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

**09/23/92**

**DOE-FN/EPA  
70  
REPORT**

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY  
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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 August 1 through August 31, 1992, and planned actions for the period September 1 through September 30, 1992.

Highlights of activities in August include the following:

- The Interim Advanced Wastewater Treatment (IAWWT) at the Storm Water Retention Basin (SWRB) has been operating successfully. The effluent from the system is being discharged into the Great Miami River via Manhole No. 175. Immediately after startup of the IAWWT, it was necessary to operate the system in an off-normal mode (i.e., recirculating the low pH water effluent back to the SWRB). The acidic residue left on the resin during its manufacture was extracted by flushing it with water from the SWRB.
- Removal Action No. 5, K-65 Decant Sump Tank was completed. The Removal Action Final Report was transmitted to the EPAs in August.
- The revised Work Plan for Removal Action No. 17, Improved Storage of Soil and Debris, was submitted to the EPAs on August 28, 1992.
- Conditional approval, with comments, was received from the U.S. EPA for the Removal Action No. 18, Control Exposed Material in Pit 5, Work Plan.
- The draft Final Work Plan for Removal Action No. 22, Waste Pit Area Containment Improvement, was submitted to the U.S. EPA on August 31, 1992.
- The revised Removal Action No. 26, Asbestos Removal(Asbestos Program) Work Procedures Compendium was submitted to the U.S. EPA on August 10, 1992.

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**WORK ASSIGNMENTS AND PROGRESS**

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

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

**CA Section IX. Removal Actions**

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

Phase I Removal Actions

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

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

Phase II Removal Actions

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

Phase III Removal Actions

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

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

- o RA No. 24, Pilot Plant Sump.
- 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 August 1992, approximately 31,563 gallons of perched groundwater have been extracted and transported for treatment to the Plant 8 Volatile Organic Compounds (VOC) treatment system. A proposal was made to add water collected from the Plant 6 Motor Bay sump to this action. After verbal concurrence from U.S. EPA and Ohio EPA, the drums of wastewater previously collected from these sumps was transferred to Plant 8 for treatment. Water collected in the sump will continue to 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 Removal Action is also in preparation to address this change.

Plants 2/3 and Plant 8 - The Plants 2/3 and Plant 8 extraction systems became operational on October 23, 1991. Through August 1992, approximately 107,257 gallons of perched water have been collected for treatment from Plant 2/3 and approximately 77,078 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 21,370 gallons of Plant 9 perched water have been extracted and transported to Plant 8 through August 1992.

Plant 8 - The start-up date for the Plant 8 treatment system was July 24, 1991. Through August 1992, approximately 233,162 gallons of groundwater have been transported and treated utilizing the Plant 8 treatment system. The Plant 8 filters, which allow the backflushing of potentially hazardous material into the Plant 8 sump, are being replaced by non-backflushing bag filters.

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 at 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 OU 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 installing new filter units in Plant 8.

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

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

Construction activities were initiated on June 6, 1991. All construction for the Waste Pit Area Runoff Control Removal Action completed on June 15, 1992.

Activities in August included the transmittal of the final closeout letter of this Removal Action to EPAs.

KEY MILESTONES	STATUS	DUE DATE
Completion of construction	Completed June 15, 1992	July 31, 1992

**RA No. 3, South Groundwater Contamination Plume**

**Part 1**

The Work Plan for Part 1, Alternate Water Supply for two industrial users (Albright & Wilson and Delta Steel) was approved by the U.S. EPA on January 3, 1991. Subsequently, Delta Steel was deleted from the current scope of the project with approval of the U.S. EPA and Ohio EPA. A revised Work Plan (Revision 1) 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 contractor was demobilized pending condemnation of remaining properties.
- Rework of above-ground pipe installation at the Albright & Wilson building continues. Electrical tie-ins are ongoing.
- On August 28, 1992, the U.S. District Court granted possession of the Mandery Trust (Rowe & Rowe) property. DOE-FN must wait approximately 20 days for the Leinesch and any "unknown owner" to respond to the U.S. District Court judge on their condemnation packages. Work on Mandery Trust is expected to begin in September.

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

**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:

Package 2A - Discharge Pipeline:

- Construction was discontinued for several days because of concerns over safety issues.
- A Best Management Practice (BMP) action was implemented for retrieval of contaminated rubble at the Great Miami River Outfall Area. This material was discovered during construction excavation activities for Part 2A of the South Plume Removal Action. Manhole 183B construction, which was impacted by this material, was relocated upstream approximately 20 feet in an attempt to allow construction of Part 2A to proceed. Subsequently, because of the need to flatten excavation cut slopes for safety considerations, the resloped excavation intersected contaminated soil located under newly discovered contaminated riprap. Construction activities in the affected area have been discontinued and redirected until a more detailed plan to handle this material is approved by DOE-FN. The impact to the Part 2B1 South Plume schedule will be evaluated once the extent of the retrieval action is known.
- Approval was received on August 6, 1992, from the Ohio Department of Transportation to bore under State Route 128 for routing of the discharge pipeline.

Package 2B1 - Outfall Cofferdam:

- The contractor's cofferdam design package has been received and is being reviewed by the Architect-Engineer.

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

- This work will be impacted by the delay caused by the removal of contaminated material at the river bank. The removal of the contaminated material is currently contingent on completion of Manhole 183B (Part 2A) construction and backfill. An alternative being considered is to expand the cofferdam back to Manhole 183B.
- Package 2B2 - Dissolved Oxygen: Certified-for-Construction drawings have been received for review and signature. The package was issued for bid on August 28, 1992. Bids are due September 24, 1992.
- Package 2C - Wellfield and 2D - Test Well: Schedule delays have been experienced due to extended negotiations with a key property owner, (Mr. Weber). Steps are being taken to evaluate and minimize any impacts to the schedule. A pre-bid meeting was held on August 20, 1992.
- The U.S. EPA commitment date of January 29, 1993, for the initiation of pumping the five recovery wells is in jeopardy. A day-for-day slip went into effect on August 3rd and will continue until access to Mr. Weber's property is obtained.
- The Part 2/3 Work Plan and the Soil and Rubble Sampling and Analysis Plan are being revised. The revised plan is expected to be completed and issued to the U.S. EPA and Ohio EPA in September.

**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 Bionitrification Effluent Treatment System (IAWWT[BDN-ETS]) has a nominal capacity of 100 gpm. Current activities are as follows:

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

IAWWT(SWRB) Unit

The Interim Advanced Wastewater Treatment (IAWWT) unit at the Storm Water Retention Basin (SWRB) has been operating successfully. The effluent from the system is being discharged into the Great Miami River via Manhole No. 175. Immediately after startup of the IAWWT, it was necessary to operate the system in an off-normal mode (i.e., recirculating the low pH water effluent back to the SWRB). The acidic residue left on the resin during its manufacture was extracted by flushing it with water from the SWRB. It was determined that the extreme delay in accomplishing flushing of the low pH from the resin was due to receiving improperly flushed resin from the manufacturer.

IAWWT(BDN-ETS) Unit

The IAWWT(BDN-ETS) was shut down on August 25, 1992, because the flow had become so restricted that only 10 gallons per minute (gpm) were being processed. The continued operation of this unit also would have required an excessive use of manpower.

The #1 Ion Exchange (IX) vessel had previously been taken off line and flushed to clear it of the material clogging the resin. The #1 IX vessel was then refilled with the cleaned resin and the #2 IX vessel was sluiced out for resin cleaning. During this time (approximately one week), the BDN-ETS discharge was being treated through the #1 and #3 IX vessels, which subsequently became clogged to the point where only 10 gpm were being processed. A decision was made to concentrate efforts on determining the best way to protect the IX beds and to not continue treating minimal amounts of BDN-ETS discharge. Two options for protection are being evaluated: tighter mesh bag filters and the addition of chemicals to produce a floc for subsequent removal.

One  $\mu\text{m}$  absolute pleated bag filter elements have been received and will be installed in the bag filters at the BDN-ETS in place of the 3  $\mu\text{m}$  filters currently used. These filters will be evaluated to determine if they are effective at bringing the total suspended solids (TSS) down to a level that will not affect the IX beds (1 ppm or less of TSS). Additionally, flocculation tests are being performed on a variety of flocculent aids and at varying concentrations. The results of these investigations will serve to determine whether enhanced filtration, flocculation, or a combination of the two will be used to prevent the fine material from clogging the IX vessels. Also, particle size distribution testing is being pursued in order to characterize the material being dealt with.

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

Successful operation of the SWRB unit will more than compensate for additional uranium being discharged by the recently completed Waste Pit Area Stormwater Runoff Control Project. Therefore, meeting of the 1,700 pound per year uranium discharge agreement negotiated with the U.S. EPA is not in jeopardy, even with the temporary setback at the BDN-ETS unit. However, full operation of both units will be imperative prior to the addition of the South Plume discharge. Preliminary evaluation of existing equipment at the BDN-ETS and possibly other locations on site for use at the BDN-ETS unit has begun in preparation for the possibility that the addition of flocculation and settling will be the required solution.

**Part 4**

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

- Continued sampling of selected RI/FS wells
- Continued sampling of homeowner wells
- Monitoring of the effluent from the ion exchange unit recently installed on the residences supplied by a well found to have greater than 30 ppb of uranium. The operation has continued to provide a water supply with less than 1 ppb of uranium after treatment.

**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.

- Preliminary results received from the sampling at a western hydropunch boring on the north traverse of hydropunch location have indicated that no organics were present.
- Response to U.S. EPA and Ohio EPA comments on the revised Soil Vapor Procedure and the Part 5 Work Plan (Revision 1) were transmitted to the EPAs on August 12, 1992.

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

Work in September for RA No. 3, Parts 1 - 5 will focus on the following:

- Part 1: Restarting construction on Mandery Trust property.
- Part 2: Completing and issuing revised Soil and Rubble Sampling and Analysis Plan to the U.S. EPA and Ohio EPA, and revising Part 2B1 plan/schedule to address the contaminated material found near Manhole 183B.
- Part 3: Determining modification required at IAWWT(BDN-ETS) to address the solids plugging the ion exchange vessels and beginning implementation of any required revisions.
- Part 4: Continuing sampling of RI/FS and homeowner wells.
- Part 5: Procuring and installing continuous water level monitor in well 2002 in preparation for test well operation.

**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 accurate methods to measure the radon concentration in the silo headspace and by analyzing the relationship of it to observed radon concentration in the vicinity of the silos and at the site boundary. This package is expected to be completed in October 1992, to provide adequate time for the incorporation and evaluation of hourly headspace data for both the months of July, August, and September 1992, as well as the analysis of observed radon data from outside of the silos.

Construction acceptance of the Removal Action No. 4, Silos 1 and 2, data logging system continued in August. The data logging system, when fully operational, will automatically record data headspace radon monitoring, headspace humidity monitoring, and temperature and pressure monitoring of Silos 1 and 2. Also data from four radon gas monitors in the K-65 area exclusion will be recorded.

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

Work in September will include construction turnover of the data logging system to OU 4.

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.

The analytical results for the general water quality parameters, Hazardous Substances List (HSL) volatile organics, HSL semi-volatile organics, and HSL pesticide organics and inorganics were received for the decant liquid taken during the implementation of the Removal Action. A Materials Evaluation Form (MEF), with the available analysis, was completed to determine the required treatment of the decant liquid. The liquid pumped from the K-65 decant sump tank was treated by the FEMP Wastewater Treatment Facility. Treatment of the decant liquid based on the MEF and available analytical results was completed on May 12, 1992.

Work in August 1992 included finalizing the Removal Action final report. The report was issued and transmitted to the EPAs in August. This completes this action.

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

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

**RA No. 6, Waste Pit 6 Residues**

This removal action was completed on December 19, 1990. The only remaining issue related to the Waste Pit 6 Exposed Material Removal Action involved the placement of air monitors to augment the site requirements for estimating fugitive emissions of radionuclides. The installation of the four air monitors was completed in July. This project is closed.

**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.

August activities included the erection of one tension support structure frame. Concrete work of the Phase II pad was nearly completed. Curbing will be installed in September to complete the pad.

Coatings of the concrete surface will be initiated the first week in September. Installation of the fabric covering of the first tensor support structure and the erection of the second support structure will begin the second week in September.

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

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

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

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

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

During August 1992, 10,920 drum equivalents (DE) of low-level waste (LLW) were dispositioned. The August goal for shipments was 7,655 DEs. This resulted in the FEMP LLW shipping being ahead by 1,881 DEs. The FY1992 cumulative total LLW shipped is 94,494 DEs.

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

The FEMP continued shipping low-level thorium waste during August. Twenty thorium shipments (783 drums) were made without incident.

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**RA No. 9, Removal of Waste Inventories (continued)**

Activities for September include continuing low-level thorium waste shipments. Shipping 7,388 DEs of LLW are anticipated and, as a result, continuing to stay ahead of schedule to reach the 100,000 DE goal.

**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.

The potential use of active and inactive ash 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

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

RA No. 11 was completed. The removal of the contents, structure, and filter material for the Experimental Treatment Facility (ETF) was completed 22 days ahead of schedule. Demobilization of the ETF Project has been completed. It was backfilled and capped, using a clay cover.

Activities for August included the issuance of the Draft Removal Action Final Report for comment.

Planned activities for September include the issuance of the Removal Action Final Report and the finalization of the close-out review process.

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.

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, 8, and 9 have been completed. Plants 5, 6, and the Pilot Plant are in rough draft form.

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

Inventorying of expense equipment items continued; 2,722 expense items are currently in the data base; 1,255 have been field verified, 578 are on a "shopping list" to ascertain on-site use, 35 have been transferred to Maintenance, and 99 have been placed on AC-563 Forms to be excessed.

The capital equipment inventory continued; of an estimated 1,707 total number of items, 1,132 have been put on AC-563 Forms to be excessed, and 575 have been identified as "In Use/Future Use" items. The capital equipment disposition task is 95 percent completed.

Relocation of Building 51 capital equipment and expense items, which began in March, has been completed. This equipment has been relocated to allow for the AWWT project to proceed.

The effort to prepare the task specific Health and Safety Plan for Safe Shutdown is ongoing. The second draft was issued for internal review, and comments are being resolved.

The project to transfer the remaining 4A metal inventory from the Fernald Environmental Management Project (FEMP) to the Defense Consolidation Facility (DCF) in Snelling, South Carolina continued. Concurrence was received to deal with the three rail cars that had been loaded with drummed material. These cars had been on hold since the June 17 lid-popping incident. A nylon safety net will be used over the drums on the rail cars to allow safe monitoring and purging of hydrogen from the drums. As work procedures allow, the drums will be removed from the cars and placed back in the warehouse so that the cars can be utilized for other materials and released to curtail any further demurrage charges.

The liner tearing problem was resolved on the 4A metal shipments. Plywood is being used to protect the liners, and we have switched from metal to new wooden skids. Also, the materials are being packaged differently to prevent any contamination of the cars, since DCF is unloading in a clean area.

In a program review meeting on August 25, 1992, a recovery plan was presented to the DOE-FN and the Department of the Army on how we plan to make up the time lost due to various unexpected circumstances. The presentation was well-received, and the Army provided the additional funding needed to cover the changes in the agreement, such as consolidation and shipment of the rolled scrap (228 Material Description Code, 1012 MTU) to the Nevada Test Site (NTS) rather than to Snelling, South Carolina. Six gondola cars have been shipped as of August 31 for a total of 318 metric tons uranium (MTU); balance to be shipped is 2535 MTU (1523 MTU to the DCF and 1012 MTU to NTS).

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

The project to transfer selected pieces of the derby breakout and slag milling systems to the Department of the Army for relocation at Aerojet Ordnance Tennessee is still on hold. A decision deadline of October 1, 1992, was given to the Army; at that time, the equipment will be excessed, even if the Army accepts the equipment.

Planned activities for September include continuing the capital equipment disposition effort; and continuing activities to transfer 4A metal from the site.

**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.

The bid opening for the subcontract for the silo dismantling was held August 6 and forwarded to DOE for approval on August 18, 1992. September activities include the approval of the demolition contract by DOE. Mobilization of the contractor is forecasted to begin in October.

The procurement of long-lead items (e.g., High Efficiency Particulate Air ventilation system) is in progress.

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

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
Submit Work Plan to the U. S. EPA	Completed January 9, 1992	January 10, 1992
Submit Revised Work Plan to the U.S. EPA	Completed March 27, 1992	March 30, 1992
Complete design.	Completed May 6, 1992.	June 18, 1992
Initiate field activities.	Open, on schedule.	October 18, 1992
Complete Removal Action	Open, on 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.

The revised Work Plan was resubmitted to the U.S. EPA on March 30, 1992. Conditional approval of the Work Plan was received from the U.S. EPA on May 20, 1992. Responses were provided to the EPAs on June 23. The revised Work Plan was submitted to the EPAs on July 15, 1992. The Ohio EPA approved the Work Plan on July 29, 1992.

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 and an additional commitment was made to complete initial hot spot excavations and additional sampling of the 100 pli/g region identified by the walk-over 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)**

Areas to be excavated have been marked in the field and white metal boxes are in place to be filled. Rock/gravel laying for the interim box storage area has been initiated. September activities will include the excavation of the soils and additional sampling and analysis.

KEY MILESTONES	STATUS	DUE DATE
Submit Work Plan to the U.S. EPA	Completed January 23, 1992	January 23, 1992
Submit Revised Work Plan to the U.S. EPA	Completed March 30, 1992	March 30, 1992
Resubmit Revised Work Plan to the U. S. EPA	Completed July 15, 1992	July 15, 1992
Phase I - Completion of walkover survey excavations of contaminated soils, and completion of additional sampling.	Open, on schedule	October 30, 1992
Phase II - Complete post excavation and submit interim reports.	Open, on schedule	April 18, 1993
Phase III - Revise RSE and submit final report.	Open, on schedule	July 18, 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 onsite. This removal action will eliminate the potential threat of additional material releases to the environment. Approximately 1,300 tons of scrap copper along with approximately 3,000 tons of recoverable scrap metals are the focus of this removal action.

The revised Work Plan was resubmitted to the U.S. EPA on April 3, 1992. Conditional approval of the Work Plan was received from the U.S. EPA on May 20, 1992. Comment-responses and revised Work Plan pages were provided to the EPAs on June 26, 1992. Draft U.S. EPA approval of the comment-responses was received on July 29.

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**RA No. 15, Scrap Metal Piles (continued)**

The subcontractor's Removal Action Project Plan (RAPP) for Phase I was transmitted to the EPAs on August 24, 1992.

September activities will include the revision of the RAPP pending receipt of EPA comments. Additionally, Phase IIA Containerization will be initiated in September.

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 June 19, 1992	September 30, 1992
Phase I - Complete	Open, on schedule	March 30, 1994
Phase IIA - Initiate Containerization	Open, on schedule	March 30, 1994

**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.

Bids were received on August 27, 1992. The construction manager is in the process of confirming the bid received from the apparent low bidder.

RCRA determination has not been made yet. Construction cannot be awarded until sampling is complete.

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

Work in September will concentrate on: the submittal of responses to comments on the conditionally approved Removal Action No. 16 Work Plan, the confirmation of the apparent low bidder, and obtaining RCRA determination.

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
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 onsite. This will eliminate the potential threat of additional material releases to the environment due to wind, rain, or vehicular traffic. The activities in this Removal Action will include characterization, interim storage, and management of the contaminated soil and debris materials until the final remediation under Operable Unit 3.

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.

September activities will include continued design work.

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

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
Submit Work Plan to the U.S. EPA	Completed March 25, 1992	March 25, 1992
Receive U.S. EPA comments on the Work Plan	Received July 29, 1992	April 24, 1992
Submit Revised Work Plan to the U.S. EPA	Completed August 28, 1992	August 28, 1992

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

The Control Exposed Material in Pit 5 Removal Action is being developed and implemented using a phased approach. This phased approach considers and utilizes information obtained from the liner repair activities, the pit berm investigation, which addresses the overall pit structural integrity, and the significance and magnitude of potential and actual emissions from the waste pit. The schedule for this Removal Action is currently being 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.

Activities for August included the completion of the design phase for the removal action. The conditional approval of the Work Plan was received from the U.S. EPA with comments.

Planned activities for September include U.S. EPA comment resolution of the Work Plan. The start date for field work is set for September 28, 1992.

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

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**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.

August activities included continued preparation of the Characterization Plan and project functional requirements.

September activities will include review of the Characterization Plan and the preparation of the Removal Site Evaluation and the Removal Action Work Plan.

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

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

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

Activities in August included revising the Plant Test Authorization and Health and Safety Plan, conducting additional personnel training, and purchasing personal NO<sub>2</sub> monitors. All of the activities incorporated lessons learned from the NO<sub>2</sub> exposure incident in July. A drill was conducted to ensure that the changes made to documentation and additional training are adequate to protect personnel in the event of an operational upset.

September activities will include resuming processing the first batch of UNH.

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

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
System Integrity Testing	Completed February 13, 1992	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	Schedule being developed

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

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

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

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

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

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**RA No. 21, Expedited Silo 3 (continued)**

Work in August included completing the Material Evaluation Form. The equipment removed from Silo 3 was determined to be non-RCRA. Work in September will include the shipment of waste to NTS. After this is completed, the removal action final report will be initiated.

**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 August included the submittal of the draft Final Work Plan to the U.S. EPA on August 31, 1992.

Planned activities for September include the issuance of a letter to the U.S. EPA confirming the verbal agreement between the U.S. EPA and DOE to sow grass as a prerequisite for Work Plan approval.

KEY MILESTONES	STATUS	DUE DATE
Submit Work Plan to the U.S. EPA	Completed August 31, 1992	August 31, 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. By removal of the debris, DOE-FN determined that no additional action is required until remediation.

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

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

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

The Work Plan was submitted to the EPAs on July 24. U.S. EPA comments were received on August 27, 1992. September activities will include resolution of comments and the revision to the Work Plan.

The initial pump-out of accumulated liquid (185 gallons) from the Pilot Plant sump occurred on July 24, 1992. A second pump-out is planned for September. Pumping will continue on a monthly basis until the removal of the sump is initiated.

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

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

The Nitric Acid Rail Car is located on the northern perimeter of the production area and east of Building 63. The FEMP RCRA Part A and Part B 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.

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

August activities included the initial Work Plan and Removal Site Evaluation submittal to DOE on August 31, 1992. September activities will include review of the Removal Site Evaluation and the Removal Action Work Plan.

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

**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.

Work Procedures Compendium for this Removal Action was submitted on May 19. U.S. EPA disapproval was received on July 10. Comment-responses were submitted on July 28. August activities included the submittal of the comment responses and revised supporting documentation on August 10, 1992. September activities will include continuing field activities in asbestos material identification and abatement.

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

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

This removal action calls for the submittal of the Engineering Evaluation/Cost Analysis 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 document submittal for DOE review on August 14, 1992. September activities will include comment-responses and revisions to the EE/CA pending receipt of DOE comments.

<b>KEY MILESTONES</b>	<b>STATUS</b>	<b>DUE DATE</b>
Submit Engineering Evaluation/Cost Analysis (EE/CA) to the U.S. EPA to support Proposed Removal Actions for Managing Contaminated Structures	Open, on schedule	December 15, 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. The Clearwell will not be sampled at this time. Discussions between DOE and the U.S. EPA are underway to determine whether Pit 5 needs to be sampled.

**Issues:**

On May 27, 1992, a conference call was held with the U.S. EPA to determine if radon flux measurements should be taken for Pits 4 and 5 and the Clearwell. At the request of U.S. EPA, radon sampling of the Pit 4 vents will be performed along with a few representative samples from the Pit 4 cap. Radon sampling for Pit 5 will not be conducted if the removal action to control emissions is completed as scheduled.

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**1.1.2 Radon Sampling Program (continued)**

**Corrective Actions:**

Install Pit 4 radon flux measurement devices.

Obtain written approval from the U.S. EPA to modify the November 19, 1991 FFA-CARE and delete the requirement for sampling Pit 5 and the Clearwell.

**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 clamshell and crane.

**Status:**

The sampling of Pits 5 and 6 and the Clearwell is complete. These samples were shipped to the analytical and treatability laboratory where characterization and stabilization testing is ongoing. Analytical data for characterization was received from Pits 5 and 6 but not the Clearwell.

**Issues/Corrective Actions:**

None to report.

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## 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 stabilization binding agents are being evaluated including portland cement, flyash, and sodium silicate. Clay (attapulgite and clinoptilolite) will be added to reduce the leachability of metals in the waste. Glass formers and modifiers 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 using composite samples. The advanced phase consists of testing on strata samples. Each phase contains two stages permitting additional reagent testing as necessary. An optional phase to evaluate waste form durability, radon emanation, and radon leaching is also being considered.

### Status:

Stabilization preliminary phase Stage 2 testing was completed on August 27, 1992, with the receipt of the Burn Pit modified toxicity characteristics leaching procedure (MTCLP) results. Preparation of preliminary phase Stage 2 molds for the Clearwell and Burn Pit were completed in July 1992. Although Stage 1 unconfined compressive strength (UCS) results for the Burn Pit were unexpectedly low, new formulations prepared for Stage 2 testing have acceptable UCS. Burn Pit and Clearwell MTCLP results must still be evaluated. All other pits had acceptable UCS and MTCLP results.

All preliminary phase Stage 1 vitrification analyses consisting of the Nuclear Waste Glass Product Consistency Tests (PCT) and the MTCLP were completed and loaded into the treatability database on July 16, 1992. Data evaluation was completed on these results and it was concluded that acceptable glass was prepared for all pits.

The advanced phase Stage 1 treatability tests were initiated in August 1992 for both stabilization and vitrification.

### Issues/Corrective Actions:

None to report.

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**1.3 Remedial Investigation**

**Scope:**

A 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:**

Data validation for the 13 Well Program is complete. The data was entered into the database and was officially complete on August 5, 1992.

Potentiometric cross-sections of the waste pit area are being prepared to establish the hydraulic relationship between the perched water and the water in the waste pits.

**Issues:**

As a result of a recent inspection of seven Operable Unit 1 monitoring wells, it was observed that staining and minor water leakage are occurring. The wells were installed in 1985. As a result of the potential leakage, the well casings will be removed, plugged, and abandoned.

**Corrective Actions:**

None to report.

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**1.3 Remedial Investigation (continued)**

**OU 1 REMEDIAL INVESTIGATION REPORT**

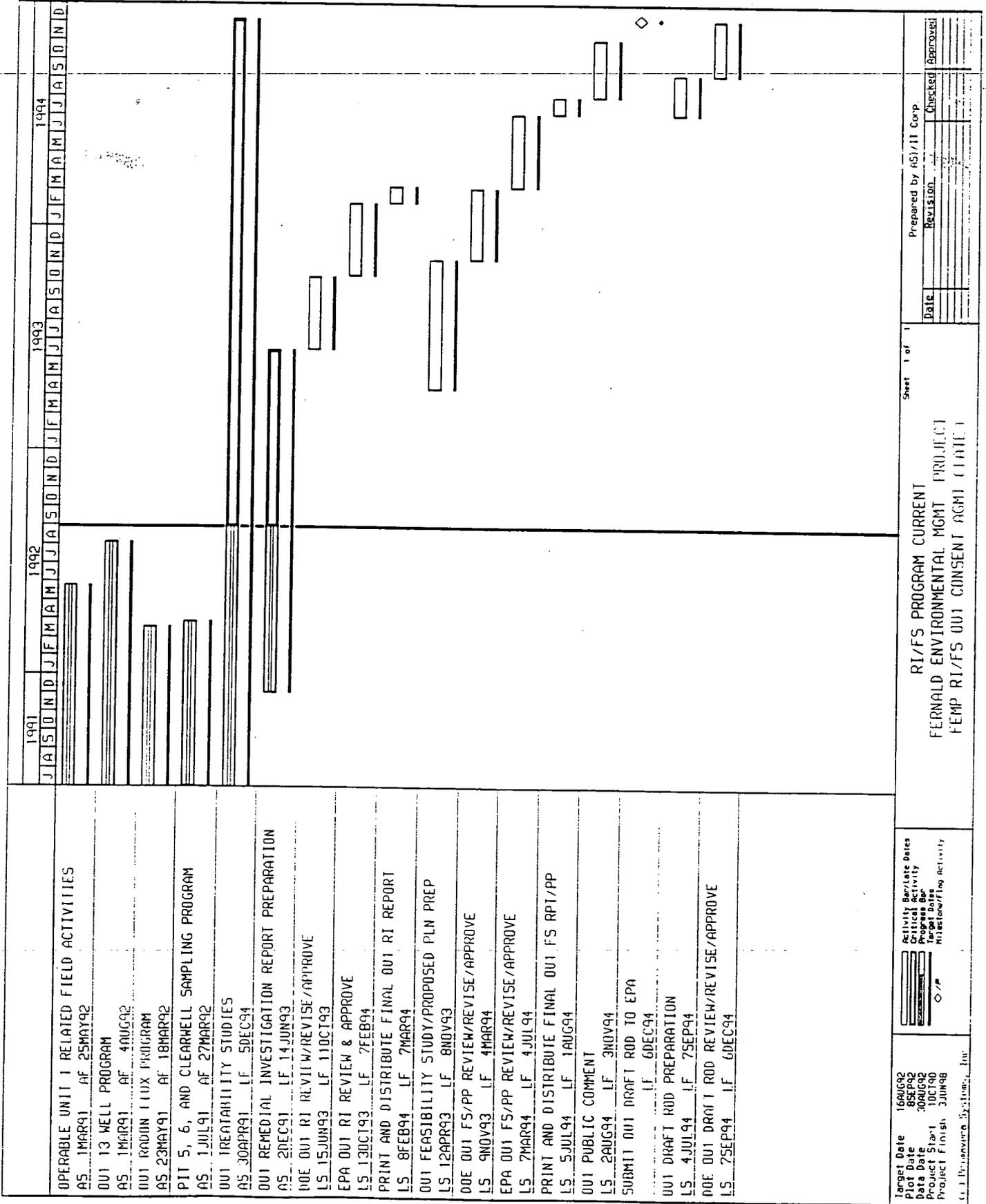
**PRIMARY**

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

**1.4 Planned Activities for September 1992**

- Continue work on the advanced phase Stage 1 treatability experiments while completing preparation of advanced phase Stage 1 stabilization molds.
- Complete analysis of Burn Pit and Clearwell samples.
- Complete validation of Pit 5 and 6 sampling data.



Prepared by 451/11 Corp.	Checked	Approved
Revision		
Date		

Sheet 1 of 1  
 RI/FS PROGRAM CURRENT  
 FERNALD ENVIRONMENTAL MGMT PROJECT  
 FEMP RI/FS UNIT CONSENT AGMT (DATE)

Activity Bar/Date  
 Critical Activity  
 Program Bar  
 Milestones  
 Milestones/Activity

Target Date 16AUG92  
 Plot Date 8SEP92  
 Data Date 30AUG92  
 Project Start 10CT90  
 Project Finish 30JUN98  
 U.S. Environmental Systems, Inc.

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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 and was not previously encountered.

**Status:**

Monitoring Well 1433 was installed on July 29, 1992. No groundwater was encountered. Well 1433 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. Plans are being developed to plug and abandon Monitoring Well 1433.

**2.2 Treatability Studies**

**Scope:**

This study supports the FS and subsequent remedy selection for Operable Unit 2. The study will demonstrate whether waste stabilization achieves the desired level of material strength and will provide quantitative leaching data for geochemical and computer modeling of groundwater contaminant transport. The study is composed of two parts: two preliminary phases (to support remedy screening) and an advanced phase (to support remedy selection). The preliminary phase involves evaluating a range of stabilization mix formulations to determine a representative formulation which meets the desired strength criteria. The advanced phase involves performing tests on stabilized waste using representative formulations determined in the preliminary phases.

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**2.2 Treatability Studies (continued)**

**Status:**

In a letter of August 17, 1992, U.S. EPA provided comments on the Treatability Study Report and "disapproved" the document.

**Issues/Corrective Actions:**

A comment response document will be prepared and presented to the U.S. EPA in September. A supplement to the document will be proposed incorporating the resolution to the U.S. EPA comments.

**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 revised RI Report was submitted to DOE-Headquarters (HQ) on August 14, 1992. DOE-HQ comment period extends through September 14, 1992. A comment resolution meeting is tentatively scheduled for September 21, 1992. The draft RI Report is expected to be submitted to U.S. EPA on October 14, 1992.

**Issues:**

The August 14, 1992, revised RI Report identified chemicals of concern based on regional background data. FEMP site-specific background data has recently become available, but not in time for incorporation in this internal draft of the RI Report. Preliminary review of the new site specific background data indicates that some new chemicals of concern must be evaluated and included in the next version of the RI report. The analysis, including required updates to the baseline risk assessment, will be included in the first draft submittal to the U.S. EPA and Ohio EPA.

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**2.3 Remedial Investigation (Continued)**

**Corrective Action:**

The identification of new chemicals of concern and the required changes to the RI Report and Baseline Risk Assessment is expected to be complete by September 18, 1992. The necessary changes will be incorporated into the draft RI Report for submittal to U.S. EPA in October 1992.

**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.	10/19/92 C	12/17/92 C	01/14/93 C

C = Consent Agreement Date

**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 site.

**Status:**

Alternative descriptions were refined and expanded in August 1992. Initial cost estimates for each alternative within each sub-unit of Operable Unit 2 were completed and the first rough drafts of Section 1 (Introduction and Background), Section 2 (Identification and Screening of Technologies and Process Options), and Section 3 (Development and Screening of Alternatives) were initiated.

The scoring system for the comparative analysis of alternatives was also reviewed and is being refined for the FS Report.

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**2.4 Feasibility Study (continued)**

**Issues:**

FS risk assessment activities cannot be completed until the Baseline Risk Assessment is completed. These delays can pose a potential schedule impact on the FS Report.

**Corrective Actions:**

The FS recovery plan is in place and all required activities have been initiated. There is still significant overlap of Baseline Risk Assessment and FS risk assessment activities; however, the first draft FS Report is still expected to be submitted for DOE-FN review by November 16, 1992. This date will support the Consent Agreement submittal date of March 15, 1993 to U.S. EPA.

**OU 2 FEASIBILITY STUDY REPORT**

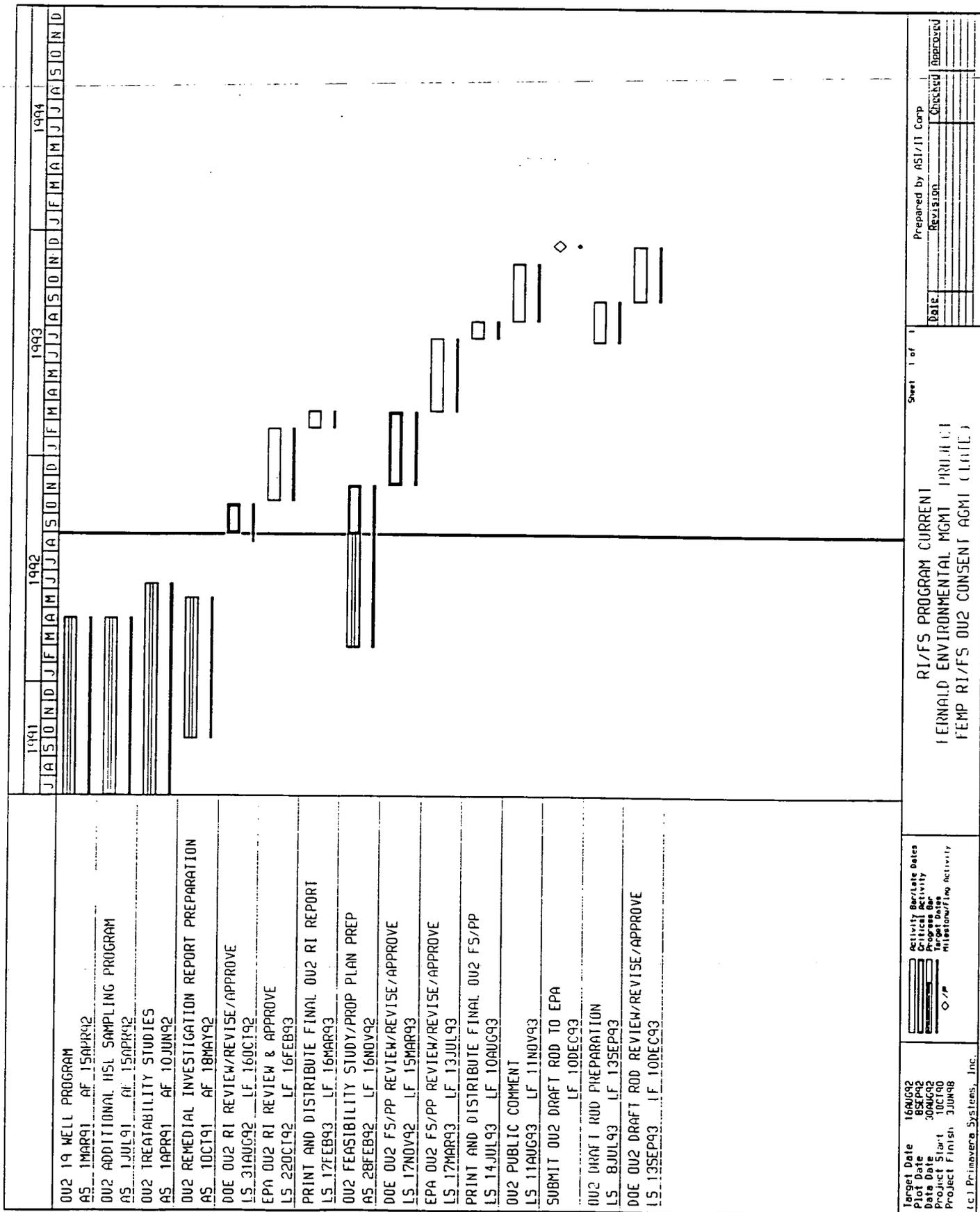
**PRIMARY**

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 September 1992**

- Receive and incorporate DOE-HQ comments into the RI Report.
- Hold DOE-HQ comment resolution meeting on September 21, 1992.
- Finalize all required RI Report revisions by September 30, 1992; prepare draft RI Report for submittal to U.S. EPA on October 14, 1992.
- Complete FS cost estimates for the revised alternatives.
- Review U.S. EPA comments on the Treatability Study Report and prepare a response document for submission to U.S. EPA.



Prepared by ASI/IT Corp	
Date	Checked

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RI/F5 PROGRAM CURRENT  
 FERNALD ENVIRONMENTAL MGMT PROJECT  
 FEMP RI/F5 002 CONSENT AGMI (L11C)

Activity	Activity Bar	Activity Bar	Activity Bar
Critical Activity	Critical Activity Bar	Critical Activity Bar	Critical Activity Bar
Progress Bar	Progress Bar	Progress Bar	Progress Bar
Intermittent Activity	Intermittent Activity Bar	Intermittent Activity Bar	Intermittent Activity Bar
Milestone/Flow Activity	Milestone/Flow Activity Bar	Milestone/Flow Activity Bar	Milestone/Flow Activity Bar

Target Date 16AUG92  
 Plot Date 8SEP92  
 Data Date 30AUG92  
 Project Start 10C190  
 Project Finish 30JUN98

(C.J. Primavera Systems, Inc.)

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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 August 1992 included development of required field instrument survey, and laboratory analytical procedures and development of a revised approach for the field characterization for Operable Unit 3. The revised approach provides significant additional sampling location, method and analyte detail in the Sampling and Analysis Plan portion of the RI/FS Work Plan Addendum. U.S. EPA and Ohio EPA comments on the Operable Unit 3 RI/FS Work Plan Addendum were received on August 4, 1992. The new Work Plan rationale (modified by U.S. EPA and Ohio EPA comments) was presented to U.S. EPA and Ohio EPA on August 19, 1992. It is to be detailed in a September submittal.

**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, waste/contaminant quantities), a work plan rationale (e.g., data requirements, SAP approach) and specific Operable Unit 3 RI/FS tasks.	08/04/92 A	09/4/92 C

C = Consent Agreement Date

A = Actual

**3.2 Issues/Corrective Actions**

None to report.

**3.3 Planned Activities for September 1992**

- Resolve U.S. EPA and Ohio EPA comments on Operable Unit 3 RI/FS Work Plan Addendum.

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**3.3 Planned Activities for September 1992 (continued)**

- Continue preparation of revised Work Plan approach, including researching and detailing 120 key components in the Sampling and Analysis Plan.
- Continue field implementation support planning (training, procurement, procedures, and staffing).
- Prepare and submit a sample work plan excerpt containing sampling approach and protocols and example application on Building 39A to U.S. EPA and Ohio EPA on September 15, 1992.

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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 Vertical Borings:**

**Scope:**

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

**Status:**

All initial sampling activities and laboratory analysis of the samples have been completed. Data validation has been completed and the data has been entered into the database.

**Issues:**

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

**Corrective Actions:**

The contract laboratory completed the analysis of the samples that were retrieved from archive storage and submitted for analysis for the missed parameters at the indicated intervals. Validation and data entry are ongoing.

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**4.2 Treatability Studies**

**Scope:**

The Treatability Study Work Plan provides additional information 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 a 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 experiments are complete and analyses are in progress. For TCLP analyses, there are 12 samples and two quality assurance (QA) samples for Silos 1 and 2 material and two samples and a QA sample for Silo 3 material. For the 5-day static leach test analyses, there is an identical number of samples. Permeability testing was initiated on July 6, 1992 and completed on July 29, 1992.

Chemical Extraction tests - Precipitation experiments were completed in August 1992 and the preparation of cement stabilized molds on the resultant precipitate was initiated on August 17 and completed on August 19. Vitrification of the liquid resulting from the chemical extraction process began on August 19.

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**4.2 Treatability Studies (Continued)**

Vitrification Treatability Tests - The 100 g test melts were completed this month. Glass formulations for Sequence A-D Tests were developed based upon the 100 g tests. Bench-scale melts also started on schedule on July 29, 1992. Bench-scale melts for sequences A through D were completed. An open and closed system melt were performed for each sequence. The glasses from all the melts passed the modified TCLP for metals. Vitrified waste forms for TCLP and PCT are ready to ship when the appropriate contracts are in place. Measurement of radon emanation from the vitrified waste is currently in progress.

**Issues:**

TCLP analytical results from the chemically extracted solids are expected on September 10, 1992, due to reruns for lead and other radioactive constituents. This could result in a schedule delay if analytical results from the stabilization program are also received late.

**Corrective Actions:**

Closely monitor receipt of analytical results received from the stabilization program and request, evaluate, and validate partial analytical data packages as necessary to minimize schedule slippage.

**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:**

Validated data for Operable Unit 4 received to date is being interpreted. The baseline risk assessment and fate and transport calculations are ongoing for Silo 3 and have been initiated for Silos 1 and 2.

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**4.3 Remedial Investigation Report (Continued)**

**Issues:**

Delays in completion of data validation and database entry have delayed evaluation of the RI data, as reported in the June 1992 and July 1992 monthly reports. 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 per Consent Agreement dates.

**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 OU4 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

Ongoing activities include evaluating the field and analytical data, revising previous drafts of the RI, creating new figures and tables, and continuing fate and transport calculations.

**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.

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**4.4 Feasibility Study (Continued)**

**Status:**

The revision of alternatives described in the U.S. EPA-approved Initial Screening of Alternatives proceeded during July 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. They are still discussing whether all off-site alternatives include on-property interim storage with adequate capacity for up to 10 years. Alternative revisions are ongoing.

**Issues/Corrective Actions:**

None to report.

**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 September 1992**

- Continue revisions to the RI Report and baseline risk assessment modeling for Silos 1, 2 and 3 contents.
- Complete revision of FS alternatives and initiate fate and transport modeling for the FS.
- Complete analyses on the stabilized precipitated material and vitrified liquid from the chemical extraction experiments.

		1991	1992	1993	1994	1995	1996	1997
OPERABLE UNIT 4 RELATED FIELD ACTIVITIES		[Gantt chart bars for 1991-1997]						
AS 15JAN91	AF 20JUL92	[Gantt chart bar]						
004 FIELD ACTIVITY - SLANT BORINGS		[Gantt chart bars]						
AS 25JAN91	AF 20JUL92	[Gantt chart bar]						
004 FIELD WORK - VERTICAL BORINGS		[Gantt chart bars]						
AS 15JAN91	AF 20JUL92	[Gantt chart bar]						
004 FIELD WORK - CONTENT SAMPLING		[Gantt chart bars]						
AS 12JUL91	AF 20JUL92	[Gantt chart bar]						
004 TREATABILITY STUDIES		[Gantt chart bars]						
AS 18JAN91	LF 23APR93	[Gantt chart bar]						
004 REMEDIAL INVESTIGATION REPORT PREPARATION		[Gantt chart bars]						
AS 10CT91	LF 17DEC92	[Gantt chart bar]						
DOE 004 RI REVIEW/REVISE/APPROVE		[Gantt chart bars]						
LS 18DEC92	LF 15APR93	[Gantt chart bar]						
EPA RI REVIEW & APPROVE		[Gantt chart bars]						
LS 19APR93	LF 13AUG93	[Gantt chart bar]						
PRINT AND DISTRIBUTE FINAL RI REPORT		[Gantt chart bars]						
LS 16AUG93	LF 10SEP93	[Gantt chart bar]						
004 FEASIBILITY STUDY/PROPOSED PLAN PREP		[Gantt chart bars]						
AS 2DEC91	LF 14MAY93	[Gantt chart bar]						
DOE 004 FS/PP REVIEW/REVISE/APPROVE		[Gantt chart bars]						
LS 17MAY93	LF 9SEP93	[Gantt chart bar]						
EPA 004 FS/PP REVIEW/REVISE/APPROVE		[Gantt chart bars]						
LS 10SEP93	LF 7JAN94	[Gantt chart bar]						
PRINT AND DISTRIBUTE FINAL 004 FS/PP REPORT		[Gantt chart bars]						
LS 10JAN94	LF 4FEB94	[Gantt chart bar]						
004 PUBLIC COMMENT		[Gantt chart bars]						
LS 7FEB94	LF 11MAY94	[Gantt chart bar]						
SUBMIT 004 DRAFT ROD TO EPA		[Gantt chart bars]						
	LF 10JUN94	[Gantt chart bar]						
004 DRAFT ROD PREPARATION		[Gantt chart bars]						
LS 6JAN94	LF 14MAR94	[Gantt chart bar]						
DOE 004 DRAFT ROD REVIEW/REVISE/APPROVE		[Gantt chart bars]						
LS 14MAR94	LF 10JUN94	[Gantt chart bar]						

DATE	REVISION	Checked	Approved

Sheet 1 of 1  
 RI/FS PROGRAM CURRENT  
 FERNALD ENVIRONMENTAL MGMT PROJECT  
 FEMP RI/FS 004 CONSENT AGMT (LATE)

Activity	Baseline Dates
Critical Activity	
Target Dates	
Milestone/Flag Activity	

Target Date 16AUG92  
 Plot Date 05SEP92  
 Data Date 30NOV92  
 Project Start 01JUN90  
 Project Finish 30JUN96  
 L.C. Primavera 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:**

This addendum was transmitted to the U.S. EPA and the Ohio EPA in April 1992 for review and approval. Comments were received from the Ohio EPA and U.S. EPA and are being reviewed.

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

The first round of groundwater sampling for HSL volatiles, general water quality, and full radiological parameters was completed for these 10 existing wells.

Nine new wells are scheduled to be installed according to the current Work Plan for this task and their status is as follows:

- 1836 Installation completed. Well development and first round of groundwater sampling completed.
- 1837 Installation completed. Well development and first round of groundwater sampling completed.
- 1838 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)**

- 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.
- 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:**

Monitoring Well 1842 was installed approximately 1.5 feet above the existing transfer line. The reason for this 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. This will require a variance to the Work Plan for modified installation techniques to prevent cross contamination.

**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 is based upon data from water samples collected from Well 2067. 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.

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**5.1.2 Outfall Line Investigation (continued)**

**Status:**

The field investigation is currently scheduled to begin in September 1992.

**Issues/Corrective Actions:**

None to report.

**5.1.3 Magnetic Anomalies Trenching**

**Scope:**

This Work Plan Addendum defines the additional field activities required for the characterization of the northeast area of the FEMP for the Operable Unit 5 RI/FS. Geophysical surveys conducted in the northeast area during the fall of 1989 and in the area immediately to the south during the summer of 1990, identified magnetic anomalies north of the road and in the fire training area. Excavation is necessary to characterize the areas of the magnetic anomalies, the stratigraphy of the anomalous area, and perched groundwater which may be present. The additional activities are necessary to provide adequate information for assessment and potential remedial design.

**Status:**

The field investigation and earth work was completed in August 1992, on three of the seven magnetic anomaly locations identified in the Work Plan. The following trenches were completed:

Trench No. 1 N 482,253/E 1,381,803

Trench No. 2 N 482,286/E 1,382,048

Trench No. 3 N 482,718/E 1,381,932

Trench 1 and 2 revealed nothing more than what appears to be undisturbed soil and subsoil horizons at the trench excavations. Trench No. 3 yielded construction debris consisting of pieces of stainless and carbon steel scrap metals and one paint can lid. No radiological readings above background levels were detected and no measurable HNu readings were observed. Trenches 1, 2, and 3 were all advanced to a depth of approximately 18 inches. Minor trenching activities also took place in the first foot of top soil of Trench 4 at location N 482,720/E 1,381,872. No man-made objects were discovered.

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**5.1.3 Magnetic Anomalies Trenching (continued)**

**Issues/Corrective Actions:**

The consensus regarding the current findings is that the geophysical techniques used to identify the anomalies were merely picking up natural interference which is giving a false positive indication that a buried manmade feature(s) exists. Valid concerns questioning the justification for continuing the trenching investigation were raised. Based upon field investigation findings, further trenching efforts were terminated because a majority of the magnetic anomalies appeared to be the result of the geophysical techniques used during the survey which were affected by natural phenomena, such as a concentration of iron oxide mineralization or a density difference between a clay horizon and strata of a different type. However, manmade buried ferrometallic objects (construction debris) were discovered in one of the trenches.

**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 graphite furnace area (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 and it was distributed in early August 1992.

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**5.2 Treatability Study (continued)**

Evaluation of remedy screening Stage 1 testing of ID-A and ID-B soils has been completed. Remedy screening Stage 2 testing of ID-A and ID-B soils has been initiated. Homogeneity tests on OU5-A soil were completed and results are satisfactory. The drums containing OU5-A soils will be sampled in early September and initial characterization completed. Pilot plant design has been initiated in support of remedy selection.

**Issues/Corrective Actions:**

None to report.

**5.3 Initial Screening of Alternatives**

**Scope:**

The Initial Screening of Alternatives 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 Initial Screening of Alternatives Report were received and are being reviewed for disposition. A draft copy for the U.S. EPA is scheduled to be completed in October 1992. Document preparation is proceeding ahead of the Consent Agreement schedule.

**Issues/Corrective Actions:**

None to report.

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

**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.	04/16/93 C	06/15/93 C	07/15/93 C

C = Consent Agreement Date

**5.4 Planned Activities for September 1992**

- Sample and initially characterize OU5-A soils.
- Initiate remedy screening Stage I tests on OU5-A soils.
- Continue work on the remedy screening pilot test program by preparing required design, permitting, and procedural documents.
- Resolve the comments received from the regulators and incorporate resolutions into the Operable Unit 5 Work Plan Addenda through document revision. Upon resolution of the comments and the revision of the 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.
- Continue with the second round of groundwater sampling at Wells 1150, 1154, 1167, 1206, 1207, 1208, 1213, 1215, 1226, and 1237.
- Complete the reinstallation of Monitoring Well 1842.
- Mobilize field crews and initiate subsequent field investigation activities for Monitoring Well 2119, if landowner access agreements are secured in September.

Activity	Start Date	End Date	1991	1992	1993	1994	1995
OPERABLE UNIT 5 RELATED FIELD ACTIVITIES							
AS 10CT90 LF 26JUL93							
FACILITIES TESTING							
AS 29MAR91 LF 12JUL93							
OUS FIELD WORK 31 WELL PROGRAM							
AS 15MAR91 LF 26JUL93							
OUS FIELD WORK - PADDYS RUN SAMPLING							
AS 6SEP91 LF 26JUL93							
OUS FIELD WORK - 8 RCRA WELLS							
AS 29MAR91 LF 12JUL93							
OUS FIELD WORK - 6 WELL PROGRAM							
AS 13JAN91 AF 15MAY91							
OUS FIELD WORK - WATER LEVEL MEASUREMENTS							
AS 10CT90 AF 28OCT91							
MAGNETIC ANOMALY TRENCHING							
AS 23MAR92 LF 4SEP92							
OUS FIELD WORK - MISC. ADDITIONAL WELLS							
AS 2JAN91 LF 12JUL93							
RCRA/CERCLA BACKGROUND SOIL STUDY							
AS 17JAN92 LF 12JUL93							
K-65 SLURRY/C. WELL LINE INVESTIGATION (WP ADD)							
AS 4MAY92 LF 12JUL93							
OUS WP ADDENDA - KC-2 & FIRE TRAINING AREA							
LS 17MAR93 LF 12JUL93							
OUS WP ADDENDA - PLANT 1 PAD BORINGS & 6 WELLS							
LS 10DEC92 LF 12JUL93							
OUS WP ADDENDA - SE QUAD G WATER INVESTIGATION							
LS 16DEC92 LF 12JUL93							
OUTFALL LINE INVESTIGATION							
AS 17FEB92 LF 26JUL93							
OUS TREATABILITY STUDIES							
AS 12AUG91 LF 11JAN94							
OUS REMEDIAL INVESTIGATION REPORT PREPARATION							
LS 13JUL93 LF 25FEB94							
DOE OUS RI REVIEW/REVISE/APPROVE							
LS 28FEB94 LF 23JUN94							
EPA OUS RI REPORT REVIEW/REVISE/APPROVE							
LS 24JUN94 LF 20OCT94							
PRINT AND DIST FINAL OUS RI REPORT							
LS 21OCT94 LF 16NOV94							

Activity Bar/Date Dates  
 Critical Activity  
 Start Date  
 Target Date  
 Milestone/Key Activity

Target Date 10CT90  
 Plot Date 05EP92  
 Data Date 10AUG92  
 Project Start 10CT90  
 Project Finish 30JUN94  
 (C.J.) Primavera Systems, Inc.

RI/F/S PROGRAM CURRENT  
 FERNALD ENVIRONMENTAL MGMT PROJECT  
 FEMP RI/F/S OUS CONSENT AGM (CLIC)

Prepared by ASI/IT Corp  
 Date: Revision: Checked: Approved:

SHEET 1 OF 2



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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 Sampling and Analysis Plan**

**Scope:**

The U.S. EPA approved the EWMF SAP as an addendum to the RI/FS Work Plan (March 1988), specifying a series of soil sample collection and analytical activities. Geotechnical, geochemical, radiological, and chemical soil samples were collected for analysis from 18 geotechnical borings (each approximately 30 feet deep) and from eight wells (five 1000-series and three 2000-series) installed under this program.

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

The resultant SAP field and laboratory data will be used to support the evaluation of criteria for a detailed analysis of the EWMF as an on-property waste disposal/storage alternative per the methodology given in "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" (EPA 1988).

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

**Status:**

The original field effort was completed. During implementation, a number of geotechnical borings encountered perched groundwater. In addition, one well set (one 1000-series, one 2000-series) encountered bedrock. Due to these developments, arrangements were made to install five additional geotechnical borings and to relocate the well pair. The five geotechnical borings were completed in March 1992; the well pair relocation was completed in April 1992.

The off-site ecological walk-over survey, including a preliminary search for running buffalo clover, was conducted April 13 through April 16, 1992.

Chemical and radiological analyses of the EWMF soil samples were completed in May 1992. Soil samples for geochemical analysis submitted in early June 1992. All analytical efforts except for batch sorption testing were completed in August 1992.

**Issues/Corrective Actions:**

None to report.

**6.2 EWMF General Siting Report**

**Scope:**

The report will establish the feasibility of locating an EWMF at the FEMP by performing a detailed analysis of the EWMF as an on-property waste disposal/storage technology option per OSWER Directive 9355.3-01. The siting report will be divided into specific 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.

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**6.2 EWMF General Siting Report (continued)**

**Issues/Corrective Actions:**

None to report.

**6.3 Planned Activities for September 1992**

- Initiate writing the EWMF siting report technical chapters.
- Start batch sorption tests at Brookhaven National Laboratory.



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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.

**Issues:**

Two comments were identified by the U.S. EPA on August 6, 1992, and must be addressed before the report is considered final.

**Corrective Actions:**

A response to these comments will be prepared and submitted in September 1992.

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**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.

**Status:**

The SWCR was submitted to the U.S. EPA on August 5, 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

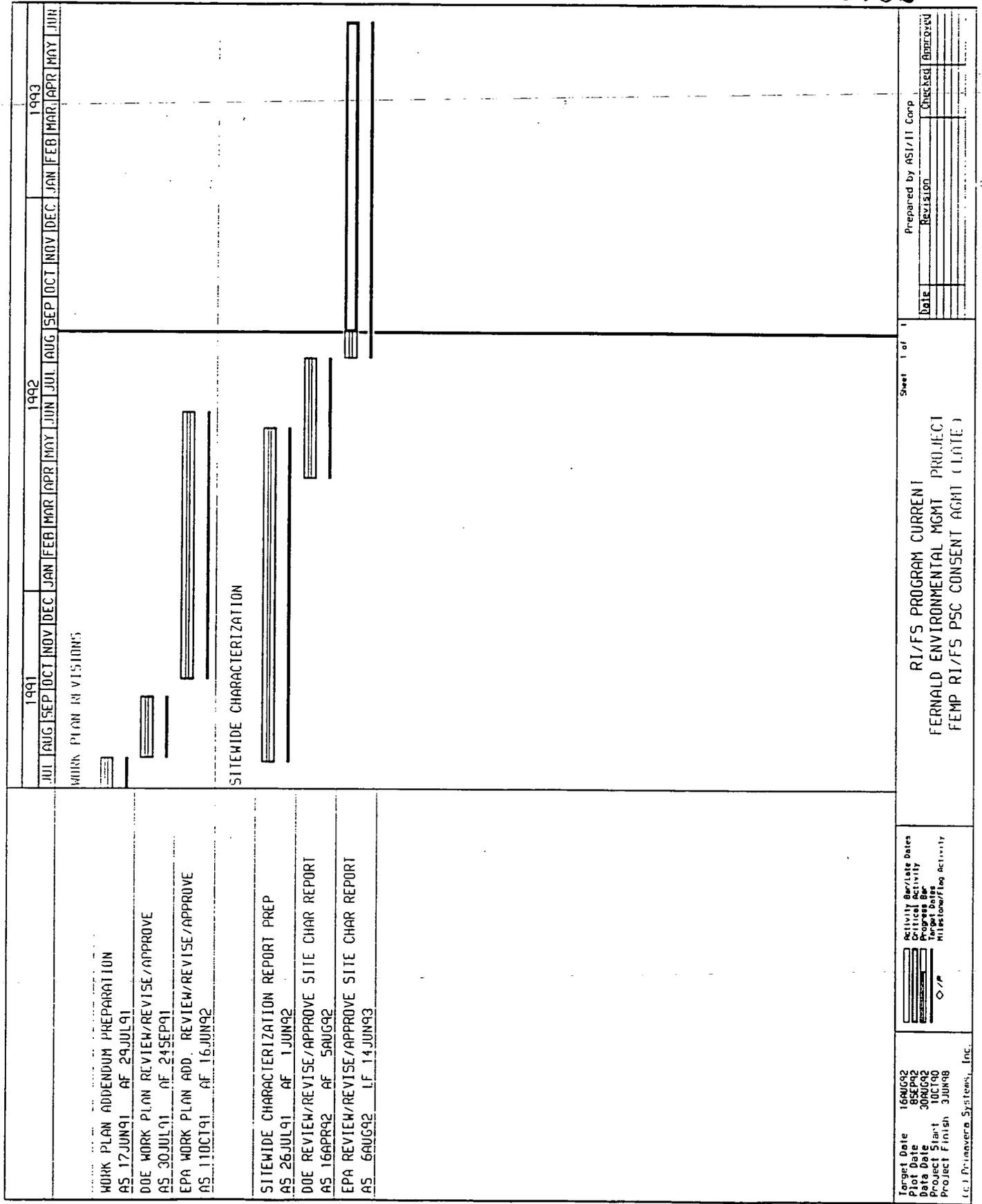
A = Actual

**Issues/Corrective Actions:**

None to report.

**7.2.1 Planned Activities for September 1992**

- Receive review comments from U.S. EPA and Ohio EPA.
- Begin revisions in response to comments from U.S. EPA and Ohio EPA.



Target Date 16AUG92  
 Plot Date 8SEP92  
 Data Date 30AUG92  
 Project Start 10CT90  
 Project Finish 3JUN93  
 C.E.I. Prineverb Systems, Inc.

Activity Bar/Late Dates  
 Critical Activity  
 Program Bar  
 Milestone/Flag Activity  
 C/P

Prepared by ASI/IT Corp  
 Revision  
 Date  
 Checked  
 Approved

Sheet 1 of 1  
 RI/FS PROGRAM CURRENT  
 FERNALD ENVIRONMENTAL MGMT PROJECT  
 FEMP RI/FS PSC CONSENT AGMT (LATE)

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**8.0 Community Relations**

**8.1 Status**

On August 3, 1992, DOE held a Public Participation Workshop. The FEMP excerpt from the draft Five-Year Plan and the draft DOE 1993 Site-Specific Plan were reviewed by eight community residents. A court reporter recorded all comments and the workshop transcript was made available to the public at the Public Environmental Information Center (PEIC) within two weeks.

On August 10, 1992, a Roundtable focusing on the EWMF was held. DOE and WEMCO personnel addressed comments from the 10 local residents who attended.

On August 11, 1992, DOE announced the selection of Fluor Daniel Environmental Restoration Management Corporation (FERMCO) as the Environmental Restoration Management Contractor for the FEMP. FERMCO will officially arrive on site September 1, 1992 and will be working with WEMCO during a three-month transition. On August 18, officials from FERMCO were introduced during an all-employee meeting at the site. They also met with area residents during a separate meeting.

To ensure RI/FS community relations activities are consistent with CERCLA, the National Contingency Plan, and EPA policies concerning removal actions, a 45-day public comment period on the work plans of nine removal actions currently in progress at the FEMP was announced. A separate addendum to the Community Relations Plan was prepared for each removal action. No comments from the public were received but a responsiveness summary providing a brief discussion of the situation will be issued. The nine removal actions are:

- Contaminated Water Beneath FEMP Buildings
- Plant 1 Pad Continuing Release
- Removal of Waste Inventories and Thorium Management
- Active Fly Ash Pile Controls
- Safe Shutdown
- Plant 1 Ore Silos
- Contaminated Soils Adjacent to Sewage Treatment Plant Incinerator
- Collect Uncontrolled Production Area Runoff - Northeast
- Improved Storage of Soil and Debris

The revised Community Relations Plan, with all comments incorporated or addressed, was finalized and submitted to U.S. EPA for approval on August 31, 1992.

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**8.0 Community Relations (Continued)**

On August 25 and 26, 1992, DOE and WEMCO conducted training at the Joint Public Information Center (JPIC) facility in Fairfield, Ohio. The JPIC functions as a central contact point for coordinating and disseminating information to the public and the media when an emergency condition, activity, or event occurs that involves the FEMP. In addition to DOE and WEMCO, community relations personnel from ASI and Parsons participated.

**Issues/Corrective Action:**

None to report.

**8.2.1 Planned Activities for September 1992**

- On September 1, 1992, FERMCO will arrive at the FEMP and begin a five-year contract with DOE.
- On September 12, 1992, a JPIC simulated emergency drill will be held at the site.
- The DOE-FN has developed an eight-week Community Environmental Education Course. The first session, entitled *Personal Protective Equipment and General Overview of Courses*, will be held September 15, 1992.
- The recently formed DOE Environmental Management Advisory Committee will meet in the Fernald vicinity on September 29 and 30, 1992.

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**PERIOD ENDING AUGUST 31, 1992**

**ENCLOSURE A**

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

**CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY  
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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 August 1992.

**Summary - August 1992**

The total quantity of uranium discharged from the FEMP to the Great Miami River via Manhole 175 (Outfall 11000004001) was 23.71 kilograms. The average uranium concentration for the previous 12 months was 0.53 mg/l. This is 59.6 percent of the Derived Concentration Guide (DOE Order 5400.5) for ingested water.

There was no discharge from the Stormwater Retention Basin (Outfall 11000004002) to Paddy's Run via the Storm Sewer Outfall Ditch in August 1992. Based on 2.62 inches of rainfall in August 1992, the total quantity of uranium discharged to Paddy's Run from uncontrolled areas of the FEMP is estimated to be 11.79 kilograms. A reevaluation of the methodology used to calculate this estimate is being initiated to accurately account for the impact of Removal Action No. 2.

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**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: August 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	1.083	342	95	0.42	1.72	142
2	1.038	270	41	0.34	1.34	115
3	1.088	167	36	0.24	0.99	81
4	1.038	162	54	0.22	0.86	74
5	1.079	140	36	0.16	0.65	54
6	0.697	203	59	0.20	0.53	68
7	0.476	212	149	0.32	0.58	108
8	0.426	153	194	0.40	0.64	135
9	0.382	252	140	0.58	0.84	196
10	0.522	239	104	0.48	0.95	162
11	0.429	342	149	0.64	1.04	216
12	0.772	410	153	0.74	2.16	250
13	0.443	572	162	0.90	1.51	304
14	0.482	333	167	0.60	1.09	203
15	0.353	333	117	0.50	0.67	169
16	0.387	297	126	0.52	0.76	176
17	0.347	351	126	0.48	0.63	162
18	0.344	180	72	0.28	0.36	95
19	0.517	171	99	0.30	0.59	101
20	0.486	149	86	0.32	0.59	108
21	0.436	122	63	0.16	0.26	54
22	0.371	86	72	0.18	0.25	61
23	0.436	90	86	0.10	0.16	34
24	0.578	90	72	0.10	0.22	34
25	0.551	95	144	0.07	0.15	24
26	0.332	45	45	0.08	0.10	27
27	0.977	104	117	0.20	0.74	68
28	1.285	225	72	0.25	1.22	84
29	0.959	135	68	0.25	0.91	84
30	0.266	338	113	0.49	0.49	166
31	0.754	185	68	0.25	0.71	84
<b>TOTAL</b>	<b>19.334</b>				<b>23.71</b>	

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**Wastewater Flows and Radionuclide Concentrations**

Facility: Fernald Environmental Management Project

Location: 001 Total Discharge

Month: August 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.	0.624	213	90	0.32	0.76	110
Max.	1.285	572	194	0.90	2.16	304
Min.	0.266	45	36	0.07	0.10	24

The average uranium concentration for the previous twelve months was 0.53 mg/l. This is 59.6 percent of the Derived Concentration Guide (DOE Order 5400.5) for ingested water.

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

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**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: August 1992

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

Based on 2.62 inches of rainfall for the month, the uranium discharge to Paddy's Run from uncontrolled areas of the FEMP is estimated to be 11.79 kgs.

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**ENCLOSURE B**

**FFCA: INITIAL REMEDIAL MEASURES**

**AND OTHER OPEN ACTIONS**

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Period Ending August 31, 1992

**INTRODUCTION**

Enclosure B describes actions undertaken at the FEMP during the period August 1 through August 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).

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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 July 1992 was transmitted to the U.S. EPA on August 19, 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 July 31, 1992, was transmitted to the U.S. EPA on August 19, 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

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

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JULY 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 July 1992 was transmitted to the U.S. EPA on August 19, 1992 (DOE-2391-92).
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**

**JULY 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.
<b>RCRA</b>			
A.1	Conduct a hazardous waste determination on all waste streams.	30 days	Pursuant to the proposed Amended Consent Decree, a RCRA waste evaluation will be conducted on all site materials by 10/92.

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

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JULY 31, 1992

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. However, further review of both the waste streams and the potential of the units to be hazardous waste management units are being evaluated as actions required by the proposed Amended Consent Decree. Final results are due October 30, 1992.
A.5	Update the facility closure plan to reflect the year the facility expects to begin closure.	30 days	The Facility closure date is dependent upon closure schedules for individual TSD units as presented most recently in Section I of the RCRA Part B Permit Application transmitted to the Ohio EPA and the U.S. EPA on October 30, 1991 (DOE-211-92). Facility closure will be completed on a date the last TSD unit is closed.

## 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	July's FFCA Monthly Progress Report was transmitted to the U.S. EPA on August 19, 1992 (DOE-2391-92).
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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 AUGUST 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 August 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 August 1 through August 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 August 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.	Completed. 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.
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.
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 August 1992.

<u>FFA Part, Paragraph(s)</u>	<u>Description of Commitment</u>	<u>FFA Due Date</u>	<u>Status of Commitment</u>
Part V, 26	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. Pit 4 will be monitored by the end of CY1992. The Clearwell does not have to be sampled. DOE and U.S. EPA are negotiating whether Pit 5 needs to be monitored.
Part V, 26	Include direct measurement data from Waste Pits 1, 2, 3, 4, and 5 and the Clearwell in the RI/FS under the CERCLA Consent Agreement.	None specified.	No information to report for August 1992.
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.	No information to report for August 1992.
Part V, 28	Submit documentation or estimates of current radon-222 emissions from existing but newly discovered sources that contain Radium-226 in sufficient concentrations to emit radon-222 in excess of NESHAP Subpart Q prior to final remediation.	Within 30 days of discovery.	No new sources identified.
Part V, 30	Submit methodology for direct measurement or other appropriate means of characterization of the relevant emissions pursuant to paragraph 29 of the FFA.	Within 45 days of the U.S. EPA response pursuant to paragraph 29.	None required.

<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 eighth progress report being submitted herewith as an integral part of the CERCLA Consent Agreement Monthly Progress Report.

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

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Period Ending August 31, 1992

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

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

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

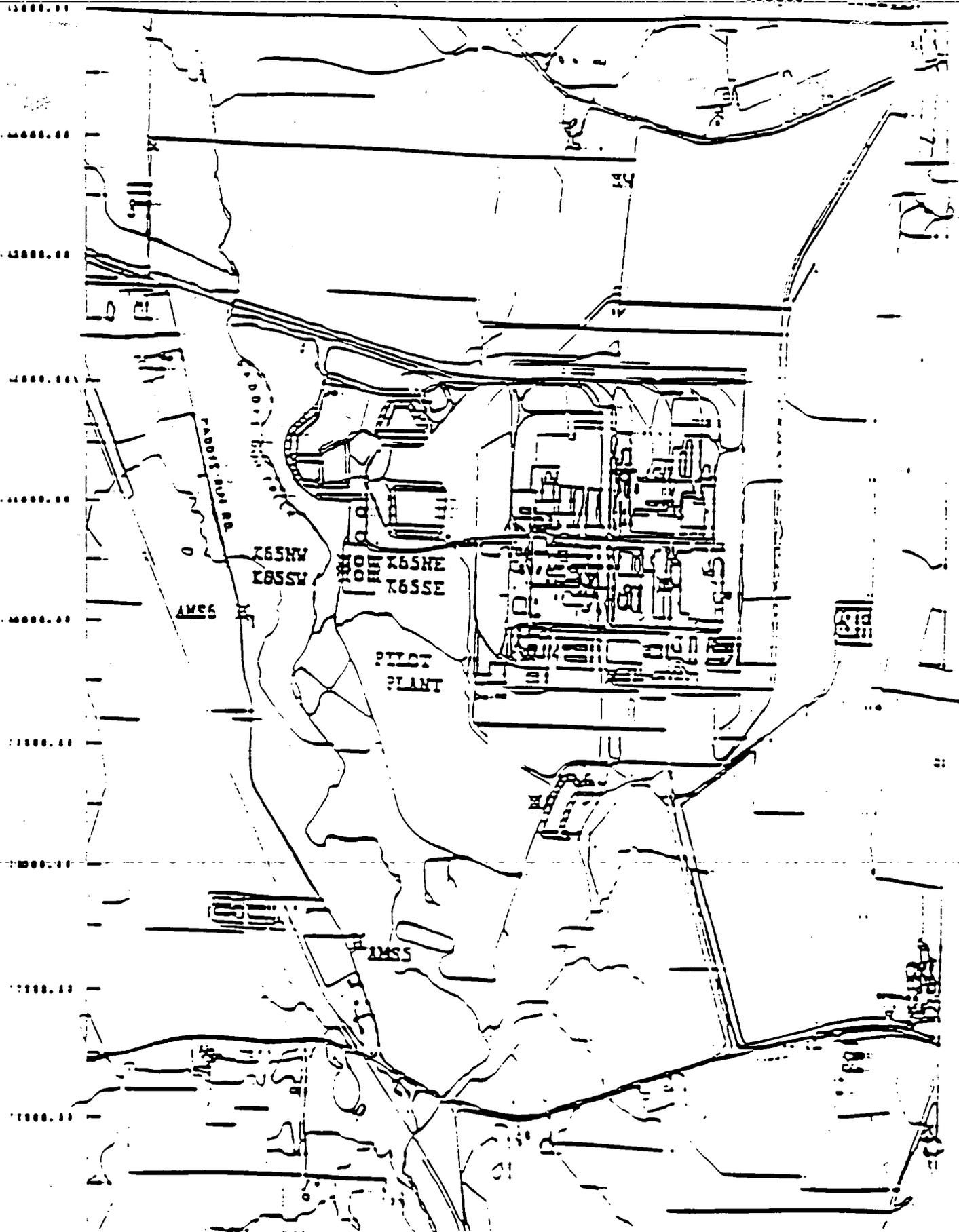
- Ambient temperature and pressure near the silos.
- Silos 1 and 2 headspace temperature.
- Silos 1 and 2 differential pressure.
- Silos 1 and 2 radon headspace concentration.
- Silos 1 and 2 headspace humidity

The 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.

REAL-TIME RADON MONITORING LOCATIONS



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

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FACILITY: Fernaid 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: AUGUST 1992

Day	Ambient		Temperature	Inter. Hum. %	Diff. Pres In. HG	Head Space Radon (pCi/l)
	Temp Deg. F	Pres In. Hg.	Head Space Deg. F			
1	65.1	29.6	64.4	98.2	-0.0013	53,710
2	65.4	29.5	64.4	98.1	-0.0016	64,361
3	70.0	29.4	64.5	98.2	-0.0010	77,331
4	66.4	29.4	64.6	98.0	-0.0018	28,585
5	65.2	29.6	64.4	96.6	-0.0016	21,566
6	66.3	29.6	64.3	97.3	-0.0013	22,455
7	70.7	29.5	64.4	97.2	-0.0006	83,062
8	75.2	29.4	64.8	96.9	-0.0126	67,992
9	79.5	29.5	65.3	96.6	0.0021	89,366
10	76.8	29.4	65.9	*	-0.0027	101,888
11	73.8	29.4	66.1	*	-0.0001	46,769
12	67.5	29.5	65.9	*	-0.0004	49,517
13	66.8	29.5	65.8	*	-0.0011	35,962
14	63.3	29.6	65.4	*	-0.0025	9,433
15	64.3	29.5	65.0	*	-0.0019	11,801
16	63.6	29.6	64.7	*	-0.0017	19,194
17	64.6	29.6	64.5	*	-0.0014	22,438
18	65.4	29.5	64.4	*	-0.0014	39,251
19	65.5	29.5	64.6	*	-0.0018	23,793
20	63.5	29.5	64.3	*	-0.0017	16,207
21	65.6	29.6	64.2	*	-0.0014	20,209
22	69.2	29.6	64.6	*	-0.0008	52,828
23	70.9	29.6	64.6	*	-0.0005	50,868
24	73.9	29.6	64.9	*	0.0003	46,221
25	72.9	29.7	65.2	*	0.0003	79,347
26	75.3	29.6	65.6	*	0.0009	59,521
27	69.9	29.4	65.8	*	0.0181	61,514
28	62.0	29.3	65.4	*	0.0479	15,116
29	59.7	29.5	64.5	*	-0.0024	5,448
30	67.6	29.5	64.5	*	-0.0016	6,858
31	62.5	29.5	64.5	*	-0.0021	19383
ARITHMETIC MEAN	68.0	29.5	64.9	97.5	0.0007	42,000
MAXIMUM	79.5	29.7	66.1	98.2	0.0479	101,888
MINIMUM	59.7	29.3	64.2	96.6	-0.0126	5,448
MEDIAN	66.4	29.5	64.6	97.3	-0.0014	39,251

Note: \* - Data not available due to failed sensor; corrective repairs underway

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

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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: AUGUST 1992

Day	Ambient		Temperature	Inter. Hum. %	Diff. Pres In. HG	Head Space Radon (pCi/l)
	Temp Deg. F	Pres In. Hg.	Head Space Deg. F			
1	65.1	29.6	63.5	98.5	-0.0090	***
2	65.4	29.5	63.4	98.4	-0.0090	***
3	70.0	29.4	63.6	97.9	-0.0093	***
4	66.4	29.4	63.6	98.0	-0.0093	***
5	65.2	29.6	62.5	97.4	-0.0114	***
6	66.3	29.6	63.2	97.9	-0.0092	***
7	70.7	29.5	63.4	97.6	-0.0092	***
8	75.2	29.4	63.8	97.2	-0.0159	***
9	79.5	29.5	64.4	96.6	-0.0097	***
10	76.8	29.4	65.0	96.6	-0.0083	***
11	73.8	29.4	65.2	96.7	-0.0097	***
12	67.5	29.5	65.0	97.5	-0.0092	***
13	66.8	29.5	64.9	97.9	-0.0092	114,365
14	63.3	29.6	64.5	98.6	-0.0093	139,387
15	64.3	29.5	64.0	99.0	-0.0093	138,371
16	63.6	29.6	63.8	98.8	-0.0092	188,493
17	64.6	29.6	63.6	98.3	-0.0092	192,470
18	65.4	29.5	63.6	97.8	-0.0090	242,815
19	65.5	29.5	63.8	97.7	-0.0093	180,477
20	63.5	29.5	63.5	98.0	-0.0091	172,544
21	65.6	29.6	63.5	97.6	-0.0092	182,832
22	69.2	29.6	63.8	97.2	-0.0093	283,899
23	70.9	29.6	63.9	97.2	-0.0094	295,956
24	73.9	29.6	64.1	96.6	-0.0097	247,709
25	72.9	29.7	64.4	96.5	-0.0095	271,966
26	75.3	29.6	64.8	96.3	-0.0096	316,868
27	69.9	29.4	65.1	96.7	0.0011	301,064
28	62.0	29.3	64.6	97.7	0.0936	186,457
29	59.7	29.5	63.7	98.8	0.0395	215,121
30	67.6	29.5	63.7	99.1	-0.0093	162,285
31	62.5	29.5	63.8	98.3	-0.0089	234,276
ARITHMETIC						
MEAN	68.0	29.5	64.0	97.7	-0.0043	131,205
MAXIMUM						
	79.5	29.7	65.2	99.1	0.0936	316,868
MINIMUM						
	59.7	29.3	62.5	96.3	-0.0159	114,365
MEDIAN						
	66.4	29.5	63.8	97.7	-0.0092	192,470

Note: \*\*\* - Data not available due to failed pulse accumulator/Pylon

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

3732

LOCATION: Selected Sampling Locations

DATE: AUGUST, 1992				
Date	K-65 NW (pCi/L)	K-65 SW (pCi/L)	K-65 NE (pCi/L)	K-65 SE (pCi/L)
08/01/92	0.7	0.9	1.5	0.6
08/02/92	1.1	1.3	3.9	1.5
08/03/92	1.4	3.5	3.9	1.2
08/04/92	1.2	1.3	2.0	1.2
08/05/92	1.2	1.6	1.6	0.9
08/06/92	1.3	1.7	1.7	1.1
08/07/92	1.6	1.7	2.9	1.6
08/08/92	0.8	0.9	0.9	0.4
08/09/92	1.2	1.3	2.5	1.0
08/10/92	1.7	1.7	3.9	1.3
08/11/92	1.1	1.0	1.3	0.7
08/12/92	1.3	1.4	2.3	1.1
08/13/92	1.2	1.4	1.4	1.0
08/14/92	0.9	1.3	0.8	0.6
08/15/92	0.8	1.0	0.7	0.4
08/16/92	1.1	1.3	1.3	0.9
08/17/92	1.6	1.9	2.2	1.4
08/18/92	1.8	1.8	3.1	2.0
08/19/92	1.5	1.6	2.8	1.3
08/20/92	1.5	1.8	1.6	1.1
08/21/92	1.8	2.1	2.5	1.4
08/22/92	1.6	1.7	2.1	1.3
08/23/92	1.7	1.8	2.2	1.3
08/24/92	2.4	2.0	2.8	1.5
08/25/92	*	1.7	2.6	1.6
08/26/92	1.4	1.6	2.8	1.3
08/27/92	1.4	1.4	1.9	1.0
08/28/92	0.7	1.0	1.3	1.1
08/29/92	0.9	1.1	1.2	0.6
08/30/92	1.0	1.2	1.5	0.6
08/31/92	1.3	1.5	2.2	1.4
AVERAGE	1.3	1.5	2.1	1.1
MAXIMUM	2.4	3.5	3.9	2.0
MINIMUM	0.7	0.9	0.7	0.4
MEDIAN	1.2	1.5	2.1	1.1
Std. Dev	0.4	0.5	0.9	0.4

\* denotes Pylon malfunction, data not available

# SELECTED RADON DATA REPORT

3732

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: AUGUST, 1992

Date	AMS 5	AMS 6	PILOT	BKGRD
	(pCi/L)	(pCi/L)	PLANT (pCi/L)	(pCi/L)
08/01/92	*	0.4	0.6	0.4
08/02/92	*	0.6	0.9	0.7
08/03/92	0.5	0.6	1.3	0.6
08/04/92	0.7	0.5	0.8	0.5
08/05/92	0.9	0.7	0.7	0.6
08/06/92	1.0	0.8	0.8	0.6
08/07/92	1.1	0.9	1.0	0.7
08/08/92	0.4	1.5	0.6	*
08/09/92	0.7	*	0.7	*
08/10/92	1.1	0.5	0.8	*
08/11/92	0.5	0.7	0.6	*
08/12/92	0.9	0.6	0.8	0.7
08/13/92	0.7	0.5	0.7	0.5
08/14/92	0.6	0.6	0.6	0.4
08/15/92	0.4	1.0	0.6	0.4
08/16/92	0.7	1.2	0.6	0.5
08/17/92	1.3	1.0	0.9	0.7
08/18/92	1.3	1.2	1.2	0.8
08/19/92	1.0	1.0	0.8	0.6
08/20/92	1.1	0.8	0.9	0.6
08/21/92	1.3	1.1	1.1	0.7
08/22/92	1.3	1.1	1.0	0.7
08/23/92	*	1.1	1.0	0.8
08/24/92	0.7	1.1	1.0	0.8
08/25/92	1.2	1.1	1.1	0.8
08/26/92	1.0	0.9	0.9	0.7
08/27/92	0.6	0.6	0.7	0.5
08/28/92	0.3	0.3	0.5	0.3
08/29/92	0.6	0.6	0.6	0.4
08/30/92	0.5	0.5	0.6	0.5
08/31/92	1.0	0.9	1.0	0.6
AVERAGE	0.8	0.8	0.8	0.6
MAXIMUM	1.3	1.5	1.3	0.8
MINIMUM	0.3	0.3	0.5	0.3
MEDIAN	0.7	0.8	0.8	0.6
Std. Dev	0.3	0.3	0.2	0.1

\* denotes Pylon malfunction, data not available

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

**PERIOD ENDING AUGUST 31, 1992**

**ENCLOSURE D**

**DRILLING/BORING LOGS**

VISUAL CLASSIFICATION OF SOILS

3732

PROJECT NUMBER: 602.50.03.11 PROJECT NAME: Magnetic Anomalies Trenching  
 BORING NUMBER: 11003 COORDINATES: N482718/E1381932 DATE: 8/22/92  
 ELEVATION: GWL: Depth Date/Time DATE STARTED: 8/22/92  
 ENGINEER/GEOLOGIST: Michael Wouda Depth Date/Time DATE COMPLETED: 8/22/92  
 DRILLING METHODS: E110 B Hydraulic Excavator / CAT PAGE 21 OF 21

DEPTH	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER UNIT	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY	REMARKS
1	102879 1100		Track hoe bucket fall	Various pieces of metal debris.			H <sub>u</sub> = 0 ppm β <sub>25</sub> = 40 cpm α = 0 cpm S <sub>AA3</sub> = 0,500 cpm
2	<del>102879</del> 8/22/92		Track hoe bucket fall				
3		N/A	18" X 36" X 24" approx.	Hard (2.54, 5/6) light olive brown silty clay, with trace gravel, no plasticity, dry.	Cl 2.5		
4							
5							
6							
7	102880 1115		Track hoe bucket fall				H <sub>u</sub> = 0 ppm β <sub>25</sub> = 40 cpm α = 0 cpm S <sub>AA3</sub> = cpm
8	<del>102880</del> 8/22/92	N/A	18" X 24" X 36" approx.	Hard (2.54, N4/1) dark gray clay, trace gravel, trace crystalline limestone + shale slabs, low plasticity, slightly moist	Cl 4.0		
9							
10							

NOTES:  
 Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: CAT E110B Hydraulic Excavator  
 Driller: DAVE NEWMAN  
 SAA - SAME AS ABOVE  
 NA - NOT APPLICABLE  
 \* All samples collected per ASTM Standard Penetration Test.  
 \* Colors identified by Munsell Color Chart.

# VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 02.50.03.11	PROJECT NAME: Magnetic Anomalies Trenching 8732	DATE: 8/21/92
BORING NUMBER: 11005	COORDINATES: N 482,718 / E 1381,932	DATE STARTED: 8/21/92
ELEVATION:	GWL: Depth NA Date/Time NA	DATE COMPLETED: 8/24/92
ENGINEER/GEOLOGIST: Michael Worlan	Depth NA Date/Time NA	PAGE 1 OF 1
DRILLING METHODS: E110B Hydraulic Excavator		

DEPTH	SAMPLE TYPE & NO	BLWSON SAMPLER PER MIN	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
1-4				TRENCH "B" - NE End DINE TREES			
1		U/A	Track hoe bucket full	various pieces of metal and debris.			H <sub>N4</sub> = 2 ppm β <sub>25</sub> = 120 cpm α = 0 cpm SPA3 = 9,000 cpm
2	10276 102867 1500 8/21/92		Track hoe bucket full				
3			18" x 36" x 24" approx.				
4				Hard (2.5Y, 5/6) light olive brown silty clay, trace crystalline limestone slabs, no plasticity dry. ↓ ↓ ↓	Cl	2.5	
5							
6	10276 102867 1600 8/21/92		Track hoe bucket full				H <sub>N4</sub> = 0 ppm β <sub>25</sub> = 120 cpm α = 0 cpm SPA3 = 10,000 cpm
7		U/A	18" x 36" x 24" approx.				
8				Hard (10YR, 5/8) yellowish brown silty clay with gray mottling, low plasticity, slightly moist	Cl	3.5	Note: Presence of crystalline limestone slabs and shale in clay matrix.
9							
10							
M.W. 8-21-92							

**NOTES:**

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: E110B CAT

Driller: Dave Newman

SAA - SAME AS ABOVE  
NA - NOT APPLICABLE

\* All samples collected per ASTM Standard Penetration Test.  
\* Colors identified by Munsell Color Chart.

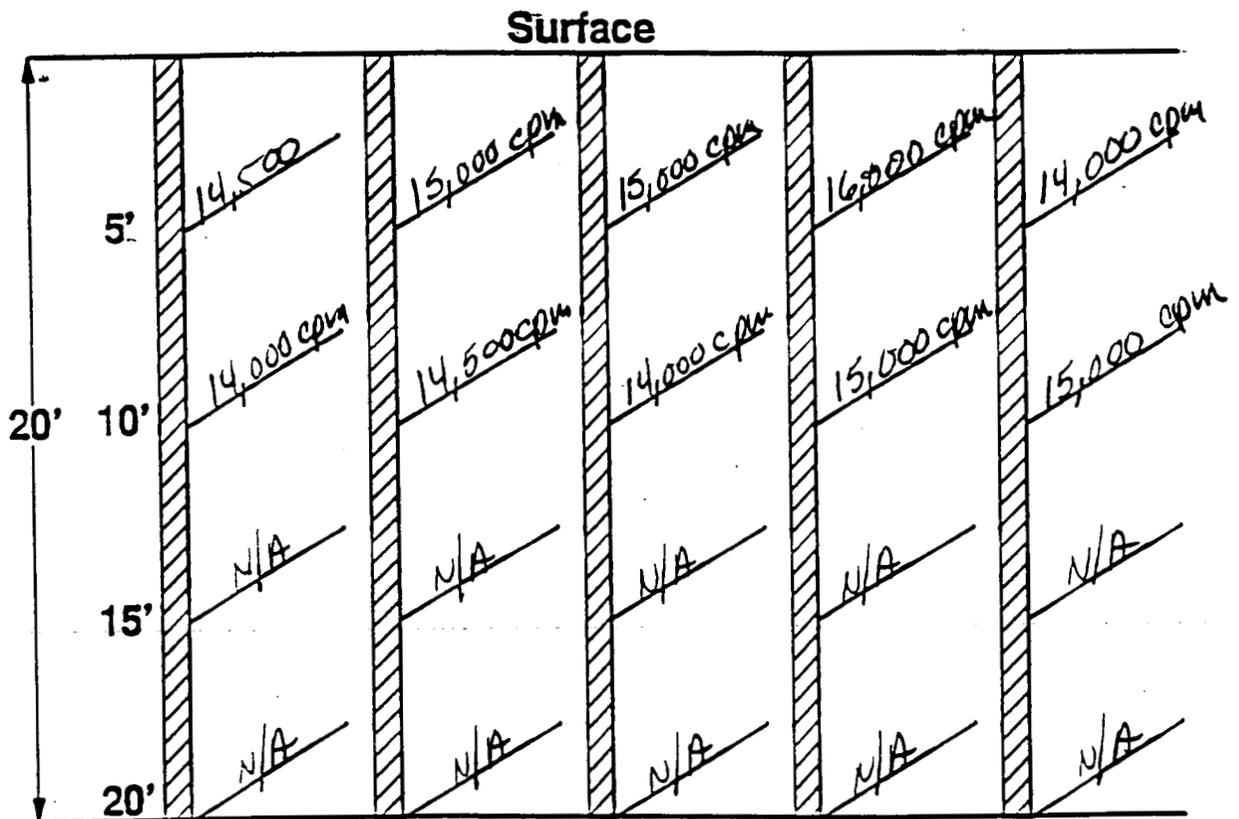
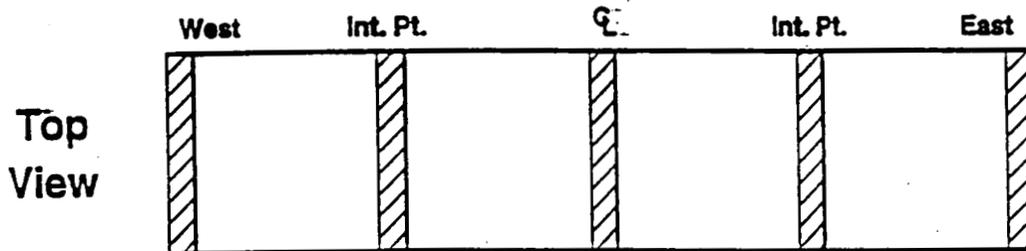
TRENCH " B "  
Profiles/SPA 3

Surface Background Reading 14,000 cpm

SPA 3 Serial No. 01302

ESP Serial No. S/N 1302

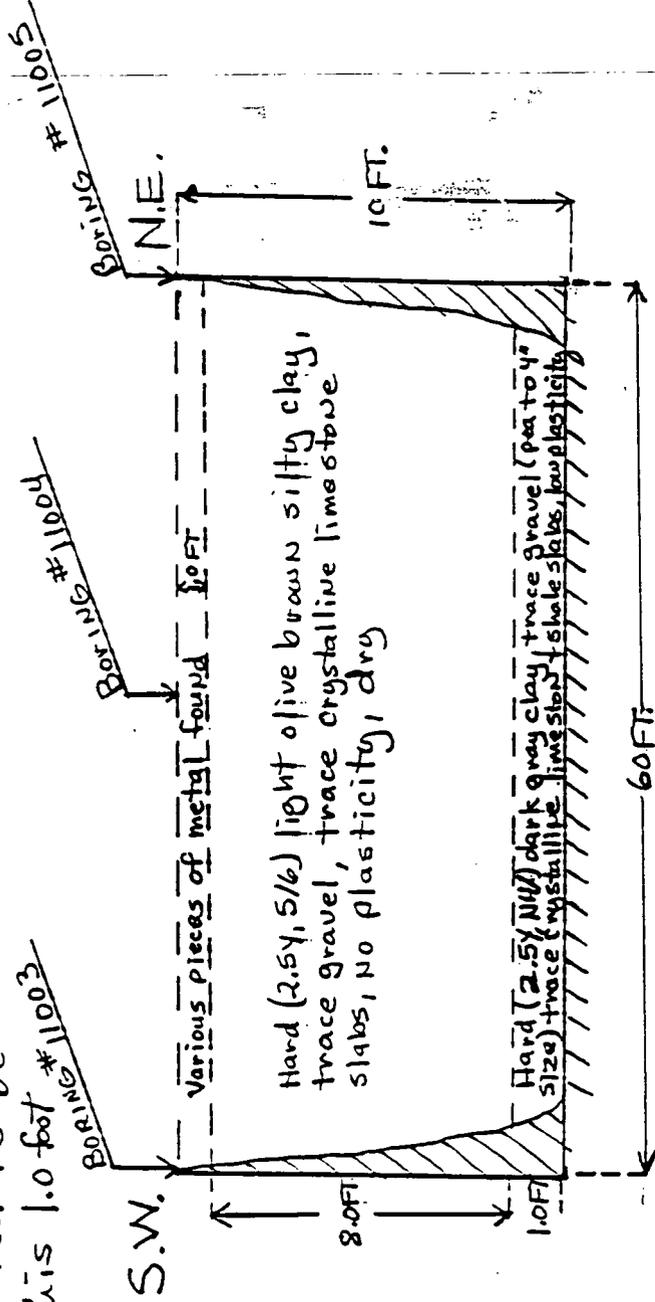
ESP Cal. Date 1/7/92



Profiles taken with SPA 3 at 5 foot intervals at end, middle, and intermediate points of the trench.

MAGNETIC ANOMALIES TRENCHING  
TRENCH B PROFILE  
NORTH PINE TREES

NOTE: Trenching began in the N.E. end of trench and continued at 10 feet the 60 FT. length of the trench. Metallic rubble was encountered in the first 1.0 foot only. Soil was determined to be native till beneath this 1.0 foot zone.



\* Soils encountered from surface are silty clays, trace coarse gravel (pea size to 4in.). Lithology remained constant through the length of trench. Dark gray clay contacted at 9 1/2 feet. Miscellaneous pieces of metal and construction rubble were encountered in the first 1.0 foot. None found to be contaminated.

3732

Dimensions:  
 width = 24 inch  
 Depth = 10 Feet

C. E. N. OR. 151

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 60250.03.11	PROJECT NAME: Magnetic Anomalies Tranching		
BORING NUMBER: 11019	COORDINATES: U 482,236 / E 1,382,048	DATE 8/20/92	
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 8/20/92
ENGINEER/GEOLOGIST: Michael Worley	Depth	Date/Time	DATE COMPLETED: 8/20/92
DRILLING METHODS: E110 B Hydraulic Excavator	PAGE 1		OF 1

1500  
#107

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 100mm	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
1	N/A	N/A		medium dense (2.54, 5/6) light olive brown silty clay with trace coarse gravel, no plasticity, dry.	CI	N/A	H <sub>nu</sub> = 0 ppm β <sub>25</sub> = 40 cpm α = 0 cpm SPA3 = 10,000 cpm
2					CI	4.0	
3						4.0	
4	102874 1345 8/20/92		Track hoe bucket full 18" X 36" X 24" approx.	Hard (2.54, N4/) dark gray clay with trace gravel and trace crystalline limestone slabs, low plasticity, slightly moist.	CI	4.0	
6							NOTE: At 7 1/2 feet crystalline limestone slabs & shale slabs were encountered. Runs to 10+ feet: H <sub>nu</sub> = 0 ppm β <sub>25</sub> = 40 cpm α = 0 cpm SPA3 = 12,000 cpm
7	102875 1500 8/20/92		Track hoe bucket full 18" X 36" X 24" approx.	Hard (2.54, N4/) dark gray silty clay with trace sand and gravel. low plasticity, wet	CI	2.5	
8							
9							
10							

NOTES:

Drilling Contractor Pennsylvania Drilling  
 Drilling Equipment E110 B Hydraulic Excavator  
 Driller: Dave Newman

SAA - SAME AS ABOVE  
 NA - NOT APPLICABLE

\* All samples collected per ASTM Standard Penetration Test.  
 x Colors identified by Munsell Color Chart.

TRENCH " G "  
Profiles/SPA 3

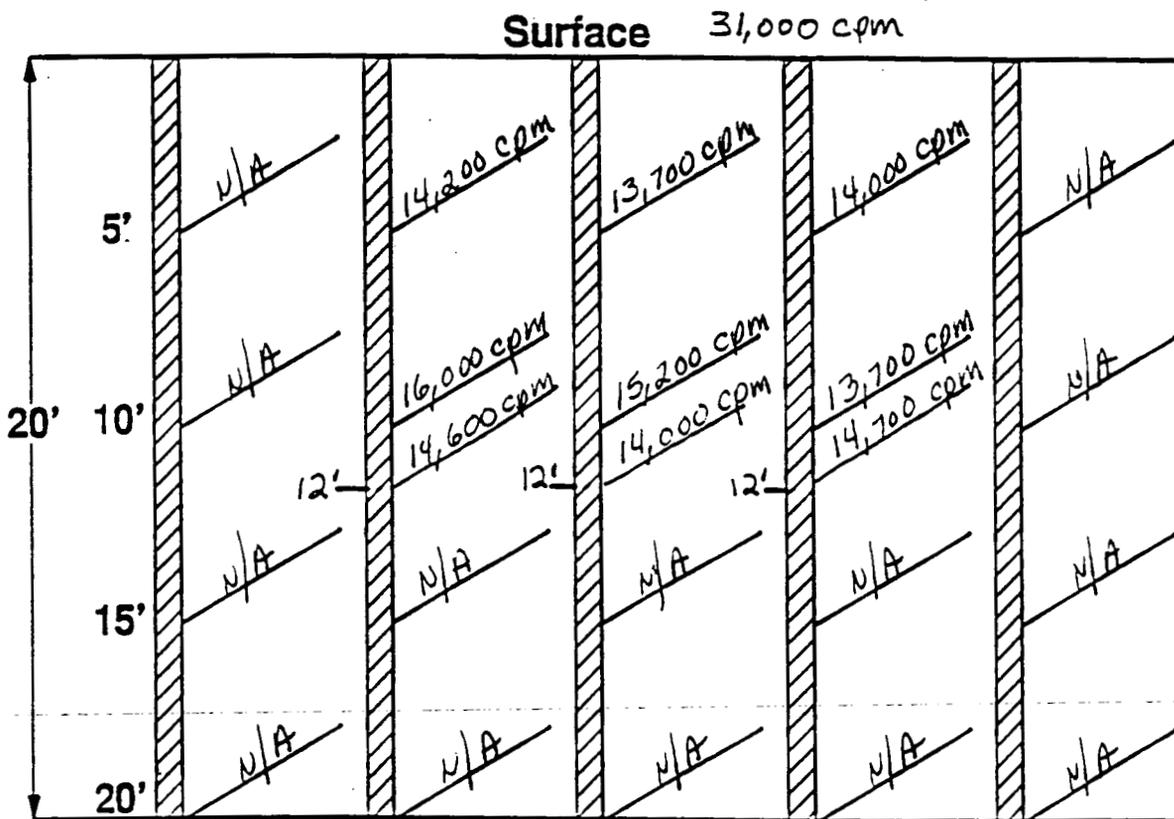
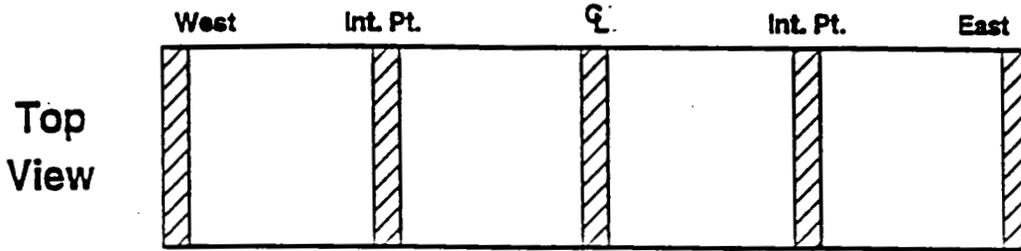
3732

Surface Background Reading 31,000 cpm

SPA 3 Serial No. 01302

ESP Serial No. S/N 1302

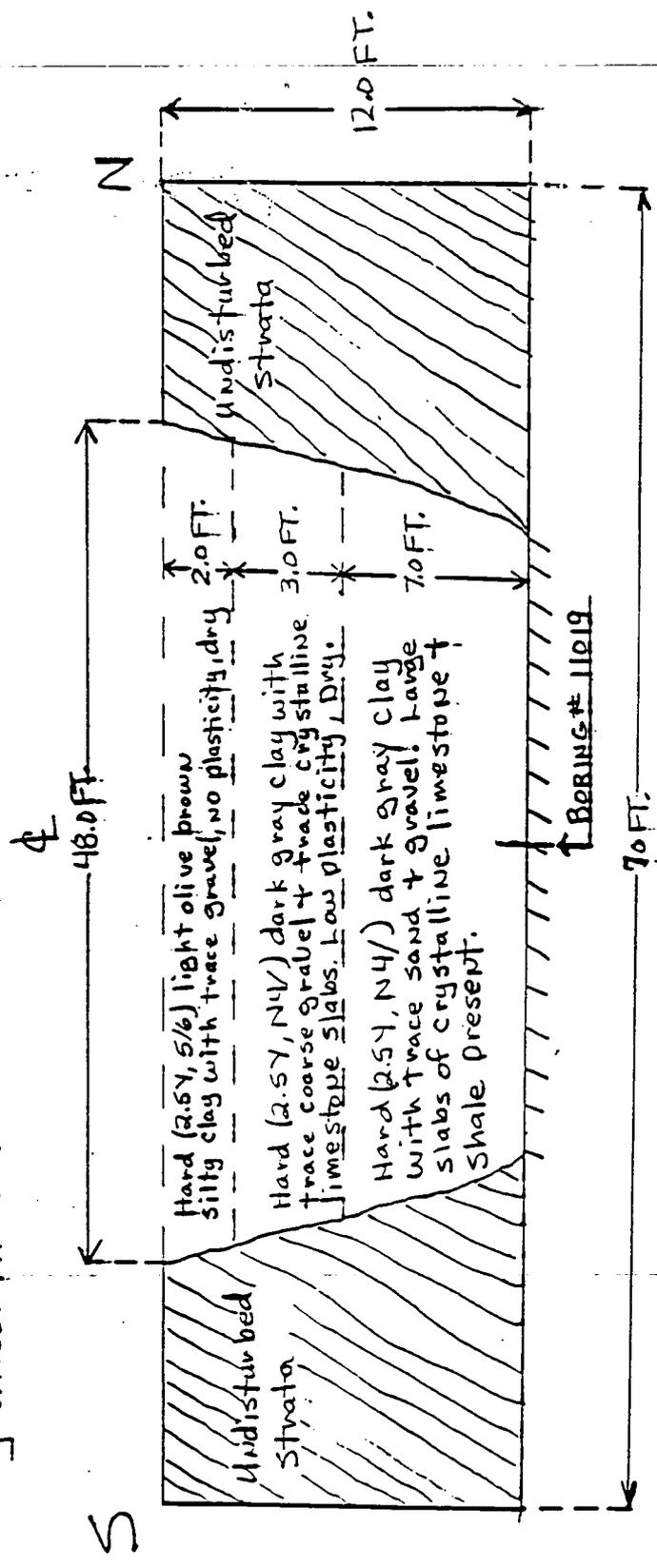
ESP Cal. Date 1/7/92



Profiles taken with SPA 3 at 5 foot intervals at end, middle, and intermediate points of the trench.

MAGNETIC ANOMOLIES TRENCHING  
TRENCH G PROFILE  
NORTH EAST BUFFER ZONE

NOTE: Trenching began at the center of the trench and continued North to point indicated. Then the trench was lengthened toward the South to point indicated. Soil was determined to be till (native) and trenching discontinued.



Dimensions:  
width = 24 inches  
Depth = 12 Feet

Soils encountered from surface are silty clays, trace coarse gravel (Pea size to 4 ip.) lithology remained constant through the length of trench opened. Dark gray clay contacted at 1 Foot and continued to bottom of trench.

# VISUAL CLASSIFICATION OF SOILS

3732

PROJECT NUMBER: 602.50.03.11	PROJECT NAME: Magnetic Anomalies Trenching		
BORING NUMBER: 11015	COORDINATES: N 482253 / E 1381, 803	DATE: 2/19/92	
ELEVATION:	GWL: Depth	Qter/Time	DATE STARTED: 8/19/92
ENGINEER/GEOLOGIST: Michael Worlen	Depth	Date/Time	DATE COMPLETED: 8/19/92
DRILLING METHODS: E110B Hydraulic Excavator / Track hoe			PAGE 1 OF 2

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 100mm	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (%)	REMARKS
1-2				(Trench "F" - West Buffer Zone A)			
3	102870 0920 8/19/92	N/A	N/A	Hard (2.5 Y, 5/6) light olive brown trace gravel, trace gray mottling, low plasticity, dry	Cl	4.0	H <sub>nu</sub> = 0 ppm B <sub>2</sub> = 60 cpm α = 0 cpm SPA3 = 17,000 cpm  Note: Trace ferromagnesian nodules present.
7	102871 0940 8/19/92	N/A	N/A	Hard (2.5 Y; 5/3) light olive brown silty clay, trace gravel, trace gray mottling, low plasticity, dry	Cl	4.0	H <sub>nu</sub> = 0 ppm B <sub>2</sub> = 40 cpm α = 0 cpm SPA3 = 17,500 cpm  Note: Trace ferromagnesian nodules present.
13	102872 1005 8/19/92	N/A	N/A	Hard (2.5 Y, N4/) dark gray clay trace gravel, low plasticity, slightly moist.	Cl	2.5	H <sub>nu</sub> = 0 ppm B <sub>2</sub> = 40 cpm α = 0 cpm SPA3 = 15,000 cpm  Note: At 10 1/2 feet the dark gray clay contact contains crystalline limestone slabs.

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: E110B Hydraulic Excavator/CAT

Driller: Dave Newman

SAA - SAME AS ABOVE  
NA - NOT APPLICABLE

\* All samples collected per ASTM Standard Penetration Test  
\* Colors identified by Munsell Color Chart

43-11-66

VISUAL CLASSIFICATION OF SOILS

3732

PROJECT NUMBER: 602.50.03.11	PROJECT NAME: Magnetic Anomalies Trenching	
BORING NUMBER: 11015	COORDINATES: N 482,253 / E 1,331,803	DATE: 8/19/92
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 8/19/92
ENGINEER/GEOLOGIST: Michael Warley	Depth Date/Time	DATE COMPLETED: 8/19/92
DRILLING METHODS:	PAGE 2 OF 2	

5-18-92

DEPTH (ft)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER UNIT	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSI)	REMARKS
16	102973 1020 8/19/92	N/A	N/A	Hard (2.54, N4/) dark gray clay trace gravel, low plasticity, slightly moist.	CL	2.5	H <sub>nu</sub> = 0 ppm P <sub>25</sub> = 40 cpm d = 0 cpm P <sub>AT-3</sub> = 10,800 cpm
17				↑ 17 feet is bottom of trench			

NOTES:

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: E110 B Hydraulic Excavator  
 Driller: Dave Newman  
N/A

SAA - SAME AS ABOVE.  
 NA - NOT APPLICABLE

# VISUAL CLASSIFICATION OF SOILS

3732

PROJECT NUMBER: 602.50.03.11	PROJECT NAME: Magnetic Anomalies Trenching		
BORING NUMBER: 11016	COORDINATES: N482,253 / E1,381,803	DATE: 8/18/92	
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 8/18/92
ENGINEER/GEOLOGIST: Michael Worlen	Depth	Date/Time	DATE COMPLETED: 8/18/92
DRILLING METHODS: E110B Hydraulic Excavator / CAT	PAGE: 1		OF: 2

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 15:00	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TEST)	REMARKS
1			Track hoe bucket full:	Trench "E" Mid-Point Buffer Zone A	CL	3.0	H <sub>nu</sub> = 0 ppm β <sub>25</sub> = 40 cpm α = 0 cpm SPA-3 = 10,500 cpm
2			18" x 36" x 24" approx.				
3	102866	N/A	Track hoe bucket full: 18" x 36" x 24" approx.	Hard (2.5Y, 5/6) light olive brown silty clay, trace gravel, trace gray mottling, low plasticity, dry.	CL	4.0	NOTE: Trace ferromagnesian nodules present.
4	1230	8/18/92					
5			Track hoe bucket full: 18" x 36" x 24" approx.	Hard (2.5Y, 5/3) light olive brown silty clay, trace gravel, trace gray mottling, low plasticity, dry.	CL	4.0	NOTE: Trace ferromagnesian nodules present.
6							
7			Track hoe bucket full: 18" x 36" x 24" approx.	Hard (2.5Y, 4/1) dark gray clay, low plasticity, <del>dry</del> - slightly moist	CL	2.5	H <sub>nu</sub> = 0 ppm β <sub>25</sub> = 40 cpm α = 0 cpm SPA-3 = 10,200 cpm
8	102867	N/A					
9	1300	8/18/92	Track hoe bucket full: 15" x 36" x 24" approx.	SAA with trace gravel	CL	2.5	NOTE: At 10 1/2 feet the dark gray clay contact contains crystalline limestone slabs.
10							
11			Track hoe bucket full: 15" x 36" x 24" approx.	SAA with trace gravel	CL	2.5	NOTE: At 10 1/2 feet the dark gray clay contact contains crystalline limestone slabs.
12							
13	102868	N/A	Track hoe bucket full: 15" x 36" x 24" approx.	SAA with trace gravel	CL	2.5	NOTE: At 10 1/2 feet the dark gray clay contact contains crystalline limestone slabs.
14	1445	8/18/92					
15							

**NOTES:**

Drilling Contractor: Pennsylvania Drilling  
 Drilling Equipment: E110B Hydraulic Excavator  
 Driller: Dave Newman  
N/A

SAA - SAME AS ABOVE  
 NA - NOT APPLICABLE

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

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.50.03.11	PROJECT NAME: Magnetic Anomalies Trenching	
BORING NUMBER: 11016	COORDINATES: N 482 253 / E 1381 803	DATE: 8/18/92
ELEVATION:	GWL: Depth _____ Date/Time _____	DATE STARTED: 8/18/92
ENGINEER/GEOLOGIST: Michael Workan	Depth _____ Date/Time _____	DATE COMPLETED: 8/18/92
DRILLING METHODS: E110B Hydraulic Excavator / CAT	PAGE 2	OF 2

DEPTH	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER FEET	RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY	REMARKS
16	103869 1500 8/18/92	N/A	N/A	<del>Stiff</del> Hand (2.54, N4) dark gray clay, low plasticity slightly moist.	CI	2.5	H <sub>mu</sub> = 0 ppm B <sub>25</sub> = 40 cpm α = 0 cpm
17				17' bottom of boring (trench).			SPA-3 = 10,200 cpm
18							Note: 17 feet was as deep as the hose would dig to. The gray clay contact is still prominent.
19							
20							

NOTES:

Drilling Contractor: Pennsylvania Drilling

Drilling Equipment: see page

Driller: \_\_\_\_\_

SAA - SAME AS ABOVE  
NA - NOT APPLICABLE

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**VISUAL CLASSIFICATION OF SOILS**

3732

PROJECT NUMBER: 602.50.03.11	PROJECT NAME: Magnetic Anomalies Trenching
BORING NUMBER: 11017	COORDINATES: N 482,253/E 1,381,803
ELEVATION:	DATE: 8/17/92
ENGINEER/GEOLOGIST: Michael W. Warden	GWL: Depth 5 feet Date/Time 8/19/92
DRILLING METHODS: E110 B Hydraulic Excavator / CAT	DATE STARTED: 8/17/92
	DATE COMPLETED: 8/17/92
	PAGE: 1 OF 1

20  
8/19/92

DEPTH - FE -	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER - NA -	RECOVERY - M. -	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY ITSF	REMARKS
				(Trench F-E End) Buffer Zone A			
1		N/A	Track hoe bucket full	Hard (2.5Y, 4/3) olive brown silty clay with coarse gravel and organics, low plasticity, dry			H <sub>nu</sub> = 0 ppm β <sub>γ</sub> = 60 cpm α = 0 cpm
2		N/A	Track hoe bucket full				
3	102861	N/A	Track hoe bucket full	Hard (2.5Y, 5/6) light olive brown silty clay, trace mottling, trace gravel, low plasticity, moist.			SPA3 = 10,000 cpm
4	1325 8/17/92	N/A	18" X 36" X 24" approx.		Cl	4.0	
5							
6		N/A	Track hoe bucket full				H <sub>nu</sub> = 0 ppm β <sub>γ</sub> = 60 cpm
7		N/A	Track hoe bucket full	Hard (2.5Y, N4) dark gray clay with trace gravel, low plasticity, slightly moist	Cl	2.5	α = 0 cpm
8	102862 1400	N/A	Track hoe bucket full				SPA3 = 12,000 cpm
9	2/19/92	N/A	18" X 36" X 24" approx.	Very loose (2.5Y, 5/6) light olive brown silty gravelly silt with trace sand, no plasticity	Ml	N/A	NOTE: At 6 feet to approximately 8 feet the dark gray clay layer contained crystalline lineston
10							Note: Prominent water zone encountered at 10 feet. Trenching discontinued.

NOTES: Drilling Contractor: Pennsylvania Drilling  
Drilling Equipment: E110 B Hydraulic Excavator  
Driller: Dave Bob Johnson  
 SAA - Same As Above  
 N/A - Not Applicable

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

TRENCH " E "

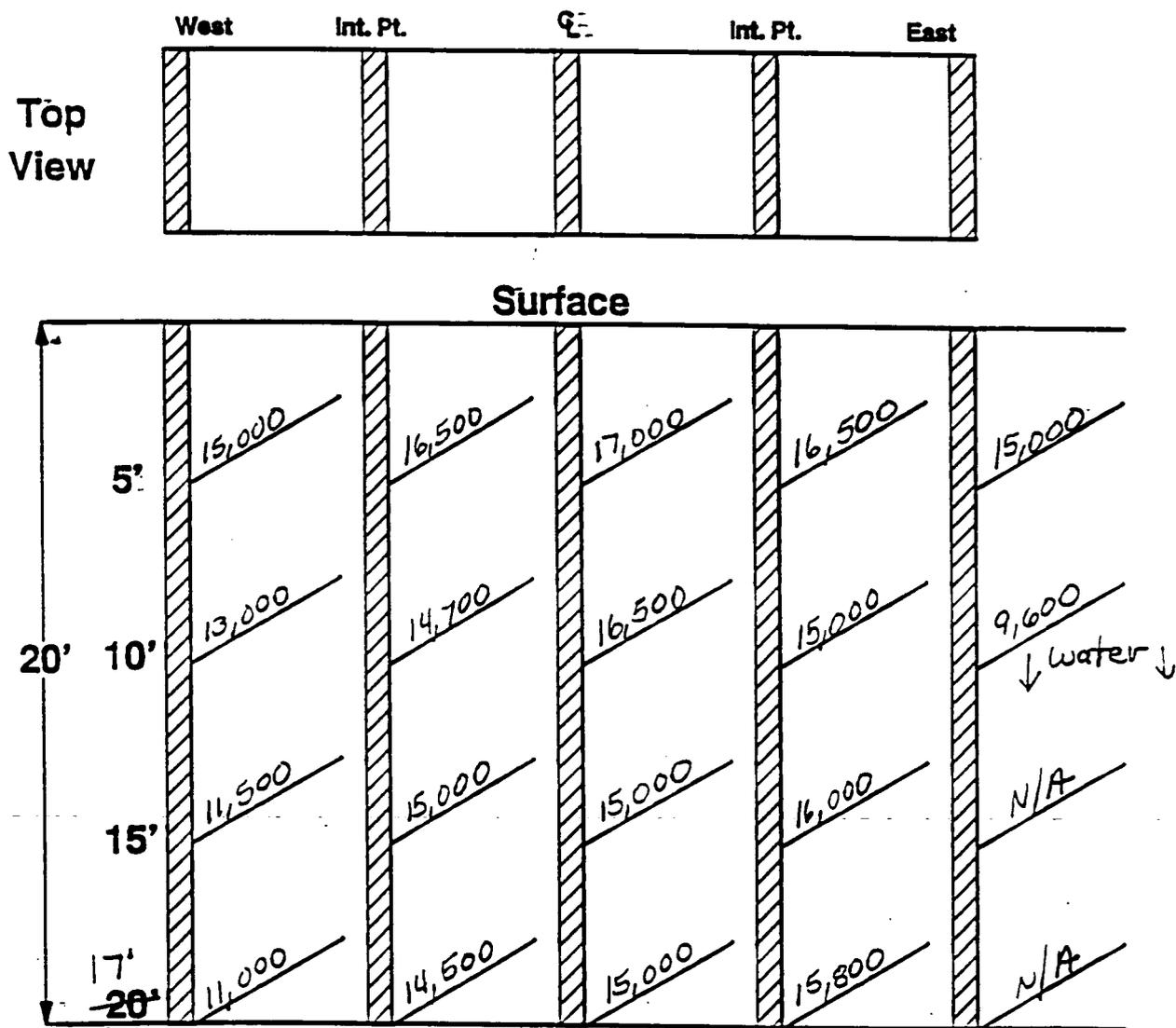
Profiles/SPA 3

Surface Background Reading 30,500 cpm

SPA 3 Serial No. 01302

ESP Serial No. S/N 1302

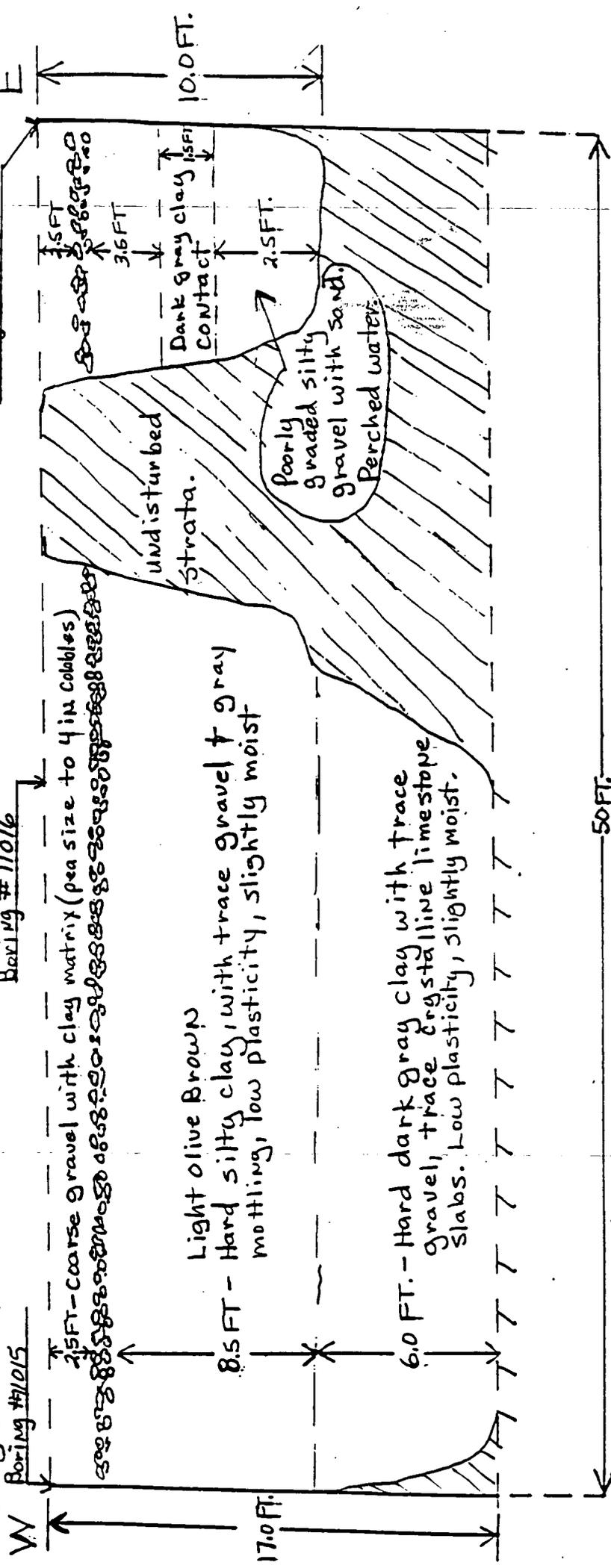
ESP Cal. Date 1/7/93



Profiles taken with SPA 3 at 5 foot intervals at end, middle, and intermediate points of the trench.

MAGNETIC ANOMALIES TRENCHING  
TRENCH F PROFILE  
NORTH EAST BUFFER ZONE

NOTE: At the East end of trench, perched water was encountered at a significant flowage (5 gal./min.). We moved West leaving an undisturbed zone and continued to trench. No perched water was discovered throughout the rest of the trench.



\* Soils encountered from surface are silty clays, trace of gravel. East end of trench contacted dark gray clay from 6 to 8 feet. West end contacted gray clay from 10.5 feet to 17 feet and continued. No rubble or

Dimensions:

Width = 24 inches  
 Length = 17 Feet West E

**VISUAL CLASSIFICATION OF SOILS**

PROJECT NUMBER: <u>602-50.0307</u>	PROJECT NAME: <u>FEMP RT/FS</u>
BORING NUMBER: <u>1840</u>	COORDINATES: _____
ELEVATION: _____	DATE: <u>8-8-92</u>
ENGINEER/GEOLOGIST: <u>K. Manian</u>	DATE STARTED: <u>8-8-92</u>
DRILLING METHODS: <u>8 inch Hollow Stem Auger</u>	DATE COMPLETED: <u>8-9-92</u>
	PAGE <u>1</u> OF <u>4</u>

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 16 in.	RECOVERY %	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ISCI)	WELL CONSTRUCTION	REMARKS
0.0	098194 1035 8-8-92	11	6	Dense light olive brown (2.5Y, 5/3) Gravelly silt with sand and clay, trace root fragments, dry	ML	N/A	N/A	H <sub>2</sub> O = 0 ppm B <sub>T</sub> = 40 cpm C = 0 cpm
	N/A	13	0	No Recovery	N/A	N/A	N/A	
1.5	N/A	18	0	No Recovery	N/A	N/A	N/A	
	098195 1035 8-8-92	5	6	Dense light olive brown (2.5Y, 5/4) Gravelly silt with sand and clay, trace root fragments, slightly moist	ML	N/A	N/A	H <sub>2</sub> O = 0 ppm B <sub>T</sub> = 40 cpm C = 0 cpm
	098446 1035 8-8-92	5.0	6	Stiff light olive brown (2.5Y, 5/4) silty clay with sand and gravel, low plasticity, moist	CL	1.75	N/A	
	098447 1035 8-8-92	8	3	Stiff light olive brown (2.5Y, 5/6) silty clay with sand and fine gravel, low plasticity, moist	CL	2.0	N/A	
3.0	098448 1105 8-8-92	3	6	Loose light olive brown (2.5Y, 5/2) Gravelly silt with sand and clay, slightly moist	ML	N/A	N/A	H <sub>2</sub> O = 0 ppm B <sub>T</sub> = 40 cpm C = 0 cpm
	098449 1105 8-8-92	3	6	Stiff light olive brown (2.5Y, 5/6) silty clay with sand and gravel, low plasticity, slightly moist	CL	1.5	N/A	C = 0 cpm
4.5	N/A	5	0	No Recovery	N/A	N/A	N/A	
	098150 1120 8-8-92	1	6	Loose Dark Yellowish brown (10YR, 4/4) well graded Gravelly sand, moist	SW	N/A	N/A	H <sub>2</sub> O = 0 ppm B <sub>T</sub> = 40 cpm C = 0 cpm
	098151 1120 8-8-92	3	5	Stiff Dark Yellowish brown (10YR, 4/4) silty clay with sand and fine gravel, medium plasticity, moist	CL	1.5	N/A	
	N/A	5	0	No Recovery	N/A	N/A	N/A	
6.0	098152 1125 8-8-92	3	6	Loose Dark yellowish brown (10YR, 4/4) poorly graded Gravelly sand, moist	SP	N/A	N/A	H <sub>2</sub> O = 0 ppm B <sub>T</sub> = 40 cpm C = 0 cpm
	098153 1125 8-8-92	4	4	Stiff Dark yellowish brown (10YR, 4/4) silty clay with sand and fine gravel, medium plasticity, moist	CL	1.5	N/A	
7.5	N/A	4	0	No Recovery	N/A	N/A	N/A	

NOTES:

Drilling Contractor Pennsylvania Drilling  
 Drilling Equipment Acker Auger Rig  
 Driller: Craig Coulter  
Mark Rebold

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

N/A = Not Applicable

H<sub>2</sub>O: 5/11: A01345 } 0 ppm } Backgr  
 B<sub>T</sub>: 5/11: 86112 } 40 cpm } Readings  
 C: 5/11: 50750 } 0 cpm }

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VISUAL CLASSIFICATION OF SOILS

3732

PROJECT NUMBER: <u>60) 50-0307</u>	PROJECT NAME: <u>FEMP RE/FS</u>
BORING NUMBER: <u>1890</u>	COORDINATES: _____
ELEVATION: _____	DATE: <u>8-8-92</u>
ENGINEER/GEOLOGIST: <u>L. Marion</u>	GWL: Depth <u>12.20 ft</u> , Date/Time <u>8-9-92/0800</u>
DRILLING METHODS: <u>3 inch Hollow Stem Auger</u>	DATE STARTED: <u>8-8-92</u>
	DATE COMPLETED: <u>8-9-92</u>
	PAGE <u>2</u> OF <u>4</u>

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 IN.) RECOVERY	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ISF)	WELL CONSTRUCTION	REMARKS	
7.5	<u>098459</u> <u>1335</u> <u>8-8-92</u>	<u>2</u>	<u>6</u>	<u>Loose light olive brown (2.5, 5/4) poorly graded gravelly sand, moist</u>	<u>SP</u>	<u>N/A</u>	<u>N/A</u>	<u>H<sub>2</sub>O = 0 ppm</u> <u>B<sub>T</sub> = 40 cpm</u> <u>C = 0 cpm</u>
	<u>N/A</u>	<u>3</u>	<u>0</u>	<u>Stiff light olive brown (2.5, 5/4) gravelly clay with sand, medium plasticity, moist</u>	<u>CL</u>	<u>LS</u>	<u>N/A</u>	
	<u>N/A</u>	<u>3</u>	<u>0</u>	<u>No Recovery</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	
	<u>N/A</u>	<u>3</u>	<u>0</u>	<u>No Recovery</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	
9.0 ft	<u>098456</u> <u>1400</u> <u>8-8-92</u>	<u>3</u>	<u>6</u>	<u>Medium dense light olive brown (2.5, 5/4) well graded gravelly sand, wet</u>	<u>SW</u>	<u>N/A</u>	<u>VA</u>	<u>H<sub>2</sub>O = 0 ppm</u> <u>B<sub>T</sub> = 40 cpm</u> <u>C = 0 cpm</u>
	<u>098457</u> <u>1400</u> <u>8-9-92</u>	<u>6</u>	<u>6</u>	<u>Medium dense light olive brown (2.5, 5/4) coarse gravel, wet</u>	<u>GP</u>	<u>N/A</u>	<u>N/A</u>	<u>A 3" split spoon was driven to collect a Full HSL and RAO Sample. NOTE: The Full HSL was not taken due to sand and gravel material.</u>
	<u>N/A</u>	<u>8</u>	<u>0</u>	<u>No Recovery</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	
10.5	<u>098458</u> <u>1415</u> <u>8-8-92</u>	<u>3</u>	<u>6</u>	<u>Light olive gray (2.5, 5/4) gravelly clay with black organics, medium plasticity, wet</u>	<u>CL</u>	<u>0.5</u>	<u>N/A</u>	<u>H<sub>2</sub>O = 0 ppm</u> <u>B<sub>T</sub> = 40 cpm</u> <u>C = 0 cpm</u>
	<u>098450</u> <u>1415</u> <u>8-8-92</u>	<u>5</u>	<u>6</u>	<u>Medium dense light yellowish brown (2.5, 6/1) silt with trace fine sand, wet</u>	<u>ML</u>	<u>N/A</u>	<u>N/A</u>	<u>H<sub>2</sub>O = 0 ppm</u> <u>B<sub>T</sub> = 40 cpm</u> <u>C = 0 cpm</u>
	<u>N/A</u>	<u>6</u>	<u>0</u>	<u>Same As Above</u>	<u>ML</u>	<u>N/A</u>	<u>N/A</u>	<u>A 3" split spoon was driven to collect a Full HSL and RAO Sample.</u>
	<u>098460</u> <u>1455</u> <u>8-8-92</u>	<u>12</u>	<u>6</u>	<u>Very stiff light olive brown (2.5, 5/4) silty clay with trace sand and gravel, low plasticity, moist</u>	<u>CL</u>	<u>2.5</u>	<u>N/A</u>	<u>H<sub>2</sub>O = 0 ppm</u> <u>B<sub>T</sub> = 40 cpm</u> <u>C = 0 cpm</u>
	<u>N/A</u>	<u>6</u>	<u>0</u>	<u>No Recovery</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>A 3" split spoon was driven to collect a Full HSL and RAO Sample. Note: Not enough recovery for this sample.</u>
	<u>N/A</u>	<u>9</u>	<u>0</u>	<u>No Recovery</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	
13.5	<u>098468</u> <u>1600</u> <u>8-8-92</u>	<u>5</u>	<u>6</u>	<u>Very stiff gray (5, 5/1) silty clay with sand and gravel, low plasticity, moist</u>	<u>CL</u>	<u>3.75</u>	<u>N/A</u>	<u>H<sub>2</sub>O = 0 ppm</u> <u>B<sub>T</sub> = 40 cpm</u> <u>C = 0 cpm</u>
	<u>098469</u> <u>1600</u> <u>8-8-92</u>	<u>10</u>	<u>6</u>	<u>Very stiff gray (5, 5/1) silty clay with sand and gravel, low plasticity, moist</u>	<u>CL</u>	<u>3.75</u>	<u>N/A</u>	<u>A 3" split spoon was driven to collect a Full HSL and RAO Sample.</u>
15.0	<u>N/A</u>	<u>12</u>	<u>0</u>	<u>No Recovery</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	

9.0 ft  
 12.0 ft  
 Perched water zone

NOTES: Bottom of Bore Hole - 15.0 FT.  
 Bottom of Sampling - 15.0 FT.

Drilling Contractor \_\_\_\_\_

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

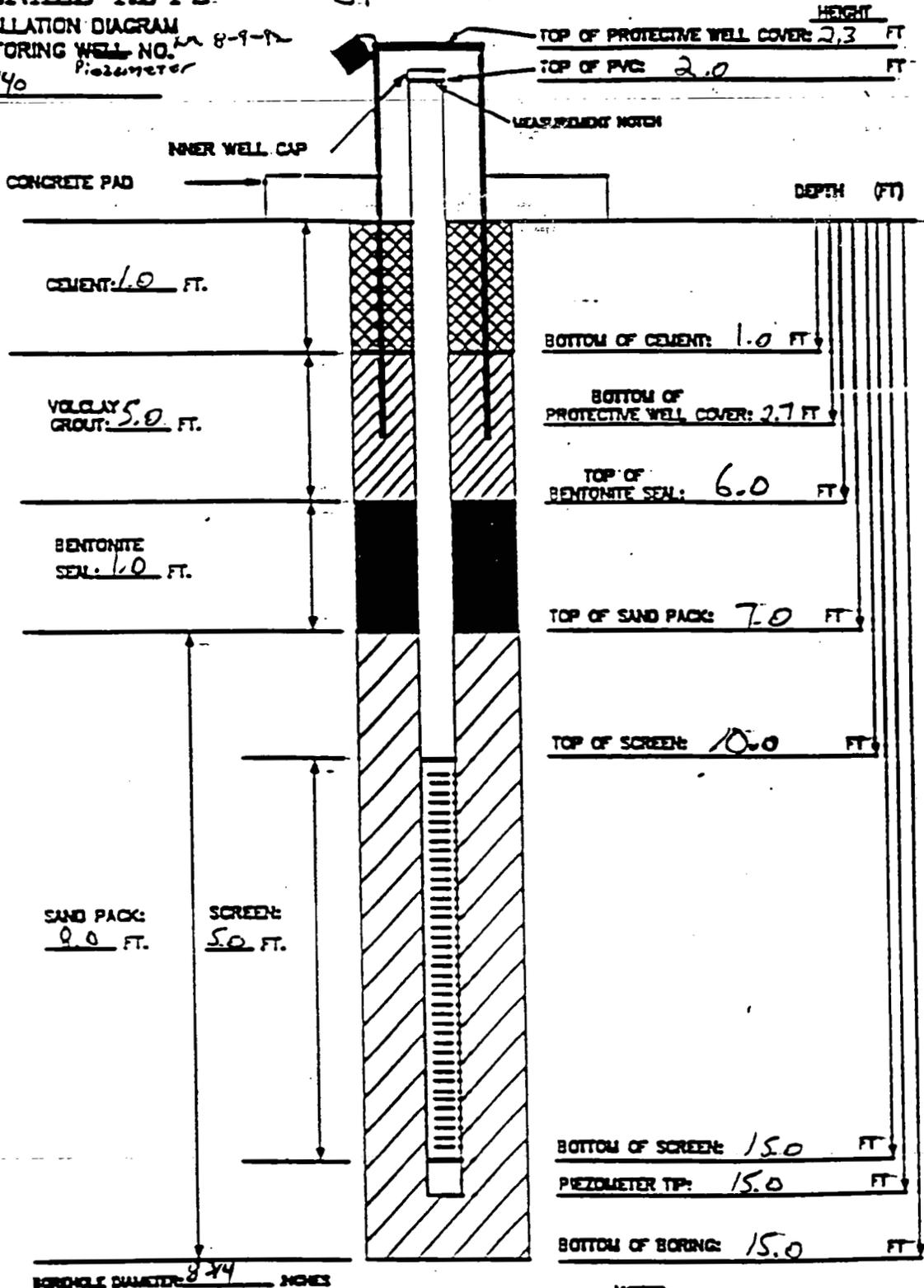
Driller: \_\_\_\_\_

SEE Page 1

FERNALD RI/FS

Stickups

INSTALLATION DIAGRAM  
MONITORING WELL NO. 1840  
Piezometer



MATERIALS USED:

SAND TYPE AND QUANTITY: 10/20 Sand, 3-80 lb. bags  
 BENTONITE PELLETS (5-GALLON BUCKETS): one bucket  
 BAGS OF VOLCLAY GROUT: 1-50 lb. bag  
 AMOUNT OF CEMENT: 1/2 50 lb. bag  
 AMOUNT OF WATER USED: 28 gallons  
 OTHER: 1 soil drum and 1 open water drum generated  
 PVC pipe section - 5 ft. Screen w/ end cap, 12 ft. of riser pipe 10.1082/8-11-92

NOTES:

- 1) RISER PVC IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS.
- 2) SCREEN IS 2-INCH I.D. SCHEDULE 40 PVC PIPE WITH 1/8-INCH SLOTS.
- 3) LOWER END OF SCREEN IS CAPPED WITH AN IDO CAP OR THREADED SUMP.
- 4) WATER DEPTH/DATE: 12.37/8-9-92

TASK: 602.50.03.07 GEOLOGIST/ENGINEER: K. Marion

**PIEZOMETER INSTALLATION SHEET**

PROJECT NAME FEMP RI/FS FIELD ENG./GEO. K. Marino DATE 8-17-92  
 PROJECT NO. 602, 50.03-07 CHECKED BY C. Zier DATE 09/08/92  
 BORING NO. 1840  
 PIEZOMETER NO. 1840 DATE OF INSTALLATION 8-9-92

**BOREHOLE DRILLING**

DRILLING METHOD <u>8" Hollow Stem Auger</u>	TYPE OF BIT <u>Bull Dog</u>
DRILLING FLUID(S) USED: FLUID <u>N/A</u> FROM <u>N/A</u> TO <u>N/A</u> FLUID <u>N/A</u> FROM <u>N/A</u> TO <u>N/A</u>	CASING SIZE(S) USED: SIZE <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 Piezometer</u>	RISER PIPE MATERIAL <u>PVC-schedule 40</u>
DIAMETER OF PERFORATED SECTION <u>2.0 in. ID</u>	RISER PIPE DIAMETERS: O.D. <u>2 5/16 in</u> I.D. <u>2.0 in</u>
PERFORATION TYPE: SLOTS <input checked="" type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>5ft screen, 10ft &amp; 2ft.</u>
AVERAGE SIZE OF PERFORATIONS <u>0.020 in</u>	JOINING METHOD <u>Screw type - flush joint threaded</u>
TOTAL PERFORATED AREA <u>5.0 ft<sup>2</sup></u>	

**PROTECTION SYSTEM**

RISER PROTECTIVE PIPE LENGTH <u>5.0 ft.</u>	OTHER PROTECTION <u>Hinged well cover with lock</u>
PROTECTIVE PIPE O.D. <u>4 3/8 in.</u>	

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (±ft)		ELEVATION ( )	
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.7			
BOREHOLE FILL MATERIALS: CEMENT GROUT/SLURRY BENTONITE SAND GRAVEL	TOP	0.0	BOTTOM	1.0
	TOP	6.0	BOTTOM	6.0
	TOP	6.0	BOTTOM	7.0
	TOP	7.0	BOTTOM	15.0
	TOP	N/A	BOTTOM	N/A
PERFORATED SECTION	TOP	10.0	BOTTOM	15.0
PIEZOMETER TIP	15.0			
BOTTOM OF BOREHOLE	15.0			
GWL AFTER INSTALLATION	10.48			

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

REMARKS \_\_\_\_\_

8/22/92

**VISUAL CLASSIFICATION OF SOILS**

PROJECT NUMBER: 602-20D3.04	PROJECT NAME: FEMP RI/FS	
BORING NUMBER: 1432	COORDINATES:	DATE: 7-29-92
ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 7-29-92
ENGINEER/GEOLOGIST: Ken Marion	Depth N/A Date/Time N/A	DATE COMPLETED: 8-4-92
DRILLING METHODS: Hollow Stem Auer		PAGE 2 OF 4

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	WELL CONSTRUCTION	REMARKS
7.5	047025 1100 7-29-92	2	3	Medium stiff light olive brown (2.5% s/s) clay fill with gravel, brick, asphalt and concrete fragments, high plasticity, very moist	CL	.5	N/A	H <sub>max</sub> = 1.5 ppm B <sub>7</sub> = 150 cpm α = 0 cpm
	N/A	4	0	No Recovery	N/A	N/A	N/A	
	N/A	7	0	No Recovery	N/A	N/A	N/A	
9.0	047026 1115 7-29-92	3	6	STIFF dark brown (10% s/s) clay fill with a little sand and gravel, high plasticity, very moist	CL	1.5	N/A	H <sub>max</sub> = 1.0 ppm B <sub>7</sub> = 120 cpm α = 0 cpm
9.5	047027 1115 7-29-92	4	6	Very stiff yellowish brown (10% s/s) silty clay with sand and gravel, non plastic, slightly moist	CL	3.5	N/A	H <sub>max</sub> = 1.0 ppm B <sub>7</sub> = 120 cpm α = 0 cpm
	047028 1115 7-29-92	6	6	Hard yellowish brown (10% s/s) silty clay with sand and gravel, non plastic, slightly moist	CL	4.5	N/A	H <sub>max</sub> = 1.0 ppm B <sub>7</sub> = 120 cpm α = 0 cpm
10.5	047029 1130 7-29-92	6	6	Hard light olive brown (2.5% s/s) silty clay with sand and gravel, low plasticity, slightly moist	CL	4.0	N/A	H <sub>max</sub> = 1.0 ppm B <sub>7</sub> = 120 cpm α = 0 cpm
	047030 1132 7-29-92	10	6	Same As Above	CL	4.0	N/A	H <sub>max</sub> = 1.0 ppm B <sub>7</sub> = 120 cpm α = 0 cpm
12.0	N/A	12	0	No Recovery	N/A	N/A	N/A	
12.5	047031 1130 7-29-92	7	6	Hard light olive brown (2.5% s/s) silty clay with sand and gravel, low plasticity, and trace gray (5% s/s) mottling, slightly moist	CL	>4.5	N/A	H <sub>max</sub> = 1.0 ppm B <sub>7</sub> = 120 cpm α = 0 cpm
				Bottom of Bore Hole				

Bottom of well

REVISIONS BY SA  
 DATE 8/27/92  
 Ken

**NOTES:**

Drilling Contractor \_\_\_\_\_

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

Driller: \_\_\_\_\_

	Initial	Date
Site		8/31/92
Site		
Hard Copy		

# FERNALD RI/FS

INSTALLATION DIAGRAM  
MONITORING WELL NO.

1433

## Stickups

INSTALLATION DATE: 8-4-92

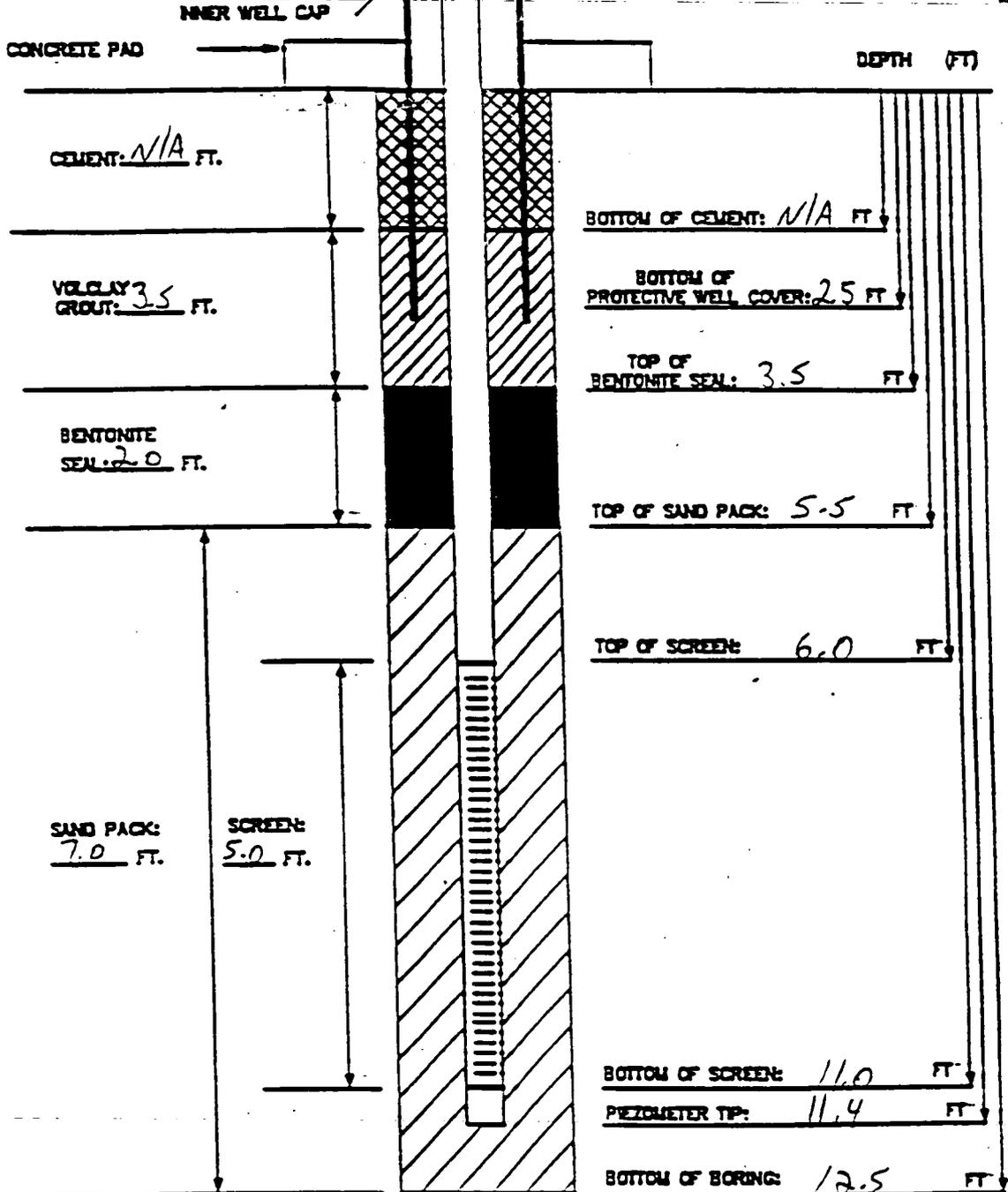
HEIGHT A.M. 8-2-92

TOP OF PROTECTIVE WELL COVER: N/A FT. 2.5 ft.

TOP OF PVC-316 Stainless Steel 2.0 FT

MEASUREMENT NOTCH

3732



### MATERIALS USED:

- SAND TYPE AND QUANTITY: 5-80 lb. bags of 10/20 SAND
- BENTONITE PELLETS (5-GALLON BUCKETS): 1 Bucket
- BAGS OF VOLCLAY GROUT: 1- 50 lb. bag
- AMOUNT OF CEMENT: N/A
- AMOUNT OF WATER USED: 30 gallons
- OTHER: Two Soil/Fill drums were generated
- Pipe sections: 4' Sump, 5 ft. stainless steel screen, 8 ft. stainless steel riser

TASK: 602-2203.04

### NOTES:

- 1) RISER PIPE IS 4 inch ID 316 Stainless Steel
- 2) SCREEN IS 8-INCH I.D. CONCRETE W/ PVC PIPE WITH 0.020-INCH SLOTS
- 3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SLAP.
- 4) WATER DEPTH/DATE: Dry Hole/8-4-92

GEOLOGIST/ENGINEER: Kan Marion

8/1/92

3732

Date			
Initial			
1st In	2nd In	Hard Copy Verif. Date	

**PIEZOMETER INSTALLATION SHEET**

PROJECT NAME FEMO RI/FS FIELD ENG./GEO. Ken Marins DATE 7-29-92  
 PROJECT NO. 602.20.03.04 CHECKED BY C. Brice DATE 9/08/92  
 BORING NO. 1433  
 PIEZOMETER NO. 1433 DATE OF INSTALLATION 7-29-92 8-4-92  
 SOREHOLE DRILLING K.M. 8-4-92

DRILLING METHOD <u>Hollow Stem Auger</u>	TYPE OF BIT <u>Bull Dog</u>
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
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>
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>3/16 Stainless Steel</u>
DIAMETER OF PERFORATED SECTION <u>4.0 in. I.D.</u>	RISER PIPE DIAMETERS:
PERFORATION TYPE:	O.D. <u>4 3/8 in</u> I.D. <u>4.0 in. I.D.</u>
SLOTS <input checked="" type="checkbox"/> HOLES <input type="checkbox"/> SCREEN <input type="checkbox"/>	LENGTH OF PIPE SECTIONS <u>5 ft screen, 8 ft rise</u>
AVERAGE SIZE OF PERFORATIONS <u>0.008 in</u>	JOINING METHOD <u>Screw type - flush joint threaded</u>
TOTAL PERFORATED AREA <u>5.0 ft</u>	

**PROTECTION SYSTEM**

RISER PROTECTIVE PIPE LENGTH <u>N/A 5.0 ft</u>	OTHER PROTECTION <u>N/A protective casing cover with installed padlocks</u>
PROTECTIVE PIPE O.D. <u>10 3/4 in.</u>	

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft.)		ELEVATION (ft.)	
TOP OF RISER PIPE	2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	<del>K.M. 8-4-92</del> <u>N/A - 2.5</u>			
SOREHOLE FILL MATERIALS:				
GROUT/SLURRY <u>C.M. 7-29-92</u>	TOP 0.0	BOTTOM 3.5	TCP	BOTTOM
BENTONITE	TOP 3.5	BOTTOM 5.5	TOP	BOTTOM
SAND	TOP 5.5	BOTTOM 12.5	TOP	BOTTOM
GRAVEL	TOP <u>N/A</u>	BOTTOM <u>N/A</u>	TOP	BOTTOM
PERFORATED SECTION	TOP 6.0	BOTTOM 11.0	TOP	BOTTOM
PIEZOMETER TIP	11.4			
BOTTOM OF SOREHOLE	12.5			
GWL AFTER INSTALLATION	<u>N/A</u>			

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

REMARKS Dry Hole as of 8-4-92  
4 40/60, 8 slot channel pack screen was used

John Smith 8/27/92

# VISUAL CLASSIFICATION OF SOILS

3732

PROJECT NUMBER: 602.20.03.04		PROJECT NAME: FEMP RICES	
BORING NUMBER: 1432		COORDINATES:	
ELEVATION:		DATE: 7-29-92	
GWL: Depth N/A Date/Time N/A		DATE STARTED: 7-29-92	
ENGINEER/GEOLOGIST: Ken Mariani		DATE COMPLETED: 8-4-92	
Depth N/A Date/Time N/A		PAGE 1 OF 4	
DRILLING METHODS: Hollow Stem Auger			

DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (%)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	WELL CONSTRUCTION	REMARKS
0.0	047016 0955 7-29-92	3	6	Medium dense dark brown (10YR, 4/3) clayey silt fill with root fragments, a little gravel, trace fly ash, moist	ML	N/A	N/A	H <sub>nu</sub> = 2.0 ppm G <sub>r</sub> = 100 cpm Σ = 0 cpm
1.0	047017 0955 7-29-92	50	6	Medium dense dark brown (10YR, 4/3) clayey silt fill with root fragments, a little gravel, trace fly ash and concrete at the bottom, moist	ML	N/A	N/A	H <sub>nu</sub> = 2.0 ppm G <sub>r</sub> = 100 cpm Σ = 0 cpm
1.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Note: Concrete down hole prevented the split spoon from driving past 1.0 ft
2.0	047018 1000 7-29-92	5	6	Medium dense, dark brown (10YR, 4/3) clayey silt fill with root fragments, a little gravel and concrete, trace fly ash, moist	ML	N/A	N/A	H <sub>nu</sub> = 2.0 ppm G <sub>r</sub> = 190 cpm Σ = 0 cpm
2.5	047019 1000 7-29-92	7	6	Same As Above	ML	N/A	N/A	H <sub>nu</sub> = 2.0 ppm G <sub>r</sub> = 210 cpm Σ = 0 cpm
3.0	N/A	10	0	No Recovery	N/A	N/A	N/A	
3.5	047019 1030 7-29-92	2	6	stiff brown (10YR, 5/3) silty clay fill with some sand, gravel, and trace concrete, low plasticity, moist.	CL	1.25	N/A	H <sub>nu</sub> = 2.5 ppm G <sub>r</sub> = 200 cpm Σ = 0 cpm
4.0	047020 1030 7-29-92	4	4	Same As Above	CL	1.25	N/A	H <sub>nu</sub> = 2.5 ppm G <sub>r</sub> = 140 cpm Σ = 0 cpm
4.5	N/A	5	0	No Recovery	N/A	N/A	N/A	
5.0	047021 1030 7-29-92	3	6	stiff light olive brown (2.5Y, 5/3) silty clay fill with trace gravel, low plasticity, moist	CL	1.5	N/A	H <sub>nu</sub> = 1.0 ppm G <sub>r</sub> = 160 cpm Σ = 0 cpm
5.5	047023 1030 7-29-92	5	3	stiff light olive brown (2.5Y, 5/3) gravelly clay fill, low plasticity, moist	CL	1.5	N/A	H <sub>nu</sub> = 1.0 ppm G <sub>r</sub> = 160 cpm Σ = 0 cpm
6.0	N/A	5	0	No Recovery	N/A	N/A	N/A	
6.5	047024 1045 7-29-92	3	6	Medium stiff light olive brown (2.5Y, 5/3) clay fill with sand and gravel, trace asphalt, medium plasticity, wet	CL	.75	N/A	H <sub>nu</sub> = 2.5 ppm G <sub>r</sub> = 150 cpm Σ = 0 cpm
7.0	N/A	5	0	No Recovery	N/A	N/A	N/A	
7.5	N/A	4	0	No Recovery	N/A	N/A	N/A	

OBTAINED BY DATE 8/22/92

perched water →

**NOTES:**

Drilling Contractor Pennsylvania Drilling  
 Drilling Equipment Acker Auger Rig  
 Driller: Craig Coulter  
John Vandine

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

N/A = Not Applicable

	Initial	Date
1st Key in	N/A	8/31/92
2nd Key in		
Hard Copy Verification		

H<sub>nu</sub> S/N: A01343 } 20 ppm Background  
 G<sub>r</sub> S/N: 50746 } 100-160 cpm Levels  
 Σ S/N: 50767 } 0 cpm

Note: Dry Hole