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**CERCLA/RCRA UNIT 2 REMOVAL ACTION NO. 29: EROSION
CONTROL AT INACTIVE FLYASH PILE FINAL REPORT - FEBRUARY
1994**

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REPORT

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CERCLA/RCRA UNIT 2

**REMOVAL ACTION NO. 29:
EROSION CONTROL
AT
INACTIVE FLYASH PILE**

FINAL REPORT

FEBRUARY 1994

**U.S. DEPARTMENT OF ENERGY
FERNALD FIELD OFFICE**

6365

FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

CERCLA/RCRA UNIT 2

REMOVAL ACTION NO. 29

EROSION CONTROL
AT INACTIVE FLYASH PILE

FINAL REPORT

FEBRUARY 1994

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EROSION CONTROL
AT INACTIVE FLYASH PILE

FINAL REPORT

TABLE OF CONTENTS

Executive Summary	iv
I. Introduction	1
II. Background Information	1
III. Description of Erosion Control Measures	2
IV. Floodplain and Jurisdictional Water Impacts	6
V. Health and Safety Controls	6
VI. Quality Control	9
VII. Cost	9
VIII. Conclusions	9

Attachments

1. Letter from N. C. Kaufman/FERMCO to T. J. Rowland/DOE dated March 9, 1993 (Letter No. C:OP:93-339)
2. Paddys Run Relocation, West Side of the Inactive Flyash Pile
3. Letter from J. R. Craig/DOE to J. A. Saric/USEPA and G. E. Mitchell/OEPA dated March 24, 1993.
4. Categorical Exclusion
5. Evaluation of Alternatives, Erosion Control at the Inactive Flyash Pile
6. Floodplain Assessment, OU2 Inactive Flyash Pile Erosion Control Project at Paddys Run
7. Letter from B. Carter/COE to T. J. Rowland/DOE dated April 1, 1993 (ID No. 199300361-bkc)
8. Letter from B. Carter/COE to R. J. Hansen/DOE dated August 27, 1993 (ID No. 199300918-bkc)

9. Memorandum from B. Schmidt/FERMCO to S. Garland/FERMCO dated June 29, 1993 (FERMCO #: M:RP(SA):93-0358)
10. Project Specific Health and Safety Plans
11. Letter from S. K. Talukder/Parsons to J. B. Williams/FERMCO dated January 22, 1993 (Parsons ID#: 02:047:20:0029-93)

EROSION CONTROL
AT INACTIVE FLYASH PILE

FINAL REPORT

EXECUTIVE SUMMARY

Removal Action No. 29, "Erosion Control at Inactive Flyash Pile," was implemented in two phases as a "time critical" removal action as defined by the National Contingency Plan. Approval to proceed on each phase was obtained from the U.S. Army Corps of Engineers in compliance with the Nationwide Permit No. 13. The U.S. EPA and Ohio EPA were notified of the proposed action prior to implementation. The action was covered under a categorical exclusion under the National Environmental Policy Act (NEPA).

The first phase included construction of a gravel access road to the site area and installation of a stone berm along the east bank of Paddys Run Creek. The berm was approximately 220 feet in length and 8 feet deep. The objective of this phase was to mitigate the immediate threat of material release from the Inactive Flyash Pile to Paddys Run.

The second phase included an alternative evaluation, detailed engineering of the preferred alternative and construction of same. The preferred alternative consisted of raising the overall height of the first phase berm by approximately 3 to 5 feet with the maximum height at the center of the structure. Toe protection was also added to insure the stability of the stone berm itself.

Field activities for the first phase of the removal action began April 20, 1993, and finished May 4, 1993. The second phase construction activities were conducted from August 26, 1993, through September 24, 1993.

The stone berm and toe protection will be subject to inspection and maintenance until the Inactive Flyash Pile is remediated. Stone has been stockpiled close to the Inactive Flyash Pile to facilitate maintenance activities.

EROSION CONTROL
AT INACTIVE FLYASH PILE

FINAL REPORT

I. INTRODUCTION

A Consent Agreement was signed by DOE and U.S. EPA in April 1990 and was amended in September 1991. The amended Consent Agreement is consistent with the requirements of Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The Consent Agreement defined five operable units at the Fernald Environmental Management Project (FEMP) to more effectively manage the ongoing CERCLA cleanup. Operable Unit 2, Other Waste Units, is one of those five operable units and includes a solid waste landfill, two lime sludge ponds, two flyash piles, and a disposal area known as the South Field. The subject of this document is a removal action, Removal Action No. 29, which was implemented at the Inactive Flyash Pile (IFAP).

Under CERCLA, a removal action is an activity identified and immediately initiated during the remedial investigation/feasibility study process to address the release or potential release of hazardous substances. Removal Action No. 29 was deemed appropriate for implementation because of the following issues under section 40 CFR 300.415 (b)(2) of the NCP (see Attachment 1) :

- Actual or potential exposure to nearby human population, animals or the food chain from hazardous substances or pollutants or contaminants
- Actual or potential contamination of drinking water supplies or sensitive ecosystems
- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released

II. BACKGROUND INFORMATION

The Inactive Flyash Pile is located approximately 2,000 feet southwest of the Fernald Environmental Management Project (FEMP) former production area and covers approximately 3.1 acres. Its western boundary is partly defined by an intermittent stream called Paddys Run which crosses the western side of the FEMP site and flows southward to the Great Miami River.

Flyash and bottom ash from the FEMP coal-fired boiler plant and other materials were deposited in the IFAP area from 1952 until approximately 1968. The total quantity of ash and other material disposed in this area has been estimated at 95,900 cubic yards (CY).

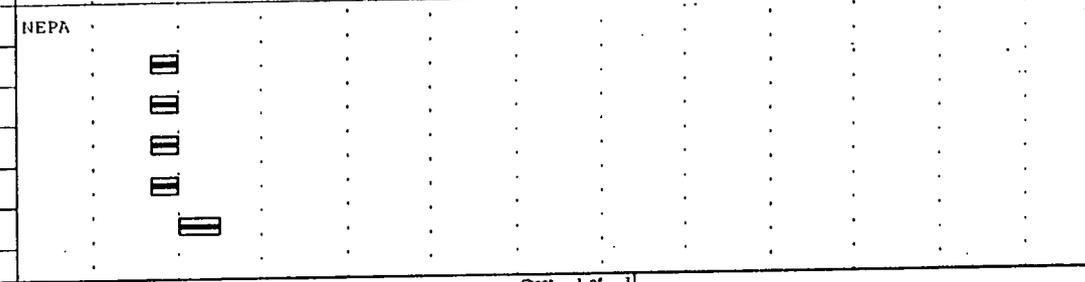
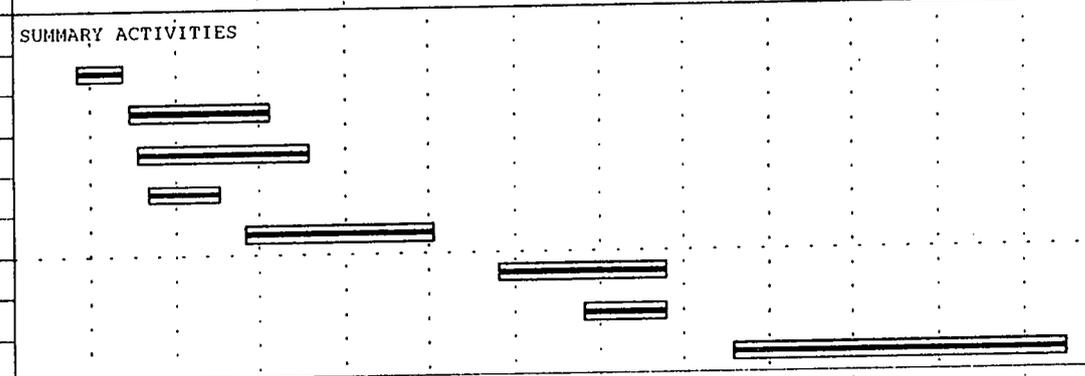
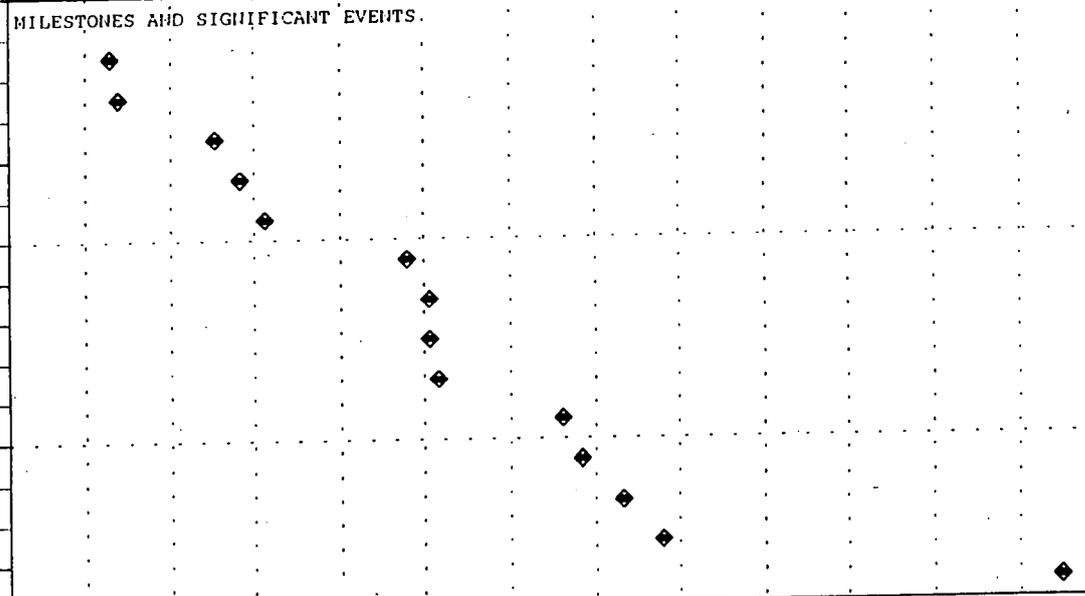
Prior to implementation of the Erosion Control Measures removal action, the east bank of Paddys Run was nearly vertical from the stream bed up approximately 10 feet to the vegetated slope near the toe of the IFAP. The condition of the east bank caused concern since continued erosion by Paddys Run could have undermined the IFAP's western slope and eventually resulted in a discharge of ash and potentially contaminated waste and fill into Paddys Run. In the fall of 1992, a study was underway by Parsons to recommend corrective action. The report from that study was issued on February 1, 1993 and recommended that the stream channel be relocated 105 feet to the west (see Attachment 2). However, high flows in Paddys Run during the late fall and winter resulted in the need for immediate erosion control actions. Consequently, the Erosion Control removal action was implemented; that action included an emergency maintenance activity that was authorized in early March 1993 (see Attachment 1). The U.S. EPA and the Ohio EPA were notified of the proposed action at that time (see Attachment 3).

III. DESCRIPTION OF EROSION CONTROL MEASURES

Erosion Control at the IFAP was a time critical removal action that was implemented in two distinct phases. The first phase was an emergency maintenance response to the impending release of contaminants into Paddys Run, and the second phase was an analysis of alternatives, detailed engineering, and construction of the approved solution. The milestones and various activities within the project are presented in the schedule beginning on the next page.

Field activities for the first phase of the removal action began April 20, 1993 and finished May 4, 1993. This phase included construction of a gravel access road to the area and the installation of a weighted stone berm approximately 220 feet in length and 8 feet deep (approx. 1,000 CY of fill material).

The second phase of the project included an alternative evaluation, detailed engineering of the approved solution and construction of that option (see Attachment 4). The final decision was based on detailed design options and relative cost versus overall performance ratings. The option that was



2R25E01025	FERMCO ISSUE RSE TO DOE AF 9MAR93
2R25E01050	DOE ISSUE RSE ACTION MEMO AF 12MAR93
2R25E01M3N	NEPA-CATEX APPROVED by DOE AF 16APR93
2R25E01M3E	START REMOVAL DESIGN AS 26APR93
2R25E01M3S	EMERGENCY MAINTENANCE ACTIVITY COMPLETE AF 4MAY93
2R25E01M2M	DRAFT WORK PLAN TO DOE AS 25JUN93
2R25E01M2K	WORK PLAN TO USEPA AF 2JUL93
2R25E01M50	FINAL DESIGN - REMOVAL AF 2JUL93
2R25E01M2I	START REMOVAL WORK PLAN AS 6JUL93
2R25E01M60	CWO - CONSTRUCTION WORK ORDER AF 19AUG93
2R25E01MD1	WORK PLAN COMMENTS RETURNED by USEPA AF 26AUG93
2R25E01MD2	INCORPORATE USEPA COMMENTS/RESUBMIT AF 10SEP93
2R25E01M4G	REMOVAL ACTION COMPLETE AF 24SEP93
2R25E01ND3	PADDY'S RUH/IFP - SUBMIT FINAL REPORT TO DOE-FH AF 15FEB94

Plot Date 10FEB94
 Data Date 29FEB94
 Project Start 14MAR93
 Project Finish 30SEP98

Activity Bar/Early Dates
 Critical Activity
 Progress Bar
 Milestone/Flag Activity

Operable Unit 2 Removal Actions/IFP
 Erosion Contrl/Emergency Maintenance
 Final Report

Sheet 1 of 3

Date	Revision	Checked	Approved

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		1993												94	
		FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	FEB		
		NEPA													
2R25E20310 AS 1APR93	DOE (FEMP) NEPA-CATEX REVIEW - EMERG.MAINT.ACT. AF 15APR93			==											
2R25E20220 AS 16APR93	NEPA-CATEX ACTION APPROVAL - REMOVAL ACT AF 16APR93														
2R25E20320 AS 16APR93	NEPA-CATEX ACTION APPROVAL - EMERG.MAINT.ACTIV. AF 16APR93														
		WORK PLAN													
2R25E22230 AS 25JUN93	SUBMIT DRAFT WORK PLAN to DOE-FN AF 25JUN93														
2R25E22250 AS 25JUN93	DOE-FN REVIEW WORK PLAN and COMMENT AF 2JUL93					==									
2R25E22260 AS 2JUL93	INCORP. DOE COMMENTS/SUBMIT WORK PLANS T AF 2JUL93														
2R25E22170 AS 6JUL93	QA PLAN AF 9JUL93														
2R25E22180 AS 22JUL93	FIELD IMPLEMENTATION PLAN AF 26JUL93														
2R25E22140 AS 26JUL93	HEALTH & SAFETY PLAN AF 30JUL93														
2R25E22400 AS 26JUL93	CORPS OF ENGINEERS REVIEW/APPROVE AF 25AUG93							==							
2R25E22280 AS 2AUG93	EPA REVIEW WORK PLANS AF 26AUG93							==							
2R25E22370 AS 27AUG93	INCORP. EPA COMMENTS/RESUBMIT AF 10SEP93								==						
2R25E22380 AS 13SEP93	EPA APPROVE WORK PLAN/COMMENT AF 24SEP93									==					
		TITLE I/II DESIGN													
2R25E25101 AS 10FEB93	PREP/SEND DESIGN PKG RFP TO A/E AF 18FEB93			==											
2R25E25102 AS 18FEB93	A/E PREP./SUBMIT DESIGN PKG PROPOSAL AF 23MAR93			==											
2R25E25103 AS 26MAR93	A/E DESIGN PKG NEGOTIATION/AUTHORIZE AF 26APR93				==										
2R25E25105 AS 26APR93	DESIGN KICKOFF AF 26APR93														
2R25E25110 AS 26APR93	30% DESIGN & SPECS AF 8JUN93					==									
2R25E25115 AS 8JUN93	30%DESIGN/SPEC/EST REVIEW AF 10JUN93														
2R25E25130 AS 14JUN93	90% DESIGN & SPECS AF 28JUN93														
2R25E25120 AS 21JUN93	90% COST ESTIMATE AF 28JUN93														
2R25E25135 AS 29JUN93	FINAL DESIGN/SPEC/EST. REVIEW AF 2JUL93														
		SAFETY ASSESSMENT													
2R25E35801 AS 21JUN93	SAFETY ASSESSMENT AF 25JUN93														
		OPERATIONAL SAFETY REQUIREMENTS (OSR)													
2R25E44000 AS 26JUL93	OPERATIONAL SAFETY REQUIREMENTS (OSR) AF 26JUL93														
		IFB - CONSTRUCTION/PROCUREMENT ISSUE FOR BID													
2R25E74050 AS 7JUL93	CFC PACKAGE SUBMITTAL/APPROVAL - CONST. ENGINEER AF 7JUL93														
2R25E74102 AS 7JUL93	PREPARE RCA AF 7JUL93														
2R25E74055 AS 26JUL93	SUBMIT APPROVED CFC (CONST. PROCURE)/IFB BIDDERS AF 26JUL93														

6365

		1993											1994	
		FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	FEB	
		IFB - CONSTRUCTION PROCUREMENT ISSUE FOR BID												
2R25E74060	RECEIVE BIDS													
AS 26JUL93	AF 26JUL93													
2R25E74065	COMPLETE TECHNICAL EVALUATION						8							
AS 26JUL93	AF 28JUL93													
2R25E74100	APPROVAL PACKAGE PREPARATION							=						
AS 29JUL93	AF 4AUG93													
2R25E74105	OBTAIN PROCUREMENT MGMT. APPROVAL							=						
AS 5AUG93	AF 18AUG93													
2R25E74110	AWARD NOTIFICATION													
AS 19AUG93	AF 19AUG93													
2R25E74115	MOBILIZATION/PERFORMANCE BONDS							=						
AS 20AUG93	AF 30AUG93													
		REMEDIATION/REMOVAL												
2R25E81200	Predesign investigation Work Plan		=											
AS 18MAR93	AF 8APR93													
2R25E81202	Conduct GeoTechnical Boring Samples			=										
AS 12APR93	AF 23APR93													
2R25E81204	LAB ANALYSIS			=	=									
AS 14APR93	AF 28MAY93													
2R25E81208	Alternate Analysis				=									
AS 10MAY93	AF 18MAY93													
		FINAL REPORT/VERIFICATION												
2R25E86250	START REMOVAL CONSTRUCTION							◆						
AS 26AUG93														
2R25E86275	FIELD CONSTRUCTION							=						
AS 26AUG93	AF 24SEP93													
2R25E86300	FINAL REPORT/VERIFICATION											=	=	
AS 19OCT93	AF 15FEB94													
		EMERGENCY MAINTENANCE ACTIVITY												
2R25E87155	RELOCATE CONTROLLED AREA FENCE		=											
AS 12MAR93	AF 17MAR93													
2R25E87075	INITIATE MAINTENANCE RESPONSE		◆											
AS 15MAR93														
2R25E87102	EVALUATE/SELECT ALTERNATIVES		=											
AS 15MAR93	AF 19MAR93													
2R25E87150	OBTAIN SEDIMENT SAMPLES													
AS 15MAR93	AF 15MAR93													
2R25E87165	ESTABLISH BASELINE - EROSION MONITORING			=	=									
AS 15MAR93	AF 18MAY93													
2R25E87160	SAMPLE ANALYSIS			=	=									
AS 16MAR93	AF 18MAY93													
2R25E87103	OBTAIN X-SECTIONS		=											
AS 18MAR93	AF 26MAR93													
2R25E87104	PROCUREMENT			=	=									
AS 22MAR93	AF 19APR93													
2R25E87106	DEVELOP FIELD IMPLEMENTATION PLAN			=	=									
AS 22MAR93	AF 19APR93													
2R25E87110	INITIATE FIELD RESPONSE							◆						
AS 20APR93														
2R25E87111	MOBILIZATION													
AS 20APR93	AF 21APR93													
2R25E87115	CONSTRUCT ROAD							=						
AS 21APR93	AF 27APR93													
2R25E87118	BANK STABILIZATION CONSTRUCTION							=						
AS 27APR93	AF 4MAY93													
2R25E87125	COMPLETE EMERGENCY MAINTENANCE RESPONSE							◆						
AS 27APR93	AF 4MAY93													
2R25E87170	AS-BUILT DOCUMENTATION							=						
AS 5MAY93	AF 21MAY93													
2R25E87175	JOB CLOSE-OUT											=	=	
AS 24MAY93	AF 20AUG93													

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chosen consisted of raising the overall height of the first phase berm by approximately 3 to 5 feet. In the critical central portion of the berm, the top elevation was increased to between 540 and 542 feet MSL. Toe protection was also installed to insure the stability of the berm itself. The second phase construction activities were conducted from August 26 through September 24, 1993. The two figures on the following pages present the as-built erosion control measures in plan view and sections.

The stone berm and toe protection will be subject to inspection and maintenance until the IFAP is remediated. Inspections will be performed quarterly. It is anticipated that the inspections will sometimes identify the need to add stone to the toe protection. Stone has been stockpiled close to the IFAP for that purpose.

IV. FLOODPLAIN AND JURISDICTIONAL WATER IMPACTS

The DOE determined pursuant to the National Environmental Policy Act (NEPA) that the time critical removal action qualified for a categorical exclusion (CX) with respect to the floodplain (see Attachment 5).

A floodplain assessment was developed in support of this determination. That assessment (see Attachment 6) notes that the removal action impact upon the floodplain is limited to approximately 0.3 feet increase in water surface elevation during the 100 year flood. That potential elevation increase would widen the floodplain by about 2 feet in the vicinity of the erosion control measures.

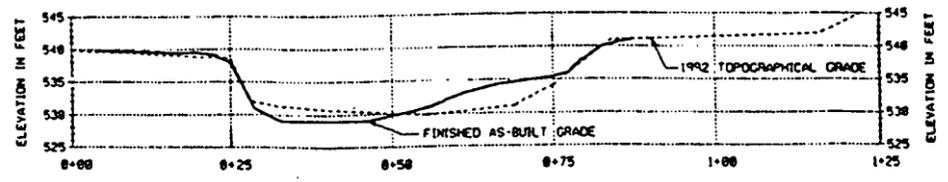
The impact to jurisdictional waters was determined to be covered under Nationwide Permit (NWP) 13. NWP 13 allows bank protection in a stream according to prescribed conditions to be performed without acquiring an individual permit under Section 404 of the Clean Water Act. Prior to each phase, information was submitted to the U.S. Army Corps of Engineers (COE) presenting the proposed erosion control measures. In both cases the COE provided a letter of compliance with NWP 13 for bank stabilization (see Attachments 7 and 8).

V. HEALTH AND SAFETY CONTROLS

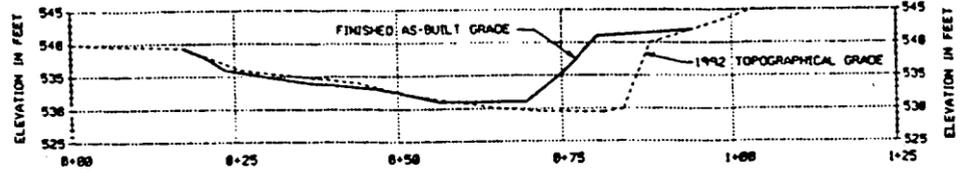
A Safety Assessment was performed for the first phase of the removal action in April 1993. Prior to the second phase, the construction drawings were reviewed and the initial Safety Assessment was determined to be sufficient for the second phase as well (see Attachment 9).

1. EXISTING CONDITIONS SHOWN ON THIS DRAWING WERE PREPARED FROM AS-BUILT SURVEY PERFORMED BY WOOLPERT CONSULTANTS, DATED NOVEMBER 5, 1993.

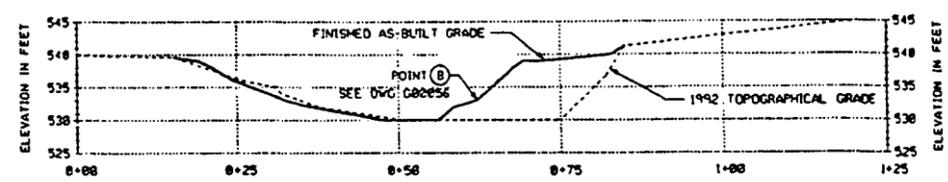
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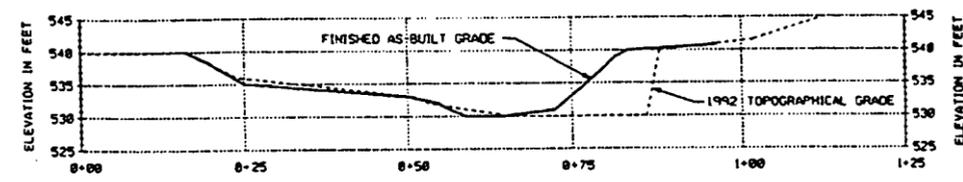
SECTION B REF (C88857) C88856



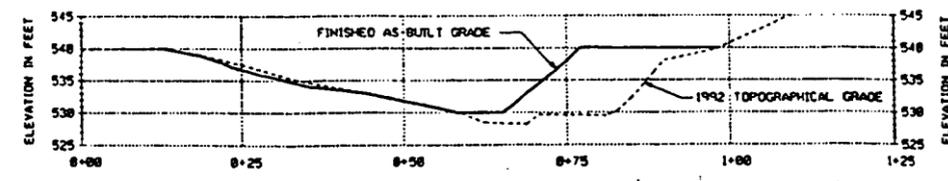
SECTION C REF (C88857) C88856



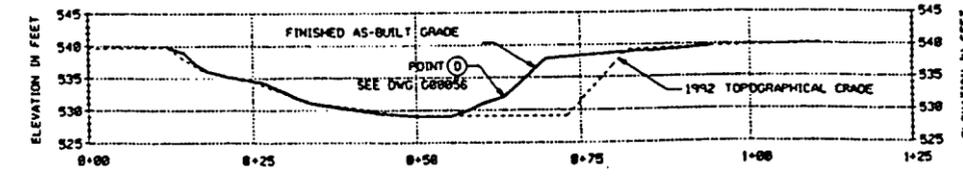
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SECTION E REF (C88857) C88856



SECTION F REF (C88857) C88856



SECTION G REF (C88857) C88856

REF DWG. NO.	DRAWING TITLE
92X-5900-G-00056	AS-BUILT SURVEY AT PADDY'S RUN

NO.	REVISION PURPOSE - DESCRIPTION	DATE	INITIALS AND DATE
0	AS-BUILT DRAWING		

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
PARSONS
 THE RALPH M. PARSONS CO. - PARSONS MAINT. INC. - ENGINEERING-SCIENCE, INC.
 CINCINNATI, OHIO

PROJECT NAME
EROSION CONTROL INACTIVE FLYASH PILE 0U2

DRAWING TITLE
CIVIL AS-BUILT CROSS SECTIONS AT PADDY'S RUN

DESIGNED BY R. LINDGREN	DATE 8/12/93	CHECKED BY [Signature]	DATE 8/13/93	DRAWN BY T. PICKERING	DATE 8/15/93
APPROVED FOR APPROVAL [Signature]			PROJECT CHG. APPROVAL [Signature]		

PROJECT NO. 92X-5900-G-00057
 SHEET NO. 00002 0

PROJECT NO.	92X-5900-G-00057
SHEET NO.	00002 0

The field work done for this removal action was consistent with the Project Specific Health and Safety plans for each phase. The plans recognize, evaluate, and present controls for identifiable safety and health hazards. In addition, they provide procedures for emergency response, hazardous operations and decontamination. The Project Specific Health and Safety Plans are included in Attachment 10 to this document.

VI. QUALITY CONTROL

During construction, quality control was performed by FERMC0's QC department according to all applicable quality control procedures. Title II design work was performed by Parsons engineering staff and followed Parsons' internal quality control procedures.

VII. COST

The cost for the implemented removal action was approximately \$293,000 as shown in the table at the top of the next page. This includes engineering by Parsons, construction labor through Wise and Rust, Fermco labor, teaming partner labor, construction materials costs, and other miscellaneous costs for both the first phase and the second phase. This does not include any costs for subsequent inspection and maintenance of the erosion control measures. The first and second phase costs are significantly lower than the estimated cost for the originally proposed alternative. That alternative, relocation of Paddys Run, was estimated to cost \$2,658,000 (as presented in Attachment 11).

VIII. CONCLUSIONS

Based on performance observations to date, the erosion protection system implemented as Removal Action No. 29 is performing as planned. Continued inspection and maintenance is anticipated to be required to maintain overall system integrity.

EROSION CONTROL AT INACTIVE FLYASH PILE COSTS AS OF JANUARY 1994			
DESCRIPTION	FY 93	FY 94	TOTAL
MATERIALS	-4249	25016	\$20,767
OTHER DIRECT COSTS	\$7,673	\$0	\$7,673
HALLIBURTON NUS	\$2,093	(\$414)	\$1,679
FLUOR DANIEL	\$15,954	(\$3,597)	\$12,357
JACOBS	\$0	\$896	\$896
PARSONS	\$145,294	\$17,185	\$162,479
RUST	\$29,701	\$0	\$29,701
ERA	\$999	\$2,972	\$3,971
WISE	\$12,244	\$392	\$12,636
TEMPORARIES	\$84	\$0	\$84
SUBCONTRACTS (NOT MAINT.)	\$0	\$35	\$35
LABOR	\$35,444	\$1,814	\$37,258
G&A	\$2,305	\$939	\$3,244
TOTAL	\$247,542	\$45,238	\$292,780

Page 1

Page 2

Page 3

Page 4

Page 5

Page 6

Page 7

Page 8

Page 9

Page 10

Page 11

Page 12

Page 13

Page 14

Page 15

Page 16

Page 17

Page 18

Page 19

Page 20

Page 21

Page 22

Page 23

Page 24

Page 25

Page 26

Page 27

Page 28

Page 29

Page 30

Page 31

Page 32

Page 33

Page 34

Page 35

Page 36

ATTACHMENT 1

Letter from N. C. Kaufman/FERMCO to T. J. Rowland/DOE
dated March 9, 1993 (Letter No. C:OP:93-339)



102.1

P.O. Box 398704 Cincinnati, Ohio 45239-8704 (513) 738-6200

March 9, 1993

U. S. Department of Energy
Fernald Environmental Management Project
Letter No. C:OP:93-339

Mr. Thomas J. Rowland, Acting Manager
DOE Field Office, Fernald
P. O. Box 398705
Cincinnati, Ohio 45239-8705

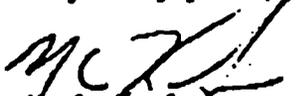
Dear Mr. Rowland:

CONTRACT DE-AC05-92OR21972, REMOVAL SITE EVALUATION - EROSION CONTROL AT INACTIVE FLYASH PILE

This letter transmits, for your review, a draft Removal Site Evaluation and a draft Removal Action Memorandum for the proposed Paddy's Run Erosion Control Removal Action. The attached documents have been completed in a format consistent with the direction provided in the National Contingency Plan and as detailed in Letter, DOE-930-90, Raymond J. Hansen to M. B. Boswell, "CERCLA Removal Actions", dated April 23, 1990.

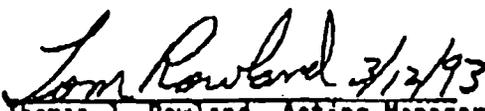
This letter also requests DOE concurrence to put into effect interim erosion protection measures while the Removal Site Evaluation process is being effected. This would be accomplished as an emergency maintenance activity as detailed in Letter, WMCO:EMT:90-535. This action is necessary as a result of the inherent uncertainties in the rate of future erosion and the inability to predict the nature or timing of potential discharge of waste to Paddy's Run.

Very truly yours,


N. C. Kaufman
President

STG:epm
Attachment

CONCURRENCE:


Thomas J. Rowland, Acting Manager
JR
3/16/93

DRAFT

Mr. N. C. Kaufman, President
Fernald Environmental Restoration
Management Corporation
P. O. Box 398704
Cincinnati, Ohio 45239-8704

Dear Mr. Kaufman:

REMOVAL ACTION MEMORANDUM: EROSION CONTROL AT THE INACTIVE FLYASH PILE

The enclosed Removal Site Evaluation for the proposed Paddy's Run Erosion Control Removal Action has been reviewed by my office. Based on this review, DOE has determined that this project currently constitutes a time-critical Removal Action as defined in the National Contingency Plan. The Administrative Record for the Remedial Investigation/Feasibility Study should include this document.

FERMCO and the DOE Site Office should cooperatively work to complete the following tasks to implement this action.

1. Evaluate three remedial measure alternatives as follows:
 - Streambank stabilization system (filled bulkhead)
 - Streambank stabilization system (revetment system)
 - Recontouring of streambank slope with erosion control measures
2. Perform predesign field investigation (PFI), geotechnical laboratory analysis; data evaluation to evaluate the three remedial measure alternatives discussed above; selection of the preferred alternative; and perform final design. Alternative selection shall be approved by the DOE, U.S.EPA, and OEPA.
3. Implement the selected remedial control measure.

FERMCO shall submit an evaluation of alternatives by May 14, 1993 and complete design of the preferred alternative by July 2, 1993. An objective is to start remedial construction by August 30, 1993.

If you have any questions, please contact J. W. Reising of my staff at extension 9083.

Sincerely,

Thomas J. Rowland
Acting Manager

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c: J. Craig
J. Reising
P. Yerace
A.R. Files

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REMOVAL SITE EVALUATION-
EROSION CONTROL AT THE INACTIVE FLYASH PILE

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY

MARCH 1993

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INTRODUCTION

As part of the FEMP's environmental investigation and cleanup, the site has been divided into five Operable Units. The Inactive Flyash Pile (IAFAP), a subunit of Operable Unit 2, is located approximately 2000 feet southwest of the former FEMP production area and covers approximately 5 acres (See Figures 1 & 2). Its western boundary, in part, is defined by Paddys Run which parallels the area for approximately 200 feet. Access Road B and a natural drainage ditch leading to Paddys Run form the IAFAP's northern border. As part of the U.S. EPA/DOE Amended Consent Agreement, chain barrier fencing and radiological "Controlled Area" signs have been installed around the entire surface area of the IAFAP and the South Field Disposal area located to the east.

Flyash and bottom ash (hereafter referred to as flyash) from the FEMP's coal-fired boiler plant and other materials were deposited in the IAFAP area from 1952 to approximately 1968. The total quantity of ash (30% flyash and 70% bottom ash) disposed in this area has been estimated at 78,500 CY (OU2 RI, October 1992). Although the area has been covered with soil, and natural vegetation has developed, materials such as concrete, steel drum lids and asbestos containing transite are visible at the surface. These materials are particularly evident along the IAFAP and Paddys Run border where geomorphological processes (e.g., erosion due to intermittent stream flow) have impacted the eastern stream bank. In this area, the nearly vertical side walls of the stream bank extend from the stream bed up approximately 15 feet to the vegetated bank near the toe of the IAFAP. The chain barrier fence is offset approximately 2 feet from the top of the stream bank (See Figure 3).

During recent months, above average precipitation has caused a stream flow condition that has accelerated the rate of stream bank erosion. In some locations adjacent to the IAFAP, the sand and gravel side walls of the stream bank have been undercut to form an overhang of soil above it. Portions of the stream bank have slumped into the stream channel in at least three locations.

Although the IAFAP is currently intact, continuation of the erosion process at the current rate (i.e., small and slow displacements of soil) could eventually undermine the pile's western slope (estimated 1h:1v) and may, over time, result in discharge of ash and potentially contaminated waste and fill into Paddys Run. This particular stretch of Paddys Run represents one of the streams most prominent meanders. It is in the outside bend of this meander where the stream velocities are greatest and where turbulent currents are generated. These currents are impacting toe support and may render a portion of the IAFAP's western slope susceptible to a slope failure. A slope failure could potentially deposit large quantities of waste and fill material into the stream channel.

This Removal Site Evaluation (RSE) is being initiated by the Department of Energy under authority delegated by Executive Order 12580 under Section 104 of CERCLA and is consistent with Section 300.410 of the National Contingency Plan (NCP). The RSE is being conducted to determine whether conditions are present to warrant the implementation of a CERCLA Removal Action to stabilize the impacted stream bank or take other actions compatible with the proposed final remedial action.

SOURCE AND NATURE OF THE THREAT OF A RELEASE

A comprehensive radiological survey of the Inactive Flyash Pile/South Field Disposal area was completed by DOE-FN on April 30, 1992. In accordance with the US DOE Radiological Control Manual definition for "contaminated areas", Geiger-Mueller (G-M) probes and Micro R Meters were used to identify surface areas having gross beta/gamma readings of greater than 1000 DPM/100 cm² and gamma radiation levels exceeding 20 uR/hr above background. Site background levels were established for soils at 60 cpm and 10 micro R/hr respectively. Based on these criteria, eight "contaminated areas" were identified as having fixed or removable contamination exceeding 1000 DPM/100 cm² or 20 uR/hr above background. Two of these areas (See Figure 4) are located in the soil cover near the impacted area on top of the IAFAP. Aerial photography indicates soil fill material may have been placed in this area prior to flyash placement. The nature and extent of the soil fill material is not well documented.

Analytical data for the underlying soil/fill obtained during the Operable Unit 2 Remedial Investigation show levels of radionuclide contamination which may pose a threat to an individual or individuals exposed to this material. Uranium, the primary contaminant in the IAFAP, has been measured as high as 873 ppm in the soil fill below the flyash and at levels near 26,600 ppm in surface soils (See Figures 5 & 6). Exposed debris along the slope of the IAFAP's western face may also contain fixed radiological contamination. In accordance with Ohio Administrative Code 3745-30, analytical results (See Tables I & II) for samples obtained strictly of flyash indicate that the ash may be considered non-toxic.

There are three mechanisms for slope failure:

- 1) Circular Arc Failure
- 2) Wedge Failure
- 3) Creep.

Of the above, creep is believed to be the least likely failure mode due to the root support from the vegetation on the ash pile slope. Both the circular arc and wedge failure modes are extremely rapid with little advance warning. Postulated failure surfaces are illustrated in Figure 3. Both could result in a large uncontrolled discharge to Paddys Run.

EVALUATION OF THE MAGNITUDE OF THE POTENTIAL THREAT

There is uncertainty in predicting when a slope failure might occur. Based on the field conditions currently observed at the inactive ash pile, the following may be concluded:

- 1) total elevation differences from the stream channel to the IAFAP toe and from the stream channel to the head of the IAFAP are 15 feet and 45 feet respectively; the slope of the IAFAP's western dumping face is approximately 45 degrees,
- 2) the degree to which particle bonding has occurred between the flyash and the

underlying soil fill, and the soil fill and the native soil is unknown,

- 3) perched water, which has been observed in the area, can induce pore water pressures that change effective stress and reduce soil shear strength,
- 4) stream flow has eroded the stream bank, this bank contributes to the stability of the IAFAP's western slope,
- 5) two of three monitoring stakes, placed perpendicularly and three feet into the bank closest to the IAFAP on September 29, 1992 were observed to have been washed away on February 10, 1993, this corresponds to an estimated erosion of 0.75 ft./month (i.e., a total of three feet) and significantly exceeds the total erosion observed during the previous two year period. Prior to September the undercut erosional surface was observed to be a dense silty sand; the undercut erosion now extends into a loose sand and gravel layer in the bank.

The above conditions suggest that stream bank erosion in Paddys Run will continue, even during low flow conditions. As erosion continues, undercutting of the IAFAP will increase the susceptibility of this area to slope displacements that may result in sliding. If this occurs, there is a potential that IAFAP waste may be discharged into the stream channel. The primary release pathways to environmental or human receptors associated with this type of discharge are as follows:

- 1) Surface Water - transport of contamination off-site via Paddys Run.
- 2) Groundwater - Paddys Run has eroded through the glacial till downstream of the IAFAP and is in direct contact with the sand and gravel deposits of the Great Miami Aquifer. Contamination in surface water may be transported directly into the aquifer via this pathway.
- 3) Air - fugitive dust emissions from resuspended ash or dust particles from waste materials.

ASSESSMENT OF THE NEED FOR A REMOVAL ACTION

Section 40 CFR 300.415 (b)(2) of the NCP defines eight factors which should be considered in determining the appropriateness of a removal action. Three of these factors, listed below, are specifically applicable to this assessment.

40 CFR 300.415 (b)(2)(i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.

40 CFR 300.415 (b)(2)(ii) Actual or potential contamination of drinking water supplies or sensitive ecosystems.

40 CFR 300.415 (b)(2)(v) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released. (e.g., storm waters)

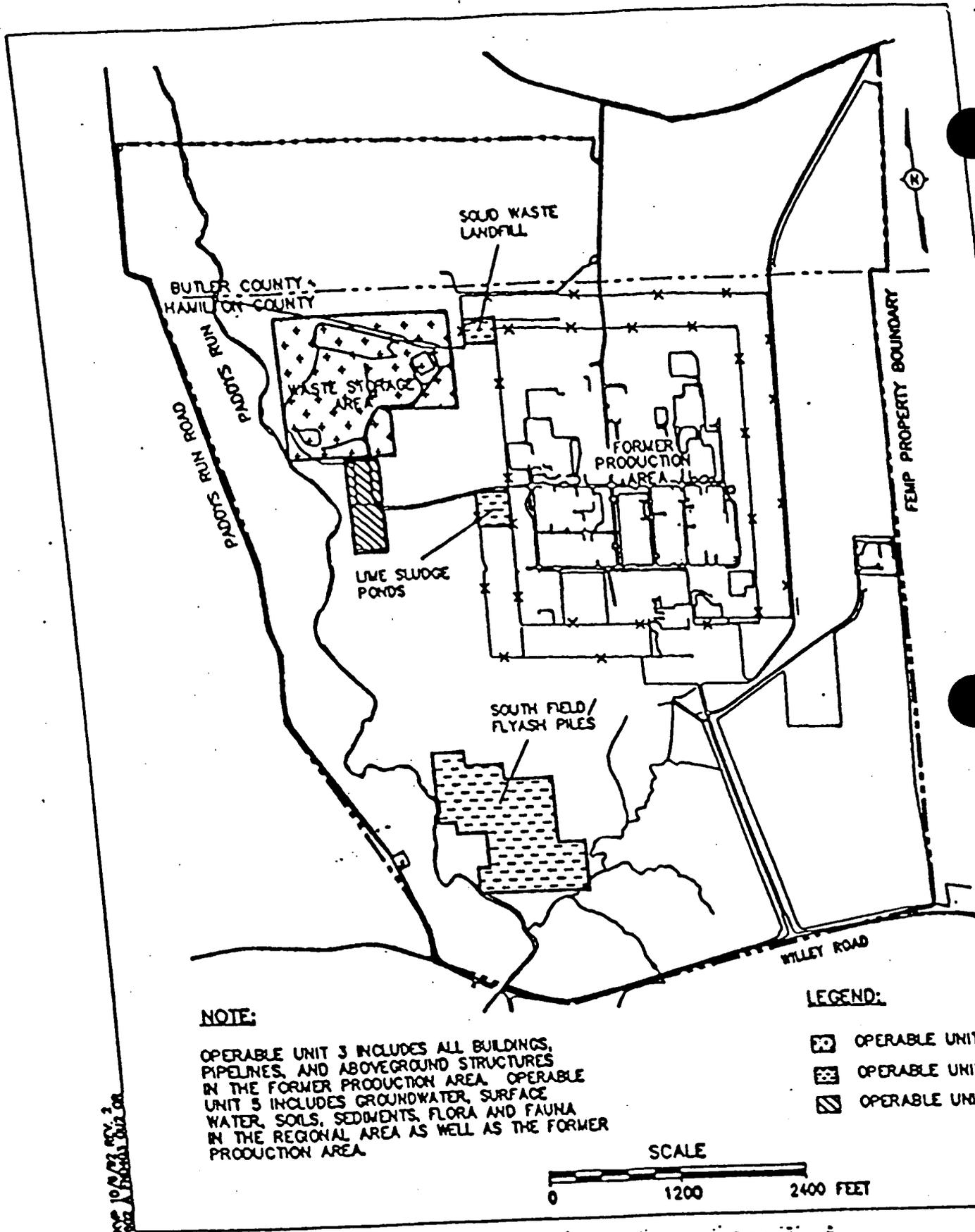
These factors are considered appropriate as a result of the continued erosion of the stream bank adjacent to the IAFAP and the potential release of contamination if slope failure of the IAFAP's western slope were to occur.

APPROPRIATENESS OF A RESPONSE

If it is determined that a response action is appropriate due to potential exposure to or threat of release of contaminants or hazardous substances, a removal action to address the existing conditions and the possibility of releases to the environment may be required. All documentation relevant to removal action implementation will be included in the CERCLA Administrative Record.

If a planning period of less than six months exists prior to initiation of a response, DOE will issue an Action Memorandum. The Action Memorandum will describe the selected response and provide supporting documentation for the decision.

If it is determined that there is a planning period greater than six months before a response is initiated, DOE will issue an Engineering Evaluation/Cost Analysis (EE/CA) approval memorandum. This memorandum is to be used to document the threat to public health and the environment and to evaluate viable alternative response actions.



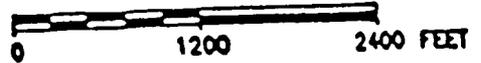
NOTE:

OPERABLE UNIT 3 INCLUDES ALL BUILDINGS, PIPELINES, AND ABOVEGROUND STRUCTURES IN THE FORMER PRODUCTION AREA. OPERABLE UNIT 2 INCLUDES GROUNDWATER, SURFACE WATER, SOILS, SEDIMENTS, FLORA AND FAUNA IN THE REGIONAL AREA AS WELL AS THE FORMER PRODUCTION AREA.

LEGEND:

-  OPERABLE UNIT 1
-  OPERABLE UNIT 2
-  OPERABLE UNIT 3

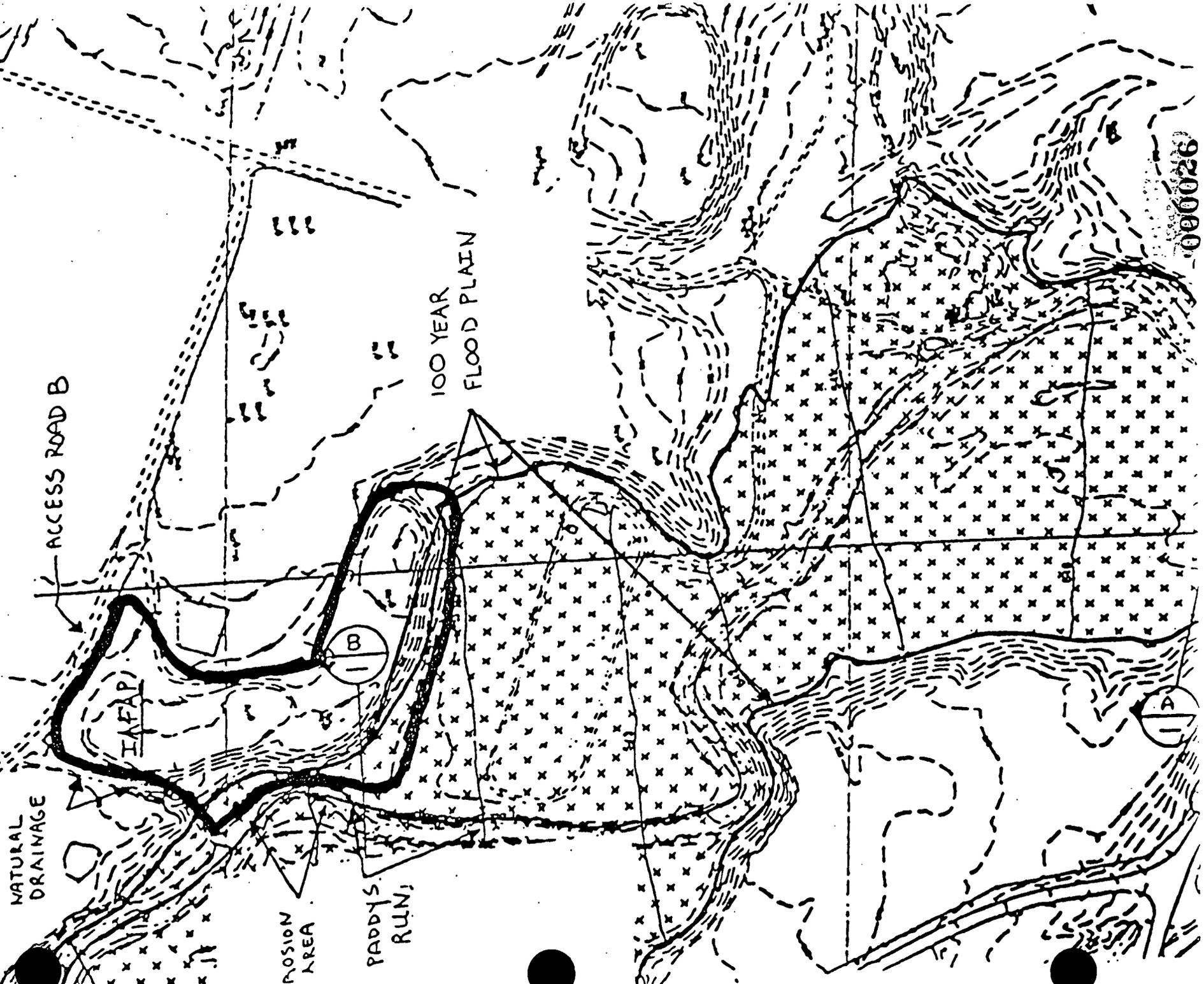
SCALE



MAP 10/23/83 REV. 3
 BY A. B. H. 10/23/83

Figure 2

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Figure 3
Cross Section - Paddys Run/Inactive Flyash Pile
(Not To Scale)

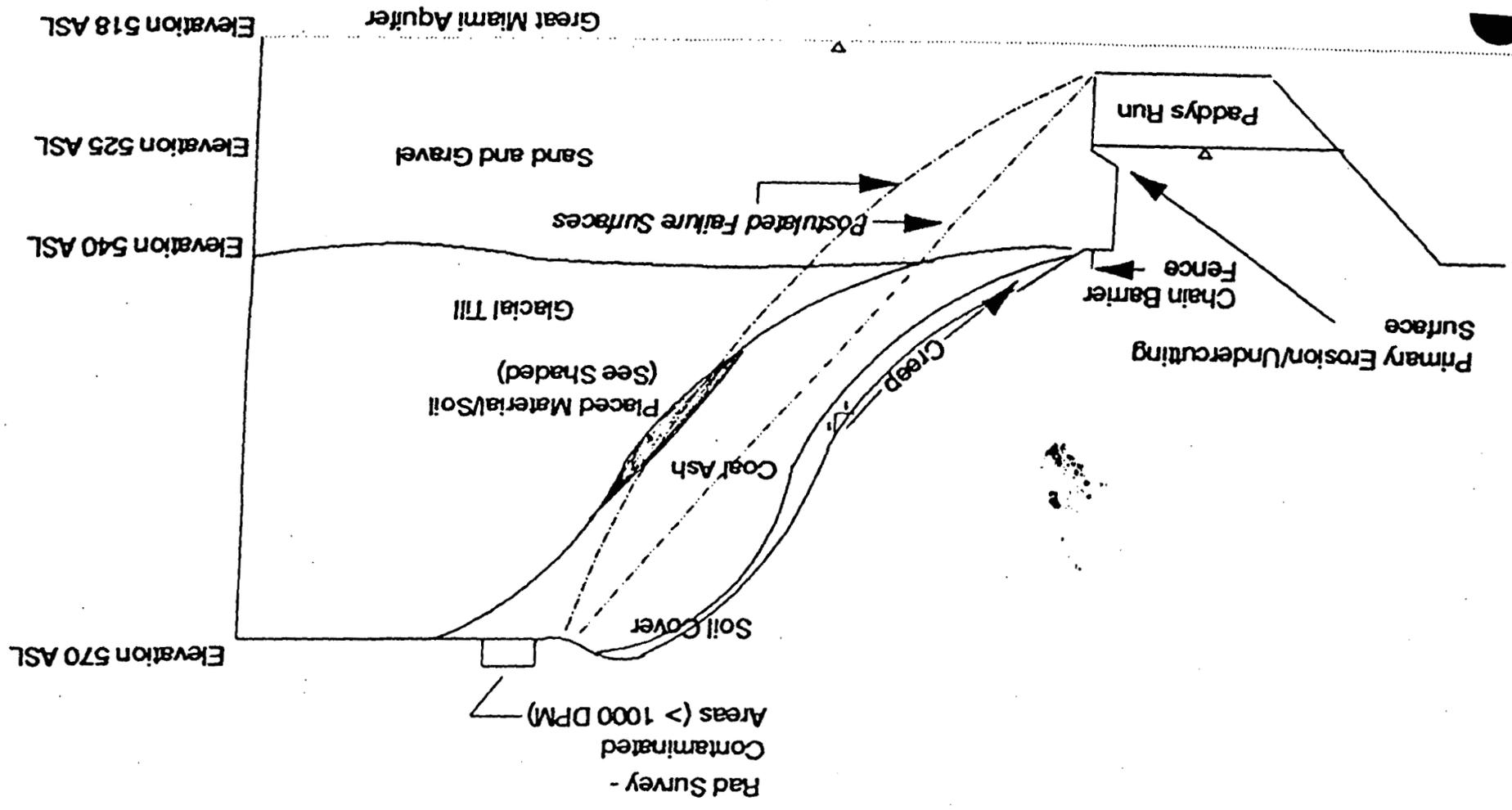
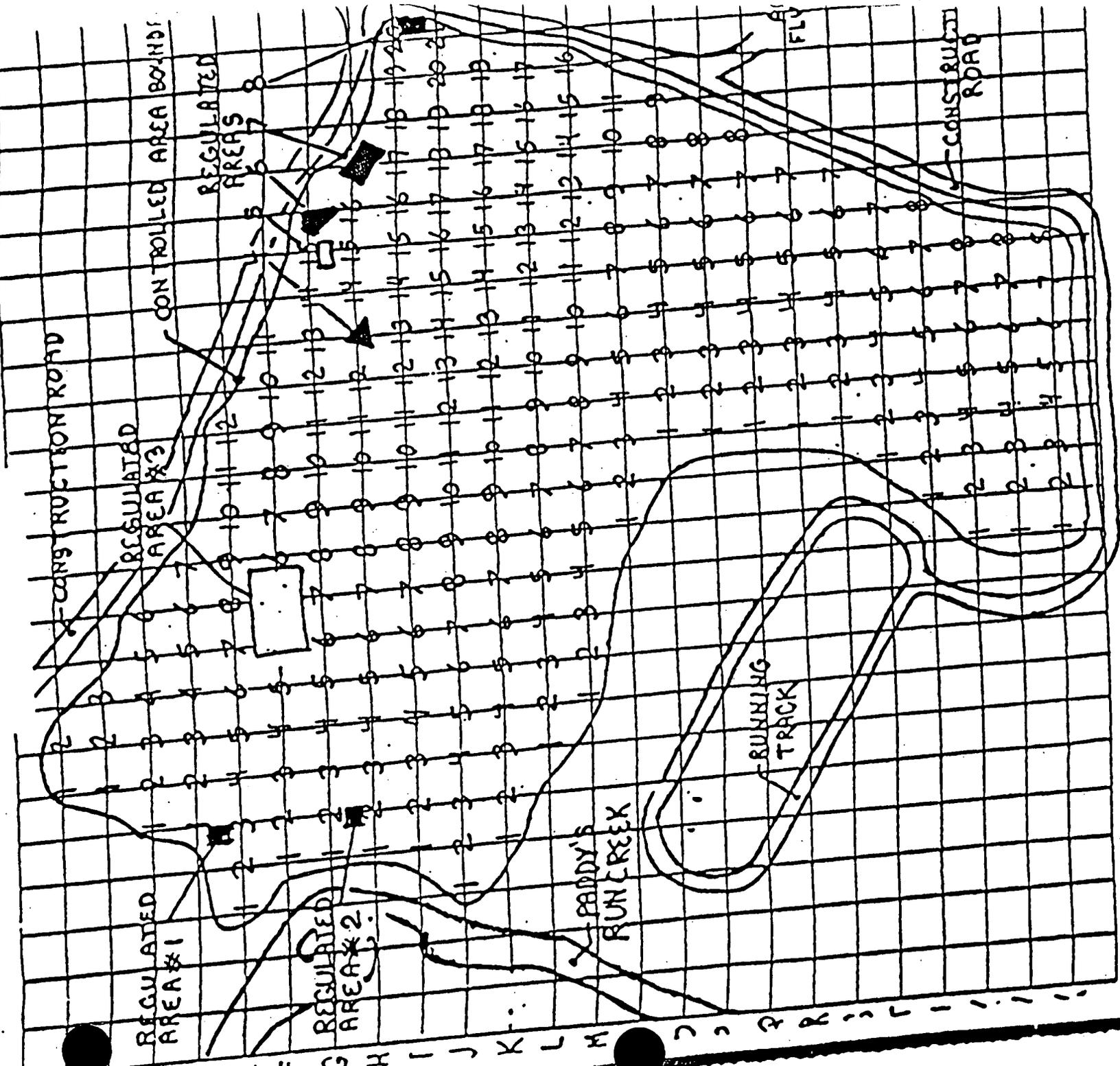


FIGURE 4

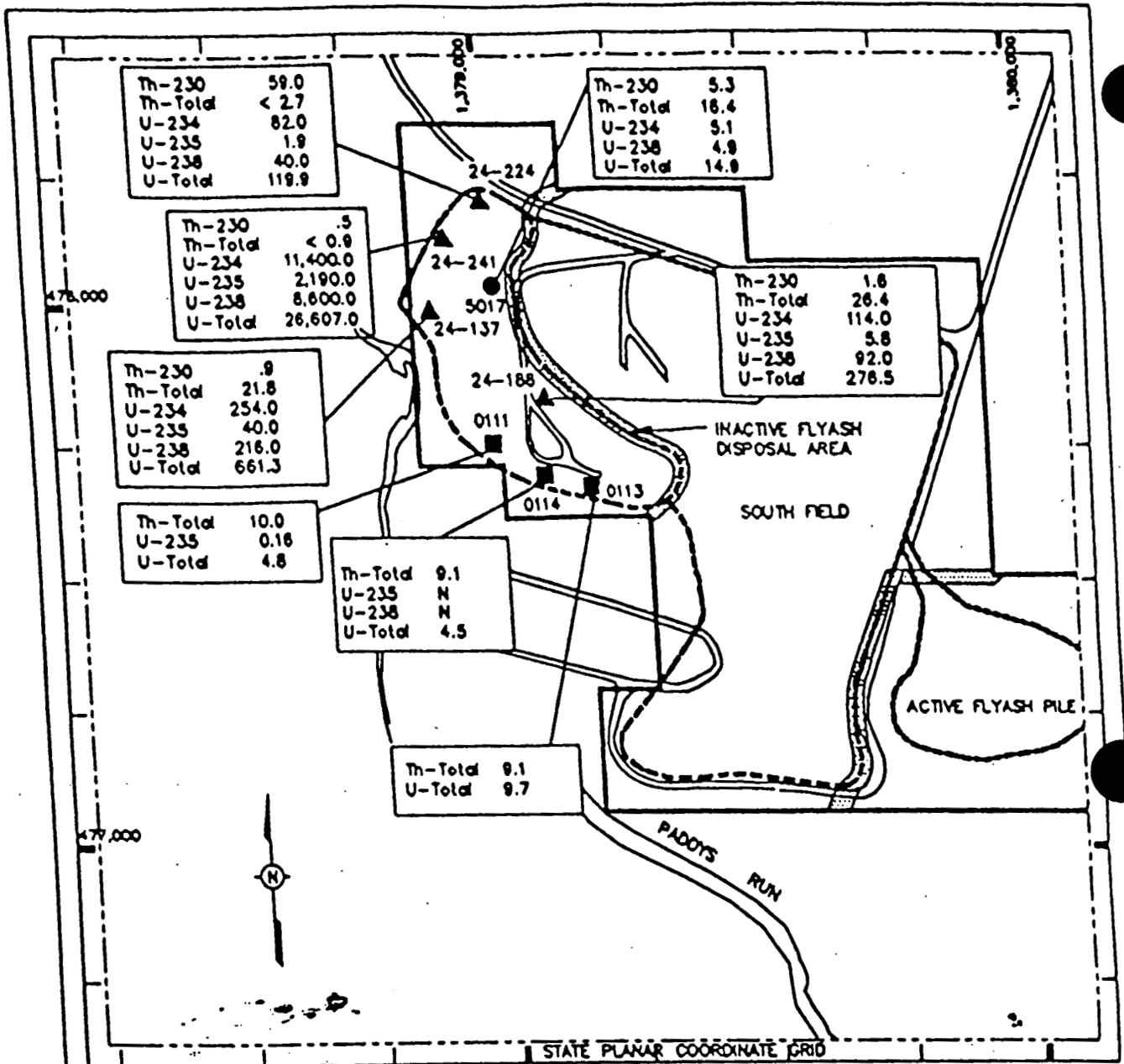
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- - PREVIOUSLY ESTABLISHED REGULATED AREAS
- - NEWLY ESTABLISHED REGULATED AREAS

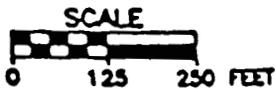
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Figure 5



NOTES:

1. ALL RESULTS EXCEPT TOTAL URANIUM GIVEN IN pCi/g
2. TOTAL URANIUM VALUES ARE GIVEN IN mg/kg
3. NA DENOTES NOT ANALYZED
4. N DENOTES NO VALUE REPORTED
(NUCLIDE NOT IDENTIFIED BY GAMMA ANALYSIS)



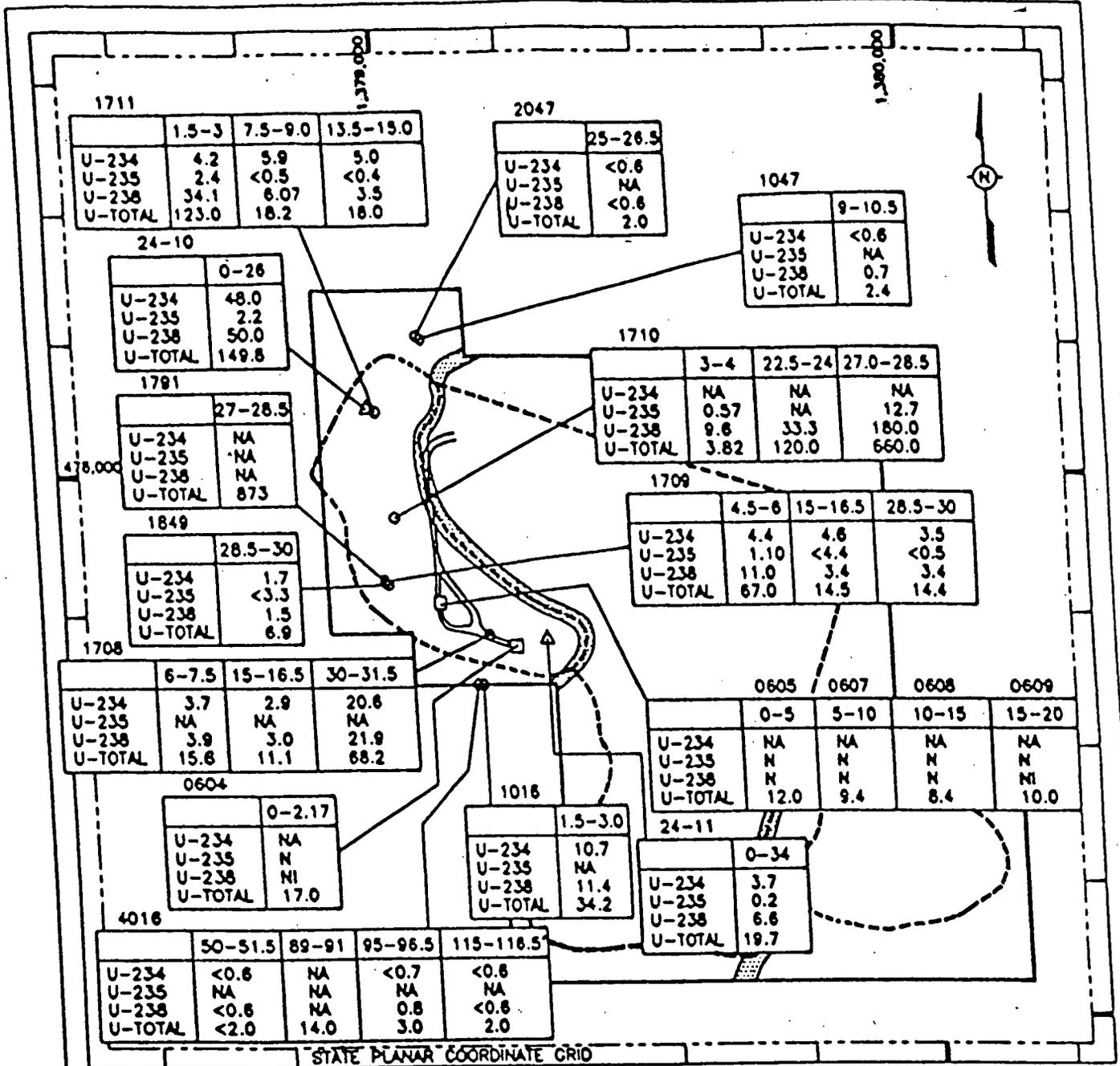
LEGEND:

SURFACE SAMPLE LOCATIONS:

- ES
- ▲ GS
- RI/FS
- EXTENT OF FILL
- FLYASH/SOUTH FIELD BOUNDARY
- ▨ BOUNDARY BETWEEN FLYASH PILES AND SOUTH FIELD
- - - OPERABLE UNIT 2 STUDY AREA

URANIUM AND THORIUM CONCENTRATIONS IN SURFACE MEDIA IN THE INACTIVE FLYASH PILE

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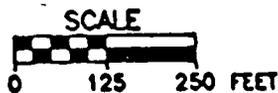


NOTES:

1. U-234, U-235, AND U-238 ARE GIVEN IN pCi/g
2. TOTAL URANIUM GIVEN IN mg/kg
3. NA DENOTES NOT ANALYZED
4. N DENOTES NO VALUE REPORTED (NUCLIDE NOT IDENTIFIED BY GAMMA ANALYSIS)
5. NI DENOTES THAT VALUE DID NOT EXCEED ROOM BACKGROUND LEVEL FOR NUCLIDE IDENTIFIED BY GAMMA ANALYSIS SAMPLE SPECTRUM

LEGEND:

- SUBSURFACE SAMPLING LOCATION**
- ES BORING
 - △ CIS BORING
 - RI/FS BORING
 - EXTENT OF FILL
 - FLYASH/SOUTH FIELD BOUNDARY
 - OPERABLE UNIT 2 STUDY AREA
 - ▨ BOUNDARY BETWEEN FLYASH PILES AND SOUTH FIELD



MAP 10/16/92 REV. 2
 BY A. BRADY AND J. J. COOKE

URANIUM CONCENTRATIONS IN SUBSURFACE MEDIA SAMPLES IN THE INACTIVE FLYASH PILE STUDY AREA

TABLE I

RI/FS RADIOLOGICAL ANALYTICAL RESULTS
FOR ASH SAMPLES OBTAINED
FROM INACTIVE FLYASH PILE

Element	Concentration Range (ppm)	Average (1) Concentration (ppm)	Typical Element Concentrations for Flyash Samples from Bituminous Coal (ppm) (2)
Total Uranium	11.1 - 38.2	19.5	9.0 - 30.1
Total Thorium	16.3 - 28.0	22.4	20 - 50

Radionuclide	Concentration Range (pci/g)	Average (1) Concentration (pci/g)	Reference Data Provided By EPRI for Eastern Bituminous Flyash (pci/g) (3)
U ₂₃₈	3.0 - 9.6	5.2	1.7 - 6.7
Th ₂₃₀	2.7 - 6.9	4.1	---
Th ₂₃₂	1.8 - 3.1	2.5	1.4 - 3.7
Ra ₂₂₆	2.3 - 4.1	3.0	1.4 - 5.3
Ra ₂₂₈	2.2 - 3.1	2.6	---

- (1) Results obtained using radiochemical procedures and analytical methods developed by IT Laboratory.
- (2) Oak Ridge National Laboratory and Virginia Polytechnic Institute studies of element concentrations for flyash samples from the Kentucky coal region (ORNL, David Klein, 1975; VPI, Furr, Parkinson et. al)
- (3) EPRI: Electric Power Research Institute, from Radco Corporation "A Radio-Chemical Survey of U. S. Coals and Coal Combustion By-Products", September, 1982.

TABLE II

**RI/FS INORGANIC
ANALYTICAL RESULTS FOR
ASH SAMPLES OBTAINED
FROM INACTIVE FLYASH PILE**

Element	Concentration (1) Range (ppm)	Typical Element(2) Concentrations for Flyash Samples from Bituminous Coal (ppm)
Arsenic	7.1 - 74.8	79 - 110
Barium	252 - 892	465 - 769
Cadmium	<0.49 - 1.3	0.2 - 8.0
Chromium	5.1 - 19.6	162 - 300
Lead	6.7 - 67.1	19 - 80
Mercury	<0.12 - 0.18	0.05 - 0.1
Selenium	0.74 - 4.1	16 - 25

- (1) Results obtained based on solid waste test methods outlined in U.S. EPA CLP "Statement of Work," March 1990. The results are total concentrations and do not include TCLP extraction results.
- (2) Oak Ridge National Laboratory and Virginia Polytechnic Institute studies of element concentrations for flyash samples from the Kentucky coal region (ORNL, David Klein, 1975; VPI, Furr, Parkinson et. al)

ATTACHMENT 2

Paddys Run Relocation
West Side of the Inactive Flyash Pile

6120 South Gilmore Road
Fairfield Executive Center
Fairfield, OH 45014
(513) 870-0300
FAX (513) 870-0444

February 1, 1993
PARSONS ID#: 02:047:206:0046-93

Mr. James B. Williams
CERCLA/RCRA Unit 2 Director
Fernald Environmental Restoration
Management Corporation
P.O. Box 398704
Cincinnati, OH 45239-8704

Subject: CERCLA/RCRA UNIT 2, Paddy's Run Relocation Study
Project Order 47 (PO-47)
Inactive Flyash Pile/Other South Field
Disposal Areas
FERMCO Subcontract No. 2-21487
PARSONS Environmental Remedial Action Project

Ref: Letter No: 02:047:206:0028-93, dated January 22, 1993,
from Talukder to Williams

Dear Mr. Williams:

PARSONS transmitted the Paddy's Run Relocation Study by the
referenced letter. However, with an inadvertent error on our part,
the narrative part of the attachment was not sent with the
referenced letter.

Attached is the Paddy's Run Relocation Study with all the
attachments for your information.

I apologize for any inconvenience it might have caused.

Please call me at 870-8274 if I can be of further assistance.

Very truly yours
PARSONS

S. K. Talukder
Sukomal K. Talukder
Project Manager, CRU-2

SKT:nl

Attachment

c: FERMCO: S. Garland /
A. Guillen
L. Henke w/o attach.
C. L. North w/o attach.

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PARSONS: D. C. Wright w/o attach.
H. Rao
B. Yeates
Y. Afshar
E. Kubrin
F. Claveau
J. Gretsich
D. Dornoff

CRU-2 Project Files 2.3.3.a

DC Code 7 Project Order-Related Documents:

Document Control

R. Duda
R. Glenn
D. Holleman
W. Hedzik
F. Gruber
S. Goldberg
G. Ossmann
J. Golyski
J. Cooper
S. Nelson
A. Claveau
S. Hammitt
S. Barreras
S. Mallette
R. Zieminski
B. Harvey
T. Pyrz

**Paddy's Run Relocation
West Side of the
Inactive Fly Ash Pile**

**Environmental Remedial Action Project
Fernald Environmental Management Project
Fernald, Ohio**

**FERMCO Subcontract No. 2-21487
January 1993
Revision A**

Operable Unit 2, Project Order 47



**Fairfield Executive Center
6120 South Gilmore Road
Fairfield, Ohio 45014**

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Paddy's Run Relocation
West Side of the Inactive Fly Ash Pile

CONTENTS

SECTION

1.0 Introduction 1-1

2.0 Objective 2-1

 2.1 Study Scope 2-1

 2.2 General Information 2-2

 2.3 Recommendations 2-3

 2.4 Relationship of this Project to Other Projects 2-4

LIST OF ACRONYMS AND ABBREVIATIONS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COE	United States Army Corps of Engineers
DOE	United States Department of Energy
FEMA	Federal Emergency Management Agency
FEMP	Fernald Environmental Management Project
IFAP	Inactive Fly Ash Pile
NEPA	National Environmental Policy Act
OSFDA	Other South Field Disposal Areas
OU	Operable Unit
US EPA	United States Environmental Protection Agency

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SECTION 1**INTRODUCTION**

Remediation of the Fernald Environmental Management Project (FEMP), located near Fernald, Ohio, is being performed pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The FEMP is divided into five operable units (OUs) to facilitate the remediation activities. Operable Unit 2 is defined as the Active Fly Ash Pile, Inactive Fly Ash Pile/Other South Field Disposal Areas (IFAP/OSFDA), North and South Lime Sludge Ponds, Solid Waste Landfill, berms, liners, and associated contaminated soil within the OU boundary. The IFAP/OSFDA are in the southwest corner of the FEMP site and very close to Paddy's Run.

It has been observed that the west side of the IFAP has been eroded by Paddy's Run. Further erosion would cause the IFAP to slough off into Paddy's Run.

SECTION 2

OBJECTIVE

The objective of this effort is to provide a conceptual engineering study with a recommendation to prevent Paddy's Run from undermining the west side of the IFAP.

2.1 Study Scope

2.1.1 Physical Description

The IFAP occupies approximately 16.7 acres. It is bounded on the south and west by Paddy's Run Road and on the east and north by a gravel access road.

Along the west side of the IFAP, Paddy's Run flows toward the pile and curves southward adjacent to the toe of the pile's slope. Paddy's Run has eroded a part of the existing bank (approximately 150 feet) near the pile.

The IFAP is presently covered with vegetation. The pile contains approximately 50,000 cubic yards (38,000 cubic meters) of fly ash from the coal-fired boiler plant. Waste oils contaminated with uranium were applied to the fly ash for dust control. It is estimated that 2,200 pounds (1,000 kg) of uranium are present because of the spreading of these oils. The pile also contains building rubble including concrete, gravel, asphalt, masonry, and steel reinforcing bars.

Paddy's Run was relocated at least twice. In 1961-62, it was diverted away from Waste Pit 3. In the early 1970s, it was relocated again to prevent the erosion of Paddy's Run Road.

2.1.2 Discussion of Study

Three alternatives to prevent undercutting of the IFAP are evaluated and the best alternative is recommended.

2.1.3 Alternate 1 (See Drawings G-01173 and G-01175 Attached)

Alternate 1 consists of relocating the existing channel 91.5 feet to the west—a distance sufficient to install the proposed improvements and leave a 33-foot "bench" between the top of the channel and the toe of a future multi-layered cap.

Depth of the new channel will accommodate a 25-year flood.

2.1.4 Alternate 2 (See Drawings G-01174 and G-01175 Attached)

Alternate 2 consists of relocating the existing channel of Paddy's Run 91.5 feet to the west—a distance sufficient to install a new channel, a 50-foot "bench," and a vertical cantilevered reinforced concrete retaining wall on the east side. The channel will carry the flow of a 25-year flood.

2.1.5 Alternate 3 (See Drawings G-01196 and G-01198 Attached)

Alternate 3 consists of relocating the existing channel of Paddy's Run 105 feet to the west so that the channel relocation alignment will be straight and the top of the new channel will be far enough away (about 65 feet) from the toe of a future multi-layered cap to assure no future undercutting.

2.2 **General Information**

The following wetlands, National Environmental Policy Act (NEPA), county ordinances, erosion protection laws, and floodplain information is provided here for general information.

2.2.1 Wetlands

Section 404 of the Clean Water Act requires that anyone interested in depositing dredged or fill material into "waters of the United States, including wetlands," must receive authorization for such activities. The United States Army Corps of Engineers (COE) has been assigned responsibility for administering the Section 404 permitting process. Activities in wetlands for which permits may be required include, but are not limited to:

- 1) Placement of fill material.
- 2) Ditching activities when the excavated material is sidecast.
- 3) Levee and dike construction.

The final determination of whether an area is a wetland and whether the activity requires a permit must be made by the appropriate COE District Office. Depending on the scope of the relocation, a nationwide permit may exist which would alleviate the need for a specific determination.

2.2.2 NEPA

In accordance with DOE's regulations for the implementation of NEPA (10 CFR 1021), an Environmental Assessment may be required for the Paddy's Run relocation.

2.2.3 County Ordinances

A county agency that has jurisdiction over drainage ditches may require notification of the relocation. The relocation may need to comply with county ordinances or specific construction and maintenance requirements.

2.2.4 Erosion Protection Laws

The Paddy's Run relocation may be affected by the Hamilton County Earth Work Regulations that address drainage systems and erosion controls.

2.2.5 Floodplains

- 1) A floodplain is sometimes defined as that space near an open channel that is outside the "normal" flow channel but is inundated during "abnormal" flows. Inspection of the Paddy's Run channel reveals abundant floodplain locations.
- 2) Preliminary drainage calculations indicate that in many places along Paddy's Run, even a 5-year storm will fill the natural channel and inundate the floodplain. Some of these floodplains can be seen from the Willey Road bridge over Paddy's Run.
- 3) Preliminary calculations were made to approximate the extent of a 100-year flood in the vicinity of the Inactive Fly Ash Pile. No attempt was made to determine the effect of backwater from obstructions and constrictions, because such time-consuming calculations were beyond the scope of this paper.

2.3 Recommendations

- 1) PARSONS recommends Alternate 3 as the proper corrective measure based on the following technical aspects.
 - (1) Location of the centerline of the stream (154 feet) is far enough from the pile that the undercutting is unlikely.
 - (2) The magnitude of the storm event (low flow) will be contained in the lowest channel areas which should lower maintenance costs. Velocities of flow will be sufficient to reduce sedimentation.
 - (3) Benches in slopes provide stability in slopes.
 - (4) Stream realignment is more graceful and reduces eroding possibilities at other locations.

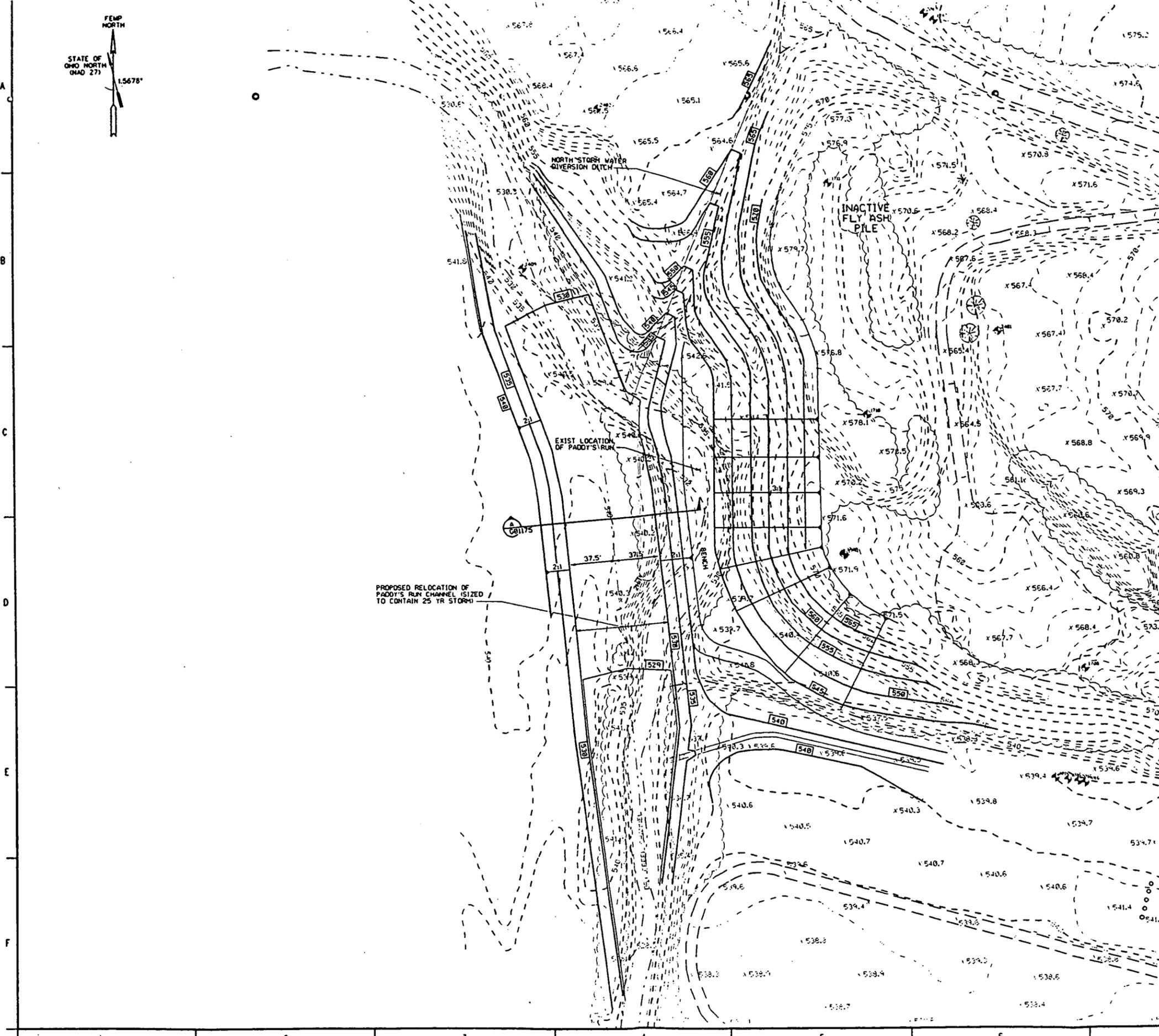
- 2) PARSONS also recommends that a detailed floodplain study be made of that portion of Paddy's Run from Willey Road northward to the Hamilton-Butler County Line prior to Title design work.

2.4 Relationship of this Project to Other Projects

Construction activities for the relocation of Paddy's Run could interfere with the installation of the future multi-layered cap on the IFAP.

PARSONS strongly recommends that the existing Paddy's Run stream bed be relocated first and as soon as practical. The relocation of the channel will provide protection for the longevity of the multi-layered cap.

01173.m(1333.ws401) po47@ws401. Fri Jan 29 16:04:08 EST 1993



NOTES

- EXISTING CONDITIONS SHOWN ON THIS DRAWING WERE PREPARED FROM FEMP SITE PROVIDED DATA DOCUMENTS LISTED BELOW.
 - EXISTING SITE DATA SOURCE (IN PLANT FILES):
 - WESTON TOPOGRAPHY, 1986
 - WESTON TOPOGRAPHY, 1988
 - FEMP CADD GRID/UTILITY DRAWINGS
 - FEMP CONTRACTOR PROJECT DESIGN DOCUMENTS
- PROPOSED CONTOURS ON FLY ASH PILE DENOTES TOP OF CAP.

LEGEND

EXISTING	SPOT ELEVATION	PROPOSED
x 584.9	SPOT ELEVATION	x 584.4
- - - 584 - - -	CONTOUR - MINOR	- - - 584 - - -
- - - 585 - - -	CONTOUR - MAJOR	- - - 585 - - -
	SLOPE INDICATOR	
	MONITORING WELL	
	GRAVEL ROADWAY/DRIVEWAY	
	ASPHALT/PAVED ROADWAY/DRIVEWAY	
	TREE LINE	
	DECIDUOUS TREE	
	HEADWALL	

REFER DWO NO.	REFERENCE DWO TITLE
SK-G-01175	PROFILES AND DETAILS

PRELIMINARY
NOT FOR CONSTRUCTION

ISSUE OR REVISION PURPOSE - DESCRIPTION	DATE	BY	CHKD	DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
PARSONS
THE RALPH M. PARSONS CO. - CHAS. T. MAN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

PROJECT NAME
INACTIVE FLYASH PILE/OTHER SOUTH FIELD
DU2/PO47

DRAWING TITLE
ALTERNATE NO. 1 PLAN
PADDY'S RUN RECHANNELING

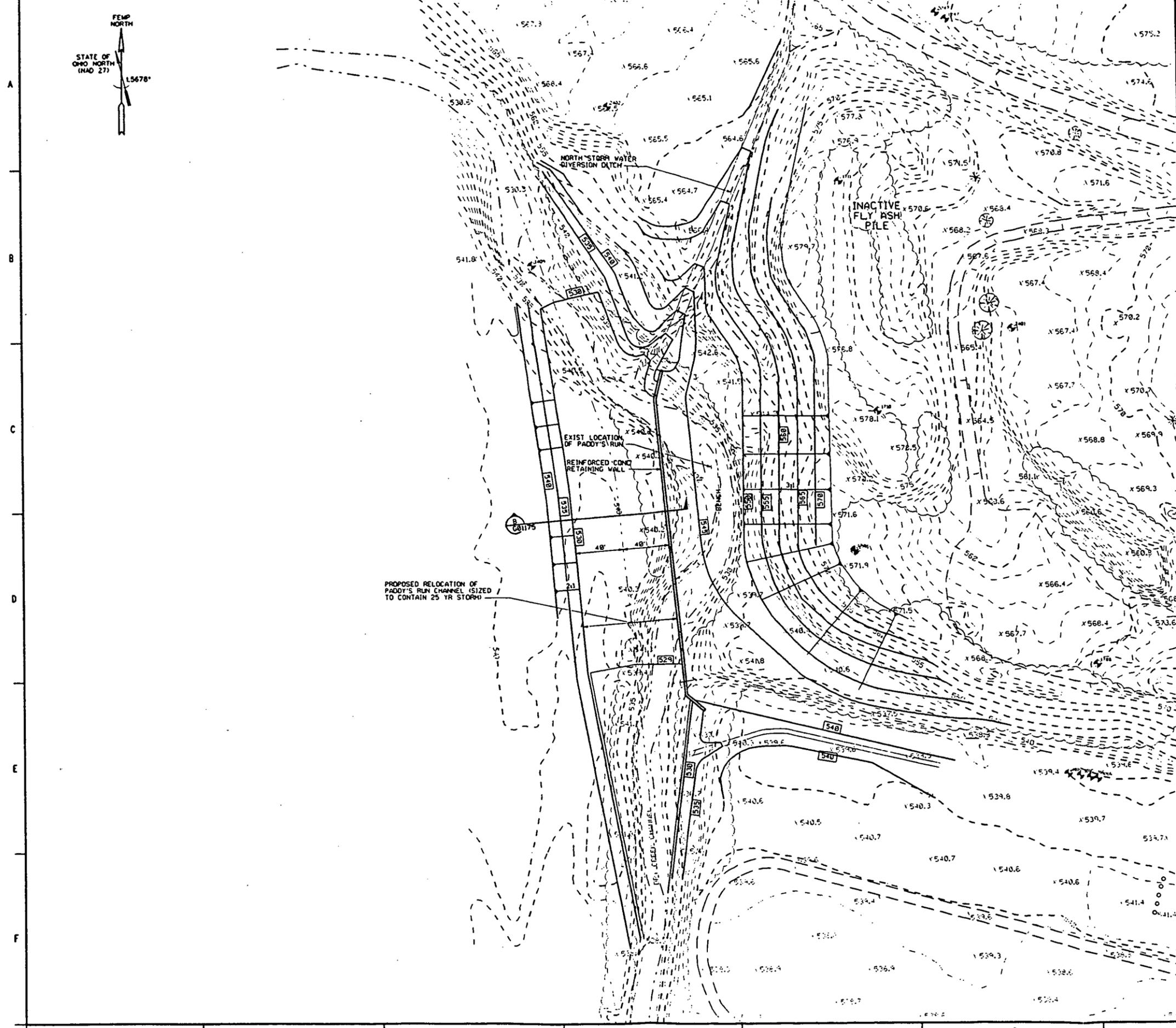
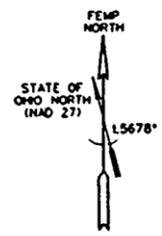
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J.S. BROOKS	11-28-92				

PROJECT NO.	SCALE	DATE
VBS	1" = 30'	01-28-92

DATE PROJECT NO.	OPERATING CONTRACTOR	DATE	CHK	DATE
00-90701	SK-G-01173			

000045

01174.m(1334.ws401) po47@ws401. Fri Jan 29 16:06:18 EST 1993



- 6365**
1. EXISTING CONDITIONS SHOWN ON THIS DRAWING WERE PREPARED FROM FEMP SITE PROVIDED DATA FROM THE DOCUMENTS LISTED BELOW.
- EXISTING SITE DATA SOURCE (IN PLANT FILE)
- WESTON TOPOGRAPHY, 1986
 - WESTON TOPOGRAPHY, 1988
 - FEMP CADD GRID/UTILITY DRAWINGS
 - FEMP CONTRACTOR PROJECT DESIGN DOCUMENTS
- FOR LEGEND, SEE DRAWING SK-G-01173
2. PROPOSED CONTOURS ON FLY ASH PILE DENOTES TOP OF CAP.

REFER DWG NO.	REFERENCE DWG TITLE
SK-G-01173	ALTERNATE NO. 1 PLAN
SK-G-01175	PROFILES AND DETAILS

PRELIMINARY
NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CHECKED	DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
PARSONS
THE RALPH M. PARSONS CO. - CHAS. T. MAR, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

PROJECT NAME
INACTIVE FLYASH PILE/OTHER SOUTH FIELD
Dwg/P047

DRAWING TITLE
CIVIL
ALTERNATE NO. 2 PLAN
PADDY'S RUN RECHANNELING

DESIGNED BY	DATE	DESIGNED CHECKED BY	DATE	DEVELOPED BY	DATE
RL INDOREN	8-23-92				

SCALE	CLASS
1" = 30'	

DATE	OPERATING CONTRACTOR	DATE	DATE	DATE	DATE

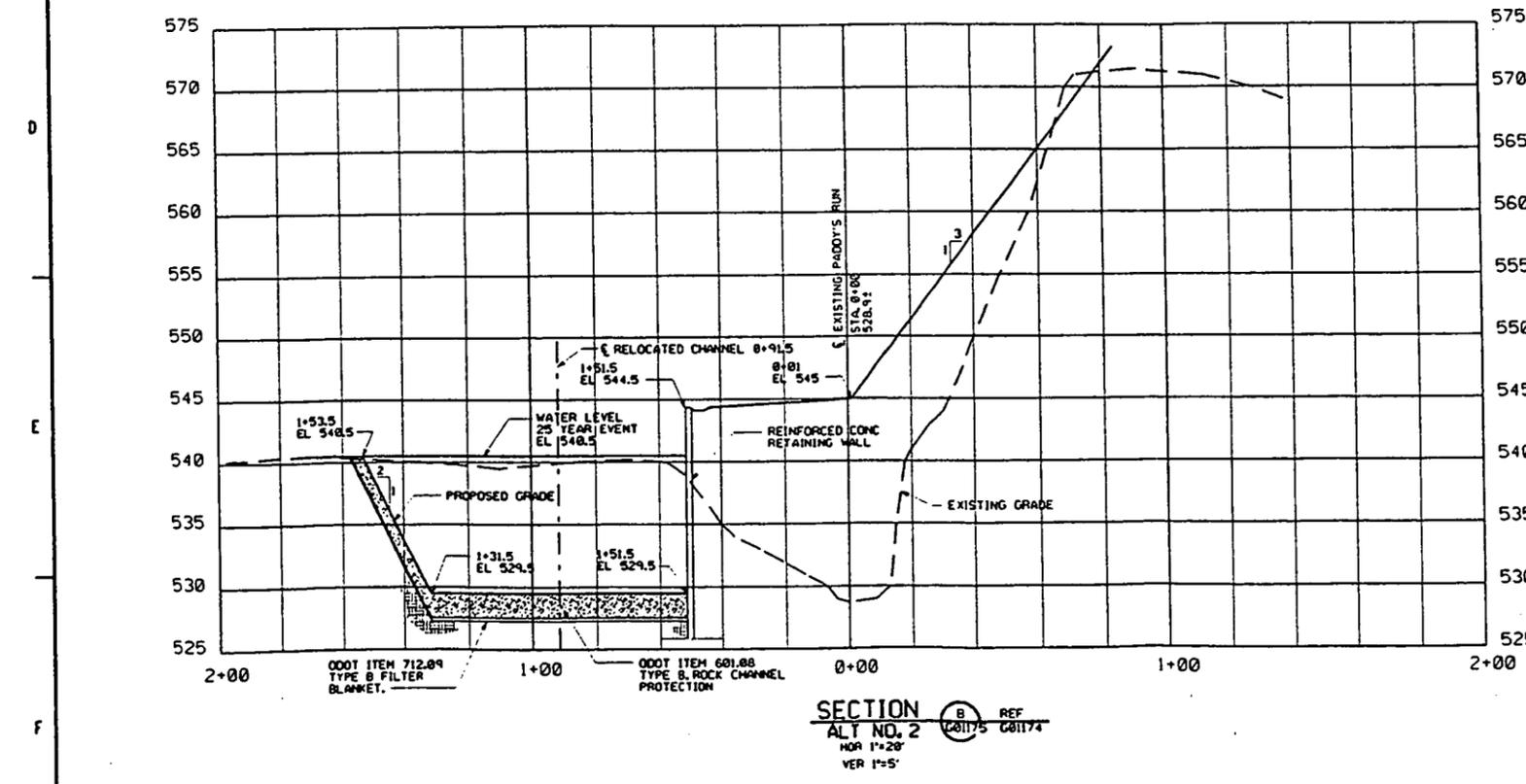
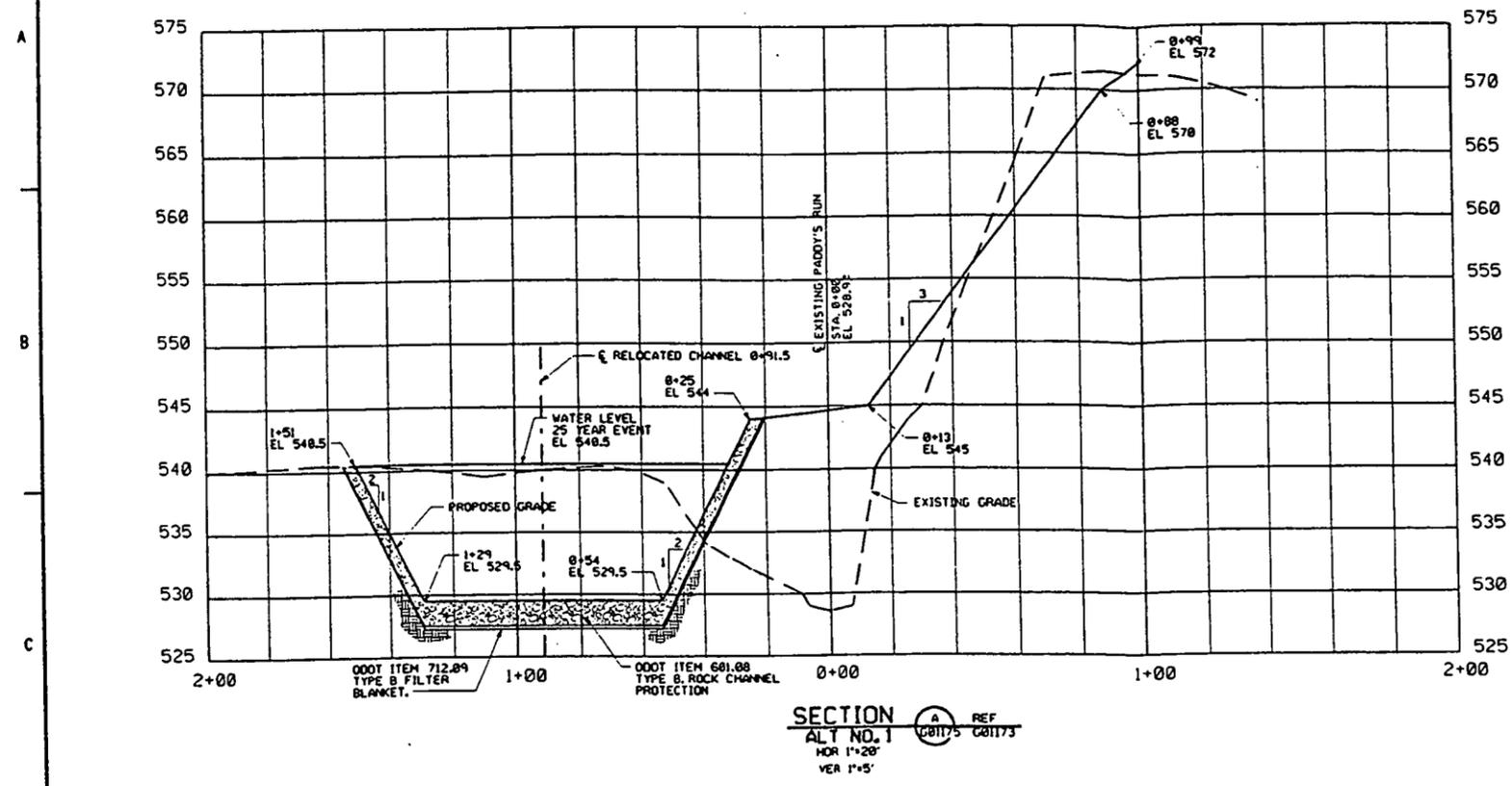
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VBS 00-90701		SK-G-01174			

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REFER DWG NO.	REFERENCE DWG TITLE
SK-G-81173	ALTERNATE NO. 1 PLAN
SK-G-81174	ALTERNATE NO. 2 PLAN

PRELIMINARY
NOT FOR CONSTRUCTION

REV. NO.	DATE OF REVISION PURPOSE - DESCRIPTION	BY	DATE

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
PARSONS
THE RALPH M. PARSONS CO. - CHAS. T. MAN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

PROJECT NAME
INACTIVE FLYASH PILE/OTHER SOUTH FIELD
02/P847

DRAWING TITLE
CIVIL
PROFILES AND DETAILS
PADDY'S RUN RECHANNELING

DESIGNED BY	DATE	RECHECKED BY	DATE	DRAWN BY	DATE
AL HOGREN	8-24-82				

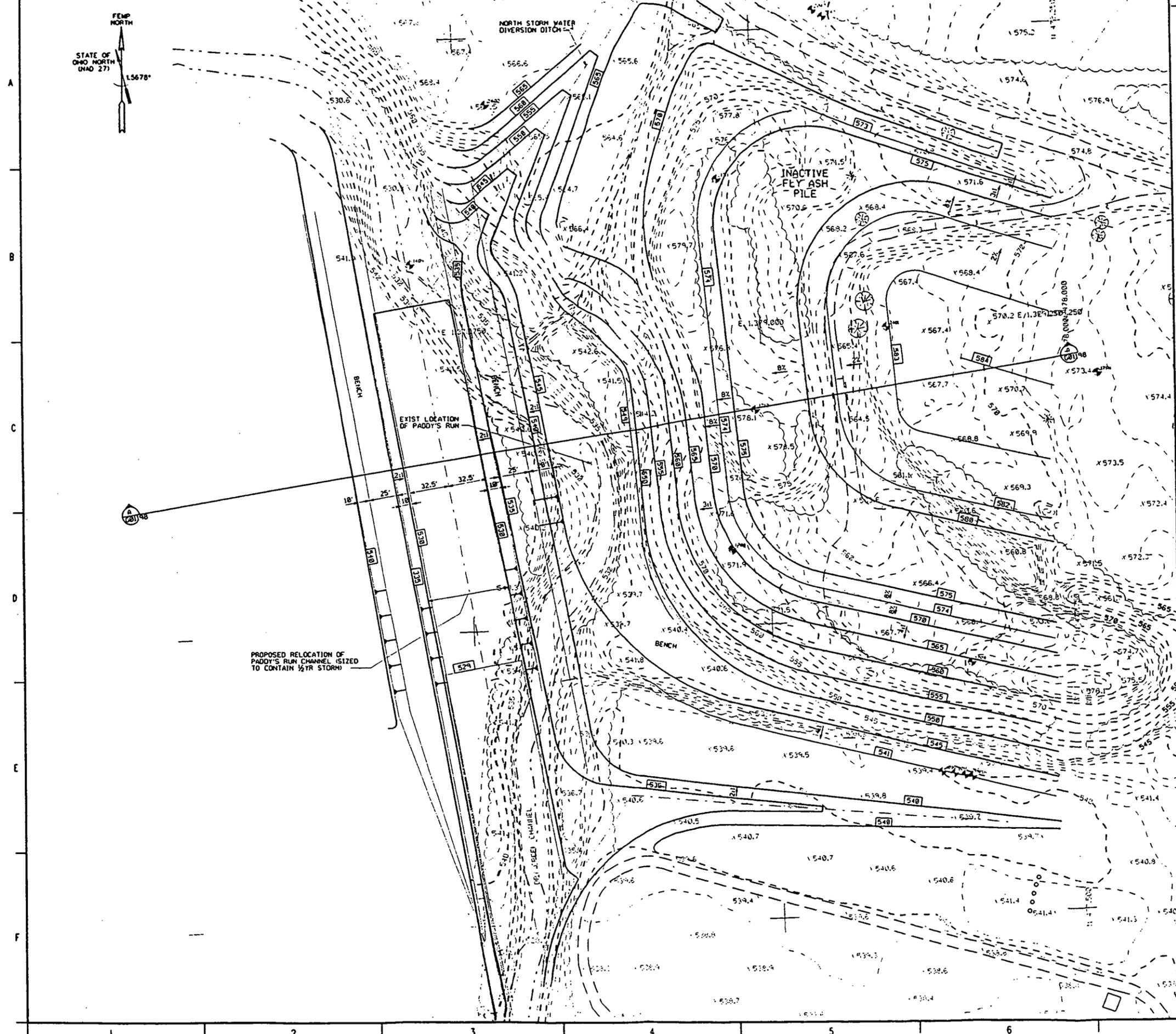
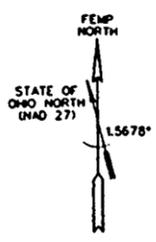
APPROVED FOR APPROVAL	APPROVAL RECORDED	DRAWING APPROVED

DATE	BY	OPERATING CONTRACTOR	DATE	DATE	DATE
00-90701	VBS				

PROJECT NO.	DWG. NO.	DATE	REV. NO.
00-90701	SK-G-01175		A

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01196.m(1336.ws401) po47@ws401. Fri Jan 29 16:11:23 EST 1993



1. PROPOSED CONTOURS ON FLY ASH PILE DENOTES TOP OF CAP.

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PRELIMINARY
NOT FOR CONSTRUCTION

REV.	DATE	ISSUE OR REVISION PURPOSE - DESCRIPTION	BY	OPERATOR	DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
PARSONS
THE RALPH M. PARSONS CO. - CHAS. T. MAN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

PROJECT NAME
INACTIVE FLY ASH PILE/OTHER SOUTH FIELD
DU2/PO47

DRAWING TITLE
CIVIL
ALTERNATE NO. 3
PADDY'S RUN RECHANNELING

DATE	BY	DATE	BY	DATE	BY
12-16-92	JS BROOKS				

DATE	BY	DATE	BY

DATE	BY	DATE	BY
00-90701	VBS	SK-G-01196	

000048

ATTACHMENT 3

Letter from J. R. Craig/DOE to
J. A. Saric/USEPA and G. E. Mitchell/OEPA
dated March 24, 1993.



Department of Energy
Fernald Environmental Management Project
P.O. Box 398705
Cincinnati, Ohio 45238-8705
(513) 738-6357

MAR 24 1993

DOE-1442-93

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V - 5HRE-8J
77 W. Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Graham E. Mitchell, Project Manager
Ohio Environmental Protection Agency
40 South Main Street
Dayton, Ohio 45402-2086

Dear Mr. Saric and Mr. Mitchell:

EMERGENCY REMOVAL ACTION FOR EROSION CONTROL AT THE INACTIVE FLYASH PILE

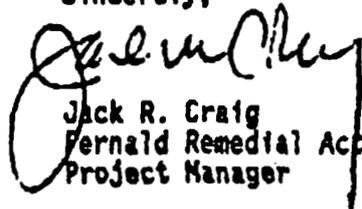
Pursuant to our past discussions and your recommendations, this letter is to notify EPA of the planned Emergency Removal Action to mitigate the observed bank erosion that is taking place at Paddy's Run adjacent to the Inactive Flyash Pile. The intended action will entail the construction of a weighed berm to stabilize the left descending bank of Paddy's Run, bordering the Inactive Flyash Pile. This action is necessary as a result of the inherent uncertainties in its rate of future erosion and the inability to predict the nature or timing of potential discharge of material to Paddy's Run.

We propose a meeting with the United States Environmental Protection Agency (U.S. EPA), Ohio Environmental Protection Agency (OEPA) and the Army Corps of Engineers (CORPs) the week of March 29, 1993. The specific plans for the emergency removal action will be presented. We will be in contact with you to firm up the proposed meeting.

Fernald Environmental Restoration Management Corporation (FERMCO) is planning to initiate field work the week of April 19, 1993 with completion by the end of May, 1993.

If you or your staff have any questions or comments, please contact Johnny W. Reising at 513-738-9083.

Sincerely,


Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Reising

 Recycled and Recyclable

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CANTON

cc:

R. P. Whitfield, EM-40/FORS
J. J. Fiore, EM-42/TREV
K. A. Hayes, EM-424/TREV
J. Kwasniewski, OEPA-Columbus
P. Harris, OEPA-Dayton
M. Proffitt, OEPA-Dayton
J. Michaels, PRC
AR Coordinator, FERMCO
P. F. Clay, FERMCO
J. King, FERMCO
H. E. Richardson, FERMCO
C. Sutton, FERMCO
J. Thiesing, FERMCO

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ATTACHMENT 4

Categorical Exclusion

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

CATEGORICAL EXCLUSION (CX) DETERMINATION

**Emergency Removal Action for Erosion Control
at the Inactive Flyash Pile
NEPA Document No. 422
Fernald Environmental Management Project (FEMP)
Fernald, Ohio**

Proposed Action

The United States Department of Energy (DOE) proposes an Emergency Removal Action to install a weighted berm to control cut bank erosion along Paddys Run Creek which is affecting the stability of the Inactive Flyash Pile (IAFAP).

Location

The IAFAP, a subunit of Operable Unit (OU) 2, is located approximately 2,000 feet southwest of the former FEMP production area and covers approximately 4 acres. Its western boundary, in part, is defined by Paddys Run which parallels the area for approximately 200 feet and eventually flows into the Great Miami River south of the FEMP site. The FEMP site is located 18 miles northwest of downtown Cincinnati, Ohio.

Background

Flyash and bottom ash from the FEMP's coal-fired boiler plant and other materials were deposited in the IAFAP area from 1952 to approximately 1968. The total quantity of ash (30% flyash and 70% bottom ash) disposed in this area has been estimated at 78,500 cubic yards. Although the area has been covered with soil and natural vegetation has developed, materials such as concrete, steel drum lids, and asbestos containing transite are visible at the surface. These materials are particularly evident along the IAFAP and Paddys Run border where geomorphological processes (e.g., erosion due to intermittent stream flow) have impacted the eastern stream bank. In this area, the nearly vertical side walls of the stream bank extend from the stream bed up approximately 15 feet to the vegetated bank near the toe of the IAFAP.

During recent months, above average stream flow has caused an accelerated rate of stream bank erosion. In some locations adjacent to the IAFAP, the sand and gravel side walls of the stream bank have been undercut to form an overhang of soil above it. Portions of the stream bank have slumped into the stream channel in at least three locations.

Although the IAFAP is currently intact, continuation of the erosion process at the current rate (i.e., small and slow displacements of soil) could eventually undermine the pile's western slope and over time may result in discharge of ash and potentially contaminated waste and fill into Paddys Run. This particular stretch of Paddys Run represents one of the stream's most prominent meanders. In

the outside bend of this meander, the stream velocities are greatest and turbulent currents are generated. These currents are impacting toe support and may render a portion of the IAFAP's western slope susceptible to a slope failure. A slope failure could potentially deposit large quantities of waste and fill material into the stream channel of Paddys Run.

A comprehensive radiological survey of the IAFAP was completed by DOE-FN on April 30, 1992. The survey identified surface areas having gross beta/gamma readings of greater than 1,000 DPM/100 cm² and gamma radiation levels exceeding 20 μ R/hr. Site background levels were established for soils at 60 DPM/100 cm² and 10 μ R/hr, respectively. Based on these criteria, eight "contaminated areas" were identified as having fixed or removable contamination exceeding 1,000 DPM/100 cm² or 20 μ R/hr. In addition, analytical data for the underlying soil/fill obtained during the OU2 Remedial Investigation show levels of radionuclide contamination above background levels.

A Removal Site Evaluation conducted for the IAFAP indicated uncertainty in predicting when a slope failure might occur at the IAFAP. However, circular arc and wedge failures are believed to be the most likely failure modes to occur. Both modes are extremely rapid with little advance warning. Therefore, an Emergency Removal Action is proposed to control the immediate threat of release. An evaluation will be made to determine whether an additional Removal Action will be required to provide a more permanent solution to the IAFAP erosion problem. Independent NEPA documentation will be completed for any additional Removal Action as appropriate.

Description of Proposed Action

The proposed action will involve the construction of a new access roadway to the IAFAP and the installation of a weighted berm on the east bank of Paddys Run, adjacent to the IAFAP. This activity will stabilize the bank until the need for Removal and/or Remedial Actions can be evaluated.

Existing access roads will be used from the southwest corner of the west parking lot, past the eastern edge of the IAFAP, down to the cinder running track. Approximately 2,000 feet of the existing access road will be reinforced (e.g., by adding stone) to support the additional construction traffic.

A new construction access road will be installed from the northwest corner of the existing cinder running track, approximately 1,200 feet north to the area where Paddys Run meets the IAFAP. The installation of the access road will involve the following: 1) spraying a biodegradable herbicide on the grassy areas of the new roadway; 2) placing a geotextile fabric on the base of the roadway; 3) placing 3 inches to 4 inches of stone on geotextile fabric (-1280 tons); 4) placing #304 gravel on top of the stone as roadway topping (-834 tons); and 5) placing and backfilling a 24-inch diameter corrugated metal culvert approximately 20 feet long in the ditch that crosses the roadway near the run bank.

**Emergency Removal Action for Erosion Control
at Inactive Flyash Pile**

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Once the roadway has been installed to the bank of Paddys Run, an area -50 feet wide by 100 feet long will be cleared of trees and brush down the stream bed of Paddys Run. An access ramp will be installed in this clearing to allow for installation of the berm.

The weighted berm will be installed by placing 6 - 12 inch diameter limestone in the stream bed along approximately 212 feet of the bank. The dimensions of the berm upon completion will be approximately 212 feet long x 10 feet wide (top) x 7 feet high. Appropriate erosion and siltation controls must be used during construction. Upon completion of the berm, all construction debris will be cleaned up and the site will be restored to its original condition to the greatest extent possible. The roadway will be left intact to allow access for future actions.

The Army Corps of Engineers has been contacted regarding this action. In response, Nationwide Permit #13 approval has been obtained to meet the requirements of Section 404 of the Clean Water Act. A wetlands delineation conducted for the FEMP site in 1992 identified no wetlands in the area to be impacted by this Emergency Removal Action. The delineation is currently pending approval by the Army Corps of Engineers.

In addition, an archeological survey has been conducted for the areas to be affected by the Emergency Removal Action. No sites of concern were identified during the archaeological survey. The appropriate report has been generated and filed in accordance with the National Historic Preservation Act. The Ohio Historic Preservation Office can review this report upon request.

This action will require installation of the berm in the 100-year floodplain. In order to meet the requirements of 10 CFR 1022, "Floodplain/Wetland Environmental Review Requirements," a formal Notice of Involvement and Floodplain Assessment will be prepared in parallel with the NEPA documentation for the more permanent Removal and/or Remedial Action. However, a Floodplain Assessment will not be prepared in parallel with this CX as this is an Emergency Removal Action.

Categorical Exclusion to be Applied

The authority for finding this project to be subject to NEPA Categorical Exclusion is contained in Subpart D of the revision to 10 CFR Part 1021, entitled "National Environmental Policy Act Implementing Procedures and Guidelines." The Final Rule and Notice, effective May 26, 1992, includes a revised and expanded list of categorical exclusions that are classes of actions that normally do not require the preparation of either an Environmental Impact Statement or an Environmental Assessment.

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Emergency Removal Action for Erosion Control
at Inactive Flyash Pile

The Final Rule and Notice specifically lists in Part 1021, Appendix B to Subpart D, Sec. 1021.410, B6.1(e), the following types of actions that are Categorical Exclusions applicable to Specific Agency Actions:

B6.1 Removal actions under CERCLA (including those taken as final response actions and those taken before remedial action) and removal-type actions similar in scope under RCRA and other authorities (including those taken as partial closure actions and those taken before corrective action), including treatment (e.g., incineration), recovery, storage, or disposal of wastes at existing facilities currently handling the type of waste involved in the removal action. These actions will meet the CERCLA regulatory cost and time limits or satisfy either of the two regulatory exemptions from those cost and time limits (National Contingency Plan, 40 CFR part 300). These actions include, but are not limited to:

(e) Capping or other containment of contaminated soils or sludges if the capping or containment would not affect future groundwater remediation and if needed to reduce migration of hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products into soil, groundwater, surface water, or air.

The Erosion Control Project at the IAFAP meets the requirements for the Categorical Exclusion listed above. It is appropriate since the proposed action as described entails implementing an Emergency Removal Action to minimize further erosion at the IAFAP.

Furthermore, the proposed action will not violate applicable statutory, regulatory, or permit requirements; it will not require siting and construction or major expansion of waste disposal, recover or treatment facilities; and it will not impact any other environmentally sensitive areas (e.g., wetlands, or the sole-source aquifer).

Compliance Action

I have determined that the proposed action meets the requirements for the CX referenced. Therefore, the proposed action is categorically excluded from further NEPA review and documentation.

Approval:

Ray Hansen for
Thomas J. Rowland, Acting Manager
U.S. Department of Energy, Fernald Office

Date:

4/16/93

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ATTACHMENT 5

Evaluation of Alternatives,
Erosion Control
at the Inactive Flyash Pile



Restoration Management Corporation

P.O. Box 398704 Cincinnati, Ohio 45239-8704 (513) 738-6200

May 18, 1993

U. S. Department of Energy
Fernald Environmental Management Project
Letter No. C:OP:93-0778

Mr. Thomas J. Rowland, Acting Manager
DOE Field Office, Fernald
P. O. Box 398705
Cincinnati, Ohio 45239-8705

Dear Mr. Rowland:

CONTRACT DE-AC05-92OR21972, EVALUATION OF ALTERNATIVES: EROSION CONTROL AT THE INACTIVE FLYASH PILE

Reference: DOE-1355-93

FERMCO has completed a focused alternative evaluation for a long term erosion control system for the Inactive Flyash Pile and recommends that the rock berm revetment system be selected as the preferred alternative. This system is essentially an upgrade of the rock berm recently installed as an interim erosion control measure in Paddy's Run. Details of the alternative evaluation process are provided as an attachment.

DOE's concurrence is hereby requested to proceed with the final design of the rock berm revetment system.

Very truly yours,

A handwritten signature in black ink, appearing to read "N. C. Kaufman". The signature is written in a cursive, flowing style.

N. C. Kaufman
President

NCK:STG:sh
Attachment

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Mr. Thomas J. Rowland
Letter No. C:OP:93-0778
Page 2

c: Robert Mendelsohn, DOE Contract Specialist
M. Albertin
K Alkema
B. Campbell
P. Clay
J. Craig, DOE-FN
J. Reising, DOE-FN
J. Thiesing
R. Warner, DOE-FN
J. Williams
P. Yerace, DOE-FN
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EVALUATION OF ALTERNATIVES
EROSION CONTROL AT THE INACTIVE FLY ASH PILE

Preliminary stability analyses were performed as an initial step in the selection and design of a long term erosion control measure for the east bank of Paddy's Run at the Inactive Fly Ash Pile (IFAP). This work is a part of Task 2, as outlined in DOE Removal Action Memorandum dated March 13, 1993, approving the Removal Site Evaluation.

Initial stability analyses were conducted to evaluate the following conditions:

- A) original slope (preconstruction), and
- B) revetment (i.e., weighted berm) to El 537. (Existing - installed under the Emergency Removal Action)

Additional analyses were performed to evaluate the effectiveness of proposed long term stability measures at the site. Alternatives evaluated include:

- C) increasing the height of the weighted berm to El 545,
- D) gabion placement from existing top of weighted berm to El 540 and use of erosion control (seeding, nets, etc.) from El 540 to 545,
- E) installation of sheetpiling behind weighted berm with top at El 545 and backfilling with soil,
- F) reshaping and flattening of the fly ash pile slope above El 555,
- G) reshaping and flattening of the fly ash pile slope above El 555 in conjunction with the measures in item C, and
- H) reshaping and flattening of the fly ash pile slope above El 555 in conjunction with the measures in item D, and
- I) increasing height of weighted berm to El 540.

Basis for Analyses

The critical (worst case) cross-section used for the analyses was taken at section E-E on the Project Location Plan dated March 22, 1993 (Figure 1). The profile E-E was obtained from the Civil Sections dated March 23, 1993 (Figure 2A). Copies of the applicable portions of these drawings are attached.

Information on soil stratigraphy and soil conditions were taken from the field geotechnical data obtained during the geotechnical sampling and testing currently being performed by Parsons. This data was in the form of field boring logs from the seven borings drilled at the site. The field logs contained soil stratification, visual descriptions of the soils, field strength tests of cohesive soils, and Standard Penetration Test (SPT) results for granular and

cohesive samples. Laboratory testing is currently underway at the time of this evaluation of alternatives.

Profile E-E modified to show existing conditions and soil stratigraphy is provided in Figure 2B. The effects of topsoil cover on the fly ash slope and vegetation, including trees, were not included. It is expected that the trees will reduce the potential for shallow slip surfaces to develop. Potential scour at the toe of the weighted berm was not considered.

For seismic considerations, a pseudo-static representation of earthquake loading was performed. An input acceleration of 0.1g representing a 500 year return period (Exhibit A-1 and A-2) was used.

Soil Strength Parameters

Long term effective strength parameters were selected because the fly ash pile has not been modified since 1968. Strength parameter selection was based on soil description, SPT correlations, and experience with similar soils. The strength parameters, considered conservative, that were used in the evaluation are given in Table 1.

Table 1 - Soil Strength Parameters			
Soil Type	Friction Angle	Cohesion, psf	Unit Weight,pcf
Fly Ash	33	0	110
Sandy Silt/Clay	25	100	120
Silty Sand/Sand	33	0	115
Gravelly Sand	35	0	120
Weighted Berm (rip rap)	45	0	140

Water Level

Water level in the channel was assumed at El 535. Current water level in Paddy's Run is approximately El 530 and the 100 year flood level is El 545 based on preliminary evaluation by Parsons (Exhibit A-3, dated March 1, 1993). Water levels in the boreholes at the completion of drilling were approximately at the same level as Paddy's Run. Based on this information, the piezometric level in the slope was assumed to be the same as the approximate water level in the channel.

Method of Analysis

The stability analyses were performed using the computer program PCSTBL5M. This program was developed by Purdue University and uses several methods to generate

trial failure surfaces and corresponding factors of safety for the ten most critical surfaces. For these analyses, the Modified Bishop Method was used.
Results of Analyses

The results of the preliminary analyses indicate, that under preconstruction conditions, the fly ash pile and bank were marginally stable with a factor of safety of 1.15. The placement of the weighted berm, through the Emergency Removal Action, increases the stability of the pile to a factor of safety of 1.33. The computed factor of safety under seismic conditions was 1.06.

The proposed alternatives all provide an increase in the stability of the fly ash pile and bank. The most effective alternatives involve increasing the size of the weighted berm or reshaping and flattening the top of the fly ash slope. These measures increase the resisting forces and decrease the driving forces, respectively.

Profiles E-E modified with each alternative, critical failure surfaces, and corresponding factors of safety are provided in Figures 3 through 7. Table 2 provides a summary of the analyses results. Seismic conditions were not evaluated for these cases, but factors of safety are estimated to be greater than 1.0.

Table 2 - Summary of the Results of the Analysis		
Case	Description of Slope Conditions	Factor of Safety
A	Original slope (preconstruction)	1.15
B	Weighted berm to E1 537 (existing)	1.33
C	Additional weighted berm to E1 545	1.50
D	Gabion placement from top of weighted berm to E1 540 and erosion control (seeding, netting, etc.)	1.36
E	Sheetpiling behind weighted berm with top at E1 545 and soil backfill	1.39
F	Reshaping of fly ash slope above E1 555	1.44
G	Additional weighted berm to E1 545 and reshaping of fly ash slope above E1 555	1.58
H	Gabion placement from top of weighted berm to E1 540, erosion control, and reshaping of fly ash slope above E1 555	1.48
I	Increase weighted berm to E1 540	1.40

In reviewing the results of these analyses, a factor of safety of 1.3 should be considered the minimum acceptable. A factor of safety of 1.5 is desirable considering the potential impact of the fly ash entering Paddy's Run in the case

of a slope failure through the fly ash pile and the bank. Generally the Corps of Engineers advise using a factor of safety of 1.5 for long term steady state conditions and a minimum factor of safety of 1.0 for long term conditions with seismic loading.

Qualifications

The preliminary stability analyses performed for the IFAP are based solely on field data from the geotechnical sampling and testing program currently being performed by Parsons. Conservative parameters were used for the alternative analysis and are being verified by the ongoing laboratory testing program. Final design will be performed by Parsons upon the completion of the laboratory testing program.

Cost of Construction

Order-of-magnitude costs for construction of stability measures for Cases C, E, F, and I are summarized in Table 3. Engineering costs are assumed constant and are not included in Table 3.

Table 3 - Cost of Construction		
Case	Description of Stability Measure	Cost
C	Additional weighted berm to E1 545	\$164,300
E	Sheetpiling behind weighted berm with top at E1 545 and soil backfill	\$218,100
F	Reshaping of fly ash slope above E1 555	\$224,000
I	Increase weighted berm to E1 540	\$34,200

Recommendations

Based on this evaluation, FERMO recommends that the final design consider the beneficial affects of increasing the height of the weighted berm recently constructed through the Emergency Removal Action. As a minimum, additional rock would be added to increase the height of the weighted berm to EL. 540 ft. MSL (CASE I). This would provide added stability and protect the exposed soil face above EL. 537 ft. MSL. Additional rock (i.e., height) may be required in critical areas to achieve adequate long term stability (CASE C). The final design would determine details of additional rock placements. In both cases, toe slope protect will be a design consideration.

The use of sheetpiles will not be considered further because of the insignificant increase in stability and high cost (CASE E).

Reshaping the flyash slope will not be considered further due to the need to remove a large number of mature trees, the risk of a construction induced slope failure, and the high cost.

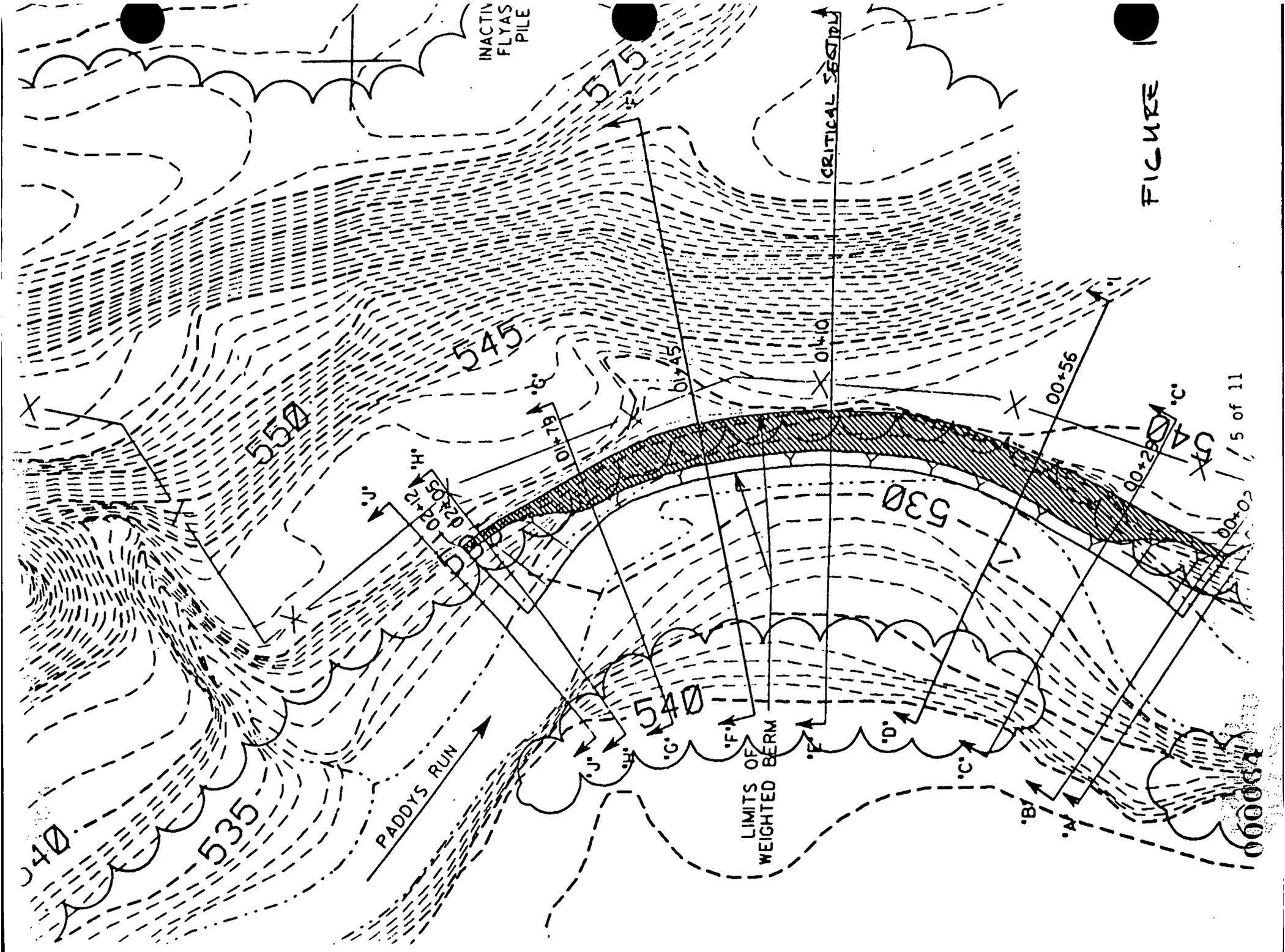
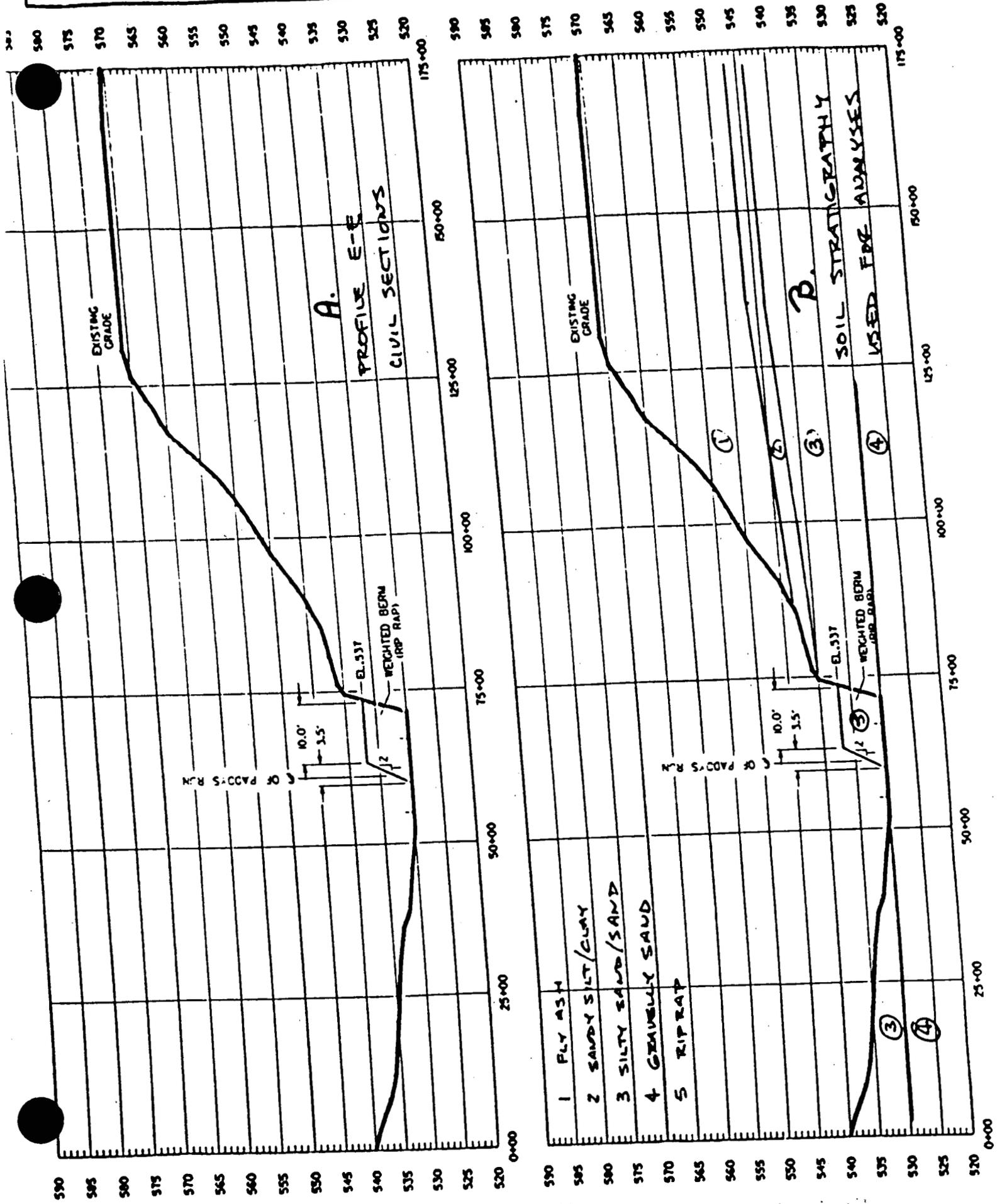


FIGURE 1

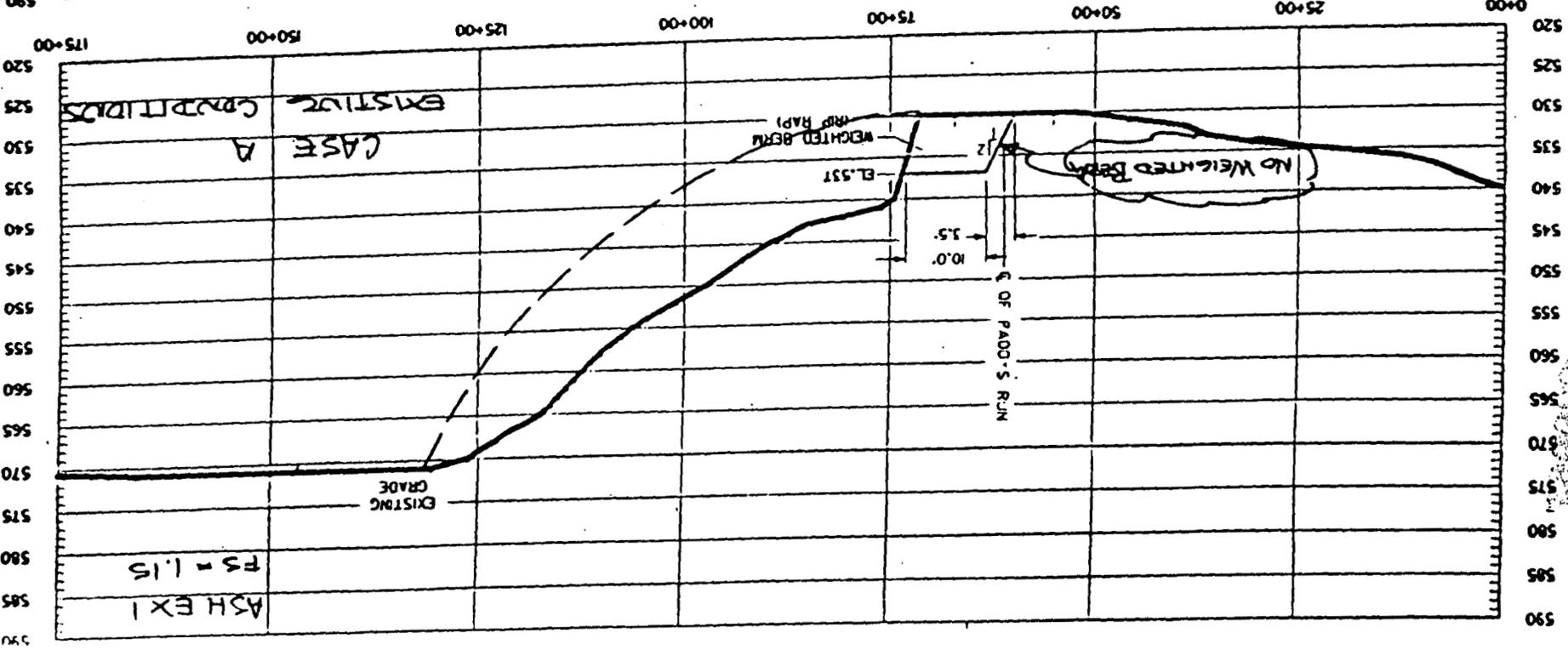
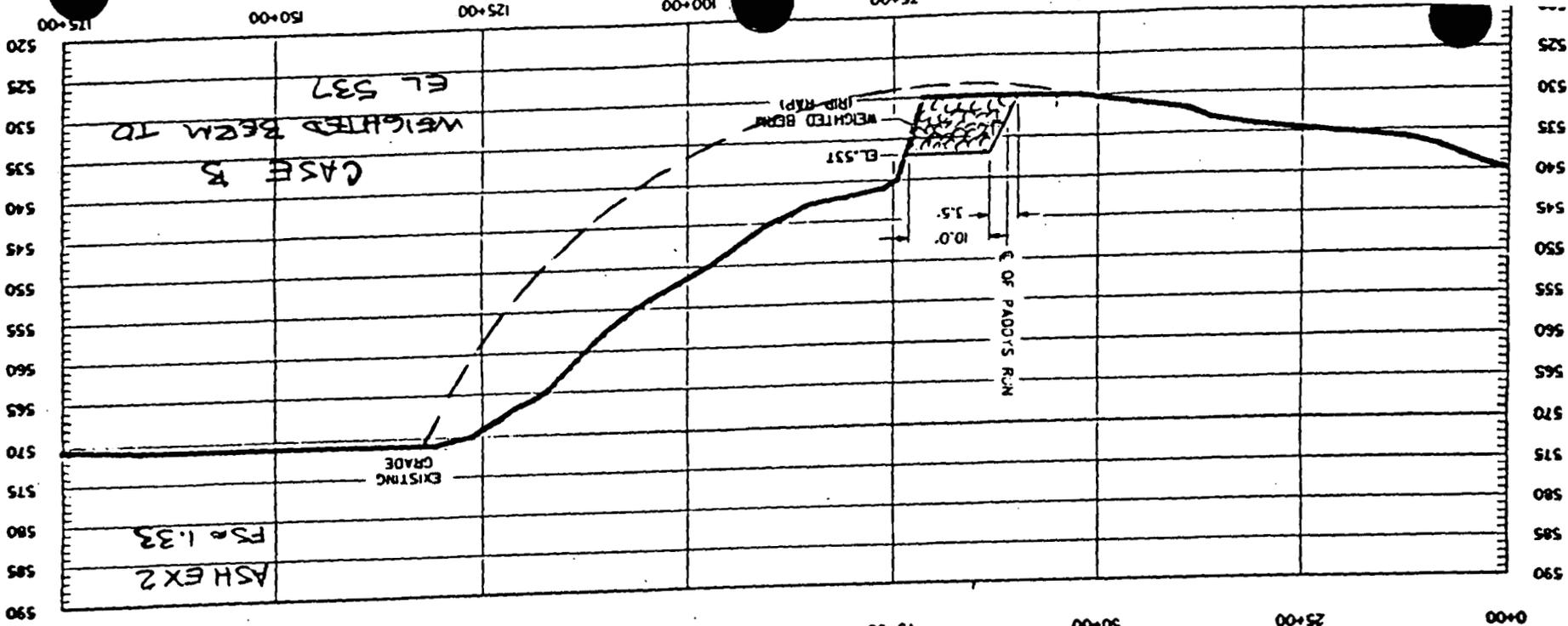


A.
PROFILE E-E
CIVIL SECTIONS

B.
SOIL STRATIGRAPHY
USED FOR ANALYSES

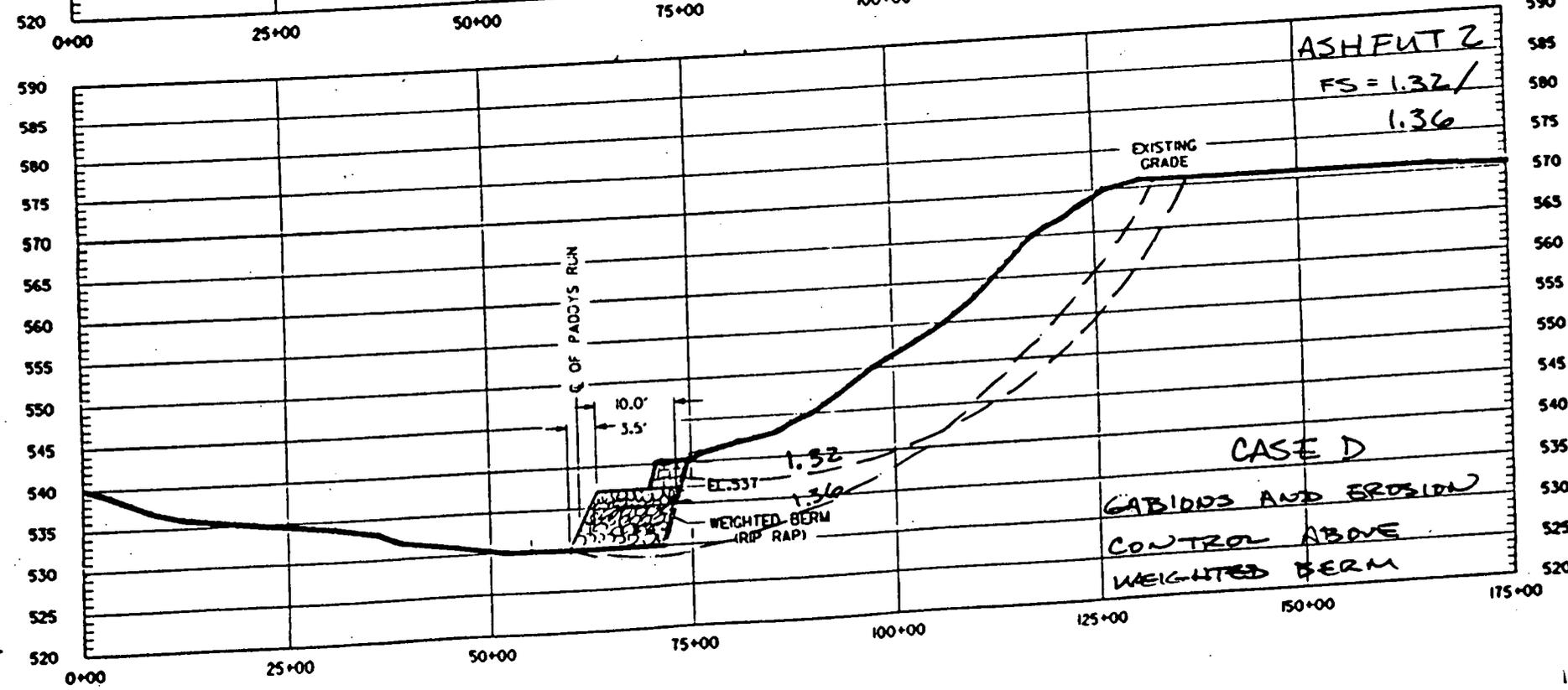
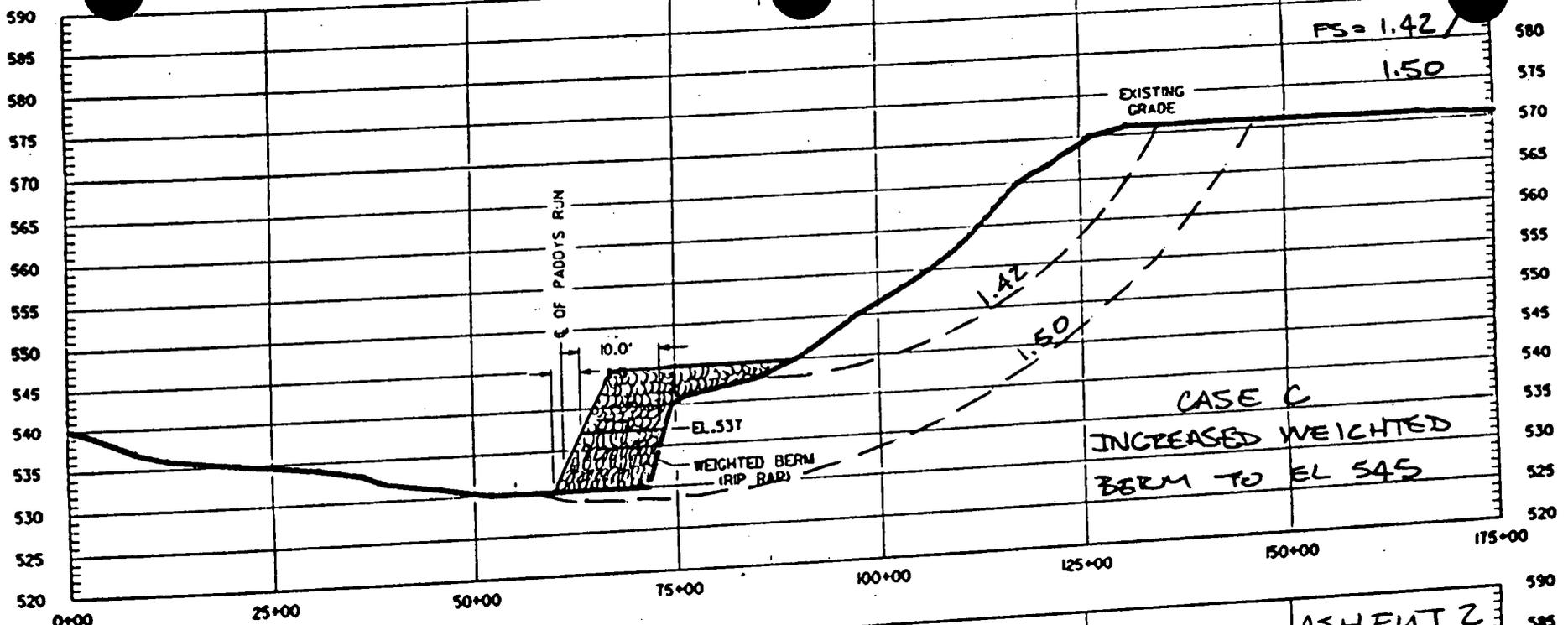
- 1 FLY ASH
- 2 SANDY SILT/CLAY
- 3 SILTY SAND/SAND
- 4 GRAVELLY SAND
- 5 RIP RAP

STANDARD CALCULATION SHEET



7.25.11

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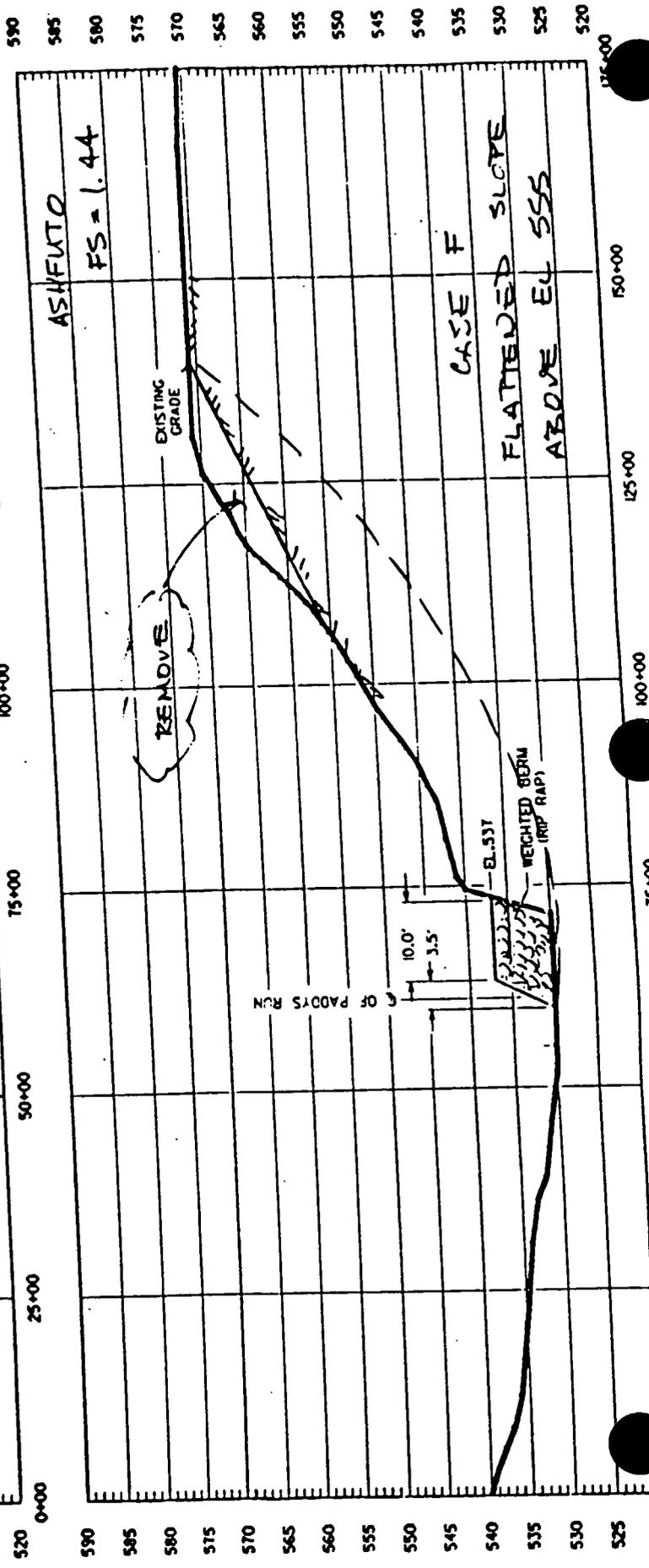
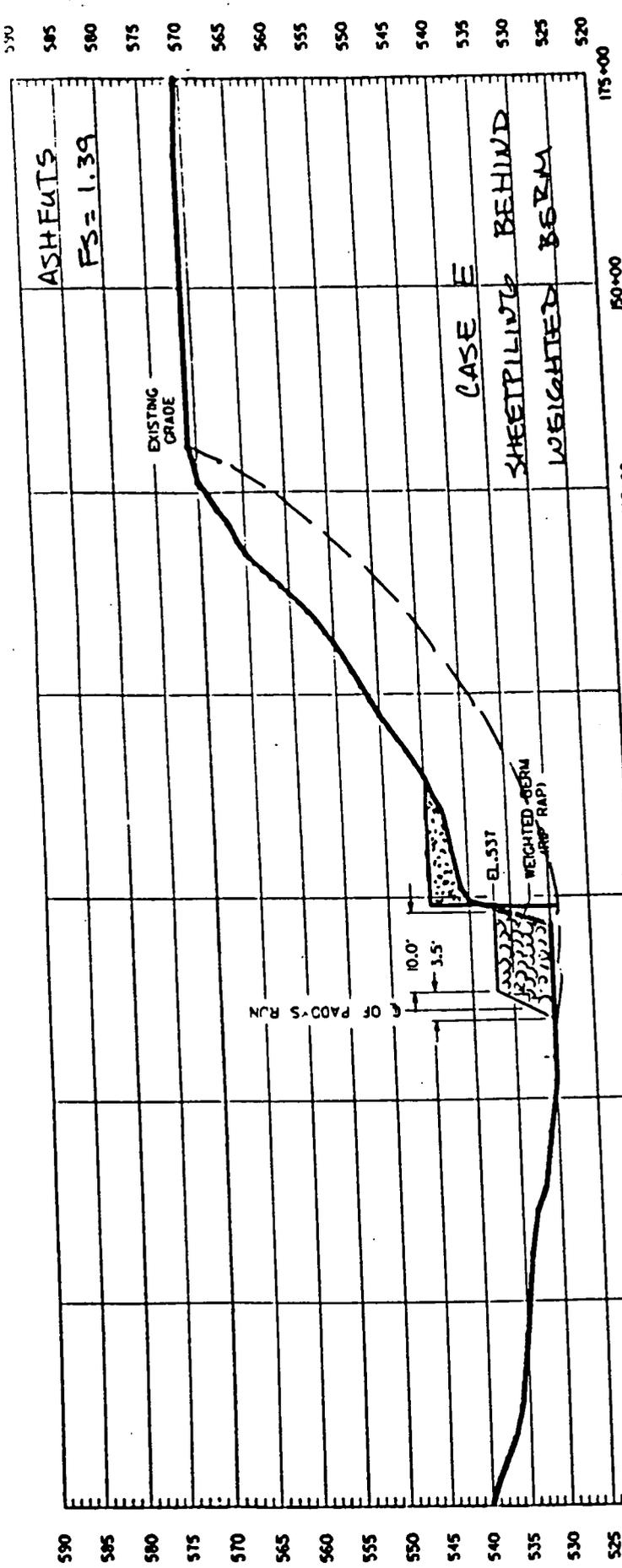


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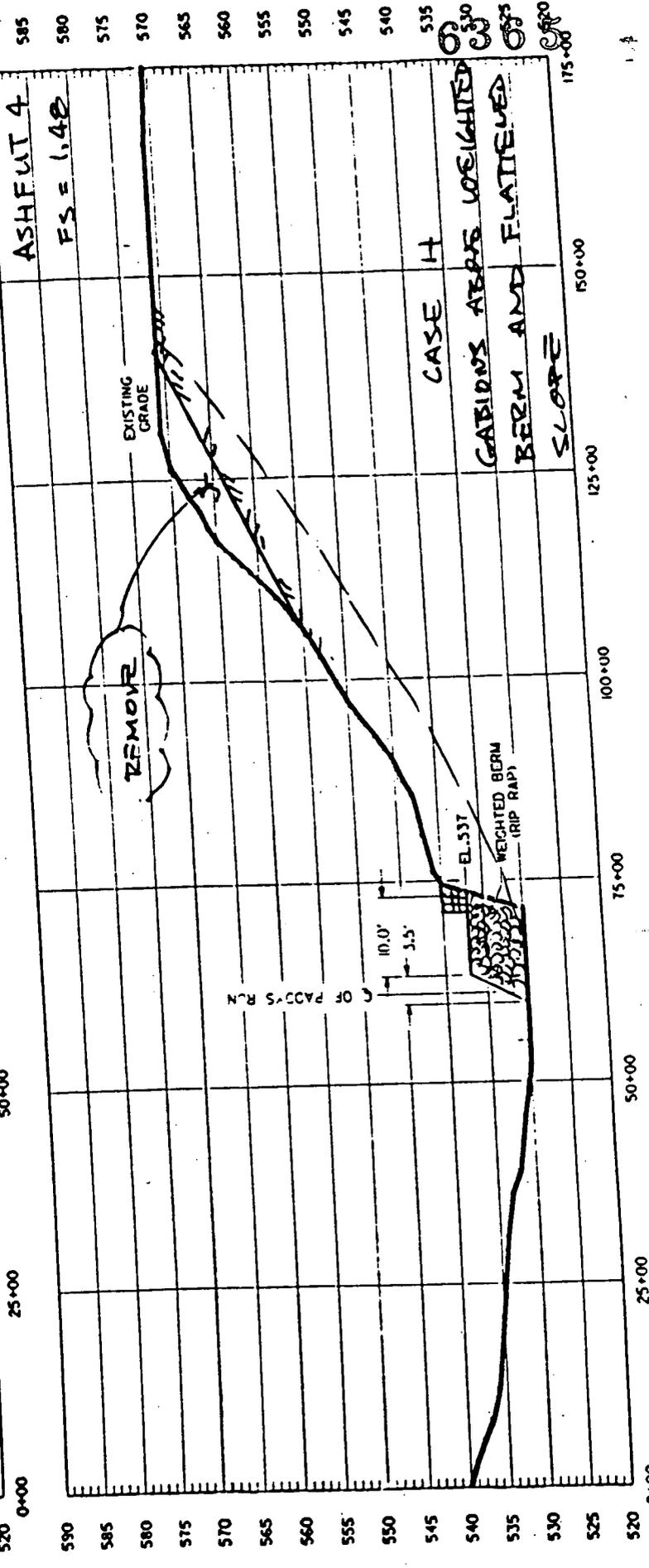
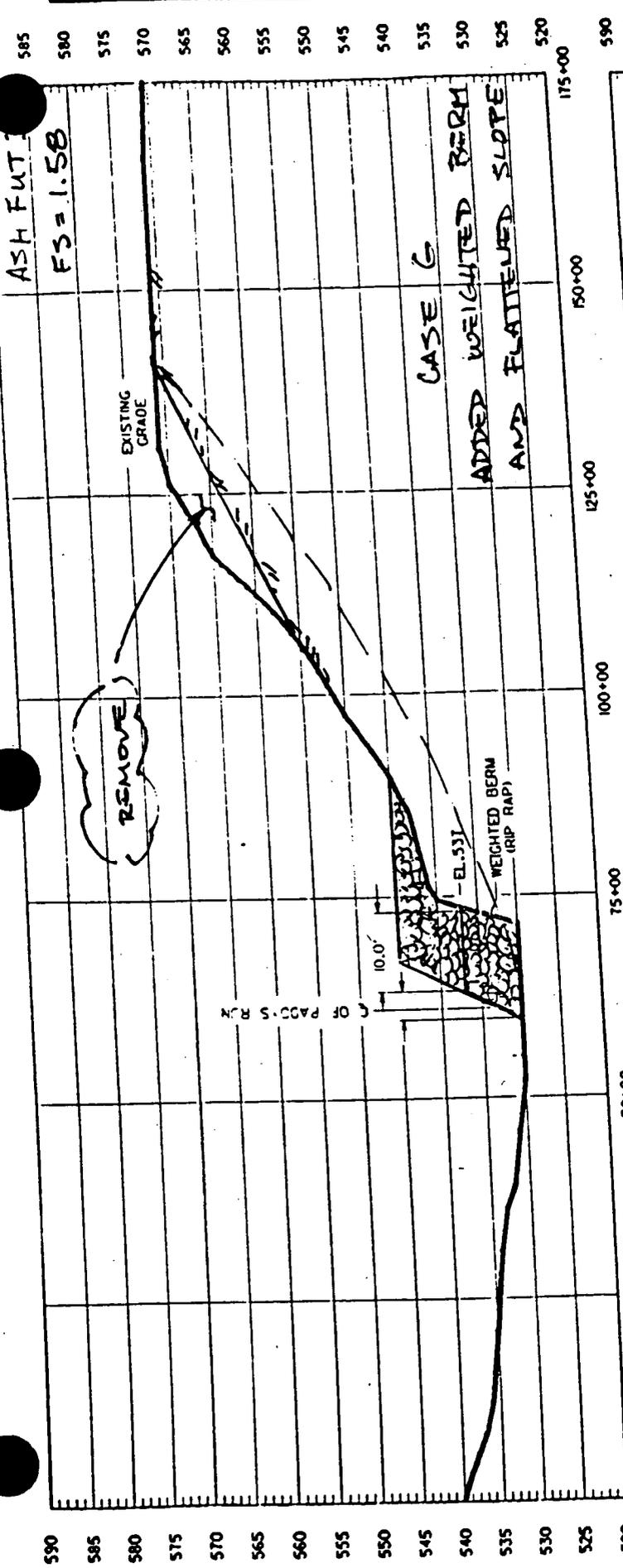
STANDARD CALCULATION SHEET



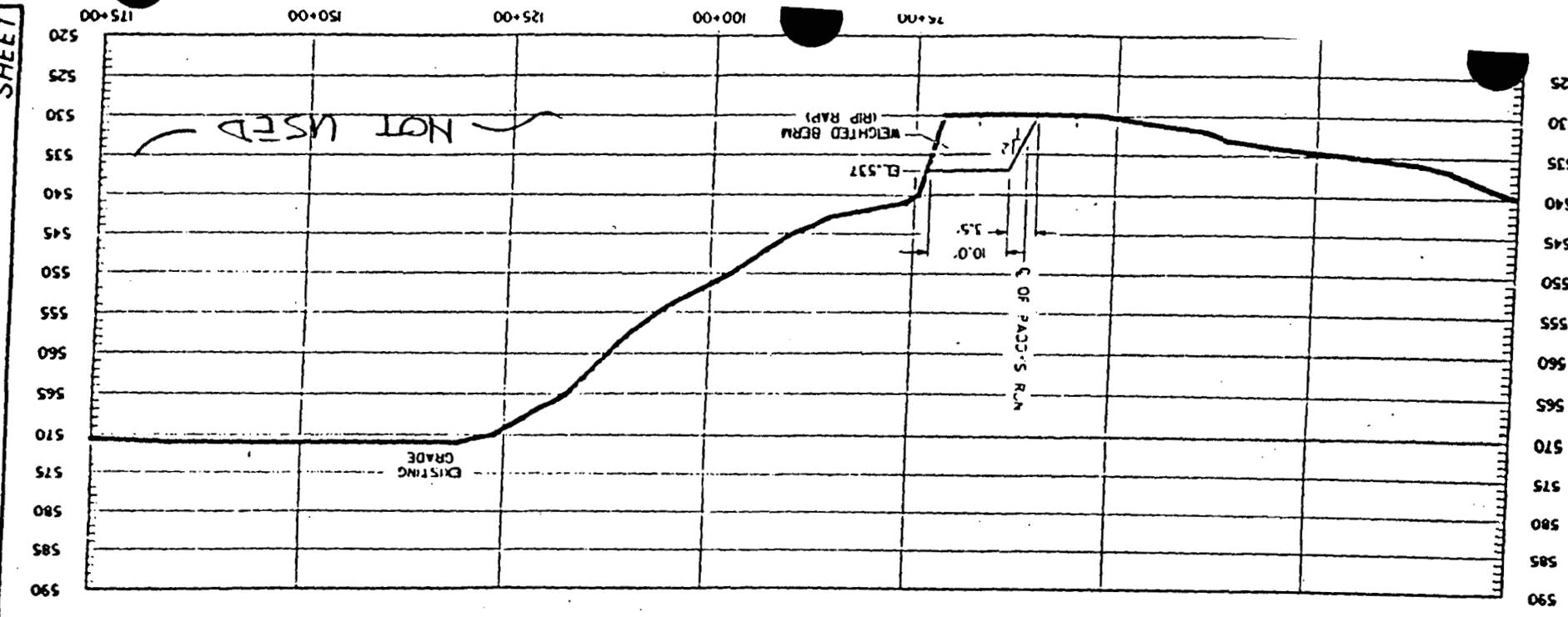
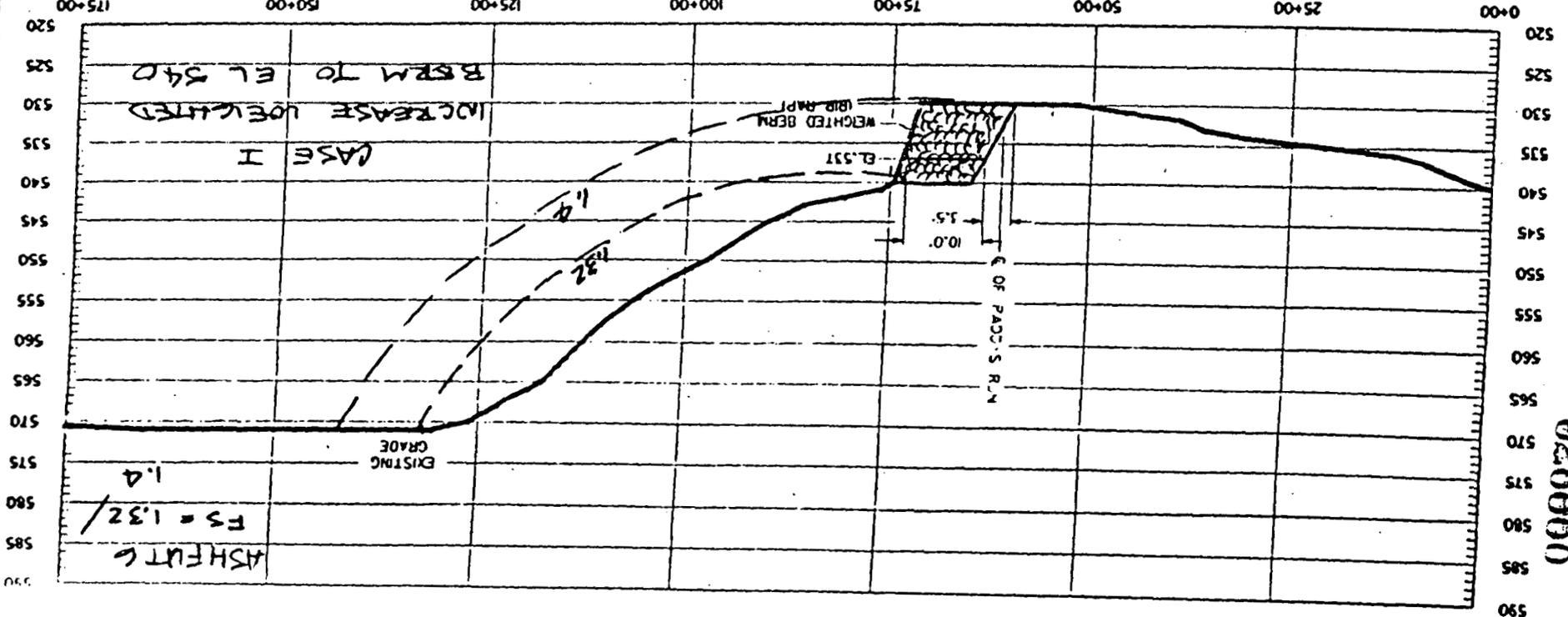
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FIG. N 11 U



STANDARD CALCULATION SHEET



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accelerations or may fail by liquefaction (a physical state wherein the soil behaves as though it were a liquid and thus fails to support a load placed upon it). Ground motion amplification may also be a consideration at the FEMP site. All facilities at the FEMP site are located above thick glacial outwash sand and gravel which may cause amplification of the PGA's discussed above. Based upon the above considerations, the design basis earthquake to be used for liquefaction analysis of the FEMP site is 0.13g PGA. This value is representative of the expected maximum ground acceleration based upon both historical seismic activity and probabilistic evaluations for a return period of 1000 years.

4.4 SUMMARY

The FEMP site is located on the eastern edge of the central stable physiographic province. The central stable region represents the interior of the American tectonic plate, and this area has been relatively undisturbed since Precambrian time. Two distinct geologic features exist in the central stable region near the FEMP site:

- The Cincinnati Arch which extends northward from Tennessee to the western border of Ohio and Kentucky
- The Findlay Arch which extends northeastward in the northwest corner of Ohio and intersects the Bowling Green fault zone. Faulting in the areas of the FEMP site is limited. The Bowling Green fault lies approximately 120 miles to the north of the FEMP site and an unnamed fault zone extends from Kentucky to about midway between Cincinnati and Portsmouth, Ohio. Outside the state of Ohio, the active New Madrid fault zone lies approximately 300 miles away from the FEMP site.

The largest known earthquake to have occurred in Ohio occurred in the Anna, Ohio area on March 9, 1937 and has been listed as MMI of VII to VIII. The corresponding MMI at the FEMP site would have been IV to V. There have been four earthquakes in the Anna, Ohio area having MMIs of VII, and would probably have resulted in intensities of IV to V at Fernak. However, it appears that based on historical activity the New Madrid seismic zone can be a greater seismic threat to the FEMP site than the Anna, Ohio seismic zone. The MMI at the FEMP site for the 1811 to 1812 New Madrid series earthquake is VII based upon an isoseismal map of the December 16, 1811 earthquake (Algermissen 1983).

For new facilities, there are usually two earthquake levels to be considered in design. The design or operating level earthquake corresponds to a 100-year return period for a 50-year design life facility. The maximum or most credible earthquake corresponds to a return period in the range of 500 years to 1000 years. When safety is a consideration for new facilities, the facility should be designed to approximately a 500-year return period earthquake level. For the FEMP site, the 100-year return period design basis earthquake corresponds to 0.06g PGA. Similarly, the 500-year to 1000-year most credible earthquake corresponds to a PGA of 0.10g to 0.12g. In addition to the above, all new or

renovated moderately hazardous facilities at the FEMP Site are required by DOE Order 6430.1A (DOE 1988) to be shut down safely in the event of a 1000-year return period PGA of 0.12g.

However, the revised DOE Order 6430.1A (DOE 1989) references UCRL-15910 "Design and Evaluation Guidelines for Department of Energy Facilities Subjected to Natural Phenomena Hazards" as an acceptable approach for design evaluation of DOE facilities for the effects of natural phenomena hazards. For the FEMP, UCRL-15910 recommends maximum horizontal ground surface accelerations of 0.10g, 0.13g, and 0.20g for earthquake hazard annual exceedance probabilities of 2×10^{-3} , 1×10^{-3} , and 2×10^{-4} , respectively; that is, return periods of 500-year, 1000-year, and 5000-year, respectively.

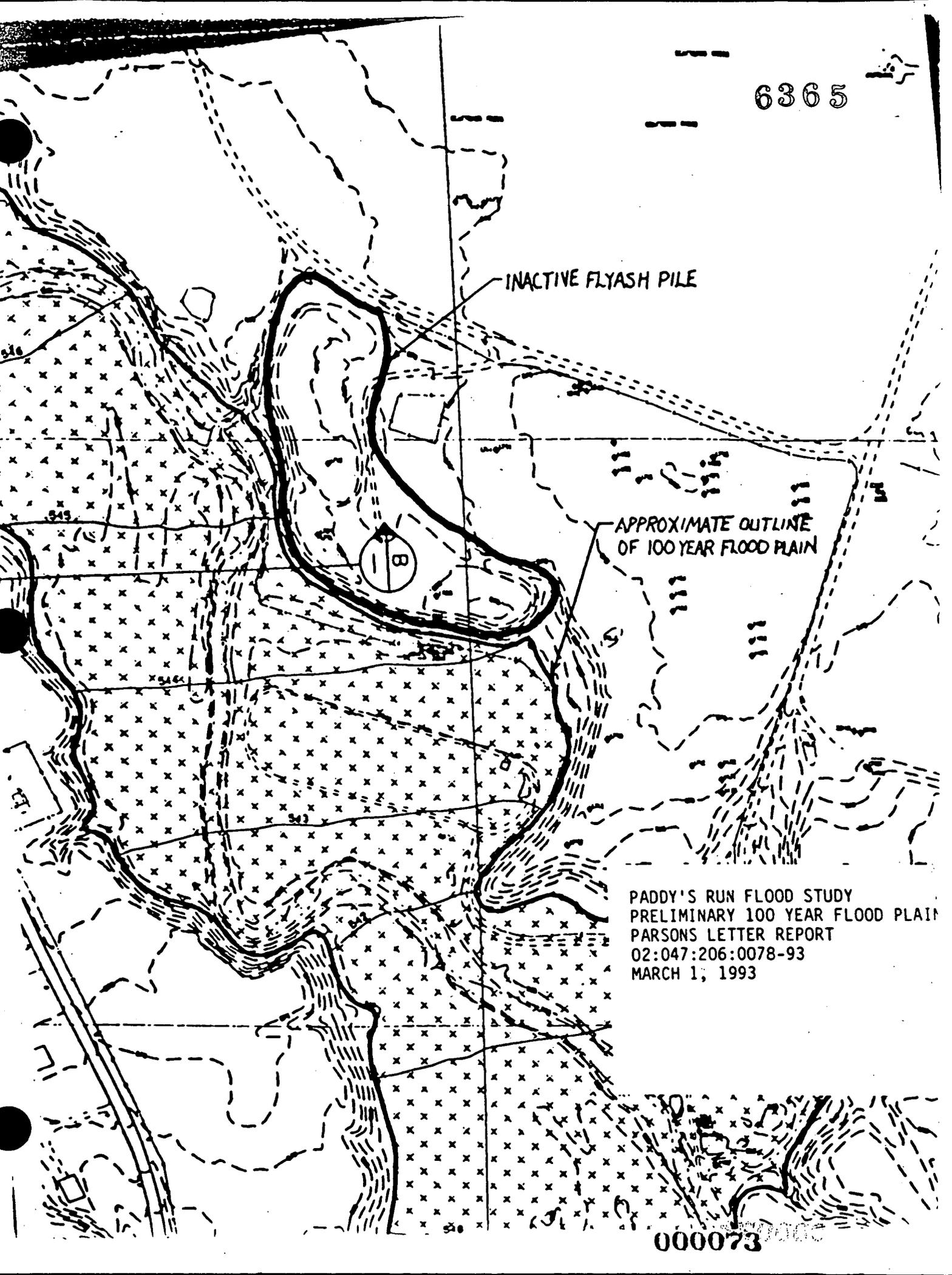
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INACTIVE FLYASH PILE

APPROXIMATE OUTLINE
OF 100 YEAR FLOOD PLAIN

PADDY'S RUN FLOOD STUDY
PRELIMINARY 100 YEAR FLOOD PLAIN
PARSONS LETTER REPORT
02:047:206:0078-93
MARCH 1, 1993

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ATTACHMENT 6

Floodplain Assessment,
OU2 Inactive Flyash Pile
Erosion Control Project at Paddys Run

**FLOODPLAIN ASSESSMENT
OU2 INACTIVE FLYASH PILE
EROSION CONTROL PROJECT**

**PREPARED FOR
THE U.S. DEPARTMENT OF ENERGY - FERNALD FIELD OFFICE
BY
FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION
P.O. BOX 398704
CINCINNATI, OHIO 45239-8704**

000075 (1/1/00)

1.0 INTRODUCTION

The Inactive Flyash Pile (IFAP), a subunit of Operable Unit (OU) 2, is located approximately 2,000 feet southwest of the Fernald Environmental Management Project (FEMP) former Production Area and covers approximately 3.1 acres. Its western boundary is partly defined by Paddys Run which eventually flows into the Great Miami River (GMR) south of the FEMP site (Figure 1). The FEMP site is located 18 miles northwest of downtown Cincinnati, Ohio.

Flyash and bottom ash from the FEMP's coal-fired boiler plant and other materials were deposited in the IFAP area from 1952 to approximately 1968. The total quantity of ash disposed in this area has been estimated at 78,500 cubic yards (DOE 1992). In the area along Paddys Run, the nearly vertical side wall of the eastern most stream bank extends from the stream bed up approximately 10 feet to the vegetated bank near the toe of the IFAP.

Although the IFAP is currently intact, continued erosion of Paddys Run could undermine the IFAP's western slope and eventually result in discharge of ash and potentially contaminated waste and fill into Paddys Run. A slope failure could potentially deposit large quantities of waste and fill material into the stream channel of Paddys Run.

A comprehensive radiological survey of the IFAP was completed by the Department of Energy - Fernald Field Office (DOE-FN) on April 30, 1992 (FERMCO 1993a). The survey identified surface areas having gross beta/gamma readings of greater than 1,000 Disintegrations ions per minute per 100 square centimeters (DPM/100 cm²) and gamma radiation levels exceeding 20 microrem per hour (μ R/hr). Site background levels were established for soils at 60 DPM/100 cm² or 10 μ R/hr, respectively. Based on these criteria, eight "contaminated areas" were defined as having fixed or removable contamination exceeding 1,000 DPM/100 cm² or 20 μ R/hr. In addition, analytical data for the underlying soil obtained during the OU2 Remedial Investigation show levels of radionuclide contamination above background levels.

The DOE determined pursuant to the National Environmental Policy Act (NEPA) that the Time Critical Removal Action qualified for a categorical exclusion (CX). The removal action involves two phases (i.e., Phase I and Phase II). The fundamental objective of the removal action is to protect human health and the environment.

2.0 PROJECT DESCRIPTION

After evaluation of the threat of release, a Time Critical Removal Action was determined to be appropriate to control the immediate threat of release in case of slope failure. During Phase I of the Time Critical Removal Action, an access roadway was constructed to the western slope of the IFAP, and a rock berm was installed on the east bank of Paddys Run adjacent to the IFAP. The rock berm is approximately 220 feet long with a width of about 10 feet at the top and a nominal width of 18 feet at the base. The berm is about 8 feet deep at its deepest point.

Phase I of the Time Critical Removal Action improved the stability of the bank until a more permanent action (Phase II) is implemented (FERMCO 1993b). The results of a preliminary analysis indicated that, under preconstruction conditions, the flyash pile and bank were marginally stable with a safety factor of

1.15. The placement of the rock berm, through the Phase I Time Critical Removal Action, increased the stability of the pile to a safety factor of 1.33. The preliminary computation of the safety factor under seismic conditions was 1.06 following berm construction. The Corps of Engineers (COE) advises using a minimum safety factor of 1.50 for long-term steady state conditions and 1.00 for long-term conditions with seismic loading (FERMCO 1993b).

After further evaluation, the DOE determined that an additional action (Phase II) to install a long-term erosion control measure for the east bank of Paddys Run at the IFAP is required. The proposed action will consist of additions to the rock berm recently constructed during Phase I of the Time Critical Removal Action performed in April and May of 1993. The action will increase the height of the rock berm and add toe protection to insure the stability of the berm itself.

Under Phase II, rock will be added to increase the nominal height of the berm three feet to Elevation (Elev.) 540 Feet (Ft.) Mean Sea Level (MSL) in critical areas. The added weight of the rock will increase the forces resisting any slope failure and provide more stability. More importantly, this rock will cover the exposed vertical soil face above Elev. 537 Ft. MSL and minimize erosion during high water levels.

As part of Phase II, toe protection will also be provided along the berm. This toe protection will be of two types. In areas where Paddys Run is already eroding the stream bed from below the toe of the berm, crushed limestone (3" to 5" size) will be added to return the bed to its approximate original level. In other areas, stone of the same size and type will be placed along the toe of the berm in such a manner that the stone will tumble down into any eroded areas created by the stream at the base of the berm.

With the Phase II improvements, stability analyses by Parsons (1993a) have shown that the safety factor under long-term steady state conditions will be increased to approximately 1.80 and under seismic loading will be 1.50.

3.0 FLOODPLAIN ASSESSMENT

The effect of the removal action upon the floodplain can be analyzed in two different ways. The first is its effect upon the overall floodplain of the GMR. The second is its effect upon the floodplain along Paddys Run itself. In the first case, the area affected by the removal action is approximately 0.16 acres. The floodplain of the GMR, just between miles 19 and 24 (Paddys Run intersects the GMR just north of mile 20), is 1600 acres; hence, any effect on the GMR floodplain would be insignificant. If any significant effects are to be anticipated, they would be along Paddys Run in the vicinity of the removal action. Therefore, the following analysis concentrates on the latter case.

3.1 Floodplain Analysis, Prior To The Removal Action

A study by Parsons (1993b) examined the 100-year floodplain along Paddys Run. The results of this study predicted a 100-year flood flow of approximately 11,150 cubic feet per second (cfs). In the vicinity of the IFAP, that flow was estimated to yield an elevation of 546 Ft. MSL. Figure 2 presents the overall results of the floodplain study in the vicinity of the FEMP.

3.2 Floodplain Analysis, Following Phase II Of The Removal Action

An analysis of the proposed Phase II berm construction was performed (1993c) using the same flow established in the Parsons study (1993b). This simplified analysis was done to determine the increase in water level that might be caused by the completed removal action. The results showed that 100-year flood elevations along Paddys Run, in the vicinity of the berm, might increase by approximately 0.3 feet beyond the pre-construction level. Because of the slope of the land on each side of the floodplain, this level increase would widen the flooded area by about 1.5 feet on the west and 0.6 feet on the east. Since the lands to the west and east are pasture and flyash pile respectively, the potential increase is not considered to be significant.

4.0 REMOVAL ACTION ALTERNATIVES

The activities discussed in the previous sections were chosen from among several possible alternatives. The major alternatives were no action, installation of sheetpiling, reshaping and flattening of the IFAP, and construction of a rock berm. While many individual variations of these alternatives are possible and several were subject to stability analysis, only the most serious alternatives are discussed below.

4.1 No Action

The No-Action Alternative consists of leaving the original slope in place. The alternative includes no emergency berm and, under preliminary analysis, yields a safety factor of 1.15. This factor is considered marginal, and the factor would be reduced by subsequent erosion, thus increasing the threat of release of hazardous substances into the floodplain.

4.2 Sheetpile

This alternative involves driving sheetpiling behind a rock berm and backfilling with soil. The rock berm is a larger version of the berm installed in Phase I. The relative cost of this alternative is high and less expensive alternatives provide better stability.

4.3 Reshaping And Flattening Of Flyash Pile

This alternative includes reshaping and flattening of the flyash pile slope above Elev. 555 Ft. either alone or in conjunction with other stability measures. This also has a high relative cost, requires the immediate displacement of vegetation (including a large number of trees) on the flyash pile, and requires siting an area to stockpile the removed materials.

4.4 Rock Berm

Construction of a rock berm to a number of different elevations was considered. A rock berm satisfies stability requirements, does not require removal of material from the area, and is relatively inexpensive. Construction of a berm to Elev. 537 Ft. provides a quick solution for emergency conditions. Construction to a higher elevation, of 540 Ft. provides the necessary additional stability as well as additional erosion protection against higher flood levels.

5.0 REFERENCES

FERMCO 1993a. CONTRACT DE-AC05-920R21972, "Removal Site Elevation - Erosion Control at Inactive Flyash Pile," letter dated March 9, 1993.

FERMCO 1993b. CONTRACT DE-AC05-920R21972, "Removal Site Elevation - Erosion Control at Inactive Flyash Pile," letter dated March 18, 1993.

FERMCO 1993c. CONTRACT DE-AC05-920R21972, "Paddys Run, 100-Year Flood Elevation," Interoffice memorandum, dated August 15, 1993.

Parsons June 1993a, "Subsurface Exploration, Erosion Control at the Inactive Flyash Pile," Revision 0, Fernald Environmental Restoration Management Corporation, Cincinnati, Ohio, prepared for U.S. Department of Energy, Fernald Field Office.

Parsons July 1993b, "Supporting Study of In Situ Remediation," 90% Draft Report, Revision, Fernald Environmental Restoration Management Corporation, Cincinnati, Ohio, prepared for U.S. Department of Energy, Fernald Field Office.

U. S. Dept. of Energy, April 1992, "Site-Wide Characterization Report Final," Ohio, Remedial Investigation and Feasibility Study, Fernald Field Office, DOE, Fernald, OH.

U. S. Environmental Protection Agency, 1992, "Compliance with Floodplains/Wetlands Environmental Review Requirements," FR Volume 57 Number 80, April 24, 1992.

6365

Attachment 7

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ATTACHMENT 7

Letter from B. Carter/COE to T. J. Rowland/DOE
dated April 1, 1993 (ID No. 199300361-bkc)



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
P.O. BOX 59
LOUISVILLE, KENTUCKY 40201-0059

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April 1, 1993

Operations and Readiness Division
Regulatory Branch (North)
ID No. 199300361-bkc

Mr. Thomas J. Rowland
Acting Manager
Department of Energy
Fernald Environmental
Management Project
P.O. Box 398705
Cincinnati, Ohio 45239-8705

Dear Mr. Rowland:

This is in regard to your March 26, 1993, application requesting authorization to place limestone rock along 280 linear feet of the bank of Paddy's Run. The proposed site is located in Hamilton County, Ohio. We have reviewed the submitted data to determine whether a Department of the Army (DA) permit will be required under the provisions of Section 404 of the Clean Water Act.

The proposed work is authorized under the provisions of 33 CFR 330 Nationwide Permit (NWP) No. 13, for bank protection activities less than 500 feet in length that will not exceed an average of 1 cubic yard per running foot of bank below the Ordinary High Water mark. An individual DA permit will not be required provided the work is done in compliance with the enclosed NWP Conditions and the following criteria are met:

- a. No material is placed in any special aquatic site, including wetlands.
- b. No material is of the type or is placed in any location or in any manner so as to impair surface water flow into or out of any wetland area.
- c. No material is placed in a manner that will be eroded by normal or expected high flows.
- d. The activity is part of a single and complete project.

This verification will be valid for a period of 2 years from the date of this letter.

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If you have any questions, please contact this office at the above address, ATTN: CEORL-OR-FN or call me at (502) 582-5607. Any correspondence on this matter should refer to our ID No. 199300361-bkc.

Sincerely,

Brenda Carter

Brenda Carter
Project Manager
Regulatory Branch

Enclosure

Nationwide Permit Conditions

General Conditions: The following general conditions must be followed in order for any authorization by a nationwide permit to be valid:

1. *Navigation.* No activity may cause more than a minimal adverse effect on navigation.
2. *Proper maintenance.* Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.
3. *Erosion and siltation controls.* Appropriate erosion and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills must be permanently stabilized at the earliest practicable date.
4. *Aquatic life movements.* No activity may substantially disrupt the movement of those species of aquatic life indigenous to the waterbody, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water.
5. *Equipment.* Heavy equipment working in wetlands must be placed on mats or other measures must be taken to minimize soil disturbance.
6. *Regional and case-by-case conditions.* The activity must comply with any regional conditions which may have been added by the division engineer (see 33 CFR 330.4(e)) and any case specific conditions added by the Corps.
7. *Wild and Scenic Rivers.* No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status. Information on Wild and Scenic Rivers may be obtained from the National Park Service and the U.S. Forest Service.
8. *Tribal rights.* No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.
9. *Water quality certification.* In certain states, an individual state water quality certification must be obtained or waived (see 33 CFR 330.4(c)).
10. *Endangered Species.* No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the district engineer if any listed species or critical habitat might be affected or is in the vicinity of the project and shall not begin work on the activity until notified by the district engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized. Information on the location of threatened and endangered species and their critical habitat can be obtained from the U.S. Fish and Wildlife Service and National Marine Fisheries Service. (see 33 CFR 330.4(f))
11. *Historic properties.* No activity which may affect Historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the DE has complied with the provisions of 33 CFR 325, Appendix C. The prospective permittee must notify the district engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)).

Section 404 Only Conditions

In addition to the General Conditions, the following conditions apply only to activities that involve the discharge of dredged or fill material and must be followed in order for authorization by the nationwide permits to be valid:

1. *Water supply intakes.* No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.
2. *Shellfish production.* No discharge of dredged or fill material may occur in areas of concentrated shellfish production, unless the discharge is directly related to a shellfish harvesting activity authorized by nationwide permit 4.
3. *Suitable material.* No discharge of dredged or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, etc.) and material discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).
4. *Mitigation.* Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e. on-site), unless the DE has approved a compensation mitigation plan for the specific regulated activity.
5. *Spawning areas.* Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable.
6. *Obstruction of high flows.* To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).
7. *Adverse impacts from impoundments.* If the discharge creates an impoundment of water, adverse impacts on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.
8. *Waterfowl breeding areas.* Discharges into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.
9. *Removal of temporary fills.* Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

ATTACHMENT 8

Letter from B. Carter/COE to R. J. Hansen/DOE
dated August 27, 1993 (ID No. 199300918-bkc)



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
P.O. BOX 50
LOUISVILLE, KENTUCKY 40201-0050

August 27, 1993

Operations and Readiness Division
Regulatory Branch (North)
ID No. 199300918-bkc

Mr. Raymond J. Hansen
Acting Manager
Department of Energy
Fernald Environmental Management Project
P.O. Box 398705
Cincinnati, Ohio 45239-8705

Dear Mr. Hansen:

This is in regard to your letter dated July 27, 1993, concerning a proposal to place fill material for bank protection in Paddys Run Creek, Hamilton County, Ohio. We have reviewed the submitted data to determine whether a Department of the Army (DA) permit will be required under the provisions of Section 404 of the Clean Water Act.

In accordance with the "Notification" general condition as outlined in 33 CFR Section 330 Appendix A, Part C (13), the material meets the requirement of Nationwide Permit (NWP) No. 13 for bank stabilization. However, it is your responsibility to contact the Ohio State Historic Preservation Office. We also require compliance with the enclosed General Conditions. This verification is only valid for 2 years from the date of this letter.

If you have any questions, please contact this office at the above address, ATTN: CEORL-OR-FN or call me at (502) 582-5607. Any correspondence on this matter should refer to our ID No. 199300918-bkc.

Sincerely,

Brenda Carter

Brenda Carter
Regulatory Specialist
Regulatory Branch

Enclosure

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General Conditions: The following general conditions must be included in every permit by a nationwide permit to be valid:

1. **Navigation.** No activity may cause more than a minimal adverse effect on navigation.
2. **Proper maintenance.** Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.
3. **Erosion and siltation controls.** Appropriate erosion and siltation controls ~~must be used and~~ maintained in effective operating condition during construction, and all exposed soil and other fills must be permanently stabilized at the earliest practicable date.
4. **Aquatic life movements.** No activity may substantially disrupt the movement of those species of aquatic life indigenous to the waterbody, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water.
5. **Equipment.** Heavy equipment working in wetlands must be placed on mats or other measures must be taken to minimize soil disturbance.
6. **Regional and case-by-case conditions.** The activity must comply with any regional conditions which may have been added by the division engineer (see 33 CFR 330.4(e)) and any case specific conditions added by the Corps.
7. **Wild and Scenic Rivers.** No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status. Information on Wild and Scenic Rivers may be obtained from the National Park Service and the U.S. Forest Service.
8. **Tribal rights.** No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.
9. **Water quality certification.** In certain states, an individual state water quality certification must be obtained or waived (see 33 CFR 330.4(c)).
10. **Endangered Species.** No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the district engineer if any listed species or critical habitat might be affected or is in the vicinity of the project and shall not begin work on the activity until notified by the district engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized. Information on the location of threatened and endangered species and their critical habitat can be obtained from the U.S. Fish and Wildlife Service and National Marine Fisheries Service. (see 33 CFR 330.4(f))
11. **Historic properties.** No activity which may affect Historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the DE has complied with the provisions of 33 CFR 325, Appendix C. The prospective permittee must notify the district engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)).

Section 404 Only Conditions

In addition to the General Conditions, the following conditions apply only to activities that involve the discharge of dredged or fill material and must be followed in order for authorization by the nationwide permits to be valid:

1. *Water supply intakes.* No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.
2. *Shellfish production.* No discharge of dredged or fill material may occur in areas of concentrated shellfish production, unless the discharge is directly related to a shellfish harvesting activity authorized by nationwide permit 4.
3. *Suitable material.* No discharge of dredged or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, etc.) and material discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).
4. *Mitigation.* Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e. on-site), unless the DE has approved a compensation mitigation plan for the specific regulated activity.
5. *Spawning areas.* Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable.
6. *Obstruction of high flows.* To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound water).
7. *Adverse impacts from impoundments.* If the discharge creates an impoundment of water, adverse impacts on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.
8. *Waterfowl breeding areas.* Discharges into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.
9. *Removal of temporary fills.* Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

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Attachment 9

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ATTACHMENT 9

Memorandum from B. Schmidt/FERMCO to S. Garland/FERMCO
dated June 29, 1993 (FERMCO #: M:RP(SA):93-0358)

REQUEST FOR SAFETY ASSESSMENT

DATE
3-16-93

TO
Safety Analysis & Risk Assessment
Manager, Nuclear & System Safety

FROM
JAY HENSKOWITZ, CRU2

REQUEST THAT A SAFETY ASSESSMENT BE PREPARED FOR THE FOLLOWING PROJECT:

PROJECT TITLE
EROSION CONTROL AT INACTIVE FLYASH PILE

PROJECT NUMBER
RDK-01

DATE REQUIRED
= SEE ATTACHED SCHEDULE

PROJECT DESCRIPTION (PROVIDE A BRIEF DESCRIPTION AND/OR ATTACH DOCUMENTATION DESCRIBING THE PROJECT)

EROSION OF ~~THE~~ THE PADDYS RUN
STREAM BANK ADJACENT TO THE
INACTIVE FLYASH PILE IS THREATENING
TO UNDERMINE THE PILE THEREBY
DISCHARGING ASH AND OTHER DISPOSED
MATERIAL INTO THE STREAM CHANNEL.
THE ATTACHED REMOVAL SITE EVALUATION
AND CONSTRUCTION MEETING MINUTES (3/11/93)
DESCRIBE ^{THIS PROJECT} IN FURTHER DETAIL.

SIGNATURE OF REQUESTER

Jay M. Hensowitz, CRU2 3-16-93

WPC-0324-2708 (REV. 4/1988)

000091

REQUEST FOR SAFETY ASSESSMENT

Safety Analysis + Risk Assessment report

This section to be filled in by Manager, ~~Approval and System Safety~~

SAFETY ASSESSMENT IDENTIFICATION NUMBER:

93-0008

The request to provide a Safety Assessment by _____ accepted: the individual assigned to the project is:

Name: FJ Petrik Phone No.: 8472

An assessment has been performed for the project described in this request and this form will serve as the Safety Assessment document. Based on the information provided with this request for Safety Assessment, no further analysis or documentation is required because this project:

does not introduce or involve hazards not routinely encountered in industry and accepted by the public.

RATIONALE:

* See NOTE below

The majority of the hazards associated with the field activities at the CRU2 Erosion Control at Inactive Fiyash Pile are of standard industrial type posing the most risk to the individual worker. Provisions for addressing the risks will be covered in the Project Specific Health and Safety Plan. Construction activities are identified in the Construction Work Plan. Radiation Work Permitting will also be required even though the access to the site and the work site itself are outside of any known radiological contamination zones. No hazardous chemicals are involved.

Documents reviewed to support this Safety Assessment include the Removal Site Evaluation (RSE) dated March 1993, the Construction Work Plan and the Meeting Notes File Record Storage Copy 104.5 dated March 12, 1993. No Safety Assessment prepared in accordance with SOP SP-A-01-013 Rev 1 is necessary for this project.

is of a type specifically excluded from requiring a Safety Analysis Report by DOE Letter "Streamlining the Safety Documentation Process" (C. C. Hawkins, 10/9/79).

RATIONALE:

* See NOTE below

SIGNATURE OF MANAGER, PROJECT AND SYSTEM SAFETY: Safety Analysis + Risk Assessment DATE: 4-5-93

*NOTE: If either rationale above is employed to conclude that further Safety Analysis Documentation is unnecessary, approval by the Manager, Regulatory Compliance, and the appropriate Technical Department Level-III Manager is required.

SIGNATURE OF MANAGER, REGULATORY COMPLIANCE: _____ DATE: _____

SIGNATURE OF TECHNICAL DEPARTMENT SECTION MANAGER: Harland DATE: 04/06/93

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ATTACHMENT 10

Project Specific Health and Safety Plans

(Note: The Plan for the second phase
was addressed by attachments to
the plan for the first phase.)

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**CRU2 BANK STABILIZATION of PADDY'S RUN
AT THE INACTIVE FLYASH PILE
SPECIFIC HEALTH and SAFETY PLAN**

**EMERGENCY PHONE: 738-6511
RADIO: CONTROL**

APPROVALS:

James B. Williams 4-14-93
Jim Williams, CRU2 Project Director

John V. Palermo 4-14-93
John Palermo, Health & Safety Officer

Daryl Mills 4-14-93
Daryl Mills, Occupational Safety & Health

Revision 0, April 14, 1993

000094

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TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	DESCRIPTION AND HISTORY	1
1.2	CHARACTERIZATION	2
1.3	SCOPE	2
1.4	GOAL OF THE PROJECT	2
2.0	WORK AREA and MANAGEMENT FOR THIS PROJECT	3
2.1	WORK AREA	3
2.2	MANAGEMENT CHAIN OF COMMAND	3
2.3	FERMCO CRU2 MANAGEMENT	3
3.0	GENERAL SAFETY REQUIREMENTS	3
3.1	PERMITS and POSTINGS	3
3.2	SAFETY EQUIPMENT	5
3.3	HEAT STRESS	6
3.4	MATERIAL SAFETY DATA SHEETS (MSDS)	6
3.5	ILLUMINATION	7
	TABLE 1 REQUIRED ILLUMINATION	7
3.6	SANITATION AT WORKSITE	7
3.7	PROCEDURE AND OTHER REQUIREMENTS	7
4.0	SITE CONTROL	8
4.1	FEMP REQUIREMENTS	8
4.2	WORK SITE REQUIREMENTS FOR ENTRY	8
5.0	TRAINING AND EDUCATION	9
5.1	REQUIRED TRAINING for ENTRY to SITE	9
5.2	OPERATIONAL TRAINING of CONSTRUCTION TYPE EQUIPMENT	10
5.3	REQUIRED SAFETY MEETINGS	10
5.4	RECORDS of TRAINING	10
5.5	VISITORS	11
6.0	MEDICAL MONITORING AND SURVEILLANCE	11
6.1	REQUIRED MEDICAL MONITORING	11
6.2	REQUIRED MEDICAL RECORDS	12
7.0	PERSONAL PROTECTION EQUIPMENT REQUIREMENTS	12
7.1	PERSONAL PROTECTIVE EQUIPMENT	12
7.2	LEVELS OF PROTECTION	13

TABLE OF CONTENTS (cont.)

8.0	REQUIRED MONITORING AND ACTION LIMITS	14
8.1	GENERAL	14
	TABLE 2 I. H. AIR MONITORING REQUIREMENTS	16
8.2	RADIOLOGICAL MONITORING	19
	TABLE 3 RADIOLOGICAL SAFETY ACTION LEVELS	21
	TABLE 4 AIRBORNE RADIOACTIVITY MEASUREMENTS	21
	TABLE 5 ACTION LEVELS for MEASURING AIRBORNE RADIONUCLIDES	22
8.3	INSTRUMENTATION	24
8.4	RADIOACTIVE MONITORING INSTRUMENTATION	25
8.5	INITIAL MONITORING	26
9.0	HANDLING DRUMS AND CONTAINERS	26
10.0	DECONTAMINATION	26
11.0	HAZARD ASSESSMENT	26
	TABLE 6 HAZARDS BY JOB TASK	27
11.1	INDUSTRIAL HYGIENE ISSUES	27
11.2	RADIOLOGICAL SAFETY ISSUES	28
11.3	INDUSTRIAL SAFETY	28
12.0	EMERGENCY/CONTINGENCY PLANS	31
12.1	REPORTING	31
	12.1.1 EMERGENCY PHONE NUMBERS	32
12.2	EVACUATION ROUTES/ACCOUNTABILITY	33
12.3	AVAILABLE EMERGENCY EQUIPMENT	33
13.0	CHANGES/AMENDMENTS to HEALTH and SAFETY PLAN	34
	13.1 CONTROL OF HEALTH & SAFETY PLAN	34
Appendix A	Work Zone	
Appendix B	Table of Contents for ESH-1-1000 and Pertinent SPRs	
Appendix C	FEMP Rally Points	
Appendix D	Location of FEMP Medical Facility	
Attachment A	Acknowledgement Log	
Attachment B	Material Safety Data Sheets	
Attachment C	FEMP Minutes of Safety Meeting	
Attachment D	Job Safety Analysis	

Revision 0, April 14, 1993

000096

1.0 INTRODUCTION

This Health and Safety Plan provides the methods for dealing with potential hazardous substances and situations associated with the CERCLA / RCRA Unit 2 (CRU2) Bank Stabilization of Paddy's Run at Inactive Flyash Pile. This plan provides an overview of the operation, the work areas, the necessary health and safety training and the requirements for dealing with the health and safety issues involved.

This plan has been developed to meet the requirements of OSHA 29 CFR 1910.120, FERMCO safety requirements and project specifications.

This Health and Safety Plan is meant to be used as a practical working document for field use at this site. While not specifically mentioned, all OSHA and FERMCO procedures shall be followed during all phases of operation.

All personnel entering a defined work area will be required to read this Health and Safety Plan. Upon reading, they must sign an acknowledgement form (Attachment A) stating they have read and understand the conditions of this plan. The acknowledgment form will be controlled by site supervisor, then filed with project files.

Visitors who shall not perform any work-like activities must be briefed on the contents of this Health and Safety Plan. The visitor will be escorted at all times. (see section 5.0)

1.1 DESCRIPTION AND HISTORY

The Fernald Environmental Management Project (FEMP) is located in Southwestern Ohio, approximately twenty miles northwest of downtown Cincinnati, near the communities of Miamitown and Ross, Ohio. Of the total site area of 1050 acres, 850 are in Crosby Townships of Hamilton County and 200 are in Ross and Morgan Townships of Butler County, Ohio. The FEMP is owned by the U. S. Department of Energy (DOE) and operated by Fernald Environmental Restoration Management Corporation (FERMCO).

The FEMP was built in 1950 and full operation started in 1953. The purpose of the facility was to establish an in-house integrated production complex for processing uranium and its compounds from natural uranium ore concentrates for use in government defense programs. A wide variety of chemical and metallurgical process steps were utilized to support the production of uranium metal products. The mission is now waste management and environmental restoration.

1.2 CHARACTERIZATION

Flyash and bottom ash (hereafter referred to as flyash) from the FEMP's coal-fired boiler plant and other materials were deposited in the Inactive Flyash Pile (IAFAP) area from 1952 to approximately 1968. The total quantity of ash (30% flyash and 70% bottom ash) disposed in this area has been estimated at 78,500 CY (OU2 RI, October 1992). Although the area has been covered with soil, and natural vegetation has developed, materials such as concrete, steel drum lids and asbestos containing transite are visible at the surface. These materials are particularly evident along the IAFAP and Paddys Run border where geomorphological processes (e.g., erosion due to intermittent stream flow) have impacted the eastern stream bank. In this area, the nearly vertical side walls of the stream bank extend from the stream bed up approximately 15 feet to the vegetated bank near the toe of the IAFAP. The chain barrier fence is offset approximately 2 feet from the top of the stream bank.

During recent months, above average precipitation has caused a stream flow condition that has accelerated the rate of stream bank erosion. In some locations adjacent to the IAFAP, the sand and gravel side walls of the stream bank have been undercut to form an overhang of soil above it. Portions of the stream bank have slumped into the stream channel in at least three locations.

Although the IAFAP is currently intact, continuation of the erosion process at the current rate (i.e., small and slow displacements of soil) could eventually undermine the pile's western slope and may result in discharge of ash and potentially contaminated waste and fill into Paddys Run. This particular stretch of Paddys Run represents one of the streams most prominent meanders. It is in the outside bend of this meander where the stream velocities are greatest and where turbulent currents are generated. These currents are impacting toe support and may render a portion of the IAFAP's western slope susceptible to a slope failure. A slope failure could potentially deposit large quantities of waste and fill material into the stream channel.

1.3 SCOPE

At a bend in Paddy's Run tangent to the Inactive Flyash Pile, approximately 280 lineal feet of bank is in need of slope improvement. Slope improvement will stabilize the bank and mitigate break-up and sloughing of the Inactive Flyash. Slope improvement will be effected by the installation of a weighted berm in the run approximately 7' deep x 10' wide (top) x 280' long. The slope of the berm in the stream will be 1(horizontal) to 2 (vertical). The berm will be constructed with 12" nominal crushed lime stone compacted by the placement equipment.

1.4 GOAL OF THE PROJECT

Improve the slope protection of approximately 280 lineal feet of the Paddy's Run bank. This action will mitigate the undercutting of the bank and prevent sloughing of the bank into Paddy s Run.

2.0 WORK AREA and MANAGEMENT FOR THIS PROJECT

2.1 WORK AREA

The work area for this project is Paddy's Run Creek on the southwest corner of the inactive flyash pile.

The work area shall be completely defined from other areas. This shall be accomplished with barriers and signs. Entrances into the work area shall be posted as a construction area and entry restricted to authorized personnel only. The posting shall include the following information as a minimum:

- Project name
- Requirements for entry
- Name of contact person

The work area shall have a defined entrance/exit. All barricade or tape/rope barriers shall be tagged to identify who installed it and why it was installed. Radiological postings will be installed by FERMCO Radiation Control.

2.2 MANAGEMENT CHAIN OF COMMAND

2.2.1 Manager CRU2	Jim Williams
2.2.2 Manager Engineering CRU2	Steve Garland
2.2.3 Project Engineer CRU2	Al Guillen
2.2.4 Health and Safety Officer CRU2	John V. Palermo
2.2.5 Construction Manager CRU2	Warren Hooper

2.3 FERMCO CRU2 MANAGEMENT

FERMCO CRU2 Management shall ensure that all personnel entering the work area are in full compliance with all requirements within this plan and all other FEMP Health & Safety requirements. FERMCO management is committed to ensuring that SAFETY is the FIRST priority, ahead of all other issues.

3.0 GENERAL SAFETY REQUIREMENTS

3.1 PERMITS and POSTINGS

3.1.1 PERMITS

Required permits for each task shall be specified in the hazards assessment section (section 11). The safety and health requirements on permits shall meet all requirements stated in this Health and Safety Plan. For additional information refer to section 7.1.

The permits shall be posted at the general posting location.

A permit system is used at the FEMP to require written authorization and instructions before beginning work not covered by an SOP. A permit is required because it formalizes the job safety planning both by the supervisor, and the safety and /or hygiene personnel and informs workers of the health and safety requirements of the work.

A work permit is required for any task involving the following:

- Work with hazardous chemicals or materials which is not covered by this Health and Safety Plan
- Elevated work
- Work with radioactive materials
- Work in a radioactively controlled area
- Excavation

The following is a listing of the types of permits that could be required to be obtained during work conducted in CRU2. Also included is the controlling FERMCO Environmental Safety and Health (ES&H) group.

PERMIT	FERMCO ES&H CONTROLLING GROUP	SPR
Chemical Hazardous Materials Work Permit	Industrial Hygiene	SPR 5-15
Hazardous Work Permit	Safety / Industrial Hygiene	SPR 2-57
Construction / Excavation penetration Permit	Construction	SPR 3-9
Radiation Work Permit	Radiological Control	RPR 3-1

While not anticipated, if any work is found that would involve confined space entry, welding / open flame, work with asbestos containing materials, or work with hazardous materials other than those addressed in this health and safety plan, the

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Health and Safety Officer CRU2 shall be informed of such work. Appropriate FEMP work permits shall be obtained and used to control such work.

3.1.2 POSTINGS

The following areas shall be clearly defined and posted according to FERMCO procedures:

Posted Area	Posted By	
	FERMCO	Contractor
Construction Area		X
Exclusion Zone	X	X
Hazardous Noise Areas	X	X
Radiological Controlled / Contamination Areas	X	

At the entrance to the construction area the following must be posted:

This CRU2 Bank Stabilization of Paddy's Run at Inactive Flyash Pile Health and Safety Plan

Material Safety Data Sheets (MSDS) for all chemicals used in the work area.

All active permits

Required safety equipment for entry

OSHA/DOE Employee Rights poster

3.2 SAFETY EQUIPMENT

3.2.1 The following is a minimum list of safety equipment which shall be available at the entrance of the work area. Quantities and types will be based on anticipated needs.

- Personal protective equipment as specified in Section 11 of this Health and Safety Plan.
- Barricade marking tape and/or safety fence
- Safety signs
- Fall protection equipment (full body harness, lanyards)
- Hard Hats (only ANSI Z89.1 listed are permitted)
- Eye protection for welding operations
- Hearing Protection

- Respirator with approved cartridges

3.2.2 EMERGENCY SAFETY EQUIPMENT

Emergency safety equipment shall be made immediately available to the work area. The site supervisor will be responsible for ensuring that the emergency equipment is accessible and maintained in proper working condition. The locations of the emergency safety equipment shall be known to all employees at the work site and posted whenever possible.

Eye wash stations shall be within 100 feet or within 10 seconds of travel time from any operation or use of chemicals that requires an eye wash to be available.

Fire Extinguishers shall be located near any point of hazardous (fire) operations.

A means to communicate any emergency condition must be readily available at all times during any work activity. This may be any of the following: 2-Way radio on FEMP channel, site telephone or Cellular phone.

**EMERGENCY PHONE: 738-6511
RADIO: CONTROL**

3.3 HEAT STRESS

Heat stress may affect personnel with or without protective clothing when working in high ambient temperatures. Plenty of water, rest breaks and careful attention shall be used by the supervisor as control measures. When ambient temperatures exceed 80°F, the FERMCO Industrial Hygiene Technicians shall be contacted to review and/or add control measures to minimize heat stress.

3.4 MATERIAL SAFETY DATA SHEETS (MSDS)

MSDS for all products or chemicals to be used on the job shall be provided to FERMCO (IS&H section) for review prior to the product or chemical arriving on site. Since products or chemicals may be disapproved for use by FERMCO, or may require special work practices or PPE requirements, early (at least one week in advance of planned use) submittal of MSDS is recommended.

Restrictions / precautions specified on the MSDS or specified by FERMCO shall be followed.

A copy of the MSDS shall be attached to this Health and Safety Plan in Attachment B.

All workers who will be working with or in the vicinity of a hazardous chemical shall be trained per section 5.0.

For additional information refer to the comprehensive FERMCO Environmental Occupational Safety and Health Program. (See Appendix B for table of contents)

3.5 ILLUMINATION

Areas accessible to employees shall be lighted to not less than the minimum illumination intensities listed in the following table while any work is in progress:

TABLE 1
REQUIRED ILLUMINATION

FOOT CANDLES	AREA of OPERATION
5	General site areas

The Health & Safety Officer CRU2 may request assistance from FERMCO IH in the evaluation of required lighting conditions.

3.6 SANITATION AT WORKSITE

An adequate supply of potable water shall be provided on the site. The containers used to dispense drinking water shall be capable of being tightly closed, and equipped with a tap. Any container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose. All drinking water locations within a radiological controlled area shall be reviewed by Radiological Control prior to use.

Under temporary field conditions, provisions shall be made to assure that at least one toilet facility is available.

Adequate washing facilities shall be available to employees engaged in operations where hazardous substances are encountered.

3.7 PROCEDURE AND OTHER REQUIREMENTS

Work conducted in connection with the FEMP and FERMCO shall comply with all safety and health procedures in the FERMCO COMPREHENSIVE SAFETY AND HEALTH PROGRAM (ESH-1-1000). Refer to Appendix B.

4.0 SITE CONTROL

4.1 FEMP REQUIREMENTS

All radiologically controlled areas / exclusion (construction) zones shall be clearly defined and posted. Visitors to the site will be restricted to outside of all radiologically controlled areas and exclusion zones unless they meet the criteria in section 5.0.

Exclusion (work and construction) zones will be established by the site supervisor with assistance from the CRU2 Health and Safety Officer.

Radiologically controlled and contamination areas will be established and controlled by FERMCO Radiological Control Department.

4.2 WORK SITE REQUIREMENTS FOR ENTRY

All personnel working on this project will:

- Read this Health and Safety Plan
- Attended a safety meeting where this plan and the project hazards are reviewed
- Sign an acknowledgment form (Attachment A) stating they have read and understand the conditions of this plan and attended the above stated safety meeting.
- Meet the training requirements for the area and task to be performed. (refer to section 5.0)

During the operation the acknowledgement form will be maintained and available for review at the job site. Upon completion of project, the form will be transferred to the project engineer where it will be kept with the project file as a permanent record of the personnel who worked on this project.

4.3 EXCLUSION ZONE

An exclusion zone or radiologically controlled area (based on survey results) is a established zone of high potential hazard due to physical, radiological or chemical dangers. Access to an exclusion zone or radiologically controlled area is restricted to employees who are required to enter in order to perform their job functions. An exclusion zone or radiologically controlled area will be marked with easily recognizable devices such as ropes, tape or fence. Signs shall be posted indicating the type of exclusion zone or radiologically controlled area (based on Industrial Hygiene and/or radiological survey results) and the specific protection

requirements. Exclusion zones or radiologically controlled areas may be expanded if airborne hazards are detected. Radiological areas will be established, controlled and marked as required by DOE/EH - 0256T.

All personnel entering the exclusion zone(s) shall be trained and certified to perform their assigned task and will have reviewed and signed this document.

Entrance to an exclusion zone(s) shall be controlled by the site supervisor. Radiological areas will be controlled by Radiological Controls Department.

5.0 TRAINING AND EDUCATION

5.1 REQUIRED TRAINING for ENTRY to SITE

5.1.1 Work in non radiological controlled areas

- General Employee Training (GET)
- Orientation on the specific Material Safety Data Sheets (MSDS) related to this project.
- Orientation on this Health and Safety Plan
- A Pre-work/Kick-off meeting will be held prior to the start of this project to discuss work activities and safety considerations. Minutes of this meeting will be made available.

In addition the following training may be required

- FEMP Respirator Training and Fit Test.
- Energy Control training

5.1.2 Work in Radiologically controlled areas

In addition to the General Worker training the following training will be required:

- Rad worker 1

5.1.3 Work in Contamination areas

In addition to the above training requirements, employees working in any Radiological contamination zone, airborne radioactivity area, radiation area, or exclusion zones (excavation) will require the following training:

- Radiation Worker II training.

5.2 OPERATIONAL TRAINING of CONSTRUCTION TYPE EQUIPMENT

Employees operating construction or heavy equipment or any equipment that requires training (noted in manufacturers manual or other requirements), shall have been trained in the operation of that equipment. Documentation of the employee successfully completing the training shall be placed on file locally.

The Health & Safety Officer CRU2 shall evaluate the training of all personnel that are operating heavy/specialized equipment.

For FERMCO employees, their supervisor through FERMCO training department shall evaluate the training of all personnel that are operating heavy/specialized equipment. Records of training shall be placed or maintained on file with the FERMCO training department.

5.3 REQUIRED SAFETY MEETINGS

All personnel involved in projects covered by this Health and Safety Plan shall attend a safety meeting prior to being permitted to work within the defined zones. The safety meeting will review this Health & Safety Plan describing all of its requirements, noted hazards and required actions by workers. All personnel will need to attend safety briefings conducted by the CRU2 Health and Safety Officer, Project Manager, or designee assigned to the project.

As a minimum, "tailgate" safety meetings will be held every-other day and more often as needed. Documentation on the briefings will be recorded on the FEMP Minutes of Safety Meeting (Attachment C). Training logs will be maintained as part of the task records. A copy of each safety meeting shall be forwarded to the CRU2 Health and Safety Officer.

The safety meetings will address any new operations, activities or procedures that are to be conducted or changes in work practice that will be implemented due to new information. Briefings will also be given to facilitate compliance with prescribed safety and health practices when performance deficiencies are identified during daily activities or as a result of safety audits.

5.4 RECORDS of TRAINING

All training conducted as specified by this Health and Safety plan shall be in accordance with the requirements in the FEMP Centralized Training Program Manual.

Documentation of training classes attended from sources other than FEMP shall be submitted to FERMCO Construction Management.

5.5 VISITORS

A visitor to the site will be defined as any one coming on-site with the sole purpose of observation or viewing the activity in progress (hands-off inspections). Visitors can not operate any equipment or supervise / oversee any work activity.

Truck drivers making deliveries will not require training if the following restrictions are complied with:

- Drivers shall not leave the cab of their truck
- Drivers shall not eat, drink or smoke while on FEMP property.

5.5.1 Visitors entering the FEMP property, but not entering any radiological controlled areas or exclusion zones shall obtain the following prior to entry:

- Briefing on the Project Specific Health & Safety Plan
- Shall be escorted by a person who has all the required training for the area to be toured.
- No Visitors shall be permitted to enter an Exclusion Zone or Radiological Contaminated Area.

5.5.2 Visitors entering the FEMP property and radiologically controlled areas, but not entering any contaminated areas or exclusion zones shall obtain the following prior to entry into the work area:

- Briefing on this Health & Safety Plan
- Escort by a person who has all the required training for the area be toured
- No Visitors shall be permitted to enter an Exclusion Zone, Contaminated Area, or Airborne Radioactivity Area
- Shall watch the general site orientation video
- Shall wear a Dosimeter badge

5.5.3 Visitors may enter Radiologically Contamination areas with written permission of Radiological Controls Department.

5.5.4 Visitors may enter Exclusion Zones with written permission of CRU2 HSO.

6.0 MEDICAL MONITORING AND SURVEILLANCE

6.1 REQUIRED MEDICAL MONITORING

In accordance with 29 CFR 1910.120, personnel assigned to a FEMP project and performing actual tasks are required to participate in the FEMP medical monitoring

program.

If examinations conducted by medical personnel other than FEMP personnel are planned, the subcontractor must receive prior authorization from FEMP Medical Services concerning the necessary protocols and providers.

Medical surveillance exams will be conducted based upon the following frequency or as determined appropriate by FEMP Medical Services:

- Pre-assignment (baseline)
- Annual (within one year of previous physical)
- After incidents, potential exposures, or physician recommendation
- Exit (termination)

All individuals who are required to work in the process or controlled areas at the FEMP facility will be required to participate in the FEMP radiation in-vivo and bioassay surveillance programs. The radiation surveillance must be conducted according to the following frequency:

- Baseline (site work)
- Periodic
Monthly - bioassay
Yearly - in vivo
- Following an incident
- Upon an individual's request
- Exit (end of project or termination)

All individuals required to wear respiratory protection must be medically approved trained and fit tested. FERMCO will conduct the medical review, training, the respirator fit test and issue a respirator fit test card. FERMCO will accept authorization to use respiratory protection from other organizations provided that proper documentation is provided in advance and meets FERMCO requirements.

6.2 REQUIRED MEDICAL RECORDS

The Medical Department will maintain all medical records as required by FERMCO policy.

7.0 PERSONAL PROTECTION EQUIPMENT REQUIREMENTS

7.1 PERSONAL PROTECTIVE EQUIPMENT

The level of protection to be worn by field personnel will be defined by a task by

task basis. Factors in the selection of personal protective equipment (PPE) shall be based on the materials or chemical compounds that will be encountered or generated by the task activities. The PPE ensemble to be worn is specified in section 11 or will be identified on FERMCO work permits.

The CRU2 Health and Safety Officer (or designee) shall perform work area inspections to determine if PPE is being properly worn and maintained. Should PPE be found to be incorrectly worn, or maintained, the worker will be informed, the problem corrected and CRU2 Management informed of the deficiency. The deficiency will be discussed at a tailgate safety meeting. Should the situation or condition continue, then disciplinary actions will be utilized.

Modification to the protective equipment ensembles may be required for specific operations or when unexpected conditions arise. In these cases, changes will be made based on review of specific hazards, weather, work conditions, operating requirements, and air monitoring at the work area. Respiratory protection and PPE may be upgraded / downgraded or modified, as deemed appropriate by the CRU2 Health and Safety Officer within the constraints of this Health and Safety Plan. The Health and Safety Officer CRU2 shall inform the Project Engineer and direct him to note the change in his project log book and the Health and Safety Plan at the work site.

FERMCO ES&H field personnel (technicians) have the authority to upgrade PPE at the job by issuing a FEMP work permit or FEMP radiation work permit (RWP). The ES&H field personnel do not have the authority to downgrade PPE requirements without permission of the CRU2 Health and Safety Officer. Refer to sections 3.1.1 and 13.1.

7.2 LEVELS OF PROTECTION

For work conducted in non radiologically controlled areas, the minimum protective equipment shall be:

- Safety glasses or goggles (safety glasses ANSI Z87.1 approved)
- Steel toed, leather safety shoes (ANSI Z41 listed)

In addition, the following equipment may be required:

- Hearing Protection
- Gloves
- Additional eye / splash protection
- Hard Hat (only ANSI Z89.1 listed are permitted)

Level D clothing will be required as a minimum for all field personnel performing

task activities within any radiologically controlled / contaminated areas. Level D is intended for use on sites where the risk from chemical contaminants is very low to non-existent. Street cloths shall not be considered Level D clothing.

Level D clothing will consist of:

- Steel toed, leather safety shoes (ANSI Z41)
- Safety glasses or goggles (safety glasses ANSI Z87.1 listed)
- Coveralls or other company-issued work uniforms.

In addition, the following equipment may be required:

- Boot covers
- Additional eye / splash protection
- Vinyl inner gloves
- Nitrile outer gloves
- Hearing protection
- Disposable outer coverall (tyvek)
- Hard Hat (only ANSI Z89.1 listed are permitted)

When monitoring indicates hazards could exceed established action levels, Level C clothing may be required. Level C clothing will consist of the following as determined necessary:

- Air purifying respirator with appropriate cartridges
- Disposable outer coverall (Tyvek, Saranex, or equivalent)
- Vinyl inner gloves
- Nitrile outer gloves
- Chemical resistant steel toed boots
- Outer disposable booties (latex)

In addition, the following equipment may be required:

- Hearing protection
- Hard Hat (only ANSI Z89.1 listed are permitted)

8.0 REQUIRED MONITORING AND ACTION LIMITS

8.1 GENERAL

FEMP policy is to maintain radiation exposures, exposures to toxic substances and combustible gases As Low As Reasonably Achievable (ALARA). The type of monitoring, monitoring equipment and frequency of monitoring is specified in this Health and Safety Plan, by FERMCO ES&H and by the CRU2 Health and Safety

Officer.

Air monitoring will be conducted to determine protection levels required for activities in the work area and to ensure compliance with the regulatory limits and FERMCO action levels.

Action levels will be established on a task by task basis in accordance with regulatory standards. FERMCO Industrial Hygiene and Radiological Control Technicians will provide monitoring support for all activities.

8.1.1 AIR MONITORING

Air monitoring will be conducted during specific activities as described in Table 2 and work permits issued for the activity. These initial requirements for monitoring will be reassessed during the project and will be modified as necessary and documented through the use of Radiation Work Permits and FEMP Work Permits.

8.1.2 PERSONAL SAMPLING

During the performance of the task activities, personal air sampling may be conducted. The intent of the personal air sampling program is to monitor the task workers' exposures to determine the relationship to current regulatory standards. Materials or compounds to be monitored, frequency of monitoring and the sampling method will be determined by CRU2 Health and Safety Officer and FERMCO ES&H.

TABLE 2
I. H. AIR MONITORING REQUIREMENTS

ACTIVITY	CONTAMINANT (1)	FREQUENCY OF MONITORING / TYPE	PERMISSIBLE EXPOSURE LIMIT	ACTION LEVEL	ACTION (2)
Disturbance of Inactive Flyash Pile Material	Nuisance Dust	As Required / Total Dust Monitoring	10 mg/m ³ (total dust)	5 mg/m ³ (total dust)	Air- Purifying Respirator (Magenta Cartridges)
	Barium	As Required / Total Dust Monitoring	See Note 3	5 mg/m ³ (total dust) (See note 3)	Air- Purifying Respirator (Magenta Cartridges)
		As Required / Personal Sampling	0.5 mg/m ³	0.25 mg/m ³	Air- Purifying Respirator (Magenta Cartridges)
	Arsenic	As Required /Total Dust Monitoring	See Note 3	5 mg/m ³ (total dust) (See note 3)	Air- Purifying Respirator (Magenta Cartridges)
		As Required / Personal Sampling	0.01 mg/m ³	.005 mg/m ³	Air- Purifying Respirator (Magenta Cartridges)

TABLE 2
I. H. AIR MONITORING REQUIREMENTS

ACTIVITY	CONTAMINANT (1)	FREQUENCY OF MONITORING / TYPE	PERMISSIBLE EXPOSURE LIMIT	ACTION LEVEL	ACTION (2)
Disturbance of Inactive Flyash Pile Material	Uranium	As Required / Total Dust Monitoring	See note 3	5 mg/m ³ (3) total dust	Air-Purifying Respirator (Magenta Cartridges)
		As Required / Personal Sampling	0.05 mg/m ³ TWA 0.6 mg/m ³ STEL	0.02 mg/m ³ TWA 0.3 mg/m ³ STEL	Air-Purifying Respirator (Magenta Cartridges)
	Organic Vapors	As Required / Organic Vapor Monitoring	Varies	Detection to 10 ppm above background (4)	Air-Purifying Respirator (Magenta/Yellow Cartridges)
				10 to 25 ppm above background (4)	Supplied Air Respirator
				Greater than 25 ppm above background (4)	Self Contained Breathing Apparatus or Withdraw

000113

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TABLE 2
I. H. AIR MONITORING REQUIREMENTS

ACTIVITY	CONTAMINANT (1)	FREQUENCY OF MONITORING / TYPE	PERMISSIBLE EXPOSURE LIMIT	ACTION LEVEL	ACTION (2)
Excavation	Nuisance dust	As required / Total dust monitoring	10 mg / m ³	5 mg / m ³	Air- purifying respirator (Magenta Cartridges)

- (1) The need for monitoring for a specific contaminant will be determined by the FERMCO Health and Safety Officer CRU2 and the I. H. representative based on the material being handled.
- (2) The action may be upgraded or downgraded depending on the actual concentration found, the particular contaminant present, and protection factors of the PPE.
- (3) The action level and required action is dependent on the concentration of barium, arsenic and uranium in the Inactive Flyash Pile. Based on the sample analysis the chemicals barium, arsenic and uranium are present in highest concentration in soil with respect to their occupational airborne limits, however they are present at very low concentrations (ppm levels). Based on the concentration of the chemicals in the soil and the chemicals allowable exposure limits an action limit of 5 mg/m³ total dust will be observed. This action level will protect workers from all of the chemical contaminants that have been found in sample analysis of soil and water.
- (4) The action levels may be modified based on knowledge / determination of the specific materials present.

000114

8.2 RADIOLOGICAL MONITORING

8.2.1 RADIOACTIVE MATERIALS CONTAMINATION (uranium)

The Radiation Control Technician (RCT) will perform routine monitoring of all soil and surface work areas and of all newly exposed surfaces. Instruments used will include a G-M beta-gamma probe and an alpha scintillation probe. Routine smear and air samples will be counted using a low background proportional counting system or portable instrument.

Monitoring is required for personnel and material leaving the Contamination Area and the Controlled Area. The limit for personnel contamination is 1000 disintegrations per minute, or the alarm level on the Hand/Foot monitors and PCM-1B. Contact Radiological Control if this limit is reached for decontamination. Do not leave the area until told to do so by Radiological Control.

Posting Requirements

Controlled Area

- < 1000 dpm/100cm² alpha/beta-gamma removable
- < 5000 dpm/100cm² alpha/beta-gamma fixed

Contamination Area

- > 1000 dpm/100cm² alpha/beta-gamma removable
- > 5000 dpm/100cm² alpha/beta-gamma fixed plus removable (total)
- > 100,000 dpm/100cm² fixed plus removable (total)

Airborne Radioactivity Area	> 2 X 10 ⁻¹² uCi/ml
Radiation Area	≥ 5 mrem/hr

8.2.2 RADIATION

The Radiation Control Technician will perform radiation surveys of the work area and determine maximum allowable stay times. This information will be specified on the Radiation Work Permit.

All employees working in radiologically controlled work areas are required to do the following:

- Wear a TLD at all times while in the Controlled area of the site
- Leave a monthly urinalysis sample
- Report to the In-Vivo Facility as requested and for an annual In-Vivo Count
- Both urinalysis and In-Vivo testing are required prior to initially working on site and upon termination.

Any circumstance which could have resulted in an intake of radioactive materials by inhalation, ingestion, or absorption shall immediately be reported to a supervisor. The supervisor shall immediately report the circumstance of possible radioactive materials intake to ES&H Radiological Control Organization for evaluation. When the suspect isotope is uranium, the involved employee(s) shall report to the Urine Sampling Station at the end of their respective shift to complete an Investigation Report (IRR, form FMPC-ES&H-1458), and submit an incident urine sample. The involved employee(s) shall also report to the Urine Sampling Station at the start of their next shift to submit a followup urine sample. When the suspect isotope is other than uranium the involved employee (s) shall report to the Radiological Control Department for further determination of actions. Employees are responsible for complying with additional requirements as specified by the Radiological Control Organization.

**TABLE 3
RADIOLOGICAL SAFETY ACTION LEVELS**

Monitoring Device	Measurement	Action
Alpha Probe	1000 dpm/100cm ²	Contact Radiological Control Tech. (x6889)
Beta/Gamma Probe	1000 dpm/100cm ²	Contact Radiological Control Tech. (x6889)

**TABLE 4
AIRBORNE RADIOACTIVITY MEASUREMENTS (SEE NOTE 4):**

Measurement	Level	Action (see note 3)
U-238, Th-230, and Th-232	> 10 % Derived Air Concentration (DAC)	Area posted as "Airborne Radioactive Area" and respiratory protection evaluated by Radiological Control (note 1)
U-238, Th-230, and Th-232	> 1.0 x DAC	Full-faced air purifying respirator with anti-C hood
U-238, Th-230, and Th-232	> 5.0 x DAC	Hooded air-supplied respirator
U-238, Th-230, and Th-232	> 10.0 x DAC	Contact Radiological Control
U-238, Th-230, and Th-232	> 40.0 x DAC	In vivo and/or in vitro sampling required by RC Dosimetry
Rn-220 daughters	< 0.10 Working Level (WL)	None
Rn-220 daughters	0.10 - 1.0 WL	Area posted as "Airborne Radioactive Area" and respiratory protection evaluated by Radiological Control (note 1)

TABLE 4 AIRBORNE RADIOACTIVITY MEASUREMENTS (SEE NOTE 4):		
Measurement	Level	Action (see note 3)
Rn-220 daughters	1.0 - 5.0 WL	Full-faced air purifying respirator
Rn-220 daughters	> 5.0 WL	Hooded air supplied respirator
Rn-222 daughters	< 0.033 WL	None
Rn-222 daughters	≥ 0.033 WL	Area posted as "Airborne Radioactive Area" and respiratory protection evaluated by Radiological Control (note 1)
Rn-222 daughters	0.75 - 1.65 WL	Full-faced air purifying respirator
Rn-222 daughters	> 1.65 - 33.0 WL	Hooded air supplied respirator
Rn-222 daughters	> 33.0 WL	SCBA and air-supplied bubble suit

TABLE 5 ACTION LEVELS for MEASURING AIRBORNE RADIONUCLIDES				
Radionuclide	1 DAC (uCi/ml) (see note 2)	10% DAC (uCi/ml)	25% DAC (uCi/ml)	WITHDRAW (uCi/ml) (see note 5)
Th-230	3 E-12	3 E-13	7.5 E-13	1.5 E-11
Th-232	5 E-13	5 E-14	1.25 E-13	2.5 E-12
U-238	2 E-11	2 E-12	5.0 E-12	1.0 E-10
Rn-220	8 E-09*	0.1 WL	0.25 WL	5.0 WL
Rn-222	3 E-08*	0.033 WL	0.0825 WL	1.65 WL

* Assumes 100% equilibrium with radon daughter products. If air sampling is

performed for radon daughter concentrations (i.e., Working Level measurements), the DACs are:

Rn-220 (thoron) daughter activity: 1.0 WL
Rn-222 (radon) daughter activity: 0.33 WL

Notes for tables 3 - 5

1. Area shall be posted as an "**Airborne Radioactivity Area**" by Radiological Safety. Respiratory protection should be considered if levels are expected to exceed 10% DAC. Radiological Control will evaluate respiratory protection at levels > 10% DAC and perform stay time calculations to keep exposure less than 4 DAC-hours/week.
2. Derived Air Concentrations (DAC) for radionuclide(s) of interest.
3. Respirator requirements based on a protection factor of 50 and airborne concentrations necessary to give < 0.1 DAC inside the facepiece. Air sample results which indicate that individuals may have been exposed to 40 DAC-hours or more per week shall trigger internal dosimetry assessment.
4. Currently, real-time monitoring for long-lived (U-238, Th-230, and Th-232) airborne radioactivity, in the presence of short-lived radon/thoron daughter activity, is not always possible. Refer to "retrospective" seven day count (long-lived) data for the affected area, if this data is available. Otherwise, assigned respiratory protection shall be based on the potential to exceed the Action Levels, or on confirmation of the airborne radioactivity levels present by special counting methods.
5. The "Withdraw" values are based on 5.0 x DAC. Hooded Air Supplied Respirator is required at those levels. If airborne radioactivity levels can exceed 10.0 DAC, contact Radiological Engineering at 8493.

8.3 INSTRUMENTATION

8.3.1 VOLATILE ORGANIC COMPOUNDS

Air sampling for volatile organic compounds will be conducted as determined by this Health and Safety Plan, the CRU2 Health and Safety Officer through a FERMCO Industrial Hygiene representative. The air sampling instrument to be used will be a photo ionization detector.*

Instrument: Photo ionization Detector

Hazard Measured: Many organic gases and vapors

Application: Detects total concentration of many organic gases and vapors.

Detection Method: Ionizes molecules using ultraviolet radiation and producing a current that is proportional to the number of ions.

General care: Recharge or replace battery. Regularly clean lamp window. Regularly clean and maintain the instrument and accessories.

Calibration: Daily

8.3.2 AEROSOLS (eg. TOTAL DUST)

Air sampling for aerosols will be conducted as determined by this Health and Safety Plan, the CRU2 Health and Safety Officer or FERMCO Industrial Hygiene representative when work is occurring soils. The air sampling instrument to be used will be a MIE RAM-1 Real-Time Aerosol Monitor *

Instrument: MIE RAM-1 Real-Time Aerosol Monitor

Hazard Measured: Aerosols

Detection Method: Light diffraction

General Care: Recharge or replace battery. Regularly clean and maintain the instrument and accessories.

Calibration: Daily

* Other industrial hygiene monitoring instruments may be used as determined

to be appropriate.

8.4 RADIOACTIVE MONITORING INSTRUMENTATION

8.4.1 AIRBORNE RADIOACTIVITY

As required, air sample will be taken by the FEMP Radiological Control personnel in the general area where work will be performed.

Instrument: Air Sampler

Hazard Measured: Collects airborne particulate for laboratory measurement.

Application: Measure of air activity when surface contamination is present and where the potential exist for an increase in airborne radioactivity.

Detection Method: Low background proportional counter.

General Care: Daily inspection

Calibration: Six months

8.4.2 RADIOACTIVE SURFACE CONTAMINATION

Radioactive surface contamination will be identified by FEMP Radiation Control personnel as they perform the survey for the required radiation work permits. Soils will be survey when disturbed excavation.

Instrument: Alpha and Beta-Gamma Contamination Monitoring equipment

Hazard Measured: Alpha, Beta, and Gamma radiation.

Application: Monitors surfaces for radioactive contamination.

Detection Method: Alpha Scintillation and GM Pancake probes or portable instruments (total)
Gas proportional (low background) counter for Swipes (removable)

General Care: Daily source and battery check. (portable)
Daily source and background (low background counter)

Calibration: Six months for portable survey meters
Monthly for low background proportional counters

8.5 INITIAL MONITORING

During any initial start up of equipment, monitoring shall be performed. This will include noise, airborne particulate and for organic compounds.

9.0 HANDLING DRUMS AND CONTAINERS

This section not applicable to this project.

10.0 DECONTAMINATION

Contamination should be avoided where possible by making minimum contact with the contaminant. All instances of personnel radiological contamination must be reported to Radiological Control and CRU2 Health & Safety Officer. Any Chemical contamination will be handled by FERMCO IH Department.

The following measures will be employed to accomplish necessary decontamination on exit from the exclusion zone:

Personnel and/or equipment will enter and exit the posted work area through a control point. Upon exit, personnel will remove protective clothing and monitor themselves for contamination. Any personal contamination will be reported to Radiological Control who will assist in personnel decontamination. Refer to SP-P-35-017

Equipment must be monitored by RCT. Equipment found to be contaminated when exiting a controlled point will be taken to the FEMP Decontamination Facility for decontamination. Transport of material to decontamination will be done according to SP-P-35-027. No other area specific decontamination procedures are required for this project.

11.0 HAZARD ASSESSMENT

The following hazards could be encountered during CRU2 Bank Stabilization of Paddy's Run at Inactive Flyash Pile. Should hazards not listed be encountered they are to be report to the CRU2 Health and Safety Officer to be resolved or define the method of control.

Based on the sample analysis the chemicals barium, arsenic and uranium are present in highest concentration in soil with respect to their occupational airborne limits, however the are present at very low concentrations (ppm levels) . Based

on the concentration of the chemicals in the soil and the chemicals allowable exposure limits an action limit of 5 mg/m³ total dust will be observed. This action level will protect workers from all of the chemical contaminants that have been found in sample analysis of soil and water.

TABLE 6 HAZARDS BY JOB TASK				
JOB/TASK	REQUIRED PERMIT	CONCERNS		CONTROLS engineer, administrative, ppe
		SAFETY/ FIRE	C H E M I C A L / RADIOLOGICAL	
Disturbance of Inactive Flyash Pile	RWP		Uranium, various organic and inorganic compounds	Level D
	Excavation/ Penetration Permit	Disturb existing underground utilities		Obtain penetration permit before start of activities

11.1 INDUSTRIAL HYGIENE ISSUES

11.1.1 ARSENIC

Arsenic is a naturally occurring contaminant in coal and is present in the Inactive Flyash Pile in low concentrations. Arsenic is a human carcinogen. When exposure above the action level could occur level C protection shall be required.

11.1.2 BARIUM

Barium is a naturally occurring contaminant in coal and is present in the Inactive Flyash Pile in low concentrations. Acute exposure if ingested is poisonous. When exposure above the action level could occur level C protection shall be required.

11.1.3 URANIUM

Uranium has been found in the Inactive Flyash Pile in low concentrations. Uranium is highly toxic on an acute basis. Soluble uranium can be absorbed through the skin. When exposure above the action level could occur, level C protection shall be required.

11.1.4 CHEMICALS, GENERAL

Chemicals used on this project may be hazardous to employees. Copies of all MSDS's will be given to FERMCO Industrial Hygiene for review and determination of P.P.E. requirements. Any personal protective equipment specified by the MSDS shall be required when work with the chemicals is conducted. See section 3.5.

11.1.5 ORGANIC COMPOUNDS

Minor contamination by some organics may be present in the soil. While not expected to present a hazard, monitoring for volatiles may be performed as a precaution.

11.1.6 LABELING OF CONTAINERS

All containers of hazardous materials shall be labeled according to ESH-1000, SPR 5-6. As a minimum, the name of the contents and it's hazard shall be clearly labeled on the container.

11.1.7 NOISE

Hearing protection will be worn when operating or working in the vicinity of process equipment or any other equipment that may exceed 85 dBA. Noise exposures will be evaluated by the CRU2 Health and Safety Officer during the specific activities where noise may present a hazard. All equipment that produces noise in excess of 85 dBA and areas where employees are exposure to noise in excess of 85 dBA shall be posted as hazardous noise areas. Employees working at sites where noise levels exceed 85 dBA shall wear hearing protection.

11.2 RADIOLOGICAL SAFETY ISSUES

The potential radiation hazard is from uranium (depleted to 2% enriched in U-235) and short lived decay products. Thorium content in affected areas is expected to be very low relative to uranium content. Therefore, the hazard from thorium is minimal.

Appropriate respiratory equipment shall be worn during activities which could cause an increase in air borne radioactivity levels.

11.3 INDUSTRIAL SAFETY ISSUES

A Job Safety Analysis has been conducted for this project. Findings of the analysis are listed here and in Attachment D.

11.3.1 LIFTING

Lifting is the most common task associated with low back pain. Many of the injuries do not result from a single incident, but develop over a period of time. This type of injury may result from repetitive lifting. Personnel should know their lifting limits and the object to be lifted should be limited by factors such as; the route and distance to be traveled, the amount of time required and the center of gravity necessary to handle the load safely.

The manual movement of soil shall be limited to less than 10 pounds per lift per person. Body type twisting actions shall not be permitted while lifting.

11.3.2 SLIPS, TRIPS, AND FALLS

Always walk where you have a firm footing, taking short steps in slippery places. Avoid carrying anything bulky that will obstruct vision. Look for falling, slipping and tripping hazards, such as cluttered traffic areas, unguarded openings and manholes, unsteady or snow-and ice-covered platforms, loose materials underfoot, tools hidden in the grass, and slippery, wet, oily or worn walkways. Climbing over equipment to get other items and falling off/down steep slopes can cause serious and sometimes fatal accidents.

All work paths and work areas shall be kept clear of slip and trip hazards. If workers must work in or near areas where these hazards exist and the hazard cannot be removed, then proper barricades and signs shall be used to route personnel away from the hazards. Some common slip and trip hazards are; mud, trash, electrical cords/airlines lying in walkways, and improperly stored equipment.

Project Engineer shall ensure that all personnel are afforded a clear walkway at all times. Exits and Exit paths shall be maintained clear at all times.

11.3.3 POWER TOOLS

Proper eye and face protection shall be provided and worn while using all hand and power tools. Inspect all tools before using. Do not use defective tools. Use tools only for the application for which they were designed. Every tool has a purpose. Do not use tools with mushroomed heads, sloppy connections or broken handles. Use the proper strength tool for each job. The use of handle extensions or cheater bars is prohibited.

Disconnect tools and machines from their power source before making adjustments or attachment changes. Do not remove guards or safety devices. They are there for your protection. Shut off all fuel-powered tools before refueling. Ensure that blade guards are in place and working properly. Air-powered tools must have

safety clips or retainers on all hose connections. Do not exceed manufacturer's safe operating pressure for all fittings.

The Health and Safety Officer CRU2 shall inspect all tools on the job site. Tools found to be defective shall be tagged and removed from service.

11.3.4 ELECTRICAL POWER

Ground Fault Circuit Interrupters (GFCI's) are required on all 15 and 20 ampere, 120 volt circuits, where hand or portable tool or equipment are used. The GFCI shall be placed at the source of the electrical service to protect both the cord and the devices connected.

All flexible cords (extension cords) shall be approved (UL listed) cord sets and be of a type rated for hard usage and damp locations. All cords shall be ran overhead to avoid damage from being on the ground. Cords will not be permitted to be in any aisleways.

11.3.5 HEAVY EQUIPMENT

Minimize the number of personnel working around heavy equipment. All mobile equipment shall be supplied with an electronic back-up alarm. All operators will be qualified to operate their machine. Equipment will be inspected at the beginning of each shift by the equipment operator, prior to use, and the inspection results will be recorded on a daily check sheet to ensure all safety equipment and devices are fully operational.

Certain tasks may require the use of drill rigs. In order for the equipment to operate in a safe manner, the equipment must be maintained and in good operating condition including back-up alarms, as required by FEMP site procedures. In addition, the operator must be properly trained in the use of the equipment. See *ESH-1-1000* SPR 2-36, 2-38 and 2-39

11.3.6 FALL PROTECTION

Since work entails some excavation, steel erection and work on roofs, a positive means of preventing falls will be provided and used. This can be accomplished using appropriate barricades, safety harnesses, lanyards, etc. All work tasks shall have 100% fall protection. See *ESH-1-1000* SPR 2-17 for additional information.

NOTE: Safety Belts Are Not Permitted.

Before entry onto any roof, approval from CRU5 Health and Safety Officer and the FERMCO Facility Owner must be obtained.

11.3.7 HIDDEN UTILITIES

If the project work scope involves penetrating into the surrounding earth, roof, floors, and walls of the facility a permit is required. Due to serious injury potential from contacting or breaching existing utilities, an Excavation Penetration Permit with a complete mapping of all hidden utilities is required prior to start of excavation. Extreme care will be taken when working in the proximity of these utilities.

11.4 FIRE PROTECTION

The potential for fires and explosions may occur during task activities. Explosions and fires can result in intense heat, open flames, smoke inhalation, flying objects and release of toxic chemicals. Such releases can threaten both personnel on site and the nearby public. To protect against explosions and fires, monitor the environment for explosive atmospheres and flammable vapors; keep all potential ignition sources away from areas where explosive or flammable environments may occur; and use work practices that will minimize the agitation or release of chemicals.

Storage, use or transfer of flammable and/or combustible liquids shall be in accordance with NFPA 30, Flammable and combustible Code, or approved by FERMCO Fire Protection. Flammable or combustible liquids with a flash point of 140° F. or less (i.e., gasoline, diesel fuel, solvents, etc.) shall be handled in Factory Mutual Approved safety cans with operable flame arrester and self-closing lid(s). All safety cans shall be properly marked with the name of the liquid contents. A label identifying the hazard of the material shall be affixed to the container.

All areas where flammable liquids are stored or paints are mixed shall have "NO SMOKING" signs posted and smoking shall not be permitted in the posted areas.

Combustible scrap and debris shall be removed at regular intervals during the course of work operations. Disposal shall be in accordance with established FERMCO requirements.

12.0 EMERGENCY/CONTINGENCY PLANS

12.1 REPORTING

All emergencies shall be reported to FERMCO "Communication Center" to ensure rapid response. Some means to report an emergency shall be available at all work locations whenever personnel are working. This may be accomplished in one of the following methods:

- Phone 6511
- Radio to "Control"

The following would be examples of emergencies that would justify calling and reporting an emergency:

- Serious Injury
- Injury Complicated by Contamination
- Chemical/Radiation Release
- Chemical Splash (Eye and Skin)
- Any fire

Any injury, no matter how minor, shall be reported immediately to FEMP Medical for evaluation or treatment. The FERMCO Health & Safety Officer CRU2 shall be notified as soon as possible after the injury has been reported to FEMP Medical.

When an injury is perceived to be serious or involve contamination (chemical or radiological), FEMP Control (6511) must be notified so that proper and timely medical treatment can be dispatched and provided.

12.1.1 EMERGENCY PHONE NUMBERS

NAME	FEMP TELEPHONE NUMBER	FEMP RADIO
Ambulance	738-6511	Control
Hospital	738-6511	Control
Fire	738-6511	Control
Security	738-6511	Control
Emergency Response	738-6511	Control
Industrial Hygiene	738-6207	357
Radiological Control	738-6889	355
Fire and Safety Inspectors	738-6235	303
HSO John Palermo	738-6894	Pager 554-9783
Assistant Emergency-Duty Officer(AEDO)	738-6295 or 738-6431	CONTROL or 202

12.1.2 SITE NOTIFICATION PROCEDURE

Employees will be notified of emergency or abnormal condition by the plant wide alarm system and radio announcements.

12.1.3 HOW TO REPORT AN EMERGENCY

When an emergency or abnormal condition is observed, personnel shall contact the

Communications Center at extension 6511 or via radio (CONTROL). The following information must be given to the Communications Center operator:

- Name
- Badge Number
- Area where emergency has occurred
- Nature of the emergency

DO NOT END THE CALL UNTIL THE COMMUNICATION OFFICER HAS HUNG UP THE PHONE.

12.2 EVACUATION ROUTES/ACCOUNTABILITY

12.2.1 RALLY POINT ACCOUNTABILITY

Should a situation require an emergency evacuation of the work area, all equipment shall be turned off (if possible) and left in place. Personnel should immediately proceed to the nearest established rally point identified in Appendix C.

12.2.1 RALLY POINT ACCOUNTABILITY (continued)

The closest Rally point is: Rally Point 2.

Personnel will assemble at a predetermined rally point a safe distance away from the work area. The rally point shall be selected based upon wind direction and type of emergency situation.

12.2.2 IN PLACE ACCOUNTABILITY

When in place accountability is required, the employee shall contact his or her supervisor and report their current position.

12.3 AVAILABLE EMERGENCY EQUIPMENT

12.3.1 SITE EQUIPMENT

The FEMP Medical Facility is staffed and equipped to handle most types of medical/fire emergencies that would occur during this operation. The medical facility is staffed with doctors, registered nurses, and Emergency Medical Technicians (EMT) and is equipped with an ambulance to transport the injured person to the nearest off-site hospital should extended or specialized treatment be necessary.

Location of FEMP Medical Facility can be seen in Appendix D.

13.0 CHANGES/AMENDMENTS to HEALTH and SAFETY PLAN

This Health & Safety Plan is based on information available at the time of preparation. It is important that personnel protective measures be routinely reassessed by the project supervision, and the Health & Safety Officer CRU2. In addition, unexpected conditions/events may arise which require reassessment of the health & safety issues. Upgrading or downgrading of precautions, personal protective equipment, ect. identified in this plan must be approved by the CRU2 Health and Safety Officer, or designee, and can be implemented without an amendment.

Unplanned activities and/or changes in work scope, equipment, or chemicals used shall require a review and may require an amendment to this Health & Safety Plan. All amendments must be approved by the CRU2 Health and Safety Officer.

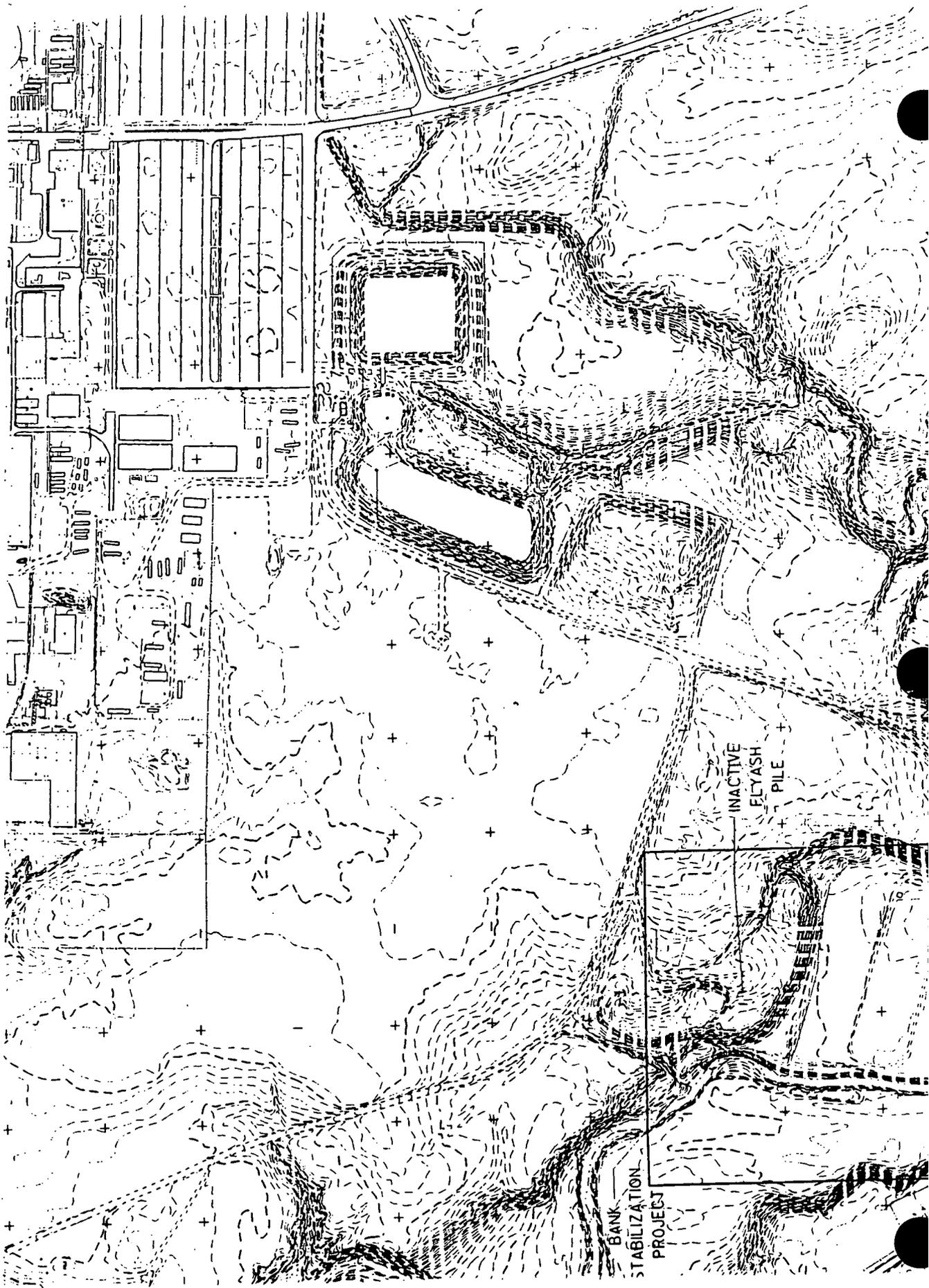
13.0 CHANGES / AMENDMENTS to HEALTH and SAFETY PLAN

13.1 CONTROL OF HEALTH & SAFETY PLAN

For the purpose of ensuring that all personnel are informed of any changes in the scope of this Health & Safety Plan, CONTROLLED copies of this document shall be maintained. Only essential personnel shall maintain controlled copies of this document. The following is the list of personnel with the controlled copies of this HSP.

Manager CRU2	Jim Williams
Manager Engineering CRU2	Steve Garland
Project Engineer (CRU2)	Al Guillen
Health and Safety Officer CRU2	John V. Palermo
Construction Manager	Warren Hooper
Project Copy at work site, Marked as PROJECT COPY	

**APPENDIX A
WORK ZONE**



BANK
STABILIZATION
PROJECT

INACTIVE
FLYASH
PILE

000132

**APPENDIX B
TABLE OF CONTENTS
ESH-1-1000 AND
PERTINENT SPRs**

**COMPREHENSIVE ENVIRONMENTAL
OCCUPATIONAL SAFETY AND HEALTH PROGRAM**

TABLE OF CONTENTS

- ii. ABSTRACT
- iii. TABLE OF CONTENTS
- xii. LIST OF EFFECTIVE SECTIONS

VOLUME 1

I. ES&H EXECUTION

1. ENVIRONMENTAL SAFETY AND HEALTH PROGRAM

ESH 1-0	MISSION
ESH 1-1	CULTURE
ESH 1-2	SAFETY PHILOSOPHY
ESH 1-3	SAFETY PRINCIPLES
ESH 1-4	RESPONSIBILITIES FOR SAFETY & HEALTH
ESH 1-5	SUPERVISOR SAFETY RESPONSIBILITIES
ESH 1-6	EMPLOYEE SAFETY RESPONSIBILITIES
ESH 1-7	REQUIREMENTS
ESH 1-8	ES&H TRAINING
ESH 1-9	FACILITY OWNER RESPONSIBILITIES

2. ENVIRONMENTAL SAFETY AND HEALTH DIVISION

ESH 2-0	ES&H ORGANIZATION
ESH 2-1	OCCUPATIONAL SAFETY AND HEALTH DEPARTMENT
ESH 2-2	RADIOLOGICAL PROTECTION DEPARTMENT
ESH 2-3	ENVIRONMENTAL PROTECTION DEPARTMENT
ESH 2-4	EMERGENCY AND MEDICAL SERVICES DEPARTMENT
ESH 2-5	ES&H ASSURANCE DEPARTMENT

II. OS&H EXECUTION

1. OCCUPATIONAL SAFETY AND HEALTH PROGRAM

SPR 1-0	OCCUPATIONAL SAFETY AND HEALTH PROGRAM
SPR 1-1	OCCUPATIONAL SAFETY AND HEALTH ORGANIZATION
SPR 1-2	OCCUPATIONAL SAFETY AND HEALTH PERSONNEL QUALIFICATIONS
SPR 1-3	NEW EMPLOYEE SAFETY ORIENTATION

000134

COMPREHENSIVE ENVIRONMENTAL
OCCUPATIONAL SAFETY AND HEALTH PROGRAM

TABLE OF CONTENTS
(Continued)

II. OS&H EXECUTION (Continued)

2. INDUSTRIAL SAFETY AND HEALTH PROGRAM

SPR 2-0	INDUSTRIAL SAFETY AND HEALTH PROGRAM
SPR 2-1	WALK YOUR SPACE PHILOSOPHY
SPR 2-2	COMPETENT PERSON DESIGNATION
SPR 2-3	SAFETY TASK ASSIGNMENT
SPR 2-4	JOB SAFETY ANALYSIS
SPR 2-5	WRITTEN SAFETY REPORTS
SPR 2-6	CLASSIFICATION OF OCCUPATIONAL INJURIES AND ILLNESSES
SPR 2-7	INCIDENT INVESTIGATION
SPR 2-8	REPORTING OF LOST TIME INJURIES
SPR 2-9	MONTHLY SAFETY AND HEALTH REPORT
SPR 2-10	OFFICE SAFETY
SPR 2-11	HOUSEKEEPING
SPR 2-12	PRE-JOB SAFETY & HEALTH SURVEY
SPR 2-13	WORK PERMITS, GENERAL
SPR 2-14	PERSONAL PROTECTIVE EQUIPMENT (PPE)
SPR 2-15	BARRICADES
SPR 2-16	SAFETY COLOR CODE AND MARKING PHYSICAL HAZARDS
SPR 2-17	FALL PREVENTION
SPR 2-18	PERIMETER AND OPENING PROTECTION - FLOORS, WALLS, AND ROOF EDGES
SPR 2-19	PORTABLE LADDERS CONTROL AND INSPECTION
SPR 2-20	METAL SCAFFOLDS
SPR 2-21	PRINCIPLES AND POLICIES FOR ELECTRICAL SAFETY
SPR 2-22	ASSURED EQUIPMENT GROUNDING CONDUCTOR PROGRAM
SPR 2-23	GROUND FAULT CIRCUIT INTERRUPTERS (GFCI)
SPR 2-24	ENERGY CONTROL (LOCKOUT/TAGOUT)
SPR 2-25	DE-ENERGIZING ELECTRICAL EQUIPMENT
SPR 2-26	ELECTRIC WELDING
SPR 2-27	WELDING, THERMAL CUTTING AND BRAZING
SPR 2-28	TARPAULINS AND WELDING CURTAINS - FIRE RETARDANT PROPERTIES
SPR 2-29	HOT TAPPING
SPR 2-30	PRE-ENGINEERED BUILDING ERECTION
SPR 2-31	HAND TOOLS
SPR 2-32	SHOP EQUIPMENT AND FACILITIES
SPR 2-33	WORKING OVER OR NEAR WATER
SPR 2-34	SITE TRAFFIC CONTROL - FLAGGING
SPR 2-35	LAWN MOWERS, WEED CUTTERS, AND CHAIN SAWS
SPR 2-36	EQUIPMENT PROPORTIONAL AND PERIODIC INSPECTIONS
SPR 2-37	EQUIPMENT INCIDENT INVESTIGATION AND REPORTING

**COMPREHENSIVE ENVIRONMENTAL
OCCUPATIONAL SAFETY AND HEALTH PROGRAM**

**TABLE OF CONTENTS
(Continued)**

II. OS&H EXECUTION (Continued)

SPR 2-38	EQUIPMENT OPERATOR TRAINING
SPR 2-39	MOTORIZED EQUIPMENT
SPR 2-40	MOTOR VEHICLES
SPR 2-41	TRANSPORTING PERSONNEL
SPR 2-42	VENDOR TRUCK LOADING AND UNLOADING
SPR 2-43	FORKLIFT OPERATIONS
SPR 2-44	AERIAL LIFTS, VEHICLE-MOUNTED ELEVATING AND ROTATION WORK PLATFORMS, POWER PLATFORMS
SPR 2-45	RIGGING PRACTICES INSPECTIONS
SPR 2-46	CRANE OPERATOR QUALIFICATION
SPR 2-47	CRANE OPERATOR LICENSING PROGRAM
SPR 2-48	MOBILE CRANES
SPR 2-49	CRANE LIFT PROCEDURE
SPR 2-50	SUSPENDED WORK BASKET / PLATFORM
SPR 2-51	MATERIAL AND PERSONNEL HOISTS
SPR 2-52	HIGH-PRESSURE WATER CLEANING (HWPC)
SPR 2-53	ABRASIVE BLASTING
SPR 2-54	AIR COMPRESSORS AND THE USE OF COMPRESSED AIR
SPR 2-55	COMPRESSED GAS CYLINDERS
SPR 2-56	SPRAY PAINTING
SPR 2-57	OPEN FLAME, WELDING AND HAZARDOUS WORK PERMITS
SPR 2-58	HAZARDOUS ABATEMENT MANAGEMENT PROGRAM
SPR 2-59	OS&H TRAINING

3. CONSTRUCTION SAFETY AND HEALTH PROGRAM

SPR 3-0	CONSTRUCTION SAFETY AND HEALTH PROGRAM
SPR 3-1	CERCLA/RCRA UNIT SAFETY AND HEALTH PLAN REQUIREMENTS
SPR 3-2	DECONTAMINATION AND DEMOLITION
SPR 3-3	CONTRACTOR \ SUBCONTRACTOR SAFETY POLICY
SPR 3-4	PRE-JOB SAFETY REQUIREMENTS
SPR 3-5	CONTRACTOR PRE-QUALIFICATIONS
SPR 3-6	MONTHLY CRU AND SUBCONTRACTOR ACCIDENT SUMMARY REPORT
SPR 3-7	OCCUPATIONAL SAFETY AND HEALTH HAZARD IDENTIFICATION PROGRAM
SPR 3-8	LOCK AND TAG PROGRAM (CONSTRUCTION)
SPR 3-9	EXCAVATIONS AND TRENCHES
SPR 3-10	CONCRETE AND MASONRY WORK
SPR 3-11	REINFORCING STEEL (REBAR)
SPR 3-12	DRILLING EQUIPMENT
SPR 3-13	DRAGLINES AND CLAMSHELLS
SPR 3-14	EARTH-MOVING EQUIPMENT

ESH-1-1000

000136

COMPREHENSIVE ENVIRONMENTAL
OCCUPATIONAL SAFETY AND HEALTH PROGRAM

TABLE OF CONTENTS
(Continued)

II. OS&H EXECUTION (Continued)

4. FIRE PROTECTION AND EMERGENCY RESPONSE PROGRAM

SPR 4-0	FIRE PROTECTION PROGRAM OVERVIEW
SPR 4-1	EXEMPTIONS AND EQUIVALENCIES
SPR 4-2	FIRE PROTECTION CORRECTIVE ACTIONS
SPR 4-3	FIRE PROTECTION FUNDING PRIORITIES
SPR 4-4	FIRE PROTECTION IN FACILITY OPERATING PROCEDURES
SPR 4-5	FIRE PROTECTION IN SAFETY ANALYSIS REPORTS
SPR 4-6	EMPLOYEE FIRE PROTECTION TRAINING
SPR 4-7	FIRE PROTECTION RECORDS
SPR 4-8	FIRE PROTECTION CHARTER
SPR 4-9	FIRE PROTECTION DESIGN CRITERIA
SPR 4-10	DOCUMENT REVIEWS
SPR 4-11	PROPERTY LOSS DESIGN CRITERIA
SPR 4-12	FIRE HAZARD ANALYSIS REQUIREMENTS
SPR 4-13	TESTING/MAINTENANCE PROCEDURES
SPR 4-14	SYSTEM TESTING INSPECTION/MAINTENANCE FREQUENCIES
SPR 4-15	FIRE PROTECTION SYSTEM IMPAIRMENTS
SPR 4-16	FIRE PROTECTION SYSTEM WINTERIZATION
SPR 4-17	FIRE WATCH REQUIREMENTS
SPR 4-18	PORTABLE HEATERS
SPR 4-19	CUTTING, WELDING, OPEN FLAME WORK
SPR 4-20	MAINTENANCE FOR VENTILATION EXHAUST
SPR 4-21	FLAMMABLE COMBUSTIBLE LIQUIDS
SPR 4-22	CONTROL OF COMBUSTIBLES
SPR 4-23	COMPRESSED GAS CYLINDERS
SPR 4-24	CONSTRUCTION DEMOLITION SITES
SPR 4-25	PORTABLE FIRE EXTINGUISHERS
SPR 4-26	NON-EMERGENCY USE OF FIRE HYDRANTS
SPR 4-27	BUILDING EMERGENCY EXITS
SPR 4-28	BUILDING EMERGENCY LIGHTS
SPR 4-29	FIRE BARRIERS
SPR 4-30	OCCUPANCY REQUIREMENTS
SPR 4-31	TEMPORARY ENCLOSURES
SPR 4-32	COMPUTER FACILITIES
SPR 4-33	OXIDIZING MATERIALS
SPR 4-34	TENSION SUPPORT STRUCTURES
SPR 4-35	EXPLOSIVES
SPR 4-36	LABORATORIES

COMPREHENSIVE ENVIRONMENTAL
OCCUPATIONAL SAFETY AND HEALTH PROGRAM

TABLE OF CONTENTS
(Continued)

II. OS&H EXECUTION (Continued)

SPR 4-37	PYROPHORIC MATERIALS AND COMBUSTIBLE METALS STORAGE
SPR 4-38	PORTABLE STRUCTURES
SPR 4-39	HAZARDOUS MATERIAL STORAGE
SPR 4-40	RECORDS STORAGE
SPR 4-41	LIGHTNING PROTECTION
SPR 4-44	ELECTRICAL INSTALLATIONS IN HAZARDOUS LOCATIONS
SPR 4-43	CONFINEMENT SYSTEMS
SPR 4 44	EMERGENCY RESPONSE TEAM

5. INDUSTRIAL HYGIENE PROGRAM

SPR 5-0	INDUSTRIAL HYGIENE
SPR 5-1	CHEMICAL EXPOSURE AND AIR MONITORING
SPR 5-2	CONTROL OF ASBESTOS WORK AND ASBESTOS WORK PERMIT
SPR 5-3	DECONTAMINATION
SPR 5-4	DRINKING WATER, EATING, AND SANITARY Facilities
SPR S-5	WORKING IN EXTREME TEMPERATURES (HOT AND COLD)
SPR S-6	HAZARD COMMUNICATION
SPR 5-7	HEARING CONSERVATION PROGRAM
SPR S-8	LABORATORY CHEMICAL HYGIENE PLAN
SPR S-9	ERGONOMICS
SPR S-10	BLOOD BORNE PATHOGENS AND BIOLOGICAL HAZARDS
SPR S-11	RESPIRATORY PROTECTION PROGRAM
SPR 5-12	CARCINOGEN CONTROL
SPR 5-13	CONFINED SPACE ENTRY
SPR 5-14	BREATHING AIR QUALITY
SPR S-15	HAZARDOUS WASTE OPERATIONS
SPR 5-16	CHEMICAL HAZARDOUS MATERIAL WORK PERMIT

6. SAFETY INCENTIVES, AWARDS, AND SUGGESTIONS PROGRAM

SPR 6-0	SAFETY INCENTIVE POLICY
SPR 6-1	SAFETY CROSS AWARD (SILVER AND BRONZE)
SPR 6-2	SAFETY AWARDS FOR OUTSTANDING ACCIDENT - PREVENTION ACHIEVEMENTS
SPR 6-3	SAFETY SUGGESTION AND COMPLAINT SYSTEM
SPR 6-4	SAFETY AWARDS FOR CONTRACTORS OUTSTANDING ACCIDENT - PREVENTION ACHIEVEMENTS

COMPREHENSIVE ENVIRONMENTAL
OCCUPATIONAL SAFETY AND HEALTH PROGRAM

TABLE OF CONTENTS
(Continued)

VOLUME 2

III. RADIOLOGICAL PROTECTION EXECUTION

1. RADIOLOGICAL PROTECTION PROGRAM

RPR 1-0	RADIOLOGICAL CONTROL POLICY
RPR 1-1	RADIOLOGICAL CONTROL PRINCIPLES
RPR 1-2	RADIOLOGICAL CONTROL ORGANIZATION
RPR 1-3	RESPONSIBILITIES FOR RADIOLOGICAL SAFETY
RPR 1-4	STAFFING
RPR 1-5	PERSONNEL QUALIFICATIONS

2. RADIOLOGICAL DOSIMETRY

RPR 2-0	RADIOLOGICAL DOSIMETRY - INTERNAL EXPOSURE
RPR 2-1	RADIOLOGICAL DOSIMETRY - EXTERNAL EXPOSURE
RPR 2-2	AIRBORNE RADIOACTIVITY MONITORING
RPR 2-3	RADIOLOGICAL RECORDS
RPR 2-4	RADIOACTIVE SOURCE CONTROLS

3. RADIOLOGICAL ASSESSMENT

RPR 3-0	RADIOLOGICAL SURVEYS
RPR 3-1	RADIATION WORK PERMITS
RPR 3-2	CONTAMINATION CONTROL
RPR 3-3	RADIOLOGICAL ASSESSMENT
RPR 3-4	PERSONNEL DECONTAMINATION

4. RADIOLOGICAL ENGINEERING

RPR 4-0	RADIOLOGICAL PROTECTION PROCEDURES
RPR 4-1	POSTING REQUIREMENTS
RPR 4-2	HEALTH PHYSICS EQUIPMENT
RPR 4 3	HEALTH PHYSICS FACILITIES
RPR 4-4	RESPIRATORY PROTECTION-RADIOLOGICAL CONTROL REQUIREMENTS
RPR 4 5	NUCLEAR CRITICALITY CONTROL

COMPREHENSIVE ENVIRONMENTAL
OCCUPATIONAL SAFETY AND HEALTH PROGRAM

TABLE OF CONTENTS
(Continued)

III. RADIOLOGICAL PROTECTION EXECUTION (Continued)

1. RADIOLOGICAL COMPLIANCE

- RPR 5-0 RADIOLOGICAL AUDITS AND INSPECTIONS
- RPR 5-1 RADIOLOGICAL COMPLIANCE AND TECHNICIAN TRAINING AND QUALIFICATION
- RPR 5-2 RADIOLOGICAL TRAINING FOR GENERAL EMPLOYEES, RADIOLOGICAL WORKERS,
VISITORS, AND INSTRUCTORS
- RPR 5-3 ALARA PROGRAM
- RPR 5-4 OFF-NORMAL EVENT RESPONSE/FOLLOW UP
- RPR 5-5 TRANSPORTATION OF RADIOACTIVE MATERIAL

IV. ENVIRONMENTAL PROTECTION PROGRAM

1. ENVIRONMENTAL SAFETY AND HEALTH ASSURANCE PROGRAM

- EPR 1-0 ENVIRONMENTAL PROTECTION POLICY
- EPR 1-1 ENVIRONMENTAL PROTECTION ORGANIZATION
- EPR 1-2 ENVIRONMENTAL PROTECTION PROGRAM AND STAFFING
- EPR 1-3 PERSONNEL QUALIFICATIONS

2. EFFLUENT MONITORING AND CONTROL

- EPR 2-0 EFFLUENT MONITORING AND CONTROL PROGRAM
- EPR 2-1 CLEAN WATER PROGRAM
- EPR 2-2 CLEAN AIR PROGRAM

3. HAZARDOUS WASTE COMPLIANCE AND FIELD IMPLEMENTATION

- EPR 3-0 HAZARDOUS WASTE COMPLIANCE AND FIELD IMPLEMENTATION PROGRAM

4. ENVIRONMENTAL MONITORING AND SURVEILLANCE

- EPR 4-0 ENVIRONMENTAL MONITORING AND SURVEILLANCE PROGRAM
- EPR ~1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
- EPR 4-2 SITE MEDIA SAMPLING

5. WASTE CHARACTERIZATION

- EPR 5-0 WASTE CHARACTERIZATION

ESH-1-1000

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000140

COMPREHENSIVE ENVIRONMENTAL
OCCUPATIONAL SAFETY AND HEALTH PROGRAM

TABLE OF CONTENTS
(Continued)

- IV. ENVIRONMENTAL PROTECTION PROGRAM (Continued)
6. FACILITIES CHARACTERIZATION
- EPR 6-0 FACILITIES CHARACTERIZATION
7. GROUNDWATER MONITORING
- EPR 7-0 GROUNDWATER MONITORING PROGRAM
- V. EMERGENCY AND MEDICAL SERVICES EXECUTION
1. EMERGENCY AND MEDICAL SERVICES PROGRAM
- EMPR 1-0 POLICY
2. EMERGENCY PREPAREDNESS
- EMPR 2-0 DESCRIPTION OF FEMP SITE
- EMPR 2-1 EMERGENCY PREPAREDNESS CAPABILITY
- EMPR 2-2 EMERGENCY RESPONSE EQUIPMENT, FACILITIES, AND MEASURES
3. MEDICAL SERVICES
- EMPR 3-0 EXAMINATIONS
- EMPR 3-1 MEDICAL TREATMENT
- EMPR 3-2 REPORTING OF OCCUPATIONAL ILLNESS INJURY
- EMPR 3-3 DAILY FIRST AID RECORD
- EMPR 3-4 RESPIRATOR WEARER MEDICAL QUALIFICATION
- EMPR 3-5 BACK INJURY PREVENTION PHILOSOPHY
- EMPR 3-6 HEALTH PROMOTION
- EMPR 3-7 SUBSTANCE Abuse POLICY
- EMPR 3-8 MEDICAL RECORDS
- EMPR 3-9 MODIFIED WORK DUTY, RESTRICTED WORK ACTIVITY
- EMPR 3-10 INTEGRATED EMERGENCY PREPAREDNESS PLANNING
- EMPR 3-11 MEDICAL FACILITIES AND EQUIPMENT
- EMPR 3-12 CLAIMS MANAGEMENT

**COMPREHENSIVE ENVIRONMENTAL
OCCUPATIONAL SAFETY AND HEALTH PROGRAM**

**TABLE OF CONTENTS
(Continued)**

- VI. ES&H ASSURANCE EXECUTION**
 - 1. ES&H ASSURANCE PROGRAM**
 - EAPR 1-0 ES&H ASSURANCE POLICY**
 - EAPR 1-1 ES&H ASSURANCE PRINCIPLES**
 - EAPR 1-2 ES&H ASSURANCE ORGANIZATION**
 - EAPR 1-3 ES&H ASSURANCE PERSONNEL QUALIFICATIONS**
 - 2. ES&H COMPLIANCE**
 - EAPR 2-0 ES&H COMPLIANCE**
 - EAPR 2-1 PROCEDURES AND DOCUMENT CONTROL**
 - 3. ES&H SELF-ASSESSMENT**
 - EAPR 3-0 ES&H SELF-ASSESSMENT PROGRAM**
 - EAPR 3-1 APPLICATION OF PERFORMANCE-BASED CONCEPTS**
 - EAPR 3-2 ES&H PERFORMANCE-BASED INSPECTIONS/AUDITS**
 - EAPR 3-3 INCIDENT INVESTIGATION AND REPORTING**
 - EAPR 3-4 SUPERVISOR'S INVESTIGATION REPORT**
 - EAPR 3-5 SAFETY INFRACTION REPORTS**
 - EAPR 3-6 AGENCY INSPECTIONS**
 - 4. ES&H DATA MANAGEMENT**
 - EAPR 4-0 FERMCO DATA MANAGEMENT**

APPENDICES

- APPENDIX A, ENVIRONMENTAL SAFETY AND HEALTH MANUAL CONTROLS**
- APPENDIX B, REFERENCES**

ESH-1-1000

000142

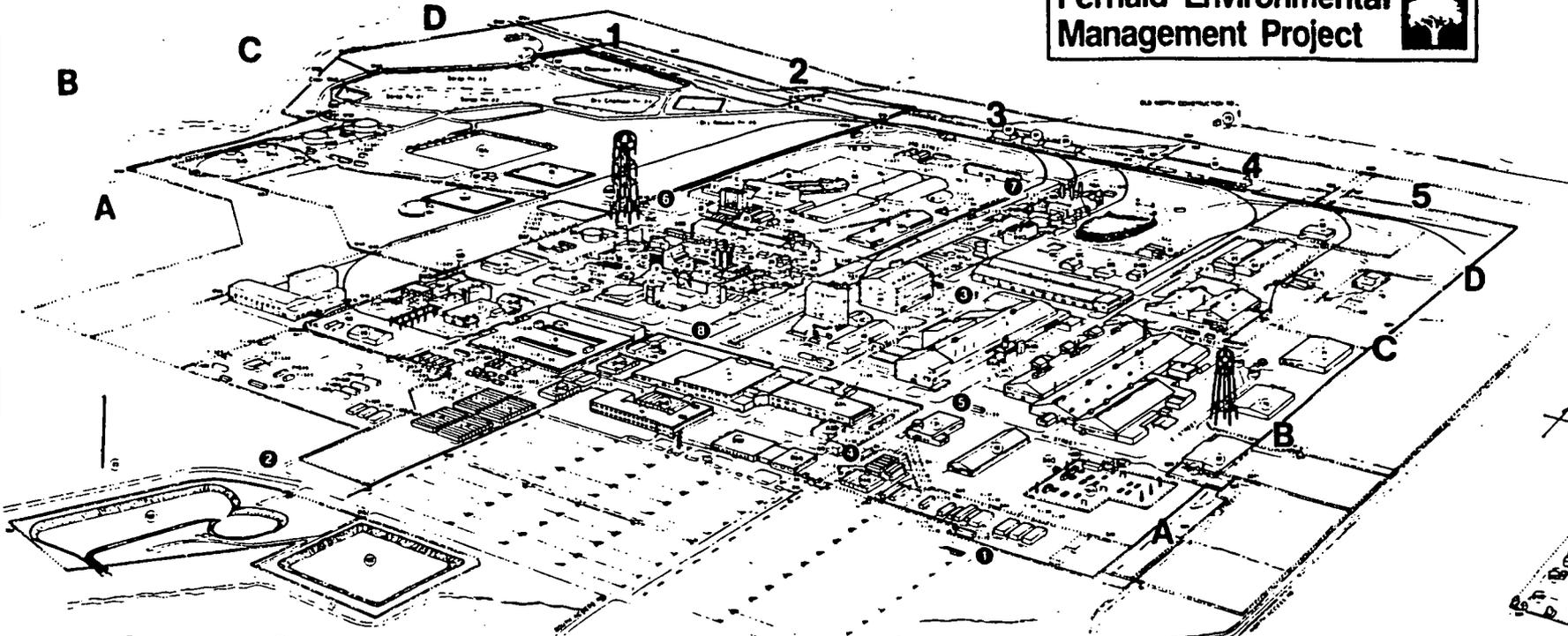
APPENDIX C
FEMP RALLY POINTS

**APPENDIX D
FEMP MEDICAL FACILITY**

94000144

200000

Fernald Environmental Management Project

● RALLY POINTS

○ BUILDING IDENTIFICATION

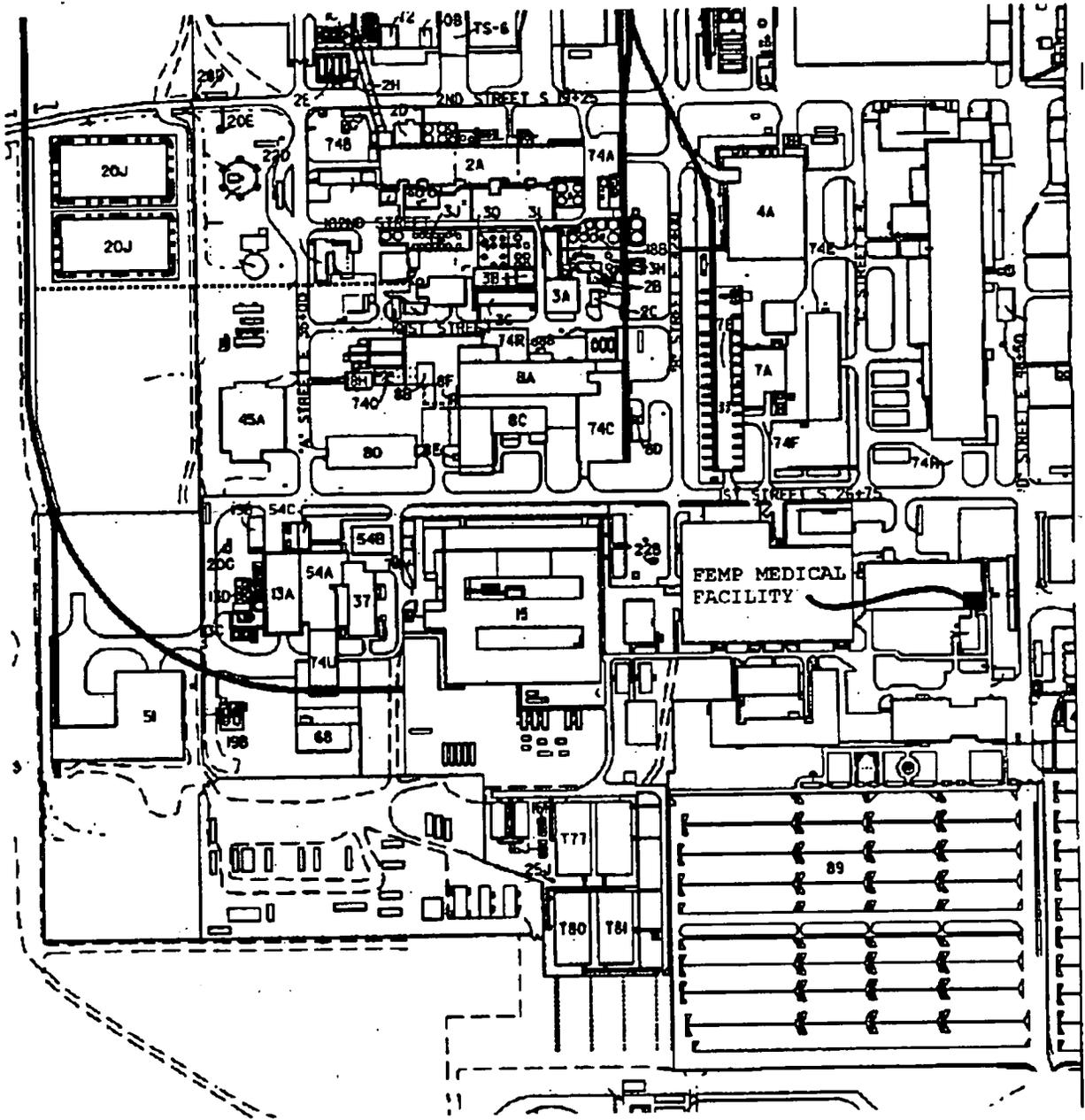
Code	Building Name	Code	Building Name	Code	Building Name	Code	Building Name
001	Office	001	Water Treatment Plant	001	Water Treatment Plant	001	Water Treatment Plant
002	Administrative Building	002	Water Plant	002	Water Plant	002	Water Plant
003	Plant 1	003	Water Plant	003	Water Plant	003	Water Plant
004	Plant 2	004	Water Plant	004	Water Plant	004	Water Plant
005	Plant 3	005	Water Plant	005	Water Plant	005	Water Plant
006	Plant 4	006	Water Plant	006	Water Plant	006	Water Plant
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102	Plant 100	102	Water Plant	102	Water Plant	102	Water Plant

May 1992

0901AS

Recycled and Recyclable

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**ATTACHMENT A
ACKNOWLEDGEMENT LOG**

**ATTACHMENT B
MATERIAL SAFETY DATA SHEETS**

000154

MOBIL MATERIAL SAFETY DATA BULLETIN

6365

MOBIL OIL CORPORATION
ENVIRONMENTAL AFFAIRS AND TOXICOLOGY DEPT.

150 EAST 42ND STREET
NEW YORK, N.Y. 10017 (USA)

10008

***** PRODUCT IDENTIFICATION *****
MOBILUBE HD 80W-90

SUPPLIER:
MOBIL OIL CORP.
CHEMICAL NAMES AND SYNONYMS:
PET. HYDROCARBONS AND ADDITIVES
USE OR DESCRIPTION:
AUTOMOTIVE GEAR LUBRICANT

*Hydraulic
oil*

HEALTH EMERGENCY TELEPHONE:
(212)883-4411
TRANSPORT EMERGENCY TELEPHONE:
(800)424-9300(CHEMTREC)
OTHER DESIGNATION:
(TRN 510156)

***** TYPICAL CHEMICAL AND PHYSICAL PROPERTIES *****

APPEARANCE: ASTM 7.0 VISCOUS LIQUID	VISCOSITY: AT 100 F, SUS 728.0	AT 40 C, CS 132.0
ODOR: MILD	VISCOSITY: AT 210 F, SUS 76.0	AT 100 C, CS 13.9
RELATIVE DENSITY: 15/4 C 0.895	SOLUBILITY IN WATER: NEGLIGIBLE	PH: NA
MELTING POINT: F(C) NA	POUR POINT: F(C) -15(-26)	
BOILING POINT: F(C) >600(316)	FLASH POINT: F(C) (METHOD) >375(191) (ASTM D-92)	
VAPOR PRESSURE:MM HG 20C < .1		

NA=NOT APPLICABLE NE=NOT ESTABLISHED D=DECOMPOSES

***** INGREDIENTS *****

WT PCT (APPROX)	TLV(TWA):	MG/M3	PPM
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HAZARDOUS INGREDIENTS:
NONE

NON-HAZARDOUS INGREDIENTS:	
REFINED MINERAL OILS	> 90
ADDITIVES AND/OR OTHER INGREDIENTS.	< 10

DEC 19 1991

DEC 10 1991

NOTE: TLVS SHOWN FOR GUIDANCE ONLY. FOLLOW APPLICABLE REGULATIONS.

INFORMATION GIVEN HEREIN IS OFFERED IN GOOD FAITH AS ACCURATE, BUT WITHOUT GUARANTEE. CONDITIONS OF USE AND SUITABILITY OF THE PRODUCT FOR PARTICULAR USES ARE BEYOND OUR CONTROL; ALL RISKS OF USE OF THE PRODUCT ARE THEREFORE ASSUMED BY THE USER AND WE EXPRESSLY DISCLAIM ALL WARRANTIES OF EVERY KIND AND NATURE, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE IN RESPECT TO THE USE OR SUITABILITY OF THE PRODUCT. NOTHING IS INTENDED AS A RECOMMENDATION FOR USES WHICH INFRINGE VALID PATENTS OR AS EXTENDING LICENSE UNDER VALID PATENTS. APPROPRIATE WARNINGS AND SAFE HANDLING PROCEDURES SHOULD BE PROVIDED TO HANDLERS AND USERS.

000155

***** FIRE AND EXPLOSION HAZARD DATA *****

FLASH POINT: F(C) (METHOD) > 375(191) (ASTM D-92) FLAMMABLE LIMITS: LEL .6 UEL 7.0

EXTINGUISHING MEDIA:

CARBON DIOXIDE, FOAM, DRY CHEMICAL AND WATER FOG.

SPECIAL FIRE FIGHTING PROCEDURES:

FIREFIGHTERS MUST USE SELF-CONTAINED BREATHING APPARATUS.

UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE

***** HEALTH HAZARD DATA ***** THRESHOLD LIMIT VALUE: (IF ESTABLISHED)

EFFECTS OF OVEREXPOSURE:

SLIGHT EYE IRRITATION. SLIGHT SKIN IRRITATION.

***** EMERGENCY AND FIRST AID PROCEDURES *****

EYE CONTACT:

FLUSH WITH WATER.

SKIN CONTACT:

WASH CONTACT AREAS WITH SOAP AND WATER.

INHALATION:

NOT EXPECTED TO BE A PROBLEM.

INGESTION:

NOT EXPECTED TO BE A PROBLEM. HOWEVER, IF GREATER THAN 1/2 LITER(PINT) INGESTED, IMMEDIATELY GIVE 1 TO 2 GLASSES OF WATER AND CALL A PHYSICIAN, HOSPITAL EMERGENCY ROOM OR POISON CONTROL CENTER FOR ASSISTANCE. DO NOT INDUCE VOMITING OR GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

***** REACTIVITY DATA *****

STABILITY: (THERMAL, LIGHT, ETC.) CONDITIONS TO AVOID:

STABLE EXTREME HEAT

INCOMPATIBILITY: (MATERIALS TO AVOID)

STRONG OXIDIZERS

HAZARDOUS-DECOMPOSITION PRODUCTS:

CARBON MONOXIDE.

HAZARDOUS POLYMERIZATION:

WILL NOT OCCUR

CONDITIONS TO AVOID:

6365

***** SPILL OR LEAK PROCEDURE *****

ENVIRONMENTAL IMPACT:

REPORT SPILLS AS REQUIRED TO APPROPRIATE AUTHORITIES. U. S. COAST GUARD REGULATIONS REQUIRE IMMEDIATE REPORTING OF SPILLS THAT COULD REACH ANY WATERWAY INCLUDING INTERMITTENT DRY CREEKS. REPORT SPILL TO COAST GUARD TOLL FREE NUMBER 800-424-8802.

PROCEDURES IF MATERIAL IS RELEASED OR SPILLED:

ADSORB ON FIRE RETARDANT TREATED SAWDUST, DIATOMACEOUS EARTH, ETC. SCRAPE UP AND REMOVE. DISPOSE OF AT AN APPROPRIATE WASTE DISPOSAL FACILITY IN ACCORDANCE WITH CURRENT APPLICABLE LAWS AND REGULATIONS, AND PRODUCT CHARACTERISTICS AT TIME OF DISPOSAL.

WASTE MANAGEMENT:

DILUTE WASTE WITH A SOLVENT, TO REDUCE ITS VISCOSITY, AND DISPOSE BY SUPERVISED INCINERATION IN COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS.

***** SPECIAL PROTECTION INFORMATION *****

Eye Protection:

NORMAL INDUSTRIAL EYE PROTECTION PRACTICES SHOULD BE EMPLOYED.

Skin Protection:

NO SPECIAL EQUIPMENT REQUIRED. HOWEVER, GOOD PERSONAL HYGIENE PRACTICES SHOULD ALWAYS BE FOLLOWED.

Respiratory Protection:

NO SPECIAL REQUIREMENTS UNDER ORDINARY CONDITIONS OF USE AND WITH ADEQUATE VENTILATION.

Ventilation:

NO SPECIAL REQUIREMENTS UNDER ORDINARY CONDITIONS OF USE AND WITH ADEQUATE VENTILATION.

OTHER:

***** SPECIAL PRECAUTIONS *****

HANDLING: NO SPECIAL PRECAUTIONS REQUIRED.

***** TOXICOLOGICAL DATA *****

ACUTE

ORAL TOXICITY: (RATS)
SLIGHTLY TOXIC (ESTIMATED) ---BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

DERMAL TOXICITY: (RABBITS)
SLIGHTLY TOXIC (ESTIMATED) ---BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

INHALATION TOXICITY: (RATS)
NOT APPLICABLE ---HARMFUL CONCENTRATIONS OF MISTS AND/OR VAPORS ARE UNLIKELY TO BE ENCOUNTERED THROUGH ANY CUSTOMARY OR REASONABLY FORESEEABLE HANDLING, USE, OR MISUSE OF THIS PRODUCT.

EYE IRRITATION: (RABBITS)
MAY CAUSE SLIGHT IRRITATION. ---BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

SKIN IRRITATION: (RABBITS)
MAY CAUSE SLIGHT IRRITATION ON PROLONGED OR REPEATED CONTACT. ---BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

SUBACUTE AND MUTAGENICITY (SUMMARY)

CHRONIC OR SPECIALIZED (SUMMARY)

OTHER DATA

FILE CODES:
(FILL NO: RP543BC201) MHC: 1* 1* NA 1* 1* PPEC: US83-130 APP
8635
ENVIRONMENTAL AFFAIRS AND TOXICOLOGY DEPT. REVISED:
MANAGER OF PRODUCT SAFETY INFORMATION, PHONE: 212-883-4242 8/22

000158

6365

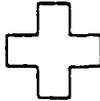
MATERIAL SAFETY DATA SHEET

ACCEPTED BY OSHA AS ESSENTIALLY SIMILAR TO OSHA FORM 20		THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE WHETHER ORIGINATING WITH ASHLAND OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE TO THEIR CIRCUMSTANCES.		
PRODUCT NAME	DATA SHEET NO.	DATE PREPARED	CODE NUMBER	
Fuel Oil No. 2	05	2-1-82	RME	
PRODUCT CLASS	GENERAL OR GENERIC IDENTIFICATION		10390	
PASSES D.O.T. TEST FOR HAZARDOUS CLASSIFICATION	HAZARD CLASSIFICATION		Diesel Combustible Liquid	
HAZARDOUS COMPONENTS	INGREDIENT		%	TLV
	Aromatic Hydrocarbons		10-30	100 ppm
		Aliphatic Hydrocarbons	> 60	500 ppm
*NIOSH Recommends a TLV of 100 mg/m ³				
PHYSICAL DATA	INITIAL BOILING POINT	IF LIQUID AT 68°F <input checked="" type="checkbox"/> PRODUCT <input type="checkbox"/> COMPONENT (%)	> 330 °F @ 760 mmHg	
	SPECIFIC GRAVITY	<input type="checkbox"/> GREATER THAN WATER <input type="checkbox"/> EQUAL TO WATER <input checked="" type="checkbox"/> LESS THAN WATER	@	°F
	VAPOR PRESSURE	IF LIQUID AT 68°F OR WHICH SUBLIME <input checked="" type="checkbox"/> PRODUCT <input type="checkbox"/> COMPONENT (%)	< 2 mmHg @ 77 °F	
	PERCENT VOLATILES	INGREDIENT WITH INITIAL BOILING POINT BELOW 435°F	10-30%	
	VAPOR DENSITY	FOR VOLATILE PORTION OF PRODUCT <input type="checkbox"/> LIGHTER THAN AIR <input checked="" type="checkbox"/> HEAVIER THAN AIR	(air = 1)	
	EVAPORATION RATE	<input type="checkbox"/> FASTER THAN ETHER <input type="checkbox"/> SLOWER THAN ETHER	(= 1)	
FIRE AND EXPLOSION DATA	FLASH POINT	<input type="checkbox"/> LESS THAN 73°F <input type="checkbox"/> 73-100°F <input type="checkbox"/> 100-200°F <input type="checkbox"/> MORE THAN 200°F	125 °F	
	LOWER EXPLOSION LIMIT	<input checked="" type="checkbox"/> PRODUCT <input type="checkbox"/> LOWEST VALUE OF COMPONENT	0.7%	
	HAZARDOUS DECOMPOSITION PRODUCTS	KNOWN HAZARDOUS PRODUCTS RESULTING FROM HEATING, BURNING, ETC. OR UNREACTED RAW MATERIAL. May form toxic materials: Carbon Dioxide, Carbon Monoxide, Various Hydrocarbons, etc.		

SEE DEFINITION ON REVERSE SIDE

CONTINUED BACK OF THIS PAGE

FIRE AND EXPLOSION DATA (CONTINUED)	<p>SPECIAL FIRE FIGHTING PROCEDURES</p>	<p>INDICATE EQUIPMENT TO PROTECT FIREMEN FROM TOXIC PRODUCTS/COMBUSTION OR IF WATER IS NOT TO BE USED</p> <p>Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.</p>	<p>CODE NUMBER</p>
	<p>UNUSUAL FIRE AND EXPLOSION HAZARDS</p>	<p>Vapors are heavier than air and may travel along the ground or be moved by ventilation and ignited by heat, pilot lights, other flames and ignition sources at locations distant from material handling point.</p>	
	<p>EXTIN. GUISHING MEDIA</p>	<p><input checked="" type="checkbox"/> DRY CHEMICAL <input type="checkbox"/> WATER FOG <input type="checkbox"/> CARBON DIOXIDE</p> <p><input checked="" type="checkbox"/> REGULAR FOAM <input type="checkbox"/> ALCOHOL FOAM <input type="checkbox"/> OTHER: _____</p>	

HEALTH HAZARD DATA	<p>THRESHOLD LIMIT VALUE</p>	<p>OSHA ESTABLISHED VALUE</p> <p>Not established for product. See Section II</p>
	<p>EFFECTS OF OVER-EXPOSURE FOR</p> <p><input type="checkbox"/> PRODUCT <input type="checkbox"/> COMPONENT</p>	<p>KNOWN EFFECTS LISTED, UNLESS NOT APPLICABLE DUE TO PHYSICAL FORM OF PRODUCT</p> <p>Eyes - Can cause severe irritation, redness, tearing, blurred vision.</p> <p>Skin - Prolonged or repeated contact can cause moderate irritation, defatting, dermatitis.</p> <p>Breathing - Excessive inhalation of vapors can cause nasal and respiratory irritation, dizziness, weakness, fatigue, nausea, headache, possible unconsciousness, and even asphyxiation.</p> <p>Swallowing - Diarrhea, aspiration of material into the lungs resulting in chemical pneumonitis which can be fatal. See Section IX</p>
	<p>SPECIAL FIRST AID ACTION</p> 	<p>IF ON SKIN</p> <p>Thoroughly wash skin with waterless hand cleaner then soap and water, whether product has contacted body or not. Immediately discard contaminated clothing and shoes.</p>
		<p>IF IN EYES</p> <p>Flush with large amounts of water, lifting upper and lower lids occasionally.</p>
<p>IF SWALLOWED</p> <p>Do not induce vomiting, keep person warm, quiet and get medical attention. Aspiration of material into the lungs due to vomiting can cause chemical pneumonitis which can be fatal.</p>		
	<p>IF BREATHED</p> <p>If affected, remove individual to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. Keep person warm, get medical attention.</p>	

000160 2000

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID HAZARDOUS POLYMERIZATION RESULTING IN A LARGE RELEASE OF ENERGY	CODE NUMBER
	<input type="checkbox"/> CAN OCCUR <input checked="" type="checkbox"/> CANNOT OCCUR	
STABILITY	CONDITIONS TO AVOID IF UNSTABLE UNDER NORMAL CONDITIONS	
	<input checked="" type="checkbox"/> STABLE <input type="checkbox"/> UNSTABLE	
INCOMPATIBILITY (MATERIALS) TO AVOID	COMMON MATERIALS OR CONTAMINANTS WHICH WOULD RESULT IN A HAZARDOUS REACTION WITH THE PRODUCT ARE SHOWN	
	Avoid contact with strong oxidizing agents.	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	SMALL SPILL	
	Absorb liquid on paper, vermiculite, floor absorbent, or other absorbent material and transfer to hood.	
	LARGE SPILL	
	Persons not wearing protective equipment should be excluded from area of spill until cleanup has been completed. Stop spill at source, dike area of spill to prevent spreading, pump liquid to salvage tank. Remaining liquid may be taken up on sand, clay, earth, floor absorbent, or other absorbent material and shoveled into containers.	
WASTE DISPOSAL METHOD	SMALL SPILL	
	Destroy by incineration.	
	LARGE SPILL	
	Destroy by liquid incineration.	
RESPIRATORY PROTECTION	Not required under normal conditions of use; however, a NIOSH/MESA respirator may be required when working in confined spaces.	
PROTECTIVE GLOVES	Wear Buna-N, Neoprene, or other resistant gloves.	
EYE PROTECTION	Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses.	
VENTILATION	Provide sufficient mechanical (general) and/or local exhaust ventilation to maintain exposure below TLV's.	
OTHER PROTECTIVE EQUIPMENT	Impermeable aprons. Use barrier creams and take daily showers.	

IX

SPECIAL PRECAUTIONS OR OTHER COMMENTS:

CODE NUMBER

Skin paint tests on laboratory animals have been found to produce skin cancer.

Acute and subchronic doses of diesel fuel fed to rats have been found to produce chromosomal breakage.

Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in this data sheet must be observed.

A HAZARDOUS INGREDIENT IS ONE WHICH MEETS ONE OR MORE OF THE FOLLOWING CRITERIA:

1. It is listed in the annual Registry of Toxic Effects of Chemical Substances, or is known to be toxic within the parameters of that Registry, and is present at a level of 1% or greater. DOT Poisons are listed if present at any level.
2. It has an OSHA established 8-hour time-weighted average or acceptable ceiling concentration (c), or an American Conference of Governmental Industrial Hygienists' (ACGIH) Threshold Limit Value, and by the nature of the product or its known use, is likely to become airborne.
3. It contributes to one or more of the following hazards of the product:
 - a. Flashpoint below 200°F (cc), or subject to spontaneous heating or decomposition.
 - b. Causes skin burns. (DOT)
 - c. Strong oxidizing agent. (DOT)
 - d. Subject to hazardous polymerization.

Each hazardous ingredient is listed by chemical, generic, or proprietary name, its level in the product is expressed as 1% or less, 1-10%, 10-30%, 30-60%, or greater than 60%, or by other means if such information is proprietary. Adopted ACGIH values are only listed, with appropriate notation, where OSHA values are not available.

000162

6365

**ATTACHMENT C
FEMP MINUTES OF SAFETY MEETING**

000163
300000

**ATTACHMENT D
JOB SAFETY ANALYSIS**

000164

6305

JOB SAFETY ANALYSIS

1.

ATTACHMENT B
(page 1 of 1)

JOB SAFETY ANALYSIS FORM

JOB: End Loader		DATE:	
JOB TITLE:	DEPARTMENT: Health & Safety	SECTION GROUP:	
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:	APPROVED BY:
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT			
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE	
End Loader Mounding/Dismounding Starting	Falling Slipping into Gear/ Equipment Failure	Keep steps free of Dirty Debris, etc. Make sure no one in front of or behind starting. Thoroughly inspect prior to use.	
Moving endloader	Hitting person/object	Make sure back up alarm is working. Be constantly aware of surroundings. Never operate at unreasonable fast speeds.	
Dumping loads	Dumping on person	Don't take chances by dumping load near any individual.	

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JOB SAFETY ANALYSIS

1.

ATTACHMENT B
(page 1 of 1)

JOB SAFETY ANALYSIS FORM

JOB Grading		DATE:	
JOB TITLE:	DEPARTMENT: Health & Safety	SECTION GROUP:	
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:	APPROVED BY:
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:			
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE	
Grader Operator			
Fueling	Opening Fuelcap Spark igniting fuel	No smoking or welding in vicinity. Turn engine off and remain at the refueling point. If fueling frequently, wear gloves. Make sure cap is put back on. Maybe chain to tank.	
Filling Tank	Overflow		
After Fueling	Skin Irritation Cap left off		
Grading	Fuel-soaked/oily rags igniting Slipping when entering	Dispose of rags promptly in proper container. Be aware of surroundings secure footing before shifting weight.	
Starting	Slipping into gear	Make sure no one in front of or behind any part of grader before starting	
Pulling away	Hitting person or object	Be aware of surroundings Never operate when back alarm not working. Give faster-moving vehicle the right-of-way.	

000166

FERMICO

6365
2.

JOB SAFETY ANALYSIS

ATTACHMENT B
(page 1 of 1)

JOB SAFETY ANALYSIS FORM

JOB: Grading		DATE:	
JOB TITLE:	DEPARTMENT: Health & Safety	SECTION GROUP:	
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:	APPROVED BY:
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:			
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE	
Grading	Blade striking something Excessive noise	Don't try to get too close to objects. Make sure there are no surprises lying under the surface of the grade. Wearing hearing protection.	

000167

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JOB SAFETY ANALYSIS

1.

ATTACHMENT B
(page 1 of 1)

JOB SAFETY ANALYSIS FORM

JOB Trucking Rules		DATE:	
JOB TITLE:		DEPARTMENT: Health & Safety	SECTION GROUP:
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:	APPROVED BY:
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:			
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE	
Trucking	Crushing	Always use proper blocking in the bed of the truck when working on hoists, greasing, etc.	
	Lose Control	Never wrap your thumb around the steering wheel.	
	Crushing	Always be sure your dump man is visible in your rear side view mirror.	
	Crushing	When visibility is impaired and when passing workmen and equipment, reduce speed as judgement dictates.	
	Crushing	Use traffic control and flagging. A. Flag persons shall be properly dressed. (orange vest, red flag) B. Plan to redirect traffic if its in a vicinity of a work area. C. If vehicles back into work area they should have backup alarm or signal person. D. Signs shall be placed to warn others of a hazardous condition.	

6365

JOB SAFETY ANALYSIS

ATTACHMENT B
(page 1 of 1)

2.

JOB SAFETY ANALYSIS FORM

JOB: Trucking Rules		DATE:
JOB TITLE:	DEPARTMENT: Health & Safety	SECTION GROUP:
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:
APPROVED BY:		
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT		
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE
Trucking	Pinch Area	Always give the loaded truck the right of way.
	Malfunction in Equipment	All vehicles shall have in operable conditions at least 2 headlights 2 tail lights Brake lights Audible warning device at operator's station Seat belts properly installed Service, parking and emergency brake system Backup alarm ROP Tires properly inflated
	Crushing	Obey all signals, signs, flagman, traffic patterns, etc.

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JOB SAFETY ANALYSIS

3.

ATTACHMENT B
(page 1 of 1)

JOB SAFETY ANALYSIS FORM

JOB Trucking Rules		DATE:
JOB TITLE:	DEPARTMENT: Health & Safety	SECTION GROUP:
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:
APPROVED BY:		
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:		
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE
Dumping	Tipping	<p>Make sure truck is not overloaded. Know the load limits.</p> <p>Make sure the truck is on even ground and wheels are stable before dumping.</p> <p>Check to see load on truck to make sure it's even.</p> <p>Check hydraulic oil levels for the scope of the truck.</p> <p>If the bed of truck is binding, report it immediately to the mechanic.</p> <p>When backing up, keep tailgate clear of previous material dumped.</p>

000170

FERMCO

JOB SAFETY ANALYSIS

6365

ATTACHMENT B
(page 1 of 1)

4.

JOB SAFETY ANALYSIS FORM

JOB: Trucking Rules		DATE:	
JOB TITLE:	DEPARTMENT: Health & Safety	SECTION GROUP:	
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:	APPROVED BY:
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:			
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE	
Trucking		<p>Always allow sufficient intervals between trucks when traveling. No tailgating will be allowed.</p> <p>Parked trucks must have keys removed from ignition and shall be left in gear. Trucks parked on a slope shall be adequately blocked.</p>	

000171
000171

FERMICO

JOB SAFETY ANALYSIS

1.

ATTACHMENT B
(page 1 of 1)

JOB SAFETY ANALYSIS FORM

JOB: Excavating		DATE	
JOB TITLE:		DEPARTMENT: Health & Safety	SECTION GROUP:
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:	APPROVED BY:
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:			
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE	
Operator: Excavating Machine	Could fall or slip	Operator - before entry into equipment cleans grease and mud from boots, uses hand holds and steps provided on equipment.	
Check Equipment	Someone could get hit - Moving equipment in blind Spot.	Stay alert - Check backup alarm. Check for unnecessary people to stay clear of area.	
Begins to dig trench operator picks up soil, pivets machine and lower bucket to empty load.	Someone could be hit by excavating machine as it pivets.	Stay clear of excavating machine. Competent person must advise sloping and benching.	
	Operator can have a blind spot.	Stay clear of blind spot areas. Never ride on moving equipment. Equipment 2 feet from edge excavation. Stock pile 2 feet from edge of excavation. Don't use defective equipment.	

000172

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JOB SAFETY ANALYSIS

6365

2.

ATTACHMENT B
(page 1 of 1)

JOB SAFETY ANALYSIS FORM

JOB Excavating		DATE:	
JOB TITLE:	DEPARTMENT Health & Safety	SECTION GROUP:	
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:	APPROVED BY:
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT			
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE	
Excavating Machine Inspection of soil conditions as excavating. Checking for waterlines, pipes, utilities. Contaminated soil	Physical	Required permit, and check utilities. Personnel will stay away from contaminated soil and it will becaution off and monitored by technician. Action levels will be set. Proper PPE worn.	

000173

FERMICO

JOB SAFETY ANALYSIS

ATTACHMENT B
(page 1 of 1)

3.

JOB SAFETY ANALYSIS FORM

JOB Excavating		DATE:	
JOB TITLE:		DEPARTMENT Health & Safety	SECTION GROUP:
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:	APPROVED BY:
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:			
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE	
Back Filling	Crushing accident	<p>All equipment must have an operating back-up alarm.</p> <p>Do not use defective equipment.</p> <p>Use equipment only as the manufacturer intended.</p> <p>Never ride on moving equipment.</p> <p>Stay clear of blind spot areas.</p> <p>Keep a safe distance from equipment.</p>	

000174

6365

JOB SAFETY ANALYSIS

ATTACHMENT B
(page 1 of 1)

1.

JOB SAFETY ANALYSIS FORM

JOB Transporting Equipment/Materials to Jobsite		DATE:
JOB TITLE:	DEPARTMENT: Health & Safety	SECTION GROUP:
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:
APPROVED BY:		

REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE
Transporting Equipment Materials to Jobsite	Handling heavy/awkward materials	Train employees in proper techniques. Stress team work. Mechanical assistance to maximum extent.
	Shifting Loads	Inspect load binders, chains, use adequate blocking and tag lines where needed.
	Moving Equipment/Truck, Rigs	Establish safe speed limits. Utilize signalmen where necessary. Ensure back-up alarm functioning, use seat belts-ropes where applicable.
	Loading/unloading equipment/material	Use qualified operators. Inspect slings, hoisting lines, shackles. Stress team work and employ hoisting equipment to maximum extent. Use tag lines/wear safety toe shoes.

000175

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JOB SAFETY ANALYSIS

2.

ATTACHMENT B
(page 1 of 1)

JOB SAFETY ANALYSIS FORM

JOB Storage of Equipment/ Material Jobsite		DATE:
JOB TITLE:	DEPARTMENT: Health & Safety	SECTION GROUP:
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:
APPROVED BY:		
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:		
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE
Storage of equipment/ material on jobsite	Falling, shifting or collapsing materials	Materials and supplies will be neatly and securely stacked, blocked interlocked and limited in height so as to be stable.
	Fire due to poor, Incomp- atible storage	Segregate flammable liquids from other combustil Maintain good access. I no smoking signs and fire extinguishers near storage area. Train employees in proper lifting techniques.
	Improper Lifting/Handling of Material	Train employees in proper lifting techniques. Stress team work and employ hoisting equipment to maximum extent.

000176

FERNICO

JOB SAFETY ANALYSIS

6365

ATTACHMENT B
(page 1 of 1)

1.

JOB SAFETY ANALYSIS FORM

JOB Miscellaneous		DATE:	
JOB TITLE:		DEPARTMENT: Health & Safety	SECTION GROUP:
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:	APPROVED BY:
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:			
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE	
Refueling Equipment	Fire/Burn	All gas cans must be safety approved. All equipment must be turned off during refueling.	
Performing Maintenance		Shut off engine, allow hot parts to cool, and be alert for lines that retain pressure - never get under a blade bucket, or other movable equipment parts. Unless they have been securly blocked.	

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JOB SAFETY ANALYSIS

ATTACHMENT B
(page 1 of 1)

2.

JOB SAFETY ANALYSIS FORM

JOB Miscellaneous		DATE:	
JOB TITLE:		DEPARTMENT Health & Safety	SECTION GROUP:
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:	APPROVED BY:
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:			
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE	
Travel to site	Falls	No riding in back of pickups unless seats are provided.	
Climbing	Pinching Fingers	Be aware of pinch points, wear gloves.	
Climbing	Slipping	Keep steps or ladders free of mud, grease, etc. Plant feet firmly before shifting weight. Wear boots with good traction on soles.	
Climbing	Falling	Spot ladder in correct position. Don't lean in order to reach. Use arrest/restraint protection.	
Climbing	Miscellaneous Splashes	Never grease moving parts. Wear all appropriate protective equipment. Shut down equipment.	

000178

FERMCO

6365

JOB SAFETY ANALYSIS

ATTACHMENT B
(page 1 of 1)

1.

JOB SAFETY ANALYSIS FORM

JOB Rigging Operation		DATE:	
JOB TITLE:		DEPARTMENT: Health & Safety	SECTION GROUP:
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:	APPROVED BY:
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:			
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE	
Rigging Operation	Shifting Load	<p>Rigging equipment will be inspected before each use and as necessary during its use to ensure that it is safe.</p> <p>Rigging equipment shall not be used if deformed, cracked, worn, kinked, crushed, cut or shows evidence of heat damage or having broken or damage parts.</p> <p>All rigging equipment including; slings, wire and nylon, chainfalls come-alongs, spreaders, lifting beams - shall be inspected on a quarterly basis by a qualified person.</p> <p>Records shall be maintained using the rigging equipment inspection report. Form 70-29</p>	

000179-000

FERMICO

JOB SAFETY ANALYSIS

ATTACHMENT B
(page 1 of 1)

2.

JOB SAFETY ANALYSIS FORM

JOB Rigging Operation		DATE:	
JOB TITLE:	DEPARTMENT: Health & Safety	SECTION GROUP:	
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:	APPROVED BY:
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT			
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE	
Rigging Operation	Shifting Load	<p>Rigging equipment, including shackles and hooks, will not be loaded in excess of its manufacturers recommended safe work load.</p> <p>Special custom designed grabs, hooks, clamps, etc. shall be marked to indicate safe work loads and shall be proof tested prior to use. 125% of their rated loads.</p>	
Hand Signals		<p>Ansi standard hand signals shall be used to direct operations.</p>	

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FERNCO

JOB SAFETY ANALYSIS

ATTACHMENT B
(page 1 of 1)

3.

JOB SAFETY ANALYSIS FORM

JOB Rigging Operation		DATE:	
JOB TITLE:		DEPARTMENT Health & Safety	SECTION GROUP:
SUPERVISOR:	ANALYSIS BY:	REVIEWED BY:	APPROVED BY:
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:			
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE	
Rigging operation	Shifting load	<p>Rigging equipment shall only be used if rated capacity or specified liftangle.</p> <p>Rigging equipment shall be labeled with the rated load, manufacturers name, serial number, and weight of equipment over 100 lbs.</p> <p>* Job or shop hooks formed from bolts, rods, rebar, etc. will not be used.</p>	

000181

ATTACHMENT 11

Letter from S. K. Talukder/Parsons to J. B. Williams/FERMCO
dated January 22, 1993 (Parsons ID#: 02:047:20:0029-93)

000182

APR 1993

6120 South Gilmore Road
Fairfield Executive Center
Fairfield, OH 45014
(513) 870-0300
FAX (513) 870-0444

WEMCO
OU 2
JAN 26 4 39 PM '93

PARSONS

January 22, 1993
PARSONS ID#: 02:047:206:0029-93

Mr. James B. Williams
CERCLA/RCRA Unit 2 Director
Fernald Environmental Restoration
Management Corporation
P.O. Box 398704
Cincinnati, OH 45239-8704

FILE COPY
120.1.4

Subject: CERCLA/RCRA UNIT 2, Inactive Flyash Pile
Relocation - Engineering Assessment
Project Order 47 (PO-47)
Inactive Flyash Pile/Other South Field
Disposal Areas
FERMCO Subcontract No. 2-21487
PARSONS Environmental Remedial Action Project

Ref: Letter No. C:CRU2:93-004, dated January 18, 1993, from
Garland/FERMCO to Talukder/PARSONS

Dear Mr. Williams:

As requested and authorized by S. T. Garland in the referenced letter, PARSONS performed an engineering assessment to move a portion of the Inactive Flyash Pile away from the affected area of Paddy's Run. Attached is a copy of the assessment, with a Rough Order of Magnitude Cost Estimate for your review and further action.

Please note that this study for the removal action is not included in the original scope of PO-47.

Please call me at 870-8274, or Hari Rao at 870-8267, should you have any questions concerning this assessment.

Very truly yours
PARSONS

S. K. Talukder
Sukomal K. Talukder
Project Manager, CRU-2

SKT:nlt

Attachment

c: FERMCO: S. Garland
A. Guillen

- L. Henke w/o attach.
- C. L. North w/o attach.
- D. C. Wright w/o attach.
- PARSONS: H. Rao
- B. Yeates
- Y. Afshar
- E. Kubrin
- A. Claveau
- J. Gretsch
- D. Dornoff
- CRU-2 Project Files 2.3.3.a

DC Code 7 Project Order-Related Documents:

Document Control

- R. Duda
- R. Glenn
- D. Holleman
- W. Hedzik
- F. Gruber
- S. Goldberg
- G. Ossmann
- J. Golyski
- J. Cooper
- S. Nelson
- S. Hammitt
- S. Barreras
- S. Mallette
- R. Zieminski
- B. Harvey
- T. Pyrz

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000185

P A R S O N S
F E M P

INACTIVE FLY ASH PILE
STUDY

DESCRIPTION: CONCEPTUAL

DOCUMENT:

ESTIMATOR: B.P. GRIGSBY

BID DATE:

JOB SIZE:

RATE TABLE: FEMP

REPORT: DETAIL

PARSONS

6365

PROJECT NO.: STUDY, CRU-3
 PROJECT TITLE: INACTIVE FLY ASH PILE
 CLIENT: DOE/FERMCO
 LOCATION: FEMP
 EST. TYPE: STUDY

ESTIMATE SUMMARY

SHEET: 1
 DATE: 22-Jan-93
 ESTD. BY: B.P. GRIGSBY
 CHKD. BY: B. NEMADE *BN*
 REV. NO.: 0
 EST. FILE: "IFASTUDY"

TIME	ITEM	DESCRIPTION	MATERIAL	LABOR	CONST. EQUIP.	TOTAL
1000		LAND & LAND RIGHT	0	0	0	0
2000	*	IMPROVEMENTS TO LAND	45,600	229,600	456,300	731,500
3000		NEW BUILDINGS & ADDITIONS	0	0	0	0
4000		BUILDING MODIFICATIONS	0	0	0	0
5000		OTHER STRUCTURES	0	0	0	0
6000		SPECIAL FACILITIES	0	0	0	0
7000		UTILITIES	0	0	0	0
8000		STANDARD EQUIPMENT	0	0	0	0
SUBTOTAL			45,600	229,600	456,300	731,500
R&D ENVIRONMENTAL MONITORING			2,500	7,500		10,000
HAZ. MAT. PRODUCT. FACTOR				213,400		213,400
JOB CONDITIONS				50,700		50,700
INDIRECT COSTS				146,600		146,600
HEALTH PHYSICS				64,030		64,030
SUBTOTAL			48,100	711,800	456,300	1,216,200
CLA & MISC. COST			100,200	76,900	0	177,100
BOND			2,200	11,800	6,800	20,800
GC MARK-UP ON SUBS					0	0
GEN CONTRACTOR OH & P			37,600	200,100	115,800	353,500
SUBTOTAL			188,100	1,000,600	578,900	1,767,600
CONSTR. MGMT.						282,800
SUBTOTAL						2,050,400
SAFETY DOCUMENTATION (INCL. IN ENGINEERING COST)						0
PROJ. MGMT. - WEMCO						164,000
ENGINEERING			Title I&II 0.0% 0	Title III 0.0% 0		0
SUBTOTAL						2,214,400
SALES TAX						2,500
DECONTAM & DISPOSAL			CONTAINERS & HANDL. COST 314,500		EQ. DECON (IN DET. EST.)	314,500
SUBTOTAL						2,531,400
ESCALATION						0
SUBTOTAL						2,531,400
CONTINGENCY						126,600
TOTAL ESTIMATED COST: (RMP EST, CONST. BID W/ESC/CONT---->			\$1,859,000			\$2,658,000

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JOB CONDITIONS & OVERHEAD SUMMARY

STUDY, CRU-3
INACTIVE FLY ASH PILE
STUDY

PRINT DATE: 22-Jan-93
ESTIMATOR: B.P. GRIGSBY
CHECKED BY: B. NEMADE

JOB CONDITIONS (%) or (\$)		450,500	INDIRECT COSTS (%) or (\$)		501,200	CHECKED BY:	759,900		
1	HEIGHT/BELOW GRADE	0.00%	0	SMALL TOOLS	0.10%	501	HOME OFFICE EXPENSES	8.00%	60,792
2	WEATHER	5.00%	22,525	SCAFFOLDING	0.00%	0	INSURANCE(RISK)	2.25%	17,098
3	HAZARDOUS FUMES/DUSTS	0.00%	0	CLEAN-UP	0.00%	0	PERMITS	0.00%	0
4	JOB CONGESTION	0.00%	0	TEMPORARY FACILITIES/SERVICE	4.45%	22,300	SCHEDULING	0.50%	3,800
5	CRAMPED WORKING AREA	0.00%	0	MAINTAINING PRODUCTION	0.00%	0	SHOP DRAWINGS	0.00%	0
6	CRAFT INTERFERENCE	0.00%	0	CHG. ORDERS ALLOWANCE	0.00%	0	PHOTOGRAPHS	0.10%	760
7	ABNORMAL CLEAN-UP	0.00%	0	WELDER QUALIFICATION	0.00%	0	LOCAL BIDDING CLIMATE (MARKET)	0.00%	0
8	STRINGENT TESTING & INSPECTION	5.00%	22,525	FIELD SUPERVISION	8.32%	41,700	FIELD PERSONNEL(OTHER THAN SUPV.)	4.15%	31,500
9	TIGHT SCHEDULE	0.00%	0	PREMIUM TIME	0.00%	0	PROFIT (TO 10%)	10.00%	75,990
10	NON-PROD. TIME	8.00%	36,040	SURVEYS,TESTS,GEOLOG.STUDY	5.00%	25,060			
TOTAL ON LABOR ONLY		18.00%	81,100	TOTAL	17.87%	89,600	TOTAL ON LAB & MAT	25.00%	189,900

TEMPORARY FACILITIES & SERVICES

PROJECT: STUDY, CRU-3
 CLIENT: DOE/FERMCO
 LOCATION: FEMP
 EST. TYPE: STUDY

JOB CONDITIONS & OVERHEAD INDIRECT COSTS SUMMARY

PRINT DATE: 22-Jan-93
 10:52 AM
 ESTIMATOR: B.P. GRIGSBY
 CHECKED BY: B. NEMADE

DURATION: CONST. OPERATIONS 0 YRS. 6 MO.

	QUANT	UNIT	UNIT MATERIAL	UNIT	LABOR	TOTAL
OFFICE TRAILERS	3.00	MO	500	1,500	0	1,500
MOB & DEMOB	1.00	LS	1,500	1,500	0	1,500
OFFICE EQUIP.	1.00	SETS	1,500	1,500	0	1,500
OFFICE COMPUTERS & SOFTWARE	0.00	SETS	3,000	0	0	0
OFFICE SUPPLIES	3.00	MO	150	450	0	450
OFFICE POSTAGE	3.00	MO	50	150	0	150
ADDITIONAL PLANS & SPECS.	0.00	EA	200	0	0	0
FIELD OFFICE UTILITIES, INSTALL & REMOVE	1.00	LS	3,000	3,000	0	3,000
TELEPHONE	3.00	MO	100	300	0	300
COMUNICATIONS	3.00	MO	500	1,500	0	1,500
WATER, ICE & CUPS	3.00	MO	100	300	0	300
MAINTAIN PARKING & ROADS	0.00	MO	200	0	0	0
TEMP FENCING & GATES	0.00	LS	5,000	0	0	0
TEMP TOILETS	12.00	MO	800	9,600	0	9,600
SERVICE ELECT & MAINT	0.00	LS	1,500	0	0	0
BLDG. HEATING	0.00	MO	100	0	0	0
FIRE PROTECTION	0.00	EA	125	0	0	0
SIGNAGE	0.00	MO	50	0	0	0
FIRST AID	3.00	MO	50	150	0	150
SAFETY EQUIPMENT	3.00	MO	100	300	0	300
BAD WEATHER GEAR	3.00	MO	50	150	0	150
INSTALL TEMP. LIGHTING & MAINTAIN	0.00	MO	100	0	0	0
TRASH BIN RENTAL	3.00	MO	200	600	0	600
TRASH DUMP FEES	3.00	MO	50	150	0	150
SNOW REMOVAL	0.00	MO	500	0	0	0
DEWATERING	0.00	MO	100	0	0	0
FACILITY WEATHER PROTECTION	0.00	MO	200	0	0	0
CONCRETE PROTECTION	0.00	MO	600	0	0	0
BLDG. BARRICADES	0.00	MO	100	0	0	0
STREET BARRICADES & LTG.	0.00	MO	100	0	0	0
SCAFFOLDING	0.00	LS	20,000	0	0	0
PORTABLE EYE WASH/SHOWER STATIONS	0.00	EA.	3,500	0	0	0
RELOCATE EYE WASH/SHOWER STATIONS	0.00	EA.	100	0	0	0
AIR MONITORING	0.00	EA.	10,000	0	0	0
RELOCATING AIR MONITORS	0.00	EA.	200	0	0	0
SALES TAX	1	LS	5.5%	1,163	0	1,163
TEMPORARY FACILITIES & SERVICES TOTAL						22,300

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681000

PARSONS

CERCLA & MISC. COSTS

SUMMARY

PROJECT: STUDY, CRU-3
 CLIENT: DOE/FERMCO
 LOCATION: FEMP
 EST. TYPE: STUDY

PRINT DATE: 22-Jan-83
 10:52 AM
 ESTIMATOR: B.P. GRIGSBY
 CHECKED BY: B. NEMADE

		0.25 YR.							
DESCRIPTION	QTY	MATERIAL		LABOR		RATE	AMOUNT		TOTAL COST
		UNIT PRICE	AMOUNT	UNIT HOURS	TOTAL HOURS				
ASSUMED 20 WORKERS OVER 3 MO. CONST. PERIOD.									
1.	SAFETY TRAINING (23 WORKERS + 2 STAFF)	25	0.00	0	72	1,800	25.00	45,000	45,000
2.	MEDICAL EXAM (ENTRY/EXIT)	50	500.00	25,000	8	400	25.00	10,000	35,000
3.	BIOASSAY TESTING (25 EA * 2 HR * YR)	25	0.00	0	1	50	25.00	1,250	1,250
4.	ANNUAL MEDICAL EXAMS. (\$500 EA * YR)	0	125.00	0	2	0	25.00	0	0
5.	ANNUAL 8 HR REFRESHER TRAINING (4YR)	0	0.00	0	2	0	25.00	0	0
6.	ATTRITION (20% OF ITEMS 1,2 & 3)	1	5,000.00	5,000		450	25.00	11,250	16,250
SUBTOTAL - CERCLA				\$30,000		2,700 HOURS		\$67,500	\$97,500
PERSONNEL PROTECTION									
12 - 4 DAY WEEKS OR 48 DAYS									
1.	TYVEK SUITS (4EA*48 DAYS*23 WKR/25/BX)*.0	177	85.00	15,014		0	25.00	0	15,014
2.	MSA MASKS (2 EA* WKR * YR)*.0	184	25.00	4,600	1	184	25.00	4,600	8,200
3.	CARTRIDGES (8 EA*48 DAYS*25 WKR)*.0	8,832	1.00	8,832		0	25.00	0	8,832
4.	GLOVES (4 PR* 48 DAYS*25 WKR)*.0	4,416	4.65	20,534		0	25.00	0	20,534
5.	RUBBER BOOTS (4 PR*25 WKR*YR)*.0	368	20.00	7,360		0	25.00	0	7,360
6.	CLEANING MASKS (25 EA*15 MIN*12 WK)/60*.0	75	35.00	2,625		0	25.00	0	2,625
7.	DRUMS; DISPOSE OF 50 TYVEKS, GLOVES ETC. EA	88	35.00	3,091		0	25.00	0	3,091
8.	DECON TRAILERS W/STORAGE TANKS 1,500 MO.	3	1,500.00	4,500	48	144	25.00	3,600	8,100
9.	PUMP STORAGE TANKS WEEKLY (234 WK X 4 HR)	12	0.00	0	4	48	25.00	1,200	1,200
	SALES TAX	1	5.5%	3,661					3,661
SUBTOTAL - PERSONNEL PROTECTION				70,200		376 HOURS		9,400	79,600
TOTAL CERCLA & MISC. COSTS				100,200		3,076 HOURS		76,900	177,100

FIELD SUPERVISION

PROJECT: STUDY, CRU-3
 CLIENT: DOE/FERMCO
 LOCATION: FEMP
 EST. TYPE: STUDY

JOB CONDITIONS & OVERHEAD INDIRECT COSTS SUMMARY

PRINT DATE: 22-Jan-93
 11:00 AM
 ESTIMATOR: B.P. GRIGSBY
 CHECKED BY: B. NEMADE

DURATION: CONST. OPERATIONS 0 YRS. 3 MO.

	QUANT.	UNIT	MONTHS	RATE	TOTAL
PROJECT MANAGER	0	0	MO	6,250	0
PROJECT SUPERINTENDENT	1	3	MO	5,416	16,248
BLDG/ SITE WK. SUPERINTENDENT	0	0	MO	5,000	0
OFFICE ENGINEER	1	3	MO	4,166	12,498
OFFICE CLERKS	0	0	MO	1,600	0
	0	0	MO	0	0
	0	0	MO	0	0
	0	0	MO	0	0
	0	0	MO	0	0
MOB & DEMOB (RELOCATION/TRAVEL COST)	0	0	MO	0	0
TAX & INSURANCE 25% ON SALARIES	1	0	LS	25.0%	7,187
EMPLOYEE BENEFITS 20% ON SALARIES	1	0	LS	20.0%	5,749
FIELD SUPERVISION TOTAL					41,700

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PROJECT: STUDY, CRU-3
 CLIENT: DOE/FERMCO
 LOCATION: FEMP
 EST. TYPE: STUDY

CONTAINERS

SUMMARY

PRINT DATE: 22-Jan-83
 11:30 AM
 ESTIMATOR: B.P. ORIGSBY
 CHECKED BY: B. NEMADE

00019100

DESCRIPTION	QTY	UNIT	MATERIAL		LABOR				EQUIPMENT		TOTAL		
			UNIT COST	MATL COST	MH UNIT	TOTAL MH	WAGE RATE	UNIT COST	LABOR COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST
1. SEALAND CONTAINERS 8'X8'X20' (USED) 37,000 LB. PAYLOAD - INSIDE VOL 1097 CF	0	EA	2,900	0	0.00	0	25.00	ERR	0	100.00	0	ERR	0
2. 20 TON CONTAINER - 8' X 7' X 8.5' - O.S. (SPECIAL) 40,000 LB. PAYLOAD - INSIDE VOL. 335 CF	0	EA	2,600	0	0.00	0	25.00	ERR	0	100.00	0	ERR	0
3. 8-25 BOXES - 4' X 4' X 8' - O.S. 10,000 LB. PAYLOAD - INSIDE VOL. 90 CF	0	EA	700	0	0.00	0	25.00	ERR	0	50.00	0	ERR	0
4. 7A BOX CONTAINER - 52" x 38" x 72" - O.S. 7,000 LB. PAYLOAD - INSIDE VOL. 85 CF	375	EA	700	262,500	2.00	750	25.00	90.00	18,750	50.00	18,750	800	300,000
5. 6 DRUM OVERPACK CONTAINER - 38" X 52" X 78" - I.S. 8,000 LB. PAYLOAD - INSIDE VOL. 87 CF	0	EA	700	0	0.00	0	25.00	ERR	0	50.00	0	ERR	0
6. DRUMS 55 GAL (STRIP LEAD, OIL, GREASE & MISC.)	0	EA	35	0	0.00	0	25.00	ERR	0	15.00	0	ERR	0
SALES TAX	1	LS	5.5%	14,438								14,438	14,438
SHIPPING COST													
1. SEALAND CONTAINERS 8'X8'X20'	0	EA	0	0	0.00	0	25.00	ERR	0	30,000	0	ERR	0
2. 7A BOX CONTAINER - 52" x 38" x 72"	0	EA	0	0	0.00	0	25.00	ERR	0	4,286	0	ERR	0
3. 6 DRUM OVERPACK CONTAINER - 38" X 52" X 78"	0	EA	0	0	0.00	0	25.00	ERR	0	4,286	0	ERR	0
TOTAL				276,900		800 HOURS				18,800		18,800	314,500

CLIENT: DOE/FERMCO
 ADDRESS: FEMP
 ESTIMATOR: B.P. GRIGSBY

INACTIVE FLY ASH PILE
 STUDY

PAGE: 1

DATE: 1-22-93
 TIME: 9:57 am

COST DESCRIPTION CODE	QTY	UM	MATERIAL		LABOR				CONSTR. EQUIP.		TOTAL		
			UNIT COST	TOTAL COST	HOURS/UNIT	TOTAL HOURS	CREW RATE	UNIT COST	TOTAL COST	UNIT COST		TOTAL COST	
1.2.3.4.													
=====													
<u>20.000 SBS INVASIT DMLT</u>													
<u>20.807 Haz material rem</u>													
2000	Load contaminated mixed soil brush and vegetation into containers	3,000	C.Y.			.03	90	28.44	.85	2,560	15.00	45,000	47,560
2000	Load, haul & unload 7A containers of contaminated mixed soil brush and vegetation 3 per trip, 3,000 lb each	375	EA.	3.00	1,125	.50	188	28.44	14.22	5,333	15.00	5,625	12,083
<u>20.810 Decon const eqp</u>													
2000	Forklift, 6,000 lb	1	EA.	15.00	15	8.00	8	28.52	228.16	228	50.00	50	293
2000	Gradeall hydraulic trk mtd	1	EA.	25.00	25	16.00	16	28.52	456.32	456	100.00	100	581
2000	Truck 5 ton tand ax flt bed	1	EA.	15.00	15	8.00	8	28.52	228.16	228	50.00	50	293
2000	Truck, 5 ton service & grease	1	EA.	15.00	15	8.00	8	28.52	228.16	228	50.00	50	293
2000	Truck, 3/4 tn pickup	2	EA.	15.00	30	16.00	32	28.52	456.32	913	50.00	100	1,043
2000	Fuel tanks & stands	2	EA.	15.00	30	8.00	16	28.52	228.16	456	50.00	100	586
2000	Office trailer 12'x 40'	1	EA.	50.00	50	60.00	60	28.52	1,711.20	1,711	200.00	200	1,961
2000	Temp. toilets	2	EA.	15.00	30	8.00	16	28.52	228.16	456	50.00	100	586
2000	Truck 12 cy tand ax rear dump	3	EA.	20.00	60	16.00	48	28.52	456.32	1,369	75.00	225	1,654
2000	Wheel loader Cat 966C 3 cy bkt	1	EA.	15.00	15	16.00	16	28.52	456.32	456	50.00	50	521
2000	Scraper Cat 627B 2 eng 14/20cy	3	EA.	50.00	150	32.00	96	28.52	912.64	2,738	200.00	600	3,488
2000	Grader Cat 14g 180 hp	1	EA.	15.00	15	16.00	16	28.52	456.32	456	50.00	50	521
2000	Compactor Cat 815 170 hp	1	EA.	15.00	15	16.00	16	28.52	456.32	456	50.00	50	521
<u>21.000 SITE PREPARATION</u>													
<u>21.104 Clear and grub</u>													
2000	Clear & grub brush & stumps	7	ACRE			41.38	290	28.44	1,176.85	8,238	2,425.00	16,975	25,213
<u>21.108 Clearing</u>													
2000	Clr brs,dzr&brs rate,medn 4"dm	8	ACRE			26.67	213	28.44	758.49	6,068	1,675.00	13,400	19,468
<u>21.144 Stripping</u>													
2000	Strip brush & vegetation	3,000	C.Y.			.02	60	28.44	.57	1,706	.55	1,650	3,356
<u>21.154 Selcty clearing</u>													
2000	Gr at&rmv,bck 1.5 14"-18" tree cut & transport to stock	400	EA.			.96	384	23.10	22.18	8,870	56.00	22,400	31,270
2000	Tree chn saw&chpp 2" to 6"dia	400	EA.			1.50	600	23.10	34.65	13,860	25.00	10,000	23,860
<u>22.000 EARTHWORK</u>													
<u>22.104 Grading</u>													
2000	Rough grade w/grader 2 passes truck hauled flyash graded in 12" lifts	33,880	S.Y.	.01	339		136	28.44	.11	3,854	.14	4,743	8,936

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CLIENT: DOE/FERMCO
 ADDRESS: FEMP
 ESTIMATOR: B.P. GRIGSBY

INACTIVE FLY ASH PILE
 STUDY

PAGE: 2

DATE: 1-22-93
 TIME: 9:57 am

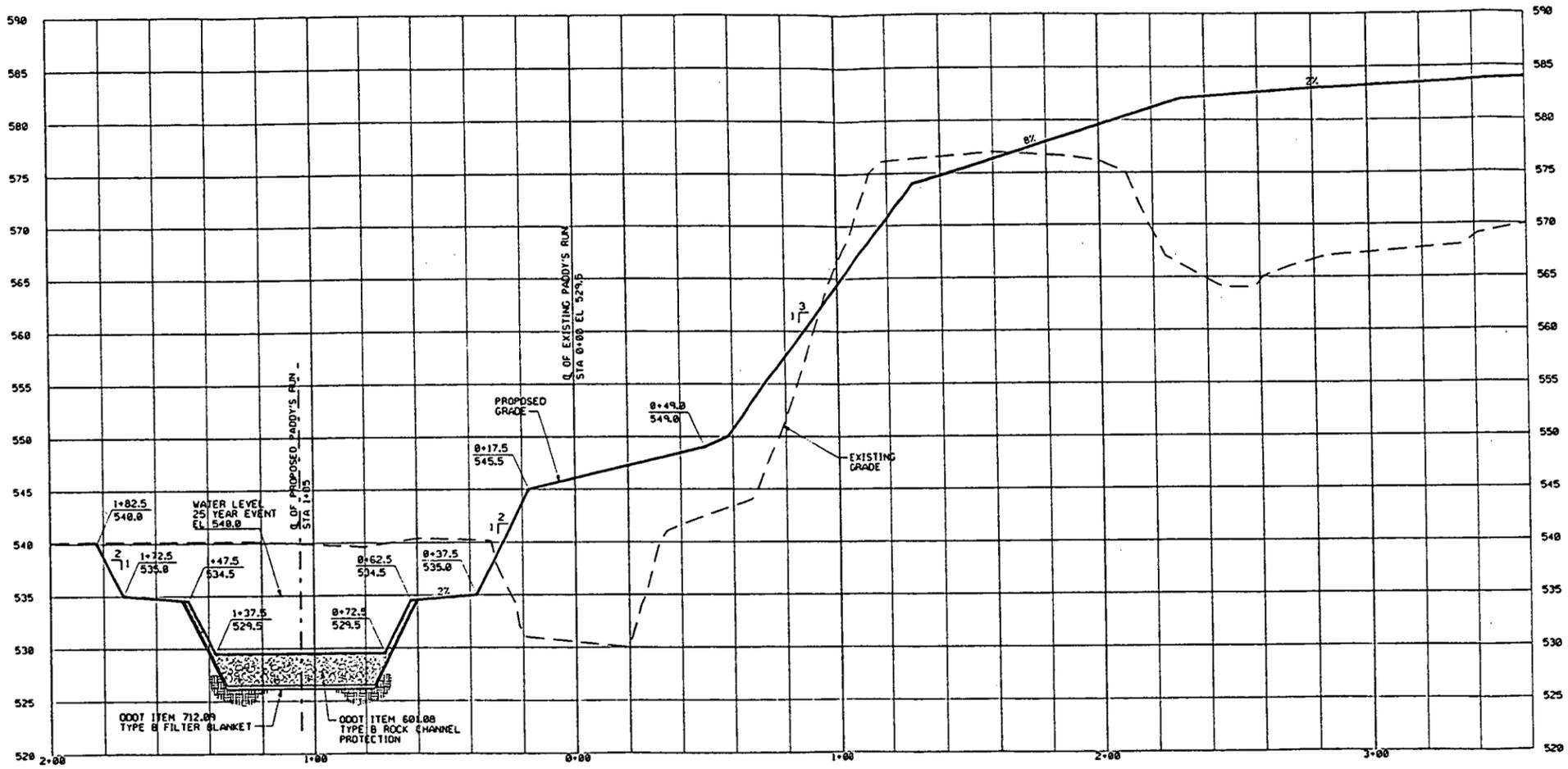
POST CODE DESCRIPTION	QTY	UM	MATERIAL		HOURS/ UNIT	TOTAL HOURS	LABOR			CONSTR. EQUIP.		TOTAL
			UNIT COST	TOTAL COST			CREW RATE	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	

22.000 EARTHWORK												
22.222 Compaction												
000 Cm,sh wob whl rol 8"l,com fill earth fill	32,468	C.Y.			.01	292	28.44	.26	8,311	.37	12,013	20,324
000 Cm,sh wob whl rol 8"l,com fill flyash fill	66,000	C.Y.			.01	594	28.44	.26	16,893	.37	24,420	41,313
22.238 Exc,blk bnk msrr												
000 Exc blk,frn end ldr ,3cy 100c/ cut flyash & load trucks	10,000	C.Y.	.26	2,600	.03	300	28.44	.85	8,532	.82	8,200	19,332
000 Cxcv bulk,grdl,48"b 1 cy,45cy/ cut, shape, dress slope and load trucks w/gradeall	2,000	C.Y.			.04	88	28.44	1.25	2,503	2.13	4,260	6,763
000 Cxcv bulk,grdl,48"b 1 cy,45cy/ shape & dress Paddys Run slope, fill & compact eroded areas	2,000	S.Y.			.04	80	28.44	1.14	2,275	2.13	4,260	6,535
22.246 Exc,blk,scrprs												
000 Xc bl slf 14c&1/4 flyash 3000' flyash cut to fill	54,000	C.Y.			.02	1,080	28.44	.57	30,715	1.99	107,460	138,175
000 Xcv blk slf 14c&1/4 comm 3000' earth cut from 7 acre cover to stock laydown area	32,468	C.Y.			.03	974	28.44	.85	27,702	2.28	74,027	101,729
000 Xcv blk slf 14c&1/4 comm 3000' earth cut from stock laydown area to flyash fill cover	32,468	C.Y.			.03	974	28.44	.85	27,702	2.28	74,027	101,729
000 Survey crew	1	L.S.	500.00	500	960.00	960	26.06	25,017.60	25,018	1,500.00	1,500	27,018
22.266 Hauling												
000 Hl ert 16c dmp 1m rnd trp 2.6/ from flyash cut to fill	13,800	C.Y.			.02	331	23.73	.57	7,859	1.35	18,630	26,489
22.274 Mblzt and demblz												
000 Mob & demob const. equipment	1	L.S.	1,000.00	1,000	240.00	240	28.44	6,825.60	6,826	6,000.00	6,000	13,826
22.704 Erosion control												
000 Chemical crusting agent 2 appl 5/20 mix, 100 sf 2 gal Betz #1415 surfae sealer	20,000	S.Y.	1.98	39,600	.01	200	23.10	.23	4,620			44,220
	1.2.3.4.			45,629		8,430			229,596		456,315	731,540
	GRAND TOTALS			45,629		8,430			229,596		456,315	731,540

co
co

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A
B
C
D
E
F



SECTION A REF
1"=20' HOR 1"=5' VERT
C81196

PRELIMINARY
NOT FOR CONSTRUCTION

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	DATE	BY	CHKD.

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
PARSONS
THE RALPH M. PARSONS CO. - CHAS. T. MAN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

PROJECT NAME
**INACTIVE FLYASH PILE/OTHER SOUTH FIELD
OU2/PO47**

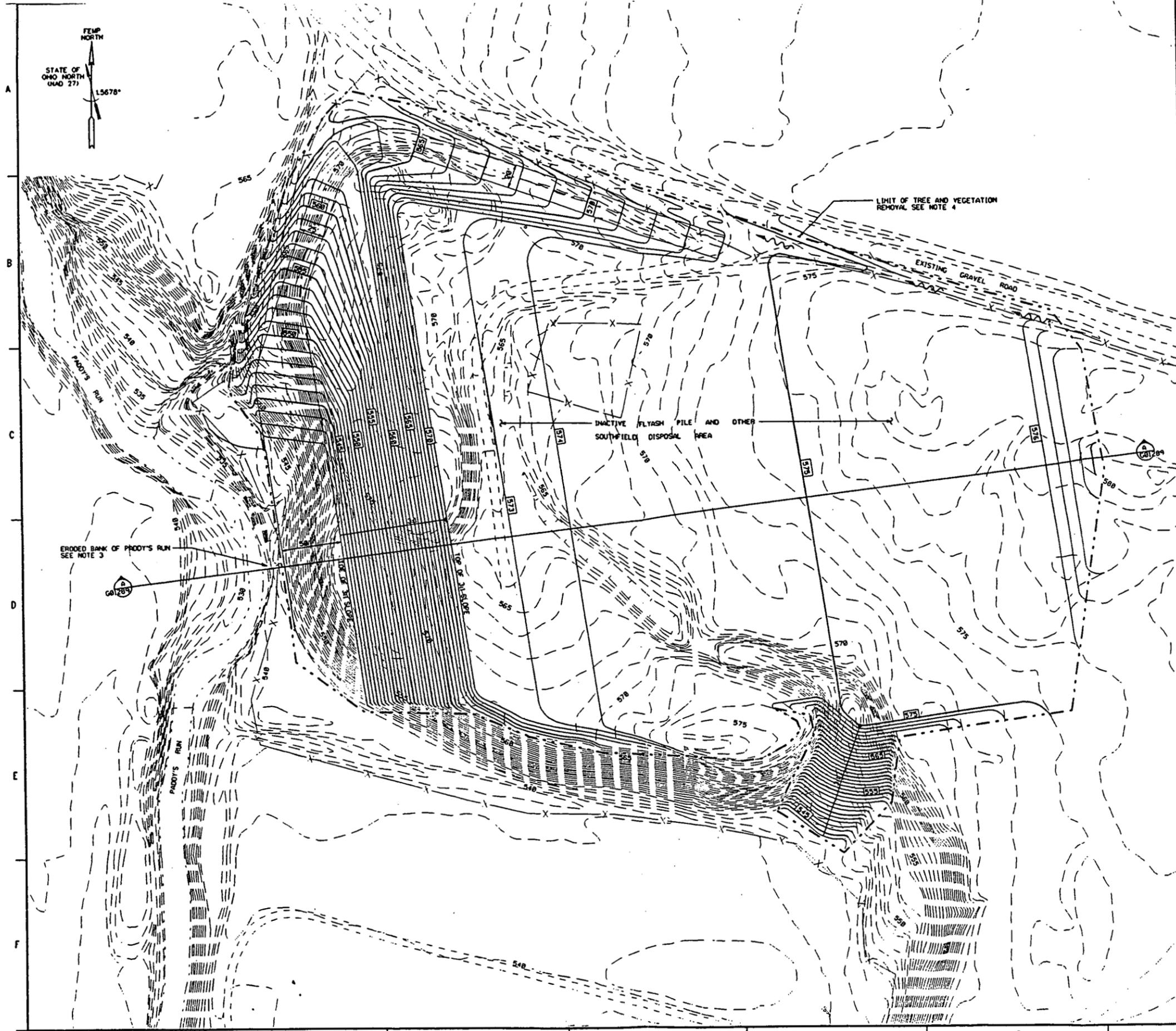
DRAWING TITLE
**CIVIL
SECTIONS AND DETAILS
PADDY'S RUN RECHANNELING**

DRAWN BY	DATE	DESIGNED/CHECKED BY	DATE	CHECKED BY	DATE
JS BROOKS	12-21-92				

APPROVED FOR APPROVAL	APPROVAL REQUIRED	DATE	BY

PROJECT NO.	DATE	OPERATING CONTRACTOR	DATE	REV. NO.
VBS 00-90701		SK-G-01198		

01241.m(153.ws320) po47@ws320. Fri Jan 22 15:38:09 EST 1993



NOTES

- EXISTING CONDITIONS SHOWN ON THIS DRAWING WERE PREPARED FROM FEMP SITE PROVIDED DATA FROM THE DOCUMENTS LISTED BELOW.
 - EXISTING SITE DATA SOURCE (IN PLANT FILES) 6365
 - WESTON TOPOGRAPHY, 1988
 - WESTON TOPOGRAPHY, 1988
 - FEMP CADD GRID/UTILITY DRAWINGS
 - FEMP CONTRACTOR PROJECT DESIGN DOCUMENTS
- THIS IS A ROUGH GRADING PLAN FOR INFORMATION ONLY. REMOVAL OF HOT SPOTS AND ANY WORK IN PADDY'S RUN ARE NOT TAKEN INTO CONSIDERATION.
- IT IS RECOMMENDED THAT THE PADDY'S RUN ERODED BANK BE STABILIZED PRIOR TO START OF CONSTRUCTION.
- BASED ON THIS GRADING PLAN, THE TOTAL VOLUME OF CUT WILL BE 68,000 CY AND AN AREA OF 7 ACRES WILL BE CLEARED OF TREES AND OTHER VEGETATION.

LEGEND

- - - - - 570 - - - - - EXISTING CONTOURS
- 570 ————— PROPOSED CONTOURS
- - - - - LIMIT OF VEGETATION REMOVAL

REFER DWG NO.	REFERENCE DWG TITLE
SK-G-01289	SECTION

PRELIMINARY
NOT FOR CONSTRUCTION

A ISSUED FOR INFORMATION ONLY			
REV. NO.	DATE	DESCRIPTION	BY
UNITED STATES DEPARTMENT OF ENERGY FERNALD ENVIRONMENTAL MANAGEMENT PROJECT THIS DRAWING PREPARED BY PARSONS THE RALPH M. PARSONS CO. - CHAS. T. MAH, INC. - ENGINEERING-SCIENCE, INC. CINCINNATI, OHIO PROJECT NAME INACTIVE FLYASH PILE/OTHER SOUTH FIELD CRU2/PO47 DRAWING TITLE CIVIL GRADING PLAN			
DESIGNED BY	DATE	DESIGNED/CHECKED BY	SCALE
JS BROOKS	08-18-10		
REVISED BY	DATE		SCALE
			1" = 30'
APPROVED FOR APPROVAL	APPROVED FOR GRADING	DESIGNED APPROVED	
DATE PROJECT NO.	DATE CONTRACT NO.	OPERATING CONTRACTOR	DATE
	00-90701	SK-G-01241	

000195