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

XX/XX/XX

**120
REPORT**

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Introduction

The Consent Agreement (CA) under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Sections 120 and 106(a) and the Federal Facility Compliance Agreement (FFCA) between the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (U.S. EPA), signed April 9, 1990 and July 18, 1986, respectively, require that monthly reports be submitted to the U.S. EPA regarding progress made to meet the provisions of those agreements. This report fulfills those requirements by describing actions undertaken at the Fernald Environmental Management Project (FEMP) during the period August 1 through August 31, 1991 and planned actions for the period September 1 through September 30, 1991.

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

- A Work Plan for sampling Pits 5, 6, and the Clearwell was transmitted to the U.S. EPA and the Ohio EPA on August 15, 1991.
- A Work Plan for the Inactive Fly Ash Pile Controls Removal Action was submitted to the U.S. EPA for approval on August 14, 1991.
- The revised Plant 1 Pad Continuing Release Removal Action Work Plan was formally approved by the U.S. EPA on August 19, 1991.
- Pumping of Plant 9 perched water was initiated on schedule on August 20, 1991 with an estimated 2,000 gallons of perched water being collected by end of August 1991.
- The revised draft Treatability Study Work Plan for OU 2 was submitted to the U.S. EPA and the Ohio EPA on August 22, 1991.
- Work Plans consisting of current waste shipping and work procedures for the Removal of Waste Inventories Removal Action related to the current Low Level Waste Management Procedures and the Thorium Management Procedures (Overpacked and Ready to Ship) were submitted for approval to the U.S. EPA on August 30, 1991.

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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 - Drilling/Boring Logs.
- o Enclosure D - Slant Boring Program Presentation

CA Section IX. Removal Actions

This section provides an update of activities associated with the implementation of Removal Actions (RAs) at the FEMP during August 1991. Information is presented for each of the Removal Actions identified in the Consent Agreement and the four previously agreed upon Removal Actions:

- o RA No. 1, Contaminated Water Beneath FEMP Buildings.
- o RA No. 2, Waste Pit Area Runoff Control.
- o RA No. 3, South Groundwater Contamination Plume.
- o RA No. 4, Silos 1 and 2.
- o RA No. 5, K-65 Decant Sump Tank.
- o RA No. 6, Waste Pit 6 Residues.
- o RA No. 7, Outfall Pipeline Replacement (Previously Outfall Pipeline Investigation and Repair).
- o RA No. 8, Plant 1 Pad Continuing Release.

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RA No. 1, Contaminated Water Beneath FEMP Buildings

Plant 6 - Pumping and collection of the perched water from underneath Plant 6 began on May 31, 1991. Consistent with the U.S. EPA modifications to the Plant 6 Perched Groundwater Removal Action Work Plan, the FEMP perched groundwater will be treated prior to mixing it with other waste streams. Through the end of August 1991, a total of 10,100 gallons of groundwater had been extracted and collected at Plant 6. Approximately 8,500 gallons of perched groundwater had been collected and transported for treatment by the Plant 8 VOC treatment system. The milestone for pumping and treatment of the Plant 6 perched water was completed on schedule.

Plants 2/3 and Plant 8 - Construction activities are underway to complete the extraction and collection system for Plants 2/3 and Plant 8. The Plants 2/3 and Plant 8 extraction systems are scheduled to be operational by November 1, 1991.

Plant 9 - Pumping from Plant 9 began on August 20, 1991 per the U.S. EPA and U.S. DOE milestone. Approximately 2,000 gallons had been extracted and collected by the end of August 1991.

Plant 8 - The startup date for the Plant 8 treatment system was July 24, 1991. The carbon absorption treatment system in Plant 8 will be used to treat the perched groundwater from Plants 2/3, 6, 8, and 9. Through August 1991, approximately 8,500 gallons of groundwater had been transported and treated utilizing the Plant 8 system. The milestone for startup of the Plant 8 treatment system was completed on schedule.

All activities are on schedule to support the deliverables identified in the three U.S. EPA approved Removal Action Work Plans.

<u>KEY MILESTONES</u>	<u>STATUS</u>	<u>DUE DATE</u>
Pumping and treatment of the Plant 6 perched groundwater became operational.	Completed July 23, 1991	July 24, 1991
Initiate Pumping in Plant 9.	Completed August 20, 1991	August 20, 1991
Initiate Pumping in Plants 2/3 and 8.	Open, on schedule.	November 1, 1991

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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 and conditional approval was received from the Ohio EPA on April 2, 1991.

A modified Sampling and Analysis Plan and a revised schedule based on the conditions and modifications to the project were submitted to the U.S. EPA and the Ohio EPA on May 14, 1991.

In order to satisfy one of the conditions stipulated by the U.S. EPA for the approval of the Waste Pit Area Runoff Control EE/CA, Permeability Studies in the Waste Pit Area were initiated. These tests were to determine if the clays in the detention area could meet the required maximum permeability of 1×10^{-7} cm/sec. Laboratory analysis of the results from the permeability testing in the north and east detention areas indicated permeability in the range of 1×10^{-7} cm/sec. However, field studies showed permeability factors as high as 1×10^{-3} cm/sec. Due to these results, modifications to the design were initiated for these detention areas.

Construction activities were initiated on June 6, 1991 with the issuance of the construction work order to Rust Engineering. The results of the pre-excitation soil sampling indicated additional sampling and analysis will be required in some areas to further characterize the nature and extent of Hazardous Substance List (HSL) materials contamination. Further evaluation of the HSL sampling results has resulted in a review of the objectives of the Sampling and Analysis Plan in August 1991. The reevaluation of the results and the plan are to ensure that the criteria developed in the plan are adequate and appropriate for addressing the disposition of excavated material and the need for additional sampling efforts. The results of this reevaluation are expected in early September 1991. The results will include a final determination for the disposition of excavated soil and the basis for the decision.

Planned activities in September 1991 include continuing the evaluation of the analytical results of the pre-excitation samples and the continuation of excavation activities.

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

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

RA No. 3, South Groundwater Contamination Plume

Part 1

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

At the end of June, the COE had obtained Right of Entry from approximately half of the affected property owners where the alternate water supply mains are to be located. The Right of Entry allows surveying, exploration, and construction. The COE archaeologist completed a cultural resource investigation (archaeological/historical survey) of the Part 1 well site area and found no reason to delay the proposed well test activities. This information was transmitted to the Ohio State Historic Preservation Officer along with information for all areas affected by Part 1 construction activities on August 12, 1991. Based on the COE findings, approval to proceed on the test well activities was granted by the DOE/FO. A summary of the most recent and ongoing activities are listed below:

- Drill Test Well and Piezometer Wells - Operation continued during August. Completion forecasted for September 21, 1991.

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

Part 1 (cont'd.)

- 100% Design Review - Issued August 8, 1991.
- 100% Design Review - Comments received and reviewed as of August 30, 1991.
- Final Design - Initiation expected September 3, 1991.

Procurement of materials and mobilization for installation of the test well began on July 8, 1991 and drilling of the test well began on July 15, 1991. A decision was made to proceed with the completion of the 100% drawings and specifications for Part 1, assuming the results of the well field testing will be positive.

Part 2

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

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

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

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

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

Part 2 (cont'd.)

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

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

A revised work plan for Parts 2 and 3 of the South Plume Removal Action, which addressed the aforementioned items, was submitted to the U.S. EPA on March 11, 1991. The Work Plan was approved by the Ohio EPA on April 12, 1991 and by the U.S. EPA on April 26, 1991, provided that fifteen and two comments, respectively, were satisfactorily resolved.

A meeting was held with the U.S. EPA on May 22, 1991 to discuss the scope of work prepared to determine the location of the South Plume Removal Action Part 2 well field. After much discussion, it was determined that the well field could not be successfully installed near New Haven Road because of the organic contaminants in this area from the PRRS plume. Therefore, it was determined that the proposed well field and transfer pump station would be relocated north of the Albright & Wilson Americas' (AWA) facilities. However, a Part 5, in support of Part 2, would be added to the South Plume Removal Action to determine the exact relocation. Part 5 would include groundwater sampling to determine what portion of the greater-than 30 $\mu\text{g}/\text{l}$ of total uranium is downstream of the well field and the boundary of the PRRS. The DOE/FO will determine the impact of these changes on the project schedules and funding.

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RA No. 3, South Groundwater Contamination Plume (cont'd.)**Part 2 (cont'd.)**

The 100% Design Review drawings and specifications for Part 2 were issued on May 31, 1991. The design package was sent to the Ohio and U.S. EPAs for informational purposes on June 7, 1991. The design package did not reflect the May 22, 1991 decision to relocate the well field and transfer pump station.

The initial computer modeling required to relocate the Part 2 well field was completed in July 1991. A meeting was held with the U.S. EPA and the Ohio EPA on July 23, 1991 to discuss the results of the modeling. Draft findings were presented. High levels of uranium were predicted by the model to be discharged from the relocated well field. This prediction raised concerns that the equivalent mass resolution will be difficult to meet with the currently scheduled associated projects discussed at the meeting. All parties agreed that the well field be installed north of the industrial user, but the issue of equivalent mass will need to be addressed in Part 3. The DOE/FO will study options and another meeting will be held to discuss the study results.

Part 3

The work plan for Part 3 (the installation and operation of an Interim Advanced Wastewater Treatment [IAWWT] System to reduce contaminant loading discharged to the Great Miami River to a level less than 1,700 pounds per year) was prepared as one Work Plan with Part 2 as described above. The Design Basis Document for the IAWWT was issued to the U.S. EPA for informational purposes on March 19, 1991. Comments were received from the Ohio EPA on the IAWWT design basis document. Responses to the comments were issued on May 30, 1991. The IAWWT System will be handled as a two-part design: the trailer package, which includes the treatment system; and the Utilities Services package, which includes all utilities and support systems. The IAWWT trailer package specifications were finalized and issued for bid on May 16, 1991. The bids were received on June 6, 1991. The contract for the fabrication of the trailer package was awarded on June 21, 1991. The 100% drawings and specifications utility portion of the project were Certified for Construction (CFC) on June 28, 1991. Incremental treatment capacity will be evaluated to meet the new equivalent mass requirements due to relocation of the Part 2 well field. An option under consideration is the integration of a second identical treatment unit into a revised design package which would double the treatment capacity currently proposed.

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RA No. 3, South Groundwater Contamination Plume (cont'd.)**Part 4**

Part 4 of the South Groundwater Contamination Plume Removal Action Work Plan involves groundwater monitoring and institutional controls. Property owner drinking water wells continue to be sampled on a monthly basis along State Route 128 where previous above-background levels of uranium have been detected. Uranium concentrations on these properties are not increasing. Sampling of other RI/FS wells continued. The property owners' drinking water well special sampling project will be completed in September 1991. A follow-up round of sampling is tentatively scheduled for October 1992.

Part 5

A work plan for Part 5 (Groundwater Modeling and Geochemical Investigation Selected Relocation of the South Plume Well Field) was prepared and submitted to the U.S. EPA for review on June 4, 1991. Comments were received from the Ohio EPA on June 25, 1991 and from the U.S. EPA on July 3, 1991. Per the agreement at the July 23 meeting between the DOE, the U.S. EPA, and the Ohio EPA, the scope of the Part 5 field investigation is being expanded to include investigation of the area north and inclusive of the relocated Part 2 extraction well field.

Summary

A meeting was held with the U.S. EPA and the Ohio EPA on August 29, 1991 in Chicago where the current status of the South Groundwater Contamination Plume Removal Action was discussed. The DOE presented revised milestones for completion of Parts 1, 2, and 3. The justification for each milestone revision was presented. Also in the month of August, the DOE began submitting weekly reports on the South Plume project to provide all parties with the most up-to-date information.

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

Summary (cont'd.)

Activities in September will focus on completing the installation of the Part 1 test well and performing the testing of the well field; completing the 100% drawing and specifications for the Part 1 water supply and determining the changes required due to the relocation of the Part 2 well field and transfer pump station to the south side of the industrial user; further evaluation of the equivalent mass uranium concern raised by relocation of the Part 2 well field and evaluating options for increasing the treatment capacity in Part 3; obtaining National Environmental Policy Act's (NEPA) approval for Parts 2/3; completing and submitting responses to the U.S. and Ohio EPAs comments on the Part 5 Work Plan; obtaining access to the Part 5 study area, and performing a cultural resource investigation of the Part 5 study area.

<u>KEY MILESTONES</u>	<u>STATUS</u>	<u>DUE DATE</u>
Complete Part 1 (Alternate Water Supply)	Open	December 1991
Complete Parts 2 and 3 (Extraction wells, force main, effluent pipeline and treatment system).	Open	April 1992
Complete Part 4 (Institutional control and monitoring).	Open	Ongoing
Complete Part 5 (Groundwater, modeling and geochemical investigation).	Open	To be determined after the Work Plan is approved.

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RA No. 4, Silos 1 and 2

The Silos 1 and 2 Removal Action Work Plan was submitted to the U.S. EPA on November 5, 1990. The U.S. EPA approval of the Silos 1 and 2 Removal Action Work Plan was received on November 30, 1990.

The demonstration of the mapping technology and equipment in Silo 4 was completed on August 2, 1991. The following contracts associated with the procurement of the equipment necessary to complete the installation of the bentonite were awarded and fabrication initiated: the distributor spray head assembly package, the main basket weldment, and the bentonite handling system.

Work in September will center on awarding the remaining contracts associated with the procurement of the equipment necessary to complete the installation of the bentonite. Mapping of Silos 1 and 2 is to be initiated in September 1991.

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

RA No. 5, K-65 Decant Sump Tank

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

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

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RA No. 5, K-65 Decant Sump Tank (cont'd.)

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

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

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

RA No. 6, Waste Pit 6 Residues

This removal action was completed on December 19, 1990.

RA No. 7, Outfall Pipeline Replacement (Previously Outfall Pipeline Investigation and Repair)

A letter was issued to the U.S. EPA on February 15, 1991 entitled "Installation of a New Effluent Line and its Incorporation into the South Plume Removal Action." The letter summarized a recently completed study which indicated that the DOE would not attempt to repair the existing line either by in situ or an equivalent relining alternative. The construction of the new effluent line has been incorporated into RA No. 3, South Groundwater Contamination Plume. Please see that Removal Action for further information.

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RA No. 8, Plant 1 Pad Continuing Release

The revised Plant 1 Pad Continuing Release Removal Action Work Plan was approved by the U.S. EPA on August 19, 1991 and the Ohio EPA on April 13, 1991. The removal action consists of three phases. Phase I implements the run-on/off control measures. Phase II addresses the installation of 80,000 square feet of a new covered and controlled concrete storage pad. Phase III involves activities to upgrade the remaining 375,000 square feet of the existing Plant 1 storage pad. Upgrading activities include installation of a polymeric vapor barrier over the existing concrete and the installation of concrete above the barrier with epoxy sealant. In addition, 22,000 square feet of the Phase III work area will be enclosed beneath a Sprung structure.

August activities included analysis of the additional sampling to characterize potential HSL contaminants for the Phase II work area.

Activities in September will include the receipt of analytical results and the continued mobilization of the construction contractor. Procurement of materials for the Phase I work is planned. Planning for the post excavation sampling of the Phase II area will be initiated.

<u>KEY MILESTONES</u>	<u>STATUS</u>	<u>DUE DATE</u>
Phase 1	Open, on schedule.	March 13, 1992
Phase 2	Open, on schedule.	December 21, 1992
Phase 3	Open, on schedule.	February 21, 1995

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

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

- o Operable Unit 1 (OU 1): Waste Pits 1-6, clearwell, burn pit.
- o Operable Unit 2 (OU 2): Other Waste Units - fly ash piles, lime sludge, ponds, sanitary landfill and Southfield.
- o Operable Unit 3 (OU 3): Production area and suspect areas outside production area (including effluent line to Great Miami River).
- o Operable Unit 4 (OU 4): Silos 1, 2, 3, and 4.
- o Operable Unit 5 (OU 5): All environmental media (i.e., including groundwater, surface water, soils, air, flora, fauna, etc.).

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Operable Unit 1: Waste Pits 1 - 6, Burn Pit, and Clearwell

1.1 Site Characterization

a. Status of Work - Key Milestones

The two planned borings in Pit 2 were completed and wells were set at these locations:

- Boring 1768 - Depth 17.5 ft.
- Boring 1769 - Depth 22.0 ft.

No obstructions were revealed in Pit 2. Water was encountered and a pit liner was definitely encountered at both locations.

All borings located in Pit 3 were completed and wells were set as follows:

- Boring 1770 - Depth 39.0 ft.
- Boring 1771 - Depth 41.0 ft.
- Boring 1772 - Depth 36.5 ft.

The material encountered during augering and sampling of Pit 3 appeared much drier than materials from previous borings in adjacent pits. During operations at borings 1770 and 1771, no pit liner was encountered at the depth of the completed borings as had been anticipated. At Boring 1772, however, a clay/gravel liner was revealed. At Boring 1772, wood chips were discovered during augering and sampling operations suggesting the presence of wood pallets. No wood debris was found at Borings 1770 and 1771.

One boring was completed at Pit 4, Boring 1774, and a well was set at 31 ft. The pit material was moist and water was encountered. Pit 4 also had a well defined liner present at the boring.

A well development and groundwater sampling team was deployed to initiate purging and sampling operations required for the waste pit wells.

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Operable Unit 1: Waste Pits 1 - 6, Burn Pit, and Clearwell

1.1 Site Characterization (cont'd.)

b. Issues/Problems

Initial development of several wells indicate a very slow rate of recovery. This slow recovery rate will not permit the removal of five well volumes prior to sampling.

c. Corrective Actions

A variance is being prepared to redefine the development of wells as provided for in the QAPP. In addition to the required concurrence by hydrogeology task leaders, the geochemical task leader is also being consulted in the variance preparation.

d. Planned Activities for September 1991

Complete the remaining two borings, Borings 1773 and 1775, in Pit 4. Continue with the purging and groundwater sampling activities on the established wells. Complete the decontamination and demobilization of equipment used for the augering and well installation.

1.2 Remedial Investigation

a. Status of Work - Key Milestones

Submittal of the Operable Unit 1 RI Report is on hold pending completion of additional waste pit sampling. A revised schedule for completing the RI Report was developed and submitted to the U.S. EPA and the Ohio EPA in mid-August. The waste pit sampling, started in May 1991, is scheduled for completion in September 1991. A description of field activities is presented in Section 1.1.

A Treatability Process Development Program Plan was developed to improve coordination and implementation of treatability studies. The management plan is an internal FEMP document that will define the roles of various contractors and agencies in the treatability program. The first draft of the document will be distributed for internal FEMP review on September 4, 1991.

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Operable Unit 1: Waste Pits 1 - 6, Burn Pit, and Clearwell

1.2 Remedial Investigation (cont'd.)

a. Status of Work - Key Milestones (cont'd.)

A work plan for sampling Pits 5, 6, and the Clearwell was developed and sent to the U.S. EPA and the Ohio EPA on August 15, 1991. The Health and Safety Plan for the sampling is nearing completion and is scheduled for internal FEMP review in early September 1991. The additional sampling of Pits 5, 6, and the Clearwell is being conducted to provide materials for the treatability studies.

A work plan for conducting radon flux measurements in the waste pit area was received from the contractor on August 20, 1991 and is being reviewed internally.

The draft Treatability Study Work Plan was submitted for U.S. EPA review on July 26, 1991.

<u>Activity</u>	<u>Comment</u>
Issue draft Treatability Study Work Plan to the U.S. EPA and the Ohio EPA on July 26, 1991.	Complete; comments expected within 30 days.
Issue draft Work Plan for sampling Pits 5, 6, and Clearwell to the U.S. EPA and the Ohio EPA on August 15, 1991.	Complete; Work Plan submitted on August 15, 1991. Comments expected within 30 days.
Issue draft Radon Sampling Work Plan to the U.S. EPA on October 18, 1991.	On schedule; draft Work Plan submitted for internal FEMP review on August 20, 1991.

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Operable Unit 1: Waste Pits 1 - 6, Burn Pit, and Clearwell

1.2 Remedial Investigation (cont'd.)

b. **Issues/Problems**

The approved sampling program for Operable Unit 1 does not include sampling of Pits 5 and 6 and the Clearwell. Samples from these areas are required to support treatability testing.

The draft Treatability Study Work Plan was submitted to the U.S. EPA and the Ohio EPA for review and comment on July 26, 1991. Comments due August 27, 1991 from the U.S. EPA were received on September 4, 1991, resulting in a day-for-day slippage of dependent activities in the RI/FS schedule.

c. **Corrective Actions**

A Work Plan Addendum was prepared to collect the required samples. The plan was submitted to the U.S. EPA and Ohio EPA for review on August 15, 1991. The Health and Safety Plan is nearing completion and will be available for internal FEMP review in early September 1991.

DOE will formally notify the U.S. EPA about the impact of the delay in receiving the Treatability Study Work Plan comments.

d. **Planned Activities for September 1991**

Continue work on completing the Work Plan Addendum (additional pit sampling to support treatability testing).

Incorporate the U.S. EPA and the Ohio EPA final comments on the draft Treatability Study Work Plan and revise the plan as appropriate.

Receive the U.S. EPA and the Ohio EPA comments on the Pits 5, 6 and Clearwell work plan and revise the plan as appropriate.

Revise draft of Radon Sampling Work Plan to incorporate internal review comments.

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Operable Unit 1: Waste Pits 1 - 6, Burn Pit, and Clearwell

1.3 Feasibility Study

a. Status of Work - Key Milestones

Submittal of the FS Report is on hold pending completion of the additional waste pit sampling and treatability studies. Revised FS schedules were developed that incorporated the additional sampling and treatability studies.

Activity

Comment

Issue draft Feasibility Study Report to the U.S. EPA on March 25, 1991.

U.S. EPA and DOE have agreed to renegotiate this delivery date.

b. Issues/Problems

None to report.

c. Corrective Action

None required.

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

Period Ending August 31, 1991

**SCHEDULES FOR THE SUBMITTAL OF PRIMARY DOCUMENTS UNDER THE
TERMS OF THE CONSENT AGREEMENT ARE ON HOLD PENDING THE
RENEGOTIATION OF THE REVISED CONSENT AGREEMENT DELIVERY DATES.**

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

Period Ending August 31, 1991

Operable Unit 2: Other Waste Units

2.1 Site Characterization

a. Status of Work - Key Milestones

The last boring, Boring 1722, of the five planned was completed at the Sanitary Landfill. Boring depth was 15.5 ft. However, all of the samples from Boring 1718 exceeded the holding times for sample extractions and a new boring was made. The new boring, 1808, was completed and sampled without impact to schedule.

The additional borings required for further HSL analysis, located in the Southfield, were completed as follows:

- Boring 1792 - Depth 34.0 ft.
- Boring 1793 - Depth 7.4 ft.
- Boring 1794 - Depth 2.4 ft.
- Boring 1795 - Depth 5.0 ft.

Boring 1794 was hand augured, whereas Borings 1792, 1793 and 1795 were made utilizing an auger rig.

The revised Work Plan for Operable Unit 2 required additional samples of water and sludge from the Lime Sludge Ponds for Appendix IX parameters. The sampling of the Lime Sludge Pond water was completed.

The shipment of treatability samples to the IT Laboratory for treatability testing was initiated.

b. Issues/Problems

Boring 1718 samples exceeded the holding times for extraction, potentially impacting the schedule.

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

Period Ending August 31, 1991

Operable Unit 2: Other Waste Units

2.1 Site Characterization

c. Corrective Actions

A new boring, 1808, was completed to replace Boring 1718. Sampling was completed and samples were forwarded to the laboratory for extraction and final analysis on a priority basis to avoid impacting the schedule.

d. Planned Activities for September 1991

Initiate laboratory treatability studies and complete the sampling of the Lime Sludge Ponds by sampling the sludge for Appendix IX parameters, as required by the revised Operable Unit 2 Work Plan.

Complete shipment of the treatability samples to the laboratory.

2.2 Remedial Investigation

a. Status of Work - Key Milestones

Submittal of the Operable Unit 2 RI Report has been delayed pending completion of additional site characterization and incorporation of this information into the report.

Consent Agreement negotiations continued in August 1991 and a revised schedule was submitted to the U.S. EPA for approval.

A revised draft Treatability Study Work Plan was submitted to the U.S. EPA and the Ohio EPA on August 22, 1991.

<u>Activity</u>	<u>Comment</u>
Issue draft RI Report to the U.S. EPA.	U.S. EPA and DOE have agreed to renegotiate the delivery date.

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

Period Ending August 31, 1991

Operable Unit 2: Other Waste Units

2.2 Remedial Investigation

a. Status of Work - Key Milestones

<u>Activity</u>	<u>Comment</u>
Issue revised draft Treatability Study Work Plan to the U.S. EPA and the Ohio EPA on August 22, 1991.	Complete; comments expected within 30 days.

b. Issues/Problems

Comments received from the U.S. EPA and the Ohio EPA on the Treatability Study Work Plan for Operable Unit 4 may have ramifications for Operable Unit 2. The U.S. EPA draft comments on the OU 4 Treatability Study Work Plan questioned the appropriateness of using TCLP extraction data as a surrogate leachate in fate and transport modeling. In order to meet the proposed schedule for the revised Consent Agreement, the treatability study for Operable Unit 2 has been initiated and is proceeding according to the draft work plan submitted on August 22, 1991.

c. Corrective Actions

The issue stated above requires immediate resolution by the DOE and the U.S. EPA. TCLP tests are planned as part of the study with similar intended use in OU 2. The outcome of the resolution of this issue for OU 4, if different from the current Operable Unit 2 program, could result in schedule slippage.

d. Planned Activities for September 1991

Resolve treatability issues identified in section 2.2b.

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

Period Ending August 31, 1991

Operable Unit 2: Other Waste Units

2.3 Feasibility Study

a. Status of Work - Key Milestones

Submittal of the Operable Unit 2 FS Report has been delayed pending completion of additional site characterization and incorporation of this information into the report.

Activity

Comment

Issue draft Feasibility Study Report to U.S. EPA.

U.S. EPA and DOE have agreed to renegotiate the delivery date.

b. Issues/Problems

None to report.

c. Corrective Actions

None required.

d. Planned Activities for September 1991

No FS activities are planned for September 1991.

1708

2071

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

Period Ending August 31, 1991

**SCHEDULES FOR THE SUBMITTAL OF PRIMARY DOCUMENTS UNDER THE
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**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT**

Period Ending August 31, 1991

Operable Unit 3: Production Area and Suspect Areas

3.1 Site Characterization

No activities were scheduled for OU 3 site characterization during August 1991.

3.2 Remedial Investigation

a. Status of Work - Key Milestones

Detailed logic and schedules (through draft ROD submittal) were prepared and presented to the U.S. EPA and the Ohio EPA on August 1, 1991. Required changes to Operable Unit 3 RI/FS schedules that resulted from subsequent negotiation sessions in August have been incorporated.

Operable Unit 3 initial scoping activities in August 1991 included employee process knowledge interviews and review of existing data.

The task of conducting process knowledge interviews is composed of gathering information from employees on past plant procedures and occurrences. This information is used to substantiate information gathered during the review of existing data, to identify possible sources of contamination that may not be revealed in the existing data review, and to identify additional sources of data. This activity has been divided into two sub-activities; Phase I (first 25 interviews) and Phase II (new interviewees suggested by Phase I interviewees). Phase I interviews are 60% complete and ahead of schedule.

The review of existing data, including information gathered during the process knowledge interviews, will be used to help develop the field sampling program that will be used to characterize the nature and extent of contamination within OU 3. During August 1991, both electronic and hard-copy files of available information were created. All data that is collected is sorted by physical location within OU 3. That data is reviewed in order to identify known or potential contamination. Part of this review and analysis process includes the creation of summary tables of those known and potential contaminants.

1708

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

Period Ending August 31, 1991

Operable Unit 3: Production Area and Suspect Areas

3.2 Remedial Investigation (cont'd.)

a. Status of Work - Key Milestones (cont'd.)

Data sources that have been collected and sorted by physical location include:

- RI/FS and perched groundwater hazardous waste/solid waste management unit.
- Abandoned-in-Place (AIP) equipment data.
- Historical plant operating data.
- Plant occurrence reports and unusual occurrence reports.
- Health and Safety Plans for maintenance and operating activities (e.g., new construction).

Data sources that have been collected but not yet sorted include:

- Standard Operating Procedures.
- Minor events reports.
- Summary of air permit applications.
- Radiological technician survey data.
- Material control and accounting data.

Data sources that have been identified but not yet collected and sorted include:

- Plant maintenance records.
- Spill events records.
- Notice of violation data.
- Chemical inventory data.

b. Issues/Problems

None to report.

c. Corrective Actions

None required.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

2071

Period Ending August 31, 1991

Operable Unit 3: Production Area and Suspect Areas

3.2 Remedial Investigation (cont'd.)

d. Planned Activities for September 1991

Continue initial scoping activities for Operable Unit 3.

Continue Phase I process knowledge interviews.

Continue data collection, sorting, and analyses.

3.3 Feasibility Study

a. Status of Work - Key Milestones

No activities were scheduled in August 1991 on the OU 3 Feasibility Study.

b. Issues/Problems

None to report.

c. Corrective Actions

None required.

d. Planned Activities for September 1991

No FS activities are scheduled for September 1991.

2071

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

Period Ending August 31, 1991

**SCHEDULES FOR THE SUBMITTAL OF PRIMARY DOCUMENTS UNDER THE
TERMS OF THE CONSENT AGREEMENT ARE ON HOLD PENDING THE
RENEGOTIATION OF THE REVISED CONSENT AGREEMENT DELIVERY DATES.**

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

Period Ending August 31, 1991

Operable Unit 4: Silos 1, 2, 3, and 4

4.1 Site Characterization

a. Status of Work - Key Milestones

Sampling of the contents of K-65 silos 1 and 2 was completed on August 26, 1991 with the following material recovery results:

- S2-NE-"B" - 60% Recovery
- S2-NE-"C" - 76% Recovery
- S1-SE-"A" - 67% Recovery
- S1-SE-"B" - 72% Recovery
- S1-SE-"C" - 65% Recovery
- S1-NE-"A" - 71% Recovery
- S1-NE-"B" - 72% Recovery
- S1-NE-"C" - 55% Recovery
- S1-NW-"A" - 32% Recovery
- S1-NW-"B" - 39% Recovery
- S1-NW-"C" - 44% Recovery

Sufficient materials from Silos 1 and 2 were collected to meet the material needs for analytical analyses, geotechnical and treatability testing.

The demobilization and decontamination of all sampling and support equipment was initiated. Preparation of geotechnical and treatability samples for shipment to the IT Laboratory for analysis and treatability studies was also initiated. Repackaging of the silo materials for archive storage continued during August.

The K-65 slant boring activities were completed on August 15, 1991 with samples collected at the remaining three (of five) slant boring locations.

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

Period Ending August 31, 1991

Operable Unit 4: Silos 1, 2, 3, and 4

4.1 Site Characterization (cont'd.)

a. Status of Work - Key Milestones (cont'd.)

Initial data analysis of information collected during the slant boring program was completed during August 1991. A presentation was made to the U.S. EPA and the Ohio EPA on August 29, 1991. The U.S. EPA and the Ohio EPA agreed during the meeting to review the information presented to determine whether the requirements of the program had been met. The U.S. EPA was informed that DOE would be demobilizing from the area to allow work on the silo bentonite removal action. Major figures and summary tables from the presentation are attached to this report as Enclosure D.

b. Issues/Problems

None to report.

c. Corrective Actions

None required.

d. Planned Activities for September 1991

Complete demobilization and decontamination of all equipment utilized to sample the contents of the K-65 Silos. Complete the preparation and shipment of samples to the laboratory for geotechnical and treatability studies. Complete the repackaging of K-65 Silos materials for archive storage.

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

Period Ending August 31, 1991

Operable Unit 4: Silos 1, 2, 3, and 4

4.2 Remedial Investigation

a. Status of Work - Key Milestones

Work on the RI Report is on hold pending the conclusion of the site characterization program for Operable Unit 4. A revised Treatability Study Work Plan was submitted to the U.S. EPA and the Ohio EPA for review in July 1991. Review comments were received from the U.S. EPA and the Ohio EPA, although only draft comments were received from the U.S. EPA.

In August, the negotiations were completed to determine the revised schedule for the completion of all Operable Unit 4 RI/FS activities. The Amended Consent Agreement now requires U.S. EPA and DOE Headquarters approval.

On August 26, 1991, a draft Treatability Study Work Plan for vitrification was issued for internal review.

<u>Activity</u>	<u>Comment</u>
Issue draft Treatability Study Work Plan to the U.S. EPA and the Ohio EPA on July 23, 1991.	Complete; comments were due August 22, 1991 and draft comments received on August 29, 1991.

b. Issues/Problems

The U.S. EPA submitted draft comments on the Treatability Study Work Plan on August 29, 1991. The U.S. EPA official comments have not been received. The DOE will have 30 days to revise and resubmit the document upon receipt of the formal transmittal from the U.S. EPA. The U.S. EPA and the Ohio EPA comments show concern with the proposed test methodology. This could be a potential concern for all operable units.

c. Corrective Actions

The DOE will seek resolution of the test methodology issue.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending August 31, 1991

Operable Unit 4: Silos 1, 2, 3, and 4

4.2 Remedial Investigation (cont'd.)

d. **Planned Activities for September 1991**

Resolve test methodology issues for the Treatability Program.

Evaluate, incorporate, and respond to the U.S. EPA and the Ohio EPA comments on the Treatability Study Work Plan.

4.3 Feasibility Study

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

No activities were completed on this task during August 1991 pending receipt of site characterization analytical results.

b. **Issues/Problems**

None to report.

c. **Corrective Actions**

None required.

d. **Planned Activities for September 1991**

No activities can be completed until the site characterization analytical results are received.

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

Period Ending August 31, 1991

Operable Unit 5: Environmental Media

5.1 Site Characterization

a. Status of Work - Key Milestones

The groundwater sampling for August will be completed the first week in September. Surface water samples were not obtained in support of the Paddy's Run South Seepage Investigation due to an insufficient quantity of stormwater.

Installation of Wells 2552, 3552, 2557 and 3557 is still required. Two cable tool rigs and one development cable tool rig are being prepared in order to proceed with this task in September.

b. Issues/Problems

Landowner access agreements are expected to be secured in September 1991 to support installation of Wells 2552, 3552, 2557 and 3557.

c. Corrective Actions

None to report.

d. Planned Activities for September 1991

Initiate installation of Wells 2552, 3552, 2557 and 3557. Upon completion of these wells, begin development and sampling activities and continue with the groundwater sampling effort.

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

Period Ending August 31, 1991

Operable Unit 5: Environmental Media

5.1.2 Facilities Testing

a. Status of Work - Key Milestones

A total of six wells require development and two rounds of sampling as follows:

Well 2055	-	Full HSL.
Well 1235	-	Semi-volatiles, volatiles and Full Rad
Well 1247	-	Semi-volatiles, volatiles and Full Rad
Well 1248	-	Semi-volatiles, volatiles and Full Rad
Well 1251	-	Semi-volatiles, volatiles and Full Rad
Well 1258	-	Semi-volatiles, volatiles and Full Rad

b. Issues/Problems

Due to insufficient recharge rates, development and sampling efforts were delayed.

c. Corrective Actions

None required.

d. Planned Activities for September 1991

Attempt development and sampling of Wells 2055, 1235, 1247, 1248, 1251 and 1258.

5.1.3 31-Well Program

a. Status of Work - Key Milestones

Two wells remain to be installed under this task: Well 3397, and off-site Well 2395. Installation of the off-site well will commence when the landowner access agreement is obtained. Well 3397 will be installed once internal concurrence has been obtained.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending August 31, 1991

Operable Unit 5: Environmental Media

5.1.3 31-Well Program (cont'd.)

b. Issues/Problems

Securing landowner access agreement for off-site Well 2395, and obtaining internal concurrence for the installation of on-site Well 3397.

c. Corrective Actions

Access agreement for Well 2395 is expected in September 1991.

d. Planned Activities in September 1991

Initiate installation of Wells 2395 and 3397.

5.1.4 RCRA Wells Program

a. Status of Work - Key Milestones

Two wells, 1645 and 1646, remain to be developed and two rounds of samples taken. Wells 2643, 2648, and 2649 require second round samples to be taken.

b. Issues/Problems

Due to the poor recharge rate at these locations, development and sampling activities are being delayed.

c. Corrective Actions

None required.

d. Planned Activities for September 1991

Attempt development and/or sampling of the remaining wells under this task.

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Period Ending August 31, 1991

Operable Unit 5: Environmental Media

5.1.5 Water-Level Measurements

a. Status of Work - Key Milestones

The water level measurements at 402 wells were completed in August 1991. Maps depicting new piezometer locations were completed.

b. Issues/Problems

Due in part to accessibility and mechanical difficulties (failed locks and damaged casing), eight wells were not measured in August 1991.

c. Corrective Actions

Repair well lids and locks immediately on the eight wells. Complete the eight water-level measurements as soon as possible.

d. Planned Activities for September 1991

Complete the water-level measurements for all 410 wells identified under this task.

5.2 Remedial Investigation

a. Status of Work - Key Milestones

Schedules for the Operable Unit 5 RI activities were prepared in June to support the Consent Agreement renegotiations. These schedules were modified throughout July and August to evaluate various scenarios proposed during the negotiations. Preliminary agreement on the schedules was reached in August 1991 with final agreement expected in September 1991.

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
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Period Ending August 31, 1991

Operable Unit 5: Environmental Media

5.2 Remedial Investigation (cont'd.)

a. Status of Work - Key Milestones (cont'd.)

Preparation of the Treatability Study Work Plan for the soil washing technology was completed in August 1991. Final corrections are being incorporated into the document as a result of an internal review. The draft document is scheduled to be submitted for final internal review on September 4, 1991.

b. Issues/Problems

None to report.

c. Corrective Actions

None required.

d. Planned Activities for September 1991

Submit Treatability Study Work Plan.

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

Period Ending August 31, 1991

Operable Unit 5: Environmental Media

5.3 Feasibility Study

a. Status of Work - Key Milestones

A schedule for all FS activities was finalized in June in support of Consent Agreement renegotiations. In mid-August preliminary agreement on the schedules was reached with final agreement expected in mid-September. During renegotiations, the definition of Operable Unit 5 was changed to include portions of Operable Unit 3 (i.e., all soils and perched groundwater). Based on this new definition, it was determined that the approved Operable Unit 5 Initial Screening of Alternatives document would be revised. Work on this document was initiated in July 1991. The Remedial Action Objectives and General Response Actions (Activities 5312A09101 and 5312A09103) were revised and completed in August 1991.

<u>Activity</u>	<u>Comments</u>
Issue revised Initial Screening of Alternatives to the U.S. EPA.	U.S. EPA and DOE have agreed to renegotiate the delivery date.
Issue draft FS Report to U.S. EPA	U.S. EPA and DOE have agreed to renegotiate the delivery date.

b. Issues/Problems

None to report.

c. Corrective Actions

None required.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending August 31, 1991

Operable Unit 5: Environmental Media

5.3 Feasibility Study

d. **Planned Activities for September 1991**

Continue revising the Operable Unit 5 Initial Screening of Alternatives report based upon the redefinition of the operable unit developed during Consent Agreement renegotiations. Specific activities include screening of technologies and evaluation of process options.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
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Period Ending August 31, 1991

SCHEDULES FOR THE SUBMITTAL OF PRIMARY DOCUMENTS UNDER THE
TERMS OF THE CONSENT AGREEMENT ARE ON HOLD PENDING THE
RENEGOTIATION OF THE REVISED CONSENT AGREEMENT DELIVERY DATES.

1508

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

Period Ending August 31, 1991

6.0 RI/FS Community Relations

a. Status of Work

The transcript from the July 16, 1991 Community Meeting was received and placed in the reading rooms. Follow-up activities from the meeting have been documented and initiated.

A Community Roundtable on "Fernald Site Cleanup Progress" was held on August 12, 1991 at the ERA Alpha Building. Four residents from the community and five members of the RI/FS project team were in attendance.

b. Issues/Problems

None to report.

c. Corrective Action

None required.

d. Planned Activities for September 1991

Submit revised appendices to the RI/FS Community Relations Plan, Volume III of the Work Plan, to the U.S. EPA. This submittal will be covered under Document Change Request #67.

Hold Community Roundtable on K-65 Silos -- September 16, 1991.

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

Period Ending August 31, 1991

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

a. Status of Work

A Sampling and Analysis Plan (SAP) comment resolution meeting was held at the FEMP on June 7, 1991 to address issues of concern and incorporate comments into the SAP. Based upon that meeting, an additional FEMP review/revision cycle for the SAP was added to the schedule. The draft SAP was revised and issued on July 23, 1991 for FEMP final review and comment. A briefing on the SAP was presented to the U.S. EPA and the Ohio EPA on August 29, 1991. The SAP is expected to be transmitted for review and approval in early September 1991.

<u>Activity</u>	<u>Comments</u>
Transmit SAP to the U.S. EPA and the Ohio EPA for approval.	September 1991.
Receive Ohio EPA and U.S. EPA comments for incorporation into SAP.	October 1991 (anticipated)

b. Issues/Problems

Signature approvals authorizing transmittal of the SAP to the U.S. EPA have not been obtained.

c. Corrective Actions

Obtain signature approvals for SAP transmittal.

d. Planned Activities for September 1991

Secure needed signatures authorizing transmittal of the SAP to the U.S. EPA.

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
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PERIOD ENDING AUGUST 31, 1991

ENCLOSURE A

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

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending August 31, 1991

Introduction

The accompanying Effluent Radiation Reports provide, in accordance with the requirements of Section XXIII.B of the Consent Agreement 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 August 1991.

Summary - August 1991

The total quantity of uranium discharged from the FEMP to the Great Miami River via Manhole 175 (Outfall 11000004001) was 34.82 kilograms. The average uranium concentration for the previous 12 months was 0.83 mg/l. This is 93.3 percent of the Derived Concentration Guide (DOE Order 5400.5) for dischargeable offsite water.

There was no discharge from the Stormwater Retention Basin (Outfall 11000004002) to Paddy's Run via the Storm Sewer Outfall Ditch in August 1991. Based on 4.73 inches of rainfall in August 1991, the total quantity of uranium discharged to Paddy's Run from uncontrolled areas of the FEMP is estimated to be 21.29 kilograms.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending August 31, 1991

Wastewater Flows and Radionuclide Concentrations

FACILITY: Fernald Environmental Management Project, U.S. Department of Energy
7400 Willey Road, P.O. Box 398704
Cincinnati, Ohio 45239 Hamilton
9002 M 9501 900212

LOCATION: 1I000004001; 001 Total Discharge MONTH: August 1991
Manhole 175 (Effluent to Great Miami River)

Day	Flow (MGD)	Total Alpha (pCi/l)	Total Beta (pCi/l)	Total U (mg/l)	Total U (kgs)	Calculated Total U-238 (pCi/l) (l)
1	0.294	198	180	0.26	0.29	88
2	0.379	194	72	0.28	0.40	95
3	0.211	149	95	0.24	0.19	81
4	0.377	194	117	0.28	0.40	95
5	0.720	180	117	0.28	0.76	95
6	1.084	131	108	0.42	1.72	142
7	1.081	194	77	0.40	1.64	135
8	0.936	185	86	0.46	1.63	155
9	0.714	432	266	0.68	1.84	230
10	0.281	662	153	0.98	1.04	331
11	0.196	599	144	0.80	0.59	270
12	0.767	387	140	0.54	1.57	182
13	1.056	252	126	0.52	2.08	176
14	1.133	239	90	0.38	1.63	128
15	0.979	221	117	0.44	1.63	149
16	0.442	212	198	0.32	0.54	108
17	0.394	284	122	0.52	0.78	176
18	0.417	293	95	0.74	1.17	250
19	0.542	387	59	0.52	1.07	176
20	0.461	383	167	0.64	1.12	216
21	1.019	239	90	0.48	1.85	162
22	1.060	293	257	0.64	2.57	216
23	0.876	293	207	0.46	1.52	155
24	0.216	230	203	0.42	0.34	142
25	0.227	509	356	1.12	0.96	378
26	0.602	505	176	0.86	1.96	291
27	0.425	365	135	0.60	0.96	203
28	0.376	239	158	0.40	0.57	135
29	0.464	243	167	0.34	0.60	115
30	0.466	243	144	0.44	0.78	149
31	0.370	243	135	0.46	0.64	155
84	----- 18.565				----- 34.82	

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

Period Ending August 31, 1991

Wastewater Flows and Radionuclide Concentrations (cont'd.)

FACILITY: Fernald Environmental Management Project

LOCATION: 001 Total Discharge

MONTH: August 1991

	<u>Flow (MGD)</u>	<u>Total Alpha (pCi/l)(2)</u>	<u>Total Beta (pCi/l)(2)</u>	<u>Total U (mg/l)(2)</u>	<u>Total U (kgs)</u>	<u>Calculated Total U-238 (pCi/l)(1)(2)</u>
Avg.	0.599	275	140	0.50	1.12	167
Max.	1.133	662	356	1.12	2.57	378
Min.	0.196	131	59	0.24	0.19	81

The average uranium concentration for the previous 12 months was 0.83 mg/l. This is 93.3 percent of the Derived Concentration Guide (DOE Order 5400.5) for ingested water.

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

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending August 31, 1991

Wastewater Flows and Radionuclide Concentrations (cont'd.)

FACILITY: Fernald Environmental Management Project, U.S. Department of Energy
7400 Willey Road, P.O. Box 398704
Cincinnati, Ohio 45239 Hamilton
9002 M 9501 900212

LOCATION: 1I000004002, 002 Discharge (Overflow) to Storm Sewer Outfall Ditch
Stormwater Retention Basin Spillway (Effluent to Paddy's Run)

MONTH: August 1991

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

Based on 4.73 inches of rainfall in August 1991, the uranium discharge to Paddy's run from uncontrolled areas of the FEMP is estimated to be 21.29 kgs.

1908

2071

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

PERIOD ENDING AUGUST 31, 1991

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

61

B-1

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

Period Ending August 31, 1991

INTRODUCTION

Enclosure B describes actions undertaken at the FEMP during the period August 1 through August 31, 1991 that are not covered by the reporting requirements of the Consent Agreement 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 brevity's sake. 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, 2, 3, and 4, Section 1.0, Site Characterization.

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 under CERCLA Sections 120 and 106(a).

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending August 31, 1991

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

3. Reports and Record Keeping

Section B

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

CLEAN AIR ACT (CAA)

Section E

The nineteenth Quarterly Particulate Emissions Report for the period April 1, 1991 through June 30, 1991 was submitted to the U.S. EPA on August 30, 1991.

RADIATION DISCHARGE INFORMATION

Section A

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

1709

2071

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

Period Ending August 31, 1991

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

REPORTING REQUIREMENTS

Section B

The Federal Facility Compliance Agreement Monthly Progress Report for July 1991 was transmitted to the U.S. EPA on August 20, 1991 as Enclosure B of the Consolidated Consent Agreement/Federal Facility Compliance Agreement (CA/FFCA) Monthly Progress Report.

1748

2071

TABLE 1

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

**STATUS OF ACTIONS AS OF
AUGUST 31, 1991**

ACTION	DESCRIPTION	COMPLETION TIME AFTER FFCA SIGNED	FY91 STATUS
CERCLA			
1.	INITIAL REMEDIAL MEASURES		
1.C	Implement radon control plan approved by the U.S. EPA.	-----	No longer applicable. Progress on actions to address radon emissions from the K-65 Silos are being reported separately under Section IX-Removal Actions of the Consent Agreement/FFCA Monthly Progress Report.
2.	REMEDIAL INVESTIGATION/FEASIBILITY STUDY		No action required.
2.A	RI/FS work is to be conducted in accordance with the U.S. EPA guidelines.	N/A	
2.B	-- No Action Required --	-----	Status information on the RI/FS is being reported in accordance with the requirements of Section X of the Consent Agreement 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 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 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 July 1991 was transmitted to the U.S. EPA on August 20, 1991 (DOE-1976-91).
CLEAN AIR ACT			
B.4	Prepare annual progress report on installation and replacement of emission control devices.	yearly	The Third Annual Progress Report on installation and replacement of emission control devices was transmitted to the U.S. EPA on February 8, 1991 (DOE-708-91).
C.	Provide annual reports to U.S. EPA per 40 CFR 61.94(c).	yearly	The Annual NESHAP Compliance Report for CY 1990 was transmitted to the U.S. EPA on June 25, 1991 (DOE-1537-91).
D.1	Provide U.S. EPA with yearly stack-testing schedule.	yearly	The 1989 stack testing schedule was transmitted to the U.S. EPA on June 16, 1989. A letter (DOE-1615-89) was transmitted to the U.S. EPA on September 15, 1989 indicating that, due to the uncertainty concerning resumption of production at the FEMP, the 1989 FFCA Stack Testing Program was being deferred. In August 1991, the DOE confirmed that no further production would take place at the facility, and renamed the facility the FEMP. Some stack operations are expected when waste processing operations are resumed. The U.S. EPA will be provided with notification of future stack testing dates when operating schedules are formulated.

TABLE 1
 STATUS OF ASSIGNMENTS FOR WORK REQUIRED ON
 FEDERAL FACILITY COMPLIANCE AGREEMENT ACTIONS

STATUS OF ACTIONS AS OF
 AUGUST 31, 1991

ACTION	DESCRIPTION	COMPLETION TIME AFTER FFCA SIGNED	FY91 STATUS
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.
E.2	Provide quarterly reports to U.S. EPA on these emissions.	quarterly	The eighteenth Quarterly Particulate Emissions Report for the period January 4, 1991 through April 5, 1991 was submitted to the U.S. EPA May 24, 1991 (DOE-1389-91). The nineteenth Quarterly Particulate Emissions Report for the period April 1, 1991 through June 30, 1991 was transmitted to the U.S. EPA on August 30, 1991. (DOE-2120-91).
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 1 of the RCRA Part B Permit Application submitted to the U.S. EPA on September 22, 1989. 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
 AUGUST 31, 1991**

ACTION	DESCRIPTION	COMPLETION TIME AFTER FFCA SIGNED	FY91 STATUS
RADIATION DISCHARGE INFORMATION			
A.3	Report to U.S. EPA, Ohio EPA and Ohio Department of Health the results of the continuous liquid discharge samples.	quarterly	The eighteenth Quarterly Liquid Discharge Report for the period January through March 1991 was transmitted to the U.S. EPA on May 24, 1991 (DOE-1389-91). The nineteenth Quarterly Liquid Discharge Report for the period April through June 1991 was transmitted to the U.S. EPA on August 30, 1991 (DOE-2120-91).
REPORTING REQUIREMENTS			
B.	Issue monthly progress report of actions taken to ensure compliance with FFCA requirements.	monthly	July's FFCA Monthly Progress Report was transmitted to the U.S. EPA on August 20, 1991 (DOE-1976-91).

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

**ENCLOSURE C
DRILLING AND BORING LOGS**

VISUAL CLASSIFICATION OF SOILS

3.29 ET 847-91

PROJECT NUMBER: 602 2727-95 ²⁴		PROJECT NAME: FERNALD RI/FS	
BORING NUMBER: 1786		COORDINATES:	
ELEVATION:		GWL: Depth Date/Time	
ENGINEER/GEOLOGIST: C. Grube		DATE STARTED: 08-06-91	
DRILLING METHODS: AUGER (HOLLOW STEM)		DATE COMPLETED: 08-07-91	
		PAGE 1 OF 4	

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 16 IN. 1	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1	NA	NA	6	Cement	NA	NA	H ₂ O = 1.5 ppm α = 0 cpm BS = 300 cpm
	NA		6	Cement	NA	NA	
2	0830 S-07	1	6	Very stiff (10 YR 5/4) yellowish brown silty clay, trace of medium gravel, low plasticity, moist	CL	3.0	H ₂ O = 2.0 ppm α = 0 cpm BS = 300-350 cpm
	0830 S-07	3	6	Stiff (10 YR 5/4) yellowish brown silty clay, low plasticity, very moist	CL	1.75	
	0830 S-07	5	4	Hard (10 YR 5/6) yellowish brown, silty clay low plasticity, moist	CL	4.5	
3	0830 S-07	8	0	No Recovery	NA	NA	H ₂ O = 1.5 ppm α = 0 cpm BS = 300-350 cpm
	0840 S-07	10	6	Hard (10 YR 5/4) yellowish brown silty clay trace of sand & fine gravel, low plasticity, moist	CL	4.0	
4	0840 S-07	11	6	SAA	CL	4.0	H ₂ O = 1.5 ppm α = 0 cpm BS = 300-350 cpm
	0840 S-07	11	0	No Recovery	NA	NA	
5	0850 S-07	15	6	Dense (10 YR 5/4) yellowish brown well graded gravelly sand, trace of silt, wet	SW	NA	H ₂ O = 1.5 ppm α = 0 cpm BS = 320-340 cpm
	0850 S-07	15	6	Very stiff (10 YR 5/4) yellowish brown silty clay trace of sand and fine gravel, low plasticity, moist	CL	3.75	
6	0850 S-07	16	2	Very stiff (10 YR 5/4) grayish brown silty clay trace of sand & fine gravel low plasticity, moist	BL	3.5	H ₂ O = 1.5 ppm α = 0 cpm BS = 320-340 cpm
	1015 S-07	5	6	Very stiff (2.5 Y 5/4) light olive brown silty clay trace of sand & fine gravel, low plasticity, moist	CL	2.25	
7	1015 S-07	5	6	Very stiff (5 Y 4/6) olive gray, silty clay, trace of sand and fine to medium gravel, low plasticity, moist	CL	3.75	H ₂ O = 1.5 ppm α = 0 cpm BS = 320-340 cpm
	1015 S-07	11	0	No Recovery	NA	NA	

4.5 FT. prof. water bearing zone
at end of boring near 5.0 FT

NOTES: CONTRACTOR: PENN DRILL
 RIC: CME-45
 DRILLER: Dave Newman
 ASSISTANT: Bob Johnson
 H&S officer: Ben Brier

SAMPLES COLLECTED PER ASTM STANDARD PENETRATION TEST
 COLORS IDENTIFIED USING MUNSSELL COLOR CHART
 BACKGROUND LEVELS: H₂O = 1.5 PPM
 α = 0 CPM
 BS = 300 CPM
 LEL = 20.6 PPM
 O₂ = 4 %

SAA = Same As Above
 NA = Not Applicable
 H₂O₂

Alpha Backscatter H₂O
 #7 ±7 329/1083

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 272739 329 04/11/91	PROJECT NAME: FERNALD RI/FS		
BORING NUMBER: 1786	COORDINATES:	DATE: 08-07-91	
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 08-07-91
ENGINEER/GEOLOGIST: C. Grube	Depth	Date/Time	DATE COMPLETED: 08-07-91
DRILLING METHODS: AUGER (HOLLOW STEM)			PAGE 2 OF 4

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 16 IN. 1	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
8	1020 8-07	8	0	Very stiff (544/2) olive gray silty clay, trace of sand & fine to medium gravel (low plasticity, moist)	CL	3.75	H ₂ O = 0-1.5 ppm α = 0 cpm β _S = 320-340 cpm
	1020 8-07	10	6	Hard, SAA	CL	4.5	
9	1020 8-07	15	6	Very stiff, (544/1) dark gray silty clay, trace of sand and fine to medium gravel, low plasticity, moist	CL	3.25	H ₂ O = 1.5 ppm α = 0 cpm β _S = 300-320 cpm
	1030 8-07	16	6	Very stiff, (544/1) dark gray silty clay, trace of sand and fine to medium gravel, low plasticity, moist	CL	3.75	
10	1030 8-07	21	6	SAA	CL	3.5	H ₂ O = NA α = NA β _S = NA
	1030 8-07	20	6	SAA	CL	2.5	
11	1330 8-07	1	0	No Recovery	NA	NA	H ₂ O = NA α = NA β _S = NA
	1330 8-07	1	0	No Recovery	NA	NA	
12	1330 8-07	2	0	No Recovery	NA	NA	H ₂ O = 2.5 ppm α = 0 cpm β _S = 280-300 cpm
	1340 8-07	9	6	Very stiff (544/1) dark gray silty clay, trace of sand and fine to medium gravel, low plasticity, moist	CL	2.75	
13	1340 8-07	11	6	SAA	CL	2.0	* Low recovery due to cobbles lodged in tip of split spoon
	1340 8-07	13	0	No Recovery	NA	NA	
14	1350 8-07	2	6	Very stiff (544/1) dark gray silty clay, trace of sand and cobble size gravel, low plasticity, moist	CL	3.0	H ₂ O = 1.5 ppm α = 0 cpm β _S = 280-300 cpm * Low Recovery due to cobbles lodged in tip of split spoon
	1350 8-07	9	0	No Recovery	NA	NA	
	1350 8-07	11	0	No Recovery	NA	NA	

NOTES:

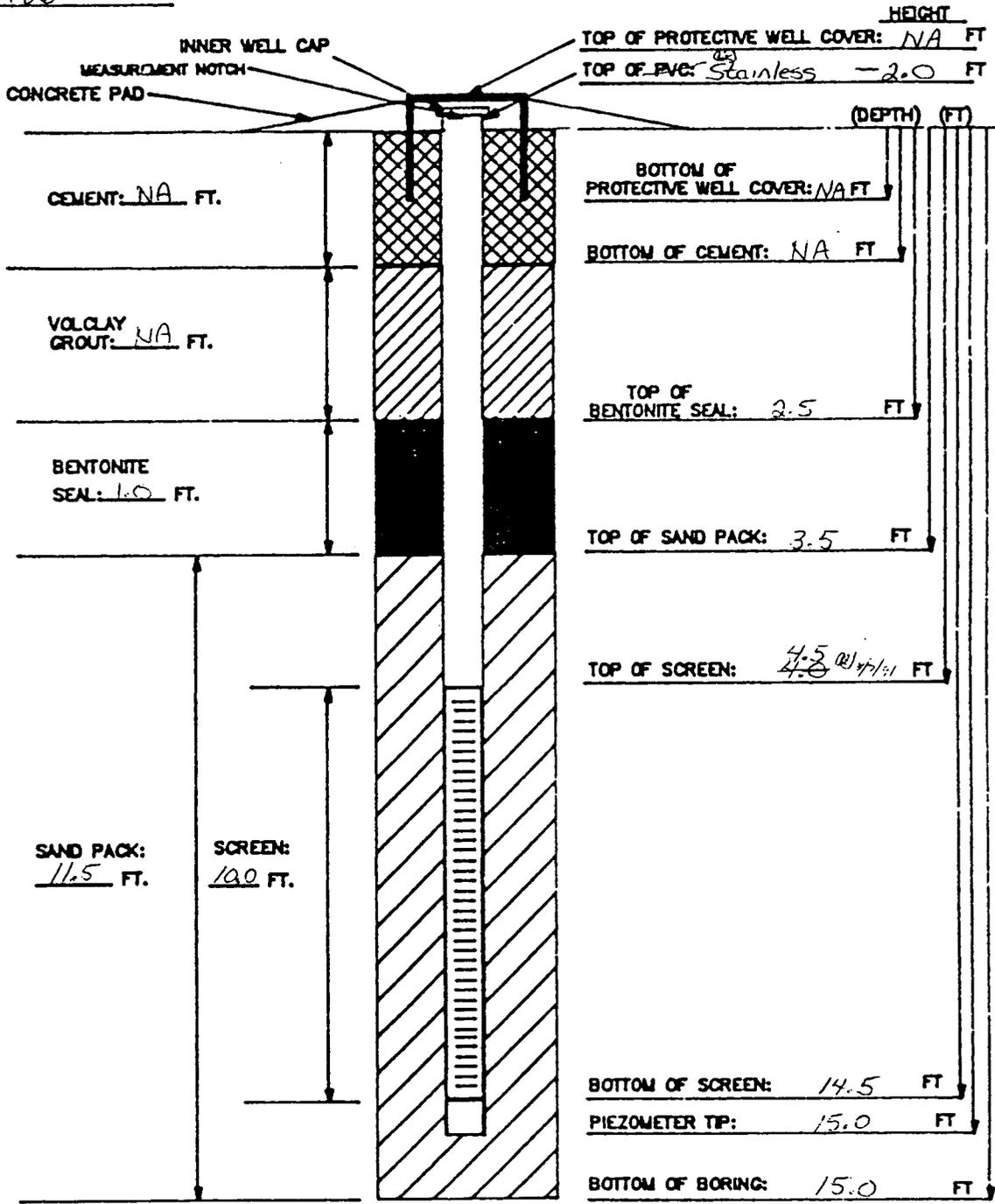
SAA = Same As Above
NA = Not Applicable

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.

1786

INSTALLATION DATE: 08-07-91



BORING DIAMETER: 10.0 INCHES

MATERIALS USED:

SAND TYPE AND QUANTITY: 3 (20 lb) bags of 10/20 sand
 BENTONITE PELLETS (5-GALLON BUCKETS): $\frac{1}{2}$ bucket
 BAGS OF VOLCLAY GROUT: NA
 AMOUNT OF CEMENT: NA
 AMOUNT OF WATER USED: 5 gal
 OTHER:

NOTES:

- 1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS. 316 stainless EXPANDABLE RUBBER PLUG AND PADLOCK.
- 2) SCREEN IS 2-INCH I.D. SCHEDULE 40 316 stainless (6) PARENTHESES INDICATE DEPTH BELOW GROUND LEVEL.
- 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 316 stainless EXPANDABLE RUBBER PLUG AND PADLOCK.

TASK: 602 ^{281 8/79} ~~2795~~

GEOLOGIST/ENGINEER: C. Grube

3.29
ET 8/9-91

2071

PIEZOMETER INSTALLATION SHEET

PROJECT NAME EMPC RI/FS FIELD ENG./GEO. Cate Grube DATE 08-07-91
 PROJECT NO. 602, 2795, 3.29 CHECKED BY _____ DATE _____
 BORING NO. 1786 ET 8-17-91
 PIEZOMETER NO. 1786 DATE OF INSTALLATION 08-07-91

BOREHOLE DRILLING

DRILLING METHOD <u>10 in. Hollow Stem Auger</u>	TYPE OF BIT <u>10 in. Hollow Auger</u>
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID <u>NA</u> FROM _____ TO _____	SIZE <u>NA</u> FROM _____ TO _____
FLUID <u>NA</u> FROM _____ TO _____	SIZE <u>NA</u> FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE <u>Monitoring piezometer</u>	RISER PIPE MATERIAL <u>316 Stainless Steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0 in ID</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>2.0 FT</u>
AVERAGE SIZE OF PERFORATIONS <u>0.010 in</u>	JOINING METHOD <u>Flush-joint threaded</u>
TOTAL PERFORATED AREA <u>10.0 FT² (11.0 FT² ^{with pump})</u>	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>NA</u>	OTHER PROTECTION <u>w/mco installed cover</u>
PROTECTIVE PIPE O.D. <u>NA</u>	<u>w/ pump assembly</u>

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (FT)		ELEVATION ()		
TOP OF RISER PIPE	2.0				
GROUND SURFACE	0.0				
BOTTOM OF PROTECTIVE PIPE	NA				
BOREHOLE FILL MATERIALS:					
	GROUT/SLURRY/CEMENT	TOP NA	BOTTOM NA	TCP	BOTTOM
	BENTONITE	TOP 2.5	BOTTOM 3.5	TOP	BOTTOM
	SAND	TOP 3.5	BOTTOM 15.0	TOP	BOTTOM
GRAVEL	TOP NA	BOTTOM NA	TOP	BOTTOM	
PERFORATED SECTION	TOP 4.5	BOTTOM 14.5	TOP	BOTTOM	
PIEZOMETER TIP	15.0				
BOTTOM OF BOREHOLE	15.0				
GWL AFTER INSTALLATION	To be taken at a later date.				

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

REMARKS Top of water bearing zone at 4.5 FT
Bottom of water bearing zone at 5.0 FT

50

VISUAL CLASSIFICATION OF SOILS

Jan P. 8. 91

ET 87891

PROJECT NUMBER: 602-26-91 3.16	PROJECT NAME: FMPC RI/FS 2/1379739.45 <i>Imo</i>		
BORING NUMBER: 1722	COORDINATES: N 48° 21' 48" E 8797' 15"	DATE: 7-30-91	
ELEVATION: 588.4	GWL: Depth	Date/Time	DATE STARTED: 7-29-91
ENGINEER/GEOLOGIST: J. Lear	Depth	Date/Time	DATE COMPLETED: 7-30-91
DRILLING METHODS: Mobile 53 Auger			PAGE: 1 OF 4

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6" -	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1	67249 17008 7-29-91	37 46	16	v. dense, brownish yellow (10yr, 6/4) gravelly clay, some sand, v. low plasticity, some organic v. dry	CL	NA	H _{nu} - 0 ppm B ₈ - 150-200 cpm α - 0 cpm
2	67250 1705 7-29-91	27 23	14	styrofoam & wood chips v. hard, dark yellowish brown to dark gray (10yr, 4/4) to (10yr, 4/1) silty clay, some gravel low plasticity, damp	CL	4.5	H _{nu} - 10-50 ppm B ₈ - 8000 cpm α - 20 cpm
3	67251 1710 7-29-91	36 34	5	Hard, olive gray (5yr, 4/2) silty clay, some gravel, low plast to med plast. sl. moist.	CL	3.75	H _{nu} - 5-10 ppm B ₈ - 10000-19000 cpm α - 50-100 cpm
4	67252 1915 7-29-91	27 17	0	N.R.	NA	NA	H _{nu} } B ₈ } NA α }
5	67253 1000 7-30-91	59	6	dark olive gray (5yr, 3/2) med, saturated limestone			H _{nu} - 5-10 ppm B ₈ - 15000 cpm α - 50-100 cpm
6				Augering to 8.0 ft			
7	67254 1410 7-30-91	14 23	0	N.R.			H _{nu} } B ₈ } NA α }
8	67255 1420 7-30-91	13 15	0	N.R.			H _{nu} } B ₈ } NA α }
9	67256 1530 7-30-91	6 6	14	Augering to 11.0' m. dense, light yellowish brown, (10yr, 6/4) silt, some cobbles, dry	ML	NA	H _{nu} - 0 ppm B ₈ - 150 cpm
10	67257 1530 7-30-91	6 6	14	very stiff, yellowish brown to dark gray, (10yr 4/6) to (10yr, 4/2) silty clay, low to med plast. moist	CL	2.5	α - 0 cpm
11	67258 1538 7-30-91	10 11	16	m. dense, light yellowish brown (10yr, 6/4) silt, some cobbles, trace sand, dry	ML	NA	H _{nu} - 0 ppm B ₈ - 150 cpm α - 0 cpm
12							
13							
14							
15							

NOTES:
 Drilling Contractor Penn Drilling
 Equipment Mobile 53 Auger
 Driller Bob Yost
 Asst Mark Kebold
 * Land fill liner located at App 11.0'

Background
 H_{nu} - 0 ppm
 B₈ - 100-200 cpm
 α - 0 cpm

VISUAL CLASSIFICATION OF SOILS

2071

ET 8-19-91

PROJECT NUMBER: <u>602.26-91 3.16</u>	PROJECT NAME: <u>FMPD RI/FS DU-2</u>		
BORING NUMBER: <u>1722</u>	COORDINATES: <u>See p 2</u>	DATE: <u>7-30-91</u>	
ELEVATION: <u>See p 2</u>	GWL: Depth	Date/Time	DATE STARTED: <u>7-29-91</u>
ENGINEER/GEOLOGIST: <u>J. Lear</u>	Depth	Date/Time	DATE COMPLETED: <u>7-30-91</u>
DRILLING METHODS: <u>Mobile 53 Auger</u>			PAGE: <u>2</u> OF <u>4</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15	67259 1540 770-91	25 27 28	15	Hard, yellowish brown, to gray (10yr. 4/6 to 10yr. 5/4) s. Hy clay, trace gravel, low plasticity. Drilling & sampling ends at 15.5'. All samples taken according to DU-2 work plan. 67260 67261 TCCF mats post. herb 1630 67262 TCCF - 750 1630 67263 TCCF 1630 67264 TCCF Drum 1645 Not Ample recovery to get second sample interval thus App is switched to 1st interval	CL	4.0	Mo - 0 ppm BT - 150 ppm α - 0 ppm

NOTES:

Drilling Contractor - Penn Drilling
 Drilling equipment - mobile 53 Auger
 Driller - Bob Yost
 Asst - Mark Bebold

Background
 Mo - 0 ppm
 BB - 150-200 ppm
 α - 0 ppm

1.2

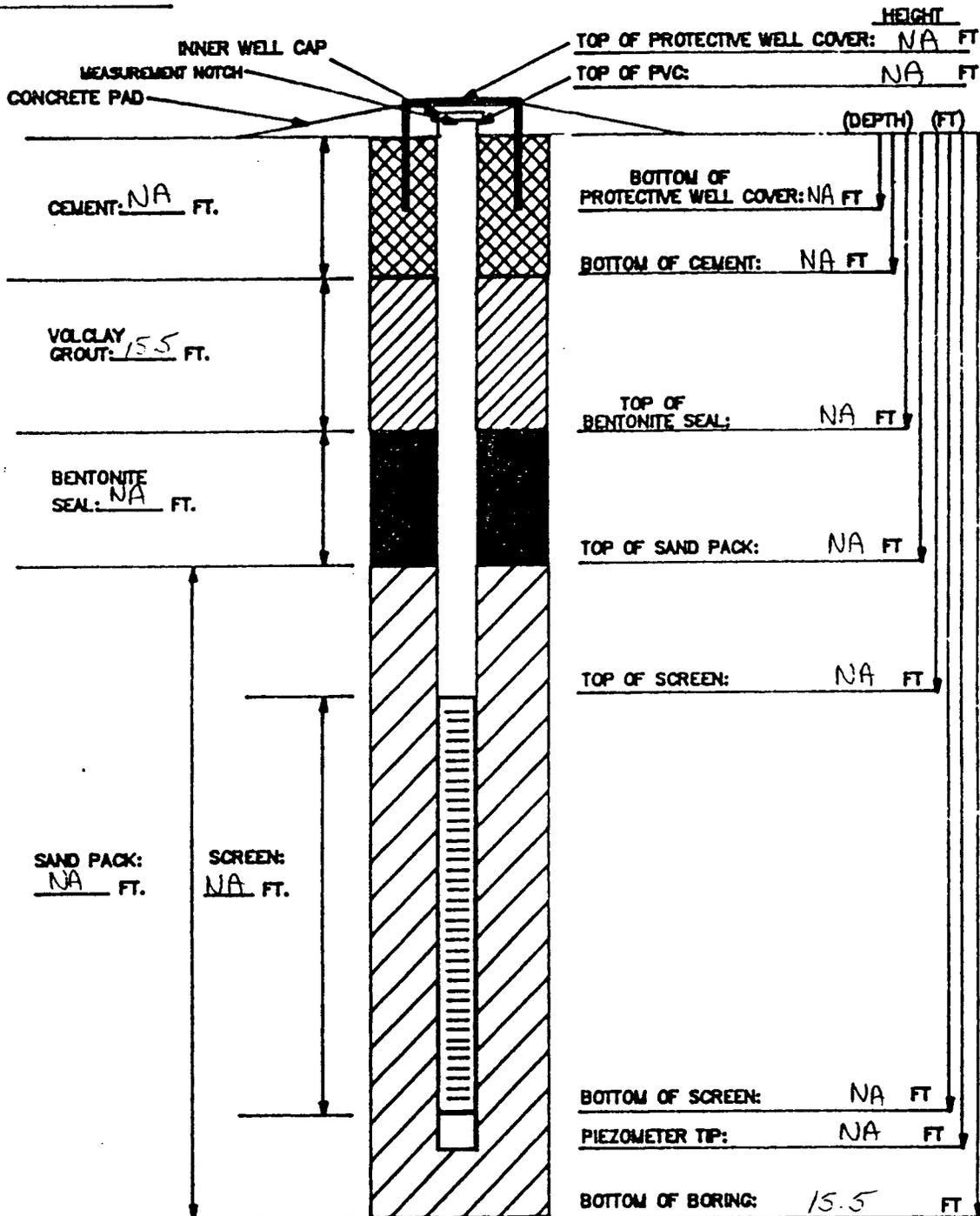
FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.

1722 Boring

plugged
INSTALLATION DATE: 7-31-91
J.L. 7-31-91

J.L. 7-31-91



BORING DIAMETER: 10 INCHES

MATERIALS USED:

SAND TYPE AND QUANTITY: NA
 BENTONITE PELLETS (5-GALLON BUCKETS): NA
 BAGS OF VOLCLAY GROUT: 1 1/2
 AMOUNT OF CEMENT: NA
 AMOUNT OF WATER USED: 55gals
 OTHER: NA

NOTES: NA

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

TASK: 602.26 ET 8-19-91
 GEOLOGIST/ENGINEER: J. LAR

3.16

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FNPC RI/FS FIELD ENG./GEO. J. LEAR DATE 7-31-91
 PROJECT NO. 102.24.91 3.16 CHECKED BY _____ DATE _____
 BORING NO. 1722 ET 8/9/91
 PIEZOMETER NO. 1722 DATE OF INSTALLATION 7-31-91

BOREHOLE DRILLING

DRILLING METHOD <u>Auger</u>	TYPE OF BIT <u>10 in Hollow Auger</u>
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID <u>NA</u> FROM _____ TO <u>→</u>	SIZE <u>NA</u> FROM _____ TO <u>→</u>
FLUID <u>NA</u> FROM _____ TO <u>→</u>	SIZE <u>NA</u> FROM _____ TO <u>→</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: <u>NA</u>	O.D. <u>NA</u> I.D. <u>NA</u>
SLOTS <input type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>NA</u>
AVERAGE SIZE OF PERFORATIONS <u>NA</u>	JOINING METHOD <u>NA</u>
TOTAL PERFORATED AREA <u>NA</u>	

PROTECTION SYSTEM

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

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (FT)		ELEVATION (FT)	
TOP OF RISER PIPE	NA		NA	
GROUND SURFACE	0.0		588.4	
BOTTOM OF PROTECTIVE PIPE	NA		NA	
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 0.0	BOTTOM 15.5	TCP 588.4	BOTTOM 568.9
BENTONITE	TOP NA	BOTTOM NA	TOP NA	BOTTOM NA
SAND	TOP NA	BOTTOM NA	TOP	BOTTOM
GRAVEL	TOP NA	BOTTOM NA	TOP	BOTTOM
PERFORATED SECTION	TOP NA	BOTTOM NA	TOP	BOTTOM
PIEZOMETER TIP	NA		NA	
BOTTOM OF BOREHOLE	NA 15.5 <u>Jaw</u>		568.9	
GWL AFTER INSTALLATION	NA		NA	

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>FMPC RI/FS</u>	PROJECT NAME: <u>FMPC RI/FS OU-2</u>	
BORING NUMBER: <u>1720</u>	COORDINATES: <u>N 48° 22' 18" E 137° 16' 16" W</u>	DATE: <u>8-10-91</u>
ELEVATION: <u>590.1</u>	GWL: Depth _____ Date/Time _____	DATE STARTED: <u>8-10-91</u>
ENGINEER/GEOLOGIST: <u>J. Lear</u>	Depth _____ Date/Time _____	DATE COMPLETED: <u>8-10-91</u>
DRILLING METHODS: <u>Mobile 53 Auger</u>		PAGE: <u>1</u> OF <u>3</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	S.A.A. Same As Above						
1	67305 1400 8-10-91	3 7 15	15	m. dense, dark yellowish brown, (10yr, 414) clayey silty, Trace sand, glass, plastic, moist.	ML	NA	H _{nu} - 0 ppm BB - 100 cpm α - 0 cpm
2	67306 1405 8-10-91	13 15 15	18	Hard, brown (10yr, 513) silty clay, trace gravel plastic, wood, brick, low plst., sil. moist.	CL	4.0	H _{nu} - 0 BB - 100-150 cpm α - 0 cpm
3	67307 1410 8-10-91	10 13 17	18	Firm, olive, (2.5y, 413) silty clay; Trace gravel mud plst. moist	CL	1.5	H _{nu} - 0 ppm BB - 80-100 cpm α - 0 cpm
5	67308 1415 8-10-91	10 12 12	18	S.A.A.	CL	1.5	H _{nu} - 0 ppm BB - 80-100 cpm α - 0 cpm
7	67309 1515 8-10-91	14 9 8	16	S.A.A. plastic, paper, brick	CL	1.5	H _{nu} - 0 ppm BB - 80-100 cpm α - 0 cpm
8	67310 67311 1520 8-10-91	7 8 10	18	Firm, olive gray, (2.5y, 418) clay trace gravel, Pumice, mud plst., moist.	CL	.75	H _{nu} - 0 ppm BB - 80-100 cpm α - 0 cpm
9	67312 67313 1525 8-10-91	23 20 21	18	Hard, yellowish brown to gray, (10yr, 518 to 10yr, 611) silty clay, trace gravel, sil moist	CL	4.0	H _{nu} - 0 ppm BB - 80-100 cpm α - 0 cpm
11	67314 1530 8-10-91	20 21 22	18	S.A.A.	CL	4.0	H _{nu} - 0 ppm BB - 80-100 cpm α - 0 cpm
13	67315 1535 8-10-91	19 17 20	18	S.A.A.	CL	4.0	H _{nu} - 0 ppm BB - 80-100 cpm α - 0 cpm
14				Boring plugged and Abandoned @ 13.5' All samples Taken According to OU-2 work Plan			

NOTES:

Drilling Contractor - Penn Drilling
 Drilling Eq. - Mobile 53 Auger
 Driller - Bob Yost
 Asst. - Mark Rebold

Ignite etc. 67316
 SELF 67317
 TOLP 67318
 Drum TOLP 67319

Background
 H_{nu} - 0 ppm
 BB - 80-120 cpm
 α - 0 cpm

* Landfill Ends app. 9.0 ft

INSTALLATION DATE: 8-11-91

2071

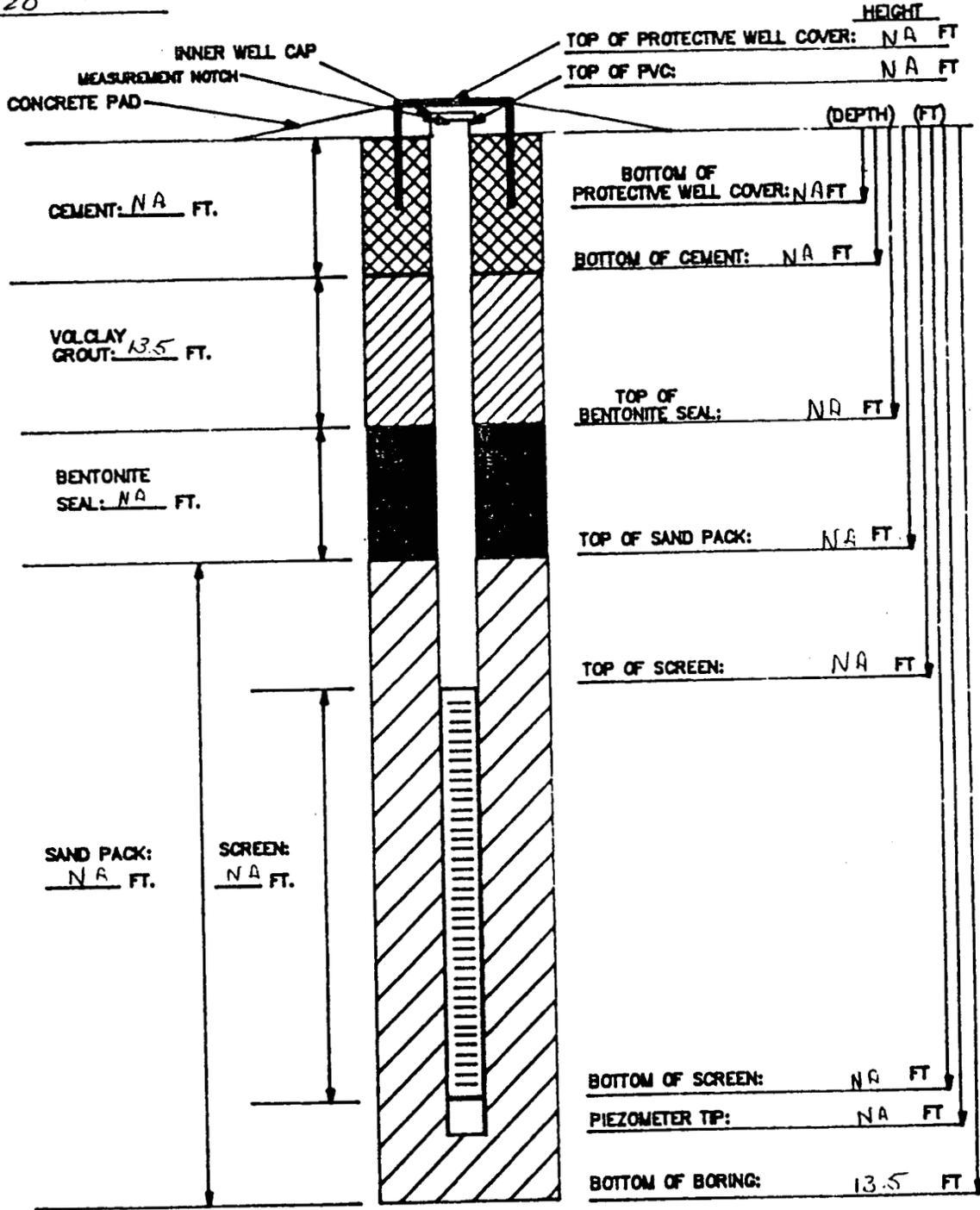
JL 8-11-91

FERNALD RI/FS

INSTALLATION DIAGRAM

MONITORING WELL NO.

Boring
1720



BORING DIAMETER: 10 INCHES

NOTES: NA

MATERIALS USED:
 SAND TYPE AND QUANTITY: NA
 BENTONITE PELLETS (5-GALLON BUCKETS): NA
 BAGS OF VOLCLAY GROUT: 2
 AMOUNT OF CEMENT: NA
 AMOUNT OF WATER USED: 55 gals
 OTHER: NA

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

TASK: 602.26.91

GEOLOGIST/ENGINEER: J. Lear

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS FIELD ENG./GEO. J. Lear DATE 8-11-91
 PROJECT NO. 602-26-91 CHECKED BY Jms DATE 9-5-91
 BORING NO. 1720
 PIEZOMETER NO. NA DATE OF INSTALLATION 8-11-91

BOREHOLE DRILLING

DRILLING METHOD <u>Auger</u>	TYPE OF BIT <u>10 in Hollow Auger</u>
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID <u>NA</u> FROM _____ TO _____	SIZE <u>NA</u> FROM _____ TO _____
FLUID <u>NA</u> FROM _____ TO _____	SIZE <u>NA</u> FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE <u>None</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 (ft)	
TOP OF RISER PIPE	NA		NA	
GROUND SURFACE	0.0		590.1	
BOTTOM OF PROTECTIVE PIPE	NA		NA	
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 0.0	BOTTOM 13.5	TCP 590.1	BOTTOM 576.6
BENTONITE	TOP NA	BOTTOM NA	TOP NA	BOTTOM NA
SAND	TOP NA	BOTTOM NA	TOP	BOTTOM
GRAVEL	TOP NA	BOTTOM NA	TOP	BOTTOM
PERFORATED SECTION	TOP NA	BOTTOM NA	TOP	BOTTOM
PIEZOMETER TIP	NA			
BOTTOM OF BOREHOLE	13.5		576.6	
GWL AFTER INSTALLATION	NA		NA	

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

REMARKS _____

REVIEWED BY QA _____ DATE _____

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>602-26-91</u>	PROJECT NAME: <u>EMPC RI/FS DU-2</u>	
BORING NUMBER: <u>1718</u>	COORDINATES: <u>See p 1</u>	DATE: <u>7-31-91</u>
ELEVATION: <u>See p 1</u>	GWL: Depth _____ Date/Time _____	DATE STARTED: <u>7-31-91</u>
ENGINEER/GEOLOGIST: <u>J. Lear</u>	Depth _____ Date/Time _____	DATE COMPLETED: <u>8-7-91</u>
DRILLING METHODS: <u>53 Mobile Auger</u>		PAGE <u>2</u> OF <u>4</u>

DEPTH (F.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (C.W.)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
16	67279 0900 8-1-91	13 50 38		S.A.A	CL	4.5	H ₂ O - 0 ppm BB - 150-200cpm α - 0cpm
				Drilling & Sampling Ends at 16.5' all Samples Taken according to the DU-2 Sampling Plan.			
				Landfill ends at App. 12.75'			
				67277 - Field Blank			
				67278 - Field Blank Replic			
				67280 - Tick out Herb Test			
				67281 - SICK			
				67282 - T ₂ etc.			
				67283 - Tick Drum			
				67284 - Archive comp			

oil
2nd

NOTES:

Drilling Contractor Vina Drilling
 Drilling Equipment Mobile 53 Auger
 Driller: Bob Vost
Mart Rebold

Background
 H₂O - 0ppm
 BB - 150-200cpm
 α - 0cpm

REVIEWED BY CA DATE _____

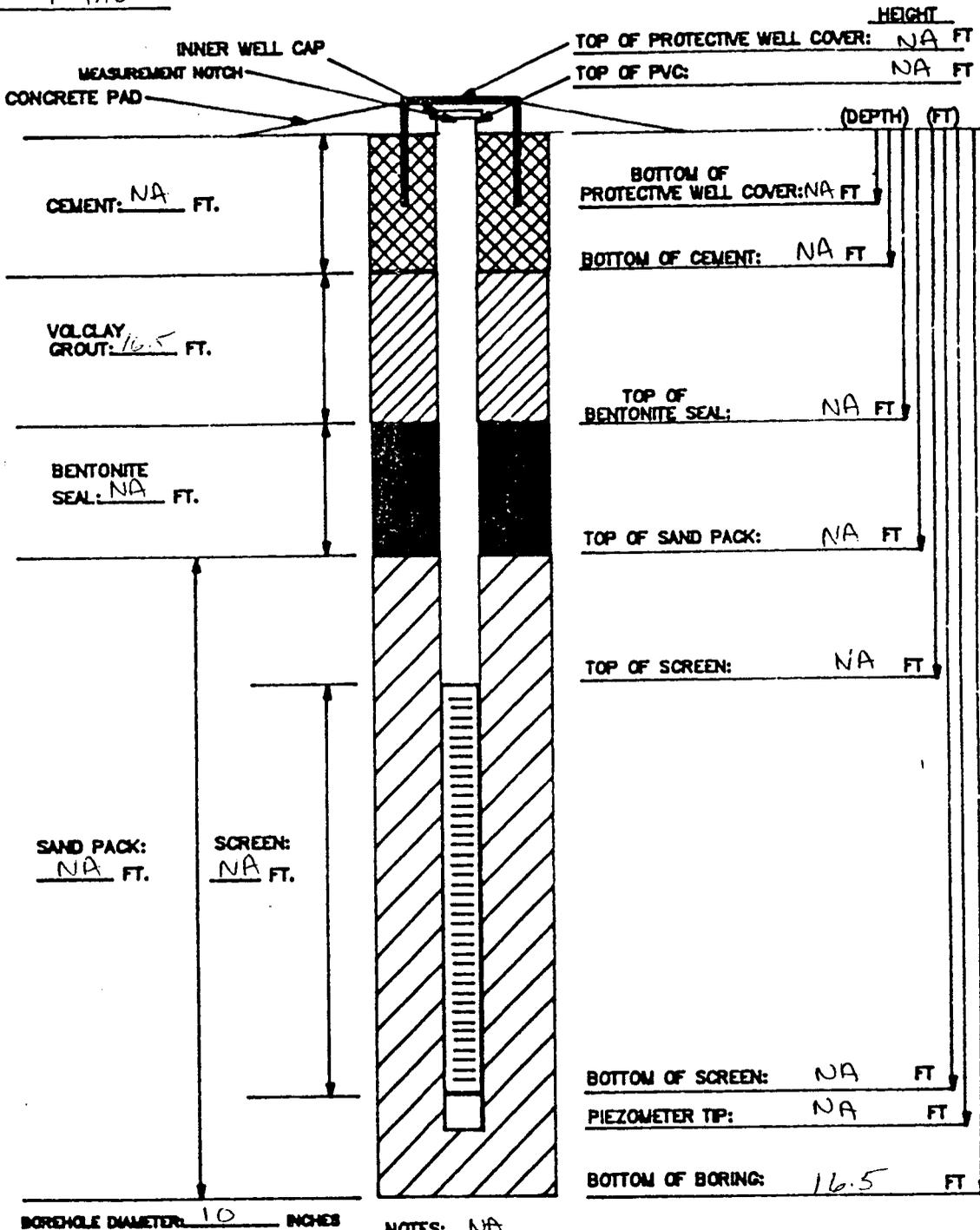
INSTALLATION DATE: 8-7-91

FERNALD RI/FS

INSTALLATION DIAGRAM MONITORING WELL NO.

Boring 178

J.C.B. 8-3-91



BORING DIAMETER: 10 INCHES

NOTES: NA

MATERIALS USED:

- SAND TYPE AND QUANTITY: NA
- BENTONITE PELLETS (5-GALLON BUCKETS): NA
- BAGS OF VOLCLAY GROUT: 1 1/2
- AMOUNT OF CEMENT: NA
- AMOUNT OF WATER USED: 559 gals
- OTHER: NA

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

TASK: 602-2491

GEOLOGIST/ENGINEER: J. LEAR

DATE

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PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS FIELD ENG./GEO. J. Lear DATE 8-5-91
 PROJECT NO. 602.2691 CHECKED BY _____ DATE _____
 BORING NO. 171B
 PIEZOMETER NO. NA DATE OF INSTALLATION 8-7-91

BOREHOLE DRILLING

DRILLING METHOD <u>Auger</u>	TYPE OF BIT <u>10 in Hollow Auger</u>
DRILLING FLUID (S) USED: FLUID <u>NA</u> FROM _____ TO <u>→</u> FLUID <u>NA</u> FROM _____ TO <u>→</u>	CASING SIZE (S) USED: SIZE <u>NA</u> FROM _____ TO <u>→</u> SIZE <u>NA</u> FROM _____ TO <u>→</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: <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 ()		ELEVATION (ft)	
	TOP	BOTTOM	TOP	BOTTOM
TOP OF RISER PIPE	<u>NA</u>			
GROUND SURFACE	<u>0.0</u>		<u>587.5</u>	
BOTTOM OF PROTECTIVE PIPE	<u>NA</u>			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP <u>0.0</u>	BOTTOM <u>16.5</u>	TOP	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>NA 16.5</u>		<u>571</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 17

DATE 72

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.26.91	PROJECT NAME: FMPC RI/FS
BORING NUMBER: 1719	COORDINATES: N 48°22'55" E 137°9'09" W
ELEVATION: 590.5	GWL: Depth 17.71 Date/Time 8-11-91 @ 1000
ENGINEER/GEOLOGIST: J. Lear	DATE: 8-7-91
DRILLING METHODS: mobile 53 Auger	DATE STARTED: 8-7-91
	DATE COMPLETED: 8-10-91
	PAGE 1 OF 4

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
				S.A.A. Same As Above			
				N.R. No Recovery			
1	67285 1430 8-7-91	7 14 19	18	stiff, brown, (10yr 4/3) silty clay, some organics trace cobbles, low plasticity, moist.	CL	2.0	H _{nu} - 0ppm BB - 80cpm α - 0
2	67286 1435 8-7-91	22 64 4	7	stiff, hard, light yellowish brown, (10yr, 6/4) silty clay, trace gravel, trace cobble, dry dense, brown, (10yr, 9/3) trace sand, silt Styracophomz installation. sl. moist	CL ML	4.5 NA	H _{nu} < 2.0ppm BB - 100-150cpm α - 0cpm
3	67287 1440 8-7-91	13 13 15	16	stiff, dark gray, (2.5y, 4/1) silty clay trace sand & trace gravel, med plast., moist	CL	2.0	H _{nu} - 0ppm BB - 80-120cpm α - 0cpm
5	67288 1445 8-7-91	14 13 11	0	N.R.	NA	NA	H _{nu} } BB } NA α }
6	67289 1515 8-7-91	13 21 14	18	Dense, dark yellowish brown, (10yr, 4/4) silt, trace sand, trace gravel, moist. stiff, dark gray, (2.5y 4/1) clay, organics trace sand, med plast. moist.	ML CL	NA .5	H _{nu} - 1-5ppm BB - 80-150cpm α - 0cpm
8	67290 1520 8-7-91	13 15 19	0	N.R.	NA	NA	H _{nu} } BB } NA α }
9	67291 1525 8-7-91	13 19 21	0	N.R.	NA	NA	H _{nu} } BB } NA α }
11	67292 1530 8-7-91	19 15 18	8	soft, olive gray (2.5 4/2) clay, trace sand and trace gravel, med plast. moist	CL	.5	H _{nu} - < 2ppm BB - 80-150cpm α - 0cpm
12	67293 0830 8-8-91	43 13 15	3	medium dense, brown, (10yr, 5/3) silty clay some gravel, low to med plasticity, moist to wet. * unable to use penetrometer	CL	NA	H _{nu} < 2.0ppm BB 80-100cpm α 0-cpm
14	67294 0840 8-8-91	11 13 24	14	Dense, dense, brown (10yr, 5/3) gravelly clay, trace cobbles, med plast. wet, organics * unable to use penetrometer	CL	NA	H _{nu} - 0-1ppm BB - 80-100cpm α - 0cpm

NOTES: Drilling Contractor - Penn Drilling Background
 Driller - Bob Yost H_{nu} - 0ppm
 Helper - Mark Rebold BB - 80-180cpm
 α - 0cpm
 67288 - Field Blank App'd
 67219 - Field Blank

REVIEWED BY SA MP DATE 9-9-91

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>602.26.91</u>	PROJECT NAME: <u>FMPC RI/FS</u>	
BORING NUMBER: <u>1719</u>	COORDINATES: <u>See p 1</u>	DATE: <u>8-8-91</u>
ELEVATION: <u>See p 1</u>	GWL: Depth Date/Time	DATE STARTED: <u>8-7-91</u>
ENGINEER/GEOLOGIST: <u>J. Lear</u>	Depth Date/Time	DATE COMPLETED: <u>8-10-91</u>
DRILLING METHODS: <u>Mobile 53 Auger</u>		PAGE <u>2</u> OF <u>4</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY (in)	DESCRIPTION	USCS SYMPL	MEASURED CONSISTENCY (TSF)	REMARKS
16	67295 0850 8-8-91	13 44 5/8	14	hard, brown, (10yr, 5/3) Gravelly clay. Some organics, med' plast. wet. -15.75 V. hard, brown to gray (10yr 5/3 to 10yr 5/1) silty clay, trace gravel, low P. plast., moist	CL	4.0	H _{no} - 0 ppm B _b - 80-100cpm
17	67296 0855 8-8-91	28 47 5/8	14	S.A.A. all sil moist No gray (10yr. sil)	CL	4.5	H _{no} - 0 ppm B _b - 80-100cpm a - 0cpm
18	67300 0900 8-8-91	27 35 4/8	16	S.A.A. all brown mottled (10yr. sil)	CL	4.5	H _{no} - 0 ppm B _b - 80-100cpm a - 0cpm
				Drilling & sampling ends at 19.5' All samples taken according to OU-2 work plan.			
				Wet Zone 12.0' - 15.75' Landfill ends at App 15.75'			
				67297 SCLP 67301 TCLP 67302 Ig. corr... 67303 TCLP Drum 67304 Archive			
					REVIEWED BY QA <u>[Signature]</u>	DATE <u>9-9-91</u>	

NOTES: Background
H_{no} - 0ppm
B_b - 80-100cpm

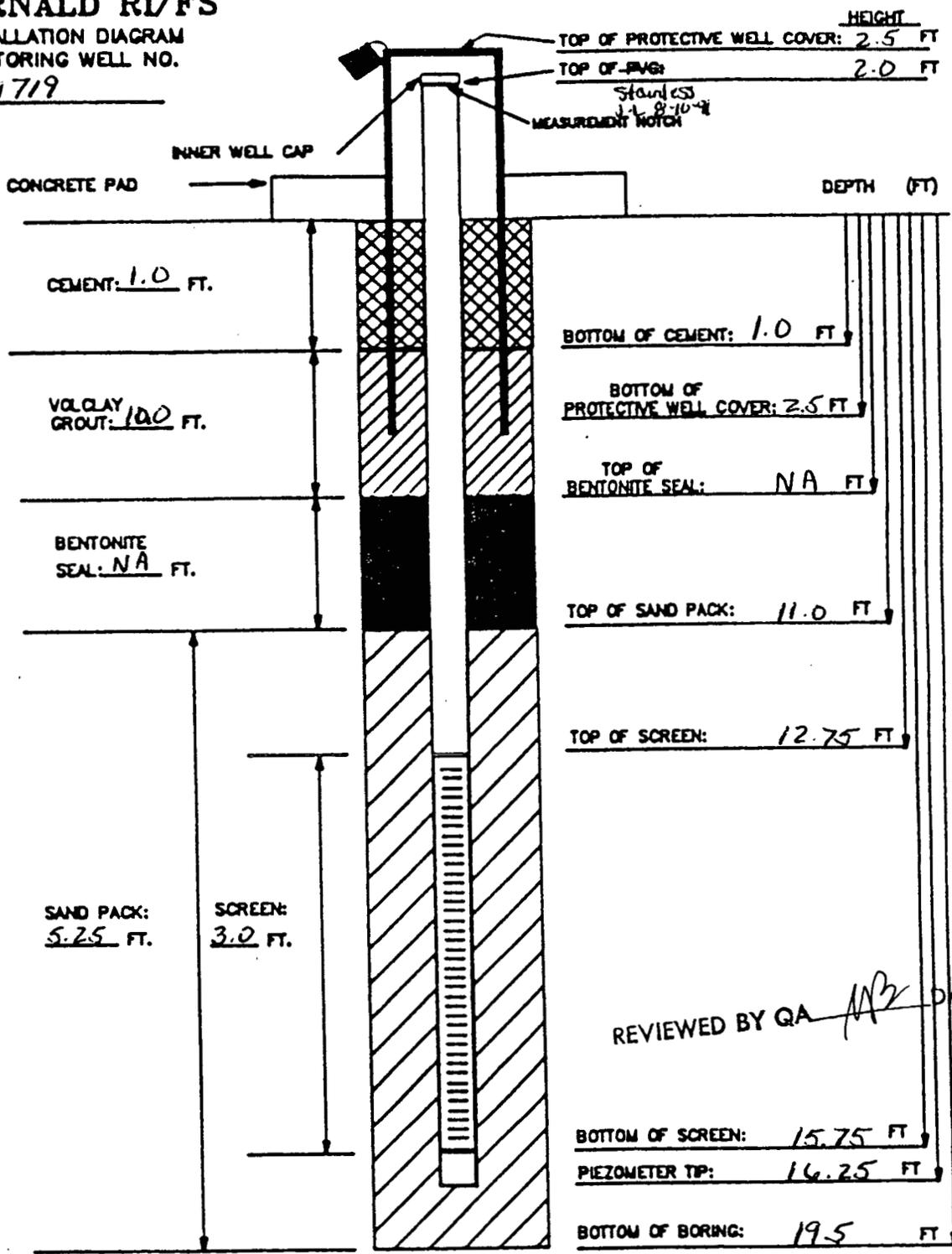
3/4

INSTALLATION DATE: 8-8-91, 8-10-91

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.

1719



REVIEWED BY QA MB DATE 9-9-91

MATERIALS USED:
 SAND TYPE AND QUANTITY: 10x20, 4-80th bags
 BENTONITE PELLETS (5-GALLON BUCKETS): 1/2
 BAGS OF VOLCLAY GROUT: 1.5
 AMOUNT OF CEMENT:
 AMOUNT OF WATER USED: 55 gals
 OTHER:

NOTES:
 1) RISER PIPE IS 4 in Stainless, 3.0 in slots
 2) PVG-PIPE, FLUSH-THREADED JOINTS. J.L
 3) SCREEN IS 3-INCH I.D. SCHEDULE 40
PVC-PIPE WITH 0.060-INCH SLOTS.
 4) LOWER END OF SCREEN IS CAPPED WITH
AN END CAP OR THREADED BUMP.
 4) WATER DEPTH/DATE: 8-10-91

TASK: 602-26-91

GEOLOGIST/ENGINEER: J. Lear

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PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS 00-2 FIELD ENG./GEO. J. Lear DATE 8-10-91
 PROJECT NO. 602.26.91 CHECKED BY J.W. DATE _____
 BORING NO. 1719
 PIEZOMETER NO. 1719 DATE OF INSTALLATION 8-10-91

BOREHOLE DRILLING

DRILLING METHOD <u>Auger</u>	TYPE OF BIT <u>10" Hollow Auger</u>
DRILLING FLUID (S) USED: <u>None</u>	CASING SIZE (S) USED: <u>NA</u>
FLUID <u>None</u> FROM _____ TO _____	SIZE <u>None</u> FROM _____ TO _____
FLUID <u>None</u> FROM _____ TO _____	SIZE <u>None</u> FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE <u>4in stainless steel</u>	RISER PIPE MATERIAL <u>4in ID stainless steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0in</u>	RISER PIPE DIAMETERS:
PERFORATION TYPE:	O.D. <u>4 3/8</u> I.D. <u>4.0in</u>
SLOTS <input checked="" type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>10ft, 2ft, 5ft</u>
AVERAGE SIZE OF PERFORATIONS <u>0.010</u>	JOINING METHOD <u>Threaded, flush joined</u>
TOTAL PERFORATED AREA <u>3.0ft</u>	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>5.0ft</u>	OTHER PROTECTION <u>Hinged well cap,</u>
PROTECTIVE PIPE O.D. <u>10.25in</u>	<u>Riser cap</u>

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION ()	
	TOP	BOTTOM	TOP	BOTTOM
TOP OF RISER PIPE	2.0'		592.1	
GROUND SURFACE	0.0		590.5 ^{Jan}	
BOTTOM OF PROTECTIVE PIPE	2.5'		587.4	
BOREHOLE FILL MATERIALS: <u>Cement</u> GROUT/SLURRY BENTONITE SAND GRAVEL	TOP 0.0	BOTTOM 1.0	590.15 ⁸	
	TOP 1.0	BOTTOM 11.0	TCP 589.1	BOTTOM 579.1
	TOP NA	BOTTOM NA	TOP NA	BOTTOM NA
	TOP 11.0	BOTTOM 16.25	TOP 579.1	BOTTOM 573.85
	TOP NA	BOTTOM NA	TOP NA	BOTTOM NA
PERFORATED SECTION	TOP 18.75	BOTTOM 15.75	TOP 577.35	BOTTOM 572.35
PIEZOMETER TIP	16.25		573.85	
BOTTOM OF BOREHOLE	19.5		570.6	
GWL AFTER INSTALLATION				

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

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REMARKS: 1/2 bucket of bentonite was used to secure sand

REVIEWED BY GA MB DATE 9-9-91

VISUAL CLASSIFICATION OF SOILS

602.3.16

PROJECT NUMBER: 602.26.91	PROJECT NAME: FMPK RI/FS OU-2
BORING NUMBER: 1793	COORDINATES: N 477464.98 E 1379446.76
ELEVATION: 572.2	DATE: 8-15-91
ENGINEER/GEOLOGIST: J. Lear	GWL: Depth Date/Time
DRILLING METHODS: 53 Mobile Auger	DATE STARTED: 8-15-91
	DATE COMPLETED:
	PAGE 1 OF 3

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1	67331 10:5 8-15-91	4 25	16	Dense, brown, (10yr, 4/13) clayey silt. Some gravel. Some organics, sil moist	ML	NA	H _{nu} - 0 ppm B _B - 80 cpm α - 0 cpm
2	67332 10:20 8-15-91	27 27	18	v. hard, gray to yellowish brown (10yr, 5/11 to 10yr 4/16) silty clay, trace gravel, trace organics, low plasticity, sil moist	CL	>4.5	H _{nu} - 0 ppm B _B - 80 cpm α - 0 cpm
3	67333 10:25 8-15-91	27 27	12	v. hard, brown (10yr, 5/13) silty clay. Some gravel trace organics, low plast. dry	CL	>4.5	H _{nu} - 0 ppm B _B - 80 cpm α - 0 cpm
4	67334 10:30 8-15-91	40 28	16	v. hard, v. dark grayish brown (10yr, 3/12) silty clay, some gravel, trace organics low plasticity, sil moist.	CL	>4.5	H _{nu} - 0 ppm B _B - 80 cpm α - 0 cpm
5	67335 10:30 8-20-91	33 26	17	v. hard, brown to dark gray (10yr, 5/13 to 10yr 4/11) silty clay, some gravel, trace organics low plast., dry to sil moist	CL	>4.5	H _{nu} - 0 ppm B _B - 80 cpm α - 0 cpm
6	67336 10:35 8-20-91	26 23	18	hard, yellowish brown, (10yr, 5/16) mottled silty clay, trace sand, low plast., moist	CL	3.75	H _{nu} - 0 ppm B _B - 80 cpm α - 0 cpm
7	67337 10:40 8-20-91	21 17	18	S.A.A. add trace gravel	CL	3.75	H _{nu} - 0 ppm B _B - 80 cpm α - 0 cpm
8	67338 10:45 8-20-91	14 21	12	S.A.A. dense, brown, (10yr, 5/13) silt. some clay, moist.	CL ML	3.0 NA	H _{nu} - 0 ppm B _B - 80 cpm α - 0 cpm
9	67339 13:15 8-20-91	20 22	17	S.A.A. Hard, brown (10yr, 5/13) clayey silt, moist.	ML ML	NA NA	H _{nu} - 0 ppm B _B - 80 cpm α - 0 cpm
10	67340 13:20 8-20-91	18 32	18	S.A.A. Hard, brown, (10yr, 5/13) silty clay, trace gravel, low plasticity, moist	ML CL	NA 3.0	H _{nu} - 0 ppm B _B - 80 cpm α - 0 cpm

Ext
HSL

TCLP
Landfill
ends
cut
wall

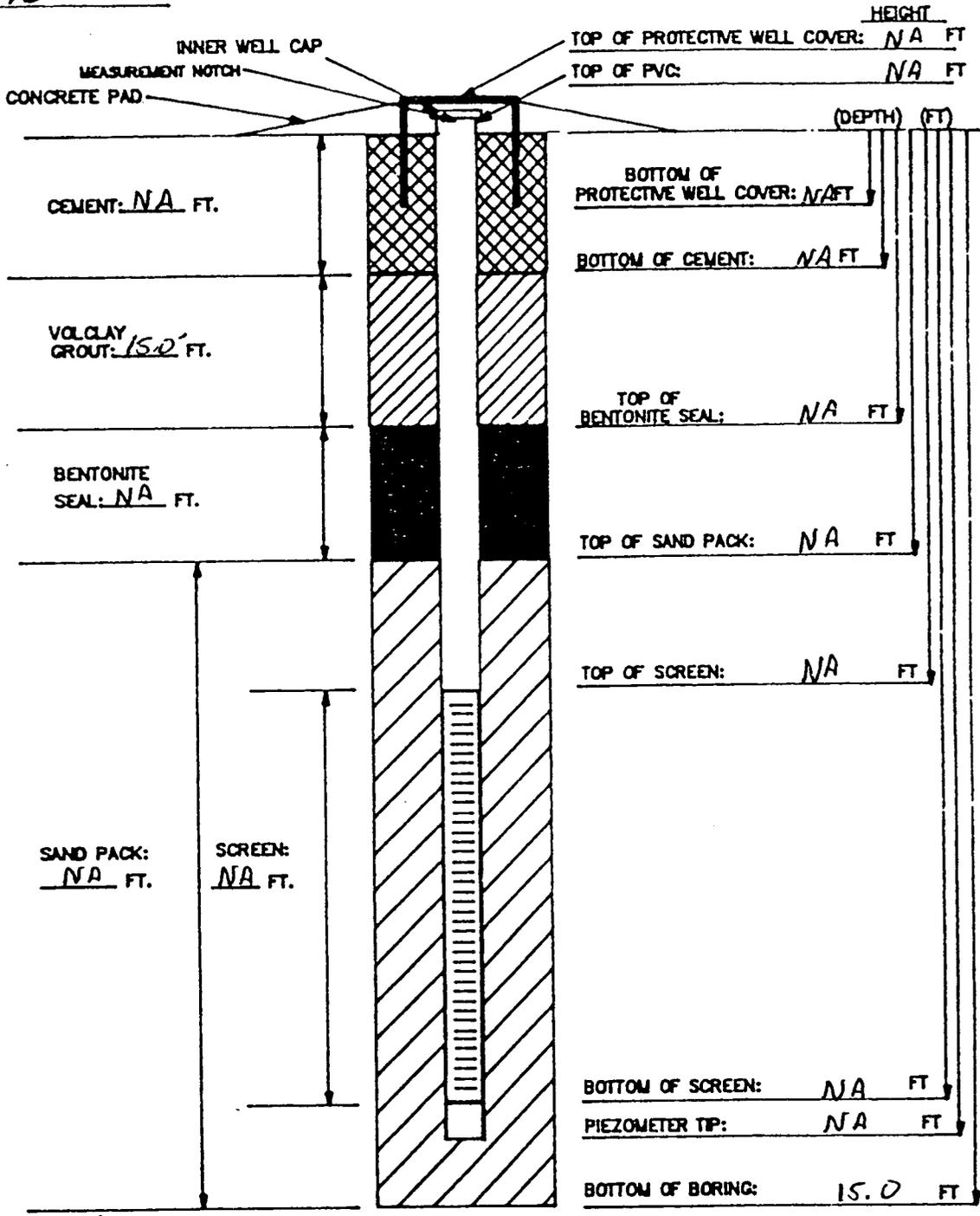
NOTES: Drilling Contractor - Penn Drilling
 Driller - Bob Yost
 Asst. - Bill Anderson
 Drilling & Sampling ends at 15.0'
 67341 - field blank
 Backgrounds
 H_{nu} - 0 ppm
 B_B - 80 cpm
 α - 0 cpm
 All samples taken according to the OU-2 Southfield Addendum work plan. Land fill ends at 7.5'

REVIEWED BY QA *[Signature]* DATE 9-9-91 77

1500

FERNALD RI/FS
 INSTALLATION DIAGRAM
 MONITORING WELL NO.
1793

INSTALLATION DATE: 9-20-91
 2071



MATERIALS USED:
 SAND TYPE AND QUANTITY: NA
 BENTONITE PELLETS (5-GALLON BUCKETS): NA
 BAGS OF VOLCLAY GROUT: 2 50lb bags
 AMOUNT OF CEMENT: NA
 AMOUNT OF WATER USED: 55 gal
 OTHER: NA

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

TASK: 602-3-16 GEOLOGIST/ENGINEER: J. Lear

REVIEWED BY QA MB DATE 9-9-91 78

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS FIELD ENG./GEO. J. Lear DATE 8-20-91
 PROJECT NO. 602-316 CHECKED BY _____ DATE _____
 BORING NO. 1793
 PIEZOMETER NO. NA DATE OF INSTALLATION 8-20-91

BOREHOLE DRILLING

DRILLING METHOD <u>Auger</u>	TYPE OF BIT <u>12.0 Hollow Auger</u>
DRILLING FLUID(S) USED: <u>NA</u>	CASING SIZE(S) USED: <u>NA</u>
FLUID <u>NA</u> FROM _____ TO _____	SIZE <u>NA</u> FROM _____ TO _____
FLUID <u>NA</u> FROM _____ TO _____	SIZE <u>NA</u> FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE <u>NA</u>	RISER PIPE MATERIAL <u>NA</u>
DIAMETER OF PERFORATED SECTION <u>NA</u>	RISER PIPE DIAMETERS:
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 ()		ELEVATION (ft)	
TOP OF RISER PIPE	NA		NA	
GROUND SURFACE	0.0		572.2	
BOTTOM OF PROTECTIVE PIPE	NA		NA	
BOREHOLE FILL MATERIALS:	TOP	BOTTOM	TCP	BOTTOM
	GROUT/SLURRY	0.0 15.0	522.2	557.2
	BENTONITE	NA NA	NA	NA
	SAND	NA NA		
GRAVEL	NA NA			
PERFORATED SECTION	TOP	BOTTOM	TOP	BOTTOM
	NA	NA		
PIEZOMETER TIP	NA			
BOTTOM OF BOREHOLE	15.0'		557.2	
GWL AFTER INSTALLATION	NA		NA	

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

REMARKS _____

VISUAL CLASSIFICATION OF SOILS

2071

PROJECT NUMBER: <u>602.25.91</u>	PROJECT NAME: <u>FMPC RI/FS OU-1</u>	
BORING NUMBER: <u>1774</u>	COORDINATES:	DATE: <u>8/26/91</u>
ELEVATION:	GWL: Depth	Date/Time
ENGINEER/GEOLOGIST: <u>Harris/Casseday</u>	Depth	Date/Time
DRILLING METHODS: <u>Hollow Stem Auger</u>	DATE STARTED: <u>8/26/91</u>	
	DATE COMPLETED: <u>8/27/91</u>	
	PAGE <u>1</u> OF <u>5</u>	

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (pcf)	WELL CONSTRUCTION	REMARKS
0	63650 8-26-91 7:32	12	0	NR , NR				HNU NA
1	63651 8-26-91 7:32	16	6	Very Dense (10%R, 6/2) Light Brownish Gray clay with some large angular gravel (cement) slightly moist to dry.	CL	5.6		HNU 5.6
	63652 8-26-91 7:32	16	6		CL	5.7		HNU 5.7
	63653 8-26-91 7:32	12	6		CL	5.7		HNU 5.7
2	63654 8-26-91 7:42	32	0		NR			
	63655 8-26-91 7:42	34	6	SAA	CL	0		HNU 0
3	63656 8-26-91 7:42	35	6	SAA	CL	0		HNU 0
	63657 8-26-91 7:42	38	6	SAA	CL	0		HNU 0
4	63658 8-26-91 7:55	20	6	SAA	CL	2.0		HNU 2.0
	63659 8-26-91 7:55	18	6	SAA	CL	2.0		HNU 2.0
5	63660 8-26-91 7:55	15	6	SAA	CL	2.0		HNU 2.0
	63661 8-26-91 7:55	13	6	SAA	CL	2.0		HNU 2.0
6	63662 8-26-91 8:07	11	6	SAA	CL	0		HNU 0
	63663 8-26-91 8:07	26	6	SAA	CL	0		HNU 0
7	63664 8-26-91 8:07	31	6	Very Dense (10%R, 6/8) Brownish Yellow sandy clay-like material dry	CL	0		HNU 0

px (60 BR)

NOTES:

Drilling Contractor Penn Drilling Co.
 Drilling Equipment Simco
 Driller: E. Gardner
Ass. J. Strappazani

SAA - Same as above
 NR - No Recovery
 NA - Not Applicable

65

80

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.25.91	PROJECT NAME: FMPC RI/FS OU-1		
BORING NUMBER: 1774	COORDINATES	DATE: 8/26/91	
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 8/26/91
ENGINEER/GEOLOGIST: Harris/Casseday	Depth	Date/Time	DATE COMPLETED: 8/27/91
DRILLING METHODS: Hollow Stem Auger			PAGE 2 OF 5

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (PSI)	WELL CONSTRUCTION	REMARKS
8	63665 8:07 8-26-91	56 807 8-26-91	6	Very dense (SY, 3/1) Very dark gray silty Material. dry	CL			HNU 0 α 0 Bγ 30000
	63666 8-26-91 8:42	10	6	Medium dense (10γ, 6/1) gray clay interspersed with pockets of white material (clay-like) slightly moist.	CL			HNU 0 α 0 Bγ 200
9	63667 8-26-91 8:42	10	6	SAA	CL			HNU 0 α 0 Bγ 2000
	63668 8-26-91 8:42	7	6	SAA	CL			HNU 0 α 0 Bγ 2000
10	63669 8-26-91 8:42	6	6	SAA	CL			HNU 0 α 0 Bγ 800
	63670 8-26-91 9:06			SHELBY TUBE 24" PUSHED				HNU NA α NA Bγ NA
12	63671 8-26-91 9:13	8	6	MEDIUM DENSE (2.5γ, NB/1) VERY DARK GRAY SILTY CLAYEY MATERIAL - VERY MOIST, JELLY LIKE CONSISTENCY (RUBBERY) WAXY APPEARANCE				HNU 0 α 0 Bγ 1200
	63672 8-26-91 9:13	7	6	SAA				HNU 0 α 0 Bγ 1000
13	63673 8-26-91 9:13	7	6	SAA				HNU 0 α 0 Bγ 1000
	63674 8-26-91 9:13	7	6	SAA				HNU 0 α 0 Bγ 1000
14	63675 8-26-91 9:19	8	6	SAA				HNU 0 α 0 Bγ 1000
	63676 8-26-91	20	6	SAA				HNU 0 α 0 Bγ 1100

HSL
VOA
FERTAL 1
FERTAL 2

SHELBY TUBE
PUSHED 24"

NOTES: 9-19

Drilling Contractor Penn. Drilling Co.

Drilling Equipment Simco

Driller: E. Gardner

SB Ass. J. Strappazoni

SAA - Same as above
NR - No Recovery
NA - Not Applicable

VISUAL CLASSIFICATION OF SOILS

2071

PROJECT NUMBER: <u>602.25.91</u>	PROJECT NAME: <u>FMPC RI/FS OU-1</u>	
BORING NUMBER: <u>1774</u>	COORDINATES	DATE: <u>8/26/91</u>
ELEVATION:	GWL: Depth	Date/Time
ENGINEER/GEOLOGIST: <u>HARRIS/CASSEDAY</u>	Depth	Date/Time
DRILLING METHODS: <u>HOLLOW STEM AUGER</u>		DATE COMPLETED: <u>8/27/91</u>
		PAGE <u>3</u> OF <u>5</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (IS)	WELL CONSTRUCTION	REMARKS
15	63677 8-26-91 9:19	13	6	SAA				HNU 0 0 BX 1000
	63678 8-26-91 9:19	20	6	SAA				HNU 0 0 BX 1000
16	63679 8-26-91 9:43	12	6	SAME AS PREVIOUSLY BUT LESS MOIST INTERSPERSED WITH POCKETS OF YELLOW, SUGARY TEXTURED MATERIAL				HNU 0 0 BX 1200
	63680 8-26-91 9:43	16	6		SAA			HNU 0 0 BX 1000
17	63681 8-26-91 9:43	15	6	SAA				HNU 0 0 BX 1200
	63682 8-26-91 9:43	13	6	SAA				HNU 0 0 BX 1000
18	63683 8-26-91 13:30	8	6	MEDIUM DENSE (2.57, US) CLAY-LIKE MATERIAL INTERSPERSED WITH SMALL BROWN DEPOSITS OF GRAINY MATERIAL. WET WITH A GREASY APPEAR- ANCE, TRASH AS PAPER PRESENT				HNU 0 0 BX 1000
	63684 8-26-91 13:30	7	6		SAA			HNU 0 0 BX 1000
19	63685 8-26-91 13:30	4	6	SAA				HNU 0 0 BX 1000
	63686 8-26-91 13:30	4	6	SAA				HNU 0 0 BX 1000
20								HNU NA NA BX NA NA
21	63687 8-26-91 13:51	SHELBY TUBE PUSHED	24"	SHELBY TUBE PUSHED 24"				HNU NA NA BX NA NA
22	63688 8-26-91 13:58	5	6	DENSE (2.57, US) CLAY-LIKE MATERIAL CONSIST- ENT THROUGHOUT, UNIFORMLY MOIST, GREASY CONSISTENCY,				HNU 0 0 BX 900

SL VOA
CLD JOA
SERIAL 2
SERIAL 3

NOTES:

Drilling Contractor: PENN DRILLING CO.

Drilling Equipment: SIMCO

Driller: E. GARDNER
Ass. J. STRAPAZON.

SAA - SAME AS ABOVE

NR - NO RECOVERY

NA - NOT APPLICABLE

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.25.91	PROJECT NAME: FMPC RI/FS OU-1
BOPING NUMBER: 1774	COORDINATES:
ELEVATION:	GWL: Depth Date/Time
ENGINEER/GEOLOGIST: Harris/Cassedy	DATE: 8/26/91
DRILLING METHODS: Hollow Stem Auger	DATE STARTED: 8/26/91
	DATE COMPLETED: 8/27/91
	PAGE 4 OF 5

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (SPT)	WELL CONSTRUCTION	REMARKS
23	63689 8-26-91 13:58	4	6	SAA				HNU 0 α 0 Bγ 800
	63690 8-26-91 13:58	4	6	SAA				HNU 0 α 0 Bγ 800
	63691 8-26-91 13:58	5	6	SAA				HNU 0 α 0 Bγ 800
24	63692 8-26-91 14:05	8	6	MEDIUM DENSE (7.5YR,N3) VERY DARK GRAY CLAY. VERY MOIST, CONSISTENT, GREASE LIKE				HNU 0 α 0 Bγ 200
	63693 8-26-91 14:05	2	6	SAA				HNU 0 α 0 Bγ 400
25	63694 8-26-91 14:05	5	6	MEDIUM DENSE (7.5YR, NS1) GRAY CLAY LIKE MATERIAL. GRADES BACK TO MATERIAL SIMILARLY DESCRIBED ABOVE. VERY MOIST GREASY.				HNU 0 α 0 Bγ 600
	63695 8-26-91 14:05	11	6	MEDIUM DENSE (7.5YR, N3) VERY DARK GRAY MATERIAL AS DESCRIBED BEFORE.				HNU 0 α 0 Bγ 800
26	63696 8-26-91 14:24	7	6	MEDIUM DENSE (2.5Y, N3) VERY DARK GRAY CLAY MATERIAL WITH POCKETS OF WHITE AND LIGHT BROWN CLAY MATERIAL, VERY MOIST & GREASY				HNU 0 α 0 Bγ 800
	63697 8-26-91 14:24	5	6	SAA, but lacking the white and brown material, sugary texture in places.				HNU 0 α 0 Bγ 1000
	63698 8-26-91 14:24	7	6	SAA				HNU 0 α 0 Bγ 1000
27	63699 8-26-91 14:24	8	6	SAA				HNU 0 α 0 Bγ 1000
	63700 8-26-91 14:32	5	6	MEDIUM DENSE (2.5Y, N3) VERY DARK GRAY CLAYEY MATERIAL WITH TRASH (PAPER) THROUGHOUT WET, PUDDING-LIKE APPEARANCE				HNU 0 α 0 Bγ 200
29	63701 8-26-91 14:32	8	6	SAA				HNU 0 α 0 Bγ 600
	63702 8-26-91 14:32	9	6	SAA				HNU 0 α 0 Bγ 800
	63703 8-26-91 14:32	11	6	SAA				HNU 0 α 0 Bγ 800
	63704 8-26-91 14:32	11	6	SAA				HNU 0 α 0 Bγ 800

NOTES:
 Drilling Contractor: Penn Drilling Co.
 Drilling Equipment: Simon
 Driller: E. Gardner
Ass. J. Strappazoni

SAA - Same as above
 NR - No Recovery
 NA - Not Applicable 83

VISUAL CLASSIFICATION OF SOILS

2071

PROJECT NUMBER: 602.25.91	PROJECT NAME: FMPC RI/FS OU-1	
BORING NUMBER: 1774	COORDINATES:	DATE: 8/26/91
ELEVATION:	GWL: Depth	Date/Time
ENGINEER/GEOLOGIST: HARRIS/CASSEDAY	Depth	Date/Time
DRILLING METHODS: Hollow Stem Auger	PAGE 5 OF 5	

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (IS)	WELL CONSTRUCTION	REMARKS
30	63704 8-27-91 8:25	5	6	VERY DENSE (2.57M ³) BLACK CLAY LIKE MATERIAL. VERY WET. FLOWING - CONSISTENTLY OF OLD MOTOR OIL. PAPER TRASH INTERSPERSED				PT-20CLM (BR)
31	63705 8-27-91 8:25	7	6	SAA				
	63706 8-27-91 8:25	26	6	VERY DENSE (10YR, 6/1) GRAY CLAY WITH SILT AND SAND MATERIAL MIXED IN. SLIGHTLY MOIST, VERY HARD.				
		27						
32								
33								
34								
35								
36								
37								

HSL
VOA

NOTES:

Drilling Contractor PENN DRILLING Co.
 Drilling Equipment SIMCO
 Driller: E. GARDNER
EE Ass. J. STRAPPAZONI

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

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS (00-1) FIELD ENG./GEO. M. HARRIS DATE 8-27-91
 PROJECT NO. 602.3.15 CHECKED BY _____ DATE _____
 BORING NO. 1774
 PIEZOMETER NO. 1774 DATE OF INSTALLATION 8-27-91

BOREHOLE DRILLING

DRILLING METHOD <u>HOLLOW STEM AUGER</u>	TYPE OF BIT <u>AUGER</u>
DRILLING FLUID(S) USED:	CASING SIZE (S) USED:
FLUID <u>NONE</u> FROM _____ TO _____	SIZE <u>NONE</u> FROM _____ TO _____
FLUID <u>NONE</u> FROM _____ TO _____	SIZE <u>NONE</u> FROM _____ TO _____

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:
PERFORATION TYPE:	O.D. <u>4 3/8"</u> I.D. <u>4.0"</u>
SLOTS <input checked="" type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>33.0'</u>
AVERAGE SIZE OF PERFORATIONS <u>0.01</u>	JOINING METHOD <u>FLUSH JOINT</u>
TOTAL PERFORATED AREA <u>4.0 FEET</u>	<u>THREADED</u>

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>2.05 FEET</u>	OTHER PROTECTION <u>HINGED LOCKING</u>
PROTECTIVE PIPE O.D. <u>10 3/4 INCH</u>	<u>COVER WITH PAD LOCK</u>

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (FT)		ELEVATION (FT)	
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0		590.8'	
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 0.0	BOTTOM 23.0	TCP	BOTTOM
BENTONITE	TOP 23.0	BOTTOM 25.0	TOP	BOTTOM
SAND	TOP 25.0	BOTTOM 31.0	TOP	BOTTOM
GRAVEL <u>NONE USED</u>	TOP N/A	BOTTOM N/A	TOP	BOTTOM
PERFORATED SECTION	TOP 26.5	BOTTOM 30.5	TOP	BOTTOM
PIEZOMETER TIP	31.0			
BOTTOM OF BOREHOLE	31.0			
GWL AFTER INSTALLATION				

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

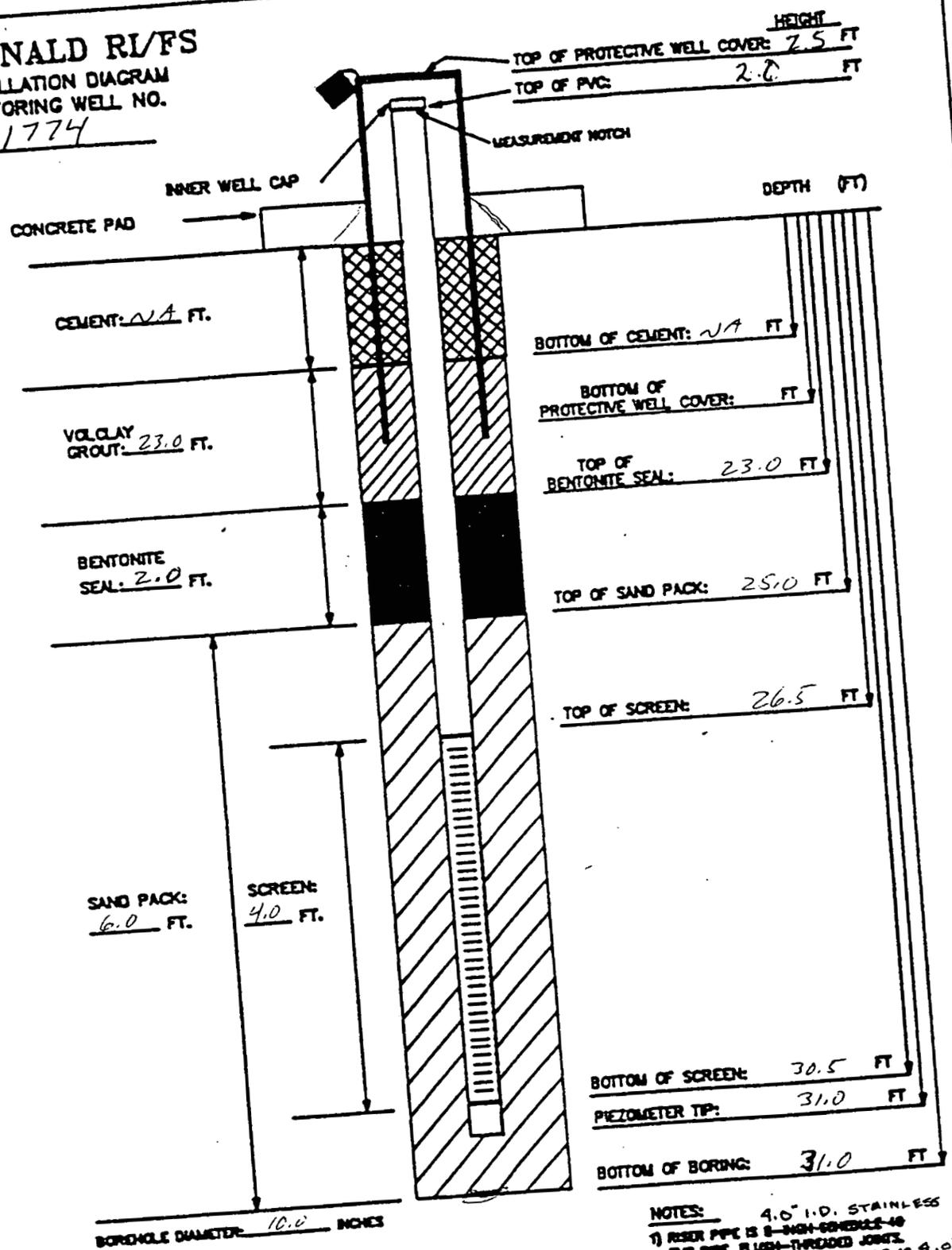
REMARKS WOOD PLUG USED IN AUGER DURING WELL

INSTALLATION

INSTALLATION DATE: 8/27/92 2071

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.
1774



MATERIALS USED:
 SAND TYPE AND QUANTITY:
 BENTONITE PELLETS (5-GALLON BUCKETS):
 BAGS OF VOLCLAY GROUT:
 AMOUNT OF CEMENT: N/A
 AMOUNT OF WATER USED:
 OTHER: 3'x3' CONCRETE
 PAD WILL BE INSTALLED.

TASK: 3-15

- NOTES:** 4.0" I.D. STAINLESS STEEL.
- 1) RISER PIPE IS 8-INCH CONDUIT-40 PVC PIPE, FLUSH-THREADED JOINTS.
 - 2) SCREEN IS 8-INCH 40-SCHEDULE 40 4.0" I.D. STAINLESS STEEL WITH 0.020-INCH SLOTS.
 - 3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED STOP.
 - 4) WATER DEPTH/DATE:

GEOLOGIST/ENGINEER: Harris

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>602.25.91 TASK 3.15</u>	PROJECT NAME: <u>FMPC RI/FS OU-1</u>
BOHNING NUMBER: <u>1769</u>	COORDINATES: _____
ELEVATION: _____	GWL: Depth _____ Date/Time _____
ENGINEER/GEOLOGIST: <u>Harris</u>	DATE STARTED: <u>8/20/91</u>
DRILLING METHODS: <u>Howell Stem Auger</u>	DATE COMPLETED: <u>8/21/91</u>
	PAGE _____ OF _____

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (S/N)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (LL)	WELL CONSTRUCTION	REMARKS	
1	63500 8/20 1500	3	6	DENSE (10YR 5/6) YELLOWISH BROWN SILTY CLAY. SOME SPARSE ANGULAR GRAVEL MODERATE CONSISTENCY. POOR PLASTICITY VERY MOIST	CL		HNU	α	B _γ
	63501 8/20 1500	17	6	SAA	CL		0	0	2800
2	63502 8/20 1500	14	6	DENSE (10YR 2/1) BLACK SILT WITH SPARSE (5Y 8/4) YELLOW MATERIAL AND SOME CLEAR CRYSTALLINE NODULES. POOR CONSISTENCY & PLASTICITY.	CL		HNU	α	B _γ
	63503 8/20 1500	17	6	SAA	CL		0	0	15000
3	63504 8/20 1507	16	6	DENSE (2.5Y 4/3) OLIVE BROWN CLAY GOOD CONSISTENCY & PLASTICITY. VERY MOIST.	CL		HNU	α	B _γ
	63505 8/20 1507	20	6	DENSE (2.5Y 4/3) OLIVE BROWN CLAY MIXED WITH FRAGMENTS OF CONCRETE. WET.	CL		0	0	2000
4	63506 8/20 1507	16	0	LARGE PIECES OF CONCRETE - NR			HNU	α	B _γ
	63507 8/20 1507	17	0	N.R.			NA	NA	NA
5	63508 8/20 1515	SHELBY TUBE PUSHED	0	SHELBY TUBE PUSHED 24" TWO ATTEMPTS MADE. NO RECOVERY MATERIAL WAS DISPLAYED			HNU	α	B _γ
							NA	NA	NA
6	63509 8/20 1530	5	6	VERY SOFT (2.5Y 6/6) OLIVE YELLOW CLAY GOOD PLASTICITY, WET	LL		HNU	α	B _γ
	63510 8/20 1530	4	6	SAA	LL		0	0	2000
7	63511 8/20 1530	3	0	SAA	LL		HNU	α	B _γ
							0	0	1000

NOTES:
 Drilling Contractor PENN DRILLING CO.
 Drilling Equipment SIMCO
 Driller: E. GARDNER
ASSISTANT J. STARRAZZONI

SAA = SAME AS ABOVE
 NA = NOT APPLICABLE
 NR = NO RECOVERY
 B_γ BACKGROUND = 100 LPM

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>602.25.91</u>	PROJECT NAME: <u>FMPC RI/FS OU-1</u>		
BORING NUMBER: <u>1769</u>	COORDINATES		DATE: <u>8/20/91</u>
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: <u>8/20/91</u>
ENGINEER/GEOLOGIST: <u>Harris</u>	Depth	Date/Time	DATE COMPLETED:
DRILLING METHODS: <u>Hollow Stem Auger</u>			PAGE OF

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DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6"/10')	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (PL)	WELL CONSTRUCTION	REMARKS
8	63512 8/20 1530	3	6	SAA	CL			HNU α B δ 0 0 1000
	63513 8/20 1540	22	6	VERY DENSE (2.54 5/4) LIGHT OLIVE BROWN SANDY CLAY WITH ANGULAR GRAVEL GRADING INTO (2.54 #21) SILEX GRAVEL. SOME YELLOW MATERIAL SOME METAL. POOR PLASTICITY. WET	GL			HNU α B δ 0 0 2000
9	63514 8/20 1540	33	6					HNU α B δ 0 0 2000
	10	63515 8/20 1540	25	0	NL			HNU α B δ NA NA NA
11		63516 8/20 1540	8	0	NL			HNU α B δ NA NA NA
	12	63517 8/21 0833	31	6	VERY DENSE (2.54 4/3) OLIVE BROWN CLAY WITH COARSE ANGULAR GRAVEL [CONCRETE]. GOOD PLASTICITY. WET	GL		HNU α B δ 0 0 900
13		63518 8/21 0833	5	6	SAA	GL		HNU α B δ 0 0 1100
	14	63519 8/21 0833	4	0	NL			HNU α B δ NA NA NA
15		63520 8/21 0833	3	0	NL			HNU α B δ NA NA NA
	16	63521 8/21 0850	SHELBY TUBE PUSHED	24"				HNU α B δ NA NA NA
17		63522 8/21 0856	1	6	VERY LOOSE (SY 6/3) PALE OLIVE, CLAY LIKE MATERIAL. PASTY CONSISTENCY. WET			HNU α B δ 0 120 5000cm
	18	63523 8/21 0856	1	6	SAA			HNU α B δ 0 80 2000

NOTES:
 Drilling Contractor Penn Drilling Co.
 Drilling Equipment SIMCO
 Driller: E. GARDNER
ASS: J. STRAZZANO

SAA = SAME AS ABOVE
 NA = NOT APPLICABLE
 NR = NO RECOVERY
 B δ BACKGROUND = 80 CPM

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>602.25.91</u>	PROJECT NAME: <u>FMPC RI/FS OU-1</u>		
BORING NUMBER: <u>1769</u>	COORDINATES:		DATE: <u>8/21/91</u>
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: <u>8/20/91</u>
ENGINEER/GEOLOGIST: <u>Harris</u>	Depth	Date/Time	DATE COMPLETED: <u>8/21/91</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>			PAGE OF

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CAMEL 3

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (PS)	WELL CONSTRUCTION	REMARKS
15	63524 8/21 0856	1	6	VERY SOFT (5Y 8/1) WHITE CLAY LIKE MATERIAL WITH SOME THIN LAYERS OF BLACK MATERIAL. PASTY CONSISTENCY VERY MOIST.	CL			HNU α B8 O 50 1500
	63525 8/21 0856	1	6		CL			HNU α B8 O 20 1000
16	63526 8/21 0905	1	6	VERY SOFT (2.5Y 6/4) LIGHT YELLOWISH BROWN CLAY LIKE MATERIAL. PASTY CONSISTENCY, WET.	CL			HNU α B8 O 20 1000
	63527 8/21 0905	1	6		CL			HNU α B8 O 60 1400
17	63528 8/21 0905	1	6	VERY SOFT (5Y 8/1) WHITE CLAY SIZE MATERIAL WITH LAYERS OF BLACK. PASTY CONSISTENCY WET.	CL			HNU α B8 O 20 1000
	63529 8/21 0905	11	6		CL			HNU α B8 O 20 800
18	63530 8/21			SHELBY TUBE PUSHED 24". Full Recovery				HNU α B8 NA NA NA
	0937	SHELBY TUBE PUSHED	24					HNU α B8 NA NA NA
20	63531 8/21 0952	13	6	VERY SOFT (5Y 8/1) WHITE CLAY SIZE MATERIAL WITH SOME BLACK STREAKING PASTY CONSISTENCY WET.	CL			HNU α B8 O 20 1000
	63532 8/21 0952	15	6		CL			HNU α B8 O 80 1400
21	63533 8/21 0952	17	6	VERY HARD (2.5Y 4/3) OLIVE BROWN CLAY. VERY MOIST.	CL	75.0		HNU α B8 O 0 1000
	63534 8/21 0952	17	6		CL			HNU α B8 O 0 800
22				THIS IS THE LINER	CL			HNU α B8

HSL
VOA

NOTES:
 Drilling Contractor PENN DRILLING CO.
 Drilling Equipment SIMCO
 Driller: E. GARDNER
ASST. J. STRAZARONI

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

AS BACKLASH = 120 CM
 α " = 0 CM

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS (Qu.) FIELD ENG./GEO. M. HARRIS DATE 8-21-91
 PROJECT NO. 602.3.15 CHECKED BY _____ DATE _____
 BORING NO. 1769
 PIEZOMETER NO. 1769 DATE OF INSTALLATION 8-21-91

BOREHOLE DRILLING

DRILLING METHOD <u>HOLLOW STEM AUGER</u>	TYPE OF BIT <u>AUGER</u>
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID <u>NONE</u> FROM _____ TO _____	SIZE <u>NONE</u> FROM _____ TO _____
FLUID <u>NONE</u> FROM _____ TO _____	SIZE <u>NONE</u> FROM _____ TO _____

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:
PERFORATION TYPE:	O.D. <u>4 3/8"</u> I.D. <u>4.0"</u>
SLOTS <input checked="" type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input type="checkbox"/>	LENGTH OF PIPE SECTIONS _____
AVERAGE SIZE OF PERFORATIONS <u>0.01"</u>	JOINING METHOD <u>FLUSH JOINT</u>
TOTAL PERFORATED AREA <u>4.0'</u>	<u>THREADED</u>

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>5.0'</u>	OTHER PROTECTION <u>HINGED LOCKING</u>
PROTECTIVE PIPE O.D. <u>1 3/4"</u>	<u>COVER WITH PADLOCK</u>

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (FT)		ELEVATION (FT)	
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0		580.5	
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 0.0	BOTTOM 14.0	TOP	BOTTOM
BENTONITE	TOP 14.0	BOTTOM 16.0	TOP	BOTTOM
SAND	TOP 16.0 ⁸⁻²⁶⁻⁹¹ 16.0	BOTTOM 22.0	TOP	BOTTOM
GRAVEL NONE USED	TOP N/A	BOTTOM N/A	TOP	BOTTOM
PERFORATED SECTION	TOP 17.5'	BOTTOM 21.5'	TOP	BOTTOM
PIEZOMETER TIP	22.0'			
BOTTOM OF BOREHOLE	22.0'			
GWL AFTER INSTALLATION				

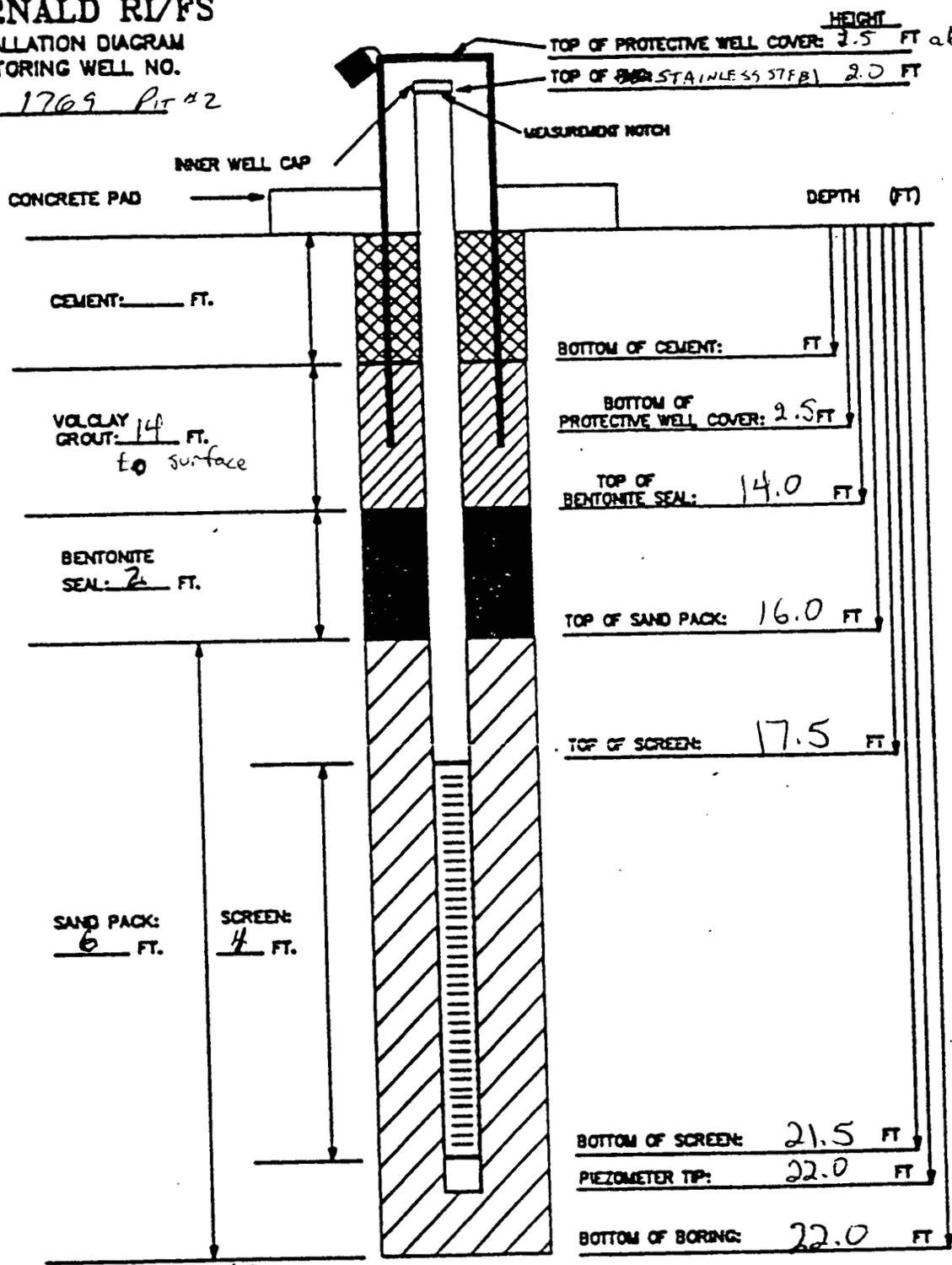
WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES NO
 WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES NO

REMARKS WOOD PLUG USED IN AUGER DURING WELL INSTALLATION.

INSTALLATION DATE: 8-21-91

FERNALD RI/FS INSTALLATION DIAGRAM MONITORING WELL NO.

1769 Pit #2



HEIGHT
 TOP OF PROTECTIVE WELL COVER: 2.5 FT above surface
 TOP OF RISER STAINLESS STEEL: 2.0 FT " "

INNER WELL CAP
 CONCRETE PAD
 MEASURING NOTCH
 DEPTH (FT)

CEMENT: _____ FT.

BOTTOM OF CEMENT: _____ FT.

VOLCLAY GROUT: 14 FT. to surface

BOTTOM OF PROTECTIVE WELL COVER: 2.5 FT

TOP OF BENTONITE SEAL: 14.0 FT.

BENTONITE SEAL: 2 FT.

TOP OF SAND PACK: 16.0 FT.

TOP OF SCREEN: 17.5 FT.

SAND PACK: 6 FT.

SCREEN: 4 FT.

BOTTOM OF SCREEN: 21.5 FT.

PIEZOMETER TIP: 22.0 FT.

BOTTOM OF BORING: 22.0 FT.

BORING DIAMETER: 10 INCHES

MATERIALS USED:

- SAND TYPE AND QUANTITY: 4 bags
- BENTONITE PELLETS (5-GALLON BUCKETS): 1
- BAGS OF VOLCLAY GROUT: 2
- AMOUNT OF CEMENT: -
- AMOUNT OF WATER USED: 40 gals.
- OTHER:

NOTES:

- 1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS.
- 2) SCREEN IS 2-INCH I.D. SCHEDULE 40 PVC PIPE WITH 0.020-INCH SLOTS.
- 3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
- 4) WATER DEPTH/DATE:

TASK:

GEOLOGIST/ENGINEER:

SE Well set 15:09

VISUAL CLASSIFICATION OF SOILS

3.15 TC 8-20-91

PROJECT NUMBER: <u>602.25.9T</u>	PROJECT NAME: <u>FMPC RI/FS OU-1</u>
BOILING NUMBER: <u>1770</u>	COORDINATES <u>N 481,681.6 E 1378159.5</u> DATE: <u>8/11/91</u>
ELEVATION: <u>587.5</u>	GWL: Depth _____ Date/Time _____ DATE STARTED: <u>8/11/91</u>
ENGINEER/GEOLOGIST: <u>HARRIS</u>	Depth _____ Date/Time _____ DATE COMPLETED: <u>8-12-91</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE <u>1</u> OF <u>6</u>

DEPTH (FT.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED COMPRESSIBILITY (15%)	WELL CONSTRUCTION	REMARKS
0	63320 8/11 0913	4	6	MEDIUM DENSE (10 YR 5/8) YELLOWISH BROWN SILTY CLAY. MODERATE COHESION & PLASTICITY. SLIGHTLY MOIST.			N/A	HNU α Bβ 6 0 200
1	63321 8/11 0913	7	6	SAA				HNU α Bβ 0 0 200
1	63322 8/11 0913	9	3	LOOSE (10 YR 2/1) BLACK FINE SAND MODERATE TO DW. COHESION. SLIGHTLY MOIST.				HNU α Bβ 0 0 1500
2	63323 8/11 0913	18	0	NR				HNU α Bβ NA NA NA
2	63324 8/11 0916	5	6	MEDIUM DENSE (10 YR 2/1) BLACK MEDIUM TO FINE SAND. MODERATE COHESION SLIGHTLY MOIST TO MOIST.				HNU α Bβ 0 0 200
3	63325 8/11 0916	7	6	SAA				HNU α Bβ 0 0 200
3	63326 8/11 0916	4	6	SAA				HNU α Bβ 0 0 200
4	63327 8/11 0916	3	6	SAA				HNU α Bβ 0 0 200
5	63328 8/11 0928	SHELBY TUBE PUSHED	24	SHELBY TUBE PUSHED 24" FULL RECOVERY				HNU α Bβ NA NA NA HNU α Bβ NA NA NA HNU α Bβ NA NA NA
6	63329 8/11 0944	1	6	LOOSE (10 YR 2/1) BLACK MEDIUM SAND WITH SPARSE ANGULAR GRAVEL. MOD. COHESION. VERY WET				HNU α Bβ 500
7	63330 8/11 0944	2	6	SAA				HNU α Bβ 1000
7	63331 8/11 0944	1	3	SAA				HNU α Bβ 120

NOTES:

Drilling Contractor PENN DRILLING
 Drilling Equipment SIMCO
 Driller: E. GARDNER
ASST F. MYERS

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

SC
DA

10

Bβ - BALL ROLL = 120 GPM

VISUAL CLASSIFICATION OF SOILS

3.15 TC 82491

PROJECT NUMBER: <u>602-25-91</u>	PROJECT NAME: <u>FMPC RI/FS OU-1</u>		
BORING NUMBER: <u>1770</u>	COORDINATES: <u>N481,681.6 E1378,159.5</u>		DATE: <u>8/11/91</u>
ELEVATION: <u>587.5</u>	GWL: Depth	Date/Time	DATE STARTED: <u>8/11/91</u>
ENGINEER/GEOLOGIST: <u>M. HARRIS</u>	Depth	Date/Time	DATE COMPLETED: <u>8-12-91</u>
DRILLING METHODS: <u>HOLLOW STEM AUGER</u>			PAGE <u>2</u> OF <u>6</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (FLS)	WELL CONSTRUCTION	REMARKS
8	63332 8/11 0944	1	0	NR			N/A	HNU <u>α</u> <u>B₈</u> NA NA NA
	63333 8/11 0952	1	0	NR				HNU <u>α</u> <u>B₈</u> NA NA NA
9	63334 8/11 0952	1	0	NR				HNU <u>α</u> <u>B₈</u> NA NA NA
	63335 8/11 0952	1	0	NR				HNU <u>α</u> <u>B₈</u> NA NA NA
10	63336 8/11 0952	1	0	NR				HNU <u>α</u> <u>B₈</u> NA NA NA
	63337 8/11 1012	1	6	DENSE (2.5x 4/3) OLIVE BROWN CLAY. MODERATE COHESION, MOIST.				HNU <u>α</u> <u>B₈</u> O O 350
11	63338 8/11 1012	1	6	SOFT (10x 4/8) RED CLAY LIKE MATERIAL. PASTY CONSISTENCY, GOOD COHESION, MOIST.				HNU <u>α</u> <u>B₈</u> O O 1000
	63339 8/11 1012	1	0	NR				HNU <u>α</u> <u>B₈</u> NA NA NA
12	63340 8/11 1012	1	0	NR				HNU <u>α</u> <u>B₈</u> NA NA NA
	63341 8/11 1019	1	6	SOFT (10x 4/8) RED CLAY LIKE MATERIAL. PASTY CONSISTENCY, GOOD COHESION, MOIST.				HNU <u>α</u> <u>B₈</u> O O 350
13	63342 8/11 1019	1	0	NR				HNU <u>α</u> <u>B₈</u> NA NA NA
	63343 8/11 1019	1	0	NR				HNU <u>α</u> <u>B₈</u> NA NA NA
14	63344 8/11 1019	1	0	NR				HNU <u>α</u> <u>B₈</u> NA NA NA
	63345 8/11 1050	1	6	VERY LOOSE (10x 4/8) RED CLAY LIKE MATERIAL MOTTLED WITH BLACK & BROWN MATERIAL. PASTY CONSISTENCY, GOOD PLASTICITY VERY MOIST.				HNU <u>α</u> <u>B₈</u> 1000
	63346 8/11 1050	1	6	SAA			N/A	HNU <u>α</u> <u>B₈</u> 1000

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NOTES:

Drilling Contractor _____
 Drilling Equipment _____
 Driller: _____

VISUAL CLASSIFICATION OF SOILS

3.15 TC E2091

PROJECT NUMBER: <u>602.25-9T</u>	PROJECT NAME: <u>FMPC RI/FS QU-1</u>		
BORING NUMBER: <u>1770</u>	COORDINATES: <u>N 481,681.6 E 1378.157</u>		DATE: <u>8/11/91</u>
ELEVATION: <u>587.5</u>	GWL: Depth	Date/Time	DATE STARTED: <u>8/11/91</u>
ENGINEER/GEOLOGIST: <u>M. HARRIS</u>	Depth	Date/Time	DATE COMPLETED: <u>8-12-91</u>
DRILLING METHODS: <u>HOLLOW STEM AUGER</u>			PAGE <u>3</u> OF <u>6</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (FS)	WELL CONSTRUCTION	REMARKS
15	63347 8/11 1030	1	6	SAA			N/A	HNU α B β 0 0 1000
	63348 8/11 1030	1	6	SAA				HNU α B β 0 0 400
16	63349 8/11 1332	1	6	VERY LOOSE (10R 4/8) RED CLAY LIKE MATERIAL. GOOD COHESION & PLASTICITY. A PASTY TO PUDDING LIKE CONSISTENCY. VERY MOIST.				HNU α B β 0 0 2200
	63350 8/11 1332	1	6		SAA			
17	63351 8/11 1332	1	6	SAA				HNU α B β 0 0 2500
	63352 8/11 1332	1	6	SAA				HNU α B β 0 0 2000
18	63353 8/11 1340	1	6	VERY LOOSE (2.5YR 4/8) RED CLAY LIKE MATERIAL MOTTLED WITH (2.5Y 6/4) LIGHT YELLOWISH BROWN MATERIAL. Poor consistency, good plasticity. Pudding like consistency. WET.				HNU α B β 0 0 1100
	63354 8/11 1340	1	6		SAA			
19	63355 8/11 1340	1	6	SAA				HNU α B β 0 0 1100
	63356 8/11 1340	1	6	SAA				HNU α B β 0 0 1000
20	63357 8/11/91	SHELBY TUBE		24" SHELBY TUBE PUSHED. 24" RECOVERY				HNU α B β NA NA NA
	7410	PUSHED	24					
21	63358 8/11 1425	1		VERY LOOSE (2.5YR 4/8) RED CLAY LIKE MATERIAL. PUDDING CONSISTENCY. VERY MOIST.				HNU α B β 0 0 1500

NOTES
 Drilling Contractor Penn Drilling
 Drilling Equipment Simco
 Driller: E. Gardner
ASST. J. STRAZARONA

VISUAL CLASSIFICATION OF SOILS

3.15 BC 82091

PROJECT NUMBER: <u>602.25-91</u>	PROJECT NAME: <u>FMPC RI/FS OU-1</u>		
BORING NUMBER: <u>1776</u>	COORDINATES: <u>N 481,681.6 E 1378,159.5</u>	DATE: <u>8/11/91</u>	
ELEVATION: <u>587.5</u>	GWL: Depth	Date/Time	DATE STARTED: <u>8/11/91</u>
ENGINEER/GEOLOGIST: <u>Harris</u>	Depth	Date/Time	DATE COMPLETED: <u>8-12-91</u>
DRILLING METHODS: <u>Howell Stem Auger</u>			PAGE <u>4</u> OF <u>6</u>

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ES)	WELL CONSTRUCTION	REMARKS
23	63359 8/11 1425	1	6	VERY LOOSE (2.5 YR 4/8) MED MOTTLED WITH (2.5 YR 6/3) LIGHT YELLOWISH BROWN. CLAY LIKE MATERIAL. PASTY CONSISTENCY. VERY MOIST. SAA			N/A	HNU α BX
	63360 8/11 1425	1	6					HNU α BX
	63361 8/11 1425	1	6					HNU α BX
24	63362 8/11 1520	1	6	LOOSE (10 YR 7/1) LIGHT GRAY CLAY LIKE MATERIAL. PASTY CONSISTENCY. MOIST. SAA			N/A	HNU α BX
	63363 8/11 1520	1	6					HNU α BX
	63364 8/11 1520	1	6					HNU α BX
25	63365 8/11 1520	1	6	VERY LOOSE (2.5 YR 4/8) MED CLAY LIKE MATERIAL. PASTY CONSISTENCY. GOOD PLASTICITY. MOIST.			N/A	HNU α BX
	63366 8/11 1540	1	6					HNU α BX
	63367 8/11 1540	1	6					HNU α BX
26	63368 8/11 1540	1	6	VERY LOOSE (10 YR 7/3) VERY PALE BROWN CLAY LIKE MATERIAL. PASTY CONSISTENCY. MOIST.			N/A	HNU α BX
	63369 8/11 1540	1	6					HNU α BX
	63370 8/11 1540	1	6					HNU α BX
27	63371 8/11 1540	1	6	VERY LOOSE (2.5 YR 3/6) DARK RED WITH THIN LAYERS (1/16") OF LIGHT GRAY MATERIAL. PASTY CONSISTENCY. MOIST TO VERY MOIST.			N/A	HNU α BX
	63372 8/11 1540	1	6					HNU α BX
	63373 8/11 1540	1	6					HNU α BX
28	63374 8/11 1540	1	6	SAA			N/A	HNU α BX
	63375 8/11 1540	1	6					HNU α BX
	63376 8/11 1540	1	6					HNU α BX
29	63377 8/11 1600	SHELBY TUBE PUSHED	24	SHELBY TUBE PUSHED 24". FULL RECOVERY			N/A	NA NA NA HNU α BX NA NA NA HNU α BX NA NA NA HNU α BX NA NA NA

NOTES.

Drilling Contractor Penn Drilling Co.
 Drilling Equipment SIMEO
 Driller: E. Gardner
J. STA 90292001

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

VISUAL CLASSIFICATION OF SOILS

3.15 TC 82091

PROJECT NUMBER: <u>602-25-9T</u>	PROJECT NAME: <u>FMPC RI/FS OU-1</u>		
BOILING NUMBER: <u>1770</u>	COORDINATES: <u>N481, 661.6 E 1, 378, 159.5</u>		DATE: <u>8/11/91</u>
ELEVATION: <u>587.5</u>	GWL: Depth	Date/Time	DATE STARTED: <u>8/11/91</u>
ENGINEER/GEOLOGIST: <u>HARRIS</u>	Depth	Date/Time	DATE COMPLETED: <u>8-12-91</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>			PAGE <u>5</u> OF <u>6</u>

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (PSI)	WELL CONSTRUCTION	REMARKS
30	63371 8/11	1	6	VERY LOOSE (2.5 yr 4/6) RED CLAY LIKE MATERIAL. PASTY CONSISTENCY VERY MOIST SAA			N/A	HNU α B ₈
	1010							O 0 1500
	63372 8/11							HNU α B ₈
31	1010	1	6	SAA			N/A	O 0 1200
	63373 8/11							HNU α B ₈
	1010							O 0 1500
32	63374 8/11	1	6	SAA			N/A	HNU α B ₈
	1010							O 0 1200
	63375 8/12							HNU α B ₈
33	0825	1	6	VERY LOOSE (2.5 yr 5/8) RED CLAY-LIKE MATERIAL. PASTY CONSISTENCY. VERY MOIST SAA			N/A	O 0 1000
	63376 8/12							HNU α B ₈
	0825							7mm 0 1000
34	63377 8/12	1	6	SAA			N/A	HNU α B ₈
	0825							10mm 0 1000
	63378 8/12							HNU α B ₈
35	0825	1	6	VERY LOOSE (10 yr 7/8) VERY PALE BROWN CLAY LIKE MATERIAL. PASTY. VERY MOIST SAA			N/A	O 0 1000
	63379 8/12							HNU α B ₈
	0825							5mm 0 800
36	63380 8/12	1	6	VERY LOOSE (2.5 yr 5/8) RED CLAY LIKE MATERIAL. PASTY CONSISTENCY. VERY MOIST TO WET. SAA			N/A	HNU α B ₈
	0825							2mm 0 900
	63381 8/12							HNU α B ₈
37	0825	1	6	SAA			N/A	4mm 0 900
	63382 8/12							HNU α B ₈
	0825							2mm 0 900
38	63383 8/12	1	6	VERY LOOSE (7.5 yr 6/8) REDDISH YELLOW CLAY LIKE MATERIAL. PADDING LIKE CONSISTENCY. WET. SAA			N/A	HNU α B ₈
	0845							O 0 1700
	63384 8/12							HNU α B ₈
39	0845	1	6	SAA			N/A	O 0 1700
	63385 8/12							HNU α B ₈
	0845							O 0 1500

NOTES:

Drilling Contractor Penn Drilling
 Drilling Equipment SIALCO
 Driller: E. Gardner
J. STANARD 2601

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

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS FIELD ENG./GEO. HARRIS DATE 8-11-91
 PROJECT NO. 602.25.9T3.15 TC 8-29 CHECKED BY _____ DATE _____
 BORING NO. 1770
 PIEZOMETER NO. 1770 DATE OF INSTALLATION 8-12-91

BOREHOLE DRILLING

DRILLING METHOD <u>HOLLOW STEM AUGER</u>	TYPE OF BIT <u>AUGER</u>
DRILLING FLUID (S) USED: FLUID <u>NONE</u> FROM _____ TO _____ FLUID <u>NONE</u> FROM _____ TO _____	CASING SIZE (S) USED: SIZE <u>NONE</u> FROM _____ TO _____ SIZE <u>NONE</u> FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE <u>MONITOR 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"</u> I.D. <u>4.0"</u>
PERFORATION TYPE: SLOTS <input checked="" type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>41.0'</u>
AVERAGE SIZE OF PERFORATIONS <u>0.01 INCH</u>	JOINING METHOD <u>FLUSH JOINT THREADED</u>
TOTAL PERFORATED AREA <u>5 FEET</u>	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>5.0 FT.</u>	OTHER PROTECTION <u>HINGED LOCKING</u>
PROTECTIVE PIPE O.D. <u>10 3/4"</u>	<u>COVER W/ PADLOCK</u>

ITEM	DISTANCE ABOVE / BELOW GROUND SURFACE (FT)		ELEVATION (FT)	
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0		587.5	
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS:				
GROUT / SLURRY	TOP 0.0	BOTTOM 31.5	TCP	BOTTOM
BENTONITE	TOP 31.5	BOTTOM 33.5	TOP	BOTTOM
SAND	TOP 33.5	BOTTOM 39.0	TOP	BOTTOM
GRAVEL <u>NONE</u>	TOP N/A	BOTTOM N/A	TOP	BOTTOM
PERFORATED SECTION	TOP 34.5	BOTTOM 38.5	TOP	BOTTOM
PIEZOMETER TIP	39.0			
BOTTOM OF BOREHOLE	39.0			
GWL AFTER INSTALLATION				

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

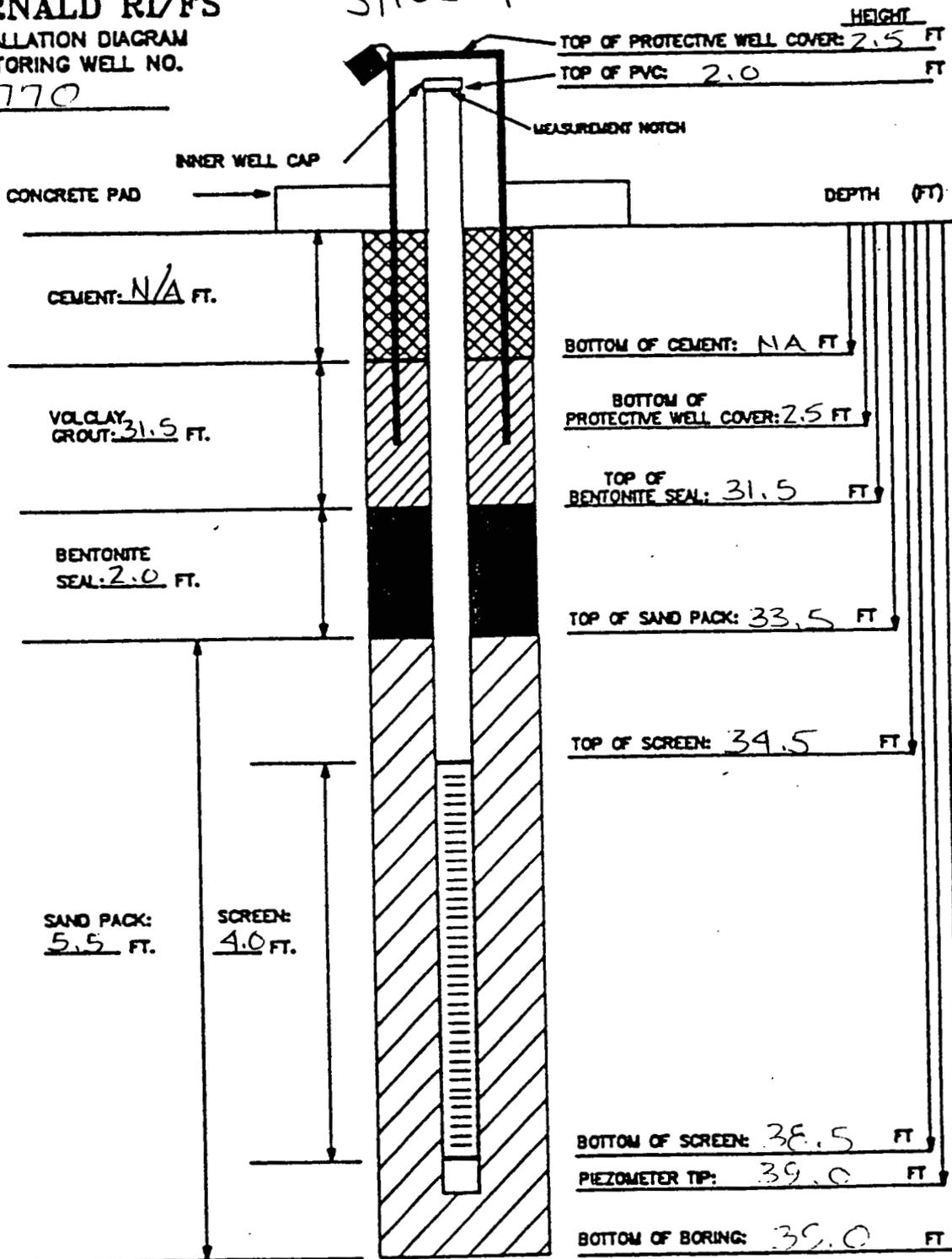
REMARKS WOOD RUG USED IN AUGER BIT DURING WELL INSTALLATION.

FERNALD RI/FS
INSTALLATION DIAGRAM
MONITORING WELL NO.

1770

INSTALLATION DATE: 8-12-91 2071

Stickups



BORING DIAMETER: 10.0 INCHES

- MATERIALS USED:**
 SAND TYPE AND QUANTITY: 1-20 lb bag, 10/20
 BENTONITE PELLETS (5-GALLON BUCKETS): 0.5
 BAGS OF VOLCLAY GROUT: 3.5 50 lb bags
 AMOUNT OF CEMENT: N/A
 AMOUNT OF WATER USED: 3 GALLONS
 OTHER: 3'x3' CONCRETE PAD
 WILL BE INSTALLED

- NOTES:** 4.0" I.D. STAINLESS
 1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS.
 2) SCREEN IS 2-INCH LB. SCHEDULE 40 4.0" I.D. STAINLESS PVC PIPE WITH 0.020-INCH SLOTS.
 3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SLAMP.
 4) WATER DEPTH/DATE:

TASK: (600) 602-543 3.15 TO 8-20-91 GEOLOGIST/ENGINEER: M. HARRIS

Jun 9.9.91

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>602.25.91</u>	PROJECT NAME: <u>FMPC RI/FS OU-1</u>
BORING NUMBER: <u>1768</u>	COORDINATES: <u>N481391.3 E 1378531.7</u>
ELEVATION: <u>578.5</u>	DATE: <u>8/22/91</u>
ENGINEER/GEOLOGIST: <u>J. ANNIS</u>	DATE STARTED: <u>8/22/91</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	DATE COMPLETED:
	PAGE <u> </u> OF <u> </u>

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (PSI)	WELL CONSTRUCTION	REMARKS
0	63600 8/22	7	6	FIRM (10YR 7/3) DARK BROWN SILTY CLAY. SOME ROUNDED GRAVEL. MODERATE PLASTICITY. MOIST.	CL			HNU α BX 0 0 600
1	63601 8/22	16	6	S.A.A.	CL			HNU α BX 0 0 250
1	63602 8/22	28	6	S.A.A.	CL			HNU α BX 0 0 600
2	63603 8/22	9	4	FIRM (10YR 3/3) DARK BROWN CLAY WITH PIECES OF ANGULAR GRAVEL (ASPHALT?) MOIST.	CL			HNU α BX 0 0 2000
2	63604 8/22	7	6	FIRM (10YR 3/2) VERY DARK GRAYISH BROWN CLAY. SOME ROUNDED GRAVEL. LOW PLASTICITY MOIST.	CL			HNU α BX 0 0 1000
3	63605 8/22	6	6	SOFT (5Y 5/6) STRONG BROWN CLAY LIKE MATERIAL WITH COARSE SAND. Fair PLASTICITY. MOIST	CL			HNU α BX 0 0 6000
3	63606 8/22	6	6	S.A.A.	CL			HNU α BX 0 0 4000
4	63607 8/22	4	6	S.A.A.	CL			HNU α BX 0 0 3000
5	63608 8/22	SHELLY TUBE PUSHED	9					HNU α BX NA NA NA HNU α BX NA NA NA HNU α BX NA NA NA HNU α BX NA NA NA
6	63609 8/22	3	6	SOFT (5Y 8/1) WHITE CLAY SILT MATERIAL. PASTY CONSISTENCY. LOW PLASTICITY. MOIST	CL			HNU α BX 0 0 2500
6	63610 8/22	3	6	S.A.A.	LL			HNU α BX 0 0 2000
7	63611 8/22	?	6	SOFT (10YR 7/4) VERY PALE BROWN CLAY LIKE MATERIAL. PASTY CONSISTENCY MOIST. VERTICAL LATERALING.	LL			HNU α BX 0 0 2000

HSL
04
TUBE 1
TUBE 2

NOTES:
 Drilling Contractor Penn Drilling Co.
 Drilling Equipment Simco
 Driller: E. GARDNER
AST T. STAPAZONI

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

88

100 BACKGROUND = 120 CAMP 100

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.25.91	PROJECT NAME: FMPC RI/FS OU-1		
BORING NUMBER: 1768	COORDINATES: Sec P1	DATE: 8/22/91	
ELEVATION: See p1	GWL: Depth	Date/Time	DATE STARTED: 8/22/91
ENGINEER/GEOLOGIST: Harris	Depth	Date/Time	DATE COMPLETED: 8/22/91
DRILLING METHODS: Hollow Stem Auger	PAGE		OF

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (FS)	WELL CONSTRUCTION	REMARKS
8	63612 8/22 0947	1	6	SAA				HNU 0 0 BX 2500
	63613 8/22 0947	1	6	SAA				HNU 0 0 BX 2200
	63614 8/22 0947	1	6	SAA				HNU 0 0 BX 2000
9	63615 8/22 1000	1	0	NZ				HNU NA NA BX NA
	63616 8/22 1000	1	0	NZ				HNU NA NA BX NA
	63617 8/22 1000	1	0	NZ				HNU NA NA BX NA
10	63618 8/22 1000	1	0	NZ				HNU NA NA BX NA
	63619 8/22 1007	SHEATH TUBE PUSHED DOWN COUNTS NA	24					HNU NA NA BX NA
	63620 8/22 1014	1	6	VERY SOFT (2.54 N7) LIGHT GRAY CLAY SITE MATERIAL INTERSPERSED WITH WHITE GRANULAR MATERIAL. WET PASTY CONSISTENCY				HNU 0 0 BX 1000
11	63621 8/22 1014	1	6	SAA				HNU 0 0 BX 1000
	63622 8/22 1030	1	6	SAA				HNU 0 0 BX 800
	63623 8/22 1030	11	6	SAA PIECE OF GRAPHITE				HNU 0 0 BX 600

HSL
UCA
CWP
JA
RUAL2
RUAL3

NOTES:

Drilling Contractor PENN DRILLING CO.
 Drilling Equipment SIMCO
 Driller: E. GARDNER
J. STRAZZONI

SAA = SAME AS ABOVE
 NZ = NO RECOVERY
 NA = NOT APPLICABLE

VISUAL CLASSIFICATION OF SOILS

2071
JUN 9.9.91

PROJECT NUMBER: 602.25.91	PROJECT NAME: FMPC RI/FS OU-1
BORING NUMBER: 1768	COORDINATES: See p1
ELEVATION: See p1	GWL: Depth Date/Time
ENGINEER/GEOLOGIST: HARRIS	Depth Date/Time
DRILLING METHODS: Hollow Stem Auger	PAGE OF

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (PS)	WELL CONSTRUCTION	REMARKS
16	63624 8/22 1020	17	6	DENSE (10 YR 4/4) DARK YELLOWISH BROWN. CLEAN SILTY FINE SAND. MOIST				HNU α Bγ 0 0 500
	63625 8/23 1345	17	6	SAA				HNU α Bγ 0 0 500
	63626 8/22 845	13	6	SAA				HNU α Bγ 0 0 200
	63627 8/23 1355	12	6	SAA				HNU α Bδ 0 0 200
17	63628 8/23 1411	21	6	VERY HARD (10 YR 5/2) GRAYISH BROWN CLAY SAND MIXTURE. LOW PLASTICITY MAST. THIS WAS DETERMINED TO BE THE LOWER				HNU α Bγ 0 0 200 HNU α Bδ HNU α Bγ HNU α Bδ HNU α Bγ HNU α Bδ HNU α Bδ HNU α Bδ

HSL
VOA

NOTES:
 Drilling Contractor: Penn Drilling Co.
 Drilling Equipment: Simco
 Driller: E. GARDNER
MR. J. STRAPPANI

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

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS (00-1) FIELD ENG./GEO. M. HARRIS DATE 8-23-91
 PROJECT NO. 602.3.15 CHECKED BY DMW/hwt DATE 9.9.91
 BORING NO. 1768
 PIEZOMETER NO. 1768 DATE OF INSTALLATION 8-23-91

BOREHOLE DRILLING

DRILLING METHOD <u>HOLLOW STEM AUGER</u>	TYPE OF BIT <u>AUGER</u>
DRILLING FLUID (S) USED: FLUID <u>NONE</u> FROM _____ TO _____ FLUID <u>NONE</u> FROM _____ TO _____	CASING SIZE (S) USED: SIZE <u>NONE</u> FROM _____ TO _____ SIZE <u>NONE</u> FROM _____ TO _____

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 in.</u>
PERFORATION TYPE: SLOTS <input checked="" type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>19.5'</u>
AVERAGE SIZE OF PERFORATIONS <u>0.01"</u>	JOINING METHOD <u>FLUSH JOINT</u>
TOTAL PERFORATED AREA <u>4.0 FEET</u>	<u>THREADED</u>

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>5.0'</u>	OTHER PROTECTION <u>HINGED LOCKING</u>
PROTECTIVE PIPE O.D. <u>10 3/4"</u>	<u>COVER WITH PADLOCK</u>

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (FT)		ELEVATION (FT)	
TOP OF RISER PIPE	2.0'			
GROUND SURFACE	0.0		578.5	
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS:	TOP	BOTTOM	TCP	BOTTOM
	GROUT/SLURRY	0.0 10.0		
	BENTONITE	10.0 12.0	TOP	BOTTOM
	SAND	12.0 17.5	TOP	BOTTOM
GRAVEL <u>NONE USED</u>	TOP N/A	BOTTOM N/A	TOP	BOTTOM
PERFORATED SECTION	TOP 13.0	BOTTOM 17.0	TOP	BOTTOM
PIEZOMETER TIP	17.5			
BOTTOM OF BOREHOLE	17.5		561.0	
GWL AFTER INSTALLATION				

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

REMARKS WOOD PLUG USED DURING DRILL IN AUGER DURING WELL INSTALLATION. 103

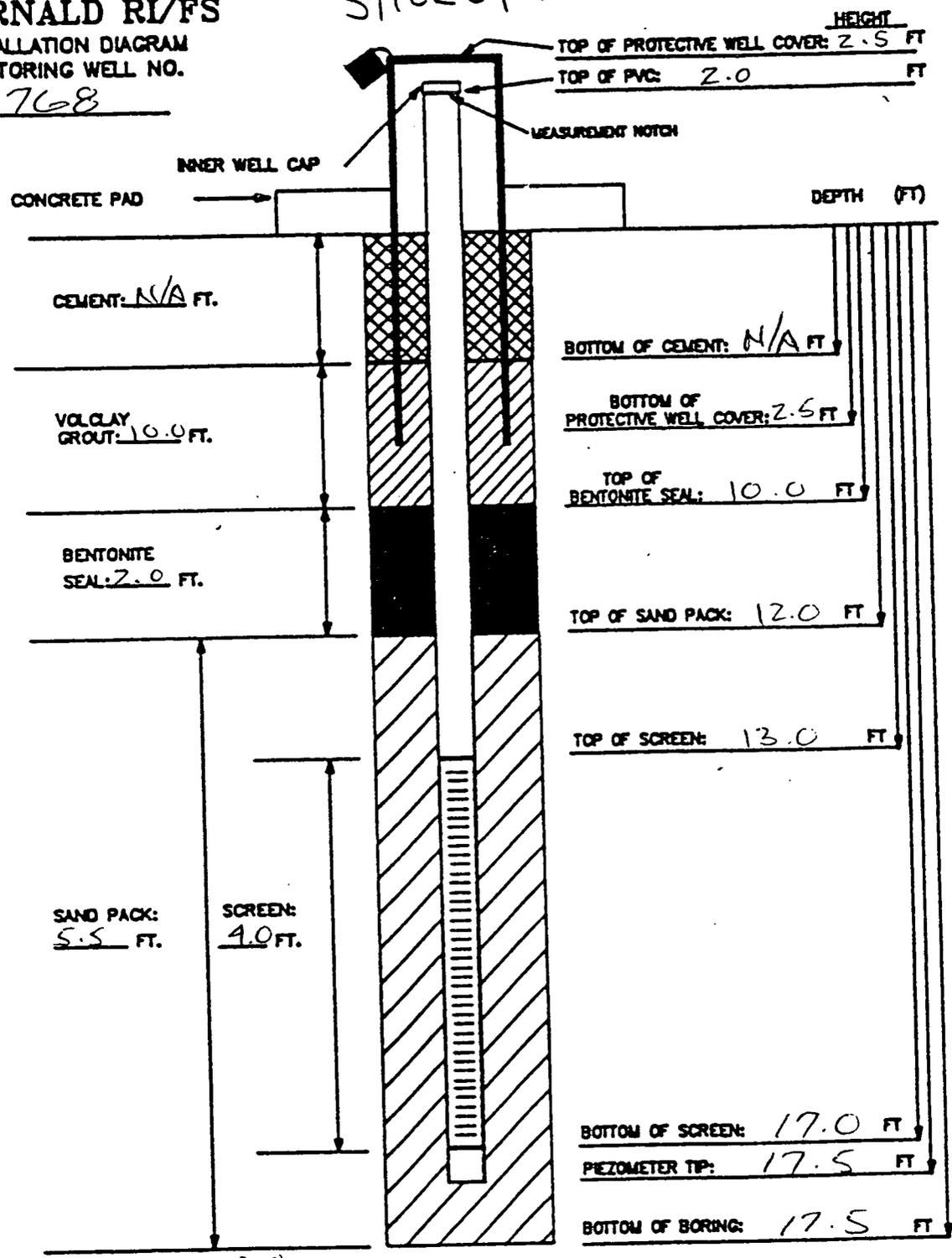
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INSTALLATION DATE: 8-23-91

FERNALD RI/FS INSTALLATION DIAGRAM MONITORING WELL NO.

1768

stickups



BORING DIAMETER: 12.0 INCHES

- MATERIALS USED:**
- SAND TYPE AND QUANTITY: 1 BAGS 50 lb bags 10/20 SAND
 - BENTONITE PELLETS (5-GALLON BUCKETS): 0.5
 - BAGS OF VOLCLAY GROUT: 3 - 50 lb bags
 - AMOUNT OF CEMENT: N/A
 - AMOUNT OF WATER USED: 3.9 GALS
 - OTHER: 3x3 CONCRETE PAD WILL BE INSTALLED

- NOTES:**
- 1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS.
 - 2) SCREEN IS 2-INCH I.D. SCHEDULE 40 4.0" I.D. STAINLESS PVC PIPE WITH 0.020-INCH SLOTS.
 - 3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED STOP.
 - 4) WATER DEPTH/DATE:

TASK: (00...) 8-23-91

GEOLOGIST/ENGINEER: M. HARRIS 104

VISUAL CLASSIFICATION OF SOILS

3.15 T.C 8-20-91

PROJECT NUMBER: <u>602-25-91</u>	PROJECT NAME: <u>FMPC RI/FS OU-1</u>		
BORING NUMBER: <u>1771</u>	COORDINATES: <u>N 481,637.8 E, 378,298.9</u>		DATE: <u>8/13/91</u>
ELEVATION: <u>589.7</u>	GWL: Depth	Date/Time	DATE STARTED: <u>8/13/91</u>
ENGINEER/GEOLOGIST: <u>HARRIS</u>	Depth	Date/Time	DATE COMPLETED: <u>8/14/91</u>
DRILLING METHODS: <u>Howell Stem Auger</u>			PAGE <u>1</u> OF <u>6</u>

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (60N)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (LL, PI)	WELL CONSTRUCTION	REMARKS		
1	63400 8/13	6	6	MEDIUM DENSE (7.5 YR 4/4) DARK BROWN SILTY CLAY. SOME SPARSE ANCHORED CANALS AND ORGANIC MATERIAL (ROOTS). MODERATE COHESION + PLASTICITY. SLIGHTLY MOIST. SAA			N/A	HNU	α	BX
	0							0	200	
	HNU							α	BX	
2	63401 8/13	9	6	LOOSE (7.5 YR N/1) BLACK MEDIUM SAND POOR COHESION, NO PLASTICITY. SLIGHTLY MOIST. NR				0	0	260
	HNU							α	BX	
	0							0	260	
3	63402 8/13	11	6	MEDIUM DENSE (10R 5/8) RED CLAY LIKE MATERIAL. GOOD COHESION + PLASTICITY. PATTY LIKE CONSISTENT. SLIGHTLY MOIST. NR				HNU	α	BX
	0							0	260	
	HNU							α	BX	
4	63403 8/13	13	6	MEDIUM DENSE (10R 5/8) RED CLAY LIKE MATERIAL. GOOD COHESION + PLASTICITY. PATTY LIKE CONSISTENT. SLIGHTLY MOIST. NR				HNU	α	BX
	0							0	260	
	HNU							α	BX	
5	63404 8/13	7	6	MEDIUM DENSE (10R 5/8) RED CLAY LIKE MATERIAL. GOOD COHESION + PLASTICITY. PATTY LIKE CONSISTENT. SLIGHTLY MOIST. NR				HNU	α	BX
	0							0	180	
	HNU							α	BX	
6	63405 8/13	6	6	MEDIUM DENSE (10R 5/8) RED CLAY LIKE MATERIAL. GOOD COHESION + PLASTICITY. PATTY LIKE CONSISTENT. SLIGHTLY MOIST. NR				HNU	α	BX
	0							0	250	
	HNU							α	BX	
7	63406 8/13	2	6	MEDIUM DENSE (10R 5/8) RED CLAY LIKE MATERIAL. GOOD COHESION + PLASTICITY. PATTY LIKE CONSISTENT. SLIGHTLY MOIST. NR				HNU	α	BX
	0							0	1500	
	HNU							α	BX	
8	63407 8/13	2	0	MEDIUM DENSE (10R 5/8) RED CLAY LIKE MATERIAL. GOOD COHESION + PLASTICITY. PATTY LIKE CONSISTENT. SLIGHTLY MOIST. NR				HNU	α	BX
	0							0	1500	
	HNU							α	BX	
9	63408 8/13	SHEAR TUBE PUSHED	0	SHEAR TUBE PUSHED 24" NO RECOVERY				HNU	α	BX
	0							0	1500	
	HNU							α	BX	
10	63409 8/13	1	6	MEDIUM DENSE (10R 5/8) RED CLAY LIKE MATERIAL. GOOD COHESION + PLASTICITY. PATTY LIKE CONSISTENT. SLIGHTLY MOIST. SAA				HNU	α	BX
	0							0	1500	
	HNU							α	BX	
11	63410 8/13	1	6	MEDIUM DENSE (10R 5/8) RED CLAY LIKE MATERIAL. GOOD COHESION + PLASTICITY. PATTY LIKE CONSISTENT. SLIGHTLY MOIST. SAA				HNU	α	BX
	0							0	1500	
	HNU							α	BX	
12	63411 8/13	1	6	MEDIUM DENSE (10R 5/8) RED CLAY LIKE MATERIAL. GOOD COHESION + PLASTICITY. PATTY LIKE CONSISTENT. SLIGHTLY MOIST. SAA				HNU	α	BX
	0							0	1500	
	HNU							α	BX	

NOTES:

Drilling Contractor: PENN DRILLING CO.
 Drilling Equipment: SIMCO
 Driller: E. LAWREN
T. STABRAZINI

SAA = SAME AS ABOVE
 N/A = NOT APPLICABLE
 NR = NO RECOVERY

VISUAL CLASSIFICATION OF SOILS

3.15 TC 8-20-91

PROJECT NUMBER: 602-25-91	PROJECT NAME: FMPC RI/FS OU-1
BOHRING NUMBER: 177	COORDINATES: N 81.657.8 E 1.378, 298.4 DATE: 8-13-91
ELEVATION: 589.7	GWL: Depth Date/Time DATE STARTED: 8/13/91
ENGINEER/GEOLOGIST: HARRIS	Depth Date/Time DATE COMPLETED: 8-14-91
DRILLING METHODS: Hollow Stem Auger	PAGE 2 OF 6

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLE PER (6" x 1")	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (PSI)	WELL CONSTRUCTION	REMARKS
8	63412 8/13 8453	1	6	SAA			N/A	HNU α Bγ G 0 1500
	63413 8/13 1000	1	6	SAA				HNU α Bγ J 0 1000
9	63414 8/13 1000	1	6	SAA				HNU α Bγ O 0 1000
	63415 8/13 1000	1	6	SAA				HNU α Bγ O 0 1200
10	63416 8/13 1000	1	6	SAA				HNU α Bγ O 0 1200
	63417 8/13 1050	1	0	NR				HNU α Bγ NA NA NA
11	63418 8/13 1030	2	0	NR				HNU α Bγ NA NA NA
	63419 8/13 1030	3	0	NR				HNU α Bγ NA NA NA
12	63420 8/13 1030	1	0	NR				HNU α Bγ NA NA NA
	63421 8/13 1045	1	6	VERY LOOSE (10R 4/8) RED CLAY LIKE MATERIAL. GOOD COHESION & PLASTICITY PASTY CONSISTENCY. MOIST				HNU α Bγ C 0 1500
13	63422 8/13 1045	1	6	SAA				HNU α Bγ C 0 1500
	63423 8/13 1045	1	6	SAA				HNU α Bγ C 0 2000
14	63424 8/13 1045	1	6	SAA				HNU α Bγ C 0 2000
	63425 8/13 1050	1	6	SAA				HNU α Bγ O 0 1000
	63426 8/13 1056	1	6	SAA			N/A	HNU α Bγ O 0 1200

NOTES:

Drilling Contractor: Penn Drilling Co
 Drilling Equipment: SIMCO
 Driller: E. Gardner

VISUAL CLASSIFICATION OF SOILS

3.15 TC 820 91

PROJECT NUMBER: <u>602-2577</u>	PROJECT NAME: <u>FMPC M/ES 04-1</u>
BORING NUMBER: <u>1771</u>	COORDINATES: <u>N401.637, E1.378, 298.9</u> DATE: <u>8/13/91</u>
ELEVATION: <u>589.7</u>	GWL: <u>Depth</u> Date/Time: _____ DATE STARTED: <u>8/13/91</u>
ENGINEER/GEOLOGIST: <u>Harris</u>	Depth: _____ Date/Time: _____ DATE COMPLETED: <u>8/14/91</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE <u>3</u> OF <u>6</u>

DEPTH (')	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER FOOT	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CUNNINGHAM (1:1)	WELL CONSTRUCTION	REMARKS
15	63427 8/13 1056	1	6	SAA			N/A	H _{NH} α β _S 0 0 1200
	63428 8/13 1056	1	6	SAA				H _{NH} α β _S 0 0 1200
16	63429 8/13 1105	1	6	SAA				H _{NH} α β _S 0 0 900
	63430 8/13 1105	1	6	SAA				H _{NH} α β _S 0 0 1100
17	63431 8/13 1105	1	6	VERY LOOSE (2.5Y 3/2) VERY DARK SANDY BROWN CLAY LIKE MATERIAL POOR COHESION & PLASTICITY. WET MUD-LIKE CONSISTENCY. WET SAA				H _{NH} α β _S 20 0 1100
	63432 8/13 1105	1	6					H _{NH} α β _S 30 0 1000
	63433 8/13 1110	1	6		SAA			
19	63434 8/13 1110	1	6	VERY LOOSE (2.5Y 4/4) OLIVE BROWN MOTTLED WITH BLACK. CLAY LIKE MATERIAL GOOD COHESION & PLASTICITY. PASTY CONSISTENCY. VERY MOIST.				H _{NH} α β _S 0 0 1200
	63435 8/13 1110	1	6					H _{NH} α β _S 0 0 1100
	63436 8/13 1110	1	6		SAA			
20	63437 8/13 1405	1	6	SAA				H _{NH} α β _S 0 0 600
	63438 8/13 1405	1	6	VERY LOOSE (10YR 2/2). WHITE STAGGERS WITH DARK BROWN & BLACK. CLAY LIKE MATERIAL. GOOD COHESION & PLASTICITY PASTY CONSISTENCY. VERY MOIST.				H _{NH} α β _S 1 0 1200
21	63439 8/13 1405	1	6		SAA			
	63440 8/13 1405	1	6	SAA				H _{NH} α β _S 0 0 1000
22	63441						N/A	

NOTES:
 Drilling Contractor Penn Drilling Co.
 Drilling Equipment Simec
 Driller: E. Gardner
Asst. J. Strappioni
601

VISUAL CLASSIFICATION OF SOILS

3.15 TC 8-20-91

PROJECT NUMBER: <u>602.25.9T</u>	PROJECT NAME: <u>FMPC RI/FS OU-1</u>
BOILING NUMBER: <u>1771</u>	COORDINATES: <u>N 481, 637.8 E 1378, 298A</u> DATE: <u>8/13/91</u>
ELEVATION: <u>589.7</u>	GWL: Depth _____ Date/Time _____ DATE STARTED: <u>8/13/91</u>
ENGINEER/GEOLOGIST: <u>HARRIS</u>	Depth _____ Date/Time _____ DATE COMPLETED: <u>8/14/91</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE <u>A</u> OF <u>6</u>

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (C/N)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (IS)	WELL CONSTRUCTION	REMARKS
23	63441 8/13 1410	SHELBY TUBE (R-110D)	0	SHELBY TUBE PUSHED 24". NO RECOVERY.			N/A	HNU <u>X</u> <u>BY</u> NA NA NA HNU <u>X</u> <u>BY</u> NA NA NA HNU <u>X</u> <u>BY</u> NA NA NA
24	63442 8/13 1433	1	6	VERY LOOSE (2.5 YA 4/8) RED CLAY LIKE MATERIAL GOOD COHESION AND PLASTICITY. PASTY CONSISTENCY VERY MOIST.				HNU <u>X</u> <u>BY</u> O O 400
25	63443 8/13 1433	1	6	VERY LOOSE (10 YA 2/1) BLACK SAND GRADUATED (5Y 8/1) WHITE CLAY LIKE MATERIAL WITH SOME YELLOW. PASTY CONSISTENCY, MOIST.				HNU <u>X</u> <u>BY</u> ZMN O 490
25	63444 8/13 1433	1	6	VERY LOOSE (10 YA 5/4) YELLOWISH BROWN STREAKED WITH (10 YA 3/2) WHITE. CLAY LIKE MATERIAL. PASTY CONSISTENCY, MOIST.				HNU <u>X</u> <u>BY</u> I O 600
26	63445 8/13 1433	1	6	SAA				HNU <u>X</u> <u>BY</u> O O 600
26	63446 8/13 1442	1	6	VERY LOOSE (5Y 8/1) WHITE STREAKED WITH BLACK. CLAY LIKE MATERIAL. PASTY CONSISTENCY, VERY MOIST.				HNU <u>X</u> <u>BY</u> O O 900
27	63447 8/13 1442	1	6	SAA				HNU <u>X</u> <u>BY</u> C O 900
27	63448 8/13 1442	1	6	VERY LOOSE (10 YA 4/6) DARK YELLOWISH BROWN (CARAMEL CANDY) STREAKED WITH THIN LAYERS OF BLACK. CLAY LIKE MATERIAL. PASTY CONSISTENCY, VERY MOIST.				HNU <u>X</u> <u>BY</u> O O 900
28	63449 8/13 1442	1	6	SAA				HNU <u>X</u> <u>BY</u> C O 800
28	63450 8/13 1449	1	6	VERY LOOSE (7.5 YA 4/8) RED CLAY LIKE MATERIAL. GOOD COHESION & PLASTICITY. PASTY CONSISTENCY, VERY MOIST.				HNU <u>X</u> <u>BY</u> O O 900
29	63451 8/13 1449	1	6	SAA				HNU <u>X</u> <u>BY</u> O O 900
29	63452 8/13 1449	1	6	SAA				HNU <u>X</u> <u>BY</u> O O 900
29	63453 8/13 1449	1	6	VERY LOOSE (5Y 8/1) WHITE STREAKED WITH SOME BLACK. CLAY LIKE MATERIAL. PASTY CONSISTENCY, VERY MOIST.			N/A	HNU <u>X</u> <u>BY</u> O O 900

NOTES:

Drilling Contractor PENN DRILLING CO.
 Drilling Equipment SIMCO
 Driller: E. GARDNER
ASST. J. STARRAPAZZI

SAA: SAME AS ABOVE.
 N/C: NO RECOVERY
 NA: NOT APPLICABLE.

501

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VISUAL CLASSIFICATION OF SOILS

3.15 TC 82-91

PROJECT NUMBER: <u>602.25.91</u>	PROJECT NAME: <u>FMPC RI/FS OU-1</u>
BORING NUMBER: <u>1771</u>	COORDINATES: <u>N 481,637.8 E 1,378,298.9</u> DATE: <u>8/13/91</u>
ELEVATION: <u>589.7</u>	GWL: Depth Date/Time DATE STARTED: <u>8/13/91</u>
ENGINEER/GEOLOGIST: <u>Harris</u>	Depth Date/Time DATE COMPLETED: <u>8/14/91</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE <u>5</u> OF <u>6</u>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (LL, PI)	WELL CONSTRUCTION	REMARKS
30	63454 8/13 1515	1	6	VERY LOOSE (10 TO 7/4) VERY PALE BROWN STREAKED WITH BLACK. CLAY LIKE MATERIAL PASTY CONSISTENCY. VERY MOIST SAA			N/A	HNU <input checked="" type="checkbox"/> BX 0 0 500
	63455 8/13 1515	1	6					HNU <input checked="" type="checkbox"/> BX 0 0 600
31	63456 8/13 1515	1	6					HNU <input checked="" type="checkbox"/> BX 0 0 700
	63457 8/13 1515	1	6	SAA			HNU <input checked="" type="checkbox"/> BX 0 0 600	
32	63458 8/13 1523	SHELLY TUBE PUSHED 24		SHELLY TUBE PUSHED 24". FULL RECOVERY				HNU <input checked="" type="checkbox"/> BX NA NA NA HNU <input checked="" type="checkbox"/> BX NA NA NA HNU <input checked="" type="checkbox"/> BX NA NA NA HNU <input checked="" type="checkbox"/> BX NA NA NA
34	63459 8/13 1530	1	6	VERY LOOSE (2.5 TO 1/8) RED CLAY LIKE MATERIAL STREAKED WITH BLACK AND SPARSE (54 8/4) PALE YELLOW MATERIAL. PASTY CONSISTENCY VERY MOIST. SAA			N/A	HNU <input checked="" type="checkbox"/> BX 0 0 500
	63460 8/13 1530	1	6					HNU <input checked="" type="checkbox"/> BX 0 0 500
35	63461 8/13 1530	1	6					HNU <input checked="" type="checkbox"/> BX 0 0 1000
	63462 8/13 1530	1	6	SAA			HNU <input checked="" type="checkbox"/> BX 0 0 800	
36	63463 8/13 1550	1	6	SAA			HNU <input checked="" type="checkbox"/> BX 0 0 600	
	63464 8/13 1550	1	6	VERY LOOSE (10 TO 4/6) DARK YELLOWISH BROWN (CANAL) PASTY CONSISTENCY. VERY MOIST. SAA			N/A	HNU <input checked="" type="checkbox"/> BX 0 0 400
37	63465 8/13 1550	1	6					HNU <input checked="" type="checkbox"/> BX 0 0 600

NOTES:

Drilling Contractor Penn Drilling Co.
 Drilling Equipment Simco
 Driller: E. Gardner
258 J. STARRAZINI

SAA = SAME AS ABOVE
 NR = NO RECOVERY
 N/A = NOT APPLICABLE

VISUAL CLASSIFICATION OF SOILS

3.15 TR 820-91

PROJECT NUMBER: <u>602.25-91</u>	PROJECT NAME: <u>FMPC RIFES 00-1</u>
BORING NUMBER: <u>1771</u>	COORDINATES <u>N 481, 637.8 E 1, 378, 288.4</u> DATE: <u>5/13/91</u>
ELEVATION: <u>589.7</u>	GWL: Depth _____ Date/Time _____ DATE STARTED: <u>5/13/91</u>
ENGINEER/GEOLOGIST: <u>F. Harris</u>	Depth _____ Date/Time _____ DATE COMPLETED: <u>8/14/91</u>
DRILLING METHODS: <u>Hollow Stem Auger</u>	PAGE <u>6</u> OF <u>6</u>

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6")	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	WELL CONSTRUCTION	REMARKS
38	63466 5/13 1550	1	6	VERY LOOSE (SY 2.5/1) BLACK CLAY LIKE MATERIAL, PASTY CONSISTENCY VERY MOIST.			N/A	HNU α Bγ 0 0 800
	63467 5/13 1600	1	6	VERY LOOSE (10YR 4/6) DARK YELLOWISH BROWN (CARAMEL) PASTY CONSISTENCY VERY MOIST. SAA SAA SAA			N/A	HNU α Bγ 0 0 800
39	63468 5/13 1600	1	6		HNU α Bγ 0 0 900			
	63469 5/13 1600	1	6		HNU α Bγ 0 0 1000			
40	63470 5/13 1600	1	6	HNU α Bγ 0 0 1200				
	63471 8/14 0825	1		VERY LOOSE (2.5YR 6/8) LIGHT RED CLAY LIKE MATERIAL. PASTY CONSISTENCY. VERY MOIST.				HNU α Bγ 0 0 3500
41	63472 8/14 0825	6		VERY LOOSE (10YR 7/4) VERY PALE BROWN CLAY LIKE MATERIAL, PASTY CONSISTENCY VERY MOIST.				HNU α Bγ 0 0 3000
				WELL SET AT 410'. NO LINER ENCOUNTERED.				N/A

NOTES:
 Drilling Contractor PENN DRILLING CO.
 Drilling Equipment SIMEO
 Driller: E. GARDNER
ASST. J. STRAPPAZONI
POI

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

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS (00.1) FIELD ENG./GEO. M. HARRIS DATE 8-14-91
 PROJECT NO. 602.3.15 CHECKED BY _____ DATE _____
 BORING NO. 1771
 PIEZOMETER NO. 1771 DATE OF INSTALLATION 8-14-91

BOREHOLE DRILLING

DRILLING METHOD <u>HOLLOW STEM AUGER</u>	TYPE OF BIT <u>AUGER</u>
DRILLING FLUID (S) USED: FLUID <u>NONE</u> FROM _____ TO _____ FLUID <u>NONE</u> FROM _____ TO _____	CASING SIZE (S) USED: SIZE <u>NONE</u> FROM _____ TO _____ SIZE <u>NONE</u> FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE <u>MONITOR 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"</u> I.D. <u>4.0"</u>
PERFORATION TYPE: SLOTS <input checked="" type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>43.0 FEET</u>
AVERAGE SIZE OF PERFORATIONS <u>0.01 IN.</u>	JOINING METHOD <u>FLUSH JOINT THREADED</u>
TOTAL PERFORATED AREA <u>4.0 FEET</u>	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>5.0 FT.</u>	OTHER PROTECTION <u>HINGED LOCKING</u>
PROTECTIVE PIPE O.D. <u>10 3/4"</u>	<u>COVER WITH PADLOCK</u>

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (FT)		ELEVATION (FT)	
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0		589.7	
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS: GROUT/SLURRY BENTONITE SAND GRAVEL <u>NONE USED</u>	TOP 0.0	BOTTOM 33.5	TOP	BOTTOM
	TOP 33.5	BOTTOM 35.5	TOP	BOTTOM
	TOP 35.5	BOTTOM <u>35.5</u>	TOP	BOTTOM
	TOP <u>N/A</u>	BOTTOM <u>N/A</u>	TOP	BOTTOM
PERFORATED SECTION	TOP 36.5	BOTTOM 40.5	TOP	BOTTOM
PIEZOMETER TIP	41.0			
BOTTOM OF BOREHOLE	41.0			
GWL AFTER INSTALLATION				

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES NO **111**
 WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES NO

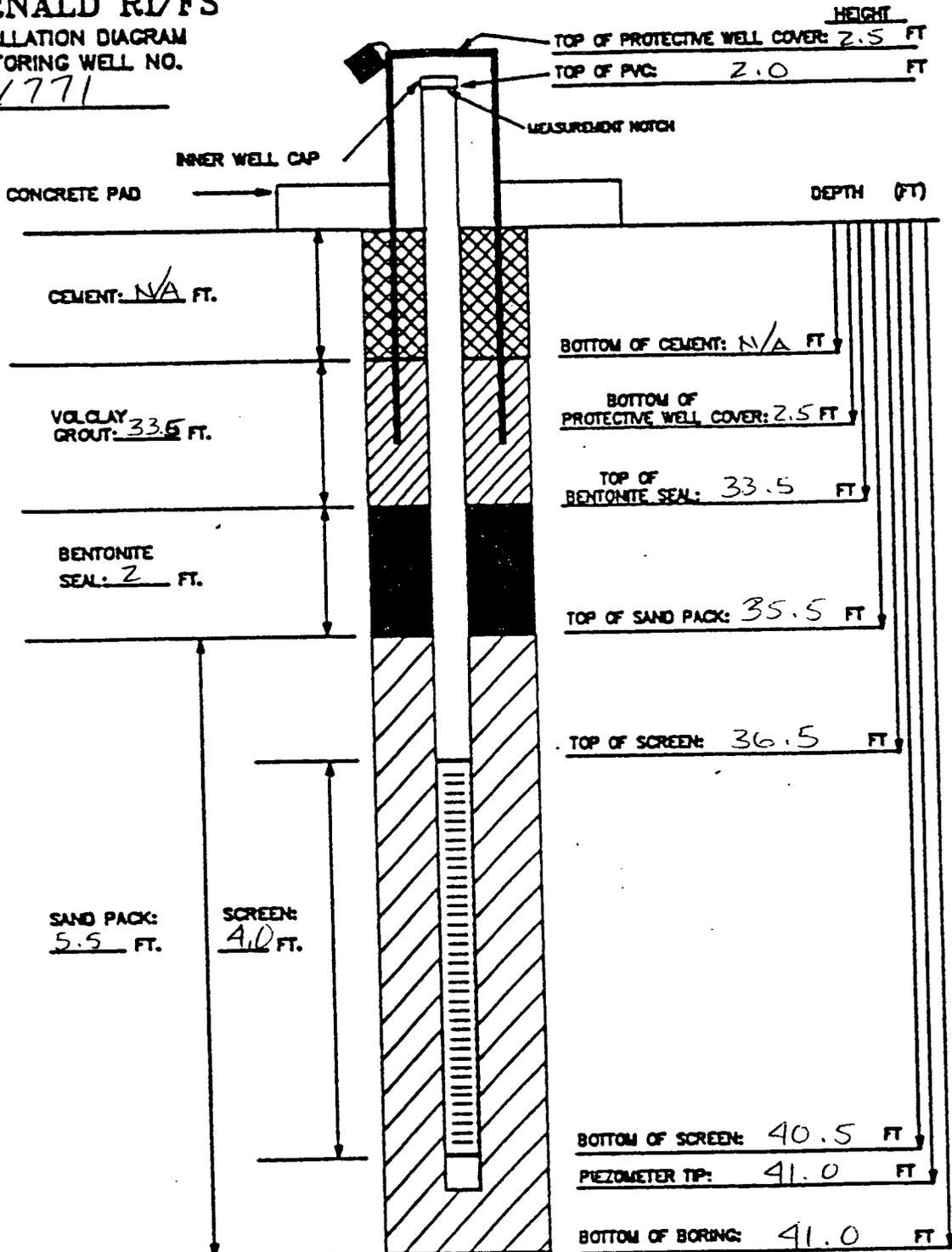
REMARKS WOOD PLUG USED IN AUGER BIT DURING WELL INSTALLATION

INSTALLATION DATE: 8-14-91

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.

1771



MATERIALS USED:

SAND TYPE AND QUANTITY: 1-Bags bag 10/20
 BENTONITE PELLETS (5-GALLON BUCKETS): 0.5
 BAGS OF VOLCLAY GROUT: 1 - 50lb bags
 AMOUNT OF CEMENT: N/A
 AMOUNT OF WATER USED: 3 GALLONS
 OTHER: 3' X 3' CONCRETE PAD
 WILL BE INSTALLED

NOTES:

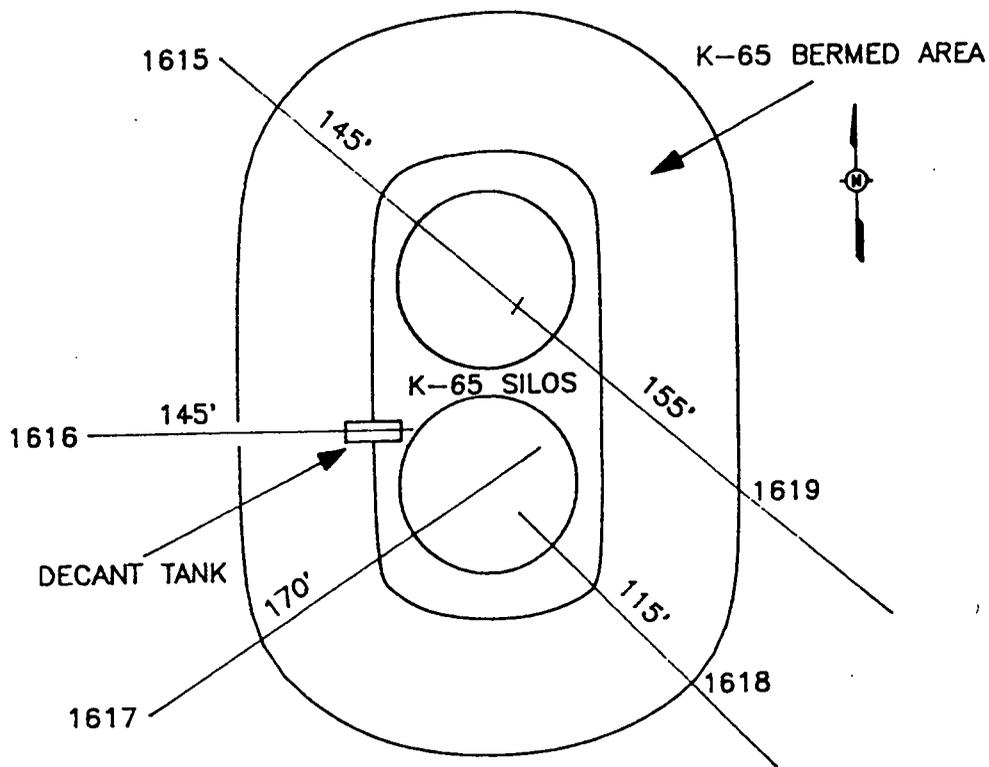
- 4.0" I.D. STAINLESS
- 1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS.
 - 2) SCREEN IS 2-INCH I.D. SCHEDULE 40 4.0" I.D. STAINLESS PVC PIPE WITH 0.020-INCH SLOTS.
 - 3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED STAMP.
 - 4) WATER DEPTH/DATE:

TASK: (cont.) 602.3.15

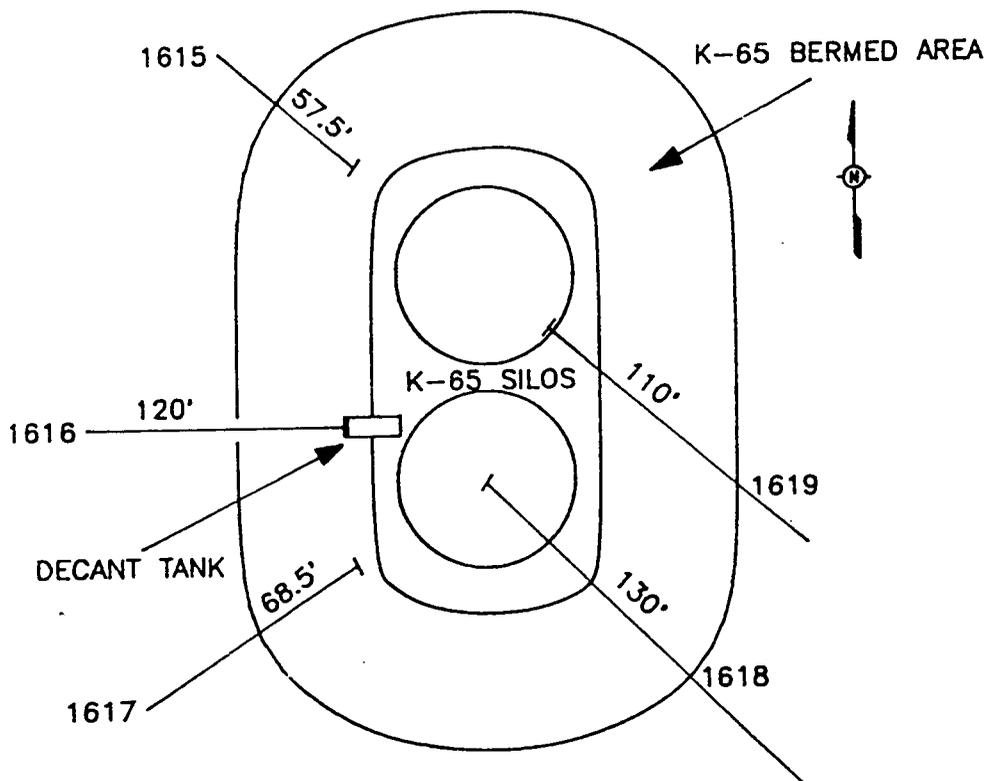
GEOLOGIST/ENGINEER: M. HARRIS

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

ENCLOSURE D
OPERABLE UNIT 4: SILOS 1, 2, 3, AND 4
SITE CHARACTERIZATION
SLANT BORING PROGRAM PRESENTATION
AUGUST 29, 1991



PROPOSED



ACTUAL

NOT TO SCALE

602A_FIG2K-65_GEN_FND

PLAN VIEWS OF PROPOSED AND
ACTUAL BORING LENGTHS

STATUS SUMMARY OF K-65 LOW ANGLE BORINGS

Boring Number	1615	1616**	1617	1618	1619**
Status Date	05-29-91	07-15-91	06-10-91	08-10-91	08-25-91
Length of Boring	58.0'	120.0'	68.5'	130.0'	110.0'
Present End-Point Location	5.2' BELOW SILO FOOTER AND 28.8' NORTHWEST FROM FOOTER	9.8' BELOW BASE OF DECANT TANK AND 1.6' PAST THE WESTERN EDGE OF THE TANK	7.2' BELOW SILO FOOTER AND 17.9' SOUTHWEST OF FOOTER	6.3' BELOW SILO FOOTER AND 40.7' PAST THE SOUTHEAST EDGE OF THE SILO.	11.4' BELOW SILO FOOTER AND 10.4' FROM THE SOUTHEAST EDGE OF THE SILO.
Elevation at Initial Boring Point	577.7'	571.0'	576.2'	577.4'	578.8'
Elevation at Final Boring Point	566.9'	550.9'	569.0'	566.4'	561.2'
Depth Below Elevation of Initial Boring Point at the Final Boring Point	10.8'	20.1'	7.2'	11.0'	17.6'
<u>SAMPLING HISTORY</u>					
Soil	2 SAMPLES SENT: 17.5' - 22.5' 37.5' - 42.5'	2 SAMPLES SENT: 83.0' - 89.0' 103.0' - 108.0'	3 SAMPLES SENT: 17.1' - 22.5' 36.5' - 41.5' 58.5' - 62.0'	5 SAMPLES SENT: 47.5' - 52.5' 67.5' - 72.5' 87.5' - 92.5' 105.0' - 110.0' 125.0' - 130.0'	3 SAMPLES SENT: 57.5' - 62.5' 81.25' - 82.5'* 103.75' - 105.0*
Perched Groundwater	1 SAMPLE SENT: FROM 57.5'	2 SAMPLES SENT FROM 48.0 AND 120.0'	1 SAMPLE SENT FROM 68.5'	1 SAMPLE SENT FROM 130.0'	1 SAMPLE SENT FROM 110.0'

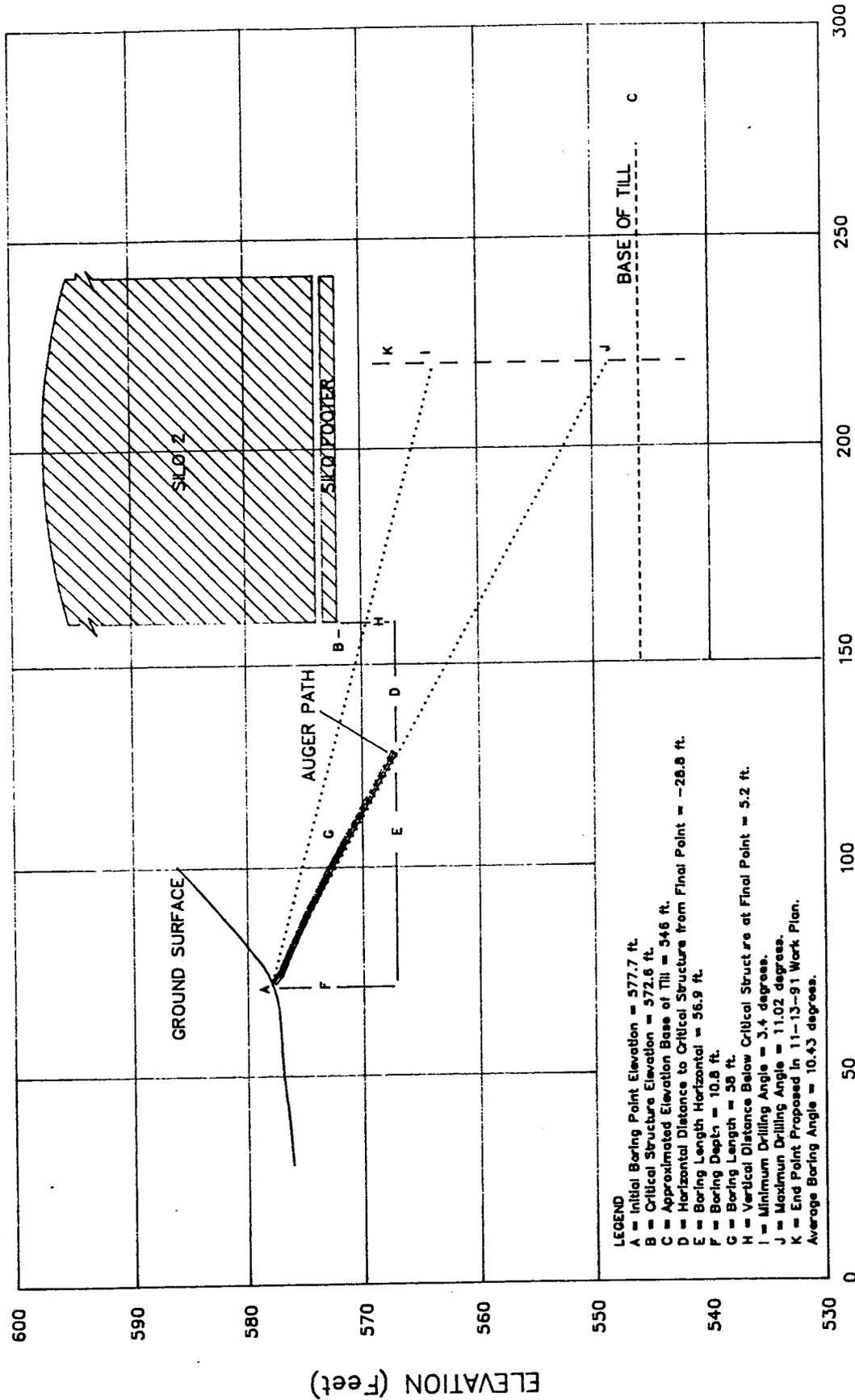
NOTES

- * Only geotechnical samples were sent due to the presence of perched water in the boring.
- ** Boreholes have been plugged and abandoned

The approximate elevation of the base of till/top of aquifer for all borings was 546.0'; however, on Boring 1616 stratigraphic information indicates that the present boring end-point is near the till/aquifer boundary.

SLANT BORING 1615 (No.1) AT K-65 SILOS

Graph #: K65B1K. APRIL 22, 1991

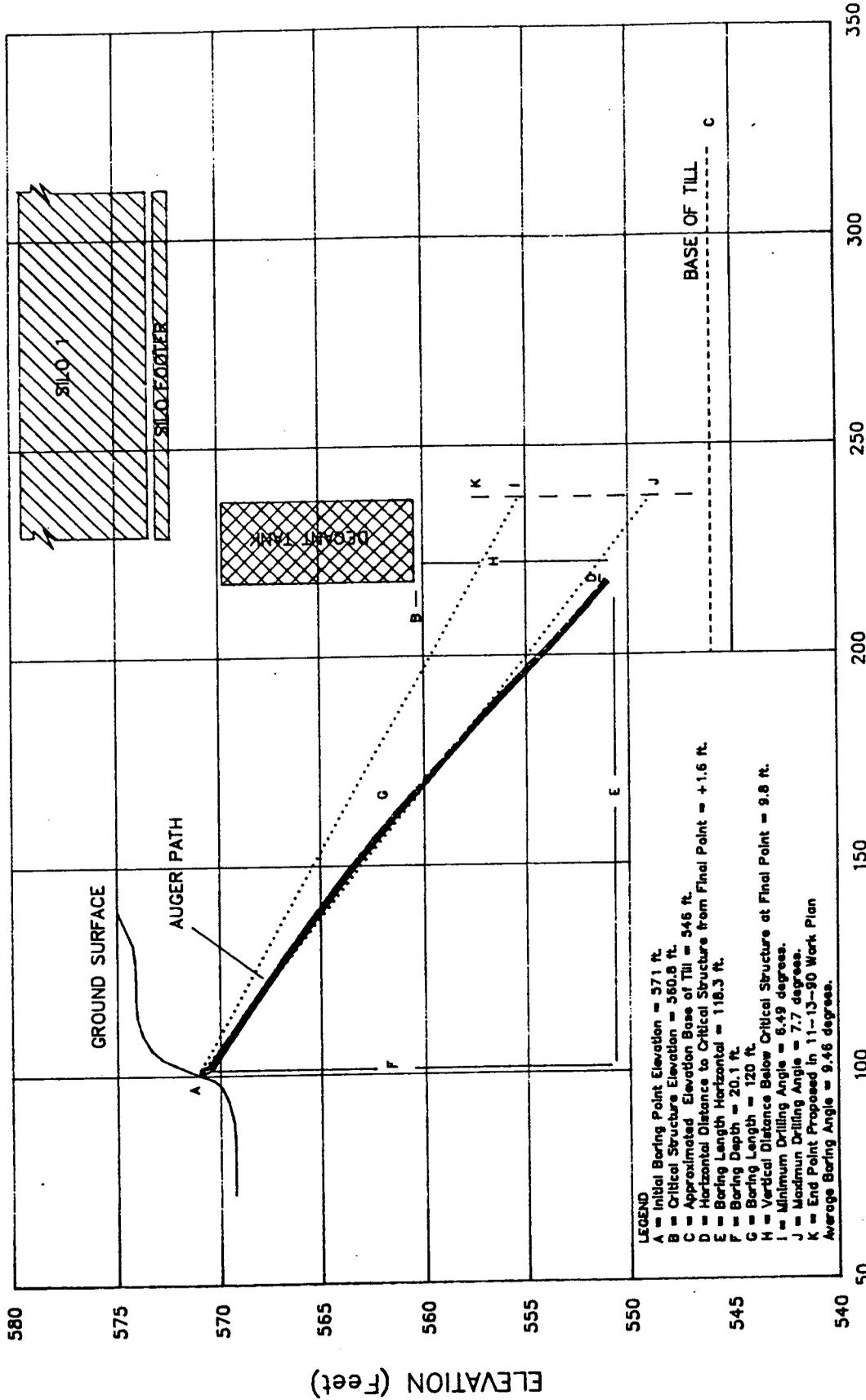


MORA_K65B1K.DRW_ASIFND_08-08-91_REV000

HORIZONTAL DISTANCE (Feet)

SLANT BORING 1616 (No.2) AT K-65 SILOS

Graph #: K65B2C. JULY 02, 1991



2071

MORA_K65B2CC.DRW_ASFNO_08-08-91_REV000

HORIZONTAL DISTANCE (Feet)

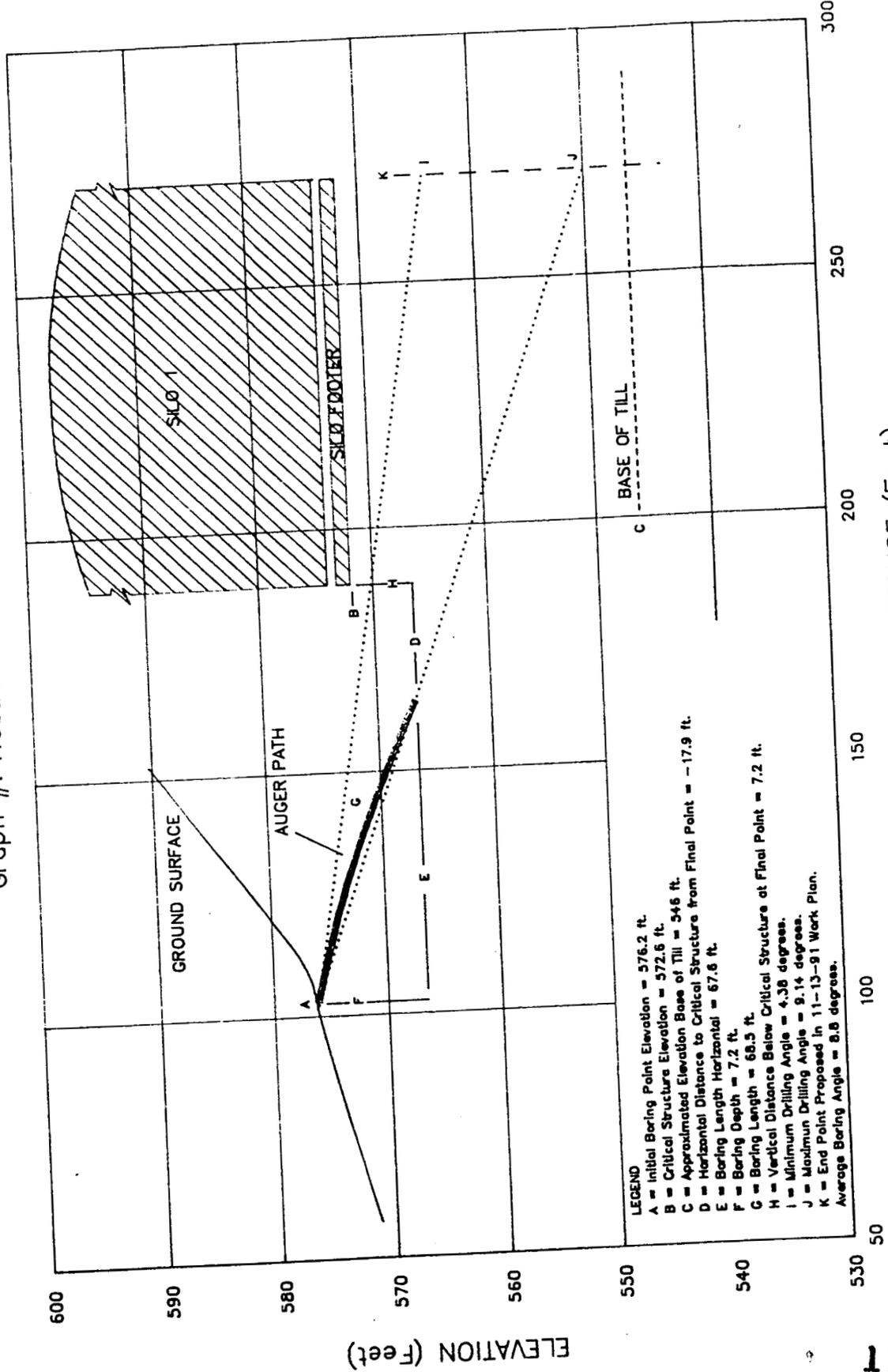
117

1709

2071

SLANT BORING 1617 (No.3) AT K-65 SILOS

Graph #: K65B3L. MAY 06, 1991



- LEGEND**
- A = Initial Boring Point Elevation = 576.2 ft.
 - B = Critical Structure Elevation = 572.6 ft.
 - C = Approximated Elevation Base of Till = 546 ft.
 - D = Horizontal Distance to Critical Structure from Final Point = 17.9 ft.
 - E = Boring Length Horizontal = 67.6 ft.
 - F = Boring Depth = 7.2 ft.
 - G = Boring Length = 68.3 ft.
 - H = Vertical Distance Below Critical Structure at Final Point = 7.2 ft.
 - I = Minimum Drilling Angle = 4.38 degrees.
 - J = Maximum Drilling Angle = 9.14 degrees.
 - K = End Point Proposed in 11-13-91 Work Plan.
- Average Boring Angle = 8.8 degrees.

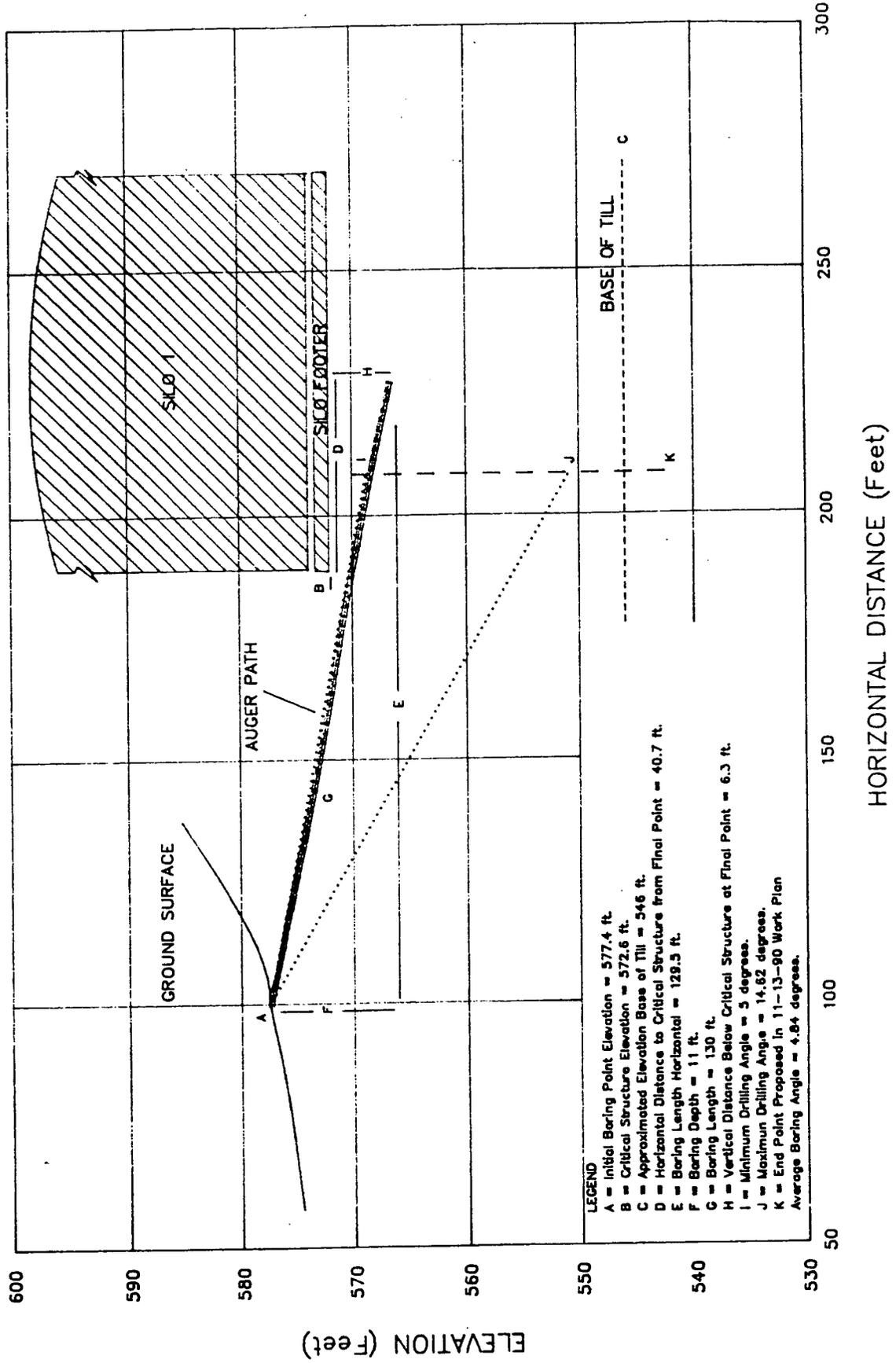
811

HORIZONTAL DISTANCE (Feet)

UORA_K65B3L.DRW_ASIFND_08-08-91_REV000

SLANT BORING 1618 (No.4) AT K-65 SILOS

Graph #: K65B4D. AUGUST 03, 1991



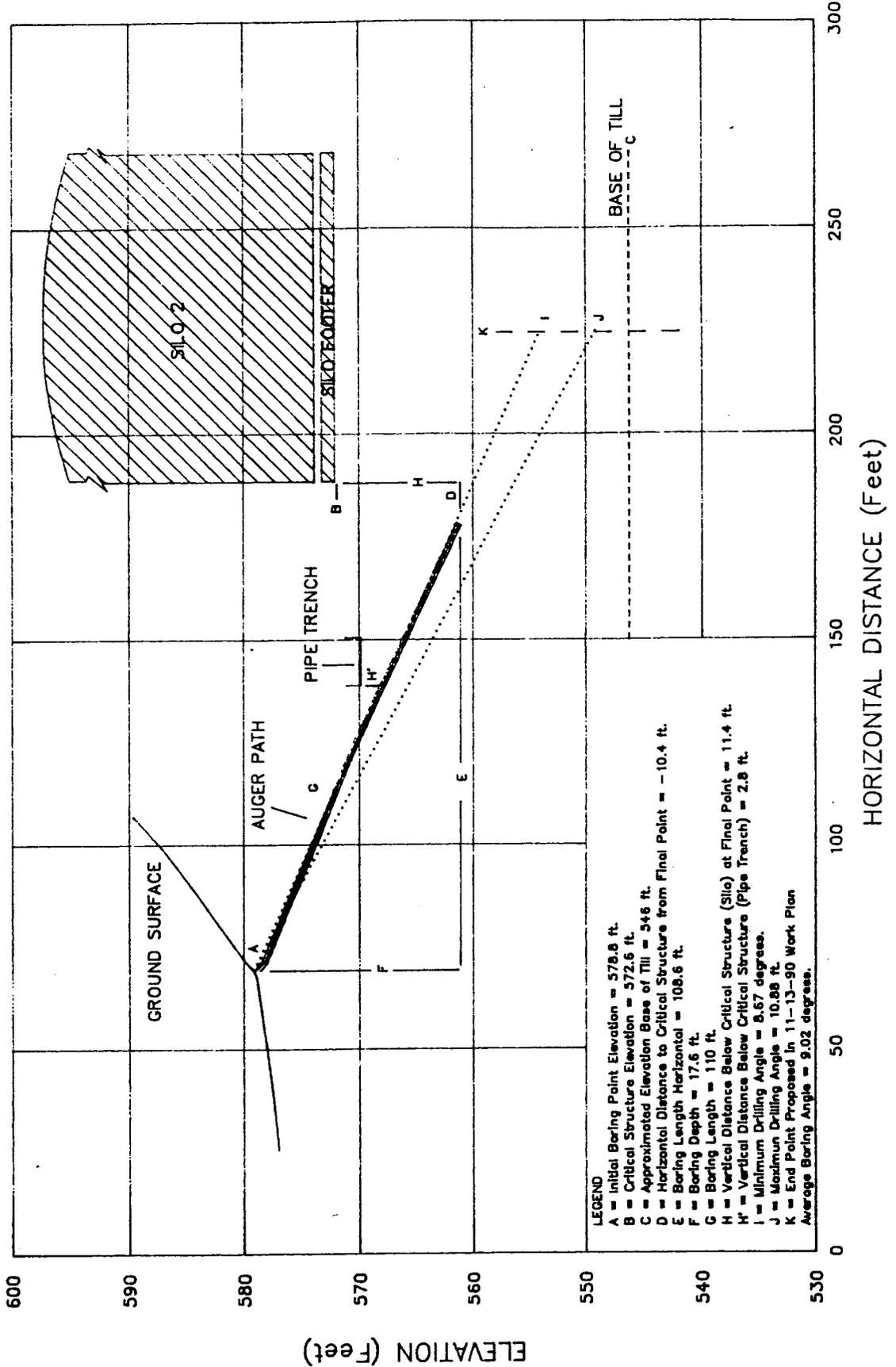
MORA_K65B4D.DRW_ASIFND_08-08-91_REV000

2071

611

SLANT BORING 1619 (No.5) AT K-65 SILOS

Graph #: K65B5C. JULY 30, 1991



- LEGEND**
- A = Initial Boring Point Elevation = 578.8 ft.
 - B = Critical Structure Elevation = 572.6 ft.
 - C = Approximated Elevation Base of Till = 546 ft.
 - D = Horizontal Distance to Critical Structure from Final Point = 10.4 ft.
 - E = Boring Length Horizontal = 108.6 ft.
 - F = Boring Depth = 17.6 ft.
 - G = Boring Length = 110 ft.
 - H = Vertical Distance Below Critical Structure (Silo) at Final Point = 11.4 ft.
 - I = Vertical Distance Below Critical Structure (Pipe Trench) = 2.8 ft.
 - J = Minimum Drilling Angle = 8.67 degrees.
 - K = Maximum Drilling Angle = 10.88 ft.
 - L = End Point Proposed in 11-13-90 Work Plan
 - Average Boring Angle = 9.02 degree.

MORA_K65B5CC.DRW_ASIFND_08-08-90_REV000