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CONSOLIDATED CONSENT AGREEMENT/ FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT PERIOD ENDING DECEMBER 31, 1991

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CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

Introduction

The Consent Agreement (CA) As Amended under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Sections 120 and 106(a) and the Federal Facility Compliance Agreement (FFCA) between the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (U.S. EPA), signed September 20, 1991 and July 18, 1986, respectively, require that monthly reports be submitted to the U.S. EPA regarding progress made to meet the provisions of those agreements. This report fulfills those requirements by describing actions undertaken at the Fernald Environmental Management Project (FEMP) during the period December 1 through December 31, 1991 and planned actions for the period January 1 through January 31, 1992.

Highlights of activities in December include the following:

- Approval of the Treatability Study Work Plan for Operable Unit 2, Other Waste Units, was received from the U.S. EPA on December 2, 1991.

- The Advanced Notice of Construction Project letters for RA No. 3, South Groundwater Contamination Plume, Part 2 were issued on December 2, 1991 for construction package 2A (Groundwater Discharge Pipeline and Outfall Pipeline from new well field to and including Manhole 182B) and for procurement of long-lead materials (HDPE pipe and fittings).

- The Operable Unit 5 Treatability Study Work Plan for Soil Washing was submitted to the U.S. EPA and the Ohio EPA on December 10, 1991 for review and comment.

- A bid package for the Trailer Design package for RA No. 3, South Groundwater Contamination Plume, Part 3 was awarded on December 9, 1991. The Utilities Design Package was issued for bid the week of December 18, 1991 and is expected to be awarded on January 20, 1992.

- The Consent Agreement/Federal Facilities Compliance Agreement Monthly Progress Report - November 1991 was transmitted to the U.S. EPA on December 20, 1991.

- The installation of a chain-link barrier around the perimeter of the Inactive Flyash Pile/South Field area for RA No. 8, Inactive Flyash Pile Control, was completed on December 23, 1991, ahead of schedule.

- The Request for Construction Action for RA No. 3, South Groundwater Contamination Plume, Part 1 was issued on December 23, 1991 to RUST Engineering.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

WORK ASSIGNMENTS AND PROGRESS

Descriptions of work progress are presented in the following sections and/or enclosures to this report:

- o CA Section IX - Removal Actions.
- o CA Section X - Remedial Investigation/Feasibility Study.
- o Enclosure A - Wastewater Flows and Radionuclide Concentrations under CA Section XXIII.B.
- o Enclosure B - FFCA: Initial Remedial Measures and Other Open Actions.
- o Enclosure C - Drilling/Boring Logs.

CA Section IX. Removal Actions

This section provides an update of activities associated with the implementation of Removal Actions (RAs) at the FEMP during December 1991. Information is presented for each of the Removal Actions identified in the Consent Agreement As Amended.

Phase I Removal Actions

- o RA No. 1, Contaminated Water Under FEMP Buildings.
- o RA No. 2, Waste Pit Area Run-off Control.
- o RA No. 3, South Groundwater Contamination Plume.
- o RA No. 4, Silos 1 and 2.
- o RA No. 5, Decant Sump Tank.
- o RA No. 6, Waste Pit 6 Residues.
- o RA No. 7, Plant 1 Pad Continuing Release.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

RA No. 1, Contaminated Water Under FEMP Buildings

Plant 6 - Pumping and collection of the perched water from underneath Plant 6 began on May 31, 1991. Through December 1991, approximately 17,200 gallons of perched groundwater have been collected and transported for treatment by the Plant 8 VOC treatment system.

Plants 2/3 and Plant 8 - The Plants 2/3 and Plant 8 extraction systems became operational on October 23, 1991. Through December 1991, approximately 31,700 gallons of perched water have been collected for treatment from Plant 2/3 and approximately 18,100 gallons of perched water have been collected for treatment from Plant 8.

Plant 9 - Pumping from Plant 9 began on August 20, 1991 per the U.S. EPA and U.S. DOE milestone. Approximately 8,700 gallons of Plant 9 perched water have been extracted and collected through December 1991.

Plant 8 - The startup date for the Plant 8 treatment system was July 24, 1991. Through December 1991, approximately 71,400 gallons of groundwater have been transported and treated utilizing the Plant 8 system.

All activities to support the deliverables identified in the three U.S. EPA approved Removal Action Work Plans have been completed. Pumping of perched water beneath the four plants will continue in accordance with the Work Plan provisions.

KEY MILESTONES	STATUS	DUE DATE
Initiate Pumping in Plants 2/3 and 8.	Completed. October 23, 1991	November 1, 1991

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

RA No. 3, South Groundwater Contamination Plume

Part 1

The Work Plan for Part 1 (alternate water supply for two industrial users) of the South Plume Removal Action was approved by the U.S. EPA on January 3, 1991. The Ohio EPA approved the Work Plan for Part 1 provided that two comments were satisfactorily resolved. Responses to these comments were prepared and included with Rev. 1 of the Work Plan submitted on December 31, 1991. The U.S. Army Corps of Engineers (COE) reached an agreement with the owner of the property where the Part 1 test well is to be installed. The Ohio EPA inspected the well field and found the site acceptable.

The COE obtained Right of Entry from all but one of the affected property owners where the alternate water supply mains are to be located. The Right of Entry allows surveying and exploration. The COE archaeologist completed a cultural resource investigation (archaeological/historical survey) of the Part 1 well site area and found no reason to delay the proposed well test activities. This information was transmitted to the Ohio State Historic Preservation Officer along with information for all areas affected by Part 1 construction activities on August 12, 1991. Based on the COE findings, approval to proceed on the test well activities was granted by the DOE/FO. Procurement of materials and mobilization for installation of the test well began on July 8, 1991 and drilling of the test well began on July 15, 1991. A decision was made to proceed with the completion of the 100% drawings and specifications for Part 1, assuming the results of the well field testing will be positive. A summary of the most recent and ongoing activities are listed below:

- 100% Design Review - Issued August 8, 1991.
- 100% Design Review - Comments received and reviewed as of August 30, 1991.
- Certified For Construction (CFC) Issue (Albright and Wilson Americas) was received on September 19, 1991.
- Test well and sampling was completed on September 26, 1991.
- Delta Steel meeting was conducted on October 3, 1991 to discuss acceptance or rejection of an alternate well. The design was completed on November 1, 1991.
- Request for Construction Action was issued December 23, 1991 to RUST Engineering.
- Work Plan (Rev. 1) was issued December 31, 1991, including the Pre-excavation Field Screening and Soil Sampling and Analysis Plan.

RA No. 3, South Groundwater Contamination Plume (cont'd.)

Part 3

The work plan for Part 3 (the installation and operation of an Interim Advanced Wastewater Treatment [IAWWT] System to reduce uranium contaminant loading discharged to the Great Miami River to a level less than 1,700 pounds per year) was prepared as one work plan with Part 2 as described above. The IAWWT System at the Stormwater Retention Basin will be handled as a two-part design: the trailer package, which includes the treatment system; and the utilities services package, which includes all utilities and support systems.

A bid package for the Trailer Design package was issued for bid on November 5, 1991 and was awarded on December 9, 1991. The Utilities Design Package was issued for bid the week of December 18, 1991 and is expected to be awarded on January 20, 1992.

The interim treatment system (150 gpm) at the Biodentrification Facility (BDN) Effluent Treatment System (ETS) is undergoing final internal design reviews. The additional treatment capacity is required to meet the intent of the dispute resolution for the South Plume EE/CA. Both treatment systems are scheduled to be operational by July 30, 1992.

Part 4

Part 4 of the South Groundwater Contamination Plume Removal Action Work Plan involves groundwater monitoring and institutional controls. A follow-up round of sampling of property owner drinking water wells along Ohio State Route 128 where previous above-background levels of uranium have been detected is tentatively scheduled for January 1992 and will follow on a quarterly schedule. Sampling of other RI/FS wells continued.

RA No. 3, South Groundwater Contamination Plume (cont'd.)

Summary (cont'd.)

Activities in January 1992 will focus on completing the drawings and specifications for the Part 1 water supply; addressing public comments to the ESD document; completing and submitting responses to the Ohio EPA's conditional comments on the Parts 1 and 5 Work Plans; obtaining access to the Part 5 study area; and reviewing CFC packages for the Part 1, Alternate Water Supply for AWA and Delta Steel. In addition, approval of the three CCB packages for Part 5, addressing the Additional Investigation of the South Plume Removal Action Wells and Impacts on Paddy's Run Road Site Groundwater Plume, Seven Additional Monitoring Wells, and Soil Vapor and Hydropunching Procedures, is expected.

KEY MILESTONES	STATUS	DUE DATE
Complete Part 1 (Alternate Water Supply).	Initiating long-lead procurement items.	July 14, 1992
Complete Part 2 (Extraction wells, force main, effluent pipeline).	Developing construction sub-packages to facilitate implementation.	January 29, 1993
Complete Part 3 (Interim Treatment Systems).	Open, on schedule.	July 30, 1992
Complete Part 4 (institutional control and monitoring).	Open	Ongoing
Complete Part 5 (groundwater modeling and geochemical investigation).	Open (ASI/IT issued new CCB package) on package 1).	TBD

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

RA No. 6, Waste Pit 6 Residues

This removal action was completed on December 19, 1990. The only remaining issue related to the Waste Pit 6 Exposed Material Removal Action involves the placement of air monitors to augment the site requirements for estimating the off-site releases of potentially harmful contaminants. The monitors have been procured. Installation is expected in early 1992. The final Waste Pit 6 Exposed Material Removal Action Report estimated completion date is January 16, 1992.

RA No. 7, Plant 1 Pad Continuing Release

The removal action consists of three phases. Phase I implements the run-on/off control measures. Phase II addresses the installation of 80,000 square feet of a new covered and controlled concrete storage pad. Phase III involves activities to upgrade the remaining 375,000 square feet of the existing Plant 1 storage pad. The Phase III upgrading activities include installation of a polymeric vapor barrier over the existing concrete and the installation of concrete above the barrier with an epoxy sealant. In addition, 22,000 square feet of the Phase III work area will be enclosed beneath a tension structure.

Activities in December included the procurement and installation of materials for the Phase I and Phase II work. Installation of Phase I run-on/off control measures is 50% complete. Planning for the post excavation sampling of the Phase II area continued.

Activities in January will include the continued installation of the underground utilities by the construction contractor. Planning for the post excavation sampling of the Phase II area will continue.

KEY MILESTONES	STATUS	DUE DATE
Complete Phase I	Open, on schedule.	March 13, 1992
Complete Phase II	Open, on schedule.	December 21, 1992
Complete Phase III	Open, on schedule.	February 21, 1995

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

RA No. 9, Removal of Waste Inventories (cont'd.)

KEY MILESTONES	STATUS	DUE DATE
Provide a schedule for providing an update to the deliverable submitted pursuant to the compilation of existing site documentation supporting the ongoing low level waste and thorium management programs by January 15, 1992.	Completed.	December 13, 1991

RA No. 10, Active Flyash Pile Controls

Final DOE/FO comments were transmitted to the Architect/Engineer (A/E) for the Active Flyash Pile Removal Action Work Plan on December 16, 1991. The A/E incorporated DOE/FO comments, and the Work Plan was sent to DOE-HQ on December 20, 1991, ahead of schedule. The final Work Plan will be submitted to the U.S. EPA by March 2, 1992.

KEY MILESTONES	STATUS	DUE DATE
Submit Active Flyash Pile Work Plan to the U.S. EPA for approval.	Open, on schedule.	March 2, 1992

RA No. 11, Pit 5 Experimental Treatment Facility

The removal action is ahead of schedule with respect to the preparation of primary documents. The Work Plan was submitted to the U.S. EPA on October 11, 1991, which was ahead of the Consent Agreement As Amended milestone of October 30, 1991. Design activities are now underway to address the optimum manner in which to remove the contents and the structure without disrupting Waste Pit 3 and to minimize any additional releases.

Planned activities in January 1992 include the continuation of design work needed to implement the Work Plan, development of the Health and Safety Plan, development of the required safety and risk assessment, and initiation of field work, including the placement of unimats.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

RA No. 12, Safe Shutdown (cont'd.)

Projected activities for January include beginning the Initial Safety Assessment scheduled for completion in February 1992; finalizing training plans for Safe Shutdown operations and initiating preparation of lesson plans for core training requirements; continuing the inventory of Building 51 (UF6-4 Reduction Facility #2) items; and continuing with the preliminary assessments for each major process area.

RA No. 13, Plant 1 Ore Silos

The Plant 1 Ore Silos Removal Action will include the dismantling of the Plant 1 Ore Silos and their support structure. This dismantling will eliminate the potential threat of additional material releases and the safety hazard due to structural deterioration of the silos and their support structure. The activities in this removal action will include characterization, removal, containerization, and disposal of the materials making up the above ground portion of the facility.

December activities included continued Removal Action Work Plan preparation. The Removal Action Work Plan is scheduled for submittal to the U.S. EPA on January 10, 1992.

KEY MILESTONES	STATUS	DUE DATE
Submit Work Plan to the U.S. EPA.	Open, on schedule.	January 10, 1992

RA No. 14, Contaminated Soils Adjacent to Sewage Treatment Plant Incinerator

This removal action will include the isolation or removal and disposition of contaminated soils in the vicinity of the Sewage Treatment Plant (STP). This will eliminate the potential threat of additional material releases to the environmental media through migration. The activities in this removal action will include characterization, removal, containerization, and storage/disposal of the materials.

December activities included ongoing preparation of the Removal Action Work Plan and planning for the implementation of the characterization portion of the removal action. Continuation of the preparation and submittal of the Removal Action Work Plan is planned for January 1992.

KEY MILESTONES	STATUS	DUE DATE
Submit Work Plan to the U.S. EPA.	Open, on schedule.	January 23, 1992.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

RA No. 17, Improved Storage of Soil and Debris

This removal action will include the management and appropriate storage for low-level radioactive waste soil and debris on-site. This will eliminate the potential threat of additional material releases to the environment due to wind, rain, or vehicular traffic. The activities in this removal action will include characterization, interim storage, and management of the contaminated soil and debris materials until the final remediation under Operable Unit 3.

December activities included continued Removal Action Work Plan preparation. Continuation of the preparation of the Removal Action Work Plan is planned for January 1992.

KEY MILESTONES	STATUS	DUE DATE
Submit Work Plan to the U.S. EPA.	Open, on schedule.	March 25, 1992

RA No. 18, Control Exposed Material in Pit 5

The Control Exposed Material in Pit 5 Removal Action will be developed and implemented using a phased approach. The Removal Site Evaluation (RSE) developed will address all aspects associated with potential releases from Waste Pit 5. The phased approach for Waste Pit 5 will consider and utilize information obtained from the liner repair activities presently in progress, the pit berm investigation (which addresses the overall pit structural integrity), and the significance and magnitude of potential and actual emissions from the waste pit.

Activities in December 1991 included development of the RSE, continuation of the berm investigation (involving geotechnical sampling and analysis), and the evaluation of alternatives to address fugitive dust emissions from Pit 5. These activities will be continued in January 1992.

KEY MILESTONES	STATUS	DUE DATE
Submit a Removal Action Work Plan to the U.S. EPA and the Ohio EPA.	Open, on schedule.	March 30, 1992

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

CA Section X. Remedial Investigation and Feasibility Study (RI/FS)

This section provides an update on RI/FS Operable Units (OUs), RI/FS Community Relations, and Site Characterization for December 1991. Status information is presented for each of the six Operable Units identified in the Consent Agreement As Amended. The six Operable Units are described below:

- Operable Unit 1 (OU 1): Waste Pit Area. Waste pits 1-6, clearwell, burnpit, berms, liners and soil within the operable unit boundary.
- Operable Unit 2 (OU 2): Other Waste Units. Flyash piles, other south field disposal areas, lime sludge ponds, solid waste landfill, berms, liners, and soil within the operable unit boundary.
- Operable Unit 3 (OU 3): Production Area. Production area and production-associated facilities and equipment (includes all above and below-grade improvements) including, but not limited to, all structures, equipment, utilities, drums, tanks, solid waste, waste, product, thorium, effluent lines, K-65 transfer line, wastewater treatment facilities, fire training facilities, scrap metal piles, feedstocks, and coal pile.
- Operable Unit 4 (OU 4): Silos 1-4. Silos 1, 2, 3, and 4, berms, decant tank system, and soil within the operable unit boundary.
- Operable Unit 5 (OU 5): Environmental Media. Groundwater, surface water, soil not included in the definitions of OU # 1-4, sediments, flora, and fauna.
- Comprehensive Site-Wide Operable Unit: An evaluation of remedies selected for OUs 1-5 above (including remedial and removal actions) to ensure that they are protective of human health and the environment on a site-wide basis, as required by CERCLA, the NCP and applicable U.S. EPA policy and guidance.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

Operable Unit 1: Waste Pit Area

1.1 Field Investigation (cont'd.)

13-Well Program (cont'd.)

c. **Corrective Actions**

The following actions have been taken to resolve these problems:

1) An alternate procedure was developed that added a second ion-exchange column to remove all uranium prior to follow-on analysis.

2) Tentative estimates of the uranium and thorium concentrations are now being made using gamma spectroscopy. These estimates allow better determination of sample aliquot size and tracer amounts.

3) Different size aliquots are being used in separate procedures for all uranium/thorium analysis, instead of using the sequential method of uranium/thorium analysis.

d. **Planned Activities for January 1992**

Complete the laboratory analyses of Operable Unit 1 waste pit samples.

Radon Sampling Program

a. **Status of Work - Key Milestones**

The Radon Sampling Program was initiated in an effort to develop a representative measurement of radon releases from the waste pit area. The data will be used to support National Emission Standards for Hazardous Air Pollutants (NESHAP) compliance and RI/FS characterization requirements. The program consists of a one-time measurement of radon release using Large Area Activated Charcoal Collectors (LAACC). Approximately 100 LAACCs were placed on Waste Pits 1, 2, and 3. The LAACCs were left on the pits for 24 hours and then removed and analyzed. Continuous ambient air radon monitoring was also conducted during the period.

Radon sampling was completed for Waste Pits 1, 2, and 3. The data are being evaluated. The rationale for not sampling Waste Pits 4 and 5 will be presented to the U.S. EPA and the Ohio EPA at a later date.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

Operable Unit 1: Waste Pit Area

1.1 Field Investigation (cont'd.)

Pits 5, 6, and Clearwell Sampling Program (cont'd.)

Activity	Comment
Sample Pits 5, 6 and Clearwell December 19, 1991.	Sampling delayed due to equipment availability; mid-January start date.

b. **Issues/Problems**

Sampling of Pits 5, 6 and the Clearwell has slipped from December to January.

c. **Corrective Actions**

Efforts are underway to expedite sampling.

d. **Planned Activities for January 1992**

Start sampling of Pits 5 and 6 and the Clearwell.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

Operable Unit 1: Waste Pit Area

1.2 Remedial Investigation (cont'd.)

b. **Issues/Problems**

Delivery of hazards containment modules has been delayed by the module vendor. This potentially impacts completion of the vitrification portion of the study.

c. **Corrective Actions**

Expedite delivery of modules from vendor and evaluate schedule for impact to milestone deliverables.

d. **Planned Activities for January 1992**

Continue the first phase of cement stabilization treatability testing. Initiate the first phase of vitrification treatability testing. Initiate sampling of Pits 5, 6, and the Clearwell. Initiate the field data analysis task of the RI.

1.3 Feasibility Study

a. **Status of Work - Key Milestones**

No activity was scheduled for this phase of the program during December 1991.

Activity	Comment
Submit Draft Feasibility Study Report/Comprehensive Response Action Risk Evaluation to the U.S. EPA on March 7, 1994.	Open, on schedule. No current activity required.

b. **Issues/Problems**

None to report.

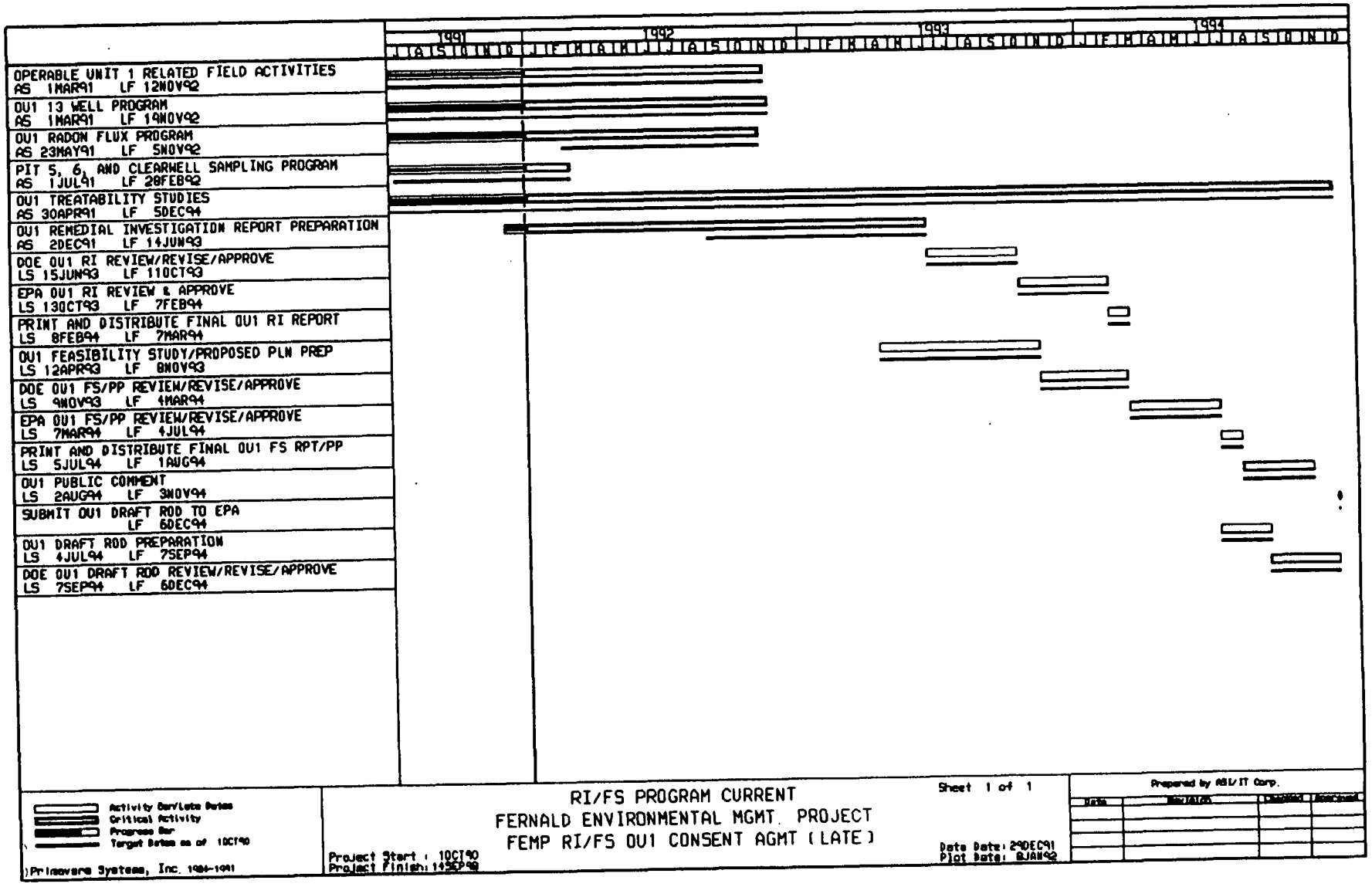
c. **Corrective Action**

None required.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY

COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

PERIOD ENDING DECEMBER 31, 1991



CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

Operable Unit 2: Other Waste Units

2.1 Field Investigation (cont'd.)

Additional HSL Parameters Sampling Program

a. **Status of Work - Key Milestones**

This program provides for collection of samples from four borings in the South Field. These samples are to be analyzed for HSL and TCLP parameters to supplement the limited data available for this area.

All sample collection activities were completed in prior months. Laboratory analyses for the additional sampling and subsequent HSL laboratory analysis were completed in December 1991.

b. **Issues/Problems**

None to report.

c. **Corrective Actions**

None required.

d. **Planned Activities for January 1992**

None scheduled.

2.2 Remedial Investigation

a. **Status of Work - Key Milestones**

The purpose of the treatability studies is to provide additional information to support the Feasibility Study and subsequent remedy selection for Operable Unit 2. Specifically, the study will demonstrate whether stabilization can achieve a desired level of material strength, as well as obtain quantitative data for geochemical modeling and subsequent computer modeling of groundwater contaminant transport. The study is composed of two parts: preliminary stages (to support remedy screening) and advanced stages (to support remedy selection). The preliminary stage involved evaluating a range of stabilization mix formulations in order to determine a representative formulation which meets the proposed strength criteria. The advanced stage study involves performing toxicity characteristic leaching procedure (TCLP) tests on stabilized waste using representative formulations determined in the preliminary stage.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

Operable Unit 2: Other Waste Units

2.3 Feasibility Study

a. **Status of Work - Key Milestones**

No feasibility study activities were scheduled in December 1991.

Activity	Comment
Issue draft Feasibility Study Report/Comprehensive Response Action Evaluation to the U.S. EPA by March 15, 1993.	Open, on schedule.
Issue the Proposed Plan to the U.S. EPA by March 15, 1993.	Open, on schedule.

b. **Issues/Problems**

None to report.

c. **Corrective Actions**

None required.

d. **Planned Activities for January 1992**

None scheduled.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

Operable Unit 3: Production Area

3.1 Field Investigation

a. **Status of Work - Key Milestones**

No activities were scheduled for Operable Unit 3 site characterization during December 1991.

b. **Issues/Problems**

None to report.

c. **Corrective Actions**

None required.

d. **Planned Activities for January 1992**

None scheduled.

3.2 Remedial Investigation

a. **Status of Work - Key Milestones**

Operable Unit 3 scoping activities in December included analysis of the data collected during previous months, identification and review of major ARARs/TBCs, development of the Operable Unit 3 conceptual model and preliminary remedial action objectives, and methodology/rationale development of the Operable Unit 3 Work Plan.

The data review/analysis included modifications of the data summary tables, as necessary, and identification of data voids. Each data table (as described in previous monthly reports) has been reviewed and modified as necessary. When new data become available, they are added where appropriate.

The identification of preliminary major ARARs/TBCs began from the comprehensive list of ARARs/TBCs that was developed throughout 1990 as part of the Initial Screening of Alternatives for Operable Unit 3 prior to the negotiation Consent Agreement As Amended. This review focused on identifying potential major requirements that may not have been considered (e.g., facilities, process equipment, etc.) prior to the current definition of Operable Unit 3.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

Operable Unit 3: Production Area

3.2 Remedial Investigation (cont'd.)

d. **Planned Activities for January 1992**

Finalize sampling program methodology/rationale.

Complete first draft of selected work plan addenda sections.

Finalize detailed Operable Unit 3 component list.

3.3 Feasibility Study

a. **Status of Work - Key Milestones**

No activities were scheduled for the Operable Unit 3 Feasibility Study during December 1991.

b. **Issues/Problems**

None to report.

c. **Corrective Actions**

None required.

d. **Planned Activities for January 1992**

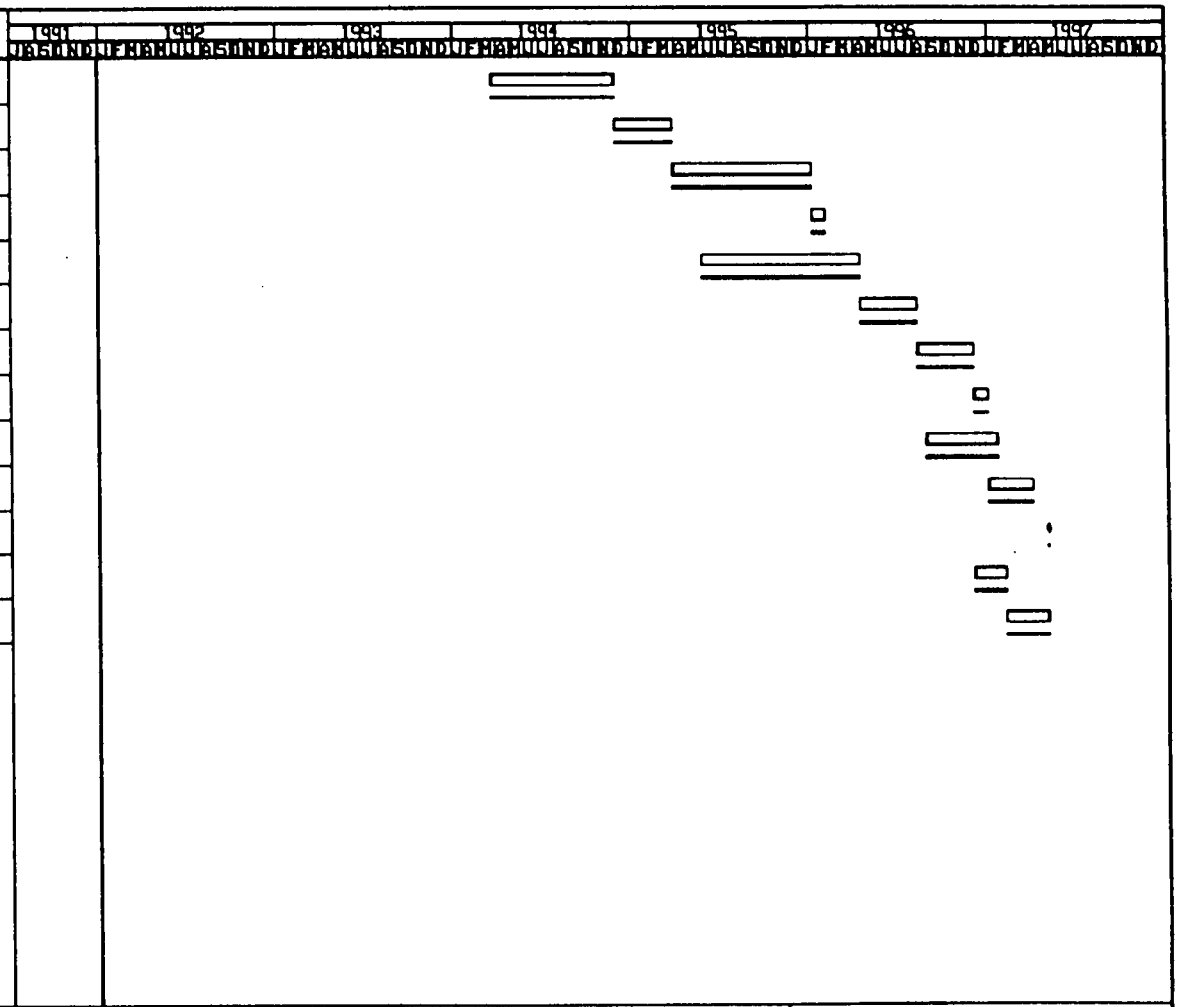
None scheduled.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY

COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

PERIOD ENDING DECEMBER 31, 1991

OU3 INITIAL SCREENING OF ALTERNATIVES RPT PREP LS 22MAR94 LF 29NOV94	
DOE OU3 ISA REVIEW/REVISE/APPROVE LS 30NOV94 LF 27MAR95	
EPA OU3 ISA REVIEW/REVISE/APPROVE LS 28MAR95 LF 4JAN96	
PRINT AND DISTRIBUTE FINAL OU3 ISA REPORT LS 5JAN96 LF 1FEB96	
OU3 FEASIBILITY STUDY/PROPOSED PLAN PREP LS 25MAY95 LF 11APR96	
DOE OU3 FS/PP REVIEW/REVISE/APPROVE LS 12APR96 LF 6AUG96	
EPA OU3 FS/PP REVIEW/REVISE/APPROVE LS 7AUG96 LF 2DEC96	
PRINT AND DISTRIBUTE FINAL OU3 FS/PP LS 3DEC96 LF 30DEC96	
OU3 DRAFT NOTICE OF AVAILABILITY (NOA) LS 27AUG96 LF 20JAN97	
OU3 PUBLIC COMMENT PERIOD LS 31DEC96 LF 3APR97	
SUBMIT OU3 DRAFT ROD TO EPA LF 2MAY97	
OU3 DRAFT ROD PREPARATION LS 2DEC96 LF 5FEB97	
DOE OU3 DRAFT ROD REVIEW/REVISE/APPROVE LS 5FEB97 LF 2MAY97	



Activity Bar/Late Dates
Critical Activity
Progress Bar
Target Dates as of 10CT90

Primavera Systems, Inc. 1984-1991

RI/FS PROGRAM CURRENT
FERNALD ENVIRONMENTAL MGMT. PROJECT
FEMP RI/FS OU3 CONSENT AGMT (LATE)

Sheet 2 of 2

Project Start : 10CT90
Project Finish: 14SEP98

Data Date: 29DEC91
Plot Date: 8JAN92

Prepared by ABI/IT Corp.

Date	Revision	Checked	Approved

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

Operable Unit 4: Silos 1-4

4.2 Remedial Investigation

a. **Status of Work - Key Milestones**

A letter from the U.S. EPA stating approval of the Treatability Study work plan pending incorporation of comments was received by the DOE on December 4, 1991. A letter from the Ohio EPA giving conditional approval with comments was received by the DOE on November 4, 1991. The DOE met with the U.S. EPA on December 12 to discuss adding durability and ANSI-16.1 testing to the Treatability Study Work Plan. The outcome of this meeting was to add durability testing but not ANSI-16.1 testing. A response to comments document and revised Treatability Study Work Plan were reviewed internally on December 31, 1991.

Stabilization testing supporting the Treatability Study continued in December. Preliminary Phase Stage II - Silo 3 specimens were poured and are in the curing stage. Stage II - Silos 1 and 2 specimens were poured and are also curing.

A letter from the U.S. EPA stating disapproval with comments on the Treatability Study Work Plan for the Vitrification of Residues from Silos 1, 2, and 3 was received from the U.S. EPA on December 30, 1991. Comments were received from the Ohio EPA on December 12, 1991. Information gathered during this study will be used in support of the FS and subsequent remedy selection. The study considers vitrification of Silos 1, 2, and 3 material, determines quantity and composition of the off-gas generated during vitrification, radon emanation rate from the vitrified waste, and the leachability of the vitrified waste.

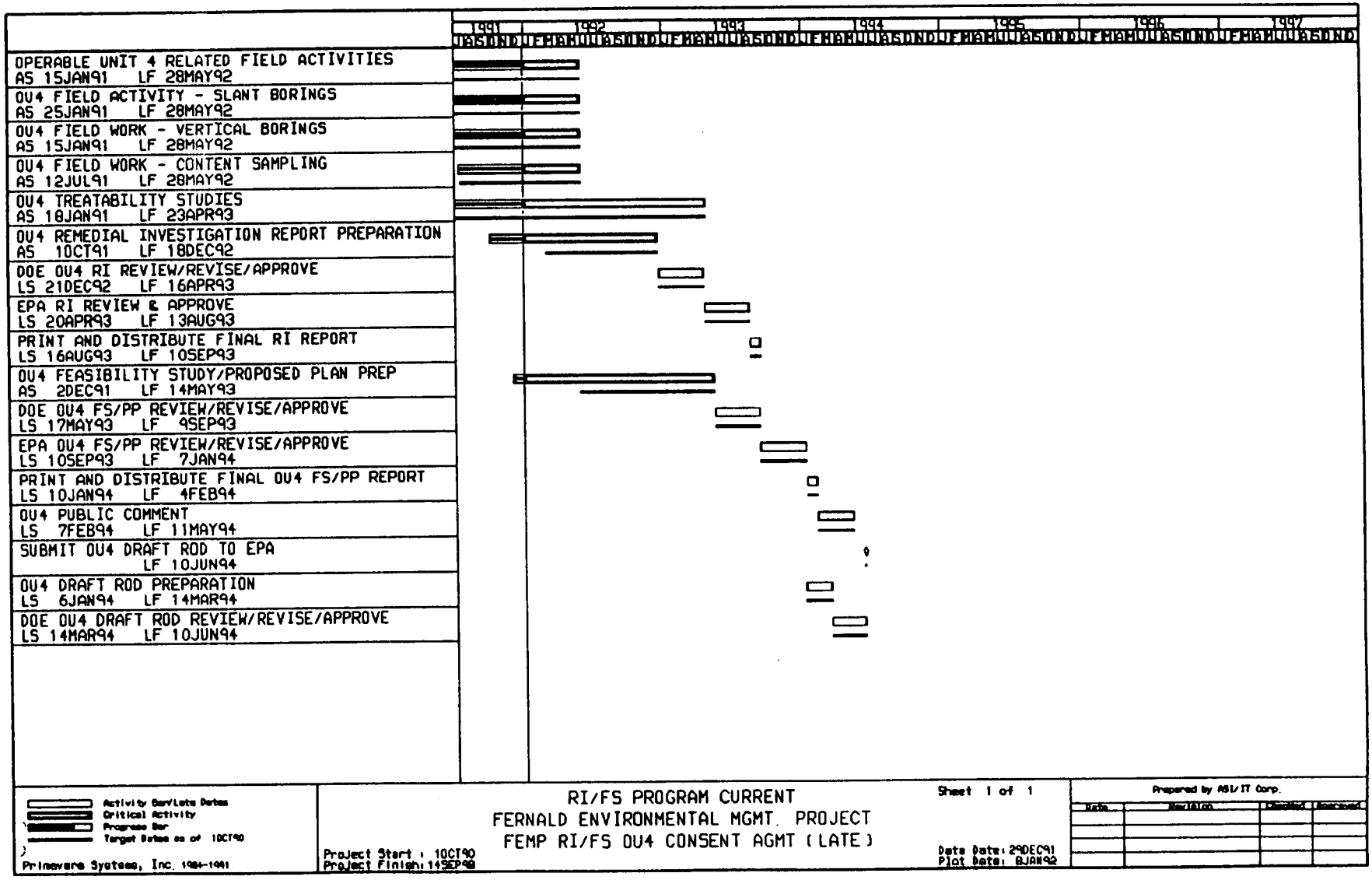
Limited work on the RI Report resumed in December 1991. This work consists of gathering and analyzing available field and analytical data and review of the current draft of the RI Report. The bulk of the RI Report preparation activity is not scheduled to start until January 1992, when analytical results become available from the field sampling programs.

Activity	Comment
Submit Remedial Investigation Report/Baseline Risk Assessment to the U.S. EPA by April 19, 1993.	Open, on schedule.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY

COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

PERIOD ENDING DECEMBER 31, 1991



3839

Operable Unit 5: Environmental Media

5.1 Field Investigation (cont'd.)

Facility Testing

a. **Status of Work - Key Milestones**

This investigation consists of systematic and focused borings within the FEMP production area and additional suspect areas. Piezometers are installed in borings where water is encountered, and the water quality is tested.

The remaining six wells were developed and sampled, completing the installation requirement for the program. The wells listed below were completed in December 1991:

- Well 2055
- Well 1235
- Well 1247
- Well 1248
- Well 1251
- Well 1258

b. **Issues/Problems**

None to report.

c. **Corrective Actions**

None required.

d. **Planned Activities for January 1992**

Continue laboratory analysis of samples previously collected.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

Operable Unit 5: Environmental Media

5.1 Field Investigation (cont'd.)

8-RCRA Well Program (cont'd.)

c. Corrective Actions

None required.

d. Planned Activities for January 1992

Complete the second and final groundwater sampling on Wells 2643 and 2649 and develop and sample Well 1646.

Miscellaneous Additional Wells Program

a. Status of Work - Key Milestones

Miscellaneous Additional Wells are being installed to fill in data gaps defined through recent sampling activities.

Conditional approval of the Work Plan Addendum was issued by the U.S. EPA on November 25, 1991 pending incorporation of several comments. Conditional approval was issued by the Ohio EPA on November 14, 1991, also pending response to several comments. During December, responses to these comments were initiated for submittal to the U.S. EPA and the Ohio EPA in early January 1992.

Installation of wells under this program has been initiated prior to resolution of these comments in an effort to adhere to Consent Agreement As Amended schedules. Minimal impact to the program is expected as a result of these comments, since the content of the comments pertained largely to clarification of information. The locations of the wells were found acceptable.

The following wells have been installed and/or developed and sampled:

- Well 2421 — Installation complete. Developed and sampled first round of groundwater.
- Well 2398 — Installation complete. Developed and sampled first round of groundwater.
- Well 2399 — Installation complete. Developed and sampled first round of groundwater.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

Operable Unit 5: Environmental Media

5.2 Remedial Investigation

a. Status of Work - Key Milestones

The purpose of the Treatability Studies is to provide information to support the Feasibility Study (FS) and subsequent remedy selection for Operable Unit 5. Specifically, the study will demonstrate the feasibility of soil washing as a remedial technology for cleaning soils in Operable Unit 5. The study incorporates a physical/chemical treatment process that initially involves the separation of a soil into different particle-size fractions. Reagent formulations in the washing solutions are used in the extraction of radionuclides, organic, and inorganic compounds from these different-size fractions. The contaminants may be separated from the wash stream into a concentrated residue for further treatment.

The Operable Unit 5 Treatability Study Work Plan for Soil Washing was submitted to the U.S. EPA and the Ohio EPA on December 10, 1991 for review and comment. Comments are expected in mid-January. This submittal accelerates the Consent Agreement As Amended schedule date of April 17, 1992.

Activity	Comment
Submit draft Treatability Study Work Plan to the U.S. EPA and the Ohio EPA by April 17, 1992.	Open, ahead of schedule.

b. Issues/Problems

None to report.

c. Corrective Actions

None required.

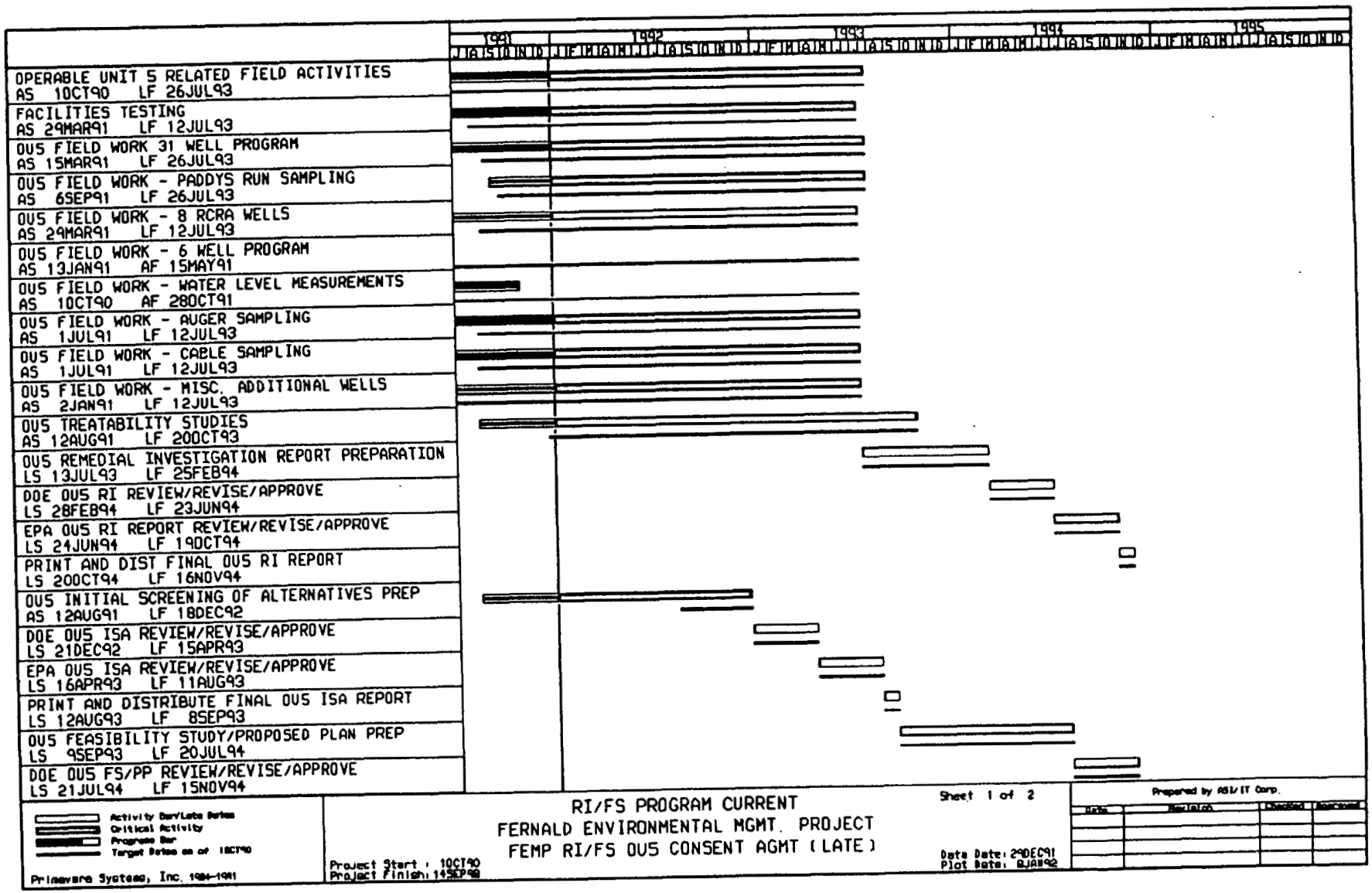
d. Planned Activities for January 1992

Respond to comments from the U.S. EPA and the Ohio EPA on draft Treatability Study Work Plan.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY

COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

PERIOD ENDING DECEMBER 31, 1991



6.0 RI/FS Community Relations

a. Status of Work

Internal comments for the revision of the Community Relations Plan - Remedial Investigation/Feasibility and Removal Actions (August 1990) have been received. After the comments are incorporated, the plan will be submitted to the U.S. EPA for approval. This revision/update of the plan was undertaken without conducting any community assessment interviews.

A draft of Addendum H to the Community Relations Plan to accommodate Removal Action No. 12, Safe Shutdown, has been completed and is presently being reviewed internally. Addendum G for Removal Action No. 9, Removal of Waste Inventories and Thorium Management Procedures, is undergoing internal review. Both addenda will be assigned a Document Change Request (DCR) number before submittal to the U.S. EPA.

Technical direction has been received to prepare another addendum to the Community Relations Plan to accommodate Removal Action No. 10, Active Flyash Pile. The draft is due in January 1992.

On December 18, 1991 a public meeting, hosted by the Centers for Disease Control (CDC), was held at the Meadowbrook Conference Center in Ross, Ohio. This was the fourth public meeting held dealing with the Fernald Dosimetry Reconstruction Project being conducted by Radiological Assessments Corporation under the direction of Dr. John Till. Approximately 100 citizens from the community attended. This meeting concentrated on Tasks 2 and 3. The study is made up of seven tasks and is scheduled to be completed in mid-1993.

No community Roundtable was held in December 1991.

b. Issues/Problems

None to report.

c. Corrective Actions

None required.

7.0 Engineered Waste Management Facility

a. Status of Work - Key Milestones

This program will evaluate the ability of the Engineered Waste Management Facility (EWMF) to manage the remedial waste generated by the Operable Units.

The EWMF Sampling and Analysis Plan (SAP) is an addendum to the RI/FS Work Plan (March 1988) and specifies a series of soil sample collection and analytical activities. Geotechnical, geochemical, radiological, and chemical soil samples will be collected for analyses from 18 geotechnical borings (each approximately 30 feet deep) and eight wells (five 1000-series and three 2000-series) to be installed under this program.

All surface soil samples will receive full radiological and full HSL analyses while, in general, samples collected at mid-stratum of the glacial overburden will receive total uranium and gamma spectral analyses only. The geochemical samples selected for batch absorption tests, x-ray diffraction analysis, and polarized light microscopy will be used to calculate retardation coefficients for an EWMF groundwater fate and transport model. The balance of the collected soil samples will receive geotechnical testing for preliminary engineering purposes. In addition, an on-and off-property NEPA ecological characterization program will be conducted with biota sampling performed on trees at nine on-property locations.

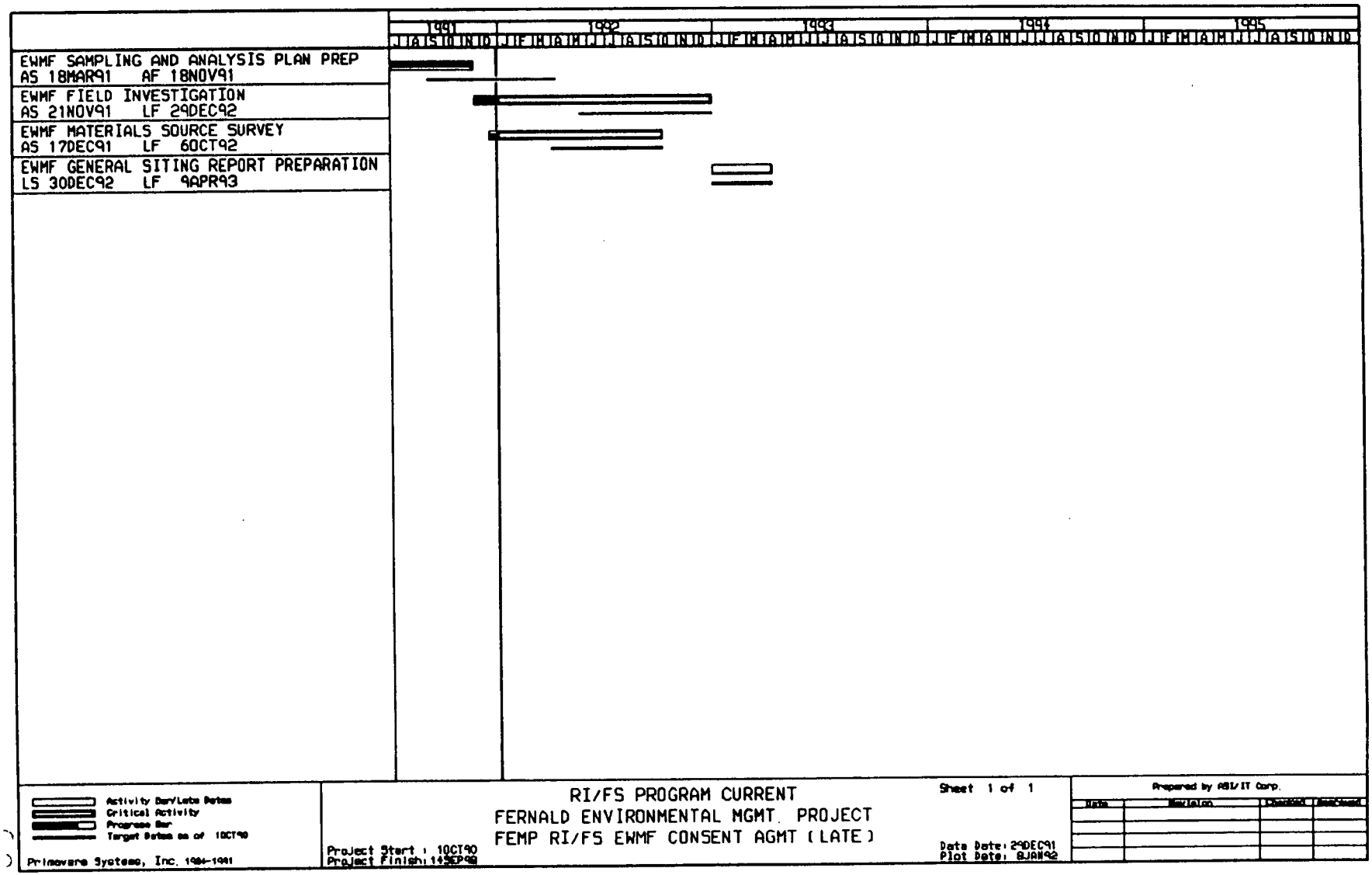
The resultant SAP field and laboratory data will be used to support the evaluation of criteria for a detailed analysis of the EWMF as an on-property waste disposal/storage alternative according to the methodology given in "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" (U.S. EPA 1988). The data obtained under the SAP and off-property walk-over surveys were also used to support NEPA documentation preparation.

The formal comment/response document and revised EWMF SAP were submitted to the U.S. EPA on November 19, 1991. Additional comments were received from the Ohio EPA on December 19, 1991. The DOE will prepare a revised SAP which will be submitted to the Ohio EPA and the U.S. EPA for approval. Following the approval, the DOE will implement all aspects of the approved SAP, including the off-property ecological survey. The revised SAP will be submitted to the U.S. EPA and the Ohio EPA during the week of January 20, 1992.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY

COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

PERIOD ENDING DECEMBER 31, 1991



CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

8.0 Site-Wide Characterization Report

a. Status of Work - Key Milestones

Risk Assessment Work Plan Addendum (cont'd.)

Activity	Comments
Receive U.S. EPA comments on Risk Assessment Work Plan Addendum.	Completed. December 4, 1991.
Submit revised Risk Assessment Work Plan Addendum to the U.S. EPA by February 4, 1992.	Open, on schedule.

Report Preparation

The Site-Wide Characterization Report (SWCR) is a one-time summary of all FEMP site data available as of December 1, 1991. It will contain the Preliminary Baseline Risk Assessment, which will estimate human health and ecological risk of the FEMP from a site-wide perspective. The SWCR will also provide the initial list of Leading Remedial Alternatives for each operable unit for input into the FS Cumulative Response Action Risk Evaluation.

A detailed outline has been prepared to guide preparation of the SWCR. This outline was presented to the U.S. EPA and the Ohio EPA at the Project Managers meeting on December 12, 1991. A brief presentation was made describing the outline.

All data present in the database as of the close of business December 1, 1991 were flagged as the database for the SWCR. Initial data compilation was begun for input to modeling and data summary tables.

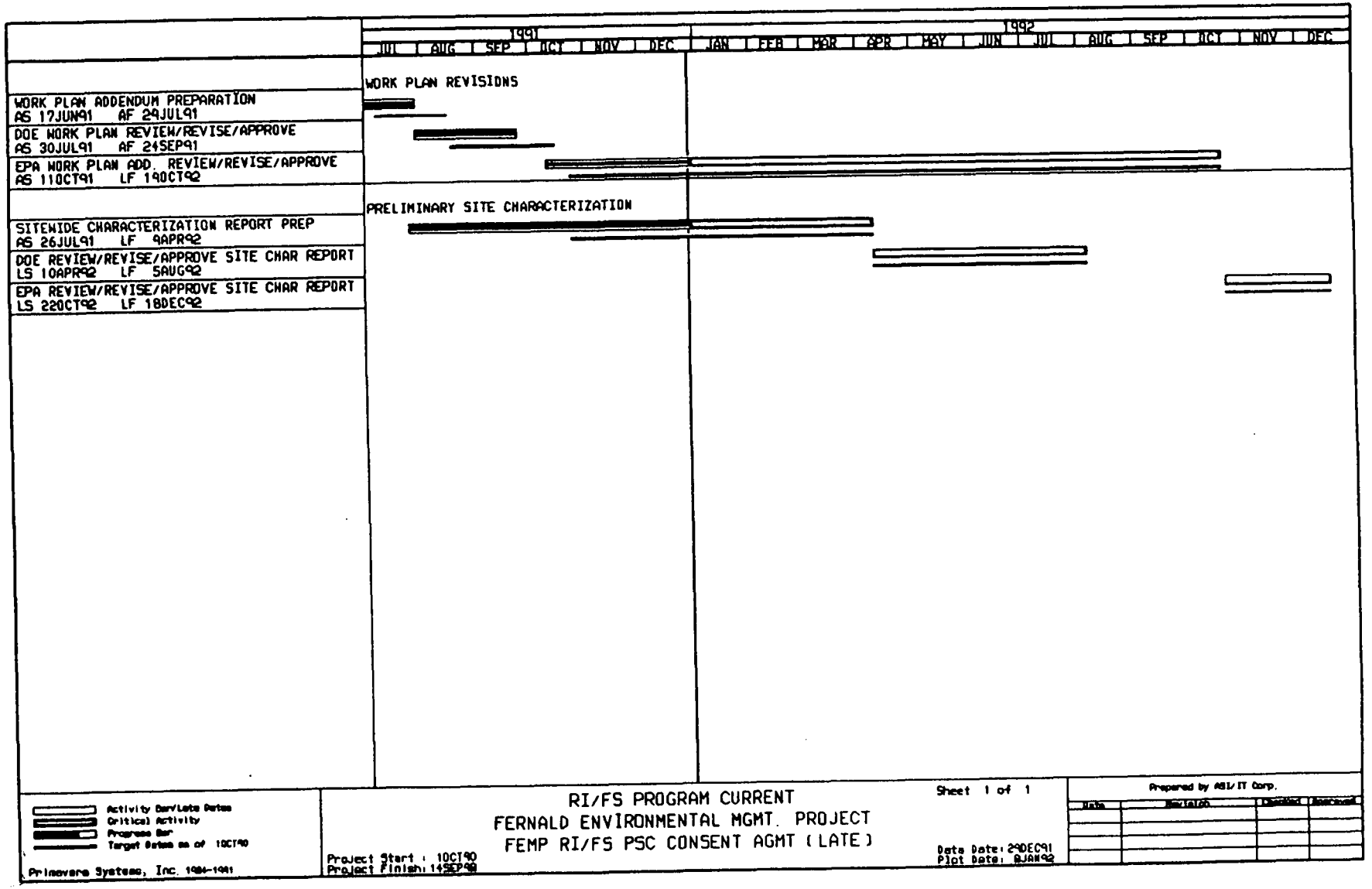
Preparation of the preliminary Baseline Risk Assessment was begun on December 5, 1991 following receipt of U.S. EPA comments on the Risk Assessment Work Plan Addendum on December 4, 1991.

Activity	Comments
Submit Site-Wide Characterization Report to the U.S. EPA by August 5, 1992.	Open, impacted by 23-day delay in receipt of U.S. EPA comments on Risk Assessment Work Plan Addendum.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY

COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

PERIOD ENDING DECEMBER 31, 1991



CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

Introduction

The accompanying Effluent Radiation Reports provide, in accordance with the requirements of Section XXIII.B of the Consent Agreement As Amended under CERCLA Sections 120 and 106 (a), data on the daily wastewater flows, radionuclide concentrations, and loadings released to the Great Miami River and an estimate of runoff and radionuclide concentrations to Paddy's Run during December 1991.

Summary - December 1991

The total quantity of uranium discharged from the FEMP to the Great Miami River via Manhole 175 (Outfall 1I000004001) was 53.33 kilograms. The average uranium concentration for the previous 12 months was 0.80 mg/l. This is 89.9 percent of the Derived Concentration Guide (DOE Order 5400.5) for dischargeable offsite water.

There was no discharge from the Stormwater Retention Basin (Outfall 1I000004002) to Paddy's Run via the Storm Sewer Outfall Ditch in December 1991. Based on 3.21 inches of rainfall in December 1991, the total quantity of uranium discharged to Paddy's Run from uncontrolled areas of the FEMP is estimated to be 14.45 kilograms.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

Wastewater Flows and Radionuclide Concentrations (cont'd.)

FACILITY: Fernald Environmental Management Project

LOCATION: 001 Total Discharge

MONTH: December 1991

	Flow (MGD)	Total Alpha (pCi/l)(2)	Total Beta (pCi/l)(2)	Total U (mg/l)(2)	Total U (kgs)	Calculated Total U-238 (pCi/l)(1)(2)
Avg.	0.724	374	141	0.63	1.72	212
Max.	1.411	878	315	1.84	3.70	622
Min.	0.217	230	50	0.36	0.49	122

The average uranium concentration for the previous 12 months was 0.80 mg/l. This is 89.9 percent of the Derived Concentration Guide (DOE Order 5400.5) for ingested water.

Comments: (1) The calculated total U-238 is based on a conversion factor of 337.84 pCi U-238/mg Total U applied to the measured value of total uranium.

(2) Average values presented are flow-weighted.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

PERIOD ENDING DECEMBER 31, 1991

ENCLOSURE B

FFCA: INITIAL REMEDIAL MEASURES AND OTHER OPEN ACTIONS

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1991

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA)

3. Reports and Record Keeping

Section B

The RI/FS Monthly Technical Progress Report for November 1991 was transmitted to the U.S. EPA on December 20, 1991 as an integral part of the Consolidated Consent Agreement/Federal Facility Compliance Agreement (CA/FFCA) Monthly Progress Report in accordance with the requirements of Section X of the Consent Agreement As Amended.

CLEAN AIR ACT (CAA)

Section E

The twentieth Quarterly Particulate Emissions Report for the period July 1, 1991 through September 30, 1991 was submitted to the U.S. EPA on November 19, 1991.

RADIATION DISCHARGE INFORMATION

Section A

The twentieth Quarterly Liquid Discharge Report for the period July through September 1991 was submitted to the U.S. EPA on November 19, 1991.

TABLE 1

STATUS OF ASSIGNMENTS FOR WORK REQUIRED ON FEDERAL FACILITY COMPLIANCE AGREEMENT ACTIONS

STATUS OF ACTIONS AS OF DECEMBER 31, 1991

ACTION	DESCRIPTION	COMPLETION TIME AFTER FFCA SIGNED	FY92 STATUS
CERCLA			
1.	INITIAL REMEDIAL MEASURES		
1.C	Implement radon control plan approved by the U.S. EPA.	-------	No longer applicable. Progress on actions to address radon emissions from the K-65 Silos are being reported separately under Section IX-Removal Actions of the Consent Agreement/FFCA Monthly Progress Report.
2.	REMEDIAL INVESTIGATION/FEASIBILITY STUDY		No action required.
2.A	RI/FS work is to be conducted in accordance with the U.S. EPA guidelines.	N/A	
2.B	-- No Action Required --	-------	Status information on the RI/FS is being reported in accordance with the requirements of Section X of the Consent Agreement As Amended under CERCLA Sections 120 and 106(a).
2.E	Amend and submit revised RI/FS Work Plan to U.S. EPA if deficiencies are found.		Status information on the RI/FS is being reported in accordance with the requirements of Section X of the Consent Agreement As Amended under CERCLA Sections 120 and 106(a).
2.F	Implement tasks described in the approved RI/FS Work Plan.		Status information on the RI/FS is being reported in accordance with the requirements of Section X of the Consent Agreement As Amended under CERCLA Sections 120 and 106(a).
3.	REPORTS AND RECORD KEEPING		
3.B	Submit monthly RI/FS progress reports.	monthly	The RI/FS Monthly Progress Report for November 1991 was transmitted to the U.S. EPA on December 20, 1991 (DOE-561-92).
CLEAN AIR ACT			
B.4	Prepare annual progress report on installation and replacement of emission control devices.	yearly	The Third Annual Progress Report on the installation and replacement of emission control devices was transmitted to the U.S. EPA on February 8, 1991 (DOE-708-91).
C.	Provide annual reports to U.S. EPA per 40 CFR 61.94(c).	yearly	The Annual NESHAP Compliance Report for CY 1990 was transmitted to the U.S. EPA on June 25, 1991 (DOE-1537-91).
D.1	Provide U.S. EPA with yearly stack-testing schedule.	yearly	The 1989 stack testing schedule was transmitted to the U.S. EPA on June 16, 1989. A letter (DOE-1615-89) was transmitted to the U.S. EPA on September 15, 1989 indicating that, due to the uncertainty concerning resumption of production at the FEMP, the 1989 FFCA Stack Testing Program was being deferred. In August 1991, the DOE confirmed that no further production would take place at the facility, and renamed the facility the FEMP. Some stack operations are expected when waste processing operations are resumed. The U.S. EPA will be provided with notification of future stack testing dates when operating schedules are formulated.

TABLE 1

STATUS OF ASSIGNMENTS FOR WORK REQUIRED ON FEDERAL FACILITY COMPLIANCE AGREEMENT ACTIONS

STATUS OF ACTIONS AS OF DECEMBER 31, 1991

ACTION	DESCRIPTION	COMPLETION TIME AFTER FFCA SIGNED	FY92 STATUS
RADIATION DISCHARGE INFORMATION			
A.3	Report to U.S. EPA, Ohio EPA and Ohio Department of Health the results of the continuous liquid discharge samples.	quarterly	The twentieth Quarterly Liquid Discharge Report for the period July through September 1991 was transmitted to the U.S. EPA on November 19, 1991 (DOE-370-92). The nineteenth Quarterly Liquid Discharge Report for the period April through June 1991 was transmitted to the U.S. EPA on August 30, 1991 (DOE-2120-91).
REPORTING REQUIREMENTS			
B.	Issue monthly progress report of actions taken to ensure compliance with FFCA requirements.	monthly	November's FFCA Monthly Progress Report was transmitted to the U.S. EPA on December 20, 1991 (DOE-561-92).

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

PERIOD ENDING DECEMBER 31, 1991

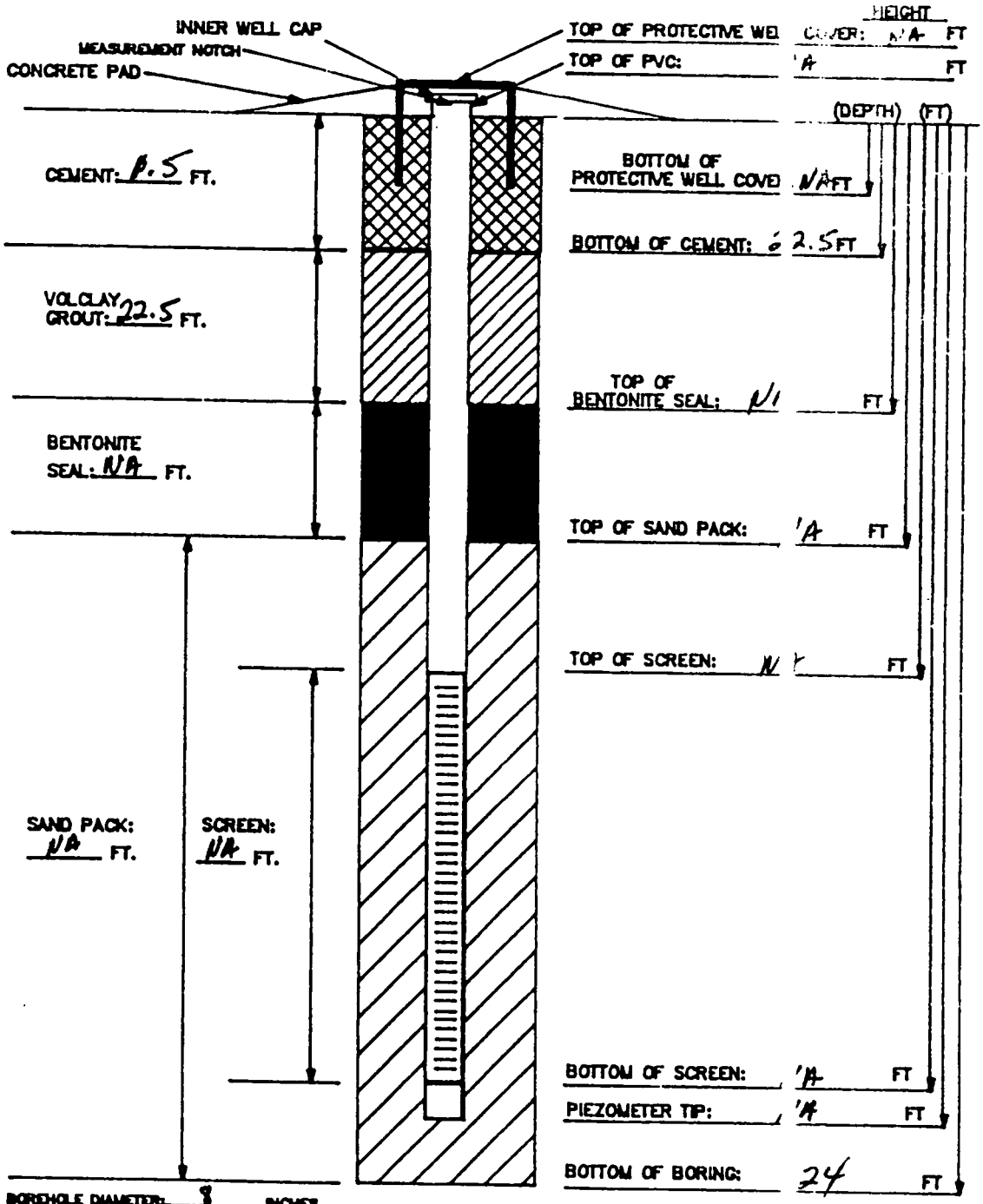
ENCLOSURE C

DRILLING AND BORING LOGS

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.
1740

INSTALLATION DATE: 12-21-91



MATERIALS USED:
SAND TYPE AND QUANITITY: NA
BENTONITE PELLETS (5-GALLON BUCKETS): NA
BAGS OF VOLCLAY GROUT: 1
AMOUNT OF CEMENT: 1/2
AMOUNT OF WATER USED: 50 gals.
OTHER:

NOTES:
1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS.
2) SCREEN IS 2-INCH I.D. SCHEDULE 40 PVC PIPE WITH 0.020-INCH SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH/DATE:
5) TOP OF PVC IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK.
6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL.

TASK: 3.22

GEOLOGIST/ENGINEER: G. Marshall

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: FERNALD RI/FS (EWMF)		
BORING NUMBER: 1740	COORDINATES: N 481,800 E 1,383,002	DATE 12-21-91	
ELEVATION: est. 603	GWL: Depth Date/Time	DATE STARTED: 12-21-91	
ENGINEER/GEOLOGIST: G.MARSHALL	Depth Date/Time	DATE COMPLETED: 12-21-91	
DRILLING METHODS: AUGER		PAGE 1 OF 7	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONCENTRATION (TSF)	REMARKS
	100753 830 12-21-91	2		FIRM (10YR 3/2) VERY DARK grayish BRN. Silty Clay, w Root Lets. No Plasticity, moist.	CL	.75	TRIP/field Blank 100754 HNU = Ø PPM BG = Ø PPM above Background.
	100755 930 12-21-91	3	12	FIRM (10YR. 5/6) yellowish BRN silty clay, No plasticity, ~~moist~~ DRY.	CL	1.75	
1		4		NO RECOVERY			
		9					
2	~~100756~~ 950 100756 12-21-91	8		HARD (10YR 5/4) yellowish BRN gravelly Silty clay, No Plasticity DRY	CL	<4	HNU = Ø PPM BG = Ø CPM above Background.
		16	12	A/A.	CL	<4	
3							

NOTES:

Drilling Contractor PENN DRILLING

Drilling Equipment MOBIL DRILLING RIG 80

Driller: BOBBY YOST

KEVIN MYERS

Sample Tech. VERN LARGER

HNU = Ø PPM
BG = 20-40 CPM
Background

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: FERNALD RI/FS (EWMF)	
BORING NUMBER: 1740	COORDINATES: N 481,800 E 1,383,000	DATE 12-21-91
ELEVATION: est 603	GWL: Depth Date/Time	DATE STARTED: 12-21-91
ENGINEER/GEOLOGIST: G.MARSHALL	Depth Date/Time	DATE COMPLETED: 12-21-91
DRILLING METHODS: AUGER		PAGE 2 OF 7

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN.)	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		18		NO RECOVERY			
		18					
4	100756 10:00 12-21-91	32		HARD (10YR 5/4) yellowish brn. gravelly silty clay, with rock. (Limestone) No plasticity, DRY	CI	3.5	HNU = Ø PPM BK = Ø PPM above Background.
		26	17	A/A	CI	3.75	
5		20		A/A.	CI	3.5	
		18		NO RECOVERY			
6	B.Dry						

NOTES:

Drilling Contractor PENN DRILLING

Drilling Equipment MOBIL DRILLING RIG 80

Driller: BOBBY YOST
KEVIN MYERS

Sample Tech. VERN LARGER

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3 22	PROJECT NAME: FERNALD RI/FS (EWMF)		
BORING NUMBER: 1740	COORDINATES: N 481,800 E 1,393,00	DATE 12/21/91	
ELEVATION: Est 602	GWL: Depth Date/Time	DATE STARTED: 12/21/91	
ENGINEER/GEOLOGIST: G.MARSHALL	Depth Date/Time	DATE COMPLETED: 12/21/91	
DRILLING METHODS: AUGER		PAGE 3 OF 7	

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	100757 1013 12-21-91 Rad	13 100761		HARD (2.5 y 4/4) olive Brown, gravelly Clay, Low plasticity, Moist w Traces of Large Pebbles	Cl	3.5	HNU = Ø PPM BT = Ø CPM ABOVE Background.
7	100760 Rad	18 100762	24	A/A	Cl	2.5	
	100759 Rad	20 100763		A/A	Cl	2.75	
	100758 Rad	21 100764		Firm (2.5 y 4/4) olive Brown gravelly clay, Low plasticity, moist w Large pebbles. (TRACE)	Cl	1.75	
8	100762 ~~100758~~ 1103 12-21-91 Rad 100766	Shelby Tube	24 21	Firm (2.5 y 4/3) olive brown, gravelly clay, Low plasticity, moist w/ Large pebbles.	Cl	20	HNU = Ø PPM BT = Ø CPM. above background.
9							
10							

NOTES:

Drilling Contractor PENN DRILLING

Drilling Equipment MOBIL DRILLING RIG 80

Driller: BOBBY YOST

KEVIN MYERS

Sample Tech VERN LARGER

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: FERNALD RI/FS (EWMF)		
BORING NUMBER: 1740	COORDINATES: N 481,800 E 1,383,00	DATE: 12-21-91	
ELEVATION: Est 602	GWL: Depth	Date/Time	DATE STARTED: 12-21-91
ENGINEER/GEOLOGIST: G.MARSHALL	Depth	Date/Time	DATE COMPLETED: 12-21-91
DRILLING METHODS: AUGER			PAGE 4 OF 4

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6")	RECOVERY (1")	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	Rad 100767	5/4/6/by-tube					
11	100768 1117 12-21-91	8		HARD (2.5y 5/4) Light olive brown, gravelly Clay, Low Plasticity, Moist.	Cl	3.0	
		15		A/A	Cl	2.5	
12		18	20	A/A w Limestone rock in the Last 2 inches of the spoon.	Cl	2.7	
		23					
13	100768 1120	15		HARD (2.5y 5/4) Light olive brown gravelly clay, Low plasticity, moist.	Cl		
	100769 1120			Firm – HARD (5y 4/1) Dark gray gravelly Clay with some sand, Low plasticity, Moist	Cl	2.0	13.3 weathering zone.

NOTES:

Drilling Contractor: PENN DRILLING

Drilling Equipment: MOBIL DRILLING RIG 80

Driller: BOBBY YOST

KEVIN MYERS

Sample Tech.: VERN LARGER

02-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: FERNALD RI/FS (EWMF)	
BORING NUMBER: 1740	COORDINATES: N 481,800 E 1,388,000	DATE 12-21-91
ELEVATION: Est 602	GWL: Depth Date/Time	DATE STARTED: 12-21-91
ENGINEER/GEOLOGIST: G.MARSHALL	Depth Date/Time	DATE COMPLETED: 12-21-91
DRILLING METHODS: AUGER		PAGE 8 OF 7

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	100769 1120 12-21-91	20		~~HARD~~ (5y 4/1) DARK gray gravelly Clay, with some sand, Low Plasticity, moist	Cl	2.25	HNU = Ø PPM BK = Ø CPM above Background.
14		23	24	A/A	Cl	3.25	
		20		A/A	Cl	2.0	
15	100770 1315 12-21-91 Total + screen	25		Firm (5y 4/1) Dark gray, Clay w/ Some sand, High plasticity, moist.	Cl	1.0	HNU = Ø PPM BK = Ø CPM above Background.
		25	22	~~A/A~~ Soft (5y 4/1) Dark gray, clay w some sand, High plasticity, Moist	Cl	.5	
16		23		Firm (5y 4/1) Dark gray, gravelly clay w/ some sand, Low plasticity Moist.	Cl	2.0	

NOTES:

Drilling Contractor: PENN DRILLING

Drilling Equipment: MOBIL DRILLING RIG 80

Driller: BOBBY YOST

KEVIN MYERS

Sample Tech: VERN LARGER

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3 22	PROJECT NAME: FERNALD RI/FS (EWMF)		
BORING NUMBER: 174	COORDINATES: N 481,800 E 1,383,000	DATE 12-21-91	
ELEVATION: Est 60	GWL: Depth Date/Time	DATE STARTED: 12-21-91	
ENGINEER/GEOLOGIST: G.MARSHALL	Depth Date/Time	DATE COMPLETED: 12-21-91	
DRILLING METHODS: AUGER		PAGE 6 OF 7	

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		27		A/A	CL	1.25	
17	100771 1330 12-21-91 Rad 100775	21		Firm (5Y 4/1) Dark gray, Clay with some sand, High plasticity moist (very)	CL	1.0	HNU = Ø PPM Bg = Ø CPM above Back ground
	100772 Rad 100776	23	24	A/A	CL	1.75	
18	100773 Rad 100777	32		Soft - Firm (5Y 4/1) Dark gray, Clay with some sand, High plasticity moist (very)	CL	1.5	
	100774 Rad 100778	37		HARD (5Y 4/1) Dark gray, Clay w some sand & gravel, Low Plasticity, moist.	CL	3.0	
19	12-21-91 100779 1456	Shelby TUBE	13	HARD (5Y 4/1) Dark gray, Clayey sand w Large cobbles, wet.	SC	2.75	HNU = Ø PPM Bg = Ø CPM above Back ground Pushed Tube 36 inches with 13 inches of Recovery

NOTES:

Drilling Contractor PENN DRILLING

Drilling Equipment MOBIL DRILLING RIG 80

Driller: BOBBY YOST

KEVIN MYERS

Sample Tech. VERN LARGER

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602 3 22	PROJECT NAME: FERNALD RI/FS (EWMF)	
BORING NUMBER: 1700	COORDINATES: N 481,800 E 1,383,000	DATE 12-21-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 12-21-91
ENGINEER/GEOLOGIST: G. Marshall	Depth Date/Time	DATE COMPLETED: 12-21-91
DRILLING METHODS: AUGER		PAGE 1 OF 1

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
21	100779 1456 12-21-91	Shelby Tube	13	NO RECOVERY			Archive Sample. 100779
22	12-21-91 ~~100779~~ ~~1506~~ 1506 Full Rod 100781	9		VERY Soft (5Y 4/1) Dark gray, Clayey Sand, wet	SC	>.25	HNU = ∅ PPM BR = ∅ cpm above Background.
	100780 1506	13		FIRM (5Y 4/1) Dark gray, Clay w Some Sand & gravel, medium plasticity, moist (very)	CL	1.5	Hit Perched Water Plug hole at 24ft.
23		21	22	N/A	CL	1.5	
24		26		~~N/A~~ HARD (5Y 4/1) Dark gray, Clay w/ Some Sand & gravel medium plasticity, moist	CL	4.0	

NOTES:

Drilling Contractor Penn Drilling

Drilling Equipment Mobil Drilling Rig 80

Driller: Bobby Yost

Kevin Myers

Sample Tech. Vern Larger

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS EW MF	
BORING NUMBER: 1741	COORDINATES:	DATE 12/20/91
ELEVATION: 598.5 ft	GWL: Depth Date/Time	DATE STARTED: 12/20/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/21/91
DRILLING METHODS: Hollow Stem Auger		PAGE 1 OF 10

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		1	6				HNU = 0 ppm BX = 0 cpm Disregard top 6 inches, sampled by hand auger.
	101312 (1010)	2	6	Stiff. 10YR (5/4) Yellowish brown, silty clay. Low plasticity, moist	CI	1.25	
1		4	6	SAA	CI	2.0	
		7	0	No Recovery			
2	101313 (1015)	5	6	Hard. 10YR (6/8) Brownish yellow silty clay with organics. No plasticity dry	CI	<4.5	HNU = 0 ppm BX = 0 cpm
		7	6	SAA	CI	<4.5	

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Bombadier Mobile Drill

Driller: Elay Gardner
Dan Jamison

Background:
HNU = 0 ppm
BX = 40 cpm
Background has been subtracted out.

402-11-86

FERNALD
RI/FS

VISUAL CLASSIFICATION OF SOILS

3839

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS EWMF		
BORING NUMBER: 1741	COORDINATES:	DATE 12/20/91	
ELEVATION: 595.5	GWL: Depth Date/Time	DATE STARTED: 12/20/91	
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/21/91	
DRILLING METHODS: Hollow Stem Auger		PAGE 2 OF 10	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		9	0	No Recovery.			
		14	0	No Recovery			
4	101314 RAD 101315A (1040)	4	6	Hard. 10YR (6/8) Yellowish brown. Silty clay with gravel. No plasticity. Dry	CL	>4.5	HNU=0 ppm RS=0cpm
	101315B	8	6	SAA	CL	>4.5	
5		12	6	SAA	CL	>4.5	
		14	0	No Recovery			

NOTES:

Drilling Contractor Pennsylvania Drilling

Drilling Equipment Bombardier Mobile Drill

Driller: Elay Gardner
Don Jamison

402-11-86

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS EWMF		
BORING NUMBER: 1741	COORDINATES:	DATE: 12/20/91	
ELEVATION: 595.5 ft	GWL: Depth / Date/Time	DATE STARTED: 12/20/91	
ENGINEER/GEOLOGIST: D. O'Brien	Depth / Date/Time	DATE COMPLETED: 12/21/91	
DRILLING METHODS: Hollow Stem Auger		PAGE 3 OF 10	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	10131 9 (1100)	9	6	Hard. 10YR (5/4) Yellowish brown. Silty clay with sand & gravel. Low plasticity moist.	CL	>4.5	HNU=0 ppm BZ=0 ppm
		11	6	SAA	CL	>4.5	
7		13	6	SAA	CL	4.0	
		15	6	SAA, very stiff	CL	3.0	
8		20	6	Backfill, no recovery	CL		
		26	0	No Recovery			

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Bombardier Mobile Drill

Driller: Clay Gardner
Don Jamison

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER. 9602-3.22	PROJECT NAME. Fernald RI/FS EWMF		
BORING NUMBER: 1741	COORDINATES:	DATE 12/20/91	
ELEVATION: 595.5 ft	GWL: Depth	Date/Time	DATE STARTED: 12/20/91
ENGINEER/GEOLOGIST. D. O'Brien	Depth	Date/Time	DATE COMPLETED: 12/21/91
DRILLING METHODS: Hollow Stem Auger			PAGE 4 OF 10

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		25	0	No Recovery.			
		28	0	No Recovery			
10		14	6	Very stiff. 10YR (5/4) Yellowish brown. Gravelly clay. No plasticity. Slightly moist	Cl	3.0	HNU=0ppm BZ=0cpm
		16	6	SAA	Cl	3.0	
11		14	6	SAA, hard	Cl	4.0	
		18	6	SAA, hard	Cl	>4.5	

NOTES:

Drilling Contractor Pennsylvania Drilling

Drilling Equipment Bombardier Mobile Drill

Driller: Elay Gardner
Dan Jamison

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS EWMF		
BORING NUMBER: 1741	COORDINATES:	DATE: 12/20/91	
ELEVATION: 598.5 ft	GWL: Depth / Date/Time	DATE STARTED: 12/20/91	
ENGINEER/GEOLOGIST: D. O'Brien	Depth / Date/Time	DATE COMPLETED: 12/21/91	
DRILLING METHODS: Hollow Stem Auger		PAGE 5 OF 10	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
RAD→	101320 (1400)	4	6	Hard. 10YR (5/4) yellowish brown gravelly clay. Low plasticity, slightly moist	CL	1.45	HNU=0ppm BG=0cpm
		7	6	SAA, very stiff.	CL	3.75	
13		8	0	No Recovery.			
		12	0	No Recovery.			
14	101321 101322 (1440)	2	6	Stiff. 5Y (5/1) Gray. Gravelly clay, low plasticity. Moist	CL	1.25	HNU=0ppm BG=0cpm
		4	6	SAA	CL	1.25	

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Bombardier Mobile Drill

Driller: Elay Gardner
Don Jamison

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS EWMF		
BORING NUMBER: 1741	COORDINATES:	DATE: 12/20/91	
ELEVATION: 595.5	GWL: Depth / Date/Time	DATE STARTED: 12/20/91	
ENGINEER/GEOLOGIST: D. O'Brien	Depth / Date/Time	DATE COMPLETED: 12/21/91	
DRILLING METHODS: Hollow Stem Auger		PAGE 6 OF 10	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		7	4	Stiff. 5Y(5/1) Gray. Gravelly clay, low plasticity, moist.	CL	1.25	
		8	0	No Recovery.			
16		9	6	Stiff. 5Y(5/1) Gray Gravelly clay, low plasticity, moist.	CL	1.0	HNU=0ppm BZ=0ppm
		6	2	SAA	CL	1.25	
17		9	0	No Recovery			
		14	0	No Recovery.			

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Bombardier Mobile Drill

Driller: Elay Gardner
Don Jamison

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS EWMF		DATE: 12/20/91
BORING NUMBER: 1741	COORDINATES:		DATE STARTED: 12/20/91
ELEVATION: 595.5ft	GWL: Depth	Date/Time	DATE COMPLETED: 12/21/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth	Date/Time	PAGE 7 OF 10
DRILLING METHODS: Hollow Stem Auger			

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
RAD→	101323 101324 (1515)	4	6	Stiff. 5Y(5/1) Gray. Gravelly clay. Low plasticity, moist.	CL	1.0	HNU=0ppm BX=0cpm
		6	0	No Recovery			
19		6	0	No Recovery.			
		12	0	No Recovery			
20 RAD→	101325 101326 (1615)	Shelby Tube	27	Stiff. 5Y(5/1) Gray. Gravelly clay. Low plasticity, moist.	CL	1.0	HNU=0ppm BX=0cpm

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Bombardier Mobile Drill

Driller: Elay Gardner
Don Jamison

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS EU MF	
BORING NUMBER: 1741	COORDINATES:	DATE: 12/20/91
ELEVATION: 595.5 ft	GWL: Depth Date/Time	DATE STARTED: 12/20/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/21/91
DRILLING METHODS: Hollow Stem Auger		PAGE 8 OF 10

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		Tube					
22		Shelby					
	101321 (1615)						
23	101328 (0900) 12/21/91	5	6	Stiff. 5Y (5/1) Gray. Gravelly Clay. Low plasticity, wet.	Cl	1.5	HNU=0ppm BZ=0ppm
		7	6	SAA	Cl	1.5	

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Bombardier Mobile Drill

Driller: Elay Gardner
Dan Jamison

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS EWMF		
BORING NUMBER: 1741	COORDINATES:	DATE: 12/21/91	
ELEVATION: 595.564	GWL: Depth Date/Time	DATE STARTED: 12/20/91	
ENGINEER/GEOLOGIST: O. O'Brian	Depth Date/Time	DATE COMPLETED: 12/21/91	
DRILLING METHODS: Hollow Stem Auger		PAGE 9 OF 10	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		11	0	No Recovery			
	10 (0910)	7	6	Stiff. 5Y(5/1) Gray. Gravelly clay. Low plasticity moist.	CL	1.0	HNU = 0ppm BG = 0cpm
25		12	6	SAA	CL	1.5	
		15	6	SAA	CL	1.5	
26		6	6	Very Stiff. 5Y(5/1) Gray. Gravelly clay. Low plasticity, moist.	CL	3.25	HNU = 0ppm BG = 0cpm
		9	6	SAA,	CL	2.5	

NOTES:

Drilling Contractor Pennsylvania Drilling

Drilling Equipment Bombardier Mobile Drill

Driller: Elay Gardner
Dan Jamison

402-11-86

RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS EWMF	
BORING NUMBER: 1741	COORDINATES:	DATE 12/21/91
ELEVATION: 595.5 ft	GWL: Depth Date/Time	DATE STARTED: 12/20/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/21/91
DRILLING METHODS: Hollow Stem Auger		PAGE 10 OF 10

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		12		No Recovery			
		12		No Recovery			
28	101329 101330 109465	12	6	Stiff. 5Y (5/1) Gray. Gravelly clay. Low plasticity Moist.	CL	1.5	HNu = 0 ppm BX = 0 cpm
	101331 101332 109466	16	6	SAA	CL	1.25	
29		20	0	No Recovery.			
		28	0	No Recovery			

NOTES:

Drilling Contractor Pennsylvania Drilling

Drilling Equipment Bombadier Mobile Drill

Driller: Elay Gardner
Don Jamison

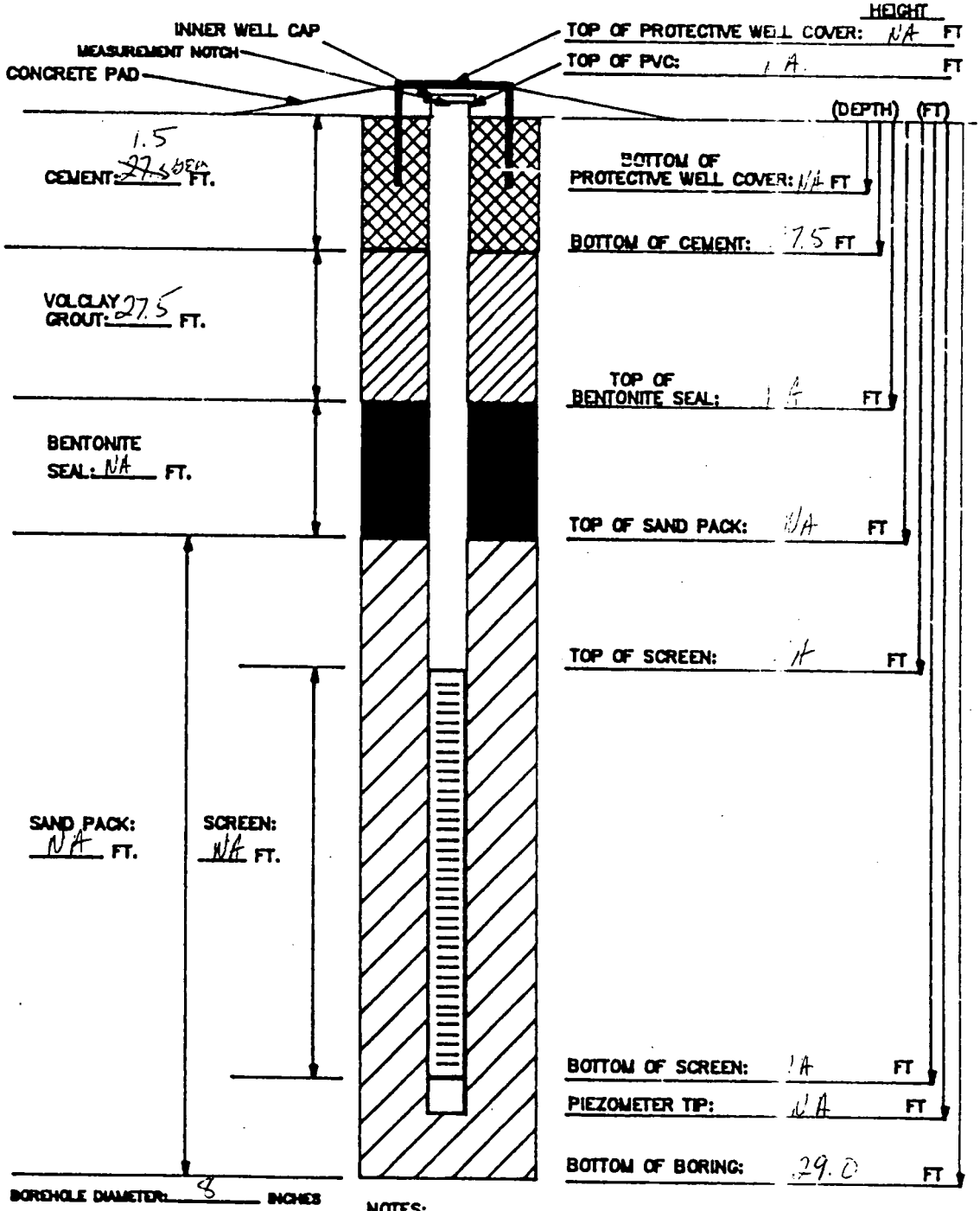
357 IHS FS
309

402-11-86

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.
1742

INSTALLATION DATE: ~~1742~~ 10-20-91



MATERIALS USED:
SAND TYPE AND QUANITITY: NA
BENTONITE PELLETS (5-GALLON BUCKETS): NA
BAGS OF VOLCLAY GROUT: 1
AMOUNT OF CEMENT: 1/2
AMOUNT OF WATER USED: 50
OTHER:

NOTES:
1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS.
2) SCREEN IS 2-INCH I.D. SCHEDULE 40 PVC PIPE WITH 0.020-INCH SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH/DATE:
5) TOP OF PVC IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK.
6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL.

TASK: 3.22.

GEOLOGIST/ENGINEER: D. Marshall

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOIL

PROJECT NUMBER: 9602.3.22	PROJECT NAME: FERNALD RI/FS (EWMF)	
BORING NUMBER: 1742	COORDINATES: N 480,210 E 1,353,000	DATE 12/19/91
ELEVATION: Est. 594	GWL: Depth Date/Time	DATE STARTED: 1/18/91
ENGINEER/GEOLOGIST: G.MARSHALL	Depth Date/Time	DATE COMPLETED: 12/20/91
DRILLING METHODS: AUGER		PAGE 1 OF 9

DEPTH (Ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6"	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	100715 1100 12-18-91	3		MEDIUM stiff (10YR ~~Darker~~ 3/6) DARK yellowish Brown, silty Clay with Root Lets, Low Plasticity, Moist.	CI	1.0	HNU = Ø ppm ~~BG = Ø cpm above Background~~ Trip Blank 100716
	100717 1100 12-18-91	4	13	very stiff (10YR 4/4) Dark yellowish Brown, silty Clay, Medium Plasticity, Moist.	CI	3.0	BY = 340 cpm above Background at 0 to inches
1		6		NO RECOVERY			
	100717 1105 12-18-91	8		HARD (10YR 5/8) yellowish brown, silty clay with Traces of gravel No plasticity, DRY	CI	4.5	HNU = Ø ppm BY = Ø cpm above Background
2		14	12	HARD (10YR 5/8) yellowish Brown silty clay with Traces of gravel, No plasticity, DRY. Traces of Fossils	CI	4.0	
		14		No RECOVERY			

NOTES:

Drilling Contractor PENN DRILLING

Drilling Equipment MOBIL DRILLING RIG 80

Driller: BOBBY YOST

KEVIN MYERS

Sample Tech. VERN LARGER

HNU = Ø ppm Background
BY = 60 cpm Background
No meter at office.

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: FERNALD RI/FS (EWMF)	
BORING NUMBER: 1742	COORDINATES: N 480,210 E 1,383,000	DATE 12/18/91
ELEVATION: Est 594	GWL: Depth Date/Time	DATE STARTED: 12/18/91
ENGINEER/GEOLOGIST: G.MARSHALL	Depth Date/Time	DATE COMPLETED: 12/20/91
DRILLING METHODS: AUGER		PAGE 2 OF 9

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	1110 12-18-91	15		NO RECOVERY			HNU = Ø PPM BG = Ø cpm above background
		16					
4		19					
	100718 1125 12-18-91	13		HARD (10YR 5/6) yellowish brown gravelly clay, low plasticity, slightly moist.	CL	4.25	HNU = Ø PPM BG = Ø cpm above background
5	Rad screen 100722						
	100719 1125 12-18-91	13	24	A/A	CL	3.25	
	Rad screen 100723						
	100720 1125 12-18-91	13		A/A	CL	3.25	
	Rad screen 100724						

NOTES:

Drilling Contractor: PENN DRILLING

Drilling Equipment: MOBIL DRILLING RIG 80

Driller: BOBBY YOST
KEVIN MYERS

Sample Tech. VERN LARGER

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: FERNALD RI/FS (EWMF)	
BORING NUMBER: 1742	COORDINATES: N 480,210 E 1,383 000	DATE 12/18/91
ELEVATION: Est 594'	GWL: Depth Date/Time	DATE STARTED: 12/18/91
ENGINEER/GEOLOGIST: G.MARSHALL	Depth Date/Time	DATE COMPLETED: 12/20/91
DRILLING METHODS: AUGER		PAGE 3 OF 9

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN.)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	100721 1125 12-18-91	20	~~20~~ 20cm	A/A	CI	<4.5	
	Rad SCREEN 100725						
	100726 1406 12-18-91	19		HARD (2.5y 5/3) Light olive brown, gravelly clay, Low Plasticity, moist.	CI	4.0	HNU = Ø PPM BK = Ø cpm above Bac GROUND
7	100726 1406 12-18-91	20	12	A/A.	CI	4.0	
		19		No RECOVERY			
8	100727 1450 12-18-91	Shelby Tube	9.5	very stiff (2.5y 4/3) olive brown gravelly clay, Low plasticity moist.	CI	3.5	HNU = Ø ppm BK = Ø cpm above Back GROUND
9							
10							

NOTES:

Drilling Contractor PENN DRILLING

Drilling Equipment MOBIL DRILLING RIG 80

Driller: BOBBY YOST

KEVIN MYERS

Sample Tech. VERN LARGER

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: FERNALD RI/FS (EWMF)	
BORING NUMBER: 1742	COORDINATES: N 480,210 E 1,383,000	DATE 12/18/91
ELEVATION: Est. 594'	GWL: Depth Date/Time	DATE STARTED: 12/18/91
ENGINEER/GEOLOGIST: G.MARSHALL	Depth Date/Time	DATE COMPLETED: 12/20/91
DRILLING METHODS: AUGER		PAGE 4 OF 9

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
				No Recovery			
11	100728 1500 12-18-91	No Blow count ~~11~~		HARD (2.5 4/3) olive brown, gravelly Clay, Low plasticity, moist	CL	4.0	HNU = Ø ppm BG = Ø cpm above Back ground
	Rad screen 100729						
	100728 1500 12-18-91	~~24~~ 14	24	A/A	CL	<4.5	Drill helper miss counting in blows. 24 inches of Recovery on Split Spoon
12	100728 1500 12-18-91	~~27~~ 24		A/A	CL	<4.5	- Disturbed Geo tech. Sample 100728 SEND Rad screen 100729
	100728 1500 12-18-91	27		very stiff (2.5 4/3) olive brown gravelly clay, Low plasticity, moist	CL	3.5	
13	1559 12-18-91	5		No Recovery			HNU = BG = Ø cpm above Back ground

NOTES:

Drilling Contractor PENN DRILLING

Drilling Equipment MOBIL DRILLING RIG 80

Driller: BOBBY YOST

KEVIN MYERS

Sample Tech. VERN LARGER

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: FERNALD RI/FS (EWMF)	
BORING NUMBER: 1742	COORDINATES: N 480,210 E 1,383,000	DATE 12/18/91
ELEVATION: est 594'	GWL: Depth Date/Time	DATE STARTED: 12/18/91
ENGINEER/GEOLOGIST: G.MARSHALL	Depth Date/Time	DATE COMPLETED: 12/20/91
DRILLING METHODS: AUGER		PAGE 5 OF 9

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 (IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		9		NO RECOVERY			
14		15					
14.5'	100730 1607 12-18-91	13		very stiff (5Y 5/1) gray, gravelly Clay, MEDIUM plasticity, moist	CI	3.25	NNU = Ø ppm ~~CPM~~ rem BY = Ø cpm above background.
15		15	18	A/A	CI	3.25	
		21		A/A	CI	2.75	
16	100731 1620 12-18-91 Rad SCREEN 100735	22		very stiff (5Y 4/1) dark gray gravelly Clay, MEDIUM plasticity moist.	CI	2.75	HNU = Ø ppm BY = Ø cpm above background.

NOTES:

Drilling Contractor: PENN DRILLING

Drilling Equipment: MOBIL DRILLING RIG 80

Driller: BOBBY YOST

KEVIN MYERS

Sample Tech. VERN LARGER

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: FERNALD RI/FS (EWMF)	
BORING NUMBER: 1742	COORDINATES: N 480,210 E 1,383,000	DATE 12/18/91 12/19/91
ELEVATION: Est. 594'	GWL: Depth Date/Time	DATE STARTED: 12/18/91
ENGINEER/GEOLOGIST: G.MARSHALL	Depth Date/Time	DATE COMPLETED: 12/20/91
DRILLING METHODS: AUGER		PAGE 6 OF 9

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	100732 1620 12-18-91	24		A/A	CI	3.[illegible]	NDU = Ø ppm BG = Ø ppm above Background.
17	Rad Screen 100736						
	100733 1620 12-18-91	24	24	A/A	CI	2.75	
	Rad Screen 100737						
	100734 1620 12-18-91	29		A/A	CI	2.2[illegible]	
18	Rad Screen 100738			VERY Stiff ~~HARD~~ (5Y 4/1) Dark gray, gravelly Clay, medium plasticity, moist			
19	100734 Tube Rad Screen 100740 939 12-19-91	Shelby tube	24	A/A	CI	3.5	NDU = Ø PPM BG = Ø CPM above Background. There was 12" of wet, gravell. Clay in the tube Remove it from the tube.
20							
21	Rad Screen 100741						

NOTES:

Drilling Contractor: PENN DRILLING

Drilling Equipment: MOBIL DRILLING RIG 80

Driller: BOBBY YOST
KEVIN MYERS

Sample Tech. VERN LARGER

12-19-91 HNU = Ø PPM
BG = 40-60 CPM
Back GROUND

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: FERNALD RI/FS (EWMF)	
BORING NUMBER: 1742	COORDINATES: N 480,210 E 1,383,000	DATE 12/19/91
ELEVATION: Est 594	GWL: Depth Date/Time	DATE STARTED 12/18/91
ENGINEER/GEOLOGIST: G.MARSHALL	Depth Date/Time	DATE COMPLETED 12/20/91
DRILLING METHODS: AUGER		PAGE 7 OF 9

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	100742 950 12-18-91	9		VERY stiff (5Y 4/1) DARK GRAY gravelly CLAY, MEDIUM plasticity moist.	CL	3.0	HNU = Ø PPM BK = Ø CPM above BACKGROUND
		15	12	VERY stiff (5Y 4/1) DARK GRAY gravelly clay, MEDIUM plasticity moist with WOOD IN the Last 2" of the SPOON.	CL	3.0	
22		19		NO RECOVERY			
	100742 1000 12-18-91	50		VERY stiff (5Y 4/1) DARK GRAY, gravelly clay, MEDIUM plasticity moist. LARGE cobble in the end of the SPOON. Could only drive SPOON 6"	CL	2.75	HNU = Ø PPM BK = Ø CPM above BACKGROUND
23		26		NO RECOVERY			REINSERT SPOON INTO hole. DROVE SPOON 12 MORE inches with No RECOVERY. AUGER DOWN to 24'
		21					

NOTES:

Drilling Contractor PENN DRILLING

Drilling Equipment MOBIL DRILLING RIG 80

Driller: BOBBY YOST

KEVIN MYERS

Sample Tech. VERN LARGER

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: FERNALD RI/FS (EWMF)		
BORING NUMBER: 743	COORDINATES: N 480 210 E 1338 000	DATE 12-19-9	
ELEVATION: Est. 594	GWL: Depth Date/Time	DATE STARTED: 12-18-91	
ENGINEER/GEOLOGIST: G.MARSHALL	Depth Date/Time	DATE COMPLETED 12-20-91	
DRILLING METHODS: AUGER		PAGE 8	OF 9

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	100743 1440 12-19-91	10		Soft (5Y 4/1) Dark gray, gravelly Clay, medium plasticity, wet. with Limestone Rock.	CI	~~>2~~ >25	HNU = Ø p.p.m. BG = Ø c.p.m. above Background.
		24	9	HARD (5Y 5/1) gray, Limestone			
25		14		NO RECOVERY			
	100744 1448 12-19-91	19		Stiff. (5Y 4/1) Dark gray, gravelly Clay, medium plasticity, wet. w Some Rock (Limestone)	CI	1.75	HNU = Ø ppm BG = Ø cpm above Background
26		22	16	HARD (5Y 4/1) Dark gray, gravelly Clay, Low plasticity sli. moist	CI	4.5	
		28		~~HARD~~ (5Y 4/1) Dark gray, gravelly Clay, Low plasticity, sli. moist.	CI	4.5	

NOTES:

Drilling Contractor PENN DRILLING

Drilling Equipment MOBIL DRILLING RIG 80

Driller: BOBBY YOST

KEVIN MYERS

Sample Tech. VERN LARGER

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: FERNALD RI/FS (EWMF)	
BORING NUMBER: 1742	COORDINATES: N 480,210 E 1,383,000	DATE 12/19/91
ELEVATION: Est 594	GWL: Depth Date/Time	DATE STARTED: 12/18/91
ENGINEER/GEOLOGIST: G.MARSHALL	Depth Date/Time	DATE COMPLETED: 12/20/91
DRILLING METHODS: AUGER		PAGE 9 OF 9

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	100745 1515 R.S. 100749	60		HARD (5Y 5/1) gray, gravelly clay Low plasticity, ~~Dry~~ moist		~~60~~ 4.5	HNU = Ø ppm BX = Ø c, & above Black, [illegible]
	100746 1515 RS 100750	100	24	HARD (5Y 5/1) gray, gravelly clay Low plasticity, moist with Rock (Limstone)	Cl	~~100~~ 4.5	
28	100747 1515 R.S 100751	50		HARD (5Y 5/1) gray, Sandy clay with gravel, No plasticity, DRY		~~50~~ 4.5	
	100748 1515 RS 100752	47		~~HARD~~ (5Y 5/1) gray, Sandy clay with gravel, No plasticity, DRY		~~47~~ 4.5	
29							

NOTES:

R.S. = Rad Screen

Drilling Contractor PENN DRILLING

Drilling Equipment MOBIL DRILLING RIG 80

Driller: BOBBY YOST

KEVIN MYERS

Sample Tech. VERN LARGER

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS EWMF	
BORING NUMBER: 1743	COORDINATES:	DATE 12/18/91
ELEVATION: 589.5 ft	GWL: Depth Date/Time	DATE STARTED: 12/18/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/19/91
DRILLING METHODS: Hollow Stem Auger		PAGE 1 OF 8

DEPTH (Ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	101 284 (1315)	2	6	Stiff. 10YR(5/4) Yellowish brown, Silty clay, Low Plasticity, moist.	CL	1.0	HNU=0 ppm BG=0 cpm
		4	6	SAA	CL	1.75	
1		5	1	SAA	CL	1.0	
		6	0	No Recovery.			
2		4	6	Stiff. 10YR (5/4) Yellowish brown. Silty clay with gravel & traces of fossil. Low plasticity, Slightly moist.	CL	1.5	HNU=0ppm BG=0cpm
		7	6	SAA	CL	>4.5	

NOTES:

Drilling Contractor: Penn Drill

Drilling Equipment: Bombardier Mobile Drill

Driller: Elay Gardner
Dan Samson

Background: HNU=0 ppm
BG=40cpm
Background subtracted out.

402-11-86

FERNALD
RI/FS

VISUAL CLASSIFICATION OF SOILS

3839

PROJECT NUMBER: 91.02-3.22	PROJECT NAME: Fernald RI/FS EWMF		
BORING NUMBER: 1743	COORDINATES:	DATE 12/18/91	
ELEVATION: 589.5 ft	GWL: Depth Date/Time	DATE STARTED: 12/18/91	
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/19/91	
DRILLING METHODS: Hollow Stem Auger		PAGE 2 OF 8	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 (IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		9	6	~~Stiff~~. Hard. 10YR (5/4) Yellowish brown. Silty clay with gravel and fossil traces. Low plasticity, slightly moist.	Cl	>4.5	
		14	0	No Recovery.			
4	101285 AD# 101286 (1400)	6	6	Very stiff. 10YR (5/4) Yellowish brown. Silty clay with sand & gravel. Low plasticity slightly moist.	Cl	3.5	HNU = 0 ppm BX = 0 cpm
	101287 RAD# 101288	8	6	SAA	Cl	3.75	
5		9	2	Backfill, No Recovery			
		14	0	No Recovery			

NOTES:

Drilling Contractor: Penn Drill

Drilling Equipment: Bombardier Mobile Drill

Driller: Clay Gardner

Dan Jamison

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS EWMF	
BORING NUMBER: 1743	COORDINATES:	DATE 12/18/91
ELEVATION: 589.54	GWL: Depth Date/Time	DATE STARTED: 12/18/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/19/91
DRILLING METHODS: Hollow Stem Augers		PAGE 3 OF 8

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	101289		24	Hard. 10YR (3/4) Yellowish brown. Silty clay with sand & gravel. Low plasticity slightly moist.	CL	>4.5	HNU = 0 ppm BX = 0 cpm
7	SHELBY TUBE						
8							

NOTES:

Drilling Contractor: Penn Drill

Drilling Equipment: Bombardier Mobile Drill

Driller: Elay Gardner

Dan Jamison

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS FCWMF	
BORING NUMBER: 1743	COORDINATES:	DATE: 12/18/91
ELEVATION: 589.5	GWL: Depth Date/Time	DATE STARTED: 12/18/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/19/91
DRILLING METHODS: Hollow Stem Auger		PAGE 4 OF 8

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
RAD→	101292 (1520) 101301	7	6	Very stiff. 10YR (5/4) Yellowish brown. Silty clay with gravel and coarse sand. Low plasticity Moist	CL	3.5	HNU=0 ppm βγ=0cpm
		10	6	SAA	CL	3.75	
10		18	5	Hard. 10YR (5/4) Yellowish brown. Silty clay with gravel & coarse sand. Low plasticity Moist.	CL	<4.5	
		20	4	SAA	CL	<4.5	
11		16	6	Stiff. 10YR (5/4) Yellowish brown. Silty clay with gravel & coarse sand. Low plasticity Moist	CL	1.0	HNU=0ppm βγ=0cpm
		21	6	Hard. 10YR (5/4) Yellowish brown. Silty clay with gravel & coarse sand. Low plasticity Moist	CL	<4.5	

NOTES:

Drilling Contractor: Penn Drill

Drilling Equipment: Bombardier Mobile Drill

Driller: Elgy Gardner
Don Jamison

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS FEMP	
BORING NUMBER: 1743	COORDINATES:	DATE 12/18/91
ELEVATION: 589.5 ft	GWL: Depth Date/Time	DATE STARTED: 12/18/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/19/91
DRILLING METHODS: Hollow Stem Auger		PAGE 5 OF 8

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	101293 (1545)	22	6	Hard. 5Y (5/3) Olive. Silty clay with large limestone pieces, gravel. Low plasticity, slightly moist	CL	>4.5	
		26	6	Very stiff. 5Y (5/3) Olive. Silty clay with large limestone pieces, gravel. Low plasticity, slightly moist	CL	2.75	
13	101294 (1555)	5	6	SAA	CL	2.75	HNU = 0 ppm BX = 0 cpm
		9	6	SAA	CL	2.75	
14 RAD	101295 101296 (1630)	14	6	Very stiff. 5Y (5/3) Olive. Silty, gravelly clay. Low Plasticity. Slightly moist.	CL	3.5	HNU = 0 ppm BX = 0 cpm
RAD	101297 101298 (1630)	15	6	SAA	CL	3.5	

NOTES:

Drilling Contractor: Penn Drill

Drilling Equipment: Bombacher Mobile Drill

Driller: Elay Gardner
Don Jamison

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS Ellmt		
BORING NUMBER: 1743	COORDINATES:	DATE 12/18/91	
ELEVATION: 589.5	GWL: Depth Date/Time	DATE STARTED: 12/18/91	
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/19/91	
DRILLING METHODS: Hollow Stem Auger		PAGE 6 OF 8	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	101359 101360 (1635)	18	6	Very stiff. 5Y (5/3) Olive. Silty, gravelly clay. Low plasticity, slightly moist.	CL	3.0	
		21	0				
16		Shelby Tube	8in	Very stiff. 5Y (5/3) Olive. Silty clay with gravel & large limestone pieces. Low plasticity. Slightly moist.	CL	3.75	Not enough recovery. Archive sample 101302 (1950) HNU = 0ppm 12/19/91 RX = 0cpm
17							

NOTES:
Drilling Contractor Penn Drill
Drilling Equipment Bombardier Mobile Drill
Driller: Elgy Gardner
Dave Jamison

402-11-86

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS EWMF	
BORING NUMBER: 1743	COORDINATES:	DATE: 12/19/91
ELEVATION: 589.5	GWL: Depth Date/Time	DATE STARTED: 12/18/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/19/91
DRILLING METHODS: Hollow Stem Auger		PAGE 7 OF 8

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
RAD →	101303 101304 (025)		34	Very stiff. 5Y(5/3) Olive. Silty clay with large limestone pieces & gravel. Low plasticity. Slightly moist.	CI	3.5	HNU = 0 ppm BG = 0 cpm
19							
		Shelby Tube					
20							

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Bombadier Mobile Drill

Driller: Elgy Gardner
Don Jamison

FERNALD
RI/FS

VISUAL CLASSIFICATION OF SOILS

3839

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS EWMF		
BORING NUMBER: 1743	COORDINATES:		DATE 12/19/91
ELEVATION: 589.5ft	GWL: Depth	Date/Time	DATE STARTED: 12/18/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth	Date/Time	DATE COMPLETED: 12/19/91
DRILLING METHODS: Hollow Stem Auger			PAGE 8 OF 8

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		Shelby Tube					
		Shelby Tube					
22	RAD → 101306 101307 (1055)	7	6	Stiff. BY(5/3) Olive silty clay with gravel. Low plasticity, moist	CL	1.5	HNU = 0ppm BZ = 0cpm
	RAD → 101308 101309 (1055)	14	4	SAA	CL	1.5	
23		17					
		20					

NOTES:

Drilling Contractor Pennsylvania Drilling

Drilling Equipment Bombardier Mobile Drill

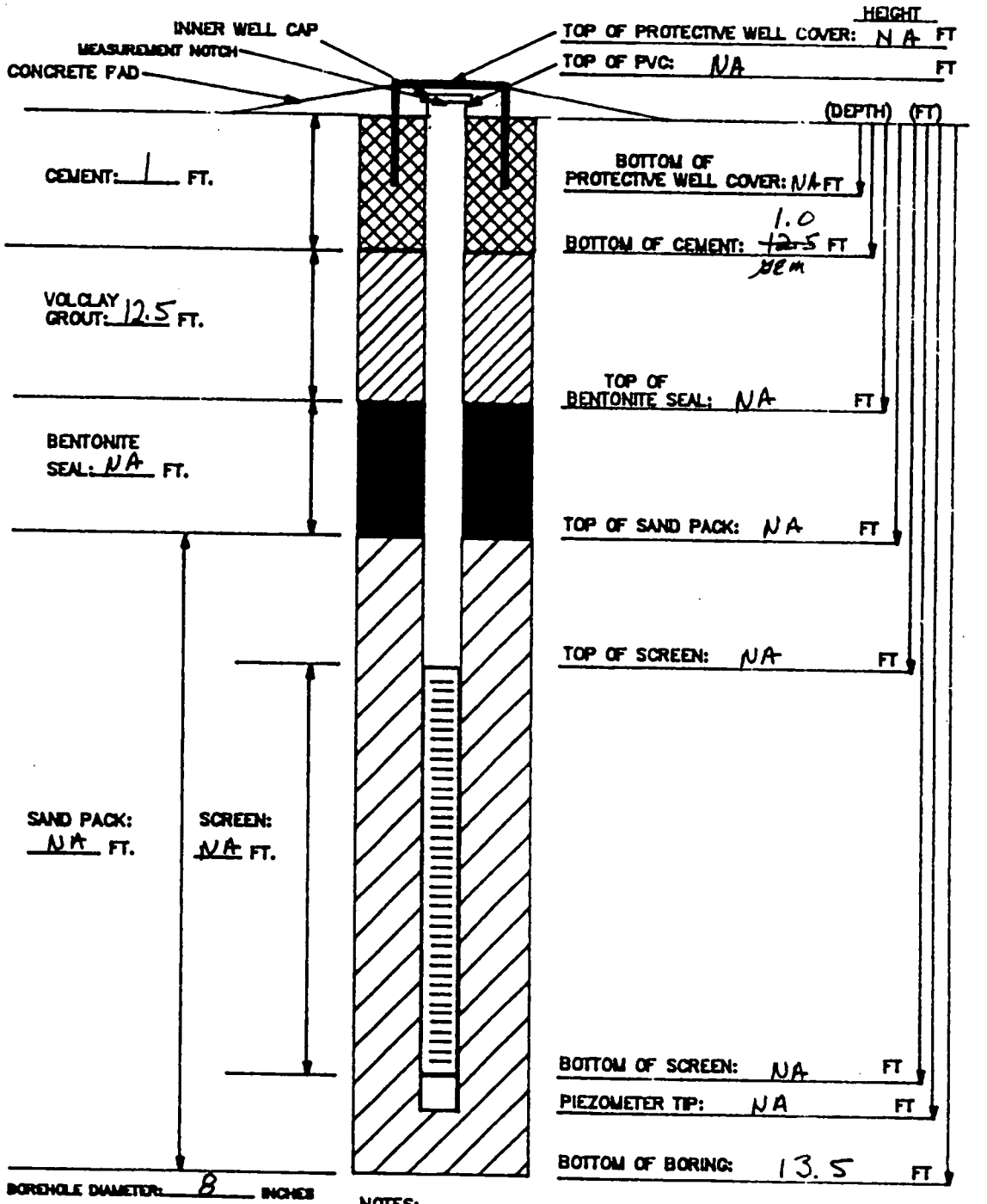
Driller: Elay Gardner
Dan Jamison

402-11-86

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.
1744

INSTALLATION DATE: 12-17-91



MATERIALS USED:

SAND TYPE AND QUANTITY: NA
BENTONITE PELLETS (5-GALLON BUCKETS): NA
BAGS OF VOLCLAY GROUT: 1
AMOUNT OF CEMENT: 1
AMOUNT OF WATER USED: 25 gallons
OTHER:

NOTES:

1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS.
2) SCREEN IS 2-INCH I.D. SCHEDULE 40 PVC PIPE WITH 0.020-INCH SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH/DATE:
5) TOP OF PVC IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK.
6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL.

TASK: 3.22

GEOLOGIST/ENGINEER: G. MARSHALL

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 9602 3.22	PROJECT NAME Fernald RI/FS (EWMF)	
BORING NUMBER: 1744	COORDINATES N 478,500 E 1,383,000	DATE 12-17-91
ELEVATION: Est 592'	GWL: Depth Date/Time	DATE STARTED 12-17-91
ENGINEER/GEOLOGIST G. Marshall	Depth Date/Time	DATE COMPLETED: 12-17-91
DRILLING METHODS AUGER		PAGE 1 OF 4

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	100701 1023 12-17-91	2		Firm (10YR 3/6) Dark yellowish Brown Silty Clay, with Rootlets Low Plasticity, Moist.	CL	1.25	HNU = Ø PPM BG = Ø CPM above Back ground.
		5	9	A/A			Trip/field Blank 100702
1		5		NO RECOVERY			
	100702 1028 12-17-91	6		HARD (10YR 5/8) yellowish brown Silty Clay, No plasticity, Dry	CL	2.75	HNU = Ø PPM BG = Ø CPM above Back ground
2		9	10	A/A			
3		12					

NOTES:

Drilling Contractor Penn Drilling

Drilling Equipment Mobil Drilling Rig #80

Driller: Bobby Yost

Kevin Myers

Sample tech. Vern Larger

Back ground
HNU = Ø ppm
BG = 40-50
No meter at office

A/A = as above

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602 3.22	PROJECT NAME: FERNALD RI/FS (EWMF)	
BORING NUMBER: 1744	COORDINATES: N 478,000 E 1,383,000	DATE 12-17-91
ELEVATION: Est. 592'	GWL: Depth Date/Time	DATE STARTED: 12-17-91
ENGINEER/GEOLOGIST: G. Marshall	Depth Date/Time	DATE COMPLETED: 12-17-91
DRILLING METHODS: AUGER		PAGE 2 OF 4

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
3	100703 1030 12-17-91	8		VERY Stiff (10YR 6/8) brownish yellow, Silty Clay, No plasticity DRY.	CL	4.25	HNU = Ø ppm BG = Ø cpm above Back ground
		13	12	HARD (10YR 6/8) brownish yellow, Silty Clay, No plasticity DRY.	CL	4.0	
4		11		No Recovery			
	1038 12-17-91 100704 Rad	13		HARD (10YR 5/4) yellowish brown Clay, No plasticity, DRY	CL	<4.5	HNU = Ø ppm BG = Ø cpm above Background
5	100705 Rad 100707	18	18	HARD (10YR 5/4) yellowish brown Clay No plasticity, DRY.	CL	<4.5	
	100706 Rad 100709	20		HARD (10YR 5/4) yellowish brown Clay, No plasticity, DRY Limestone Rock was Jammed in the end of split spoon.	CL	<4.5	
6							

NOTES:

Drilling Contractor Refer to Page 1.

Drilling Equipment

Driller:

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602. 3.22	PROJECT NAME: Fernald RI/FS EWMF	
BORING NUMBER: 1744	COORDINATES: N: 478,500 E 1,383,000	DATE 12-17-91
ELEVATION: Est 592'	GWL: Depth Date/Time	DATE STARTED: 12-17-91
ENGINEER/GEOLOGIST: G. Marshall	Depth Date/Time	DATE COMPLETED: 12-17-91
DRILLING METHODS: AUGER		PAGE 3 OF 4

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		25		NO RECOVERY			
	100710 1043 12-17-91	10		HARD (2.5Y 5/3) light olive brown Clay, with TRACES of fine gravel No plasticity, DRY	CI	4.0	HNU = Ø ppm BK = Ø cpm above Background.
7		16	10	A/A	CI	<4.5	
		16		NO RECOVERY			
8	100711 1115 12-17-91 ARLIVE	Shelby tube		VERY stiff (2.5Y 5/3) Light olive brown, Modled with (2.5 N5/) Gray, gravelly Clay with Cobbles, Low plasticity, Moist.	CL	3.0	HNU = ØPPM BK = Ø cpm above Background
9				No Sample taken			DROVE Shelby tube 1 foot hit Rock. Will TRY to AUGER PASS it. Tube CRUSHED 6 in. ON the END.
10							

NOTES:
Drilling Contractor Refer to Page 1.
Drilling Equipment
Driller:

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 9602.3.22	PROJECT NAME. FERNALD RI/FS EWMF	
BORING NUMBER: 1744	COORDINATES: N:478,500 E 1,383,000	DATE 12-17-91
ELEVATION: Est. 592'	GWL: Depth Date/Time	DATE STARTED: 12-17-91
ENGINEER/GEOLOGIST. L. Marshall	Depth Date/Time	DATE COMPLETED: 12-17-91
DRILLING METHODS: AUGER		PAGE 4 OF 4

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
10				No Sample			Augering pass Rocks. found Large Cobble in the Auger.
11	1330 100712 12-17-91	Tube		HARD (2.5y 5/4) Light olive Brown, gravelly Clay, Low Plasticity, Moist	CL	<4.5	HNU = Ø ppm BY = Ø CPM above Background. Could only push tube 1 foot.
	1330 100713 12-17-91	Shelby		Very Soft (2.5 4/3) olive brown Clayey Gravels w Traces of Cobbles. wet	GC	>.25	
12	1340 100714 12-17-91 Rad	24 SCREEN		MEDIUM DENSE (2.5 4.3) olive brown Clayey Gravels increase in the amount of fines. wet.	GC		HNU = Ø PPM BY = Ø CPM above Background
		32	15	A/A	GC		END of Weathering Zone.
BOH		20		HARD (5y 5/1) gray, Clay No plasticity. DRY. No Recovery		<4.5	Total Depth of Boring 13.5'

NOTES:

Drilling Contractor Refer to Page 1

Drilling Equipment

Driller:

USED 1 Bag of Volclay
25 gals of water
1 Bag Cement.

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS FWMF		
BORING NUMBER: 1745	COORDINATES:		DATE 12/16/91
ELEVATION: 586 ft	GWL: Depth	Date/Time	DATE STARTED: 12/16/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth	Date/Time	DATE COMPLETED: 12/17/91
DRILLING METHODS: Hollow Stem Auger			PAGE 1 OF 9

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	101253 (1330)	5	6	Stiff. 10YR (5/4) Yellowish brown. Silty clay. Low Plasticity. Moist	CI	1.0	HNu = 0 ppm BX = 0 cpm
		5	5	SAA	CI	1.0	
1		7	0	No Recovery.			
		8	0	No Recovery.			
2		5	6	Very Stiff. 10YR (5/4) Yellowish brown. Silty clay. Low Plasticity. Moist.	CI	2.75	HNu = 0 ppm BX = 0 ppm
		11	6	SAA	CI	2.75	
3							

NOTES:

Drilling Contractor: Simon Drill

Drilling Equipment: –

Driller: Clay Gardner
Dan Jameson

Background
HNu = 0 ppm
BX = 40 ppm

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS FEMPF		
BORING NUMBER: 1745	COORDINATES:	DATE	12/16/91
ELEVATION: 586 ft	GWL: Depth Date/Time	DATE STARTED:	12/16/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED:	12/17/91
DRILLING METHODS: Hollow Stem Auger		PAGE 2	OF 9

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		14	1	Hard. 10YR(5/4) Yellowish brown. Silty Clay. Low Plasticity. Moist	Cl	4.5	
		17	0	No Recovery.			
4		8	0	No Recovery.			HNu=0ppm BG=0cpm
RAD→	101254 101255 (1400)	16	4	Stiff. 10YR(5/4) Yellowish brown. Silty clay with sand & gravel. Low Plasticity Moist	Cl	2.0	
5 RAD→	101256 101257	18	6	Hard. 10YR(5/4) Yellowish brown. Silty clay with sand & gravel. Moist.	Cl	>4.5	
RAD→	101258 101259	20	6	SAA	Cl	4.5	

NOTES:

Drilling Contractor: Penn Drill

Drilling Equipment:

Driller: Eloy Gardner
Dan Tamson

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9402-3.22	PROJECT NAME: Fernald RI/FS EWMF		
BORING NUMBER: 1743	COORDINATES:		DATE 12/16/91
ELEVATION: 586 ft	GWL: Depth	Date/Time	DATE STARTED: 12/16/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth	Date/Time	DATE COMPLETED: 12/17/91
DRILLING METHODS: Hollow Stem Auger			PAGE 3 OF 9

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (")	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
Shelby- RAD	101260 101261 (1530)		30"	Stiff. 10YR (5/4) Yellowish brown. Silty Clay with some sand. Low Plasticity Moist.	Cl	1.75	HNu=0 ppm BX=0 cpm
		Shelby					
7		Shelby					
		Shelby					
8		Shelby					
RAD	101262 (1530)						

NOTES:

Drilling Contractor: Penn Drill

Drilling Equipment: –

Driller: Elay Gardner
Dan Jameson

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9102-3.22	PROJECT NAME: Fernald RI/FS EWMF	
BORING NUMBER: 1745	COORDINATES:	DATE 12/17/91
ELEVATION: 5816 ft	GWL: Depth Date/Time	DATE STARTED: 12/16/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/17/91
DRILLING METHODS: Hollow Stem Auger		PAGE 4 OF 9

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	1012B3 (0900)	11	6	Stiff, 10YR (5/4) Yellowish brown. Silty clay. Low Plasticity. moist		1.75	HNU = 0 ppm BG = 0 cpm
		47	6	SAA		1.5	
10		9	6	SAA		2.75	
		14	0	No Recovery		1.7	
11		13	6	SAA, some sand		1.5	HNU = 0 ppm BG = 0 cpm
		21	6	SAA, very stiff		3.0	

NOTES:

Drilling Contractor: Penn Drill

Drilling Equipment: –

Driller: Elay Gardner
Dan Jamison

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS FWMF	
BORING NUMBER: 1743	COORDINATES:	DATE 12/17/91
ELEVATION: 556.77	GWL: Depth Date/Time	DATE STARTED: 12/16/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/17/91
DRILLING METHODS: Hollow Stem Auger		PAGE 5 OF 9

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 ft	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	101264 (0900)	20	5	Stiff. 5Y (5/3) Olive. Silty clay with some sand. Low plasticity, moist.	CL	1.75	HNU = 0 ppm BG = 0 cpm
		13	0	No recovery.			
13	101265 (0923)	3	0	No recovery.			
		7	0	No recovery.			
14		9	6	Very stiff. 5Y (5/3) Olive. Silty clay with sand and gravel. Low plasticity. Moist.	CL	2.5	HNU = 0 ppm BG = 0 cpm
		17	1	SAA	CL	2.75	

NOTES:

Drilling Contractor: Penn Drill

Drilling Equipment: Mobile Drill

Driller: Clay Gardner
Bob Jamison

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER. 9602-3.22	PROJECT NAME. Fernald RI/FS FEMP		
BORING NUMBER: 1745	COORDINATES:	DATE 12/17/91	
ELEVATION: 551.4 ft	GWL: Depth Date/Time	DATE STARTED: 12/14/91	
ENGINEER/GEOLOGIST. D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/17/91	
DRILLING METHODS: Hollow Stem Auger		PAGE 6 OF 8	

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		5	0	No Recovery			HNU=0 ppm BX=0 cpm
		11	0	No Recovery			
16 RAD	101266 101267 (0940)	14	6	Very Stiff. 5Y (5/3) Olive, silty clay w/sand & gravel Low plasticity, Moist	CL	2.25	
RAD	101268 101269 (0940)	17	6	HARD. 5Y (5/3) Olive, silty clay w/sand & gravel. Low plasticity, moist.	CL	4.25	
17 RAD	101270 (1020) 101271	Shelby Tube	25"	Very Stiff. 5Y (5/3) Olive. Silty Clay w/ sand & gravel. Low plasticity, moist.	CL	2.5	HNU=0 ppm BX=0 cpm

NOTES:
Drilling Contractor PENN DRILL
Drilling Equipment
Driller: Clay Gardner
Dan Jamison

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS	
BORING NUMBER: 1743	COORDINATES:	DATE 12/17/91
ELEVATION: 584 ft	GWL: Depth Date/Time	DATE STARTED: 12/16/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/17/91
DRILLING METHODS: Hollow Stem Auger		PAGE 7 OF 8

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
19	Fuller Shelby						
RAD → 20	101272 110201						
		6	0	No Recovery			
		14	0	No Recovery.			

NOTES:

Drilling Contractor: Penn Drill

Drilling Equipment:

Driller: Elay Gardner
Dan Samison

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS FUMF	
BORING NUMBER: 1745	COORDINATES:	DATE 12/17/91
ELEVATION: 586 ft	GWL: Depth Date/Time	DATE STARTED: 12/16/91
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/17/91
DRILLING METHODS: Hollow Stem Auger		PAGE 8 OF 9

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		14	0	No Recovery			
		19	0	No Recovery			
22		9	0	No Recovery			
		18	0	No Recovery			
23		21	0	No Recovery			
		24	0	No Recovery			

NOTES:

Drilling Contractor: PENN DRILL

Drilling Equipment: —

Driller: Elgy Gardner
Dan Jamison

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS FCUMA		
BORING NUMBER: 1745	COORDINATES:	DATE 12/17/91	
ELEVATION: 556.54	GWL: Depth Date/Time	DATE STARTED: 12/16/91	
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 12/17/91	
DRILLING METHODS: Hollow Stem Auger		PAGE 9 OF 9	

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		9	0	No Recovery			
		14	0	No Recovery			
23 RAD	101273 101274 (1415)	9	6	Very Stiff, 5Y (5/3) Olive. Silty clay with sand & gravel. Low Plasticity. Moist.		2.0	HNU=0 ppm RD=0cpm
RAD	101275 101276 (1415)	18	6	Hard. 5Y (5/3) Olive. Silty clay with sand & gravel Low plasticity. Moist.		4.5	
26 RAD	101277 101278 (1415)	21	6	Very Stiff. 5Y (5/3) Olive Silty clay with sand & gravel. Low plasticity Moist.		2.5	
RAD	101279 101280 (1415)	24	6	Very Stiff. 5Y (5/3) Olive Silty clay with sand & gravel. Low plasticity. Moist		3.0	

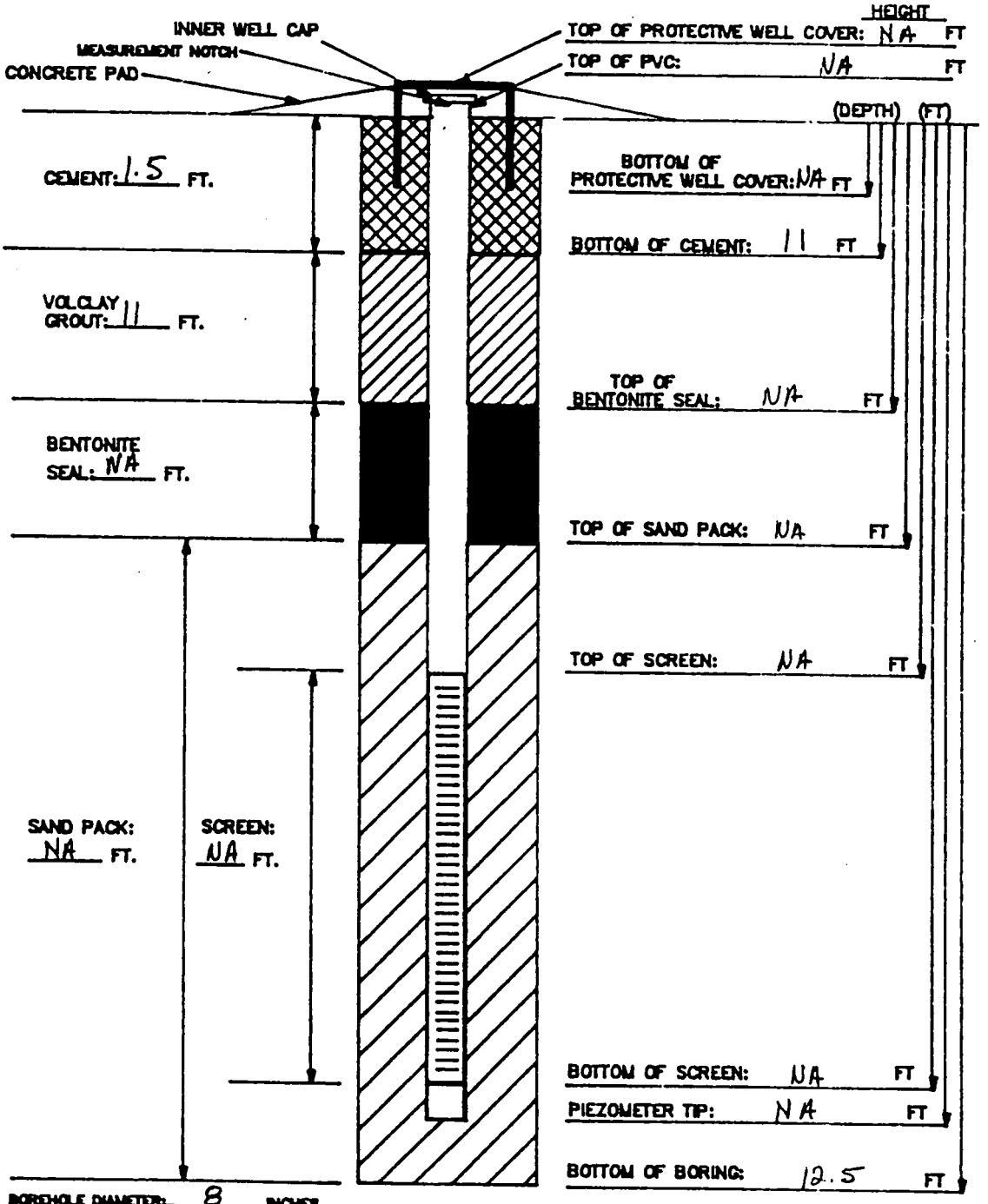
NOTES:
Drilling Contractor: PENN DRILL
Drilling Equipment: Mobile Drill
Driller: Clay Gardner
Don Jamison

402-11-86

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.
1746

INSTALLATION DATE: 12-16-91



BOREHOLE DIAMETER: 8 INCHES

MATERIALS USED:

SAND TYPE AND QUANITITY: NA
BENTONITE PELLETS (5-GALLON BUCKETS): NA.
BAGS OF VOLCLAY GROUT: 1
AMOUNT OF CEMENT: 1
AMOUNT OF WATER USED: ~~50 gals~~ 25 gals
OTHER:

NOTES:

1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS.
2) SCREEN IS 2-INCH I.D. SCHEDULE 40 PVC PIPE WITH 0.020-INCH SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH/DATE:
5) TOP OF PVC IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK.
6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL.

TASK: 3.22

GEOLOGIST/ENGINEER: G. Marshall

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 9602.3.22	PROJECT NAME Fernald RI/FS (EWMF)	
BORING NUMBER: 1746	COORDINATES: N: 478,000 E: 1,382,500	DATE 12-16-91
ELEVATION: Est. 593'	GWL: Depth Date/Time	DATE STARTED 12-16-91
ENGINEER/GEOLOGIST G. Marshall	Depth Date/Time	DATE COMPLETED: 12-16-91
DRILLING METHODS: AUGER		PAGE 1 OF 4

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	100687 11:10 12-16-91	5		Stiff (10YR 3/6) Dark yellowish Brown, Silty Clay, with Root Lets, No plasticity Dry	Cl	1.5	HNU = Ø ppm Bγ = Ø cpm above Back ground
		7	6	No Recovery			Trip/field Blank 100688
1.		7					
	100689 13.50 12-16-91	13		HARD (10 YR 4/6) Dark yellowish Brown, Silty clay, Trace of Grovel, No Plasticy, Dry.	Cl	4.5	HNU = Ø ppm Bγ = Ø cpm above Back ground
2		12	6	No Recovery			
		16					
3.							

NOTES:

Drilling Contractor Penn Drilling

Drilling Equipment Mobil Drilling Rig 80

Driller: Bobby Vost
Kevin Myers

Sample Tech Vern Larger

Color from Munsell Color Chart

Background HNU = Ø ppm
Bγ = 40 cpm
α = No meter

No meters At office.

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: Fernald RI/FS (EWMF)	
BORING NUMBER: 1746	COORDINATES: N 478,800 E 1,382,500	DATE 12-16-91
ELEVATION: Est 593'	GWL: Depth Date/Time	DATE STARTED: 12-16-91
ENGINEER/GEOLOGIST: G. Marshall	Depth Date/Time	DATE COMPLETED:
DRILLING METHODS: AUGERS		PAGE 2 OF 4

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6"	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
3	100689 1355 12-16-91	16		HARD (10YR 6/4) Light yellowish Brown, Silty Clay, with gravel No plasticity, DRY.	CL	<4.5	HNU = Ø ppm BR = Ø cpm above Background.
		28	15	HARD (10YR 6/4) Light yellowish Brown, Silty clay, with gravel No plasticity Dry	CL	<4.5	
4		27		HARD (10YR 6/4) Light yellowish Brown, Silty clay, with gravel No plasticity, DRY	CL	<4.5	
				NO RECOVERY			
	100690 1400 12-16-91	12		HARD (10YR 4/4) DARK yellowish Brown, Silty clay with some gravel, No plasticity, DRY	CL	<4.5	HNU = Ø ppm BR = Ø cpm above Background.
5	Rad Screen 100693						
	100691 1400 12-16-91	13	17	HARD (10YR 4/4) DARK yellowish Brown, Silty clay with some gravel No plasticity, DRY	CL	<4.5	
	Rad Screen 100694						
	100692 1400 12-16-91	14		HARD (10YR 4/4) Dark yellowish Brown, Silty clay with some gravel, No plasticity, DRY.	CL	<4.5	
6	Rad Screen 100695						

NOTES:

Drilling Contractor: See Page 1

Drilling Equipment:

Driller:

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602 3.22	PROJECT NAME: Fernald RI/FS (EWMF)	
BORING NUMBER: ~~14~~ 1746	COORDINATES: N 478,000 E 1,382,000	DATE 12-16-91
ELEVATION: Est 593'	GWL: Depth Date/Time	DATE STARTED 12-16-91
ENGINEER/GEOLOGIST: G. Marshall	Depth Date/Time	DATE COMPLETED: 12-16-91
DRILLING METHODS: AUGER		PAGE 3 OF 4

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6"	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		13		NO RECOVERY.			
	100696 1405 12-16-91	18		HARD (10YR 5/6) yellowish brown, gravel clay, no plasticity, dry	CL	<4.5	HNU = Ø PPM BK = Ø cpm above Background
7	100697 1405 12-16-91	19	16	medium stiff (10YR 5/4) yellowish brown, very fine clayey sand, no plasticity, moist	SC	1.0	
	100697 1405 12-16-91	16		medium stiff (10YR 5/4) yellowish brown, very fine clayey sand, no plasticity, moist	SC	1.0	
				NO RECOVERY			
8	100697 1410 12-16-91	20		very soft. (10YR 5/4) yellowish brown mottled w (10YR 5/1) gray very fine clayey sand, no plasticity, wet	SC	.25	HNU = Ø PPM BK = Ø cpm above Background. Hit perched water at 8.0'
	Rad screen 100697	22	10	very soft (10YR 5/4) yellowish brown, very fine clayey sand, no plasticity, ~~moist~~ wet moist.	SC	.25	
				NO RECOVERY			

NOTES:

Drilling Contractor: See Page 1

Drilling Equipment:

Driller:

402-11-66

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: Fernald RI/FS	
BORING NUMBER: 1746	COORDINATES: N 478,000 E 1,382,000	DATE 12-16-91
ELEVATION: est 593'	GWL: Depth Date/Time	DATE STARTED: 12-16-91
ENGINEER/GEOLOGIST: G Marsha II	Depth Date/Time	DATE COMPLETED: 12-16-91
DRILLING METHODS: Auger		PAGE 4 OF 4

DEPTH (Ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		17		No Recovery			
9.5	1527 100698 12-16-91			Very stiff (2.5 4/3) olive brown, gravelly clay, Low plasticity, moist.	Cl	2.75	HNU = ∅ PPM BG = ∅ CPM above Background
	1527 12-16-91 100699			Very soft (2.5 4/3) olive brown Clayey Gravels, No plasticity. Wet.	GC	.25	
10.5	100700 1527 12-16-91	Shelby Tube	19	Very stiff (2.5 4/3) olive brown gravelly Clay, Low Plasticity, moist.	Cl	2.50	
11.5				No Recovery			
12.5				Total Depth 12.5'			

NOTES:

Drilling Contractor See page 1

Drilling Equipment

Driller:

USED 1 Bag of Volclay.
1 Bag of Cement.

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS EWMF	
BORING NUMBER: 1747	COORDINATES:	DATE: 12-10-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 12-10-91
ENGINEER/GEOLOGIST: P. CASSEDAY	Depth Date/Time	DATE COMPLETED: 12-11-91
DRILLING METHODS: HOLLOW STEM AUGER		PAGE 1 OF 6

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS βγ = 20 cpm (background)
0	101226 1446 12-10-91	2	6	MEDIUM STIFF (10YR 4/6) DARK YELLOWISH BROWN SILTY CLAY. ABUNDANT ROOTS AND ORGANIC MATERIAL SLIGHTLY MOIST.	CL	0.5	HNU = 0 βγ = 20 α = 0
ARCHIVE		3	6	VERY STIFF (10YR, 4/6) DARK YELLOWISH BROWN SILTY CLAY, LESS ORGANIC MATERIAL, SLIGHTLY MOIST LOW PLASTICITY	CL	3.5	HNU = 0 βγ = 20 α = 0
1		5	3	HARD, SAA	CL	>40	HNU = 0 βγ = 20 α = 0
ARCHIVE	~~1453~~ PC 12-10	12	0	NR			
2							
DISTURBED GEOTECH	101227 1453 12-10	15	6	DENSE (2.5YR 6/6) OLIVE YELLOW CLAYEY SILT, WITH SOME MINOR SAND DRY. LOW PLASTICITY. TRACE GRAVEL	ML	NA	HNU = 0 βγ = 20 α = 0
		21	6	SAA	ML	NA	HNU = 0 βγ = 20 α = 0
3							

NOTES:

DRILLERS: PENNSYLVANIA DRILLING
ELGY GARDNER
DAN JAMISON (HELPER)

SAMPLE TECH: CHRIS JOHNSON

NA - NOT APPLICABLE
NR - NO RECOVERY
SAA - SAME AS ABOVE

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS EWMF	
BORING NUMBER: 1747	COORDINATES:	DATE 12-10-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 12-10-91
ENGINEER/GEOLOGIST: P. CASSEDAY	Depth Date/Time	DATE COMPLETED: 12-11-91
DRILLING METHODS: HOLLOW STEM AUGER		PAGE 2 OF 6

DEPTH (Ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER - -	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
3	1500 ~~12-10~~ 12-10	28	6	DENSE (2.5Y 6/6) OLIVE YELLOW CLAYEY SILT WITH MINOR SAND AND SOME GRAVEL DRY.	ML	NA	HNU = 0 BR = 20 α = 0
DISTURBED GEOTECH		20	6	SAA	ML	NA	HNU = 0 BR = 20 α = 0
4		20	2	SAA	ML	NA	HNU = 0 BR = 20 α = 0
	1522 12-10	20	6	SAA	ML	NA	HNU = 0 BR = 20 α = 0
5 DISTURBED GEOTECH		20	6	SAA	ML	NA	HNU = 0 BR = 20 α = 0
DISTURBED GEOTECH	101228 PC ~~12-10~~ 12-10	24	2	STIFF (10YR 5/4) YELLOWISH BROWN ~~CLAY~~ SILTY CLAY PC WITH TRACES OF SAND ~~AND GRAVEL~~ PC 12-10. PLASTIC ~~SLIGHTLY~~ MOIST. PC 12-10	CL	1.5	HNU = 0 BR = 20 α = 0
6							

NOTES:

DRILLERS: PENNSYLVANIA DRILLING
ELGY GARDINER
DAN JAMISON (HELPER)

SAMPLE TECH: CHRIS JOHNSON

NA - NOT APPLICABLE
NR - NO RECOVERY
SAA - SAME AS ABOVE

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS EWMF	
BORING NUMBER: 1747	COORDINATES:	DATE 10-12-10-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 12-10-91
ENGINEER/GEOLOGIST: P. CASSEDAY	Depth Date/Time	DATE COMPLETED: 12-11-91
DRILLING METHODS: HOLLOW STEM AUGER		PAGE 3 OF 6

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
6	1548 12-10	22	6	MEDIUM STIFF (10YR 5/4) YELLOWISH BROWN ~~LIGHT~~ SILTY CLAY WITH SAND ~~AND SILT~~ PC 12-10 TRACES AND SOME INTERMITTENT GRAVEL PC 12-10 SLIGHTLY PLASTIC, ~~SLIGHTLY~~ MOIST.	CL	0.75	HNU = 0 $\alpha = 0$ $\beta\gamma = 20$
DISTURBED GEOTECH		22	6	SAA.	CL	0.75	HNU = 0 $\alpha = 0$ $\beta\gamma = 20$
7		26	6	SAA.	CL	0.75	HNU = 0 $\alpha = 0$ $\beta\gamma = 20$
	1604 12-10	14	6	SAA WITH SOME LARGER CHUNKS OF GRAVEL PRESENT	CL	0.75	HNU = 0 $\alpha = 0$ $\beta\gamma = 20$
8 DISTURBED GEOTECH		16	6	SAA ONLY MEDIUM STIFF	CL	1.5	HNU = 0 $\alpha = 0$ $\beta\gamma = 20$
9		21	6	VERY STIFF, PC ~~B~~ 12-10 OTHERWISE SAA	CL	3.5	HNU = 0 $\alpha = 0$ $\beta\gamma = 20$

NOTES:

DRILLERS - PENNSYLVANIA DRILLING
ELGY GARDNER
DAN JAMISON (HELPER)
SAMPLE TECH - CHRIS JOHNSON

NA - NOT APPLICABLE
NR - NO RECOVERY
SAA - SAME AS ABOVE

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS EWMF	
BORING NUMBER: 1747	COORDINATES:	DATE 12-11-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 12-10-91
ENGINEER/GEOLOGIST: P. CASSEDAY	Depth Date/Time	DATE COMPLETED: 12-11-91
DRILLING METHODS: HOLLOW STEM AUGER		PAGE 4 OF 6

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER -	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS $\beta\gamma$ = 20 cpm background
9	101229 12-11 1000	NA	12	MEDIUM STIFF (10YR, 4/4) DARK YELLOWISH BROWN CLAYEY SILT. SOME SMALL GRAVEL. SLIGHTLY MOIST	CL	0.8	SHELBY TUBE PUSHED 9'-12' DENTED BOTTOM, CONTENTS REMOVED, ARCHIVED ATTEMPT ANOTHER SHELBY 12'-15'
10		NA	12	SAA	CL	1.0	HNU=0 α=0 $\beta\gamma$=20
11			4	STIFF (10YR, 5/6) YELLOWISH BROWN SILTY CLAY WITH SOME GRAVEL. LOW PLASTICITY, SLIGHTLY MOIST	CL	1.25	
12	101230 12-11 1200			MEDIUM STIFF (10YR, 4/4) YELLOWISH BROWN SILTY CLAY WITH SOME GRAVEL. MOIST AND PLASTIC.	CL	1.0	HNU=0 α=0 $\beta\gamma$=20
13	101231 RAD SCREEN (TOP)	SHELBY TUBE PUSHED					
14	101232 RAD SCREEN (BOTTOM)	12.0-14.5'		HARD STIFF (5Y, 5/1) GRAY CLAY WITH SOME LARGE GRAVEL. MOIST AND PLASTIC.	CL	1.5	HNU=0 α=0 $\beta\gamma$=20
15		15	0	NR	NA	NA	HNU=0 α=0 $\beta\gamma$=20

NOTES:
PENNSYLVANIA DRILLING
DRILLER - E. GARDNER
HELPER - D. JAMISON
SAMPLE TECH - C. JOHNSON

SAA - SAME AS ABOVE
NR - NO RECOVERY
NA - NOT APPLICABLE

402-11-86

FERNALD
RI/FS

VISUAL CLASSIFICATION OF SOILS

3839

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS EWIMF	
BORING NUMBER: 1747	COORDINATES:	DATE 12-11-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 12-10-91
ENGINEER/GEOLOGIST: P. CASSEDAY	Depth Date/Time	DATE COMPLETED: 12-11-91
DRILLING METHODS: HOLLOW STEM AUGER		PAGE 5 OF 6

DEPTH (Ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6"	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS βγ = 20cpm background
15	101233 1313 12-11	6	6	STIFF, MEDIUM DENSE (5Y, 5/1) GRAY CLAY WITH MINOR SILT AND SOME GRAVEL. MOIST AND PLASTIC	CL	1.75	HNU = 0 α = 0 βγ = 20
RAD SCREEN & TOTAL U βγ SPEC							ATTEMPTED GEOCHEM SAMPLE, BUT INSUFFICIENT RECOVERY, SO SAMPLE WAS USED FOR RAD SCREEN AND TOTAL U βγ SPEC. (101233)
		8	0	NR	NA	NA	
16		11	0	NR	NA	NA	ATTEMPT ANOTHER GEOCHEM AT 17'-19'.
		21	0	NR	NA	NA	
17	101234 1340 12-11 ~~GEOCHEM~~ PC 101235 12-11 1340	34	6	VERY STIFF, VERY DENSE (5Y, 5/1) GRAY CLAY. CONTAINS SOME SILT AND GRAVEL (SOME QUITE LARGE) MOIST AND PLASTIC	CL ~~2.5~~ PC	2.5	HNU = 0 α = 0 βγ = 20
101234 GEOCHEM 101235 RAD SCREEN							
101236 12-11 1340 101237 12-11 1340		30	6	SAA	CL ~~3.0~~ PC	3.0	HNU = 0 α = 0 βγ = 20
101236 GEOCHEM 101237 RAD SCREEN							
18							

NOTES: PENNSYLVANA DRILLING
DRILLER - E. GARDNER
HELPER - D. JAMISON

SAMPLE TECH - C. JOHNSON

NA - NOT APPLICABLE
SAA - SAME AS ABOVE
NR - NO RECOVERY

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.22	PROJECT NAME: FEMP RI/FS EWMF	
BORING NUMBER: 1747	COORDINATES:	DATE 12-11-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 12-10-91
ENGINEER/GEOLOGIST: P. CASSEDAY	Depth Date/Time	DATE COMPLETED: 12-11-91
DRILLING METHODS: HOLLOW STEM AUGER		PAGE 6 OF 6

	DEPTH (Ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (-)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1238 GEOTECH 1239 RAD SCREEN	18	101238 12-11 1340 101239 12-11 1340	27	6	VERY STIFF, VERY DENSE (5Y, 5/1) GRAY CLAY, GRADING INTO A CLAYEY SILT WITH GRAVEL. MOIST.	CL	3.0	HNU = 0 α = 0 BG = 20
1240 GEOTECH 1241 RAD SCREEN		101240 12-11 1340 101239 12-11 1340	21	6	SAA, with INCREASING SILTINESS	CL	3.0	HNU = 0 α = 0 BG = 20
1242 DISTURBED GEOTECH	19	101242 12-11 1440	SHELBY TUBE PUSHED	30	VERY STIFF (5Y, 5/1) GRAY SANDY SILT. CONTAINS SOME GRAVEL. VERY WET	ML	3.0	HNU = 0 α = 0 BG = 20 SHELBY TUBE PUSHED WATER ENCOUNTER 21'-21.5' PERCHED TABLE. EMPTIED SHELBY, COLLECTED DISTURBED GEOTECH AND FULL RAD & RAD SCREEN. DRILLING HALTED
1243 FULL RAD RAD SCREEN	20							
	21	101243 12-11 1440						

NOTES: PENNSYLVANIA DRILLING
DRILLER - E. GARDNER
HELPER - D. JAMISON

SAMPLE TECH - C. JOHNSON

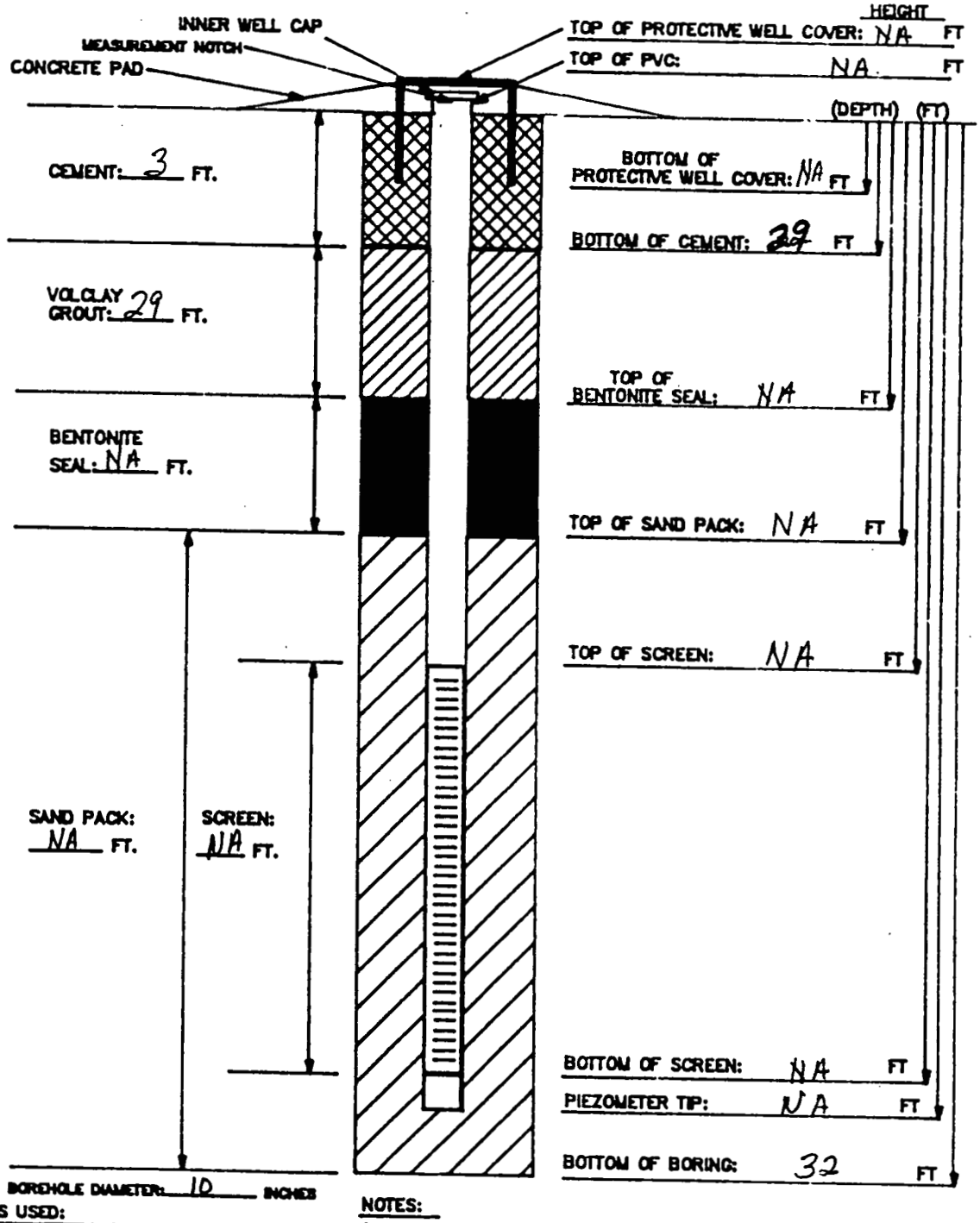
SAA - SAME AS ABOVE
NA - NOT APPLICABLE
NR - NO RECOVERY

402-11-86

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO. 1748

INSTALLATION DATE: 12-12-91



MATERIALS USED:

SAND TYPE AND QUANITITY: NA
BENTONITE PELLETS (5-GALLON BUCKETS): NA
BAGS OF VOLCLAY GROUT: 4
AMOUNT OF CEMENT: 1
AMOUNT OF WATER USED: 100 gals
OTHER:

NOTES:

1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS.
2) SCREEN IS 2-INCH I.D. SCHEDULE 40 PVC PIPE WITH 0.020-INCH SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH/DATE:
5) TOP OF PVC IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK.
6) PARENTHESES INDICATE DEPTH BELOW GROUND LEVEL.

TASK: 3.22

GEOLOGIST/ENGINEER: G. Marshall

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 9602.3.22	PROJECT NAME Fernald RI/FS (EWMF)	
BORING NUMBER: 1748	COORDINATES: N-477,300 E 1,382,500	DATE 12-9-91
ELEVATION: Est. 601	GWL: Depth Date/Time	DATE STARTED: 12-9-91
ENGINEER/GEOLOGIST: G. Marshall	Depth Date/Time	DATE COMPLETED: 12-12-91
DRILLING METHODS: AUGER		PAGE 1 OF 9

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	100651 1330 12-10-91	3		Stiff (10YR 3/6) Dark yellowish Brown, Silty Clay, Silt, Rootlets DRY, No Plasticity	Cl	1.5	Trip/Field Blank 100652
	100652 1330 12-10-91	5	12	MED Stiff (10YR 3/6) Dark yellowish Brown, Silty Clay, DRY No plasticity	Cl	1.0	HNU – Ø PPM BY – Ø CPM Above Background
1	100653			Stiff (10YR 5/8) yellowish brn Clay Silty, DRY, No Plasticity	Cl	1.75	
		3		No Recovery			
	100653 1340 12-10-91	6		HARD (10YR 5/8) yellowish Brown, Silty Clay, DRY, No Plasticity	Cl	>4	HNU – Ø PPM BY – 0 CPM Above Background.
2		12	6	No Recovery			
3		15					

NOTES: Penn Drilling Co.
Mobil Drilling Rig. 80.
Driller - Bobby Yost
Drill Helper - Kevin Meyers
Sample Tech. Vern Laizger

Background HNU = 0ppm
BY = 0-80cpm
α = 0 cpm.

No alpha meters at office

Color from Munsell Color Chart

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: Fernald RI/FS (EU MF)	
BORING NUMBER: 1248	COORDINATES: N-477300 E 1,382,500	DATE 12-9-91
ELEVATION: Est 601	GWL: Depth Date/Time	DATE STARTED: 12-9-91
ENGINEER/GEOLOGIST: G. Marshall	Depth Date/Time	DATE COMPLETED:
DRILLING METHODS: AUGER		PAGE 2 OF 9

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 (in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY	REMARKS
3	100653 1400 12-10-91	12		HARD (10YR 5/8) yellowish Brown silty clay, No Plasticity, Dry	CI	<4	HNU = Ø PPM BG = Ø CPM above Background
	100653 1400 12-10-91	22	13	HARD (10YR 5/8) yellowish Brown silty clay, No Plasticity, Dry.	CI	<4	
4		21		NO RECOVERY			
	100653 1420 12-10-91	21		HARD (10YR 5/6) yellowish Brown, silty clay w traces of gravel, No Plasticity, Dry	CI	<4	HNU = Ø PPM BG = Ø CPM. above Background
5	100653	18	6	NO RECOVERY			
6		12					

NOTES:

Drilling Contractor: Refer to Page 1.

Drilling Equipment:

Driller:

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602 - 3.22	PROJECT NAME: Fernald RI/FS (EWMF)	
BORING NUMBER: 1748	COORDINATES: N 477,300 E 1,382,500	DATE 12-10-91
ELEVATION: Est 601	GWL: Depth Date/Time	DATE STARTED: 12-9-91
ENGINEER/GEOLOGIST: G. Marshall	Depth Date/Time	DATE COMPLETED: 12-12-91
DRILLING METHODS: AUGER		PAGE 3 OF 9

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
6	100654 1515 12-10-91	11		Very stiff (10YR 5/3) Brown, Clay with Sand and gravel High plasticity, moist.	Cl	3.5	HNU = Ø PPM Bγ = Ø CPM above Background
	RAD SCREEN 100686						
	100654 1515 12-10-91	15	18	Stiff (10YR 5/3) Brown, Clay with Sand and gravel High plasticity, moist	Cl	1.75	
7	100654 1515 12-10-91	11		Very stiff (10YR 5/3) Brown, Clay with Sand and gravel High plasticity, moist.	Cl	2.75	
	100654 1525 12-10-91	11		Stiff (10YR 5/3) Brown, Clay with Sand and gravel, Low Plasticity, moist.	Cl	1.0	HNU = Ø PPM Bγ = Ø CPM above Background
8	RAD SCREEN 100686						
	100654 1525 12-10-91	13	18	Very Stiff (10YR 5/3) Brown, Clay with sand and gravel, Low Plasticity, moist	Cl	2.0	
	100654 1525 12-10-91	11		Hard (10YR 5/3) Brown, Clay with Sand and gravel, Low Plasticity, moist.	Cl	4.0	
9							

NOTES:

Drilling Contractor: Refer to Page 1.

Drilling Equipment:

Driller:

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602.3.22	PROJECT NAME: Fernald RI/FS (EWMF)	
BORING NUMBER: 1748	COORDINATES: N 477,300 E 1,382,500	DATE 12-10-91 & 12-11-91
ELEVATION: Est 601	GWL: Depth Date/Time	DATE STARTED 12-9-91
ENGINEER/GEOLOGIST: G. Marshall	Depth Date/Time	DATE COMPLETED:
DRILLING METHODS: AUGER		PAGE 4 OF 9

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
9	100655 1600 12-10-91 Rad Screen 100656	Shelby Tube	33	HARD (10YR 5/1) GRAY, Clay with Sand & gravel, No Plasticity, DRY.	Cl	1.5	HNU = Ø PPM Bγ = Ø CPM above Background
10							
11	100657 Rad Screen			---- NO RECOVERY		<4.0	HNU = Ø PPM Bγ = Ø CPM above Background
12	100658 0940 12-11-91	9		HARD (5YR 5/8) yellowish Red, Silty clay with sand & gravel Low Plasticity, moist.	Cl	3.0	HNU = Ø PPM Bγ = Ø CPM above Background
	100661 Rad Screen						
	100659 0940 12-11-91	10	18	HARD (10YR 5/1) gray modeled w (5YR 5/8) yellowish Red, Clay with Sand & gravel, Low Plasticity, moist	Cl	2.5	HNU = Ø PPM Bγ = Ø CPM above Background
13	100662 Rad Screen						
	100660 0940 12-11-91	16		Very Hard (10YR 5/1) gray modeled w (5YR 5/8) yellowish Red, Clay with Sand & gravel, Low Plasticity, moist.	Cl	<4.5	HNU = Ø PPM Bγ = Ø CPM. above Background
	100663 Rad Screen						

NOTES:

Drilling Contractor: Refer to Page 1.

Drilling Equipment:

Driller:

Back ground Readings for 12-11-91
HNU = Ø ppm
Bγ = 40 CPM

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602-3.22	PROJECT NAME: Fernald RI/FS (EWMF)	
BORING NUMBER: 174B	COORDINATES: N 477,300 E 1,382,500	DATE 12-9-91
ELEVATION: Est 601	GWL: Depth Date/Time	DATE STARTED: 12-9-91
ENGINEER/GEOLOGIST: G. Marsh	Depth Date/Time	DATE COMPLETED:
DRILLING METHODS: AUGER		PAGE 5 OF 9

DEPTH	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	0940	20		NO RECOVERY			
14	100664 1017 12-11-91	4		FIRM (5YR 4/4) Reddish Brown Silty Clay with Sand and gravel, Low plasticity, moist	Cl	1.25	HNU = Ø PPM Br = Ø CPM above Background
	100664 RAD	SCREEN					
	100664 1017 12-11-91	9	12	HARD (10YR 5/1) GRAY, Silty Clay with sand & gravel, Low plasticity Moist	Cl	2.5	
15		13		No RECOVERY			
	100685 1039 12-11-91 100683	9		FIRM (10YR 5/1) gray, gravelly Clay with sand, Low Plasticity Moist	Cl	1.5	HNU = Ø PPM Br = Ø CPM above Background
	Rad SCREEN 100684		14				
16	100685 1039 12-11-91 100683	12		Very Stiff (10YR 5/1) gray, gravelly Clay with sand, Low Plasticity Moist.	Cl	2.75	Sample interval used for Disturbed Geotech.

NOTES:

Drilling Contractor: Refer to Page 1

Drilling Equipment

Driller:

402-11-86

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602 . 3.22	PROJECT NAME: Fernald RI/FS	EWMF
BORING NUMBER: 1748	COORDINATES: N 477,300 E 1,392,500	DATE 12-9-91
ELEVATION: Est 601	GWL: Depth Date/Time	DATE STARTED: 12-9-91
ENGINEER/GEOLOGIST: G. Marshall	Depth Date/Time	DATE COMPLETED: 12-12-91
DRILLING METHODS: AUGER		PAGE 6 OF 9

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	100683 100685 1039 12-11-91	16		Very stiff (10YR 5/1) gray, gravelly Clay with sand, Low Plasticity, moist. NO RECOVERY	CI	2.75	
17	100685 1343 12-11-91 100683 Red screen	11	100685	Very Stiff (5Y 5/1) gray, gravelly clay with sand, Low Plasticity moist. TRACE of wood	CI	2.75	HNU = Ø PPM Bγ = Ø cpm above Background
	100685 1343 12-11-91 100683	20	18	Very stiff (5Y 5/1) gray, gravelly Clay with sand, Low plasticity moist.	CI	2.50	Sample interval used for Disturbed Geotech.
18	100685 1343 12-11-91 100683	23		Very stiff (5Y 5/1) gray, gravelly Clay with sand, Low Plasticity moist.	CI	2.50	
19	100665 1425	Shelby tube	22	Very stiff (5Y 5/1) gray, gravelly clay with sand, Low Plasticity, moist.	CI	3.0	HNU = Ø PPM Bγ = 0 cpm above Background Recovery too Low. Archive Sample.

NOTES:

Drilling Contractor: Refer to Page 1.

Drilling Equipment

Driller:

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 9602 3.22	PROJECT NAME: FERNALD RI/FS (EWMF)	
BORING NUMBER: 1748	COORDINATES: N 477,300 E 1,382,500	DATE 12-11-91
ELEVATION: Est 601	GWL: Depth Date/Time	DATE STARTED: 12-9-91
ENGINEER/GEOLOGIST: G. Marshall	Depth Date/Time	DATE COMPLETED: 12-12-91
DRILLING METHODS: AUGER		PAGE 7 OF 9

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
20	100665 1343 12-11-91	Shelby tube		Very stiff (5y 5/1) gray, gravelly Clay with Sand, Low Plasticity, Moist.		2.5	HNU = Ø PPM BG = Ø CPM above background.
21							
22				NO RECOVERY			Drilled and extra 6in to try to get pass Cobble.
23	100665 1450 12-11-91	tube	24	Very stiff (5y 5/1) gray gravelly Clay with Sand, Low Plasticity, moist.		3.0	HNU = Ø PPM BG = Ø CPM above background. tube crushed, Low Recovery, Archive Sample.
24		Shelby					
25							

NOTES:

Drilling Contractor Refer to Page 1

Drilling Equipment

Driller:

402-11-86

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

3839

PROJECT NUMBER: 9602·3·22	PROJECT NAME: Fernald RI/FS (EWMF)	
BORING NUMBER: 1748	COORDINATES: N 477,300 E 1,382,500	DATE 12-9-91
ELEVATION: Est 601	GWL: Depth Date/Time	DATE STARTED: 12-9-91
ENGINEER/GEOLOGIST: G. Marshall	Depth Date/Time	DATE COMPLETED: 12-12-91
DRILLING METHODS: AUGER		PAGE 8 OF 9

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
25	100666 1556 12-11-91	7		HARD (5Y 5/1) gray, gravelly clay with sand, low plasticity, moist		<4.5	HNU = Ø PPM BG = Ø CPM above background.
	100669 Rad Screen						
	100667 1556 12-11-91	11	(18)	HARD (5Y 5/1) gray, gravelly clay with sand, low plasticity, moist		<4.5	
26	100670 Rad Screen						
	100668 1556 12-11-91	14		HARD (5Y 5/1) gray, gravelly clay with sand, low plasticity, moist.		<4.5	
	100671 Rad Screen						
		18		No Recovery			
27	100672 1615 Rad Screen 100673	Shelby Tube		HARD (5YR 5/2) olive gray, gravelly clay with sand (fine) low plasticity, moist		<4.5	HNU = Ø PPM BG = Ø CPM above background
28							
29							

NOTES:

Drilling Contractor Refer to Page 1

Drilling Equipment

Driller:

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 9602 · 3.22	PROJECT NAME: Fernald RI/FS (EWMF)	
BORING NUMBER: 1748	COORDINATES: N 477,3[illegible]0 E 1,382,5[illegible]0	DATE 12-11-91
ELEVATION: Est 602	GWL: Depth Date Time	DATE STARTED: 12-9-91
ENGINEER/GEOLOGIST: G. Marshall	Depth Date Time	DATE COMPLETED: 12-12-91
DRILLING METHODS: AUGER		PAGE ~~10~~ 9 OF 9

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	Rad SCREEN 100674	Shelby TUBE	16	HARD (5y 5/2) olive gray, gravelly Clay with fine sand, Low plasticity moist.		4.5	
30	100675 1632 12-11-91	5		Very Stiff (5y 5/1) gray, gravelly clay, with medium sand, Low Plasiticity, moist.		3.0	HNU = Ø PPM BG = Ø CPM above background
	100679	Rad SCREEN					
	100676 1632 12-11-91	17	24	Very stiff (5y 5/1) gray, gravelly Clay, with Medium size sand Low Plasticity, moist.		2.5	
31	100680	Rad					
	100677 1632 12-11-91	22		Very stiff (5y 5/1) gray, gravelly Clay, with Medium size sand, Low Plasticity, moist.		2.75	
	100681	Rad SCREEN					
	100678 1632 12-11-91	27		VERY stiff (5y 5/1) gray, gravelly clay, with Medium size sand, Low Plasticity, moist.		2.75	
32	100682	Rad SCREEN					Total Depth 32'

NOTES:
Drilling Contractor Refer to page 1
Drilling Equipment
Driller:

USED 4 bags of Volclay to Plug HOLE. AND 1 bag of cement.

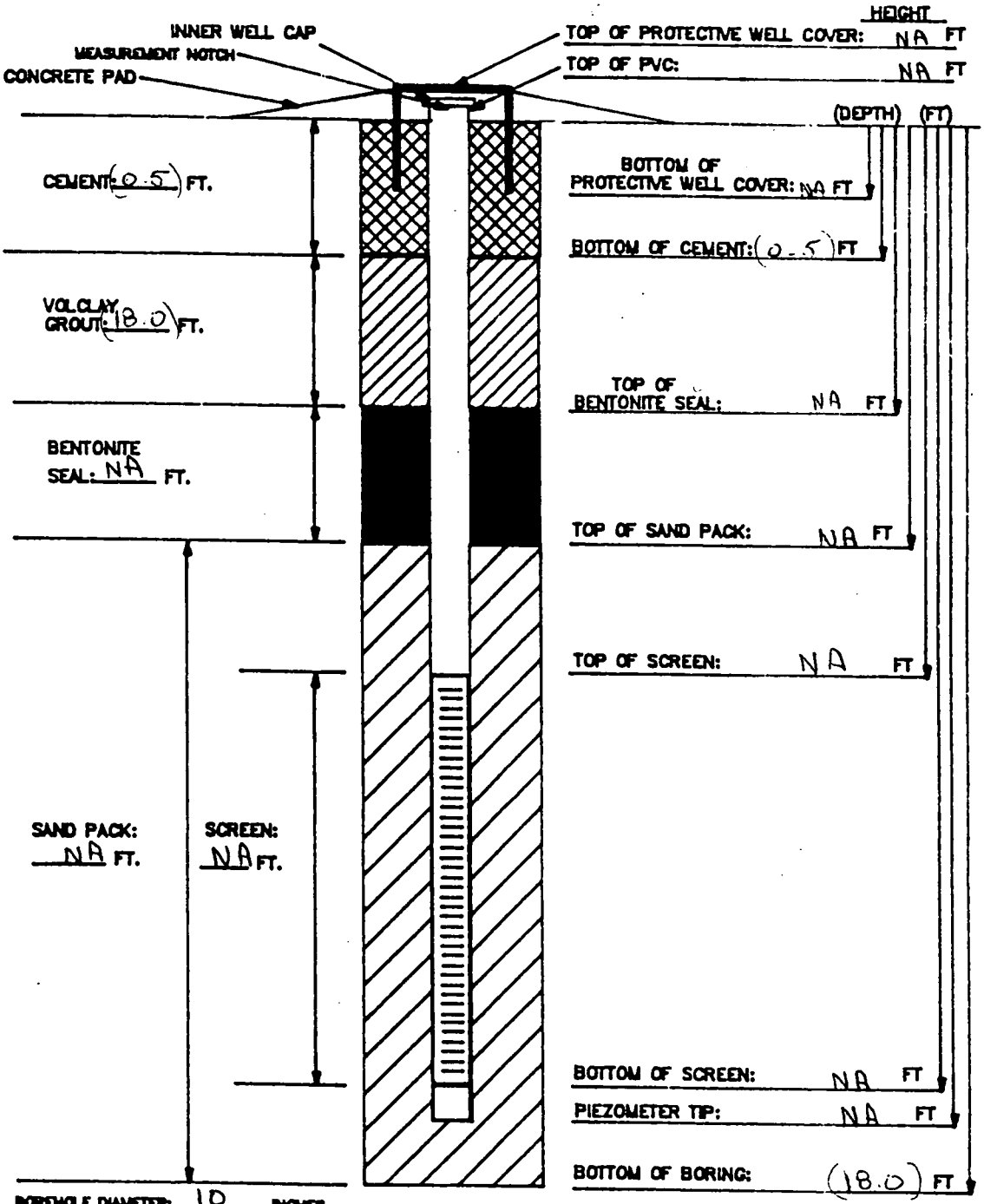
402-11-86

FERNALD RI/FS

INSTALLATION DIAGRAM

~~MONITORING WELL~~ Plugged Coring NO. 1401

INSTALLATION DATE: 12-19-91



MATERIALS USED:

SAND TYPE AND QUANTITY: NA
BENTONITE PELLETS (5-GALLON BUCKETS): NA
BAGS OF VOLCLAY GROUT: 4-80lb bags
AMOUNT OF CEMENT: 1/2 bag
AMOUNT OF WATER USED: 150 gals
OTHER: NA

NOTES: NA

1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS.
2) SCREEN IS 2-INCH I.D. SCHEDULE 40 PVC PIPE WITH 0.020-INCH SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH/DATE:
5) TOP OF PVC IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK.
6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL.

TASK: 602.3.23 GEOLOGIST/ENGINEER: J. Lear

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS		
BORING NUMBER: ~~2401~~ 1401 (J.L 12-19-91)	COORDINATES:		DATE 12-17-91
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 12-17-91
ENGINEER/GEOLOGIST: J. Lear	Depth	Date/Time	DATE COMPLETED: 12-19-91
DRILLING METHODS: Cable tool			PAGE 1 OF 4

DEPTH (Ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1	53654 1330 12-17-91	2 3 5	10	Stiff, dark yellowish brown, (10yr, 4/4) silty clay, trace gravel, Trace coal dust. Low to mid plasticity, moist.	CL	1.25	Hnu - 0 ppm Bg - 100 cpm α - 0 cpm
2	53655 1335 12-17-91	3 5 6	2	S.A.A, no coal dust	CL	1.25	Hnu - 0 ppm Bg - 100 cpm α - 0 cpm
3	53656 1340 12-17-91	4 7 7	5	med dense, dark yellowish brown, (10yr, 4/6) Gravelly clay, Some sand, med Plasticity, moist.	CL	NA	Hnu - 0 Bg - 100 cpm α - 0 cpm
5	53657 1345 12-17-91	40 11 7	1	Stiff, dark yellowish brown, (10yr, 4/4) Clay, Some cement gravel, trace High Bg Organics, med plasticity, moist	CL	1.25	Hnu - 0 ppm Bg - 700 cpm α - 3 cpm
6 7	53658 1350 12-17-91	8 13 16	10	Stiff, brown, (10yr, 5/3) silty clay, Some Cement gravel, trace sand, med Plasticity, moist	CL	1.25	Hnu - 0 ppm Bg - 100 cpm α - 0 cpm
Perched water Zone 8	53659 1355 12-17-91	12 13 13	12	med. dense, Dark yellowish brown (10yr, 4/6) silty clay, Some sand, some gravel, wet (no plast. possible) 8.0 J.L 12-17-91	CL	NA	Hnu - 0 ppm Bg - 100 cpm α - 0 cpm
9				med dense, Dark yellowish brown, 10yr, 4/6) silty (poorly graded) Sand, wet.	SF	NA	
9.75 Clay Zone 10	53660 1515 12-17-91	8 11 17	18	med dense, brown, 10yr, 5/3) clay gravel Sand "soup", wet. 9.75 V. Stiff dark yellowish brown, (10yr, 4/4) silty clay, trace gravel, Low plast. moist	CL	NA	Hnu - 0 ppm Bg - 100 cpm α - 0 cpm
11 12 12.0	53661 1530 12-17-91	7 12 12	7	med dense, dark yellowish brown (10yr, 4/6) Sandy silt, Saturated.	ML	NA	Hnu - 0 ppm Bg - 100 cpm α - 0 cpm
13	53662 1410 12-18-91	24 31 36	8	Hard, gray, (10yr, 5/1) silty clay, trace gravel Low plasticity, Sl. moist.	CL	4.0	Hnu - 0 ppm Bg - 100-120 cpm α - 0 cpm
14 15	53663 1420 12-18-91	15 41 50/1	9	S.A.A. 14.7 Hard, dark yellowish brown, (10yr 4/6) silty clay, trace gravel, slow Plasticity, Sl. moist	CL CL	4.0 >4.0	Hnu - 0 ppm Bg - 100 cpm α - 0 cpm

NOTES

Drilling Contractor - Penn Drilling
Drilling equipment - Cyclone 45
Driller - Craig Coulter
Asst. - Gary Dye

S.A.A. Same As Above

Backgrounds
Hnu - 0 ppm
Bg - 80 - 120 cpm
α - 0 cpm

402-11-8

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 402.3.23	PROJECT NAME: Temp RI/FS	
BORING NUMBER: 1401	COORDINATES:	DATE 12-18-91
ELEVATION:	GWL: Depth NA Date/Time	DATE STARTED: 12-17-91
ENGINEER/GEOLOGIST: J. Lear	Depth NA Date/Time	DATE COMPLETED: 12-19-91
DRILLING METHODS: Cable Tool		PAGE 2 OF 4

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
16	NA NA NA	NA	NA	Inpenetrable struck at 15.0ft Drill through to 16.5ft	NA	NA	NA
17	53664 1445 12-18-91	15 34 25	8	V. Dense, dark yellowish brown 10yr. 4/6 Poorly graded ~~large~~ med sand, trace gravel, Sl. moist. (L 12-18-91)	SP	NA	Hnu - 0 ppm Bd - 100-120 cpm α - 0 cpm
18				Boring Plugged and Abandoned Drilling depth 16.5ft Sampling depth 18.0ft Aqeafer met at 15.0-16.5ft			

NOTES: see page 1

402-11-88

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.1D	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2395	COORDINATES:	DATE 12-11-91
ELEVATION:	GWL: Depth 19.41' Date/Time 12-12-91 0930	DATE STARTED: 12-11-91
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED: 12-12-91
DRILLING METHODS: Cable		PAGE 1 OF 5

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1	~~53613~~ 53613 0945 12-11-91	13 21 12	3	Dense, very dark, (10yr, 4/2) clayey silt trace gravel, trace sand, moist	ML	NA	Hnu - 0 ppm BG - 40 cpm α - 0 cpm
2 3	53614 1050 12-11-91	5 7 15	6	V. stiff, dark brown (10yr, 4/3) silty clay trace sand, med plast. moist.	CL	2.5	Hnu - 0 ppm BG - 40 cpm α - 0 cpm
4	53615 1055 12-11-91	5 3 6	13	loose, dark yellowish brown (10yr, 3/4) clayey sand, (poorly graded), moist.	SP	NA	Hnu - 0 ppm BG - 40 cpm α - 0 cpm
				-3.75 loose, yellowish brown (10yr, 5/6) poorly graded fine sand, moist.	SP	NA	
5	53616 1100 12-11-91	12 13 18	12	4.9' S.A.A.	SP	NA	Hnu - 0 ppm BG 40 cpm α - 0 cpm
				Dense, dark yellowish brown (10yr, 4/4) poorly graded fine sand trace gravel, moist	SP	NA	
6				-5.3' Dense, dark yellowish brown (10yr, 4/6) poorly graded fine sand, trace gravel, moist.	SP	NA	
7 8 9				Aquifer met at 3.0 - 4.5 ft interval. Samples to be taken at 5.0 ft intervals beginning at 10.0 ft.			
10 11	53617 1400 12-11-91	11 16 25	12	Dense, yellowish brown, (10yr 5/4) well graded sand, with laminar shaley limestone, very moist.	SW	NA	Hnu - 0 ppm BG - 40 cpm α - 0 cpm
12 13 14 15							

NOTES:
Drilling Contractor - Penn Drilling
Drilling Equipment - Gylone 45
Driller - Craig Coulter
Asst. - Gary Dye

S.A.A - Same As Above
N.R. - No Recovery

Background
Hnu - 0 ppm
BG - 40 cpm
α - 0 cpm

402-11-66

33579

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 6023.10	PROJECT NAME: FEMP RI/FS		
BORING NUMBER: 2395 J.L. 01-03-92	COORDINATES:		DATE 12-11-91
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 12-11-91
ENGINEER/GEOLOGIST: J. Lear	Depth	Date/Time	DATE COMPLETED: 12-12-91
DRILLING METHODS:			PAGE 2 OF 5

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15							
16	53618 1430 12-11-91	50/4	5	very dense, yellowish brown, (10yr 5/4), Poorly graded, gravel, trace sand, ~~trace~~ ~~gravel~~, wet. fine J.L. 12-11-91	GP	NA	Hw - 0 ppm BZ - 40 cpm α - 0 cpm
17							
18							
19							
20	53619 1500 12-11-91	50/4	3	v. dense, grayish brown, (10yr 5/2) well graded sand, some gravel, wet.	SW	NA	Hw - 0 ppm BZ - 40 cpm α - 0 cpm
21							
22							
23							
24							
25	53620 1545	50/2	2	very dense grayish brown (10yr, 5/2) Poorly graded large sand, trace gravel, wet.	SP	NA	Hw - 0 ppm BZ - 40 cpm α - 0 cpm
26							
27							
28							
29							
30							

J.L. 12-11-91

NOTES See page 1

402-11-85

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 1602.3.10	PROJECT NAME FEMP RI/FS		
BORING NUMBER 2395	COORDINATES:		DATE 12-11-91
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 12-11-91
ENGINEER/GEOLOGIST J. Lear	Depth	Date/Time	DATE COMPLETED: 12-12-91
DRILLING METHODS Cable Tool			PAGE 3 OF 5

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
30							
31	53621 1600 12-11-91	50/4	0	N. R.	NA	NA	Hnu - 0 ppm Bγ - 40 cpm α - 0 cpm
32							
33							
34				Drilling stops at 34.0ft Sampling ceases at 31.5ft			

NOTES See page 1

402-11-2

FERNALD RI/FS

3839 4/5

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FEMP RI/FS FIELD ENG./GEO. J. Lear DATE 12-15-91
PROJECT NO. 602.3.10 CHECKED BY _____ DATE _____
BORING NO. 2395
PIEZOMETER NO. 2395 DATE OF INSTALLATION 12-12-91

BOREHOLE DRILLING

DRILLING METHOD Cable tool
DRILLING FLUID (S) USED:
FLUID H_2O FROM 0 TO 34 ft
FLUID NA FROM ~~_____~~ TO ~~_____~~

TYPE OF BIT Cable Tool
CASING SIZE (S) USED:
SIZE 8 in FROM 0 ft TO 35 ft
SIZE NA FROM _____ TO >

PIEZOMETER DESCRIPTION

TYPE Stainless Steel 4 in ID
DIAMETER OF PERFORATED SECTION 4.0 in
PERFORATION TYPE:
SLOTS ☐ HOLES ☐ Slotted SCREEN ☑
AVERAGE SIZE OF PERFORATIONS .010 in
TOTAL PERFORATED AREA 15 ft

RISER PIPE MATERIAL Stainless Steel 316
RISER PIPE DIAMETERS:
O.D. 4 3/8 I.D. 4.0 in
LENGTH OF PIPE SECTIONS 10 ft 3 ft
JOINING METHOD Threaded Flush Joined

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5.0 ft
PROTECTIVE PIPE O.D. 10.75 in

OTHER PROTECTION Vented Well cap. Locked Hinged Riser

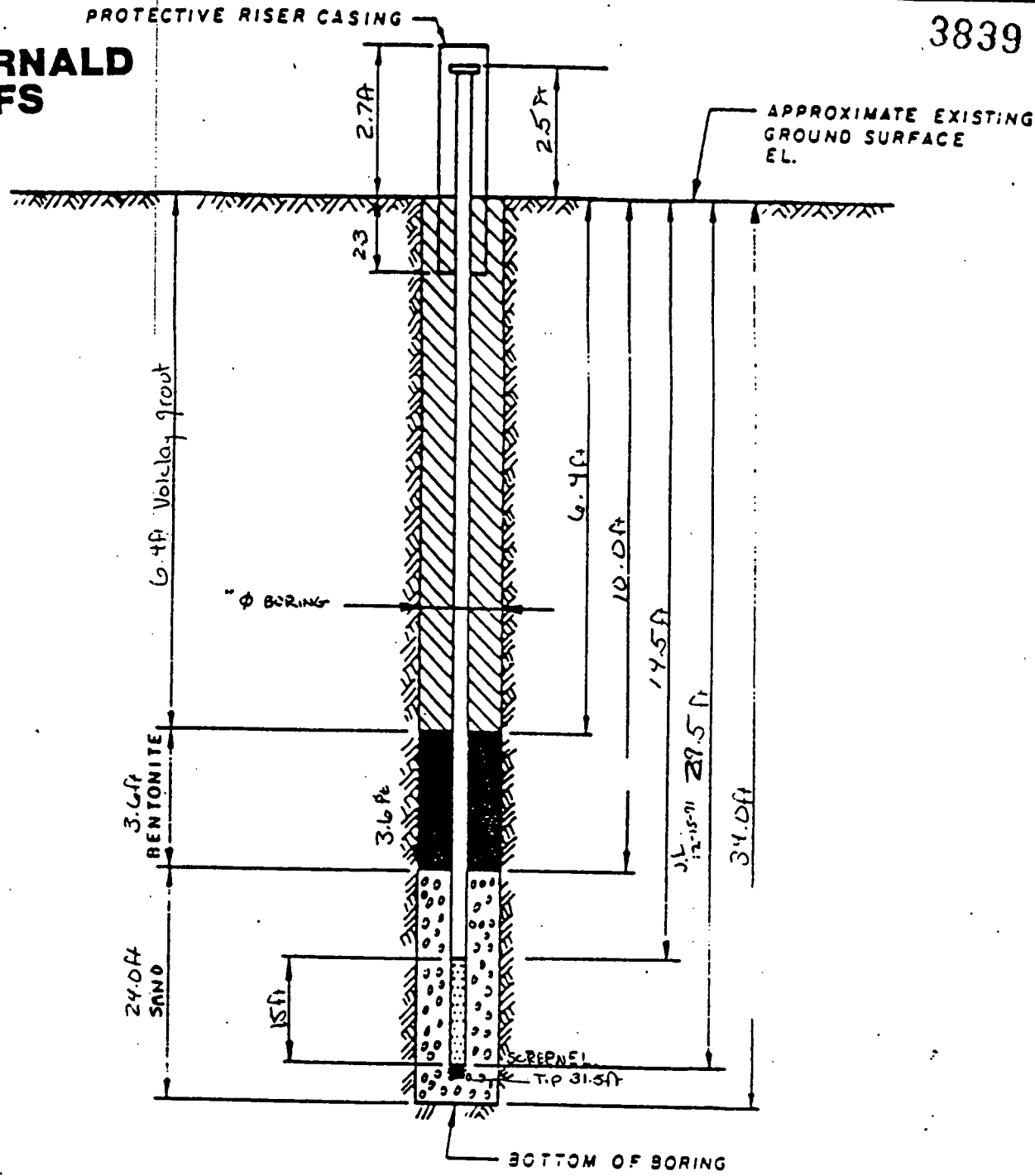
ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION ( )	
TOP OF RISER PIPE	2.8 J.L 12-15-91			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.3			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 0.0	BOTTOM 6.4	TOP	BOTTOM
BENTONITE	TOP 6.4	BOTTOM 10.0	TOP	BOTTOM
SAND J.L 12-15-91 ~~GRAVEL~~	TOP 10.0	BOTTOM 34.0	TOP	BOTTOM
	TOP NA	BOTTOM NA	TOP	BOTTOM
PERFORATED SECTION	TOP J.L 12-15-91 24.5	BOTTOM 29.5	TOP	BOTTOM
PIEZOMETER TIP	31.5			
BOTTOM OF BOREHOLE	34.0			
GWL AFTER INSTALLATION	J.L 12-15-91 29.4			

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES ☐ NO ☑
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES ☐ NO ☑

REMARKS _____

3839

FERNALD RI/FS



DRAWING NUMBER	
CHECKED BY	APPROVED BY
J. Lear 12-15-91	
DRAWN BY	

NOTES:

1. RISER PIPE IS 4.0 IN I.D. ~~SCHEDULE~~ J.L 12-15-91 316 SS. PIPE, THREADED. FLUSH-JOINTED.
2. SCREEN IS 4.0 IN I.D SS. PIPE CONTINUOUS SLOT SCREEN (0.010 IN SLOT SIZE).
3. LOWER END OF SCREEN IS CAPPED.
4. ELEVATION OF WATER LEVEL
5. WATER LEVEL READING ON 21.40 ft, 12-12-91

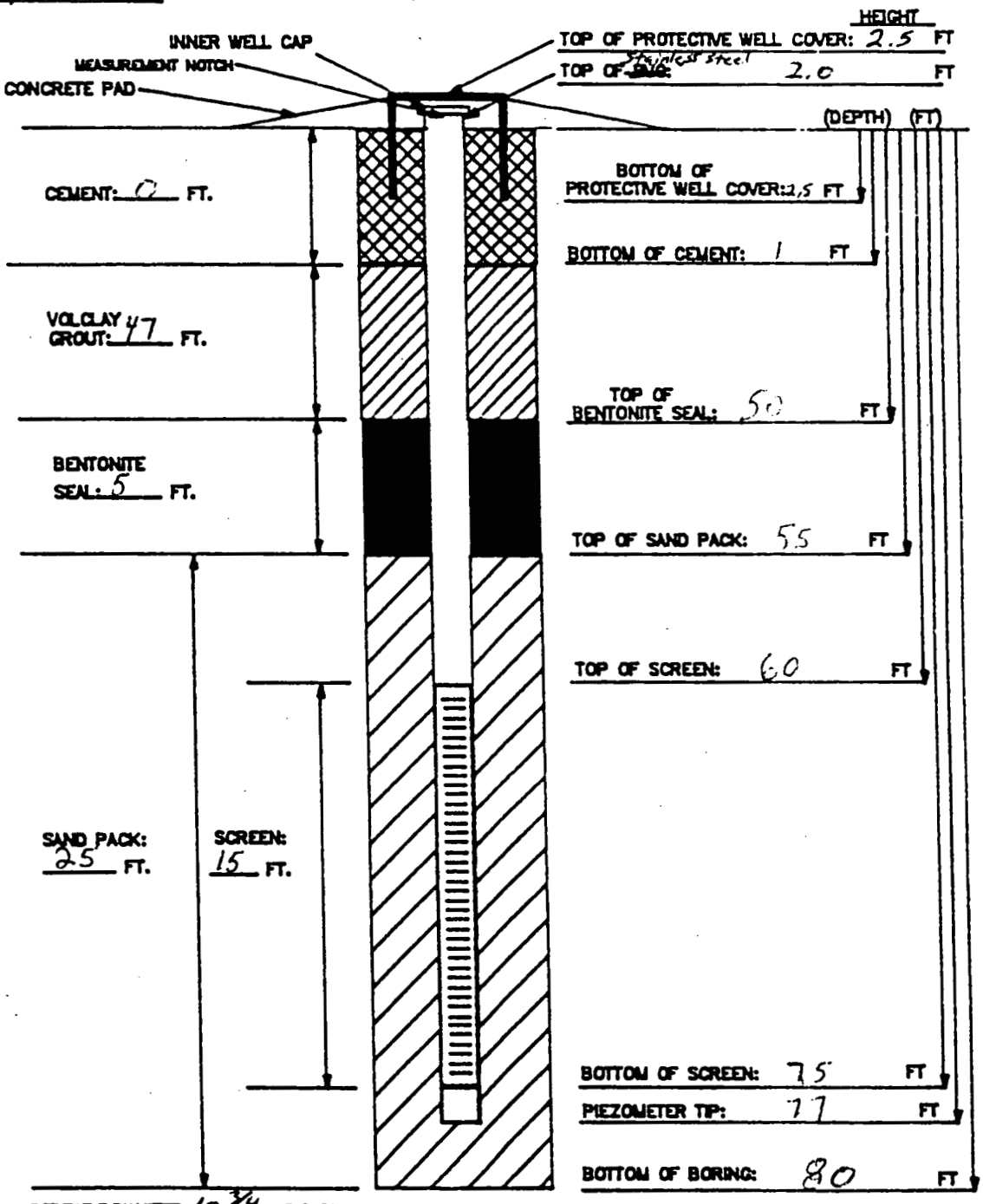
500 gals H_2O used
6 bags 50lb J.L 12-15-91 30x20 sand
2 5gal buckets of bentonite pellets
2 bags 80lb Volclay grout

INSTALLATION DETAILS
MONITORING WELL
2395
PREPARED FOR
Fernald RI/FS

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.
2400

INSTALLATION DATE: 12-20-91



BOREHOLE DIAMETER: 10 3/4 INCHES

MATERIALS USED:
SAND TYPE AND QUANTITY: 430 Sand, 14 bags
BENTONITE PELLETS (5-GALLON BUCKETS): 11
BAGS OF VOLCLAY GROUT: 9
AMOUNT OF CEMENT: 1/2 bag
AMOUNT OF WATER USED: 800 gallons
OTHER:

NOTES:
1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE; FLUSH-THREADED JOINTS.
2) SCREEN IS 2-INCH I.D. SCHEDULE 40 PVC PIPE WITH 0.020-INCH SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH/DATE: 63.4 Ft. / 12-21-91
5) TOP OF PLUG IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK.
6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL.

TASK: 602.3.23 GEOLOGIST/ENGINEER: Ken Marion

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2400	COORDINATES:	DATE 12-12-91
ELEVATION:	GWL: Depth 63.4 Date/Time 12-21-91/1230	DATE STARTED: 12-12-91
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 12-20-91
DRILLING METHODS: Cable Tool 10" drill bit		PAGE 1 OF 8

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0 .9 1.5	12-12-91 1410 53625	3 5 5	11	Stiff yellowish brown (10 YR, 5/4) CLAYEY SILT with organic matter, moist	ML	1.5	Hnu = .2 ppm Br = 60 cpm α = 0 cpm
2.3 3.0	12-12-91 1415 53626	5 13 15	10	Hard yellowish brown (10YR, 5/4) SILTY CLAY with sand and some black weathering, a little organic matter, damp, non plastic	CL	>4.5	Hnu = .2 ppm Br = 60 cpm α = 0 cpm
3.5 4.5	12-12-91 1420 53627	15 16 20	6	Hard light yellowish brown (2.5Y, 6/4) SILTY CLAY with sand and a little fine gravel, dry, non plastic	CL	>4.5	Hnu = .2 ppm Br = 60 cpm α = 0 cpm
5.3 6.0	12-12-91 1430 53628	18 18 18	10	Hard light yellowish brown (2.5Y, 6/4) SILTY CLAY with sand and trace fine gravel, damp, non plastic	CL	4.5	Hnu = .2 ppm Br = 60 cpm α = 0 cpm
6.8 7.5	12-12-91 1435 53629	17 17 16	10	Hard light yellowish brown (2.5Y, 6/4) SILTY CLAY with sand and a little gravel, damp, non plastic	CL	4.5	Hnu = .2 ppm Br = 60 cpm α = 0 cpm

NOTES:
Drilling Company: Pennsylvania Drilling
Driller: Dave Newman
Assistant Driller: Bob Johnson

Samples Collected per ASTM Standard Penetration Test
Colors Identified using Munsell Color Chart

Hnu = A01343	.2 ppm	Background Levels
Br S/N. 73937	60 cpm	
α S/N: 73908	0 cpm	

402-11-88

VISUAL CLASSIFICATION OF SOILS

3839

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2400	COORDINATES:	DATE 12-12-91
ELEVATION:	GWL: Depth 63.4 Date/Time 12-11-91/1230	DATE STARTED: 12-12-91
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 12-20-91
DRILLING METHODS: CABLE Tool 10" drill bit		PAGE 2 OF 8

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
7.5	12-12-91 1440 53630	13 12 21	0	No Recovery	N/A	N/A	Hnu = Br = c = N/A
9.0 9.5	12-12-91 1450 53631	13 21 30	6	Stiff light yellowish brown (2.5Y, 6/4) CLAY with some sand and fine gravel, moist, medium plasticity	CL	1.5	Hnu = .2 ppm Br = 60 cpm c = 0 cpm
10.5 11	12-16-91 1314 53632	8 12 18	6	Stiff light yellowish brown (2.5Y, 6/4) SANDY CLAY with gravel, moist medium plasticity	CL	1.5	Hnu = .2 ppm Br = 40 cpm c = 0 cpm
12	12-16-91 1325 53633	12 28 31	18	Very stiff gray (2.5Y, 5/0) SANDY CLAY with gravel, damp, low plasticity	CL	3.0	Hnu = .2 ppm Br = 40 cpm c = 0 cpm
13.5 13.75 15	12-16-91 1345 53634	7 9 12	3	Same as above	CL	3.0	Hnu = .2 ppm Br = 40 cpm c = 0 cpm

NOTES:

On 12-16-91 Gary Dye was the Assistant Driller

12-16-91

Hnu S/N: A01343	.2 ppm	Background Levels
Br S/N: 73937	40 cpm	
c S/N: 73908	0 cpm	

402-11-86

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2400	COORDINATES:	DATE 12-16-91
ELEVATION:	GWL: Depth 63.4 Date/Time 12-21-91/1230	DATE STARTED: 12-12-91
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 12-20-91
DRILLING METHODS: CABLE Tool 10" Drill Bit		PAGE 3 OF 8

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15	12-16-91 1400 53635	3 5 8	12	Very stiff gray (5Y, 5/1) SANDY CLAY with gravel, damp, low plasticity	CL	3.0	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
16.5	12-16-91 1410 53636	3 4 8	6	Same as above	CL	3.0	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
18	12-16-91 1430 53637	3 8 10	12	Very stiff gray (5Y, 5/1) SANDY CLAY with gravel, damp, medium plasticity	CL	2.0	Hnu = .2 Bγ = 40 α = 0
19.5	12-16-91 1540 53638	3 6 9	0	No Recovery	N/A	N/A	N/A
21	12-16-91 1645 53639	5 9 9	12	Very stiff gray (5Y, 5/1) SANDY CLAY with gravel, damp, medium plasticity	CL	2.5	Hnu = .2 Bγ = 40 α = 0
22.5							

NOTES

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2400	COORDINATES:	DATE 12-16-91
ELEVATION:	GWL: Depth 63.4 Date/Time 12-21-91 1230	DATE STARTED: 12-12-91
ENGINEER/GEOLOGIST: Ken Marien	Depth Date/Time	DATE COMPLETED: 12-20-91
DRILLING METHODS: Cable Tool 10" drill bit		PAGE 4 OF 8

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
22.5	12-16-91 1655 53640	2 4 5	14	Loose olive brown (2.5Y, 4/3) medium SAND with trace gravel, dry	SP	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
23.7							
24	12-18-91 0900 53641	4 6 12	12	Medium dense grayish brown (2.5Y, 5/2) medium SAND with trace gravel, dry	SP	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
25							
25.5				Samples will be taken at 5 ft. intervals			
30							

NOTES:

12-17-91

Hnu S/N: [illegible]	.2 ppm	Background Levels
Bγ S/N: 7 [illegible]	40 cpm	
α S/N: 7 [illegible]	0 cpm	

402-11-86

RI/FS

VISUAL CLASSIFICATION OF SOILS

3839

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2400	COORDINATES:	DATE 12-17-91
ELEVATION:	GWL: Depth 63.4 Date/Time 12-21-91/1230	DATE STARTED: 12-12-91
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 12-20-91
DRILLING METHODS: Cable Tool 10" drill bit		PAGE 5 OF 8

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
30	12-17-91 0945 53642	39 45 49	14	Very dense light yellowish brown (2.5Y, 6/3) gravelly SAND, dry	SW	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
31.5							
35	12-17-91 1015 53643	19 18 23	18	Same as above but dense	SW	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
36.5							
40	12-17-91 1120 53644	10 17 20	15	Same as above	SW	N/A	Hnu = .2 ppm Bγ = 40 cpm α = 0 cpm
41.5							
45							

NOTES:

402-11-86

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 602.3.23	PROJECT NAME FEMP RI/FS	
BORING NUMBER: 2400	COORDINATES:	DATE 12-17-91
ELEVATION:	GWL: Depth 63.4 Date/Time 12-21-91/1230	DATE STARTED: 12-12-91
ENGINEER/GEOLOGIST Ken Marion	Depth Date/Time	DATE COMPLETED: 12-20-91
DRILLING METHODS: Cable Tool 10" drill bit		PAGE 6 OF 8

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
45	12-17-91 1430 53645	17 49 50	18	Same as above but very dense	SW	N/A	Hum: .2 ppm Bg 40 cpm α = 0 cpm
46.5							
50	12-17-91 1520 53646	6 15 27	14	Same as above but dense	SW	N/A	Hum = .2 ppm Bg = 40 cpm α = 0 cpm
51.2 51.5							
55	12-17-91 1600 53647	39 50	12	Very dense light yellowish brown (2.5Y, 6/3) Sandy Gravel dry	GW	N/A	Hum = .2 ppm Bg = 40 cpm α = 0 cpm
56 56.5							
60							

NOTES

402-11-88

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

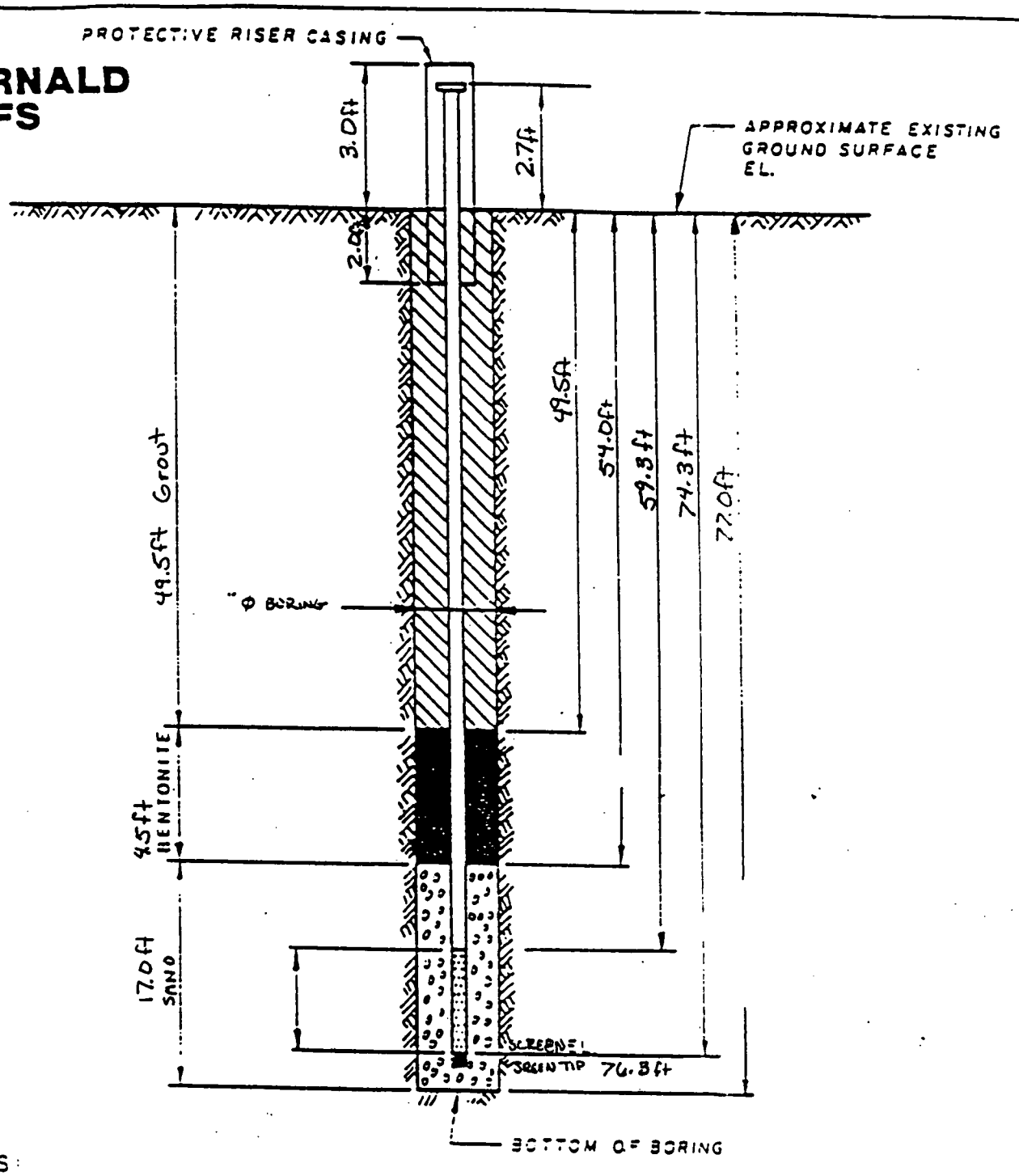
PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2400	COORDINATES:	DATE: 12-18-91
ELEVATION:	GWL: Depth 63.4 Date/Time 12-21-91 1230	DATE STARTED: 12-12-91
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 12-20-91
DRILLING METHODS: Cable Tool 10" drill bit		PAGE 8 OF 8

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
75	12-18-91 1500 53651	3 6 9	14	Medium dense grayish brown (2.5Y, 5/2) SAND with fine gravel, wet	SW	N/A	H.. = .2 ppm BT = 40 cpm α = 0 cpm
76.5							
80							
80.4	12-18-91 1549 53652	5 7 6	5	Same as above	SW	N/A	H.. .2 ppm B.. 40 cpm α 0 cpm
81.5				Bottom of Bore Hole			

NOTES:

402-11-86

FERNALD RI/FS



DRAWING NUMBER	
CHECKED BY	
APPROVED BY	
J. Lear	12-10-91
DRAWN BY	

NOTES:

1. RISER PIPE IS 4.0 IN ID SCHEDULE 40 PIPE, THREADED, FLUSH-JOINTED.
2. SCREEN IS 4.0 IN I.D SS PIPE CONTINUOUS SLOT SCREEN (0.010 IN SLOT SIZE).
3. LOWER END OF SCREEN IS CAPPED.
4. ELEVATION OF WATER LEVEL 63.12 Ft.
5. WATER LEVEL READING ON 12-9-91

500 gals H_2O used
11 80 lb bags of 10x20 sand used
17 bags (50 lb) volclay grout used
4 5 gal buckets of bentonite used

INSTALLATION DETAILS
MONITORING WELL
2399
PREPARED FOR
Fernald RI/FS

FERNALD
RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2399	COORDINATES:	DATE 11-19-91
ELEVATION:	GWL: Depth 64.04 Date/Time 11-22-91	DATE STARTED: 11-19-91
ENGINEER/GEOLOGIST: J. Lear	Depth 63.12 Date/Time 12-9-91	DATE COMPLETED:
DRILLING METHODS: Cable Tool		PAGE 1 OF 8

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 (in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1	33581 0950 11-19-91	4 7 9	8	mcs dense, Pale brown (10yr, 6/3) Silt, Some organics, dry	ML	N/A	Hnu - 0 ppm Bq - 40 cpm α - 0 cpm
2 3	33582 0955 11-19-91	6 9 12	2	Hard, yellowish brown (10yr, 5/8) silty clay, Low plasticity, Sl. moist.	CL	>4.0	Hnu - 0 ppm Bq - 40 cpm α - 0 cpm
4	33583 1000 11-19-91	7 13 16	10	Hard, yellowish brown, (10yr, 5/4) silty clay, some gravel, Low plasticity, Sl. moist.	CL	>4.0	Hnu - 0 ppm Bq - 40 cpm α - 0 cpm
5 6	33584 1005 11-19-91	25 28 30	13	S.A.A. add 10yr, 5/8	CL	>1.0	Hnu - 0 ppm Bq - 40 cpm α - 0 ppm
7	33585 1010 11-19-91	4 11 36	12	Hard, Pale Brown to yellowish brown (10yr, 6/3) silty clay, trace gravel, laminar sand, (10yr, 5/4) dry to sl. moist.	CL	>4.0	Hnu - 0 ppm Bq - 40 cpm α - 0 cpm
8 9	33586 1015 11-19-91	50/4	4	Hard, Pale brown to brown, (10yr, 6/3 to 10yr 5/3) silty clay, trace gravel, low plast. dry to sl. moist.	CL	>4.0	Hnu - 0 ppm Bq - 40 cpm α - 0 cpm
10	33587 1025 11-19-91	11 11 26	6	V. stiff, yellowish brown, (10yr, 5/4) silty clay. Trace gravel, Low to mod plasticity, moist.	CL	2.5	Hnu - 0 ppm Bq - 40 cpm α - 0 cpm
11 12	33588 1040 11-19-91	9 14 18	9	Hard, gray to yellowish brown, (10yr, 5/1 to 10yr 5/4) silty clay, Trace sand, Trace gravel, ~~med~~ Low plasticity, sl moist.	CL	>4.0	Hnu - 0 ppm Bq - 40 cpm α - 0 cpm
13	33589 1335 11-19-91	10 30 29	10	V. stiff, gray (10yr, 5/1) silty clay, some gravel, trace sand, Low plasticity, Sl. moist	CL	3.5	Hnu - 0 ppm Bq - 40 cpm α - 0 cpm
14	33590 1340 11-19-91	10 10 26	12	J.L 11-19-91 ~~Hard~~, S.A.A	CL	.5	Hnu - 0 ppm Bq - 50 cpm α - 0 cpm
15				Hard, yellowish brown, (10yr, 5/4) silty clay, Some sand, laminar gravel, moist. Low plast.	CL	1.5	

NOTES:
Drilling Contractor - Penn Drilling
Drilling Equipment - Cyclone 45
Driller - Craig Coulter
Asst - Gary Dye

S.A.A. Same as Above
N.R. No Recovery

Background
Hnu - 0 ppm
Bq - 40 cpm
α - 0 cpm

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2399	COORDINATES:	DATE 11-19-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 11-19-91
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED:
DRILLING METHODS: Cable Tool		PAGE 2 OF 8

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 6in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
16	33592 1345 11-19-91	14 16 20	7	v. stiff, gray (10yr, 5/1) silty clay, trace gravel, low plasticity, sl. moist.	CL	3.25	Hnu - 0 ppm Bd - 40 cpm α - 0 cpm
17	33592 1400 11-19-91	3 6 13	10	v stiff, gray, (10yr, 5/1) silty clay, some gravel, laminar sand, low plast. sl. moist.	CL	3.5	Hnu - 0 ppm Bd - 40 cpm α - 0 cpm
18 19	33593 1415 11-19-91	10 16 25	6	S.A.A. no sand.	CL	3.5	Hnu - 0 ppm Bd - 40 cpm α - 0 cpm
20 21	33594 1420 11-19-91	4 6 9	11	stiff, gray, (10yr, 5/1) silty clay, trace gravel med. plasticity, moist.	CL	1.75	Hnu - 0 ppm Bd - 40 cpm α - 0 cpm
22	33595 1425 11-19-91	6 9 13	15	S.A.A. -21.75 med. dense, gray (10yr, 6/1) clayey silt, trace sand, moist.	CL ML	1.75 NA	Hnu - 0 ppm Bd - 40 cpm α - 0 ppm
23 24	33596 1435 11-19-91	7 8 15	0	N.R	NA	NA	NA
25	33597 0920 11-21-91	9 15 22	8	very stiff, gray, (10yr, 5/1) silty clay, trace gravel, med plasticity, moist.	CL	3.75	Hnu - 0 ppm Bd - 50 cpm α - 0 cpm
26 27	33598 0930 11-21-91	4 6 9	J.L. 11-21-91 8 12	med dense, gray, (10yr 5/1) silt, very moist -26.0' very stiff, gray (10yr, 5/1) silt clay, trace gravel, low to med plasticity, moist.	ML CL	NA 2.75	Hnu - 0 ppm Bd - 50 cpm α - 0 cpm
28	~~33600~~ 33599 0940 11-21-91	50/4 J.L. 11-21-91	4	V. dense, yellowish brown, (10yr, 5/6) well sorted med sand, trace gravel, moist.	SP	NA	Hnu - 0 ppm Bd - 50 cpm α - 0 cpm
29 30				Sand and gravel Aquifer met at 27.0 ft. Samples will be taken at 5.0 ft intervals starting at 30.0 ft			

NOTES see pg 1

402-11-88

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS		
BORING NUMBER: 2399	COORDINATES:		DATE 11-21-91
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 11-19-91
ENGINEER/GEOLOGIST: J. Lear	Depth	Date/Time	DATE COMPLETED:
DRILLING METHODS: cable tool			PAGE 3 OF 8

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
30							
31	33600 0955 11-21-91	21 35 31	15	V. dense, gray (10yr, 6/1) gravel clay sand mixture, V. moist. -30.7 ft V. dense, yellowish brown (10yr, 5/6) wellsorted med sand some gravel, moist.	GC SP	NA NA	Hnu - 0 ppm Bg - 50 cpm α - 0 cpm
32							
33							
34							
35	33602 1600 11-21-91	50/5	3	S.A.A	SP	NA	Hnu - 0 ppm Bg - 50 cpm α - 0 cpm
36							
37							
38							
39							
40	33603 1630 11-21-91	50/5	5	S.A.A.	SP	NA	Hnu - 0 ppm Bg - 50 cpm α - 0 cpm
41							
42							
43							
45							
45							

NOTES: see page 1

402-11-8

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS		
BORING NUMBER: 2399	COORDINATES:		DATE 11-21-91
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 11-19-91
ENGINEER/GEOLOGIST: J. Lear	Depth	Date/Time	DATE COMPLETED:
DRILLING METHODS: Cable Tool			PAGE 4 OF 8

DEPTH (Ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
45							
46	33603 1715 11-21-91	11 50/4	8	v. dense, yellowish brown (10yr, 5/4) well sorted, fine sand, trace gravel, moist	SP	NA	Hnu - 0 ppm BD - 50 cpm α - 0 cpm
47							
48							
49							
50							
51	33604 1730 11-21-91	13 50/5	10	S.A.A	SP	NA	Hnu - 0 ppm BD - 50 cpm α - 0 cpm
52							
53							
54							
55							
56	33605 0855 11-22-91	25 50/3	4	S.A.A	SP	NA	Hnu - 0 ppm BD - 50 cpm α - 0 cpm
57							
58							
59							
60							

NOTES see pg 1

402-11-8

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS		
BORING NUMBER: 2399	COORDINATES:		DATE 11-22-91
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 11-19-91
ENGINEER/GEOLOGIST: J. Lear	Depth	Date/Time	DATE COMPLETED:
DRILLING METHODS:			PAGE 5 OF 8

DEPTH (Ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
60							
61	33608 0925 11-22-91	20 50/5	7	V. dense, dark yellowish brown (10yr 4/4) well sorted sand, some gravel, some silt, moist.	SP	NA	Hnu - 0 ppm BD - 50 cpm α - 0 cpm
62							
63							
64							
65							
water bearing zone ↓ 66	33608 1005 11-22-91	22 31 37	6	V. dense, grayish brown, (10yr. 5/2) poorly sorted gravelly sand, trace silt, wet.	SW	NA	Hnu - 0 ppm BD - 50 cpm α - 0 cpm
67							
68							
69							
70							
71	33608 1045 11-22-91	28 50/5	7	S.A.A	SW	NA	Hnu - 0 ppm BD - 50 cpm α - 0 cpm
72							
73							
74							
75							

NOTES: See page 1

402-11

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

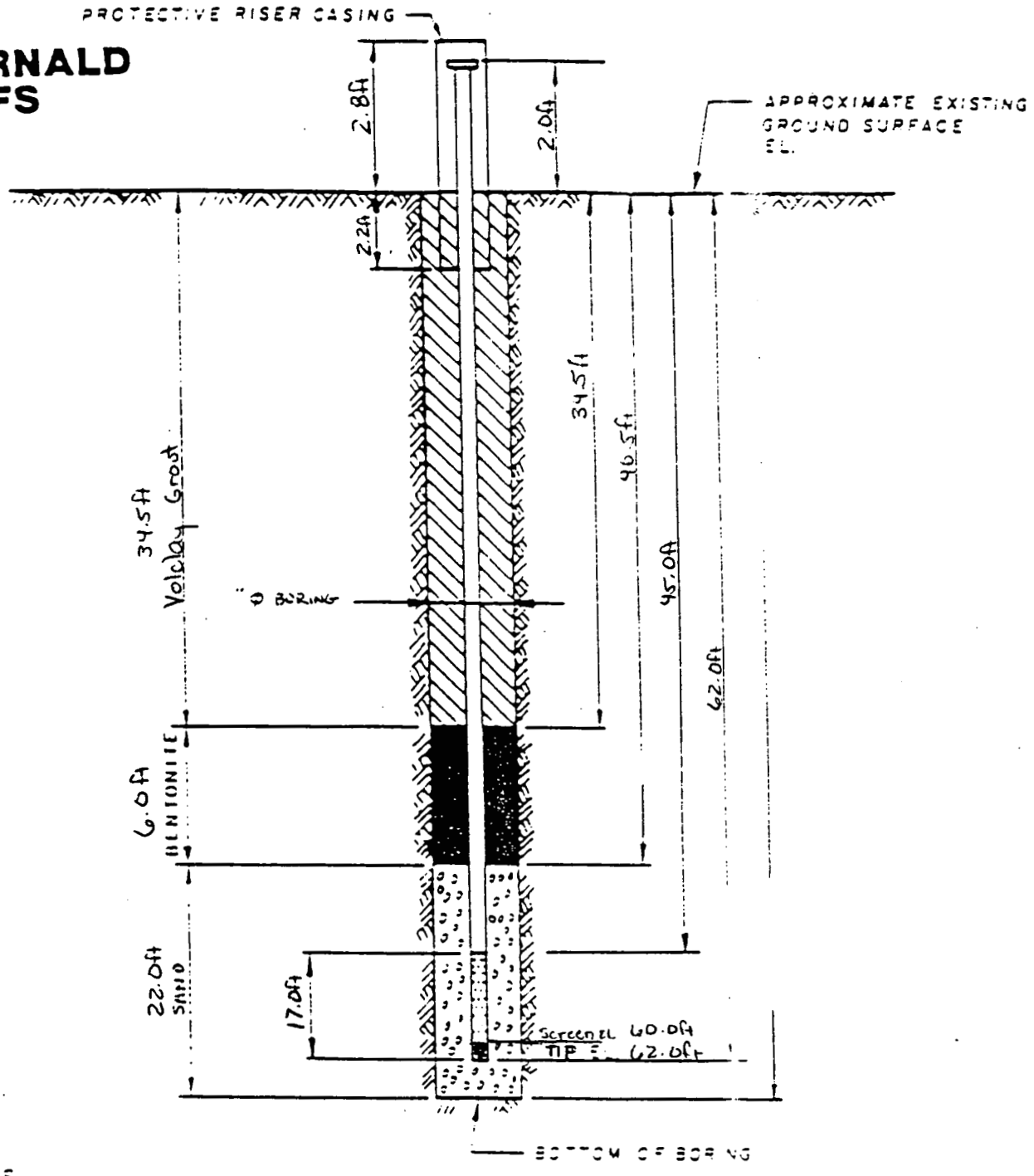
PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2399	COORDINATES:	DATE 11-22-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 11-19-91
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED:
DRILLING METHODS: cable tool		PAGE 6 OF 8

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
75	33609	6					
76	1120	10	13	med dense, dark grayish brown, (10yr. 4/2) sandy gravel, trace silt, wet.	GW	NA	Hnu - 0 ppm Bb - 50 cpm α - 0 cpm
	11-22-91	10					
77				Drilling ends at 78.0 ft Sampling ends at 76.5 ft			

NOTES: See page 1

402-11-86

FERNALD RI/FS



NOTES

1. RISER PIPE 1 54.0 IN I.D ~~SCHEDULE~~ 316 Stainless Steel PIPE. THREADED. FLUSH JOINTED. J.L. 12-22-91
2. SCREEN 1 54.0 IN I.D SS PIPE CONTINUOUS SLOT SCREEN (0.010 IN SLOT SIZE)
3. LOWER END OF SCREEN IS CAPPED.
4. ELEVATION OF WATER LEVEL 46.85ft
5. WATER LEVEL READING ON 12-21, 1315

300 gals H_2O used
5 5 gal buckets of bentonite used; 1 bucket used on ground surface
8 bags 10x20 sand used
5 bags volclay grout used

INSTALLATION DETAILS
MONITORING WELL
2402

PREPARED FOR
Fernald RI/FS

DRAWING NUMBER

CHECKED BY / APPROVED BY

DRAWN BY J. Lear 12-22-91

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2402	COORDINATES:	DATE 12-20-91
ELEVATION:	GWL: Depth 46.85 Date/Time 12-21, 1315	DATE STARTED: 12-20-91
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED: 12-22-91
DRILLING METHODS: Cable Tool		PAGE 1 OF 7

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1	53666 1015 12-20-91	3 3 8	8	med dense, dark yellowish brown to yellowish brown (10yr, 4/4 to 10yr 5/4) clayey silt, some organics, moist.	ML	NA	Hnu - 0 ppm BD - 40 α - 0
2 3	53667 1020 12-20-91	7 10 15	12	V. dense, yellowish brown to brown, (10yr 4/6 to 10yr, 5/3) silty clay, trace sand, low plast. sl. moist.	CL	3.5	Hnu - 0 ppm BD - 40 cpm α - 0 cpm
4	53665 1025 12-20-91	25 31 35	14	Hard, yellowish brown to light gray (10yr, 4/6 to 10yr, 7/1) silty clay, trace sand, sl. moist. low plasticity.	CL	> 0	Hnu - 0 ppm BD - 60 cpm α - 0 cpm
5 6	53669 1030 12-20-91	50/4	3	S.A.A. with trace gravel	CL	> 0	Hnu - 0 ppm BD - 60 cpm α - 0 cpm
7	53670 1035 12-20-91	10 50/5	J.L 12-20-91 12	Hard, yellowish brown to brown, (10yr, 5/6 to 10yr 5/3) silty clay, trace sand, low plast. sl. moist.	CL	> 0	Hnu - 0 ppm BD - 50 cpm α - 0 cpm
8 9	53671 1100 12-20-91	14 13 14	18	Hard, PALE brown to light gray to yellowish brown silty clay (10yr, 6/3 to 10yr, 5/6 to 10yr, 7/1) some sand, low plast., sl. moist. -13.25 med dense, brown to PALE brown (10yr, 5/3 to 10yr 6/3 sandy silt grading to silty sand, sl. moist.	CL ML-SP	> 0 NA	Hnu - 0 ppm BD - 60 cpm α - 0 cpm
10	53672 1110 12-20-91	3 5 6	18	med dense, yellowish brown (10yr, 4/4) to (10yr 4/6) silty sand grading to sand, some clay, (poorly graded) moist to dry	SP	NA	Hnu - 0 ppm BD - 60 cpm α - 0 cpm
11 12	53673 1430 12-20-91	8 15 19	0	N.R.	NA	NA	NA
13	53674 1435 12-20-91	15 21 23	3	V. stiff, yellowish brown, (10yr, 5/4) silty clay, trace gravel, low plasticity, moist.	CL	[illegible]	Hnu - 0 ppm BD - 50 cpm α - 0 cpm
14 15	53675 1440 12-20-91	12 20 20	5	S.A.A.	CL	[illegible]	Hnu - 0 ppm BD - 50 cpm α - 0 cpm

NOTES:
Drilling Contractor - Penn Drilling
Drilling Equipment - Cyclone 45
Driller - Craig Coulter
Asst. - Gary Dye

S.A.A. - Same As Above
N.R. - No Recovery

Background
Hnu - 0 ppm
BD - 50 cpm
α - 0 cpm

402-11-88

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: FEMP RI/FS	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2402	COORDINATES:	DATE 12-20-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 12-20-91
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED: 12-22-91
DRILLING METHODS: Cable Tool		PAGE 2 OF 7

DEPTH (Ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15							
16	53676 1445 12-20-91	10 25 30	12	V. St.ff, gray, (10yr, 5/1) silty clay, some sand, some gravel, low plastic., sl moist.	CL	3.	Hnu - 0 ppm BD - 60 CPM α - 0 CPM
17	53677 1450 12-20-91	50/1 50/4	10	S.A.A 17.0 V stiff, yellowish brown (10yr, 5/4) silt, clay, some sand some gravel, sl. moist	CL	3	Hnu - 0 ppm BD - 50 CPM α - 0 CPM
18	53678 1500 12-20-91	11 24 36	16	Dense, yellowish brown, (10yr, 5/6) well graded gravelly sand, sl. moist.	SW	N	Hnu - 0 ppm
19				Dense, (10yr, 5/6) yellowish brown Poorly graded med sand, trace gravel sl. moist.	SP	N	BD - 50 CPM α - 0 CPM
20	53679 1510 12-20-91	14 16 22	15	Dense, yellowish brown, (10yr, 5/6) Poorly graded med sand, trace gravel, dry	SP	N	Hnu - 0 ppm BD - 50 CPM α - 0 CPM
21							
22				Aquifer met at 18.0ft - 19.5ft interval sampling will resume at 5.0ft intervals			
23							
24							
25	53680 1630 12-20-91	10 5/15	8	V. Dense, yellowish brown to dark yellowish brown (10yr, 5/6 to 10yr 4/6) ~~poor~~ well graded sand, sl moist.			Hnu - 0 ppm BD - 50 CPM α - 0 CPM
26							
27							
28							
29							
30							

NOTES:
See page 1

402-11-88

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2402	COORDINATES:	DATE 12-20-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 12-20-91
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED: 12-22-91
DRILLING METHODS: Cable Tool		PAGE 3 OF 7

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (USCS)	REMARKS
30							
31	53681 1650 12-20-91	24 32 50/3	10	V. Dense, (10yr, 4/6) dark yellowish brown well graded, sand, some gravel, v. moist.	SW	N/	HNU - 0 ppm BZ - 50 cpm Z - 0 cpm
32	JC 12-22-91						
33							
34							
35	53682 1730 12-20-91	6 11 24	8	Dense, pale brown, (10yr, 6/3) poorly graded, sand, trace gravel, dry.	SP	N	HNU - 0 ppm BZ - 40 cpm Z - 0 cpm
36							
37							
38							
39							
40	53683 0830 12-20-91	7 12 14	10	med dense, brown, (10yr, 6/3) poorly graded fine to med sand, moist.	SP	N	HNU - 0 ppm BZ - 30 cpm Z - 0 cpm
41							
42							
43							
44							
45							

NOTES:
see page 1

402-11-86

FERNALD RI/FS

3839

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2402	COORDINATES:	DATE 12-20-
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 12-20-91
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED: 12-22-91
DRILLING METHODS: Cable tool		PAGE 4 OF 7

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6"	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED (TSF)	REMARKS
45	5368-1 0910 12-20-91	50/4	6	Dense, yellowish brown (10yr, 5/4) poorly graded med gravel grading to large sand, v moist. (trace clay)	GP,SP	N	Hnu - 0 ppm BD - 50 cpm α - 0 cpm
46							
47							
48							
49							
50	5368-2 0930 12-20-91	2 2 3	14	loose, yellowish brown, (10yr, 5/4) well graded sand, trace gravel, wet. (trace clay)	SW	N	Hnu - 0 ppm BD - 50 cpm α - 0 cpm
51							
52							
53							
54							
55	5368-3 1005 12-20-91	23 28 31	12	V. dense, yellowish brown, (10yr, 4/4) well graded sand, trace gravel, trace clay, wet	SW	N A	Hnu - 0 ppm BD - 50 cpm α - 0 cpm
56							
57							
58							
59							
60							

NOTES:
See page 1

402-11-88

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2402	COORDINATES:	DATE 12-21-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 1-20-91
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED: 12-22-91
DRILLING METHODS: Cable Tool		PAGE 5 OF 7

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED (TSF)	REMARKS
60	5 3 C 8 7	3		S.A.A	SW		Ha 0 PF
61	1025	5	18	61.0			B1 50 CP
	2-28-91	7		S.A.A with some clay	SW		0 CP
62				Drilling stops at 62.0 ft Sampling stops at 61.5 ft			

NOTES:
See page 1

402-11-88

FERNALD

FAX

DATE: 1-22-92

TO: Graham Mitchell/Tom Schneider

FAX #: 513-285-6249 VERIFICATION #: 513-285-6357

FROM: Jack Craig

PAGES: 2 (EXCLUDING COVER SHEET)

MESSAGE: CA FFCA & RI/FS Update Consolidated Report for January 1992

FACSIMILE	VERIFICATION
FTS 774-6650	FTS 774-6153
513 738-6650	513 738-6153

SENT BY: _____

FERNALD'S MAIN PRIORITY IS CLEANUP

< CONFIRMATION REPORT >

01-22-1992(WED) 10:49

[TRANSMIT]

NO.	DATE	TIME	DESTINATION	PG.	DURATION	MODE	RESULT
1721	1-22	10:48	5 1 3 4 4 9 6 2 4 9	3	0°01'54"	NORM.E	OK
				3	0°01'54"		

FERNALD FAX

DATE: ~~[illegible]~~ 1-21-92

TO: Jim A. Saric

FAX #: FTS 353-6775 VERIFICATION #: FTS 886-4436

FROM: Jack Craig

PAGES: 2 (EXCLUDING COVER SHEET)

MESSAGE: CA FFCA RI/FS Update Consolidated Report for January 1992

FACSIMILE	VERIFICATION
FTS 774-6650	FTS 774-6153
513 738-6650	513 738-6153

SENT BY:

FERNALD'S MAIN PRIORITY IS CLEANUP