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**CONSOLIDATED CONSENT AGREEMENT/  
FEDERAL FACILITY COMPLIANCE  
AGREEMENT/FEDERAL FACILITY AGREEMENT  
MONTHLY PROGRESS REPORT PERIOD ENDING  
MARCH 31, 1992**

**04/20/92**

**DOE-FN/EPA  
100  
REPORT**

- 88-500-100 -

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

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### Introduction

The Consent Agreement (CA) As Amended under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Sections 120 and 106(a), the Federal Facility Compliance Agreement (FFCA), and the Federal Facility Agreement (FFA) between the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (U.S. EPA) signed September 20, 1991, July 18, 1986, and November 19, 1991, 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 March 1 through March 31, 1992 and planned actions for the period April 1 through April 30, 1992.

Highlights of activities in March include the following:

- Bid opening for Part 2A (groundwater discharge pipeline from south of Willey Road to and including Manhole 182B) of Removal Action No. 3, South Groundwater Contamination Plume, occurred March 27, 1992. The acceptability of the apparent low bidder is being verified.
- The U.S. EPA approved the Removal Action No. 3 Part 5 Hydropunch Procedure and concurred with the DOE letter requesting that the hydropunching and soil vapor survey be done in a sequence of steps rather than all at once.
- Removal Action No. 11, Pit 5 Experimental Treatment Facility, was completed on March 20, 1992, 22 days ahead of schedule.
- The Commerce Business Daily notice for the normal and enriched portions of the FEMP's uranium inventory was published March 24, 1992. Initial response to the notice has been good and follow-up on the inquiries continues.
- The revised Removal Action No. 13, Plant 1 Ore Silos, Work Plan was submitted to the U.S. EPA on March 27, 1992. Comments which were received from both the U.S. and Ohio EPAs were incorporated.
- The Removal Action No. 16, Collect Uncontrolled Production Area Runoff-Northeast, Work Plan was submitted to the U.S. EPA and the Ohio EPA on March 2, 1992, as required by the Consent Agreement.

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**Introduction (continued)**

- The revised Removal Action No. 14, Contaminated Soils Adjacent to Sewage Treatment Plant Incinerator, Work Plan was submitted to the U.S. EPA on March 30, 1992. Comments received from both the U.S. and Ohio EPAs were incorporated.
- The Operable Unit 1 field crew and sampling equipment were relocated to the Clearwell where samples were collected on March 8, 1992 and shipped to the treatability laboratory on March 31, 1992. With completion of the Clearwell sampling, all treatability and characterization sampling activities at Pits 5 and 6 and the Clearwell are complete. The crane and other sampling equipment are in the process of being decontaminated and demobilized.
- A Work Plan Addendum has been prepared for the excavation of trenches in the Solid Waste Landfill. It was transmitted to the Ohio EPA and the U.S. EPA on March 10, 1992.
- The Engineered Waste Management Facility (EWMF) Applicable or Relevant and Appropriate Requirements (ARAR), previously submitted to the EPAs on December 3, 1991, were revised and transmitted to the EPAs on March 18, 1992.
- The Corps of Engineers and DOE are processing the required government condemnation packages to take possession of numerous properties needed to implement the South Plume Removal Action. The condemnation processing time is resulting in unanticipated schedule delays.
- The Work Plan for Removal Action No. 16, Collect Uncontrolled Production Area Runoff--Northeast, was submitted to the U.S. EPA and the Ohio EPA on March 2, 1992, as required by the Consent Agreement.
- The Work Plan for Removal Action No. 17, Improved Storage of Soils and Debris, was submitted to the U.S. EPA on March 25, 1992.

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**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 - FFA: Control and Abatement of Radon-222 Emissions.
- o Enclosure D - 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 March 1992. 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.

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**CA Section IX. Removal Actions (continued)**

Phase II Removal Actions

- o RA No. 8, Inactive Flyash Pile Control.
- o RA No. 9, Removal of Waste Inventories.
- o RA No. 10, Active Flyash 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 Incinerator.
- 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.

Phase III Removal Actions

- o RA No. 19, Plant 7 Dismantling.
- o RA No. 20, Stabilization of UNH Inventories.
- o RA No. 21, Expedited Silo 3.
- o RA No. 22, Waste Pit Area Containment Improvement.
- o RA No. 23, Inactive Flyash Pile.
- o RA No. 24, Pilot Plant Sump.

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**CA Section IX. Removal Actions (continued)**

- o RA No. 25, Nitric Acid Tank Car and Area.
- o RA No. 26, Asbestos Removals (Asbestos Program).
- o RA No. 27, Management of Contained Structures at the FEMP.

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**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 March 1992, approximately 19,700 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 March 1992, approximately 58,800 gallons of perched water have been collected for treatment from Plant 2/3 and approximately 35,000 gallons of perched water have been collected for treatment from Plant 8.

Plant 9 - Pumping from Plant 9 began on August 20, 1991, in accordance with the U.S. EPA and U.S. DOE milestone. Approximately 14,800 gallons of Plant 9 perched water have been extracted and collected through March 1992.

Plant 8 - The startup date for the Plant 8 treatment system was July 24, 1991. Through March 1992, approximately 125,200 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.

**RA No. 2, Waste Pit Area Runoff Control**

The Work Plan for the Waste Pit Area Runoff Control Removal Action was approved with modifications by the U.S. EPA on January 10, 1991. Conditional approval was received from the Ohio EPA on April 2, 1991.

Construction activities have been ongoing since June 6, 1991. Six of the eight construction sequences for the Waste Pit Area Runoff Control Removal Action have been completed. This Removal Action is 70% complete.

The stock piles generated from the excavated soil from the sump have been characterized within the 30 days as included in the revised Sampling and Analysis Plan.

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**RA No. 2, Waste Pit Area Runoff Control (continued)**

Activities in March include substantial completion of the new sump. All of the underground pipe has been installed. Trench drain installation is underway with 45% complete.

Planned activities for April include the installation of the sump system pumps; the continuation of the installation of the north end trench drains; and, installation of the bentonite liners.

KEY MILESTONES	STATUS	DUE DATE
Completion of construction	Open	July 31, 1992

**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. A summary of the most recent and ongoing activities for Part 1 are listed below:

- Written approval, with conditions, was received from the U.S. EPA for delay of the Delta Steel Alternate Water Supply.
- The construction bid due date has been revised to April 1, 1992. The contract award time period has been extended from 90 days to 150 days (i.e., the construction manager has up to 150 days after bids are received to make the award). The time period was extended to accommodate the anticipated time required to obtain access to the AWS wellfield site property. The U.S. Army Corps of Engineers (COE) and the Department of Energy (DOE) are processing the government condemnation packages to take possession of the property, as well as attempting to negotiate access with the property owner, Rowe & Rowe, Trustees.
- A meeting was held with the COE on March 25, 1992. This was attended by DOE-HQ, DOE-ORFO, DOE-FN, WEMCO Operable Unit 5 (OU5) and Project Management 4 (PM4), and COE. DOE-HQ and DOE-ORFO will assist in expediting review of property condemnation packages — Lienesch and Rowe and Rowe, Trustees.

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**RA No. 3, South Groundwater Contamination Plume (continued)**

**Part 1 (continued)**

- Issued letter to the U.S. EPA and the Ohio EPA indicating that the schedule for supply of water to Albright and Wilson may be impacted due to unforeseen access problems, which have surfaced since the Part 1 Schedule was revised and approved.
- COE, DOE, and WEMCO are preparing a letter to explain property acquisition problems encountered since the December 1991 Part 1 schedule approval and to request a schedule extension for Part 1 of the South Groundwater Contamination Plume Removal Action. The delay in issuing the letter is the inability to firmly define the new schedule milestone date. Efforts are underway to verify all steps required for condemnation and subsequently the time to complete each step.
- The response to the Ohio EPA's comments on Part 1 is being prepared. All soil excavated and removed under Part 1 will be handled in accordance with the procedures set forth in the Removal Action No. 17 Work Plan. This plan was just recently finalized and is currently being reviewed by the U.S. EPA and the Ohio EPA.

**Part 2**

To expedite the Part 2 construction, this project was divided into four construction bid packages. These include: 2A - Groundwater discharge pipeline (pressure flow) and outfall pipeline (gravity flow) from south of Willey Road to and including Manhole 182B, 2B - Manhole 182B to Great Miami River and aeration facility, 2C - Recovery wellfield, and 2D - Test well installation and pump test. Part 2 follow-on activities include:

- Bid opening for Part 2A occurred March 27, 1992. The acceptability of the apparent low bidder is being verified.
- The condemnation process for the Delta Steel Property (location of recovery test well), needed for Parts 2C and 2D, will take longer than anticipated. The COE will not have an appraisal until approximately June 1, at which time the condemnation process will commence. The process may take about three months to complete. The delay is necessary to obtain the services of an independent appraiser as required by law.

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**RA No. 3, South Groundwater Contamination Plume (continued)**

**Part 2 (continued)**

- The responses to regulator comments on the South Groundwater Contamination Plume Part 2 Wellfield Operation and Maintenance (O&M) manual were approved by the U.S. EPA and the Ohio EPA.
- The revised Work Plan for Parts 2/3 was conditionally approved by the U.S. EPA and the Ohio EPA. The comments that were received addressed the modifications to the Soil Sampling and Analysis Plan.
- The Health and Safety Plan for the South Groundwater Contamination Plume Removal Action Parts 2/3 was revised to incorporate additional project scope of the Interim Advanced Wastewater Treatment Bionitrification-Effluent Treatment System (IAWWT[BDN-ETS]). Additional health and safety concerns are minor. The Health and Safety Plan was submitted March 18, 1992, for review and approval by WEMCO's Industrial, Radiological Safety and Training Department. The resolution of any comments and approval of the Plan is anticipated in early April.
- The Groundwater Modeling Report was forwarded to ASI/IT to incorporate changes. Revised report is due back to DOE on April 9, 1992. The document is on schedule to be issued to the U.S. EPA and Ohio EPA by April 16, 1992.
- The new Part 2A outfall line was staked. Adjustments were made to keep the line within the existing easement and at the same time provide adequate clearance with the Cincinnati Gas and Electric Company's field confirmation of the gas line location. Field screening and monitoring started March 30, 1992, on the south side of Willey Rd.
- The response to the Ohio EPA's comments on Parts 2/3 Work Plan is being prepared. All soil excavated and removed under Part 2 should be handled according to the procedures set forth in the Removal Action No. 17 Work Plan. This plan was just recently finalized and is currently being reviewed by the U.S. EPA and the Ohio EPA.

**Part 3**

The Work Plan for Part 3 (the installation and operation of an 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. Due to the relocation of the Part 2 wellfield to an area having a higher concentration of uranium, the IAWWT system capacity was expanded

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**RA No. 3, South Groundwater Contamination Plume (continued)**

**Part 3 (continued)**

in order to maintain the 1,700 pound per year maximum level. The IAWWT system will include two treatment units. The IAWWT unit located at the SWRB will have a nominal 300 gpm capacity and the unit located at the Bionitrification Treatment/Effluent Treatment System (IAWWT[BDN-ETS]) will have a nominal capacity of 100 gpm.

Current activities in this area are as follows:

- The fabrication of trailers for the trailer systems portion of the IAWWT-SWRB is progressing on schedule. The first trailer is expected to arrive on June 9, 1992. The second trailer is expected to arrive on June 17, 1992.
- The contractor continues to pour concrete for the utilities building. Construction is expected to be completed by May 30 or the first week in June.
- The Invitation-for-Bid package for the IAWWT (BDN-ETS) unit was issued on March 31, 1992. A pre-bid meeting will be held on April 8. Bids are due on April 16, 1992.
- Parsons has prepared preliminary SOPs for WEMCO review for both IAWWT units (SWRB and BDN-ETS). Comments received are being incorporated and the formal review will begin April 13, 1992.
- The response to the Ohio EPA's comments on Part 3 is being prepared. All soil excavated and removed under Part 3 should be handled according to the procedures set forth in the Removal Action #17 Work Plan. This plan was just recently finalized and is currently being reviewed by the U.S. EPA and the Ohio EPA.

**Part 4**

Sampling of property owner drinking water wells along Ohio State Route 128 where previous above-background levels of uranium were detected will be conducted during April 1992. This sampling is done on a quarterly basis, except for those wells servicing three homeowners receiving bottled drinking water. These three wells are sampled on a monthly basis.

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**RA No. 3, South Groundwater Contamination Plume (continued)**

**Part 5**

Part 5 was added to the South Plume in order to address the relocation of the Part 2 wellfield. Part 5 includes geochemical investigation of the area south of the wellfield to determine if 20 mg/l uranium in groundwater concentration is present downgradient of the Part 2 wellfield.

- According to the State Historical Preservation Officer, an archaeological survey will not be necessary for the Part 5 scope of work; only information related to the project is needed.
- The U.S. EPA approved the Part 5 Hydropunch Procedure and concurred with the DOE letter requesting that the hydropunching and soil vapor survey be done in a sequence of steps rather than all at once. Based on the results obtained from each step, the Work Plan may require modification. This change is due to the latest sampling indicating that the plume may not be as far south as modeling predicted.
- Work on Part 5 is proceeding in a phased approach. WEMCO has requested ASI/IT to prepare a Cost Account Plan package for installing the north row of hydropunching. When the north row of hydropunch and adjacent existing wells and piezometer sampling are completed, a decision will be made whether to proceed with the remainder of the work plan or to revise the plan.
- Access to properties required for installation of the north row of hydropunching is completed with the exception to the CSX Realty property.

Work in April for RA No. 3, Parts 1 - 5 will focus on the issuance of Design Criteria for Part 2C and 2D, beginning Title I/II design of Part 2C and 2D, completing Appendices A and B of the O&M Manual, and gaining approval of the Notice-to-Proceed on north row of Part 5 hydropunching. Internal comments on the Part 2 wellfield relocation Modeling Report will be addressed and the report will be issued to regulators. Responses to the regulators' comments on Parts 1, 2 and 3 concerning soil handling will be prepared. Responses are contingent upon incorporation of the Removal Action No. 17 procedures. Notice-to-Proceed on construction for Part 2A will be awarded and construction begun. A pre-bid meeting will be held and the contract to begin construction of Part 2C IAWWT(BDN-ETS) unit will be awarded.

Preparation of condemnation packages will continue by the COE. DOE will make every attempt to expedite the required documentation through the approval process.

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**RA No. 4, Silos 1 and 2**

Installation of the bentonite in Silos 1 and 2 was completed on November 28, 1991. This was ahead of the scheduled commitment date of December 1, 1991.

A Silos 1 and 2 Removal Action, Bentonite Effectiveness Monitoring Plan, that describes the methodology and computer model that will be used to determine the effectiveness of the bentonite in attaining the .015 pCi/l goal was submitted to the U.S. EPA on January 27, 1992. On February 19, 1992, the plan was disapproved by the U.S. EPA. The remaining issues on calculating the conversion from measured headspace radon concentration to flux from the dome were addressed in the revised document submitted on March 13, 1992. Draft comments concerning specific parameters used in the calculations were received from the U.S. EPA on March 31, 1992.

Also in March, final calibration and checkout of the data logging system was initiated. The data logging system will automatically record data for Silos 1 and 2 headspace radon monitoring, Silos 1 and 2 headspace humidity monitoring, Silos 1 and 2 temperature and pressure monitoring, and four K-65 area exclusion radon gas monitors.

Work in April will include responding to the draft U.S. EPA comments on the Bentonite Effectiveness Monitoring Plan. Data will be input into the ISC computer model in April, for transmittal of the initial report in the April Consent Agreement Report. In the interim, the Selected Radon Data Report can be found in Enclosure C.

As defined in the Removal Action Work Plan and the Federal Facility Agreement, data associated with monitoring the effectiveness of the bentonite installation is included in Enclosure C.

KEY MILESTONES	STATUS	DUE DATE
Complete installation of bentonite slurry into Silos 1 and 2	Completed November 28, 1991	December 1, 1991
Submit Bentonite Monitoring Plan	Completed January 27, 1992	January 27, 1992
Report monitoring results for bentonite effectiveness of EPA - 1st run 4/92	Open	May 22, 1992

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**RA No. 5, K-65 Decant Sump Tank**

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, Hazardous Substances List (HSL) volatile organics, HSL semi-volatile organics, and HSL pesticide organics and inorganics were received for the decant liquid taken during the implementation of the Removal Action. A Materials Evaluation Form (MEF), with the available analysis, was initiated to determine the required treatment of the decant liquid. The liquid pumped from the K-65 decant sump tank is being stored in the Plant 2/3 holding tanks.

Work in April 1992 will center on determination of the required treatment based on the MEF and available analytical results.

KEY MILESTONES	STATUS	DUE DATE
Complete the removal of the liquid from the K-65 decant sump tank	Completed April 16, 1991	April 26, 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 CY1992. The final Waste Pit 6 Exposed Material Removal Action Final Report was completed.

**RA No. 7, Plant 1 Pad Continuing Release**

This removal action consists of three phases. Phase I, which implements the run-on/off control measures, is complete. Phase II addresses the installation of 80,000 square feet of a newly 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.

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**RA No. 7, Plant 1 Pad Continuing Release (continued)**

Activities in March included the procurement of materials and excavation of an additional 10% of the soil for the Phase II work. Implementation for the post-excavation sampling of the Phase II area began.

Activities in April will include the continued excavation of the Phase II soils by the construction contractor. Implementation for the post excavation sampling of the Phase II area will continue.

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
Complete Phase I	Completed January 17, 1992	March 13, 1992
Complete Phase II	Open, on schedule	December 21, 1992
Complete Phase III	Open, on schedule	February 21, 1995

**RA No. 8, Inactive Flyash Pile Control**

The Inactive Flyash Pile Isolation Activity, which involved the installation of a plastic chain link fence and the posting of warning signs, was completed ahead of schedule on December 23, 1991.

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**RA No. 9, Removal of Waste Inventories**

During March 1992, 7,544 drum equivalents (DE) of low-level waste (LLW) were dispositioned. The March goal for shipments was 7,711 DEs. The FY1992 cumulative total LLW shipped is 44,075 DEs.

KEY MILESTONES	STATUS	DUE DATE
Update existing internal procedures to ensure that appropriate shipping documentation is entered into the administrative record file	To be updated annually	June 30, 1992

Efforts are now underway to ship containers which have been verified as nonhazardous low-level radioactive waste and complete characterization for those containers which have an undetermined status.

Projected activities for April include shipping 10,912 DEs of LLW. DOE-NV did not return formal comments on the "FEMP Waste Application to Ship Waste to the Nevada Test Site" during March as scheduled. Formal review comments regarding the 1991 Shipping and Thorium Audits were also not received from the DOE-NV during March.

A close-out meeting regarding these issues will be scheduled once official comments from DOE-NV are received.

**RA No. 10, Active Flyash Pile Controls**

The Work Plan for the Active Flyash Pile Controls Removal Action was completed and submitted ahead of schedule to the U.S. and Ohio EPAs on February 18, 1992. Comments from the Ohio EPA were received on March 18. U.S. EPA approval of the Plan was received on March 30.

Design for this removal action continues on schedule.

KEY MILESTONES	STATUS	DUE DATE
Submit Active Flyash Pile Work Plan to the U.S. EPA for approval	Completed February 18, 1992	March 2, 1992

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**RA No. 11, Pit 5 Experimental Treatment Facility**

Removal Action No. 11 is in the final construction phases. Work is proceeding on schedule. Approximately 9 cubic yards of sand were removed following completion of the sampling effort below the Experimental Treatment Facility (ETF) structure.

Verbal authorization was received from both U.S. EPA and Ohio EPA to modify the sampling and analysis requirements of the approved Work Plan. The authorization modification allows the analysis of the soil samples to be completed by a "non-CLP" lab.

Activities for March 1992 included the sampling of the soil from beneath the ETF structure; the removal, containerization, and on-site storage of ETF contents (approximately 9 cubic yards); and the sampling of containerized waste material.

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
Complete removal action within 120 days of Work Plan approval	Completed March 20, 1992	April 11, 1992 (based on Work Plan approval date of December 13, 1991)

**RA No. 12, Safe Shutdown**

The Safe Shutdown Removal Action documents the ongoing shutdown activities that will remove uranium and other process/raw materials from equipment and pipe lines in areas of formerly used processing equipment and will disposition the removed materials offsite.

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RA No. 12, Safe Shutdown (continued)

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
Removal Action Memorandum Safe Shutdown Activities	Completed December 13,1991	December 15, 1991
Provide a schedule for providing an update to the deliverable submitted pursuant to the compilation of existing site documentation supporting the ongoing Safe Shutdown programs by January 15, 1992	Completed	January 15, 1992
Update existing internal procedures to ensure that appropriate documentation is entered into the administrative record file	To be updated annually	June 30, 1992

The preliminary assessments for each major process area are continuing.

Inventorying of expense equipment items continued; 2,351 expense items have been inventoried to date. Of those, 1,987 items are on an internal "shopping list" to ascertain future need, 27 have been transferred to Maintenance, and 337 have been placed on AC-563 Forms to be excessed.

The capital equipment inventory continued; 1,088 items have been identified. Of those, 854 have been put on AC-563 Forms to be excessed, and 219 have been identified as "In Use/Future Use" items.

Maintenance work orders for equipment disconnects in Building 51 were initiated as planned.

Relocation of Building 51 equipment that has no utility connections was begun in March as projected. This equipment is being relocated to allow for the Advanced Waste Water Treatment (AWWT) project to proceed.

A task order was completed and issued for the preparation of the task specific Health and Safety Plan for Safe Shutdown.

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**RA No. 12, Safe Shutdown (continued)**

A meeting was held with Major James Sanders of the Department of the Army to finalize plans for transfer of the remaining 4A metal inventory from the Fernald Environmental Management Project (FEMP) to the Defense Consolidation Facility in Snelling, South Carolina. An agreement was reached on the Terms and Conditions for this transfer, and Material Disposition Order D-690, Final, was issued covering this project. This effort will result in an inventory reduction of ~2,838 metric tons uranium, (~6,300,000 net pounds of material).

The *Commerce Business Daily* notice for the normal and enriched portions of the FEMP's uranium inventory was published March 24, 1992. Initial response to the notice has been good and follow-up on the inquiries continues.

The Scope of Work was received from Aerojet Ordnance Tennessee for the transfer of selected pieces of the derby breakout and slag milling systems to their site. It is being reviewed to provide them further detail on WEMCO and Rust costs in support of this effort.

A document was prepared by Safe Shutdown addressing the historical management of the thorium inventory at the FEMP and the questions raised by the Office of Counsel concerning the pending sale of ~125 metric tons (MT) of thorium to Atomergic. The purpose of the document was to provide a basis for determining if the established criteria have been sufficiently met to minimize risk of liability and to allow the transaction to continue. It is currently in the review cycle.

It was determined that there is no future application for the FEMP thorium inventory other than the ~125 MT pending sale to Atomergic. It was recommended, therefore, to DOE-FN that Defense Programs proceed with their disposition plans.

Planned activities for April include scheduling the first meeting of the task team to initiate the Risk Assessment Report, completing the review cycle of task order to Parsons to conduct the hazard survey for each process area, along with a time schedule for completion, continuing the preliminary assessments for each major process area, and continuing the capital equipment disposition effort.

**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.

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**RA No. 13, Plant 1 Ore Silos (continued)**

Comments on the Removal Action Work Plan were received from the U.S. EPA on February 27, 1992. The revised Action Work Plan was submitted to the U.S. EPA on March 27, 1992. Comments which were received from both the U.S. and Ohio EPAs were incorporated. April activities will include continued design preparation.

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
Submit Work Plan to the U. S. EPA	Completed January 9, 1992	January 10, 1992
Submit Revised Work Plan to the U.S. EPA	Completed March 27, 1992	March 30, 1992

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

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.

March activities included continued preparation for the implementation of the Removal Action. Comments on the Work Plan were received from the U.S. EPA on February 28, 1992. The revised Work Plan was resubmitted to the U.S. EPA on March 30, 1992.

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
Submit Work Plan to the U.S. EPA	Completed January 23, 1992	January 23, 1992
Submit Revised Work Plan to the U.S. EPA	Completed March 30, 1992	March 30, 1992

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**RA No. 15, Scrap Metal Piles**

The Scrap Metal Piles Removal Action will detail the stabilization and disposition of LLW scrap metal currently stockpiled onsite. This Removal Action will eliminate the potential threat of additional material releases to the environment. Approximately 1,300 tons of scrap copper along with approximately 3,000 tons of recoverable scrap metals are the focus of this Removal Action.

March activities included continued preparation for the implementation of the Removal Action. Comments on the Work Plan were received from the U.S. EPA on March 3, 1992. Comment resolution occurred during March and the revised Work Plan will be resubmitted in April 1992.

KEY MILESTONES	STATUS	DUE DATE
Submit Work Plan to the U.S. EPA	Completed January 31, 1992	January 31, 1992
Submit Revised Work Plan to the U.S. EPA	Open, on schedule	April 2, 1992

**RA No. 16, Collect Uncontrolled Production Area Runoff – Northeast**

The scope of this removal action is to collect the remaining stormwater from the perimeter of the 136 acre production area that currently discharges to Paddy's Run and divert it through the existing storm sewer system to the SWRB.

The Removal Action Work Plan was submitted to the U.S. EPA and the Ohio EPA on March 2, 1992, as required by the Consent Agreement.

Planned activities for April are to receive and address comments from the U.S. EPA and Ohio EPA on the Work Plan and continue with Title II design.

KEY MILESTONES	STATUS	DUE DATE
Submit Work Plan to the U.S. EPA	Completed March 2, 1992	March 2, 1992

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**RA No. 17, Improved Storage of Soil and Debris**

This removal action will include the management and appropriate storage for contaminated soil and debris onsite. 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.

March activities included submittal of the Removal Action Work Plan. April activities will include continued preparation for the implementation of the Removal Action.

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
Submit Work Plan to the U.S. EPA	Completed March 25, 1992	March 25, 1992
Receive U.S. EPA comments on the Work Plan	Open	April 24, 1992
Submit Revised Work Plan to the U.S. EPA	Open	May 25, 1992

**RA No. 18, Control Exposed Material In Pit 5**

The Control Exposed Material in Pit 5 Removal Action is being developed and implemented using a phased approach. This phased approach considers and utilizes information obtained from the liner repair activities, 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 March 1992 included an internal Work Plan review/comment resolution session followed by the submission of the Work Plan to U.S. EPA and Ohio EPA. The Work Plan was submitted to the U.S. EPA on March 26, 1992, ahead of schedule.

Planned activities for April 1992 include an evaluation of the crane versus the dredge for implementation of this removal action.

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**RA No. 18, Control Exposed Material In Pit 5 (continued)**

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
Submit a Removal Action Work Plan to the U.S. EPA and the Ohio EPA	Completed March 26, 1992	March 30, 1992

**RA No. 19, Plant 7 Dismantling**

The Plant 7 Dismantling Removal Action will include decontamination and dismantling of the Plant 7 structure. This dismantling will eliminate the potential threat of additional material releases and the safety hazard due to histoplasmosis. The activities in this removal action will include characterization, decontamination, removal, containerization, and disposal of the materials making up the above ground portion of the facility.

March activities included continued work for preparation of the Characterization Plan for the Removal Action. April activities will include initiation of project functional requirements.

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
Submit Work Plan to the U.S. EPA	Open, on schedule	April 20, 1993

**RA No. 20, Stabilization of UNH Inventories**

The Stabilization of UNH Inventories Removal Action will remove and prepare for safe storage approximately 230,000 gallons of acidic UNH that is currently stored in 21 tanks in and around Plant 2/3. Existing processing equipment will be used to neutralize the solutions, filter the precipitate, and package the resulting filter cake in double containment for safe storage. This activity was previously part of Removal Action No. 12, Safe Shutdown, but is being accelerated as a separate expedited response.

Activities in March included completing operator classroom training and most repairs to the West Eimco filter. A presentation of the UNH Stabilization project was made to the Defense Nuclear Facilities Safety Board for their review.

The schedule for commencing and finishing the processing will be finalized, following approval that all required safety systems are in place and operating.

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**RA No. 20, Stabilization of UNH Inventories (continued)**

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
System Integrity Testing	Completed	February 13, 1992
Submit Flow Charts to the U.S. EPA	Open, behind schedule	March 31, 1992
Commence Processing Material	Open	Schedule being developed
Finish Processing Material	Open	Schedule being developed

**RA No. 21, Expedited Silo 3**

On December 13, 1991, an Action Memorandum was issued to initiate an expedited removal action. The Silo 3 Removal Action mitigated the potential release of material to the environment and included the following actions:

- All obvious openings in the dust collector hopper were covered and sealed.
- The dust collector was removed.
- All obvious pathways for release were capped or covered.

Implementation of the Removal Action was initiated on December 20, 1991. The material within the dust collector hopper exposed to the environment was stabilized on December 21, 1991. Loose equipment on the silo dome was removed.

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
Complete removal of the dust collector on Silo 3 dome	Completed January 8, 1992	January 15, 1992

Work in April will center on disposition of the equipment removed from Silo 3.

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**RA No. 22, Waste Pit Area Containment Improvement**

A Removal Site Evaluation (RSE) was prepared in 1991 and submitted to DOE. The Action Plan to address the Waste Pit Area Roads and Exposed Surfaces was transmitted to DOE on February 24, 1992. This Action Plan is now being used as the basis for developing a Work Plan.

This activity was listed on a list of candidate removal action submitted to the EPA. EPA accepted this as a subset of activities for a removal action.

Activities for March included determining other actions necessary to be taken prior to the Work Plan development, and issuing a purchase order to begin preparation of the Work Plan.

Planned activities for April 1992 will include the initiation of the Work Plan and other support documents.

KEY MILESTONES	STATUS	DUE DATE
Submit Work Plan to the U.S. EPA	Open, on schedule	August 31, 1992

**RA No. 23, Inactive Flyash Pile**

A field investigation (RA No. 8) is being conducted to determine if select locations within the Inactive Flyash Pile and South Field Disposal area boundary will require soil "hot spots" excavation. The results of this investigation and a schedule for submittal of a work plan (if required) are due to the EPAs on June 30, 1992.

There are areas of elevated contamination which Ohio and U.S. EPA have asked to be evaluated further. Consequently, during January of 1992, a field instrument survey was conducted and two areas were identified, isolated, and posted with radiological warning signs.

During February, a magenta rope was attached to the top of the posts which support the perimeter chain barrier, and radiological controlled area signs have been posted.

Further characterization of surface contamination at the Inactive Flyash Pile and Other South Field Disposal Areas have been initiated to determine the need for action. The results of this evaluation are due to the EPAs by June 30, 1992.

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**RA No. 24, Pilot Plant Sump**

This sump is located on the southwest side of the Pilot Plant. The sump consists of a stainless steel cylinder approximately two feet in diameter and ten feet deep. This sump was built to remove liquids from the floor drains of the Pilot Plant and was actively used only during the renovation of the Pilot Plant in 1969.

The sump is filled with a thick liquid and sludge. Analytical results of the sump contents show high concentrations of metals: lead, copper, chromium, nickel, as well as thorium and volatile organic compounds. Initial planning for the Removal Action for implementing an RSE got underway in March 1992. Scoping and planning will continue in April 1992.

KEY MILESTONES	STATUS	DUE DATE
Submit Work Plan to the U.S. EPA	Open	July 31, 1992

**RA No. 25, Nitric Acid Tank Car and Area**

The Nitric Acid Rail Car is located on the northern perimeter of the production area and east of Building 63. The FEMP RCRA Part A and Part B identify this tank car and area surrounding it as a Hazardous Waste Management Unit.

This high-grade, stainless steel tank car has a capacity of approximately 100,000 pounds and measures approximately 10 ft wide x 40 ft long x 15 ft high. This unit operated from 1952 until about 1989. This tank car stored nitric acid used at the FEMP. Based on recent analysis, the tank car now contains 50-100 gallons of nitric acid.

This Removal Action includes removal of residual contents of the tank car followed by decontamination and dispositioning of the tank car, as well as characterizing and subsequent excavation and disposition of the nearby soils for contaminants related to the tank car.

KEY MILESTONES	STATUS	DUE DATE
Submit Work Plan to the U.S. EPA	Open	October 30, 1992

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**RA No. 26, Asbestos Removals (Asbestos Program)**

This removal action documents ongoing asbestos abatement activity at the FEMP, to mitigate the potential for contaminant release and migration. Abatements within the Asbestos Program include in-situ repairs, encasement, and encapsulation as well as removals.

Activities in March involved initiating compilation of applicable procedures and supporting text to begin assembly of the Work Procedures document.

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
Submit Work Procedures to the U.S. EPA	Open	May 19, 1992

**RA No. 27, Management of Contaminated Structures at the FEMP**

Submit EE/CA study to identify alternatives for managing contaminated structures; document the selection of a response(s) that will mitigate the potential threat to workers, the general public, and the environment associated with these structures; and, address health and environmental impacts associated with the proposed action.

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
Submit Engineering Evaluation/Cost Analysis (EE/CA) to the U.S. EPA to support Proposed Removal Actions for Managing Contaminated Structures	Open	December 15, 1992

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**1.0 Operable Unit 1**

Operable Unit 1 as defined in the Amended Consent Agreement includes the Waste Pits 1-6, Clearwell, Burn Pit, berms, liners and soil within the operable unit boundary.

**1.1 Field Investigation**

**1.1.1 13-Well Program**

**Scope:**

The 13 wells were installed into Waste Pits 1 - 4 and the Burn Pit. Waste samples were collected at various locations during boring operations and analyzed for Hazardous Substance List (HSL) parameters and characteristic radionuclides. Wells were developed and sampled to determine constituents of concern in the waste pit leachate.

**Status:**

All waste pit wells have been sampled per the approved work plan. Laboratory analysis was completed on all Operable Unit 1 samples in February. Data validation and entry into the RI/FS database are ongoing.

**Issues/Corrective Actions:**

Efforts are underway to expedite the data validation process.

**1.1.2 Radon Sampling Program**

**Scope:**

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 Remedial Investigation/Feasibility Study (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.

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**1.1.2 Radon Sampling Program (continued)**

**Status:**

The radon sampling is complete for Waste Pits 1, 2, and 3. The data has been evaluated and a draft report has been issued. Sampling will not be attempted on Pit 4, since it is covered by a synthetic cap. Pits 5 and 6 were not sampled due to standing water covering the waste materials.

**Issues:**

Sampling of Pits 4, 5, and 6 have been deemed inadvisable since Pit 4 is covered by a synthetic cap and Pits 5 and 6 have standing water covering the waste materials. A revision/variance from the SAP is required.

**Corrective Actions:**

Request a variance from U.S. EPA to the work plan as discussed in the February Project Manager's meeting.

**1.1.3 Pits 5 and 6 and the Clearwell Sampling Program**

**Scope:**

The objectives of the Pits 5, 6, and Clearwell Sampling Program are to obtain sufficient quantities of samples for treatability studies and to provide additional RCRA characterization information on the waste pits. The pits will be sampled using one of the following methods as appropriate:

- a) slurry pump and backhoe
- b) clamshell and crane
- c) bailer
- d) vibra-core sampler

**Status:**

The sampling of Pits 5, 6, and the Clearwell was scheduled to begin on December 16, 1991. The sampling was delayed due to the unavailability of a long-boom crane which is essential to the sampling effort. Samples were extracted from Pits 5 and 6 on January 29 and February 20, 1992, with a clamshell and crane. These samples have

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been shipped to the treatability laboratory. Specimen preparation for stabilization testing is on going. The field crew and sampling equipment were relocated to the Clearwell where samples were collected on March 8, 1992 and shipped to the treatability laboratory on March 31, 1992.

With completion of the Clearwell sampling, all treatability and characterization sampling activities are complete. The crane and other sampling equipment are in the process of being decontaminated and demobilized.

**Issue:**

All samples from Pits 5, 6, and the Clearwell will undergo the planned treatability testing as they are received in the laboratory.

**Corrective Action:**

Efforts are underway to expedite the treatability testing effort. The advanced stages of treatability testing will proceed on Pits 1, 2, 3, 4, and the Burn Pit without waiting for completion of preliminary testing on Pits 5, 6, and the Clearwell. As preliminary stage testing on Pits 5, 6, and the Clearwell are completed they will proceed to the advanced stages of treatability testing.

**1.2 Treatability Studies**

**Scope:**

The Operable Unit 1 treatability studies will evaluate the two treatment process options identified in the Operable Unit 1 Initial Screening of Alternatives document. The two treatment process options are cement stabilization and vitrification. The technical feasibility of these technologies will be evaluated by conducting a series of experiments on both composite waste samples and individual strata samples. Ranges of formulations will be investigated as will other performance criteria such as compressive strength, leachability, bulking factor and permeability. For cement stabilization, binding agents that will be evaluated include portland cement, flyash, and sodium silicate. Clay (attapulgite and clinoptilolite) will be added to reduce the leachability of metals in the waste. Glass formers and modifiers being considered for vitrification are flyash, soil, and sodium hydroxide.

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**1.2 Treatability Studies (continued)**

**Status:**

To date, all Stage I molds for the cement stabilization studies have been made for all pits except the Clearwell. Unconfined compressive strength (UCS) tests have been performed and modified toxicity characteristic leaching procedures (MTCLPs) initiated for all pits except Pit 6 and the Clearwell. Test specimens for Pit 6 have been prepared and are curing. A Clearwell sample was collected on March 8, 1992 and was shipped to the treatability lab on March 31, 1992. MTCLP extraction results are being received periodically and are being evaluated. With the collection of the Clearwell sample, all treatability sampling activities are complete.

Trial waste vitrification tests were completed using a waste surrogate to validate test procedures. The trial melts indicated that the glass would be less reactive with the crucible if platinum/gold crucibles were used instead of ceramic. Using the platinum/gold crucibles, preliminary stage vitrification melts were conducted on Pits 1 through 6 and the Burn Pit using waste without any additives. Preliminary results indicate variability of glass quality from pit to pit.

**Issues:**

The delay in collecting samples from Pits 5, 6, and the Clearwell may impact the Treatability Study Schedule.

**Corrective Actions:**

Expedite the analyses of the samples from Pits 5, 6, and the Clearwell to get back on schedule (May 26, 1992).

The advanced stages of treatability testing will proceed on Pits 1, 2, 3, 4, and the Burn Pit without waiting for completion of preliminary testing on Pits 5, 6, and the Clearwell. As preliminary stage testing on Pits 5, 6, and the Clearwell are completed they will proceed to the advanced stages of treatability testing.

**1.3 Remedial Investigation**

**Scope:**

An RI Report will be prepared in accordance with the U.S. EPA Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (EPA Directive 93553-01) and the Approved Risk Assessment Work Plan Addendum.

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**1.3 Remedial Investigation (continued)**

**Status:**

The first activity scheduled for the RI is the field data analysis. The objective of the field data analysis activity is to evaluate the preliminary data available from field measurements while awaiting results of lab analysis. The field data analysis was initiated on December 2, 1991 with the revision of the waste pit cross sections. With the new boring logs that were obtained from the recent 13-well field investigation, data is available for the depths of Waste Pits 1, 2, 3, 4, and the Burn Pit. Preliminary data from the new borings indicates the projected depths of the waste pit bottoms are within three to six feet of their actual bottoms. The exception to this finding is the Burn Pit, where the actual bottom depth is approximately 10 feet deeper than originally projected. The cross sections were completed the week of March 1, 1992 and are undergoing internal review.

**Issue:**

Delays in completion of data validation and entry into the database are delaying evaluation of the RI data.

**Corrective Action:**

Additional staff have been assigned to assist in completion of data validation and entry into the database. Work is proceeding on non-data-related tasks such as field program descriptions and text editing.

**OU 1 REMEDIAL INVESTIGATION REPORT**

**PRIMARY**

SCOPE	SUBMIT TO DOE	SUBMIT TO DOE HQ	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
Details the nature and extent of contaminants within the Operable Unit 1 study area. Estimates the volume of contaminated media and materials.	06/15/93 C 10/14/92 F	8/11/93 C 12/14/92 F	10/12/93 C 02/11/93 F	12/11/91 C 04/13/93 F	01/10/94 C 05/11/93 F

C = Consent Agreement Date

F = Forecast Complete

A = Actual

Initial stages are underway including model development and data analysis. Cross sections of the waste pits are being revised to incorporate data from the recent 13-boring program.

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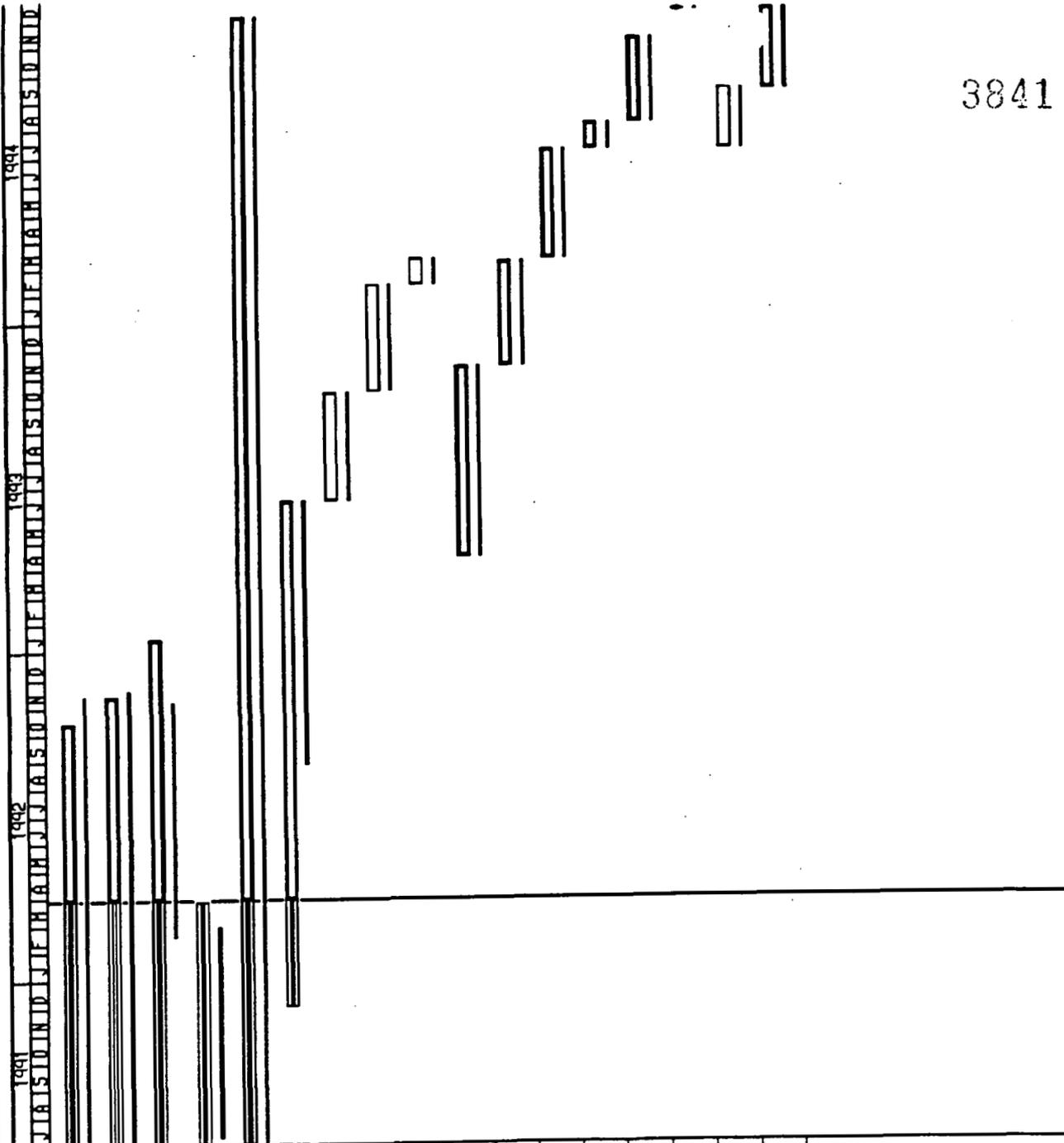
**1.4 Planned Activities for April 1992**

Complete data validation and 90% verification of database entry for the 13-well program.

Continue the first phase of cementation and vitrification treatability testing.

Initiate treatability testing on the Clearwell sample.

Issue Final Radon Flux Report.



OPERABLE UNIT 1 RELATED FIELD ACTIVITIES AS 1MAR91 LF 14OCT92
OU1 13 WELL PROGRAM AS 1MAR91 LF 12NOV92
OU1 RADON FLUX PROGRAM AS 23MAY91 LF 14JAN93
PIT 5, 6, AND CLEARWELL SAMPLING PROGRAM AS 1JUL91 AF 27MAR92
OU1 TREATABILITY STUDIES AS 30APR91 LF 5DEC94
OU1 REMEDIAL INVESTIGATION REPORT PREPARATION AS 2DEC91 LF 14JUN93
DOE OU1 RI REVIEW/REVISE/APPROVE LS 15JUN93 LF 11OCT93
EPA OU1 RI REVIEW & APPROVE LS 13OCT93 LF 7FEB94
PRINT AND DISTRIBUTE FINAL OU1 RI REPORT LS 8FEB94 LF 7MAR94
OU1 FEASIBILITY STUDY/PROPOSED PLN PREP LS 12APR93 LF 8NOV93
DOE OU1 FS/PP REVIEW/REVISE/APPROVE LS 9NOV93 LF 4MAR94
EPA OU1 FS/PP REVIEW/REVISE/APPROVE LS 7MAR94 LF 4JUL94
PRINT AND DISTRIBUTE FINAL OU1 FS RPT/PP LS 5JUL94 LF 1AUG94
OU1 PUBLIC COMMENT LS 2AUG94 LF 3NOV94
SUBMIT OU1 DRAFT ROD TO EPA LF 6DEC94
OU1 DRAFT ROD PREPARATION LS 4JUL94 LF 7SEP94
DOE OU1 DRAFT ROD REVIEW/REVISE/APPROVE LS 7SEP94 LF 6DEC94

Date	Revision	Checked	Approved

Sheet 1 of 1  
 Date Date: 29MAY92  
 Plot Date: 7APR92

RI/FS PROGRAM CURRENT  
 FERNALD ENVIRONMENTAL MGMT. PROJECT  
 FEMP RI/FS OU1 CONSENT AGMT (LATE)

Project Start: 10CT90  
 Project Finish: 14DEC98

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

Primavera Systems, Inc. 1984-1991

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**2.0 Operable Unit 2**

Operable Unit 2, as defined in the Amended Consent Agreement, includes the Flyash Piles, other South Field disposal areas, lime sludge ponds, solid waste landfill, berms, liners, and soil within the operable unit boundary.

**2.1 Field Investigation**

**2.1.1 19-Boring/Well Program**

**Scope:**

This program provides additional characterization of the individual waste units within Operable Unit 2. Borings are located in both Flyash Piles, the solid waste landfill and the South Field. If leachate is encountered during boring operations, wells will be installed and sampled. Sampling and characterization of standing water in the north lime sludge pond is also included in the program.

**Status:**

All field characterization activities associated with the original work plan have been completed. The analytical results from the original program have been received, validated, and evaluated as to conformance to the work plan and data user requirements.

**Issues:**

After review of the Operable Unit 2 validation results, it was determined that additional sampling would be prudent. The additional samples required were due in part to not testing certain parameters for samples taken in the Active and Inactive Flyash Piles, the solid waste landfill, and the South Field, or due to suspected matrix effects on several parameters. Various parameters were analyzed from these locations during the additional sampling, including TCLP volatile and semi-volatile organic compounds, HSL, Appendix IX, full radiological, total organic carbon, and simulated rainwater leaching procedure (SRLP).

**Corrective Actions:**

Omitted radiological analyses will be performed on samples retrieved from archived storage.

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**2.1.1 19-Boring/Well Program (continued)**

A Work Plan addendum was written for extracting the additional samples. Additional borings were advanced in the following areas in order to collect the parameters that were inadvertently missed or sustained matrix interference during laboratory analysis:

<u>Boring</u>	<u>Location</u>	<u>Completion Date</u>
1846	Active Flyash Pile	February 22, 1992
1849	Inactive Flyash Pile	February 22, 1992
1850	Inactive Flyash Pile	February 23, 1992
1882*	South Field	February 22, 1992
1883*	South Field	February 22, 1992
1884*	South Field	February 22, 1992
1885*	South Field	February 22, 1992
1888	Solid Waste Landfill	February 23, 1992
1889	Solid Waste Landfill	February 25, 1992

\*Hand auger boring

1846 Replacement boring for 1723	1883 Replacement boring for 1713
1849 Replacement boring for 1709/1791	1884 Replacement boring for 1714
1850 Replacement boring for 1711	1885 Replacement boring for 1715
1882 Replacement boring for 1712	1888 Replacement boring for 1721/1722

All resultant samples from the above additional borings were transported to the contract laboratory for subsequent radiological and chemical analyses. The contract laboratory has committed to completing the analysis by April 17, 1992, for all samples. Copies of the field logs for this sampling activity are attached to this report.

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**2.1.2 Additional HSL Parameters Sampling Program**

**Scope:**

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

**Status:**

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

**Issues/Corrective Actions:**

As part of the corrective actions given in Section 2.1.1, 19-Boring/Well Program, four additional samples were taken to complete the data set.

**2.1.3 Excavation of Trenches In the Solid Waste Landfill**

**Scope:**

This program provides for the excavation of three trenches in the landfill. Excavation of trenches is needed to provide visual observation and a definitive description of the intervals not recovered in Borings 1719, 1721, and 1722, which were drilled as part of the 19-Boring Program. If leachate/perched groundwater is encountered in the trenches it will be sampled for HSL, Appendix IX, selected radiological, and general groundwater chemistry parameters.

**Status:**

A Work Plan Addendum has been prepared and was transmitted to the Ohio EPA and the U.S. EPA on March 10, 1992.

**Issues/Corrective Actions:**

None to report

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

**Period Ending March 31, 1992**

**2.2 Treatability Studies**

**Scope:**

The purpose of this study is to provide additional information to support the FS and subsequent remedy selection for Operable Unit 2. Specifically, the study will demonstrate whether stabilization can achieve the 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 involves evaluating a range of stabilization mix formulations in order to determine a representative formulation which meets the proposed strength criteria. The advanced stage involves performing tests on stabilized waste using representative formulations determined in the preliminary stage.

**Status:**

Permeability testing was initiated during February 1992. The permeability testing is scheduled to be completed by mid- or late April. The majority of TCLP analyses have been received; however, a minimal amount of radiological analyses for lead-210 and radium are still undergoing reruns. These are expected to be complete in early April. Preparation of the Treatability Study Report was initiated during March. The Treatability Study Report is scheduled to be submitted for FEMP site review on May 11, 1992.

**2.3 Remedial Investigation**

The purpose of the RI is to provide a summary of the field investigations and to support the FS by defining the nature and extent of the contaminants in the Operable Unit 2 study area; estimating the volume of contaminated media and materials; and providing a baseline risk assessment which establishes remedial action objectives (RAOs).

**Status:**

Work effort during the month included evaluation of the field data from the characterization program as well as the results of data validation. Revision of text, tables, and figures in the first four chapters of the RI are nearing completion. Efforts to incorporate the description of the affected environment as required by the integration of CERCLA and NEPA requirements are ongoing.

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Period Ending March 31, 1992

**2.3 Remedial Investigation (continued)**

**Issues:**

Due to the delay in obtaining analytical results from the laboratory, the internal forecast completion date of the RI Report has slipped, although the Consent Agreement delivery date for the RI has not been impacted.

**Corrective Action:**

A schedule recovery plan has been prepared and implemented to reduce the slippage.

**OU 2 REMEDIAL INVESTIGATION REPORT**

**PRIMARY**

SCOPE	SUBMIT TO DOE	SUBMIT TO DOE HQ	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
Details the nature and extent of contaminants within the Operable Unit 2 study area. Estimates the volume of contaminated media and materials. Provides a baseline risk assessment and establishes remedial action objectives.	06/22/92 C 05/11/92 F	8/19/92 C 7/8/92 F	10/19/92 C 09/04/92 F	12/18/92 C 11/04/92 F	01/17/93 C 12/02/92 F

C = Consent Agreement Date

F = Forecast Complete

A = Actual

**2.4 Feasibility Study**

The purpose of the feasibility study is to evaluate alternatives in detail with respect to the nine evaluation criteria developed by the U.S. EPA. The alternatives are analyzed individually against each criterion and then compared against one another to determine their respective strengths and weaknesses and to identify the key tradeoffs that must be balanced for the site.

**Status:**

The characterization review and alternative assessment were initiated in February 1992. The process of reviewing and updating applicable or relevant and appropriate requirements (ARARs) was initiated in March.

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

Period Ending March 31, 1992

**2.4 Feasibility Study (continued)**

**OU 2 FEASIBILITY STUDY REPORT**

**PRIMARY**

SCOPE	SUBMIT TO DOE	SUBMIT TO DOE HQ	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
Describes and analyzes potential remedial alternatives. A comparative analysis is performed for all alternatives.	11/16/92 C 11/16/92 F	01/15/93 C 01/15/93 F	03/15/93 C 03/15/93 F	05/14/93 C 05/14/93 F	06/13/93 C 06/13/93 F

C = Consent Agreement Date

F = Forecast Complete

A = Actual

Initial stages are underway including model development and data analysis.

**2.5 Planned Activities for April 1992**

Complete permeability testing.

Obtain TCLP results from the advanced stage of the treatability study.

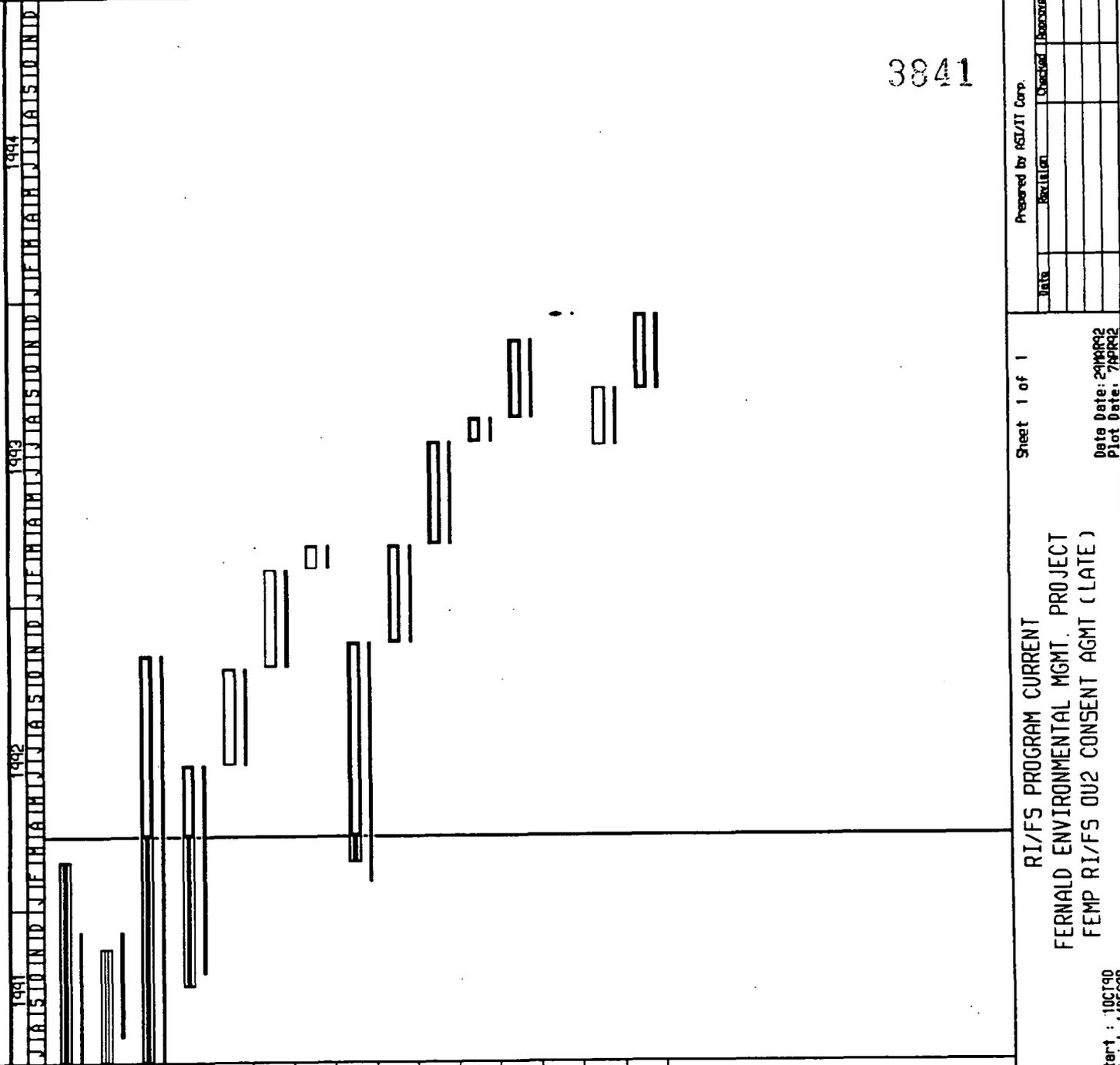
Continue preparation of the Treatability Study Report.

Perform data validation on advanced stage treatability analytical results.

Continue preparation of the RI Report.

Continue characterization review and alternative revision based on treatability results for the FS Report.

Continue with Ebasco independent 100% validation of data and ASI data validation process.



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<p>OU2 19 WELL PROGRAM AS 1MAR91 AF 28FEB92</p> <p>OU2 ADDITIONAL HSL SAMPLING PROGRAM AS 1JUL91 AF 15NOV91</p> <p>OU2 TREATABILITY STUDIES AS 1APR91 LF 2NOV92</p> <p>OU2 REMEDIAL INVESTIGATION REPORT PREPARATION AS 1OCT91 LF 22JUN92</p> <p>DOE OU2 RI REVIEW/REVISE/APPROVE LS 24JUN92 LF 16OCT92</p> <p>EPA OU2 RI REVIEW &amp; APPROVE LS 20OCT92 LF 12FEB93</p> <p>PRINT AND DISTRIBUTE FINAL OU2 RI REPORT LS 15FEB93 LF 12MAR93</p> <p>OU2 FEASIBILITY STUDY/PROP PLAN PREP AS 28FEB92 LF 16NOV92</p> <p>DOE OU2 FS/PP REVIEW/REVISE/APPROVE LS 17NOV92 LF 12MAR93</p> <p>EPA OU2 FS/PP REVIEW/REVISE/APPROVE LS 15MAR93 LF 12JUL93</p> <p>PRINT AND DISTRIBUTE FINAL OU2 FS/PP LS 13JUL93 LF 9AUG93</p> <p>OU2 PUBLIC COMMENT LS 10AUG93 LF 10NOV93</p> <p>SUBMIT OU2 DRAFT ROD TO EPA LF 10DEC93</p> <p>OU2 DRAFT ROD PREPARATION LS 8JUL93 LF 13SEP93</p> <p>DOE OU2 DRAFT ROD REVIEW/REVISE/APPROVE LS 13SEP93 LF 10DEC93</p>	<p>Activity Bar/Late Dates</p> <p>Critical Activity</p> <p>Progress Bar</p> <p>Target Dates as of 10CT90</p>	<p>Project Start : 10CT90</p> <p>Project Finish: 14DEC98</p>	<p>RI/FS PROGRAM CURRENT</p> <p>FERNALD ENVIRONMENTAL MGMT. PROJECT</p> <p>FEMP RI/FS OU2 CONSENT AGMT (LATE)</p>	<p>Prepared by ASL/IT Corp.</p> <p>Date: _____</p> <p>Reviewed: _____</p> <p>Checked: _____</p> <p>Approved: _____</p>
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Sheet 1 of 1

Date Date: 29MAR92  
Plot Date: 7/29/92

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY  
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT MONTHLY  
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**3.0 Operable Unit 3**

Operable Unit 3 as defined in the Amended Consent Agreement includes the 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 lines, wastewater treatment facilities, fire training facilities, scrap metal piles, feed stocks, and coal pile.

**3.1 Initial Scoping/Work Plan Revisions**

Operable Unit 3 initial scoping/work plan revision activities in March included completion of the first draft of the RI/FS Work Plan Addendum for review by DOE-HQ. Other tasks included supporting activities for preparation of the basic work plan and completion of the draft Sampling and Analysis Plan (SAP).

**3.1.1 Development of Draft Sections of the Operable Unit 3 Work Plan Addendum**

Internal comments on the first draft of the Work Plan Addendum (released on February 14, 1992) were received and incorporated. Sampling approaches and methods were developed on a component basis, and 12 general sampling and measurement protocols were established. A comprehensive list of required health and safety, field instruments, field sampling, and analytical laboratory procedures was developed. A methodology was established for the preparation of component-specific Field Implementation Plans (FIPs).

Supporting activities such as data collection/analysis, identification of preliminary RAOs, ARARs and remedial action alternatives, and development of a preliminary Operable Unit 3 conceptual model continued. Sampling approaches and methods for Operable Unit 3 were finalized and documented in the draft SAP (Appendix D to the basic work plan).

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**3.1.1 Development of Draft Sections of the Operable Unit 3 Work Plan Addendum  
(continued)**

**OU3 WORK PLAN ADDENDUM**

**WORK PLAN**

SCOPE	SUBMIT TO DOE	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
The work plan/appendices will include an initial evaluation of Operable Unit 3 (e.g., conceptual models, waste/contaminant quantities), a work plan rationale (e.g., data requirements, SAP approach) and specific Operable Unit 3 RI/FS tasks.	04/03/92 C 04/03/92 F	06/02/92 C 06/02/92 F	07/02/92 C 07/02/92 F	07/30/92 C 07/30/92 F

C = Consent Agreement Date

F = Forecast Complete

A = Actual

**3.2 Issues/Corrective Actions**

None

**3.3 Planned Activities for April 1992**

Continue review/revision of OU3 RI/FS Work Plan Addendum and Appendices

Start preparation of component-specific FIPs

1991	1992	1993	1994	1995	1996	1997
<p>SCOPING OF OPER. UNIT 3 AS 1JUL91 LF 27AUG92</p> <p>OPERABLE UNIT 3 FIELD RELATED ACTIVITIES LS 3JUL92 LF 20DEC94</p> <p>ADMINISTRATION BUILDING LS 28AUG92 LF 25JUN93</p> <p>WAREHOUSE/STORAGE BUILDINGS LS 28AUG92 LF 1MAR94</p> <p>CHEMICAL PROCESS PLANT LS 28AUG92 LF 24DEC93</p> <p>METAL PROCESS PLANT LS 28AUG92 LF 26APR93</p> <p>SUPPORT FACILITIES LS 65EP93 LF 2DEC94</p> <p>ABV GRND. TANKS/UTIL./EQUIP. LS 22DEC92 LF 7JAN94</p> <p>PARKING LOTS/RAILROAD TRACKS/ROADS LS 11JAN94 LF 5JUL94</p> <p>WASTE PROCESSING FACILITIES LS 11NOV93 LF 2DEC94</p> <p>INVENTORY SAMPLING LS 2MAR94 LF 2DEC94</p> <p>BULK CONTAMINANTS LS 11FEB93 LF 16MAR94</p> <p>PONDS/BASINS LS 15JAN93 LF 16JUN93</p> <p>SUBSURFACE TANKS/UTIL./EQUIP. LS 23AUG93 LF 4NOV94</p> <p>SAFE SHUTDOWN BY MEMCO AS 1JUL91 LF 28MAR95</p> <p>DO3 BL RISK ASSESSMENT LS 24AUG93 LF 23MAY95</p> <p>DO3 TREATABILITY STUDIES LS 12JUN92 LF 19JUN95</p> <p>DO3 REMEDIAL INVESTIGATION REPORT PREP LS 27APR93 LF 14NOV95</p> <p>DOE DO3 RI REVIEW/REVISE/APPROVE LS 15NOV95 LF 12MAR96</p> <p>EPA DO3 RI REVIEW/REVISE/APPROVE LS 13MAR96 LF 8JUL96</p> <p>PRINT AND DISTRIBUTE FINAL DO3 RI REPORT LS 9JUL96 LF 5AUG96</p>						

Activity Bar/Leads Dates

Critical Activity

Progress Bar

Target Dates as of 10C190

Sheet 1 of 2

RI/FS PROGRAM CURRENT

FERNALD ENVIRONMENTAL MGMT. PROJECT

FEMP RI/FS DO3 CONSENT AGMT (LATE)

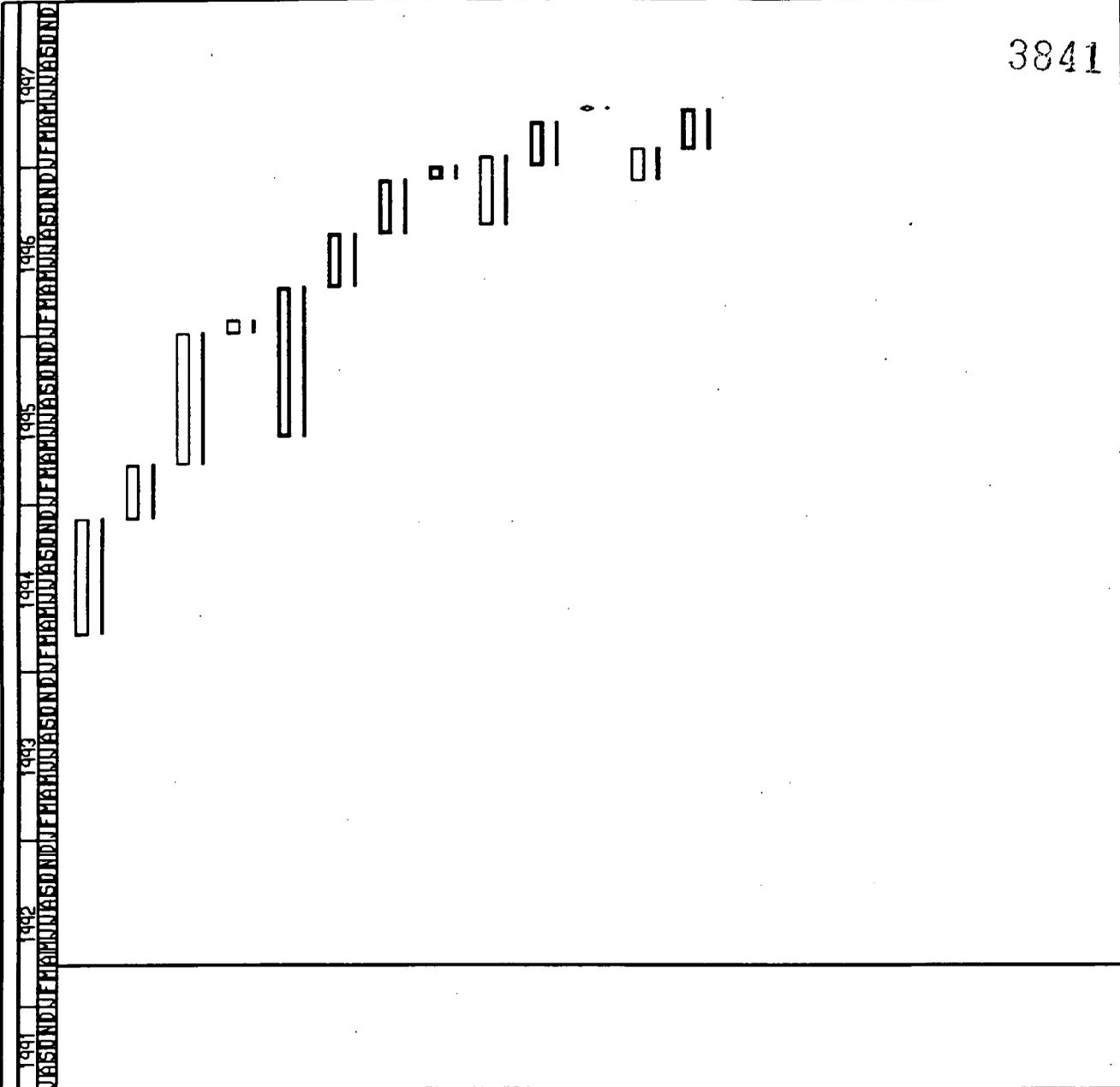
Prepared by ASI/IT Corp.

Date: \_\_\_\_\_ Revision: \_\_\_\_\_ Checked: \_\_\_\_\_ Approved: \_\_\_\_\_

Data Date: 29MAY92

Plot Date: 7APR92

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UO3 INITIAL SCREENING OF ALTERNATIVES RPT PREP LS 21MAR94 LF 28NOV94
DOE UO3 ISA REVIEW/REVISE/APPROVE LS 29NOV94 LF 24MAR95
EPA UO3 ISA REVIEW/REVISE/APPROVE LS 27MAR95 LF 31JAN96
PRINT AND DISTRIBUTE FINAL UO3 ISA REPORT LS 4JAN96 LF 31JAN96
UO3 FEASIBILITY STUDY/PROPOSED PLAN PREP LS 24MAY95 LF 10APR96
DOE UO3 FS/PP REVIEW/REVISE/APPROVE LS 11APR96 LF 5AUG96
EPA UO3 FS/PP REVIEW/REVISE/APPROVE LS 6AUG96 LF 24NOV96
PRINT AND DISTRIBUTE FINAL UO3 FS/PP LS 20DEC96 LF 27DEC96
UO3 DRAFT NOTICE OF AVAILABILITY (NOA) LS 26AUG96 LF 17JAN97
UO3 PUBLIC COMMENT PERIOD LS 30DEC96 LF 2APR97
SUBMIT UO3 DRAFT ROD TO EPA LF 2MAY97
UO3 DRAFT ROD PREPARATION LS 24NOV96 LF 4FEB97
DOE UO3 DRAFT ROD REVIEW/REVISE/APPROVE LS 4FEB97 LF 1MAY97

Sheet 2 of 2

RI/FS PROGRAM CURRENT  
FERNALD ENVIRONMENTAL MGMT. PROJECT  
FEMP RI/FS UO3 CONSENT AGMT (LATE)

Date Date: 29MAY92  
Plot Date: 7APR92

Project Start: 10C190  
Project Finish: 14DEC98

Primavera Systems, Inc. 1994-1991

Activity Bar/Life Dates	Prepared by RSI/TT Corp.
Critical Activity	Date
Progress Bar	Revision
Target Dates as of 10C190	Checked
	Approved

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY  
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT MONTHLY  
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**Period Ending March 31, 1992**

**4.0 Operable Unit 4**

Operable Unit 4 as defined in the Amended Consent Agreement consists of Silos 1, 2, 3, and 4, the silo berms, the Decant Tank System, and soil within the operable unit boundary.

**4.1 Field Investigation**

**4.1.1 Slant Borings**

**Scope:**

Five slant or angled borings were advanced beneath Silos 1 and 2 and the decant sump tank.

**Status:**

All sampling activities and laboratory analysis of the samples have been completed. Data validation is nearing completion and evaluation of validation results will begin shortly.

**Issues/Corrective Actions:**

None to report

**4.1.2 Vertical Borings:**

**Scope:**

Four vertical borings were advanced into the earthen berms of Silos 1 and 2 to identify contaminant transported from the silos in the area of the decant ports.

**Status:**

All sampling activities and laboratory analysis of the samples have been completed. Data validation is nearing completion. Evaluation of validation results will begin shortly.

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY  
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT MONTHLY  
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**4.1.2 Vertical Borings: (continued)**

**Issues:**

During examination of the sample validation results, it was determined that three samples from three of the four vertical borings were inadvertently not collected during the initial sampling operations. The three missed samples were to be analyzed for full radiological parameters. The missed samples were to be collected at the 10-foot interval of the first third of Borings 1620, 1622, and 1623.

**Corrective Actions:**

Sufficient quantities for these intervals are available in archived storage and are being retrieved to complete this requirement. Analytical results will be available prior to completion of the RI Report.

**4.1.3 Silos 1 and 2 Contents:**

**Scope:**

Silos 1 and 2 contents were sampled from three of the four manways at each silo. The contract laboratory completed the analysis for the Silos 1 and 2 samples in January 1992.

**Status:**

All sampling activities and laboratory analyses of the samples have been completed. Data validation is nearing completion. Evaluation of validation results will begin shortly.

**Issues/Corrective Actions:**

None to report

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY  
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT MONTHLY  
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**Period Ending March 31, 1992**

**4.2 Treatability Studies**

**Scope:**

The purpose of a treatability study work plan is to provide additional information to support the FS and subsequent remedy selection for Operable Unit 4. There are two separate work plans/studies to support the Operable Unit 4 FS. One study considers cement stabilization of Silos 1, 2, and 3 material and chemical extraction, leachate stabilization, and leachate purification of Silos 1 and 2 material. The second study considers the vitrification of Silos 1, 2, and 3 material.

The Treatability Study Work Plan (for cementation and chemical extraction) will demonstrate whether stabilization can achieve a desired level of material strength, provide information to help determine the effectiveness of chemical extraction, and to provide data for use in fate and transport modeling. The study is composed of two parts with a provision for optional studies as necessary; these are preliminary phase and advanced phase studies. The preliminary phase studies will determine the potential reagents and conditions for stabilization and/or extraction on composites of the silo material. The advanced phase will evaluate the material variability by testing formulations and/or extraction on the top, middle, and bottom layers from each silo. Optional studies relate to radon emission, radon leaching, and durability testing.

The Treatability Study Work Plan for the Vitrification of Residues from Silos 1, 2, and 3 considers vitrification of silo 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.

**Status:**

Stabilization testing supporting the Treatability Study continued in March.

During Preliminary Phase I - Stage 3, three specimens from Silos 1 and 2 were poured during March and are currently in the 28-day curing stage.

During Preliminary Phase I - Stage 3, the 6 Silo 3 specimens poured in February completed their curing cycle and currently are being analyzed.

Advanced phase leaching was initiated during March and will be completed in early April. Washing of the precipitated solids will occur in early April.

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**4.2 Treatability Studies (continued)**

**Vitrification Treatability Tests**

Laboratory screening tests are ongoing for Silos 1, 2, and 3 and are at risk due to the Vitrification Treatability Work Plan not yet being approved. Chemical analyses for Silo 3 have been completed. Chemical analyses on the Silos 1 and 2 material was initiated during March. Design of the vitrification system continued in March, with completion scheduled for late April 1992.

**4.3 Remedial Investigation Report**

**Scope:**

The purpose of the RI is to provide a summary of the field investigations and to support the FS by defining the nature and extent of the contaminants in the Operable Unit 4 study area; estimating the volume of contaminated media and materials; and providing a baseline risk assessment, which establishes RAOs.

**Status:**

Operable Unit 4 RI activities in March included continued gathering and reviewing of available field and analytical data; continued revisions to the previous draft of the RI Report; and continued model revisions for the risk assessment.

**Issues:**

Due to the unavailability of validated field and analytical data the RI activities have slipped 11 weeks. This does not impact the delivery date under the Amended Consent Agreement but is an unacceptable trend.

**Corrective Action:**

A plan has been formulated to recover much of the slippage for the RI Report.

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY  
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**4.3 Remedial Investigation Report (continued)**

**OU4 REMEDIAL INVESTIGATION REPORT**

**PRIMARY**

SCOPE	SUBMIT TO DOE	SUBMIT TO DOE/HQ	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
Details the nature and extent of contaminants in the OU4 study area. Estimates the volume of contaminated media and materials. Provides a baseline risk assessment and establishes remedial action objectives.	12/21/92 C 10/15/92 F	02/17/93 C 12/14/92 F	04/19/93 C 02/11/93 F	06/18/93 C 04/13/93 F	07/18/93 C 05/11/93 F

C = Consent Agreement Date

F = Forecast Complete

A = Actual

Activities continued including gathering and reviewing field and analytical data, revising previous drafts of the RI, and revising risk assessment models.

**4.4 Planned Activities for April 1992**

Continue revisions to the RI Report/Baseline Risk Assessment.

Review and analyze data validation to determine if OU4 has been fully characterized.

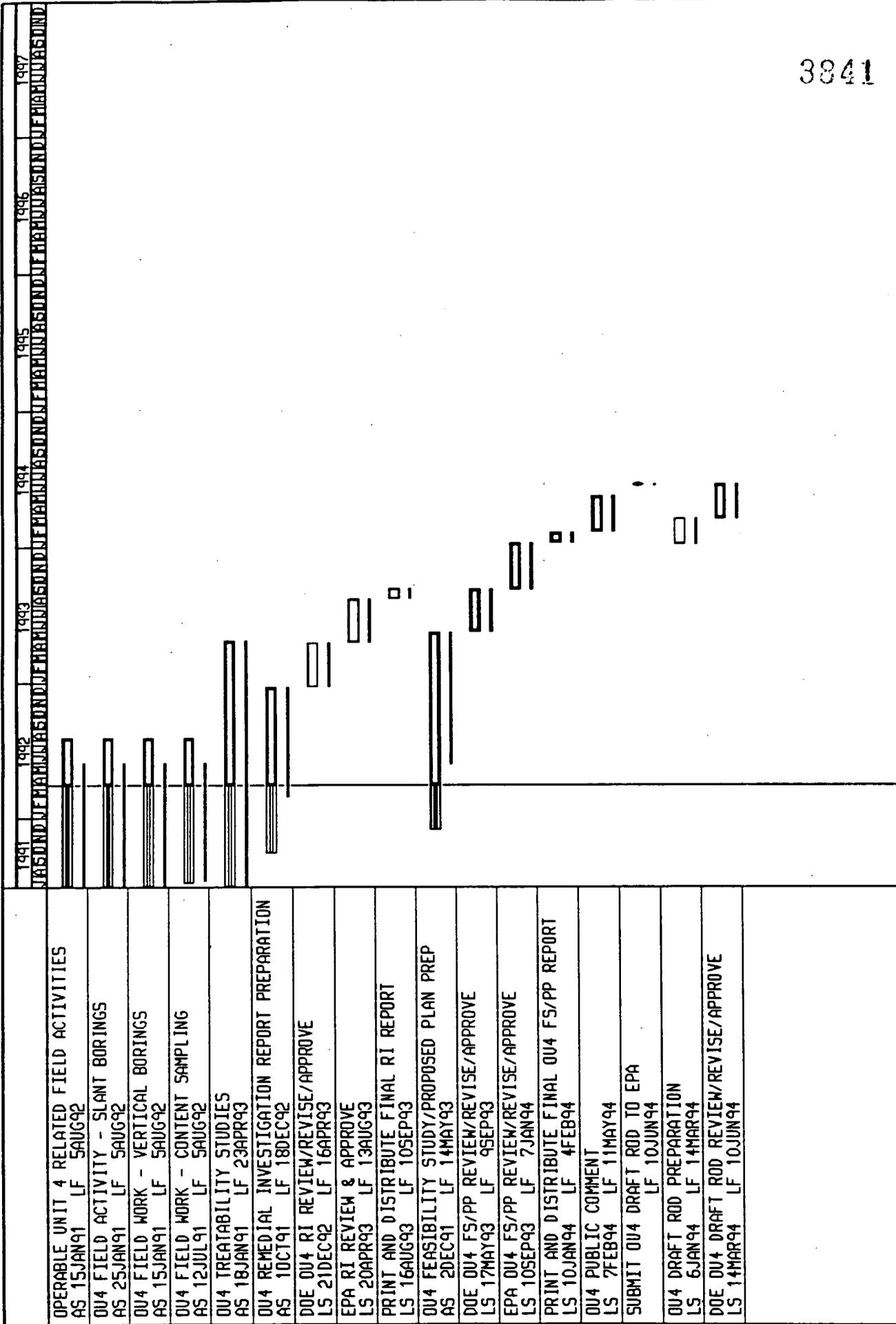
Initiate Ebasco independent 100% data validation review.

Cement stabilization treatability testing will continue with completion of sample analyses of Preliminary Phase - Stage 3 specimens and evaluation of resulting data.

Chemical extraction testing will continue with the initiation of leached solid washing studies, time and temperature evaluations, and advanced stage solids and leachate analyses.

Vitrification laboratory screening testing will continue for Silos 1, 2, and 3. Design of the bench scale testing system will be completed.

Retrieve the required samples from archive storage and send to the contract laboratory for full radiological analysis.



OPERABLE UNIT 4 RELATED FIELD ACTIVITIES AS 15JAN91 LF 5AUG92		Sheet 1 of 1  RI/FS PROGRAM CURRENT FERNALD ENVIRONMENTAL MGMT. PROJECT FEMP RI/FS 0U4 CONSENT AGMT (LATE)	Prepared by: ASI/TI Corp. Date: _____ Checked: _____ Approved: _____	
0U4 FIELD ACTIVITY - SLANT BORINGS AS 25JAN91 LF 5AUG92			Date Date: 29MAR92 Plot Date: 7APR92	
0U4 FIELD WORK - VERTICAL BORINGS AS 15JAN91 LF 5AUG92				
0U4 FIELD WORK - CONTENT SAMPLING AS 12JUL91 LF 5AUG92				
0U4 TREATABILITY STUDIES AS 18JAN91 LF 23APR93				
0U4 REMEDIAL INVESTIGATION REPORT PREPARATION AS 10CT91 LF 18DEC92				
DOE 0U4 RI REVIEW/REVISE/APPROVE LS 21DEC92 LF 16APR93				
EPA RI REVIEW & APPROVE LS 20APR93 LF 13AUG93				
PRINT AND DISTRIBUTE FINAL RI REPORT LS 16AUG93 LF 10SEP93				
0U4 FEASIBILITY STUDY/PROPOSED PLAN PREP AS 20DEC91 LF 14MAY93				
DOE 0U4 FS/PP REVIEW/REVISE/APPROVE LS 17MAY93 LF 9SEP93				
EPA 0U4 FS/PP REVIEW/REVISE/APPROVE LS 10SEP93 LF 7JAN94				
PRINT AND DISTRIBUTE FINAL 0U4 FS/PP REPORT LS 10JAN94 LF 4FEB94				
0U4 PUBLIC COMMENT LS 7FEB94 LF 11MAY94				
SUBMIT 0U4 DRAFT ROD TO EPA LF 10JUN94				
0U4 DRAFT ROD PREPARATION LS 6JAN94 LF 14MAR94				
DOE 0U4 DRAFT ROD REVIEW/REVISE/APPROVE LS 14MAR94 LF 10JUN94				

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**5.0 Operable Unit 5**

Operable Unit 5, as defined in the Amended Consent Agreement, includes groundwater (including site-wide perched groundwater), surface water, soil not included in the definitions of Operable Units 1-4, sediments, flora, and fauna.

**5.1 Field Investigation**

**5.1.1 Paddy's Run South**

**Scope:**

This investigation consists of the installation of twelve 2000-series wells along Paddy's Run, south of the FEMP, with the contingency to install twelve 3000-series wells, sample wells monthly for one year, perform stream gauge and stream infiltration measurements, and perform surface water sampling.

**Status:**

The monthly groundwater sampling of all monitoring wells within the Paddy's Run South investigation was previously completed in February. The use of wells, installed for this program, in the long-term environmental monitoring program is being evaluated.

**Issues/Corrective Actions:**

Laboratory analysis for total uranium was received for Well Location 0552. The total uranium for Well 2552 exceeded the limits previously established. A contingency well will be installed (3552) to further investigate this occurrence.

**5.1.2 Facilities Testing**

**Scope:**

This investigation consists of systematic and focused borings within the FEMP production area and additional suspect areas. Piezometers have been installed in those borings in which water was encountered.

**Status:**

Complete.

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY  
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Period Ending March 31, 1992

**5.1.2 Facilities Testing (continued)**

**Issues/Corrective Actions:**

None to report

**5.1.3 31-Well Program**

**Scope:**

This investigation consists of defining the limits of uranium plumes in the southern area of the FEMP.

**Status:**

All sampling activities associated with this task have been completed; final laboratory analysis for the collected samples is pending.

**Issues/Corrective Actions:**

None to report

**5.1.4 8-RCRA Well Program**

**Scope:**

Eight wells were installed to meet RCRA and RI/FS requirements in and around the FEMP waste storage area.

**Status:**

Well 1646 was developed and the initial round of groundwater sampling was completed. The second round of groundwater sampling was completed March 31, 1992; laboratory analysis of the samples is not yet complete.

**Issues/Corrective Actions:**

None to report

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Period Ending March 31, 1992

**5.1.5 Miscellaneous Additional Wells Program**

**Scope:**

Sixteen additional wells are being installed to fill data gaps defined through recent sampling activities.

**Status:**

A revised work plan incorporating the final comment resolution will be prepared and submitted, once approval of the responses are received.

Installation of all planned wells under this program is complete.

The following wells have been installed and/or developed and sampled (total dissolved uranium concentrations are shown where available):

- Well 2421 - Installation complete. Developed and sampled first and second round of groundwater.
- Well 2398 - Installation complete. Completed first and second rounds of groundwater sampling. Analytical results from the on-site laboratory indicate a total dissolved uranium concentration of 3.7 ug/L in the initial sample.
- Well 2399 - Installation complete. Developed and sampled first and second round of groundwater. Analytical results from the on-site laboratory indicate a total dissolved uranium concentration of 2.4 ug/L in the initial sample.
- Well 3421 - Installation complete. Developed and sampled first round of groundwater.
- Well 2171 - Installation complete. Developed and sampled first round of groundwater.
- Well 2420 - Installation complete. Developed and sampled first round of groundwater. Analytical results from the on-site laboratory indicate a total dissolved uranium concentration of 9.7 ug/L in the initial sample.

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

Period Ending March 31, 1992

**5.1.5 Miscellaneous Additional Wells Program (continued)**

- Well 2400 - Installation complete. Developed and sampled first and second round of groundwater. Analytical results from the on-site laboratory indicate a total dissolved uranium concentration of 1.6 ug/L in the initial sample.
- Well 2402 - Installation complete. Developed and sampled first round of groundwater. Analytical results from the on-site laboratory indicate a total dissolved uranium concentration of 27 ug/L in the initial sample. Contingency Well 3402 has been added to the scope of this task as a result of the uranium concentration in Well 2402.
- Well 2679 - Installation complete. Developed and sampled first round of groundwater.
- Well 3679 - Installation complete. Developed and sampled first round of groundwater.
- Well 3678 - Installation complete. Developed and sampled first round of groundwater.
- Well 2423 - Installation complete. Developed and sampled first round of groundwater.
- Well 3423 - Installation complete. Developed and sampled first round of groundwater.
- Well 2417 - Installation complete.
- Well 3402 - Installation complete.

**Issues/Corrective Actions:**

None to report

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

Period Ending March 31, 1992

**5.1.6 Auger and Cable Sampling Program (OU5 Addenda)**

**Scope:**

Soil and perched groundwater sampling will occur in the following areas under this program: the Plant 1 Pad, the Southeast Quadrant of the Production Area, the Fire Training Area, the KC-2 Warehouse Area, Scrap Metal Area and Electrical Substation, and the K-65 Slurry Line and Clearwell Line.

**Status:**

It is expected that the addendum will be transmitted to the U.S. EPA and the Ohio EPA in April 1992.

**Corrective Actions:**

Priority should be given to finalizing the review and approval of this document through the U.S. EPA and the Ohio EPA.

**Planned Activities for April 1992**

Install contingency Well 3552 for the Paddy's Run South Investigation.

Submittal of the OU5 Work Plan Addenda to the U.S. EPA and Ohio EPA for review and approval.

Complete the development and sampling of groundwater samples for the Miscellaneous Additional Wells Program.

**5.2 Treatability Studies**

**Scope:**

The purpose of this study is to provide information to support the 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.

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

Period Ending March 31, 1992

**5.2 Treatability Studies (continued)**

**Status:**

On February 14, 1992, a written notice of extension for responding to comments received from U.S. EPA on the draft Treatability Study Work Plan was submitted to U.S. EPA, providing for a 20-day extension per the Amended Consent Agreement. The Consent Agreement schedule will not be impacted as a result of this extension. The response to comments and a revised document were submitted to the agencies on March 4, 1992. Comments are expected from the Ohio EPA on the Treatability in early April. ASI/IT has been given a Notice to Proceed (NTP) on a portion of the treatability effort prior to Ohio EPA approval. This effort consists of preliminary sampling and analysis for the determination of soil locations.

**OU5 TREATABILITY STUDY WORK PLAN**

**WORK PLAN**

SCOPE	SUBMIT TO DOE	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
Provides scope of treatability studies for Operable Unit 5 soil treatment technologies including lab procedures and test evaluation criteria.	02/19/92 C 09/04/91 A	04/16/92 C 12/10/91 A	05/18/92 C 01/15/92 A	06/05/92 C 03/04/92 A

C = Consent Agreement Date

F = Forecast Complete

A = Actual

Work plan preparation is proceeding ahead of the Consent Agreement schedule.

**5.3 Initial Screening of Alternatives**

**Scope:**

The initial Screening of Alternatives Report will document the initial activities of the FS. These activities include developing RAOs, developing general response actions, identifying volumes or areas of media to which response actions might be applied, identifying and screening technologies, identifying and evaluating technology process options, assembling selected representative process options into alternatives, and performing an initial screening of the alternatives.

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

Period Ending March 31, 1992

**5.3 Initial Screening of Alternatives (continued)**

**Status:**

Significant internal comments regarding the draft Initial Screening of Alternatives document were received from FEMP on March 13, 1992. A meeting was held between the FEMP and ASI/IT to address the volume of comments. It was determined that the document was in need of restructuring and that effort is presently ongoing.

**OU5 INITIAL SCREENING OF ALTERNATIVES**

**PRIMARY**

SCOPE	SUBMIT TO DOE	SUBMIT TO DOE/HQ	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
Provides for initial evaluation against preselected criteria of candidate technologies assembled to remediate Operable Unit 5.	12/19/92 C 01/22/92 A	02/16/93 C 05/29/92 F	04/16/93 C 07/29/92 F	06/15/93 C 08/27/92 F	07/15/93 C 09/28/92 F

C = Consent Agreement Date

F = Forecast Complete

A = Actual

**Issues/Corrective Actions:**

None to report.

**5.4 Planned Activities for April 1992**

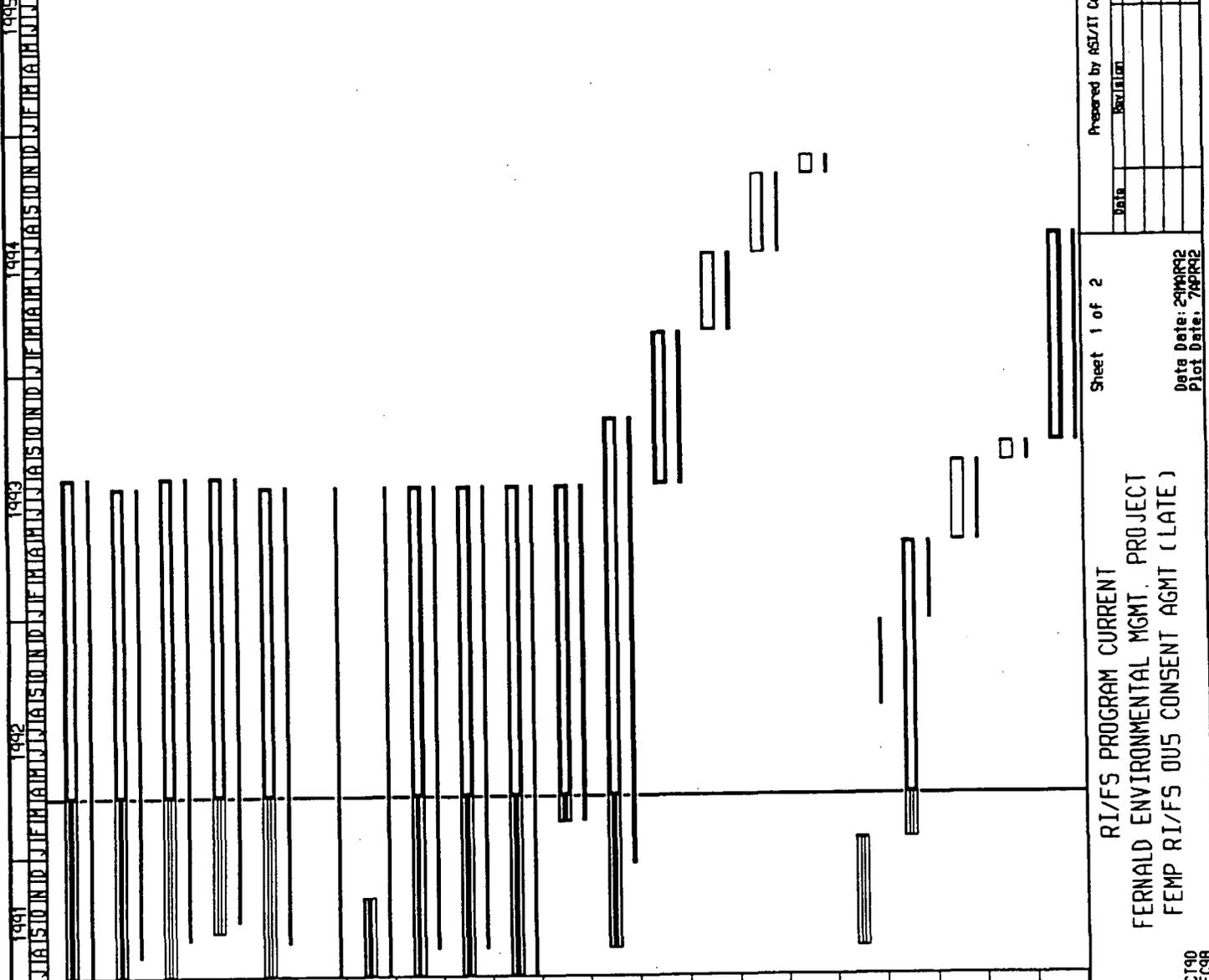
Submittal of RI/FS Work Plan Addenda for Operable Unit 5 to U.S. EPA and Ohio EPA for review and approval.

Receipt of U.S. EPA and Ohio EPA approval of the draft final Treatability Study Work Plan. Initiation of laboratory studies will begin in April.

Revision of the Initial Screening of Alternatives document for DOE/HQ review.

Activity Bar/Late Dates	Critical Activity	Progress Bar	Target Dates as of 10CT90
OPERABLE UNIT 5 RELATED FIELD ACTIVITIES			
AS 10CT90 LF 26JUL93			
FACILITIES TESTING			
AS 29MAR91 LF 12JUL93			
OU5 FIELD WORK 31 WELL PROGRAM			
AS 15MAR91 LF 26JUL93			
OU5 FIELD WORK - PADDYS RUN SAMPLING			
AS 6SEP91 LF 26JUL93			
OU5 FIELD WORK - 8 RCRA WELLS			
AS 29MAR91 LF 12JUL93			
OU5 FIELD WORK - 6 WELL PROGRAM			
AS 13JAN91 AF 15MAY91			
OU5 FIELD WORK - WATER LEVEL MEASUREMENTS			
AS 10CT90 AF 28OCT91			
OU5 FIELD WORK - AUGER SAMPLING			
AS 1JUL91 LF 12JUL93			
OU5 FIELD WORK - CABLE SAMPLING			
AS 1JUL91 LF 12JUL93			
OU5 FIELD WORK - MISC. ADDITIONAL WELLS			
AS 2JAN91 LF 12JUL93			
RCRA/CERCLA BACKGROUND SOIL STUDY			
AS 20FEB92 LF 12JUL93			
OU5 TREATABILITY STUDIES			
AS 12AUG91 LF 20OCT93			
OU5 REMEDIAL INVESTIGATION REPORT PREPARATION			
LS 13JUL93 LF 25FEB94			
DOE OUS RI REVIEW/REVISE/APPROVE			
LS 28FEB94 LF 23JUN94			
EPA OUS RI REPORT REVIEW/REVISE/APPROVE			
LS 24JUN94 LF 19OCT94			
PRINT AND DIST FINAL OUS RI REPORT			
LS 20OCT94 LF 16NOV94			
OU5 INITIAL SCREENING OF ALTERNATIVES PREP			
AS 12AUG91 AF 22JAN92			
DOE OUS ISA REVIEW/REVISE/APPROVE			
AS 23JAN92 LF 15APR93			
EPA OUS ISA REVIEW/REVISE/APPROVE			
LS 16APR93 LF 11AUG93			
PRINT AND DISTRIBUTE FINAL OUS ISA REPORT			
LS 12AUG93 LF 8SEP93			
OU5 FEASIBILITY STUDY/PROPOSED PLAN PREP			
LS 9SEP93 LF 20JUL94			

1991 1992 1993 1994 1995



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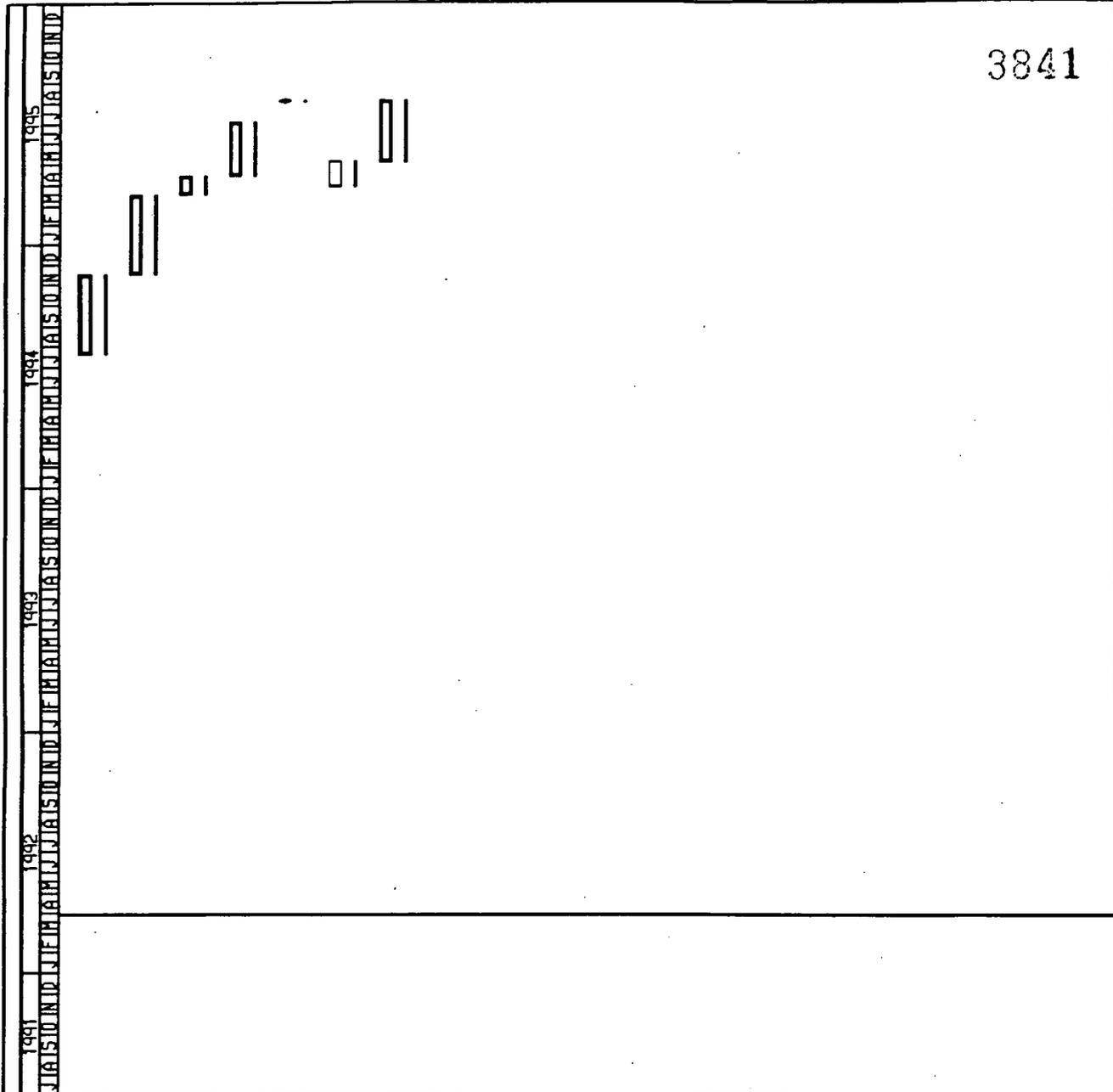
Sheet 1 of 2

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

Data Date: 29MAR92  
 Plot Date: 78PR92

Project Start: 10CT90  
 Project Finish: 14DEC98

Primavera Systems, Inc. 1994-1991



DOE OUS FS/PP REVIEW/REVISE/APPROVE LS 21JUL94 LF 15NOV94
EPA OUS FS/PP REVIEW/REVISE/APPROVE LS 16NOV94 LF 15MAR95
PRINT AND DIST FINAL OUS FS RPT/PP LS 16MAR95 LF 12APR95
OUS PUBLIC COMMENT LS 13APR95 LF 3JUL95
SUBMIT OUS DRAFT ROD TO EPA LF 2AUG95
OUS DRAFT ROD PREPARATION LS 29MAR95 LF 4MAY95
DOE OUS DRAFT ROD REVIEW/REVISE/APPROVE LS 4MAY95 LF 2AUG95

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Activity Bar/Late Dates  
 Critical Activity  
 Progress Bar  
 Target Dates as of 10/1/90

Project Start : 10/1/90  
 Project Finish: 14DEC98

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

Sheet 2 of 2

Prepared by RSL/TI Corp.

Date: \_\_\_\_\_ Revision: \_\_\_\_\_ Tracker: \_\_\_\_\_

Data Date: 29MAY95  
 Plot Date: 7APR95

Primavera Systems, Inc. 1994-1991

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

Period Ending March 31, 1992

### 6.0 Engineered Waste Management Facility

This program will evaluate the ability of the Engineered Waste Management Facility (EWMF) to manage the remedial waste generated by the operable units. The technical approach for the evaluation will be based on a program-specific sampling and analysis plan and development of an EWMF Siting Report with comprehensive analysis. The report will perform a detailed analysis of the EWMF as an on-property waste disposal/storage technology option, per OSWER 9355.3-01.

### 6.1 Sampling and Analysis Plan

#### Scope:

The U.S. EPA approved the EWMF SAP as an addendum to the RI/FS Work Plan (March 1988), specifying a series of soil sample collection and analytical activities. Geotechnical, geochemical, radiological, and chemical soil samples will be collected for analysis 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 analysis while, in general, samples collected at mid-stratum of the glacial overburden will receive total uranium and gamma spectral analysis only. The geochemical samples selected for batch sorption 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 per the methodology given in "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" (EPA 1988).

#### Status:

The original field effort has now been completed. During implementation, a number of geotechnical borings encountered perched groundwater. In addition, one well set (one-1000-series, one-2000 series) encountered bedrock. Due to these developments, arrangements have been made to install five additional geotechnical borings and to relocate the well pair. The five geotechnical borings were completed in March.

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

**Period Ending March 31, 1992**

**6.1 Sampling and Analysis Plan (continued)**

**Issues/Corrective Actions:**

None to report.

**6.2 EWMF General Siting Report**

**Scope:**

The report will establish the feasibility of locating an EWMF at the FEMP by performing a detailed analysis of the EWMF as an on-property waste disposal/storage technology option per OSWER Directive 9355.3-01. The siting report will be divided into specific chapters characterizing all pathways and associated risks. The report will be divided into the following chapters: Geologic/Hydrogeologic, Geotechnical, Geochemical, Risk Assessment, RI/FS-EIS, and ARARs.

**Status:**

The EWMF ARARs Revision 3 were submitted to the DOE for EPA review on December 3, 1991. Comments were received from the Ohio EPA on January 6, 1992 and the U.S. EPA on January 30, 1992. The ARARs were revised and resubmitted to DOE and transmitted to the EPAs on March 18, 1992.

**Issues/Corrective Actions**

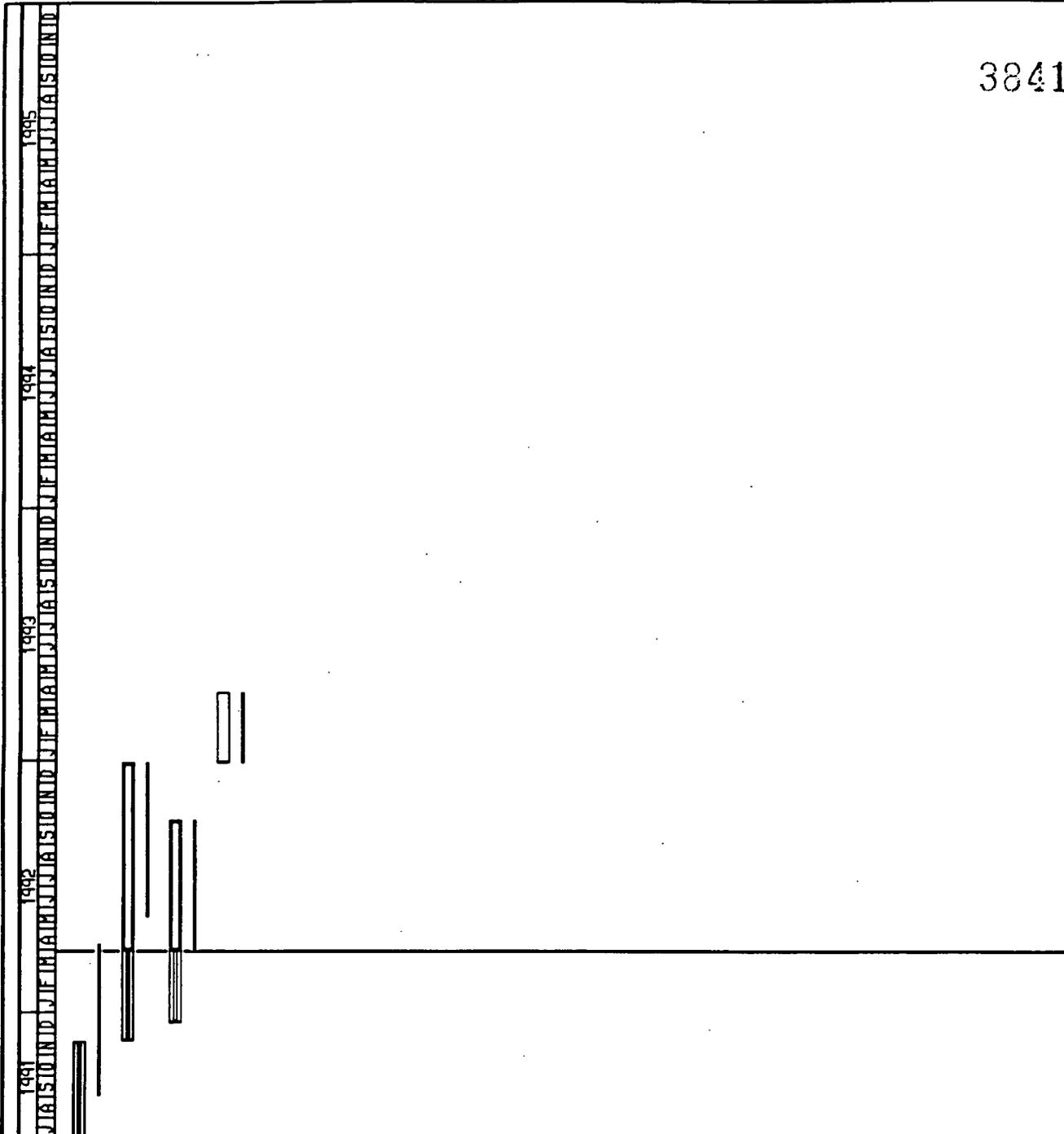
None to report

**6.3 Planned Activities for April 1992**

Two well installations will be initiated in April.

Radiological, chemical, and geotechnical analysis of the EWMF soil samples will continue.

Complete the installation of the two remaining wells. Complete the laboratory analysis of the samples.



<p>EWMP SAMPLING AND ANALYSIS PLAN PREP AS 18MAR91 LF 18NOV91</p> <p>EWMP FIELD INVESTIGATION AS 21NOV91 LF 29DEC92</p> <p>EWMP MATERIALS SOURCE SURVEY AS 17DEC91 LF 6OCT92</p> <p>EWMP GENERAL SITING REPORT PREPARATION LS 30DEC92 LF 9APR93</p>
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Activity Bar/Late Dates  
 Critical Activity  
 Progress Bar  
 Target Dates as of 10CT90

Project Start: 10CT90  
 Project Finish: 14DEC98

Prepared by ASL/AT Corp.

Date	Revision	Checked	Approved

Sheet 1 of 1

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

Data Date: 29APR92  
 Plot Date: 7APR92

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

**Period Ending March 31, 1992**

**7.0 Site-Wide Characterization Report**

**7.1 Risk Assessment Work Plan Addendum**

**Scope:**

The Risk Assessment Work Plan Addendum provides a detailed scheme for development and completion of a baseline risk assessment for each operable unit, a preliminary site-wide baseline risk assessment, and a remedial action risk evaluation with each operable unit FS.

The Risk Assessment Work Plan Addendum presents the specific risk assessment methodology to be followed in the RI/FS risk assessment tasks. It also establishes the scope of risk assessment work and documents the specific approach to be followed for determining whether estimated risks associated with selected remedial alternatives for the entire site are protective of human health and the environment. The addendum provides the methods, models, and parameters for development of the baseline risk assessment for each operable unit, the preliminary baseline risk assessment of the Site-Wide Characterization Report (SWCR), the remedial action risk evaluation, and the comprehensive response action risk evaluation for each operable unit FS.

**Status:**

DOE received approval of the Risk Assessment Work Plan Addendum from U.S. EPA on March 17, 1992. Approximately 51 comments were received from U.S. EPA and Ohio EPA on the draft final Addendum. Responses will be prepared for the comments, and the Addendum will be revised as needed.

The revised Addendum fulfills the requirements of the Amended Consent Agreement and presents the detailed methodology for performing risk assessment/risk management tasks in the RI/FS to resolve issues raised by U.S. EPA and Ohio EPA.

**Issues/Corrective Actions:**

Review of the 51 comments and responses with U.S. EPA and Ohio EPA should be performed by approximately April 7, 1992, in order for the final changes to be agreed upon prior to printing changes to the final Addendum which is to be submitted to U.S. EPA on April 16, 1992.

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

Period Ending March 31, 1992

**7.1 Risk Assessment Work Plan Addendum (continued)**

**RISK ASSESSMENT WORK PLAN ADDENDUM**

**WORK PLAN**

SCOPE	SUBMIT TO DOE	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
Provides a detailed scheme for development and completion of the Baseline Risk Assessments and general approach for the Site-Wide Projected Residual Risk Assessment.	08/14/91 C 07/29/91 A	10/15/91 C 10/10/91 A	11/11/91 C 12/4/91 A	12/11/91 C 2/4/92 A

C = Consent Agreement Date

F = Forecast Complete

A = Actual

**7.2 SWCR Report Preparation**

**Scope:**

The 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.

**Status:**

Revision and preparation of Chapters 1 through 4 of the SWCR are continuing. Data compilation continued in support of Chapter 4 and the preliminary baseline risk assessment. Preparation of the section on selection of the leading remedial alternatives began.

A meeting was held on March 12 with the U.S. EPA, Ohio EPA, DOE, and DOE's contractors to discuss ecological issues at the FEMP. A presentation on ecological studies at the FEMP was made. As a result of this meeting, and conditional approval of the Risk Assessment Work Plan Addendum, agreement was reached on the outstanding ecological issues. U.S. EPA and Ohio EPA are not currently recommending further studies.

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

Period Ending March 31, 1992

**7.2 SWCR Report Preparation (continued)**

**Status:**

The preliminary baseline risk assessment is underway with identification of constituents of potential concern, of potential site-wide reasonable maximum exposure individuals and locations, preliminary identification of scenarios for potential future releases from the FEMP, and development of site-wide models for exposure assessment calculations. Data is being compiled and used in preliminary calculations. Drafts of Chapters 5, 6, and 8 were revised following internal review.

**SITE-WIDE CHARACTERIZATION REPORT**

**SECONDARY**

SCOPE	SUBMIT TO DOE	SUBMIT TO DOE/HQ	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
Provides a one-time summary of site characterization data available as of 12/1/91, the Preliminary Baseline Risk Assessment and a list of the leading remedial alternatives.	04/09/92 C 04/13/92 F	06/08/92 C 06/10/92 F	08/05/92 C 08/07/92 F	10/04/92 C 09/02/92 F	11/03/92 C 10/06/92 F

C = Consent Agreement Date

F = Forecast Complete

A = Actual

**Issues:**

Any potential delay in delivery of the SWCR due to late U.S. EPA comments on the Risk Assessment Work Plan Addendum has not been determined.

**Corrective Actions:**

Notify U.S. EPA of any potential delay in delivery of the SWCR.

**7.3 Planned Activities for April 1992**

Continue data compilation in support of modeling and data summaries.

Submit drafts of Part I (the data summary) and Part III (the selection of leading remedial alternatives) of the SWCR to DOE for review.

Continue preparation of Part II (the preliminary baseline risk assessment).

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1991 1992  
JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

WORK PLAN REVISIONS

WORK PLAN ADDENDUM PREPARATION  
AS 17JUN91 AF 29JUL91  
DOE WORK PLAN REVIEW/REVISE/APPROVE  
AS 30JUL91 AF 24SEP91  
EPA WORK PLAN ADD. REVIEW/REVISE/APPROVE  
AS 11OCT91 EF 16APR92

PRELIMINARY SITE CHARACTERIZATION

SITIEWIDE CHARACTERIZATION REPORT PREP  
AS 26JUL91 EF 21APR92  
DOE REVIEW/REVISE/APPROVE SITE CHAR REPORT  
ES 22APR92 EF 17AUG92  
EPA REVIEW/REVISE/APPROVE SITE CHAR REPORT  
ES 18AUG92 EF 14OCT92

Sheet 1 of 1

Prepared by ASI/AT Corp.  
Date: \_\_\_\_\_ Revision: \_\_\_\_\_ Unchecked: \_\_\_\_\_

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

Project Start: 10CT90  
Project Finish: 14DEC98

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

Praeger Systems, Inc. 1984-1991

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

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Period Ending March 31, 1992

**8.0 Community Relations**

**8.1 Status**

The following removal action addenda to the Community Relations Plan -- Remedial Investigation/Feasibility Study and Removal Actions -- Volume III of the Work Plan are ready for submittal to U.S. EPA for approval:

Removal Action No. 1 - Contaminated Water Beneath FEMP Buildings - DCR #75

Removal Action No. 7 - Plant 1 Pad Continuing Release - DCR #76

Removal Action No. 9 - Removal of Waste Inventories and Thorium Management - DCR #77

Removal Action No. 12 - Safe Shutdown - DCR #78

Removal Action No. 10 - Active Flyash Pile Controls - DCR #79

All comments/edits for the revision of the Community Relations Plan -- Remedial Investigation/Feasibility Study and Removal Actions -- Volume III of the Work Plan (August 1990), have been incorporated. After completing the review cycle and assigning it a Document Change Request number, the plan will be submitted to U.S. EPA for approval.

On March 10 an open-to-the-public meeting was held to discuss the Fernald Dosimetry Reconstruction Project. Dr. John Till and his staff from Radiological Assessments Corporation outlined the progress they have made to date. This study is being conducted to determine if releases during the operational years from the FEMP posed a risk to nearby residents.

The first public meeting under the guidance of the Ohio EPA focusing on the Paddy's Run Road Site Remedial Investigation/Feasibility Study was held March 31 at the Ross High School.

**8.2 Issues/Corrective Action**

None.

**8.3 Planned Activities for April 1992**

A DOE Programmatic Environmental Impact Statement workshop focusing on the draft Implementation Plan will be held in Cincinnati on April 2.

A Community Roundtable will be held April 13 at the Executive Resource Associates Alpha Building to discuss the FEMP Waste Shipping Program.

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

**PERIOD ENDING MARCH 31, 1992**

**ENCLOSURE A**

**WASTEWATER FLOWS AND RADIONUCLIDE  
CONCENTRATIONS UNDER CA SECTION XXIII.B**

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

**Period Ending March 31, 1992**

**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 March 1992.

**Summary - March 1992**

The total quantity of uranium discharged from the FEMP to the Great Miami River via Manhole 175 (Outfall 11000004001) was 37.38 kilograms. The average uranium concentration for the previous 12 months was 0.58 mg/l. This is 65.2 percent of the Derived Concentration Guide (DOE Order 5400.5) for ingested water.

There was no discharge from the Stormwater Retention Basin (Outfall 11000004002) to Paddy's Run via the Storm Sewer Outfall Ditch in February 1992. Based on 1.53 inches of rainfall in March 1992, the total quantity of uranium discharged to Paddy's Run from uncontrolled areas of the FEMP is estimated to be 6.89 kilograms.

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

Period Ending March 31, 1992

**Wastewater Flows and Radionuclide Concentrations**

Facility: Fernald Environmental Management Project  
U.S. Department of Energy  
7400 Willey Road, P.O. Box 398705  
Cincinnati, Ohio 45239-8705

Location: 11000004001  
001 Total Discharge  
Manhole 175 (Effluent to the Great Miami River)

Month: March 1992

Day	Flow (MGD)	Total Alpha (pCi/l)	Total Beta (pCi/l)	Total U (mg/l)	Total U (kgs)	Calculated Total U-238 (pCi/l) (1)
1	0.285	608	302	0.80	0.86	270
2	0.419	338	185	0.54	0.86	182
3	0.572	495	248	0.90	1.95	304
4	0.597	477	203	0.86	1.94	291
5	0.559	523	207	0.78	1.65	264
6	0.742	360	257	0.62	1.74	209
7	0.548	360	140	0.62	1.29	209
8	0.527	635	81	0.84	1.67	284
9	0.546	423	131	0.76	1.57	257
10	0.757	410	194	0.72	2.06	243
11	0.696	563	198	0.80	2.11	270
12	0.627	559	270	0.76	1.80	257
13	0.590	505	234	0.70	1.56	236
14	0.570	293	225	0.58	1.25	196
15	0.491	324	225	0.52	0.97	176
16	0.545	297	243	0.42	0.87	142
17	0.733	293	149	0.40	1.11	135
18	1.200	203	90	0.30	1.36	101
19	0.683	167	90	0.28	0.72	95
20	0.376	225	158	0.34	0.48	115
21	1.063	248	95	0.38	1.53	128
22	0.976	257	95	0.40	1.48	135
23	0.918	275	135	0.30	1.04	101
24	0.520	234	189	0.28	0.55	95
25	0.420	167	135	0.28	0.44	95
26	1.032	252	108	0.40	1.56	135
27	0.404	342	212	0.58	0.89	196
28	0.352	293	140	0.50	0.67	169
29	0.274	360	225	0.54	0.56	182
30	0.468	198	135	0.28	0.50	95
31	<u>0.328</u>	297	131	0.28	<u>0.35</u>	95
TOTAL	18.818				37.38	

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

Period Ending March 31, 1992

**Wastewater Flows and Radionuclide Concentrations**

Facility: Fernald Environmental Management Project

Location: 001 Total Discharge

Month: March 1992

	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.	0.607	343	165	0.53	1.21	177
Max.	1.200	635	302	0.90	2.11	304
Min.	0.274	167	81	0.28	0.35	95

The average uranium concentration for the previous twelve months was 0.58 mg/l. This is 65.2 percent of the Derived Concentration Guide (DOE Order 5400.5) for ingested water.

- Comments: (1) The activity of this discharge has been and will continue to be reported as Uranium-238 (pCi/l) in accordance with the Ohio EPA format for reporting uranium. Since this does not account for the activity of the other uranium isotopes in the effluent, the total uranium data is also presented. The calculated total U-238 is based on a conversion factor of 337.84 pCi U-238/mg Total U applied to measure value of total uranium.
- (2) Average values presented are flow-weighted.

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

**Period Ending March 31, 1992**

**Wastewater Flows and Radionuclide Concentrations**

**Facility:** Fernald Environmental Management Project  
U.S. Department of Energy  
7400 Willey Road, P.O. Box 398705  
Cincinnati, Ohio 45239-8705

**Location:** 11000004002  
002 Discharge (Overflow) to Storm Sewer Outfall Ditch  
Stormwater Retention Basin Spillway (Effluent to Paddy's Run)

**Month:** March 1992

There was no discharge to Paddy's Run from the Stormwater Retention Basin.

Based on 1.53 inches of rainfall for the month, the uranium discharge to Paddy's Run from uncontrolled areas of the FEMP is estimated to be 6.89 kgs.

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

**PERIOD ENDING MARCH 31, 1992**

**ENCLOSURE B**

**FFCA: INITIAL REMEDIAL MEASURES**

**AND OTHER OPEN ACTIONS**

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

Period Ending March 31, 1992

INTRODUCTION

Enclosure B describes actions undertaken at the FEMP during the period March 1 through March 31, 1992 that are not covered by the reporting requirements of the Consent Agreement As Amended under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Sections 120 and 106(a).

**WORK ASSIGNMENTS AND PROGRESS**

Descriptions of ongoing work progress are presented in the following sections of this report. The status of ongoing work in support of the Federal Facility Compliance Agreement (FFCA) is summarized in Table 1 of Enclosure B. Completed work previously reported upon has been eliminated for the sake of brevity. In this portion of the report and in Table 1, descriptions of actions are presented in a format consistent with that of the FFCA.

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

1. Initial Remedial Measures

*Section C*

K-65 Silo Project - Status information on the K-65 Silo project normally reported in this section is being provided under Operable Unit 4: Silos 1-4.

2. Remedial Investigation/Feasibility Study (RI/FS)

Status information on the Remedial Investigation/Feasibility Study (RI/FS) normally reported in this section is being provided separately in accordance with the requirements of Section X of the Consent Agreement As Amended under CERCLA Sections 120 and 106(a).

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

**Period Ending March 31, 1992**

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

**3. Reports and Record Keeping**

*Section B*

The RI/FS Monthly Technical Progress Report for February 1992 was transmitted to the U.S. EPA on March 19, 1992 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 twenty-first Quarterly Particulate Emissions Report for the period October 1, 1991 through December 31, 1991 was submitted to the U.S. EPA on February 20, 1992.

**RADIATION DISCHARGE INFORMATION**

*Section A*

The twenty-first Quarterly Liquid Discharge Report for the period October through December 1991 was submitted to the U.S. EPA on February 20, 1992.

**REPORTING REQUIREMENTS**

*Section B*

The Federal Facility Compliance Agreement Monthly Progress Report for February 29, 1992, was transmitted to the U.S. EPA on March 19, 1992 as Enclosure B of the Consolidated Consent Agreement/Federal Facility Compliance Agreement (CA/FFCA) Monthly Progress Report.

TABLE 1

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

**STATUS OF ACTIONS AS OF  
MARCH 31, 1992**

<u>ACTION</u>	<u>DESCRIPTION</u>	<u>COMPLETION TIME AFTER FFCA SIGNED</u>	<u>FY92 STATUS</u>
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 February 1992 was transmitted to the U.S. EPA on March 19, 1992 (DOE-1186-92).

TABLE 1

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

**STATUS OF ACTIONS AS OF  
MARCH 31, 1992**

<u>ACTION</u>	<u>DESCRIPTION</u>	<u>COMPLETION TIME AFTER FFCA SIGNED</u>	<u>FY92 STATUS</u>
<b>CLEAN AIR ACT</b>			
B.4	Prepare annual progress report on installation and replacement of emission control devices.	yearly	The Fourth Annual Progress Report on the installation and replacement of emission control devices was transmitted to the U.S. EPA on January 28, 1992 (DOE-982-92).
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.
D.2	Provide U.S. EPA with stack-test results for stacks tested that year.	45 days	Because the FEMP has been out of production since mid-1989, there was no opportunity to perform stack testing. The DOE, in August 1991, confirmed that no future production will take place at the FEMP. Some stack operations are expected when waste processing operations are resumed. Stack test results will be provided following the completion of testing on stacks which are returned to operation.
E.1	Maintain records of monthly particulate matter emissions.	-----	Ongoing.

TABLE 1

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

**STATUS OF ACTIONS AS OF  
MARCH 31, 1992**

<u>ACTION</u>	<u>DESCRIPTION</u>	<u>COMPLETION TIME AFTER FFCA SIGNED</u>	<u>FY92 STATUS</u>
E.2	Provide quarterly reports to U.S. EPA on these emissions.	quarterly	The twenty-first Quarterly Particulate Emissions Report for the period October 1, 1991 through December 31, 1991 was submitted to the U.S. EPA February 20, 1992 (DOE-941-92). The twentieth Quarterly Particulate Emissions Report for the period July 1, 1991 through September 30, 1991 was transmitted to the U.S. EPA on November 19, 1991. (DOE-370-92).
RCRA			
A.1	Conduct a hazardous waste determination on all waste streams.	30 days	Pursuant to the proposed Amended Consent Decree, a RCRA waste evaluation will be conducted on all site materials by 10/92.
A.2	Commence a hazardous waste analysis program for materials in the landfill and going to the incinerator.	30 days	Complete. Operations of these units was discontinued and data on the waste which had gone to them was provided in a 30-day FFCA deliverable on August 17, 1986. However, further review of both the waste streams and the potential of the units to be hazardous waste management units are being evaluated as actions required by the proposed Amended Consent Decree. Final results are due October 30, 1992.
A.5	Update the facility closure plan to reflect the year the facility expects to begin closure.	30 days	The Facility closure date is dependent upon closure schedules for individual TSD units as presented most recently in Section I of the RCRA Part B Permit Application transmitted to the Ohio EPA and the U.S. EPA on October 30, 1991 (DOE-211-92). Facility closure will be completed on the date the last TSD unit is closed.

TABLE 1

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

**STATUS OF ACTIONS AS OF  
MARCH 31, 1992**

<u>ACTION</u>	<u>DESCRIPTION</u>	<u>COMPLETION TIME AFTER FFCA SIGNED</u>	<u>FY92 STATUS</u>
<b>RADIATION DISCHARGE INFORMATION</b>			
A.3	Report to U.S. EPA, Ohio EPA and Ohio Department of Health the results of the continuous liquid discharge samples.	quarterly	The twenty-first Quarterly Liquid Discharge Report for the period October through December 1991 was transmitted to the U.S. EPA on February 20, 1992 (DOE-941-92). 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).
<b>REPORTING REQUIREMENTS</b>			
B.	Issue monthly progress report of actions taken to ensure compliance with FFCA requirements.	monthly	February's FFCA Monthly Progress Report was transmitted to the U.S. EPA on March 19, 1992 (DOE-1186-92).

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

**PERIOD ENDING MARCH 31, 1992**

**ENCLOSURE C**

**FEDERAL FACILITY AGREEMENT:  
CONTROL AND ABATEMENT OF RADON-222 EMISSIONS**

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

**Period Ending March 31, 1992**

**Introduction**

The Federal Facility Agreement (FFA) between the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (U.S. EPA), signed November 19, 1991, requires that a monthly report be submitted to the U.S. EPA regarding all steps undertaken in the preceding month to implement Part V of the agreement and that all data generated as a result of those actions be submitted.

Enclosure C fulfills those requirements by describing steps taken at the FEMP during the period March 1 through March 31, 1992, to implement Part V, Radon-222 Control and Abatement Plan, paragraphs 19-33 of the FFA.

**Work Assignments and Progress**

In this section of Enclosure C, action descriptions and work progress are presented in a format consistent with that of the FFA. Immediately following this section are the K-65 Silos Report and the Selected Radon Data Report. Reporting this data is also a requirement included in the U.S. EPA approved Silos 1 and 2 Removal Action Work Plan (Removal Action No. 4).

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

Period Ending March 31, 1992

<u>FFA Part, Paragraph(s)</u>	<u>Description of Commitment</u>	<u>FFA Due Date</u>	<u>Status of Commitment</u>
Part V, 19 & 21	Implement the K-65 Silos 1 and 2 Removal Action in accordance with the approved Silos 1 and 2 Removal Action Work Plan.	12/1/91	Completed. Installation of the bentonite completed 11/28/91.
Part V, 20	Reduce radon-222 to a level As-Low-As Reasonably Achievable (ALARA) with the goal as specified in the Silos 1 and 2 Removal Action Work Plan.	None specified.	The Bentonite Effectiveness Environmental Monitoring Plan was submitted to the U.S. EPA on 1/27/92.
Part V, 22	Submit proposed methodology for estimating radon-222 concentration reductions resulting from completion of the Silos 1 and 2 Removal Action.	Within 60 days of completing removal action; 1/27/92.	Completed. The Bentonite Effectiveness Environmental Monitoring Plan was submitted to the U.S. EPA for comment and approval on 1/27/92.
Part V, 23	Evaluate performance of the removal action and determine whether or not additional actions are needed prior to final remediation.	None specified.	Proposed methodology for estimating radon-222 concentration reduction submitted to U.S. EPA per paragraph 20 of Part V.
Part V, 24, 25, and 33	Demonstrate compliance with NESHAP Subpart Q at the completion of final remediation using a methodology approved by the U.S. EPA. Applicable to: Silos 1, 2, and 3; Waste Pits 1, 2, 3, 4, and 5 and the Clearwell; and newly discovered radon-222 emission sources.	None specified.	No information to report for March 1992.
Part V, 26	Directly measure radon-222 flux from Waste Pits 1, 2, 3, 4, and 5 and the Clearwell in the RI/FS under the CERCLA Consent Agreement.	None specified.	No information to report for March 1992.

<u>FFA Part, Paragraph(s)</u>	<u>Description of Commitment</u>	<u>FFA Due Date</u>	<u>Status of Commitment</u>
Part V, 26	Include direct measurement data from Waste Pits 1, 2, 3, 4, and 5 and the Clearwell in the RI/FS under the CERCLA Consent Agreement.	None specified.	No information to report for March 1992.
Part V, 27	Estimate Radon-222 emissions from Silo 3 based upon characterization data; include the estimate radon-222 emission data from Silo 3 in the RI/FS that includes Silo 3 under the CERCLA Consent Agreement.	None specified.	No information to report for March 1992.
Part V, 28	Submit documentation or estimates of current radon-222 emissions from existing but newly discovered sources that contain Radium-226 in sufficient concentrations to emit radon-222 in excess of NESHAP Subpart Q prior to final remediation.	Within 30 days of discovery.	No new sources identified.
Part V, 30	Submit methodology for direct measurement or other appropriate means of characterization of the relevant emissions pursuant to paragraph 29 of the FFA.	Within 45 days of the U.S. EPA response pursuant to paragraph 29.	None required.
Part V, 31	Submit results of measurements pursuant to paragraph 30.	Within 30 days of U.S. EPA approval of characterization method.	None required.
Part VI, 31	Submit monthly report on steps undertaken to implement Part V of the FFA in the preceding month.	20th day of succeeding month.	The third progress report being submitted herewith as an integral part of the CERCLA Consent Agreement Monthly Progress Report.

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

Period Ending March 31, 1992

**Data Reporting Requirements: RA No. 4: Silos 1 and 2**

As defined in the Silos 1 and 2 Removal Action Work Plan and the Federal Facility Agreement, data associated with monitoring the effectiveness of the bentonite installation are included in the following tables: the K-65 Silos Report and the Selected Radon Data Report.

The K-65 Silos Report includes or will include data on the following parameters:

- Ambient temperature and pressure near the silos.
- Silos 1 and 2 headspace temperature.
- Silos 1 and 2 differential pressure.
- Silos 1 and 2 radon headspace concentration.
- Silos 1 and 2 headspace humidity  
(The silos 1 and 2 headspace humidity data is not available at this time. Instrumentation and the associated monitoring equipment is being installed as part of the data logging system upgrade. In the future, these data will be collected automatically).

The radon silo headspace data submitted has been collected manually since the completion of the bentonite installation. An automated data logging system is currently being calibrated. After calibration and final system check-out of the data logging system is completed, these data will be automatically recorded.

The Selected Radon Data Report includes or will include radon data from the following locations:

- Air monitoring station number 5 (AMS-5)
- Air monitoring station number 6 (AMS-6)
- Pilot Plant

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

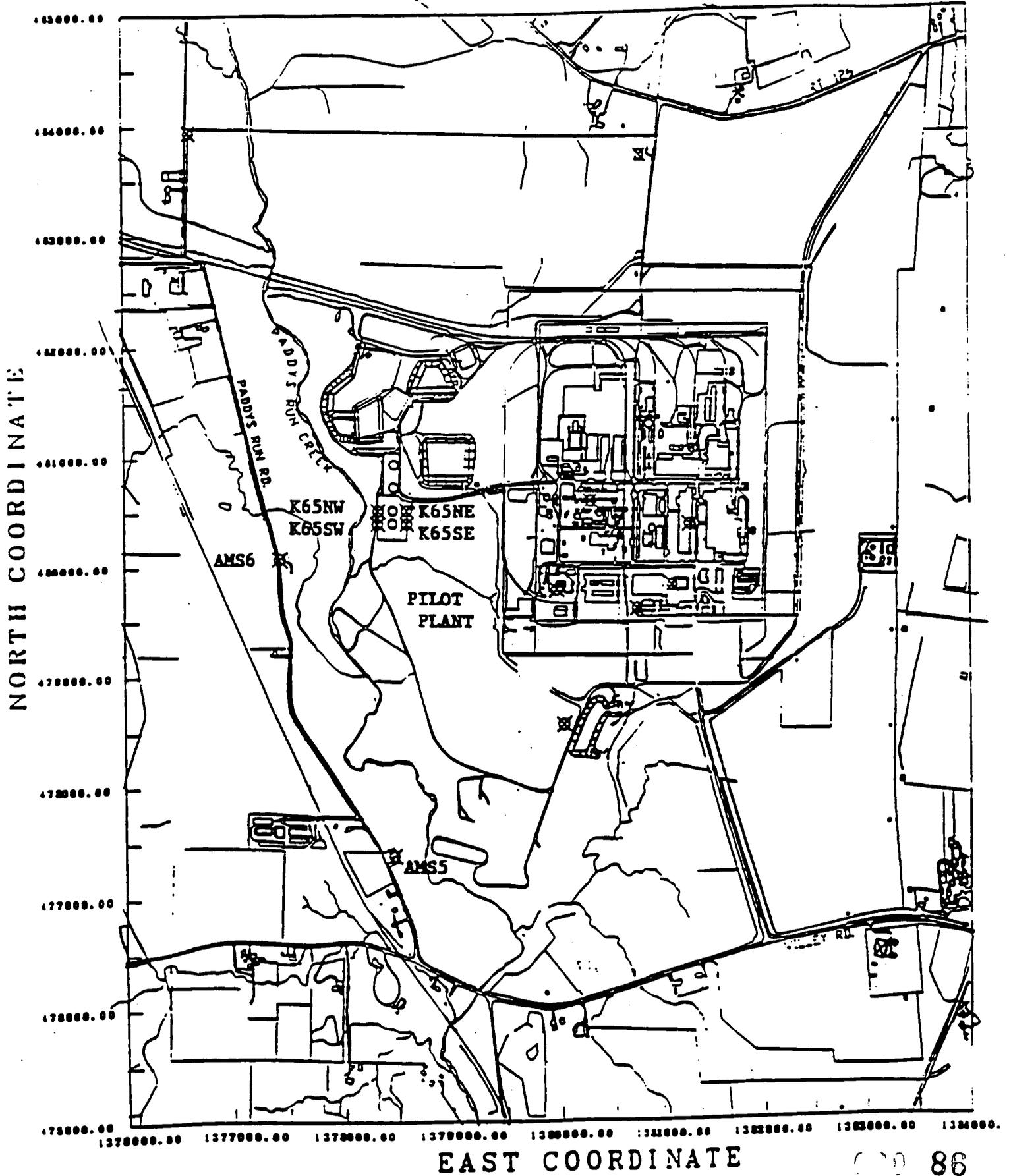
**Period Ending March 31, 1992**

- Background data
- K-65 Monitoring Data (K-65 NW, K-65 SW, K-65 NE, K-65 SE). Figure C-6, immediately following, identifies sampling locations.

Minimum and maximum values are based on the lowest and highest hourly values that were recorded and incorporated into the daily averages.

# REAL-TIME RADON MONITORING LOCATIONS

Background office - Hamilton



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

FACILITY: Fernald Environmental Management Project  
U.S. Department of Energy  
7400 Willey Road, P.O. Box 398704  
Cincinnati, Ohio 45239 Hamilton

## K-65 SILO REPORT

LOCATION: Silo # 1

DATE: MARCH 1992

Day	Ambient Temp Deg. F	Pres In. Hg.	Temperature Head Space Deg. F	Inter. Hum. %	Diff. Pres In. HG	Head Space Radon (pCi/l)
1	43.0	29.48	41.8	*	-0.090	*
2	59.4	29.46	42.5	*	-0.050	*
3	64.4	29.45	43.9	*	-0.020	*
4	*	●	*	*	*	*
5	*	*	*	*	*	155,300
6	*	*	*	*	*	178,800
7	*	*	*	*	*	*
8	*	*	*	*	*	*
9	*	*	*	*	*	●
10	*	*	*	*	*	302,600
11	*	*	*	*	*	*
12	*	*	*	*	*	*
13	*	*	*	●	*	*
14	*	*	*	*	*	*
15	*	*	*	*	*	*
16	*	*	*	●	●	178,600
17	*	*	●	●	●	116,800
18	*	*	*	*	●	*
19	*	*	●	●	*	*
20	33.2	29.39	41.9	100	-0.130	240,600
21	33.9	29.46	41.9	100	-0.120	*
22	36.7	29.15	42.1	100	-0.130	*
23	32.2	29.41	41.9	100	-0.130	156,500
24	37.9	29.57	41.9	100	-0.100	*
25	36.3	29.43	42.1	100	-0.110	*
26	42.8	29.29	42.4	100	-0.100	*
27	34.2	29.41	42.4	100	-0.150	*
28	37.0	29.63	42.2	100	-0.100	*
29	39.8	29.49	42.5	100	-0.100	*
30	38.0	29.28	42.6	100	-0.120	206,400
31	42.1	29.35	42.5	100	-0.090	*

## ARITHMETIC

MEAN	40.7	29.42	42.3	100	-0.103	191,950
MAXIMUM	*	*	*	100	*	302,600
MINIMUM	*	*	*	100	*	116,800
MEDIAN	37.9	29.43	42.2	100	-0.100	178,700

Note: \* - data not available Head Space Radon is a grab sample  
Maximum and minimum values are based on hourly readings, daily  
values are based on twenty-four hourly averages

CONSOLIDATE CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT/  
FEDERAL FACILITY AGREEMENT MONTHLY PROGRESS REPORT

FACILITY: Fernald Environmental Management Project  
U.S. Department of Energy  
7400 Willey Road, P.O. Box 398704  
Cincinnati, Ohio 45239 Hamilton

## K-65 SILO REPORT

LOCATION: Silo # 2

DATE: MARCH 1992

Day	Ambient Temp Deg. F	Pres In. Hg.	Temperature Head Space Deg. F	Inter. Hum. %	Diff. Pres In. HG	Head Space Radon (pCi/l)
1	43.0	29.48	41.6	*	-0.130	*
2	59.4	29.46	42.3	*	0.540	*
3	64.4	29.45	43.8	*	0.800	*
4	*	*	*	*	●	*
5	*	*	*	*	●	111,600
6	*	*	*	*	●	41,700
7	*	*	*	*	●	*
8	*	*	*	*	●	*
9	*	*	*	*	●	*
10	*	●	*	*	*	180,300
11	*	*	*	●	●	*
12	*	*	*	*	*	*
13	●	*	*	*	*	*
14	*	*	*	*	●	*
15	●	*	●	*	●	●
16	*	*	●	*	*	125,800
17	●	*	*	*	*	144,000
18	*	*	●	*	*	*
19	*	*	*	*	●	●
20	33.2	29.39	41.7	100	-0.460	155,200
21	33.9	29.46	41.7	100	-0.470	*
22	36.7	29.15	41.8	100	-0.380	*
23	32.2	29.41	41.6	100	-0.380	208,900
24	37.9	29.57	41.6	100	-0.210	*
25	36.3	29.43	41.8	100	-0.350	*
26	42.8	29.29	42.1	100	-0.010	*
27	34.2	29.41	42.1	100	-0.420	●
28	37.0	29.63	41.8	100	-0.040	*
29	39.8	29.49	42.2	100	-0.210	*
30	38.0	29.28	42.2	100	-0.280	71,300
31	42.1	29.35	42.2	100	0.070	*

## ARITHMETIC

MEAN	40.7	29.42	42.0	100	-0.129	129,850
MAXIMUM	●	●	*	100	●	208,900
MINIMUM	*	*	*	100	●	41,700
MEDIAN	37.9	29.43	41.8	100	-0.210	134,900

Note: \* - data not available Head Space Radon is a grab sample  
Maximum and minimum values are based on hourly readings, daily  
values are based on twenty-four hourly averages

## SELECTED RADON DATA REPORT

FACILITY: Fernald Environmental Management Report  
 U.S. Department of Energy  
 7400 Willey Road, P.O. Box 398704  
 Cincinnati, Ohio 45239 Hamilton

LOCATION: Selected Sampling Locations

DATE: March, 1992

Day	AMS 5 (pCi/L)	AMS 6 (pCi/L)	PILOT PLANT (pCi/L)	BKGRD (pCi/L)
1	0.7	0.7	0.7	0.7
2	0.4	0.4	1.0	0.7
3	1.5	1.2	1.7	1.3
4	1.7	1.5	2.2	1.4
5	1.7	1.5	2.8	1.2
6	0.4	0.5	0.4	0.5
7	0.4	0.5	0.4	0.4
8	0.6	0.6	0.7	0.6
9	1.0	0.9	1.0	0.7
10	0.3	0.5	0.6	0.4
11	0.3	0.5	1.2	0.4
12	0.4	0.5	1.1	0.4
13	0.3	0.5	1.2	0.5
14	0.5	0.6	1.0	0.6
15	0.4	0.5	1.0	0.4
16	0.6	0.6	1.2	0.6
17	0.3	0.5	0.7	0.4
18	0.4	0.6	0.7	0.5
19	0.3	0.5	0.6	0.4
20	0.5	0.6	0.7	0.5
21	0.3	0.6	0.7	0.5
22	0.3	0.5	0.6	0.4
23	0.4	0.6	0.7	0.5
24	0.8	0.9	1.0	0.7
25	0.7	0.9	0.9	0.6
26	0.4	0.5	0.7	0.4
27	0.3	0.5	0.6	0.3
28	0.4	0.5	0.6	0.4
29	0.4	0.6	0.6	0.4
30	0.4	0.5	0.6	0.4
31	0.4	0.5	0.6	0.5
AVERAGE	0.6	0.7	0.9	0.6
MAXIMUM	3.4	3.0	11.5	2.5
MINIMUM	0.1	0.2	0.3	0.2
MEDIAN	0.4	0.5	0.7	0.5

\* data not available

Maximum and minimum values are based on hourly readings  
 Daily values are based on twenty-four hourly averages

## SELECTED RADON DATA REPORT

FACILITY: Fernald Environmental Management Report  
 U.S. Department of Energy  
 7400 Willey Road, P.O. Box 398704  
 Cincinnati, Ohio 45239 Hamilton

LOCATION: Selected Sampling Locations

DATE: March, 1992

Day	NW (pCi/L)	SW (pCi/L)	NE (pCi/L)	SE (pCi/L)
1	1.0	1.1	1.2	*
2	0.7	0.7	0.8	1.3
3	2.1	2.4	1.9	1.7
4	2.1	2.3	2.1	0.8
5	2.5	2.4	1.8	1.7
6	0.8	0.6	0.4	0.3
7	1.1	0.9	0.7	0.4
8	*	1.1	0.7	0.7
9	*	1.7	1.3	1.6
10	0.4	0.6	0.4	1.2
11	0.5	0.5	0.7	0.9
12	0.7	0.9	0.6	0.7
13	0.8	1.1	1.1	1.0
14	0.8	1.3	1.1	0.9
15	0.6	1.0	0.6	0.6
16	1.4	1.2	1.0	0.7
17	*	0.8	1.1	0.4
18	3.0	1.2	1.7	0.4
19	*	0.8	1.8	0.4
20	0.3	1.0	2.3	0.7
21	*	0.9	1.9	0.5
22	*	0.7	1.8	0.3
23	0.8	1.0	2.0	0.6
24	1.2	1.5	2.6	1.1
25	1.0	1.2	2.5	1.2
26	0.8	1.1	2.1	0.6
27	0.4	0.7	1.9	0.6
28	0.7	1.1	2.2	0.5
29	1.0	1.0	1.7	0.3
30	0.6	0.9	1.8	0.4
31	0.8	0.8	2.0	0.4
AVERAGE	0.8	1.1	1.5	0.7
MAXIMUM	5.5	5.1	5.2	4.5
MINIMUM	0.2	0.2	0.1	0.1
MEDIAN	0.8	1.0	1.7	0.7

\* data not available

Maximum and minimum values are based on hourly readings  
 Daily values are based on twenty-four hourly averages

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

**PERIOD ENDING MARCH 31, 1992**

**ENCLOSURE D**

**DRILLING/BORING LOGS**

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RT/FS	
RING NUMBER: 3402	COORDINATES:	DATE: 3-12-92
LOCATION:	GWL: Depth 45.04 Date/Time 3-24-92	DATE STARTED: 3-12-92
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 3-24-92
DRILLING METHODS: Cable Tool 10" drill bit	PAGE 1	OF 7

ft.	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ISCI)	REMARKS
				The description of the interval from 0-65 ft, is described in the visual classification of soils sheet for well 2402			
			45.04	▽			The water level is 45.04 ft. below the ground surface

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

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

This is a contingency well for well 2402.

3-12-92  
 Hsu S/N: 1185 } 0.1 ppm  
 BT S/N: 50713 } 30 cpm  
 C S/N: 55361 } 0 cpm  
 } Background Levels

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
RING NUMBER: 3402	COORDINATES:	DATE: 3-16-92
ELEVATION:	GWL: Depth 45.04 Date/Time 3-24-92 / 0830	DATE STARTED: 3-12-92
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 3-24-92
DILLING METHODS: Cable Tool 10" Drill Bit	PAGE 2	OF 7

ft.	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 16 in.	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (USF)	REMARKS
5.0	038120 1034 3-16-92	11 16 19	18	Dense yellowish brown (10YR, 5/4) well graded SAND with trace fine gravel, wet	SW	N/A	H <sub>sw</sub> = 0.1 ppm B <sub>7</sub> = 30 cpm α = 0 cpm
5				split spoon samples will be taken at 5ft. intervals.			
4.0	038121 1102 3-16-92	5 8 13	18	Medium dense yellowish brown (10YR, 5/4) well graded SAND, wet	SW	N/A	H <sub>sw</sub> = 0.1 ppm B <sub>7</sub> = 30 cpm α = 0 cpm
5							
3.0	038122 1404 3-16-92	3 11 11	8	Medium dense yellowish brown (10YR, 5/4) well graded SAND, with trace gravel, wet	SW	N/A	H <sub>sw</sub> = 0.1 ppm B <sub>7</sub> = 30 cpm α = 0 cpm
5							
0							

See Page 1

3-16-92

H<sub>sw</sub> S/N: 1185 | 0.1 ppm } Background Levels  
 B<sub>7</sub> S/N: 50773 | 30 cpm  
 α S/N: 55361 | 0 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602-3-23	PROJECT NAME: FEMP RI/FS	
LOGGING NUMBER: 3402	COORDINATES:	DATE: 3-16-92
LOCATION:	GWL: Depth 45.04 Date/Time 3-24-92	DATE STARTED: 3-12-92
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 3-24-92
LOGGING METHODS: Cable Tool 10" drill bit	PAGE 23 OF 67	

DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 16 in. 1	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ISCI)	REMARKS
0	038123 1609 3-16-92	8 16 21	18	Dense yellowish brown (10YR, 5/4) well graded SAND with trace gravel, wet	SW	N/A	K.M. 4-1-92 H <sub>nu</sub> = 0.1 ppm B <sub>x</sub> = 30 cpm c = 0 cpm
5							
5	038124 1639 3-16-92	2 3 5	18	Loose yellowish brown (10YR, 5/4) poorly graded medium SAND, wet	SP	N/A	H <sub>nu</sub> = 0.1 ppm B <sub>x</sub> = 30 cpm c = 0 cpm
	038125 0850 3-17-92	7 6 10	18	<del>Loose</del> <sup>Medium Dense</sup> yellowish brown (10YR, 5/4) poorly graded medium SAND, wet	SP	NA	H <sub>nu</sub> = 0.1 ppm B <sub>x</sub> = 30 cpm c = 0 cpm

ES See page 1

**VISUAL CLASSIFICATION OF SOILS**

3841

OBJECT NUMBER: 602-3-23	PROJECT NAME: FEMP RI/FS	
RING NUMBER: 3402	COORDINATES:	DATE: 3-17-92
ELEVATION:	GWL: Depth 45.04 Date/Time 3-24-92 6830	DATE STARTED: 3-12-92
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 3-24-92
DILLING METHODS: Core Tool 10" drill bit	PAGE 34 OF 67	

DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 in. 1	RECOVERY (in. 1)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (11SF)	REMARKS
5.0	038126 0930 3-17-92	5 1 1	18	Very Loose yellowish brown (10YR, 5/4) poorly graded medium SAND, wet	SP	N/A	K.M. 4-1-92 H <sub>max</sub> = 0.1 ppm B <sub>x</sub> = 30 cpm α = 0 cpm
5.5	038127 1340 3-17-92	5 7	11	Medium dense yellowish brown (10YR, 5/4) poorly graded medium SAND, wet	SP	N/A	H <sub>max</sub> = 0.1 ppm B <sub>x</sub> = 30 cpm α = 0 cpm
6.0	038128 1745 3-17-92	11 19 20	11 13 20	Dense yellowish brown (10YR, 5/4) poorly graded medium SAND, wet	SP	N/A	H <sub>max</sub> = 0.1 ppm B <sub>x</sub> = 30 cpm α = 0 cpm

See page 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RT/FS	
LOG NUMBER: 3402	COORDINATES:	DATE: 3-17-92
VARIATION:	GWL: Depth 45.04 Date/Time 3-24-92/0830	DATE STARTED: 3-12-92
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 3-24-92
TESTING METHODS: Cable Tool 10" drill bit	PAGE 45 OF 67	

DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (15%)	REMARKS
0-5	038129 1507 3-17-92	3 6 13	10	Medium dense yellowish brown (10YR, 5/14) poorly graded medium SAND, wet	SP	N/A	H <sub>max</sub> = 0.1 ppm G <sub>s</sub> = 30 cpm α = 0 cpm
0-5	038130 166 3-17-92	3 7 13	18	Medium dense light olive brown (2.5Y, 5/4) poorly graded medium SAND with trace gravel, wet 116.5 ft. stiff olive gray (5Y, 5/2) SILTY CLAY with black (5Y, 2.5N) mottling, low plasticity, slightly moist	SP CL	N/A 1.0	H <sub>max</sub> = 0.1 ppm The last six inches G <sub>s</sub> = 30 cpm is the α = 0 cpm "Blue Clay"
0-5	038131 0940 3-19-92	Shelby N/A Tube	23	Very stiff, Very Dark Gray (2.5Y, 3/0) SILTY CLAY with some sand and trace gravel, low plasticity, moist	CL	2.0	H <sub>max</sub> = 0.1 ppm G <sub>s</sub> = 30 cpm α = 0 cpm Shelby tube pushed 20 ft.
				Bottom of Bore Hole Drilled to 116.5 ft. Pushed Shelby Tube from 116.5 ft. to 118.5 ft.			

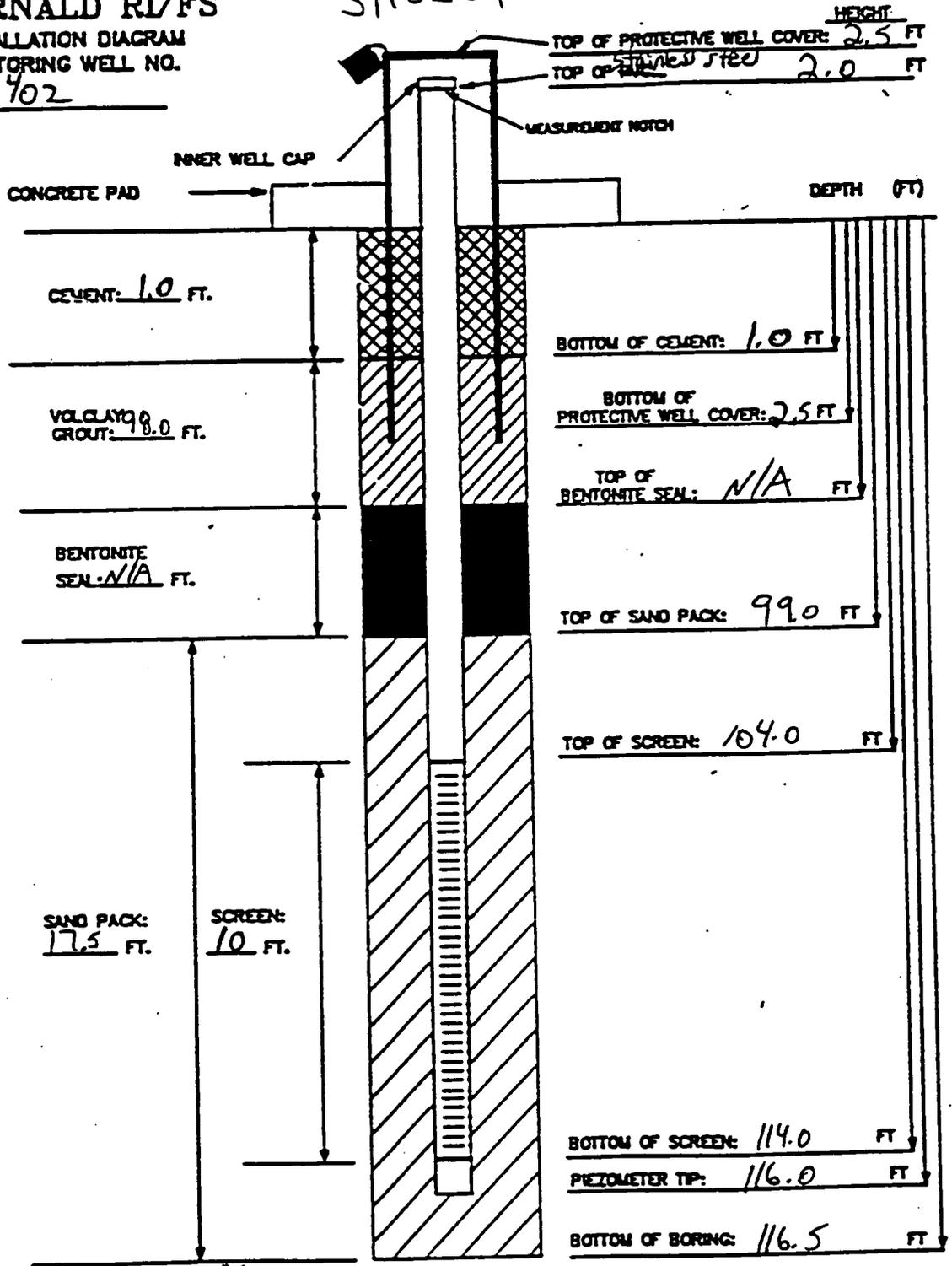
TESTS  
Used a 30 in. Shelby tube, 3 inch diameter  
pushed it 2.0 ft.

INSTALLATION DATE: 3-24-92

3841

**FERNALD RI/FS**  
**INSTALLATION DIAGRAM**  
**MONITORING WELL NO.**  
3402

Stickups



HEIGHT  
 TOP OF PROTECTIVE WELL COVER: 2.5 FT  
 TOP OF STAINLESS STEEL: 2.0 FT  
 MEASUREMENT NOTCH  
 CONCRETE PAD  
 DEPTH (FT)  
 CEMENT: 1.0 FT.  
 BOTTOM OF CEMENT: 1.0 FT  
 VOLCLAY GROUT: 8.0 FT.  
 BOTTOM OF PROTECTIVE WELL COVER: 2.5 FT  
 BENTONITE SEAL: N/A FT  
 TOP OF SAND PACK: 99.0 FT  
 TOP OF SCREEN: 104.0 FT  
 SAND PACK: 17.5 FT.  
 SCREEN: 10 FT.  
 BOTTOM OF SCREEN: 114.0 FT  
 PIEZOMETER TIP: 116.0 FT  
 BOTTOM OF BORING: 116.5 FT

BORING DIAMETER: 10 3/4 INCHES

- MATERIALS USED:**  
 SAND TYPE AND QUANTITY: 16 bags  
 BENTONITE PELLETS (5-GALLON BUCKETS): N/A.  
 BAGS OF VOLCLAY GROUT: 33  
 AMOUNT OF CEMENT: 1/2 bag  
 AMOUNT OF WATER USED: 1300 gallons  
 OTHER: NA

- NOTES:**
- 1) RISER PIPE IS 4" 316 STAINLESS STEEL 4 in ID 316
  - 2) PVC PIPE, FLUSH-THREADED JOINTS 40 in. I.D.
  - 3) SCREEN IS 3-INCH I.D. SCHEDULE 40 PVC PIPE WITH 1/2-INCH SLOTS .010 in. Slots
  - 4) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SLAMPER

K.M. 3-26-92

TASK: 602.3-23

GEOLOGIST/ENGINEER: Ken Marion

**PIEZOMETER INSTALLATION SHEET**

PROJECT NAME FEMP RI/FS FIELD ENG./GEO. Ken Marion DATE 3-26-92  
 PROJECT NO. 602.3.23 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 BORING NO. 3702  
 PIEZOMETER NO. N/A 3402 DATE OF INSTALLATION 3-24-92  
 BOREHOLE DRILLING 3/24/92

DRILLING METHOD <u>Cable Tool</u>	TYPE OF BIT <u>10" Churn bit</u>
DRILLING FLUID (S) USED: FLUID <u>Water</u> FROM <u>0.0</u> TO <u>116.5 ft</u> FLUID <u>N/A</u> FROM <u>-</u> TO <u>-</u>	CASING SIZE (S) USED: SIZE <u>10 3/4</u> FROM <u>0.0</u> TO <u>116.5 ft</u> SIZE <u>N/A</u> FROM <u>-</u> TO <u>-</u>

**PIEZOMETER DESCRIPTION**

TYPE <u>Stainless Steel</u>	RISER PIPE MATERIAL <u>3/6 Stainless Steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0 in. I.D.</u>	RISER PIPE DIAMETERS: O.D. <u>4 3/8 in.</u> I.D. <u>4.0 in.</u>
PERFORATION TYPE: SLOTS <input checked="" type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>10 - 10 Ft. Sections</u> <u>3 - 2 Ft. Sections</u>
AVERAGE SIZE OF PERFORATIONS <u>.010 in.</u>	JOINING METHOD <u>Flush Joint Threaded</u>
TOTAL PERFORATED AREA <u>10.015.0 ft.</u>	

**PROTECTION SYSTEM**

RISER PROTECTIVE PIPE LENGTH <u>5.0 ft.</u>	OTHER PROTECTION <u>Steel well cover</u>
PROTECTIVE PIPE O.D. <u>10 3/4 in.</u>	<u>With lock</u>

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft.)		ELEVATION (ft.)	
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS: <u>Cement</u> GROUT/SLURRY BENTONITE SAND GRAVEL	TOP 0.0	BOTTOM 1.0		
	TOP 1.0	BOTTOM 99.0	TCP	BOTTOM
	TOP N/A	BOTTOM N/A	TOP N/A	BOTTOM N/A
	TOP 99.0	BOTTOM 116.5	TOP	BOTTOM
	TOP N/A	BOTTOM N/A	TOP N/A	BOTTOM N/A
PERFORATED SECTION	TOP 104.0	BOTTOM 114.0	TOP	BOTTOM
PIEZOMETER TIP	<del>114.0</del> <sup>K.M. 3-26-92</sup> 116.0			
BOTTOM OF BOREHOLE	116.5			
GWL AFTER INSTALLATION	45.04			

IS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES  NO   
 IS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES  NO   
 REMARKS The temporary casing was removed during the installation of the well

VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: <u>602.3.23</u>	PROJECT NAME: <u>Fernald RIFES Misc Wells</u>	
BORING NUMBER: <u>2401</u>	COORDINATES:	DATE <u>3/3/92</u>
ELEVATION:	GWL: Depth <u>51.6</u> Date/Time <u>3/6/92</u>	DATE STARTED: <u>3/3/92</u>
ENGINEER/GEOLOGIST: <u>D.O'Brien</u>	Depth Date/Time	DATE COMPLETED: <u>3/5/92</u>
DRILLING METHODS: <u>Cable Tool</u>	PAGE <u>1</u>	OF <u>7</u>

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10 IN	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
8.5	1615 38460 38461 38462	6	12	Vary stiff. 10YR(5/3) brown silty clay. No plasticity slightly moist.	cl	2.75	H <sub>2</sub> O = 0 ppm B <sub>6</sub> = 50 cpm
12.5	1617 38461 38462	4	10	Stiff. 10YR(4/6) brownish yellow silty clay. Low plasticity, slightly moist	cl	1.75	H <sub>2</sub> O = 0 ppm B <sub>6</sub> = 40 cpm
14.5	1625 38462 38462	0	12	SAA, high plasticity	cl	1.75	H <sub>2</sub> O = 0 ppm B <sub>6</sub> = 40 cpm
15.5	1625 38463 38462	11	18	Medium Dens. 10YR(5/3) brown clayey sand poorly graded moist.	sc	NA	H <sub>2</sub> O = 0 ppm B <sub>6</sub> = 40 cpm
17.5	1630 38464 38462	10	18	Vary stiff. 10YR(4/6) brownish yellow mottled w/ gray silty, sandy clay low plasticity slightly moist	cl	2.5	H <sub>2</sub> O = 0 ppm B <sub>6</sub> = 60 cpm
18.5	1635 38465 38465	16	12	Medium Dens. 10YR(5/3) brown clayey sand w/ gravel poorly graded, wet	sc	NA	H <sub>2</sub> O = 0 ppm B <sub>6</sub> = 50 cpm
20.5	1640 38466 38466	15	18	SAA Stiff. 10YR(5/10) brownish yellow mottled w/ gray silty clay, low plast. wet 10YR(5/10) light gray silty clay	cl	1.75	H <sub>2</sub> O = 0 ppm B <sub>6</sub> = 60 cpm
22.5	1645 38467 38467	12	0	No Recovery	NA	NA	H <sub>2</sub> O = NA B <sub>6</sub> = NA
23.5	1700 38467 38467	9	8	Stiff. 5Y(5/1) gray clay med. plasticity, moist.	cl	1.0	H <sub>2</sub> O = 0 ppm B <sub>6</sub> = 40 cpm
24.5	1710 38468 38468	10	15	Stiff. 5Y(5/1) gray clay med. plasticity, moist.	cl	1.25	H <sub>2</sub> O = 0 ppm B <sub>6</sub> = 50 cpm

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: \_\_\_\_\_

Driller: Craig Carter

Gary Ditz John Yandine

3/5/92

Bkgd: H<sub>2</sub>O = 0 ppm  
B<sub>6</sub> = 40-60 cpm

SAA - same as above  
NA - not applicable

Samples collected per ASTM standard Penetration Test  
Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>U02.3.23</u>	PROJECT NAME: <u>Finnald RIFES Misc. Wells</u>	
BORING NUMBER: <u>2401</u>	COORDINATES:	DATE: <u>3/4/92</u>
ELEVATION:	GWL: Depth <u>4.6</u> Date/Time <u>3/6/92</u>	DATE STARTED: <u>3/3/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brum</u>	Depth Date/Time	DATE COMPLETED: <u>3/5/92</u>
DRILLING METHODS: <u>Cable Tool</u>	PAGE <u>2</u> OF <u>7</u>	

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0m	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY % (SF)	REMARKS
16	0840 38469 38470 3/4/92	9 28 30	10	Very soft, 5Y(5/1) Gray clay with gravel, no plasticity slightly moist.	CI	225	H <sub>2</sub> O = 0ppm R <sub>8</sub> = 60cpm
17	0915 38470 38471 3/4/92	21 48 50/3	2	SAA	CI	25	H <sub>2</sub> O = 0ppm R <sub>8</sub> = 60cpm
18	3/4/92 0925 38471 38472 3/4/92	31 43 50	7	3' SAA Bottom 4" Very dense, 10YR(4/4) light yellowish brown sand with gravel, poorly graded, moist.	SP	2.5 NA	H <sub>2</sub> O = 0ppm R <sub>8</sub> = 50cpm
20				Base of Till - Sample every 5ft at approx 18.5ft			
25	0925 38472 38473 3/4/92	14 26 43	15	Very dense, 10YR(5/6) yellowish brown sand with gravel, poorly graded, moist	SP	NA	H <sub>2</sub> O = 0ppm R <sub>8</sub> = 40cpm

NOTES: Pennsylvania Drilling JAA - same as above  
 Drilling Contractor: Craig Coulter NA - not applicable  
 Drilling Equipment: \_\_\_\_\_  
 Driller: John Vandina  
 sec 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: Emerald RI/FS Misc. Wells	
BORING NUMBER: 2401	COORDINATES:	DATE 3/4/92
ELEVATION:	GWL: Depth 51.6 Date/Time 3/6/92	DATE STARTED: 3/3/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 3/5/92
DRILLING METHODS: Cable Tool	PAGE 3 OF 7	

DEPTH	SAMPLE TYPE & NO	BLOWSON SAMPLER PER	RECOVERY	DESCRIPTION	USGS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
20	1025	15					
21	38473 24/92	16	18	Dense, 10YR(5/4) yellowish brown, sand some gravel, poorly graded, coarse in the middle of spoon dry.	SP	NA	H <sub>2</sub> O = 0 ppm BS = 60 cpm
22							
23							
24							
25	1100 38474 24/92	30		Dense 10YR(5/4) yellowish brown, coarse sand some gravel, well graded, dry	SW SAT	NA	H <sub>2</sub> O = 0 ppm BS = 40 cpm
26		50/4					
27							
28							
29							
30							
31	1335 38475 24/92	45	12	Very dense, 10YR(5/4) yellowish brown, coarse sand, gravel, well graded. Moist	SW SAT	NA	H <sub>2</sub> O = 0 ppm BS = 60 cpm
32		50/3					
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							

NOTES: NA - not applicable

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: \_\_\_\_\_

Driller: Craig Costler  
John Vardine

See p. 1, 101

VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: <u>U02.3.23</u>	PROJECT NAME: <u>Finnald RIFES Misc. Wells</u>	
BORING NUMBER: <u>2401</u>	COORDINATES:	DATE: <u>3/4/92</u>
ELEVATION:	GWL: Depth <u>51.6</u> Date/Time <u>3/6/92</u>	DATE STARTED: <u>3/3/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brien</u>	Depth Date/Time	DATE COMPLETED: <u>3/5/92</u>
DRILLING METHODS: <u>Cable Tool</u>	PAGE <u>4</u>	OF <u>7</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 100mm	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%SF)	REMARKS
46	<u>1430</u> <u>38406</u> <u>3/4/92</u>	<u>100/3</u>	<u>12</u>	<u>54.6"</u> Very dense, 10YR (5/4) yellowish brown. Goes mud. coarse poorly graded moist. Next 3' coarse, S&A. Bottom 5' fine, S&A	<u>SP</u>	<u>NA</u>	<u>H<sub>2</sub>O = 0 ppm</u> <u>BB = 40 cpm</u>
47							
48							
49							
50							
51	<u>1500</u> <u>38407</u> <u>3/4/92</u>	<u>13/3</u> <u>17</u>	<u>15</u>	Dense, 10YR (5/4) yellowish brown med. coarse, poorly graded, wet (sand)	<u>SP</u>	<u>NA</u>	<u>H<sub>2</sub>O lab n table</u> <u>51 ft.</u> <u>H<sub>2</sub>O = 0 ppm</u> <u>BB = 50 cpm</u>
52				<u>Groundwater level 51.6 Ft on 2/6/92</u>			
53							
54							
55	<u>1000</u> <u>38408</u> <u>3/4/92</u>	<u>6</u> <u>8</u> <u>10</u>	<u>7</u>	Medium Dense, 10YR (5/4) yellowish brown, sand, med. coarse poorly graded, wet.	<u>SP</u>	<u>NA</u>	<u>H<sub>2</sub>O = 0 ppm</u> <u>BB = 60 cpm</u>
56							
57							
58							
59							
60							

NOTES: NA - not applicable

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: \_\_\_\_\_

Driller: Craig Costler  
John Vandine

See p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 002.3.23	PROJECT NAME: Emerald RI/FS Misc. Wells	
BORING NUMBER: 2401	COORDINATES:	DATE 3/4/92
ELEVATION:	GWL: Depth 51.6 Date/Time 3/6/92	DATE STARTED: 3/3/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 3/5/92
DRILLING METHODS: Cable Tool	PAGE 5 OF 7	

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1' (min)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%SF)	REMARKS
41	1613 38480 3/4/92	7 14 16	18	Medium Dense. 10YR (5/4) yellowish brown, medium coarse sand, poorly graded, wet.	SP	NA	H <sub>2</sub> O = 0 ppm R <sub>6</sub> = 40 cpm
42							
43							
44							
45	1645 38480 4/1/92	7 7 10	18	SAA	SP	NA	H <sub>2</sub> O = 0 ppm R <sub>6</sub> = 60 cpm
46							
47				End of boring 65 ft			
48				Bottom of sampling 66.5 ft			
49							
70							
71							
72							
73							
74							
75							

NOTES: NA - not applicable

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: \_\_\_\_\_

Driller: Craig Coulter  
John Vandine

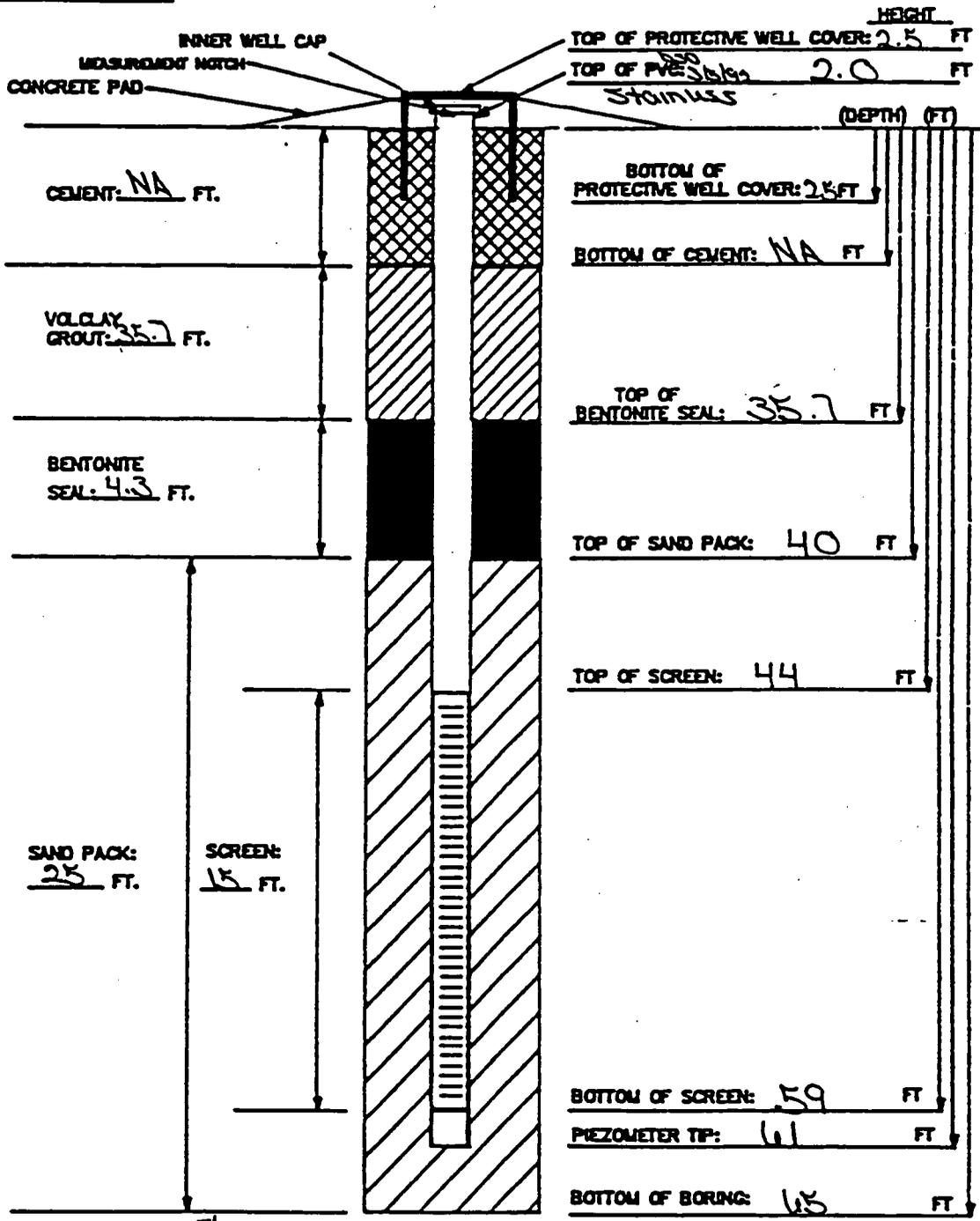
See p. 1 103

12

607  
3841

**FERNALD RI/FS**  
**INSTALLATION DIAGRAM**  
**MONITORING WELL NO.**  
2401

INSTALLATION DATE: 3/5/92



BORING DIAMETER: 8 INCHES

**MATERIALS USED:**  
 SAND TYPE AND QUANTITY: 9 bag  
 BENTONITE PELLETS (5-GALLON BUCKETS): 3  
 BAGS OF VOLCLAY GROUT: 5  
 AMOUNT OF CEMENT: NA  
 AMOUNT OF WATER USED: 500 gal  
 OTHER: NA

**NOTES:**  
 1) RISER PIPE IS 2-INCH SCHEDULE-40 316 STAINLESS STEEL  
 2) SCREEN IS 2-INCH SCHEDULE-40 316 STAINLESS STEEL WITH 20-MESH SLOTS  
 3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SLIP CAP  
 4) WATER DEPTH/DATE: 49.8 3/5/92  
 5) TOP OF PVC IS SECURED WITH EXPANDABLE RUBBER FLUG AND PACLOCK  
 6) PARANTHERS INDICATE DEPTH BELOW GROUND LEVEL  
 7) 31.6 3/10/92  
 8) 31.6 3/10/92

TASK: 3.23 GEOLOGIST/ENGINEER: D. O'BRUN

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**PIEZOMETER INSTALLATION SHEET**

3841

PROJECT NAME Fernald RI/FS Mirehill FIELD ENG./GEO. D. O'Brien DATE 3/5/92  
 PROJECT NO. 602. KO. 08.08 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 BORING NO. 2401  
 PIEZOMETER NO. 2401 DATE OF INSTALLATION 3/5/92

**BOREHOLE DRILLING**

DRILLING METHOD <u>Cable Tool</u>	TYPE OF BIT <u>Churn Bit</u>
DRILLING FLUID (S) USED: FLUID <u>H<sub>2</sub>O</u> FROM <u>0</u> TO <u>65 ft</u> FLUID <u>NA</u> FROM <u>NA</u> TO <u>NA</u>	CASING SIZE (S) USED: SIZE <u>8" in.</u> FROM <u>0</u> TO <u>65</u> SIZE <u>NA</u> FROM <u>NA</u> TO <u>NA</u>

**PIEZOMETER DESCRIPTION**

TYPE <u>Monitoring Well</u>	RISER PIPE MATERIAL <u>316 stainless steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0" in</u>	RISER PIPE DIAMETERS: O.D. <u>4 3/8 inch</u> I.D. <u>4.0" in</u>
PERFORATION TYPE: SLOTS <input type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input checked="" type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>15' screen 48' riser</u>
AVERAGE SIZE OF PERFORATIONS <u>0.010</u>	JOINING METHOD <u>flush joint threaded</u>
TOTAL PERFORATED AREA <u>13 ft<sup>2</sup></u>	

**PROTECTION SYSTEM**

RISER PROTECTIVE PIPE LENGTH <u>5.0 ft</u>	OTHER PROTECTION <u>hinged locking cap</u>
PROTECTIVE PIPE O.D. <u>10 3/4 in</u>	

ITEM	DISTANCE ABOVE / BELOW GROUND SURFACE (ft.)		ELEVATION ( )	
TOP OF RISER PIPE	2.5			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS:				
	GROUT / SLURRY	TOP <u>0</u> BOTTOM <u>35.7</u>	TCP	BOTTOM
	BENTONITE	TOP <u>35.7</u> BOTTOM <u>40</u>	TOP	BOTTOM
	SAND	TOP <u>40</u> BOTTOM <u>65</u>	TOP	BOTTOM
GRAVEL	TOP <u>NA</u> BOTTOM <u>NA</u>	TOP	BOTTOM	
PERFORATED SECTION	TOP <u>44</u> BOTTOM <u>59</u>	TOP	BOTTOM	
PIEZOMETER TIP	<u>41</u>			
BOTTOM OF BOREHOLE	<u>65</u>			
GWL AFTER INSTALLATION	<u>51.6</u>			

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

REMARKS \_\_\_\_\_ 105

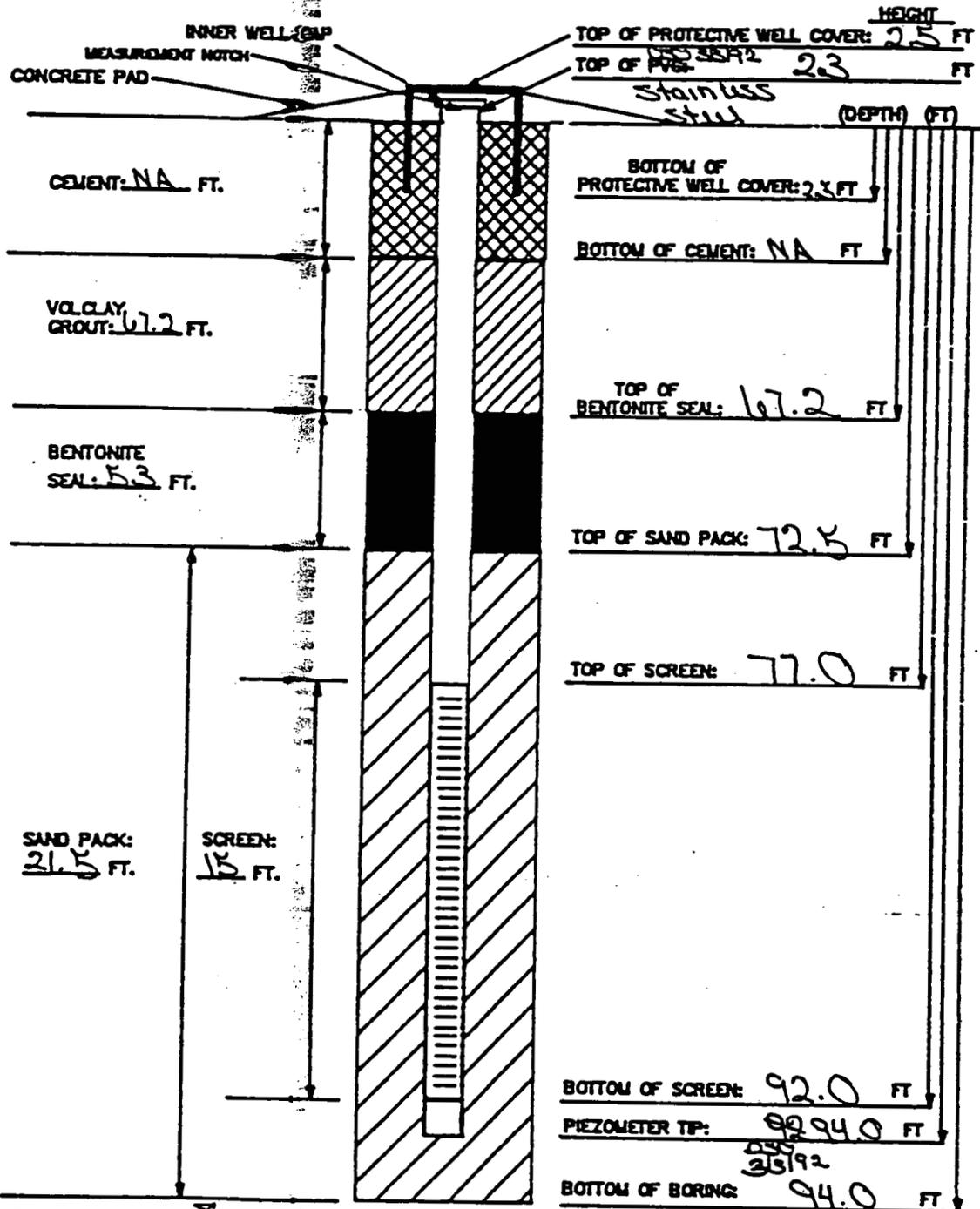


**FERNALD RI/FS**  
**INSTALLATION DIAGRAM**  
**MONITORING WELL NO.**

2423

INSTALLATION DATE: 3/2/92

3241



BORING DIAMETER: 8 INCHES

**MATERIALS USED:**  
 SAND TYPE AND QUANTITY: 9 bags  
 BENTONITE PELLETS (5-GALLON BUCKETS): 6 buckets  
 BAGS OF VOLCLAY GROUT: 13 bags  
 AMOUNT OF CEMENT: NA  
 AMOUNT OF WATER USED: 400 gal.  
 OTHER: NA

**NOTES:** 4 inch 316 Stainless Steel  
 1) RISER PIPE IS 3-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS.  
 2) SCREEN IS 2-INCH I.D. SCHEDULE 40 PVC PIPE WITH 20-MESH 20-PT. 0.015 IN. GROUND LEVEL.  
 3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SLUMP.  
 4) WATER DEPTH/DATE: 76.54 (3/2/92)  
 5) TOP OF PVC IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK.  
 6) PARADIMERS INDICATE DEPTH BELOW GROUND LEVEL.

TASK: 3.23

GEOLOGIST/ENGINEER: Tom Anderson / D.O'Brien

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**PIEZOMETER INSTALLATION SHEET**

PROJECT NAME Fernald RI/FS Misc Well FIELD ENG./GEO. D. O'Brien DATE 2/27/92  
 PROJECT NO. 602.3.23 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 BORING NO. 2423  
 PIEZOMETER NO. 2423 DATE OF INSTALLATION 2/27/92 3/2/92  
 (2) 3/3/92

**BOREHOLE DRILLING**

DRILLING METHOD <u>Cable Tool</u>	TYPE OF BIT <u>Churn Bit</u>
DRILLING FLUID (S) USED: FLUID <u>H<sub>2</sub>O</u> FROM <u>0</u> TO <u>94.0</u> FLUID <u>NA</u> FROM <u>NA</u> TO <u>NA</u>	CASING SIZE (S) USED: SIZE <u>8"</u> FROM <u>0</u> TO <u>94.0</u> SIZE <u>NA</u> FROM <u>NA</u> TO <u>NA</u>

**PIEZOMETER DESCRIPTION**

TYPE <u>Monitoring Well</u>	RISER PIPE MATERIAL <u>316 stainless steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0 I.D.</u>	RISER PIPE DIAMETERS: O.D. <u>4 3/8 in.</u> I.D. <u>4.0"</u>
PERFORATION TYPE: SLOTS <input type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input checked="" type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>15' screen 8' riser</u>
AVERAGE SIZE OF PERFORATIONS <u>0.010</u>	JOINING METHOD <u>flush joint threaded</u>
TOTAL PERFORATED AREA <u>15 ft</u>	

**PROTECTION SYSTEM**

RISER PROTECTIVE PIPE LENGTH <u>5.0 ft</u>	OTHER PROTECTION <u>hinged backing cap</u>
PROTECTIVE PIPE O.D. <u>10 3/4 in</u>	

ITEM	DISTANCE ABOVE / BELOW GROUND SURFACE (ft)		ELEVATION ( )	
TOP OF RISER PIPE	<u>2.3</u>			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	<u>2.5</u>			
BOREHOLE FILL MATERIALS:				
	GROUT/SLURRY	TOP <u>0.0</u> BOTTOM <u>67.2</u>	TCP	BOTTOM
	BENTONITE	TOP <u>67.2</u> BOTTOM <u>72.5</u>	TOP	BOTTOM
	SAND	TOP <u>72.5</u> BOTTOM <u>94.0</u>	TOP	BOTTOM
GRAVEL	TOP <u>NA</u> BOTTOM <u>NA</u>	TOP	BOTTOM	
PERFORATED SECTION	TOP <u>77.0</u> BOTTOM <u>92.0</u>	TOP	BOTTOM	
PIEZOMETER TIP	<u>94.0</u>			
BOTTOM OF BOREHOLE	<u>94.0</u>			
GWL AFTER INSTALLATION	<u>76.5</u>			

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

REMARKS \_\_\_\_\_ 108

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.03.01.04	PROJECT NAME: Fernald RI/FS EWMF		
BORING NUMBER: 1751	COORDINATES:	DATE: 3/24/92	
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 3/24/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth	Date/Time	DATE COMPLETED: 3/24/92
DRILLING METHODS: Hollow Stem Auger	PAGE 1		OF 12

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0 FT	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	1410 101605	2	6	V. stiff, 104R (5/8) brownish yellow silty clay low plasticity, slightly moist	CI	2.25	H <sub>Nu</sub> = 0 ppm B <sub>S</sub> = 50cpm
		3	6	SAA	CI	3.0	
		4	0	No Recovery	NA	NA	
		9	0	No Recovery	NA	NA	
	1415 101609 101610	4	6	V. stiff 104R (6/4) light yellowish brown silty clay low plasticity, slightly moist	CI	2.25	H <sub>Nu</sub> = 0 ppm B <sub>S</sub> = 60cpm
	1415 101611 101612	6	6	SAA	CI	2.5	

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NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable  
 Bkgd - H<sub>Nu</sub> = 0 ppm  
 B<sub>S</sub> = 10-60cpm

Samples collected per ASTM standard Penetration Test  
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.03.01.04		PROJECT NAME: Fernald RIFES ELMF	
BORING NUMBER: 1751	COORDINATES:		DATE: 3/24/92
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 3/24/92
ENGINEER/GEOLOGIST: D. O'Brion	Depth	Date/Time	DATE COMPLETED: 3/24/92
DRILLING METHODS: Hollow Stem Auger			PAGE 2 OF 12

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 (in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%SF)	REMARKS
		9	0	No Recovery	NA	NA	
		12	0	No Recovery	NA	NA	
4	1420 10163 3/24/92	14	6	V. STIFF, 2.54 (616) Olive yellow silty clay w/ gravel. Low plasticity slightly moist	CI	2.0	HNU = 0ppm BB = 40cpm
		19	6	SAA, STIFF	CI	1.75	
5		21	6	SAA, V. STIFF	CI	2.5	
		21	6	SAA	CI	2.75	

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Tom Barille  
Craig Carter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.03.01.04		PROJECT NAME: Fernald RIFES EUMF	
BORING NUMBER: 1751	COORDINATES:		DATE: 3/24/92
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 3/24/92
ENGINEER/GEOLOGIST: D. O'BRUN	Depth	Date/Time	DATE COMPLETED: 3/26/92
DRILLING METHODS: Hollow Stem Auger			PAGE 3 OF 12

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 150mm	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%SF)	REMARKS
7	1430 101613 101614 3/24/92	12	6	v. stiff, 2.54 (6/16) Olive yellow silty clay w/ gravel low plasticity, slightly moist	cl	3.75	HMU = 0 ppm R <sub>z</sub> = 40 cpm
		17	6	SAA, hard	cl	4.0	
		19	6	SAA, v. stiff	cl	3.75	
		21	6	SAA	cl	3.75	
8	1430 101615 101616 3/24/92	↑ 28	28	SAA, hard	cl	4.0	HMU = 0 ppm R <sub>z</sub> = 50 cpm

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Tom Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: 602.03.01.04		PROJECT NAME: Farnald RIFES EWMF	
BORING NUMBER: 1751		COORDINATES:	DATE: 3/24/92
ELEVATION:		GWL: Depth Date/Time	DATE STARTED: 3/24/92
ENGINEER/GEOLOGIST: D.O'BRID		Depth Date/Time	DATE COMPLETED: 3/24/92
DRILLING METHODS: Hollow Stem Auger		PAGE: 4	OF: 12

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
10							
10.617							
11		7	0	No Recovery	NA	NA	
		14	0	No Recovery	NA	NA	

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Tom Barick  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 102.03.01.04	PROJECT NAME: Fernald Rifle Range
BORING NUMBER: 1751	COORDINATES: 1
ELEVATION:	GWL: Depth Date/Time
ENGINEER/GEOLOGIST: D. O'Brien	DATE STARTED: 3/24/92
DRILLING METHODS: Hollow Stem Auger	DATE COMPLETED: 3/24/92
	PAGE 5 OF 12

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 100mm	RECOVERY	DESCRIPTION	USE SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
13		21	0	No Recovery	NA	NA	
		23	0	No Recovery	NA	NA	
		4	0	No Recovery	NA	NA	
		5	0	No Recovery	NA	NA	
14		6	0	No Recovery	NA	NA	
		10	0	No Recovery	NA	NA	

NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Carter

SAA - same as above  
 NA - not applicable

Seep. 1

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VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: 102.03.01.04		PROJECT NAME: Fernald RIFES ELMF	
BORING NUMBER: 1751	COORDINATES:		DATE: 3/24/92
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 3/24/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth	Date/Time	DATE COMPLETED: 3/24/92
DRILLING METHODS: Hollow Stem Auger			PAGE 6 OF 12

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 100mm	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%PI)	REMARKS
15.4	1544 1545 10168 10169	4	6	STIFF. SY (U/G) Olive yellow silty clay w/ gravel mod. plasticity, moist	CI	1.75	HNu = 0 ppm B <sub>u</sub> = 40 cpm
16.4	1545 10169	6	6	STIFF. SY (S/L) Gray clay with gravel, low plasticity moist.	CL	1.5	
16.8		9	2	SAA	CI	1.75	
17.2		14	0	No Recovery	NA	NA	
17.6		20	0	No Recovery	NA	NA	
18.0		8	0	No Recovery	NA	NA	

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Mobile Drill 80

Driller: Joe Barile  
Craig Carter

SAA - same as above  
NA - not applicable

See p. 1

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 1002.03.01.04	PROJECT NAME: Fernald Rifle Range	
BORING NUMBER: 1751	COORDINATES:	DATE: 3/24/92
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 3/24/92
ENGINEER/GEOLOGIST: D. O'Brine	Depth Date/Time	DATE COMPLETED: 3/26/92
DRILLING METHODS: Hollow Stem Auger	PAGE: 7	OF: 12

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0m	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		4	0	No Recovery	NA	NA	
		11	0	No Recovery	NA	NA	
19	10115 10120 10121 10122	↑ 20	20	Stiff, gy (sl) Gray granular clay, low plasticity, moist	CI	1.0	H <sub>Nc</sub> = 0 ppm B <sub>x</sub> = 60 cpm
20							

NOTES:

Drilling Contractor: Philadelphia Drilling

Drilling Equipment: Mobile Drill 80

Driller: Tom Barile  
Craig Coulter

JAA - same as above  
NA - not applicable

see p. 1

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 1602.03.01.04		PROJECT NAME: Fernald Rifle Range	
BORING NUMBER: 1751		COORDINATES:	DATE: 3/24/92
ELEVATION:		GWL: Depth Date/Time	DATE STARTED: 3/24/92
ENGINEER/GEOLOGIST: D. O'Brien		Depth Date/Time	DATE COMPLETED: 3/24/92
DRILLING METHODS: Hollow Stem Auger		PAGE 8 OF 12	

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0m	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
17.5	101621						
18.5	101622						
22.0	101623 101624	7	6	Med. stiff gy (bl.) Gray granular clay low plasticity slightly moist	cl	.75	H <sub>2</sub> O = 0 ppm B <sub>x</sub> = 80 cpm
22.5	101625 101626	9	6	SAA, stiff	cl	1.5	
23.0	101627 101628	10	6	SAA	cl	1.0	
23.5	101629 101630	12	6	SAA	cl	1.25	

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Mobile Drill 80

Driller: Tom Barile  
Craig Coulter

SAA - same as above  
NA - not applicable

See p. 1

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VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: 1602.03.01.04	PROJECT NAME: Farnold RIFTS EUMF
BORING NUMBER: 1751	COORDINATES: 1
ELEVATION:	GWL: Depth Date/Time
ENGINEER/GEOLOGIST: D. O'Brien	DATE STARTED: 3/24/92
DRILLING METHODS: Hollow Stem Auger	DATE COMPLETED: 3/24/92
	PAGE 9 OF 12

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10cm	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
14.1	1680 101620	4	6	STIFF. 54(31) Gray granular clay, low plasticity slightly moist	CI	1.5	H <sub>2</sub> O = 0 ppm R <sub>6</sub> = 60 cpm
18.1		4	6	SAA	CI	1.5	
22.1		7	4	SAA	CI	20	
26.1		9	0	No Recovery	NA	NA	
26.1	1635 101631	8	4	STIFF. 54(31) Gray granular clay, low plasticity	CI	1.5	H <sub>2</sub> O = 0 ppm R <sub>6</sub> = 60 cpm
30.1		50/2	0	No Recovery	NA	NA	Hit a rock

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Mobile Drill 80

Driller: Joe Barile  
Craig Carter

SAA - same as above  
NA - not applicable

VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: 602.03.01.04		PROJECT NAME: Fernald Rifle Range	
BORING NUMBER: 1751	COORDINATES:		DATE: 3/24/92
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 3/24/92
ENGINEER/GEOLOGIST: D. O'BRUN	Depth	Date/Time	DATE COMPLETED: 3/26/92
DRILLING METHODS: Hollow Stem Auger			PAGE 10 OF 12

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 100mm	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
14		NA Refusal	0	No Recovery	NA	NA	
		NA refusal	0	No Recovery	NA	NA	
25		refusal	0	No Recovery	NA	NA	End boring at 28.0ft
29							

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Mobile Drill 80

Driller: Tom Barille  
Craig Carter

SAA - same as above  
NA - not applicable

See p. 1

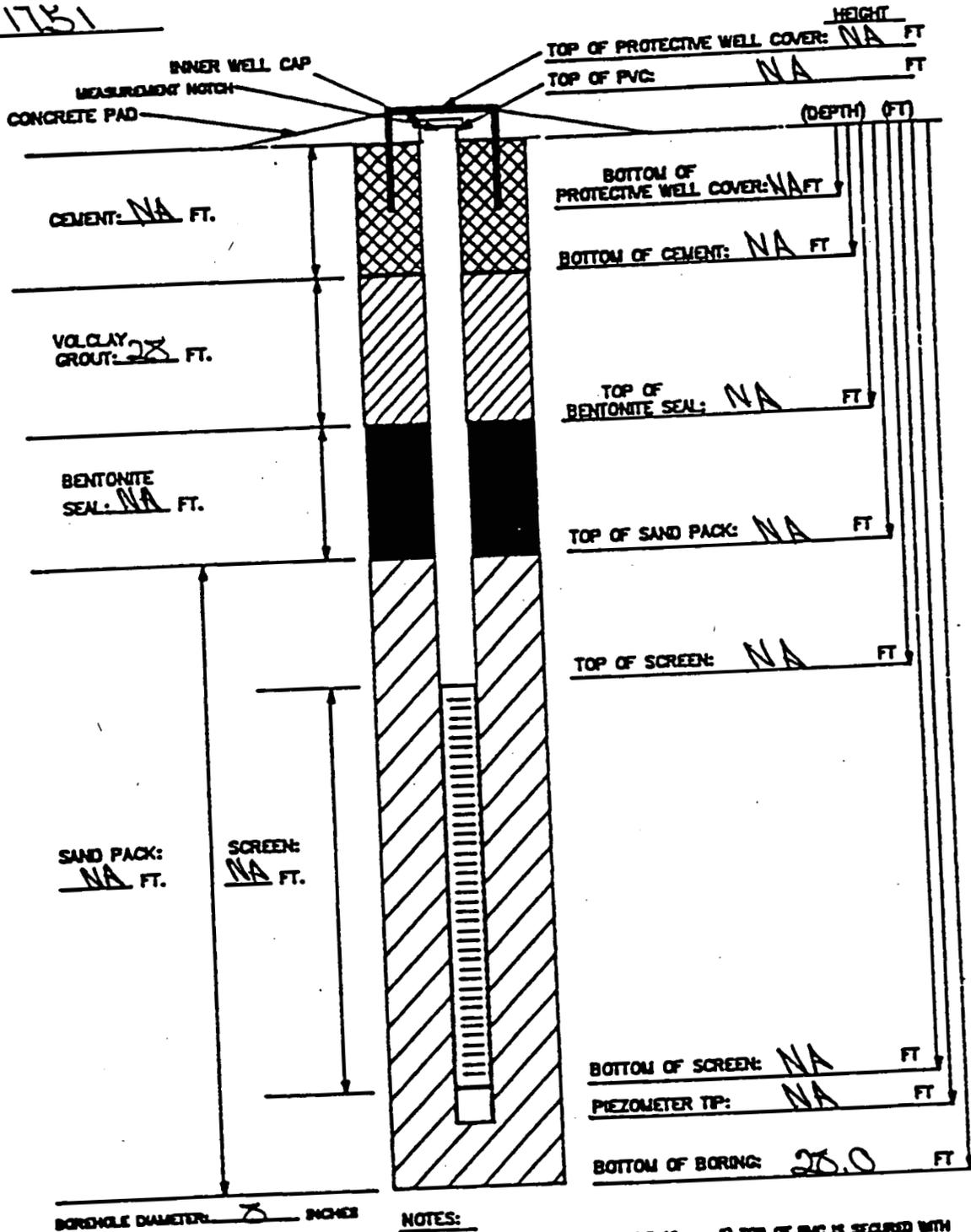
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INSTALLATION DATE: 3/20/92

**FERNALD RI/FS**  
INSTALLATION DIAGRAM  
MONITORING WELL NO.

1751



**MATERIALS USED:**  
 SAND TYPE AND QUANTITY: NA  
 BENTONITE PELLETS (5-GALLON BUCKETS): NA  
 BAGS OF VOLCLAY GROUT: 3 bags  
 AMOUNT OF CEMENT: NA  
 AMOUNT OF WATER USED: 10 gal.  
 OTHER: NA

- 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 BLUP.
  - 4) WATER DEPTH/DATE: NA
  - 5) TOP OF PVC IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK.
  - 6) PARENTHESES INDICATE DEPTH BELOW GROUND LEVEL.

TASK: 602.03.01.04 GEOLOGIST/ENGINEER: D. O'Brien

**PIEZOMETER INSTALLATION SHEET**

PROJECT NAME Fernald RI/FS EUMF FIELD ENG./GEO. D. O'Brien DATE 3/26/92  
 PROJECT NO. 602.03.01.04 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 BORING NO. 1751  
 PIEZOMETER NO. NA DATE OF INSTALLATION 3/26/92

**BOREHOLE DRILLING**

DRILLING METHOD <u>Hollow Stem Auger</u>	TYPE OF BIT <u>Auger Bit</u>
DRILLING FLUID (S) USED: FLUID <u>NA</u> FROM <u>NA</u> TO <u>NA</u> FLUID <u>NA</u> FROM <u>NA</u> TO <u>NA</u>	CASING SIZE (S) USED: SIZE <u>NA</u> FROM <u>NA</u> TO <u>NA</u> SIZE <u>NA</u> FROM <u>NA</u> TO <u>NA</u>

**PIEZOMETER DESCRIPTION**

TYPE <u>NA</u>	RISER PIPE MATERIAL <u>NA</u>
DIAMETER OF PERFORATED SECTION <u>NA</u>	RISER PIPE DIAMETERS: O.D. <u>NA</u> I.D. <u>NA</u>
PERFORATION TYPE: 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 ( )	
TOP OF RISER PIPE	<u>NA</u>			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	<u>NA</u>			
BOREHOLE FILL MATERIALS: <u>Cement</u> GROUT/SLURRY BENTONITE SAND GRAVEL	TOP <u>0</u>	BOTTOM <u>28.0</u>	TCP	BOTTOM
	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
PERFORATED SECTION	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
PIEZOMETER TIP	<u>NA</u>			
BOTTOM OF BOREHOLE	<u>28.0</u>			
GWL AFTER INSTALLATION	<u>NA</u>			

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: <u>U02.03.01.01</u>	PROJECT NAME: <u>Fernald RI/FS</u>		<u>YUMF</u>
BORING NUMBER: <u>1752</u>	COORDINATES:		DATE: <u>3/16/92</u>
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: <u>3/16/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Bray</u>	Depth	Date/Time	DATE COMPLETED: <u>3/17/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>			PAGE <u>1</u> OF <u>10/12</u>

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 IN	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY TEST	REMARKS
	<u>10150</u>	<u>2</u>	<u>6</u>	<u>V. Stiff. 2.54 (5/4) Light olive brown silty clay. low plasticity, slightly moist</u>	<u>CI</u>	<u>2.5</u>	<u>DSO 3/16/92</u> <u>HNU = 50 ppm</u> <u>BS = 50 cpm</u>
	<u>slubs</u>						
		<u>6</u>	<u>6</u>	<u>SAA, stiff.</u>	<u>CI</u>	<u>1.5</u>	<u>HNU = SAA</u> <u>BS = SAA</u>
<u>1</u>		<u>9</u>	<u>0</u>	<u>No Recovery</u>	<u>NA</u>	<u>NA</u>	<u>HNU = SAA NA</u> <u>BS = SAA NA</u> <u>4/1/92</u>
		<u>12</u>	<u>0</u>	<u>No Recovery</u>	<u>NA</u>	<u>NA</u>	<u>HNU = SAA NA</u> <u>BS = SAA NA</u> <u>4/1/92</u>
<u>2</u>	<u>10151</u>	<u>12</u>	<u>6</u>	<u>Hard. 2.54 (5/4) Light olive brown silty clay w/ large limestone fragments. No plasticity, slightly moist</u>	<u>CI</u>	<u>4.0</u>	<u>HNU = 0 ppm</u> <u>BS = 40 cpm</u>
	<u>slubs</u>						
		<u>24</u>	<u>0</u>	<u>No Recovery</u>	<u>NA</u>	<u>NA</u>	<u>HNU = NA</u> <u>BS = NA</u>

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Mobile Drill 80

Driller: Joe Barile  
Craig Coulter

SAA - same as above  
NA - not applicable  
Bkpd - HNU = 0 ppm  
BS = 40-60 cpm

Samples collected per ASTM Standard Penetration Test  
Colors identified using Munsell Color Chart

**VISUAL CLASSIFICATION OF SOILS**

3841

PROJECT NUMBER: <u>102.03.01.01</u>	PROJECT NAME: <u>Fernald RI/FS YLWTF</u>	
BORING NUMBER: <u>1752</u>	COORDINATES:	DATE: <u>3/16/92</u>
ELEVATION:	GWL: Depth      Date/Time	DATE STARTED: <u>3/11/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brien</u>	Depth      Date/Time	DATE COMPLETED: <u>3/17/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE <u>2</u> OF <u>12</u>	

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 IN	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ISPT)	REMARKS
14		50/2	0	No Recovery	NA	NA	H <sub>N</sub> = NA B <sub>x</sub> = NA
		refusal	0	No Recovery	NA	NA	H <sub>N</sub> = NA B <sub>x</sub> = NA
14.20	101572 101573	11	6	Stiff, 2.5 (3/4) Light olive brown silty clay with gravel low plasticity, slightly moist	CI	1.75	H <sub>N</sub> = 0 ppm B <sub>x</sub> = 60 cpm
14.20	101574 101575	14	6	SAA, v. stiff	CI	2.0	H <sub>N</sub> = SAA B <sub>x</sub> = SAA
14.20	101576 101577	18	6	SAA, stiff	CI	1.75	H <sub>N</sub> = SAA B <sub>x</sub> = SAA
		24	0	No Recovery	NA	NA	H <sub>N</sub> = SAA NA B <sub>x</sub> = S NA B <sub>20</sub> = 10/92

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable

see p. 1

**VISUAL CLASSIFICATION OF SOILS**

3841

PROJECT NUMBER: <u>602.03.01.01</u>	PROJECT NAME: <u>Fernald RI/FS YLWME</u>	
BORING NUMBER: <u>1752</u>	COORDINATES:	DATE: <u>3/16/92</u>
ELEVATION:	GWL: Depth      Date/Time	DATE STARTED: <u>3/16/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brien</u>	Depth      Date/Time	DATE COMPLETED: <u>3/17/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE <u>3</u> OF <u>12/12</u>	

DEPTH FT	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY IN	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%SF)	REMARKS
6	1450 101578	14	6	Hard. 2.54 (1/4) Light yellowish brown silty clay w/ gravel no plasticity, slightly moist	CI	>40	H <sub>Nu</sub> = 0 ppm B <sub>x</sub> = 60 cpm
7		21	0	No Recovery	NA	NA	H <sub>Nu</sub> = NA B <sub>x</sub> = NA
		25	0	SAA - No Recovery	NA	NA	H <sub>Nu</sub> = NA B <sub>x</sub> = NA
		37	0	SAA - No Recovery	NA	NA	H <sub>Nu</sub> = NA B <sub>x</sub> = NA
8	1440 101578 3/16/92	↑ 17	17	Hard. 2.54 (1/4) Light yellowish brown silty clay w/ limestone fragments no plasticity, dry	CI	>40	H <sub>Nu</sub> = 0 ppm B <sub>x</sub> = 40 cpm Archived Shaly
							H <sub>Nu</sub> = SAA B <sub>x</sub> = SAA

NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Carter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>U02.03.01.01</u>	PROJECT NAME: <u>Fernald RI/FS YUMF</u>	
BORING NUMBER:	COORDINATES:	DATE: <u>3/11/92</u>
ELEVATION:	GWL: Depth      Date/Time	DATE STARTED: <u>3/10/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brien</u>	Depth      Date/Time	DATE COMPLETED: <u>3/11/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE <u>4</u>	OF <u>12-12</u>

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 IN	RECOVERY IN	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%F)	REMARKS
							H <sub>Nc</sub> = 5 ppm B <sub>x</sub> = 40 cpm
							H <sub>Nc</sub> = NA B <sub>x</sub> = NA
							H <sub>Nc</sub> = NA B <sub>x</sub> = NA
							H <sub>Nc</sub> = NA B <sub>x</sub> = NA
11	1450 101578 101579 101580 3/11/92	21	0	V. Stiff. 2.5 (U14) light yellowish brown silty clay with limstone fragments, no plasticity, dry	Cl	3.5	H <sub>Nc</sub> = 0 ppm B <sub>x</sub> = 50 cpm
		14	0	No Recovery	NA	NA	H <sub>Nc</sub> = NA B <sub>x</sub> = NA

NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Cauter

NA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: 102.03.01.01	PROJECT NAME: Fernald RI/FS		DATE: 3/16/92
BORING NUMBER: 1752	COORDINATES:		DATE STARTED: 3/16/92
ELEVATION:	GWL: Depth	Date/Time	DATE COMPLETED: 3/17/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth	Date/Time	PAGE 5 OF 12
DRILLING METHODS: Hollow Stem Auger			

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 100mm	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
13		10	0	No Recovery	NA	NA	H <sub>N</sub> = NA B <sub>S</sub> = NA
		11	0	No Recovery	NA	NA	H <sub>N</sub> = NA B <sub>S</sub> = NA
	10578	13	6	Hard. 2.54 (1/4) Light yellowish brown silty clay w/ limestone fragments, no plasticity or 2.	CI	240	H <sub>N</sub> = 0 ppm B <sub>S</sub> = 50 cpm
		13	2	SAA	CI	240	H <sub>N</sub> = SAA B <sub>S</sub> = SAA
14		15	0	No Recovery	NA	NA	H <sub>N</sub> = NA B <sub>S</sub> = NA
		21	0	No Recovery	NA	NA	H <sub>N</sub> = NA B <sub>S</sub> = NA

NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

**VISUAL CLASSIFICATION OF SOILS**

3841

PROJECT NUMBER: <u>102.03.01.01</u>	PROJECT NAME: <u>Fernald Rifle YLWTF</u>	
BORING NUMBER: <u>1752</u>	COORDINATES:	DATE: <u>3/16/92</u>
ELEVATION:	GWL: Depth      Date/Time	DATE STARTED: <u>3/16/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brien</u>	Depth      Date/Time	DATE COMPLETED: <u>3/17/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE: <u>6</u>	OF: <u>12</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10 CM	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSFI)	REMARKS
14.1	10157	4	6	V. STIFF. 2.54 (1/4) Light yellowish brown, silty clay w/ limestone fragments no plasticity dry	CI	2.5	H <sub>N</sub> = 0 ppm B <sub>S</sub> = 40 cpm
		14	6	SAA, hard	CI	4.0	H <sub>N</sub> = SAA B <sub>S</sub> = SAA
16		16	6	SAA, hard	CI	4.0	H <sub>N</sub> = SAA B <sub>S</sub> = SAA
		23	2	SAA, hard	CI	4.0	H <sub>N</sub> = SAA B <sub>S</sub> = SAA
17	10155 10580	10	6	V. STIFF. 2.54 (1/4) Light olive brown, silty clay w/ gravel, no plasticity slightly moist	CI	3.5	H <sub>N</sub> = 0 ppm B <sub>S</sub> = 40 cpm
		14	4	SAA	CI	3.5	H <sub>N</sub> = SAA B <sub>S</sub> = SAA

NOTES:  
 Drilling Contractor Pennsylvania Drilling  
 Drilling Equipment Mobile Drill 80  
 Driller: Joe Barile  
Craig Cauter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: <u>102.03.01.01</u>	PROJECT NAME: <u>Fernald RI/FS</u>		<u>YUMF</u>
BORING NUMBER: <u>1752</u>	COORDINATES:	DATE: <u>3/16/92</u>	
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: <u>3/16/92</u>
ENGINEER/GEOLOGIST: <u>D.O. Brown</u>	Depth	Date/Time	DATE COMPLETED: <u>3/17/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE: <u>7</u>		OF: <u>12-12</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10 CM	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
14		15	0	No Recovery	NA	NA	HNu = NA Bx = NA
19		22	0	No Recovery	NA	NA	HNu = NA Bx = NA
19	10150	↑	19	V. Stiff. 2.5Y (5H) Light olive brown silty clay w/ gravel. Low plasticity slightly moist	CI	3.25	HNu = 0 ppm Bx = 60 cpm Archive Shelby
23							HNu = SAA Bx = SAA
28							HNu = SAA Bx = SAA
							HNu = SAA Bx = SAA

NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>102.03.01.01</u>	PROJECT NAME: <u>Fernald RI/FS YLWTF</u>	
BORING NUMBER: <u>1752</u>	COORDINATES:	DATE: <u>3/16/92</u>
ELEVATION:	GWL: Depth      Date/Time	DATE STARTED: <u>3/16/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brien</u>	Depth      Date/Time	DATE COMPLETED: <u>3/17/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>		PAGE <u>8</u> OF <u>12</u>

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.5 IN	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%T)	REMARKS
							H <sub>Nc</sub> = NA B <sub>x</sub> = NA
							H <sub>Nc</sub> = NA B <sub>x</sub> = NA
22	1700 101581 101582 3/16/92	50/4	6	V. Stiff. 2.54 (5/4) Light yellow brown silty clay w/ gravel no plasticity, slightly moist	CI	30	H <sub>Nc</sub> = 0 ppm B <sub>x</sub> = 50 cpm
	Refusal		0	No Recovery	NA	NA	H <sub>Nc</sub> = NA B <sub>x</sub> = NA
23	Refusal		0	SAA	NA	NA	H <sub>Nc</sub> = NA B <sub>x</sub> = NA
	Refusal		0	SAA	NA	NA	H <sub>Nc</sub> = NA B <sub>x</sub> = NA

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: 102.03.01.01	PROJECT NAME: Fernald RIFES YUMF	
BORING NUMBER: 1752	COORDINATES: NK	DATE: 3/16/92
ELEVATION: NK D. BIRD/T. M. W. L. D. E. R.	GWL: Depth	DATE STARTED: 3/16/92
ENGINEER/GEOLOGIST: <del>Robert</del> TM	Depth	DATE COMPLETED: 3/17/92
DRILLING METHODS: Hollow Stem Auger	PAGE 9 OF 12	

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 IN	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
14				Hole discrepancy. Toped to 25.5ft. Due to rig slipping & switching drillers. See FADL for 3/17/92 for more details.			HNU = NA BS = NA
25							HNU = NA BS = NA
							HNU = NA BS = NA
							HNU = NA BS = NA
	101583	10	3	Very stiff, lt. yellowish brown (2.5 Y 6/4) w/ gravel to (FM)	CI	2.5	
	101584 1045 3-11	5	6	Silty clay, w/ gravel to 1cm, low plasticity, moist wet SAA	cl	2.5	HNU = 4 ppm BS = 50 cpm TM
26		11	6	stiff, lt. yellowish brown (2.5 Y 6/4) silty clay w/ gravel to 1cm, low plasticity, wet	cl	0.5	HNU = 0 ppm BS = 50 cpm TM
		26	6	SAA	cl	0.5	HNU = 0 ppm BS = 50 cpm TM

NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Bonilla E. Gardner  
Ernie Coulter M. Rebot  
 SAA - same as above  
 NA - not applicable  
 see p. 1

VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: <u>U02.03.01.01</u>	PROJECT NAME: <u>Fernand Riles YUMF</u>		
BORING NUMBER: <u>1752</u>	COORDINATES:		DATE: <u>3/16/92</u>
ELEVATION: <u>NO. 8.1 m / T. M. 1.4 m</u>	GWL: Depth	Date/Time	DATE STARTED: <u>3/16/92</u>
ENGINEER/GEOLOGIST: <u>D. O. Barill</u>	Depth	Date/Time	DATE COMPLETED: <u>3/17/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>			PAGE <u>10</u> OF <u>12</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 IN	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
14		14	6	Soft. (2.5Y (6/4)) Light yellowish brown silty clay with gravel to 1cm, low plasticity, wet	CI	0.5	H <sub>Nu</sub> = <del>0</del> 0 ppm B <sub>S</sub> = <del>ALK</del> 50 cpm TM
28	101585 1000 3-17	32	6	Stiff, lt. olive brown (2.5Y 5/6), clay laminated clay, low plasticity, moist shale gravel, olive gray (5Y 5/2) moist	CI GW	2.0 >4.0	H <sub>Nu</sub> = <del>4.5</del> 4.5 ppm B <sub>S</sub> = <del>ALK</del> 50 cpm TM 1-2 mm laminae
28	101586 101587 1120 3-17	22	6	Stiff, lt. olive brown (2.5Y 5/6), laminated clay, low plasticity, moist	CI	2.05	H <sub>Nu</sub> = 4 ppm B <sub>S</sub> = 50 cpm
29	101588 101589 1120 3-17	24	6	Soft, lt. yellowish brown (2.5Y 6/4), silty clay, low plasticity, wet SAA	CI	0.25	H <sub>Nu</sub> = 3 ppm B <sub>S</sub> = 50 cpm
29	101590 101591 1120 3-17	25	6	SAA	CI	0.25	H <sub>Nu</sub> = 3 ppm B <sub>S</sub> = 50 cpm
29	101592 101593 1120 3-17	50/3	6	SAA	CI	0.25	H <sub>Nu</sub> = 2 ppm B <sub>S</sub> = 50 cpm Total 1.7 drums of cuttings
				Bottom of Boring at 30.0 Ft.			

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: D. O. Barill E. Gardner  
Craig Carter M. Rebolt

SAA - same as above  
 NA - not applicable

See p. 1

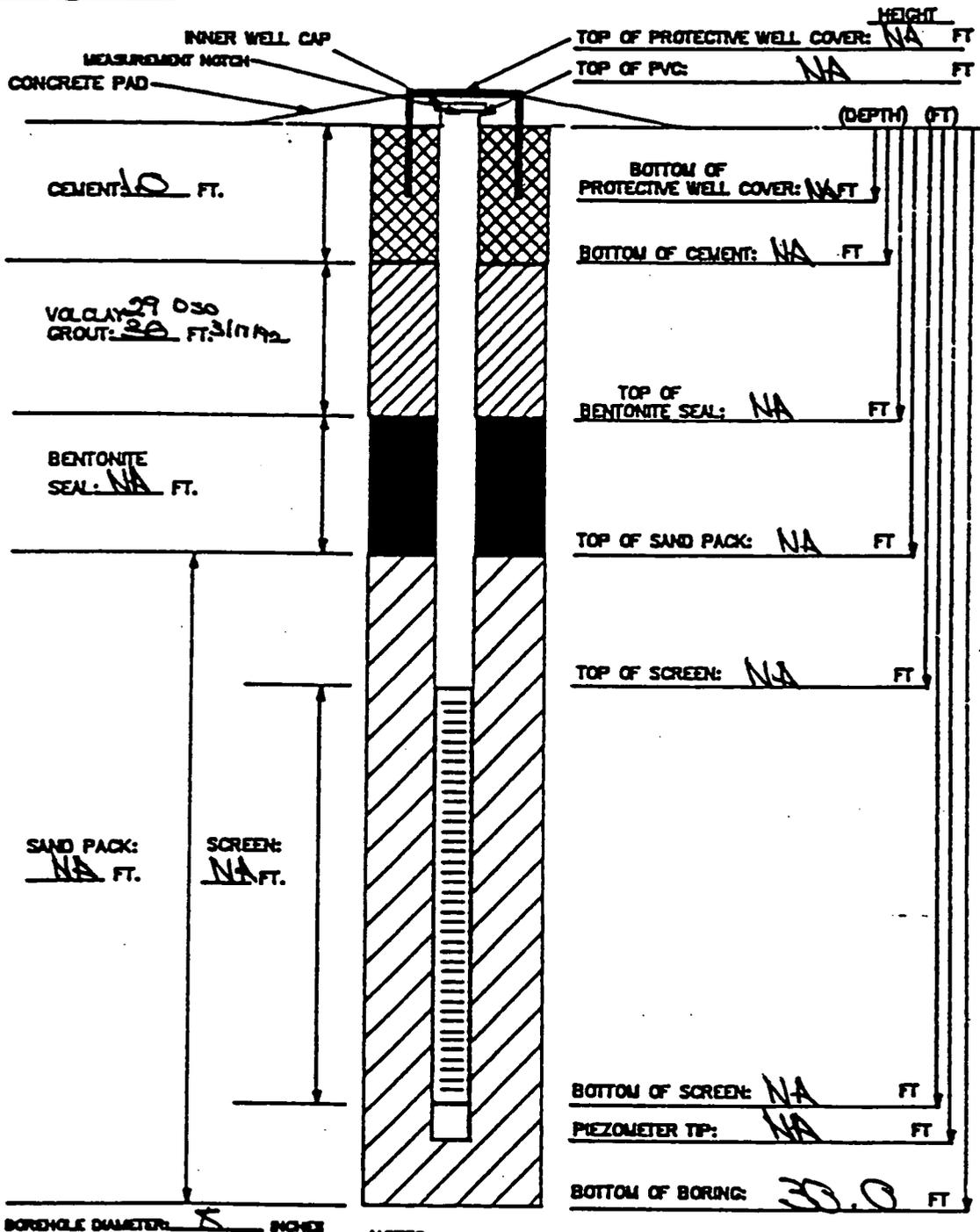
11/9/12

# FERNALD RI/FS INSTALLATION DIAGRAM MONITORING WELL NO.

INSTALLATION DATE: 8/17/92

3841

1752



**MATERIALS USED:**  
 SAND TYPE AND QUANTITY: NA  
 BENTONITE PELLETS (5-GALLON BUCKETS): NA  
 BAGS OF VOLCLAY GROUT: 29  
 AMOUNT OF CEMENT: 1.0  
 AMOUNT OF WATER USED: 60 gal  
 OTHER: NA

- 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: NA
  - 5) TOP OF PVC IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK.
  - 6) PARENTHESES INDICATE DEPTH BELOW GROUND LEVEL.

TASK: 602030104 GEOLOGIST/ENGINEER: D.O. Brien

**PIEZOMETER INSTALLATION SHEET**

3841

PROJECT NAME Fernald RI/FS ELMF FIELD ENG./GEO. D. O'Brien DATE 3/17/92  
 PROJECT NO. 602.03.01.04 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 BORING NO. 1152  
 PIEZOMETER NO. NA DATE OF INSTALLATION 3/17/92

**BOREHOLE DRILLING**

DRILLING METHOD <u>Hollow Stem Auger</u>	TYPE OF BIT <u>Auger Bit</u>
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID <u>NA</u> FROM <u>NA</u> TO <u>NA</u>	SIZE <u>NA</u> FROM <u>NA</u> TC <u>NA</u>
FLUID <u>NA</u> FROM <u>NA</u> TO <u>NA</u>	SIZE <u>NA</u> FROM <u>NA</u> TC <u>NA</u>

**PIEZOMETER DESCRIPTION**

TYPE <u>NA</u>	RISER PIPE MATERIAL <u>NA</u>
DIAMETER OF PERFORATED SECTION <u>NA</u>	RISER PIPE DIAMETERS:
PERFORATION TYPE:	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 ( )	
	TOP	BOTTOM	TOP	BOTTOM
TOP OF RISER PIPE	<u>NA</u>			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	<u>NA</u>			
BOREHOLE FILL MATERIALS: <u>Cement</u>	TOP <u>0.0</u>	BOTTOM <u>1.0</u>	TCP	BOTTOM
	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
PERFORATED SECTION	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
PIEZOMETER TIP	<u>NA</u>			
BOTTOM OF BOREHOLE	<u>30.0</u>			
GWL AFTER INSTALLATION	<u>NA</u>			

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: 602.03.01.04	PROJECT NAME: Farnald Rifles EWMP	
BORING NUMBER: 1753	COORDINATES:	DATE: 3/23/92
ELEVATION:	GWL: Depth NA Date/Time	DATE STARTED: 3/23/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 3/23/92
DRILLING METHODS: Hollow Stem Auger	PAGE: 1	OF: 8

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0m	RECOVERY 1.0m	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%F)	REMARKS
	0850 101545 3/23/92	2	6	STIFF. 10YR (4/4) Dark yellowish brown silty clay low plasticity, moist	CI	1.5	H <sub>Nu</sub> = 0 ppm B <sub>X</sub> = 40 cpm
		4	6	SAA, v. stiff	CI	2.25	
		6	2	SAA	CI	2.25	
		9	0	No Recovery	NA	NA	
2	0900 101596 101597 3/23/92	6	6	v. STIFF. 10YR (5/4) Light olive brown, silty clay some gravel, no plasticity slightly moist	CI	2.75	H <sub>Nu</sub> = 0 ppm B <sub>X</sub> = 50 cpm
	0900 101598 101599 3/23/92	9	6	SAA	CI	3.25	

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Tom Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable

Okad - H<sub>Nu</sub> = 0 ppm  
 B<sub>X</sub> = 40-60 cpm

Samples collected per ASTM standard Penetration Test  
 Colors identified by using Munsell Color Chart

**VISUAL CLASSIFICATION OF SOILS**

PROJECT NUMBER: <u>602.03.01.04</u>	PROJECT NAME: <u>Fernald RIFES EWMF</u>		
BORING NUMBER: <u>1753</u>	COORDINATES:	DATE: <u>3/23/92</u>	
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: <u>3/23/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brien</u>	Depth	Date/Time	DATE COMPLETED: <u>3/23/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE: <u>2</u>		OF: <u>8</u>

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.5in	RECOVERY in	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	<u>0900 101602 3/23/92</u>	<u>16</u>	<u>6</u>	<u>V. Stiff. 2.5y (3/4) Light olive brown, silty clay some gravel, no plasticity, slightly moist.</u>	<u>CI</u>	<u>35</u>	
		<u>18</u>	<u>0</u>	<u>No Recovery</u>	<u>NA</u>	<u>NA</u>	
<u>4</u>	<u>0905 101602 3/23/92</u>	<u>21</u>	<u>6</u>	<u>V. Stiff. 2.5y (4/4) Light yellowish brown, silty clay, some gravel, no plasticity, dry</u>	<u>CI</u>	<u>30</u>	<u>HMW = 20 ppm RF = 50 cpm</u>
		<u>37</u>	<u>6</u>	<u>SAA</u>	<u>CI</u>	<u>30</u>	
<u>5</u>		<u>25</u>	<u>6</u>	<u>SAA, hard</u>	<u>CI</u>	<u>24.0</u>	
		<u>31</u>	<u>6</u>	<u>SAA</u>	<u>CI</u>	<u>24.0</u>	

NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: 1002.03.01.04	PROJECT NAME: Farnald RIFES EUMF	
BORING NUMBER: 1753	COORDINATES:	DATE: 3/23/92
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 3/23/92
ENGINEER/GEOLOGIST: D.O'Brian	Depth Date/Time	DATE COMPLETED: 3/23/92
DRILLING METHODS: Hollow Stem Auger	PAGE: 3	OF: 8

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 100mm	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
14.1			100				
15.05	101602	24	b	SAA 3/23/92 v. stiff. 2.54 (1/4) Light yellowish brown silty clay, no plasticity dry	CL	1.75	HM= 0 ppm PS= 40 cpm
3/23/92		37	b	SAA, v. stiff	CL	2.0	
7		50	b	SAA, hard	CL	24.0	
	refused		b	SAA	CL	24.9	
8	1325 030 101604 3/23/92		C	Hard. 2.54 (1/4) Light yellowish brown weathered shale, no plasticity dry.	SH	24.0	HM= 20 ppm PS= 60 cpm Archimed Shelby
			Shelby				

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.03.01.04	PROJECT NAME: Fernald RIFES EUMF	
BORING NUMBER: 1753	COORDINATES:	DATE: 3/23/92
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 3/23/92
ENGINEER/GEOLOGIST: D.O'Brin	Depth Date/Time	DATE COMPLETED: 3/23/92
DRILLING METHODS: Hollow Stem Auger	PAGE 4	OF 8

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0m	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TEF)	REMARKS
141							
142	Shaly	Shaly					
10	1420	20	6	Hard. 2.5Y (6/2) Light brownish gray weathered shale & limestone interbedded dy.	sh	4.0	HNu = 0ppm B <sub>6</sub> = 40cpm
		5/4	0	No Recovery	NA	NA	
			0	No Recovery	NA	NA	HNu = 0.50 B <sub>6</sub> = 323/92
			0	No Recovery	NA	NA	

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Tom Barile  
Craig Coulter

SA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: 102.03.01.04		PROJECT NAME: Fernald Rifle EUMP	
BORING NUMBER: 1753	COORDINATES:		DATE: 3/23/92
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 3/23/92
ENGINEER/GEOLOGIST: D. O'BRUN	Depth	Date/Time	DATE COMPLETED: 3/23/92
DRILLING METHODS: Hollow Stem Auger			PAGE 5 OF 8

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0 IN	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
12.5	1435 101608	22	6	2.54 (NG1) Gray weathered shale, dry.	SH	NA	HNU = 0 ppm BS = 60 cpm
13		50/4	0	No Recovery	NA	NA	
13			0	No Recovery	NA	NA	Hit 0.50 BS 3/23/92
14			0	No Recovery	NA	NA	Hit bedrock, going to core 5'
14							* Augered thru rock to 15'
15				End soil boring - core 5'			

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Mobile Drill 80

Driller: Joe Barile  
Craig Carter

JAA - same as above  
NA - not applicable

See p. 1

**VISUAL CLASSIFICATION OF ROCK**

PROJECT NUMBER 602.03.01.04 FIELD ENG./GEO. D. O'Brien PAGE 6 OF 8  
 PROJECT NAME Fernald RI/FS EWMX BORING NO. 1753  
 APPROX. ELEV. \_\_\_\_\_ CORE SIZE 2" DATE 3/23/92  
 DRILLING METHOD Auger DATE STARTED 3/23/92  
 COORDINATES \_\_\_\_\_ DATE COMPLETED 3/23/92

CASING INFORMATION		GROUNDWATER LEVEL DATA			
SIZE	DEPTH	ACTUAL TIME	DEPTH	ACTUAL TIME	DEPTH
8"	15'	NA	NA	NA	NA

RUN NUMBER	DEPTH (ft)	RECOVERY (in)	RECOVERY	% ROD	DESCRIPTION	JOINT SPACING			REMARKS
						MAXIMUM	MINIMUM	AVERAGE	
15	15	10 1/2	6	NA	Soft. 2.54 (N61) Gray shale weathered. Very thin bedded				H <sub>2</sub> O = 0 ppm RS = 500 ppm
16	16	6	6	NA	SAA				SAA = Same As Above. See p. 1 Notes Section for additional information
17	17	6	6	NA	SAA				
18	18	6	6	NA	SAA				
19	19	6	6	NA	SAA				
20	20	6	6	NA	SAA				
21	21	6	6	NA	Very hard. 2.84 (N61) Gray crystalline limestone with fossils.				

Bottom of Coring at 20.5 ft

7018

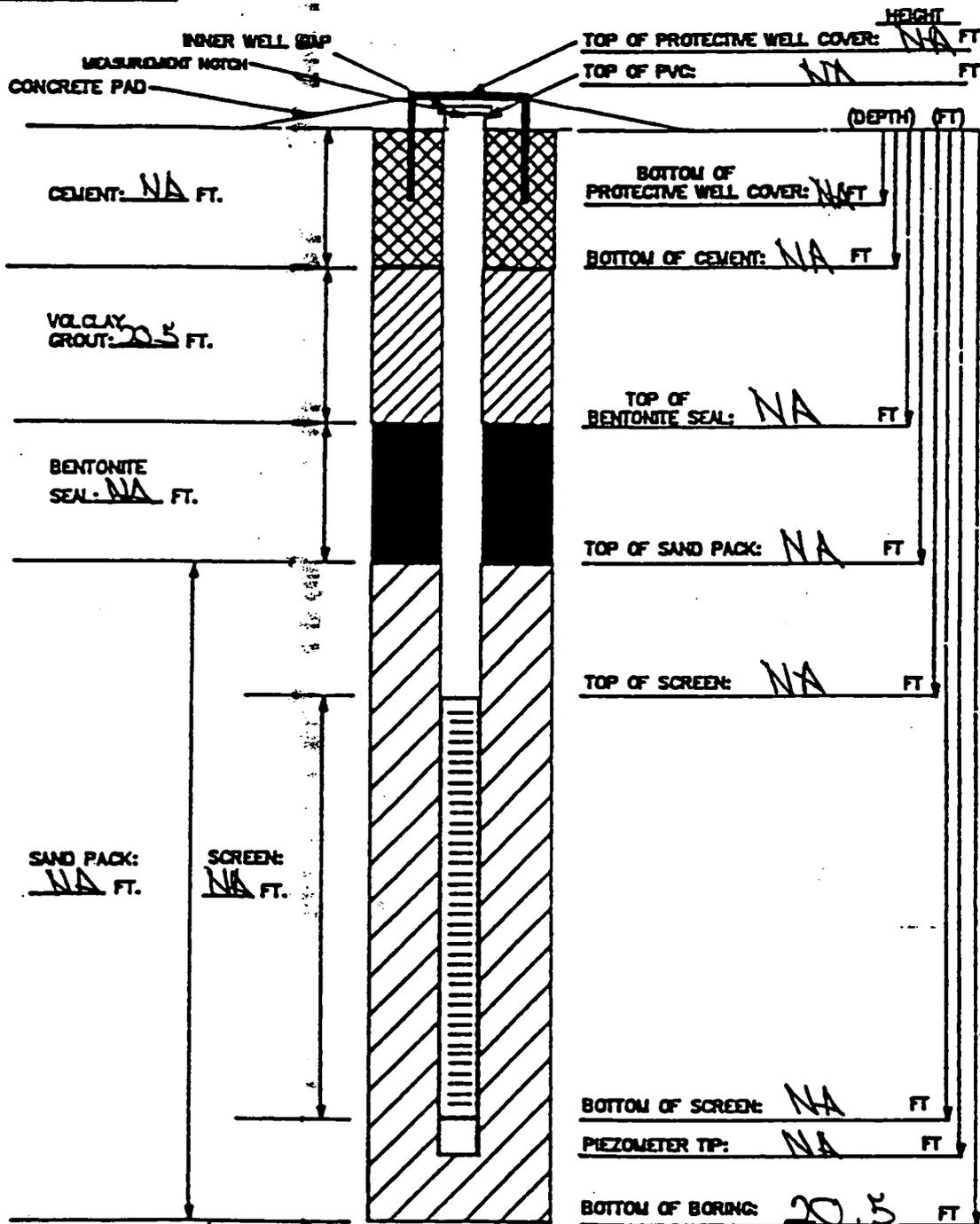
# FERNALD RI/FS

INSTALLATION DIAGRAM  
MONITORING WELL NO.

1753

INSTALLATION DATE: 3/23/92

3841



BORING DIAMETER: 8 INCHES

**MATERIALS USED:**  
 SAND TYPE AND QUANTITY: NA  
 BENTONITE PELLETS (5-GALLON BUCKETS): NA  
 BAGS OF VOLCLAY GROUT: 2 bags  
 AMOUNT OF CEMENT: NA  
 AMOUNT OF WATER USED: 60 gal  
 OTHER: NA

- 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 PLUG.
  - 4) WATER DEPTH/DATE: NA
  - 5) TOP OF PVC IS SECURED WITH EXPANDEBLE RUBBER PLUG AND PADLOCK.
  - 6) PARENTHESES INDICATE DEPTH BELOW GROUND LEVEL.

TASK: 602.03.01.04 GEOLOGIST/ENGINEER: D.O. BROWN

**PIEZOMETER INSTALLATION SHEET**

PROJECT NAME Fernald RI/FS FUMF FIELD ENG./GEO. D. O'Brien DATE 3/23/92  
 PROJECT NO. 602.03.01.04 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 BORING NO. 1753  
 PIEZOMETER NO. NA DATE OF INSTALLATION 3/23/92

**BOREHOLE DRILLING**

DRILLING METHOD <u>Hollow Stem Auger</u>	TYPE OF BIT <u>Auger Bit</u>
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID <u>NA</u> FROM <u>NA</u> TO <u>NA</u>	SIZE <u>NA</u> FROM <u>NA</u> TC <u>NA</u>
FLUID <u>NA</u> FROM <u>NA</u> TO <u>NA</u>	SIZE <u>NA</u> FROM <u>NA</u> TC <u>NA</u>

**PIEZOMETER DESCRIPTION**

TYPE <u>NA</u>	RISER PIPE MATERIAL <u>NA</u>
DIAMETER OF PERFORATED SECTION <u>NA</u>	RISER PIPE DIAMETERS:
PERFORATION TYPE:	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 ( )	
TOP OF RISER PIPE	<u>NA</u>			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	<u>NA</u>			
BOREHOLE FILL MATERIALS: <u>Cement</u> GROUT / SLURRY BENTONITE SAND GRAVEL	TOP	<u>0</u>	BOTTOM	<u>20.5</u>
	TOP	<u>NA</u>	BOTTOM	<u>NA</u>
	TOP	<u>NA</u>	BOTTOM	<u>NA</u>
	TOP	<u>NA</u>	BOTTOM	<u>NA</u>
PERFORATED SECTION	TOP	<u>NA</u>	BOTTOM	<u>NA</u>
PIEZOMETER TIP	<u>NA</u>			
BOTTOM OF BOREHOLE	<u>20.5</u>			
GWL AFTER INSTALLATION	<u>NA</u>			

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: <u>102.03.01.01</u>	PROJECT NAME: <u>Fernald RI/FS YUMF</u>	
BORING NUMBER: <u>1750</u>	COORDINATES:	DATE: <u>3/12/92</u>
ELEVATION:	GWL: Depth <u>NA</u> Date/Time	DATE STARTED: <u>3/12/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brayn</u>	Depth Date/Time	DATE COMPLETED: <u>3/18/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE	OF 12

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%F)	REMARKS
1	1515 101534 3/12/92	2	6	Med. Stiff. 10YR (5/4) yellowish brown. Silty clay, low plasticity, slightly moist.	CI	.75	HNU = 0 ppm BX = 40 cpm
		4	6	SAA, STIFF.	CI	1.0	HNU = 0 ppm BX = 40 cpm
		6	4	SAA	CI	1.75	HNU = 0 ppm BX = 40 cpm <del>40</del>
		8	0	No Recovery	NA	NA	HNU = NA BX = NA
2	1525 101535 101534 3/12/92	3	6	Med. Stiff. 10YR (5/4) yellowish brown silty clay, low plasticity slightly moist.	CI	.5	HNU = 0 ppm BX = 50 cpm
	101539 101538 3/12/92	7	6	SAA	CI	.5	HNU = SAA BX = SAA

NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Cauter

SAA - same as above  
 NA - not applicable  
 Bkgd - HNU = 0 ppm  
 BX = 40-60 cpm

Samples collected per ASTM standard Penetration Test  
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>102.03.01.01</u>	PROJECT NAME: <u>Fernald RI/FS</u>		<u>YUMF</u>
BORING NUMBER: <u>1750</u>	COORDINATES:		DATE: <u>3/12/92</u>
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: <u>3/12/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brayn</u>	Depth	Date/Time	DATE COMPLETED: <u>3/12/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>			PAGE <u>2</u> OF <u>12</u>

DEPTH FT	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10.15"	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY % (SI)	REMARKS
1528	DSS 101310	9	6	Med. stiff. 10YR (8/4) Yellowish brown silty clay, low plasticity, slightly moist	CI	5	H <sub>N</sub> = 0 ppm B <sub>x</sub> = 80 cpm
		12	0	No Recovery	NA	NA	H <sub>N</sub> = NA B <sub>x</sub> = NA
1530	101311	8	6	Soft. 2.5Y (8/4) Light olive brown silty clay, some gravel mod plasticity, moist.	CI	<.5	H <sub>N</sub> = 0 ppm B <sub>x</sub> = 40 cpm
		12	6	SAA, v. stiff.	CI	2.25	H <sub>N</sub> = SAA B <sub>x</sub> = SAA
		15	6	SAA	CI	30	H <sub>N</sub> = SAA B <sub>x</sub> = SAA
		18	6	SAA	CI	3.0	H <sub>N</sub> = SAA B <sub>x</sub> = SAA

NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: <u>102.03.01.01</u>	PROJECT NAME: <u>Fernald RI/FS YLWTF</u>	
BORING NUMBER: <u>1750</u>	COORDINATES:	DATE: <u>3/12/92</u>
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: <u>3/12/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Bray</u>	Depth Date/Time	DATE COMPLETED: <u>3/13/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE <u>3</u> OF <u>12</u>	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10 IN	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1530	101511 101512	2	6	V. STIFF. 2.5Y (5/4) Light olive brown silty clay some gravel, medium plasticity, moist.	CI	2.0	H <sub>Nc</sub> = 0 ppm B <sub>x</sub> = 50 cpm
		6	6	SAA	CI	2.0	H <sub>Nc</sub> = SAA B <sub>x</sub> = SAA
		10	6	SAA	CI	2.5	H <sub>Nc</sub> = SAA B <sub>x</sub> = SAA
		10	2	SAA	CI	2.5	H <sub>Nc</sub> = SAA B <sub>x</sub> = SAA
	1005 101513 101514	Tubul ↑	25	SAA	CI	35	H <sub>Nc</sub> = SAA B <sub>x</sub> = SAA
	Shalby						H <sub>Nc</sub> = NA B <sub>x</sub> = NA

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>102.03.01.01</u>	PROJECT NAME: <u>Fernand Riles YUMF</u>	
BORING NUMBER: <u>1750</u>	COORDINATES:	DATE: <u>3/12/92</u>
ELEVATION:	GWL: Depth      Date/Time	DATE STARTED: <u>3/12/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brien</u>	Depth      Date/Time	DATE COMPLETED: <u>3/13/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE <u>4</u>	OF <u>12</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10 CM	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		1					H <sub>N</sub> = NA B <sub>S</sub> = NA
							H <sub>N</sub> = NA B <sub>S</sub> = NA
10							H <sub>N</sub> = NA B <sub>S</sub> = NA
	1605 101345						H <sub>N</sub> = NA B <sub>S</sub> = NA
11		8	0	No Recovery	NA	NA	H <sub>N</sub> = NA B <sub>S</sub> = NA
		11	0	No Recovery	NA	NA	H <sub>N</sub> = NA B <sub>S</sub> = NA

NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barille  
Craig Cauter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: <u>102.03.01.01</u>	PROJECT NAME: <u>Fernald RI/FS YLWF</u>	
BORING NUMBER: <u>1750</u>	COORDINATES:	DATE: <u>3/12/92</u>
ELEVATION:	GWL: Depth      Date/Time	DATE STARTED: <u>3/12/92</u>
ENGINEER/GEOLOGIST: <u>D.O'Bray</u>	Depth      Date/Time	DATE COMPLETED: <u>3/12/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>		PAGE <u>5</u> OF <u>19</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%SF)	REMARKS
13		17	0	No Recovery	NA	NA	H <sub>Nu</sub> = NA B <sub>x</sub> = NA
		19	0	No Recovery	NA	NA	H <sub>Nu</sub> = NA B <sub>x</sub> = NA
13	1630 101546 3/12/92	6	6	Med stiff, 2.5y (3/4) Light olive brown silty clay with gravel med. plasticity moist	cl	.75	H <sub>Nu</sub> = 0 ppm B <sub>x</sub> = 50 cpm
		6	6	SAA, v. stiff	cl	2.25	H <sub>Nu</sub> = 0 ppm B <sub>x</sub> = 50 cpm
14	1630 101547 3/12/92	11	6	Stiff, 5y (3/1) Gray clay with gravel low plasticity slightly moist	cl	1.5	H <sub>Nu</sub> = 0 ppm B <sub>x</sub> = 50 cpm
		20	4	SAA, med. stiff	cl	.75	H <sub>Nu</sub> = 0 ppm B <sub>x</sub> = 50 cpm

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Cauter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>102.03.01.01</u>		PROJECT NAME: <u>Fernald RI/FS YUMF</u>	
BORING NUMBER: <u>1753</u>		COORDINATES:	
ELEVATION:		DATE: <u>3/12/92</u>	
ENGINEER/GEOLOGIST: <u>D. O'Brum</u>		DATE STARTED: <u>3/12/92</u>	
DRILLING METHODS: <u>Hollow Stem Auger</u>		DATE COMPLETED: <u>3/13/92</u>	
		PAGE <u>6</u> OF <u>12</u>	

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10 CM	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
14	1100 101548 3/12/92	6	6	V. STIFF 2.5 (3/4) Light brown silty clay low plasticity, moist	CI	2.25	H <sub>2</sub> O = 0 ppm B <sub>8</sub> = 60 cpm
15	10549 3/12/92	7	6	V. STIFF 54 (5/1) Gray clay w/ gravel, low plasticity, moist	CI	2.5	H <sub>2</sub> O = 0 ppm B <sub>8</sub> = 60 cpm
16		9	0	No Recovery	NA	NA	H <sub>2</sub> O = NA B <sub>8</sub> = NA
		14	0	No Recovery	NA	NA	H <sub>2</sub> O = NA B <sub>8</sub> = NA
17	0840 101550 3/15/92	6	6	V. STIFF. 54 (5/1) Gray clay with gravel, low plasticity, wet.	CI	2.5	H <sub>2</sub> O = 0 ppm B <sub>8</sub> = 50 cpm
		10	3	SAA	CI	2.5	H <sub>2</sub> O = 0 ppm B <sub>8</sub> = 50 cpm

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill-80  
 Driller: Joe Barille  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>102.03.01.01</u>	PROJECT NAME: <u>Fernald RIFS YUMF</u>	
BORING NUMBER: <u>170</u>	COORDINATES:	DATE: <u>3/13/92</u>
ELEVATION:	GWL: Depth      Date/Time	DATE STARTED: <u>3/13/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brien</u>	Depth      Date/Time	DATE COMPLETED: <u>3/13/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>		PAGE <u>7</u> OF <u>12</u>

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 IN	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		13	0	No Recovery	NA	NA	HNU = NA BS = NA
		13	0	No Recovery	NA	NA	HNU = NA BS = NA
19	0855 101531 3/13/92	↑	17	Hard. 54 (51) Gray clay with gravel. Low plasticity, moist.	CI	>4.0	HNU = 0 ppm BS = 50 cpm Anchored shulby not enough recovery
							HNU = SAA BS = SAA
20		Shulby					HNU = SAA BS = SAA
							HNU = NA BS = NA

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: <u>102.03.01.01</u>	PROJECT NAME: <u>Fernald RI/FS</u>		DATE: <u>3/13/92</u>
BORING NUMBER: <u>1750</u>	COORDINATES:		DATE STARTED: <u>3/12/92</u>
ELEVATION:	GWL: Depth	Date/Time	DATE COMPLETED: <u>3/13/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brien</u>	Depth	Date/Time	PAGE <u>8</u> OF <u>12</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>			

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 IN	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%SF)	REMARKS
14			100				H <sub>Nc</sub> = NA B <sub>x</sub> = NA
							H <sub>Nc</sub> = NA B <sub>x</sub> = NA
22	0905 101552 101553	10	6	Hard 5y (51) Gray granully clay, no plasticity most	CI	>4.0	H <sub>Nc</sub> = 0 ppm B <sub>x</sub> = 60 ppm
	3/13/92 0905 101554 101555	12	6	SAA	CI	>4.0	H <sub>Nc</sub> = SAA B <sub>x</sub> = SAA
23	3/13/92 0905 101556 101557	14	6	SAA, v. stiff	CI	3.5	H <sub>Nc</sub> = SAA B <sub>x</sub> = SAA
	3/13/92 0905 101558 101559	18	6	SAA, hard	CI	>4.0	H <sub>Nc</sub> = SAA B <sub>x</sub> = SAA

NOTES:

Drilling Contractor Pennsylvania Drilling  
 Drilling Equipment Mobile Drill 80  
 Driller: Joe Barile  
Craig Cauter

SAA - same as above  
 NA - not applicable

See p. 1

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VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: 102.03.01.01	PROJECT NAME: Farnold Rills YLWTF	
BORING NUMBER: 1750	COORDINATES:	DATE: 3/13/92
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 3/12/92
ENGINEER/GEOLOGIST: D. O'Brayn	Depth Date/Time	DATE COMPLETED: 3/13/92
DRILLING METHODS: Hollow Stem Auger	PAGE: 9	OF 10

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10 CM	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
14	0910 10150 10151 slits	10	6	Stiff, 54 (51) Gray granully clay. NO plasticity	CI	1.75	H <sub>2</sub> O = 0 ppm B <sub>2</sub> = 40 cpm
		11	4	SAA	CI	1.5	H <sub>2</sub> O = 0 ppm B <sub>2</sub> = 40 cpm
25		14	0	No Recovery	NA	NA	H <sub>2</sub> O = NA B <sub>2</sub> = NA
		13	0	No Recovery	NA	NA	H <sub>2</sub> O = NA B <sub>2</sub> = NA
26	10150	4	6	Stiff, 54 (51) Gray granully clay, low plasticity, moist. wet slits	CI	1.25	H <sub>2</sub> O = 0 ppm B <sub>2</sub> = 40 cpm
		4	6	SAA	CI	1.25	H <sub>2</sub> O = SAA B <sub>2</sub> = SAA

NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barile  
Craig Cauter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>102.03.01.02</u>	PROJECT NAME: <u>Fernald RI/FS YGME</u>	
BORING NUMBER: <u>1750</u>	COORDINATES:	DATE: <u>3/13/92</u>
ELEVATION:	GWL: Depth      Date/Time	DATE STARTED: <u>3/12/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brady</u>	Depth      Date/Time	DATE COMPLETED: <u>3/12/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE <u>10</u> OF <u>12</u>	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
		6	0	No Recovery	NA	NA	H <sub>Nc</sub> = <del>NA</del> B <sub>x</sub> = <del>NA</del>
		7	0	No Recovery	NA	NA	H <sub>Nc</sub> = NA B <sub>x</sub> = NA
28	0940 101562 101563 3/13/92	6	6	V. St. 34 (51) Gray granular clay low plasticity, wet	cl	2.0	H <sub>Nc</sub> = 0 ppm B <sub>x</sub> = 60 cpm
	0940 101564 101565 3/13/92	8	6	SAA	cl	2.0	H <sub>Nc</sub> = SAA B <sub>x</sub> = SAA
29	0940 101566 101567 3/13/92	9	6	SAA	cl	2.0	H <sub>Nc</sub> = SAA B <sub>x</sub> = SAA
	0940 101568 101569 3/13/92	11	6	SAA	cl	2.5	H <sub>Nc</sub> = SAA B <sub>x</sub> = SAA
				Bottom of Boring at 30.0 ft			

NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barille  
Craig Coulter

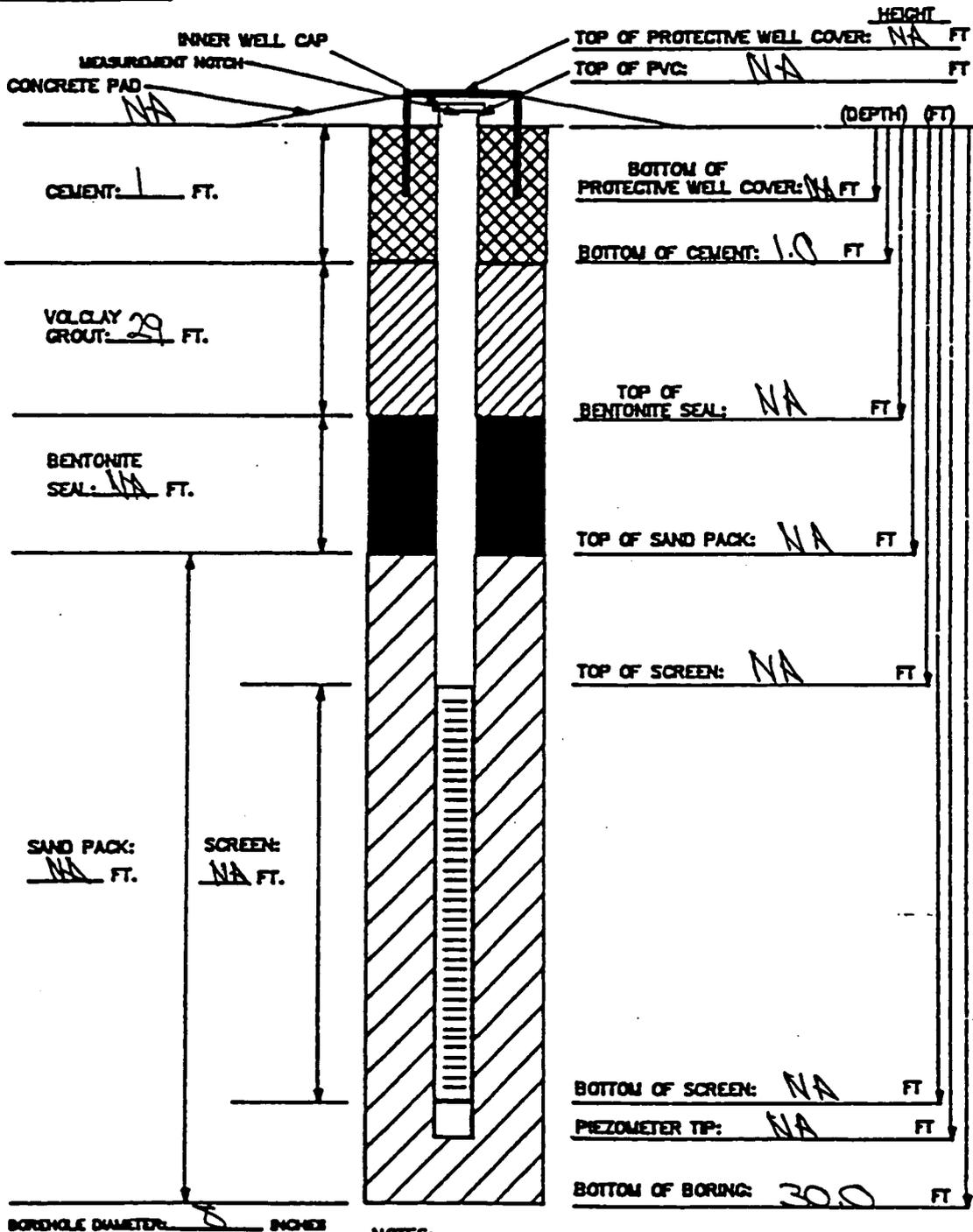
SAA - same as above  
 NA - not applicable

See p. 1

# FERNALD RI/FS INSTALLATION DIAGRAM MONITORING WELL NO.

INSTALLATION DATE: 3/13/92

1750



### MATERIALS USED:

SAND TYPE AND QUANTITY: NA  
 BENTONITE PELLETS (5-GALLON BUCKETS): NA  
 BAGS OF VOLCLAY GROUT: 3 bags  
 AMOUNT OF CEMENT: 112 bag  
 AMOUNT OF WATER USED: 80 gal  
 OTHER: NA

### 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 SLIP.
- 4) WATER DEPTH/DATE: NA
- 5) TOP OF PVC IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK.
- 6) PARENTHESES INDICATE DEPTH BELOW GROUND LEVEL.

TASK: 602.03.01.04

GEOLOGIST/ENGINEER: D. O'BRIEN

**PIEZOMETER INSTALLATION SHEET**

PROJECT NAME Fernald RI/FS ELMF FIELD ENG./GEO. D. O'Brien DATE 3/13/92  
 PROJECT NO. 602.03.01.04 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 BORING NO. 1750  
 PIEZOMETER NO. NA DATE OF INSTALLATION 3/13/92

**BOREHOLE DRILLING**

DRILLING METHOD <u>Hollow Stem Auger</u>	TYPE OF BIT <u>Auger Bit</u>
DRILLING FLUID (S) USED: FLUID <u>NA</u> FROM <u>NA</u> TO <u>NA</u> FLUID <u>NA</u> FROM <u>NA</u> TO <u>NA</u>	CASING SIZE (S) USED: SIZE <u>NA</u> FROM <u>NA</u> TC <u>NA</u> SIZE <u>NA</u> FROM <u>NA</u> TC <u>NA</u>

**PIEZOMETER DESCRIPTION**

TYPE <u>NA</u>	RISER PIPE MATERIAL <u>NA</u>
DIAMETER OF PERFORATED SECTION <u>NA</u>	RISER PIPE DIAMETERS: O.D. <u>NA</u> I.D. <u>NA</u>
PERFORATION TYPE: 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 ( )	
	TOP	BOTTOM	TCP	BOTTOM
TOP OF RISER PIPE	<u>NA</u>			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	<u>NA</u>			
BOREHOLE FILL MATERIALS:	TOP 0.0	BOTTOM 1.0		
<u>Cement</u> GROUT / SLURRY	TOP <u>0.0</u>	BOTTOM <u>29.0</u>	TCP	BOTTOM
BENTONITE	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
SAND	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
GRAVEL	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
PERFORATED SECTION	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
PIEZOMETER TIP	<u>NA</u>			
BOTTOM OF BOREHOLE	<u>30.0</u>			
GWL AFTER INSTALLATION	<u>NA</u>			

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: <u>602.03.01.01</u>	PROJECT NAME: <u>FORD RIFES ELMF</u>
BORING NUMBER: <u>1749</u>	COORDINATES: _____ DATE: <u>3/11/92</u>
ELEVATION: _____	GWL: Depth <u>NA</u> Date/Time _____ DATE STARTED: <u>3/10/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brien</u>	Depth _____ Date/Time _____ DATE COMPLETED: <u>3/11/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE <u>1</u> OF <u>12</u>

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 (ft)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (pcf)	REMARKS
1.4	1000 10151 3/11/92	2	6	STIFF. 10YR (5/4) yellowish brown silty clay, no plast. slightly moist.	CI	1.0	H <sub>Nu</sub> = 0 ppm B <sub>X</sub> = 50 cpm
1.75		3	6	SAA	CI	1.25	H <sub>Nu</sub> = 0 ppm B <sub>X</sub> = 60 cpm
2.1		4	2	SAA, very stiff.	CI	2.5	H <sub>Nu</sub> = 0 ppm B <sub>X</sub> = 60 cpm
2.4		6	0	No Recovery	NA	NA	H <sub>Nu</sub> = 0 ppm D <sub>30</sub> B <sub>X</sub> = 40 cpm 3/11/92
2.8	1005 10152 10153 3/11/92	5	6	<del>SAA</del> STIFF. 10YR (5/4) yellowish brown silty clay, no plasticity, slightly moist	CI	2.0	H <sub>Nu</sub> = 0 ppm B <sub>X</sub> = 40 cpm
3.1	1005 10154 10155 3/11/92	7	6	SAA	CI	2.0	H <sub>Nu</sub> = 0 ppm B <sub>X</sub> = 40 cpm

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: Mobile Drill 80  
 Driller: Joe Barille  
Craig Coulter

SAA - same as above  
 NA - not applicable

Samples collected per ASTM Standard Penetration Test  
 Colors identified using Munsell Color Chart  
 Bkgd: H<sub>Nu</sub> = 0 ppm  
 B<sub>X</sub> = 40 to 60 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 102.03.01.01		PROJECT NAME: FARMER RIFES ELMF	
BORING NUMBER: 1749	COORDINATES:	DATE: 3/11/92	
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 3/10/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth	Date/Time	DATE COMPLETED: 3/11/92
DRILLING METHODS: Hollow Stem Auger		PAGE: 2	OF: 12

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 IN	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
3	101305 101306 101307	9	6	v. st. f. 10YR (8.4) yellowish brown, silty clay, no plasticity, slightly moist	CI	3.0	HNo = 0 ppm Bx = 60 cpm
3 1/2		11	0	No Recovery	NA	NA	<del>HNo = 0 ppm Bx = 50 cpm</del> 3 1/2 ft
4	101308 101309	6	6	v. st. f. 2.5Y (6.3) light yellowish brown, silty clay w/ gravel, no plasticity, dry	CI	2.0	HNo = 0 ppm Bx = 50 cpm
4 1/2		9	6	SAA	CI	2.25	HNo = 0 ppm Bx = 50 cpm
5		13	6	SAA	CI	2.25	HNo = 0 ppm Bx = 40 cpm
5 1/2		17	6	SAA, hard	CI	4.0	HNo = 0 ppm Bx = 40 cpm

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: \_\_\_\_\_

Driller: Joe Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable  
 BKgd - HNo = 0 ppm  
 Bx = 40-60 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>602.03.01.01</u>		PROJECT NAME: <u>Farmold RIFES ELMF</u>	
BORING NUMBER: <u>1749</u>	COORDINATES:	DATE: <u>3/11/92</u>	
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: <u>3/10/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brien</u>	Depth	Date/Time	DATE COMPLETED: <u>3/11/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>			PAGE <u>2</u> OF <u>12</u>

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 150mm	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
6	<del>10158</del> <del>10159</del> 10160	6	6	Hard. 2.5y (6/3) Light yellowish brown silty clay w/ gravel, low plasticity, slightly moist	CI	4.0	HNU = 0ppm BS = 40cpm
7		11	0	No Recovery	NA	NA	
		14	0	No Recovery	NA	NA	
		18	0	No Recovery	NA	NA	
8	<del>11400</del> <del>10161</del> <del>10162</del> 10163	18	18	V. stiff. 2.5y (6/3) Light yellowish brown silty clay w/ gravel, low plasticity, slightly moist	CI	3.5	Archival Sample HNU = 0ppm BS = 60cpm
	Stubby			<del>SAA</del> SSO 3/11/92			

NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: \_\_\_\_\_  
 Driller: Joe Barille  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>602.03.01.01</u>		PROJECT NAME: <u>Fernald RIFES EWMF</u>	
BORING NUMBER: <u>1749</u>	COORDINATES:		DATE: <u>3/11/92</u>
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: <u>3/10/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brien</u>	Depth	Date/Time	DATE COMPLETED: <u>3/11/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>			PAGE <u>84</u> OF <u>122</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 150mm	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (pcf)	REMARKS
4.1							
6	SHELLY TUBES			SAA 250 3/11/92	C		
11							
14.20		14	6	SAA 250 3/11/92 v. stiff, 54 (51) Gray clay w/ gravel, low plasticity, dry	CI	2.0	H <sub>Nu</sub> = 0 ppm B <sub>X</sub> = 60 cpm
18		18	6	SAA, v. stiff 57 (54) Gray clay w/ gravel.	CI	35	H <sub>Nu</sub> = 0 ppm B <sub>X</sub> = 40 cpm

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: \_\_\_\_\_  
 Driller: Joe Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.03.01.01	PROJECT NAME: FARMER RIFES EWME	
BORING NUMBER: 1749	COORDINATES:	DATE: 3/11/92
ELEVATION:	GWL: Depth      Date/Time	DATE STARTED: 3/10/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth      Date/Time	DATE COMPLETED: 3/11/92
DRILLING METHODS: Hollow Stem Auger	PAGE 45 OF 12	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 (ft)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
		27	6	Hard. 34 (bl.) Gray clay w/ gravel, no plasticity dry	cl	40	H <sub>N</sub> = 0 ppm R <sub>U</sub> = 40 cpm
		30	6	SAA, <del>stiff</del> stiff	cl	2.75	SAA
13	101511 101512 1430	6	6	SAA, stiff	cl	2.0	H <sub>N</sub> = 0 ppm R <sub>U</sub> = 60 cpm
	101513 101514 1430	7	6	SAA, v. stiff	cl	2.25	SAA
14	101515 101516 1430	14	13	SAA	cl	2.25	SAA
		22	0	No Recovery	NA	NA	

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: \_\_\_\_\_

Driller: Joe Barick  
Craig Coulter

SAA - same as above  
NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.03.01.01	PROJECT NAME: Farnold RIFES ELMF	
BORING NUMBER: 1749	COORDINATES:	DATE: 3/11/92
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 3/10/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 3/11/92
DRILLING METHODS: Hollow Stem Auger	PAGE 56 OF 12:	

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1' (40)	RECOVERY (%)	DESCRIPTION	UICS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
14	1445 101517 3/11/92	4	98	V. stiff 5y (5/1) Gray clay with pockets of poorly graded coarse sand, low plasticity, wet.	cl	2.0	H <sub>Nu</sub> = 0ppm R <sub>S</sub> = 40cpm
15		9	3	SAA	cl	2.0	H <sub>Nu</sub> = 0ppm R <sub>S</sub> = 30cpm
16		11	0	No Recovery	NA	NA	
17		20	0	No Recovery	NA	NA	
18	1500 101518 101519 3/11/92	7	6	V. stiff 5y (5/1) Gray clay some gravel, low plasticity, wet	cl	2.0	H <sub>Nu</sub> = 0ppm R <sub>S</sub> = 50cpm
19		14	6	SAA	cl	2.0	SAA

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: \_\_\_\_\_

Driller: The Barile  
Craig Coulter

SAA - same as above  
NA - not applicable

see p. 1

VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: 609.03.01.01		PROJECT NAME: FORD RIFES ELMF	
BORING NUMBER: 1749	COORDINATES:		DATE: 3/11/92
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 3/10/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth	Date/Time	DATE COMPLETED: 3/11/92
DRILLING METHODS: Hollow Stem Auger			PAGE 07 OF 12

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 MIN	RECOVERY (%)	DESCRIPTION	URCS SYMBOL	MEASURED CONSISTENCY (pcf)	REMARKS
14		5	6	11 Stiff. 54 (Bl) Gray clay some gravel, low plasticity, wet.	cl	2.0	H <sub>Nu</sub> = 0 ppm B <sub>X</sub> = 60 cpm
		8	6	SAA, mod. stiff	cl	.75	SAA
19	1530 101521 01522	↑	31	SAA, stiff	cl	1.75	SAA
20	Shelby Tube						

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: \_\_\_\_\_  
 Driller: The Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER. 602.03.01.01		PROJECT NAME. Farnold RIFFS ELWME	
BORING NUMBER: 1749	COORDINATES:		DATE 3/11/92
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 3/10/92
ENGINEER/GEOLOGIST. D. O'Brien	Depth	Date/Time	DATE COMPLETED: 3/11/92
DRILLING METHODS: Hollow Stem Auger			PAGE 8 OF 12

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (ft)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	101523 1550						
22	3/11/92 101524 1550	8	6	Mod. Stiff. gy (5/11) Gray clay low plasticity, slightly moist	cl .5		H <sub>N</sub> = 0 ppm P <sub>S</sub> = 40 cpm
	3/11/92			SAA, Stiff.	cl 1.0		SAA
23		13	0	No Recovery	NA NA		
		15	0	No Recovery	NA NA		

NOTES:

Drilling Contractor Pennsylvania Drilling  
 Drilling Equipment \_\_\_\_\_  
 Driller: Joe Barile  
Craig Gaudin

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.03.01.01	PROJECT NAME: FORD RIFES EWME	
BORING NUMBER: 1749	COORDINATES:	DATE: 3/11/92
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 3/10/92
ENGINEER/GEOLOGIST: D. O'Rain	Depth Date/Time	DATE COMPLETED: 3/11/92
DRILLING METHODS: Hollow Stem Auger	PAGE 89 OF 12	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 (ft)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
14 - 15	101324 101325	6	6	Stiff. 54 (5/1) Gray clay some gravel, high plasticity slightly moist	CI	1.25	HNO = 0 ppm BX = 400 ppm
15 - 16		8	6	SAA	CI	1.0	SAA
16 - 17		11	6	SAA, mud stiff	CI	.5	SAA
17 - 18		14	6	SAA	CI	.5	SAA
18 - 19	101324	4	6	SAA, mud stiff	CI	.75	SAA
19 - 20		5	6	SAA	CI	.75	SAA

NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: \_\_\_\_\_  
 Driller: Joe Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

VISUAL CLASSIFICATION OF SOILS

3841

PROJECT NUMBER: <u>602.08.01.01</u>	PROJECT NAME: <u>Fernald RI/FS EGWME</u>	
BORING NUMBER: <u>1749</u>	COORDINATES:	DATE: <u>3/11/92</u>
ELEVATION:	GWL: Depth      Date/Time	DATE STARTED: <u>3/10/92</u>
ENGINEER/GEOLOGIST: <u>D. O'Brien</u>	Depth      Date/Time	DATE COMPLETED: <u>3/11/92</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE <u>9</u> OF <u>12</u>	

DEPTH	SAMPLE TYPE & NO	BLOWSON SAMPLER PER	RECOVERY	DESCRIPTION	USGS SYMBOL	MEASURED CONSISTENCY	REMARKS
4		7	4	Soft. 5y (51) Gray clay high plasticity, moist	cl	< 25 X.5	HNU = 0ppm RS = 50cpm
		9	0	No Recovery	NA	NA	
28	101526 101527 1630	11	6	Soft. 5y (51) Gray clay med. plasticity, moist	cl	< 25 X.5	HNU = 0ppm RS = 40cpm
	3/11/92 101528 101529 1630	14	6	SAA, med. stiff	cl	.75	SAA
29	3/11/92 101530 101531 1630	27	6	SAA	cl	.75	SAA
	3/11/92	31	0	No Recovery	NA	NA	

Bottom of Boring at 30.0ft.

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: \_\_\_\_\_  
 Driller: Joe Barile  
Craig Coulter

SAA - same as above  
 NA - not applicable

See p. 1

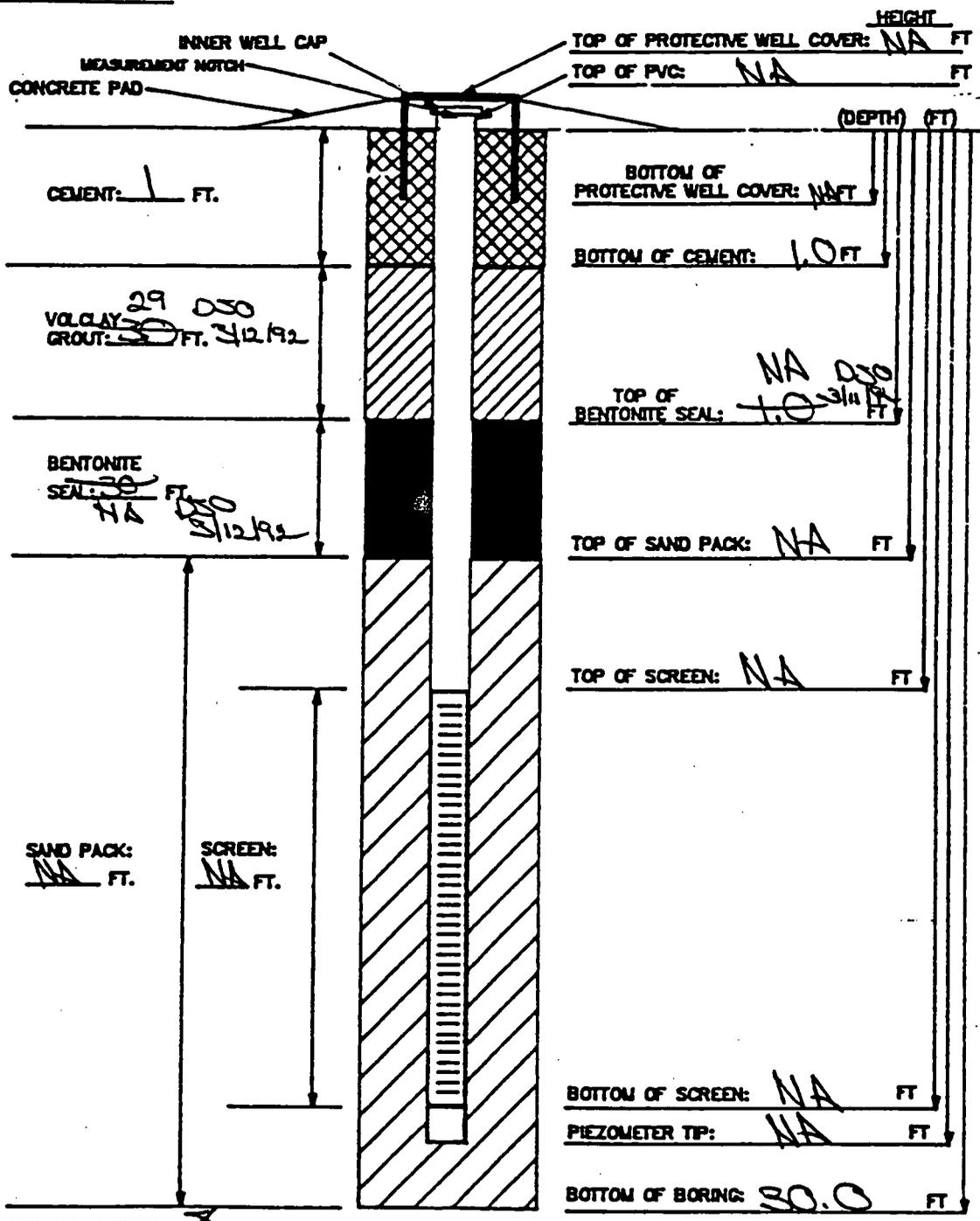
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# FERNALD RI/FS

INSTALLATION DIAGRAM  
MONITORING WELL NO.  
1749

INSTALLATION DATE: 3/12/92

3841



BORING DIAMETER: 3 INCHES

**MATERIALS USED:**  
 SAND TYPE AND QUANTITY: NA  
 BENTONITE PELLETS (5-GALLON BUCKETS): NA  
 BAGS OF VOLCLAY GROUT: 3 bags  
 AMOUNT OF CEMENT: 12 bags  
 AMOUNT OF WATER USED: 60 gal.  
 OTHER: NA

- 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 SLIP.
  - 4) WATER DEPTH/DATE: NA
  - 5) TOP OF PVC IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK.
  - 6) PARENTHESES INDICATE DEPTH BELOW GROUND LEVEL.

TASK: 602.03.01.01 GEOLOGIST/ENGINEER: D. O'Brien

**PIEZOMETER INSTALLATION SHEET**

3841

PROJECT NAME FERNALD RI/FS FLUMF FIELD ENG./GEO. D. O'Brien DATE 3/12/99  
 PROJECT NO. 11250402-8-22 602.03.01.01 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 BORING NO. 1749  
 PIEZOMETER NO. NA DATE OF INSTALLATION 3/12/99

**BOREHOLE DRILLING**

DRILLING METHOD <u>Hollow Stem Auger</u>	TYPE OF BIT <u>NA</u>
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID <u>NA</u> FROM <u>NA</u> TO <u>NA</u>	SIZE <u>NA</u> FROM <u>NA</u> TC <u>NA</u>
FLUID <u>NA</u> FROM <u>NA</u> TO <u>NA</u>	SIZE <u>NA</u> FROM <u>NA</u> TC <u>NA</u>

**PIEZOMETER DESCRIPTION**

TYPE <u>NA</u>	RISER PIPE MATERIAL <u>NA</u>
DIAMETER OF PERFORATED SECTION <u>NA</u>	RISER PIPE DIAMETERS:
PERFORATION TYPE:	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 ( )	
	TOP	BOTTOM	TOP	BOTTOM
TOP OF RISER PIPE	<u>NA</u>			
GROUND SURFACE	<u>0.0</u>			
BOTTOM OF PROTECTIVE PIPE	<u>NA</u>			
BOREHOLE FILL MATERIALS: <u>Cement</u> GROUT / SLURRY BENTONITE SAND GRAVEL	TOP <u>0.0</u>	BOTTOM <u>1.0</u>		
	TOP <u>0.0</u>	BOTTOM <u>30.0</u>	TCP	BOTTOM
	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
PERFORATED SECTION	TOP <u>NA</u>	BOTTOM <u>NA</u>	TOP	BOTTOM
PIEZOMETER TIP	<u>NA</u>			
BOTTOM OF BOREHOLE	<u>30.0</u>			
GWL AFTER INSTALLATION	<u>NA</u>			

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

REMARKS 0.0-1.0 ft. cement cap

**VISUAL CLASSIFICATION OF SOILS**

PROJECT NUMBER: <u>602 3.23</u>	PROJECT NAME: <u>FEMP RI / FS</u>	
BORING NUMBER: <u>2417</u>	COORDINATES:	DATE: <u>2-28-92</u>
ELEVATION:	GWL: Depth <u>76.90</u> Date/Time <u>3-9-92/165</u>	DATE STARTED: <u>2-28-92</u>
ENGINEER/GEOLOGIST: <u>Ken Marion</u>	Depth . Date/Time	DATE COMPLETED: <u>3-9-92</u>
DRILLING METHODS: <u>Cable Tool 10" drill bit</u>		PAGE <u>1</u> OF <u>11</u>

DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 16 in. 1	RECOVERY (in. 1)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (USPS)	REMARKS
0	38081	3		Loose olive brown (2.5Y, 4/4) CLAYEY SILT with organic matter, slightly moist	ML	N/A	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
	1045	5	10				
	2-28-92	3					
1.5	38082	3		Stiff light olive brown (2.5Y, 5/4) SILTY CLAY with trace organic matter, high plasticity, slightly moist	CL	1.5	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
	1050	5	11				
	2-28-92	7					
3.0	38083	7		Stiff light olive brown (2.5Y, 5/4) SILTY CLAY with sand and gravel, low plasticity, slightly moist	CL	2.0	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
	1055	9	15				
	2-28-92	10					
4.5	38084	10		Very stiff light olive brown (2.5Y, 5/4) SILTY CLAY with some light brownish gray (2.5Y, 6/2) mottling and some sand and gravel, low plasticity, slightly moist	CL	3.0	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
	1100	11	18				
	2-28-92	11					
6.0	38085	11		Very stiff light olive brown (2.5Y, 5/4) SILTY CLAY with sand and gravel, <sup>R.N. 2-28-92</sup> and trace light brownish gray (2.5Y, 6/2) mottling and very dark grayish brown (10YR, 3/2) staining, low plasticity, moist	CL	2.0	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
	1105	13	9				
	2-28-92	13					
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

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H <sub>nu</sub> S/N: 1185	0 ppm	} Background Levels
B <sub>r</sub> S/N: 50760	40 cpm	
α S/N: 50768	0 cpm	

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2417	COORDINATES:	DATE: 2-28-92
ELEVATION:	GWL: Depth 76.90 Date/Time 3-9-92/1615	DATE STARTED: 2-28-92
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 3-9-92
DRILLING METHODS: Cable Tool 10" drill bit	PAGE 2	OF 11

DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 16 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
7.5	38086 1110 2-28-92	13 15 16	14	Stiff olive brown (2.5Y, 5/4) SILTY CLAY with sand and gravel, low plasticity, moist	CL	2.5	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
9.0	38087 1120 2-28-92	15 17 21	18	Stiff olive brown (2.5Y, 5/4) SILTY CLAY with sand and gravel, low plasticity, slightly moist	CL	3.0	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
10.5	38088 1625 3-2-92	3 10 21	15	Very stiff light olive brown (2.5Y, 5/4) SILTY CLAY with sand and gravel, some light gray (5Y, 6/1) and yellowish brown (10YR, 5/6) mottling, low plasticity, slightly moist	CL	3.0	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
12.0	38089 1634 3-2-92	6 13 25	15	Same as above	CL	3.25	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
13.5	38090 1653 3-2-92	1 5 7	10	Stiff gray (2.5Y, 5/0) SILTY CLAY with sand and gravel, medium plasticity, moist	CL	1.5	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
15.0							

NOTES

See p. 1

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 607 3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2417	COORDINATES:	DATE: 3-2-92
ELEVATION:	GWL: Depth 76.90 Date/Time 3-9-92 / 16.15	DATE STARTED: 2-28-92
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 3-9-92
DRILLING METHODS: Cable Tool 10" drill bit		PAGE 3 OF 11

DEPTH ft.	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 1.6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (USCS)	REMARKS
15.0	38091	5		Very stiff gray (5Y, 5/1) SILTY CLAY with sand and gravel, trace dark olive brown (2.5Y, 3/3) staining, low plasticity, slightly moist	CL	3.0	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
	1701	5	16				
	3-2-92	11					
16.5	38092	5		Very stiff gray (5Y, 5/1) SILTY CLAY with sand and gravel, low plasticity, slightly moist	CL	2.0	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
	1715	8	16				
	3-2-92	12					
18.0	38093	7		Same as above	CL	2.25	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
	1724	13	18				
	3-2-92	15					
19.5	38094	17		Very stiff gray (5Y, 5/1) SILTY CLAY with sand and gravel, low plasticity, <del>moist</del> slightly moist	CL	3.5	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
	0844	18	15				
	3-3-92	21					
21.0	38095	10		Very stiff gray (5Y, 5/1) SILTY CLAY with sand and gravel, medium plasticity, moist	CL	2.0	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
	0854	13	12				
	3-3-92	17					
22.5							

NOTES

See p. 1

**VISUAL CLASSIFICATION OF SOILS**

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PROJECT NUMBER: <u>602.3.23</u>	PROJECT NAME: <u>FEMP RI/FS</u>	
BORING NUMBER: <u>2417</u>	COORDINATES:	DATE <u>3-3-92</u>
ELEVATION:	GWL: Depth <u>76.90</u> Date/Time <u>3-9-92/1615</u>	DATE STARTED: <u>2-28-92</u>
ENGINEER/GEOLOGIST: <u>Ken Maxion</u>	Depth	Date/Time
DRILLING METHODS: <u>Cable Tool 10" drill bit</u>	PAGE <u>4</u>	OF <u>11</u>

DEPTH ft.	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY %	REMARKS
22.5	38096 0910 3-3-92	6 9 15	12	Stiff gray (SY, S/I) SILTY CLAY with sand and gravel, medium plasticity, moist	CL	1.75	H <sub>nu</sub> = 0 ppm B <sub>γ</sub> = 40 cpm α = 0 cpm
24.0	38097 0953 3-3-92	9 13 20	14	Very stiff gray (SY, S/I) SILTY CLAY with sand and gravel, low plasticity, moist	CL	3.0	H <sub>nu</sub> = 0 ppm B <sub>γ</sub> = 40 cpm α = 0 cpm
25.5	38098 1005 3-3-92	13 16 22	14	Same as above	CL	3.5	H <sub>nu</sub> = 0 ppm B <sub>γ</sub> = 40 cpm α = 0 cpm
27.0	38099 1027 3-3-92	16 25 27	14	Same as above	CL	3.5	H <sub>nu</sub> = 0 ppm B <sub>γ</sub> = 40 cpm α = 0 cpm
28.5	38100 1315 3-3-92	5 7 13	13	Very stiff gray (SY, S/I) SILTY CLAY with sand and gravel, medium plasticity, moist	CL	3.5	H <sub>nu</sub> = 0 ppm B <sub>γ</sub> = 40 cpm α = 0 cpm
30.0							

NOTES

see p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 247	COORDINATES:	DATE: 3-3-92
ELEVATION:	GWL: Depth 76.90 Date/Time 3-9-92/1615	DATE STARTED: 2-28-92
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 3-9-92
DRILLING METHODS: Cable Tool 10" drill bit	PAGE 5	OF 11

DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 16 (in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (USF)	REMARKS
30.0	38101 1335 3-3-92	7 11 16	14	Hard gray (5Y, 5/1) SILTY CLAY with sand and gravel, low plasticity, moist	CL	4.0	H <sub>nu</sub> = 0 ppm D <sub>r</sub> = 40 cpm α = 0 cpm
31.5	38102 1347 3-3-92	10 10 13	16	Stiff gray (5Y, 5/1) SILTY CLAY with sand and gravel, medium plasticity, moist	CL	2.0	H <sub>nu</sub> = 0 ppm D <sub>r</sub> = 40 cpm α = 0 cpm
33.0	38103 1410 3-3-92	7 13 21	16	Dense <sup>RM. 3-3-92</sup> <del>Very fine</del> gray (5Y, 5/1) <del>SILTY CLAY</del> poorly graded very fine sand, slightly moist	SC	N/A	H <sub>nu</sub> = 0 ppm D <sub>r</sub> = 40 cpm α = 0 cpm Aquifer met Base of till at 34.5 ft
34.5	38104 1430 3-3-92	12 22 25	16	Dense yellowish brown (10YR, 5/6) <del>met</del> poorly graded medium sand, trace gravel, dry	SP	N/A	H <sub>nu</sub> = 0 ppm D <sub>r</sub> = 40 cpm α = 0 cpm
36.0				No sample collected Samples will be collected at 5.0 ft intervals.			H <sub>nu</sub> = 0 ppm D <sub>r</sub> = 40 cpm α = 0 cpm

37.5  
NOTES

see p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2417	COORDINATES:	DATE: 3-3-92
ELEVATION:	GWL: Depth 76.70 Date/Time 3-9-92/1615	DATE STARTED: 2-28-92
ENGINEER/GEOLOGIST: Ken Marion	Depth . Date/Time	DATE COMPLETED: 3-9-92
DRILLING METHODS: Cable Tool 10" drill bit		PAGE 6 OF 11

DEPTH ft.	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 16" I	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
37.5				No samples collected			
40.0	38105 1500 3-3-92	18 36 48	14	Very dense light yellowish brown (2.5Y, 6/4) <sup>poorly</sup> graded medium sand, trace gravel, dry	SP	N/A	H <sub>nu</sub> = 0 ppm BT = 40 cpm α = 0 cpm
41.5				Samples will be collected at .5 ft. intervals			
45.0	38106 1637 3-3-92	23 50	13	Very dense light yellowish brown (2.5Y, 6/4) SANDY GRAVEL, dry	GW	N/A	H <sub>nu</sub> = 0 ppm BT = 40 cpm α = 0 cpm
46.5							
50.0	38107 1733 3-3-92	5 11 26	17	Dense light yellowish brown (2.5Y, 6/4) well graded SAND with a little gravel, dry	SW	N/A	H <sub>nu</sub> = 0 ppm BT = 40 cpm α = 0 cpm
51.5							
52.5							

NOTES

See p. 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2417	COORDINATES:	DATE: 3-4-92
ELEVATION:	GWL: Depth 76.90 Date/Time 3-9-92 / 1615	DATE STARTED: 2-28-92
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 3-9-92
DRILLING METHODS: Cable Tool 10" drill bit		PAGE 7 OF 11

DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 16 (in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
52.5							
55.0	38108 0820 3-4-92	20 50/4	14	Very dense light yellowish brown (2.5%, 6/4) poorly graded medium SAND, dry	SP	N/A	H <sub>nu</sub> = 0 ppm δ <sub>r</sub> = 40 cpm α = 0 cpm
56.5							
60	38109 0940 3-4-92	12 25 48	18	Very dense light yellowish brown (2.5%, 6/4) GRAVELLY SAND, dry	SW	N/A	H <sub>nu</sub> = 0 ppm δ <sub>r</sub> = 40 cpm α = 0 cpm
61.5							
65.0	38110 1110 3-4-92	33 50/4	17	Very dense light yellowish brown (2.5%, 6/4) GRAVELLY SAND, dry	JW	N/A	H <sub>nu</sub> = 0 ppm δ <sub>r</sub> = 40 cpm α = 0 cpm
66.5							
67.5							

NOTES

see p. i

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2417	COORDINATES:	DATE: 3-4-92
ELEVATION:	GWL: Depth 76.90 Date/Time 3-4-92/1615	DATE STARTED: 2-28-92
ENGINEER/GEOLOGIST: Ken Marion	Depth Date/Time	DATE COMPLETED: 3-9-92
DRILLING METHODS: Cable Tool 10" drill bit	PAGE 8	OF 11

DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 16 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
67.5							
70.0							
71.5	38111 1145 3-4-92	45 50/4	10	Very dense light yellowish brown (2.54, 6/4) SANDY GRAVEL, dry	GW	N/A	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
75.0							
76.5	38112 1545 3-4-92	3 5 12	12	Medium dense light brownish gray (1048, 6/2) well graded SAND with trace gravel	SW	N/A	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
				▽ W.L. = 76.90 ft.			The water level was measured 3-4-92 at 1615.
80.0							
81.5	38113 1647 3-4-92	16 23 23	15	Dense grayish brown (2.54, 5/2) well graded sand with a little fine gravel, wet	SW	N/A	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm α = 0 cpm
82.5							

NOTES

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W.L. = water level

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**VISUAL CLASSIFICATION OF SOILS**

PROJECT NUMBER: 602, 3, 23	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 2417	COORDINATES:	DATE: 3-5-92
ELEVATION:	GWL: Depth 76.90 Date/Time 3-9-92 / 615	DATE STARTED: 2-28-92
ENGINEER/GEOLOGIST: Ken Marien	Depth: Date/Time:	DATE COMPLETED: 3-9-92
DRILLING METHODS: Cable Tool 10" drill bit	PAGE 9	OF 11

DEPTH ft.	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ISF)	REMARKS
82.5							
85.0	38114 0840 3-5-92	3 5 5	13	Loose grayish brown (2.5, 5/2) GRAVELLY SAND, wet	SW	N/A	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm ω = 0 cpm
86.5							
90.0	38115 0930 3-5-92	3 3 5	13	Loose grayish brown (2.5, 5/2) Coarse SAND, wet	SW	N/A	H <sub>nu</sub> = 0 ppm B <sub>r</sub> = 40 cpm ω = 0 cpm
91.5				Bottom of Bore Hole Drilled to a depth of 90.0 ft. Split spoon sampled to a depth of 91.5 ft.			

NOTES

See p. 1

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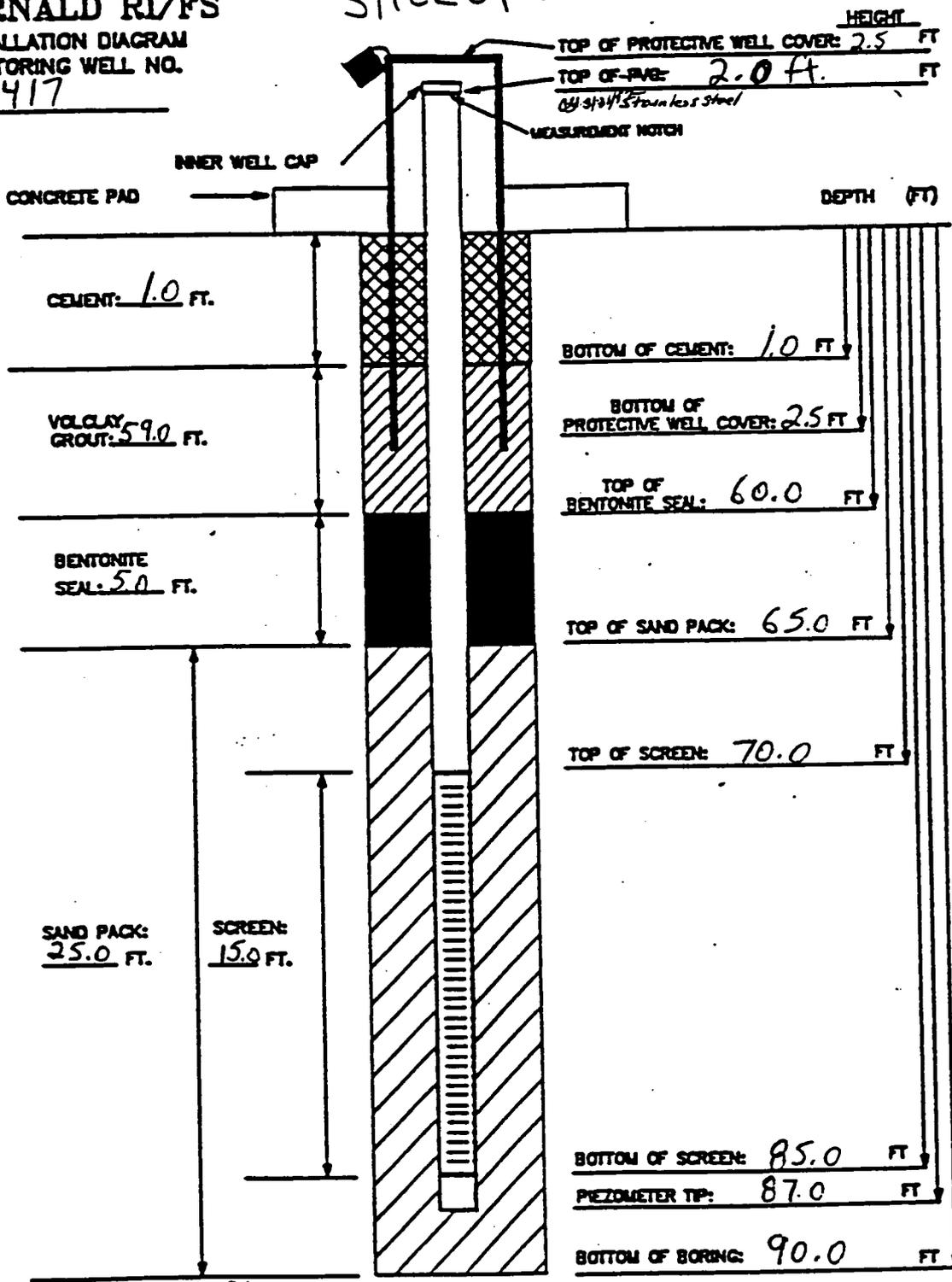
# FERNALD RI/FS

## INSTALLATION DIAGRAM MONITORING WELL NO.

2417

INSTALLATION DATE: 3-9-92

Stickups



BORING DIAMETER: 10 3/4 INCHES

**MATERIALS USED:**  
 SAND TYPE AND QUANTITY: 430 Sand, 16 bags  
 BENTONITE PELLETS (5-GALLON BUCKETS): 6  
 BAGS OF VOLCLAY GROUT: 11  
 AMOUNT OF CEMENT: 1/2 bag  
 AMOUNT OF WATER USED: 800 gallons  
 OTHER:

**NOTES:**  
 1) 4 in. stainless steel  
 REINER PIPE IS 8-INCH SCHEDULE 40  
 PVC-PIPE, FLUSH-THREADED JOINTS.  
 2) SCREEN IS 8-INCH I.D. SCHEDULE 40- 40 in. I.D.  
 PVC-PIPE WITH 4.000-INCH SLOTS - .010 in. slots  
 3) LOWER END OF SCREEN IS CAPPED WITH  
 AN IDO CAP OR THREADED SLAP.  
 4) WATER DEPTH/DATE: 76.90 / 3-9-92

K.M.  
3-11-92

TASK: 602.3.23

GEOLOGIST/ENGINEER: Ken Marica

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**PIEZOMETER INSTALLATION SHEET**

PROJECT NAME FEMP RI/FS FIELD ENG./GEO. Ken Marion DATE 3-10-92  
 PROJECT NO. 602.3.23 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 BORING NO. 2417  
 PIEZOMETER NO. N/A DATE OF INSTALLATION 3-9-92

**BOREHOLE DRILLING**

DRILLING METHOD <u>Cable Tool</u>	TYPE OF BIT <u>10 inch drill bit (churn bit)</u>
DRILLING FLUID(S) USED:	CASING SIZE(S) USED:
FLUID <u>Water</u> FROM <u>0.0</u> TO <u>90.0</u>	SIZE <u>10 3/4 in</u> FROM <u>0.0</u> TO <u>90.0</u>
FLUID <u>N/A</u> FROM <u>N/A</u> TO <u>N/A</u>	SIZE <u>N/A</u> FROM <u>N/A</u> TO <u>N/A</u>

**PIEZOMETER DESCRIPTION**

TYPE <u>Cable Tool</u>	RISER PIPE MATERIAL <u>316 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>67 ft.</u>
AVERAGE SIZE OF PERFORATIONS <u>0.10 in.</u>	JOINING METHOD <u>flush-joint threaded</u>
TOTAL PERFORATED AREA <u>15.0 ft.</u>	

**PROTECTION SYSTEM**

RISER PROTECTIVE PIPE LENGTH <u>5 ft.</u>	OTHER PROTECTION <u>Steel well cover</u>
PROTECTIVE PIPE O.D. <u>10 3/4 in.</u>	<u>with lock</u>

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft.)		ELEVATION (ft.)	
TOP OF RISER PIPE	2.5			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 0.0	BOTTOM 60.0	TCP	BOTTOM
BENTONITE	TOP 60.0	BOTTOM 65.0	TOP	BOTTOM
SAND	TOP 65.0	BOTTOM 87.0	TOP	BOTTOM
GRAVEL	TOP N/A	BOTTOM N/A	TOP N/A	BOTTOM N/A
PERFORATED SECTION	TOP 70.0	BOTTOM 85.0	TOP	BOTTOM
PIEZOMETER TIP	87.0			
BOTTOM OF BOREHOLE	90.0			
GWL AFTER INSTALLATION	76.90			

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

REMARKS The temporary casing was removed during the installation of the well

**VISUAL CLASSIFICATION OF SOILS**

PROJECT NUMBER: 50.03.46	PROJECT NAME: RCRA/CERCLA BACKGROUND SOIL STUDY		
BORING NUMBER: 1755	COORDINATES: NK	DATE: 3-16-92	
ELEVATION: NK	GWL: Depth NA Date/Time NA	DATE STARTED: 3-16-92	
ENGINEER/GEOLOGIST: T. MULDER	Depth NA Date/Time NA	DATE COMPLETED: 3-16-92	
DRILLING METHODS: HAND AUGER - 3 in. dia.	PAGE 1 OF 1		

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (NA)	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0.61622	1215	6		Soft, olive grey (5Y 4/2), homogeneous clayey silt, non-plastic, moist	ML		Field duplicate
0.61623	1215	6					frangible silt-loess
1		6					
2		6		Medium stiff, olive grey (5Y 4/2) w/ yellowish brown (10YR 5/6) mottling, clayey silt, low plasticity, moist	ML		
3		6		Medium stiff, yellowish brown (10YR 5/6) w/ olive grey mottling (5Y 4/2), silty clayey silt silty clay w/ sand pebbles to less than 2mm (5%), med. plastic, moist	CL CH		Glacial
4		6		Yellowish brown (10YR 5/6), silty homogeneous, clayey silt w/ sand pebbles < 3mm (5%), moist, med. plastic	CL CH		
				total depth 4.5 ft			

NOTES:

Drilling Contractor: NA Geologist: T. Mulder

Drilling Equipment: NA Sample Tech: R. Ledford

Driller: NA

NA

Colors identified using Munsell Color Chart

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**VISUAL CLASSIFICATION OF SOILS**

PROJECT NUMBER: 50.03.46	PROJECT NAME: RCRA/CERCLA BACKGROUND SOIL STUDY		
BORING NUMBER: 1756	COORDINATES: NK	DATE: 3-16-92	
ELEVATION: NK	GWL: Depth NA	Date/Time NA	DATE STARTED: 3-16-92
ENGINEER/GEOLOGIST: T. Mulder	Depth NA	Date/Time NA	DATE COMPLETED: 3-16-92
DRILLING METHODS: HAND AUGER - 3 in. dia.			PAGE 1 OF 1

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLE PER (NA)	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0	61626	1355	6	Soft, olive gray (5Y 4/2), homogeneous, clayey silt, low plastic, moist	ML		
1			6	Soft, yellowish brown (10YR 5/6) w/ olive gray mottling, homogen., silty clay w/ sand, low plastic, moist	CL CH	410/92	↑ Glacial fill
2			6	Yellowish brown (10YR 5/6) w/ olive gray mottling, homogeneous, silty clay, med plastic, moist	CL CH	410/92	
3			6	Yellowish brown (10YR 5/6), homogen., silty clay w/ 10% pebbles to 1cm, med plastic, wet	CL CH	410/92	
4			6	Lt olive brown (2.5YR 5/4), homogen., clayey silt w/ pebbles to 3mm, med plastic, moist	ML MH	410/92	
4	61628	1430	6	Lt olive brown (2.5YR 5/3), homogen., clayey silt w/ sand/pebbles to 5mm, med plastic, wet	ML MH	410/92	
				Total depth 4.5 ft			

NOTES:

Drilling Contractor: NA Geologist: T. Mulder  
 Drilling Equipment: NA Sample Tech: R. Lordford  
 Driller: NA  
NA

Colors identified using Munsell Color Chart 177

**VISUAL CLASSIFICATION OF SOILS**

PROJECT NUMBER: 50.03.46	PROJECT NAME: RCRA/CERCLA BACKGROUND SOIL STUDY		
BORING NUMBER: 1757	COORDINATES: NK	DATE: 3-19-92	
ELEVATION: NK	GWL: Depth NA Date/Time NA	DATE STARTED: 3-19-92	
ENGINEER/GEOLOGIST: T. MULDER	Depth NA Date/Time NA	DATE COMPLETED: 3-19-92	
DRILLING METHODS: HAND AUGER - 3 in. dia.	PAGE 1 OF 1		

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (NA)	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS	
0	061629 0535 3-19	NA	6	Firm, dk grayish brown (2.5Y 4/2), homogeneous, clay, dilatancy none, toughness medium, low-med. plasticity, moist	CL		↑ glacial fill	
1			6	Firm, olive brown (2.5Y 4/3), clay w/ fine gravel, homogeneous, dilatancy none, med. toughness, med. plasticity, moist.	CL CH CU 4/2/10			
2			6	Firm, olive yellow (2.5Y 6/6), clay w/ fine gravel, homogeneous, dilatancy none, med. toughness, med. plasticity, moist	CL CH CU 4/2/10			
3			6	Firm, lt yellowish brown (2.5Y 6/4), clayey fm sand w/ gravel to 4 cm, subrounded, moist.	SC			
4	061630 0455 3-19		6					
4	061631 061634 0925 3-19		V	6	Firm, gray (2.5Y N6/) w/ olive grey mottling (2.5Y 4/6), homogeneous, clayey silt w/ 3cm dilatancy none, low plasticity, moist	ML		
				Total depth 54 inches			↓	

NOTES:  
 Drilling Contractor: NA  
 Drilling Equipment: NA  
 Driller: NA  
 Geologist: T. Mulder  
 Sample Tech: R. Ledford  
 J. Holtgrewe

**VISUAL CLASSIFICATION OF SOILS**

PROJECT NUMBER: 50.03.46	PROJECT NAME: RCRA/CERCLA BACKGROUND SOIL STUDY		
BORING NUMBER: 1758	COORDINATES: NK	DATE: 3-19-92	
ELEVATION: NK	GWL: Depth NA Date/Time NA	DATE STARTED: 3-19-92	
ENGINEER/GEOLOGIST: T. Maider	Depth NA Date/Time NA	DATE COMPLETED: 3-19-92	
DRILLING METHODS: HAND AUGER - 3 in. dia.			PAGE 1 OF 1

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (NA)	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0	61632	NA	6	Firm, olive (5Y 4/3), homogeneous, clayey silt w/ gravel/cobbles to 4 in, homogeneous, dilatancy none, medium toughness, high plasticity, moist	ML		Soil duplicate collected, extremely "sticky" material - difficult to mix well
0	61633		6	Firm, Lt. olive brown (2.5Y 5/4), silty clay w/ gravel to 5 cm, homogeneous, dilatancy none, med. toughness, high plasticity, wet	CH		↑ glacial till ↓
1	1370		6	V. Firm, pale olive (5Y 6/4), clay w/ cobbles to 5 in, blocky, dilatancy none, toughness med, non-plastic, low plasticity, moist	CL		
2	3-19		6	V. firm, gray (2.5Y NS1), clay, homogeneous, dilatancy none, non-plastic, moist	CL		
3	61634		6				
3	1435		6				
3	3-19		6				
4	61635			3-19-92 Total depth 36 inches 7 borings were made @ the location before eventually collecting the 36-42 inch interval. The presence of 1st flagstones <del>prevented</del> made multiple borings necessary and prevented collection of the last sample interval.			

NOTES:

Drilling Contractor: NA Geologist: T. Maider  
 Drilling Equipment: NA Sample Tech: R. Ledford  
 Driller: NA  
NA

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Colors identified using Munsell Color Chart

**VISUAL CLASSIFICATION OF SOILS**

PROJECT NUMBER: 50.03.46	PROJECT NAME: RCRA/CERCLA BACKGROUND SOIL STUDY		
BORING NUMBER: 1759	COORDINATES: NK	DATE: 3-20-92	
ELEVATION: NK	GWL: Depth NA	Date/Time NA	DATE STARTED: 3-20-92
ENGINEER/GEOLOGIST: T. MULDER	Depth NA	Date/Time NA	DATE COMPLETED: 3-20-92
DRILLING METHODS: HAND AUGER - 3 in. dia.			PAGE 1 OF 1

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (NA)	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0	61635 0840 3-20	NA	6	Firm, dark olive gray (5Y 3/2), clayey silt w/ high organic content, non-plastic, moist, homogeneous	ML		↑ Clay/silt/tn sand till w/ gravel and cobbles to 8cm constituting less than 5% of soil
1			6	Soft, dark yellowish brown (10YR 4/6), homogeneous, silty clay, med-high plasticity, moist	CL EH 42.2		
2			6				
2			6	Firm, dark yellowish brown (10YR 3/4), blocky, silty clay w/ gravel to 2cm, low plasticity, moist	CL 34in		
3	61636 0905 3-20		6	Firm, dark yellowish brown (10YR 3/4), homogeneous, silty/sandy clay w/ gravel and high organic content, low plasticity, moist	CL 44in		
4	61637 0930 3-20		6	olive yellow (2.5Y 6/6), homogeneous, silty fine sand, sub-rounded, moist	SM		↓
				Total depth 54 inches			

NOTES:

Drilling Contractor: NA Geologist: T. Mulder  
 Drilling Equipment: NA Sample Tech: R. Ledford  
 Driller: NA  
 NA

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Colors identified using Munsell Color Chart

**VISUAL CLASSIFICATION OF SOILS**

PROJECT NUMBER: 50.03.46	PROJECT NAME: RCRA/CERCLA BACKGROUND SOIL STUDY
BORING NUMBER: 1760	COORDINATES: NK
ELEVATION: NK	GWL: Depth NA Date/Time NA
ENGINEER/GEOLOGIST: T. MULDER	Depth NA Date/Time NA
DRILLING METHODS: HAND AUGER - 3 in. dia.	PAGE 1 OF 1

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (NA)	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0	61638 1040 3-20	NA	6	Firm, Lt. olive brown (2.5Y 5/4), homogeneous, <del>non plastic</del> silty clay, non plastic, moist 3-20-92	CL		Till of predominantly fines w/ gravel/cobbles to 12 cm, pebbles and cobbles
1			6	Firm, lt olive brown (2.5Y 5/6), homogeneous, silty clay, med. plasticity, moist	CL		
2			6	Firm, Lt. olive brown (2.5Y 5/6), homogeneous, silty/sandy clay, low plasticity, moist	CL		
3				Lt. olive brown (2.5Y 5/6), homogeneous, clayey/sandy silt, subrounded, no plasticity, moist	ML	33 in	
3	61639 1510 3-20			Lt. yellowish brown (2.5Y 6/4), homogeneous, clayey/sandy silt, subangular, low plasticity, <del>moist wet</del> 3-20-92	ML	45 in	
4	61670 3-20-92		Lt yellowish brown (2.5Y 6/3) homogeneous, sandy silt w/ clay, subangular, wet 3-20-92	ML	48 in		

NOTES:  
 Drilling Contractor NA Geologist: T. Mulder  
 Drilling Equipment NA Sample Tech: R. Ledford  
 Driller: NA  
NA

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Colors identified using Munsell Color Chart

**VISUAL CLASSIFICATION OF SOILS**

PROJECT NUMBER: 50.03.46	PROJECT NAME: RCRA/CERCLA BACKGROUND SOIL STUDY		
BORING NUMBER: 1764	COORDINATES: NK	DATE: 3-24-92	
ELEVATION: NK	GWL: Depth NA	Date/Time NA	DATE STARTED: 3-24-92
ENGINEER/GEOLOGIST: T. MULDER	Depth NA	Date/Time NA	DATE COMPLETED: 3-24-92
DRILLING METHODS: HAND AUGER - 3 in. dia.	PAGE 1		OF 1

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (NA)	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0.5	061650	NA	6	Firm, olive brown (2.5Y 4/4), homogeneous, non-low clayey silt, non-low plastic, wet	ML		↑
	<del>1355</del> 1305 3-24		6				
1.5			6	Firm, Lt olive brown (2.5Y 5/6) w/ olive brown mottling (2.5Y 4/4), homogeneous, clayey silt, non plastic moist	ML		↓
			6				
2.5			6	Firm, Lt. olive brown (2.5Y 5/4), homogeneous, silty/clayey med. sand w/ pebbles to 3 cm, sub angular, wet	SM SC		Till
			6				
3.5	061651		6	Firm, Lt olive brown (2.5Y 5/4) w/ gray mottling, homogeneous, sandy/silty clayey silt, sub angular, moist	ML		↓
	1330 3-24		6				
4.5	061652		6	Firm, Lt. olive brown (2.5Y 5/4) w/ gray mottling, homogeneous, silty/clayey fa sand w/ pebbles to 3cm, Sub angular, moist	SM SC		← Hit rock, started new hole
	1355 3-24		6				
				T.D. 4.5 ft			

NOTES:

Drilling Contractor NA Geologist: T. Mulder  
 Drilling Equipment NA Sample Tech: R. Lefford  
 Driller: NA  
NA

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Colors identified using Munsell Color Chart

**VISUAL CLASSIFICATION OF SOILS**

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PROJECT NUMBER: 50.03.46	PROJECT NAME: RCRA/CERCLA BACKGROUND SOIL STUDY		
BORING NUMBER: 1761	COORDINATES:	DATE: 3-23-92	
ELEVATION: NK	GWL: Depth NA Date/Time NA	DATE STARTED: 3-23-92	
ENGINEER/GEOLOGIST: T. Mulder	Depth NA Date/Time NA	DATE COMPLETED: 3-23-92	
DRILLING METHODS: HAND AUGER - 3 in. dia.	PAGE 1 OF 1		

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (NA)	RECOVER	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0	61640	NA	6	Firm, lt. olive brown (2.5Y 5/3), homog., silt, low plastic, moist	ML		Frittle, easily mixed
0	61641		6	Firm, yellowish brown (10YR 5/4), homogeneous, silty clay, low-med. plastic, moist	CL		↑ glacial
1	0925 3-23		6				
2			6	Firm, yellowish brown (10YR 5/4), homogeneous, silty/sandy clay, low-med plasticity, moist	CL		
3			6				
3	61642		6				
3	0945 3-23		6				
4		6		Firm, lt. olive brown (2.5Y 5/4), homogeneous, silty/sandy clay, med plastic, moist	CL		
4	61643	6		lt. olive brown (2.5Y 5/4) w/ lt. gray mottling, clayey/sandy fine sandy, homogeneous, subangular, moist	XC		↓
				Total depth 4.5 ft.			

NOTES:

Drilling Contractor NA Geologist: T. Mulder  
 Drilling Equipment NA Sample Tech: R. Ledford  
 Driller: NA

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Colors identified using Munsell Color Chart

**VISUAL CLASSIFICATION OF SOILS**

PROJECT NUMBER: 50.03.46	PROJECT NAME: RCRA/CERCLA BACKGROUND SOIL STUDY		
BORING NUMBER: 1762	COORDINATES: 11E	DATE: 3-23-92	
ELEVATION: N/K	GWL: Depth NA Date/Time NA	DATE STARTED: 3-23-92	
ENGINEER/GEOLOGIST: T. Mulder	Depth NA Date/Time NA	DATE COMPLETED: 3-23-92	
DRILLING METHODS: HAND AUGER - 3 in. dia.	PAGE 1	OF 1	

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (NA)	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0	61644 1100 3-23		6	soft Firm, Olive (5Y 4/3), silty clay w/ high organic content, homogeneous, low med plastic, moist	CL		↑ glacial- unsorted silt/clays/ fn sands, Occasional cobbles to 5cm
1			6	Firm, olive mottle & (5Y 4/3 and 5/4), silty/sandy clay, homogeneous, med plastic, moist	CL		
2			6	Firm, Olive brown (2.5Y 4/3), homogeneous, silty/sandy clay, med plastic, moist	CL		
3			6	Firm, Lt. olive brown (2.5Y 5/4), homogeneous, silty/sandy clay, clayey/sandy, non-plastic, moist	ML	3-23-92 SANDY SITE	
4	61645 1125 3-23		6	Firm, Lt. olive brown (2.5Y 5/4) homogeneous, clayey/silty/sand, subangular, moist	SC/SM	45 inches	
4	61646 1145 3-23		6	Firm, Lt. olive grey (2.5Y 5/6) w/ Lt. olive grey (5Y 6/2) mottling, homogeneous, clayey/sandy silt, subangular, moist	ML	3-23-92	↓
				T.D. 4.5 ft			

NOTES:  
 Drilling Contractor: NA  
 Drilling Equipment: NA  
 Driller: NA  
 Geologist: T. Mulder  
 Sample Tech: R. Ledford

Colors identified using Munsell Color Chart

**VISUAL CLASSIFICATION OF SOILS**

PROJECT NUMBER: 50.03.46	PROJECT NAME: RCRA/CERCLA BACKGROUND SOIL STUDY		
BORING NUMBER: 1763	COORDINATES: NK	DATE: 3-24-92	
ELEVATION: NK	GWL: Depth NA Date/Time NA	DATE STARTED: 3-24-92	
ENGINEER/GEOLOGIST: T. Mulder	Depth NA Date/Time NA	DATE COMPLETED: 3-24-92	
DRILLING METHODS: HAND AUGER - 3 in. dia.			PAGE 1 OF 1

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (NA) 1	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1	061647 6820 3-24	NA	6	Firm, olive brown (2.5Y 4/3), homogeneous, silt, non plastic, moist	ML		↑ loess
	6						
2	NA	NA	6	Firm, dark yellowish brown (10YR 4/6), homogeneous, clayey silt, non plastic, moist	ML		↓ Till
			6	Firm, dark yellowish brown (10YR 4/6), homogeneous, sandy/silty clay w/ pebbles to 1 cm, med plastic, moist	CL	21 inches	
3	061648 0845 3-24	NA	6	Firm, <del>dark</del> lt olive brown, (2.5Y 5/6), clayey/sandy silt w/ pebbles to 4 cm, low plastic, moist	ML		← spud bar used
			6	Firm, olive yellow (5Y 4/6), homogen, sandy/clayey silt w/ pebbles to 4cm, low plastic, moist	ML		← spud bar used
4	061649 1000 3-24	NA	6	Firm, Lt. olive brown (2.5Y 5/6) w/ gray (5Y 5/1) mottling, silt (M) 3-24-92 homogeneous, silty clay, med plastic, moist	CL		↓
				TD 4.5 ft			

NOTES:  
 Drilling Contractor: NA Geologist: T. Mulder  
 Drilling Equipment: NA Sample Tech: R. Ledford  
 Driller: NA  
 NA

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Colors identified using Munsell Color Chart

**VISUAL CLASSIFICATION OF SOILS**

PROJECT NUMBER: 50.03.46	PROJECT NAME: RCRA/CERCLA BACKGROUND SOIL STUDY		
BORING NUMBER: 1826	COORDINATES: NK	DATE: 3-24-92	
ELEVATION: NK	GWL: Depth NA Date/Time NA	DATE STARTED: 3-24-92	
ENGINEER/GEOLOGIST: T. MULDER	Depth NA Date/Time NA	DATE COMPLETED: 3-24-92	
DRILLING METHODS: HAND AUGER - 3 in. dia.			PAGE 1 OF 1

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (NA)	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0	061653 061654 1425 3-24	NA	6	Firm, olive brown (2.5Y 4/4), homogeneous, clayey silt, non-plastic, moist	ML	Soil Duplicates Collected	↑
1	6		Firm, olive brown (2.5Y 4/4) w/ grey and olive yellow (2.5Y NS/1) (2.5Y 6/8) mottling, homogeneous, clayey silt, <del>low</del> plastic, moist	ML			
2	6		Firm, lt olive brown (2.5Y 5/6), homogeneous, clayey silt, low plastic, moist	ML	Loss		
3	6		Firm, lt olive brown (2.5Y 5/6) homogeneous, clayey/sandy silt w/ gravel to 2 cm (TM 3-24-92)	ML			
3	061655 1445 3-24		6	lt olive brown (2.5Y 5/6), homogeneous, clayey cgs sand w/ gravel, subangular, wet	SC		
4	061656 3-24-92	(TM)	TD 3.5 ft could not extend hole below 3.5 ft. hole would not stay open - wet portion @ 3.5 feet caved in				

NOTES:

Drilling Contractor: NA Geologist: T. Mulder  
 Drilling Equipment: NA Sample Tech: P. Ledford  
 Driller: NA

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Colors identified using Munsell Color Chart