOR OFF–SITE DISPOSAL TO ENVIROCARE														
EXCAVATION														
Excavate Lime Sludge – Level D	16500	BCY	0.055	1171	16.97			1.17		$19,870		$19,310		$39,180
Excavate Additional Soil	1700	BCY	0.055	121	16.97			1.17		$2,050		$1,990		$4,040
Sort Contaminated Lime Sludge/Soil BCY 18200	22750	LCY	0.033	968	16.97			2.58		$16,430		$58,700		$75,130
Low Level Thermal Destruction Unit BCY 7100	9053	TON					70.00				$633,680			$633,680
Sub–contract cost for Drying Operation and moisture test Only.														
(SHREDDING COMMON TO SWL, IFP & SF)														
Shredder/Crusher – Purchase/Install N/A		LOT	280.0					8400.00	317800.00					
60 Ton per Hour														
Generated Waste BCY 2475														
(Percent of Gen.Waste to be Shredded) 25%														
Generated Waste TOTAL TONS 1423														
Operating Costs	24	HRS							25.75					
(2) Operators	48	HRS	1.00	62	16.97					$1,050				$1,050
BCY = BANK CUBIC YARDS : The Volume of 1 Cubic Yard of material in its natural state OR Volume/Void to be filled.														
LCY = LOOSE CUBIC YARDS (w/Swell Factor) Volume of material after being excavated.														
ICY = IN–PLACE CUBIC YARDS (w/Shrinkage Factor) Volume of material it takes to fill a 1 Cubic Yard space.														
TOTAL (EXCAVATE/SORT/DRY)	1	LS		2,322						$39,400	$633,680	$80,000		$753,080

Off–Site Excavate/Sort/Dry Details

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FEMP-OU02-5 DRAFT
August 24, 1994

000927

1981

CONTR.NO. – 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – LSP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

CONTR.NO. 4424321
EST. NO. C2940702
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
LOAD & HAUL FOR OFF–SITE DISPOSAL CONTAMINATED WASTE TO ENVIROCARE															
(ITEMS @ 20% ARE COMMON TO SWL,LSP,SF,AFP & IFP)															
Install Loading Equipment for LLW	20%														
Hopper	1	0.20	EA	177.0	35	16.97	3000.00			6000.00	$600			$1,200	$1,800
Loading Conveyor	1	0.20	EA	147.0	29	16.97	2500.00			8500.00	$500			$1,700	$2,200
Scale	1	0.20	EA	589.0	118	16.97	10000.00			15000.00	$2,000			$3,000	$5,000
Railroad Loading Facility	20%														
a. 160' x 160 'Concrete Pad															
i. Clear & Grub	1	0.12	AC	41.40	6	16.97			2575.00		$100		$320		$420
ii. Grading	2845	569.00	SY	0.010	7	16.97			0.32		$120		$190		$310
iii. Sub–Grade & Sub–Base for Conc.	2845	569.00	SY	0.041	30	16.97			1.45	5.51	$510		$850	$3,230	$4,590
iv. Concrete Slab 160 x 160' x 8"thk.	631	126.20	CY	4.07	663	17.98			18.38	67.00	$11,920		$2,390	$8,710	$23,020
v. Concrete Curb – 2'h x 480 lf x 8" tl	24	4.80	CY	15.30	95	17.98			69.08	275.90	$1,710		$340	$1,360	$3,410
vi. Wood Ties, Ballast, 100# Rail Derailer, Turnout, Bumper Car Stops	600	120.00	LF	1.06	164	16.97			4.43	77.40	$2,780		$550	$9,570	$12,900
vii. Grading for track	800	160.00	SY	0.010	2	16.97			0.32		$30		$50		$80
HAUL															
From excavation site to rail loading facility															
6 CY dump truck 1/2 mi r.t.		22750	LCY	0.041	1,203	16.97			1.65		$20,410		$37,540		$57,950
LOADING GONDOLA	LCY														
Excavated level D & Additional =	22750														
Allowable CY's of waste per Gondola	73.0														
Install Liner in Gondola car		312	EA	0.75	302	16.97			32.21		$5,120		$10,050		$15,170
Load Gondola – 6/day, 2 workers		52	DAYS	16.00	1,073	16.97			15.00		$18,210		$780		$18,990
Seal liner, Install Cover		312	EA	0.75	302	16.97			32.21		$5,120		$10,050		$15,170
Dust control – light		52	DAYS	8.00	537	16.97			500.00		$9,110		$26,000		$35,110
(RSO takes ownership at this time.) (See: Off–Site Disposal Wksht. and Appendix E)															
TOTAL (LOAD & HAUL OFF–SITE DISPOSAL)		1	LS		4,566						$78,240		$89,110	$28,770	$196,120

Offsite Load/Haul/Disposal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – LSP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940702
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ENVIROCARE Demo. /Load/Haul														
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)														
(ITEMS @ 20% ARE COMMON TO SWL,LSP,SF,AFP & IFP)														
a. Office/Parking Area 50%														
Excavate, Load, Haul, Backfill, Compact														
Sub–grade Gravel 494	247	BCY	0.292	93	16.97			9.16		$1,580		$2,330		$3,910
Geo–Fabric & Liner 2222	1111	SY	0.002	3	16.97			0.02		$50		$20		$70
Haul & Dump Rubble 185	93	BCY	0.30	36	16.97			2.51		$610		$240		$850
b. Const.Equip.Decon Area @ Excav.Sit 50%														
Demo/Remove Concrete 49.3	25	BCY	1.2	38	16.97			3.62		$640		$90		$730
Excavate, Load, Haul, Backfill, Compact														
Sub–grade Stone 28	14	BCY	0.292	5	16.97			9.16		$80		$130		$210
Geo–Fabric & Liner 167	84	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6" 27	14	EA	0.48	8	16.97			1.68		$140		$20		$160
Splash Guard 702	351	SF	0.04	18	16.97			0.03		$310		$10		$320
Haul & Dump Rubble 24.9	12	BCY	0.30	5	16.97			2.51		$80		$30		$110
c. Personnel Decon. Area @ Excav. Site 50%														
Demo/Remove Concrete 2.2	1	BCY	1.2	2	16.97			3.62		$30				$30
Excavate, Load, Haul, Backfill, Compact														
Sub–grade Stone 2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo–Fabric & Liner 14	7	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6" 6	3	EA	0.48	2	16.97			1.68		$30		$10		$40
Splash Guard 132	66	SF	0.04	3	16.97			0.03		$50				$50
Haul & Dump Rubble 3.5	2	BCY	0.30	1	16.97			2.51		$20				$20
d. Storage Pad Area– for SWL & LSP 100%														
Demo/Remove Concrete	370	BCY	1.2	573	16.97			3.62		$9,720		$1,380		$11,100
Excavate, Load, Haul, Backfill, Compact														
Sub–grade Stone	370	BCY	0.292	139	16.97			9.16		$2,360		$3,490		$5,850
Geo–Fabric & Liner	2222	SY	0.002	1	16.97			0.02		$20		$50		$70
Haul & Dump Rubble	105	BCY	0.30	41	16.97			2.51		$700		$270		$970
SUB–TOTAL (GENERATED WASTE REMOVAL)	1	LOT		968						$16,420		$8,080		$24,500

Generated Waste Removal Details

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August 24, 1994

000929

1981

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – LSP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940702
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ENVIROCARE (CON'T.)															
Demo. /Load/Haul/Compact															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
(ITEMS @ 20% ARE COMMON TO SWL,LSP,SF,AFP & IFP)															
e. Staging Area	50%														
Demo/Remove Concrete	655	328	BCY	1.2	507	16.97			3.62		$8,600		$1,220		$9,820
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	475	238	BCY	0.292	89	16.97			9.16		$1,510		$2,240		$3,750
Geo–Fabric & Liner	2845	1423	SY	0.002	4	16.97			0.02		$70		$30		$100
Haul & Dump Rubble	105	53	BCY	0.30	20	16.97			2.51		$340		$140		$480
f. Staging Area @ rail siding	20%														
Demo/Remove Concrete	655	328	BCY	1.2	507	16.97			3.62		$8,600		$1,220		$9,820
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	475	238	BCY	0.292	89	16.97			9.16		$1,510		$2,240		$3,750
Geo–Fabric & Liner	2845	1423	SY	0.002	4	16.97			0.02		$70		$30		$100
Haul & Dump Rubble	105.0	53	BCY	0.30	20	16.97			2.51		$340		$140		$480
LOADING GONDOLA	BCY														
Generated Waste	2475														
Plus a swell factor of 15%	2846														
Allowable CY's of waste per Gondola	49.0														
Install Liner in Gondola car		58	EA	0.75	56	16.97			32.21		$950		$1,870		$2,820
Load Gondola – 6/day, 2 workers		10	DAYS	16.00	206	16.97			15.00		$3,500		$150		$3,650
Seal liner, Install Cover		58	EA	0.75	56	16.97			32.21		$950		$1,870		$2,820
Dust control – light		10	DAYS	8.00	103	16.97			500.00		$1,750		$5,000		$6,750
SUB–TOTAL (GENERATED WASTE REMOVAL		1	LOT		1,661						$28,190		$16,150		$44,340
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		2,629						$44,610		$24,230		$68,840

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. - [illegible]321
CLIENT - U.S. DEPT. OF ENERGY
PROJECT - ALT-3A - LSP - EXCAVATION & OFF-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.3

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940702
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off-site source															
a. Borrow Common Soil, Backfill	BCY														
Lime Sludge Ponds	39000	46800	ICY	0.09	5433	16.97			3.21	3.50	$92,200		$154,730	$168,710	$415,640
	50%														
Office/Parking	494	247	ICY	0.09	29	16.97			3.21	3.50	$490		$820	$890	$2,200
Const.Equip.Decon.Area	78	39	ICY	0.09	5	16.97			3.21	3.50	$80		$130	$140	$350
Personnel Decon.Area	7	4	ICY	0.09		16.97			3.21	3.50			$10	$10	$20
Staging Area at Sub-Unit	475	238	ICY	0.09	28	16.97			3.21	3.50	$480		$790	$860	$2,130
	100%														
Storage Area at S/U (SWL & LSP)	370	370	ICY	0.09	43	16.97			3.21	3.50	$730		$1,220	$1,330	$3,280
	20%														
Staging Area at Rail Loading	655	157	ICY	0.09	18	16.97			3.21	3.50	$310		$520	$570	$1,400
b. Final Grade for LSP (Excludes Cap)		11667	SY	0.02	301	16.97			0.70		$5,110		$8,410		$13,520
c. Borrow Top Soil 6" Thk., Spread															
Lime Sludge Ponds		1667	SY	0.036	77	16.97			2.33	2.88	$1,310		$4,000	$4,940	$10,250
	50%														
Office/Parking	2222	1111	SY	0.036	52	16.97			2.33	2.88	$880		$2,670	$3,300	$6,850
Const.Equip.Decon.Area	167	84	SY	0.036	4	16.97			2.33	2.88	$70		$200	$250	$520
Personnel Decon.Area	14	7	SY	0.036		16.97			2.33	2.88			$20	$20	$40
Staging Area at Sub-Unit	2845	1423	SY	0.036	66	16.97			2.33	2.88	$1,120		$3,410	$4,220	$8,750
	100%														
Storage Area at S/U (SWL & LSP)	2222	2222	SY	0.036	103	16.97			2.33	2.88	$1,750		$5,330	$6,590	$13,670
	20%														
Staging Area at Rail Loading	2845	569	SY	0.036	26	16.97			2.33	2.88	$440		$1,370	$1,690	$3,500
d. Grass Cover - Seed, Fertilize, Mulch															
Utility Mix - Hydro/Air Seeding	SY														
Lime Sludge Ponds	11677	105	MSF	0.30	41	16.97			6.75	25.00	$700		$730	$2,700	$4,130
	50%														
Office/Parking	2222	10	MSF	0.30	4	16.97			6.75	25.00	$70		$70	$260	$400
Const.Equip.Decon.Area	167	1	MSF	0.30		16.97			6.75	25.00			$10	$30	$40
Personnel Decon.Area	14		MSF	0.30		16.97			6.75	25.00					
Staging Area at Sub-Unit	2845	13	MSF	0.30	5	16.97			6.75	25.00	$80		$90	$330	$500
	100%														
Storage Area at S/U (SWL & LSP)	2222	20	MSF	0.30	8	16.97			6.75	25.00	$140		$140	$520	$800
	20%														
Staging Area at Rail Loading	2845	5	MSF	0.30	2	16.97			6.75	25.00	$30		$30	$130	$190
e. Security Fence - 6ga aluminized - 6' high		1400	LF	0.13	231	16.97			1.64	9.80	$3,920		$2,360	$14,130	$20,410
i. Corner posts - 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
TOTAL (SITE RESTORATION)		1	LOT		6,497						$110,270		$187,280	$211,990	$509,540

Site Restoration Details

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August 24, 1994
5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – LSP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940702
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT				LABOR	S/C	EQUIP.	MATERIAL	TOTAL
			UNIT	TOTAL	RATE	LABOR	SUB	EQUIP.	MAT'L					
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at S/U: 8 Pairs x 120 ft.	8	PAIR					23,000				$184,000			$184,000
b. Abandon Existing Wells	5	EA					13,000				$65,000			$65,000
TOTAL (MONITORING WELLS)	1	LOT									$249,000			$249,000

Monitoring Wells Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – LSP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940702
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO														
PURCHASE														
Bulk Gondola Rail Car N/A	0	EA												
Liner for Gondola														
Excavated Waste – level D & Additional	312	EA							400.00				$124,800	$124,800
Excavated Waste – lead/soil	0	EA												
Generated Waste –	58	EA							400.00				$23,200	$23,200
Cover for Gondola														
Excavated Waste – level D & Additional	312	EA							395.00				$123,240	$123,240
Excavated Waste – lead/soil	0	EA							395.00					
Generated Waste –	58	EA							395.00				$22,910	$22,910
TOTALS FORWARD TO No. 24 ESTIMATE SUMMARY														
TOTAL (FERMCO PURCHASE COSTS)	1	LOT											$294,200	$294,200

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FERMCO Purchase Costs Details

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – LSP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940702
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF–SITE TRANSPORTATION COST TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas's	370	EA					340.00				$125,800			$125,800
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additional	312	EA					22681.00				$7,076,470			$7,076,470
Excavated Waste – lead/soil	0	EA												
Generated Waste –	58	EA					23045.00				$1,336,610			$1,336,610
TOTALS FORWARD TO No. 23 ESTIMATE SUMMARY														
TOTAL (OFF–SITE TRANSP. COST TO ENV)	1	LOT									$8,538,900			$8,538,900

Off–Site Transportation Costs Details

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August 24, 1994

CONTR.NO. - [redacted]4321
CLIENT - [redacted]. DEPT. OF ENERGY
PROJECT - ALT-3A - LSP - EXCAVATION & OFF-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940702
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	50000	GAL					0.01				$500			$500
Runnoff from the Exclusion Zone.	1000000	GAL					0.01				$10,000			$10,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$10,500			$10,500

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Waste Water Treatment Operations Cost Details

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – LSP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940702
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	91	EA					2,002				$182,200			$182,200
Rad	91	EA					2,000				$182,000			$182,000
Confirmatory Tests														
Full Rad Tests	46	EA					3,101				$142,600			$142,600
Full HSL	18	EA					1,500				$27,000			$27,000
Full TCLP	18	EA					2,000				$36,000			$36,000
2 Technicians per Month	12	MO					13,163				$158,000			$158,000
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS)	1	LOT									$727,800			$727,800

000936

F-5-78

FEMP-OU02-5 DRAFT
August 24, 1994

Screening & Confirmation Testing Details

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 3A, LSP – EXCAVATION AND OFF–SITE DISPOSAL (EXPANDED TRESI
CLIENT: DOE DATE: 07–Aug–94
CONTRACT: C2–94–07–02 BASE ESTIMATE: $14,643,000

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$20,207,835	$5,564,835	38.0%
0.05%	$19,167,962	$4,524,962	30.9%
5.00%	$18,585,981	$3,942,981	26.9%
10.00%	$18,367,488	$3,724,488	25.4%
15.00%	$18,166,439	$3,523,439	24.1%
20.00%	$17,989,634	$3,346,634	22.9%
25.00%	$17,811,868	$3,168,868	21.6%
30.00%	$17,644,002	$3,001,002	20.5%
35.00%	$17,459,132	$2,816,132	19.2%
40.00%	$17,270,658	$2,627,658	17.9%
45.00%	$17,129,215	$2,486,215	17.0%
50.00%	$16,992,308	$2,349,308	16.0%
55.00%	$16,838,030	$2,195,030	15.0%
60.00%	$16,656,797	$2,013,797	13.8%
65.00%	$16,498,716	$1,855,716	12.7%
70.00%	$16,336,818	$1,693,818	11.6%
75.00%	$16,172,867	$1,529,867	10.4%
80.00%	$16,036,106	$1,393,106	9.5%
85.00%	$15,863,310	$1,220,310	8.3%
90.00%	$15,710,121	$1,067,121	7.3%
95.00%	$15,463,524	$820,524	5.6%
99.95%	$14,896,187	$253,187	1.7%
100.00%	$13,875,654	($767,346)	–5.2%

00093

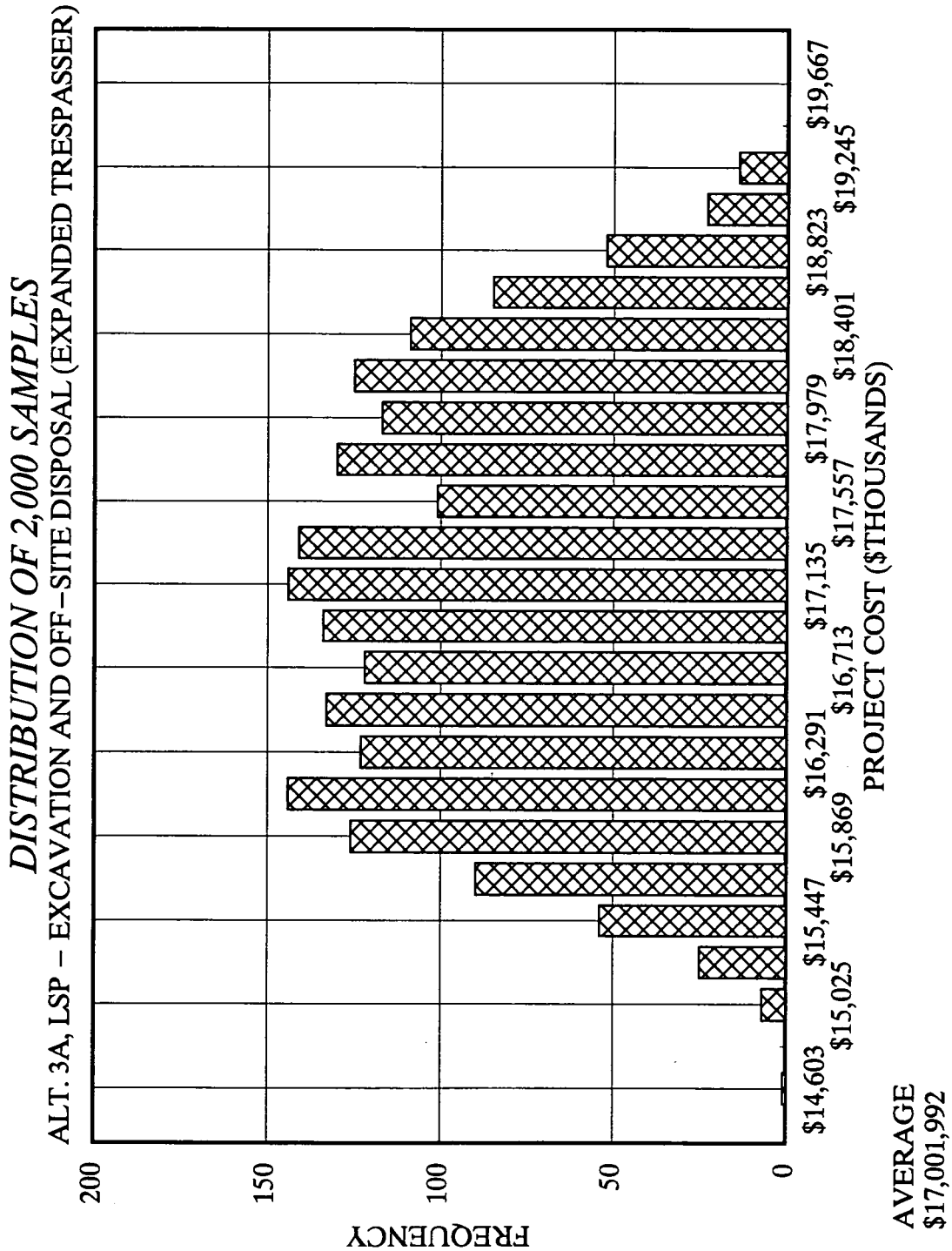
861

FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

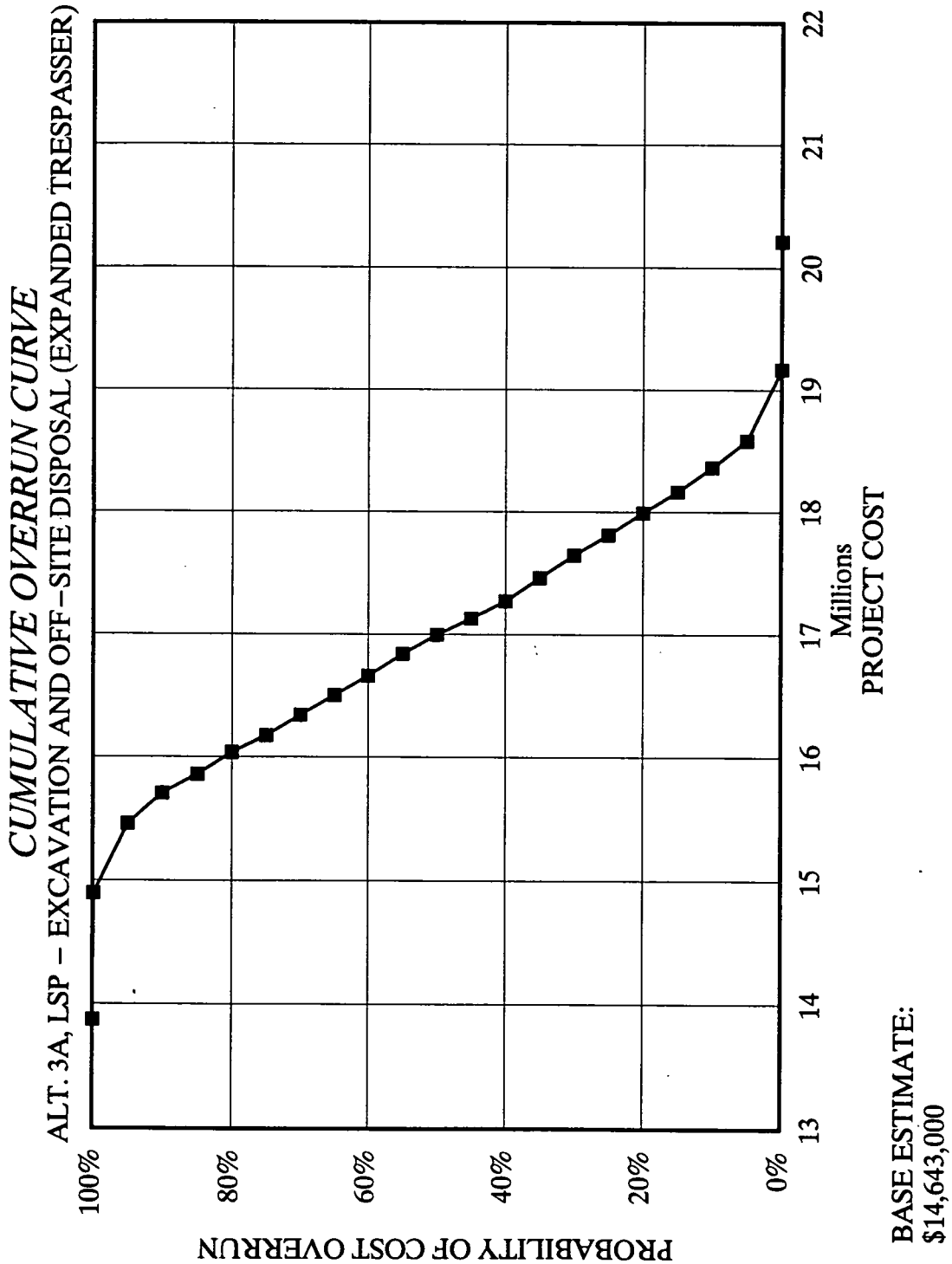
PROJECT: ALT. 3A, LSP – EXCAVATION AND OFF–SITE DISPOSAL (EXPANDED TRESPASSER)
CLIENT: DOE
CONTRACT: C2–94–07–02

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA–TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$85,940	–5.0%	$81,643	30%	$111,722	U		14%
2	SITE PREPERATION S/C	16,500	–5.0%	15,675	30%	21,450	U		14%
3	SITE PREPERATION MAT'L	137,900	–5.0%	131,005	20%	165,480	U		20%
4	DECON FACILITIES/SERVICES LABOR	8,900	–2.0%	8,722	80%	16,020	U		2%
5	DECON FACILITIES/SERVICES S/C	32,870	–6.0%	30,898	80%	59,166	U		7%
6	DECON FACILITIES/SERVICES MAT'L	9,110	–6.0%	8,563	60%	14,576	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	29,910	–5.0%	28,415	30%	38,883	U		14%
8	EROSION/SEDIMENT CNTRLS MAT'L	25,280	–5.0%	24,016	30%	32,864	U		14%
9	EXC/SORT/DRY OFF–SITE LBR	43,340	–6.0%	40,740	125%	97,515	U		5%
10	EXC/SORT/DRY OFF–SITE S/C	696,980	–6.0%	655,161	125%	1,568,205	U		5%
11	LOAD & HAUL OFF–SITE DISP LABOR	86,060	–6.0%	80,896	125%	193,635	U		5%
12	LOAD & HAUL OFF–SITE DISP MAT'L	31,650	–10.0%	28,485	50.0%	47,475	U		17%
13	GENERATED WASTE REMVL LABOR	49,070	–5.0%	46,617	50.0%	73,605	U		9%
14	SITE RESTORATION LABOR	121,300	–5.0%	115,235	30.0%	157,690	U		14%
15	SITE RESTORATION MAT'L	233,190	–5.0%	221,531	30.0%	303,147	U		14%
16	MONITORING WELLS S/C	273,900	–5.0%	260,205	50.0%	410,850	U		9%
17	INDIRECT FIELD COSTS LABOR	462,300	–5.0%	439,185	50.0%	693,450	U		9%
18	INDIRECT FIELD COSTS S/C	275,000	–5.0%	261,250	100.0%	550,000	U		5%
19	INDIRECT FIELD COSTS MAT'L	550,500	–5.0%	522,975	50.0%	825,750	U		9%
20	FIELD SUPPORT COSTS LABOR	580,100	–10.0%	522,090	30.0%	754,130	U		25%
21	FIELD SUPPORT COSTS S/C	9,277,200	–5.0%	8,813,340	30.0%	12,060,360	U		14%
22	FIELD SUPPORT COSTS MAT'L	294,200	–5.0%	279,490	30.0%	382,460	U		14%
23	ENGINEERING COSTS	1,226,600	–5.0%	1,165,270	25.0%	1,533,250	U		17%
24	SALES TAX MAT'L	95,200	–1.0%	94,248	1.0%	96,152	U		50%
25				0		0			0%
26				0		0			0%
27				0		0			0%
28				0		0			0%
29				0		0			0%
30				0		0			0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$14,643,000		$13,875,654		$20,207,835			

5861


DISTRIBUTION OF 2,000 SAMPLES
ALT. 3A, LSP – EXCAVATION AND OFF-SITE DISPOSAL (EXPANDED TRESPASSER)
FREQUENCY
200
150
100
50
0
$14,603
$15,025
$15,447
$15,869
$16,291
$16,713
$17,135
$17,557
$17,979
$18,401
$18,823
$19,245
$19,667
PROJECT COST ($THOUSANDS)
AVERAGE
$17,001,992

000939


CUMULATIVE OVERRUN CURVE
ALT. 3A, LSP – EXCAVATION AND OFF–SITE DISPOSAL (EXPANDED TRESPASSER)
PROBABILITY OF COST OVERRUN
100%
80%
60%
40%
20%
0%
13
14
15
16
17
18
19
20
21
22
Millions
PROJECT COST
BASE ESTIMATE:
$14,643,000

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, LSP - EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940702
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$14,643,000	BASE EST:	$85,940	BASE EST:	$16,500	BASE EST:	$137,900	BASE EST:	$8,900	BASE EST:	$32,870	BASE EST:	$9,110
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	25%	-10%	30%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	25%	-10%	30%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$81,643	$111,722	$15,675	$20,625	$124,110	$179,270	$8,722	$16,020	$30,898	$59,166	$8,563	$14,576

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

000941

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FEMP-OU02-5 DRAFT
August 24, 1994

F-5-83

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, LSP – EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940702
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$29,910	BASE EST:	$0	BASE EST:	$25,280	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$28,415	$44,865	$0	$0	$24,016	$32,864	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

000942

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, LSP - EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940702
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$43,340	BASE EST:	$696,980	BASE EST:	$0	BASE EST:	$86,060	BASE EST:	$0	BASE EST:	$31,650
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	100%					-1%	100%				
MATERIAL PRICING			-1%	100%							-5%	25%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-5%	25%	-5%	25%			-5%	25%			-5%	25%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	125%	-6%	125%	0%	0%	-6%	125%	0%	0%	-10%	50%
TOTAL $	$40,740	$97,515	$655,161	$1,568,205	$0	$0	$80,896	$193,635	$0	$0	$28,485	$47,475

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

58

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, LSP - EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940702
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE LABOR $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE S/C $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-5-86

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, LSP - EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940702
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		CLAY CAP LABOR $'s		CLAY CAP S/C $'s		CLAY CAP MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

000835

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, LSP - EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940702
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$49,070	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$46,617	$73,605	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

000035

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, LSP - EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940702
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$121,300	BASE EST:	$0	BASE EST:	$233,190	BASE EST:	$0	BASE EST:	$273,900	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$115,235	$157,690	$0	$0	$221,531	$303,147	$0	$0	$260,205	$410,850	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

5861

000947

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3A, LSP – EXCAVATION & OFF–SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940702
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS	
	LABOR $'s		S/C $'s		MAT'L. $'s		LABOR $'s		S/C $'s		MAT'L. $'s	
	BASE EST:	$462,300	BASE EST:	$275,000	BASE EST:	$550,500	BASE EST:	$580,100	BASE EST:	$9,277,200	BASE EST:	$294,200
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–10%	30%				
MATERIAL PRICING			–5%	100%	–5%	50%			–5%	30%	–10%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	–5%	100%	–5%	50%	–10%	30%	–5%	30%	–10%	30%
TOTAL $	$439,185	$693,450	$261,250	$550,000	$522,975	$825,750	$522,090	$754,130	$8,813,340	$12,080,360	$264,780	$382,460
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, LSP – EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940702
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CLS

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$1,226,600	BASE EST:	$95,200	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-5%	25%										
(OTHER)												
TOTAL %	-5%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$1,165,270	$1,533,250	$94,248	$96,152	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

LCC ANALYSIS TITLE:	IFP - EXCAVATE & OFF-SITE DISPOSAL - (EXPANDED TRESPASSER)			
WBS NO.:	1.1.1.1.2.3.5		TASK NO.:	2CNF
ALTERNATIVE:	3A		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	37 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	07-Aug-94
DOCUMENT NO.:	LCC-94-03-04	EST. NO. C2-94-07-03/FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$0	$0	$0	$0	1997
$23,961,721	$0	$0	$23,961,700	1998
$26,140,059	$0	$0	$26,140,100	1999
$23,961,721	$0	$0	$23,961,700	2000
$0	$128,933	$0	$128,900	2001
$0	$111,362	$0	$111,400	2002
$0	$111,362	$0	$111,400	2003
$0	$111,362	$0	$111,400	2004
$0	$131,362	$0	$131,400	2005
$0	$309,362	$0	$309,400	2006
$0	$309,362	$0	$309,400	2007
$0	$309,362	$0	$309,400	2008
$0	$309,362	$0	$309,400	2009
$0	$329,362	$0	$329,400	2010
$0	$309,362	$0	$309,400	2011
$0	$309,362	$0	$309,400	2012
$0	$309,362	$0	$309,400	2013
$0	$309,362	$0	$309,400	2014
$0	$329,362	$0	$329,400	2015
$0	$309,362	$0	$309,400	2016
$0	$309,362	$0	$309,400	2017
$0	$309,362	$0	$309,400	2018
$0	$309,362	$0	$309,400	2019
$0	$329,362	$0	$329,400	2020
$0	$309,362	$0	$309,400	2021
$0	$309,362	$0	$309,400	2022
$0	$309,362	$0	$309,400	2023
$0	$309,362	$0	$309,400	2024
$0	$329,362	$0	$329,400	2025
$0	$309,362	$0	$309,400	2026
$0	$309,362	$0	$309,400	2027
$0	$309,362	$0	$309,400	2028
$0	$309,362	$0	$309,400	2029
$0	$329,362	$0	$329,400	2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$74,063,500	$8,428,400	$0	$82,493,000	TOTAL
$64,527,600	$4,579,400	$0	$69,107,600	<----(@NPV)

F ERMC O
ESTIMATING SERVICES

EST FILE #: C2940703 | DATE: 07-Aug-94
CLIENT: US DOE | SUMMARY SHEET | ESTIMATOR: KEN KEPLER
PROJECT TITLE: ALT-3A, IFP - EXCAVATION & OFF-SITE DISPOSAL - (EXPANDED TRESPASSER) | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.5 | TASK#: 2CNF

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		OFF-SITE DISPOSAL TO ENVIROCARE BY RAIL	55,569		$939,600	$1,071,600	$626,500	$2,637,700
2		EXCAVATE, SORT, DRY, SHRED/CRUSH, LOAD, HAUL						
		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		55,569		$939,600	$1,071,600	$626,500	$2,637,700
11	SUPERVISION - CONTRACTOR				$160,000			$160,000
12	SM TOOLS/CONSM'BLS						$56,400	$56,400
13	EQUIPMENT RENTAL						$1,377,200	$1,377,200
14	TEMP. FACILITIES				$19,700		$36,600	$56,300
15	TEMP UTL'S HOOK-UP				$9,900		$18,300	$28,200
16	JOB CLEAN-UP				$19,700		$36,600	$56,300
17	SAFETY				$9,900		$18,300	$28,200
18	HEALTH PHYSICS S/C				$129,200		$44,400	$173,600
19	CERCLA/SAT $1,500 PER PERSON					$19,500		$19,500
	BOND					$26,400		$26,400
	OVERHEAD & PROFIT					$415,800		$415,800
22	PAYRL BRD.&BENFT.				$669,800			$669,800
	INDIRECT FIELD COSTS				$1,018,200	$461,700	$1,587,800	$3,067,700
	DIRECT & INDIRECT FIELD COSTS				$1,957,800	$1,533,300	$2,214,300	$5,705,400
23	TRANSPORTATION & BURIAL					$41,401,600		$41,401,600
24	WASTE CONTAINERS						$1,429,400	$1,429,400
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$58,600		$58,600
25	SCREENING & CONFIRMATION TESTING					$3,672,900		$3,672,900
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$1,563,300			$1,563,300
	FERMCO FIELD SUPPORT COSTS				$1,563,300	$45,133,100	$1,429,400	$48,125,800
28	EMISSION MODELING				$10,000		$18,500	$28,500
29	PSAR/FSAR(SAFETY RPT)				$308,100			$308,100
30	ENGINEERING	TITLE I&II $1,740,100 TITLE III	$1,723,000	CDR	$627,600	DCR	$450,700	$4,541,400
	ENGINEERING COSTS							$4,878,000
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$5,091,600	$305,500
	SUB-TOTAL	(BASE ESTIMATE)						$59,014,700
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	13.5%						$7,967,000
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$66,981,700
	CONTINGENCY	12.0%						$7,081,800
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$74,063,500

000954

PRELIMINARY

LOTUS31\FS2\ALT3A\IFP\INDSUM.WK3 - FEASABILITY STUDY

Alternative 3 – Excavation and Off-Site Disposal
(Expanded Trespasser)

Inactive Flyash Pile

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	1	1	5	sample	$5,500.00	36	NA	$198,000	9 wells x 4 samples/year
Long Term	1	6	30	sample	$5,500.00	18	NA	$99,000	9 wells x 2 samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	2.25	2.90	$1,127	Inspect all wells twice/year. Repair 1 out of 8.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Long Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Well Inspect & Maint.	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
OU2 Waste Cell Leachate									
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Facility Maint. at Subunit									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	1	1	30	acre	$1,861.92	4.2	5.42	$10,088	Approx. 4.2 Acres
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.8	1.03	$2,034	Approx. 1650 ft perimeter
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Fence Repair	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of Subunit	5	5	30	lump Sum	$20,000.00	1	NA	$20,000	Total divided among 5 subunits
Facility Review of OU2 Cell	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative

Annual Costs, Year 1 (excluding facility review)	$128,933
Annual Costs, Years 2–5 (excluding facility review)	$111,362
Annual Costs, Years 6–30 (excluding facility review)	$309,362
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 C:

8/3/94

5.86 F

DATE: 06-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

ALT-3A, IFP - EXCAVATION & OFF-SITE DISPOSAL - (EXPANDED TRESPASSER)
WBS#:
1.1.1.1.2.3.5

EST.NO.: C2940703
EST. : KEN KEPLER
TASK I.D. :
2CNF

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	• NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			•	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	335	$4,290	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	335	$8,040	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	335	$1,740	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	335	$1,880	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	335	$2,010	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	335	$1,210	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	335	$23,450	C/B		
SUB-TOTAL		31.80	4		$42,620			
					$127.22	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	13		$170	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	6		$130	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	6		$1,040	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$1,820			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$44,400			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE.
COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

000953

DATE: 06-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

ALT-3A, IFP - EXCAVATION & OFF-SITE DISPOSAL - (EXPANDED TRESPASSER)
WBS#:
1.1.1.1.2.3.5

EST.NO.: C2940703
EST. : KEN KEPLER
TASK I.D. :
2CNF

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	13	52	$16.97	$880		
ANNUAL PHYSICALS	2	3	13	78	$16.97	$1,320		
EXIT (TERMINATION) PHYSICALS	1	4	13	52	$16.97	$880		
SUB-TOTAL						$3,080		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	34	1	13	448	$16.97	$7,600		
YEARLY IN-VIVO	2	4	13	104	$16.97	$1,760		
EXIT (END OF PROJECT / TERMINATION)	1	4	13	52	$16.97	$880		
SUB-TOTAL						$10,240		
WORK DELAYS CAUSED BY MONITORING	5%				$1,158,800	$57,940		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$1,158,800	$57,940		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$129,200	$44,400	$173,600

000954

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT –ALT-3A, IFP – EXCAVATION & OFF-SITE DISPOSAL – (EXPANDED TRESSPASSER)
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CNF

WBS NO. – 1.1.1.1.2.3.5
EST. NO. – C2940703
BY – K. KEPLER
DATE – 08/06/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	30–Jun–94	01–Nov–97	02–Apr–99	31–Aug–2000	34	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
57	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

APPENDIX E

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – IFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.5

EST.NO. C2940703
BY KEN KEPLER
DATE 06–Aug–94
TASK ID 2CNF

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR)			CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS 141				ENVIROCARE BURIAL COSTS		TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							$80.15 PER TON (90 TON MIN.)	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	$120 DEMURAGE $/DAY (>6 DAYS)	(1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	
	CAR	LINER	COVER			TONS/CY	TONS						
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 159, 182, or 243 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

F-5-98

000956

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – IFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.5

EST.NO. C2940703
BY KEN KEPLER
DATE 06–Aug–94
TASK ID 2CNF

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C –D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0

INPUT

F-5-99

000957

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – IFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.5

EST.NO. C2940703
BY KEN KEPLER
DATE 06–Aug–94
TASK ID 2CNF

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	0.0	0	$23,816	$0	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	129250.0	1771	$23,816	$42,178,100	$326.25		
	GW / RUBBLE	49.00	1296.0	27	$24,180	$652,900	$493.47		
						**			

INPUT

** **NOTE:**
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

000958

CONTR.NO.– [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – IFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940703
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
OFF–SITE DISPOSAL TO ENVIROCARE (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		3,693						$64,140	$15,000	$37,590	$96,390	$213,120
DECONTAMINATION FACILITIES/SERVICES	1	LS		304						$5,540	$25,400	$1,350	$5,510	$37,800
EROSION AND SEDIMENT CONTROLS	1	LS		1134						$21,530		$8,470	$45,730	$75,730
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAV/SORT/DRY/CRUSH – OFFSITE DISPOSAL TO ENVIROCARE	1	LS		15451						$254,240	$769,780	$457,330	$111,940	$1,593,290
LOAD/HAUL – OFF–SITE DISPOSAL TO ENVIROCARE	1	LS		20599						$350,340		$486,460	$28,770	$865,570
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE	N/A													N/A
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	N/A													N/A
DIKE	N/A													N/A
GENERATED WASTE REMOVAL	1	LS		1144						$19,410		$11,130		$30,540
SITE RESTORATION	1	LS		8192						$139,020		$249,690	$281,180	$669,890
MONITORING WELLS	1	LS									$164,000			$164,000
SUB–TOTAL (DIRECT FIELD COSTS)				50517						$854,220	$974,180	$1,252,020	$569,520	$3,649,940
TAKE–OFF ALLOWANCE 10%	1	LS		5,052						$85,420	$97,420	$125,200	$56,950	$364,990
TOTAL (DIRECT FIELD COSTS)	1	LS		55,569						$939,600	$1,071,600	$1,377,200	$626,500	$4,014,900

Off–Site Disposal of Inactive Flyash Pile to ENVIROCARE – SUMMARY

PAGE 1 of 15

000059

F-5-101

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – IFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940703
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	2000	LF	0.213	550	16.97				6.25	$9,330			$12,880	$22,210
c. Clear and Grub														
i. Remediation Site	6.50	AC	41.40	347	16.97			2575.00		$5,890		$17,240		$23,130
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Storage Area, & Staging Area @ Sub–unit														
d. Dewatering														
i. Excavate Dewatering Trench	380	CY	0.50	245	16.97			1.49		$4,160		$580		$4,740
ii. Pump – w/4" Suction Hose	120	DAYS	3.00	464	16.97			19.55		$7,870		$2,420		$10,290
iii. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
iv. Remove Sediment fm. Tank – 1cy/trip	2	CY	4.00	10	16.97			100.00		$170		$210		$380
e. General Grading														
i. New Roads	6222	SY	0.001	8	16.97			0.07		$140		$450		$590
33%														
ii. Office/Parking Area 2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area 272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area 49	16	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub–Unit 2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
v. Storage Area @ Sub–Unit 1112	370	SY	0.010	5	16.97			0.32		$80		$120		$200
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	6222	SY	0.030	241	16.97			1.08	6.66	$4,090		$6,920	$42,680	$53,690
33%														
ii. Office/Parking – 8" Gravel W/ Geot 2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc 2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk. 631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" tl 24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub–grade Piping – 4" 500	167	LF	0.21	45	17.98			0.74	3.02	$810		$130	$520	$1,460
Epoxy Coating 2845	947	SY	0.22	269	17.98			0.77	7.56	$4,840		$750	$7,380	$12,970
Backfill & Compact around Slab 183	61	ICY	0.086	7	17.98			1.38				$90		$90
Mob/Demob.Equip. 1	0	LS	2.00	1	17.98			184.00		$20		$60		$80
iv. Storage Area – 100' x100' Asphalt														
Includes Compacted Sub–Grade 1112	370	SY	0.084	40	16.97			2.56	14.04	$680		$980	$5,350	$7,010
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat														
TOTAL (SITE PREPARATION)	1	LS		3,693						$64,140	$15,000	$37,590	$96,390	$213,120

Site Preparation Details

F-5-102
000960
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – IFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940703
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CNF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT															
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)															
	33%														
a. Decon Trailer – Rental	50	17	MO					1500.00				$24,980			$24,980
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'i.d.x 25l	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Gu:	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in (	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
	BCY														
x. Backfill & Compaction around concrete slab	310	124	ICY	0.086	14	16.97			1.38		$240		$180		$420
SUB–TOTAL (EQUIP. DECON. FACILITY)					268						$4,860	$25,370	$1,240	$4,140	$35,610

Equipment Decon. Facility Details

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F-5-103

FEMP-OU02-5 DRAFT
August 24, 1994

0009961

1998

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – IFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940703
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 20NF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)															
c. Personnel Decon. Facility	33%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric, – Gravel, & Compact Sub–grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0.50	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0.10	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0.13	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Gua	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in (	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0.33	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	0.33	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		304						$5,540	$25,400	$1,350	$5,510	$37,800

Personnel Decon.Facilities/Services Details

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F-5-104

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – IFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940703
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	3000	LF	0.017	66	16.97			0.06	0.65	$1,120		$180	$2,010	$3,310
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	10	EA	8.00	103	16.97			5.00	70.00	$1,750		$50	$700	$2,500
v. Hay Bales	300	EA	0.24	93	16.97			1.53	1.35	$1,580		$470	$420	$2,470
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iv. 2"/4" HDPE Carrier/Container HDP pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction (100% 1400)	1400	LF	0.38	688	19.95			5.11	4.42	$13,730		$7,150	$6,190	$27,070
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout (4)	4	EA	8.00	41	16.97			28.00	8300.00	$700		$110	$33,200	$34,010
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,134						$21,530		$8,470	$45,730	$75,730

Erosion Control Details

FEMP-OU02-5 DRAFT
August 24, 1994
F-5-105
000363
1861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – IFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940703
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE/SORT/DRY FOR OFF–SITE DISPOSAL TO ENVIROCARE														
EXCAVATION														
Excavate Contaminated Flyash/Soil – Level D	84800	BCY	0.055	6,017	16.97			1.17		$102,110		$99,220		$201,330
Excavate Additional Flyash/Soil – BCY	9400	BCY	0.055	667	16.97			1.17		$11,320		$11,000		$22,320
Sort Cont.Flyash/Soil & Addit.Soil 94200 BCY	117750	LCY	0.033	5,013	16.97			2.58		$85,070		$303,800		$388,870
Low Level Thermal Destruction Unit 6900	10997	TON					70.00				$769,780			$769,780
Shredder/Crusher – Purchase/Install 33.3%	0.33	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY 4000														
Generated Waste BCY 1127														
Excavated Debris TONS 6375														
(Percent of Gen.Waste to be Shredded 25%														
Generated Waste TONS 285														
TOTAL TONS 6660														
Operating Costs	111	HRS							25.75				$2,940	$2,940
(2) Operators	222	HRS	1.00	286	16.97					$4,850				$4,850
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Flyash/Soil – Level C BCY	9200	BCY	0.055	653	16.97			1.17		$11,080		$10,760		$21,840
Sort Contaminated Soil 9200	11500	LCY	0.033	490	16.97			2.58		$8,320		$29,670		$37,990
			S/T	1143										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	1143	HRS	150%	1715	16.97					$29,100				$29,100
			S/T	3348										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day)	335	MD												
BCY = BANK CUBIC YARDS : The volume of 1 Cubic Yard of material in its natural state OR Volume/Void to be filled.														
LCY = LOOSE CUBIC YARDS (w/Swell Factor) Volume of material after being excavated.														
ICY = IN–PLACE CUBIC YARDS (w/Shrinkage Factor) Volume of material it takes to fill a 1 Cubic Yard space.														
TOTAL (EXCAVATE/SORT/DRY)	1	LS		15,451						$254,240	$769,780	$457,330	$111,940	$1,593,290

Excavate/Sort/Dry Details

F-5-106
000964
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]321 PRELIMINARY
CLIENT - U.S. DEPT. OF ENERGY
PROJECT - ALT-3A - IFP - EXCAVATION & OFF-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.5

CONTR.NO. 4424321
EST. NO. C2940703
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CNF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
LOAD & HAUL FOR OFF-SITE DISPOSAL CONTAMINATED WASTE TO ENVIROCARE															
(ITEMS @ 20% ARE COMMON TO AFP,IFP,SF,SWL & LSP)															
Install Loading Equipment for LLW	20%														
Hopper	1	0.20	EA	177.0	35	16.97	3000.00			6000.00	$600			$1,200	$1,800
Loading Conveyor	1	0.20	EA	147.0	29	16.97	2500.00			8500.00	$500			$1,700	$2,200
Scale	1	0.20	EA	589.0	118	16.97	10000.00			15000.00	$2,000			$3,000	$5,000
Railroad Loading Facility	20%														
a. 160' x 160 'Concrete Pad															
i. Clear & Grub	0.60	0.12	AC	41.40	6	16.97			2575.00		$100		$320		$420
ii. Grading	2845	569.00	SY	0.010	7	16.97			0.32		$120		$190		$310
iii. Sub-Grade & Sub-Base for Conc.Slab	2845	569.00	SY	0.041	30	16.97			1.45	5.51	$510		$850	$3,230	$4,590
iv. Concrete Slab 160 x 160' x 8"thk.	631	126.20	CY	4.07	663	17.98			18.38	67.00	$11,920		$2,390	$8,710	$23,020
v. Concrete Curb - 2'h x 480 lf x 8" thk.	24	4.80	CY	15.30	95	17.98			69.08	275.90	$1,710		$340	$1,360	$3,410
vi. Wood Ties, Ballast, 100# Rail Derailer, Turnout, Bumper Car Stops	600	120.00	LF	1.06	164	16.97			4.43	77.40	$2,780		$550	$9,570	$12,900
vii. Grading for track	800	160.00	SY	0.010	2	16.97			0.32		$30		$50		$80
HAUL															
From excavation site to rail loading facility 6 CY dump truck 1/2 mi r.t.		129250	LCY	0.041	6836	16.97			1.65		$116,010		$213,260		$329,270
LOADING GONDOLA	LCY														
Excavated Flyash & Addit. =	129250														
Allowable CY's of waste per Gondola	73.0														
Install Liner in Gondola car		1771	EA	0.75	1713	16.97			32.21		$29,070		$57,040		$86,110
Load Gondola - 6/day, 2 workers		295	DAYS	16.00	6092	16.97			15.00		$103,380		$4,430		$107,810
Seal liner, Install Cover		1771	EA	0.75	1713	16.97			32.21		$29,070		$57,040		$86,110
Dust control - light		300	DAYS	8.00	3096	16.97			500.00		$52,540		$150,000		$202,540
(RSO takes ownership at this time.) (See: Off-Site Disposal Wksht. and Appendix E)															
TOTAL (LOAD & HAUL OFF-SITE DISPOSAL)		1	LS		20,599						$350,340		$486,460	$28,770	$865,570

Offsite Load/Haul/Disposal Details

000965

1861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – IFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940703
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CNF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO OFFSITE DISPOSAL ENVIROCARE Demo. /Load/Haul/Compact															
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)															
a. Office/Parking Area	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo–Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Area @ Excav.Sit	33%														
Demo/Remove Concrete	49	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo–Fabric & Liner	14	5	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	2	1	EA	0.48		16.97			1.68						
Splash Guard	9	3	SF	0.04		16.97			0.03						
Haul & Dump Rubble	25	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Area @ Excav. Site	33%														
Demo/Remove Concrete	2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2	1	BCY	0.292		16.97			9.16				$10		$10
Geo–Fabric & Liner	1	0.40	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	1	0.20	EA	0.48		16.97			1.68						
Splash Guard	2	1	SF	0.04		16.97			0.03						
Haul & Dump Rubble	4	1	BCY	0.30		16.97			2.51						
d. Storage Area	33%														
Demo/ Remove Asphalt	185	62	BCY	1.20	95	16.97			3.62		$1,610		$230		$1,840
Excavate/load/haul/backfill															
sub–grade	185	62	BCY	0.292	23	16.97			9.16		$390		$580		$970
Geo–fabric liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	247	82	BCY	0.300	32	16.97			2.51		$540		$210		$750
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		275						$4,660		$2,950		$7,610

Generated Waste Removal Details

F-5-108
000966
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]321
CLIENT - [redacted]. DEPT. OF ENERGY
PROJECT - ALT-3A - IFP - EXCAVATION & OFF-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940703
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CNF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO OFFSITE DISPOSAL ENVIROCARE (CON'T.)															
Demo. /Load/Haul/Dump/Compact (ITEMS @ 33-1/3% ARE COMMON TO AFP,IFP & SF)															
e. Staging Area @ sub unit	33%														
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo-Fabric & Liner	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	105	35	BCY	0.30	14	16.97			2.51		$240		$90		$330
f. Staging Area @ Rail Siding	20%														
Demo/Remove Concrete	655	131	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	475	95	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo-Fabric & Liner	2845	569	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	105	21	BCY	0.30	8	16.97			2.51		$140		$50		$190
LOADING GONDOLA	BCY														
Generated Waste	1127														
Plus a swell factor of 15%	1296														
Allowable CY's of waste per Gondola	49.0														
Install Liner in Gondola car		27	EA	0.75	26	16.97			32.21		$440		$870		$1,310
Load Gondola - 6/day, 2 workers		5	DAYS	16.00	103	16.97			15.00		$1,750		$80		$1,830
Seal liner, Install Cover		27	EA	0.75	26	16.97			32.21		$440		$870		$1,310
Dust control - light		5	DAYS	8.00	52	16.97			500.00		$880		$2,500		$3,380
SUB-TOTAL (GENERATED WASTE REMOVAL)		1	LOT		869						$14,750		$8,180		$22,930
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,144						$19,410		$11,130		$30,540

Generated Waste Removal Details

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August 24, 1994

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000967

5861

CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – IFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

CONTR.NO. 4424321
EST. NO. C2940703
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CNF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
Inactive Flyash Pile	46000	55200	ICY	0.09	6409	16.97			3.21	3.50	$108,760		$182,510	$199,000	$490,270
	33.3%														
Office/Parking	494	197	ICY	0.09	23	16.97			3.21	3.50	$390		$650	$710	$1,750
Const.Equip.Decon.Area	78	31	ICY	0.09	4	16.97			3.21	3.50	$70		$100	$110	$280
Personnel Decon.Area	7	3	ICY	0.09		16.97			3.21	3.50			$10	$10	$20
Staging Area at Sub–Unit	475	190	ICY	0.09	22	16.97			3.21	3.50	$370		$630	$680	$1,680
Storage Area at Sub–Unit	370	148	ICY	0.09	17	16.97			3.21	3.50	$290		$490	$530	$1,310
Staging Area at Rail Siding	475	190	ICY	0.09	22	16.97			3.21	3.50	$370		$630	$680	$1,680
b. Final Grade for IFP (Excludes Cap)		16667	SY	0.02	430	16.97			0.70		$7,300		$12,020		$19,320
c. Borrow Top Soil 6" Thk., Spread															
Inactive Flyash Pile	16667	16667	SY	0.036	774	16.97			2.33	2.88	$13,130		$40,000	$49,440	$102,570
	33.3%														
Office/Parking	2222	888	SY	0.036	41	16.97			2.33	2.88	$700		$2,130	$2,630	$5,460
Const.Equip.Decon.Area	167	67	SY	0.036	3	16.97			2.33	2.88	$50		$160	$200	$410
Personnel Decon.Area	14	6	SY	0.036		16.97			2.33	2.88			$10	$20	$30
Staging Area at Sub–Unit	2845	1137	SY	0.036	53	16.97			2.33	2.88	$900		$2,730	$3,370	$7,000
Storage Area at Sub–Unit	1112	444	SY	0.036	21	16.97			2.33	2.88	$360		$1,070	$1,320	$2,750
Staging Area at Rail Siding	2845	1137	SY	0.036	53	16.97			2.33	2.88	$900		$2,730	$3,370	$7,000
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Inactive Flyash Pile	16667	150	MSF	0.30	58	16.97			6.75	25.00	$980		$1,040	$3,860	$5,880
	33.3%														
Office/Parking	2222	7	MSF	0.30	3	16.97			6.75	25.00	$50		$50	$180	$280
Const.Equip.Decon.Area	167	1	MSF	0.30		16.97			6.75	25.00			$10	$30	$40
Personnel Decon.Area	14		MSF	0.30		16.97			6.75	25.00					
Staging Area at Sub–Unit	2845	9	MSF	0.30	3	16.97			6.75	25.00	$50		$60	$230	$340
Storage Area at Sub–Unit	1112	3	MSF	0.30	1	16.97			6.75	25.00	$20		$20	$80	$120
Staging Area at Rail Siding	2845	9	MSF	0.30	3	16.97			6.75	25.00	$50		$60	$230	$340
e. Security Fence – 6ga aluminized – 6' high		1400	LF	0.13	231	16.97			1.64	9.80	$3,920		$2,360	$14,130	$20,410
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
TOTAL (SITE RESTORATION)		1	LOT		8,192						$139,020		$249,690	$281,180	$669,890

Site Restoration Details

F-5-110
000968
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]321
CLIENT - U.S. DEPT. OF ENERGY
PROJECT - ALT-3A - IFP - EXCAVATION & OFF-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940703
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS - MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at Restoration Site: 8 Pairs x 120 ft.	6	PAIR					23,000				$138,000			$138,000
b. Abandon Existing Wells	2	EA					13,000				$26,000			$26,000
TOTAL (MONITORING WELLS)	1	LOT									$164,000			$164,000

Monitoring Wells Details

5861

FEMP-OU02-5 DRAFT August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – IFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940703
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CNF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO															
PURCHASE															
Bulk Gondola Rail Car	N/A	0	EA												
Liner for Gondola															
Excavated Waste – level C,D & Additional		1771	EA							400.00				$708,400	$708,400
Excavated Waste – lead/soil	N/A		EA							400.00					
Generated Waste		27	EA							400.00				$10,800	$10,800
Cover for Gondola															
Excavated Waste – level C,D & Additional		1771	EA							395.00				$699,550	$699,550
Excavated Waste – lead/soil	N/A		EA							395.00					
Generated Waste		27	EA							395.00				$10,670	$10,670
TOTALS FORWARD TO No. 24 ESTIMATE SUMMARY															
TOTAL (PURCHASE COSTS BY FERMCO)		1	LOT											$1,429,400	$1,429,400

Purchase Cost by FERMCO Details

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000570
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321 PRELIMINARY
CLIENT – [redacted]. DEPT. OF ENERGY
PROJECT – ALT–3A – IFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

CONTR.NO.: 4424321
EST. NO. C2940703
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF–SITE TRANSPORTATION COST TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas	1798	EA					340.00				$611,320			$611,320
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additional	1771	EA					22681.00				$40,168,050			$40,168,050
Excavated Waste – lead/soil N/A		EA												
Generated Waste	27	EA					23045.00				$622,220			$622,220
TOTALS FORWARD TO No. 23 ESTIMATE SUMMARY														
TOTAL (OFF–SITE TRANSPORTATION COST)	1	LOT									$41,401,600			$41,401,600

Off–Site Transportation Details

000971
586.1
F-5-113
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – IFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940703
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	155000	GAL					0.01				$1,600			$1,600
Runnoff from the Exclusion Zone.	5700000	GAL					0.01				$57,000			$57,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$58,600			$58,600

Waste Water Treatment Operations Cost Details

000972

F-5-114

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]321
CLIENT – [redacted]. DEPT. OF ENERGY
PROJECT – ALT–3A – IFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940703
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	517	EA					2,002				$1,035,000			$1,035,000
Rad	517	EA					2,000				$1,034,000			$1,034,000
Confirmatory Tests														
Full Rad Tests	356	EA					3,101				$1,104,000			$1,104,000
Full HSL	30	EA					1,500				$45,000			$45,000
Full TCLP	30	EA					2,000				$60,000			$60,000
2 Technicians per Month	30	MO					13,163				$394,900			$394,900
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS)	1	LOT									$3,672,900			$3,672,900

Screening & Confirmation Testing Details

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 3A, IFP – EXCAVATION AND OFF–SITE DISPOSAL (EXPANDED TRESF.

CLIENT: DOE DATE: 07–Aug–94

CONTRACT: C2–94–07–03 BASE ESTIMATE: $59,014,700

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$78,257,806	$19,243,106	32.6%
0.05%	$75,940,196	$16,925,496	28.7%
5.00%	$74,223,990	$15,209,290	25.8%
10.00%	$73,372,464	$14,357,764	24.3%
15.00%	$72,683,420	$13,668,720	23.2%
20.00%	$71,888,707	$12,874,007	21.8%
25.00%	$71,062,821	$12,048,121	20.4%
30.00%	$70,222,939	$11,208,239	19.0%
35.00%	$69,385,541	$10,370,841	17.6%
40.00%	$68,675,588	$9,660,888	16.4%
45.00%	$67,871,227	$8,856,527	15.0%
50.00%	$67,077,918	$8,063,218	13.7%
55.00%	$66,378,536	$7,363,836	12.5%
60.00%	$65,677,014	$6,662,314	11.3%
65.00%	$64,788,207	$5,773,507	9.8%
70.00%	$64,056,768	$5,042,068	8.5%
75.00%	$63,259,535	$4,244,835	7.2%
80.00%	$62,479,692	$3,464,992	5.9%
85.00%	$61,657,978	$2,643,278	4.5%
90.00%	$60,823,810	$1,809,110	3.1%
95.00%	$59,953,525	$938,825	1.6%
99.95%	$58,165,639	($849,061)	–1.4%
100.00%	$55,960,403	($3,054,297)	–5.2%

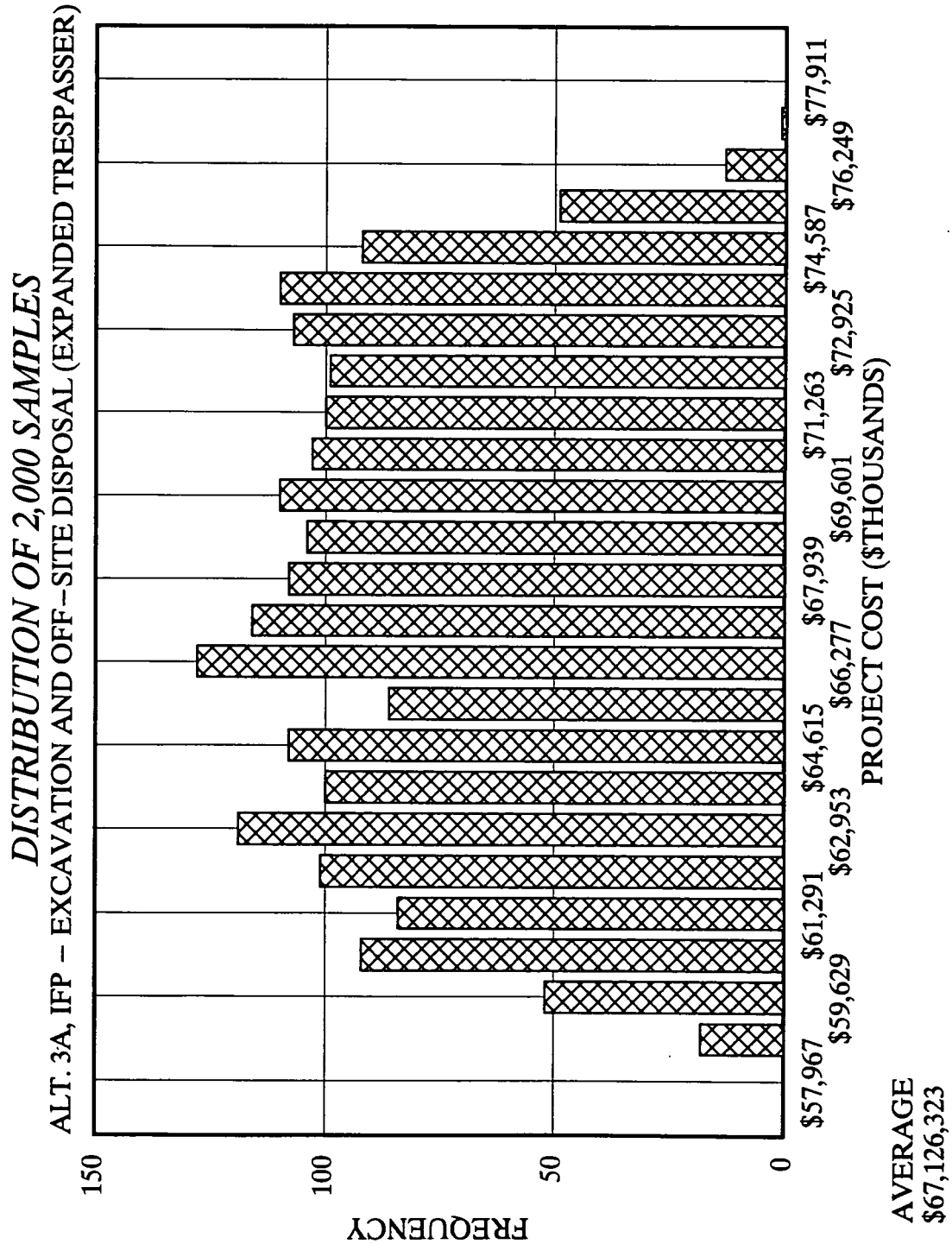
FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

PROJECT: ALT. 3A, IFP – EXCAVATION AND OFF-SITE DISPOSAL (EXPANDED TRESPASSER)
CLIENT: DOE
CONTRACT: C2-94-07-03

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$70,550	-5.0%	$67,023	30%	$91,715	U		14%
2	SITE PREPERATION S/C	16,500	-5.0%	15,675	30%	21,450	U		14%
3	SITE PREPERATION MAT'L	106,030	-5.0%	100,729	20%	127,236	U		20%
4	DECON FACILITIES/SERVICES LABOR	6,090	-2.0%	5,968	80%	10,962	U		2%
5	DECON FACILITIES/SERVICES S/C	27,940	-6.0%	26,264	80%	50,292	U		7%
6	DECON FACILITIES/SERVICES MAT'L	6,060	-6.0%	5,696	60%	9,696	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	23,680	-5.0%	22,496	30%	30,784	U		14%
8	EROSION/SEDIMENT CNTRLS MAT'L	50,300	-5.0%	47,785	30%	65,390	U		14%
9	EXC/SORT/SHRD/DRY OFF-SITE LBR	279,660	-6.0%	262,880	125%	629,235	U		5%
10	EXC/SORT/SHRD/DRY OFF-SITE S/C	846,770	-10.0%	762,093	75%	1,481,848	U		12%
11	EXC/SORT/SHRD/DRY OFF-SITE MTL	123,130	-10.0%	110,817	75%	215,478	U		12%
12	LOAD & HAUL OFF-SITE DISP LABOR	385,370	-1.0%	381,516	100%	770,740	U		1%
13	LOAD & HAUL OFF-SITE DISP MAT'L	31,650	-10.0%	28,485	50.0%	47,475	U		17%
14	GENERATED WASTE REMVL LABOR	21,350	-5.0%	20,283	50.0%	32,025	U		9%
15	SITE RESTORATION LABOR	152,920	-5.0%	145,274	30.0%	198,796	U		14%
16	SITE RESTORATION MAT'L	309,300	-5.0%	293,835	30.0%	402,090	U		14%
17	MONITORING WELLS S/C	180,400	-5.0%	171,380	50.0%	270,600	U		9%
18	INDIRECT FIELD COSTS LABOR	1,018,200	-5.0%	967,290	50.0%	1,527,300	U		9%
19	INDIRECT FIELD COSTS S/C	461,700	-5.0%	438,615	100.0%	923,400	U		5%
20	INDIRECT FIELD COSTS MAT'L	1,587,800	-5.0%	1,508,410	50.0%	2,381,700	U		9%
21	FIELD SUPPORT COSTS LABOR	1,563,300	-10.0%	1,406,970	30.0%	2,032,290	U		25%
22	FIELD SUPPORT COSTS S/C	45,133,100	-5.0%	42,876,445	30.0%	58,673,030	U		14%
23	FIELD SUPPORT COSTS MAT'L	1,429,400	-5.0%	1,357,930	30.0%	1,858,220	U		14%
24	ENGINEERING COSTS	4,878,000	-5.0%	4,634,100	25.0%	6,097,500	U		17%
25	SALES TAX MAT'L	305,500	-1.0%	302,445	1.0%	308,555	U		50%
26				0		0			0%
27				0		0			0%
28				0		0			0%
29				0		0			0%
30				0		0			0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$59,014,700		$55,960,403		$78,257,806			

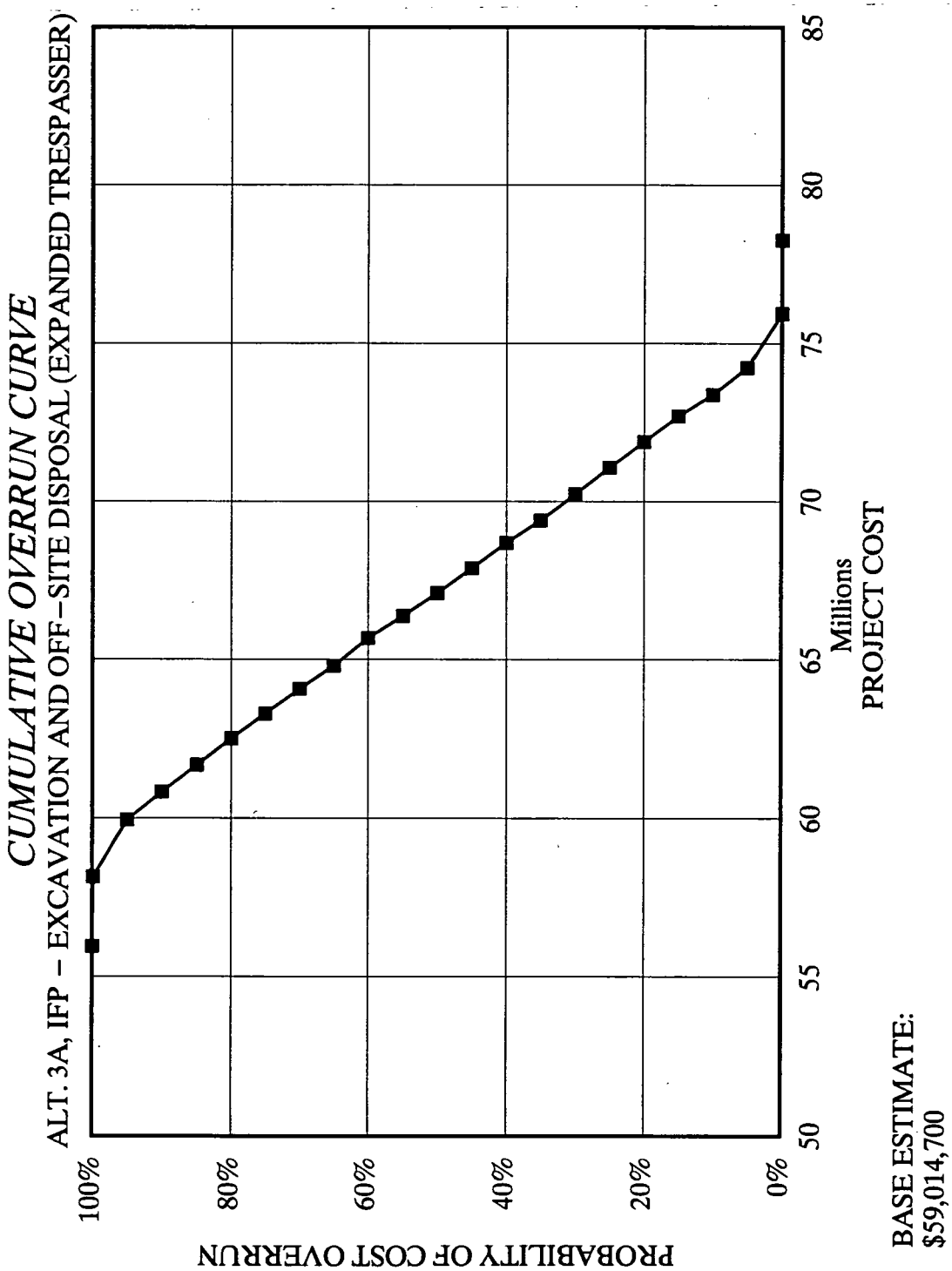
000975

1981


DISTRIBUTION OF 2,000 SAMPLES
ALT. 3A, IFP – EXCAVATION AND OFF-SITE DISPOSAL (EXPANDED TRESPASSER)
FREQUENCY
150
100
50
0
$57,967
$59,629
$61,291
$62,953
$64,615
$66,277
$67,939
$69,601
$71,263
$72,925
$74,587
$76,249
$77,911
PROJECT COST ($THOUSANDS)
AVERAGE
$67,126,323

000976

5861


CUMULATIVE OVERRUN CURVE
ALT. 3A, IFP – EXCAVATION AND OFF–SITE DISPOSAL (EXPANDED TRESPASSER)
PROBABILITY OF COST OVERRUN
100%
80%
60%
40%
20%
0%
50
55
60
65
70
75
80
85
Millions
PROJECT COST
BASE ESTIMATE:
$59,014,700

000977

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3A, IFP – EXCAVATION & OFF–SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940703
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$59,014,700	BASE EST:	$70,550	BASE EST:	$16,500	BASE EST:	$106,030	BASE EST:	$6,090	BASE EST:	$27,940	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	30%					–1%	30%				
MATERIAL PRICING			–5%	30%	–5%	20%			–5%	30%	–5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							–1%	50%	–1%	50%	–1%	40%
(OTHER)												
TOTAL %	–5%	30%	–5%	30%	–5%	20%	–2%	80%	–6%	80%	–6%	60%
TOTAL $	$67,023	$91,715	$15,675	$21,450	$100,729	$127,236	$5,968	$10,962	$26,264	$50,292	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3A, IFP – EXCAVATION & OFF–SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940703
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$23,680	BASE EST:	$0	BASE EST:	$50,300	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%										
MATERIAL PRICING					–5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	0%	0%	–5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$22,496	$35,520	$0	$0	$47,785	$65,390	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

000979

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3A, IFP – EXCAVATION & OFF–SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940703
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	EXCAVATE/SORT/SHRED/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/SHRED/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/SHRED/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$279,660	BASE EST:	$846,770	BASE EST:	$123,130	BASE EST:	$385,370	BASE EST:	$0	BASE EST:	$31,650
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–1%	100%					–1%	100%				
MATERIAL PRICING			–5%	50%	–5%	50%					–5%	25%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–5%	25%	–5%	25%	–5%	25%	–5%	50%			–5%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	125%	–10%	75%	–10%	75%	–6%	150%	0%	0%	–10%	75%
TOTAL $	$262,880	$629,235	$762,093	$1,481,848	$110,817	$215,478	$362,248	$963,425	$0	$0	$28,485	$55,388

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, IFP – EXCAVATION & OFF-SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940703
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE LABOR $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE S/C $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, IFP – EXCAVATION & OFF-SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940703
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		CLAY CAP LABOR $'s		CLAY CAP S/C $'s		CLAY CAP MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, IFP - EXCAVATION & OFF-SITE DISPOSAL - (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940703
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$21,350	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$20,283	$32,025	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3A, IFP – EXCAVATION & OFF–SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940703
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$152,920	BASE EST:	$0	BASE EST:	$309,300	BASE EST:	$0	BASE EST:	$180,400	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	30%										
MATERIAL PRICING					–5%	30%			–5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	30%	0%	0%	–5%	30%	0%	0%	–5%	50%	0%	0%
TOTAL $	$145,274	$198,796	$0	$0	$293,835	$402,090	$0	$0	$171,380	$270,600	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3A, IFP – EXCAVATION & OFF–SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940703
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$1,018,200	BASE EST:	$461,700	BASE EST:	$1,587,800	BASE EST:	$1,563,300	BASE EST:	$45,133,100	BASE EST:	$1,429,400
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–10%	30%				
MATERIAL PRICING			–5%	100%	–5%	50%			–5%	30%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	–5%	100%	–5%	50%	–10%	30%	–5%	30%	–5%	30%
TOTAL $	$967,290	$1,527,300	$438,615	$923,400	$1,508,410	$2,381,700	$1,406,970	$2,032,290	$42,876,445	$58,673,030	$1,357,930	$1,858,220
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, IFP – EXCAVATION & OFF-SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940703
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CNF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$4,878,000	BASE EST:	$305,500	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-5%	25%										
(OTHER)												
TOTAL %	-5%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$4,634,100	$6,097,500	$302,445	$308,555	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

5861

LCC ANALYSIS TITLE:	SF - EXCAVATE & OFF-SITE DISPOSAL - (EXPANDED TRESPASSER)			
WBS NO.:	1.1.1.1.2.3.2		TASK NO.:	2CSF
ALTERNATIVE:	3A		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	35 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	07-Aug-94
DOCUMENT NO.:	LCC-94-03-05	EST. NO. C2-94-07-04/FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$10,859,565	$0	$0	$10,859,600	1996
$32,578,696	$0	$0	$32,578,700	1997
$19,004,239	$0	$0	$19,004,200	1998
$0	$185,487	$0	$185,500	1999
$0	$164,058	$0	$164,100	2000
$0	$164,058	$0	$164,100	2001
$0	$164,058	$0	$164,100	2002
$0	$184,058	$0	$184,100	2003
$0	$87,058	$0	$87,100	2004
$0	$87,058	$0	$87,100	2005
$0	$87,058	$0	$87,100	2006
$0	$87,058	$0	$87,100	2007
$0	$107,058	$0	$107,100	2008
$0	$87,058	$0	$87,100	2009
$0	$87,058	$0	$87,100	2010
$0	$87,058	$0	$87,100	2011
$0	$87,058	$0	$87,100	2012
$0	$107,058	$0	$107,100	2013
$0	$87,058	$0	$87,100	2014
$0	$87,058	$0	$87,100	2015
$0	$87,058	$0	$87,100	2016
$0	$87,058	$0	$87,100	2017
$0	$107,058	$0	$107,100	2018
$0	$87,058	$0	$87,100	2019
$0	$87,058	$0	$87,100	2020
$0	$87,058	$0	$87,100	2021
$0	$87,058	$0	$87,100	2022
$0	$107,058	$0	$107,100	2023
$0	$87,058	$0	$87,100	2024
$0	$87,058	$0	$87,100	2025
$0	$87,058	$0	$87,100	2026
$0	$87,058	$0	$87,100	2027
$0	$107,058	$0	$107,100	2028
				2029
				2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$62,442,500	$3,138,200	$0	$65,581,900	TOTAL
$57,281,300	$1,972,600	$0	$59,254,600	<====(@NPV)

000987

F ERMC O
ESTIMATING SERVICES

EST FILE #: C2940704 | DATE: 07-Aug-94
CLIENT: US DOE | ESTIMATOR: KEN KEPLER
PROJECT TITLE: ALT-3A, SF - EXCAVATION & OFF-SITE DISPOSAL - EXPANDED TRESPASSER | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.2 | TASK#: 2CSF

SUMMARY SHEET

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		OFF-SITE DISPOSAL TO ENVIROCARE BY RAIL EXCAVATE, SORT, DRY, SHRED/CRUSH, LOAD, HAUL	46,168		$789,200	$2,057,400	$582,500	$3,429,100
2								
3		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
4								
5								
6								
7								
8								
9								
10								
				AVG				
	DIRECT FIELD COSTS		46,168		$789,200	$2,057,400	$582,500	$3,429,100
11	SUPERVISION - CONTRACTOR				$134,000			$134,000
12	SM TOOLS/CONSM'BLS						$47,400	$47,400
13	EQUIPMENT RENTAL						$1,211,200	$1,211,200
14	TEMP. FACILITIES				$16,600		$30,800	$47,400
15	TEMP UTL'S HOOK-UP				$8,300		$15,400	$23,700
16	JOB CLEAN-UP				$16,600		$30,800	$47,400
17	SAFETY				$8,300		$15,400	$23,700
18	HEALTH PHYSICS S/C				$108,800		$3,400	$112,200
19	CERCLA/SAT $1,500 PER PERSON					$24,000		$24,000
20	BOND					$34,300		$34,300
21	OVERHEAD & PROFIT					$462,100		$462,100
22	PAYRL BRD.&BENFT.				$562,500			$562,500
	INDIRECT FIELD COSTS				$855,100	$520,400	$1,354,400	$2,729,900
	DIRECT & INDIRECT FIELD COSTS				$1,644,300	$2,577,800	$1,936,900	$6,159,000
23	TRANSPORTATION & BURIAL					$34,521,200		$34,521,200
24	WASTE CONTAINERS						$1,191,700	$1,191,700
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$198,700		$198,700
25	SCREENING & CONFIRMATION TESTING					$2,714,100		$2,714,100
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$1,435,000			$1,435,000
	FERMCO FIELD SUPPORT COSTS				$1,435,000	$37,434,000	$1,191,700	$40,060,700
28	EMISSION MODELING				$10,800		$20,000	$30,800
29	PSAR/FSAR(SAFETY RPT)				$184,800			$184,800
30	ENGINEERING	TITLE I&II $837,600 TITLE III	$954,600	CDR	$308,000	DCR	$178,600	$2,278,800
	ENGINEERING COSTS							$2,494,400
31	SALES TAX	6.0% SUB-TOTAL MATERIAL DOLLARS					$4,340,300	$260,400
	SUB-TOTAL	(BASE ESTIMATE)						$48,974,500
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	15.0%						$7,346,200
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$56,320,700
35	CONTINGENCY	12.5%						$6,121,800
								PRELIMINARY
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$62,442,500

LOTUS31\FS2\ALT3A\SF\INDSUM.WK3 - FEASABILITY STUDY

Alternative 3 – Excavation and Off-Site Disposal
(Expanded Trespasser)

South Field

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	1	1	5	sample	$5,500.00	28	NA	$154,000	7 wells x 4 samples/year
Long Term	1	6	30	sample	$5,500.00	14	NA	$77,000	7 wells x 2 samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	1.75	2.26	$876	Inspect all wells twice/year. Repair 1 out of 8.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Long Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Well Inspect & Maint.	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
OU2 Waste Cell Leachate									
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Facility Maint. at Subunit									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	1	1	30	acre	$1,861.92	2.9	3.74	$6,965	Approx. 2.9 Acres
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.6	0.77	$1,526	Approx. 1200 ft perimeter
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Fence Repair	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of Subunit	5	5	30	lump Sum	$20,000.00	1	NA	$20,000	Total divided among 5 subunits
Facility Review of OU2 Cell	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative

Annual Costs, Year 1 (excluding facility review)	$185,487
Annual Costs, Years 2–5 (excluding facility review)	$164,058
Annual Costs, Years 6–30 (excluding facility review)	$87,058
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 C:

8/3/94

DATE: 06-Aug-94

PROJECT TITLE:
ALT-3A, SF - EXCAVATION & OFF-SITE DISPOSAL -
EXPANDED TRESPASSER

WBS#:
1.1.1.1.2.3.2

HEALTH PHYSICS

EST.NO.: C2940704
EST. : KEN KEPLER
TASK I.D. :
2CSF

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY / MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	16	$200	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	16	$380	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	16	$80	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	16	$90	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	16	$100	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	16	$60	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	16	$1,120	C/B		
SUB-TOTAL		31.80	4		$2,030			
					$126.88	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	8		$100	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	4		$90	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	4		$700	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$1,370			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$3,400			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

000990

DATE: 06-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940704

ALT-3A, SF - EXCAVATION & OFF-SITE DISPOSAL -

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.2

EXPANDED TRESPASSER

TASK I.D. : 2CSF

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	16	64	$16.97	$1,090		
ANNUAL PHYSICALS	1	3	16	48	$16.97	$810		
EXIT (TERMINATION) PHYSICALS	1	4	16	64	$16.97	$1,090		
SUB-TOTAL						$2,990		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	23	1	16	372	$16.97	$6,320		
YEARLY IN-VIVO	1	4	16	64	$16.97	$1,090		
EXIT (END OF PROJECT / TERMINATION)	1	4	16	64	$16.97	$1,090		
SUB-TOTAL						$8,500		
WORK DELAYS CAUSED BY MONITORING	5%				$973,000	$48,650		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$973,000	$48,650		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$108,800	$3,400	$112,200

000991

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT-3A, SF – EXCAVATION & OFF-SITE DISPOSAL –
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CSF

WBS NO. – 1.1.1.1.2.3.2
EST. NO. – C2940704
BY – K. KEPLER
DATE – 08/06/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	30-Jun-94	01-Jun-96	16-May-97	30-Apr-98	23	MONTHS

EST.DATE TO MID-POINT OF ACTIVITY	
35	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

000992

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SF – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940704
BY KEN KEPLER
DATE 06–Aug–94
TASK ID 2CSF

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR) CAR	LINER	COVER	CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE TONS/CY	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS 141 TONS	$80.15 PER TON (90 TON MIN.)	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	$120 DEMURAGE $/DAY (>5 DAYS)	ENVIROCARE BURIAL COSTS (1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							DISCOUNT		6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17		$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00		$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17		$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00		$7,157	$0	$120	1971	$15,768	$23,045
	$0	$400	$395	$340	LEAD/SOIL	1.810	95.00		$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 125, 141, or 200 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

000993

F-5-135

FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SF – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940704
BY KEN KEPLER
DATE 06–Aug–94
TASK ID 2CSF

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C – D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0
	LEAD/SOIL	1.810	134.00	1971.0	196,000	0	196,000	1462.7	54.2

INPUT

000594

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SF – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940704
BY KEN KEPLER
DATE 06–Aug–94
TASK ID 2CSF

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	106875.0	1465	$23,816	$34,890,400	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	1295.0	27	$24,180	$652,900	$493.47		
	LEAD/SOIL	54.20	396.0	8	$24,180	$193,400	$446.13		
						**			

INPUT

** NOTE:
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

000995

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SF – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940704
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
OFF–SITE DISPOSAL TO ENVIROCARE (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		4,901						$84,300	$15,000	$61,410	$102,360	$263,070
DECONTAMINATION FACILITIES/SERVICES	1	LS		304						$5,540	$25,400	$1,350	$5,510	$37,800
EROSION AND SEDIMENT CONTROLS	1	LS		1,536						$28,600		$9,370	$33,480	$71,450
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT/DRY/CRUSH – OFFSITE DISPOSAL	1	LS		11,369						$193,280	$1,456,920	$378,660	$113,770	$2,142,630
LOAD/HAUL – OFF–SITE DISPOSAL TO ENVIROCARE	1	LS		17,267						$293,810		$408,180	$28,770	$730,760
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE	N/A													N/A
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	N/A													N/A
DIKE	N/A													N/A
GENERATED WASTE REMOVAL	1	LS		710						$12,050		$11,510		$23,560
SITE RESTORATION	1	LS		5,884						$99,870		$230,650	$245,670	$576,190
MONITORING WELLS	1	LS									$373,000			$373,000
SUB–TOTAL (DIRECT FIELD COSTS)				41,971						$717,450	$1,870,320	$1,101,130	$529,560	$4,218,460
TAKE–OFF ALLOWANCE 10%	1	LS		4,197						$71,750	$187,030	$110,110	$52,960	$421,850
TOTAL (DIRECT FIELD COSTS)	1	LS		46,168						$789,200	$2,057,400	$1,211,200	$582,500	$4,640,300

Off–Site Disposal of South Field to ENVIROCARE – SUMMARY

CONTR.NO.- [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SF – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940704
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	3400	LF	0.213	934	16.97				6.25	$15,850			$21,890	$37,740
c. Clear and Grub														
i. Remediation Site	15.00	AC	41.40	801	16.97			2575.00		$13,590		$39,780		$53,370
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Storage Area, &/or Staging Area @ Sub–unit														
d. Dewatering														
i. Excavate Dewatering Trench	500	CY	0.50	323	16.97			1.49		$5,480		$770		$6,250
ii. Pump – w/4" Suction Hose	200	DAYS	3.00	774	16.97			19.55		$13,130		$4,030		$17,160
iii. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
iv. Remove Sediment fm. Tank – 1cy/trip	2	CY	4.00	10	16.97			100.00		$170		$210		$380
e. General Grading														
i. New Roads	5778	SY	0.001	7	16.97			0.07		$120		$420		$540
33.3%														
ii. Office/Parking Area 2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area 272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area 49	16	SY	0.010		16.97			0.32				$10		$10
v. Staging Area @ Sub–Unit 2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
vi. Storage Area 1112	370	SY	0.010	5	16.97			0.32		$80		$120		$200
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	5778	SY	0.030	224	16.97			1.08	6.66	$3,800		$6,430	$39,640	$49,870
33.3%														
ii. Office/Parking – 8" Gravel W/ Geot 2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ S/U – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc.Slab 2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk. 631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" t 24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub–grade Piping – 4" 500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating 2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab 183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip. 1	0	LS	2.00	1	16.97			184.00		$20		$60		$80
iv. Storage Area – 100' x100' Asphalt														
Includes Compacted Sub–Grade 1112	370	SY	0.084	40	16.97			2.56	14.04	$680		$980	$5,350	$7,010
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat														
TOTAL (SITE PREPARATION)	1	LS		4,901						$84,300	$15,000	$61,410	$102,360	$263,070

Site Preparation Details

F-5-139
000997
FEMP-OU02-5 DRAFT
August 24, 1994
5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SF – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940704
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT															
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)	33.3%														
a. Decon Trailer – Rental	50	17	MO					1500.00				$24,980			$24,980
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Pad Trench – 2'x2'i.d.x 25lfx8" thl	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping 2" X 4"	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Gu	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set con	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping 2"	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
x. Backfill & Compaction around concrete slab	BCY 310 ICY 372	124	ICY	0.086	14	16.97			1.38		$240		$180		$420
SUB–TOTAL (EQUIP. DECON. FACILITY)					268						$4,860	$25,370	$1,240	$4,140	$35,610

Equipment Decon. Facility Details

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000098

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SF – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940704
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)															
c. Personnel Decon. Facility	33.3%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric, – Gravel, & Compact Sub–grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0.50	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0.10	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0.13	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	4.66	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Gua	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in (	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0.33	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	0.33	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
	BCY 17														
viii. Backfill & Compaction around concrete slab	ICY 20	6.66	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		304						$5,540	$25,400	$1,350	$5,510	$37,800

Personnel Decon.Facilities/Services Details

F-5-141
000099
FEMP-OU02-5 DRAFT
August 24, 1994
5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SF – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940704
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	2000	LF	0.017	44	16.97			0.06	0.65	$750		$120	$1,340	$2,210
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	500	EA	0.24	155	16.97			1.53	1.35	$2,630		$790	$700	$4,120
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
100% iii. Sedimentation/Decon. Tank-13000 ga 1	1	LS	64.00	83	19.95			224.00	7000.00	$1,660		$220	$7,000	$8,880
iv. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction 1400	1400	LF	0.38	688	19.95			5.11	4.42	$13,730		$7,150	$6,190	$27,070
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout 3	1	EA	8.00	10	16.97			28.00	8300.00	$170		$30	$8,290	$8,490
vi. 50 gal. Pump Includes Controls & Electrical	2	EA	60.00	155	16.97			210.00	2500.00	$2,630		$420	$5,000	$8,050
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,536						$28,600		$9,370	$33,480	$71,450

Erosion Control Details

P-5-142
001000
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]321
CLIENT - [redacted]. DEPT. OF ENERGY
PROJECT - ALT-3A - SF - EXCAVATION & OFF-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940704
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE/SORT/DRY FOR OFF-SITE DISPOSAL to ENVIROCARE														
Excavate Lead Contaminated Soil @ Firing Range	300	BCY	0.20	77	16.97			5.65		$1,310				$1,310
Solidification of lead cont.soil w/Potland Cement 30% Portland Cement, 2% Sodium Silicate in drums. 300 CY @ 1.5 Tons =	450	TONS					510.50				$229,730			$229,730
Excavate Contaminated Soil - Level D	77200	BCY	0.055	5,477	16.97			1.17		$92,940		$90,320		$183,260
Excavate Additional Soil	7800	BCY	0.055	553	16.97			1.17		$9,380		$9,130		$18,510
Sort Contaminated Soil - BCY 85000	106250	LCY	0.033	4,523	16.97			2.58		$76,760		$274,130		$350,890
Low Level Thermal Destruction Unit BCY 11000	17531	TON					70.00				$1,227,190			$1,227,190
Sub-contract cost for Drying Operation and moisture test Only.														
Shredder/Crusher - Purchase/Install 33.3%	0.33	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY 6500														
Generated Wastes BCY 1126														
Excavated Debris TONS 10359														
(Percent of Gen.wst. to be Shredded) 25%														
Generated Wastes TONS 413														
TOTAL TONS 10772														
Operating Costs	180	HRS							25.75				$4,770	$4,770
(2) Operators	360	HRS	1.00	464	16.97					$7,870				$7,870
PPE LEVEL 'C' Allowance added to the following:														
Excavate contaminated soil/rubble - Level C	500	BCY	0.055	35	16.97			1.17		$590		$590		$1,180
Sort contaminated soil/rubble BCY 500	625	LCY	0.033	27	16.97			2.58		$460		$1,610		$2,070
			S/T	62										
**PPE PRODUCTIVITY ALLOWANCE - LEVEL C	62	HRS	150%	93	16.97					$1,580				$1,580
			S/T	155										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day)	16	MD												
BCY = BANK CUBIC YARDS : The volume of 1 Cubic Yard of material in its natural state or the volume / void to be filled. LCY = LOOSE CUBIC YARDS : The volume of material after being excavated with Swell Factor. ICY = IN-PLACE CUBIC YARDS = The volume of material it takes to fill a space 1 cubic yard in size. (Includes shrinkage/compaction factor)														
TOTAL (EXCAVATE/SORT/DRY)	1	LS		11,369						$193,280	$1,456,920	$378,660	$113,770	$2,142,630

Excavate/Sort/Dry Details

F-5-143
FEMP-OU02-5-BR6 August 24, 1994
5861
001001

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SF – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940704
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
LOAD & HAUL FOR OFF–SITE DISPOSAL CONTAMINATED WASTE															
(ITEMS @ 20% ARE COMMON TO SWL,LSP,AFP,IFP & SF)															
Install Loading Equipment for LLW	20%														
Hopper	1	0.20	EA	177.0	35	16.97	3000.00			6000.00	$600			$1,200	$1,800
Loading Conveyor	1	0.20	EA	147.0	29	16.97	2500.00			8500.00	$500			$1,700	$2,200
Scale	1	0.20	EA	589.0	118	16.97	10000.00			15000.00	$2,000			$3,000	$5,000
Railroad Loading Facility															
a. 160' x 160 'Concrete Pad	20%														
i. Clear & Grub	0.60	0.12	AC	41.40	6	16.97			2575.00		$100		$320		$420
ii. Grading	2845	569.00	SY	0.010	7	16.97			0.32		$120		$190		$310
iii. Sub–Grade & Sub–Base for Conc.Sla	2845	569.00	SY	0.041	30	16.97			1.45	5.51	$510		$850	$3,230	$4,590
iv. Concrete Slab 160 x 160' x 8"thk.	631	126.20	CY	4.07	663	17.98			18.38	67.00	$11,920		$2,390	$8,710	$23,020
v. Concrete Curb – 2'h x 480 lf x 8" thk.	24	4.80	CY	15.30	95	17.98			69.08	275.90	$1,710		$340	$1,360	$3,410
vi. Wood Ties, Ballast, 100# Rail Derailer, Turnout, Bumper Car Stops	600	120	LF	1.06	164	16.97			4.43	77.40	$2,780		$550	$9,570	$12,900
vii. Grading for track	800	160	SY	0.010	2	16.97			0.32		$30		$50		$80
HAUL															
From excavation site to rail loading facility															
6 CY dump truck 1/2 mi rt.															
Excavated level D, C & Addn. Soils		106875	LCY	0.04	5,653	16.97			1.65		$95,930		$181,630		$277,560
Solidified lead/soil/cement		396	LCY	0.04	21	16.97			1.65		$360		$670		$1,030
LOADING GONDOLA															
Excavated level D, C & Addn. Soils	LCY														
Excavate level D, C & Additional =	106875														
Allowable CY's of waste per Gondola	73.0														
Solidified lead/soil/cement	LCY														
Excav. 300 BCY x 1.25 swell factor =	396														
Allowable CY's of waste per Gondola	54.2														
Install Liner in Gondola car															
Excavated level D, C & Addn. Soils		1464	EA	0.75	1,416	16.97			32.21		$24,030		$47,160		$71,190
Solidified lead/soil/cement		8	EA	0.75	8	16.97			32.21		$140		$260		$400
Load Gondola – 6/day, 2 workers		245	DAYS	16.00	5,064	16.97			15.00		$85,940		$3,680		$89,620
Seal liner, Install Cover															
Excavated level D, C & Addn. Soils		1464	EA	0.75	1,416	16.97			32.21		$24,030		$47,160		$71,190
Solidified lead/soil/cement		8	EA	0.75	8	16.97			32.21		$140		$260		$400
Dust control – light		245	DAYS	8.00	2,532	16.97			500.00		$42,970		$122,670		$165,640
(RSO takes ownership at this time.)															
(See: Off–Site Disposal Wksht. & App.E)															
TOTAL (LOAD & HAUL OFF–SITE DISPOSAL)		1	LS		17,267						$293,810		$408,180	$28,770	$730,760

Offsite Load/Haul/Disposal Details

F-5-144
001002
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]321
CLIENT - [redacted]. DEPT. OF ENERGY
PROJECT - ALT-3A - SF - EXCAVATION & OFF-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940704
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ENVIROCARE Demo. /Load/Haul															
(ITEMS @ 20% ARE COMMON TO SWL,LSP,AFP,IFP & SF)															
(ITEMS @ 33-1/3% ARE COMMON TO AFP,IFP & SF)															
a. Office/Parking Area	33.3%														
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo-Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Area @ Excav.Sit	33.3%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo-Fabric & Liner	167	56	SY	0.002	1	16.97			0.02		$20				$20
Posts - 4" x 4" x 9'-6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Area @ Excav. Site	33.3%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo-Fabric & Liner	14	5	SY	0.002	1	16.97			0.02		$20				$20
Posts - 4" x 4" x 9'-6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
d. Storage Pad Area @ sub unit	33.3%														
Demo/Remove Asphalt	185.0	62	BCY	1.2	95	16.97			3.62		$1,610		$230		$1,840
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	185.0	62	BCY	0.292	23	16.97			9.16		$390		$580		$970
Geo-Fabric & Liner	1112	370	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	247.0	82	BCY	0.30	32	16.97			2.51		$540		$210		$750
SUB-TOTAL (GENERATED WASTE REMOVAL)		1	LOT		295						$5,000		$2,970		$7,970

Generated Waste Removal Details

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SF – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940704
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ENVIROCARE (CON'T.)															
Demo. /Load/Haul/Compact															
(ITEMS @ 20% ARE COMMON TO SWL,LSP,AFP,IFP & SF)															
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)															
e. Staging Area @ sub–unit	33.3%														
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo–Fabric & Liner	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	105	35	BCY	0.30	14	16.97			2.51		$240		$90		$330
f. Staging Area @ Rail Siding	20%														
Demo/Remove Concrete	655	131	BCY	1.2		17.98			3.62				$610		$610
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	474	95	BCY	0.292		17.98			9.16				$1,120		$1,120
Geo–Fabric & Liner	2844	569	SY	0.002	1	17.98			0.02		$20		$10		$30
Haul & Dump Rubble	105	21	BCY	0.30		17.98			2.51				$70		$70
LOADING GONDOLA	BCY														
Generated Waste	1126														
Plus a swell factor of 15% = LCY	1295														
Allowable CY's of waste per Gondola	49.0														
Install Liner in Gondola car		27	EA	0.75		17.98			32.21				$870		$870
Load Gondola – 6/day, 2 workers		5	DAYS	16.00		17.98			15.00				$80		$80
Seal liner, install Cover		27	EA	0.75		17.98			32.21				$870		$870
Dust control – light		5	DAYS	8.00		17.98			500.00				$2,500		$2,500
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		415						$7,050		$8,540		$15,590
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		710						$12,050		$11,510		$23,560

Generated Waste Removal Details

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001002

FEMP-OU02-5 DRAFT
August 31, 1994

CONTR.NO. – [redacted]321
CLIENT – [redacted]. DEPT. OF ENERGY
PROJECT – ALT–3A – SF – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940704
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
South Field	5000	6000	ICY	0.09	697	16.97			3.21	3.50	$11,830		$19,840	$21,630	$53,300
	33%														
Office/Parking	494	197	ICY	0.09	23	16.97			3.21	3.50	$390		$650	$710	$1,750
Const.Equip.Decon.Area	78	31	ICY	0.09	4	16.97			3.21	3.50	$70		$100	$110	$280
Personnel Decon.Area	7	3	ICY	0.09		16.97			3.21	3.50			$10	$10	$20
Staging Area at Sub–Unit	475	190	ICY	0.09	22	16.97			3.21	3.50	$370		$630	$680	$1,680
Storage Area at Sub–unit	370	148	ICY	0.09	17	16.97			3.21	3.50	$290		$490	$530	$1,310
b. Final Grade for SF		62920	SY	0.02	1623	16.97			0.70		$27,540		$45,370		$72,910
c. Borrow Top Soil 6" Thk., Spread															
South Field		62920	SY	0.036	2922	16.97			2.33	2.88	$49,590		$151,000	$186,650	$387,240
	33%														
Office/Parking	2222	888	SY	0.036	41	16.97			2.33	2.88	$700		$2,130	$2,630	$5,460
Const.Equip.Decon.Area	167	67	SY	0.036	3	16.97			2.33	2.88	$50		$160	$200	$410
Personnel Decon.Area	14	6	SY	0.036		16.97			2.33	2.88			$10	$20	$30
Staging Area at Sub–Unit	2845	1137	SY	0.036	53	16.97			2.33	2.88	$900		$2,730	$3,370	$7,000
Storage Area at Sub–Unit	1112	444	SY	0.036	21	16.97			2.33	2.88	$360		$1,070	$1,320	$2,750
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
South Field	62920	566	MSF	0.30	219	16.97			6.75	25.00	$3,720		$3,940	$14,570	$22,230
	33%														
Office/Parking	2222	7	MSF	0.30	3	16.97			6.75	25.00	$50		$50	$180	$280
Const.Equip.Decon.Area	167	1	MSF	0.30		16.97			6.75	25.00			$10	$30	$40
Personnel Decon.Area	14		MSF	0.30		16.97			6.75	25.00					
Staging Area at Sub–Unit	2845	9	MSF	0.30	3	16.97			6.75	25.00	$50		$60	$230	$340
Storage Area at Sub–Unit	1112	3	MSF	0.30	1	16.97			6.75	25.00	$20		$20	$80	$120
e. Security Fence – 6ga aluminized – 6' high		1200	LF	0.13	198	16.97			1.64	9.80	$3,360		$2,030	$12,110	$17,500
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		2	PR	10.00	26	16.97			133.00	240.00	$440		$270	$490	$1,200
TOTAL (SITE RESTORATION)		1	LOT		5,884						$99,870		$230,650	$245,670	$576,190

Site Restoration Details

FEMP-OU02-5 DRAFT August 24, 1994

F-5-147

000005

9861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SF – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940704
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at Restoration Site: 8 Pairs x 120 ft.	10	PAIR					23,000				$230,000			$230,000
b. Abandon Existing Wells	11	EA					13,000				$143,000			$143,000
TOTAL (MONITORING WELLS)	1	LOT									$373,000			$373,000

Monitoring Wells Details

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001008

CONTR.NO.- [redacted]321
CLIENT - U.S. DEPT. OF ENERGY
PROJECT - ALT-3A - SF - EXCAVATION & OFF-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940704
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO														
PURCHASE														
Bulk Gondola Rail Car N/A	0	EA												
Liner for Gondola														
Excavated Waste - level C,D & Additional	1464	EA							400.00				$585,600	$585,600
Excavated Waste - lead/soil	8	EA							400.00				$3,200	$3,200
Generated Waste	27	EA							400.00				$10,800	$10,800
Cover for Gondola														
Excavated Waste - level C,D & Additional	1464	EA							395.00				$578,280	$578,280
Excavated Waste - lead/soil	8	EA							395.00				$3,160	$3,160
Generated Waste	27	EA							395.00				$10,670	$10,670
TOTALS FORWARD TO No. 24 ESTIMATE SUMMARY														
TOTAL (PURCHASE WASTE CONTAINERS)	1	LOT											$1,191,700	$1,191,700

001007

5861

Purchase Waste Container Details

PAGE 12 of 15

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SF – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940704
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF–SITE TRANSPORTATION COST TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas	1499	EA					340.00				$509,660			$509,660
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additional	1464	EA					22681.00				$33,204,880			$33,204,980
Excavated Waste – lead/soil	8	EA					23045.00				$184,360			$184,360
Generated Waste	27	EA					23045.00				$622,220			$622,220
TOTALS FORWARD TO No. 23 ESTIMATE SUMMARY														
TOTAL (OFF–SITE DISPOSAL COST)	1	LOT									$34,521,200			$34,521,200

001008

F-5-150

FEMP-OU02-5 DRAFT
August 24, 1994

Off–Site Disposal Details

CONTR.NO.- [redacted]321
CLIENT - [redacted]. DEPT. OF ENERGY
PROJECT - ALT-3A - SF - EXCAVATION & OFF-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940704
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	165000	GAL					0.01				$1,700			$1,700
Runnoff from the Exclusion Zone.	19700000	GAL					0.01				$197,000			$197,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$198,700			$198,700

Waste Water Treatment Operations Cost Details

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001009
5861
F-5-151
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3A – SF – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940704
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTS														
Excavation														
Full TCLP	428	EA					2,002				$856,900			$856,900
Rad	428	EA					2,000				$856,000			$856,000
Confirmatory Tests														
Full Rad Tests	214	EA					3,101				$663,600			$663,600
Full HSL	25	EA					1,500				$37,500			$37,500
Full TCLP	25	EA					2,000				$50,000			$50,000
2 Technicians per Month	19	MO					13,163				$250,100			$250,100
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS)	1	LOT									$2,714,100			$2,714,100

001010

F-5-152

FEMP-OU02-5 DRAFT
August 24, 1994

Screening & Confirmation Testing Details

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 3A, SF – EXCAVATION AND OFF–SITE DISPOSAL (EXPANDED TRESP.
CLIENT: DOE DATE: 07–Aug–94
CONTRACT: C2–94–07–04 BASE ESTIMATE: $48,974,500

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$66,459,235	$17,484,735	35.7%
0.05%	$64,353,760	$15,379,260	31.4%
5.00%	$62,447,203	$13,472,703	27.5%
10.00%	$61,592,617	$12,618,117	25.8%
15.00%	$60,847,590	$11,873,090	24.2%
20.00%	$60,257,717	$11,283,217	23.0%
25.00%	$59,570,996	$10,596,496	21.6%
30.00%	$58,904,500	$9,930,000	20.3%
35.00%	$58,173,721	$9,199,221	18.8%
40.00%	$57,546,571	$8,572,071	17.5%
45.00%	$56,863,024	$7,888,524	16.1%
50.00%	$56,201,615	$7,227,115	14.8%
55.00%	$55,599,024	$6,624,524	13.5%
60.00%	$54,943,982	$5,969,482	12.2%
65.00%	$54,297,561	$5,323,061	10.9%
70.00%	$53,621,258	$4,646,758	9.5%
75.00%	$52,868,185	$3,893,685	8.0%
80.00%	$52,241,176	$3,266,676	6.7%
85.00%	$51,648,078	$2,673,578	5.5%
90.00%	$51,062,523	$2,088,023	4.3%
95.00%	$50,340,745	$1,366,245	2.8%
99.95%	$48,518,375	($456,125)	–0.9%
100.00%	$46,435,059	($2,539,441)	–5.2%

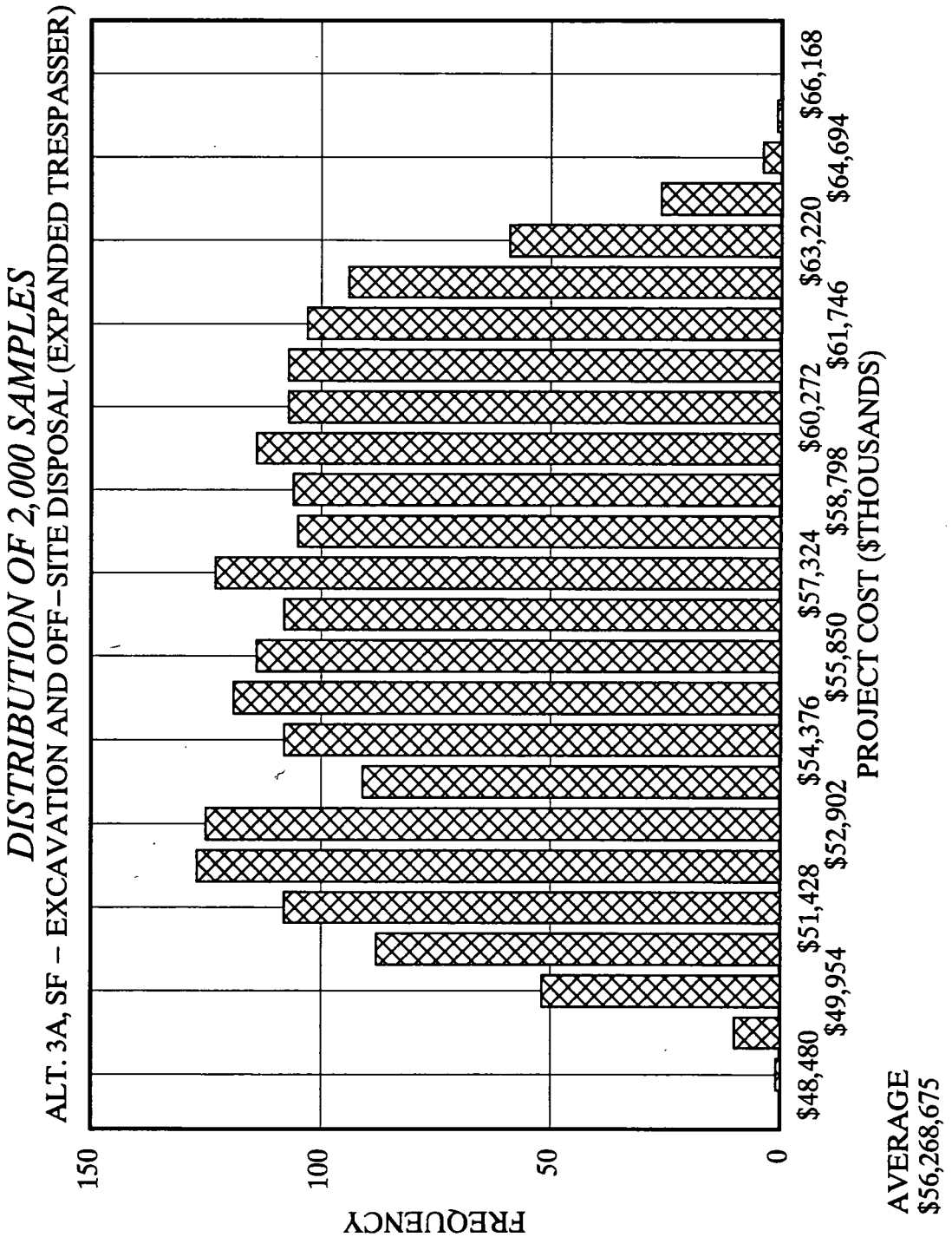
FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

PROJECT: ALT. 3A, SF – EXCAVATION AND OFF-SITE DISPOSAL (EXPANDED TRESPASSER)
CLIENT: DOE
CONTRACT: C2-94-07-04

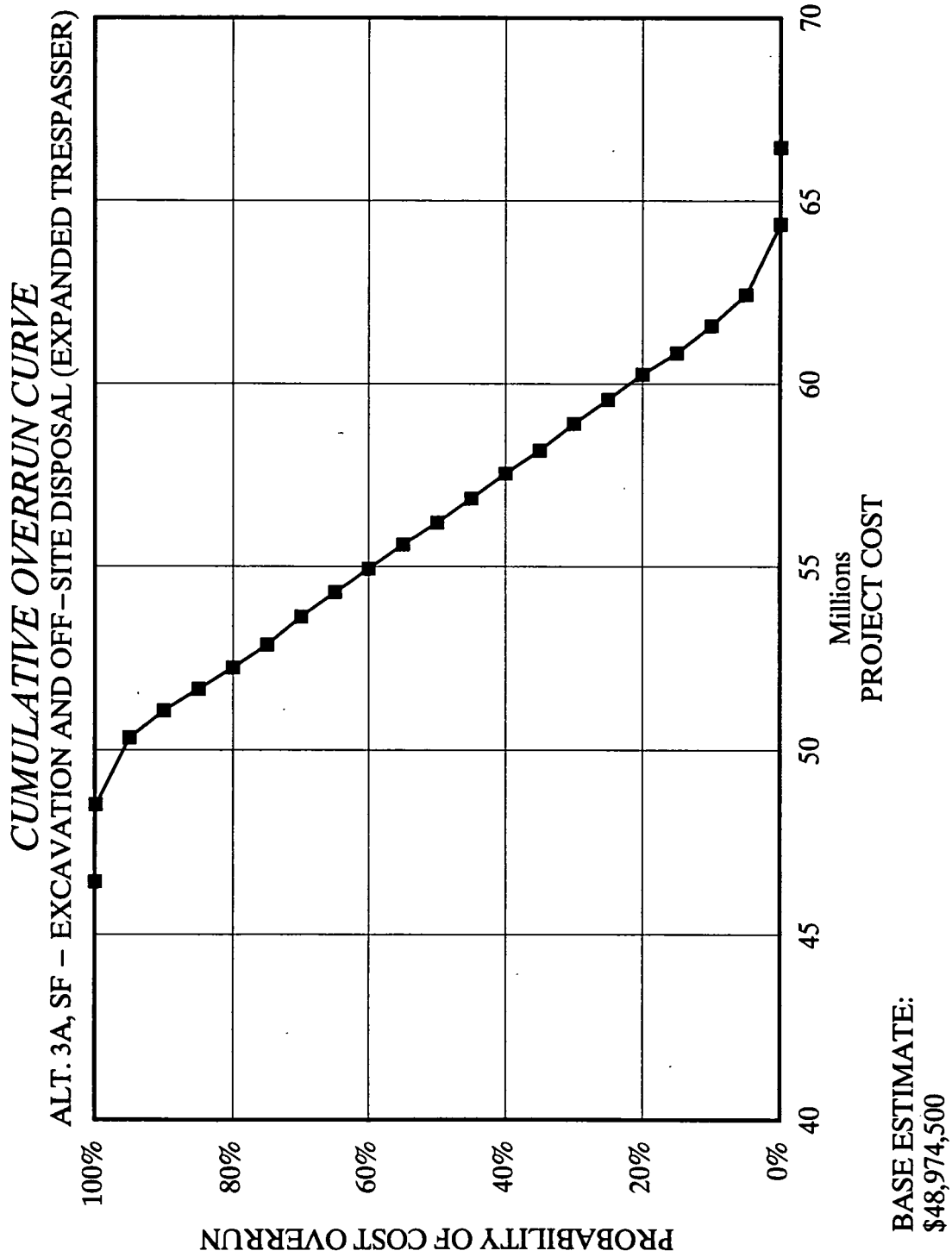
ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$92,730	-5.0%	$88,094	30%	$120,549	U		14%
2	SITE PREPERATION S/C	16,500	-5.0%	15,675	30%	21,450	U		14%
3	SITE PREPERATION MAT'L	112,600	-5.0%	106,970	20%	135,120	U		20%
4	DECON FACILITIES/SERVICES LABOR	6,090	-2.0%	5,968	80%	10,962	U		2%
5	DECON FACILITIES/SERVICES S/C	27,940	-6.0%	26,264	80%	50,292	U		7%
6	DECON FACILITIES/SERVICES MAT'L	6,060	-6.0%	5,696	60%	9,696	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	31,460	-5.0%	29,887	30%	40,898	U		14%
8	EROSION/SEDIMENT CNTRLS MAT'L	36,830	-5.0%	34,989	30%	47,879	U		14%
9	EXC/SORT/SHRD/DRY OFF-SITE LBR	212,610	-6.0%	199,853	125%	478,373	U		5%
10	EXC/SORT/SHRD/DRY OFF-SITE S/C	1,602,630	-6.0%	1,506,472	125%	3,605,918	U		5%
11	EXC/SORT/SHRD/DRY OFF-SITE MTL	125,150	-10.0%	112,635	75%	219,013	U		12%
12	LOAD & HAUL OFF-SITE DISP LABOR	323,190	-6.0%	303,799	125%	727,178	U		5%
13	LOAD & HAUL OFF-SITE DISP MAT'L	31,650	-10.0%	28,485	50.0%	47,475	U		17%
14	GENERATED WASTE REMVL LABOR	13,260	-5.0%	12,597	50.0%	19,890	U		9%
15	SITE RESTORATION LABOR	109,860	-5.0%	104,367	30.0%	142,818	U		14%
16	SITE RESTORATION MAT'L	270,240	-5.0%	256,728	30.0%	351,312	U		14%
17	MONITORING WELLS S/C	410,300	-5.0%	389,785	50.0%	615,450	U		9%
18	INDIRECT FIELD COSTS LABOR	855,100	-5.0%	812,345	50.0%	1,282,650	U		9%
19	INDIRECT FIELD COSTS S/C	520,400	-5.0%	494,380	100.0%	1,040,800	U		5%
20	INDIRECT FIELD COSTS MAT'L	1,354,400	-5.0%	1,286,680	50.0%	2,031,600	U		9%
21	FIELD SUPPORT COSTS LABOR	1,435,000	-10.0%	1,291,500	30.0%	1,865,500	U		25%
22	FIELD SUPPORT COSTS S/C	37,434,000	-5.0%	35,562,300	30.0%	48,664,200	U		14%
23	FIELD SUPPORT COSTS MAT'L	1,191,700	-5.0%	1,132,115	30.0%	1,549,210	U		14%
24	ENGINEERING COSTS	2,494,400	-5.0%	2,369,680	25.0%	3,118,000	U		17%
25	SALES TAX MAT'L	260,400	-1.0%	257,796	1.0%	263,004	U		50%
26				0		0			0%
27				0		0			0%
28				0		0			0%
29				0		0			0%
30				0		0			0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$48,974,500		$46,435,059		$66,459,235			

001012

586


DISTRIBUTION OF 2,000 SAMPLES
ALT. 3A, SF – EXCAVATION AND OFF-SITE DISPOSAL (EXPANDED TRESPASSER)
FREQUENCY
150
100
50
0
$48,480
$49,954
$51,428
$52,902
$54,376
$55,850
$57,324
$58,798
$60,272
$61,746
$63,220
$64,694
$66,168
PROJECT COST ($THOUSANDS)
AVERAGE
$56,268,675

001013



BASE ESTIMATE:
$48,974,500

001014

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SF – EXCAVATION & OFF-SITE DISPOSAL –
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940704
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$48,974,500	BASE EST:	$92,730	BASE EST:	$16,500	BASE EST:	$112,600	BASE EST:	$6,090	BASE EST:	$27,940	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	25%	-5%	20%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	25%	-5%	20%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$88,094	$120,549	$15,675	$20,625	$106,970	$135,120	$5,968	$10,962	$26,264	$50,292	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SF – EXCAVATION & OFF-SITE DISPOSAL –
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940704
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$31,460	BASE EST:	$0	BASE EST:	$36,830	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$29,887	$47,190	$0	$0	$34,989	$47,879	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SF - EXCAVATION & OFF-SITE DISPOSAL -
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940704
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

	EXCAVATE/SORT/SHRED/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/SHRED/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/SHRED/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$212,610	BASE EST:	$1,602,630	BASE EST:	$125,150	BASE EST:	$323,190	BASE EST:	$0	BASE EST:	$31,650
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	100%					-1%	100%				
MATERIAL PRICING			-1%	100%	-5%	50%					-5%	25%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-5%	25%	-5%	25%	-5%	25%	-5%	25%			-5%	25%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	125%	-6%	125%	-10%	75%	-6%	125%	0%	0%	-10%	50%
TOTAL $	$199,853	$478,373	$1,506,472	$3,605,918	$112,635	$219,013	$303,799	$727,178	$0	$0	$28,485	$47,475

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

001017

F-5-159

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SF - EXCAVATION & OFF-SITE DISPOSAL -
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940704
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

	EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE LABOR $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE S/C $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

001018

F-5-160

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SF - EXCAVATION & OFF-SITE DISPOSAL -
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940704
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		LABOR $'s		S/C $'s		MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: *Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.*

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3A, SF – EXCAVATION & OFF–SITE DISPOSAL –
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940704
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

	LABOR $'s		S/C $'s		MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$13,260	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							–5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	–5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$12,597	$19,890	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SF - EXCAVATION & OFF-SITE DISPOSAL -
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940704
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$109,860	BASE EST:	$0	BASE EST:	$270,240	BASE EST:	$0	BASE EST:	$410,300	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$104,367	$142,818	$0	$0	$256,728	$351,312	$0	$0	$389,785	$615,450	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-5-163

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SF – EXCAVATION & OFF-SITE DISPOSAL –
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940704
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSE

	INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS	
	LABOR $'s		S/C $'s		MAT'L. $'s		LABOR $'s		S/C $'s		MAT'L. $'s	
	BASE EST:	$855,100	BASE EST:	$520,400	BASE EST:	$1,354,400	BASE EST:	$1,435,000	BASE EST:	$37,434,000	BASE EST:	$1,191,700
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–10%	30%				
MATERIAL PRICING			–5%	100%	–5%	50%			–5%	30%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	–5%	100%	–5%	50%	–10%	30%	–5%	30%	–5%	30%
TOTAL $	$812,345	$1,282,650	$494,380	$1,040,800	$1,286,680	$2,031,600	$1,291,500	$1,865,500	$35,562,300	$48,664,200	$1,132,115	$1,549,210
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-5-164

001022

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, SF - EXCAVATION & OFF-SITE DISPOSAL -
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940704
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CSF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$2,494,400	BASE EST:	$260,400	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-5%	25%										
(OTHER)												
TOTAL %	-5%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$2,369,680	$3,118,000	$257,796	$263,004	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

000023

1861

F ERMC O
ESTIMATING SERVICES

SUMMARY SHEET

EST FILE #: C2940705
CLIENT: US DOE
PROJECT TITLE: ALT-3A, AFP - EXCAVATION & OFF-SITE DISPOSAL - (EXPANDED TRESPASSER)
WBS#: 1.1.1.1.2.3.4

DATE: 07-Aug-94
ESTIMATOR: KEN KEPLER
LOCATION: FERNALD
TASK#: 2CAF

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		OFF-SITE DISPOSAL TO ENVIROCARE BY RAIL	39,177		$669,900	$337,200	$374,300	$1,381,400
2		EXCAVATE, SORT, DRY, LOAD, HAUL						
		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		39,177		$669,900	$337,200	$374,300	$1,381,400
11	SUPERVISION - CONTRACTOR				$114,000			$114,000
12	SM TOOLS/CONSM'BLS						$40,200	$40,200
13	EQUIPMENT RENTAL						$993,800	$993,800
14	TEMP. FACILITIES				$14,100		$26,100	$40,200
15	TEMP UTL'S HOOK-UP				$7,000		$13,100	$20,100
16	JOB CLEAN-UP				$14,100		$26,100	$40,200
17	SAFETY				$7,000		$13,100	$20,100
18	HEALTH PHYSICS S/C				$92,200			$92,200
19	CERCLA/SAT	$1,500 PER PERSON				$19,500		$19,500
20	BOND					$13,800		$13,800
21	OVERHEAD & PROFIT					$249,800		$249,800
22	PAYRL BRD.&BENFT.				$477,500			$477,500
	INDIRECT FIELD COSTS				$725,900	$283,100	$1,112,400	$2,121,400
	DIRECT & INDIRECT FIELD COSTS				$1,395,800	$620,300	$1,486,700	$3,502,800
23	TRANSPORTATION & BURIAL					$28,840,400		$28,840,400
24	WASTE CONTAINERS						$996,100	$996,100
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$12,000		$12,000
25	SCREENING & CONFIRMATION TESTING					$2,338,600		$2,338,600
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$441,400			$441,400
	FERMCO FIELD SUPPORT COSTS				$441,400	$31,191,000	$996,100	$32,628,500
28	EMISSION MODELING				$6,100		$11,400	$17,500
29	PSAR/FSAR(SAFETY RPT)				$150,600			$150,600
30	ENGINEERING	TITLE I&II $507,900 TITLE III	$525,400	CDR	$182,100	DCR	$171,600	$1,387,000
	ENGINEERING COSTS							$1,555,100
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$3,490,300	$209,400
	SUB-TOTAL	(BASE ESTIMATE)						$37,895,800
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	13.5%						$5,115,900
	TARGET ESTIMATE (BASE ESTIMATE PLUS RISK BUDGET)							$43,011,700
35	CONTINGENCY	13.0%						$4,926,500
								PRELIMINARY
	TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY)							$47,938,200

LOTUS31\FS2\ALT3A\AFP\INDSUM.WK3 - FEASABILITY STUDY

Alternative 3 – Excavation and Off-Site Disposal
(Expanded Trespasser)

Active Flyash Pile

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	1	1	5	sample	$5,500.00	24	NA	$132,000	9 wells x 4 samples/year
Long Term	1	6	30	sample	$5,500.00	12	NA	$66,000	9 wells x 2 samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	1.5	1.94	$751	Inspect all wells twice/year. Repair 1 out of 8.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Long Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Well Inspect & Maint.	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
OU2 Waste Cell Leachate									
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Facility Maint. at Subunit									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	1	1	30	acre	$1,861.92	5.7	7.35	$13,691	Approx. 5.7 Acres
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.7	0.90	$1,780	Approx. 1400 ft perimeter
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Fence Repair	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of Subunit	5	5	30	lump Sum	$20,000.00	1	NA	$20,000	Total divided among 5 subunits
Facility Review of OU2 Cell	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative

Annual Costs, Year 1 (excluding facility review)	$170,341
Annual Costs, Years 2–5 (excluding facility review)	$148,912
Annual Costs, Years 6–30 (excluding facility review)	$82,912
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 C:

8/3/94

DATE: 06-Aug-94

PROJECT TITLE:
ALT-3A, AFP - EXCAVATION & OFF-SITE DISPOSAL - (EXPANDED TRESPASSER)
WBS#:
1.1.1.1.2.3.4

HEALTH PHYSICS

EST.NO.: C2940705
EST. : KEN KEPLER
TASK I.D. :
2CAF

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	• NO. OF CHANGE OUTS PER WORKER PER DAY / MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			•	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	0	$0	C/B		
SUB-TOTAL		31.80	4		$0			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	0		$0	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	0		$0	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	0		$0	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	0		$0	C/B		
THERMO STRIPS	EA	50.00	0		$0	C/B		
SUB-TOTAL		327.21			$0			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$0			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE.
COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

001026

DATE: 06-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

ALT-3A, AFP - EXCAVATION & OFF-SITE DISPOSAL - (EXPANDED TRESPASSER)

WBS#:
1.1.1.1.2.3.4

EST.NO.: C2940705
EST. : KEN KEPLER
TASK I.D. :
2CAF

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	13	52	$16.97	$880		
ANNUAL PHYSICALS	1	3	13	39	$16.97	$660		
EXIT (TERMINATION) PHYSICALS	1	4	13	52	$16.97	$880		
SUB-TOTAL						$2,420		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	24	1	13	316	$16.97	$5,360		
YEARLY IN-VIVO	1	4	13	52	$16.97	$880		
EXIT (END OF PROJECT / TERMINATION)	1	4	13	52	$16.97	$880		
SUB-TOTAL						$7,120		
WORK DELAYS CAUSED BY MONITORING	5%				$826,100	$41,305		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$826,100	$41,305		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$92,200	$0	$92,200

001027

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT-3A, AFP – EXCAVATION & OFF-SITE DISPOSAL – (EXPANDED TRESPASSER)
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CAF

WBS NO. – 1.1.1.1.2.3.4
EST. NO. – C2940705
BY – K. KEPLER
DATE – 08/06/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	30-Jun-94	01-Jun-97	31-May-98	31-May-99	24	MONTHS

EST.DATE TO MID-POINT OF ACTIVITY	
47	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO.– 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3A – AFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.4

EST.NO. C2940705
BY KEN KEPLER
DATE 06–Aug–94
TASK ID 2CAF

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR)			CERTI–FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS				ENVIROCARE BURIAL COSTS		TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							$80.15 PER TON (90 TON MIN.)	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	$120 DEMURAGE $/DAY (>6 DAYS)	(1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	
	CAR	LINER	COVER			TONS/CY	TONS						
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT
1) Type of waste to be disposed at ENVIROCARE.
2) Insert 159, 182, or 243 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

CONTR.NO. – 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3A – AFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.4

EST.NO. C2940705
BY KEN KEPLER
DATE 06–Aug–94
TASK ID 2CAF

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C – D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0

INPUT

001030

CONTR.NO. – 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3A – AFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.4

EST.NO. C2940705
BY KEN KEPLER
DATE 06–Aug–94
TASK ID 2CAF

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	0.0	0	$23,816	$0	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	89500.0	1227	$23,804	$29,207,500	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	1296.0	27	$24,180	$652,900	$493.47		
						**			

INPUT

** 001031

NOTE:
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

5861

CONTR.NO.– 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3A – AFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940705
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
OFF–SITE DISPOSAL TO ENVIROCARE (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		3,397						$58,780	$15,000	$24,900	$85,630	$184,310
DECONTAMINATION FACILITIES/SERVICES	1	LS		296						$5,400	$25,890	$1,240	$5,510	$38,040
EROSION AND SEDIMENT CONTROLS	1	LS		1429						$26,540		$9,220	$39,380	$75,140
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT/DRY – OFFSITE DISPOSAL TO ENVIROCARE	1	LS		8918						$151,340	$49,610	$314,690	$280	$515,920
LOAD/HAUL – OFF–SITE DISPOSAL (ALL FLYASH TO ENVIROCARE)	1	LS		15568						$264,970		$384,420	$28,770	$678,160
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE	N/A													N/A
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	N/A													N/A
DIKE	N/A													N/A
GENERATED WASTE REMOVAL	1	LS		1164						$19,750		$11,150		$30,900
SITE RESTORATION	1	LS		4843						82180		157830	180660	420670
MONITORING WELLS	1	LS									$216,000			$216,000
SUB–TOTAL (DIRECT FIELD COSTS)	1	LS		35615						$608,960	$306,500	$903,450	$340,230	$2,159,140
TAKE–OFF ALLOWANCE 10%	1	LS		3,562						$60,900	$30,650	$90,350	$34,020	$215,920
TOTAL (DIRECT FIELD COSTS)	1	LS		39,177						$669,900	$337,200	$993,800	$374,300	$2,375,200

Off–Site Disposal of Active Flyash Pile to ENVIROCARE – SUMMARY

PAGE 1 of 15

F-5-174
001033
FEMP-OU02-5 DRAFT August 24, 1998

CONTR.NO.-[redacted]321
CLIENT -.U.S.DEPT.OF ENERGY
PROJECT - ALT-3A - AFP - EXCAVATION & OFF-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940705
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 33-1/3% ARE COMMON TO AFP,IFP & SF)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	2000	LF	0.213	550	16.97				6.25	$9,330			$12,880	$22,210
c. Clear and Grub														
i. Remediation Site	2.50	AC	41.40	134	16.97			2575.00		$2,270		$6,630		$8,900
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Storage Area, &/or Staging Area @ Sub-unit														
d. Dewatering														
i. Excavate Dewatering Trench	400	CY	0.50	258	16.97			1.49		$4,380		$610		$4,990
ii. Pump - w/4" Suction Hose	120	DAYS	3.00	464	16.97			19.55		$7,870		$2,420		$10,290
iii. HDPE Pipe to Sedimentation Tank	300	LF	0.19	74	16.97			0.67	0.84	$1,260		$210	$260	$1,730
e. General Grading														
i. New Roads	4667	SY	0.001	6	16.97			0.07		$100		$340		$440
33%														
ii. Office/Parking Area 2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area 272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area 49	16	SY	0.010		16.97			0.32				$10		$10
v. Staging Area @ Sub-Unit 2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
vi. Storage Area 1112	370	SY	0.010	5	16.97			0.32		$80		$120		$200
f. Surfacing/Paving/Concrete Slab														
i. New Roads - 8" Gravel W/Geotextile	4667	SY	0.030	181	16.97			1.08	6.66	$3,070		$5,190	$32,010	$40,270
33%														
ii. Office/Parking - 8" Gravel W/ Geot 2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub-Unit - 160' x160' Concrete														
Sub-Grade & Sub-Base for Conc 2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk. 631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb - 2'h x 480 lf x 8" tl 24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub-grade Piping - 4" 500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating 2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab 183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip. 1	0	LS	2.00	1	16.97			184.00		$20		$60		$80
iv. Storage Area - 100' x100' Asphalt														
Includes Compacted Sub-Grade 1112	370	SY	0.084	40	16.97			2.56	14.04	$680		$980	$5,350	$7,010
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4-1/2" Asph.Conc.Base course, Tack Coat, 1-1/2" Asph.Conc.Surface Coat														
TOTAL (SITE PREPARATION)	1	LS		3,397						$58,780	$15,000	$24,900	$85,630	$184,310

Site Preparation Details

F-5-175
001033
FEMP-OU02-5 DRAFT August 24, 1994
583

CONTR.NO. – 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3A – AFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940705
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CAF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT															
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)	33%														
a. Decon Trailer – Rental	51	17	MO					1500.00				$25,470			$25,470
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'i.d.x 25l	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Gu	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
x. Backfill & Compaction around concrete slab	BCY 129	52	ICY	0.086	6	16.97			1.38		$100		$70		$170
SUB–TOTAL (EQUIP. DECON. FACILITY)					260						$4,720	$25,860	$1,130	$4,140	$35,850

Equipment Decon. Facility Details

001034

CONTR.NO.– [illegible]321
CLIENT – [illegible].DEPT.OF ENERGY
PROJECT – ALT–3A – AFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940705
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CAF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	COST/UNIT RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)															
c. Personnel Decon. Facility	33%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep.	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
– Includes HDPE Liner, Geotextile Fabric															
– Gravel, & Compact Sub–grade															
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 2'x 2'	4	1.33	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0.50	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0.10	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0.13	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Gua	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in (	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0.33	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping– 1500 gal.	1	0.33	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		296						$5,400	$25,890	$1,240	$5,510	$38,040

Personnel Decon.Facilities/Services Details

CONTR.NO.– 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3A – AFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940705
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL (ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)														
a. Diversion of Clean Run–off														
i. Silt Fence	1300	LF	0.017	29	16.97			0.06	0.65	$490		$80	$870	$1,440
ii.Diversion Berms	200	CY	0.24	62	16.97			0.84	7.50	$1,050		$170	$1,500	$2,720
iii. Diversion Ditches	100	CY	0.24	31	16.97			0.84	7.50	$530		$80	$750	$1,360
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	700	EA	0.24	217	16.97			1.53	1.35	$3,680		$1,100	$970	$5,750
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iv. 2"/4" HDPE Carrier/Container HDP from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction 100% 1400	1400	LF	0.38	688	19.95			5.11	4.42	$13,730		$7,150	$6,190	$27,070
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall M W/Cleanout 3	3	EA	8.00	31	16.97			28.00	8300.00	$530		$80	$24,900	$25,510
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,429						$26,540		$9,220	$39,380	$75,140

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Erosion Control Details

CONTR.NO.- [redacted]321
CLIENT - [redacted].DEPT.OF ENERGY
PROJECT - ALT-3A - AFP - EXCAVATION & OFF-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940705
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE/SORT/DRY FOR OFF-SITE DISPOSAL TO ENVIROCARE														
EXCAVATION														
Excavate FLYASH/Contaminated Soil - (Level D)	65100	BCY	0.055	4,619	16.97			1.17		$78,380		$76,170		$154,550
Excavate Additional Flyash/soil Soil - BCY	6500	BCY	0.055	461	16.97			1.17		$7,820		$7,610		$15,430
Sort Flyash/Contaminated Soil -Level D 71600 and Additional Soil Contaminated Flyash/Soil BCY	89500	LCY	0.033	3,810	16.97			2.58		$64,660		$230,910		$295,570
Low Level Thermal Destruction Unit 700 Sub-contract cost for Drying Operation and moisture test Only.	709	TON					70.00				$49,610			$49,610
(SHREDDING COMMON TO SWL, IFP & SF)														
Shredder/Crusher - Purchase/Install N/A 60 Ton per Hour		LOT	280.0					********	317800.00					
Excavated Debris BCY N/A														
Generated Waste BCY 1127														
Excavated Debris TONS N/A														
(Percent of Gen.Waste to be Shredded) 25%														
Generated Waste TONS 648														
TOTAL TONS 648														
Operating Costs	11	HRS							25.75				$280	$280
(2) Operators	22	HRS	1.00	28	16.97					$480				$480
BCY = BANK CUBIC YARDS : The Volume of 1 Cubic Yard of material in its natural state OR Volume/Void to be filled.														
LCY = LOOSE CUBIC YARDS (w/Swell Factor) Volume of material after being excavated.														
ICY = IN-PLACE CUBIC YARDS (w/Shrinkage Factor) Volume of material it takes to fill a 1 Cubic Yard space.														
TOTAL (EXCAVATE/SORT/DRY)	1	LS		8,918						$151,340	$49,610	$314,690	$280	$515,920

Excavate/Sort/Dry Details

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ALT-3A - AFP - OFF-SITE TO ENVIROCARE

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CONTR.NO. – 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3A – AFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940705
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CAF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
LOAD & HAUL FOR OFF–SITE DISPOSAL CONTAMINATED WASTE TO ENVIROCARE															
(ITEMS @ 20% ARE COMMON TO AFP,IFP,SF,SWL & LSP)															
Install Loading Equipment for LLW	20%														
Hopper	1	0.2	EA	177.0	35	16.97	3000.00			6000.00	$600			$1,200	$1,800
Loading Conveyor	1	0.2	EA	147.0	29	16.97	2500.00			8500.00	$500			$1,700	$2,200
Scale	1	0.2	EA	589.0	118	16.97	10000.00			15000.00	$2,000			$3,000	$5,000
Railroad Loading Facility															
a. 160' x 160 'Concrete Pad	20%														
i. Clear & Grub	0.60	0.12	AC	41.40	6	16.97			2575.00		$100		$320		$420
ii. Grading	2845	569.00	SY	0.010	7	16.97			0.32		$120		$190		$310
iii. Sub–Grade & Sub–Base for Conc.Slab	2845	569.00	SY	0.041	30	16.97			1.45	5.51	$510		$850	$3,230	$4,590
iv. Concrete Slab 160 x 160' x 8"thk.	631	126.20	CY	4.07	663	17.98			18.38	67.00	$11,920		$2,390	$8,710	$23,020
v. Concrete Curb – 2'h x 480 lf x 8" thk.	24	4.80	CY	15.30	95	17.98			69.08	275.90	$1,710		$340	$1,360	$3,410
vi. Wood Ties, Ballast, 100# Rail Derailer, Turnout, Bumper Car Stops	600	120.00	LF	1.06	164	16.97			4.43	77.40	$2,780		$550	$9,570	$12,900
vii. Grading for track	800	160.00	SY	0.010	2	16.97			0.32		$30		$50		$80
HAUL															
From excavation site to rail loading facility 6 CY dump truck 1/2 mi r.t.		89500	LCY	0.041	4734	16.97			1.65		$80,340		$147,680		$228,020
LOADING GONDOLA	LCY														
Excavated Flyash/soil level D & Addit. :	89500														
Allowable CY's of waste per Gondola	73.0														
Install Liner in Gondola car		1226	EA	0.75	1186	16.97			32.21		$20,130		$39,490		$59,620
Load Gondola – 6/day, 2 workers		204	DAYS	16.00	4217	16.97			15.00		$71,560		$3,070		$74,630
Seal liner, Install Cover		1226	EA	0.75	1186	16.97			32.21		$20,130		$39,490		$59,620
Dust control – light		300	DAYS	8.00	3096	16.97			500.00		$52,540		$150,000		$202,540
(RSO takes ownership at this time.) (See: Off–Site Disposal Wksht. and Appendix E)															
TOTAL (LOAD & HAUL OFF–SITE DISPOSAL)		1	LS		15,568						$264,970		$384,420	$28,770	$678,160

Offsite Load/Haul/Disposal Details

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August 24, 1994

CONTR.NO.- [redacted]321
CLIENT - [redacted].DEPT.OF ENERGY
PROJECT - ALT-3A - AFP - EXCAVATION & OFF-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940705
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CAF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO OFFSITE DISPOSAL Demo. /Load/Haul/Compact															
(ITEMS @ 33-1/3% ARE COMMON TO AFP,IFP & SF)															
a. Office/Parking Area	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo-Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Area @ Excav.Sit	33%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo-Fabric & Liner	167	56	SY	0.002	1	16.97			0.02		$20				$20
Posts - 4" x 4" x 9'-6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Area @ Excav. Site	33%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo-Fabric & Liner	14	5	SY	0.002	1	16.97			0.02		$20				$20
Posts - 4" x 4" x 9'-6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.50	1	BCY	0.30		16.97			2.51						
d. Staging Area @ s/u	33%														
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo-Fabric & Liner	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	105.0	35	BCY	0.30	14	16.97			2.51		$240		$90		$330
SUB-TOTAL (GENERATED WASTE REMOVAL)		1	LOT		558						$9,470		$4,350		$13,820

Generated Waste Removal Details

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CONTR.NO. – 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3A – AFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940705
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CAF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO OFFSITE DISPOSAL (CON'T.)															
Demo. /Load/Haul/Compact															
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)															
e. Storage Area @ s/u	33%														
Demo/Remove Asphalt	185	62	BCY	1.2	95	16.97			3.62		$1,610		$230		$1,840
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	185	62	BCY	0.292	23	16.97			9.16		$390		$580		$970
Geo–Fabric & Liner	1112	370	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	247.0	82	BCY	0.30	32	16.97			2.51		$540		$210		$750
f. Staging Area @ Rail Siding	20%														
Demo/Remove Concrete	655	131	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	475	95	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo–Fabric & Liner	2845	569	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	105.0	21	BCY	0.30	8	16.97			2.51		$140		$50		$190
LOADING GONDOLA	BCY														
Generated Waste	1127														
Plus a swell factor of 15% = LCY	1296														
Allowable CY's of waste per Gondola	49.0														
Install Liner in Gondola car		27	EA	0.75	26	16.97			32.21		$440		$870		$1,310
Load Gondola – 6/day, 2 workers		5	DAYS	16.00	103	16.97			15.00		$1,750		$80		$1,830
Seal liner, Install Cover		27	EA	0.75	26	16.97			32.21		$440		$870		$1,310
Dust control – light		5	DAYS	8.00	52	16.97			500.00		$880		$2,500		$3,380
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		606						$10,280		$6,800		$17,080
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,164						$19,750		$11,150		$30,900

Generated Waste Removal Details

CONTR.NO.– [redacted]321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3A – AFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940705
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CAF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
Active Flyash Pile	20000	24000	ICY	0.09	2786	16.97			3.21	3.50	$47,280		$79,350	$86,520	$213,150
	33%														
Office/Parking	494	197	ICY	0.09	23	16.97			3.21	3.50	$390		$650	$710	$1,750
Const.Equip.Decon.Area	78	31	ICY	0.09	4	16.97			3.21	3.50	$70		$100	$110	$280
Personnel Decon.Area	7	3	ICY	0.09		16.97			3.21	3.50			$10	$10	$20
Staging Area at Sub–Unit	475	190	ICY	0.09	22	16.97			3.21	3.50	$370		$630	$680	$1,680
Storage Area at Sub–Unit	475	190	ICY	0.09	22	16.97			3.21	3.50	$370		$630	$680	$1,680
Staging Area at Rail Siding	475	190	ICY	0.09	22	16.97			3.21	3.50	$370		$630	$680	$1,680
b. Final Grade for AFP		19600	SY	0.02	506	16.97			0.70		$8,590		$14,130		$22,720
c. Borrow Top Soil 6" Thk., Spread															
Active Flyash Pile		19600	SY	0.036	910	16.97			2.33	2.88	$15,440		$47,040	$58,140	$120,620
	33%														
Office/Parking	2222	888	SY	0.036	41	16.97			2.33	2.88	$700		$2,130	$2,630	$5,460
Const.Equip.Decon.Area	167	67	SY	0.036	3	16.97			2.33	2.88	$50		$160	$200	$410
Personnel Decon.Area	14	6	SY	0.036		16.97			2.33	2.88			$10	$20	$30
Staging Area at Sub–Unit	2845	1137	SY	0.036	53	16.97			2.33	2.88	$900		$2,730	$3,370	$7,000
Storage Area at Sub–Unit	2845	1137	SY	0.036	53	16.97			2.33	2.88	$900		$2,730	$3,370	$7,000
Staging Area at Rail Siding	2845	1137	SY	0.036	53	16.97			2.33	2.88	$900		$2,730	$3,370	$7,000
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Active Flyash Pile	19600	176	MSF	0.30	68	16.97			6.75	25.00	$1,150		$1,220	$4,530	$6,900
	33%														
Office/Parking	2222	7	MSF	0.30	3	16.97			6.75	25.00	$50		$50	$180	$280
Const.Equip.Decon.Area	167	1	MSF	0.30		16.97			6.75	25.00			$10	$30	$40
Personnel Decon.Area	14		MSF	0.30		16.97			6.75	25.00					
Staging Area at Sub–Unit	2845	9	MSF	0.30	3	16.97			6.75	25.00	$50		$60	$230	$340
Storage Area at Sub–Unit	2845	9	MSF	0.30	3	16.97			6.75	25.00	$50		$60	$230	$340
Staging Area at Rail Siding	2845	9	MSF	0.30	3	16.97			6.75	25.00	$50		$60	$230	$340
e. Security Fence – 6ga aluminized – 6' high		1400	LF	0.13	231	16.97			1.64	9.80	$3,920		$2,360	$14,130	$20,410
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		2	PR	10.00	26	16.97			133.00	240.00	$440		$270	$490	$1,200
TOTAL (SITE RESTORATION)		1	LOT		4,843						$82,180		$157,830	$180,660	$420,670

Site Restoration Details

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CONTR.NO.– 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3A – AFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940705
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at Restoration Site: 8 Pairs x 120 ft.	6	PAIR					23,000				$138,000			$138,000
b. Abandon Existing Wells	6	EA					13,000				$78,000			$78,000
TOTAL (MONITORING WELLS)	1	LOT									$216,000			$216,000

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Monitoring Wells Details

CONTR.NO.– [redacted]321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3A – AFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940705
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO														
PURCHASE														
Bulk Gondola Rail Car N/A	0	EA												
Liner for Gondola														
Excavated Waste – level C,D & Additional	1226	EA							400.00				$490,400	$490,400
Excavated Waste – lead/soil N/A		EA												
Generated Waste	27	EA							400.00				$10,800	$10,800
Cover for Gondola														
Excavated Waste – level C,D & Additional	1226	EA							395.00				$484,270	$484,270
Excavated Waste – lead/soil N/A		EA												
Generated Waste	27	EA							395.00				$10,670	$10,670
TOTALS FORWARD TO No. 24 ESTIMATE SUMMARY														
TOTAL (PURCHASE COSTS BY FERMCO)	1	LOT											$996,100	$996,100

Purchase Costs by FERMCO Details

001043

F-5-185

FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO.– 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3A – AFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940705
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF–SITE TRANSPORTATION COST TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas's	1253	EA					340.00				$426,020			$426,020
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additional	1226	EA					22669.00				$27,792,190			$27,792,190
Excavated Waste – lead/soil N/A		EA												
Generated Waste	27	EA					23045.00				$622,220			$622,220
TOTALS FORWARD TO No. 23 ESTIMATE SUMMARY														
TOTAL (OFF–SITE TRANSPORTATION COST)	1	LOT									$28,840,400			$28,840,400

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August 24, 1994

Off–Site Transportation Details

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CONTR.NO.- [redacted]321
CLIENT - U.S.DEPT.OF ENERGY
PROJECT - ALT-3A - AFP - EXCAVATION & OFF-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940705
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	95000	GAL					0.01				$1,000			$1,000
Runnoff from the Exclusion Zone.	1100000	GAL					0.01				$11,000			$11,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$12,000			$12,000

Waste Water Treatment Operations Cost Details

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FEMP-OU02-5 DRAFT
August 24, 1994

586

CONTR.NO. – 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3A – AFP – EXCAVATION & OFF–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940705
BY: KEN KEPLER
DATE: 08/06/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTS														
Excavation														
Full TCLP	358	EA					2,002				$716,700			$716,700
Rad	358	EA					2,000				$716,000			$716,000
Confirmatory Tests														
Full rad tests	179	EA					3,101				$555,100			$555,100
Full HSL	25	EA					1,500				$37,500			$37,500
Full TCLP	25	EA					2,000				$50,000			$50,000
2 Technicians per month	20	MO					13,163				$263,300			$263,300
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS)	1	LOT									$2,338,600			$2,338,600

001046

F-5-188

FEMP-OU02-5 DRAFT
August 24, 1994

Screening & Confirmation Testing Details

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 3A, AFP – EXCAVATION AND OFF–SITE DISPOSAL (EXPANDED TRES
CLIENT: DOE DATE: 07–Aug–94
CONTRACT: C2–94–07–05 BASE ESTIMATE: $37,895,800

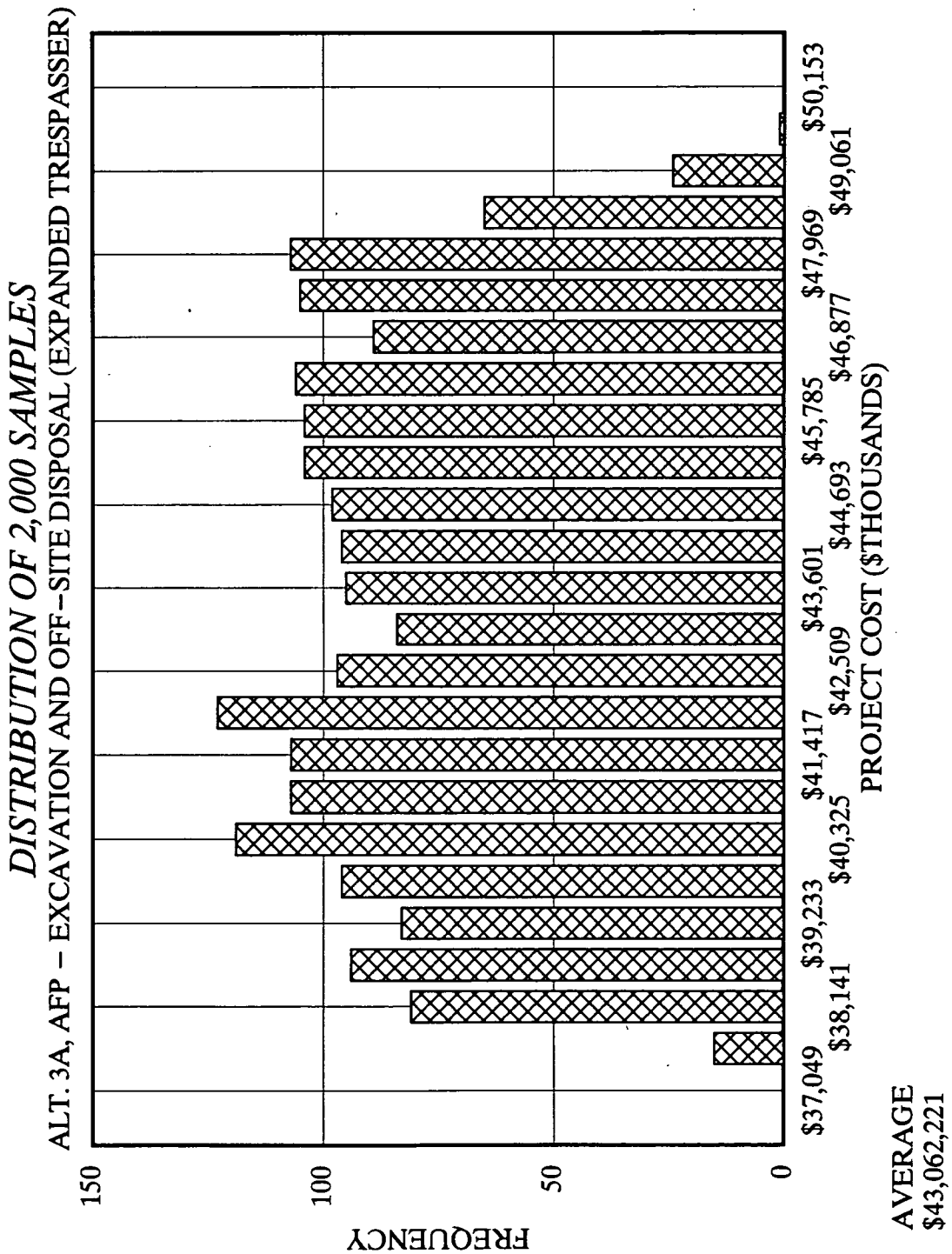
CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$50,146,689	$12,250,889	32.3%
0.05%	$48,875,000	$10,979,200	29.0%
5.00%	$47,908,726	$10,012,926	26.4%
10.00%	$47,406,609	$9,510,809	25.1%
15.00%	$46,886,703	$8,990,903	23.7%
20.00%	$46,288,454	$8,392,654	22.1%
25.00%	$45,769,921	$7,874,121	20.8%
30.00%	$45,240,491	$7,344,691	19.4%
35.00%	$44,747,194	$6,851,394	18.1%
40.00%	$44,174,044	$6,278,244	16.6%
45.00%	$43,564,308	$5,668,508	15.0%
50.00%	$43,001,311	$5,105,511	13.5%
55.00%	$42,380,792	$4,484,992	11.8%
60.00%	$41,887,359	$3,991,559	10.5%
65.00%	$41,400,370	$3,504,570	9.2%
70.00%	$40,916,428	$3,020,628	8.0%
75.00%	$40,373,028	$2,477,228	6.5%
80.00%	$39,928,660	$2,032,860	5.4%
85.00%	$39,373,029	$1,477,229	3.9%
90.00%	$38,759,184	$863,384	2.3%
95.00%	$38,167,305	$271,505	0.7%
99.95%	$37,179,496	($716,304)	–1.9%
100.00%	$35,992,815	($1,902,985)	–5.0%

FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

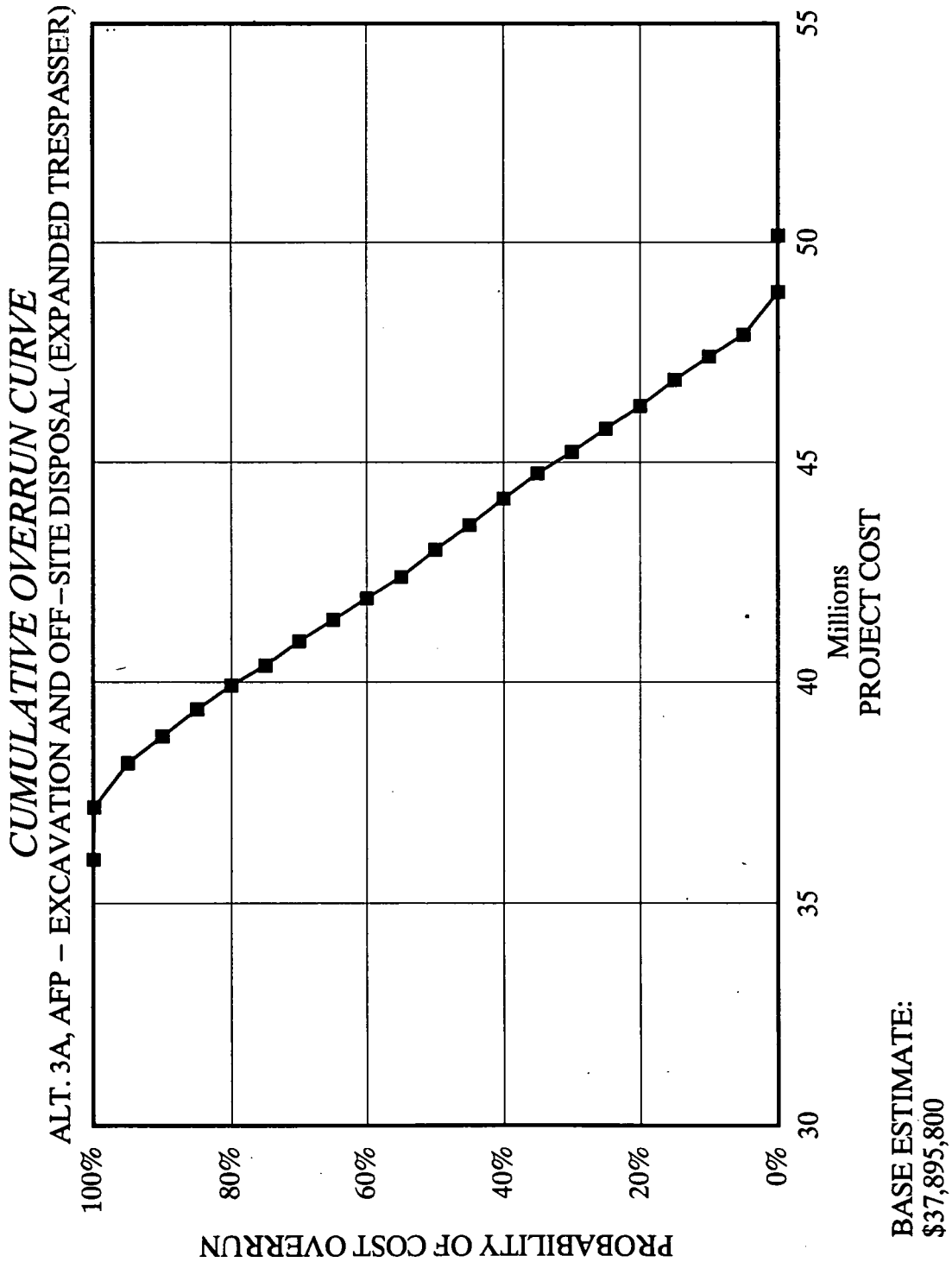
PROJECT: ALT. 3A, AFP – EXCAVATION AND OFF–SITE DISPOSAL (EXPANDED TRESPASSER)
CLIENT: DOE
CONTRACT: C2–94–07–05

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA–TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$64,660	–5.0%	$61,427	30%	$84,058	U		14%
2	SITE PREPERATION S/C	16,500	–5.0%	15,675	30%	21,450	U		14%
3	SITE PREPERATION MAT'L	94,190	–5.0%	89,481	20%	113,028	U		20%
4	DECON FACILITIES/SERVICES LABOR	5,940	–2.0%	5,821	80%	10,692	U		2%
5	DECON FACILITIES/SERVICES S/C	28,480	–6.0%	26,771	80%	51,264	U		7%
6	DECON FACILITIES/SERVICES MAT'L	6,060	–6.0%	5,696	60%	9,696	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	29,190	–5.0%	27,731	30%	37,947	U		14%
8	EROSION/SEDIMENT CNTRLS MAT'L	43,320	–5.0%	41,154	30%	56,316	U		14%
9	EXC/SORT/DRY OFF–SITE LBR	166,600	–6.0%	156,604	125%	374,850	U		5%
10	EXC/SORT/DRY OFF–SITE S/C	54,570	–10.0%	49,113	75%	95,498	U		12%
11	EXC/SORT/DRY OFF–SITE MTL	310	–10.0%	279	75%	543	U		12%
12	LOAD & HAUL OFF–SITE DISP LABOR	291,470	–1.0%	288,555	100%	582,940	U		1%
13	LOAD & HAUL OFF–SITE DISP MAT'L	31,650	–10.0%	28,485	50.0%	47,475	U		17%
14	GENERATED WASTE REMVL LABOR	21,730	–5.0%	20,644	50.0%	32,595	U		9%
15	SITE RESTORATION LABOR	90,400	–5.0%	85,880	30.0%	117,520	U		14%
16	SITE RESTORATION MAT'L	198,730	–5.0%	188,794	30.0%	258,349	U		14%
17	MONITORING WELLS S/C	237,600	–5.0%	225,720	50.0%	356,400	U		9%
18	INDIRECT FIELD COSTS LABOR	725,900	–5.0%	689,605	50.0%	1,088,850	U		9%
19	INDIRECT FIELD COSTS S/C	283,100	–5.0%	268,945	100.0%	566,200	U		5%
20	INDIRECT FIELD COSTS MAT'L	1,112,400	–5.0%	1,056,780	50.0%	1,668,600	U		9%
21	FIELD SUPPORT COSTS LABOR	441,400	–10.0%	397,260	30.0%	573,820	U		25%
22	FIELD SUPPORT COSTS S/C	31,191,000	–5.0%	29,631,450	30.0%	40,548,300	U		14%
23	FIELD SUPPORT COSTS MAT'L	996,100	–5.0%	946,295	30.0%	1,294,930	U		14%
24	ENGINEERING COSTS	1,555,100	–5.0%	1,477,345	25.0%	1,943,875	U		17%
25	SALES TAX MAT'L	209,400	–1.0%	207,306	1.0%	211,494	U		50%
26				0		0			0%
27				0		0			0%
28				0		0			0%
29				0		0			0%
30				0		0			0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$37,895,800		$35,992,815		$50,146,689			

5861


DISTRIBUTION OF 2,000 SAMPLES
ALT. 3A, AFP – EXCAVATION AND OFF-SITE DISPOSAL (EXPANDED TRESPASSER)
FREQUENCY
150
100
50
0
$37,049
$38,141
$39,233
$40,325
$41,417
$42,509
$43,601
$44,693
$45,785
$46,877
$47,969
$49,061
$50,153
PROJECT COST ($THOUSANDS)
AVERAGE
$43,062,221

001049


CUMULATIVE OVERRUN CURVE
ALT. 3A, AFP – EXCAVATION AND OFF–SITE DISPOSAL (EXPANDED TRESPASSER)
PROBABILITY OF COST OVERRUN
100%
80%
60%
40%
20%
0%
30
35
40
45
50
55
Millions
PROJECT COST
BASE ESTIMATE:
$37,895,800

001050

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, AFP – EXCAVATION & OFF-SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940705
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$37,895,800	BASE EST:	$64,660	BASE EST:	$16,500	BASE EST:	$94,190	BASE EST:	$5,940	BASE EST:	$28,480	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	30%					–1%	30%				
MATERIAL PRICING			–5%	25%	–10%	30%			–5%	30%	–5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							–1%	50%	–1%	50%	–1%	40%
(OTHER)												
TOTAL %	–5%	30%	–5%	25%	–10%	30%	–2%	80%	–6%	80%	–6%	60%
TOTAL $	$61,427	$84,058	$15,675	$20,625	$84,771	$122,447	$5,821	$10,692	$26,771	$51,264	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001051

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-5-193

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, AFP – EXCAVATION & OFF-SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940705
DATE: 08/06/94
BY: KEN.KEPLER
TASK # : 2CAF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$29,190	BASE EST:	$0	BASE EST:	$43,320	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$27,731	$43,785	$0	$0	$41,154	$56,316	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, AFP – EXCAVATION & OFF-SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940705
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$166,600	BASE EST:	$54,570	BASE EST:	$310	BASE EST:	$291,470	BASE EST:	$0	BASE EST:	$31,650
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	100%					-1%	100%				
MATERIAL PRICING			-1%	100%	-1%	100%					-5%	25%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-5%	25%	-5%	25%	-1%	100%	-5%	25%			-5%	25%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	125%	-6%	125%	-2%	200%	-6%	125%	0%	0%	-10%	50%
TOTAL $	$156,604	$374,850	$51,296	$122,783	$304	$930	$273,982	$655,808	$0	$0	$28,485	$47,475

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

001053

F-5-195

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3A, AFP – EXCAVATION & OFF–SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940705
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

	EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE LABOR $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE S/C $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001054

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, AFP – EXCAVATION & OFF-SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940705
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

	COMPOSAITE CAP LABOR $'s		COMPOSAITE CAP S/C $'s		COMPOSAITE CAP MAT'L. $'s		CLAY CAP LABOR $'s		CLAY CAP S/C $'s		CLAY CAP MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001055

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, AFP – EXCAVATION & OFF-SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940705
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$21,730	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$20,644	$32,595	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, AFP – EXCAVATION & OFF-SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940705
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$90,400	BASE EST:	$0	BASE EST:	$198,730	BASE EST:	$0	BASE EST:	$237,600	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$85,880	$117,520	$0	$0	$188,794	$258,349	$0	$0	$225,720	$356,400	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, AFP – EXCAVATION & OFF-SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940705
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

	INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS	
	LABOR $'s		S/C $'s		MAT'L. $'s		LABOR $'s		S/C $'s		MAT'L. $'s	
	BASE EST:	$725,900	BASE EST:	$283,100	BASE EST:	$1,112,400	BASE EST:	$441,400	BASE EST:	$31,191,000	BASE EST:	$996,100
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-10%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-5%	30%	-5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-10%	30%	-5%	30%	-5%	30%
TOTAL $	$689,605	$1,088,850	$268,945	$566,200	$1,056,780	$1,668,600	$397,260	$573,820	$29,631,450	$40,548,300	$946,295	$1,294,930
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3A, AFP – EXCAVATION & OFF-SITE DISPOSAL – (EXPANDED TRESPASSER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940705
DATE: 08/06/94
BY: KEN KEPLER
TASK # : 2CAF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$1,555,100	BASE EST:	$209,400	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-5%	25%										
(OTHER)												
TOTAL %	-5%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$1,477,345	$1,943,875	$207,306	$211,494	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

001059

5861

FEMP-OU02-5 DRAFT
August 24, 1994

F-5-201

5 861

DETAILED COST ESTIMATE

ALTERNATIVE 3 - EXCAVATION AND OFF-SITE DISPOSAL

B. PRIVATE OWNERSHIP (Residential Farmer)

001060

CONTR. NO.	4424321	CONTR.NO.	4424321
CLIENT	U.S.DEPT. OF ENERGY	EST.NO.	C29407_ _
PROJECT	ALT-3B - ALL QTY'S. - OFF-SITE TO ENVIROCARE - RESIDENT FARMER	DATE	24-Aug-94
LOCATION	FERNALD, OHIO	BY	KEN KEPLER
PROJ.CTL.	CRU2	TASK ID	2C _ _

OU2 FEASIBILITY STUDIES

	TOTAL ESTIMATE - CONSTANT 1994 DOLLARS					NET PRESENT VALUE: 37 YEAR STUDY PERIOD - 2.8% REAL DISC.RATE				
TITLE	CAPITAL COST	O & M DURING REMEDIATION	O & M POST REMEDIATION	TOTAL CONSTANT 1994 $'s	TOTAL UNIT COST PER BCY OF EXCAV.& GEN. WASTE	CAPITAL COST	O & M DURING REMEDIATION	O & M POST REMEDIATION	TOTAL NPV DOLLARS	TOTAL UNIT COST PER BCY OF EXCAV.& GEN. WASTE
ALT3B - SWL	$86,539,900			$86,539,900	$762.04	$73,765,900			$73,765,900	$649.55
ALT3B - SF	$238,312,300			$238,312,300	$635.29	$218,614,600			$218,614,600	$582.78
ALT3B - LSP	$62,229,200			$62,229,200	$674.39	$56,111,400			$56,111,400	$608.09
ALT3B - AFP	$54,209,500			$54,209,500	$649.01	$48,326,200			$48,326,200	$578.57
ALT3B - IFP	$78,243,300			$78,243,300	$697.81	$68,169,300			$68,169,300	$607.97
TOTAL ALT-3B	$519,534,200			$519,534,200	$668.97	$464,987,400			$464,987,400	$598.73

O & M POST REMEDIATION - 30 YEARS

TITLE	ANNUAL COST			FACILITY REVIEW	TOTAL
	YEAR 1	YEARS 2 - 5	YEARS 6 - 30	@ 5 YR. INTERV.'s	CONSTANT
FREQUENCY	1	4	25	6	'94 $'s
ALT3B - SWL					
ALT3B - SF					
ALT3B - LSP					
ALT3B - AFP					
ALT3B - IFP					
TOTAL ALT-3B					

F-5-203

001061

5861

FEMP-OU02-5 DRAFT
August 24, 1994

FERMCO ESTIMATING SERVICES

SUMMARY SHEET

EST FILE #: C29407_ _
CLIENT: US DOE
PROJECT TITLE: ALT-3B - EXCAVATION & OFF-SITE DISPOSAL
WBS#: 1.1.1.1.2.3. RESIDENT FARMER

DATE: 24-Aug-94
ESTIMATOR: KEN KEPLER
LOCATION: FERNALD
TASK#: 2C

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		OFF-SITE DISPOSAL - ENVIROCARE	346,488		5,897,200	5,235,400	2,552,100	$13,684,700
2								
3		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		346,488		$5,897,200	$5,235,400	$2,552,100	$13,684,700
11	SUPERVISION - CONTRACTOR				1,001,000			$1,001,000
12	SM TOOLS/CONSM'BLS						353,900	$353,900
13	EQUIPMENT RENTAL						9,125,200	$9,125,200
14	TEMP. FACILITIES				123,700		229,900	$353,600
15	TEMP UTL'S HOOK-UP				61,900		115,000	$176,900
16	JOB CLEAN-UP				123,700		229,900	$353,600
17	SAFETY				61,900		115,000	$176,900
18	HEALTH PHYSICS S/C				820,700		56,700	$877,400
19	CERCLA/SAT	$1,500 PER PERSON				202,500		$202,500
20	BOND					136,800		$136,800
21	OVERHEAD & PROFIT					2,379,800		$2,379,800
22	PAYRL BRD.&BENFT.				4,206,800			$4,206,800
	INDIRECT FIELD COSTS				$6,399,700	$2,719,100	$10,225,600	$19,344,400
	DIRECT & INDIRECT FIELD COSTS				$12,296,900	$7,954,500	$12,777,700	$33,029,100
23	TRANSPORTATION & BURIAL					307,402,000		$307,402,000
24	WASTE CONTAINERS						10,614,000	$10,614,000
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					288,800		$288,800
25	SCREENING & CONFIRMATION TESTING					23,168,300		$23,168,300
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				7,170,500			$7,170,500
	FERMCO FIELD SUPPORT COSTS				$7,170,500	$330,859,100	$10,614,000	$348,643,600
28	EMISSION MODELING				57,700		107,300	$165,000
29	PSAR/FSAR(SAFETY RPT)				1,263,100			$1,263,100
30	ENGINEERING	TITLE I&II , 5,746,300 TITLE III	6,075,100	CDR	2,250,100	DCR	1,404,700	$15,476,200
	ENGINEERING COSTS							$16,904,300
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				34,113,000	2,046,700
	SUB-TOTAL	(BASE ESTIMATE)						$400,623,700
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	14.8%						59,295,400
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$459,919,100
35	CONTINGENCY	14.9%						59,615,100
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$519,534,200

001062

PRELIMINARY

LOTUS31\FS2\INDALT3B.WK3 - FEASIBILITY STUDY

CONTR.NO. [redacted]24321
CLIENT [redacted]S. DEPT. OF ENERGY
PROJECT – ALT–3B – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C29407__
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2C

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
OFF–SITE DISPOSAL TO ENVIROCARE (RESIDENT FARMER)														
SITE PREPARATION	1	LS		19,983						346,490	75,000	191,950	497,210	$1,110,650
DECONTAMINATION FACILITIES/SERVICES	1	LS		1,766						32,180	136,450	7,470	32,860	$208,960
EROSION AND SEDIMENT CONTROLS	1	LS		6,109						113,200		36,750	215,590	$365,540
PERCHED GROUNDWATER COLLECTION	N/A													N/A
EXCAV./SORT/SHRED/DRY – OFFSITE DISPOSAL	1	LS		99,783						1,686,070	3,690,930	3,388,840	339,070	$9,104,910
LOAD/HAUL – OFF–SITE DISPOSAL	1	LS		150,404						2,556,200		3,627,560	143,850	$6,327,610
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE	1	LS	N/A											N/A
COMPOSITE LINER	1	LS	N/A											N/A
COMPOSITE CAP	1	LS	N/A											N/A
DIKE FOR DISPOSAL CELL	1	LS	N/A											N/A
GENERATED WASTE REMOVAL	1	LS		7,019						119,090		71,460		$190,550
SITE RESTORATION	1	LS		29,924						507,850		971,530	1,091,420	$2,570,800
MONITORING WELLS	1	LS									857,000			$857,000
SUB TOTAL (DIRECT FIELD COSTS)	1	LOT		314,988						$5,361,080	$4,759,380	$8,295,560	$2,320,000	$20,736,020
TAKE–OFF ALLOWANCE 10%	1	LOT		31,500						536,110	475,940	829,560	232,010	$2,073,620
TOTAL (DIRECT FIELD COSTS)	1	LOT		346,488						$5,897,200	$5,235,300	$9,125,100	$2,552,000	$22,809,600

Alt–3B – Excavation & Off–Site Disposal – Resident Farmer – SUMMARY

TABLE F.4-3

ALTERNATIVE 3 - EXCAVATION AND OFF-SITE DISPOSAL (ENVIROCARE) RESIDENT FARMER AND 10^{-6} RISK LEVEL REMEDIATION AND OFF-SITE DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Generated Waste Volume (yd^3)	Total Off-Site Disposal Volume (yd^3)	Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavation				
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total						
Solid Waste Landfill	96,700	1,700	98,400	13,800	112,200	3,000	115,200	5,300	7,000
Lime Sludge Ponds	81,600	0	81,600	8,200	89,800	3,000	92,800	0	7,100
Inactive Flyash Piles	91,700	9,200	100,900	10,100	111,000	3,000	114,000	4,000	6,900
South Field	338,900	500	339,400	34,000	373,400	3,000	376,400	6,500	11,000
Active Flyash Pile	74,900	0	74,900	7,500	82,400	3,000	85,400	0	700
Total	683,800	11,400	695,200	73,600	768,800	15,000	783,800	15,800	32,500

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

001064

LCC ANALYSIS TITLE:	SWL - EXCAVATE & OFF-SITE DISPOSAL - (RESIDENT FARMER)			
WBS NO.:	1.1.1.1.2.3.1		TASK NO.:	2CSW
ALTERNATIVE:	3B		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	37 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	08-Aug-94
DOCUMENT NO.:	LCC-94-03-01	EST. NO. C2-94-07-06/FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$0	$0	$0	$0	1997
$0	$0	$0	$0	1998
$18,544,264	$0	$0	$18,544,300	1999
$67,995,636	$0	$0	$67,995,600	2000
$0	$0	$0	$0	2001
$0	$0	$0	$0	2002
$0	$0	$0	$0	2003
$0	$0	$0	$0	2004
$0	$0	$0	$0	2005
$0	$0	$0	$0	2006
$0	$0	$0	$0	2007
$0	$0	$0	$0	2008
$0	$0	$0	$0	2009
$0	$0	$0	$0	2010
$0	$0	$0	$0	2011
$0	$0	$0	$0	2012
$0	$0	$0	$0	2013
$0	$0	$0	$0	2014
$0	$0	$0	$0	2015
$0	$0	$0	$0	2016
$0	$0	$0	$0	2017
$0	$0	$0	$0	2018
$0	$0	$0	$0	2019
$0	$0	$0	$0	2020
$0	$0	$0	$0	2021
$0	$0	$0	$0	2022
$0	$0	$0	$0	2023
$0	$0	$0	$0	2024
$0	$0	$0	$0	2025
$0	$0	$0	$0	2026
$0	$0	$0	$0	2027
$0	$0	$0	$0	2028
$0	$0	$0	$0	2029
$0	$0	$0	$0	2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$86,539,900	$0	$0	$86,539,900	TOTAL
$73,765,900	$0	$0	$73,765,900	<====(@NPV)

FEMP-OU02-5 DRAFT
August 24, 1994

F ERMC O
ESTIMATING SERVICES

EST FILE #: C2940706 | DATE: 08-Aug-94
CLIENT: US DOE | SUMMARY SHEET | ESTIMATOR: KEN KEPLER
PROJECT TITLE: ALT-3B, SWL - EXCAV. & OFF-SITE DISPOSAL - (RESIDENT FARMER) | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.1 | TASK#: 2CSW

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		OFF-SITE DISPOSAL TO ENVIROCARE BY RAIL	51,112		$873,000	$1,153,700	$458,000	$2,484,700
		EXCAVATE, SORT, DRY, SHRED/CRUSH, LOAD, HAUL						
2		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10								
				AVG				
	DIRECT FIELD COSTS		51,112		$873,000	$1,153,700	$458,000	$2,484,700
11	SUPERVISION - CONTRACTOR				$148,000			$148,000
12	SM TOOLS/CONSM'BLS						$52,400	$52,400
13	EQUIPMENT RENTAL						$1,274,600	$1,274,600
14	TEMP. FACILITIES				$18,300		$34,000	$52,300
15	TEMP UTL'S HOOK-UP				$9,200		$17,000	$26,200
16	JOB CLEAN-UP				$18,300		$34,000	$52,300
17	SAFETY				$9,200		$17,000	$26,200
18	HEALTH PHYSICS S/C				$124,500		$8,900	$133,400
19	CERCLA/SAT	$1,500 PER PERSON				$45,000		$45,000
20	BOND					$24,800		$24,800
21	OVERHEAD & PROFIT					$388,800		$388,800
22	PAYRL BRD.&BENFT.				$624,300			$624,300
	INDIRECT FIELD COSTS				$951,800	$458,800	$1,437,900	$2,848,300
	DIRECT & INDIRECT FIELD COSTS				$1,824,800	$1,612,300	$1,895,900	$5,333,000
23	TRANSPORTATION & BURIAL					$45,018,100		$45,018,100
24	WASTE CONTAINERS						$1,554,200	$1,554,200
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$9,000		$9,000
25	SCREENING & CONFIRMATION TESTING					$3,350,000		$3,350,000
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$1,109,300			$1,109,300
	FERMCO FIELD SUPPORT COSTS				$1,109,300	$48,377,100	$1,554,200	$51,040,600
28	EMISSION MODELING				$9,300		$17,300	$26,600
29	PSAR/FSAR(SAFETY RPT)				$256,000			$256,000
30	ENGINEERING	TITLE I&II $943,900 TITLE III	$1,061,300	CDR	$517,300	DCR	$202,700	$2,725,200
	ENGINEERING COSTS							$3,007,800
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$5,021,600	$301,300
	SUB-TOTAL	(BASE ESTIMATE)						$59,682,700
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	21.0%						$12,533,400
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$72,216,100
35	CONTINGENCY	24.0%						$14,323,800
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$86,539,900

001066

PRELIMINARY

LOTUS31\FS2\ALT3B\SWL\INDSUM.WK3 - FEASABILITY STUDY

DATE: 08-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

ALT-3B, SWL - EXCAV. & OFF-SITE DISPOSAL - (RESIDENT FARMER)
WBS#:
1.1.1.1.2.3.1

EST.NO.: C2940706
EST. : KEN KEPLER
TASK I.D. :
2CSW

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS) *	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	53	$680	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	53	$1,270	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	53	$280	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	53	$300	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	53	$320	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	53	$190	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	53	$3,710	C/B		
SUB-TOTAL		31.80	4		$6,750			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	8		$100	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	8		$180	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	8		$1,390	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$2,150			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$8,900			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

001067

DATE: 08-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940706

ALT-3B, SWL - EXCAV. & OFF-SITE DISPOSAL - (RESIDENT FARMER)

EST. : KEN KEPLER

WBS#:
1.1.1.1.2.3.1

TASK I.D. :
2CSW

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	30	120	$16.97	$2,040		
ANNUAL PHYSICALS	1	3	30	90	$16.97	$1,530		
EXIT (TERMINATION) PHYSICALS	1	4	30	120	$16.97	$2,040		
SUB-TOTAL						$5,610		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	14	1	30	427	$16.97	$7,250		
YEARLY IN-VIVO	1	4	30	120	$16.97	$2,040		
EXIT (END OF PROJECT / TERMINATION)	1	4	30	120	$16.97	$2,040		
SUB-TOTAL						$11,330		
WORK DELAYS CAUSED BY MONITORING	5%				$1,076,000	$53,800		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$1,076,000	$53,800		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$124,500	$8,900	$133,400

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT-3B, SWL – EXCAV. & OFF-SITE DISPOSAL – (RESIDENT FARMER)
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CSW

WBS NO. – 1.1.1.1.2.3.1
EST. NO. – C2940706
BY – K. KEPLER
DATE – 07/21/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	30-Jun-94	01-Jul-99	30-Jan-2000	31-Aug-2000	14	MONTHS

EST.DATE TO MID-POINT OF ACTIVITY	
67	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

APPENDIX E

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.1

EST.NO. C2940706
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CSW

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR) CAR	LINER	COVER	CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE TONS/CY	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS 141: $80.15 PER TON (90 TON MIN.) TONS	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	$120 DEMURAGE $/DAY (>6 DAYS)	ENVIROCARE BURIAL COSTS (1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 125, 141, or 200 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

001070

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.1

EST.NO. C2940706
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CSW

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C – D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0

INPUT

001071

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.1

EST.NO. C2940706
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CSW

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	140250.0	1922	$23,816	$45,774,400	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	1569.0	33	$24,180	$797,900	$493.47		
						**			

INPUT

** **NOTE:**
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

001072

CONTR.NO. [redacted]24321
CLIENT [redacted]S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940706
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
OFF–SITE DISPOSAL TO ENVIROCARE (RESIDENT FARMER)														
SITE PREPARATION	1	LS		3,490						$61,140	$15,000	$29,080	$87,470	$192,690
DECONTAMINATION FACILITIES/SERVICES	1	LS		419						$7,610	$29,880	$1,630	$8,050	$47,170
EROSION AND SEDIMENT CONTROLS	1	LS		1244						$22,710		$6,320	$63,600	$92,630
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT/SHRED/DRY – OFFSITE DISPOSAL	1	LS		14765						$250,910	$780,940	$496,000	$113,080	$1,640,930
LOAD/HAUL – OFF–SITE DISPOSAL TO ENVIROCARE	1	LS		21995						$374,000		$514,730	$28,770	$917,500
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE (Onsite)	N/A													N/A
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	N/A													N/A
DIKE	N/A													N/A
GENERATED WASTE REMOVAL	1	LS		1372						$23,270		$13,440		$36,710
SITE RESTORATION	1	LS		3180						$53,980		$97,480	$115,430	$266,890
MONITORING WELLS	1	LS									$223,000			$223,000
SUB–TOTAL (DIRECT FIELD COSTS)				46465						$793,620	$1,048,820	$1,158,680	$416,400	$3,417,520
TAKE–OFF ALLOWANCE 10%	1	LS		4,647						$79,360	$104,880	$115,870	$41,640	$341,750
TOTAL (DIRECT FIELD COSTS)	1	LS		51,112						$873,000	$1,153,700	$1,274,600	$458,000	$3,759,300

OFF–Site Disposal of SWL to ENVIROCARE – SUMMARY

PAGE 1 of 15

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940706
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
a. Construction Survey		1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing		1500	LF	0.213	412	16.97				6.25	$6,990			$9,660	$16,650
c. Clear and Grub															
i. Remediation Site		3.35	AC	41.40	179	16.97			2575.00		$3,040		$8,890		$11,930
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Storage Area, &/or Staging Area @ Sub–unit															
d. Dewatering															
i. Excavate Dewatering Trench		233	CY	0.50	150	16.97			1.49		$2,550		$360		$2,910
ii. Pump – w/4" Suction Hose		100	DAYS	3.00	387	16.97			19.55		$6,570		$2,010		$8,580
iv. HDPE Pipe to Sedimentation Tank		400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip		1	CY	4.00	5	16.97			100.00		$80		$100		$180
e. General Grading															
i. New Roads		6400	SY	0.001	8	16.97			0.07		$140		$460		$600
	50%														
ii. Office/Parking Area	2222	1111	SY	0.010	14	16.97			0.32		$240		$370		$610
iii. Const.Equip.Decon.Pad Area	234	117	SY	0.010	2	16.97			0.32		$30		$40		$70
iv. Pers.Decon.Pad Area	14	7	SY	0.010		16.97			0.32						
vi. Staging Area @ Sub–Unit	2845	1423	SY	0.010	18	16.97			0.32		$310		$470		$780
f. Surfacing/Paving/Concrete Slab															
i. New Roads – 8" Gravel W/Geotextile		5334	SY	0.030	206	16.97			1.08	6.66	$3,500		$5,930	$36,590	$46,020
	50%														
ii. Office/Parking – 8" Gravel W/ Geot	2222	1111	SY	0.030	43	16.97			1.08	6.66	$730		$1,240	$7,620	$9,590
iii. Staging Area @ Sub–Unit – 160' x160' Concrete															
Sub–Grade & Sub–Base for Conc	2845	1423	SY	0.041	75	16.97			1.45	5.51	$1,270		$2,120	$8,070	$11,460
Concrete Slab 160 x 160' x 8"thk.	631	316	CY	4.07	1656	17.98			18.38	67.00	$29,770		$5,970	$21,770	$57,510
Concrete Curb – 2'h x 480 lf x 8" tl	24	12	CY	15.30	237	17.98			69.08	275.90	$4,260		$850	$3,410	$8,520
HDPE Perf.Sub–grade Piping – 4"	500	250	LF	0.21	68	17.98			0.74	3.02	$1,220		$190	$780	$2,190
Epoxy Coating	2845	1423	SY	0.22	404	17.98			0.77	7.56	$7,260		$1,130	$11,080	$19,470
Backfill & Compact around Slab	183	92	ICY	0.086	10	17.98			1.38		$180		$130		$310
Mob/Demob.Equip.	1	1	LS	2.00	1	17.98			184.00		$20		$90		$110
TOTAL (SITE PREPARATION)		1	LS		3,490						$61,140	$15,000	$29,080	$87,470	$192,690

Site Preparation Details

FEMP-OU02-5 DRAFT August 24, 1994

001074

CONTR.NO. [redacted]24321
CLIENT [redacted]S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940706
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
	50%														
a. Decon Trailer – Rental	39	20	MO					1500.00				$29,250			$29,250
b. Construction Equipment Decon. Facility															
25 ft x 60 ft	50%														
i. Excavation – Structural	175	88	BCY	0.021	2	16.97			0.64		$30		$60		$90
ii. Sub–grade Prep.	167	84	SY	0.041	4	16.97		6.75	1.45	5.51	$70	$580	$120	$470	$1,240
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	8	SF	0.32	3	19.21			0.73	12.55	$60		$10	$100	$170
Metal Grating 2 ft wide x 25 lf	25	13	LF	0.53	9	19.21			1.86	46.67	$170		$20	$600	$790
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	20	CY	4.07	102	17.98			14.25	67.00	$1,830		$290	$1,350	$3,470
Decon Pad Trench – 2'x2'i.d.x 25l	5	3	CY	28.22	91	17.98			98.77	202.30	$1,640		$250	$520	$2,410
Decon Pad Curb – 6" x 6" x 120 lf	5	3	CY	15.30	49	17.98			53.55	275.90	$880		$140	$710	$1,730
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	2	17.98			37.24	97.20	$40		$10	$20	$70
Epoxy Coating	167	84	SY	0.22	24	17.00			0.77	7.56	$410		$70	$650	$1,130
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	1	EA	12.00	8	17.98			100.00	525.00	$140		$50	$270	$460
vi. HDPE Piping 2" X 4"	100	50	LF	0.38	25	19.95			5.11	4.42	$500		$260	$230	$990
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Gu:	720	360	SF	0.04	17	16.97			0.03	1.55	$290		$10	$570	$870
4" x 4" x 9'–6" Wood Posts set in (	27	14	EA	0.480	8	16.97			1.68	5.75	$140		$20	$80	$240
viii. Air Diaphragm Pump 50 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$400	$630
ix. Suction and Discharge Piping 2"	10	5	LF	0.11	1	19.95			0.39	0.84	$20				$20
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	2	LF	0.47	1	19.95			1.65	14.91	$20			$20	$40
	BCY														
x. Backfill & Compaction	129														
around concrete slab	ICY														
	155	78	ICY	0.086	9	16.97			1.38		$150		$110		$260
SUB–TOTAL (EQUIP. DECON. FACILITY)					365						$6,590	$29,830	$1,450	$5,990	$43,860

Equipment Decon. Facility Details

001075

1861

F-5-217

FEMP-OU02-5 DRAFT August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940706
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	COST/UNIT RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
c. Personnel Decon. Facility	50%														
i. Excavation – Structural	19	10	BCY	0.021		16.97			0.64				$10		$10
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric, – Gravel, & Compact Sub–grade	14	7	SY	0.041		16.97		6.75	1.45	5.51		$50	$10	$40	$100
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	2	SF	0.32	1	16.97			0.73	12.55	$20			$30	$50
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	1	CY	4.07	4	17.98			14.25	67.00	$70		$10	$50	$130
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	6	17.98			111.44	250.70	$110		$20	$40	$170
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	4	17.98			53.55	275.90	$70		$10	$60	$140
Epoxy Coating	14	7	SY	0.22	2	17.00			0.77	7.56	$30		$10	$50	$90
v. Corrugated Fiberglass Splash Gua	132	66	SF	0.04	3	16.97			0.03	1.55	$50			$110	$160
4" x 4" x 9'–6" Wood Posts set in (	6	3	EA	0.480	2	16.97			1.68	5.75	$30		$10	$20	$60
vi. Pump 20 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$410	$640
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	1	LS	32.00	21	19.95			112.00	2500.00	$420		$60	$1,250	$1,730
viii. Backfill & Compaction around concrete slab	BCY 17 ICY 20	10	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		54						$1,020	$50	$180	$2,060	$3,310
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		419						$7,610	$29,880	$1,630	$8,050	$47,170

Personnel Decon.Facilities/Services Details

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CONTR.NO. [redacted]24321
CLIENT – [redacted]S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940706
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	880	LF	0.017	19	16.97			0.06	0.65	$320		$50	$590	$960
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	500	EA	0.24	155	16.97			1.53	1.35	$2,630		$790	$700	$4,120
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 300 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. Sedimentation/Decon. Tank 10000 gal	1	LS	53.40	69	19.95			186.90	7100.00	$1,380		$190	$7,310	$8,880
iv. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	800	LF	0.38	393	19.95			5.11	4.42	$7,840		$4,090	$3,540	$15,470
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	5	EA	8.00	52	16.97			28.00	8300.00	$880		$140	$41,500	$42,520
vi. 50 gal. Pump Includes Controls & Electrical	2	EA	60.00	155	16.97			210.00	2500.00	$2,630		$420	$5,000	$8,050
TOTAL (EROSION & SEDIMENT CONTROL)	1	LOT		1,244						$22,710		$6,320	$63,600	$92,630

Erosion Control Details

FEMP-OU02-5 DRAFT
August 24, 1994

F-5-219

001077

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LCC ANALYSIS TITLE:	AFP - EXCAVATE & OFF-SITE DISPOSAL - (EXPANDED TRESPASSER)			
WBS NO.:	1.1.1.1.2.3.4		TASK NO.:	2CAF
ALTERNATIVE:	3A		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	36 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	07-Aug-94
DOCUMENT NO.:	LCC-94-03-03	EST. NO. C2-94-07-05 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$7,989,700	$0	$0	$7,989,700	1997
$23,969,100	$0	$0	$23,969,100	1998
$15,979,400	$0	$0	$15,979,400	1999
$0	$170,341	$0	$170,300	2000
$0	$148,912	$0	$148,900	2001
$0	$148,912	$0	$148,900	2002
$0	$148,912	$0	$148,900	2003
$0	$168,912	$0	$168,900	2004
$0	$82,912	$0	$82,900	2005
$0	$82,912	$0	$82,900	2006
$0	$82,912	$0	$82,900	2007
$0	$82,912	$0	$82,900	2008
$0	$102,912	$0	$102,900	2009
$0	$82,912	$0	$82,900	2010
$0	$82,912	$0	$82,900	2011
$0	$82,912	$0	$82,900	2012
$0	$82,912	$0	$82,900	2013
$0	$102,912	$0	$102,900	2014
$0	$82,912	$0	$82,900	2015
$0	$82,912	$0	$82,900	2016
$0	$82,912	$0	$82,900	2017
$0	$82,912	$0	$82,900	2018
$0	$102,912	$0	$102,900	2019
$0	$82,912	$0	$82,900	2020
$0	$82,912	$0	$82,900	2021
$0	$82,912	$0	$82,900	2022
$0	$82,912	$0	$82,900	2023
$0	$102,912	$0	$102,900	2024
$0	$82,912	$0	$82,900	2025
$0	$82,912	$0	$82,900	2026
$0	$82,912	$0	$82,900	2027
$0	$82,912	$0	$82,900	2028
$0	$102,912	$0	$102,900	2029
				2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$47,938,200	$2,958,800	$0	$50,896,600	TOTAL
$42,735,500	$1,802,100	$0	$44,537,300	<====(@NPV)

CONTR.NO. [redacted]4321
CLIENT – [redacted]S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940706
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE/SORT/DRY														
FOR OFF–SITE DISPOSAL TO ENVIROCARE														
EXCAVATION														
Excavate Contaminated Soil	96700	BCY	0.055	6,861	16.97			1.17		$116,430		$113,140		$229,570
Excavate Additional Soil	13800	BCY	0.055	979	16.97			1.17		$16,610		$16,150		$32,760
Sort Contaminated Soil BCY 110500	138125	LCY	0.033	5,880	16.97			2.58		$99,780		$356,360		$456,140
Low Level Thermal Destruction Unit BCY 7000	11156	TON					70.00				$780,940			$780,940
Sub–contract cost for Drying Operation and moisture test Only.														
(SHREDDING COMMON TO SWL,IFP & SF)														
Shredder/Crusher – Purchase/Install 33.3%	0.33	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY 5300														
Generated Waste BCY 1364														
Excavated Debris TONS 8447														
(Percent of Ge.Waste to be Shredded) 25%														
Generated Waste TONS 784														
TOTAL TONS 9231														
Operating Costs	154	HRS							25.75				$4,080	$4,080
(2) Operators	308	HRS	1.00	397	16.97					$6,740				$6,740
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil BCY 1700	1700	BCY	0.055	121	16.97			1.17		$2,050		$1,990		$4,040
Sort Contaminated Soil	2125	LCY	0.033	90	16.97			2.58		$1,530		$5,480		$7,010
			S/T	211										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	211	HRS	150%	317	16.97					$5,380				$5,380
			S/T	528										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) SEE APPENDIX C	53	MD												
BCY = BANK CUBIC YARDS : The Volume of 1 Cubic Yard of material in its natural state OR Volume/Void to be filled.														
LCY = LOOSE CUBIC YARDS (w/Swell Factor) Volume of material after being excavated.														
ICY = IN–PLACE CUBIC YARDS (w/Shrinkage Factor) Volume of material it takes to fill a 1 Cubic Yard space.														
TOTAL (EXCAVATE/SORT/DRY)	1	LS		14,765						$250,910	$780,940	$496,000	$113,080	$1,640,930

Excavate/Sort/Dry Details

001079

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940706
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
LOAD & HAUL FOR OFF–SITE DISPOSAL TO ENVIROCARE															
(ITEMS @ 20% ARE COMMON TO SWL,LSP,SF,AFP & IFP)															
Install Loading Equipment for LLW	20%														
Hopper	1	0.20	EA	177.0	35	16.97	3000.00			6000.00	$590			$1,200	$1,790
Loading Conveyor	1	0.20	EA	147.0	29	16.97	2500.00			8500.00	$490			$1,700	$2,190
Scale	1	0.20	EA	589.0	118	16.97	10000.00			15000.00	$2,000			$3,000	$5,000
Railroad Loading Facility	20%														
a. 160' x 160 'Concrete Pad															
i. Clear & Grub	1	0.12	AC	41.40	6	16.97			2575.00		$100		$320		$420
ii. Grading	2845	569.00	SY	0.010	7	16.97			0.32		$120		$190		$310
iii. Sub–Grade & Sub–Base for Conc.Slab	2845	569.00	SY	0.041	30	16.97			1.45	5.51	$510		$850	$3,230	$4,590
iv. Concrete Slab 160 x 160' x 8"thk.	631	126.20	CY	4.07	663	17.98			18.38	67.00	$11,920		$2,390	$8,710	$23,020
v. Concrete Curb – 2'h x 480 lf x 8" thk.	24	4.80	CY	15.30	95	17.98			69.08	275.90	$1,710		$340	$1,360	$3,410
vi. Wood Ties, Ballast, 100# Rail Derailer, Turnout, Bumper Car Stops	600	120.00	LF	1.06	164	16.97			4.43	77.40	$2,780		$550	$9,570	$12,900
vii. Grading for track	800	160.00	SY	0.010	2	16.97			0.32		$30		$50		$80
HAUL															
From excavation site to rail loading facility 6 CY dump truck 1/2 mi r.t.		140250	LCY	0.041	7,418	16.97			1.65		$125,880		$231,410		$357,290
LOADING GONDOLA	LCY														
Excavated level D, C & Additional =	140250														
Allowable CY's of waste per Gondola	73.0														
Install Liner in Gondola car		1922	EA	0.75	1,860	16.97			32.21		$31,560		$61,910		$93,470
Load Gondola – 6/day, 2 workers		320	DAYS	16.00	6,612	16.97			15.00		$112,210		$4,810		$117,020
Seal liner, Install Cover		1922	EA	0.75	1,860	16.97			32.21		$31,560		$61,910		$93,470
Dust control – light		300	DAYS	8.00	3,096	16.97			500.00		$52,540		$150,000		$202,540
(RSO takes ownership at this time.) (See: Off–Site Disposal Wksht. and Appendix E)															
TOTAL (LOAD & HAUL OFF–SITE DISPOSAL)		1	LS		21,995						$374,000		$514,730	$28,770	$917,500

Offsite Load/Haul/Disposal Details

CONTR.NO. [redacted]4321
CLIENT – [redacted]S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940706
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ENVIROCARE															
Demo. /Load/Haul to rail loading facility															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
(ITEMS @ 20% ARE COMMON TO SWL,LSP,SF,AFP & IFP)															
a. Office/Parking Area	50%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	247	BCY	0.292	93	16.97			9.16		$1,580		$2,330		$3,910
Geo–Fabric & Liner	2222	1111	SY	0.002	3	16.97			0.02		$50		$20		$70
Haul & Dump Rubble	185	93	BCY	0.30	36	16.97			2.51		$610		$240		$850
b. Const.Equip.Decon Area @ Excav.Sit	50%														
Demo/Remove Concrete	49.3	25	BCY	1.2	38	16.97			3.62		$640		$90		$730
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	14	BCY	0.292	5	16.97			9.16		$80		$130		$210
Geo–Fabric & Liner	167	84	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	27	14	EA	0.48	8	16.97			1.68		$140		$20		$160
Splash Guard	702	351	SF	0.04	18	16.97			0.03		$310		$10		$320
Haul & Dump Rubble	24.9	12	BCY	0.30	5	16.97			2.51		$80		$30		$110
c. Personnel Decon. Area @ Excav. Site	50%														
Demo/Remove Concrete	2.2	1	BCY	1.2	2	16.97			3.62		$30				$30
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo–Fabric & Liner	14	7	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	6	3	EA	0.48	2	16.97			1.68		$30		$10		$40
Splash Guard	132	66	SF	0.04	3	16.97			0.03		$50				$50
Haul & Dump Rubble	3.5	2	BCY	0.30	1	16.97			2.51		$20				$20
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		216						$3,660		$2,890		$6,550

Generated Waste Removal Details

FEMP-OU02-5 DRAFT
August 24, 1994

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST.NO. C2940706
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ENVIROCARE (CON'T.)															
Demo. /Load/Haul to rail loading facility															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
(ITEMS @ 20% ARE COMMON TO SWL,LSP,SF,AFP & IFP)															
d. Staging Area @ S/U	50%														
Demo/Remove Concrete	655	328	BCY	1.2	507	16.97			3.62		$8,600		$1,220		$9,820
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	474	237	BCY	0.292	89	16.97			9.16		$1,510		$2,240		$3,750
Geo–Fabric & Liner	SY 2844	1422	SY	0.002	1	16.97			0.02		$20		$30		$50
Haul & Dump Rubble	316	158	BCY	0.30	61	16.97			2.51		$1,040		$410		$1,450
d. Staging Area @ Rail Siding	20%														
Demo/Remove Concrete	655	131	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	474	95	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Geo–Fabric & Liner	SY 2844	569	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	105	21	BCY	0.30	8	16.97			2.51		$140		$50		$190
LOADING GONDOLA	BCY														
Generated Waste	1364														
Plus a swell factor of 15%	1569														
Allowable CY's of waste per Gondola	49.0														
Install Liner in Gondola car		33	EA	0.75	32	16.97			32.21		$540		$1,060		$1,600
Load Gondola – 6/day, 2 workers		6	DAYS	16.00	124	16.97			15.00		$2,100		$90		$2,190
Seal liner, Install Cover		33	EA	0.75	32	16.97			32.21		$540		$1,060		$1,600
Dust control – light		6	DAYS	8.00	62	16.97			500.00		$1,050		$3,000		$4,050
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,156						$19,610		$10,550		$30,160
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,372						$23,270		$13,440		$36,710

Generated Waste Removal Details

PAGE 9 of 15

CONTR.NO. [redacted]4321
CLIENT – [redacted]S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940706
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
Solid Waste Landfill	15600	18720	ICY	0.09	2173	16.97			3.21	3.50	$36,880		$61,890	$67,490	$166,260
	50%														
Office/Parking	494	296	ICY	0.09	34	16.97			3.21	3.50	$580		$980	$1,070	$2,630
Const.Equip.Decon.Area	78	47	ICY	0.09	5	16.97			3.21	3.50	$80		$150	$170	$400
Personnel Decon.Area	7	4	ICY	0.09		16.97			3.21	3.50			$10	$20	$30
Staging Area at Sub–Unit	475	285	ICY	0.09	33	16.97			3.21	3.50	$560		$940	$1,030	$2,530
b. Final Grade for SWL (Excludes Cap)		7333	SY	0.02	189	16.97			0.70		$3,210		$5,290		$8,500
c. Borrow Top Soil 6" Thk., Spread															
Solid Waste Landfill		7333	SY	0.036	341	16.97			2.33	2.88	$5,790		$17,600	$21,750	$45,140
	50%														
Office/Parking	2222	1333	SY	0.036	62	16.97			2.33	2.88	$1,050		$3,200	$3,950	$8,200
Const.Equip.Decon.Area	234	140	SY	0.036	7	16.97			2.33	2.88	$120		$340	$420	$880
Personnel Decon.Area	14	8	SY	0.036		16.97			2.33	2.88			$20	$20	$40
Staging Area at Sub–Unit	2845	1707	SY	0.036	79	16.97			2.33	2.88	$1,340		$4,100	$5,060	$10,500
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Solid Waste Landfill	7333	66	MSF	0.30	26	16.97			6.75	25.00	$440		$460	$1,700	$2,600
	50%														
Office/Parking	2222	20	MSF	0.30	8	16.97			6.75	25.00	$140		$140	$520	$800
Const.Equip.Decon.Area	234	2	MSF	0.30	1	16.97			6.75	25.00	$20		$10	$50	$80
Personnel Decon.Area	14		MSF	0.30		16.97			6.75	25.00					
Staging Area at Sub–Unit	2845	26	MSF	0.30	10	16.97			6.75	25.00	$170		$180	$670	$1,020
e. Security Fence – 6ga aluminized – 6' high		1080	LF	0.13	178	16.97			1.64	9.80	$3,020		$1,820	$10,900	$15,740
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		2	PR	10.00	26	16.97			133.00	240.00	$440		$270	$490	$1,200
TOTAL (SITE RESTORATION)		1	LOT		3,180						$53,980		$97,480	$115,430	$266,890

Site Restoration Details

F-5-225
FEMP-OU02-5 DRAFT
August 24, 1994
5861
001083

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940706
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at Restoration Site: 8 Pairs x 120 ft.	8	PAIR					23,000				$184,000			$184,000
b. Abandon Existing Wells	3	EA					13,000				$39,000			$39,000
TOTAL (MONITORING WELLS)	1	LOT									$223,000			$223,000

001084

F-5-226

FEMP-OU02-5 DRAFT
August 24, 1994

Monitoring Wells Details

CONTR.NO. [redacted]4321
CLIENT – [redacted]S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940706
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO														
PURCHASE														
Bulk Gondola Rail Car N/A	0	EA												
Liner for Gondola														
Excavated Waste – level C,D & Additional	1922	EA							400.00				$768,800	$768,800
Excavated Waste – lead/soil N/A	0	EA												
Generated Waste –	33	EA							400.00				$13,200	$13,200
Cover for Gondola														
Excavated Waste – level C,D & Additional	1922	EA							395.00				$759,190	$759,190
Excavated Waste – lead/soil N/A	0	EA												
Generated Waste –	33	EA							395.00				$13,040	$13,040
TOTALS FORWARD TO No. 24 ESTIMATE SUMMARY														
TOTAL (PURCHASE COSTS by FERMCO)	1	LOT											$1,554,200	$1,554,200

001085

Purchase Cost by FERMCO Details

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940706
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF–SITE TRANSPORTATION COST TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas's	1955	EA					340.00				$664,700			$664,700
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additional	1922	EA					22681.00				$43,592,880			$43,592,880
Excavated Waste – lead/soil N/A	0	EA												
Generated Waste –	33	EA					23045.00				$760,490			$760,490
TOTALS FORWARD TO No. 23 ESTIMATE SUMMARY														
TOTAL (OFF–SITE DISPOSAL COST)	1	LOT									$45,018,100			$45,018,100

001086

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FEMP-OU02-5 DRAFT
August 24, 1994

Off–Site Transportation Cost to ENVIROCARE Details

CONTR.NO. [redacted]4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940706
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	45000	GAL					0.01				$500			$500
Runnoff from the Exclusion Zone.	850000	GAL					0.01				$8,500			$8,500
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$9,000			$9,000

Waste Water Treatment Operations Cost Details

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FEMP-OU02-5 DRAFT
August 24, 1994

1861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SWL – EXCAVATION & OFFSITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940706
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTS														
Excavation														
Full TCLP	561	EA					2,002				$1,123,100			$1,123,100
Rad	561	EA					2,000				$1,122,000			$1,122,000
Confirmatory Tests														
Full Rad Test	280	EA					3,101				$868,300			$868,300
Full HSL	30	EA					1,500				$45,000			$45,000
Full TCLP	30	EA					2,000				$60,000			$60,000
2 Technician per month	10	MO					13,163				$131,600			$131,600
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS)	1	LOT									$3,350,000			$3,350,000

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Screening & Confirmation Testing Details

PAGE 15 of 15

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

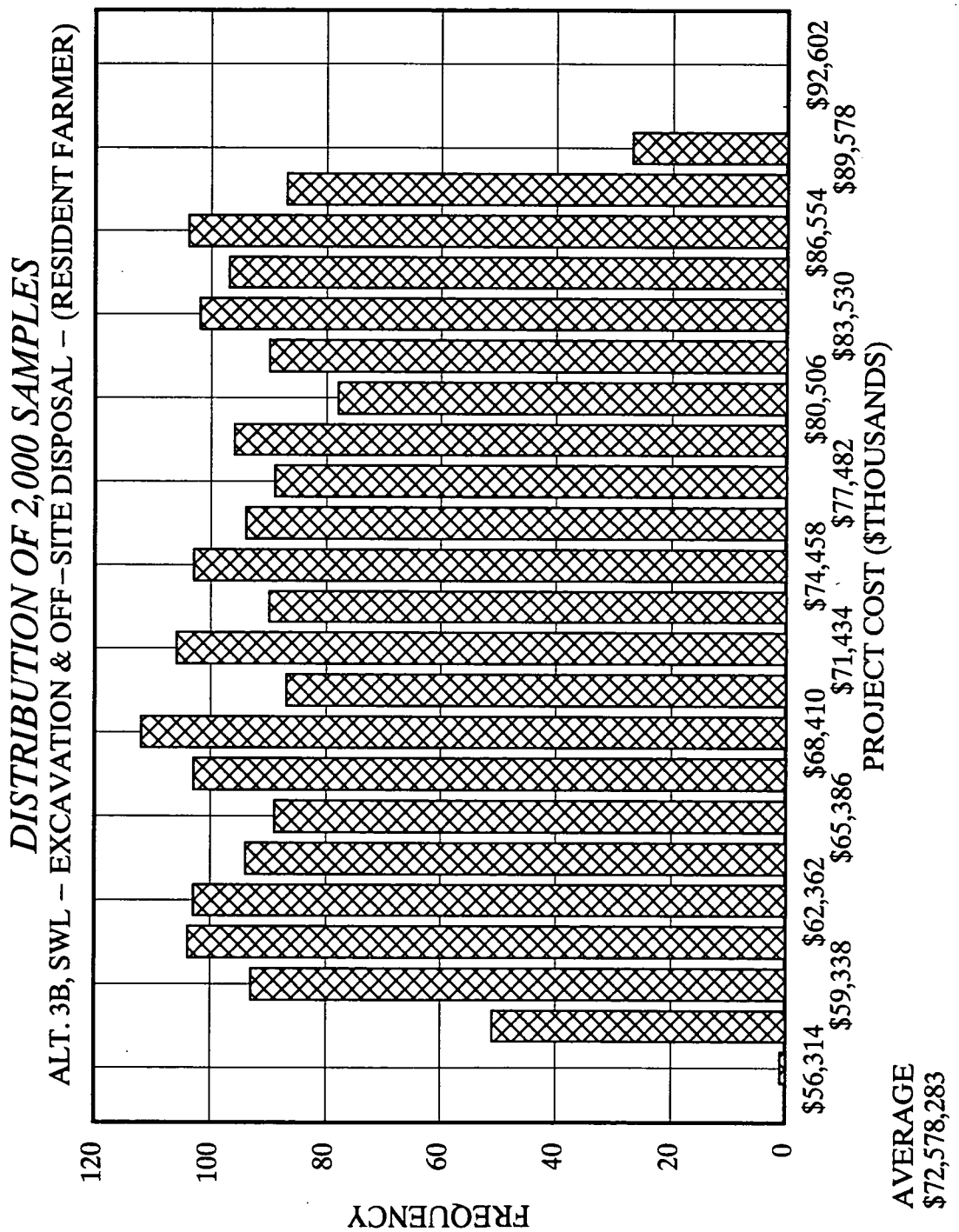
PROJECT: ALT. 3B, SWL – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARME
CLIENT: DOE DATE: 08–Aug–94
CONTRACT: C2–94–07–06 BASE ESTIMATE: $59,682,700

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$91,171,783	$31,489,083	52.8%
0.05%	$89,280,888	$29,598,188	49.6%
5.00%	$86,750,683	$27,067,983	45.4%
10.00%	$85,306,789	$25,624,089	42.9%
15.00%	$83,775,042	$24,092,342	40.4%
20.00%	$82,265,915	$22,583,215	37.8%
25.00%	$80,675,369	$20,992,669	35.2%
30.00%	$78,775,940	$19,093,240	32.0%
35.00%	$77,188,796	$17,506,096	29.3%
40.00%	$75,557,764	$15,875,064	26.6%
45.00%	$73,959,739	$14,277,039	23.9%
50.00%	$72,333,551	$12,650,851	21.2%
55.00%	$70,785,819	$11,103,119	18.6%
60.00%	$69,183,083	$9,500,383	15.9%
65.00%	$67,783,512	$8,100,812	13.6%
70.00%	$66,332,286	$6,649,586	11.1%
75.00%	$64,819,368	$5,136,668	8.6%
80.00%	$63,109,327	$3,426,627	5.7%
85.00%	$61,745,017	$2,062,317	3.5%
90.00%	$60,104,547	$421,847	0.7%
95.00%	$58,618,037	($1,064,663)	–1.8%
99.95%	$56,333,774	($3,348,926)	–5.6%
100.00%	$54,145,827	($5,536,873)	–9.3%

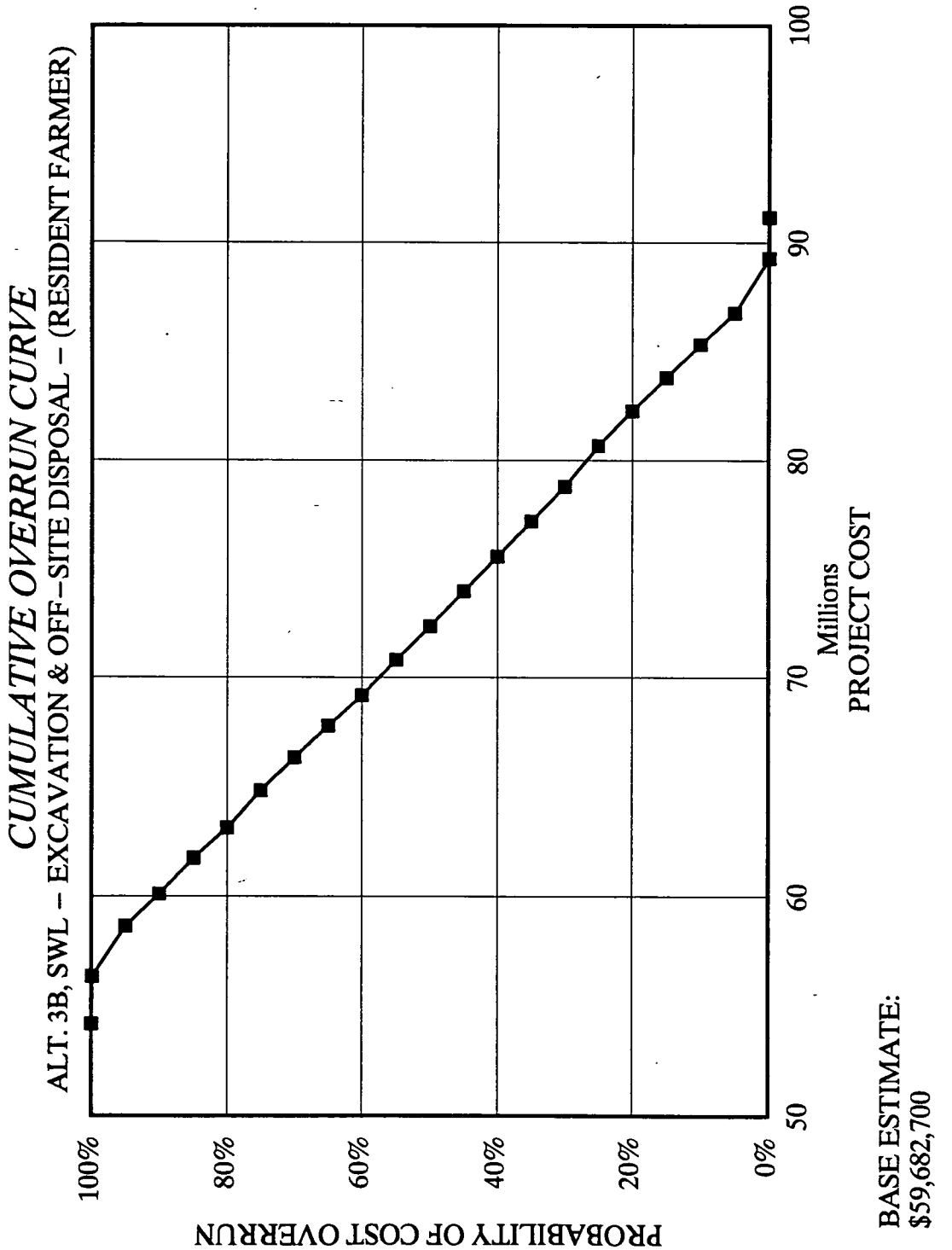
FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

PROJECT: ALT. 3B, SWL – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARMER)
CLIENT: DOE
CONTRACT: C2–94–07–06

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA–TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$67,250	–5.0%	$63,888	30%	$87,425	U		14%
2	SITE PREPERATION S/C	16,500	–5.0%	15,675	30%	21,450	U		14%
3	SITE PREPERATION MAT'L	96,220	–5.0%	91,409	20%	115,464	U		20%
4	DECON FACILITIES/SERVICES LABOR	8,370	–2.0%	8,203	80%	15,066	U		2%
5	DECON FACILITIES/SERVICES S/C	32,870	–6.0%	30,898	80%	59,166	U		7%
6	DECON FACILITIES/SERVICES MAT'L	8,860	–6.0%	8,328	60%	14,176	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	24,980	–5.0%	23,731	50%	37,470	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	69,960	–5.0%	66,462	30%	90,948	U		14%
9	EXC/SORT/DRY OFF–SITE LABOR	276,000	–6.0%	259,440	100%	552,000	U	A	6%
10	EXC/SORT/DRY OFF–SITE S/C	859,000	–6.0%	807,460	100%	1,718,000	U	A	6%
11	EXC/SORT/DRY OFF–SITE MAT'L	124,390	–6.0%	116,927	55%	192,805	U	A	10%
12	LOAD & HAUL OFF–SITE DISP LABOR	411,400	–5.0%	390,830	75.0%	719,950	U	A	6%
13	LOAD & HAUL OFF–SITE DISP MAT'L	31,650	–5.0%	30,068	20.0%	37,980	U	A	20%
14	GENERATED WASTE REMVL LABOR	25,600	–5.0%	24,320	50.0%	38,400	U		9%
15	SITE RESTORATION LABOR	59,380	–5.0%	56,411	30.0%	77,194	U		14%
16	SITE RESTORATION MAT'L	126,970	–5.0%	120,622	30.0%	165,061	U		14%
17	MONITORING WELLS S/C	245,300	–5.0%	233,035	50.0%	367,950	U		9%
18	INDIRECT FIELD COSTS LABOR	951,800	–5.0%	904,210	50.0%	1,427,700	U		9%
19	INDIRECT FIELD COSTS S/C	458,600	–5.0%	435,670	50.0%	687,900	U		9%
20	INDIRECT FIELD COSTS MAT'L	1,437,900	–5.0%	1,366,005	50.0%	2,156,850	U		9%
21	FIELD SUPPORT COSTS LABOR	1,109,300	–10.0%	998,370	30.0%	1,442,090	U		25%
22	FIELD SUPPORT COSTS S/C	48,377,100	–10.0%	43,539,390	55.0%	74,984,505	U		15%
23	FIELD SUPPORT COSTS MAT'L	1,554,200	–10.0%	1,398,780	35.0%	2,098,170	U		22%
24	ENGINEERING COSTS	3,007,800	–5.0%	2,857,410	25.0%	3,759,750	U		17%
25	SALES TAX MAT'L	301,300	–1.0%	298,287	1.0%	304,313	U		50%
26				0		0			0%
27				0		0			0%
28				0		0			0%
29				0		0			0%
30				0		0			0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$59,682,700		$54,145,827		$91,171,783			


DISTRIBUTION OF 2,000 SAMPLES
ALT. 3B, SWL – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARMER)
FREQUENCY
120
100
80
60
40
20
0
$56,314
$59,338
$62,362
$65,386
$68,410
$71,434
$74,458
$77,482
$80,506
$83,530
$86,554
$89,578
$92,602
PROJECT COST ($THOUSANDS)
AVERAGE
$72,578,283

001091



BASE ESTIMATE:
$59,682,700

001092

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, SWL - EXCAV. & OFF-SITE DISPOSAL - (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940706
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$59,682,700	BASE EST:	$67,250	BASE EST:	$16,500	BASE EST:	$96,220	BASE EST:	$8,370	BASE EST:	$32,870	BASE EST:	$8,860
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	30%	-5%	20%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	30%	-5%	20%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$63,888	$87,425	$15,675	$21,450	$91,409	$115,484	$8,203	$15,066	$30,898	$59,166	$8,328	$14,176

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-5-235

001093

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FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, SWL - EXCAV. & OFF-SITE DISPOSAL - (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940706
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$24,980	BASE EST:	$0	BASE EST:	$69,960	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$23,731	$37,470	$0	$0	$66,462	$90,948	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-5-236

001094

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, SWL - EXCAV. & OFF-SITE DISPOSAL - (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940706
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	EXCAVATE/SORT/DRY/CRUSH OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY/CRUSH OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY/CRUSH OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$276,000	BASE EST:	$859,000	BASE EST:	$124,390	BASE EST:	$411,400	BASE EST:	$0	BASE EST:	$31,650
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	75%					-5%	75%				
MATERIAL PRICING			-5%	75%	-5%	30%					-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	25%	-1%	25%	-1%	25%						
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	100%	-6%	100%	-6%	55%	-5%	75%	0%	0%	-5%	20%
TOTAL $	$259,440	$552,000	$807,460	$1,718,000	$116,927	$192,805	$390,830	$719,950	$0	$0	$30,068	$37,980

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U	A	U	A	U	A	U	A	U		U	A

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-5-237

001095

5861

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, SWL - EXCAV. & OFF-SITE DISPOSAL - (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940706
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	EXCAVATE & CONTAIN ON-SITE DISPOSAL LABOR $'s		EXCAVATE & CONTAIN ON-SITE DISPOSAL S/C $'s		EXCAVATE & CONTAIN ON-SITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-5-238

001096

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, SWL - EXCAV. & OFF-SITE DISPOSAL - (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940706
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		CLAY CAP LABOR $'s		CLAY CAP S/C $'s		CLAY CAP MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-5-239

001097

5861

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, SWL - EXCAV. & OFF-SITE DISPOSAL - (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940706
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$25,600	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$24,320	$38,400	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-5-240

001098

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, SWL - EXCAV. & OFF-SITE DISPOSAL - (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940706
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$59,380	BASE EST:	$0	BASE EST:	$126,970	BASE EST:	$0	BASE EST:	$245,300	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$56,411	$77,194	$0	$0	$120,622	$165,061	$0	$0	$233,035	$367,950	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001099

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-5-241

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, SWL - EXCAV. & OFF-SITE DISPOSAL - (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940706
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$951,800	BASE EST:	$458,600	BASE EST:	$1,437,900	BASE EST:	$1,109,300	BASE EST:	$48,377,100	BASE EST:	$1,554,200
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-10%	30%				
MATERIAL PRICING			-5%	50%	-5%	50%			-5%	30%	-5%	10%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION									-5%	25%	-5%	25%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	50%	-5%	50%	-10%	30%	-10%	55%	-10%	35%
TOTAL $	$904,210	$1,427,700	$435,670	$687,900	$1,366,005	$2,156,850	$998,370	$1,442,090	$43,539,390	$74,984,505	$1,398,780	$2,098,170
RISK PROFILE & CORRELATION FOR	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
EACH COST ELEMENT	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, SWL - EXCAV. & OFF-SITE DISPOSAL - (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940706
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$3,007,800	BASE EST:	$301,300	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-5%	25%										
(OTHER)												
TOTAL %	-5%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$2,857,410	$3,759,750	$298,287	$304,313	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-5-243

001101

FEMP-OU02-5 DRAFT
August 24, 1994

5861

LCC ANALYSIS TITLE:	LSP - EXCAVATE & OFF-SITE DISPOSAL - (RESIDENT FARMER)			
WBS NO.:	1.1.1.1.2.3.3		TASK NO.:	2CLS
ALTERNATIVE:	3B		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	35 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	08-Aug-94
DOCUMENT NO.:	LCC-94-03-02	EST. NO. C2-94-07-07/FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$15,557,300	$0	$0	$15,557,300	1997
$46,671,900	$0	$0	$46,671,900	1998
$0	$0	$0	$0	1999
$0	$0	$0	$0	2000
$0	$0	$0	$0	2001
$0	$0	$0	$0	2002
$0	$0	$0	$0	2003
$0	$0	$0	$0	2004
$0	$0	$0	$0	2005
$0	$0	$0	$0	2006
$0	$0	$0	$0	2007
$0	$0	$0	$0	2008
$0	$0	$0	$0	2009
$0	$0	$0	$0	2010
$0	$0	$0	$0	2011
$0	$0	$0	$0	2012
$0	$0	$0	$0	2013
$0	$0	$0	$0	2014
$0	$0	$0	$0	2015
$0	$0	$0	$0	2016
$0	$0	$0	$0	2017
$0	$0	$0	$0	2018
$0	$0	$0	$0	2019
$0	$0	$0	$0	2020
$0	$0	$0	$0	2021
$0	$0	$0	$0	2022
$0	$0	$0	$0	2023
$0	$0	$0	$0	2024
$0	$0	$0	$0	2025
$0	$0	$0	$0	2026
$0	$0	$0	$0	2027
$0	$0	$0	$0	2028
				2029
				2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$62,229,200	$0	$0	$62,229,200	TOTAL
$56,111,400	$0	$0	$56,111,400	<====(@NPV)

FERMCO ESTIMATING SERVICES

EST FILE #: C2940707 | DATE: 08-Aug-94

CLIENT: US DOE | SUMMARY SHEET | ESTIMATOR: KEN KEPLER

PROJECT TITLE: ALT-3B, LSP - EXCAVATION & OFF-SITE DISPOSAL | LOCATION: FERNALD

WBS#: 1.1.1.1.2.3.3 RESIDENT FARMER | TASK#: 2CLS

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		OFF-SITE DISPOSAL TO ENVIROCARE BY RAIL EXCAVATE, SORT, DRY, LOAD, HAUL	49,697		$849,900	$1,020,300	$469,800	$2,340,000
2		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		49,697		$849,900	$1,020,300	$469,800	$2,340,000
11	SUPERVISION - CONTRACTOR				$144,000			$144,000
12	SM TOOLS/CONSM'BLS						$51,000	$51,000
13	EQUIPMENT RENTAL						$1,212,800	$1,212,800
14	TEMP. FACILITIES				$17,800		$33,100	$50,900
15	TEMP UTL'S HOOK-UP				$8,900		$16,600	$25,500
16	JOB CLEAN-UP				$17,800		$33,100	$50,900
17	SAFETY				$8,900		$16,600	$25,500
18	HEALTH PHYSICS S/C				$119,700			$119,700
19	CERCLA/SAT	$1,500 PER PERSON				$37,500		$37,500
	BOND					$23,400		$23,400
	OVERHEAD & PROFIT					$367,300		$367,300
22	PAYRL BRD.&BENFT.				$606,800			$606,800
	INDIRECT FIELD COSTS				$923,900	$428,200	$1,363,200	$2,715,300
	DIRECT & INDIRECT FIELD COSTS				$1,773,800	$1,448,500	$1,833,000	$5,055,300
23	TRANSPORTATION & BURIAL					$36,762,600		$36,762,600
24	WASTE CONTAINERS						$1,268,800	$1,268,800
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$10,500		$10,500
25	SCREENING & CONFIRMATION TESTING					$2,757,600		$2,757,600
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$925,100			$925,100
	FERMCO FIELD SUPPORT COSTS				$925,100	$39,530,700	$1,268,800	$41,724,600
28	EMISSION MODELING				$8,800		$16,400	$25,200
29	PSAR/FSAR(SAFETY RPT)				$141,500			$141,500
30	ENGINEERING	TITLE I&II $702,700 TITLE III	$662,200	CDR	$242,700	DCR	$182,000	$1,789,600
	ENGINEERING COSTS							$1,956,300
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$4,387,000	$263,200
	SUB-TOTAL	(BASE ESTIMATE)						$48,899,400
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	15.0%						$7,349,900
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$56,349,300
	CONTINGENCY	12.0%						$5,879,900
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$62,229,200

001103

PRELIMINARY

LOTUS31\FS2\ALT3B\LSP\INDSUM.WK3 - FEASABILITY STUDY

DATE: 08-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940707

ALT-3B, LSP - EXCAVATION & OFF-SITE DISPOSAL - (RESIDENT FARMER)

EST. : KEN KEPLER

WBS#:
1.1.1.1.2.3.3

TASK I.D. :
2CLS

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	• NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS) *	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	0	$0	C/B		
SUB-TOTAL		31.80	4		$0			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	0		$0	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	0		$0	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	0		$0	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	0		$0	C/B		
THERMO STRIPS	EA	50.00	0		$0	C/B		
SUB-TOTAL		327.21			$0			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$0			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

DATE: 08-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

ALT-3B, LSP - EXCAVATION & OFF-SITE DISPOSAL - (RESIDENT FARMER)

WBS#:
1.1.1.1.2.3.3

EST.NO.: C2940707
EST. : KEN KEPLER
TASK I.D. :
2CLS

5861

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	25	100	$16.97	$1,700		
ANNUAL PHYSICALS	1	3	25	75	$16.97	$1,270		
EXIT (TERMINATION) PHYSICALS	1	4	25	100	$16.97	$1,700		
SUB-TOTAL						$4,670		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	16	1	25	405	$16.97	$6,870		
YEARLY IN-VIVO	1	4	25	100	$16.97	$1,700		
EXIT (END OF PROJECT / TERMINATION)	1	4	25	100	$16.97	$1,700		
SUB-TOTAL						$10,270		
WORK DELAYS CAUSED BY MONITORING	5%				$1,047,300	$52,365		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$1,047,300	$52,365		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$119,700	$0	$119,700

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT-3B, LSP – EXCAVATION & OFF-SITE DISPOSAL – (RESIDENT FARMER)
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CLS

WBS NO. – 1.1.1.1.2.3.3
EST. NO. – C2940707
BY – K. KEPLER
DATE – 08/08/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	30-Jun-94	01-Jun-97	30-Jan-98	30-Sep-98	16	MONTHS

EST.DATE TO MID-POINT OF ACTIVITY	
43	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – LSP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.3

EST.NO. C2940707
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CLS

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR)			CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS 141				ENVIROCARE BURIAL COSTS		TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							$80.15 PER TON (90 TON MIN.)	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	$120 DEMURAGE $/DAY (>6 DAYS)	(1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	
	CAR	LINER	COVER			TONS/CY	TONS						
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 125, 141, or 200 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

001107

F-5-249

FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – LSP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.3

EST.NO. C2940707
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CLS

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C – D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0

INPUT

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – LSP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.3

EST.NO. C2940707
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CLS

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	112250.0	1538	$23,816	$36,629,000	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	2846.0	58	$24,180	$1,402,400	$493.47		
						**			

INPUT

** NOTE:
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

001109

.861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-3B – LSP – EXCAVATION & OFF-SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940707
BY: KEN KEPLER
DATE: 08/08/94
TASK LD.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY (RESIDENT FARMER) OFF-SITE DISPOSAL TO ENVIROCARE														
SITE PREPARATION	1	LS		4,502						$78,130	$15,000	$38,970	$125,360	$257,460
DECONTAMINATION FACILITIES/SERVICES	1	LS		443						$8,090	$29,880	$1,900	$8,280	$48,150
EROSION AND SEDIMENT CONTROLS	1	LS		1433						$27,190		$10,460	$22,980	$60,630
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT/DRY –OFF-SITE DISPOSAL	1	LS		11212						$190,270	$633,680	$394,670		$1,218,620
LOAD/HAUL – OFF-SITE DISPOSAL TO ENVIROCARE	1	LS		17998						$306,200		$421,000	$28,770	$755,970
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE	N/A													N/A
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	N/A													N/A
DIKE	N/A													N/A
GENERATED WASTE REMOVAL	1	LS		2629						$44,610		$24,230		$68,840
SITE RESTORATION	1	LS		6962						118160		211280	241660	571100
MONITORING WELLS	1	LS									$249,000			$249,000
SUB-TOTAL (DIRECT FIELD COSTS)				45179						$772,650	$927,560	$1,102,510	$427,050	$3,229,770
TAKE-OFF ALLOWANCE 10%	1	LS		4,518						$77,270	$92,760	$110,250	$42,710	$322,990
TOTAL (DIRECT FIELD COSTS)	1	LS		49,697						$849,900	$1,020,300	$1,212,800	$469,800	$3,552,800

Off-Site Disposal of Lime Sludge Ponds to ENVIROCARE – Resident Farmer – SUMMARY

CONTR.NO. – [redacted]321
CLIENT – [redacted]. DEPT. OF ENERGY
PROJECT – ALT–3B – LSP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940707
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	1500	LF	0.213	412	16.97				6.25	$6,990			$9,660	$16,650
c. Clear and Grub														
i. Remediation Site	4.00	AC	41.40	214	16.97			2575.00		$3,630		$10,610		$14,240
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Storage Area, &/or Staging Area @ Sub–unit														
d. Dewatering														
i. Excavate Dewatering Trench	335	CY	0.50	216	16.97			1.49		$3,670		$510		$4,180
ii. Pump – w/4" Suction Hose	150	DAYS	3.00	581	16.97			19.55		$9,860		$3,020		$12,880
iv. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip	1	CY	4.00	5	16.97			100.00		$80		$100		$180
e. General Grading														
i. New Roads	4445	SY	0.001	6	16.97			0.07		$100		$320		$420
50%														
ii. Office/Parking Area 2222	1111	SY	0.010	14	16.97			0.32		$240		$370		$610
iii. Const.Equip.Decon.Pad Area 272	136	SY	0.010	2	16.97			0.32		$30		$40		$70
iv. Pers.Decon.Pad Area 49	25	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub–Unit 2845	1423	SY	0.010	18	16.97			0.32		$310		$470		$780
v. Storage Area 100%	2222	SY	0.010	29	16.97			0.32		$490		$730		$1,220
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	4445	SY	0.030	172	16.97			1.08	6.66	$2,920		$4,940	$30,490	$38,350
50%														
ii. Office/Parking – 8" Gravel W/ Geot 2222	1111	SY	0.030	43	16.97			1.08	6.66	$730		$1,240	$7,620	$9,590
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc 2845	1423	SY	0.041	75	16.97			1.45	5.51	$1,270		$2,120	$8,070	$11,460
Concrete Slab 160 x 160' x 8"thk. 631	316	CY	4.07	1656	17.98			18.38	67.00	$29,770		$5,970	$21,770	$57,510
Concrete Curb – 2'h x 480 lf x 8" tl 24	12	CY	15.30	237	17.98			69.08	275.90	$4,260		$850	$3,410	$8,520
HDPE Perf.Sub–grade Piping – 4" 500	250	LF	0.21	68	16.97			0.74	3.02	$1,150		$190	$780	$2,120
Epoxy Coating 2845	1423	SY	0.22	404	16.97			0.77	7.56	$6,860		$1,130	$11,080	$19,070
Backfill & Compact around Slab 183	92	ICY	0.086	10	16.97			1.38				$130		$130
Mob/Demob.Equip. 1	1	LS	2.00	1	16.97			184.00		$20		$90		$110
iv. Storage Area – 100' x200' Asphal 100%														
Includes Compacted Sub–Grade Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat	2222	SY	0.084	241	16.97			2.56	14.04	$4,090		$5,860	$32,130	$42,080
TOTAL (SITE PREPARATION)	1	LS		4,502						$78,130	$15,000	$38,970	$125,360	[redacted]57,460

Site Preparation Details

F-5-253
001111
FEMP-OU02-5 DRAFT
August 24, 1994
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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – LSP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940707
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
	50%														
a. Decon Trailer – Rental	39	20	MO					1500.00				$29,250			$29,250
	50%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	88	BCY	0.021	2	16.97			0.64		$30		$60		$90
ii. Sub–grade Prep.	167	84	SY	0.041	4	16.97		6.75	1.45	5.51	$70	$580	$120	$470	$1,240
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	8	SF	0.32	3	19.21			0.73	12.55	$60		$10	$100	$170
Metal Grating 2 ft wide x 25 lf	25	13	LF	0.53	9	19.21			1.86	46.67	$170		$20	$600	$790
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	20	CY	4.07	102	17.98			14.25	67.00	$1,830		$290	$1,350	$3,470
Decon Pad Trench – 2'x2'i.d.x 25l	5	3	CY	28.22	91	17.98			98.77	202.30	$1,640		$250	$520	$2,410
Decon Pad Curb – 6" x 6" x 120 lf	5	3	CY	15.30	49	17.98			53.55	275.90	$880		$140	$710	$1,730
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	2	17.98			37.24	97.20	$40		$10	$20	$70
Epoxy Coating	167	84	SY	0.22	24	17.00			0.77	7.56	$410		$70	$650	$1,130
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	1	EA	12.00	8	17.98			100.00	525.00	$140		$50	$270	$460
vi. HDPE Piping	200	100	LF	0.38	49	19.95			5.11	4.42	$980		$530	$460	$1,970
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Gu:	720	360	SF	0.04	17	16.97			0.03	1.55	$290		$10	$570	$870
4" x 4" x 9'–6" Wood Posts set in (	27	14	EA	0.480	8	16.97			1.68	5.75	$140		$20	$80	$240
viii. Air Diaphragm Pump 50 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$400	$630
ix. Suction and Discharge Piping	10	5	LF	0.11	1	19.95			0.39	0.84	$20				$20
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	2	LF	0.47	1	19.95			1.65	14.91	$20			$20	$40
	BCY 129 ICY														
x. Backfill & Compaction around concrete slab	155	78	ICY	0.086	9	16.97			1.38		$150		$110		$260
SUB–TOTAL (EQUIP. DECON. FACILITY)		1	LS		389						$7,070	$29,830	$1,720	$6,220	$44,840

Equipment Decon. Facility Details

F-5-254
001142
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]321
CLIENT - [redacted]. DEPT. OF ENERGY
PROJECT - ALT-3B - LSP - EXCAVATION & OFF-SITE DISPOSAL - RESIDENT FARMER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940707
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB-UNIT (CON'T.)															
(ITEMS @ 50% ARE COMMON TO SWL & LSP'S)															
c. Personnel Decon. Facility	50%														
i. Excavation - Structural	19	10	BCY	0.021		16.97			0.64				$10		$10
ii. Sub-grade Prep. - Includes HDPE Liner, Geotextile Fabric - Gravel, & Compact Sub-grade	14	7	SY	0.041		16.97		6.75	1.45	5.51		$50	$10	$40	$100
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover - 2'x 2'	4	2	SF	0.32	1	16.97			0.73	12.55	$20			$30	$50
iv. Cast-in-Place Concrete -															
Decon Slab - 11' x 11' x4" thk	1.5	1	CY	4.07	4	17.98			14.25	67.00	$70		$10	$50	$130
Decon Slab Sump - 2'x 2' x 3'	0.3	0	CY	31.84	6	17.98			111.44	250.70	$110		$20	$40	$170
Decon Slab Curb - 6" x 6" x 42 lf	0.4	0	CY	15.30	4	17.98			53.55	275.90	$70		$10	$60	$140
Epoxy Coating	14	7	SY	0.22	2	17.00			0.77	7.56	$30		$10	$50	$90
v. Corrugated Fiberglass Splash Gua	132	66	SF	0.04	3	16.97			0.03	1.55	$50			$110	$160
4" x 4" x 9'-6" Wood Posts set in (	6	3	EA	0.480	2	16.97			1.68	5.75	$30		$10	$20	$60
vi. Pump 20 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$410	$640
vii. Clean Wtr.Strg.Tank W/Piping- 1!	1	1	LS	32.00	21	19.95			112.00	2500.00	$420		$60	$1,250	$1,730
viii. Backfill & Compaction around concrete slab	BCY 17 ICY 20	10	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB-TOTAL (PERSONNEL DECON. FACILITY)		1	LS		54						$1,020	$50	$180	$2,060	$3,310
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		443						$8,090	$29,880	$1,900	$8,280	$48,150

Personnel Decon.Facilities/Services Details

F-5-255

FEMP-OU02-5 DRAFT
August 24, 1994

001113

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – LSP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940707
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	2000	LF	0.017	44	16.97			0.06	0.65	$750		$120	$1,340	$2,210
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	300	EA	0.24	93	16.97			1.53	1.35	$1,580		$470	$420	$2,470
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1800	LF	0.38	885	19.95			5.11	4.42	$17,660		$9,200	$7,960	$34,820
iv. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	1	EA	8.00	10	16.97			28.00	8300.00	$170		$30	$8,300	$8,500
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,433						$27,190		$10,460	$22,980	$60,630

001114

F-5-256

FEMP-OU02-5 DRAFT
August 24, 1994

Erosion Control Details

CONTR.NO.- [redacted]321
CLIENT - [redacted]. DEPT. OF ENERGY
PROJECT - ALT-3B - LSP - EXCAVATION & OFF-SITE DISPOSAL - RESIDENT FARMER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940707
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE/SORT/DRY FOR OFF-SITE DISPOSAL TO ENVIROCARE														
EXCAVATION														
Excavate Lime Sludge - Level D	81600	BCY	0.055	5790	16.97			1.17		$98,260		$95,470		$193,730
Excavate Additional Soil	8200	BCY	0.055	582	16.97			1.17		$9,880		$9,590		$19,470
Sort Contaminated Lime Sludge/Soil BCY 89800	112250	LCY	0.033	4778	16.97			2.58		$81,080		$289,610		$370,690
Low Level Thermal Destruction Unit BCY 7100	9053	TON					70.00				$633,680			$633,680
Sub-contract cost for Drying Operation and moisture test Only.														
(SHREDDING COMMON TO SWL, IFP & SF)														
Shredder/Crusher - Purchase/Install N/A		LOT	280.0					8400.00	317800.00					
60 Ton per Hour														
Generated Waste BCY 2475														
(Percent of Gen.Waste to be Shredded) 25%														
Generated Waste TOTAL TONS 1423														
Operating Costs	24	HRS							25.75					
(2) Operators	48	HRS	1.00	62	16.97					$1,050				$1,050
BCY = BANK CUBIC YARDS : The Volume of 1 Cubic Yard of material in its natural state OR Volume/Void to be filled.														
LCY = LOOSE CUBIC YARDS (w/Swell Factor) Volume of material after being excavated.														
ICY = IN-PLACE CUBIC YARDS (w/Shrinkage Factor) Volume of material it takes to fill a 1 Cubic Yard space.														
TOTAL (EXCAVATE/SORT/DRY)	1	LS		11,212						$190,270	$633,680	$394,670		$1,218,620

Off-Site Excavate/Sort/Dry Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-5-257

001115

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – LSP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940707
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: C 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
LOAD & HAUL FOR OFF–SITE DISPOSAL CONTAMINATED WASTE TO ENVIROCARE															
(ITEMS @ 20% ARE COMMON TO SWL,LSP,SF,AFP & IFP)															
Install Loading Equipment for LLW	20%														
Hopper	1	0.20	EA	177.0	35	16.97	3000.00			6000.00	$600			$1,200	$1,800
Loading Conveyor	1	0.20	EA	147.0	29	16.97	2500.00			8500.00	$500			$1,700	$2,200
Scale	1	0.20	EA	589.0	118	16.97	10000.00			15000.00	$2,000			$3,000	$5,000
Railroad Loading Facility	20%														
a. 160' x 160 'Concrete Pad															
i. Clear & Grub	1	0.12	AC	41.40	6	16.97			2575.00		$100		$320		$420
ii. Grading	2845	569.00	SY	0.010	7	16.97			0.32		$120		$190		$310
iii. Sub–Grade & Sub–Base for Conc.	2845	569.00	SY	0.041	30	16.97			1.45	5.51	$510		$850	$3,230	$4,590
iv. Concrete Slab 160 x 160' x 8"thk.	631	126.20	CY	4.07	663	17.98			18.38	67.00	$11,920		$2,390	$8,710	$23,020
v. Concrete Curb – 2'h x 480 lf x 8" tl	24	4.80	CY	15.30	95	17.98			69.08	275.90	$1,710		$340	$1,360	$3,410
vi. Wood Ties, Ballast, 100# Rail Derailer, Turnout, Bumper Car Stops	600	120.00	LF	1.06	164	16.97			4.43	77.40	$2,780		$550	$9,570	$12,900
vii. Grading for track	800	160.00	SY	0.010	2	16.97			0.32		$30		$50		$80
HAUL															
From excavation site to rail loading facility															
6 CY dump truck 1/2 mi r.t.		112250	LCY	0.041	5,937	16.97			1.65		$100,750		$185,210		$285,960
LOADING GONDOLA	LCY														
Excavated level D & Additional =	112250														
Allowable CY's of waste per Gondola	73.0														
Install Liner in Gondola car		1538	EA	0.75	1,488	16.97			32.21		$25,250		$49,540		$74,790
Load Gondola – 6/day, 2 workers		256	DAYS	16.00	5,291	16.97			15.00		$89,790		$3,850		$93,640
Seal liner, Install Cover		1538	EA	0.75	1,488	16.97			32.21		$25,250		$49,540		$74,790
Dust control – light		256	DAYS	8.00	2,645	16.97			500.00		$44,890		$128,170		$173,060
(RSO takes ownership at this time.) (See: Off–Site Disposal Wksht. and Appendix E)															
TOTAL (LOAD & HAUL OFF–SITE DISPOSAL)		1	LS		17,998						$306,200		$421,000	$28,770	$755,970

Offsite Load/Haul/Disposal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]321
CLIENT - [redacted]. DEPT. OF ENERGY
PROJECT - ALT-3B - LSP - EXCAVATION & OFF-SITE DISPOSAL - RESIDENT FARMER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940707
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ENVIROCARE Demo. /Load/Haul															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
(ITEMS @ 20% ARE COMMON TO SWL,LSP,SF,AFP & IFP)															
a. Office/Parking Area	50%														
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Gravel	494	247	BCY	0.292	93	16.97			9.16		$1,580		$2,330		$3,910
Geo-Fabric & Liner	2222	1111	SY	0.002	3	16.97			0.02		$50		$20		$70
Haul & Dump Rubble	185	93	BCY	0.30	36	16.97			2.51		$610		$240		$850
b. Const.Equip.Decon Area @ Excav.Sit	50%														
Demo/Remove Concrete	49.3	25	BCY	1.2	38	16.97			3.62		$640		$90		$730
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	28	14	BCY	0.292	5	16.97			9.16		$80		$130		$210
Geo-Fabric & Liner	167	84	SY	0.002		16.97			0.02						
Posts - 4" x 4" x 9'-6"	27	14	EA	0.48	8	16.97			1.68		$140		$20		$160
Splash Guard	702	351	SF	0.04	18	16.97			0.03		$310		$10		$320
Haul & Dump Rubble	24.9	12	BCY	0.30	5	16.97			2.51		$80		$30		$110
c. Personnel Decon. Area @ Excav. Site	50%														
Demo/Remove Concrete	2.2	1	BCY	1.2	2	16.97			3.62		$30				$30
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo-Fabric & Liner	14	7	SY	0.002		16.97			0.02						
Posts - 4" x 4" x 9'-6"	6	3	EA	0.48	2	16.97			1.68		$30		$10		$40
Splash Guard	132	66	SF	0.04	3	16.97			0.03		$50				$50
Haul & Dump Rubble	3.5	2	BCY	0.30	1	16.97			2.51		$20				$20
d. Storage Pad Area- for SWL & LSP	100%														
Demo/Remove Concrete		370	BCY	1.2	573	16.97			3.62		$9,720		$1,380		$11,100
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone		370	BCY	0.292	139	16.97			9.16		$2,360		$3,490		$5,850
Geo-Fabric & Liner		2222	SY	0.002	1	16.97			0.02		$20		$50		$70
Haul & Dump Rubble		105	BCY	0.30	41	16.97			2.51		$700		$270		$970
SUB-TOTAL (GENERATED WASTE REMOVAL)		1	LOT		968						$16,420		$8,080		$24,500

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

1861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – LSP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940707
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ENVIROCARE (CON'T.)															
Demo. /Load/Haul/Compact															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
(ITEMS @ 20% ARE COMMON TO SWL,LSP,SF,AFP & IFP)															
e. Staging Area	50%														
Demo/Remove Concrete	655	328	BCY	1.2	507	16.97			3.62		$8,600		$1,220		$9,820
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	475	238	BCY	0.292	89	16.97			9.16		$1,510		$2,240		$3,750
Geo–Fabric & Liner	2845	1423	SY	0.002	4	16.97			0.02		$70		$30		$100
Haul & Dump Rubble	105	53	BCY	0.30	20	16.97			2.51		$340		$140		$480
f. Staging Area @ rail siding	20%														
Demo/Remove Concrete	655	328	BCY	1.2	507	16.97			3.62		$8,600		$1,220		$9,820
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	475	238	BCY	0.292	89	16.97			9.16		$1,510		$2,240		$3,750
Geo–Fabric & Liner	2845	1423	SY	0.002	4	16.97			0.02		$70		$30		$100
Haul & Dump Rubble	105.0	53	BCY	0.30	20	16.97			2.51		$340		$140		$480
LOADING GONDOLA	BCY														
Generated Waste	2475														
Plus a swell factor of 15%	2846														
Allowable CY's of waste per Gondola	49.0														
Install Liner in Gondola car		58	EA	0.75	56	16.97			32.21		$950		$1,870		$2,820
Load Gondola – 6/day, 2 workers		10	DAYS	16.00	206	16.97			15.00		$3,500		$150		$3,650
Seal liner, Install Cover		58	EA	0.75	56	16.97			32.21		$950		$1,870		$2,820
Dust control – light		10	DAYS	8.00	103	16.97			500.00		$1,750		$5,000		$6,750
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,661						$28,190		$16,150		$44,340
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		2,629						$44,610		$24,230		$68,840

Generated Waste Removal Details

F-5-260
001118
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. - [redacted]321
CLIENT - [redacted] DEPT. OF ENERGY
PROJECT - ALT-3B - LSP - EXCAVATION & OFF-SITE DISPOSAL - RESIDENT FARMER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940707
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CLS

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off-site source															
a. Borrow Common Soil, Backfill	BCY														
Lime Sludge Ponds	39000	46800	ICY	0.09	5433	16.97			3.21	3.50	$92,200		$154,730	$168,710	$415,640
	50%														
Office/Parking	494	247	ICY	0.09	29	16.97			3.21	3.50	$490		$820	$890	$2,200
Const.Equip.Decon.Area	78	39	ICY	0.09	5	16.97			3.21	3.50	$80		$130	$140	$350
Personnel Decon.Area	7	4	ICY	0.09		16.97			3.21	3.50			$10	$10	$20
Staging Area at Sub-Unit	475	238	ICY	0.09	28	16.97			3.21	3.50	$480		$790	$860	$2,130
	100%														
Storage Area at S/U (SWL & LSP)	370	370	ICY	0.09	43	16.97			3.21	3.50	$730		$1,220	$1,330	$3,280
	20%														
Staging Area at Rail Loading	655	157	ICY	0.09	18	16.97			3.21	3.50	$310		$520	$570	$1,400
b. Final Grade for LSP (Excludes Cap)		11667	SY	0.02	301	16.97			0.70		$5,110		$8,410		$13,520
c. Borrow Top Soil 6" Thk., Spread															
Lime Sludge Ponds		11667	SY	0.036	542	16.97			2.33	2.88	$9,200		$28,000	$34,610	$71,810
	50%														
Office/Parking	2222	1111	SY	0.036	52	16.97			2.33	2.88	$880		$2,670	$3,300	$6,850
Const.Equip.Decon.Area	167	84	SY	0.036	4	16.97			2.33	2.88	$70		$200	$250	$520
Personnel Decon.Area	14	7	SY	0.036		16.97			2.33	2.88			$20	$20	$40
Staging Area at Sub-Unit	2845	1423	SY	0.036	66	16.97			2.33	2.88	$1,120		$3,410	$4,220	$8,750
	100%														
Storage Area at S/U (SWL & LSP)	2222	2222	SY	0.036	103	16.97			2.33	2.88	$1,750		$5,330	$6,590	$13,670
	20%														
Staging Area at Rail Loading	2845	569	SY	0.036	26	16.97			2.33	2.88	$440		$1,370	$1,690	$3,500
d. Grass Cover - Seed, Fertilize, Mulch															
Utility Mix - Hydro/Air Seeding	SY														
Lime Sludge Ponds	11677	105	MSF	0.30	41	16.97			6.75	25.00	$700		$730	$2,700	$4,130
	50%														
Office/Parking	2222	10	MSF	0.30	4	16.97			6.75	25.00	$70		$70	$260	$400
Const.Equip.Decon.Area	167	1	MSF	0.30		16.97			6.75	25.00			$10	$30	$40
Personnel Decon.Area	14		MSF	0.30		16.97			6.75	25.00					
Staging Area at Sub-Unit	2845	13	MSF	0.30	5	16.97			6.75	25.00	$80		$90	$330	$500
	100%														
Storage Area at S/U (SWL & LSP)	2222	20	MSF	0.30	8	16.97			6.75	25.00	$140		$140	$520	$800
	20%														
Staging Area at Rail Loading	2845	5	MSF	0.30	2	16.97			6.75	25.00	$30		$30	$130	$190
e. Security Fence - 6ga aluminized - 6' high		1400	LF	0.13	231	16.97			1.64	9.80	$3,920		$2,360	$14,130	$20,410
i. Corner posts - 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
TOTAL (SITE RESTORATION)		1	LOT		6,962						$118,160		$211,280	$241,660	$571,100

Site Restoration Details

F-5-261

001119

FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – LSP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940707
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D. 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at S/U: 8 Pairs x 120 ft.	8	PAIR					23,000				$184,000			$184,000
b. Abandon Existing Wells	5	EA					13,000				$65,000			$65,000
TOTAL (MONITORING WELLS)	1	LOT									$249,000			$249,000

001120

F-5-262

FEMP-OU02-5 DRAFT
August 24, 1994

Monitoring Wells Details

CONTR.NO. – [redacted]321
CLIENT – [redacted]. DEPT. OF ENERGY
PROJECT – ALT–3B – LSP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940707
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO														
PURCHASE														
Bulk Gondola Rail Car N/A	0	EA												
Liner for Gondola														
Excavated Waste – level D & Additional	1538	EA							400.00				$615,200	$615,200
Excavated Waste – lead/soil	0	EA												
Generated Waste –	58	EA							400.00				$23,200	$23,200
Cover for Gondola														
Excavated Waste – level D & Additional	1538	EA							395.00				$607,510	$607,510
Excavated Waste – lead/soil	0	EA							395.00					
Generated Waste –	58	EA							395.00				$22,910	$22,910
TOTALS FORWARD TO No. 24 ESTIMATE SUMMARY														
TOTAL (FERMCO PURCHASE COSTS)	1	LOT											$1,268,800	$1,268,800

001121

5861

FERMCO Purchase Costs Details

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – LSP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940707
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF–SITE TRANSPORTATION COST TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas's	1596	EA					340.00				$542,640			$542,640
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additional	1538	EA					22681.00				**********			$34,883,380
Excavated Waste – lead/soil	0	EA												
Generated Waste –	58	EA					23045.00				$1,336,610			$1,336,610
TOTALS FORWARD TO No. 23 ESTIMATE SUMMARY														
TOTAL (OFF–SITE TRANSP. COST TO ENV)	1	LOT									$36,762,600			$36,762,600

Off–Site Transportation Costs Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]321
CLIENT - U.S. DEPT. OF ENERGY
PROJECT - ALT-3B - LSP - EXCAVATION & OFF-SITE DISPOSAL - RESIDENT FARMER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940707
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	50000	GAL					0.01				$500			$500
Runnoff from the Exclusion Zone.	1000000	GAL					0.01				$10,000			$10,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$10,500			$10,500

001123

1861

Waste Water Treatment Operations Cost Details

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – LSP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.3

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940707
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CLS

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	449	EA					2,002				$898,900			$898,900
Rad	449	EA					2,000				$898,000			$898,000
Confirmatory Tests														
Full Rad Tests	225	EA					3,101				$697,700			$697,700
Full HSL	30	EA					1,500				$45,000			$45,000
Full TCLP	30	EA					2,000				$60,000			$60,000
2 Technicians per Month	12	MO					13,163				$158,000			$158,000
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS)	1	LOT									$2,757,600			$2,757,600

001124

F-5-266

FEMP-OU02-5 DRAFT
August 24, 1994

Screening & Confirmation Testing Details

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 3B, LSP – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARME
CLIENT: DOE DATE: 08–Aug–94
CONTRACT: C2–94–07–07 BASE ESTIMATE: $48,999,400

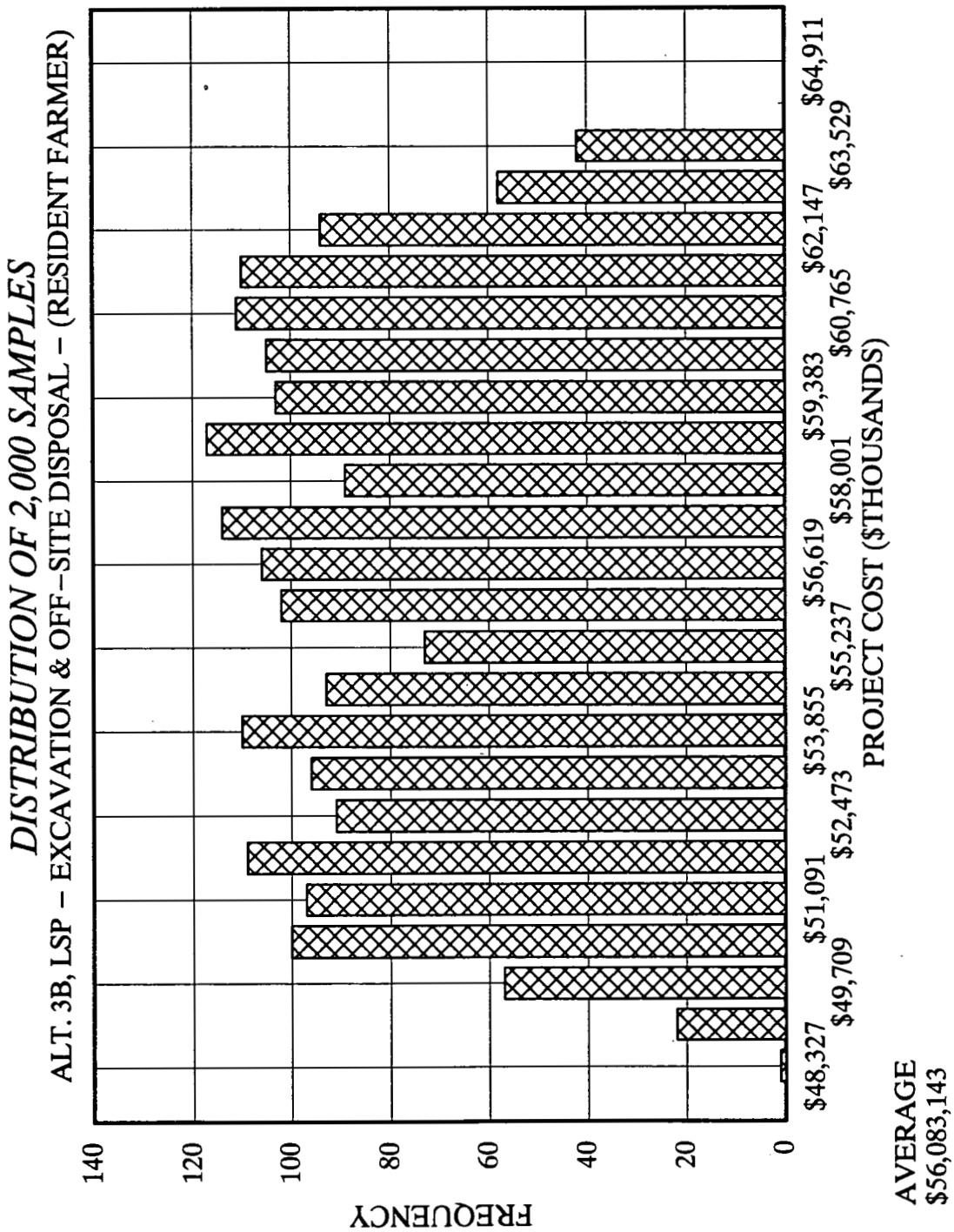
CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$65,562,938	$16,563,538	33.8%
0.05%	$63,340,477	$14,341,077	29.3%
5.00%	$62,154,828	$13,155,428	26.8%
10.00%	$61,376,705	$12,377,305	25.3%
15.00%	$60,774,771	$11,775,371	24.0%
20.00%	$60,195,312	$11,195,912	22.8%
25.00%	$59,542,855	$10,543,455	21.5%
30.00%	$58,910,080	$9,910,680	20.2%
35.00%	$58,213,306	$9,213,906	18.8%
40.00%	$57,580,100	$8,580,700	17.5%
45.00%	$56,871,052	$7,871,652	16.1%
50.00%	$56,270,211	$7,270,811	14.8%
55.00%	$55,612,595	$6,613,195	13.5%
60.00%	$54,746,883	$5,747,483	11.7%
65.00%	$54,001,113	$5,001,713	10.2%
70.00%	$53,375,102	$4,375,702	8.9%
75.00%	$52,651,402	$3,652,002	7.5%
80.00%	$51,912,229	$2,912,829	5.9%
85.00%	$51,214,536	$2,215,136	4.5%
90.00%	$50,566,798	$1,567,398	3.2%
95.00%	$49,844,568	$845,168	1.7%
99.95%	$48,453,218	($546,182)	–1.1%
100.00%	$46,429,201	($2,570,199)	–5.2%

FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

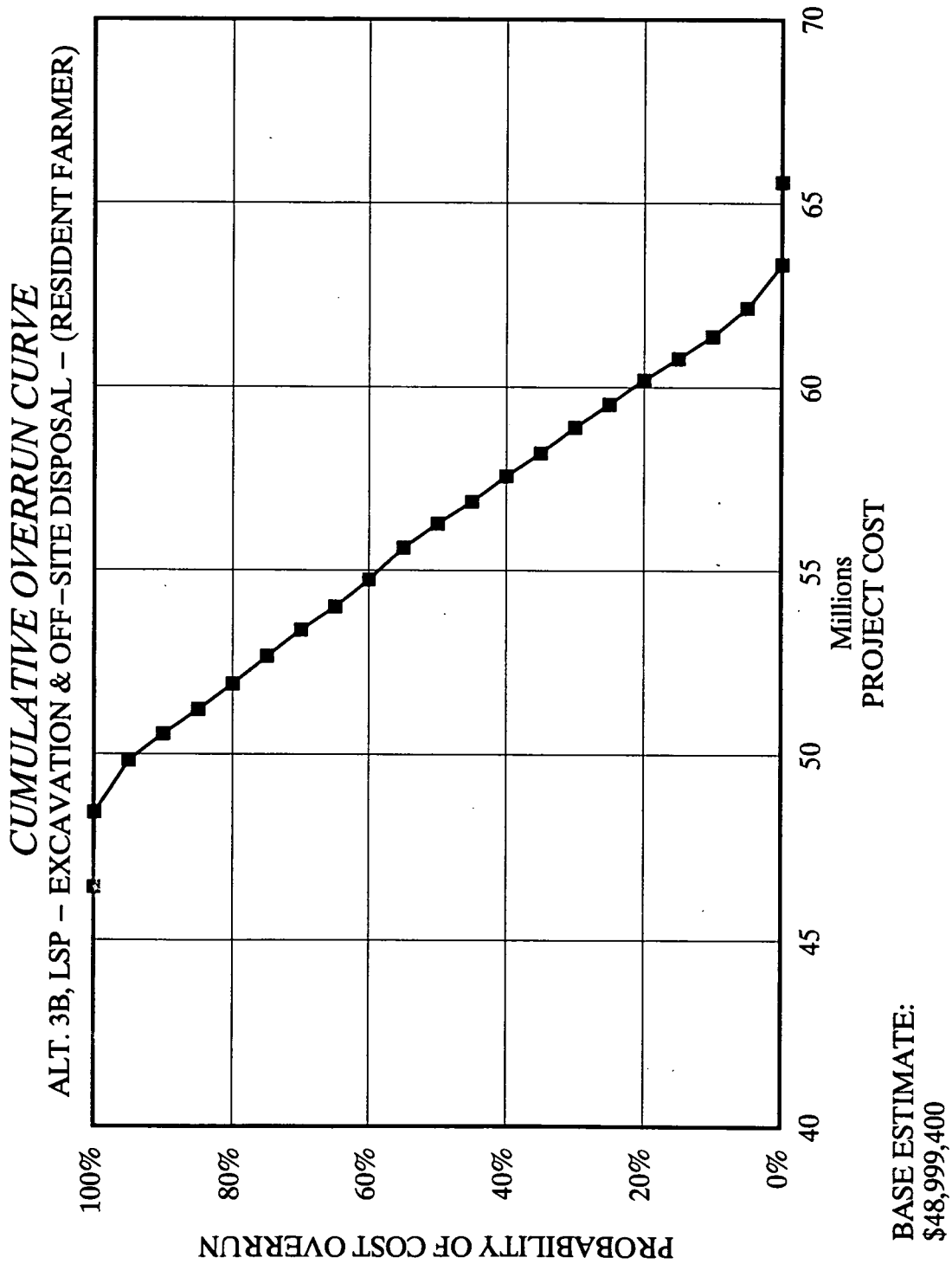
PROJECT: ALT. 3B, LSP – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARMER)
CLIENT: DOE
CONTRACT: C2–94–07–07

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA–TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$85,940	–5.0%	$81,643	30%	$111,722	U		14%
2	SITE PREPERATION S/C	16,500	–5.0%	15,675	25%	20,625	U		17%
3	SITE PREPERATION MAT'L	137,900	–10.0%	124,110	30%	179,270	U		25%
4	DECON FACILITIES/SERVICES LABOR	8,900	–2.0%	8,722	80%	16,020	U		2%
5	DECON FACILITIES/SERVICES S/C	32,870	–6.0%	30,898	80%	59,166	U		7%
6	DECON FACILITIES/SERVICES MAT'L	9,110	–6.0%	8,563	60%	14,576	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	29,910	–5.0%	28,415	50%	44,865	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	25,280	–5.0%	24,016	30%	32,864	U		14%
9	EXC/SORT/DRY OFF–SITE LABOR	209,300	–6.0%	196,742	125%	470,925	U		5%
10	EXC/SORT/DRY OFF–SITE S/C	697,040	–6.0%	655,218	125%	1,568,340	U		5%
11	LOAD & HAUL OFF–SITE DISP LABOR	336,820	–6.0%	316,611	125%	757,845	U		5%
12	LOAD & HAUL OFF–SITE DISP MAT'L	31,650	–10.0%	28,485	50.0%	47,475	U		17%
13	GENERATED WASTE REMVL LABOR	49,070	–5.0%	46,617	50.0%	73,605	U		9%
14	SITE RESTORATION LABOR	129,980	–5.0%	123,481	30.0%	168,974	U		14%
15	SITE RESTORATION MAT'L	265,830	–5.0%	252,539	30.0%	345,579	U		14%
16	MONITORING WELLS S/C	273,900	–5.0%	260,205	50.0%	410,850	U		9%
17	INDIRECT FIELD COSTS LABOR	923,900	–5.0%	877,705	50.0%	1,385,850	U		9%
18	INDIRECT FIELD COSTS S/C	428,200	–5.0%	406,790	100.0%	856,400	U		5%
19	INDIRECT FIELD COSTS MAT'L	1,363,200	–5.0%	1,295,040	50.0%	2,044,800	U		9%
20	FIELD SUPPORT COSTS LABOR	925,100	–10.0%	832,590	30.0%	1,202,630	U		25%
21	FIELD SUPPORT COSTS S/C	39,530,700	–5.0%	37,554,165	30.0%	51,389,910	U		14%
22	FIELD SUPPORT COSTS MAT'L	1,268,800	–10.0%	1,141,920	30.0%	1,649,440	U		25%
23	ENGINEERING COSTS	1,956,300	–5.0%	1,858,485	25.0%	2,445,375	U		17%
24	SALES TAX MAT'L	263,200	–1.0%	260,568	1.0%	265,832	U		50%
25				0		0			0%
26				0		0			0%
27				0		0			0%
28				0		0			0%
29				0		0			0%
30				0		0			0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$48,999,400		$46,429,201		$65,562,938			

586


DISTRIBUTION OF 2,000 SAMPLES
ALT. 3B, LSP – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARMER)
FREQUENCY
0
20
40
60
80
100
120
140
$48,327
$49,709
$51,091
$52,473
$53,855
$55,237
$56,619
$58,001
$59,383
$60,765
$62,147
$63,529
$64,911
PROJECT COST ($THOUSANDS)
AVERAGE
$56,083,143

001127



BASE ESTIMATE:
$48,999,400

001128

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, LSP – EXCAVATION & OFF-SITE DISPOSAL – (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940707
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$48,999,400	BASE EST:	$85,940	BASE EST:	$16,500	BASE EST:	$137,900	BASE EST:	$8,900	BASE EST:	$32,870	BASE EST:	$9,110
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	25%	-10%	30%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	25%	-10%	30%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$81,643	$111,722	$15,675	$20,625	$124,110	$179,270	$8,722	$16,020	$30,898	$59,166	$8,563	$14,576

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-5-271

001129

5861

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, LSP – EXCAVATION & OFF-SITE DISPOSAL – (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940707
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$29,910	BASE EST:	$0	BASE EST:	$25,280	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$28,415	$44,865	$0	$0	$24,016	$32,864	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3B, LSP – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940707
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$209,300	BASE EST:	$697,040	BASE EST:	$0	BASE EST:	$336,820	BASE EST:	$0	BASE EST:	$31,650
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–1%	100%					–1%	100%				
MATERIAL PRICING			–1%	100%							–5%	25%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–5%	25%	–5%	25%			–5%	25%			–5%	25%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	125%	–6%	125%	0%	0%	–6%	125%	0%	0%	–10%	50%
TOTAL $	$196,742	$470,925	$655,218	$1,568,340	$0	$0	$316,611	$757,845	$0	$0	$28,485	$47,475

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-5-273

001131

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, LSP – EXCAVATION & OFF-SITE DISPOSAL – (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940707
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE LABOR $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE S/C $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-5-274

001132

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, LSP - EXCAVATION & OFF-SITE DISPOSAL - (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940707
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		CLAY CAP LABOR $'s		CLAY CAP S/C $'s		CLAY CAP MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

001133

5861

FEMP-OU02-5 DRAFT
August 24, 1994

F-5-275

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3B, LSP – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940707
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$49,070	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							–5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	–5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$46,617	$73,605	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001134

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, LSP - EXCAVATION & OFF-SITE DISPOSAL - (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940707
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$129,980	BASE EST:	$0	BASE EST:	$265,830	BASE EST:	$0	BASE EST:	$273,900	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$123,481	$168,974	$0	$0	$252,539	$345,579	$0	$0	$260,205	$410,850	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, LSP – EXCAVATION & OFF-SITE DISPOSAL – (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940707
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$923,900	BASE EST:	$428,200	BASE EST:	$1,363,200	BASE EST:	$925,100	BASE EST:	$39,530,700	BASE EST:	$1,268,800
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-10%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-5%	30%	-10%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-10%	30%	-5%	30%	-10%	30%
TOTAL $	$877,705	$1,385,850	$406,790	$856,400	$1,295,040	$2,044,800	$832,590	$1,202,630	$37,554,165	$51,369,910	$1,141,920	$1,649,440
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3B, LSP – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARMER)
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940707
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$1,956,300	BASE EST:	$263,200	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			–1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	–5%	25%										
(OTHER)												
TOTAL %	–5%	25%	–1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$1,858,485	$2,445,375	$260,568	$265,832	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-5-279

001137

5861

FEMP-OU02-5 DRAFT
August 24, 1994

LCC ANALYSIS TITLE:	IFP - EXCAVATE & OFF-SITE DISPOSAL - (RESIDENT FARMER)			
WBS NO.:	1.1.1.1.2.3.5		TASK NO.:	2CNF
ALTERNATIVE:	3B		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	37 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	08-Aug-94
DOCUMENT NO.:	LCC-94-03-04	EST. NO. C2-94-07-08/FILE NO. FS\OU2\ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$0	$0	$0	$0	1997
$25,314,009	$0	$0	$25,314,000	1998
$27,615,282	$0	$0	$27,615,300	1999
$25,314,009	$0	$0	$25,314,000	2000
$0	$0	$0	$0	2001
$0	$0	$0	$0	2002
$0	$0	$0	$0	2003
$0	$0	$0	$0	2004
$0	$0	$0	$0	2005
$0	$0	$0	$0	2006
$0	$0	$0	$0	2007
$0	$0	$0	$0	2008
$0	$0	$0	$0	2009
$0	$0	$0	$0	2010
$0	$0	$0	$0	2011
$0	$0	$0	$0	2012
$0	$0	$0	$0	2013
$0	$0	$0	$0	2014
$0	$0	$0	$0	2015
$0	$0	$0	$0	2016
$0	$0	$0	$0	2017
$0	$0	$0	$0	2018
$0	$0	$0	$0	2019
$0	$0	$0	$0	2020
$0	$0	$0	$0	2021
$0	$0	$0	$0	2022
$0	$0	$0	$0	2023
$0	$0	$0	$0	2024
$0	$0	$0	$0	2025
$0	$0	$0	$0	2026
$0	$0	$0	$0	2027
$0	$0	$0	$0	2028
$0	$0	$0	$0	2029
$0	$0	$0	$0	2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$78,243,300	$0	$0	$78,243,300	TOTAL
$68,169,300	$0	$0	$68,169,300	<====(@NPV)

F ERMC O
ESTIMATING SERVICES

EST FILE #: C2940708 | DATE: 08-Aug-94
CLIENT: US DOE | SUMMARY SHEET | ESTIMATOR: KEN KEPLER
PROJECT TITLE: ALT-3B, IFP - EXCAVATION & OFF-SITE DISPOSAL | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.5 RESIDENT FARMER | TASK#: 2CNF

5861

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		OFF-SITE DISPOSAL TO ENVIROCARE BY RAIL EXCAVATE, SORT, DRY, SHRED/CRUSH, LOAD, HAUL	57,603		$973,200	$1,071,600	$623,600	$2,668,400
2		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		57,603		$973,200	$1,071,600	$623,600	$2,668,400
11	SUPERVISION - CONTRACTOR				$165,000			$165,000
12	SM TOOLS/CONSM'BLS						$58,400	$58,400
13	EQUIPMENT RENTAL						$1,437,400	$1,437,400
14	TEMP. FACILITIES				$20,400		$38,000	$58,400
15	TEMP UTL'S HOOK-UP				$10,200		$19,000	$29,200
16	JOB CLEAN-UP				$20,400		$38,000	$58,400
17	SAFETY				$10,200		$19,000	$29,200
18	HEALTH PHYSICS S/C				$134,300		$44,400	$178,700
19	CERCLA/SAT $1,500 PER PERSON					$21,000		$21,000
	BOND					$26,700		$26,700
	OVERHEAD & PROFIT					$425,800		$425,800
22	PAYRL BRD.&BENFT.				$693,500			$693,500
	INDIRECT FIELD COSTS				$1,054,000	$473,500	$1,654,200	$3,181,700
	DIRECT & INDIRECT FIELD COSTS				$2,027,200	$1,545,100	$2,277,800	$5,850,100
23	TRANSPORTATION & BURIAL					$44,394,300		$44,394,300
24	WASTE CONTAINERS						$1,532,800	$1,532,800
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$58,600		$58,600
25	SCREENING & CONFIRMATION TESTING					$3,583,100		$3,583,100
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$1,602,900			$1,602,900
	FERMCO FIELD SUPPORT COSTS				$1,602,900	$48,036,000	$1,532,800	$51,171,700
28	EMISSION MODELING				$10,200		$19,000	$29,200
29	PSAR/FSAR(SAFETY RPT)				$315,900			$315,900
30	ENGINEERING	TITLE I&II $1,784,300 TITLE III	$1,766,700	CDR	$643,500	DCR	$462,200	$4,656,700
	ENGINEERING COSTS							$5,001,800
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$5,362,400	$321,700
	SUB-TOTAL	(BASE ESTIMATE)						$62,345,300
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	13.5%						$8,416,600
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$70,761,900
	CONTINGENCY	12.0%						$7,481,400
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$78,243,300

001139

PRELIMINARY

LOTUS31\FS2\ALT3B\IFP\INDSUM.WK3 - FEASABILITY STUDY

DATE: 08-Aug-94

PROJECT TITLE:
ALT-3B, IFP - EXCAVATION & OFF-SITE DISPOSAL
WBS#:
1.1.1.1.2.3.5

HEALTH PHYSICS

RESIDENT FARMER

EST.NO.: C2940708
EST. : KEN KEPLER
TASK I.D. :
2CNF

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY / MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	335	$4,290	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	335	$8,040	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	335	$1,740	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	335	$1,880	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	335	$2,010	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	335	$1,210	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	335	$23,450	C/B		
SUB-TOTAL		31.80	4		$42,620			
					$127.22	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	13		$170	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	6		$130	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	6		$1,040	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$1,820			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$44,400			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE.
COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

001140

DATE: 08-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

ALT-3B, IFP - EXCAVATION & OFF-SITE DISPOSAL

WBS#: 1.1.1.1.2.3.5

RESIDENT FARMER

EST.NO.: C2940708
EST. : KEN KEPLER
TASK I.D. :
2CNF 5861

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	14	56	$16.97	$950		
ANNUAL PHYSICALS	2	3	14	84	$16.97	$1,430		
EXIT (TERMINATION) PHYSICALS	1	4	14	56	$16.97	$950		
SUB-TOTAL						$3,330		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	34	1	14	483	$16.97	$8,190		
YEARLY IN-VIVO	2	4	14	112	$16.97	$1,900		
EXIT (END OF PROJECT / TERMINATION)	1	4	14	56	$16.97	$950		
SUB-TOTAL						$11,040		
WORK DELAYS CAUSED BY MONITORING	5%				$1,199,400	$59,970		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$1,199,400	$59,970		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$134,300	$44,400	$178,700

00114

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT –ALT-3B, IFP – EXCAVATION & OFF-SITE DISPOSAL – (RESIDENT FARMER)
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CNF

WBS NO. – 1.1.1.1.2.3.5
EST. NO. – C2940708
BY – K. KEPLER
DATE – 07/25/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	30-Jun-94	01-Nov-97	02-Apr-99	31-Aug-2000	34	MONTHS

EST.DATE TO MID-POINT OF ACTIVITY	
57	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – IFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.5

EST.NO. C2940708
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CNF

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR)			CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS 141				ENVIROCARE BURIAL COSTS		TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							$80.15 PER TON (90 TON MIN.)	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	$120 DEMURAGE $/DAY (>6 DAYS)	(1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	
	CAR	LINER	COVER			TONS/CY	TONS						
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 159, 182, or 243 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – IFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.5

EST.NO. C2940708
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CNF

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C –D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0

INPUT

001144

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – IFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.5

EST.NO. C2940708
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CNF

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	0.0	0	$23,816	$0	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	138750.0	1901	$23,816	$45,274,200	$326.25		
	GW / RUBBLE	49.00	1296.0	27	$24,180	$652,900	$493.47		
						**			

INPUT

** NOTE:
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

001145

5861

F-5-287

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – IFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940708
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
OFF–SITE DISPOSAL TO ENVIROCARE (RESIDENT FARMER)														
SITE PREPARATION	1	LS		3,693						$64,140	$15,000	$37,590	$96,390	$213,120
DECONTAMINATION FACILITIES/SERVICES	1	LS		304						$5,540	$25,400	$1,350	$5,510	$37,800
EROSION AND SEDIMENT CONTROLS	1	LS		839						$15,640		$5,410	$43,080	$64,130
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAV/SORT/DRY/CRUSH – OFFSITE DISPOSAL TO ENVIROCARE	1	LS		16394						$270,250	$769,780	$490,730	$111,940	$1,642,700
LOAD/HAUL – OFF–SITE DISPOSAL TO ENVIROCARE	1	LS		21800						$370,730		$510,840	$28,770	$910,340
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE	N/A													N/A
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	N/A													N/A
DIKE	N/A													N/A
GENERATED WASTE REMOVAL	1	LS		1144						$19,410		$11,130		$30,540
SITE RESTORATION	1	LS		8192						$139,020		$249,690	$281,180	$669,890
MONITORING WELLS	1	LS									$164,000			$164,000
SUB–TOTAL (DIRECT FIELD COSTS)				52366						$884,730	$974,180	$1,306,740	$566,870	$3,732,520
TAKE–OFF ALLOWANCE 10%	1	LS		5,237						$88,470	$97,420	$130,670	$56,690	$373,250
TOTAL (DIRECT FIELD COSTS)	1	LS		57,603						$973,200	$1,071,600	$1,437,400	$623,600	$4,105,800

Off–Site Disposal of Inactive Flyash Pile to ENVIROCARE – SUMMARY

CONTR.NO.– [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – IFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940708
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION (ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	2000	LF	0.213	550	16.97				6.25	$9,330			$12,880	$22,210
c. Clear and Grub														
i. Remediation Site	6.50	AC	41.40	347	16.97			2575.00		$5,890		$17,240		$23,130
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Storage Area, & Staging Area @ Sub–unit														
d. Dewatering														
i. Excavate Dewatering Trench	380	CY	0.50	245	16.97			1.49		$4,160		$580		$4,740
ii. Pump – w/4" Suction Hose	120	DAYS	3.00	464	16.97			19.55		$7,870		$2,420		$10,290
iii. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
iv. Remove Sediment fm. Tank – 1cy/trip	2	CY	4.00	10	16.97			100.00		$170		$210		$380
e. General Grading														
i. New Roads	6222	SY	0.001	8	16.97			0.07		$140		$450		$590
33% ii. Office/Parking Area 2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area 272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area 49	16	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub–Unit 2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
v. Storage Area @ Sub–Unit 1112	370	SY	0.010	5	16.97			0.32		$80		$120		$200
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	6222	SY	0.030	241	16.97			1.08	6.66	$4,090		$6,920	$42,680	$53,690
33% ii. Office/Parking – 8" Gravel W/ Geot 2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc 2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk. 631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" tl 24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub–grade Piping – 4" 500	167	LF	0.21	45	17.98			0.74	3.02	$810		$130	$520	$1,460
Epoxy Coating 2845	947	SY	0.22	269	17.98			0.77	7.56	$4,840		$750	$7,380	$12,970
Backfill & Compact around Slab 183	61	ICY	0.086	7	17.98			1.38				$90		$90
Mob/Demob.Equip. 1	0	LS	2.00	1	17.98			184.00		$20		$60		$80
iv. Storage Area – 100' x100' Asphalt														
Includes Compacted Sub–Grade 1112	370	SY	0.084	40	16.97			2.56	14.04	$680		$980	$5,350	$7,010
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat														
TOTAL (SITE PREPARATION)	1	LS		3,693						$64,140	$15,000	$37,590	$96,390	$213,120

Site Preparation Details

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FEMP-OU02-5 DRAFT
August 24, 1994
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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – IFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940708
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CNF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT															
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)															
a. Decon Trailer – Rental	33% 50	17	MO					1500.00				$24,980			$24,980
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'i.d.x 25l	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Gu:	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in (	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
x. Backfill & Compaction around concrete slab	BCY 310	124	ICY	0.086	14	16.97			1.38		$240		$180		$420
SUB–TOTAL (EQUIP. DECON. FACILITY)					268						$4,860	$25,370	$1,240	$4,140	$35,610

Equipment Decon. Facility Details

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August 24, 1994

CONTR.NO.– [redacted]321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – IFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

CONTR.NO. 4424321
EST. NO. C2940708
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CNF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)															
c. Personnel Decon. Facility	33%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric, – Gravel, & Compact Sub–grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0.50	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0.10	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0.13	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Gua	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in (	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0.33	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	0.33	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		304						$5,540	$25,400	$1,350	$5,510	$37,800

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Personnel Decon.Facilities/Services Details

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – IFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940708
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	3000	LF	0.017	66	16.97			0.06	0.65	$1,120		$180	$2,010	$3,310
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	10	EA	8.00	103	16.97			5.00	70.00	$1,750		$50	$700	$2,500
v. Hay Bales	300	EA	0.24	93	16.97			1.53	1.35	$1,580		$470	$420	$2,470
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDP pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction 100% 800	800	LF	0.38	393	19.95			5.11	4.42	$7,840		$4,090	$3,540	$15,470
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout 4	4	EA	8.00	41	16.97			28.00	8300.00	$700		$110	$33,200	$34,010
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		839						$15,640		$5,410	$43,080	$64,130

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FEMP-OU02-5 DRAFT
August 24, 1994

Erosion Control Details

CONTR.NO.- [redacted]321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-3B – IFP – EXCAVATION & OFF-SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.5

CONTR.NO. 4424321
EST. NO. C2940708
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE/SORT/DRY FOR OFF-SITE DISPOSAL TO ENVIROCARE														
EXCAVATION														
Excavate Contaminated Flyash/Soil – Level D	91700	BCY	0.055	6,506	16.97			1.17		$110,410		$107,290		$217,700
Excavate Additional Flyash/Soil – BCY 101800	10100	BCY	0.055	717	16.97			1.17		$12,170		$11,820		$23,990
Sort Cont.Flyash/Soil & Addit.Soil	127250	LCY	0.033	5,417	16.97			2.58		$91,930		$328,310		$420,240
Low Level Thermal Destruction Unit BCY 6900	10997	TON					70.00				$769,780			$769,780
Shredder/Crusher – Purchase/Install 33.3%	0.33	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY 4000														
Generated Waste BCY 1127														
Excavated Debris TONS 6375														
(Percent of Gen.Waste to be Shredded 25%														
Generated Waste TONS 285														
TOTAL TONS 6660														
Operating Costs	111	HRS							25.75				$2,940	$2,940
(2) Operators	222	HRS	1.00	286	16.97					$4,850				$4,850
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Flyash/Soil – Level C BCY 9200	9200	BCY	0.055	653	16.97			1.17		$11,080		$10,760		$21,840
Sort Contaminated Soil	11500	LCY	0.033	490	16.97			2.58		$8,320		$29,670		$37,990
			S/T	1143										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	1143	HRS	150%	1715	16.97					$29,100				$29,100
			S/T	3348										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day)	335	MD												
BCY = BANK CUBIC YARDS : The volume of 1 Cubic Yard of material in its natural state OR Volume/Void to be filled.														
LCY = LOOSE CUBIC YARDS (w/Swell Factor) Volume of material after being excavated.														
ICY = IN-PLACE CUBIC YARDS (w/Shrinkage Factor) Volume of material it takes to fill a 1 Cubic Yard space.														
TOTAL (EXCAVATE/SORT/DRY)	1	LS		16,394						$270,250	$769,780	$490,730	$111,940	$1,642,700

Excavate/Sort/Dry Details

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – IFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940708
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CNF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
LOAD & HAUL FOR OFF–SITE DISPOSAL CONTAMINATED WASTE TO ENVIROCARE															
(ITEMS @ 20% ARE COMMON TO AFP,IFP,SF,SWL & LSP)															
Install Loading Equipment for LLW	20%														
Hopper	1	0.20	EA	177.0	35	16.97	3000.00			6000.00	$600			$1,200	$1,800
Loading Conveyor	1	0.20	EA	147.0	29	16.97	2500.00			8500.00	$500			$1,700	$2,200
Scale	1	0.20	EA	589.0	118	16.97	10000.00			15000.00	$2,000			$3,000	$5,000
Railroad Loading Facility	20%														
a. 160' x 160 'Concrete Pad															
i. Clear & Grub	0.60	0.12	AC	41.40	6	16.97			2575.00		$100		$320		$420
ii. Grading	2845	569.00	SY	0.010	7	16.97			0.32		$120		$190		$310
iii. Sub–Grade & Sub–Base for Conc.Slab	2845	569.00	SY	0.041	30	16.97			1.45	5.51	$510		$850	$3,230	$4,590
iv. Concrete Slab 160 x 160' x 8"thk.	631	126.20	CY	4.07	663	17.98			18.38	67.00	$11,920		$2,390	$8,710	$23,020
v. Concrete Curb – 2'h x 480 lf x 8" thk.	24	4.80	CY	15.30	95	17.98			69.08	275.90	$1,710		$340	$1,360	$3,410
vi. Wood Ties, Ballast, 100# Rail Derailer, Turnout, Bumper Car Stops	600	120.00	LF	1.06	164	16.97			4.43	77.40	$2,780		$550	$9,570	$12,900
vii. Grading for track	800	160.00	SY	0.010	2	16.97			0.32		$30		$50		$80
HAUL															
From excavation site to rail loading facility 6 CY dump truck 1/2 mi r.t.		138750	LCY	0.041	7338	16.97			1.65		$124,530		$228,940		$353,470
LOADING GONDOLA	LCY														
Excavated Flyash & Addit. =	138750														
Allowable CY's of waste per Gondola	73.0														
Install Liner in Gondola car		1901	EA	0.75	1839	16.97			32.21		$31,210		$61,230		$92,440
Load Gondola – 6/day, 2 workers		317	DAYS	16.00	6539	16.97			15.00		$110,970		$4,750		$115,720
Seal liner, Install Cover		1901	EA	0.75	1839	16.97			32.21		$31,210		$61,230		$92,440
Dust control – light		300	DAYS	8.00	3096	16.97			500.00		$52,540		$150,000		$202,540
(RSO takes ownership at this time.) (See: Off–Site Disposal Wksht. and Appendix E)															
TOTAL (LOAD & HAUL OFF–SITE DISPOSAL)		1	LS		21,800						$370,730		$510,840	$28,770	$910,340

Offsite Load/Haul/Disposal Details

CONTR.NO.- [redacted]321
CLIENT - [redacted]. DEPT. OF ENERGY
PROJECT - ALT-3B - IFP - EXCAVATION & OFF-SITE DISPOSAL - RESIDENT FARMER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940708
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CNF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	COST/UNIT RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO OFFSITE DISPOSAL ENVIROCARE Demo. /Load/Haul/Compact															
(ITEMS @ 33-1/3% ARE COMMON TO AFP,IFP & SF)															
a. Office/Parking Area	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo-Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Area @ Excav.Sit	33%														
Demo/Remove Concrete	49	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo-Fabric & Liner	14	5	SY	0.002	1	16.97			0.02		$20				$20
Posts - 4" x 4" x 9'-6"	2	1	EA	0.48		16.97			1.68						
Splash Guard	9	3	SF	0.04		16.97			0.03						
Haul & Dump Rubble	25	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Area @ Excav. Site	33%														
Demo/Remove Concrete	2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	2	1	BCY	0.292		16.97			9.16				$10		$10
Geo-Fabric & Liner	1	0.40	SY	0.002	1	16.97			0.02		$20				$20
Posts - 4" x 4" x 9'-6"	1	0.20	EA	0.48		16.97			1.68						
Splash Guard	2	1	SF	0.04		16.97			0.03						
Haul & Dump Rubble	4	1	BCY	0.30		16.97			2.51						
d. Storage Area	33%														
Demo/ Remove Asphalt	185	62	BCY	1.20	95	16.97			3.62		$1,610		$230		$1,840
Excavate/load/haul/backfill sub-grade	185	62	BCY	0.292	23	16.97			9.16		$390		$580		$970
Geo-fabric liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	247	82	BCY	0.300	32	16.97			2.51		$540		$210		$750
SUB-TOTAL (GENERATED WASTE REMOVAL)		1	LOT		275						$4,660		$2,950		$7,610

Generated Waste Removal Details

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – IFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940708
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CNF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO OFFSITE DISPOSAL ENVIROCARE (CON'T.)															
Demo. /Load/Haul/Dump/Compact (ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)															
e. Staging Area @ sub unit	33%														
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo–Fabric & Liner	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	105	35	BCY	0.30	14	16.97			2.51		$240		$90		$330
f. Staging Area @ Rail Siding	20%														
Demo/Remove Concrete	655	131	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	475	95	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo–Fabric & Liner	2845	569	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	105	21	BCY	0.30	8	16.97			2.51		$140		$50		$190
LOADING GONDOLA	BCY														
Generated Waste	1127														
Plus a swell factor of 15%	1296														
Allowable CY's of waste per Gondola	49.0														
Install Liner in Gondola car		27	EA	0.75	26	16.97			32.21		$440		$870		$1,310
Load Gondola – 6/day, 2 workers		5	DAYS	16.00	103	16.97			15.00		$1,750		$80		$1,830
Seal liner, Install Cover		27	EA	0.75	26	16.97			32.21		$440		$870		$1,310
Dust control – light		5	DAYS	8.00	52	16.97			500.00		$880		$2,500		$3,380
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		869						$14,750		$8,180		$22,930
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,144						$19,410		$11,130		$30,540

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-3B – IFP – EXCAVATION & OFF-SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO: 4424321
EST. NO. C2940708
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CNF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off-site source															
a. Borrow Common Soil, Backfill	BCY														
Inactive Flyash Pile	46000	55200	ICY	0.09	6409	16.97			3.21	3.50	$108,760		$182,510	$199,000	$490,270
	33.3%														
Office/Parking	494	197	ICY	0.09	23	16.97			3.21	3.50	$390		$650	$710	$1,750
Const.Equip.Decon.Area	78	31	ICY	0.09	4	16.97			3.21	3.50	$70		$100	$110	$280
Personnel Decon.Area	7	3	ICY	0.09		16.97			3.21	3.50			$10	$10	$20
Staging Area at Sub-Unit	475	190	ICY	0.09	22	16.97			3.21	3.50	$370		$630	$680	$1,680
Storage Area at Sub-Unit	370	148	ICY	0.09	17	16.97			3.21	3.50	$290		$490	$530	$1,310
Staging Area at Rail Siding	475	190	ICY	0.09	22	16.97			3.21	3.50	$370		$630	$680	$1,680
b. Final Grade for IFP (Excludes Cap)		16667	SY	0.02	430	16.97			0.70		$7,300		$12,020		$19,320
c. Borrow Top Soil 6" Thk., Spread															
Inactive Flyash Pile	16667	16667	SY	0.036	774	16.97			2.33	2.88	$13,130		$40,000	$49,440	$102,570
	33.3%														
Office/Parking	2222	888	SY	0.036	41	16.97			2.33	2.88	$700		$2,130	$2,630	$5,460
Const.Equip.Decon.Area	167	67	SY	0.036	3	16.97			2.33	2.88	$50		$160	$200	$410
Personnel Decon.Area	14	6	SY	0.036		16.97			2.33	2.88			$10	$20	$30
Staging Area at Sub-Unit	2845	1137	SY	0.036	53	16.97			2.33	2.88	$900		$2,730	$3,370	$7,000
Storage Area at Sub-Unit	1112	444	SY	0.036	21	16.97			2.33	2.88	$360		$1,070	$1,320	$2,750
Staging Area at Rail Siding	2845	1137	SY	0.036	53	16.97			2.33	2.88	$900		$2,730	$3,370	$7,000
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Inactive Flyash Pile	16667	150	MSF	0.30	58	16.97			6.75	25.00	$980		$1,040	$3,860	$5,880
	33.3%														
Office/Parking	2222	7	MSF	0.30	3	16.97			6.75	25.00	$50		$50	$180	$280
Const.Equip.Decon.Area	167	1	MSF	0.30		16.97			6.75	25.00			$10	$30	$40
Personnel Decon.Area	14		MSF	0.30		16.97			6.75	25.00					
Staging Area at Sub-Unit	2845	9	MSF	0.30	3	16.97			6.75	25.00	$50		$60	$230	$340
Storage Area at Sub-Unit	1112	3	MSF	0.30	1	16.97			6.75	25.00	$20		$20	$80	$120
Staging Area at Rail Siding	2845	9	MSF	0.30	3	16.97			6.75	25.00	$50		$60	$230	$340
e. Security Fence – 6ga aluminized – 6' high		1400	LF	0.13	231	16.97			1.64	9.80	$3,920		$2,360	$14,130	$20,410
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
TOTAL (SITE RESTORATION)		1	LOT		8,192						$139,020		$249,690	$281,180	$669,890

Site Restoration Details

001155
F-5-297
FEMP-OU02-5 DRAFT August 24, 1994
5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – IFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940708
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at Restoration Site: 8 Pairs x 120 ft.	6	PAIR					23,000				$138,000			$138,000
b. Abandon Existing Wells	2	EA					13,000				$26,000			$26,000
TOTAL (MONITORING WELLS)	1	LOT									$164,000			$164,000

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F-5-298

FEMP-OU02-5 DRAFT
August 24, 1994

Monitoring Wells Details

CONTR.NO. – [redacted]321
CLIENT – [redacted]. DEPT. OF ENERGY
PROJECT – ALT–3B – IFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940708
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO														
PURCHASE														
Bulk Gondola Rail Car N/A	0	EA												
Liner for Gondola														
Excavated Waste – level C,D & Additional	1901	EA							400.00				$760,400	$760,400
Excavated Waste – lead/soil N/A		EA							400.00					
Generated Waste	27	EA							400.00				$10,800	$10,800
Cover for Gondola														
Excavated Waste – level C,D & Additional	1901	EA							395.00				$750,900	$750,900
Excavated Waste – lead/soil N/A		EA							395.00					
Generated Waste	27	EA							395.00				$10,670	$10,670
TOTALS FORWARD TO No. 24 ESTIMATE SUMMARY														
TOTAL (PURCHASE COSTS BY FERMCO)	1	LOT											$1,532,800	$1,532,800

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FEMP-OU02-5 DRAFT
August 24, 1994

Purchase Cost by FERMCO Details

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – IFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940708
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF–SITE TRANSPORTATION COST TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas	1928	EA					340.00				$655,520			$655,520
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additional	1901	EA					22681.00				$43,116,580			$43,116,580
Excavated Waste – lead/soil	N/A	EA												
Generated Waste	27	EA					23045.00				$622,220			$622,220
TOTALS FORWARD TO No. 23 ESTIMATE SUMMARY														
TOTAL (OFF–SITE TRANSPORTATION COST)	1	LOT									$44,394,300			$44,394,300

Off–Site Transportation Details

F-5-300
001158
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – IFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940708
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	155000	GAL					0.01				$1,600			$1,600
Runnoff from the Exclusion Zone.	5700000	GAL					0.01				$57,000			$57,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$58,600			$58,600

Waste Water Treatment Operations Cost Details

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F-5-301
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – IFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.5

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940708
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CNF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	555	EA					2,002				$1,111,100			$1,111,100
Rad	555	EA					2,000				$1,110,000			$1,110,000
Confirmatory Tests														
Full Rad Tests	278	EA					3,101				$862,100			$862,100
Full HSL	30	EA					1,500				$45,000			$45,000
Full TCLP	30	EA					2,000				$60,000			$60,000
2 Technicians per Month	30	MO					13,163				$394,900			$394,900
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS)	1	LOT									$3,583,100			$3,583,100

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F-5-302

FEMP-OU02-5 DRAFT
August 24, 1994

Screening & Confirmation Testing Details

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 3B, IFP – EXCAVATION & OFF–SITE DIPOSAL – (RESIDENT FARMER)
CLIENT: DOE DATE: 08–Aug–94
CONTRACT: C2–94–07–08 BASE ESTIMATE: $62,345,300

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$82,637,856	$20,292,556	32.5%
0.05%	$80,408,307	$18,063,007	29.0%
5.00%	$78,394,853	$16,049,553	25.7%
10.00%	$77,510,726	$15,165,426	24.3%
15.00%	$76,606,324	$14,261,024	22.9%
20.00%	$75,691,723	$13,346,423	21.4%
25.00%	$74,819,866	$12,474,566	20.0%
30.00%	$74,025,025	$11,679,725	18.7%
35.00%	$73,176,901	$10,831,601	17.4%
40.00%	$72,372,864	$10,027,564	16.1%
45.00%	$71,606,788	$9,261,488	14.9%
50.00%	$70,895,271	$8,549,971	13.7%
55.00%	$70,115,116	$7,769,816	12.5%
60.00%	$69,122,931	$6,777,631	10.9%
65.00%	$68,401,166	$6,055,866	9.7%
70.00%	$67,534,583	$5,189,283	8.3%
75.00%	$66,733,502	$4,388,202	7.0%
80.00%	$65,874,083	$3,528,783	5.7%
85.00%	$64,985,842	$2,640,542	4.2%
90.00%	$64,203,459	$1,858,159	3.0%
95.00%	$63,306,263	$960,963	1.5%
99.95%	$61,364,158	($981,142)	–1.6%
100.00%	$59,123,860	($3,221,440)	–5.2%

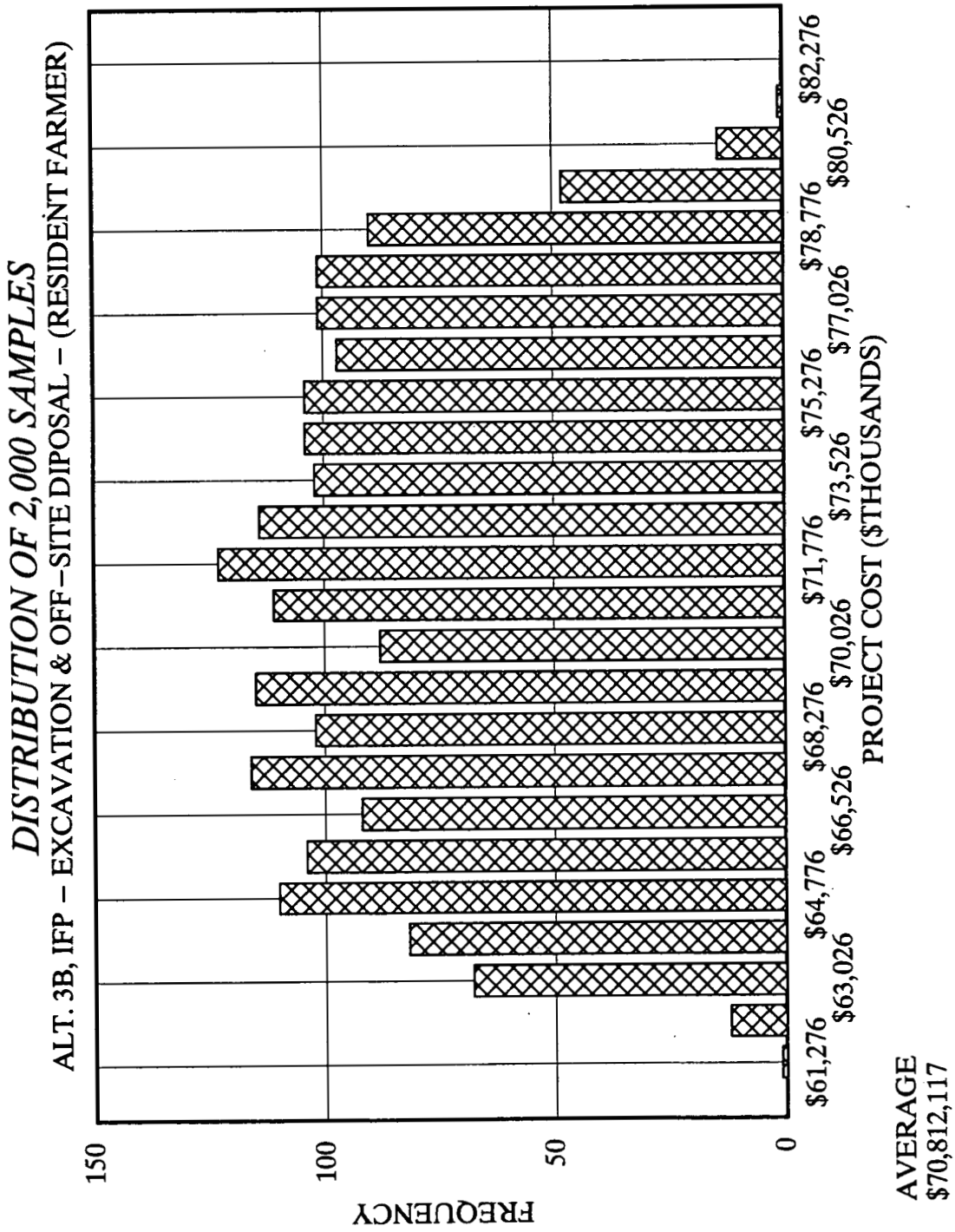
FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

PROJECT: ALT. 3B, IFP – EXCAVATION & OFF–SITE DIPOSAL – (RESIDENT FARMER)
CLIENT: DOE
CONTRACT: C2–94–07–08

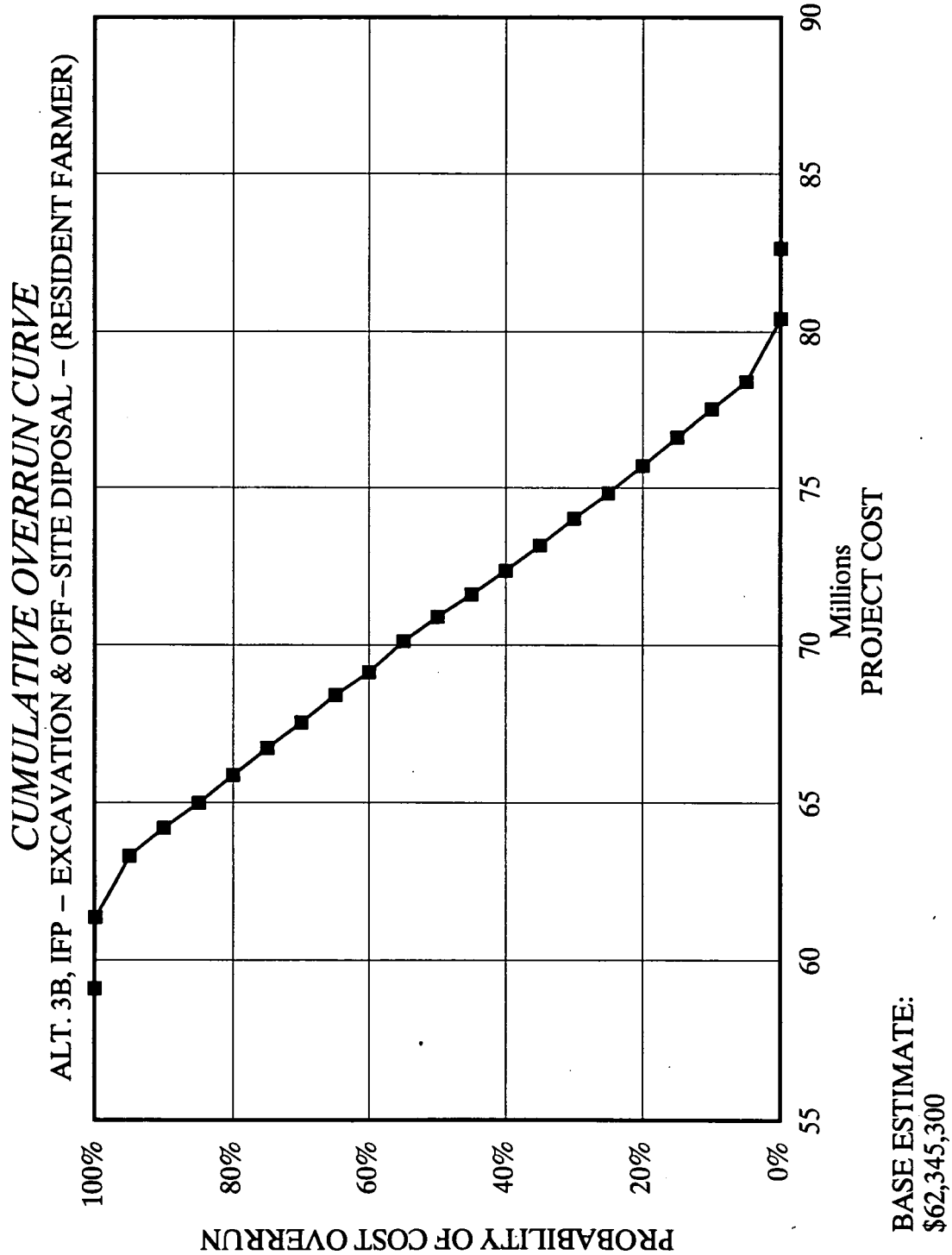
ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA–TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$70,550	–5.0%	$67,023	30%	$91,715	U		14%
2	SITE PREPERATION S/C	16,500	–5.0%	15,675	30%	21,450	U		14%
3	SITE PREPERATION MAT'L	106,030	–5.0%	100,729	20%	127,236	U		20%
4	DECON FACILITIES/SERVICES LABOR	6,090	–2.0%	5,968	80%	10,962	U		2%
5	DECON FACILITIES/SERVICES S/C	27,940	–6.0%	26,264	80%	50,292	U		7%
6	DECON FACILITIES/SERVICES MAT'L	6,060	–6.0%	5,696	60%	9,696	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	17,200	–5.0%	16,340	30%	22,360	U		14%
8	EROSION/SEDIMENT CNTRLS MAT'L	47,390	–5.0%	45,021	30%	61,607	U		14%
9	EXC/SORT/SHRD/DRY OFF–SITE LBR	297,280	–6.0%	279,443	125%	668,880	U		5%
10	EXC/SORT/SHRD/DRY OFF–SITE S/C	846,810	–10.0%	762,129	75%	1,481,918	U		12%
11	EXC/SORT/SHRD/DRY OFF–SITE MTL	123,130	–10.0%	110,817	75%	215,478	U		12%
12	LOAD & HAUL OFF–SITE DISP LABOR	407,800	–1.0%	403,722	100%	815,600	U		1%
13	LOAD & HAUL OFF–SITE DISP MAT'L	31,650	–10.0%	28,485	50.0%	47,475	U		17%
14	GENERATED WASTE REMVL LABOR	21,350	–5.0%	20,283	50.0%	32,025	U		9%
15	SITE RESTORATION LABOR	152,920	–5.0%	145,274	30.0%	198,796	U		14%
16	SITE RESTORATION MAT'L	309,300	–5.0%	293,835	30.0%	402,090	U		14%
17	MONITORING WELLS S/C	180,400	–5.0%	171,380	50.0%	270,600	U		9%
18	INDIRECT FIELD COSTS LABOR	1,054,000	–5.0%	1,001,300	50.0%	1,581,000	U		9%
19	INDIRECT FIELD COSTS S/C	473,500	–5.0%	449,825	100.0%	947,000	U		5%
20	INDIRECT FIELD COSTS MAT'L	1,654,200	–5.0%	1,571,490	50.0%	2,481,300	U		9%
21	FIELD SUPPORT COSTS LABOR	1,602,900	–10.0%	1,442,610	30.0%	2,083,770	U		25%
22	FIELD SUPPORT COSTS S/C	48,036,000	–5.0%	45,634,200	30.0%	62,446,800	U		14%
23	FIELD SUPPORT COSTS MAT'L	1,532,800	–5.0%	1,456,160	30.0%	1,992,640	U		14%
24	ENGINEERING COSTS	5,001,800	–5.0%	4,751,710	25.0%	6,252,250	U		17%
25	SALES TAX MAT'L	321,700	–1.0%	318,483	1.0%	324,917	U		50%
26				0		0			0%
27				0		0			0%
28				0		0			0%
29				0		0			0%
30				0		0			0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$62,345,300		$59,123,860		$82,637,856			

001162

5 881


DISTRIBUTION OF 2,000 SAMPLES
ALT. 3B, IFP – EXCAVATION & OFF–SITE DIPOSAL – (RESIDENT FARMER)
FREQUENCY
150
100
50
0
$61,276
$63,026
$64,776
$66,526
$68,276
$70,026
$71,776
$73,526
$75,276
$77,026
$78,776
$80,526
$82,276
PROJECT COST ($THOUSANDS)
AVERAGE
$70,812,117

001163


CUMULATIVE OVERRUN CURVE
ALT. 3B, IFP – EXCAVATION & OFF-SITE DIPOSAL – (RESIDENT FARMER)
PROBABILITY OF COST OVERRUN
100%
80%
60%
40%
20%
0%
55
60
65
70
75
80
85
90
Millions
PROJECT COST
BASE ESTIMATE:
$62,345,300

001164

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, IFP - EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940708
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$62,345,300	BASE EST:	$70,550	BASE EST:	$16,500	BASE EST:	$106,030	BASE EST:	$6,090	BASE EST:	$27,940	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	30%	-5%	20%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)							-1%	50%	-1%	50%	-1%	40%
TOTAL %	-5%	30%	-5%	30%	-5%	20%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$67,023	$91,715	$15,675	$21,450	$100,729	$127,236	$5,968	$10,962	$26,264	$50,292	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-5-307

001165

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, IFP - EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940708
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$17,200	BASE EST:	$0	BASE EST:	$47,390	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$16,340	$25,800	$0	$0	$45,021	$61,607	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, IFP – EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940708
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

	EXCAVATE/SORT/SHRED/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/SHRED/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/SHRED/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$297,280	BASE EST:	$846,810	BASE EST:	$123,130	BASE EST:	$407,800	BASE EST:	$0	BASE EST:	$31,650
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	100%					-1%	100%				
MATERIAL PRICING			-5%	50%	-5%	50%					-5%	25%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-5%	25%	-5%	25%	-5%	25%					-5%	25%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	125%	-10%	75%	-10%	75%	-1%	100%	0%	0%	-10%	50%
TOTAL $	$279,443	$668,880	$762,129	$1,481,918	$110,817	$215,478	$403,722	$815,600	$0	$0	$28,485	$47,475

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

000167
5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, IFP – EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940708
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

	EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE LABOR $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE S/C $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001168

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, IFP – EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940708
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		CLAY CAP LABOR $'s		CLAY CAP S/C $'s		CLAY CAP MAT'L. $'s	
	BASE EST: $0		BASE EST: $0		BASE EST: $0		BASE EST: $0		BASE EST: $0		BASE EST: $0	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001169

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, IFP – EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940708
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$21,350	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$20,283	$32,025	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, IFP – EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940708
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$152,920	BASE EST:	$0	BASE EST:	$309,300	BASE EST:	$0	BASE EST:	$180,400	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$145,274	$198,796	$0	$0	$293,835	$402,090	$0	$0	$171,380	$270,600	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

001171

F-5-313

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3B, IFP – EXCAVATION & OFF–SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940708
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$1,054,000	BASE EST:	$473,500	BASE EST:	$1,654,200	BASE EST:	$1,602,900	BASE EST:	$48,036,000	BASE EST:	$1,532,800
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–10%	30%				
MATERIAL PRICING			–5%	100%	–5%	50%			–5%	30%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	–5%	100%	–5%	50%	–10%	30%	–5%	30%	–5%	30%
TOTAL $	$1,001,300	$1,581,000	$449,825	$947,000	$1,571,490	$2,481,300	$1,442,610	$2,083,770	$45,634,200	$62,446,800	$1,456,160	$1,992,640
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, IFP – EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940708
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$5,001,800	BASE EST:	$321,700	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-5%	25%										
(OTHER)												
TOTAL %	-5%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$4,751,710	$6,252,250	$318,483	$324,917	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

LCC ANALYSIS TITLE:	SF - EXCAVATE & OFF-SITE DISPOSAL - (RESIDENT FARMER)			
WBS NO.:	1.1.1.1.2.3.2		TASK NO.:	2CSF
ALTERNATIVE:	3B		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	35 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	09-Aug-94
DOCUMENT NO.:	LCC-94-03-05	EST. NO. C2-94-07-09/FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$41,445,617	$0	$0	$41,445,600	1996
$124,336,852	$0	$0	$124,336,900	1997
$72,529,830	$0	$0	$72,529,800	1998
$0	$0	$0	$0	1999
$0	$0	$0	$0	2000
$0	$0	$0	$0	2001
$0	$0	$0	$0	2002
$0	$0	$0	$0	2003
$0	$0	$0	$0	2004
$0	$0	$0	$0	2005
$0	$0	$0	$0	2006
$0	$0	$0	$0	2007
$0	$0	$0	$0	2008
$0	$0	$0	$0	2009
$0	$0	$0	$0	2010
$0	$0	$0	$0	2011
$0	$0	$0	$0	2012
$0	$0	$0	$0	2013
$0	$0	$0	$0	2014
$0	$0	$0	$0	2015
$0	$0	$0	$0	2016
$0	$0	$0	$0	2017
$0	$0	$0	$0	2018
$0	$0	$0	$0	2019
$0	$0	$0	$0	2020
$0	$0	$0	$0	2021
$0	$0	$0	$0	2022
$0	$0	$0	$0	2023
$0	$0	$0	$0	2024
$0	$0	$0	$0	2025
$0	$0	$0	$0	2026
$0	$0	$0	$0	2027
$0	$0	$0	$0	2028
				2029
				2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$238,312,300	$0	$0	$238,312,300	TOTAL
$218,614,600	$0	$0	$218,614,600	<====(@NPV)

F ERMC O
ESTIMATING SERVICES

EST FILE #: C2940709 | DATE: 08-Aug-94
CLIENT: US DOE | SUMMARY SHEET | ESTIMATOR: KEN KEPLER
PROJECT TITLE: ALT-3B, SF - EXCAVATION & OFF-SITE DISPOSAL | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.2 RESIDENT FARMER | TASK#: 2CSF

867

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		OFF-SITE DISPOSAL TO ENVIROCARE BY RAIL EXCAVATE, SORT, DRY, SHRED/CRUSH, LOAD, HAUL	145,977		$2,482,900	$1,804,400	$630,300	$4,917,600
2								
3		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		145,977		$2,482,900	$1,804,400	$630,300	$4,917,600
11	SUPERVISION - CONTRACTOR				$422,000			$422,000
12	SM TOOLS/CONSM'BLS						$149,000	$149,000
13	EQUIPMENT RENTAL						$4,120,800	$4,120,800
14	TEMP. FACILITIES				$52,100		$96,800	$148,900
15	TEMP UTL'S HOOK-UP				$26,100		$48,400	$74,500
16	JOB CLEAN-UP				$52,100		$96,800	$148,900
17	SAFETY				$26,100		$48,400	$74,500
18	HEALTH PHYSICS S/C				$343,400		$3,400	$346,800
19	CERCLA/SAT	$1,500 PER PERSON				$78,000		$78,000
	OND					$49,200		$49,200
	VERHEAD & PROFIT					$947,700		$947,700
22	PAYRL BRD.&BENFT.				$1,770,400			$1,770,400
	INDIRECT FIELD COSTS				$2,692,200	$1,074,900	$4,563,600	$8,330,700
	DIRECT & INDIRECT FIELD COSTS				$5,175,100	$2,879,300	$5,193,900	$13,248,300
23	TRANSPORTATION & BURIAL					$148,129,900		$148,129,900
24	WASTE CONTAINERS						$5,115,000	$5,115,000
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$198,700		$198,700
25	SCREENING & CONFIRMATION TESTING					$10,839,200		$10,839,200
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$3,086,900			$3,086,900
	FERMCO FIELD SUPPORT COSTS				$3,086,900	$159,167,800	$5,115,000	$167,369,700
28	EMISSION MODELING				$23,200		$43,100	$66,300
29	PSAR/FSAR(SAFETY RPT)				$397,400			$397,400
30	ENGINEERING	TITLE I&II $1,801,800 TITLE III	$2,053,500	CDR	$662,400	DCR	$384,200	$4,901,900
	ENGINEERING COSTS							$5,365,600
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$15,467,000	$928,000
	SUB-TOTAL	(BASE ESTIMATE)						$186,911,600
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	13.5%						$25,233,100
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$212,144,700
	ONTINGENCY	14.0%						$26,167,600
								PRELIMINARY
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$238,312,300

LOTUS31\FS2\ALT3B\SF\INDSUM.WK3 - FEASABILITY STUDY

001175

DATE: 08-Aug-94

PROJECT TITLE:
ALT-3B, SF - EXCAVATION & OFF-SITE DISPOSAL
WBS#:
1.1.1.1.2.3.2

HEALTH PHYSICS

RESIDENT FARMER

EST.NO.: C2940709
EST. : KEN KEPLER
TASK I.D. :
2CSF

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY / MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	16	$200	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	16	$380	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	16	$80	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	16	$90	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	16	$100	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	16	$60	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	16	$1,120	C/B		
SUB-TOTAL		31.80	4		$2,030			
					$126.88	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	8		$100	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	4		$90	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	4		$700	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$1,370			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$3,400			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

DATE: 08-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940709

ALT-3B, SF - EXCAVATION & OFF-SITE DISPOSAL

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.2

RESIDENT FARMER

TASK I.D. : 2CSF

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	52	208	$16.97	$3,530		
ANNUAL PHYSICALS	1	3	52	156	$16.97	$2,650		
EXIT (TERMINATION) PHYSICALS	1	4	52	208	$16.97	$3,530		
SUB-TOTAL						$9,710		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	23	1	52	1210	$16.97	$20,530		
YEARLY IN-VIVO	1	4	52	208	$16.97	$3,530		
EXIT (END OF PROJECT / TERMINATION)	1	4	52	208	$16.97	$3,530		
SUB-TOTAL						$27,590		
WORK DELAYS CAUSED BY MONITORING	5%				$3,061,300	$153,065		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$3,061,300	$153,065		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$343,400	$3,400	$346,800

001177

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT-3B, SF – EXCAVATION & OFF-SITE DISPOSAL – (RESIDENT FARMER)
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CSF

WBS NO. – 1.1.1.1.2.3.2
EST. NO. – C2940709
BY – K. KEPLER
DATE – 07/22/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	30-Jun-94	01-Jun-96	16-May-97	30-Apr-98	23	MONTHS

EST.DATE TO MID-POINT OF ACTIVITY	
35	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SF – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940709
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CSF

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR) CAR	LINER	COVER	CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE TONS/CY	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS 141 $80.15 PER TON (90 TON MIN.) TONS	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	$120 DEMURAGE $/DAY (>5 DAYS)	ENVIROCARE BURIAL COSTS (1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045
	$0	$400	$395	$340	LEAD/SOIL	1.810	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 125, 141, or 200 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

001179

F-5-321

FEMP-OU02-5 DRAFT
August 24, 1994

5861

APPENDIX E

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SF – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940709
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CSF

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C –D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0
	LEAD/SOIL	1.810	134.00	1971.0	196,000	0	196,000	1462.7	54.2

INPUT

001180

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SF – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940709
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CSF

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	467125.0	6399	$23,816	$152,398,600	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	1295.0	27	$24,180	$652,900	$493.47		
	LEAD/SOIL	54.20	396.0	8	$24,180	$193,400	$446.13		
						**			

INPUT

** NOTE:
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

001184
5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SF – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940709
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
OFF–SITE DISPOSAL TO ENVIROCARE (RESIDENT FARMER)														
SITE PREPARATION	1	LS		4,901						$84,300	$15,000	$61,410	$102,360	$263,070
DECONTAMINATION FACILITIES/SERVICES	1	LS		304						$5,540	$25,400	$1,350	$5,510	$37,800
EROSION AND SEDIMENT CONTROLS	1	LS		1,557						$28,960		$9,420	$50,090	$88,470
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT/DRY/CRUSH – OFFSITE DISPOSAL (LEAD CONTAMINATED SOIL)	1	LS		47,153						$800,540	$1,456,920	$1,645,290	$113,770	$4,016,520
LOAD/HAUL – OFF–SITE DISPOSAL TO ENVIROCARE (LEAD CONTAMINATED SOIL)	1	LS		71,334						$1,211,320		$1,761,920	$28,770	$3,002,010
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE	N/A													N/A
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	N/A													N/A
DIKE	N/A													N/A
GENERATED WASTE REMOVAL	1	LS		710						$12,050		$11,510		$23,560
SITE RESTORATION	1	LS		6,747						$114,510		$255,250	$272,490	$642,250
MONITORING WELLS	1	LS									$143,000			$143,000
SUB–TOTAL (DIRECT FIELD COSTS)				132,706						$2,257,220	$1,640,320	$3,746,150	$572,990	$8,216,680
TAKE–OFF ALLOWANCE 10%	1	LS		13,271						$225,720	$164,030	$374,620	$57,300	$821,670
TOTAL (DIRECT FIELD COSTS)	1	LS		145,977						$2,482,900	$1,804,400	$4,120,800	$630,300	$9,038,400

Off–Site Disposal of South Field to ENVIROCARE – SUMMARY

PAGE 1 of 15

F-5-324
001188
FEMP-OU02-5 DRAFT August 24, 1998

CONTR.NO. – [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SF – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940709
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	3400	LF	0.213	934	16.97				6.25	$15,850			$21,890	$37,740
c. Clear and Grub														
i. Remediation Site	15.00	AC	41.40	801	16.97			2575.00		$13,590		$39,780		$53,370
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Storage Area, &/or Staging Area @ Sub–unit														
d. Dewatering														
i. Excavate Dewatering Trench	500	CY	0.50	323	16.97			1.49		$5,480		$770		$6,250
ii. Pump – w/4" Suction Hose	200	DAYS	3.00	774	16.97			19.55		$13,130		$4,030		$17,160
iii. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
iv. Remove Sediment fm. Tank – 1cy/trip	2	CY	4.00	10	16.97			100.00		$170		$210		$380
e. General Grading														
i. New Roads	5778	SY	0.001	7	16.97			0.07		$120		$420		$540
33.3%														
ii. Office/Parking Area 2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area 272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area 49	16	SY	0.010		16.97			0.32				$10		$10
v. Staging Area @ Sub–Unit 2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
vi. Storage Area 1112	370	SY	0.010	5	16.97			0.32		$80		$120		$200
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	5778	SY	0.030	224	16.97			1.08	6.66	$3,800		$6,430	$39,640	$49,870
33.3%														
ii. Office/Parking – 8" Gravel W/ Geot 2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ S/U – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc.Slab 2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk. 631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" tl 24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub–grade Piping – 4" 500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating 2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab 183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip. 1	0	LS	2.00	1	16.97			184.00		$20		$60		$80
iv. Storage Area – 100' x100' Asphalt														
Includes Compacted Sub–Grade 1112	370	SY	0.084	40	16.97			2.56	14.04	$680		$980	$5,350	$7,010
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat														
TOTAL (SITE PREPARATION)	1	LS		4,901						$84,300	$15,000	$61,410	$102,360	$263,070

Site Preparation Details

F-S-325
001183
FEMP-OU02-5 DRAFT August 26, 1994
5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SF – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940709
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT														
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)														
33.3%														
a. Decon Trailer – Rental 50	17	MO					1500.00				$24,980			$24,980
b. Construction Equipment Decon. Facility														
25 ft x 60 ft														
i. Excavation – Structural 175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep. 167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.														
1/4" Steel Plate Cover – 5' dia. 16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf 25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete														
Decon Pad – 8" to 12" thk. 39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Pad Trench – 2'x2'i.d.x 25lfx8" thl 5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf 5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk. 0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating 167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete														
Sump – 5'dia.x 5' deep. 1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping 2" X 4" 200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding														
vii. Corrugated Fiberglass Splash Gu: 720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set con: 27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm 1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping 2" 10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction														
HDPE Pipe–Conc.Trench to Manhole 3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
BCY														
x. Backfill & Compaction 310														
around concrete slab ICY														
372	124	ICY	0.086	14	16.97			1.38		$240		$180		$420
SUB–TOTAL (EQUIP. DECON. FACILITY)				268						$4,860	$25,370	$1,240	$4,140	$35,610

Equipment Decon. Facility Details

FEMP-OU02-5 DRAFT
August 24, 1994
F-5-326
001184

CONTR.NO.- [redacted]4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SF – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940709
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.) (ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)															
c. Personnel Decon. Facility	33.3%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric, – Gravel, & Compact Sub–grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0.50	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0.10	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0.13	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	4.66	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Gua	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0.33	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping– 1	1	0.33	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17 ICY 20	6.66	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		304						$5,540	$25,400	$1,350	$5,510	$37,800

Personnel Decon.Facilities/Services Details

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001185

FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SF – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940709
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	2000	LF	0.017	44	16.97			0.06	0.65	$750		$120	$1,340	$2,210
ii. Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	500	EA	0.24	155	16.97			1.53	1.35	$2,630		$790	$700	$4,120
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
100% iii. Sedimentation/Decon. Tank 13000 ga 1	1	LS	64.00	83	19.95			224.00	7000.00	$1,660		$220	$7,000	$8,880
iv. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction 1400	1400	LF	0.38	688	19.95			5.11	4.42	$13,730		$7,150	$6,190	$27,070
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout 3	3	EA	8.00	31	16.97			28.00	8300.00	$530		$80	$24,900	$25,510
vi. 50 gal. Pump Includes Controls & Electrical	2	EA	60.00	155	16.97			210.00	2500.00	$2,630		$420	$5,000	$8,050
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,557						$28,960		$9,420	$50,090	$88,470

Erosion Control Details

FEMP-OU02-5 DRAFT
August 24, 1994
F-5-328
001186

CONTR.NO.- [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT-3B – SF – EXCAVATION & OFF-SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940709
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE/SORT/DRY FOR OFF-SITE DISPOSAL to ENVIROCARE														
Excavate Lead Contaminated Soil @ Firing Range	300	BCY	0.20	77	16.97			5.65		$1,310				$1,310
Solidification of lead cont.soil w/Potland Cement 30% Portland Cement, 2% Sodium Silicate in drums. 300 CY @ 1.5 Tons =	450	TONS					510.50				$229,730			$229,730
Excavate Contaminated Soil – Level D	339200	BCY	0.055	24,066	16.97			1.17		$408,400		$396,860		$805,260
Excavate Additional Soil	34000	BCY	0.055	2,412	16.97			1.17		$40,930		$39,780		$80,710
Sort Contaminated Soil – BCY 373200	466500	LCY	0.033	19,859	16.97			2.58		$337,010		$1,203,570		$1,540,580
Low Level Thermal Destruction Unit BCY 11000	17531	TON					70.00				$1,227,190			$1,227,190
Sub-contract cost for Drying Operation and moisture test Only.														
Shredder/Crusher – Purchase/Install 33.3%	0.33	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY 6500														
Generated Wastes BCY 1126														
Excavated Debris TONS 10359														
(Percent of Gen.wst. to be Shredded) 25%														
Generated Wastes TONS 413														
TOTAL TONS 10772														
Operating Costs	180	HRS							25.75				$4,770	$4,770
(2) Operators	360	HRS	1.00	464	16.97					$7,870				$7,870
PPE LEVEL 'C' Allowance added to the following:														
Excavate contaminated soil/rubble – Level C BCY 500	500	BCY	0.055	35	16.97			1.17		$590		$590		$1,180
Sort contaminated soil/rubble	625	LCY	0.033	27	16.97			2.58		$460		$1,610		$2,070
			S/T	62										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	62	HRS	150%	93	16.97					$1,580				$1,580
			S/T	155										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day)	16	MD												
BCY = BANK CUBIC YARDS : The volume of 1 Cubic Yard of material in its natural state or the volume / void to be filled. LCY = LOOSE CUBIC YARDS : The volume of material after being excavated with Swell Factor. ICY = IN-PLACE CUBIC YARDS = The volume of material it takes to fill a space 1 cubic yard in size. (Includes shrinkage/compaction factor)														
TOTAL (EXCAVATE/SORT/DRY)	1	LS		47,153						$800,540	$1,456,920	$1,645,290	$113,770	$4,016,520

Excavate/Sort/Dry Details

F-5-329
001187
FEMP-OU02-5 DRAFT August 24, 1994
5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SF – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940709
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
LOAD & HAUL FOR OFF–SITE DISPOSAL															
CONTAMINATED WASTE															
(ITEMS @ 20% ARE COMMON TO SWL,LSP,AFP,JFP & SF)															
Install Loading Equipment for LLW	20%														
Hopper	1	0.20	EA	177.0	35	16.97	3000.00			6000.00	$600			$1,200	$1,800
Loading Conveyor	1	0.20	EA	147.0	29	16.97	2500.00			8500.00	$500			$1,700	$2,200
Scale	1	0.20	EA	589.0	118	16.97	10000.00			15000.00	$2,000			$3,000	$5,000
Railroad Loading Facility															
a. 160' x 160 'Concrete Pad	20%														
i. Clear & Grub	0.60	0.12	AC	41.40	6	16.97			2575.00		$100		$320		$420
ii. Grading	2845	569.00	SY	0.010	7	16.97			0.32		$120		$190		$310
iii. Sub–Grade & Sub–Base for Conc.Sla	2845	569.00	SY	0.031	30	16.97			1.45	5.51	$510		$850	$3,230	$4,590
iv. Concrete Slab 160 x 160' x 8"thk.	631	126.20	CY	4.07	663	17.98			18.38	67.00	$11,920		$2,390	$8,710	$23,020
v. Concrete Curb – 2'h x 480 lf x 8" thk.	24	4.80	CY	15.30	95	17.98			69.08	275.90	$1,710		$340	$1,360	$3,410
vi. Wood Ties, Ballast, 100# Rail	600	120	LF	1.06	164	16.97			4.43	77.40	$2,780		$550	$9,570	$12,900
Derailer, Turnout, Bumper Car Stops															
vii. Grading for track	800	160	SY	0.010	2	16.97			0.32		$30		$50		$80
HAUL															
From excavation site to rail loading facility															
6 CY dump truck 1/2 mi rt.															
Excavated level D, C & Addn. Soils		467125	LCY	0.04	24,706	16.97			1.65		$419,260		$793,880		$1,213,140
Solidified lead/soil/cement		396	LCY	0.04	21	16.97			1.65		$360		$670		$1,030
LOADING GONDOLA															
Excavated level D, C & Addn. Soils	LCY														
Excavate level D, C & Additional =	467125														
Allowable CY's of waste per Gondola	73.0														
Solidified lead/soil/cement	LCY														
Excav. 300 BCY x 1.25 swell factor =	396														
Allowable CY's of waste per Gondola	54.2														
Install Liner in Gondola car															
Excavated level D, C & Addn. Soils		6399	EA	0.75	6,191	16.97			32.21		$105,060		$206,110		$311,170
Solidified lead/soil/cement		8	EA	0.75	8	16.97			32.21		$140		$260		$400
Load Gondola – 6/day, 2 workers		1068	DAYS	16.00	22,040	16.97			15.00		$374,020		$16,020		$390,040
Seal liner, Install Cover															
Excavated level D, C & Addn. Soils		6399	EA	0.75	6,191	16.97			32.21		$105,060		$206,110		$311,170
Solidified lead/soil/cement		8	EA	0.75	8	16.97			32.21		$140		$260		$400
Dust control – light		1068	DAYS	8.00	11,020	16.97			500.00		$187,010		$533,920		$720,930
(RSO takes ownership at this time.)															
(See: Off–Site Disposal Wksht. & App.E)															
TOTAL (LOAD & HAUL OFF–SITE DISPOSAL)		1	LS		71,334						$1,211,320		$1,761,920	$28,770	$3,002,010

Offsite Load/Haul/Disposal Details

F-5-330
001188
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. - [illegible]4321
CLIENT - U.S. DEPT. OF ENERGY
PROJECT - ALT-3B - SF - EXCAVATION & OFF-SITE DISPOSAL - RESIDENT FARMER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940709
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	COST/UNIT RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ENVIROCARE Demo. /Load/Haul															
(ITEMS @ 20% ARE COMMON TO SWL,LSP,AFP,IFP & SF)															
(ITEMS @ 33-1/3% ARE COMMON TO AFP,IFP & SF)															
a. Office/Parking Area	33.3%														
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo-Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Area @ Excav.Sit	33.3%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo-Fabric & Liner	167	56	SY	0.002	1	16.97			0.02		$20				$20
Posts - 4" x 4" x 9'-6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Area @ Excav. Site	33.3%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo-Fabric & Liner	14	5	SY	0.002	1	16.97			0.02		$20				$20
Posts - 4" x 4" x 9'-6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
d. Storage Pad Area @ sub unit	33.3%														
Demo/Remove Asphalt	185.0	62	BCY	1.2	95	16.97			3.62		$1,610		$230		$1,840
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	185.0	62	BCY	0.292	23	16.97			9.16		$390		$580		$970
Geo-Fabric & Liner	1112	370	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	247.0	82	BCY	0.30	32	16.97			2.51		$540		$210		$750
SUB-TOTAL (GENERATED WASTE REMOVAL)		1	LOT		295						$5,000		$2,970		$7,970

Generated Waste Removal Details

F-5-331

001189

5861

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SF – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940709
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ENVIROCARE (CON'T.)														
Demo. /Load/Haul/Compact														
(ITEMS @ 20% ARE COMMON TO SWL,LSP,AFP,IFP & SF)														
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)														
e. Staging Area @ sub–unit 33.3%														
Demo/Remove Concrete 655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excavate, Load, Haul, Backfill, Compact														
Sub–grade Stone 475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo–Fabric & Liner 2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble 105	35	BCY	0.30	14	16.97			2.51		$240		$90		$330
f. Staging Area @ Rail Siding 20%														
Demo/Remove Concrete 655	131	BCY	1.2		17.98			3.62				$610		$610
Excavate, Load, Haul, Backfill, Compact														
Sub–grade Stone 474	95	BCY	0.292		17.98			9.16				$1,120		$1,120
Geo–Fabric & Liner 2844	569	SY	0.002	1	17.98			0.02		$20		$10		$30
Haul & Dump Rubble 105	21	BCY	0.30		17.98			2.51				$70		$70
LOADING GONDOLA BCY														
Generated Waste 1126														
Plus a swell factor of 15% = LCY 1295														
Allowable CY's of waste per Gondola 49.0														
Install Liner in Gondola car	27	EA	0.75		17.98			32.21				$870		$870
Load Gondola – 6/day, 2 workers	5	DAYS	16.00		17.98			15.00				$80		$80
Seal liner, Install Cover	27	EA	0.75		17.98			32.21				$870		$870
Dust control – light	5	DAYS	8.00		17.98			500.00				$2,500		$2,500
SUB–TOTAL (GENERATED WASTE REMOVAL)	1	LOT		415						$7,050		$8,540		$15,590
TOTAL (GENERATED WASTE REMOVAL)	1	LOT		710						$12,050		$11,510		$23,560

Generated Waste Removal Details

FEMP-OU02-5 DRAFT August 31, 1994

001190

R-5-332

CONTR.NO.– [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SF – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940709
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
South Field	11200	13440	ICY	0.09	1560	16.97			3.21	3.50	$26,470		$44,440	$48,450	$119,360
	33%														
Office/Parking	494	197	ICY	0.09	23	16.97			3.21	3.50	$390		$650	$710	$1,750
Const.Equip.Decon.Area	78	31	ICY	0.09	4	16.97			3.21	3.50	$70		$100	$110	$280
Personnel Decon.Area	7	3	ICY	0.09		16.97			3.21	3.50			$10	$10	$20
Staging Area at Sub–Unit	475	190	ICY	0.09	22	16.97			3.21	3.50	$370		$630	$680	$1,680
Storage Area at Sub–unit	370	148	ICY	0.09	17	16.97			3.21	3.50	$290		$490	$530	$1,310
b. Final Grade for SF		62920	SY	0.02	1623	16.97			0.70		$27,540		$45,370		$72,910
c. Borrow Top Soil 6" Thk., Spread															
South Field		62920	SY	0.036	2922	16.97			2.33	2.88	$49,590		$151,000	$186,650	$387,240
	33%														
Office/Parking	2222	888	SY	0.036	41	16.97			2.33	2.88	$700		$2,130	$2,630	$5,460
Const.Equip.Decon.Area	167	67	SY	0.036	3	16.97			2.33	2.88	$50		$160	$200	$410
Personnel Decon.Area	14	6	SY	0.036		16.97			2.33	2.88			$10	$20	$30
Staging Area at Sub–Unit	2845	1137	SY	0.036	53	16.97			2.33	2.88	$900		$2,730	$3,370	$7,000
Storage Area at Sub–Unit	1112	444	SY	0.036	21	16.97			2.33	2.88	$360		$1,070	$1,320	$2,750
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
South Field	62920	566	MSF	0.30	219	16.97			6.75	25.00	$3,720		$3,940	$14,570	$22,230
	33%														
Office/Parking	2222	7	MSF	0.30	3	16.97			6.75	25.00	$50		$50	$180	$280
Const.Equip.Decon.Area	167	1	MSF	0.30		16.97			6.75	25.00			$10	$30	$40
Personnel Decon.Area	14		MSF	0.30		16.97			6.75	25.00					
Staging Area at Sub–Unit	2845	9	MSF	0.30	3	16.97			6.75	25.00	$50		$60	$230	$340
Storage Area at Sub–Unit	1112	3	MSF	0.30	1	16.97			6.75	25.00	$20		$20	$80	$120
e. Security Fence – 6ga aluminized – 6' high		1200	LF	0.13	198	16.97			1.64	9.80	$3,360		$2,030	$12,110	$17,500
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		2	PR	10.00	26	16.97			133.00	240.00	$440		$270	$490	$1,200
TOTAL (SITE RESTORATION)		1	LOT		6,747						$114,510		$255,250	$272,490	$642,250

Site Restoration Details

001191

FEMP-OU02-5 DRAFT August 2, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SF – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940709
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at Restoration Site: 8 Pairs x 120 ft.	N/A	PAIR					23,000							
b. Abandon Existing Wells	11	EA					13,000				$143,000			$143,000
TOTAL (MONITORING WELLS)	1	LOT									$143,000			$143,000

Monitoring Wells Details

001192

F-5-334

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. - [redacted]4321
CLIENT - [redacted]. DEPT. OF ENERGY
PROJECT - ALT-3B - SF - EXCAVATION & OFF-SITE DISPOSAL - RESIDENT FARMER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940709
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO														
PURCHASE														
Bulk Gondola Rail Car N/A	0	EA												
Liner for Gondola														
Excavated Waste - level C,D & Additional	6399	EA							400.00				$2,559,600	$2,559,600
Excavated Waste - lead/soil	8	EA							400.00				$3,200	$3,200
Generated Waste	27	EA							400.00				$10,800	$10,800
Cover for Gondola														
Excavated Waste - level C,D & Additional	6399	EA							395.00				$2,527,610	$2,527,610
Excavated Waste - lead/soil	8	EA							395.00				$3,160	$3,160
Generated Waste	27	EA							395.00				$10,670	$10,670
TOTALS FORWARD TO No. 24 ESTIMATE SUMMARY														
TOTAL (PURCHASE WASTE CONTAINERS)	1	LOT											$5,115,000	$5,115,000

001193

5861

F-5-335

FEMP-OU02-5 DRAFT
August 24, 1994

Purchase Waste Container Details

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SF – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940709
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF–SITE TRANSPORTATION COST TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas	6434	EA					340.00				$2,187,560			$2,187,560
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additional	6399	EA					22681.00				$145,135,720			$145,135,720
Excavated Waste – lead/soil	8	EA					23045.00				$184,360			$184,360
Generated Waste	27	EA					23045.00				$622,220			$622,220
TOTALS FORWARD TO No. 23 ESTIMATE SUMMARY														
TOTAL (OFF–SITE DISPOSAL COST)	1	LOT									$148,129,900			$148,129,900

001194

F-5-336

FEMP-OU02-5 DRAFT
August 24, 1994

Off–Site Disposal Details

CONTR.NO.- [redacted]321
CLIENT - [redacted]. DEPT. OF ENERGY
PROJECT - ALT-3B - SF - EXCAVATION & OFF-SITE DISPOSAL - RESIDENT FARMER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940709
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	165000	GAL					0.01				$1,700			$1,700
Runnoff from the Exclusion Zone.	19700000	GAL					0.01				$197,000			$197,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$198,700			$198,700

001195

5861

F-5-337

FEMP-OU02-5 DRAFT
August 24, 1994

Waste Water Treatment Operations Cost Details

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–3B – SF – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940709
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTS														
Excavation														
Full TCLP	1869	EA					2,002				$3,741,700			$3,741,700
Rad	1869	EA					2,000				$3,738,000			$3,738,000
Confirmatory Tests														
Full Rad Tests	935	EA					3,101				$2,899,400			$2,899,400
Full HSL	60	EA					1,500				$90,000			$90,000
Full TCLP	60	EA					2,000				$120,000			$120,000
2 Technicians per Month	19	MO					13,163				$250,100			$250,100
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS)	1	LOT									$10,839,200			$10,839,200

001196

Screening & Confirmation Testing Details

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 3B, SF – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARMER
CLIENT: DOE DATE: 08–Aug–94
CONTRACT: C2–94–07–09 BASE ESTIMATE: $186,911,600

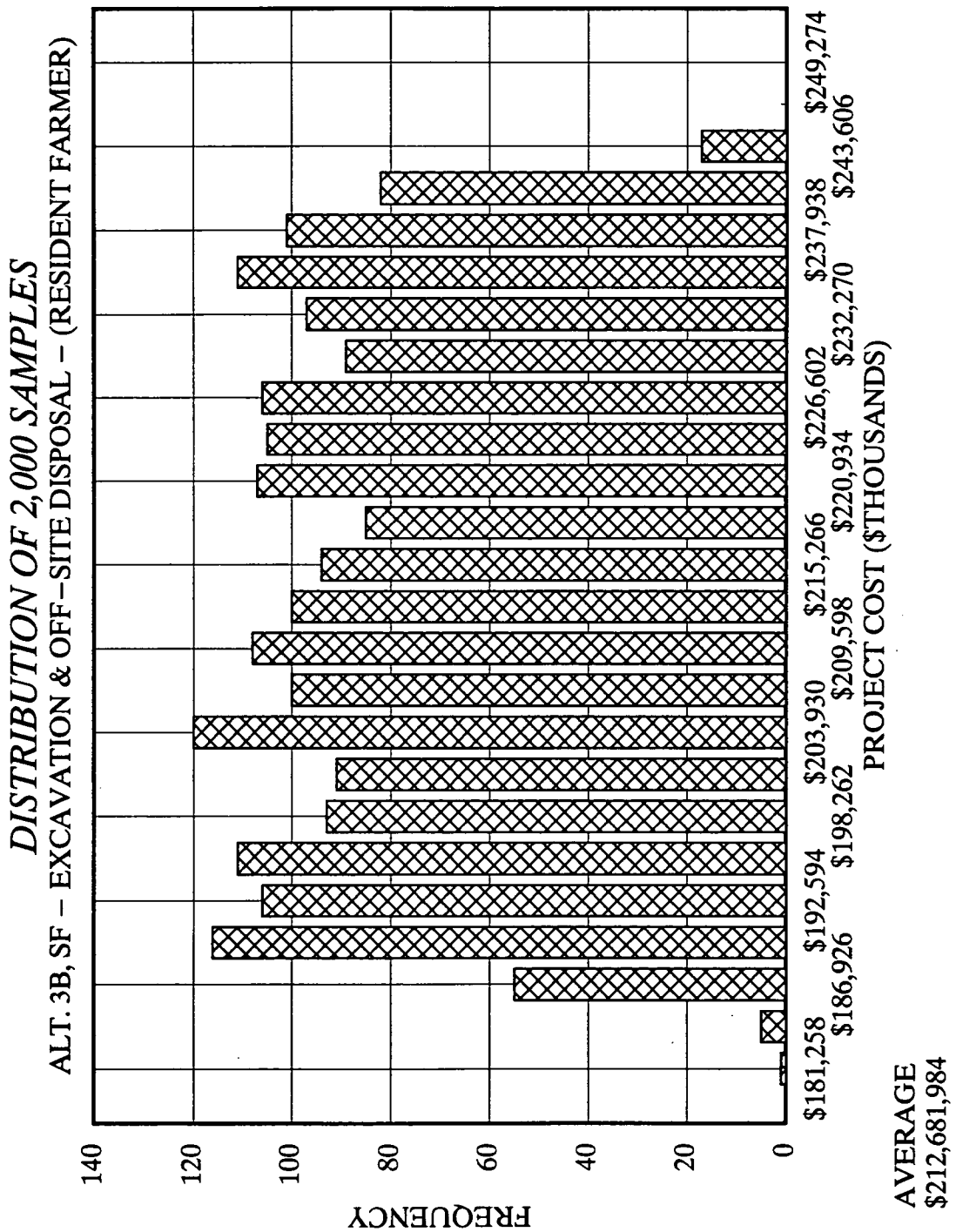
CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$248,386,027	$61,474,427	32.9%
0.05%	$242,182,371	$55,270,771	29.6%
5.00%	$237,893,438	$50,981,838	27.3%
10.00%	$235,107,567	$48,195,967	25.8%
15.00%	$232,563,428	$45,651,828	24.4%
20.00%	$229,937,385	$43,025,785	23.0%
25.00%	$226,575,141	$39,663,541	21.2%
30.00%	$223,849,617	$36,938,017	19.8%
35.00%	$221,092,211	$34,180,611	18.3%
40.00%	$218,422,232	$31,510,632	16.9%
45.00%	$215,350,865	$28,439,265	15.2%
50.00%	$212,224,833	$25,313,233	13.5%
55.00%	$209,479,627	$22,568,027	12.1%
60.00%	$206,840,168	$19,928,568	10.7%
65.00%	$203,980,833	$17,069,233	9.1%
70.00%	$201,565,239	$14,653,639	7.8%
75.00%	$198,578,882	$11,667,282	6.2%
80.00%	$195,693,173	$8,781,573	4.7%
85.00%	$193,170,903	$6,259,303	3.3%
90.00%	$190,425,152	$3,513,552	1.9%
95.00%	$187,684,044	$772,444	0.4%
99.95%	$182,654,885	($4,256,715)	–2.3%
100.00%	$177,397,011	($9,514,589)	–5.1%

FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

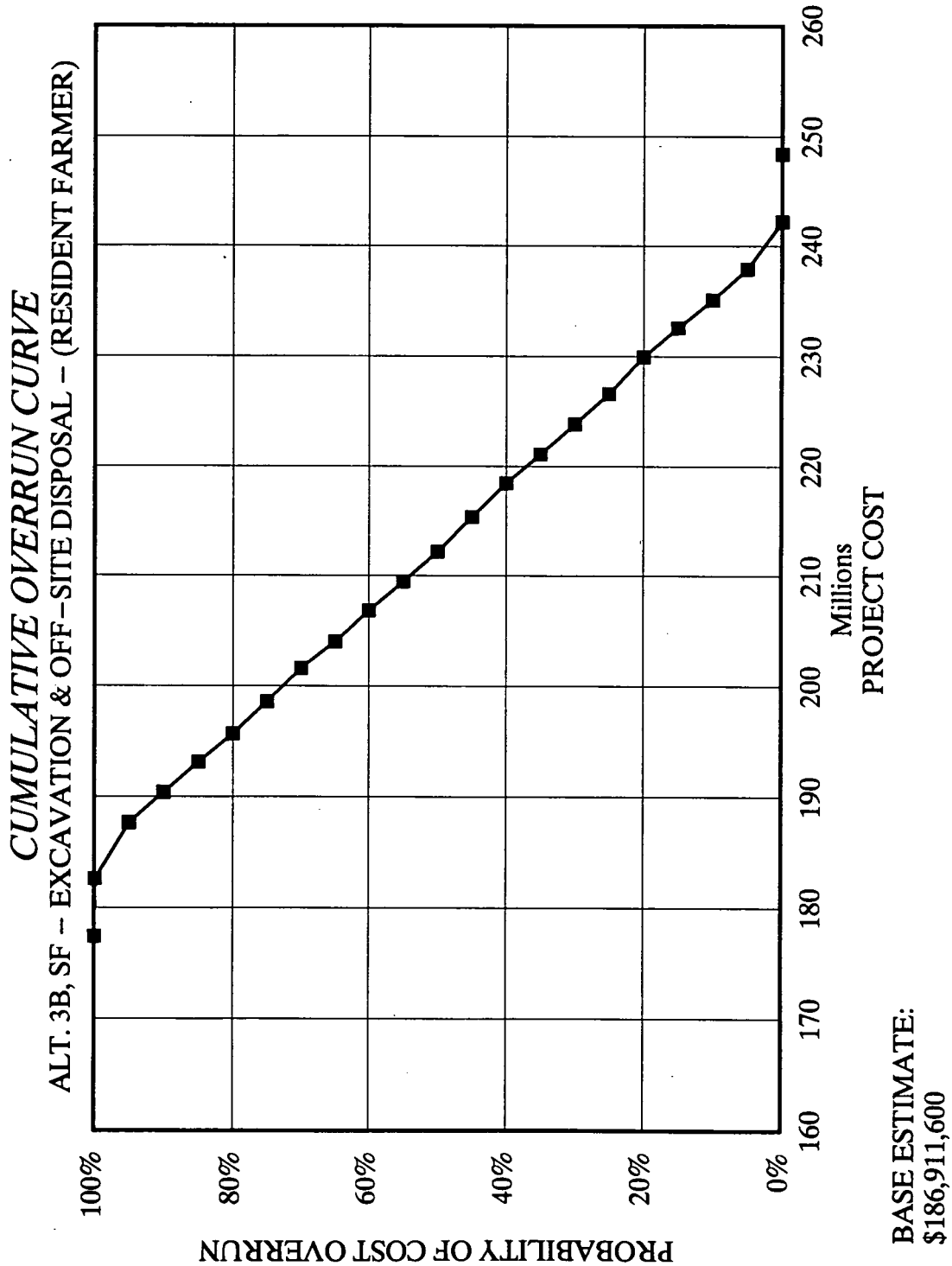
PROJECT: ALT. 3B, SF – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARMER)
CLIENT: DOE
CONTRACT: C2–94–07–09

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA–TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$92,730	–5.0%	$88,094	30%	$120,549	U		14%
2	SITE PREPERATION S/C	16,500	–5.0%	15,675	25%	20,625	U		17%
3	SITE PREPERATION MAT'L	112,600	–10.0%	101,340	20%	135,120	U		33%
4	DECON FACILITIES/SERVICES LABOR	6,090	–2.0%	5,968	80%	10,962	U		2%
5	DECON FACILITIES/SERVICES S/C	27,940	–6.0%	26,264	80%	50,292	U		7%
6	DECON FACILITIES/SERVICES MAT'L	6,060	–6.0%	5,696	60%	9,696	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	31,860	–5.0%	30,267	50%	47,790	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	55,100	–5.0%	52,345	30%	71,630	U		14%
9	EXC/SORT/SHD/DRY OFF–SITE LBR	880,590	–6.0%	827,755	125%	1,981,328	U		5%
10	EXC/SORT/SHD/DRY OFF–SITE S/C	1,602,620	–6.0%	1,506,463	125%	3,605,895	U		5%
11	EXC/SORT/SHD/DRY OFF–SITE MAT'L	125,150	–10.0%	112,635	75%	219,013	U		12%
12	LOAD & HAUL OFF–SITE DISP LABOR	1,332,450	–6.0%	1,252,503	125.0%	2,998,013	U		5%
13	LOAD & HAUL OFF–SITE DISP MAT'L	31,650	–10.0%	28,485	50.0%	47,475	U		17%
14	GENERATED WASTE REMVL LABOR	13,260	–5.0%	12,597	50.0%	19,890	U		9%
15	SITE RESTORATION LABOR	125,960	–5.0%	119,662	30.0%	163,748	U		14%
16	SITE RESTORATION MAT'L	299,740	–5.0%	284,753	30.0%	389,662	U		14%
17	MONITORING WELLS S/C	157,300	–5.0%	149,435	50.0%	235,950	U		9%
18	INDIRECT FIELD COSTS LABOR	2,692,200	–5.0%	2,557,590	50.0%	4,038,300	U		9%
19	INDIRECT FIELD COSTS S/C	1,074,900	–5.0%	1,021,155	100.0%	2,149,800	U		5%
20	INDIRECT FIELD COSTS MAT'L	4,563,600	–5.0%	4,335,420	50.0%	6,845,400	U		9%
21	FIELD SUPPORT COSTS LABOR	3,086,900	–10.0%	2,778,210	30.0%	4,012,970	U		25%
22	FIELD SUPPORT COSTS S/C	159,167,800	–5.0%	151,209,410	30.0%	206,918,140	U		14%
23	FIELD SUPPORT COSTS MAT'L	5,115,000	–5.0%	4,859,250	30.0%	6,649,500	U		14%
24	ENGINEERING COSTS	5,365,600	–5.0%	5,097,320	25.0%	6,707,000	U		17%
25	SALES TAX MAT'L	928,000	–1.0%	918,720	1.0%	937,280	U		50%
26				0		0			0%
27				0		0			0%
28				0		0			0%
29				0		0			0%
30				0		0			0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$186,911,600		$177,397,011		$248,386,027			

861


DISTRIBUTION OF 2,000 SAMPLES
ALT. 3B, SF – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARMER)
FREQUENCY
0
20
40
60
80
100
120
140
$181,258
$186,926
$192,594
$198,262
$203,930
$209,598
$215,266
$220,934
$226,602
$232,270
$237,938
$243,606
$249,274
PROJECT COST ($THOUSANDS)
AVERAGE
$212,681,984

001199


CUMULATIVE OVERRUN CURVE
ALT. 3B, SF – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARMER)
PROBABILITY OF COST OVERRUN
100%
80%
60%
40%
20%
0%
160
170
180
190
200
210
220
230
240
250
260
Millions
PROJECT COST
BASE ESTIMATE:
$186,911,600

001200

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, SF - EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940709
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$186,911,600	BASE EST:	$92,730	BASE EST:	$16,500	BASE EST:	$112,600	BASE EST:	$6,090	BASE EST:	$27,940	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	25%	-5%	20%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	25%	-5%	20%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$88,094	$120,549	$15,675	$20,625	$106,970	$135,120	$5,968	$10,962	$26,264	$50,292	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-5-343

001201

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3B, SF – EXCAVATION & OFF–SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940709
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$31,860	BASE EST:	$0	BASE EST:	$55,100	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%										
MATERIAL PRICING					–5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	0%	0%	–5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$30,267	$47,790	$0	$0	$52,345	$71,630	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001202

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, SF – EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940709
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF

	EXCAVATE/SORT/SHRED/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/SHRED/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/SHRED/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$880,590	BASE EST:	$1,602,620	BASE EST:	$125,150	BASE EST:	$1,332,450	BASE EST:	$0	BASE EST:	$31,650
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	100%					-1%	100%				
MATERIAL PRICING			-1%	100%	-5%	50%					-5%	25%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-5%	25%	-5%	25%	-5%	25%	-5%	25%			-5%	25%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	125%	-6%	125%	-10%	75%	-6%	125%	0%	0%	-10%	50%
TOTAL $	$827,755	$1,981,328	$1,506,463	$3,605,895	$112,635	$219,013	$1,252,503	$2,998,013	$0	$0	$28,485	$47,475

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-5-345

001203

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, SF - EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940709
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF

	EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE LABOR $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE S/C $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, SF - EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940709
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		LABOR $'s		S/C $'s		MAT'L. $'s	
	BASE EST: $0		BASE EST: $0		BASE EST: $0		BASE EST: $0		BASE EST: $0		BASE EST: $0	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-5-347

001205

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, SF - EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940709
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF

	LABOR $'s		S/C $'s		MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$13,260	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$12,597	$19,890	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001206

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, SF - EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940709
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$125,960	BASE EST:	$0	BASE EST:	$299,740	BASE EST:	$0	BASE EST:	$157,300	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$119,662	$163,748	$0	$0	$284,753	$389,662	$0	$0	$149,435	$235,950	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

001207

F-5-349

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3B, SF – EXCAVATION & OFF–SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940709
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF[illegible]

	INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS	
	LABOR $'s		S/C $'s		MAT'L. $'s		LABOR $'s		S/C $'s		MAT'L. $'s	
	BASE EST:	$2,692,200	BASE EST:	$1,074,900	BASE EST:	$4,563,600	BASE EST:	$3,086,900	BASE EST:	$159,167,600	BASE EST:	$5,115,000
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–10%	30%				
MATERIAL PRICING			–5%	100%	–5%	50%			–5%	30%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	–5%	100%	–5%	50%	–10%	30%	–5%	30%	–5%	30%
TOTAL $	$2,557,590	$4,038,300	$1,021,155	$2,149,800	$4,335,420	$6,845,400	$2,778,210	$4,012,970	$151,209,410	$208,918,140	$4,859,250	$6,649,500
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-5-350

001208

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3B, SF – EXCAVATION & OFF–SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940709
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$5,365,600	BASE EST:	$928,000	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			–1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	–5%	25%										
(OTHER)												
TOTAL %	–5%	25%	–1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$5,097,320	$6,707,000	$918,720	$937,280	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

LCC ANALYSIS TITLE:	AFP - EXCAVATE & OFF-SITE DISPOSAL - (RESIDENT FARMER)			
WBS NO.:	1.1.1.1.2.3.4		TASK NO.:	2CAF
ALTERNATIVE:	3B		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	36 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	09-Aug-94
DOCUMENT NO.:	LCC-94-03-03	EST. NO. C2-94-07-10 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$9,034,917	$0	$0	$9,034,900	1997
$27,104,750	$0	$0	$27,104,800	1998
$18,069,833	$0	$0	$18,069,800	1999
$0	$0	$0	$0	2000
$0	$0	$0	$0	2001
$0	$0	$0	$0	2002
$0	$0	$0	$0	2003
$0	$0	$0	$0	2004
$0	$0	$0	$0	2005
$0	$0	$0	$0	2006
$0	$0	$0	$0	2007
$0	$0	$0	$0	2008
$0	$0	$0	$0	2009
$0	$0	$0	$0	2010
$0	$0	$0	$0	2011
$0	$0	$0	$0	2012
$0	$0	$0	$0	2013
$0	$0	$0	$0	2014
$0	$0	$0	$0	2015
$0	$0	$0	$0	2016
$0	$0	$0	$0	2017
$0	$0	$0	$0	2018
$0	$0	$0	$0	2019
$0	$0	$0	$0	2020
$0	$0	$0	$0	2021
$0	$0	$0	$0	2022
$0	$0	$0	$0	2023
$0	$0	$0	$0	2024
$0	$0	$0	$0	2025
$0	$0	$0	$0	2026
$0	$0	$0	$0	2027
$0	$0	$0	$0	2028
$0	$0	$0	$0	2029
				2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$54,209,500	$0	$0	$54,209,500	TOTAL
$48,326,200	$0	$0	$48,326,200	<====(0012710

F ERMCO ESTIMATING SERVICES

SUMMARY SHEET

EST FILE #: C2940710 | DATE: 09-Aug-94
CLIENT: US DOE | ESTIMATOR: KEN KEPLER
PROJECT TITLE: ALT-3B, AFP - EXCAVATION & OFF-SITE DISPOSAL | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.4 RESIDENT FARMER | TASK#: 2CAF

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		OFF-SITE DISPOSAL TO ENVIROCARE BY RAIL EXCAVATE, SORT, DRY, LOAD, HAUL	42,099		$718,200	$185,400	$370,400	$1,274,000
2		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10								
				AVG				
	DIRECT FIELD COSTS		42,099		$718,200	$185,400	$370,400	$1,274,000
11	SUPERVISION - CONTRACTOR				$122,000			$122,000
12	SM TOOLS/CONSM'BLS						$43,100	$43,100
13	EQUIPMENT RENTAL						$1,079,600	$1,079,600
14	TEMP. FACILITIES				$15,100		$28,000	$43,100
15	TEMP UTL'S HOOK-UP				$7,500		$14,000	$21,500
16	JOB CLEAN-UP				$15,100		$28,000	$43,100
17	SAFETY				$7,500		$14,000	$21,500
18	HEALTH PHYSICS S/C				$98,800			$98,800
19	CERCLA/SAT	$1,500 PER PERSON				$21,000		$21,000
	OND					$12,700		$12,700
	OVERHEAD & PROFIT					$250,200		$250,200
22	PAYRL BRD.&BENFT.				$511,800			$511,800
	INDIRECT FIELD COSTS				$777,800	$283,900	$1,206,700	$2,268,400
	DIRECT & INDIRECT FIELD COSTS				$1,496,000	$469,300	$1,577,100	$3,542,400
23	TRANSPORTATION & BURIAL					$33,097,100		$33,097,100
24	WASTE CONTAINERS						$1,143,200	$1,143,200
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$12,000		$12,000
25	SCREENING & CONFIRMATION TESTING					$2,638,400		$2,638,400
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$446,300			$446,300
	FERMCO FIELD SUPPORT COSTS				$446,300	$35,747,500	$1,143,200	$37,337,000
28	EMISSION MODELING				$6,200		$11,500	$17,700
29	PSAR/FSAR(SAFETY RPT)				$152,300			$152,300
30	ENGINEERING	TITLE I&II $513,600 TITLE III	$531,400	CDR	$184,200	DCR	$173,600	$1,402,800
	ENGINEERING COSTS							$1,572,800
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$3,875,000	$232,500
	SUB-TOTAL	(BASE ESTIMATE)						$42,684,700
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	13.5%						$5,762,400
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$48,447,100
	ONTINGENCY	13.5%						$5,762,400
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$54,209,500

001211

PRELIMINARY

LOTUS31\FS2\ALT3B\AFP\INDSUM.WK3 - FEASABILITY STUDY

DATE: 08-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940710

ALT-3B, AFP - EXCAVATION & OFF-SITE DISPOSAL

EST. : KEN KEPLER

WBS#: RESIDENT FARMER

TASK I.D. :

1.1.1.1.2.3.4

2CAF

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY / MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	0	$0	C/B		
SUB-TOTAL		31.80	4		$0			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	0		$0	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	0		$0	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	0		$0	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	0		$0	C/B		
THERMO STRIPS	EA	50.00	0		$0	C/B		
SUB-TOTAL		327.21			$0			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$0			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

001212

DATE: 08-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940710

ALT-3B, AFP - EXCAVATION & OFF-SITE DISPOSAL

EST. : KEN KEPLER

WBS#: RESIDENT FARMER

TASK I.D. :

1.1.1.1.2.3.4

2CAF

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	14	56	$16.97	$950		
ANNUAL PHYSICALS	1	3	14	42	$16.97	$710		
EXIT (TERMINATION) PHYSICALS	1	4	14	56	$16.97	$950		
SUB-TOTAL						$2,610		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	24	1	14	340	$16.97	$5,770		
YEARLY IN-VIVO	1	4	14	56	$16.97	$950		
EXIT (END OF PROJECT / TERMINATION)	1	4	14	56	$16.97	$950		
SUB-TOTAL						$7,670		
WORK DELAYS CAUSED BY MONITORING	5%				$885,400	$44,270		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$885,400	$44,270		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$98,800	$0	$98,800

001213

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT-3B, AFP – EXCAVATION & OFF-SITE DISPOSAL – (RESIDENT FARMER)
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CAF

WBS NO. – 1.1.1.1.2.3.4
EST. NO. – C2940710
BY – K. KEPLER
DATE – 07/25/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	30-Jun-94	01-Jun-97	31-May-98	31-May-99	24	MONTHS

EST.DATE TO MID-POINT OF ACTIVITY	
47	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

APPENDIX E

CONTR.NO. – 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3B – AFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.4

EST.NO. C2940710
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CAF

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR)			CERTI–FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS				ENVIROCARE BURIAL COSTS		TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							$80.15 PER TON (90 TON MIN.)	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	141 $120 DEMURAGE $/DAY (>6 DAYS)	(1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	
	CAR	LINER	COVER			TONS/CY	TONS						
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 159, 182, or 243 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

F-5-357

001215

FEMP-OU02-5 DRAFT
August 24, 1994

561

CONTR.NO.– 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3B – AFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.4

EST.NO. C2940710
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CAF

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C –D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0

INPUT

001216

CONTR.NO. – 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3B – AFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.4

EST.NO. C2940710
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CAF

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	0.0	0	$23,816	$0	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	103000.0	1411	$23,804	$33,587,400	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	1296.0	27	$24,180	$652,900	$493.47		
						**			

INPUT

** NOTE:
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

001217

5861

CONTR.NO. – 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3B – AFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940710
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
OFF–SITE DISPOSAL TO ENVIROCARE (RESIDENT FARMER)														
SITE PREPARATION	1	LS		3,397						$58,780	$15,000	$24,900	$85,630	$184,310
DECONTAMINATION FACILITIES/SERVICES	1	LS		296						$5,400	$25,890	$1,240	$5,510	$38,040
EROSION AND SEDIMENT CONTROLS	1	LS		1036						$18,700		$5,140	$35,840	$59,680
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT/DRY – OFFSITE DISPOSAL TO ENVIROCARE	1	LS		10259						$174,100	$49,610	$362,150	$280	$586,140
LOAD/HAUL – OFF–SITE DISPOSAL (ALL FLYASH TO ENVIROCARE)	1	LS		17277						$293,950		$419,070	$28,770	$741,790
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE	N/A													N/A
COMPOSITE LINER	N/A													N/A
COMPOSITE CAP	N/A													N/A
DIKE	N/A													N/A
GENERATED WASTE REMOVAL	1	LS		1164						$19,750		$11,150		$30,900
SITE RESTORATION	1	LS		4843						82180		157830	180660	420670
MONITORING WELLS	1	LS									$78,000			$78,000
SUB–TOTAL (DIRECT FIELD COSTS)	1	LS		38272						$652,860	$168,500	$981,480	$336,690	$2,139,530
TAKE–OFF ALLOWANCE 10%	1	LS		3,827						$65,290	$16,850	$98,150	$33,670	$213,960
TOTAL (DIRECT FIELD COSTS)	1	LS		42,099						$718,200	$185,400	$1,079,600	$370,400	$2,353,600

Off–Site Disposal of Active Flyash Pile to ENVIROCARE – SUMMARY

F-5-360
001218
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]321 PRELIMINARY
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3B – AFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

CONTR.NO.: 4424321
EST. NO. C2940710
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	2000	LF	0.213	550	16.97				6.25	$9,330			$12,880	$22,210
c. Clear and Grub														
i. Remediation Site	2.50	AC	41.40	134	16.97			2575.00		$2,270		$6,630		$8,900
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas, Storage Area, &/or Staging Area @ Sub–unit														
d. Dewatering														
i. Excavate Dewatering Trench	400	CY	0.50	258	16.97			1.49		$4,380		$610		$4,990
ii. Pump – w/4" Suction Hose	120	DAYS	3.00	464	16.97			19.55		$7,870		$2,420		$10,290
iii. HDPE Pipe to Sedimentation Tank	300	LF	0.19	74	16.97			0.67	0.84	$1,260		$210	$260	$1,730
e. General Grading														
i. New Roads	4667	SY	0.001	6	16.97			0.07		$100		$340		$440
33%														
ii. Office/Parking Area 2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area 272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area 49	16	SY	0.010		16.97			0.32				$10		$10
v. Staging Area @ Sub–Unit 2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
vi. Storage Area 1112	370	SY	0.010	5	16.97			0.32		$80		$120		$200
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	4667	SY	0.030	181	16.97			1.08	6.66	$3,070		$5,190	$32,010	$40,270
33%														
ii. Office/Parking – 8" Gravel W/ Geot 2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc 2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk. 631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" tl 24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub–grade Piping – 4" 500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating 2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab 183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip. 1	0	LS	2.00	1	16.97			184.00		$20		$60		$80
iv. Storage Area – 100' x100' Asphalt														
Includes Compacted Sub–Grade 1112	370	SY	0.084	40	16.97			2.56	14.04	$680		$980	$5,350	$7,010
Geotextile Fabric,Comp.Crushed Limestone														
Prime Coat,4–1/2" Asph.Conc.Base course,														
Tack Coat, 1–1/2" Asph.Conc.Surface Coat														
TOTAL (SITE PREPARATION)	1	LS		3,397						$58,780	$15,000	$24,900	$85,630	[illegible],310

Site Preparation Details

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001219

FEMP-OU02-5 DRAFT August 24, 1994

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CONTR.NO.– 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3B – AFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940710
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CAF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT															
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)															
a. Decon Trailer – Rental	33% 51	17	MO					1500.00				$25,470			$25,470
b. Construction Equipment Decon. Facility 25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'i.d.x 25l	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Gu:	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in (	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
x. Backfill & Compaction around concrete slab	BCY 129	52	ICY	0.086	6	16.97			1.38		$100		$70		$170
SUB–TOTAL (EQUIP. DECON. FACILITY)					260						$4,720	$25,860	$1,130	$4,140	$35,850

Equipment Decon. Facility Details

F-5-362
001220
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]321
CLIENT - U.S.DEPT.OF ENERGY
PROJECT - ALT-3B - AFP - EXCAVATION & OFF-SITE DISPOSAL - RESIDENT FARMER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940710
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CAF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	COST/UNIT RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB-UNIT (CON'T.)															
(ITEMS @ 33-1/3% ARE COMMON TO AFP,IFP & SF)															
c. Personnel Decon. Facility	33%														
i. Excavation - Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub-grade Prep.	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
- Includes HDPE Liner, Geotextile Fabric															
- Gravel, & Compact Sub-grade															
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover - 2'x 2'	4	1.33	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast-in-Place Concrete -															
Decon Slab - 11' x 11' x4" thk	1.5	0.50	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump - 2'x 2' x 3'	0.3	0.10	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb - 6" x 6" x 42 lf	0.4	0.13	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Gua	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'-6" Wood Posts set in	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0.33	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping- 1500 gal.	1	0.33	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB-TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		296						$5,400	$25,890	$1,240	$5,510	$38,040

001221

F-5-363

Personnel Decon.Facilities/Services Details

FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3B – AFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

CONTR.NO. 4424321
EST. NO. C2940710
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL (ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)														
a. Diversion of Clean Run–off														
i. Silt Fence	1300	LF	0.017	29	16.97			0.06	0.65	$490		$80	$870	$1,440
ii.Diversion Berms	200	CY	0.24	62	16.97			0.84	7.50	$1,050		$170	$1,500	$2,720
iii. Diversion Ditches	100	CY	0.24	31	16.97			0.84	7.50	$530		$80	$750	$1,360
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	700	EA	0.24	217	16.97			1.53	1.35	$3,680		$1,100	$970	$5,750
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDP 100% 600 from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	600	LF	0.38	295	19.95			5.11	4.42	$5,890		$3,070	$2,650	$11,610
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall M 3 W/Cleanout	3	EA	8.00	31	16.97			28.00	8300.00	$530		$80	$24,900	$25,510
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,036						$18,700		$5,140	$35,840	$59,680

001222

F-5-364

FEMP-OU02-5 DRAFT
August 24, 1994

Erosion Control Details

CONTR.NO.– [redacted]321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3B – AFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940710
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE/SORT/DRY FOR OFF–SITE DISPOSAL TO ENVIROCARE														
EXCAVATION														
Excavate FLYASH/Contaminated Soil – (Level D)	74900	BCY	0.055	5,314	16.97			1.17		$90,180		$87,630		$177,810
Excavate Additional Flyash/soil Soil – BCY	7500	BCY	0.055	532	16.97			1.17		$9,030		$8,780		$17,810
Sort Flyash/Contaminated Soil –Level D 82400 and Additional Soil Contaminated Flyash/Soil BCY	103000	LCY	0.033	4,385	16.97			2.58		$74,410		$265,740		$340,150
Low Level Thermal Destruction Unit 700 Sub–contract cost for Drying Operation and moisture test Only.	709	TON					70.00				$49,610			$49,610
(SHREDDING COMMON TO SWL, IFP & SF)														
Shredder/Crusher – Purchase/Install N/A 60 Ton per Hour		LOT	280.0					8400.00	317800.00					
Excavated Debris BCY N/A														
Generated Waste BCY 1127														
Excavated Debris TONS N/A														
(Percent of Gen.Waste to be Shredded) 25%														
Generated Waste TONS 648														
TOTAL TONS 648														
Operating Costs	11	HRS							25.75				$280	$280
(2) Operators	22	HRS	1.00	28	16.97					$480				$480
BCY = BANK CUBIC YARDS : The Volume of 1 Cubic Yard of material in its natural state OR Volume/Void to be filled.														
LCY = LOOSE CUBIC YARDS (w/Swell Factor) Volume of material after being excavated.														
ICY = IN–PLACE CUBIC YARDS (w/Shrinkage Factor) Volume of material it takes to fill a 1 Cubic Yard space.														
TOTAL (EXCAVATE/SORT/DRY)	1	LS		10,259						$174,100	$49,610	$362,150	$280	$586,140

Excavate/Sort/Dry Details

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001223

FEMP-OU02-5 DRAFT
August 24, 1994

5881

CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3B – AFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

CONTR.NO. 4424321
EST. NO. C2940710
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CAF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
LOAD & HAUL FOR OFF–SITE DISPOSAL CONTAMINATED WASTE TO ENVIROCARE															
(ITEMS @ 20% ARE COMMON TO AFP,IFP,SF,SWL & LSP)															
Install Loading Equipment for LLW	20%														
Hopper	1	0.2	EA	177.0	35	16.97	3000.00			6000.00	$600			$1,200	$1,800
Loading Conveyor	1	0.2	EA	147.0	29	16.97	2500.00			8500.00	$500			$1,700	$2,200
Scale	1	0.2	EA	589.0	118	16.97	10000.00			15000.00	$2,000			$3,000	$5,000
Railroad Loading Facility															
a. 160' x 160 'Concrete Pad	20%														
i. Clear & Grub	0.60	0.12	AC	41.40	6	16.97			2575.00		$100		$320		$420
ii. Grading	2845	569.00	SY	0.010	7	16.97			0.32		$120		$190		$310
iii. Sub–Grade & Sub–Base for Conc.Slab	2845	569.00	SY	0.041	30	16.97			1.45	5.51	$510		$850	$3,230	$4,590
iv. Concrete Slab 160 x 160' x 8"thk.	631	126.20	CY	4.07	663	17.98			18.38	67.00	$11,920		$2,390	$8,710	$23,020
v. Concrete Curb – 2'h x 480 lf x 8" thk.	24	4.80	CY	15.30	95	17.98			69.08	275.90	$1,710		$340	$1,360	$3,410
vi. Wood Ties, Ballast, 100# Rail Derailer, Turnout, Bumper Car Stops	600	120.00	LF	1.06	164	16.97			4.43	77.40	$2,780		$550	$9,570	$12,900
vii. Grading for track	800	160.00	SY	0.010	2	16.97			0.32		$30		$50		$80
HAUL															
From excavation site to rail loading facility															
6 CY dump truck 1/2 mi r.t.		103000	LCY	0.041	5448	16.97			1.65		$92,450		$169,950		$262,400
LOADING GONDOLA	LCY														
Excavated Flyash/soil level D & Addit.	= 103000														
Allowable CY's of waste per Gondola	73.0														
Install Liner in Gondola car		1411	EA	0.75	1365	16.97			32.21		$23,160		$45,450		$68,610
Load Gondola – 6/day, 2 workers		235	DAYS	16.00	4854	16.97			15.00		$82,370		$3,530		$85,900
Seal liner, Install Cover		1411	EA	0.75	1365	16.97			32.21		$23,160		$45,450		$68,610
Dust control – light		300	DAYS	8.00	3096	16.97			500.00		$52,540		$150,000		$202,540
(RSO takes ownership at this time.) (See: Off–Site Disposal Wksht. and Appendix E)															
TOTAL (LOAD & HAUL OFF–SITE DISPOSAL)		1	LS		17,277						$293,950		$419,070	$28,770	$741,790

F-5-366

001224

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]321 PRELIMINARY
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT-3B – AFP – EXCAVATION & OFF-SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.4

CONTR.NO. 4424321
EST. NO. C2940710
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CAF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO OFFSITE DISPOSAL Demo. /Load/Haul/Compact															
(ITEMS @ 33-1/3% ARE COMMON TO AFP,IFP & SF)															
a. Office/Parking Area	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo-Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Area @ Excav.Sit	33%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo-Fabric & Liner	167	56	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'-6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Area @ Excav. Site	33%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo-Fabric & Liner	14	5	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'-6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.50	1	BCY	0.30		16.97			2.51						
d. Staging Area @ s/u	33%														
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excavate, Load, Haul, Backfill, Compact															
Sub-grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo-Fabric & Liner	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	105.0	35	BCY	0.30	14	16.97			2.51		$240		$90		$330
SUB-TOTAL (GENERATED WASTE REMOVAL)		1	LOT		558						$9,470		$4,350		$13,820

Generated Waste Removal Details

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001225

FEMP-OU02-5 DRAFT August 24, 1994

5861

CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3B – AFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

CONTR.NO. 4424321
EST. NO. C2940710
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CAF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO OFFSITE DISPOSAL (CON'T.)															
Demo. /Load/Haul/Compact															
(ITEMS @ 33–1/3% ARE COMMON TO AFP,IFP & SF)															
e. Storage Area @ s/u	33%														
Demo/Remove Asphalt	185	62	BCY	1.2	95	16.97			3.62		$1,610		$230		$1,840
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	185	62	BCY	0.292	23	16.97			9.16		$390		$580		$970
Geo–Fabric & Liner	1112	370	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	247.0	82	BCY	0.30	32	16.97			2.51		$540		$210		$750
f. Staging Area @ Rail Siding	20%														
Demo/Remove Concrete	655	131	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	475	95	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo–Fabric & Liner	2845	569	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	105.0	21	BCY	0.30	8	16.97			2.51		$140		$50		$190
LOADING GONDOLA	BCY														
Generated Waste	1127														
Plus a swell factor of 15% = LCY	1296														
Allowable CY's of waste per Gondola	49.0														
Install Liner in Gondola car		27	EA	0.75	26	16.97			32.21		$440		$870		$1,310
Load Gondola – 6/day, 2 workers		5	DAYS	16.00	103	16.97			15.00		$1,750		$80		$1,830
Seal liner, Install Cover		27	EA	0.75	26	16.97			32.21		$440		$870		$1,310
Dust control – light		5	DAYS	8.00	52	16.97			500.00		$880		$2,500		$3,380
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		606						$10,280		$6,800		$17,080
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,164						$19,750		$11,150		$30,900

Generated Waste Removal Details

001226

CONTR.NO.- [redacted]321
CLIENT - U.S.DEPT.OF ENERGY
PROJECT - ALT-3B - AFP - EXCAVATION & OFF-SITE DISPOSAL - RESIDENT FARMER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940710
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CAF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off-site source															
a. Borrow Common Soil, Backfill	BCY														
Active Flyash Pile	20000	24000	ICY	0.09	2786	16.97			3.21	3.50	$47,280		$79,350	$86,520	$213,150
	33%														
Office/Parking	494	197	ICY	0.09	23	16.97			3.21	3.50	$390		$650	$710	$1,750
Const.Equip.Decon.Area	78	31	ICY	0.09	4	16.97			3.21	3.50	$70		$100	$110	$280
Personnel Decon.Area	7	3	ICY	0.09		16.97			3.21	3.50			$10	$10	$20
Staging Area at Sub-Unit	475	190	ICY	0.09	22	16.97			3.21	3.50	$370		$630	$680	$1,680
Storage Area at Sub-Unit	475	190	ICY	0.09	22	16.97			3.21	3.50	$370		$630	$680	$1,680
Staging Area at Rail Siding	475	190	ICY	0.09	22	16.97			3.21	3.50	$370		$630	$680	$1,680
b. Final Grade for AFP		19600	SY	0.02	506	16.97			0.70		$8,590		$14,130		$22,720
c. Borrow Top Soil 6" Thk., Spread															
Active Flyash Pile		19600	SY	0.036	910	16.97			2.33	2.88	$15,440		$47,040	$58,140	$120,620
	33%														
Office/Parking	2222	888	SY	0.036	41	16.97			2.33	2.88	$700		$2,130	$2,630	$5,460
Const.Equip.Decon.Area	167	67	SY	0.036	3	16.97			2.33	2.88	$50		$160	$200	$410
Personnel Decon.Area	14	6	SY	0.036		16.97			2.33	2.88			$10	$20	$30
Staging Area at Sub-Unit	2845	1137	SY	0.036	53	16.97			2.33	2.88	$900		$2,730	$3,370	$7,000
Storage Area at Sub-Unit	2845	1137	SY	0.036	53	16.97			2.33	2.88	$900		$2,730	$3,370	$7,000
Staging Area at Rail Siding	2845	1137	SY	0.036	53	16.97			2.33	2.88	$900		$2,730	$3,370	$7,000
d. Grass Cover - Seed, Fertilize, Mulch															
Utility Mix - Hydro/Air Seeding	SY														
Active Flyash Pile	19600	176	MSF	0.30	68	16.97			6.75	25.00	$1,150		$1,220	$4,530	$6,900
	33%														
Office/Parking	2222	7	MSF	0.30	3	16.97			6.75	25.00	$50		$50	$180	$280
Const.Equip.Decon.Area	167	1	MSF	0.30		16.97			6.75	25.00			$10	$30	$40
Personnel Decon.Area	14		MSF	0.30		16.97			6.75	25.00					
Staging Area at Sub-Unit	2845	9	MSF	0.30	3	16.97			6.75	25.00	$50		$60	$230	$340
Storage Area at Sub-Unit	2845	9	MSF	0.30	3	16.97			6.75	25.00	$50		$60	$230	$340
Staging Area at Rail Siding	2845	9	MSF	0.30	3	16.97			6.75	25.00	$50		$60	$230	$340
e. Security Fence - 6ga aluminized - 6' high		1400	LF	0.13	231	16.97			1.64	9.80	$3,920		$2,360	$14,130	$20,410
i. Corner posts - 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		2	PR	10.00	26	16.97			133.00	240.00	$440		$270	$490	$1,200
TOTAL (SITE RESTORATION)		1	LOT		4,843						$82,180		$157,830	$180,660	$420,670

Site Restoration Details

F-5-369
001227
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3B – AFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940710
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT				LABOR	S/C	EQUIP.	MATERIAL	TOTAL
			UNIT	TOTAL	RATE	LABOR	SUB	EQUIP.	MAT'L					
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at Restoration Site: 8 Pairs x 120 ft.	N/A	PAIR					23,000							
b. Abandon Existing Wells	6	EA					13,000				$78,000			$78,000
TOTAL (MONITORING WELLS)	1	LOT									$78,000			$78,000

Monitoring Wells Details

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001228

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3B – AFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940710
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO														
PURCHASE														
Bulk Gondola Rail Car N/A	0	EA												
Liner for Gondola														
Excavated Waste – level C,D & Additional	1411	EA							400.00				$564,400	$564,400
Excavated Waste – lead/soil N/A		EA												
Generated Waste	27	EA							400.00				$10,800	$10,800
Cover for Gondola														
Excavated Waste – level C,D & Additional	1411	EA							395.00				$557,350	$557,350
Excavated Waste – lead/soil N/A		EA												
Generated Waste	27	EA							395.00				$10,670	$10,670
TOTALS FORWARD TO No. 24 ESTIMATE SUMMARY														
TOTAL (PURCHASE COSTS BY FERMCO)	1	LOT											$1,143,200	$1,143,200

001229

F-5-371

Purchase Costs by FERMCO Details

5861

CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3B – AFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

CONTR.NO. 4424321
EST. NO. C2940710
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF–SITE TRANSPORTATION COST TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas's	1438	EA					340.00				$488,920			$488,920
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additional	1411	EA					22669.00				$31,985,960			$31,985,960
Excavated Waste – lead/soil N/A		EA												
Generated Waste	27	EA					23045.00				$622,220			$622,220
TOTALS FORWARD TO No. 23 ESTIMATE SUMMARY														
TOTAL (OFF–SITE TRANSPORTATION COST)	1	LOT									$33,097,100			$33,097,100

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F-5-372

FEMP-OU02-5 DRAFT
August 24, 1994

Off–Site Transportation Details

CONTR.NO.- [redacted]321
CLIENT – [redacted].DEPT.OF ENERGY
PROJECT – ALT–3B – AFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940710
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	95000	GAL					0.01				$1,000			$1,000
Runnoff from the Exclusion Zone.	1100000	GAL					0.01				$11,000			$11,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$12,000			$12,000

Waste Water Treatment Operations Cost Details

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FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO. – 4424321
CLIENT – U.S.DEPT.OF ENERGY
PROJECT – ALT–3B – AFP – EXCAVATION & OFF–SITE DISPOSAL – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.4

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940710
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CAF

DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT				LABOR	S/C	EQUIP.	MATERIAL	TOTAL
			UNIT	TOTAL	RATE	LABOR	SUB	EQUIP.	MAT'L					
SCREENING & CONFIRMATION TESTS														
Excavation														
Full TCLP	412	EA					2,002				$824,800			$824,800
Rad	412	EA					2,000				$824,000			$824,000
Confirmatory Tests														
Full rad tests	206	EA					3,101				$638,800			$638,800
Full HSL	25	EA					1,500				$37,500			$37,500
Full TCLP	25	EA					2,000				$50,000			$50,000
2 Technicians per month	20	MO					13,163				$263,300			$263,300
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS)	1	LOT									$2,638,400			$2,638,400

001232

F-5-374

FEMP-OU02-5 DRAFT
August 24, 1994

Screening & Confirmation Testing Details

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 3B, AFP – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARME
CLIENT: DOE DATE: 09–Aug–94
CONTRACT: C2–94–07–10 BASE ESTIMATE: $42,684,700

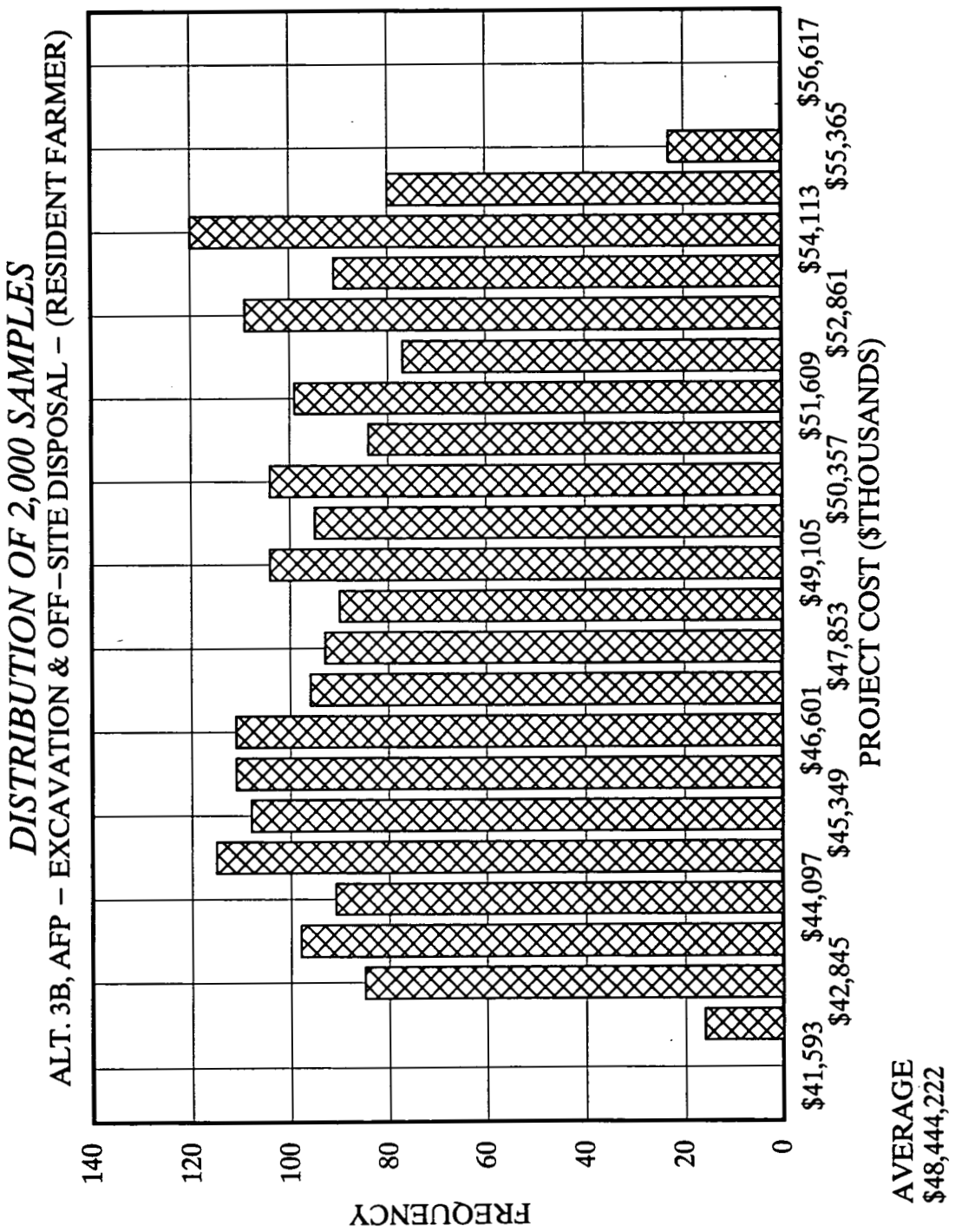
CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$56,531,205	$13,846,505	32.4%
0.05%	$55,206,299	$12,521,599	29.3%
5.00%	$54,144,588	$11,459,888	26.8%
10.00%	$53,586,720	$10,902,020	25.5%
15.00%	$52,976,574	$10,291,874	24.1%
20.00%	$52,380,433	$9,695,733	22.7%
25.00%	$51,618,609	$8,933,909	20.9%
30.00%	$50,981,831	$8,297,131	19.4%
35.00%	$50,265,332	$7,580,632	17.8%
40.00%	$49,584,474	$6,899,774	16.2%
45.00%	$49,025,431	$6,340,731	14.9%
50.00%	$48,380,439	$5,695,739	13.3%
55.00%	$47,726,327	$5,041,627	11.8%
60.00%	$47,037,054	$4,352,354	10.2%
65.00%	$46,403,530	$3,718,830	8.7%
70.00%	$45,821,902	$3,137,202	7.3%
75.00%	$45,287,124	$2,602,424	6.1%
80.00%	$44,697,435	$2,012,735	4.7%
85.00%	$44,135,613	$1,450,913	3.4%
90.00%	$43,482,184	$797,484	1.9%
95.00%	$42,837,248	$152,548	0.4%
99.95%	$41,836,541	($848,159)	–2.0%
100.00%	$40,525,292	($2,159,408)	–5.1%

FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

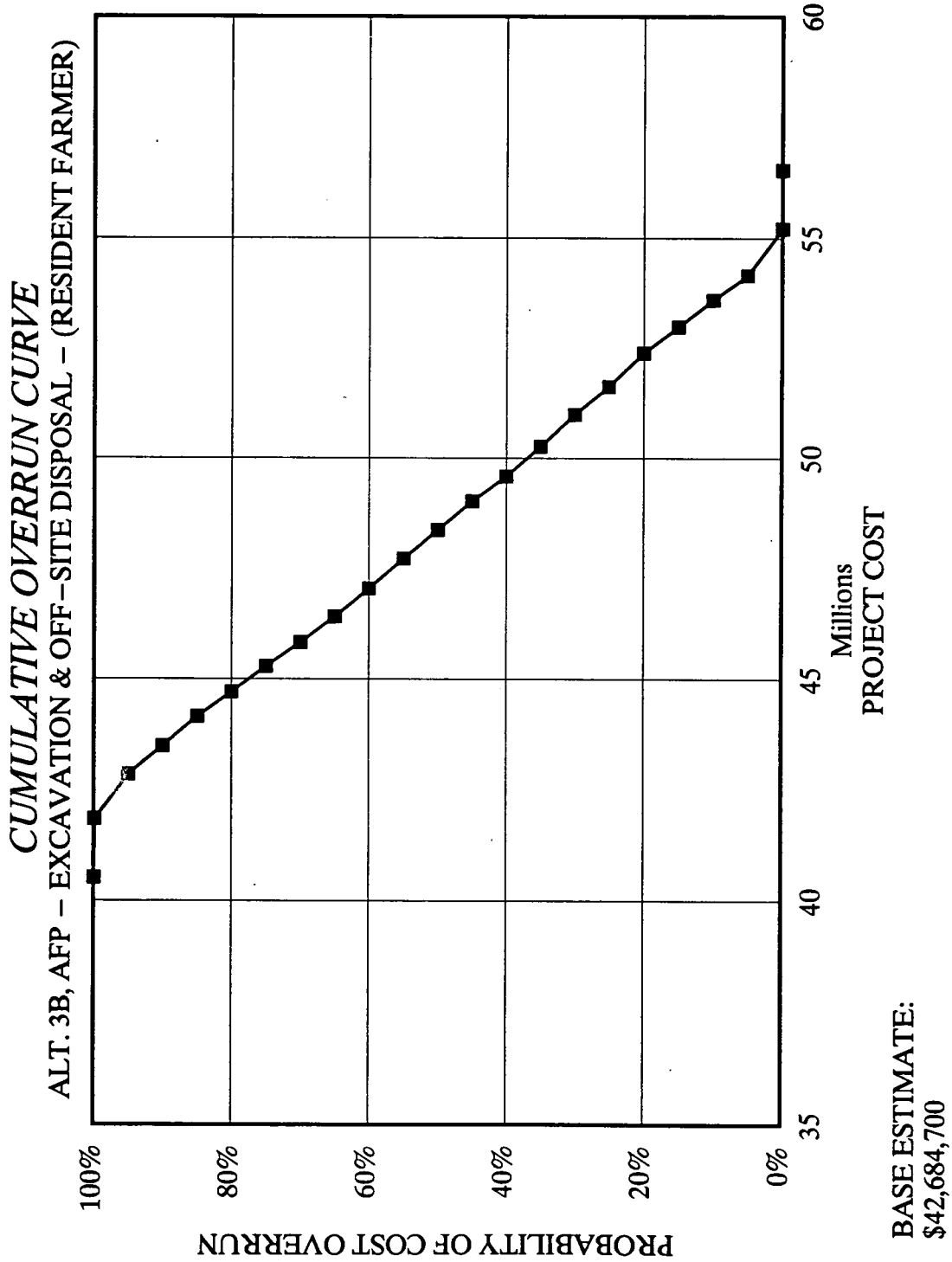
PROJECT: ALT. 3B, AFP – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARMER)
CLIENT: DOE
CONTRACT: C2–94–07–10

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$64,660	–5.0%	$61,427	30%	$84,058	U		14%
2	SITE PREPERATION S/C	16,500	–5.0%	15,675	25%	20,625	U		17%
3	SITE PREPERATION MAT'L	94,190	–10.0%	84,771	30%	122,447	U		25%
4	DECON FACILITIES/SERVICES LABOR	5,940	–2.0%	5,821	80%	10,692	U		2%
5	DECON FACILITIES/SERVICES S/C	28,480	–6.0%	26,771	80%	51,264	U		7%
6	DECON FACILITIES/SERVICES MAT'L	6,060	–6.0%	5,696	60%	9,696	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	20,570	–5.0%	19,542	50%	30,855	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	39,420	–5.0%	37,449	30%	51,246	U		14%
9	EXC/SORT/DRY OFF–SITE LABOR	191,510	–6.0%	180,019	125%	430,898	U		5%
10	EXC/SORT/DRY OFF–SITE S/C	54,570	–6.0%	51,296	125%	122,783	U		5%
11	EXC/SORT/DRY OFF–SITE MAT'L	310	–6.0%	291	125%	698	U		5%
12	LOAD & HAUL OFF–SITE DISP LABOR	323,480	–6.0%	304,071	125%	727,830	U		5%
13	LOAD & HAUL OFF–SITE DISP MAT'L	31,650	–10.0%	28,485	50.0%	47,475	U		17%
14	GENERATED WASTE REMVL LABOR	21,730	–5.0%	20,644	50.0%	32,595	U		9%
15	SITE RESTORATION LABOR	90,400	–5.0%	85,880	30.0%	117,520	U		14%
16	SITE RESTORATION MAT'L	198,730	–5.0%	188,794	30.0%	258,349	U		14%
17	MONITORING WELLS S/C	85,800	–5.0%	81,510	50.0%	128,700	U		9%
18	INDIRECT FIELD COSTS LABOR	777,800	–5.0%	738,910	50.0%	1,166,700	U		9%
19	INDIRECT FIELD COSTS S/C	283,900	–5.0%	269,705	100.0%	567,800	U		5%
20	INDIRECT FIELD COSTS MAT'L	1,206,700	–5.0%	1,146,365	50.0%	1,810,050	U		9%
21	FIELD SUPPORT COSTS LABOR	446,300	–10.0%	401,670	30.0%	580,190	U		25%
22	FIELD SUPPORT COSTS S/C	35,747,500	–5.0%	33,960,125	30.0%	46,471,750	U		14%
23	FIELD SUPPORT COSTS MAT'L	1,143,200	–5.0%	1,086,040	30.0%	1,486,160	U		14%
24	ENGINEERING COSTS	1,572,800	–5.0%	1,494,160	25.0%	1,966,000	U		17%
25	SALES TAX MAT'L	232,500	–1.0%	230,175	1.0%	234,825	U		50%
26				0		0			0%
27				0		0			0%
28				0		0			0%
29				0		0			0%
30				0		0			0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$42,684,700		$40,525,292		$56,531,205			

5861


DISTRIBUTION OF 2,000 SAMPLES
ALT. 3B, AFP – EXCAVATION & OFF-SITE DISPOSAL – (RESIDENT FARMER)
FREQUENCY
140
120
100
80
60
40
20
0
$41,593
$42,845
$44,097
$45,349
$46,601
$47,853
$49,105
$50,357
$51,609
$52,861
$54,113
$55,365
$56,617
PROJECT COST ($THOUSANDS)
AVERAGE
$48,444,222

001235


CUMULATIVE OVERRUN CURVE
ALT. 3B, AFP – EXCAVATION & OFF–SITE DISPOSAL – (RESIDENT FARMER)
PROBABILITY OF COST OVERRUN
100%
80%
60%
40%
20%
0%
35
40
45
50
55
60
Millions
PROJECT COST
BASE ESTIMATE:
$42,684,700

001236

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, AFP - EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940710
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$42,684,700	BASE EST:	$64,660	BASE EST:	$16,500	BASE EST:	$94,190	BASE EST:	$5,940	BASE EST:	$28,480	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	25%	-10%	30%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	25%	-10%	30%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$61,427	$84,058	$15,675	$20,625	$84,771	$122,447	$5,821	$10,692	$26,771	$51,264	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001237

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, AFP – EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940710
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$20,570	BASE EST:	$0	BASE EST:	$39,420	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$19,542	$30,855	$0	$0	$37,449	$51,246	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001238

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, AFP – EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940710
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$191,510	BASE EST:	$54,570	BASE EST:	$310	BASE EST:	$323,480	BASE EST:	$0	BASE EST:	$31,650
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	100%					-1%	100%				
MATERIAL PRICING			-1%	100%	-1%	100%					-5%	25%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-5%	25%	-5%	25%	-5%	25%	-5%	25%			-5%	25%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	125%	-6%	125%	-6%	125%	-6%	125%	0%	0%	-10%	50%
TOTAL $	$180,019	$430,898	$51,296	$122,783	$291	$698	$304,071	$727,830	$0	$0	$28,485	$47,475

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-5-381

001239

5861

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–3B, AFP – EXCAVATION & OFF–SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940710
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE LABOR $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE S/C $'s		EXCAV/SORT/VITRIFY SOLIDIFY/STABILIZE MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001240

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, AFP – EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940710
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	COMPOSAITE CAP LABOR $'s		COMPOSAITE CAP S/C $'s		COMPOSAITE CAP MAT'L. $'s		CLAY CAP LABOR $'s		CLAY CAP S/C $'s		CLAY CAP MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, AFP – EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940710
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$21,730	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$20,644	$32,595	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, AFP – EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940710
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$90,400	BASE EST:	$0	BASE EST:	$198,730	BASE EST:	$0	BASE EST:	$85,800	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$85,880	$117,520	$0	$0	$188,794	$258,349	$0	$0	$81,510	$128,700	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, AFP - EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940710
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$777,800	BASE EST:	$283,900	BASE EST:	$1,206,700	BASE EST:	$446,300	BASE EST:	$35,747,500	BASE EST:	$1,143,200
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-10%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-5%	30%	-5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-10%	30%	-5%	30%	-5%	30%
TOTAL $	$738,910	$1,166,700	$269,705	$567,800	$1,146,365	$1,810,050	$401,670	$580,190	$33,960,125	$48,471,750	$1,086,040	$1,486,160
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

001244

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-3B, AFP – EXCAVATION & OFF-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940710
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$1,572,800	BASE EST:	$232,500	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			−1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	−5%	25%										
(OTHER)												
TOTAL %	−5%	25%	−1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$1,494,160	$1,966,000	$230,175	$234,825	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

5861

APPENDIX - F.6

DETAILED COST ESTIMATE

ALTERNATIVE 5 - EXCAVATION AND ON-SITE DISPOSAL

FEDERAL OWNERSHIP (Expanded Trespasser)

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

BASIS OF ESTIMATE

PROJECT DESCRIPTION:	ALT-5A - EXCAVATION AND ON-SITE DISPOSAL - FEDERAL OWNERSHIP - EXPANDED TRESPASSER - (BASE CASE)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

SUPPORTING DOCUMENTATION:

Verbal Scope	X	P & ID's		Work Plan	
Drawings	X	Equipment List		Site Walk	
Sketch	X	Specifications		Eng Mtg	
Flow Diagrams		Site H & S Plan		Price Quotes	X

TYPE OF ESTIMATE:

Plan/Feasbl	X	Budg/Concpt		Title I Des	
Title II Des		Government		Independent	
Construction		Baseline			

BASIS OF ESTIMATE:

This Basis of Estimate represents the five Operable Unit 2 subunits, (SWL - Solid Waste Landfill, LSP - Lime Sludge Ponds, SF - South Field, AFP - Active Flyash Pile, IFP - In-active Flyash Pile), supporting ALT-5A alternative for the OU2 Feasibility Studies based on federal ownership (expanded trespasser) scenario to determine the level of clean-up for each sub-unit. All subunits include costs for site preparation (new or existing road up-grades, clearing, grubbing, grading and earthwork for and construction of support facilities such as office trailers, parking, staging and storage facilities and equipment and personnel decontamination facilities); erosion and sediment controls (silt fencing, diversion berms and ditches, sediment traps and tanks, collection sumps, pumps and piping, etc.); excavation of waste to be disposed at an on-site disposal cell, and excavation of waste for off-site disposal to Envirocare by rail gondola car (lead-contaminated soil at the firing range in the south field (SF);

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PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

BASIS OF ESTIMATE

PROJECT DESCRIPTION:	ALT-5A - EXCAVATION AND ON-SITE DISPOSAL - FEDERAL OWNERSHIP - EXPANDED TRESPASSER - (BASE CASE)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

treatment of solid waste by shredding/crushing for placement in an on-site disposal cell, solidification of lead contaminated soil at the SF firing range for off-site disposal to Envirocare; construction of an on-site disposal cell (site preparation and support facilities at the Cell site, construction of the liner, placement of excavated and generated waste, construction of the cap and dike); site restoration of each subunit with backfill, top soil, seeding and mulch; demolition and removal of all support facilities/utilities (generated waste/GW) to the on-Site disposal cell.

Site maintenance, groundwater monitoring, and O&M costs for a 30-year period following remediation are included.

Comments in this basis will be typical of all subunits with the main objective being to clarify the estimating philosophy and procedures applied. In all cases where a common facility is described that supports two or more subunits, the quantities either represent a prorated quantity in relationship to the volume of remediated soil/waste to each other, such as appear in the liner, cap and dike sections or as a percentage applied to the total quantities representing a common support facility. These estimates are considered to be within a -30% to +50% range of accuracy (including Risk Budget), based on the level of information provided at this time.

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-5A - EXCAVATION AND ON-SITE DISPOSAL - FEDERAL OWNERSHIP - EXPANDED TRESPASSER - (BASE CASE)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407_ _

EXECUTION:

These projects are estimated to be performed by a subcontractor working a 40-hour week, 10 hours a day, no overtime or holidays. Construction start and finish dates are indicated in Appendix D (Construction Activity Duration) for each alternative. Months indicated for some common support facilities span the time from the start of one subunit to the end of the last subunit to be completed.

WAGE RATES:

Wage rates within the estimates are based on the current rates furnished by the local Craft Labor Board and developed into a craft mix. All Labor Dollars are considered constant 1994 dollars.

ENGINEERING:

Engineering costs are based on the percentage of Direct and Indirect Field Costs that resulted in the Baseline estimates, dated November,1993. Refer to CRU2 Baseline Summary. Also, included in the Titles I & II Engineering allowance, is cost for the Cultural Resource Surveys, Phases I & II.

PRODUCTIVITY:

A site specific factor of 1.29 has been applied to Net Chart manhours. See Appendices A and B for development and application.
Task-specific factors were applied as necessary when identified.
PPE-specific factors were applied based on level identified. See Appendix B.
An allowance for delays caused by monitoring and radiation checking is included. See Appendix C, Health Physics.
No exposure/burnout rates have been identified for this work. 001249

NOTE: All references to "See Appendix" refer to cost estimate Appendices only.

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-5A - EXCAVATION AND ON-SITE DISPOSAL - FEDERAL OWNERSHIP - EXPANDED TRESPASSER - (BASE CASE)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

ESCALATION:

Escalation has been excluded from these estimates. Costs are considered to be constant 1994 dollars.

UNIT RATES:

In general, the unit manhours, subcontract dollars, equipment dollars, and material dollars were based on 1993 MEANS. In most cases, a site productivity factor of 1.29 was applied to the Net chart unit manhours. The unit material and subcontract dollars were escalated 3% to arrive at 1994 constant dollars. Some costs were taken directly from the previous estimates.

The Low Level Thermal Destruction Unit costs were derived from B&RE quotational information.

Solidification costs for lead contaminated soil with portland cement have been formulated from information provided in "Hazardous Waste Cost Control" by R.A. Selg.

Waste container costs to purchase gondola liners and covers provided by FERMCO Recycling and Technology Dept.

Transportation and burial costs represent RSO's cost to transport waste by rail in gondola cars and bury the OU2 waste at Envirocare in Clive, Utah. Unit costs provided by FERMCO Recycling and Technology Dept. Certification costs by RSO are based on costs to certify a typical Sealand container. See Appendix E and estimate detail sheets for unit cost breakdown.

Waste Water Treatment costs are provided by OU5 to cover the cost of processing waste streams produced by OU2 construction activities.

Screening and confirmatory testing requirements and pricing were provided by CRU2 engineering.

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-5A - EXCAVATION AND ON-SITE DISPOSAL - FEDERAL OWNERSHIP - EXPANDED TRESPASSER - (BASE CASE)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

UNIT QUANTITIES:

Quantities of soil, flyash, lime sludge and solid waste to be remediated were provided by CRU2 Engineering Dept. See Tables in section F.8. The "Additional Excavation" volume required to excavate the remediation quantity of waste material at each subunit is based on the preliminary layout of excavation limits. The percent of the remediated quantity for the "Additional Excavation" is 14% for SWL and 10% each for the other subunits.
All other quantities, volumes, sizes, etc., were provided by CRU2 Engineering. All volumes of waste were considered bank cubic yards (BCY) at 10^{-6} risk level.

SWELL, DENSITY & SHRINKAGE FACTORS:

A swell or shrinkage factor was applied to the BCYs provided by CRU2 Engineering when applicable, resulting in loose cubic yards (LCY) or in-place or compacted cubic yards (ICY). Factors used are estimators judgement based on data provided in 'Fundamentals of Earthmoving' by Caterpillar Tractor Co. Density factors were applied for converting LCYs to Tons for costing out the shredding/crushing operation, solidification of the lead-contaminated soil at the Firing Range, and for determining the maximum allowable volume by weight for material to be shipped to Envirocare by rail in 90-ton gondola cars. Density factors used are estimator's judgment based on 'Weights and Specific Gravities' in the American Institute of Steel Construction book. Weights are for bulk, heaped, or loose materials. The following factors were used:

MAT'L.	SWELL	DENSITY	SHRINKAGE
EARTH	1.25	1.275	1.2
CLAY	1.23	1.25	1.18
GRAVEL	1.12	1.275	1.075
SAND	1.12	1.275	1.075
GEN.WASTE	1.15	2.00	1.15

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PROJECT & CONFIGURATION CONTROL
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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-5A - EXCAVATION AND ON-SITE DISPOSAL - FEDERAL OWNERSHIP - EXPANDED TRESPASSER - (BASE CASE)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

HEALTH PHYSICS: (See Appendix C)

All workers at the site will participate in the Medical Monitoring & Surveillance Program and the FEMP Radiation In-Vivo & Bioassay Testing Program. Costs are for the workers' time to participate in these programs based on the Number of Workers and the Duration of Construction Activity information.
Material dollars are included in this section to provide PPEs for the worker when required. Disposable PPEs are to be provided by the subcontractor. Washable PPEs will be provided by the subcontractor for the initial changeout for each required worker, with subsequent changeouts and cost for washing and decontamination provided by FERMCO. Labor dollars are included in this section for work delays caused by monitoring and rad checking.

NUMBER OF WORKERS:

Calculation: Total Direct Manhours Div. By 1813 Hours (1 Man Year) x 1.25 (attrition) Div. By the Duration of Construction in Months x 12 = number of workers per year.

(Use number of workers per year to determine CERCLA/SAT and Health Physics costs.)

G&A (Home Office Expense):

G&A are excluded from the target estimate. The G&A costs are calculated within the Micro-Frame computer system according to the plan for rebaselining.

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PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-5A - EXCAVATION AND ON-SITE DISPOSAL - FEDERAL OWNERSHIP - EXPANDED TRESPASSER - (BASE CASE)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

RISK BUDGET:

A cost element, based on a risk analysis calculated for this estimate to cover a statistical probability of a 50% chance of overrun/underrun to the project. The target estimate is the sum of the base estimate and the risk budget. The target estimate is the basis for the Performance Baseline. The risk budget for these projects will vary according to the results of the analysis. See the Risk Analysis at the end of each estimated alternative and refer to the Estimate Summary Sheets.

CONTINGENCY:

An amount budgeted to cover costs that may result from incomplete design, unforeseen and unpredictable conditions, or uncertainties. The amount of the contingency will depend on the status of design, procurement, construction, and the complexity and uncertainties of the component parts of the project. Contingency is not to be used to avoid making an accurate assessment of expected costs.

Contingency is calculated as the delta between the 50% chance of overrun and the 5% chance of overrun, indicated on the risk analysis. Contingency for these alternatives will vary based on the results of the risk analysis. See the risk analysis at the end of each estimated alternative and refer to the Estimate Summary Sheets.

PRESENT WORTH ANALYSIS:

An economic evaluation that compares the sums of discounted dollar costs or benefits of capital investments, replacements, operations, maintenance, decommission, and salvage of two or more systems or operations over the expected useful life span. The analysis identifies the system or operation considered to be the least-cost alternative for satisfying a particular purpose.
(SEE Present Worth Analysis Study "SUMMARY")

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PROJECT & CONFIGURATION CONTROL
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24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-5A - EXCAVATION AND ON-SITE DISPOSAL - FEDERAL OWNERSHIP - EXPANDED TRESPASSER - (BASE CASE)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

INCLUSIONS:

Costs have been included in the Field Directs for:

SITE PREPARATION
- Construction Survey
- Temporary Construction Fencing
- Clearing and Grubbing
- Dewatering
- General grading and surfacing for new roads, office/parking area, decontamination facilities and staging and/or Storage Areas

DECONTAMINATION FACILITIES AT SUBUNITS
- Decon. trailer rental at 39 mo.'s for SWL and LSP
- Decon. trailer rental at 51 mo.'s for SF, AFP and IFP
- Construction equipment decon.facility common for subunits SWL and LSP and one common for FS, AFP & IFP - 25' x 60'
- Personnel decon.facility common for sub-units SWL and LSP and one common for SF, AFP & IFP - 11' x 11'

EROSION AND SEDIMENT CONTROLS
- Diversion of clean run-off
- Diversion, collection and pumping of contaminated run-off to AWWT Facility
- Erosion and sediment control measures

OFF-SITE DISPOSAL
- Excavate contaminated soils/waste and lead-contaminated soil exceeding WAC
- Solidify lead-contaminated soil at firing range - 300 BCY
- Dry waste - low level thermal destruction (if required)
- Shred and crush waste (if required)

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FERMCO
PROJECT & CONFIGURATION CONTROL
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24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-5A - EXCAVATION AND ON-SITE DISPOSAL - FEDERAL OWNERSHIP - EXPANDED TRESPASSER - (BASE CASE)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

LOAD AND HAUL FOR OFF-SITE DISPOSAL
- Haul treated lead-contaminated soil from SF to OU1 rail loading facility
- Haul soil/waste exceeding WAC from subunits to OU1 rail loading facility
- Load waste into 90-ton capacity gondola rail cars
- Certify and ship to Envirocare

EXCAVATE, LOAD AND HAUL FOR ON-SITE DISPOSAL
- Excavate, sort and haul level D, C and additional soil/waste from subunits to on-site disposal cell

SITE PREP. FOR DISPOSAL CELL
- Clear and grub surrounding area - 45 acres
- Relocate South Access Road - 7,333 yd^2
- New haul road - 5,778 yd^2
- Temporary fencing - 5,200 linear feet
- Storage area - 200' x 200', asphalt
- Staging area - 160' x 160', concrete
- Decontamination trailer rental - 51 mo.'s
- Decontamination facilities - equipment - 25' x 60'
- Decontamination facilities - personnel - 11' x 11'
- Shredding/crushing equipment and operation at SWL and SF Staging areas

COMPOSITE LINER -
- Subgrade preparation - remove top soil, grade/compact
- Construct liner w/borrow materials
- Install leachate collection system
- Install leak detection system
- Install leachate discharge system
- Backfill and compact - impacted cushion layer 12" thick
- Backfill and compact - remaining impacted fill
- Backfill and compact - level C impacted fill
- Backfill generated waste

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SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-5A - EXCAVATION AND ON-SITE DISPOSAL - FEDERAL OWNERSHIP - EXPANDED TRESPASSER - (BASE CASE)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

COMPOSITE CAP
- Construct composite cap w/borrow materials
- Top soil - 6" thick
- Grass cover - seed, mulch
- Security fence

DIKE FOR DISPOSAL CELL
- Construct dike w/borrow materials
- Construct dike cover and HDPE piping
- Top Soil and grass cover - seed, mulch

GENERATED WASTE REMOVAL
- Office/parking facilities common to SWL and LSP
- Office/parking facilities common to AFP, IFP and SF
- Equip.and personnel decon. facilities common to SWL and LSP
- Equip.and personnel decon facilities common to AFP, IFP and SF
- Equip.and personnel decon facilities common to on-site disposal cell
- Staging area common to SWL and LSP
- Staging area common to AFP, IFP and SF
- Staging area common to on-site disposal cell
- Storage area common to on-site disposal cell
- All temporary construction fencing
- Relocated South Access Road
- Haul road

SITE RESTORATION - ALL SUBUNITS AND SUPPORT FACILITIES AT CELL
- Borrowed cmmon soil for backfill
- Final grade
- Borrowed top soil
- Grass cover, seed, fertilize, mulch
- Security fence and gates at each subunit

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FERMCO
PROJECT & CONFIGURATION CONTROL
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SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-5A - EXCAVATION AND ON-SITE DISPOSAL - FEDERAL OWNERSHIP - EXPANDED TRESPASSER - (BASE CASE)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

MONITORING WELLS

- Abandon existing wells at subunits
- Install new wells at subunits
- Install new wells at on-site disposal cell

Costs have been included in the Indirect Field Costs for:

- Contractor supervision
- Small tools and consumables
- Equipment rental
- Temporary construction facilities
- Temporary utilities and hook-up
- Job clean-up
- Safety
- Health Physics
- CERCLA and site access training
- Bond
- Subcontractor overhead and profit (Includes insurance and reserve fund)
- Subcontractor payroll burdens and benefits

Costs have been included as FERMCO Field Support Costs for:

- Transportation and burial to Envirocare
- Purchase cost of liners and covers for rail gondola cars
- Waste water treatment cost (OU5)
- Screening and confirmatory testing
- FERMCO construction management

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FERMCO
PROJECT & CONFIGURATION CONTROL
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SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-5A - EXCAVATION AND ON-SITE DISPOSAL - FEDERAL OWNERSHIP - EXPANDED TRESPASSER - (BASE CASE)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

Costs included for Engineering are:

- Emission modeling
- PSAR/FSAR Reports
- Titles I,II and III (Includes cultural resource surveys, Phases I and II)
- CDR and DCR

Costs have been included for Ohio State sales tax

- at 6%

Costs have been included for Risk Budget.

Costs have been included for Contingency.

ALL OF THE ABOVE REPRESENTS SCOPE FOR THE CAPITAL COST FOR THE ALTERNATIVES.

ALT5A represents quantities based on criteria for Federal ownership (Expanded Trespasser).

Operations and maintenance costs were developed for a 30-year period following the remediation of each subunit. These costs, along with the capital cost, were used to develop the Life Cycle Cost Analysis Report in 1994 constant dollars to determine the Net Present Value (NPV).

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PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-5A - EXCAVATION AND ON-SITE DISPOSAL - FEDERAL OWNERSHIP - EXPANDED TRESPASSER - (BASE CASE)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

EXCLUSIONS:

- Permits and fees
- Landlord costs
- Escalation
- G&A (home office expense)
- Rail loading facility provided in CRU1 baseline.

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CONTR. NO. 4424321
CLIENT U.S.DEPT. OF ENERGY
PROJECT ALT-5A - EXCAVATION & ON-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION FERNALD, OHIO
PROJ.CTL. CRU2

CONTR.NO. 4424321
EST.NO. C29407_ _
DATE 24-Aug-94
BY KEN KEPLER
TASK ID 2C _ _

OU2 FEASIBILITY STUDIES

TITLE	TOTAL ESTIMATE - CONSTANT 1994 DOLLARS					NET PRESENT VALUE				
	CAPITAL COST	O & M DURING REMEDIATION	O & M POST REMEDIATION	TOTAL CONSTANT 1994 $'s	TOTAL UNIT COST PER BCY OF EXCAV.& GEN. WASTE	CAPITAL COST	O & M DURING REMEDIATION	O & M POST REMEDIATION	TOTAL CONSTANT 1994 $'s	TOTAL UNIT COST PER BCY OF EXCAV.& GEN. WASTE
ALT5A - SWL	$10,666,400		$6,181,400	$16,847,800	$567.23					
ALT5A - SF	$26,325,500		$7,465,500	$33,791,000	$371.67					
ALT5A - LSP	$8,993,000		$6,136,900	$15,129,900	$635.66					
ALT5A - AFP	$19,469,400		$5,876,800	$25,346,200	$329.96					
ALT5A - IFP	$34,676,800		$7,101,700	$41,778,500	$384.64					
TOTAL ALT-5A	$100,131,100		$32,762,300	$132,893,400	$402.88					

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CONTR. NO. 4424321
CLIENT U.S.DEPT. OF ENERGY
PROJECT ALT-5A - EXCAVATION & ON-SITE DISPOSAL - EXPANDED TRESPASSER
LOCATION FERNALD, OHIO
PROJ.CTL. CRU2

CONTR.NO. 4424321
EST.NO. C29407_ _
DATE 24-Aug-94
BY KEN KEPLER
TASK ID 2C _ _

OU2 FEASIBILITY STUDIES

TITLE	BCY EXCAVATED		SUB-TOTAL	GENERATED WASTE TOTAL	TOTAL BCY's OF EXCAV. & GENERATED WASTE
	LEVEL D	LEVEL C			
ALT5A - SWL	22400	1700	24100	5602	29702
ALT5A - SF	85200	500	85700	5217	90917
ALT5A - LSP	18200		18200	5602	23802
ALT5A - AFP	71600		71600	5217	76817
ALT5A - IFP	97300	6100	103400	5217	108617
TOTAL ALT-5A	294700	8300	303000	26855	329855

FEMP-OU02-5 DRAFT
August 24, 1994

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ESTIMATING SERVICES

EST FILE #: C29407 _ _
CLIENT: US DOE
PROJECT TITLE: ALT-5A - EXCAVATION & ON-SITE DISPOSAL
WBS#: 1.1.1.2.3 EXPANDED TRESPASSER

SUMMARY SHEET

DATE: 24-Aug-94
ESTIMATOR: KEN KEPLER
LOCATION: FERNALD
TASK#: 2C_

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL -	325,106		5,552,500	5,843,500	9,354,500	$20,750,500
2								
3		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		325,106		$5,552,500	$5,843,500	$9,354,500	$20,750,500
11	SUPERVISION - CONTRACTOR				945,000			$945,000
12	SM TOOLS/CONSM'BLS						333,100	$333,100
13	EQUIPMENT RENTAL						6,481,200	$6,481,200
14	TEMP. FACILITIES				116,600		216,500	$333,100
15	TEMP UTL'S HOOK-UP				58,400		108,300	$166,700
16	JOB CLEAN-UP				116,600		216,500	$333,100
17	SAFETY				58,400		108,300	$166,700
18	HEALTH PHYSICS S/C				770,600		146,100	$916,700
19	CERCLA/SAT	$1,500 PER PERSON				174,000		$174,000
20	BOND					207,600		$207,600
21	OVERHEAD & PROFIT					2,772,900		$2,772,900
22	PAYRL BRD.&BENFT.				3,961,400			$3,961,400
	INDIRECT FIELD COSTS				$6,027,000	$3,154,500	$7,810,000	$16,791,500
	DIRECT & INDIRECT FIELD COSTS				$11,579,500	$8,998,000	$16,964,500	$37,542,000
23	TRANSPORTATION & BURIAL					187,100		$187,100
24	WASTE CONTAINERS						6,400	$6,400
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					288,800		$288,800
25	SCREENING & CONFIRMATION TESTING					9,985,100		$9,985,100
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				8,046,100			$8,046,100
	FERMCO FIELD SUPPORT COSTS				$8,046,100	$10,461,000	$6,400	$18,513,500
28	EMISSION MODELING				65,700		122,000	$187,700
29	PSAR/FSAR(SAFETY RPT)				1,566,700			$1,566,700
30	ENGINEERING	TITLE I&II 7,256,200 TITLE III	7,516,100	CDR	2,752,500	DCR	1,875,700	$19,400,500
	ENGINEERING COSTS							$21,154,900
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				17,099,300	1,025,900
	SUB-TOTAL	(BASE ESTIMATE)						$78,236,300
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	20.5%						16,065,200
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$94,301,500
35	CONTINGENCY	7.5%						5,829,600
								PRELIMINARY
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$100,131,100

LOTUS31\FS2\INDALT5.WK3 - FEASIBILITY STUDY

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CONTR.NO. [redacted]4321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – EXCAVATION & ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.

BUDGET ESTIMATE DETAILS

CONTR.NO.- 4424321
EST. NO. C29407_ _
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2C

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY EXPANDED TRESPASSER) ON–SITE DISPOSAL w/OFF–SITE														
SITE PREPARATION	1	LS		20,434						353,660	75,000	192,510	495,950	$1,117,120
DECONTAMINATION FACILITIES/SERVICES	1	LS		1,757						31,970	137,430	7,440	32,630	$209,470
EROSION AND SEDIMENT CONTROLS	1	LS		6,155						114,640		37,620	198,150	$350,410
PERCHED GROUNDWATER COLLECTION	1	LS												
EXCAV./SORT/SHRED/DRY – OFFSITE DISPOSAL	1	LS		77						1,310	229,730	1,750		$232,790
LOAD/HAUL – OFF–SITE DISPOSAL	1	LS		79						1,360		1,880		$3,240
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE	1	LS		64,986						1,114,760		967,380	452,500	$2,534,640
COMPOSITE LINER	1	LS		91,668						1,556,840	2,503,890	2,078,620	3,403,490	$9,542,840
COMPOSITE CAP	1	LS		21,854						370,850	433,760	531,610	1,159,290	$2,495,510
CLAY CAP	1	LS		44,231						750,570	132,460	935,070	1,637,110	$3,455,210
GENERATED WASTE REMOVAL	1	LS		14,859						252,110		142,930		$395,040
SITE RESTORATION	1	LS		29,451						499,810		995,100	1,124,930	$2,619,840
MONITORING WELLS	1	LS									1,800,000			$1,800,000
SUB TOTAL (DIRECT FIELD COSTS)	1	LOT		295,551						$5,047,880	$5,312,270	$5,891,910	$8,504,050	$24,756,110
TAKE–OFF ALLOWANCE 10%	1	LOT		29,555						$504,790	$531,230	$589,190	$850,410	$2,475,620
TOTAL (DIRECT FIELD COSTS)	1	LOT		325,106						$5,552,700	$5,843,500	$6,481,100	$9,354,500	$27,231,800

Alt–5A – Excavation & On–Site Disposal – EXPANDED TRESPASSER – SUMMARY

TABLE F.4-4

ALTERNATIVE 5 - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF LEAD CONTAMINATE SOIL EXPANDED TRESPASSER AND 10^{-6} RISK LEVEL REMEDIATION AND DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Off-Site Disposal Volume (yd^3)	On-Site Disposal Volume (yd^3)			Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavation		Excavation Volume to On-Site Disposal	Generated Waste Volume	Total On-Site Disposal Volume		
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total								
Solid Waste Landfill	19,500	1,700	21,200	3,000	24,200	0	24,200	3,000	27,200	5,300	0
Lime Sludge Ponds	16,800	0	16,800	1,700	18,500	0	18,500	3,000	21,500	0	0
Inactive Flyash Piles	84,800	9,200	94,000	9,400	103,400	0	103,400	3,000	106,400	4,000	0
South Field	77,100	500	77,600	7,800	85,400	300	85,100	3,000	88,100	6,500	0
Active Flyash Pile	65,100	0	65,100	6,500	71,600	0	71,600	3,000	74,600	0	0
Total	263,300	11,400	274,700	28,400	303,100	300	302,800	15,000	317,800	15,800	0

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

001264

5861

F ERMC O
ESTIMATING SERVICES

SUMMARY SHEET

EST FILE #: C2940731
CLIENT: US DOE
PROJECT TITLE: ALT-5A - SWL - EXCAV. & ONSITE DISPOSAL
WBS#: 1.1.1.1.2.3.1 EXPANDED TRESPASSER

DATE: 11-Aug-94
ESTIMATOR: KEN KEPLER
LOCATION: FERNALD
TASK#: 2CSW

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL	35,453		$615,100	$628,100	$1,074,700	$2,317,900
		NO TREATMENT - SHRED/CRUSH, COMPOSITE LINER & CAP						
2		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10								
				AVG				
	DIRECT FIELD COSTS		35,453		$615,100	$628,100	$1,074,700	$2,317,900
11	SUPERVISION - CONTRACTOR				$105,000			$105,000
12	SM TOOLS/CONSM'BLS						$36,900	$36,900
13	EQUIPMENT RENTAL						$642,200	$642,200
14	TEMP. FACILITIES				$12,900		$24,000	$36,900
15	TEMP UTL'S HOOK-UP				$6,500		$12,000	$18,500
16	JOB CLEAN-UP				$12,900		$24,000	$36,900
17	SAFETY				$6,500		$12,000	$18,500
18	HEALTH PHYSICS S/C				$87,800		$17,500	$105,300
19	CERCLA/SAT	$1,500 PER PERSON				$31,500		$31,500
	BOND					$23,200		$23,200
	OVERHEAD & PROFIT					$303,600		$303,600
22	PAYRL BRD.&BENFT.				$440,300			$440,300
	INDIRECT FIELD COSTS				$671,900	$358,300	$768,600	$1,798,800
	DIRECT & INDIRECT FIELD COSTS				$1,287,000	$986,400	$1,843,300	$4,116,700
23	TRANSPORTATION & BURIAL	N/A						
24	WASTE CONTAINERS	N/A						
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY. OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$9,000		$9,000
25	SCREENING/CONFIRMATORY TESTING					$885,500		$885,500
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$856,300			$856,300
	FERMCO FIELD SUPPORT COSTS				$856,300	$894,500		$1,750,800
28	EMISSION MODELING				$7,200		$13,400	$20,600
29	PSAR/FSAR(SAFETY RPT)				$197,600			$197,600
30	ENGINEERING	TITLE I&II $728,700 TITLE III	$819,200	CDR	$399,300	DCR	$156,400	$2,103,600
	ENGINEERING COSTS							$2,321,800
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$1,856,700	$111,400
	SUB-TOTAL	(BASE ESTIMATE)						$8,300,700
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	21.5%						$1,784,700
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$10,085,400
	CONTINGENCY	7.0%						$581,000
								PRELIMINARY
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$10,666,400

LOTUS31\FS2\ALT5A\SWL\INDSUM.WK3 - FEASABILITY STUDY

001265

DATE: 11-Aug-94

PROJECT TITLE:
ALT-5A - SWL - EXCAV. & ONSITE DISPOSAL
WBS#:
1.1.1.1.2.3.1

HEALTH PHYSICS

EXPANDED TRESPASSER

EST.NO.: C2940731
EST. : KEN KEPLER
TASK I.D. :
2CSW

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY / MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	127	$1,630	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	127	$3,050	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	127	$660	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	127	$710	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	127	$760	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	127	$460	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	127	$8,890	C/B		
SUB-TOTAL		31.80	4		$16,160			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	8		$100	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	4		$90	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	4		$700	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$1,370			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$17,500			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

001266

DATE: 11-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940731

ALT-5A - SWL - EXCAV. & ONSITE DISPOSAL

EST. : KEN KEPLER

WBS#:
1.1.1.1.2.3.1

EXPANDED TRESPASSER

TASK I.D. :
2CSW

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

5861

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	21	84	$16.97	$1,430		
ANNUAL PHYSICALS	1	3	21	63	$16.97	$1,070		
EXIT (TERMINATION) PHYSICALS	1	4	21	84	$16.97	$1,430		
SUB-TOTAL						$3,930		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	14	1	21	299	$16.97	$5,070		
YEARLY IN-VIVO	1	4	21	84	$16.97	$1,430		
EXIT (END OF PROJECT / TERMINATION)	1	4	21	84	$16.97	$1,430		
SUB-TOTAL						$7,930		
WORK DELAYS CAUSED BY MONITORING	5%				$758,900	$37,945		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$758,900	$37,945		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$87,800	$17,500	$105,300

001267

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL CELL – EXPANDED TRESPASSER
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CSW

WBS NO. – 1.1.1.1.2.3.1
EST. NO. – C2940731
BY – K. KEPLER
DATE – 08/11/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25–Mar–94	01–Jul–99	30–Jan–2000	31–Aug–2000	14	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
70	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

001268

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL w/OFF–SITE OPTION (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		4,219						$73,340	$15,000	$38,730	$134,390	$261,460
DECONTAMINATION FACILITIES/SERVICES	1	LS		427						$7,750	$29,880	$1,740	$8,050	$47,420
EROSION AND SEDIMENT CONTROLS	1	LS		1223						$22,820		$6,260	$46,790	$75,870
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT/DRY – OFFSITE DISPOSAL	N/A													N/A
LOAD/HAUL – OFF–SITE DISPOSAL	N/A													N/A
EXCAVATE–LOAD/HAUL TO ON–SITE DISPOSAL (SHRED/CRUSH)	1	LS		5372						$102,050		$79,320	$114,150	$295,520
COMPOSITE LINER	1	LS		9029						$150,310	$211,790	$191,760	$309,340	$863,200
COMPOSITE CAP	1	LS		1790						$30,370	$34,720	$43,990	$95,240	$204,320
DIKE FOR DISPOSAL CELL	1	LS		3308						$56,130	$10,600	$70,940	$124,630	$262,300
GENERATED WASTE REMOVAL	1	LS		3150						$53,440		$29,960		$83,400
SITE RESTORATION	1	LS		3712						$63,010		$121,080	$144,440	$328,530
MONITORING WELLS	1	LS									$269,000			$269,000
SUB–TOTAL (DIRECT FIELD COSTS)				32230						$559,220	$570,990	$583,780	$977,030	$2,691,020
TAKE–OFF ALLOWANCE 10%	1	LS		3,223						$55,920	$57,100	$58,380	$97,700	$269,100
TOTAL (DIRECT FIELD COSTS)	1	LS		35,453						$615,100	$628,100	$642,200	$1,074,700	$2,960,100

On–Site Disposal of SWL – SUMMARY

PAGE 1 of 18

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 20% ARE COMMON TO ALL SUB–UNITS)														
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	1500	LF	0.213	412	16.97				6.25	$6,990			$9,660	$16,650
c. Clear and Grub														
i. Remediation Site	4.10	AC	41.40	219	16.97			2575.00		$3,720		$10,870		$14,590
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas														
d. Dewatering														
i. Excavate Dewatering Trench	233	CY	0.50	150	16.97			1.49		$2,550		$360		$2,910
ii. Pump – w/4" Suction Hose	100	DAYS	3.00	387	16.97			19.55		$6,570		$2,010		$8,580
iv. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip	1	CY	4.00	5	16.97			100.00		$80		$100		$180
e. General Grading														
i. New Roads	12534	SY	0.001	16	16.97			0.07		$270		$900		$1,170
50%														
ii. Office/Parking Area 2222	1111	SY	0.010	14	16.97			0.32		$240		$370		$610
iii. Const.Equip.Decon.Pad Area 234	117	SY	0.010	2	16.97			0.32		$30		$40		$70
iv. Pers.Decon.Pad Area 14	7	SY	0.010		16.97			0.32						
v. Staging Area @ Sub–Unit 2845	1423	SY	0.010	18	16.97			0.32		$310		$470		$780
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	10445	SY	0.030	404	16.97			1.08	6.66	$6,860		$11,620	$71,650	$90,130
50%														
ii. Office/Parking – 8" Gravel W/ Geotextile 2222	1111	SY	0.030	43	16.97			1.08	6.66	$730		$1,240	$7,620	$9,590
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc.Slab 2845	1423	SY	0.041	75	16.97			1.45	5.51	$1,270		$2,120	$8,070	$11,460
Concrete Slab 160 x 160' x 8"thk. 631	316	CY	4.07	1656	17.98			18.38	67.00	$29,770		$5,970	$21,770	$57,510
Concrete Curb – 2'h x 480 lf x 8" thk. 24	12	CY	15.30	237	17.98			69.08	275.90	$4,260		$850	$3,410	$8,520
HDPE Perf.Sub–grade Piping – 4" 500	250	LF	0.21	68	16.97			0.74	3.02	$1,150		$190	$780	$2,120
Epoxy Coating 2845	1423	SY	0.22	404	16.97			0.77	7.56	$6,860		$1,130	$11,080	$19,070
Backfill & Compact around Slab 183	92	ICY	0.086	10	16.97			1.38				$130		$130
Mob/Demob.Equip. 1	0.50	LS	2.00	1	16.97			184.00		$20		$90		$110
g. Relocated Diversion Ditch														
i. Excavation – Ditch	3150	CY	0.24	975	16.97			0.84	7.50	$16,550		$2,650	$23,630	$42,830
SY														
ii. Grass Cover: Seed, Fertilize, Mulch 11000	99	MSF	0.30	38	16.97			6.75	25.00	$640		$690	$2,550	$3,880
TOTAL (SITE PREPARATION)	1	LS		4,219						$73,340	$15,000	$38,730	$134,390	$261,460

Site Preparation Details

CONTR.NO. – [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	50%														
a. Decon Trailer – Rental	39	20	MO					1500.00				$29,250			$29,250
	50%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	88	BCY	0.021	2	16.97			0.64		$30		$60		$90
ii. Sub–grade Prep.	167	84	SY	0.041	4	16.97		6.75	1.45	5.51	$70	$580	$120	$470	$1,240
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	8	SF	0.32	3	19.21			0.73	12.55	$60		$10	$100	$170
Metal Grating 2 ft wide x 25 lf	25	13	LF	0.53	9	19.21			1.86	46.67	$170		$20	$600	$790
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	20	CY	4.07	102	17.98			14.25	67.00	$1,830		$290	$1,350	$3,470
Decon Pad Trench – 2'x2'i.d.x 25l	5	3	CY	28.22	91	17.98			98.77	202.30	$1,640		$250	$520	$2,410
Decon Pad Curb – 6" x 6" x 120 lf	5	3	CY	15.30	49	17.98			53.55	275.90	$880		$140	$710	$1,730
Pump Pad – 4' x 4' x 6" thk.	0.30	0.15	CY	10.64	2	17.98			37.24	97.20	$40		$10	$20	$70
Epoxy Coating	167	84	SY	0.22	24	17.00			0.77	7.56	$410		$70	$650	$1,130
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	1	EA	12.00	8	17.98			100.00	525.00	$140		$50	$270	$460
vi. HDPE Piping	100	50	LF	0.38	25	19.95			5.11	4.42	$500		$260	$230	$990
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	360	SF	0.04	17	16.97			0.03	1.55	$290		$10	$570	$870
4" x 4" x 9'–6" Wood Posts set in conc.	27	14	EA	0.480	8	16.97			1.68	5.75	$140		$20	$80	$240
viii. Air Diaphragm Pump 50 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$400	$630
ix. Suction and Discharge Piping	10	5	LF	0.11	1	19.95			0.39	0.84	$20				$20
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	2	LF	0.47	1	19.95			1.65	14.91	$20			$20	$40
x. Backfill & Compaction around concrete slab	BCY 258	155	ICY	0.086	17	16.97			1.38		$290		$220		$510
SUB–TOTAL (EQUIP. DECON. FACILITY)					373						$6,730	$29,830	$1,560	$5,990	$44,110

Equipment Decon. Facility Details

FEMP-OU02-5 DRAFT
August 24, 1994

5861

001271

CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	50%														
i. Excavation – Structural	19	10	BCY	0.021		16.97			0.64				$10		$10
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	7	SY	0.041		16.97		6.75	1.45	5.51		$50	$10	$40	$100
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	2	SF	0.32	1	16.97			0.73	12.55	$20			$30	$50
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	1	CY	4.07	4	17.98			14.25	67.00	$70		$10	$50	$130
Decon Slab Sump – 2'x 2' x 3'	0.3	0.15	CY	31.84	6	17.98			111.44	250.70	$110		$20	$40	$170
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0.20	CY	15.30	4	17.98			53.55	275.90	$70		$10	$60	$140
Epoxy Coating	14	7	SY	0.22	2	17.00			0.77	7.56	$30		$10	$50	$90
v. Corrugated Fiberglass Splash Guard	132	66	SF	0.04	3	16.97			0.03	1.55	$50			$110	$160
4" x 4" x 9'–6" Wood Posts set in (	6	3	EA	0.480	2	16.97			1.68	5.75	$30		$10	$20	$60
vi. Pump 20 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$410	$640
vii. Clean Wtr.Strg.Tank W/Piping– 1500 gal.	1	1	LS	32.00	21	19.95			112.00	2500.00	$420		$60	$1,250	$1,730
viii. Backfill & Compaction around concrete slab	BCY 17	10	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		54						$1,020	$50	$180	$2,060	$3,310
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		427						$7,750	$29,880	$1,740	$8,050	$47,420

Personnel Decon.Facilities/Services Details

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FEMP-OU02-5 DRAFT
August 24, 1994

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CONTR.NO.– [illegible]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	880	LF	0.017	19	16.97			0.06	0.65	$320		$50	$590	$960
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	500	EA	0.24	155	16.97			1.53	1.35	$2,630		$790	$700	$4,120
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 300 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. Sedimentation/Decon. Tank 10000 gal	1	LS	53.40	69	19.95			186.90	7100.00	$1,380		$190	$7,100	$8,670
iv. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	800	LF	0.38	393	19.95			5.11	4.42	$7,840		$4,090	$3,540	$15,470
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	3	EA	8.00	31	16.97			28.00	8300.00	$530		$80	$24,900	$25,510
vi. 50 gal. Pump Includes Controls & Electrical	2	EA	60.00	155	19.95			210.00	2500.00	$3,090		$420	$5,000	$8,510
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,223						$22,820		$6,260	$46,790	$75,870

Erosion Control Details

FEMP-OU02-5 DRAFT
August 24, 1994

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5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
LOAD & HAUL FOR ON–SITE DISPOSAL														
Excavate and Load – Level D	19400	BCY	0.055	1376	16.97			1.17		$23,350		$23,380		$46,730
Excavate Additional Soil	3000	BCY	0.055	213	16.97			1.17		$3,610		$3,620		$7,230
Haul to Onsite Disposal Cell BCY														
– 12" thk. Cushion Layer 2048	2560	LCY	0.081	267	16.97			1.51		$4,530		$3,980		$8,510
– Impacted Fill 20352	25440	LCY	0.081	2658	16.97			1.51		$45,110		$39,570		$84,680
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load	1700	BCY	0.055	121	16.97			1.17		$2,050		$2,050		$4,100
Haul to Onsite Disposal Cell BCY														
– Impacted Fill 1700	2125	LCY	0.081	222	16.97			1.51		$3,770		$3,310		$7,080
			S/T	343										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	343	HRS	150%	515	16.97			1.51		$8,740		$530		$9,270
			S/T	858										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	86	MD												
(SHREDDING COMMON TO SWL, IFP & SF)														
Shredder/Crusher – Purchase/Install 33.3%	0.3	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY 5300														
Generated Waste BCY 5602														
Excavated Debris TONS 8447														
(Percent of Gen.Waste to be Shredded) 25%														
Generated Waste TONS 3221														
TOTAL TONS 11668														
Operating Costs	194	HRS							25.75				$5,150	$5,150
(2) Operators	388	HRS	1.00	501	16.97					$8,500				$8,500
TOTAL (EXCAVATE– ON–SITE DISPOSAL)	1	LOT		5,372						$102,050		$79,320	$114,150	$295,520

Excavate for Onsite Disposal Details

CONTR.NO. – [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP.)															
a. Clear and Grubb	20%														
i. On–site Cell & Surrounding area	35	7.0	AC	41.40	374	16.97			2575.00		$6,350		$18,570		$24,920
b. Relocated South Access Road	20%														
i. Clear & Grub	3	0.6	AC	41.40	32	16.97			2575.00		$540		$1,590		$2,130
ii. General Grading	1467	293.4	SY	0.001					0.07				$20		$20
iii. Road – 8" Gravel W/Geotextile	7333	1466.6	SY	0.030	57	16.97			1.08	6.66	$970		$1,630	$10,060	$12,660
c. Haul Road	20%														
i. Clear & Grub	2.4	0.5	AC	41.40	26	16.97			2575.00		$440		$1,270		$1,710
ii. General Grading	11556	2311.2	SY	0.001	3	16.97			0.07		$50		$170		$220
iii. Road – 8" Gravel W/Geotextile	5778	1155.6	SY	0.030	45	16.97			1.08	6.66	$760		$1,290	$7,930	$9,980
	20%														
d. Temporary Construction Fencing	5200	1040.0	LF	0.213	286	16.97				6.25	$4,850			$6,700	$11,550
e. 20' wide Swing Gates	1	0.2	EA	25.60	7	16.97			340.00	560.00	$120		$70	$120	$310
f. Staging Area @ Cell	20%														
Area Excavation for Slab	1606	321.2	BCY	0.016	7	16.97			0.60		$120		$200		$320
Sub–Base for Slab	2845	569.0	SY	0.041	30	16.97		6.75	1.45	5.51	$510	$3,840	$850	$3,230	$8,430
HDPE Perf.Sub–grade Piping – 4"	500	100.0	LF	0.21	27	16.97			0.74	3.02	$460		$80	$310	$850
Concrete Slab – 160'x160'x8" thk	631	126.2	CY	4.07	663	17.98			14.25	67.00	$11,920		$1,850	$8,710	$22,480
Concrete Curb – 480'x2'x8" thk	24	4.8	CY	15.30	95	17.98			53.55	275.90	$1,710		$260	$1,360	$3,330
Epoxy Coating	2845	569.0	SY	0.22	161	16.97			0.77	7.56	$2,730		$450	$4,430	$7,610
Backfill & Compact around Slab	183	36.6	ICY	0.086	4	16.97			1.38				$50		$50
Mob/Demob.Equip.	1	0.2	LS	2.00	1	16.97			184.00		$20		$40		$60
g. Storage Area – 200' x 200' Asphalt Includes Compacted Sub–Grade	4444	889	SY	0.084	96	16.97			2.56	14.04	$1,630		$2,340	$12,850	$16,820
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat															
	20%														
h. Decon Trailer – Rental	51	10	MO					1500.00				$15,300			$15,300
i. Const.Equipment Decon. Facility 25 ft x 60 ft	20% 1	0.20	LS	730.00	146	18.05		1160.00	2900.00	11980.00	$2,640	$230	$580	$2,400	$5,850
j. Personnel Decon. Facility 11'x 11'	20% 1	0.20	LS	108.00	22	18.89		100.00	360.00	4120.00	$420	$20	$70	$820	$1,330
SUB–TOTAL (COMPOSITE LINER)		1	LOT		2082						$36,240	$19,390	$31,380	$58,920	$145,930

Composite Liner Details

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FEMP-OU02-5 DRAFT August 24, 1994

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CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER														
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.														
COMPOSITE LINER														
a. Subgrade Preparation – includes removal of top soil, grading & comp.	6205	SY	0.024	192	16.97			0.86		$3,260		$5,500		$8,760
b. 95% Clay – 5% Bentonite 36" Thk BCY 6205	7322	ICY	0.260	2456	16.97			11.19	20.35	$41,680		$84,390	$153,470	$279,540
c. Composite Clay Liner	6205	SY					7.38				$45,790			$45,790
d. HDPE Liner 60 mil	6205	SY					4.75				$29,470			$29,470
e. Geotextile Fabric	6205	SY					2.25				$13,960			$13,960
f. Pea Gravel 12" Thk; In–place BCY 2048	2202	ICY	0.11	312	16.97			0.77	17.00	$5,290		$1,750	$38,550	$45,590
g. Composite Clay Liner	6205	SY					7.38				$45,790			$45,790
h. HDPE Liner 60 mil	6205	SY					4.75				$29,470			$29,470
i. Geotextile Fabric	6205	SY					2.25				$13,960			$13,960
j. Pea Gravel 12" Thk; In–place BCY 2048	2202	ICY	0.11	312	16.97			0.77	17.00	$5,290		$1,750	$38,550	$45,590
k. Geotextile Fabric	6205	SY					2.25				$13,960			$13,960
l. HDPE Perforated Pipe – leachate collection 6" Dia.	360	LF	0.30	139	16.97			1.05	6.56	$2,360		$390	$2,430	$5,180
m. HDPE Perforated Pipe – leak detection 6" Dia.	360	LF	0.30	139	16.97			1.05	6.56	$2,360		$390	$2,430	$5,180
n. Leachate Discharge Piping														
i. HDPE Carrier & containment Pipe 6" x 10' Includes Trench Excav/Backfill, sand bedding and compaction.	280	LF	0.86	311	16.97			11.37	22.33	$5,280		$3,280	$6,440	$15,000
ii. HDPE Manhole – 4' dia. x 8' deep	1	EA	8.00	10	16.97			28.00	8300.00	530.00		$30	$8,550	$9,110
o. Impacted Fill–Cusion Layer 12" Thk BCY 2048	2560	LCY	0.06	198	16.97			1.67		$3,360		$4,400		$7,760
p. Impacted Fill–Spread and Compact BCY 20352	25440	LCY	0.06	1969	16.97			1.67		$33,410		$43,760		$77,170
q. Generated Waste BCY 5602	6442	LCY	0.06	499	16.97			1.67		$8,470		$11,080		$19,550
PPE LEVEL C Allowance is added to the														
r. Impacted fill BCY 1700	2125	LCY	0.06	164	16.97			1.67		$2,780		$3,660		$6,440
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	164	HRS	150%	246										
			S/T	410										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	41	MD												
SUB–TOTAL (COMPOSITE LINER)	1	LOT		6,947						$114,070	$192,400	$160,380	$250,420	$717,270
TOTAL (COMPOSITE LINER)	1	LOT		9,029						$150,310	$211,790	$191,760	$309,340	$863,200

Composite Liner Details

CONTR.NO.– [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE CAP															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
COMPOSITE CAP															
a. Contouring Layer 18" Thk.	BCY 1059	1271	ICY	0.06	98	16.97			1.67	3.50	$1,660		$2,190	$4,580	$8,430
b. 95% Clay – 5% Bentonite 24" Thk	BCY 1419	1674	ICY	0.260	562	16.97			11.19	20.35	$9,540		$19,300	$35,100	$63,940
c. GML\GCC – composite Liner		2119	SY					7.38				$15,640			$15,640
d. Geotextile Fabric		2119	SY					2.25				$4,770			$4,770
e. Pea gravel 12" Thk, In–place	BCY 699	751	ICY	0.11	107	16.97			0.77	17.00	$1,820		$600	$13,160	$15,580
f. Geotextile Fabric		2119	SY					2.25				$4,770			$4,770
g. Cobbels 36" Thk; In–place	BCY 2119	2278	ICY	0.258	758	16.97			7.15	10.10	$12,860		$16,780	$23,700	$53,340
h. Geotextile Fabric		2119	SY					2.25				$4,770			$4,770
i. Sand Layer 6" Thk; In–place	BCY 360	387	ICY	0.052	26	16.97			1.76	5.00	$440		$700	$1,990	$3,130
j. Geotextile Fabric		2119	SY					2.25				$4,770			$4,770
k. Common Soil 21" Thk; In–place	BCY 1229	1475	ICY	0.06	114	16.97			1.67	3.50	$1,930		$2,540	$5,320	$9,790
l. Top Soil 6" Thk; In–place	BCY 360	432	ICY	0.053	30	16.97			1.82	12.10	$510		$810	$5,380	$6,700
m. Grass Cover – Seed, Fertilize, Mulc Utility Mix – Hydro/Air Seeding	SY 2119	19	MSF	0.30	7	16.97			6.75	25.00	$120		$130	$490	$740
n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized		400	LF	0.17	88	16.97			2.28	13.40	$1,490		$940	$5,520	$7,950
TOTAL (COMPOSITE CAP)		1	LOT		1,790						$30,370	$34,720	$43,990	$95,240	$204,320

Composite Cap Details

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August 24, 1994

F-6-31

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CONTR.NO.– 4424321 PRELIMINARY

CLIENT – U.S. DEPT. OF ENERGY

PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER

LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS

PROJ.CTL. – CRU–2

WBS NO. – 1.1.1.1.2.3.1

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DIKE FOR DISPOSAL CELL															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
a. Borrow Common Soil – Dike	BCY 16138	19366	ICY	0.06	1499	16.97			1.67	3.50	$25,440		$33,310	$69,810	$128,560
b. Geotextile Fabric		4709	SY					2.25				$10,600			$10,600
c. Cobbels 36" Thk; In–place	BCY 4709	5062	ICY	0.258	1685	16.97			7.15	10.10	$28,590		$37,280	$52,660	$118,530
d. HDPE Drainage Pipe	6" Dia.	320	LF	0.30	124	16.97			1.05	6.56	$2,100		$350	$2,160	$4,610
TOTAL (DIKE – DISPOSAL CELL)		1	LOT		3,308						$56,130	$10,600	$70,940	$124,630	$262,300

Dike Details

CONTR.NO. – [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL															
a. Office/Parking Area @ S/U	50%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	247	BCY	0.292	93	16.97			9.16		$1,580		$2,330		$3,910
Geo–Fabric & Liner	2222	1111	SY	0.002	3	16.97			0.02		$50		$20		$70
Haul & Dump Rubble	185	93	BCY	0.30	36	16.97			2.51		$610		$240		$850
b. Const.Equip.Decon Facil.@ S/U	50%														
Demo/Remove Concrete	49.3	25	BCY	1.2	38	16.97			3.62		$640		$90		$730
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	14	BCY	0.292	5	16.97			9.16		$80		$130		$210
Geo–Fabric & Liner	167	84	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	27	14	EA	0.48	8	16.97			1.68		$140		$20		$160
Splash Guard	702	351	SF	0.04	18	16.97			0.03		$310		$10		$320
Haul & Dump Rubble	24.9	12	BCY	0.30	5	16.97			2.51		$80		$30		$110
c. Personnel Decon. Facil. @ S/U	50%														
Demo/Remove Concrete	2.2	1	BCY	1.2	2	16.97			3.62		$30				$30
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo–Fabric & Liner	14	7	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	6	3	EA	0.48	2	16.97			1.68		$30		$10		$40
Splash Guard	132	66	SF	0.04	3	16.97			0.03		$50				$50
Haul & Dump Rubble	3.5	2	BCY	0.30	1	16.97			2.51		$20				$20
d. Staging pad @ S/U	50.0%														
Demo/Remove Concrete	655	328	BCY	1.2	507	16.97			3.62		$8,600		$1,220		$9,820
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	238	BCY	0.292	89	16.97			9.16		$1,510		$2,240		$3,750
Geo–Fabric & Liner 105 cy	2845	1423	SY	0.002	4	16.97			0.02		$70		$30		$100
Haul & Dump Rubble	395.5	198	BCY	0.30	77	16.97			2.51		$1,310		$510		$1,820
	20%														
e. Const.Equip.Decon.Facil. @ Onsite Disp.Cell															
Demo/Remove Concrete	49.3	10	BCY	1.2	15	16.97			3.62		$250		$40		$290
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	6	BCY	0.292	2	16.97			9.16		$30		$50		$80
Geo–Fabric & Liner	167	33	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	27	5	EA	0.48	3	16.97			1.68		$50		$10		$60
Splash Guard	702	140	SF	0.04	7	16.97			0.03		$120				$120
Haul & Dump Rubble	24.9	5	BCY	0.30	2	16.97			2.51		$30		$10		$40
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		920						$15,590		$7,000		$22,590

Generated Waste Removal Details

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ALT–5A – SWL – ON–SITE CELL

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FEMP-OU02-5 DRAFT
August 24, 1994

F-6-33

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL (CON'T.)															
Demo. /Load/Haul/Dump/Compact															
	20.0%														
f. Personnel Decon. Facil.@ Onsite Disp. Cell															
Demo/Remove Concrete	2.2	0.44	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	0.48	BCY	0.292		16.97			9.16						
Geo–Fabric & Liner	14	2.80	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	6	1.20	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	26.40	SF	0.04	1	16.97			0.03		$20				$20
Haul & Dump Rubble	3.5	0.70	BCY	0.30		16.97			2.51						
	20.0%														
g. Relocated South Access Road/Cell	SY														
Road – 8" Gravel W/Geotextile	7333	1467	BCY	0.292	552	16.97			9.16		$9,370		$13,840		$23,210
Haul & Dump Rubble		1467	BCY	0.30	568	16.97			2.51		$9,640		$3,790		$13,430
	20.0%														
h. Haul Road for Cell	SY														
Road – 8" Gravel W/Geotextile	5778	257	BCY	0.292	97	16.97			1.08		$1,650		$290		$1,940
Haul & Dump Rubble		257	BCY	0.30	99	16.97			2.51		$1,680		$660		$2,340
	20.0%														
i. Temporary Construction Fencing @ Cell	5200	1040	LF	0.107	143	16.97					$2,430				$2,430
Haul & Dump Rubble		135	BCY	0.30	52	16.97			2.51		$880		$350		$1,230
	20.0%														
j. 20' wide Swing Gates @ Cell	2	0.40	EA	12.75	7	16.97			340.00		$120		$140		$260
Haul & Dump Rubble		0.05	BCY	0.30		16.97			2.51						
	20.0%														
k. Storage Pad Area @ Cell	BCY														
Demo/Remove Asphalt	988	197.60	BCY	1.2	306	16.97			3.62		$5,190		$740		$5,930
Excav., Load, Haul, Backfill, Compac	474.0	94.80	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Sub–grade Stone															
Geo–Fabric & Liner	4444	888.80	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble		197.0	BCY	0.30	76	16.97			2.51		$1,290		$510		$1,800
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,941						$32,950		$21,230		$54,180

Generated Waste Removal Details

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001280
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL (CON'T.)															
Demo. /Load/Haul/Dump/Compact															
The following prorated at:	20.0%														
I. Staging Area @ On–Site Disposal Cell															
Demo/Remove Concrete	655	131.0	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	475	95.0	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo–Fabric & Liner 105 cy	2845	569.0	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	395.5	126.0	BCY	0.30	49	16.97			2.51		$830		$330		$1,160
TOTAL GENERATED WASTE	BCY 5602 LCY 6442														
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		289						$4,900		$1,730		$6,630
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		3,150						$53,440		$29,960		$83,400

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
Solid Waste Landfill	15600	18720	ICY	0.09	2173	16.97			3.21	3.50	$36,880		$61,890	$67,490	$166,260
	50%														
Office/Parking @ S/U	494	296	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	47	ICY												
Decon.Facil.– Personnel @ S/U	7	4	ICY												
Staging Area @ S/U	1099	659	ICY												
	S/T	1006.8	ICY	0.09	117	16.97			3.21	3.50	$1,990		$3,330	$3,630	$8,950
	20%														
Staging Area at On–Site Disp.Cell	1099	264	ICY												
Storage Area at On–Site Disp.Cell	474	114	ICY												
Decon.Facil.– Const.Equip.@ Cell	78	19	ICY												
Decon.Facil.– Personnel @ Cell	7	2	ICY												
Relocated South Access Road	1628	391	ICY												
Haul Road	1283	308	ICY												
	S/T	1096.6	ICY	0.09	127	16.97			3.21	3.50	$2,160		$3,630	$3,950	$9,740
b. Final Grade for SWL (Excludes Cap)		7330	SY	0.02	189	16.97			0.70		$3,210		$5,280		$8,490
c. Borrow Top Soil 6" Thk., Spread															
Solid Waste Landfill		7330	SY	0.036	340	16.97			2.33	2.88	$5,770		$17,590	$21,740	$45,100
	50%														
Office/Parking @ S/U	2222	1333	SY												
Decon.Facil.– Const.Equip. @ S/U	167	100	SY												
Decon.Facil.– Personnel @ S/U	14	8	SY												
Staging Area @ S/U	2845	1423	SY												
	S/T	2864.3	SY	0.036	133	16.97			2.33	2.88	$2,260		$6,870	$8,500	$17,630
	20%														
Staging Area at On–Site Disp.Cell	2845	683	SY												
Storage Area at On–Site Disp.Cell	4444	1067	SY												
Decon.Facil.– Const.Equip.@ Cell	167	40	SY												
Decon.Facil.– Personnel @ Cell	14	3	SY												
Relocated South Access Road	14667	3520	SY												
Haul Road	11556	2773	SY												
	S/T	8086.3	SY	0.036	376	16.97			2.33	2.88	$6,380		$19,410	$23,990	$49,780
(SUB–TOTAL SITE RESTORATION)		1	LOT		3,455						$58,650		$118,000	$129,300	$305,950

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FEMP-OU02-5 DRAFT
August 24, 1994

Site Restoration Details

CONTR.NO.- [redacted]321
CLIENT - [redacted]. DEPT. OF ENERGY
PROJECT - ALT-5A - SWL - ON-SITE DISPOSAL w/OFF-SITE DISPOSAL > WAC - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION Backfill and top soil to be borrowed from the off-site source															
d. Grass Cover - Seed, Fertilize, Mulch															
Utility Mix - Hydro/Air Seeding	SY														
Solid Waste Landfill	7330	66	MSF	0.30	26	16.97			6.75	25.00	$440		$460	$1,700	$2,600
	50%														
Office/Parking @ S/U	2222	10	MSF												
Decon.Facil.- Const.Equip. @ S/U	167	0.75	MSF												
Decon.Facil.- Personnel @ S/U	14	0.06	MSF												
Staging Area @ S/U	2845	12.8	MSF												
	S/T	23.6	MSF	0.30	9	16.97			6.75	25.00	$150		$160	$610	$920
	20%														
Staging Area at On-Site Disp.Cell	2845	5.12	MSF												
Storage Area at On-Site Disp.Cell	4444	8.00	MSF												
Decon.Facil.- Const.Equip.@ Cell	167	0.30	MSF												
Decon.Facil.- Personnel @ Cell	14	0.03	MSF												
Relocated South Access Road	14667	26.40	MSF												
Haul Road	11556	20.8	MSF												
	S/T	60.7	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,560	$2,370
e. Security Fence - 6ga aluminized - 6' high		1080	LF	0.13	178	16.97			1.64	9.80	$3,020		$1,820	$10,900	$15,740
i. Corner posts - 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
(SUB-TOTAL SITE RESTORATION)		1	LOT		257						$4,360		$3,080	$15,140	$22,580
(TOTAL SITE RESTORATION)		1	LOT		3,712						$63,010		$121,080	$144,440	$328,530

Site Restoration Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-6-37

001283

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II MW														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility MW 1 Pair x 120 ft/pair	2	PR					23000.00				$46,000			$46,000
b. MW at S/U – Type I & II	8	PR					23000.00				$184,000			$184,000
c. Abandon Existing Wells	3	EA					13000.00				$39,000			$39,000
TOTAL (MONITORING WELLS)	1	LOT									$269,000			$269,000

Monitoring Wells Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [illegible]321
CLIENT – [illegible]. DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	45000	GAL					0.01				$500			$500
Runnoff from the Exclusion Zone.	850000	GAL					0.01				$8,500			$8,500
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$9,000			$9,000

Waste Water Treatment Operations Cost Details

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FEMP-OU02-5 DRAFT
August 24, 1994

001285

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940731
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATORY TESTING														
Excavation														
Full TCLP	120	EA					2,002				$240,200			$240,200
Rad	120	EA					2,000				$240,000			$240,000
Confirmatory tests														
Full Rad Test	60	EA					3,101				$186,100			$186,100
Full HSL	25	EA					1,500				$37,500			$37,500
Full TCLP	25	EA					2,002				$50,100			$50,100
2 Technicians per month	10	MO					13,163				$131,600			$131,600
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING/CONFIRMATORY TEST)	1	LOT									$885,500			$885,500

Screening/Confirmatory Testing Details

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F-6-40

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A – SWL – EXCAV. & ONSITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940731
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSW

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$8,300,700	BASE EST:	$80,670	BASE EST:	$16,500	BASE EST:	$147,830	BASE EST:	$8,530	BASE EST:	$32,870	BASE EST:	$8,860
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	30%					–1%	30%				
MATERIAL PRICING			–5%	30%	–5%	20%			–5%	30%	–5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							–1%	50%	–1%	50%	–1%	40%
(OTHER)												
TOTAL %	–5%	30%	–5%	30%	–5%	20%	–2%	80%	–6%	80%	–6%	60%
TOTAL $	$76,637	$104,871	$15,675	$21,450	$140,439	$177,396	$8,359	$15,354	$30,898	$59,166	$8,328	$14,176

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A – SWL – EXCAV. & ONSITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940731
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSW

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$25,100	BASE EST:	$0	BASE EST:	$51,470	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	75%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-1%	75%			-1%	75%						
(OTHER)												
TOTAL %	-6%	125%	0%	0%	-6%	150%	0%	0%	0%	0%	0%	0%
TOTAL $	$23,594	$56,475	$0	$0	$48,382	$128,675	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001288

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A – SWL – EXCAV. & ONSITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940731
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSW

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001289

5861

FEMP-OU02-5 DRAFT
August 24, 1994

F-6-43

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–5A – SWL – EXCAV. & ONSITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940734
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSW

	EXCAVATE & LOAD TO ON–SITE DISPOSAL LABOR $'s		EXCAVATE & LOAD TO ON–SITE DISPOSAL S/C $'s		EXCAVATE & LOAD TO ON–SITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$112,260	BASE EST:	$0	BASE EST:	$125,570	BASE EST:	$165,340	BASE EST:	$232,970	BASE EST:	$340,210
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–1%	100%					–1%	75%	–1%	25%		
MATERIAL PRICING					–1%	50%					–5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	50%			–1%	50%	–1%	50%	–1%	50%	–1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–2%	150%	0%	0%	–2%	100%	–2%	125%	–2%	75%	–6%	70%
TOTAL $	$110,015	$280,650	$0	$0	$123,059	$251,140	$162,033	$372,015	$228,311	$407,698	$319,797	$578,357

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001590

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A – SWL – EXCAV. & ONSITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940731
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSW

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		DIKE LABOR $'s		DIKE S/C $'s		DIKE MAT'L. $'s	
	BASE EST:	$33,410	BASE EST:	$38,190	BASE EST:	$104,760	BASE EST:	$61,740	BASE EST:	$11,660	BASE EST:	$137,090
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–5%	50%				
MATERIAL PRICING			–5%	50%	–5%	30%			–5%	40%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	50%	–5%	50%	–1%	50%	–5%	50%	–5%	50%	–5%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	100%	–10%	100%	–6%	80%	–10%	100%	–10%	90%	–10%	80%
TOTAL $	$31,405	$66,820	$34,371	$76,380	$98,474	$188,568	$55,566	$123,480	$10,494	$22,154	$123,381	$246,762

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001291

5861

FEMP-OU02-5 DRAFT
August 24, 1994

F-6-45

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A – SWL – EXCAV. & ONSITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940731
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSW

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$58,780	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION							-1%	100%				
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-6%	150%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$55,253	$146,950	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A – SWL – EXCAV. & ONSITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940731
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSW

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$69,310	BASE EST:	$0	BASE EST:	$158,880	BASE EST:	$0	BASE EST:	$295,900	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-5%	50%			-5%	50%						
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-10%	80%	0%	0%	-10%	80%	0%	0%	-5%	50%	0%	0%
TOTAL $	$62,379	$124,758	$0	$0	$142,992	$285,984	$0	$0	$281,105	$443,850	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-6-47

001293

5861

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–5A – SWL – EXCAV. & ONSITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940731
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSW

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$671,900	BASE EST:	$358,300	BASE EST:	$768,600	BASE EST:	$856,300	BASE EST:	$894,500	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–10%	30%				
MATERIAL PRICING			–5%	100%	–5%	50%			–5%	30%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	–5%	100%	–5%	50%	–10%	30%	–5%	30%	0%	0%
TOTAL $	$638,305	$1,007,850	$340,385	$716,600	$730,170	$1,152,900	$770,670	$1,113,190	$849,775	$1,162,850	$0	$0
RISK PROFILE & CORRELATION FOR	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
EACH COST ELEMENT	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001294

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A – SWL – EXCAV. & ONSITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940731
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSW

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$2,321,800	BASE EST:	$111,400	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			–1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	–5%	25%										
(OTHER)												
TOTAL %	–5%	25%	–1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$2,205,710	$2,902,250	$110,286	$112,514	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001295

5861

FEMP-OU02-5 DRAFT
August 24, 1994

F-6-49

F ERMC O
ESTIMATING SERVICES

EST FILE #: C2940732 | DATE: 11-Aug-94
CLIENT: US DOE | ESTIMATOR: KEN KEPLER
PROJECT TITLE: ALT-5A- LSP - EXCAV. & ON-SITE DISPOSAL | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.3 EXPANDED TRESPASSER | TASK#: 2CLS

SUMMARY SHEET

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL - NO TREATMENT COMPOSITE LINER, CAP, DIKE	33,805		$580,100	$624,000	$1,004,800	$2,208,900
2		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		33,805		$580,100	$624,000	$1,004,800	$2,208,900
11	SUPERVISION - CONTRACTOR				$99,000			$99,000
12	SM TOOLS/CONSM'BLS						$34,800	$34,800
13	EQUIPMENT RENTAL						$637,600	$637,600
14	TEMP. FACILITIES				$12,200		$22,600	$34,800
15	TEMP UTL'S HOOK-UP				$6,100		$11,300	$17,400
16	JOB CLEAN-UP				$12,200		$22,600	$34,800
17	SAFETY				$6,100		$11,300	$17,400
18	HEALTH PHYSICS S/C				$81,700			$81,700
19	CERCLA/SAT $1,500 PER PERSON					$25,500		$25,500
20	BOND					$22,100		$22,100
21	OVERHEAD & PROFIT					$289,300		$289,300
22	PAYRL BRD.&BENFT.				$414,600			$414,600
	INDIRECT FIELD COSTS				$631,900	$336,900	$740,200	$1,709,000
	DIRECT & INDIRECT FIELD COSTS				$1,212,000	$960,900	$1,745,000	$3,917,900
23	TRANSPORTATION & BURIAL	N/A						
24	WASTE CONTAINERS	N/A						
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$10,500		$10,500
25	SCREENING & CONFIRMATORY TESTING					$731,300		$731,300
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$717,000			$717,000
	FERMCO FIELD SUPPORT COSTS				$717,000	$741,800		$1,458,800
28	EMISSION MODELING				$6,900		$12,700	$19,600
29	PSAR/FSAR(SAFETY RPT)				$109,700			$109,700
30	ENGINEERING	TITLE I&II $544,600 TITLE III	$513,200	CDR	$188,100	DCR	$141,000	$1,386,900
	ENGINEERING COSTS							$1,516,200
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$1,757,700	$105,500
	SUB-TOTAL	(BASE ESTIMATE)						$6,898,400
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	21.5%						$1,504,700
	TARGET ESTIMATE (BASE ESTIMATE PLUS RISK BUDGET)							$8,503,100
35	CONTINGENCY	7.0%						$489,900
								PRELIMINARY
	TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY)							$8,993,000

LOTUS31\FS2\ALT5A\LSP\INDSUM.WK3 - FEASABILITY STUDY

DATE: 11-Aug-94

PROJECT TITLE:
ALT-5A- LSP - EXCAV. & ON-SITE DISPOSAL
WBS#:
1.1.1.1.2.3.3

HEALTH PHYSICS

EXPANDED TRESPASSER

EST.NO.: C2940732
EST. : KEN KEPLER
TASK I.D. :
2CLS

5861

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY / MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	0	$0	C/B		
SUB-TOTAL		31.80	4		$0			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	0		$0	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	0		$0	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	0		$0	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	0		$0	C/B		
THERMO STRIPS	EA	50.00	0		$0	C/B		
SUB-TOTAL		327.21			$0			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$0			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

DATE: 11-Aug-94

PROJECT TITLE:
ALT-5A- LSP - EXCAV. & ON-SITE DISPOSAL
WBS#:
1.1.1.1.2.3.3

HEALTH PHYSICS

EXPANDED TRESPASSER

EST.NO.: C2940732
EST. : KEN KEPLER
TASK I.D. :
2CLS

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	17	68	$16.97	$1,150		
ANNUAL PHYSICALS	1	3	17	51	$16.97	$870		
EXIT (TERMINATION) PHYSICALS	1	4	17	68	$16.97	$1,150		
SUB-TOTAL						$3,170		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	16	1	17	275	$16.97	$4,670		
YEARLY IN-VIVO	1	4	17	68	$16.97	$1,150		
EXIT (END OF PROJECT / TERMINATION)	1	4	17	68	$16.97	$1,150		
SUB-TOTAL						$6,970		
WORK DELAYS CAUSED BY MONITORING	5%				$715,700	$35,785		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$715,700	$35,785		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$81,700	$0	$81,700

001298

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT-5A- LSP - EXCAV. & ON-SITE DISPOSAL
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CLS

WBS NO. – 1.1.1.1.2.3.3
EST. NO. – C2940732
BY – K. KEPLER
DATE – 08/11/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25–Mar–94	01–Jun–97	30–Jan–98	30–Sep–98	16	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
46	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL w/OFF–SITE OPTION (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		4,232						$73,550	$15,000	$32,370	$93,230	$214,150
DECONTAMINATION FACILITIES/SERVICES	1	LS		427						$7,750	$29,880	$1,740	$8,050	$47,420
EROSION AND SEDIMENT CONTROLS	1	LS		1138						$21,300		$7,390	$20,320	$49,010
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT/DRY – OFFSITE DISPOSAL	N/A													N/A
LOAD/HAUL – OFF–SITE DISPOSAL	N/A													N/A
EXCAVATE–LOAD/HAUL TO ON–SITE DISPOSAL (SHRED/CRUSH)	1	LS		3928						$67,010		$60,190	$110,430	$237,630
COMPOSITE LINER	1	LS		7730						$132,450	$187,770	$166,880	$279,100	$766,200
COMPOSITE CAP	1	LS		1567						$26,600	$30,360	$38,490	$83,380	$178,830
DIKE FOR DISPOSAL CELL	1	LS		2893						$49,090	$9,270	$62,080	$109,060	$229,500
GENERATED WASTE REMOVAL	1	LS		3150						$53,440		$29,960		$83,400
SITE RESTORATION	1	LS		5667						$96,190		$180,500	$209,840	$486,530
MONITORING WELLS	1	LS									$295,000			$295,000
SUB–TOTAL (DIRECT FIELD COSTS)				30732						$527,380	$567,280	$579,600	$913,410	$2,587,670
TAKE–OFF ALLOWANCE 10%	1	LS		3,073						$52,740	$56,730	$57,960	$91,340	$258,770
TOTAL (DIRECT FIELD COSTS)	1	LS		33,805						$580,100	$624,000	$637,600	$1,004,800	$2,846,500

On–Site Disposal of LSP – SUMMARY

CONTR.NO. – [illegible]21
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION															
(ITEMS @ 20% ARE COMMON TO ALL SUB–UNITS)															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
a. Construction Survey		1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing		1500	LF	0.213	412	16.97				6.25	$6,990			$9,660	$16,650
c. Clear and Grub															
i. Remediation Site		4.00	AC	41.40	214	16.97			2575.00		$3,630		$10,610		$14,240
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas															
d. Dewatering															
i. Excavate Dewatering Trench		335	CY	0.50	216	16.97			1.49		$3,670		$510		$4,180
ii. Pump – w/4" Suction Hose		150	DAYS	3.00	581	16.97			19.55		$9,860		$3,020		$12,880
iv. HDPE Pipe to Sedimentation Tank		400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip		1	CY	4.00	5	16.97			100.00		$80		$100		$180
e. General Grading															
i. New Roads		4445	SY	0.001	6	16.97			0.07		$100		$320		$420
	50%														
ii. Office/Parking Area	2222	1111	SY	0.010	14	16.97			0.32		$240		$370		$610
iii. Const.Equip.Decon.Pad Area	234	117	SY	0.010	2	16.97			0.32		$30		$40		$70
iv. Pers.Decon.Pad Area	14	7	SY	0.010		16.97			0.32						
v. Staging Area @ Sub–Unit	2845	1423	SY	0.010	18	16.97			0.32		$310		$470		$780
f. Surfacing/Paving/Concrete Slab															
i. New Roads – 8" Gravel W/Geotextile		4445	SY	0.030	172	16.97			1.08	6.66	$2,920		$4,940	$30,490	$38,350
	50%														
ii. Office/Parking – 8" Gravel W/ Geot	2222	1111	SY	0.030	43	16.97			1.08	6.66	$730		$1,240	$7,620	$9,590
iii. Staging Area @ Sub–Unit – 160' x160' Concrete															
Sub–Grade & Sub–Base for Conc.Slab	2845	1423	SY	0.041	75	16.97			1.45	5.51	$1,270		$2,120	$8,070	$11,460
Concrete Slab 160 x 160' x 8"thk.	631	316	CY	4.07	1656	17.98			18.38	67.00	$29,770		$5,970	$21,770	$57,510
Concrete Curb – 2'h x 480 lf x 8" thl	24	12	CY	15.30	237	17.98			69.08	275.90	$4,260		$850	$3,410	$8,520
HDPE Perf.Sub–grade Piping – 4"	500	250	LF	0.21	68	16.97			0.74	3.02	$1,150		$190	$780	$2,120
Epoxy Coating	2845	1423	SY	0.22	404	16.97			0.77	7.56	$6,860		$1,130	$11,080	$19,070
Backfill & Compact around Slab	183	92	ICY	0.086	10	16.97			1.38				$130		$130
Mob/Demob.Equip.	1	0.50	LS	2.00	1	16.97			184.00		$20		$90		$110
TOTAL (SITE PREPARATION)		1	LS		4,232						$73,550	$15,000	$32,370	$93,230	$214,150

Site Preparation Details

FEMP-OU02-5 DRAFT
August 24, 1994
5861
F-6-55
001304

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	50%														
a. Decon Trailer – Rental	39	20	MO					1500.00				$29,250			$29,250
	50%														
b. Construction Equipment Decon. Facility 25 ft x 60 ft															
i. Excavation – Structural	175	88	BCY	0.021	2	16.97			0.64		$30		$60		$90
ii. Sub–grade Prep.	167	84	SY	0.041	4	16.97		6.75	1.45	5.51	$70	$580	$120	$470	$1,240
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	8	SF	0.32	3	19.21			0.73	12.55	$60		$10	$100	$170
Metal Grating 2 ft wide x 25 lf	25	13	LF	0.53	9	19.21			1.86	46.67	$170		$20	$600	$790
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	20	CY	4.07	102	17.98			14.25	67.00	$1,830		$290	$1,350	$3,470
Decon Pad Trench – 2'x2'i.d.x 25l	5	3	CY	28.22	91	17.98			98.77	202.30	$1,640		$250	$520	$2,410
Decon Pad Curb – 6" x 6" x 120 lf	5	3	CY	15.30	49	17.98			53.55	275.90	$880		$140	$710	$1,730
Pump Pad – 4' x 4' x 6" thk.	0.30	0.15	CY	10.64	2	17.98			37.24	97.20	$40		$10	$20	$70
Epoxy Coating	167	84	SY	0.22	24	17.00			0.77	7.56	$410		$70	$650	$1,130
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	1	EA	12.00	8	17.98			100.00	525.00	$140		$50	$270	$460
vi. HDPE Piping	100	50	LF	0.38	25	19.95			5.11	4.42	$500		$260	$230	$990
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Gu:	720	360	SF	0.04	17	16.97			0.03	1.55	$290		$10	$570	$870
4" x 4" x 9'–6" Wood Posts set in (	27	14	EA	0.480	8	16.97			1.68	5.75	$140		$20	$80	$240
viii. Air Diaphragm Pump 50 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$400	$630
ix. Suction and Discharge Piping	10	5	LF	0.11	1	19.95			0.39	0.84	$20				$20
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	2	LF	0.47	1	19.95			1.65	14.91	$20			$20	$40
	BCY														
x. Backfill & Compaction around concrete slab	258	155	ICY	0.086	17	16.97			1.38		$290		$220		$510
SUB–TOTAL (EQUIP. DECON. FACILITY)					373						$6,730	$29,830	$1,560	$5,990	$44,110

Equipment Decon. Facility Details

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001302

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	50%														
i. Excavation – Structural	19	10	BCY	0.021		16.97			0.64				$10		$10
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	7	SY	0.041		16.97		6.75	1.45	5.51		$50	$10	$40	$100
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	2	SF	0.32	1	16.97			0.73	12.55	$20			$30	$50
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	1	CY	4.07	4	17.98			14.25	67.00	$70		$10	$50	$130
Decon Slab Sump – 2'x 2' x 3'	0.3	0.15	CY	31.84	6	17.98			111.44	250.70	$110		$20	$40	$170
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0.20	CY	15.30	4	17.98			53.55	275.90	$70		$10	$60	$140
Epoxy Coating	14	7	SY	0.22	2	17.00			0.77	7.56	$30		$10	$50	$90
v. Corrugated Fiberglass Splash Gua	132	66	SF	0.04	3	16.97			0.03	1.55	$50			$110	$160
4" x 4" x 9'–6" Wood Posts set in (	6	3	EA	0.480	2	16.97			1.68	5.75	$30		$10	$20	$60
vi. Pump 20 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$410	$640
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	1	LS	32.00	21	19.95			112.00	2500.00	$420		$60	$1,250	$1,730
viii. Backfill & Compaction around concrete slab	BCY 17	10	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		54						$1,020	$50	$180	$2,060	$3,310
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		427						$7,750	$29,880	$1,740	$8,050	$47,420

Personnel Decon.Facilities/Services Details

FEMP-OU02-5 DRAFT
August 24, 1994
5861
001303
F-6-57

CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	2000	LF	0.017	44	16.97			0.06	0.65	$750		$120	$1,340	$2,210
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	300	EA	0.24	93	16.97			1.53	1.35	$1,580		$470	$420	$2,470
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 300 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1200	LF	0.38	590	19.95			5.11	4.42	$11,770		$6,130	$5,300	$23,200
iv. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	1	EA	8.00	10	16.97			28.00	8300.00	$170		$30	$8,300	$8,500
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,138						$21,300		$7,390	$20,320	$49,010

001304

F-6-58

FEMP-OU02-5 DRAFT
August 24, 1994

Erosion Control Details

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CONTR.NO.– [redacted]21 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
LOAD & HAUL FOR ON–SITE DISPOSAL														
LIME SLUDGE PONDS														
Excavate and Load	16500	BCY	0.055	1171	16.97			1.17		$19,870		$19,880		$39,750
Excavate Additional Soil	1700	BCY	0.055	121	16.97			1.17		$2,050		$2,050		$4,100
Haul to Onsite Disposal Cell BCY														
– 12" thk. Cushion Layer 1792	2240	LCY	0.081	234	16.97			1.51		$3,970		$3,480		$7,450
– Impacted Fill 16408	20510	LCY	0.081	2143	16.97			1.51		$36,370		$31,900		$68,270
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load	N/A	BCY	0.055		16.97			1.17						
Haul to Onsite Disposal Cell BCY														
– Impacted Fill N/A		LCY	0.081		16.97			1.51						
			S/T											
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C		HRS	150%		16.97			1.51						
			S/T											
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)		MD												
(SHREDDING COMMON TO SWL, IFP & SF)														
Shredder/Crusher – Purchase/Install 33.3%	0.3	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY N/A														
Generated Waste BCY 5602														
Excavated Debris TONS														
(Percent of Gen.Waste to be Shredded) 25%														
Generated Waste TONS 3221														
TOTAL TONS 3221														
Operating Costs	54	HRS							25.75				$1,430	$1,430
(2) Operators	108	HRS	1.00	139	16.97					$2,360				$2,360
TOTAL (EXCAVATE– ON–SITE DISPOSAL)	1	LOT		3,928						$67,010		$60,190	$110,430	$237,630

Excavate Onsite Disposal Details

FEMP-OU02-5 DRAFT August 24, 1994

F-6-59

001300

1861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP.)															
a. Clear and Grubb	20%														
i. On–site Cell & Surrounding area	35	7.0	AC	41.40	374	16.97			2575.00		$6,350		$18,570		$24,920
b. Relocated South Access Road	20%														
i. Clear & Grub	3	0.6	AC	41.40	32	16.97			2575.00		$540		$1,590		$2,130
ii. General Grading	1467	293.4	SY	0.001					0.07				$20		$20
iii. Road – 8" Gravel W/Geotextile	7333	1466.6	SY	0.030	57	16.97			1.08	6.66	$970		$1,630	$10,060	$12,660
c. Haul Road	20%														
i. Clear & Grub	2.4	0.5	AC	41.40	26	16.97			2575.00		$440		$1,270		$1,710
ii. General Grading	11556	2311.2	SY	0.001	3	16.97			0.07		$50		$170		$220
iii. Road – 8" Gravel W/Geotextile	5778	1155.6	SY	0.030	45	16.97			1.08	6.66	$760		$1,290	$7,930	$9,980
	20%														
d. Temporary Construction Fencing	5200	1040.0	LF	0.213	286	16.97				6.25	$4,850			$6,700	$11,550
e. 20' wide Swing Gates	1	0.2	EA	25.60	7	16.97			340.00	560.00	$120		$70	$120	$310
f. Staging Area @ Cell	20%														
Area Excavation for Slab	1606	321.2	BCY	0.016	7	16.97			0.60		$120		$200		$320
Sub–Base for Slab	2845	569.0	SY	0.041	30	16.97		6.75	1.45	5.51	$510	$3,840	$850	$3,230	$8,430
HDPE Perf.Sub–grade Piping – 4"	500	100.0	LF	0.21	27	16.97			0.74	3.02	$460		$80	$310	$850
Concrete Slab – 160'x160'x8" thk	631	126.2	CY	4.07	663	17.98			14.25	67.00	$11,920		$1,850	$8,710	$22,480
Concrete Curb – 480'x2'x8" thk	24	4.8	CY	15.30	95	17.98			53.55	275.90	$1,710		$260	$1,360	$3,330
Epoxy Coating	2845	569.0	SY	0.22	161	16.97			0.77	7.56	$2,730		$450	$4,430	$7,610
Backfill & Compact around Slab	183	36.6	ICY	0.086	4	16.97			1.38				$50		$50
Mob/Demob.Equip.	1	0.2	LS	2.00	1	16.97			184.00		$20		$40		$60
g. Storage Area – 200' x 200' Asphalt Includes Compacted Sub–Grade	4444	889	SY	0.084	96	16.97			2.56	14.04	$1,630		$2,340	$12,850	$16,820
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat															
	20%														
h. Decon Trailer – Rental	51	10	MO					1500.00				$15,300			$15,300
i. Const.Equipment Decon. Facility 25 ft x 60 ft	20% 1	0.20	LS	730.00	146	18.05		1160.00	2900.00	11980.00	$2,640	$230	$580	$2,400	$5,850
j. Personnel Decon. Facility 11'x 11'	20% 1	0.20	LS	108.00	22	18.89		100.00	360.00	4120.00	$420	$20	$70	$820	$1,330
SUB–TOTAL (COMPOSITE LINER)		1	LOT		2082						$36,240	$19,390	$31,380	$58,920	$145,930

Composite Liner Details

CONTR.NO.– [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
ON–SITE DISPOSAL FACILITY COMPOSITE LINER (CON'T.)														
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.														
a. Subgrade Preparation – includes removal of top soil, grading & comp.	5429	SY	0.024	168	16.97			0.86		$2,850		$4,810		$7,660
b. 95% Clay – 5% Bentonite 36" Thk BCY 5429	6406	ICY	0.260	2149	16.97			11.19	20.35	$36,470		$73,840	$134,280	$244,590
c. Composite Clay Liner	5429	SY					7.38				$40,070			$40,070
d. HDPE Liner 60 mil	5429	SY					4.75				$25,790			$25,790
e. Geotextile Fabric	5429	SY					2.25				$12,220			$12,220
f. Pea Gravel 12" Thk; In–place BCY 1792	1926	ICY	0.11	273	16.97			0.77	17.00	$4,630		$1,530	$33,730	$39,890
g. Composite Clay Liner	5429	SY					7.38				$40,070			$40,070
h. HDPE Liner 60 mil	5429	SY					4.75				$25,790			$25,790
i. Geotextile Fabric	5429	SY					2.25				$12,220			$12,220
j. Pea Gravel 12" Thk; In–place BCY 1792	1926	ICY	0.11	273	16.97			0.77	17.00	$4,630		$1,530	$33,730	$39,890
k. Geotextile Fabric	5429	SY					2.25				$12,220			$12,220
l. HDPE Perforated Pipe – leachate collection 6" Dia.	315	LF	0.30	122	16.97			1.05	6.56	$2,070		$340	$2,130	$4,540
m. HDPE Perforated Pipe – leak detection 6" Dia.	315	LF	0.30	122	16.97			1.05	6.56	$2,070		$340	$2,130	$4,540
n. Leachate Discharge Piping														
i. HDPE Carrier & containment Pipe 6" x 10' Includes Trench Excav/Backfill, sand bedding and compaction.	245	LF	0.86	272	16.97			11.37	22.33	$4,620		$2,870	$5,630	$13,120
ii. HDPE Manhole – 4' dia. x 8' deep	1	EA	8.00	10	16.97			28.00	8300.00	530.00		$30	$8,550	$9,110
o. Impacted Fill–Cusion Layer 12" Thk BCY 1792	2240	LCY	0.06	173	16.97			1.67		$2,940		$3,850		$6,790
p. Impacted Fill–Spread and Compact BCY 16408	20510	LCY	0.06	1587	16.97			1.67		$26,930		$35,280		$62,210
q. Generated Waste BCY 5602	6442	LCY	0.06	499	16.97			1.67		$8,470		$11,080		$19,550
PPE LEVEL C Allowance is added to the foll														
r. Impacted fill N/A		LCY	0.06					1.67						
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C		HRS	S/T											
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)		MD												
SUB–TOTAL (COMPOSITE LINER)	1	LOT		5,648						$96,210	$168,380	$135,500	$220,180	$620,270
TOTAL (COMPOSITE LINER)	1	LOT		7,730						$132,450	$187,770	$166,880	$279,100	$766,200

Composite Liner Details

FEMP-OU02-5 DRAFT
August 24, 1994
F-6-61
001307
5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE CAP														
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .														
COMPOSITE CAP														
a. Contouring Layer 18" Thk. liner BCY 927	1112	ICY	0.06	86	16.97			1.67	3.50	$1,460		$1,910	$4,010	$7,380
b. 95% Clay – 5% Bentonite 24" Thk BCY 1242	1466	ICY	0.260	492	16.97			11.19	20.35	$8,350		$16,890	$30,720	$55,960
c. GML\GCC – composite Liner	1854	SY					7.38				$13,680			$13,680
d. Geotextile Fabric	1854	SY					2.25				$4,170			$4,170
e. Pea gravel 12" Thk, In–place BCY 612	658	ICY	0.11	93	16.97			0.77	17.00	$1,580		$520	$11,520	$13,620
f. Geotextile Fabric	1854	SY					2.25				$4,170			$4,170
g. Cobbels 36" Thk; In–place BCY 1854	1993	ICY	0.258	663	16.97			7.15	10.10	$11,250		$14,680	$20,730	$46,660
h. Geotextile Fabric	1854	SY					2.25				$4,170			$4,170
i. Sand Layer 6" Thk; In–place BCY 315	339	ICY	0.052	23	16.97			1.76	5.00	$390		$610	$1,740	$2,740
j. Geotextile Fabric	1854	SY					2.25				$4,170			$4,170
k. Common Soil 21" Thk; In–place BCY 1081	1297	ICY	0.06	100	16.97			1.67	3.50	$1,700		$2,230	$4,680	$8,610
l. Top Soil 6" Thk; In–place BCY 315	378	ICY	0.053	26	16.97			1.82	12.10	$440		$710	$4,710	$5,860
m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding SY 1854	17	MSF	0.30	7	16.97			6.75	25.00	$120		$120	$440	$680
n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized	350	LF	0.17	77	16.97			2.28	13.40	$1,310		$820	$4,830	$6,960
TOTAL (COMPOSITE CAP)	1	LOT		1,567						$26,600	$30,360	$38,490	$83,380	$178,830

Composite Details

F-6-62
001308
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [illegible]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DIKE FOR DISPOSAL CELL															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
a. Borrow Common Soil – Dike	BCY 14120	16944	ICY	0.06	1311	16.97			1.67	3.50	$22,250		$29,150	$61,080	$112,480
b. Geotextile Fabric		4121	SY					2.25				$9,270			$9,270
c. Cobbels 36" Thk; In–place	BCY 4121	4430	ICY	0.258	1474	16.97			7.15	10.10	$25,010		$32,630	$46,090	$103,730
d. HDPE Drainage Piping	6" Dia.	280	LF	0.30	108	16.97			1.05	6.56	$1,830		$300	$1,890	$4,020
TOTAL (DIKE – DISPOSAL CELL)		1	LOT		2,893						$49,090	$9,270	$62,080	$109,060	$229,500

Dike Details

FEMP-OU02-5 DRAFT
August 24, 1994

001309

F-6-63

5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL															
a. Office/Parking Area @ S/U	50%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	247	BCY	0.292	93	16.97			9.16		$1,580		$2,330		$3,910
Geo–Fabric & Liner	2222	1111	SY	0.002	3	16.97			0.02		$50		$20		$70
Haul & Dump Rubble	185	93	BCY	0.30	36	16.97			2.51		$610		$240		$850
b. Const.Equip.Decon Facil.@ S/U	50%														
Demo/Remove Concrete	49.3	25	BCY	1.2	38	16.97			3.62		$640		$90		$730
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	14	BCY	0.292	5	16.97			9.16		$80		$130		$210
Geo–Fabric & Liner	167	84	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	27	14	EA	0.48	8	16.97			1.68		$140		$20		$160
Splash Guard	702	351	SF	0.04	18	16.97			0.03		$310		$10		$320
Haul & Dump Rubble	24.9	12	BCY	0.30	5	16.97			2.51		$80		$30		$110
c. Personnel Decon. Facil. @ S/U	50%														
Demo/Remove Concrete	2.2	1	BCY	1.2	2	16.97			3.62		$30				$30
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo–Fabric & Liner	14	7	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	6	3	EA	0.48	2	16.97			1.68		$30		$10		$40
Splash Guard	132	66	SF	0.04	3	16.97			0.03		$50				$50
Haul & Dump Rubble	3.5	2	BCY	0.30	1	16.97			2.51		$20				$20
d. Staging pad @ S/U	50.0%														
Demo/Remove Concrete	655	328	BCY	1.2	507	16.97			3.62		$8,600		$1,220		$9,820
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	238	BCY	0.292	89	16.97			9.16		$1,510		$2,240		$3,750
Geo–Fabric & Liner 105 cy	2845	1423	SY	0.002	4	16.97			0.02		$70		$30		$100
Haul & Dump Rubble	395.5	198	BCY	0.30	77	16.97			2.51		$1,310		$510		$1,820
	20%														
e. Const.Equip.Decon.Facil. @ Onsite Disp.Cell															
Demo/Remove Concrete	49.3	10	BCY	1.2	15	16.97			3.62		$250		$40		$290
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	6	BCY	0.292	2	16.97			9.16		$30		$50		$80
Geo–Fabric & Liner	167	33	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	27	5	EA	0.48	3	16.97			1.68		$50		$10		$60
Splash Guard	702	140	SF	0.04	7	16.97			0.03		$120				$120
Haul & Dump Rubble	24.9	5	BCY	0.30	2	16.97			2.51		$30		$10		$40
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		920						$15,590		$7,000		$22,590

Generated Waste Removal Details

F-6-64
001310
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	COST/UNIT RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL (CON'T.)															
Demo. /Load/Haul/Dump/Compact															
	20.0%														
f. Personnel Decon. Facil.@ Onsite Disp. Cell															
Demo/Remove Concrete	2.2	0.44	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	0.48	BCY	0.292		16.97			9.16						
Geo–Fabric & Liner	14	2.80	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	6	1.20	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	26.40	SF	0.04	1	16.97			0.03		$20				$20
Haul & Dump Rubble	3.5	0.70	BCY	0.30		16.97			2.51						
	20.0%														
g. Relocated South Access Road/Cell	SY														
Road – 8" Gravel W/Geotextile	7333	1467	BCY	0.292	552	16.97			9.16		$9,370		$13,840		$23,210
Haul & Dump Rubble		1467	BCY	0.30	568	16.97			2.51		$9,640		$3,790		$13,430
	20.0%														
h. Haul Road for Cell	SY														
Road – 8" Gravel W/Geotextile	5778	257	BCY	0.292	97	16.97			1.08		$1,650		$290		$1,940
Haul & Dump Rubble		257	BCY	0.30	99	16.97			2.51		$1,680		$660		$2,340
	20.0%														
i. Temporary Construction Fencing @ Cell	5200	1040	LF	0.107	143	16.97					$2,430				$2,430
Haul & Dump Rubble		135	BCY	0.30	52	16.97			2.51		$880		$350		$1,230
	20.0%														
j. 20' wide Swing Gates @ Cell	2	0.40	EA	12.75	7	16.97			340.00		$120		$140		$260
Haul & Dump Rubble		0.05	BCY	0.30		16.97			2.51						
	20.0%														
k. Storage Pad Area @ Cell	BCY														
Demo/Remove Asphalt	988	197.60	BCY	1.2	306	16.97			3.62		$5,190		$740		$5,930
Excav., Load, Haul, Backfill, Compac	474.0	94.80	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Sub–grade Stone															
Geo–Fabric & Liner	4444	888.80	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble		197.0	BCY	0.30	76	16.97			2.51		$1,290		$510		$1,800
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,941						$32,950		$21,230		$54,180

Generated Waste Removal Details

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F-6-65

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL (CON'T.)														
Demo. /Load/Haul/Dump/Compact														
The following prorated at: 20.0%														
I. Staging Area @ On–Site Disposal Cell														
Demo/Remove Concrete 655	131.0	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excavate, Load, Haul, Backfill, Compact														
Sub–grade Stone 475	95.0	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo–Fabric & Liner 105 cy 2845	569.0	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble 395.5	126.0	BCY	0.30	49	16.97			2.51		$830		$330		$1,160
TOTAL GENERATED WASTE BCY 5602 LCY 6442														
SUB–TOTAL (GENERATED WASTE REMOVAL	1	LOT		289						$4,900		$1,730		$6,630
TOTAL (GENERATED WASTE REMOVAL)	1	LOT		3,150						$53,440		$29,960		$83,400

001312

F-6-66

Generated Waste Removal Details

PAGE 13 of 1

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [illegible]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
Lime Sludge Ponds	27000	32400	ICY	0.09	3762	16.97			3.21	3.50	$63,840		$107,120	$116,800	$287,760
	50%														
Office/Parking @ S/U	494	296	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	47	ICY												
Decon.Facil.– Personnel @ S/U	7	4	ICY												
Staging Area @ S/U	1099	659	ICY												
	S/T	1006.8	ICY	0.09	117	16.97			3.21	3.50	$1,990		$3,330	$3,630	$8,950
	20%														
Staging Area at On–Site Disp.Cell	1099	264	ICY												
Storage Area at On–Site Disp.Cell	474	114	ICY												
Decon.Facil.– Const.Equip.@ Cell	78	19	ICY												
Decon.Facil.– Personnel @ Cell	7	2	ICY												
Relocated South Access Road	1628	391	ICY												
Haul Road	1283	308	ICY												
	S/T	1096.6	ICY	0.09	127	16.97			3.21	3.50	$2,160		$3,630	$3,950	$9,740
b. Final Grade for LSP (Excludes Cap)		11667	SY	0.02	301	16.97			0.70		$5,110		$8,410		$13,520
c. Borrow Top Soil 6" Thk., Spread															
Lime Sludge Ponds		11667	SY	0.036	542	16.97			2.33	2.88	$9,200		$28,000	$34,610	$71,810
	50%														
Office/Parking @ S/U	2222	1333	SY												
Decon.Facil.– Const.Equip. @ S/U	167	100	SY												
Decon.Facil.– Personnel @ S/U	14	8	SY												
Staging Area @ S/U	2845	1423	SY												
	S/T	2864.3	SY	0.036	133	16.97			2.33	2.88	$2,260		$6,870	$8,500	$17,630
	20%														
Staging Area at On–Site Disp.Cell	2845	683	SY												
Storage Area at On–Site Disp.Cell	4444	1067	SY												
Decon.Facil.– Const.Equip.@ Cell	167	40	SY												
Decon.Facil.– Personnel @ Cell	14	3	SY												
Relocated South Access Road	14667	3520	SY												
Haul Road	11556	2773	SY												
	S/T	8086.3	SY	0.036	376	16.97			2.33	2.88	$6,380		$19,410	$23,990	$49,780
(SUB–TOTAL SITE RESTORATION)		1	LOT		5,358						$90,940		$176,770	$191,480	$459,190

Site Restoration Details

FEMP-OU02-5 DRAFT
August 24, 1994
5861
001313

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Lime Sludge Ponds	11667	105	MSF	0.30	41	16.97			6.75	25.00	$700		$730	$2,700	$4,130
	50%														
Office/Parking @ S/U	2222	10	MSF												
Decon.Facil.– Const.Equip. @ S/U	167	0.75	MSF												
Decon.Facil.– Personnel @ S/U	14	0.06	MSF												
Staging Area @ S/U	2845	12.8	MSF												
	S/T	23.6	MSF	0.30	9	16.97			6.75	25.00	$150		$160	$610	$920
	20%														
Staging Area at On–Site Disp.Cell	2845	5.12	MSF												
Storage Area at On–Site Disp.Cell	4444	8.00	MSF												
Decon.Facil.– Const.Equip.@ Cell	167	0.30	MSF												
Decon.Facil.– Personnel @ Cell	14	0.03	MSF												
Relocated South Access Road	14667	26.40	MSF												
Haul Road	11556	20.8	MSF												
	S/T	60.7	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,560	$2,370
e. Security Fence – 6ga aluminized – 6' high		1300	LF	0.13	215	16.97			1.64	9.80	$3,650		$2,200	$13,120	$18,970
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
(SUB–TOTAL SITE RESTORATION)		1	LOT		309						$5,250		$3,730	$18,360	$27,340
(TOTAL SITE RESTORATION)		1	LOT		5,667						$96,190		$180,500	$209,840	$486,530

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Site Restoration Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility MW 1 Pair x 120 ft/pair	2	PR					23000.00				$46,000			$46,000
b. New MW's at LSP's– Type I & II	8	PR					23000.00				$184,000			$184,000
c. Abandon Existing Wells at LSP's	5	EA					13000.00				$65,000			$65,000
TOTAL (MONITORING WELLS)	1	LOT									$295,000			$295,000

Monitoring Wells Details

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FEMP-OU02-5 DRAFT
August 24, 1994

5861

001315

F-6-69

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT				LABOR	S/C	EQUIP.	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	EQUIP.	MAT'L					
	WASTE WATER TREATMENT COST														
	Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
	Decontamination Facilities	50000	GAL					0.01				$500			$500
	Runnoff from the Exclusion Zone.	1000000	GAL					0.01				$10,000			$10,000
	TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
	TOTAL (WASTE WATER TREATMENT)	1	LOT									$10,500			$10,500

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Waste Water Treatment Operations Cost Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]21
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – LSP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940732
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATORY TESTING														
Excavation														
Full TCLP	91	EA					2,002				$182,200			$182,200
Rad	91	EA					2,000				$182,000			$182,000
Confirmatory tests														
Full Rad Test	46	EA					3,101				$142,600			$142,600
Full HSL	19	EA					1,500				$28,500			$28,500
Full TCLP	19	EA					2,002				$38,000			$38,000
2 Technicians per month	12	MO					13,163				$158,000			$158,000
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING/CONFIRMATORY TESTS)	1	LOT									$731,300			$731,300

Screening & Confirmatory Testing Details

001317

F-6-71

FEMP-OU02-5 DRAFT
August 24, 1994

1861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A- LSP - EXCAV. & ON-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940732
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CLS

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$6,998,400	BASE EST:	$80,910	BASE EST:	$16,500	BASE EST:	$102,550	BASE EST:	$8,530	BASE EST:	$32,870	BASE EST:	$8,860
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	25%	-10%	30%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	25%	-10%	30%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$76,865	$105,183	$15,675	$20,625	$92,295	$133,315	$8,359	$15,354	$30,898	$59,166	$8,328	$14,176

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–5A– LSP – EXCAV. & ON–SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940732
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CLS

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$23,430	BASE EST:	$0	BASE EST:	$22,350	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%										
MATERIAL PRICING					–5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	0%	0%	–5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$22,259	$35,145	$0	$0	$21,233	$29,055	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–5A– LSP – EXCAV. & ON–SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940732
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CLS

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001320

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A- LSP - EXCAV. & ON-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940732
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CLS

	EXCAV/NO TREATMENT ON-SITE DISPOSAL LABOR $'s		EXCAV/NO TREATMENT ON-SITE DISPOSAL S/C $'s		EXCAV/NO TREATMENT ON-SITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$73,710	BASE EST:	$0	BASE EST:	$121,470	BASE EST:	$145,700	BASE EST:	$206,550	BASE EST:	$307,010
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	75%					-5%	50%	-5%	50%		
MATERIAL PRICING					-1%	50%					-5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%			-1%	50%	-1%	50%	-1%	50%	-1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-2%	125%	0%	0%	-2%	100%	-6%	100%	-6%	100%	-6%	80%
TOTAL $	$72,236	$165,848	$0	$0	$119,041	$242,940	$136,958	$291,400	$194,157	$413,100	$288,589	$552,618

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

001321

581

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–5A– LSP – EXCAV. & ON–SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940732
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CLS

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		DIKE LABOR $'s		DIKE S/C $'s		DIKE MAT'L. $'s	
	BASE EST:	$29,260	BASE EST:	$33,400	BASE EST:	$91,720	BASE EST:	$54,000	BASE EST:	$10,200	BASE EST:	$119,970
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%			–5%	50%	–5%	50%				
MATERIAL PRICING			–5%	50%					–5%	50%	–5%	50%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	50%	–1%	50%	–1%	50%	–1%	50%	–1%	50%	–1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	100%	–6%	100%	–6%	100%	–6%	100%	–6%	100%	–6%	100%
TOTAL $	$27,504	$58,520	$31,396	$66,800	$86,217	$183,440	$50,760	$108,000	$9,588	$20,400	$112,772	$239,940

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

001322

F-6-76

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A- LSP - EXCAV. & ON-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940732
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CLS

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$58,780	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$55,841	$88,170	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001323

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

5861

FEMP-OU02-5 DRAFT
August 24, 1994

F-6-77

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A- LSP - EXCAV. & ON-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940732
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CLS

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$105,810	BASE EST:	$0	BASE EST:	$230,820	BASE EST:	$0	BASE EST:	$324,500	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$100,520	$137,553	$0	$0	$219,279	$300,066	$0	$0	$308,275	$486,750	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

001324

F-6-78

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A- LSP - EXCAV. & ON-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940732
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CLS

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$631,900	BASE EST:	$336,900	BASE EST:	$740,200	BASE EST:	$717,000	BASE EST:	$741,800	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-10%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-5%	30%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-10%	30%	-5%	30%	0%	0%
TOTAL $	$600,305	$947,850	$320,055	$673,800	$703,190	$1,110,300	$645,300	$932,100	$704,710	$984,340	$0	$0
RISK PROFILE & CORRELATION FOR	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
EACH COST ELEMENT	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

001325

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A- LSP - EXCAV. & ON-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940732
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CLS

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$1,516,200	BASE EST:	$105,500	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-5%	25%										
(OTHER)												
TOTAL %	-5%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$1,440,390	$1,895,250	$104,445	$106,555	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

5861

F ERMC O
ESTIMATING SERVICES

EST FILE #: C2940733 | DATE: 11-Aug-94

CLIENT: US DOE | SUMMARY SHEET | ESTIMATOR: KEN KEPLER

PROJECT TITLE: ALT-5A – IFP – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC EXPANDED TRESPASSER | LOCATION: FERNALD

WBS#: 1.1.1.1.2.3.5 | TASK#: 2CNF

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL NO TREATMENT	99,904		$1,701,100	$1,528,400	$2,806,300	$6,035,800
2		SHRED/CRUSH – COMPOSITE LINER, CAP, DIKE (SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		99,904		$1,701,100	$1,528,400	$2,806,300	$6,035,800
11	SUPERVISION – CONTRACTOR				$289,000			$289,000
12	SM TOOLS/CONSM'BLS						$102,100	$102,100
13	EQUIPMENT RENTAL						$2,005,700	$2,005,700
14	TEMP. FACILITIES				$35,700		$66,300	$102,000
15	TEMP UTL'S HOOK-UP				$17,900		$33,200	$51,100
16	JOB CLEAN-UP				$35,700		$66,300	$102,000
17	SAFETY				$17,900		$33,200	$51,100
18	HEALTH PHYSICS S/C				$234,400		$117,800	$352,200
19	CERCLA/SAT	$1,500 PER PERSON				$36,000		$36,000
	BOND					$60,400		$60,400
	OVERHEAD & PROFIT					$826,900		$826,900
22	PAYRL BRD.&BENFT.				$1,212,500			$1,212,500
	INDIRECT FIELD COSTS				$1,843,100	$923,300	$2,424,600	$5,191,000
	DIRECT & INDIRECT FIELD COSTS				$3,544,200	$2,451,700	$5,230,900	$11,226,800
23	TRANSPORTATION & BURIAL							
24	WASTE CONTAINERS							
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$58,600		$58,600
25	SCREENING & CONFIRMATION TESTING					$3,354,600		$3,354,600
26	PROJ.MGMT-FERMCO – OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$3,076,100			$3,076,100
	FERMCO FIELD SUPPORT COSTS				$3,076,100	$3,413,200		$6,489,300
28	EMISSION MODELING				$19,600		$36,500	$56,100
29	PSAR/FSAR(SAFETY RPT)				$606,200			$606,200
30	ENGINEERING	TITLE I&II $3,424,200 TITLE III	$3,390,500	CDR	$1,234,900	DCR	$886,900	$8,936,500
	ENGINEERING COSTS							$9,598,800
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$5,267,400	$316,000
	SUB-TOTAL	(BASE ESTIMATE)						$27,630,900
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	18.5%						$5,111,700
	TARGET ESTIMATE (BASE ESTIMATE PLUS RISK BUDGET)							$32,742,600
	CONTINGENCY	7.0%						$1,934,200
								PRELIMINARY
	TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY)							$34,676,800

LOTUS31\FS2\ALT5A\IFP\INDSUM.WK3 – FEASABILITY STUDY

DATE: 11-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940733

ALT-5A - IFP - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.5

EXPANDED TRESPASSER

TASK I.D. : 2CNF

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	• NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			•	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	912	$11,670	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	912	$21,890	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	912	$4,740	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	912	$5,110	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	912	$5,470	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	912	$3,280	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	912	$63,840	C/B		
SUB-TOTAL		31.80	4		$116,000			
					$127.19	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	13		$170	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	6		$130	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	6		$1,040	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$1,820			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$117,800			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

DATE: 11-Aug-94

PROJECT TITLE: **HEALTH PHYSICS**

EST.NO.: C2940733

ALT-5A - IFP - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.5

EXPANDED TRESPASSER

TASK I.D. : 2CNF

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

5861

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	24	96	$16.97	$1,630		
ANNUAL PHYSICALS	2	3	24	144	$16.97	$2,440		
EXIT (TERMINATION) PHYSICALS	1	4	24	96	$16.97	$1,630		
SUB-TOTAL						$5,700		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	34	1	24	827	$16.97	$14,040		
YEARLY IN-VIVO	2	4	24	192	$16.97	$3,260		
EXIT (END OF PROJECT / TERMINATION)	1	4	24	96	$16.97	$1,630		
SUB-TOTAL						$18,930		
WORK DELAYS CAUSED BY MONITORING	5%				$2,097,300	$104,865		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$2,097,300	$104,865		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$234,400	$117,800	$352,200

001329

CONSTRUCTION ACTIVITY DURATION

TIME 6

CONT.NO. – 4424321
PROJECT – ALT-6A – IFP – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CNF

WBS NO. – 1.1.1.1.2.3.5
EST. NO. – C2940718
BY – K. KEPLER
DATE – 08/11/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25–Mar–94	01–Nov–97	02–Apr–99	31–Aug–2000	34	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
60	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO. – [redacted]321
CLIENT – [redacted]. DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		3,765						$65,040	$15,000	$37,090	$91,040	$208,170
DECONTAMINATION FACILITIES/SERVICES	1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210
EROSION AND SEDIMENT CONTROLS	1	LS		1134						$21,530		$8,470	$45,730	$75,730
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE – OFFSITE DISPOSAL	N/A	LS												N/A
LOAD/HAUL – OFF–SITE DISPOSAL	N/A	LS												N/A
EXCAVATE & HAUL TO ON–SITE DISPOSAL (Onsite)	1	LS		23171						$393,580		$330,420	$112,740	$836,740
COMPOSITE LINER	1	LS		29393						$499,870	$813,690	$665,880	$1,073,800	$3,053,240
COMPOSITE CAP	1	LS		7192						$122,050	$143,130	$174,410	$381,860	$821,450
DIKE FOR DISPOSAL CELL	1	LS		14452						$245,250	$43,710	$310,510	$539,400	$1,138,870
GENERATED WASTE REMOVAL	1	LS		2853						$48,410		$27,670		$76,080
SITE RESTORATION	1	LS		8561						$145,270		$267,590	$301,070	$713,930
MONITORING WELLS	1	LS									$348,000			$348,000
SUB–TOTAL (DIRECT FIELD COSTS)				90822						$1,546,490	$1,389,420	$1,823,360	$2,551,150	$7,310,420
TAKE–OFF ALLOWANCE 10%	1	LS		9,082						$154,650	$138,940	$182,340	$255,120	$731,050
TOTAL (DIRECT FIELD COSTS)	1	LS		99,904						$1,701,100	$1,528,400	$2,005,700	$2,806,300	$8,041,500

On–Site Disposal of In–Active Flyash Pile w/ Off–site Option – SUMMARY

001331
5881
F-6-85
FEMP-OU02-5 DRAFT August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 20% ARE COMMON TO ALL SUB–UNITS)														
(ITEMS @ 33.3% ARE COMMON TO SF, AFP & IFP)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	2000	LF	0.213	550	16.97				6.25	$9,330			$12,880	$22,210
c. Clear and Grub														
i. Remediation Site	6.50	AC	41.40	347	16.97			2575.00		$5,890		$17,240		$23,130
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Staging Area @ Sub–unit														
d. Dewatering														
i. Excavate Dewatering Trench	380	CY	0.50	245	16.97			1.49		$4,160		$580		$4,740
ii. Pump – w/4" Suction Hose	150	DAYS	3.00	581	16.97			19.55		$9,860		$3,020		$12,880
iv. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip	2	CY	4.00	10	16.97			100.00		$170		$210		$380
e. General Grading														
i. New Roads	6222	SY	0.001	8	16.97			0.07		$140		$450		$590
33.3%														
ii. Office/Parking Area 2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area 272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area 49	16	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub–Unit 2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	6222	SY	0.030	241	16.97			1.08	6.66	$4,090		$6,920	$42,680	$53,690
33.3%														
ii. Office/Parking – 8" Gravel W/ Geotextile 2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc.Slab 2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk. 631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" thl 24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub–grade Piping – 4" 500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating 2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab 183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip. 1	0.33	LS	2.00	1	16.97			184.00		$20		$60		$80
TOTAL (SITE PREPARATION)	1	LS		3,765						$65,040	$15,000	$37,090	$91,040	$208,170

Site Preparation Details

F-6-86
004332
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted]. DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	33.3%														
a. Decon Trailer – Rental	51	17	MO					1500.00				$25,470			$25,470
	33.3%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'i.d.x 25lfx8	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in con	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
x. Backfill & Compaction around concrete slab	BCY 258	103	ICY	0.086	11	16.97			1.38		$190		$150		$340
SUB–TOTAL (EQUIP. DECON. FACILITY)					265						$4,810	$25,860	$1,210	$4,140	$36,020

Equipment Decon. Facility Details

PAGE 3 of 18

F-6-87

001333

5861

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	33.3%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Gua	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in (	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	0	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210

Personnel Decon.Facilities/Services Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted]. DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	3000	LF	0.017	66	16.97			0.06	0.65	$1,120		$180	$2,010	$3,310
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	10	EA	8.00	103	16.97			5.00	70.00	$1,750		$50	$700	$2,500
v. Hay Bales	300	EA	0.24	93	16.97			1.53	1.35	$1,580		$470	$420	$2,470
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1400	LF	0.38	688	19.95			5.11	4.42	$13,730		$7,150	$6,190	$27,070
iv. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	4	EA	8.00	41	16.97			28.00	8300.00	$700		$110	$33,200	$34,010
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,134						$21,530		$8,470	$45,730	$75,730

Erosion Control Details

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FEMP-OU02-5 DRAFT
August 24, 1994

001335

5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D. 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
LOAD & HAUL TO ON–SITE DISPOSAL CELL														
(NO TREATMENT)														
Excavate Contaminated Soil														
Excavate and Load – Level D	87900	BCY	0.055	6237	16.97			1.17		$105,840		$105,930		$211,770
Excavate Additional Soil	9400	BCY	0.055	667	16.97			1.17		$11,320		$11,330		$22,650
Haul to Onsite Disposal Cell BCY														
– 12" thk. Cushion Layer 8447	10559	LCY	0.081	1103	16.97			1.51		$18,720		$16,420		$35,140
– Impacted Fill 88853	111066	LCY	0.081	11605	16.97			1.51		$196,940		$172,740		$369,680
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load – Level C	6100	BCY	0.055	433	16.97			1.17		$7,350		$7,350		$14,700
Haul to Onsite Disposal Cell BCY 6100	7625	LCY	0.081	797	16.97			1.51		$13,530		$11,860		$25,390
			S/T	1230										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	1230	HRS	150%	1845	16.97			1.51		$31,310		$1,910		$33,220
			S/T	3075										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	308	MD												
(SHREDDING COMMON TO SWL, IFP & SF)														
k. Shredder/Crusher – Purchase/Install 33.3%	0.3	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY 4000														
Generated Waste BCY 5217														
Excavated Debris TONS 6375														
(Percent of Gen.Waste to be Shredded 25%														
Generated Waste TONS 2079														
TOTAL TONS 8454														
Operating Costs	141	HRS							25.75				$3,740	$3,740
(2) Operators	282	HRS	1.00	364	16.97					$6,180				$6,180
TOTAL (EXCAV/NO TREATMENT–ONSITE DISPOSAL)	1	LOT		23,171						$393,580		$330,420	$112,740	$836,740

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Excavate – No Treatment – South Field Onsite Disposal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP.)															
a. Clear and Grubb	20%														
i. Disposal Cell & Surrounding area	35	7.0	AC	41.40	374	16.97			2575.00		$6,350		$18,570		$24,920
b. Relocated South Access Road	20%														
i. Clear & Grub	3	0.6	AC	41.40	32	16.97			2575.00		$540		$1,590		$2,130
ii. General Grading	1467	293.4	SY	0.001		16.97			0.07				$20		$20
iii. Road – 8" Gravel W/Geotextile	7333	1466.6	SY	0.030	57	16.97			1.08	6.66	$970		$1,630	$10,060	$12,660
c. Haul Road	20%														
i. Clear & Grub	2.4	0.5	AC	41.40	26	16.97			2575.00		$440		$1,270		$1,710
ii. General Grading	11556	2311.2	SY	0.001	3	16.97			0.07		$50		$170		$220
iii. Road – 8" Gravel W/Geotextile	5778	1155.6	SY	0.030	45	16.97			1.08	6.66	$760		$1,290	$7,930	$9,980
	20%														
d. Temporary Construction Fencing	5200	1040.0	LF	0.213	286	16.97				6.25	$4,850			$6,700	$11,550
e. 20' wide Swing Gates	2	0.4	EA	25.60	13	16.97			340.00	560.00	$220		$140	$230	$590
f. Staging Area @ Cell	20%														
Area Excavation for Slab	1606	321.2	BCY	0.016	7	16.97			0.60		$120		$200		$320
Sub–Base for Slab	2845	569.0	SY	0.041	30	16.97		6.75	1.45	5.51	$510	$3,960	$850	$3,230	$8,550
HDPE Perf.Sub–grade Piping – 4"	500	100.0	LF	0.21	27	16.97			0.74	3.02	$460		$80	$310	$850
Concrete Slab – 160'x160'x8" thk	631	126.2	CY	4.07	663	17.98			14.25	67.00	$11,920		$1,850	$8,710	$22,480
Concrete Curb – 480'x2'x8" thk	24	4.8	CY	15.30	95	17.98			11.16	275.90	$1,710		$60	$1,360	$3,130
Epoxy Coating	2845	569.0	SY	0.22	161	16.97			0.77	7.56	$2,730		$450	$4,430	$7,610
Backfill & Compact around Slab	183	36.6	ICY	0.086	4	16.97			1.38				$50		$50
Mob/Demob.Equip.	1	0.2	LS	2.00	1	16.97			184.00		$20		$40		$60
g. Storage Area – 200' x 200' Asphalt	20%														
Includes Compacted Sub–Grade	4444	889	SY	0.084	96	16.97			2.56	14.04	$1,630		$2,340	$12,850	$16,820
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat															
	20%														
h. Decon Trailer – Rental	51	10	MO					1500.00				$15,760			$15,760
i. Const.Equipment Decon. Facility	20%														
25 ft x 60 ft	1	0.20	LS	730.00	146	18.05		1160.00	2900.00	11980.00	$2,640	$240	$580	$2,400	$5,860
j. Personnel Decon. Facility	20%														
11'x 11'	1	0.20	LS	108.00	22	18.89		100.00	360.00	4120.00	$420	$20	$70	$820	$1,330
SUB–TOTAL (COMPOSITE LINER –SITE PREP)		1	LOT		2,088	17.40					$36,340	$19,980	$31,250	$59,030	$146,600

Composite Liner – Site Prep. – South Field Onsite Disposal Details

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001337
5861
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (CON'T.)														
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.														
COMPOSITE LINER														
a. Subgrade Preparation – includes removal of top soil, grading & comp.	25595	SY	0.024	792	16.97			0.86		$13,440		$22,670		$36,110
b. 95% Clay – 5% Bentonite 36" Thk BCY 25595	30202	ICY	0.260	10130	16.97			11.19	20.35	$171,910		$348,100	$633,050	$1,153,060
c. Composite Clay Liner	25595	SY					7.38				$188,890			$188,890
d. HDPE Liner 60 mil	25595	SY					4.75				$121,580			$121,580
e. Geotextile Fabric	25595	SY					2.25				$57,590			$57,590
f. Pea Gravel 12" Thk; In–place 8447	9081	ICY	0.11	1289	16.97			0.77	17.00	$21,870		$7,200	$159,000	$188,070
g. Composite Clay Liner	25595	SY					7.38				$188,890			$188,890
h. HDPE Liner 60 mil	25595	SY					4.75				$121,580			$121,580
i. Geotextile Fabric	25595	SY					2.25				$57,590			$57,590
j. Pea Gravel 12" Thk; In–place BCY 8447	9081	ICY	0.11	1289	16.97			0.77	17.00	$21,870		$7,200	$159,000	$188,070
k. Geotextile Fabric	25595	SY					2.25				$57,590			$57,590
l. HDPE Perforated Pipe – leachate collection 6" Dia.	1485	LF	0.30	575	16.97			1.05	6.56	$9,760		$1,610	$10,030	$21,400
m. HDPE Perforated Pipe – leak detection 6" Dia.	1485	LF	0.30	575	16.97			1.05	6.56	$9,760		$1,610	$10,030	$21,400
n. Leachate Discharge Piping														
i. HDPE Carrier & containment Pipe 6" x 10" Includes Trench Excav/Backfill, sand bedding and compaction.	1155	LF	0.86	1281	16.97			11.37	22.33	$21,740		$13,530	$26,560	$61,830
ii. HDPE Manhole – 4' dia. x 8' deep	2	EA	8.00	21	16.97			28.00	8300.00	530.00		$60	$17,100	$17,690
o. Impacted Fill–Cusion Layer 12" Thk BCY 8447	10559	LCY	0.06	817	16.97			1.67		$13,860		$18,160		$32,020
p. Impacted Fill–Spread and Compact BCY 88853	111066	LCY	0.06	8597	16.97			1.67		$145,890		$191,050		$336,940
q. Generated Waste BCY 5217	6000	LCY	0.06	464	16.97			1.67		$7,870		$10,320		$18,190
PPE LEVEL C Allowance is added to the following														
r. Impacted fill BCY 6100	7625	LCY	0.06	590	16.97			1.67		$10,010		$13,120		$23,130
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	590	HRS	150% S/T	885 1475	16.97					$15,020				$15,020
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	148	MD												
SUB–TOTAL (COMPOSITE LINER)	1	LOT		27,305						$463,530	$793,710	$634,630	$1,014,770	$2,906,640
TOTAL (COMPOSITE LINER)	1	LOT		29,393						$499,870	$813,690	$665,880	$1,073,800	$3,053,240

Composite Liner Details

F-6-92
001238
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted]. DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE CAP															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
COMPOSITE CAP															
a. Contouring Layer 18" Thk.	BCY 4370	5244	ICY	0.06	406	16.97			1.67	3.50	$6,890		$9,020	$18,900	$34,810
b. 95% Clay – 5% Bentonite 24" Thk	BCY 5855	6294	ICY	0.260	2111	16.97			11.19	20.35	$35,820		$72,540	$131,930	$240,290
c. GML\GCC – composite Liner		8739	SY					7.38				$64,490			$64,490
d. Geotextile Fabric		8739	SY					2.25				$19,660			$19,660
e. Pea gravel 12" Thk, In–place	BCY 2884	3205	ICY	0.11	455	16.97			0.77	17.00	$7,720		$2,540	$56,120	$66,380
f. Geotextile Fabric		8739	SY					2.25				$19,660			$19,660
g. Cobbels 36" Thk; In–place	BCY 8739	9394	ICY	0.258	3127	16.97			7.15	10.10	$53,070		$69,190	$97,730	$219,990
h. Geotextile Fabric		8739	SY					2.25				$19,660			$19,660
i. Sand Layer 6" Thk; In–place	BCY 1486	1597	ICY	0.052	107	16.97			1.76	5.00	$1,820		$2,900	$8,230	$12,950
j. Geotextile Fabric		8739	SY					2.25				$19,660			$19,660
k. Common Soil 21" Thk; In–place	BCY 5069	6083	ICY	0.06	471	16.97			1.67	3.50	$7,990		$10,460	$21,930	$40,380
l. Top Soil 6" Thk; In–place	BCY 1486	1783	ICY	0.053	122	16.97			1.82	12.10	$2,070		$3,340	$22,220	$27,630
m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding	SY 8739	79	MSF	0.30	31	16.97			6.75	25.00	$530		$550	$2,030	$3,110
n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized		1650	LF	0.17	362	16.97			2.28	13.40	$6,140		$3,870	$22,770	$32,780
TOTAL (COMPOSITE CAP)		1	LOT		7,192						$122,050	$143,130	$174,410	$381,860	$821,450

Composite Cap Details

FEMP-OU02-5 DRAFT
August 24, 1994

001339

5861

F-693

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DIKE FOR DISPOSAL CELL															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
a. Borrow Common Soil – Dike	BCY 66568	79882	ICY	0.06	6183	16.97			1.67	3.50	$104,930		$137,400	$287,970	$530,300
b. Geotextile Fabric		19426	SY					2.25				$43,710			$43,710
c. Cobbels 36" Thk; In–place	BCY 19426	23311	ICY	0.258	7758	16.97			7.15	10.10	$131,650		$171,680	$242,510	$545,840
e. Drainage Piping – HDPE	6" Dia.	1320	LF	0.30	511	16.97			1.05	6.56	$8,670		$1,430	$8,920	$19,020
TOTAL (DIKE – DISPOSAL CELL)		1	LOT		14,452						$245,250	$43,710	$310,510	$539,400	$1,138,870

Dike Details

F-6-94
001340
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [illegible]321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL															
a. Office/Parking Area @ S/U	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo–Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Facil.@ S/U	33%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo–Fabric & Liner	167	56	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Facil. @ S/U	33%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292					9.16				$10		$10
Geo–Fabric & Liner	14	5	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
d. Staging pad @ S/U	33.3%														
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo–Fabric & Liner 105 cy	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	395.5	132	BCY	0.30	51	16.97			2.51		$870		$340		$1,210
	20%														
e. Const.Equip.Decon.Facil. @ Onsite Disp.Cell															
Demo/Remove Concrete	49.3	10	BCY	1.2	15	16.97			3.62		$250		$40		$290
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	6	BCY	0.292	2	16.97			9.16		$30		$50		$80
Geo–Fabric & Liner	167	33	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	5	EA	0.48	3	16.97			1.68		$50		$10		$60
Splash Guard	702	140	SF	0.04	7	16.97			0.03		$120				$120
Haul & Dump Rubble	24.9	5	BCY	0.30	2	16.97			2.51		$30		$10		$40
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		622						$10,540		$4,710		$15,250

Generated Waste Removal Details

001341
5881
F-6-95
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.)															
Demo. /Load/Haul/Dump/Compact															
	20.0%														
f. Personnel Decon. Facil.@ Onsite Disp. Cell															
Demo/Remove Concrete	2.2	0.44	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	0.48	BCY	0.292		16.97			9.16						
Geo–Fabric & Liner	14	3	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	6	1	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	26	SF	0.04	1	16.97			0.03		$20				$20
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
	20.0%														
g. Relocated South Access Road/Cell	SY														
Road – 8" Gravel W/Geotextile	7333	1467	BCY	0.292	552	16.97			9.16		$9,370		$13,840		$23,210
Haul & Dump Rubble		1467	BCY	0.30	568	16.97			2.51		$9,640		$3,790		$13,430
	20.0%														
h. Haul Road for Cell	SY														
Road – 8" Gravel W/Geotextile	5778	257.0	BCY	0.292	97	16.97			1.08		$1,650		$290		$1,940
Haul & Dump Rubble		257.0	BCY	0.30	99	16.97			2.51		$1,680		$660		$2,340
	20.0%														
i. Temporary Construction Fencing @ Cell	5200	1040.0	LF	0.107	143	16.97					$2,430				$2,430
Haul & Dump Rubble		135.0	BCY	0.30	52	16.97			2.51		$880		$350		$1,230
	20.0%														
j. 20' wide Swing Gates @ Cell	2	0.40	EA	12.75	7	16.97			340.00		$120		$140		$260
Haul & Dump Rubble		0.05	BCY	0.30		16.97			2.51						
	20.0%														
k. Storage Pad Area @ Cell	BCY														
Demo/Remove Asphalt	988	197.6	BCY	1.2	306	16.97			3.62		$5,190		$740		$5,930
Excav., Load, Haul, Backfill, Compac	474.0	94.8	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Sub–grade Stone															
Geo–Fabric & Liner	4444	888.8	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble		197.0	BCY	0.30	76	16.97			2.51		$1,290		$510		$1,800
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,942						$32,970		$21,230		$54,200

Generated Waste Removal Details

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001342

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]321 PRELIMINARY
CLIENT - [redacted]. DEPT. OF ENERGY
PROJECT - ALT-5A - IFP - ON-SITE DISPOSAL w/OFF-SITE > WAC - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.2

CONTR.NO.: 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.)															
Demo. /Load/Haul/Dump/Compact															
The following prorated at:	20.0%														
I. Staging Area @ On-Site Disposal Cell															
Demo/Remove Concrete	655	131.0	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excav., Load, Haul, Backfill, Compact															
Sub-grade Stone	475	95.0	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo-Fabric & Liner 105 cy	2845	569.0	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	395.5	126.0	BCY	0.30	49	16.97			2.51		$830		$330		$1,160
TOTAL GENERATED WASTE	BCY 5217 LCY 6000														
SUB- TOTAL (GENERATED WASTE REMOVAL		1	LOT		289						$4,900		$1,730		$6,630
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		2,853						$48,410		$27,670		$76,080

Generated Waste Removal Details

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001343

FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
In–Active Flyash Pile	46000	55200	ICY	0.09	6409	16.97			3.21	3.50	$108,760		$182,510	$199,000	$490,270
	33.3%														
Office/Parking	494	197	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	31	ICY												
Decon.Facil.– Personnel @ S/U	7	3	ICY												
Staging Area @ S/U	1099	439	ICY												
	S/T	670.5	ICY	0.09	78	16.97			3.21	3.50	$1,320		$2,220	$2,420	$5,960
	20%														
Staging Area at On–Site Disp.Cell	1099	264	ICY												
Storage Area at On–Site Disp.Cell	474	114	ICY												
Decon.Facil.– Const.Equip. @ Cell	78	19	ICY												
Decon.Facil.– Personnel @ Cell	7	2	ICY												
Relocated South Access Road	1628	391	ICY												
Haul Road	1283	308	ICY												
	S/T	1096.6	ICY	0.09	127	16.97			3.21	3.50	$2,160		$3,630	$3,950	$9,740
b. Final Grade for IFP		16667	SY	0.02	430	16.97			0.70		$7,300		$12,020		$19,320
c. Borrow Top Soil 6" Thk., Spread															
In–Active Flyash Pile		16667	SY	0.036	774	16.97			2.33	2.88	$13,130		$40,000	$49,440	$102,570
	33.3%														
Office/Parking	2222	740	SY												
Decon.Facil.– Const.Equip. @ S/U	167	56	SY												
Decon.Facil.– Personnel @ S/U	14	5	SY												
Staging Area @ S/U	2845	947	SY												
	S/T	1747.6	SY	0.036	81	16.97			2.33	2.88	$1,370		$4,190	$5,180	$10,740
	20%														
Staging Area at On–Site Disp.Cell	2845	683	SY												
Storage Area at On–Site Disp.Cell	4444	1067	SY												
Decon.Facil.– Const.Equip. @ Cell	167	40	SY												
Decon.Facil.– Personnel @ Cell	14	3	SY												
Relocated South Access Road	14667	3520	SY												
Haul Road	11556	2773	SY												
	S/T	8086.3	SY	0.036	376	16.97			2.33	2.88	$6,380		$19,410	$23,990	$49,780
SUB–TOTAL (SITE RESTORATION)		1	LOT		8,275						$140,420		$263,980	$283,980	$688,380

Site Restoration Details

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001344
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted]. DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION (CON'T.)															
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
In–Active Flyash Pile	16667	150	MSF	0.30	58	16.97			6.75	25.00	$980		$1,040	$3,860	$5,880
	33.3%														
Office/Parking	2222	6.7	MSF												
Decon.Facil.– Const.Equip. @ S/U	167	0.5	MSF												
Decon.Facil.– Personnel @ S/U	14		MSF												
Staging Area @ S/U	2845	8.5	MSF												
	S/T	15.7	MSF	0.30	6	16.97			6.75	25.00	$100		$110	$400	$610
	20%														
Staging Area at On–Site Disp.Cell	2845	5.1	MSF												
Storage Area at On–Site Disp.Cell	4444	8.0	MSF												
Decon.Facil.– Const.Equip.@ Cell	167	0.3	MSF												
Decon.Facil.– Personnel @ Cell	14		MSF												
Relocated South Access Road	14667	26.4	MSF												
Haul Road	11556	20.8	MSF												
	S/T	60.6	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,560	$2,370
e. Security Fence – 6ga aluminized – 6' high		1080	LF	0.13	178	16.97			1.64	9.80	$3,020		$1,820	$10,900	$15,740
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
SUB–TOTAL (SITE RESTORATION)		1	LOT		286						$4,850		$3,610	$17,090	$25,550
TOTAL (SITE RESTORATION)		1	LOT		8,561						$145,270		$267,590	$301,070	$713,930

Site Restoration Details

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001345

5861

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT.-5A – IFP – ON-SITE DISPOSAL w/OFF-SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.2

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at ON-Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility	8	PR					23000.00				$184,000			$184,000
b. MW at IFP – Type I & II	6	PR					23000.00				$138,000			$138,000
c. Abandon Existing Wells	2	EA					13000.00				$26,000			$26,000
TOTAL (MONITORING WELLS)	1	LOT									$348,000			$348,000

001346

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Monitoring Wells Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4[illegible]21
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT				LABOR	S/C	EQUIP.	MATERIAL	TOTAL
			UNIT	TOTAL	RATE	LABOR	SUB	EQUIP.	MAT'L					
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	155000	GAL					0.01				$1,600			$1,600
Runnoff from the Exclusion Zone.	5700000	GAL					0.01				$57,000			$57,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$58,600			$58,600

Waste Water Treatment Operations Cost Details

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5861

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940733
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	517	EA					2,002				$1,035,000			$1,035,000
Rad	517	EA					2,000				$1,034,000			$1,034,000
Confirmatory Tests														
Full Rad Tests	259	EA					3,101				$803,200			$803,200
Full HSL	25	EA					1,500				$37,500			$37,500
Full TCLP	25	EA					2,000				$50,000			$50,000
2 Technicians per Month	30	MO					13,163				$394,900			$394,900
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIMATION TESTS)	1	LOT									$3,354,600			$3,354,600

001348

F-6-102

Screening & Confirmation Testing Details

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FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A - IFP - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940733
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CNF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$27,630,900	BASE EST:	$71,540	BASE EST:	$16,500	BASE EST:	$100,140	BASE EST:	$6,040	BASE EST:	$28,480	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	25%	-10%	30%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	25%	-10%	30%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$67,963	$93,002	$15,675	$20,625	$90,126	$130,182	$5,919	$10,872	$26,771	$51,264	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001349

5861

F-6-103

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A – IFP – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940733
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CNF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$23,680	BASE EST:	$0	BASE EST:	$50,300	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$22,496	$35,520	$0	$0	$47,785	$65,390	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001350

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A – IFP – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940733
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CNF

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	50%					-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%					-1%	50%				
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-2%	100%	0%	0%	0%	0%	-6%	100%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001351

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A – IFP – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940733
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CNF

	EXCAV/SORT/CRUSH ONSITE DISPOSAL LABOR $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL S/C $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$432,940	BASE EST:	$0	BASE EST:	$124,010	BASE EST:	$549,860	BASE EST:	$895,060	BASE EST:	$1,181,210
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	100%					-5%	50%				
MATERIAL PRICING					-1%	50%			-5%	25%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%			-1%	50%	-1%	50%	-1%	50%	-1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	150%	0%	0%	-2%	100%	-6%	100%	-6%	75%	-6%	70%
TOTAL $	$406,964	$1,082,350	$0	$0	$121,530	$248,020	$516,868	$1,099,720	$841,356	$1,566,355	$1,110,337	$2,008,057

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001352

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–5A – IFP – EXCAV. & ON–SITE DISPL. w/OFF–SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940733
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CNF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		DIKE LABOR $'s		DIKE S/C $'s		DIKE MAT'L. $'s	
	BASE EST:	$134,260	BASE EST:	$157,440	BASE EST:	$420,050	BASE EST:	$269,780	BASE EST:	$48,080	BASE EST:	$593,340
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–5%	50%				
MATERIAL PRICING			–5%	30%	–5%	30%			–5%	50%	–5%	50%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–5%	30%	–5%	30%	–5%	30%	–5%	50%	–5%	50%	–5%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–10%	80%	–10%	60%	–10%	60%	–10%	100%	–10%	100%	–10%	100%
TOTAL $	$120,834	$241,668	$141,696	$251,904	$378,045	$672,080	$242,802	$539,560	$43,272	$96,160	$534,006	$1,186,680

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001353

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-6-107

FEMP-OU02-5.DRAFT
August 24, 1994

586

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A - IFP - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940733
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CNF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$53,250	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$50,588	$79,875	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001354

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–5A – IFP – EXCAV. & ON–SITE DISPL. w/OFF–SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940733
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CNF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$159,800	BASE EST:	$0	BASE EST:	$331,180	BASE EST:	$0	BASE EST:	$382,800	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	30%										
MATERIAL PRICING					–5%	30%			–5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	30%	0%	0%	–5%	30%	0%	0%	–5%	50%	0%	0%
TOTAL $	$151,810	$207,740	$0	$0	$314,621	$430,534	$0	$0	$363,660	$574,200	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001355

5861

FEMP-OU02-5 DRAFT
August 24, 1994

F-6-109

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–5A – IFP – EXCAV. & ON–SITE DISPL. w/OFF–SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940733
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CNF

	INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS	
	LABOR $'s		S/C $'s		MAT'L. $'s		LABOR $'s		S/C $'s		MAT'L. $'s	
	BASE EST:	$1,843,100	BASE EST:	$923,300	BASE EST:	$2,424,600	BASE EST:	$3,076,100	BASE EST:	$3,413,200	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–10%	30%				
MATERIAL PRICING			–5%	100%	–5%	50%			–5%	30%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	–5%	100%	–5%	50%	–10%	30%	–5%	30%	–5%	30%
TOTAL $	$1,750,945	$2,764,650	$877,135	$1,846,600	$2,303,370	$3,636,900	$2,768,490	$3,998,930	$3,242,540	$4,437,160	$0	$0
RISK PROFILE & CORRELATION FOR	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
EACH COST ELEMENT	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001356

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A – IFP – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940733
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CNF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$9,598,800	BASE EST:	$316,000	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			–1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	–5%	25%										
(OTHER)												
TOTAL %	–5%	25%	–1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$9,118,860	$11,998,500	$312,840	$319,160	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-6-111

001357

5861

FEMP-OU02-5 DRAFT
August 24, 1994

F ERMCO ESTIMATING SERVICES

EST FILE #: C2940734 | DATE: 11-Aug-94
CLIENT: US DOE | ESTIMATOR: KEN KEPLER
PROJECT TITLE: ALT-5A, SF, - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.2 EXPANDED TRESPASSER | TASK#: 2CSF

SUMMARY SHEET

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL - COMPOSITE LINER, CAP, DIKE	84,874		$1,445,500	$1,822,200	$2,489,800	$5,757,500
2		OFF-SITE DISPOSAL OF LEAD/SOIL TO ENVIROCARE						
3		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		84,874		$1,445,500	$1,822,200	$2,489,800	$5,757,500
11	SUPERVISION - CONTRACTOR				$246,000			$246,000
12	SM TOOLS/CONSM'BLS						$86,700	$86,700
13	EQUIPMENT RENTAL						$1,764,700	$1,764,700
14	TEMP. FACILITIES				$30,400		$56,400	$86,800
15	TEMP UTL'S HOOK-UP				$15,200		$28,200	$43,400
16	JOB CLEAN-UP				$30,400		$56,400	$86,800
17	SAFETY				$15,200		$28,200	$43,400
18	HEALTH PHYSICS S/C				$199,800		$10,800	$210,600
19	CERCLA/SAT	$1,500 PER PERSON				$45,000		$45,000
20	BOND					$57,600		$57,600
21	OVERHEAD & PROFIT					$758,600		$758,600
22	PAYRL BRD.&BENFT.				$1,030,900			$1,030,900
	INDIRECT FIELD COSTS				$1,567,900	$861,200	$2,031,400	$4,460,500
	DIRECT & INDIRECT FIELD COSTS				$3,013,400	$2,683,400	$4,521,200	$10,218,000
23	TRANSPORTATION & BURIAL					$187,100		$187,100
24	WASTE CONTAINERS						$6,400	$6,400
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$198,700		$198,700
25	SCREENING & CONFIRMATION TESTING					$2,692,600		$2,692,600
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$2,380,800			$2,380,800
	FERMCO FIELD SUPPORT COSTS				$2,380,800	$3,078,400	$6,400	$5,465,600
28	EMISSION MODELING				$17,900		$33,200	$51,100
29	PSAR/FSAR(SAFETY RPT)				$306,500			$306,500
30	ENGINEERING	TITLE I&II $1,389,600 TITLE III	$1,583,800	CDR	$510,900	DCR	$296,300	$3,780,600
	ENGINEERING COSTS							$4,138,200
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$4,567,200	$274,000
	SUB-TOTAL	(BASE ESTIMATE)						$20,095,800
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	23.0%						$4,622,000
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$24,717,800
35	CONTINGENCY	8.0%						$1,607,700
								PRELIMINARY
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$26,325,500

LOTUS31\FS2\ALT5A\SF\INDSUM.WK3 FEASABILITY STUDY

001358

DATE: 11-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940734

ALT-5A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC EXPANDED TRESPASSER

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.2

TASK I.D.: 2CSF 5861

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	• NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			•	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	74	$950	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	74	$1,780	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	74	$380	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	74	$410	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	74	$440	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	74	$270	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	74	$5,180	C/B		
SUB-TOTAL		31.80	4		$9,410			
					$127.16	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	8		$100	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	4		$90	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	4		$700	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$1,370			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$10,800			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE.
COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

DATE: 11-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940734

ALT-5A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
EXPANDED TRESPASSER

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.2

TASK I.D. : 2CSF

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	30	120	$16.97	$2,040		
ANNUAL PHYSICALS	1	3	30	90	$16.97	$1,530		
EXIT (TERMINATION) PHYSICALS	1	4	30	120	$16.97	$2,040		
SUB-TOTAL						$5,610		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	23	1	30	698	$16.97	$11,850		
YEARLY IN-VIVO	1	4	30	120	$16.97	$2,040		
EXIT (END OF PROJECT / TERMINATION)	1	4	30	120	$16.97	$2,040		
SUB-TOTAL						$15,930		
WORK DELAYS CAUSED BY MONITORING	5%				$1,782,700	$89,135		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$1,782,700	$89,135		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$199,800	$10,800	$210,600

001360

5861

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT –ALT-5A, SF – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CSF

WBS NO. – 1.1.1.1.2.3.2
EST. NO. – C2940734
BY – K. KEPLER
DATE – 08/11/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25-Mar-94	01-Jun-96	16-May-97	30-Apr-98	23	MONTHS

EST.DATE TO MID-POINT OF ACTIVITY	
38	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940734
BY KEN KEPLER
DATE 11–Aug–94
TASK ID 2CSF

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR) CAR	LINER	COVER	CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE TONS/CY	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS 141 $60.15 PER TON (90 TON MIN.) TONS	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	$120 DEMURAGE $/DAY (>5 DAYS)	ENVIROCARE BURIAL COSTS (1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045
	$0	$400	$395	$340	LEAD/SOIL	1.810	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 125, 141, or 200 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

F-6-116

001362

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940734
BY KEN KEPLER
DATE 11–Aug–94
TASK ID 2CSF

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C – D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0
	LEAD/SOIL	1.810	134.00	1971.0	196,000	0	196,000	1462.7	54.2

INPUT

F-6-117

001363

5861

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940734
BY KEN KEPLER
DATE 11–Aug–94
TASK ID 2CSF

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	0.0	0	$23,816	$0	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	0.0	0	$24,180	$0	$493.47		
	LEAD/SOIL	54.20	396.0	8	$24,180	$193,400	$446.13		
						**			

INPUT

** NOTE:
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

001364

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		4,856						$83,540	$15,000	$60,310	$97,010	$255,860
DECONTAMINATION FACILITIES/SERVICES	1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210
EROSION AND SEDIMENT CONTROLS	1	LS		1428						$26,380		$8,320	$47,700	$82,400
PERCHED GROUNDWATER SYSTEM	N/A	LS												N/A
EXCAVATE – OFFSITE DISPOSAL (REMOVE LEAD/SOIL FROM FIRING RANGE)	1	LS		77						$1,310	$229,730	$1,750		$232,790
LOAD/HAUL – OFF–SITE DISPOSAL (LEAD/SOIL FROM FIRING RANGE)	1	LS		79						$1,360		$1,880		$3,240
EXCAVATE & HAUL TO ON–SITE DISPOSAL (Onsite)	1	LS		17993						$305,690		$271,970	$114,250	$691,910
COMPOSITE LINER	1	LS		24437						$415,430	$693,420	$566,270	$939,640	$2,614,760
COMPOSITE CAP	1	LS		6087						$103,290	$121,440	$147,930	$322,460	$695,120
DIKE FOR DISPOSAL CELL	1	LS		12696						$215,440	$37,090	$264,680	$465,250	$982,460
GENERATED WASTE REMOVAL	1	LS		2853						$48,410		$27,670		$76,080
SITE RESTORATION	1	LS		6351						$107,780		$252,170	$271,620	$631,570
MONITORING WELLS	1	LS									$534,000			$534,000
SUB–TOTAL (DIRECT FIELD COSTS)				77158						$1,314,120	$1,656,570	$1,604,270	$2,263,440	$6,838,400
TAKE–OFF ALLOWANCE 10%	1	LS		7,716						$131,410	$165,660	$160,430	$226,340	$683,840
TOTAL (DIRECT FIELD COSTS)	1	LS		84,874						$1,445,500	$1,822,200	$1,764,700	$2,489,800	$7,522,200

On–Site Disposal of South Field – w/Off–site Option – SUMMARY

PAGE 1 of 22

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FEMP-OU02-5 DRAFT
August 24, 1994

001365

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST.NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 20% ARE COMMON TO ALL SUB–UNITS)														
(ITEMS @ 33.3% ARE COMMON TO SF, AFP & IFP)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	3400	LF	0.213	934	16.97				6.25	$15,850			$21,890	$37,740
c. Clear and Grub														
i. Remediation Site	15.00	AC	41.40	801	16.97			2575.00		$13,590		$39,780		$53,370
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Staging Area @ Sub–unit														
d. Dewatering														
i. Excavate Dewatering Trench	500	CY	0.50	323	16.97			1.49		$5,480		$770		$6,250
ii. Pump – w/4" Suction Hose	200	DAYS	3.00	774	16.97			19.55		$13,130		$4,030		$17,160
iv. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip	2	CY	4.00	10	16.97			100.00		$170		$210		$380
e. General Grading														
i. New Roads	5778	SY	0.001	7	16.97			0.07		$120		$420		$540
33.3%														
ii. Office/Parking Area 2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area 272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area 49	16	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub–Unit 2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	5778	SY	0.030	224	16.97			1.08	6.66	$3,800		$6,430	$39,640	$49,870
33.3%														
ii. Office/Parking – 8" Gravel W/ Geot 2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc.Slab 2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk. 631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" thl 24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub–grade Piping – 4" 500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating 2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab 183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip. 1	0.33	LS	2.00	1	16.97			184.00		$20		$60		$80
TOTAL (SITE PREPARATION)	1	LS		4,856						$83,540	$15,000	$60,310	$97,010	$255,860

Site Preparation Details

F-6-120
001366
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]21
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	33.3%														
a. Decon Trailer – Rental	51	17	MO					1500.00				$25,470			$25,470
	33.3%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'i.d.x 25lfx8	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in con	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
x. Backfill & Compaction around concrete slab	BCY 258	103	ICY	0.086	11	16.97			1.38		$190		$150		$340
SUB–TOTAL (EQUIP. DECON. FACILITY)					265						$4,810	$25,860	$1,210	$4,140	$36,020

Equipment Decon. Facility Details

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FEMP-OU02-5 DRAFT
August 24, 1994

001367

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D. 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	33.3%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Gua	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in (	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	0	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210

Personnel Decon.Facilities/Services Details

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001368

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	2000	LF	0.017	44	16.97			0.06	0.65	$750		$120	$1,340	$2,210
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	500	EA	0.24	155	16.97			1.53	1.35	$2,630		$790	$700	$4,120
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. Sedimentation/Decon. Tank 13000 gal	1	LS	40.00	52	19.95			140.00	5500.00	$1,040		$140	$5,500	$6,680
iv. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1200	LF	0.38	590	19.95			5.11	4.42	$11,770		$6,130	$5,300	$23,200
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	3	EA	8.00	31	16.97			28.00	8300.00	$530		$80	$24,900	$25,510
vi. 50 gal. Pump Includes Controls & Electrical	2	EA	60.00	155	16.97			210.00	2500.00	$2,630		$420	$5,000	$8,050
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,428						$26,380		$8,320	$47,700	$82,400

001369

5861

Erosion Control Details

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F-6-123

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
OFF–SITE DISPOSAL														
Excavate Lead Contaminated Soil at Firing Range														
Excavate	300	BCY	0.20	77	16.97			5.65		$1,310		$1,750		$3,060
Solidification of lead cont.soil w/Portland Cement														
30% Portland Cement, 2% Sodium Silicate in drums. 300 CY @ 1.5 Tons =	450	TONS					510.50				$229,730			$229,730
TOTAL (EXCAVATE OFFSITE DISPOSAL)	1	LOT		77						$1,310	$229,730	$1,750		$232,790

Excavate – Offsite Disposal Details

PAGE 6 of 22

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001370

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
LOAD & HAUL														
OFF–SITE DISPOSAL														
Lead Removal at Firing Range														
HAUL														
From excavation site to rail loading facility														
6 CY dump truck 1/2 mi rt.														
Solidified lead/soil/cement	396	LCY	0.04	21	16.97			1.65		$360		$670		$1,030
LOADING GONDOLA														
Solidified lead/soil/cement LCY														
Excav. 300 BCY x 1.25 swell factor = 396														
Allowable CY's of waste per Gondola 54.2														
Install Liner in Gondola car														
Solidified lead/soil/cement	8	EA	0.75	8	16.97			32.21		$140		$260		$400
Load Gondola – 6/day, 2 workers	1	DAYS	16.00	28	16.97			15.00		$480		$20		$500
Seal liner, Install Cover														
Solidified lead/soil/cement	8	EA	0.75	8	16.97			32.21		$140		$260		$400
Dust control – light	1	DAYS	8.00	14	16.97			500.00		$240		$670		$910
(RSO takes ownership at this time.)														
(See: Off–Site Disposal Wksht. & App.E)														
TOTAL (LOAD & HAUL – OFFSITE DISPOSAL	1	LOT		79						$1,360		$1,880		$3,240

001371

Load & Haul – Offsite Disposal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
LOAD & HAUL TO ON–SITE DISPOSAL CELL														
(NO TREATMENT)														
Excavate Contaminated Soil														
Excavate and Load – Level D	77100	BCY	0.055	5470	16.97			1.17		$92,830		$92,910		$185,740
Excavate Additional Soil	7800	BCY	0.055	553	16.97			1.17		$9,380		$9,400		$18,780
Haul to Onsite Disposal Cell BCY														
– 12" thk. Cushion Layer 7167	8959	LCY	0.081	936	16.97			1.51		$15,880		$13,930		$29,810
– Impacted Fill 77733	97166	LCY	0.081	10153	16.97			1.51		$172,300		$151,120		$323,420
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load – Level C	500	BCY	0.055	35	16.97			1.17		$590		$600		$1,190
Haul to Onsite Disposal Cell BCY 500	625	LCY	0.081	65	16.97			1.51		$1,100		$970		$2,070
			S/T	100										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	100	HRS	150%	150	16.97			1.51		$2,550		$160		$2,710
			S/T	250										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	25	MD												
(SHREDDING COMMON TO SWL, IFP & SF)														
k. Shredder/Crusher – Purchase/Install 33.3%	0.3	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY 6500														
Generated Waste BCY 5217														
Excavated Debris TONS 10359														
(Percent of Gen.Waste to be Shredded 18%														
Generated Waste TONS 1497														
TOTAL TONS 11856														
Operating Costs	198	HRS							25.75				$5,250	$5,250
(2) Operators	396	HRS	1.00	511	16.97					$8,670				$8,670
TOTAL (EXCAV/NO TREATMENT–ONSITE DISPOSAL)	1	LOT		17,993						$305,690		$271,970	$114,250	$691,910

Excavate – No Treatment – South Field Onsite Disposal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.[redacted] 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP.)															
a. Clear and Grubb	20%														
i. Disposal Cell & Surrounding area	35	7.0	AC	41.40	374	16.97			2575.00		$6,350		$18,570		$24,920
b. Relocated South Access Road	20%														
i. Clear & Grub	3	0.6	AC	41.40	32	16.97			2575.00		$540		$1,590		$2,130
ii. General Grading	1467	293.4	SY	0.001		16.97			0.07				$20		$20
iii. Road – 8" Gravel W/Geotextile	7333	1466.6	SY	0.030	57	16.97			1.08	6.66	$970		$1,630	$10,060	$12,660
c. Haul Road	20%														
i. Clear & Grub	2.4	0.5	AC	41.40	26	16.97			2575.00		$440		$1,270		$1,710
ii. General Grading	11556	2311.2	SY	0.001	3	16.97			0.07		$50		$170		$220
iii. Road – 8" Gravel W/Geotextile	5778	1155.6	SY	0.030	45	16.97			1.08	6.66	$760		$1,290	$7,930	$9,980
	20%														
d. Temporary Construction Fencing	5200	1040.0	LF	0.213	286	16.97				6.25	$4,850			$6,700	$11,550
e. 20' wide Swing Gates	1	0.2	EA	25.60	7	16.97			340.00	560.00	$120		$70	$120	$310
f. Staging Area @ Cell	20%														
Area Excavation for Slab	1606	321.2	BCY	0.016	7	16.97			0.60		$120		$200		$320
Sub–Base for Slab	2845	569.0	SY	0.041	30	16.97		6.75	1.45	5.51	$510	$3,960	$850	$3,230	$8,550
HDPE Perf.Sub–grade Piping – 4"	500	100.0	LF	0.21	27	16.97			0.74	3.02	$460		$80	$310	$850
Concrete Slab – 160'x160'x8" thk	631	126.2	CY	4.07	663	17.98			14.25	67.00	$11,920		$1,850	$8,710	$22,480
Concrete Curb – 480'x2'x8" thk	24	4.8	CY	15.30	95	17.98			11.16	275.90	$1,710		$60	$1,360	$3,130
Epoxy Coating	2845	569.0	SY	0.22	161	16.97			0.77	7.56	$2,730		$450	$4,430	$7,610
Backfill & Compact around Slab	183	36.6	ICY	0.086	4	16.97			1.38				$50		$50
Mob/Demob.Equip.	1	0.2	LS	2.00	1	16.97			184.00		$20		$40		$60
g. Storage Area – 200' x 200' Asphalt															
Includes Compacted Sub–Grade	4444	889	SY	0.084	96	16.97			2.56	14.04	$1,630		$2,340	$12,850	$16,820
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat															
	20%														
h. Decon Trailer – Rental	51	10	MO					1500.00				$15,760			$15,760
i. Const.Equipment Decon. Facility	20%														
25 ft x 60 ft	1	0.20	LS	730.00	146	18.05		1160.00	2900.00	11980.00	$2,640	$240	$580	$2,400	$5,860
j. Personnel Decon. Facility	20%														
11'x 11'	1	0.20	LS	108.00	22	18.89		100.00	360.00	4120.00	$420	$20	$70	$820	$1,330
SUB–TOTAL (COMPOSITE LINER –SITE PREP)		1	LOT		2,082	17.41					$36,240	$19,980	$31,180	$58,920	$146,320

Composite Liner – Site Prep. – South Field Onsite Disposal Details

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001373
FEMP-OU02-5 DRAFT August 24, 1994
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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (CON'T.)														
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.														
COMPOSITE LINER														
a. Subgrade Preparation – includes removal of top soil, grading & comp.	21717	SY	0.024	672	16.97			0.86		$11,400		$19,240		$30,640
BCY														
b. 95% Clay – 5% Bentonite 36" Thk 21717	25626	ICY	0.260	8595	16.97			11.19	20.35	$145,860		$295,360	$537,140	$978,360
c. Composite Clay Liner	21717	SY					7.38				$160,270			$160,270
d. HDPE Liner 60 mil	21717	SY					4.75				$103,160			$103,160
e. Geotextile Fabric	21717	SY					2.25				$48,860			$48,860
f. Pea Gravel 12" Thk; In–place 7167	7705	ICY	0.11	1093	16.97			0.77	17.00	$18,550		$6,110	$134,910	$159,570
g. Composite Clay Liner	21717	SY					7.38				$160,270			$160,270
h. HDPE Liner 60 mil	21717	SY					4.75				$103,160			$103,160
i. Geotextile Fabric	21717	SY					2.25				$48,860			$48,860
BCY														
j. Pea Gravel 12" Thk; In–place 7167	7705	ICY	0.11	1093	16.97			0.77	17.00	$18,550		$6,110	$134,910	$159,570
k. Geotextile Fabric	21717	SY					2.25				$48,860			$48,860
l. HDPE Perforated Pipe – leachate collection 6" Dia.	1260	LF	0.30	488	16.97			1.05	6.56	$8,280		$1,360	$8,510	$18,150
m. HDPE Perforated Pipe – leak detection 6" Dia.	1260	LF	0.30	488	16.97			1.05	6.56	$8,280		$1,360	$8,510	$18,150
n. Leachate Discharge Piping														
i. HDPE Carrier & containment Pipe 6" x 10" Includes Trench Excav/Backfill, sand bedding and compaction.	980	LF	0.86	1087	16.97			11.37	22.33	$18,450		$11,480	$22,540	$52,470
ii. HDPE Manhole – 4' dia. x 8' deep	4	EA	8.00	41	16.97			28.00	8300.00	530.00		$120	$34,200	$34,850
BCY														
o. Impacted Fill–Cusion Layer 12" Thk 7167	8959	LCY	0.06	693	16.97			1.67		$11,760		$15,410		$27,170
BCY														
p. Impacted Fill–Spread and Compact 77733	97166	LCY	0.06	7521	16.97			1.67		$127,630		$167,140		$294,770
BCY														
q. Generated Waste 5217	6000	LCY	0.06	464	16.97			1.67		$7,870		$10,320		$18,190
PPE LEVEL C Allowance is added to the following BCY														
r. Impacted fill 500	625	LCY	0.06	48	16.97			1.67		$810		$1,080		$1,890
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	48	HRS	150% S/T	72	16.97					$1,220				$1,220
				120										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	12	MD												
SUB–TOTAL (COMPOSITE LINER)	1	LOT		22,355						$379,190	$673,440	$535,090	$880,720	$2,468,440
TOTAL (COMPOSITE LINER)	1	LOT		24,437						$415,430	$693,420	$566,270	$939,640	$2,614,760

Composite Liner Details

001374

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FEMP-OU02-5 DRAFT August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE CAP														
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .														
COMPOSITE CAP														
a. Contouring Layer 18" Thk. BCY 3707	4448	ICY	0.06	344	16.97			1.67	3.50	$5,840		$7,650	$16,040	$29,530
b. 95% Clay – 5% Bentonite 24" Thk BCY 4968	5341	ICY	0.260	1791	16.97			11.19	20.35	$30,390		$61,550	$111,940	$203,880
c. GML\GCC – composite Liner	7415	SY					7.38				$54,720			$54,720
d. Geotextile Fabric	7415	SY					2.25				$16,680			$16,680
e. Pea gravel 12" Thk, In–place BCY 2447	2631	ICY	0.11	373	16.97			0.77	17.00	$6,330		$2,090	$46,060	$54,480
f. Geotextile Fabric	7415	SY					2.25				$16,680			$16,680
g. Cobbels 36" Thk; In–place BCY 7415	7971	ICY	0.258	2653	16.97			7.15	10.10	$45,020		$58,700	$82,920	$186,640
h. Geotextile Fabric	7415	SY					2.25				$16,680			$16,680
i. Sand Layer 6" Thk; In–place BCY 1261	1356	ICY	0.052	91	16.97			1.76	5.00	$1,540		$2,460	$6,980	$10,980
j. Geotextile Fabric	7415	SY					2.25				$16,680			$16,680
k. Common Soil 21" Thk; In–place BCY 4301	5161	ICY	0.06	399	16.97			1.67	3.50	$6,770		$8,880	$18,610	$34,260
l. Top Soil 6" Thk; In–place BCY 1261	1513	ICY	0.053	103	16.97			1.82	12.10	$1,750		$2,840	$18,860	$23,450
m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding SY 7415	67	MSF	0.30	26	16.97			6.75	25.00	$440		$470	$1,730	$2,640
n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized	1400	LF	0.17	307	16.97			2.28	13.40	$5,210		$3,290	$19,320	$27,820
TOTAL (COMPOSITE CAP)	1	LOT		6,087						$103,290	$121,440	$147,930	$322,460	$695,120

Composite Cap Details

001375

F-6-129

FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

	DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	DIKE FOR DISPOSAL CELL															
	Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
	a. Borrow Common Soil – Dike	BCY 56482	67778	ICY	0.06	5246	16.97			1.67	3.50	$89,020		$116,590	$244,340	$449,950
	b. Geotextile Fabric		16483	SY					2.25				$37,090			$37,090
	c. Cobbels 36" Thk; In–place	BCY 16483	19780	ICY	0.258	6583	16.97			7.15	10.10	$111,710		$145,670	$205,770	$463,150
	d. Drainage Piping – HDPE	6" Dia.	2240	LF	0.30	867	16.97			1.05	6.56	$14,710		$2,420	$15,140	$32,270
	TOTAL (DIKE – DISPOSAL CELL)		1	LOT		12,696						$215,440	$37,090	$264,680	$465,250	$982,460

Dike Details

FEMP-OU02-5 DRAFT
August 24, 1994

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CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL															
a. Office/Parking Area @ S/U	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo–Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Facil.@ S/U	33%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo–Fabric & Liner	167	56	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Facil. @ S/U	33%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292					9.16				$10		$10
Geo–Fabric & Liner	14	5	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
d. Staging pad @ S/U	33.3%														
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo–Fabric & Liner 105 cy	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	395.5	132	BCY	0.30	51	16.97			2.51		$870		$340		$1,210
	20%														
e. Const.Equip.Decon.Facil. @ Onsite Disp.Cell															
Demo/Remove Concrete	49.3	10	BCY	1.2	15	16.97			3.62		$250		$40		$290
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	6	BCY	0.292	2	16.97			9.16		$30		$50		$80
Geo–Fabric & Liner	167	33	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	5	EA	0.48	3	16.97			1.68		$50		$10		$60
Splash Guard	702	140	SF	0.04	7	16.97			0.03		$120				$120
Haul & Dump Rubble	24.9	5	BCY	0.30	2	16.97			2.51		$30		$10		$40
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		622						$10,540		$4,710		$15,250

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT August 24, 1994

5864

001377

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.) Demo. /Load/Haul/Dump/Compact															
	20.0%														
f. Personnel Decon. Facil.@ Onsite Disp. Cell															
Demo/Remove Concrete	2.2	0.44	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	0.48	BCY	0.292		16.97			9.16						
Geo–Fabric & Liner	14	3	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	6	1	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	26	SF	0.04	1	16.97			0.03		$20				$20
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
	20.0%														
g. Relocated South Access Road/Cell	SY														
Road – 8" Gravel W/Geotextile	7333	1467	BCY	0.292	552	16.97			9.16		$9,370		$13,840		$23,210
Haul & Dump Rubble		1467	BCY	0.30	568	16.97			2.51		$9,640		$3,790		$13,430
	20.0%														
h. Haul Road for Cell	SY														
Road – 8" Gravel W/Geotextile	5778	257.0	BCY	0.292	97	16.97			1.08		$1,650		$290		$1,940
Haul & Dump Rubble		257.0	BCY	0.30	99	16.97			2.51		$1,680		$660		$2,340
	20.0%														
i. Temporary Construction Fencing @ Cell	5200	1040.0	LF	0.107	143	16.97					$2,430				$2,430
Haul & Dump Rubble		135.0	BCY	0.30	52	16.97			2.51		$880		$350		$1,230
	20.0%														
j. 20' wide Swing Gates @ Cell	2	0.40	EA	12.75	7	16.97			340.00		$120		$140		$260
Haul & Dump Rubble		0.05	BCY	0.30		16.97			2.51						
	20.0%														
k. Storage Pad Area @ Cell	BCY														
Demo/Remove Asphalt	988	197.6	BCY	1.2	306	16.97			3.62		$5,190		$740		$5,930
Excav., Load, Haul, Backfill, Compac	474.0	94.8	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Sub–grade Stone															
Geo–Fabric & Liner	4444	888.8	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble		197.0	BCY	0.30	76	16.97			2.51		$1,290		$510		$1,800
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,942						$32,970		$21,230		$54,200

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

001378

CONTR.NO. – [redacted]321
CLIENT – [redacted]DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.) Demo. /Load/Haul/Dump/Compact															
The following prorated at:	20.0%														
I. Staging Area @ On–Site Disposal Cell															
Demo/Remove Concrete	655	131.0	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excav., Load, Haul, Backfill, Compact Sub–grade Stone	475	95.0	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo–Fabric & Liner 105 cy	2845	569.0	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	395.5	126.0	BCY	0.30	49	16.97			2.51		$830		$330		$1,160
TOTAL GENERATED WASTE	BCY 5217 LCY 6000														
SUB– TOTAL (GENERATED WASTE REMOVAL)		1	LOT		289						$4,900		$1,730		$6,630
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		2,853						$48,410		$27,670		$76,080

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

5861

001379

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
South Field	5000	6000	ICY	0.09	697	16.97			3.21	3.50	$11,830		$19,840	$21,630	$53,300
	33.3%														
Office/Parking	494	197	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	31	ICY												
Decon.Facil.– Personnel @ S/U	7	3	ICY												
Staging Area @ S/U	1099	439	ICY												
	S/T	670.5	ICY	0.09	78	16.97			3.21	3.50	$1,320		$2,220	$2,420	$5,960
	20%														
Staging Area at On–Site Disp.Cell	1099	264	ICY												
Storage Area at On–Site Disp.Cell	474	114	ICY												
Decon.Facil.– Const.Equip. @ Cell	78	19	ICY												
Decon.Facil.– Personnel @ Cell	7	2	ICY												
Relocated South Access Road	1628	391	ICY												
Haul Road	1283	308	ICY												
	S/T	1096.6	ICY	0.09	127	16.97			3.21	3.50	$2,160		$3,630	$3,950	$9,740
b. Final Grade for SF		62920	SY	0.02	1623	16.97			0.70		$27,540		$45,370		$72,910
c. Borrow Top Soil 6" Thk., Spread															
South Field		62920	SY	0.036	2922	16.97			2.33	2.88	$49,590		$151,000	$186,650	$387,240
	33.3%														
Office/Parking	2222	740	SY												
Decon.Facil.– Const.Equip. @ S/U	167	56	SY												
Decon.Facil.– Personnel @ S/U	14	5	SY												
Staging Area @ S/U	2845	947	SY												
	S/T	1747.6	SY	0.036	81	16.97			2.33	2.88	$1,370		$4,190	$5,180	$10,740
	20%														
Staging Area at On–Site Disp.Cell	2845	683	SY												
Storage Area at On–Site Disp.Cell	4444	1067	SY												
Decon.Facil.– Const.Equip. @ Cell	167	40	SY												
Decon.Facil.– Personnel @ Cell	14	3	SY												
Relocated South Access Road	14667	3520	SY												
Haul Road	11556	2773	SY												
	S/T	8086.3	SY	0.036	376	16.97			2.33	2.88	$6,380		$19,410	$23,990	$49,780
SUB–TOTAL (SITE RESTORATION)		1	LOT		5,904						$100,190		$245,660	$243,820	$589,670

Site Restoration Details

F-6-134
001380
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT-5A – SF – ON-SITE DISPOSAL w/OFF-SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION (CON'T.)															
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
South Field	62920	566	MSF	0.30	219	16.97			6.75	25.00	$3,720		$3,940	$14,570	$22,230
	33.3%														
Office/Parking	2222	6.7	MSF												
Decon.Facil.– Const.Equip. @ S/U	167	0.5	MSF												
Decon.Facil.– Personnel @ S/U	14		MSF												
Staging Area @ S/U	2845	8.5	MSF												
	S/T	15.7	MSF	0.30	6	16.97			6.75	25.00	$100		$110	$400	$610
	20%														
Staging Area at On-Site Disp.Cell	2845	5.1	MSF												
Storage Area at On-Site Disp.Cell	4444	8.0	MSF												
Decon.Facil.– Const.Equip.@ Cell	167	0.3	MSF												
Decon.Facil.– Personnel @ Cell	14		MSF												
Relocated South Access Road	14667	26.4	MSF												
Haul Road	11556	20.8	MSF												
	S/T	60.6	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,560	$2,370
e. Security Fence – 6ga aluminized – 6' high		1080	LF	0.13	178	16.97			1.64	9.80	$3,020		$1,820	$10,900	$15,740
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
SUB-TOTAL (SITE RESTORATION)		1	LOT		447						$7,590		$6,510	$27,800	$41,900
TOTAL (SITE RESTORATION)		1	LOT		6,351						$107,780		$252,170	$271,620	$631,570

Site Restoration Details

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FEMP-OU02-5 DRAFT
August 24, 1994

5861

001381

F-6-135

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility	7	PR					23000.00				$161,000			$161,000
a. MW at SF – Type I & II	10	PR					23000.00				$230,000			$230,000
c. Abandon Existing Wells	11	EA					13000.00				$143,000			$143,000
TOTAL (MONITORING WELLS)	1	LOT									$534,000			$534,000

Monitoring Wells Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-6-136

001382

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.[redacted] 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO															
PURCHASE															
Bulk Gondola Rail Car	N/A	0	EA												
Liner for Gondola															
Excavated Waste – level C,D & Additio	N/A		EA							400.00					
Excavated Waste – lead/soil		8	EA							400.00				$3,200	$3,200
Generated Waste	N/A		EA							400.00					
Cover for Gondola															
Excavated Waste – level C,D & Additio	N/A		EA							395.00					
Excavated Waste – lead/soil		8	EA							395.00				$3,160	$3,160
Generated Waste	N/A		EA							395.00					
(Also See Appendix E)															
TOTALS FORWARD TO ESTIMATE SUMMARY No.24															
TOTAL (PURCHASE COSTS – FERMCO)		1	LOT											$6,400	$6,400

001383

Purchase Waste Container Details

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F-6-137

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF–SITE TRANSPORTATION COSTS TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas	8	EA					340.00				$2,720			$2,720
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additio N/A		EA					22681.00							
Excavated Waste – lead/soil	8	EA					23045.00				$184,360			$184,360
Generated Waste N/A		EA					23045.00							
(Also See Appendix E)														
TOTALS FORWARD TO ESTIMATE SUMMARY No.23														
TOTAL (OFF–SITE TRANSPORT. COSTS – FERMCO)	1	LOT									$187,100			$187,100

001384

F-6-138

FEMP-OU02-5 DRAFT
August 24, 1994

ENVIROCARE Transportation Details

PAGE 20 of 22

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	165000	GAL					0.01				$1,700			$1,700
Runnoff from the Exclusion Zone.	19700000	GAL					0.01				$197,000			$197,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$198,700			$198,700

Waste Water Treatment Operations Cost Details

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FEMP-OU02-5 DRAFT
August 24, 1994

5881

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940734
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

	DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	SCREENING & CONFIRMATION TESTING														
	Excavation														
	Full TCLP	427	EA					2,002				$854,800			$854,900
	Rad	427	EA					2,000				$854,000			$854,000
	Confirmatory Tests														
	Full Rad Tests	214	EA					3,101				$663,600			$663,600
	Full HSL	20	EA					1,500				$30,000			$30,000
	Full TCLP	20	EA					2,000				$40,000			$40,000
	2 Technicians per Month	19	MO					13,163				$250,100			$250,100
	TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
	TOTAL (SCREENING/CONFIRMATION TESTS)	1	LOT									$2,692,600			$2,692,600

Screening & Confirmation Testing Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-6-140

001386

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940734
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$20,095,800	BASE EST:	$91,890	BASE EST:	$16,500	BASE EST:	$106,710	BASE EST:	$6,040	BASE EST:	$28,480	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	30%	-5%	20%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	30%	-5%	20%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$87,296	$119,457	$15,675	$21,450	$101,375	$128,052	$5,919	$10,872	$26,771	$51,264	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-6-141

001387

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–5A, SF – EXCAV. & ON–SITE DISPL. w/OFF–SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940734
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$29,020	BASE EST:	$0	BASE EST:	$52,470	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%										
MATERIAL PRICING					–5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	0%	0%	–5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$27,569	$43,530	$0	$0	$49,847	$68,211	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-6-142

001388

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, SF -- EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940734
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSF

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$1,440	BASE EST:	$252,700	BASE EST:	$0	BASE EST:	$1,500	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	100%					-5%	100%				
MATERIAL PRICING			-5%	50%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-5%	50%	-5%	50%			-5%	50%				
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	150%	-10%	100%	0%	0%	-10%	150%	0%	0%	0%	0%
TOTAL $	$1,354	$3,600	$227,430	$505,400	$0	$0	$1,350	$3,750	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-6-143

001389

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940734
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSF

	EXCAV/SORT/CRUSH ONSITE DISPOSAL LABOR $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL S/C $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$336,260	BASE EST:	$0	BASE EST:	$125,680	BASE EST:	$456,970	BASE EST:	$762,760	BASE EST:	$1,033,560
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	100%					-5%	50%				
MATERIAL PRICING					-1%	50%			-5%	50%	-5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%			-1%	50%	-1%	50%	-1%	50%	-1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	150%	0%	0%	-2%	100%	-6%	100%	-6%	100%	-6%	80%
TOTAL $	$316,084	$840,650	$0	$0	$123,166	$251,360	$429,552	$913,940	$716,994	$1,525,520	$971,546	$1,860,408

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, SF – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940734
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		DIKE LABOR $'s		DIKE S/C $'s		DIKE MAT'L. $'s	
	BASE EST:	$113,620	BASE EST:	$133,580	BASE EST:	$354,710	BASE EST:	$236,980	BASE EST:	$40,800	BASE EST:	$511,780
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-5%	50%				
MATERIAL PRICING			-5%	50%	-5%	30%			-5%	50%	-5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%	-5%	50%	-1%	50%	-1%	50%	-1%	50%	-1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	100%	-10%	100%	-6%	80%	-6%	100%	-6%	100%	-6%	80%
TOTAL $	$106,803	$227,240	$120,222	$267,160	$333,427	$638,478	$222,761	$473,960	$38,352	$81,600	$481,073	$921,204

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-6-145

001391

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940734
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$53,250	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-1%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-1%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$52,718	$79,875	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940734
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$118,560	BASE EST:	$0	BASE EST:	$298,780	BASE EST:	$0	BASE EST:	$587,400	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$112,632	$154,128	$0	$0	$283,841	$388,414	$0	$0	$558,030	$881,100	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001393

1861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940734
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSF

	INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS	
	LABOR $'s		S/C $'s		MAT'L. $'s		LABOR $'s		S/C $'s		MAT'L. $'s	
	BASE EST:	$1,567,900	BASE EST:	$861,200	BASE EST:	$2,031,400	BASE EST:	$2,380,800	BASE EST:	$3,078,400	BASE EST:	$6,400
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-10%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-5%	50%	-5%	50%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-10%	30%	-5%	50%	-5%	50%
TOTAL $	$1,489,505	$2,351,850	$818,140	$1,722,400	$1,929,830	$3,047,100	$2,142,720	$3,095,040	$2,924,480	$4,617,600	$6,080	$9,600

RISK PROFILE & CORRELATION FOR	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
EACH COST ELEMENT	U		U		U		U		U		U	

001394

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, SF -- EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940734
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CSF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$4,138,200	BASE EST:	$274,000	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-10%	25%										
(OTHER)												
TOTAL %	-10%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$3,724,380	$5,172,750	$271,260	$276,740	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-6-149

001395

FEMP-OU02-5 DRAFT
August 24, 1994

F ERMC O
ESTIMATING SERVICES

SUMMARY SHEET

EST FILE #: C2940735
CLIENT: US DOE
PROJECT TITLE: ALT-5A, AFP - EXCAV.& ON-SITE DISPOSAL
WBS#: 1.1.1.1.2.3.4 EXPANDED TRESPASSER

DATE: 11-Aug-94
ESTIMATOR: KEN KEPLER
LOCATION: FERNALD
TASK#: 2CAF

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL	71,070		$1,210,700	$1,240,800	$1,978,900	$4,430,400
		NO TREATMENT - COMPOSITE LINER, CAP, DIKE						
2		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		71,070		$1,210,700	$1,240,800	$1,978,900	$4,430,400
11	SUPERVISION - CONTRACTOR				$206,000			$206,000
12	SM TOOLS/CONSM'BLS						$72,600	$72,600
13	EQUIPMENT RENTAL						$1,431,000	$1,431,000
14	TEMP. FACILITIES				$25,400		$47,200	$72,600
15	TEMP UTL'S HOOK-UP				$12,700		$23,600	$36,300
16	JOB CLEAN-UP				$25,400		$47,200	$72,600
17	SAFETY				$12,700		$23,600	$36,300
18	HEALTH PHYSICS S/C				$166,900			$166,900
19	CERCLA/SAT	$1,500 PER PERSON				$36,000		$36,000
20	BOND					$44,300		$44,300
21	OVERHEAD & PROFIT					$594,500		$594,500
22	PAYRL BRD.&BENFT.				$863,100			$863,100
	INDIRECT FIELD COSTS				$1,312,200	$674,800	$1,645,200	$3,632,200
	DIRECT & INDIRECT FIELD COSTS				$2,522,900	$1,915,600	$3,624,100	$8,062,600
23	TRANSPORTATION & BURIAL	N/A						
24	WASTE CONTAINERS	N/A						
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$12,000		$12,000
25	SCREENING & CONFIRMATION TESTING					$2,321,100		$2,321,100
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$1,015,900			$1,015,900
	FERMCO FIELD SUPPORT COSTS				$1,015,900	$2,333,100		$3,349,000
28	EMISSION MODELING				$14,100		$26,200	$40,300
29	PSAR/FSAR(SAFETY RPT)				$346,700			$346,700
30	ENGINEERING	TITLE I&II $1,169,100 TITLE III	$1,209,400	CDR	$419,300	DCR	$395,100	$3,192,900
	ENGINEERING COSTS							$3,579,900
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$3,650,300	$219,000
	SUB-TOTAL	(BASE ESTIMATE)						$15,210,500
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	20.0%						$3,042,100
	TARGET ESTIMATE (BASE ESTIMATE PLUS RISK BUDGET)							$18,252,600
35	CONTINGENCY	8.0%						$1,216,800
								PRELIMINARY
	TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY)							$19,469,400

LOTUS31\FS2\ALT5A\AFP\INDSUM.WK3 - FEASABILITY STUDY

DATE: 5861

PROJECT TITLE:
ALT-5A, AFP - EXCAV.& ON-SITE DISPOSAL
WBS#:
1.1.1.1.2.3.4

HEALTH PHYSICS

EXPANDED TRESPASSER

EST.NO.: C2940735
EST. : KEN KEPLER
TASK I.D. :
2CAF

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	0	$0	C/B		
SUB-TOTAL		31.80	4		$0			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	0		$0	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	0		$0	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	0		$0	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	0		$0	C/B		
THERMO STRIPS	EA	50.00	0		$0	C/B		
SUB-TOTAL		327.21			$0			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$0			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE.
COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

001397

DATE: 11-Aug-94

PROJECT TITLE:
ALT-5A, AFP - EXCAV.& ON-SITE DISPOSAL
WBS#:
1.1.1.1.2.3.4

HEALTH PHYSICS

EXPANDED TRESPASSER

EST.NO.: C2940735
EST. : KEN KEPLER
TASK I.D. :
2CAF

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	24	96	$16.97	$1,630		
ANNUAL PHYSICALS	1	3	24	72	$16.97	$1,220		
EXIT (TERMINATION) PHYSICALS	1	4	24	96	$16.97	$1,630		
SUB-TOTAL						$4,480		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	24	1	24	583	$16.97	$9,900		
YEARLY IN-VIVO	1	4	24	96	$16.97	$1,630		
EXIT (END OF PROJECT / TERMINATION)	1	4	24	96	$16.97	$1,630		
SUB-TOTAL						$13,160		
WORK DELAYS CAUSED BY MONITORING	5%				$1,492,900	$74,645		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$1,492,900	$74,645		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$166,900	$0	$166,900

001398

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT –ALT–5A, AFP – EXCAV.& ON–SITE DISPOSAL
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CAF

WBS NO. – 1.1.1.1.2.3.4
EST. NO. – C2940735
BY – K. KEPLER
DATE – 08/11/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25–Mar–94	01–Jun–97	31–May–98	31–May–99	24	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
50	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

001399

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		3,362						$58,190	$15,000	$24,010	$80,280	$177,480
DECONTAMINATION FACILITIES/SERVICES	1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210
EROSION AND SEDIMENT CONTROLS	1	LS		1232						$22,610		$7,180	$37,610	$67,400
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE – OFFSITE DISPOSAL	N/A													N/A
LOAD/HAUL – OFF–SITE DISPOSAL	N/A													N/A
EXCAVATE & HAUL TO ON–SITE DISPOSAL (Onsite)	1	LS		14522						$246,430		$225,480	$930	$472,840
COMPOSITE LINER	1	LS		21079						$358,780	$597,220	$487,830	$801,610	$2,245,440
COMPOSITE CAP	1	LS		5218						$88,540	$104,110	$126,790	$276,350	$595,790
DIKE FOR DISPOSAL CELL	1	LS		10882						$184,660	$31,790	$226,860	$398,770	$842,080
GENERATED WASTE REMOVAL	1	LS		2853						$48,410		$27,670		$76,080
SITE RESTORATION	1	LS		5160						$87,560		$173,760	$197,960	$459,280
MONITORING WELLS	1	LS									$354,000			$354,000
SUB–TOTAL (DIRECT FIELD COSTS)				64609						$1,100,670	$1,128,010	$1,300,900	$1,799,020	$5,328,600
TAKE–OFF ALLOWANCE 10%	1	LS		6,461						$110,070	$112,800	$130,090	$179,900	$532,860
TOTAL (DIRECT FIELD COSTS)	1	LS		71,070						$1,210,700	$1,240,800	$1,431,000	$1,978,900	$5,861,400

On–Site Disposal of Active Flyash Pile – No Treatment – SUMMARY

PAGE 1 of 18

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00400

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted]DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 20% ARE COMMON TO ALL SUB–UNITS)														
(ITEMS @ 33.3% ARE COMMON TO SF, AFP & IFP)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	2000	LF	0.213	550	16.97				6.25	$9,330			$12,880	$22,210
c. Clear and Grub														
i. Remediation Site	2.50	AC	41.40	134	16.97			2575.00		$2,270		$6,630		$8,900
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Staging Area @ Sub–unit														
d. Dewatering														
i. Excavate Dewatering Trench	400	CY	0.50	258	16.97			1.49		$4,380		$610		$4,990
ii. Pump – w/4" Suction Hose	120	DAYS	3.00	464	16.97			19.55		$7,870		$2,420		$10,290
iv. HDPE Pipe to Sedimentation Tank	300	LF	0.19	74	16.97			0.67	0.84	$1,260		$210	$260	$1,730
v. Remove Sediment fm. Tank – 1cy/trip	2	CY	4.00	10	16.97			100.00		$170		$210		$380
e. General Grading														
i. New Roads	4667	SY	0.001	6	16.97			0.07		$100		$340		$440
33.3%														
ii. Office/Parking Area 2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area 272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area 49	16	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub–Unit 2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	4667	SY	0.030	181	16.97			1.08	6.66	$3,070		$5,190	$32,010	$40,270
33.3%														
ii. Office/Parking – 8" Gravel W/ Geotextile 2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc.Slab 2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk. 631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" thl 24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub–grade Piping – 4" 500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating 2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab 183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip. 1	0.33	LS	2.00	1	16.97			184.00		$20		$60		$80
TOTAL (SITE PREPARATION)	1	LS		3,362						$58,190	$15,000	$24,010	$80,280	$177,480

Site Preparation Details

001401

5 881

F-6-155

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940735
BY: KEN KEBLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	33.3%														
a. Decon Trailer – Rental	51	17	MO					1500.00				$25,470			$25,470
	33.3%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'i.d.x 25lfx8	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in con	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
	BCY														
x. Backfill & Compaction around concrete slab	258	103	ICY	0.086	11	16.97			1.38		$190		$150		$340
SUB–TOTAL (EQUIP. DECON. FACILITY)					265						$4,810	$25,860	$1,210	$4,140	$36,020

Equipment Decon. Facility Details

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001402

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	33.3%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Guard	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in conc.	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	0	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210

Personnel Decon.Facilities/Services Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-6-157

001403

1861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	1300	LF	0.017	29	16.97			0.06	0.65	$490		$80	$870	$1,440
ii.Diversion Berms	200	CY	0.24	62	16.97			0.84	7.50	$1,050		$170	$1,500	$2,720
iii. Diversion Ditches	100	CY	0.24	31	16.97			0.84	7.50	$530		$80	$750	$1,360
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	700	EA	0.24	217	16.97			1.53	1.35	$3,680		$1,100	$970	$5,750
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1000	LF	0.38	491	19.95			5.11	4.42	$9,800		$5,110	$4,420	$19,330
iv. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhol W/Cleanout	3	EA	8.00	31	16.97			28.00	8300.00	$530		$80	$24,900	$25,510
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,232						$22,610		$7,180	$37,610	$67,400

Erosion Control Details

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
LOAD & HAUL TO ON–SITE DISPOSAL CELL														
(NO TREATMENT)														
Excavate Contaminated Soil														
Excavate and Load – Level D	65100	BCY	0.055	4619	16.97			1.17		$78,380		$78,450		$156,830
Excavate Additional Soil	6500	BCY	0.055	461	16.97			1.17		$7,820		$7,830		$15,650
Haul to Onsite Disposal Cell BCY														
– 12" thk. Cushion Layer 6413	8016	LCY	0.081	838	16.97			1.51		$14,220		$12,470		$26,690
– Impacted Fill 65187	81484	LCY	0.081	8514	16.97			1.51		$144,480		$126,730		$271,210
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load – Level C	N/A	BCY	0.055		16.97			1.17						
Haul to Onsite Disposal Cell BCY N/A		LCY	0.081		16.97			1.51						
			S/T											
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C		HRS	150%		16.97			1.51						
			S/T											
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)		MD												
(SHREDDING COMMON TO SWL, IFP & SF)														
k. Shredder/Crusher – Purchase/Install 33.3%	N/A	LOT	280.0		19.95			8400.00	317800.00					
60 Ton per Hour														
Excavated Debris BCY N/A														
Generated Waste BCY 5217														
Excavated Debris TONS														
(Percent of Gen.Waste to be Shredded 25%														
Generated Waste TONS 2079														
TOTAL TONS 2079														
Operating Costs	35	HRS							25.75				$930	$930
(2) Operators	70	HRS	1.00	90	16.97					$1,530				$1,530
TOTAL(EXCAVATE/LOAD& HAUL TO ON–SITE DISPOSAL)	1	LOT		14,522						$246,430		$225,480	$930	$472,8[illegible]

001405

Excavate – No Treatment – AFP Onsite Disposal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-6-159

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP.)															
a. Clear and Grubb	20%														
i. Disposal Cell & Surrounding area	35	7.0	AC	41.40	374	16.97			2575.00		$6,350		$18,570		$24,920
b. Relocated South Access Road	20%														
i. Clear & Grub	3	0.6	AC	41.40	32	16.97			2575.00		$540		$1,590		$2,130
ii. General Grading	1467	293.4	SY	0.001		16.97			0.07				$20		$20
iii. Road – 8" Gravel W/Geotextile	7333	1466.6	SY	0.030	57	16.97			1.08	6.66	$970		$1,630	$10,060	$12,660
c. Haul Road	20%														
i. Clear & Grub	2.4	0.5	AC	41.40	26	16.97			2575.00		$440		$1,270		$1,710
ii. General Grading	11556	2311.2	SY	0.001	3	16.97			0.07		$50		$170		$220
iii. Road – 8" Gravel W/Geotextile	5778	1155.6	SY	0.030	45	16.97			1.08	6.66	$760		$1,290	$7,930	$9,980
d. Temporary Construction Fencing	20% 5200	1040.0	LF	0.213	286	16.97				6.25	$4,850			$6,700	$11,550
e. 20' wide Swing Gates	1	0.2	EA	25.60	7	16.97			340.00	560.00	$120		$70	$120	$310
f. Staging Area @ Cell	20%														
Area Excavation for Slab	1606	321.2	BCY	0.016	7	16.97			0.60		$120		$200		$320
Sub–Base for Slab	2845	569.0	SY	0.041	30	16.97		6.75	1.45	5.51	$510	$3,960	$850	$3,230	$8,550
HDPE Perf.Sub–grade Piping – 4"	500	100.0	LF	0.21	27	16.97			0.74	3.02	$460		$80	$310	$850
Concrete Slab – 160'x160'x8" thk	631	126.2	CY	4.07	663	17.98			14.25	67.00	$11,920		$1,850	$8,710	$22,480
Concrete Curb – 480'x2'x8" thk	24	4.8	CY	15.30	95	17.98			11.16	275.90	$1,710		$60	$1,360	$3,130
Epoxy Coating	2845	569.0	SY	0.22	161	16.97			0.77	7.56	$2,730		$450	$4,430	$7,610
Backfill & Compact around Slab	183	36.6	ICY	0.086	4	16.97			1.38				$50		$50
Mob/Demob.Equip.	1	0.2	LS	2.00	1	16.97			184.00		$20		$40		$60
g. Storage Area – 200' x 200' Asphalt															
Includes Compacted Sub–Grade	4444	889	SY	0.084	96	16.97			2.56	14.04	$1,630		$2,340	$12,850	$16,820
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat															
h. Decon Trailer – Rental	20% 51	10	MO					1500.00				$15,760			$15,760
i. Const.Equipment Decon. Facility	20%														
25 ft x 60 ft	1	0.20	LS	730.00	146	18.05		1160.00	2900.00	11980.00	$2,640	$240	$580	$2,400	$5,860
j. Personnel Decon. Facility	20%														
11'x 11'	1	0.20	LS	108.00	22	18.89		100.00	360.00	4120.00	$420	$20	$70	$820	$1,330
SUB–TOTAL (COMPOSITE LINER –SITE PREP)		1	LOT		2,082	17.41					$36,240	$19,980	$31,180	$58,920	$146,320

Composite Liner – Site Prep. – AFP Onsite Disposal Details

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (CON'T.)														
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.														
COMPOSITE LINER														
a. Subgrade Preparation – includes removal of top soil, grading & comp.	18615	SY	0.024	576	16.97			0.86		$9,770		$16,490		$26,260
b. 95% Clay – 5% Bentonite 36" Thk BCY 18615	21966	ICY	0.260	7367	16.97			11.19	20.35	$125,020		$253,170	$460,410	$838,600
c. Composite Clay Liner	18615	SY					7.38				$137,380			$137,380
d. HDPE Liner 60 mil	18615	SY					4.75				$88,420			$88,420
e. Geotextile Fabric	18615	SY					2.25				$41,880			$41,880
f. Pea Gravel 12" Thk; In–place BCY 6143	6604	ICY	0.11	937	16.97			0.77	17.00	$15,900		$5,240	$115,630	$136,770
g. Composite Clay Liner	18615	SY					7.38				$137,380			$137,380
h. HDPE Liner 60 mil	18615	SY					4.75				$88,420			$88,420
i. Geotextile Fabric	18615	SY					2.25				$41,880			$41,880
j. Pea Gravel 12" Thk; In–place BCY 6143	6604	ICY	0.11	937	16.97			0.77	17.00	$15,900		$5,240	$115,630	$136,770
k. Geotextile Fabric	18615	SY					2.25				$41,880			$41,880
l. HDPE Perforated Pipe – leachate collection 6" Dia.	1080	LF	0.30	418	16.97			1.05	6.56	$7,090		$1,170	$7,300	$15,560
m. HDPE Perforated Pipe – leak detection 6" Dia.	1080	LF	0.30	418	16.97			1.05	6.56	$7,090		$1,170	$7,300	$15,560
n. Leachate Discharge Piping														
i. HDPE Carrier & containment Pipe 6" x 10" Includes Trench Excav/Backfill, sand bedding and compaction.	840	LF	0.86	932	16.97			11.37	22.33	$15,820		$9,840	$19,320	$44,980
ii. HDPE Manhole – 4' dia. x 8' deep	2	EA	8.00	21	16.97			28.00	8300.00	530.00		$60	$17,100	$17,690
o. Impacted Fill–Cusion Layer 12" Thk BCY 6413	8016	LCY	0.06	620	16.97			1.67		$10,520		$13,790		$24,310
p. Impacted Fill–Spread and Compact BCY 85187	81484	LCY	0.06	6307	16.97			1.67		$107,030		$140,160		$247,190
q. Generated Waste BCY 5217	6000	LCY	0.06	464	16.97			1.67		$7,870		$10,320		$18,190
PPE LEVEL C Allowance is added to the following														
r. Impacted fill BCY N/A		LCY	0.06		16.97			1.67						
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C		HRS	150% S/T		16.97									
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)		MD												
SUB–TOTAL (COMPOSITE LINER)	1	LOT		18,997						$322,540	$577,240	$456,650	$742,690	$2,099,120
TOTAL (COMPOSITE LINER)	1	LOT		21,079						$358,780	$597,220	$487,830	$801,610	$2,245,440

Composite Liner Details

FEMP-OU02-5 DRAFT
August 24, 1994
5861
F-6-161
001407

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

	DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	COMPOSITE CAP															
	Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
	COMPOSITE CAP															
	a. Contouring Layer 18" Thk.	BCY 3178	3814	ICY	0.06	295	16.97			1.67	3.50	$5,010		$6,560	$13,750	$25,320
	b. 95% Clay – 5% Bentonite 24" Thk	BCY 4258	4577	ICY	0.260	1535	16.97			11.19	20.35	$26,050		$52,760	$95,940	$174,750
	c. GML\GCC – composite Liner		6356	SY					7.38				$46,910			$46,910
	d. Geotextile Fabric		6356	SY					2.25				$14,300			$14,300
	e. Pea gravel 12" Thk, In–place	BCY 2097	2254	ICY	0.11	320	16.97			0.77	17.00	$5,430		$1,790	$39,470	$46,690
	f. Geotextile Fabric		6356	SY					2.25				$14,300			$14,300
	g. Cobbels 36" Thk; In–place	BCY 6356	6833	ICY	0.258	2274	16.97			7.15	10.10	$38,590		$50,320	$71,080	$159,990
	h. Geotextile Fabric		6356	SY					2.25				$14,300			$14,300
	i. Sand Layer 6" Thk; In–place	BCY 1080	1161	ICY	0.052	78	16.97			1.76	5.00	$1,320		$2,100	$5,980	$9,400
	j. Geotextile Fabric		6356	SY					2.25				$14,300			$14,300
	k. Common Soil 21" Thk; In–place	BCY 3686	4423	ICY	0.06	342	16.97			1.67	3.50	$5,800		$7,610	$15,950	$29,360
	l. Top Soil 6" Thk; In–place	BCY 1080	1296	ICY	0.053	89	16.97			1.82	12.10	$1,510		$2,430	$16,150	$20,090
	m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding	SY 6356	57	MSF	0.30	22	16.97			6.75	25.00	$370		$400	$1,470	$2,240
	n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized		1200	LF	0.17	263	16.97			2.28	13.40	$4,460		$2,820	$16,560	$23,840
	TOTAL (COMPOSITE CAP)		1	LOT		5,218						$88,540	$104,110	$126,790	$276,350	$595,790

Composite Cap Details

F-6-162
001408
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DIKE FOR DISPOSAL CELL															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
a. Borrow Common Soil – Dike	BCY 48413	58096	ICY	0.06	4497	16.97			1.67	3.50	$76,310		$99,930	$209,430	$385,670
b. Geotextile Fabric		14128	SY					2.25				$31,790			$31,790
c. Cobbels 36" Thk; In–place	BCY 14128	16954	ICY	0.258	5642	16.97			7.15	10.10	$95,740		$124,850	$176,370	$396,960
d. Drainage Piping – HDPE	6" Dia.	1920	LF	0.30	743	16.97			1.05	6.56	$12,610		$2,080	$12,970	$27,660
TOTAL (DIKE – DISPOSAL CELL)		1	LOT		10,882						$184,660	$31,790	$226,860	$398,770	$842,080

001409

5861

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August 24, 1994

Dike Details

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL															
a. Office/Parking Area @ S/U	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo–Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Facil.@ S/U	33%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo–Fabric & Liner	167	56	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Facil. @ S/U	33%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292					9.16				$10		$10
Geo–Fabric & Liner	14	5	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
d. Staging pad @ S/U	33.3%														
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo–Fabric & Liner 105 cy	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	395.5	132	BCY	0.30	51	16.97			2.51		$870		$340		$1,210
	20%														
e. Const.Equip.Decon.Facil. @ Onsite Disp.Cell															
Demo/Remove Concrete	49.3	10	BCY	1.2	15	16.97			3.62		$250		$40		$290
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	6	BCY	0.292	2	16.97			9.16		$30		$50		$80
Geo–Fabric & Liner	167	33	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	5	EA	0.48	3	16.97			1.68		$50		$10		$60
Splash Guard	702	140	SF	0.04	7	16.97			0.03		$120				$120
Haul & Dump Rubble	24.9	5	BCY	0.30	2	16.97			2.51		$30		$10		$40
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		622						$10,540		$4,710		$15,250

Generated Waste Removal Details

E-6-164
001440
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.) Demo. /Load/Haul/Dump/Compact															
	20.0%														
f. Personnel Decon. Facil.@ Onsite Disp. Cell															
Demo/Remove Concrete	2.2	0.44	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	0.48	BCY	0.292		16.97			9.16						
Geo–Fabric & Liner	14	3	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	6	1	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	26	SF	0.04	1	16.97			0.03		$20				$20
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
	20.0%														
g. Relocated South Access Road/Cell	SY														
Road – 8" Gravel W/Geotextile	7333	1467	BCY	0.292	552	16.97			9.16		$9,370		$13,840		$23,210
Haul & Dump Rubble		1467	BCY	0.30	568	16.97			2.51		$9,640		$3,790		$13,430
	20.0%														
h. Haul Road for Cell	SY														
Road – 8" Gravel W/Geotextile	5778	257.0	BCY	0.292	97	16.97			1.08		$1,650		$290		$1,940
Haul & Dump Rubble		257.0	BCY	0.30	99	16.97			2.51		$1,680		$660		$2,340
	20.0%														
i. Temporary Construction Fencing @ Cell	5200	1040.0	LF	0.107	143	16.97					$2,430				$2,430
Haul & Dump Rubble		135.0	BCY	0.30	52	16.97			2.51		$880		$350		$1,230
	20.0%														
j. 20' wide Swing Gates @ Cell	2	0.40	EA	12.75	7	16.97			340.00		$120		$140		$260
Haul & Dump Rubble		0.05	BCY	0.30		16.97			2.51						
	20.0%														
k. Storage Pad Area @ Cell	BCY														
Demo/Remove Asphalt	988	197.6	BCY	1.2	306	16.97			3.62		$5,190		$740		$5,930
Excav., Load, Haul, Backfill, Compac	474.0	94.8	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Sub–grade Stone															
Geo–Fabric & Liner	4444	888.8	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble		197.0	BCY	0.30	76	16.97			2.51		$1,290		$510		$1,800
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,942						$32,970		$21,230		$54,200

Generated Waste Removal Details

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August 24, 1994

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001411

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.)														
Demo. /Load/Haul/Dump/Compact														
The following prorated at: 20.0%														
I. Staging Area @ On–Site Disposal Cell														
Demo/Remove Concrete 655	131.0	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excav., Load, Haul, Backfill, Compact														
Sub–grade Stone 475	95.0	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo–Fabric & Liner 105 cy 2845	569.0	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble 395.5	126.0	BCY	0.30	49	16.97			2.51		$830		$330		$1,160
TOTAL GENERATED WASTE BCY 5217 LCY 6000														
SUB– TOTAL (GENERATED WASTE REMOVAL)	1	LOT		289						$4,900		$1,730		$6,630
TOTAL (GENERATED WASTE REMOVAL)	1	LOT		2,853						$48,410		$27,670		$76,080

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.[redacted] 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
Active Flyash Pile	20000	24000	ICY	0.09	2786	16.97			3.21	3.50	$47,280		$79,350	$86,520	$213,150
	33.3%														
Office/Parking	494	197	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	31	ICY												
Decon.Facil.– Personnel @ S/U	7	3	ICY												
Staging Area @ S/U	1099	439	ICY												
	S/T	670.5	ICY	0.09	78	16.97			3.21	3.50	$1,320		$2,220	$2,420	$5,960
	20%														
Staging Area at On–Site Disp.Cell	1099	264	ICY												
Storage Area at On–Site Disp.Cell	474	114	ICY												
Decon.Facil.– Const.Equip. @ Cell	78	19	ICY												
Decon.Facil.– Personnel @ Cell	7	2	ICY												
Relocated South Access Road	1628	391	ICY												
Haul Road	1283	308	ICY												
	S/T	1096.6	ICY	0.09	127	16.97			3.21	3.50	$2,160		$3,630	$3,950	$9,740
b. Final Grade for AFP		19600	SY	0.02	506	16.97			0.70		$8,590		$14,130		$22,720
c. Borrow Top Soil 6" Thk., Spread															
Active Flyash Pile		19600	SY	0.036	910	16.97			2.33	2.88	$15,440		$47,040	$58,140	$120,620
	33.3%														
Office/Parking	2222	740	SY												
Decon.Facil.– Const.Equip. @ S/U	167	56	SY												
Decon.Facil.– Personnel @ S/U	14	5	SY												
Staging Area @ S/U	2845	947	SY												
	S/T	1747.6	SY	0.036	81	16.97			2.33	2.88	$1,370		$4,190	$5,180	$10,740
	20%														
Staging Area at On–Site Disp.Cell	2845	683	SY												
Storage Area at On–Site Disp.Cell	4444	1067	SY												
Decon.Facil.– Const.Equip. @ Cell	167	40	SY												
Decon.Facil.– Personnel @ Cell	14	3	SY												
Relocated South Access Road	14667	3520	SY												
Haul Road	11556	2773	SY												
	S/T	8086.3	SY	0.036	376	16.97			2.33	2.88	$6,380		$19,410	$23,990	$49,780
SUB–TOTAL (SITE RESTORATION)		1	LOT		4,864						$82,540		$169,970	$180,200	$432,710

Site Restoration Details

FEMP-OU02-5 DRAFT
August 24, 1994

F-6-167

001413

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION (CON'T.)															
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Active Flyash Pile	19600	176	MSF	0.30	68	16.97			6.75	25.00	$1,150		$1,220	$4,530	$6,900
	33.3%														
Office/Parking	2222	6.7	MSF												
Decon.Facil.– Const.Equip. @ S/U	167	0.5	MSF												
Decon.Facil.– Personnel @ S/U	14		MSF												
Staging Area @ S/U	2845	8.5	MSF												
	S/T	15.7	MSF	0.30	6	16.97			6.75	25.00	$100		$110	$400	$610
	20%														
Staging Area at On–Site Disp.Cell	2845	5.1	MSF												
Storage Area at On–Site Disp.Cell	4444	8.0	MSF												
Decon.Facil.– Const.Equip.@ Cell	167	0.3	MSF												
Decon.Facil.– Personnel @ Cell	14		MSF												
Relocated South Access Road	14667	26.4	MSF												
Haul Road	11556	20.8	MSF												
	S/T	60.6	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,560	$2,370
e. Security Fence – 6ga aluminized – 6' high		1080	LF	0.13	178	16.97			1.64	9.80	$3,020		$1,820	$10,900	$15,740
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
SUB–TOTAL (SITE RESTORATION)		1	LOT		296						$5,020		$3,790	$17,760	$26,570
TOTAL (SITE RESTORATION)		1	LOT		5,160						$87,560		$173,760	$197,960	$459,280

Site Restoration Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-6-168

001414

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility	6	PR					23000.00				$138,000			$138,000
b. MW at AFP – Type I & II	6	PR					23000.00				$138,000			$138,000
c. Abandon Existing Wells	6	EA					13000.00				$78,000			$78,000
TOTAL (MONITORING WELLS)	1	LOT									$354,000			$354,000

Monitoring Wells Details

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001415

F-6-169

FEMP-OU02-5 DRAFT
August 24, 1994

861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT				LABOR	S/C	EQUIP.	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	EQUIP.	MAT'L					
	WASTE WATER TREATMENT COST														
	Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
	Decontamination Facilities	95000	GAL					0.01				$1,000			$1,000
	Runnoff from the Exclusion Zone.	1100000	GAL					0.01				$11,000			$11,000
	TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
	TOTAL (WASTE WATER TREATMENT)	1	LOT									$12,000			$12,000

Waste Water Treatment Operations Cost Details

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FEMP-OU02-5 DRAFT
August 24, 1994

001416

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–5A – AFP – ON–SITE DISPOSAL – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940735
BY: KEN KEPLER
DATE: 08/11/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	358	EA					2,002				$716,700			$716,700
Rad	358	EA					2,000				$716,000			$716,000
Confirmatory Tests														
Full Rad Tests	179	EA					3,101				$555,100			$555,100
Full HSL	20	EA					1,500				$30,000			$30,000
Full TCLP	20	EA					2,000				$40,000			$40,000
2 Technicians per Month	20	MO					13,163				$263,300			$263,300
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS	1	LOT									$2,321,100			$2,321,100

F-6171

001417

Screening & Confirmation Testing Details

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FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, AFP – EXCAV.& ON-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940735
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CAF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$15,210,500	BASE EST:	$64,010	BASE EST:	$16,500	BASE EST:	$88,310	BASE EST:	$6,040	BASE EST:	$28,480	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	25%	-10%	30%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	25%	-10%	30%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$60,810	$83,213	$15,675	$20,625	$79,479	$114,803	$5,919	$10,872	$26,771	$51,264	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–5A, AFP – EXCAV.& ON–SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940735
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CAF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$24,870	BASE EST:	$0	BASE EST:	$41,370	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%										
MATERIAL PRICING					–5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	0%	0%	–5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$23,627	$37,305	$0	$0	$39,302	$53,781	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, AFP – EXCAV.& ON-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940735
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CAF

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001420

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, AFP – EXCAV.& ON-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940735
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CAF

	EXCAV/SORT/CRUSH ONSITE DISPOSAL LABOR $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL S/C $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$271,070	BASE EST:	$0	BASE EST:	$1,020	BASE EST:	$394,660	BASE EST:	$656,940	BASE EST:	$881,690
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	100%					-5%	50%				
MATERIAL PRICING					-1%	50%			-5%	25%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%			-1%	50%	-1%	50%	-1%	50%	-1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	150%	0%	0%	-2%	100%	-6%	100%	-6%	75%	-6%	70%
TOTAL $	$254,806	$677,675	$0	$0	$1,000	$2,040	$370,980	$789,320	$617,524	$1,149,645	$828,789	$1,498,873

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-6-175

001421

FEMP-OU02-5 DRAFT
August 24, 1994

5 x 61

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, AFP – EXCAV.& ON-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940735
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CAF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		DIKE LABOR $'s		DIKE S/C $'s		DIKE MAT'L. $'s	
	BASE EST:	$97,390	BASE EST:	$114,520	BASE EST:	$303,990	BASE EST:	$203,130	BASE EST:	$34,970	BASE EST:	$438,650
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-5%	50%				
MATERIAL PRICING			-5%	50%	-5%	30%			-5%	50%	-5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%	-1%	50%	-1%	50%	-5%	50%	-5%	50%	-5%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	100%	-6%	100%	-6%	80%	-10%	100%	-10%	100%	-10%	80%
TOTAL $	$91,547	$194,780	$107,649	$229,040	$285,751	$547,182	$182,817	$406,260	$31,473	$69,940	$394,785	$789,570

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001422

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, AFP – EXCAV.& ON-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940735
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CAF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$53,250	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$50,588	$79,875	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, AFP - EXCAV.& ON-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940735
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CAF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$96,320	BASE EST:	$0	BASE EST:	$217,760	BASE EST:	$0	BASE EST:	$389,400	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$91,504	$125,216	$0	$0	$206,872	$283,088	$0	$0	$369,930	$584,100	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001424

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, AFP – EXCAV.& ON-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940735
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CAF

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$1,312,200	BASE EST:	$674,800	BASE EST:	$1,645,200	BASE EST:	$1,015,900	BASE EST:	$2,333,100	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-25%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-20%	30%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-25%	30%	-20%	30%	0%	0%
TOTAL $	$1,246,590	$1,968,300	$641,060	$1,349,600	$1,562,940	$2,467,800	$761,925	$1,320,670	$1,866,480	$3,033,030	$0	$0
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-5A, AFP – EXCAV.& ON-SITE DISPOSAL
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940735
DATE: 08/11/94
BY: KEN KEPLER
TASK # : 2CAE

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$3,579,900	BASE EST:	$219,000	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			−1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	−5%	25%										
(OTHER)												
TOTAL %	−5%	25%	−1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$3,400,905	$4,474,875	$216,810	$221,190	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-6-180

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FEMP-OU02-5 DRAFT
August 24, 1994

DRAFT

APPENDIX - F.7

DETAILED COST ESTIMATE

ALTERNATIVE 6 - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA

A. FEDERAL OWNERSHIP (Expanded Trespasser)

B. PRIVATE OWNERSHIP (Resident Farmer)

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BASIS OF ESTIMATE

PROJECT DESCRIPTION: ALT-6A and 6B - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA (WAC)
WBS NUMBER: 1.1.1.1.2.3.__
PROJECT LOCATION: FERNALD, OHIO
PROJECT ENGINEER: GREG JONES
ESTIMATOR: KEN KEPLER
ESTIMATE NUMBER: C29407__ __

SUPPORTING DOCUMENTATION:

Verbal Scope	X	P & ID's		Work Plan	
Drawings	X	Equipment List		Site Walk	
Sketch	X	Specifications		Eng Mtg	
Flow Diagrams		Site H & S Plan		Price Quotes	X

TYPE OF ESTIMATE:

Plan/Feasbl	X	Budg/Concpt		Title I Des	
Title II Des		Government		Independent	
Construction		Baseline			

BASIS OF ESTIMATE:

This Basis of Estimate represents the five Operable Unit 2 subunits (SWL - Solid Waste Landfill, LSP - Lime Sludge Ponds, SF - South Field, AFP - Active Flyash Pile, IFP - In-active Flyash Pile) supporting the alternative's 6A and 6B for the OU2 Feasibility Studies based on federal ownership (expanded trespasser) or private ownership (resident farmer) scenarios to determine the level of clean-up for each sub-unit. All alternates include costs for site preparation (new or existing road up-grades, clearing, grubbing, grading and earthwork for and construction of support facilities such as office trailers, parking, staging and storage facilities and equipment and personnel decontamination facilities); erosion and sediment controls (silt fencing, diversion berms and ditches, sediment traps and tanks, collection sumps, pumps and piping, etc.); excavation of waste to be disposed at an on-site disposal cell and excavation of lead-contaminated soil for off-site disposal to Envirocare by rail gondola car;

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BASIS OF ESTIMATE

PROJECT DESCRIPTION:	ALT-6A and 6B - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA (WAC)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

treatment of solid waste by shredding/crushing for placement in an on-site disposal cell, solidification of lead contaminated soil at the SF firing range for off-site disposal to Envirocare; construction of an on-site disposal cell (site preparation and support facilities at the Cell site, construction of the liner, placement of excavated and generated waste, construction of the cap and dike); site restoration of each subunit with backfill, top soil, seeding and mulch; demolition and removal of all support facilities/utilities (generated waste) to the on-site disposal cell.

Site maintenance, groundwater monitoring, and O&M costs for a 30-year period following remediation are included.

Comments in this basis will be typical of all subunits with the main objective being to clarify the estimating philosophy and procedures applied. In all cases where a common facility is described that supports two or more subunits, the quantities either represent a prorated quantity in relationship to the volume of remediated soil/waste to each other, such as appear in the liner, cap and dike sections or as a percentage applied to the total quantities representing a common support facility. These estimates are considered to be within a -30% to +50% range of accuracy (including Risk Budget), based on the level of information provided at this time.

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-6A AND ALT-6B - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA (WAC)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

EXECUTION:

These projects are estimated to be performed by a subcontractor working a 40-hour week, 10 hours a day, no overtime or holidays. Construction start and finish dates are indicated in Appendix D (Construction Activity Duration) for each alternative. Months indicated for some common support facilities span the time from the start of one subunit to the end of the last subunit to be completed.

WAGE RATES:

Wage rates within the estimates are based on the current rates furnished by the local Craft Labor Board and developed into a craft mix. All Labor Dollars are considered constant 1994 dollars.

ENGINEERING:

Engineering costs are based on the percentage of Direct and Indirect Field Costs that resulted in the Baseline estimates, dated November,1993. Refer to CRU2 Baseline Summary. Also, included in the Titles I & II Engineering allowance, is cost for the Cultural Resource Surveys, Phases I & II.

PRODUCTIVITY:

A site specific factor of 1.29 has been applied to Net Chart manhours. See Appendices A and B for development and application.
Task-specific factors were applied as necessary when identified.
PPE-specific factors were applied based on level identified. See Appendix B.
An allowance for delays caused by monitoring and radiation checking is included. See Appendix C, Health Physics.
No exposure/burnout rates have been identified for this work.

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NOTE: All references to "See Appendix" refer to cost estimate Appendices only.

FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-6A AND ALT-6B - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA (WAC)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

ESCALATION:

Escalation has been excluded from these estimates. Costs are considered to be constant 1994 dollars.

UNIT RATES:

In general, the unit manhours, subcontract dollars, equipment dollars, and material dollars were based on 1993 MEANS. In most cases, a site productivity factor of 1.29 was applied to the Net chart unit manhours. The unit material and subcontract dollars were escalated 3% to arrive at 1994 constant dollars. Some costs were taken directly from the previous estimates.

The Low Level Thermal Destruction Unit costs were derived from B&RE quotational information.

Solidification costs for lead contaminated soil with portland cement have been formulated from information provided in "Hazardous Waste Cost Control" by R.A. Selg.

Waste container costs to purchase gondola liners and covers provided by FERMCO Recycling and Technology Dept.

Transportation and burial costs represent RSO's cost to transport waste by rail in gondola cars and bury the OU2 waste at Envirocare in Clive, Utah. Unit costs provided by FERMCO Recycling and Technology Dept. Certification costs by RSO are based on costs to certify a typical Sealand container. See Appendix E and estimate detail sheets for unit cost breakdown.

Waste Water Treatment costs are provided by OU5 to cover the cost of processing waste streams produced by OU2 construction activities.

Screening and confirmatory testing requirements and pricing were provided by CRU2 engineering.

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ESTIMATING SERVICES

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24 AUGUST 94

ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-6A AND ALT-6B - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA (WAC)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

UNIT QUANTITIES:

Quantities of soil, flyash, lime sludge and solid waste to be remediated were provided by CRU2 Engineering Dept. See Tables in section F.8. The "Additional Excavation" volume required to excavate the remediation quantity of waste material at each subunit is based on the preliminary layout of excavation limits. The percent of the remediated quantity for the "Additional Excavation" is 14% for SWL and 10% each for the other subunits.
All other quantities, volumes, sizes, etc., were provided by CRU2 Engineering. All volumes of waste were considered bank cubic yards (BCY) at 10^{-6} risk level.

SWELL, DENSITY & SHRINKAGE FACTORS:

A swell or shrinkage factor was applied to the BCYs provided by CRU2 Engineering when applicable, resulting in loose cubic yards (LCY) or in-place or compacted cubic yards (ICY). Factors used are estimators judgement based on data provided in 'Fundamentals of Earthmoving' by Caterpillar Tractor Co. Density factors were applied for converting LCYs to Tons for costing out the shredding/crushing operation, solidification of the lead-contaminated soil at the Firing Range, and for determining the maximum allowable volume by weight for material to be shipped to Envirocare by rail in 90-ton gondola cars. Density factors used are estimator's judgment based on 'Weights and Specific Gravities' in the American Institute of Steel Construction book. Weights are for bulk, heaped, or loose materials. The following factors were used:

MAT'L.	SWELL	DENSITY	SHRINKAGE
EARTH	1.25	1.275	1.2
CLAY	1.23	1.25	1.18
GRAVEL	1.12	1.275	1.075
SAND	1.12	1.275	1.075
GEN.WASTE	1.15	2.00	1.15

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-6A AND ALT-6B - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA (WAC)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

HEALTH PHYSICS: (See Appendix C)

All workers at the site will participate in the Medical Monitoring & Surveillance Program and the FEMP Radiation In-Vivo & Bioassay Testing Program. Costs are for the workers' time to participate in these programs based on the Number of Workers and the Duration of Construction Activity information.
Material dollars are included in this section to provide PPEs for the worker when required. Disposable PPEs are to be provided by the subcontractor. Washable PPEs will be provided by the subcontractor for the initial changeout for each required worker, with subsequent changeouts and cost for washing and decontamination provided by FERMCO. Labor dollars are included in this section for work delays caused by monitoring and rad checking.

NUMBER OF WORKERS:

Calculation: Total Direct Manhours Div. By 1813 Hours (1 Man Year) x 1.25 (attrition) Div. By the Duration of Construction in Months x 12 = number of workers per year.

(Use number of workers per year to determine CERCLA/SAT and Health Physics costs.)

G&A (Home Office Expense):

G&A are excluded from the target estimate. The G&A costs are calculated within the Micro-Frame computer system according to the plan for rebaselining.

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ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	ALT-6A AND ALT-6B - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA (WAC)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

RISK BUDGET:

A cost element, based on a risk analysis calculated for this estimate to cover a statistical probability of a 50% chance of overrun/underrun to the project. The target estimate is the sum of the base estimate and the risk budget. The target estimate is the basis for the Performance Baseline. The risk budget for these projects will vary according to the results of the analysis. See the Risk Analysis at the end of each estimated alternative and refer to the Estimate Summary Sheets.

CONTINGENCY:

An amount budgeted to cover costs that may result from incomplete design, unforeseen and unpredictable conditions, or uncertainties. The amount of the contingency will depend on the status of design, procurement, construction, and the complexity and uncertainties of the component parts of the project. Contingency is not to be used to avoid making an accurate assessment of expected costs.

Contingency is calculated as the delta between the 50% chance of overrun and the 5% chance of overrun, indicated on the risk analysis. Contingency for these alternatives will vary based on the results of the risk analysis. See the risk analysis at the end of each estimated alternative and refer to the Estimate Summary Sheets.

PRESENT WORTH ANALYSIS:

An economic evaluation that compares the sums of discounted dollar costs or benefits of capital investments, replacements, operations, maintenance, decommission, and salvage of two or more systems or operations over the expected useful life span. The analysis identifies the system or operation considered to be the least-cost alternative for satisfying a particular purpose.
(SEE Present Worth Analysis Study "SUMMARY")

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SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-6A AND ALT-6B - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA (WAC)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407_ _

INCLUSIONS:

Costs have been included in the Field Directs for:

SITE PREPARATION
- Construction Survey
- Temporary Construction Fencing
- Clearing and Grubbing
- Dewatering
- General grading and surfacing for new roads, office/parking areas, decontamination facilities and staging and/or storage areas

DECONTAMINATION FACILITIES AT SUBUNITS
- Decon. trailer rental at 39 mo.'s for SWL and LSP
- Decon. trailer rental at 51 mo.'s for SF, AFP and IFP
- Construction equipment decon.facility common for subunits SWL and LSP and one common for FS, AFP & IFP - 25' x 60'
- Personnel decon.facility common for sub-units SWL and LSP and one common for SF, AFP & IFP - 11' x 11'

EROSION AND SEDIMENT CONTROLS
- Diversion of clean run-off
- Diversion, collection and pumping of contaminated run-off to AWWT Facility
- Erosion and sediment control measures

OFF-SITE DISPOSAL
- Excavate contaminated soils/waste and lead-contaminated soil exceeding WAC
- Solidify lead-contaminated soil at firing range - 300 BCY
- Dry waste - low level thermal destruction (if required)
- Shred and crush waste (if required)

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SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-6A AND ALT-6B - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA (WAC)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

LOAD AND HAUL FOR OFF-SITE DISPOSAL
- Haul treated lead-contaminated soil from SF to OU1 rail loading facility
- Haul soil/waste exceeding WAC from subunits to OU1 rail loading facility
- Load waste into 90-ton capacity gondola rail cars
- Certify and ship to Envirocare

EXCAVATE, LOAD AND HAUL FOR ON-SITE DISPOSAL
- Excavate, sort and haul level D, C and additional soil/waste from subunits to on-site disposal cell

SITE PREP. FOR DISPOSAL CELL
- Clear and grub surrounding area - 45 acres
- Relocate South Access Road - 7,333 yd^2
- New haul road - 5,778 yd^2
- Temporary fencing - 5,200 linear feet
- Storage area - 200' x 200', asphalt
- Staging area - 160' x 160', concrete
- Decontamination trailer rental - 51 mo.'s
- Decontamination facilities - equipment - 25' x 60'
- Decontamination facilities - personnel - 11' x 11'
- Shredding/crushing equipment and operation at SWL and SF Staging areas

COMPOSITE LINER -
- Subgrade preparation - remove top soil, grade/compact
- Construct liner w/borrow materials
- Install leachate collection system
- Install leak detection system
- Install leachate discharge system
- Backfill and compact - impacted cushion layer 12" thick
- Backfill and compact - remaining impacted fill
- Backfill and compact - level C impacted fill
- Backfill generated waste

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SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-6A AND ALT-6B - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA (WAC)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

COMPOSITE CAP
- Construct composite cap w/borrow materials
- Top soil - 6" thick
- Grass cover - seed, mulch
- Security fence

DIKE FOR DISPOSAL CELL
- Construct dike w/borrow materials
- Construct dike cover and HDPE piping
- Top Soil and grass cover - seed, mulch

GENERATED WASTE REMOVAL
- Office/parking facilities common to SWL and LSP
- Office/parking facilities common to AFP, IFP and SF
- Equip.and personnel decon. facilities common to SWL and LSP
- Equip.and personnel decon facilities common to AFP, IFP and SF
- Equip.and personnel decon facilities common to on-site disposal cell
- Staging area common to SWL and LSP
- Staging area common to AFP, IFP and SF
- Staging area common to on-site disposal cell
- Storage area common to on-site disposal cell
- All temporary construction fencing
- Relocated South Access Road
- Haul road

SITE RESTORATION - ALL SUBUNITS AND SUPPORT FACILITIES AT CELL
- Borrowed cmmon soil for backfill
- Final grade
- Borrowed top soil
- Grass cover, seed, fertilize, mulch
- Security fence and gates at each subunit

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SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-6A AND ALT-6B - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA (WAC)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

MONITORING WELLS

- Abandon existing wells at subunits
- Install new wells at subunits
- Install new wells at on-site disposal cell

Costs have been included in the Indirect Field Costs for:

- Contractor supervision
- Small tools and consumables
- Equipment rental
- Temporary construction facilities
- Temporary utilities and hook-up
- Job clean-up
- Safety
- Health Physics
- CERCLA and site access training
- Bond
- Subcontractor overhead and profit (Includes insurance and reserve fund)
- Subcontractor payroll burdens and benefits

Costs have been included as FERMCO Field Support Costs for:

- Transportation and burial to Envirocare
- Purchase cost of liners and covers for rail gondola cars
- Waste water treatment cost (OU5)
- Screening and confirmatory testing
- FERMCO construction management

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FERMCO
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SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-6A AND ALT-6B - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA (WAC)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

Costs included for Engineering are:

- Emission modeling
- PSAR/FSAR Reports
- Titles I,II and III (Includes cultural resource surveys, Phases I and II)
- CDR and DCR

Costs have been included for Ohio State sales tax

- at 6%

Costs have been included for Risk Budget.

Costs have been included for Contingency.

ALL OF THE ABOVE REPRESENTS SCOPE FOR THE CAPITAL COST FOR THE ALTERNATIVES.

ALT-6A represents quantities based on criteria for Federal ownership (Expanded Trespasser).

ALT-6B represents quantities based on criteria for Private Ownership (Resident Farmer).

Operations and maintenance costs were developed for a 30-year period following the remediation of each subunit. These costs, along with the capital cost, were used to develop the Life Cycle Cost Analysis Report in 1994 constant dollars to determine the Net Present Value (NPV).

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24 AUGUST 94

SCOPE OF WORK

PROJECT DESCRIPTION:	ALT-6A AND ALT-6B - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA (WAC)
WBS NUMBER:	1.1.1.1.2.3.__
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	GREG JONES
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	C29407__ __

EXCLUSIONS:

- Permits and fees
- Landlord costs
- Escalation
- G&A (home office expense)
- Rail loading facility provided in CRU1 baseline.

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APPENDIX A

PROJECT: OU2 FEASIBILITY STUDIES
PROJ.LOCATION: FERNALD PLANT
ESTIMATOR : KEN KEPLER

SITE SPECIFIC
EFFICIENCY / MULTIPLIER ANALYSIS

WBS NO. : 1.1.1.1.2.3.
TASK I.D. : 2C
EST. NO.: C29407
DATE: 24-Aug-94

	PERCENT OF INFLUENCE ON CHART MANHOURS						CHART MANHOURS			% OF INFLUENCE	WT'D VALUE	PROD. RESULT
	40%	50%	60%	70%	80%	90%	100%	105%	110%			
CRAFT SKILL (NOTE 1)	POOR			FAIR			STD	V.GOOD	EXCELLENT	80.00%	12.0%	9.60%
CRAFT AVAIL.(NOTE 1)		POOR		FAIR			STD			90.00%	8.0%	7.20%
CLIMATE (NOTE 2)	SEVERE	ICE/SNOW			RAIN		+40 TO +85			60.00%	20.0%	12.00%
PLANT ELEVATION		OVER 10,000FT			5,000' TO 10,000 FT		UNDER 5,000 FT			100.00%	5.0%	5.00%
WORK SPACE	<---- MULTIPLE SHIFTS-			200 SF	250 SF	300 SF	350 SF			70.00%	10.0%	7.00%
WORK WEEK							4-10s / 5-8s			100.00%	15.0%	15.00%
50 HOUR WORK WEEK	//// MULTIPLE-SHIFT			OVER 7 WEEKS	3 TO 7 WEEKS	UP TO 3 WEEKS						
60 HOUR WORK WEEK			OVER 7 WEEKS	3 TO 7 WEEKS	UP TO 3 WEEKS							
SHIFTWORK												
2ND SHIFT					2ND SHIFT		ONE SHIFT ONLY			100.00%	3.0%	3.00%
3RD SHIFT			3RD SHIFT							100.00%	5.0%	5.00%
PROJECT SIZE					400M MH AND UP	300M TO 400M MH	200M TO 300M MH	200M MH OR LESS		105.00%	4.0%	4.20%
PLANT TYPE				REVAMP ONLY	REVAMP & NEW	NEW IN EXIST PLT	GRASS ROOTS			70.00%	8.0%	5.60%
AREA/UNION INFLUENCE	STRONG		MILD		SOME		NONE			40.00%	10.0%	4.00%
											100.0%	77.6%

NOTES.....

1. TURNOVER HAS BEEN CONSIDERED

2. FOR EXTERIOR WORK ONLY

EFFICIENCY (AS A % OFF CHART MANHOURS) 77.6%

MULTIPLIER – (TO BE APPLIED TO CHART M.H.'S TO OBTAIN SITE M.H.'S) 1.29

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EFFICIENCY FACTORS

CONTRACT NO. :	4424321
PROJECT DESC. :	OU2 FEASIBILITY STUDIES
PROJECT CONTROLS :	CRU2
PROJ. LOCATION :	FERNALD
PROJ. ENGINEER :	GREG JONES
ESTIMATOR :	KEN KEPLER
ESTIMATE NO. :	C29407
WBS NO. :	1.1.1.1.2.3.
TASK I.D. :	2C

EXAMPLE:

STANDARD CHART MANHOURS =	NET	100	
EFFICIENCY FACTORS:			
*SITE SPECIFIC (SEE APPENDIX A)	29%	29	
S/T = BASE UNIT MANHOURS		129	
*TASK SPECIFIC (BASED ON LABOR CHARTS OR EST.KNOWLEDGE)			
SEE DETAIL SHEETS or M.H.CHARTS	0%	0	N/A
S/T = NEW BASE UNIT MANHOURS		129	

*PPE SPECIFIC (BASED ON CURRENT DATA & EST. KNOWLEDGE)	LEVEL	D	Mod.'D'		C		B	
PRODUCTIVITY HOURS (AS ADDER TO BASE MH's)	0	0	1.1	142	1.5	194	1.75	226
TOTAL HOURS WITH PRODUCTIVITY		129	2.1	271	2.5	323	2.75	355

NOTE : Use a Default Productivity Factor of 2.1 for working *in a contaminated area if Safety Level cannot* be determined.
(SEE FERMCO ESTIMATING SERVICES REFERENCE MANUAL IM-6006 8.10)

Total hours with productivity divided by 10 hour working days = (PPE) ManDays to determine material cost of PPE's. (SEE APPENDIX C -HEALTH PHYSICS)

27 MD	32 MD	36 MD

THESE EFFICIENCY FACTORS WERE APPLIED INDIVIDUALLY THROUGHOUT THE ESTIMATE AT A TASK SPECIFIC LEVEL TO OBTAIN A MORE ACCURATE ACCOUNT OF OVERALL EFFICIENCY IMPACT DUE TO PPE REQUIREMENTS IN HANDLING CONTAMINATED AND HAZARDOUS WASTE.

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CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – OU2 FEASIBILITY STUDIES
CONTROLS – CRU2
LOCATION-FERNALD
TASK I.D. – 2C _ _

WBS NO. – 1.1.1.1.2.3. _
EST. NO. – C29407 _ _
BY – K. KEPLER
DATE – 24–Aug–94

OU2 SUB–UNIT CONSTRUCTION ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	CONSTRUCTION ACTIVITY	DURATION
SOLID WASTE LANDFILL	24–Aug–94	01–Jul–99	30–Jan–2000	31–Aug–2000	14	MONTHS
LIME SLUDGE PONDS	24–Aug–94	01–Jun–97	30–Jan–98	30–Sep–98	16	MONTHS
IN–ACTIVE FLYASH PILE	24–Aug–94	01–Nov–97	02–Apr–99	31–Aug–2000	34	MONTHS
SOUTH FIELD	24–Aug–94	01–Jun–96	16–May–97	30–Apr–98	23	MONTHS
ACTIVE FLYASH PILE	24–Aug–94	01–Jun–97	31–May–98	30–May–99	24	MONTHS
TOTAL OU2 S/U's	24–Aug–94	01–Jun–96	17–Jul–98	31–Aug–2000	51	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
65	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

001443

APPENDIX E

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – OU2 FEASIBILITY STUDIES
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3. _

EST.NO. C29407
BY KEN KEPLER
DATE 24–Aug–94
TASK ID 2C _ _

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR) CAR	LINER	COVER	CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE TONS/CY	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS 141 — $80.15 PER TON (90 TON MIN.) TONS	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	$120 DEMURAGE $/DAY (>5 DAYS)	ENVIROCARE BURIAL COSTS (1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045
	$0	$400	$395	$340	LEAD/SOIL	1.810	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 125, 141, or 200 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

001444

5861

FEMP-OU02-5 DRAFT
August 24, 1994

F-7-17

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – OU2 FEASIBILITY STUDIES
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3. _

EST.NO. C29407
BY KEN KEPLER
DATE 24–Aug–94
TASK ID 2C _ _

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf A	MAXIMUM CAPACITY cf B	MAXIMUM LOADED WEIGHT C	EMPTY WEIGHT D	ALLOWABLE LBS. OF WASTE PER CONTAINER (C –D) E	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A) F	USE CY OF WASTE PER CONTAINER G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0
	LEAD/SOIL	1.810	134.00	1971.0	196,000	0	196,000	1462.7	54.2

INPUT

001445

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – OU2 FEASIBILITY STUDIES
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3. _

EST.NO. C29407
BY KEN KEPLER
DATE 24–Aug–94
TASK ID 2C _ _

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	0.0	0	$23,816	$0	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	0.0	0	$24,180	$0	$493.47		
	LEAD/SOIL	54.20	0.0	0	$24,180	$0	$446.13		
						**			

INPUT

** NOTE:
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

001446

DETAILED COST ESTIMATE
ALTERNATIVE 6 - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA

A. FEDERAL OWNERSHIP (Expanded Trespasser)

CONTR. NO. 4424321
CLIENT U.S.DEPT. OF ENERGY
PROJECT ALT-6A - ON-SITE DISPOSAL w/>WAC TO ENVIROCARE - EXPANDED TRESPASSER
LOCATION FERNALD, OHIO
PROJ.CTL. CRU2

CONTR.NO. 4424321
EST.NO. C29407_
DATE 16-Aug-94
BY KEN KEPLER
TASK ID 2C _ _

OU2 FEASIBILITY STUDIES

TITLE	TOTAL ESTIMATE - CONSTANT 1994 DOLLARS					NET PRESENT VALUE: 37 YEAR STUDY PERIOD - 2.8% REAL DISC.RATE				
	CAPITAL COST	O & M DURING REMEDIATION	O & M POST REMEDIATION	TOTAL CONSTANT 1994 $'s	TOTAL UNIT COST PER BCY OF EXCAV.& GEN. WASTE	CAPITAL COST	O & M DURING REMEDIATION	O & M POST REMEDIATION	TOTAL NPV DOLLARS	TOTAL UNIT COST PER BCY OF EXCAV.& GEN. WASTE
ALT6A - SWL	$10,666,400		$6,181,400	$16,847,800	$567.23	$9,092,000		$3,672,800	$12,764,800	$429.76
ALT6A - SF	$26,325,500		$7,465,500	$33,791,000	$371.67	$24,149,600		$4,677,000	$28,826,600	$317.07
ALT6A - LSP	$8,993,000		$6,136,900	$15,129,900	$635.66	$8,108,900		$3,854,600	$11,963,500	$502.63
ALT6A - AFP	$19,469,400		$5,876,800	$25,346,200	$329.96	$17,356,400		$3,573,600	$20,930,000	$272.47
ALT6A - IFP	$36,310,000		$7,101,700	$43,411,700	$399.68	$31,635,000		$4,207,300	$35,842,300	$329.99
TOTAL ALT-6A	$101,764,300		$32,762,300	$134,526,600	$407.84	$90,341,900		$19,985,300	$110,327,200	$334.47

O & M POST REMEDIATION - 30 YEARS

TITLE	ANNUAL COST			FACILITY REVIEW	TOTAL
	YEAR 1	YEARS 2 - 5	YEARS 6 - 30	@ 5 YR. INTERV.'s	CONSTANT
FREQUENCY	1	4	25	6	'94 $'s
ALT6A - SWL	$347,429	$326,000	$176,400	$20,000	$6,181,400
ALT6A - SF	$408,564	$387,135	$215,535	$20,000	$7,465,500
ALT6A - LSP	$345,944	$324,515	$174,915	$20,000	$6,136,900
ALT6A - AFP	$318,940	$297,511	$169,911	$20,000	$5,876,800
ALT6A - IFP	$387,270	$365,841	$205,241	$20,000	$7,101,700
TOTAL ALT-6A	$1,808,147	$1,701,002	$942,002	$100,000	$32,762,300

F-7-21

001448

5861

FEMP-OU02-5 DRAFT
August 24, 1994

F ERMCO ESTIMATING SERVICES

EST FILE #: C29407 _ _ | DATE: 16-Aug-94

CLIENT: US DOE | SUMMARY SHEET | ESTIMATOR: KEN KEPLER

PROJECT TITLE: ALT-6A - EXCAVATION & ON-SITE DISPOSAL w/OFF-SITE DISP. OF FRACTION EXCEEDING WAC EXPANDED TRESPASSER | LOCATION: FERNALD

WBS#: 1.1.1.1.2.3 | TASK#: 2C_

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL - w/OFF-SITE OPTION	325,150		5,553,300	5,843,500	9,354,500	$20,751,300
2								
3		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		325,150		$5,553,300	$5,843,500	$9,354,500	$20,751,300
11	SUPERVISION - CONTRACTOR				945,000			$945,000
12	SM TOOLS/CONSM'BLS						333,100	$333,100
13	EQUIPMENT RENTAL						6,494,100	$6,494,100
14	TEMP. FACILITIES				116,600		216,600	$333,200
15	TEMP UTL'S HOOK-UP				58,400		108,300	$166,700
16	JOB CLEAN-UP				116,600		216,600	$333,200
17	SAFETY				58,400		108,300	$166,700
18	HEALTH PHYSICS S/C				770,600		146,100	$916,700
19	CERCLA/SAT	$1,500 PER PERSON				174,000		$174,000
20	BOND					207,600		$207,600
21	OVERHEAD & PROFIT					2,774,100		$2,774,100
22	PAYRL BRD.&BENFT.				3,961,800			$3,961,800
	INDIRECT FIELD COSTS				$6,027,400	$3,155,700	$7,623,100	$16,806,200
	DIRECT & INDIRECT FIELD COSTS				$11,580,700	$8,999,200	$16,977,600	$37,557,500
23	TRANSPORTATION & BURIAL					1,407,200		$1,407,200
24	WASTE CONTAINERS						48,500	$48,500
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					288,800		$288,800
25	SCREENING & CONFIRMATION TESTING					9,985,100		$9,985,100
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				8,050,400			$8,050,400
	FERMCO FIELD SUPPORT COSTS				$8,050,400	$11,681,100	$48,500	$19,780,000
28	EMISSION MODELING				65,800		122,000	$187,800
29	PSAR/FSAR(SAFETY RPT)				1,567,600			$1,567,600
30	ENGINEERING	TITLE I&II 7,260,900 TITLE III	7,520,800	CDR	2,754,300	DCR	1,876,900	$19,412,900
	ENGINEERING COSTS							$21,168,300
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				17,196,600	1,031,800
	SUB-TOTAL	(BASE ESTIMATE)						$79,537,600
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	20.5%						16,306,000
	TARGET ESTIMATE (BASE ESTIMATE PLUS RISK BUDGET)							$95,843,600
35	CONTINGENCY	7.4%						5,920,700
								PRELIMINARY
	TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY)							$101,764,300

LOTUS31\FS2\INDALT6A.WK3 - FEASIBILITY STUDY

001445

CONTR.NO. – [redacted]321
CLIENT – [redacted]. DEPT. OF ENERGY
PROJECT – ALT–6A – EXCAVATION & ON–SITE DISPOSAL w/OFF–SITE DISPOSAL OF FRACTION EXCEEDING WAC
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.

BUDGET ESTIMATE DETAILS
EXPANDED TRESPASSER

CONTR.NO [redacted] 4424321
EST. NO. C29407_ _
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2C

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
On–SITE DISPOSAL w/OFF–SITE														
SITE PREPARATION	1	LS		20,434						353,660	75,000	192,510	495,950	$1,117,120
DECONTAMINATION FACILITIES/SERVICES	1	LS		1,757						31,970	137,430	7,440	32,630	$209,470
EROSION AND SEDIMENT CONTROLS	1	LS		6,155						114,640		37,620	198,150	$350,410
PERCHED GROUNDWATER COLLECTION	N/A													N/A
EXCAV./SORT/SHRED/DRY – OFFSITE DISPOSAL	1	LS		462						7,840	229,730	15,380		$252,950
LOAD/HAUL – OFF–SITE DISPOSAL	1	LS		659						11,210		16,440		$27,650
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE	1	LS		64,361						1,104,150		957,610	452,500	$2,514,260
COMPOSITE LINER	1	LS		91,368						1,551,750	2,503,890	2,071,950	3,403,490	$9,531,080
COMPOSITE CAP	1	LS		21,854						370,850	433,760	531,610	1,159,290	$2,495,510
DIKE	1	LS		44,231						750,570	132,460	935,070	1,637,110	$3,455,210
GENERATED WASTE REMOVAL	1	LS		14,859						252,110		142,930		$395,040
SITE RESTORATION	1	LS		29,451						499,810		995,100	1,124,930	$2,619,840
MONITORING WELLS	1	LS									1,800,000			$1,800,000
SUB TOTAL (DIRECT FIELD COSTS)	1	LOT		295,591						$5,048,560	$5,312,270	$5,903,660	$8,504,050	$24,768,540
TAKE–OFF ALLOWANCE 10%	1	LOT		29,559						$504,860	$531,230	$590,370	$850,410	$2,476,870
TOTAL (DIRECT FIELD COSTS)	1	LOT		325,150						$5,553,400	$5,843,500	$6,494,000	$9,354,500	$27,245,400

Alt–6A – Excav. & On–Site Disposal w/Off–Site Disposal Option – Expanded Trespasser – SUMMAR

PAGE 1 of 1

001450

5861

TABLE F.4-5

ALTERNATIVE 6 - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION ABOVE WASTE ACCEPTANCE CRITERIA EXPANDED TRESPASSER AND 10^{-6} RISK LEVEL REMEDIATION AND DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Off-Site Disposal Volume (yd^3)	On-site Disposal Volume (yd^3)			Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavation		Excavation Volume to On-Site Disposal	Generated Waste Volume	Total On-Site Disposal Volume		
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total								
Solid Waste Landfill	19,500	1,700	21,200	3,000	24,200	0	24,200	3,000	27,200	5,300	0
Lime Sludge Ponds	16,800	0	16,800	1,700	18,500	0	18,500	3,000	21,500	0	0
Inactive Flyash Piles	84,800	9,200	94,000	9,400	103,400	3,100	100,300	3,000	103,300	4,000	0
South Field	77,100	500	77,600	7,800	85,400	300	85,100	3,000	88,100	6,500	0
Active Flyash Pile	65,100	0	65,100	6,500	71,600	0	71,600	3,000	74,600	0	0
Total	263,300	11,400	274,700	28,400	303,100	3,400	299,700	15,000	314,700	15,800	0

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

001451

LCC ANALYSIS TITLE:	SWL - EXC. & ON-SITE DISP. W/OFF-SITE DISP. OF FRACTION EXCEEDING WAC- (EXPANDED TRESPASSER)			
WBS NO.:	1.1.1.1.2.3.1		TASK NO.:	2CSW
ALTERNATIVE:	6A		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	37 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	07-Aug-94
DOCUMENT NO.:	LCC-94-03-01	EST. NO. C2-94-07-16 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$0	$0	$0	$0	1997
$0	$0	$0	$0	1998
$2,285,657	$0	$0	$2,285,700	1999
$8,380,743	$0	$0	$8,380,700	2000
$0	$347,429	$0	$347,400	2001
$0	$326,000	$0	$326,000	2002
$0	$326,000	$0	$326,000	2003
$0	$326,000	$0	$326,000	2004
$0	$346,000	$0	$346,000	2005
$0	$176,400	$0	$176,400	2006
$0	$176,400	$0	$176,400	2007
$0	$176,400	$0	$176,400	2008
$0	$176,400	$0	$176,400	2009
$0	$196,400	$0	$196,400	2010
$0	$176,400	$0	$176,400	2011
$0	$176,400	$0	$176,400	2012
$0	$176,400	$0	$176,400	2013
$0	$176,400	$0	$176,400	2014
$0	$196,400	$0	$196,400	2015
$0	$176,400	$0	$176,400	2016
$0	$176,400	$0	$176,400	2017
$0	$176,400	$0	$176,400	2018
$0	$176,400	$0	$176,400	2019
$0	$196,400	$0	$196,400	2020
$0	$176,400	$0	$176,400	2021
$0	$176,400	$0	$176,400	2022
$0	$176,400	$0	$176,400	2023
$0	$176,400	$0	$176,400	2024
$0	$196,400	$0	$196,400	2025
$0	$176,400	$0	$176,400	2026
$0	$176,400	$0	$176,400	2027
$0	$176,400	$0	$176,400	2028
$0	$176,400	$0	$176,400	2029
$0	$196,400	$0	$196,400	2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$10,666,400	$6,181,400	$0	$16,847,800	TOTAL
$9,092,000	$3,672,800	$0	$12,764,700	<====(@NPV)

Alternative 6 – Excavation and On-Site Disposal with Off-Site Disposal of Fraction Exceeding WAC (Expanded Trespasser)

Solid Waste Landfill

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	1	1	5	sample	$5,500.00	32	NA	$176,000	8 wells x 4 samples/year
Long Term	1	6	30	sample	$5,500.00	16	NA	$88,000	8 wells x 2 samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	2	2.58	$1,001	Inspect all wells twice/year. Repair 1 out of 8.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	1	1	5	sample	$5,500.00	22.4	NA	$123,200	One fifth x (26 wells x 4 samples/year plus 8 leachate samples/year)
Long Term	1	6	30	sample	$5,500.00	11.2	NA	$61,600	One fifth x (26 wells x 2 samples/year plus 4 leachate samples/year)
Well Inspect & Maint.	1	1	30	well	$388.14	1.3	1.68	$651	One fifth x (inspection of 26 wells twice/year & repair 1 out of 8)
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
OU2 Waste Cell Leachate									
Pipeline Maintenance	1	1	30	lump sum	$1,106.83	1	1.29	$1,428	Overall cost divided among 5 subunits.
Treatment & Disposal	1	1	30	gallon	0.01	86,000	NA	$860	Overall cost divided among 5 subunits.
Facility Maint. at Subunit									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Mowing	1	1	30	acre	$1,861.92	3.2	4.13	$7,686	Approx. 3.2 acre
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.54	0.70	$1,373	Approx. 1080 ft. perimeter
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	1	1	30	acre	$2,183.32	1.65	2.13	$4,647	Total divided among 5 subunits. (incl. side slopes)
Mowing	1	1	30	acre	$1,861.92	3.1	4.00	$7,446	Total divided among 5 subunits
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.4	0.52	$1,017	Total divided among 5 subunits
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of OU2 Cell and Subunit	5	5	30	lump Sum	$20,000	1	NA	$20,000	Total divided among 5 subunits

Annual Costs, Year 1 (excluding facility review)	$347,429
Annual Costs, Years 2–5 (excluding facility review)	$326,000
Annual Costs, Years 6–30 (excluding facility review)	$176,400
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 A:

6/2/94

001455

F ERMCO ESTIMATING SERVICES

EST FILE #: C2940716 | DATE: 16-Aug-94
CLIENT: US DOE | ESTIMATOR: KEN KEPLER
PROJECT TITLE: ALT-6A - SWL - EXCAV. & ONSITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.1 EXPANDED TRESPASSER | TASK#: 2CSW

SUMMARY SHEET

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL	35,453		$615,100	$628,100	$1,074,700	$2,317,900
		NO TREATMENT - SHRED/CRUSH, COMPOSITE LINER & CAP						
2		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		35,453		$615,100	$628,100	$1,074,700	$2,317,900
11	SUPERVISION - CONTRACTOR				$105,000			$105,000
12	SM TOOLS/CONSM'BLS						$36,900	$36,900
13	EQUIPMENT RENTAL						$642,200	$642,200
14	TEMP. FACILITIES				$12,900		$24,000	$36,900
15	TEMP UTL'S HOOK-UP				$6,500		$12,000	$18,500
16	JOB CLEAN-UP				$12,900		$24,000	$36,900
17	SAFETY				$6,500		$12,000	$18,500
18	HEALTH PHYSICS S/C				$87,800		$17,500	$105,300
19	CERCLA/SAT	$1,500 PER PERSON				$31,500		$31,500
[illegible]	IND					$23,200		$23,200
21	OVERHEAD & PROFIT					$303,600		$303,600
22	PAYRL BRD.&BENFT.				$440,300			$440,300
	INDIRECT FIELD COSTS				$671,900	$358,300	$768,600	$1,798,800
	DIRECT & INDIRECT FIELD COSTS				$1,287,000	$986,400	$1,843,300	$4,116,700
23	TRANSPORTATION & BURIAL	N/A						
24	WASTE CONTAINERS	N/A						
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$9,000		$9,000
25	SCREENING/CONFIRMATORY TESTING					$885,500		$885,500
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$856,300			$856,300
	FERMCO FIELD SUPPORT COSTS				$856,300	$894,500		$1,750,800
28	EMISSION MODELING				$7,200		$13,400	$20,600
29	PSAR/FSAR(SAFETY RPT)				$197,600			$197,600
30	ENGINEERING	TITLE I&II $728,700 TITLE III	$819,200	CDR	$399,300	DCR	$156,400	$2,103,600
	ENGINEERING COSTS							$2,321,800
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$1,856,700	$111,400
	SUB-TOTAL	(BASE ESTIMATE)						$8,300,700
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	21.5%						$1,784,700
	TARGET ESTIMATE (BASE ESTIMATE PLUS RISK BUDGET)							$10,085,400
[illegible]	CONTINGENCY	7.0%						$581,000
	TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY)							$10,666,400

001454

PRELIMINARY

LOTUS31\FS2\ALT6A\SWL\INDSUM.WK3 - FEASIBILITY STUDY

DATE: 16-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940716

ALT-6A - SWL - EXCAV. & ONSITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC EXPANDED TRESPASSER

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.1

TASK I.D. : 2CSW

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	127	$1,630	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	127	$3,050	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	127	$660	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	127	$710	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	127	$760	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	127	$460	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	127	$8,890	C/B		
SUB-TOTAL		31.80	4		$16,160			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	8		$100	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	4		$90	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	4		$700	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$1,370			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$17,500			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE.
COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

001455

DATE: 16-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940716

ALT-6A - SWL - EXCAV. & ONSITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC EXPANDED TRESPASSER

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.1

TASK I.D. : 2CSW

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

5861

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	21	84	$16.97	$1,430		
ANNUAL PHYSICALS	1	3	21	63	$16.97	$1,070		
EXIT (TERMINATION) PHYSICALS	1	4	21	84	$16.97	$1,430		
SUB-TOTAL						$3,930		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	14	1	21	299	$16.97	$5,070		
YEARLY IN-VIVO	1	4	21	84	$16.97	$1,430		
EXIT (END OF PROJECT / TERMINATION)	1	4	21	84	$16.97	$1,430		
SUB-TOTAL						$7,930		
WORK DELAYS CAUSED BY MONITORING	5%				$758,900	$37,945		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$758,900	$37,945		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$87,800	$17,500	$105,300

001456

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT-6A – SWL – ON-SITE DISPOSAL CELL – EXPANDED TRESPASSER
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CSW

WBS NO. – 1.1.1.1.2.3.1
EST. NO. – C2940716
BY – K. KEPLER
DATE – 08/03/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25-Mar-94	01-Jul-99	30-Jan-2000	31-Aug-2000	14	MONTHS

EST.DATE TO MID-POINT OF ACTIVITY	
70	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL w/OFF–SITE OPTION (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		4,219						$73,340	$15,000	$38,730	$134,390	$261,460
DECONTAMINATION FACILITIES/SERVICES	1	LS		427						$7,750	$29,880	$1,740	$8,050	$47,420
EROSION AND SEDIMENT CONTROLS	1	LS		1223						$22,820		$6,260	$46,790	$75,870
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT/DRY – OFFSITE DISPOSAL	N/A													N/A
LOAD/HAUL – OFF–SITE DISPOSAL	N/A													N/A
EXCAVATE–LOAD/HAUL TO ON–SITE DISPOSAL (SHRED/CRUSH)	1	LS		5372						$102,050		$79,320	$114,150	$295,520
COMPOSITE LINER	1	LS		9029						$150,310	$211,790	$191,760	$309,340	$863,200
COMPOSITE CAP	1	LS		1790						$30,370	$34,720	$43,990	$95,240	$204,320
DIKE FOR DISPOSAL CELL	1	LS		3308						$56,130	$10,600	$70,940	$124,630	$262,300
GENERATED WASTE REMOVAL	1	LS		3150						$53,440		$29,960		$83,400
SITE RESTORATION	1	LS		3712						$63,010		$121,080	$144,440	$328,530
MONITORING WELLS	1	LS									$269,000			$269,000
SUB–TOTAL (DIRECT FIELD COSTS)				32230						$559,220	$570,990	$583,780	$977,030	$2,691,020
TAKE–OFF ALLOWANCE 10%	1	LS		3,223						$55,920	$57,100	$58,380	$97,700	$269,100
TOTAL (DIRECT FIELD COSTS)	1	LS		35,453						$615,100	$628,100	$642,200	$1,074,700	$2,960,100

On–Site Disposal of SWL w/Off–site Option– SUMMARY

PAGE 1 of 18

F-7-31
001458
5861
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 20% ARE COMMON TO ALL SUB–UNITS)														
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	1500	LF	0.213	412	16.97				6.25	$6,990			$9,660	$16,650
c. Clear and Grub														
i. Remediation Site	4.10	AC	41.40	219	16.97			2575.00		$3,720		$10,870		$14,590
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas														
d. Dewatering														
i. Excavate Dewatering Trench	233	CY	0.50	150	16.97			1.49		$2,550		$360		$2,910
ii. Pump – w/4" Suction Hose	100	DAYS	3.00	387	16.97			19.55		$6,570		$2,010		$8,580
iv. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip	1	CY	4.00	5	16.97			100.00		$80		$100		$180
e. General Grading														
i. New Roads	12534	SY	0.001	16	16.97			0.07		$270		$900		$1,170
50% ii. Office/Parking Area 2222	1111	SY	0.010	14	16.97			0.32		$240		$370		$610
iii. Const.Equip.Decon.Pad Area 234	117	SY	0.010	2	16.97			0.32		$30		$40		$70
iv. Pers.Decon.Pad Area 14	7	SY	0.010		16.97			0.32						
v. Staging Area @ Sub–Unit 2845	1423	SY	0.010	18	16.97			0.32		$310		$470		$780
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	10445	SY	0.030	404	16.97			1.08	6.66	$6,860		$11,620	$71,650	$90,130
50% ii. Office/Parking – 8" Gravel W/ Geotextile 2222	1111	SY	0.030	43	16.97			1.08	6.66	$730		$1,240	$7,620	$9,590
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc.Slab 2845	1423	SY	0.041	75	16.97			1.45	5.51	$1,270		$2,120	$8,070	$11,460
Concrete Slab 160 x 160' x 8"thk. 631	316	CY	4.07	1656	17.98			18.38	67.00	$29,770		$5,970	$21,770	$57,510
Concrete Curb – 2'h x 480 lf x 8" thk. 24	12	CY	15.30	237	17.98			69.08	275.90	$4,260		$850	$3,410	$8,520
HDPE Perf.Sub–grade Piping – 4" 500	250	LF	0.21	68	16.97			0.74	3.02	$1,150		$190	$780	$2,120
Epoxy Coating 2845	1423	SY	0.22	404	16.97			0.77	7.56	$6,860		$1,130	$11,080	$19,070
Backfill & Compact around Slab 183	92	ICY	0.086	10	16.97			1.38				$130		$130
Mob/Demob.Equip. 1	0.50	LS	2.00	1	16.97			184.00		$20		$90		$110
g. Relocated Diversion Ditch														
i. Excavation – Ditch	3150	CY	0.24	975	16.97			0.84	7.50	$16,550		$2,650	$23,630	$42,830
SY ii. Grass Cover: Seed, Fertilize, Mulch 11000	99	MSF	0.30	38	16.97			6.75	25.00	$640		$690	$2,550	$3,880
TOTAL (SITE PREPARATION)	1	LS		4,219						$73,340	$15,000	$38,730	$134,390	$261,460

Site Preparation Details

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F-7-32
001459
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321 PRELIMINARY
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

CONTR.N[redacted] 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	50%														
a. Decon Trailer – Rental	39	20	MO					1500.00				$29,250			$29,250
	50%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	88	BCY	0.021	2	16.97			0.64		$30		$60		$90
ii. Sub–grade Prep.	167	84	SY	0.041	4	16.97		6.75	1.45	5.51	$70	$580	$120	$470	$1,240
iii. Misc. Metal Fab'n:															
1/4" Steel Plate Cover – 5' dia.	16	8	SF	0.32	3	19.21			0.73	12.55	$60		$10	$100	$170
Metal Grating 2 ft wide x 25 lf	25	13	LF	0.53	9	19.21			1.86	46.67	$170		$20	$600	$790
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	20	CY	4.07	102	17.98			14.25	67.00	$1,830		$290	$1,350	$3,470
Decon Pad Trench – 2'x2'i.d.x 25l	5	3	CY	28.22	91	17.98			98.77	202.30	$1,640		$250	$520	$2,410
Decon Pad Curb – 6" x 6" x 120 lf	5	3	CY	15.30	49	17.98			53.55	275.90	$880		$140	$710	$1,730
Pump Pad – 4' x 4' x 6" thk.	0.30	0.15	CY	10.64	2	17.98			37.24	97.20	$40		$10	$20	$70
Epoxy Coating	167	84	SY	0.22	24	17.00			0.77	7.56	$410		$70	$650	$1,130
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	1	EA	12.00	8	17.98			100.00	525.00	$140		$50	$270	$460
vi. HDPE Piping	100	50	LF	0.38	25	19.95			5.11	4.42	$500		$260	$230	$990
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	360	SF	0.04	17	16.97			0.03	1.55	$290		$10	$570	$870
4" x 4" x 9'–6" Wood Posts set in conc.	27	14	EA	0.480	8	16.97			1.68	5.75	$140		$20	$80	$240
viii. Air Diaphragm Pump 50 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$400	$630
ix. Suction and Discharge Piping	10	5	LF	0.11	1	19.95			0.39	0.84	$20				$20
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	2	LF	0.47	1	19.95			1.65	14.91	$20			$20	$40
x. Backfill & Compaction around concrete slab	BCY 258	155	ICY	0.086	17	16.97			1.38		$290		$220		$510
SUB–TOTAL (EQUIP. DECON. FACILITY)					373						$6,730	$29,830	$1,560	$5,990	$44,110

Equipment Decon. Facility Details

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F-7-33

FEMP-OU02-5 DRAFT
August 24, 1994

001490

8861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	50%														
i. Excavation – Structural	19	10	BCY	0.021		16.97			0.64				$10		$10
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	7	SY	0.041		16.97		6.75	1.45	5.51		$50	$10	$40	$100
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	2	SF	0.32	1	16.97			0.73	12.55	$20			$30	$50
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	1	CY	4.07	4	17.98			14.25	67.00	$70		$10	$50	$130
Decon Slab Sump – 2'x 2' x 3'	0.3	0.15	CY	31.84	6	17.98			111.44	250.70	$110		$20	$40	$170
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0.20	CY	15.30	4	17.98			53.55	275.90	$70		$10	$60	$140
Epoxy Coating	14	7	SY	0.22	2	17.00			0.77	7.56	$30		$10	$50	$90
v. Corrugated Fiberglass Splash Guard	132	66	SF	0.04	3	16.97			0.03	1.55	$50			$110	$160
4" x 4" x 9'–6" Wood Posts set in	6	3	EA	0.480	2	16.97			1.68	5.75	$30		$10	$20	$60
vi. Pump 20 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$410	$640
vii. Clean Wtr.Strg.Tank W/Piping – 1500 gal.	1	1	LS	32.00	21	19.95			112.00	2500.00	$420		$60	$1,250	$1,730
viii. Backfill & Compaction around concrete slab	BCY 17	10	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		54						$1,020	$50	$180	$2,060	$3,310
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		427						$7,750	$29,880	$1,740	$8,050	$47,420

Personnel Decon.Facilities/Services Details

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August 24, 1994

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CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	880	LF	0.017	19	16.97			0.06	0.65	$320		$50	$590	$960
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	500	EA	0.24	155	16.97			1.53	1.35	$2,630		$790	$700	$4,120
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 300 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. Sedimentation/Decon. Tank 10000 gal	1	LS	53.40	69	19.95			186.90	7100.00	$1,380		$190	$7,100	$8,670
iv. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	800	LF	0.38	393	19.95			5.11	4.42	$7,840		$4,090	$3,540	$15,470
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	3	EA	8.00	31	16.97			28.00	8300.00	$530		$80	$24,900	$25,510
vi. 50 gal. Pump Includes Controls & Electrical	2	EA	60.00	155	19.95			210.00	2500.00	$3,090		$420	$5,000	$8,510
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,223						$22,820		$6,260	$46,790	$75,870

Erosion Control Details

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August 24, 1994

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D. 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
LOAD & HAUL FOR ON–SITE DISPOSAL														
Excavate and Load – Level D	19400	BCY	0.055	1376	16.97			1.17		$23,350		$23,380		$46,730
Excavate Additional Soil	3000	BCY	0.055	213	16.97			1.17		$3,610		$3,620		$7,230
Haul to Onsite Disposal Cell BCY														
– 12" thk. Cushion Layer 2048	2560	LCY	0.081	267	16.97			1.51		$4,530		$3,980		$8,510
– Impacted Fill 20352	25440	LCY	0.081	2658	16.97			1.51		$45,110		$39,570		$84,680
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load	1700	BCY	0.055	121	16.97			1.17		$2,050		$2,050		$4,100
Haul to Onsite Disposal Cell BCY														
– Impacted Fill 1700	2125	LCY	0.081	222	16.97			1.51		$3,770		$3,310		$7,080
			S/T	343										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	343	HRS	150%	515	16.97			1.51		$8,740		$530		$9,270
			S/T	858										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	86	MD												
(SHREDDING COMMON TO SWL, IFP & SF)														
Shredder/Crusher – Purchase/Install 33.3%	0.3	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY 5300														
Generated Waste BCY 5602														
Excavated Debris TONS 8447														
(Percent of Gen.Waste to be Shredded) 25%														
Generated Waste TONS 3221														
TOTAL TONS 11668														
Operating Costs	194	HRS							25.75				$5,150	$5,150
(2) Operators	388	HRS	1.00	501	16.97					$8,500				$8,500
TOTAL (EXCAVATE– ON–SITE DISPOSAL)	1	LOT		5,372						$102,050		$79,320	$114,150	$295,520

Excavate for Onsite Disposal Details

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August 24, 1994

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CONTR.NO. – [redacted]21
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP.)															
a. Clear and Grubb	20%														
i. On–site Cell & Surrounding area	35	7.0	AC	41.40	374	16.97			2575.00		$6,350		$18,570		$24,920
b. Relocated South Access Road	20%														
i. Clear & Grub	3	0.6	AC	41.40	32	16.97			2575.00		$540		$1,590		$2,130
ii. General Grading	1467	293.4	SY	0.001					0.07				$20		$20
iii. Road – 8" Gravel W/Geotextile	7333	1466.6	SY	0.030	57	16.97			1.08	6.66	$970		$1,630	$10,060	$12,660
c. Haul Road	20%														
i. Clear & Grub	2.4	0.5	AC	41.40	26	16.97			2575.00		$440		$1,270		$1,710
ii. General Grading	11556	2311.2	SY	0.001	3	16.97			0.07		$50		$170		$220
iii. Road – 8" Gravel W/Geotextile	5778	1155.6	SY	0.030	45	16.97			1.08	6.66	$760		$1,290	$7,930	$9,980
	20%														
d. Temporary Construction Fencing	5200	1040.0	LF	0.213	286	16.97				6.25	$4,850			$6,700	$11,550
e. 20' wide Swing Gates	1	0.2	EA	25.60	7	16.97			340.00	560.00	$120		$70	$120	$310
f. Staging Area @ Cell	20%														
Area Excavation for Slab	1606	321.2	BCY	0.016	7	16.97			0.60		$120		$200		$320
Sub–Base for Slab	2845	569.0	SY	0.041	30	16.97		6.75	1.45	5.51	$510	$3,840	$850	$3,230	$8,430
HDPE Perf.Sub–grade Piping – 4"	500	100.0	LF	0.21	27	16.97			0.74	3.02	$460		$80	$310	$850
Concrete Slab – 160'x160'x8" thk	631	126.2	CY	4.07	663	17.98			14.25	67.00	$11,920		$1,850	$8,710	$22,480
Concrete Curb – 480'x2'x8" thk	24	4.8	CY	15.30	95	17.98			53.55	275.90	$1,710		$260	$1,360	$3,330
Epoxy Coating	2845	569.0	SY	0.22	161	16.97			0.77	7.56	$2,730		$450	$4,430	$7,610
Backfill & Compact around Slab	183	36.6	ICY	0.086	4	16.97			1.38				$50		$50
Mob/Demob.Equip.	1	0.2	LS	2.00	1	16.97			184.00		$20		$40		$60
g. Storage Area – 200' x 200' Asphalt Includes Compacted Sub–Grade	4444	889	SY	0.084	96	16.97			2.56	14.04	$1,630		$2,340	$12,850	$16,820
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat															
	20%														
h. Decon Trailer – Rental	51	10	MO					1500.00				$15,300			$15,300
i. Const.Equipment Decon. Facility	20%														
25 ft x 60 ft	1	0.20	LS	730.00	146	18.05		1160.00	2900.00	11980.00	$2,640	$230	$580	$2,400	$5,850
j. Personnel Decon. Facility	20%														
11'x 11'	1	0.20	LS	108.00	22	18.89		100.00	360.00	4120.00	$420	$20	$70	$820	$1,330
SUB–TOTAL (COMPOSITE LINER)		1	LOT		2082						$36,240	$19,390	$31,380	$58,920	$145,930

Composite Liner Details

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER														
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.														
COMPOSITE LINER														
a. Subgrade Preparation – includes removal of top soil, grading & comp.	6205	SY	0.024	192	16.97			0.86		$3,260		$5,500		$8,760
b. 95% Clay – 5% Bentonite 36" Thk BCY 6205	7322	ICY	0.260	2456	16.97			11.19	20.35	$41,680		$84,390	$153,470	$279,540
c. Composite Clay Liner	6205	SY					7.38				$45,790			$45,790
d. HDPE Liner 60 mil	6205	SY					4.75				$29,470			$29,470
e. Geotextile Fabric	6205	SY					2.25				$13,960			$13,960
f. Pea Gravel 12" Thk; In–place 2048	2202	ICY	0.11	312	16.97			0.77	17.00	$5,290		$1,750	$38,550	$45,590
g. Composite Clay Liner	6205	SY					7.38				$45,790			$45,790
h. HDPE Liner 60 mil	6205	SY					4.75				$29,470			$29,470
i. Geotextile Fabric	6205	SY					2.25				$13,960			$13,960
j. Pea Gravel 12" Thk; In–place BCY 2048	2202	ICY	0.11	312	16.97			0.77	17.00	$5,290		$1,750	$38,550	$45,590
k. Geotextile Fabric	6205	SY					2.25				$13,960			$13,960
l. HDPE Perforated Pipe – leachate collection 6" Dia.	360	LF	0.30	139	16.97			1.05	6.56	$2,360		$390	$2,430	$5,180
m. HDPE Perforated Pipe – leak detection 6" Dia.	360	LF	0.30	139	16.97			1.05	6.56	$2,360		$390	$2,430	$5,180
n. Leachate Discharge Piping														
i. HDPE Carrier & containment Pipe 6" x 10' Includes Trench Excav/Backfill, sand bedding and compaction.	280	LF	0.86	311	16.97			11.37	22.33	$5,280		$3,280	$6,440	$15,000
ii. HDPE Manhole – 4' dia. x 8' deep	1	EA	8.00	10	16.97			28.00	8300.00	530.00		$30	$8,550	$9,110
o. Impacted Fill–Cusion Layer 12" Thk BCY 2048	2560	LCY	0.06	198	16.97			1.67		$3,360		$4,400		$7,760
p. Impacted Fill–Spread and Compact BCY 20352	25440	LCY	0.06	1969	16.97			1.67		$33,410		$43,760		$77,170
q. Generated Waste BCY 5602	6442	LCY	0.06	499	16.97			1.67		$8,470		$11,080		$19,550
PPE LEVEL C Allowance is added to the														
r. Impacted fill BCY 1700	2125	LCY	0.06	164	16.97			1.67		$2,780		$3,660		$6,440
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	164	HRS	150%	246										
			S/T	410										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	41	MD												
SUB–TOTAL (COMPOSITE LINER)	1	LOT		6,947						$114,070	$192,400	$160,380	$250,420	$717,270
TOTAL (COMPOSITE LINER)	1	LOT		9,029						$150,310	$211,790	$191,760	$309,340	$863,200

Composite Liner Details

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August 24, 1994

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CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE CAP															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
COMPOSITE CAP															
a. Contouring Layer 18" Thk.	BCY 1059	1271	ICY	0.06	98	16.97			1.67	3.50	$1,660		$2,190	$4,580	$8,430
b. 95% Clay – 5% Bentonite 24" Thk	BCY 1419	1674	ICY	0.260	562	16.97			11.19	20.35	$9,540		$19,300	$35,100	$63,940
c. GML\GCC – composite Liner		2119	SY					7.38				$15,640			$15,640
d. Geotextile Fabric		2119	SY					2.25				$4,770			$4,770
e. Pea gravel 12" Thk, In–place	BCY 699	751	ICY	0.11	107	16.97			0.77	17.00	$1,820		$600	$13,160	$15,580
f. Geotextile Fabric		2119	SY					2.25				$4,770			$4,770
g. Cobbels 36" Thk; In–place	BCY 2119	2278	ICY	0.258	758	16.97			7.15	10.10	$12,860		$16,780	$23,700	$53,340
h. Geotextile Fabric		2119	SY					2.25				$4,770			$4,770
i. Sand Layer 6" Thk; In–place	BCY 360	387	ICY	0.052	26	16.97			1.76	5.00	$440		$700	$1,990	$3,130
j. Geotextile Fabric		2119	SY					2.25				$4,770			$4,770
k. Common Soil 21" Thk; In–place	BCY 1229	1475	ICY	0.06	114	16.97			1.67	3.50	$1,930		$2,540	$5,320	$9,790
l. Top Soil 6" Thk; In–place	BCY 360	432	ICY	0.053	30	16.97			1.82	12.10	$510		$810	$5,380	$6,700
m. Grass Cover – Seed, Fertilize, Mulc Utility Mix – Hydro/Air Seeding	SY 2119	19	MSF	0.30	7	16.97			6.75	25.00	$120		$130	$490	$740
n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized		400	LF	0.17	88	16.97			2.28	13.40	$1,490		$940	$5,520	$7,950
TOTAL (COMPOSITE CAP)		1	LOT		1,790						$30,370	$34,720	$43,990	$95,240	$204,320

Composite Cap Details

FEMP-OU02-5 DRAFT
August 24, 1994

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DIKE FOR DISPOSAL CELL															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
a. Borrow Common Soil – Dike	BCY 16138	19366	ICY	0.06	1499	16.97			1.67	3.50	$25,440		$33,310	$69,810	$128,560
b. Geotextile Fabric		4709	SY					2.25				$10,600			$10,600
c. Cobbels 36" Thk; In–place	BCY 4709	5062	ICY	0.258	1685	16.97			7.15	10.10	$28,590		$37,280	$52,660	$118,530
d. HDPE Drainage Pipe	6" Dia.	320	LF	0.30	124	16.97			1.05	6.56	$2,100		$350	$2,160	$4,610
TOTAL (DIKE – DISPOSAL CELL)		1	LOT		3,308						$56,130	$10,600	$70,940	$124,630	$262,300

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FEMP-OU02-5 DRAFT
August 24, 1994

Dike Details

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL															
a. Office/Parking Area @ S/U	50%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	247	BCY	0.292	93	16.97			9.16		$1,580		$2,330		$3,910
Geo–Fabric & Liner	2222	1111	SY	0.002	3	16.97			0.02		$50		$20		$70
Haul & Dump Rubble	185	93	BCY	0.30	36	16.97			2.51		$610		$240		$850
b. Const.Equip.Decon Facil.@ S/U	50%														
Demo/Remove Concrete	49.3	25	BCY	1.2	38	16.97			3.62		$640		$90		$730
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	14	BCY	0.292	5	16.97			9.16		$80		$130		$210
Geo–Fabric & Liner	167	84	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	27	14	EA	0.48	8	16.97			1.68		$140		$20		$160
Splash Guard	702	351	SF	0.04	18	16.97			0.03		$310		$10		$320
Haul & Dump Rubble	24.9	12	BCY	0.30	5	16.97			2.51		$80		$30		$110
c. Personnel Decon. Facil. @ S/U	50%														
Demo/Remove Concrete	2.2	1	BCY	1.2	2	16.97			3.62		$30				$30
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo–Fabric & Liner	14	7	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	6	3	EA	0.48	2	16.97			1.68		$30		$10		$40
Splash Guard	132	66	SF	0.04	3	16.97			0.03		$50				$50
Haul & Dump Rubble	3.5	2	BCY	0.30	1	16.97			2.51		$20				$20
d. Staging pad @ S/U	50.0%														
Demo/Remove Concrete	655	328	BCY	1.2	507	16.97			3.62		$8,600		$1,220		$9,820
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	238	BCY	0.292	89	16.97			9.16		$1,510		$2,240		$3,750
Geo–Fabric & Liner 105 cy	2845	1423	SY	0.002	4	16.97			0.02		$70		$30		$100
Haul & Dump Rubble	395.5	198	BCY	0.30	77	16.97			2.51		$1,310		$510		$1,820
	20%														
Const.Equip.Decon.Facil. @ Onsite Disp.Cell															
Demo/Remove Concrete	49.3	10	BCY	1.2	15	16.97			3.62		$250		$40		$290
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	6	BCY	0.292	2	16.97			9.16		$30		$50		$80
Geo–Fabric & Liner	167	33	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	27	5	EA	0.48	3	16.97			1.68		$50		$10		$60
Splash Guard	702	140	SF	0.04	7	16.97			0.03		$120				$120
Haul & Dump Rubble	24.9	5	BCY	0.30	2	16.97			2.51		$30		$10		$40
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		920						$15,590		$7,000		$22,590

Generated Waste Removal Details

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001468
5861
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL (CON'T.)															
Demo. /Load/Haul/Dump/Compact	20.0%														
f. Personnel Decon. Facil.@ Onsite Disp. Cell															
Demo/Remove Concrete	2.2	0.44	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	0.48	BCY	0.292		16.97			9.16						
Geo–Fabric & Liner	14	2.80	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	6	1.20	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	26.40	SF	0.04	1	16.97			0.03		$20				$20
Haul & Dump Rubble	3.5	0.70	BCY	0.30		16.97			2.51						
	20.0%														
g. Relocated South Access Road/Cell	SY														
Road – 8" Gravel W/Geotextile	7333	1467	BCY	0.292	552	16.97			9.16		$9,370		$13,840		$23,210
Haul & Dump Rubble		1467	BCY	0.30	568	16.97			2.51		$9,640		$3,790		$13,430
	20.0%														
h. Haul Road for Cell	SY														
Road – 8" Gravel W/Geotextile	5778	257	BCY	0.292	97	16.97			1.08		$1,650		$290		$1,940
Haul & Dump Rubble		257	BCY	0.30	99	16.97			2.51		$1,680		$660		$2,340
	20.0%														
i. Temporary Construction Fencing @ Cell	5200	1040	LF	0.107	143	16.97					$2,430				$2,430
Haul & Dump Rubble		135	BCY	0.30	52	16.97			2.51		$880		$350		$1,230
	20.0%														
j. 20' wide Swing Gates @ Cell	2	0.40	EA	12.75	7	16.97			340.00		$120		$140		$260
Haul & Dump Rubble		0.05	BCY	0.30		16.97			2.51						
	20.0%														
k. Storage Pad Area @ Cell	BCY														
Demo/Remove Asphalt	988	197.60	BCY	1.2	306	16.97			3.62		$5,190		$740		$5,930
Excav., Load, Haul, Backfill, Compac	474.0	94.80	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Sub–grade Stone															
Geo–Fabric & Liner	4444	888.80	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble		197.0	BCY	0.30	76	16.97			2.51		$1,290		$510		$1,800
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,941						$32,950		$21,230		$54,180

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FEMP-OU02-5 DRAFT
August 24, 1994

Generated Waste Removal Details

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.[redacted] 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

	DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL (CON'T.)														
	Demo. /Load/Haul/Dump/Compact														
	The following prorated at: 20.0%														
	I. Staging Area @ On–Site Disposal Cell														
	Demo/Remove Concrete 655	131.0	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
	Excavate, Load, Haul, Backfill, Compact														
	Sub–grade Stone 475	95.0	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
	Geo–Fabric & Liner 105 cy 2845	569.0	SY	0.002	1	16.97			0.02		$20		$10		$30
	Haul & Dump Rubble 395.5	126.0	BCY	0.30	49	16.97			2.51		$830		$330		$1,160
	TOTAL GENERATED WASTE BCY 5602 LCY 6442														
	SUB–TOTAL (GENERATED WASTE REMOVAL)	1	LOT		289						$4,900		$1,730		$6,630
	TOTAL (GENERATED WASTE REMOVAL)	1	LOT		3,150						$53,440		$29,960		$83,400

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
Solid Waste Landfill	15600	18720	ICY	0.09	2173	16.97			3.21	3.50	$36,880		$61,890	$67,490	$166,260
	50%														
Office/Parking @ S/U	494	296	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	47	ICY												
Decon.Facil.– Personnel @ S/U	7	4	ICY												
Staging Area @ S/U	1099	659	ICY												
	S/T	1006.8	ICY	0.09	117	16.97			3.21	3.50	$1,990		$3,330	$3,630	$8,950
	20%														
Staging Area at On–Site Disp.Cell	1099	264	ICY												
Storage Area at On–Site Disp.Cell	474	114	ICY												
Decon.Facil.– Const.Equip.@ Cell	78	19	ICY												
Decon.Facil.– Personnel @ Cell	7	2	ICY												
Relocated South Access Road	1628	391	ICY												
Haul Road	1283	308	ICY												
	S/T	1096.6	ICY	0.09	127	16.97			3.21	3.50	$2,160		$3,630	$3,950	$9,740
b. Final Grade for SWL (Excludes Cap)		7330	SY	0.02	189	16.97			0.70		$3,210		$5,280		$8,490
c. Borrow Top Soil 6" Thk., Spread															
Solid Waste Landfill		7330	SY	0.036	340	16.97			2.33	2.88	$5,770		$17,590	$21,740	$45,100
	50%														
Office/Parking @ S/U	2222	1333	SY												
Decon.Facil.– Const.Equip. @ S/U	167	100	SY												
Decon.Facil.– Personnel @ S/U	14	8	SY												
Staging Area @ S/U	2845	1423	SY												
	S/T	2864.3	SY	0.036	133	16.97			2.33	2.88	$2,260		$6,870	$8,500	$17,630
	20%														
Staging Area at On–Site Disp.Cell	2845	683	SY												
Storage Area at On–Site Disp.Cell	4444	1067	SY												
Decon.Facil.– Const.Equip.@ Cell	167	40	SY												
Decon.Facil.– Personnel @ Cell	14	3	SY												
Relocated South Access Road	14667	3520	SY												
Haul Road	11556	2773	SY												
	S/T	8086.3	SY	0.036	376	16.97			2.33	2.88	$6,380		$19,410	$23,990	$49,780
(SUB–TOTAL SITE RESTORATION)		1	LOT		3,455						$58,650		$118,000	$129,300	$305,950

Site Restoration Details

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Solid Waste Landfill	7330	66	MSF	0.30	26	16.97			6.75	25.00	$440		$460	$1,700	$2,600
	50%														
Office/Parking @ S/U	2222	10	MSF												
Decon.Facil.– Const.Equip. @ S/U	167	0.75	MSF												
Decon.Facil.– Personnel @ S/U	14	0.06	MSF												
Staging Area @ S/U	2845	12.8	MSF												
	S/T	23.6	MSF	0.30	9	16.97			6.75	25.00	$150		$160	$610	$920
	20%														
Staging Area at On–Site Disp.Cell	2845	5.12	MSF												
Storage Area at On–Site Disp.Cell	4444	8.00	MSF												
Decon.Facil.– Const.Equip.@ Cell	167	0.30	MSF												
Decon.Facil.– Personnel @ Cell	14	0.03	MSF												
Relocated South Access Road	14667	26.40	MSF												
Haul Road	11556	20.8	MSF												
	S/T	60.7	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,560	$2,370
e. Security Fence – 6ga aluminized – 6' high		1080	LF	0.13	178	16.97			1.64	9.80	$3,020		$1,820	$10,900	$15,740
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
(SUB–TOTAL SITE RESTORATION)		1	LOT		257						$4,360		$3,080	$15,140	$22,580
(TOTAL SITE RESTORATION)		1	LOT		3,712						$63,010		$121,080	$144,440	$328,530

Site Restoration Details

FEMP-OU02-5 DRAFT
August 24, 1994

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II MW														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility MW 1 Pair x 120 ft/pair	2	PR					23000.00				$46,000			$46,000
b. MW at S/U – Type I & II	8	PR					23000.00				$184,000			$184,000
c. Abandon Existing Wells	3	EA					13000.00				$39,000			$39,000
TOTAL (MONITORING WELLS)	1	LOT									$269,000			$269,000

Monitoring Wells Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	45000	GAL					0.01				$500			$500
Runnoff from the Exclusion Zone.	850000	GAL					0.01				$8,500			$8,500
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$9,000			$9,000

Waste Water Treatment Operations Cost Details

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940716
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATORY TESTING														
Excavation														
Full TCLP	120	EA					2,002				$240,200			$240,200
Rad	120	EA					2,000				$240,000			$240,000
Confirmatory tests														
Full Rad Test	60	EA					3,101				$186,100			$186,100
Full HSL	25	EA					1,500				$37,500			$37,500
Full TCLP	25	EA					2,002				$50,100			$50,100
2 Technicians per month	10	MO					13,163				$131,600			$131,600
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING/CONFIRMATORY TEST)	1	LOT									$885,500			$885,500

Screening/Confirmatory Testing Details

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FEMP-OU02-5 DRAFT
August 24, 1994

FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

PROJECT: ALT. 6A, SWL- EXCAV.& ON-SITE DISPOSAL W/OFF-SITE DISPOSAL OF FRACTION EXCEEDING WAC
CLIENT: DOE
CONTRACT: C2-94-07-16

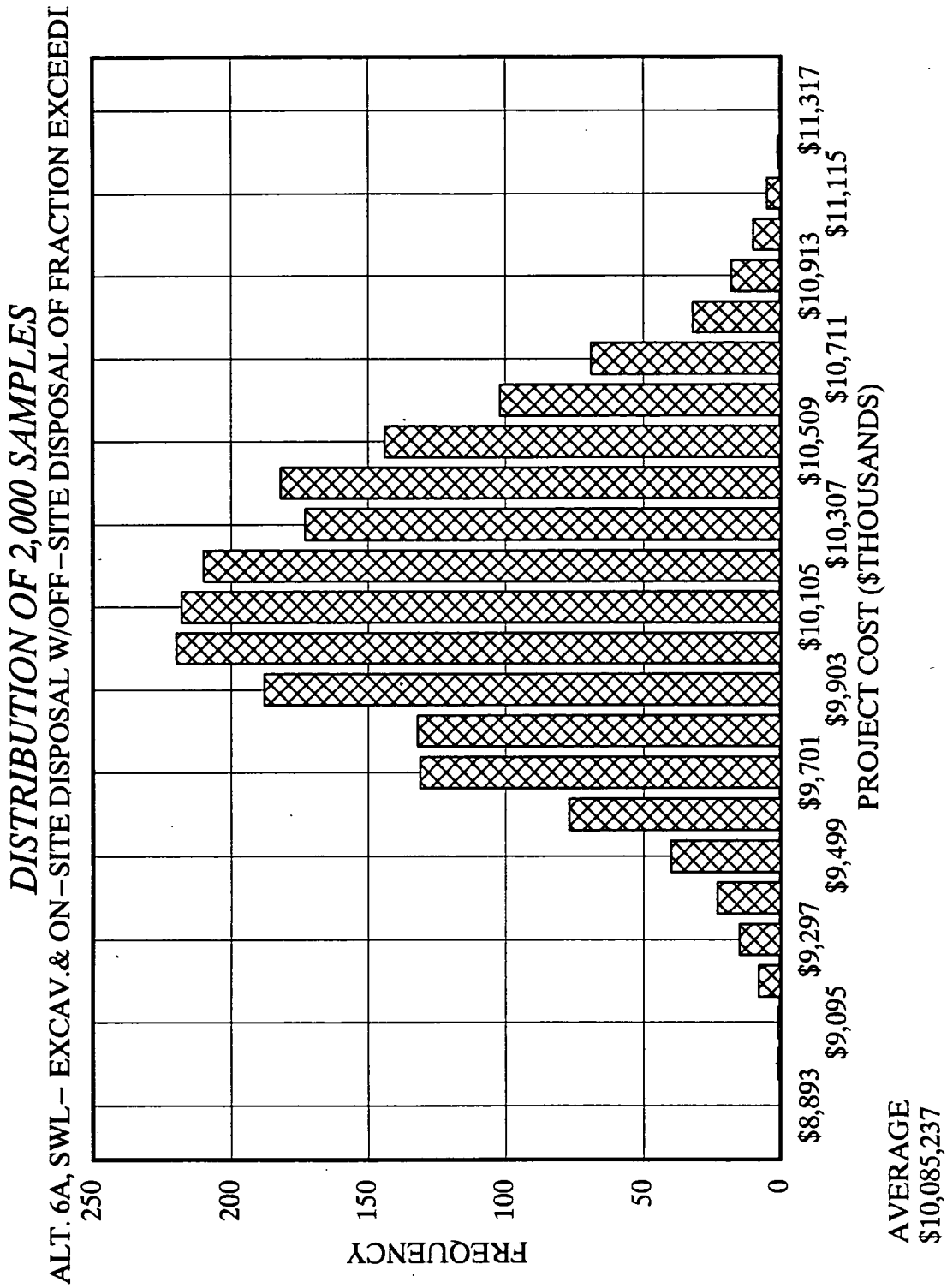
ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$80,670	-5.0%	$76,637	30%	$104,871	U		14%
2	SITE PREPERATION S/C	16,500	-5.0%	15,675	30%	21,450	U		14%
3	SITE PREPERATION MAT'L	147,830	-5.0%	140,439	20%	177,396	U		20%
4	DECON FACILITIES/SERVICES LABOR	8,530	-2.0%	8,359	80%	15,354	U		2%
5	DECON FACILITIES/SERVICES S/C	32,870	-6.0%	30,898	80%	59,166	U		7%
6	DECON FACILITIES/SERVICES MAT'L	8,860	-6.0%	8,328	60%	14,176	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	25,100	-6.0%	23,594	125%	56,475	U		5%
8	EROSION/SEDIMENT CNTRLS MAT'L	51,470	-6.0%	48,382	150%	128,675	U		4%
9	EXC & LOAD ON-SITE DISP LABOR	112,260	-2.0%	110,015	150%	280,650	U		1%
10	EXC & LOAD ON-SITE DISP MAT'L	125,570	-2.0%	123,059	100%	251,140	U		2%
11	COMPOSITE LINER LABOR	165,340	-2.0%	162,033	125%	372,015	U		2%
12	COMPOSITE LINER S/C	232,970	-2.0%	228,311	75%	407,698	U		3%
13	COMPOSITE LINER MAT'L	340,210	-6.0%	319,797	70.0%	578,357	U		8%
14	COMPOSITE CAP LABOR	33,410	-6.0%	31,405	100.0%	66,820	U		6%
15	COMPOSITE CAP S/C	38,190	-10.0%	34,371	100.0%	76,380	U		9%
16	COMPOSITE CAP MAT'L	104,760	-6.0%	98,474	80.0%	188,568	U		7%
17	DIKE LABOR	61,740	-10.0%	55,566	100.0%	123,480	U		9%
18	DIKE S/C	11,660	-10.0%	10,494	90.0%	22,154	U		10%
19	DIKE MAT'L	137,090	-10.0%	123,381	80.0%	246,762	U		11%
20	GENERATED WASTE REMVL LABOR	58,780	-6.0%	55,253	150.0%	146,950	U		4%
21	SITE RESTORATION LABOR	69,310	-10.0%	62,379	80.0%	124,758	U		11%
22	SITE RESTORATION MAT'L	158,880	-10.0%	142,992	80.0%	285,984	U		11%
23	MONITORING WELLS S/C	295,900	-5.0%	281,105	50.0%	443,850	U		9%
24	INDIRECT FIELD COSTS LABOR	671,900	-5.0%	638,305	50.0%	1,007,850	U		9%
25	INDIRECT FIELD COSTS S/C	358,300	-5.0%	340,385	100.0%	716,600	U		5%
26	INDIRECT FIELD COSTS MAT'L	768,600	-5.0%	730,170	50.0%	1,152,900	U		9%
27	FIELD SUPPORT COSTS LABOR	856,300	-10.0%	770,670	30.0%	1,113,190	U		25%
28	FIELD SUPPORT COSTS S/C	894,500	-5.0%	849,775	30.0%	1,162,850	U		14%
29	ENGINEERING COSTS	2,321,800	-5.0%	2,205,710	25.0%	2,902,250	U		17%
30	SALES TAX MAT'L	111,400	-1.0%	110,286	1.0%	112,514	U		50%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$8,300,700		$7,836,248		$12,361,283			

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

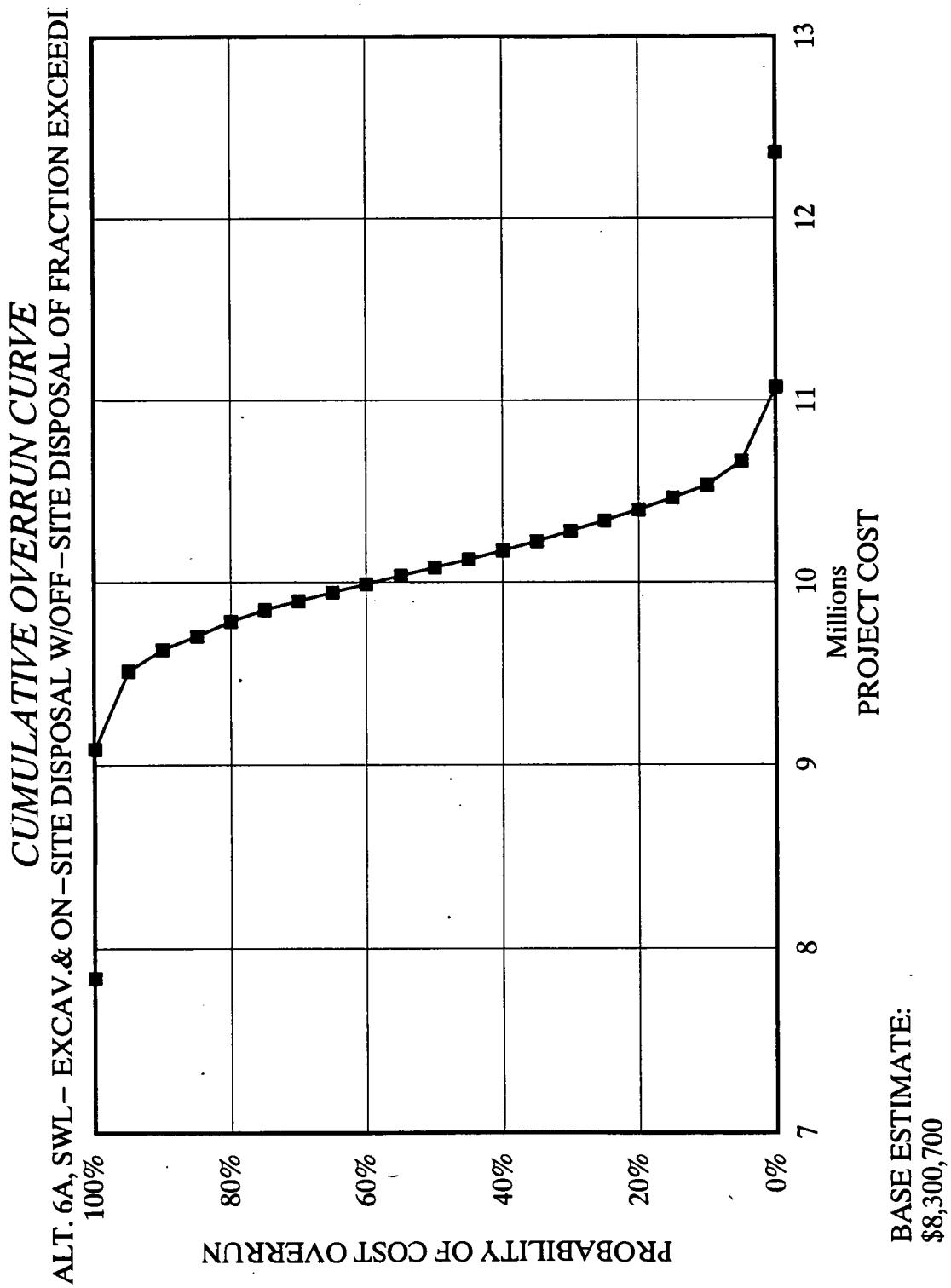
PROJECT: ALT. 6A, SWL– EXCAV.& ON–SITE DISPOSAL W/OFF–SITE DISPOSAL OF I
CLIENT: DOE DATE: 07–Aug–94
CONTRACT: C2–94–07–16 BASE ESTIMATE: $8,300,700

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$12,361,283	$4,060,583	48.9%
0.05%	$11,075,420	$2,774,720	33.4%
5.00%	$10,664,725	$2,364,025	28.5%
10.00%	$10,533,040	$2,232,340	26.9%
15.00%	$10,463,833	$2,163,133	26.1%
20.00%	$10,397,839	$2,097,139	25.3%
25.00%	$10,337,991	$2,037,291	24.5%
30.00%	$10,280,952	$1,980,252	23.9%
35.00%	$10,226,554	$1,925,854	23.2%
40.00%	$10,173,208	$1,872,508	22.6%
45.00%	$10,126,861	$1,826,161	22.0%
50.00%	$10,081,834	$1,781,134	21.5%
55.00%	$10,035,806	$1,735,106	20.9%
60.00%	$9,990,267	$1,689,567	20.4%
65.00%	$9,945,333	$1,644,633	19.8%
70.00%	$9,894,805	$1,594,105	19.2%
75.00%	$9,846,956	$1,546,256	18.6%
80.00%	$9,784,721	$1,484,021	17.9%
85.00%	$9,704,011	$1,403,311	16.9%
90.00%	$9,630,808	$1,330,108	16.0%
95.00%	$9,512,791	$1,212,091	14.6%
99.95%	$9,087,725	$787,025	9.5%
100.00%	$7,836,248	($464,452)	–5.6%

5861


DISTRIBUTION OF 2,000 SAMPLES
ALT. 6A, SWL– EXCAV.& ON–SITE DISPOSAL W/OFF–SITE DISPOSAL OF FRACTION EXCEEDI
FREQUENCY
250
200
150
100
50
0
$8,893
$9,095
$9,297
$9,499
$9,701
$9,903
$10,105
$10,307
$10,509
$10,711
$10,913
$11,115
$11,317
PROJECT COST ($THOUSANDS)
AVERAGE
$10,085,237

001478


CUMULATIVE OVERRUN CURVE
ALT. 6A, SWL – EXCAV.& ON–SITE DISPOSAL W/OFF–SITE DISPOSAL OF FRACTION EXCEEDI
PROBABILITY OF COST OVERRUN
100%
80%
60%
40%
20%
0%
7
8
9
10
11
12
13
Millions
PROJECT COST
BASE ESTIMATE:
$8,300,700

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A – SWL – EXCAV. & ONSITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940716
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$8,300,700	BASE EST:	$80,670	BASE EST:	$16,500	BASE EST:	$147,830	BASE EST:	$8,530	BASE EST:	$32,870	BASE EST:	$8,860
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	30%					–1%	30%				
MATERIAL PRICING			–5%	30%	–5%	20%			–5%	30%	–5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							–1%	50%	–1%	50%	–1%	40%
(OTHER)												
TOTAL %	–5%	30%	–5%	30%	–5%	20%	–2%	80%	–6%	80%	–6%	60%
TOTAL $	$76,637	$104,871	$15,675	$21,450	$140,439	$177,396	$8,359	$15,354	$30,898	$59,166	$8,328	$14,176

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001480

R861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A – SWL – EXCAV. & ONSITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940716
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$25,100	BASE EST:	$0	BASE EST:	$51,470	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	75%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-1%	75%			-1%	75%						
(OTHER)												
TOTAL %	-6%	125%	0%	0%	-6%	150%	0%	0%	0%	0%	0%	0%
TOTAL $	$23,594	$56,475	$0	$0	$48,382	$128,675	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001481

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A – SWL – EXCAV. & ONSITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940716
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-55

001482

FEMP-OU02-5 DRAFT
August 24, 1994

586

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A - SWL - EXCAV. & ONSITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940716
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	EXCAVATE & LOAD TO ON-SITE DISPOSAL LABOR $'s		EXCAVATE & LOAD TO ON-SITE DISPOSAL S/C $'s		EXCAVATE & LOAD TO ON-SITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$112,260	BASE EST:	$0	BASE EST:	$125,570	BASE EST:	$165,340	BASE EST:	$232,970	BASE EST:	$340,210
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	100%					-1%	75%	-1%	25%		
MATERIAL PRICING					-1%	50%					-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%			-1%	50%	-1%	50%	-1%	50%	-1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-2%	150%	0%	0%	-2%	100%	-2%	125%	-2%	75%	-6%	70%
TOTAL $	$110,015	$280,650	$0	$0	$123,059	$251,140	$162,033	$372,015	$228,311	$407,698	$319,797	$578,357

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001483

F-7-56

FEMP-OU02-5 DRAFT
August 24, 1994

COST IMPACT MATRIX

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A – SWL – EXCAV. & ONSITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

EST. NO: C2940716
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		DIKE LABOR $'s		DIKE S/C $'s		DIKE MAT'L. $'s	
	BASE EST:	$33,410	BASE EST:	$38,190	BASE EST:	$104,760	BASE EST:	$61,740	BASE EST:	$11,660	BASE EST:	$137,090
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–5%	50%				
MATERIAL PRICING			–5%	50%	–5%	30%			–5%	40%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	50%	–5%	50%	–1%	50%	–5%	50%	–5%	50%	–5%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	100%	–10%	100%	–6%	80%	–10%	100%	–10%	90%	–10%	80%
TOTAL $	$31,405	$66,820	$34,371	$76,380	$98,474	$188,568	$55,566	$123,480	$10,494	$22,154	$123,381	$246,762
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A – SWL – EXCAV. & ONSITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940716
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$58,780	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION							-1%	100%				
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-6%	150%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$55,253	$146,950	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001485

F-7-58

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A – SWL – EXCAV. & ONSITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940716
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$69,310	BASE EST:	$0	BASE EST:	$158,880	BASE EST:	$0	BASE EST:	$295,900	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-5%	50%			-5%	50%						
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-10%	80%	0%	0%	-10%	80%	0%	0%	-5%	50%	0%	0%
TOTAL $	$62,379	$124,758	$0	$0	$142,992	$285,984	$0	$0	$281,105	$443,850	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001486

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–6A – SWL – EXCAV. & ONSITE DISPL. w/OFF–SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940716
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS	
	LABOR $'s		S/C $'s		MAT'L. $'s		LABOR $'s		S/C $'s		MAT'L. $'s	
	BASE EST:	$671,900	BASE EST:	$358,300	BASE EST:	$768,600	BASE EST:	$856,300	BASE EST:	$894,500	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–10%	30%				
MATERIAL PRICING			–5%	100%	–5%	50%			–5%	30%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	–5%	100%	–5%	50%	–10%	30%	–5%	30%	0%	0%
TOTAL $	$638,305	$1,007,850	$340,385	$716,600	$730,170	$1,152,900	$770,670	$1,113,190	$849,775	$1,162,850	$0	$0
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001487

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A – SWL – EXCAV. & ONSITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940716
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSW

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$2,321,800	BASE EST:	$111,400	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-5%	25%										
(OTHER)												
TOTAL %	-5%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$2,205,710	$2,902,250	$110,286	$112,514	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001488

F-7-61

FEMP-OU02-5 DRAFT
August 24, 1994

5861

LCC ANALYSIS TITLE:	LSP - EXC. & ON-SITE DISP. W/OFF-SITE DISP. OF FRACTION EXCEEDING WAC (EXPANDED TRESPASSER)			
WBS NO.:	1.1.1.1.2.3.3		TASK NO.:	2CLS
ALTERNATIVE:	6A		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	35 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	07-Aug-94
DOCUMENT NO.:	LCC-94-03-02	EST. NO. C2-94-07-17 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$2,248,250	$0	$0	$2,248,300	1997
$6,744,750	$0	$0	$6,744,800	1998
$0	$345,944	$0	$345,900	1999
$0	$324,515	$0	$324,500	2000
$0	$324,515	$0	$324,500	2001
$0	$324,515	$0	$324,500	2002
$0	$344,515	$0	$344,500	2003
$0	$174,915	$0	$174,900	2004
$0	$174,915	$0	$174,900	2005
$0	$174,915	$0	$174,900	2006
$0	$174,915	$0	$174,900	2007
$0	$194,915	$0	$194,900	2008
$0	$174,915	$0	$174,900	2009
$0	$174,915	$0	$174,900	2010
$0	$174,915	$0	$174,900	2011
$0	$174,915	$0	$174,900	2012
$0	$194,915	$0	$194,900	2013
$0	$174,915	$0	$174,900	2014
$0	$174,915	$0	$174,900	2015
$0	$174,915	$0	$174,900	2016
$0	$174,915	$0	$174,900	2017
$0	$194,915	$0	$194,900	2018
$0	$174,915	$0	$174,900	2019
$0	$174,915	$0	$174,900	2020
$0	$174,915	$0	$174,900	2021
$0	$174,915	$0	$174,900	2022
$0	$194,915	$0	$194,900	2023
$0	$174,915	$0	$174,900	2024
$0	$174,915	$0	$174,900	2025
$0	$174,915	$0	$174,900	2026
$0	$174,915	$0	$174,900	2027
$0	$194,915	$0	$194,900	2028
				2029
				2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$8,993,000	$6,136,900	$0	$15,129,500	TOTAL
$8,108,900	$3,854,600	$0	$11,963,300	<====(@NPV)

F ERMCO ESTIMATING SERVICES

SUMMARY SHEET

586F

EST FILE #: C2940717 | DATE: 16-Aug-94
CLIENT: US DOE | ESTIMATOR: KEN KEPLER
PROJECT TITLE: ALT-6A- LSP - EXCAV. & ON-SITE DISP. w/OFF-SITE DISP. OF FRACTION EXCEEDING WAC | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.3 EXPANDED TRESPASSER | TASK#: 2CLS

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL NO TREATMENT - COMPOSITE LINER, CAP, DIKE	33,805		$580,100	$624,000	$1,004,800	$2,208,900
2		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
		DIRECT FIELD COSTS	33,805		$580,100	$624,000	$1,004,800	$2,208,900
11		SUPERVISION - CONTRACTOR			$99,000			$99,000
12		SM TOOLS/CONSM'BLS					$34,800	$34,800
13		EQUIPMENT RENTAL					$637,600	$637,600
14		TEMP. FACILITIES			$12,200		$22,600	$34,800
15		TEMP UTL'S HOOK-UP			$6,100		$11,300	$17,400
16		JOB CLEAN-UP			$12,200		$22,600	$34,800
17		SAFETY			$6,100		$11,300	$17,400
18		HEALTH PHYSICS S/C			$81,700			$81,700
19		CERCLA/SAT $1,500 PER PERSON				$25,500		$25,500
20		BOND				$22,100		$22,100
21		OVERHEAD & PROFIT				$289,300		$289,300
22		PAYRL BRD.&BENFT.			$414,600			$414,600
		INDIRECT FIELD COSTS			$631,900	$336,900	$740,200	$1,709,000
		DIRECT & INDIRECT FIELD COSTS			$1,212,000	$960,900	$1,745,000	$3,917,900
23		TRANSPORTATION & BURIAL N/A						
24		WASTE CONTAINERS N/A						
37		SOILWASH OPERATIONS (OU5) N/A						
37		PULSE DRY OPRATIONS (OU1) N/A						
37		WASTE WATER TREATMENT COST (OU5)				$10,500		$10,500
25		SCREENING & CONFIRMATORY TESTING				$731,300		$731,300
26		PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)						
27		CONSTR MGMT-FERMCO			$717,000			$717,000
		FERMCO FIELD SUPPORT COSTS			$717,000	$741,800		$1,458,800
28		EMISSION MODELING			$6,900		$12,700	$19,600
29		PSAR/FSAR(SAFETY RPT)			$109,700			$109,700
30		ENGINEERING TITLE I&II $544,600 TITLE III	$513,200	CDR	$188,100	DCR	$141,000	$1,386,900
		ENGINEERING COSTS						$1,516,200
31		SALES TAX 6.0%	SUB-TOTAL MATERIAL DOLLARS				$1,757,700	$105,500
		SUB-TOTAL (BASE ESTIMATE)						$8,998,400
32		G&A-FERMCO (SEE EXCLUSION COMMENTS)						
33		ESCALATION (SEE EXCLUSION COMMENTS)						
34		RISK BUDGET 21.5%						$1,504,700
		TARGET ESTIMATE (BASE ESTIMATE PLUS RISK BUDGET)						$8,503,100
		CONTINGENCY 7.0%						$489,900
								PRELIMINARY
		TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY)						$8,993,000

001483 ...FS2\ALT6A\LSP\INDSUM.WK3 - FEASIBILITY STUDY

Alternative 6 – Excavation and On-Site Disposal with Off-Site Disposal of Fraction Exceeding WAC (Expanded Trespasser)

Lime Sludge Ponds

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	1	1	5	sample	$5,500.00	32	NA	$176,000	8 wells x 4 samples/year
Long Term	1	6	30	sample	$5,500.00	16	NA	$88,000	8 wells x 2 samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	2	2.58	$1,001	Inspection of all wells twice/year. Repair 1 out of 8
Groundwater Monitoring at OU2 Waste Cell									
Short Term	1	1	5	sample	$5,500.00	22.4	NA	$123,200	One fifth x (26 wells x 4 samples/year plus 8 leachate samples/year)
Long Term	1	6	30	sample	$5,500.00	11.2	NA	$61,600	One fifth x (26 wells x 2 samples/year plus 8 leachate samples/year)
Well Inspect & Maint.	1	1	30	well	$388.14	1.3	1.68	$651	One fifth x (inspection of 26 wells twice/year & repair 1 out of 8)
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
OU2 Waste Cell Leachate									
Pipeline Maintenance	1	1	30	lump sum	$1,106.83	1	1.29	$1,428	Overall cost divided among 5 subunits.
Treatment & Disposal	1	1	30	gallon	0.01	86,000	NA	$860	Overall cost divided among 5 subunits.
Facility Maint. at Subunit									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Mowing	1	1	30	acre	$1,861.92	2.7	3.48	$6,485	Approx. 2.7 acre
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.65	0.84	$1,653	Approx. 1300 ft. perimeter
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	1	1	30	acre	$2,183.32	1.45	1.87	$4,084	Total divided among 5 subunits. (Incl. side slopes)
Mowing	1	1	30	acre	$1,861.92	3.1	4.00	$7,446	Total divided among 5 subunits
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.4	0.52	$1,017	Total divided among 5 subunits
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of OU2 Cell and Subunit	5	5	30	Lump Sum	$20,000	1	NA	$20,000	Total divided among 5 subunits

Annual Costs, Year 1 (excluding facility review)	$345,944
Annual Costs, Years 2–5 (excluding facility review)	$324,515
Annual Costs, Years 6–30 (excluding facility review)	$174,915
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 A:

6/2/94

001491

DATE: 16-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940717

ALT-6A- LSP - EXCAV. & ON-SITE DISP. w/OFF-SITE DISP. OF FRACTION EXCEEDING WAC

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.3

EXPANDED TRESPASSER

TASK I.D. : 2CLS

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	• NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			•	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	0	$0	C/B		
SUB-TOTAL		31.80	4		$0			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	0		$0	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	0		$0	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	0		$0	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	0		$0	C/B		
THERMO STRIPS	EA	50.00	0		$0	C/B		
SUB-TOTAL		327.21			$0			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$0			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

001492

DATE: 16-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940717

ALT-6A- LSP - EXCAV. & ON-SITE DISP. w/OFF-SITE DISP. OF FRACTION EXCEEDING WAC EXPANDED TRESPASSER

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.3

TASK I.D. : 2CLS

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	17	68	$16.97	$1,150		
ANNUAL PHYSICALS	1	3	17	51	$16.97	$870		
EXIT (TERMINATION) PHYSICALS	1	4	17	68	$16.97	$1,150		
SUB-TOTAL						$3,170		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	16	1	17	275	$16.97	$4,670		
YEARLY IN-VIVO	1	4	17	68	$16.97	$1,150		
EXIT (END OF PROJECT / TERMINATION)	1	4	17	68	$16.97	$1,150		
SUB-TOTAL						$6,970		
WORK DELAYS CAUSED BY MONITORING	5%				$715,700	$35,785		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$715,700	$35,785		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$81,700	$0	$81,700

001493

5 861

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT-6A- LSP - EXCAV. & ON-SITE DISP. w/OFF-SITE DISP. OF FRACTION EXCEEDING WAC
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CLS

WBS NO. – 1.1.1.1.2.3.3
EST. NO. – C2940717
BY – K. KEPLER
DATE – 08/03/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25–Mar–94	01–Jun–97	30–Jan–98	30–Sep–98	16	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
46	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

001494

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL w/OFF–SITE OPTION (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		4,232						$73,550	$15,000	$32,370	$93,230	$214,150
DECONTAMINATION FACILITIES/SERVICES	1	LS		427						$7,750	$29,880	$1,740	$8,050	$47,420
EROSION AND SEDIMENT CONTROLS	1	LS		1138						$21,300		$7,390	$20,320	$49,010
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT/DRY – OFFSITE DISPOSAL	N/A													N/A
LOAD/HAUL – OFF–SITE DISPOSAL	N/A													N/A
EXCAVATE–LOAD/HAUL TO ON–SITE DISPOSAL (SHRED/CRUSH)	1	LS		3928						$67,010		$60,190	$110,430	$237,630
COMPOSITE LINER	1	LS		7730						$132,450	$187,770	$166,880	$279,100	$766,200
COMPOSITE CAP	1	LS		1567						$26,600	$30,360	$38,490	$83,380	$178,830
DIKE FOR DISPOSAL CELL	1	LS		2893						$49,090	$9,270	$62,080	$109,060	$229,500
GENERATED WASTE REMOVAL	1	LS		3150						$53,440		$29,960		$83,400
SITE RESTORATION	1	LS		5667						$96,190		$180,500	$209,840	$486,530
MONITORING WELLS	1	LS									$295,000			$295,000
SUB–TOTAL (DIRECT FIELD COSTS)				30732						$527,380	$567,280	$579,600	$913,410	$2,587,670
TAKE–OFF ALLOWANCE 10%	1	LS		3,073						$52,740	$56,730	$57,960	$91,340	$258,770
TOTAL (DIRECT FIELD COSTS)	1	LS		33,805						$580,100	$624,000	$637,600	$1,004,800	$2,846,500

On–Site Disposal of LSP w/Off–site Option– SUMMARY

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001495

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321 PRELIMINARY
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

CONTR.N[redacted] 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION															
(ITEMS @ 20% ARE COMMON TO ALL SUB–UNITS)															
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)															
a. Construction Survey		1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing		1500	LF	0.213	412	16.97				6.25	$6,990			$9,660	$16,650
c. Clear and Grub															
i. Remediation Site		4.00	AC	41.40	214	16.97			2575.00		$3,630		$10,610		$14,240
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas															
d. Dewatering															
i. Excavate Dewatering Trench		335	CY	0.50	216	16.97			1.49		$3,670		$510		$4,180
ii. Pump – w/4" Suction Hose		150	DAYS	3.00	581	16.97			19.55		$9,860		$3,020		$12,880
iv. HDPE Pipe to Sedimentation Tank		400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip		1	CY	4.00	5	16.97			100.00		$80		$100		$180
e. General Grading															
i. New Roads		4445	SY	0.001	6	16.97			0.07		$100		$320		$420
	50%														
ii. Office/Parking Area	2222	1111	SY	0.010	14	16.97			0.32		$240		$370		$610
iii. Const.Equip.Decon.Pad Area	234	117	SY	0.010	2	16.97			0.32		$30		$40		$70
iv. Pers.Decon.Pad Area	14	7	SY	0.010		16.97			0.32						
v. Staging Area @ Sub–Unit	2845	1423	SY	0.010	18	16.97			0.32		$310		$470		$780
f. Surfacing/Paving/Concrete Slab															
i. New Roads – 8" Gravel W/Geotextile		4445	SY	0.030	172	16.97			1.08	6.66	$2,920		$4,940	$30,490	$38,350
	50%														
ii. Office/Parking – 8" Gravel W/ Geot	2222	1111	SY	0.030	43	16.97			1.08	6.66	$730		$1,240	$7,620	$9,590
iii. Staging Area @ Sub–Unit – 160' x160' Concrete															
Sub–Grade & Sub–Base for Conc.Slab	2845	1423	SY	0.041	75	16.97			1.45	5.51	$1,270		$2,120	$8,070	$11,460
Concrete Slab 160 x 160' x 8"thk.	631	316	CY	4.07	1656	17.98			18.38	67.00	$29,770		$5,970	$21,770	$57,510
Concrete Curb – 2'h x 480 lf x 8" thl	24	12	CY	15.30	237	17.98			69.08	275.90	$4,260		$850	$3,410	$8,520
HDPE Perf.Sub–grade Piping – 4"	500	250	LF	0.21	68	16.97			0.74	3.02	$1,150		$190	$780	$2,120
Epoxy Coating	2845	1423	SY	0.22	404	16.97			0.77	7.56	$6,860		$1,130	$11,080	$19,070
Backfill & Compact around Slab	183	92	ICY	0.086	10	16.97			1.38				$130		$130
Mob/Demob.Equip.	1	0.50	LS	2.00	1	16.97			184.00		$20		$90		$110
TOTAL (SITE PREPARATION)		1	LS		4,232						$73,550	$15,000	$32,370	$93,230	$214,150

Site Preparation Details

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C861

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	50%														
a. Decon Trailer – Rental	39	20	MO					1500.00				$29,250			$29,250
	50%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	88	BCY	0.021	2	16.97			0.64		$30		$60		$90
ii. Sub–grade Prep.	167	84	SY	0.041	4	16.97		6.75	1.45	5.51	$70	$580	$120	$470	$1,240
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	8	SF	0.32	3	19.21			0.73	12.55	$60		$10	$100	$170
Metal Grating 2 ft wide x 25 lf	25	13	LF	0.53	9	19.21			1.86	46.67	$170		$20	$600	$790
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	20	CY	4.07	102	17.98			14.25	67.00	$1,830		$290	$1,350	$3,470
Decon Pad Trench – 2'x2'i.d.x 25l	5	3	CY	28.22	91	17.98			98.77	202.30	$1,640		$250	$520	$2,410
Decon Pad Curb – 6" x 6" x 120 lf	5	3	CY	15.30	49	17.98			53.55	275.90	$880		$140	$710	$1,730
Pump Pad – 4' x 4' x 6" thk.	0.30	0.15	CY	10.64	2	17.98			37.24	97.20	$40		$10	$20	$70
Epoxy Coating	167	84	SY	0.22	24	17.00			0.77	7.56	$410		$70	$650	$1,130
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	1	EA	12.00	8	17.98			100.00	525.00	$140		$50	$270	$460
vi. HDPE Piping	100	50	LF	0.38	25	19.95			5.11	4.42	$500		$260	$230	$990
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Gu:	720	360	SF	0.04	17	16.97			0.03	1.55	$290		$10	$570	$870
4" x 4" x 9'–6" Wood Posts set in (	27	14	EA	0.480	8	16.97			1.68	5.75	$140		$20	$80	$240
viii. Air Diaphragm Pump 50 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$400	$630
ix. Suction and Discharge Piping	10	5	LF	0.11	1	19.95			0.39	0.84	$20				$20
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	2	LF	0.47	1	19.95			1.65	14.91	$20			$20	$40
	BCY														
x. Backfill & Compaction around concrete slab	258	155	ICY	0.086	17	16.97			1.38		$290		$220		$510
SUB–TOTAL (EQUIP. DECON. FACILITY)					373						$6,730	$29,830	$1,560	$5,990	$44,110

Equipment Decon. Facility Details

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001497

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]321 PRELIMINARY CONTR.N[redacted] 4424317
CLIENT – [redacted] DEPT. OF ENERGY EST. NO. C2940717
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER BY: KEN KEPLER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS DATE: 08/16/94
PROJ.CTL. – CRU–2 TASK I.D.: 2CSW
WBS NO. – 1.1.1.1.2.3.1

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	50%														
i. Excavation – Structural	19	10	BCY	0.021		16.97			0.64				$10		$10
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	7	SY	0.041		16.97		6.75	1.45	5.51		$50	$10	$40	$100
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	2	SF	0.32	1	16.97			0.73	12.55	$20			$30	$50
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	1	CY	4.07	4	17.98			14.25	67.00	$70		$10	$50	$130
Decon Slab Sump – 2'x 2' x 3'	0.3	0.15	CY	31.84	6	17.98			111.44	250.70	$110		$20	$40	$170
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0.20	CY	15.30	4	17.98			53.55	275.90	$70		$10	$60	$140
Epoxy Coating	14	7	SY	0.22	2	17.00			0.77	7.56	$30		$10	$50	$90
v. Corrugated Fiberglass Splash Gua	132	66	SF	0.04	3	16.97			0.03	1.55	$50			$110	$160
4" x 4" x 9'–6" Wood Posts set in (	6	3	EA	0.480	2	16.97			1.68	5.75	$30		$10	$20	$60
vi. Pump 20 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$410	$640
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	1	LS	32.00	21	19.95			112.00	2500.00	$420		$60	$1,250	$1,730
viii. Backfill & Compaction around concrete slab	BCY 17	10	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		54						$1,020	$50	$180	$2,060	$3,310
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		427						$7,750	$29,880	$1,740	$8,050	$47,420

Personnel Decon.Facilities/Services Details PAGE 4 of 18

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FEMP-OU02-5 DRAFT August 24, 1994

001498

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	2000	LF	0.017	44	16.97			0.06	0.65	$750		$120	$1,340	$2,210
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	300	EA	0.24	93	16.97			1.53	1.35	$1,580		$470	$420	$2,470
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 300 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1200	LF	0.38	590	19.95			5.11	4.42	$11,770		$6,130	$5,300	$23,200
iv. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	1	EA	8.00	10	16.97			28.00	8300.00	$170		$30	$8,300	$8,500
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,138						$21,300		$7,390	$20,320	$49,010

Erosion Control Details

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FEMP-OU02-5 DRAFT
August 24, 1994

001499

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
LOAD & HAUL FOR ON–SITE DISPOSAL														
LIME SLUDGE PONDS														
Excavate and Load	16500	BCY	0.055	1171	16.97			1.17		$19,870		$19,880		$39,750
Excavate Additional Soil	1700	BCY	0.055	121	16.97			1.17		$2,050		$2,050		$4,100
Haul to Onsite Disposal Cell BCY														
– 12" thk. Cushion Layer 1792	2240	LCY	0.081	234	16.97			1.51		$3,970		$3,480		$7,450
– Impacted Fill 16408	20510	LCY	0.081	2143	16.97			1.51		$36,370		$31,900		$68,270
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load	N/A	BCY	0.055		16.97			1.17						
Haul to Onsite Disposal Cell BCY														
– Impacted Fill N/A		LCY	0.081		16.97			1.51						
			S/T											
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C		HRS	150%		16.97			1.51						
			S/T											
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)		MD												
(SHREDDING COMMON TO SWL, IFP & SF)														
Shredder/Crusher – Purchase/Install 33.3%	0.3	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY N/A														
Generated Waste BCY 5602														
Excavated Debris TONS														
(Percent of Gen.Waste to be Shredded) 25%														
Generated Waste TONS 3221														
TOTAL TONS 3221														
Operating Costs	54	HRS							25.75				$1,430	$1,430
(2) Operators	108	HRS	1.00	139	16.97					$2,360				$2,360
TOTAL (EXCAVATE– ON–SITE DISPOSAL)	1	LOT		3,928						$67,010		$60,190	$110,430	$237,630

Excavate Onsite Disposal Details

001500
5861
F-7-73
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP.)															
a. Clear and Grubb	20%														
i. On–site Cell & Surrounding area	35	7.0	AC	41.40	374	16.97			2575.00		$6,350		$18,570		$24,920
b. Relocated South Access Road	20%														
i. Clear & Grub	3	0.6	AC	41.40	32	16.97			2575.00		$540		$1,590		$2,130
ii. General Grading	1467	293.4	SY	0.001					0.07				$20		$20
iii. Road – 8" Gravel W/Geotextile	7333	1466.6	SY	0.030	57	16.97			1.08	6.66	$970		$1,630	$10,060	$12,660
c. Haul Road	20%														
i. Clear & Grub	2.4	0.5	AC	41.40	26	16.97			2575.00		$440		$1,270		$1,710
ii. General Grading	11556	2311.2	SY	0.001	3	16.97			0.07		$50		$170		$220
iii. Road – 8" Gravel W/Geotextile	5778	1155.6	SY	0.030	45	16.97			1.08	6.66	$760		$1,290	$7,930	$9,980
d. Temporary Construction Fencing	20% 5200	1040.0	LF	0.213	286	16.97				6.25	$4,850			$6,700	$11,550
e. 20' wide Swing Gates	1	0.2	EA	25.60	7	16.97			340.00	560.00	$120		$70	$120	$310
f. Staging Area @ Cell	20%														
Area Excavation for Slab	1606	321.2	BCY	0.016	7	16.97			0.60		$120		$200		$320
Sub–Base for Slab	2845	569.0	SY	0.041	30	16.97		6.75	1.45	5.51	$510	$3,840	$850	$3,230	$8,430
HDPE Perf.Sub–grade Piping – 4"	500	100.0	LF	0.21	27	16.97			0.74	3.02	$460		$80	$310	$850
Concrete Slab – 160'x160'x8" thk	631	126.2	CY	4.07	663	17.98			14.25	67.00	$11,920		$1,850	$8,710	$22,480
Concrete Curb – 480'x2'x8" thk	24	4.8	CY	15.30	95	17.98			53.55	275.90	$1,710		$260	$1,360	$3,330
Epoxy Coating	2845	569.0	SY	0.22	161	16.97			0.77	7.56	$2,730		$450	$4,430	$7,610
Backfill & Compact around Slab	183	36.6	ICY	0.086	4	16.97			1.38				$50		$50
Mob/Demob.Equip.	1	0.2	LS	2.00	1	16.97			184.00		$20		$40		$60
g. Storage Area – 200' x 200' Asphalt Includes Compacted Sub–Grade	4444	889	SY	0.084	96	16.97			2.56	14.04	$1,630		$2,340	$12,850	$16,820
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat															
h. Decon Trailer – Rental	20% 51	10	MO					1500.00				$15,300			$15,300
i. Const.Equipment Decon. Facility 25 ft x 60 ft	20% 1	0.20	LS	730.00	146	18.05		1160.00	2900.00	11980.00	$2,640	$230	$580	$2,400	$5,850
j. Personnel Decon. Facility 11'x 11'	20% 1	0.20	LS	108.00	22	18.89		100.00	360.00	4120.00	$420	$20	$70	$820	$1,330
SUB–TOTAL (COMPOSITE LINER)		1	LOT		2082						$36,240	$19,390	$31,380	$58,920	$145,930

Composite Liner Details

F-7-74
001501
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]321 PRELIMINARY
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

CONTR.[redacted] 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
ON–SITE DISPOSAL FACILITY COMPOSITE LINER (CON'T.)														
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.														
a. Subgrade Preparation – includes removal of top soil, grading & comp.	5429	SY	0.024	168	16.97			0.86		$2,850		$4,810		$7,660
b. 95% Clay – 5% Bentonite 36" Thk BCY 5429	6406	ICY	0.260	2149	16.97			11.19	20.35	$36,470		$73,840	$134,280	$244,590
c. Composite Clay Liner	5429	SY					7.38				$40,070			$40,070
d. HDPE Liner 60 mil	5429	SY					4.75				$25,790			$25,790
e. Geotextile Fabric	5429	SY					2.25				$12,220			$12,220
f. Pea Gravel 12" Thk; In–place BCY 1792	1926	ICY	0.11	273	16.97			0.77	17.00	$4,630		$1,530	$33,730	$39,890
g. Composite Clay Liner	5429	SY					7.38				$40,070			$40,070
h. HDPE Liner 60 mil	5429	SY					4.75				$25,790			$25,790
i. Geotextile Fabric	5429	SY					2.25				$12,220			$12,220
j. Pea Gravel 12" Thk; In–place BCY 1792	1926	ICY	0.11	273	16.97			0.77	17.00	$4,630		$1,530	$33,730	$39,890
k. Geotextile Fabric	5429	SY					2.25				$12,220			$12,220
l. HDPE Perforated Pipe – leachate collection 6" Dia.	315	LF	0.30	122	16.97			1.05	6.56	$2,070		$340	$2,130	$4,540
m. HDPE Perforated Pipe – leak detection 6" Dia.	315	LF	0.30	122	16.97			1.05	6.56	$2,070		$340	$2,130	$4,540
n. Leachate Discharge Piping														
i. HDPE Carrier & containment Pipe 6" x 10' Includes Trench Excav/Backfill, sand bedding and compaction.	245	LF	0.86	272	16.97			11.37	22.33	$4,620		$2,870	$5,630	$13,120
ii. HDPE Manhole – 4' dia. x 8' deep	1	EA	8.00	10	16.97			28.00	8300.00	530.00		$30	$8,550	$9,110
o. Impacted Fill–Cusion Layer 12" Thk BCY 1792	2240	LCY	0.06	173	16.97			1.67		$2,940		$3,850		$6,790
p. Impacted Fill–Spread and Compact BCY 16408	20510	LCY	0.06	1587	16.97			1.67		$26,930		$35,280		$62,210
q. Generated Waste BCY 5602	6442	LCY	0.06	499	16.97			1.67		$8,470		$11,080		$19,550
PPE LEVEL C Allowance is added to the foll														
r. Impacted fill N/A		LCY	0.06					1.67						
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C		HRS	S/T											
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)		MD												
SUB–TOTAL (COMPOSITE LINER)	1	LOT		5,648						$96,210	$168,380	$135,500	$220,180	$620,270
TOTAL (COMPOSITE LINER)	1	LOT		7,730						$132,450	$187,770	$166,880	$279,100	$[illegible]6,200

Composite Liner Details

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FEMP-OU02-5 DRAFT
August 24, 1994

001502

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE CAP															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
COMPOSITE CAP															
a. Contouring Layer 18" Thk. liner	BCY 927	1112	ICY	0.06	86	16.97			1.67	3.50	$1,460		$1,910	$4,010	$7,380
b. 95% Clay – 5% Bentonite 24" Thk	BCY 1242	1466	ICY	0.260	492	16.97			11.19	20.35	$8,350		$16,890	$30,720	$55,960
c. GML\GCC – composite Liner		1854	SY					7.38				$13,680			$13,680
d. Geotextile Fabric		1854	SY					2.25				$4,170			$4,170
e. Pea gravel 12" Thk, In–place	BCY 612	658	ICY	0.11	93	16.97			0.77	17.00	$1,580		$520	$11,520	$13,620
f. Geotextile Fabric		1854	SY					2.25				$4,170			$4,170
g. Cobbels 36" Thk; In–place	BCY 1854	1993	ICY	0.258	663	16.97			7.15	10.10	$11,250		$14,680	$20,730	$46,660
h. Geotextile Fabric		1854	SY					2.25				$4,170			$4,170
i. Sand Layer 6" Thk; In–place	BCY 315	339	ICY	0.052	23	16.97			1.76	5.00	$390		$610	$1,740	$2,740
j. Geotextile Fabric		1854	SY					2.25				$4,170			$4,170
k. Common Soil 21" Thk; In–place	BCY 1081	1297	ICY	0.06	100	16.97			1.67	3.50	$1,700		$2,230	$4,680	$8,610
l. Top Soil 6" Thk; In–place	BCY 315	378	ICY	0.053	26	16.97			1.82	12.10	$440		$710	$4,710	$5,860
m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding	SY 1854	17	MSF	0.30	7	16.97			6.75	25.00	$120		$120	$440	$680
n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized		350	LF	0.17	77	16.97			2.28	13.40	$1,310		$820	$4,830	$6,960
TOTAL (COMPOSITE CAP)		1	LOT		1,567						$26,600	$30,360	$38,490	$83,380	$178,830

001503

F-7-76

FEMP-OU02-5 DRAFT
August 24, 1994

Composite Details

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DIKE FOR DISPOSAL CELL															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
a. Borrow Common Soil – Dike	BCY 14120	16944	ICY	0.06	1311	16.97			1.67	3.50	$22,250		$29,150	$61,080	$112,480
b. Geotextile Fabric		4121	SY					2.25				$9,270			$9,270
c. Cobbels 36" Thk; In–place	BCY 4121	4430	ICY	0.258	1474	16.97			7.15	10.10	$25,010		$32,630	$46,090	$103,730
d. HDPE Drainage Piping	6" Dia.	280	LF	0.30	108	16.97			1.05	6.56	$1,830		$300	$1,890	$4,020
TOTAL (DIKE – DISPOSAL CELL)		1	LOT		2,893						$49,090	$9,270	$62,080	$109,060	$229,500

Dike Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-7-77

001504

5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL															
a. Office/Parking Area @ S/U	50%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	247	BCY	0.292	93	16.97			9.16		$1,580		$2,330		$3,910
Geo–Fabric & Liner	2222	1111	SY	0.002	3	16.97			0.02		$50		$20		$70
Haul & Dump Rubble	185	93	BCY	0.30	36	16.97			2.51		$610		$240		$850
b. Const.Equip.Decon Facil.@ S/U	50%														
Demo/Remove Concrete	49.3	25	BCY	1.2	38	16.97			3.62		$640		$90		$730
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	14	BCY	0.292	5	16.97			9.16		$80		$130		$210
Geo–Fabric & Liner	167	84	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	27	14	EA	0.48	8	16.97			1.68		$140		$20		$160
Splash Guard	702	351	SF	0.04	18	16.97			0.03		$310		$10		$320
Haul & Dump Rubble	24.9	12	BCY	0.30	5	16.97			2.51		$80		$30		$110
c. Personnel Decon. Facil. @ S/U	50%														
Demo/Remove Concrete	2.2	1	BCY	1.2	2	16.97			3.62		$30				$30
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo–Fabric & Liner	14	7	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	6	3	EA	0.48	2	16.97			1.68		$30		$10		$40
Splash Guard	132	66	SF	0.04	3	16.97			0.03		$50				$50
Haul & Dump Rubble	3.5	2	BCY	0.30	1	16.97			2.51		$20				$20
d. Staging pad @ S/U	50.0%														
Demo/Remove Concrete	655	328	BCY	1.2	507	16.97			3.62		$8,600		$1,220		$9,820
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	238	BCY	0.292	89	16.97			9.16		$1,510		$2,240		$3,750
Geo–Fabric & Liner 105 cy	2845	1423	SY	0.002	4	16.97			0.02		$70		$30		$100
Haul & Dump Rubble	395.5	198	BCY	0.30	77	16.97			2.51		$1,310		$510		$1,820
	20%														
e. Const.Equip.Decon.Facil. @ Onsite Disp.Cell															
Demo/Remove Concrete	49.3	10	BCY	1.2	15	16.97			3.62		$250		$40		$290
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	6	BCY	0.292	2	16.97			9.16		$30		$50		$80
Geo–Fabric & Liner	167	33	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	27	5	EA	0.48	3	16.97			1.68		$50		$10		$60
Splash Guard	702	140	SF	0.04	7	16.97			0.03		$120				$120
Haul & Dump Rubble	24.9	5	BCY	0.30	2	16.97			2.51		$30		$10		$40
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		920						$15,590		$7,000		$22,590

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

001505

CONTR.NO. – [redacted]321 PRELIMINARY
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL (CON'T.)														
Demo. /Load/Haul/Dump/Compact														
20.0%														
f. Personnel Decon. Facil.@ Onsite Disp. Cell														
Demo/Remove Concrete 2.2	0.44	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact														
Sub–grade Stone 2.4	0.48	BCY	0.292		16.97			9.16						
Geo–Fabric & Liner 14	2.80	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6" 6	1.20	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard 132	26.40	SF	0.04	1	16.97			0.03		$20				$20
Haul & Dump Rubble 3.5	0.70	BCY	0.30		16.97			2.51						
20.0%														
g. Relocated South Access Road/Cell SY														
Road – 8" Gravel W/Geotextile 7333	1467	BCY	0.292	552	16.97			9.16		$9,370		$13,840		$23,210
Haul & Dump Rubble	1467	BCY	0.30	568	16.97			2.51		$9,640		$3,790		$13,430
20.0%														
h. Haul Road for Cell SY														
Road – 8" Gravel W/Geotextile 5778	257	BCY	0.292	97	16.97			1.08		$1,650		$290		$1,940
Haul & Dump Rubble	257	BCY	0.30	99	16.97			2.51		$1,680		$660		$2,340
20.0%														
i. Temporary Construction Fencing @ Cell 5200	1040	LF	0.107	143	16.97					$2,430				$2,430
Haul & Dump Rubble	135	BCY	0.30	52	16.97			2.51		$880		$350		$1,230
20.0%														
j. 20' wide Swing Gates @ Cell 2	0.40	EA	12.75	7	16.97			340.00		$120		$140		$260
Haul & Dump Rubble	0.05	BCY	0.30		16.97			2.51						
20.0%														
k. Storage Pad Area @ Cell BCY														
Demo/Remove Asphalt 988	197.60	BCY	1.2	306	16.97			3.62		$5,190		$740		$5,930
Excav., Load, Haul, Backfill, Compac 474.0	94.80	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Sub–grade Stone														
Geo–Fabric & Liner 4444	888.80	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	197.0	BCY	0.30	76	16.97			2.51		$1,290		$510		$1,800
SUB–TOTAL (GENERATED WASTE REMOVAL)	1	LOT		1,941						$32,950		$21,230		$54,180

Generated Waste Removal Details

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001506

FEMP-OU02-5 DRAFT
August 24, 1994

F-7-79

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL (CON'T.)															
Demo. /Load/Haul/Dump/Compact															
The following prorated at:	20.0%														
I. Staging Area @ On–Site Disposal Cell															
Demo/Remove Concrete	655	131.0	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	475	95.0	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo–Fabric & Liner 105 cy	2845	569.0	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	395.5	126.0	BCY	0.30	49	16.97			2.51		$830		$330		$1,160
TOTAL GENERATED WASTE	BCY 5602 LCY 6442														
SUB–TOTAL (GENERATED WASTE REMOVAL		1	LOT		289						$4,900		$1,730		$6,630
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		3,150						$53,440		$29,960		$83,400

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-7-80

001507

CONTR.NO. – [redacted]321
CLIENT – [redacted]. DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
Lime Sludge Ponds	27000	32400	ICY	0.09	3762	16.97			3.21	3.50	$63,840		$107,120	$116,800	$287,760
	50%														
Office/Parking @ S/U	494	296	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	47	ICY												
Decon.Facil.– Personnel @ S/U	7	4	ICY												
Staging Area @ S/U	1099	659	ICY												
	S/T	1006.8	ICY	0.09	117	16.97			3.21	3.50	$1,990		$3,330	$3,630	$8,950
	20%														
Staging Area at On–Site Disp.Cell	1099	264	ICY												
Storage Area at On–Site Disp.Cell	474	114	ICY												
Decon.Facil.– Const.Equip.@ Cell	78	19	ICY												
Decon.Facil.– Personnel @ Cell	7	2	ICY												
Relocated South Access Road	1628	391	ICY												
Haul Road	1283	308	ICY												
	S/T	1096.6	ICY	0.09	127	16.97			3.21	3.50	$2,160		$3,630	$3,950	$9,740
b. Final Grade for LSP (Excludes Cap)		11667	SY	0.02	301	16.97			0.70		$5,110		$8,410		$13,520
c. Borrow Top Soil 6" Thk., Spread															
Lime Sludge Ponds		11667	SY	0.036	542	16.97			2.33	2.88	$9,200		$28,000	$34,610	$71,810
	50%														
Office/Parking @ S/U	2222	1333	SY												
Decon.Facil.– Const.Equip. @ S/U	167	100	SY												
Decon.Facil.– Personnel @ S/U	14	8	SY												
Staging Area @ S/U	2845	1423	SY												
	S/T	2864.3	SY	0.036	133	16.97			2.33	2.88	$2,260		$6,870	$8,500	$17,630
	20%														
Staging Area at On–Site Disp.Cell	2845	683	SY												
Storage Area at On–Site Disp.Cell	4444	1067	SY												
Decon.Facil.– Const.Equip.@ Cell	167	40	SY												
Decon.Facil.– Personnel @ Cell	14	3	SY												
Relocated South Access Road	14667	3520	SY												
Haul Road	11556	2773	SY												
	S/T	8086.3	SY	0.036	376	16.97			2.33	2.88	$6,380		$19,410	$23,990	$49,780
(SUB–TOTAL SITE RESTORATION)		1	LOT		5,358						$90,940		$176,770	$191,480	$459,190

Site Restoration Details

FEMP-OU02-5 DRAFT
August 24, 1994
F-7-81
001508
586

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Lime Sludge Ponds	11667	105	MSF	0.30	41	16.97			6.75	25.00	$700		$730	$2,700	$4,130
	50%														
Office/Parking @ S/U	2222	10	MSF												
Decon.Facil.– Const.Equip. @ S/U	167	0.75	MSF												
Decon.Facil.– Personnel @ S/U	14	0.06	MSF												
Staging Area @ S/U	2845	12.8	MSF												
	S/T	23.6	MSF	0.30	9	16.97			6.75	25.00	$150		$160	$610	$920
	20%														
Staging Area at On–Site Disp.Cell	2845	5.12	MSF												
Storage Area at On–Site Disp.Cell	4444	8.00	MSF												
Decon.Facil.– Const.Equip.@ Cell	167	0.30	MSF												
Decon.Facil.– Personnel @ Cell	14	0.03	MSF												
Relocated South Access Road	14667	26.40	MSF												
Haul Road	11556	20.8	MSF												
	S/T	60.7	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,560	$2,370
e. Security Fence – 6ga aluminized – 6' high		1300	LF	0.13	215	16.97			1.64	9.80	$3,650		$2,200	$13,120	$18,970
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
(SUB–TOTAL SITE RESTORATION)		1	LOT		309						$5,250		$3,730	$18,360	$27,340
(TOTAL SITE RESTORATION)		1	LOT		5,667						$96,190		$180,500	$209,840	$486,530

Site Restoration Details

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FEMP-OU02-5 DRAFT
August 24, 1994

001509

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility MW 1 Pair x 120 ft/pair	2	PR					23000.00				$46,000			$46,000
b. New MW's at LSP's– Type I & II	8	PR					23000.00				$184,000			$184,000
c. Abandon Existing Wells at LSP's	5	EA					13000.00				$65,000			$65,000
TOTAL (MONITORING WELLS)	1	LOT									$295,000			$295,000

Monitoring Wells Details

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001510

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940717
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT				LABOR	S/C	EQUIP.	MATERIAL	TOTAL
			UNIT	TOTAL	RATE	LABOR	SUB	EQUIP.	MAT'L					
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	50000	GAL					0.01				$500			$500
Runnoff from the Exclusion Zone.	1000000	GAL					0.01				$10,000			$10,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$10,500			$10,500

Waste Water Treatment Operations Cost Details

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FEMP-OU02-5 DRAFT
August 24, 1994

001511

CONTR.NO. – [redacted]321 PRELIMINARY [redacted] CONTR.N[redacted] 4424317
CLIENT – [redacted] DEPT. OF ENERGY EST. NO. C2940717
PROJECT – ALT–6A – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – EXPANDED TRESPASSER BY: KEN KEPLER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS DATE: 08/16/94
PROJ.CTL. – CRU–2 TASK I.D.: 2CSW
WBS NO. – 1.1.1.1.2.3.1

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATORY TESTING														
Excavation														
Full TCLP	91	EA					2,002				$182,200			$182,200
Rad	91	EA					2,000				$182,000			$182,000
Confirmatory tests														
Full Rad Test	46	EA					3,101				$142,600			$142,600
Full HSL	19	EA					1,500				$28,500			$28,500
Full TCLP	19	EA					2,002				$38,000			$38,000
2 Technicians per month	12	MO					13,163				$158,000			$158,000
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING/CONFIRMATORY TESTS)	1	LOT									$731,300			$731,300

Screening & Confirmatory Testing Details

FEMP-OU02-5 DRAFT
August 24, 1994

F-7-85

001512

586

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

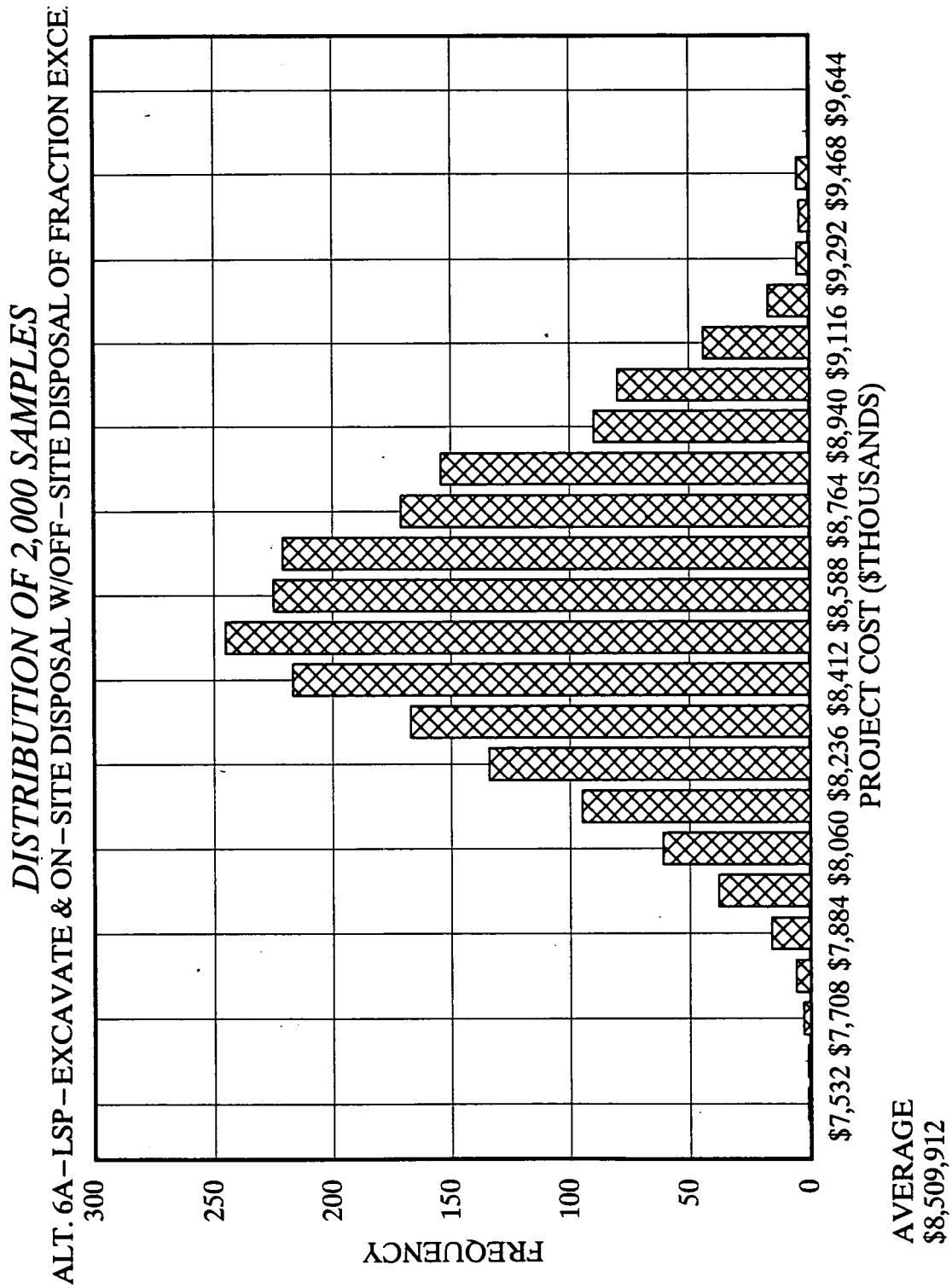
PROJECT: ALT. 6A–LSP–EXCAVATE & ON–SITE DISPOSAL W/OFF–SITE DISPOSAL (
CLIENT: DOE DATE: 07–Aug–94
CONTRACT: C2–94–07–17 BASE ESTIMATE: $6,998,400

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$10,397,759	$3,399,359	48.6%
0.05%	$9,415,919	$2,417,519	34.5%
5.00%	$8,989,561	$1,991,161	28.5%
10.00%	$8,895,002	$1,896,602	27.1%
15.00%	$8,816,268	$1,817,868	26.0%
20.00%	$8,763,598	$1,765,198	25.2%
25.00%	$8,712,581	$1,714,181	24.5%
30.00%	$8,665,854	$1,667,454	23.8%
35.00%	$8,624,198	$1,625,798	23.2%
40.00%	$8,582,994	$1,584,594	22.6%
45.00%	$8,547,703	$1,549,303	22.1%
50.00%	$8,508,074	$1,509,674	21.6%
55.00%	$8,469,630	$1,471,230	21.0%
60.00%	$8,431,891	$1,433,491	20.5%
65.00%	$8,399,038	$1,400,638	20.0%
70.00%	$8,353,627	$1,355,227	19.4%
75.00%	$8,310,308	$1,311,908	18.7%
80.00%	$8,262,709	$1,264,309	18.1%
85.00%	$8,202,524	$1,204,124	17.2%
90.00%	$8,132,948	$1,134,548	16.2%
95.00%	$8,018,154	$1,019,754	14.6%
99.95%	$7,613,802	$615,402	8.8%
100.00%	$6,607,438	($390,962)	–5.6%

FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

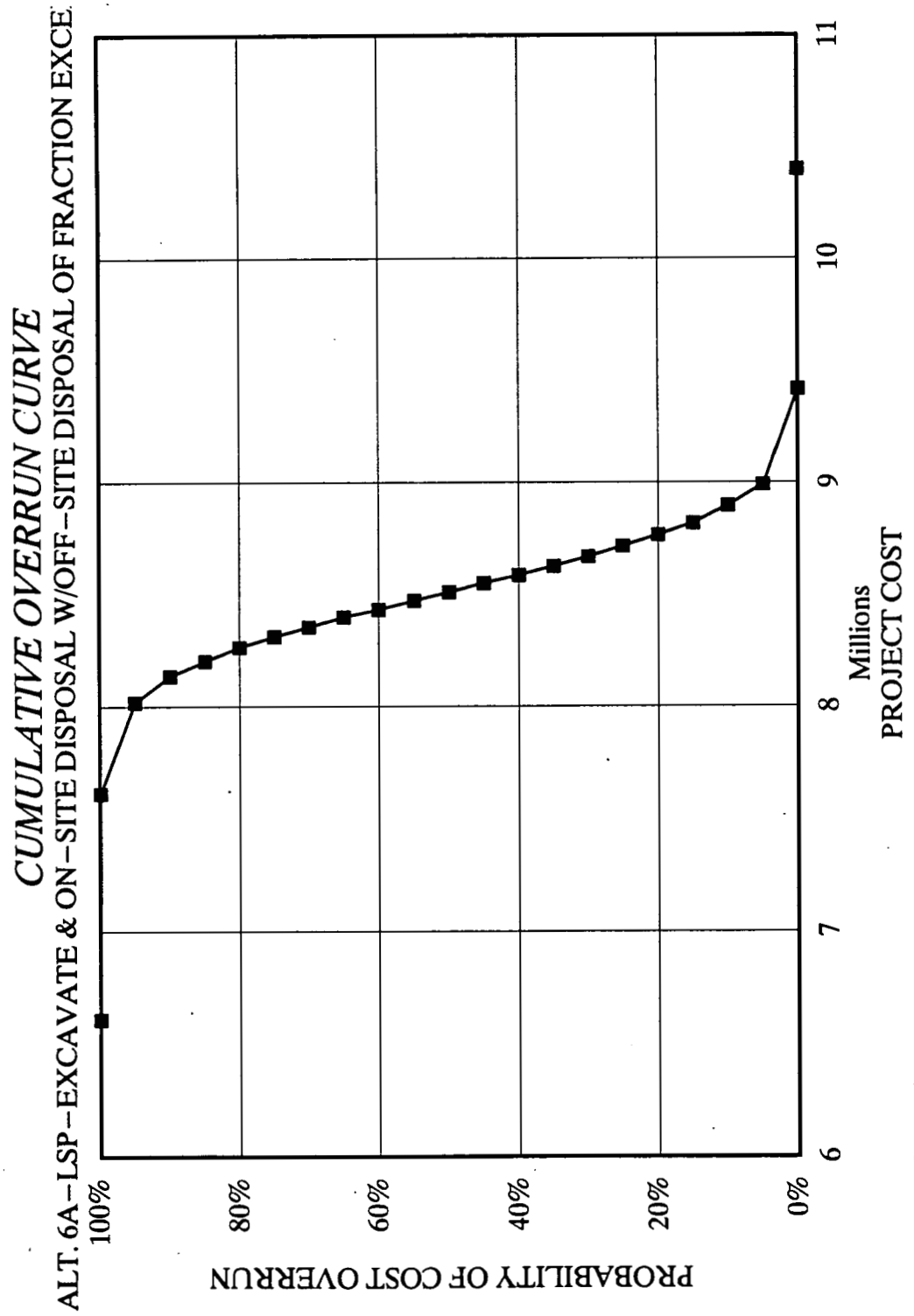
PROJECT: ALT. 6A-LSP-EXCAVATE & ON-SITE DISPOSAL W/OFF-SITE DISPOSAL OF FRACTION EXCEEDING WAC
CLIENT: DOE
CONTRACT: C2-94-07-17

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$80,910	-5.0%	$76,865	30%	$105,183	U		14%
2	SITE PREPERATION S/C	16,500	-5.0%	15,675	25%	20,625	U		17%
3	SITE PREPERATION MAT'L	102,550	-10.0%	92,295	30%	133,315	U		25%
4	DECON FACILITIES/SERVICES LABOR	8,530	-2.0%	8,359	80%	15,354	U		2%
5	DECON FACILITIES/SERVICES S/C	32,870	-6.0%	30,898	80%	59,166	U		7%
6	DECON FACILITIES/SERVICES MAT'L	8,860	-6.0%	8,328	60%	14,176	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	23,430	-5.0%	22,259	50%	35,145	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	22,350	-5.0%	21,233	30%	29,055	U		14%
9	EXC/NO TREAT ON-SITE DISP LABOR	73,710	-2.0%	72,236	125%	165,848	U		2%
10	EXC/NO TREAT ON-SITE DISP MAT'L	121,470	-2.0%	119,041	100%	242,940	U		2%
11	COMPOSITE LINER LABOR	145,700	-6.0%	136,958	100%	291,400	U		6%
12	COMPOSITE LINER S/C	206,550	-6.0%	194,157	100.0%	413,100	U		6%
13	COMPOSITE LINER MAT'L	307,010	-6.0%	288,589	80.0%	552,618	U		7%
14	COMPOSITE CAP LABOR	29,260	-6.0%	27,504	100.0%	58,520	U		6%
15	COMPOSITE CAP S/C	33,400	-6.0%	31,396	100.0%	66,800	U		6%
16	COMPOSITE CAP MAT'L	91,720	-6.0%	86,217	100.0%	183,440	U		6%
17	DIKE LABOR	54,000	-6.0%	50,760	100.0%	108,000	U		6%
18	DIKE S/C	10,200	-6.0%	9,588	100.0%	20,400	U		6%
19	DIKE MAT'L	119,970	-6.0%	112,772	100.0%	239,940	U		6%
20	GENERATED WASTE REMVL LABOR	58,780	-5.0%	55,841	50.0%	88,170	U		9%
21	SITE RESTORATION LABOR	105,810	-5.0%	100,520	30.0%	137,553	U		14%
22	SITE RESTORATION MAT'L	230,820	-5.0%	219,279	30.0%	300,066	U		14%
23	MONITORING WELLS S/C	324,500	-5.0%	308,275	50.0%	486,750	U		9%
24	INDIRECT FIELD COSTS LABOR	631,900	-5.0%	600,305	50.0%	947,850	U		9%
25	INDIRECT FIELD COSTS S/C	336,900	-5.0%	320,055	100.0%	673,800	U		5%
26	INDIRECT FIELD COSTS MAT'L	740,200	-5.0%	703,190	50.0%	1,110,300	U		9%
27	FIELD SUPPORT COSTS LABOR	717,000	-10.0%	645,300	30.0%	932,100	U		25%
28	FIELD SUPPORT COSTS S/C	741,800	-5.0%	704,710	30.0%	964,340	U		14%
29	ENGINEERING COSTS	1,516,200	-5.0%	1,440,390	25.0%	1,895,250	U		17%
30	SALES TAX MAT'L	105,500	-1.0%	104,445	1.0%	106,555	U		50%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$6,998,400		$6,607,438		$10,397,759			


DISTRIBUTION OF 2,000 SAMPLES
ALT. 6A–LSP–EXCAVATE & ON–SITE DISPOSAL W/OFF–SITE DISPOSAL OF FRACTION EXCE
FREQUENCY
300
250
200
150
100
50
0
$7,532 $7,708 $7,884 $8,060 $8,236 $8,412 $8,588 $8,764 $8,940 $9,116 $9,292 $9,468 $9,644
PROJECT COST ($THOUSANDS)
AVERAGE
$8,509,912

001515

5861



BASE ESTIMATE:
$6,998,400

001516

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A- LSP - EXCAV. & ON-SITE DISP. w/OFF-SITE DISP. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940717
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$6,998,400	BASE EST:	$80,910	BASE EST:	$16,500	BASE EST:	$102,550	BASE EST:	$8,530	BASE EST:	$32,870	BASE EST:	$8,860
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	25%	-10%	30%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	25%	-10%	30%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$76,865	$105,183	$15,675	$20,625	$92,295	$133,315	$8,359	$15,354	$30,898	$59,166	$8,328	$14,176

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A- LSP - EXCAV. & ON-SITE DISP. w/OFF-SITE DISP. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940717
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$23,430	BASE EST:	$0	BASE EST:	$22,350	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$22,259	$35,145	$0	$0	$21,233	$29,055	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

001518

F-7-91

FEMP-OU02-5 DRAFT
August 24, 1994

1861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A- LSP - EXCAV. & ON-SITE DISP. w/OFF-SITE DISP. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940717
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-7-92

001519

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A- LSP - EXCAV. & ON-SITE DISP. w/OFF-SITE DISP. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940717
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	EXCAV/NO TREATMENT ON-SITE DISPOSAL LABOR $'s		EXCAV/NO TREATMENT ON-SITE DISPOSAL S/C $'s		EXCAV/NO TREATMENT ON-SITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$73,710	BASE EST:	$0	BASE EST:	$121,470	BASE EST:	$145,700	BASE EST:	$206,550	BASE EST:	$307,010
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	75%					-5%	50%	-5%	50%		
MATERIAL PRICING					-1%	50%					-5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%			-1%	50%	-1%	50%	-1%	50%	-1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-2%	125%	0%	0%	-2%	100%	-6%	100%	-6%	100%	-6%	80%
TOTAL $	$72,236	$165,848	$0	$0	$119,041	$242,940	$136,958	$291,400	$194,157	$413,100	$288,589	$552,618
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-7-93

001520

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A- LSP - EXCAV. & ON-SITE DISP. w/OFF-SITE DISP. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940717
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		DIKE LABOR $'s		DIKE S/C $'s		DIKE MAT'L. $'s	
	BASE EST:	$29,260	BASE EST:	$33,400	BASE EST:	$91,720	BASE EST:	$54,000	BASE EST:	$10,200	BASE EST:	$119,970
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%			-5%	50%	-5%	50%				
MATERIAL PRICING			-5%	50%					-5%	50%	-5%	50%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%	-1%	50%	-1%	50%	-1%	50%	-1%	50%	-1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	100%	-6%	100%	-6%	100%	-6%	100%	-6%	100%	-6%	100%
TOTAL $	$27,504	$58,520	$31,396	$66,800	$86,217	$183,440	$50,760	$108,000	$9,588	$20,400	$112,772	$239,940

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

001521

F-7-94

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A- LSP - EXCAV. & ON-SITE DISP. w/OFF-SITE DISP. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940717
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$58,780	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$55,841	$88,170	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

F-7-95

001522

FEMP-OU02-5 DRAFT
August 24, 1994

561

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A- LSP - EXCAV. & ON-SITE DISP. w/OFF-SITE DISP. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940717
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$105,810	BASE EST:	$0	BASE EST:	$230,820	BASE EST:	$0	BASE EST:	$324,500	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$100,520	$137,553	$0	$0	$219,279	$300,066	$0	$0	$308,275	$486,750	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001523

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A- LSP - EXCAV. & ON-SITE DISP. w/OFF-SITE DISP. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940717
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$631,900	BASE EST:	$336,900	BASE EST:	$740,200	BASE EST:	$717,000	BASE EST:	$741,800	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-10%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-5%	30%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-10%	30%	-5%	30%	0%	0%
TOTAL $	$600,305	$947,850	$320,055	$673,800	$703,190	$1,110,300	$645,300	$932,100	$704,710	$964,340	$0	$0
RISK PROFILE & CORRELATION FOR	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
EACH COST ELEMENT	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A- LSP - EXCAV. & ON-SITE DISP. w/OFF-SITE DISP. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.3

COST IMPACT MATRIX

EST. NO: C2940717
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CLS

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$1,516,200	BASE EST:	$105,500	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-5%	25%										
(OTHER)												
TOTAL %	-5%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$1,440,390	$1,895,250	$104,445	$106,555	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Direct Field Cost Dollars include a 10% MTO Allowance from the Budget Estimate Details Summary Sheet.

001525

LCC ANALYSIS TITLE:	IFP - EXCAVATE & ON-SITE DISP. W/OFF-SITE OF FRACTION EXCEEDING WAC - (EXPANDED TRESPASSER)			
WBS NO.:	1.1.1.1.2.3.5		TASK NO.:	2CNF
ALTERNATIVE:	6A		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH
STUDY PERIOD:	37 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	07-Aug-94
DOCUMENT NO.:	LCC-94-03-04	EST. NO. C2-94-07-18 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$0	$0	$0	$0	1997
$11,747,353	$0	$0	$11,747,400	1998
$12,815,294	$0	$0	$12,815,300	1999
$11,747,353	$0	$0	$11,747,400	2000
$0	$387,270	$0	$387,300	2001
$0	$365,841	$0	$365,800	2002
$0	$365,841	$0	$365,800	2003
$0	$365,841	$0	$365,800	2004
$0	$385,841	$0	$385,800	2005
$0	$205,241	$0	$205,200	2006
$0	$205,241	$0	$205,200	2007
$0	$205,241	$0	$205,200	2008
$0	$205,241	$0	$205,200	2009
$0	$225,241	$0	$225,200	2010
$0	$205,241	$0	$205,200	2011
$0	$205,241	$0	$205,200	2012
$0	$205,241	$0	$205,200	2013
$0	$205,241	$0	$205,200	2014
$0	$225,241	$0	$225,200	2015
$0	$205,241	$0	$205,200	2016
$0	$205,241	$0	$205,200	2017
$0	$205,241	$0	$205,200	2018
$0	$205,241	$0	$205,200	2019
$0	$225,241	$0	$225,200	2020
$0	$205,241	$0	$205,200	2021
$0	$205,241	$0	$205,200	2022
$0	$205,241	$0	$205,200	2023
$0	$205,241	$0	$205,200	2024
$0	$225,241	$0	$225,200	2025
$0	$205,241	$0	$205,200	2026
$0	$205,241	$0	$205,200	2027
$0	$205,241	$0	$205,200	2028
$0	$205,241	$0	$205,200	2029
$0	$225,241	$0	$225,200	2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$36,310,000	$7,101,700	$0	$43,410,600	TOTAL
$31,635,000	$4,207,300	$0	$35,841,700	<====(@NPM

F ERMC O
ESTIMATING SERVICES

EST FILE #: C2940718 | DATE: 16-Aug-94
CLIENT: US DOE | ESTIMATOR: KEN KEPLER
SUMMARY SHEET
PROJECT TITLE: ALT-6A - IFP - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.5 EXPANDED TRESPASSER | TASK#: 2CNF

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL NO TREATMENT	99,948		$1,701,900	$1,528,400	$2,806,300	$6,036,600
2		SHRED/CRUSH - COMPOSITE LINER, CAP, DIKE (SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		99,948		$1,701,900	$1,528,400	$2,806,300	$6,036,600
11	SUPERVISION - CONTRACTOR				$289,000			$289,000
12	SM TOOLS/CONSM'BLS						$102,100	$102,100
13	EQUIPMENT RENTAL						$2,018,600	$2,018,600
14	TEMP. FACILITIES				$35,700		$66,400	$102,100
15	TEMP UTL'S HOOK-UP				$17,900		$33,200	$51,100
16	JOB CLEAN-UP				$35,700		$66,400	$102,100
17	SAFETY				$17,900		$33,200	$51,100
18	HEALTH PHYSICS S/C				$234,400		$117,800	$352,200
19	CERCLA/SAT	$1,500 PER PERSON				$36,000		$36,000
20	BOND					$60,400		$60,400
21	OVERHEAD & PROFIT					$828,100		$828,100
22	PAYRL BRD.&BENFT.				$1,212,900			$1,212,900
	INDIRECT FIELD COSTS				$1,843,500	$924,500	$2,437,700	$5,205,700
	DIRECT & INDIRECT FIELD COSTS				$3,545,400	$2,452,900	$5,244,000	$11,242,300
23	TRANSPORTATION & BURIAL					$1,220,100		$1,220,100
24	WASTE CONTAINERS						$42,100	$42,100
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$58,600		$58,600
25	SCREENING & CONFIRMATION TESTING					$3,354,600		$3,354,600
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$3,080,400			$3,080,400
	FERMCO FIELD SUPPORT COSTS				$3,080,400	$4,633,300	$42,100	$7,755,800
28	EMISSION MODELING				$19,700		$36,500	$56,200
29	PSAR/FSAR(SAFETY RPT)				$607,100			$607,100
30	ENGINEERING	TITLE I&II $3,428,900 TITLE III	$3,395,200	CDR	$1,236,700	DCR	$888,100	$8,948,900
	ENGINEERING COSTS							$9,612,200
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$5,364,700	$321,900
-	SUB-TOTAL	(BASE ESTIMATE)						$28,932,200
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	18.5%						$5,352,500
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$34,284,700
35	CONTINGENCY	7.0%						$2,025,300
								PRELIMINARY
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$36,310,000

LOTUS31\FS2\ALT6A\IFP\INDSUM.WK3 - FEASIBILITY STUDY

001527

Alternative 6 – Excavation and On-Site Disposal with Off-Site Disposal of Fraction Exceeding WAC (Expanded Trespasser)

Inactive Fly Ash Pile

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	1	1	5	sample	$5,500.00	36	NA	$198,000	9 wells x 4 samples/year
Long Term	1	6	30	sample	$5,500.00	18	NA	$99,000	9 wells x 2 samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	2.25	2.90	$1,127	Inspect all wells twice/year. Repair 1 out of 8.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	1	1	5	sample	$5,500.00	22.4	NA	$123,200	One fifth x (26 wells x 4 samples/year plus 8 leachate samples/year
Long Term	1	6	30	sample	$5,500.00	11.2	NA	$61,600	One fifth x (26 wells x 2 samples/year plus 4 leachate samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	1.3	1.68	$651	One fifth of inspection of all wells twice per year & repair of 2.5 wells.
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
OU2 Waste Cell Leachate									
Pipeline Maintenance	1	1	30	lump sum	$1,106.83	1	1.29	$1,428	Overall cost divided among 5 subunits.
Treatment & Disposal	1	1	30	gallon	0.01	86,000	NA	$860	Overall cost divided among 5 subunits.
Facility Maint. at Subunit									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	1	1	30	acre	$1,861.92	4.2	5.42	$10,088	Approx. 4.2 acre
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.83	1.06	$2,098	Approx. 1650 ft. perimeter
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	1	1	30	acre	$2,183.32	6.83	8.81	$19,237	Total divided among 5 subunits. (Incl. side slopes)
Mowing	1	1	30	acre	$1,861.92	3.1	4.00	$7,446	Total divided among 5 subunits
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.4	0.52	$1,017	Total divided among 5 subunits
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of OU2 Cell and Subunit	5	5	30	Lump Sum	$20,000	1	NA	$20,000	Total divided among 5 subunits

Annual Costs, Year 1 (excluding facility review)	$387,270
Annual Costs, Years 2–5 (excluding facility review)	$365,841
Annual Costs, Years 6–30 (excluding facility review)	$205,241
Facility Review Costs, Every 5 Years	$20,000

O_MFS5 WK3 A:

8/2/94

DATE: 16-Aug-94

PROJECT TITLE: **HEALTH PHYSICS** EST.NO.: C2940718

ALT-6A - IFP - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC EST. : KEN KEPLER

WBS#: EXPANDED TRESPASSER TASK I.D. :

1.1.1.1.2.3.5 2CNF

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	• NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			•	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	912	$11,670	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	912	$21,890	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	912	$4,740	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	912	$5,110	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	912	$5,470	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	912	$3,280	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	912	$63,840	C/B		
SUB-TOTAL		31.80	4		$116,000			
					$127.19	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	13		$170	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	6		$130	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	6		$1,040	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$1,820			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$117,800			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

DATE: 16-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940718

ALT-6A - IFP - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.5

EXPANDED TRESPASSER

TASK I.D. : 2CNF

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	24	96	$16.97	$1,630		
ANNUAL PHYSICALS	2	3	24	144	$16.97	$2,440		
EXIT (TERMINATION) PHYSICALS	1	4	24	96	$16.97	$1,630		
SUB-TOTAL						$5,700		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	34	1	24	827	$16.97	$14,040		
YEARLY IN-VIVO	2	4	24	192	$16.97	$3,260		
EXIT (END OF PROJECT / TERMINATION)	1	4	24	96	$16.97	$1,630		
SUB-TOTAL						$18,930		
WORK DELAYS CAUSED BY MONITORING	5%				$2,098,100	$104,905		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$2,098,100	$104,905		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$234,400	$117,800	$352,200

001550

APPENDIX D

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT-6A – IFP – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WA
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CNF

WBS NO. – 1.1.1.1.2.3.5
EST. NO. – C2940718
BY – K. KEPLER
DATE – 08/03/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25–Mar–94	01–Nov–97	02–Apr–99	31–Aug–2000	34	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
60	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940718
BY KEN KEPLER
DATE 07–Aug–94
TASK ID 2CSF

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR)			CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS 141				ENVIROCARE BURIAL COSTS		TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							$80.15 PER TON (80 TON MIN.)	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	$120 DEMURAGE $/DAY (>5 DAYS)	(1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	
	CAR	LINER	COVER			TONS/CY	TONS						
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045
	$0	$400	$395	$340	LEAD/SOIL	1.810	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 125, 141, or 200 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

001534

561

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940718
BY KEN KEPLER
DATE 07–Aug–94
TASK ID 2CSF

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C – D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0
	LEAD/SOIL	1.810	134.00	1971.0	196,000	0	196,000	1462.7	54.2

INPUT

001533

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940718
BY KEN KEPLER
DATE 07–Aug–94
TASK ID 2CSF

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	3875.0	53	$23,816	$1,262,200	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	0.0	0	$24,180	$0	$493.47		
	LEAD/SOIL	54.20	0.0	0	$24,180	$0	$446.13		
						**			

INPUT

** **NOTE:**
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		3,765						$65,040	$15,000	$37,090	$91,040	$208,170
DECONTAMINATION FACILITIES/SERVICES	1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210
EROSION AND SEDIMENT CONTROLS	1	LS		1134						$21,530		$8,470	$45,730	$75,730
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE – OFFSITE DISPOSAL	1	LS		385						$6,530		$13,630		$20,160
LOAD/HAUL – OFF–SITE DISPOSAL	1	LS		580						$9,850		$14,560		$24,410
EXCAVATE & HAUL TO ON–SITE DISPOSAL	1	LS		22546						$382,970		$320,650	$112,740	$816,360
(Onsite) COMPOSITE LINER	1	LS		29093						$494,780	$813,690	$659,210	$1,073,800	$3,041,480
COMPOSITE CAP	1	LS		7192						$122,050	$143,130	$174,410	$381,860	$821,450
DIKE FOR DISPOSAL CELL	1	LS		14452						$245,250	$43,710	$310,510	$539,400	$1,138,870
GENERATED WASTE REMOVAL	1	LS		2853						$48,410		$27,670		$76,080
SITE RESTORATION	1	LS		8561						$145,270		$267,590	$301,070	$713,930
MONITORING WELLS	1	LS									$348,000			$348,000
SUB–TOTAL (DIRECT FIELD COSTS)				90862						$1,547,170	$1,389,420	$1,835,110	$2,551,150	$7,322,850
TAKE–OFF ALLOWANCE 10%	1	LS		9,086						$154,720	$138,940	$183,510	$255,120	$732,290
TOTAL (DIRECT FIELD COSTS)	1	LS		99,948						$1,701,900	$1,528,400	$2,018,600	$2,806,300	$8,055,200

On–Site Disposal of In–Active Flyash Pile w/ Off–site Option – SUMMARY

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[illegible]321
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 20% ARE COMMON TO ALL SUB–UNITS)														
(ITEMS @ 33.3% ARE COMMON TO SF, AFP & IFP)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	2000	LF	0.213	550	16.97				6.25	$9,330			$12,880	$22,210
c. Clear and Grub														
i. Remediation Site	6.50	AC	41.40	347	16.97			2575.00		$5,890		$17,240		$23,130
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Staging Area @ Sub–unit														
d. Dewatering														
i. Excavate Dewatering Trench	380	CY	0.50	245	16.97			1.49		$4,160		$580		$4,740
ii. Pump – w/4" Suction Hose	150	DAYS	3.00	581	16.97			19.55		$9,860		$3,020		$12,880
iv. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip	2	CY	4.00	10	16.97			100.00		$170		$210		$380
e. General Grading														
i. New Roads	6222	SY	0.001	8	16.97			0.07		$140		$450		$590
33.3%														
ii. Office/Parking Area 2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area 272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area 49	16	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub–Unit 2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	6222	SY	0.030	241	16.97			1.08	6.66	$4,090		$6,920	$42,680	$53,690
33.3%														
ii. Office/Parking – 8" Gravel W/ Geotextile 2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc.Slab 2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk. 631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" thl 24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub–grade Piping – 4" 500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating 2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab 183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip. 1	0.33	LS	2.00	1	16.97			184.00		$20		$60		$80
TOTAL (SITE PREPARATION)	1	LS		3,765						$65,040	$15,000	$37,090	$91,040	$208,170

Site Preparation Details

FEMP-OU02-5 DRAFT August 24, 1994

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO.. 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	33.3%														
a. Decon Trailer – Rental	51	17	MO					1500.00				$25,470			$25,470
	33.3%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'i.d.x 25lfx8	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in con	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
	BCY														
x. Backfill & Compaction around concrete slab	258	103	ICY	0.086	11	16.97			1.38		$190		$150		$340
SUB–TOTAL (EQUIP. DECON. FACILITY)					265						$4,810	$25,860	$1,210	$4,140	$36,020

Equipment Decon. Facility Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted]DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	33.3%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Gua	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in (	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	0	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210

Personnel Decon.Facilities/Services Details

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FEMP-OU02-5 DRAFT
August 24, 1994

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1991

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	3000	LF	0.017	66	16.97			0.06	0.65	$1,120		$180	$2,010	$3,310
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	10	EA	8.00	103	16.97			5.00	70.00	$1,750		$50	$700	$2,500
v. Hay Bales	300	EA	0.24	93	16.97			1.53	1.35	$1,580		$470	$420	$2,470
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1400	LF	0.38	688	19.95			5.11	4.42	$13,730		$7,150	$6,190	$27,070
iv. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	4	EA	8.00	41	16.97			28.00	8300.00	$700		$110	$33,200	$34,010
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,134						$21,530		$8,470	$45,730	$75,730

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Erosion Control Details

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CONTR.NO.– 4[illegible]21
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE OFF–SITE DISPOSAL TO ENVIROCARE														
Excavate Contaminated Soil	3100	BCY	0.055	220	16.97			1.17		$3,730		$3,630		$7,360
Sort Contaminated Soil BCY 3100	3875	LCY	0.033	165	16.97			2.58		$2,800		$10,000		$12,800
Low Level Thermal Destruction Unit BCY N/A Sub–contract cost for Drying Operation and moisture test Only.		TON					70.00							
TOTAL (EXCAVATE OFFSITE DISPOSAL)	1	LOT		385						$6,530		$13,630		$20,160

Excavate – Offsite Disposal Details

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August 24, 1994

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
LOAD & HAUL														
OFF–SITE DISPOSAL														
Lead Removal at Firing Range														
HAUL														
From excavation site to rail loading facility														
6 CY dump truck 1/2 mi rt.														
Contaminated Soil	3875	LCY	0.04	205	16.97			1.65		$3,480		$6,590		$10,070
LOADING GONDOLA LCY														
Contaminated Soil 3875														
Allowable CY's of waste per Gondola 73.0														
Install Liner in Gondola car														
Contaminated Soil	53	EA	0.75	51	16.97			32.21		$870		$1,710		$2,580
Load Gondola – 6/day, 2 workers	8.83	DAYS	16.00	182	16.97			15.00		$3,090		$130		$3,220
Seal liner, Install Cover														
Contaminated Soil	53	EA	0.75	51	16.97			32.21		$870		$1,710		$2,580
Dust control – light	8.83	DAYS	8.00	91	16.97			500.00		$1,540		$4,420		$5,960
(RSO takes ownership at this time.)														
(See: Off–Site Disposal Wksht. & App.E)														
TOTAL (LOAD & HAUL – OFFSITE DISPOSAL	1	LOT		580						$9,850		$14,560		$24,410

Load & Haul – Offsite Disposal Details

FEMP-OU02-5 DRAFT
August 24, 1994

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CONTR.NO. – 4[illegible]21
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
LOAD & HAUL TO ON–SITE DISPOSAL CELL														
(NO TREATMENT)														
Excavate Contaminated Soil														
Excavate and Load – Level D	84800	BCY	0.055	6017	16.97			1.17		$102,110		$102,190		$204,300
Excavate Additional Soil	9400	BCY	0.055	667	16.97			1.17		$11,320		$11,330		$22,650
Haul to Onsite Disposal Cell BCY														
– 12" thk. Cushion Layer 8447	10559	LCY	0.081	1103	16.97			1.51		$18,720		$16,420		$35,140
– Impacted Fill 85753	107191	LCY	0.081	11200	16.97			1.51		$190,060		$166,710		$356,770
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load – Level C	6100	BCY	0.055	433	16.97			1.17		$7,350		$7,350		$14,700
Haul to Onsite Disposal Cell BCY 6100	7625	LCY	0.081	797	16.97			1.51		$13,530		$11,860		$25,390
			S/T	1230										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	1230	HRS	150%	1845	16.97			1.51		$31,310		$1,910		$33,220
			S/T	3075										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	308	MD												
(SHREDDING COMMON TO SWL, IFP & SF)														
k. Shredder/Crusher – Purchase/Install 33.3%	0.3	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY 4000														
Generated Waste BCY 5217														
Excavated Debris TONS 6375														
(Percent of Gen.Waste to be Shredded 25%														
Generated Waste TONS 2079														
TOTAL TONS 8454														
Operating Costs	141	HRS							25.75				$3,740	$3,740
(2) Operators	282	HRS	1.00	364	16.97					$6,180				$6,180
TOTAL (EXCAV/NO TREATMENT–ONSITE DISPOSAL)	1	LOT		22,546						$382,970		$320,650	$112,740	$816,360

Excavate – No Treatment – South Field Onsite Disposal Details

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August 24, 1994

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5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP.)															
a. Clear and Grubb	20%														
i. Disposal Cell & Surrounding area	35	7.0	AC	41.40	374	16.97			2575.00		$6,350		$18,570		$24,920
b. Relocated South Access Road	20%														
i. Clear & Grub	3	0.6	AC	41.40	32	16.97			2575.00		$540		$1,590		$2,130
ii. General Grading	1467	293.4	SY	0.001		16.97			0.07				$20		$20
iii. Road – 8" Gravel W/Geotextile	7333	1466.6	SY	0.030	57	16.97			1.08	6.66	$970		$1,630	$10,060	$12,660
c. Haul Road	20%														
i. Clear & Grub	2.4	0.5	AC	41.40	26	16.97			2575.00		$440		$1,270		$1,710
ii. General Grading	11556	2311.2	SY	0.001	3	16.97			0.07		$50		$170		$220
iii. Road – 8" Gravel W/Geotextile	5778	1155.6	SY	0.030	45	16.97			1.08	6.66	$760		$1,290	$7,930	$9,980
	20%														
d. Temporary Construction Fencing	5200	1040.0	LF	0.213	286	16.97				6.25	$4,850			$6,700	$11,550
e. 20' wide Swing Gates	2	0.4	EA	25.60	13	16.97			340.00	560.00	$220		$140	$230	$590
f. Staging Area @ Cell	20%														
Area Excavation for Slab	1606	321.2	BCY	0.016	7	16.97			0.60		$120		$200		$320
Sub–Base for Slab	2845	569.0	SY	0.041	30	16.97		6.75	1.45	5.51	$510	$3,960	$850	$3,230	$8,550
HDPE Perf.Sub–grade Piping – 4"	500	100.0	LF	0.21	27	16.97			0.74	3.02	$460		$80	$310	$850
Concrete Slab – 160'x160'x8" thk	631	126.2	CY	4.07	663	17.98			14.25	67.00	$11,920		$1,850	$8,710	$22,480
Concrete Curb – 480'x2'x8" thk	24	4.8	CY	15.30	95	17.98			11.16	275.90	$1,710		$60	$1,360	$3,130
Epoxy Coating	2845	569.0	SY	0.22	161	16.97			0.77	7.56	$2,730		$450	$4,430	$7,610
Backfill & Compact around Slab	183	36.6	ICY	0.086	4	16.97			1.38				$50		$50
Mob/Demob.Equip.	1	0.2	LS	2.00	1	16.97			184.00		$20		$40		$60
g. Storage Area – 200' x 200' Asphalt	20%														
Includes Compacted Sub–Grade	4444	889	SY	0.084	96	16.97			2.56	14.04	$1,630		$2,340	$12,850	$16,820
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat															
	20%														
h. Decon Trailer – Rental	51	10	MO					1500.00				$15,760			$15,760
i. Const.Equipment Decon. Facility	20%														
25 ft x 60 ft	1	0.20	LS	730.00	146	18.05		1160.00	2900.00	11980.00	$2,640	$240	$580	$2,400	$5,860
j. Personnel Decon. Facility	20%														
11'x 11'	1	0.20	LS	108.00	22	18.89		100.00	360.00	4120.00	$420	$20	$70	$820	$1,330
SUB–TOTAL (COMPOSITE LINER –SITE PREP)		1	LOT		2,088	17.40					$36,340	$19,980	$31,250	$59,030	$146,600

Composite Liner – Site Prep. – South Field Onsite Disposal Details

CONTR.NO.– 4[illegible]21
CLIENT – U[illegible]DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (CON'T.)															
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.															
COMPOSITE LINER															
a. Subgrade Preparation – includes removal of top soil, grading & comp.		25595	SY	0.024	792	16.97			0.86		$13,440		$22,670		$36,110
b. 95% Clay – 5% Bentonite 36" Thk	BCY 25595	30202	ICY	0.260	10130	16.97			11.19	20.35	$171,910		$348,100	$633,050	$1,153,060
c. Composite Clay Liner		25595	SY					7.38				$188,890			$188,890
d. HDPE Liner 60 mil		25595	SY					4.75				$121,580			$121,580
e. Geotextile Fabric		25595	SY					2.25				$57,590			$57,590
f. Pea Gravel 12" Thk; In–place	8447	9081	ICY	0.11	1289	16.97			0.77	17.00	$21,870		$7,200	$159,000	$188,070
g. Composite Clay Liner		25595	SY					7.38				$188,890			$188,890
h. HDPE Liner 60 mil		25595	SY					4.75				$121,580			$121,580
i. Geotextile Fabric		25595	SY					2.25				$57,590			$57,590
j. Pea Gravel 12" Thk; In–place	BCY 8447	9081	ICY	0.11	1289	16.97			0.77	17.00	$21,870		$7,200	$159,000	$188,070
k. Geotextile Fabric		25595	SY					2.25				$57,590			$57,590
l. HDPE Perforated Pipe – leachate collection	6" Dia.	1485	LF	0.30	575	16.97			1.05	6.56	$9,760		$1,610	$10,030	$21,400
m. HDPE Perforated Pipe – leak detection	6" Dia.	1485	LF	0.30	575	16.97			1.05	6.56	$9,760		$1,610	$10,030	$21,400
n. Leachate Discharge Piping															
i. HDPE Carrier & containment Pipe Includes Trench Excav/Backfill, sand bedding and compaction.	6" x 10"	1155	LF	0.86	1281	16.97			11.37	22.33	$21,740		$13,530	$26,560	$61,830
ii. HDPE Manhole – 4' dia. x 8' deep		2	EA	8.00	21	16.97			28.00	8300.00	530.00		$60	$17,100	$17,690
o. Impacted Fill–Cusion Layer 12" Thk	BCY 8447	10559	LCY	0.06	817	16.97			1.67		$13,860		$18,160		$32,020
p. Impacted Fill–Spread and Compact	BCY 85753	107191	LCY	0.06	8297	16.97			1.67		$140,800		$184,380		$325,180
q. Generated Waste	BCY 5217	6000	LCY	0.06	464	16.97			1.67		$7,870		$10,320		$18,190
PPE LEVEL C Allowance is added to the following r. Impacted fill	BCY 6100	7625	LCY	0.06	590	16.97			1.67		$10,010		$13,120		$23,130
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C		590	HRS	150% S/T	885 1475	16.97					$15,020				$15,020
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)		148	MD												
SUB–TOTAL (COMPOSITE LINER)		1	LOT		27,005						$458,440	$793,710	$627,960	$1,014,770	$2,894,880
TOTAL (COMPOSITE LINER)		1	LOT		29,093						$494,780	$813,690	$659,[illegible]	$1,073,800	$3,041,480

Composite Liner Details

FEMP-OU02-5 DRAFT August 24, 1994

F-7-117

961544

1986

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE CAP															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
COMPOSITE CAP															
a. Contouring Layer 18" Thk.	BCY 4370	5244	ICY	0.06	406	16.97			1.67	3.50	$6,890		$9,020	$18,900	$34,810
b. 95% Clay – 5% Bentonite 24" Thk	BCY 5855	6294	ICY	0.260	2111	16.97			11.19	20.35	$35,820		$72,540	$131,930	$240,290
c. GML\GCC – composite Liner		8739	SY					7.38				$64,490			$64,490
d. Geotextile Fabric		8739	SY					2.25				$19,660			$19,660
e. Pea gravel 12" Thk, In–place	BCY 2884	3205	ICY	0.11	455	16.97			0.77	17.00	$7,720		$2,540	$56,120	$66,380
f. Geotextile Fabric		8739	SY					2.25				$19,660			$19,660
g. Cobbels 36" Thk; In–place	BCY 8739	9394	ICY	0.258	3127	16.97			7.15	10.10	$53,070		$69,190	$97,730	$219,990
h. Geotextile Fabric		8739	SY					2.25				$19,660			$19,660
i. Sand Layer 6" Thk; In–place	BCY 1486	1597	ICY	0.052	107	16.97			1.76	5.00	$1,820		$2,900	$8,230	$12,950
j. Geotextile Fabric		8739	SY					2.25				$19,660			$19,660
k. Common Soil 21" Thk; In–place	BCY 5069	6083	ICY	0.06	471	16.97			1.67	3.50	$7,990		$10,460	$21,930	$40,380
l. Top Soil 6" Thk; In–place	BCY 1486	1783	ICY	0.053	122	16.97			1.82	12.10	$2,070		$3,340	$22,220	$27,630
m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding	SY 8739	79	MSF	0.30	31	16.97			6.75	25.00	$530		$550	$2,030	$3,110
n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized		1650	LF	0.17	362	16.97			2.28	13.40	$6,140		$3,870	$22,770	$32,780
TOTAL (COMPOSITE CAP)		1	LOT		7,192						$122,050	$143,130	$174,410	$381,860	$821,450

Composite Cap Details

001545
F-7-118
FEMP-OU02-5, DRAFT
August 24, 1994

CONTR.NO.– [redacted]21
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DIKE FOR DISPOSAL CELL															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
a. Borrow Common Soil – Dike	BCY 66568	79882	ICY	0.06	6183	16.97			1.67	3.50	$104,930		$137,400	$287,970	$530,300
b. Geotextile Fabric		19426	SY					2.25				$43,710			$43,710
c. Cobbels 36" Thk; In–place	BCY 19426	23311	ICY	0.258	7758	16.97			7.15	10.10	$131,650		$171,680	$242,510	$545,840
e. Drainage Piping – HDPE	6" Dia.	1320	LF	0.30	511	16.97			1.05	6.56	$8,670		$1,430	$8,920	$19,020
TOTAL (DIKE – DISPOSAL CELL)		1	LOT		14,452						$245,250	$43,710	$310,510	$539,400	$1,138,870

Dike Details

F-7-119
001546
FEMP-OU02-5 DRAFT
August 24, 1994
861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL															
a. Office/Parking Area @ S/U	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo–Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Facil.@ S/U	33%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo–Fabric & Liner	167	56	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Facil. @ S/U	33%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292					9.16				$10		$10
Geo–Fabric & Liner	14	5	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
d. Staging pad @ S/U	33.3%														
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo–Fabric & Liner 105 cy	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	395.5	132	BCY	0.30	51	16.97			2.51		$870		$340		$1,210
	20%														
e. Const.Equip.Decon.Facil. @ Onsite Disp.Cell															
Demo/Remove Concrete	49.3	10	BCY	1.2	15	16.97			3.62		$250		$40		$290
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	6	BCY	0.292	2	16.97			9.16		$30		$50		$80
Geo–Fabric & Liner	167	33	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	5	EA	0.48	3	16.97			1.68		$50		$10		$60
Splash Guard	702	140	SF	0.04	7	16.97			0.03		$120				$120
Haul & Dump Rubble	24.9	5	BCY	0.30	2	16.97			2.51		$30		$10		$40
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		622						$10,540		$4,710		$15,250

Generated Waste Removal Details

CONTR.NO. – [illegible]321
CLIENT – [illegible] DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.) Demo. /Load/Haul/Dump/Compact															
	20.0%														
f. Personnel Decon. Facil.@ Onsite Disp. Cell															
Demo/Remove Concrete	2.2	0.44	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact Sub–grade Stone	2.4	0.48	BCY	0.292		16.97			9.16						
Geo–Fabric & Liner	14	3	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	6	1	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	26	SF	0.04	1	16.97			0.03		$20				$20
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
	20.0%														
g. Relocated South Access Road/Cell	SY														
Road – 8" Gravel W/Geotextile	7333	1467	BCY	0.292	552	16.97			9.16		$9,370		$13,840		$23,210
Haul & Dump Rubble		1467	BCY	0.30	568	16.97			2.51		$9,640		$3,790		$13,430
	20.0%														
h. Haul Road for Cell	SY														
Road – 8" Gravel W/Geotextile	5778	257.0	BCY	0.292	97	16.97			1.08		$1,650		$290		$1,940
Haul & Dump Rubble		257.0	BCY	0.30	99	16.97			2.51		$1,680		$660		$2,340
	20.0%														
i. Temporary Construction Fencing @ Cell	5200	1040.0	LF	0.107	143	16.97					$2,430				$2,430
Haul & Dump Rubble		135.0	BCY	0.30	52	16.97			2.51		$880		$350		$1,230
	20.0%														
j. 20' wide Swing Gates @ Cell	2	0.40	EA	12.75	7	16.97			340.00		$120		$140		$260
Haul & Dump Rubble		0.05	BCY	0.30		16.97			2.51						
	20.0%														
k. Storage Pad Area @ Cell	BCY														
Demo/Remove Asphalt	988	197.6	BCY	1.2	306	16.97			3.62		$5,190		$740		$5,930
Excav., Load, Haul, Backfill, Compac	474.0	94.8	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Sub–grade Stone															
Geo–Fabric & Liner	4444	888.8	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble		197.0	BCY	0.30	76	16.97			2.51		$1,290		$510		$1,800
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,942						$32,970		$21,230		$54,200

Generated Waste Removal Details

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August 24, 1994

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001548

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.) Demo. /Load/Haul/Dump/Compact															
The following prorated at:	20.0%														
I. Staging Area @ On–Site Disposal Cell															
Demo/Remove Concrete	655	131.0	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	95.0	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo–Fabric & Liner 105 cy	2845	569.0	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	395.5	126.0	BCY	0.30	49	16.97			2.51		$830		$330		$1,160
TOTAL GENERATED WASTE	BCY 5217 LCY 6000														
SUB– TOTAL (GENERATED WASTE REMOVAL)		1	LOT		289						$4,900		$1,730		$6,630
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		2,853						$48,410		$27,670		$76,080

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]21
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
In–Active Flyash Pile	46000	55200	ICY	0.09	6409	16.97			3.21	3.50	$108,760		$182,510	$199,000	$490,270
	33.3%														
Office/Parking	494	197	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	31	ICY												
Decon.Facil.– Personnel @ S/U	7	3	ICY												
Staging Area @ S/U	1099	439	ICY												
	S/T	670.5	ICY	0.09	78	16.97			3.21	3.50	$1,320		$2,220	$2,420	$5,960
	20%														
Staging Area at On–Site Disp.Cell	1099	264	ICY												
Storage Area at On–Site Disp.Cell	474	114	ICY												
Decon.Facil.– Const.Equip. @ Cell	78	19	ICY												
Decon.Facil.– Personnel @ Cell	7	2	ICY												
Relocated South Access Road	1628	391	ICY												
Haul Road	1283	308	ICY												
	S/T	1096.6	ICY	0.09	127	16.97			3.21	3.50	$2,160		$3,630	$3,950	$9,740
b. Final Grade for IFP		16667	SY	0.02	430	16.97			0.70		$7,300		$12,020		$19,320
c. Borrow Top Soil 6" Thk., Spread															
In–Active Flyash Pile		16667	SY	0.036	774	16.97			2.33	2.88	$13,130		$40,000	$49,440	$102,570
	33.3%														
Office/Parking	2222	740	SY												
Decon.Facil.– Const.Equip. @ S/U	167	56	SY												
Decon.Facil.– Personnel @ S/U	14	5	SY												
Staging Area @ S/U	2845	947	SY												
	S/T	1747.6	SY	0.036	81	16.97			2.33	2.88	$1,370		$4,190	$5,180	$10,740
	20%														
Staging Area at On–Site Disp.Cell	2845	683	SY												
Storage Area at On–Site Disp.Cell	4444	1067	SY												
Decon.Facil.– Const.Equip. @ Cell	167	40	SY												
Decon.Facil.– Personnel @ Cell	14	3	SY												
Relocated South Access Road	14667	3520	SY												
Haul Road	11556	2773	SY												
	S/T	8086.3	SY	0.036	376	16.97			2.33	2.88	$6,380		$19,410	$23,990	$49,780
SUB–TOTAL (SITE RESTORATION)		1	LOT		8,275						$140,420		$263,980	$283,980	$688,380

Site Restoration Details

PAGE 1[redacted]22

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FEMP-OU02-5 DRAFT
August 24, 1994

001550

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

	DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	SITE RESTORATION (CON'T.)															
	d. Grass Cover – Seed, Fertilize, Mulch															
	Utility Mix – Hydro/Air Seeding	SY														
	In–Active Flyash Pile	16667	150	MSF	0.30	58	16.97			6.75	25.00	$980		$1,040	$3,860	$5,880
		33.3%														
	Office/Parking	2222	6.7	MSF												
	Decon.Facil.– Const.Equip. @ S/U	167	0.5	MSF												
	Decon.Facil.– Personnel @ S/U	14		MSF												
	Staging Area @ S/U	2845	8.5	MSF												
		S/T	15.7	MSF	0.30	6	16.97			6.75	25.00	$100		$110	$400	$610
		20%														
	Staging Area at On–Site Disp.Cell	2845	5.1	MSF												
	Storage Area at On–Site Disp.Cell	4444	8.0	MSF												
	Decon.Facil.– Const.Equip.@ Cell	167	0.3	MSF												
	Decon.Facil.– Personnel @ Cell	14		MSF												
	Relocated South Access Road	14667	26.4	MSF												
	Haul Road	11556	20.8	MSF												
		S/T	60.6	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,560	$2,370
	e. Security Fence – 6ga aluminized – 6' high		1080	LF	0.13	178	16.97			1.64	9.80	$3,020		$1,820	$10,900	$15,740
	i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
	ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
	iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
	SUB–TOTAL (SITE RESTORATION)		1	LOT		286						$4,850		$3,610	$17,090	$25,550
	TOTAL (SITE RESTORATION)		1	LOT		8,561						$145,270		$267,590	$301,070	$713,930

Site Restoration Details

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F-7-124

001551

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[illegible]321
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility	8	PR					23000.00				$184,000			$184,000
b. MW at IFP – Type I & II	6	PR					23000.00				$138,000			$138,000
c. Abandon Existing Wells	2	EA					13000.00				$26,000			$26,000
TOTAL (MONITORING WELLS)	1	LOT									$348,000			$348,000

Monitoring Wells Details

FEMP-OU02-5 DRAFT
August 24, 1994

F-7-125

001552

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO														
PURCHASE														
Bulk Gondola Rail Car N/A	0	EA												
Liner for Gondola														
Excavated Waste – level C,D & Additional	53	EA							400.00				$21,200	$21,200
Excavated Waste – lead/soil N/A		EA							400.00					
Generated Waste N/A		EA							400.00					
Cover for Gondola														
Excavated Waste – level C,D & Additional	53	EA							395.00				$20,940	$20,940
Excavated Waste – lead/soil N/A		EA							395.00					
Generated Waste N/A		EA							395.00					
TOTALS FORWARD TO ESTIMATE SUMMARY No.24														
TOTAL (PURCHASE COSTS – FERMCO)	1	LOT											$42,100	$42,100

Purchase Waste Container Details

FEMP-OU02-5 DRAFT
August 24, 1994

001553

F-7-126

CONTR.NO. – 4[illegible]21
CLIENT – U[illegible] DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF–SITE TRANSPORTATION COSTS TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas	53	EA					340.00				$18,020			$18,020
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additional	53	EA					22681.00				$1,202,090			$1,202,090
Excavated Waste – lead/soil		EA					23045.00							
Generated Waste		EA					23045.00							
TOTALS FORWARD TO ESTIMATE SUMMARY No.23														
TOTAL (OFF–SITE TRANSPORT. COSTS – FERMCO)	1	LOT									$1,220,100			$1,220,100

Off–Site Disposal Details

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001554

5861

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	155000	GAL					0.01				$1,600			$1,600
Runnoff from the Exclusion Zone.	5700000	GAL					0.01				$57,000			$57,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$58,600			$58,600

Waste Water Treatment Operations Cost Details

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001555

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[illegible]321
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6A – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940718
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	517	EA					2,002				$1,035,000			$1,035,000
Rad	517	EA					2,000				$1,034,000			$1,034,000
Confirmatory Tests														
Full Rad Tests	259	EA					3,101				$803,200			$803,200
Full HSL	25	EA					1,500				$37,500			$37,500
Full TCLP	25	EA					2,000				$50,000			$50,000
2 Technicians per Month	30	MO					13,163				$394,900			$394,900
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIMATION TESTS)	1	LOT									$3,354,600			$3,354,600

Screening & Confirmation Testing Details

PAGE 22 of 2[illegible]

FEMP-OU02-5 DRAFT
August 24, 1994

F-7-129

001556

5861

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

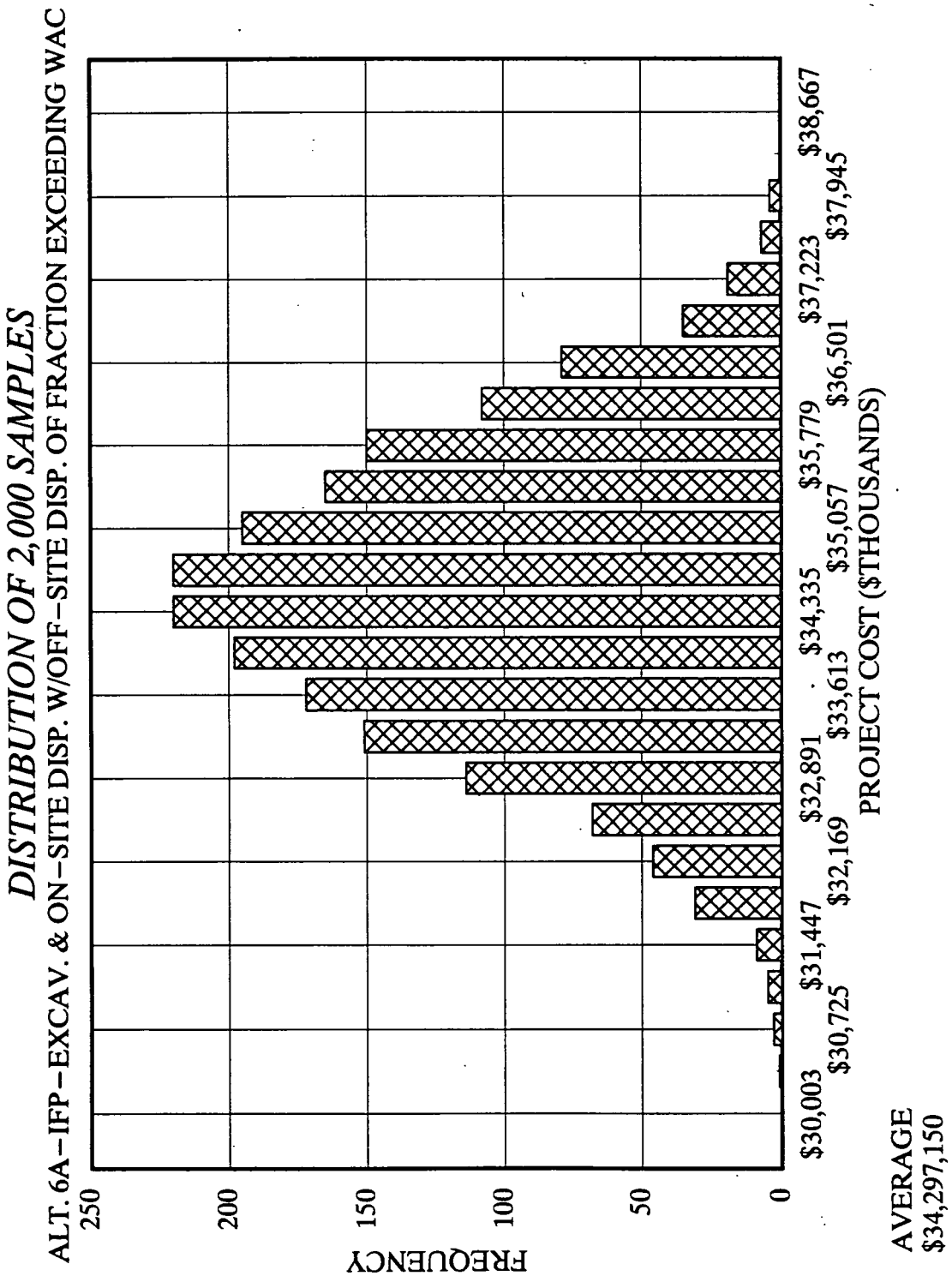
PROJECT: ALT. 6A–IFP–EXCAV. & ON–SITE DISP. W/OFF–SITE DISP. OF FRACTION
CLIENT: DOE DATE: 07–Aug–94
CONTRACT: C2–94–07–18 BASE ESTIMATE: $28,932,200

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$41,390,913	$12,458,713	43.1%
0.05%	$37,764,984	$8,832,784	30.5%
5.00%	$36,317,955	$7,385,755	25.5%
10.00%	$35,947,346	$7,015,146	24.2%
15.00%	$35,647,381	$6,715,181	23.2%
20.00%	$35,424,291	$6,492,091	22.4%
25.00%	$35,214,761	$6,282,561	21.7%
30.00%	$35,004,475	$6,072,275	21.0%
35.00%	$34,810,040	$5,877,840	20.3%
40.00%	$34,623,642	$5,691,442	19.7%
45.00%	$34,473,574	$5,541,374	19.2%
50.00%	$34,304,115	$5,371,915	18.6%
55.00%	$34,153,995	$5,221,795	18.0%
60.00%	$33,977,335	$5,045,135	17.4%
65.00%	$33,799,799	$4,867,599	16.8%
70.00%	$33,617,141	$4,684,941	16.2%
75.00%	$33,395,452	$4,463,252	15.4%
80.00%	$33,199,083	$4,266,883	14.7%
85.00%	$32,954,599	$4,022,399	13.9%
90.00%	$32,664,708	$3,732,508	12.9%
95.00%	$32,224,518	$3,292,318	11.4%
99.95%	$30,428,290	$1,496,090	5.2%
100.00%	$27,231,536	($1,700,664)	–5.9%

FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

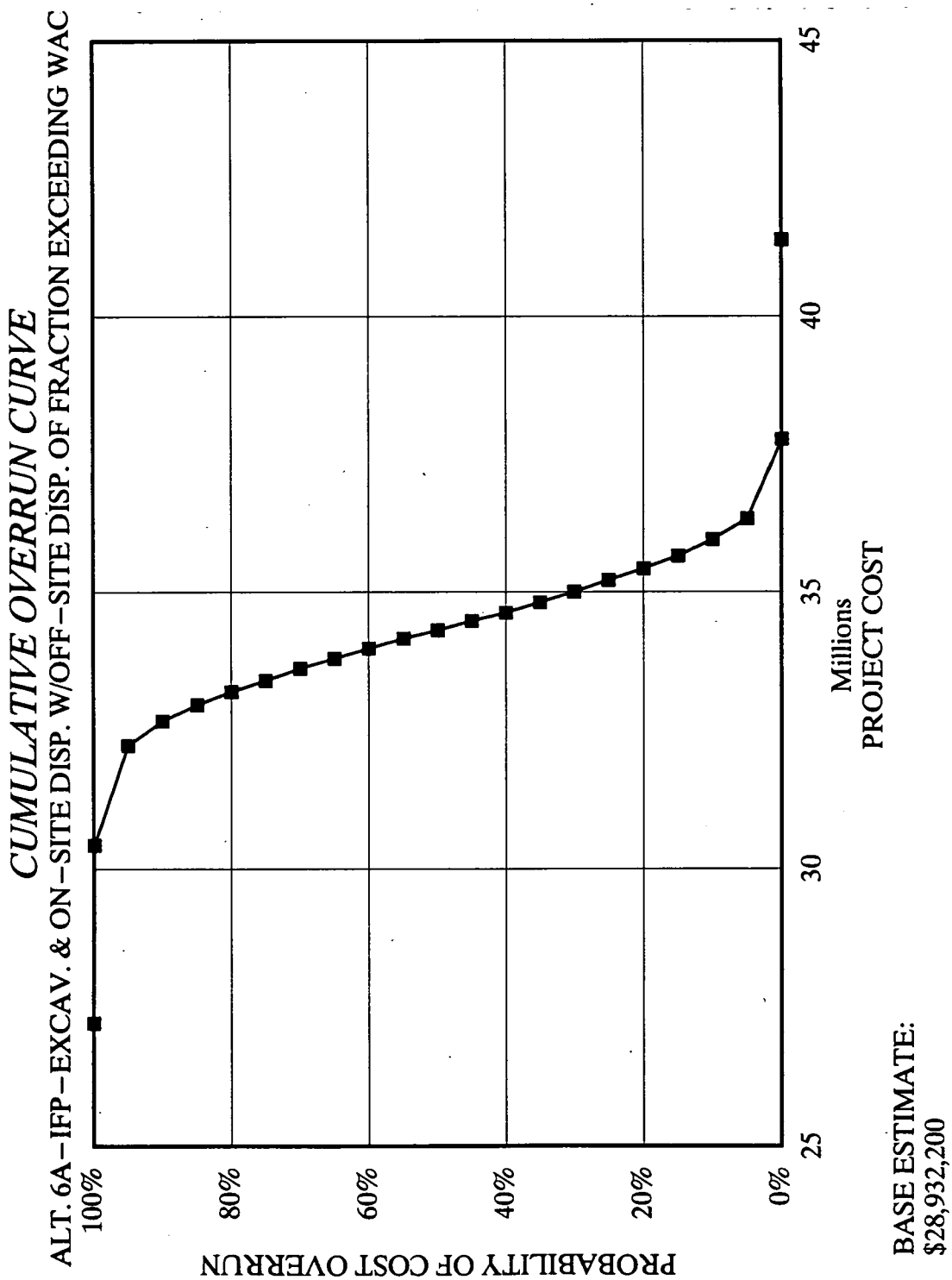
PROJECT: ALT. 6A-IFP-EXCAV. & ON-SITE DISP. W/OFF-SITE DISP. OF FRACTION EXCEEDING WAC
CLIENT: DOE
CONTRACT: C2-94-07-18

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$71,540	-5.0%	$67,963	30%	$93,002	U		14%
2	SITE PREPERATION S/C	16,500	-5.0%	15,675	25%	20,625	U		17%
3	SITE PREPERATION MAT'L	100,140	-10.0%	90,126	30%	130,182	U		25%
4	DECON FACILITIES/SERVICES LABOR	6,040	-2.0%	5,919	80%	10,872	U		2%
5	DECON FACILITIES/SERVICES S/C	28,480	-6.0%	26,771	80%	51,264	U		7%
6	DECON FACILITIES/SERVICES MAT'L	6,060	-6.0%	5,696	60%	9,696	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	23,680	-5.0%	22,496	50%	35,520	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	50,300	-5.0%	47,785	30%	65,390	U		14%
9	EXC/SRT/DRY OFF-SITE DISP LABOR	7,180	-2.0%	7,036	100%	14,360	U		2%
10	LOAD & HAUL OFF-SITE DISP LABOR	10,840	-6.0%	10,190	100%	21,680	U		6%
11	EXC/SRT/CRSH ON-SITE DISP LABOI	421,270	-6.0%	395,994	150%	1,053,175	U		4%
12	EXC/SRT/CRSH ON-SITE DISP MAT'L	124,010	-2.0%	121,530	100%	248,020	U		2%
13	COMPOSITE LINER LABOR	544,260	-6.0%	511,604	100%	1,088,520	U		6%
14	COMPOSITE LINER S/C	895,060	-6.0%	841,356	75.0%	1,566,355	U		7%
15	COMPOSITE LINER MAT'L	1,181,260	-6.0%	1,110,384	70.0%	2,008,142	U		8%
16	COMPOSITE CAP LABOR	134,260	-10.0%	120,834	80.0%	241,668	U		11%
17	COMPOSITE CAP S/C	157,440	-10.0%	141,696	60.0%	251,904	U		14%
18	COMPOSITE CAP MAT'L	420,050	-10.0%	378,045	60.0%	672,080	U		14%
19	DIKE LABOR	269,780	-10.0%	242,802	100.0%	539,560	U		9%
20	DIKE S/C	48,080	-10.0%	43,272	100.0%	96,160	U		9%
21	DIKE MAT'L	593,340	-10.0%	534,006	100.0%	1,186,680	U		9%
22	GENERATED WASTE REMVL LABOR	53,250	-5.0%	50,588	50.0%	79,875	U		9%
23	SITE RESTORATION LABOR	159,800	-5.0%	151,810	30.0%	207,740	U		14%
24	SITE RESTORATION MAT'L	331,180	-5.0%	314,621	30.0%	430,534	U		14%
25	MONITORING WELLS S/C	382,800	-5.0%	363,660	50.0%	574,200	U		9%
26	INDIRECT FIELD COSTS LABOR	1,843,500	-5.0%	1,751,325	50.0%	2,765,250	U		9%
27	INDIRECT FIELD COSTS S/C	924,500	-5.0%	878,275	100.0%	1,849,000	U		5%
28	INDIRECT FIELD COSTS MAT'L	2,437,700	-5.0%	2,315,815	50.0%	3,656,550	U		9%
29	FIELD SUPPORT COSTS LABOR	3,080,400	-10.0%	2,772,360	30.0%	4,004,520	U		25%
30	FIELD SUPPORT COSTS S/C	4,633,300	-5.0%	4,401,635	30.0%	6,023,290	U		14%
31	FIELD SUPPORT COSTS MAT'L	42,100	-5.0%	39,995	30.0%	54,730	U		14%
32	ENGINEERING COSTS	9,612,200	-5.0%	9,131,590	25.0%	12,015,250	U		17%
33	SALES TAX MAT'L	321,900	-1.0%	318,681	1.0%	325,119	U		50%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$28,932,200		$27,231,536		$41,390,913			


DISTRIBUTION OF 2,000 SAMPLES
ALT. 6A–IFP–EXCAV. & ON–SITE DISP. W/OFF–SITE DISP. OF FRACTION EXCEEDING WAC
FREQUENCY
250
200
150
100
50
0
$30,003
$30,725
$31,447
$32,169
$32,891
$33,613
$34,335
$35,057
$35,779
$36,501
$37,223
$37,945
$38,667
PROJECT COST ($THOUSANDS)
AVERAGE
$34,297,150

001559

861


CUMULATIVE OVERRUN CURVE
ALT. 6A–IFP–EXCAV. & ON–SITE DISP. W/OFF–SITE DISP. OF FRACTION EXCEEDING WAC
100%
80%
60%
40%
20%
0%
PROBABILITY OF COST OVERRUN
25
30
35
40
45
Millions
PROJECT COST
BASE ESTIMATE:
$28,932,200

001560

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A - IFP - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940718
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$28,932,200	BASE EST:	$71,540	BASE EST:	$16,500	BASE EST:	$100,140	BASE EST:	$6,040	BASE EST:	$28,480	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	25%	-10%	30%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	25%	-10%	30%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$67,963	$93,002	$15,675	$20,625	$90,126	$130,182	$5,919	$10,872	$26,771	$51,264	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001561

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A – IFP – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940718
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$23,680	BASE EST:	$0	BASE EST:	$50,300	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$22,496	$35,520	$0	$0	$47,785	$65,390	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-135

001562

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A – IFP – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940718
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$7,180	BASE EST:	$0	BASE EST:	$0	BASE EST:	$10,840	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	50%					-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%					-1%	50%				
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-2%	100%	0%	0%	0%	0%	-6%	100%	0%	0%	0%	0%
TOTAL $	$7,036	$14,360	$0	$0	$0	$0	$10,190	$21,680	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-136

001563

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–6A – IFP – EXCAV. & ON–SITE DISPL. w/OFF–SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940718
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

	EXCAV/SORT/CRUSH ONSITE DISPOSAL LABOR $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL S/C $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$421,270	BASE EST:	$0	BASE EST:	$124,010	BASE EST:	$544,260	BASE EST:	$895,060	BASE EST:	$1,181,260
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	100%					–5%	50%				
MATERIAL PRICING					–1%	50%			–5%	25%	–5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	50%			–1%	50%	–1%	50%	–1%	50%	–1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	150%	0%	0%	–2%	100%	–6%	100%	–6%	75%	–6%	70%
TOTAL $	$395,994	$1,053,175	$0	$0	$121,530	$248,020	$511,604	$1,088,520	$841,356	$1,566,355	$1,110,384	$2,008,142

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001564

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A – IFP – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940718
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		DIKE LABOR $'s		DIKE S/C $'s		DIKE MAT'L. $'s	
	BASE EST:	$134,260	BASE EST:	$157,440	BASE EST:	$420,050	BASE EST:	$269,780	BASE EST:	$48,080	BASE EST:	$593,340
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-5%	50%				
MATERIAL PRICING			-5%	30%	-5%	30%			-5%	50%	-5%	50%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-5%	30%	-5%	30%	-5%	30%	-5%	50%	-5%	50%	-5%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-10%	80%	-10%	60%	-10%	60%	-10%	100%	-10%	100%	-10%	100%
TOTAL $	$120,834	$241,668	$141,696	$251,904	$378,045	$672,080	$242,802	$539,560	$43,272	$96,160	$534,006	$1,186,680

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001565

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A – IFP – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940718
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$53,250	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$50,588	$79,875	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A – IFP – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940718
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNE

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$159,800	BASE EST:	$0	BASE EST:	$331,180	BASE EST:	$0	BASE EST:	$382,800	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$151,810	$207,740	$0	$0	$314,621	$430,534	$0	$0	$363,660	$574,200	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001567

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–6A – IFP – EXCAV. & ON–SITE DISPL. w/OFF–SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940718
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

	INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS	
	LABOR $'s		S/C $'s		MAT'L. $'s		LABOR $'s		S/C $'s		MAT'L. $'s	
	BASE EST:	$1,843,500	BASE EST:	$924,500	BASE EST:	$2,437,700	BASE EST:	$3,080,400	BASE EST:	$4,633,300	BASE EST:	$42,100
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–10%	30%				
MATERIAL PRICING			–5%	100%	–5%	50%			–5%	30%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	–5%	100%	–5%	50%	–10%	30%	–5%	30%	–5%	30%
TOTAL $	$1,751,325	$2,765,250	$878,275	$1,849,000	$2,315,815	$3,656,550	$2,772,360	$4,004,520	$4,401,635	$6,023,290	$39,995	$54,730
RISK PROFILE & CORRELATION FOR	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
EACH COST ELEMENT	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-141

001568

FEMP-OU02-5 DRAFT
August 24, 1994

861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A – IFP – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940718
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CNF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$9,612,200	BASE EST:	$321,900	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-5%	25%										
(OTHER)												
TOTAL %	-5%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$9,131,590	$12,015,250	$318,681	$325,119	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001563

LCC ANALYSIS TITLE:	SF - EXCAVATE & ON-SITE DISP. W/OFF-SITE DISP. OF FRACTION EXCEEDING WAC - (EXPANDED TRESPASSER)			
WBS NO.:	1.1.1.1.2.3.2		TASK NO.:	2CSF
ALTERNATIVE:	6A		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH
STUDY PERIOD:	35 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	07-Aug-94
DOCUMENT NO.:	LCC-94-03-05	EST. NO. C2-94-07-19/FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$4,578,348	$0	$0	$4,578,300	1996
$13,735,043	$0	$0	$13,735,000	1997
$8,012,109	$0	$0	$8,012,100	1998
$0	$408,564	$0	$408,600	1999
$0	$387,135	$0	$387,100	2000
$0	$387,135	$0	$387,100	2001
$0	$387,135	$0	$387,100	2002
$0	$407,135	$0	$407,100	2003
$0	$215,535	$0	$215,500	2004
$0	$215,535	$0	$215,500	2005
$0	$215,535	$0	$215,500	2006
$0	$215,535	$0	$215,500	2007
$0	$235,535	$0	$235,500	2008
$0	$215,535	$0	$215,500	2009
$0	$215,535	$0	$215,500	2010
$0	$215,535	$0	$215,500	2011
$0	$215,535	$0	$215,500	2012
$0	$235,535	$0	$235,500	2013
$0	$215,535	$0	$215,500	2014
$0	$215,535	$0	$215,500	2015
$0	$215,535	$0	$215,500	2016
$0	$215,535	$0	$215,500	2017
$0	$235,535	$0	$235,500	2018
$0	$215,535	$0	$215,500	2019
$0	$215,535	$0	$215,500	2020
$0	$215,535	$0	$215,500	2021
$0	$215,535	$0	$215,500	2022
$0	$235,535	$0	$235,500	2023
$0	$215,535	$0	$215,500	2024
$0	$215,535	$0	$215,500	2025
$0	$215,535	$0	$215,500	2026
$0	$215,535	$0	$215,500	2027
$0	$235,535	$0	$235,500	2028
				2029
				2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$26,325,500	$7,465,500	$0	$33,789,900	TOTAL
$24,149,600	$4,677,000	$0	$28,825,900	<====(@NPV)

001570

F ERMC O
ESTIMATING SERVICES

EST FILE #: C2940719 | DATE: 16-Aug-94
CLIENT: US DOE | ESTIMATOR: KEN KEPLER

SUMMARY SHEET

PROJECT TITLE: ALT-6A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.2 EXPANDED TRESPASSER | TASK#: 2CSF

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL - COMPOSITE LINER, CAP, DIKE OFF-SITE DISPOSAL OF LEAD/SOIL TO ENVIROCARE	84,874		$1,445,500	$1,822,200	$2,489,800	$5,757,500
2		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		84,874		$1,445,500	$1,822,200	$2,489,800	$5,757,500
11	SUPERVISION - CONTRACTOR				$246,000			$246,000
12	SM TOOLS/CONSM'BLS						$86,700	$86,700
13	EQUIPMENT RENTAL						$1,764,700	$1,764,700
14	TEMP. FACILITIES				$30,400		$56,400	$86,800
15	TEMP UTL'S HOOK-UP				$15,200		$28,200	$43,400
16	JOB CLEAN-UP				$30,400		$56,400	$86,800
17	SAFETY				$15,200		$28,200	$43,400
18	HEALTH PHYSICS S/C				$199,800		$10,800	$210,600
19	CERCLA/SAT $1,500 PER PERSON					$45,000		$45,000
20	BOND					$57,600		$57,600
21	OVERHEAD & PROFIT					$758,600		$758,600
22	PAYRL BRD.&BENFT.				$1,030,900			$1,030,900
	INDIRECT FIELD COSTS				$1,567,900	$861,200	$2,031,400	$4,460,500
	DIRECT & INDIRECT FIELD COSTS				$3,013,400	$2,683,400	$4,521,200	$10,218,000
23	TRANSPORTATION & BURIAL					$187,100		$187,100
24	WASTE CONTAINERS						$6,400	$6,400
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$198,700		$198,700
25	SCREENING & CONFIRMATION TESTING					$2,692,600		$2,692,600
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$2,380,800			$2,380,800
	FERMCO FIELD SUPPORT COSTS				$2,380,800	$3,078,400	$6,400	$5,465,600
28	EMISSION MODELING				$17,900		$33,200	$51,100
29	PSAR/FSAR(SAFETY RPT)				$306,500			$306,500
30	ENGINEERING	TITLE I&II $1,389,600 TITLE III	$1,583,800	CDR	$510,900	DCR	$296,300	$3,780,600
	ENGINEERING COSTS							$4,138,200
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$4,567,200	$274,000
	SUB-TOTAL (BASE ESTIMATE)							$20,095,800
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	23.0%						$4,622,000
	TARGET ESTIMATE (BASE ESTIMATE PLUS RISK BUDGET)							$24,717,800
35	CONTINGENCY	8.0%						$1,607,700
								PRELIMINARY
	TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY)							$26,325,500

001571

LOTUS31\FS2\ALT6A\SF\INDSUM.WK3 - FEASIBILITY STUDY

Alternative 6 – Excavation and On-Site Disposal with Off-Site Disposal of Fraction Exceeding WAC (Expanded Trespasser)

South Field

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	1	1	5	sample	$5,500.00	40	NA	$220,000	10 wells x 4 samples/year
Long Term	1	6	30	sample	$5,500.00	20	NA	$110,000	10 wells x 2 samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	2.5	3.23	$1,252	Inspect all wells twice/year. Repair 1 out of 8.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	1	1	5	sample	$5,500.00	22.4	NA	$123,200	One fifth x (26 wells x 4 samples/year plus 8 leachate samples/year
Long Term	1	6	30	sample	$5,500.00	11.2	NA	$61,600	One fifth x (26 wells x 2 samples/year plus 4 leachate samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	1.3	1.68	$651	One fifth of inspection of all wells twice per year & repair of 2.5 wells.
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
OU2 Waste Cell Leachate									
Pipeline Maintenance	1	1	30	lump sum	$1,106.83	1	1.29	$1,428	Overall cost divided among 5 subunits.
Treatment & Disposal	1	1	30	gallon	0.01	86,000	NA	$860	Overall cost divided among 5 subunits.
Facility Maint. at Subunit									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	1	1	30	acre	$1,861.92	5.3	6.84	$12,730	Approx. 5.3 acre
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.6	0.77	$1,526	Approx. 1200 ft. perimeter
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	1	1	30	acre	$2,183.32	5.8	7.48	$16,336	Total divided among 5 subunits. (Incl. side slopes)
Mowing	1	1	30	acre	$1,861.92	3.1	4.00	$7,446	Total divided among 5 subunits
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.4	0.52	$1,017	Total divided among 5 subunits
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of OU2 Cell and Subunit	5	5	30	Lump Sum	$20,000	1	NA	$20,000	Total divided among 5 subunits

Annual Costs, Year 1 (excluding facility review)	$408,564
Annual Costs, Years 2–5 (excluding facility review)	$387,135
Annual Costs, Years 6–30 (excluding facility review)	$215,535
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 A:

8/2/94

DATE: 16-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940719

ALT-6A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.2

EXPANDED TRESPASSER

TASK I.D. : 2CSF

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	• NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			•	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	74	$950	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	74	$1,780	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	74	$380	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	74	$410	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	74	$440	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	74	$270	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	74	$5,180	C/B		
SUB-TOTAL		31.80	4		$9,410			
					$127.16	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	8		$100	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	4		$90	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	4		$700	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$1,370			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$10,800			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE.
COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

001573

DATE: 16-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940719

ALT-6A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC EXPANDED TRESPASSER

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.2

TASK I.D. : 2CSF

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	30	120	$16.97	$2,040		
ANNUAL PHYSICALS	1	3	30	90	$16.97	$1,530		
EXIT (TERMINATION) PHYSICALS	1	4	30	120	$16.97	$2,040		
SUB-TOTAL						$5,610		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	23	1	30	698	$16.97	$11,850		
YEARLY IN-VIVO	1	4	30	120	$16.97	$2,040		
EXIT (END OF PROJECT / TERMINATION)	1	4	30	120	$16.97	$2,040		
SUB-TOTAL						$15,930		
WORK DELAYS CAUSED BY MONITORING	5%				$1,782,700	$89,135		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$1,782,700	$89,135		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$199,800	$10,800	$210,600

001574

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT –ALT-6A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CSF

WBS NO. – 1.1.1.1.2.3.2
EST. NO. – C2940719
BY – K. KEPLER
DATE – 08/03/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25-Mar-94	01-Jun-96	16-May-97	30-Apr-98	23	MONTHS

EST.DATE TO MID-POINT OF ACTIVITY	
38	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

001575

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940719
BY KEN KEPLER
DATE 07–Aug–94
TASK ID 2CSF

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR)			CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE	RAIL TRANSPORTATION COSTS / GONDOLA CAR				ENVIROCARE BURIAL COSTS		TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							OUTBOUND & RETURN COSTS 141						
							$80.15 PER TON (90 TON MIN.)	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	$120 DEMURAGE $/DAY (>5 DAYS)	(1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	
	CAR	LINER	COVER			TONS/CY	TONS						
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045
	$0	$400	$395	$340	LEAD/SOIL	1.810	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT
1) Type of waste to be disposed at ENVIROCARE.
2) Insert 125, 141, or 200 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940719
BY KEN KEPLER
DATE 07–Aug–94
TASK ID 2CSF

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C – D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0
	LEAD/SOIL	1.810	134.00	1971.0	196,000	0	196,000	1462.7	54.2

INPUT

001577

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940719
BY KEN KEPLER
DATE 07–Aug–94
TASK ID 2CSF

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	0.0	0	$23,816	$0	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	0.0	0	$24,180	$0	$493.47		
	LEAD/SOIL	54.20	396.0	8	$24,180	$193,400	$446.13		
						**			

INPUT

** NOTE:
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

001578

1861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		4,856						$83,540	$15,000	$60,310	$97,010	$255,860
DECONTAMINATION FACILITIES/SERVICES	1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210
EROSION AND SEDIMENT CONTROLS	1	LS		1428						$26,380		$8,320	$47,700	$82,400
PERCHED GROUNDWATER SYSTEM	N/A	LS												N/A
EXCAVATE – OFFSITE DISPOSAL (REMOVE LEAD/SOIL FROM FIRING RANGE)	1	LS		77						$1,310	$229,730	$1,750		$232,790
LOAD/HAUL – OFF–SITE DISPOSAL (LEAD/SOIL FROM FIRING RANGE)	1	LS		79						$1,360		$1,880		$3,240
EXCAVATE & HAUL TO ON–SITE DISPOSAL (Onsite)	1	LS		17993						$305,690		$271,970	$114,250	$691,910
COMPOSITE LINER	1	LS		24437						$415,430	$693,420	$566,270	$939,640	$2,614,760
COMPOSITE CAP	1	LS		6087						$103,290	$121,440	$147,930	$322,460	$695,120
DIKE FOR DISPOSAL CELL	1	LS		12696						$215,440	$37,090	$264,680	$465,250	$982,460
GENERATED WASTE REMOVAL	1	LS		2853						$48,410		$27,670		$76,080
SITE RESTORATION	1	LS		6351						$107,780		$252,170	$271,620	$631,570
MONITORING WELLS	1	LS									$534,000			$534,000
SUB–TOTAL (DIRECT FIELD COSTS)				77158						$1,314,120	$1,656,570	$1,604,270	$2,263,440	$6,838,400
TAKE–OFF ALLOWANCE 10%	1	LS		7,716						$131,410	$165,660	$160,430	$226,340	$683,840
TOTAL (DIRECT FIELD COSTS)	1	LS		84,874						$1,445,500	$1,822,200	$1,764,700	$2,489,800	$7,522,200

On–Site Disposal of South Field – w/Off–site Option – SUMMARY

PAGE 1 of 22

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6015579

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[illegible]21
CLIENT – U[illegible]EPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 20% ARE COMMON TO ALL SUB–UNITS)														
(ITEMS @ 33.3% ARE COMMON TO SF, AFP & IFP)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	3400	LF	0.213	934	16.97				6.25	$15,850			$21,890	$37,740
c. Clear and Grub														
i. Remediation Site	15.00	AC	41.40	801	16.97			2575.00		$13,590		$39,780		$53,370
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Staging Area @ Sub–unit														
d. Dewatering														
i. Excavate Dewatering Trench	500	CY	0.50	323	16.97			1.49		$5,480		$770		$6,250
ii. Pump – w/4" Suction Hose	200	DAYS	3.00	774	16.97			19.55		$13,130		$4,030		$17,160
iv. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip	2	CY	4.00	10	16.97			100.00		$170		$210		$380
e. General Grading														
i. New Roads	5778	SY	0.001	7	16.97			0.07		$120		$420		$540
33.3%														
ii. Office/Parking Area 2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area 272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area 49	16	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub–Unit 2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	5778	SY	0.030	224	16.97			1.08	6.66	$3,800		$6,430	$39,640	$49,870
33.3%														
ii. Office/Parking – 8" Gravel W/ Geot 2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc.Slab 2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk. 631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" thl 24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub–grade Piping – 4" 500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating 2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab 183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip. 1	0.33	LS	2.00	1	16.97			184.00		$20		$60		$80
TOTAL (SITE PREPARATION)	1	LS		4,856						$83,540	$15,000	$60,310	$97,010	$255,860

Site Preparation Details

PAGE 2 of 22

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FEMP-OU02-5 DRAFT
August 24, 1994

001580

1861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	33.3%														
a. Decon Trailer – Rental	51	17	MO					1500.00				$25,470			$25,470
	33.3%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'i.d.x 25lfx8	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in con	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
	BCY														
x. Backfill & Compaction around concrete slab	258	103	ICY	0.086	11	16.97			1.38		$190		$150		$340
SUB–TOTAL (EQUIP. DECON. FACILITY)					265						$4,810	$25,860	$1,210	$4,140	$36,020

Equipment Decon. Facility Details

FEMP-OU02-5 DRAFT
August 24, 1994

001581

CONTR.NO. – 4[illegible]21
CLIENT – [illegible] DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	33.3%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Gua	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in (	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	0	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210

Personnel Decon.Facilities/Services Details

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FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	2000	LF	0.017	44	16.97			0.06	0.65	$750		$120	$1,340	$2,210
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	500	EA	0.24	155	16.97			1.53	1.35	$2,630		$790	$700	$4,120
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. Sedimentation/Decon. Tank 13000 gal	1	LS	40.00	52	19.95			140.00	5500.00	$1,040		$140	$5,500	$6,680
iv. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1200	LF	0.38	590	19.95			5.11	4.42	$11,770		$6,130	$5,300	$23,200
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	3	EA	8.00	31	16.97			28.00	8300.00	$530		$80	$24,900	$25,510
vi. 50 gal. Pump Includes Controls & Electrical	2	EA	60.00	155	16.97			210.00	2500.00	$2,630		$420	$5,000	$8,050
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,428						$26,380		$8,320	$47,700	$82,400

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Erosion Control Details

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CONTR.NO. – 4[illegible]21
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

	DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	EXCAVATE														
	OFF–SITE DISPOSAL														
	Excavate Lead Contaminated Soil at Firing Range														
	Excavate	300	BCY	0.20	77	16.97			5.65		$1,310		$1,750		$3,060
	Solidification of lead cont.soil w/Portland Cement														
	30% Portland Cement, 2% Sodium Silicate in drums. 300 CY @ 1.5 Tons =	450	TONS					510.50				$229,730			$229,730
	TOTAL (EXCAVATE OFFSITE DISPOSAL)	1	LOT		77						$1,310	$229,730	$1,750		$232,790

Excavate – Offsite Disposal Details

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August 24, 1994

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5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

	DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	LOAD & HAUL														
	OFF–SITE DISPOSAL														
	Lead Removal at Firing Range														
	HAUL														
	From excavation site to rail loading facility														
	6 CY dump truck 1/2 mi rt.														
	Solidified lead/soil/cement	396	LCY	0.04	21	16.97			1.65		$360		$670		$1,030
	LOADING GONDOLA														
	Solidified lead/soil/cement LCY														
	Excav. 300 BCY x 1.25 swell factor = 396														
	Allowable CY's of waste per Gondola 54.2														
	Install Liner in Gondola car														
	Solidified lead/soil/cement	8	EA	0.75	8	16.97			32.21		$140		$260		$400
	Load Gondola – 6/day, 2 workers	1	DAYS	16.00	28	16.97			15.00		$480		$20		$500
	Seal liner, Install Cover														
	Solidified lead/soil/cement	8	EA	0.75	8	16.97			32.21		$140		$260		$400
	Dust control – light	1	DAYS	8.00	14	16.97			500.00		$240		$670		$910
	(RSO takes ownership at this time.)														
	(See: Off–Site Disposal Wksht. & App.E)														
	TOTAL (LOAD & HAUL – OFFSITE DISPOSAL	1	LOT		79						$1,360		$1,880		$3,240

Load & Haul – Offsite Disposal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

001583

CONTR.NO.– 4[illegible]321
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
LOAD & HAUL TO ON–SITE DISPOSAL CELL														
(NO TREATMENT)														
Excavate Contaminated Soil														
Excavate and Load – Level D	77100	BCY	0.055	5470	16.97			1.17		$92,830		$92,910		$185,740
Excavate Additional Soil	7800	BCY	0.055	553	16.97			1.17		$9,380		$9,400		$18,780
Haul to Onsite Disposal Cell BCY														
– 12" thk. Cushion Layer 7167	8959	LCY	0.081	936	16.97			1.51		$15,880		$13,930		$29,810
– Impacted Fill 77733	97166	LCY	0.081	10153	16.97			1.51		$172,300		$151,120		$323,420
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load – Level C	500	BCY	0.055	35	16.97			1.17		$590		$600		$1,190
Haul to Onsite Disposal Cell BCY 500	625	LCY	0.081	65	16.97			1.51		$1,100		$970		$2,070
			S/T	100										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	100	HRS	150%	150	16.97			1.51		$2,550		$160		$2,710
			S/T	250										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	25	MD												
(SHREDDING COMMON TO SWL, IFP & SF)														
k. Shredder/Crusher – Purchase/Install 33.3%	0.3	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY 6500														
Generated Waste BCY 5217														
Excavated Debris TONS 10359														
(Percent of Gen.Waste to be Shredded 18%														
Generated Waste TONS 1497														
TOTAL TONS 11856														
Operating Costs	198	HRS							25.75				$5,250	$5,250
(2) Operators	396	HRS	1.00	511	16.97					$8,670				$8,670
TOTAL (EXCAV/NO TREATMENT–ONSITE DISPOSAL)	1	LOT		17,993						$305,690		$271,970	$114,250	$691,910

Excavate – No Treatment – South Field Onsite Disposal Details

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DRAFT

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP.)															
a. Clear and Grubb	20%														
i. Disposal Cell & Surrounding area	35	7.0	AC	41.40	374	16.97			2575.00		$6,350		$18,570		$24,920
b. Relocated South Access Road	20%														
i. Clear & Grub	3	0.6	AC	41.40	32	16.97			2575.00		$540		$1,590		$2,130
ii. General Grading	1467	293.4	SY	0.001		16.97			0.07				$20		$20
iii. Road – 8" Gravel W/Geotextile	7333	1466.6	SY	0.030	57	16.97			1.08	6.66	$970		$1,630	$10,060	$12,660
c. Haul Road	20%														
i. Clear & Grub	2.4	0.5	AC	41.40	26	16.97			2575.00		$440		$1,270		$1,710
ii. General Grading	11556	2311.2	SY	0.001	3	16.97			0.07		$50		$170		$220
iii. Road – 8" Gravel W/Geotextile	5778	1155.6	SY	0.030	45	16.97			1.08	6.66	$760		$1,290	$7,930	$9,980
	20%														
d. Temporary Construction Fencing	5200	1040.0	LF	0.213	286	16.97				6.25	$4,850			$6,700	$11,550
e. 20' wide Swing Gates	1	0.2	EA	25.60	7	16.97			340.00	560.00	$120		$70	$120	$310
f. Staging Area @ Cell	20%														
Area Excavation for Slab	1606	321.2	BCY	0.016	7	16.97			0.60		$120		$200		$320
Sub–Base for Slab	2845	569.0	SY	0.041	30	16.97		6.75	1.45	5.51	$510	$3,960	$850	$3,230	$8,550
HDPE Perf.Sub–grade Piping – 4"	500	100.0	LF	0.21	27	16.97			0.74	3.02	$460		$80	$310	$850
Concrete Slab – 160'x160'x8" thk	631	126.2	CY	4.07	663	17.98			14.25	67.00	$11,920		$1,850	$8,710	$22,480
Concrete Curb – 480'x2'x8" thk	24	4.8	CY	15.30	95	17.98			11.16	275.90	$1,710		$60	$1,360	$3,130
Epoxy Coating	2845	569.0	SY	0.22	161	16.97			0.77	7.56	$2,730		$450	$4,430	$7,610
Backfill & Compact around Slab	183	36.6	ICY	0.086	4	16.97			1.38				$50		$50
Mob/Demob.Equip.	1	0.2	LS	2.00	1	16.97			184.00		$20		$40		$60
g. Storage Area – 200' x 200' Asphalt															
Includes Compacted Sub–Grade	4444	889	SY	0.084	96	16.97			2.56	14.04	$1,630		$2,340	$12,850	$16,820
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat															
	20%														
h. Decon Trailer – Rental	51	10	MO					1500.00				$15,760			$15,760
i. Const.Equipment Decon. Facility	20%														
25 ft x 60 ft	1	0.20	LS	730.00	146	18.05		1160.00	2900.00	11980.00	$2,640	$240	$580	$2,400	$5,860
j. Personnel Decon. Facility	20%														
11'x 11'	1	0.20	LS	108.00	22	18.89		100.00	360.00	4120.00	$420	$20	$70	$820	$1,330
SUB–TOTAL (COMPOSITE LINER –SITE PREP)		1	LOT		2,082	17.41					$36,240	$19,980	$31,180	$58,920	$146,320

Composite Liner – Site Prep. – South Field Onsite Disposal Details

F-7-160
001587
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[illegible]21
CLIENT – U[illegible] DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (CON'T.)														
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.														
COMPOSITE LINER														
a. Subgrade Preparation – includes removal of top soil, grading & comp.	21717	SY	0.024	672	16.97			0.86		$11,400		$19,240		$30,640
b. 95% Clay – 5% Bentonite 36" Thk BCY 21717	25626	ICY	0.260	8595	16.97			11.19	20.35	$145,860		$295,360	$537,140	$978,360
c. Composite Clay Liner	21717	SY					7.38				$160,270			$160,270
d. HDPE Liner 60 mil	21717	SY					4.75				$103,160			$103,160
e. Geotextile Fabric	21717	SY					2.25				$48,860			$48,860
f. Pea Gravel 12" Thk; In–place 7167	7705	ICY	0.11	1093	16.97			0.77	17.00	$18,550		$6,110	$134,910	$159,570
g. Composite Clay Liner	21717	SY					7.38				$160,270			$160,270
h. HDPE Liner 60 mil	21717	SY					4.75				$103,160			$103,160
i. Geotextile Fabric	21717	SY					2.25				$48,860			$48,860
j. Pea Gravel 12" Thk; In–place BCY 7167	7705	ICY	0.11	1093	16.97			0.77	17.00	$18,550		$6,110	$134,910	$159,570
k. Geotextile Fabric	21717	SY					2.25				$48,860			$48,860
l. HDPE Perforated Pipe – leachate collection 6" Dia.	1260	LF	0.30	488	16.97			1.05	6.56	$8,280		$1,360	$8,510	$18,150
m. HDPE Perforated Pipe – leak detection 6" Dia.	1260	LF	0.30	488	16.97			1.05	6.56	$8,280		$1,360	$8,510	$18,150
n. Leachate Discharge Piping														
i. HDPE Carrier & containment Pipe 6" x 10" Includes Trench Excav/Backfill, sand bedding and compaction.	980	LF	0.86	1087	16.97			11.37	22.33	$18,450		$11,480	$22,540	$52,470
ii. HDPE Manhole – 4' dia. x 8' deep	4	EA	8.00	41	16.97			28.00	8300.00	530.00		$120	$34,200	$34,850
o. Impacted Fill–Cusion Layer 12" Thk BCY 7167	8959	LCY	0.06	693	16.97			1.67		$11,760		$15,410		$27,170
p. Impacted Fill–Spread and Compact BCY 77733	97166	LCY	0.06	7521	16.97			1.67		$127,630		$167,140		$294,770
q. Generated Waste BCY 5217	6000	LCY	0.06	464	16.97			1.67		$7,870		$10,320		$18,190
PPE LEVEL C Allowance is added to the following														
r. Impacted fill BCY 500	625	LCY	0.06	48	16.97			1.67		$810		$1,080		$1,890
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	48	HRS	150% S/T	72	16.97					$1,220				$1,220
				120										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	12	MD												
SUB–TOTAL (COMPOSITE LINER)	1	LOT		22,355						$379,190	$673,440	$535,090	$880,720	$2,468,440
TOTAL (COMPOSITE LINER)	1	LOT		24,437						$415,430	$693,420	$566,270	$939,640	$2,614,760

Composite Liner Details

FEMP-OU02-5 DRAFT August 24, 1994

F-7-161

001580

1861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE CAP															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
COMPOSITE CAP															
a. Contouring Layer 18" Thk.	BCY 3707	4448	ICY	0.06	344	16.97			1.67	3.50	$5,840		$7,650	$16,040	$29,530
b. 95% Clay – 5% Bentonite 24" Thk	BCY 4968	5341	ICY	0.260	1791	16.97			11.19	20.35	$30,390		$61,550	$111,940	$203,880
c. GML\GCC – composite Liner		7415	SY					7.38				$54,720			$54,720
d. Geotextile Fabric		7415	SY					2.25				$16,680			$16,680
e. Pea gravel 12" Thk, In–place	BCY 2447	2631	ICY	0.11	373	16.97			0.77	17.00	$6,330		$2,090	$46,060	$54,480
f. Geotextile Fabric		7415	SY					2.25				$16,680			$16,680
g. Cobbels 36" Thk; In–place	BCY 7415	7971	ICY	0.258	2653	16.97			7.15	10.10	$45,020		$58,700	$82,920	$186,640
h. Geotextile Fabric		7415	SY					2.25				$16,680			$16,680
i. Sand Layer 6" Thk; In–place	BCY 1261	1356	ICY	0.052	91	16.97			1.76	5.00	$1,540		$2,460	$6,980	$10,980
j. Geotextile Fabric		7415	SY					2.25				$16,680			$16,680
k. Common Soil 21" Thk; In–place	BCY 4301	5161	ICY	0.06	399	16.97			1.67	3.50	$6,770		$8,880	$18,610	$34,260
l. Top Soil 6" Thk; In–place	BCY 1261	1513	ICY	0.053	103	16.97			1.82	12.10	$1,750		$2,840	$18,860	$23,450
m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding	SY 7415	67	MSF	0.30	26	16.97			6.75	25.00	$440		$470	$1,730	$2,640
n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized		1400	LF	0.17	307	16.97			2.28	13.40	$5,210		$3,290	$19,320	$27,820
TOTAL (COMPOSITE CAP)		1	LOT		6,087						$103,290	$121,440	$147,930	$322,460	$695,120

Composite Cap Details

F-7-162
001589
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.- [redacted]21
CLIENT - [redacted] DEPT. OF ENERGY
PROJECT - ALT-6A - SF - ON-SITE DISPOSAL w/OFF-SITE > WAC - EXPANDED TRESPASSER
LOCATION - FERNALD, OHIO
PROJ.CTL. - CRU-2
WBS NO. - 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DIKE FOR DISPOSAL CELL															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
a. Borrow Common Soil - Dike	BCY 56482	67778	ICY	0.06	5246	16.97			1.67	3.50	$89,020		$116,590	$244,340	$449,950
b. Geotextile Fabric		16483	SY					2.25				$37,090			$37,090
c. Cobbels 36" Thk; In-place	BCY 16483	19780	ICY	0.258	6583	16.97			7.15	10.10	$111,710		$145,670	$205,770	$463,150
d. Drainage Piping - HDPE	6" Dia.	2240	LF	0.30	867	16.97			1.05	6.56	$14,710		$2,420	$15,140	$32,270
TOTAL (DIKE - DISPOSAL CELL)		1	LOT		12,696						$215,440	$37,090	$264,680	$465,250	$982,460

Dike Details

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FEMP-OU02-5 DRAFT
August 24, 1994

5861

001530

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL															
a. Office/Parking Area @ S/U	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo–Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Facil.@ S/U	33%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo–Fabric & Liner	167	56	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Facil. @ S/U	33%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292					9.16				$10		$10
Geo–Fabric & Liner	14	5	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
d. Staging pad @ S/U	33.3%														
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo–Fabric & Liner 105 cy	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	395.5	132	BCY	0.30	51	16.97			2.51		$870		$340		$1,210
	20%														
e. Const.Equip.Decon.Facil. @ Onsite Disp.Cell															
Demo/Remove Concrete	49.3	10	BCY	1.2	15	16.97			3.62		$250		$40		$290
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	6	BCY	0.292	2	16.97			9.16		$30		$50		$80
Geo–Fabric & Liner	167	33	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	5	EA	0.48	3	16.97			1.68		$50		$10		$60
Splash Guard	702	140	SF	0.04	7	16.97			0.03		$120				$120
Haul & Dump Rubble	24.9	5	BCY	0.30	2	16.97			2.51		$30		$10		$40
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		622						$10,540		$4,710		$15,250

Generated Waste Removal Details

F-7-164
001591
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[illegible]21
CLIENT – U[illegible]EPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.) Demo. /Load/Haul/Dump/Compact															
	20.0%														
f. Personnel Decon. Facil.@ Onsite Disp. Cell															
Demo/Remove Concrete	2.2	0.44	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact Sub–grade Stone	2.4	0.48	BCY	0.292		16.97			9.16						
Geo–Fabric & Liner	14	3	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	6	1	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	26	SF	0.04	1	16.97			0.03		$20				$20
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
	20.0%														
g. Relocated South Access Road/Cell	SY														
Road – 8" Gravel W/Geotextile	7333	1467	BCY	0.292	552	16.97			9.16		$9,370		$13,840		$23,210
Haul & Dump Rubble		1467	BCY	0.30	568	16.97			2.51		$9,640		$3,790		$13,430
	20.0%														
h. Haul Road for Cell	SY														
Road – 8" Gravel W/Geotextile	5778	257.0	BCY	0.292	97	16.97			1.08		$1,650		$290		$1,940
Haul & Dump Rubble		257.0	BCY	0.30	99	16.97			2.51		$1,680		$660		$2,340
	20.0%														
i. Temporary Construction Fencing @ Cell	5200	1040.0	LF	0.107	143	16.97					$2,430				$2,430
Haul & Dump Rubble		135.0	BCY	0.30	52	16.97			2.51		$880		$350		$1,230
	20.0%														
j. 20' wide Swing Gates @ Cell	2	0.40	EA	12.75	7	16.97			340.00		$120		$140		$260
Haul & Dump Rubble		0.05	BCY	0.30		16.97			2.51						
	20.0%														
k. Storage Pad Area @ Cell	BCY														
Demo/Remove Asphalt	988	197.6	BCY	1.2	306	16.97			3.62		$5,190		$740		$5,930
Excav., Load, Haul, Backfill, Compac	474.0	94.8	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Sub–grade Stone															
Geo–Fabric & Liner	4444	888.8	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble		197.0	BCY	0.30	76	16.97			2.51		$1,290		$510		$1,800
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,942						$32,970		$21,230		$54,200

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

5861

001592

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.)															
Demo. /Load/Haul/Dump/Compact															
The following prorated at:	20.0%														
I. Staging Area @ On–Site Disposal Cell															
Demo/Remove Concrete	655	131.0	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	95.0	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo–Fabric & Liner 105 cy	2845	569.0	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	395.5	126.0	BCY	0.30	49	16.97			2.51		$830		$330		$1,160
TOTAL GENERATED WASTE	BCY 5217 LCY 6000														
SUB– TOTAL (GENERATED WASTE REMOVAL		1	LOT		289						$4,900		$1,730		$6,630
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		2,853						$48,410		$27,670		$76,080

Generated Waste Removal Details

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F-7-166

001593

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
South Field	5000	6000	ICY	0.09	697	16.97			3.21	3.50	$11,830		$19,840	$21,630	$53,300
	33.3%														
Office/Parking	494	197	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	31	ICY												
Decon.Facil.– Personnel @ S/U	7	3	ICY												
Staging Area @ S/U	1099	439	ICY												
	S/T	670.5	ICY	0.09	78	16.97			3.21	3.50	$1,320		$2,220	$2,420	$5,960
	20%														
Staging Area at On–Site Disp.Cell	1099	264	ICY												
Storage Area at On–Site Disp.Cell	474	114	ICY												
Decon.Facil.– Const.Equip. @ Cell	78	19	ICY												
Decon.Facil.– Personnel @ Cell	7	2	ICY												
Relocated South Access Road	1628	391	ICY												
Haul Road	1283	308	ICY												
	S/T	1096.6	ICY	0.09	127	16.97			3.21	3.50	$2,160		$3,630	$3,950	$9,740
b. Final Grade for SF		62920	SY	0.02	1623	16.97			0.70		$27,540		$45,370		$72,910
c. Borrow Top Soil 6" Thk., Spread															
South Field		62920	SY	0.036	2922	16.97			2.33	2.88	$49,590		$151,000	$186,650	$387,240
	33.3%														
Office/Parking	2222	740	SY												
Decon.Facil.– Const.Equip. @ S/U	167	56	SY												
Decon.Facil.– Personnel @ S/U	14	5	SY												
Staging Area @ S/U	2845	947	SY												
	S/T	1747.6	SY	0.036	81	16.97			2.33	2.88	$1,370		$4,190	$5,180	$10,740
	20%														
Staging Area at On–Site Disp.Cell	2845	683	SY												
Storage Area at On–Site Disp.Cell	4444	1067	SY												
Decon.Facil.– Const.Equip. @ Cell	167	40	SY												
Decon.Facil.– Personnel @ Cell	14	3	SY												
Relocated South Access Road	14667	3520	SY												
Haul Road	11556	2773	SY												
	S/T	8086.3	SY	0.036	376	16.97			2.33	2.88	$6,380		$19,410	$23,990	$49,780
SUB–TOTAL (SITE RESTORATION)		1	LOT		5,904						$100,190		$245,660	$243,820	$589,670

Site Restoration Details

5861

FEMP-OU02-5 DRAFT
August 24, 1994

F-7-167

001594

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D. 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION (CON'T.)															
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
South Field	62920	566	MSF	0.30	219	16.97			6.75	25.00	$3,720		$3,940	$14,570	$22,230
	33.3%														
Office/Parking	2222	6.7	MSF												
Decon.Facil.– Const.Equip. @ S/U	167	0.5	MSF												
Decon.Facil.– Personnel @ S/U	14		MSF												
Staging Area @ S/U	2845	8.5	MSF												
	S/T	15.7	MSF	0.30	6	16.97			6.75	25.00	$100		$110	$400	$610
	20%														
Staging Area at On–Site Disp.Cell	2845	5.1	MSF												
Storage Area at On–Site Disp.Cell	4444	8.0	MSF												
Decon.Facil.– Const.Equip.@ Cell	167	0.3	MSF												
Decon.Facil.– Personnel @ Cell	14		MSF												
Relocated South Access Road	14667	26.4	MSF												
Haul Road	11556	20.8	MSF												
	S/T	60.6	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,560	$2,370
e. Security Fence – 6ga aluminized – 6' high		1080	LF	0.13	178	16.97			1.64	9.80	$3,020		$1,820	$10,900	$15,740
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
SUB–TOTAL (SITE RESTORATION)		1	LOT		447						$7,590		$6,510	$27,800	$41,900
TOTAL (SITE RESTORATION)		1	LOT		6,351						$107,780		$252,170	$271,620	$631,570

Site Restoration Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-7-168

001595

CONTR.NO.– 4[illegible]21
CLIENT – U[illegible]DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility	7	PR					23000.00				$161,000			$161,000
a. MW at SF – Type I & II	10	PR					23000.00				$230,000			$230,000
c. Abandon Existing Wells	11	EA					13000.00				$143,000			$143,000
TOTAL (MONITORING WELLS)	1	LOT									$534,000			$534,000

Monitoring Wells Details

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FEMP-OU02-5 DRAFT
August 24, 1994

5861

F-7-169

001596

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO															
PURCHASE															
Bulk Gondola Rail Car	N/A	0	EA												
Liner for Gondola															
Excavated Waste – level C,D & Additio	N/A		EA							400.00					
Excavated Waste – lead/soil		8	EA							400.00				$3,200	$3,200
Generated Waste	N/A		EA							400.00					
Cover for Gondola															
Excavated Waste – level C,D & Additio	N/A		EA							395.00					
Excavated Waste – lead/soil		8	EA							395.00				$3,160	$3,160
Generated Waste	N/A		EA							395.00					
(Also See Appendix E)															
TOTALS FORWARD TO ESTIMATE SUMMARY No.24															
TOTAL (PURCHASE COSTS – FERMCO)		1	LOT											$6,400	$6,400

001597

F-7-170

FEMP-OU02-5 DRAFT
August 24, 1994

Purchase Waste Container Details

CONTR.NO. – [redacted]21
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT-6A – SF – ON-SITE DISPOSAL w/OFF-SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF-SITE TRANSPORTATION COSTS TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas	8	EA					340.00				$2,720			$2,720
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additio N/A		EA					22681.00							
Excavated Waste – lead/soil	8	EA					23045.00				$184,360			$184,360
Generated Waste N/A		EA					23045.00							
(Also See Appendix E)														
TOTALS FORWARD TO ESTIMATE SUMMARY No.23														
TOTAL (OFF-SITE TRANSPORT. COSTS – FERMCO)	1	LOT									$187,100			$187,100

001598

F-7-171

ENVIROCARE Transportation Details

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FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	165000	GAL					0.01				$1,700			$1,700
Runnoff from the Exclusion Zone.	19700000	GAL					0.01				$197,000			$197,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$198,700			$198,700

Waste Water Treatment Operations Cost Details

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001595

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted]DEPT. OF ENERGY
PROJECT – ALT–6A – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940719
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	427	EA					2,002				$854,900			$854,900
Rad	427	EA					2,000				$854,000			$854,000
Confirmatory Tests														
Full Rad Tests	214	EA					3,101				$663,600			$663,600
Full HSL	20	EA					1,500				$30,000			$30,000
Full TCLP	20	EA					2,000				$40,000			$40,000
2 Technicians per Month	19	MO					13,163				$250,100			$250,100
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING/CONFIRMATION TESTS)	1	LOT									$2,692,600			$2,692,600

Screening & Confirmation Testing Details

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FEMP-OU02-5 DRAFT
August 24, 1994

001600

1861

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

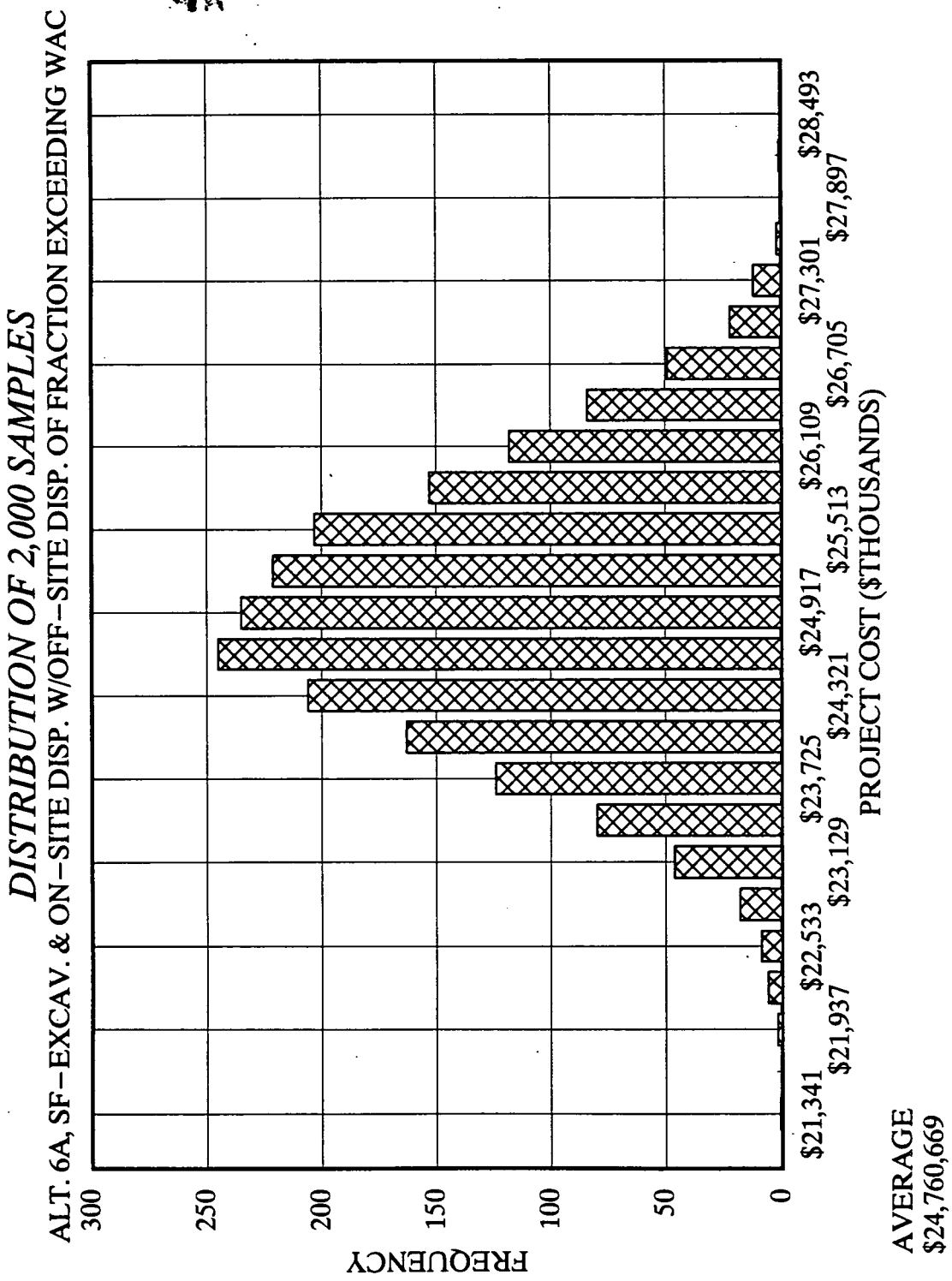
PROJECT: ALT. 6A, SF–EXCAV. & ON–SITE DISP. W/OFF–SITE DISP. OF FRACTION E
CLIENT: DOE DATE: 07–Aug–94
CONTRACT: C2–94–07–19 BASE ESTIMATE: $20,095,800

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$30,763,399	$10,667,599	53.1%
0.05%	$27,431,152	$7,335,352	36.5%
5.00%	$26,327,366	$6,231,566	31.0%
10.00%	$26,014,708	$5,918,908	29.5%
15.00%	$25,782,555	$5,686,755	28.3%
20.00%	$25,582,654	$5,486,854	27.3%
25.00%	$25,420,255	$5,324,455	26.5%
30.00%	$25,276,109	$5,180,309	25.8%
35.00%	$25,140,409	$5,044,609	25.1%
40.00%	$24,998,432	$4,902,632	24.4%
45.00%	$24,863,724	$4,767,924	23.7%
50.00%	$24,738,179	$4,642,379	23.1%
55.00%	$24,621,052	$4,525,252	22.5%
60.00%	$24,508,173	$4,412,373	22.0%
65.00%	$24,388,212	$4,292,412	21.4%
70.00%	$24,258,710	$4,162,910	20.7%
75.00%	$24,094,267	$3,998,467	19.9%
80.00%	$23,945,269	$3,849,469	19.2%
85.00%	$23,762,422	$3,666,622	18.2%
90.00%	$23,525,124	$3,429,324	17.1%
95.00%	$23,230,552	$3,134,752	15.6%
99.95%	$21,791,185	$1,695,385	8.4%
100.00%	$18,723,878	($1,371,922)	–6.8%

FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

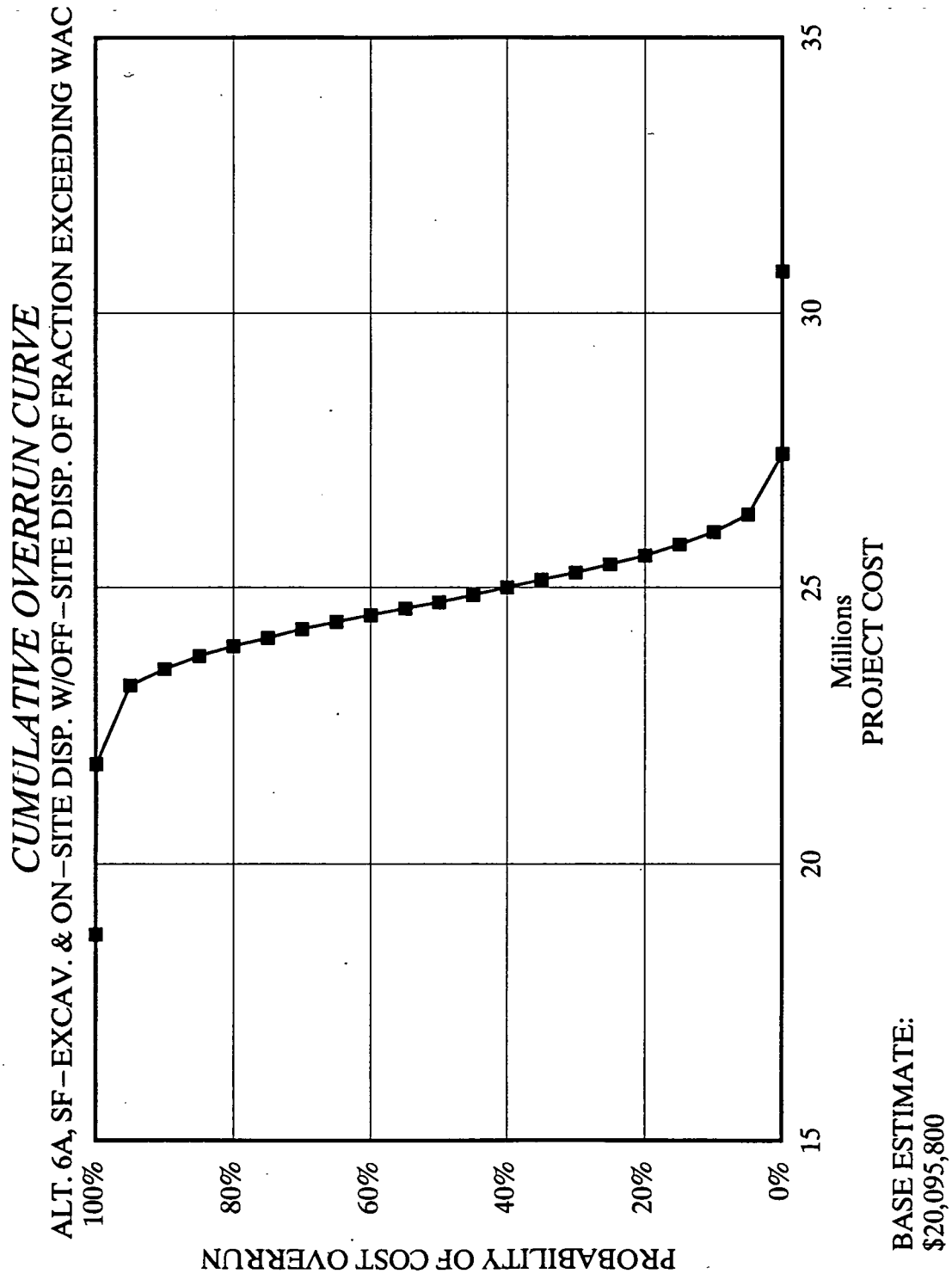
PROJECT: ALT. 6A, SF-EXCAV. & ON-SITE DISP. W/OFF-SITE DISP. OF FRACTION EXCEEDING WAC
CLIENT: DOE
CONTRACT: C2-94-07-19

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$91,890	-5.0%	$87,296	30%	$119,457	U		14%
2	SITE PREPERATION S/C	16,500	-5.0%	15,675	30%	21,450	U		14%
3	SITE PREPERATION MAT'L	106,710	-5.0%	101,375	20%	128,052	U		20%
4	DECON FACILITIES/SERVICES LABOR	6,040	-2.0%	5,919	80%	10,872	U		2%
5	DECON FACILITIES/SERVICES S/C	28,480	-6.0%	26,771	80%	51,264	U		7%
6	DECON FACILITIES/SERVICES MAT'L	6,060	-6.0%	5,696	60%	9,696	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	29,020	-5.0%	27,569	50%	43,530	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	52,470	-5.0%	49,847	30%	68,211	U		14%
9	EXC/SORT/DRY OFF-SITE LABOR	1,440	-6.0%	1,354	150.0%	3,600	U		4%
10	EXC/SORT/DRY OFF-SITE S/C	252,700	-10.0%	227,430	100%	505,400	U		9%
11	LOAD & HAUL OFF-SITE DISP LABOR	1,500	-10.0%	1,350	150%	3,750	U		6%
12	EXC/SRT/CRSH ON-SITE DISP LABOR	336,260	-6.0%	316,084	150.0%	840,650	U		4%
13	EXC/SRT/CRSH ON-SITE DISP MAT'L	125,680	-2.0%	123,166	100.0%	251,360	U		2%
14	COMPOSITE LINER LABOR	456,970	-6.0%	429,552	100.0%	913,940	U		6%
15	COMPOSITE LINER S/C	762,760	-6.0%	716,994	100.0%	1,525,520	U		6%
16	COMPOSITE LINER MAT'L	1,033,560	-6.0%	971,546	80.0%	1,860,408	U		7%
17	COMPOSITE CAP LABOR	113,620	-6.0%	106,803	100.0%	227,240	U		6%
18	COMPOSITE CAP S/C	133,580	-10.0%	120,222	100.0%	267,160	U		9%
19	COMPOSITE CAP MAT'L	354,710	-6.0%	333,427	80.0%	638,478	U		7%
20	DIKE LABOR	236,980	-6.0%	222,761	100.0%	473,960	U		6%
21	DIKE S/C	40,800	-6.0%	.38,352	100.0%	81,600	U		6%
22	DIKE MAT'L	511,780	-6.0%	481,073	80.0%	921,204	U		7%
23	GENERATED WASTE REMVL LABOR	53,250	-1.0%	52,718	50.0%	79,875	U		2%
24	SITE RESTORATION LABOR	118,560	-5.0%	112,632	30.0%	154,128	U		14%
25	SITE RESTORATION MAT'L	298,780	-5.0%	283,841	30.0%	388,414	U		14%
26	MONITORING WELLS S/C	587,400	-5.0%	558,030	50.0%	881,100	U		9%
27	INDIRECT FIELD COSTS LABOR	1,567,900	-5.0%	1,489,505	50.0%	2,351,850	U		9%
28	INDIRECT FIELD COSTS S/C	861,200	-5.0%	818,140	100.0%	1,722,400	U		5%
29	INDIRECT FIELD COSTS MAT'L	2,031,400	-5.0%	1,929,830	50.0%	3,047,100	U		9%
30	FIELD SUPPORT COSTS LABOR	2,380,800	-10.0%	2,142,720	30.0%	3,095,040	U		25%
31	FIELD SUPPORT COSTS S/C	3,078,400	-5.0%	2,924,480	50.0%	4,617,600	U		9%
32	FIELD SUPPORT COSTS MAT'L	6,400	-5.0%	6,080	50.0%	9,600	U		9%
33	ENGINEERING COSTS	4,138,200	-10.0%	3,724,380	25.0%	5,172,750	U		29%
34	SALES TAX MAT'L	274,000	-1.0%	271,260	1.0%	276,740	U		50%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$20,095,800		$18,723,878		$30,763,399			


DISTRIBUTION OF 2,000 SAMPLES
ALT. 6A, SF–EXCAV. & ON–SITE DISP. W/OFF–SITE DISP. OF FRACTION EXCEEDING WAC
FREQUENCY
300
250
200
150
100
50
0
$21,341
$21,937
$22,533
$23,129
$23,725
$24,321
$24,917
$25,513
$26,109
$26,705
$27,301
$27,897
$28,493
PROJECT COST ($THOUSANDS)
AVERAGE
$24,760,669

001603

5861


CUMULATIVE OVERRUN CURVE
ALT. 6A, SF–EXCAV. & ON–SITE DISP. W/OFF–SITE DISP. OF FRACTION EXCEEDING WAC
PROBABILITY OF COST OVERRUN
100%
80%
60%
40%
20%
0%
15
20
25
30
35
Millions
PROJECT COST
BASE ESTIMATE:
$20,095,800

001604

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–6A, SF – EXCAV. & ON–SITE DISPL. w/OFF–SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940719
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSP

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$20,095,800	BASE EST:	$91,890	BASE EST:	$16,500	BASE EST:	$106,710	BASE EST:	$6,040	BASE EST:	$28,480	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	30%					–1%	30%				
MATERIAL PRICING			–5%	30%	–5%	20%			–5%	30%	–5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							–1%	50%	–1%	50%	–1%	40%
(OTHER)												
TOTAL %	–5%	30%	–5%	30%	–5%	20%	–2%	80%	–6%	80%	–6%	60%
TOTAL $	$87,296	$119,457	$15,675	$21,450	$101,375	$128,052	$5,919	$10,872	$26,771	$51,264	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940719
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$29,020	BASE EST:	$0	BASE EST:	$52,470	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$27,569	$43,530	$0	$0	$49,847	$68,211	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A, SF – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940719
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$1,440	BASE EST:	$252,700	BASE EST:	$0	BASE EST:	$1,500	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	100%					-5%	100%				
MATERIAL PRICING			-5%	50%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-5%	50%	-5%	50%			-5%	50%				
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	150%	-10%	100%	0%	0%	-10%	150%	0%	0%	0%	0%
TOTAL $	$1,354	$3,600	$227,430	$505,400	$0	$0	$1,350	$3,750	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001607

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–6A, SF – EXCAV. & ON–SITE DISPL. w/OFF–SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940719
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF

	EXCAV/SORT/CRUSH ONSITE DISPOSAL LABOR $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL S/C $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$336,260	BASE EST:	$0	BASE EST:	$125,680	BASE EST:	$456,970	BASE EST:	$762,760	BASE EST:	$1,033,560
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	100%					–5%	50%				
MATERIAL PRICING					–1%	50%			–5%	50%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	50%			–1%	50%	–1%	50%	–1%	50%	–1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	150%	0%	0%	–2%	100%	–6%	100%	–6%	100%	–6%	80%
TOTAL $	$316,084	$840,650	$0	$0	$123,166	$251,360	$429,552	$913,940	$716,994	$1,525,520	$971,546	$1,860,408

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940719
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		DIKE LABOR $'s		DIKE S/C $'s		DIKE MAT'L. $'s	
	BASE EST:	$113,620	BASE EST:	$133,580	BASE EST:	$354,710	BASE EST:	$236,980	BASE EST:	$40,800	BASE EST:	$511,780
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-5%	50%				
MATERIAL PRICING			-5%	50%	-5%	30%			-5%	50%	-5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%	-5%	50%	-1%	50%	-1%	50%	-1%	50%	-1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	100%	-10%	100%	-6%	80%	-6%	100%	-6%	100%	-6%	80%
TOTAL $	$106,803	$227,240	$120,222	$267,160	$333,427	$638,478	$222,761	$473,960	$38,352	$81,600	$481,073	$921,204

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940719
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$53,250	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR' EFFICIENCY							-1%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-1%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$52,718	$79,875	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A, SF – EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940719
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSE

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$118,560	BASE EST:	$0	BASE EST:	$298,780	BASE EST:	$0	BASE EST:	$587,400	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$112,632	$154,128	$0	$0	$283,841	$388,414	$0	$0	$558,030	$881,100	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001611

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940719
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF

	INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS	
	LABOR $'s		S/C $'s		MAT'L. $'s		LABOR $'s		S/C $'s		MAT'L. $'s	
	BASE EST:	$1,567,900	BASE EST:	$861,200	BASE EST:	$2,031,400	BASE EST:	$2,380,800	BASE EST:	$3,078,400	BASE EST:	$6,400
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-10%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-5%	50%	-5%	50%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-10%	30%	-5%	50%	-5%	50%
TOTAL $	$1,489,505	$2,351,850	$818,140	$1,722,400	$1,929,830	$3,047,100	$2,142,720	$3,095,040	$2,924,480	$4,617,600	$6,080	$9,600
RISK PROFILE & CORRELATION FOR	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
EACH COST ELEMENT	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A, SF - EXCAV. & ON-SITE DISPL. w/OFF-SITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940719
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CSF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$4,138,200	BASE EST:	$274,000	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-10%	25%										
(OTHER)												
TOTAL %	-10%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$3,724,380	$5,172,750	$271,260	$276,740	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001613

LCC ANALYSIS TITLE:	AFP - EXCAVATE & ON-SITE DISP. W/OFF-SITE DISP. OF FRACTION EXCEEDING WAC (EXPANDED TRESPASSER)			
WBS NO.:	1.1.1.1.2.3.4		TASK NO.:	2CAF
ALTERNATIVE:	6A		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	36 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	07-Aug-94
DOCUMENT NO.:	LCC-94-03-03	EST. NO. C2-94-07-20 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$3,244,900	$0	$0	$3,244,900	1997
$9,734,700	$0	$0	$9,734,700	1998
$6,489,800	$0	$0	$6,489,800	1999
$0	$318,940	$0	$318,900	2000
$0	$297,511	$0	$297,500	2001
$0	$297,511	$0	$297,500	2002
$0	$297,511	$0	$297,500	2003
$0	$317,511	$0	$317,500	2004
$0	$169,911	$0	$169,900	2005
$0	$169,911	$0	$169,900	2006
$0	$169,911	$0	$169,900	2007
$0	$169,911	$0	$169,900	2008
$0	$189,911	$0	$189,900	2009
$0	$169,911	$0	$169,900	2010
$0	$169,911	$0	$169,900	2011
$0	$169,911	$0	$169,900	2012
$0	$169,911	$0	$169,900	2013
$0	$189,911	$0	$189,900	2014
$0	$169,911	$0	$169,900	2015
$0	$169,911	$0	$169,900	2016
$0	$169,911	$0	$169,900	2017
$0	$169,911	$0	$169,900	2018
$0	$189,911	$0	$189,900	2019
$0	$169,911	$0	$169,900	2020
$0	$169,911	$0	$169,900	2021
$0	$169,911	$0	$169,900	2022
$0	$169,911	$0	$169,900	2023
$0	$189,911	$0	$189,900	2024
$0	$169,911	$0	$169,900	2025
$0	$169,911	$0	$169,900	2026
$0	$169,911	$0	$169,900	2027
$0	$169,911	$0	$169,900	2028
$0	$189,911	$0	$189,900	2029
				2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$19,469,400	$5,876,800	$0	$25,345,800	TOTAL
$17,356,400	$3,573,600	$0	$20,929,800	<====(@NPV)

F ERMCO ESTIMATING SERVICES

EST FILE #: C2940720 | DATE: 16-Aug-94
CLIENT: US DOE | ESTIMATOR: KEN KEPLER

SUMMARY SHEET

PROJECT TITLE: ALT-6A, AFP - EXCAV.& ON-SITE DISPOSAL w/OFFSITE DISPL. OF FRACTION EXCEEDING WAC | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.4 EXPANDED TRESPASSER | TASK#: 2CAF

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL	71,070		$1,210,700	$1,240,800	$1,978,900	$4,430,400
2		NO TREATMENT - COMPOSITE LINER, CAP, DIKE (SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		71,070		$1,210,700	$1,240,800	$1,978,900	$4,430,400
11	SUPERVISION - CONTRACTOR				$208,000			$208,000
12	SM TOOLS/CONSM'BLS						$72,600	$72,600
13	EQUIPMENT RENTAL						$1,431,000	$1,431,000
14	TEMP. FACILITIES				$25,400		$47,200	$72,600
15	TEMP UTL'S HOOK-UP				$12,700		$23,600	$36,300
16	JOB CLEAN-UP				$25,400		$47,200	$72,600
17	SAFETY				$12,700		$23,600	$36,300
18	HEALTH PHYSICS S/C				$168,900			$168,900
19	CERCLA/SAT	$1,500 PER PERSON				$36,000		$36,000
20	BOND					$44,300		$44,300
21	OVERHEAD & PROFIT					$594,500		$594,500
22	PAYRL BRD.&BENFT.				$863,100			$863,100
	INDIRECT FIELD COSTS				$1,312,200	$674,800	$1,645,200	$3,632,200
	DIRECT & INDIRECT FIELD COSTS				$2,522,900	$1,915,600	$3,624,100	$8,062,600
23	TRANSPORTATION & BURIAL	N/A						
24	WASTE CONTAINERS	N/A						
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$12,000		$12,000
25	SCREENING & CONFIRMATION TESTING					$2,321,100		$2,321,100
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$1,015,900			$1,015,900
	FERMCO FIELD SUPPORT COSTS				$1,015,900	$2,333,100		$3,349,000
28	EMISSION MODELING				$14,100		$26,200	$40,300
29	PSAR/FSAR(SAFETY RPT)				$346,700			$346,700
30	ENGINEERING	TITLE I&II $1,169,100 TITLE III	$1,209,400	CDR	$419,300	DCR	$395,100	$3,192,900
	ENGINEERING COSTS							$3,579,900
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$3,650,300	$219,000
	SUB-TOTAL	(BASE ESTIMATE)						$15,210,500
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	20.0%						$3,042,100
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$18,252,600
35	CONTINGENCY	8.0%						$1,216,800
								PRELIMINARY
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$19,469,400

LOTUS31\FS2\ALT6A\AFP\INDSUM.WK3 - FEASIBILITY STUDY

Alternative 6 – Excavation and On-Site Disposal with Off-Site Disposal of Fraction Exceeding WAC (Expanded Trespasser)

Active Flyash Pile

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	1	1	5	sample	$5,500.00	24	NA	$132,000	6 wells x 4 samples/year
Long Term	1	6	30	sample	$5,500.00	12	NA	$66,000	6 wells x 2 samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	1.5	1.94	$751	Inspect all wells twice/year. Repair 1 out of 8.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	1	1	5	sample	$5,500.00	22.4	NA	$123,200	One fifth x (26 wells x 4 samples/year plus 8 leachate samples/year
Long Term	1	6	30	sample	$5,500.00	11.2	NA	$61,600	One fifth x (26 wells x 2 samples/year plus 4 leachate samples/year
Well Inspect & Maint.	1	1	30	well	$388.14	1.3	1.68	$651	One fifth of inspection of all wells twice per year & repair of 2.5 wells.
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
OU2 Waste Cell Leachate									
Pipeline Maintenance	1	1	30	lump sum	$1,106.83	1	1.29	$1,428	Overall cost divided among 5 subunits.
Treatment & Disposal	1	1	30	gallon	0.01	86,000	NA	$860	Overall cost divided among 5 subunits.
Facility Maint. at Subunit									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	1	1	30	acre	$1,861.92	5.7	7.35	$13,691	Approx. 5.7 acre
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.7	0.90	$1,780	Approx. 1400 ft. perimeter.
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	1	1	30	acre	$2,183.32	4.97	6.41	$13,998	Total divided among 5 subunits. (Incl. side slopes)
Mowing	1	1	30	acre	$1,861.92	3.1	4.00	$7,446	Total divided among 5 subunits
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.4	0.52	$1,017	Total divided among 5 subunits
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of OU2 Cell and Subunit	5	5	30	Lump Sum	$20,000	1	NA	$20,000	Total divided among 5 subunits

Annual Costs, Year 1 (excluding facility review)	$318,940
Annual Costs, Years 2–5 (excluding facility review)	$297,511
Annual Costs, Years 6–30 (excluding facility review)	$169,911
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 A:

8/2/94

586T

DATE: 16-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940720

ALT-6A, AFP - EXCAV.& ON-SITE DISPOSAL w/OFFSITE DISPL. OF FRACTION EXCEEDING WAC EXPANDED TRESPASSER

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.4

TASK I.D. : 2CAF

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY / MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	0	$0	C/B		
SUB-TOTAL		31.80	4		$0			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	0		$0	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	0		$0	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	0		$0	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	0		$0	C/B		
THERMO STRIPS	EA	50.00	0		$0	C/B		
SUB-TOTAL		327.21			$0			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$0			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE.
COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

001617

DATE: 16-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940720

ALT-6A, AFP - EXCAV.& ON-SITE DISPOSAL w/OFFSITE DISPL. OF FRACTION EXCEEDING WAC

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.4

EXPANDED TRESPASSER

TASK I.D. : 2CAF

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	24	96	$16.97	$1,630		
ANNUAL PHYSICALS	1	3	24	72	$16.97	$1,220		
EXIT (TERMINATION) PHYSICALS	1	4	24	96	$16.97	$1,630		
SUB-TOTAL						$4,480		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	24	1	24	583	$16.97	$9,900		
YEARLY IN-VIVO	1	4	24	96	$16.97	$1,630		
EXIT (END OF PROJECT / TERMINATION)	1	4	24	96	$16.97	$1,630		
SUB-TOTAL						$13,160		
WORK DELAYS CAUSED BY MONITORING	5%				$1,492,900	$74,645		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$1,492,900	$74,645		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$166,900	$0	$166,900

001628

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT –ALT-6A, AFP – EXCAV.& ON-SITE DISPOSAL w/OFFSITE DISPL. OF FRACTION EXCEEDING WAC
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CAF

WBS NO. – 1.1.1.1.2.3.4
EST. NO. – C2940720
BY – K. KEPLER
DATE – 08/03/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25-Mar-94	01-Jun-97	31-May-98	31-May-99	24	MONTHS

EST.DATE TO MID-POINT OF ACTIVITY	
50	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

001619

CONTR.NO.– [redacted]21 PRELIMINARY
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

CONTR.N[redacted] 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL (EXPANDED TRESPASSER)														
SITE PREPARATION	1	LS		3,362						$58,190	$15,000	$24,010	$80,280	$177,480
DECONTAMINATION FACILITIES/SERVICES	1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210
EROSION AND SEDIMENT CONTROLS	1	LS		1232						$22,610		$7,180	$37,610	$67,400
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE – OFFSITE DISPOSAL	N/A													N/A
LOAD/HAUL – OFF–SITE DISPOSAL	N/A													N/A
EXCAVATE & HAUL TO ON–SITE DISPOSAL (Onsite)	1	LS		14522						$246,430		$225,480	$930	$472,840
COMPOSITE LINER	1	LS		21079						$358,780	$597,220	$487,830	$801,610	$2,245,440
COMPOSITE CAP	1	LS		5218						$88,540	$104,110	$126,790	$276,350	$595,790
DIKE FOR DISPOSAL CELL	1	LS		10882						$184,660	$31,790	$226,860	$398,770	$842,080
GENERATED WASTE REMOVAL	1	LS		2853						$48,410		$27,670		$76,080
SITE RESTORATION	1	LS		5160						$87,560		$173,760	$197,960	$459,280
MONITORING WELLS	1	LS									$354,000			$354,000
SUB–TOTAL (DIRECT FIELD COSTS)				64609						$1,100,670	$1,128,010	$1,300,900	$1,799,020	$5,328,600
TAKE–OFF ALLOWANCE 10%	1	LS		6,461						$110,070	$112,800	$130,090	$179,900	$532,860
TOTAL (DIRECT FIELD COSTS)	1	LS		71,070						$1,210,700	$1,240,800	$1,431,000	$1,978,900	$5,861,400

On–Site Disposal of Active Flyash Pile – No Treatment – SUMMARY

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FEMP-OU02-5 DRAFT August 24, 1994

5861

001620

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION															
(ITEMS @ 20% ARE COMMON TO ALL SUB–UNITS)															
(ITEMS @ 33.3% ARE COMMON TO SF, AFP & IFP)															
a. Construction Survey		1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing		2000	LF	0.213	550	16.97				6.25	$9,330			$12,880	$22,210
c. Clear and Grub															
i. Remediation Site		2.50	AC	41.40	134	16.97			2575.00		$2,270		$6,630		$8,900
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Staging Area @ Sub–unit															
d. Dewatering															
i. Excavate Dewatering Trench		400	CY	0.50	258	16.97			1.49		$4,380		$610		$4,990
ii. Pump – w/4" Suction Hose		120	DAYS	3.00	464	16.97			19.55		$7,870		$2,420		$10,290
iv. HDPE Pipe to Sedimentation Tank		300	LF	0.19	74	16.97			0.67	0.84	$1,260		$210	$260	$1,730
v. Remove Sediment fm. Tank – 1cy/trip		2	CY	4.00	10	16.97			100.00		$170		$210		$380
e. General Grading															
i. New Roads		4667	SY	0.001	6	16.97			0.07		$100		$340		$440
	33.3%														
ii. Office/Parking Area	2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area	272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area	49	16	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub–Unit	2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
f. Surfacing/Paving/Concrete Slab															
i. New Roads – 8" Gravel W/Geotextile		4667	SY	0.030	181	16.97			1.08	6.66	$3,070		$5,190	$32,010	$40,270
	33.3%														
ii. Office/Parking – 8" Gravel W/ Geotextile	2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub–Unit – 160' x160' Concrete															
Sub–Grade & Sub–Base for Conc.Slab	2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk.	631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" thl	24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub–grade Piping – 4"	500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating	2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab	183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip.	1	0.33	LS	2.00	1	16.97			184.00		$20		$60		$80
TOTAL (SITE PREPARATION)		1	LS		3,362						$58,190	$15,000	$24,010	$80,280	$177,480

Site Preparation Details

F-7-194
001621
FEMP-OU02-5 DRAFT August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	33.3%														
a. Decon Trailer – Rental	51	17	MO					1500.00				$25,470			$25,470
	33.3%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'i.d.x 25lfx8	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in con	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
x. Backfill & Compaction around concrete slab	BCY 258	103	ICY	0.086	11	16.97			1.38		$190		$150		$340
SUB–TOTAL (EQUIP. DECON. FACILITY)					265						$4,810	$25,860	$1,210	$4,140	$36,020

Equipment Decon. Facility Details

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August 24, 1994

F-7-195

001622

5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	33.3%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Guard	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in conc.	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	0	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210

Personnel Decon.Facilities/Services Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-7-196

001623

CONTR.NO. – 4[illegible]321
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	1300	LF	0.017	29	16.97			0.06	0.65	$490		$80	$870	$1,440
ii.Diversion Berms	200	CY	0.24	62	16.97			0.84	7.50	$1,050		$170	$1,500	$2,720
iii. Diversion Ditches	100	CY	0.24	31	16.97			0.84	7.50	$530		$80	$750	$1,360
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	700	EA	0.24	217	16.97			1.53	1.35	$3,680		$1,100	$970	$5,750
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1000	LF	0.38	491	19.95			5.11	4.42	$9,800		$5,110	$4,420	$19,330
iv. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhol W/Cleanout	3	EA	8.00	31	16.97			28.00	8300.00	$530		$80	$24,900	$25,510
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,232						$22,610		$7,180	$37,610	$67,400

Erosion Control Details

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5861

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

	DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	COST/UNIT RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	EXCAVATE														
	LOAD & HAUL TO ON–SITE DISPOSAL CELL														
	(NO TREATMENT)														
	Excavate Contaminated Soil														
	Excavate and Load – Level D	65100	BCY	0.055	4619	16.97			1.17		$78,380		$78,450		$156,830
	Excavate Additional Soil	6500	BCY	0.055	461	16.97			1.17		$7,820		$7,830		$15,650
	Haul to Onsite Disposal Cell BCY														
	– 12" thk. Cushion Layer 6413	8016	LCY	0.081	838	16.97			1.51		$14,220		$12,470		$26,690
	– Impacted Fill 65187	81484	LCY	0.081	8514	16.97			1.51		$144,480		$126,730		$271,210
	PPE LEVEL 'C' Allowance added to the following:														
	Excavate Contaminated Soil														
	Excavate and Load – Level C	N/A	BCY	0.055		16.97			1.17						
	Haul to Onsite Disposal Cell BCY N/A		LCY	0.081		16.97			1.51						
	**PPE PRODUCTIVITY ALLOWANCE – LEVEL C		HRS	S/T 150%		16.97			1.51						
	MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)		MD	S/T											
	(SHREDDING COMMON TO SWL, IFP & SF)														
	k. Shredder/Crusher – Purchase/Install 33.3%	N/A	LOT	280.0		19.95			8400.00	317600.00					
	60 Ton per Hour														
	Excavated Debris BCY N/A														
	Generated Waste BCY 5217														
	Excavated Debris TONS														
	(Percent of Gen.Waste to be Shredded 25%														
	Generated Waste TONS 2079														
	TOTAL TONS 2079														
	Operating Costs	35	HRS							25.75				$930	$930
	(2) Operators	70	HRS	1.00	90	16.97					$1,530				$1,530
	TOTAL(EXCAVATE/LOAD& HAUL TO ON–SITE DISPOSAL)	1	LOT		14,522						$246,430		$225,480	$930	$472,840

001625

Excavate – No Treatment – AFP Onsite Disposal Details

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CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP.)															
a. Clear and Grubb	20%														
i. Disposal Cell & Surrounding area	35	7.0	AC	41.40	374	16.97			2575.00		$6,350		$18,570		$24,920
b. Relocated South Access Road	20%														
i. Clear & Grub	3	0.6	AC	41.40	32	16.97			2575.00		$540		$1,590		$2,130
ii. General Grading	1467	293.4	SY	0.001		16.97			0.07				$20		$20
iii. Road – 8" Gravel W/Geotextile	7333	1466.6	SY	0.030	57	16.97			1.08	6.66	$970		$1,630	$10,060	$12,660
c. Haul Road	20%														
i. Clear & Grub	2.4	0.5	AC	41.40	26	16.97			2575.00		$440		$1,270		$1,710
ii. General Grading	11556	2311.2	SY	0.001	3	16.97			0.07		$50		$170		$220
iii. Road – 8" Gravel W/Geotextile	5778	1155.6	SY	0.030	45	16.97			1.08	6.66	$760		$1,290	$7,930	$9,980
	20%														
d. Temporary Construction Fencing	5200	1040.0	LF	0.213	286	16.97				6.25	$4,850			$6,700	$11,550
e. 20' wide Swing Gates	1	0.2	EA	25.60	7	16.97			340.00	560.00	$120		$70	$120	$310
f. Staging Area @ Cell	20%														
Area Excavation for Slab	1606	321.2	BCY	0.016	7	16.97			0.60		$120		$200		$320
Sub–Base for Slab	2845	569.0	SY	0.041	30	16.97		6.75	1.45	5.51	$510	$3,960	$850	$3,230	$8,550
HDPE Perf.Sub–grade Piping – 4"	500	100.0	LF	0.21	27	16.97			0.74	3.02	$460		$80	$310	$850
Concrete Slab – 160'x160'x8" thk	631	126.2	CY	4.07	663	17.98			14.25	67.00	$11,920		$1,850	$8,710	$22,480
Concrete Curb – 480'x2'x8" thk	24	4.8	CY	15.30	95	17.98			11.16	275.90	$1,710		$60	$1,360	$3,130
Epoxy Coating	2845	569.0	SY	0.22	161	16.97			0.77	7.56	$2,730		$450	$4,430	$7,610
Backfill & Compact around Slab	183	36.6	ICY	0.086	4	16.97			1.38				$50		$50
Mob/Demob.Equip.	1	0.2	LS	2.00	1	16.97			184.00		$20		$40		$60
g. Storage Area – 200' x 200' Asphalt															
Includes Compacted Sub–Grade	4444	889	SY	0.084	96	16.97			2.56	14.04	$1,630		$2,340	$12,850	$16,820
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat															
	20%														
h. Decon Trailer – Rental	51	10	MO					1500.00				$15,760			$15,760
i. Const.Equipment Decon. Facility	20%														
25 ft x 60 ft	1	0.20	LS	730.00	146	18.05		1160.00	2900.00	11980.00	$2,640	$240	$580	$2,400	$5,860
j. Personnel Decon. Facility	20%														
11'x 11'	1	0.20	LS	108.00	22	18.89		100.00	360.00	4120.00	$420	$20	$70	$820	$1,330
SUB–TOTAL (COMPOSITE LINER –SITE PREP)		1	LOT		2,082	17.41					$36,240	$19,980	$31,180	$58,920	$146,320

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Composite Liner – Site Prep. – AFP Onsite Disposal Details

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (CON'T.)														
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.														
COMPOSITE LINER														
a. Subgrade Preparation – includes removal of top soil, grading & comp.	18615	SY	0.024	576	16.97			0.86		$9,770		$16,490		$26,260
b. 95% Clay – 5% Bentonite 36" Thk BCY 18615	21966	ICY	0.260	7367	16.97			11.19	20.35	$125,020		$253,170	$460,410	$838,600
c. Composite Clay Liner	18615	SY					7.38				$137,380			$137,380
d. HDPE Liner 60 mil	18615	SY					4.75				$88,420			$88,420
e. Geotextile Fabric	18615	SY					2.25				$41,880			$41,880
f. Pea Gravel 12" Thk; In–place 6143	6604	ICY	0.11	937	16.97			0.77	17.00	$15,900		$5,240	$115,630	$136,770
g. Composite Clay Liner	18615	SY					7.38				$137,380			$137,380
h. HDPE Liner 60 mil	18615	SY					4.75				$88,420			$88,420
i. Geotextile Fabric	18615	SY					2.25				$41,880			$41,880
j. Pea Gravel 12" Thk; In–place BCY 6143	6604	ICY	0.11	937	16.97			0.77	17.00	$15,900		$5,240	$115,630	$136,770
k. Geotextile Fabric	18615	SY					2.25				$41,880			$41,880
l. HDPE Perforated Pipe – leachate collection 6" Dia.	1080	LF	0.30	418	16.97			1.05	6.56	$7,090		$1,170	$7,300	$15,560
m. HDPE Perforated Pipe – leak detection 6" Dia.	1080	LF	0.30	418	16.97			1.05	6.56	$7,090		$1,170	$7,300	$15,560
n. Leachate Discharge Piping														
i. HDPE Carrier & containment Pipe 6" x 10" Includes Trench Excav/Backfill, sand bedding and compaction.	840	LF	0.86	932	16.97			11.37	22.33	$15,820		$9,840	$19,320	$44,980
ii. HDPE Manhole – 4' dia. x 8' deep	2	EA	8.00	21	16.97			28.00	8300.00	530.00		$60	$17,100	$17,690
o. Impacted Fill–Cusion Layer 12" Thk BCY 6413	8016	LCY	0.06	620	16.97			1.67		$10,520		$13,790		$24,310
p. Impacted Fill–Spread and Compact BCY 65187	81484	LCY	0.06	6307	16.97			1.67		$107,030		$140,160		$247,190
q. Generated Waste BCY 5217	6000	LCY	0.06	464	16.97			1.67		$7,870		$10,320		$18,190
PPE LEVEL C Allowance is added to the following														
r. Impacted fill BCY N/A		LCY	0.06		16.97			1.67						
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C		HRS	150% S/T		16.97									
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)		MD												
SUB–TOTAL (COMPOSITE LINER)	1	LOT		18,997						$322,540	$577,240	$456,650	$742,690	$2,099,120
TOTAL (COMPOSITE LINER)	1	LOT		21,079						$358,780	$597,220	$487,830	$801,610	$2,245,440

Composite Liner Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4[illegible]321
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE CAP															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
COMPOSITE CAP															
a. Contouring Layer 18" Thk.	BCY 3178	3814	ICY	0.06	295	16.97			1.67	3.50	$5,010		$6,560	$13,750	$25,320
b. 95% Clay – 5% Bentonite 24" Thk	BCY 4258	4577	ICY	0.260	1535	16.97			11.19	20.35	$26,050		$52,760	$95,940	$174,750
c. GML\GCC – composite Liner		6356	SY					7.38				$46,910			$46,910
d. Geotextile Fabric		6356	SY					2.25				$14,300			$14,300
e. Pea gravel 12" Thk, In–place	BCY 2097	2254	ICY	0.11	320	16.97			0.77	17.00	$5,430		$1,790	$39,470	$46,690
f. Geotextile Fabric		6356	SY					2.25				$14,300			$14,300
g. Cobbels 36" Thk; In–place	BCY 6356	6833	ICY	0.258	2274	16.97			7.15	10.10	$38,590		$50,320	$71,080	$159,990
h. Geotextile Fabric		6356	SY					2.25				$14,300			$14,300
i. Sand Layer 6" Thk; In–place	BCY 1080	1161	ICY	0.052	78	16.97			1.76	5.00	$1,320		$2,100	$5,980	$9,400
j. Geotextile Fabric		6356	SY					2.25				$14,300			$14,300
k. Common Soil 21" Thk; In–place	BCY 3686	4423	ICY	0.06	342	16.97			1.67	3.50	$5,800		$7,610	$15,950	$29,360
l. Top Soil 6" Thk; In–place	BCY 1080	1296	ICY	0.053	89	16.97			1.82	12.10	$1,510		$2,430	$16,150	$20,090
m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding	SY 6356	57	MSF	0.30	22	16.97			6.75	25.00	$370		$400	$1,470	$2,240
n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized		1200	LF	0.17	263	16.97			2.28	13.40	$4,460		$2,820	$16,560	$23,840
TOTAL (COMPOSITE CAP)		1	LOT		5,218						$88,540	$104,110	$126,790	$276,350	$595,790

Composite Cap Details

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FEMP-OU02-5 DRAFT
August 24, 1994
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CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

CONTR.NO. 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DIKE FOR DISPOSAL CELL															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
a. Borrow Common Soil – Dike	BCY 48413	58096	ICY	0.06	4497	16.97			1.67	3.50	$76,310		$99,930	$209,430	$385,670
b. Geotextile Fabric		14128	SY					2.25				$31,790			$31,790
c. Cobbels 36" Thk; In–place	BCY 14128	16954	ICY	0.258	5642	16.97			7.15	10.10	$95,740		$124,850	$176,370	$396,960
d. Drainage Piping – HDPE	6" Dia.	1920	LF	0.30	743	16.97			1.05	6.56	$12,610		$2,080	$12,970	$27,660
TOTAL (DIKE – DISPOSAL CELL)		1	LOT		10,882						$184,660	$31,790	$226,860	$398,770	$842,080

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FEMP-OU02-5 DRAFT
August 24, 1994

Dike Details

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL															
a. Office/Parking Area @ S/U	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo–Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Facil.@ S/U	33%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo–Fabric & Liner	167	56	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Facil. @ S/U	33%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292					9.16				$10		$10
Geo–Fabric & Liner	14	5	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
d. Staging pad @ S/U	33.3%														
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo–Fabric & Liner 105 cy	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	395.5	132	BCY	0.30	51	16.97			2.51		$870		$340		$1,210
	20%														
e. Const.Equip.Decon.Facil. @ Onsite Disp.Cell															
Demo/Remove Concrete	49.3	10	BCY	1.2	15	16.97			3.62		$250		$40		$290
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	6	BCY	0.292	2	16.97			9.16		$30		$50		$80
Geo–Fabric & Liner	167	33	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	5	EA	0.48	3	16.97			1.68		$50		$10		$60
Splash Guard	702	140	SF	0.04	7	16.97			0.03		$120				$120
Haul & Dump Rubble	24.9	5	BCY	0.30	2	16.97			2.51		$30		$10		$40
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		622						$10,540		$4,710		$15,250

Generated Waste Removal Details

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CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

CONTR.NO. 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D. 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.) Demo. /Load/Haul/Dump/Compact															
	20.0%														
f. Personnel Decon. Facil.@ Onsite Disp. Cell															
Demo/Remove Concrete	2.2	0.44	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	0.48	BCY	0.292		16.97			9.16						
Geo–Fabric & Liner	14	3	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	6	1	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	26	SF	0.04	1	16.97			0.03		$20				$20
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
	20.0%														
g. Relocated South Access Road/Cell	SY														
Road – 8" Gravel W/Geotextile	7333	1467	BCY	0.292	552	16.97			9.16		$9,370		$13,840		$23,210
Haul & Dump Rubble		1467	BCY	0.30	568	16.97			2.51		$9,640		$3,790		$13,430
	20.0%														
h. Haul Road for Cell	SY														
Road – 8" Gravel W/Geotextile	5778	257.0	BCY	0.292	97	16.97			1.08		$1,650		$290		$1,940
Haul & Dump Rubble		257.0	BCY	0.30	99	16.97			2.51		$1,680		$660		$2,340
	20.0%														
i. Temporary Construction Fencing @ Cell	5200	1040.0	LF	0.107	143	16.97					$2,430				$2,430
Haul & Dump Rubble		135.0	BCY	0.30	52	16.97			2.51		$880		$350		$1,230
	20.0%														
j. 20' wide Swing Gates @ Cell	2	0.40	EA	12.75	7	16.97			340.00		$120		$140		$260
Haul & Dump Rubble		0.05	BCY	0.30		16.97			2.51						
	20.0%														
k. Storage Pad Area @ Cell	BCY														
Demo/Remove Asphalt	988	197.6	BCY	1.2	306	16.97			3.62		$5,190		$740		$5,930
Excav., Load, Haul, Backfill, Compac	474.0	94.8	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Sub–grade Stone															
Geo–Fabric & Liner	4444	888.8	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble		197.0	BCY	0.30	76	16.97			2.51		$1,290		$510		$1,800
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,942						$32,970		$21,230		$54,200

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[illegible]321
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.) Demo. /Load/Haul/Dump/Compact															
The following prorated at:	20.0%														
I. Staging Area @ On–Site Disposal Cell															
Demo/Remove Concrete	655	131.0	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	95.0	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo–Fabric & Liner 105 cy	2845	569.0	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	395.5	126.0	BCY	0.30	49	16.97			2.51		$830		$330		$1,160
TOTAL GENERATED WASTE	BCY 5217 LCY 6000														
SUB– TOTAL (GENERATED WASTE REMOVAL		1	LOT		289						$4,900		$1,730		$6,630
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		2,853						$48,410		$27,670		$76,080

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

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5861

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
Active Flyash Pile	20000	24000	ICY	0.09	2786	16.97			3.21	3.50	$47,280		$79,350	$86,520	$213,150
	33.3%														
Office/Parking	494	197	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	31	ICY												
Decon.Facil.– Personnel @ S/U	7	3	ICY												
Staging Area @ S/U	1099	439	ICY												
	S/T	670.5	ICY	0.09	78	16.97			3.21	3.50	$1,320		$2,220	$2,420	$5,960
	20%														
Staging Area at On–Site Disp.Cell	1099	264	ICY												
Storage Area at On–Site Disp.Cell	474	114	ICY												
Decon.Facil.– Const.Equip. @ Cell	78	19	ICY												
Decon.Facil.– Personnel @ Cell	7	2	ICY												
Relocated South Access Road	1628	391	ICY												
Haul Road	1283	308	ICY												
	S/T	1096.6	ICY	0.09	127	16.97			3.21	3.50	$2,160		$3,630	$3,950	$9,740
b. Final Grade for AFP		19600	SY	0.02	506	16.97			0.70		$8,590		$14,130		$22,720
c. Borrow Top Soil 6" Thk., Spread															
Active Flyash Pile		19600	SY	0.036	910	16.97			2.33	2.88	$15,440		$47,040	$58,140	$120,620
	33.3%														
Office/Parking	2222	740	SY												
Decon.Facil.– Const.Equip. @ S/U	167	56	SY												
Decon.Facil.– Personnel @ S/U	14	5	SY												
Staging Area @ S/U	2845	947	SY												
	S/T	1747.6	SY	0.036	81	16.97			2.33	2.88	$1,370		$4,190	$5,180	$10,740
	20%														
Staging Area at On–Site Disp.Cell	2845	683	SY												
Storage Area at On–Site Disp.Cell	4444	1067	SY												
Decon.Facil.– Const.Equip. @ Cell	167	40	SY												
Decon.Facil.– Personnel @ Cell	14	3	SY												
Relocated South Access Road	14667	3520	SY												
Haul Road	11556	2773	SY												
	S/T	8086.3	SY	0.036	376	16.97			2.33	2.88	$6,380		$19,410	$23,990	$49,780
SUB–TOTAL (SITE RESTORATION)		1	LOT		4,864						$82,540		$169,970	$180,200	$432,710

Site Restoration Details

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.[redacted] 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION (CON'T.)															
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Active Flyash Pile	19600	176	MSF	0.30	68	16.97			6.75	25.00	$1,150		$1,220	$4,530	$6,900
	33.3%														
Office/Parking	2222	6.7	MSF												
Decon.Facil.– Const.Equip. @ S/U	167	0.5	MSF												
Decon.Facil.– Personnel @ S/U	14		MSF												
Staging Area @ S/U	2845	8.5	MSF												
	S/T	15.7	MSF	0.30	6	16.97			6.75	25.00	$100		$110	$400	$610
	20%														
Staging Area at On–Site Disp.Cell	2845	5.1	MSF												
Storage Area at On–Site Disp.Cell	4444	8.0	MSF												
Decon.Facil.– Const.Equip.@ Cell	167	0.3	MSF												
Decon.Facil.– Personnel @ Cell	14		MSF												
Relocated South Access Road	14667	26.4	MSF												
Haul Road	11556	20.8	MSF												
	S/T	60.6	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,560	$2,370
e. Security Fence – 6ga aluminized – 6' high		1080	LF	0.13	178	16.97			1.64	9.80	$3,020		$1,820	$10,900	$15,740
i. Corner posts – 3" dia.		4	EA	0.80	4	16.97			10.65	0.55	$70		$40		$110
ii. Braces		8	EA	0.40	4	16.97			5.35	14.95	$70		$40	$120	$230
iii. Double swing gates 12' opening		1	PR	10.00	13	16.97			133.00	240.00	$220		$140	$250	$610
SUB–TOTAL (SITE RESTORATION)		1	LOT		296						$5,020		$3,790	$17,760	$26,570
TOTAL (SITE RESTORATION)		1	LOT		5,160						$87,560		$173,760	$197,960	$459,280

Site Restoration Details

PAGE 15 of 18

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility	6	PR					23000.00				$138,000			$138,000
b. MW at AFP – Type I & II	6	PR					23000.00				$138,000			$138,000
c. Abandon Existing Wells	6	EA					13000.00				$78,000			$78,000
TOTAL (MONITORING WELLS)	1	LOT									$354,000			$354,000

Monitoring Wells Details

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FEMP-OU02-5 DRAFT
August 24, 1994

001635

CONTR.NO.– [redacted]321
CLIENT – [redacted]DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	95000	GAL					0.01				$1,000			$1,000
Runnoff from the Exclusion Zone.	1100000	GAL					0.01				$11,000			$11,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$12,000			$12,000

Waste Water Treatment Operations Cost Details

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001636

5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6A – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – EXPANDED TRESPASSER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940720
BY: KEN KEPLER
DATE: 08/16/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	358	EA					2,002				$716,700			$716,700
Rad	358	EA					2,000				$716,000			$716,000
Confirmatory Tests														
Full Rad Tests	179	EA					3,101				$555,100			$555,100
Full HSL	20	EA					1,500				$30,000			$30,000
Full TCLP	20	EA					2,000				$40,000			$40,000
2 Technicians per Month	20	MO					13,163				$263,300			$263,300
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS	1	LOT									$2,321,100			$2,321,100

Screening & Confirmation Testing Details

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001632

FEMP-OU02-5 DRAFT
August 24, 1994

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 6A, AFP – EXCAV. & ON–SITE DISP. W/OFF–SITE DISP. OF FRACTION
CLIENT: DOE DATE: 07–Aug–94
CONTRACT: C2–94–07–20 BASE ESTIMATE: $15,210,500

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$22,643,628	$7,433,128	48.9%
0.05%	$20,254,143	$5,043,643	33.2%
5.00%	$19,407,634	$4,197,134	27.6%
10.00%	$19,160,044	$3,949,544	26.0%
15.00%	$18,965,239	$3,754,739	24.7%
20.00%	$18,829,129	$3,618,629	23.8%
25.00%	$18,717,583	$3,507,083	23.1%
30.00%	$18,597,463	$3,386,963	22.3%
35.00%	$18,477,283	$3,266,783	21.5%
40.00%	$18,392,585	$3,182,085	20.9%
45.00%	$18,310,953	$3,100,453	20.4%
50.00%	$18,215,962	$3,005,462	19.8%
55.00%	$18,109,453	$2,898,953	19.1%
60.00%	$18,007,409	$2,796,909	18.4%
65.00%	$17,910,848	$2,700,348	17.8%
70.00%	$17,806,858	$2,596,358	17.1%
75.00%	$17,715,198	$2,504,698	16.5%
80.00%	$17,596,221	$2,385,721	15.7%
85.00%	$17,449,558	$2,239,058	14.7%
90.00%	$17,297,550	$2,087,050	13.7%
95.00%	$17,037,811	$1,827,311	12.0%
99.95%	$16,209,933	$999,433	6.6%
100.00%	$13,840,001	($1,370,499)	–9.0%

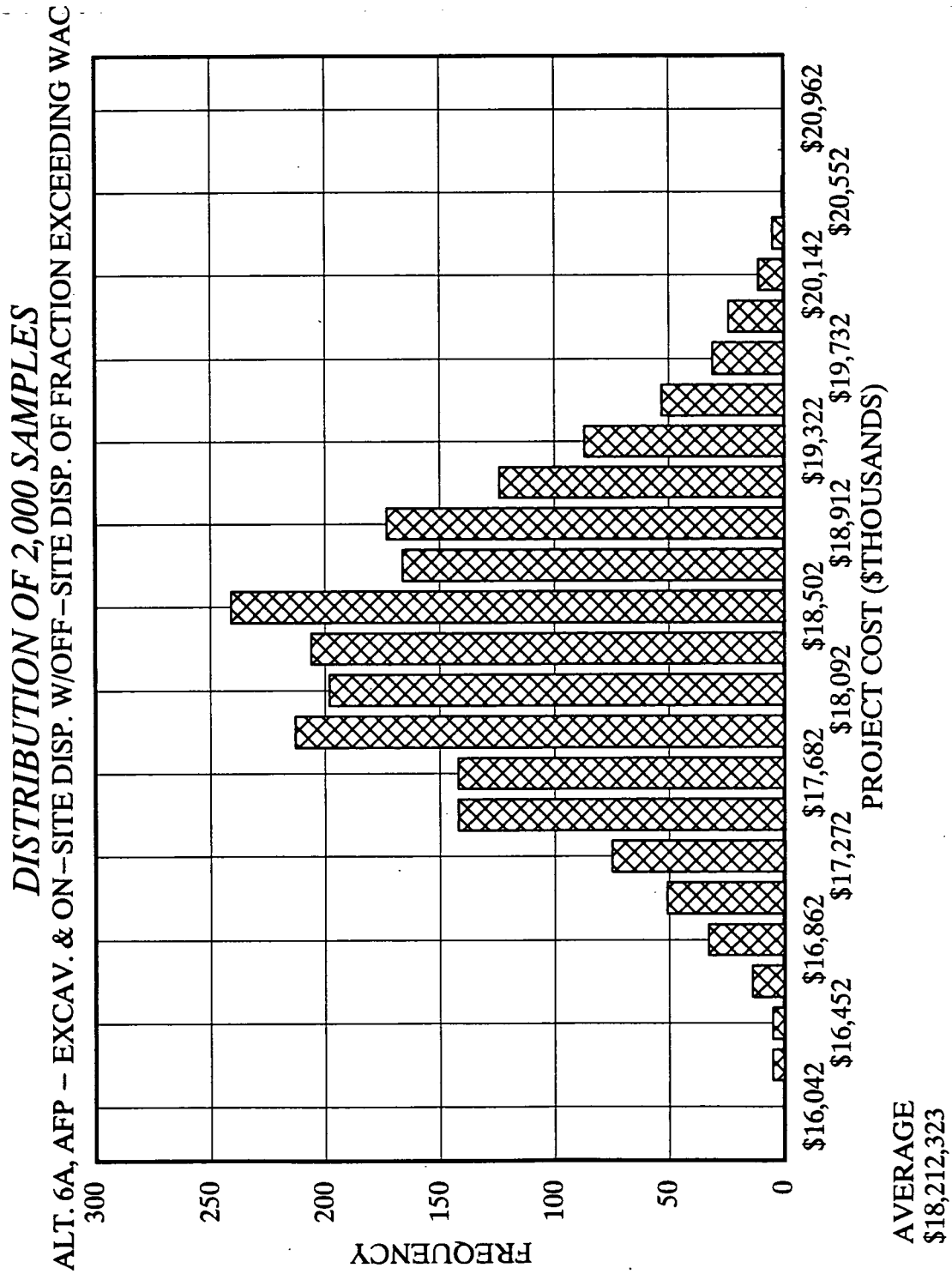
FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

PROJECT: ALT. 6A, AFP – EXCAV. & ON-SITE DISP. W/OFF-SITE DISP. OF FRACTION EXCEEDING WAC
CLIENT: DOE
CONTRACT: C2-94-07-20

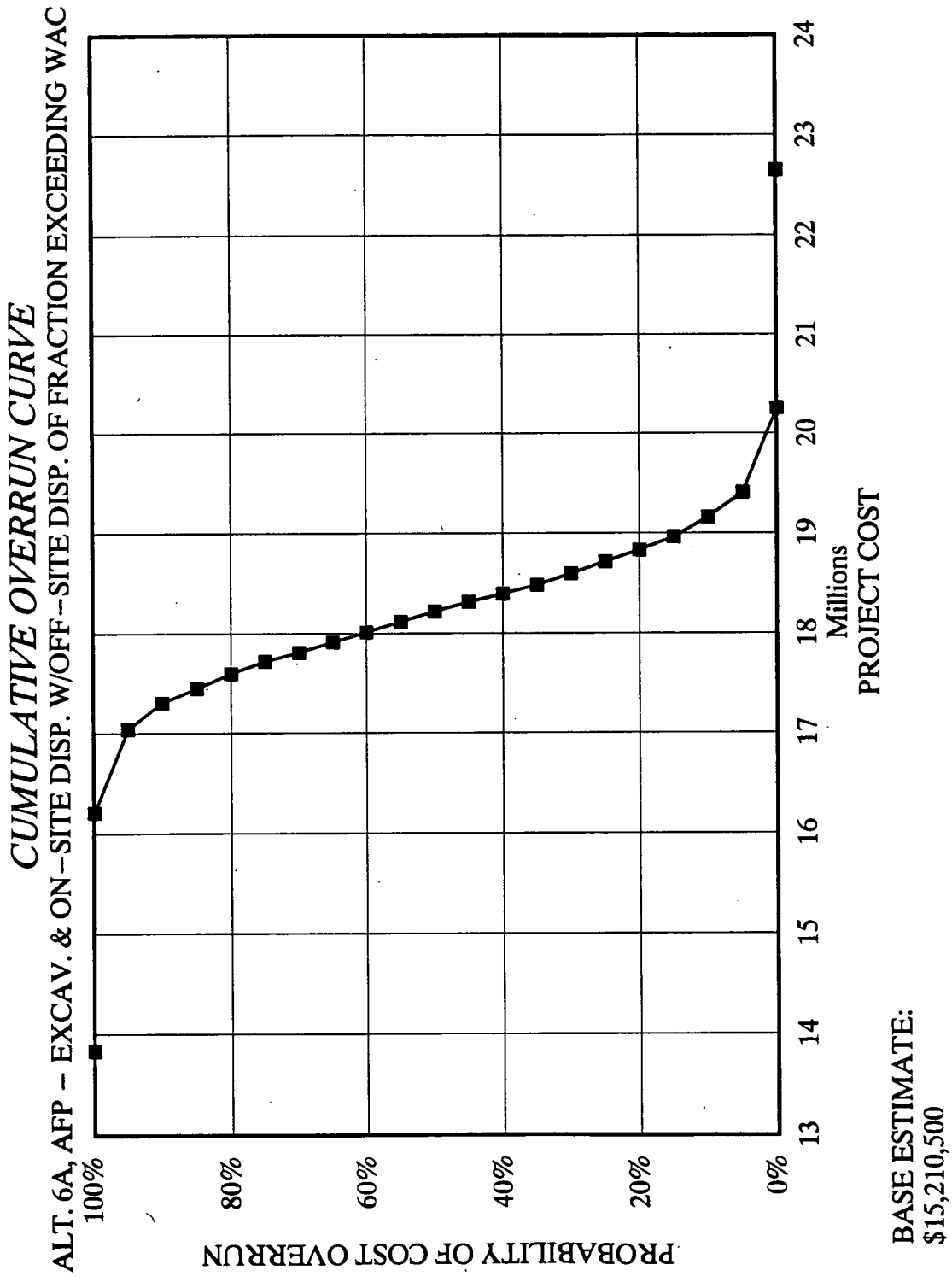
ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$64,010	-5.0%	$60,810	30%	$83,213	U		14%
2	SITE PREPERATION S/C	16,500	-5.0%	15,675	25%	20,625	U		17%
3	SITE PREPERATION MAT'L	88,310	-10.0%	79,479	30%	114,803	U		25%
4	DECON FACILITIES/SERVICES LABOR	6,040	-2.0%	5,919	80%	10,872	U		2%
5	DECON FACILITIES/SERVICES S/C	28,480	-6.0%	26,771	80%	51,264	U		7%
6	DECON FACILITIES/SERVICES MAT'L	6,060	-6.0%	5,696	60%	9,696	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	24,870	-5.0%	23,627	50%	37,305	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	41,370	-5.0%	39,302	30%	53,781	U		14%
9	EXC/SRT/CRSH ON-SITE DISP LABO	271,070	-6.0%	254,806	150%	677,675	U		4%
10	EXC/SRT/CRSH ON-SITE DISP MAT'L	1,020	-2.0%	1,000	100%	2,040	U		2%
11	COMPOSITE LINER LABOR	394,660	-6.0%	370,980	100%	789,320	U		6%
12	COMPOSITE LINER S/C	656,940	-6.0%	617,524	75.0%	1,149,645	U		7%
13	COMPOSITE LINER MAT'L	881,690	-6.0%	828,789	70.0%	1,498,873	U		8%
14	COMPOSITE CAP LABOR	97,390	-6.0%	91,547	100.0%	194,780	U		6%
15	COMPOSITE CAP S/C	114,520	-6.0%	107,649	100.0%	229,040	U		6%
16	COMPOSITE CAP MAT'L	303,990	-6.0%	285,751	80.0%	547,182	U		7%
17	DIKE LABOR	203,130	-10.0%	182,817	100.0%	406,260	U		9%
18	DIKE S/C	34,970	-10.0%	31,473	100.0%	69,940	U		9%
19	DIKE MAT'L	438,650	-10.0%	394,785	80.0%	789,570	U		11%
20	GENERATED WASTE REMVL LABOR	53,250	-5.0%	50,588	50.0%	79,875	U		9%
21	SITE RESTORATION LABOR	96,320	-5.0%	91,504	30.0%	125,216	U		14%
22	SITE RESTORATION MAT'L	217,760	-5.0%	206,872	30.0%	283,088	U		14%
23	MONITORING WELLS S/C	389,400	-5.0%	369,930	50.0%	584,100	U		9%
24	INDIRECT FIELD COSTS LABOR	1,312,200	-5.0%	1,246,590	50.0%	1,968,300	U		9%
25	INDIRECT FIELD COSTS S/C	674,800	-5.0%	641,060	100.0%	1,349,600	U		5%
26	INDIRECT FIELD COSTS MAT'L	1,645,200	-5.0%	1,562,940	50.0%	2,467,800	U		9%
27	FIELD SUPPORT COSTS LABOR	1,015,900	-25.0%	761,925	30.0%	1,320,670	U		45%
28	FIELD SUPPORT COSTS S/C	2,333,100	-20.0%	1,866,480	30.0%	3,033,030	U		40%
29	ENGINEERING COSTS	3,579,900	-5.0%	3,400,905	25.0%	4,474,875	U		17%
30	SALES TAX MAT'L	219,000	-1.0%	216,810	1.0%	221,190	U		50%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$15,210,500		$13,840,001		$22,643,628			

001639

5861


DISTRIBUTION OF 2,000 SAMPLES
ALT. 6A, AFP – EXCAV. & ON–SITE DISP. W/OFF–SITE DISP. OF FRACTION EXCEEDING WAC
FREQUENCY
300
250
200
150
100
50
0
$16,042
$16,452
$16,862
$17,272
$17,682
$18,092
$18,502
$18,912
$19,322
$19,732
$20,142
$20,552
$20,962
PROJECT COST ($THOUSANDS)
AVERAGE
$18,212,323

001640


CUMULATIVE OVERRUN CURVE
ALT. 6A, AFP – EXCAV. & ON–SITE DISP. W/OFF–SITE DISP. OF FRACTION EXCEEDING WAC
100%
80%
60%
40%
20%
0%
PROBABILITY OF COST OVERRUN
13
14
15
16
17
18
19
20
21
22
23
24
Millions
PROJECT COST
BASE ESTIMATE:
$15,210,500

001641

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A, AFP – EXCAV.& ON-SITE DISPOSAL w/OFFSITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940720
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CAF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$15,210,500	BASE EST:	$64,010	BASE EST:	$16,500	BASE EST:	$88,310	BASE EST:	$6,040	BASE EST:	$28,480	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	25%	-10%	30%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	25%	-10%	30%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$60,810	$83,213	$15,675	$20,625	$79,479	$114,803	$5,919	$10,872	$26,771	$51,264	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-215

001642

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–6A, AFP – EXCAV.& ON–SITE DISPOSAL w/OFFSITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940720
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CAF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$24,870	BASE EST:	$0	BASE EST:	$41,370	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%										
MATERIAL PRICING					–5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	0%	0%	–5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$23,627	$37,305	$0	$0	$39,302	$53,781	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001643

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A, AFP – EXCAV.& ON-SITE DISPOSAL w/OFFSITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940720
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CAF

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-217

001644

FEMP-OU02-5 DRAFT
August 24, 1994

5861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A, AFP - EXCAV.& ON-SITE DISPOSAL w/OFFSITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940720
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CAF

	EXCAV/SORT/CRUSH ONSITE DISPOSAL LABOR $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL S/C $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$271,070	BASE EST:	$0	BASE EST:	$1,020	BASE EST:	$394,660	BASE EST:	$656,940	BASE EST:	$881,690
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	100%					-5%	50%				
MATERIAL PRICING					-1%	50%			-5%	25%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%			-1%	50%	-1%	50%	-1%	50%	-1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	150%	0%	0%	-2%	100%	-6%	100%	-6%	75%	-6%	70%
TOTAL $	$254,806	$677,675	$0	$0	$1,000	$2,040	$370,980	$789,320	$617,524	$1,149,645	$828,789	$1,498,873

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001645

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–6A, AFP – EXCAV.& ON–SITE DISPOSAL w/OFFSITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940720
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CAF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		DIKE LABOR $'s		DIKE S/C $'s		DIKE MAT'L. $'s	
	BASE EST:	$97,390	BASE EST:	$114,520	BASE EST:	$303,990	BASE EST:	$203,130	BASE EST:	$34,970	BASE EST:	$438,650
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–5%	50%				
MATERIAL PRICING			–5%	50%	–5%	30%			–5%	50%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	50%	–1%	50%	–1%	50%	–5%	50%	–5%	50%	–5%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	100%	–6%	100%	–6%	80%	–10%	100%	–10%	100%	–10%	80%
TOTAL $	$91,547	$194,780	$107,649	$229,040	$285,751	$547,182	$182,817	$406,260	$31,473	$69,940	$394,785	$789,570

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A, AFP – EXCAV.& ON-SITE DISPOSAL w/OFFSITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940720
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CAF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$53,250	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$50,588	$79,875	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001647

F-7-220

FEMP-OU02-5 DRAFT
August 24, 1994

COST IMPACT MATRIX

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A, AFP – EXCAV.& ON-SITE DISPOSAL w/OFFSITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

EST. NO: C2940720
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CAF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$96,320	BASE EST:	$0	BASE EST:	$217,760	BASE EST:	$0	BASE EST:	$389,400	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$91,504	$125,216	$0	$0	$206,872	$283,088	$0	$0	$369,930	$584,100	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001648

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

1861

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A, AFP – EXCAV.& ON-SITE DISPOSAL w/OFFSITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS #: 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940720
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CAF

	INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS	
	LABOR $'s		S/C $'s		MAT'L. $'s		LABOR $'s		S/C $'s		MAT'L. $'s	
	BASE EST:	$1,312,200	BASE EST:	$674,800	BASE EST:	$1,645,200	BASE EST:	$1,015,900	BASE EST:	$2,333,100	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-25%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-20%	30%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-25%	30%	-20%	30%	0%	0%
TOTAL $	$1,246,590	$1,968,300	$641,060	$1,349,600	$1,562,940	$2,467,800	$761,925	$1,320,670	$1,866,480	$3,033,030	$0	$0
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-222

001649

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6A, AFP – EXCAV.& ON-SITE DISPOSAL w/OFFSITE DISPL. OF FRACTION EXCEEDING WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940720
DATE: 08/08/94
BY: KEN KEPLER
TASK # : 2CAF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$3,579,900	BASE EST:	$219,000	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			-1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	-5%	25%										
(OTHER)												
TOTAL %	-5%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$3,400,905	$4,474,875	$216,810	$221,190	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-223

FEMP-OU02-5 DRAFT
August 24, 1994

861

5861

DETAILED COST ESTIMATE

ALTERNATIVE 6 - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION EXCEEDING WASTE ACCEPTANCE CRITERIA

B. PRIVATE OWNERSHIP (Resident Farmer)

001651

CONTR. NO. 4424321
CLIENT U.S.DEPT. OF ENERGY
PROJECT ALT-6B - ON-SITE DISPOSAL w/>WAC TO ENVIROCARE - RESIDENT FARMER
LOCATION FERNALD, OHIO
PROJ.CTL. CRU2

CONTR.NO. 4424321
EST.NO. C29407_ _
DATE 24-Aug-94
BY KEN KEPLER
TASK ID 2C _ _

OU2 FEASIBILITY STUDIES

TITLE	TOTAL ESTIMATE - CONSTANT 1994 DOLLARS					NET PRESENT VALUE: 37 YEAR STUDY PERIOD - 2.8% REAL DISC.RATE				
	CAPITAL COST	O & M DURING REMEDIATION	O & M POST REMEDIATION	TOTAL CONSTANT 1994 $'s	TOTAL UNIT COST PER BCY OF EXCAV.& GEN. WASTE	CAPITAL COST	O & M DURING REMEDIATION	O & M POST REMEDIATION	TOTAL NPV DOLLARS	TOTAL UNIT COST PER BCY OF EXCAV.& GEN. WASTE
ALT6B - SWL	$22,065,800		$4,140,600	$26,206,400	$222.46	$18,808,700		$2,436,100	$21,244,800	$180.34
ALT6B - SF	$65,883,100		$4,140,600	$70,023,700	$184.80	$60,437,500		$2,574,500	$63,012,000	$166.29
ALT6B - LSP	$19,752,900		$4,140,600	$23,893,500	$250.45	$17,811,000		$2,574,500	$20,385,500	$213.68
ALT6B - AFP	$15,926,400		$3,764,600	$19,691,000	$224.74	$14,197,900		$2,284,700	$16,482,600	$188.12
ALT6B - IFP	$28,399,000		$4,140,600	$32,539,600	$279.99	$24,742,600		$2,436,100	$27,178,700	$233.86
TOTAL ALT-6B	$152,027,200		$20,327,000	$172,354,200	$216.54	$135,997,700		$12,305,900	$148,303,600	$186.32

O & M POST REMEDIATION - 30 YEARS

TITLE	ANNUAL COST			FACILITY REVIEW	TOTAL
	YEAR 1	YEARS 2 - 5	YEARS 6 - 30	@ 5 YR. INTERV.'s	CONSTANT
FREQUENCY	1	4	25	6	'94 $'s
ALT6B - SWL	$218,901	$197,472	$120,472	$20,000	$4,140,600
ALT6B - SF	$218,901	$197,472	$120,472	$20,000	$4,140,600
ALT6B - LSP	$218,901	$197,472	$120,472	$20,000	$4,140,600
ALT6B - AFP	$218,901	$197,472	$120,472	$20,000	$4,140,600
ALT6B - IFP	$206,369	$184,940	$107,940	$20,000	$3,764,600
TOTAL ALT-6B	$1,081,973	$974,828	$589,828	$100,000	$20,327,000

F-7-225

001652

5861

F ERMC O
ESTIMATING SERVICES

EST FILE #: C29407 _ _ | DATE: 24-Aug-94
CLIENT: US DOE | ESTIMATOR: KEN KEPLER
PROJECT TITLE: ALT-6B - EXCAVATION & ON-SITE DISPOSAL w/OFF-SITE DISP. OF FRACTION EXCEEDING WAC | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3. RESIDENT FARMER | TASK#: 2C_

SUMMARY SHEET

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL - w/OFF-SITE OPTION	527,968		8,983,700	6,363,300	11,506,800	$26,853,800
2								
3		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		527,968		$8,983,700	$6,363,300	$11,506,800	$26,853,800
11	SUPERVISION - CONTRACTOR				1,527,000			$1,527,000
12	SM TOOLS/CONSM'BLS						539,100	$539,100
13	EQUIPMENT RENTAL						10,568,900	$10,568,900
14	TEMP. FACILITIES				188,600		350,400	$539,000
15	TEMP UTL'S HOOK-UP				94,400		175,200	$269,600
16	JOB CLEAN-UP				188,600		350,400	$539,000
17	SAFETY				94,400		175,200	$269,600
18	HEALTH PHYSICS S/C				1,251,200		146,100	$1,397,300
19	CERCLA/SAT $1,500 PER PERSON					310,500		$310,500
20	BOND					268,500		$268,500
21	OVERHEAD & PROFIT					3,877,400		$3,877,400
22	PAYRL BRD.&BENFT.				6,410,600			$6,410,600
	INDIRECT FIELD COSTS				$9,754,800	$4,456,400	$12,305,300	$26,516,500
	DIRECT & INDIRECT FIELD COSTS				$18,738,500	$10,819,700	$23,812,100	$53,370,300
23	TRANSPORTATION & BURIAL					1,407,200		$1,407,200
24	WASTE CONTAINERS						48,500	$48,500
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					288,800		$288,800
25	SCREENING & CONFIRMATION TESTING					23,693,500		$23,693,500
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				11,537,300			$11,537,300
	FERMCO FIELD SUPPORT COSTS				$11,537,300	$25,389,500	$48,500	$36,975,300
28	EMISSION MODELING				93,300		173,500	$266,800
29	PSAR/FSAR(SAFETY RPT)				1,998,300			$1,998,300
30	ENGINEERING	TITLE I&II 9,028,500 TITLE III -	9,590,400	CDR	3,516,100	DCR	2,200,000	$24,335,000
	ENGINEERING COSTS							$26,600,100
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				24,082,600	1,445,000
	SUB-TOTAL	(BASE ESTIMATE)						$118,390,700
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	21.1%						24,946,800
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$143,337,500
35	CONTINGENCY	7.3%						8,689,700
								PRELIMINARY
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$152,027,200

LOTUS31\FS2\INDALT6B.WK3 - FEASIBILITY STUDY

001653

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – EXCAVATION & ON–SITE DISPOSAL w/OFF–SITE DISPOSAL OF FRACTION EXCEEDING WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.

BUDGET ESTIMATE DETAILS

CONTR.NO. [redacted] 4424321
EST. NO. C29407_ _
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2C

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY (RESIDENT FARMER) On–SITE DISPOSAL w/OFF–SITE														
SITE PREPARATION	1	LS		20,434						353,660	75,000	192,510	495,950	$1,117,120
DECONTAMINATION FACILITIES/SERVICES	1	LS		1,757						31,970	137,430	7,440	32,630	$209,470
EROSION AND SEDIMENT CONTROLS	1	LS		6,155						114,640		37,620	198,150	$350,410
PERCHED GROUNDWATER COLLECTION	N/A													N/A
EXCAV./SORT/SHRED/DRY – OFFSITE DISPOSAL	1	LS		462						7,840	229,730	15,380		$252,950
LOAD/HAUL – OFF–SITE DISPOSAL	1	LS		659						11,210		16,440		$27,650
EXCAV/SORT/VITRIFY/SOLIDIFY/STABILIZE	1	LS		158,310						2,687,600		2,422,590	338,350	$5,448,540
COMPOSITE LINER	1	LS		155,080						2,633,280	3,377,590	3,529,680	4,611,690	$14,152,240
COMPOSITE CAP	1	LS		36,165						613,730	718,330	881,910	1,926,310	$4,140,280
DIKE FOR DISPOSAL CELL	1	LS		32,787						556,400	159,750	668,490	1,018,760	$2,403,400
GENERATED WASTE REMOVAL	1	LS		14,859						252,110		142,930		$395,040
SITE RESTORATION	1	LS		53,301						904,530		1,693,130	1,838,980	$4,436,640
MONITORING WELLS	1	LS									1,087,000			$1,087,000
SUB TOTAL (DIRECT FIELD COSTS)	1	LOT		479,969						$8,166,970	$5,784,830	$9,608,120	$10,460,820	$34,020,740
TAKE–OFF ALLOWANCE 10%	1	LOT		47,997						$816,700	$578,480	$960,810	$1,046,080	$3,402,070
TOTAL (DIRECT FIELD COSTS)	1	LOT		527,966						$8,983,700	$6,363,300	$10,568,900	$11,506,900	$37,422,800

Alt–6B – Excav. & On–Site Disposal w/Off–Site Disposal Option – Resident Farmer – SUMMARY

PAGE 1 of 1

TABLE F.4-6

ALTERNATIVE 6 - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION ABOVE WASTE ACCEPTANCE CRITERIA RESIDENT FARMER AND 10^{-6} RISK LEVEL REMEDIATION AND DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Off-Site Disposal Volume (yd^3)	On-Site Disposal Volume (yd^3)			Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavation		Excavation Volume to On-Site Disposal	Generated Waste Volume	Total On-Site Disposal Volume		
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total								
Solid Waste Landfill	96,700	1,700	98,400	13,800	112,200	0	112,200	3,000	115,200	5,300	0
Lime Sludge Ponds	81,600	0	81,600	8,200	89,800	0	89,800	3,000	92,800	0	0
Inactive Flyash Piles	91,700	9,200	100,900	10,100	111,000	3,100	107,900	3,000	110,900	4,000	0
South Field	338,900	500	339,400	34,000	376,400	300	373,100	3,000	373,100	6,500	0
Active Flyash Pile	74,900	0	74,900	7,500	85,400	0	82,400	3,000	82,400	0	0
Total	683,800	11,400	695,200	73,600	780,400	3,400	765,400	15,000	765,400	15,800	0

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

001655

5861

LCC ANALYSIS TITLE:	SWL - EXC. & ON-SITE DISP. W/OFF-SITE DISP. OF FRACTION EXCEEDING WAC- (RESIDENT FARMER)			
WBS NO.:	1.1.1.1.2.3.1		TASK NO.:	2CSW
ALTERNATIVE:	6B		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	37 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	18-Aug-94
DOCUMENT NO.:	LCC-94-03-01	EST. NO. C2-94-07-21 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$0	$0	$0	$0	1997
$0	$0	$0	$0	1998
$4,728,386	$0	$0	$4,728,400	1999
$17,337,414	$0	$0	$17,337,400	2000
$0	$218,901	$0	$218,900	2001
$0	$197,472	$0	$197,500	2002
$0	$197,472	$0	$197,500	2003
$0	$197,472	$0	$197,500	2004
$0	$217,472	$0	$217,500	2005
$0	$120,472	$0	$120,500	2006
$0	$120,472	$0	$120,500	2007
$0	$120,472	$0	$120,500	2008
$0	$120,472	$0	$120,500	2009
$0	$140,472	$0	$140,500	2010
$0	$120,472	$0	$120,500	2011
$0	$120,472	$0	$120,500	2012
$0	$120,472	$0	$120,500	2013
$0	$120,472	$0	$120,500	2014
$0	$140,472	$0	$140,500	2015
$0	$120,472	$0	$120,500	2016
$0	$120,472	$0	$120,500	2017
$0	$120,472	$0	$120,500	2018
$0	$120,472	$0	$120,500	2019
$0	$140,472	$0	$140,500	2020
$0	$120,472	$0	$120,500	2021
$0	$120,472	$0	$120,500	2022
$0	$120,472	$0	$120,500	2023
$0	$120,472	$0	$120,500	2024
$0	$140,472	$0	$140,500	2025
$0	$120,472	$0	$120,500	2026
$0	$120,472	$0	$120,500	2027
$0	$120,472	$0	$120,500	2028
$0	$120,472	$0	$120,500	2029
$0	$140,472	$0	$140,500	2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$22,065,800	$4,140,600	$0	$26,207,200	TOTAL
$18,808,700	$2,436,100	$0	$21,245,300	<====(@NPV)

001656

EST FILE #: C2940721

F ERMC O
ESTIMATING SERVICES

DATE: 24-Aug-94

CLIENT: US DOE

SUMMARY SHEET

ESTIMATOR: KEN KEPLER

PROJECT TITLE: ALT-6B - SWL - ONSITE DISPOSAL w/OFF-SITE > WAC

LOCATION: FERNALD

WBS#: 1.1.1.1.2.3.1 RESIDENT FARMER

TASK#: 2CSW

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL CELL	76,581		$1,301,500	$926,000	$1,704,600	$3,932,100
2		EXCAVATE, SHRED/CRUSH, COMPOSITE LINER & CAP, DIKE						
		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		76,581		$1,301,500	$926,000	$1,704,600	$3,932,100
11	SUPERVISION - CONTRACTOR				$221,000			$221,000
12	SM TOOLS/CONSM'BLS						$78,100	$78,100
13	EQUIPMENT RENTAL						$1,448,600	$1,448,600
14	TEMP. FACILITIES				$27,300		$50,800	$78,100
15	TEMP UTL'S HOOK-UP				$13,700		$25,400	$39,100
16	JOB CLEAN-UP				$27,300		$50,800	$78,100
17	SAFETY				$13,700		$25,400	$39,100
18	HEALTH PHYSICS S/C				$185,800		$17,500	$203,300
19	CERCLA/SAT	$1,500 PER PERSON				$67,500		$67,500
20	BOND					$39,300		$39,300
21	OVERHEAD & PROFIT					$560,200		$560,200
22	PAYRL BRD.&BENFT.				$931,000			$931,000
	INDIRECT FIELD COSTS				$1,419,800	$667,000	$1,696,600	$3,783,400
	DIRECT & INDIRECT FIELD COSTS				$2,721,300	$1,593,000	$3,401,200	$7,715,500
23	TRANSPORTATION & BURIAL	N/A						
24	WASTE CONTAINERS	N/A						
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$9,000		$9,000
25	SCREENING & CONFIRMATION TESTING					$3,420,100		$3,420,100
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$1,604,800			$1,604,800
	FERMCO FIELD SUPPORT COSTS				$1,604,800	$3,429,100		$5,033,900
28	EMISSION MODELING				$13,500		$25,100	$38,600
29	PSAR/FSAR(SAFETY RPT)				$370,300			$370,300
30	ENGINEERING	TITLE I&II $1,385,600 TITLE III	$1,535,400	CDR	$748,400	DCR	$293,200	$3,942,600
	ENGINEERING COSTS							$4,351,500
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$3,426,300	$205,600
	SUB-TOTAL	(BASE ESTIMATE)						$17,306,500
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	20.0%						$3,461,300
	TARGET ESTIMATE (BASE ESTIMATE PLUS RISK BUDGET)							$20,767,800
35	CONTINGENCY	7.5%						$1,298,000
								PRELIMINARY
	TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY)							$22,065,800

LOTUS31\FS2\ALT6B\SWL\INDSUM.WK3 - FEASIBILITY STUDY

001657

Alternative 6 – Excavation and On-Site Disposal with Off-Site Disposal of Fraction Exceeding WAC (Resident Farmer)

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Long Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Well Inspect & Maint.	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	1	1	5	sample	$5,500.00	28	NA	$154,000	One fifth x (33 wells x 4 samples/year plus 8 leachate samples/year)
Long Term	1	6	30	sample	$5,500.00	14	NA	$77,000	One fifth x (33 wells x 2 samples/year plus 4 leachate samples/year)
Well Inspect & Maint.	1	1	30	well	$388.14	1.65	2.13	$826	One fifth x (inspection of 28 wells twice/year & repair 1 out of 8)
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
OU2 Waste Cell Leachate									
Pipeline Maintenance	1	1	30	lump sum	$1,106.83	1	1.29	$1,428	Overall cost divided among 5 subunits.
Treatment & Disposal	1	1	30	gallon	0.01	86,000	NA	$860	Overall cost divided among 5 subunits.
Facility Maint. at Subunit									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Mowing	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Fence Repair	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	1	1	30	acre	$2,183.32	6.63	8.55	$18,673	Total divided among 5 subunits. (incl. side slopes)
Mowing	1	1	30	acre	$1,861.92	8	10.32	$19,215	Total divided among 5 subunits
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.7	0.90	$1,780	Total divided among 5 subunits
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of OU2 Cell	5	5	30	lump Sum	$20,000	1	NA	$20,000	Total divided among 5 subunits

Annual Costs, Year 1 (excluding facility review)	$218,901
Annual Costs, Years 2–5 (excluding facility review)	$197,472
Annual Costs, Years 6–30 (excluding facility review)	$120,472
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 D:

001658

5861

8/2/94

DATE: 18-Aug-94

PROJECT TITLE:
ALT-6B - ISWL - ONSITE DISPOSAL w/OFF-SITE > WAC
RESIDENT FARMER

WBS#:
1.1.1.1.2.3.1

HEALTH PHYSICS

EST.NO.: C2940721
EST. : KEN KEPLER
TASK I.D. :
2CSW

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY / MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	127	$1,630	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	127	$3,050	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	127	$660	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	127	$710	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	127	$760	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	127	$460	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	127	$8,890	C/B		
SUB-TOTAL		31.80	4		$16,160			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	8		$100	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	4		$90	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	4		$700	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$1,370			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$17,500			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

001659

DATE: 18-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940721

ALT-6B - SWL - ONSITE DISPOSAL w/OFF-SITE > WAC

EST. : KEN KEPLER

WBS#: RESIDENT FARMER

TASK I.D. :

1.1.1.1.2.3.1

2CSW

5861

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	45	180	$16.97	$3,050		
ANNUAL PHYSICALS	1	3	45	135	$16.97	$2,290		
EXIT (TERMINATION) PHYSICALS	1	4	45	180	$16.97	$3,050		
SUB-TOTAL						$8,390		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	14	1	45	641	$16.97	$10,870		
YEARLY IN-VIVO	1	4	45	180	$16.97	$3,050		
EXIT (END OF PROJECT / TERMINATION)	1	4	45	180	$16.97	$3,050		
SUB-TOTAL						$16,970		
WORK DELAYS CAUSED BY MONITORING	5%				$1,604,500	$80,225		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$1,604,500	$80,225		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$185,800	$17,500	$203,300

001660

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT-6B – SWL – ONSITE DISPOSAL w/OFF-SITE > WAC
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CSW

WBS NO. – 1.1.1.1.2.3.1
EST. NO. – C2940721
BY – K. KEPLER
DATE – 08/18/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25-Mar-94	01-Jul-99	30-Jan-2000	31-Aug-2000	14	MONTHS

EST.DATE TO MID-POINT OF ACTIVITY	
70	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

001661

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL w/OFF–SITE OPTION (RESIDENT FARMER)														
SITE PREPARATION	1	LS		4,219						$73,340	$15,000	$38,730	$134,390	$261,460
DECONTAMINATION FACILITIES/SERVICES	1	LS		427						$7,750	$29,880	$1,740	$8,050	$47,420
EROSION AND SEDIMENT CONTROLS	1	LS		1223						$22,820		$6,260	$46,790	$75,870
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT/DRY – OFFSITE DISPOSAL	N/A													N/A
LOAD/HAUL – OFF–SITE DISPOSAL	N/A													N/A
EXCAVATE–LOAD/HAUL TO ON–SITE DISPOSAL (SHRED/CRUSH)	1	LS		23131						$392,530		$353,880		$746,410
COMPOSITE LINER	1	LS		24293						$409,680	$511,240	$539,340	$799,220	$2,259,480
COMPOSITE CAP	1	LS		5513						$93,560	$107,750	$136,100	$293,080	$630,490
DIKE FOR DISPOSAL CELL	1	LS		4150						$70,430	$23,960	$91,870	$134,950	$321,210
GENERATED WASTE REMOVAL	1	LS		3150						$53,440		$29,960		$83,400
SITE RESTORATION	1	LS		3513						$59,630		$119,040	$133,170	$311,840
MONITORING WELLS	1	LS									$154,000			$154,000
SUB–TOTAL (DIRECT FIELD COSTS)				69619						$1,183,180	$841,830	$1,316,920	$1,549,650	$4,891,580
TAKE–OFF ALLOWANCE 10%	1	LS		6,962						$118,320	$84,180	$131,690	$154,970	$489,160
TOTAL (DIRECT FIELD COSTS)	1	LS		76,581						$1,301,500	$926,000	$1,448,600	$1,704,600	$5,380,700

On–Site Disposal of SWL w/Off–site Option– SUMMARY

PAGE 1 of 19

F-7-235

001662

5861

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 20% ARE COMMON TO ALL SUB–UNITS)														
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	1500	LF	0.213	412	16.97				6.25	$6,990			$9,660	$16,650
c. Clear and Grub														
i. Remediation Site	4.10	AC	41.40	219	16.97			2575.00		$3,720		$10,870		$14,590
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas														
d. Dewatering														
i. Excavate Dewatering Trench	233	CY	0.50	150	16.97			1.49		$2,550		$360		$2,910
ii. Pump – w/4" Suction Hose	100	DAYS	3.00	387	16.97			19.55		$6,570		$2,010		$8,580
iv. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip	1	CY	4.00	5	16.97			100.00		$80		$100		$180
e. General Grading														
i. New Roads	12534	SY	0.001	16	16.97			0.07		$270		$900		$1,170
50%														
ii. Office/Parking Area 2222	1111	SY	0.010	14	16.97			0.32		$240		$370		$610
iii. Const.Equip.Decon.Pad Area 234	117	SY	0.010	2	16.97			0.32		$30		$40		$70
iv. Pers.Decon.Pad Area 14	7	SY	0.010		16.97			0.32						
v. Staging Area @ Sub–Unit 2845	1423	SY	0.010	18	16.97			0.32		$310		$470		$780
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	10445	SY	0.030	404	16.97			1.08	6.66	$6,860		$11,620	$71,650	$90,130
50%														
ii. Office/Parking – 8" Gravel W/ Geot 2222	1111	SY	0.030	43	16.97			1.08	6.66	$730		$1,240	$7,620	$9,590
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc.Slab 2845	1423	SY	0.041	75	16.97			1.45	5.51	$1,270		$2,120	$8,070	$11,460
Concrete Slab 160 x 160' x 8"thk. 631	316	CY	4.07	1656	17.98			18.38	67.00	$29,770		$5,970	$21,770	$57,510
Concrete Curb – 2'h x 480 lf x 8" thl 24	12	CY	15.30	237	17.98			69.08	275.90	$4,260		$850	$3,410	$8,520
HDPE Perf.Sub–grade Piping – 4" 500	250	LF	0.21	68	16.97			0.74	3.02	$1,150		$190	$780	$2,120
Epoxy Coating 2845	1423	SY	0.22	404	16.97			0.77	7.56	$6,860		$1,130	$11,080	$19,070
Backfill & Compact around Slab 183	92	ICY	0.086	10	16.97			1.38				$130		$130
Mob/Demob.Equip. 1	0.50	LS	2.00	1	16.97			184.00		$20		$90		$110
g. Relocated Diversion Ditch														
i. Excavation – Ditch	3150	CY	0.24	975	16.97			0.84	7.50	$16,550		$2,650	$23,630	$42,830
SY														
ii. Grass Cover: Seed, Fertilize, Mulch 11000	99	MSF	0.30	38	16.97			6.75	25.00	$640		$690	$2,550	$3,880
TOTAL (SITE PREPARATION)	1	LS		4,219						$73,340	$15,000	$38,730	$134,390	$261,460

Site Preparation Details

F-7-236
001963
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[illegible]21
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES															
AT SUB–UNIT	50%														
a. Decon Trailer – Rental	39	20	MO					1500.00				$29,250			$29,250
	50%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	88	BCY	0.021	2	16.97			0.64		$30		$60		$90
ii. Sub–grade Prep.	167	84	SY	0.041	4	16.97		6.75	1.45	5.51	$70	$580	$120	$470	$1,240
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	8	SF	0.32	3	19.21			0.73	12.55	$60		$10	$100	$170
Metal Grating 2 ft wide x 25 lf	25	13	LF	0.53	9	19.21			1.86	46.67	$170		$20	$600	$790
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	20	CY	4.07	102	17.98			14.25	67.00	$1,830		$290	$1,350	$3,470
Decon Pad Trench – 2'x2'i.d.x 25l	5	3	CY	28.22	91	17.98			98.77	202.30	$1,640		$250	$520	$2,410
Decon Pad Curb – 6" x 6" x 120 lf	5	3	CY	15.30	49	17.98			53.55	275.90	$880		$140	$710	$1,730
Pump Pad – 4' x 4' x 6" thk.	0.30	0.15	CY	10.64	2	17.98			37.24	97.20	$40		$10	$20	$70
Epoxy Coating	167	84	SY	0.22	24	17.00			0.77	7.56	$410		$70	$650	$1,130
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	1	EA	12.00	8	17.98			100.00	525.00	$140		$50	$270	$460
vi. HDPE Piping	100	50	LF	0.38	25	19.95			5.11	4.42	$500		$260	$230	$990
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Gu:	720	360	SF	0.04	17	16.97			0.03	1.55	$290		$10	$570	$870
4" x 4" x 9'–6" Wood Posts set in (	27	14	EA	0.480	8	16.97			1.68	5.75	$140		$20	$80	$240
viii. Air Diaphragm Pump 50 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$400	$630
ix. Suction and Discharge Piping	10	5	LF	0.11	1	19.95			0.39	0.84	$20				$20
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	2	LF	0.47	1	19.95			1.65	14.91	$20			$20	$40
	BCY														
x. Backfill & Compaction around concrete slab	258	155	ICY	0.086	17	16.97			1.38		$290		$220		$510
SUB–TOTAL (EQUIP. DECON. FACILITY)					373						$6,730	$29,830	$1,560	$5,990	$44,110

Equipment Decon. Facility Details

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August 24, 1994

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	50%														
i. Excavation – Structural	19	10	BCY	0.021		16.97			0.64				$10		$10
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	7	SY	0.041		16.97		6.75	1.45	5.51		$50	$10	$40	$100
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	2	SF	0.32	1	16.97			0.73	12.55	$20			$30	$50
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	1	CY	4.07	4	17.98			14.25	67.00	$70		$10	$50	$130
Decon Slab Sump – 2'x 2' x 3'	0.3	0.15	CY	31.84	6	17.98			111.44	250.70	$110		$20	$40	$170
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0.20	CY	15.30	4	17.98			53.55	275.90	$70		$10	$60	$140
Epoxy Coating	14	7	SY	0.22	2	17.00			0.77	7.56	$30		$10	$50	$90
v. Corrugated Fiberglass Splash Guard	132	66	SF	0.04	3	16.97			0.03	1.55	$50			$110	$160
4" x 4" x 9'–6" Wood Posts set in	6	3	EA	0.480	2	16.97			1.68	5.75	$30		$10	$20	$60
vi. Pump 20 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$410	$640
vii. Clean Wtr.Strg.Tank W/Piping– 1500 gal.	1	1	LS	32.00	21	19.95			112.00	2500.00	$420		$60	$1,250	$1,730
viii. Backfill & Compaction around concrete slab	BCY 17	10	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		54						$1,020	$50	$180	$2,060	$3,310
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		427						$7,750	$29,880	$1,740	$8,050	$47,420

Personnel Decon.Facilities/Services Details

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CONTR.NO.– [redacted]21
CLIENT – [redacted]DEPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	880	LF	0.017	19	16.97			0.06	0.65	$320		$50	$590	$960
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	500	EA	0.24	155	16.97			1.53	1.35	$2,630		$790	$700	$4,120
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 300 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. Sedimentation/Decon. Tank 10000 gal	1	LS	53.40	69	19.95			186.90	7100.00	$1,380		$190	$7,100	$8,670
iv. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	800	LF	0.38	393	19.95			5.11	4.42	$7,840		$4,090	$3,540	$15,470
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	3	EA	8.00	31	16.97			28.00	8300.00	$530		$80	$24,900	$25,510
vi. 50 gal. Pump Includes Controls & Electrical	2	EA	60.00	155	19.95			210.00	2500.00	$3,090		$420	$5,000	$8,510
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,223						$22,820		$6,260	$46,790	$75,870

Erosion Control Details

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August 24, 1994

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
LOAD & HAUL FOR ON–SITE DISPOSAL														
Excavate and Load	96700	BCY	0.055	6861	16.97			1.17		$116,430		$116,530		$232,960
Excavate Additional Soil	13800	BCY	0.055	979	16.97			1.17		$16,610		$16,630		$33,240
Haul to Onsite Disposal Cell BCY														
– 12" thk. Cushion Layer 5234	6543	LCY	0.081	684	16.97			1.51		$11,610		$10,180		$21,790
– Impacted Fill 105266	131583	LCY	0.081	13749	16.97			1.51		$233,320		$204,650		$437,970
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load	1700	BCY	0.055	121	16.97			1.17		$2,050		$2,050		$4,100
Haul to Onsite Disposal Cell BCY														
– Impacted Fill 1700	2125	LCY	0.081	222	16.97			1.51		$3,770		$3,310		$7,080
			S/T	343										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	343	HRS	150%	515	16.97			1.51		$8,740		$530		$9,270
			S/T	858										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	86	MD												
TOTAL (EXCAVATE– ON–SITE DISPOSAL)	1	LOT		23,131						$392,530		$353,880		$746,410

Excavate for Onsite Disposal Details

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August 24, 1994

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CONTR.NO. – 4[illegible]21
CLIENT – U[illegible]EPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP.)															
a. Clear and Grubb	20%														
i. On–site Cell & Surrounding area	45	9.0	AC	41.40	481	16.97			2575.00		$8,160		$23,870		$32,030
b. Relocated South Access Road	20%														
i. Clear & Grub	3	0.6	AC	41.40	32	16.97			2575.00		$540		$1,590		$2,130
ii. General Grading	1467	293.4	SY	0.001					0.07				$20		$20
iii. Road – 8" Gravel W/Geotextile	7333	1466.6	SY	0.030	57	16.97			1.08	6.66	$970		$1,630	$10,060	$12,660
c. Haul Road	20%														
i. Clear & Grub	2.4	0.5	AC	41.40	26	16.97			2575.00		$440		$1,270		$1,710
ii. General Grading	11556	2311.2	SY	0.001	3	16.97			0.07		$50		$170		$220
iii. Road – 8" Gravel W/Geotextile	5778	1155.6	SY	0.030	45	16.97			1.08	6.66	$760		$1,290	$7,930	$9,980
	20%														
d. Temporary Construction Fencing	5200	1040.0	LF	0.213	286	16.97				6.25	$4,850			$6,700	$11,550
e. 20' wide Swing Gates	1	0.2	EA	25.60	7	16.97			340.00	560.00	$120		$70	$120	$310
f. Staging Area @ Cell	20%														
Area Excavation for Slab	1606	321.2	BCY	0.016	7	16.97			0.60		$120		$200		$320
Sub–Base for Slab	2845	569.0	SY	0.041	30	16.97		6.75	1.45	5.51	$510	$3,840	$850	$3,230	$8,430
HDPE Perf.Sub–grade Piping – 4"	500	100.0	LF	0.21	27	16.97			0.74	3.02	$460		$80	$310	$850
Concrete Slab – 160'x160'x8" thk	631	126.2	CY	4.07	663	17.98			14.25	67.00	$11,920		$1,850	$8,710	$22,480
Concrete Curb – 480'x2'x8" thk	24	4.8	CY	15.30	95	17.98			53.55	275.90	$1,710		$260	$1,360	$3,330
Epoxy Coating	2845	569.0	SY	0.22	161	16.97			0.77	7.56	$2,730		$450	$4,430	$7,610
Backfill & Compact around Slab	183	36.6	ICY	0.086	4	16.97			1.38				$50		$50
Mob/Demob.Equip.	1	0.2	LS	2.00	1	16.97			184.00		$20		$40		$60
g. Storage Area – 200' x 200' Asphalt Includes Compacted Sub–Grade	4444	889	SY	0.084	96	16.97			2.56	14.04	$1,630		$2,340	$12,850	$16,820
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat															
	20%														
h. Decon Trailer – Rental	51	10	MO					1500.00				$15,300			$15,300
i. Const.Equipment Decon. Facility	20%														
25 ft x 60 ft	1	0.20	LS	730.00	146	18.05		1160.00	2900.00	11980.00	$2,640	$230	$580	$2,400	$5,850
j. Personnel Decon. Facility	20%														
11'x 11'	1	0.20	LS	108.00	22	18.89		100.00	360.00	4120.00	$420	$20	$70	$820	$1,330
SUB–TOTAL (COMPOSITE LINER)		1	LOT		2189						$38,050	$19,390	$36,680	$58,920	$153,040

Composite Liner Details

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP. CON'T.)														
(SHREDDING COMMON TO SWL, IFP & SF)														
k. Shredder/Crusher – Purchase/Install 33.3%	0.3	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY 5300														
Generated Waste BCY 5602														
Excavated Debris TONS 8447														
(Percent of Gen.Waste to be Shredded) 25%														
Generated Waste TONS 3221														
TOTAL TONS 11668														
Operating Costs	194	HRS							25.75				$5,150	$5,150
(2) Operators	388	HRS	1.00	501	16.97					$8,500				$8,500
SUB–TOTAL (COMPOSITE LINER)	1	LOT		621						$10,890		$2,880	$114,150	$127,920

Composite Liner Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4[illegible]21 PRELIMINARY
CLIENT – [illegible]EPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

CONTR.N[illegible] 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
ON–SITE DISPOSAL FACILITY														
COMPOSITE LINER														
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.														
COMPOSITE LINER														
a. Subgrade Preparation – includes removal of top soil, grading & comp.	15860	SY	0.024	491	16.97			0.86		$8,330		$14,050		$22,380
b. 95% Clay – 5% Bentonite 36" Thk BCY 15860	18715	ICY	0.260	6277	16.97			11.19	20.35	$106,520		$215,700	$392,270	$714,490
c. Composite Clay Liner	15860	SY					7.38				$117,050			$117,050
d. HDPE Liner 60 mil	15860	SY					4.75				$75,340			$75,340
e. Geotextile Fabric	15860	SY					2.25				$35,690			$35,690
f. Pea Gravel 12" Thk; In–place BCY 5234	5627	ICY	0.11	798	16.97			0.77	17.00	$13,540		$4,460	$98,520	$116,520
g. Composite Clay Liner	15860	SY					7.38				$117,050			$117,050
h. HDPE Liner 60 mil	15860	SY					4.75				$75,340			$75,340
i. Geotextile Fabric	15860	SY					2.25				$35,690			$35,690
j. Pea Gravel 12" Thk; In–place BCY 5234	5627	ICY	0.11	798	16.97			0.77	17.00	$13,540		$4,460	$98,520	$116,520
k. Geotextile Fabric	15860	SY					2.25				$35,690			$35,690
l. HDPE Perforated Pipe – leachate collection 6" Dia.	1200	LF	0.30	464	16.97			1.05	6.56	$7,870		$1,300	$8,110	$17,280
m. HDPE Perforated Pipe – leak detection 6" Dia.	1200	LF	0.30	464	16.97			1.05	6.56	$7,870		$1,300	$8,110	$17,280
n. Leachate Discharge Piping														
i. HDPE Carrier & containment Pipe 6" x 10' Includes Trench Excav/Backfill, sand bedding and compaction.	525	LF	0.86	582	16.97			11.37	22.33	$9,880		$6,150	$12,070	$28,100
ii. HDPE Manhole – 4' dia. x 8' deep	1	EA	8.00	10	16.97			28.00	8300.00	530.00		$30	$8,550	$9,110
o. Impacted Fill–Cusion Layer 12" Thk BCY 5234	6543	LCY	0.06	506	16.97			1.67		$8,590		$11,250		$19,840
p. Impacted Fill–Spread and Compact BCY 105266	131583	LCY	0.06	10184	16.97			1.67		$172,820		$226,340		$399,160
q. Generated Waste BCY 5602	6442	LCY	0.06	499	16.97			1.67		$8,470		$11,080		$19,550
PPE LEVEL C Allowance is added to the														
r. Impacted fill BCY 1700	2125	LCY	0.06	164	16.97			1.67		$2,780		$3,660		$6,440
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	164	HRS	150%	246										
			S/T	410										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	41	MD												
SUB–TOTAL (COMPOSITE LINER)	1	LOT		21,483						$360,740	$491,850	$499,780	$626,150	$1,978,520
TOTAL (COMPOSITE LINER)	1	LOT		24,293						$409,680	$511,240	$539,340	$799,220	$2,259,480

Composite Liner Details

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August 24, 1994
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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE CAP															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
COMPOSITE CAP															
a. Contouring Layer 18" Thk.	BCY 3289	3947	ICY	0.06	305	16.97			1.67	3.50	$5,180		$6,790	$14,230	$26,200
b. 95% Clay – 5% Bentonite 24" Thk	BCY 4407	5200	ICY	0.260	1744	16.97			11.19	20.35	$29,600		$59,940	$109,000	$198,540
c. GML\GCC – composite Liner		6578	SY					7.38				$48,550			$48,550
d. Geotextile Fabric		6578	SY					2.25				$14,800			$14,800
e. Pea gravel 12" Thk, In–place	BCY 2171	2334	ICY	0.11	331	16.97			0.77	17.00	$5,620		$1,850	$40,870	$48,340
f. Geotextile Fabric		6578	SY					2.25				$14,800			$14,800
g. Cobbels 36" Thk; In–place	BCY 6578	7071	ICY	0.258	2353	16.97			7.15	10.10	$39,930		$52,080	$73,560	$165,570
h. Geotextile Fabric		6578	SY					2.25				$14,800			$14,800
i. Sand Layer 6" Thk; In–place	BCY 1118	1202	ICY	0.052	81	16.97			1.76	5.00	$1,370		$2,180	$6,190	$9,740
j. Geotextile Fabric		6578	SY					2.25				$14,800			$14,800
k. Common Soil 21" Thk; In–place	BCY 3815	4578	ICY	0.06	354	16.97			1.67	3.50	$6,010		$7,870	$16,500	$30,380
l. Top Soil 6" Thk; In–place	1118	1342	ICY	0.053	92	16.97			1.82	12.10	$1,560		$2,510	$16,720	$20,790
m. Grass Cover – Seed, Fertilize, Mulc Utility Mix – Hydro/Air Seeding	SY 6578	59	MSF	0.30	23	16.97			6.75	25.00	$390		$410	$1,520	$2,320
n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized		1050	LF	0.17	230	16.97			2.28	13.40	$3,900		$2,470	$14,490	$20,860
TOTAL (COMPOSITE CAP)		1	LOT		5,513						$93,560	$107,750	$136,100	$293,080	$630,490

Composite Cap Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 44[illegible]21
CLIENT – U[illegible]EPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO[illegible] 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DIKE FOR DISPOSAL CELL														
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .														
a. Dike Cover – 18" thk. common soil BCY 3663	4396	ICY	0.06	340	16.97			1.67	3.50	$5,770		$7,560	$15,850	$29,180
b. Geotextile Fabric	10650	SY					2.25				$23,960			$23,960
c. Cobbels 36" Thk; In–place BCY 10650	11449	ICY	0.258	3810	16.97			7.15	10.10	$64,660		$84,310	$119,100	$268,070
TOTAL (DIKE – DISPOSAL CELL)	1	LOT		4,150						$70,430	$23,960	$91,870	$134,950	$321,210

Dike Details

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August 24, 1994

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001672

1986

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL															
a. Office/Parking Area @ S/U	50%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	247	BCY	0.292	93	16.97			9.16		$1,580		$2,330		$3,910
Geo–Fabric & Liner	2222	1111	SY	0.002	3	16.97			0.02		$50		$20		$70
Haul & Dump Rubble	185	93	BCY	0.30	36	16.97			2.51		$610		$240		$850
b. Const.Equip.Decon Facil.@ S/U	50%														
Demo/Remove Concrete	49.3	25	BCY	1.2	38	16.97			3.62		$640		$90		$730
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	14	BCY	0.292	5	16.97			9.16		$80		$130		$210
Geo–Fabric & Liner	167	84	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	27	14	EA	0.48	8	16.97			1.68		$140		$20		$160
Splash Guard	702	351	SF	0.04	18	16.97			0.03		$310		$10		$320
Haul & Dump Rubble	24.9	12	BCY	0.30	5	16.97			2.51		$80		$30		$110
c. Personnel Decon. Facil. @ S/U	50%														
Demo/Remove Concrete	2.2	1	BCY	1.2	2	16.97			3.62		$30				$30
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo–Fabric & Liner	14	7	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	6	3	EA	0.48	2	16.97			1.68		$30		$10		$40
Splash Guard	132	66	SF	0.04	3	16.97			0.03		$50				$50
Haul & Dump Rubble	3.5	2	BCY	0.30	1	16.97			2.51		$20				$20
d. Staging pad @ S/U	50.0%														
Demo/Remove Concrete	655	328	BCY	1.2	507	16.97			3.62		$8,600		$1,220		$9,820
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	238	BCY	0.292	89	16.97			9.16		$1,510		$2,240		$3,750
Geo–Fabric & Liner 105 cy	2845	1423	SY	0.002	4	16.97			0.02		$70		$30		$100
Haul & Dump Rubble	395.5	198	BCY	0.30	77	16.97			2.51		$1,310		$510		$1,820
	20%														
e. Const.Equip.Decon.Facil. @ Onsite Disp.Cell															
Demo/Remove Concrete	49.3	10	BCY	1.2	15	16.97			3.62		$250		$40		$290
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	6	BCY	0.292	2	16.97			9.16		$30		$50		$80
Geo–Fabric & Liner	167	33	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	27	5	EA	0.48	3	16.97			1.68		$50		$10		$60
Splash Guard	702	140	SF	0.04	7	16.97			0.03		$120				$120
Haul & Dump Rubble	24.9	5	BCY	0.30	2	16.97			2.51		$30		$10		$40
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		920						$15,590		$7,000		$22,590

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4[illegible]21
CLIENT – U[illegible]EPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL (CON'T.)															
Demo. /Load/Haul/Dump/Compact															
	20.0%														
f. Personnel Decon. Facil.@ Onsite Disp. Cell															
Demo/Remove Concrete	2.2	0.44	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	0.48	BCY	0.292		16.97			9.16						
Geo–Fabric & Liner	14	2.80	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	6	1.20	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	26.40	SF	0.04	1	16.97			0.03		$20				$20
Haul & Dump Rubble	3.5	0.70	BCY	0.30		16.97			2.51						
	20.0%														
g. Relocated South Access Road/Cell	SY														
Road – 8" Gravel W/Geotextile	7333	1467	BCY	0.292	552	16.97			9.16		$9,370		$13,840		$23,210
Haul & Dump Rubble		1467	BCY	0.30	568	16.97			2.51		$9,640		$3,790		$13,430
	20.0%														
h. Haul Road for Cell	SY														
Road – 8" Gravel W/Geotextile	5778	257	BCY	0.292	97	16.97			1.08		$1,650		$290		$1,940
Haul & Dump Rubble		257	BCY	0.30	99	16.97			2.51		$1,680		$660		$2,340
	20.0%														
i. Temporary Construction Fencing @ Cell	5200	1040	LF	0.107	143	16.97					$2,430				$2,430
Haul & Dump Rubble		135	BCY	0.30	52	16.97			2.51		$880		$350		$1,230
	20.0%														
j. 20' wide Swing Gates @ Cell	2	0.40	EA	12.75	7	16.97			340.00		$120		$140		$260
Haul & Dump Rubble		0.05	BCY	0.30		16.97			2.51						
	20.0%														
k. Storage Pad Area @ Cell	BCY														
Demo/Remove Asphalt	988	197.60	BCY	1.2	306	16.97			3.62		$5,190		$740		$5,930
Excav., Load, Haul, Backfill, Compac	474.0	94.80	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Sub–grade Stone															
Geo–Fabric & Liner	4444	888.80	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble		197.0	BCY	0.30	76	16.97			2.51		$1,290		$510		$1,800
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,941						$32,950		$21,230		$54,180

Generated Waste Removal Details

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August 24, 1994

F-7247

001674

1861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL (CON'T.)															
Demo. /Load/Haul/Dump/Compact															
The following prorated at:	20.0%														
I. Staging Area @ On–Site Disposal Cell															
Demo/Remove Concrete	655	131.0	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	475	95.0	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo–Fabric & Liner 105 cy	2845	569.0	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	395.5	126.0	BCY	0.30	49	16.97			2.51		$830		$330		$1,160
TOTAL GENERATED WASTE	BCY 5602 LCY 6442														
SUB–TOTAL (GENERATED WASTE REMOVAL		1	LOT		289						$4,900		$1,730		$6,630
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		3,150						$53,440		$29,960		$83,400

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

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001675

CONTR.NO. – [redacted]21
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
Solid Waste Landfill	15600	18720	ICY	0.09	2173	16.97			3.21	3.50	$36,880		$61,890	$67,490	$166,260
	50%														
Office/Parking @ S/U	494	296	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	47	ICY												
Decon.Facil.– Personnel @ S/U	7	4	ICY												
Staging Area @ S/U	1099	659	ICY												
	S/T	1006.8	ICY	0.09	117	16.97			3.21	3.50	$1,990		$3,330	$3,630	$8,950
	20%														
Staging Area at On–Site Disp.Cell	1099	264	ICY												
Storage Area at On–Site Disp.Cell	474	114	ICY												
Decon.Facil.– Const.Equip.@ Cell	78	19	ICY												
Decon.Facil.– Personnel @ Cell	7	2	ICY												
Relocated South Access Road	1628	391	ICY												
Haul Road	1283	308	ICY												
	S/T	1096.6	ICY	0.09	127	16.97			3.21	3.50	$2,160		$3,630	$3,950	$9,740
b. Final Grade for SWL (Excludes Cap)		7330	SY	0.02	189	16.97			0.70		$3,210		$5,280		$8,490
c. Borrow Top Soil 6" Thk., Spread															
Solid Waste Landfill		7330	SY	0.036	340	16.97			2.33	2.88	$5,770		$17,590	$21,740	$45,100
	50%														
Office/Parking @ S/U	2222	1333	SY												
Decon.Facil.– Const.Equip. @ S/U	167	100	SY												
Decon.Facil.– Personnel @ S/U	14	8	SY												
Staging Area @ S/U	2845	1423	SY												
	S/T	2864.3	SY	0.036	133	16.97			2.33	2.88	$2,260		$6,870	$8,500	$17,630
	20%														
Staging Area at On–Site Disp.Cell	2845	683	SY												
Storage Area at On–Site Disp.Cell	4444	1067	SY												
Decon.Facil.– Const.Equip.@ Cell	167	40	SY												
Decon.Facil.– Personnel @ Cell	14	3	SY												
Relocated South Access Road	14667	3520	SY												
Haul Road	11556	2773	SY												
	S/T	8086.3	SY	0.036	376	16.97			2.33	2.88	$6,380		$19,410	$23,990	$49,780
(SUB–TOTAL SITE RESTORATION)		1	LOT		3,455						$58,650		$118,000	$129,300	$305,950

Site Restoration Details

FEMP-OU02-5 DRAFT
August 24, 1994

F-7-249

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5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST.NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION Backfill and top soil to be borrowed from the off–site source															
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Solid Waste Landfill	7330	66	MSF	0.30	26	16.97			6.75	25.00	$440		$460	$1,700	$2,600
	50%														
Office/Parking @ S/U	2222	10	MSF												
Decon.Facil.– Const.Equip. @ S/U	167	0.75	MSF												
Decon.Facil.– Personnel @ S/U	14	0.06	MSF												
Staging Area @ S/U	2845	12.8	MSF												
	S/T	23.6	MSF	0.30	9	16.97			6.75	25.00	$150		$160	$610	$920
	20%														
Staging Area at On–Site Disp.Cell	2845	5.12	MSF												
Storage Area at On–Site Disp.Cell	4444	8.00	MSF												
Decon.Facil.– Const.Equip.@ Cell	167	0.30	MSF												
Decon.Facil.– Personnel @ Cell	14	0.03	MSF												
Relocated South Access Road	14667	26.40	MSF												
Haul Road	11556	20.8	MSF												
	S/T	60.7	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,560	$2,370
(SUB–TOTAL SITE RESTORATION)		1	LOT		58						$980		$1,040	$3,870	$5,890
(TOTAL SITE RESTORATION)		1	LOT		3,513						$59,630		$119,040	$133,170	$311,840

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FEMP-OU02-5 DRAFT
August 24, 1994

Site Restoration Details

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CONTR.NO.– [redacted]21
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II MW														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility MW 1 Pair x 120 ft/pair	5	PR					23000.00				$115,000			$115,000
b. Abandon Existing Wells	3	EA					13000.00				$39,000			$39,000
TOTAL (MONITORING WELLS)	1	LOT									$154,000			$154,000

Monitoring Wells Details

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FEMP-OU02-5 DRAFT
August 24, 1994

5864

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	45000	GAL					0.01				$500			$500
Runnoff from the Exclusion Zone.	850000	GAL					0.01				$8,500			$8,500
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$9,000			$9,000

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Waste Water Treatment Operations Cost Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[illegible]21
CLIENT – U[illegible]EPT. OF ENERGY
PROJECT – ALT–6B – SWL – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940721
BY: KEN KEPLER
DATE: 24–Aug–94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATORY TESTING														
Excavation														
Full TCLP	561	EA					2,002				$1,123,100			$1,123,100
Rad	561	EA					2,000				$1,122,000			$1,122,000
Confirmatory tests														
Full Rad Test	280	EA					3,101				$868,300			$868,300
Full HSL	50	EA					1,500				$75,000			$75,000
Full TCLP	50	EA					2,002				$100,100			$100,100
2 Technicians per month	10	MO					13,163				$131,600			$131,600
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING/CONFIRMATORY TEST)	1	LOT									$3,420,100			$3,420,100

Screening/Confirmatory Testing Details

PAGE 19 of 19

F-7-253

001680

FEMP-OU02-5 DRAFT
August 24, 1994

5861

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 6B, SWL– ON–SITE DISPOSAL W/OFF–SITE > WAC
CLIENT: DOE DATE: 18–Aug–94
CONTRACT: C2–94–07–21 BASE ESTIMATE: $17,306,500

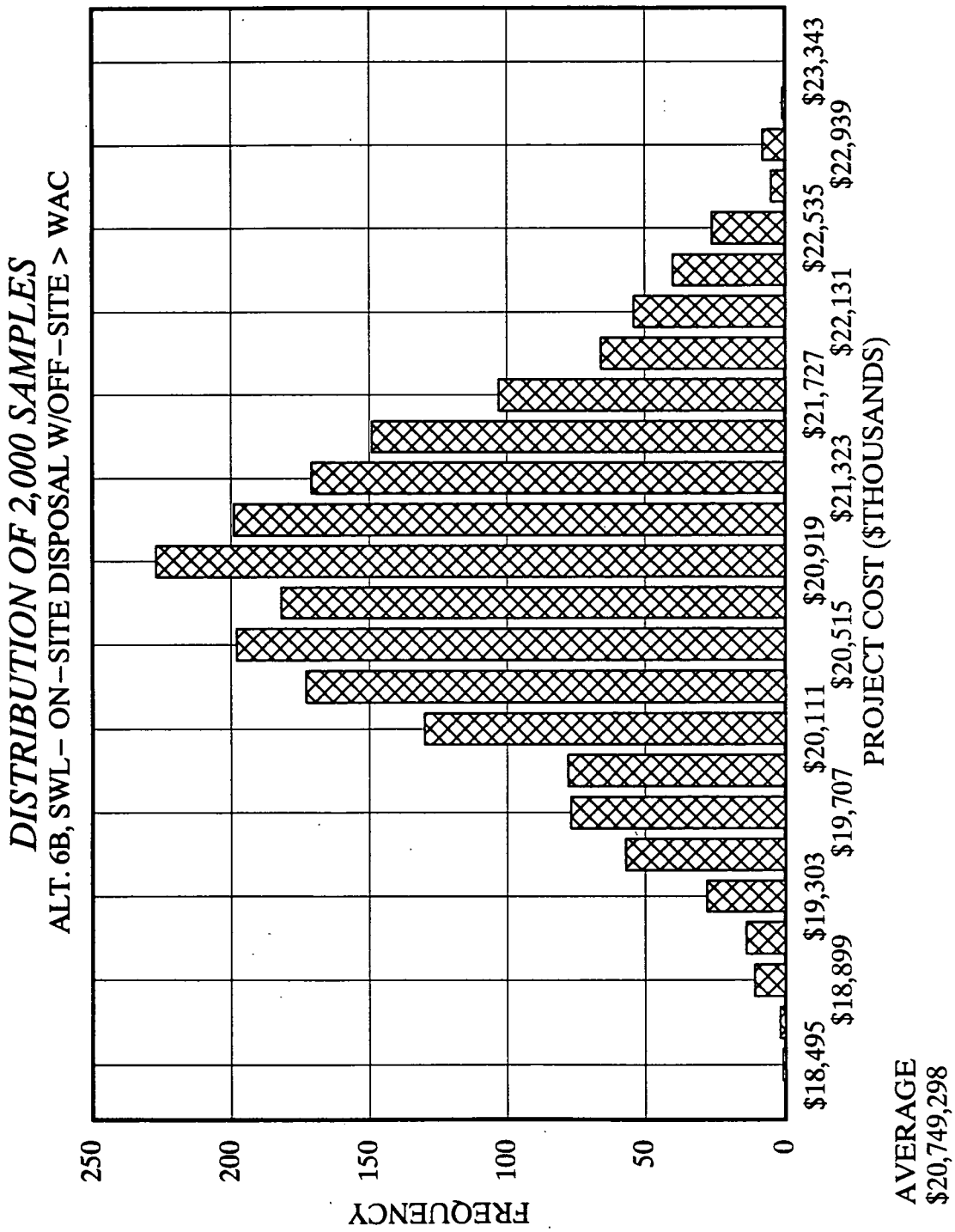
CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$25,122,135	$7,815,635	45.2%
0.05%	$22,865,756	$5,559,256	32.1%
5.00%	$22,065,820	$4,759,320	27.5%
10.00%	$21,736,584	$4,430,084	25.6%
15.00%	$21,527,048	$4,220,548	24.4%
20.00%	$21,400,013	$4,093,513	23.7%
25.00%	$21,267,011	$3,960,511	22.9%
30.00%	$21,146,793	$3,840,293	22.2%
35.00%	$21,051,508	$3,745,008	21.6%
40.00%	$20,937,968	$3,631,468	21.0%
45.00%	$20,847,343	$3,540,843	20.5%
50.00%	$20,752,389	$3,445,889	19.9%
55.00%	$20,662,075	$3,355,575	19.4%
60.00%	$20,553,803	$3,247,303	18.8%
65.00%	$20,447,231	$3,140,731	18.1%
70.00%	$20,339,058	$3,032,558	17.5%
75.00%	$20,225,733	$2,919,233	16.9%
80.00%	$20,114,626	$2,808,126	16.2%
85.00%	$19,972,564	$2,666,064	15.4%
90.00%	$19,724,637	$2,418,137	14.0%
95.00%	$19,474,966	$2,168,466	12.5%
99.95%	$18,537,146	$1,230,646	7.1%
100.00%	$16,400,096	($906,404)	–5.2%

001681

FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

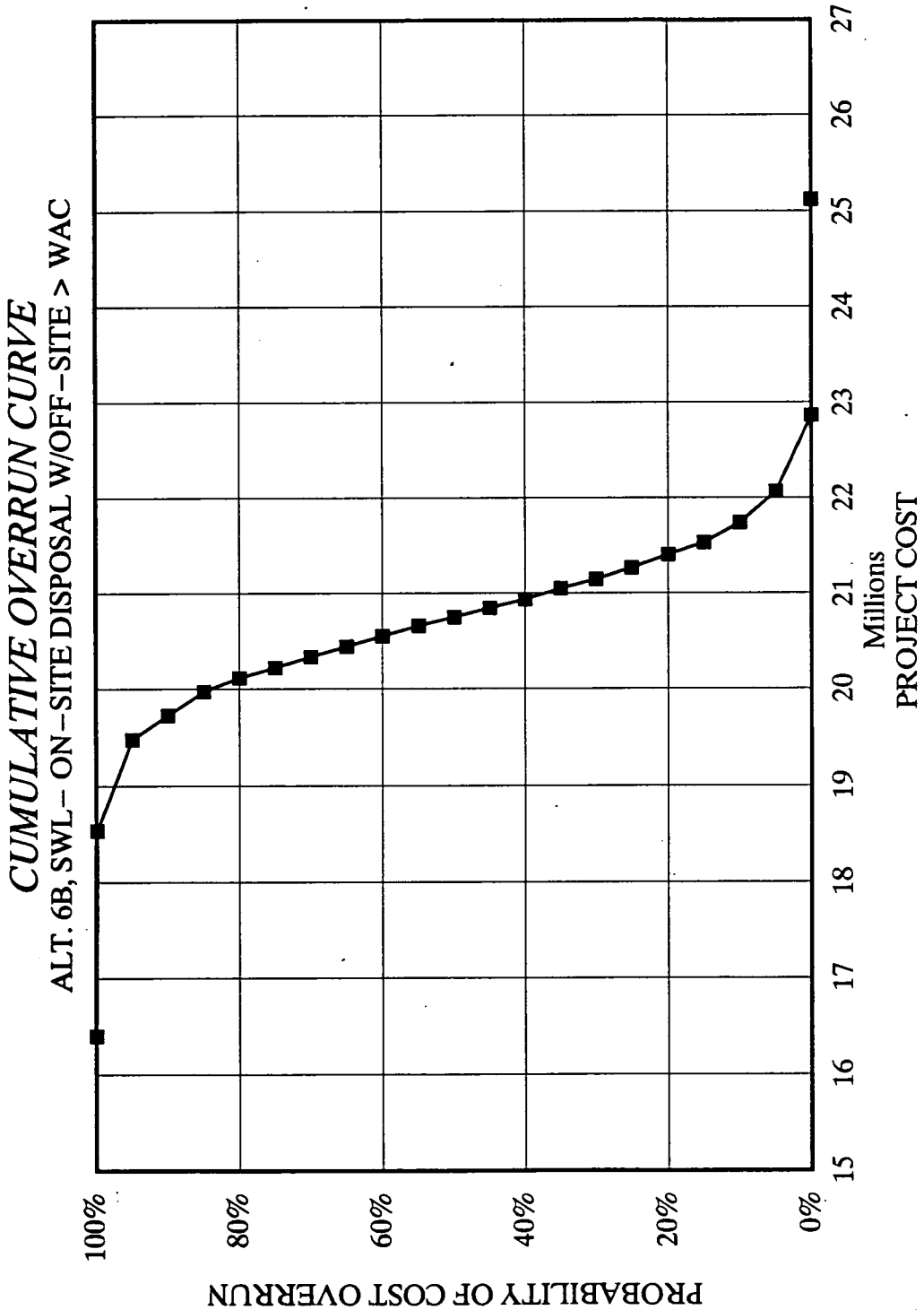
PROJECT: ALT. 6B, SWL- ON-SITE DISPOSAL W/OFF-SITE > WAC
CLIENT: DOE
CONTRACT: C2-94-07-21

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$80,670	-5.0%	$76,637	30%	$104,871	U		14%
2	SITE PREPERATION S/C	16,500	-5.0%	15,675	30%	21,450	U		14%
3	SITE PREPERATION MAT'L	147,830	-5.0%	140,439	20%	177,396	U		20%
4	DECON FACILITIES/SERVICES LABOR	8,530	-2.0%	8,359	80%	15,354	U		2%
5	DECON FACILITIES/SERVICES S/C	32,870	-6.0%	30,898	80%	59,166	U		7%
6	DECON FACILITIES/SERVICES MAT'L	8,860	-6.0%	8,328	60%	14,176	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	25,100	-5.0%	23,845	50%	37,650	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	51,470	-5.0%	48,897	30%	66,911	U		14%
9	EXC & LOAD ON-SITE DISP LABOR	431,780	-2.0%	423,144	150%	1,079,450	U		1%
10	COMPOSITE LINER LABOR	450,650	-1.0%	446,144	75%	788,638	U		1%
11	COMPOSITE LINER S/C	562,360	-2.0%	551,113	75%	984,130	U		3%
12	COMPOSITE LINER MAT'L	879,100	-6.0%	826,354	70.0%	1,494,470	U		8%
13	COMPOSITE CAP LABOR	102,920	-6.0%	96,745	75.0%	180,110	U		7%
14	COMPOSITE CAP S/C	118,530	-6.0%	111,418	80.0%	213,354	U		7%
15	COMPOSITE CAP MAT'L	322,390	-6.0%	303,047	55.0%	499,705	U		10%
16	DIKE LABOR	77,470	-6.0%	72,822	125.0%	174,308	U		5%
17	DIKE S/C	26,360	-6.0%	24,778	125.0%	59,310	U		5%
18	DIKE MAT'L	148,450	-6.0%	139,543	125.0%	334,013	U		5%
19	GENERATED WASTE REMVL LABOR	58,780	-5.0%	55,841	50.0%	88,170	U		9%
20	SITE RESTORATION LABOR	65,590	-5.0%	62,311	30.0%	85,267	U		14%
21	SITE RESTORATION MAT'L	146,490	-5.0%	139,166	30.0%	190,437	U		14%
22	MONITORING WELLS S/C	169,400	-5.0%	160,930	50.0%	254,100	U		9%
23	INDIRECT FIELD COSTS LABOR	1,419,800	-5.0%	1,348,810	50.0%	2,129,700	U		9%
24	INDIRECT FIELD COSTS S/C	667,000	-5.0%	633,650	100.0%	1,334,000	U		5%
25	INDIRECT FIELD COSTS MAT'L	1,696,600	-5.0%	1,611,770	50.0%	2,544,900	U		9%
26	FIELD SUPPORT COSTS LABOR	1,604,800	-10.0%	1,444,320	30.0%	2,086,240	U		25%
27	FIELD SUPPORT COSTS S/C	3,429,100	-5.0%	3,257,645	30.0%	4,457,830	U		14%
28	ENGINEERING COSTS	4,351,500	-5.0%	4,133,925	25.0%	5,439,375	U		17%
29	SALES TAX MAT'L	205,600	-1.0%	203,544	1.0%	207,656	U		50%
30				0		0	U		0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$17,306,500		$16,400,096		$25,122,135			


DISTRIBUTION OF 2,000 SAMPLES
ALT. 6B, SWL- ON-SITE DISPOSAL W/OFF-SITE > WAC
FREQUENCY
250
200
150
100
50
0
$18,495
$18,899
$19,303
$19,707
$20,111
$20,515
$20,919
$21,323
$21,727
$22,131
$22,535
$22,939
$23,343
PROJECT COST ($THOUSANDS)
AVERAGE
$20,749,298

001683

586F



BASE ESTIMATE:
$17,306,500

001684

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B – SWL – ONSITE DISPOSAL w/OFF-SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940721
DATE: 08/18/94
BY: KEN KEPLER
TASK # : 2CSW

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$17,306,500	BASE EST:	$80,670	BASE EST:	$16,500	BASE EST:	$147,830	BASE EST:	$8,530	BASE EST:	$32,870	BASE EST:	$8,860
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	30%					–1%	30%				
MATERIAL PRICING			–5%	30%	–5%	20%			–5%	30%	–5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							–1%	50%	–1%	50%	–1%	40%
(OTHER)												
TOTAL %	–5%	30%	–5%	30%	–5%	20%	–2%	80%	–6%	80%	–6%	60%
TOTAL $	$76,637	$104,871	$15,675	$21,450	$140,439	$177,396	$8,359	$15,354	$30,898	$59,166	$8,328	$14,176

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001685

F-7-258

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–6B – SWL – ONSITE DISPOSAL w/OFF–SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940721
DATE: 08/18/94
BY: KEN KEPLER
TASK # : 2CSW

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$25,100	BASE EST:	$0	BASE EST:	$51,470	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%										
MATERIAL PRICING					–5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–5%	50%	0%	0%	–5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$23,845	$37,650	$0	$0	$48,897	$66,911	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–6B – SWL – ONSITE DISPOSAL w/OFF–SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940721
DATE: 08/18/94
BY: KEN KEPLER
TASK # : 2CSW

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001687

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B – SWL – ONSITE DISPOSAL w/OFF-SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940721
DATE: 08/18/94
BY: KEN KEPLER
TASK # : 2CSW

	EXCAVATE & LOAD TO ON-SITE DISPOSAL LABOR $'s		EXCAVATE & LOAD TO ON-SITE DISPOSAL S/C $'s		EXCAVATE & LOAD TO ON-SITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$431,780	BASE EST:	$0	BASE EST:	$0	BASE EST:	$450,650	BASE EST:	$562,360	BASE EST:	$879,100
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	100%					-1%	75%	-1%	25%		
MATERIAL PRICING											-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%							-1%	50%	-1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-2%	150%	0%	0%	0%	0%	-1%	75%	-2%	75%	-6%	70%
TOTAL $	$423,144	$1,079,450	$0	$0	$0	$0	$446,144	$788,638	$551,113	$984,130	$826,354	$1,494,470

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B – SWL – ONSITE DISPOSAL w/OFF-SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940721
DATE: 08/18/94
BY: KEN KEPLER
TASK # : 2CSW

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		DIKE LABOR $'s		DIKE S/C $'s		DIKE MAT'L. $'s	
	BASE EST:	$102,920	BASE EST:	$118,530	BASE EST:	$322,390	BASE EST:	$77,470	BASE EST:	$26,360	BASE EST:	$148,450
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–5%	75%				
MATERIAL PRICING			–5%	50%	–5%	30%			–5%	75%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	25%	–1%	30%	–1%	25%	–1%	50%	–1%	50%	–1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	75%	–6%	80%	–6%	55%	–6%	125%	–6%	125%	–6%	80%
TOTAL $	$96,745	$180,110	$111,418	$213,354	$303,047	$499,705	$72,822	$174,308	$24,778	$59,310	$139,543	$267,210

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001689

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–6B – SWL – ONSITE DISPOSAL w/OFF–SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940721
DATE: 08/18/94
BY: KEN KEPLER
TASK # : 2CSW

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$58,780	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							–5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	–5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$55,841	$88,170	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001650
5861
F-7-263
FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B – SWL – ONSITE DISPOSAL w/OFF-SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940721
DATE: 08/18/94
BY: KEN KEPLER
TASK # : 2CSW

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$65,590	BASE EST:	$0	BASE EST:	$146,490	BASE EST:	$0	BASE EST:	$169,400	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$62,311	$85,267	$0	$0	$139,166	$190,437	$0	$0	$160,930	$254,100	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001691

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B – SWL – ONSITE DISPOSAL w/OFF-SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940721
DATE: 08/18/94
BY: KEN KEPLER
TASK # : 2CSW

	INDIRECT FIELD COSTS LABOR $'s		INDIRECT FIELD COSTS S/C $'s		INDIRECT FIELD COSTS MAT'L. $'s		FERMCO FIELD SUPPORT COSTS LABOR $'s		FERMCO FIELD SUPPORT COSTS S/C $'s		FERMCO FIELD SUPPORT COSTS MAT'L. $'s	
	BASE EST:	$1,419,800	BASE EST:	$667,000	BASE EST:	$1,696,600	BASE EST:	$1,604,800	BASE EST:	$3,429,100	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-10%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-5%	30%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-10%	30%	-5%	30%	0%	0%
TOTAL $	$1,348,810	$2,129,700	$633,650	$1,334,000	$1,611,770	$2,544,900	$1,444,320	$2,086,240	$3,257,645	$4,457,830	$0	$0
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B – SWL – ONSITE DISPOSAL w/OFF-SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.1

COST IMPACT MATRIX

EST. NO: C2940721
DATE: 08/18/94
BY: KEN KEPLER
TASK # : 2CSW

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$4,351,500	BASE EST:	$205,600	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			–1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	–5%	25%										
(OTHER)												
TOTAL %	–5%	25%	–1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$4,133,925	$5,439,375	$203,544	$207,656	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

5861

LCC ANALYSIS TITLE:	LSP - EXC. & ON-SITE DISP. W/OFF-SITE DISP. OF FRACTION EXCEEDING WAC (RESIDENT FARMER)			
WBS NO.:	1.1.1.1.2.3.3		TASK NO.:	2CLS
ALTERNATIVE:	6B		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	35 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	09-Aug-94
DOCUMENT NO.:	LCC-94-03-02	EST. NO. C2-94-07-22 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$4,938,225	$0	$0	$4,938,200	1997
$14,814,675	$0	$0	$14,814,700	1998
$0	$218,901	$0	$218,900	1999
$0	$197,472	$0	$197,500	2000
$0	$197,472	$0	$197,500	2001
$0	$197,472	$0	$197,500	2002
$0	$217,472	$0	$217,500	2003
$0	$120,472	$0	$120,500	2004
$0	$120,472	$0	$120,500	2005
$0	$120,472	$0	$120,500	2006
$0	$120,472	$0	$120,500	2007
$0	$140,472	$0	$140,500	2008
$0	$120,472	$0	$120,500	2009
$0	$120,472	$0	$120,500	2010
$0	$120,472	$0	$120,500	2011
$0	$120,472	$0	$120,500	2012
$0	$140,472	$0	$140,500	2013
$0	$120,472	$0	$120,500	2014
$0	$120,472	$0	$120,500	2015
$0	$120,472	$0	$120,500	2016
$0	$120,472	$0	$120,500	2017
$0	$140,472	$0	$140,500	2018
$0	$120,472	$0	$120,500	2019
$0	$120,472	$0	$120,500	2020
$0	$120,472	$0	$120,500	2021
$0	$120,472	$0	$120,500	2022
$0	$140,472	$0	$140,500	2023
$0	$120,472	$0	$120,500	2024
$0	$120,472	$0	$120,500	2025
$0	$120,472	$0	$120,500	2026
$0	$120,472	$0	$120,500	2027
$0	$140,472	$0	$140,500	2028
				2029
				2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$19,752,900	$4,140,600	$0	$23,894,300	TOTAL
$17,811,000	$2,574,500	$0	$20,385,900	<====(@NPV)

001694

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ESTIMATING SERVICES

SUMMARY SHEET

EST FILE #: C2940722
CLIENT: US DOE
PROJECT TITLE: ALT-6B - LSP - ON-SITE DISPOSAL w/OFF-SITE > WAC
WBS#: 1.1.1.1.2.3.3 RESIDENT FARMER

DATE: 09-Aug-94
ESTIMATOR: KEN KEPLER
LOCATION: FERNALD
TASK#: 2CLS

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL COMPOSITE LINER, CAP, DIKE	77,180		$1,316,200	$792,100	$1,816,000	$3,924,300
2		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		77,180		$1,316,200	$792,100	$1,816,000	$3,924,300
11	SUPERVISION - CONTRACTOR				$224,000			$224,000
12	SM TOOLS/CONSM'BLS						$79,000	$79,000
13	EQUIPMENT RENTAL						$1,585,500	$1,585,500
14	TEMP. FACILITIES				$27,600		$51,300	$78,900
15	TEMP UTL'S HOOK-UP				$13,800		$25,700	$39,500
16	JOB CLEAN-UP				$27,600		$51,300	$78,900
17	SAFETY				$13,800		$25,700	$39,500
18	HEALTH PHYSICS S/C				$185,600			$185,600
19	CERCLA/SAT	$1,500 PER PERSON				$58,500		$58,500
20	BOND					$39,200		$39,200
21	OVERHEAD & PROFIT					$570,000		$570,000
22	PAYRL BRD.&BENFT.				$940,500			$940,500
	INDIRECT FIELD COSTS				$1,432,900	$667,700	$1,818,500	$3,919,100
	DIRECT & INDIRECT FIELD COSTS				$2,749,100	$1,459,800	$3,634,500	$7,843,400
23	TRANSPORTATION & BURIAL	N/A						
24	WASTE CONTAINERS	N/A						
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$10,500		$10,500
25	SCREENING & CONFIRMATION TESTING					$2,827,700		$2,827,700
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$1,435,300			$1,435,300
	FERMCO FIELD SUPPORT COSTS				$1,435,300	$2,838,200		$4,273,500
28	EMISSION MODELING				$13,700		$25,500	$39,200
29	PSAR/FSAR(SAFETY RPT)				$219,600			$219,600
30	ENGINEERING	TITLE I&II $1,090,200 TITLE III	$1,027,500	CDR	$376,500	DCR	$282,400	$2,776,600
	ENGINEERING COSTS							$3,035,400
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$3,660,000	$219,600
	SUB-TOTAL	(BASE ESTIMATE)						$15,371,900
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	21.5%						$3,305,000
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$18,676,900
35	CONTINGENCY	7.0%						$1,076,000

PRELIMINARY

TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY) **$19,752,900**

LOTUS31\FS2\ALT6B\LSP\INDSUM.WK3 - FEASABILITY STUDY

Alternative 6 – Excavation and On-Site Disposal with Off-Site Disposal of Fraction Exceeding WAC (Resident Farmer)

Lime Sludge Ponds

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Long Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Well Inspect & Maint.	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	1	1	5	sample	$5,500.00	28	NA	$154,000	One fifth x (33 wells x 4 samples/year plus 8 leachate samples/year)
Long Term	1	6	30	sample	$5,500.00	14	NA	$77,000	One fifth x (33 wells x 2 samples/year plus 4 leachate samples/year)
Well Inspect & Maint.	1	1	30	well	$388.14	1.65	2.13	$826	One fifth x (inspection of 26 wells twice/year & repair 1 out of 8)
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
OU2 Waste Cell Leachate									
Pipeline Maintenance	1	1	30	lump sum	$1,106.83	1	1.29	$1,428	Overall cost divided among 5 subunits.
Treatment & Disposal	1	1	30	gallon	0.01	86,000	NA	$860	Overall cost divided among 5 subunits.
Facility Maint. at Subunit									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Mowing	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Fence Repair	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	1	1	30	acre	$2,183.32	6.63	8.55	$18,673	Total divided among 5 subunits. (Incl. side slopes)
Mowing	1	1	30	acre	$1,861.92	8	10.32	$19,215	Total divided among 5 subunits
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.7	0.90	$1,780	Total divided among 5 subunits
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of OU2 Cell	5	5	30	Lump Sum	$20,000	1	NA	$20,000	Total divided among 5 subunits

Annual Costs, Year 1 (excluding facility review)	$218,901
Annual Costs, Years 2–5 (excluding facility review)	$197,472
Annual Costs, Years 6–30 (excluding facility review)	$120,472
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 D:

001696

8/2/94

5861

DATE: 08-Aug-94

PROJECT TITLE:
ALT-6B - LSP - ON-SITE DISPOSAL w/OFF-SITE > WAC
RESIDENT FARMER

WBS#:
1.1.1.1.2.3.3

HEALTH PHYSICS

EST.NO.: C2940722
EST. : KEN KEPLER
TASK I.D. :
2CLS

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY / MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	0	$0	C/B		
SUB-TOTAL		31.80	4		$0			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	0		$0	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	0		$0	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	0		$0	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	0		$0	C/B		
THERMO STRIPS	EA	50.00	0		$0	C/B		
SUB-TOTAL		327.21			$0			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$0			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

001697

DATE: 08-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940722

ALT-6B - LSP - ON-SITE DISPOSAL w/OFF-SITE > WAC

EST. : KEN KEPLER

WBS#: RESIDENT FARMER

TASK I.D. :

1.1.1.1.2.3.3

2CLS

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

5861

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	39	156	$16.97	$2,650		
ANNUAL PHYSICALS	1	3	39	117	$16.97	$1,990		
EXIT (TERMINATION) PHYSICALS	1	4	39	156	$16.97	$2,650		
SUB-TOTAL						$7,290		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	16	1	39	632	$16.97	$10,720		
YEARLY IN-VIVO	1	4	39	156	$16.97	$2,650		
EXIT (END OF PROJECT / TERMINATION)	1	4	39	156	$16.97	$2,650		
SUB-TOTAL						$16,020		

WORK DELAYS CAUSED BY MONITORING	5%				$1,623,000	$81,150		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$1,623,000	$81,150		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$185,600	$0	$185,600

001698

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE > WAC
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CLS

WBS NO. – 1.1.1.1.2.3.3
EST. NO. – C2940722
BY – K. KEPLER
DATE – 08/08/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25–Mar–94	01–Jun–97	30–Jan–98	30–Sep–98	16	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
46	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO. – 4[illegible]21 PRELIMINARY
CLIENT – U[illegible]EPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

CONTR.N[illegible] 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL w/OFF–SITE OPTION (RESIDENT FARMER)														
SITE PREPARATION	1	LS		4,232						$73,550	$15,000	$32,370	$93,230	$214,150
DECONTAMINATION FACILITIES/SERVICES	1	LS		427						$7,750	$29,880	$1,740	$8,050	$47,420
EROSION AND SEDIMENT CONTROLS	1	LS		1138						$21,300		$7,390	$20,320	$49,010
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE/SORT/DRY – OFFSITE DISPOSAL	N/A													N/A
LOAD/HAUL – OFF–SITE DISPOSAL	N/A													N/A
EXCAVATE–LOAD/HAUL TO ON–SITE DISPOSAL (SHRED/CRUSH)	1	LS		18360						$311,930		$285,680	$110,430	$708,040
COMPOSITE LINER	1	LS		19289						$328,580	$412,860	$438,810	$561,550	$1,741,800
COMPOSITE CAP	1	LS		4424						$75,070	$86,200	$108,580	$235,990	$505,840
DIKE FOR DISPOSAL CELL	1	LS		3738						$63,430	$19,170	$74,670	$115,260	$272,530
GENERATED WASTE REMOVAL	1	LS		3150						$53,440		$29,960		$83,400
SITE RESTORATION	1	LS		15406						$261,460		$462,160	$506,090	$1,229,710
MONITORING WELLS	1	LS									$157,000			$157,000
SUB–TOTAL (DIRECT FIELD COSTS)				70164						$1,196,510	$720,110	$1,441,360	$1,650,920	$5,008,900
TAKE–OFF ALLOWANCE 10%	1	LS		7,016						$119,650	$72,010	$144,140	$165,090	$500,890
TOTAL (DIRECT FIELD COSTS)	1	LS		77,180						$1,316,200	$792,100	$1,585,500	$1,816,000	$5,509,800

On–Site Disposal of LSP w/Off–site Option– SUMMARY

PAGE 1 of 18

F-7-273

FEMP-OU02-5 DRAFT August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 20% ARE COMMON TO ALL SUB–UNITS)														
(ITEMS @ 50% ARE COMMON TO SWL & LSP's)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	1500	LF	0.213	412	16.97				6.25	$6,990			$9,660	$16,650
c. Clear and Grub														
i. Remediation Site	4.00	AC	41.40	214	16.97			2575.00		$3,630		$10,610		$14,240
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas														
d. Dewatering														
i. Excavate Dewatering Trench	335	CY	0.50	216	16.97			1.49		$3,670		$510		$4,180
ii. Pump – w/4" Suction Hose	150	DAYS	3.00	581	16.97			19.55		$9,860		$3,020		$12,880
iv. HDPE Pipe to Sedimentation Tank	400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip	1	CY	4.00	5	16.97			100.00		$80		$100		$180
e. General Grading														
i. New Roads	4445	SY	0.001	6	16.97			0.07		$100		$320		$420
50% ii. Office/Parking Area 2222	1111	SY	0.010	14	16.97			0.32		$240		$370		$610
iii. Const.Equip.Decon.Pad Area 234	117	SY	0.010	2	16.97			0.32		$30		$40		$70
iv. Pers.Decon.Pad Area 14	7	SY	0.010		16.97			0.32						
v. Staging Area @ Sub–Unit 2845	1423	SY	0.010	18	16.97			0.32		$310		$470		$780
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	4445	SY	0.030	172	16.97			1.08	6.66	$2,920		$4,940	$30,490	$38,350
50% ii. Office/Parking – 8" Gravel W/ Geotext 2222	1111	SY	0.030	43	16.97			1.08	6.66	$730		$1,240	$7,620	$9,590
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc.Slab 2845	1423	SY	0.041	75	16.97			1.45	5.51	$1,270		$2,120	$8,070	$11,460
Concrete Slab 160 x 160' x 8"thk. 631	316	CY	4.07	1656	17.98			18.38	67.00	$29,770		$5,970	$21,770	$57,510
Concrete Curb – 2'h x 480 lf x 8" thk. 24	12	CY	15.30	237	17.98			69.08	275.90	$4,260		$850	$3,410	$8,520
HDPE Perf.Sub–grade Piping – 4" 500	250	LF	0.21	68	16.97			0.74	3.02	$1,150		$190	$780	$2,120
Epoxy Coating 2845	1423	SY	0.22	404	16.97			0.77	7.56	$6,860		$1,130	$11,080	$19,070
Backfill & Compact around Slab 183	92	ICY	0.086	10	16.97			1.38				$130		$130
Mob/Demob.Equip. 1	0.50	LS	2.00	1	16.97			184.00		$20		$90		$110
TOTAL (SITE PREPARATION)	1	LS		4,232						$73,550	$15,000	$32,370	$93,230	$214,150

Site Preparation Details

F-7-274
001701
FEMP-OU02-5 DRAFT August 24, 1994

CONTR.NO. – 4[illegible]21 PRELIMINARY
CLIENT – [illegible]EPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

CONTR.N[illegible] 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	50%														
a. Decon Trailer – Rental	39	20	MO					1500.00				$29,250			$29,250
	50%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	88	BCY	0.021	2	16.97			0.64		$30		$60		$90
ii. Sub–grade Prep.	167	84	SY	0.041	4	16.97		6.75	1.45	5.51	$70	$580	$120	$470	$1,240
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	8	SF	0.32	3	19.21			0.73	12.55	$60		$10	$100	$170
Metal Grating 2 ft wide x 25 lf	25	13	LF	0.53	9	19.21			1.86	46.67	$170		$20	$600	$790
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	20	CY	4.07	102	17.98			14.25	67.00	$1,830		$290	$1,350	$3,470
Decon Pad Trench – 2'x2'i.d.x 25lfx8	5	3	CY	28.22	91	17.98			98.77	202.30	$1,640		$250	$520	$2,410
Decon Pad Curb – 6" x 6" x 120 lf	5	3	CY	15.30	49	17.98			53.55	275.90	$880		$140	$710	$1,730
Pump Pad – 4' x 4' x 6" thk.	0.30	0.15	CY	10.64	2	17.98			37.24	97.20	$40		$10	$20	$70
Epoxy Coating	167	84	SY	0.22	24	17.00			0.77	7.56	$410		$70	$650	$1,130
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	1	EA	12.00	8	17.98			100.00	525.00	$140		$50	$270	$460
vi. HDPE Piping	100	50	LF	0.38	25	19.95			5.11	4.42	$500		$260	$230	$990
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	360	SF	0.04	17	16.97			0.03	1.55	$290		$10	$570	$870
4" x 4" x 9'–6" Wood Posts set in conc.	27	14	EA	0.480	8	16.97			1.68	5.75	$140		$20	$80	$240
viii. Air Diaphragm Pump 50 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$400	$630
ix. Suction and Discharge Piping	10	5	LF	0.11	1	19.95			0.39	0.84	$20				$20
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	2	LF	0.47	1	19.95			1.65	14.91	$20			$20	$40
x. Backfill & Compaction around concrete slab	BCY 258	155	ICY	0.086	17	16.97			1.38		$290		$220		$510
SUB–TOTAL (EQUIP. DECON. FACILITY)					373						$6,730	$29,830	$1,560	$5,990	$44,110

Equipment Decon. Facility Details

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001702

FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	50%														
i. Excavation – Structural	19	10	BCY	0.021		16.97			0.64				$10		$10
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	7	SY	0.041		16.97		6.75	1.45	5.51		$50	$10	$40	$100
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	2	SF	0.32	1	16.97			0.73	12.55	$20			$30	$50
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	1	CY	4.07	4	17.98			14.25	67.00	$70		$10	$50	$130
Decon Slab Sump – 2'x 2' x 3'	0.3	0.15	CY	31.84	6	17.98			111.44	250.70	$110		$20	$40	$170
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0.20	CY	15.30	4	17.98			53.55	275.90	$70		$10	$60	$140
Epoxy Coating	14	7	SY	0.22	2	17.00			0.77	7.56	$30		$10	$50	$90
v. Corrugated Fiberglass Splash Gua	132	66	SF	0.04	3	16.97			0.03	1.55	$50			$110	$160
4" x 4" x 9'–6" Wood Posts set in (	6	3	EA	0.480	2	16.97			1.68	5.75	$30		$10	$20	$60
vi. Pump 20 gpm	1	1	EA	15.00	10	19.95			52.50	800.00	$200		$30	$410	$640
vii. Clean Wtr.Strg.Tank W/Piping– 1!	1	1	LS	32.00	21	19.95			112.00	2500.00	$420		$60	$1,250	$1,730
viii. Backfill & Compaction around concrete slab	BCY 17	10	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		54						$1,020	$50	$180	$2,060	$3,310
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		427						$7,750	$29,880	$1,740	$8,050	$47,420

Personnel Decon.Facilities/Services Details

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FEMP-OU02-5 DRAFT
August 24, 1994

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001703

CONTR.NO.– 4[illegible]21
CLIENT – U[illegible]EPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	2000	LF	0.017	44	16.97			0.06	0.65	$750		$120	$1,340	$2,210
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	300	EA	0.24	93	16.97			1.53	1.35	$1,580		$470	$420	$2,470
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 300 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1200	LF	0.38	590	19.95			5.11	4.42	$11,770		$6,130	$5,300	$23,200
iv. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	1	EA	8.00	10	16.97			28.00	8300.00	$170		$30	$8,300	$8,500
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,138						$21,300		$7,390	$20,320	$49,010

001704

Erosion Control Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-7-277

CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

CONTR.NO. 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
LOAD & HAUL FOR ON–SITE DISPOSAL														
LIME SLUDGE PONDS														
Excavate and Load	81600	BCY	0.055	5790	16.97			1.17		$98,260		$98,340		$196,600
Excavate Additional Soil	8200	BCY	0.055	582	16.97			1.17		$9,880		$9,880		$19,760
Haul to Onsite Disposal Cell BCY														
– 12" thk. Cushion Layer 4187	5234	LCY	0.081	547	16.97			1.51		$9,280		$8,140		$17,420
– Impacted Fill 85613	107016	LCY	0.081	11182	16.97			1.51		$189,760		$166,440		$356,200
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load	N/A	BCY	0.055		16.97			1.17						
Haul to Onsite Disposal Cell BCY														
– Impacted Fill N/A		LCY	0.081		16.97			1.51						
			S/T											
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C		HRS	150%		16.97			1.51						
			S/T											
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)		MD												
(SHREDDING COMMON TO SWL, IFP & SF)														
Shredder/Crusher – Purchase/Install 33.3%	0.3	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY N/A														
Generated Waste BCY 5602														
Excavated Debris TONS														
(Percent of Gen.Waste to be Shredded) 25%														
Generated Waste TONS 3221														
TOTAL TONS 3221														
Operating Costs	54	HRS							25.75				$1,430	$1,430
(2) Operators	108	HRS	1.00	139	16.97					$2,360				$2,360
TOTAL (EXCAVATE– ON–SITE DISPOSAL)	1	LOT		18,360						$311,930		$285,680	$110,430	$708,040

Excavate Onsite Disposal Details

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00/1/05

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[redacted]21
CLIENT – U[redacted]EPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP.)															
a. Clear and Grubb	20%														
i. On–site Cell & Surrounding area	45	9.0	AC	41.40	481	16.97			2575.00		$8,160		$23,870		$32,030
b. Relocated South Access Road	20%														
i. Clear & Grub	3	0.6	AC	41.40	32	16.97			2575.00		$540		$1,590		$2,130
ii. General Grading	1467	293.4	SY	0.001					0.07				$20		$20
iii. Road – 8" Gravel W/Geotextile	7333	1466.6	SY	0.030	57	16.97			1.08	6.66	$970		$1,630	$10,060	$12,660
c. Haul Road	20%														
i. Clear & Grub	2.4	0.5	AC	41.40	26	16.97			2575.00		$440		$1,270		$1,710
ii. General Grading	11556	2311.2	SY	0.001	3	16.97			0.07		$50		$170		$220
iii. Road – 8" Gravel W/Geotextile	5778	1155.6	SY	0.030	45	16.97			1.08	6.66	$760		$1,290	$7,930	$9,980
	20%														
d. Temporary Construction Fencing	5200	1040.0	LF	0.213	286	16.97				6.25	$4,850			$6,700	$11,550
e. 20' wide Swing Gates	1	0.2	EA	25.60	7	16.97			340.00	560.00	$120		$70	$120	$310
f. Staging Area @ Cell	20%														
Area Excavation for Slab	1606	321.2	BCY	0.016	7	16.97			0.60		$120		$200		$320
Sub–Base for Slab	2845	569.0	SY	0.041	30	16.97		6.75	1.45	5.51	$510	$3,840	$850	$3,230	$8,430
HDPE Perf.Sub–grade Piping – 4"	500	100.0	LF	0.21	27	16.97			0.74	3.02	$460		$80	$310	$850
Concrete Slab – 160'x160'x8" thk	631	126.2	CY	4.07	663	17.98			14.25	67.00	$11,920		$1,850	$8,710	$22,480
Concrete Curb – 480'x2'x8" thk	24	4.8	CY	15.30	95	17.98			53.55	275.90	$1,710		$260	$1,360	$3,330
Epoxy Coating	2845	569.0	SY	0.22	161	16.97			0.77	7.56	$2,730		$450	$4,430	$7,610
Backfill & Compact around Slab	183	36.6	ICY	0.086	4	16.97			1.38				$50		$50
Mob/Demob.Equip.	1	0.2	LS	2.00	1	16.97			184.00		$20		$40		$60
g. Storage Area – 200' x 200' Asphalt Includes Compacted Sub–Grade	4444	889	SY	0.084	96	16.97			2.56	14.04	$1,630		$2,340	$12,850	$16,820
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat															
	20%														
h. Decon Trailer – Rental	51	10	MO					1500.00				$15,300			$15,300
i. Const.Equipment Decon. Facility 25 ft x 60 ft	20% 1	0.20	LS	730.00	146	18.05		1160.00	2900.00	11980.00	$2,640	$230	$580	$2,400	$5,850
j. Personnel Decon. Facility 11'x 11'	20% 1	0.20	LS	108.00	22	18.89		100.00	360.00	4120.00	$420	$20	$70	$820	$1,330
SUB–TOTAL (COMPOSITE LINER)		1	LOT		2189						$38,050	$19,390	$36,680	$58,920	$153,040

Composite Liner Details

F-7-279
FEMP-OU02-5 DRAFT August 24, 1994
001706
5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
ON–SITE DISPOSAL FACILITY														
COMPOSITE LINER														
(CON'T.)														
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.														
a. Subgrade Preparation – includes removal of top soil, grading & comp.	12688	SY	0.024	393	16.97			0.86		$6,670		$11,240		$17,910
b. 95% Clay – 5% Bentonite 36" Thk BCY 12688	14972	ICY	0.260	5022	16.97			11.19	20.35	$85,220		$172,560	$313,820	$571,600
c. Composite Clay Liner	12688	SY					7.38				$93,640			$93,640
d. HDPE Liner 60 mil	12688	SY					4.75				$60,270			$60,270
e. Geotextile Fabric	12688	SY					2.25				$28,550			$28,550
f. Pea Gravel 12" Thk; In–place BCY 4187	4501	ICY	0.11	639	16.97			0.77	17.00	$10,840		$3,570	$78,810	$93,220
g. Composite Clay Liner	12688	SY					7.38				$93,640			$93,640
h. HDPE Liner 60 mil	12688	SY					4.75				$60,270			$60,270
i. Geotextile Fabric	12688	SY					2.25				$28,550			$28,550
j. Pea Gravel 12" Thk; In–place BCY 4187	4501	ICY	0.11	639	16.97			0.77	17.00	$10,840		$3,570	$78,810	$93,220
k. Geotextile Fabric	12688	SY					2.25				$28,550			$28,550
l. HDPE Perforated Pipe – leachate collection 6" Dia.	960	LF	0.30	372	16.97			1.05	6.56	$6,310		$1,040	$6,490	$13,840
m. HDPE Perforated Pipe – leak detection 6" Dia.	960	LF	0.30	372	16.97			1.05	6.56	$6,310		$1,040	$6,490	$13,840
n. Leachate Discharge Piping														
i. HDPE Carrier & containment Pipe 6" x 10' Includes Trench Excav/Backfill, sand bedding and compaction.	420	LF	0.86	466	16.97			11.37	22.33	$7,910		$4,920	$9,660	$22,490
ii. HDPE Manhole – 4' dia. x 8' deep	1	EA	8.00	10	16.97			28.00	8300.00	530.00		$30	$8,550	$9,110
o. Impacted Fill–Cusion Layer 12" Thk BCY 4187	5234	LCY	0.06	405	16.97			1.67		$6,870		$9,000		$15,870
p. Impacted Fill–Spread and Compact BCY 85613	107016	LCY	0.06	8283	16.97			1.67		$140,560		$184,080		$324,640
q. Generated Waste BCY 5602	6442	LCY	0.06	499	16.97			1.67		$8,470		$11,080		$19,550
PPE LEVEL C Allowance is added to the foll														
r. Impacted fill BCY N/A		LCY	0.06					1.67						
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C		HRS	S/T											
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)		MD												
SUB–TOTAL (COMPOSITE LINER)	1	LOT		17,100						$290,530	$393,470	$402,130	$502,630	$1,588,760
TOTAL (COMPOSITE LINER)	1	LOT		19,289						$328,580	$412,860	$438,810	$561,550	$1,741,800

Composite Liner Details

F-7-280 001707

FEMP-OU02-5 DRAFT August 24, 1994

CONTR.NO. – 4[illegible]21
CLIENT – U[illegible]DEPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE CAP															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
COMPOSITE CAP															
a. Contouring Layer 18" Thk. liner	BCY 2631	3157	ICY	0.06	244	16.97			1.67	3.50	$4,140		$5,430	$11,380	$20,950
b. 95% Clay – 5% Bentonite 24" Thk	BCY 3526	4161	ICY	0.260	1395	16.97			11.19	20.35	$23,670		$47,950	$87,210	$158,830
c. GML\GCC – composite Liner		5263	SY					7.38				$38,840			$38,840
d. Geotextile Fabric		5263	SY					2.25				$11,840			$11,840
e. Pea gravel 12" Thk, In–place	BCY 1737	1867	ICY	0.11	265	16.97			0.77	17.00	$4,500		$1,480	$32,700	$38,680
f. Geotextile Fabric		5263	SY					2.25				$11,840			$11,840
g. Cobbels 36" Thk; In–place	BCY 5263	5658	ICY	0.258	1883	16.97			7.15	10.10	$31,950		$41,670	$58,860	$132,480
h. Geotextile Fabric		5263	SY					2.25				$11,840			$11,840
i. Sand Layer 6" Thk; In–place	BCY 895	962	ICY	0.052	65	16.97			1.76	5.00	$1,100		$1,740	$4,950	$7,790
j. Geotextile Fabric		5263	SY					2.25				$11,840			$11,840
k. Common Soil 21" Thk; In–place	BCY 2631	3157	ICY	0.06	244	16.97			1.67	3.50	$4,140		$5,430	$11,380	$20,950
l. Top Soil 6" Thk; In–place	BCY 895	1074	ICY	0.053	73	16.97			1.82	12.10	$1,240		$2,010	$13,390	$16,640
m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding	SY 5263	47	MSF	0.30	18	16.97			6.75	25.00	$310		$330	$1,210	$1,850
n. Security Fence – 8' tall w/ 3–strands wire 6ga. Aluminized		1080	LF	0.17	237	16.97			2.28	13.40	$4,020		$2,540	$14,910	$21,470
TOTAL (COMPOSITE CAP)		1	LOT		4,424						$75,070	$86,200	$108,580	$235,990	$505,840

Composite Details

F-7-281
FEMP-OU02-5 DRAFT
August 24, 1994
5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DIKE FOR DISPOSAL CELL															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
a. Borrow Common Soil – Dike	BCY 2931	3517	ICY	0.06	272	16.97			1.67	3.50	$4,620		$6,050	$12,680	$23,350
b. Geotextile Fabric		8520	SY					2.25				$19,170			$19,170
c. Cobbels 36" Thk; In–place	BCY 8520	9159	ICY	0.258	3048	16.97			7.15	10.10	$51,720		$67,450	$95,280	$214,450
d. HDPE Drainage Piping	6" Dia.	1080	LF	0.30	418	16.97			1.05	6.56	$7,090		$1,170	$7,300	$15,560
TOTAL (DIKE – DISPOSAL CELL)		1	LOT		3,738						$63,430	$19,170	$74,670	$115,260	$272,530

Dike Details

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007709
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[illegible]21
CLIENT – [illegible] DEPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL															
a. Office/Parking Area @ S/U	50%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	247	BCY	0.292	93	16.97			9.16		$1,580		$2,330		$3,910
Geo–Fabric & Liner	2222	1111	SY	0.002	3	16.97			0.02		$50		$20		$70
Haul & Dump Rubble	185	93	BCY	0.30	36	16.97			2.51		$610		$240		$850
b. Const.Equip.Decon Facil.@ S/U	50%														
Demo/Remove Concrete	49.3	25	BCY	1.2	38	16.97			3.62		$640		$90		$730
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	14	BCY	0.292	5	16.97			9.16		$80		$130		$210
Geo–Fabric & Liner	167	84	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	27	14	EA	0.48	8	16.97			1.68		$140		$20		$160
Splash Guard	702	351	SF	0.04	18	16.97			0.03		$310		$10		$320
Haul & Dump Rubble	24.9	12	BCY	0.30	5	16.97			2.51		$80		$30		$110
c. Personnel Decon. Facil. @ S/U	50%														
Demo/Remove Concrete	2.2	1	BCY	1.2	2	16.97			3.62		$30				$30
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292		16.97			9.16				$10		$10
Geo–Fabric & Liner	14	7	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	6	3	EA	0.48	2	16.97			1.68		$30		$10		$40
Splash Guard	132	66	SF	0.04	3	16.97			0.03		$50				$50
Haul & Dump Rubble	3.5	2	BCY	0.30	1	16.97			2.51		$20				$20
d. Staging pad @ S/U	50.0%														
Demo/Remove Concrete	655	328	BCY	1.2	507	16.97			3.62		$8,600		$1,220		$9,820
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	238	BCY	0.292	89	16.97			9.16		$1,510		$2,240		$3,750
Geo–Fabric & Liner 105 cy	2845	1423	SY	0.002	4	16.97			0.02		$70		$30		$100
Haul & Dump Rubble	395.5	198	BCY	0.30	77	16.97			2.51		$1,310		$510		$1,820
	20%														
e. Const.Equip.Decon.Facil. @ Onsite Disp.Cell															
Demo/Remove Concrete	49.3	10	BCY	1.2	15	16.97			3.62		$250		$40		$290
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	6	BCY	0.292	2	16.97			9.16		$30		$50		$80
Geo–Fabric & Liner	167	33	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	27	5	EA	0.48	3	16.97			1.68		$50		$10		$60
Splash Guard	702	140	SF	0.04	7	16.97			0.03		$120				$120
Haul & Dump Rubble	24.9	5	BCY	0.30	2	16.97			2.51		$30		$10		$40
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		920						$15,590		$7,000		$22,590

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL (CON'T.)															
Demo. /Load/Haul/Dump/Compact															
	20.0%														
f. Personnel Decon. Facil.@ Onsite Disp. Cell															
Demo/Remove Concrete	2.2	0.44	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	0.48	BCY	0.292		16.97			9.16						
Geo–Fabric & Liner	14	2.80	SY	0.002		16.97			0.02						
Posts – 4" x 4" x 9'–6"	6	1.20	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	26.40	SF	0.04	1	16.97			0.03		$20				$20
Haul & Dump Rubble	3.5	0.70	BCY	0.30		16.97			2.51						
	20.0%														
g. Relocated South Access Road/Cell	SY														
Road – 8" Gravel W/Geotextile	7333	1467	BCY	0.292	552	16.97			9.16		$9,370		$13,840		$23,210
Haul & Dump Rubble		1467	BCY	0.30	568	16.97			2.51		$9,640		$3,790		$13,430
	20.0%														
h. Haul Road for Cell	SY														
Road – 8" Gravel W/Geotextile	5778	257	BCY	0.292	97	16.97			1.08		$1,650		$290		$1,940
Haul & Dump Rubble		257	BCY	0.30	99	16.97			2.51		$1,680		$660		$2,340
	20.0%														
i. Temporary Construction Fencing @ Cell	5200	1040	LF	0.107	143	16.97					$2,430				$2,430
Haul & Dump Rubble		135	BCY	0.30	52	16.97			2.51		$880		$350		$1,230
	20.0%														
j. 20' wide Swing Gates @ Cell	2	0.40	EA	12.75	7	16.97			340.00		$120		$140		$260
Haul & Dump Rubble		0.05	BCY	0.30		16.97			2.51						
	20.0%														
k. Storage Pad Area @ Cell	BCY														
Demo/Remove Asphalt	988	197.60	BCY	1.2	306	16.97			3.62		$5,190		$740		$5,930
Excav., Load, Haul, Backfill, Compac	474.0	94.80	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Sub–grade Stone															
Geo–Fabric & Liner	4444	888.80	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble		197.0	BCY	0.30	76	16.97			2.51		$1,290		$510		$1,800
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,941						$32,950		$21,230		$54,180

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Generated Waste Removal Details

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F-7-284

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[illegible]21 PRELIMINARY CONTR.N[illegible] 4424317
CLIENT – U[illegible]EPT. OF ENERGY EST. NO. C2940722
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER BY: KEN KEPLER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS DATE: 08/08/94
PROJ.CTL. – CRU–2 TASK I.D.: 2CSW
WBS NO. – 1.1.1.1.2.3.1

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL CELL (CON'T.) Demo. /Load/Haul/Dump/Compact															
The following prorated at:	20.0%														
I. Staging Area @ On–Site Disposal Cell															
Demo/Remove Concrete	655	131.0	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	475	95.0	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo–Fabric & Liner 105 cy	2845	569.0	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	395.5	126.0	BCY	0.30	49	16.97			2.51		$830		$330		$1,160
TOTAL GENERATED WASTE	BCY 5602 LCY 6442														
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		289						$4,900		$1,730		$6,630
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		3,150						$53,440		$29,960		$83,400

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-7-285

001712

5861

CONTR.NO.– 4424321 PRELIMINARY
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

CONTR.NO. 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
Lime Sludge Ponds	98600	118320	ICY	0.09	13737	16.97			3.21	3.50	$233,120		$391,200	$426,540	$1,050,860
	50%														
Office/Parking @ S/U	494	296	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	47	ICY												
Decon.Facil.– Personnel @ S/U	7	4	ICY												
Staging Area @ S/U	1099	659	ICY												
	S/T	1006.8	ICY	0.09	117	16.97			3.21	3.50	$1,990		$3,330	$3,630	$8,950
	20%														
Staging Area at On–Site Disp.Cell	1099	264	ICY												
Storage Area at On–Site Disp.Cell	474	114	ICY												
Decon.Facil.– Const.Equip.@ Cell	78	19	ICY												
Decon.Facil.– Personnel @ Cell	7	2	ICY												
Relocated South Access Road	1628	391	ICY												
Haul Road	1283	308	ICY												
	S/T	1096.6	ICY	0.09	127	16.97			3.21	3.50	$2,160		$3,630	$3,950	$9,740
b. Final Grade for LSP (Excludes Cap)		11667	SY	0.02	301	16.97			0.70		$5,110		$8,410		$13,520
c. Borrow Top Soil 6" Thk., Spread															
Lime Sludge Ponds		11667	SY	0.036	542	16.97			2.33	2.88	$9,200		$28,000	$34,610	$71,810
	50%														
Office/Parking @ S/U	2222	1333	SY												
Decon.Facil.– Const.Equip. @ S/U	167	100	SY												
Decon.Facil.– Personnel @ S/U	14	8	SY												
Staging Area @ S/U	2845	1423	SY												
	S/T	2864.3	SY	0.036	133	16.97			2.33	2.88	$2,260		$6,870	$8,500	$17,630
	20%														
Staging Area at On–Site Disp.Cell	2845	683	SY												
Storage Area at On–Site Disp.Cell	4444	1067	SY												
Decon.Facil.– Const.Equip.@ Cell	167	40	SY												
Decon.Facil.– Personnel @ Cell	14	3	SY												
Relocated South Access Road	14667	3520	SY												
Haul Road	11556	2773	SY												
	S/T	8086.3	SY	0.036	376	16.97			2.33	2.88	$6,380		$19,410	$23,990	$49,780
(SUB–TOTAL SITE RESTORATION)		1	LOT		15,333						$260,220		$460,850	$501,220	$1,222,290

Site Restoration Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-7-286

001713

CONTR.NO.– 4[illegible]21 PRELIMINARY
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

CONTR.N[illegible] 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Lime Sludge Ponds	11667	105	MSF	0.30	41	16.97			6.75	25.00	$700		$730	$2,700	$4,130
	50%														
Office/Parking @ S/U	2222	10	MSF												
Decon.Facil.– Const.Equip. @ S/U	167	0.75	MSF												
Decon.Facil.– Personnel @ S/U	14	0.06	MSF												
Staging Area @ S/U	2845	12.8	MSF												
	S/T	23.6	MSF	0.30	9	16.97			6.75	25.00	$150		$160	$610	$920
	20%														
Staging Area at On–Site Disp.Cell	2845	5.12	MSF												
Storage Area at On–Site Disp.Cell	4444	8.00	MSF												
Decon.Facil.– Const.Equip.@ Cell	167	0.30	MSF												
Decon.Facil.– Personnel @ Cell	14	0.03	MSF												
Relocated South Access Road	14667	26.40	MSF												
Haul Road	11556	20.8	MSF												
	S/T	60.7	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,560	$2,370
(SUB–TOTAL SITE RESTORATION)		1	LOT		73						$1,240		$1,310	$4,870	$7,420
(TOTAL SITE RESTORATION)		1	LOT		15,406						$261,460		$462,160	$506,090	$1,229,710

001714

F-7-287

Site Restoration Details

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FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D. 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility MW 1 Pair x 120 ft/pair	4	PR					23000.00				$92,000			$92,000
b. Abandon Existing Wells at LSP's	5	EA					13000.00				$65,000			$65,000
TOTAL (MONITORING WELLS)	1	LOT									$157,000			$157,000

001715

F-7-288

Monitoring Wells Details

CONTR.NO.– 4[illegible]21
CLIENT – [illegible]EPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT				LABOR	S/C	EQUIP.	MATERIAL	TOTAL
			UNIT	TOTAL	RATE	LABOR	SUB	EQUIP.	MAT'L					
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	50000	GAL					0.01				$500			$500
Runnoff from the Exclusion Zone.	1000000	GAL					0.01				$10,000			$10,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$10,500			$10,500

Waste Water Treatment Operations Cost Details

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F-7-289

FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – LSP – ON–SITE DISPOSAL w/OFF–SITE DISPOSAL > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.1

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424317
EST. NO. C2940722
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D. 2CSW

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATORY TESTING														
Excavation														
Full TCLP	449	EA					2,002				$898,900			$898,900
Rad	449	EA					2,000				$898,000			$898,000
Confirmatory tests														
Full Rad Test	225	EA					3,101				$697,700			$697,700
Full HSL	50	EA					1,500				$75,000			$75,000
Full TCLP	50	EA					2,002				$100,100			$100,100
2 Technicians per month	12	MO					13,163				$158,000			$158,000
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING/CONFIRMATORY TESTS)	1	LOT									$2,827,700			$2,827,700

001717

F-7-290

Screening & Confirmatory Testing Details

PAGE 18 of 19

FEMP-OU02-5 DRAFT
August 2, 1994

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 6B, LSP – ON–SITE DISPOSAL W/OFF–SITE > WAC
CLIENT: DOE DATE: 09–Aug–94
CONTRACT: C2–94–07–22 BASE ESTIMATE: $15,371,900

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$22,945,367	$7,573,467	49.3%
0.05%	$20,780,286	$5,408,386	35.2%
5.00%	$19,821,084	$4,449,184	28.9%
10.00%	$19,572,250	$4,200,350	27.3%
15.00%	$19,408,170	$4,036,270	26.3%
20.00%	$19,281,524	$3,909,624	25.4%
25.00%	$19,172,621	$3,800,721	24.7%
30.00%	$19,072,291	$3,700,391	24.1%
35.00%	$18,971,324	$3,599,424	23.4%
40.00%	$18,889,802	$3,517,902	22.9%
45.00%	$18,797,992	$3,426,092	22.3%
50.00%	$18,705,199	$3,333,299	21.7%
55.00%	$18,640,720	$3,268,820	21.3%
60.00%	$18,548,711	$3,176,811	20.7%
65.00%	$18,474,173	$3,102,273	20.2%
70.00%	$18,380,298	$3,008,398	19.6%
75.00%	$18,287,594	$2,915,694	19.0%
80.00%	$18,184,499	$2,812,599	18.3%
85.00%	$18,045,702	$2,673,802	17.4%
90.00%	$17,864,573	$2,492,673	16.2%
95.00%	$17,671,151	$2,299,251	15.0%
99.95%	$16,870,766	$1,498,866	9.8%
100.00%	$14,515,147	($856,753)	–5.6%

FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

PROJECT: ALT. 6B, LSP – ON-SITE DISPOSAL W/OFF-SITE > WAC
CLIENT: DOE
CONTRACT: C2-94-07-22

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$80,910	-6.0%	$76,055	60%	$129,456	U		9%
2	SITE PREPERATION S/C	16,500	-6.0%	15,510	55%	25,575	U		10%
3	SITE PREPERATION MAT'L	102,550	-6.0%	96,397	60%	164,080	U		9%
4	DECON FACILITIES/SERVICES LABOR	8,530	-2.0%	8,359	80%	15,354	U		2%
5	DECON FACILITIES/SERVICES S/C	32,870	-6.0%	30,898	80%	59,166	U		7%
6	DECON FACILITIES/SERVICES MAT'L	8,860	-6.0%	8,328	60%	14,176	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	23,430	-6.0%	22,024	80%	42,174	U		7%
8	EROSION/SEDIMENT CNTRLS MAT'L	22,350	-6.0%	21,009	60%	35,760	U		9%
9	EXC/NO TREAT ON-SITE DISP LABOR	343,120	-2.0%	336,258	125.0%	772,020	U		2%
10	EXC/NO TREAT ON-SITE DISP MAT'L	121,470	-6.0%	114,182	80.0%	218,646	U		7%
11	COMPOSITE LINER LABOR	361,440	-6.0%	339,754	100%	722,880	U		6%
12	COMPOSITE LINER S/C	454,150	-6.0%	426,901	100%	908,300	U		6%
13	COMPOSITE LINER MAT'L	617,690	-6.0%	580,629	80.0%	1,111,842	U		7%
14	COMPOSITE CAP LABOR	82,580	-6.0%	77,625	100.0%	165,160	U		6%
15	COMPOSITE CAP S/C	94,820	-6.0%	89,131	80.0%	170,676	U		7%
16	COMPOSITE CAP MAT'L	259,590	-6.0%	244,015	80.0%	467,262	U		7%
17	DIKE LABOR	69,770	-6.0%	65,584	100.0%	139,540	U		6%
18	DIKE S/C	21,090	-6.0%	19,825	80.0%	37,962	U		7%
19	DIKE MAT'L	126,790	-6.0%	119,183	80.0%	228,222	U		7%
20	GENERATED WASTE REMVL LABOR	58,780	-6.0%	55,253	80.0%	105,804	U		7%
21	SITE RESTORATION LABOR	287,610	-6.0%	270,353	60.0%	460,176	U		9%
22	SITE RESTORATION MAT'L	556,700	-6.0%	523,298	60.0%	890,720	U		9%
23	MONITORING WELLS S/C	172,700	-6.0%	162,338	60.0%	276,320	U		9%
24	INDIRECT FIELD COSTS LABOR	1,432,900	-5.0%	1,361,255	50.0%	2,149,350	U		9%
25	INDIRECT FIELD COSTS S/C	667,700	-5.0%	634,315	100.0%	1,335,400	U		5%
26	INDIRECT FIELD COSTS MAT'L	1,818,500	-5.0%	1,727,575	50.0%	2,727,750	U		9%
27	FIELD SUPPORT COSTS LABOR	1,435,300	-10.0%	1,291,770	30.0%	1,865,890	U		25%
28	FIELD SUPPORT COSTS S/C	2,838,200	-5.0%	2,696,290	30.0%	3,689,660	U		14%
29	ENGINEERING COSTS	3,035,400	-5.0%	2,883,630	25.0%	3,794,250	U		17%
30	SALES TAX MAT'L	219,600	-1.0%	217,404	1.0%	221,796	U		50%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$15,371,900		$14,515,147		$22,945,367			

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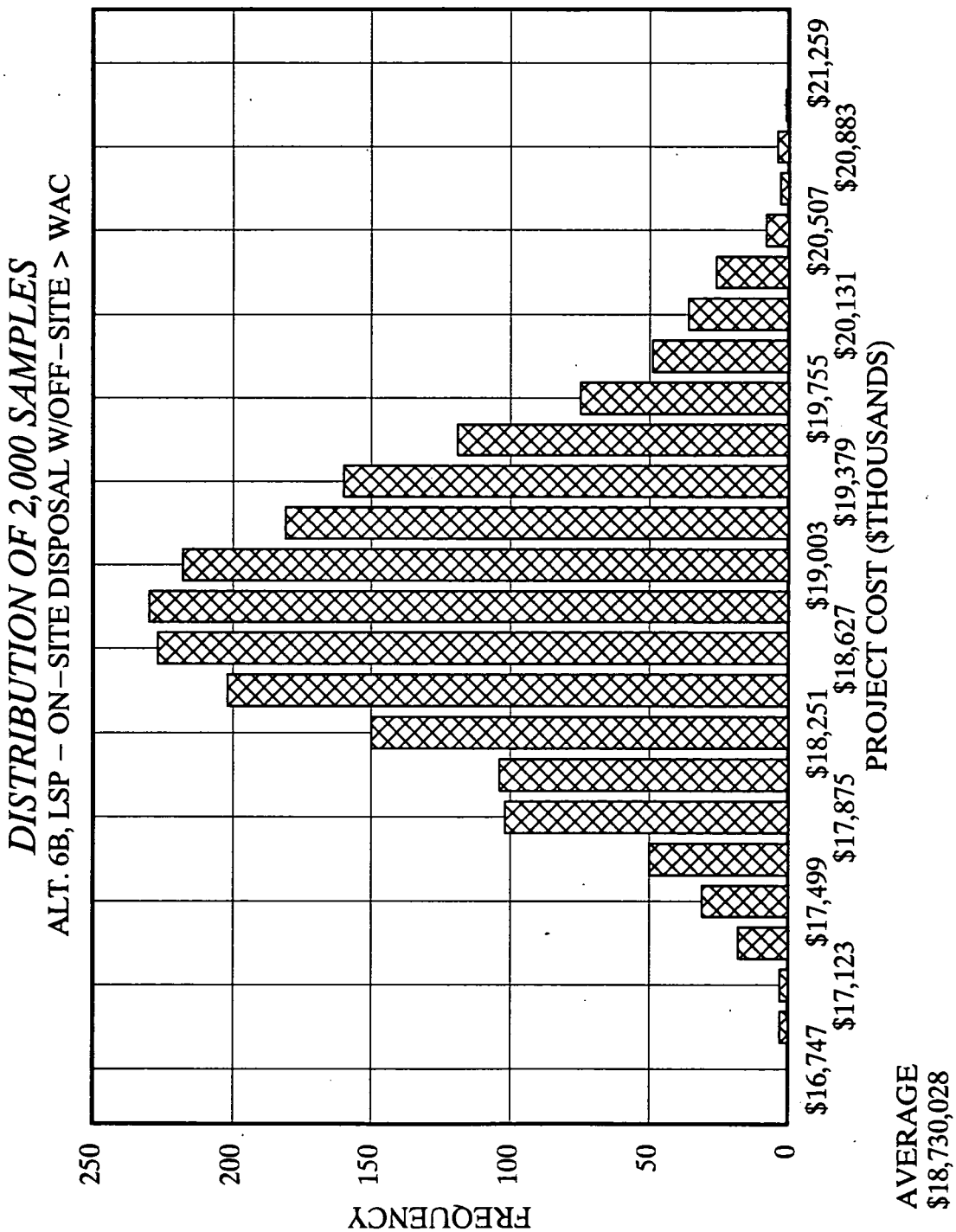
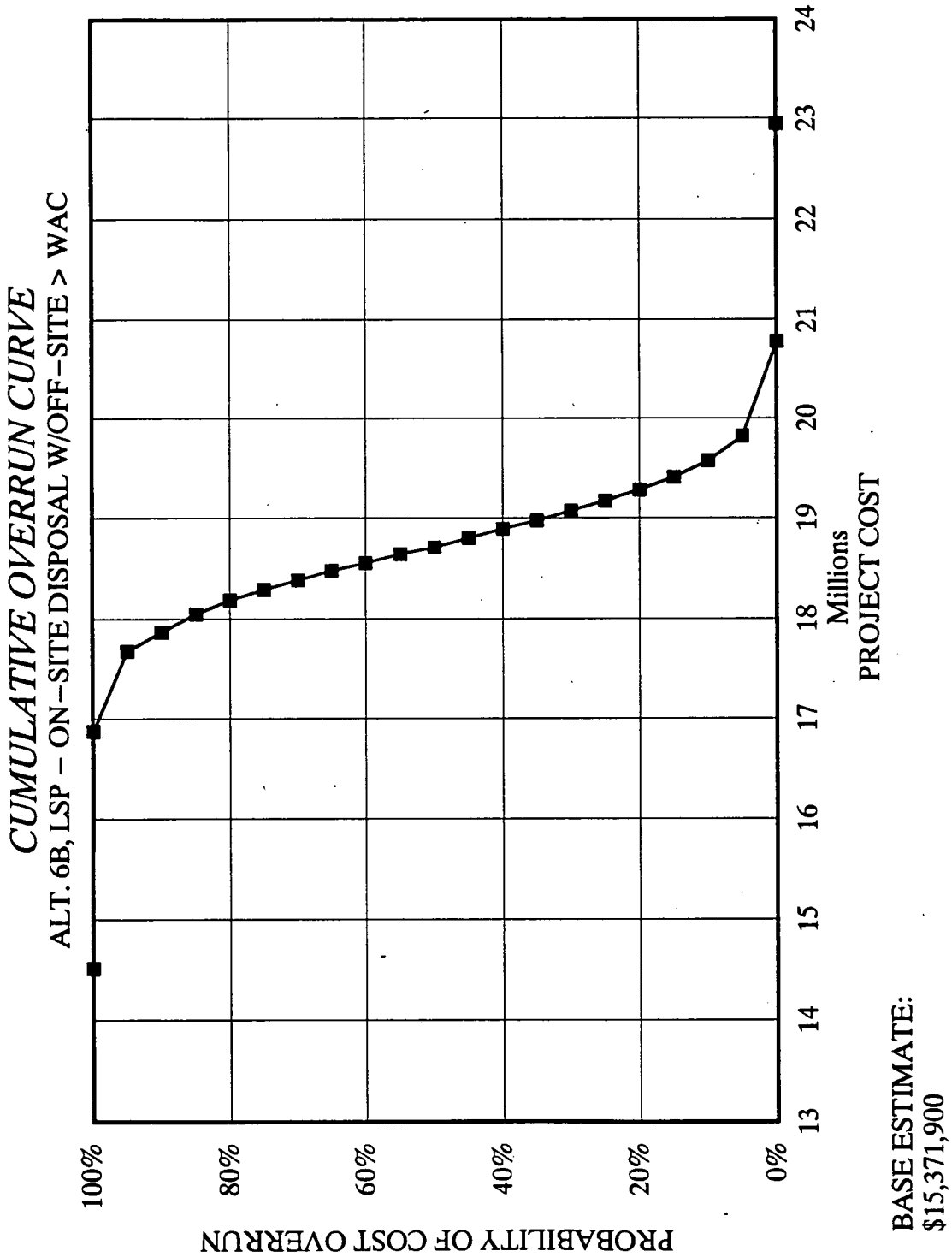

DISTRIBUTION OF 2,000 SAMPLES
ALT. 6B, LSP – ON–SITE DISPOSAL W/OFF–SITE > WAC
FREQUENCY
250
200
150
100
50
0
$16,747
$17,123
$17,499
$17,875
$18,251
$18,627
$19,003
$19,379
$19,755
$20,131
$20,507
$20,883
$21,259
PROJECT COST ($THOUSANDS)
AVERAGE
$18,730,028

001720



BASE ESTIMATE:
$15,371,900

001721

LCC ANALYSIS TITLE:	IFP - EXCAVATE & ON-SITE DISP. W/OFF-SITE OF FRACTION EXCEEDING WAC - (RESIDENT FARMER)			5861
WBS NO.:	1.1.1.1.2.3.5		TASK NO.:	2CNF
ALTERNATIVE:	6B		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	37 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	09-Aug-94
DOCUMENT NO.:	LCC-94-03-04	EST. NO. C2-94-07-23 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$0	$0	$0	$0	1997
$9,187,912	$0	$0	$9,187,900	1998
$10,023,176	$0	$0	$10,023,200	1999
$9,187,912	$0	$0	$9,187,900	2000
$0	$218,901	$0	$218,900	2001
$0	$197,472	$0	$197,500	2002
$0	$197,472	$0	$197,500	2003
$0	$197,472	$0	$197,500	2004
$0	$217,472	$0	$217,500	2005
$0	$120,472	$0	$120,500	2006
$0	$120,472	$0	$120,500	2007
$0	$120,472	$0	$120,500	2008
$0	$120,472	$0	$120,500	2009
$0	$140,472	$0	$140,500	2010
$0	$120,472	$0	$120,500	2011
$0	$120,472	$0	$120,500	2012
$0	$120,472	$0	$120,500	2013
$0	$120,472	$0	$120,500	2014
$0	$140,472	$0	$140,500	2015
$0	$120,472	$0	$120,500	2016
$0	$120,472	$0	$120,500	2017
$0	$120,472	$0	$120,500	2018
$0	$120,472	$0	$120,500	2019
$0	$140,472	$0	$140,500	2020
$0	$120,472	$0	$120,500	2021
$0	$120,472	$0	$120,500	2022
$0	$120,472	$0	$120,500	2023
$0	$120,472	$0	$120,500	2024
$0	$140,472	$0	$140,500	2025
$0	$120,472	$0	$120,500	2026
$0	$120,472	$0	$120,500	2027
$0	$120,472	$0	$120,500	2028
$0	$120,472	$0	$120,500	2029
$0	$140,472	$0	$140,500	2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$28,399,000	$4,140,600	$0	$32,540,400	TOTAL
$24,742,600	$2,436,100	$0	$27,179,100	<====(@NPV)

F ERMC O
ESTIMATING SERVICES

SUMMARY SHEET

EST FILE #: C2940723
CLIENT: USDOE
PROJECT TITLE: ALT-6B - IFP - ON-SITE DISPOSAL w/OFF-SITE > WAC
WBS#: 1.1.1.1.2.3.5 RESIDENT FARMER

DATE: 09-Aug-94
ESTIMATOR: KEN KEPLER
LOCATION: FERNALD
TASK#: 2CNF

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL	81,947		$1,396,400	$837,000	$1,790,000	$4,023,400
2		SHRED/CRUSH - COMPOSITE LINER, CAP, DIKE (SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		81,947		$1,396,400	$837,000	$1,790,000	$4,023,400
11	SUPERVISION - CONTRACTOR				$237,000			$237,000
12	SM TOOLS/CONSM'BLS						$83,800	$83,800
13	EQUIPMENT RENTAL						$1,580,200	$1,580,200
14	TEMP. FACILITIES				$29,300		$54,500	$83,800
15	TEMP UTL'S HOOK-UP				$14,700		$27,200	$41,900
16	JOB CLEAN-UP				$29,300		$54,500	$83,800
17	SAFETY				$14,700		$27,200	$41,900
18	HEALTH PHYSICS S/C				$192,700		$117,800	$310,500
19	CERCLA/SAT $1,500 PER PERSON					$30,000		$30,000
20	BOND					$40,200		$40,200
21	OVERHEAD & PROFIT					$590,100		$590,100
22	PAYRL BRD.&BENFT.				$995,300			$995,300
	INDIRECT FIELD COSTS				$1,513,000	$680,300	$1,945,200	$4,118,500
	DIRECT & INDIRECT FIELD COSTS				$2,909,400	$1,497,300	$3,735,200	$8,141,900
23	TRANSPORTATION & BURIAL	N/A				$1,220,100		$1,220,100
24	WASTE CONTAINERS	N/A					$42,100	$42,100
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$58,600		$58,600
25	SCREENING & CONFIRMATION TESTING					$3,653,100		$3,653,100
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$2,230,900			$2,230,900
	FERMCO FIELD SUPPORT COSTS				$2,230,900	$4,931,800	$42,100	$7,204,800
28	EMISSION MODELING				$14,200		$26,500	$40,700
29	PSAR/FSAR(SAFETY RPT)				$439,700			$439,700
30	ENGINEERING	TITLE I&II $2,483,300 TITLE III	$2,458,900	CDR	$895,600	DCR	$643,200	$6,481,000
	ENGINEERING COSTS							$8,981,400
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$3,845,900	$230,800
	SUB-TOTAL (BASE ESTIMATE)							$22,538,900
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	19.0%						$4,282,400
	TARGET ESTIMATE (BASE ESTIMATE PLUS RISK BUDGET)							$26,821,300
35	CONTINGENCY	7.0%						$1,577,700
								PRELIMINARY
	TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY)							$28,399,000

LOTUS31\FS2\ALT6B\IFP\INDSUM.WK3 - FEASABILITY STUDY

Alternative 6 – Excavation and On-Site Disposal with Off-Site Disposal of Fraction Exceeding WAC (Resident Farmer)

Inactive Fly Ash Pile

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Long Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Well Inspect & Maint.	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	1	1	5	sample	$5,500.00	28	NA	$154,000	One fifth x (33 wells x 4 samples/year plus 8 leachate samples/year)
Long Term	1	6	30	sample	$5,500.00	14	NA	$77,000	One fifth x (33 wells x 2 samples/year plus 4 leachate samples/year)
Well Inspect & Maint.	1	1	30	well	$388.14	1.65	2.13	$826	One fifth x (inspection of 26 wells twice/year & repair 1 out of 8)
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
OU2 Waste Cell Leachate									
Pipeline Maintenance	1	1	30	lump sum	$1,106.83	1	1.29	$1,428	Overall cost divided among 5 subunits.
Treatment & Disposal	1	1	30	gallon	0.01	86,000	NA	$860	Overall cost divided among 5 subunits.
Facility Maint. at Subunit									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Fence Repair	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	1	1	30	acre	$2,183.32	6.63	8.55	$18,673	Total divided among 5 subunits. (Incl. side slopes)
Mowing	1	1	30	acre	$1,861.92	8	10.32	$19,215	Total divided among 5 subunits
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.7	0.90	$1,780	Total divided among 5 subunits
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of OU2 Cell	5	5	30	Lump Sum	$20,000	1	NA	$20,000	Total divided among 5 subunits

Annual Costs, Year 1 (excluding facility review)	$218,901
Annual Costs, Years 2–5 (excluding facility review)	$197,472
Annual Costs, Years 6–30 (excluding facility review)	$120,472
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 D:

8/2/94

001724

5861

DATE: 08-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940723

ALT-6B - IFP - ON-SITE DISPOSAL w/OFF-SITE > WAC

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.5

RESIDENT FARMER

TASK I.D. : 2CNF

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	* NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS) *	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	912	$11,670	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	912	$21,890	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	912	$4,740	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	912	$5,110	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	912	$5,470	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	912	$3,280	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	912	$63,840	C/B		
SUB-TOTAL		31.80	4		$116,000			
					$127.19	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	13		$170	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	6		$130	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	6		$1,040	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$1,820			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$117,800			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

001725

DATE: 08-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940723
EST. : KEN KEPLER
TASK I.D. : 2CNF

ALT-6B - IFP - ON-SITE DISPOSAL w/OFF-SITE > WAC
RESIDENT FARMER

WBS#:
1.1.1.1.2.3.5

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	20	80	$16.97	$1,360		
ANNUAL PHYSICALS	2	3	20	120	$16.97	$2,040		
EXIT (TERMINATION) PHYSICALS	1	4	20	80	$16.97	$1,360		
SUB-TOTAL						$4,760		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	34	1	20	689	$16.97	$11,700		
YEARLY IN-VIVO	2	4	20	160	$16.97	$2,720		
EXIT (END OF PROJECT / TERMINATION)	1	4	20	80	$16.97	$1,360		
SUB-TOTAL						$15,780		
WORK DELAYS CAUSED BY MONITORING	5%				$1,721,400	$86,070		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$1,721,400	$86,070		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$192,700	$117,800	$310,500

001726

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CNF

WBS NO. – 1.1.1.1.2.3.5
EST. NO. – C2940723
BY – K. KEPLER
DATE – 08/08/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25–Mar–94	01–Nov–97	02–Apr–99	31–Aug–2000	34	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
60	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

001727

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940723
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CSF

WASTE CONTAINERS
PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR) CAR	LINER	COVER	CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE TONS/CY	RAIL TRANSPORTATION COSTS / GONDOLA CAR: OUTBOUND & RETURN COSTS 141 — $80.15 PER TON (90 TON MIN.) TONS	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	$120 DEMURAGE $/DAY (>5 DAYS)	ENVIROCARE BURIAL COSTS (1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045
	$0	$400	$395	$340	LEAD/SOIL	1.810	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 125, 141, or 200 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

F-7-301

001728

FEMP-OU02-5 DRAFT
August 24, 1994

586

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940723
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CSF

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C –D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0
	LEAD/SOIL	1.810	134.00	1971.0	196,000	0	196,000	1462.7	54.2

INPUT

001729

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940723
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CSF

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	3875.0	53	$23,816	$1,262,200	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	0.0	0	$24,180	$0	$493.47		
	LEAD/SOIL	54.20	0.0	0	$24,180	$0	$446.13		
						**			

INPUT

** NOTE:
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

5861

001730

F-7-303

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL (RESIDENT FARMER)														
SITE PREPARATION	1	LS		3,765						$65,040	$15,000	$37,090	$91,040	$208,170
DECONTAMINATION FACILITIES/SERVICES	1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210
EROSION AND SEDIMENT CONTROLS	1	LS		1134						$21,530		$8,470	$45,730	$75,730
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE – OFFSITE DISPOSAL	1	LS		385						$6,530		$13,630		$20,160
LOAD/HAUL – OFF–SITE DISPOSAL	1	LS		580						$9,850		$14,560		$24,410
EXCAVATE & HAUL TO ON–SITE DISPOSAL	1	LS		24078						$408,980		$344,590	$112,740	$866,310
(Onsite) COMPOSITE LINER	1	LS		23115						$393,340	$479,030	$504,550	$652,570	$2,029,490
COMPOSITE CAP	1	LS		5148						$87,370	$100,590	$122,870	$282,510	$593,340
DIKE FOR DISPOSAL CELL	1	LS		4776						$81,050	$22,370	$96,260	$147,390	$347,070
GENERATED WASTE REMOVAL	1	LS		2853						$48,410		$27,670		$76,080
SITE RESTORATION	1	LS		8362						$141,890		$265,550	$289,800	$697,240
MONITORING WELLS	1	LS									$118,000			$118,000
SUB–TOTAL (DIRECT FIELD COSTS)				74497						$1,269,480	$760,880	$1,436,560	$1,627,290	$5,094,210
TAKE–OFF ALLOWANCE 10%	1	LS		7,450						$126,950	$76,090	$143,660	$162,730	$509,430
TOTAL (DIRECT FIELD COSTS)	1	LS		81,947						$1,396,400	$837,000	$1,580,200	$1,790,000	$5,603,600

On–Site Disposal of In–Active Flyash Pile w/ Off–site Option – SUMMARY

PAGE 1 of 22

F-7-304

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[illegible]21 PRELIMINARY
CLIENT – U[illegible]EPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO BUDGET ESTIMATE DETAILS
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

CONTR.N[illegible] 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION															
(ITEMS @ 20% ARE COMMON TO ALL SUB–UNITS)															
(ITEMS @ 33.3% ARE COMMON TO SF, AFP & IFP)															
a. Construction Survey		1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing		2000	LF	0.213	550	16.97				6.25	$9,330			$12,880	$22,210
c. Clear and Grub															
i. Remediation Site		6.50	AC	41.40	347	16.97			2575.00		$5,890		$17,240		$23,130
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Staging Area @ Sub–unit															
d. Dewatering															
i. Excavate Dewatering Trench		380	CY	0.50	245	16.97			1.49		$4,160		$580		$4,740
ii. Pump – w/4" Suction Hose		150	DAYS	3.00	581	16.97			19.55		$9,860		$3,020		$12,880
iv. HDPE Pipe to Sedimentation Tank		400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip		2	CY	4.00	10	16.97			100.00		$170		$210		$380
e. General Grading															
i. New Roads		6222	SY	0.001	8	16.97			0.07		$140		$450		$590
	33.3%														
ii. Office/Parking Area	2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area	272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area	49	16	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub–Unit	2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
f. Surfacing/Paving/Concrete Slab															
i. New Roads – 8" Gravel W/Geotextile		6222	SY	0.030	241	16.97			1.08	6.66	$4,090		$6,920	$42,680	$53,690
	33.3%														
ii. Office/Parking – 8" Gravel W/ Geotextile	2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub–Unit – 160' x160' Concrete															
Sub–Grade & Sub–Base for Conc.Slab	2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk.	631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" thl	24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub–grade Piping – 4"	500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating	2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab	183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip.	1	0.33	LS	2.00	1	16.97			184.00		$20		$60		$80
TOTAL (SITE PREPARATION)		1	LS		3,765						$65,040	$15,000	$37,090	$91,040	$208,170

Site Preparation Details

F-7-305
FEMP-OU02-5 DRAFT
August 24, 1994
5861
001732

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	33.3%														
a. Decon Trailer – Rental	51	17	MO					1500.00				$25,470			$25,470
	33.3%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'i.d.x 25lfx8	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in con	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
x. Backfill & Compaction around concrete slab	BCY 258	103	ICY	0.086	11	16.97			1.38		$190		$150		$340
SUB–TOTAL (EQUIP. DECON. FACILITY)					265						$4,810	$25,860	$1,210	$4,140	$36,020

Equipment Decon. Facility Details

FEMP-OU02-5 DRAFT
August 24, 1994

F-7-306

0017233

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	33.3%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Guard	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in con	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping – 1500 gal.	1	0	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210

Personnel Decon.Facilities/Services Details

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001734

FEMP-OU02-5 DRAFT
August 24, 1994

1991

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	3000	LF	0.017	66	16.97			0.06	0.65	$1,120		$180	$2,010	$3,310
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	10	EA	8.00	103	16.97			5.00	70.00	$1,750		$50	$700	$2,500
v. Hay Bales	300	EA	0.24	93	16.97			1.53	1.35	$1,580		$470	$420	$2,470
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1400	LF	0.38	688	19.95			5.11	4.42	$13,730		$7,150	$6,190	$27,070
iv. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	4	EA	8.00	41	16.97			28.00	8300.00	$700		$110	$33,200	$34,010
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,134						$21,530		$8,470	$45,730	$75,730

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FEMP-OU02-5 DRAFT
August 24, 1994

Erosion Control Details

CONTR.NO. – 4[illegible]21
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE OFF–SITE DISPOSAL TO ENVIROCARE														
Excavate Contaminated Soil	3100	BCY	0.055	220	16.97			1.17		$3,730		$3,630		$7,360
Sort Contaminated Soil BCY 3100	3875	LCY	0.033	165	16.97			2.58		$2,800		$10,000		$12,800
Low Level Thermal Destruction Unit BCY N/A Sub–contract cost for Drying Operation and moisture test Only.		TON					70.00							
TOTAL (EXCAVATE OFFSITE DISPOSAL)	1	LOT		385						$6,530		$13,630		$20,160

Excavate – Offsite Disposal Details

FEMP-OU02-5 DRAFT
August 24, 1994

F-7-309

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586 F

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
LOAD & HAUL														
OFF–SITE DISPOSAL														
HAUL														
From excavation site to rail loading facility														
6 CY dump truck 1/2 mi rt.														
Contaminated Soil	3875	LCY	0.04	205	16.97			1.65		$3,480		$6,590		$10,070
LOADING GONDOLA LCY														
Contaminated Soil 3875														
Allowable CY's of waste per Gondola 73.0														
Install Liner in Gondola car														
Contaminated Soil	53	EA	0.75	51	16.97			32.21		$870		$1,710		$2,580
Load Gondola – 6/day, 2 workers	8.83	DAYS	16.00	182	16.97			15.00		$3,090		$130		$3,220
Seal liner, Install Cover														
Contaminated Soil	53	EA	0.75	51	16.97			32.21		$870		$1,710		$2,580
Dust control – light	8.83	DAYS	8.00	91	16.97			500.00		$1,540		$4,420		$5,960
(RSO takes ownership at this time.)														
(See: Off–Site Disposal Wksht. & App.E)														
TOTAL (LOAD & HAUL – OFFSITE DISPOSAL	1	LOT		580						$9,850		$14,560		$24,410

Load & Haul – Offsite Disposal Details

FEMP-OU02-5 DRAFT
August 24, 1994

F-7-310

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CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
LOAD & HAUL TO ON–SITE DISPOSAL CELL														
(NO TREATMENT)														
Excavate Contaminated Soil														
Excavate and Load – Level D	91700	BCY	0.055	6506	16.97			1.17		$110,410		$110,510		$220,920
Excavate Additional Soil	10100	BCY	0.055	717	16.97			1.17		$12,170		$12,170		$24,340
Haul to Onsite Disposal Cell BCY														
– 12" thk. Cushion Layer 4885	6106	LCY	0.081	638	16.97			1.51		$10,830		$9,500		$20,330
– Impacted Fill 96915	121144	LCY	0.081	12658	16.97			1.51		$214,810		$188,410		$403,220
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load – Level C	6100	BCY	0.055	433	16.97			1.17		$7,350		$7,350		$14,700
Haul to Onsite Disposal Cell BCY														
6100	7625	LCY	0.081	797	16.97			1.51		$13,530		$11,860		$25,390
			S/T	1230										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	1230	HRS	150%	1845	16.97			1.51		$31,310		$1,910		$33,220
			S/T	3075										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	308	MD												
(SHREDDING COMMON TO SWL, IFP & SF)														
k. Shredder/Crusher – Purchase/Install 33.3%	0.3	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY 4000														
Generated Waste BCY 5217														
Excavated Debris TONS 6375														
(Percent of Gen.Waste to be Shredded 25%														
Generated Waste TONS 2079														
TOTAL TONS 8454														
Operating Costs	141	HRS							25.75				$3,740	$3,740
(2) Operators	282	HRS	1.00	364	16.97					$6,180				$6,180
TOTAL (EXCAV/NO TREATMENT–ONSITE DISPOSAL)	1	LOT		24,078						$408,980		$344,590	$112,740	$866,310

Excavate – No Treatment – South Field Onsite Disposal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP.)															
a. Clear and Grubb	20%														
i. Disposal Cell & Surrounding area	35	7.0	AC	41.40	374	16.97			2575.00		$6,350		$18,570		$24,920
b. Relocated South Access Road	20%														
i. Clear & Grub	3	0.6	AC	41.40	32	16.97			2575.00		$540		$1,590		$2,130
ii. General Grading	1467	293.4	SY	0.001		16.97			0.07				$20		$20
iii. Road – 8" Gravel W/Geotextile	7333	1466.6	SY	0.030	57	16.97			1.08	6.66	$970		$1,630	$10,060	$12,660
c. Haul Road	20%														
i. Clear & Grub	2.4	0.5	AC	41.40	26	16.97			2575.00		$440		$1,270		$1,710
ii. General Grading	11556	2311.2	SY	0.001	3	16.97			0.07		$50		$170		$220
iii. Road – 8" Gravel W/Geotextile	5778	1155.6	SY	0.030	45	16.97			1.08	6.66	$760		$1,290	$7,930	$9,980
	20%														
d. Temporary Construction Fencing	5200	1040.0	LF	0.213	286	16.97				6.25	$4,850			$6,700	$11,550
e. 20' wide Swing Gates	2	0.4	EA	25.60	13	16.97			340.00	560.00	$220		$140	$230	$590
f. Staging Area @ Cell	20%														
Area Excavation for Slab	1606	321.2	BCY	0.016	7	16.97			0.60		$120		$200		$320
Sub–Base for Slab	2845	569.0	SY	0.041	30	16.97		6.75	1.45	5.51	$510	$3,960	$850	$3,230	$8,550
HDPE Perf.Sub–grade Piping – 4"	500	100.0	LF	0.21	27	16.97			0.74	3.02	$460		$80	$310	$850
Concrete Slab – 160'x160'x8" thk	631	126.2	CY	4.07	663	17.98			14.25	67.00	$11,920		$1,850	$8,710	$22,480
Concrete Curb – 480'x2'x8" thk	24	4.8	CY	15.30	95	17.98			11.16	275.90	$1,710		$60	$1,360	$3,130
Epoxy Coating	2845	569.0	SY	0.22	161	16.97			0.77	7.56	$2,730		$450	$4,430	$7,610
Backfill & Compact around Slab	183	36.6	ICY	0.086	4	16.97			1.38				$50		$50
Mob/Demob.Equip.	1	0.2	LS	2.00	1	16.97			184.00		$20		$40		$60
g. Storage Area – 200' x 200' Asphalt	20%														
Includes Compacted Sub–Grade	4444	889	SY	0.084	96	16.97			2.56	14.04	$1,630		$2,340	$12,850	$16,820
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat															
	20%														
h. Decon Trailer – Rental	51	10	MO					1500.00				$15,760			$15,760
i. Const.Equipment Decon. Facility	20%														
25 ft x 60 ft	1	0.20	LS	730.00	146	18.05		1160.00	2900.00	11980.00	$2,640	$240	$580	$2,400	$5,860
j. Personnel Decon. Facility	20%														
11'x 11'	1	0.20	LS	108.00	22	18.89		100.00	360.00	4120.00	$420	$20	$70	$820	$1,330
SUB–TOTAL (COMPOSITE LINER –SITE PREP)		1	LOT		2,088	17.40					$36,340	$19,980	$31,250	$59,030	$146,600

Composite Liner – Site Prep. – South Field Onsite Disposal Details

CONTR.NO.– [redacted]321
CLIENT – [redacted]DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (CON'T.)														
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.														
COMPOSITE LINER														
a. Subgrade Preparation – includes removal of top soil, grading & comp.	14803	SY	0.024	458	16.97			0.86		$7,770		$13,110		$20,880
b. 95% Clay – 5% Bentonite 36" Thk BCY 14803	17468	ICY	0.260	5859	16.97			11.19	20.35	$99,430		$201,330	$366,130	$666,890
c. Composite Clay Liner	14803	SY					7.38				$109,250			$109,250
d. HDPE Liner 60 mil	14803	SY					4.75				$70,310			$70,310
e. Geotextile Fabric	14803	SY					2.25				$33,310			$33,310
f. Pea Gravel 12" Thk; In–place 4885	5251	ICY	0.11	745	16.97			0.77	17.00	$12,640		$4,160	$91,950	$108,750
g. Composite Clay Liner	14803	SY					7.38				$109,250			$109,250
h. HDPE Liner 60 mil	14803	SY					4.75				$70,310			$70,310
i. Geotextile Fabric	14803	SY					2.25				$33,310			$33,310
j. Pea Gravel 12" Thk; In–place BCY 4885	5251	ICY	0.11	745	16.97			0.77	17.00	$12,640		$4,160	$91,950	$108,750
k. Geotextile Fabric	14803	SY					2.25				$33,310			$33,310
l. HDPE Perforated Pipe – leachate collection 6" Dia.	1120	LF	0.30	433	16.97			1.05	6.56	$7,350		$1,210	$7,570	$16,130
m. HDPE Perforated Pipe – leak detection 6" Dia.	1120	LF	0.30	433	16.97			1.05	6.56	$7,350		$1,210	$7,570	$16,130
n. Leachate Discharge Piping														
i. HDPE Carrier & containment Pipe 6" x 10" Includes Trench Excav/Backfill, sand bedding and compaction.	490	LF	0.86	544	16.97			11.37	22.33	$9,230		$5,740	$11,270	$26,240
ii. HDPE Manhole – 4' dia. x 8' deep	2	EA	8.00	21	16.97			28.00	8300.00	530.00		$60	$17,100	$17,690
o. Impacted Fill–Cusion Layer 12" Thk BCY 4885	6106	LCY	0.06	473	16.97			1.67		$8,030		$10,500		$18,530
p. Impacted Fill–Spread and Compact BCY 96915	121144	LCY	0.06	9377	16.97			1.67		$159,130		$208,380		$367,510
q. Generated Waste BCY 5217	6000	LCY	0.06	464	16.97			1.67		$7,870		$10,320		$18,190
PPE LEVEL C Allowance is added to the following														
r. Impacted fill BCY 6100	7625	LCY	0.06	590	16.97			1.67		$10,010		$13,120		$23,130
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	590	HRS	150% S/T	885 1475	16.97					$15,020				$15,020
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	148	MD												
SUB–TOTAL (COMPOSITE LINER)	1	LOT		21,027						$357,000	$459,050	$473,300	$593,540	$1,882,890
TOTAL (COMPOSITE LINER)	1	LOT		23,115						$393,340	$479,030	$504,550	$652,570	$2,029,490

Composite Liner Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: -2CSF

	DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	COMPOSITE CAP															
	Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
	COMPOSITE CAP															
	a. Contouring Layer 18" Thk.	BCY 3070	3684	ICY	0.06	285	16.97			1.67	3.50	$4,840		$6,340	$13,280	$24,460
	b. 95% Clay – 5% Bentonite 24" Thk	BCY 4114	4423	ICY	0.260	1483	16.97			11.19	20.35	$25,170		$50,970	$92,700	$168,840
	c. GML\GCC – composite Liner		6140	SY					7.38				$45,310			$45,310
	d. Geotextile Fabric		6140	SY					2.25				$13,820			$13,820
	e. Pea gravel 12" Thk, In–place	BCY 2026	3205	ICY	0.11	455	16.97			0.77	17.00	$7,720		$2,540	$56,120	$66,380
	f. Geotextile Fabric		6140	SY					2.25				$13,820			$13,820
	g. Cobbels 36" Thk; In–place	BCY 6140	6601	ICY	0.258	2197	16.97			7.15	10.10	$37,280		$48,610	$68,670	$154,560
	h. Geotextile Fabric		6140	SY					2.25				$13,820			$13,820
	i. Sand Layer 6" Thk; In–place	BCY 1044	1122	ICY	0.052	75	16.97			1.76	5.00	$1,270		$2,030	$5,780	$9,080
	j. Geotextile Fabric		6140	SY					2.25				$13,820			$13,820
	k. Common Soil 21" Thk; In–place	BCY 3561	4273	ICY	0.06	331	16.97			1.67	3.50	$5,620		$7,350	$15,400	$28,370
	l. Top Soil 6" Thk; In–place	BCY 1044	1253	ICY	0.053	86	16.97			1.82	12.10	$1,460		$2,350	$15,610	$19,420
	m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding	SY 6140	55	MSF	0.30	21	16.97			6.75	25.00	$360		$380	$1,420	$2,160
	n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized		980	LF	0.17	215	16.97			2.28	13.40	$3,650		$2,300	$13,530	$19,480
	TOTAL (COMPOSITE CAP)		1	LOT		5,148						$87,370	$100,590	$122,870	$282,510	$593,340

F-7-314

001766

FEMP-OU02-5 DRAFT
August 24, 1994

Composite Cap Details

CONTR.NO.– [redacted]21
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DIKE FOR DISPOSAL CELL															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
a. Borrow Common Soil – Dike	BCY 3419	4103	ICY	0.06	318	16.97			1.67	3.50	$5,400		$7,060	$14,790	$27,250
b. Geotextile Fabric		9940	SY					2.25				$22,370			$22,370
c. Cobbels 36" Thk; In–place	BCY 9940	11928	ICY	0.258	3970	16.97			7.15	10.10	$67,370		$87,840	$124,090	$279,300
e. Drainage Piping – HDPE	6" Dia.	1260	LF	0.30	488	16.97			1.05	6.56	$8,280		$1,360	$8,510	$18,150
TOTAL (DIKE – DISPOSAL CELL)		1	LOT		4,776						$81,050	$22,370	$96,260	$147,390	$347,070

001742

Dike Details

5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL															
a. Office/Parking Area @ S/U	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo–Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Facil.@ S/U	33%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo–Fabric & Liner	167	56	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Facil. @ S/U	33%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292					9.16				$10		$10
Geo–Fabric & Liner	14	5	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
d. Staging pad @ S/U	33.3%														
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo–Fabric & Liner 105 cy	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	395.5	132	BCY	0.30	51	16.97			2.51		$870		$340		$1,210
	20%														
e. Const.Equip.Decon.Facil. @ Onsite Disp.Cell															
Demo/Remove Concrete	49.3	10	BCY	1.2	15	16.97			3.62		$250		$40		$290
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	6	BCY	0.292	2	16.97			9.16		$30		$50		$80
Geo–Fabric & Liner	167	33	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	5	EA	0.48	3	16.97			1.68		$50		$10		$60
Splash Guard	702	140	SF	0.04	7	16.97			0.03		$120				$120
Haul & Dump Rubble	24.9	5	BCY	0.30	2	16.97			2.51		$30		$10		$40
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		622						$10,540		$4,710		$15,250

Generated Waste Removal Details

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001743
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[illegible]21
CLIENT – U[illegible] DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.)															
Demo. /Load/Haul/Dump/Compact															
	20.0%														
f. Personnel Decon. Facil.@ Onsite Disp. Cell															
Demo/Remove Concrete	2.2	0.44	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	0.48	BCY	0.292		16.97			9.16						
Geo–Fabric & Liner	14	3	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	6	1	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	26	SF	0.04	1	16.97			0.03		$20				$20
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
	20.0%														
g. Relocated South Access Road/Cell	SY														
Road – 8" Gravel W/Geotextile	7333	1467	BCY	0.292	552	16.97			9.16		$9,370		$13,840		$23,210
Haul & Dump Rubble		1467	BCY	0.30	568	16.97			2.51		$9,640		$3,790		$13,430
	20.0%														
h. Haul Road for Cell	SY														
Road – 8" Gravel W/Geotextile	5778	257.0	BCY	0.292	97	16.97			1.08		$1,650		$290		$1,940
Haul & Dump Rubble		257.0	BCY	0.30	99	16.97			2.51		$1,680		$660		$2,340
	20.0%														
i. Temporary Construction Fencing @ Cell	5200	1040.0	LF	0.107	143	16.97					$2,430				$2,430
Haul & Dump Rubble		135.0	BCY	0.30	52	16.97			2.51		$880		$350		$1,230
	20.0%														
j. 20' wide Swing Gates @ Cell	2	0.40	EA	12.75	7	16.97			340.00		$120		$140		$260
Haul & Dump Rubble		0.05	BCY	0.30		16.97			2.51						
	20.0%														
k. Storage Pad Area @ Cell	BCY														
Demo/Remove Asphalt	988	197.6	BCY	1.2	306	16.97			3.62		$5,190		$740		$5,930
Excav., Load, Haul, Backfill, Compac	474.0	94.8	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Sub–grade Stone															
Geo–Fabric & Liner	4444	888.8	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble		197.0	BCY	0.30	76	16.97			2.51		$1,290		$510		$1,800
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,942						$32,970		$21,230		$54,200

Generated Waste Removal Details

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001744

5861

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

	DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.) Demo. /Load/Haul/Dump/Compact															
	The following prorated at:	20.0%														
	I. Staging Area @ On–Site Disposal Cell															
	Demo/Remove Concrete	655	131.0	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
	Excav., Load, Haul, Backfill, Compact															
	Sub–grade Stone	475	95.0	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
	Geo–Fabric & Liner 105 cy	2845	569.0	SY	0.002	1	16.97			0.02		$20		$10		$30
	Haul & Dump Rubble	395.5	126.0	BCY	0.30	49	16.97			2.51		$830		$330		$1,160
	TOTAL GENERATED WASTE	BCY 5217 LCY 6000														
	SUB– TOTAL (GENERATED WASTE REMOVAL		1	LOT		289						$4,900		$1,730		$6,630
	TOTAL (GENERATED WASTE REMOVAL)		1	LOT		2,853						$48,410		$27,670		$76,080

Generated Waste Removal Details

F-7-318
001745
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
In–Active Flyash Pile	46000	55200	ICY	0.09	6409	16.97			3.21	3.50	$108,760		$182,510	$199,000	$490,270
	33.3%														
Office/Parking	494	197	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	31	ICY												
Decon.Facil.– Personnel @ S/U	7	3	ICY												
Staging Area @ S/U	1099	439	ICY												
	S/T	670.5	ICY	0.09	78	16.97			3.21	3.50	$1,320		$2,220	$2,420	$5,960
	20%														
Staging Area at On–Site Disp.Cell	1099	264	ICY												
Storage Area at On–Site Disp.Cell	474	114	ICY												
Decon.Facil.– Const.Equip. @ Cell	78	19	ICY												
Decon.Facil.– Personnel @ Cell	7	2	ICY												
Relocated South Access Road	1628	391	ICY												
Haul Road	1283	308	ICY												
	S/T	1096.6	ICY	0.09	127	16.97			3.21	3.50	$2,160		$3,630	$3,950	$9,740
b. Final Grade for IFP		16667	SY	0.02	430	16.97			0.70		$7,300		$12,020		$19,320
c. Borrow Top Soil 6" Thk., Spread															
In–Active Flyash Pile		16667	SY	0.036	774	16.97			2.33	2.88	$13,130		$40,000	$49,440	$102,570
	33.3%														
Office/Parking	2222	740	SY												
Decon.Facil.– Const.Equip. @ S/U	167	56	SY												
Decon.Facil.– Personnel @ S/U	14	5	SY												
Staging Area @ S/U	2845	947	SY												
	S/T	1747.6	SY	0.036	81	16.97			2.33	2.88	$1,370		$4,190	$5,180	$10,740
	20%														
Staging Area at On–Site Disp.Cell	2845	683	SY												
Storage Area at On–Site Disp.Cell	4444	1067	SY												
Decon.Facil.– Const.Equip. @ Cell	167	40	SY												
Decon.Facil.– Personnel @ Cell	14	3	SY												
Relocated South Access Road	14667	3520	SY												
Haul Road	11556	2773	SY												
	S/T	8086.3	SY	0.036	376	16.97			2.33	2.88	$6,380		$19,410	$23,990	$49,780
SUB–TOTAL (SITE RESTORATION)		1	LOT		8,275						$140,420		$263,980	$283,980	$688,380

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August 24, 1994

001746

Site Restoration Details

1861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION (CON'T.)															
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
In–Active Flyash Pile	16667	150	MSF	0.30	58	16.97			6.75	25.00	$980		$1,040	$3,860	$5,880
	33.3%														
Office/Parking	2222	6.7	MSF												
Decon.Facil.– Const.Equip. @ S/U	167	0.5	MSF												
Decon.Facil.– Personnel @ S/U	14		MSF												
Staging Area @ S/U	2845	8.5	MSF												
	S/T	15.7	MSF	0.30	6	16.97			6.75	25.00	$100		$110	$400	$610
	20%														
Staging Area at On–Site Disp.Cell	2845	5.1	MSF												
Storage Area at On–Site Disp.Cell	4444	8.0	MSF												
Decon.Facil.– Const.Equip.@ Cell	167	0.3	MSF												
Decon.Facil.– Personnel @ Cell	14		MSF												
Relocated South Access Road	14667	26.4	MSF												
Haul Road	11556	20.8	MSF												
	S/T	60.6	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,560	$2,370
SUB–TOTAL (SITE RESTORATION)		1	LOT		87						$1,470		$1,570	$5,820	$8,860
TOTAL (SITE RESTORATION)		1	LOT		8,362						$141,890		$265,550	$289,800	$697,240

Site Restoration Details

FEMP-OU02-5 DRAFT
August 24, 1994

F-7-320

001747

CONTR.NO. – 4[illegible]21
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility	4	PR					23000.00				$92,000			$92,000
b. Abandon Existing Wells	2	EA					13000.00				$26,000			$26,000
TOTAL (MONITORING WELLS)	1	LOT									$118,000			$118,000

Monitoring Wells Details

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August 24, 1994

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CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO															
PURCHASE															
Bulk Gondola Rail Car	N/A	0	EA												
Liner for Gondola															
Excavated Waste – level C,D & Additional		53	EA							400.00				$21,200	$21,200
Excavated Waste – lead/soil	N/A		EA							400.00					
Generated Waste	N/A		EA							400.00					
Cover for Gondola															
Excavated Waste – level C,D & Additional		53	EA							395.00				$20,940	$20,940
Excavated Waste – lead/soil	N/A		EA							395.00					
Generated Waste	N/A		EA							395.00					
TOTALS FORWARD TO ESTIMATE SUMMARY No.24															
TOTAL (PURCHASE COSTS – FERMCO)		1	LOT											$42,100	$42,100

Purchase Waste Container Details

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF–SITE TRANSPORTATION COSTS TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas	53	EA					340.00				$18,020			$18,020
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additional	53	EA					22881.00				$1,202,090			$1,202,090
Excavated Waste – lead/soil		EA					23045.00							
Generated Waste		EA					23045.00							
TOTALS FORWARD TO ESTIMATE SUMMARY No.23														
TOTAL (OFF–SITE TRANSPORT. COSTS – FERMCO)	1	LOT									$1,220,100			$1,220,100

Off–Site Disposal Details

FEMP-OU02-5 DRAFT
August 24, 1994

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001750
5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	155000	GAL					0.01				$1,600			$1,600
Runnoff from the Exclusion Zone.	5700000	GAL					0.01				$57,000			$57,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$58,600			$58,600

Waste Water Treatment Operations Cost Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]21
CLIENT – [redacted]DEPT. OF ENERGY
PROJECT – ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940723
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	555	EA					2,002				$1,111,100			$1,111,100
Rad	555	EA					2,000				$1,110,000			$1,110,000
Confirmatory Tests														
Full Rad Tests	278	EA					3,101				$862,100			$862,100
Full HSL	50	EA					1,500				$75,000			$75,000
Full TCLP	50	EA					2,000				$100,000			$100,000
2 Technicians per Month	30	MO					13,163				$394,900			$394,900
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIMATION TESTS)	1	LOT									$3,653,100			$3,653,100

Screening & Confirmation Testing Details

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FEMP-OU02-5 DRAFT
August 24, 1994

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 6B, IFP – ON–SITE DISPOSAL W/OFF–SITE > WAC

CLIENT: DOE DATE: 09–Aug–94

CONTRACT: C2–94–07–23 BASE ESTIMATE: $22,538,900

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$32,225,415	$9,686,515	43.0%
0.05%	$29,373,257	$6,834,357	30.3%
5.00%	$28,338,787	$5,799,887	25.7%
10.00%	$28,039,639	$5,500,739	24.4%
15.00%	$27,790,048	$5,251,148	23.3%
20.00%	$27,609,748	$5,070,848	22.5%
25.00%	$27,438,133	$4,899,233	21.7%
30.00%	$27,266,187	$4,727,287	21.0%
35.00%	$27,140,739	$4,601,839	20.4%
40.00%	$27,013,886	$4,474,986	19.9%
45.00%	$26,893,410	$4,354,510	19.3%
50.00%	$26,765,083	$4,226,183	18.8%
55.00%	$26,629,894	$4,090,994	18.2%
60.00%	$26,496,754	$3,957,854	17.6%
65.00%	$26,341,379	$3,802,479	16.9%
70.00%	$26,209,142	$3,670,242	16.3%
75.00%	$26,031,978	$3,493,078	15.5%
80.00%	$25,874,731	$3,335,831	14.8%
85.00%	$25,652,968	$3,114,068	13.8%
90.00%	$25,417,248	$2,878,348	12.8%
95.00%	$25,107,678	$2,568,778	11.4%
99.95%	$23,793,853	$1,254,953	5.6%
100.00%	$21,271,616	($1,267,285)	–5.6%

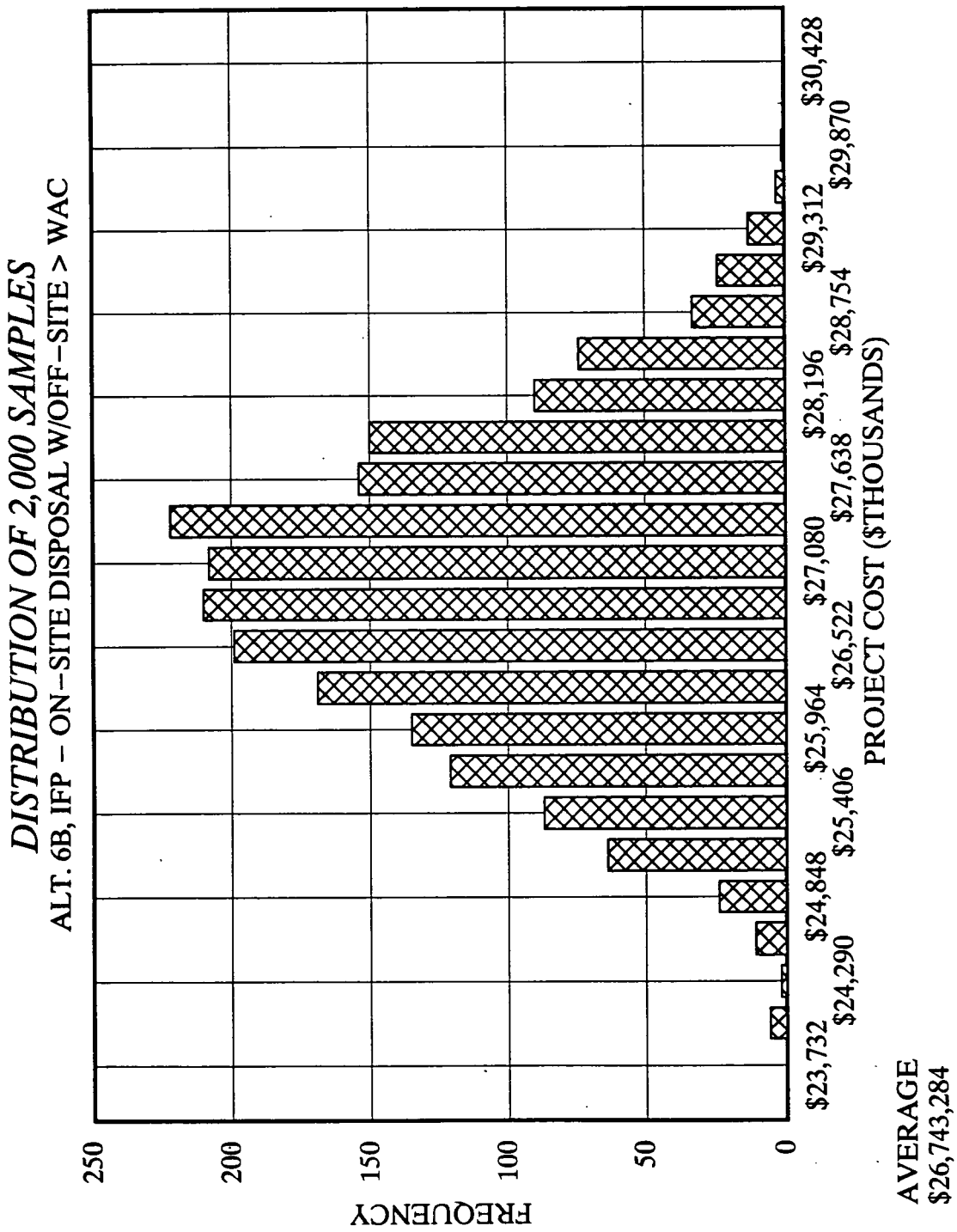
FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

PROJECT: ALT. 6B, IFP – ON–SITE DISPOSAL W/OFF–SITE > WAC
CLIENT: DOE
CONTRACT: C2–94–07–23

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA–TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$71,540	–5.0%	$67,963	30%	$93,002	U		14%
2	SITE PREPERATION S/C	16,500	–5.0%	15,675	30%	21,450	U		14%
3	SITE PREPERATION MAT'L	100,140	–10.0%	90,126	30%	130,182	U		25%
4	DECON FACILITIES/SERVICES LABOR	6,040	–2.0%	5,919	80%	10,872	U		2%
5	DECON FACILITIES/SERVICES S/C	28,480	–6.0%	26,771	80%	51,264	U		7%
6	DECON FACILITIES/SERVICES MAT'L	6,060	–6.0%	5,696	60%	9,696	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	23,680	–5.0%	22,496	50%	35,520	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	50,300	–5.0%	47,785	30%	65,390	U		14%
9	EXC/SRT/DRY OFF–SITE DISP LABOR	7,180	–6.0%	6,749	100%	14,360	U		6%
10	LOAD & HAUL OFF–SITE DISP LABOR	10,840	–6.0%	10,190	100%	21,680	U		6%
11	EXC/SRT/CRSH ON–SITE DISP LBR	449,880	–6.0%	422,887	150.0%	1,124,700	U		4%
12	EXC/SRT/CRSH ON–SITE DISP MAT'L	124,010	–6.0%	116,569	80.0%	223,218	U		7%
13	COMPOSITE LINER LABOR	432,670	–6.0%	406,710	100%	865,340	U		6%
14	COMPOSITE LINER S/C	526,930	–6.0%	495,314	80%	948,474	U		7%
15	COMPOSITE LINER MAT'L	717,820	–6.0%	674,751	80.0%	1,292,076	U		7%
16	COMPOSITE CAP LABOR	96,110	–6.0%	90,343	100.0%	192,220	U		6%
17	COMPOSITE CAP S/C	110,650	–5.0%	105,118	30.0%	143,845	U		14%
18	COMPOSITE CAP MAT'L	310,760	–6.0%	292,114	80.0%	559,368	U		7%
19	DIKE LABOR	89,160	–6.0%	83,810	100.0%	178,320	U		6%
20	DIKE S/C	24,610	–6.0%	23,133	80.0%	44,298	U		7%
21	DIKE MAT'L	162,130	–6.0%	152,402	80.0%	291,834	U		7%
22	GENERATED WASTE REMVL LABOR	53,250	–6.0%	50,055	100.0%	106,500	U		6%
23	SITE RESTORATION LABOR	156,080	–5.0%	148,276	30.0%	202,904	U		14%
24	SITE RESTORATION MAT'L	318,780	–6.0%	299,653	80.0%	573,804	U		7%
25	MONITORING WELLS S/C	129,800	–6.0%	122,012	60.0%	207,680	U		9%
26	INDIRECT FIELD COSTS LABOR	1,513,000	–5.0%	1,437,350	50.0%	2,269,500	U		9%
27	INDIRECT FIELD COSTS S/C	660,300	–5.0%	627,285	100.0%	1,320,600	U		5%
28	INDIRECT FIELD COSTS MAT'L	1,945,200	–5.0%	1,847,940	50.0%	2,917,800	U		9%
29	FIELD SUPPORT COSTS LABOR	2,230,900	–10.0%	2,007,810	30.0%	2,900,170	U		25%
30	FIELD SUPPORT COSTS S/C	4,931,800	–5.0%	4,685,210	30.0%	6,411,340	U		14%
31	FIELD SUPPORT COSTS MAT'L	42,100	–1.0%	41,679	50.0%	63,150	U		2%
32	ENGINEERING COSTS	6,961,400	–5.0%	6,613,330	25.0%	8,701,750	U		17%
33	SALES TAX MAT'L	230,800	–1.0%	228,492	1.0%	233,108	U		50%
34				0		0	U		0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$22,538,900		$21,271,616		$32,225,415			

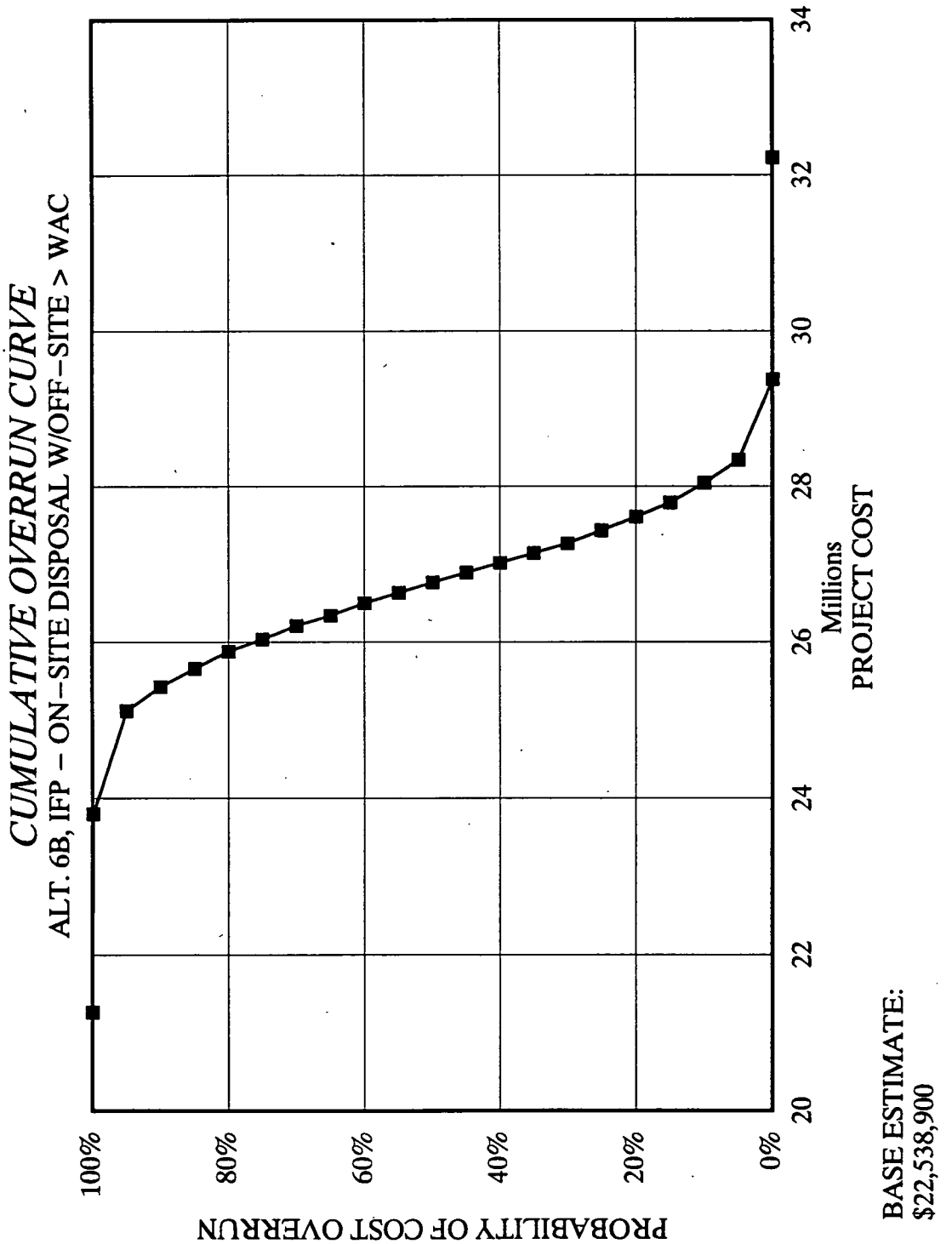
001754

861


DISTRIBUTION OF 2,000 SAMPLES
ALT. 6B, IFP – ON–SITE DISPOSAL W/OFF–SITE > WAC
FREQUENCY
250
200
150
100
50
0
$23,732
$24,290
$24,848
$25,406
$25,964
$26,522
$27,080
$27,638
$28,196
$28,754
$29,312
$29,870
$30,428
PROJECT COST ($THOUSANDS)
AVERAGE
$26,743,284

001755

5861


CUMULATIVE OVERRUN CURVE
ALT. 6B, IFP – ON–SITE DISPOSAL W/OFF–SITE > WAC
PROBABILITY OF COST OVERRUN
100%
80%
60%
40%
20%
0%
20
22
24
26
28
30
32
34
Millions
PROJECT COST
BASE ESTIMATE:
$22,538,900

001756

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B - IFP - ON-SITE DISPOSAL w/OFF-SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940723
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CNF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$22,538,900	BASE EST:	$71,540	BASE EST:	$16,500	BASE EST:	$100,140	BASE EST:	$6,040	BASE EST:	$28,480	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	25%	-10%	30%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	25%	-10%	30%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$67,963	$93,002	$15,675	$20,625	$90,126	$130,182	$5,919	$10,872	$26,771	$51,264	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001757

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B - IFP - ON-SITE DISPOSAL w/OFF-SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940723
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CNF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$23,680	BASE EST:	$0	BASE EST:	$50,300	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	0%	0%	0%	0%	0%	0%
TOTAL $	$22,496	$35,520	$0	$0	$47,785	$65,390	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

FEMP-OU02-5 DRAFT
August 24, 1994

5861

001758

F-7-331

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940723
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CNF

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$7,180	BASE EST:	$0	BASE EST:	$0	BASE EST:	$10,840	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	50%					–1%	50%				
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	100%	0%	0%	0%	0%	–6%	100%	0%	0%	0%	0%
TOTAL $	$6,749	$14,360	$0	$0	$0	$0	$10,190	$21,680	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940723
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CNF

	EXCAV/SORT/CRUSH ONSITE DISPOSAL LABOR $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL S/C $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$449,880	BASE EST:	$0	BASE EST:	$124,010	BASE EST:	$432,670	BASE EST:	$526,930	BASE EST:	$717,820
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	100%					–5%	50%				
MATERIAL PRICING					–5%	30%			–5%	30%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	50%			–1%	50%	–1%	50%	–1%	50%	–1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	150%	0%	0%	–6%	80%	–6%	100%	–6%	80%	–6%	80%
TOTAL $	$422,887	$1,124,700	$0	$0	$116,569	$223,218	$406,710	$865,340	$495,314	$948,474	$674,751	$1,292,076

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-333

001760

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940723
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CNF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		DIKE LABOR $'s		DIKE S/C $'s		DIKE MAT'L. $'s	
	BASE EST:	$96,110	BASE EST:	$110,650	BASE EST:	$310,760	BASE EST:	$89,160	BASE EST:	$24,610	BASE EST:	$162,130
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–5%	50%				
MATERIAL PRICING			–5%	30%	–5%	30%			–5%	30%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	50%			–1%	50%	–1%	50%	–1%	50%	–1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	100%	–5%	30%	–6%	80%	–6%	100%	–6%	80%	–6%	80%
TOTAL $	$90,343	$192,220	$105,118	$143,845	$292,114	$559,368	$83,810	$178,320	$23,133	$44,298	$152,402	$291,834

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001761

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B – IFP – ON-SITE DISPOSAL w/OFF-SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940723
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CNF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$53,250	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION							-1%	50%				
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-6%	100%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$50,055	$106,500	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–6B – IFP – ON–SITE DISPOSAL w/OFF–SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940723
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CNF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$156,080	BASE EST:	$0	BASE EST:	$318,780	BASE EST:	$0	BASE EST:	$129,800	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	30%										
MATERIAL PRICING					–5%	30%			–5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	50%			–1%	50%			–1%	10%		
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	80%	0%	0%	–6%	80%	0%	0%	–6%	60%	0%	0%
TOTAL $	$146,715	$280,944	$0	$0	$299,653	$573,804	$0	$0	$122,012	$207,680	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001763

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B – IFP – ON-SITE DISPOSAL w/OFF-SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940723
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CNF

	INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS	
	LABOR $'s		S/C $'s		MAT'L. $'s		LABOR $'s		S/C $'s		MAT'L. $'s	
	BASE EST:	$1,513,000	BASE EST:	$660,300	BASE EST:	$1,945,200	BASE EST:	$2,230,900	BASE EST:	$4,931,800	BASE EST:	$42,100
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-10%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-5%	30%	-5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-10%	30%	-5%	30%	-5%	30%
TOTAL $	$1,437,350	$2,269,500	$627,285	$1,320,600	$1,847,940	$2,917,800	$2,007,810	$2,900,170	$4,685,210	$6,411,340	$39,995	$54,730
RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B – IFP – ON-SITE DISPOSAL w/OFF-SITE > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.5

COST IMPACT MATRIX

EST. NO: C2940723
DATE: 08/09/94
BY: KEN KERLER
TASK # : 2CNF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$6,961,400	BASE EST:	$230,800	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			–1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	–5%	25%										
(OTHER)												
TOTAL %	–5%	25%	–1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$6,613,330	$8,701,750	$228,492	$233,108	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001765

5861

LCC ANALYSIS TITLE:	SF - EXCAVATE & ON-SITE DISP. W/OFF-SITE DISP. OF FRACTION EXCEEDING WAC - (RESIDENT FARMER)			
WBS NO.:	1.1.1.1.2.3.2		TASK NO.:	2CSF
ALTERNATIVE:	6B		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	35 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	09-Aug-94
DOCUMENT NO.:	LCC-94-03-05	EST. NO. C2-94-07-24 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$11,457,930	$0	$0	$11,457,900	1996
$34,373,791	$0	$0	$34,373,800	1997
$20,051,378	$0	$0	$20,051,400	1998
$0	$218,901	$0	$218,900	1999
$0	$197,472	$0	$197,500	2000
$0	$197,472	$0	$197,500	2001
$0	$197,472	$0	$197,500	2002
$0	$217,472	$0	$217,500	2003
$0	$120,472	$0	$120,500	2004
$0	$120,472	$0	$120,500	2005
$0	$120,472	$0	$120,500	2006
$0	$120,472	$0	$120,500	2007
$0	$140,472	$0	$140,500	2008
$0	$120,472	$0	$120,500	2009
$0	$120,472	$0	$120,500	2010
$0	$120,472	$0	$120,500	2011
$0	$120,472	$0	$120,500	2012
$0	$140,472	$0	$140,500	2013
$0	$120,472	$0	$120,500	2014
$0	$120,472	$0	$120,500	2015
$0	$120,472	$0	$120,500	2016
$0	$120,472	$0	$120,500	2017
$0	$140,472	$0	$140,500	2018
$0	$120,472	$0	$120,500	2019
$0	$120,472	$0	$120,500	2020
$0	$120,472	$0	$120,500	2021
$0	$120,472	$0	$120,500	2022
$0	$140,472	$0	$140,500	2023
$0	$120,472	$0	$120,500	2024
$0	$120,472	$0	$120,500	2025
$0	$120,472	$0	$120,500	2026
$0	$120,472	$0	$120,500	2027
$0	$140,472	$0	$140,500	2028
				2029
				2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$65,883,100	$4,140,600	$0	$70,024,500	TOTAL
$60,437,500	$2,574,500	$0	$63,012,500	<====(@NPV)

F ERMCO ESTIMATING SERVICES

SUMMARY SHEET

EST FILE #: C2940724 | DATE: 09-Aug-94
CLIENT: US DOE | ESTIMATOR: KEN KEPLER
PROJECT TITLE: ALT-6B, SF - ON-SITE DISPOSAL w/OFF-SITE > WAC - RESIDENT FARMER | LOCATION: FERNALD
WBS#: 1.1.1.1.2.3.2 | TASK#: 2CSF

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL - COMPOSITE LINER, CAP, DIKE OFF-SITE DISPOSAL OF LEAD/SOIL TO ENVIROCARE	231,784		$3,938,600	$3,051,300	$4,916,300	$11,906,200
2		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		231,784		$3,938,600	$3,051,300	$4,916,300	$11,906,200
11	SUPERVISION - CONTRACTOR				$670,000			$670,000
12	SM TOOLS/CONSM'BLS						$236,300	$236,300
13	EQUIPMENT RENTAL						$4,779,400	$4,779,400
14	TEMP. FACILITIES				$82,700		$153,600	$236,300
15	TEMP UTL'S HOOK-UP				$41,400		$76,800	$118,200
16	JOB CLEAN-UP				$82,700		$153,600	$236,300
17	SAFETY				$41,400		$76,800	$118,200
18	HEALTH PHYSICS S/C				$544,500		$10,800	$555,300
19	CERCLA/SAT	$1,500 PER PERSON				$123,000		$123,000
20	BOND					$119,100		$119,100
21	OVERHEAD & PROFIT					$1,718,800		$1,718,800
22	PAYRL BRD.&BENFT.				$2,808,700			$2,808,700
	INDIRECT FIELD COSTS				$4,271,400	$1,960,900	$5,487,300	$11,719,600
	DIRECT & INDIRECT FIELD COSTS				$8,210,000	$5,012,200	$10,403,600	$23,625,800
23	TRANSPORTATION & BURIAL					$187,100		$187,100
24	WASTE CONTAINERS						$6,400	$6,400
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$198,700		$198,700
25	SCREENING & CONFIRMATION TESTING					$11,154,200		$11,154,200
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$5,504,800			$5,504,800
	FERMCO FIELD SUPPORT COSTS				$5,504,800	$11,540,000	$6,400	$17,051,200
28	EMISSION MODELING				$41,300		$76,800	$118,100
29	PSAR/FSAR(SAFETY RPT)				$708,800			$708,800
30	ENGINEERING	TITLE I&II $3,213,100 TITLE III	$3,662,000	CDR	$1,181,300	DCR	$685,100	$8,741,500
	ENGINEERING COSTS							$9,568,400
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$10,493,200	$629,600
	SUB-TOTAL	(BASE ESTIMATE)						$50,875,000
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	22.0%						$11,192,500
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$62,067,500
35	CONTINGENCY	7.5%						$3,815,600
								PRELIMINARY
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$65,883,100

LOTUS31\FS2\ALT6B\SF\INDSUM.WK3 - FEASABILITY STUDY

Alternative 6 – Excavation and On-Site Disposal with Off-Site Disposal of Fraction Exceeding WAC (Resident Farmer)

South Field

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Long Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Well Inspect & Maint.	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	1	1	5	sample	$5,500.00	28	NA	$154,000	One fifth x (33 wells x 4 samples/year plus 8 leachate samples/year)
Long Term	1	6	30	sample	$5,500.00	14	NA	$77,000	One fifth x (33 wells x 2 samples/year plus 4 leachate samples/year)
Well Inspect & Maint.	1	1	30	well	$388.14	1.65	2.13	$826	One fifth x (inspection of 26 wells twice/year & repair 1 out of 8)
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
OU2 Waste Cell Leachate									
Pipeline Maintenance	1	1	30	lump sum	$1,106.83	1	1.29	$1,428	Overall cost divided among 5 subunits.
Treatment & Disposal	1	1	30	gallon	0.01	86,000	NA	$860	Overall cost divided among 5 subunits.
Facility Maint. at Subunit									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Fence Repair	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	1	1	30	acre	$2,183.32	6.63	8.55	$18,673	Total divided among 5 subunits. (Incl. side slopes)
Mowing	1	1	30	acre	$1,861.92	8	10.32	$19,215	Total divided among 5 subunits
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.7	0.90	$1,780	Total divided among 5 subunits
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of OU2 Cell	5	5	30	Lump Sum	$20,000	1	NA	$20,000	Total divided among 5 subunits

Annual Costs, Year 1 (excluding facility review)	$218,901
Annual Costs, Years 2–5 (excluding facility review)	$197,472
Annual Costs, Years 6–30 (excluding facility review)	$120,472
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 D:

8/2/94

DATE: 08-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940724
EST. : KEN KEPLER
TASK I.D. : 2CSF

ALT-6B, SF - ON-SITE DISPOSAL w/OFF-SITE > WAC - RESIDENT FARMER

WBS#: 1.1.1.1.2.3.2

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	# NO. OF CHANGE OUTS PER WORKER PER DAY / MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	74	$950	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	74	$1,780	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	74	$380	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	74	$410	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	74	$440	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	74	$270	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	74	$5,180	C/B		
SUB-TOTAL		31.80	4		$9,410			
					$127.16	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	8		$100	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	4		$90	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	4		$700	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	2		$280	C/B		
THERMO STRIPS	EA	50.00	4		$200	C/B		
SUB-TOTAL		327.21			$1,370			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$10,800			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

DATE: 08-Aug-94

PROJECT TITLE:
ALT-6B, SF - ON-SITE DISPOSAL w/OFF-SITE > WAC - RESIDENT FARMER

HEALTH PHYSICS

EST.NO.: C2940724
EST. : KEN KEPLER
TASK I.D. : 2CSF

WBS#: 1.1.1.1.2.3.2

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	82	328	$16.97	$5,570		
ANNUAL PHYSICALS	1	3	82	246	$16.97	$4,170		
EXIT (TERMINATION) PHYSICALS	1	4	82	328	$16.97	$5,570		
SUB-TOTAL						$15,310		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	23	1	82	1908	$16.97	$32,380		
YEARLY IN-VIVO	1	4	82	328	$16.97	$5,570		
EXIT (END OF PROJECT / TERMINATION)	1	4	82	328	$16.97	$5,570		
SUB-TOTAL						$43,520		
WORK DELAYS CAUSED BY MONITORING	5%				$4,856,800	$242,840		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$4,856,800	$242,840		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$544,500	$10,800	$555,300

001770

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT –ALT–6B, SF – ON–SITE DISPOSAL w/OFF–SITE > WAC –
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CSF

WBS NO. – 1.1.1.1.2.3.2
EST. NO. – C2940724
BY – K. KEPLER
DATE – 08/08/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25–Mar–94	01–Jun–96	16–May–97	30–Apr–98	23	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
38	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940724
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CSF

WASTE CONTAINERS PURCHASE AND DISPOSAL COSTS

0.1
0.0

WASTE CONTAINER TYPE	PURCHASE COST BY FERMCO (1 YR) CAR	LINER	COVER	CERTI-FICATION BY FERMCO	TYPE OF WASTE	DENSITY OF WASTE TONS/CY	RAIL TRANSPORTATION COSTS / GONDOLA CAR OUTBOUND & RETURN COSTS 141 — $80.15 PER TON (90 TON MIN.) TONS	$'s PER GONDOLA OUTBOUND	N/A PER GONDOLA RETURN	$120 DEMURAGE $/DAY (>5 DAYS)	ENVIROCARE BURIAL COSTS (1971 max.) CUBIC FEET PER CONTAINER	$8.00 per cf DISPOSAL CHARGE	TRANSPORTATION AND BURIAL COSTS PER GONDOLA CAR
							DISCOUNT	6.0%	6.0%	1			SEE NOTE 7
BULK GONDOLA RAIL CAR	$0	$400	$395	$340	EARTH–DRY	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	FLYASH	0.810	90.00	$6,781	$0	$120	1971	$15,768	$22,669
	$0	$400	$395	$340	FLYASH/RUBBLE	1.270	90.17	$6,793	$0	$120	1971	$15,768	$22,681
	$0	$400	$395	$340	GW / RUBBLE	2.000	95.00	$7,157	$0	$120	1971	$15,768	$23,045
	$0	$400	$395	$340	LEAD/SOIL	1.810	95.00	$7,157	$0	$120	1971	$15,768	$23,045

INPUT

1) Type of waste to be disposed at ENVIROCARE.
2) Insert 125, 141, or 200 in field L10 for number of cars per train trip to determine % of discount.
3) Lbs per cubic foot for type of waste. (Enter on page 2.)
4) Total loose cubic yards (LCY) of waste (w/swell factor). (Enter on page 3.)
5) Verify all other unit costs with FERMCO Transportation Dept.
6) ENVIROCARE Burial based on a Maximum Allowable Volume (1917 cf) per Gondola car.
7) Excludes purchase costs and certification costs.
See page 3 for total costs per Gondola Car By Waste Material Type.

F-7-345

001772

FEMP-OU02-5 DRAFT
August 24, 1994

1861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940724
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CSF

WASTE CONTAINERS CAPACITY

WASTE CONTAINER TYPE	TYPE OF WASTE	DENSITY OF WASTE	lbs per cf	MAXIMUM CAPACITY cf	MAXIMUM LOADED WEIGHT	EMPTY WEIGHT	ALLOWABLE LBS. OF WASTE PER CONTAINER (C –D)	ALLOWABLE cf OF WASTE PER CONTAINER BY WEIGHT (E / A)	USE CY OF WASTE PER CONTAINER
			A	B	C	D	E	F	G
		TONS/ CY	LBS	CF	LBS	LBS	LBS	CF	CY
BULK GONDOLA RAIL CAR	EARTH–DRY	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH	0.810	60.00	1971.0	196,000	0	196,000	1971.0	73.0
	FLYASH/RUBBLE	1.270	94.40	1971.0	196,000	0	196,000	1971.0	73.0
	GW / RUBBLE	2.000	148.00	1971.0	196,000	0	196,000	1324.3	49.0
	LEAD/SOIL	1.810	134.00	1971.0	196,000	0	196,000	1462.7	54.2

INPUT

001773

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
WBS NO. – 1.1.1.1.2.3.2

EST.NO. C2940724
BY KEN KEPLER
DATE 08–Aug–94
TASK ID 2CSF

WASTE CONTAINERS

QUANTITY

WASTE CONTAINER TYPE	TYPE OF WASTE	USE CY OF WASTE PER CONTAINER	TOTAL LCY's OF WASTE	TOTAL QUANTITY OF GONDOLAS	TOTAL COSTS PER GONDOLA CAR	TOTAL TRANP. & BURIAL COSTS TO ENVIROCARE	UNIT COST $'s PER LCY		WASTE CONTAINER TYPE
		CY	CY	QTY.					
BULK GONDOLA RAIL CAR	EARTH–DRY	73.00	0.0	0	$23,816	$0	$326.25		BULK GONDOLA RAIL CAR
	FLYASH	73.00	0.0	0	$23,804	$0	$326.08		
	FLYASH/RUBBLE	73.00	0.0	0	$23,816	$0	$326.25		
	GW / RUBBLE	49.00	0.0	0	$24,180	$0	$493.47		
	LEAD/SOIL	54.20	396.0	8	$24,180	$193,400	$446.13		
						**			

INPUT

** NOTE:
Excludes loading Gondola cars with waste material. (See Direct Field Cost Estimate.)

F-7-347

001774

5861

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL (RESIDENT FARMER)														
SITE PREPARATION	1	LS		4,856						$83,540	$15,000	$60,310	$97,010	$255,860
DECONTAMINATION FACILITIES/SERVICES	1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210
EROSION AND SEDIMENT CONTROLS	1	LS		1428						$26,380		$8,320	$47,700	$82,400
PERCHED GROUNDWATER SYSTEM	N/A	LS												N/A
EXCAVATE – OFFSITE DISPOSAL (REMOVE LEAD/SOIL FROM FIRING RANGE)	1	LS		77						$1,310	$229,730	$1,750		$232,790
LOAD/HAUL – OFF–SITE DISPOSAL (LEAD/SOIL FROM FIRING RANGE)	1	LS		79						$1,360		$1,880		$3,240
EXCAVATE & HAUL TO ON–SITE DISPOSAL (Onsite)	1	LS		76043						$1,290,790		$1,178,950	$114,250	$2,583,990
COMPOSITE LINER	1	LS		70495						$1,197,030	$1,593,790	$1,641,510	$2,069,430	$6,501,760
COMPOSITE CAP	1	LS		17150						$291,040	$344,790	$418,460	$906,910	$1,961,200
DIKE FOR DISPOSAL CELL	1	LS		16372						$277,830	$76,680	$330,060	$505,350	$1,189,920
GENERATED WASTE REMOVAL	1	LS		2853						$48,410		$27,670		$76,080
SITE RESTORATION	1	LS		21059						$357,370		$674,660	$723,230	$1,755,260
MONITORING WELLS	1	LS									$488,000			$488,000
SUB–TOTAL (DIRECT FIELD COSTS)				210713						$3,580,550	$2,773,880	$4,344,890	$4,469,390	$15,168,710
TAKE–OFF ALLOWANCE 10%	1	LS		21,071						$358,060	$277,390	$434,490	$446,940	$1,516,880
TOTAL (DIRECT FIELD COSTS)	1	LS		231,784						$3,938,600	$3,051,300	$4,779,400	$4,916,300	$16,685,600

On–Site Disposal of South Field – w/Off–site Option – SUMMARY

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0017725

FEMP-OU02-5 DRAFT August 24, 1994

CONTR.NO. – 4[illegible]21
CLIENT – U[illegible]EPT. OF ENERGY
PROJECT – ALT-6B – SF – ON-SITE DISPOSAL w/OFF-SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION															
(ITEMS @ 20% ARE COMMON TO ALL SUB-UNITS)															
(ITEMS @ 33.3% ARE COMMON TO SF, AFP & IFP)															
a. Construction Survey		1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing		3400	LF	0.213	934	16.97				6.25	$15,850			$21,890	$37,740
c. Clear and Grub															
i. Remediation Site		15.00	AC	41.40	801	16.97			2575.00		$13,590		$39,780		$53,370
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Staging Area @ Sub-unit															
d. Dewatering															
i. Excavate Dewatering Trench		500	CY	0.50	323	16.97			1.49		$5,480		$770		$6,250
ii. Pump – w/4" Suction Hose		200	DAYS	3.00	774	16.97			19.55		$13,130		$4,030		$17,160
iv. HDPE Pipe to Sedimentation Tank		400	LF	0.19	98	16.97			0.67	0.84	$1,660		$270	$350	$2,280
v. Remove Sediment fm. Tank – 1cy/trip		2	CY	4.00	10	16.97			100.00		$170		$210		$380
e. General Grading															
i. New Roads		5778	SY	0.001	7	16.97			0.07		$120		$420		$540
	33.3%														
ii. Office/Parking Area	2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area	272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area	49	16	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub-Unit	2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
f. Surfacing/Paving/Concrete Slab															
i. New Roads – 8" Gravel W/Geotextile		5778	SY	0.030	224	16.97			1.08	6.66	$3,800		$6,430	$39,640	$49,870
	33.3%														
ii. Office/Parking – 8" Gravel W/ Geotextile	2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub-Unit – 160' x160' Concrete															
Sub-Grade & Sub-Base for Conc.Slab	2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk.	631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" thk.	24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub-grade Piping – 4"	500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating	2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab	183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip.	1	0.33	LS	2.00	1	16.97			184.00		$20		$60		$80
TOTAL (SITE PREPARATION)		1	LS		4,856						$83,540	$15,000	$60,310	$97,010	$255,860

Site Preparation Details

FEMP-OU02-5 DRAFT
August 24, 1994
5861
F-7-349
001776

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	33.3%														
a. Decon Trailer – Rental	51	17	MO					1500.00				$25,470			$25,470
	33.3%														
b. Construction Equipment Decon. Facility															
25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'l.d.x 25lfx8" thk.	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in conc.	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
	BCY														
x. Backfill & Compaction around concrete slab	258	103	ICY	0.086	11	16.97			1.38		$190		$150		$340
SUB–TOTAL (EQUIP. DECON. FACILITY)					265						$4,810	$25,860	$1,210	$4,140	$36,020

Equipment Decon. Facility Details

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT-6B – SF – ON-SITE DISPOSAL w/OFF-SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU-2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB-UNIT (CON'T.)															
c. Personnel Decon. Facility	33.3%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub-grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub-grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast-in-Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Guard	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'-6" Wood Posts set in conc.	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping – 1500 gal.	1	0	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB-TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210

Personnel Decon.Facilities/Services Details

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FEMP-OU02-5 DRAFT
August 24, 1994

5861

001278

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	2000	LF	0.017	44	16.97			0.06	0.65	$750		$120	$1,340	$2,210
ii.Diversion Berms	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iii. Diversion Ditches	50	CY	0.24	15	16.97			0.84	7.50	$250		$40	$380	$670
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	500	EA	0.24	155	16.97			1.53	1.35	$2,630		$790	$700	$4,120
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. Sedimentation/Decon. Tank 13000 gal	1	LS	40.00	52	19.95			140.00	5500.00	$1,040		$140	$5,500	$6,680
iv. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1200	LF	0.38	590	19.95			5.11	4.42	$11,770		$6,130	$5,300	$23,200
v. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhole W/Cleanout	3	EA	8.00	31	16.97			28.00	8300.00	$530		$80	$24,900	$25,510
vi. 50 gal. Pump Includes Controls & Electrical	2	EA	60.00	155	16.97			210.00	2500.00	$2,630		$420	$5,000	$8,050
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,428						$26,380		$8,320	$47,700	$82,400

001779

F-7-352

FEMP-OU02-5 DRAFT
August 24, 1994

Erosion Control Details

CONTR.NO.– 4[illegible]21
CLIENT – U[illegible]EPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
OFF–SITE DISPOSAL														
Excavate Lead Contaminated Soil at Firing Range														
Excavate	300	BCY	0.20	77	16.97			5.65		$1,310		$1,750		$3,060
Solidification of lead cont.soil w/Portland Cement														
30% Portland Cement, 2% Sodium Silicate in drums. 300 CY @ 1.5 Tons =	450	TONS					510.50				$229,730			$229,730
TOTAL (EXCAVATE OFFSITE DISPOSAL)	1	LOT		77						$1,310	$229,730	$1,750		$232,790

Excavate – Offsite Disposal Details

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August 24, 1994

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
LOAD & HAUL														
OFF–SITE DISPOSAL														
Lead Removal at Firing Range														
HAUL														
From excavation site to rail loading facility														
6 CY dump truck 1/2 mi rt.														
Solidified lead/soil/cement	396	LCY	0.04	21	16.97			1.65		$360		$670		$1,030
LOADING GONDOLA														
Solidified lead/soil/cement LCY														
Excav. 300 BCY x 1.25 swell factor = 396														
Allowable CY's of waste per Gondola 54.2														
Install Liner in Gondola car														
Solidified lead/soil/cement	8	EA	0.75	8	16.97			32.21		$140		$260		$400
Load Gondola – 6/day, 2 workers	1	DAYS	16.00	28	16.97			15.00		$480		$20		$500
Seal liner, Install Cover														
Solidified lead/soil/cement	8	EA	0.75	8	16.97			32.21		$140		$260		$400
Dust control – light	1	DAYS	8.00	14	16.97			500.00		$240		$670		$910
(RSO takes ownership at this time.)														
(See: Off–Site Disposal Wksht. & App.E)														
TOTAL (LOAD & HAUL – OFFSITE DISPOSAL	1	LOT		79						$1,360		$1,880		$3,240

Load & Haul – Offsite Disposal Details

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001781

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	RATE	COST/UNIT LABOR	SUB	EQUIP.	MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
LOAD & HAUL TO ON–SITE DISPOSAL CELL														
(NO TREATMENT)														
Excavate Contaminated Soil														
Excavate and Load – Level D	338900	BCY	0.055	24045	16.97			1.17		$408,040		$408,410		$816,450
Excavate Additional Soil	34000	BCY	0.055	2412	16.97			1.17		$40,930		$40,970		$81,900
Haul to Onsite Disposal Cell BCY														
– 12" thk. Cushion Layer 16748	20935	LCY	0.081	2187	16.97			1.51		$37,110		$32,560		$69,670
– Impacted Fill 356152	445190	LCY	0.081	46518	16.97			1.51		$789,410		$692,400		$1,481,810
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load – Level C	500	BCY	0.055	35	16.97			1.17		$590		$600		$1,190
Haul to Onsite Disposal Cell BCY 500	625	LCY	0.081	65	16.97			1.51		$1,100		$970		$2,070
			S/T	100										
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	100	HRS	150%	150	16.97			1.51		$2,550		$160		$2,710
			S/T	250										
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	25	MD												
(SHREDDING COMMON TO SWL, IFP & SF)														
k. Shredder/Crusher – Purchase/Install 33.3%	0.3	LOT	280.0	120	19.95			8400.00	317800.00	$2,390		$2,880	$109,000	$114,270
60 Ton per Hour														
Excavated Debris BCY 6500														
Generated Waste BCY 5217														
Excavated Debris TONS 10359														
(Percent of Gen.Waste to be Shredded 18%														
Generated Waste TONS 1497														
TOTAL TONS 11856														
Operating Costs	198	HRS							25.75				$5,250	$5,250
(2) Operators	396	HRS	1.00	511	16.97					$8,670				$8,670
TOTAL (EXCAV/NO TREATMENT–ONSITE DISPOSAL)	1	LOT		76,043						$1,290,790		$1,178,950	$114,250	$2,583,990

Excavate – No Treatment – South Field Onsite Disposal Details

FEMP-OU02-5 DRAFT
August 24, 1994
F-7-355
001782
5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP.)															
a. Clear and Grubb	20%														
i. Disposal Cell & Surrounding area	35	9.0	AC	41.40	481	16.97			2575.00		$8,160		$23,870		$32,030
b. Relocated South Access Road	20%														
i. Clear & Grub	3	0.6	AC	41.40	32	16.97			2575.00		$540		$1,590		$2,130
ii. General Grading	1467	293.4	SY	0.001		16.97			0.07				$20		$20
iii. Road – 8" Gravel W/Geotextile	7333	1466.6	SY	0.030	57	16.97			1.08	6.66	$970		$1,630	$10,060	$12,660
c. Haul Road	20%														
i. Clear & Grub	2.4	0.5	AC	41.40	26	16.97			2575.00		$440		$1,270		$1,710
ii. General Grading	11556	2311.2	SY	0.001	3	16.97			0.07		$50		$170		$220
iii. Road – 8" Gravel W/Geotextile	5778	1155.6	SY	0.030	45	16.97			1.08	6.66	$760		$1,290	$7,930	$9,980
	20%														
d. Temporary Construction Fencing	5200	1040.0	LF	0.213	286	16.97				6.25	$4,850			$6,700	$11,550
e. 20' wide Swing Gates	1	0.2	EA	25.60	7	16.97			340.00	560.00	$120		$70	$120	$310
f. Staging Area @ Cell	20%														
Area Excavation for Slab	1606	321.2	BCY	0.016	7	16.97			0.60		$120		$200		$320
Sub–Base for Slab	2845	569.0	SY	0.041	30	16.97		6.75	1.45	5.51	$510	$3,960	$850	$3,230	$8,550
HDPE Perf.Sub–grade Piping – 4"	500	100.0	LF	0.21	27	16.97			0.74	3.02	$460		$80	$310	$850
Concrete Slab – 160'x160'x8" thk	631	126.2	CY	4.07	663	17.98			14.25	67.00	$11,920		$1,850	$8,710	$22,480
Concrete Curb – 480'x2'x8" thk	24	4.8	CY	15.30	95	17.98			11.16	275.90	$1,710		$60	$1,360	$3,130
Epoxy Coating	2845	569.0	SY	0.22	161	16.97			0.77	7.56	$2,730		$450	$4,430	$7,610
Backfill & Compact around Slab	183	36.6	ICY	0.086	4	16.97			1.38				$50		$50
Mob/Demob.Equip.	1	0.2	LS	2.00	1	16.97			184.00		$20		$40		$60
g. Storage Area – 200' x 200' Asphalt															
Includes Compacted Sub–Grade	4444	889	SY	0.084	96	16.97			2.56	14.04	$1,630		$2,340	$12,850	$16,820
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat															
	20%														
h. Decon Trailer – Rental	51	10	MO					1500.00				$15,760			$15,760
i. Const.Equipment Decon. Facility	20%														
25 ft x 60 ft	1	0.20	LS	730.00	146	18.05		1160.00	2900.00	11980.00	$2,640	$240	$580	$2,400	$5,860
j. Personnel Decon. Facility	20%														
11'x 11'	1	0.20	LS	108.00	22	18.89		100.00	360.00	4120.00	$420	$20	$70	$820	$1,330
SUB–TOTAL (COMPOSITE LINER –SITE PREP)		1	LOT		2,189	17.38					$38,050	$19,980	$36,480	$58,920	$153,430

Composite Liner – Site Prep. – South Field Onsite Disposal Details

F-7-356
001783
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[illegible]21
CLIENT – U[illegible]EPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL [illegible]/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (CON'T.)														
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.														
COMPOSITE LINER														
a. Subgrade Preparation – includes removal of top soil, grading & comp.	50752	SY	0.024	1571	16.97			0.86		$26,660		$44,960		$71,620
b. 95% Clay – 5% Bentonite 36" Thk BCY 50752	59887	ICY	0.260	20086	16.97			11.19	20.35	$340,860		$690,240	$1,255,270	$2,286,370
c. Composite Clay Liner	50752	SY					7.38				$374,550			$374,550
d. HDPE Liner 60 mil	50752	SY					4.75				$241,070			$241,070
e. Geotextile Fabric	50752	SY					2.25				$114,190			$114,190
f. Pea Gravel 12" Thk; In–place BCY 16748	18004	ICY	0.11	2555	16.97			0.77	17.00	$43,360		$14,280	$315,250	$372,890
g. Composite Clay Liner	50752	SY					7.38				$374,550			$374,550
h. HDPE Liner 60 mil	50752	SY					4.75				$241,070			$241,070
i. Geotextile Fabric	50752	SY					2.25				$114,190			$114,190
j. Pea Gravel 12" Thk; In–place BCY 16748	18004	ICY	0.11	2555	16.97			0.77	17.00	$43,360		$14,280	$315,250	$372,890
k. Geotextile Fabric	50752	SY					2.25				$114,190			$114,190
l. HDPE Perforated Pipe – leachate collection 6" Dia.	3840	LF	0.30	1486	16.97			1.05	6.56	$25,220		$4,150	$25,950	$55,320
m. HDPE Perforated Pipe – leak detection 6" Dia.	3840	LF	0.30	1486	16.97			1.05	6.56	$25,220		$4,150	$25,950	$55,320
n. Leachate Discharge Piping														
i. HDPE Carrier & containment Pipe 6" x 10" Includes Trench Excav/Backfill, sand bedding and compaction.	1680	LF	0.86	1864	16.97			11.37	22.33	$31,630		$19,670	$38,640	$89,940
ii. HDPE Manhole – 4' dia. x 8' deep	4	EA	8.00	41	16.97			28.00	8300.00	530.00		$120	$34,200	$34,850
o. Impacted Fill–Cusion Layer 12" Thk BCY 16748	20935	LCY	0.06	1620	16.97			1.67		$27,490		$36,010		$63,500
p. Impacted Fill–Spread and Compact BCY 356152	445190	LCY	0.06	34458	16.97			1.67		$584,750		$765,770		$1,350,520
q. Generated Waste BCY 5217	6000	LCY	0.06	464	16.97			1.67		$7,870		$10,320		$18,190
PPE LEVEL C Allowance is added to the following														
r. Impacted fill BCY 500	625	LCY	0.06	48	16.97			1.67		$810		$1,080		$1,890
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C	48	HRS	150% S/T	72 120	16.97					$1,220				$1,220
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)	12	MD												
SUB–TOTAL (COMPOSITE LINER)	1	LOT		68,306						$1,158,980	$1,573,810	$1,605,030	$2,010,510	$6,348,330
TOTAL (COMPOSITE LINER)	1	LOT		70,495						$1,197,030	$1,593,790	$1,641,510	$2,069,430	$6,501,760

Composite Liner Details

F-7-357
001784
FEMP-OU02-5 DRAFT August 24, 1994
5861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE CAP															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
COMPOSITE CAP															
a. Contouring Layer 18" Thk.	BCY 10525	12630	ICY	0.06	978	16.97			1.67	3.50	$16,600		$21,720	$45,530	$83,850
b. 95% Clay – 5% Bentonite 24" Thk	BCY 14104	15162	ICY	0.260	5085	16.97			11.19	20.35	$86,290		$174,750	$317,800	$578,840
c. GML\GCC – composite Liner		21050	SY					7.38				$155,350			$155,350
d. Geotextile Fabric		21050	SY					2.25				$47,360			$47,360
e. Pea gravel 12" Thk, In–place	BCY 6947	7468	ICY	0.11	1060	16.97			0.77	17.00	$17,990		$5,920	$130,770	$154,680
f. Geotextile Fabric		21050	SY					2.25				$47,360			$47,360
g. Cobbels 36" Thk; In–place	BCY 21050	22629	ICY	0.258	7531	16.97			7.15	10.10	$127,800		$166,650	$235,410	$529,860
h. Geotextile Fabric		21050	SY					2.25				$47,360			$47,360
i. Sand Layer 6" Thk; In–place	BCY 3579	3847	ICY	0.052	258	16.97			1.76	5.00	$4,380		$6,970	$19,810	$31,160
j. Geotextile Fabric		21050	SY					2.25				$47,360			$47,360
k. Common Soil 21" Thk; In–place	BCY 12209	14651	ICY	0.06	1134	16.97			1.67	3.50	$19,240		$25,200	$52,820	$97,260
l. Top Soil 6" Thk; In–place	BCY 3579	4295	ICY	0.053	294	16.97			1.82	12.10	$4,990		$8,050	$53,530	$66,570
m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding	SY 21050	189	MSF	0.30	73	16.97			6.75	25.00	$1,240		$1,310	$4,870	$7,420
n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized		3360	LF	0.17	737	16.97			2.28	13.40	$12,510		$7,890	$46,370	$66,770
TOTAL (COMPOSITE CAP)		1	LOT		17,150						$291,040	$344,790	$418,460	$906,910	$1,961,200

Composite Cap Details

FEMP-OU02-5 DRAFT
August 24, 1994
F-7-358
001785
08-Aug-94
ALT-6B - SF ITE CELL
Page 11

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DIKE FOR DISPOSAL CELL															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
a. Borrow Common Soil – Dike	BCY 11723	14068	ICY	0.06	1089	16.97			1.67	3.50	$18,480		$24,200	$50,710	$93,390
b. Geotextile Fabric		34081	SY					2.25				$76,680			$76,680
c. Cobbels 36" Thk; In–place	BCY 34081	40897	ICY	0.258	13611	16.97			7.15	10.10	$230,980		$301,190	$425,450	$957,620
d. Drainage Piping – HDPE	6" Dia.	4320	LF	0.30	1672	16.97			1.05	6.56	$28,370		$4,670	$29,190	$62,230
TOTAL (DIKE – DISPOSAL CELL)		1	LOT		16,372						$277,830	$76,680	$330,060	$505,350	$1,189,920

Dike Details

FEMP-OU02-5 DRAFT
August 24, 1994

5861

001786

F-7-359

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS-

CONTR.NO. 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2GSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL															
a. Office/Parking Area @ S/U	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo–Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Facil.@ S/U	33%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo–Fabric & Liner	167	56	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Facil. @ S/U	33%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292					9.16				$10		$10
Geo–Fabric & Liner	14	5	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
d. Staging pad @ S/U	33.3%														
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo–Fabric & Liner 105 cy	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	395.5	132	BCY	0.30	51	16.97			2.51		$870		$340		$1,210
	20%														
e. Const.Equip.Decon.Facil. @ Onsite Disp.Cell															
Demo/Remove Concrete	49.3	10	BCY	1.2	15	16.97			3.62		$250		$40		$290
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	6	BCY	0.292	2	16.97			9.16		$30		$50		$80
Geo–Fabric & Liner	167	33	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	5	EA	0.48	3	16.97			1.68		$50		$10		$60
Splash Guard	702	140	SF	0.04	7	16.97			0.03		$120				$120
Haul & Dump Rubble	24.9	5	BCY	0.30	2	16.97			2.51		$30		$10		$40
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		622						$10,540		$4,710		$15,250

Generated Waste Removal Details

F-7-360
001787
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.[redacted] 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.) Demo. /Load/Haul/Dump/Compact															
	20.0%														
f. Personnel Decon. Facil.@ Onsite Disp. Cell															
Demo/Remove Concrete	2.2	0.44	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	0.48	BCY	0.292		16.97			9.16						
Geo–Fabric & Liner	14	3	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	6	1	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	26	SF	0.04	1	16.97			0.03		$20				$20
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
	20.0%														
g. Relocated South Access Road/Cell	SY														
Road – 8" Gravel W/Geotextile	7333	1467	BCY	0.292	552	16.97			9.16		$9,370		$13,840		$23,210
Haul & Dump Rubble		1467	BCY	0.30	568	16.97			2.51		$9,640		$3,790		$13,430
	20.0%														
h. Haul Road for Cell	SY														
Road – 8" Gravel W/Geotextile	5778	257.0	BCY	0.292	97	16.97			1.08		$1,650		$290		$1,940
Haul & Dump Rubble		257.0	BCY	0.30	99	16.97			2.51		$1,680		$660		$2,340
	20.0%														
i. Temporary Construction Fencing @ Cell	5200	1040.0	LF	0.107	143	16.97					$2,430				$2,430
Haul & Dump Rubble		135.0	BCY	0.30	52	16.97			2.51		$880		$350		$1,230
	20.0%														
j. 20' wide Swing Gates @ Cell	2	0.40	EA	12.75	7	16.97			340.00		$120		$140		$260
Haul & Dump Rubble		0.05	BCY	0.30		16.97			2.51						
	20.0%														
k. Storage Pad Area @ Cell	BCY														
Demo/Remove Asphalt	988	197.6	BCY	1.2	306	16.97			3.62		$5,190		$740		$5,930
Excav., Load, Haul, Backfill, Compac	474.0	94.8	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Sub–grade Stone															
Geo–Fabric & Liner	4444	888.8	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble		197.0	BCY	0.30	76	16.97			2.51		$1,290		$510		$1,800
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,942						$32,970		$21,230		$54,200

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

001788

1861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.)															
Demo. /Load/Haul/Dump/Compact															
The following prorated at:	20.0%														
I. Staging Area @ On–Site Disposal Cell															
Demo/Remove Concrete	655	131.0	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	95.0	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo–Fabric & Liner 105 cy	2845	569.0	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	395.5	126.0	BCY	0.30	49	16.97			2.51		$830		$330		$1,160
TOTAL GENERATED WASTE	BCY 5217 LCY 6000														
SUB– TOTAL (GENERATED WASTE REMOVAL		1	LOT		289						$4,900		$1,730		$6,630
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		2,853						$48,410		$27,670		$76,080

Generated Waste Removal Details

FEMP-OU02-5 DRAFT
August 31, 1994

F-7-362

001789

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.[redacted] 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
South Field	112000	134400	ICY	0.09	15604	16.97			3.21	3.50	$264,800		$444,370	$484,510	$1,193,680
	33.3%														
Office/Parking	494	197	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	31	ICY												
Decon.Facil.– Personnel @ S/U	7	3	ICY												
Staging Area @ S/U	1099	439	ICY												
	S/T	670.5	ICY	0.09	78	16.97			3.21	3.50	$1,320		$2,220	$2,420	$5,960
	20%														
Staging Area at On–Site Disp.Cell	1099	264	ICY												
Storage Area at On–Site Disp.Cell	474	114	ICY												
Decon.Facil.– Const.Equip. @ Cell	78	19	ICY												
Decon.Facil.– Personnel @ Cell	7	2	ICY												
Relocated South Access Road	1628	391	ICY												
Haul Road	1283	308	ICY												
	S/T	1096.6	ICY	0.09	127	16.97			3.21	3.50	$2,160		$3,630	$3,950	$9,740
b. Final Grade for SF		62920	SY	0.02	1623	16.97			0.70		$27,540		$45,370		$72,910
c. Borrow Top Soil 6" Thk., Spread															
South Field		62920	SY	0.036	2922	16.97			2.33	2.88	$49,590		$151,000	$186,650	$387,240
	33.3%														
Office/Parking	2222	740	SY												
Decon.Facil.– Const.Equip. @ S/U	167	56	SY												
Decon.Facil.– Personnel @ S/U	14	5	SY												
Staging Area @ S/U	2845	947	SY												
	S/T	1747.6	SY	0.036	81	16.97			2.33	2.88	$1,370		$4,190	$5,180	$10,740
	20%														
Staging Area at On–Site Disp.Cell	2845	683	SY												
Storage Area at On–Site Disp.Cell	4444	1067	SY												
Decon.Facil.– Const.Equip. @ Cell	167	40	SY												
Decon.Facil.– Personnel @ Cell	14	3	SY												
Relocated South Access Road	14667	3520	SY												
Haul Road	11556	2773	SY												
	S/T	8086.3	SY	0.036	376	16.97			2.33	2.88	$6,380		$19,410	$23,990	$49,780
SUB–TOTAL (SITE RESTORATION)		1	LOT		20,811						$353,160		$670,190	$706,700	$1,730,050

Site Restoration Details

FEMP-OU02-5 DRAFT
August 24, 1994

F-7-363

001290

5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION (CON'T.)															
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
South Field	62920	566	MSF	0.30	219	16.97			6.75	25.00	$3,720		$3,940	$14,570	$22,230
	33.3%														
Office/Parking	2222	6.7	MSF												
Decon.Facil.– Const.Equip. @ S/U	167	0.5	MSF												
Decon.Facil.– Personnel @ S/U	14		MSF												
Staging Area @ S/U	2845	8.5	MSF												
	S/T	15.7	MSF	0.30	6	16.97			6.75	25.00	$100		$110	$400	$610
	20%														
Staging Area at On–Site Disp.Cell	2845	5.1	MSF												
Storage Area at On–Site Disp.Cell	4444	8.0	MSF												
Decon.Facil.– Const.Equip.@ Cell	167	0.3	MSF												
Decon.Facil.– Personnel @ Cell	14		MSF												
Relocated South Access Road	14667	26.4	MSF												
Haul Road	11556	20.8	MSF												
	S/T	60.6	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,560	$2,370
SUB–TOTAL (SITE RESTORATION)		1	LOT		248						$4,210		$4,470	$16,530	$25,210
TOTAL (SITE RESTORATION)		1	LOT		21,059						$357,370		$674,660	$723,230	$1,755,260

Site Restoration Details

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001791

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4[illegible]21
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
MONITORING WELLS – MW														
Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility	15	PR					23000.00				$345,000			$345,000
b. Abandon Existing Wells	11	EA					13000.00				$143,000			$143,000
TOTAL (MONITORING WELLS)	1	LOT									$488,000			$488,000

Monitoring Wells Details

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5861

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
PURCHASE COSTS by FERMCO															
PURCHASE															
Bulk Gondola Rail Car	N/A	0	EA												
Liner for Gondola															
Excavated Waste – level C,D & Additio	N/A		EA							400.00					
Excavated Waste – lead/soil		8	EA							400.00				$3,200	$3,200
Generated Waste	N/A		EA							400.00					
Cover for Gondola															
Excavated Waste – level C,D & Additio	N/A		EA							395.00					
Excavated Waste – lead/soil		8	EA							395.00				$3,160	$3,160
Generated Waste	N/A		EA							395.00					
(Also See Appendix E)															
TOTALS FORWARD TO ESTIMATE SUMMARY No.24															
TOTAL (PURCHASE COSTS – FERMCO)		1	LOT											$6,400	$6,400

001793

F-7-366

Purchase Waste Container Details

CONTR.NO. – [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
OFF–SITE TRANSPORTATION COSTS TO ENVIROCARE														
FERMCO (RSO) Handling & Certification														
Certification of Gondolas	8	EA					340.00				$2,720			$2,720
Rail Transportation & Burial														
Gondola Car – Outbound & Return														
Excavated Waste – level C,D & Additio N/A		EA					22681.00							
Excavated Waste – lead/soil	8	EA					23045.00				$184,360			$184,360
Generated Waste N/A		EA					23045.00							
(Also See Appendix E)														
TOTALS FORWARD TO ESTIMATE SUMMARY No.23														
TOTAL (OFF–SITE TRANSPORT. COSTS – FERMCO)	1	LOT									$187,100			$187,100

001794

ENVIROCARE Transportation Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-7-367

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CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT				LABOR	S/C	EQUIP.	MATERIAL	TOTAL
			UNIT	TOTAL	RATE	LABOR	SUB	EQUIP.	MAT'L					
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	165000	GAL					0.01				$1,700			$1,700
Runnoff from the Exclusion Zone.	19700000	GAL					0.01				$197,000			$197,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$198,700			$198,700

Waste Water Treatment Operations Cost Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4[illegible]21
CLIENT – U[illegible]EPT. OF ENERGY
PROJECT – ALT–6B – SF – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940724
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	1869	EA					2,002				$3,741,700			$3,741,700
Rad	1869	EA					2,000				$3,738,000			$3,738,000
Confirmatory Tests														
Full Rad Tests	935	EA					3,101				$2,899,400			$2,899,400
Full HSL	150	EA					1,500				$225,000			$225,000
Full TCLP	150	EA					2,000				$300,000			$300,000
2 Technicians per Month	19	MO					13,163				$250,100			$250,100
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING/CONFIRMATION TESTS)	1	LOT									$11,154,200			$11,154,200

Screening & Confirmation Testing Details

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FEMP-OU02-5 DRAFT
August 2[illegible], 1994

586

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 6B, SF – ON–SITE DISPOSAL W/OFF–SITE > WAC
CLIENT: DOE DATE: 09–Aug–94
CONTRACT: C2–94–07–24 BASE ESTIMATE: $50,875,000

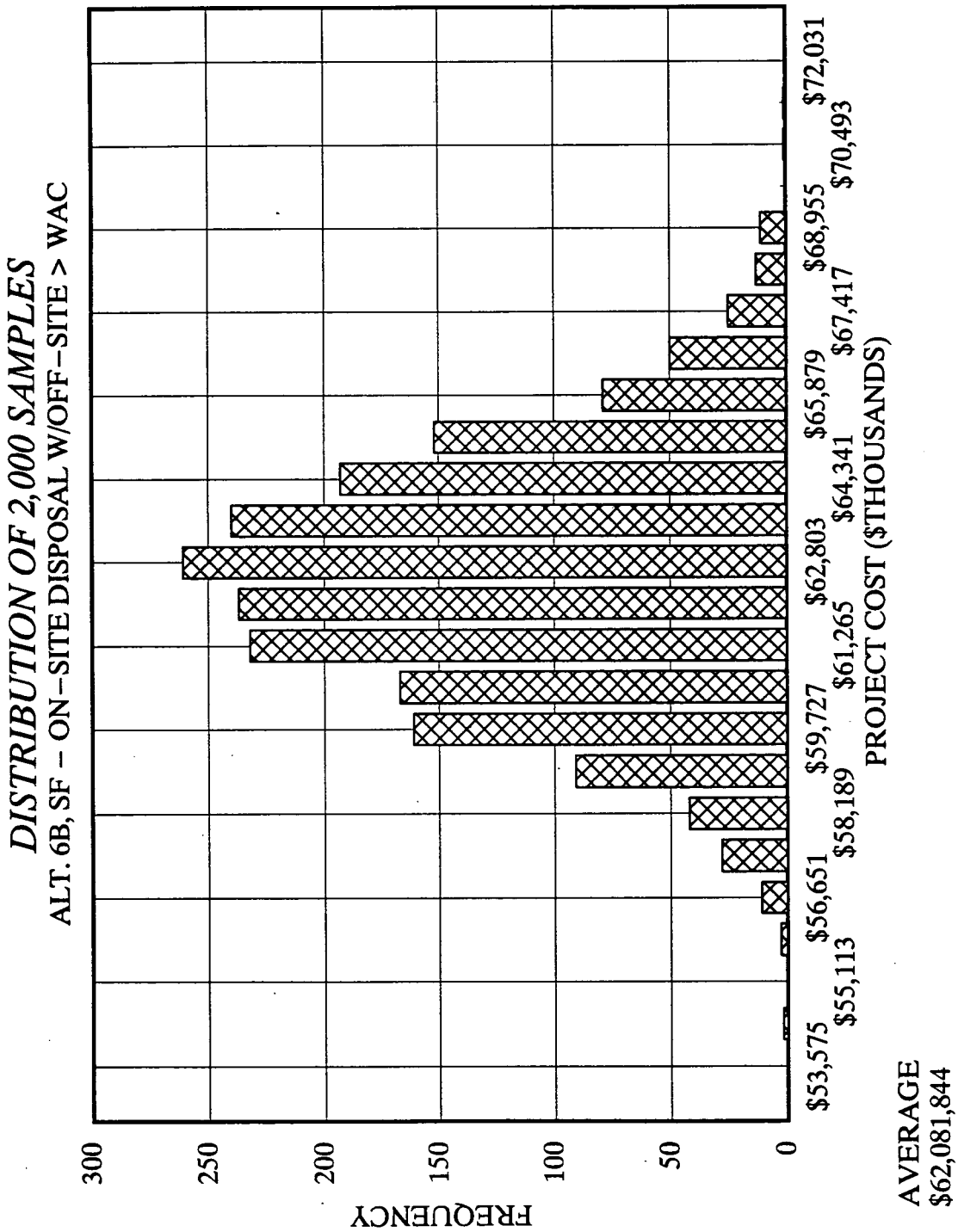
CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$76,117,219	$25,242,219	49.6%
0.05%	$68,932,668	$18,057,668	35.5%
5.00%	$65,894,042	$15,019,042	29.5%
10.00%	$64,994,122	$14,119,122	27.8%
15.00%	$64,474,628	$13,599,628	26.7%
20.00%	$64,103,863	$13,228,863	26.0%
25.00%	$63,712,567	$12,837,567	25.2%
30.00%	$63,346,850	$12,471,850	24.5%
35.00%	$63,020,709	$12,145,709	23.9%
40.00%	$62,703,088	$11,828,088	23.2%
45.00%	$62,395,713	$11,520,713	22.6%
50.00%	$62,100,569	$11,225,569	22.1%
55.00%	$61,799,673	$10,924,673	21.5%
60.00%	$61,457,407	$10,582,407	20.8%
65.00%	$61,147,276	$10,272,276	20.2%
70.00%	$60,865,388	$9,990,388	19.6%
75.00%	$60,483,012	$9,608,012	18.9%
80.00%	$60,029,934	$9,154,934	18.0%
85.00%	$59,553,039	$8,678,039	17.1%
90.00%	$59,086,922	$8,211,922	16.1%
95.00%	$58,329,622	$7,454,622	14.7%
99.95%	$54,342,190	$3,467,190	6.8%
100.00%	$47,983,398	($2,891,602)	–5.7%

001797

FERMCO RISK BUDGET ESTIMATING INPUT DATA TABLE

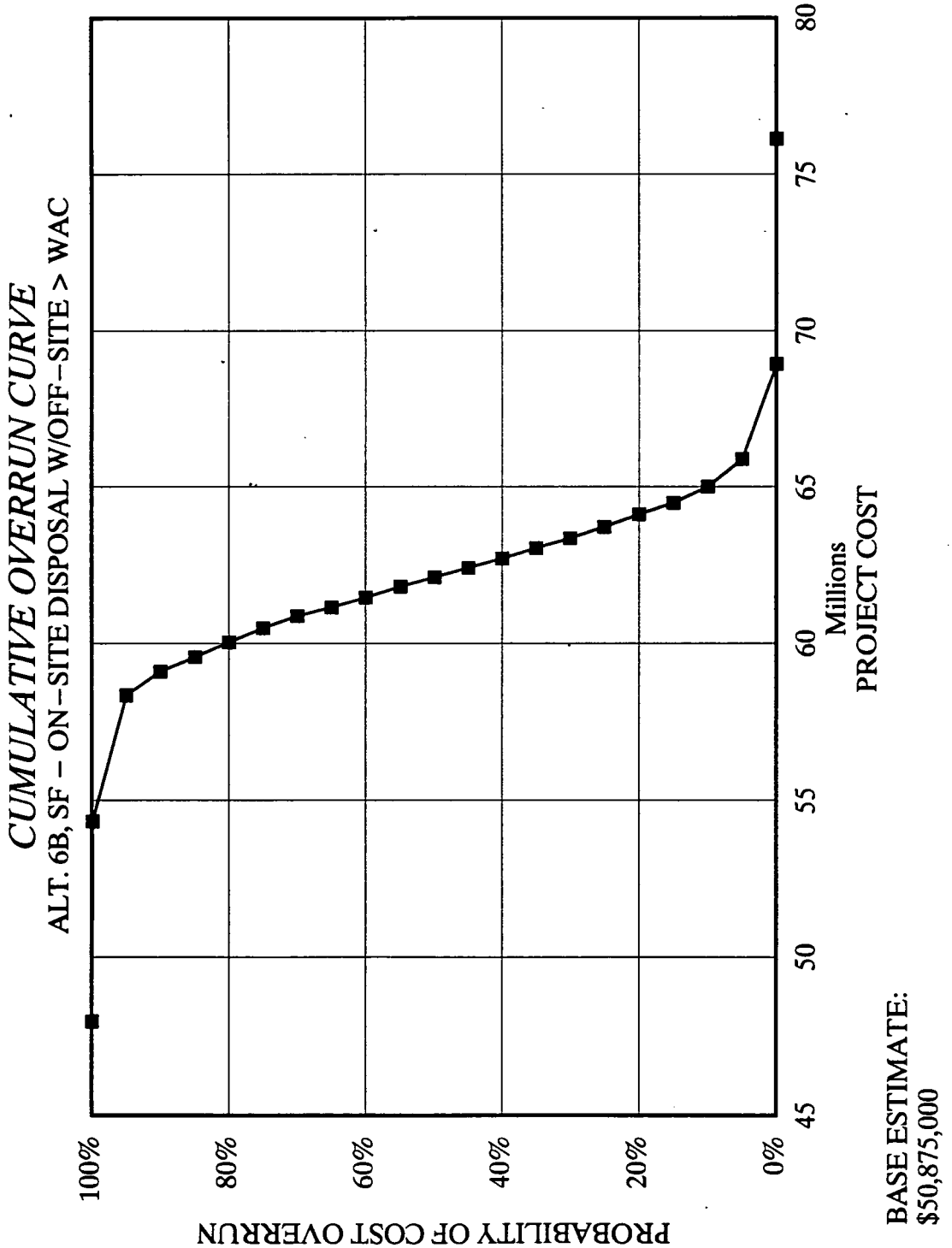
PROJECT: ALT. 6B, SF – ON-SITE DISPOSAL W/OFF-SITE > WAC
CLIENT: DOE
CONTRACT: C2-94-07-24

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA-TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$91,890	-5.0%	$87,296	30%	$119,457	U		14%
2	SITE PREPERATION S/C	16,500	-5.0%	15,675	30%	21,450	U		14%
3	SITE PREPERATION MAT'L	106,710	-5.0%	101,375	20%	128,052	U		20%
4	DECON FACILITIES/SERVICES LABOR	6,040	-2.0%	5,919	80%	10,872	U		2%
5	DECON FACILITIES/SERVICES S/C	28,480	-6.0%	26,771	80%	51,264	U		7%
6	DECON FACILITIES/SERVICES MAT'L	6,060	-6.0%	5,696	60%	9,696	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	29,020	-5.0%	27,569	50%	43,530	U		9%
8	EROSION/SEDIMENT CNTRLS MAT'L	52,470	-5.0%	49,847	30%	68,211	U		14%
9	EXC/SRT/DRY OFF-SITE DISP LABOR	1,440	-6.0%	1,354	125%	3,240	U		5%
10	EXC/SRT/DRY OFF-SITE DISP S/C	252,700	-6.0%	237,538	125%	568,575	U		5%
11	LOAD & HAUL OFF-SITE DISP LABOR	1,500	-5.0%	1,425	75%	2,625	U		6%
12	EXC/SRT/CRSH ON-SITE DISP LBR	1,419,870	-6.0%	1,334,678	150.0%	3,549,675	U		4%
13	EXC/SRT/CRSH ON-SITE DISP MAT'L	125,680	-6.0%	118,139	80.0%	226,224	U		7%
14	COMPOSITE LINER LABOR	1,316,730	-6.0%	1,237,726	100%	2,633,460	U		6%
15	COMPOSITE LINER S/C	1,753,170	-6.0%	1,647,980	100%	3,506,340	U		6%
16	COMPOSITE LINER MAT'L	2,276,370	-6.0%	2,139,788	80.0%	4,097,466	U		7%
17	COMPOSITE CAP LABOR	320,140	-6.0%	300,932	100.0%	640,280	U		6%
18	COMPOSITE CAP S/C	379,270	-6.0%	356,514	100.0%	758,540	U		6%
19	COMPOSITE CAP MAT'L	997,600	-6.0%	937,744	80.0%	1,795,680	U		7%
20	DIKE LABOR	305,610	-6.0%	287,273	125.0%	687,623	U		5%
21	DIKE S/C	84,350	-6.0%	79,289	125.0%	189,788	U		5%
22	DIKE MAT'L	555,890	-6.0%	522,537	125.0%	1,250,753	U		5%
23	GENERATED WASTE REMVL LABOR	53,250	-5.0%	50,588	50.0%	79,875	U		9%
24	SITE RESTORATION LABOR	393,110	-5.0%	373,455	30.0%	511,043	U		14%
25	SITE RESTORATION MAT'L	795,550	-5.0%	755,773	30.0%	1,034,215	U		14%
26	MONITORING WELLS S/C	536,800	-5.0%	509,960	50.0%	805,200	U		9%
27	INDIRECT FIELD COSTS LABOR	4,271,400	-5.0%	4,057,830	50.0%	6,407,100	U		9%
28	INDIRECT FIELD COSTS S/C	1,960,900	-5.0%	1,862,855	100.0%	3,921,800	U		5%
29	INDIRECT FIELD COSTS MAT'L	5,487,300	-5.0%	5,212,935	50.0%	8,230,950	U		9%
30	FIELD SUPPORT COSTS LABOR	5,504,800	-10.0%	4,954,320	30.0%	7,156,240	U		25%
31	FIELD SUPPORT COSTS S/C	11,540,000	-5.0%	10,963,000	30.0%	15,002,000	U		14%
32	FIELD SUPPORT COSTS MAT'L	6,400	-1.0%	6,336	50.0%	9,600	U		2%
33	ENGINEERING COSTS	9,568,400	-5.0%	9,089,980	25.0%	11,960,500	U		17%
34	SALES TAX MAT'L	629,600	-1.0%	623,304	1.0%	635,896	U		50%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$50,875,000		$47,983,398		$76,117,219			


DISTRIBUTION OF 2,000 SAMPLES
ALT. 6B, SF – ON–SITE DISPOSAL W/OFF–SITE > WAC
FREQUENCY
300
250
200
150
100
50
0
$53,575
$55,113
$56,651
$58,189
$59,727
$61,265
$62,803
$64,341
$65,879
$67,417
$68,955
$70,493
$72,031
PROJECT COST ($THOUSANDS)
AVERAGE
$62,081,844

001799

586F


CUMULATIVE OVERRUN CURVE
ALT. 6B, SF – ON–SITE DISPOSAL W/OFF–SITE > WAC
PROBABILITY OF COST OVERRUN
100%
80%
60%
40%
20%
0%
45
50
55
60
65
70
75
80
Millions
PROJECT COST
BASE ESTIMATE:
$50,875,000

001800

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, SF - ON-SITE DISPOSAL w/OFF-SITE > WAC -
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940724
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CSF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$50,875,000	BASE EST:	$91,890	BASE EST:	$16,500	BASE EST:	$106,710	BASE EST:	$6,040	BASE EST:	$28,480	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	30%	-5%	20%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION							-1%	50%	-1%	50%	-1%	40%
(OTHER)												
TOTAL %	-5%	30%	-5%	30%	-5%	20%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$87,296	$119,457	$15,675	$21,450	$101,375	$128,052	$5,919	$10,872	$26,771	$51,264	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-374

001801

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, SF - ON-SITE DISPOSAL w/OFF-SITE > WAC -
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940724
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CSF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$29,020	BASE EST:	$0	BASE EST:	$52,470	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-5%	50%				
MATERIAL PRICING					-5%	30%			-5%	50%	-5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	0%	0%	-5%	30%	-5%	50%	-5%	50%	-5%	30%
TOTAL $	$27,569	$43,530	$0	$0	$49,847	$68,211	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-375

001802

FEMP-OU02-5 DRAFT
August 24, 1994

588

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, SF - ON-SITE DISPOSAL w/OFF-SITE > WAC -
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940724
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CSF

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$1,440	BASE EST:	$252,700	BASE EST:	$0	BASE EST:	$1,500	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	100%					-5%	75%				
MATERIAL PRICING			-1%	100%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-5%	25%	-5%	25%								
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	125%	-6%	125%	0%	0%	-5%	75%	0%	0%	0%	0%
TOTAL $	$1,354	$3,240	$237,538	$568,575	$0	$0	$1,425	$2,625	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001803

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, SF – ON-SITE DISPOSAL w/OFF-SITE > WAC –
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940724
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CSF

	EXCAV/SORT/CRUSH ONSITE DISPOSAL LABOR $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL S/C $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$1,419,870	BASE EST:	$0	BASE EST:	$125,680	BASE EST:	$1,316,730	BASE EST:	$1,753,170	BASE EST:	$2,276,370
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	100%					–5%	50%				
MATERIAL PRICING					–5%	30%			–5%	50%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	50%			–1%	50%	–1%	50%	–1%	50%	–1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	150%	0%	0%	–6%	80%	–6%	100%	–6%	100%	–6%	80%
TOTAL $	$1,334,678	$3,549,675	$0	$0	$118,139	$226,224	$1,237,726	$2,633,460	$1,647,980	$3,506,340	$2,139,788	$4,097,466

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-377

001804

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, SF - ON-SITE DISPOSAL w/OFF-SITE > WAC -
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940724
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CSF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		DIKE LABOR $'s		DIKE S/C $'s		DIKE MAT'L. $'s	
	BASE EST:	$320,140	BASE EST:	$379,270	BASE EST:	$997,600	BASE EST:	$305,610	BASE EST:	$84,350	BASE EST:	$555,890
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-5%	75%				
MATERIAL PRICING			-5%	50%	-5%	30%			-5%	50%	-5%	50%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%	-1%	50%	-1%	50%	-1%	75%	-1%	75%	-1%	75%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	100%	-6%	100%	-6%	80%	-6%	150%	-6%	125%	-6%	125%
TOTAL $	$300,932	$640,280	$356,514	$758,540	$937,744	$1,795,680	$287,273	$764,025	$79,289	$189,788	$522,537	$1,250,753

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-378

001805

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, SF - ON-SITE DISPOSAL w/OFF-SITE > WAC -
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940724
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CSF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$53,250	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-5%	50%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$50,588	$79,875	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, SF - ON-SITE DISPOSAL w/OFF-SITE > WAC -
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940724
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CSF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$393,110	BASE EST:	$0	BASE EST:	$795,550	BASE EST:	$0	BASE EST:	$536,800	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	30%	0%	0%	-5%	30%	0%	0%	-5%	50%	0%	0%
TOTAL $	$373,455	$511,043	$0	$0	$755,773	$1,034,215	$0	$0	$509,960	$805,200	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001807

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, SF - ON-SITE DISPOSAL w/OFF-SITE > WAC -
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940724
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CSF

	INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS	
	LABOR $'s		S/C $'s		MAT'L. $'s		LABOR $'s		S/C $'s		MAT'L. $'s	
	BASE EST:	$4,271,400	BASE EST:	$1,960,900	BASE EST:	$5,487,300	BASE EST:	$5,504,800	BASE EST:	$11,540,000	BASE EST:	$6,400
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-10%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-5%	30%	-1%	50%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-10%	30%	-5%	30%	-1%	50%
TOTAL $	$4,057,830	$6,407,100	$1,862,855	$3,921,800	$5,212,935	$8,230,950	$4,954,320	$7,156,240	$10,963,000	$15,002,000	$6,336	$9,600
RISK PROFILE & CORRELATION FOR	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
EACH COST ELEMENT	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT–6B, SF – ON–SITE DISPOSAL w/OFF–SITE > WAC –
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.2

COST IMPACT MATRIX

EST. NO: C2940724
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CSF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$9,568,400	BASE EST:	$629,600	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			–1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	–5%	25%										
(OTHER)												
TOTAL %	–5%	25%	–1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$9,089,980	$11,960,500	$623,304	$635,896	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001809

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

5861

LCC ANALYSIS TITLE:	AFP - EXCAVATE & ON-SITE DISP. W/OFF-SITE DISP. OF FRACTION EXCEEDING WAC (RESIDENT FARMER)			
WBS NO.:	1.1.1.1.2.3.4		TASK NO.:	2CAF
ALTERNATIVE:	6B		CLIENT:	EPA
BASE DATE:	FY94	DESCRIPTION	LOCATION:	FERNALD, OH.
STUDY PERIOD:	36 YEARS	PRESENT WORTH ANALYSIS	ANALYST:	J. JACOBOSKI
REAL DISCOUNT RATE:	2.8%	OU2 FEASIBILITY STUDY	DATE:	09-Aug-94
DOCUMENT NO.:	LCC-94-03-03	EST. NO. C2-94-07-25 / FILE NO. FSOU2ALL	PAGE:	1 OF 1

CAPITAL COST	O & M COST	SALVAGE COST	ANNUAL CASH FLOW	CASH FLOW YEAR
$0	$0	$0	$0	1994
$0	$0	$0	$0	1995
$0	$0	$0	$0	1996
$2,654,400	$0	$0	$2,654,400	1997
$7,963,200	$0	$0	$7,963,200	1998
$5,308,800	$0	$0	$5,308,800	1999
$0	$206,369	$0	$206,400	2000
$0	$184,940	$0	$184,900	2001
$0	$184,940	$0	$184,900	2002
$0	$184,940	$0	$184,900	2003
$0	$204,940	$0	$204,900	2004
$0	$107,940	$0	$107,900	2005
$0	$107,940	$0	$107,900	2006
$0	$107,940	$0	$107,900	2007
$0	$107,940	$0	$107,900	2008
$0	$127,940	$0	$127,900	2009
$0	$107,940	$0	$107,900	2010
$0	$107,940	$0	$107,900	2011
$0	$107,940	$0	$107,900	2012
$0	$107,940	$0	$107,900	2013
$0	$127,940	$0	$127,900	2014
$0	$107,940	$0	$107,900	2015
$0	$107,940	$0	$107,900	2016
$0	$107,940	$0	$107,900	2017
$0	$107,940	$0	$107,900	2018
$0	$127,940	$0	$127,900	2019
$0	$107,940	$0	$107,900	2020
$0	$107,940	$0	$107,900	2021
$0	$107,940	$0	$107,900	2022
$0	$107,940	$0	$107,900	2023
$0	$127,940	$0	$127,900	2024
$0	$107,940	$0	$107,900	2025
$0	$107,940	$0	$107,900	2026
$0	$107,940	$0	$107,900	2027
$0	$107,940	$0	$107,900	2028
$0	$127,940	$0	$127,900	2029
				2030
				2031
				2032
				2033
				2034
				2035
				2036
				2037
				2038
				2039
$15,926,400	$3,764,600	$0	$19,689,900	TOTAL
$14,197,900	$2,284,700	$0	$16,482,000	<====(@NPV)

F ERMCO ESTIMATING SERVICES

SUMMARY SHEET

EST FILE #: C2940725
CLIENT: US DOE
PROJECT TITLE: ALT-6B, AFP - ON-SITE DISPOSAL w/OFFSITE DISPOSAL > WAC
WBS#: 1.1.1.1.2.3.4 RESIDENT FARMER

DATE: 09-Aug-94
ESTIMATOR: KEN KEPLER
LOCATION: FERNALD
TASK#: 2CAF

	CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR $	S/C $ / OTHERS	MAT'L $	TOTAL $
1		ON-SITE DISPOSAL COMPOSITE LINER, CAP, DIKE	60,474		$1,031,000	$756,900	$1,279,900	$3,067,800
2		(SEE CONSTRUCTION ACTIVITY SUMMARY)						
3								
4								
5								
6								
7								
8								
9								
10				AVG				
	DIRECT FIELD COSTS		60,474		$1,031,000	$756,900	$1,279,900	$3,067,800
11	SUPERVISION - CONTRACTOR				$175,000			$175,000
12	SM TOOLS/CONSM'BLS						$61,900	$61,900
13	EQUIPMENT RENTAL						$1,175,200	$1,175,200
14	TEMP. FACILITIES				$21,700		$40,200	$61,900
15	TEMP UTL'S HOOK-UP				$10,800		$20,100	$30,900
16	JOB CLEAN-UP				$21,700		$40,200	$61,900
17	SAFETY				$10,800		$20,100	$30,900
18	HEALTH PHYSICS S/C				$142,600			$142,600
19	CERCLA/SAT	$1,500 PER PERSON				$31,500		$31,500
20	BOND					$30,700		$30,700
21	OVERHEAD & PROFIT					$438,300		$438,300
22	PAYRL BRD.&BENFT.				$735,100			$735,100
	INDIRECT FIELD COSTS				$1,117,700	$500,500	$1,357,700	$2,975,900
	DIRECT & INDIRECT FIELD COSTS				$2,148,700	$1,257,400	$2,637,600	$6,043,700
23	TRANSPORTATION & BURIAL	N/A						
24	WASTE CONTAINERS	N/A						
37	SOILWASH OPERATIONS (OU5)	N/A						
37	PULSE DRY OPRATIONS (OU1)	N/A						
37	WASTE WATER TREATMENT COST (OU5)					$12,000		$12,000
25	SCREENING & CONFIRMATION TESTING					$2,638,400		$2,638,400
26	PROJ.MGMT-FERMCO - OU2 (SEE WBS NO. 1.1.1.1.2.5)							
27	CONSTR MGMT-FERMCO				$761,500			$761,500
	FERMCO FIELD SUPPORT COSTS				$761,500	$2,650,400		$3,411,900
28	EMISSION MODELING				$10,600		$19,600	$30,200
29	PSAR/FSAR(SAFETY RPT)				$259,900			$259,900
30	ENGINEERING	TITLE I&II $876,300 TITLE III	$906,600	CDR	$314,300	DCR	$296,100	$2,393,300
	ENGINEERING COSTS							$2,683,400
31	SALES TAX	6.0%	SUB-TOTAL MATERIAL DOLLARS				$2,657,200	$159,400
	SUB-TOTAL	(BASE ESTIMATE)						$12,288,400
32	G&A-FERMCO	(SEE EXCLUSION COMMENTS)						
33	ESCALATION	(SEE EXCLUSION COMMENTS)						
34	RISK BUDGET	22.0%						$2,705,600
	TARGET ESTIMATE	(BASE ESTIMATE PLUS RISK BUDGET)						$15,004,000
35	CONTINGENCY	7.5%						$922,400
								PRELIMINARY
	TOTAL ESTIMATE	(TARGET ESTIMATE PLUS CONTINGENCY)						$15,926,400

LOTUS31\FS2\ALT6B\AFP\INDSUM.WK3 - FEASABILITY STUDY

Alternative 6 – Excavation and On-Site Disposal with Off-Site Disposal of Fraction Exceeding WAC (Resident Farmer)

Active Flyash Pile

Item	Frequency (years)	Start Year	End Year	Unit	Unit Cost	Annual Quantity	Efficiency Factor 1.29	Annual Cost	Notes
Groundwater Monitoring at Subunit									
Short Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Long Term	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Well Inspect & Maint.	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative.
Groundwater Monitoring at OU2 Waste Cell									
Short Term	1	1	5	sample	$5,500.00	28	NA	$154,000	One fifth x (33 wells x 4 samples/year plus 8 leachate samples/year)
Long Term	1	6	30	sample	$5,500.00	14	NA	$77,000	One fifth x (33 wells x 2 samples/year plus 4 leachate samples/year)
Well Inspect & Maint.	1	1	30	well	$388.14	1.65	2.13	$826	One fifth x (inspection of 26 wells twice/year & repair 1 out of 8)
Perched Groundwater (South Field Vicinity)									
Pumping	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pump Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Pipeline Maintenance	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
Treatment & Disposal	NA	NA	NA	NA	NA	NA	NA	NA	No long term perched groundwater treatment.
OU2 Waste Cell Leachate									
Pipeline Maintenance	1	1	30	lump sum	$1,106.83	1	1.29	$1,428	Overall cost divided among 5 subunits.
Treatment & Disposal	1	1	30	gallon	0.01	86,000	NA	$860	Overall cost divided among 5 subunits.
Facility Maint. at Subunit									
Cap Maint. & Repairs	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Mowing	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Fence Repair	NA	NA	NA	NA	NA	NA	NA	NA	Not applicable to this alternative
Facility Maint. at OU2 Cell									
Cap Maint. & Repairs	1	1	30	acre	$2,183.32	6.63	8.55	$18,673	Total divided among 5 subunits. (Incl. side slopes)
Mowing	1	1	30	acre	$1,861.92	8	10.32	$19,215	Total divided among 5 subunits
Fence Repair	1	1	30	2,000 ft.	$1,971.08	0.7	0.90	$1,780	Total divided among 5 subunits
Radon Monitoring									
Flux (Year 1)	1	1	1	1				$19,845	Total divided among 5 subunits
Ambient (Year 1)	1	1	1	4				$2,274	Total divided among 5 subunits
Ambient (Years 2–30)	1	2	30	10				$690	Total divided among 5 subunits
Facility Review of OU2 Cell	5	5	30	Lump Sum	$20,000	1	NA	$20,000	Total divided among 5 subunits

Annual Costs, Year 1 (excluding facility review)	$218,901
Annual Costs, Years 2–5 (excluding facility review)	$197,472
Annual Costs, Years 6–30 (excluding facility review)	$120,472
Facility Review Costs, Every 5 Years	$20,000

O_MFS5.WK3 D:

8/2/94

DATE: 08-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940725

ALT-6B, AFP - ON-SITE DISPOSAL w/OFFSITE DISPOSAL > WAC
RESIDENT FARMER

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.4

TASK I.D. : 2CAF

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST $'s	• NO. OF CHANGE OUTS PER WORKER PER DAY MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS) •	MD	MAT'L.$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	C/B		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	C/B		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	C/B		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	C/B		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	C/B		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	C/B		
APR CARTRIDGES - DISPOSABLE	PR	17.50	4	0	$0	C/B		
SUB-TOTAL		31.80	4		$0			
					$127.20	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT - DISPOSABLE	EA	3.20	4	0	$0	D		
TYVEK HOOD - DISPOSABLE	EA	6.00	4	0	$0	D		
TYVEK BOOT COVER - DISPOSABLE	EA	1.30	4	0	$0	D		
GLOVE LINER - DISPOSABLE	PR	1.40	4	0	$0	D		
GLOVE, LASTEX - DISPOSABLE	PR	1.50	4	0	$0	D		
GLOVE, WORK - DISPOSABLE	PR	0.90	4	0	$0	D		
SUB-TOTAL		14.30	4		$0			
					$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS-(1)PR.PER WORKER	PR	12.70	0		$0	D/C/B		
APR w/HALF FACE MASK - (1) PER WORKER	EA	22.30	0		$0	C		
APR w/FULL FACE MASK - (1) PER WORKER	EA	174.00	0		$0	C		
SCBA	EA	1894.00	0		$0	B		
COOL VESTS	EA	137.50	0		$0	C/B		
THERMO STRIPS	EA	50.00	0		$0	C/B		
SUB-TOTAL		327.21			$0			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					$0			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

DATE: 08-Aug-94

PROJECT TITLE:

HEALTH PHYSICS

EST.NO.: C2940725

ALT-6B, AFP - ON-SITE DISPOSAL w/OFFSITE DISPOSAL > WAC

EST. : KEN KEPLER

WBS#: 1.1.1.1.2.3.4

RESIDENT FARMER

TASK I.D. : 2CAF

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVIELLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
BASELINE PHYSICALS	1	4	21	84	$16.97	$1,430		
ANNUAL PHYSICALS	1	3	21	63	$16.97	$1,070		
EXIT (TERMINATION) PHYSICALS	1	4	21	84	$16.97	$1,430		
SUB-TOTAL						$3,930		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR $		
MONTHLY BIOASSAY	24	1	21	510	$16.97	$8,660		
YEARLY IN-VIVO	1	4	21	84	$16.97	$1,430		
EXIT (END OF PROJECT / TERMINATION)	1	4	21	84	$16.97	$1,430		
SUB-TOTAL						$11,520		
WORK DELAYS CAUSED BY MONITORING	5%				$1,271,000	$63,550		
WORK DELAYS CAUSED BY RAD CHECKING	5%				$1,271,000	$63,550		

	TOTAL LABOR $'s	TOTAL MAT'L.$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	$142,600	$0	$142,600

001814

CONSTRUCTION ACTIVITY DURATION

CONT.NO. – 4424321
PROJECT –ALT–6B, AFP – ON–SITE DISPOSAL w/OFFSITE DISPOSAL > WAC
CONTROLS– CRU2
LOCATION-FERNALD
TASK I.D. –2CAF

WBS NO. – 1.1.1.1.2.3.4
EST. NO. – C2940725
BY – K. KEPLER
DATE – 08/08/94

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	ACTIVITY	DURATION
CONSTRUCTION	25–Mar–94	01–Jun–97	31–May–98	31–May–99	24	MONTHS

EST.DATE TO MID–POINT OF ACTIVITY	
50	MONTHS

ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT AND HEALTH PHYSICS COSTS.

001815

CONTR.NO.– [redacted]21
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE AVG	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
CONSTRUCTION ACTIVITY SUMMARY														
ON–SITE DISPOSAL (RESIDENT FARMER)														
SITE PREPARATION	1	LS		3,362						$58,190	$15,000	$24,010	$80,280	$177,480
DECONTAMINATION FACILITIES/SERVICES	1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210
EROSION AND SEDIMENT CONTROLS	1	LS		1232						$22,610		$7,180	$37,610	$67,400
PERCHED GROUNDWATER SYSTEM	N/A													N/A
EXCAVATE – OFFSITE DISPOSAL	N/A													N/A
LOAD/HAUL – OFF–SITE DISPOSAL	N/A													N/A
EXCAVATE & HAUL TO ON–SITE DISPOSAL (Onsite)	1	LS		16698						$283,370		$259,490	$930	$543,790
COMPOSITE LINER	1	LS		17888						$304,650	$380,670	$405,470	$528,920	$1,619,710
COMPOSITE CAP	1	LS		3930						$66,690	$79,000	$95,900	$207,820	$449,410
DIKE FOR DISPOSAL CELL	1	LS		3751						$63,660	$17,570	$75,630	$115,810	$272,670
GENERATED WASTE REMOVAL	1	LS		2853						$48,410		$27,670		$76,080
SITE RESTORATION	1	LS		4961						$84,180		$171,720	$186,690	$442,590
MONITORING WELLS	1	LS									$170,000			$170,000
SUB–TOTAL (DIRECT FIELD COSTS)				54976						$937,250	$688,130	$1,068,390	$1,163,570	$3,857,340
TAKE–OFF ALLOWANCE 10%	1	LS		5,498						$93,730	$68,810	$106,840	$116,360	$385,740
TOTAL (DIRECT FIELD COSTS)	1	LS		60,474						$1,031,000	$756,900	$1,175,200	$1,279,900	$4,243,000

On–Site Disposal of Active Flyash Pile – No Treatment – SUMMARY

F-7-389
001816
FEMP-OU02-5 DRAFT August 24, 1994
1861

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE PREPARATION														
(ITEMS @ 20% ARE COMMON TO ALL SUB–UNITS)														
(ITEMS @ 33.3% ARE COMMON TO SF, AFP & IFP)														
a. Construction Survey	1	LS					15000.00				$15,000			$15,000
b. Temporary Construction Fencing	2000	LF	0.213	550	16.97				6.25	$9,330			$12,880	$22,210
c. Clear and Grub														
i. Remediation Site	2.50	AC	41.40	134	16.97			2575.00		$2,270		$6,630		$8,900
Includes: New roads, Office/Parking, Const.Equip.& Personnel Decon. Areas Staging Area @ Sub–unit														
d. Dewatering														
i. Excavate Dewatering Trench	400	CY	0.50	258	16.97			1.49		$4,380		$610		$4,990
ii. Pump – w/4" Suction Hose	120	DAYS	3.00	464	16.97			19.55		$7,870		$2,420		$10,290
iv. HDPE Pipe to Sedimentation Tank	300	LF	0.19	74	16.97			0.67	0.84	$1,260		$210	$260	$1,730
v. Remove Sediment fm. Tank – 1cy/trip	2	CY	4.00	10	16.97			100.00		$170		$210		$380
e. General Grading														
i. New Roads	4667	SY	0.001	6	16.97			0.07		$100		$340		$440
33.3%														
ii. Office/Parking Area 2222	740	SY	0.010	10	16.97			0.32		$170		$240		$410
iii. Const.Equip.Decon.Pad Area 272	91	SY	0.010	1	16.97			0.32		$20		$30		$50
iv. Pers.Decon.Pad Area 49	16	SY	0.010		16.97			0.32				$10		$10
vi. Staging Area @ Sub–Unit 2845	947	SY	0.010	12	16.97			0.32		$200		$310		$510
f. Surfacing/Paving/Concrete Slab														
i. New Roads – 8" Gravel W/Geotextile	4667	SY	0.030	181	16.97			1.08	6.66	$3,070		$5,190	$32,010	$40,270
33.3%														
ii. Office/Parking – 8" Gravel W/ Geotextile 2222	740	SY	0.030	29	16.97			1.08	6.66	$490		$820	$5,080	$6,390
iii. Staging Area @ Sub–Unit – 160' x160' Concrete														
Sub–Grade & Sub–Base for Conc.Slab 2845	947	SY	0.041	50	16.97			1.45	5.51	$850		$1,410	$5,380	$7,640
Concrete Slab 160 x 160' x 8"thk. 631	210	CY	4.07	1103	17.98			18.38	67.00	$19,830		$3,980	$14,500	$38,310
Concrete Curb – 2'h x 480 lf x 8" thl 24	8	CY	15.30	158	17.98			69.08	275.90	$2,840		$570	$2,270	$5,680
HDPE Perf.Sub–grade Piping – 4" 500	167	LF	0.21	45	16.97			0.74	3.02	$760		$130	$520	$1,410
Epoxy Coating 2845	947	SY	0.22	269	16.97			0.77	7.56	$4,560		$750	$7,380	$12,690
Backfill & Compact around Slab 183	61	ICY	0.086	7	16.97			1.38				$90		$90
Mob/Demob.Equip. 1	0.33	LS	2.00	1	16.97			184.00		$20		$60		$80
TOTAL (SITE PREPARATION)	1	LS		3,362						$58,190	$15,000	$24,010	$80,280	$177,480

Site Preparation Details

F-7-390

001817

FEMP-OU02-5 DRAFT August 31, 1994

CONTR.NO. – 4[illegible]21
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT	33.3%														
a. Decon Trailer – Rental	51	17	MO					1500.00				$25,470			$25,470
	33.3%														
b. Construction Equipment Decon. Facility 25 ft x 60 ft															
i. Excavation – Structural	175	58	BCY	0.021	2	16.97			0.64		$30		$40		$70
ii. Sub–grade Prep.	167	56	SY	0.041	3	16.97		6.75	1.45	5.51	$50	$390	$80	$320	$840
iii. Misc. Metal Fab'n.															
1/4" Steel Plate Cover – 5' dia.	16	5	SF	0.32	2	19.21			0.73	12.55	$40			$70	$110
Metal Grating 2 ft wide x 25 lf	25	8	LF	0.53	6	19.21			1.86	46.67	$120		$20	$400	$540
iv. Cast–in–Place Concrete															
Decon Pad – 8" to 12" thk.	39	13	CY	4.07	68	17.98			14.25	67.00	$1,220		$190	$900	$2,310
Decon Pad Trench – 2'x2'i.d.x 25lfx8	5	2	CY	28.22	61	17.98			98.77	202.30	$1,100		$170	$350	$1,620
Decon Pad Curb – 6" x 6" x 120 lf	5	2	CY	15.30	33	17.98			53.55	275.90	$590		$90	$470	$1,150
Pump Pad – 4' x 4' x 6" thk.	0.30	0	CY	10.64	1	17.98			37.24	97.20	$20			$10	$30
Epoxy Coating	167	56	SY	0.22	16	17.00			0.77	7.56	$270		$40	$430	$740
v. Precast Concrete															
Sump – 5'dia.x 5' deep.	1	0	EA	12.00	5	17.98			100.00	525.00	$90		$30	$180	$300
vi. HDPE Piping	200	67	LF	0.38	33	19.95			5.11	4.42	$660		$350	$300	$1,310
Includes Trench Excav/Backfill, Sand Pipe Bedding															
vii. Corrugated Fiberglass Splash Guard	720	240	SF	0.04	11	16.97			0.03	1.55	$190		$10	$380	$580
4" x 4" x 9'–6" Wood Posts set in con	27	9	EA	0.480	6	16.97			1.68	5.75	$100		$20	$50	$170
viii. Air Diaphragm Pump 50 gpm	1	0	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
ix. Suction and Discharge Piping	10	3	LF	0.11		19.95			0.39	0.84					
Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction															
HDPE Pipe–Conc.Trench to Manhole	3	1	LF	0.47	1	19.95			1.65	14.91	$20			$10	$30
x. Backfill & Compaction around concrete slab	BCY 258	103	ICY	0.086	11	16.97			1.38		$190		$150		$340
SUB–TOTAL (EQUIP. DECON. FACILITY)					265						$4,810	$25,860	$1,210	$4,140	$36,020

Equipment Decon. Facility Details

5861

001818

F-7-391

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DECON. FACILITIES AND SERVICES AT SUB–UNIT (CON'T.)															
c. Personnel Decon. Facility	33.3%														
i. Excavation – Structural	19	6	BCY	0.021		16.97			0.64						
ii. Sub–grade Prep. – Includes HDPE Liner, Geotextile Fabric – Gravel, & Compact Sub–grade	14	5	SY	0.041		16.97		6.75	1.45	5.51		$30	$10	$30	$70
iii. Misc. Metal Fab'n. 1/4" Steel Plate Cover – 2'x 2'	4	1	SF	0.32	1	16.97			0.73	12.55	$20			$20	$40
iv. Cast–in–Place Concrete –															
Decon Slab – 11' x 11' x4" thk	1.5	0.50	CY	4.07	3	17.98			14.25	67.00	$50		$10	$30	$90
Decon Slab Sump – 2'x 2' x 3'	0.3	0.10	CY	31.84	4	17.98			111.44	250.70	$70		$10	$30	$110
Decon Slab Curb – 6" x 6" x 42 lf	0.4	0.13	CY	15.30	3	17.98			53.55	275.90	$50		$10	$40	$100
Epoxy Coating	14	5	SY	0.22	1	17.00			0.77	7.56	$20			$40	$60
v. Corrugated Fiberglass Splash Guard	132	44	SF	0.04	2	16.97			0.03	1.55	$30			$70	$100
4" x 4" x 9'–6" Wood Posts set in conc.	6	2	EA	0.480	1	16.97			1.68	5.75	$20			$10	$30
vi. Pump 20 gpm	1	0.33	EA	15.00	6	19.95			52.50	800.00	$120		$20	$270	$410
vii. Clean Wtr.Strg.Tank W/Piping– 1500 gal.	1	0.33	LS	32.00	14	19.95			112.00	2500.00	$280		$40	$830	$1,150
viii. Backfill & Compaction around concrete slab	BCY 17	7	ICY	0.086	1	16.97			1.38		$20		$10		$30
SUB–TOTAL (PERSONNEL DECON. FACILITY)		1	LS		36						$680	$30	$110	$1,370	$2,190
TOTAL (DECON.FACILITIES & SERVICES)		1	LS		301						$5,490	$25,890	$1,320	$5,510	$38,210

Personnel Decon.Facilities/Services Details

PAGE 4 of 18

F-7-392

FEMP-OU02-5 DRAFT
August 23, 1994

001819

CONTR.NO.– [redacted]21
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EROSION AND SEDIMENT CONTROL														
a. Diversion of Clean Run–off														
i. Silt Fence	1300	LF	0.017	29	16.97			0.06	0.65	$490		$80	$870	$1,440
ii.Diversion Berms	200	CY	0.24	62	16.97			0.84	7.50	$1,050		$170	$1,500	$2,720
iii. Diversion Ditches	100	CY	0.24	31	16.97			0.84	7.50	$530		$80	$750	$1,360
iv. Sediment Traps	25	EA	8.00	258	16.97			5.00	70.00	$4,380		$130	$1,750	$6,260
v. Hay Bales	700	EA	0.24	217	16.97			1.53	1.35	$3,680		$1,100	$970	$5,750
b. Diversion of Contaminated Run–off														
i. Collection Sump	1	EA	28.00	36	16.97			220.00	1450.00	$610		$220	$1,450	$2,280
ii. Temporary Pumping – 100 gpm	1	LS	60.00	77	19.95			210.00	1000.00	$1,540		$210	$1,000	$2,750
iii. 2"/4" HDPE Carrier/Container HDPE Pipe from Tank to AWWT Includes Trench Excav/Backfill, Sand Pipe Bedding & Compaction	1000	LF	0.38	491	19.95			5.11	4.42	$9,800		$5,110	$4,420	$19,330
iv. 4 ft Dia x 8 ft high HDPE Dbl.Wall Manhol W/Cleanout	3	EA	8.00	31	16.97			28.00	8300.00	$530		$80	$24,900	$25,510
TOTAL(EROSION & SEDIMENT CONTROL)	1	LOT		1,232						$22,610		$7,180	$37,610	$67,400

Erosion Control Details

FEMP-OU02-5 DRAFT
August 24, 1994

5861

001820

F-7-393

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D. 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	COST/UNIT RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
EXCAVATE														
LOAD & HAUL TO ON–SITE DISPOSAL CELL														
(NO TREATMENT)														
Excavate Contaminated Soil														
Excavate and Load – Level D	74900	BCY	0.055	5314	16.97			1.17		$90,180		$90,260		$180,440
Excavate Additional Soil	7500	BCY	0.055	532	16.97			1.17		$9,030		$9,040		$18,070
Haul to Onsite Disposal Cell BCY														
– 12" thk. Cushion Layer 3838	4798	LCY	0.081	501	16.97			1.51		$8,500		$7,460		$15,960
– Impacted Fill 78562	98203	LCY	0.081	10261	16.97			1.51		$174,130		$152,730		$326,860
PPE LEVEL 'C' Allowance added to the following:														
Excavate Contaminated Soil														
Excavate and Load – Level C	N/A	BCY	0.055		16.97			1.17						
Haul to Onsite Disposal Cell BCY N/A		LCY	0.081		16.97			1.51						
			S/T											
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C		HRS	150%		16.97			1.51						
			S/T											
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)		MD												
(SHREDDING COMMON TO SWL, IFP & SF)														
k. Shredder/Crusher – Purchase/Install 33.3%	N/A	LOT	280.0		19.95			8400.00	317800.00					
60 Ton per Hour														
Excavated Debris BCY N/A														
Generated Waste BCY 5217														
Excavated Debris TONS														
(Percent of Gen.Waste to be Shredded 25%														
Generated Waste TONS 2079														
TOTAL TONS 2079														
Operating Costs	35	HRS							25.75				$930	$930
(2) Operators	70	HRS	1.00	90	16.97					$1,530				$1,530
TOTAL (EXCAVATE/LOAD& HAUL TO ON–SITE DISPOSAL)	1	LOT		16,698						$283,370		$259,490	$930	$543,790

Excavate – No Treatment – AFP Onsite Disposal Details

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F-7-394

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – [redacted]21
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (SITE PREP.)															
a. Clear and Grubb	20%														
i. Disposal Cell & Surrounding area	45	9.0	AC	41.40	481	16.97			2575.00		$8,160		$23,870		$32,030
b. Relocated South Access Road	20%														
i. Clear & Grub	3	0.6	AC	41.40	32	16.97			2575.00		$540		$1,590		$2,130
ii. General Grading	1467	293.4	SY	0.001		16.97			0.07				$20		$20
iii. Road – 8" Gravel W/Geotextile	7333	1466.6	SY	0.030	57	16.97			1.08	6.66	$970		$1,630	$10,060	$12,660
c. Haul Road	20%														
i. Clear & Grub	2.4	0.5	AC	41.40	26	16.97			2575.00		$440		$1,270		$1,710
ii. General Grading	11556	2311.2	SY	0.001	3	16.97			0.07		$50		$170		$220
iii. Road – 8" Gravel W/Geotextile	5778	1155.6	SY	0.030	45	16.97			1.08	6.66	$760		$1,290	$7,930	$9,980
	20%														
d. Temporary Construction Fencing	5200	1040.0	LF	0.213	286	16.97				6.25	$4,850			$6,700	$11,550
e. 20' wide Swing Gates	1	0.2	EA	25.60	7	16.97			340.00	560.00	$120		$70	$120	$310
f. Staging Area @ Cell	20%														
Area Excavation for Slab	1606	321.2	BCY	0.016	7	16.97			0.60		$120		$200		$320
Sub–Base for Slab	2845	569.0	SY	0.041	30	16.97		6.75	1.45	5.51	$510	$3,960	$850	$3,230	$8,550
HDPE Perf.Sub–grade Piping – 4"	500	100.0	LF	0.21	27	16.97			0.74	3.02	$460		$80	$310	$850
Concrete Slab – 160'x160'x8" thk	631	126.2	CY	4.07	663	17.98			14.25	67.00	$11,920		$1,850	$8,710	$22,480
Concrete Curb – 480'x2'x8" thk	24	4.8	CY	15.30	95	17.98			11.16	275.90	$1,710		$60	$1,360	$3,130
Epoxy Coating	2845	569.0	SY	0.22	161	16.97			0.77	7.56	$2,730		$450	$4,430	$7,610
Backfill & Compact around Slab	183	36.6	ICY	0.086	4	16.97			1.38				$50		$50
Mob/Demob.Equip.	1	0.2	LS	2.00	1	16.97			184.00		$20		$40		$60
g. Storage Area – 200' x 200' Asphalt															
Includes Compacted Sub–Grade	4444	889	SY	0.084	96	16.97			2.56	14.04	$1,630		$2,340	$12,850	$16,820
Geotextile Fabric,Comp.Crushed Limestone Prime Coat,4–1/2" Asph.Conc.Base course, Tack Coat, 1–1/2" Asph.Conc.Surface Coat															
	20%														
h. Decon Trailer – Rental	51	10	MO					1500.00				$15,760			$15,760
i. Const.Equipment Decon. Facility	20%														
25 ft x 60 ft	1	0.20	LS	730.00	146	18.05		1160.00	2900.00	11980.00	$2,640	$240	$580	$2,400	$5,860
j. Personnel Decon. Facility	20%														
11'x 11'	1	0.20	LS	108.00	22	18.89		100.00	360.00	4120.00	$420	$20	$70	$820	$1,330
SUB–TOTAL (COMPOSITE LINER –SITE PREP)		1	LOT		2,189	17.38					$38,050	$19,980	$36,480	$58,920	$153,430

Composite Liner – Site Prep. – AFP Onsite Disposal Details

F-7-395
001822
586191
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
COMPOSITE LINER (CON'T.)														
Layers of Liner include: Borrow, Load, Haul 300 ft, Place & Compact.														
COMPOSITE LINER														
a. Subgrade Preparation – includes removal of top soil, grading & comp.	11631	SY	0.024	360	16.97			0.86		$6,110		$10,300		$16,410
b. 95% Clay – 5% Bentonite 36" Thk BCY 11631	13725	ICY	0.260	4603	16.97			11.19	20.35	$78,110		$158,190	$287,670	$523,970
c. Composite Clay Liner	11631	SY					7.38				$85,840			$85,840
d. HDPE Liner 60 mil	11631	SY					4.75				$55,250			$55,250
e. Geotextile Fabric	11631	SY					2.25				$26,170			$26,170
f. Pea Gravel 12" Thk; In–place BCY 3838	4126	ICY	0.11	585	16.97			0.77	17.00	$9,930		$3,270	$72,240	$85,440
g. Composite Clay Liner	11631	SY					7.38				$85,840			$85,840
h. HDPE Liner 60 mil	11631	SY					4.75				$55,250			$55,250
i. Geotextile Fabric	11631	SY					2.25				$26,170			$26,170
j. Pea Gravel 12" Thk; In–place BCY 3838	4126	ICY	0.11	585	16.97			0.77	17.00	$9,930		$3,270	$72,240	$85,440
k. Geotextile Fabric	11631	SY					2.25				$26,170			$26,170
l. HDPE Perforated Pipe – leachate collection 6" Dia.	880	LF	0.30	341	16.97			1.05	6.56	$5,790		$950	$5,950	$12,690
m. HDPE Perforated Pipe – leak detection 6" Dia.	880	LF	0.30	341	16.97			1.05	6.56	$5,790		$950	$5,950	$12,690
n. Leachate Discharge Piping														
i. HDPE Carrier & containment Pipe 6" x 10" Includes Trench Excav/Backfill, sand bedding and compaction.	385	LF	0.86	427	16.97			11.37	22.33	$7,250		$4,510	$8,850	$20,610
ii. HDPE Manhole – 4' dia. x 8' deep	2	EA	8.00	21	16.97			28.00	8300.00	530.00		$60	$17,100	$17,690
o. Impacted Fill–Cusion Layer 12" Thk BCY 3838	4798	LCY	0.06	371	16.97			1.67		$6,300		$8,250		$14,550
p. Impacted Fill–Spread and Compact BCY 78562	98203	LCY	0.06	7601	16.97			1.67		$128,990		$168,920		$297,910
q. Generated Waste BCY 5217	6000	LCY	0.06	464	16.97			1.67		$7,870		$10,320		$18,190
PPE LEVEL C Allowance is added to the following														
r. Impacted fill BCY N/A		LCY	0.06		16.97			1.67						
**PPE PRODUCTIVITY ALLOWANCE – LEVEL C		HRS	150% S/T		16.97									
MD = Man Day (No. of Hours worked in PPE's Divided by a 10 Hour Day) (SEE APPENDIX C)		MD												
SUB–TOTAL (COMPOSITE LINER)	1	LOT		15,699						$266,600	$360,690	$368,990	$470,000	$1,466,280
TOTAL (COMPOSITE LINER)	1	LOT		17,888						$304,650	$380,670	$405,470	$528,920	$1,619,710

Composite Liner Details

F-7-396
001823
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4[illegible]21
CLIENT – [illegible]DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

	DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	COMPOSITE CAP															
	Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
	COMPOSITE CAP															
	a. Contouring Layer 18" Thk.	BCY 2412	2894	ICY	0.06	224	16.97			1.67	3.50	$3,800		$4,980	$10,430	$19,210
	b. 95% Clay – 5% Bentonite 24" Thk	BCY 3232	3474	ICY	0.260	1165	16.97			11.19	20.35	$19,770		$40,040	$72,830	$132,640
	c. GML\GCC – composite Liner		4824	SY					7.38				$35,600			$35,600
	d. Geotextile Fabric		4824	SY					2.25				$10,850			$10,850
	e. Pea gravel 12" Thk, In–place	BCY 1592	1711	ICY	0.11	243	16.97			0.77	17.00	$4,120		$1,360	$29,970	$35,450
	f. Geotextile Fabric		4824	SY					2.25				$10,850			$10,850
	g. Cobbels 36" Thk; In–place	BCY 4824	5186	ICY	0.258	1726	16.97			7.15	10.10	$29,290		$38,190	$53,950	$121,430
	h. Geotextile Fabric		4824	SY					2.25				$10,850			$10,850
	i. Sand Layer 6" Thk; In–place	BCY 820	882	ICY	0.052	59	16.97			1.76	5.00	$1,000		$1,600	$4,540	$7,140
	j. Geotextile Fabric		4824	SY					2.25				$10,850			$10,850
	k. Common Soil 21" Thk; In–place	BCY 2798	3358	ICY	0.06	260	16.97			1.67	3.50	$4,410		$5,780	$12,100	$22,290
	l. Top Soil 6" Thk; In–place	BCY 820	984	ICY	0.053	67	16.97			1.82	12.10	$1,140		$1,840	$12,260	$15,240
	m. Grass Cover – Seed, Fertilize, Mulch Utility Mix – Hydro/Air Seeding	SY 4824	43	MSF	0.30	17	16.97			6.75	25.00	$290		$300	$1,110	$1,700
	n. Security Fence – 8' tall w/ 3–strands wire 6 ga. Aluminized		770	LF	0.17	169	16.97			2.28	13.40	$2,870		$1,810	$10,630	$15,310
	TOTAL (COMPOSITE CAP)		1	LOT		3,930						$66,690	$79,000	$95,900	$207,820	$449,410

F-7-397

FEMP-OU02-5 DRAFT
August 24, 1994

001824

5861

Composite Cap Details

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
DIKE FOR DISPOSAL CELL															
Common for SWL, LSP, IFP, SF, and AFP Cap and Liner quantities are prorated based on waste volume to be disposed .															
a. Borrow Common Soil – Dike	BCY 2686	3223	ICY	0.06	249	16.97			1.67	3.50	$4,230		$5,540	$11,620	$21,390
b. Geotextile Fabric		7810	SY					2.25				$17,570			$17,570
c. Cobbels 36" Thk; In–place	BCY 7810	9372	ICY	0.258	3119	16.97			7.15	10.10	$52,930		$69,020	$97,500	$219,450
d. Drainage Piping – HDPE	6" Dia.	990	LF	0.30	383	16.97			1.05	6.56	$6,500		$1,070	$6,690	$14,260
TOTAL (DIKE – DISPOSAL CELL)		1	LOT		3,751						$63,660	$17,570	$75,630	$115,810	$272,670

001825

F-7-398

FEMP-OU02-5 DRAFT
August 24, 1994

Dike Details

CONTR.NO. – [illegible]21
CLIENT – [illegible] DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[illegible] 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL															
a. Office/Parking Area @ S/U	33%														
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Gravel	494	165	BCY	0.292	62	16.97			9.16		$1,050		$1,550		$2,600
Geo–Fabric & Liner	2222	740	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	185	62	BCY	0.30	24	16.97			2.51		$410		$160		$570
b. Const.Equip.Decon Facil.@ S/U	33%														
Demo/Remove Concrete	49.3	16	BCY	1.2	25	16.97			3.62		$420		$60		$480
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	9	BCY	0.292	4	16.97			9.16		$70		$90		$160
Geo–Fabric & Liner	167	56	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	9	EA	0.48	6	16.97			1.68		$100		$20		$120
Splash Guard	702	234	SF	0.04	12	16.97			0.03		$200		$10		$210
Haul & Dump Rubble	24.9	8	BCY	0.30	3	16.97			2.51		$50		$20		$70
c. Personnel Decon. Facil. @ S/U	33%														
Demo/Remove Concrete	2.2	1	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	1	BCY	0.292					9.16				$10		$10
Geo–Fabric & Liner	14	5	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	6	2	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	44	SF	0.04	2	16.97			0.03		$30				$30
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
d. Staging pad @ S/U	33.3%														
Demo/Remove Concrete	655	218	BCY	1.2	338	16.97			3.62		$5,740		$810		$6,550
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	158	BCY	0.292	60	16.97			9.16		$1,020		$1,490		$2,510
Geo–Fabric & Liner 105 cy	2845	947	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble	395.5	132	BCY	0.30	51	16.97			2.51		$870		$340		$1,210
	20%														
e. Const.Equip.Decon.Facil. @ Onsite Disp.Cell															
Demo/Remove Concrete	49.3	10	BCY	1.2	15	16.97			3.62		$250		$40		$290
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	28	6	BCY	0.292	2	16.97			9.16		$30		$50		$80
Geo–Fabric & Liner	167	33	SY	0.002					0.02						
Posts – 4" x 4" x 9'–6"	27	5	EA	0.48	3	16.97			1.68		$50		$10		$60
Splash Guard	702	140	SF	0.04	7	16.97			0.03		$120				$120
Haul & Dump Rubble	24.9	5	BCY	0.30	2	16.97			2.51		$30		$10		$40
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		622						$10,540		$4,710		$15,250

Generated Waste Removal Details

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001826
5861
F-7-399
FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.)															
Demo. /Load/Haul/Dump/Compact															
	20.0%														
f. Personnel Decon. Facil.@ Onsite Disp. Cell															
Demo/Remove Concrete	2.2	0.44	BCY	1.2	1	16.97			3.62		$20				$20
Excavate, Load, Haul, Backfill, Compact															
Sub–grade Stone	2.4	0.48	BCY	0.292		16.97			9.16						
Geo–Fabric & Liner	14	3	SY	0.002	1	16.97			0.02		$20				$20
Posts – 4" x 4" x 9'–6"	6	1	EA	0.48	1	16.97			1.68		$20				$20
Splash Guard	132	26	SF	0.04	1	16.97			0.03		$20				$20
Haul & Dump Rubble	3.5	1	BCY	0.30		16.97			2.51						
	20.0%														
g. Relocated South Access Road/Cell	SY														
Road – 8" Gravel W/Geotextile	7333	1467	BCY	0.292	552	16.97			9.16		$9,370		$13,840		$23,210
Haul & Dump Rubble		1467	BCY	0.30	568	16.97			2.51		$9,640		$3,790		$13,430
	20.0%														
h. Haul Road for Cell	SY														
Road – 8" Gravel W/Geotextile	5778	257.0	BCY	0.292	97	16.97			1.08		$1,650		$290		$1,940
Haul & Dump Rubble		257.0	BCY	0.30	99	16.97			2.51		$1,680		$660		$2,340
	20.0%														
i. Temporary Construction Fencing @ Cell	5200	1040.0	LF	0.107	143	16.97					$2,430				$2,430
Haul & Dump Rubble		135.0	BCY	0.30	52	16.97			2.51		$880		$350		$1,230
	20.0%														
j. 20' wide Swing Gates @ Cell	2	0.40	EA	12.75	7	16.97			340.00		$120		$140		$260
Haul & Dump Rubble		0.05	BCY	0.30		16.97			2.51						
	20.0%														
k. Storage Pad Area @ Cell	BCY														
Demo/Remove Asphalt	988	197.6	BCY	1.2	306	16.97			3.62		$5,190		$740		$5,930
Excav., Load, Haul, Backfill, Compac	474.0	94.8	BCY	0.292	36	16.97			9.16		$610		$890		$1,500
Sub–grade Stone															
Geo–Fabric & Liner	4444	888.8	SY	0.002	2	16.97			0.02		$30		$20		$50
Haul & Dump Rubble		197.0	BCY	0.30	76	16.97			2.51		$1,290		$510		$1,800
SUB–TOTAL (GENERATED WASTE REMOVAL)		1	LOT		1,942						$32,970		$21,230		$54,200

Generated Waste Removal Details

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001827

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]321
CLIENT – [redacted]DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY

BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
GENERATED WASTE REMOVAL TO ONSITE DISPOSAL (CON'T.)															
Demo. /Load/Haul/Dump/Compact															
The following prorated at:	20.0%														
I. Staging Area @ On–Site Disposal Cell															
Demo/Remove Concrete	655	131.0	BCY	1.2	203	16.97			3.62		$3,440		$490		$3,930
Excav., Load, Haul, Backfill, Compact															
Sub–grade Stone	475	95.0	BCY	0.292	36	16.97			9.16		$610		$900		$1,510
Geo–Fabric & Liner 105 cy	2845	569.0	SY	0.002	1	16.97			0.02		$20		$10		$30
Haul & Dump Rubble	395.5	126.0	BCY	0.30	49	16.97			2.51		$830		$330		$1,160
TOTAL GENERATED WASTE	BCY 5217 LCY 6000														
SUB– TOTAL (GENERATED WASTE REMOVAL		1	LOT		289						$4,900		$1,730		$6,630
TOTAL (GENERATED WASTE REMOVAL)		1	LOT		2,853						$48,410		$27,670		$76,080

Generated Waste Removal Details

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FEMP-OU02-5 DRAFT
August 24, 1994

F-7-401

001823

5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION															
Backfill and top soil to be borrowed from the off–site source															
a. Borrow Common Soil, Backfill	BCY														
Active Flyash Pile	20000	24000	ICY	0.09	2786	16.97			3.21	3.50	$47,280		$79,350	$86,520	$213,150
	33.3%														
Office/Parking	494	197	ICY												
Decon.Facil.– Const.Equip. @ S/U	78	31	ICY												
Decon.Facil.– Personnel @ S/U	7	3	ICY												
Staging Area @ S/U	1099	439	ICY												
	S/T	670.5	ICY	0.09	78	16.97			3.21	3.50	$1,320		$2,220	$2,420	$5,960
	20%														
Staging Area at On–Site Disp.Cell	1099	264	ICY												
Storage Area at On–Site Disp.Cell	474	114	ICY												
Decon.Facil.– Const.Equip. @ Cell	78	19	ICY												
Decon.Facil.– Personnel @ Cell	7	2	ICY												
Relocated South Access Road	1628	391	ICY												
Haul Road	1283	308	ICY												
	S/T	1096.6	ICY	0.09	127	16.97			3.21	3.50	$2,160		$3,630	$3,950	$9,740
b. Final Grade for AFP		19600	SY	0.02	506	16.97			0.70		$8,590		$14,130		$22,720
c. Borrow Top Soil 6" Thk., Spread															
Active Flyash Pile		19600	SY	0.036	910	16.97			2.33	2.88	$15,440		$47,040	$58,140	$120,620
	33.3%														
Office/Parking	2222	740	SY												
Decon.Facil.– Const.Equip. @ S/U	167	56	SY												
Decon.Facil.– Personnel @ S/U	14	5	SY												
Staging Area @ S/U	2845	947	SY												
	S/T	1747.6	SY	0.036	81	16.97			2.33	2.88	$1,370		$4,190	$5,180	$10,740
	20%														
Staging Area at On–Site Disp.Cell	2845	683	SY												
Storage Area at On–Site Disp.Cell	4444	1067	SY												
Decon.Facil.– Const.Equip. @ Cell	167	40	SY												
Decon.Facil.– Personnel @ Cell	14	3	SY												
Relocated South Access Road	14667	3520	SY												
Haul Road	11556	2773	SY												
	S/T	8086.3	SY	0.036	376	16.97			2.33	2.88	$6,380		$19,410	$23,990	$49,780
SUB–TOTAL (SITE RESTORATION)		1	LOT		4,864						$82,540		$169,970	$180,200	$432,710

Site Restoration Details

FEMP-OU02-5 DRAFT
August 24, 1994
F-7-402
001829

CONTR.NO.– [redacted]321
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION		QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SITE RESTORATION (CON'T.)															
d. Grass Cover – Seed, Fertilize, Mulch															
Utility Mix – Hydro/Air Seeding	SY														
Active Flyash Pile	19600	176	MSF	0.30	68	16.97			6.75	25.00	$1,150		$1,220	$4,530	$6,900
	33.3%														
Office/Parking	2222	6.7	MSF												
Decon.Facil.– Const.Equip. @ S/U	167	0.5	MSF												
Decon.Facil.– Personnel @ S/U	14		MSF												
Staging Area @ S/U	2845	8.5	MSF												
	S/T	15.7	MSF	0.30	6	16.97			6.75	25.00	$100		$110	$400	$610
	20%														
Staging Area at On–Site Disp.Cell	2845	5.1	MSF												
Storage Area at On–Site Disp.Cell	4444	8.0	MSF												
Decon.Facil.– Const.Equip.@ Cell	167	0.3	MSF												
Decon.Facil.– Personnel @ Cell	14		MSF												
Relocated South Access Road	14667	26.4	MSF												
Haul Road	11556	20.8	MSF												
	S/T	60.6	MSF	0.30	23	16.97			6.75	25.00	$390		$420	$1,560	$2,370
SUB–TOTAL (SITE RESTORATION)		1	LOT		97						$1,640		$1,750	$6,490	$9,880
TOTAL (SITE RESTORATION)		1	LOT		4,961						$84,180		$171,720	$186,690	$442,590

Site Restoration Details

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5861

F-7-403

FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO. – 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

	DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
	MONITORING WELLS – MW														
	Each Pair of MW includes 40 ft. deep Type I MW and 80 ft. deep Type II														
	a. MW at ON–Site Disposal Facility Prorated based on waste volume to be disposed at the disposal facility	4	PR					23000.00				$92,000			$92,000
	b. Abandon Existing Wells	6	EA					13000.00				$78,000			$78,000
	TOTAL (MONITORING WELLS)	1	LOT									$170,000			$170,000

Monitoring Wells Details

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FEMP-OU02-5 DRAFT
August 24, 1994

CONTR.NO.– [redacted]21
CLIENT – [redacted] DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.N[redacted] 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
WASTE WATER TREATMENT COST														
Anticipated volume of waste water and runnoff to be sent to AWWT plant.														
Decontamination Facilities	95000	GAL					0.01				$1,000			$1,000
Runnoff from the Exclusion Zone.	1100000	GAL					0.01				$11,000			$11,000
TOTALS FORWARD TO No. 37 ESTIMATE SUMMARY														
TOTAL (WASTE WATER TREATMENT)	1	LOT									$12,000			$12,000

Waste Water Treatment Operations Cost Details

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001832

FEMP-OU02-5 DRAFT
August 24, 1994

5861

CONTR.NO.– 4424321
CLIENT – U.S. DEPT. OF ENERGY
PROJECT – ALT–6B – AFP – ON–SITE DISPOSAL w/OFF–SITE > WAC – RESIDENT FARMER
LOCATION – FERNALD, OHIO
PROJ.CTL. – CRU–2
WBS NO. – 1.1.1.1.2.3.2

PRELIMINARY
BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. C2940725
BY: KEN KEPLER
DATE: 08/08/94
TASK I.D.: 2CSF

DESCRIPTION	QUAN	UNIT	MANHOURS UNIT	MANHOURS TOTAL	MANHOURS RATE	COST/UNIT LABOR	COST/UNIT SUB	COST/UNIT EQUIP.	COST/UNIT MAT'L	LABOR	S/C	EQUIP.	MATERIAL	TOTAL
SCREENING & CONFIRMATION TESTING														
Excavation														
Full TCLP	412	EA					2,002				$824,800			$824,800
Rad	412	EA					2,000				$824,000			$824,000
Confirmatory Tests														
Full Rad Tests	206	EA					3,101				$638,800			$638,800
Full HSL	25	EA					1,500				$37,500			$37,500
Full TCLP	25	EA					2,000				$50,000			$50,000
2 Technicians per Month	20	MO					13,163				$263,300			$263,300
TOTALS FORWARD TO No. 25 ESTIMATE SUMMARY														
TOTAL (SCREENING & CONFIRMATION TESTS	1	LOT									$2,638,400			$2,638,400

001833

F-7-406

Screening & Confirmation Testing Details

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FEMP-OU02-5 DRAFT
August 26, 1994

RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: ALT. 6B, AFP – ON–SITE DISPOSAL W/OFF–SITE > WAC
CLIENT: DOE DATE: 09–Aug–94
CONTRACT: C2–94–07–25 BASE ESTIMATE: $12,298,490

CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	$18,377,249	$6,078,759	49.4%
0.05%	$16,652,735	$4,354,245	35.4%
5.00%	$15,923,742	$3,625,252	29.5%
10.00%	$15,689,252	$3,390,762	27.6%
15.00%	$15,576,896	$3,278,406	26.7%
20.00%	$15,463,824	$3,165,334	25.7%
25.00%	$15,372,568	$3,074,078	25.0%
30.00%	$15,295,184	$2,996,694	24.4%
35.00%	$15,215,871	$2,917,381	23.7%
40.00%	$15,145,205	$2,846,715	23.1%
45.00%	$15,078,868	$2,780,378	22.6%
50.00%	$15,007,313	$2,708,823	22.0%
55.00%	$14,939,106	$2,640,616	21.5%
60.00%	$14,867,458	$2,568,968	20.9%
65.00%	$14,789,684	$2,491,194	20.3%
70.00%	$14,714,200	$2,415,710	19.6%
75.00%	$14,640,594	$2,342,104	19.0%
80.00%	$14,545,709	$2,247,219	18.3%
85.00%	$14,413,752	$2,115,262	17.2%
90.00%	$14,252,299	$1,953,809	15.9%
95.00%	$14,034,473	$1,735,983	14.1%
99.95%	$13,275,210	$976,720	7.9%
100.00%	$11,617,014	($681,476)	–5.5%

001834

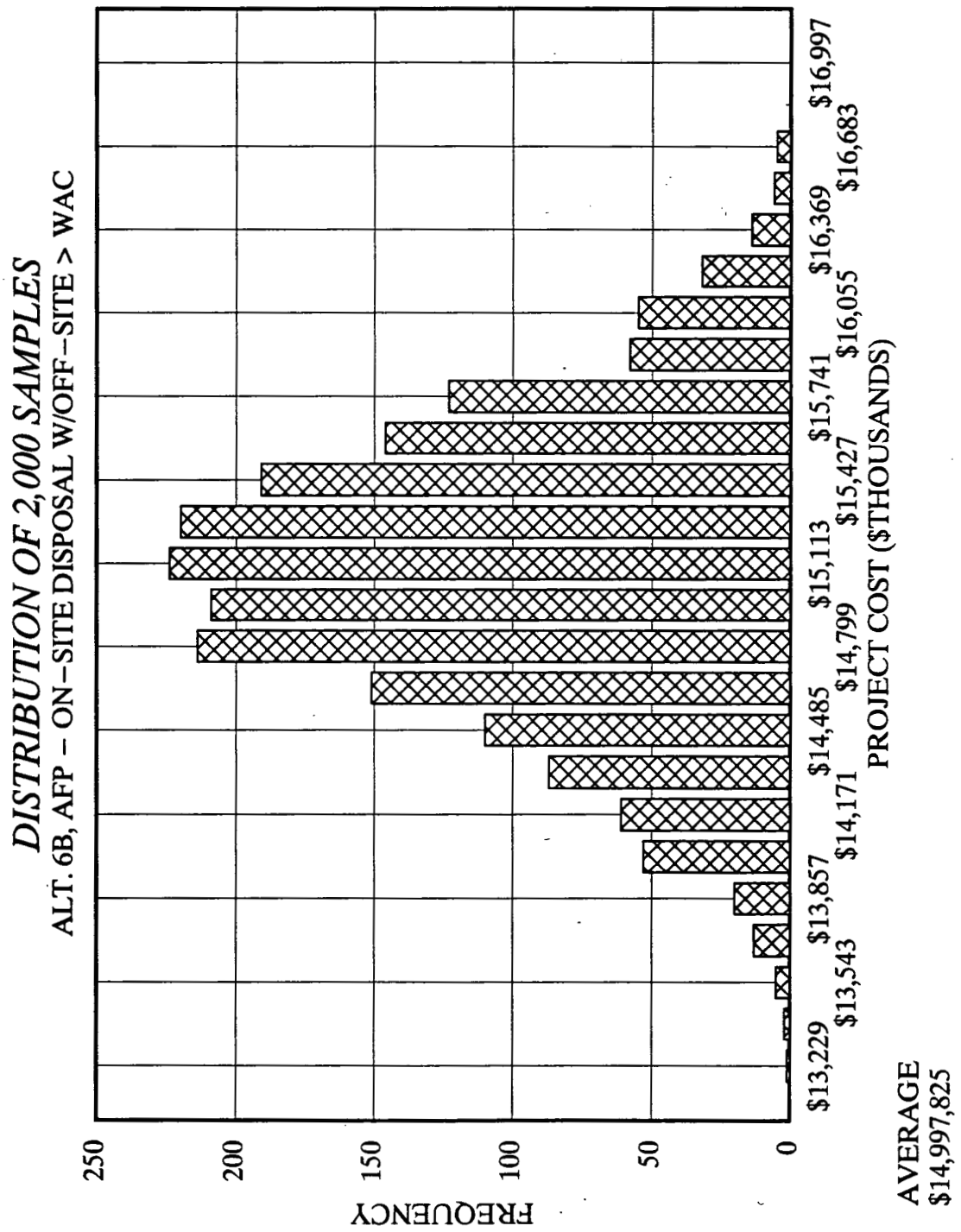
FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE

PROJECT: ALT. 6B, AFP – ON–SITE DISPOSAL W/OFF–SITE > WAC
CLIENT: DOE
CONTRACT: C2–94–07–25

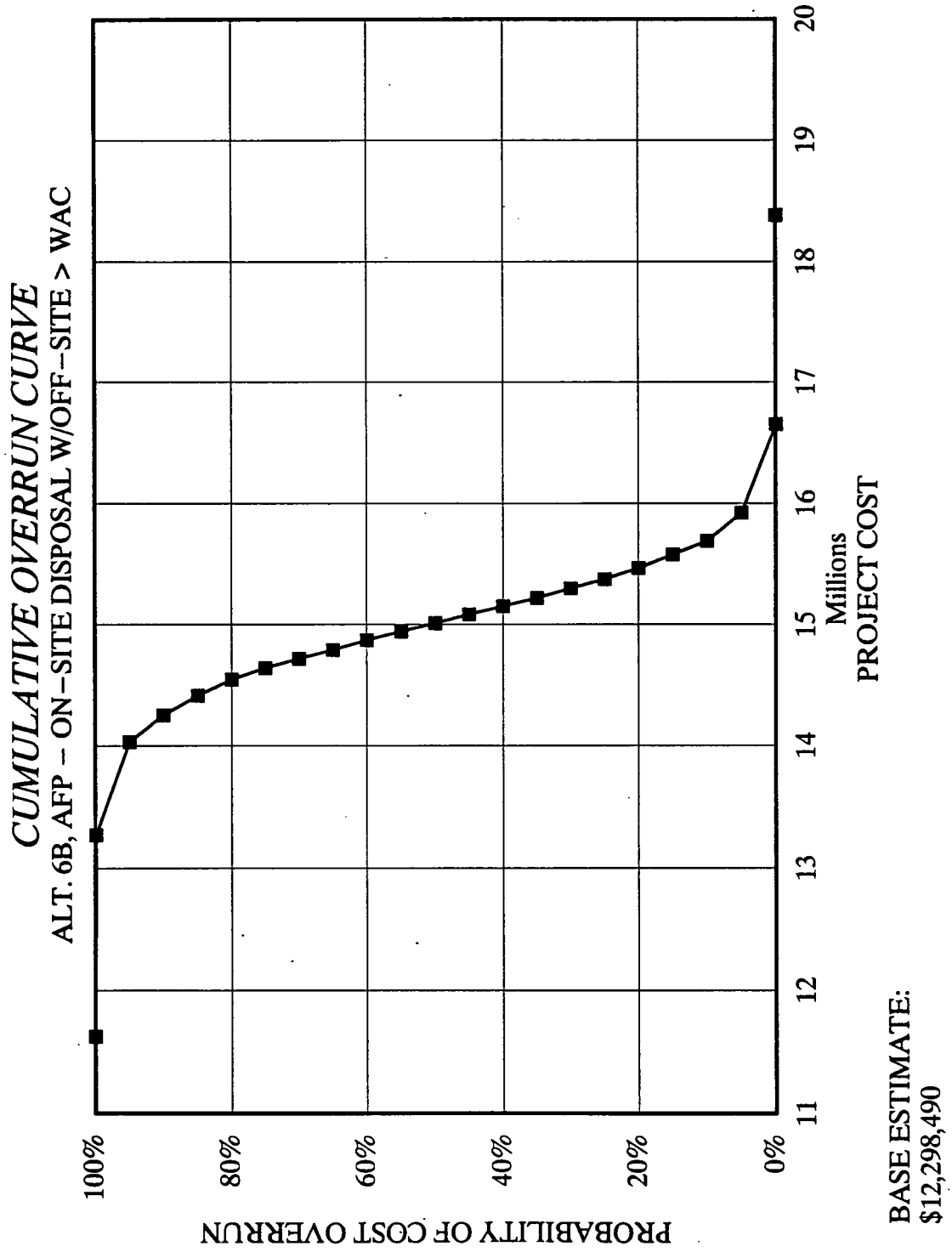
ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE $BASE	%LOW	$LOW	%HIGH	$HIGH	DIST. TYPE	RELA–TIONS	RANGE FACTOR
1	SITE PREPERATION LABOR	$64,010	–6.0%	$60,169	60%	$102,416	U		9%
2	SITE PREPERATION S/C	16,500	–6.0%	15,510	55%	25,575	U		10%
3	SITE PREPERATION MAT'L	88,310	–11.0%	78,596	60%	141,296	U		15%
4	DECON FACILITIES/SERVICES LABOR	6,040	–2.0%	5,919	80%	10,872	U		2%
5	DECON FACILITIES/SERVICES S/C	28,480	–6.0%	26,771	80%	51,264	U		7%
6	DECON FACILITIES/SERVICES MAT'L	6,060	–6.0%	5,696	60%	9,696	U		9%
7	EROSION/SEDIMENT CNTRLS LABOR	24,870	–6.0%	23,378	80%	44,766	U		7%
8	EROSION/SEDIMENT CNTRLS MAT'L	41,370	–6.0%	38,888	60%	66,192	U		9%
9	EXC/SRT/CRSH ON–SITE DISP LBR	311,740	–6.0%	293,036	150.0%	779,350	U		4%
10	EXC/SRT/CRSH ON–SITE DISP MAT'L	1,020	–6.0%	959	80.0%	1,836	U		7%
11	COMPOSITE LINER LABOR	335,120	–6.0%	315,013	100%	670,240	U		6%
12	COMPOSITE LINER S/C	418,740	–6.0%	393,616	80%	753,732	U		7%
13	COMPOSITE LINER MAT'L	581,810	–6.0%	546,901	80.0%	1,047,258	U		7%
14	COMPOSITE CAP LABOR	73,360	–6.0%	68,958	100.0%	146,720	U		6%
15	COMPOSITE CAP S/C	86,900	–6.0%	81,686	100.0%	173,800	U		6%
16	COMPOSITE CAP MAT'L	228,600	–6.0%	214,884	80.0%	411,480	U		7%
17	DIKE LABOR	70,030	–6.0%	65,828	100.0%	140,060	U		6%
18	DIKE S/C	19,330	–6.0%	18,170	80.0%	34,794	U		7%
19	DIKE MAT'L	127,390	–6.0%	119,747	80.0%	229,302	U		7%
20	GENERATED WASTE REMVL LABOR	53,250	–6.0%	50,055	80.0%	95,850	U		7%
21	SITE RESTORATION LABOR	92,600	–6.0%	87,044	60.0%	148,160	U		9%
22	SITE RESTORATION MAT'L	205,360	–6.0%	193,038	60.0%	328,576	U		9%
23	MONITORING WELLS S/C	187,000	–6.0%	175,780	60.0%	299,200	U		9%
24	INDIRECT FIELD COSTS LABOR	1,117,700	–5.0%	1,061,815	50.0%	1,676,550	U		9%
25	INDIRECT FIELD COSTS S/C	500,500	–5.0%	475,475	100.0%	1,001,000	U		5%
26	INDIRECT FIELD COSTS MAT'L	1,357,700	–5.0%	1,289,815	50.0%	2,036,550	U		9%
27	FIELD SUPPORT COSTS LABOR	761,500	–10.0%	685,350	30.0%	989,950	U		25%
28	FIELD SUPPORT COSTS S/C	2,650,400	–5.0%	2,517,880	30.0%	3,445,520	U		14%
29	ENGINEERING COSTS	2,683,400	–5.0%	2,549,230	25.0%	3,354,250	U		17%
30	SALES TAX MAT'L	159,400	–1.0%	157,806	1.0%	160,994	U		50%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		$12,298,490		$11,617,014		$18,377,249			

001835

5 8 7


DISTRIBUTION OF 2,000 SAMPLES
ALT. 6B, AFP – ON–SITE DISPOSAL W/OFF–SITE > WAC
FREQUENCY
250
200
150
100
50
0
$13,229
$13,543
$13,857
$14,171
$14,485
$14,799
$15,113
$15,427
$15,741
$16,055
$16,369
$16,683
$16,997
PROJECT COST ($THOUSANDS)
AVERAGE
$14,997,825

001836


CUMULATIVE OVERRUN CURVE
ALT. 6B, AFP – ON–SITE DISPOSAL W/OFF–SITE > WAC
PROBABILITY OF COST OVERRUN
100%
80%
60%
40%
20%
0%
11
12
13
14
15
16
17
18
19
20
Millions
PROJECT COST
BASE ESTIMATE:
$12,298,490

001837

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, AFP - ON-SITE DISPOSAL w/OFFSITE DISPOSAL > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940725
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

COST IMPACT MATRIX TOTAL	SITE PREPARATION LABOR $'s		SITE PREPARATION S/C $'s		SITE PREPARATION MAT'L. $'s		DECONTAMINATION FACILITIES / SERVICES LABOR $'s		DECONTAMINATION FACILITIES / SERVICES S/C $'s		DECONTAMINATION FACILITIES / SERVICES MAT'L. $'s	
$12,298,490	BASE EST:	$64,010	BASE EST:	$16,500	BASE EST:	$88,310	BASE EST:	$6,040	BASE EST:	$28,480	BASE EST:	$6,060
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%					-1%	30%				
MATERIAL PRICING			-5%	25%	-10%	30%			-5%	30%	-5%	20%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	30%	-1%	30%	-1%	30%	-1%	50%	-1%	50%	-1%	40%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	60%	-6%	55%	-11%	60%	-2%	80%	-6%	80%	-6%	60%
TOTAL $	$60,169	$102,416	$15,510	$25,575	$78,596	$141,296	$5,919	$10,872	$26,771	$51,264	$5,696	$9,696

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-411

001838

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, AFP – ON-SITE DISPOSAL w/OFFSITE DISPOSAL > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940725
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	EROSION AND SEDIMENT CONTROLS LABOR $'s		EROSION AND SEDIMENT CONTROLS S/C $'s		EROSION AND SEDIMENT CONTROLS MAT'L. $'s		PERCHED GROUNDWTR. SYSTEM LABOR $'s		PERCHED GROUNDWTR. SYSTEM S/C $'s		PERCHED GROUNDWTR. SYSTEM MAT'L. $'s	
	BASE EST:	$24,870	BASE EST:	$0	BASE EST:	$41,370	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%										
MATERIAL PRICING					-5%	30%						
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	30%			-1%	30%						
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	80%	0%	0%	-6%	60%	0%	0%	0%	0%	0%	0%
TOTAL $	$23,378	$44,766	$0	$0	$38,888	$66,192	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, AFP – ON-SITE DISPOSAL w/OFFSITE DISPOSAL > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940725
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	EXCAVATE/SORT/DRY OFFSITE DISPOSAL LABOR $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL S/C $'s		EXCAVATE/SORT/DRY OFFSITE DISPOSAL MAT'L. $'s		LOAD & HAUL OFFSITE DISPOSAL LABOR $'s		LOAD & HAUL OFFSITE DISPOSAL S/C $'s		LOAD & HAUL OFFSITE DISPOSAL MAT'L. $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

001840

5861

FEMP-OU02-5 DRAFT
August 24, 1994

F-7-413

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, AFP – ON-SITE DISPOSAL w/OFFSITE DISPOSAL > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940725
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	EXCAV/SORT/CRUSH ONSITE DISPOSAL LABOR $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL S/C $'s		EXCAV/SORT/CRUSH ONSITE DISPOSAL MAT'L. $'s		COMPOSITE LINER LABOR $'s		COMPOSITE LINER S/C $'s		COMPOSITE LINER MAT'L. $'s	
	BASE EST:	$311,740	BASE EST:	$0	BASE EST:	$1,020	BASE EST:	$335,120	BASE EST:	$418,740	BASE EST:	$581,810
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	100%			-5%	30%	-5%	50%				
MATERIAL PRICING									-5%	30%	-5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	50%			-1%	50%	-1%	50%	-1%	50%	-1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	150%	0%	0%	-6%	80%	-6%	100%	-6%	80%	-6%	80%
TOTAL $	$293,036	$779,350	$0	$0	$959	$1,836	$315,013	$670,240	$393,616	$753,732	$546,901	$1,047,258

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001841

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, AFP – ON-SITE DISPOSAL w/OFFSITE DISPOSAL > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940725
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	COMPOSITE CAP LABOR $'s		COMPOSITE CAP S/C $'s		COMPOSITE CAP MAT'L. $'s		DIKE LABOR $'s		DIKE S/C $'s		DIKE MAT'L. $'s	
	BASE EST:	$73,360	BASE EST:	$86,900	BASE EST:	$228,600	BASE EST:	$70,030	BASE EST:	$19,330	BASE EST:	$127,390
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	–5%	50%					–5%	50%				
MATERIAL PRICING			–5%	50%	–5%	30%			–5%	30%	–5%	30%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	–1%	50%	–1%	50%	–1%	50%	–1%	50%	–1%	50%	–1%	50%
PROJECT DEFINITION												
(OTHER)												
TOTAL %	–6%	100%	–6%	100%	–6%	80%	–6%	100%	–6%	80%	–6%	80%
TOTAL $	$68,958	$146,720	$81,686	$173,800	$214,884	$411,480	$65,828	$140,060	$18,170	$34,794	$119,747	$229,302

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

001842

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-415

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, AFP – ON-SITE DISPOSAL w/OFFSITE DISPOSAL > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940725
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	TYPE 'C' CAP LABOR $'s		TYPE 'C' CAP S/C $'s		TYPE 'C' CAP MAT'L. $'s		GENERATED WASTE REMOVAL LABOR $'s		GENERATED WASTE REMOVAL S/C $'s		GENERATED WASTE REMOVAL MAT'L $'s	
	BASE EST:	$0	BASE EST:	$0	BASE EST:	$0	BASE EST:	$53,250	BASE EST:	$0	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY							-5%	50%				
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION							-1%	30%				
PROJECT DEFINITION												
(OTHER)												
TOTAL %	0%	0%	0%	0%	0%	0%	-6%	80%	0%	0%	0%	0%
TOTAL $	$0	$0	$0	$0	$0	$0	$50,055	$95,850	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

F-7-416

001843

FEMP-OU02-5 DRAFT
August 24, 1994

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, AFP – ON-SITE DISPOSAL w/OFFSITE DISPOSAL > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940725
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	SITE RESTORATION LABOR $'s		SITE RESTORATION S/C $'s		SITE RESTORATION MAT'L. $'s		MONITORING WELLS LABOR $'s		MONITORING WELLS S/C $'s		MONITORING WELLS MAT'L. $'s	
	BASE EST:	$92,600	BASE EST:	$0	BASE EST:	$205,360	BASE EST:	$0	BASE EST:	$187,000	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	30%										
MATERIAL PRICING					-5%	30%			-5%	50%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION	-1%	30%			-1%	30%			-1%	10%		
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-6%	60%	0%	0%	-6%	60%	0%	0%	-6%	60%	0%	0%
TOTAL $	$87,044	$148,160	$0	$0	$193,038	$328,576	$0	$0	$175,780	$299,200	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, AFP – ON-SITE DISPOSAL w/OFFSITE DISPOSAL > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940725
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		INDIRECT FIELD COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS		FERMCO FIELD SUPPORT COSTS	
	LABOR $'s		S/C $'s		MAT'L. $'s		LABOR $'s		S/C $'s		MAT'L. $'s	
	BASE EST:	$1,117,700	BASE EST:	$500,500	BASE EST:	$1,357,700	BASE EST:	$761,500	BASE EST:	$2,650,400	BASE EST:	$0
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-5%	50%					-25%	30%				
MATERIAL PRICING			-5%	100%	-5%	50%			-20%	30%		
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION												
(OTHER)												
TOTAL %	-5%	50%	-5%	100%	-5%	50%	-25%	30%	-20%	30%	0%	0%
TOTAL $	$1,061,815	$1,676,550	$475,475	$1,001,000	$1,289,815	$2,036,550	$571,125	$989,950	$2,120,320	$3,445,520	$0	$0
RISK PROFILE & CORRELATION FOR	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
EACH COST ELEMENT	U		U		U		U		U		U	

001845

NOTE: Base Estimate Dollars include 10% MTO Allowance from Construction Activity Summary Sheet.

RISK ANALYSIS

REQUESTOR: GREG JONES
CLIENT: U.S. DEPARTMENT OF ENERGY
PROJECT: ALT-6B, AFP – ON-SITE DISPOSAL w/OFFSITE DISPOSAL > WAC
LOCATION: FERNALD, OHIO
WBS # : 1.1.1.1.2.3.4

COST IMPACT MATRIX

EST. NO: C2940725
DATE: 08/09/94
BY: KEN KEPLER
TASK # : 2CAF

	ENGINEERING COSTS TOTAL $'s		SALES TAX MATERIAL $'s									
	BASE EST:	$2,683,400	BASE EST:	$159,400	BASE EST:		BASE EST:		BASE EST:		BASE EST:	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY												
MATERIAL PRICING			−1%	1%								
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION	−5%	25%										
(OTHER)												
TOTAL %	−5%	25%	−1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL $	$2,549,230	$3,354,250	$157,806	$160,994	$0	$0	$0	$0	$0	$0	$0	$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

5861

001846

APPENDIX - F.8

COST COMPARISON 10^{-5} AND 10^{-6} RISK CRITERIA

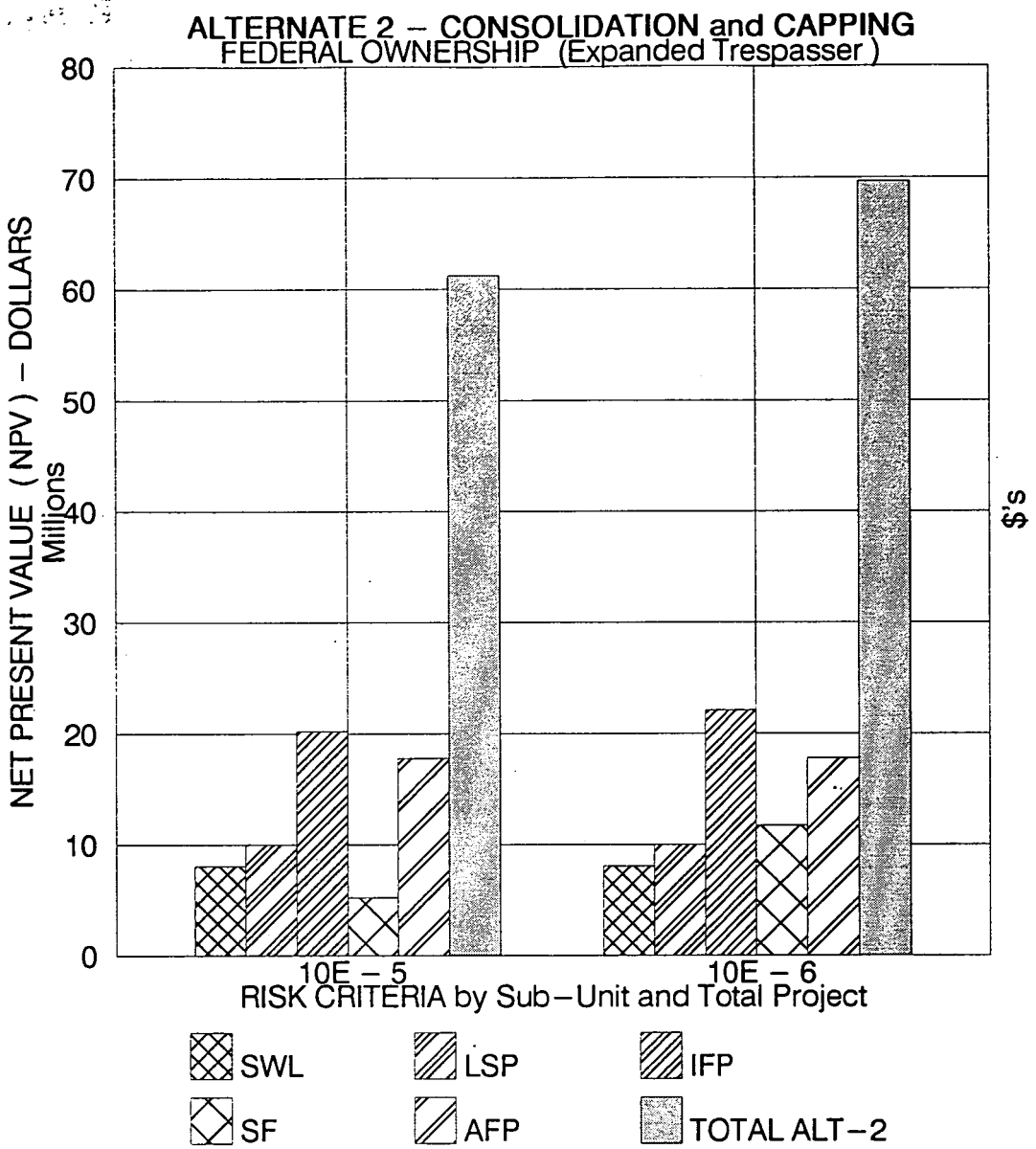
TABLE F.8-1

COMPARISON OF NET PRESENT WORTH COSTS ALTERNATIVE LAND-USE SCENARIOS AND PRL RISK VALUES OPERABLE UNIT 2

Alternative	Net Present Worth Cost ($millions)			
	Federal Ownership		Private Ownership	
	PRL Risk Value = 10^{-5}	PRL Risk Value = 10^{-6}	PRL Risk Value = 10^{-5}	PRL Risk Value = 10^{-6}
1 - No Action	0	0	0	0
2 - Consolidation and Capping	61.2	69.6	NA[a]	NA
3 - Excavation and Off-Site Disposal	175.6	212.8	321.8	464.9
6 - Excavation and On-Site Disposal with Off-Site Disposal of Fraction Exceeding Waste Acceptance Criteria	92.9	110.3	105.5	148.3

[a]Not applicable.

COMPARISON OF NET PRESENT VALUES BY RISK CRITERIA



COMPARISON OF NET PRESENT VALUES BY SUB–UNITS

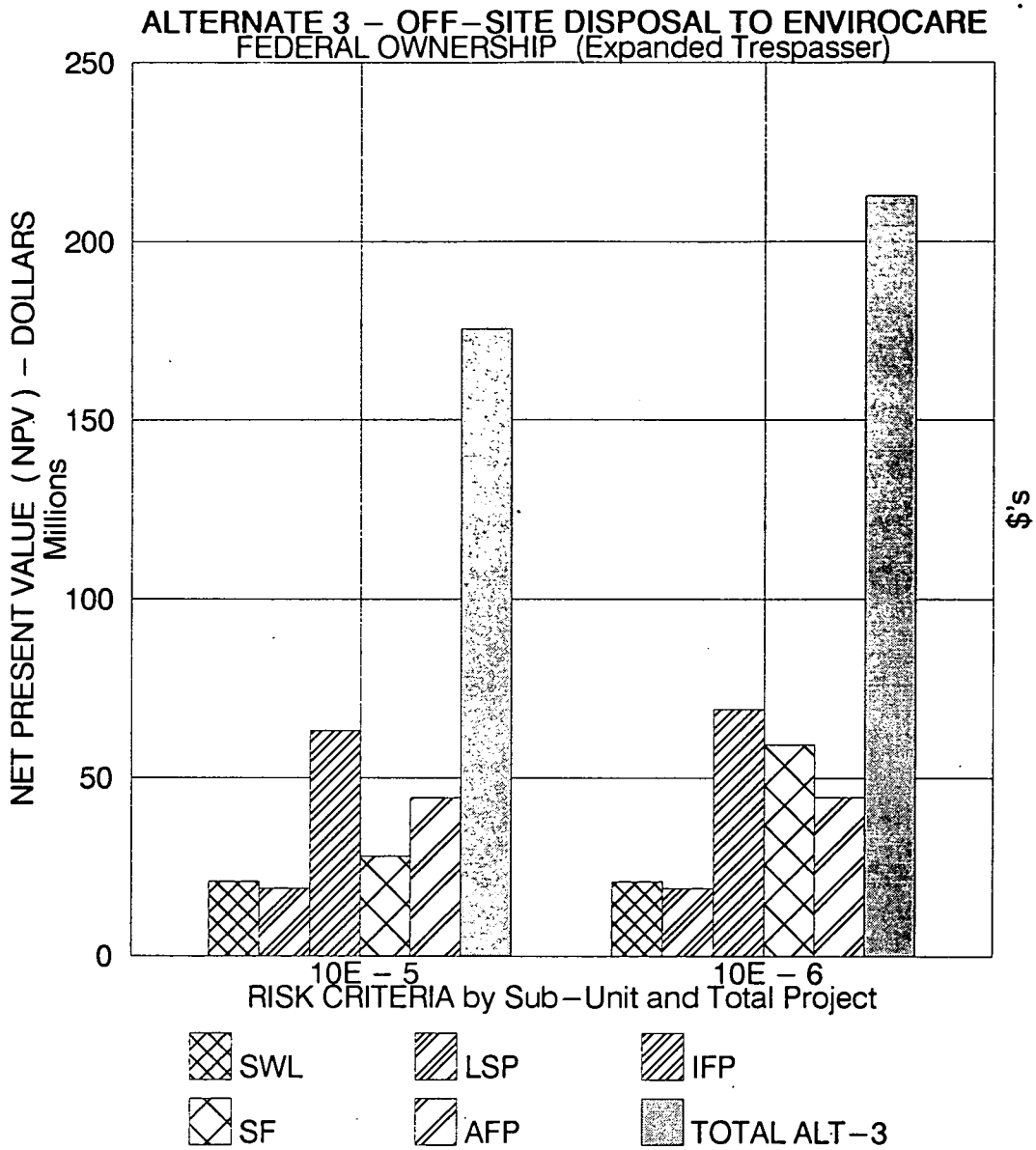
Risk Criteria 10E – 5

TITLE	EXCAVATED BANK CUBIC YARDS			TOTAL EXCAVATED BCY	GENERATED WASTE BCY	TOTAL BCY	UNIT COST PER BCY	TOTAL NPV DOLLARS
	LEVEL D	LEVEL C	ADDITNL.					
ALT2 – SWL	10400	1700	1200	13300	1232	14532	$556.55	$8,087,800
ALT2 – LSP	6100		200	6300	1232	7532	$1,327.67	$10,000,000
ALT2 – IFP	76600	9200	8600	94400	771	95171	$212.00	$20,175,930
ALT2 – SF	18000	500	1900	20400	771	21171	$247.39	$5,237,399
ALT2 – AFP	65000		6500	71500	771	72271	$245.31	$17,728,969
TOTAL ALT–2	176100	11400	18400	205900	4777	210677	$290.63	$61,230,098

Risk Criteria 10E – 6

TITLE	EXCAVATED BANK CUBIC YARDS			TOTAL EXCAVATED BCY	GENERATED WASTE BCY	TOTAL BCY	UNIT COST PER BCY	TOTAL NPV DOLLARS
	LEVEL D	LEVEL C	ADDITNL.					
ALT2 – SWL	10400	1700	1200	13300	1232	14532	$556.55	$8,087,800
ALT2 – LSP	6100		200	6300	1232	7532	$1,327.67	$10,000,000
ALT2 – IFP	84800	9200	9400	103400	771	104171	$212.00	$22,083,900
ALT2 – SF	41900	500	4200	46600	771	47371	$247.39	$11,718,900
ALT2 – AFP	65100		6500	71600	771	72371	$245.31	$17,753,500
TOTAL ALT–2	208300	11400	21500	241200	4777	245977	$283.13	$69,644,100

COMPARISON OF NET PRESENT VALUES BY RISK CRITERIA



COMPARISON OF NET PRESENT VALUES BY SUB–UNITS

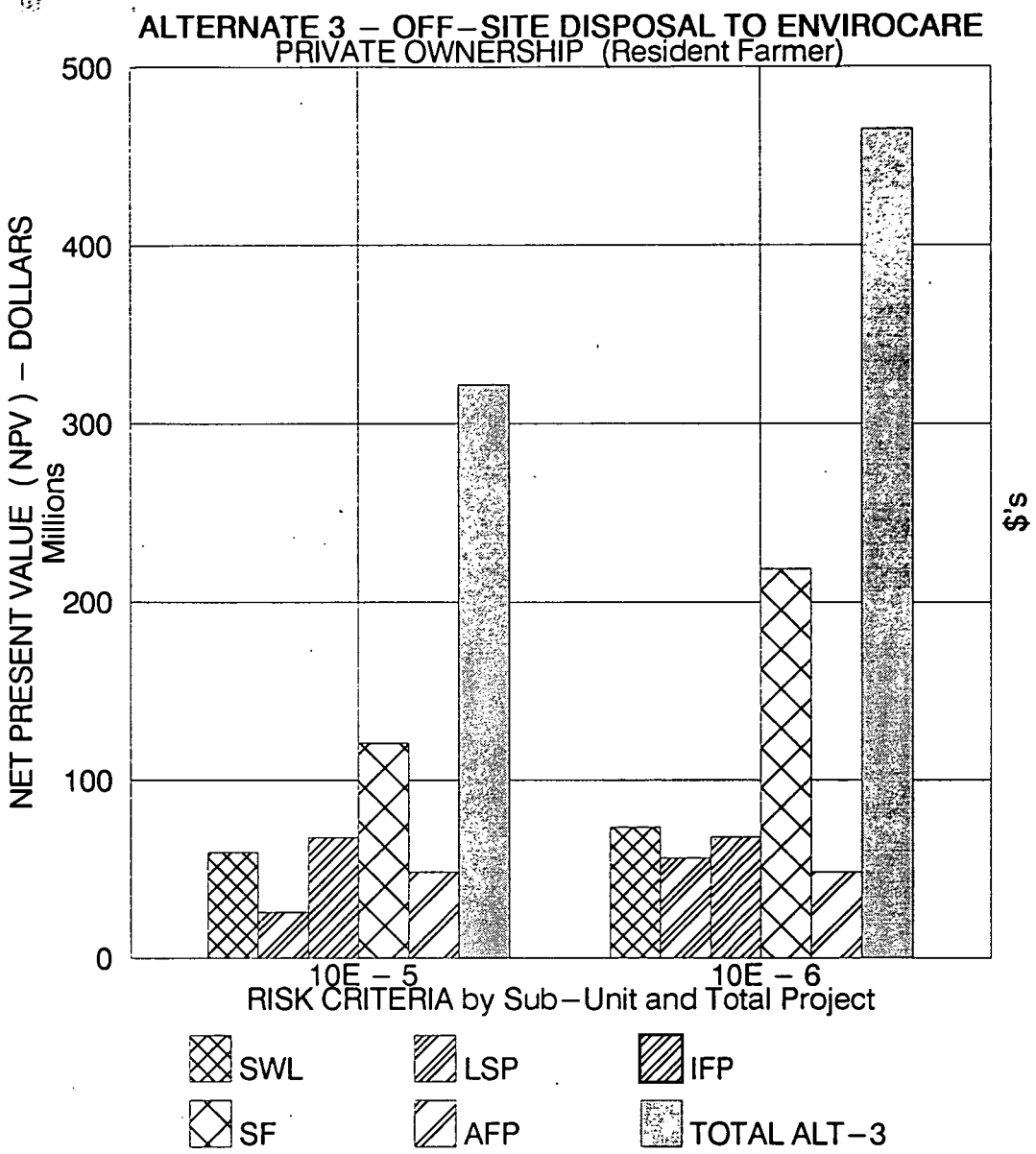
Risk Criteria 10E – 5

TITLE	EXCAVATED BANK CUBIC YARDS			TOTAL EXCAVATED BCY	GENERATED WASTE BCY	TOTAL BCY	UNIT COST PER BCY	TOTAL NPV DOLLARS
	LEVEL D	LEVEL C	ADDITNL.					
ALT3A – SWL	19400	1700	3000	24100	1364	25464	$823.91	$20,980,100
ALT3A – LSP	16500		1700	18200	2475	20675	$914.97	$18,917,000
ALT3A – IFP	76700	9200	8600	94500	1127	95627	$661.14	$63,222,852
ALT3A – SF	35900	500	3600	40000	1126	41126	$681.66	$28,033,913
ALT3A – AFP	65000		6500	71500	1127	72627	$612.39	$44,476,361
TOTAL ALT–3A	213500	11400	23400	248300	7219	255519	$687.35	$175,630,226

Risk Criteria 10E – 6

TITLE	EXCAVATED BANK CUBIC YARDS			TOTAL EXCAVATED BCY	GENERATED WASTE BCY	TOTAL BCY	UNIT COST PER BCY	TOTAL NPV DOLLARS
	LEVEL D	LEVEL C	ADDITNL.					
ALT3A – SWL	19400	1700	3000	24100	1364	25464	$823.91	$20,980,100
ALT3A – LSP	16500		1700	18200	2475	20675	$914.97	$18,917,000
ALT3A – IFP	84800	9200	9400	103400	1127	104527	$661.14	$69,107,000
ALT3A – SF	77500	500	7800	85800	1126	86926	$681.66	$59,253,900
ALT3A – AFP	65100		6500	71600	1127	72727	$612.39	$44,537,600
TOTAL ALT–3A	263300	11400	28400	303100	7219	310319	$685.73	$212,795,600

COMPARISON OF NET PRESENT VALUES BY RISK CRITERIA



COMPARISON OF NET PRESENT VALUES BY SUB–UNITS

Risk Criteria 10E – 5

TITLE	EXCAVATED BANK CUBIC YARDS			TOTAL EXCAVATED BCY	GENERATED WASTE BCY	TOTAL BCY	UNIT COST PER BCY	TOTAL NPV DOLLARS
	LEVEL D	LEVEL C	ADDITNL.					
ALT3B – SWL	80100	1700	8200	90000	1364	91364	$649.55	$59,345,811
ALT3B – LSP	36300		3600	39900	2475	42375	$608.09	$25,767,766
ALT3B – IFP	91200	9200	10000	110400	1127	111527	$607.97	$67,804,521
ALT3B – SF	186400	500	19000	205900	1126	207026	$582.78	$120,649,878
ALT3B – AFP	74900		7500	82400	1127	83527	$578.57	$48,326,200
TOTAL ALT–3B	468900	11400	48300	528600	7219	535819	$600.75	$321,894,176

Risk Criteria 10E – 6

TITLE	EXCAVATED BANK CUBIC YARDS			TOTAL EXCAVATED BCY	GENERATED WASTE BCY	TOTAL BCY	UNIT COST PER BCY	TOTAL NPV DOLLARS
	LEVEL D	LEVEL C	ADDITNL.					
ALT3B – SWL	96700	1700	13800	112200	1364	113564	$649.55	$73,765,900
ALT3B – LSP	81600		8200	89800	2475	92275	$608.09	$56,111,400
ALT3B – IFP	91700	9200	10100	111000	1127	112127	$607.97	$68,169,300
ALT3B – SF	339500	500	34000	374000	1126	375126	$582.78	$218,614,600
ALT3B – AFP	74900		7500	82400	1127	83527	$578.57	$48,326,200
TOTAL ALT–3B	684400	11400	73600	769400	7219	776619	$598.73	$464,987,400

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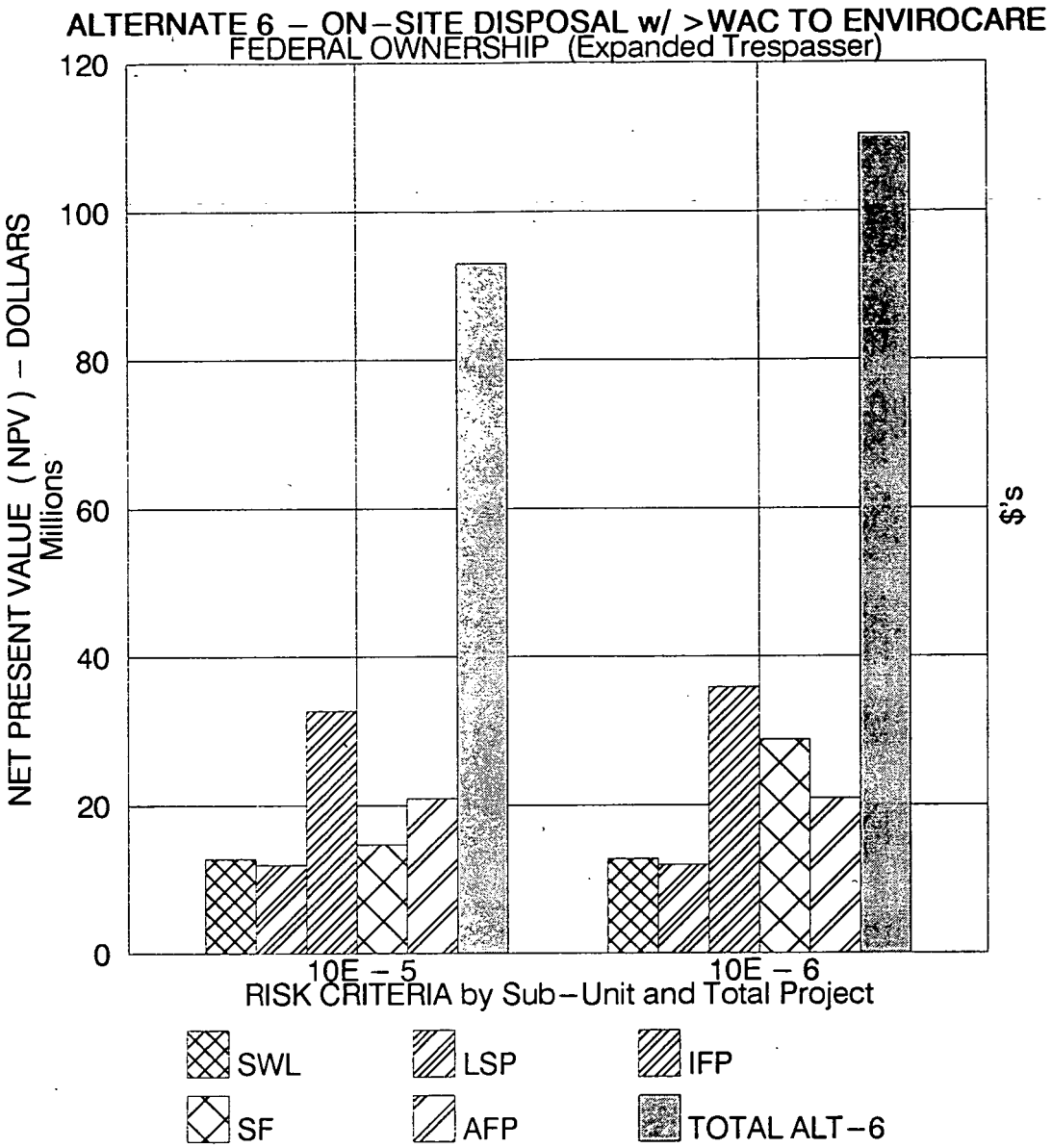
COMPARISON OF NET PRESENT VALUES BY RISK CRITERIA



COMPARISON OF NET PRESENT VALUES BY SUB–UNITS

Risk Criteria 10E – 5

TITLE	EXCAVATED BANK CUBIC YARDS			TOTAL EXCAVATED BCY	GENERATED WASTE BCY	TOTAL BCY	UNIT COST PER BCY	TOTAL NPV DOLLARS
	LEVEL D	LEVEL C	ADDITNL.					
ALT6A – SWL	19400	1700	3000	24100	5602	29702	$429.76	$12,764,800
ALT6A – LSP	16500		1700	18200	5602	23802	$502.63	$11,963,500
ALT6A – IFP	79800	6100	8000	93900	5217	99117	$329.99	$32,707,415
ALT6A – SF	36900	500	3600	41000	5217	46217	$317.07	$14,653,794
ALT6A – AFP	65000		6500	71500	5217	76717	$272.47	$20,902,753
TOTAL ALT–6A	217600	8300	22800	248700	26855	275555	$337.47	$92,992,262

Risk Criteria 10E – 6

TITLE	EXCAVATED BANK CUBIC YARDS			TOTAL EXCAVATED BCY	GENERATED WASTE BCY	TOTAL BCY	UNIT COST PER BCY	TOTAL NPV DOLLARS
	LEVEL D	LEVEL C	ADDITNL.					
ALT6A – SWL	19400	1700	3000	24100	5602	29702	$429.76	$12,764,800
ALT6A – LSP	16500		1700	18200	5602	23802	$502.63	$11,963,500
ALT6A – IFP	87900	6100	9400	103400	5217	108617	$329.99	$35,842,300
ALT6A – SF	77400	500	7800	85700	5217	90917	$317.07	$28,826,600
ALT6A – AFP	65100		6500	71600	5217	76817	$272.47	$20,930,000
TOTAL ALT–6A	266300	8300	28400	303000	26855	329855	$334.47	$110,327,200

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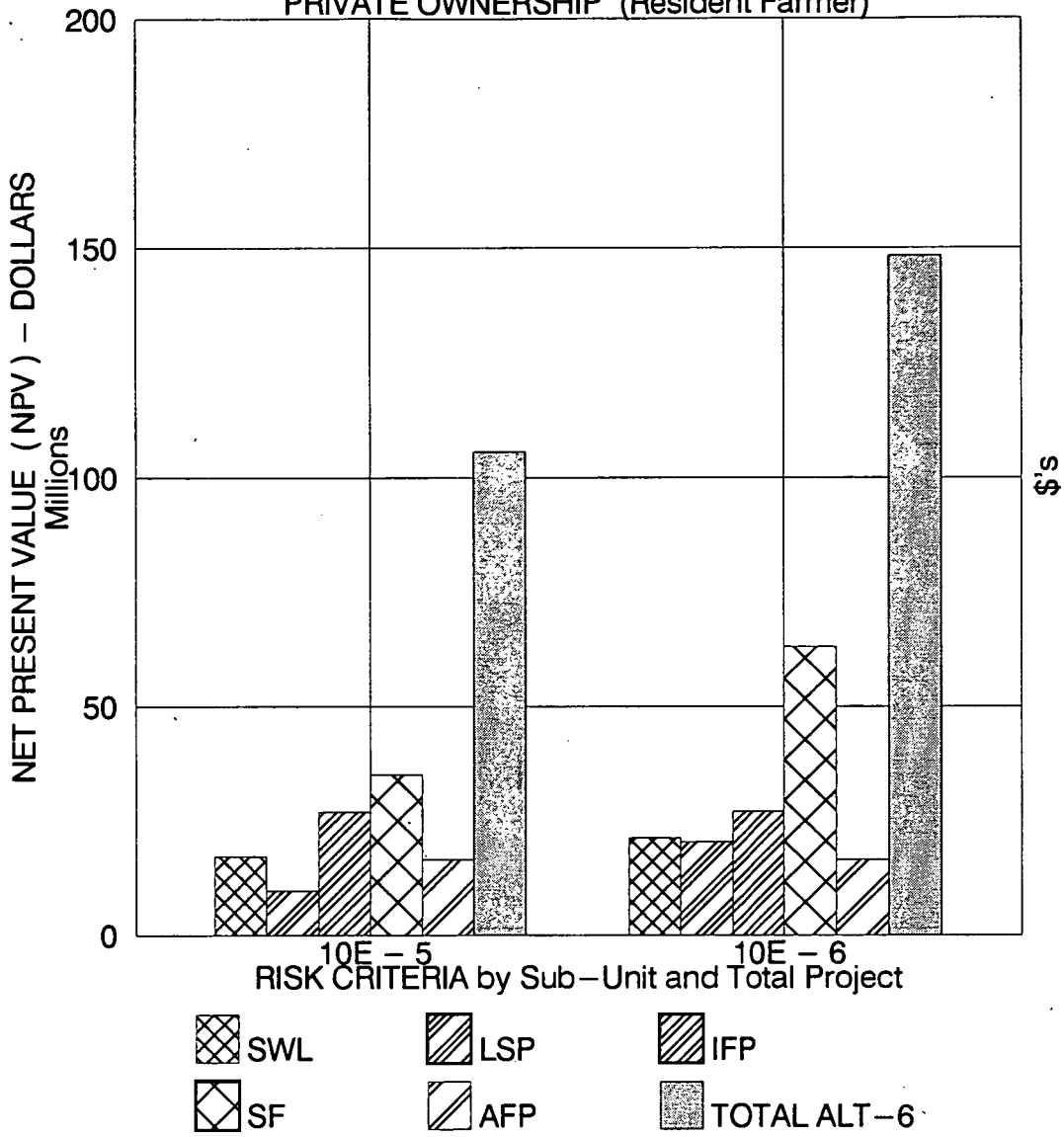
COMPARISON OF NET PRESENT VALUES BY RISK CRITERIA

ALTERNATE 6 – ON-SITE DISPOSAL w/ >WAC TO ENVIROCARE
PRIVATE OWNERSHIP (Resident Farmer)



COMPARISON OF NET PRESENT VALUES BY SUB-UNITS
Risk Criteria 10E – 5

TITLE	EXCAVATED BANK CUBIC YARDS			TOTAL EXCAVATED BCY	GENERATED WASTE BCY	TOTAL BCY	UNIT COST PER BCY	TOTAL NPV DOLLARS
	LEVEL D	LEVEL C	ADDITNL.					
ALT6B – SWL	80100	1700	8200	90000	5602	95602	$180.34	$17,241,179
ALT6B – LSP	36300		3600	39900	5602	45502	$213.68	$9,722,868
ALT6B – IFP	91200	9200	10000	110400	5217	115617	$233.86	$27,038,383
ALT6B – SF	186400	500	19000	205900	5217	211117	$166.29	$35,107,700
ALT6B – AFP	74900		7500	82400	5217	87617	$188.12	$16,482,600
TOTAL ALT-6B	468900	11400	48300	528600	26855	555455	$190.10	$105,592,730

Risk Criteria 10E – 6

TITLE	EXCAVATED BANK CUBIC YARDS			TOTAL EXCAVATED BCY	GENERATED WASTE BCY	TOTAL BCY	UNIT COST PER BCY	TOTAL NPV DOLLARS
	LEVEL D	LEVEL C	ADDITNL.					
ALT6B – SWL	98700	1700	13800	112200	5602	117802	$180.34	$21,244,800
ALT6B – LSP	81600		8200	89800	5602	95402	$213.68	$20,385,500
ALT6B – IFP	94800	6100	10100	111000	5217	116217	$233.86	$27,178,700
ALT6B – SF	339200	500	34000	373700	5217	378917	$166.29	$63,012,000
ALT6B – AFP	74900		7500	82400	5217	87617	$188.12	$16,482,600
TOTAL ALT-6B	687200	8300	73600	769100	26855	795955	$186.32	$148,303,600

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TABLE F.8-2

ALTERNATIVE 2 - CONSOLIDATION AND CAPPING EXPANDED TRESPASSER AND 10^{-5} RISK LEVEL CONSOLIDATION AND OFF-SITE DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Off-Site Disposal Volume (yd^3)	Consolidation Volume (yd^3)			Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation (yd^3)	Total Excavation (yd^3)		Excavation Volume to On-Site Disposal	Generated Waste Volume	Total Consolidation Volume		
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total								
Solid Waste Landfill	10,400	1,700	12,100	1,200	13,300	0	13,300	3,000	16,300	5,300	0
Lime Sludge Ponds	1,600	0	1,600	200	1,800	0	1,800	3,000	4,800	100	0
Inactive Flyash Piles	76,600	9,200	85,800	8,600	94,400	0	94,400	3,000	97,400	4,000	0
South Field	18,000	500	18,500	1,900	20,400	300	20,100	3,000	23,100	6,500	0
Active Flyash Pile	65,000	0	65,000	6,500	71,500	0	71,500	3,000	74,500	0	0
Total	171,600	11,400	183,000	18,400	201,400	300	201,200	15,000	216,000	15,900	0

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

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TABLE F.8-3

ALTERNATIVE 3 - EXCAVATION AND OFF-SITE DISPOSAL (ENVIROCARE) EXPANDED TRESPASSER AND 10^{-5} RISK LEVEL REMEDIATION AND OFF-SITE DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Generated Waste Volume (yd^3)	Total Off-Site Disposal Volume (yd^3)	Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavation				
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total						
Solid Waste Landfill	19,500	1,700	21,200	2,100	23,300	3,000	26,300	5,300	7,000
Lime Sludge Ponds	16,800	0	16,800	1,700	18,500	3,000	21,500	0	7,100
Inactive Flyash Piles	76,700	9,200	85,900	8,600	94,500	3,000	97,500	4,000	6,900
South Field	35,900	500	36,400	3,600	40,000	3,000	43,000	6,500	11,000
Active Flyash Pile	65,000	0	65,000	6,500	71,500	3,000	74,500	0	700
Total	213,900	11,400	225,300	22,500	247,800	15,000	262,800	15,800	32,700

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

001855

TABLE F.8-4

ALTERNATIVE 3 - EXCAVATION AND OFF-SITE DISPOSAL (ENVIROCARE) RESIDENT FARMER AND 10^{-5} RISK LEVEL REMEDIATION AND OFF-SITE DISPOSAL VOLUMES

Subunit	Excavation Volumes (yd^3)					Generated Waste Volume (yd^3)	Total Off-Site Disposal Volume (yd^3)	Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavation				
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total						
Solid Waste Landfill	78,800	1,700	80,500	8,000	88,500	3,000	91,500	5,300	7,000
Lime Sludge Ponds	36,300	0	36,300	3,600	39,900	3,000	42,900	0	7,100
Inactive Flyash Piles	91,200	9,200	100,400	10,000	110,400	3,000	113,400	4,000	6,900
South Field	186,400	500	186,900	19,000	205,900	3,000	208,900	6,500	11,000
Active Flyash Pile	74,900	0	74,900	7,500	82,400	3,000	85,400	0	500
Total	468,900	11,400	479,000	48,100	527,100	15,000	543,600	15,800	32,700

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

TABLE F.8-5

ALTERNATIVE 6 - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION ABOVE WASTE ACCEPTANCE CRITERIA EXPANDED TRESPASSER AND 10^{-5} RISK LEVEL

Subunit	Excavation Volumes (yd^3)					Off-Site Disposal Volume (yd^3)	On-Site Disposal Volume (yd^3)			Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavation		Excavation Volume to On-Site Disposal	Generated Waste Volume	Total On-Site Disposal Volume		
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total								
Solid Waste Landfill	19,500	1,700	21,200	3,000	24,200	0	24,200	3,000	27,200	5,300	0
Lime Sludge Ponds	16,800	0	16,800	1,700	18,500	0	18,500	3,000	21,500	0	0
Inactive Flyash Piles	76,700	9,200	85,900	8,600	94,500	3,100	91,400	3,000	94,400	4,000	0
South Field	35,900	500	36,400	3,600	40,000	,300	39,700	3,000	42,700	6,500	0
Active Flyash Pile	65,000	0	65,000	6,500	71,500	0	71,500	3,000	74,500	0	0
Total	213,900	11,400	225,300	23,400	248,700	3,400	245,300	15,000	260,300	15,800	0

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

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TABLE F.8-6

ALTERNATIVE 6 - EXCAVATION AND ON-SITE DISPOSAL WITH OFF-SITE DISPOSAL OF FRACTION ABOVE WASTE ACCEPTANCE CRITERIA RESIDENT FARMER AND 10^{-5} RISK LEVEL

Subunit	Excavation Volumes (yd^3)					Off-Site Disposal Volume (yd^3)	On-Site Disposal Volume (yd^3)			Debris Volume (yd^3)	Drying Volume (yd^3)
	Remediation Volume			Additional Excavation	Total Excavation		Excavation Volume to On-Site Disposal	Generated Waste Volume	Total On-Site Disposal Volume		
	PPE Level - D (<125 pCi/g)	PPE Level - C (>125 pCi/g)	Total								
Solid Waste Landfill	78,800	1,700	80,500	8,000	88,500	0	88,500	3,000	91,500	5,300	0
Lime Sludge Ponds	36,300	0	36,300	3,600	39,900	0	39,900	3,000	42,900	0	0
Inactive Flyash Piles	91,200	9,200	100,400	10,000	110,400	3,100	107,300	3,000	110,300	4,000	0
South Field	186,400	500	186,900	19,000	205,900	300	205,600	3,000	208,600	6,500	0
Active Flyash Pile	74,900	0	74,900	7,500	82,400	0	82,400	3,000	85,400	0	0
Total	468,900	11,400	479,000	48,100	527,100	3,400	523,700	15,000	538,700	15,800	0

Note: For excavation volume criteria and methodology, refer to Appendix E.1.2

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Appendix G
NEPA Impact Analysis

APPENDIX G

NEPA CUMULATIVE IMPACT ANALYSIS
OU2 FS/PP-EA

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LIST OF ACRONYMS

ARAR	applicable or relevant and appropriate requirements
BAR	Basin-and-Range Province
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm	centimeters
COE	U.S. Army Corp of Engineers
CRARE	Comprehensive Response Action Risk Evaluation
CRP	chlorosulfanated reinforced polyethylene
dB	decibel
dBA	decibel (A-weighted)
DCG	derived concentration guideline
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EA	environmental assessment
EDE	effective dose equivalent
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
EPDM	ethylene-propylene-diene monomer
EWMF	engineered waste management facility
FEMP	Fernald Environmental Management Project
FS	feasibility study
FS/PP-EIS	feasibility study/proposed plan - environmental impact statement
ft	feet
ft^2	square feet
ft^3	cubic feet
GMR	Great Miami River
ha	hectare
HEAST	Health Effects Assessment Summary Tables

LIST OF ACRONYMS
(Continued)

in.	inch
kg	kilogram
km/hr	kilometers per hour
km^2	square kilometers
L	liter
lbs	pounds
LRA	leading remedial alternative
m	meter
m^2	square meter
m^3	cubic meter
mi/hr	miles per hour
mi^2	square mile
MSL	mean sea level
NAFB	Nellis Air Force Base
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
NTS	Nevada Test Site
OAC	Ohio Administrative Code
OEPA	Ohio Environmental Protection Agency
PCB	polychlorinated biphenyl
pCi	picoCuries
PP	Proposed Plan
ppb	parts per billion
PRG	preliminary remediation goal
RCRA	Resource Conservation Recovery Act
RI	remedial investigation

LIST OF ACRONYMS
(Continued)

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RI/FS	remedial investigation/feasibility study
SPL	sound measure level
SWCR	Site-Wide Characterization Report
TCLP	toxicity characteristic leaching procedure
UF_4	green salt
UMTRCA	Uranium Mill Tailings Radiation Control Act
UO_3	uranium oxide (orange oxide)
WEMCO	Westinghouse Environmental Management Corporation
yd^3	cubic yard
yr	year

G.1.0 INTRODUCTION

G.1.1 PURPOSE

This appendix provides an analysis of the cumulative impacts that would result from the implementation of the Operable Unit 2 Representative Alternative (or the proposed remedial alternative) with the leading remedial alternatives (LRAs) or preferred alternatives for the other four operable units at the Fernald Environmental Management Project (FEMP) site. To show progression from the "Leading Remedial Alternative (LRA)" (a term utilized in the Site-Wide Characterization Report), the term "Representative Alternative" is employed in this analysis and Appendix H for Operable Unit 2. The Proposed Plan for Operable Unit 2 will select the preferred alternative. This analysis provides the reader with the best current information on how the potential impacts from Operable Units 1, 3, 4, and 5 relate to the potential impacts of Operable Unit 2. This appendix is an update of the cumulative impact analysis provided in the Operable Unit 4 Feasibility Study/Proposed Plan-Environmental Impact Statement (FS/PP-EIS) and the Operable Unit 1 FS/PP-Environmental Assessment (EA). The descriptions of the Operable Unit 2 remedial actions have changed slightly from those evaluated in the Operable Unit 4 and Operable Unit 1 documents; therefore, this appendix has been updated for the Operable Unit 2 analysis. Note that terminology utilized in this analysis may differ slightly from operable unit to operable unit.

In this analysis, efforts have been made to further quantify impacts in the cumulative impact analysis. After the identification of the preferred or representative alternatives for Operable Units 1, 2 and 4 in their respective FS/PP-National Environmental Policy Act (NEPA) documentation, it is possible to more accurately quantify impacts to wetlands, biotic resources, etc. In addition, analyses related to noise impacts and transportation have been added. The original cumulative impact analysis for the Operable Unit 4 FS/PP-EIS evaluated cumulative impacts based on the LRAs identified in the Site-Wide Characterization Report (SWCR), which assumed on-site disposal for all operable units [U.S. Department of Energy (DOE) 1993]. As a point of interest, the impacts to the FEMP site are becoming less significant as LRAs or preferred alternatives involving off-site disposal are identified.

It is important to note that for Operable Units 3 and 5, this cumulative assessment is still based on the current LRAs consistent with the Implementation Plan for the National Environmental Policy Act (NEPA) process at the FEMP site (DOE 1992). Additional data will be collected and analyzed for Operable Units 3 and 5 as these operable units progress through the Comprehensive Environmental

Response, Compensation, and Liability Act (CERCLA) process. As additional information becomes available and/or the LRAs change, revisions to this appendix will be presented in the FS/PP-NEPA documents for Operable Units 3 and 5.

G.1.2 SCOPE OF NEPA CUMULATIVE IMPACT ANALYSIS

The detailed evaluation in this cumulative impact analysis is limited to impacts on and immediately adjacent to the FEMP site. However, a description of off-site disposal areas has been included. Land use in the region around the FEMP site is rural and predominantly agricultural; however, there are specific areas around the FEMP site that warrant discussion. Nevertheless, activities being carried out in the region around the FEMP site are generally not of the nature that they will have a cumulative impact on air quality, groundwater, biotic resources, etc., when combined with the FEMP site remedial activities.

Sites that warrant discussion include: (1) a CERCLA site immediately south of the FEMP site (approximately 1 mile) that is undergoing the remedial investigation/feasibility study (RI/FS) process for an organic contamination plume in the Great Miami Aquifer (note that two other sites are being evaluated as potential CERCLA sites, but their proximity to the FEMP site does not justify or warrant a discussion), (2) a small quarry located less than 1 mile from the eastern boundary of the FEMP site, and (3) the potential for disposal of waste at an off-site location. The remaining areas around the FEMP site are primarily used for agricultural (i.e., cultivated fields) and limited residential domains.

The response action to the CERCLA site located immediately south of the FEMP will address the contamination in the Great Miami Aquifer and will likely involve groundwater pumping and some form of treatment. It will be relatively small scale when compared to the groundwater remediation associated with Operable Unit 5 at the FEMP site. Because the main activity will involve the pumping and treatment of groundwater, there will be minimal activity involving air emissions, excavation, disruption of habitat, etc. Therefore, cumulative impacts resulting from these activities in conjunction with the remedial activities at the FEMP site will be limited to the potential for impacts to groundwater and surface water (assuming treated water is discharged to the Great Miami River [GMR]). These impacts are limited to the potential for minor increases in contaminant loading to the GMR, which will be negated through treatment of extracted groundwater, and the negligible possibility of land subsidence due to groundwater extraction. This possibility of subsidence is very remote, because groundwater does not act as a support mechanism in this geologic structure.

However, the remedial alternative for Operable Unit 5 will need to consider the remedial action taking place at the site south of the FEMP site.

Activities at the quarry involve some excavation and movement of soil and rock. Because the quarry is in the prevailing wind direction from the FEMP site, there is the potential that fugitive dust emissions from the FEMP site could combine with dust emissions from this quarry, resulting in increased levels of particulates to downwind receptors. However, the operation of the quarry is on a relatively small scale when compared to the overall remediation of the FEMP site. These cumulative impacts to air quality in the area around the site will be minimal due to: (1) the limited amount of time dust generated at the site and in the fields will stay suspended, (2) the limited number of receptors downwind, and (3) the implementation of engineering controls.

The disposal of waste at an off-site location is another activity that could result in cumulative environmental impacts. The representative alternative for Operable Unit 2 involves the disposal of waste at the FEMP site with the potential for limited off site disposal. The preferred alternatives for Operable Units 1 and 4 involve the disposal of waste off site. In addition, the LRAs for the remaining operable units will likely involve the disposal of waste at off-site disposal facilities. Waste disposal facilities like Nevada Test Site (NTS) dispose of large volumes of waste from various generating sources. These facilities have appropriate land areas available for disposal activities (e.g., arid desert in the case of NTS) and the appropriate controls (e.g., leachate controls) to prevent releases from occurring. Therefore, the cumulative impacts of waste disposal at off-site facilities is expected to be minimal. A description of potential off-site waste disposal areas is provided in Attachment G.III.

Due to the land uses around the FEMP site, the potential for cumulative impacts in the region around the site as a result of the implementation of the FEMP remedial actions is limited. Therefore, the focus of the detailed analysis in this appendix will be limited to the response actions for operable units carried out at the FEMP site, since they pose the greatest potential for cumulative impacts to the environment and residents in the region around the site.

Efforts have been made throughout the Cumulative Impact Analysis to quantify impacts to the extent possible. For example, impacts to wetlands and habitats have been quantified (i.e., estimation of acres disturbed) wherever possible. In addition, the overall impacts of the FEMP remedial activities

on the local socioeconomic structure have been quantified to the extent possible. Due to the timing of the remedial activities, quantitative information was not available in all cases. In these situations, a qualitative evaluation of potential impacts is provided.

G.1.3 NEPA/CERCLA INTEGRATION APPROACH AT THE FEMP SITE

It is DOE policy to integrate NEPA into the CERCLA process wherever practical. DOE regulations concerning NEPA compliance are contained in Title 10 Code of Federal Regulations (CFR) Part 1021. Furthermore, DOE Order 5400.4 addresses the integration of environmental compliance processes i.e., CERCLA and NEPA. According to the order, integration is to be accomplished by conducting the NEPA and CERCLA environmental planning and review procedures concurrently. Integration is intended to (1) avoid duplicate effort and the larger commitment of resources that would be needed to implement both NEPA and CERCLA separately, (2) avoid conflicts in analysis and the selection of a remedial alternative, and (3) minimize the risk of delaying remedial actions on procedural grounds. The primary instrument for DOE's NEPA/CERCLA integration is the RI/FS process, supplemented as needed to address NEPA values. The final product is to be a single integrated set of documents -- an RI report and a FS/PP-EIS that satisfies the requirements of CERCLA and addresses NEPA values.

The NEPA/CERCLA integration approach published in the Federal Register Notice of Intent (NOI) (DOE 1990) concluded that (1) a FS/PP-EIS was the appropriate level of NEPA documentation for the lead operable unit (i.e., Operable Unit 4) and (2) NEPA/CERCLA integration is also to be provided in the remaining four operable unit FS/PP-NEPA reports. The FS/PP-EA for Operable Unit 1 contains a discussion of common issues and potential cumulative impacts, referencing the Operable Unit 4 FS/PP-EIS as a lead document. All subsequent operable unit reports such as this cumulative impact analysis for the Operable Unit 2 FS/PP-EA also reference the material presented in the Operable Unit 4 FS/PP-EIS. This evaluation will update available information, as appropriate, and contain adequate operable unit-specific data to support the complete NEPA impact analyses to be contained in each operable unit FS.

G.1.4 REPORT ORGANIZATION

The NOI states that the purpose of the first operable unit FS/PP-EIS is to analyze issues common to all operable units, examine potential cumulative impacts, and serve as a reference document for subsequent operable unit reports. The descriptions of proposed remedial alternatives for Operable

Unit 2 are contained in the main text of the FS. Environmental impact analyses of Operable Unit 2 alternatives are contained in Section 5.0 of the Operable Unit 2 FS. The SWCR contains the baseline data required for analyses of potential impacts of site-wide remediation, including a baseline ecological risk assessment (which was summarized in the Operable Unit 4 FS/PP-EIS). The Proposed Plan presents the preferred alternative and summarizes the impacts of implementing it (including ecological risks). Section G.2.0 contains a description of the preferred alternative (Operable Units 1 and 4), representative alternative (Operable Unit 2), or LRA (Operable Units 3 and 5). The cumulative impacts of proposed on-site actions are described in Section G.3.0, which analyzes the potential impacts on the environment from concurrent implementation of remedial activities for the operable units and site-wide facilities.

Section G.4.0 lists and describes federal, state, and local agencies consulted during the compilation of data for the operable unit FS reports and the relationship of remediation at the FEMP site to the objectives of local, state, regional, and federal land-use plans, policies, and controls. Section G.5.0 provides an updated discussion of irreversible and irretrievable commitment of resources resulting from remedial activities at the FEMP site. The relationship between short- and long-term productivity is examined in Section G.6.0. Attachment G.I contains the list of contributors, as required by NEPA, and Attachment G.II describes FEMP site removal actions completed or proposed. Attachment G.III provides a description of potential off-site disposal locations.

G.1.5 Site-Wide Baseline Ecological Risk Assessment

The purpose of the ecological risk assessment, which was completed as a companion to the preliminary site-wide baseline risk assessment in the SWCR, was to estimate the potential and future baseline risks of FEMP contaminants to ecological receptors. The Operable Unit 4 FS/PP-EIS summarizes the Site-Wide Ecological Risk Assessment (DOE 1994a).

The U.S. Environmental Protection Agency (EPA) and DOE have agreed in the Amended Consent Agreement (September 1991) that the Site-Wide Ecological Risk Assessment would be done as part of the Operable Unit 5 RI. The Site-Wide Ecological Risk Assessment in the Operable Unit 5 RI Report will assess the possible risks from current concentrations of site contaminants to ecological receptors inhabiting on-site and off-site areas not presently targeted for remediation based on human-health concerns. More discussion on the ecological risk issues specific to Operable Unit 2 can be found in Section 5.0 of the Operable Unit 2 FS.

G.2.0 LEADING REMEDIAL ALTERNATIVES

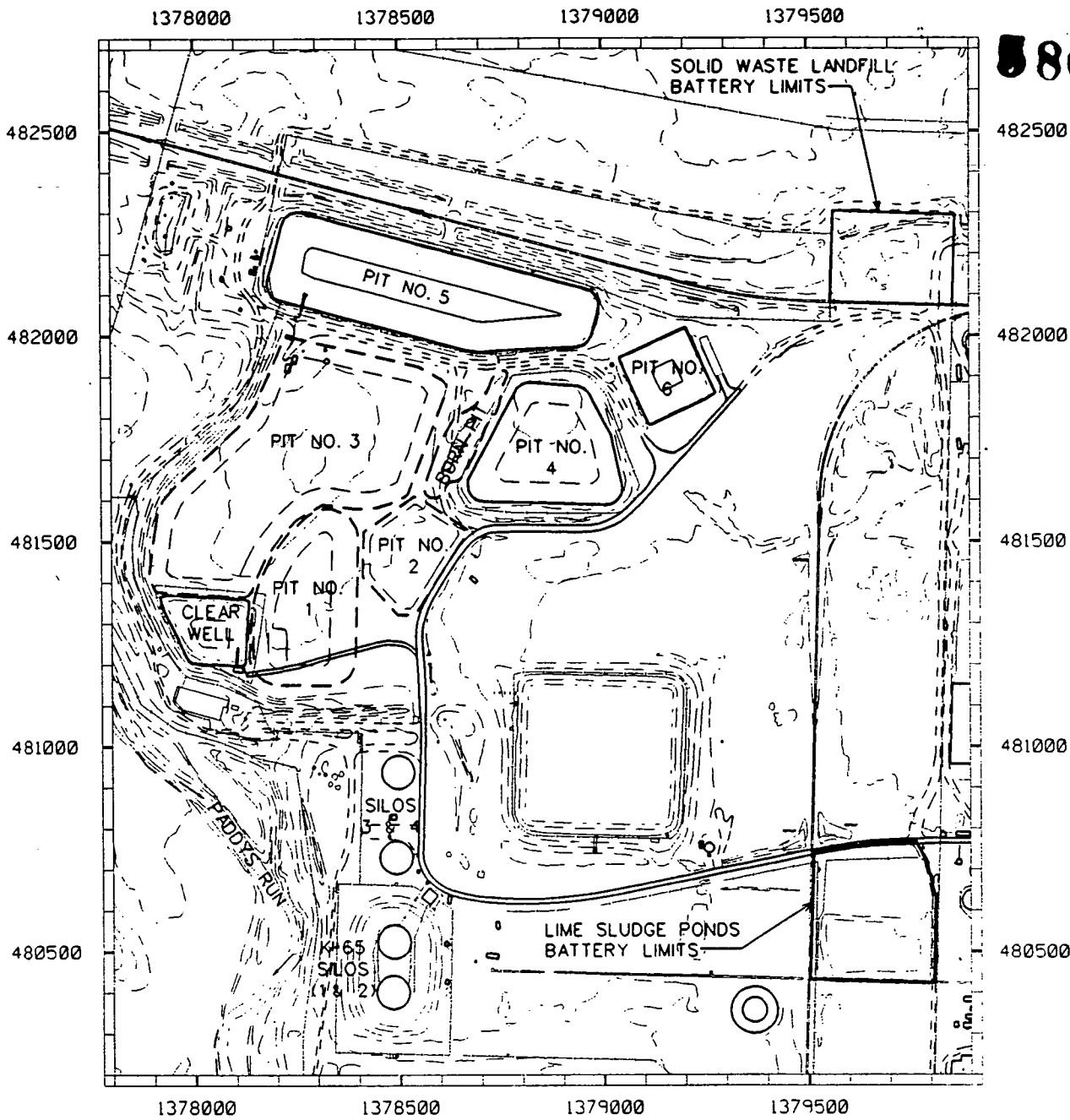
This section contains descriptions of each of the operable units at the FEMP site. The LRAs or preferred alternatives (depending on the status of their FS documents) for Operable Units 1, 3, 4, and 5 are described. For Operable Unit 2, this section describes the representative alternative, which was presented in detail in the FS evaluation. The No Action Alternative for the site was evaluated in detail in the SWCR and the cumulative impact analysis (Appendix I) of the Operable Unit 4 FS/PP-EIS.

The FEMP site was divided into five operable units under the original 1990 Consent Agreement. However, the definitions of these operable units have been revised under the amended Consent Agreement, and a Comprehensive Site-Wide Operable Unit has been added. The five operable units (Figure G.2-1) and their revised definitions are presented below:

- Operable Unit 1 - Waste Pits 1 through 6, the Clearwell, the Burn Pit, berms, liners, and associated contaminated soil within the operable unit boundary
- Operable Unit 2 - the Active and Inactive Flyash Piles, the South Field, the Lime Sludge Ponds, the Solid Waste Landfill, berms, liners, and associated contaminated soil within the operable unit boundary
- Operable Unit 3 - the former Production Area and production associated facilities and equipment (includes all above- and below-grade improvements) including, but not limited to, all structures, equipment, utilities, drums, tanks, solid waste, waste, product, thorium, effluent lines, K-65 transfer line, waste water treatment facilities, fire training facilities, scrap metal piles, feedstocks, and the coal pile
- Operable Unit 4 - Silos 1, 2, 3, and 4, berms, the decant sump tank system, and associated contaminated berms and soil within the operable unit boundary
- Operable Unit 5 - perched and regional groundwater, surface water, soils not associated with other operable units, sediment, flora, and fauna
- Operable Unit 6 - Comprehensive Site-Wide Operable Unit. The Comprehensive Site-Wide Operable Unit was added as a provision of the 1991 Amended Consent Agreement. This is not a specific site area; rather, the purpose is to evaluate the remedies selected for Operable Units 1 through 5 to ensure that they protect human health and the environment.

G.2.1 OPERABLE UNIT 1

Operable Unit 1 includes six low-level radioactive waste storage pits, the Burn Pit, and the Clearwell, all located west of the former Production Area (Figure G.2-1). The pits contain large quantities of



LEGEND

- ELEVATION CONTOURS
- ROADS
- STREAM
- BATTERY LIMITS
- FENCE
- RAILROAD

NOTE:
Coordinates are in State Planar NAD 1927.
Surface contours based on 1992 flyover.

SCALE (FT)
0 200 400 800

SCALE (METER)
0 48 96 192

FIGURE G.2-1
WASTE STORAGE AREA

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liquid and solid wastes that were generated by the various operations at the FEMP site and disposed of before 1984. The Operable Unit 1 waste units are described below and in Table G.2-1. A detailed description of the nature and extent of contamination associated with Operable Unit 1 is provided in the RI Report for Operable Unit 1. The waste pits in Operable Unit 1 contain the following:

- Waste Pit 1 - constructed in 1952 into existing native clay and then lined with an additional 1.2 meters (m) [4 feet (ft)] of clay. The pit has a maximum depth of 8.9 m (29.5 ft). Contents of the waste pit include 37,083 cubic meters (m^3) [48,500 cubic yards (yd^3)] of waste and 15,216 m^3 (19,900 yd^3) of contaminated cap and soil liner. Waste Pit 1 has been out of service since 1959, when it was backfilled, covered with clean soil, and graded to provide surface drainage into the Clearwell.

- Waste Pit 2 - constructed in 1957 and lined with native clay with a 4.2 m (13.8 ft) average design depth and a maximum depth of 7.1 m (23.5 ft). Contents of the waste pit include 18,503 m^3 (24,200 yd^3) of waste and 10,093 m^3 (13,200 yd^3) of contaminated cap and liner soil. Waste Pit 2 has been out of service since 1964, when it was backfilled and covered with clean soil.

- Waste Pit 3 - constructed in 1958 by excavating into underlying glacial till and then adding a clay liner along the pit walls and bottom. The pit has a maximum depth of 12.8 m (42.0 ft). The contents of the waste includes 156,055 m^3 (204,100 yd^3) of waste and 79,060 m^3 (103,400 yd^3) of contaminated cap and liner soil. Waste Pit 3 has been out of service since 1977, when it was backfilled and covered with clean soil.

- Waste Pit 4 - clay-lined pit constructed in 1960 with a 9.7 m (32 ft) maximum depth. Contains an estimated 10,659 kilograms (kg) [23,500 pounds (lbs)] of barium chloride in addition to radioactive wastes (Table G.2-1). In 1984, an interim cap providing an additional cover of compacted clay overlain by a 45-mil-thick Hypalon chlorosulfanated reinforced polyethylene (CRP) liner was installed to further ensure segregation of encapsulated materials from surface water during the interim period prior to implementation of a final remedial action. Contents of the waste pit includes 42,129 m^3 (55,100 yd^3) of waste and 13,533 m^3 (17,700 yd^3) of contaminated cap and liner soils. In 1986, Waste Pit 4 was backfilled and covered with clean soil.

- Waste Pit 5 - constructed in 1968 and served as a settling pond for slurried waste from various production processes. It is a maximum 8.8 m (29 ft) deep pond lined with a 60-mil-thick Royal-Seal ethylene-propylene-diene monomer (EPDM) elastomeric membrane. When heavy rainfall occurs, storm water overflow from Waste Pit 5 flows by gravity from the pit to the Clearwell. Contents of the waste pit includes 74,854 m^3 (97,900 yd^3) of waste covered with water. Waste Pit 5 has been out of service since 1983.

- Waste Pit 6 - constructed in 1979, this pit is a 7.3 m (24 ft) deep pond lined with a 60-mil-thick Royal-Seal EPDM elastomeric membrane. The pit has been out of service since 1985 and has not been covered. The waste pit contains 7,340 m^3 (9,600 yd^3) of waste, and standing water remains trapped within the berms of the pit. When heavy rainfall occurs, storm water overflow from Waste Pit 6 flows to Waste Pit 5 and then to the Clearwell.

TABLE G.2-1

OPERABLE UNIT 1 WASTES[a]

Waste Pit	Surface Area (ft^2)(m^2)	Radioactive Waste (lb)(kg)	Total Waste Volume (yd^3)(m^3)	Types of Waste
1	83,000/7,711	120,000/52,163 U	68,400/52,298	Filter cake, flyash, graphite, sump liquor, depleted slag, drums, uranium
2	45,000/4,181	2,700,000/1,224,699 U 880/399 Th	37,400/28,596	Filter cake, flyash, graphite, sump liquor depleted slag, drums, uranium, thorium
3	240,000/22,296	290,000/112,491 U 800/399 Th	307,500/235,114	Raffinate, raffinate concentrate, slag, filter cake, flyash, lime sludge, uranium, thorium
4	84,000/7,804	6,700,000/2,993,710 U 140,000/61,688 Th	72,800/55,662	Filter cake, slurries, graphite, raffinates, trash, asbestos, barium chloride, uranium, thorium
5	161,000/14,957	110,000/49,895 U 38,000/17,236 Th	97,900/74,854	Raffinates, slurries, lime sludges, uranium, thorium
6	32,400/3,010	1,900,000/861,826 U	9,600/7,340	Filter cake, slag, asbestos, uranium, process residues
Burn Pit	22,000/2,044	Unknown	30,300/23,167	Disposed lab chemicals, waste oils, uranium
Clearwell	25,500/2,369	Unknown	4,300/3,287	Process water settleable solids, uranium

[a]All stated quantities are approximate, and the information is based on process knowledge and production and disposal records.

- The Burn Pit - excavated in 1957 as a clay borrow pit for lining Waste Pits 1 and 2. The depth and size of the pit are not precisely known, but it is estimated to be approximately 9.1 m (30 ft) deep. The pit was subsequently used for the disposal and burning of laboratory chemicals, waste oils, and other low-level radioactivity-contaminated, materials, such as wooden pallets. The pit contains 23,167 m^3 (30,300 yd^3) of mixed waste and soil.

- The Clearwell - constructed in 1959 and served as a settling basin for process water and storm water runoff from the waste pits. The Clearwell contains 3,288 m^3 (4,300 yd^3) of sludge and contaminated liner soils. Most recently, the Clearwell was used as a final settling basin for process water that passed through Waste Pit 5 prior to its discharge to the Great Miami River via the National Pollutant Discharge Elimination System (NPDES) permitted discharge. This use was terminated in March 1987, when Waste Pit 5 was removed from the process water treatment scheme. The Clearwell currently receives surface water runoff from most of the surfaces of Waste Pits 1, 2, and 3 and from the entire surface of Waste Pit 5. Water of varying depths remains in the Clearwell at all times. The sediment resulting from material deposition was removed on at least one occasion during the period of operation. The depth of sediment remaining in the Clearwell is estimated at 8.2 m (27 ft).

G.2.1.1 Preferred Alternative for Operable Unit 1

The preferred alternative (as identified in the Operable Unit 1 FS/PP-EA) for Operable Unit 1 involves the removal and treatment of sufficient waste materials from Waste Pits 1 through 6, the Burn Pit, and the Clearwell to achieve risk-based Preliminary Remediation Goals (PRGs) and applicable or relevant and appropriate requirements (ARARs). The excavated area will be backfilled with compacted soils. Any remaining waste and contaminated soils in the Operable Unit 1 area will be stabilized and covered with a closure cap. The excavated materials will be treated (dried) and transported by rail to a commercial disposal facility. Waste that does not meet acceptance criteria at the representative permitted commercial disposal facility will be shipped to NTS. Remedial facilities will be decontaminated, dismantled, and transferred to Operable Unit 3. This alternative also includes continued federal ownership of the land to control future land use.

G.2.2 OPERABLE UNIT 2

Operable Unit 2 includes the following waste units: the Solid Waste Landfill, the Lime Sludge Ponds, the Inactive Flyash Pile, the South Field (an area between and adjacent to the flyash areas), and the Active Flyash Pile. The contents of the waste units are described below, and volumes are provided in Table G.2-2. A detailed description of the nature and extent of contamination associated with Operable Unit 2 is provided in the Operable Unit 2 RI Report (DOE 1994b).

TABLE G.2-2

OPERABLE UNIT 2 WASTES

Study Area	Surface Area (ft^2)(m^2)	Waste Volume (yd^3)(m^3)	Types of Waste
Solid Waste Landfill	40,700/3,781	15,200/11,600	Cafeteria wastes, sanitary rubbish, asbestos, construction rubble, medical wastes
Lime Sludge Ponds	56,250/5,230	16,500/12,600	Spent lime sludge
Inactive Flyash Pile	130,680/12,141	96,000/73,300	Flyash, waste oils, construction rubble, asphalt, masonry, steel, uranium
South Field	479,160/44,515	120,000/92,000	Construction rubble
Active Flyash Pile	87,120/8,095	58,800/44,956	Flyash, waste oils, construction rubble, asphalt, masonry, steel, uranium

- Solid Waste Landfill - located on a 0.4 ha (1.1 ac) tract at the northeast corner of the Waste Storage Area and northwest of the former Production Area. The Solid Waste Landfill was used through early 1986 for the disposal of cafeteria wastes, rubbish, and other wastes from nonprocess areas. Materials that reportedly have been disposed of at the landfill include: nonburnable and nonradioactive solid wastes generated on site; nonradioactive and construction-related rubble; nonradioactive asbestos (double-bagged and bulk quantities); and medical wastes.

- Lime Sludge Ponds - consist of two ponds, north and south. The North Lime Sludge Pond is an active, unlined pond located southeast of the Waste Storage Area with approximate dimensions of 38 m by 69 m by 1.6 m (125 ft by 225 ft by 5.3 ft) deep. This pond is approximately 90 percent full, with a freeboard depth of 0.6 m (2 ft), and is partially covered with vegetation. Typically, standing water accumulates in the North Pond above the lime sludge with the depth depending on precipitation and plant operations. Spent lime sludges (primarily lime-alum and boiler plant blowdown) from the FEMP site water treatment plant operations have been conveyed to this active pond. Records do not indicate the routing of any hazardous chemicals or radioactive materials to this pond.

  The South Lime Sludge Pond is an inactive, dry, unlined pond located directly south of the north pond. The approximate dimensions of the South Lime Sludge Pond are 38 m by 69 m by 3.4 m (125 ft by 225 ft by 11.2 ft) deep. This pond is retired and overgrown with vegetation. The use of this pond was similar to that of the North Lime Sludge Pond. Again, records do not indicate the routing of any hazardous chemicals or radioactive materials to this pond.

- Inactive Flyash Pile - located approximately 610 m (2,000 ft) southwest of the Former Production Area, northwest of the Active Flyash Pile, and west of the South Field. The Inactive Flyash Pile, which is no longer used, covers approximately 12,141 m^2 (130,680 ft^2) and is sparsely covered with soil and vegetation.

- South Field - located between the Inactive and Active Flyash Piles where construction rubble and soil from the Former Production Area was dumped. The thickness of the construction rubble and soil fill increases at the western and southern edges of the area to approximately 6 m (20 ft), because material was dumped down the natural slope of an old meander scar. A review of the shallow trenches through the fill indicates that the material is predominantly soil with some rock and concrete and only occasional pieces of wood. The construction rubble deposited in the South Field contained low levels of radioactive materials. Results of trenching activities indicate that the buried materials are within the top 1.2 m (4 ft) of soil.

- Active Flyash Pile - formerly received flyash from the coal-fired boiler plant at the FEMP site. This disposal area is located east of the running track and on the east side of the south construction road (Figure G.2-2). The active flyash pile is a roughly hexagonal area of approximately 1.4 ha (3 to 4 ac) with a maximum height of 12 m (40 ft). The Storm Sewer Outfall Ditch runs along the southeast side of the area.

Data gathered for the Operable Unit 2 RI/FS indicate that the subunits hold large volumes of solid waste, in which small volumes of radiological and/or chemical wastes may have been co-disposed. A

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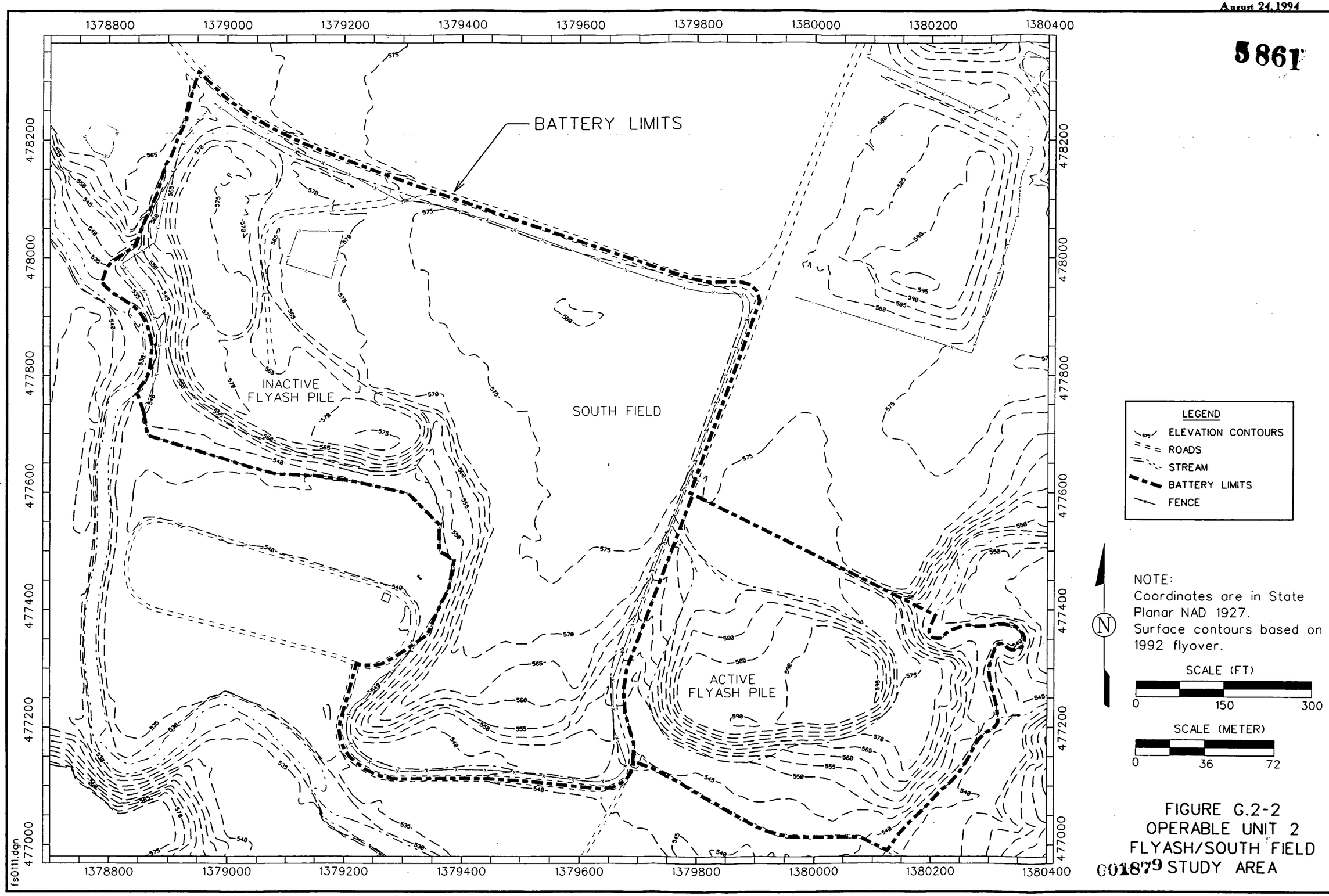

FIGURE G.2-2
OPERABLE UNIT 2
FLYASH/SOUTH FIELD
STUDY AREA

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review of the RI/FS sampling data for the Active and Inactive Flyash Piles and the South Field indicates concentrations of uranium-238 in all media (DOE 1994b).

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G.2.2.1 Representative Alternative for Operable Unit 2

Contaminated material with concentrations above the expanded trespasser and on-property resident farmer cleanup levels would be excavated and segregated according to radiological contamination. The contaminated material would be placed in an on-site disposal cell in the southeast corner of the FEMP site. Any Firing Range soils that fail the Resource Conservation and Recovery Act (RCRA) toxicity characteristic leaching procedure (TCLP) test would be managed as a RCRA hazardous waste and disposed at an off-site mixed waste disposal facility. Water would be collected and pumped to a treatment facility, as necessary. Institutional controls would include physical barriers and groundwater monitoring.

G.2.3 OPERABLE UNIT 3

Operable Unit 3 includes the former Production Area and all above-ground and below-ground production-associated facilities and equipment encompassing structures, utilities, drums, tanks, solid waste, waste, product, thorium, effluent lines, wastewater treatment and fire training facilities, scrap metal piles, feedstock, and the coal pile.

The production of uranium metal products at the FEMP site involved a series of chemical and metallurgical conversions that occurred in nine specialized plants within Operable Unit 3. A number of other buildings housed support operations. Each of these facilities had a distinct purpose, resulting in important differences in the process operations, chemical forms, and types of individual storage, and containment units associated with the respective facilities. The potential contaminants resulting from production activities are listed in Table G.2-3.

Solid waste materials associated with uranium metals production are presently stored on site in steel drums awaiting further processing or off-site disposal at approved facilities. These wastes include oils, sludges, contaminated combustibles, filter cake, off-specification uranium or thorium tetrafluoride, and reject uranium trioxide. The drums sit on various pads and in warehouses and are inspected weekly. Contents of deteriorated drums are repackaged. Other wastes stored in drums on contained surfaces include spent degreasing solvents and material contaminated with polychlorinated biphenyls (PCBs). Estimated volumes of potentially contaminated materials are listed by component in Table G.2-4.

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TABLE G.2-3

OPERABLE UNIT 3 RI/FS ANALYTE LIST

Radionuclides
Isotopic uranium
Isotopic thorium
Isotopic plutonium and 241
Radium-226 and 228
Neptunium-237
Americium-241
Cesium-137
Strontium-90
Lead-210
Polonium-210
Technetium-99
Alpha/Beta Screening

TAL Inorganics
Aluminum
Antimony
Arsenic
Barium
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc
Cyanide[a]

TCL Semivolatile Organics
1,2-Dichlorobenzene
1,2,4-Trichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2-Chloronapthalene
2-Chlorophenol
2-Methylnaphthalene
2-Methylphenol
2-Nitroanilene
2-Nitrophenol
2,2-Oxybis-(1-chloroprane)
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,6-Dinitrotoluene
3-Nitroaniline
3,3-Dichlorobenzidine
4-Bromophenyl-phenyl ether
4-Chloro-3-methylphenol
4-Chloroaniline
4-Chlorophenyl-phenyl ether
4-Methylphenol
4-Nitroaniline
4-Nitrophenol
4,6-Dinitro-2-methylphenol
Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene
bis(2-Chloroethyl) ether
bis(2-Chloroethoxyl) methane
bis(2-Ethylhexyl)phthalate
Butylbenzylphthalate
Carbazole
Chryzene
Dibenzofuran
Dibenzo(a,h)anthracene
Diethylphthalate
Dimethylphthalate
Di-n-butylphthalate
Di-n-octylphthalate
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Ideno(1,2,3-cd)pyrene
Isophorone
Napthalene
Nitrobenzene
N-Nitroso-di-n-dipropylanine
N-Nitrosodiphenylamine
Pentachlorophenol
Phenanthrene
Phenol
Pyrene

TCL PCBs
Arochlor-1016
Arochlor-1221
Arochlor-1232
Arochlor-1242
Arochlor-1248
Arochlor-1254
Arochlor-1260

TCL Volatile Organics
1,1-Dichloroethane
1,1-Dichloroethene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dichloroethane
1,2-Dichloroethene (total)
1,2-Dichloropropane
2-Butanone
2-Hexanone
4-Methyl-2-pentanone
Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon disultfied
Carbon tetrachloride
Chlorobenzene
Chloroethane
Choroform
Chloromethane
cis-1,3-Dichloropropene
Dibromochloromethane
Ethyl benzene
Methylene chloride
Styrene
Tetrachloroethene
Toluene
Total xylenes
trans-1,3-Dichloropropene
Trichloroethene
Vinyl chloride

TCLP Metals
Arsenic
Barium
Cadmium
Chromium
Lead
Mercury
Selenium
Silver

TCLP Semivolatile Organics
1,4-Dichlorobenzene
2,4-Dinitrotoluene
Hexachlorobenzene
Hexachloroethane
Hexachloro-1,3-butadiene
Nitrobenzene
Pentachlorophenol
Pyridine
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
o-Cresol
m-Cresol
p-Cresol

TCLP Volatile Organics
Benzene
Carbon tetrachloride
Chlorobenzene
Chloroform
2-Butanone
1,2-Dichloroethane
1,1-Dichloroethylene
Tetrachloroethylene
Trichloroethylene
Vinyl chloride

[a]Requested only in components with history of cyanide usage.

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TABLE G.2-4

ESTIMATED VOLUMES OF OPERABLE UNIT 3 COMPONENTS (ft^3)

Component	Concrete	Cement Block	Steel	Transite	Other Metal	Soil/ Rubble	Asphalt	Other
Buildings (structure)	1,692,394	295,288	31,493	40,096	0	0	0	39,435
Buildings (content)	0	0	0	0	0	0	0	2,656,597
Containers	130,419	382	6,751	0	199	0	0	4,286
Bulk Material	0	0	2,000	0	550,000	981,000	0	189,000
Pads	440,890	0	2,059	0	0	0	445,708	33,792
Piping, etc.	56,282	0	11,789	0	157	0	0	19,587
Ponds and basins	5,139	0	312	0	0	0	0	13,373
Miscellaneous	40,762	0	3,502	0	0	0	0	9,011
Total	2,365,886	295,670	57,906	40,096	550,356	981,000	445,708	2,965,081

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G.2.3.1 Leading Remedial Alternative for Operable Unit 3

The LRA for Operable Unit 3 involves the removal, treatment/decontamination, and disposal of contaminated materials to reduce the potential for contaminant migration. Decontamination and treatment residues would require further treatment and disposal. Contaminated materials will be disposed of in an on-site engineered above-ground disposal cell, and clean materials will be free released for reuse or recycling. This cell would be located on FEMP site property within the engineered waste management facility (EWMF) study area. The selection of this LRA is based on limited characterization and engineering study data and may change. This alternative also includes continued federal ownership of the land to control future land use.

G.2.4 OPERABLE UNIT 4

Waste units in Operable Unit 4 consist of: two earthen-bermed concrete silos (Silos 1 and 2) containing K-65 residues, which are high-specific-activity, radium-bearing residues resulting from the pitchblende refining process; one concrete silo containing metal oxides (Silo 3); and one unused concrete silo (Silo 4). All silos are located south of the Waste Pit Area (Figure G.2-1). The domed waste storage silos measure 24 m (80 ft) in diameter, 11 m (36 ft) high to the center of the silo dome, and 8 m (27 ft) to the top of the vertical walls. The walls are 0.2 m (8 in) thick concrete, as are the outer part of the domes, which taper to 0.1 m (4 in) in thickness at the center. Silos 1 and 2 are surrounded by an earthen berm to a height of approximately 7.9 m (26 ft), while Silos 3 and 4 are free-standing.

Silos 1 and 2 were used for the storage of radium-bearing residues formed as by-products of uranium ore processing from 1952 to 1959. Waste raffinates were pumped into the silos, where the solids would settle. The free liquid was decanted through a series of valves placed at various levels along the height of the silo wall. Settling and decanting continued until the silos were filled to approximately 1.2 m (4 ft) below the top of the vertical wall (Table G.2-5). The concentration of each radionuclide at each of the 16 air monitoring sites details the volumes and types of waste associated with Operable Unit 4.

Corrective actions have been performed to maintain the integrity of Silos 1 and 2. These included repairing the walls and constructing a berm on a 1.5 to 1 slope (mid-1960s) and enlarging the berm to a 3 to 1 slope in the early 1980s. In 1985, a structural assessment was performed that revealed that the walls and base slab were structurally stable and could function as a containment for dry solids for

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TABLE G.2-5
OPERABLE UNIT 4 WASTES

Component	Volume (yd^3)(m^3)		
	Silo 1	Silo 2	Silo 3
Bentonite/grout cover	465/356	411/314	NA[a]
K-65 residues	4,291/3,281	3,720/2,844	NA
Calcine	NA	NA	5,200/3,976
Structures	460/352	460/352	460/352
Material below silos and berms[b]	230/176	60/46	500/382
Contaminated soil	30,000[c]/4,664	NA	NA
Total[d]	5,446/4,164	4,651/3,556	6,160/4,710

[a]NA=not applicable.
[b]Includes gravel, asphalt, clay, pipes, and decant sump tank.
[c]Total for Silos 1 and 2.
[d]Does not include contaminated soil.

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a period of 10 to 15 years. However, the center 6 m (20 ft) section of the dome was determined to be structurally unsound for a load greater than the existing static load.

Remedial actions taken since 1985 include placement of protective covers constructed of steel and plywood over the center portion of each silo dome; 0.08 m (3 in.) of rigid polyethylene foam topped by a 45-mil waterproof, ultraviolet-resistant, urethane-finish coating was placed over each silo dome in 1987 to provide weather protection and insulation. A Radon Treatment System was implemented for this project to reduce radiation exposure to the workers during the installation process. In 1991, a layer of bentonite clay was inserted over the residues in Silos 1 and 2 to reduce radon levels in the silos and to provide protection in the event of silo dome collapse. This was done under a removal action. Silos 3 and 4 were constructed in 1952 and were designed to receive dry materials only. Waste raffinate slurries from refinery operations were dewatered in an evaporator and spray calcined to produce a dry waste form for storage in the silo. The waste was blown in under pressure to fill Silo 3, but Silo 4 was never used and remains empty.

G.2.4.1 Preferred Alternative for Operable Unit 4

There is one preferred remedial alternative for each of the three subunits in Operable Unit 4. The preferred alternative for the contents of Silos 1 and 2 involves the removal of the contents, stabilization by vitrification or cement stabilization, and off-site disposal at the NTS (see attachment G.II). The preferred alternative for Silo 3 contents is identical to the Silos 1 and 2 contents alternative. The final preferred alternative involves the removal, decontamination, and on-property disposal (management by Operable Unit 5) of Silos 1, 2, 3 and 4 structures, berms, Silos 1 and 2 subsoils, decant sump tank, process piping, and the process piping trenches. Waste would be packaged and disposed of in a disposal facility constructed on property. More detail on these alternatives is provided in Section 4.0 of the FS Report for Operable Unit 4.

G.2.5 OPERABLE UNIT 5

The components of Operable Unit 5 include groundwater, surface water, soils, sediment, flora, and fauna and are described in detail in the SWCR (DOE 1993). Estimates of quantities of groundwater and soil requiring remediation will be provided in the RI Report for Operable Unit 5.

G.2.5.1 Leading Remedial Alternative for Operable Unit 5

The LRA for Operable Unit 5 involves the extraction of contaminated groundwater, treatment at an on-site facility, and discharge of the treated effluent to the Great Miami River through the newly constructed effluent line. Treatment residuals will be disposed of in an on-site engineered above-ground disposal facility. The LRA also involves the excavation of contaminated sediment/soils necessary to meet risk-based PRGs and ARARs, transport to an on-site location for treatment using a fluidized soil washing technique, and return of the treated materials as backfill. The soil washing fluids will be recycled and the removed contaminants will be stabilized and disposed of in the on-site disposal facility, which would be located within the Former Production Area. This alternative also assumes continued federal ownership of the land to control future land use.

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G.3.0 CUMULATIVE IMPACTS OF PROPOSED ON-PROPERTY ACTIONS

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When describing all the potential impacts arising from remedial activity, it is important to address the possible impacts arising from concurrent implementation of activities. Simultaneous implementation of remediation projects for LRAs or preferred alternatives at all of the operable units could multiply the impacts resulting from the remediation of a single waste unit or operable unit. Current scheduling indicates that Operable Units 1, 2, 4, and 5 have the potential for concurrent implementation, as do Operable Units 1, 3, and 5 (Figure G.3-1). Added to these possible overlaps are the activities associated with the on-site above-ground disposal facility and other site-wide facilities.

G.3.1 SOIL AND GEOLOGY

The mechanical and/or hydraulic removal of pit wastes, soils, buildings, and other structures in the former Production Area poses the greatest short-term threat to subsurface soils. Adverse impacts to subsurface soil could result if there is a breach of a pit liner during the removal process or the release of loose contamination from structures. The breach could act as a conduit, which may allow contaminated water and/or waste to migrate into the glacial overburden in higher concentrations and at a faster rate than currently occurs.

If contaminants remain on the ground surface for extended periods of time, infiltration of rainwater or storm water runoff could cause migration of the contaminants into the subsurface soils. Judging from existing conditions, it is unlikely that major impacts on the subsurface soils would occur.

Removal of wastes from Silos 1, 2, and 3 would temporarily disturb approximately 3.2 ha (8 ac) of soils. These areas would be regraded and returned to their previous condition following remediation. Construction of a disposal facility for silo structures and berm soils would result in the permanent disturbance of approximately 4.7 ha (11.6 ac) of soils, approximately 1 percent of the land area of the FEMP site. No impacts are anticipated on the regional geology of the area as a result of operable unit remedial activities.

The preferred alternative for Operable Unit 1 would result in the temporary disturbance of approximately 14.0 ha (36.4 ac) of land due to the excavation of the waste pits and associated soils. However, these areas would be regraded and evaluated to promote positive drainage. Furthermore, the preferred alternative for Operable Unit 1 does not involve on-site disposal, thereby resulting in no long-term impacts to soil and geology.

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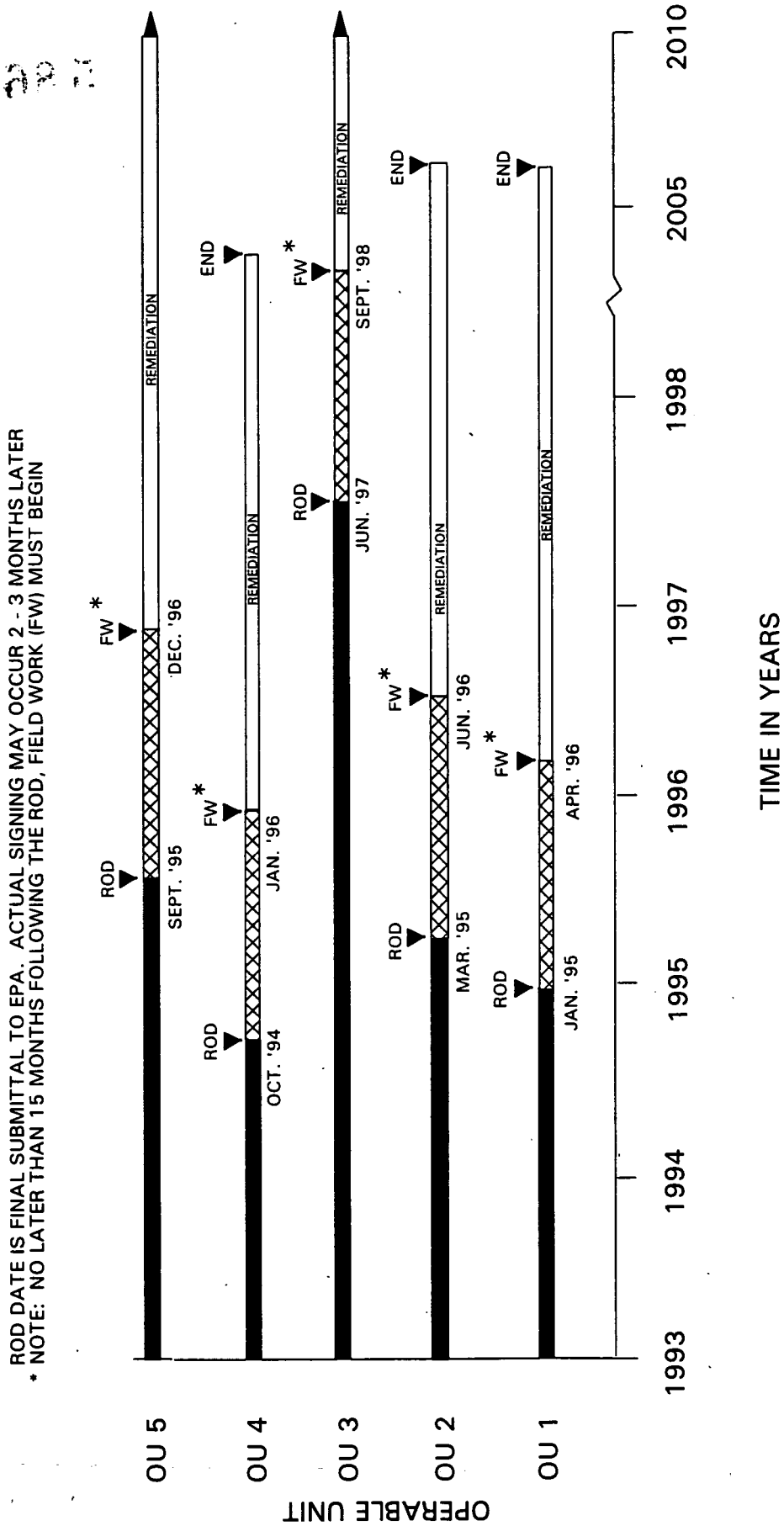

FIGURE G.3-1 CURRENT SCHEDULE FOR REMEDIATION

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The preferred alternative for Operable Unit 2 involves the implementation of an on-site disposal cell. This would result in the temporary impact of approximately 30.4 ha (75 ac) and the permanent commitment of approximately 9.3 ha (23 ac) for on-site disposal. This permanent commitment of acreage does not include a 91 m (300 ft) buffer zone. The implementation of a buffer zone would result in approximately 14.2 ha (35 ac) of the FEMP site being committed and its associated future use lost.

When the alternatives selected in the Operable Units 1, 2 and 4 Proposed Plans are combined with the LRAs for Operable Units 3 and 5, it is likely that approximately 81 ha (200 ac) will be disturbed during remediation, with an additional 61 ha (150 ac) permanently committed to disposal. In a worst-case approach, all 142 ha (350 ac) would be permanently lost at the site. This number is slightly lower than previous evaluations due to the Operable Unit 1 material being disposed of off site.

Adverse impacts on surface soils could result during waste removal, segregation, and treatment. There is the potential for spills to occur during the handling and packaging of waste, as well as during transport to the treatment facility. Spills would be expected to affect only localized areas, and surface soils contaminated by a spill could be excavated and disposed of with the waste material. Therefore, impacts on surface soils from spills would likely be minor.

The removal of contaminated structures from the former Production Area, along with waste treatment and decontamination, should have beneficial long-term effects on both surface and subsurface soils due to the removal of contaminant sources. Pumping and treatment of the contaminated perched and regional groundwater should stop contaminant migration in the subsurface soils.

G.3.2 WATER QUALITY AND HYDROLOGY

Adverse impacts to both the perched groundwater and the regional aquifer would not be increased by concurrent remedial activities. The possibility of contaminant migration to the aquifer exists during any remedial activity, whether the activities are performed individually or concurrently. The rate at which contaminants are supplied to the regional aquifer may be increased with concurrent remediation activities, but the overall contaminant load would remain the same. The DOE guideline for uranium in drinking water is 30 parts per billion (ppb) or 20 picoCuries per liter (pCi/L) (EPA 1986). However, EPA has proposed 20 ppb (13.5 pCi\L) as a standard for uranium in drinking water, which will likely be promulgated. Groundwater monitoring will continue throughout remedial actions and

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upon completion of remedial actions to ensure that areas exceeding the standards are identified and appropriate response actions are identified.

Long-term groundwater quality should improve as a result of the implementation of the LRAs, because FEMP site wastes will be eliminated and/or isolated from rainwater and storm water runoff, preventing the potential infiltration of these contaminants to perched groundwater and the regional aquifer. Any hazardous waste disposal facility would comply with the requirements specified in the facility permit for the uppermost aquifer underlying the waste management area beyond the point of compliance. The concentration of chemicals in groundwater should not exceed background levels of the listed maximum concentration of the constituent for groundwater protection, which is even higher (10 CFR 264.94).

The findings of the Operable Unit 4 Comprehensive Response Action Risk Evaluation (CRARE) (Appendix K to the Operable Unit 4 FS Report) identified the consumption of drinking water as a major pathway of concern. Groundwater modeling in the CRARE predicted that the highest cancer risk in this pathway would be associated with residual uranium leaching from site-wide soils. However, the carcinogenic risk levels associated with the groundwater pathway under the various land-use scenarios are within the target risk range of 10^{-6} to 10^{-4} in all cases. All remediation of waste with the potential to release radionuclides that are contained in the waste materials to the environmental media would be in compliance with DOE Order 5400.5, Chapter III, "Radiation Protection of the Public and the Environment."

The simultaneous implementation of remedial activities has the potential to increase surface water quality impacts over those which would normally be expected from implementation of a single project. Impacts to surface water quality in Paddys Run could occur during consolidation of Operable Unit 2 waste units; during removal, treatment, and on-site disposal of Operable Units 3 and 5 wastes; and during the removal, decontamination, and on-property disposal of Silos 1, 2, and 3 structures, berms, and soils in Operable Unit 4. Short-term impacts resulting from these activities may include contaminated runoff entering Paddys Run; erosion of exposed wastes and the subsequent influx of contaminated soils into the stream during waste removal and capping; and increased stream turbidity resulting from excavation of contaminated sediments and relocation of portions of the stream. However, appropriate engineering controls will be implemented to control runoff and other

impacts to Paddys Run. The use of silt fences, straw bales, and other drainage and erosion controls will be particularly critical as part of remedial activities.

Over the long term, surface water quality in Paddys Run should improve, because FEMP site wastes will be isolated from rainwater and storm water runoff, thus eliminating the potential migration of contaminated material into Paddys Run. No cumulative impacts on the Great Miami River are anticipated from the simultaneous implementation of remedial activities. All effluents produced by remedial activities will be treated to comply with FEMP NPDES permit limits and conditions prior to discharge to the Great Miami River. In addition, all pollutants or combinations of pollutants will be treated so as not to exceed the numerical and narrative criteria for aquatic life habitat and water supply use designations for Paddys Run and the Great Miami River [Ohio Administrative Code (OAC) 3745-1-07 and OAC 3745-1-21].

Cumulative wetland impacts may also arise from the implementation of remedial activities, particularly in the forested wetland in the northern part of the site and the various emergent wetlands associated with site drainage ditches. Wetland impacts most likely will result from the siting of treatment and disposal facilities and from the potential of contaminated runoff during waste removal and construction activities. Proposed DOE actions in these wetlands would first be evaluated for potential adverse effects to the wetlands (10 CFR 1022), and consideration would be given to natural and beneficial values provided by the wetlands when considering mitigation alternatives to offset the impacts.

G.3.3 AIR QUALITY

Cumulative air quality impacts will be based on projected emissions from each of the preferred alternatives or LRAs for operable units at the FEMP site. The emissions of primary short- and long-term concern with respect to ambient air involve the re-entrainment of radiologically contaminated fugitive dust and the volatilization of toxic chemicals.

Remedial alternatives that involve in situ procedures such as capping have little or no impact on ambient air. However, waste-removal activities and alternatives that involve substantial handling of waste have the potential to generate radiologically contaminated dusts and other waste constituents. These activities include ground clearing, excavation, demolition, cut-and-fill operations, loading/unloading trucks, heavy equipment traffic, and wind erosion of disturbed areas. During periods of turbulent wind conditions, particles of disturbed surface materials (e.g., contaminated soil) can become resuspended in ambient air and be subject to inhalation by on-property and/or off-property

receptors. The amount of dust resuspended depends on wind speed and other site conditions such as soil moisture, particle size, and vegetative cover. Resuspended particles are then carried downwind to on- and/or off-property receptors.

Additional potential airborne pollutants associated with remedial activities at the FEMP site include inorganic constituents, volatile organics, semivolatiles, PCBs, dichlorodiphenyl trichloroethane (DDT), herbicides, radionuclides, and radon. Emissions of these pollutants could result from the removal and handling of volatile or semivolatile wastes, waste segregation activities, and vitrification processes.

In the past, radon has been a significant portion of the annual dose to the public adjacent to the FEMP site. Until remedial activities are complete, DOE Order 5400.5 regulates radon concentrations in the atmosphere above facility surfaces or openings at and adjacent to the FEMP. When added to background levels, the concentrations mandated by DOE Order 5400.5 must not exceed an annual average concentration of 30 pCi/L over the facility's site and 3 pCi/L at or above any location outside the facility site. Once remedial activities have been completed, the National Emissions Standards for Hazardous Air Pollutants (NESHAP) Subpart Q standard (40 CFR 61 Subpart Q) of 20 pCi/m^2 per second for radon-222 will be applied to site storage and disposal areas for radon-producing wastes. An active monitoring system has been in place at the FEMP site since the early 1980s. As a point of comparison, the average site boundary total radon concentration of 0.57 pCi/L in 1992 was about 29 percent of the average indoor radon concentration (2.0 pCi/L) for homes in the Cincinnati area. Monitoring will continue throughout the remedial activities and upon completion of remedial activities (as appropriate) to ensure that radon levels remain in compliance with all applicable regulations.

Guidelines for concentrations of radionuclides other than radon-222 are also established by DOE Order 5400.5. These concentrations, referred to as Derived Concentration Guidelines (DCGs), are concentrations of radionuclides that, under conditions of continuous exposure for 1 year by one exposure mode, would result in a dose of 100 mrem. In addition to the DCGs, radiologic emissions to the ambient air from the FEMP site will also be subject to the NESHAP Subpart H standard (40 CFR Part 61 Subpart H), which stipulates that radiological emissions from the site cannot exceed those amounts that might cause any member of the public to receive an annual effective dose equivalent (EDE) of 10 mrem per year. Monitoring of the air pathway for radionuclides during the

FEMP site remedial activities will continue to ensure that emission levels do not exceed applicable DCGs or the NESHAP Subpart H standard.

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The impacts associated with the generation of fugitive dust and the volatilization of toxic chemicals tend to be short term. Cumulative air quality impacts that would occur during phases of remedial activity at the FEMP site would include pollutants generated off site as well as those generated on site. Although there are no major sources of pollutants in the vicinity of the FEMP site, there would be substantial amounts of transportation-related pollutants generated off site by the large number of trucks necessary to supply construction materials for the disposal facility. In addition to pollutants generated on site by disposal facility construction, filling, and closure, the cumulative air quality impact would also depend on: (1) the remedial alternatives chosen, (2) the remediation schedule (e.g., the extent of simultaneous remedial activities across the FEMP site), (3) the mitigating measures or controls chosen, and (4) the effectiveness of mitigating measures or controls. Typical control methods for various remedial activities and qualitative evaluations of their effectiveness, advantages, and disadvantages are included in the Operable Unit 4 FS Report, Appendix I, Attachment I.I, Table I.I-3.

The potential for long-term residual risks associated with the FEMP site in a post-remediation condition has been evaluated in the Operable Unit 4 FS Report, Appendix K. The findings of the CRARE identified the inhalation of dusts as a major pathway of concern with respect to long-term cancer risks. The primary source of radionuclide emissions is from site-wide soil remaining in Operable Unit 5. However, the carcinogenic risks associated with a 70-year lifetime exposure for the various land-use scenarios were calculated to be within the target range of 10^{-6} to 10^{-4} in almost all non-resident cases. Only the land-use scenario involving on-property residential farmer receptors gave risks above the 10^{-4} level. Emissions of radionuclides to the ambient air from the FEMP site would not exceed those amounts that might cause any member of the public to receive an EDE of 10 mrem per year in any year. Monitoring would be implemented at release points having the potential to discharge radionuclides that could cause an EDE in excess of 0.1 mrem per year to any member of the public (40 CFR 61, Subpart H).

G.3.4 BIOTIC RESOURCES

Cumulative impacts on vegetation could result from short- and long-term removal and disturbance of habitat associated with remediation of contaminated soils and waste units; construction of staging areas, support facilities, and disposal facilities; and general physical disturbance of soils. The

19.4 ha (48 ac) of introduced grassland/leased pasture, 3.3 ha (8.3 ac) early/mid- and reparian successional woodlands, and 0.26 ha (0.65 ac) drainage-ditch/swale wetland habitats. Operable Unit 1 activities would result in the loss of 5.4 ha (13.2 ac) of riparian habitat and 1.9 ha (4.7 ac) of wetland habitat. Construction of on-site disposal cells for Operable Units 3, 4, and 5 could also disturb similar habitats. Surveys will be completed in the summer 1994 for threatened or endangered species that could reside on the FEMP site. Construction of on-site disposal cells for Operable Units 3, 4, and 5 would result in a total loss of approximately 61 ha (150 ac). Construction of an interim storage facility would have a similar impact, although restoration may be possible once wastes are removed from the FEMP site.

Concurrent implementation of remediation activities could have impacts on wildlife primarily through the short- and long-term removal and disturbance of habitat as described above, with correlated reductions in local wildlife populations. Cumulative impacts on wildlife would differ from the impacts of the LRAs or preferred alternatives considered separately. For example, if remedial activity were spread out over time, adjacent undisturbed areas could provide refuges for displaced wildlife. These "safe" areas would not be available if activities are simultaneous. Cumulative project-related noise and increased levels of human activity could disrupt nearby wildlife to a greater degree than individual actions and would reduce or eliminate wildlife use in most areas of the FEMP site.

Cumulative impacts on aquatic organisms from remedial actions involve the potential contamination of Paddys Run, the Great Miami River, and various wetland areas. Potentially affected aquatic organisms include fish, invertebrates, amphibians, reptiles, and semi-aquatic species such as muskrats. Additionally, physical impacts on aquatic habitat resulting from remedial activities would adversely affect aquatic populations. Loss of habitat or exposure to contaminants could also lead to a reduction in species biodiversity.

Levels of contaminants could increase in Paddys Run and wetland drainage areas from soil erosion and runoff during concurrent waste removal, stabilization, and isolation activities. Additionally, destruction of aquatic habitat from the excavation of contaminated sediments for Operable Unit 5 could adversely affect organisms residing in these areas. Adverse cumulative impacts on aquatic organisms could be substantially mitigated by diversion and collection of surface water runoff and by

performing remedial activities when flow in Paddys Run and the Storm Sewer Outfall Ditch is low or nonexistent.

Waste removal, stabilization, and isolation activities, concurrent with construction of an on-site storage facility or disposal cell would likely result in short-term adverse cumulative impacts on the organisms in the wetland drainages. Long-term negative effects on aquatic organisms could be minimized if the areas are revegetated after completion of the activities. Of particular concern is the 10.5 ha (26 ac) tract of forested wetlands in the northern portion of the FEMP site. This area would be avoided as much as possible. The cumulative effects of FEMP site remediation activities would be positive for human health and the environment in the long term.

Cumulative impacts on threatened and endangered species include the potential loss of habitat, disruption of breeding activities, and loss of individuals. Disturbances in the riparian corridor along Paddys Run could result in impacts to the Sloan's crayfish (*Orconectes sloanii*) and Indiana bat (*Myotis sodalis*). Potential habitat for the state-listed endangered slender finger-grass (*Digitaria filiformis*) and mountain bindweed (*Polygonum cilinode*) also exists in this corridor and could also be adversely affected (Facemire 1990). Erosion-control measures will be employed to minimize short-term adverse impacts on Sloan's crayfish, a state-listed threatened species that has been observed in Paddys Run. In the long term, the cumulative impacts of FEMP site remedial activities will be beneficial, because releases of contaminants into the environment will be prevented. The introduced grassland/leased pasture habitat at the FEMP site may be suitable for running buffalo clover (*Trifolium stoloniferum*), which is on the federal endangered species list. Waste excavation and disposal activities for Operable Unit 2 would cause long-term impacts to this plant species if it is present. Operable Unit 1 activities would impact potential threatened or endangered species in the riparian area. Surveys will be completed in the summer 1994 for all potential threatened or endangered species.

G.3.5 WETLANDS AND FLOODPLAINS

A site-wide wetlands delineation (Ebasco 1993) was conducted in February 1993 in accordance with the 1987 U.S. Army Corps of Engineers (COE) Wetlands Delineation Manual; it was approved on August 12, 1993. The purpose of the delineation was to determine the extent of Jurisdictional Wetlands and Waters of the United States at the FEMP site and to avoid or minimize impacts to these resources during future activities. Results from the site-wide delineation indicate a total of 14.5 ha (35.9 ac) of jurisdictional wetlands on the FEMP site. Operable Unit 2 activities would result in long-term and short-term impacts to 0.28 ha (0.69 ac) of drainage-ditch/swale wetlands. Operable Unit 1

activities would disrupt 1.9 ha (4.7 ac) of drainage-ditch/swale and scrub/shrub persistent emergent wetlands. Operable Unit 4 activities would cause the loss of 0.2 ha (0.5 ac) drainage-ditch wetlands. Wetland impacts as a result of operable unit remedial activities would be minimized by implementing best management practices during and following remediation. Proper notification and mitigative measures would be executed if impacts are expected to occur.

Floodplains within the FEMP property are confined to the north-south corridor containing Paddys Run. Outside the boundaries of the FEMP, the 100- and 500-year floodplain of the Great Miami River extends west of Big Bend to an elevation near the eastern boundary of the site. The 100- and 500-year floodplain of the river also extends northward along Paddys Run from the confluence of the two streams to a point north of the northern boundary of the FEMP. During remediation, direct impact to the 100-year and 500-year floodplain may occur due to excavation activities. In extreme cases, the relocation of Paddys Run and the floodplain may be necessary. During remedial action, engineering controls (e.g., silt fences and berms) will be utilized to minimize floodplain impacts. In cases where relocation is required, the floodplain will be reestablished to near original condition.

G.3.6 SOCIOECONOMICS AND LAND USE

Simultaneous implementation of remediation projects for all of the operable units could multiply the impacts resulting from the remediation of a single waste unit or operable unit. Operable Units 1, 2, 4, and 5 have the potential for concurrent implementation, as do Operable Units 1, 3, and 5. The following is a discussion of potential impacts of concurrent remedial activity at the FEMP site on the local economy, land use, transportation systems, community services, and cultural resources.

G.3.6.1 Economic Activity

The maximum number of workers that would be required for implementation of remedial activities for each operable unit is expected to be small. Although the scope of work may be large, the work is usually expected to be completed by multiple small crews working over a long period of time. For example, the labor force required to construct the on-site disposal facility is estimated at a maximum of 155 persons per day over the 20-year life of the project. More specific impacts on the local economy will be estimated as detailed cost estimates are made and will be reported in subsequent feasibility studies. However, remedial activities at the FEMP site would be expected to have a positive impact on the local economy, as many of the needed resources would be purchased within the area.

Overall levels of employment at the FEMP site are expected to remain relatively consistent in the near term and then decline as removal and remedial activities are completed. Existing on-site workers will be utilized to the extent possible.

One sector of the local economy that would experience direct impacts resulting from remedial activity at the FEMP site would be wholesale and retail sales, with particular emphasis on the provision of construction materials such as concrete, aggregate, and lumber. These impacts would be most felt with the initiation of capping and on-site disposal or storage alternatives. For example, construction material requirements for the disposal facility are substantial (Parsons 1992). Total materials estimated to be required for construction of vaults include 409,419 m^3 (535,500 yd^3) of concrete, 96,615 metric tons (106,500 tons) of reinforcing steel, and 1,070,377 m^3 (1,400,000 yd^3) of site work, which includes backfill with concrete foundation work. This is in addition to an estimated 2,140,754 m^3 (2,800,000 yd^3) of earth fill and over 1,529,110 m^3 (2,000,000 yd^3) of stone that would have to be imported to the site to complete earthworks for the structures. Also required would be approximately 209,032 m^2 (250,000 yd^2) of aggregate, 45,150 m^2 (54,000 yd^2) of asphalt, and 4,682 m^2 (5,600 yd^2) of concrete for roads and aprons used during construction, filling, and monitoring. Although current construction schedules indicate that these materials would be used and purchased over several years (a total of 20 years in the case of the disposal facility), the impacts to local and regional suppliers, as well as consumers, may be felt as local supplies dwindle, additional materials are imported, and prices rise. Indirect impacts to employment in these sectors would also be likely.

G.3.6.2 Land Use

Within the boundaries of the FEMP site are a number of acres that contain prime agricultural soils; however, it is not designated as prime farmland. This designation is used to describe land with the proper combination of current cultivation, soil, slope, length of growing season, and rainfall to allow for sustained crop yield with the least effort. The construction of an on-property storage or disposal facility would result in an irretrievable loss of some of these soils. Capping alternatives may also encroach on some of these designated soils.

G.3.6.3 Noise

Noise is defined as unwanted or undesirable sounds that have an adverse effect on human beings and their environment, including land, structures, natural wildlife, and ecological systems (Canter 1977). Measurements of noise are expressed in a logarithmic ratio of sound pressure referred to as the "sound pressure level" (SPL) and are quantified using the term "decibel" (dB). To obtain a representative

sound level containing a wide range of frequencies to which humans respond, the SPL is A-weighted (resulting in the term dBA). Normal human hearing capabilities range from 0 dBA (the threshold of hearing) to 140 dBA (a jet plane on the ground 20 feet away).

With a population density of 352 residents/square kilometer (km^2) [917 residents per square mile (mi^2)] combined with the presence of industry in the area, land use within a 8 km (5 mi) radius around the Fernald site could operationally be classified as agricultural/quiet residential. This classification provided by Canter (1977), combined with noise level data recorded by the Westinghouse Environmental Management Corporation (WEMCO) in 1991 indicates that the current average background noise level within the 8 km (5 mi) radius is approximately 50 dBA.

It is expected that noise levels at the Fernald site will fluctuate according to the type of activity being conducted. Typical activities would include heavy-equipment operation, organization and placement of dismantled building materials, waste treatment operations, general construction traffic (e.g., waste and material shipments), and commuter traffic.

Rather than increasing and decreasing in a liner fashion, noise propagating from a point source changes logarithmatically. Consequently, for every doubling of the distance away from the source of the noise, the sound level decreases by 6 dBA. Most remedial activities will take place toward the center of the Fernald site. An activity emitting a sound level of 100 dBA would decrease to 60 dBA once the sound wave reaches the resident 1 mile away from the sound source. This would result in a 10 dBA sound level above the 50 dBA background sound level at the Fernald site. It is assumed that general construction noise might be heard by the some of the surrounding communities; however, the noise levels for the closest resident would not increase more than 10 to 15 dBA over an 8-hour period. Although no sound barriers would be constructed during remedial activities, noise levels will be reduced through engineering controls. Noise levels for on-site workers will not exceed the 85 dBA (OSHA 29 CFR Part 1910.95) standard, because the Site Noise Conservation Program will continue to be enforced at the FEMP site.

G.3.6.4 Transportation

Impacts to local transportation systems arising from concurrent implementation of LRAs or preferred alternatives would be minimal. The local Ohio Department of Transportation representative would be consulted to discuss potential damage to State Route 128. Because concurrent construction is likely, the total number of one-way daily truck trips during FEMP site remediation will require consultation

with local officials. More specific impacts to the local roads will be estimated as detailed cost estimates are calculated and will be reported in subsequent operable unit feasibility studies.

Additional transportation impacts from remediation involve the transport of materials on the site. The maximum impacts would arise from implementation of all of the waste removal and treatment alternatives. Traffic control measures will be required, and vehicle exhaust could result in minor impacts to air quality. More specific impacts to on-site transportation systems will be estimated as detailed cost estimates are calculated and will be reported in subsequent feasibility studies.

G.3.6.5 Impacts from Current Off-Site Waste Transport

DOE-Fernald has two categorical exclusions in place concerning the transport of waste off site: "FEMP Site Waste and Hazardous Material Shipping" (FEMP site NEPA Document No. 387) and "Shipment of Thorium Low-Level Waste" (FEMP site NEPA Document No. 349). The first document describes the shipment of various types of waste, hazardous materials, and laboratory and treatability samples from the FEMP site to and from various licensed disposal facilities, laboratories, and other federal facilities. Included is a variety of wastes classified as RCRA hazardous wastes, mixed waste, low-level waste, and PCB-contaminated waste currently stored on site and awaiting final disposal. In addition, past production operations resulted in the generation of a variety of other hazardous materials [e.g., low-level residues, high grade residues, orange oxide (UO_3), green salt (UF_4), uranium derbies, and refinery feedstock] currently awaiting final disposition. Facilities that are to receive and ship the waste, hazardous materials, and samples include, but are not limited to, the following: privately owned, licensed treatment and disposal facilities; privately owned laboratories; privately owned nuclear facilities; and federal facilities [e.g., DOE sites, and the U.S. Department of Defense (DOD) Consolidation Facility].

Transport of wastes involve the packaging and shipping of existing wastes, hazardous materials, and samples that have been and will be generated from FEMP site removal actions and routine maintenance projects. Samples that are sent to laboratories for characterization and treatability studies are shipped back to the FEMP site for storage and final disposal. In some cases, it may also be necessary to ship waste and hazardous materials back to the FEMP site if the material is not accepted at the disposal facilities. All material received at the FEMP site will be in compliance with approved FEMP site acceptance criteria for the receipt of sample and waste material.

Several FEMP site removal actions involve the disposition of currently stored waste and hazardous material inventories (e.g., Removal Action 9 - Removal of Waste Inventories; Removal Action 12 - Safe Shutdown; and Removal Action 15 - Scrap Metal Piles). These removal actions require the packaging and shipping of low-level waste and other hazardous materials that are currently stored on site. Low-level waste material will be shipped to other facilities for treatment and disposal. Hazardous nuclear materials generated will be shipped to other federal facilities or their contractors' facilities for use and/or storage.

In addition, a number of proposed removal actions would generate low-level waste materials, RCRA hazardous waste, and mixed waste (e.g., Removal Action 13 - Plant 1 Ore Silos and Removal; Action 24 - Pilot Plant Sump). The low-level waste will be packaged and shipped for disposal under Removal Action 9. RCRA hazardous waste and mixed waste will be packaged and stored on site in approved RCRA storage areas until they are shipped for disposal as a routine maintenance activity.

Other sources of waste and hazardous material shipped from the FEMP site will be routine maintenance activities (e.g., activities required to maintain and preserve buildings, structures, and equipment). Stored inventories of RCRA hazardous waste, mixed waste, and PCB-contaminated waste will be packaged and shipped for treatment and disposal under regulations addressing routine maintenance activity. Ongoing FEMP site routine maintenance activities will result in the generation of additional quantities of these wastes that will also be shipped off site for treatment and disposal. Routine maintenance activities will result in the generation of additional quantities of low-level waste that will be handled under Removal Action 9.

DOE proposed to ship 13,000 containers of thorium low-level waste to the NTS for final disposal. These 13,000 containers of thorium low-level wastes are being overpacked in U.S. Department of Transportation (DOT) approved containers. The thorium is being shipped from the FEMP site to the NTS for final disposal. The thorium shipments will occur over a period of 3 years, at a rate of approximately 175 shipments per year. Total low-level waste shipments from the FEMP site will be approximately 1,600 per year. The remaining 1,425 annual shipments will consist of uranium low-level waste. The transport of thorium is part of Removal Action No. 9 and is conducted in accordance with the requirements of RCRA and CERCLA. All waste transported from the FEMP site is shipped in accordance with DOT guidelines.

G.3.6.6 Community Services

Community services that could be affected by remedial activities include schools, health-care facilities, housing, emergency and protective services, and water and wastewater treatment systems. Impacts to these services normally arise primarily as a result of a relocation of large numbers of workers during major activities such as the remediation. Because the employment requirements for FEMP site remediation are not expected to result in a major influx of workers during remedial activity, due in part to the work being spread over time, no long-term impacts on community services are anticipated.

G.3.7 CULTURAL RESOURCES

Any federal activity that may adversely affect a site or structure that is listed on the National Register of Historic Places (NRHP), or is considered eligible for inclusion on the NRHP must undergo rigorous scrutiny to ensure that the adverse effect is avoided. This examination is also necessary to determine potentially significant sites, such as uncovered archaeological remains. The Ohio State Historic Preservation Officer has stated that remedial activity within the boundaries of Operable Unit 3 would not adversely affect any properties listed on or eligible for the NRHP (Luce 1987). To ensure that no resources will be affected by remedial activities in the other operable units, an archaeological survey would be performed on all non-controlled areas of the site which have not been previously disturbed. The rainbow arch bridge over Paddys Run on Willey Road may be affected by transport of materials to the FEMP site. The Ohio Historic Preservation Office and the Ohio Department of Transportation would be consulted for guidance. Any additional construction proposed beyond the boundaries of the FEMP site would require an archaeological survey and consultation with state and national preservation officials prior to initiation.

G.4.0 AGENCIES CONSULTED AND RELATIONSHIP TO OBJECTIVES OF LOCAL, STATE, REGIONAL, AND FEDERAL LAND-USE PLANS, POLICIES, AND CONTROLS

During the development of the lead FS/PP-EIS for Operable Unit 4, a number of federal, regional, state, and local organizations were contacted for information or assistance. This information has been referenced herein for the Operable Unit 2 FS/PP-EA. Some of these agencies were also contacted for consultation under 40 CFR 1502.16, which requires a discussion of "possible conflicts with the objectives of state, federal, regional, and local land use plans, policies, and controls" in environmental documents. Agencies were contacted under this provision to determine whether any conflicts would arise as a result of remedial activity at the FEMP site. No agency or organization that was contacted considered future remedial actions at the FEMP site to be in conflict with its land-use plans, policies, or controls in the area. The following organizations were contacted:

Federal:

- U.S. Environmental Protection Agency
- U.S. Department of the Interior
- U.S. Department of Transportation

State:

- Ohio Environmental Protection Agency
- Ohio Department of Natural Resources, Wildlife Division
- Ohio Department of Transportation
- Ohio Department of Natural Resources, Division of Natural Areas and Preserves, Parks Department
  - Soil Conservation Service
  - Ohio Historic Preservation Office
  - Ohio Department of Commerce, Data Users Center
  - Ohio Department of Rehabilitation and Correction

County:

- Hamilton County Planning Commission
- Hamilton County Park District

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- Hamilton County Engineer
- Hamilton County Cooperative Extension Service
- Butler County Planning Commission
- Butler County Park District
- Butler County Engineer
- Butler County Cooperative Extension Service
- Butler County Treasury Office
- Hamilton County Treasury Office
- Warren County Auditors Office
- Clermont County Accounting Office
- Brown County Auditors Office
- Boone County (Kentucky) Auditors Office
- Gallatin County (Kentucky) Auditors Office
- Kenton County (Kentucky) Treasury Office
- Grant County (Kentucky) Treasury Office
- Campbell County (Kentucky) Payroll Office
- Pendleton County (Kentucky) Auditors Office
- Dearborn County (Indiana) Auditors Office
- Ohio County (Indiana) Treasury Office

Regional:

- Ohio-Kentucky-Indiana Regional Council of Governments - A regional planning agency involved in a variety of areas including water resources, solid waste management, population studies, public services management, transportation, and land use in the Greater Cincinnati area.
- Ohio River Valley Sanitation Commission - A group responsible for monitoring and reporting the water quality of the Ohio River and its major tributaries.

- Water Management Association of Ohio - An organization dedicated to supporting the development, conservation, control, protection, and use of Ohio's water resources for beneficial purposes.

- Miami Conservancy District - A water conservation subdistrict responsible for the observation and evaluation of water resources in the area between Hamilton and New Baltimore.

- Miami Purchase Association for Historic Preservation

Local:

- Hillside Trust - A nonprofit organization dedicated to promoting the preservation and thoughtful use of the hillsides in the Greater Cincinnati area.

- Hamilton County Prisons

- Great Rivers Council, Girl Scouts of America

- Ross Township Trustees

- Crosby Township Trustees

G.5.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The commitment of raw materials, economic resources, and some land is unavoidable for any alternative at the FEMP site. The following paragraphs analyze these commitments, using information available at this time. Alternatives for Operable Units 3 and 5 are in preliminary planning stages, and the total resources required for remedial alternatives are not developed. Therefore, the cumulative commitment of resources cannot be completely quantified at this time. Subsequent FS reports will update and expand this analysis. The purpose of the evaluation of resource commitment is to outline the major issues and tradeoffs to be considered in the final selection of remedial and waste management alternatives for the FEMP site. This analysis is in compliance with NEPA guidelines.

Each remedial alternative will require the commitment of some land, economic resources, and regional raw materials. The alternatives that require excavation, on-site treatment, and on-site disposal will require the highest commitment of land, economic resources, and regional raw materials. At least 81 ha (200 ac) of land would be disturbed during remediation operations. The waste that is removed (with the exception of most Operable Unit 4 and all Operable Unit 1 material) will be placed in a disposal facility on site. This facility will require an additional 61 ha (150 ac) of land on a 425 ha (1,050 ac) site.

In the worst case, all 142 ha (350 ac) would be irretrievable and committed to the DOE Waste Management Program and DOE ownership. The remaining 283 ha (700 ac) of site property could be made available for private ownership, if it is not required as a buffer zone adjacent to the waste disposal facility.

As part of the commitment of land at the FEMP, the subsequent loss of various types of habitat is likely. It is likely that a portion of the acreage committed to on-site disposal will be in the form of wetlands and various habitats. The construction and implementation of a disposal cell for Operable Unit 2 wastes would cause the loss of approximately 14.2 ha (35 ac) of introduced grassland/leased pasture habitat. Waste excavation activities would cause the loss of an additional 5.6 ha (13.8 ac) of this habitat in and around the South Field. This area may provide suitable habitat for the federally listed endangered running buffalo clover. In addition, 3.3 ha (8.3 ac) of early/mid-successional and riparian woodland and 0.26 ha (0.65 ac) of drainage-ditch/swale wetlands habitat would be lost.

Operable Unit 1 activities would result in the loss of 1.9 ha (4.7 ac) of wetlands and 5.3 ha (13.2 ac) of riparian habitat. Operable Unit 4 activities would cause the loss of 0.2 ha (0.5 ac) of drainage-ditch wetland and associated habitat and 4.7 ha (11.6 ac) of grassland habitat.

The commitment to a permanent waste facility at the FEMP site would require substantial economic resources. An evaluation of DOE's economic commitment required at all sites is beyond the scope of this report, but will be examined in the nation-wide Programmatic EIS for Environmental Restoration and Waste Management.

Regional raw materials such as concrete, aggregate, and lumber will be required for all remediation alternatives. The largest amounts will be for treatment and disposal facilities. The total amount required is not known at this time. It is possible that the amounts required could cause some temporary regional shortages of construction materials.

If the FEMP site remains a permanent waste facility and part of the DOE Waste Management Program, there would be a commitment to retain most of the wastes stored on site in a stabilized form. Some of the FEMP site will not be returned to its original agricultural condition. The facility will be monitored and the land will be controlled for an indefinite period of time.

G.6.0 RELATIONSHIP BETWEEN SHORT-TERM AND LONG-TERM PRODUCTIVITY

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The natural productivity of the land will be disrupted during remedial operations. At the same time, the productivity of the site labor force and regional raw materials will be high, since facilities are constructed and used for remediation. The long-term monitoring of the FEMP site as a waste facility will provide low productivity in terms of labor force and raw materials. No products will be produced on the land and no tax base will be established for local governments.

As described in Section C.5.0, approximately 81 ha (200 ac) of land and its associated habitat would be disturbed and possibly lost during remediation operations. The environmental productivity of the site will be disrupted in the short term, and there is the potential for disruption of a species on the federal or state list of threatened or endangered species. Species that may be present and potential impacts to those species are described in Sections G.2.0 and G.3.0. In the short term, the economic productivity on site will be high. Specific data on material requirements and labor force needs are not available at this time. However, it is anticipated that expenditures for labor and materials will continue for the next 10 years of remediation operations.

Long-term economic productivity at the facility will be at a much lower level. A limited labor force will be required to monitor the waste disposal facility. Some of the land not required for the waste disposal facility may be available for recreation, agricultural, or other designated uses. The existence of a visible waste facility may slow the economic growth and development of adjacent land. The land occupied by the waste disposal facility will not be productive and will be owned by the DOE. The long-term productivity of terrestrial and aquatic species could be re-established on the vacant land with active mitigation activities. A valuable, regional ecosystem resource could be developed with wetland and other habitats for threatened and endangered species.

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ATTACHMENT G.I
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ATTACHMENT G.II
DESCRIPTION OF OFF-SITE DISPOSAL AREAS POTENTIALLY AFFECTED BY FEMP REMEDIAL ACTIVITIES

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G.II.1 Nevada Test Site

The preferred alternative for Operable Unit 4 calls for the disposal of low-level wastes at an existing government facility located in an arid western environment. This facility is currently operating and accepting many types of DOE waste. An EIS for waste disposal activities at the Nevada Test Site (NTS) is currently in process to satisfy NEPA requirements. Several disposal technologies are currently utilized at NTS (e.g., shallow land burial, burial in trenches, and disposal in large-diameter augured shafts). Only shallow land burial is utilized for low-level waste. However, mixed waste in not currently accepted at the facility. Because the facility is located in an area with an arid climate, far from any population centers and significant water sources, it offers many advantages from a long-term risk standpoint. An interim on-site storage facility can be a part of this process option if the administrative and regulatory issues for off-site waste disposal have not been resolved at the start of remediation. The wastes could be transported to the facility by truck or rail as discussed elsewhere in this appendix.

Human habitation of the NTS area ranges from as early as 10,000 B.C. to the present. Various aboriginal cultures occupied the NTS area over this extended period, as evidenced by the presence of artifacts at many sites and more substantial deposits of cultural material in several rock shelters. This period of aboriginal occupation was sustained primarily by a hunting-and-gathering economy based on using temporary campsites and shelters. The area was occupied by Pauite Indians at the time of the first known outside contact in 1849 (DOE 1991).

The NTS has been the primary location for testing the nation's nuclear explosive devices since January 1951. The NTS is operated by the DOE as the on-continent site for nuclear weapons testing. It is located in Nye County, Nevada, with the southeast corner lying about 105 km (65 mi) northwest of the city of Las Vegas, Nevada. The NTS encompasses about 3,500 km^2 (1,350 mi^2), an area larger than the State of Rhode Island. The dimensions of the NTS vary from 46 to 56 km (28 to 35 mi) in width (eastern to western border) and from 64 to 88 km (40 to 55 mi) in length (northern to southern border). The NTS is surrounded on the east, north, and west sides by public access exclusion areas consisting of the Nellis Air Force Base (NAFB) Bombing and Gunnery Range and the Tonopah Test Range. These two areas comprise the NAFB Range Complex, which provides a buffer zone between the test areas and public lands. The combination of the NAFB Range Complex and the

NTS is one of the larger unpopulated land areas in the United States, comprising some 14,200 km² (5,470 mi²). Mercury, Nevada, located at the southern end of the NTS, is the main Base Camp for worker housing and administrative operations for the site. Area 12 Base Camp, located at the northern end of the site, is the other major worker housing and operations support facility.

The topography of the NTS is typical of much of the Basin and Range physiographic province of Nevada, Arizona, and Utah. North-south-trending mountain ranges are separated by broad, flat-floored, gently sloped valleys. Elevations range from about 910 m (3,000 ft) above mean sea level (MSL) in the south and east to 2,100 m (6,900 ft) in the mesa areas toward the northern and western boundaries. The slopes on the upland surfaces are steep and dissected, whereas the slopes on the lower surfaces are gentle and alleviated with rock debris from the adjacent highlands. The principle effect on the terrain from nuclear testing has been the creation of numerous dish-shaped surface subsidence craters, particularly in Yucca Flat. There are no continuously flowing streams on the NTS. Surface drainages from the Yucca Flat and Frenchman Flat are in closed-basin systems which drain onto the dry lake beds (playas) in each valley. The remaining area of the NTS drains via arroyos and dry stream beds that carry water only during unusually intense or persistent storms. Rainfall or snow melt typically infiltrates quickly into the moisture-deficient soil or runs off in normally dry channels, where it evaporates or seeps into permeable sands and gravels. During extreme conditions, flash floods may occur. The northwest portion (Pahute Mesa) of the NTS has integrated channel systems which carry runoff beyond NTS boundaries into the closed basins and playas in Kawich Valley and Gold Flat on the NAFB Range Complex. The western half and southernmost part of the NTS have channel systems which carry runoff from intense storms toward the southern boundary of the NTS and off site toward the Amargosa Desert (DOE 1991).

In general, the geology consists of three major rock units: (1) completely folded and faulted sedimentary rocks of Paleozoic age overlain at many places by (2) volcanic tuffs and lavas of Tertiary age, which (in the valleys) are covered by (3) alluvium of late Tertiary and Quaternary age. The sedimentary rocks of Paleozoic age are many thousands of feet thick and are comprised mainly of carbonate rocks (shale and quartzite). The volcanic rocks are relatively undeformed, and dips are generally gentle. The alluvium is derived from erosion of the nearby hills of tertiary and Paleozoic rocks. The volcanic rocks of Tertiary age are predominantly tuffs, which erupted from various volcanic centers and lavas, and are mostly rhyolitic in composition. The aggregate thickness of the volcanic rocks is many thousands of feet, but in most places the total thickness of the section is far less because of erosion or nondeposition. These materials erupted before the collapse of large

volcanic centers known as calderas. Alluvial materials fill the intermountain valleys and cover the adjacent slopes. These sediments attain thickness of 600 to 900 m (2,000 to 3,000 ft) in the central portions of the valleys. The alluvium in Yucca Flat is vertically offset along the prominent north-south-trending Yucca fault.

Depths to groundwater beneath the NTS vary from about 157 m (515 ft) beneath the Frenchman Flat playa (DOE 1991) in the southern part of NTS to more than 610 m (2,000 ft) beneath part of Pahute Mesa. In the eastern portions of the NTS, the water table occurs generally in the alluvium and volcanic rocks above the regional carbonate aquifer. The flow in the shallower parts of the groundwater body is generally toward major valleys (Yucca and Frenchman) where it deflects downward to join the regional drainage to the southwest in the carbonate aquifer. The hydrogeologic units at the NTS occur in three groundwater subbasins in the Death Valley groundwater basin. Groundwater beneath the eastern part of the NTS is in the Ash Meadows subbasin defined by discharge through evapotranspiration along a spring line in Ash Meadows (south of the NTS). Most of the western NTS is in the Alkali Flat/Furnace Creek Ranch subbasin, which discharges by evapotranspiration at Alkali Flat and by spring discharge near Furace Creek Ranch. Groundwater beneath the far northwestern corner of the NTS may be in the Oasis Valley subbasin, discharging by evapotranspiration in the Oasis Valley.

A long-term groundwater monitoring program was instituted in 1972 to be operated by the EPA under an interagency agreement. Groundwater was monitored on and around the NTS, at eight sites in other states, and at two locations off site in Nevada in 1991 to detect the presence of any radioactivity in the groundwater. No radioactivity was detected in the groundwater sampling network around NTS. The NTS groundwater monitoring network currently utilizes wells that were drilled for water supply or exploratory purposes. Therefore, an extensive program to install groundwater monitoring wells has been implemented. The program will involve the installation of approximately 90 wells on or near NTS.

Precipitation levels on the NTS are low, runoff is intermittent, and most of the active testing areas on the NTS drain into closed basins on the site. The NTS mesas receive an average annual precipitation of 23 cm (9 in.), which includes winter snow accumulations. The lower elevations receive approximately 15 cm (6 in.) of precipitation annually, with occasional snow accumulations lasting only a matter of days. Predominating winds are southerly during summer and northerly during winter. The prevailing wind direction during winter months is from the north-northeast; during

summer months, winds prevail from the south. In Yucca Flat, the average annual wind speed is 11 kilometers per hour (km/hr) [7 miles per hour (mi/hr)]. The prevailing wind direction during the winter months is north-northwest and during summer months is south-southwest. At Mercury, the average annual wind speed is 13 km/hr (8 mi/hr), with a prevailing wind direction of northwest during the winter months and southwest during the summer months.

Most of the NTS is vegetated by various associations of desert shrubs typical of the Mojave or Great Basin Deserts or the zone of transition desert between these two. There are areas of desert woodland (pinon and juniper) at higher elevations. Even there, typical Great Basin shrubs, principally sagebrushes, are a conspicuous component of the vegetation. Although shrubs (or shrubs and small trees) are the dominant forms, herbaceous plants are well represented in the flora and play an important role in supporting animal life.

Extensive floral collection has yielded 711 taxa of vascular plants within or near the boundaries of the NTS (DOE 1991). Associations of creosote brush *(Larrea tridentata)*, which are characteristic of the Mojave Desert, dominate the vegetation mosaic on the dajadas of the southern NTS. Between 1,220 and 1,520 m (4,000 and 5,000 ft) elevations in Yucca Flat, transitional associations are dominated by hopsage/desert thorn *(Grayia spinosa/Lycium andersonii)* associations, while the upper bajadas support *Coleogyne* types. Above 1,520 m (5,000 ft), the vegetation mosaic is dominated by sagebrush associations of *Artemisia tridentata* and *Artemisia arbuscula* ssp. *nova*. Above 1,830 m (6,000 ft), pinon pine and juniper mix with the sagebrush associations where there is suitable moisture for these trees. No plant species located on the NTS is currently on the federal endangered species list; however, the State of Nevada has placed *Astragalus beatleyae* on its critical species list. Most mammals on the NTS are small and secretive (often nocturnal in habitat), hence not often seen by casual observers; larger mammals include horses, burros, deer, mountain lions, bobcats, coyote, kit foxes, and rabbits. Reptiles include four species of venomous snakes; bird species are mostly migrants or seasonal residents. In terms of distribution or relative abundance, rodents are the most important group of mammals on the NTS. Most nonrodent mammals have been placed in the "protected" classification by the state of Nevada. In 1989, the desert tortoise, *(Gopherus agassizii)* was placed on the endangered species list by the U.S. Department of the Interior and was relisted as threatened in 1991. Tortoise habitats on the NTS are found in the southern third of NTS outside the current areas of nuclear test activities in Yucca Flat, Rainer Mesa, and Pahute Mesa (DOE 1991).

There are many archaeological sites on the Pauite and Rainer Mesas testing areas (DOE 1991). In addition to the archeological sites, there are also some sites of historical interest on the NTS. The principle sites include the remains of primitive stone cabins with nearby corrals at three springs, a natural cave containing prospectors' paraphernalia in Area 30, and crude remains of early mining and smelting activities.

In 1991, 17 pre-activity surveys were conducted for archeological sites on the NTS, and reports on the findings were prepared (DOE 1991). These pre-activity surveys identified 56 sites containing previously unknown archeological information. These sites were added to the cultural resources inventory files, site records, and all artifacts collected from the NTS were processed for storage. Due to avoidance of all potentially significant sites by activities at the NTS, no test excavations, data recovery plans, or data-recovery projects were undertaken in 1991.

Excluding Clark County, the major population center (approximately 741,000 in 1990), the population density within a 150-km radius of the NTS is about 0.5 persons/km^2. In comparison, the 48 contiguous states (1990 census) had a population density of approximately 29 persons/km^2. The estimated average population density for Nevada in 1990 (including Clark County) was 2.8/km^2. The off-site area within 80 km of the NTS Control Point is predominantly rural. CP-1 (a building at the Control Point) historically has been the point from which distances from the NTS were determined (DOE 1991).

Several small communities are located in the area, the largest being in the Pahrump Valley. This growing rural community with an estimated population of 15,000, is located 80 km south of CP-1. The Amargosa Farm area, which has a population of about 950, is located about 50 km southwest of CP-1. The largest town in the near off-site area is Beatty, which has a population of about 1,500 and is located approximately 65 km to the west of CP-1. The Mojave Desert of California, which includes Death Valley National Monument, lies along the southwestern border of Nevada. The National Park Service (NPS) estimated that the population within the monument boundaries ranges from a minimum of 200 permanent residents during the summer months to as many as 5,000 tourists and campers on any particular day during "Death Valley Days" in the month of November (DOE 1991). The largest nearby population in this desert is the Ridgecrest-China Lake area about 190 km (118 mi) southwest of the NTS, which contains about 28,000 people. The next largest is in the Barstow area (104 km^2 or 40 mi^2) located 265 km (165 mi) southwest of the NTS with a 1991 population of 21,000. The Owens Valley, where numerous small towns are located, lies 50 km

(31 mi) west of Death Valley. The largest town in the Owens Valley is Bishop, located 225 km (140 mi) northwest of the NTS, with a population of 3500.

Recreational areas lie in all directions around the NTS and are used for such activities as hunting, fishing, and camping. In general, the camping and fishing sites to the northwest, north, and northeast of the NTS are utilized throughout the year except for the winter months. Camping and fishing locations to the south and southwest are utilized throughout the entire year. The peak hunting season is from September through January.

G.II.2 Commercial Disposal Facility at Clive, Utah

The preferred alternative for Operable Unit 1 calls for the disposal of wastes at a commercial disposal facility in Clive, Utah. The facility is located on the eastern edge of the Great Salt Lake Dessert, 4.8 km (3 mi) west of the Ceder Mountains. Owned by the State of Utah, the 16 km (10 mi) area around the site is rarely used due to its remoteness from urbanized areas. The area is uninhabitated by humans and only occasionally used for grazing and off-road vehicles. The only other use of lands within the 16 km (10 mi) radius is for transportation. Interstate 80 and the Union Pacific railway pass 4 km (2.5 mi) and 1.6 km (1 mi) north, respectively, of the site. Because the facility is located in an area with an arid climate far away from any population centers, the lack of human habitation offers many advantages from a long-term risk standpoint.

The commercial disposal facility site has probably been used for grazing since the early settlers. No events of historical significance are known to have occurred on the site. The Donner Trail probably passed north of the site, but the trail's exact location is unknown. A cultural resource inventory for the facility was performed in August 1981 by the Archaeological Environmental Research Corporation (DOE 1984). No cultural resource sites were found. The Ground to Air Pilotless Aircraft Launch Site and Blockhouse is listed in the National Register of Historic Places and is approximately 16 km (10 mi) west of the facility. To the southeast of Clive [approximately 37 km (23 mi)] is the site of the Gosepa Settlement Cemetery.

The proposed disposal site is located in the Basin and Range physiographic province which covers nearly all of Nevada and parts of California, Oregon, Idaho, Arizona, New Mexico, and Texas. It is characterized by broad, flat basins occasionally interrupted by small mountain ranges. The area within a 16 km (10 mi) radius is typical of this province. Because of the flatness of the terrain, vistas of 48 km (30 mi) are common. The Bureau of Land Management (BLM) Visual Resource Inventory

and Evaluation System (DOE 1984), rated the scenic quality of the disposal facility relative to the physiographic province low to medium; hence, no special management attention is required for the site.

The commercial disposal facility is located within a relatively flat area along the eastern edge of the Great Salt Lake Desert. The desert area extends for approximately 96 km (60 mi) from the Nevada border on the west to a series of north-south-trending mountain ranges on the east. The eastern edge of the desert in the vicinity of the site is formed by the Ceder Mountains, which rise to an elevation of approximately 2,346 m (7,700 ft), approximately 1,066 m (3,500 ft) above the desert floor. The proximity of this mountain range results in a generally westward slope to the site, with drainage into the Great Salt Lake Basin. The site has a topographic relief of less than 3.3 m (11 ft).

Because of the lack of detailed subsurface data concerning the bedrock, the exact depth to and relationships among various units at the disposal facility are unknown (DOE 1984). Lone Mountain, located 4.8 km (3 mi) east of the site, has a core of Paleozoic rocks. These include, from west to east, the Grandeur Member of the Park City Formation, an unnamed Permian formation, and Unit 5 of the Oquirrh Formation. These well-indurated limestones and sandstones strike slightly east to north and dip steeply (72 to 74 degrees) to the west. Lone Mountain represents the west limb of a north-trending anticline, which is, in turn, located on the upper plate of the Lone Mountain Thrust Fault, a slightly northwest-trending Laramide (early Tertiary) low-angle fault.

The scattered low hills about 2.4 km (1.5 mi) west of the disposal facility site also contain outcrops of Paleozoic Oquirrh Formation (DOE 1984). These rocks may represent the northern extent of a slightly northeast-trending overturned anticline. The facility may be located in the syncline between this anticline and the Lone Mountain anticline to the east.

The Grayback Hills, 5.6 km (3.5 mi) northwest of the disposal facility (just north of Interstate 80), are formed by remnants of Late Tertiary basalt and basaltic andesite flows (DOE 1984). These flows are the only apparent evidence near the site of Late Tertiary tectonism.

The commercial disposal facility site lies in a region which contains active faulting. Seismogenic sources include zones of faulting along the east flank of the Ceder Mountains, the east flank of the Newfoundland Mountains, the west flank of the Stansbury Mountains, and within Puddle Valley. The density of possible seismogenic sources is considerably less than along the Watsatch Front located

about 104 km (65 mi) east of the disposal facility. The site is located within the Great Basin in the Basin-and-Range Province (BAR) in western Utah. It lies in a transition zone between exposed BAR horsts and grabens (mountain ranges and valleys) to the east and buried BAR horsts and grabens to the west. The surrounding area does not have recorded historical seismicity, but nearby seismogenic areas and geologic structures could pose a hazard to the site.

Surface and subsurface conditions at the disposal facility and in its vicinity were evaluated through the drilling, logging, and sampling of 13 exploration borings. The logs of the exploration borings are available in the Uranium Mill Tailings Radiation Control Act (UMTRCA) Project Office in Albuquerque, New Mexico. Surficial soils encountered in the 13 exploration borings generally consist of light brown to tan, sandy to clayey silt. These soils were classified as either stiff or very stiff and were noted to contain a small pinhole structure and bedding layers that range from approximately .018 to 3.6 m (.06 to 12 ft) (DOE 1984).

Underlying the surficial material is an interlayered lacustrian deposit ranging from relatively clean fine- and medium-grained sands to silty clays. This interlayered soil sequence appears to be random, and no definite pattern or predominant material type could be correlated among individual borings. The soils are layered but vary in thickness from stiff to very stiff, while the cohesionless materials were generally medium dense to dense. This interlayered sequence extends to depths between 13.7 and 15.5 km (45 and 51 ft).

No bodies of surface water are present on the commercial disposal site area. The nearest stream channel ends about 3.2 km (2 mi) east of the site and is typical of all the drainages along the transportation corridors within about 34 km (20 mi). The site lies to the west of the Ceder Mountains in a relatively flat basin. The streams within the area do not reach the site; the channels end 3.2 km (2 mi) east of the site. This indicates that flows normally infiltrate or evaporate before reaching the site.

The site is located within the Great Salt Lake Desert. The two major groundwater systems in the area are the valley fill and the alluvial fans bordering the desert. The Ceder Mountains east of the site provide surface water recharge to the alluvial fill. Direct infiltration of incident precipitation is not a significant component of the total groundwater regimen. Groundwater monitoring wells indicate groundwater lies 6 to 9 m (20 to 30 ft) below ground surface. The principle direction of groundwater flow within the disposal site region is to the west. Locally, however, the direction of the

groundwater flow is modified by both the surface topography and by the stratigraphy at depth. The direction of groundwater movement appears to be mainly to the northeast. The hydraulic gradient in this direction is small, approximately .91 m (3 ft) per mile.

The surrounding area is arid dessert. Temperatures range from -2.7° C (27°F) in January to 26°C (79°F) in July. Normal extremes range from nighttime lows of -7.9°C (19°F) in January to daytime highs of 33.3°C (92°F) in July. The average rainfall is only 12.7 cm (5 in.) per year. Thunderstorms occur in the summer, and occasional snowfall occurs in the winter.

Soils at the disposal facility site are characterized as having a horizon of clay and alkali (sodium) accumulation. The soil lacks moisture for plant growth for long periods and is low in organic matter (DOE 1984). The dry subsurface soils are powdery and easily dispersed in the air by traffic of any kind. These highly saline, slowly permeable soils in this extremely arid location are unsuitable for re-establishing a lasting, self-sustaining vegetation to protect the soil covering the disposed materials. Even if the low precipitation could be overcome by irrigation, the nature of the soils would impose insurmountable problems that would prevent satisfactory plant cover within 10 to 20 years (DOE 1984). Soils with these characteristics will act as a barrier to all but the most shallowly rooted plant species, and density of the clay will deter burrowing by small animals.

The vegetation of the disposal facility site is a homogeneous, semi-desert low shrubland, primarily composed of shadscale *(Atriplex confertifolia)*. The shrubland is part of the Northern Desert Shrub Biome of the Cold Desert Formation (DOE 1984). Plant communities identified on the site are Shadscale-Gray Molly *(Kochia americana var. vestita)*, a transitional community type of Shadscale-Gray Molly-Black Greaseweed *(Sarcobatus vermiculatus)*, and Black Greaseweed-Garder Saltbush *(Atriplex nuttallii)*. Vegetation patterns at the site are correlated with soil salinity and corresponding shifts in presence or abundance of species. All three communities are low in species diversity. Seep-weed or inkweed *(Suaeda torreyana)* and scattered perfoliate pepperweed *(Lepidium perfoliatum)* are the only prominent understory species of the Shadscale-Gray Molly community. This community occurs over most of the site, although black greasewood becomes prominent enough on the eastern quarter to form a Shadscale-Black Greaseweed-Gray Molly community (DOE 1984).

Two habitat types occur on the disposal site: shadscale flats and greaseweed. Animal species typically include the black-tailed jackrabbit *(Lepus californicus)*, the deer mouse *(Peromyscus maniculatus)*, the horned lark *(Eremophila alpestris)*, and the desert horned lizard *(Phrynosoma platyrhinos)*; species

diversity is low. All of these animal species could use the site for breeding or nesting. Aquatic ecosystems do not occur on the disposal site nor do any threatened or endangered species reside in the area.

The commercial disposal facility is located in Tooele County, Utah. The County encompasses 700 square miles within the state and had a population in 1990 of 26,000, representing approximately 1.5 percent of the population of Utah. (The population of Utah was 1,723,000 in 1990). The population in Tooele County has increased on average 3.2 percent between 1970 and 1980; however, it remained constant over the past 10 years at approximately 26,000.

Most lands within a 16 km (10 mi) radius of the site are used very rarely because of their remoteness from urbanized areas and the poor spill, occasional muddy conditions, and sparse vegetation characteristic of the region. Sheep grazing and recreational-vehicle driving are the primary uses made of the area, but such uses are apparently light. Although no reports on land uses in the vicinity could be found, numerous trails in the area indicate that it has been used on occasion for recreational vehicle purposes, and much of the vicinity may be used on occasion for hunting. The only other use of lands within a 16 km (0 mi) radius is for transportation. Interstate 80 and the Union Pacific System railway pass 4 km (2.5 mi) and 1.6 km (1 mi) north, respectively, of the site.

REFERENCES

5861

Canter, L. W., 1977, Environmental Impact Assessment, McGraw Hill, New York, NY.

Ebasco, 1993, "Wetlands Delineation Report of the FEMP, Draft," FERMCO, Cincinnati, Ohio, prepared for the U.S. Department of Energy, Fernald Field Office, Fernald, OH.

Facemire, C. F., S. G. Guttman, D. R. Osborne and R. H. Sperger, 1990, "Biological and Ecological Site Characterization of the Feed Materials Production Center," FMPC-SUB 018, prepared for Westinghouse Materials Company of Ohio, Cincinnati, OH.

Luce, W. R., Ohio Historical Society, 1987, Letter to J. Reafsnyder, Subject: Review of Archaeological Properties at the FEMP.

Ohio Environmental Protection Agency (OEPA), 1990, "State of Ohio Water Quality Standards," Chapter 3745-1 Administrative Code, Columbus, OH.

Parsons, 1992, "Conceptual Design Report for the Engineered Waste Management Facility, Volumes 1 and 2," Document Control No. 06CP03279201, DOE Contract No. DE-AC05-900R21951, Parsons Executive Office, Fairfield, Ohio, prepared for the U.S. Department of Energy, Fernald Field Office, Fernald, OH.

U.S. Environmental Protection Agency (EPA), 1986, "Quality Criteria for Water 1986," Office of Water Regulations and Standards, EPA/44015/86-001, Washington, DC.

U.S. Department of Energy (DOE), 1984, "Remedial Actions at the Framer Vitro Chemical Company Site," South Salt Lake City, Salt Lake County, UT.

U.S. Department of Energy (DOE), 1990, "Notice of Intent to Prepare a Remedial Investigation/ Feasibility Study Environmental Impact Statement for the First of Five Remedial Actions at the FEMP," 55 Federal Register 94, pp. 20183-20188.

U.S. Department of Energy (DOE), 1991, "Nevada Test Site Annual Site Environmental Report, 1990," DOE-NV 10630.20, Nevada Field Office, Las Vegas, NV.

U.S. Department of Energy (DOE), 1992, "Implementation Plan for the Remedial Investigation/ Feasibility Study Environmental Impact Statement for Operable Unit 2 and Other Operable Units," Fernald Environmental Management Project, Cincinnati, OH.

U.S. Department of Energy (DOE), 1993, "Site-Wide Characterization Report," Fernald Environmental Management Project, Fernald, Ohio, Remedial Investigation and Feasibility Study, DOE, Fernald Field Office, Fernald, OH.

U.S. Department of Energy (DOE), 1994a, Feasibility Study Report for Operable Unit 4, DOE/EIS-0195D, Fernald Environmental Management Project, prepared by Fernald Environmental Restoration Management Corp. for DOE Fernald Field Office, Cincinnati, OH.

U.S. Department of Energy (DOE), 1994b, "Remedial Investigation Report for Operable Unit 2," DOE Fernald Field Office, Fernald, Ohio.

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Appendix H
Floodplain/Wetland

APPENDIX H

FLOODPLAIN/WETLAND ASSESSMENT FOR THE FEMP OPERABLE UNIT 2 REPRESENTATIVE ALTERNATIVE

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LIST OF ACRONYMS

ac	acre
ARARs	applicable or relevant and appropriate requirements
AWWT	advanced wastewater treatment
CFR	Code of Federal Regulations
COE	U.S Army Corps of Engineers
DOE	U.S Department of Energy
EA	environmental assessment
FEMP	Fernald Environmental Management Project
FS/PP-EA	Feasibility Study/Proposed Plan-Environmental Assessment
ft	foot
ha	hectare
m	meter
MSL	mean sea level
OEPA	Ohio Environmental Protection Agency
PRL	preliminary remediation level
EPA	U.S. Environmental Protection Agency

H.1.0 INTRODUCTION

The Fernald Environmental Management Project (FEMP) is divided into five operable units. The subject of the Feasibility Study/Proposed Plan (FS/PP) - Environmental Assessment (EA) and this Floodplain/ Wetland Assessment is Operable Unit 2, which consists of five waste areas: the Solid Waste Landfill, Lime Sludge Ponds, Inactive Flyash Pile, South Field, and Active Flyash Pile.

The purpose of the Operable Unit 2 FS/PP-EA is to evaluate the range of available remedial action alternatives addressing final disposition of Operable Unit 2 wastes. The primary objective of the remedial action is to protect human health and the environment by implementing long-term cleanup solutions.

Executive Order 11990 (Protection of Wetlands) and Executive Order 11988 (Protection of Floodplains), which are implemented by U.S. Department of Energy (DOE) Regulation 10 Code of Federal Regulations (CFR) 1022, "Compliance with Floodplain/Wetlands Environmental Review Requirements," specify the requirement for a floodplain/wetland assessment in cases where DOE is responsible for providing federally undertaken, financed, or assisted construction and improvements that may impact floodplains or wetlands (DOE 1979). Pursuant to 10 CFR 1022.5 and 1022.11, the DOE has determined that a Floodplain/Wetland Assessment will be prepared for the representative alternative being considered for Operable Unit 2. A Floodplain/Wetland Notice of Involvement will be issued in the Federal Register to satisfy the public notice requirements of 10 CFR 1022.14.

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H.2.0 PURPOSE AND NEED

The purpose of the FS/PP-EA is to evaluate and select a remedial action alternative that will protect human health and the environment in the future. The Representative Alternative (Alternative 6, Excavation and On-Site Disposal with Off-Site Disposal of Fraction Exceeding Waste Acceptance Criteria) for Operable Unit 2, would require activities on site that would impact floodplain and wetland areas. Therefore, DOE is preparing this Floodplain Wetland Assessment.

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H.3.0 DESCRIPTION OF THE PROPOSED ACTION

The Representative Alternative for Operable Unit 2 includes excavation and on-site disposal of Operable Unit 2 wastes in an engineered disposal cell located in the southeast corner of the FEMP site. A limited quantity of contaminated material with a uranium-238 concentration above acceptance criteria for the on-site disposal cell and soil with lead-contaminated bullets and fragments would be disposed of off site at a mixed-waste disposal facility, as necessary. This alternative has been developed to meet the health-based preliminary remediation levels (PRLs) for the off-property farmer and expanded trespasser and assumes future land use under administrative control. Implementation of this alternative would reduce the spread of contaminants at the site by restricting the air, soil, surface water, and groundwater pathways and would be protective of both human health and the environment.

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H.4.0 FLOODPLAIN/WETLAND EFFECTS

H.4.1 FLOODPLAINS

Floodplains within the FEMP site property are confined to the north-south corridor containing Paddys Run, which has also been designated as a Water of the United States and the State of Ohio (Figure H.4-1). Note that areas north of the main rail spur and south of Willey Road were not studied. Outside the boundaries of the FEMP site, the 100- and 500-year floodplain of the Great Miami River extends west of the "Big Bend" area and northward along Paddys Run from the confluence of the two streams past the southern boundary of the FEMP site (Figure H.4-2). Elevations range from 165 meters (m) [542 feet (ft)] mean sea level (MSL) at the southern boundary of the floodplain studied to 173 m (567 ft) MSL at the northern tip (Figure H.4-1).

H.4.1.1 Floodplains Adjacent to Operable Unit 2

A study by Parsons (1993) examined the 100- and 500-year floodplain along Paddys Run. The results of this study predicted a 100-year flood flow of approximately 316 cubic meters per second (11,150 cubic feet per second). In the vicinity of the Inactive Flyash Pile, that flow was estimated to yield an elevation of 546 ft MSL.

H.4.1.2 Floodplain Impacts

Remedial activities involving the Inactive Flyash Pile, the Active Flyash Pile, and the South Field would have potential impacts on the floodplain (Table H.4-1). Direct impacts to the floodplain would result from the excavation of lead bullets and fragments and the construction of a temporary haul road within the floodplain. However, this physical impact would be temporary and would not cause any permanent alterations. No change in flood elevations would be expected, because disturbed areas would be backfilled and graded to match topographic conditions.

Potential indirect impacts as a result of remedial activities involving the flyash piles and South Field include surface water runoff and sedimentation loading into the floodplain. Measures to minimize or eliminate these potential adverse impacts may include, but not be limited to, the utilization of silt fences and straw bales. In summary, remedial activities would result in short-term impacts to the floodplain; however, no change in flood elevations would occur.

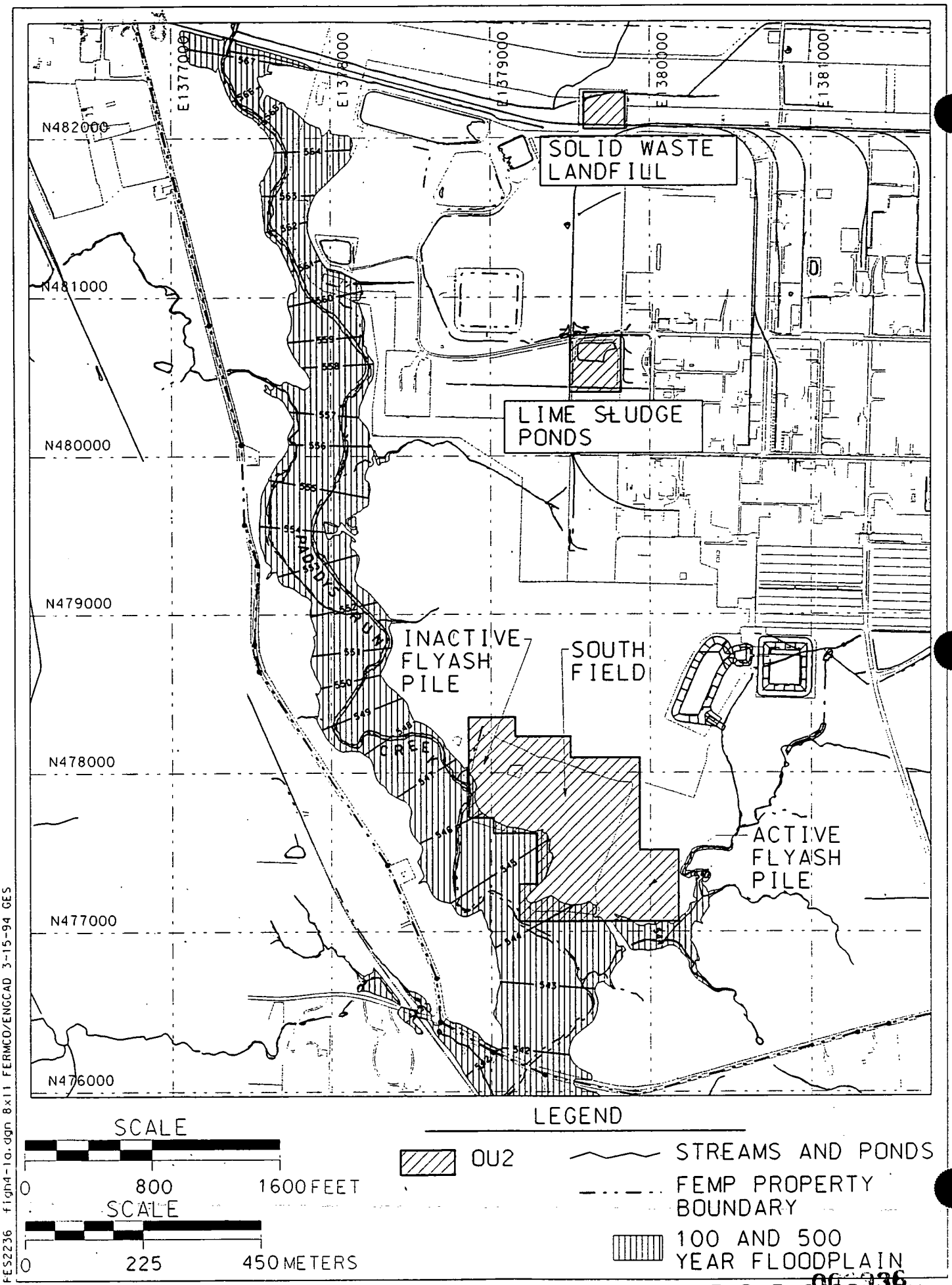
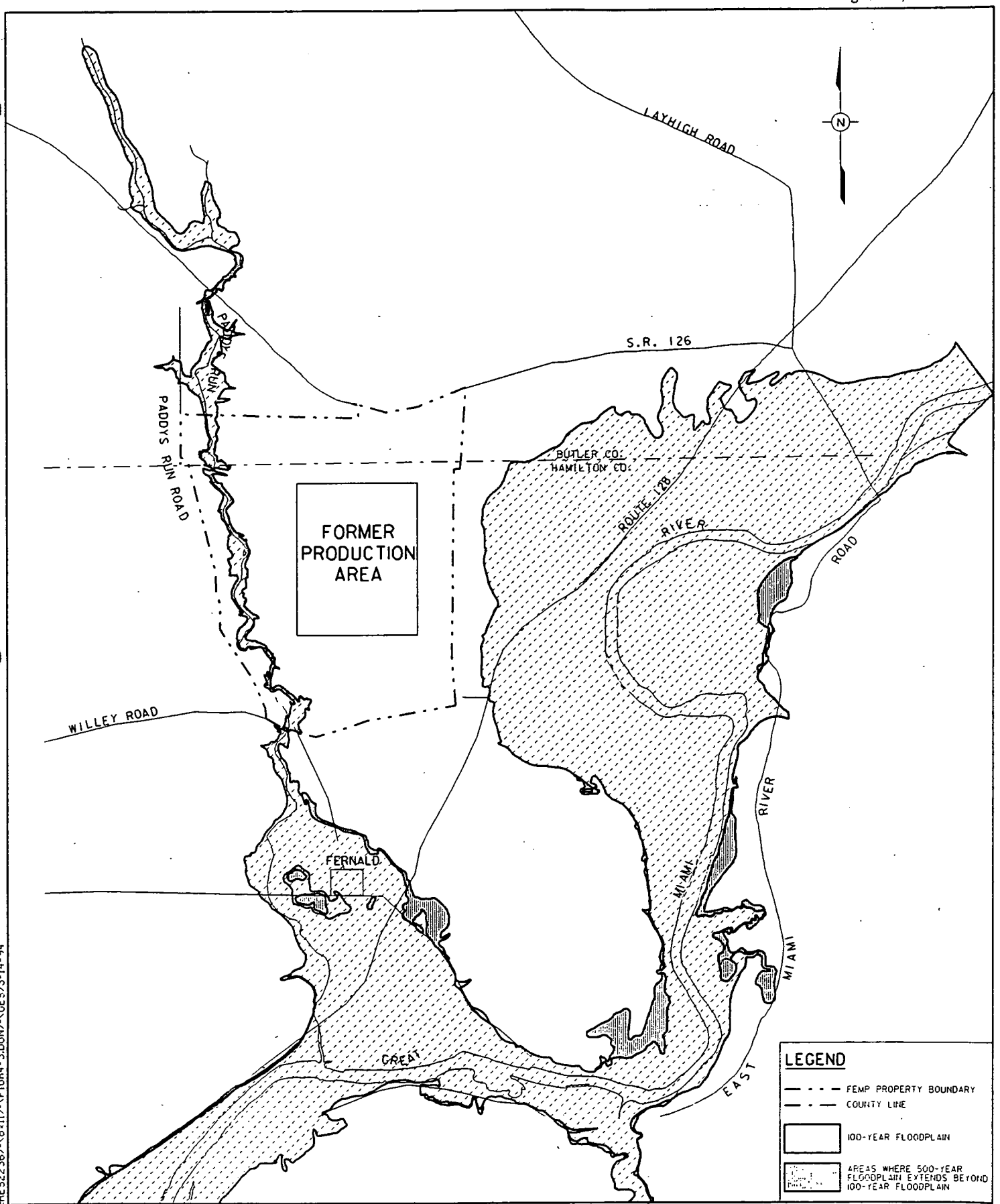


FIGURE H.4-1 PADDYS RUN CREEK 100 AND 500 YEAR FLOODPLAIN



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SCALE
0 3500 FEET
SCALE
0 1000 METERS

FIGURE H.4-2 GREAT MIAMI RIVER AND PADDYS RUN 100-YEAR AND 500-YEAR FLOODPLAIN

TABLE H.4-1

FLOODPLAIN AND WETLAND IMPACTS FROM ALTERNATIVE 6 (REPRESENTATIVE ALTERNATIVE)

Representative Alternative	Floodplain and Wetland Impact
Excavation and On-Property Disposal with Off-Site Disposal of Fraction Exceeding Waste Acceptance Criteria	Limited excavation, sedimentation, runoff in floodplain; no change in flood elevations Filling of 0.2 ha (0.6 ac) of drainage ditch/swale wetlands; sedimentation, runoff, fugitive dust to 0.02 ha (0.04 ac) drainage ditch wetlands (temporary)

H.4.2 WETLANDS

A jurisdictional wetland delineation has been approved by the U.S. Army Corps of Engineers (COE), Louisville District, which established jurisdictional wetland boundaries and Waters of the United States (Ebasco Environmental 1993). Results from the site-wide delineation indicate a total of 14.5 hectares (ha) [35.9 acres (ac)] of palustrine forested wetlands, 2.8 ha (6.95 ac) of drainage ditches/swales, and 0.96 ha (2.37 ac) of isolated persistent emergent and scrub/shrub wetlands (Figure H.4-3). Wetlands were delineated using the Routine On-Site Methodology (Environmental Laboratory 1987).

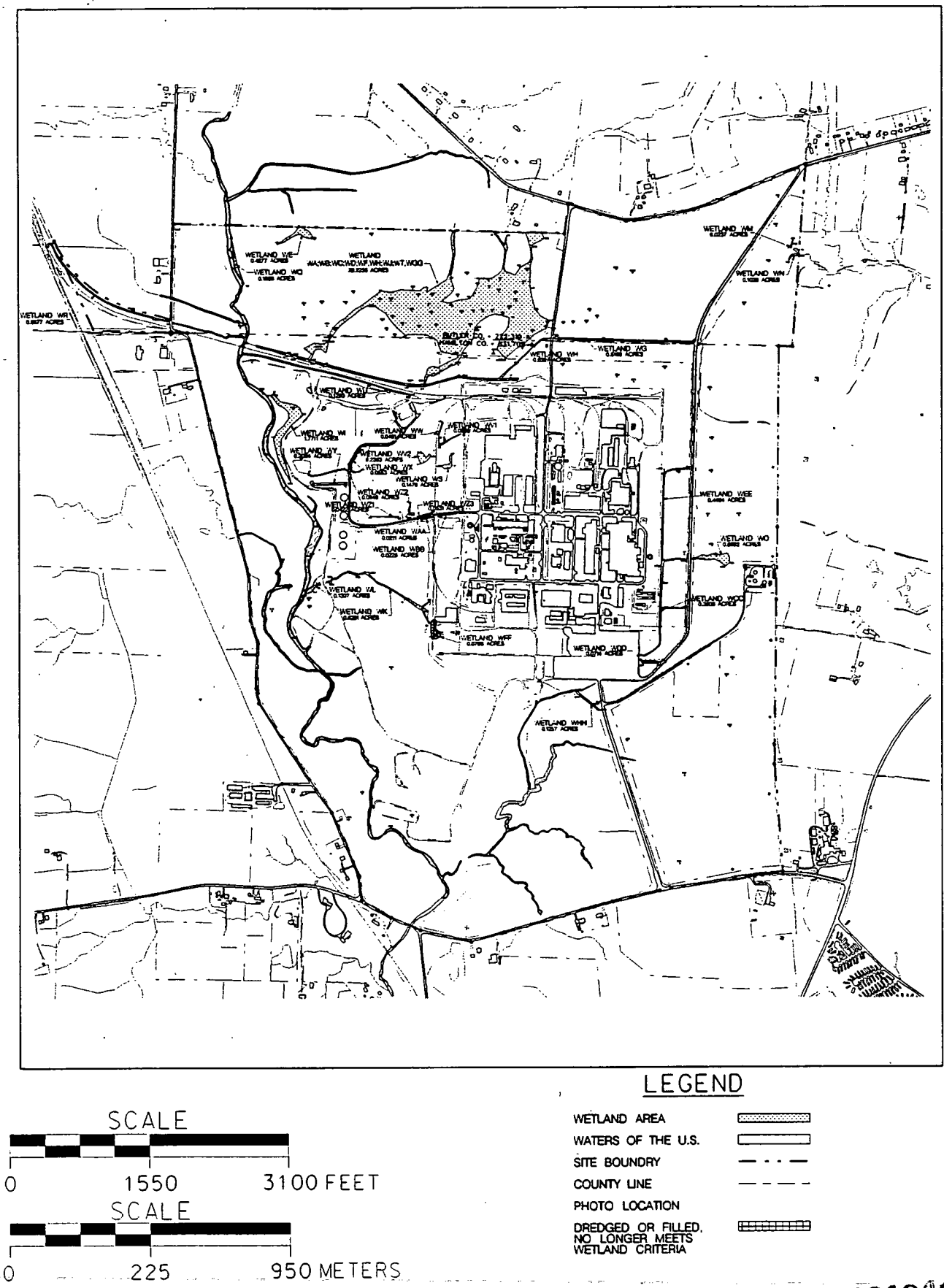
H.4.2.1 Wetlands Within and Adjacent to Operable Unit 2

The delineation revealed 0.1 ha (0.2 ac) of drainage-ditch wetlands on the northern boundary of the Solid Waste Landfill, 0.008 ha (0.02 ac) of drainage-ditch wetlands north of the Lime Sludge Ponds, and 0.008 ha (0.02 acre) of drainage-ditch wetlands northwest of the Lime Sludge Ponds, and various drainage ditch/swale wetlands throughout the FEMP site. These drainage ditches/swales support the common broad-leaf cattail (*Typha latifolia*).

H.4.2.2 Wetland Impacts

Remedial activities at the Solid Waste Landfill and Lime Sludge Ponds would result in direct and indirect impacts to wetland areas. Excavation and construction activities would result in direct physical impact (e.g., filling of wetland) to the 0.1 ha (0.2 ac) drainage ditch in the Solid Waste Landfill. Indirect impacts would include the migration of eroded soil and surface water runoff and the dispersion of fugitive dust to the wetlands above the Lime Sludge Ponds (Table H.4-1). In addition, the construction of a haul road from the waste areas to the on-site disposal cell would result in a direct impact: filling of approximately 0.01 ha (0.3 ac) of various drainage-ditch/swale wetlands. The installation of a pipeline from the on-site disposal cell to the Advanced Wastewater Treatment (AWWT) Facility would result in filling of another 0.04 ha (0.1 ac) drainage-ditch wetland. On-site borrow activities (if implemented) could result in direct impact: filling of approximately 0.8 ha (2.0 ac) of drainage ditch/swale wetlands. This potential disturbance is not shown in Table H.4-1.

Engineering controls would be implemented during all remedial activities. Controls would include utilization of silt fences, straw bales, and dust suppressants. Compensatory mitigation of wetland impacts would be determined using the 404 (b) (1) guidelines of the Clean Water Act in consultation with the COE, EPA, and Ohio Environmental Protection Agency (OEPA).



LEGEND

- WETLAND AREA
- WATERS OF THE U.S.
- SITE BOUNDRY
- COUNTY LINE
- PHOTO LOCATION
- DREDGED OR FILLED, NO LONGER MEETS WETLAND CRITERIA

SCALE

0 1550 3100 FEET

SCALE

0 225 950 METERS

001940

RES2236 8x11 fig1-1.dgn cru2 GES 3-16-94

FIGURE H.4-3 1993 JURISDICTIONAL WETLANDS & WATERS OF THE U.S. FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

H.5.0 ALTERNATIVES CONSIDERED

The remedial alternative discussed in the previous sections was chosen from among several possible alternatives. The other major alternatives evaluated were no action, consolidation and capping, and excavation and off-site disposal.

H.5.1 NO ACTION

Under the no action alternative (Alternative 1), no remedial action would be taken. This alternative would leave Operable Unit 2 as is, and abandon current administrative controls. Such an action would increase the threat of release of hazardous substances into floodplain and wetland areas. Furthermore, the no action alternative is not protective of human health and the environment, does not comply with applicable or relevant and appropriate requirements (ARARs), and does not provide long-term effectiveness and permanence. Therefore, the no action alternative would not be selected. The no action alternative is retained to provide a comparative baseline against which other alternatives can be evaluated.

H.5.2 CONSOLIDATION AND CAPPING

Alternative 2 (Table H.5-1) involves consolidating and containing wastes in three separate composite capping systems. Remedial activities would result in direct and indirect impacts to floodplain and wetland areas. Excavation and construction activities would result in direct physical impact (e.g., filling of wetland) to the drainage ditch in the Solid Waste Landfill. Indirect impacts would include the migration of eroded soil and surface water runoff and the dispersion of fugitive dust to the wetlands above the Lime Sludge Ponds. Direct floodplain impact would occur from the excavation of lead bullets and fragments from the floodplain; however, no change in flood elevation would be expected, because the disturbed area would be backfilled and graded to match topographic conditions.

H.5.3 OFF-SITE DISPOSAL

Alternative 3 (Table H.5-2) involves excavation and off-site disposal of wastes at a representative permitted commercial disposal facility. During remedial activities floodplain and wetland impacts would occur, as discussed in Section H.5.2. Engineering controls would be implemented to minimize any impacts.

TABLE H.5-1

FLOODPLAIN AND WETLAND IMPACTS FROM ALTERNATIVE 2

Alternative	Floodplain and Wetland Impacts
Consolidation and Capping	Limited excavation, sedimentation, runoff in floodplain; no change in flood elevations Filling of 0.1 ha (0.2 ac) of drainage ditch wetlands; sedimentation, runoff, fugitive dust to 0.02 ha (0.04 ac) drainage ditch wetlands (temporary)

TABLE H.5-2

FLOODPLAIN AND WETLAND IMPACTS FROM ALTERNATIVE 3

Alternative	Floodplain and Wetland Impacts
Excavation and Off-Site Disposal	Limited excavation, sedimentation, runoff in floodplain; no change in flood elevations Filling of 0.1 ha (0.2 ac) of drainage ditch wetlands; sedimentation, runoff, fugitive dust to 0.02 ha (0.04 ac) drainage ditch wetlands (temporary)

REFERENCES

Ebasco Environmental, 1993, "Wetlands Delineation Report of the FEMP," FERMCO, Cincinnati, Ohio, prepared for the U.S. Department of Energy, Fernald Field Office, Fernald, Ohio.

Environmental Laboratory, 1987, "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, prepared for the U.S. Army Corps of Engineers, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

U.S. Department of Energy (DOE), 1979, "Compliance with Floodplains/Wetlands Environmental Review Requirements," 10 CFR Part 1022, March 7, Federal Register, U.S. Government Printing Office, Washington, DC.

Parsons, 1993, "100- and 500-year Floodplain Determination Sitewide," Fernald Environmental Management Project, Cincinnati, Ohio, prepared for the U.S. Department of Energy, Fernald Field Office, Fernald, Ohio