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REPORT

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G-006-711,62

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
CONTROL AND ABATEMENT OF RADON-222 EMISSIONS
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Introduction

The Consent Agreement (CA) As Amended under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Sections 120 and 106(a), the Federal Facility Compliance Agreement (FFCA), and the Federal Facility Agreement for Control and Abatement of Radon-222 Emissions (FFA-CARE) between the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (U.S. EPA) signed September 20, 1991, July 18, 1986, and November 19, 1991, respectively, require that monthly reports be submitted to the U.S. EPA regarding progress made to meet the provisions of those agreements. This report fulfills those requirements by describing actions undertaken at the Fernald Environmental Management Project (FEMP) during the period October 1 through October 31, 1992, and planned actions for the period November 1 through November 31, 1992.

Highlights of activities in October include the following:

- The U.S. District Court granted access to the two outstanding properties needed for Part 1 of Removal Action No. 3, South Groundwater Contamination Plume. Construction activities on these properties was begun.
- Initial excavation activities and additional sampling activities for Removal Action No. 14, Contaminated Soils Adjacent to Sewage Treatment Plant Incinerator, was completed.
- The revised Work Plan for Removal Action No. 24, Pilot Plant Sump, was submitted to the U.S. EPA and the Ohio EPA.
- The draft Work Plan/Closure Plan Information and Data Package for Removal Action No. 25, Nitric Acid Tank Car and Area, was submitted to the U.S. EPA and the Ohio EPA.

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WORK ASSIGNMENTS AND PROGRESS

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

- o CA Section IX - Removal Actions.
- o CA Section X - Remedial Investigation/Feasibility Study.
- o Enclosure A - Wastewater Flows and Radionuclide Concentrations under CA Section XXIII.B.
- o Enclosure B - FFCA: Initial Remedial Measures and Other Open Actions.
- o Enclosure C - FFA: Control and Abatement of Radon-222 Emissions.
- o Enclosure D - Drilling/Boring Logs

CA Section IX. Removal Actions

This section provides an update of activities associated with the implementation of Removal Actions (RAs) at the FEMP during October 1992. Information is presented for each of the Removal Actions identified in the Consent Agreement As Amended.

Phase I Removal Actions

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

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Phase II Removal Actions

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

Phase III Removal Actions

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

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CA Section IX. Removal Actions (continued)

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

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RA No. 1, Contaminated Water Under FEMP Buildings

Plant 6 - Pumping and collection of the perched water from underneath Plant 6 began on May 31, 1991. Through October 1992, approximately 34,074 gallons of perched groundwater have been extracted and transported for treatment to the Plant 8 Volatile Organic Compound (VOC) treatment system. A proposal was made to add the Plant 6 Motor Bay sump water to this action. After oral concurrence from the U.S. EPA and the Ohio EPA, the drums of wastewater previously collected from these sumps were transferred to Plant 8 for treatment. Future water collected in temporary storage will likewise be transferred to Plant 8 for treatment. Plans are underway to provide permanent piping and tankage for handling this additional water.

An addendum to the Plant 6 Perched Water Removal Action Work Plan to address the addition of the Plant 6 Motor Bay Sump Treatment in the Plant 8 VOC Treatment System was forwarded to U.S. EPA and Ohio EPA on October 27, 1992.

Plants 2/3 and Plant 8 - The Plants 2/3 and Plant 8 extraction systems became operational on October 23, 1991. Through October 1992, approximately 117,848 gallons of perched water have been collected for treatment from Plant 2/3 and approximately 83,858 gallons of perched water have been collected for treatment from Plant 8. Direct piping to the Plant 8 treatment system from the Plant 2/3 wells was completed in May 1992.

Plant 9 - Pumping from Plant 9 began on August 20, 1991. Approximately 22,308 gallons of Plant 9 perched water have been extracted and transported to Plant 8 through October 1992.

Plant 8 - The start-up date for the Plant 8 treatment system was July 24, 1991. Through October 1992, approximately 251,488 gallons of groundwater have been treated utilizing the Plant 8 treatment system. The Plant 8 filter elements have been reworked to address the bypass of untreated flows via the multimedia filter backwash. This was accomplished by replacing the multimedia filters with bag filters that have no backwash. All activities to support the deliverables identified in the three U.S. EPA approved Removal Action Work Plans have been completed. Pumping of perched water beneath the four plants with subsequent treatment in the Interim Plant 8 VOC Treatment System followed by uranium removal in the Plant 8 Wastewater Treatment System will continue in accordance with the Work Plan provisions in keeping with the revised operable unit descriptions in the Amended Consent Agreement. Treatment will continue in this manner until the Advanced Waste Water Treatment (AWWT) Phases I and II are operational in 1994.

Future actions include completing plans and specifications for the Plant 6 Motor Bay Sump pumping and issuing for review and comment.

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REMOVAL ACTIONS

RA No. 2, Waste Pit Area Runoff Control

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

All activities for this removal action have been completed.

RA No. 3, South Groundwater Contamination Plume

Part 1

The Work Plan for Part 1, Alternate Water Supply for two industrial users was approved by the U.S. EPA on January 3, 1991. Subsequently, one industrial user was deleted from the scope of the project with approval of the U.S. EPA and Ohio EPA. A revised Work Plan was prepared and issued to the EPAs to reflect this and other changes which have occurred. A summary of the most recent and ongoing activities for Part 1 are listed below:

- The U.S. District Court granted *Order for Delivery of Possession* on October 13, 1992. These orders granted access to the two outstanding properties. The contractor began construction activities on these remaining properties (pipe installation) on October 19, 1992.
- The pipeline for the Mandery Trust property has been installed. Except for electricity, the well field has essentially been completed.

Part 2

To expedite the Part 2 construction, this project was divided into five construction bid packages. These include: 2A - Groundwater discharge pipeline (pressure flow) and outfall pipeline (gravity flow) from south of Willey Road to and including Manhole 183B; 2B1 - Manhole 183B to Great Miami River; 2B2 - Aeration Facility; 2C - Recovery well field; and 2D - Test well installation and pump test. Part 2 follow-on activities include:

- The U.S. EPA has approved an extension of the scheduled milestone date from January 29, 1993, to August 28, 1993.

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

Completed installation of pipeline casing under State Route 128 and under south access road. Nearing completion of the installation of pipe arch just west of south access roadway. Manhole 182 concrete placement was completed. Installation of new box culvert along pipe crossing at Storm Sewer Outfall Ditch is nearing completion.

Package 2B1 (Cofferdam) - A presentation was made to the U.S. and Ohio EPA regarding the modified construction plan for the cofferdam construction - Package 2B1. Both U.S. and Ohio EPA accepted the proposed plan as presented with no comment. Additionally, this information was presented to members of FRESH by DOE. Based on the acceptance by the U.S. and Ohio EPAs, DOE has approved the Plan of Action for Package 2B.1 (cofferdam) construction. Partial suspension of the construction contractor was lifted on October 13, 1992.

Part 3

The Work Plan for Part 3 (the installation and operation of an Interim Advanced Wastewater Treatment (IAWWT) System to reduce uranium contaminant loading discharged to the Great Miami River to a level less than 1,700 pounds per year) was prepared as one work plan with Part 2. Due to the relocation of the Part 2 well field to an area having a higher concentration of uranium, the IAWWT system capacity was expanded to maintain the 1,700 pound per year maximum level. The IAWWT system includes two treatment units. The IAWWT unit located at the Storm Water Retention Basin (IAWWT[SWRB]) consists of two trailer-mounted assemblies, each with a nominal 150 gpm capacity or a total nominal 300 gpm capacity. The unit located at the Biondenitrification Effluent Treatment System (IAWWT[BDN-ETS]) has a nominal capacity of 100 gpm. Current activities are as follows:

IAWWT(SWRB) Unit

The IAWWT unit at the SWRB continues to operate successfully.

IAWWT(BDN-ETS) Unit

Preliminary design (30% design) of the additional flocculation/clarification step upstream of the IAWWT(BDN-ETS) has been completed and reviewed. The system will remain shutdown until this additional treatment stage is successfully added to the existing system.

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

Part 4

Part 4 of the South Groundwater Contamination Plume Removal Action Work Plan involves groundwater monitoring and institutional controls. Current activities are as follows:

- Quarterly sampling was performed in October
- Bottled drinking water continues to be supplied to seven private residences in the South Plume Area

Part 5

Part 5 was added to the South Plume in order to address the relocation of the Part 2 well field. It includes groundwater modeling and geochemical investigation of the area south of the well field to determine if 20 ppb uranium concentration in groundwater is present downgradient of the Part 2 well field.

- The Operable Unit 5 RI/FS Work Plan Addenda has been revised to incorporate responses to comments received from the U.S. and Ohio EPA. This Work Plan was transmitted to the U.S. EPA and Ohio EPA on October 22, 1992.

Future work includes continuing construction on Parts 1 and 2, continuing design modification on Part 3 IAWWT(BDN-ETS) and beginning installation of Part 5 monitoring wells on accessible properties.

RA No. 4, Silos 1 and 2

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

As previously discussed at the Program Managers' Meeting on July 21, 1992, the DOE is preparing a paper detailing a revised method for evaluating the effectiveness of the bentonite in the silos. The reduction in radon emanation, as a result of bentonite installation, can be evaluated more thoroughly and consistently using analytical methods to measure the radon concentration in the silo headspace and by analyzing the relationship of these results to observed radon concentration in the vicinity of the silos and at the site boundary. Work continues on developing the revised methodology for assessing the effectiveness of the bentonite in the silos. A November completion date is anticipated.

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RA No. 4, Silos 1 and 2 (continued)

Construction acceptance of the Removal Action No. 4, Silos 1 and 2, data logging system occurred on October 9, 1992. The data logging system automatically records data generated from the headspace radon monitoring, headspace humidity monitoring, and temperature and pressure monitoring of Silos 1 and 2. Also data from four radon monitors, located on the K-65 area exclusion fence, is being recorded.

Work in October also included the turnover of the data logging system to Operable Unit 4 and evaluating the system from an operations and maintenance standpoint.

Future work includes investigating necessary upgrades to the data logging system to enhance operations. This will be an ongoing activity until the historical data base is sufficient to confirm the data on a statistical basis.

As defined in the Removal Action Work Plan and the FFA-CARE, data associated with monitoring the effectiveness of the bentonite installation is included in Enclosure C.

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

RA No. 5, K-65 Decant Sump Tank

Removal of the liquid from the K-65 decant sump tank was completed on April 16, 1991, when the liquid was transferred to the holding tanks in Plant 2/3. Treatment of the decant liquid based on the MEF and available analytical results was completed on May 12, 1992.

The Removal Action Final Report was submitted to the Ohio EPA and the U.S. EPA in August. Comments received on September 25 and October 2 are in WEMCO internal review. Comment responses will be submitted for transmittal to Ohio EPA and U.S. EPA in November.

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RA No. 6, Waste Pit 6 Residues

This removal action was completed on December 19, 1990.

RA No. 7, Plant 1 Pad Continuing Release

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

October activities included: the installation of the fabric covering of the second tension support structure; the installation of lighting, powered over-head doors, and emergency exit doors in the first structure; completion of the grading around the perimeter and application of concrete coatings.

The bid cycle for Phase III construction also began in October. The Invitation for Bid (IFB) is expected in November. Other November activities will include completion of the second tension support structure, including the installation of lighting, powered over-head doors, and emergency exit doors.

KEY MILESTONES	STATUS	DUE DATE
Complete Phase I	Completed January 17, 1992	March 13, 1992
Complete Phase II	Open, ahead of schedule	December 21, 1992
Complete Phase III	Open, ahead of schedule	February 21, 1995

RA No. 8, Inactive Flyash Pile Control

The Inactive Flyash Pile Isolation Activity was completed ahead of schedule on December 23, 1991.

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RA No. 9, Removal of Waste Inventories

During October 1992, 3,432 drum equivalents (DEs) of low-level waste (LLW) were dispositioned. The October goal for shipments was 4,416 DEs. Currently, LLW shipping is 984 DEs behind schedule. This deficit was caused by a delay in the initiation of shipping for FY1993 due to NVO-325 requirements. The FEMP had to revise the data transmission form used to transmit shipping data to the Nevada Test Site (NTS). The revision had to be completed, tested by FEMP personnel, and approved by NTS personnel before shipments could resume. The FY1993 goal is to dispose of 67,000 DEs of LLW at the NTS.

The FEMP is waiting for sample analysis for the three drums of thorium sampled in September.

Activities for November include shipping 5,400 DEs of LLW to the NTS. This volume will bring the waste shipping volume back on schedule.

KEY MILESTONES	STATUS	DUE DATE
Update existing internal procedures to ensure that appropriate shipping documentation is entered into the administrative record file	On schedule (To be updated annually)	June 30, 1993

RA No. 10, Active Flyash Pile Controls

The Work Plan for the Active Flyash Pile Controls Removal Action was completed and submitted ahead of schedule to the U.S. and Ohio EPAs on February 18, 1992. Comments from the Ohio EPA were received on March 18. U.S. EPA approval of the Plan was received on March 30. Resolution of these comments and a revised version of the Work Plan were transmitted to the EPAs on April 29.

The design of this removal action was completed in April. A construction contractor was selected on May 29, 1992. Interim controls (Phase I), to provide wind and surface water run-off control at the Active Flyash Pile, and the remainder of the removal action (Phase II), were completed on June 29, 1992. Any required maintenance will be conducted on an ongoing basis.

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RA No. 10, Active Flyash Pile Controls (continued)

The potential use of active and inactive flyash pile material as an additive in controlled low strength material (CLSM) is being investigated. Use of CLSM has become popular as a replacement for compacted granular material in backfill, structural fill, and slope stability applications.

KEY MILESTONES	STATUS	DUE DATE
Submit Active Flyash Pile Work Plan to the U.S. EPA for approval	Completed February 18, 1992	March 2, 1992
Phase I - Complete interim surface stabilization	Completed June 29, 1992	June 30, 1992
Phase II - Complete Active Fly Ash Pile Controls.	Completed June 29, 1992	October 28, 1993

RA No. 11, Pit 5 Experimental Treatment Facility

RA No. 11 was completed.

Activities for October included the issuance of the Removal Action Final Report.

There are no planned activities for November.

KEY MILESTONES	STATUS	DUE DATE
Complete removal action within 120 days of Work Plan approval	Completed March 20, 1992	April 11, 1992

RA No. 12, Safe Shutdown

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

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RA No. 12, Safe Shutdown (continued)

KEY MILESTONES	STATUS	DUE DATE
Update existing internal procedures to ensure that appropriate documentation is entered into the administrative record file	On schedule (To be updated annually)	June 30, 1993

The preliminary assessments for each major process area are continuing. Plants 1, 2/3, 4, 5, 8, and 9 have been completed. Plants 6 and the Pilot Plant are in rough draft form.

Inventorying of expense equipment items continued; 2,718 expense items are currently in the data base; 1,251 have been field verified, 578 are on a "shopping list" to ascertain on-site use, 35 have been transferred to Maintenance, and 98 have been placed on AC-563 Forms to be excessed. Expense equipment is physical plant inventory with a net value less than \$5,000. These numbers are expected to fluctuate from month to month as field verification are conducted. In September's CA/FFCA/FFA-CARE Monthly Progress Report, 1,255 items had been reported as field verified. Four items were discovered to be duplicated in the data base. The removal of the duplications resulted in the current 1,251 field verifications.

The capital equipment inventory continued; of an estimated 1,705 total number of items, 1,149 have been put on AC-563 Forms to be excessed, and 556 have been identified as "In Use/Future Use" items. Capital equipment is physical plant inventory with a net value greater than \$5,000. The initial evaluation for capital equipment disposition has been completed.

The equipment data base is being merged with the preliminary assessment data base, utilizing the capital equipment bar code and the Maintenance Manager and Inventory Control System (MMICS) numbers. Utilities are assigned for each and task orders are filled out, in addition to a maintenance work order. There will also be an assessment of the materials in the equipment and applicable permits will be included. The benefit of all this is the assembling of a complete package which can then be utilized in disconnecting utilities.

Phase I (shipments to the Defense Consolidation Facility, Snelling, South Carolina) of the project to transfer the remaining 4A metal inventory from the Fernald Environmental Management Project (FEMP) continued. Twenty-six (26) gondola cars have been shipped as of October 31 for a total of 1593.5 metric tons uranium (MTU); balance to be shipped 1259.5 MTU (247.5 MTU to the DCF and 1012 MTU to Nevada Test Site).

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RA No. 12, Safe Shutdown (continued)

Phase II (shipments of rolled scrap to the Nevada Test Site for burial) is currently being negotiated between the Army and NTS. In support of this effort, Safe Shutdown has been asked to provide quality assurance and material certification/accountability plans.

Preparation of the Safety Analysis Report (SAR) by Parsons is at 90 percent draft review.

In an effort to reduce the risk hazards associated with work being performed in process buildings, the main natural gas lines have been disconnected and blanked off to each building.

As scheduled, Work Orders to isolate utilities and Task Orders to remove excess materials were initiated the first of October in the following areas:

Plant 1	First Floor
Plants 2/3	Denitration
Plant 6	South
Plant 6	Basement
Plant 8	Dry Side
Plant 9	East Side

To date, 59 Work Orders have been issued, with 29 actively being worked. Five Task Orders have been written.

A meeting was held with Nuclear Systems Safety on September 16, 1992, to clarify the safety documentation requirements for the Safe Shutdown Program field activities. A Safety Assessment covering the task of removing hold-up materials from the process equipment will be written utilizing data accumulated for the site-wide Safety Analysis Report (SAR). Utility isolation of the process equipment is a routine maintenance activity not requiring specific safety analysis. Requests for Safety Assessments are being prepared for the tasks to remove excess materials from the process buildings, to gain entry and remove hold-up materials, and to remove radiological contamination.

Planned activities for November include continuing the capital equipment disposition effort; continuing activities to transfer 4A metal from the site; continuing to pursue the release of the final draft of the RFPs; continuing to issue work orders for utility isolation work; and continuing reconciliation of Safe Shutdown data base.

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RA No. 13, Plant 1 Ore Silos

The Plant 1 Ore Silos Removal Action will include the dismantling of the 14 Plant 1 Ore Silos and their support structure. This dismantling will eliminate the potential threat of additional material releases and the safety hazard due to structural deterioration of the silos and their support structure. The activities in this removal action will include characterization, removal, containerization, and disposal of the materials making up the above-ground portion of the facility.

DOE-OR approval of award of the subcontract for the silo dismantling was received on September 9, 1992. The Construction Work Order was consequently issued to RUST Engineering. Mobilization of the subcontractor began in October. WEMCO Maintenance forces continue field work in preparation for removal action activities. November activities will include the receipt and review of the subcontractor's Removal Action Project Plan.

KEY MILESTONES	STATUS	DUE DATE
Initiate field activities.	Completed October 16, 1992	October 18, 1992
Complete Removal Action	Open, ahead of schedule.	December 20, 1994

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

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

Based on results from the radiological walkover survey, the areas exceeding the field action level are more extensive than originally thought. Phase I was revised to be complete upon completion of the walkover survey. An additional commitment was made to complete initial hot spot excavations and additional sampling of the 100 pCi/g region identified by the walkover survey by October 30, 1992. The objective of the additional sampling is to provide more information on the depth of contamination in order to better evaluate additional potential soil excavations. These revisions were presented and agreed to at the monthly DOE-EPA Manager's Meeting on August 19, 1992.

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**RA No. 14, Contaminated Soils Adjacent to Sewage Treatment Plant Incinerator
(continued)**

A letter detailing preliminary results of the walk-over survey and options for soil excavation was submitted to the EPAs on August 28, 1992. Ohio and U.S. EPA comments were received on September 10, and October 8, 1992, respectively. November activities will include the resolution of these EPA comments.

Excavation activities began on September 9 and were completed on October 15. Sampling activities began on September 21 and were completed on October 13. All available analytical data from off-property sample locations was provided to DOE-FN on October 29. November activities will include the obtainment of off-property access and further excavation and sampling activity.

KEY MILESTONES	STATUS	DUE DATE
Phase II - Complete initial excavation and additional sampling	Completed October 15 and 13, respectively	October 30, 1992
Phase III - Submit total uranium analysis and proposed recommendation for potential off-property excavations	Open, on schedule	December 1, 1992
Phase IV - Submit Work Plan Addendum including Interim Report summarizing analytical results and revised RSE supporting potential future actions	Open, on schedule	April 30, 1993

RA No. 15, Scrap Metal Piles

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

The subcontractor's Removal Action Project Plan (RAPP) for Phase I was transmitted to the EPAs on August 24, 1992. Comments were received during October. November activities will include comment resolutions and RAPP revisions.

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RA No. 15, Scrap Metal Piles (continued)

Phase IIA, containerization of scrap copper, was initiated on September 29, 1992. October activities included the continued containerization of the scrap copper. A net weight of 191,753 pounds of scrap copper have been containerized so far (gross weight, including the containers is 223,640 pounds).

KEY MILESTONES	STATUS	DUE DATE
Submit Work Plan to the U.S. EPA	Completed January 31, 1992	January 31, 1992
Submit Revised Work Plan to the U.S. EPA	Completed April 3, 1992	April 3, 1992
Phase I - Award of contract	Completed June 19, 1992	June 30, 1992
Phase I - Submit Subcontractor's Removal Action Project Plan	Completed August 24, 1992	September 30, 1992
Phase I - Complete	Open, on schedule	March 30, 1994
Phase IIA - Initiate Containerization	Completed September 29, 1992	September 30, 1992

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

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

Notice-to-Proceed on construction was issued to the construction manager on October 30, 1992.

Pre-excavation sampling is virtually complete.

Sampling for RCRA determinations has been completed.

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RA No. 16, Collect Uncontrolled Production Area Runoff – Northeast (continued)

Planned activities for November include completing additional sampling and proceeding with construction.

KEY MILESTONES	STATUS	DUE DATE
Submit Work Plan to the U.S. EPA	Completed March 2, 1992	March 2, 1992
Complete Removal Action	Open, on schedule	August 30, 1993

RA No. 17, Improved Storage of Soil and Debris

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

The draft Work Plan was transmitted to the EPAs on March 25, 1992. Draft comments indicating U.S. EPA disapproval of the Work Plan were received on July 29, 1992. August activities included comment resolutions and the resubmittal of the Work Plan to the EPAs on August 28, 1992. EPA conditional approval with comments were received on October 5. October activities included meetings to discuss comments.

November activities will include resolution of comments and final Work Plan submittal.

RA No. 18, Control Exposed Material In Pit 5

The Control Exposed Material in Pit 5 Removal Action is being developed and implemented using a phased approach. This phased approach considers and utilizes information obtained from the liner repair activities, the pit berm investigation, which addresses the overall pit structural integrity, and the significance and magnitude of potential and actual emissions from the waste pit. The schedule for this Removal Action was revised to reflect the current philosophy for accomplishing the scope. An Alternatives Evaluation identified the dredge method as the most viable means to transfer material within Pit 5.

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

Activities for October included continuation of site preparation and the spraying down of the material, and the procurement of the dredging system and services. Residues have been moved from the liner pit edge towards the center of the pit using water pressure. Liner seam separations have been discovered. Attempts to lower the water level and repair the seams has begun.

Planned activities for November include beginning training dredging subcontractor personnel assigned to work at the FEMP and initiate dredging operation.

KEY MILESTONES	STATUS	DUE DATE
Submit a Removal Action Work Plan to the U.S. EPA and the Ohio EPA	Completed March 26, 1992	March 30, 1992
Submit Revised Work Plan to Ohio and U.S. EPA	Approved August 17, 1992	----
Complete Field Work	Open, on schedule	December 18, 1992

RA No. 19, Plant 7 Dismantling

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

October activities included a "dismantling sequence" meeting and review of the Functional and Operational Requirements Document and the draft Removal Site Evaluation. November activities will include revisions to these documents.

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

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RA No. 20, Stabilization of UNH Inventories

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

Activities in October included neutralization of 41,833 gallons of uranyl nitrate solution. The neutralized slurry was filtered on the Plant 8 East Eimco filter and 228 drums of filter cake were produced.

November activities will include completing the processing of material contained in Tank F1-26, which is expected to be completed by November 13, 1992. Additional activities will include an evaluation of the process by the WEMCO operational readiness review and DOE operational readiness evaluation teams.

KEY MILESTONES	STATUS	DUE DATE
System Integrity Testing	Completed February 13, 1992	February 13, 1992
Submit Flow Charts to the U.S. EPA	Completed April 8, 1992	March 31, 1992
Commence Processing Material	Achieved July 6, 1992	July 6, 1992
Finish Processing Material	Open	To Be Determined

RA No. 21, Expedited Silo 3

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

- All obvious openings in the dust collector hopper were covered and sealed.

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REMOVAL ACTIONS

RA No. 21, Expedited Silo 3 (continued)

- The dust collector was removed.
- All obvious pathways for release were capped or covered.

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

The removal action final report is in preparation.

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

RA No. 22, Waste Pit Area Containment Improvement

A Removal Site Evaluation (RSE) was prepared in 1991 and submitted to DOE. This RSE is presently being updated to include information on the berm for Pit 4 and the Burn Pit cap. The Action Plan to address the Waste Pit Area Roads and Exposed Surfaces was transmitted to DOE on February 24, 1992. This Action Plan is now being used as the basis for developing a Work Plan.

Activities for October included vegetation seeding (first field activity), and following site procedures for preparing the necessary documentation (e.g., Safety Assessment, Risk Assessment, NEPA documentation) as required.

Planned activities for November include submittal of the Final Work Plan to EPA.

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REMOVAL ACTIONS

RA No. 22, Waste Pit Area Containment Improvement (continued)

KEY MILESTONES	STATUS	DUE DATE
Submit Work Plan to the U.S. EPA	Completed August 31, 1992	August 31, 1992
Submit Revised Work Plan	Completed November 4, 1992	November 5, 1992

RA No. 23, Inactive Flyash Pile

A field investigation was conducted to determine if select locations within the Inactive Flyash Pile and South Field Disposal area boundary (RA No. 8) would require material to be removed. On June 24, contaminated debris from three of the regulated areas identified in the survey report were collected and placed in interim controlled storage. The contaminated items collected were a plastic bag (approximately 1 gallon) containing soil, a 1 foot x 2 feet section of transite and two small pieces of yellow material. Results of the survey were submitted on June 29, 1992. As a result of removal of the debris, DOE-FN determined that no additional action is required until remediation.

RA No. 24, Pilot Plant Sump

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

The sump is filled with a thick liquid and sludge. Analytical results of the sump contents show high concentrations of metals: lead, copper, chromium, nickel, as well as thorium and volatile organic compounds.

The Work Plan was submitted to the EPAs on July 24. U.S. EPA comments were received on August 27. September activities included resolution of RCRA issues and EPA Work Plan comments. October activities included the submittal of the draft final Work Plan to the EPAs on October 14.

The fourth pump-out of the Pilot Plant temporary sump occurred on October 27, 1992, resulting in the removal of approximately 130 gallons. A total of 635 gallons have been removed in four pumping operations. Another pump-out is scheduled the end of November.

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REMOVAL ACTIONS

RA No. 24, Pilot Plant Sump (continued)

KEY MILESTONES	STATUS	DUE DATE
Submit Work Plan to the U.S. EPA	Completed July 24, 1992	July 31, 1992
Submit draft final Work Plan to the U.S. EPA	Completed October 14, 1992	October 14, 1992

RA No. 25, Nitric Acid Tank Car and Area

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

This high-grade, stainless steel tank car has a capacity of approximately 100,000 gallons and measures approximately 10 feet wide x 40 feet long x 15 feet high. This unit operated from 1952 until about 1989. The tank car stored nitric acid used at the FEMP. Based on recent analysis, the tank car now contains 50-100 gallons of nitric acid. This removal action includes removal of residual contents from the tank car followed by the tank car's decontamination and dispositioning.

The draft Work Plan/Closure Plan Information and Data Package was issued to the EPAs on October 30, 1992. November activities will include receipt of EPA comments and revision of the document.

KEY MILESTONES	STATUS	DUE DATE
Submit Work Plan to the U.S. EPA	Completed October 30, 1992	October 30, 1992
Submit Final Draft of Work Plan to U.S. EPA	Open, on schedule	December 30, 1992

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RA No. 26, Asbestos Removals (Asbestos Program)

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

November activities will include continuing field activities in asbestos material identification and abatement and development of the large scale asbestos removal specifications.

KEY MILESTONES	STATUS	DUE DATE
Submit Work Procedures to the U.S. EPA	Completed May 19, 1992	May 19, 1992
Update existing internal procedures to ensure that appropriate documentation is entered into the administrative record file	To be updated annually	June 30, 1993
Submit final draft of Work Plan to U.S. EPA	Open, on schedule	August 10, 1993

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

This removal action calls for the submittal of the Engineering Evaluation/Cost Analysis (EE/CA) study to identify alternatives for managing contaminated structures; the documentation of the selection of a response(s) that will mitigate the potential threat to workers, the general public, and the environment associated with these structures; and addressing health and environmental impacts associated with the proposed action.

August activities included EE/CA submittal for DOE-FN and DOE-HQ review on August 14, 1992. September activities included DOE comment resolutions. October activities included revision of the EE/CA. November activities will include receipt of DOE comments and resolution of those comments in support of the Consent Agreement to provide the EE/CA to the EPA in December.

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REMOVAL ACTIONS

RA No. 27, Management of Contaminated Structures at the FEMP (continued)

KEY MILESTONES	STATUS	DUE DATE
Submit Engineering Evaluation/Cost Analysis (EE/CA) to the U.S. EPA to support Proposed Removal Actions for Managing Contaminated Structures	Open, on schedule	December 16, 1992

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1.0 Operable Unit 1

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

1.1 Field Investigation

1.1.2 Radon Sampling Program

Scope:

The Radon Sampling Program was initiated to develop a representative measurement of radon releases from the waste pit area. The November 19, 1991, "Federal Facility Agreement for Control and Abatement of Radon-222 Emissions" currently requires radon flux measurements of Waste Pits 1, 2, 3, 4, and 5, and the Clearwell. The data will be used to support National Emission Standards for Hazardous Air Pollutants (NESHAP) compliance and Remedial Investigation/Feasibility Study (RI/FS) characterization requirements. The program consists of a one-time measurement of radon release using large area activated charcoal collectors (LAACC). Approximately 100 LAACCs were placed on Waste Pits 1, 2, and 3. The LAACCs were left on the pits for 24 hours and then removed and analyzed. Continuous ambient air radon monitoring was also conducted during the period.

Status:

The radon sampling is complete for Waste Pits 1, 2, and 3. A final report was issued to the U.S. EPA on June 25, 1992.

As a result of a discussion with the U.S. EPA on May 27, 1992, concerning the issue of sampling Pits 4 and 5 and the Clearwell, it was determined that Pit 4 will need to be sampled in addition to Pits 1, 2, and 3. Discussions between the DOE and the U.S. EPA resulted in an agreement to not sample the Clearwell at this time and that timely completion of the Pit 5 removal action (No. 18) will satisfy concerns of radon emissions from this pit.

Issues:

A letter was received from the U.S. EPA on October 16, giving approval of the proposed method for measuring the radon flux from Pit 4. The letter also stated that since the clearwell is water covered, and Pit 5 is nearly 100% water covered, the flux from Pit 5 and the Clearwell may be assumed to be zero.

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1.1.2 Radon Sampling Program (continued)

Corrective Actions:

Install Pit 4 radon flux measurement devices.

1.1.3 Pits 5 and 6 and the Clearwell Sampling Program

Scope:

The objectives of the Pits 5 and 6 and Clearwell Sampling Program are to obtain sufficient quantities of samples for treatability studies and to provide additional Resource Conservation and Recovery Act (RCRA) characterization information on the waste pits. The pits were sampled using a crane with a clamshell.

Status:

The sampling of Pits 5 and 6 and the Clearwell is complete. These samples were shipped to the analytical and treatability laboratories where characterization and stabilization testing is ongoing. Analytical data for characterization was received, and validation of this characterization data has begun.

Issues/Corrective Actions:

Volatile and semi-volatile analytes exceeded holding times. Some data from this sampling event may be rejected due to this. Validation of the Characterization Investigation Study data is currently underway.

1.2 Treatability Studies

Scope:

The Operable Unit 1 treatability studies will evaluate the two treatment process options identified in the Operable Unit 1 Initial Screening of Alternatives document: cement stabilization and vitrification. The technical feasibility of these technologies will be evaluated by conducting a series of experiments on both composite waste samples and individual strata samples. Performance criteria, including formulation ranges, compressive strength, leachability, bulking factor, and permeability, will be investigated. Cement

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1.2 Treatability Studies (continued)

stabilization binding agents are being evaluated including portland cement, flyash, Blast Furnace Slag, and sodium silicate. Clay (attapulgite and clinoptilolite) will be added to reduce the leachability of metals in the waste. Glass formers and modifiers considered for vitrification are flyash, soil, and sodium hydroxide.

The stabilization testing will consist of two phases. The preliminary phase consists of reagent range-finding experiments on a pit-by-pit basis using composite samples from individual waste pits. The advanced phase consists of testing on strata samples where available. Each phase contains two stages permitting additional reagent testing as necessary. An optional phase to evaluate waste form durability is also being considered.

Status:

Curing of cement stabilization Advanced phase Stage 1 molds for all waste pits on strata as specified in the approved work plan were completed on October 29, 1992, except for Waste Pit 2 Strata 3. Sufficient material quantities have now been located in analytical lab archives to prepare molds for this strata. As of October 31, 1992, the molds for TCLP have been prepared. Molds for the five-day static leach tests are now in preparation and should be complete within a week. Optional testing is in progress with 38 of 43 radon emanation tests being completed. Radon leaching testing will be initiated in early November 1992.

Advanced phase Stage 1 vitrification work is progressing. As of September 25, 1992, 31 of the 43 formulations were completed with only the Burn Pit and Clearwell yet to be finalized; however, significant variations in pit strata samples have produced severe damage to the platinum crucibles used for these melts. Evaluation of alternative materials for crucible use have been completed and yttrium oxide coated 446 stainless steel crucibles are in use as of October 26, 1992.

Issues:

Severe damage to the platinum crucibles used for vitrification melts occurred which have impacted advanced phase Stage 1 completion schedules.

Corrective Actions:

Crucibles made from 446 stainless steel are now in use and further schedule slips are unlikely.

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1.3 Remedial Investigation

Scope:

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

Initial activities scheduled for the RI are field data collection and analysis. The field data analysis will evaluate the preliminary data available from field measurements while awaiting results of lab analysis.

Status:

An independent peer review of the validation results for samples collected under the RI/FS program was completed during September 1992. The findings of the review have been resolved, and changes to the data quantifiers in the database have been made.

Potentiometric cross-sections of the waste pit area have been prepared to establish the hydraulic relationship between the perched water and the water in the waste pits. More detailed geologic cross-sections are being developed. Contaminant transport modeling and toxicity/exposure assessment have begun.

Issues\Corrective Actions:

None to report.

1.3 Remedial Investigation (continued)

OU 1 REMEDIAL INVESTIGATION REPORT

PRIMARY

SCOPE	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
Details the nature and extent of contaminants within the Operable Unit 1 study area. Estimates the volume of contaminated media and materials. Provides a baseline risk assessment and establishes remedial action objectives.	10/12/93 C	12/11/93 C	01/10/94 C

C = Consent Agreement Date

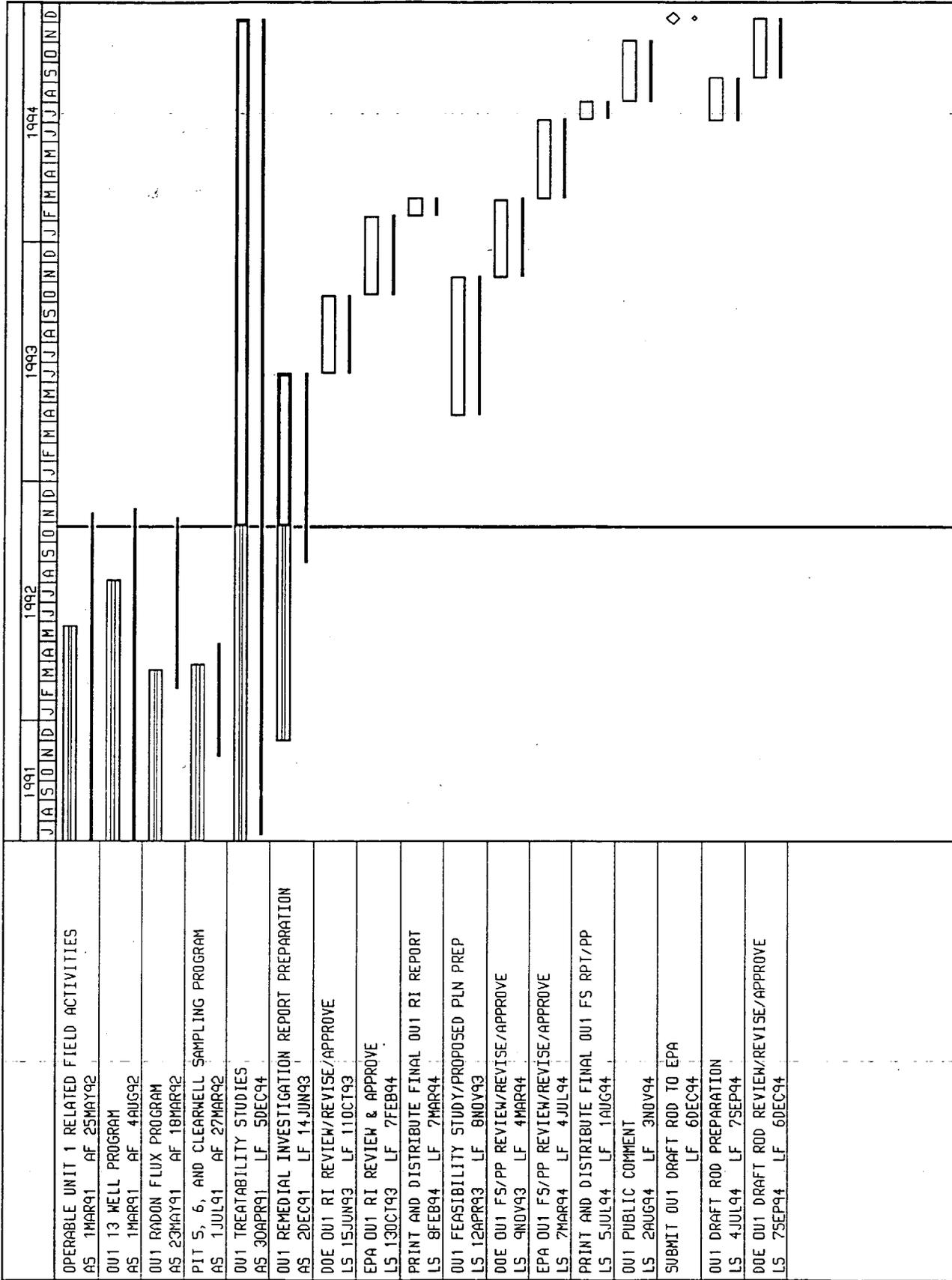
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1.4 Planned Activities for November 1992

- Complete work on the Advanced phase Stage 1 Cement Stabilization and Vitrification treatability experiments.
- Complete radiological analysis of Pits 5 and 6 and Clearwell samples and chemical analysis of Clearwell samples.
- Continue data validation of Pits 5 and 6 and Clearwell samples and chemical analysis of Clearwell samples.
- Continue data validation of Characterization Investigation Study data.



<p>Target Date: 10OCT90 Plot Date: 3NOV92 Data Date: 25OCT92 Project Start: 10CT90 Project Finish: 10AUG98</p> <p>(c) Primavera Systems, Inc.</p>	<p>Activity Bar: [] Critical Activity: [] Progress Bar: [] Target Dates: [] Milestone/Tag Activity: []</p>	<p>Sheet 1 of 1</p> <p>RI/FS PROGRAM CURRENT FERNALD ENVIRONMENTAL MGMT. PROJECT FEMP RI/FS OU1 CONSENT AGMT (LATE)</p>	<p>Prepared by ASI/11 Corp.</p> <table border="1"> <tr> <th>Date</th> <th>Revision</th> <th>Checked</th> <th>Approved</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	Date	Revision	Checked	Approved								
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2.0 Operable Unit 2

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

2.1 Field Investigation

2.1.1 Work Plan Addendum - Installation of Monitoring Well 1433

Scope:

The Work Plan Addendum provides for installation of Monitoring Well 1433 in the northwest area of the South Field, near Boring 1401. This is desirable to further characterize the fill/soil material by sampling any perched groundwater/leachate that may be present at that location that was not previously encountered.

Status:

Monitoring Well 1433 was installed on July 29, 1992. No groundwater was encountered after the well was installed. The casing at Well 1433 will be removed and the boring will be plugged and abandoned.

Issues/Corrective Actions:

Very little groundwater was encountered during the installation of Monitoring Well 1433. Development and sampling activities were not performed due to insufficient quantities of groundwater. The abandonment and plugging work plan for Monitoring Well 1433 was approved in October 1992. Field activities for plugging and abandoning Monitoring Well 1433 will commence in November 1992.

2.2 Treatability Studies

Scope:

This study is complete except for final revision to the Treatability Study Report. These results support the FS and subsequent remedy selection for Operable Unit 2. The study demonstrated that waste stabilization can achieve the desired level of material strength and provides quantitative leaching data for geochemical and computer modeling of groundwater contaminant transport.

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2.2 Treatability Studies (Continued)

Status:

A Treatability Report Comment Response document was submitted to the Ohio EPA on October 21, 1992. In a letter received on October 21, 1992, the U.S. EPA conditionally approved the Treatability Study Report pending resolution of three outstanding comments followed by report revision.

Issues/Corrective Actions:

Comment responses addressing the three outstanding comments will be prepared and submitted to the U.S. EPA in November 1992. Ohio EPA comment response package approval had not been received as of October 31, 1992.

2.3 Remedial Investigation

The RI provides a summary of the field investigations and supports the FS by defining the nature and extent of the contaminants in the Operable Unit 2 study area, estimating the volume of contaminated media and materials, and providing a Baseline Risk Assessment which establishes remedial action objectives.

Status:

The draft RI Report was submitted to the U.S. EPA and the Ohio EPA on October 16, 1992. This draft primary document is subject to a 60-day period for review and comment, as outlined in the Amended Consent Agreement.

Issues/Corrective Actions:

None to report.

OU 2 REMEDIAL INVESTIGATION REPORT

PRIMARY

SCOPE	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
Details the nature and extent of contaminants within the Operable Unit 2 study area. Estimates the volume of contaminated media and materials. Provides a baseline risk assessment and establishes remedial action objectives.	10/16/92 A	12/17/92 C	01/14/93 C

C = Consent Agreement Date

A = Actual Completion Date

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2.4 Feasibility Study

The FS evaluates alternatives in detail with respect to the nine evaluation criteria developed by the U.S. EPA. The alternatives are analyzed individually against each criterion and then compared against one another to determine their respective strengths and weaknesses and to identify the key tradeoffs that must be balanced for the operable unit.

Status:

The first complete draft of the FS Report and Proposed Plan (PP) is on schedule for submittal to WEMCO/DOE-FN on November 16, 1992.

Issues:

The FS schedule continues to be very tight with no float available.

Corrective Actions:

Additional personnel have been used on the FS in conjunction with many parallel activities for completing the first draft FS Report.

OU 2 FEASIBILITY STUDY REPORT

PRIMARY

SCOPE	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
Describes and analyzes potential remedial alternatives. A comparative analysis is performed for all alternatives.	03/15/93 C	05/13/93 C	06/13/93 C

C = Consent Agreement Date

2.5 Planned Activities for November 1992

- Complete first draft of the Operable Unit 2 FS/PP Report.
- Receive Ohio EPA comment response package approval of the Treatability Study Report and prepare comment responses for submission.
- Complete the plugging and abandonment of Monitoring Well 1433.

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3.0 Operable Unit 3

Operable Unit 3, as defined in the Amended Consent Agreement, includes the Production Area and production-associated facilities and equipment (includes all above - and below-grade improvements), including, but not limited to, all structures, equipment, utilities, drums, tanks, solid waste, waste product, thorium, effluent lines, K-65 transfer lines, wastewater treatment facilities, fire training facilities, scrap metal piles, feed stocks, and coal pile.

3.1 Initial Scoping/Work Plan Revisions

Operable Unit 3 initial scoping/work plan revision activities in October 1992 included completion of development of procedures covering required field instrument surveys and laboratory analyses, and continuation of a partial draft chapter for the Operable Unit 3 initial screening of alternatives (ISA). This task covers expansion of the initial identification and screening of decontamination/dismantlement technologies applicable to Operable Unit 3 that was submitted in September 1992 to include chemical contamination. In addition, support was provided for revision of the Operable Unit 3 RI/FS Work Plan Addendum and schedule/cost information was gathered to support development of a Configuration Change Request (CCR) for validation of required Operable Unit 3 laboratory analytical procedures.

In response, in part to comments received from U.S. EPA on the June 2, 1992, Draft Operable Unit 3 RI/FS Work Plan Addendum, data needs were re-evaluated and a revised approach to data collection for the Operable Unit 3 RI/FS was developed. This revised approach was submitted to U.S. EPA in draft on September 15, 1992, with the documentation detailing data needs, the revised approach to data collection based on these needs, and revised protocols. This document also presented example component-specific information which will be added to the Sampling and Analysis Plan. An extensive effort was also initiated to compile this component-specific information. Also, at the request of the U.S. EPA, an example Field Work Package for one component was prepared and provided for information.

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3.1 Initial Scoping/Work Plan Revisions (continued)

OU 3 WORK PLAN ADDENDUM

WORK PLAN

SCOPE	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
The work plan/appendices will include an initial evaluation of Operable Unit 3 (e.g., conceptual models and waste/contaminant quantities), a work plan rationale (e.g., data requirements and SAP approach) and specific Operable Unit 3 RI/FS tasks.	08/04/92 A	12/18/92

C = Consent Agreement Date

A = Actual

3.2 Issues/Corrective Actions:

None to report.

3.3 Planned Activities for November 1992

- Submit CCR for validation of field instrument survey and laboratory analytical procedures.
- Continue development of the Operable Unit 3 ISA chapter on identification and screening of technologies for applicability to non-radiological contaminants.
- Continue revision of the Operable Unit 3 RI/FS Work Plan Addendum.

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4.0 Operable Unit 4

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

4.1 Field Investigation

4.1.1 Sampling West of K-65 Silos 1 and 2

Scope:

This investigation is to further define the western (downgradient) extent of contamination in the water bearing zone(s) within the glacial overburden underlying the K-65 area. Two wells will target the main perched water bearing zone west of Silos 1 and 2. One well or lysimeter will target the area below the main perched water zone, at a location downgradient of the decant tank. Three lysimeters will be installed in the east bank of Paddy's Run.

Status:

This work will be completed as an addendum to the Operable Unit 5 Sampling Analysis Plan.

Issues/Corrective Actions:

Results from this sampling effort will be included in the Operable Unit 5 RI Report. Minimal discussion will be included in the Operable Unit 4 RI Report, if the validated data are available prior to the RI Report submittal to the U.S. EPA. The information obtained from this investigation program will, however be included in the Operable Unit 4 FS.

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4.2 Treatability Studies

Scope:

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

The Treatability Study Work Plan (for cementation and chemical extraction) will demonstrate whether stabilization achieves the desired level of material strength, provide information to help determine the effectiveness of chemical extraction, and provide data for use in fate and transport modeling. The study is composed of three preliminary phases and an advanced phase. The preliminary phases will determine the potential reagents and conditions for stabilization and/or extraction on composites of the silo material. The advanced phase will evaluate the material variability by testing formulations and/or extraction on the top, middle, and bottom layers from each silo.

The Treatability Study Work Plan for the Vitrification of Residues from Silos 1, 2, and 3 considers vitrification of silo material, radon emanation rate from the vitrified waste, and the leachability of the vitrified waste.

Status:

Stabilization Experiments - Silos 1, 2, and 3 advanced phase analyses were completed on August 28, 1992, and data validation was completed in October 1992.

Chemical Extraction tests - Toxicity Characteristics Leaching Procedure (TCLP) analyses on leachate from chemically extracted solids is complete and data validation was completed in October 1992. Vitrification of the liquid resulting from the chemical extraction process is also complete. Chemical extraction experiments were completed in October 1992 to gather additional information on the effects of time, temperature, and washing agents.

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4.2 Treatability Studies (Continued)

Vitrification Treatability Tests - The benchscale test melts on sequences A - D are complete and TCLP extractions were initiated in late September 1992. Measurement of radon emanation from the vitrified waste is complete. Product Consistency Test (PCT) extractions were completed in October 1992; therefore, all glass is now undergoing analysis.

Issues:

Late initiation of vitrification program TCLP extractions have caused negative schedule impacts.

Corrective Actions:

Expedite TCLP analyses and review other schedule compression options.

4.3 Remedial Investigation Report

Scope:

The RI provides a summary of the field investigations and supports the FS by defining the nature and extent of the contaminants in the Operable Unit 4 study area, estimating the volume of contaminated media and materials, and providing a baseline risk assessment which establishes remedial action objectives.

Status:

Initial draft of the RI Report including Baseline Risk Assessment was submitted to for internal review on October 19, 1992. Review comments are due November 17, 1992.

Issues:

Delays in completion of data validation and database entry have delayed evaluation of the RI data. No impact to the Consent Agreement delivery date for the RI is anticipated.

Corrective Action:

A recovery plan was initiated to ensure that the RI will be completed and delivered to the U.S. EPA per Consent Agreement dates.

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OU 4 REMEDIAL INVESTIGATION REPORT

PRIMARY

SCOPE	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
Details the nature and extent of contaminants in the Operable Unit 4 study area. Estimates the volume of contaminated media and materials. Provides a baseline risk assessment and establishes remedial action objectives.	04/19/93 C	06/18/93 C	07/18/93 C

C = Consent Agreement Date

4.4 Feasibility Study

Scope:

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

Status:

The revision of alternatives described in the U.S. EPA-approved ISA proceeded during July 1992 at the direction of DOE-FN and is designed to provide separate alternatives for the different waste media. For example, alternatives to disposition Silos 1 and 2 contents are being created; alternatives for Silo 3 contents only are being revised; silo structures, berms; and subsoils are being grouped in another set of alternatives; and Silo 4 is being dispositioned in separate alternatives. Disposal options and locations, both on property and off site, were discussed with WEMCO and DOE-FN during August 1992 and are being included as appropriate to the alternatives. Alternative description revisions are ongoing.

Issues/Corrective Actions:

The FS is currently 17 days past the scheduled Consent Agreement date. This is due to vitrification treatability analytical results not being available on schedule. A recovery plan was initiated and 31 days were recovered from a schedule slippage of 48 days. A second recovery plan is being investigated to determine if the remaining days can be recovered.

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4.4 Feasibility Study (continued)

OU 4 FEASIBILITY STUDY

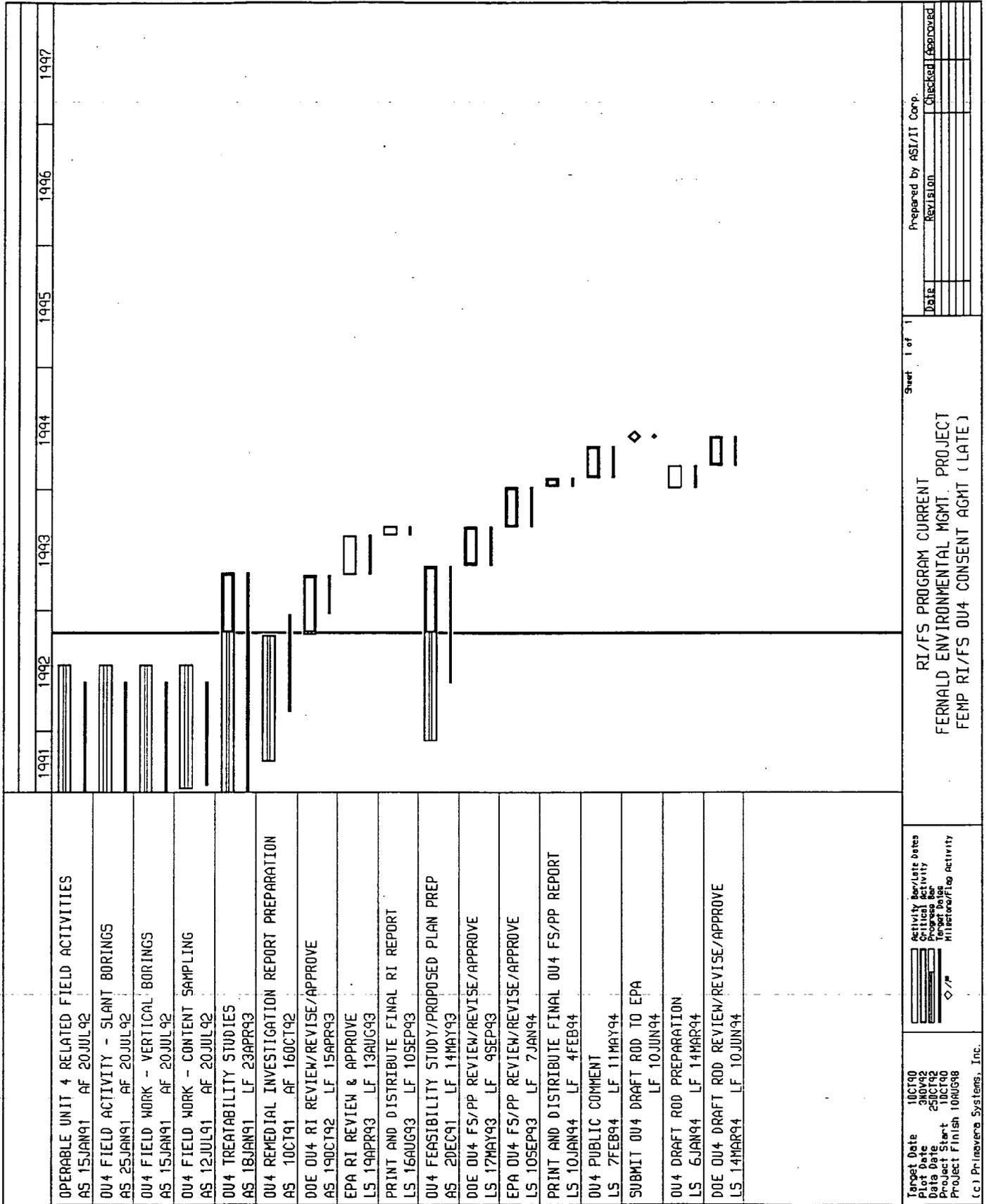
PRIMARY

SCOPE	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
Describes and analyzes potential remedial alternatives. A comparative analysis is performed for all alternatives.	09/09/93 C	11/10/93 C	12/09/93 C

C = Consent Agreement Date

4.5 Planned Activities for November 1992

- Complete revision of FS alternatives descriptions and continue fate and transport modeling and cost estimates for the FS.
- Complete TCLP analyses of Treatability Program vitrified material leachate.
- Continue PCT analyses of Treatability Program vitrified material leachate.
- Initiate radon emanation and leaching tests as part of the Optional Treatability Program.



DATE	REVISION	Checked	Approved

Prepared by ASI/II Corp.

RI/FS PROGRAM CURRENT
 FERNALD ENVIRONMENTAL MGMT. PROJECT
 FEMP RI/FS OU4 CONSENT AGMT (LATE)

Sheet 1 of 1

Activity: Milestone/Flag activity
 Critical Activity
 Progress Bar
 Milestone/Flag activity

Legend symbols: vertical line, horizontal line with dots, horizontal bar with diagonal lines, diamond

Target Date 10CT90
 Plot Date 3NOV92
 Data Date 25OCT92
 Project Start 10CT90
 Project Finish 10AUG98
 (c) Pr-intervene Systems, Inc.

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5.0 Operable Unit 5

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

5.1 Field Investigation

5.1.1 Operable Unit 5 Work Plan Addenda (Formally Auger and Cable Tool Sampling Program)

Scope:

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

Status:

Responses to the comments received from the Ohio EPA and U.S. EPA were completed and returned to the respective regulatory agencies. The work plan addenda revisions were completed and transmitted to regulators for review and approval on October 23, 1992.

Field characterization of the K-65 Slurry and Clearwell Line continued according to the Work Plan. Currently, the first round of groundwater samples from 10 existing wells (1150, 1154, 1167, 1206, 1207, 1208, 1213, 1215, 1226, 1237) and seven of the nine new wells are being analyzed for HSL volatiles, general water quality, and full radiological parameters.

The second round of groundwater sampling for HSL volatiles, general water quality, and full radiological parameters was completed in October 1992 for the 10 existing wells. Based upon responses to agency comments, some of the wells were sampled for full HSL parameters rather than HSL volatiles.

The nine new wells which were installed according to the Work Plan for this task and their status are as follows:

- 1836 Installation completed. Well development and first round of groundwater sampling completed.

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5.1.1 Operable Unit 5 Work Plan Addenda (Formally Auger and Cable Tool Sampling Program) (continued)

- 1837 Installation completed. Well development and first round of groundwater sampling completed.
- 1838 Installation completed. Well development and first round of groundwater sampling completed.
- 1839 Installation completed. Well development and first round of groundwater sampling completed.
- 1840 Installation completed. Well development and first round of groundwater sampling completed.
- 1841 Boring complete. Well not installed due to the fact that groundwater was not encountered at this location.
- 1842 Installation completed. Well installed but not producing sufficient groundwater samples. This well will be reinstated at the beginning of November.
- 1843 Installation completed. Well development and first round of groundwater sampling completed.
- 1844 Installation completed. Well development and first round of groundwater sampling completed.

Issues/Corrective Action:

A variance was written and approved for the reinstallation of Monitoring Well 1842 which was installed approximately 1.5 feet above the existing transfer line. The reason for this variance is that the Work Plan requirements mandated the boring be terminated at the base of the first perched water bearing unit. Well 1842 will be reinstalled at a lower elevation in order to adequately characterize the soils beneath the transfer line per the Work Plan. Reinstallation of Well 1842 will commence in November 1992.

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5.1.1 Operable Unit 5 Work Plan Addenda (Formally Auger and Cable Tool Sampling Program) (continued)

The delays that were experienced in implementing the remainder of this program were due to the resolution of the regulatory agency's comments which have caused a day per day slip in the Operable Unit 5 Baseline Schedule. However, it is expected that the schedule slippage will be recovered through acceleration of both the field characterization effort and subsequent sample analysis at the contract laboratories.

5.1.2 Outfall Line Investigation

Scope:

This Work Plan Addendum defines the sampling and analysis required to investigate potential leakage from the outfall line as part of the Operable Unit 5 RI. The installation of Monitoring Well 2119 and subsequent sampling program was based upon data from water samples collected from Well 2067 and documented failure of the pipeline between manhole 179 and 180.

If groundwater contamination has occurred due to a failure in the pipeline between Manhole 179 and 180, then a previously unidentified occurrence of contamination in groundwater may exist beyond the FEMP eastern boundary. Uranium contamination is present in groundwater samples at Well 2067. The installation of Well 2119 will determine if there is groundwater contamination associated with the pipeline failure between Manholes 179 and 180. If an off-FEMP plume is identified, then additional investigation may be required to determine the vertical and lateral extent of the plume.

Status:

It was determined that the proposed location of Monitoring Well 2119 will interfere with the installation of the outfall line replacement project currently under excavation and construction. A new location has been identified and is currently undergoing review. Discussions with the landowner of the newly selected location of Well 2119 are favorable; therefore, no delays in obtaining a landowner access agreement is foreseen.

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5.1.2 Outfall Line Investigation (continued)

Issues/Corrective Actions:

The current construction and excavation activities associated with the replacement of the outfall line will require that a new location be determined for Monitoring Well 2119. Field investigations on the potential relocation and the impacts are currently being reviewed. The likely relocation will require an access agreement with another landowner.

The installation of Monitoring Well 2119 is scheduled to begin in November 1992.

5.1.3 Installation of Monitoring Well 2166

Scope:

This work plan addendum will provide a vertical profile of uranium concentration data for the water column upgradient of Homeowner Well 13 and a monitoring location at the vertical depth with the maximum measurable uranium concentration.

Homeowner well groundwater sampling has detected an increase in total uranium in water pumped from Homeowner Well 13 (total uranium approximately 33 $\mu\text{g/L}$). Homeowner Well 13 is completed approximately 20 feet beneath the water table contact. Monitoring Well 2398 indicates total uranium concentrations of 1.4 $\mu\text{g/L}$ and 3.7 $\mu\text{g/L}$ at the water table contact. A vertical profile of uranium concentration upgradient of Homeowner Well 13 is needed to determine at what level beneath the water table contact uranium concentrations are the greatest.

The total uranium concentrations, determined from the groundwater sampling of Monitoring Well 2166 during Hydropunch II operations, are as follows:

•	73'-0" -	31.0 $\mu\text{g/L}$
•	84'-0" -	47.0 $\mu\text{g/L}$
•	92'-0" -	9.3 $\mu\text{g/L}$
•	102'-0" -	8.8 $\mu\text{g/L}$
•	112'-0" -	2.8 $\mu\text{g/L}$
•	122'-0" -	2.8 $\mu\text{g/L}$
•	132'-0" -	1.2 $\mu\text{g/L}$

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5.1.3 Installation of Monitoring Well 2166 (continued)

Status:

The installation of Monitoring Well 2166 was completed October 19, 1992. Well development and first round of groundwater sampling is scheduled to be completed in November 1992.

Issues/Corrective Actions:

None to report.

5.2 Treatability Study

Scope:

The purpose of this study is to provide information to support the FS and subsequent remedy selection for Operable Unit 5. Specifically, the study will demonstrate the feasibility of soil washing as a remedial technology for cleaning soils in Operable Unit 5. The study incorporates a physical separation/chemical extraction process that initially involves the separation of a soil into different particle-size fractions. Reagent formulas in the washing solutions are used in the extraction of radionuclides and organic and inorganic compounds from these different-size fractions. The contaminants may be separated from the wash stream into a concentrated residue for further treatment. The study consists of two phases: 1) remedy screening Stages 1 and 2, involving laboratory and bench-scale tests and 2) remedy selection using pilot-scale equipment. Soils from four different areas will be used in these investigations. These soils come from the following areas: incinerator area (ID-A), Plant 1 pad area (ID-B), maintenance building area (OU5-A), and either the fire training area or underground storage tank soil piles (OU5-B).

Status:

DOE-FN received a letter from U.S. EPA dated June 22, 1992, agreeing with the revised comment responses to the work plan. These responses have been incorporated into the final Treatability Study Work Plan which was distributed on August 4, 1992. As of October 31, 1992, Ohio EPA had not responded to the document submittal.

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5.2 Treatability Study (continued)

Remedy screening Stage 2 testing of ID-A and ID-B soils is completed. Pilot plant design continued in October 1992 and a bid process to select an equipment assembly subcontractor is in progress. Also in October 1992, receipt of pilot scale equipment on site was initiated.

Issues/Corrective Actions:

None to report.

5.3 Initial Screening of Alternatives

Scope:

The ISA Report documents the initial activities of the FS. These activities include developing remedial action objectives, developing general response actions, identifying volumes or areas of media to which response actions might be applied, identifying and screening technologies, identifying and evaluating technology process options, assembling selected representative process options into alternatives, and performing an initial screening of the alternatives.

Status:

Internal comments on the ISA Report were received and incorporated where appropriate. A draft copy for the U.S. EPA is scheduled to be completed in November 1992. Document preparation is proceeding ahead of the Consent Agreement schedule.

Issues/Corrective Actions:

None to report.

OU 5 INITIAL SCREENING OF ALTERNATIVES

PRIMARY

SCOPE	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
Provides for initial evaluation against preselected criteria of candidate technologies assembled to remediate Operable Unit 5.	04/15/93 C	06/15/93 C	07/13/93 C

C = Consent Agreement Date

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5.4 Remedial Investigation

Scope:

The Remedial Investigation (RI) data compilation has been started. All data sources to be included in the RI will be identified and summarized. The geologic information continued in the RI/FS project files and documents will be compiled, evaluated, and updated. Existing maps and cross sections will be updated where additional information has become available.

Status:

This task is proceeding according to schedule.

Issues/Correction Actions:

None to report.

5.5 Planned Activities for November 1992

- Sample and initially characterize OU5-B soils.
- Initiate remedy screening Stage 1 tests on OU5-A soils.
- Continue remedy screening Stage 2 tests on ID soils.
- Continue work on the remedy screening pilot test program by awarding the Pilot Plan Equipment assembly subcontract and continuing preparation of required design, permitting, and procedural documents.
- Complete the revision of the Operable Unit 5 Work Plan Addenda by incorporating the resolutions to the comments received from the regulators. Upon completion of the revised Work Plan, commence immediate mobilization of field crews to begin sampling activities associated with the KC-2 warehouse, fire training area, and the southeast quadrant.
- Complete the second round of groundwater sampling at Wells 1836, 1837, 1838, 1839, 1840, 1843, and 1844.
- Complete the reinstallation of Monitoring Well 1842 including groundwater sampling.

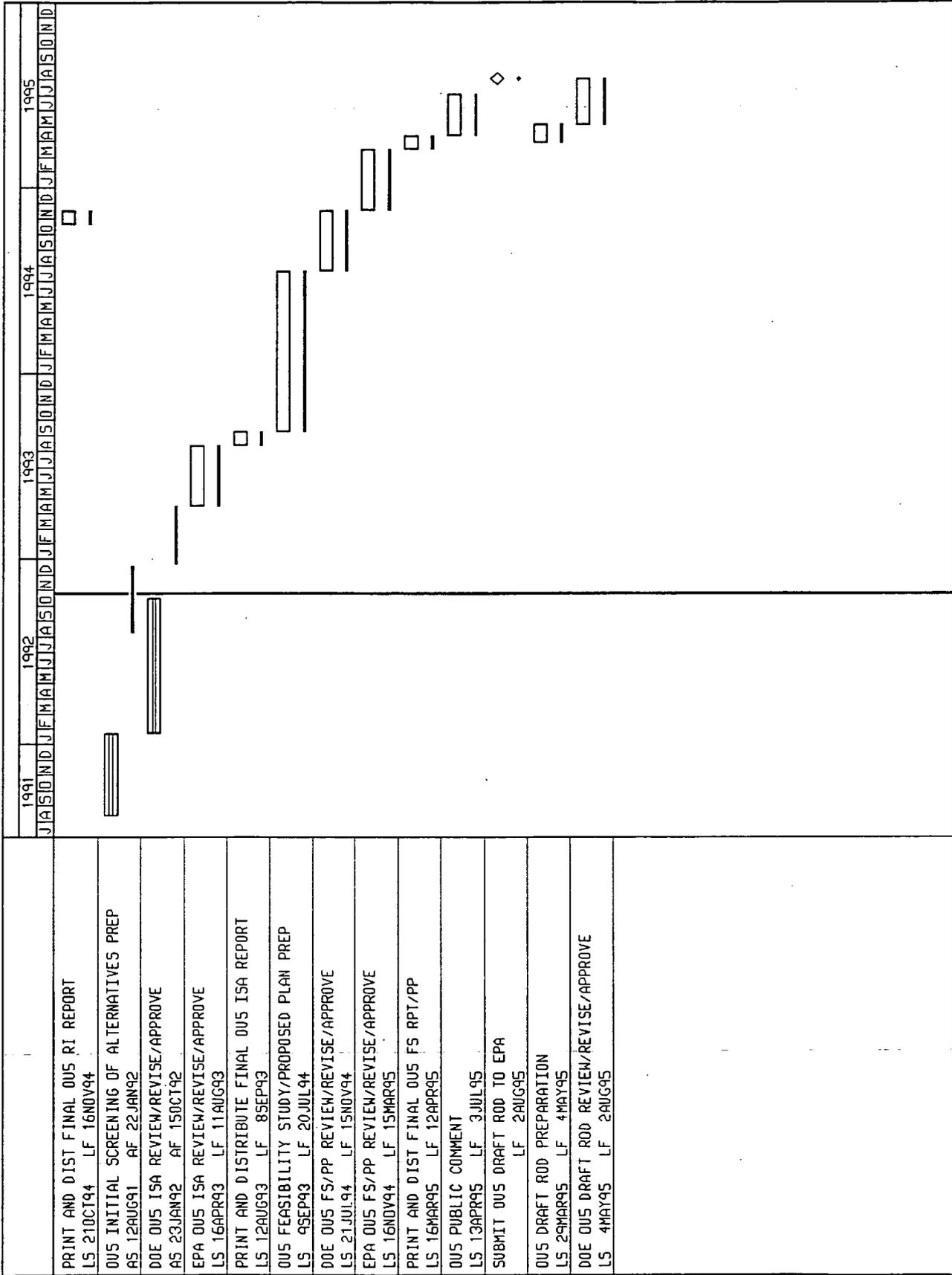
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5.5 Planned Activities for November 1992 (Continued)

- Mobilize field crews and initiate subsequent field investigation activities for Monitoring Well 2119 upon approval of the new location.
- Complete the well development and first round of groundwater sampling of Monitoring Well 2166.
- Complete draft copy of Operable Unit 5 ISA for the EPA.
- Continue compiling, evaluating, and updating, and summarize all data sources to be included in the Operable Unit 5 RI.



<p>Target Date 10CT90 Plot Date 3NOV92 Data Date 25OCT92 Project Start 10CT90 Project Finish 10RUG98</p>	<p>Activity Bar/Late Dates Critical Activity Progress Bar Milestone/Flag Activity</p>	<p>Sheet 2 of 2</p>	<p>Prepared by ASI/IT Corp.</p>
<p>Activity Bar/Late Dates Critical Activity Progress Bar Milestone/Flag Activity</p>	<p>Activity Bar/Late Dates Critical Activity Progress Bar Milestone/Flag Activity</p>	<p>Activity Bar/Late Dates Critical Activity Progress Bar Milestone/Flag Activity</p>	<p>Activity Bar/Late Dates Critical Activity Progress Bar Milestone/Flag Activity</p>

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 FEMP RI/FS OUS CONSENT AGMT (LATE)

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6.0 Engineered Waste Management Facility

This program will evaluate the ability of the Engineered Waste Management Facility (EWMF) to manage the remedial waste generated by the operable units. The technical approach for the evaluation will be based on a program-specific sampling and analysis plan (SAP) and development of an EWMF Siting Report with comprehensive analysis. The report will perform a detailed analysis of the EWMF as an on-property waste disposal/storage technology option, per OSWER Directive 9355.3-01, "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988).

6.1 EWMF General Siting Report

Scope:

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

Status:

The EWMF ARARs, Revision 3 were submitted by the DOE for U.S. EPA and Ohio EPA review on December 3, 1991. Comments were received from the Ohio EPA on January 6, 1992 and the U.S. EPA on January 30, 1992. The ARARs were revised and transmitted to the EPAs on March 18, 1992 as Revision 4. On April 21, 1992, comments were received from Ohio EPA on Revision 4. DOE's responses to the comments will be incorporated into the draft Operable Unit 2 FS/PP/ROD for U.S. EPA submittal.

Issues/Corrective Actions:

None to report.

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6.3 Planned Activities for November 1992

- Continue writing the EWMF siting report technical chapters.
- Continue batch sorption tests at Brookhaven National Laboratory.
- Continue fate and transport modeling.

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7.0 Site-Wide Characterization Report

7.1 Risk Assessment Work Plan Addendum

Scope:

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

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

Status:

The (Final) Risk Assessment Work Plan Addendum was transmitted to the U.S. EPA and Ohio EPA on June 19, 1992. Response to comments received from the U.S. EPA on August 6, 1992, were submitted on September 24, 1992.

Issues/Corrective Actions:

None to report.

7.2 SWCR Report Preparation

Scope:

The SWCR is a one-time summary of all FEMP site data available as of December 1, 1991. It contains the preliminary baseline risk assessment which estimates human health and ecological risk of the FEMP from a site-wide perspective. The SWCR also provides the initial list of the leading remedial alternatives for each operable unit for input into the FS cumulative response action risk evaluation.

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7.2 SWCR Report Preparation (continued)

Status:

The SWCR was submitted to the U.S. EPA on August 5, 1992. Comments were received on October 8, 1992. Responses to comments will be submitted on November 30, 1992.

SITE-WIDE CHARACTERIZATION REPORT

SECONDARY

SCOPE	SUBMIT TO EPA	RECEIVE FROM EPA	SUBMIT TO EPA FINAL
Provides a one-time summary of site characterization data available as of 12/1/91, the Preliminary Baseline Risk Assessment, and a list of the leading remedial alternatives.	08/05/92 A	09/08/92 C	12/18/92 C

C = Consent Agreement Date

A = Actual

Issues/Corrective Actions:

Delay in receipt of comments may delay revisions. Scope of comments may delay revisions and/or affect operable unit-specific risk assessments.

7.2.1 Planned Activities for November 1992

- Prepare responses to comments from the U.S. EPA and the Ohio EPA.
- Attend meeting to resolve major comments on November 5, 1992.

<p>1991 JUL AUG SEP OCT NOV DEC 1991 1992 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 1992 1993 JAN FEB MAR APR MAY JUN</p>	<p>WORK PLAN REVISIONS</p>	<p>SITEWIDE CHARACTERIZATION</p>	<p>WORK PLAN ADDENDUM PREPARATION AS 17 JUN 91 AF 29 JUL 91 DOE WORK PLAN REVIEW/REVISE/APPROVE AS 30 JUL 91 AF 24 SEP 91 EPA WORK PLAN ADD. REVIEW/REVISE/APPROVE AS 11 OCT 91 AF 16 JUN 92</p> <p>SITEWIDE CHARACTERIZATION REPORT PREP AS 26 JUL 91 AF 1 JUN 92 DOE REVIEW/REVISE/APPROVE SITE CHAR REPORT AS 16 APR 92 AF 5 AUG 92 EPA REVIEW/REVISE/APPROVE SITE CHAR REPORT AS 5 AUG 92 LF 14 JUN 93</p>	<p>Target Date 10CT90 Plot Date 30JUN92 Data Date 25OCT92 Project Start 10CT90 Project Finish 10AUG98 (c) Primavera Systems, Inc.</p> <p>Activity Bar/Late Dates Critical Activity Target Dates Milestone/Flag Activity</p> <p>Activity Bar/Late Dates Critical Activity Target Dates Milestone/Flag Activity</p>	<p>Sheet 1 of 1</p> <p>RI/FS PROGRAM CURRENT FERNALD ENVIRONMENTAL MGMT. PROJECT FEMP RI/FS PSC CONSENT AGMT (LATE)</p> <p>Prepared by ASI/IT Corp. Date _____ Revision _____ Checked _____ Approved _____</p>
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**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
CONTROL AND ABATEMENT OF RADON-222 EMISSIONS
MONTHLY PROGRESS REPORT**

Period Ending October 31, 1992

REMEDIAL INVESTIGATIONS/FEASIBILITY STUDIES

8.0 Community Relations

8.1 Status

The DOE-FN has developed an eight-week Community Environmental Education Course. Sessions were held from 7:00 - 9:00 p.m. in Classroom B at the Executive Resource Associates ALPHA Building, 10991 Hamilton-Cleves Road, on the following subjects:

October 6, 1992	--	Groundwater Sampling
October 13, 1992	--	Mixed and Hazardous Waste Issues
October 20, 1992	--	Parsons Role in FEMP Remediation
October 27, 1992	--	Air Monitoring

These classes have been very well received by the public with approximately 30 - 35 residents attending each course.

A Roundtable focusing on the Site-Wide Characterization Report was held October 26, 1992 at the Executive Resource Associates ALPHA Building, 10991 Hamilton-Cleves Road. Approximately 10 community residents attended.

The *Fernald Project Cleanup Report* was mailed October 27, 1992 giving the latest updates on the RI/FS including the five operable units, the Engineered Waste Management Facility, the Site-Wide Characterization Report, and a status report on all FEMP removal actions.

WEMCO received verbal approval from U.S. EPA on the revised Community Relations Plan submitted in September 1992.

On October 28, 1992, as part of National Quality Month, DOE-FN conducted a one-day exhibition that gave focal point attention to the Total Quality continuous improvement process and created FEMP employee awareness in compliance to DOE Order 5700.6c. DOE, FERMCO, WEMCO, and all principal DOE contractors at the FEMP provided "Employee Appreciation Day" exhibits that were on display in the cafeteria.

The DOE-FN Office of Public Information, along with representatives of FERMCO and WEMCO's Public Affairs organizations, conducted Communications Departmental meetings on October 14 and October 19, 1992. The two sessions were designed to discuss the DOE-FN Office of Public Information's mission and its goals for the future, in addition to involving everyone in developing recommendations for improvement.

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
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CONTROL AND ABATEMENT OF RADON-222 EMISSIONS
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Period Ending October 31, 1992

REMEDIAL INVESTIGATIONS/FEASIBILITY STUDIES

8.0 Community Relations (Continued)

On October 28, 1992, DOE sent out letters of invitation to the local community for the November 9, 1992 Community Meeting. Flyers were distributed to businesses and organizations.

DOE has approved opening a public comment period on the following six FEMP removal actions:

- Scrap Metal Piles (RA No. 15)
- Improved Storage of Soils & Debris (Revised Plan) (RA No. 17)
- Control of Exposed Material in Pit 5 (RA No. 18)
- Waste Pit Area Containment Improvement (RA No. 22)
- Pilot Plant Sump (RA No. 24)
- Nitric Acid Tank Car and Area (RA No. 25)

8.2 Issues/Corrective Action

None.

8.3 Planned Activities for November 1992

On November 2, 1992, a dry run for the Community Meeting exhibits will be held at Parsons and a dry run for the Community Meeting presentations will be held in the DOE conference room.

On November 4, 1992, a public comment period will commence on six FEMP removal actions.

November 9, 1992 is the next date in a series of DOE community meetings concerning cleanup at the FEMP. It will be held at The Plantation, 9660 Dry Fork Road in Harrison, Ohio from 6:00 - 9:30 p.m.

The last two courses in the DOE eight-week Community Environmental Education Course will be held from 7:00 - 9:00 p.m. in Classroom B at the Executive Resource Associates ALPHA Building, 10991 Hamilton-Cleves Road, on November 10 and November 17, 1992.

On November 16, 1992, a Community Roundtable will be held in Classroom B at the Executive Resource Associates ALPHA Building, 10991 Hamilton-Cleves Road, to discuss Pre-College Programs.

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
CONTROL AND ABATEMENT OF RADON-222 EMISSIONS
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PERIOD ENDING OCTOBER 31, 1992

ENCLOSURE A

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

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
CONTROL AND ABATEMENT OF RADON-222 EMISSIONS
MONTHLY PROGRESS REPORT**

Period Ending October 31, 1992

Wastewater Flows and Radionuclide Concentrations

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

Location: 11000004001 Month: October 1992
001 Total Discharge
Manhole 175 (Effluent to the 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) (1)
1	1.074	198	36	0.21	0.85	71
2	0.673	230	113	0.27	0.69	91
3	0.278	311	131	0.51	0.54	172
4	0.209	329	189	0.61	0.48	206
5	0.379	275	225	0.46	0.66	155
6	0.357	221	126	0.36	0.49	122
7	0.373	293	144	0.44	0.62	149
8	0.410	108	95	0.23	0.36	78
9	0.381	405	108	0.65	0.94	220
10	0.266	437	108	0.50	0.50	169
11	0.231	306	171	0.52	0.45	176
12	0.349	284	108	0.49	0.65	166
13	0.317	270	81	0.35	0.42	118
14	0.382	230	113	0.39	0.56	132
15	0.711	216	104	0.35	0.94	118
16	1.352	261	113	0.33	1.69	111
17	1.027	243	122	0.38	1.48	128
18	0.930	167	99	0.31	1.09	105
19	0.723	212	99	0.23	0.63	78
20	0.726	194	108	0.23	0.63	78
21	0.448	144	126	0.23	0.39	78
22	0.447	162	45	0.27	0.46	91
23	0.304	378	90	0.37	0.43	125
24	0.247	527	149	0.60	0.56	203
25	0.249	446	131	0.51	0.48	172
26	0.346	365	153	0.51	0.67	172
27	0.464	261	158	0.47	0.82	159
28	0.367	257	158	0.45	0.62	152
29	0.345	194	117	0.43	0.56	145
30	0.357	194	113	0.37	0.50	125
31	<u>0.233</u>	342	108	0.59	<u>0.52</u>	199
TOTAL	14.955				20.68	

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**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
CONTROL AND ABATEMENT OF RADON -222 EMISSIONS
MONTHLY PROGRESS REPORT**

Period Ending October 31, 1992

Wastewater Flows and Radionuclide Concentrations

Facility: Fernald Environmental Management Project

Location: 001 Total Discharge

Month: October 1992

	Flow (MGD)	Total Alpha (pCi/L)(2)	Total Beta (pCi/L)(2)	Total U (mg/L)(2)	Total U (kgs)	Calculated Total U-238 (pCi/L)(1)(2)
Avg.	0.482	249	113	0.37	0.67	123
Max.	1.352	527	225	0.65	1.69	220
Min.	0.209	108	36	0.21	0.36	71

The average uranium concentration for the previous twelve months was 0.52 mg/L. This is 58.4% of the Derived Concentration Guide (DOE Order 5400.5) for ingested water.

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

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
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Period Ending October 31, 1992

Wastewater Flows and Radionuclide Concentrations

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

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

Month: October 1992

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

Based on 2.22 inches of rainfall for the month, the uranium discharge to Paddy's Run from uncontrolled areas of the FEMP is estimated to be 9.99 kgs.

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE
AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
CONTROL AND ABATEMENT OF RADON-222 EMISSIONS
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PERIOD ENDING OCTOBER 31, 1992

ENCLOSURE B

FFCA: INITIAL REMEDIAL MEASURES

AND OTHER OPEN ACTIONS

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
CONTROL AND ABATEMENT OF RADON-222 EMISSIONS
MONTHLY PROGRESS REPORT**

Period Ending October 31, 1992

INTRODUCTION

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

WORK ASSIGNMENTS AND PROGRESS

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

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

1. Initial Remedial Measures

Section C

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

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

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

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
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**COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND
LIABILITY ACT (CERCLA)**

3. Reports and Record Keeping

Section B

The RI/FS Monthly Technical Progress Report for September 1992 was transmitted to the U.S. EPA on October 20, 1992, as an integral part of the Consolidated Consent Agreement/Federal Facility Compliance Agreement/Federal Facility Agreement for Control and Abatement of Radon-222 Emissions (CA/FFCA/FFA-CARE) Monthly Progress Report in accordance with the requirements of Section X of the Consent Agreement As Amended.

CLEAN AIR ACT (CAA)

Section E

The Quarterly Particulate Emissions Report will now be incorporated into the Annual NESHAP Compliance Report.

RADIATION DISCHARGE INFORMATION

Section A

The twenty-first Quarterly Liquid Discharge Report for the period October through December 1991 was submitted to the U.S. EPA on February 20, 1992. This information will now be submitted on an annual basis.

REPORTING REQUIREMENTS

Section B

The Federal Facility Compliance Agreement Monthly Progress Report for September, 1992, was transmitted to the U.S. EPA on October 20, 1992, as Enclosure B of the Consolidated Consent Agreement/Federal Facility Compliance Agreement/Federal Facility Agreement for Control and Abatement of Radon-222 Emissions (CA/FFCA/FFA-CARE) Monthly Progress Report.

TABLE 1

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

OCTOBER 31, 1992

<u>ACTION</u>	<u>DESCRIPTION</u>	<u>COMPLETION TIME AFTER FFCA SIGNED</u>	<u>FY1992 STATUS</u>
CERCLA			
1.	INITIAL REMEDIAL MEASURES		
1.C	Implement radon control plan approved by the U.S. EPA.	-----	No longer applicable. Progress on actions to address radon emissions from the K-65 Silos are being reported separately under Section IX-Removal Actions of the Consent Agreement/FFCA Monthly Progress Report.
2.	REMEDIAL INVESTIGATION/FEASIBILITY STUDY		No action required.
2.A	RI/FS work is to be conducted in accordance with the U.S. EPA guidelines.	N/A	
2.B	--No Action Required--	-----	Status information on the RI/FS is being reported in accordance with the requirements of Section X of the Consent Agreement As Amended under CERCLA Sections 120 and 106(a).
2.E	Amend and submit revised RI/FS Work Plan to U.S. EPA if deficiencies are found.		Status information on the RI/FS is being reported in accordance with the requirements of Section X of the Consent Agreement As Amended under CERCLA Sections 120 and 106(a).
2.F	Implement tasks described in the approved RI/FS Work Plan		Status information on the RI/FS is being reported in accordance with the requirements of Section X of the Consent Agreement As Amended under CERCLA sections 120 and 106(a).
3.	REPORTS AND RECORD KEEPING		
3.B	Submit monthly RI/FS progress reports.	monthly	The RI/FS Monthly Progress Report for September 1992 was transmitted to the U.S. EPA on October 20, 1992 (DOE-0153-93).
CLEAN AIR ACT			
B.4	Prepare annual progress report installation and replacement of emission control devices.	yearly	The Fourth Annual Progress Report on the installation and replacement of emission control devices was transmitted to the U.S. EPA on January 28, 1992 (DOE-982-92).

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

OCTOBER 31, 1992

C.	Provide annual reports to the U.S. EPA per 40 CFR 61.94(c).	yearly	The Annual NESHAP Compliance Report for CY1990 was transmitted to the U.S. EPA on June 25, 1992 (DOE-1912-92).
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. Stacks in areas such as the Laboratory are currently being identified for testing during FY1993. Procurement activities are in process to obtain services for performance of the tests.
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. Stacks in areas such as the Laboratory are currently being identified for testing during FY1993. Procurement activities are in process to obtain services for performance of the tests.
E.1	Maintain records of monthly particulate matter emissions.	-----	Ongoing.
E.2	Provide quarterly reports to U.S. EPA on these emissions.	-----	The Quarterly Particulate Emissions Report will now be incorporated into the Annual NESHAP Compliance Report.
RCRA			
A.1	Conduct a hazardous waste determination on all waste streams.	30 days	Complete. Pursuant to the Proposed Amended Consent Decree, a RCRA waste evaluation was be conducted on all identified waste streams pertaining to the PACD.
A.2	Commence a hazardous waste analysis program for materials in the landfill and going to the incinerator.	30 days	Complete. Operation 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.

TABLE 1

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

OCTOBER 31, 1992

A.5	Update the facility closure plan to reflect the year the facility expects to begin closure.	30 days	The Facility closure date is dependent upon closure schedules for individual TSD units as presented most recently in Section I of the RCRA Part B Permit Application transmitted to the Ohio EPA and the U.S. EPA on October 30, 1991 (DOE-211-92). Facility closure will be completed on a date the last TSD unit is closed.
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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.	yearly	The twenty-first Quarterly Discharge Report for the period October through December 1991 was transmitted to the U.S. EPA on February 20, 1992 (DOE-941-92). This information will now be reported on an annual basis.
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REPORTING REQUIREMENTS

B.	Issue monthly progress report of actions taken to ensure compliance with FFCA requirements.	monthly	September's FFCA Monthly Progress Report was transmitted to the U.S. EPA on October 20, 1992 (DOE-0153-93).
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**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
CONTROL AND ABATEMENT OF RADON-222 EMISSIONS
MONTHLY PROGRESS REPORT**

PERIOD ENDING OCTOBER 31, 1992

ENCLOSURE C

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

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
CONTROL AND ABATEMENT OF RADON-222 EMISSIONS
MONTHLY PROGRESS REPORT**

Period Ending October 31, 1992

Introduction

The Federal Facility Agreement for Control and Abatement of Radon-222 Emissions (FFA-CARE) between the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (U.S. EPA), signed November 19, 1991, requires that a monthly report be submitted to the U.S. EPA regarding all steps undertaken in the preceding month to implement Part V of the agreement and that all data generated as a result of those actions be submitted.

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

After four months of data collection for the applicable parameters, preparation is now underway to evaluate the data for use in the Transport Release Models.

Work Assignments and Progress

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

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
CONTROL AND ABATEMENT OF RADON-222 EMISSIONS
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Period Ending October 31, 1992

<u>FFA Part, Paragraph(s)</u>	<u>Description of Commitment</u>	<u>FFA Due Date</u>	<u>Status of Commitment</u>
Part V, 19 & 21	Implement the K-65 Silos 1 and 2 Removal Action in accordance with the approved Silos 1 and 2 Removal Action Work Plan.	12/1/91	Completed. Installation of the bentonite completed 11/28/91.
Part V, 20	Reduce radon-222 to a level As-Low-As Reasonably-Achievable (ALARA) with the goal as specified in the Silos 1 and 2 Removal Action Work Plan.	5/22/92	Completed. The Bentonite Effectiveness Environmental Monitoring Report was transmitted to the U.S. EPA on 5/22/92.
Part V, 22	Submit proposed methodology for estimating radon-222 concentration reductions resulting from completion of the Silos 1 and 2 Removal Action.	Within 60 days of completing removal action; 1/27/92.	The Bentonite Effectiveness Environmental Monitoring Plan was resubmitted to the U.S. EPA for comment and approval on 3/13/92. EPA approval was received on 4/24/92. DOE is preparing a revision to the methodology.
Part V, 23	Evaluate performance of the removal action and determine whether or not additional actions are needed prior to final remediation.	None specified.	Methodology for estimating radon-222 concentration reduction submitted to U.S. EPA per paragraph 20 of Part V. The first Bentonite Effectiveness Environmental Monitoring Report was issued to the U.S. EPA on 5/22/92. (DOE is preparing a revision to the methodology.)
Part V, 24, 25, and 33	Demonstrate compliance with NESHAP Subpart Q at the completion of final remediation using a methodology approved by the U.S. EPA. Applicable to: Silos 1, 2, and 3; Waste Pits 1, 2, 3, 4, and 5 and the Clearwell; and any newly discovered radon-222 emission sources.	None specified.	No information to report for October 1992.

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
CONTROL AND ABATEMENT OF RADON-222 EMISSIONS
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Introduction

The accompanying Effluent Radiation Reports provide, in accordance with the requirements of Section XXIII.B of the Consent Agreement As Amended under CERCLA Sections 120 and 106 (a), data on the daily wastewater flows, radionuclide concentrations, and loadings released to the Great Miami River and an estimate of runoff and radionuclide concentrations to Paddy's Run during October 1992.

Summary - October 1992

The total quantity of uranium discharged from the FEMP to the Great Miami River via Manhole 175 (Outfall 11000004001) was 20.68 kilograms. The average uranium concentration for the previous 12 months was 0.52 mg/L. This is 58.4% of the Derived Concentration Guide (DOE Order 5400.5) for ingested water.

There was no discharge from the Stormwater Retention Basin (Outfall 11000004002) to Paddy's Run via the Storm Sewer Outfall Ditch in October 1992. Based on 2.22 inches of rainfall in October 1992, the total quantity of uranium discharged to Paddy's Run from uncontrolled areas of the FEMP is estimated to be 9.99 kilograms.

<u>FFA Part, Paragraph(s)</u>	<u>Description of Commitment</u>	<u>FFA Due Date</u>	<u>Status of Commitment</u>
Part V, 26	Directly measure radon-222 flux from Waste Pits 1, 2, 3, 4, and 5 and the Clearwell in the RI/FS under the CERCLA Consent Agreement.	None specified.	Radon sampling is complete for Pits 1, 2, and 3. All measurements were below the criteria set by the U.S. EPA. A final report was issued to the U.S. EPA on 6/25/92. A letter was received from the U.S. EPA on 10/16/92 giving approval of the proposed method for measuring the radon flux from Pit 4. The letter also stated that since the Clearwell is water covered, and Pit 5 is nearly 100% water covered, the flux from Pit 5 and the Clearwell may be assumed to be zero.
Part V, 26	Include direct measurement data from Waste Pits 1, 2, 3, 4, and 5 and the Clearwell in the RI/FS under the CERCLA Consent Agreement.	None specified.	See above.
Part V, 27	Estimate radon-222 emissions from Silo 3 based upon characterization data; include the estimated radon-222 emission data from Silo 3 in the RI/FS that includes Silo 3 under the CERCLA Consent Agreement.	None specified.	Completed. An estimate of radon flux from the K-65 Silo 3 was submitted to the U.S. EPA on 12/17/91. Radon flux for the silo was estimated to be above 20 pCi/m ² -s.
Part V, 28	Submit documentation or estimates of current radon-222 emissions from existing but newly discovered sources that contain radium-226 in sufficient concentrations to emit radon-222 in excess of NESHAP Subpart Q prior to final remediation.	Within 30 days of discovery.	No new sources identified.
Part V, 30	Submit methodology for direct measurement or other appropriate means of characterization of the relevant emissions pursuant to paragraph 29 of the FFA.	Within 45 days of the U.S. EPA response pursuant to paragraph 29.	None required.

<u>FFA Part, Paragraph(s)</u>	<u>Description of Commitment</u>	<u>FFA Due Date</u>	<u>Status of Commitment</u>
Part V, 31	Submit results of measurements pursuant to paragraph 30.	Within 30 days of U.S. EPA approval of characterization method.	None required.
Part VI, 31	Submit monthly report on steps undertaken to implement Part V of the FFA-CARE and the data obtained in the preceding month.	20th day of succeeding month.	The progress report being submitted herewith as an integral part of the CERCLA Consent Agreement Monthly Progress Report.

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**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
CONTROL AND ABATEMENT OF RADON-222 EMISSIONS
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Data Reporting Requirements: RA No. 4: Silos 1 and 2

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

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

- Ambient temperature and pressure near the silos.
- Silos 1 and 2 headspace temperature.
- Silos 1 and 2 differential pressure.
- Silos 1 and 2 radon headspace concentration.
- Silos 1 and 2 headspace humidity

The silo radon headspace data submitted was collected manually since the completion of the bentonite installation until mid-July 1992. Currently, the data for Silos 1 and 2 and the perimeter pylons is automatically recorded.

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

- Air monitoring station number 5 (AMS-5)
- Air monitoring station number 6 (AMS-6)
- Pilot Plant
- Background data
- K-65 Monitoring Data (K-65 NW, K-65 SW, K-65 NE, K-65 SE). Figure C-6, immediately following, identifies the sampling locations.

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

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

K-65 SILO REPORT

LOCATION: Silo # 1

DATE: October 1992

Day	Ambient		Temperature	Inter.	Diff.	Head Space
	Temp	Pres	Head Space			
	Deg. F	In. Hg.	Deg. F	Hum.	In. HG	Radon
				%		(pCi/l)
1	50.9	29.6	60.3	100	-0.006	20710
2	53.0	29.5	59.9	100	-0.003	57480
3	55.7	29.4	59.8	100	-0.004	42130
4	55.3	29.4	59.9	100	-0.003	49510
5	52.8	29.6	59.9	100	-0.005	25440
6	49.3	29.7	59.7	100	-0.005	2550
7	52.1	29.6	59.2	99	-0.005	28430
8	54.8	29.4	58.9	99	-0.004	51410
9	52.8	29.3	58.9	99	0	86550
10	50.8	29.3	58.8	99	0.047	16550
11	47.0	29.3	58.4	99	-0.006	40820
12	48.2	29.3	57.5	98	-0.003	11080
13	50.0	29.4	57.4	99	-0.005	31750
14	64.4	29.4	57.5	98	-0.003	23350
15	62.3	29.4	58.3	98	0.017	30780
16	52.3	29.4	58.3	98	0.02	30080
17	40.8	29.7	57.3	99	-0.007	22720
18	39.7	29.6	56.6	99	-0.008	12840
19	32.9	29.7	55.6	99	-0.008	20590
20	37.7	29.6	54.8	98	-0.008	34010
21	51.2	29.7	54.8	96	-0.005	22330
22	49.5	29.9	55.1	98	-0.005	34520
23	53.8	29.7	55.2	98	-0.005	66340
24	58.6	29.4	55.7	98	-0.004	63730
25	46.5	29.4	55.7	98	-0.006	35130
26	52.1	29.3	55.2	98	-0.005	18720
27	53.4	29.3	55.5	98	-0.005	29370
28	46.8	29.3	55.2	98	-0.005	408470
29	46.9	29.4	54.9	98	-0.006	17664
30	45.4	29.4	54.8	98	-0.007	4053
31	47.8	29.5	54.6	98	-0.006	4125
ARITHMETIC						
MEAN	50.2	29.5	57.2	98.6	-0.002	43330
MAXIMUM						
	64.4	29.9	60.3	100.0	0.047	408470
MINIMUM						
	32.9	29.3	54.6	96.0	-0.008	2550
MEDIAN						
	50.9	29.4	57.4	98	-0.005	29370

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

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

K-65 SILO REPORT

LOCATION: Silo # 2

DATE: October 1992

Day	Ambient		Temperature	Inter.	Diff.	Head Space
	Temp	Pres	Head Space			
	Deg. F	In. Hg.	Deg. F	Hum.	In. HG	Radon
				%		(pCi/l)
1	50.9	29.6	59.9	100	-0.008	209380
2	53.0	29.5	59.4	100	-0.008	243760
3	55.7	29.4	59.3	101	-0.008	226630
4	55.3	29.4	59.3	100	-0.008	240130
5	52.8	29.6	59.4	99	-0.009	136890
6	49.3	29.7	59.2	100	-0.009	136580
7	52.1	29.6	58.7	100	-0.008	230630
8	54.8	29.4	58.4	100	-0.008	262710
9	52.8	29.3	58.4	100	-0.003	268010
10	50.8	29.3	58.3	100	0.023	136970
11	47.0	29.3	57.9	100	-0.008	230450
12	48.2	29.3	56.9	99	-0.009	190070
13	50.0	29.4	56.9	99	-0.008	203916
14	64.4	29.4	57	99	-0.009	69365
15	62.3	29.4	57.8	99	0.014	151410
16	52.3	29.4	57.7	99	0.028	167950
17	40.8	29.7	56.8	99	-0.007	250032
18	39.7	29.6	56.2	99	-0.007	.
19	32.9	29.7	55.3	99	-0.007	245693
20	37.7	29.6	54.5	100	-0.007	202000
21	51.2	29.7	54.4	99	-0.008	198950
22	49.5	29.9	54.6	99	-0.008	277354
23	53.8	29.7	54.7	99	-0.008	309680
24	58.6	29.4	55.2	99	-0.008	274750
25	46.5	29.4	55.2	99	-0.007	298260
26	52.1	29.3	54.8	99	-0.008	232590
27	53.4	29.3	55.1	99	-0.008	255100
28	46.8	29.3	54.8	99	-0.008	296138
29	46.9	29.4	54.5	99	-0.008	272252
30	45.4	29.4	54.4	99	-0.008	112928
31	47.8	29.5	54.2	99	-0.008	139533
ARITHMETIC MEAN	50.2	29.5	56.7	99.4	-0.005	215670
MAXIMUM	64.4	29.9	59.9	101.0	0.028	309680
MINIMUM	32.9	29.3	54.2	99.0	-0.009	69365
MEDIAN	50.9	29.4	56.9	99	-0.008	230540

*Computer Lockup

K-65 Silo #1 & #2 Grab Samples
 September
 Technician: R.D. Daniels/C. Schilling
 Counting Equipment: AB-5 Pylon
 Lucas Cell: 110A

Sample #	Silo Number	Month	Sample Date	Sample Location Hours	Sample Location Min	Count Date	Sample Count Hours	Sample Count Min	(U)	(Gross counts/Count Int) - Background = cps		Lucas Cell		Concentration pCi/l
										Gross Cnts	Count Int (min)	Ser #	E ^r	
											93466.4	601	0.709	135125
											90975	561	0.709	131523
											175096.3	559	0.717	258286
											142553.7	558	0.732	211705
											85029.8	560	0.717	130552
											97479.9	561	0.709	155158
											43958.9	562	0.721	62408
											44252.4	558	0.732	70796
											440504.8	559	0.717	727302
											33558.4	560	0.717	48144
											94113.4	558	0.732	149977
											243116.4	560	0.717	388522
											68171	561	0.709	98655
											206679.8	562	0.721	294641
											172962.4	558	0.732	387033
											155658	559	0.717	356136
											59.6	560	0.717	85
											87128	561	0.709	127029
											78.6	558	0.732	110
											183172.8	559	0.717	262983
											154465.4	560	0.717	220570
											233898.6	562	0.721	332647
											88041.2	561	0.709	127458
											16030.2	558	0.732	22495
											129958.2	558	0.732	182460

- Notes:
1. Samples 3 - 5 were initially reported in error. Corrections have been made to the calculational methods.
 2. Samples 3 - 7 had count intervals of 10 minutes.
 3. Only silo 2 was sampled on 13 Oct. due to the inability to sample silo 1 per procedure.
(tygon tubing flat, no flow).

SELECTED RADON DATA REPORT

3931

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

LOCATION: Selected Sampling Locations

DATE: OCTOBER, 1992

Date	AMS 5 (pCi/L)	AMS 6 (pCi/L)	PILOT PLANT (pCi/L)	BKGRD (pCi/L)
10/01/92	1.6	1.4	1.4	1.0
10/02/92	1.7	1.4	1.4	1.0
10/03/92	1.7	1.4	1.5	1.1
10/04/92	1.4	1.3	1.3	1.0
10/05/92	0.6	0.5	0.5	0.4
10/06/92	1.5	1.2	1.2	0.7
10/07/92	1.8	1.5	1.7	1.2
10/08/92	1.3	1.1	1.2	0.6
10/09/92	0.5	0.8	0.6	0.4
10/10/92	1.2	1.0	1.1	0.6
10/11/92	1.0	0.8	1.0	0.6
10/12/92	1.3	1.2	1.4	0.7
10/13/92	1.3	1.0	1.1	0.6
10/14/92	0.9	0.9	0.9	0.5
10/15/92	0.5	0.5	0.6	0.4
10/16/92	0.3	0.4	0.6	0.4
10/17/92	0.6	0.5	0.7	0.4
10/18/92	0.7	0.6	0.9	0.6
10/19/92	0.7	0.7	1.0	0.7
10/20/92	0.8	0.8	0.9	0.6
10/21/92	0.8	0.7	0.9	0.5
10/22/92	1.1	0.9	1.1	0.7
10/23/92	1.5	1.4	1.6	1.2
10/24/92	0.8	0.8	1.1	1.0
10/25/92	1.3	1.1	1.3	0.7
10/26/92	1.6	1.4	1.6	1.1
10/27/92	0.8	0.7	0.7	0.6
10/28/92	1.6	1.4	1.4	0.9
10/29/92	1.4	1.3	1.5	0.9
10/30/92	0.6	0.6	0.7	0.5
10/31/92	0.4	0.5	0.6	0.4
AVERAGE	1.1	1.0	1.1	0.7
MAXIMUM	1.8	1.5	1.7	1.2
MINIMUM	0.3	0.4	0.5	0.4
MEDIAN	1.1	0.9	1.1	0.6
Std. Dev	0.4	0.3	0.3	0.2

SELECTED RADON DATA REPORT

3931

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

LOCATION: Selected Sampling Locations

DATE: OCTOBER, 1992

Date	K-65 NW (pCi/L)	K-65 SW (pCi/L)	K-65 NE (pCi/L)	K-65 SE (pCi/L)
	10/01/92	2.1	2.4	7.2
10/02/92	2.2	2.4	6.5	3.6
10/03/92	2.0	2.3	5.1	2.5
10/04/92	2.1	2.2	2.8	1.9
10/05/92	0.9	1.3	0.9	0.5
10/06/92	1.9	2.2	3.6	1.6
10/07/92	2.7	2.9	6.8	1.0
10/08/92	2.0	0.6	4.1	2.0
10/09/92	0.8	0.2	1.3	1.0
10/10/92	1.7	0.5	3.4	2.0
10/11/92	1.4	0.3	3.5	1.6
10/12/92	2.0	1.0	8.0	2.8
10/13/92	2.4	*	*	*
10/14/92	1.5	*	*	*
10/15/92	1.0	*	*	*
10/16/92	0.7	*	*	*
10/17/92	1.1	*	*	*
10/18/92	1.2	*	*	*
10/19/92	1.7	*	*	*
10/20/92	1.5	*	*	*
10/21/92	1.2	1.3	1.3	2.0
10/22/92	1.9	2.1	2.1	3.0
10/23/92	2.2	2.5	6.3	2.0
10/24/92	1.6	1.7	2.7	3.1
10/25/92	2.3	2.1	4.7	6.0
10/26/92	1.3	2.3	6.6	0.9
10/27/92	1.2	1.4	2.1	1.3
10/28/92	2.2	2.2	7.4	2.8
10/29/92	2.0	2.2	4.5	2.0
10/30/92	1.0	2.8	0.8	0.7
10/31/92	0.9	2.3	0.6	*
AVERAGE	1.6	1.3	3.0	1.5
MAXIMUM	2.7	2.9	8.0	6.0
MINIMUM	0.7	0.2	0.6	0.5
MEDIAN	1.7	2.2	3.6	2.0
Std. Dev	0.5	1.0	2.7	1.4

* data unavailable due to unit malfunction

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
CONTROL AND ABATEMENT OF RADON-222 EMISSIONS
MONTHLY PROGRESS REPORT**

PERIOD ENDING OCTOBER 31, 1992

ENCLOSURE D

DRILLING/BORING LOGS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602,0427	PROJECT NAME: RCKA Phase 1	
BORING NUMBER: 3475	COORDINATES:	DATE: 9-15-92
ELEVATION:	GWL: Depth 62.5 ft Date/Time 9/22/92/10:00	DATE STARTED: 9-15-92
ENGINEER/GEOLOGIST: K. Marisa K. Goggin	Depth 48.45 ft Date/Time 10/20/92/11:00	DATE COMPLETED: 10/4/92
DRILLING METHODS: Cable Tool	X6112012	PAGE 1 OF 14

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0.0	103241 9-15-92 1430	4 9 13	14 0.5 ft	Medium dense, dark yellowish brown (10YR, 4/4) silty sand with trace gravel, and a little organic matter, moist	SM Sc CA4/4	N/A	H _{nu} = 0.2 ppm BT = 400 cpm α = 0 cpm
1.5	103242 9-15-92 1445	5 9 13	9	Very stiff light olive brown (2.5Y, 5/4) silty clay with sand and a little fine gravel, medium plasticity, moist	CL	2.75	H _{nu} = .2 ppm BT = 400 cpm α = 0 cpm
3.0	103243 9-15-92 1450	7 9 11	15	Very stiff light olive brown (2.5Y, 5/4) silty clay with sand, medium plasticity, moist	CL	2.0	H _{nu} = .2 ppm BT = 110 cpm α = 0 cpm
4.5	103244 9-15-92 1500	9 11 11	18	Medium dense light olive brown (2.5Y, 5/4) clayey silt with sand and fine gravel, trace light brownish gray (2.5Y, 6/2) mottling, moist	ML	N/A	H _{nu} = .2 ppm BT = 100 cpm α = 0 cpm
6.0	103245 9-15-92 1505	9 10 11	18	Medium dense light olive brown (2.5Y, 5/4) clayey silt with sand and gravel, trace light brownish gray (2.5Y, 6/2) mottling, moist	ML	N/A	H _{nu} = .2 ppm BT = 60 cpm α = 0 cpm
7.5							

NOTES:
 Drilling Contractor: Pennsylvania Drilling
 Drilling Equipment: Cable Tool
 Driller: Dave Newman
 Jim Sacconi

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

Background Readings
 H_{nu} = .2 ppm
 BT = 50 cpm
 α = 0 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 3435	COORDINATES:	DATE 9-15-92
ELEVATION:	GWL: Depth <i>seep</i> Date/Time	DATE STARTED: 9-15-92
ENGINEER/GEOLOGIST: K. Marion K. Gerson	Depth <i>seep</i> Date/Time	DATE COMPLETED: 10/7/92
DRILLING METHODS: Cable Tool	PAGE 2	OF 14

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
7.5	103246 9-15-92 1510	9 12 21	18	Very stiff light olive brown (2.5Y, 5/4) silty clay with sand and gravel, trace gray (10YR, 6/1) mottling, low plasticity, slightly moist	CL	3.5	H _{nu} = .2 ppm B _S = 50 cpm α = 0 cpm
9.0	103247 9-16-92 0950	17 22 33	18	Very dense light olive brown (2.5Y, 5/4) clayey silt with sand and a little gravel, moist	ML	N/A	H _{nu} = .2 ppm B _S = 50 cpm α = 0 cpm
10.5	103248 9-16-92 1000	19 24 33	18	Hard, light olive brown (2.5Y, 5/6) silty clay with a little sand and gravel, non plastic, slightly moist	CL	>4.5	H _{nu} = .2 ppm B _S = 50 cpm α = 0 cpm
12.0	103249 9-16-92 1015	14 16 23	18	Hard gray (2.5Y, 5/0) silty clay with a little sand and gravel, non plastic, slightly moist	CL	>4.5	
13.5	103249 9-16-92 1015	14 16 23	18	Very stiff gray (2.5Y, 5/0) silty clay with sand and trace gravel, medium plasticity, moist	CL	2.0	H _{nu} = .2 ppm B _S = 50 cpm α = 0 cpm
15.0	103250 9-16-92 1025	6 8 11	15	Stiff dark gray (5Y, 4/1) silty clay with sand and trace fine gravel, medium plasticity, moist	CL	1.75	H _{nu} = .2 ppm B _S = 50 cpm α = 0 cpm

NOTES

SEE Page 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602, 04-27	PROJECT NAME: RCRA - Phase 1	
BORING NUMBER: 3735	COORDINATES:	DATE: 9-16-92
ELEVATION:	GWL: Depth sec p. 1 Date/Time	DATE STARTED: 9-15-92
ENGINEER/GEOLOGIST: K. Marion, K. Geiger	Depth sec p. 1 Date/Time	DATE COMPLETED: 10/7/92
DRILLING METHODS: Cable Tool	PAGE 3	OF 14

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15.0	103251 9-16-92 1040	8 9 16	15	K.M. 9-16-92 Stiff dark gray (SY, 4/1) silty clay with sand and trace fine gravel, medium plasticity, moist	CL	1.5	H _{nu} = .2 ppm B _r = 50 cpm α = 0 cpm
16.5	103252 9-16-92 1420	5 7 14	13	Stiff dark gray (SY, 4/1) silty clay with sand and trace fine gravel, medium plasticity, slightly moist	CL	1.5	H _{nu} = .2 ppm B _r = 50 cpm α = 0 cpm
18.0	103253 9-16-92 1435	6 7 14	14	Stiff dark gray (SY, 4/1) silty clay with sand and trace fine gravel, medium plasticity, moist	CL	1.5	H _{nu} = .2 ppm B _r = 50 cpm α = 0 cpm
19.5	103254 9-16-92 1640	6 7 14	18	Stiff dark gray (SY, 4/1) silty clay with sand and a little fine gravel, medium plasticity, moist	CL	1.5	H _{nu} = .2 ppm B _r = 50 cpm α = 0 cpm
21.0	103255 9-16-92 1655	8 11 17	18	K.M. 9-16-92 4/1 Stiff dark gray (SY, 4/1) silty clay with sand and a little gravel and trace fossils, medium plasticity, moist	CL	1.5	H _{nu} = .2 ppm B _r = 50 cpm α = 0 cpm

NOTES

See Page 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 04-27	PROJECT NAME: RCRA - Phase 1	
BORING NUMBER: 3435	COORDINATES:	DATE 9-17-92
ELEVATION:	GWL: Depth See p 1 Date/Time	DATE STARTED: 9-15-92
ENGINEER/GEOLOGIST: K. Marion, K. Geiger	Depth See a 1 Date/Time	DATE COMPLETED: 10/7/92
DRILLING METHODS: Cable Foot	PAGE 4	OF 14

DEPTH ft.	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
22.5	103256 9-17-92 0900	3 6 7	17	Stiff dark gray (SY, 4/1) silty clay with sand and trace gravel, medium plasticity, moist	CL	1.5	H _{nu} = .1 ppm B _σ = 60 cpm α = 0 cpm
24.0	103257 9-17-92 0910	3 9 11	18	stiff dark gray (SY, 4/1) silty clay with sand and gravel, medium plasticity, moist	CL	1.5	H _{nu} = .1 ppm B _σ = 80 cpm α = 0 cpm
25.5	103258 9-17-92 0940	9 9 11	6	Medium stiff dark gray (SY, 4/1) silty clay with sand and trace gravel, medium plasticity, moist	CL	.75	H _{nu} = .1 ppm B _σ = 60 cpm α = 0 cpm
27.0	103259 9-17-92 0950	3 6 9	18	Same As Above	CL	.75	H _{nu} = .1 ppm B _σ = 60 cpm α = 0 cpm
28.5	103260 9-17-92 1000	3 3 4	10	Same As Above	CL	.75	H _{nu} = .1 ppm B _σ = 80 cpm α = 0 cpm

NOTES:

See page 1

9-17-92
Background Readings
H_{nu} = .1 ppm
B_σ = 60 cpm
α = 0 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 64.27	PROJECT NAME: RCR Phase 1	
BORING NUMBER: 3435	COORDINATES:	DATE: 9-17-92
ELEVATION:	GWL: Depth sec p.1 Date/Time	DATE STARTED: 9-15-92
ENGINEER/GEOLOGIST: K. Marjory Geiger	Depth sec p.1 Date/Time	DATE COMPLETED: 10/7/92
DRILLING METHODS: Cable Tool		PAGE 5 of 14

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in. 1	RECOVERY (in. 1)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
30.0	103261 9-17-92 1045	3 3 5	3	Soft gray (SY, S/I) silty, sandy clay with gravel, medium plasticity, moist	CL .5		H _{nu} = .1 ppm Br = 80 cpm α = 0 cpm
31.5	103262 9-17-92 1100	3 5 8	10	stiff gray (SY, S/I) silty, sandy clay with some gravel, medium plasticity, moist	CL 1.5		H _{nu} = .1 ppm Br = 60 cpm α = 0 cpm
33.0	103264 9-17-92 1430	17 37 42	33.2 18	Very dense gray (SY, S/I) well sorted gravel, dry Hard gray (SY, S/I) silty clay with trace sand and gravel, low plasticity, slightly moist	GP CL >45	N/A	H _{nu} = .1 ppm Br = 60 cpm α = 0 cpm
34.5	103265 9-17-92 1445	20 29 42	10	Very stiff gray (SY, S/I) gravelly clay, low plasticity, slightly moist	CL 4.0		H _{nu} = .1 ppm Br = 60 cpm α = 0 cpm
36.0	103266 9-17-92 1710	28 36 49	16	K.M. 9-17-92 Very stiff gray (SY, S/I) gravelly clay, low plasticity, slightly moist	CL 3.0		H _{nu} = .1 ppm Br = 60 cpm α = 0 cpm
37.5				Very dense yellowish brown (OYR, S/I) fine clayey sand, moist	SC N/A		Base of till / Top of aquifer at 37.3 ft

NOTES:

See page 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCKA Phase 1	
BORING NUMBER: 3735	COORDINATES:	DATE: 9-17-92
ELEVATION:	GWL: Depth see p. 1 Date/Time	DATE STARTED: 9-15-92
ENGINEER/GEOLOGIST: K. Marion, K. Geiger	Depth see p. 1 Date/Time	DATE COMPLETED: 10/7/92
DRILLING METHODS: Cable Tool		PAGE 6 OF 14

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
37.5	103267 947-92 1715	19 27 39	18	Very dense yellowish brown (10 YR, 5/8) ^{clayey} fine sand, moist	SC	N/A	H _{nu} = .1 ppm B ₅ = 60 cpm α = 0 cpm
39.0	103268 948-92 0930	17 37 50	10	Very dense yellowish brown (10 YR, 5/8) ^{poorly graded} gravelly medium sand, moist	SP SE CA 11/4/92	N/A	H _{nu} = N/A high humidity prevented accurate reading B ₅ = 50 cpm α = 0 cpm
40.5	103269 948-92 0945	27 38 46	14	Very dense yellowish brown (10 YR, 5/8) gravelly well graded sand, moist	SW	N/A	H _{nu} = N/A high humidity prevented accurate reading B ₅ = 50 cpm α = 0 cpm
42.0				split spoon samples will be taken at 5 ft. intervals starting at 45.0 ft.			
45.0							

NOTES

See Page 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 60204.27	PROJECT NAME: RCRA Phase 1	
BORING NUMBER: 3435	COORDINATES:	DATE 9-18-92
ELEVATION:	GWL: Depth <i>see p. 1</i> Date/Time	DATE STARTED 9-15-92
ENGINEER/GEOLOGIST: K. Marion, K. Geiger	Depth <i>see p. 1</i> Date/Time	DATE COMPLETED: 10/7/92
DRILLING METHODS: Cable Tool	PAGE 7	OF 14

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
45.0	103270 9-18-92 1040	36 50/3	5	Very dense pale yellow (2.5 _y , 7/3) gravelly poorly graded sand, dry	SP	N/A	H _{nu} = N/A ppm B ₅ = 50 cpm a = 0 cpm high humidity prevented accurate H _{nu} reading
46.5							
50.0							
51.5	103271 9-18-92 1100	32 50/4	11	Very dense light yellowish brown (2.5 _y , 6/3) Gravelly well graded sand, dry	SW	N/A	H _{nu} = N/A ppm B ₅ = 50 cpm a = 0 cpm high humidity prevented accurate H _{nu} reading
55.0							
56.5	103272 9-21-92 1000	21 38 49	16	Very dense light olive brown (2.5 _y , 5/4) gravelly well graded sand, very moist	SW	N/A	H _{nu} = high humidity prevented accurate reading B ₅ = 50 cpm a = 0 cpm
60.0							↓ The moisture content of the sample is due to the water used when drilling and the fact that the hole was left unattended over the weekend

NOTES:

See Page 1

Note: Changed scale as each tick equals 6 inches

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602-04-27	PROJECT NAME: RCRA Phase 2	
BORING NUMBER: 3435	COORDINATES:	DATE 9-26-92
ELEVATION:	GWL: Depth see p. 1 Date/Time	DATE STARTED 9-15-92
ENGINEER/GEOLOGIST: K. Mayton, K. Geiger	Depth see p. 1 Date/Time	DATE COMPLETED: 10/7/92
DRILLING METHODS: Cable Tool	PAGE 8	OF 14

DEPTH ft.	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
60.0	103273 7-21-92 1015	18 37 48	6	Very dense light gray (10YR, 6/1) well sorted medium sand with trace gravel, dry	SP	N/A	H _{max} = N/A B _r = 60 cpm α = 0 cpm high humidity prevented accurate H _{max} reading
				▽ w.L. = 2.5 ft.			
65.0	103274 9-21-92 1440	14 17 19	18	Dense light olive brown (2.5Y, 5/4) well sorted coarse sand with trace gravel, wet	SP	N/A	H _{max} = N/A B _r = 60 cpm α = 0 cpm
70.0	103275 9-21-92 1500	9 12 18	18	Medium dense light olive brown (2.5Y, 5/4) well sorted coarse sand with trace gravel, wet	SP	N/A	H _{max} = N/A B _r = 60 cpm α = 0 cpm
75.0							

NOTES

SEE Page 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 3435	COORDINATES:	DATE 9-22-92
ELEVATION:	GWL: Depth sec p. 1 Date/Time	DATE STARTED 9-15-92
ENGINEER/GEOLOGIST: K. Marion, K. Geiger	Depth sec p. 1 Date/Time	DATE COMPLETED: 10/7/92
DRILLING METHODS: Cable Tool	PAGE 9 = 14	

DEPTH ft.	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.6 ft.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ITSF)	REMARKS
75.0	103277 9-22-92 154	17 26 32	15	VERY DENSE light olive brown (2.5%, 5/4) poorly sorted very coarse Gravelly sand, wet	SP	N/A	K.M. 9-22-92 H _{nu} = 0 ppm BT = 60 cpm α = 0 cpm
76.5	K.M. 9-22-92	92					
80.0	103278 9-23-92	11 13		Medium dense light olive brown (2.5%, 5/3) poorly graded medium sand, wet	SP	N/A	H _{nu} = .1 ppm BT = 50 cpm α = 0 cpm
81.5	0920	17	13.85	Medium dense light olive brown (2.5%, 5/3) poorly graded gravelly coarse sand, wet	SP	N/A	
85.0	103279 9-23-92	14 22	18	Very Dense light olive brown (2.5%, 5/3) poorly graded Gravelly coarse sand wet	SP	NA	H _{nu} = 0.1 ppm BT = 50 cpm α = 0 cpm
86.5	1030	35					

NOTES

SEE Page 1

9-22-92
Background Levels
H_{nu} = 0 ppm
BT = 60 cpm
α = 0 cpm

9-23-92
Background Levels
H_{nu} = .1 ppm
BT = 50 cpm
α = 0 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602,0427	PROJECT NAME: RCAF Phase 1	
BORING NUMBER: 3435	COORDINATES:	DATE 9/23/92
ELEVATION:	GWL: Depth see p.1 Date/Time	DATE STARTED 9/15/92
ENGINEER/GEOLOGIST: K. Maxon, K. Geigert	Depth see p.1 Date/Time	DATE COMPLETED: 10/7/92
DRILLING METHODS: Cable Tool	PAGE 10 OF 14	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
90.0	103280 9/23/92	18 32	90.5 16	VERY DENSE LIGHT OLIVE BROWN (2.5y, 5/3) POORLY GRADED GRAVELLY COARSE SAND WLT	SP	N/A	H _u = .1 ppm B _y = 50 cpm α = 0 cpm
91.6	1545	42		VERY DENSE LIGHT OLIVE BROWN (2.5y, 5/3) WELL GRADED MED COARSE SAND WLT	SW	N/A	
95.0	103281 9/24/92	9 11	95.5 15	DENSE LIGHT OLIVE BROWN (2.5y, 5/3) WELL SORTED MED SAND WLT	SP	N/A	H _u = .1 ppm B _y = 50 cpm α = 0 cpm
96.5	950	32		DENSE LIGHT OLIVE BROWN (2.5y, 5/3) POORLY GRADED GRAVELLY COARSE SAND WLT	SP SW CRMH	N/A	
100	103293 9/24/92	12 27	17	VERY DENSE LIGHT OLIVE BROWN (2.5y, 5/3) WELL SORTED MED SAND WLT	SP	N/A	H _u = .1 ppm B _y = 50 cpm α = 0 cpm
101.5							
105.0							

NOTES

SEE Page 1

9/23/92
Background Levels

H_u = .1 ppm
B_y = 50 cpm
α = 0 cpm

9/24/92
Background Levels

H_u = .1 ppm
B_y = 50 cpm
α = 0 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase 1		
BORING NUMBER: 3435	COORDINATES:	DATE: 9-24-92	
ELEVATION:	GWL: Depth <i>see p. 1</i> / Date/Time	DATE STARTED: 1-5-92	
ENGINEER/GEOLOGIST: K. Marion, G. Geary	Depth <i>see p. 1</i> / Date/Time	DATE COMPLETED: 1/7/92	
DRILLING METHODS: Cable Tool	PAGE: 11	OF: 14	

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in. 1	RECOVERY (in. 1)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
105.0	103284 9-24-92 1525	9 23 30	18	Very dense light olive brown (2.54, 5/3) well sorted coarse sandy wet, trace gravel	SP	N/A	H _{sw} = .1 ppm B _x = 50 cpm α = 0 cpm
110.0	103285 9-24-92 1600	5 9 23	18	Dense light olive brown (2.54, 5/3) well sorted coarse sand with trace gravel, wet	SP	N/A	H _{sw} = .1 ppm B _x = 50 cpm α = 0 cpm
115.0	103286 9/25/92 1435	18 20 21	18	Dense light olive brown (2.54, 5/3) well sorted med sand with trace of fine gravel, wet	SP	N/A	H _{sw} = 3 ppm B _x = 50 cpm α = 0 cpm
116.5	103287 9/25/92 1530	5 19 32	14	Very dense light olive brown (2.54, 5/3) well sorted med sand with trace of fine gravel, wet	SP	N/A	H _{sw} = 3 ppm B _x = 50 cpm α = 0 cpm
118.0	103288 9/25/92 1700	13 15 16	18	Dense light olive brown (2.54, 5/3) well sorted med sand with trace of gravel, wet	SP	N/A	H _{sw} = 3 ppm B _x = 50 cpm α = 0 cpm
119.5	CONTINUE ON NEXT PAGE						

NOTES

see page 1

9/24/92
Background Levels
H_{sw} = .1 ppm
B_x = 50 cpm
α = 0 cpm

9/25/92
Background Levels
H_{sw} = 3 ppm
B_x = 50 cpm
α = 0 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <i>602, 04, 27</i>	PROJECT NAME: <i>RCRA Phase 1</i>	
BORING NUMBER: <i>3435</i>	COORDINATES:	DATE: <i>9/28/92</i>
ELEVATION:	GWL: Depth <i>See p. 1</i> Date/Time	DATE STARTED: <i>9/15/92</i>
ENGINEER/GEOLOGIST: <i>Kharion, K. G. 9/28</i>	Depth <i>See p. 1</i> Date/Time	DATE COMPLETED: <i>10/7/92</i>
DRILLING METHODS: <i>Cable Tool</i>		PAGE <i>12</i> OF <i>14</i>

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWSON SAMPLER PER 16 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
119.5	103289 9/28/92	9	12	Med Dense Light olive brown (2.5y, 5/3) well sorted medium sand with trace of gravel, wet	SP	N/A	H _{nu} = 0 ppm B _γ = 60 cpm α = 0 cpm
121.0	103291 9/28/92	10	18	Med Dense Dense Light olive brown (2.5y, 5/3) well sorted coarse sand with trace of gravel, wet	SP	N/A	H _{nu} = 0 ppm B _γ = 60 cpm α = 0 cpm
122.5	103292 9/28/92	6	13	Medium dense light olive brown (2.5y, 5/3) well sorted coarse sand with trace gravel, wet	SP	N/A	H _{nu} = 0 ppm B _γ = 60 cpm α = 0 cpm
124.0	103293 9/28/92	8	15	Same As Above	SP	N/A	H _{nu} = 0 ppm B _γ = 60 cpm α = 0 cpm
125.5							The blue clay was thought to be at 125 ft. We discovered it at 129 ft. A Shelby tube was driven at 129 ft. only 1 ft. could be sampled. This was not enough for a geotechnical analysis, so we saved it as an archive.
129.0	103295 9/28/92	N/A	12.5	stiff very dark gray (5y, 3/1) sandy clay with a little gravel, low plasticity, moist stiff dark gray (5y, 4/1) clay, medium plasticity, moist	CL	1.5	H _{nu} = 0 ppm Blue clay B _γ = 60 cpm α = 0 cpm
130.0							
131.0	103296 10-2-92	N/A	24	stiff dark gray (5y, 4/1) clay, medium plasticity, moist	CL	1.5	Drove 36" shelly tube 2 ft. into the blue clay.
133.0				Bottom of bore hole drilled to 131.0 ft. Drove Shelby tube 2 ft. to 133.0 ft.			

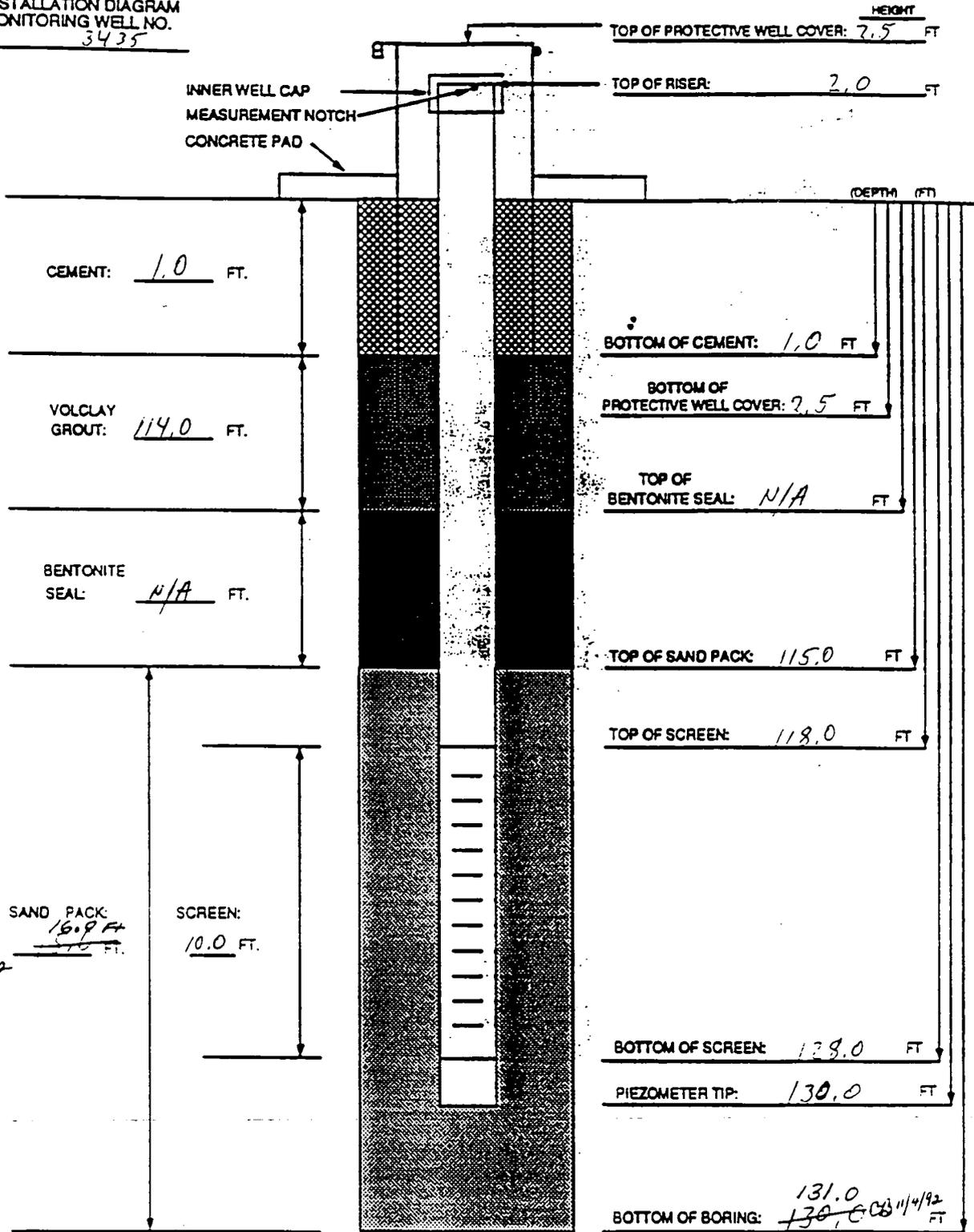
NOTES

see page 1

Background Levels
9/28/92
H_{nu} = 0 ppm
B_γ = 60 cpm
α = 0 cpm

FERNALD RVFS
INSTALLATION DIAGRAM
MONITORING WELL NO.
3435

INSTALLATION DATE: 10/17/92



BOREHOLE DIAMETER $1\frac{3}{4}$ IN.

MATERIALS USED

SAND TYPE AND QUANTITY: 430 Sand / 20-50 lb bags
 BENTONITE PELLETS (5-GALLON BUCKETS): N/A
 BAGS OF VOLCLAY GROUT: 28 - 50 lb bags
 AMOUNT OF CEMENT: 1.5 Bags
 AMOUNT OF WATER USED: 769 gal
 OTHER: 30 Soil Down Generator / 90cc water drum
 TASK: 602.04.27

NOTES:

- 1) RISER PIPE IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE. FLUSH-THREADED JOINTS.
 - 2) SCREEN IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE WITH 0.020 IN. SLOTS.
 - 3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
- GEOLOGIST/ENGINEER: Ken Grigel

- 4) WATER DEPTH AND DATE 625 FT / 11/22/92
- 5) TOP OF CASING IS SECURED WITH A STAINLESS STEEL CAP.
- 6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL.
- 7) WELL CASING HAS A PROTECTIVE COVER WITH PADLOCK.

PIEZOMETER INSTALLATION SHEET

PROJECT NAME RCRA Phase 1 FIELD ENG./GEO. Ken Geiger DATE 10/7/92
 PROJECT NO. 602 04 27 CHECKED BY C. Brown DATE 11/4/92
 BORING NO. 3435 DATE OF INSTALLATION 10/7/92
 PIEZOMETER NO. 3435
Monitoring well
BOREHOLE DRILLING

DRILLING METHOD <u>Cable Tool</u>	TYPE OF BIT <u>Hammer Percussion B.T</u>
DRILLING FLUID(S) USED: FLUID <u>Water</u> FROM <u>0.0 FT</u> TO <u>65.0 FT</u> FLUID <u>N/A</u> FROM <u>N/A</u> TO <u>N/A</u>	CASING SIZE(S) USED: SIZE <u>10.0 in ID</u> FROM <u>0.0</u> TO <u>131.0</u> <small>CG</small> SIZE <u>N/A</u> FROM <u>N/A</u> TO <u>N/A</u>

PIEZOMETER DESCRIPTION

TYPE <u>Monitoring Well</u>	RISER PIPE MATERIAL <u>316 stainless steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0 in</u>	RISER PIPE DIAMETERS: O.D. <u>4 3/8 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>1-2 ft 13-70 ft 1-1 ft</u>
AVERAGE SIZE OF PERFORATIONS <u>.020 in</u>	JOINING METHOD <u>Screw type - Flush Joint</u>
TOTAL PERFORATED AREA <u>10.0 ft</u>	<u>Threaded</u>

PROTECTION SYSTEM

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

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION (ft)	
	TOP	BOTTOM	TOP	BOTTOM
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 1.0	BOTTOM 115.0	TOP	BOTTOM
BENTONITE	TOP N/A	BOTTOM N/A	TOP	BOTTOM
SAND	TOP 115.0	BOTTOM 131.0 130.0	TOP	BOTTOM
GRAVEL	TOP N/A	BOTTOM N/A	TOP	BOTTOM
PERFORATED SECTION	TOP 118.0	BOTTOM 128.0	TOP	BOTTOM
PIEZOMETER TIP	CG 11/4 30.0 130.0			
BOTTOM OF BOREHOLE	CG 11/4 30.0 131.0			
GWL AFTER INSTALLATION	62.5 ft 10/19/92 49.45 ft			

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

REMARKS _____

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I Perimeter Well Installation
BORING NUMBER: 4398 ¹⁰⁻¹⁻⁹² 3398	COORDINATES: DATE 9-23-92
ELEVATION:	GWL: Depth 60.6 ft Date/Time 10-7-92
ENGINEER/GEOLOGIST: Michael Worley	DATE STARTED: 9-23-92
DRILLING METHODS: Cable Tool	DATE COMPLETED: 10-7-92
	PAGE 1 OF 12

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.00 IN	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%w)	REMARKS
1	0900 103160 9-23-92	3 7 8	14	Stiff (10YR, 4/6) dark yellowish brown silty clay with organics, low plasticity, slightly moist	CI	1.5	H _{nu} = 0 ppm B _s = 40 cpm COM 9-23-92
2	0910 103161 9-23-92	8 15 13	14	SAA - Hard	EI	4.0	H _{nu} = 0 ppm B _s = 40 cpm
3	0915 103162 9-23-92	16 14 12	10	Stiff (10YR, 5/8) yellowish brown clay with trace gravel, medium plasticity, slightly moist	CI	1.5	H _{nu} = 0 ppm B _s = 40 cpm
4	0920 103163 9-23-92	10 11 16	10	Stiff (10YR, 5/8) yellowish brown silty clay with trace sand, moist	CI	2.0	H _{nu} = 0 ppm B _s = 40 cpm
5	0923 103164 9-23-92	13 15 22	18	Hard (2.5Y 5/4) light olive brown, mottled with gray, silty clay with trace gravel, low plasticity, slightly moist	CI	4.5	H _{nu} = 0 ppm B _s = 40 cpm
6	0925 N/A 9-23-92	21 33 34	0	NO RECOVERY	N/A	N/A	N/A
7	1300 103165 9-23-92	6 11 21	14	Very stiff (2.5Y N5) gray clay with trace gravel, medium plasticity, moist	CI	2.5	H _{nu} = 0 ppm B _s = 40 cpm
8	1310 N/A 9-23-92	21 23 27	0	NO RECOVERY	N/A	N/A	N/A
9	1345 103166 9-23-92	21 23 29	18	Stiff (2.5Y, N5) gray clay with trace gravel, medium plasticity, slightly moist	CI	2.0	H _{nu} = 0 ppm B _s = 40 cpm
10	1410 103167 9-23-92	4 7 15	6	SAA	CI	2.0	H _{nu} = 0 ppm B _s = 40 cpm

NOTES:

Drilling Contractor Pennsylvania Drilling

Drilling Equipment Cable Tool - 72 Speed Star

Operator: Joe Barile
Mark Reind

SAA - SAME AS ABOVE
NA - NOT APPLICABLE

Background Readings { H_{nu} = 0 ppm
B_s = 40 cpm

* Samples collected per ASTM standard Penetration Test.
* All colors identified by Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602,04,27	PROJECT NAME: RCP N/A Waste
BORING NUMBER: 4398 3398	COORDINATES:
ELEVATION:	GWL: Depth 60.6 Date/Time: 10-7-92
ENGINEER/GEOLOGIST: Michael Worley	DATE COMPLETED:
DRILLING METHODS: Cable Tool	PAGE: 07

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWSON SAMPLER PER 100mm	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
16	1420 103165 9-23-92	19 50 .5	14	Very stiff (2.54, N4) dark gray silty clay, trace gravel, low plasticity, moist	CI	2.5	H _{nu} = 0 ppm β _δ = 40 cpm
17	1440 N/A	50 .5	0	NO RECOVERY	N/A	N/A	H _{nu} = 0 ppm β _δ = 40 cpm
19	1515 103169 9-23-92	50 .4	5	Very dense (2.54, N51) gray clayey gravel, non plastic, moist	GC	N/A	H _{nu} = 0 ppm β _δ = 40 cpm
20	1600 103170	11 13	3	medium dense, SAA	GC	N/A	H _{nu} = 9 ppm β _δ = 40 cpm
21	1640 103171 9-23-92	13 7 12	5	SAA	GC	N/A	H _{nu} = 0 ppm β _δ = 40 cpm
23	0830 103172 9-24-92	13 7 19	15	Stiff (2.54, N51) gray clay, trace gravel, low plasticity, moist	CI	1.5	H _{nu} = 0 ppm β _δ = 40 cpm
25	0845 103173 9-24-92	14 27 42	15	SAA - top 8 inches --- Bottom 7 inches, Very dense (2.54, 5/4) light olive brown well graded sand, trace gravel, dry	CI SW	1.5 N/A	H _{nu} = 0 ppm β _δ = 40 cpm Base of fill
26				Samples will be taken at 5 FT. intervals starting at 29.5 FT.			
27							
28							
29							
30				see page 3 for classification			29.5 to 31.0

NOTES:
 Drilling Contractor Pennsylvania Drilling
 Drilling Equipment 72 speed star
 Driller: Joe Barile
Mark Rebold

SAA - SAME AS ABOVE
 NA - NOT APPLICABLE
 Background { H_{nu} = 0 ppm
 Readings { β_δ = 40 cpm

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

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602,04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 4348 ¹⁰⁻¹⁻⁹² 3398	COORDINATES:	DATE 9-24-92
ELEVATION:	GWL: Depth 60.6 FT Date/Time 10-7-92	DATE STARTED: 9-23-92
ENGINEER/GEOLOGIST: Michael Worley	Depth	Date/Time
DRILLING METHODS:	PAGE 3	OF 12

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0:1.0	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%F)	REMARKS
31	0940 (03174) 9-24-92	47 50/3	16	Very dense (2.54, 5/4) well graded coarse sand, trace gravel, slightly moist <i>W 4-24-92 light olive brown</i>	SW	N/A	H _{nu} = 0 ppm B _g = 40 cpm
32							
33							
34							
35	1105 103175 9-24-92	8 19 21	12	Dense, SAA	SW	N/A	H _{nu} = 0 ppm B _g = 40 cpm
36							
37							
38							
39							
40	1310 103176 9-24-92	25 21 22	15	Dense (2.54, 5/4) light olive brown poorly graded medium fine sand, slightly moist	SP	N/A	H _{nu} = 0 ppm B _g = 40 cpm
41							
42							
43							
44							
45				See page 4 for description from 44.5 - 46.0			

NOTES:
 Drilling Contractor Pennsylvania Drilling
 Drilling Equipment 72 speedstar
 Driller: Joe Barile
Mark Rebold
 SAA - SAME AS ABOVE
 NA - NOT APPLICABLE
 Background { H_{nu} = 0 ppm
 B_g = 40 cpm
 * Samples collected per ASTM standard Penetration Test
 * All colors identified by the Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I
BORING NUMBER: 4398 ¹⁰⁻¹⁻⁹² 3398	COORDINATES: DATE 9-24-92
ELEVATION:	GWL: Depth 60.6 FT Date/Time 10-7-92 DATE STARTED: 9-23-92
ENGINEER/GEOLOGIST: Michael Worley	Depth Date/Time DATE COMPLETED: 10-7-92
DRILLING METHODS: Cable Tool	PAGE 4 OF 12

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0 IN	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
46	1840 108177 9-24-92	50 5	5	Very dense (2.54, 4/4) olive brown poorly graded sand, trace gravel, moist	SP	N/A	H _{nu} = 0 ppm B _s = 40 cpm
47							
48							
49							
50	1600 103173 9-24-92	13 37 29	14	Very dense (2.54, 5/5) light olive brown well graded gravel, trace sand, moist	GM	N/A	H _{nu} = 0 ppm B _s = 40 cpm
51							
52							
53							
54							
55	1650 102179 9-24-92	19 50 13	12	Very dense, SAA	GM	N/A	H _{nu} = 0 ppm B _s = 40 cpm
56							
57				Samples at even foot, 5 foot intervals from this point.			
58							
59				WATER LEVEL ▽			
60							

NOTES:

Drilling Contractor Pennsylvania Drilling
 Drilling Equipment 72 Speedstar
 Driller: Joe Banile
Mark Rebold

SAA - SAME AS ABOVE
 NA - NOT APPLICABLE

Background { H_{nu} = 0 ppm
 B_s = 40 cpm
 102

* Samples collected per ASTM Standard Penetration Test
 * All colors identified by the Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 1002.04.27	PROJECT NAME: RCRA Chase I	DATE: 9-26-92
BORING NUMBER: 4-98 10-1-92 3398	COORDINATES:	DATE: 9-25-92
ELEVATION:	GWL: Depth 60.6 FT Date/Time 10-7-92	DATE STARTED: 9-25-92
ENGINEER/GEOLOGIST: Michael Werlen	Depth Date/Time	DATE COMPLETED: 10-7-92
DRILLING METHODS: Cable Tool		PAGE 5 OF 12

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10 IN	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY STATE	REMARKS
61	0860 103181 4-25-92	13 23 25	12	Dense (2.54, 5/3) light olive brown well graded gravel, trace sand wet	GW	N/A	H _{nu} = 0 ppm β _s = 40 cpm
62							
63							
64							
65							
66	0950 103182 9-25-92	50 .4	18	Very dense, SAA	GW	N/A	H _{nu} = 0 ppm β _s = 40 cpm
67							
68							
69							
70							
71	1100 103183 4-25-92	15 13 15	18	Medium dense, SAA	GW	N/A	H _{nu} = 0 ppm β _s = 40 cpm
72							
73							
74							
75							

NOTES:
 Drilling Contractor Pennsylvania Drilling
 Drilling Equipment 72 Speed Star
 Driller: Joe Banile
Mark Rebold

SAA - SAME AS ABOVE
 NA - NOT APPLICABLE
 Background { H_{nu} = 0 ppm
 β_s = 40 cpm
 103

* Samples collected per ASTM Standard Penetration Test
 * All colors identified by the Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 102.04.27	PROJECT NAME: ECR A Phase I		
BORING NUMBER: 11298 ¹⁰⁻¹⁻⁹² 3398	COORDINATES:	DATE: 9-25-92	
ELEVATION:	GWL: Depth 60.6 FT Date/Time 10-7-92	DATE STARTED: 9-23-92	
ENGINEER/GEOLOGIST: Michael Werley	Depth	Date/Time	DATE COMPLETED: 10-7-92
DRILLING METHODS: Cable Tool	PAGE: 6		OF 12

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10 IN	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ISPT)	REMARKS
76	1450 103185 9-25-92	21 37 35	18	Very dense (2.54, 5/4) light olive brown well graded sand, trace gravel, wet	SW	N/A	H _{nu} = 0 ppm β _γ = 40 cpm
77							
78							
79							
80							
81	1500 103186 9-25-92	24 30 39	18	SAA	SW	N/A	H _{nu} = 0 ppm β _γ = 40 cpm
82							
83							
84							
85							
86	1645 103187 9-25-92	35 50 3	14	SAA	SW	N/A	H _{nu} = 0 ppm β _γ = 40 cpm
87							
88							
89							
90							

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: 72 Speed Star

Driller: Joe Parile
Mark Reynolds

SAA - SAME AS ABOVE
NA - NOT APPLICABLE

Background: { H_{nu} = 0 ppm
β_γ = 40 cpm

* Samples collected per ASTM Standard Penetration Test
* All colors identified by the Munsell Color Chart

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 429-10-1-92 3398	COORDINATES:	DATE: 9-28-92
ELEVATION:	GWL: Depth 60.6 FT Date/Time 10-7-92	DATE STARTED: 9-28-92
ENGINEER/GEOLOGIST: Michael Wierken	Depth: Date/Time:	DATE COMPLETED: 10-7-92
DRILLING METHODS: Cable Tool	PAGE 7 OF 12	

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10 IN	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
91	0945 103188 9-28-92	4 4 11	16	Medium dense (2.54, 5/4) light olive brown well graded coarse sand, trace gravel, wet	SW	N/A	H _{nu} = 0 ppm B _σ = 40 cpm
92							
93							
94							
95							
96	1100 103184 9-28-92	11 17 23	18	Dense (2.54, 5/2) grayish brown well graded, coarse sand, trace gravel, wet	SW	N/A	H _{nu} = 0 ppm B _σ = 40 cpm
97							
98							
99							
100							
101	1350 103141	9 13 17	18	Medium dense, SAA	SW	N/A	H _{nu} = 0 ppm B _σ = 40 cpm
102							
103							
104							
105							

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: 72 Standard Star

Driller: Joe Barile
Mark Rebold

SAA - SAME AS ABOVE
NA - NOT APPLICABLE

Background { H_{nu} = 0 ppm
B_σ = 40 cpm

* Samples collected per ASTM Standard Penetration Test
* All colors identified by the Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Chase I
BORING NUMBER: 426 ¹⁰⁻¹⁻⁹² 3398	COORDINATES:
ELEVATION:	GWL: Depth 60.6 FT Date/Time 10-7-92
ENGINEER/GEOLOGIST: Michael Werlen	Depth Date/Time
DRILLING METHODS: Cable Tool	PAGE 8 OF 12

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10 IN	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY	REMARKS
106	1515 103142 4-28-92	12 33 49	18	Dense (2.54, 4/2) dark grayish brown well graded coarse sand, trace gravel, wet	SW	N/A	H _{nu} = 0 ppm β _s = 40 cpm
107							
108							
109							
110							
111	1545 103143 4-28-92	12 15 14	13	Medium dense, SAA	SW	N/A	H _{nu} = 0 ppm β _s = 40 cpm
112							
113							
114							
115	0830	21		Dense, SAA			H _{nu} = 0 ppm β _s = 40 cpm
116	103144 4-24-92	26 17	18		SW	N/A	H _{nu} = 0 ppm β _s = 40 cpm
117							
118							
119							
120							

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: 2" rod star

Driller: Joe Barile
Mark Rebold

SAA - SAME AS ABOVE
NA - NOT APPLICABLE

Background { H_{nu} = 0 ppm
β_s = 40 cpm

* Samples collected per ASTM Standard Penetration Test
* All colors identified by the Munsell Color Chart

106

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Chase I	
BORING NUMBER: 11293 ¹⁰⁻¹⁻⁹² 3398	COORDINATES:	DATE: 9-29-92
ELEVATION:	GWL: Depth 40.6 FT Date/Time 10-7-92	DATE STARTED: 9-29-92
ENGINEER/GEOLOGIST: Michael Worken	Depth: Date/Time:	DATE COMPLETED: 10-7-92
DRILLING METHODS: Cable Tool	PAGE: 9	OF: 12

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10.1 IN	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
121	0850 N/A 9-29-92	3 4 9	10	Medium dense (2.54, 4/2) dark grayish brown poorly graded medium sand, trace gravel, wet	SP	N/A	H _{nu} = 0 ppm B _σ = 40 cpm Sample used for screen analysis
122							
123							
124							
125	1630	19					
126	N/A 9-29-92	24 35	18	Very dense, SAA	SP	N/A	H _{nu} = 0 ppm B _σ = 40 cpm Sample used for screen analysis
127							
128							
129							
130	1650	21					
131	N/A 9-29-92	25 31	5	SAA	SP	N/A	H _{nu} = 0 ppm B _σ = 40 cpm Sample used for screen analysis
132							
133							
134							
135							

NOTES:

Drilling Contractor: Pennsylvania Drilling
 Drilling Equipment: 72 Speed Star
 Driller: Joe Pavile
Mark Renald

SAA - SAME AS ABOVE
 NA - NOT APPLICABLE

{ H_{nu} = 0 ppm
 { B_σ = 40 cpm

* Samples collected per ASTM Standard Penetration Test
 * All colors identified by the Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 102.0427	PROJECT NAME: RCRA Charge I
BORING NUMBER: 11298 ¹⁰⁻¹⁻⁹² 3398	COORDINATES:
ELEVATION:	GWL: Depth 60.6 FT Date/Time 10-7-92
ENGINEER/GEOLOGIST: Michael Wozniak	Depth Date/Time
DRILLING METHODS: Cable Tool	PAGE 10 OF 12:

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10.0 FT	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%F)	REMARKS
136	0930 N/A 9-30-92	28 35 42	18	Very dense (2.54, 5/2) grayish brown well graded sand, trace gravel, wet	SW	N/A	H _{nu} = 0 ppm B _s = 40 cpm Sample used for Screen analysis
137							
138							
139							
140	1020	23		SAA			
141	103197 9-30-92	50 /4	12		SW	N/A	H _{nu} = 0 ppm B _s = 40 cpm Gravel is rubble size
142							
143							
144							
145	1500	27		Very dense (2.54, 5/2), SAA			
146	103198 9-30-92	29 36	18		SW	N/A	H _{nu} = 0 ppm B _s = 40 cpm
147				Bottom of sampling at 146.5 FT. Bottom of boring at 150.0 FT.			

NOTES:

Drilling Contractor Pennsylvania Drilling
 Drilling Equipment 72 Speed Star
 Driller: Joe Parile
Jeff Pontier

SAA - SAME AS ABOVE
 NA - NOT APPLICABLE

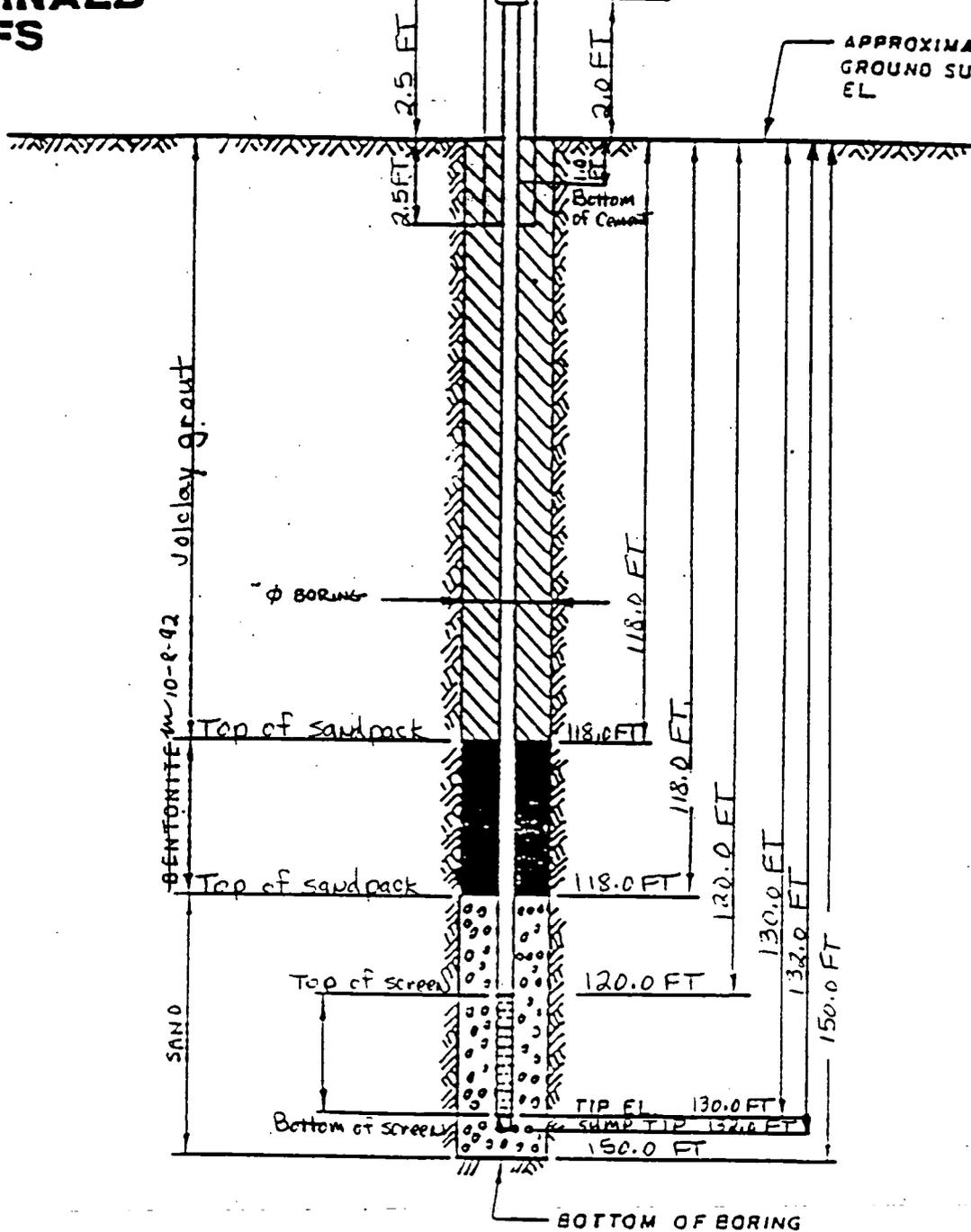
{ H_{nu} = 0 ppm
 { B_s = 40 cpm

* Samples collected per ASTM Standard Penetration Test
 * All colors identified by the Munsell Color Chart

**FERNALD
RI/FS**

PROTECTIVE RISER CASING HINGED COVER WITH PADLOCK

APPROXIMATE EXISTING
GROUND SURFACE
EL



DRAWING NUMBER
CHECKED BY
APPROVED BY
DRAWN BY
10-8-92

NOTES:

1. RISER PIPE IS 4.0" 10. SCHEDULE PIPE, THREADED, FLUSH-JOINTED.
2. SCREEN IS 4.0" 1.0 316 PIPE CONTINUOUS SLOT SCREEN (0.020 IN. SLOT SIZE)
3. LOWER END OF SCREEN IS CAPPED. [with welded silt trap]
4. ELEVATION OF WATER LEVEL 60.6 FT
5. WATER LEVEL READING ON 10-7-92

INSTALLATION DETAILS
MONITORING WELL # 3398

PREPARED FOR

FMPC RI/ES

Materials used during well installation:

15 50lb. bags of 4/30 sand

36 50lb. bags of volclay grout

1100 gallons of water used during grouting and drilling procedures

316 stain steel pipe sections: 12-10.0 FT; 1-2.0 FT; 1-10.0 FT screen with 2.0 FT silt trap

PIEZOMETER INSTALLATION SHEET

PROJECT NAME RCRA Phase I FIELD ENG./GEO. Michael Worley DATE 10-7-92
 PROJECT NO. 602.04.27 CHECKED BY _____ DATE _____
 BORING NO. 3398
 PIEZOMETER NO. 3398 DATE OF INSTALLATION 10-7-92

BOREHOLE DRILLING

DRILLING METHOD <u>Cable Tool</u>	TYPE OF BIT <u>Hammer Percussion Bit</u>
DRILLING FLUID(S) USED:	CASING SIZE (S) USED:
FLUID <u>water</u> FROM <u>0.0 FT.</u> TO <u>100.0 FT.</u>	SIZE <u>10.0 in ID</u> FROM <u>0.0 FT</u> TO <u>150.0 FT</u>
FLUID <u>NA</u> FROM <u>-</u> TO <u>-</u>	SIZE <u>NA</u> FROM <u>-</u> TO <u>-</u>

PIEZOMETER DESCRIPTION

TYPE <u>Monitoring Well</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>12-10 FT, 1-2 FT.</u>
AVERAGE SIZE OF PERFORATIONS <u>0.020 in.</u>	JOINING METHOD <u>Screw type - flush joint</u>
TOTAL PERFORATED AREA <u>10.0 FT.</u>	<u>threaded</u>

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>5.0 FT</u>	OTHER PROTECTION <u>Hinged locking cover</u>
PROTECTIVE PIPE O.D. <u>10 3/4 in.</u>	<u>with padlock</u>

ITEM	DISTANCE ABOVE / BELOW GROUND SURFACE (FT)		ELEVATION ()	
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS: Vclay GROUT / <u>CEMENT</u> <u>SLURRY</u> <u>10-7-92</u> BENTONITE PELLETS SAND-4/30 GRAVEL-NONE USED	TOP	0.0	BOTTOM	1.0
	TOP	1.0	BOTTOM	118.0
	TOP	N/A	BOTTOM	N/A
	TOP	118.0	BOTTOM	132.0
	TOP	N/A	BOTTOM	N/A
PERFORATED SECTION	TOP	120.0	BOTTOM	130.0
PIEZOMETER TIP	132.0			
BOTTOM OF BOREHOLE	150.0			
GWL AFTER INSTALLATION	<u>62.8</u> <u>11-4-92</u> <u>62.9 FT. (TOP OF RISER)</u>			

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

REMARKS Cement placed from 0.0 to 1.0 FT to hold protective cover
in place.

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 6020427	PROJECT NAME: RCRA Phase 1	
BORING NUMBER: 2435	COORDINATES:	DATE 10/16/92
ELEVATION:	GWL: Depth 61.97m Date/Time 10/27/92	DATE STARTED 10/16/92
ENGINEER/GEOLOGIST: Ken Geiger	Depth Date/Time	DATE COMPLETED: 10/24/92
DRILLING METHODS: Cable Tool	PAGE 1 OF 7	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0				See Lithologic Description well 3435			
15'							

NOTES

Drilling Contractor: Pennsylvania Drilling
 Drilling Equipment: Cable Tool
 Driller: Dave Newman
 John Vandina

10/16/92
 Background Reading
 H₂O = 0 ppm
 O₂ = 66 cpm
 α = 0 cpm

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

10/19/92
 Background Reading
 H₂O = 0 ppm
 O₂ = 60-80 cpm
 α = 0 cpm

111

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 04.27	PROJECT NAME: RCRA Phase 1	
BORING NUMBER: 2435	COORDINATES:	DATE: 10/19/92
ELEVATION:	GWL: Depth <i>see p. 1</i> Date/Time	DATE STARTED: 10/16/92
ENGINEER/GEOLOGIST: Ken Geiger	Depth Date/Time	DATE COMPLETED: 10/27/92
DRILLING METHODS: Cable Tool	PAGE 2 OF 7	

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 IN	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15'				SEE PAGE 1			
30'							

NOTES: See page 1

10/19/92
Background Readings
H₂O = 0 ppm
pH = 6.0-9.0 ppm
n = 0 cpm

112

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER. <i>602.04.27</i>		PROJECT NAME. <i>RCHA Phase 1</i>	
BORING NUMBER. <i>2435</i>		COORDINATES:	DATE <i>10/19/92</i>
ELEVATION:		GWL: Depth <i>see p. 1</i> Date/Time	DATE STARTED: <i>10/16/92</i>
ENGINEER/GEOLOGIST. <i>Ken Geiger</i>		Depth Date/Time	DATE COMPLETED: <i>10/27/92</i>
DRILLING METHODS: <i>Cable Tool</i>			PAGE <i>3</i> OF <i>7</i>

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 IN	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
				<i>See Page 1</i>			

45'

NOTES	<i>See page 1</i>	Background Readings <i>10/19/92</i> H _{me} = 0 ppm B _γ = 60-80 cpm α = 0 cpm	Background Readings <i>10/20/92</i> H _{me} = .1 ppm B _γ = 60-80 cpm α = 0 cpm	113
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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04 27	PROJECT NAME: RCHA Phase 1	
BORING NUMBER: 2435	COORDINATES:	DATE: 10/20/92
ELEVATION:	GWL: Depth see p. 1 Date/Time	DATE STARTED: 10/16/92
ENGINEER/GEOLOGIST: Ken Geringer	Depth Date/Time	DATE COMPLETED: 10/27/92
DRILLING METHODS: Cable Tool	PAGE 4 OF 7	

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
				See page 1			

5'

60'

NOTES: See page 1

Background Readings
10/20/92
H_{nu} = 11 p/m
B_f = 60 cpm
K = 0 cpm

114

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER. <i>6020427</i>	PROJECT NAME. <i>Rcra Phase I</i>		
BORING NUMBER. <i>2435</i>	COORDINATES:	DATE <i>10/21/92</i>	
ELEVATION:	GWL: Depth <i>see p. 1</i> Date/Time		DATE STARTED: <i>10/14/92</i>
ENGINEER/GEOLOGIST. <i>Ken Geiger</i>	Depth	Date/Time	DATE COMPLETED: <i>10/17/92</i>
DRILLING METHODS: <i>Cable Tool</i>	PAGE <i>5</i>		<i>7</i>

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
				<i>see page 1</i>			
				<i>W.L. = 61.97 ft</i>			
				<i>Bottom of Bore Hole - 72.0 ft.</i>			

NOTES

see page 1

Background Readings

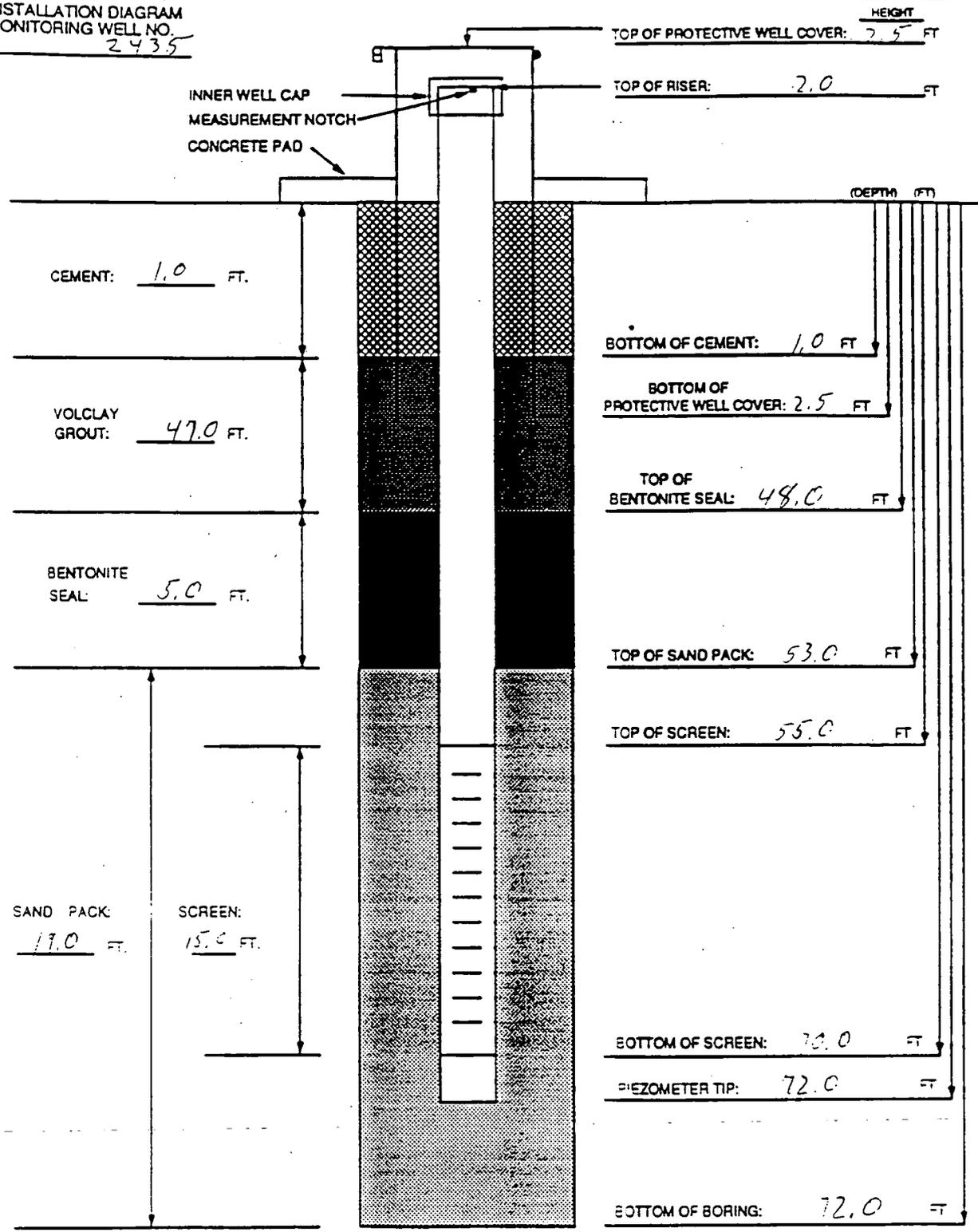
Hsu = 0 ppm

Bz = 60-80 ppm

L = 0 ppm

FERNALD R/VFS
INSTALLATION DIAGRAM
MONITORING WELL NO.
2435

INSTALLATION DATE: 10/27/92



BOREHOLE DIAMETER 10 3/4 IN.

MATERIALS USED

SAND TYPE AND QUANTITY: 430 S. sand / 20-50 lb bags
 BENTONITE PELLETS (5-GALLON BUCKETS): 5 buckets
 BAGS OF VOLCLAY GROUT: 9-50 lb bags
 AMOUNT OF CEMENT: 1.5 bags
 AMOUNT OF WATER USED: 247 gal
 OTHER: 12 Soil Drums Grout
 TASK: 102 04 27

NOTES:

- 1) RISER PIPE IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE. FLUSH-THREADED JOINTS.
- 2) SCREEN IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE WITH 0.020 IN. SLOTS.
- 3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
- 4) WATER DEPTH AND CATE 61.97 FT / 61.97
- 5) TOP OF CASING IS SECURED WITH A STAINLESS STEEL CAP.
- 6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL
- 7) WELL CASING HAS A PROTECTIVE COVER WITH PADLOCK.

GEOLOGIST/ENGINEER: Kon Geisler

PIEZOMETER INSTALLATION SHEET

PROJECT NAME RCRA Phase 1 FIELD ENG./GEO. Ken Geiger DATE 10/29/92
 PROJECT NO. 602 04 27 CHECKED BY C. Bauer DATE 11/04/92
 BORING NO. 2435
 PIEZOMETER NO. 2435 DATE OF INSTALLATION 10/27/92
Monitoring Well

BOREHOLE DRILLING

DRILLING METHOD <u>Cable Tool</u>	TYPE OF BIT <u>Hammer Percussion T</u>
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID <u>Water</u> FROM <u>0.0ft</u> TO <u>61.97</u>	SIZE <u>10.0 in ID</u> FROM <u>0.0</u> TO <u>72.0</u>
FLUID <u>N/A</u> FROM <u>N/A</u> TO <u>N/A</u>	SIZE <u>N/A</u> FROM <u>N/A</u> TO <u>N/A</u>

PIEZOMETER DESCRIPTION

TYPE <u>Monitoring Well</u>	RISER PIPE MATERIAL <u>316 Stainless Steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0 in</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>5.10ft 1.5ft 2.26ft 1.5ft</u>
AVERAGE SIZE OF PERFORATIONS <u>.020 in</u>	JOINING METHOD <u>ScREW TYPE - Flush Joint</u>
TOTAL PERFORATED AREA <u>15.0 ft</u>	<u>Threaded</u>

PROTECTION SYSTEM

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

ITEM	DISTANCE ABOVE / BELOW GROUND SURFACE (ft)		ELEVATION (ft)	
	TOP	BOTTOM	TOP	BOTTOM
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS: <u>CEMENT GROUT/SLURRY</u>	TOP	0.0	BOTTOM	1.0
	TOP	1.0	BOTTOM	48.0
	TOP	48.0	BOTTOM	53.0
	TOP	53.0	BOTTOM	72.0
BENTONITE	TOP	48.0	BOTTOM	53.0
SAND	TOP	53.0	BOTTOM	72.0
GRAVEL	TOP	N/A	BOTTOM	N/A
PERFORATED SECTION	TOP	55.0	BOTTOM	70.0
PIEZOMETER TIP	72.0			
BOTTOM OF BOREHOLE	72.0			
GWL AFTER INSTALLATION	61.97			

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

REMARKS _____

117

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: 602..04.27	PROJECT NAME: RCRA Phase I	DATE: 9/18/92
BORING NUMBER: 4424	COORDINATES:	DATE STARTED: 9/19/92
ELEVATION:	GWL: Depth 96.7 ft Date/Time 10/7/92	DATE COMPLETED: 10/15/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth: Date/Time:	PAGE: 1 OF 21
DRILLING METHODS: Cable Tool		

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER FOOT	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%SF)	REMARKS
1	10225 10227 91912	12	8	V. Soft 2.5% (4%) Light yellowish brown clayey silty, w/ organics no plasticity, dry	CI	3.28	H ₂ O = 0 ppm BS = 20 cpm
2	10227 10228 91912	16 14	11	Hard 2.5% (4%) Olive yellow silty clay, no plasticity dry	CI	14.5	H ₂ O = 0 ppm BS = 60 cpm
3	10230 10229 91912	16 23	14	Hard 2.5% (4%) Olive yellow, silty clay, no plasticity, dry	CI	4.5	H ₂ O = 0 ppm BS = 60 cpm
4	10231 10232 10233	17 18	15	SAA	CI	4.0	H ₂ O = 0 ppm BS = 60 cpm
5	10234 10235 91912	19 21	15	Hard 2.5% (4%) Olive yellow mottled w/ gray silty clay w/ gravel. No plasticity, dry	CI	14.5	H ₂ O = 0 ppm BS = 60 cpm
6	10236 10237 10238	11 13	0	No Recovery	NA	NA	H ₂ O = NA BS = NA
7	91912 10239 10240	20 11	11	Hard 10% (15%) yellowish brown mottled w/ gray silty clay w/ some gravel, low plasticity, slightly moist	CI	4.0	H ₂ O = 0 ppm BS = 60 cpm
8	10241 10242 91912	21 13	15	SAA	CI	4.5	H ₂ O = 0 ppm BS = 60 cpm
9	91912 10243 10244	17 16	0	No Recovery	NA/NA	NA	H ₂ O = NA BS = NA
10	10245 10246 91912	18 13	16	V. Soft 2.5% (4%) Gray granular clay, low plasticity, slightly moist	CI	2.25	H ₂ O = 0 ppm BS = 20 cpm

NOTES: Pennsylvania Drilling SAA - Same as Above
 Drilling Contract: _____
 Drilling Equipment: 42 Cyclone NA - Not Applicable
 Driller: Craig Coulter
 Kevin Myers Samples collected per ASTM standard penetration test

Colors identified using Munsell Color Chart

Background: H₂O = 0 ppm BS = 40 cpm - 60 cpm

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 4424	COORDINATES:	DATE: 9/19/92
ELEVATION:	GWL: Depth see p. / Date/Time	DATE STARTED: 9/19/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 10/13/92
DRILLING METHODS: Cable Tool	PAGE: 2	OF 21

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.00 ft	RECOVERY 1.00 ft	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY % (SI)	REMARKS
16	10285 91919	0-6	0	stiff, 2.5 (NBS) Gray granular clay, low plasticity, slightly moist.	cl	1.5	HNU = 0 ppm BS = 400 ppm
17	10286 10288	0-1	0	stiff, 2.5 (NBS) gray granular clay, low plasticity, slightly moist.	cl	1.25	HNU = 0 ppm BS = 600 ppm
18	10287 10289	0-1	0	SAA	cl	1.5	HNU = 0 ppm BS = 400 ppm
19	10290 10292	0-1	0	SAA, medium stiff	cl	.75	HNU = 0 ppm BS = 600 ppm
20	10291 10293	0-1	0	SAA, stiff	cl	1.5	HNU = 0 ppm BS = 400 ppm
21	10294 10296	0-1	0	SAA, stiff	cl	1.5	HNU = 0 ppm BS = 400 ppm
22	10295 10297	0-1	0	SAA, stiff	cl	1.5	HNU = 0 ppm BS = 400 ppm
23	10298 10300	0-1	0	SAA, stiff	cl	1.5	HNU = 0 ppm BS = 400 ppm
24	10299 10301	0-1	0	SAA, v. stiff	cl	2.0	HNU = 0 ppm BS = 400 ppm
25	10302 10304	0-1	0	SAA	cl	2.25	HNU = 0 ppm BS = 400 ppm
26	10303 10305	0-1	0	SAA, stiff	cl	1.25	HNU = 0 ppm BS = 600 ppm
27	10306 10308	0-1	0	SAA	cl	1.5	HNU = 0 ppm BS = 400 ppm

NOTES: Pennsylvania Drilling SAA - Same as Above
 Drilling Contract: 42 Cyclone NA - Not Applicable
 Drilling Equipment: Craig Coulter
 Driller: Kevin Myers
 Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 4424	COORDINATES:	DATE 9/15/92
ELEVATION:	GWL: Depth See p. 1 Date/Time	DATE STARTED: 9/9/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 10/15/92
DRILLING METHODS: Cable Tool	PAGE 4	OF 21

DEPTH FT	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.00 FT	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
46	102954 9/15/92	17 22	17	V. Stiff. 2.5Y(N5) Gray sandy granully clay, low plasticity, moist	CI	2.5	H ₂ O = 0 ppm R ₂ = 60 cpm
47	102955 9/15/92	20 32	14	SAA	CI	2.25	H ₂ O = 0 ppm R ₂ = 40 cpm
48	102956 9/15/92	16 27 36	18	SAA	CI	2.5	H ₂ O = 0 ppm R ₂ = 60 cpm
49	102957 9/15/92	16 28 20	8	V. Stiff. 2.5Y(N5) Gray sandy granully clay, low plasticity, moist.	CI	2.5	H ₂ O = 0 ppm R ₂ = 60 cpm
50	102958 9/15/92	7 13	0	No Recovery	NA	NA	H ₂ O = NA R ₂ = NA
51	102959 9/15/92	17 30	12	V. Stiff. 2.5Y(N5) gray sandy granully clay, low plasticity moist	CI	2.25	H ₂ O = 0 ppm R ₂ = 60 cpm
52	102960 9/15/92	7 12 22	16	SAA	CI	2.0	H ₂ O = 0 ppm R ₂ = 60 cpm
53	102961 9/15/92	8 12 16	14	SAA	CI	2.0	H ₂ O = 0 ppm R ₂ = 60 cpm
54	102962 9/15/92	4 8 13	18	Stiff. 2.5Y(N5) gray clay med. plasticity, moist.	CI	1.5	H ₂ O = 0 ppm R ₂ = 60 cpm
55	102963 9/15/92	20 50/2	9	TOP 2" SAA V. Dense. 10YR(5/6) yellowish brown, clayey silt, moist	MI	NA	H ₂ O = 0 ppm R ₂ = 60 cpm

NOTES: Pennsylvania Drilling SAA - Same as Above
 Drilling Contract: 42 Cyclone NA Not Applicable
 Drilling Equipment: Craig Couiter
 Driller: Kevin Myers
 Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 4424	COORDINATES:	DATE: 9/16/92
ELEVATION:	GWL: Depth <i>See p.1</i> Date/Time	DATE STARTED: 9/9/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 10/15/92
DRILLING METHODS: Cable Tool	PAGE: 5	OF 21

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0 FT	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY TEST	REMARKS
61	100B 100F13 91162	28 28 33	8	V. Dark 2.5y (S14), light brown brown, silty sand, poorly graded, dry	SP	NA	HNU = 0ppm BB = 400pm
62				Begin sampling every 5ft. See next page			HNU = NA BB = NA
							HNU = NA BB = NA
							HNU = NA BB = NA
							HNU = NA BB = NA
							HNU = NA BB = NA
							HNU = NA BB = NA
							HNU = NA BB = NA
							HNU = NA BB = NA
							HNU = NA BB = NA
							HNU = NA BB = NA
							HNU = NA BB = NA

NOTES:

Drilling Contract: Pennsylvania Drilling SAA - Same as Above

Drilling Equipment: 42 Cyclone NA - Not Applicable

Driller: Craig Coulter

Kevin Myers Samples collected per ASTM standard penetration test

Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 4424	COORDINATES:	DATE 9/16/92
ELEVATION:	GWL: Depth see p. 1 Date/Time	DATE STARTED: 9/19/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 10/15/92
DRILLING METHODS: Cable Tool	PAGE 1	OF 21

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 100mm	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
66.5	1115 1029164 9/16/92	50/3	75	V. Dense, 2.5y (5/4) Light olive brown, med. grain sand, poorly graded, dry	SP	NA	H ₂ O = 0 ppm S ₂ = 100 gph
70	1305 1029165 9/16/92	15 20 25	7	SAA, dense	SP	NA	H ₂ O = 0 ppm S ₂ = 100 gph
75	1345 1029166 9/16/92	7 50/3	75	SAA, v. dense.	SP	NA	H ₂ O = 0 ppm S ₂ = 100 gph

NOTES:

Drilling Contract: Pennsylvania Drilling SAA - Same as Above

Drilling Equipment: 42 Cyclone NA - Not Applicable

Driller: Craig Coulter

Kevin Myers Samples collected per ASTM standard penetration test

Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 4424	COORDINATES:	DATE: 9/17/92
ELEVATION:	GWL: Depth <small>see p. 1</small> Date/Time	DATE STARTED: 9/9/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 10/15/92
DRILLING METHODS: Cable Tool	PAGE: 8	OF 21

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0m	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
97.5	10274 10271 10272	16 27 35	J	V. Dense. 2.54 (1 1/4) Light olive brown, gravel w/ sand, wet well graded	GW SP CA	NA	HNU = 0 ppm BS = 40 ppm
98.5	10275 10271 10272	32 40 50	J	V. Dense. 2.54 (1 1/4) Light olive brown, med grain sand, with gravel, wet poorly graded	SP	NA	HNU = 0 ppm BS = 40 ppm
99.5	10275 10271 10272	30 35 45	J	V. Dense. 2.54 (1 1/4) Light olive brown, gravel w/ sand, wet poorly graded	SP GW CA	NA	HNU = 2 ppm BS = 40 ppm

NOTES: Pennsylvania Drilling SAA - Same as Above
 Drilling Contract: _____
 Drilling Equipment: 42 Cyclone NA - Not Applicable
 Driller: Craig Coulter
 Kevin Myers Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I		
BORING NUMBER: 4424	COORDINATES:	DATE: 9/17/92	
ELEVATION:	GWL: Depth <i>See p. 1</i> Date/Time	DATE STARTED: 9/19/92	
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 9/18/92	
DRILLING METHODS: Cable Tool	PAGE: 9		OF: 21

DEPTH	SAMPLE TYPE & NO	BLOOMSON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TVE)	REMARKS
102.7	1125 102916	10 16	10	Dense. 2.84 (5/4) Light olive brown coarse sand w/ gravel, well graded, wet	SW	NA	H _{N6} = 0 ppm B ₆ = 60 ppm
111.5	1125 102916	10 16	10				
118	10885 102916	10 16	10	M. Dense. 2.84 (6/11) Gray med. grain sand with gravel, well graded, wet	SP	NA	H _{N6} = 0 ppm B ₆ = 40 ppm
116.5	1125 102916	10 16	10				
120	10288 102917	10 16	10	V. Dense. SAA	SP	NA	H _{N6} = 0 ppm B ₆ = 40 ppm
121.5	1125 102916	10 16	10				

NOTES: Pennsylvania Drilling SAA - Same as Above

Drilling Contract: 42 Cyclone NA - Not Applicable

Drilling Equipment: Craig Couiter

Driller: Kevin Myers Samples collected per ASTM standard penetration test

Colors identified using Munsell Color Chart

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602..04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 4424	COORDINATES:	DATE 9/17/92
ELEVATION:	GWL: Depth see p. 1 Date/Time	DATE STARTED: 9/19/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 10/1/92
DRILLING METHODS: Cable Tool	PAGE 10	OF 21

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 100mm	RECOVERY (%)	DESCRIPTION	UNCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
129.5	102970 9/18/92	10	5	M. Dense 5y(4/1) Gray med grading sand w/ gravel, poorly graded, well	SP	NA	H ₂ O = 0 ppm BS = 40 cpm
131.5	102971 9/18/92	15	18	SAA	SP	NA	H ₂ O = 0 ppm BS = 60 cpm
135	102980 9/18/92	13	14	SAA	SP	NA	H ₂ O = 0 ppm BS = 40 cpm

NOTES:

Drilling Contract: Pennsylvania Drilling SAA - Same as Above

Drilling Equipment: 42 Cyclone NA - Not Applicable

Operator: Craig Coulter

Kevin Myers Samples collected per ASTM standard penetration test

Colors identified using Munsell Color Chart **127**

VISUAL CLASSIFICATION OF SOILS

393

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I		
BORING NUMBER: 4424	COORDINATES:	DATE: 9/22/92	
ELEVATION:	GWL: Depth <i>see p. 1</i> Date/Time		DATE STARTED: 9/9/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth	Date/Time	DATE COMPLETED: 9/14/92
DRILLING METHODS: Cable Tool	PAGE: 11		OF 21

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 100mm	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%SF)	REMARKS
141.5	1110 102881 9/22/92	7 13 16	18	Med. Dense 34(4/1) Gray, med. fine sand w/ gravel, poorly graded, well	SP	NA	HMC = 0 ppm RF = 60 ppm
146.5	1350 102883 9/22/92	13 21	13	SAA Bottom 2" large gravel	SP	NA	HMC = 0 ppm RF = 10 ppm
151.5	1350 102884 9/22/92	13 15	13	V. Dense 34(4/1) Gray coarse sand w/ some fines & gravel, well graded, well	SP	NA	HMC = 0 ppm RF = 60 ppm

NOTES:

Drilling Contract: Pennsylvania Drilling SAA - Same as Above

Drilling Equipment: 42 Cyclone NA - Not Applicable

Driller: Craig Coulter

Kevin Myers Samples collected per ASTM standard penetration test

Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 4424	COORDINATES:	DATE: 9/22/92
ELEVATION:	GWL: Depth <i>See p.</i> / Date/Time	DATE STARTED: 9/18/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth / Date/Time	DATE COMPLETED: 10/15/92
DRILLING METHODS: Cable Tool	PAGE: 12	OF 21

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 MIN	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
14.5	0900 102975 912375	10 20 22	10	Dense Bk (bl) Gray coarse sand w/ gravel, well graded, wet	SW	NA	HNU = 0 ppm BS = 15 cpm
16	0935 102976 912375	11 13 22	10	SAA	SW	NA	HNU = 0 ppm BS = 40 cpm
16.5	1445 0973 912375	0	0	NO RECOVERY	NA	NA	

NOTES: Pennsylvania Drilling SAA - Same as Above
 Drilling Contract: _____
 Drilling Equipment: 42 Cyclone NA - Not Applicable
 Driller: Craig Coulter
 Kevin Myers Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27 PROJECT NAME: RCRA Phase I
 BORING NUMBER: 4424 COORDINATES: DATE 9/25/92
 ELEVATION: GWL: Depth 56.1 Date/Time DATE STARTED: 9/19/92
 ENGINEER/GEOLOGIST: D. O'Brien Depth Date/Time DATE COMPLETED: 10/14/92
 DRILLING METHODS: Cable Tool PAGE 15 OF 21

DEPTH FT	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER FOOT	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%SF)	REMARKS
198	1505 102995 9/25/92	75 75	10	V. Dense, 5Y (4/1) Gray med grain coarse to fine sand, well graded, wet	SW	NA	H ₂₅ = 0 ppm R ₂₅ = 60 cpm
199	1625 102996 9/25/92	7 9 15	14	m. dense 5Y (6/1) Gray, med. grain to coarse gravelly sand, well graded, wet	SW	NA	H ₂₅ = 0 ppm R ₂₅ = 60 cpm
200	1700 102997 9/25/92	8 12 15	18	m. dense 5Y (6/1) Gray, coarse to fine to medium sand w/ trace gravel, well graded, wet	SW	NA	H ₂₅ = 0 ppm R ₂₅ = 60 cpm
201.5	0925 102998 9/28/92	20 43 50	15	V. Dense, SAA	SW	NA	H ₂₅ = 0 ppm R ₂₅ = 60 cpm
202	0945 102999 9/28/92	23 24 50	12	V. Dense, 5Y (6/1) Gray medium sand w/ trace gravel, well graded, wet	SW	NA	H ₂₅ = 0 ppm R ₂₅ = 60 cpm
204	1050 103000 9/25/92	25 32 49	15	SAA	SW	NA	H ₂₅ = 0 ppm R ₂₅ = 60 cpm
				Resume Eff. sampling see next page			H ₂₅ = NA R ₂₅ = NA
							H ₂₅ = NA R ₂₅ = NA
							H ₂₅ = NA R ₂₅ = NA
							H ₂₅ = NA R ₂₅ = NA

NOTES: Pennsylvania Drilling SAA - Same as Above
 Drilling Contract: 42 Cyclone NA - Not Applicable
 Drilling Equipment: Craig Couiter
 Operator: Kevin Myers
 Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: 602..04.27	PROJECT NAME: RCRA Phase I		
BORING NUMBER: 4424	COORDINATES:	DATE: 9/28/92	
ELEVATION:	GWL: Depth Sec. p. 1	DATE STARTED: 9/9/92	
ENGINEER/GEOLOGIST: D. O'Brien	Depth	Date/Time	DATE COMPLETED: 10/15/92
DRILLING METHODS: Cable Tool	PAGE: 17		OF 21

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 100mm	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ISPT)	REMARKS
14.1	1645	1	100				
15.25	1645	13	0	No Recovery	NA	NA	
22.5		17	0				
23.0	125	50	0	No Recovery	NA	NA	
23.5		62	0	Begin continuous sampling see next page.			
23.5							
23.5							

NOTES:

Drilling Contract: <u>Pennsylvania Drilling</u>	SAA - Same as Above
Drilling Equipment: <u>42 Cyclone</u>	NA - Not Applicable
Driller: <u>Craig Coulter</u>	
<u>Kevin Myers</u>	Samples collected per ASTM standard penetration test
	Colors identified using Munsell Color Chart 134

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602..04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 4424	COORDINATES:	DATE: 10/1/92
ELEVATION:	GWL: Depth See p. / Date/Time	DATE STARTED: 9/19/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 10/1/92
DRILLING METHODS: Cable Tool		PAGE 19 OF 21

DEPTH FT	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.00 IN	RECOVERY IN	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY % (SI)	REMARKS
246.5	1570 103011 1102	16 24 50	18	V. Dense. 5Y(10) Gray fine to med. grained sand, poorly sorted, well-sorted good to 100% 11/4/92	SP	NA	HMU = 0 ppm SS = 100 ppm
251.5	1510 103012 1110	17 1/3	2	Weathered limestone	NA	NA	
				Boring terminated at 250 ft.			

NOTES

Drilling Contract: Pennsylvania Drilling SAA - Same as Above

Drilling Equipment: 42 Cyclone NA - Not Applicable

Driller: Craig Coulter

Kevin Myers Samples collected per ASTM standard penetration test

Colors identified using Munsell Color Chart

PIEZOMETER INSTALLATION SHEET

PROJECT NAME DCRA Phase 1 FIELD ENG./GEO. D.O'Brien DATE 10/15/92
 PROJECT NO. 10204'27 CHECKED BY _____ DATE _____
 BORING NO. 4424
 PIEZOMETER NO. 4424 DATE OF INSTALLATION 10/15/92

BOREHOLE DRILLING

DRILLING METHOD <u>Cable Tool</u>	TYPE OF BIT <u>Churn Bit</u>
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID <u>Water</u> FROM <u>0.0 FT</u> TO <u>1000 FT</u>	SIZE <u>100 in ID</u> FROM <u>0.0 FT</u> TO <u>250.0 FT</u>
FLUID _____ FROM _____ TO _____	SIZE _____ FROM _____ TO _____

PIEZOMETER DESCRIPTION

TYPE <u>Monitoring Well</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>23-10 FT</u> <u>1-2 FT</u>
AVERAGE SIZE OF PERFORATIONS <u>0.010 in</u>	JOINING METHOD <u>Flush joint</u>
TOTAL PERFORATED AREA <u>10.0 FT</u>	<u>Threaded</u>

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>5.0 FT</u>	OTHER PROTECTION <u>buried locking cap</u>
PROTECTIVE PIPE O.D. <u>1.314 in</u>	<u>with padlock</u>

ITEM	DISTANCE ABOVE / BELOW GROUND SURFACE (FT)		ELEVATION ()	
	TOP	BOTTOM	TOP	BOTTOM
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.2			
BOREHOLE FILL MATERIALS:				
GROUT / SLURRY	TOP 0.0	BOTTOM 227.5	TCP <u>227.5</u>	BOTTOM
BENTONITE	TOP 0.0	BOTTOM 227.5	TOP	BOTTOM
SAND	TOP 227.5	BOTTOM 240.0	TOP	BOTTOM
GRAVEL	TOP 227.5	BOTTOM 240.0	TOP	BOTTOM
PERFORATED SECTION	TOP 230.0	BOTTOM 240.0	TOP	BOTTOM
PIEZOMETER TIP	242.0			
BOTTOM OF BOREHOLE	245.0			
GWL AFTER INSTALLATION				

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES NO
 WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES NO 137

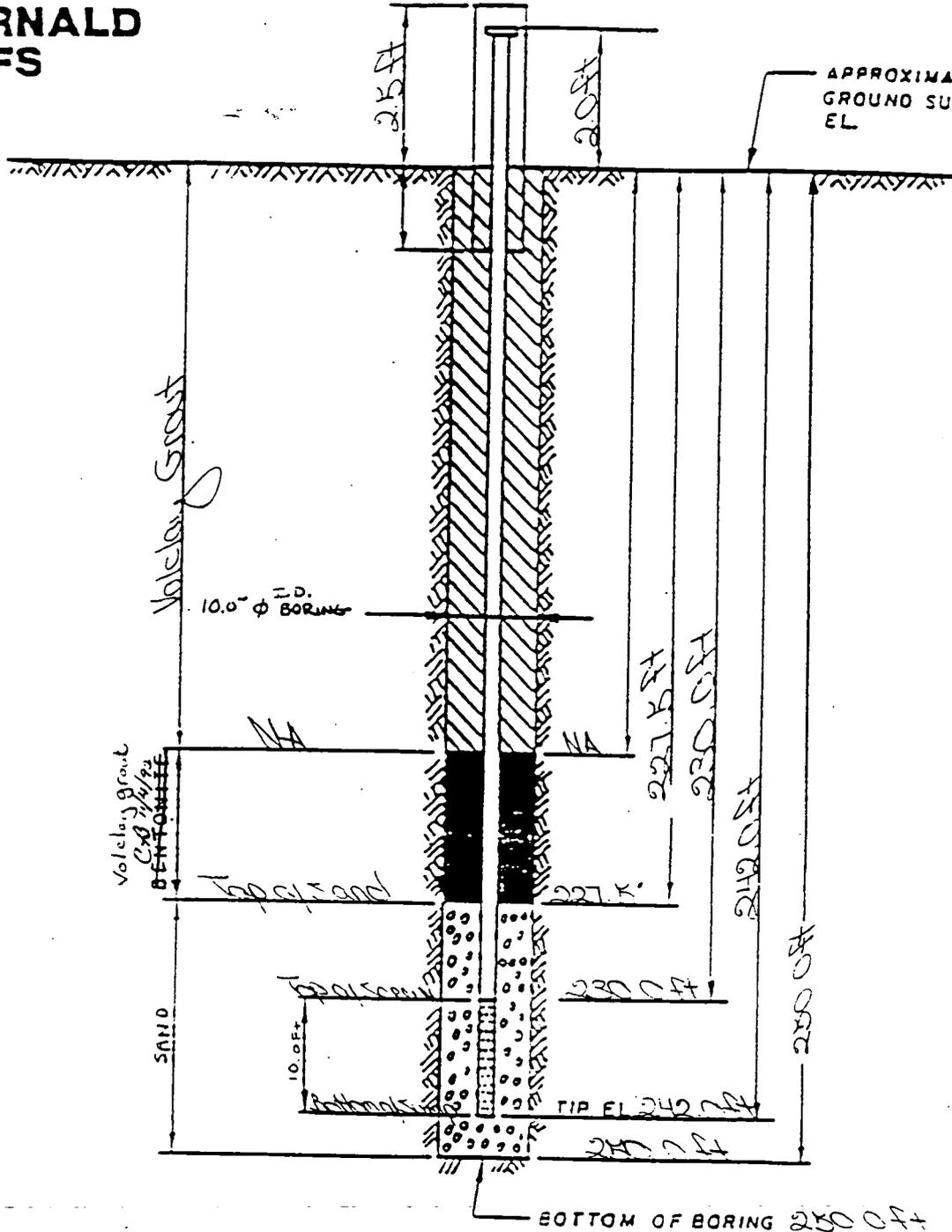
REMARKS _____

2021

**FERNALD
RI/FS**

PROTECTIVE RISER CASING

APPROXIMATE EXISTING
GROUND SURFACE
EL



DRAWING NUMBER	
CHECKED BY	
APPROVED BY	
DRAWN BY	

NOTES:

1. RISER PIPE IS 40 IN 10. SCHEDULE PIPE, THREADED, FLUSH-JOINTED.
 2. SCREEN IS 40 IN 1.0 BISS PIPE CONTINUOUS SLOT SCREEN (0.010 IN. SLOT SIZE)
 3. LOWER END OF SCREEN IS CAPPED.
 4. ELEVATION OF WATER LEVEL 226.7 FT
 5. WATER LEVEL READING ON 10/11/92
- Materials Used During Installation
- 22 bags of 10120 sand
- 75 bags of volebay grout
- 3000 gallons of water

INSTALLATION DETAILS
MONITORING WELL # 4424

PREPARED FOR

AMPC 5/1/92

138

37500 drums 2 water drums

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: 602.0427	PROJECT NAME: RCRA Phase I
BORING NUMBER: 3733	COORDINATES:
ELEVATION: MK	GWL: Depth 96.5 Date/Time 10/28/92
ENGINEER/GEOLOGIST: B. Yeardley	DATE STARTED: 10/2/92
DRILLING METHODS: Cable Tool	DATE COMPLETED: 10/5/92
	PAGE 1 OF 11

DEPTH ft.	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%FC)	REMARKS
1	1545 104601 10/2/92	9 10 7	5	Soft 7.5 YR (S13) Brown, silty clay, low plasticity, dry	OL	.25	HNU = 0 ppm αβ = 60 cpm
2	1530 104602 10/2/92	9 8 9	10	Firm 10YR (6/6) brownish yellow silty clay, low plasticity, moist	CL	1.5	HNU = 0 ppm αβ = 60 cpm
3	1555 104603 10/2/92	4 5 8	12	Soft 10YR (6/8) brownish yellow silty clay low plasticity, moist to silty clay, med plasticity, moist	CL	.5 to 4.0	HNU = 0 ppm αβ = 60 cpm
4	1600 104604 10/2/92	10 11 13	18	V. hard 10YR (8/6) yellow brown silty clay w/ gravel, med. plasticity, moist	CL	4.5	HNU = 0 ppm αβ = 60 cpm
5	1630 104605 10/2/92	6 9 15	15	Hard 10YR (8/4) yellowish brown, silty clay w/ gravel, med plasticity, moist	CL	2.5	HNU = 0 ppm αβ = 60 cpm
6	1635 104606 10/2/92	12 9 7	0	No Recovery	NA	NA	NA
7	1650 104607 10/2/92	9 21 17	17	Hard 10YR (8/4) yellowish brown w/ gray 2.5Y (S11) streaks silty clay w/ fine - coarse gravel, med plasticity, moist	CL	3.25	HNU = 0 ppm αβ = 60 cpm
8	1700 104608 10/2/92	9 18 28	18	Hard 5YR (3/3) dk brown and 5YR (5/1) Gray silty clay w/ fine to coarse gravel, med. plasticity, moist	CL	3.75	HNU = 0 ppm αβ = 60 cpm
9	1100 104609 10/5/92	7 25 33	14	Hard 2.5Y (5/1) Gray silty clay w/ gravel, med. plasticity, moist	CL	2.75	HNU = 0 ppm αβ = 60 cpm
10	1110 104610 10/5/92	7 21 28	16	Hard, 2.5Y (5/1) Gray silty, gravelly clay, med. plasticity, moist	CL	2.5	HNU = 0 ppm αβ = 60 cpm

NOTES:

Drilling Contractor: Pennsylvania Drilling SAA = Same as above

Drilling Equipment: 38 C-dome NA = Not Applicable

Driller: Chris Coulter
David Holmes

Samples collected per ASTM standard penetration test
Colors identified using Munsell Color Chart

55

VISUAL CLASSIFICATION OF SOILS 3931

PROJECT NUMBER: <u>602.0427</u>		PROJECT NAME: <u>RCRA Phase I</u>	
BORING NUMBER: <u>3733</u>		COORDINATES:	
ELEVATION:		DATE: <u>10/5/92</u>	DATE STARTED: <u>10/2/92</u>
ENGINEER/GEOLOGIST: <u>B. Yeardley</u>		DATE/TIME:	DATE COMPLETED: <u>10/5/92</u>
DRILLING METHODS: <u>Cable Tool</u>		PAGE <u>2</u> OF <u>11</u>	

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in. 1	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
16	1120	12	NA	No Recovery	NA	NA	HNU = 0 ppm NA αβ = 60 cpm NA
16.5	10/5/92	19 23					
17	1130	33		Very Dense 2.5YR(5/1) Gray silty sand, wet	SM	NA	HNU = 0 ppm αβ = 60 cpm
17	104611	22	17				
18	10/5/92	47					
19	1310	12		Hard 2.5YR(5/1) Gray, silty clay w/ gravel, med. plasticity, moist	CL	2.0	HNU = 0 ppm αβ = 60 cpm
19	104612	17	14				
19	10/5/92	23					
20	1726	6		Hard 2.5YR(5/1) Gray, silty gravelly clay, med. plasticity, moist	CL	3.0	HNU = 0 ppm αβ = 60 cpm
20	104013	22	9				
20	10/5/92	36					
21	1335	12		V. Dense 2.5YR(5/1) Gray, clayey silty, low plasticity, moist	ML	NA	HNU = 0 ppm αβ = 60 cpm
22	104614	19	15	Hard 2.5YR(5/1) Gray, silty clay w/ gravel, med. plasticity, moist	CL	2.5	
22	10/5/92	33					
23	1445	5		SAA	ML	NA	HNU = 0 ppm αβ = 60 cpm
23	104615	12	12				
24	10/5/92	14					
24	1500	6		No Recovery	NA	NA	HNU = 0 ppm αβ = NA
25	10/5/92	15	0				
26	1515	4		Firm 2.5YR(5/1) Gray, silty, gravelly clay, med. plasticity, moist	CL	1.75	HNU = 0 ppm αβ = 60 cpm
26	104616	5	13				
27	10/5/92	9					
27	1530	12		Firm 2.5YR(5/1) Gray, silty gravelly clay, med. plasticity, moist	CL	1.25	HNU = 0 ppm αβ = 60 cpm
28	104617	10	17				
28	10/5/92	7					
29	1540	5		No recovery	NA	NA	HNU = NA αβ = NA
29	10/5/92	11	0				
30	10/5/92	14					

NOTES:

Drilling Contractor: Pennsylvania Drilling
 Drilling Equipment: 34 Cyclone
 Driller: Chris Coviter
David Holmes

SAA = Same as above
 NA = Not Applicable

140

Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>602.0427</u>		PROJECT NAME: <u>RCRA Phase I</u>	
BORING NUMBER: <u>3733</u>		COORDINATES:	
ELEVATION:		GRL: Depth	Date/Time
ENGINEER/GEOLOGIST: <u>B. Yearley</u>		Depth	Date/Time
DRILLING METHODS: <u>Cable Tool</u>		PAGE <u>3</u>	OF <u>11</u>
		DATE <u>10/5/92</u>	
		DATE STARTED: <u>10/5/92</u>	
		DATE COMPLETED: <u>10/6/92</u>	

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
31	1550 104619 10/5/92	4 7 17	12	Firm 2.5Y(5/1) Gray, silty, gravelly clay, med plasticity, moist	CL	1.25	HNU 0 ppm dB 60 cpm
32	1655 104619 10/5/92	1 15 17	18	SAA	CL	1.75	HNU 0 ppm dB 60 cpm
33	1710 104620 10/5/92	9 9 17	18	SAA	CL	1.5	HNU 0 ppm dB 60 cpm
35	104621 1010 10/6/92	4	0	Stiff 2.5Y(5/1) Gray gravelly clay, low plasticity, moist	CI	1.8	HNU = 0 ppm dB = 40 cpm
36	104621 1010 10/6/92	5	0	No Recovery	NA	NA	
38	1025 104622 10/6/92	50	10	V stiff, 10YR5/6 yellowish brown gravelly clay. Bottom inch coarse-med grained sand, moist	CI	2.0	HNU = 0 ppm dB = 40 cpm
39	1080 104623 10/6/92	32	18	V. Dense 2.5Y(5/4) Light olive brown coarse sand with gravel, dry	SW	NA	HNU = 0 ppm dB = 40 cpm
41				Begin 5ft sampling			
42							
43							
44							
45							

NOTES:

Drilling Contractor Pennsylvania Drilling SAA = Same as above

Drilling Equipment 38 Cable NA = Not Applicable

Driller: Chris Carter 141

Daved Holmes Samples collected per ASTM standard penetration test

Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER <u>6020427</u>	PROJECT NAME <u>RCRA Phase I</u>	
BORING NUMBER <u>3733</u>	COORDINATES:	DATE <u>10/6/92</u>
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: <u>0/2/92</u>
ENGINEER/GEOLOGIST <u>B Yeardley</u>	Depth Date/Time	DATE COMPLETED: <u>10/27/92</u>
DRILLING METHODS <u>Cable Tool</u>	PAGE <u>4</u> OF <u>11</u>	

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in.	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (USF)	REMARKS
46.5	1440 104624 10/6/92	50/15	4	V. Dense light olive brown 2.5Y (5M) coarse sand & gravel, well sorted, dry By 11/4/92	SW	NA	HNU = 0ppm αβ = 60cpm
50	1500 104625 10/6/92	35 24 35	15	SAA	SW	NA	HNU = 0ppm αβ = 80cpm
55	1620 10/6/92	50/15	0	No Recovery	NA	NA	NA

NOTES

Drilling Contractor Pennsylvania Drilling
 Drilling Equipment 38 Cyclone
 Driller Chris Coulter
David Holmes

SAA - Same as above: **142**
 NA - Not Applicable

Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: 602.04.27		PROJECT NAME: RCRA Phase I	
BORING NUMBER: 424 3733		COORDINATES:	DATE: 10/16/92
ELEVATION:		GWL: Depth Date/Time	DATE STARTED: 10/2/92
ENGINEER/GEOLOGIST: D. O'Brien		Depth Date/Time	DATE COMPLETED: 10/17/92
DRILLING METHODS: Cable Tool			PAGE: 5 OF 11

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 IN	RECOVERY 1 IN	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
61.5	1345 104628 10/16/92	50	8	V-Dense 2.5Y (5/4) light olive brown brown coarse sand & gravel well sorted, dry graded 0.8/4/92	SU	NA	H ₂₅ = 0 ppm αβ = 60 ppm
65	1345 104627 10/7/92	59.5	5	V-Dense 2.5Y (5/4) light olive brown med sand, poorly graded, dry. Bottom 2 in poorly graded, gravel	SP	NA	H ₂₅ = 0 ppm αβ = 60 ppm
70	1405 104628 10/17/92	24 36 35	12	V-Dense 2.5Y (6/4) light yellowish brown, coarse gravelly sand, well graded, dry	SW	NA	H ₂₅ = 0 ppm αβ = 60 ppm

NOTES: Pennsylvania Drilling SAA - Same as Above

Drilling Contract: 3842 Cyclone NA - Not Applicable

Drilling Equipment: Craig Coulter

Driller: Kevin Myers Samples collected per ASTM standard penetration test

Chris Coulter Colors identified using Munsell Color Chart

David Holmes

143

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: 602..04.27	PROJECT NAME: RCRA Phase I
BORING NUMBER: 3733	COORDINATES:
ELEVATION:	DATE: 10/7/92
ENGINEER/GEOLOGIST: B. Yearley	GWL: Depth Date/Time DATE STARTED: 10/2/92
DRILLING METHODS: Cable Tool	Depth Date/Time DATE COMPLETED: 10/9/92
	PAGE 6 OF 11

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0 IN	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY	REMARKS
76.5	1530 104629 10/7/92	23 27 24	5	V. Dense 2.54 (S/4) light olive brown coarse sand and gravel, well graded, moist BSU 10/7/92	SW	NA	H _N U = 0 ppm αβ = 60 cpm
81.5	1600 104630 10/7/92	50/5	5	SAA	SW	NA	H _N U = 0 ppm αβ = 60 cpm
86.5	1915 104631 10/9/92	50/5	5	V. Dense 10.4R (S/6) yellowish brown gravel w/ sand and clay, well graded, moist	GW	MT	H _N U = 0 ppm αβ = 60 cpm

NOTES

Drilling Contract: Pennsylvania Drilling

Drilling Equipment: 34 - 42 Cyclone

Driller: Chris Coulter

Kevin Myers 10/8/92 Samples collected per ASTM standard penetration test

David Holmes 8/2/92 Colors identified using Munsell Color Chart

SAA - Same as Above
NA - Not Applicable

144

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER <u>602 04 27</u>	PROJECT NAME: <u>RCRA Phase I</u>		
BORING NUMBER <u>3733</u>	COORDINATES:	DATE <u>10/9/92</u>	
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: <u>10/8/92</u>
ENGINEER/GEOLOGIST <u>B Yeardley</u>	Depth	Date/Time	DATE COMPLETED: <u>10/27/92</u>
DRILLING METHODS: <u>Cable Tool</u>	PAGE <u>7</u>		OF <u>11</u>

DEPTH ft.	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
40	1060 104632	20 15	9	Med. Dense 2.5Y (5H) lt. olive brown fine to medium sand w/ gravel, well graded, wet	SW	NA	HNU = 0ppm αβ = 60cpm
91.5	104632	13					Water table found at 97', Hydro punch driven to 93.5
95	1420 104634	26 15	8	lt. olive brown Med. Dense 2.5Y (5H) medium to coarse gravelly sand, well graded, wet	SW	NA	HNU = 0ppm αβ = 60cpm
96.5		5					
100	1525 104635	24 21	12	Dense 2.5Y (5H) lt. olive brown, fine to coarse gravelly sand, well graded, wet	SW	NA	HNU = 0ppm αβ = 60cpm
101.5	104635	29					

NOTES

Drilling Contractor Pennsylvania Drilling
 Drilling Equipment 38 Cyclone
 Driller Chris Carter
David Holmes

SAA - Same as above
 NA - Not Applicable

145

Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER <u>602 04 27</u>	PROJECT NAME <u>RCRA Phase I</u>	
BORING NUMBER <u>3733</u>	COORDINATES	DATE <u>10/19/92</u>
ELEVATION:	GWL: Depth _____ Date/Time _____	DATE STARTED <u>10/12/92</u>
ENGINEER/GEOLOGIST <u>B. Yearley</u>	Depth _____ Date/Time _____	DATE COMPLETED: <u>10/12/92</u>
DRILLING METHODS <u>Cable Tool</u>		PAGE <u>8</u> OF <u>11</u>

DEPTH ft.	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
105	1630 104636	17 24	14	V. Dense 2.5Y(5/4) lt. olive brown, med to coarse gravelly sand, well graded, wet	SW	NA	HNU = 0 ppm dB = 60 cpm
106.5	10/5/92	35					
110	0955 104637	26 27	12	Dense 2.5Y(5/3) lt. olive brown, gravel w/ coarse sand, well graded, wet	GW	NA	HNU = 0 ppm dB = 60 cpm
111.5	10/12/92	21					
115	1100 104638	17 19	18	Dense 2.5Y(5/3) lt. olive brown, fine to coarse sandy gravel, well graded, wet	GW	NA	HNU = 0 ppm dB = 60 cpm
116.5	10/13/92	21					

NOTES

Drilling Contractor Pennsylvania Drilling SAA - Same as above **146**

Drilling Equipment 38 Cyclone NA - Not Applicable

Driller Chris Coulter
Dave Holmes

Samples collected per ASTM standard penetration test
Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER <u>6020427</u>	PROJECT NAME <u>RCRA Phase I</u>		
BORING NUMBER <u>3733</u>	COORDINATES:	DATE <u>10/13/92</u>	<u>2 Aug 11/92</u>
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: <u>10/13/92</u>
ENGINEER/GEOLOGIST <u>B. Yearley</u>	Depth	Date/Time	DATE COMPLETED: <u>10/14/92</u>
DRILLING METHODS <u>Cable Tool</u>	PAGE <u>9</u>		OF <u>11</u>

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in. 1	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (IS)	REMARKS
120	<u>1345</u> <u>104639</u> <u>10/13/92</u>	<u>45</u> <u>30</u> <u>25</u>	<u>4</u>	<u>V. Dense 2.5 (S13) fine to coarse sandy gravel, well graded, wet</u>	<u>GW</u>	<u>NA</u>	<u>HNU = 0 ppm</u> <u>±β = 60 cpm</u>
125							
125	<u>1430</u> <u>104641</u> <u>10/14/92</u>	<u>B37</u> with <u>1/2</u>	<u>0</u>	<u>No Recovery</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
130	<u>1515</u> <u>104641</u> <u>10/14/92</u>	<u>17</u> <u>21</u> <u>21</u>	<u>14</u>	<u>Dense 2.57 (S13) to olive brown med sand w/ fine to coarse gravel, well graded, wet</u>	<u>SW</u>	<u>NA</u>	<u>HNU = 0 ppm</u> <u>±β = 60 cpm</u>
135							

NOTES

Drilling Contractor Pennsylvania Drilling SAA - Same as above

Drilling Equipment 38 Cyclone NA - Not Applicable

Driller Chris Coulter David Holmes

Samples collected per ASTM standard penetration test
Colors identified using Munsell Color Chart

147

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER <u>602 04 27</u>	PROJECT NAME <u>RCRA Phase I</u>	
BORING NUMBER <u>3733</u>	COORDINATES	DATE <u>10/15/92</u> 11/1/92
ELEVATION: _____	GWL: Depth _____ Date/Time _____	DATE STARTED <u>10/15/92</u> 11/1/92
ENGINEER/GEOLOGIST <u>B. Yearley</u>	Depth _____ Date/Time _____	DATE COMPLETED <u>10/16/92</u>
DRILLING METHODS <u>Cable Tool</u>	PAGE <u>10</u> OF <u>11</u>	

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
135.0 136.5	<u>104642</u> <u>945</u> <u>10/15/92</u>	<u>37</u> <u>50/5</u>	<u>6</u>	<u>V. Dense 2.5Y (S/4) l. to olive brown med - coarse gravelly sand, well graded, wet</u>	<u>SW</u>	<u>NA</u>	<u>H₂O = 0 ppm</u> <u>d_β = 60 cpm</u>
140 141.5	<u>104643</u> <u>1015</u> <u>10/15/92</u>	<u>15</u> <u>21</u> <u>15</u>	<u>13</u>	<u>Dense 2.5Y (S/4) l. to olive brown med. gravelly sand, poorly graded, wet</u>	<u>SP</u>	<u>NA</u>	<u>H₂O = 0 ppm</u> <u>d_β = 60 cpm</u>
145 146.5	<u>1300</u> <u>10/10/92</u>	<u>100/4</u>	<u>0</u>	<u>No Recovery</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>

NOTES

Drilling Contractor Pennsylvania Drilling
 Drilling Equipment 38 cyclone
 Driller Chris Coulter
David Holmes

SAA - Same as above
 NA - Not Applicable

148

Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: <u>602.0427</u>		PROJECT NAME: <u>RCRA Phase I</u>	
BORING NUMBER: <u>3733</u>		COORDINATES:	
ELEVATION:		GILL: Depth	Date/Time
ENGINEER/GEOLOGIST: <u>B. Yearalen</u>		Depth	Date/Time
DRILLING METHODS: <u>Cable Tool</u>		DATE: <u>10/16/92</u> 2 Aug 11/11/92	
		DATE STARTED: <u>10/16/92</u> 29 Aug 11/11/92	
		DATE COMPLETED: <u>10/19/92</u>	
		PAGE	OF

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in. 1	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%SF)	REMARKS
150.0	1345	16		Dense 2.57 (S14) light olive brown med. gravelly sand, well graded, wet	SW	NA	H _N U = 0 ppm αβ = 60 cpm
151	104644 1011642	16 16	12				
152	1020 10446	50/6	5	V. Dense 2.57 (S14) light olive brown SAA	SW	NA	H _N U = 0 ppm αβ = 40 cpm
153	104142						
154	1045 1019132	17 15 5	3	Dense 2.57 (S14) light olive brown med grained sand w/ coarse gravel well graded, wet	SW	NA	H _N U = 0 ppm αβ = 40 cpm Sample used for Sieve Anal 7.5.1
155	1115 104647	21 37	18	V. Dense 2.57 (S14) light olive brown med grained gravelly sand, well graded, wet	SW	NA	H _N U = 0 ppm αβ = 40 cpm
156	1019157	50/5					
157	1340 10444 1019142	21 34 26	8	V. Dense 2.57 (S14) lt. olive brown, med gr. sand w/ coarse gravel, well graded, wet	SW	NA	H _N U = 0 ppm αβ = 40 cpm
158	1405 104649	30 39	10	V. Dense 2.57 (S14) lt. olive brown, med. gravelly sand, SAA, well graded, wet	SW	NA	H _N U = 0 ppm αβ = 40 cpm
159	101502	48					
160	1515 104650 1019142	50/14	5	V. Dense 2.57 (S14) SAA	SW	NA	H _N U = 0 ppm αβ = 40 cpm
161				(Drilled to 162.0)			
162				↓			
163							
164							
165							

NOTES:

Drilling Contractor: Pennsylvania Drilling SAA = Same as above

Drilling Equipment: 38 cyclone NA - Not Applicable

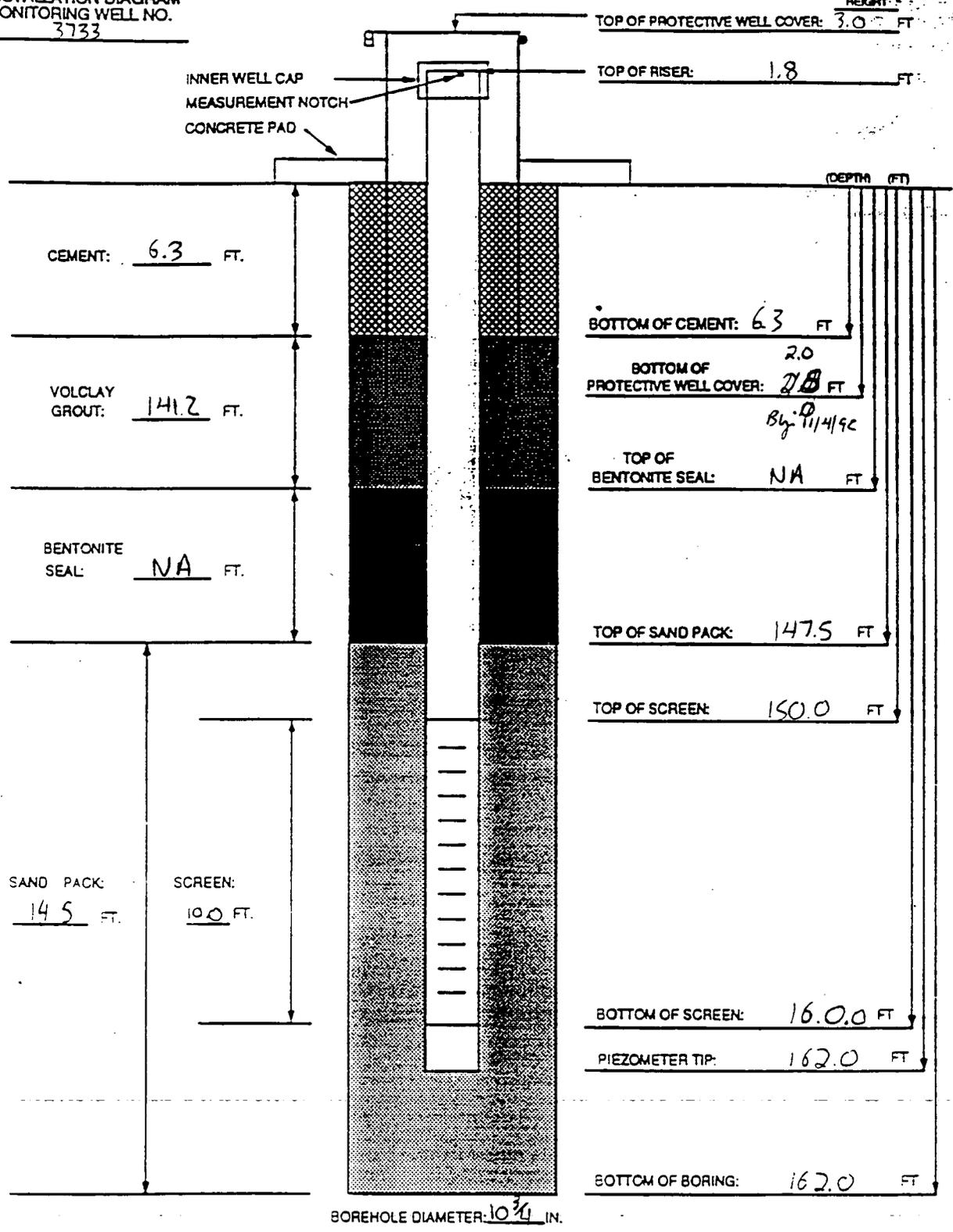
Driller: Chris Coulter

Davia Holmes Samples collected per ASTM standard penetration test

Colors identified using Munsell Color Chart

FERNALD RI/FS
 INSTALLATION DIAGRAM
 MONITORING WELL NO.
3733

INSTALLATION DATE: 10/28/92



BOREHOLE DIAMETER: 10 3/4 IN.

MATERIALS USED

SAND TYPE AND QUANTITY: 8 50lb bags of coarse
 BENTONITE PELLETS (5-GALLON BUCKETS): N/A
 BAGS OF VOLCLAY GROUT: 50 50lb bags
 AMOUNT OF CEMENT: 1 bag
 AMOUNT OF WATER USED: 1750 gal
 OTHER: 26 barrels of soil 1 barrels water
 TASK: 602 04.27

NOTES:

1) RISER PIPE IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE, FLUSH-THREADED JOINTS.
 2) SCREEN IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE WITH 0.020 IN. SLOTS.
 3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
 GEOLOGIST/ENGINEER: Brian Yearaley

4) WATER DEPTH AND DATE 86.5 FT / 10/28/92
 5) TOP OF CASING IS SECURED WITH A STAINLESS STEEL CAP.
 6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL
 7) WELL CASING HAS A PROTECTIVE COVER WITH PADLOCK.

PIEZOMETER INSTALLATION SHEET

PROJECT NAME RCRA Phase I FIELD ENG./GEO. Brian Yearnsley DATE 11/3/92
 PROJECT NO. 602 04.27 CHECKED BY _____ DATE _____
 BORING NO. 2430
 PIEZOMETER NO. 2430 DATE OF INSTALLATION 10/28/92

BOREHOLE DRILLING

DRILLING METHOD <u>Cable Tool</u>	TYPE OF BIT <u>Hammer Perc. on Bit</u>
DRILLING FLUID (S) USED: FLUID <u>Water</u> FROM <u>0.0</u> TO <u>87.0</u> FLUID <u>NA</u> FROM <u>-</u> TO <u>-</u>	CASING SIZE (S) USED: SIZE <u>10.75 in ID</u> FROM <u>0.0</u> TO <u>162.0</u> ft SIZE <u>NA</u> FROM <u>-</u> TO <u>-</u>

PIEZOMETER DESCRIPTION

TYPE <u>Monitoring Well</u>	RISER PIPE MATERIAL <u>316 Stainless Steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0 in ID</u>	RISER PIPE DIAMETERS: O.D. <u>4 3/8 in.</u> I.D. <u>4.0 in.</u>
PERFORATION TYPE: SLOTS <input checked="" type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>10.0 ft, 2 ft.</u>
AVERAGE SIZE OF PERFORATIONS <u>0.020 in</u>	JOINING METHOD <u>Screw type - flush joint threaded</u>
TOTAL PERFORATED AREA <u>10.0 ft.</u>	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>5.0 ft</u>	OTHER PROTECTION <u>Hinged locking cover w/ padlock</u>
PROTECTIVE PIPE O.D. <u>10 3/4 in</u>	

ITEM	DISTANCE ABOVE / BELOW GROUND SURFACE (ft)		ELEVATION ()	
TOP OF RISER PIPE	1.8			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.0			
BOREHOLE FILL MATERIALS: <u>Cement</u> <u>Voicely GROUT / SLURRY</u> By 11/3/92 <u>BENTONITE - NA</u> <u>SAND</u> <u>GRAVEL - N/A</u>	TOP <u>0.0</u>	BOTTOM <u>5.3</u>		
	TOP <u>5.3</u>	BOTTOM <u>14.75</u>	TCP	BOTTOM
	TOP <u>NA</u>	BOTTOM <u>NA</u>	TCP	BOTTOM
	TOP <u>14.75</u>	BOTTOM <u>162.0</u>	TCP	BOTTOM
	TOP <u>NA</u>	BOTTOM <u>NA</u>	TCP	BOTTOM
PERFORATED SECTION	TOP <u>150.0</u>	BOTTOM <u>160.0</u>	TCP	BOTTOM
PIEZOMETER TIP	162.0			
BOTTOM OF BOREHOLE	162.0			
GWL AFTER INSTALLATION	96.5 (from ground surface)			

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: 60250-23-12	PROJECT NAME: TYPICAL	DATE: 11/2/92
BORING NUMBER: 2-166	COORDINATES:	DATE:
ELEVATION:	GWL Depth: 63.75	Date/Time: 10/13/92
ENGINEER/GEOLOGIST: K. Payne	Depth: 63.92	Date/Time: 10/13/92
DRILLING METHODS: Cable Tool	PAGE 1 OF 1	

DEPTH (ft)	SAMPLE TYPE AND NO.	BLONSON'S SAMPLER DEPTH (IN)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY	REMARKS
1	104401 0810 9-23-92	3 7 11	12	Stiff (2.5Y, 5/3) mottled Lt. Olive Brown, Silty Clay, non plastic, slightly moist, with roots	CL	1.5	HNU = 0 ppm BX = 40-60 cpm
2	104402 0815 9-23-92	7 17 21	12	Very Stiff (10YR, 4/6) Dark Yellowish Brown, Silty Clay, non plastic, slightly moist, some mottling.	EL	4.0	HNU = 0 ppm BX = 40 cpm
4	104403 0850 9-23-92	15 19 20	16	Dense (2.5Y, 5/6) Lt. Olive Brown Clayey Silt, non plastic, slightly moist.	ML	N/A	HNU = 0 ppm BX = 40-60 cpm
5	104404 0900 9-23-92	21 25 20	17	Stiff (2.5Y, 5/4) Lt. Olive Brown, Silty Clay, low plasticity, slightly moist	CL	2.0	HNU = 1 ppm BX = 40 cpm
7	104405 0905 9-23-92	15 14 11	14	Stiff (2.5Y, 5/4) Lt. Olive Brown, Silty Clay, medium plasticity, moist	CL	1.5	HNU = 0 ppm BX = 40-60 cpm
8	104406 0910 9-23-92	10 26 28	18	Very Dense (2.5Y, 5/4) Lt. Olive Brown, Clayey Silt, non plastic, very moist	ML	1.0	HNU = 1 ppm BX = 20-40 cpm
10	104407 1430 9-23-92	1 3 6	14	Medium Stiff (2.5YR, N4/1) Dark Gray, Low plasticity, slightly moist, Silty Clay	CL	1.0	HNU = 0 ppm BX = 40-60 cpm
11	104408 1455 9-23-92	5 13 11	17	Medium Stiff (2.5YR, N4/1) Dark Gray, Silty Clay, Low plasticity, slightly moist.	CL	1.5	HNU = 1 ppm BX = 40-60 cpm
12	104409 1505 9-23-92	5 10 16	16	Stiff (2.5YR, N4/1) Dark Gray, Silty Clay, plastic, moist	CL	1.5	HNU = 1 ppm BX = 60-80 cpm
14	104410 1515 9-23-92	7 12 17	14	Stiff (2.5YR, N5/1) Gray, Silty Clay, medium plasticity, slightly moist	CL	1.0	HNU = 0 ppm BX = 40-60 cpm

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Cyclone RP 10-7-92 42

Driller: Bob Johnson
Bob Post

SAA - SAME AS ABOVE
NA - NOT APPLICABLE

Background Readings { HNU = 1 ppm
BX = 20-40 cpm } 152

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602-50-03-12	PROJECT NAME:
BORING NUMBER: 2166	COORDINATES:
ELEVATION:	DATE:
ENGINEER GEOLOGIST: K. Payne	DATE STARTED:
DRILLING METHODS: Cable Tool	DATE COMPLETED:
	PAGE: 0

DEPTH (ft)	SAMPLE TYPE	BLOWS ON SAMPLE	RECOVERY (%)	DESCRIPTION	UNCS SYMBOL	MEASURED CONSISTENCY	REMARKS
16	104411 1545 9-23-92	9 15 23	15	Very stiff (2.5YR, N5/1) Gray, Silty clay with trace gravel, medium plasticity, slightly moist	CL	2.0	H _{Nu} = 0 ppm β _γ = 60-80 cpm
17	104412 1555 9-23-92	10 15 19	14	S.A.A.	CL	3.0	H _{Nu} = 0 ppm β _γ = 20-40 cpm
19	104413 1645 9-23-92	12 17 19	14	Hard (5Y, 5/1) Gray, Silty Clay with trace gravel, medium plasticity, moist	CL	4.0	H _{Nu} = 1 ppm β _γ = 40-60 cpm
20	104414 0855 9-24-92	9 12 25	15	Dense (5Y, 5/1) Gray, Clayey silt with trace gravel, low plasticity, slightly moist	ML	3.5	H _{Nu} = 3 ppm β _γ = 60-80 cpm
22	104415 0910 9-24-92	9 15 28	16	Dense (5Y, 5/1) Gray, Clayey silt with trace gravel, low plasticity, slightly moist	ML	2.5	H _{Nu} = 0 ppm β _γ = 60-80 cpm
23	104416 0930 9-24-92	15 29 39	12	Very Dense (5Y, 5/1) Gray, Clayey silt with trace gravel, low plasticity, slightly moist	ML	N/A	H _{Nu} = 0 ppm β _γ = 40-60 cpm
25	104417 0945 9-24-92	1 10 17	5	Medium Dense (10YR, 4/4) Dark Yellowish Brown, Gravelly Sand, non-plastic, dry	SW	N/A	H _{Nu} = 0 ppm β _γ = 60-80 cpm
26				Next sample at 30 feet			
27				samples at 5 foot intervals			
28				from 25 feet through aquifer			
29							
30							

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Cyclone 43 KP 10-7-42 42

Driller: Bob Johnson
Bob Vost

SAA - SAME AS ABOVE
NA - NOT APPLICABLE

9/23/92 - Backarunas Readings { H_{Nu} = 1 ppm
β_γ = 20-40 cpm

9/24/92 - Backarunas Readings { H_{Nu} = 1 ppm
β_γ = 40-60 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602750-09-92	PROJECT NAME:
BORING NUMBER: 2	COORDINATES:
ELEVATION:	DATE STARTED:
ENGINEER/GEOLOGIST: K. Payne	DATE COMPLETED:
DRILLING METHODS: Cable tool	PAGE: 3 of 3

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER (100/30)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASUREMENTS (CONSISTENCY)	REMARKS
31	104418 1310 9-24-92	10 29 50	6	Very Dense (10YR, 3/4) Dk. Yellowish Brown well graded Gravelly Sand, non plastic, moist	SW	N/A 4Nu = 0 ppm βγ = 40-60 cpm	
32							
33							
34							
35							
36	104419 1500 9-24-92	15 42 50	17	Very Dense (2.5Y, 6/3) Lt. Yellowish Brown well graded Gravelly Sand, non plastic, moist	SW	N/A HNu = 1 ppm βγ = 80-100 cpm	
37							
38							
39							
40							
41	104420 1535 9-24-92	13 24 25	17	Dense (10YR, 4/3) Brown well graded sandy Gravel, non plastic very moist	SW	N/A HNu = 0 ppm βγ = 20-40 cpm	
42							
43							
44							

NOTES:

Drilling Contractor Pennsylvania Drilling
 Drilling Equipment Cyclone 43 ^{KP 7-72} 42
 Driller: Bob Johnson
Bob Vest

SAA - SAME AS ABOVE
 NA - NOT APPLICABLE

9/24/92 Background Readings { HNu = 2 ppm
 βγ = 0-60 cpm } 15!

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 02152	PROJECT NAME:
BORING NUMBER: 2152	COORDINATES:
ELEVATION:	DATE:
ENGINEER/GEOLOGIST:	DATE STARTED:
DRILLING METHODS:	DATE COMPLETED:
	PAGE: 11

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER MINUTE	RECOVERY (%)	DESCRIPTION	LIQ. LIMIT	MEASURED CONSISTENCY INDEX	REMARKS
46	104421 1600 9-24-92	15 75	12	Very Dense (2.57, 5/4) Lt. Olive Brown poorly graded medium sand with trace gravel, non plastic, moist	SP	N/A	HNU = 0 ppm BX = 20-45 cpm
47							
48							
49							
50							
51	104422 0950 9-25-92	32 45 50	13	Very Dense (101R, 5/4) Yellowish Brown poorly graded medium sand with trace gravel, non plastic, moist	SP	N/A	HNU = 0 ppm BX = 80-100 cpm
52							
53							
54							
55							
56	04423 1045 9-25-92	36 50	11	Very Dense (101R, 6A1) Light Yellowish Brown well graded coarse sand, non plastic, moist Dry	SW	N/A	HNU = 0 ppm BX = 40-60 cpm
57							
58							
59							
60							

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Cyclone 43^{RD 10-1-92} 425

Driller: Bob Johnson
Rob Yost

SAA - SAME AS ABOVE
NA - NOT APPLICABLE

9/24/92 Background LNU = 2 ppm
Readings BX = 40-60 cpm

155

9/25/92 Background LNU = 3 ppm
BX = 60-80 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.50:03.12	PROJECT NAME: [unclear] / One Month
BORING NUMBER: 2166	COORDINATES: [unclear]
ELEVATION: [unclear]	DATE: [unclear]
ENGINEER/GEOLOGIST: K Payne	DATE STARTED: 9/25/92
DRILLING METHODS: Cable Tool	DATE COMPLETED: [unclear]
	PAGE 5 OF 5

DEPTH (ft)	SAMPLE TYPE & NO	BLOWSON SAMPLER PER 100mm	RECOVERY (%)	DESCRIPTION	USES SYMBOL	MEASURED CONSISTENCY (SF)	REMARKS
61	104424 1430 9-25-92	28 50	12	Very Dense (2.5Y, 6/3) light yellowish brown well graded coarse gravelly sand, dry	SW	N/A	HNU = 0 ppm BX = 60-80 cpm
62				Ground Water Level			
63							
64							
65	104425 1540 9-25-92	14 49 50	16	Very Dense (10YR, 5/4) Yellowish Brown well graded coarse gravelly sand, wet	SW	N/A	HNU = 0 ppm BX = 80-100 cpm
66							
67							
68							
69							
70	104426 1440 9-25-92	32 50	11	Very Dense (10YR, 5/6) Yellowish Brown well graded gravel, wet	GW	N/A	HNU = 0 ppm BX = 80-100 cpm
71							
72							
73	104427 104428 104429 104430			Hydro Punch 104427 sent to WEMCO samples for 9/29/92 Trip. F.H. Blank samples for 9/30/92			
74							
75							

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: 2 x knr 43 ft 16-172 42

Driller: Bob Johnson

Bob West

SAA - SAME AS ABOVE

NA - NOT APPLICABLE

9/25/92 Background { HNU = 3 ppm
Readings { BX = 60-80 cpm

9/29/92 Background { HNU = 0 ppm
Readings { BX = 4-11 cpm

9/28/92 Background { HNU = 0 ppm
Readings { BX = 0-11 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602-50	PROJECT NAME: W-2
BORING NUMBER: 2-10	COORDINATES: _____
ELEVATION: _____	DATE: _____
ENGINEER/GEOLOGIST: _____	DATE STARTED: _____
DRILLING METHODS: SAA, J, Tab 4	DATE COMPLETED: _____
PAGE 7 OF 7	

DEPTH	SAMPLE TYPE/NO.	SAMPLER PERCENTAGE	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASUREMENTS	REMARKS
91	104435 1315 10-1-92	8 10 12	12	Medium Dense (2.57, 4/3) olive Brown ^{with grad} Gravelly Sand, non-plastic, wet	SW	N/A	HNU = 0 ppm BX = 40-60 cpm
92							
93							
94							
95							
96	104437 0820 10-2-92	25 50	9	Very Dense (10.4R, 4/3) Brown ^{with grad} Gravelly Sand, non-plastic, wet	SP	N/A	HNU = 1 ppm BX = 60-80 cpm
97							
98							
99							
100							
101	104438 0850 10-2-92	10 15 23	17	Dense (10.4R, 5/2) Golden Brown ^{with grad} Coarse Sand, non-plastic, wet	SW	N/A	HNU = 0 ppm BX = 60-80 cpm
102							
103							
104							
105							

NOTES:

Drilling Contractor: Pennsylvania Drilling
 Drilling Equipment: Cyclone 43 KP-16-7-92 92
 Driller: Bob Johnson
Bob Yost

9/30/92 SAA - SAME AS ABOVE
 NA - NOT APPLICABLE
 Background Readings { HNU = 1 ppm
 BX = 60-80 cpm
 Background Readings 10/1/92 { HNU = 1 ppm
 BX = 60-80 cpm

158

Background Readings 10/2/92 { HNU = 0 ppm
 BX = 10-20 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 60250-03-10 PROJECT NAME: PA 45-11-75
 BORING NUMBER: 2766 COORDINATES: _____ DATE: _____
 ELEVATION: _____ GWC Depth: _____ Date/Time: _____ DATE STARTED: _____
 ENGINEER/GEOLOGIST: K. Payne Date: _____ Date/Time: _____ DATE COMPLETED: _____
 DRILLING METHODS: Cable Tool PAGE: 9 OF 9

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 1 INCH	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
-106	10440 1540 10-2-92	22 48 50	18	Very Dense (10YR, 4/2) Dark Sandy Grayish Brown, Gravelly Sand, non-plastic, wet & plastic	GW SW	N/A	HNU = 0 ppm BX = 60-80 cpm
-107							
-108							
-109							
-110	10441 1605 10-2-92	5 6 9	10	Medium Dense (10YR, 5/2) Grayish Brown, Gravelly Sand, non-plastic, wet	GP	N/A	HNU = 0 ppm BX = 80-100 cpm
-112				Hydro. Punch			
-113							
-114							
-115	14443 1340 10-5-92	7 9 11	14	Medium Dense (2.5Y, 5/2) Grayish Brown, Gravelly sand, non-plastic, wet	SW	N/A	HNU = 0 ppm BX = 60-80 cpm
-117							
-118							
-119							
-120							

NOTES:
 Drilling Contractor: Pennsylvania Drilling
 Drilling Equipment: Cyclone 42
 Driller: Bob Johnson
Bob Post

SAA - SAME AS ABOVE
 NA - NOT APPLICABLE

10/2/92 Background Readings { HNU = 0 ppm
 BX = 60-80 cpm

10/5/92 Background Readings { HNU = 0 ppm
 BX = 60-80 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602-50-03-12 PROJECT NAME: [illegible]

BORING NUMBER: 2166 COORDINATES: [illegible] DATE: [illegible]

ELEVATION: [illegible] G.W. Depth: [illegible] DATE STARTED: [illegible]

ENGINEER/GEOLOGIST: K. Payne G.W. Depth: [illegible] DATE COMPLETED: [illegible]

DRILLING METHODS: Cable Tool PAGE: 9 OF [illegible]

DEPTH	SAMPLE TYPE & NO.	BLONSON SAMPLER PER U.S. I.	RECOVERY	DESCRIPTION	UIC SYMBOL	MEASUREMENTS	REMARKS
121	1505 10-5-92	10 11	0	No Recovery	N/A	N/A	HNU = N/A ppm BX = N/A. cpm
122				Hydro Punch			
123							
124							
125	0905 10-7-92	7 10	0	No Recovery	N/A	N/A	HNU = N/A ppm BX = N/A cpm
126		12					
127							
128							
129							
130	104446 10-7-92	11 18 11	14	Medium Dense (2.57, 4/2) Dark Grayish Brown ^{wet, read soil} Sandy Gravel, non-plastic, wet	GW	N/A	HNU = N/A 0 ppm BX = 40-60 cpm
131							
132				Hydro Punch			
133							
134							
135				Bottom of Boring (135.0')			

NOTES:
 Drilling Contractor: Pennsylvania Drilling
 Drilling Equipment: Cyclone 42
 Driller: Bob Johnson
Bob Yost

SAA - SAME AS ABOVE
 NA - NOT APPLICABLE
 10/5/92 Background Readings { HNU = 0 ppm
 BX = 60-80 cpm
 10/6/92 Background Readings { HNU = 1 ppm
 BX = 40-60 cpm

10/7/92 Background Readings { HNU = 0 ppm
 BX = 40-60 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: <u>60.50.03.12</u>	PROJECT NAME: <u>Monitoring Well 2166</u>	
BORING NUMBER: <u>2166</u>	COORDINATES:	DATE: <u>10-7-92</u>
ELEVATION:	GWL: Depth <u>Sec. 1</u> Date/Time	DATE STARTED: <u>9-22-92</u>
ENGINEER/GEOLOGIST: <u>K. Payne</u>	Depth	Date/Time
DRILLING METHODS: <u>Cable Tool</u>	DATE COMPLETED: <u>10-19-92</u> ^{KP} ₁₀₋₁₉₋₉₂	
	PAGE: <u>10</u>	OF: <u>12</u>

DEPTH +ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.000	RECOVERY 1.000	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%F)	REMARKS
136	¹⁰⁻¹⁴⁻⁹² 1555 ₁₀₋₇₋₉₂	5 10 12	78	Medium Dense (7.5 YR, N4/) Dark Grey, Sandy Pea Size ^{well} _{graded} Gravel, non-plastic) wet	GW	U/A	HNU = 0 ppm BY = 60-80 cpm
137				TD of Sampling (136.5')			
138							
139							
140							

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Cyclone 42

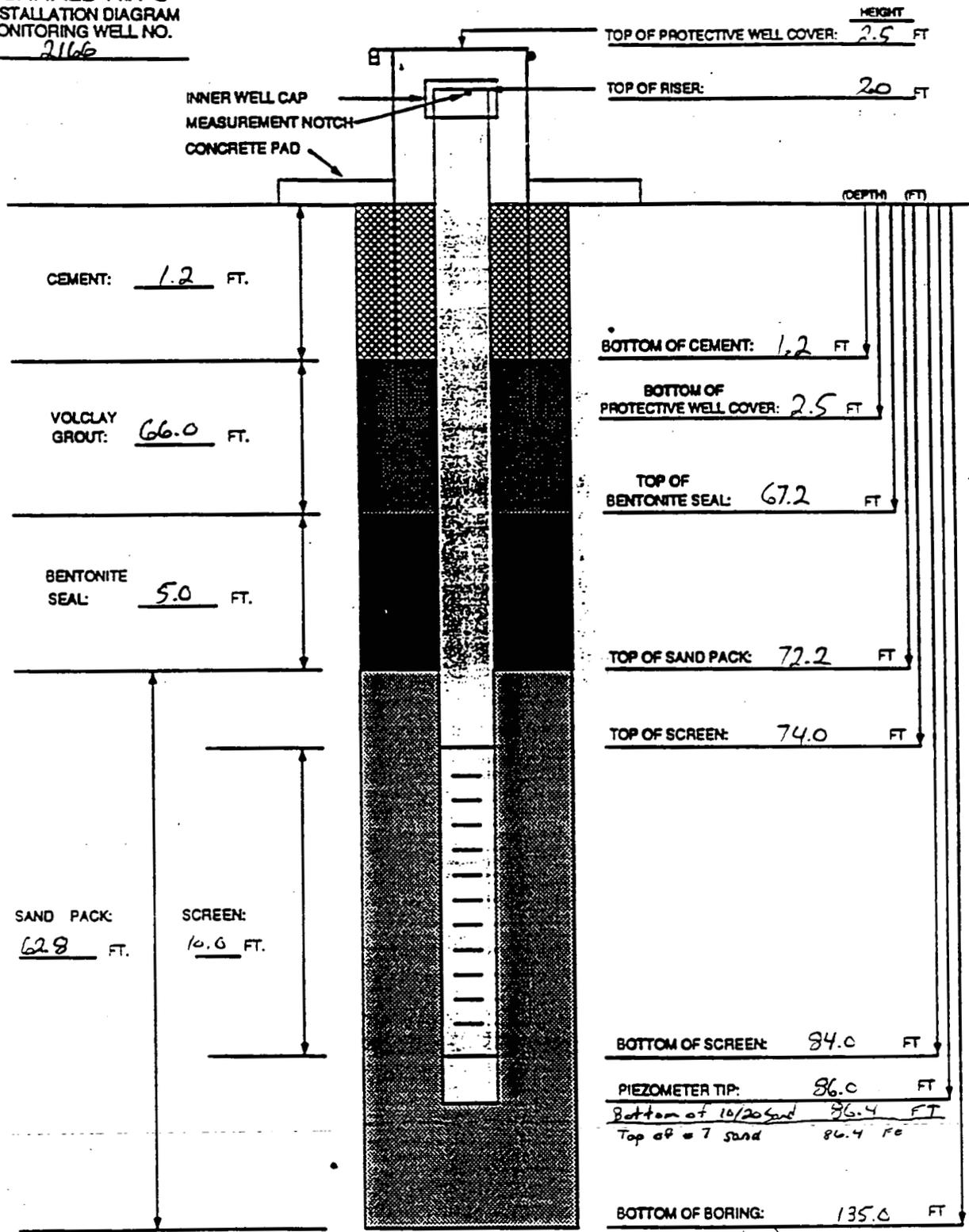
Driller: Bob Johnson
Bob Yoo

SAA - SAME AS ABOVE
NA - NOT APPLICABLE

10/7/92 Background Readings < HNU = 0 ppm
BY = 40-60 ppm

FERNALD RVFS
INSTALLATION DIAGRAM
MONITORING WELL NO. 2166

INSTALLATION DATE: 10/19/92



BOREHOLE DIAMETER: 4.0 IN. (Inside Diameter)

MATERIALS USED

- SAND TYPE AND QUANTITY: 53 bags x 50 lb #7
- BENTONITE PELLETS (5-GALLON BUCKETS): 2
- BAGS OF VOLCLAY GROUT: 24 bags x 50 lb
- AMOUNT OF CEMENT: 172 bags
- AMOUNT OF WATER USED: 1200 gallons
- OTHER: N/A
- TASK: 602-50-03.12

NOTES:

- 1) RISER PIPE IS 4 IN. ID. 316 STAINLESS STEEL PIPE, FLUSH-THREADED JOINTS.
 - 2) SCREEN IS 4 IN. ID. 316 STAINLESS STEEL PIPE WITH 0.010 IN. SLOTS.
 - 3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
- GEOLOGIST/ENGINEER: K. Payne

- 4) WATER DEPTH AND DATE: 10/19/92 86.15 FT. 10/19/92
- 5) TOP OF CASING IS SECURED WITH A STAINLESS STEEL CAP.
- 6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL
- 7) WELL CASING HAS A PROTECTIVE COVER WITH PADLOCK

3931

PIEZOMETER INSTALLATION SHEET

PROJECT NAME RI/FS Monitoring Well 2166 FIELD ENG./GEO. K. Payne DATE 10/19/92
 PROJECT NO. 602.90.03.12 CHECKED BY C. Brewer DATE 11/04/92
 BORING NO. 2166
 PIEZOMETER NO. 2166 DATE OF INSTALLATION 10/19/92

BOREHOLE DRILLING

DRILLING METHOD <u>Cable Tool</u>	TYPE OF BIT <u>Hammer Percussion Bit</u>
DRILLING FLUID(S) USED: FLUID <u>Water</u> FROM <u>0.0</u> TO <u>80.0</u> FLUID <u>N/A</u> FROM <u>N/A</u> TO <u>N/A</u>	CASING SIZE(S) USED: SIZE <u>100 in ID</u> FROM <u>0.0</u> TO <u>135.0</u> SIZE <u>N/A</u> FROM <u>N/A</u> TO <u>N/A</u>

PIEZOMETER DESCRIPTION

TYPE <u>Monitoring Well</u>	RISER PIPE MATERIAL <u>316 Stainless Steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0 in ID</u>	RISER PIPE DIAMETERS: O.D. <u>4 3/8 in</u> I.D. <u>4.0 in</u>
PERFORATION TYPE: SLOTS <input checked="" type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>7-10 FT, 3-2 FT</u>
AVERAGE SIZE OF PERFORATIONS <u>0.010 in</u>	JOINING METHOD <u>Screw Type, Flush Joint</u>
TOTAL PERFORATED AREA <u>10.0 ft</u>	<u>Threaded</u>

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>5.0 ft</u>	OTHER PROTECTION <u>Hinged locking cover</u>
PROTECTIVE PIPE O.D. <u>10 3/4 in</u>	<u>with pad lock</u>

ITEM	DISTANCE ABOVE / BELOW GROUND SURFACE (ft)		ELEVATION ()		
TOP OF RISER PIPE	2.0 feet				
GROUND SURFACE	0.0 feet				
BOTTOM OF PROTECTIVE PIPE	2.5 feet				
BOREHOLE FILL MATERIALS:	GROUT/SLURRY	TOP 1.2 ft	BOTTOM 67.2 ft	TOP	BOTTOM
	BENTONITE	TOP 67.2 ft	BOTTOM 72.2 ft	TOP	BOTTOM
	SAND	TOP 72.2 ft	BOTTOM ¹⁴² 96.4 ft	TOP	BOTTOM
	GRAVEL	TOP N/A	BOTTOM N/A	TOP	BOTTOM
PERFORATED SECTION	TOP 74.0 ft	BOTTOM 84.0 ft	TOP	BOTTOM	
PIEZOMETER TIP	86.0 ft				
BOTTOM OF BOREHOLE	135.0 ft				
GWL AFTER INSTALLATION	63.15 (Top Riser) ft				

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES NO
 WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES NO **163**
 REMARKS Cement placed from 0.0 to 1.2 ft to hold protective cover in place

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT/FEDERAL FACILITY AGREEMENT FOR
CONTROL AND ABATEMENT OF RADON-222 EMISSIONS
MONTHLY PROGRESS REPORT**

PERIOD ENDING OCTOBER 31, 1992

ENCLOSURE D

DRILLING/BORING LOGS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase 1	
BORING NUMBER: 3435	COORDINATES:	DATE 9-15-92
ELEVATION:	GWL: Depth seep/ Date/Time	DATE STARTED: 9-15-92
ENGINEER/GEOLOGIST: K. Marion, K. Geisler	Depth seep/ Date/Time	DATE COMPLETED: 10/7/92
DRILLING METHODS: Cable Tool	PAGE 2	OF 14

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in.	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ITSF)	REMARKS
7.5	103246 9-15-92 1510	9 12 21	18	Very stiff light olive brown (2.5Y, 5/4) silty clay with sand and gravel, trace gray (10YR, 6/1) mottling, low plasticity, slightly moist	CL	3.5	H _{nu} = .2 ppm B _x = 50 cpm α = 0 cpm
9.0	103247 9-16-92 0950	17 22 33	18	Very dense light olive brown (2.5Y, 5/4) clayey silt with sand and a little gravel, moist	ML	N/A	H _{nu} = .2 ppm B _x = 50 cpm α = 0 cpm
10.5	103248 9-16-92 1000	19 24 33	18	Hard, light olive brown (2.5Y, 5/6) silty clay with a little sand and gravel, non plastic, slightly moist	CL	>4.5	H _{nu} = .2 ppm B _x = 50 cpm α = 0 cpm
12.0	103249 9-16-92 1015	14 16 23	18	Hard gray (2.5Y, 5/0) silty clay with a little sand and gravel, non plastic, slightly moist	CL	>4.5	
13.5	103249 9-16-92 1015	14 16 23	18	Very stiff gray (2.5Y, 5/0) silty clay with sand and trace gravel, medium plasticity, moist	CL	2.0	H _{nu} = .2 ppm B _x = 50 cpm α = 0 cpm
15.0	103250 9-16-92 1025	6 8 11	15	Stiff dark gray (5Y, 4/1) silty clay with sand and trace fine gravel, medium plasticity, moist	CL	1.75	H _{nu} = .2 ppm B _x = 50 cpm α = 0 cpm

NOTES:

SEE Page 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602-04-27	PROJECT NAME: RCRA - Phase 1	
BORING NUMBER: 3435	COORDINATES:	DATE 9-17-92
ELEVATION:	GWL: Depth <i>see p 1</i> Date/Time	DATE STARTED: 9-15-92
ENGINEER/GEOLOGIST: K. Marion, K. Geiger	Depth <i>see p 1</i> Date/Time	DATE COMPLETED: 10/7/92
DRILLING METHODS: Cable Tool	PAGE 4	OF 14

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
22.5	103256 9-17-92 0900	3 6 7	17	Stiff dark gray (SY, 4/1) silty clay with sand and trace gravel, medium plasticity, moist	CL	1.5	H _{nu} = .1 ppm B _σ = 60 cpm α = 0 cpm
24.0	103257 9-17-92 0910	3 9 11	18	stiff dark gray (SY, 4/1) silty clay with sand and gravel, medium plasticity, moist	CL	1.5	H _{nu} = .1 ppm B _σ = 80 cpm α = 0 cpm
25.5	103258 9-17-92 0940	4 9 11	6	Medium stiff dark gray (SY, 4/1) silty clay with sand and trace gravel, medium plasticity, moist	CL	.75	H _{nu} = .1 ppm B _σ = 60 cpm α = 0 cpm
27.0	103259 9-17-92 0950	3 6 9	18	Same As Above	CL	.75	H _{nu} = .1 ppm B _σ = 80 cpm α = 0 cpm
28.5	103260 9-17-92 1000	3 3 4	10	Same As Above	CL	.75	H _{nu} = .1 ppm B _σ = 80 cpm α = 0 cpm

NOTES:
See page 1

9-17-92 **166**

Background Readings
 H_{nu} = .1 ppm
 B_σ = 60 cpm
 α = 0 cpm

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCKA Phase 2	
BORING NUMBER: 3935	COORDINATES:	DATE 9-17-92
ELEVATION:	GWL: Depth see p. 1 Date/Time	DATE STARTED: 9-15-92
ENGINEER/GEOLOGIST: K. Marion, K. Geiger	Depth see p. 1 Date/Time	DATE COMPLETED: 10/7/92
DRILLING METHODS: Cable Tool		PAGE 6 OF 14

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in. 1	RECOVERY (in. 1)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
37.5	103267 9-17-92 1715	19 27 39	18	Very dense yellowish brown (10 YR, 5/8) ^{clayey} fine sand, moist	SC	N/A	H _{nu} = .1 ppm B _s = 60 cpm L = 0 cpm
39.0	103268 9-18-92 0930	17 37 50	10	Very dense yellowish brown (10 YR, 5/8) ^{poorly graded} gravelly medium sand, moist	SP SE CA 11/4/92	N/A	H _{nu} = N/A high humidity prevented accurate reading B _s = 50 cpm L = 0 cpm
40.5	103269 9-18-92 0945	27 38 46	14	Very dense yellowish brown (10 YR, 5/8) gravelly well graded sand, moist	SW	N/A	H _{nu} = N/A high humidity prevented accurate reading B _s = 50 cpm L = 0 cpm
42.0				split spoon samples will be taken at 5 ft. intervals starting at 45.0 ft.			
45.0							

NOTES
See Page 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602-04-27	PROJECT NAME: RCRA Phase 2	
BORING NUMBER: 3435	COORDINATES:	DATE 7-26-92
ELEVATION:	GWL: Depth see p. 1 Date/Time	DATE STARTED 9-15-92
ENGINEER/GEOLOGIST: K. Marton, K. Geiger	Depth see p. 1 Date/Time	DATE COMPLETED: 10/7/92
DRILLING METHODS: Cable Tool	PAGE 8	OF 14

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in. 1	RECOVERY (in. 1)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
60.0	103273 7-N-92 1015	18 37 40	6	Very dense light gray (10YR, 6/1) well sorted medium sand with trace gravel, dry	SP	N/A	H _{max} = N/A B _r = 60 cpm a = 0 cpm high humidity prevented accurate Hum reading
				P w.L. = 2.5 ft.			
65.0	103274 9-21-92 1440	14 17 19	18	Dense light olive brown (2.5Y, 5/4) well sorted coarse sand with trace gravel, wet	SP	N/A	H _{max} = N/A B _r = 60 cpm a = 0 cpm
70.0	103275 9-21-92 1500	9 12 18	18	Medium dense light olive brown (2.5Y, 5/4) well sorted coarse sand with trace gravel, wet	SP	N/A	H _{max} = N/A B _r = 60 cpm a = 0 cpm

NOTES

SEE Page 1

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602,04,27	PROJECT NAME: RCA Phase 1		
BORING NUMBER: 3435	COORDINATES:	DATE 9/23/92	
ELEVATION:	GWL: Depth see p. 1 Date/Time	DATE STARTED: 9/15/92	
ENGINEER/GEOLOGIST: K. Maxwell, K. Geiger	Depth see p. 1 Date/Time	DATE COMPLETED: 10/17/92	
DRILLING METHODS: Cable Tool	PAGE 10		OF 14

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
90.0	103280 9/23/92	18 32	90.5 16	VERY DENSE LIGHT OLIVE BROWN (2.5y, 5/3) poorly graded gravelly coarse sand w/LT	SP	N/A	H _{nu} = .1 ppm B _y = 50 cpm α = 0 cpm
91.6	1545	42		VERY DENSE LIGHT OLIVE BROWN (2.5y, 5/3) well graded med coarse sand w/LT	SW	N/A	
95.0	103281 9/24/92	9 11	95.5 15	DENSE LIGHT OLIVE BROWN (2.5y, 5/3) well sorted med sand w/LT	SP	N/A	H _{nu} = .1 ppm B _y = 50 cpm α = 0 cpm
96.5	950	32		DENSE LIGHT OLIVE BROWN (2.5y, 5/3) poorly graded gravelly coarse sand w/LT	SP SW GRM/HS	N/A	
100	103283 9/24/92	12 27	17	VERY DENSE LIGHT OLIVE BROWN (2.5y, 5/3) well sorted med sand w/LT	SP	N/A	H _{nu} = .1 ppm B _y = 50 cpm α = 0 cpm
101.5	M15	42					
105.0							

NOTES

SEE Page 1

9/23/92
Background Levels
H_{nu} = .1 ppm
B_y = 50 cpm
α = 0 cpm

9/24/92
Background Levels
H_{nu} = .1 ppm
B_y = 50 cpm
α = 0 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602,04,27	PROJECT NAME: RCRA Phase 1	
BORING NUMBER: 3435	COORDINATES:	DATE 9/28/92
ELEVATION:	GWL: Depth <i>See p. 1</i> Date/Time	DATE STARTED: 9/15/92
ENGINEER/GEOLOGIST: <i>K. Merion, K. Go. 9/28</i>	Depth <i>See p. 1</i> Date/Time	DATE COMPLETED: 10/7/92
DRILLING METHODS: <i>Cable Tool</i>	PAGE 12	OF 14

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in. (17.1)	RECOVERY (17.1)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
129.5	103287 9/28/92 1030	9 12 18	12	Med Dense Light olive brown (2.5y, 5/3) well sorted medium sand with trace of gravel, wet	SP	N/A	H _{nu} = 0 ppm B _γ = 60 cpm α = 0 cpm
121.0	103291 9/28/92 1705	10 19 25	18	Med Dense Med Dense Light olive brown (2.5y, 5/3) well sorted coarse sand with trace of gravel, wet	SP	N/A	H _{nu} = 0 ppm B _γ = 60 cpm α = 0 cpm
122.5	103292 9/28/92 0925	6 10 18	13	Medium dense light olive brown (2.5y, 5/3) well sorted coarse sand with trace gravel, wet	SP	N/A	H _{nu} = 0 ppm B _γ = 60 cpm α = 0 cpm
124.0	103293 9/28/92 0945	8 12 17	15	Same As Above	SP	N/A	H _{nu} = 0 ppm B _γ = 60 cpm α = 0 cpm
125.5							The blue clay was thought to be at 125 ft. We discovered it at 129 ft. A Shelby tube was driven at 129 ft. only 1 ft. could be sampled. This was not enough for a geotechnical analysis, so we saved it as an archive.
129.0	103295 9/28/92 1500	N/A	12	stiff very dark gray (5Y, 3/1) sandy clay with a little gravel, low plasticity, moist	CL	1.5	H _{nu} = 0 ppm Blue B _γ = 60 cpm Clay α = 0 cpm
131.0	103296 10-2-92 1070	N/A	24	stiff dark gray (5Y, 4/1) clay, medium plasticity, moist	CL	1.5	Drove 36" Shelby tube 2 ft. into the blue clay.
133.0				Bottom of bore hole drilled to 131.0 ft. Drove Shelby tube 2 ft. to 133.0 ft.			

NOTES

see page 1

Background Levels
9/28/92

H_{nu} = 0 ppm
B_γ = 60 cpm
α = 0 cpm

PIEZOMETER INSTALLATION SHEET

PROJECT NAME RCLA Phase 1 FIELD ENG./GEO. Ken Grayer DATE 10/7/92
 PROJECT NO. 602 E4 27 CHECKED BY C. Bauer DATE 11/4/92
 BORING NO. 3435
 PIEZOMETER NO. 3435 DATE OF INSTALLATION 10/7/92
min. facing wall

BOREHOLE DRILLING

DRILLING METHOD <u>Cable Tool</u>	TYPE OF BIT <u>Hammer Percussion Bit</u>
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID <u>Water</u> FROM <u>0.0 FT</u> TO <u>65.0 FT</u>	SIZE <u>10.0 in ID</u> FROM <u>0.0</u> TC <u>131.0 CB</u>
FLUID <u>N/A</u> FROM <u>N/A</u> TO <u>N/A</u>	SIZE <u>N/A</u> FROM <u>N/A</u> TC <u>N/A</u>

PIEZOMETER DESCRIPTION

TYPE <u>Monitoring Well</u>	RISER PIPE MATERIAL <u>316 Stainless Steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0 in</u>	RISER PIPE DIAMETERS:
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>1-2 ft, 13-10 ft, 1-1 ft</u>
AVERAGE SIZE OF PERFORATIONS <u>.020 in</u>	JOINING METHOD <u>Screw type - flush joint</u>
TOTAL PERFORATED AREA <u>10.0 ft</u>	<u>Threaded</u>

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>5.0 ft</u>	OTHER PROTECTION <u>Hinged Well Cover</u>
PROTECTIVE PIPE O.D. <u>10 3/4 in</u>	<u>with Lock</u>

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION (ft)	
	TOP	BOTTOM	TCP	BOTTOM
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 1.0	BOTTOM 115.0	TCP	BOTTOM
BENTONITE	TOP N/A	BOTTOM N/A	TCP	BOTTOM
SAND	TOP 115.0	BOTTOM 131.0 130.0	TCP	BOTTOM
GRAVEL	TOP N/A	BOTTOM N/A	TCP	BOTTOM
PERFORATED SECTION	TOP 118.0	BOTTOM 128.0	TCP	BOTTOM
PIEZOMETER TIP	CB 11/4/92 130.0 - 130.0			
BOTTOM OF BOREHOLE	CB 11/4/92 130.0 - 131.0			
GWL AFTER INSTALLATION	62.5 ft 16.01912 48.45 ft			

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

REMARKS _____ 171

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602,04,27	PROJECT NAME: RECONSTRUCTION
BORING NUMBER: 4398	COORDINATES:
ELEVATION:	GWL Depth: 60.6
ENGINEER/GEOLOGIST: Michael Woolley	DATE COMPLETED:
DRILLING METHODS: Cable Tool	PAGE: 01

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWSON SAMPLER PER MIN.	RECOVERY (%)	DESCRIPTION	UNCL. SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
16	1420 103168 9-23-92	19 50 .5	14	Very stiff (2.54, N4) dark gray silty clay, trace gravel, low plasticity, moist	CI	2.5	H _{nu} = 0 ppm B _γ = 40 cpm
17	1440 N/A 9-23-92	50 .5	0	NO RECOVERY	N/A	N/A	H _{nu} = 0 ppm B _γ = 40 cpm
19	1515 103169 9-23-92	50 .4	5	Very dense (2.54, NS1) gray clayey gravel, non plastic, moist	GC	N/A	H _{nu} = 0 ppm B _γ = 40 cpm
20	1600 103170 9-23-92	11 13	3	Medium dense, SAA	GC	N/A	H _{nu} = 9 ppm B _γ = 40 cpm
22	1640 103171 9-23-92	13 7 12	5	SAA	GC	N/A	H _{nu} = 0 ppm B _γ = 40 cpm
23	0830 103172 9-24-92	13 7 19	15	Stiff (2.54, NS1) gray clay, trace gravel, low plasticity, moist	CI	1.5	H _{nu} = 0 ppm B _γ = 40 cpm
25	0845 103173 9-24-92	14 27 42	15	SAA - top 3 inches --- Bottom 7 inches, Very dense (2.54, 5/4) light olive brown well graded sand, trace gravel, dry	CI SW	1.5 N/A	H _{nu} = 0 ppm B _γ = 40 cpm Base of fill
26				Samples will be taken at 5 FT. intervals starting at 29.5 FT.			
27							
28							
29							
30				see page 3 for classification			29.5 to 31.0

NOTES:
 Drilling Contractor: Pennsylvania Drilling
 Drilling Equipment: 72 speed star
 Driller: Joe Barile
Mark Rebold
 * samples collected per ASTM standard Penetration Test
 * Colors identified by the Munsell Color Chart

SAA - SAME AS ABOVE
 NA - NOT APPLICABLE
 Background { H_{nu} = 0 ppm
 Readings { B_γ = 40 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 4398 ⁷⁴ 10-1-92 3398	COORDINATES:	DATE 9-24-92
ELEVATION:	GWL: Depth 60.6 FT Date/Time 10-7-92	DATE STARTED: 9-23-92
ENGINEER/GEOLOGIST: Michael Worley	Depth Date/Time	DATE COMPLETED: 10-7-92
DRILLING METHODS: Cable Tool	PAGE 4 OF 12	

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0 FT	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
46	1840 108177 9-24-92	50 5	5	Very dense (2.54, 4/4) olive brown poorly graded sand, trace gravel, moist	SP	N/A	H _{nu} = 0 ppm B _s = 40 cpm
47							
48							
49							
50	1600 103173 4-21-92	13 37 29	14	Very dense (2.54, 5/5) light olive brown well graded gravel, trace sand, moist	GW	N/A	H _{nu} = 0 ppm B _s = 40 cpm
51							
52							
53							
54							
55	1650 102179 9-24-92	19 50 18	12	Very dense, SAA	GW	N/A	H _{nu} = 0 ppm B _s = 40 cpm
56							
57				Samples at even foot, 5 foot intervals from this point.			
58	5-24-92						
59				WATER LEVEL			
60							

NOTES:

Drilling Contractor Pennsylvania Drilling

Drilling Equipment 72 Speedstar

Driller: Joe Banile
Mark Rebold

SAA - SAME AS ABOVE
NA - NOT APPLICABLE

Background { H_{nu} = 0 ppm
B_s = 40 cpm

* Samples collected per ASTM Standard Penetration Test
* All colors identified by the Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 1002.04.07	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 11398 ^{HW-1-92} 3398	COORDINATES:	DATE: 9-25-92
ELEVATION:	GWL: Depth 60.6 FT Date/Time 10-7-92	DATE STARTED: 9-25-92
ENGINEER/GEOLOGIST: Michael Worley	Depth: Date/Time:	DATE COMPLETED: 10-7-92
DRILLING METHODS: Cable Tool		PAGE 6 OF 12

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10 IN	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%FC)	REMARKS
76	1430 103185 9-25-92	21 37 35	18	Very dense (2.54, 5/4) light olive brown well graded sand, trace gravel, wet	SW	N/A	H _{nu} = 0 ppm B _γ = 40 cpm
77							
78							
79							
80							
81	1500 103186 9-25-92	24 30 34	18	SAA	SW	N/A	H _{nu} = 0 ppm B _γ = 40 cpm
82							
83							
84							
85							
86	1645 103187 9-25-92	35 50 1.3	14	SAA	SW	N/A	H _{nu} = 0 ppm B _γ = 40 cpm
87							
88							
89							
90							

NOTES:

Drilling Contractor Pennsylvania Drilling
 Drilling Equipment 72 Speed Star
 Driller: Joe Pawle
Mark Rebold

SAA - SAME AS ABOVE
 NA - NOT APPLICABLE

Background { H_{nu} = 0 ppm
 B_γ = 40 cpm

* Samples collected per ASTM Standard Penetration Test
 * All colors identified by the Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 1002.04.27	PROJECT NAME: RCRA Phase I		
BORING NUMBER: 4-28-92 10-1-92 3398	COORDINATES:	DATE: 9-28-92	
ELEVATION:	GWL: Depth 6.06 FT Date/Time 10-7-92	DATE STARTED: 9-28-92	
ENGINEER/GEOLOGIST: Michael Werley	Depth	Date/Time	DATE COMPLETED: 10-7-92
DRILLING METHODS: Cable Tool		PAGE 8 OF 12	

DEPTH ft	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10 IN	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
106	1515 103142 4-28-92	12 33 49	18	Dense (2.5Y, 4/2) dark grayish brown well graded coarse sand, trace gravel, wet	SW	N/A	H _{nu} = 0 ppm β _s = 40 cpm
107							
108							
109							
110							
111	1545 103143 4-28-92	12 15 14	13	Medium dense, SAA	SW	N/A	H _{nu} = 0 ppm β _s = 40 cpm
112							
113							
114							
115							
116	0830 103144 4-28-92	21 26 17	18	Dense, SAA	SW	N/A	H _{nu} = 0 ppm β _s = 40 cpm
117							
118							
119							
120							

NOTES:

Drilling Contractor Pennsylvania Drilling
 Drilling Equipment 72 Speed Star
 Driller: Joe Barile
Mark Rebold

SAA - SAME AS ABOVE
 NA - NOT APPLICABLE

Background { H_{nu} = 0 ppm
 β_s = 40 cpm

* Samples collected per ASTM Standard Penetration Test
 * All colors identified by the Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 1602.04.27	PROJECT NAME: RCRA Chase I	
BORING NUMBER: 11298 ^{W/10-1-92} 3398	COORDINATES:	DATE: 9-30-92
ELEVATION:	GWL: Depth 10.6 FT Date/Time 10-7-92	DATE STARTED: 9-2-92
ENGINEER/GEOLOGIST: Michael Worley	Depth: Date/Time:	DATE COMPLETED: 10-7-92
DRILLING METHODS: Cable Tool	PAGE 10 OF 12:	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 10 IN	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (pcf)	REMARKS
136	0930 N/A 9-30-92	28 35 42	18	Very dense (2.54, 5/2) grayish brown well graded sand, trace gravel, wet	SW	N/A	H _{nu} = 0 ppm B _s = 40 cpm Sample used for screen analysis
137							
138							
139							
140	1020	23		SAA			
141	103197 9-30-92	50 4	12		SW	N/A	H _{nu} = 0 ppm B _s = 40 cpm Gravel is rubble size
142							
143							
144							
145	1500	27		Very dense (2.54, 5/2), SAA			
146	103198 9-30-92	29 36	18		SW	N/A	H _{nu} = 0 ppm B _s = 40 cpm
147				Bottom of sampling at 146.5 FT. Bottom of boring at 150.0 FT.			

NOTES:
 Drilling Contractor: Pennsylvania Drilling
 Drilling Equipment: 72 Speed Star
 Driller: Joe Pavile
Jeff Fontleu

SAA - SAME AS ABOVE
 NA - NOT APPLICABLE

H_{nu} = 0 ppm
 B_s = 40 cpm

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* Samples collected per ASTM Standard Penetration Test
 * All colors identified by the Munsell Color Chart

PIEZOMETER INSTALLATION SHEET

3931

PROJECT NAME RCRA Phase I FIELD ENG./GEO. Michael Worley DATE 10-7-92
 PROJECT NO. 602.04.27 CHECKED BY _____ DATE _____
 BORING NO. 3398
 PIEZOMETER NO. 3398 DATE OF INSTALLATION 10-7-92

BOREHOLE DRILLING

DRILLING METHOD <u>Cable Tool</u>	TYPE OF BIT <u>Hammer Percussion Bit</u>
DRILLING FLUID(S) USED: FLUID <u>water</u> FROM <u>0.0 FT.</u> TO <u>100.0 FT.</u> FLUID <u>NA</u> FROM <u>-</u> TO <u>-</u>	CASING SIZE (S) USED: SIZE <u>10.0 in ID</u> FROM <u>0.0 FT</u> TO <u>150.0 FT</u> SIZE <u>NA</u> FROM <u>-</u> TO <u>-</u>

PIEZOMETER DESCRIPTION

TYPE <u>Monitoring Well</u>	RISER PIPE MATERIAL <u>3/16 Stainless Steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0 in. ID</u>	RISER PIPE DIAMETERS: O.D. <u>4 3/8 in.</u> I.D. <u>4.0 in.</u>
PERFORATION TYPE: SLOTS <input checked="" type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>12-10 FT, 1-2 FT.</u>
AVERAGE SIZE OF PERFORATIONS <u>0.020 in.</u>	JOINING METHOD <u>Screw type - flush joint threaded</u>
TOTAL PERFORATED AREA <u>10.0 FT.</u>	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH <u>5.0 FT</u>	OTHER PROTECTION <u>Hinged locking cover with padlock</u>
PROTECTIVE PIPE O.D. <u>10 3/4 in.</u>	

ITEM	DISTANCE ABOVE / BELOW GROUND SURFACE (Ft)		ELEVATION ()	
	TOP	BOTTOM		
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.5			
BOREHOLE FILL MATERIALS: Vd clay GROUT / <u>CEMENT SLURRY</u> 10-7-92 BENTONITE PELLETS SAND - 4/30 GRAVEL - NONE USED	TOP	0.0	BOTTOM	1.0
	TOP	1.0	BOTTOM	118.0
	TOP	N/A	BOTTOM	N/A
	TOP	118.0	BOTTOM	132.0
	TOP	N/A	BOTTOM	N/A
PERFORATED SECTION	TOP	120.0	BOTTOM	130.0
PIEZOMETER TIP	132.0			
BOTTOM OF BOREHOLE	150.0			
GWL AFTER INSTALLATION	62.8 FT. (TOP OF RISER)			

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES NO
 WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES NO 177
 REMARKS Cement placed from 0.0 to 1.0 FT to hold protective cover in place.

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602,04,27	PROJECT NAME: RCRA Phase 1	
BORING NUMBER: 2435	COORDINATES:	DATE: 10/19/92
ELEVATION:	GWL: Depth <i>see p.1</i> Date/Time	DATE STARTED: 10/16/92
ENGINEER/GEOLOGIST: Ken Geiger	Depth Date/Time	DATE COMPLETED: 10/27/92
DRILLING METHODS: Cable Tool	PAGE 2 OF 7	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 IN	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15'				<i>see page 1</i>			
30'							

NOTES *see page 1*

10/29/92
Background Readings
H_{nu} = 0 ppm
dy = 60-90 cpm
a = 0 cpm

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27		PROJECT NAME: RCHA Phase 1	
BORING NUMBER: 2435		COORDINATES:	DATE: 10/20/92
ELEVATION:		GWL: Depth see p. 1 Date/Time	DATE STARTED: 10/16/92
ENGINEER/GEOLOGIST: Ken Gavigan		Depth Date/Time	DATE COMPLETED: 10/27/92
DRILLING METHODS: Cable Tool			PAGE 4 OF 7

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
5'				See page 1			
60'							

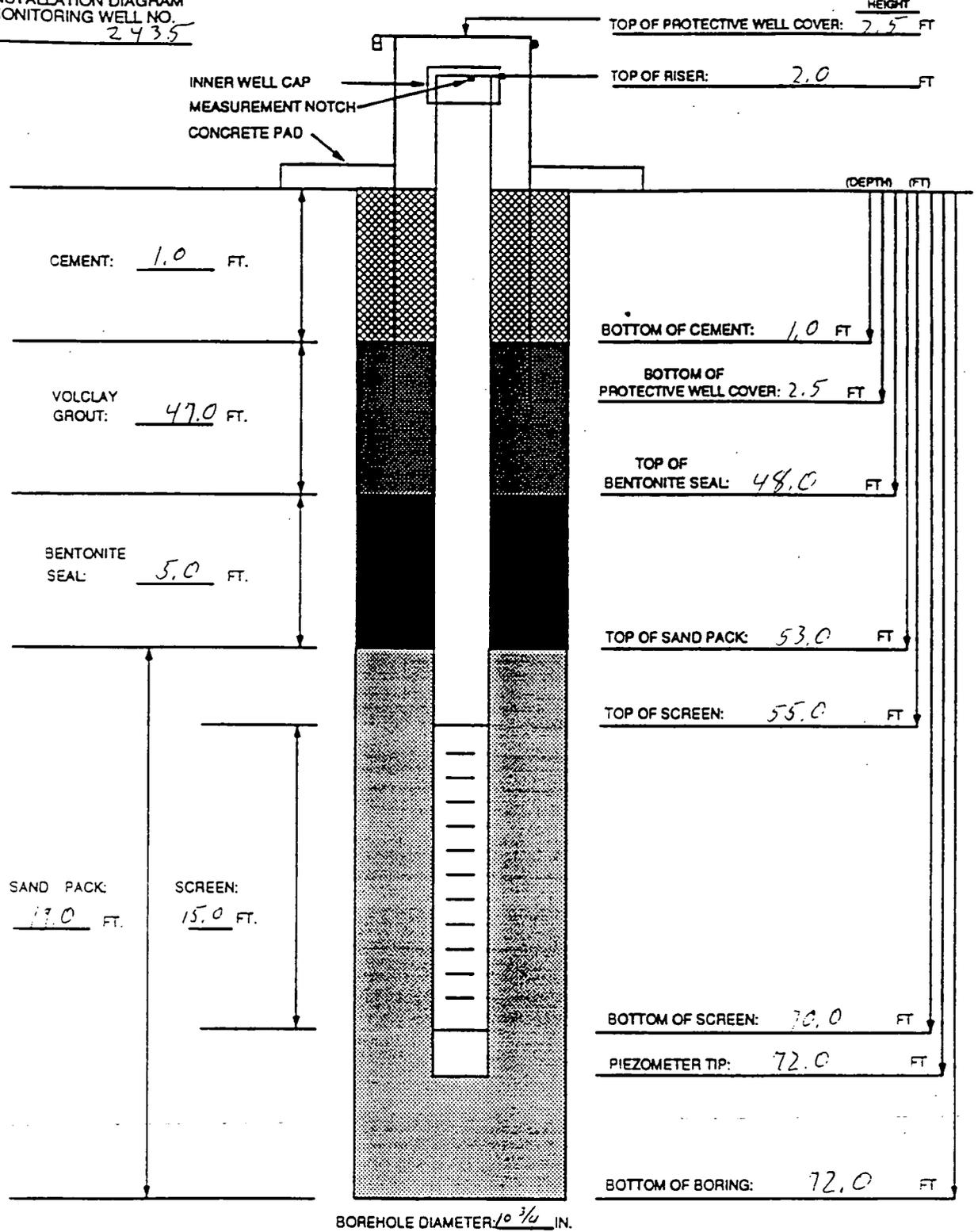
NOTES: See page 1

Background Readings
10/20/92
H_{NU} = 11 p/m
B_f = 60 cpm
L = 0 cpm

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FERNALD RIVFS
INSTALLATION DIAGRAM
MONITORING WELL NO.
2435

INSTALLATION DATE: 10/27/92



BOREHOLE DIAMETER: 10 3/4 IN.

MATERIALS USED

NOTES:

SAND TYPE AND QUANTITY: 430 Sqyd / 20-50lb bags
 BENTONITE PELLETS (5-GALLON BUCKETS): 5 Buckets
 BAGS OF VOLCLAY GROUT: 9-50lb bags
 AMOUNT OF CEMENT: 1.5 Bags
 AMOUNT OF WATER USED: 247 gal
 OTHER: 12 Soil Drums Geinured
 TASK: 102 04 27

- 1) RISER PIPE IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE, FLUSH-THREADED JOINTS.
 - 2) SCREEN IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE WITH 0.020 IN. SLOTS.
 - 3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
 - 4) WATER DEPTH AND DATE 61.97 FT / 10/27/92
 - 5) TOP OF CASING IS SECURED WITH A STAINLESS STEEL CAP.
 - 6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL
 - 7) WELL CASING HAS A PROTECTIVE COVER WITH PADLOCK.
- GEOLOGIST/ENGINEER: Ken Geiger

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	DATE: 9/18/92
BORING NUMBER: 4424	COORDINATES:	DATE STARTED: 9/19/92
ELEVATION:	GWL: Depth 96.7 ft Date/Time 10/7/92	DATE COMPLETED: 10/15/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	PAGE 1 OF 21
DRILLING METHODS: Cable Tool		

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 100mm	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
1	10225 10227 9/19/92	10	8	V. Soft 2.5Y(4.5) Light yellowish brown clayey silty, w/ organics no plasticity, dry	CH	3.25	H _{Nu} = 0 ppm R _S = 20 cpm
2	10227 10228 9/19/92	16	11	Hard 2.5Y(4.5) Olive yellow silty clay, no plasticity dry	CI	14.5	H _{Nu} = 0 ppm R _S = 60 cpm
3	10228 10229 9/19/92	14		Hard 2.5Y(4.5) Olive yellow, silty clay, no plasticity, dry	CI	4.5	H _{Nu} = 0 ppm R _S = 60 cpm
4	10229 9/19/92	23	14	Hard 2.5Y(4.5) Olive yellow, silty clay, no plasticity, dry	CI	4.5	H _{Nu} = 0 ppm R _S = 60 cpm
5	10230 10231 9/19/92	5	15	SAA	CI	4.0	H _{Nu} = 0 ppm R _S = 60 cpm
6	10230 10231 9/19/92	19		Hard 2.5Y(4.5) Olive yellow mottled w/ gray silty clay w/ gravel. No plasticity, dry	CI	14.5	H _{Nu} = 0 ppm R _S = 60 cpm
7	10231 9/19/92	21	15	Hard 2.5Y(4.5) Olive yellow mottled w/ gray silty clay w/ gravel. No plasticity, dry	CI	14.5	H _{Nu} = 0 ppm R _S = 60 cpm
8	10232 10233 9/19/92	11	0	No Recovery	NA	NA	H _{Nu} = NA R _S = NA
9	10233 10234 9/19/92	13	0	No Recovery	NA	NA	H _{Nu} = NA R _S = NA
10	10234 10235 9/19/92	20		Hard 10YR(5.5) Yellowish brown mottled w/ gray silty clay w/ some gravel, low plasticity, slightly moist	CI	4.0	H _{Nu} = 0 ppm R _S = 40 cpm
11	10235 10236 9/19/92	11	11	SAA	CI	4.5	H _{Nu} = 0 ppm R _S = 60 cpm
12	10236 10237 9/19/92	17	15	SAA	CI	4.5	H _{Nu} = 0 ppm R _S = 60 cpm
13	10237 10238 9/19/92	10	0	No Recovery	NA	NA	H _{Nu} = NA R _S = NA
14	10238 10239 9/19/92	18	16	V. Soft 2.5Y(4.5) Gray granular clay, low plasticity, slightly moist	CI	2.25	H _{Nu} = 0 ppm R _S = 60 cpm

NOTES:

Drilling Contract: Pennsylvania Drilling SAA - Same as Above

Drilling Equipment: 42 Cyclone NA - Not Applicable

Officer: Craig Coulter

Kevin Myers Samples collected per ASTM standard penetration test

Colors identified using Munsell Color Chart

Background: H_{Nu} = 0 ppm R_S = 40 cpm - 60 cpm

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 4424	COORDINATES:	DATE: 9/10/92
OPERATION:	GWL: Depth <i>see p. 1</i> Date/Time	DATE STARTED: 9/9/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 10/15/92
DRILLING METHODS: Cable Tool		PAGE 3 OF 21

DEPTH FT	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0 IN	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY % (SF)	REMARKS
31	1315 102945 9/10/92	20	14	STIFF 2.5Y (NS) Gray silty gravelly clay, low plasticity slightly moist	CI	1.75	H ₂₅ = 0 ppm P ₂₅ = 40 ppm
32	1320 102946 9/10/92	20	12	SAA	CI	1.25	H ₂₅ = 0 ppm P ₂₅ = 40 ppm
33			0	No Recovery	NA	NA	H ₂₅ = 0 ppm P ₂₅ = 40 ppm 9/10/92
35	1325 102947 9/10/92	20	12	V. STIFF 2.5Y (NS) Gray gravelly clay, low plasticity, moist	CI	2.25	H ₂₅ = 0 ppm P ₂₅ = 40 ppm
36	1330 102948 9/10/92	20	12	STIFF 2.5Y (NS) Gray gravelly clay, low plasticity, moist	CI	1.5	H ₂₅ = 0 ppm P ₂₅ = 40 ppm
38	1335 102949 9/10/92	4	12	SAA, V STIFF Bottom 2" sand mixed in	CI	2.25	H ₂₅ = 0 ppm P ₂₅ = 40 ppm
39	1340 102950 9/10/92	19	10	Dense 2.5Y (NS) Gray clayey sand, very fine, moist.	SC	NA	H ₂₅ = 0 ppm P ₂₅ = 40 ppm
41	1345 102951 9/10/92	10	17	V. STIFF 2.5Y (NS) Gray silty gravelly clay, w/ fine sand! no plasticity, moist.	CI	2.0	H ₂₅ = 0 ppm P ₂₅ = 40 ppm
42	1350 102952 9/15/92	10	18	Hard 2.5Y (NS) Gray gravelly clay, no plasticity, moist	CI	4.0	H ₂₅ = 0 ppm P ₂₅ = 40 ppm
44	1410 102953 9/10/92	10	13	V. STIFF 2.5Y (NS) Gray gravelly silty clay, low plasticity moist	CI	2.5	H ₂₅ = 0 ppm P ₂₅ = 40 ppm

NOTES:

Drilling Contract: Pennsylvania Drilling
 Drilling Equipment: 42 Cyclone
 Driller: Craig Coulter
Kevin Myers

SAA - Same as Above
 NA - Not Applicable

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Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 4424	COORDINATES:	DATE 9/16/92
ELEVATION:	GWL: Depth <i>See p.1</i> Date/Time	DATE STARTED: 9/19/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 10/15/92
DRILLING METHODS: Cable Tool	PAGE 5 OF 21	

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.0 IN	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
61	1087163 9/16/92	20	8	V. Dark, 2.54 (1/4), light brown brown, silty sand, pebbly gravel, dry	SP	NA	HNU = 0ppm BX = 400pm
62				Begin sampling every 5ft. Subst paper			HNU = NA BX = NA
							HNU = NA BX = NA
							HNU = NA BX = NA
							HNU = NA BX = NA
							HNU = NA BX = NA
							HNU = NA BX = NA
							HNU = NA BX = NA
							HNU = NA BX = NA
							HNU = NA BX = NA

NOTES: Pennsylvania Drilling SAA - Same as Above
 Drilling Contract: 42 Cyclone NA - Not Applicable
 Drilling Equipment: Craig Coulter
 Driller: Kevin Myers

Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

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VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: 602..04.27	PROJECT NAME: RCRA Phase I		
BORING NUMBER: 4424	COORDINATES:	DATE 9/17/92	
ELEVATION:	GWL: Depth <i>see p. 1</i> Date/Time	DATE STARTED: 9/19/92	
ENGINEER/GEOLOGIS: D. O'Brien	Depth Date/Time	DATE COMPLETED: 9/18/92	
DRILLING METHODS: Cable Tool	PAGE 9	OF 21	

DEPTH	SAMPLE TYPE & NO	BLOMS ON SAMPLER PER UAN 1	RECOVERY UAN 1	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%SF)	REMARKS
102.77 111.5	116 117 118 119	10 10 10 10	10	Dense. 2.34 (5/4) Light olive brown coarse sand w/ gravel, well sorted, wet	SW	NA	HNU = 0 ppm BB = 60 cpm
115	120 121 122	10 10 10	10	Med. dense. 2.34 (6/11) Gray med. grain sand with gravel, well sorted, wet	SP	NA	HNU = 0 ppm BB = 40 cpm
120	123 124 125	10 10 10	10	V. Dense. SAA	SP	NA	HNU = 0 ppm BB = 40 cpm
121.5	126 127 128	10 10 10	10				

NOTES: Pennsylvania Drilling SAA - Same as Above
 Drilling Contract: 42 Cyclone NA - Not Applicable **185**
 Drilling Equipment: Craig Coulter
 Driller: Kevin Myers Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: 602..04.27	PROJECT NAME: RCRA Phase I		
BORING NUMBER: 4424	COORDINATES:	DATE: 9/23/92	
ELEVATION:	GWL: Depth <u>see p. 1</u> Date/Time	DATE STARTED: 9/9/92	
ENGINEER/GEOLOGIST: D. O'Brien	Depth: _____ Date/Time: _____	DATE COMPLETED: 10/14/92	
DRILLING METHODS: Cable Tool	PAGE: 13		OF 21

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1' (U/I)	RECOVERY (U/I)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
171.5	1748 102889 9/23/92	50 50 50	8	V. Dense. 54(101) Gray coarse sand w/ gravel, poorly sorted, poorly graded, low plasticity DOB 11/4/92	SP	NA	H _{NL} = 0.00M R _L = 60cpm
176.5	1748 102889 9/23/92	50 50 50	13	V. Dense. 54(101) Gray med grain sand w/ gravel, sand clay poor, poorly sorted, low plasticity DOB 9/23/92	SP	NA	H _{NL} = 0.00M R _L = 60cpm
181.5	1750 102890 9/24/92	22 24	1X	Dense 54(101) Gray med grain sand w/ gravel, sand, silt, poorly sorted, low plasticity DOB 11/4/92			

NOTES:

Drilling Contract: <u>Pennsylvania Drilling</u> Drilling Equipment: <u>42 Cyclone</u> Driller: <u>Craig Coulter</u> <u>Kevin Myers</u>	SAA - Same as Above NA - Not Applicable Samples collected per ASTM standard penetration test Colors identified using Munsell Color Chart
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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.04.27	PROJECT NAME: RCRA Phase I	
BORING NUMBER: 4424	COORDINATES:	DATE 9/25/92
ELEVATION:	GWL: Depth <i>Sec. 1</i> Date/Time	DATE STARTED: 9/19/92
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 10/1/92
DRILLING METHODS: Cable Tool	PAGE 15	OF 21

DEPTH FT	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1 IN	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY TEST	REMARKS
198	1625 102994 9/25/92	75	16	V. Dense, 5Y (4/1) Gray med grain coarse to fine sand, well graded, wet	SW	NA	HNU = 0 ppm BS = 60 cpm
199	1625 102996 9/25/92	7 9 15	14	m. dense 5Y (6/1) Gray, med. grain to coarse gravelly sand, well graded, wet	SW	NA	HNU = 0 ppm BS = 60 cpm
200	1700 102997 9/25/92	8 12 15	18	m. dense 5Y (6/1) Gray, coarse to fine to medium sand w/ trace gravel, well graded, wet	SW	NA	HNU = 0 ppm BS = 60 cpm
201.5	0925 102998 9/28/92	20 43 50	15	V. Dense, SAA	SW	NA	HNU = 0 ppm BS = 60 cpm
202	0945 102999 9/28/92	23 24 50	12	V. Dense, 5Y (6/1) Gray medium sand w/ trace gravel, well graded, wet	SW	NA	HNU = 0 ppm BS = 60 cpm
204	1050 103000 9/28/92	25 32 49	18	SAA	SW	NA	HNU = 0 ppm BS = 60 cpm
				Resume 5ft. sampling see next page			HNU = NA BS = NA
							HNU = NA BS = NA
							HNU = NA BS = NA
							HNU = NA BS = NA

NOTES: Pennsylvania Drilling SAA - Same as Above
 Drilling Contract: _____ NA - Not Applicable
 Drilling Equipment: 42 Cyclone
 Driller: Craig Coulter
 Kevin Myers
 Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: 602..04.27	PROJECT NAME: RCRA Phase I		
BORING NUMBER: 4424	COORDINATES:	DATE 9/28/92	
ELEVATION:	GWL: Depth See p. 1 Date/Time	DATE STARTED: 9/9/92	
ENGINEER/GEOLOGIST: D. O'Brien	Depth Date/Time	DATE COMPLETED: 10/15/92	
DRILLING METHODS: Cable Tool	PAGE 17	OF 21	

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 100MM	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY	REMARKS
14.1	1145	13	0	No Recovery	NA	NA	
22.5	1125	50	0	No Recovery	NA	NA	
23.5				Begin continuous sampling see next page.			
25							
26.5							

NOTES:

Drilling Contract: <u>Pennsylvania Drilling</u>	SAA - Same as Above
Drilling Equipment: <u>42 Cyclone</u>	NA - Not Applicable
Driller: <u>Craig Coulter</u>	
<u>Kevin Myers</u>	Samples collected per ASTM standard penetration test
	Colors identified using Munsell Color Chart

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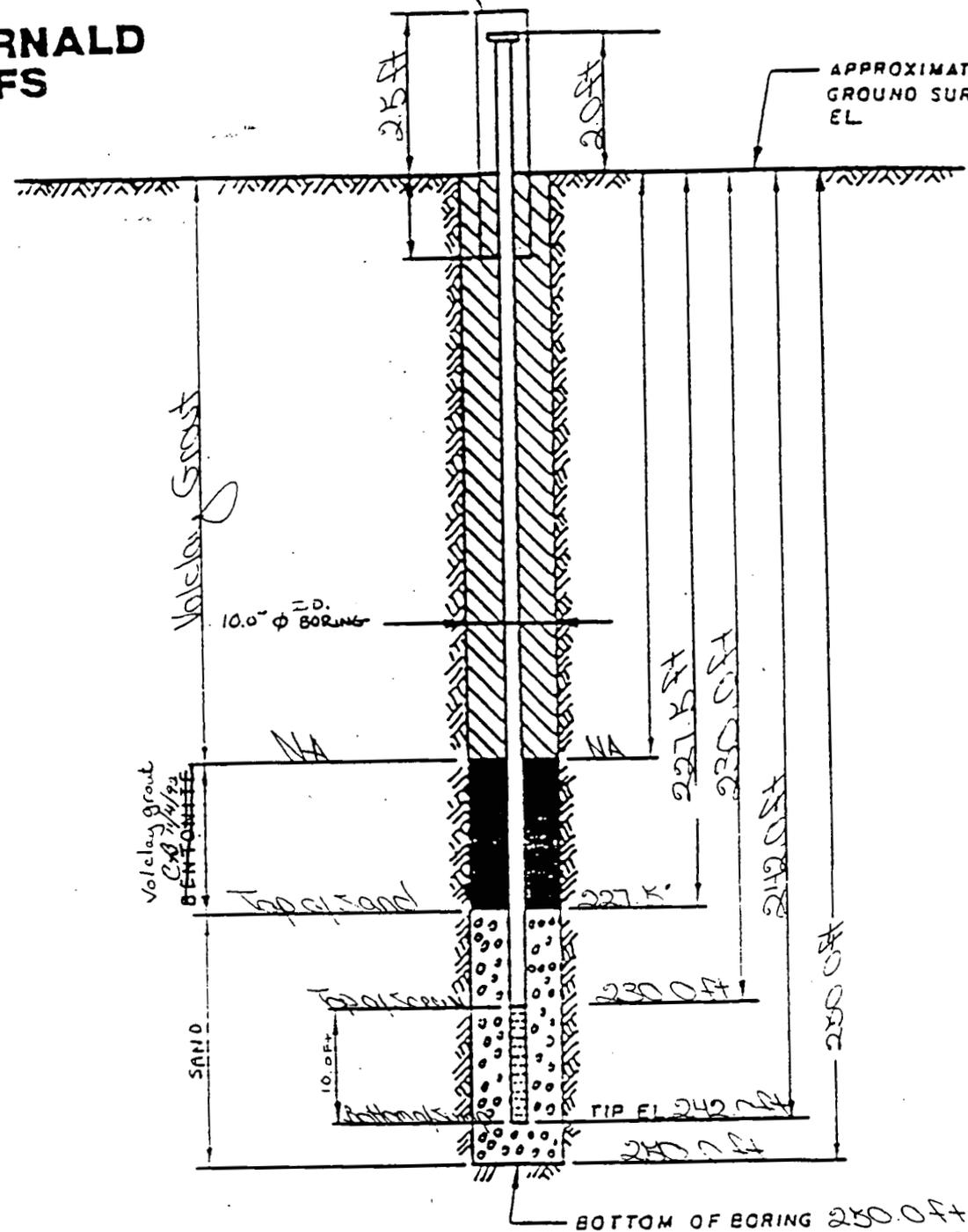
209/21

**FERNALD
RI/FS**

PROTECTIVE RISER CASING

APPROXIMATE EXISTING
GROUND SURFACE
EL

DRAWING NUMBER
CHECKED BY
APPROVED BY
DRAWN BY



NOTES:

1. RISER PIPE 1540 IN 10. SCHEDULE PIPE, THREADED, FLUSH-JOINTED.
 2. SCREEN 1540 IN 1.0 BUIS PIPE CONTINUOUS SLOT SCREEN (0.010 IN. SLOT SIZE)
 3. LOWER END OF SCREEN IS CAPPED.
 4. ELEVATION OF WATER LEVEL 96.7 ft
 5. WATER LEVEL READING ON 10/1/92
- Materials Used During Installation*
 22 bags of 10120 sand
 75 bags of voleloy grout
 3000 gallons of water

INSTALLATION DETAILS
MONITORING WELL # 4424

PREPARED FOR
FMPC RI/FS

27 soil drums 2 water drums

VISUAL CLASSIFICATION OF SOILS

3931

PROJECT NUMBER: <u>602.0427</u>	PROJECT NAME: <u>RCRA Phase I</u>
BORING NUMBER: <u>3733</u>	COORDINATES:
ELEVATION:	DATE: <u>10/5/92</u>
ENGINEER/GEOLOGIST: <u>B. Yearley</u>	DATE STARTED: <u>10/2/92</u>
DRILLING METHODS: <u>Cable Tool</u>	DATE COMPLETED: <u>10/5/92</u>
	PAGE <u>2</u> OF <u>11</u>

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 1.6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
16	1120	12	NA	No Recovery	NA	NA	HNU = 0 ppm NA αβ = 60 cpm NA
16.5	10/5/92	23		By 11/4/92			By 11/4/92
17	1130 104611	33 22	17	Very Dense 2.5YR(5/1) Gray silty sand, wet	SM	NA	HNU = 0 ppm αβ = 60 cpm
18	10/5/92	47		By 10/14/92			
19	1310 104612	12 17	14	Hard 2.5YR(5/1) Gray, silty clay w/ gravel, med. plasticity, moist	CL	2.0	HNU = 0 ppm αβ = 60 cpm
20	10/5/92	23		By 11/4/92			
20	1328 104613	6 22	9	Hard 2.5YR(5/1) Gray, silty gravelly clay, med. plasticity, moist	CL	3.0	HNU = 0 ppm αβ = 60 cpm
21	10/5/92	36					
22	1335 104614	12 19	15	V. Dense 2.5YR(5/1) Gray, clayey silt, low plasticity, moist w/ gravel	ML	NA	HNU = 0 ppm αβ = 60 cpm
22	10/5/92	33		Hard 2.5YR(5/1) Gray, silty clay w/ gravel, med. plasticity, moist	CL	2.5	
23	1445 104615	5 12	12	SAA	ML	NA	HNU = 0 ppm αβ = 60 cpm
24	10/5/92	14			CL	2.5	
25	1500	6	0	No Recovery	NA	NA	HNU = 0 ppm αβ = NA
25	10/5/92	19		By 11/4/92			
26	1515 104616	2 5	13	Firm 2.5YR(5/1) Gray, silty, gravelly clay, med plasticity, moist	CL	1.75	HNU = 0 ppm αβ = 60 cpm
27	10/5/92	9		By 11/4/92			
28	1530 104617	12 10	17	Firm 2.5YR(5/1) Gray, silty, gravelly clay, med plasticity, moist	CL	1.25	HNU = 0 ppm αβ = 60 cpm
29	10/5/92	7					
29	1540	5	0	No recovery	NA	NA	HNU = NA αβ = NA
30	10/5/92	14					

NOTES:

Drilling Contractor: Pennsylvania Drilling SAA = Same as above

Drilling Equipment: 38 Cyclone NA = Not Applicable

Driller: Chris Coalter

David Holmes Samples collected per ASTM standard penetration test

Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER	602 04 27	PROJECT NAME	RCRA Phase I
BORING NUMBER	3733	COORDINATES	DATE 10/6/92
ELEVATION:		GWL: Depth Date/Time	DATE STARTED 10/2/92
ENGINEER/GEOLOGIST	B. Yeardeley	Depth Date/Time	DATE COMPLETED 10/27/92
DRILLING METHODS	Cable Tool		PAGE 4 OF 11

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in. 1	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
46.5	1440 104624 10/6/92	50/5	4	V. Dense Light olive brown 25Y (5H) coarse sand & gravel, well sorted, graded, dry By 11/4/92	SW	NA	H ₂ O = 0 ppm αβ = 80 cpm
50	1500 104625 10/6/92	35 24 35	15	SAA	SW	NA	H ₂ O = 0 ppm αβ = 80 cpm
55	1620 10/6/92	50/5	0	No Recovery	NA	NA	NA

NOTES

Drilling Contractor Pennsylvania Drilling
 Drilling Equipment 38 Cyclone
 Driller Chris Coulter
David Holmes

SAA - Same as above
 NA - Not Applicable

Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER <u>602 04 27</u>	PROJECT NAME <u>RCRA Phase I</u>	
BORING NUMBER <u>3733</u>	COORDINATES	DATE <u>10/9/92</u>
ELEVATION:	GWL: Depth Date/Time	DATE STARTED <u>10/2/92</u>
ENGINEER/GEOLOGIST <u>B. Yeardley</u>	Depth Date/Time	DATE COMPLETED <u>10/17/92</u>
DRILLING METHODS <u>Cable Tool</u>	PAGE <u>8</u> OF <u>11</u>	

DEPTH (ft.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in.	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
105	1630	17					
	104636	24	14	V. Dense 2.5Y(5/4) lt. olive brown, med to coarse gravelly sand, well graded, wet	SW	NA	HNU = 0 ppm dB = 60 cpm
106.5	10/9/92	35					
110	0955	26					
	104637	27	12	Dense 2.5Y(5/3) lt. olive brown, gravel w/ fine sand, well graded, wet	GW	NA	HNU = 0 ppm dB = 60 cpm
111.5	10/12/92	21					
115	1100	17					
	104638	19	18	Dense 2.5Y(5/3) lt. olive brown, fine to coarse sandy gravel, well graded, wet	GW	NA	HNU = 0 ppm dB = 60 cpm
116.5	10/13/92	21					

NOTES

Drilling Contractor Pennsylvania Drilling
 Drilling Equipment 38 Cyclone
 Driller Chris Caulter
David Holmes

SAA - Same as above
 NA - Not Applicable

Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER <u>6020427</u>	PROJECT NAME <u>RCRA Phase I</u>	
BORING NUMBER <u>3733</u>	COORDINATES	DATE <u>10/15/92</u> 11/1/92
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: <u>10/15/92</u> 11/1/92
ENGINEER/GEOLOGIST <u>B. Yearley</u>	Depth Date/Time	DATE COMPLETED: <u>10/18/92</u>
DRILLING METHODS: <u>Cable Tool</u>		PAGE <u>10</u> OF <u>11</u>

DEPTH ft.	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 in.	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
135.0 136.5	<u>1046A2</u> <u>945</u> <u>10/15/92</u>	<u>37</u> <u>50/5</u>	<u>6</u>	<u>V-Dense 2.5Y (S/4) lite olive brown med. coarse gravelly sand, well graded, wet</u>	<u>SW</u>	<u>NA</u>	<u>H₂O = 0 ppm</u> <u>αβ = 60 cpm</u>
140 141.5	<u>1046B3</u> <u>1015</u> <u>10/15/92</u>	<u>15</u> <u>21</u> <u>15</u>	<u>13</u>	<u>Dense 2.5Y (S/4) lite olive brown med. gravelly sand, poorly graded, wet</u>	<u>SP</u>	<u>NA</u>	<u>H₂O = 0 ppm</u> <u>αβ = 60 cpm</u>
145 146.5	<u>1300</u> <u>10/18/92</u>	<u>100/4</u>	<u>0</u>	<u>No Recovery</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>

NOTES

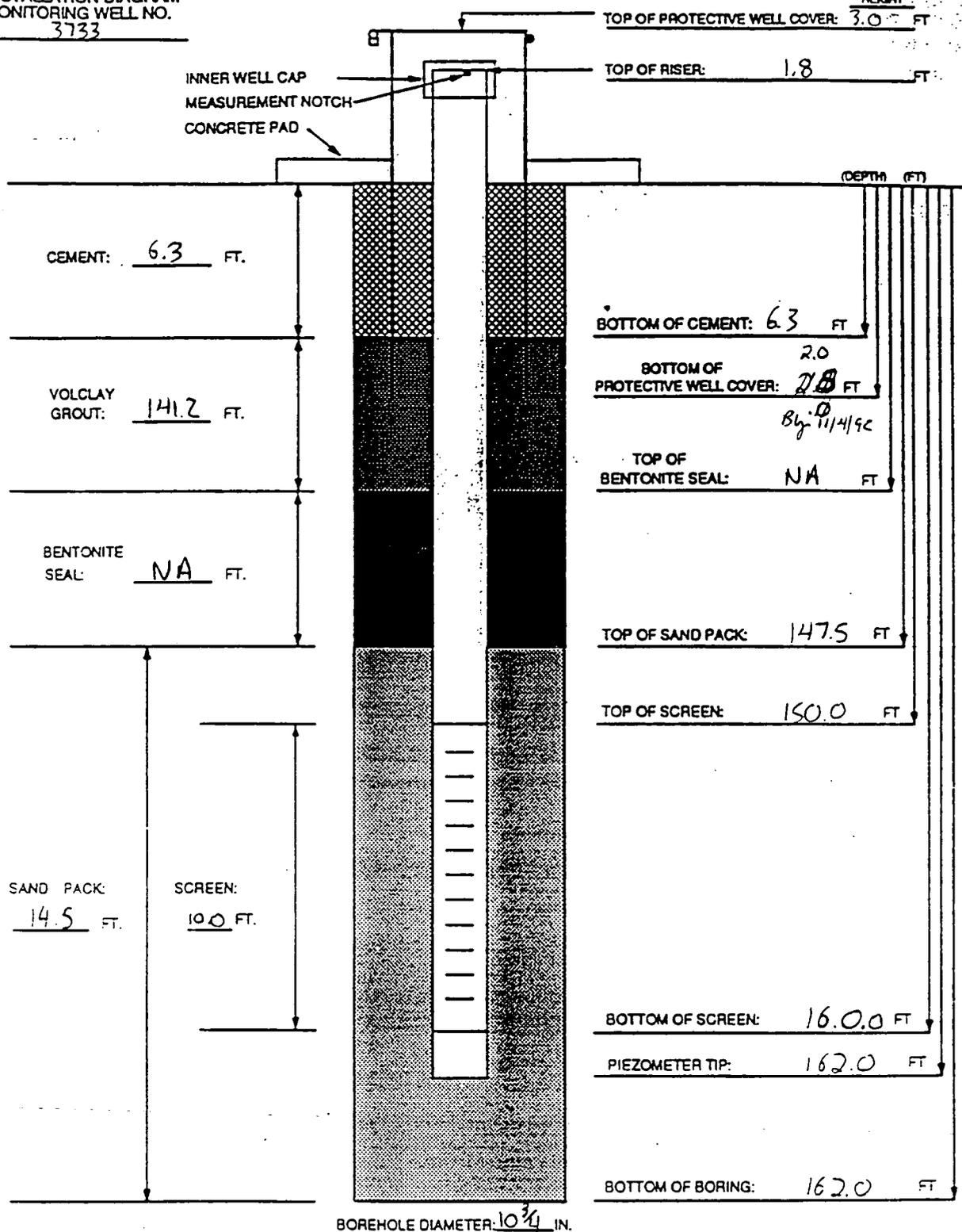
Drilling Contractor Pennsylvania Drilling
 Drilling Equipment 38 cyclone
 Driller Chris Coulter
David Holmes

SAA - Same as above
 NA - Not Applicable

Samples collected per ASTM standard penetration test
 Colors identified using Munsell Color Chart

FERNALD R/FS
INSTALLATION DIAGRAM
MONITORING WELL NO.
3733

INSTALLATION DATE: 10/28/92



BOREHOLE DIAMETER: 10 3/4 IN.

MATERIALS USED

SAND TYPE AND QUANTITY: 8 50lb. bags of coarse
 BENTONITE PELLETS (5-GALLON BUCKETS): N/A
 BAGS OF VOLCLAY GROUT: 50 50lb. bags
 AMOUNT OF CEMENT: 1 bag
 AMOUNT OF WATER USED: 1750 gal
 OTHER: 26 barrels of soil 1 barrels water
 TASK: 302 04.27

NOTES:

- 1) RISER PIPE IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE, FLUSH-THREADED JOINTS.
 - 2) SCREEN IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE WITH 0.020 IN. SLOTS.
 - 3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
- GEOLOGIST/ENGINEER: Brian Yearaley

- 4) WATER DEPTH AND DATE 86.5 FT; 10/28/92
- 5) TOP OF CASING IS SECURED WITH A STAINLESS STEEL CAP.
- 6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL
- 7) WELL CASING HAS A PROTECTIVE COVER WITH PADLOCK.

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.50.03.17	PROJECT NAME: [unclear]	DATE: 11/2/92
BORING NUMBER: 2166	COORDINATES: [unclear]	DATE: [unclear]
ELEVATION: [unclear]	GWL Depth 8.75 Date/Time 9/23/92	DATE STARTED: 9/21/92
ENGINEER/GEOLOGIST: K. Payne	Depth 6.39 Date/Time 10/13/92	DATE COMPLETED: 10/19/92
DRILLING METHODS: Cable Tool	PAGE 1 OF 10	

DEPTH (ft)	SAMPLE TYPE AND NO.	BLOWSON SAMPLER PER MINUTE	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY INDEX	REMARKS
1	104401 0810 9-23-92	3 7 11	12	Stiff (2.5Y, 5/3) mottled Lt. Olive Brown, Silty Clay, non plastic, slightly moist, with roots	CL	1.5	HNU = 0 ppm BX = 40-60 cpm
2	104402 0815 9-23-92	7 17 21	12	Very Stiff (10YR, 4/6) Dark Yellowish Brown, Silty Clay, non plastic, slightly moist, some mottling.	EL	4.0	HNU = 0 ppm BX = 40 cpm
3	104403 0850 9-23-92	15 19 20	16	Dense (2.5Y, 5/6) Lt. Olive Brown clayey silt, non plastic, slightly moist.	ML	N/A	HNU = 0 ppm BX = 40-60 cpm
4	104404 0900 9-23-92	21 25 20	12	Stiff (2.5Y, 5/4) Lt. olive Brown, Silty Clay, low plasticity, slightly moist	CL	2.0	HNU = 1 ppm BX = 40 cpm
5	104405 0905 9-23-92	15 14 11	14	Stiff (2.5Y, 5/4) Lt. Olive Brown, Silty Clay, medium plasticity, moist	CL	1.5	HNU = 0 ppm BX = 40-60 cpm
6	104406 0910 9-23-92	10 26 28	18	Very Dense (2.5Y, 5/4) Lt. olive Brown, clayey silt, non plastic, very moist	ML	1.0	HNU = 1 ppm BX = 20-40 cpm
7	104407 1430 9-23-92	1 3 6	14	medium stiff (2.5YR, N4/1) Dark Gray, low plasticity, slightly moist, silty clay	CL	1.0	HNU = 0 ppm BX = 40-60 cpm
8	104408 1455 9-23-92	5 13 11	12	medium stiff (2.5YR, N4/1) Dark Gray, silty clay, low plasticity, slightly moist.	CL	1.5	HNU = 1 ppm BX = 40-60 cpm
9	104409 1505 9-23-92	5 16 16	16	Stiff (2.5YR, N4/1) Dark Gray, silty clay, plastic, moist	CL	1.5	HNU = 1 ppm BX = 60-80 cpm
10	104410 1515 9-23-92	7 12 17	14	Stiff (2.5YR, N5/1) Gray, Silty Clay, medium plasticity, slightly moist	CL	1.0	HNU = 0 ppm BX = 40-60 cpm

NOTES:

Drilling Contractor: Pennsylvania Drilling
 Drilling Equipment: Cyclone RP 10-7-92 4/2
 Driller: Bob Johnson
Bob Yost

SAA - SAME AS ABOVE
 NA - NOT APPLICABLE

Background { HNU = 1 ppm
 Readings { BX = 20-40 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 20250-0992	PROJECT NAME:
BORING NUMBER: 276	COORDINATES:
ELEVATION:	DATE: 9/24/92
ENGINEER/GEOLOGIST: K. Payne	DATE STARTED:
DRILLING METHODS: Cable Tool	DATE COMPLETED:
	PAGE: 3 OF 10

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWSON SAMPLER (UNITS)	RECOVERY (%)	DESCRIPTION	UTCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
31	104418 1310 9-24-92	10 29 50	6	Very Dense (10YR, 3/4) DK. Yellowish Brown well graded Gravelly sand, non plastic, moist	SW	N/A	4Nu = 0 ppm βγ = 40-60 cpm
32							
33							
34							
35							
36	104419 1500 9-24-92	15 42 50	17	Very Dense (2.5Y, 6/3) Lt. Yellowish Brown well graded Gravelly sand, non plastic, moist	SW	N/A	HNu = 1 ppm βγ = 80-100 cpm
37							
38							
39							
40							
41	104420 1535 9-24-92	13 24 25	17	Dense (10YR, 4/3) Brown well graded sandy Gravel, non plastic very moist	GW	N/A	HNu = 0 ppm βγ = 20-40 cpm
42							
43							
44							
45							

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: Cyclone 43 ^{KPK-742} 420

Driller: Bob Johnson

Bob Yost

SAA - SAME AS ABOVE
NA - NOT APPLICABLE

9/24/92 Background Readings { HNu = 2 ppm
βγ = 40-60 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602-5050	PROJECT NAME: W.A.
BORING NUMBER: 2-166	COORDINATES:
ELEVATION:	DATE:
ENGINEER/GEOLOGIST: K. Payne	DATE STARTED:
DRILLING METHODS: Cable Tool	DATE COMPLETED:
	PAGE 7 OF

DEPTH (ft)	SAMPLE TYPE	BLOBS ON SAMPLE PER QUANTITY	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (Liquidity Index)	REMARKS
91	104435 1315 10-1-92	8 10 12	12	Medium Dense (2.57, 4/3) Olive Brown, well graded Gravelly sand, non-plastic, wet	SW	N/A	HNU = 0 ppm βγ = 40-60 cpm
92							3931
93							
94							
95	104437 0820 10-2-92	25 50	9	Very Dense (10.7R, 4/3) Brown, well graded Gravelly sand, non-plastic, wet	SP	N/A	HNU = 1 ppm βγ = 60-80 cpm
96							
97							
98							
99							
100	104438 0850 10-2-92	10 15 23	17	Dense (10.7R, 5/2) Golden Brown, well graded coarse sand, non-plastic, wet	SW	N/A	HNU = 0 ppm βγ = 60-80 cpm
101							
102							
103							
104							
105							

3931

NOTES:
 Drilling Contractor: Pennsylvania Drilling
 Drilling Equipment: Cyclone 43 KP-10-7-92 42
 Driller: Bob Johnson
Bob Yost

9/3/92 SAA - SAME AS ABOVE
 NA - NOT APPLICABLE
 Background Readings { HNU = 1 ppm
 βγ = 60-80 cpm
 Background Readings 10/1/92 { HNU = 1 ppm
 βγ = 60-80 cpm

Background Readings 10/2/92 { HNU = 0 ppm
 βγ = 60-80 cpm

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602-50-03-112	PROJECT NAME:
BORING NUMBER: 2106	COORDINATES:
ELEVATION:	DATE:
ENGINEER/GEOLOGIST: K. Payne	DATE STARTED:
DRILLING METHODS: Cable Tool	DATE COMPLETED:
	PAGE: 9 OF

DEPTH	SAMPLE TYPE & NO.	BLOWS ON AMPLER PER 1.0m	RECOVERY (%)	DESCRIPTION	UICY SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
121	KP10-5-92 1505 10-5-92	10 12 11	0	No Recovery	N/A	N/A	HNU = N/A ppm BX = N/A cpm
122				Hydro Punch			
123							
124							
125	KP10-7-92 0905 10-7-92	7 10 12	0	No Recovery	N/A	N/A	HNU = N/A ppm BX = N/A cpm
127							
128							
129							
130	104446	11		Medium Dense (2.57, 4/2) Dark Grayish Brown ^{wet, grad. sh} Sandy Gravel, non-plastic, wet	GW	N/A	KP 10-7-92 HNU = N/A 0 ppm BX = 40-60 cpm
131	1025 10-7-92	18 11	14				
132				Hydro Punch			
133							
134							
135				Bottom of Boring (135.0')			

3931

NOTES:
 Drilling Contractor: Pennsylvania Drilling
 Drilling Equipment: Cyclone 42
 Driller: Bob Johnson
Bob Yost

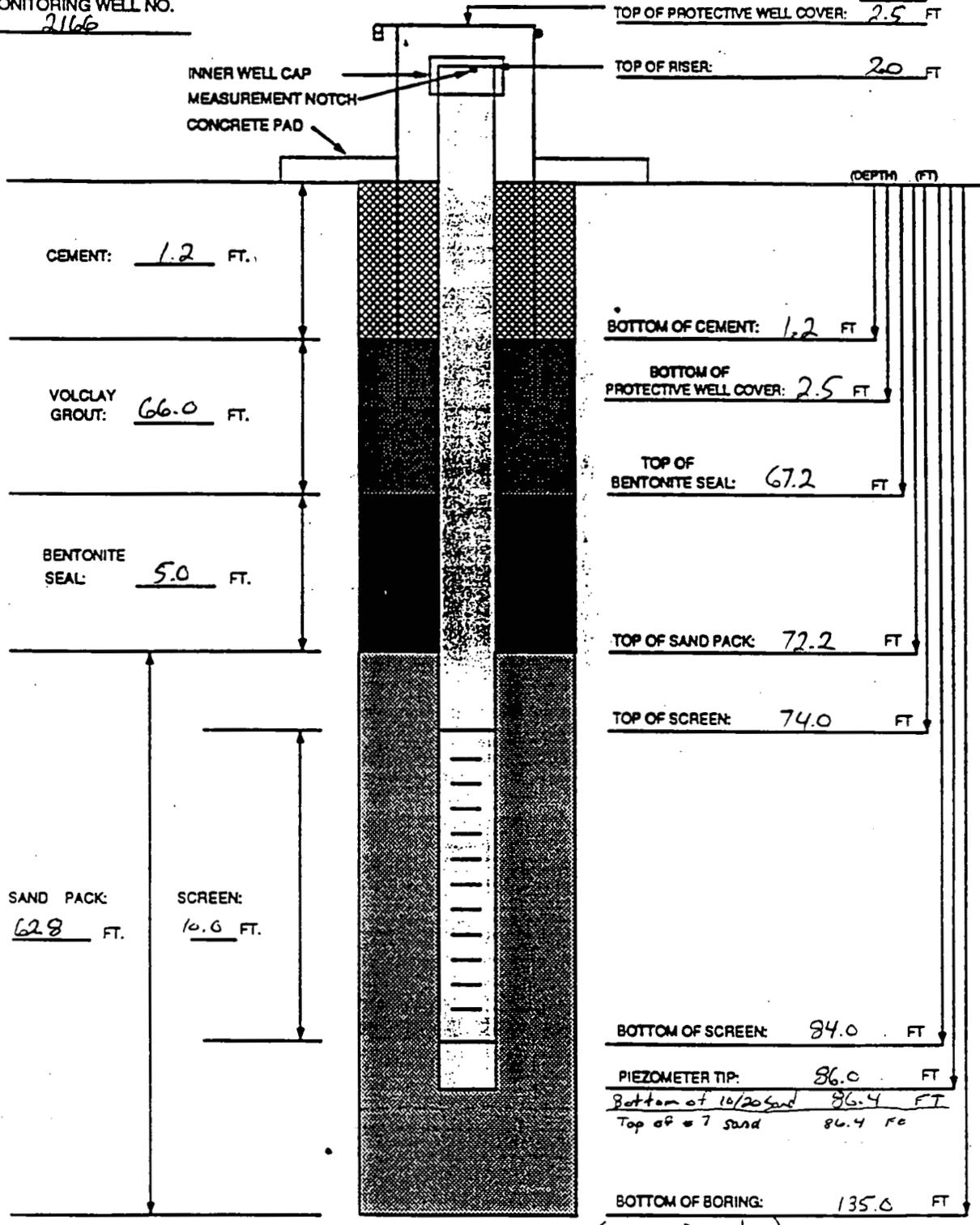
SAA - SAME AS ABOVE
 NA - NOT APPLICABLE
 10/5/92 Background Readings { HNU = 0 ppm
 BX = 60-80 cpm
 10/6/92 Background Readings { HNU = 1 ppm
 BX = 40-60 cpm

202

10/7/92 Background Readings { HNU = 0 ppm
 BX = 40-60 cpm

FERNALD RVFS
INSTALLATION DIAGRAM
MONITORING WELL NO.
2166

INSTALLATION DATE: 10/19/92



BOREHOLE DIAMETER: 4.0 IN. (Inside Diameter)

MATERIALS USED

- SAND TYPE AND QUANTITY: 53 bags x 50 lb #7
- BENTONITE PELLETS (5-GALLON BUCKETS): 2
- BAGS OF VOLCLAY GROUT: 24 bags x 50 lb
- AMOUNT OF CEMENT: 172 bag
- AMOUNT OF WATER USED: 1200 gallons
- OTHER: N/A
- TASK: 602-50-03.12

NOTES:

- 1) RISER PIPE IS 4 IN. ID. 316 STAINLESS STEEL PIPE, FLUSH-THREADED JOINTS.
 - 2) SCREEN IS 4 IN. ID. 316 STAINLESS STEEL PIPE WITH 0.010 IN. SLOTS.
 - 3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
 - 4) WATER DEPTH AND DATE 9/15/92 61.39 FT. 10/19/92
 - 5) TOP OF CASING IS SECURED WITH A STAINLESS STEEL CAP.
 - 6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL
 - 7) WELL CASING HAS A PROTECTIVE COVER WITH PADLOCK.
- GEOLOGIST/ENGINEER: K. Payne

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