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

11/20/91

**DOE-FN/EPA
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REPORT**

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending October 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 October 1 through October 31, 1991 and planned actions for the period November 1 through November 30, 1991.

Highlights of work completed in October by the DOE includes the following:

- The Operable Unit 4 revised draft Treatability Study Work Plan was submitted to the U.S. EPA and Ohio EPA for approval on October 4, 1991.
- The Operable Unit 1 revised Treatability Study Work Plan was submitted to the U.S. EPA and Ohio EPA on October 8, 1991.
- Removal Action No. 4, Silos 1 and 2, baseline residue mapping was completed on October 11, 1991.
- The Work Plan for RA No. 11, Pit 5 Experimental Treatment Facility, was submitted to the U.S. EPA on October 11, 1991 ahead of the Consent Agreement As Amended milestone of October 30, 1991.
- The Operable Unit 1 draft Radon Sampling Work Plan was submitted to the U.S. EPA and the Ohio EPA for review and approval on October 18, 1991.
- Phase II of the process knowledge interviews for Operable Unit 3 was completed on October 21, 1991.
- The Operable Unit 2 revised draft Treatability Study Work Plan was submitted to the U.S. EPA and the Ohio EPA on October 22, 1991.
- The Revised Work Plan for RA No. 8, Inactive Fly Ash Pile Control, was submitted to the U.S. EPA and the Ohio EPA on October 22, 1991 ahead of the October 23, 1991 due date.
- The RI/FS Work Plan Addendum, Operable Unit 5, for Additional Monitoring Wells, was submitted to the U.S. EPA and the Ohio EPA on October 23, 1991.

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CA Section IX. Removal Actions (cont'd.)

Phase I Removal Actions (cont'd.)

- o RA No. 3, South Groundwater Contamination Plume.
- o RA No. 4, Silos 1 and 2.
- o RA No. 5, K-65 Decant Sump Tank.
- o RA No. 6, Waste Pit 6 Residues.
- o RA No. 7, Plant 1 Pad Continuing Release.

Phase II Removal Actions

- o RA No. 8, Inactive Fly Ash Pile Control.
- o RA No. 9, Removal of Waste Inventories.
- o RA No. 10, Active Fly Ash Pile Controls.
- o RA No. 11, Pit 5 Experimental Treatment Facility.
- o RA No. 12, Safe Shutdown.
- o RA No. 13, Plant 1 Ore Silos.
- o RA No. 14, Contaminated Soils Adjacent to Sewage Treatment Plant Incinerators.
- o RA No. 15, Scrap Metal Piles.
- o RA No. 16, Collect Uncontrolled Production Area Runoff--Northeast.
- o RA No. 17, Improved Storage of Soil and Debris.
- o RA No. 18, Control Exposed Material in Pit 5.

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RA No. 2, Waste Pit Area Runoff Control (cont'd.)

Field studies showed permeability factors as high as 1×10^{-3} cm/sec in the north and east detention areas. As a result of these field studies, modifications in the form of a soil liner have been made to the design for these detention areas.

Construction activities have been ongoing since June 6, 1991. Three of the eight construction sequences for the Waste Pit Area Runoff Control Removal Action have been completed.

The pre-excavation soil sampling and the subsequent reevaluation of the goals and objectives of the Sampling and Analysis Plan with respect to Hazardous Substance List (HSL) materials has resulted in a revision of the criteria for identifying the need for more samples, the disposition of excess construction soil, and the technical requirements for stockpiling the excavated soil (such as synthetic liners below and on top of the soil piles). The reevaluation of the results and the plan are to ensure that the criteria developed in the plan are adequate and appropriate for addressing each objective stated. Difficulties with site-wide issues related to the disposition of soils and debris necessitated the revision of the Sampling and Analysis Plan in terms of intermediate soil stockpiles along with a management plan for characterizing the excess material within 90 days of excavation. The revised plan was submitted to the U.S. EPA and the Ohio EPA for review and comment in October 1991. The revised Sampling and Analysis Plan includes the final determination for the disposition of excavated soil and the basis for the decision.

Planned activities in November 1991 include the continuation of excavation activities, construction of the sump, and sampling to meet build over criteria at the bottom of the sump.

<u>KEY MILESTONES</u>	<u>STATUS</u>	<u>DUE DATE</u>
Initiation of Bid/Award construction activities with issuance of the construction work order.	Completed. June 6, 1991.	June 1991
Completion of construction/system testing (system operational).	Open, on schedule.	July 1992

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

Part 2

Part 2 (pump South Plume and discharge to Great Miami River) and Part 3 (the installation and operation of an Interim Advanced Wastewater Treatment System [IAWWT] to reduce contaminant loading discharged to the Great Miami River to a level less than 1,700 pounds per year) were prepared as one Work Plan and submitted to the U.S. EPA on December 17, 1990. The Work Plan for Parts 2 and 3 of the South Plume Removal Action was disapproved by the U.S. EPA on January 17, 1991. The Ohio EPA comments were received on January 18, 1991.

The preliminary drawings for Part 2 were issued to the U.S. EPA for informational purposes on February 6, 1991.

A meeting was held on February 8, 1991 at the Ohio EPA Dayton office to discuss key comment items and FEMP's initial responses. The U.S. EPA did not attend the meeting. Several changes resulted from the meeting and were reflected in the revised Work Plan as well as responses to comments. The Ohio EPA stated that, based on the latest groundwater information discussed at a meeting held on February 1, 1991 at Advanced Sciences, Inc. (ASI) offices, relocation of the well field to the north should be considered.

A second meeting was held February 20, 1991 at the Ohio EPA Dayton office. The U.S. EPA and the Paddy's Run Road Site (PRRS) representatives were in attendance. A discussion on relocating the well field determined that, if possible, the well field should be moved north to minimize the impact on the PRRS plume. The Work Plan was revised to reflect an evaluation of this relocation.

Due to the delay required to evaluate relocating the well field, the project was split into two construction packages. The first package, which is the most time consuming to construct, contains the transfer pump station, groundwater discharge pipeline, outfall pipeline, and associated appurtenances. The second package contains the well field details. Construction will be delayed on the well field package until the issues on the well field relocation are resolved.

A letter was issued to the U.S. EPA on February 15, 1991 entitled "Installation of a New Effluent Line and its Incorporation into the South Plume Removal Action." The letter summarized a recently completed study which indicated that the DOE would not attempt to repair the existing outfall pipeline but would instead replace the existing line with a new pipeline. The DOE also stated that a twenty-day extension was needed to make the necessary changes to the Work Plan to reflect this decision.

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

Part 2 (cont'd.)

Based on the reevaluation of all the above information, it seemed desirable to adjust the course of action for both projects. Accordingly, a restructuring concept for future direction was prepared which aggregately addressed the major outstanding issues for both the Part 2 and the Part 3 projects.

A formal proposal was prepared and presented to the U.S. EPA and the Ohio EPA at the August 29, 1991 Project Managers' meeting in Chicago. The proposal received verbal approval from the U.S. EPA and the Ohio EPA.

Accordingly, an addendum to the Engineering Evaluation/Cost Analysis (EE/CA) was prepared which defined the restructuring concept and was issued to the U.S. EPA and the Ohio EPA for review and comment. Comments were received from the Ohio EPA on September 25, 1991. Comments from the U.S. EPA were received on October 18, 1991.

Revisions to the addendum were made to reflect the comments received. The addendum will then be forwarded so that it can be incorporated into the EE/CA - Environmental Assessment (EA) and issued to the U.S. EPA and the Ohio EPA for a second review. After approval is received from the U.S. EPA and the Ohio EPA, the addendum will be issued for a 30-day public comment period.

The operating and maintenance plan for the Part 2 well field was prepared and issued for internal comments. Comments were received and the document was revised to reflect those comments. The operating plan will be submitted for U.S. EPA and Ohio EPA review on November 1, 1991.

The draft report on the groundwater computer modeling results which support the relocation of the extraction well field was received and issued for internal review. Comments were consolidated and submitted to ASI/IT for resolution. After comments are resolved, the document will be transmitted to the U.S. EPA and the Ohio EPA for review and comment.

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

Part 5

The Part 5 Work Plan (Groundwater Modeling and Geochemical Investigation) was prepared and submitted to the U.S. EPA for review on June 4, 1991. Comments were received from the Ohio EPA on June 25, 1991 and from the U.S. EPA on July 3, 1991. Per the agreement at the July 23, 1991 meeting between the DOE, the U.S. EPA, and the Ohio EPA, the scope of the Part 5 field investigation was expanded to include investigation of the area north and inclusive of the relocated Part 2 extraction well field. A revised Part 5 Work Plan was resubmitted to the U.S. EPA and the Ohio EPA. The U.S. EPA approved the Part 5 Work Plan. The Ohio EPA conditionally approved the Part 5 Work Plan with comments. Draft responses to the Ohio EPA comments were prepared but are being held up pending reevaluation of the need to perform a pump test on the extraction well field.

Summary

A meeting was held with the U.S. EPA and the Ohio EPA on August 29, 1991 in Chicago where the current status of the South Groundwater Contamination Plume Removal Action was discussed. The DOE presented justification for delaying Parts 1, 2, and 3. A subsequent meeting was held on October 29, 1991 during which the projected revised completion dates for Parts 1, 2, and 3 were presented. A formal letter requesting extension of the completion dates is being prepared. The DOE continued submitting weekly reports on the South Plume Removal Action to provide all parties with up-to-date information.

Activities in November 1991 will focus on completing the drawing and specifications for the Part 1 water supply; issuing the EE/CA Addendum to the U.S. EPA and the Ohio EPA for their approval to issue the Addendum for a 30-day public comment period and to DOE/HQ so that efforts to obtain National Environmental Policy Act's (NEPA) approval for Parts 2/3 can be initiated; completing and submitting responses to the Ohio EPA's conditional comments on the Part 5 Work Plan; obtaining access to the Part 5 study area and performing a cultural resource investigation of the Part 5 study area; and issuing a letter requesting delay of the Parts 1, 2, and 3 milestones.

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RA No. 4, Silos 1 and 2 (cont'd.)

<u>KEY MILESTONES</u>	<u>STATUS</u>	<u>DUE DATE</u>
Complete installation of bentonite slurry into Silos 1 and 2.	Open, on schedule.	December 1, 1991

RA No. 5, K-65 Decant Sump Tank

The K-65 Decant Sump Tank Removal Action Work Plan was submitted to the U.S. EPA for approval on December 10, 1990. The U.S. EPA's conditional approval of the K-65 Decant Sump Tank Removal Action Work Plan was received on January 10, 1991. The responses to the issues included in the conditional approval were submitted to the U.S. EPA on February 8, 1991. A revised implementation schedule was included in those responses.

Pumping and removal of the decant liquid was initiated on March 26, 1991. Removal of the liquid from the K-65 decant sump tank was completed on April 16, 1991 when the liquid was transferred to the holding tanks in Plant 2/3.

The analytical results for the general water quality parameters, HSL volatile organics, HSL semi-volatile organics, and HSL pesticide organics and inorganics were received for the three samples of the decant liquid taken during the implementation of the Removal Action. Once the analytical results of the full radiological analyses for the three samples of the decant liquid are received, the treatment option will be determined. Sludge samples were collected from the decant sump in late June 1991. The sludge samples were shipped to the contract laboratory on August 20, 1991 for full radiological analyses only.

The liquid pumped from the K-65 decant sump tank will be stored in the Plant 2/3 holding tanks until the analytical results are available and determination of the treatment required for the decant sump liquid.

Work in November will center on preliminary determination of the required treatment based on the available analytical results.

<u>KEY MILESTONES</u>	<u>STATUS</u>	<u>DUE DATE</u>
Complete the removal of the liquid from the K-65 decant sump tank.	Completed. April 16, 1991	April 26, 1991

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RA No. 8, Inactive Fly Ash Pile Control

Responses to the U.S. EPA and the Ohio EPA comments on the Inactive Fly Ash Pile/Southfield Disposal Area Work Plan were prepared and transmitted to the agencies, along with the revised Work Plan, on October 22, 1991.

The warning signs and the proposed chain barrier for this Removal Action were shown to the U.S. EPA and Ohio EPA at the October 29, 1991 meeting. Procurement activities for the installation of the isolation barrier were initiated.

<u>KEY MILESTONES</u>	<u>STATUS</u>	<u>DUE DATE</u>
Submit work plan.	Completed August 14, 1991.	August 15, 1991
Revise work plan and respond to U.S. EPA and Ohio EPA comments.	Completed. October 22, 1991.	October 23, 1991

Approval of the Work Plan is expected from the U.S. EPA on November 25, 1991.

RA No. 9, Removal of Waste Inventories

Removal of waste inventories is ongoing. During October 1991, 9,600 drum equivalents (DEs) of low level waste were disposed of at the Nevada Test Site (NTS).

The Ohio EPA comments were received and are being resolved.

<u>KEY MILESTONES</u>	<u>STATUS</u>	<u>DUE DATE</u>
Provide a compilation of existing site documentation supporting the ongoing low level waste and thorium management programs for submittal to the U.S. EPA and the Ohio EPA by August 21, 1991.	Completed.	August 21, 1991
Establish an administrative record file for Removal Action 9.	Completed.	August 21, 1991

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RA No. 11, Pit 5 Experimental Treatment Facility

The Waste Pit 5 Experimental Treatment Facility (ETF) was deemed to be a Removal Action by the DOE/FO after review of the Removal Site Evaluation (RSE) submitted on June 12, 1991. A document presenting alternatives was prepared and submitted on July 29, 1991. Following an evaluation of alternatives, a determination was made to proceed with the total demolition of the ETF structure. 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 November 1991 include the continuation of design work needed to implement the Work Plan, development of the Health and Safety Plan, and the development of the required safety and risk assessment. Response to the Work Plan is expected from the U.S. EPA on November 12, 1991.

<u>KEY MILESTONES</u>	<u>STATUS</u>	<u>DUE DATE</u>
Submit Work Plan for ETF to the U.S. EPA for review and approval.	Completed. October 11, 1991	October 30, 1991
Initiate field work on ETF removal action.	Open.	To be determined pending Work Plan approval and resolution of RCRA integration.
Complete removal action 120 days after approval of Work Plan (due date depends on Work Plan Approval by December 13, 1991).	Open.	To be determined.

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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.

<u>KEY MILESTONES</u>	<u>STATUS</u>	<u>DUE DATE</u>
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 disposal of the materials.

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

RA No. 15, Scrap Metal Piles

The Scrap Metal Piles Removal Action will detail the stabilization and disposition of low-level radioactive waste scrap metal on-site. This removal action will eliminate the potential threat of additional material releases to the environment due to wind, rain, or vehicular traffic.

<u>KEY MILESTONES</u>	<u>STATUS</u>	<u>DUE DATE</u>
Submit Work Plan to the U.S. EPA.	Open, on schedule.	January 31, 1992

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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 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 (now 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.

Planned activities in November 1991 include the RSE development, continuation of the berm investigation (involving geotechnical sampling and analysis), and the evaluation of alternatives to address fugitive dust emissions from Pit 5.

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

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Operable Unit 1: Waste Pit Area

1.1 Site Characterization

a. Status of Work - Key Milestones

Boring 1819 was advanced in the Burn Pit to replace sample parameters missed due to sample holding time being exceeded for Boring 1776. The depth of Boring 1819 was 14 feet. Wooden pallets were encountered at a depth of 11 feet in the Burn Pit.

Well development and groundwater sampling were reinitiated for sampling waste pit leachate. Sampling of leachate was completed at the following locations:

- Well 1765 - Pit 1
- Well 1766 - Pit 1
- Well 1768 - Pit 2
- Well 1769 - Pit 2

Waste Pit leachate sampling will be completed by November 21, 1991. Completion of the laboratory analyses and final report will not be affected by delays experienced in the sampling task. The contract laboratory has committed additional resources to maintain current RI/FS schedules.

The Waste Pit leachate sampling team has experienced some delays in sampling due to slow recharge rates of the wells. A variance was written to reduce the volume of groundwater required to be purged from the wells prior to extraction of the leachate sample.

b. Issues/Problems

Missed holding times for two previous leachate samples extracted from the waste pit wells occurred in late September.

c. Corrective Actions

Both waste pit leachate samples that exceeded holding times were recollected and sent to the contract laboratory for analysis.

d. Planned Activities for November 1991

Complete all waste pit leachate sampling by November 21, 1991.

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Operable Unit 1: Waste Pit Area

1.2 Remedial Investigation (cont'd.)

a. Status of Work - Key Milestones

<u>Activity</u>	<u>Comment</u>
Issue draft Radon Sampling Work Plan to the U.S. EPA and the Ohio EPA on October 18, 1991.	Completed. The Work Plan was submitted on October 18, 1991. Verbal approval was received from the U.S. EPA on October 29, 1991. Work will begin as soon as weather permits.

b. Issues/Problems

Due to the shortfall in laboratory capacity, the additional sampling in the waste pit area has not been completed. The well sampling will not be completed until the end of November, which may delay initiation of the RI.

c. Corrective Actions

The DOE will evaluate the impact of the delay in completing the field sampling program on the RI schedule. The RI/FS contractor is exploring the use of other laboratories.

d. Planned Activities for November 1991

Initiate the first phase of treatability testing.

Initiate the radon flux measurements in the waste pit area.

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Activity	1991												1992	1993	1994	
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC				
OPERABLE UNIT 1																
SITE INVESTIGATION AS 1 MAR91 LF 18 NOV92																
TREATABILITY STUDIES AS 30 APR91 LF 2 DEC94																
REMEDIAL INVESTIGATION LS 19 NOV92 LF 4 MAR94 AS 5 JAN91 AF 5 JAN91																
INITIAL SCREENING OF ALTERNATIVES FEASIBILITY STUDY LS 9 APR93 LF 29 JUL94																
SITELWIDE FS RISK ASSESSMENT LS 12 JUL93 LF 8 OCT93																
NOTICE OF AVAILABILITY LS 28 MAR94 LF 19 AUG94																
PUBLIC COMMENT PERIOD LS 1 AUG94 LF 2 NOV94																
DRAFT RECORD OF DECISION LS 1 JUL94 LF 5 DEC94																

RJ/FS PROGRAM
FERNALD ENVIRONMENTAL MGMT. PROJECT
FEMP RJ/FS OUI CONSENT AGMT TRACKING

Sheet 1 of 1
Data Date: 27 OCT91
Print Date: 28 NOV91

Project Start: 1 OCT90
Project End: 28 OCT92
Program: 5 years, Inc.

Prepared by: ASMT Corp.
Title: _____
Location: _____
Checked: _____
Approved: _____

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Operable Unit 2: Other Waste Units

2.1 Site Characterization (cont'd.)

d. Planned Activities for November 1991

Resample Lime Sludge Ponds sludge and water for identified parameters. No delays are expected in completion of laboratory analysis, due to missed parameters, as identified in the RI/FS schedules.

2.2 Remedial Investigation

a. Status of Work - Key Milestones

Responses to U.S. EPA comments were completed and incorporated into the draft Treatability Study Work Plan. The work plan was resubmitted to the U.S. EPA on October 22, 1991. Phase I activities are continuing, and unconfined strength testing was initiated on October 21, 1991. Modified Toxicity Characteristic Leaching Procedure (TCLP) testing began on October 30, 1991.

Planning and preparation for the resumption of RI Report activities began in October 1991. Samples are being tracked through the laboratory and laboratory reports are being received for validation. Identification of samples requiring validation is complete, and data validation activities are being conducted as data are received.

<u>Activity</u>	<u>Comment</u>
Initiate stabilization treatability studies by September 2, 1991.	Completed on September 9, 1991.
Issue revised draft Treatability Study Work Plan to the U.S. EPA and the Ohio EPA by October 23, 1991.	Completed on October 22, 1991.
Issue draft RI Report/Baseline Risk Assessment to the U.S. EPA by October 19, 1992.	Open, on schedule.

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Operable Unit 2: Other Waste Units

2.3 Feasibility Study (cont'd.)

a. Status of Work - Key Milestones

	<u>Activity</u>	<u>Comment</u>
	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 November 1991	
	During November, the review of Applicable or Relevant and Appropriate Requirements (ARARs) for regulatory changes promulgated in the past year is planned. This activity will be ongoing until the FS Report preparation activities are resumed.	

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Operable Unit 3: Production Area

3.1 Site Characterization

a. Status of Work - Key Milestones

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

b. Issues/Problems

None to report.

c. Corrective Actions

None required.

d. Planned Activities for November 1991

None scheduled.

3.2 Remedial Investigation

a. Status of Work - Key Milestones

Operable Unit 3 initial scoping activities included continuation of activities begun in previous months: employee process knowledge interviews, review of existing data, creation of data summary tables, and creation of three-dimensional facility and building maps. In addition, initial identification of appropriate remedial action objectives (RAOs), general response actions (GRAs), and major ARARs/TBCs was begun.

Phase I of the process knowledge interviews (the first 25 interviews) was completed in September. Phase II was completed on October 21, 1991, bringing the total number of interviews conducted to 46. Information gained from these interviews has been summarized in a separate document. This information will be added, as appropriate, to other data summary tables. The primary use for this information is in adding to the description and uses of structures and in identifying contaminants throughout the production area.

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Operable Unit 3: Production Area

3.2 Remedial Investigation (cont'd.)

a. Status of Work - Key Milestones

• Inventory of Contaminated Materials

Intended to provide total quantities of contaminated material; identifies location, type of material (e.g., soil, rubble, equipment, building materials), type/level of contamination, and volume/quantity of material.

• Inventory of Contaminants (if necessary)

Intended to provide comprehensive summary, including contaminant type, location and total quantity.

The identification of appropriate RAOs, GRAs, and ARARs for Operable Unit 3 was initiated earlier than normally scheduled during the initial scoping process. This is primarily a result of the information and background already available for the FEMP from previous RI/FS activities. Although none of the RAOs, GRAs or ARARs are finalized, early initiation of this aspect of scoping helps maintain continuity with both other operable units and site-wide considerations at the FEMP. The finalization of these activities will occur on or before the RI/FS schedule dates.

The facility/building maps for Operable Unit 3 were not completed in October as previously estimated. However, no adverse schedule impact is expected as a result. Approximately 85% of the maps were completed in October, and no difficulties are foreseen in completing all maps by the end of November 1991.

b. Issues/Problems

None to report.

c. Corrective Actions

None required.

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Operable Unit 4: Silos 1-4

4.2 Remedial Investigation (cont'd.)

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

The preliminary phases of the treatability study were started in October 1991.

The draft Treatability Study Work Plan for vitrification was distributed for internal review on October 4, 1991.

<u>Activity</u>	<u>Comment</u>
Incorporate U.S. EPA and Ohio EPA comments and return draft Treatability Study Work Plan on October 4, 1991 for approval.	Completed on October 4, 1991; awaiting U.S. EPA and Ohio EPA responses.
Initiate gathering and analysis of field data.	This activity will continue until the bulk of the RI work is started.
Initiate stabilization/extraction testing on October 17, 1991.	Open, on schedule.
b. Issues/Problems	
Start of treatability studies was delayed three weeks.	
c. Corrective Actions	
A catch-up plan to recover the lost days has been initiated. With successful completion of the catch-up plan, the treatability study should be completed on schedule.	
d. Planned Activities for November 1991	
Approval or comments from the U.S. EPA and the Ohio EPA on the Treatability Study Work Plan are due by November 4, 1991.	
Continue treatability studies.	

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		1991	1992	1993	1994
OPERABLE UNIT 4					
SITE INVESTIGATION AS 15JAN91 EF 13JAN92					
TREATABILITY STUDIES AS 18JAN91 EF 6JAN93					
REMEDIAL INVESTIGATION ES 7JAN92 EF 14JUN93					
FEASIBILITY STUDY ES 28OCT91 EF 1FEB94					
SITELWIDE FS RISK ASSESSMENT ES 7JAN92 EF 6APR92					
NOTICE OF AVAILABILITY ES 8SEP93 EF 1FEB94					
PUBLIC COMMENT PERIOD ES 2FEB94 EF 6MAY94					
DRAFT RECORD OF DECISION ES 13MAY93 EF 7JUN94					

Project Start:	10CT90
Project Finish:	26APR99
Project Name:	R/F/S PROGRAM
Project Description:	FERNALD ENVIRONMENTAL MGMT. PROJECT FEMP R/F/S OU4 CONSENT AGMT TRACKING
Sheet:	1 of 1
Data Date:	27OCT91
Plot Date:	31OCT91

Prepared by: ABBOTT Corp

10CT90
26APR99

R/F/S PROGRAM
FERNALD ENVIRONMENTAL MGMT. PROJECT
FEMP R/F/S OU4 CONSENT AGMT TRACKING

Project Start: 10CT90
Project Finish: 26APR99

Sheet: 1 of 1
Data Date: 27OCT91
Plot Date: 31OCT91

Prepared by: ABBOTT Corp

10CT90
26APR99

R/F/S PROGRAM
FERNALD ENVIRONMENTAL MGMT. PROJECT
FEMP R/F/S OU4 CONSENT AGMT TRACKING

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending October 31, 1991

Operable Unit 5: Environmental Media

5.1 Site Characterization (cont'd.)

b. Issues/Problems

Due to slow recharge rates, development and sampling operations at the identified well locations were delayed.

c. Corrective Actions

None to report.

d. Planned Activities for November 1991

Attempt development and sampling of Wells 2055, 1235, 1247, 1248, 1251 and 1258. A variance may be written per the RI/FS QAPP which deletes the requirement to purge three to five well volumes prior to sampling due to the very slow recharge rate of these wells.

31-Well Program

a. Status of Work - Key Milestones

Installation of Well 3397 was completed, including well development and sampling. Final approval of landowner access agreement for Location 0395 is pending.

b. Issues/Problems

Secure Landowner Access Agreement for well location 0395.

c. Corrective Actions

Progress toward obtaining landowner access agreement approval for Location 0395 indicates an agreement will be secured in November 1991.

d. Planned Activities for November 1991

Secure access agreement and commence installation of Well 0395.

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT**

Period Ending October 31, 1991

Operable Unit 5: Environmental Media

5.2 Remedial Investigation (cont'd.)

b. Issues/Problems

None to report.

c. Corrective Actions

None required.

d. Planned Activities for November 1991

Complete revision of draft Treatability Study Work Plan and submit to the U.S. EPA and the Ohio EPA. Complete evaluation of alternative treatability studies to soil washing.

5.3 Feasibility Study

a. Status of Work - Key Milestones

Progress continued on the preparation of the Initial Screening of Alternatives (ISA) document. Specific activities included revision of process option evaluations and modification of Operable Unit 5 alternatives.

<u>Activity</u>	<u>Comments</u>
Revise process option evaluations.	Completed on October 22, 1991.
Issue revised Initial Screening of Alternatives to the U.S. EPA by April 16, 1993.	On schedule.

b. Issues/Problems

None to report.

c. Corrective Actions

None required.

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

Activity	1991												1992												1993												1994											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
OPERABLE UNIT 5	[Gantt chart showing activity bars for Operable Unit 5 across the months of 1991-1994]																																															
SITE INVESTIGATION AS 1OCT90 EF 25JAN93	[Gantt bar from Oct 1990 to Jan 1993]																																															
TREATABILITY STUDIES AS 12AUG91 EF 28SEP93	[Gantt bar from Aug 1991 to Sep 1993]																																															
REMEDIAL INVESTIGATION ES 10AUG92 EF 13MAY94	[Gantt bar from Aug 1992 to May 1994]																																															
INITIAL SCREENING OF ALTERNATIVES AS 12AUG91 EF 28SEP92	[Gantt bar from Aug 1991 to Sep 1992]																																															
FEASIBILITY STUDY ES 14JUL93 EF 20FEB95	[Gantt bar from Jul 1993 to Feb 1995]																																															
SITWIDE FS RISK ASSESSMENT ES 23NOV93 EF 21FEB94	[Gantt bar from Nov 1993 to Feb 1994]																																															
NOTICE OF AVAILABILITY ES 27SEP94 EF 20FEB95	[Gantt bar from Sep 1994 to Feb 1995]																																															
PUBLIC COMMENT PERIOD ES 21FEB95 EF 11MAY95	[Gantt bar from Feb 1995 to May 1995]																																															
DRAIT RECORD OF DECISION ES 1JUN94 EF 12JUN95	[Gantt bar from Jun 1994 to Jun 1995]																																															

Summary Bar/Entry Dates
 Critical Designator
 Program Bar
 Target Dates as of 10CT90
 Primavera 3 personal, Inc. 1994.1041

Project Start: 10CT90
 Project Finish: 28APR99

R/FS PROGRAM
 FEDERAL ENVIRONMENTAL MGMT. PROJECT
 FEMP R/FS OUS CONSENT AGMT TRACKING

Sheet 1 of 1
 Date Drawn: 27OCT91
 Plot Date: 6NOV91

Prepared by: ASMT/Comp
 Date: []
 Checked: []
 Approved: []

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending October 31, 1991

6.0 RI/FS Community Relations

d. Planned Activities for November 1991

Two addenda for removal actions will be added to the Community Relations Plan. Addendum E -- Plant 1 Pad Continuing Release Removal Action and Addendum F -- Contaminated Water Under FEMP Buildings Removal Action.

The Community Relations Plan will be revised including, but not limited to, the following issues: the new name of the facility, the Amended Consent Agreement As Amended, the transfer of site responsibility, and additional programs. This revision will be undertaken without conducting any community interviews.

A Roundtable focusing on "Communication with Neighbors at the Fernald Site" will be held on November 4, 1991 at the ERA Alpha Building.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending October 31, 1991

7.0 Engineered Waste Management Facility (EWMF) RI/FS Site Characterization
and Suitability Investigation

d. Planned Activities for November 1991

Prepare response to the comments on the SAP and revise as necessary.
Initiate mobilization for field program.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending October 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 October 1991.

Summary - October 1991

The total quantity of uranium discharged from the FEMP to the Great Miami River via Manhole 175 (Outfall 11000004001) was 20.24 kilograms. The average uranium concentration for the previous 12 months was 0.81 mg/l. This is 91.0 percent of the Derived Concentration Guide (DOE Order 5400.5) for dischargeable offsite water.

There was no discharge from the Stormwater Retention Basin (Outfall 11000004002) to Paddy's Run via the Storm Sewer Outfall Ditch in October 1991. Based on 1.14 inches of rainfall in October 1991, the total quantity of uranium discharged to Paddy's Run from uncontrolled areas of the FEMP is estimated to be 5.13 kilograms.

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT**

Period Ending October 31, 1991

Wastewater Flows and Radionuclide Concentrations (cont'd.)

FACILITY: Fernald Environmental Management Project

LOCATION: 001 Total Discharge

MONTH: October 1991

	<u>Flow (MGD)</u>	<u>Total Alpha (pCi/l)(2)</u>	<u>Total Beta (pCi/l)(2)</u>	<u>Total U (mg/l)(2)</u>	<u>Total U (kgs)</u>	<u>Calculated Total U-238 (pCi/l)(1)(2)</u>
Avg.	0.368	294	241	0.47	0.65	159
Max.	1.030	523	824	0.84	2.74	284
Min.	0.142	149	45	0.32	0.21	108

The average uranium concentration for the previous 12 months was 0.81 mg/l. This is 91.0 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 OCTOBER 31, 1991

ENCLOSURE B

**FFCA: INITIAL REMEDIAL MEASURES
AND OTHER OPEN ACTIONS**

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending October 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 September 1991 was transmitted to the U.S. EPA on October 21, 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 nineteenth Quarterly Particulate Emissions Report for the period April 1, 1991 through June 30, 1991 was submitted to the U.S. EPA on August 30, 1991.

RADIATION DISCHARGE INFORMATION

Section A

The nineteenth Quarterly Liquid Discharge Report for the period April through June 1991 was submitted to the U.S. EPA on August 30, 1991.

TABLE 1

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

**STATUS OF ACTIONS AS OF
OCTOBER 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 September 1991 was transmitted to the U.S. EPA on October 21, 1991 (DOE-160-92).
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
 OCTOBER 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 eighteenth Quarterly Liquid Discharge Report for the period January through March 1991 was transmitted to the U.S. EPA on May 24, 1991 (DOE-1389-91). 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			
8.	Issue monthly progress report of actions taken to ensure compliance with FFCA requirements.	monthly	September's FFCA Monthly Progress Report was transmitted to the U.S. EPA on October 21, 1991 (DOE-160-92).

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

PERIOD ENDING OCTOBER 31, 1991

ENCLOSURE C
DRILLING AND BORING LOGS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 602.3.11	PROJECT NAME FEMP RI/FS	
BORING NUMBER 2557	COORDINATES:	DATE 10-21-91
ELEVATION:	GWL: Depth .32 Date/Time 10-22-1990	DATE STARTED 10-21-91
ENGINEER/GEOLOGIST J. Lear	Depth Date/Time	DATE COMPLETED 10-22-91
DRILLING METHODS Cable Tool	PAGE 1	OF 5

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0 in	RECOVERY in	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ISS)	REMARKS
1	33456 1-30 10-21-91	6	6	m. dense, brown, (10gr 5/3 to 10gr 4/3) clayey silt, trace gravel, trace sand, dry	ML	NA	H ₂₀ - 0 ppm B ₂₀ - 50 cpm α - 0 cpm
2	33457 1535 10-21-91	7	8	m. dense pale brown (10gr. 6/3) clayey silt, trace sand, dry	ML	NA	H ₂₀ - 0 ppm B ₂₀ - 60 cpm α - 0 cpm
3	33458 1540 10-21-91	9	7	S.A.A.	ML	NA	H ₂₀ - 0 PPM B ₂₀ - 50 cpm α - 0 cpm
5	33459 1555 10-21-91	50/4	3	v. dense, dark grayish brown to grayish brown clayey silt, (10gr. 4/2 to 10gr 5/2) some sand, moist to dry. 50' Drill to 60'	ML	NA	H ₂₀ - 0 ppm B ₂₀ - 50 cpm α - 0 cpm
6	33460 1600 10-21-91	50/5	4	v. dense, brown (10gr. 9/3) sandy silt, moist 6.5' Drill to 7.5'	ML	NA	H ₂₀ - 0 ppm B ₂₀ - 50 cpm α - 0 cpm
8	33461 1610 10-21-91	17 50/4	7	v. dense, very pale brown, (10gr. 7/3) fine gravel, sand, clay mixture, dry. Drill to 9.0'	GC	NA	H ₂₀ - 0 ppm B ₂₀ - 60 cpm α - 0 cpm
9	33462 1620 10-21-91	32 50	10	v. dense brown, (10gr. 5/3) gravelly silt some sand, moist to dry	ML	NA	H ₂₀ - 0 ppm B ₂₀ - 50 cpm α - 0 cpm
10	33463 1645 10-21-91	50 32	16	v. dense brown, (10gr. 5/3) sandy gravel, some silt, moist	GW	NA	H ₂₀ - trace B ₂₀ - 50 cpm
11	33464 1645 10-21-91	50 36	16	v. dense, light yellowish brown (10gr 4/4) silty gravel moist	GW	NA	α - 0 cpm
12				Aquifer met at 10.5-12.0ft sampling every 5.0ft begins			
13							
14							

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
 H₂₀ - 0 PPM
 B₂₀ - 40-60 cpm
 α - 0 cpm

VISUAL CLASSIFICATION OF SOILS

3835

PROJECT NUMBER 602.3.11	PROJECT NAME FEMP RI/FS	
BORING NUMBER 2557	COORDINATES	DATE 10-21-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED 10-21-91
ENGINEER/GEOLOGIST J Lear	Depth Date/Time	DATE COMPLETED 10-22-91
DRILLING METHODS cable Tool	PAGE 2 OF 6	

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10.75"	RECOVER (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ISS)	REMARKS
15							
16	33464 1710 10-21-91	27 50 21	8	Very dense, brown (10yr 5/3) poorly sorted sandy gravel, Trace clay, moist to wet.	GC	ML	H _{nu} - 0 ppm B _b - 60 cpm a - 0 cpm
17							
18							
19							
20							
21	33465 1745 10-22-91	5 8 8	8	m. dense, dark gray (10yr, 4/1) sandy poorly sorted gravel, Trace silt, Trace clay wet.	GW	NA	H _{nu} - 0 ppm B _b - 50 cpm a - 0 cpm
22							
23							
24							
25							
26	33466 1075 10-22-91	42 42 26	8	v. dense, gray, (10yr, 5/1) poorly sorted coarse gravelly sand, Trace clay, wet	GW	NA	H _{nu} - 0 ppm B _b - 50 cpm a - 0 cpm
27							
28							
29							
30							

NOTES See pg 1

VISUAL CLASSIFICATION OF SOILS

6-02-311

PROJECT NUMBER FEMP RI/FS	PROJECT NAME FEMP RI/FS	
BORING NUMBER 2557	COORDINATES.	DATE 10-22-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED 10-21-91
ENGINEER/GEOLOGIST J. Lear	Depth Date/Time	DATE COMPLETED 10-23-
DRILLING METHODS cable tool	PAGE 3 OF 5	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER SAMPLER (in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
30							
31	33467 1135 10-22-91	50/2	2	v. dense, gray, (10yr. sil) large gravelly poorly sorted sand, trace clay, wet.	SW	NA	H ₂ O - 0 ppm pH - 5.0 cpm σ - 0 cpm
32				Drilling ends at 30.0 ft. Sampling ends at 31.5 ft well set from 8.0 ft to 23.0 ft			

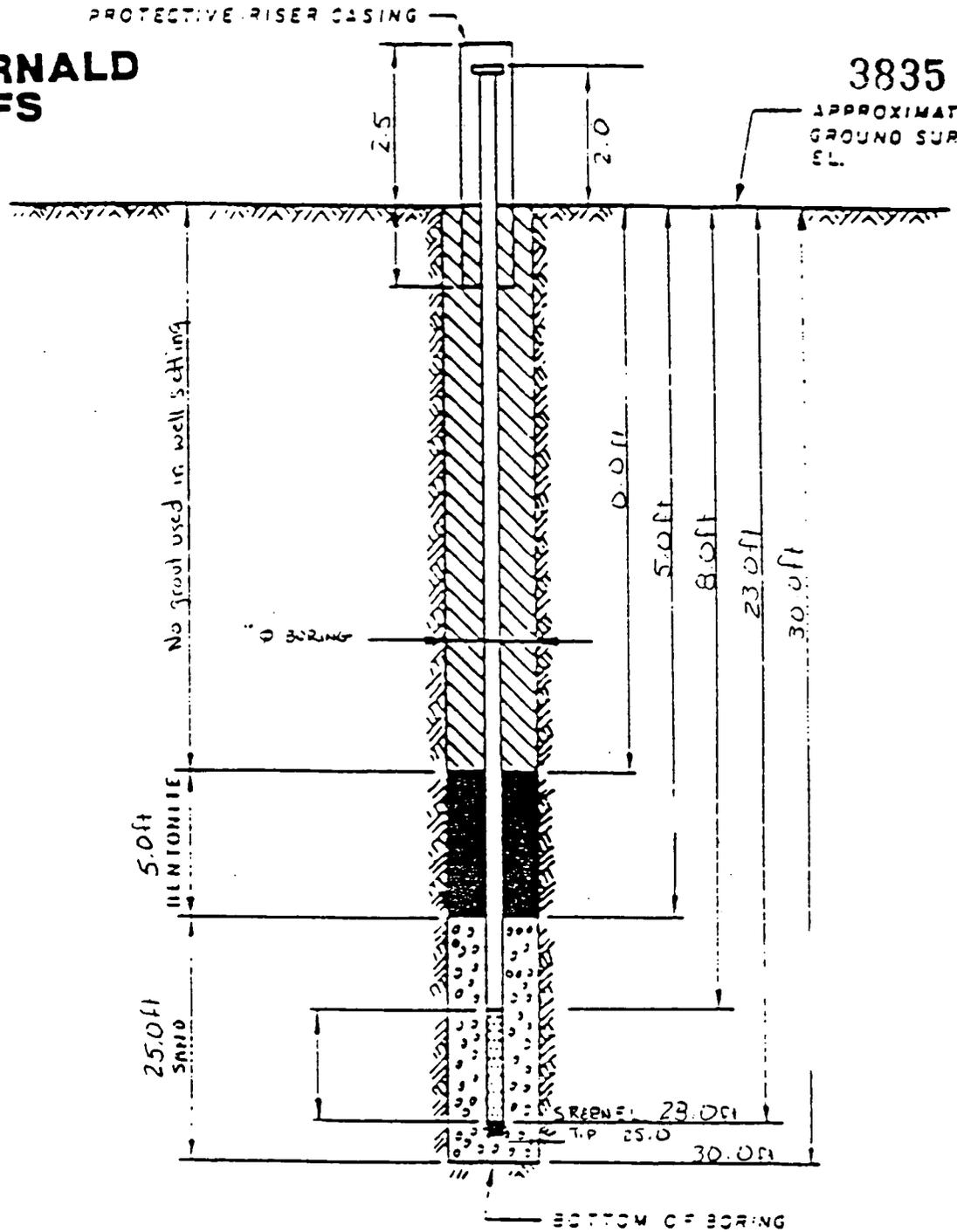
NOTES See Pg. 1

FERNALD RI/FS

3835

APPROXIMATE EXIST GROUND SURFACE EL.

DRAWING NUMBER
CHECKED BY
APPROVED BY
J LEAY
10-22-91
DRAWN BY



NOTES

1. RISER PIPE IS 4" I.D. SCHEDULE 40 PIPE, THREADED, FLANGE JOINTED.
2. SCREEN IS 4" I.D. SS PIPE CONTINUOUS SLOT SCREEN (0.010 IN. SLOT SIZE)
3. LOWER END OF SCREEN IS CAPPED.
4. ELEVATION OF WATER LEVEL 13.20
5. WATER LEVEL READING ON 10-22-91

- 14 bags of 80lb 20x20 sand
- 2 buckets of bentonite (5 gal)
- 100 gals of H₂O used in drilling

INSTALLATION DETAILS
MONITORING WELL

2557

PREPARED FOR

Fernald RI/FS

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FEMP RI/FS FIELD ENG./GEO. J. Lear DATE 10-22-91
 PROJECT NO. 602-3-11 CHECKED BY _____ DATE _____
 BORING NO. 2557
 PIEZOMETER NO. 2557 DATE OF INSTALLATION 10-22-91

BOREHOLE DRILLING

DRILLING METHOD <u>cable tool</u>	TYPE OF BIT <u>cable tool</u>
DRILLING FLUID (S) USED: <u>H₂O</u>	CASING SIZE (S) USED: <u>8 in</u>
FLUID <u>H₂O</u> FROM <u>0.0</u> TO <u>30.0</u>	SIZE <u>8 in</u> FROM <u>0.0</u> TO <u>30.0</u>
FLUID <u>NA</u> FROM _____ TO _____	SIZE <u>NA</u> FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE <u>Stainless steel</u>	RISER PIPE MATERIAL <u>Stainless steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0 in</u>	RISER PIPE DIAMETERS:
PERFORATION TYPE:	O.D. <u>4 3/8</u> I.D. <u>4.0 in</u>
SLOTS <input type="checkbox"/> HOLES <input type="checkbox"/> SLOTTED SCREEN <input checked="" type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>10ft, 2ft 5ft screen</u>
AVERAGE SIZE OF PERFORATIONS <u>0.01 in</u>	JOINING METHOD <u>Threaded flush joined</u>
TOTAL PERFORATED AREA <u>15 ft</u>	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>5.0 ft</u>	OTHER PROTECTION <u>Hinged well cap, locked vented well cover</u>
PROTECTIVE PIPE O.D. <u>10.75 in</u>	

ITEM	DISTANCE ABOVE / BELOW GROUND SURFACE (ft)		ELEVATION ()		
	TOP	BOTTOM	TOP	BOTTOM	
TOP OF RISER PIPE	2.0 ft				
GROUND SURFACE	0.0				
BOTTOM OF PROTECTIVE PIPE	2.5				
BOREHOLE FILL MATERIALS:					
	GROUT / SLURRY J.L. 10-22-91	TOP NA	BOTTOM NA	TOP	BOTTOM
	BENTONITE	TOP 0.0	BOTTOM 5.0	TOP	BOTTOM
	SAND	TOP 5.0	BOTTOM 30.0	TOP	BOTTOM
GRAVEL J.L. 10-22-91	TOP NA	BOTTOM NA	TOP	BOTTOM	
PERFORATED SECTION	TOP	BOTTOM	TOP	BOTTOM	
PIEZOMETER TIP	25.0				
BOTTOM OF BOREHOLE	30.0				
GWL AFTER INSTALLATION					

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES NO
 WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES NO **38**

REMARKS _____

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 602.3.11	PROJECT NAME FEMP RI/FS	
BORING NUMBER 3551	COORDINATES: $47^{\circ} 53' 36.88''$ N $122^{\circ} 40' 00.93''$ W	DATE 10-2-91
ELEVATION: T.O.C. 532.36'	GWL: Depth 11.81 Date/Time 10-8-91 0945	DATE STARTED: 10-2-91
ENGINEER/GEOLOGIST J. Lear	Depth N/A Date/Time N/A	DATE COMPLETED: 10-7-91
DRILLING METHODS Cable Tool	Method: Run	PAGE 1 OF 9

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER INCH	RECOVERY (NA)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
5				All Descriptions for 0.0 - 30.0 ft can be cross referenced from Boring Log # 3551.			
10							
15							
20							
25							
30							

NOTES: 1. H.W. Contractor - Penn Drilling
 Drilling equipment - Cyclone 45
 Driller - Craig Coulter
 Asst - Gary Dye

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

Back ground
 H.W. - 0 ppm
 CO - 50 ppm
 a - 0 ppm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 602-3.11	PROJECT NAME FEMP RI/FS	
BORING NUMBER 3551	COORDINATES. SEE Pg 1	DATE 10-2-91
ELEVATION: SEE Pg 1	GWL: Depth SEE Pg 1 Date/Time SEE Pg 1	DATE STARTED 10-2-91
ENGINEER/GEOLOGIST J. WEF	Depth N/A Date/Time N/A	DATE COMPLETED 10-7-91
DRILLING METHODS Cable tool		PAGE 2 OF 9

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16.0"	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (USC)	REMARKS
27							
30							
31							
32							
33							
34							
35		3					
36	1615 10-2-91	6 9	16	m. dense, brown (10yr. 5/3) well sorted fine sand, trace gravel, wet. SS, ST	SP	NA	U₁₀₀ - 0 PPM S₆₀ - 50 CPM S₂₀ - 0 CPM
37							
38							
39							
40		5					
41	1625 10-2-91	8	16	S. A. A.	SW	NA	U₁₀₀ - 0 PPM P₂₀ - 50 CPM S₂₀ - 0 CPM
42							
43							

NOTES
see page 2

VISUAL CLASSIFICATION OF SOILS

J. C. 10-7-91

PROJECT NUMBER: <u>6.02 2803.6</u>	PROJECT NAME: <u>TEMP RI/FS</u>	
BORING NUMBER: <u>3551</u>	COORDINATES: <u>SEE Pg 1</u>	DATE: <u>10-3-91</u>
ELEVATION: <u>SEE Pg 1</u>	GWL: Depths <u>SEE Pg 1</u> Date/Time <u>SEE Pg 1</u>	DATE STARTED: <u>10-2-91</u>
ENGINEER/GEOLOGIST: <u>J. Lee</u>	Depth <u>N/A</u> Date/Time <u>N/A</u>	DATE COMPLETED: <u>10-7-91</u>
DRILLING METHODS: <u>cable tool</u>		PAGE <u>3</u> OF <u>9</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
45	33421	37		V dense, dark yellowish brown (10yr, y14) well sorted med sand some gravel, wet.	SP	NA	H ₂₀ - 0 ppm
46	720	38	18				AB - 50 cpm
	10-3-91	40					σ - 0 cpm
47							
48							
49							
50	33430	9		Dense, brown (10yr, 5/1) poorly sorted sand, some gravel, trace silt, wet.	SW	NA	H ₂₀ - 0 ppm
51	0940	20	16				BI - 50 cpm
	10-4-91	20					σ - 0 cpm
52							
53							
54							
55	33431	5		N.R.			H ₂₀ - 0
56	0950	20	0				AD - NA
	10-4-91	21					σ - 0
57							
58							
59							

NOTES SEE PG 10

VISUAL CLASSIFICATION OF SOILS

10-7-91

PROJECT NUMBER: 602. 5-62-03	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 3551	COORDINATES: SEE Pg -1	DATE: 10-4-91
ELEVATION: SEE Pg 1	GWL: Depth SEE Pg 1	DATE STARTED: 10-2-91
ENGINEER/GEOLOGIST: J. Carr	Depth: N/A	DATE COMPLETED: 10-7-91
DRILLING METHODS: cable tool		PAGE: 9 OF 9

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
61	33432 1000 10-4-91	16 10 13	18	med dense, dark grayish brown (10yr 4/2) well sorted sand, Trace gravel, trace silt, wet.	SP	NA	H ₂ O - 0 ppm BB - 50 cpm α - 0 cpm
66	33433 200 10-4-91	11 13 10	18	S.A.A.			H ₂ O - 0 ppm BB - 50 cpm α - 0 cpm
71	33434 1995 10-4-91	17 21 33	12	dense, dark grayish brown (10yr 4/2) poorly sorted sand, Trace gravel, Trace silt wet	SW	NA	H ₂ O - 0 ppm BB - 50 cpm α - 0 cpm

NOTES
See page 2

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 602.3.11	PROJECT NAME FEMP RI/FS
BORING NUMBER 3551	COORDINATES: SEE Pg-1
ELEVATION: SEE Pg-1	GWL: Depth SEE Pg 1 Date/Time SEE Pg 1
ENGINEER/GEOLOGIST J. Lear	Depth N/A Date/Time N/A
DRILLING METHODS Cable Tool	PAGE 5 OF 9

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 150mm	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
75							
76	33495 1600 10-4-91	5 6 11	18	med dense, dark grayish brown (104-412) poorly sorted sand, some gravel, trace silt, wet.	SW	N.A.	U ₁₀₀ - 0 p.p.m. G ₆₀ - 50 c.p.m. G ₂₀₀ - 0 c.p.m.
77							
78							
79							
80	33496 0830 10-6-91	25 50/3	8	M. dense, dark grayish brown (104-412) well sorted fine sand, trace silt, wet.	SP	NA	U ₁₀₀ - 0 p.p.m. G ₆₀ - 50 c.p.m. G ₂₀₀ - 0 c.p.m.
81							
82							
83							
84							
85	33497 0700 10-6-91	11 27 50	8	very dense, dark grayish brown (104, 412) poorly sorted sand, some gravel, wet.	SW	NA	U ₁₀₀ - 0 p.p.m. G ₆₀ - 50 c.p.m. G ₂₀₀ - 0 c.p.m.
86							
87							
88							
89							

NOTES see page 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.11	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 3551	COORDINATES: SEC P9-1	DATE: 10-6-91
ELEVATION: SEE P9-1	GWL: Depth: SEE P9-1 Date/Time: SEE P9-1	DATE STARTED: 10-2-91
ENGINEER/GEOLOGIST: J. Lear	Depth: N/A Date/Time: N/A	DATE COMPLETED: 10-7-91
DRILLING METHODS: cable tool	PAGE: 6 OF 9	

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 15.75"	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
90							
91	35125 3535 10-6-91	30 50/6	8	V. dense, dark grayish brown. (1040, 412) Poorly sorted gravel, Trace clay, Trace silt, wet sandy	GW	NA	H ₂₅ - 0 ppm B ₆ - 50 cpm a - 0 cpm
92							
93							
94							
95	35447	30					
96	1110 10-6-91	31 35	18	S.A.A.			H ₂₅ - 0 ppm B ₆ - 50 cpm a - 0 cpm
97							
98							
99							
100	35440	32					
101	1400 10-6-91	50/2	6	V. dense, dark grayish brown. (1040, 412) Poorly sorted gradually sand, wet	SW	NA	H ₂₅ - 0 ppm B ₆ - 50 cpm a - 0 cpm
102							
103							
104							
105							

NOTES: see page 1

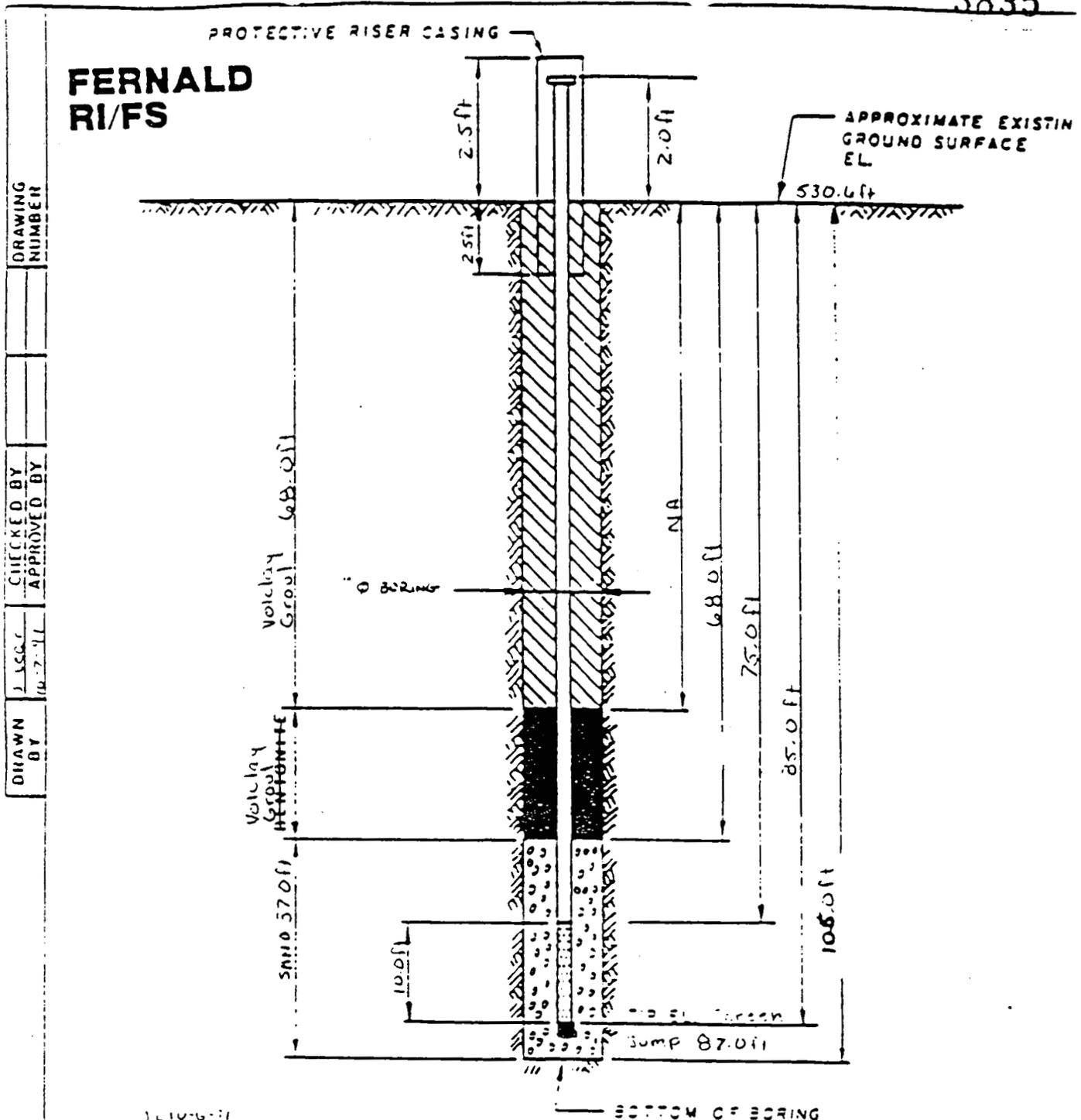
VISUAL CLASSIFICATION OF SOILS

3835

PROJECT NUMBER 602.3.11	PROJECT NAME FEMP RI/FS	
BORING NUMBER 3551	COORDINATES SEE Pg-1	DATE 10-6-91
ELEVATION: SEE Pg-1	GWL: Depth SEE Pg-1 Date/Time SEE Pg-1	DATE STARTED 10-2-91
ENGINEER/GEOLOGIST J. Leaf	Depth N/A Date/Time N/A	DATE COMPLETED 10-7-91
DRILLING METHODS cable Tool	PAGE 7 OF 9	

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ISCI)	REMARKS
105	33441	25					
106	1630 10-6-91	SD/S	7	Medium grayish brown (10YR, 5/2) poorly sorted gravel, fine sand, trace silt, wet. * some odor	GW	NA	4.0 - 0.0 cm 3.0 - 50.0 cm 2 - 0.0 cm
107				Drilling ends at 105.0 ft. Sampling ends at 106.5 ft. well set at 85 ft. No blue clay encountered.			

NOTES see Pg 1



DRAWING NUMBER	
CHECKED BY	
APPROVED BY	
DATE	10-2-71
DRAWN BY	

NOTES

1. RISER PIPE IS 4 IN. TO SCHEDULE 40 PIPE, THREADED, FLANGE-JOINTED.
2. SCREEN IS 4 IN. I.D. SS PIPE CONTINUOUS SLOT SCREEN (0.0-0 IN SLOT SIZE)
3. LOWER END OF SCREEN IS CAPPED.
4. ELEVATION OF WATER LEVEL
5. WATER LEVEL READING ON
- 7 - 20 lb bags 10#20 sand
- 20 - 50 lb bags volclay grout
- 100 - gal of H₂O used in drilling and grouting
- 2 - 5 gal buckets of bentonite

INSTALLATION DETAILS
 MONITORING WELL
 3551
 PREPARED FOR
 Fernald RI/FS

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FEMP RI/FS FIELD ENG./GEO. J. Lear DATE 10-7-91
 PROJECT NO. 602.3.11 CHECKED BY _____ DATE _____
 BORING NO. 3551
 PIEZOMETER NO. 3551 DATE OF INSTALLATION 10-7-91

BOREHOLE DRILLING

DRILLING METHOD <u>cable Tool</u>	TYPE OF BIT <u>cable tool Bit</u>
DRILLING FLUID(S) USED: FLUID <u>H₂O</u> FROM <u>0.0</u> TO <u>10.0 ft</u> FLUID <u>NA</u> FROM _____ TO _____	CASING SIZE(S) USED: SIZE <u>10.0</u> FROM <u>0.0 ft</u> TO <u>105.0 ft</u> SIZE <u>NA</u> FROM <u>NA</u> TO <u>NA</u>

PIEZOMETER DESCRIPTION

TYPE <u>stainless steel</u>	RISER PIPE MATERIAL <u>stainless steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0 in ID</u>	RISER PIPE DIAMETERS: O.D. <u>4 3/8 in</u> I.D. <u>4.0 in</u>
PERFORATION TYPE: SLOTS <input type="checkbox"/> HOLES <input type="checkbox"/> SLOTTED SCREEN <input checked="" type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>7.10 ft sections 1.5 ft</u>
AVERAGE SIZE OF PERFORATIONS <u>0.10 in</u>	JOINING METHOD <u>Threaded flush lined</u>
TOTAL PERFORATED AREA <u>10.0 ft²</u>	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>5.0 ft</u>	OTHER PROTECTION <u>vented well cap</u>
PROTECTIVE PIPE O.D. <u>10.75 in</u>	<u>Hinged hole cover, locked</u>

ITEM	DISTANCE ABOVE / BELOW GROUND SURFACE (ft)		ELEVATION (AT)					
TOP OF RISER PIPE	2.0		531.86'					
GROUND SURFACE	0.0		529.86'					
BOTTOM OF PROTECTIVE PIPE	2.5		527.36'					
BOREHOLE FILL MATERIALS: GROUT / SLURRY BENTONITE SAND <u>36 10-7-91</u> <u>GRAVEL None used</u>	TOP	0.0	BOTTOM	68.0	TCP	529.86	BOTTOM	461.86
	TOP	0.0	BOTTOM	0.0	TOP	0.0	BOTTOM	0.0
	TOP	68.0	BOTTOM	105.0	TOP	461.86	BOTTOM	286
	TOP	NA	BOTTOM	NA	TOP	N/A	BOTTOM	N/A
PERFORATED SECTION	TOP	75.0	BOTTOM	85.0	TOP	457.86	BOTTOM	444.8
PIEZOMETER TIP	37.0		442.86'					
BOTTOM OF BOREHOLE	105.0		424.86'					
GWL AFTER INSTALLATION	11.31		518.05'					

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

REMARKS _____

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.16	PROJECT NAME: FEMP RI/FS
BORING NUMBER: 1820	COORDINATES: ^{N 47 74 4.33} ^{W 137 9 888.2} UNKNOWN ^{RI 10 10 10}
ELEVATION: 576.3	GWL: Depth NA Date/Time NA
ENGINEER/GEOLOGIST: G. Marshall	Depth NA Date/Time NA
DRILLING METHODS: SPLIT SPOON	PAGE 1 OF 1

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEAS JRED CONSISTENCY (TSF)	REMARKS
1	15:14 10-16-91	5 7 15	16.5	Black (2.5yr/10) silt, some sand, some gravel, dry, Traces of brick.	ML	NA	HNU - 0 ppm. BX - 50-90cpm. α - 0 cpm
2	67508 15:21 10-16-91	15 18 23	18.0	Black (2.5yr/10) silt, some sand some gravel, dry, Traces of brick.	ML	NA	HNU - 0ppm BX - 50-90cpm α - 0 cpm.
3	67504 15:37 10-16-91	15 25 29	18.0	Black (2.5yr/10) silt, some sand some gravel, dry	ML	NA	HNU - 0ppm BX - 50-90cpm. α - 0 cpm
4	15:44 10-16-91	19 20 21	16.0	Black (2.5yr/10) silt, some sand some gravel, dry, trace of shale	ML	NA	HNU - 0ppm BX - 50-90cpm α - 0 cpm.
5	67506 15:52 10-16-91	15 14 9	17.0	Black (2.5 yr/10) silt, some sand some gravel, dry, trace of brick	ML	NA	HNU - 0ppm BX - 50-90cpm α - 0 cpm
6	15:59 10-16-91	7 5 5	10.0	Black (2.5 yr/10) sandy, silt, some gravel, dry.	ML	NA	HNU - 0ppm BX - 50-90cpm α - 0 cpm.
7	67508 16:05 10-16-91	26 15 13	13.0	Black (2.5 yr/10) sandy, silt, some gravel, dry Light yellowish brn. (10yr/6/4) well sorted sand, trace of gravel dry.	ML CL	NA NA	HNU - 0 ppm BX - 50-90cpm α - 0 cpm
8	67508 16:14 10-16-91	13 18 19	14.0	Light yellowish brn (2.5y/6/4) silty clay trace of sand low plasticity, moist. V stiff.	CI	2.5	HNU - 0 ppm BX - 50-90cpm α - 0 cpm.
9	16:20 10-16-91	16 13 23	12.0	Light yellowish brn (2.5y/6/4) silty clay, trace of sand low plasticity, moist. V. stiff.	CL	2.5	HNU - 0 ppm BX - 50-90cpm α - 0 cpm.
10				No Recovery			
11				No Recovery			
12				No Recovery			
13				No Recovery			

FOC
= Hot
= Rad

FOC
= Rad
= HSL

RAD

HSL
FOC

NOTES Drilling Contractor - Penn Drilling
 Drilling Equipment - 42 cyclone
 Driller - Dave Newman
 Drill Helper - Bob Johnson
 Sampling Techs - VERN LARGER, LARRY MARSHALL
 Back ground
 HNU - 0ppm
 BX - 50-90cpm.
 α - 0 cpm.

#67507 Soil composite TC10 (metals, Pest & Herb) E? Tox (Corrosivity, Reactivity, Toxicity).
 #67508 - Field Blank. SRLP (Gen Chem, Metals, Radionuclides Table A-1)

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FEMP RI/FS FIELD ENG./GEO. G. Marshall DATE 10-16-91
 PROJECT NO. 602.20.03.01 (3.16) CHECKED BY _____ DATE _____
 BORING NO. 1820 ^{PEM 10-16-91}
 PIEZOMETER NO. NA DATE OF INSTALLATION 10-16-91
Plugging

BOREHOLE DRILLING

DRILLING METHOD <u>split Spoon</u>	TYPE OF BIT <u>NA</u>
DRILLING FLUID(S) USED: <u>NA</u>	CASING SIZE(S) USED: <u>NA</u>
FLUID <u>NA</u> FROM _____ TO _____	SIZE <u>NA</u> FROM _____ TO _____
FLUID <u>NA</u> FROM _____ TO _____	SIZE <u>NA</u> FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE <u>NA</u>	RISER PIPE MATERIAL <u>NA</u>
DIAMETER OF PERFORATED SECTION <u>NA</u>	RISER PIPE DIAMETERS: <u>NA</u>
PERFORATION TYPE: <u>NA</u>	O.D. <u>NA</u> I.D. <u>NA</u>
SLOTS <input type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>NA</u>
AVERAGE SIZE OF PERFORATIONS <u>NA</u>	JOINING METHOD <u>NA</u>
TOTAL PERFORATED AREA <u>NA</u>	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>NA</u>	OTHER PROTECTION <u>NA</u>
PROTECTIVE PIPE O.D. <u>NA</u>	

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION (ft.)		
	TOP	BOTTOM	TCP	BOTTOM	
TOP OF RISER PIPE	<u>NA</u>		<u>NA</u>		
GROUND SURFACE		0.0		576.3	
BOTTOM OF PROTECTIVE PIPE	<u>NA</u>		<u>NA</u>		
BOREHOLE FILL MATERIALS:					
	GROUT/SLURRY	TOP <u>0.0</u>	BOTTOM <u>13.5</u>	TCP <u>576.3</u>	BOTTOM <u>562.8</u>
	BENTONITE	TOP <u>NA</u>	BOTTOM	TOP <u>NA</u>	BOTTOM <u>NA</u>
	SAND	TOP <u>NA</u>	BOTTOM	TOP <u>NA</u>	BOTTOM <u>NA</u>
GRAVEL	TOP <u>NA</u>	BOTTOM	TOP <u>NA</u>	BOTTOM <u>NA</u>	
PERFORATED SECTION	TOP <u>NA</u>	BOTTOM	TOP <u>NA</u>	BOTTOM <u>NA</u>	
PIEZOMETER TIP	<u>NA</u>		<u>NA</u>		
BOTTOM OF BOREHOLE	<u>13.5</u>	13.5 <u>13.5</u>		<u>562.8</u>	
GWL AFTER INSTALLATION	<u>NA</u>		<u>NA</u>		

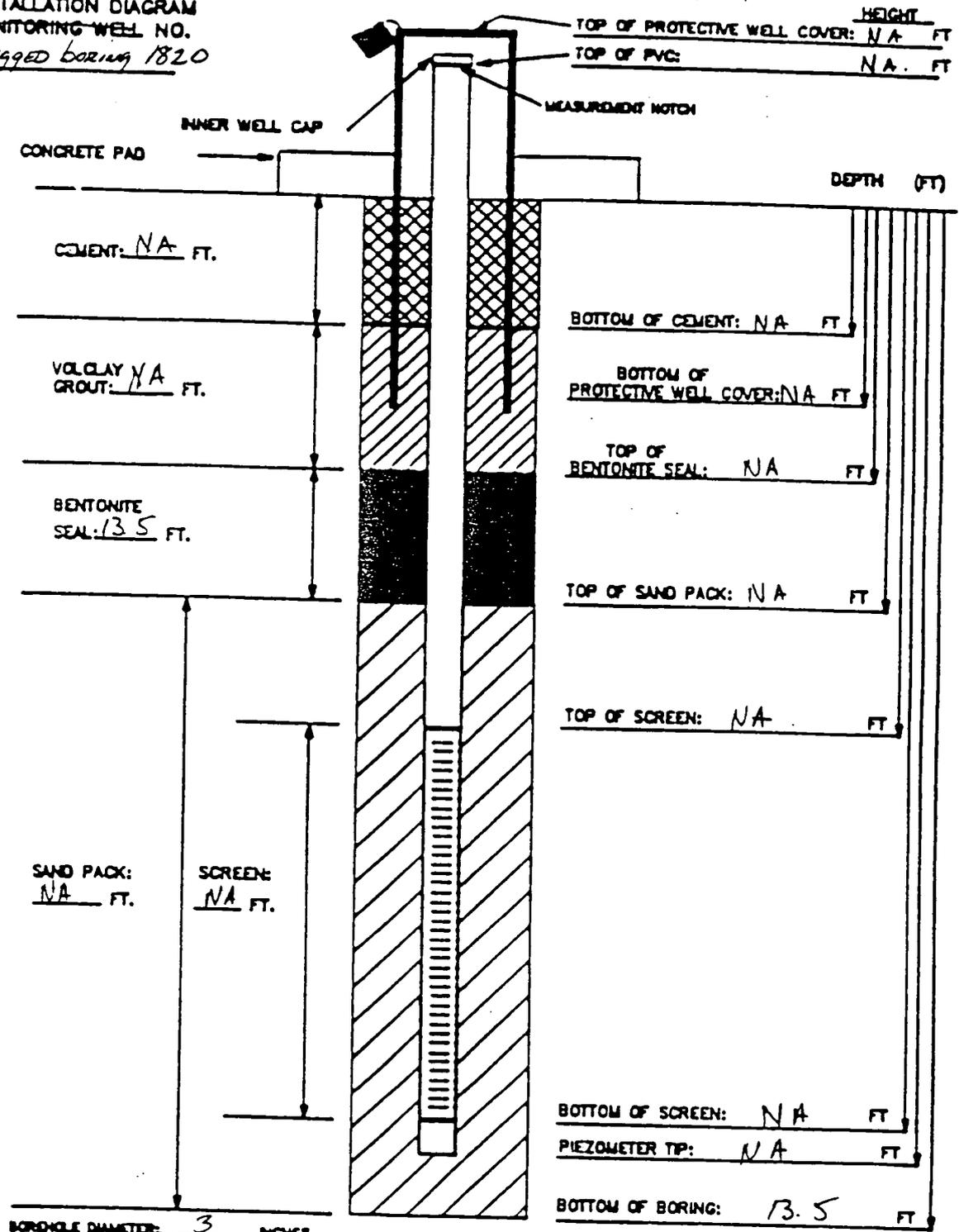
WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES NO
 WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES NO

REMARKS _____

SCM 10-16-91
INSTALLATION DATE: 10-16-91
Plugging

FERNALD RI/FS

HFP INSTALLATION DIAGRAM
MONITORING WELL NO.
Plugged boring 1820



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

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 BUMP.
 4) WATER DEPTH/DATE:

TASK: 602. 20.03.01
Task 3.16

GEOLOGIST/ENGINEER: J. Marsha

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER	602 25 91	PROJECT NAME	EMPC RI/FS CU-1
BOREHOLE NUMBER	1819	COORDINATES	
ELEVATION		GWL Depth	N/A
ENGINEER/GEOLOGIST	Ken Mariani	Date/Time	
DRILLING METHODS	10" Hollow stem Auger		PAGE 1 OF 2

DEPTH ft.	SAMPLE TYPE & NO.	BLOWS ON SAMPLE (6 in.)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED LIQUIDITY (LL)	WELL CLASSIFICATION	REMARKS																		
0	101691 1500	9	6	Hard olive brown (2.5Y, 4/4) and some light yellowish brown (2.5Y, 6/4) SILTY CLAY with some organic matter and a little gravel; dry, non plastic	CL	>40	N/A	<table border="1"> <tr><td>HL</td><td>0</td><td>13</td></tr> <tr><td>CU</td><td>0</td><td>300</td></tr> <tr><td>LL</td><td>0</td><td>81</td></tr> <tr><td>CL</td><td>0</td><td>200</td></tr> <tr><td>UL</td><td>0</td><td>81</td></tr> <tr><td>CU</td><td>0</td><td>250</td></tr> </table>	HL	0	13	CU	0	300	LL	0	81	CL	0	200	UL	0	81	CU	0	250
HL	0	13																								
CU	0	300																								
LL	0	81																								
CL	0	200																								
UL	0	81																								
CU	0	250																								
1		38	6																							
1 1/2		30	6																							
2		20		No Recovery																						
2	101691 1525	21	6	Light olive brown (2.5Y, 5/4) very stiff CLAY with a little gravel and trace sand, dry, non plastic.	CL	2.75		<table border="1"> <tr><td>HL</td><td>0</td><td>13</td></tr> <tr><td>CU</td><td>0</td><td>220</td></tr> <tr><td>LL</td><td>0</td><td>81</td></tr> <tr><td>CL</td><td>0</td><td>200</td></tr> </table>	HL	0	13	CU	0	220	LL	0	81	CL	0	200						
HL	0	13																								
CU	0	220																								
LL	0	81																								
CL	0	200																								
3		24	6																							
3 1/2		15	6	Very stiff olive gray (5Y, 4/2) CLAY with black organic matter, trace gravel, glass fragments, damp, medium plasticity	CL	2.5	N/A	<table border="1"> <tr><td>HL</td><td>0</td><td>13</td></tr> <tr><td>CU</td><td>0</td><td>160</td></tr> </table>	HL	0	13	CU	0	160												
HL	0	13																								
CU	0	160																								
4		15	6																							
4 1/2	101691 1535	36	6	Very stiff olive yellow (2.5Y, 6/6) clay with trace sand and organic matter, damp, low plasticity	CL	2.5		<table border="1"> <tr><td>HL</td><td>0</td><td>13</td></tr> <tr><td>CU</td><td>0</td><td>350</td></tr> </table>	HL	0	13	CU	0	350												
HL	0	13																								
CU	0	350																								
5		25	6	Dense Black medium SAND with trace gravel, damp			N/A	<table border="1"> <tr><td>HL</td><td>0</td><td>81</td></tr> <tr><td>CU</td><td>0</td><td>200</td></tr> </table>	HL	0	81	CU	0	200												
HL	0	81																								
CU	0	200																								
5 1/2		26	6		SP	N/A		<table border="1"> <tr><td>HL</td><td>0</td><td>180</td></tr> <tr><td>CU</td><td>0</td><td>150</td></tr> </table>	HL	0	180	CU	0	150												
HL	0	180																								
CU	0	150																								
6		21	6																							
6 1/2	101691 1550	8	6	Very stiff olive yellow (5Y, 6/8) Clay, moist, high plasticity with some grayish black sand	CL	3.0	N/A	<table border="1"> <tr><td>HL</td><td>0</td><td>13</td></tr> <tr><td>CU</td><td>0</td><td>150</td></tr> </table>	HL	0	13	CU	0	150												
HL	0	13																								
CU	0	150																								
6 3/4	63885	15	6					<table border="1"> <tr><td>HL</td><td>0</td><td>130</td></tr> <tr><td>CU</td><td>0</td><td>120</td></tr> </table>	HL	0	130	CU	0	120												
HL	0	130																								
CU	0	120																								
7	63886	18	6					<table border="1"> <tr><td>HL</td><td>0</td><td>13</td></tr> <tr><td>CU</td><td>0</td><td>150</td></tr> </table>	HL	0	13	CU	0	150												
HL	0	13																								
CU	0	150																								

NOTES

Drilling Contractor Penn Drill
 Drilling Equipment SIMCO
 Driller: Elgy Gardner
John Strapuzzen

Colors Identified using Munsell color chart

HL	S/N: 1185	0.1 ppm
CU	S/N: 5536	0 cpm
UL	S/N: 2012	20-110 cpm

 } Background Levels

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER <u>602 25 01</u>	PROJECT NAME <u>EMPC RI/FS CU-1</u>		
BOREHOLE NUMBER <u>1819</u>	COORDINATES	DATE <u>10/16/91</u>	
ELEVATION	GWL Depth <u>N/A</u>	Date/Time	DATE STARTED: <u>10/16/91</u>
ENGINEER/GEOLOGIST <u>Ken Marice</u>	Depth	Date/Time	DATE COMPLETED: <u>10/17/91</u>
DRILLING METHODS <u>10" Hollow Stem Auger</u>			PAGE <u>2</u> OF <u>2</u>

DEPTH (ft.)	SAMPLE TYPE & ID	BLOWS ON SAMPLER (6 in)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	WELL CLASSIFICATION	REMARKS
7 1/2	1016/11 1559	40	6	Mottled grayish black and pale olive (5Y, 6/4) very stiff sandy/silty CLAY with glass fragments, a little gravel, and trace organic matter, wet, high plasticity	CL	2.75	N/A	
8 1/2		38	6					
9		32		No Recovery				
9	1016/11 1605			Bottom of Bore Hole				
10				Note: At 9 ft metal object was struck while trying to drive Shelby tube. Tried to auger through the obstruction but the rig became seized in the wet.				
11				No Recovery				
11.5								

NOTES
 Drilling Contractor Penn Drill
 Drilling Equipment STAC
 Driller Eliu Gardner
John Strapazzon

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.11	PROJECT NAME: FEMP R/FS	
BORING NUMBER: 3550	COORDINATES:	DATE 10-9-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 10-10-91
ENGINEER/GEOLOGIST: J. Lee	Depth Date/Time	DATE COMPLETED: 10-18-91
DRILLING METHODS: cable tool	PAGE 1 OF 8	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
5				Descriptions may be cross referenced from Boring 2550 up to 30.0 ft.			
10							
15							
20							
25							

NOTES
 Drilling Equipment - Cyclone 45 cable tool
 Drilling Company - Penn Drilling
 Driller - Craig Coulter
 Asst - Smiley Rye

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

Background
 H₂O - 0 ppm
 BB - 50-60 cpm
 a - 0 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>602.3.11</u>	PROJECT NAME: <u>FEMP RI/FS</u>	
BORING NUMBER: <u>3550</u>	COORDINATES:	DATE <u>10-15-91</u>
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: <u>10-10-91</u>
ENGINEER/GEOLOGIST: <u>J. Lear</u>	Depth Date/Time	DATE COMPLETED: <u>10-18-91</u>
DRILLING METHODS: <u>cable Tool</u>		PAGE <u>2</u> OF <u>8</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10 CM	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS		
30									
31									
32									
33									
34									
35	<u>27443</u>	<u>15</u>		<u>Dense, yellowish brown, (10gr, 5/4) fine sand (well sorted) some silt, wet.</u>	<u>SP</u>	<u>NA</u>	<u>400 - 0 FPM</u>		
36	<u>27444</u>	<u>27</u>	<u>18</u>				<u>300</u>	<u>NA</u>	<u>30 - 50 CFM</u>
	<u>27445</u>	<u>25</u>					<u>0 - 0</u>		
37									
38									
39									
40	<u>27444</u>	<u>15</u>		<u>Dense, yellowish brown, (10gr, 5/4) well sorted medium some silt, trace gravel, wet</u>	<u>SP</u>	<u>NA</u>	<u>400 - 0 FPM</u>		
41	<u>27445</u>	<u>15</u>	<u>18</u>				<u>30 - 60 CFM</u>		
	<u>27446</u>	<u>15</u>					<u>0 - 0 CFM</u>		
42									
43									
44									
45									

NOTES
 Drilling Equipment - cyclone 45 cable tool
 Drilling Company - Penn Drilling
 Logger - Craig Coulter
 Boss - Craig Lear

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>602.3.11</u>	PROJECT NAME: <u>FEMP RI/FS</u>	
BORING NUMBER: <u>355D</u>	COORDINATES:	DATE <u>10-15-91</u>
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: <u>10-10-91</u>
ENGINEER/GEOLOGIST: <u>J. Lear</u>	Depth Date/Time	DATE COMPLETED: <u>10-18-91</u>
DRILLING METHODS: <u>Cable Tool</u>		PAGE <u>3</u> OF <u>8</u>

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
45							
46	31495 500 10/15-91	10 19 28	12	Dense, yellowish brown (10yr 5/4) Poorly sorted sand Trace gravel, trace silt, wet.	SW	NA	H ₂₀ - 0 fpm CB - 50 cpm Q - 0 cpm
47							
48							
49							
50	33496 1615 10-15-91	30 50/5	12	V. Dense dark grayish brown (10yr 4/2) Poorly sorted Gravelly sand, Trace silt; wet	SW	NA	H ₂₀ - 0 fpm CB - 60 cpm Q - 0 cpm
51							
52							
53							
54							
55	37497 1700 10/15-91	12 17	18	S.A.A. add dense	SW	NA	H ₂₀ - 0 fpm CB - 60 cpm Q - 0 cpm
56							
57							
58							
59							

NOTES see pg 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.11	PROJECT NAME: FEMP RI/FS		
BORING NUMBER: 3550	COORDINATES:	DATE 10-16-91	
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 10-10-91
ENGINEER/GEOLOGIST: J. Lear	Depth	Date/Time	DATE COMPLETED: 10-18-91
DRILLING METHODS: Cable Tool			PAGE 4 OF 8

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0m	RECOVERY (m)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ISCI)	REMARKS
61	27443 0900 10-16-91	2 22 22	18	Dense, yellowish brown, (10yr, 5/4) well sorted med sand, some silt, trace gravel, wet.	SP	NA	H ₂₀ - 0 ppm BB - 60 cpm S - 0 cpm
62							
63							
64							
65	73495 0730 10-16-91	6 7 11	18	med dense yellowish brown (10yr, 5/4) poorly sorted sand, some gravel, wet	SW	NA	H ₂₀ - 0 ppm BB - 60 cpm
66				med dense, yellowish brown (10yr 5/4) poorly sorted gravel, some sand, wet.	GW	NA	S - 0 cpm
67							
68							
69							
70	33450 1045 10-16-91	17 26 23	18	Dense, yellowish brown, (10yr, 5/4) poorly sorted sand, trace silt, trace gravel, wet	SW	NA	H ₂₀ - 0 ppm BB - 50 cpm S - 0 cpm
71							
72							
73							
74							

NOTES See Fig 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>002.3.11</u>	PROJECT NAME: <u>FEMP RI/FS</u>		
BORING NUMBER: <u>3550</u>	COORDINATES:	DATE: <u>10-16-91</u>	
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: <u>10-10-91</u>
ENGINEER/GEOLOGIST: <u>J. Lear</u>	Depth	Date/Time	DATE COMPLETED: <u>10-18-91</u>
DRILLING METHODS: <u>cable tool</u>			PAGE: <u>5</u> OF <u>8</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 15.0"	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
75							
76	<u>37451</u> <u>1200</u> <u>10-16-91</u>	<u>7</u>	<u>18</u>	<u>med dense, very dark grayish brown, (0.4r, 5/2) poorly sorted sand, some gravel, trace silt.</u>	<u>SW</u>	<u>NA</u>	<u>H₂₀₀ - 0 ppm</u> <u>C₁ - 60 CPM</u> <u>z - 0 CPM</u>
77							
78							
79							
80							
81	<u>37452</u> <u>1300</u> <u>10-16-91</u>	<u>15</u>	<u>0</u>	<u>N.R.</u>	<u>NA</u>	<u>NA</u>	<u>H₂₀₀ - 0 ppm</u> <u>B₂₀ - 60 JL 10-16-91</u> <u>z - NA</u>
82							
83							
84							
85	<u>37453</u> <u>1420</u> <u>10-16-91</u>	<u>17</u>	<u>11</u>	<u>med, very dark ^{grayish} brown, (0.4r, 5/2) poorly sorted sand, some gravel, trace silt, wet</u>	<u>SW</u>	<u>NA</u>	<u>H₂₀₀ - 0 ppm</u> <u>F₂₀ - 60 CPM</u> <u>z - 0 CPM</u>
86							
87							
88							
89							

NOTES see pg 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602-3-11	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 3350	COORDINATES:	DATE 10-16-91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 10-10-91
ENGINEER/GEOLOGIST: J. War	Depth Date/Time	DATE COMPLETED: 10-18-91
DRILLING METHODS: Cable Tool		PAGE 6 OF 8

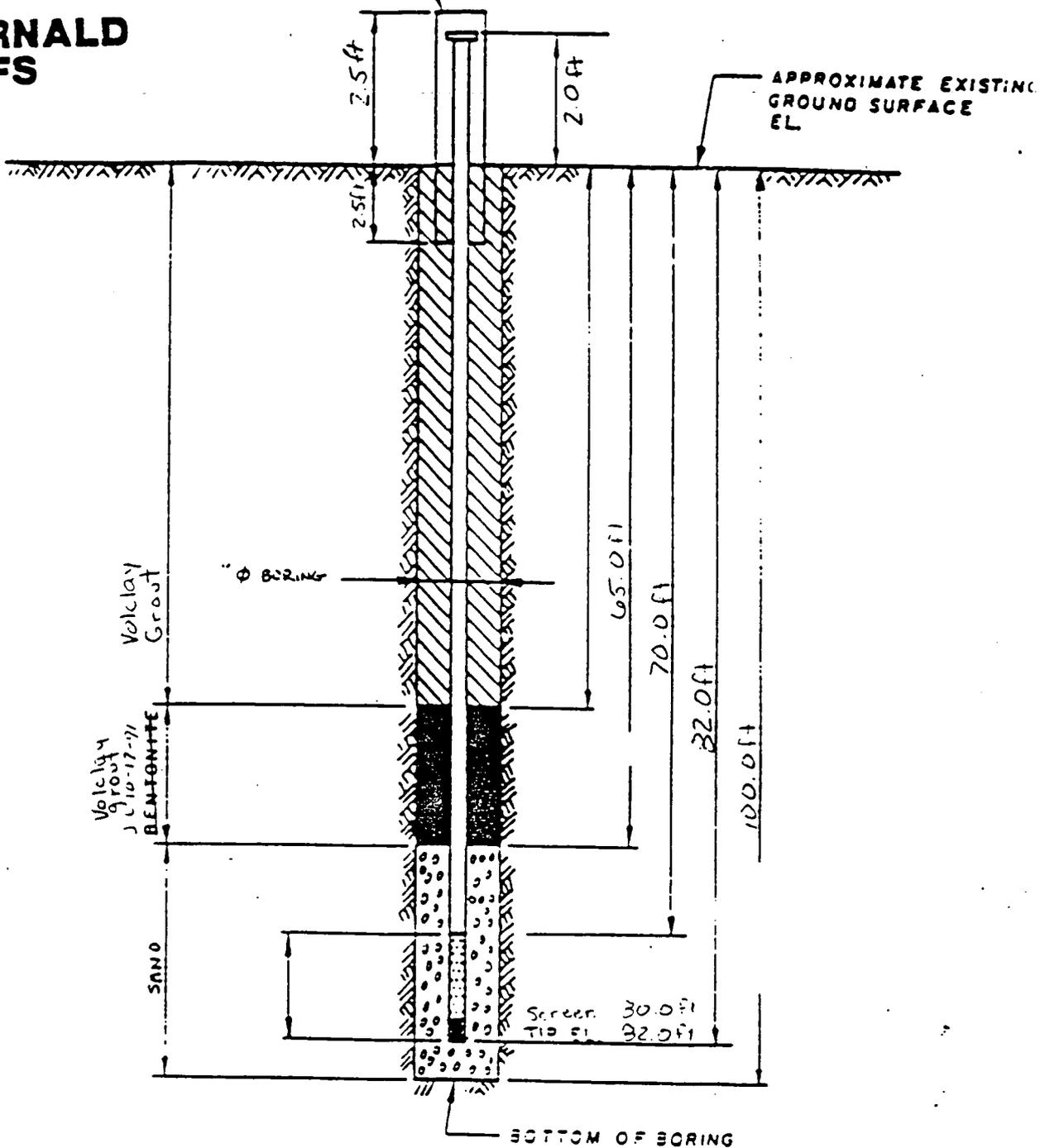
DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (ft)	RECOVERY (ft)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
70							
71	33454 1445 10-10-91	11 21 23	12	S.A.R.	SW	NA	H ₂₅ - 0 ppm B ₂₅ - 50 cpm α - 0 cpm
72							
73							
74							
75							
76	33455 1600 10-11-91	9 16	13	S.A.R.	SW	NA	H ₂₆ - 0 ppm B ₂₆ - 60 cpm α - 0 cpm
77							
78							
79							
100							
101	33456 1445 10-16-91	10 21	13	Dense, dark grayish brown (uvr, 4%) well sorted med sand with gravel, trace silt, wt	SP	NA	H ₂₇ - 0 cpm B ₂₇ - 60 cpm α - 0 cpm
102				Drilling ends at 100.0' Sampling ends at 101.5' Well set at 80.0'			

NOTES See P91

FERNALD RI/FS

PROTECTIVE RISER CASING

DRAWING NUMBER	
CHECKED BY	
APPROVED BY	
J. Lear	10-17-91
DRAWN BY	



NOTES:

1. RISER PIPE IS 4" IN 10 SCHEDULE 40 PIPE, THREADED, FLUSH-JOINTED.
 2. SCREEN IS 4" IN 1.0 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
- 10-Bags 30 lb 10x20 sand
 25-Bags 20 lb Volclay grout
 300-gals used in grouting
 300-gals used in drilling

**INSTALLATION DETAILS
 MONITORING WELL**

3550

PREPARED FOR

Fernald RI/FS

Stainless lengths used in well
 construction = 7-10ft sections, 1-2ft riser
 1-2ft sump

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FEMP RI/FS FIELD ENG./GEO. J. Lear DATE 10-17-91
 PROJECT NO. 602-3-11 CHECKED BY _____ DATE _____
 BORING NO. 3550
 PIEZOMETER NO. 3550 DATE OF INSTALLATION 10-17-91

BOREHOLE DRILLING

DRILLING METHOD <u>Cable Tool</u>	TYPE OF BIT <u>Cable Tool</u>
DRILLING FLUID (S) USED: FLUID <u>H₂O</u> FROM <u>0.0ft</u> TO <u>100.0</u> FLUID <u>NA</u> FROM <u>NA</u> TO <u>NA</u>	CASING SIZE (S) USED: SIZE <u>8in</u> FROM <u>0.0</u> TO <u>100.0</u> SIZE <u>NA</u> FROM <u>NA</u> TO <u>NA</u>

PIEZOMETER DESCRIPTION

TYPE <u>Stainless steel</u>	RISER PIPE MATERIAL <u>Stainless steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0 in</u>	RISER PIPE DIAMETERS: O.D. <u>4 3/8</u> I.D. <u>4.0 in</u>
PERFORATION TYPE: SLOTS <input type="checkbox"/> HOLES <input type="checkbox"/> SLOTTED SCREEN <input checked="" type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>70ft, 2ft</u>
AVERAGE SIZE OF PERFORATIONS <u>0.010 in</u>	JOINING METHOD <u>Threaded, flush joined</u>
TOTAL PERFORATED AREA <u>10.0 ft</u>	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>5.0ft</u>	OTHER PROTECTION <u>hinged well cap, locked, well cover, vented</u>
PROTECTIVE PIPE O.D. <u>10.75 in</u>	

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION ()	
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 0.0	BOTTOM 65.0	TCP	BOTTOM
BENTONITE	TOP NA	BOTTOM NA	TOP	BOTTOM
SAND	TOP 65.0	BOTTOM 100.0	TOP	BOTTOM
GRAVEL	TOP NA	BOTTOM NA	TOP	BOTTOM
PERFORATED SECTION	TOP 70.0	BOTTOM 80.0	TOP	BOTTOM
PIEZOMETER TIP	82.0			
BOTTOM OF BOREHOLE	100.0			
GWL AFTER INSTALLATION	To be taken later			

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

REMARKS _____

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.11	PROJECT NAME: FEMP RI/FS		
BORING NUMBER: 2552	COORDINATES:		DATE 10/29/91
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 10/29/91
ENGINEER/GEOLOGIST: Ken Marion	Depth	Date/Time	DATE COMPLETED: 10/31/91
DRILLING METHODS: Cable Tool	10" drill bit	PAGE 1	OF 3

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.6 in.	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ITSF)	REMARKS
0	33476 10-29-91 1700	2	16	Loose dark yellowish brown (10YR, 4/4) SAND and SILT with organic matter, damp	SM	N/A	H _{nu} = 0 ppm B _r = 30 cpm α = 0 cpm
1.0		5					
1.3		5		Loose light olive brown (2.5Y, 5/4) SAND and SILT with organic matter, dry	SM	N/A	
1.5				No Recovery			
	33477 10-29-91 1705	7	16	Loose light olive brown (2.5Y, 5/4) SAND with silt and a little gravel, dry	SM	N/A	H _{nu} = 0 ppm B _r = 30 cpm α = 0 cpm
2.8		5					
3.0				No Recovery			
	33478 10-29-91 1710	7	6	Medium dense light olive brown (2.5Y, 5/4) SAND with silt and a little gravel, dry	SM	N/A	H _{nu} = 0 ppm B _r = 30 cpm α = 0 cpm
3.5		8					
				No Recovery			
4.5		7					
	33479 10-29-91 1715	9	6	Medium dense olive yellow (2.5Y, 6/6) gravelly SAND, dry	SP	N/A	H _{nu} = 0 ppm B _r = 30 cpm α = 0 cpm
5.0		13					
6.0		10					
				Hit aquifer at 4.5 - 6.0 ft. interval Samples will be taken at 5 ft. intervals			
7.5							

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

Samples collected per ASTM Standard Penetration Test
 colors Identified using Munsell Color Chart

H_{nu} s/N: A01345 | 0 ppm
 B_r s/N: 86112 | 30 cpm
 α s/N: 55361 | 0 cpm

} Background Levels

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602-3.11	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2552	COORDINATES:	DATE 10/30/91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 10/29/91
ENGINEER/GEOLOGIST: Ken Marica	Depth Date/Time	DATE COMPLETED: 10/31/91
DRILLING METHODS: Cable Tool 10" drill bit		PAGE 2 OF 3

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in. I	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
7.5				Hit aquifer at 4.5 - 6.0 ft. interval Samples will be taken at 5 ft. intervals			
10	33420 10-2-91 1015	27 23 18	18	Dense grayish brown (2.5% s/2) Gravel and SAND, wet	GW N/A	H _{nu} = .1 ppm B ₀ = 35 cpm α = 0 cpm	
11.5				Hit aquifer at 4.5 - 6.0 ft. interval Samples will be taken at 5 ft. intervals			

15
NOTES

H_{nu} S/N: 401345 | 0.1 ppm
 B₀ S/N: 86112 | 35 cpm
 α S/N: 55361 | 0 cpm

} Background Levels

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.11	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2552	COORDINATES:	DATE 10/30/91
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 10/29/91
ENGINEER/GEOLOGIST: Ken Marisa	Depth Date/Time	DATE COMPLETED: 10/31/91
DRILLING METHODS: Cable Tool 1 1/2" drill bit		PAGE 3 OF 3

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15	33481 10-30-11 1045	13 15 20	18 in.	Dense light olive brown (2.54, 5/4) Gravel and SAND, Wet	GW	N/A	H _{nu} = .1 ppm BF = 35 cpm α = 0 cpm
16.5				Hit aquifer at 4.5 - 6.0 ft. interval Samples will be taken at 5 ft. intervals			
20	33482 10-30-11 1415	2 6 7	18	Medium dense olive brown (2.54, 7/4) SAND, wet	SW	N/A	H _{nu} = .1 ppm BF = 35 cpm α = 0 cpm
21.5				Bottom of Borehole at 25 ft.			

NOTES:

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FFMP RI/FS FIELD ENG./GEO. Ken Alarid DATE 10-31-91
 PROJECT NO. 602-311 CHECKED BY _____ DATE _____
 BORING NO. 2552
 PIEZOMETER NO. 2552 DATE OF INSTALLATION 10-31-91

BOREHOLE DRILLING

DRILLING METHOD <u>Cable Tool</u>	TYPE OF BIT <u>10" churn bit</u>
DRILLING FLUID(S) USED:	CASING SIZE(S) USED:
FLUID <u>N/A</u> FROM _____ TO _____	SIZE <u>N/A</u> FROM _____ TO _____
FLUID <u>N/A</u> FROM _____ TO _____	SIZE <u>N/A</u> FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE <u>monitoring well</u>	RISER PIPE MATERIAL <u>3/16 stainless steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0 in. I.D.</u>	RISER PIPE DIAMETERS:
PERFORATION TYPE:	O.D. <u>4 3/8 in.</u> I.D. <u>4.0 in.</u>
SLOTS <input checked="" type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>7 ft. ft.</u>
AVERAGE SIZE OF PERFORATIONS <u>0.0 in.</u>	JOINING METHOD <u>flush-joint threaded</u>
TOTAL PERFORATED AREA <u>15 ft.</u>	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>N/A</u>	OTHER PROTECTION <u>steel well cover</u>
PROTECTIVE PIPE O.D. <u>N/A</u>	<u>w/ lock</u>

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION ()		
TOP OF RISER PIPE	<u>2.0</u>				
GROUND SURFACE	<u>0.0</u>				
BOTTOM OF PROTECTIVE PIPE	<u>2.5 ft. N/A</u>				
BOREHOLE FILL MATERIALS:	GROUT/SLURRY	TOP <u>N/A</u>	BOTTOM <u>N/A</u>	TCP	BOTTOM
		TOP <u>1</u>	BOTTOM <u>3</u>	TOP	BOTTOM
	BENTONITE	TOP <u>3</u>	BOTTOM <u>25</u>	TOP	BOTTOM
		TOP <u>N/A</u>	BOTTOM <u>N/A</u>	TOP	BOTTOM
PERFORATED SECTION	TOP <u>5</u>	BOTTOM <u>20</u>	TOP	BOTTOM	
PIEZOMETER TIP	<u>22</u>				
BOTTOM OF BOREHOLE	<u>25</u>				
GWL AFTER INSTALLATION	<u>to be measured later</u>				

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

REMARKS _____

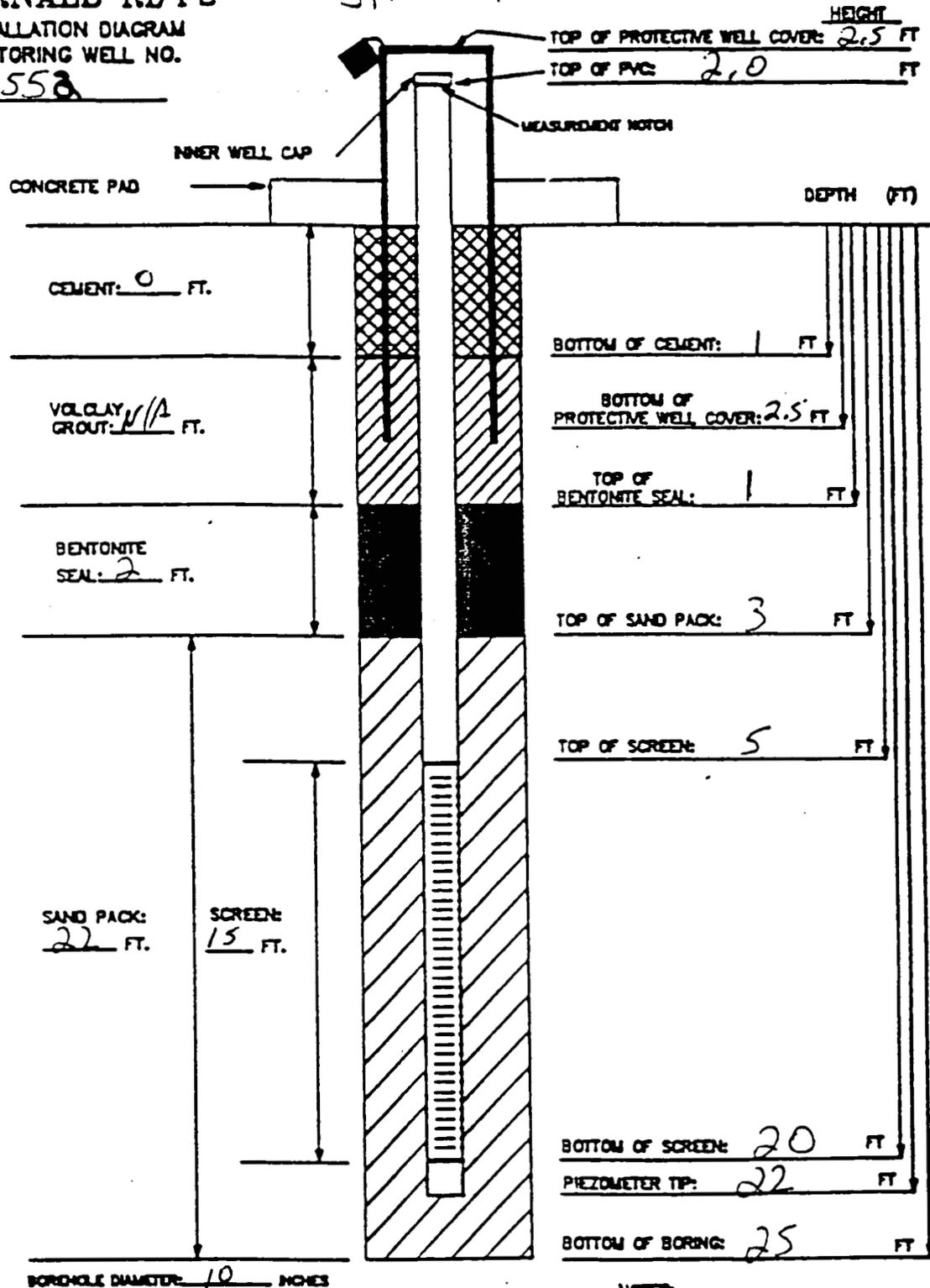
FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.

255a

Stickups

INSTALLATION DATE: 10-31-11



MATERIALS USED:

SAND TYPE AND QUANTITY: Best Sand, 13 bags
 BENTONITE PELLETS (5-GALLON BUCKETS): 4
 BAGS OF VOLCLAY GROUT: N/A
 AMOUNT OF CEMENT: 1 bag
 AMOUNT OF WATER USED: 2.5 gallons
 OTHER:

215

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 SLUMP.
- 4) WATER DEPTH/DATE:

TASK: 602.3.11

GEOLOGIST/ENGINEER: Ken Marion

VISUAL CLASSIFICATION OF SOILS 3835

PROJECT NUMBER: 602.3.11	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2553	COORDINATES:	DATE: 10-29-91
ELEVATION:	GWL: Depth 7.40' Date/Time 10-30-91 0323	DATE STARTED: 10-29-91
ENGINEER/GEOLOGIST: J. Lear	Depth: Date/Time:	DATE COMPLETED: 10-30-91
DRILLING METHODS: Cable Tool	PAGE: 1 OF 4	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (G.O.T.)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ITSF)	REMARKS
1	33486 1545 10-29-91	2 4 4	8	loose, dark yellowish br. (10yr, 4/4) clayey s.H., trace organics, moist	ML	NA	H ₂₅ - 0 ppm B ₂₅ - 50-60 cpm α - 0 cpm
2	33487 1550 10-29-91	5 4 6	12	loose, yellowish brown. (10yr, 5/4) s.H., some clay, moist	ML	NA	H ₂₅ - 12 ppm B ₂₅ - 50-60 cpm α - 0 cpm
3	33488 1555 10-29-91	5 5 6	12	med dense, yellowish brown. (10yr, 5/4) s.Hy some sand, trace clay, sl. moist.	ML	NA	H ₂₅ - trace B ₂₅ - 60 cpm α - 0 cpm
4	33489 1600 10-29-91	5 4 6	10	loose, yellowish brown. (10yr, 5/6) well sorted fine sand, trace s.H., trace gravel, sl. moist.	ML	NA	H ₂₅ - trace B ₂₅ - 50 cpm α - 0 cpm
5							
6							
7				Aug. for met at 4.5 - 6.0' interval Samples will be taken every 5.0ft			
8							
9							
10	33490 1645 10-29-91	6 10 16	7	med. dense, light olive brown. (2.54, 5/3) poorly sorted gravelly sand, trace s.H. wet	SW	NA	H ₂₅ - 0 ppm B ₂₅ - 50-80 cpm α - 0 cpm
11							
12							
13							
14							
15							

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

Backgrounds
 H₂₅ - 0 ppm
 B₂₅ - 40-60 cpm
 α - 0 cpm

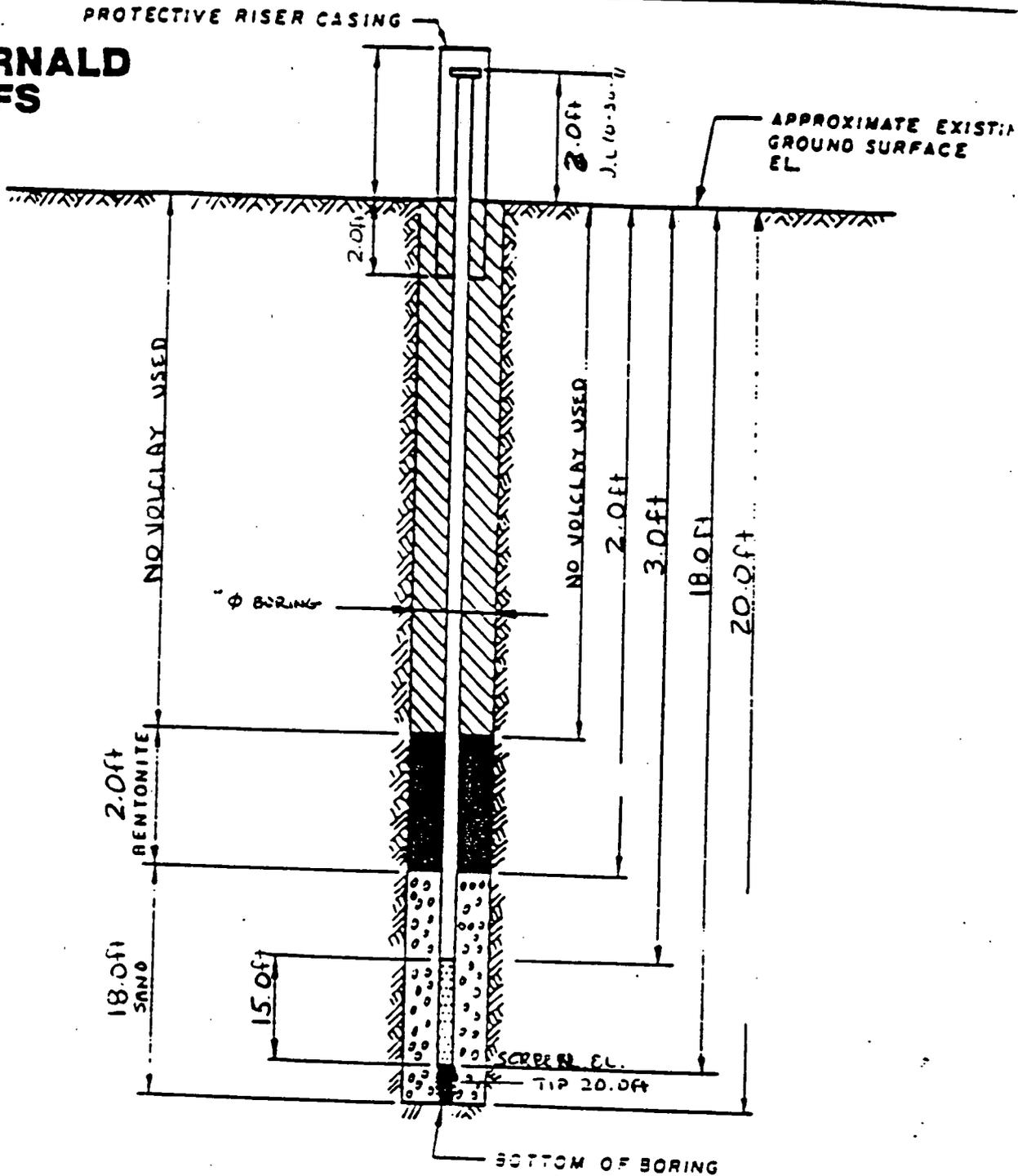
VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER	602.3.11	PROJECT NAME	FEMP RIFES
BORING NUMBER	2553	COORDINATES	
ELEVATION:		GWL: Depth	Date/Time
ENGINEER/GEOLOGIST	J. Lear	Depth	Date/Time
DRILLING METHODS	Cable Tool	PAGE	2 OF 4

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0 in	RECOVER (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15							
16	33491 1655 10-29-71	8 21 24	6	Dense, yellowish brown, (10yr. 5/6) Gravelly Poorly Sorted Sand, Trace clay, wet.	SW	NA	Mu - 0 ppm Bb - 50 cpm α - 0 cpm
17							
18							
19							
20	33492 1745 10-29-71	4 9 12	12	med. dense dark grayish brown, (10yr 4/12) Well sorted fine Sand, wet. 21.0' med dense, yellowish brown, (10yr. 3/6) Poorly sorted sandy gravel, trace silt, wet	SP GW	NA NA	Mu - 0 ppm Bb - 50 cpm α - 0 cpm
21							
22				Drilling and Sampling ends at 20.0ft - 21.5 ft interval. Well set at 20.0ft.			

NOTES see page 1

FERNALD RI/FS



DRAWING NUMBER	
CHECKED BY	J.E.S.
APPROVED BY	10-30-91
DRAWN BY	

NOTES:

1. RISER PIPE 1.540IN ID SCHEDULE 40 PIPE, THREADED, FLUSH-JOINTED.
 2. SCREEN 1.540IN I.D SS. PIPE CONTINUOUS SLOT SCREEN (10.0' x 0.0' IN SLOT SIZE).
 3. LOWER END OF SCREEN IS CAPPED.
 4. ELEVATION OF WATER LEVEL 9.38ft 10-30-91
 5. WATER LEVEL READING ON 10-30-91
- 10 - bags of 10020 B01b sand
 1 - bucket of 5gal bentonite
 100 - gals used in drilling procedures

INSTALLATION DETAILS
 MONITORING WELL
 2553
 PREPARED FOR
 Fernald RI/FS

Amount of stainless used
 1- 2ft pump, 1- 15ft screen, 1- 5ft riser.

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FEMP RI/FS FIELD ENG./GEO. J. Lear DATE 10-30-91
 PROJECT NO. 1602-3.11 CHECKED BY _____ DATE _____
 BORING NO. 2553
 PIEZOMETER NO. 2553 DATE OF INSTALLATION 10-30-91

BOREHOLE DRILLING

DRILLING METHOD <u>Cable Tool</u>	TYPE OF BIT <u>Cable Tool</u>
DRILLING FLUID (S) USED: <u>H₂O</u>	CASING SIZE (S) USED: <u>8.0 in</u>
FLUID <u>H₂O</u> FROM <u>0.0</u> TO <u>20.0ft</u>	SIZE <u>8.0 in</u> FROM <u>0.0</u> TO <u>20.0ft</u>
FLUID <u>NA</u> FROM _____ TO _____	SIZE <u>NA</u> FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE _____	RISER PIPE MATERIAL <u>Stainless steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0 in</u>	RISER PIPE DIAMETERS:
PERFORATION TYPE:	O.D. <u>4 3/8</u> I.D. <u>4.0 in</u>
SLOTS <input type="checkbox"/> HOLES <input type="checkbox"/> SLOTTED SCREEN <input checked="" type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>1-15ft screen 1-5ft Pipe</u>
AVERAGE SIZE OF PERFORATIONS <u>0.010</u>	JOINING METHOD <u>Threaded Nut joined</u>
TOTAL PERFORATED AREA <u>15.0 ft</u>	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>5.0ft</u>	OTHER PROTECTION <u>hinged hole cover, locked well cap, vented</u>
PROTECTIVE PIPE O.D. <u>10.75 in</u>	

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION ()		
	TOP	BOTTOM	TOP	BOTTOM	
TOP OF RISER PIPE		<u>3.0</u>			
GROUND SURFACE		<u>0.0</u>			
BOTTOM OF PROTECTIVE PIPE		<u>2.0</u>			
BOREHOLE FILL MATERIALS:					
	GROUT/SLURRY	TOP <u>NA</u>	BOTTOM <u>NA</u>	TCP	BOTTOM
	BENTONITE	TOP <u>0.0</u>	BOTTOM <u>2.0</u>	TOP	BOTTOM
	SAND	TOP <u>2.0</u>	BOTTOM <u>20.0</u>	TOP	BOTTOM
GRAVEL	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM	
PERFORATED SECTION	TOP <u>3.0</u>	BOTTOM <u>13.0</u>	TOP	BOTTOM	
PIEZOMETER TIP		<u>20.0</u>			
BOTTOM OF BOREHOLE		<u>20.0</u>			
GWL AFTER INSTALLATION					

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES NO
 WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES NO 69
 REMARKS Hole cover put at 2.0ft below surface due to lack of bentonite in hole.