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CONSOLIDATED CONSENT AGREEMENT/ FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT PERIOD ENDING DECEMBER 31, 1990

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CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1990

Introduction

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

- The revised South Plume Removal Action Work Plan for Part 1 was submitted to the U.S. EPA on December 5, 1990.
- The revised Waste Pit Area Runoff Control Work Plan was submitted to the U.S. EPA on December 13, 1990.
- The South Plume Removal Action Work Plan for Parts 2 & 3 was submitted to the U.S. EPA on December 17, 1990.

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WORK ASSIGNMENTS AND PROGRESS

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

- CA Section IX - Removal Actions
- CA Section X - Remedial Investigation/Feasibility Study
- Enclosure A - Wastewater flows and radionuclide concentrations under CA Section XXIII.B
- Enclosure B - FFCA: Initial Remedial Measures and Other Open Actions
- Enclosure C - Drilling/Boring Logs

CA Section IX. Removal Actions

This section provides an update of activities associated with the implementation of Removal Actions (RAs) at the FMPC during December 1990. Information is presented for each of the four removal actions identified in the Consent Agreement, including:

- RA No. 1, Contaminated Water Beneath FMPC Buildings
- RA No. 2, Waste Pit Area Runoff Control
- RA No. 3, South Groundwater Contamination Plume
- RA No. 4, Silos 1 and 2

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RA No. 1, Contaminated Water Beneath FMPC Buildings

Plant 6 - Groundwater pumping activities from the three (3) wells and the clarifier pit remained curtailed during December. Analytical results from Volatile Organic Compounds/Hazardous Substance List (VOC/HSL) sampling were received from the laboratories and the results are being incorporated into the design of system modifications. Activities required to design, procure, install, start-up and operate the Plant 6 perched water extraction system continued on schedule and the final design is scheduled to be submitted for DOE/FMPC approval in January, 1991.

Plants 2/3 and Plant 9 - The preliminary engineering necessary to locate and design the extraction and treatment systems specified within the approved work scope continued on schedule. Development of the documentation to support the solicitation of engineering services from the FMPC CERCLA Program Architect/Engineer was completed in December, 1990. Engineering activities associated with the detailed design and procurement of piping and equipment to support the removal and treatment of contaminated perched water beneath Plant 9, Plants 2/3 and Plant 8 are underway.

Activities in January will focus on the detailed design of the Plants 2/3 and Plant 8 extraction systems and the procurement and fabrication of materials to support required piping modifications in Plant 6. Work on the design of the piping and tankage necessary to install the Volatile Organic Compounds (VOC) treatment system in Plant 8 is planned for January. All activities are on schedule to support the deliverables identified in the three U. S. EPA Removal Action Work Plans.

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RA No. 2, Waste Pit Area Runoff Control

The Waste Pit Area Runoff Control EE/CA was conditionally approved by the U.S. EPA and the Ohio EPA on September 12, 1990.

The U.S. EPA issued a letter on November 13, 1990 disapproving the Work Plan. Deficiencies cited by the U.S. EPA were incorporated into the Work Plan and the Work Plan was resubmitted on schedule to the U.S. EPA on December 13, 1990. Late comments were received from the Ohio EPA the week of November 19, 1990. These comments were also resolved and reflected in the Work Plan.

In order to satisfy one of the conditions stipulated by the U.S. EPA for the approval of the Waste Pit Area Runoff Control EE/CA, Permeability Studies in the Waste Pit Area was initiated. These tests will determine if the clays in the detention area will meet the required maximum permeability of 1×10^{-7} cm/sec.

The Approved-For-Construction (AFC) package for the Waste Pit Area Runoff Control Removal Action was received from the Architect Engineering (A/E) firm.

Planned activities in January include the following: (1) Issue the AFC package for solicitation of bids; and (2) conduct the permeability tests.

KEY MILESTONES	STATUS	DUE DATE
Receive U.S. EPA comments/approval on the Waste Pit Area Runoff Control Work Plan	Completed	November 13, 1990
Issue the revised Waste Pit Area Runoff Control Work Plan to the U.S. EPA	Completed	December 13, 1990

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RA No. 3, South Groundwater Contamination Plume

The Work Plan for Part 1 of the South Plume Removal Action was disapproved by the U.S. EPA on November 5, 1990. A revised work plan was prepared and resubmitted to the U.S. EPA on December 5, 1990. The Work Plans for Part 2 (pump from leading edge of South Plume and discharge to Great Miami River) and Part 3 (the installation and operation of an Interim Advanced Wastewater Treatment Unit to reduce contaminant loading discharged to the Great Miami River to a level less than 1,700 pounds per year) was prepared as one Work Plan and submitted to the U.S. EPA on December 17, 1990.

Work in January will center on the continuation of the design work for Parts 1, 2, and 3; working with the Corps of Engineers to obtain easements for Parts 1 and 2; issue to U.S. EPA for informational purposes, the preliminary drawings and specifications for Part 1 and addressing any comments on the Work Plan for Parts 2 and 3.

KEY MILESTONES	STATUS	DUE DATE
Issue Part 1 Revised Work Plan to U.S. EPA for approval	Completed	December 5, 1990
Issue Parts 2 & 3 Work Plan to the U.S. EPA for review/approval	Completed	December 17, 1990

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RA No. 4, Silos 1 and 2

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

Work in January will center on the design efforts for the Removal Action and procuring the subcontractor to complete the Application Demonstration Program necessary to support implementation of the Removal Action.

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

This section provides an update on RI/FS Operable Units (OUs), Community Relations and Field Activities for December 1990. Status information is presented for each of the five Operable Units (OUs) identified in the Consent Agreement. The five Operable Units are:

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

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

1.1 Remedial Investigation

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

The second internal draft of the RI Report was submitted for internal review on December 17, 1990. The draft RI Report has been revised to reflect November's internal review comments.

The second revision of the site (task)-specific Health and Safety Plan for the OU1 additional sampling program was revised to reflect internal review comments and issued for comment resolution. Additional comments surfaced during the comment resolution process. These comments are being resolved. Installation and safety materials are being procured in parallel with these activities.

Activity	Comments
Issue draft Remedial Investigation Report to U.S. EPA by February 18, 1991	Open, On schedule, 85% complete

b. **Issues/Problems**

The results of additional sampling and analyses will not be available for inclusion in the RI and FS documents at the time of submittal. The U.S. EPA will not approve documents without this data.

c. **Corrective Actions**

Complete the waste pit sampling and incorporate the data as it becomes available. Initiate discussions with the U.S. EPA for the deletion of this sampling requirement or negotiate schedule extensions.

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Operable Unit 1: Waste Pits (cont'd.)

1.2 Feasibility Study

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

An informal dispute resolution meeting for the OU1 Initial Screening of Alternatives report was held at the U.S. EPA Region V office in Chicago on December 3, 1990. As a result of the meeting, the informal dispute was resolved on December 13, 1990. The result of the dispute resolution was to revise the OU1 Initial Screening of Alternatives Report and submit the revised document to U.S. EPA on January 4, 1991.

The initial draft of the FS report was submitted for internal review on December 10, 1990. The initial FS report will require revision to incorporate the results of the dispute resolution from the Initial Screening of Alternatives report.

Activity	Comment
Dispute Resolution for the Initial Screening of Alternatives Report.	Dispute Resolved December 13, 1990.
Present Detailed Analysis of Alternatives to U.S. EPA	Delayed to allow incorporation of Initial Screening of Alternatives Dispute Resolution results.
Issue Draft Feasibility Study Report to U.S. EPA on March 25, 1991	On schedule, 51% complete May need to be delayed based on decisions made on additional sampling.

Operable Unit 1: Waste Pits (cont'd.)

1.2 Feasibility Study (cont'd.)

b. **Issues/Problems**

Additional sampling of Waste Pits and Treatability Study data will not be available for inclusion into FS Report based on the present schedule for report submittal.

Comments received from the U.S. EPA and Ohio EPA on the OU1 Initial Screening of Alternatives report and reports for other operable units indicate unresolved risk assessment issues. These issues include definition of future land-use exposure scenarios and point of compliance for the groundwater pathway.

Initial evaluation of the vitrification technology appears very promising for use in remediation at the FMPC. However, since it is a relatively unproven technology on a large scale, there are significant questions on reliability that cannot be addressed readily in the FS at this time.

c. **Corrective Actions**

The FS will proceed on the current schedule and to the extent practical, additional data will be incorporated as it becomes available. Negotiations will be held with the U.S. EPA concerning schedule extensions.

The DOE and the U.S. EPA should hold meetings to resolve outstanding Risk Assessment issues to avoid problems in FS document acceptance.

Bench and/or pilot scale applications of vitrification technology for OU1 should be initiated to resolve questions in the FS.

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Operable Unit 1: Waste Pits (cont'd.)

d. **Planned Activities for January 1991**

Revise the draft FS to incorporate internal review comments.

Submit the Final Initial Screening of Alternatives Report to the U.S. EPA on January 4, 1991.

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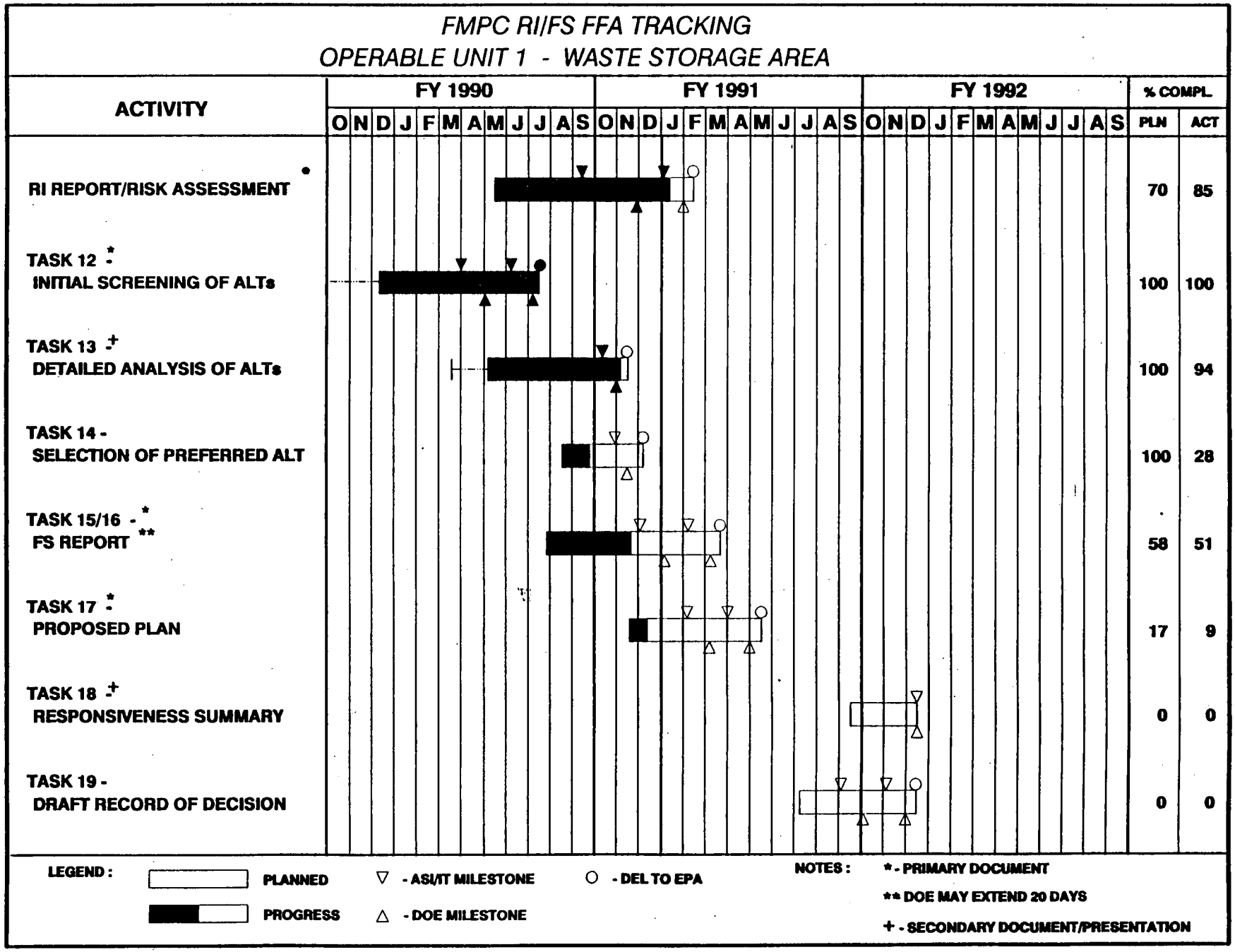

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Operable Unit 2: Other Waste Units

2.1 Remedial Investigation

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

DOE-HQ comments were received on the Operable Unit 2 Remedial Investigation Report. The report is being revised to reflect the comments.

The Work Plan Addendum for Operable Unit 2 additional sampling was approved by U.S. EPA on December 13, 1990. Planning is underway for this activity with initiation of field activities scheduled for February.

Activity	Comment
Issue draft RI Report to the U.S. EPA on February 11, 1991.	Open, On schedule, 94% complete

b. Issues/Problems

Additional sampling results will not be available for the RI or FS reports. Treatability studies are required to support the FS report.

c. **Corrective Actions**

Negotiate schedule extensions with the U.S. EPA.

d. **Planned Activities for January 1991**

Respond to internal review comments on the draft RI Report and revise the report to reflect those comments.

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Operable Unit 2: Other Waste Units

2.2 Feasibility Study

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

Preparation of the draft final Initial Screening of Alternatives (ISA) Report for Operable Unit 2 is continuing. The ISA report is being revised to reflect DOE responses to U.S. EPA comments on the draft version. Delivery of the draft final ISA report to the U.S. EPA has been delayed until January 9, 1991. Notification as required by the Consent Agreement was made on December 19, 1991.

The Detailed Analysis of Alternatives presentation to the U.S. EPA is on hold. Changes to the Initial Screening of Alternatives Report resulting from the U.S. EPA review comments will need to be incorporated into the Detailed Analysis of Alternatives (DAA).

Work has also progressed on the draft Feasibility Study Report for Operable Unit 2. The document was reviewed internally and comments received on December 20, 1990. Comments are being resolved and preparation of a revised document has been initiated for delivery to DOE-HQ for review. The document will also reflect U.S. EPA comments on the ISA report.

Activity	Comment
Issue draft final Initial Screening of Alternatives Report to the U.S. EPA on January 9, 1991	Open, On schedule, 100% complete
Present Detailed Analysis of Alternatives to the U.S. EPA	Open, On schedule, 100% complete
Issue draft Feasibility Study Report to the U.S. EPA on March 25, 1991	Open, On schedule, 68% complete

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Operable Unit 2: Other Waste Units

2.2 Feasibility Study (cont'd.)

b. **Issues/Problems**

Due to the nature of the U.S. EPA comments on the ISA report and the necessity of revising the DAA, it is likely that a schedule extension for the submittal of the Feasibility Study Report will be required.

c. **Corrective Actions**

Negotiate a schedule extension with the U.S. EPA.

d. **Planned Activities for January 1991**

Revise the Initial Screening of Alternatives Report and submit to the U.S. EPA. Revise the Detailed Analysis of Alternatives presentation and the draft Feasibility Study Report.

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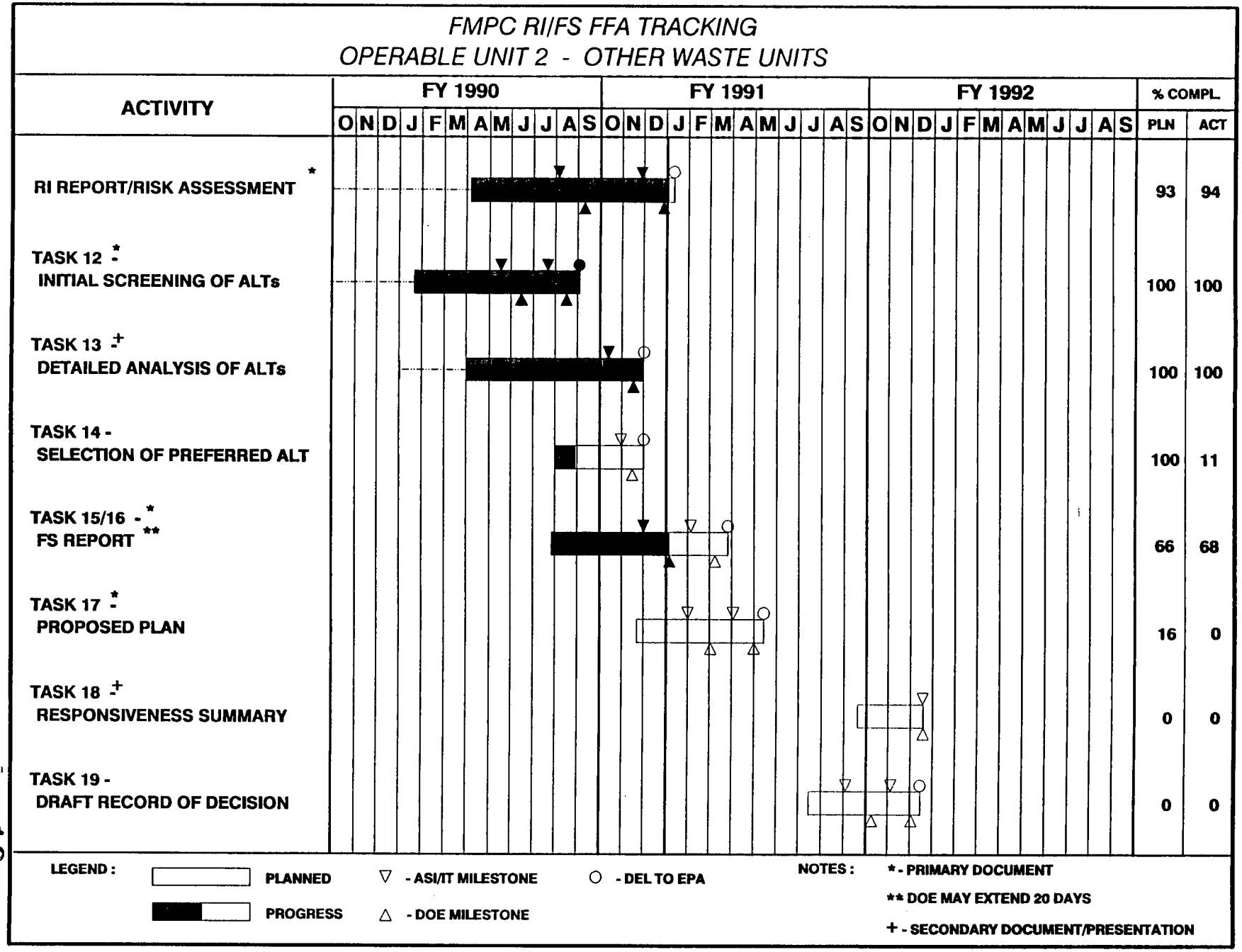

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Operable Unit 3: Production Area and Suspect Areas

3.1 Remedial Investigation (RI)

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

Progress-to-date is consistent with scheduled commitments. The internal draft of the Remedial Investigation/Baseline Risk Assessment Report is being reviewed internally.

Activity	Comment
Issue draft RI Report to the U.S. EPA on April 8, 1991	Open, On schedule, 61% complete

b. **Issues/Problems**

The U.S. EPA contends that production area facilities, aboveground drums, underground storage tanks, and stored product are within the scope of Operable Unit 3. A Notice of Violation (NOV) was received on December 26, 1990 concerning this and other issues relative to the draft final Initial Screening of Alternatives Report.

c. **Corrective Actions**

Formal Dispute Resolution is scheduled to begin January 23, 1991.

d. **Planned Activities for January 1991**

Meet with the U.S. EPA to discuss resolution of the dispute.

Continue to incorporate analytical results into the next revision of the Remedial Investigation/Baseline Risk Assessment Report. Initiate revision to these reports in response to internal review comments.

Operable Unit 3: Production Area and Suspect Areas (cont'd.)

3.2 Feasibility Study (FS)

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

Progress-to-date is consistent with scheduled commitments. However, the U.S. EPA comments disapproving the draft final Initial Screening of Alternatives (ISA) Report were received on December 21, 1990. The U.S. EPA disapproved the report based on the following: 1) the ISA did not address all of the deficiencies previously identified; 2) the ISA failed to address the entire operable unit; and 3) the ISA was not developed in accordance with the Consent Agreement, CERCLA, National Contingency Plan (NCP), and applicable guidance and policy. Dispute resolution was invoked to address these issues.

The Detailed Analysis of Alternatives (DAA) was presented for internal review on December 12, 1990. The presentation to U.S. EPA has been placed on hold pending resolution of ISA issues. Other DAA activities continued, including generation of source term data for groundwater modeling.

Draft detailed cost estimates are being revised to incorporate internal review comments. Work plans for treatability studies are being revised to reflect internal review comments.

Activity	Comment
Issue Draft Final Initial Screening of Alternatives Report to the U.S. EPA	Completed November 21, 1990
Present Detailed Analysis of Alternatives to the U.S. EPA	On hold, pending result of ISA dispute resolution, 83% complete

Operable Unit 3: Production Area and Suspect Areas (cont'd.)

3.2 Feasibility Study (cont'd.)

b. **Issues/Problems**

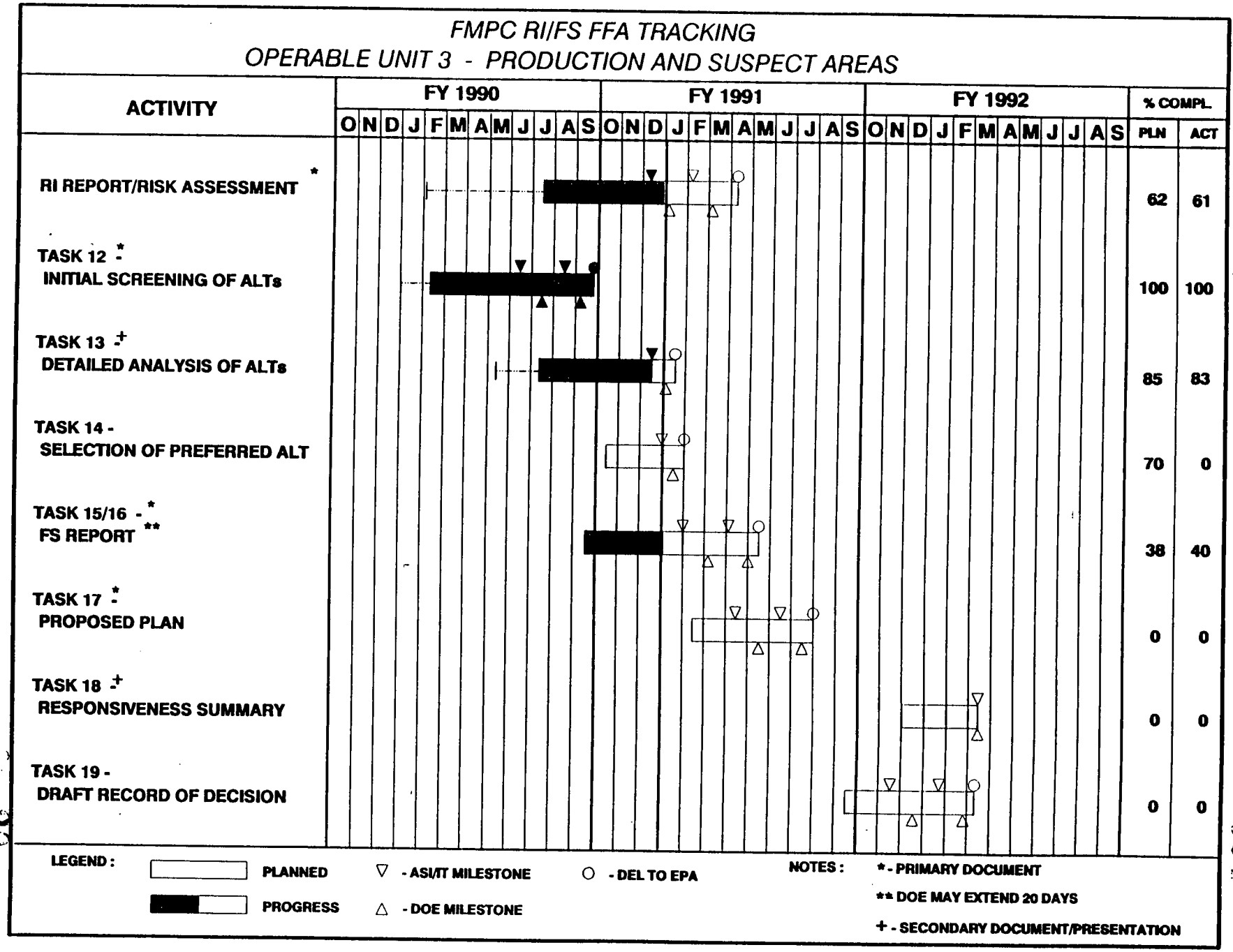
The U.S. EPA contends that production area facilities, aboveground drums, underground storage tanks, and stored product are within the scope of Operable Unit 3. The draft final ISA Report was disapproved by the U.S. EPA on December 21, 1990 (see preceding milestone discussion) and a Notice of Violation (NOV) was received on December 26, 1990 concerning this and other issues relative to the draft final Initial Screening of Alternatives Report.

c. **Corrective Actions**

Formal dispute resolution will be initiated on January 23, 1991 in response to the NOV.

d. **Planned Activities for January 1991**

Continue development of the FS Report including the Detailed Analysis of Alternatives presentation and associated groundwater modeling.


FMPC RI/FS FFA TRACKING
OPERABLE UNIT 3 - PRODUCTION AND SUSPECT AREAS
ACTIVITY
FY 1990
FY 1991
FY 1992
O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S
% COMPL.
PLN
ACT
RI REPORT/RISK ASSESSMENT *
62
61
TASK 12 - *
INITIAL SCREENING OF ALTs
100
100
TASK 13 - +
DETAILED ANALYSIS OF ALTs
85
83
TASK 14 -
SELECTION OF PREFERRED ALT
70
0
TASK 15/16 - *
FS REPORT **
38
40
TASK 17 - *
PROPOSED PLAN
0
0
TASK 18 - +
RESPONSIVENESS SUMMARY
0
0
TASK 19 -
DRAFT RECORD OF DECISION
0
0
LEGEND :
PLANNED
PROGRESS
▽ - ASI/T MILESTONE
△ - DOE MILESTONE
○ - DEL TO EPA
NOTES :
* - PRIMARY DOCUMENT
** DOE MAY EXTEND 20 DAYS
+ - SECONDARY DOCUMENT/PRESENTATION

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

4.1 Remedial Investigation

a. Status of Work - Key Milestones

The U.S. EPA comments on the draft final Remedial Investigation (RI) Report for Operable Unit 4 (OU4) were received on December 7, 1990. The U.S. EPA disapproved the RI Report citing inadequate and incomplete characterization data. A Notice of Violation (NOV) on the OU4 RI Report was issued by the U.S. EPA on December 7, 1991 which stated that the DOE had failed to meet the data requirements specified in the Consent Agreement, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). On December 16, 1990, the DOE formally disagreed with the U.S. EPA findings and requested that the Dispute Resolution Clause of the Consent Agreement be invoked.

b. Issues/Problems

The current sampling and analysis schedule will delay the incorporation of analytical data for Operable Unit 4 into the RI Report.

c. Corrective Actions

A new proposed schedule logic diagram was prepared based upon what would be required to revise the RI document once the analytical results from all the sampling programs have been obtained. The preliminary schedule follows the suggested process outline provided in the U.S. EPA CERCLA guidance documents. This network logic will serve as the basis for the operable unit management team to optimize the schedule for both RI and FS completion in a manner that will thoroughly identify the extent and scope of any subsequent remedial actions.

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

4.1 Remedial Investigation (cont'd.)

d. **Planned Activities for January 1991**

The comment response document to the U.S. EPA comments on the RI Report will be completed. Sampling efforts for the K-65 silo residues, slant borings, and vertical borings will be continued. The preliminary draft schedule logic network will be refined.

4.2 Feasibility Study

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

The DOE did not submit the draft Feasibility Study which was due to the U.S. EPA on December 17, 1990. This submittal was not made as a direct result of the NOV issued by the U.S. EPA against the RI Report. Refinement of this document continues in order that it can be submitted to the U.S. EPA upon resolution of the RI dispute.

Concurrently, review of the draft Proposed Plan is also awaiting the RI dispute resolution.

b. **Issues/Problems**

The Feasibility Study Report and subsequent documents are currently on hold pending the RI dispute resolution. All future Consent Agreement delivery dates for OU4 primary documents are no longer achievable.

c. **Corrective Actions**

The network logic diagram mentioned under Section 4.1, Remedial Investigation, included a network for the Feasibility Study and subsequent documents. These activities will be optimized and presented to the U.S. EPA to allow agreement on a revised schedule for the delivery of primary documents.

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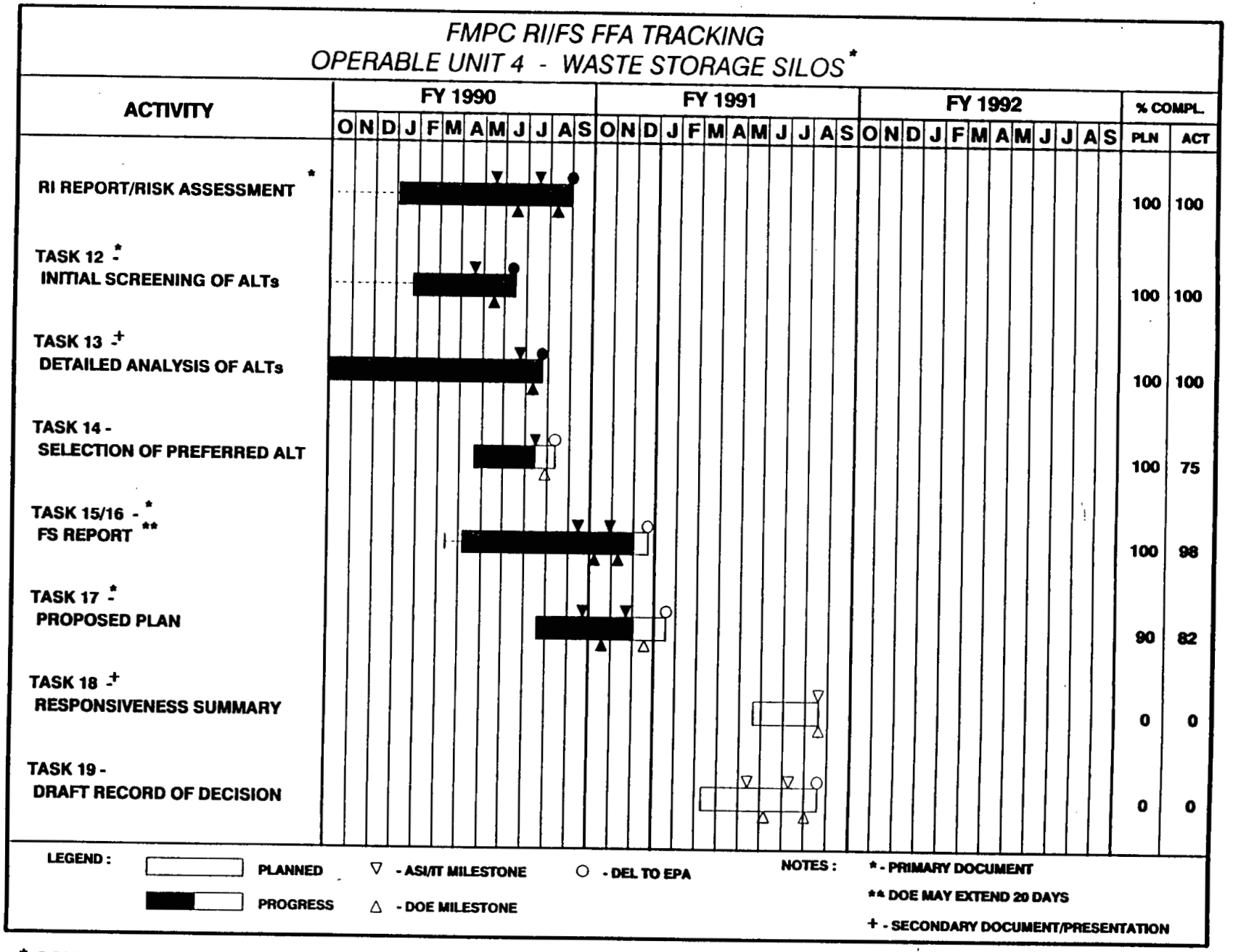
Operable Unit 4: Silos 1, 2, 3, and 4

4.1 Remedial Investigation (cont'd.)

d. **Planned Activities for January 1991**

Complete a thorough Quality Assurance review of the Feasibility Study during the RI dispute resolution process and make corresponding revisions to the Proposed Plan.

Conduct a RI Report dispute resolution teleconference meeting between the DOE and the U.S. EPA on January 15, 1991.



* *SCHEDULE SUBJECT TO UPDATE*

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Operable Unit 5: All Environmental Media

5.1 Remedial Investigation

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

A draft version of the RI Report was completed in December and is being reviewed internally. A companion report for the Operable Unit 5 RI, the FMPC Groundwater Report, was submitted with the RI Report. The FMPC Groundwater Report is a source document for the RI Report and contains information and interpretation of site-wide groundwater data.

Activity	Comment
Issue draft RI Report to U.S. EPA on April 8, 1991	Open, On schedule, 59% complete

b. **Issues/Problems**

None to report.

c. **Corrective Actions**

None required.

d. **Planned Activities for January 1991**

Incorporate internal review comments into the revised draft RI Report.

Operable Unit 5: All Environmental Media

5.2 Feasibility Study

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

The Initial Screening of Alternatives Report was approved by the U.S. EPA on November 26, 1990. The final report was scheduled to be submitted to the U.S. EPA and the Ohio EPA on December 26, 1990. Responses will be provided to the U.S. EPA to clarify additional comments received on five of the U.S. EPA initial comments. Additional responses will also be provided to the Ohio EPA as requested in their letter dated November 28, 1990.

The list of ARARs for OU5 was submitted on October 31, 1990 for internal review.

The Detailed Analysis of Alternatives was prepared and submitted for internal review. Comments received on the Initial Screening of Alternatives Report were reflected in the document. The Detailed Analysis of Alternatives Report is scheduled for submittal to the U.S. EPA on February 22, 1991.

Work was initiated on the draft Feasibility Study Report.

The draft Treatability Work Plan (Bench scale testing) for groundwater and soil treatment technologies for Operable Units 3 and 5 has been prepared. The work plan is being reviewed internally.

Activity	Comment
Issue final Initial Screening of Alternatives Report to U.S. EPA on December 26, 1990	Open awaiting transmittal
Issue Detailed Analysis of Alternatives to U.S. EPA on February 22, 1991	Open, On schedule, 86% complete

Operable Unit 5: All Environmental Media (cont'd.)

5.2 Feasibility Study (cont'd).

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

Activity	Comment
Issue draft Feasibility Study Report to U.S. EPA on June 4, 1991	Open, On schedule, 30% complete

b. **Issues/Problems**

The Initial Screening of Alternatives Report was not submitted on its due date, December 26, 1990.

c. **Corrective Actions**

The Initial Screening of Alternatives Report is being revised to reflect the Ohio EPA comments.

d. **Planned Activities for January 1991**

Continue preparation of the Detailed Analysis of Alternatives for submittal to the U.S. EPA and Ohio EPA on February 22, 1991.

Continue preparation of the draft Feasibility Study Report.

Submit the revised Initial Screening of Alternatives Report incorporating responses to the Ohio EPA comments.

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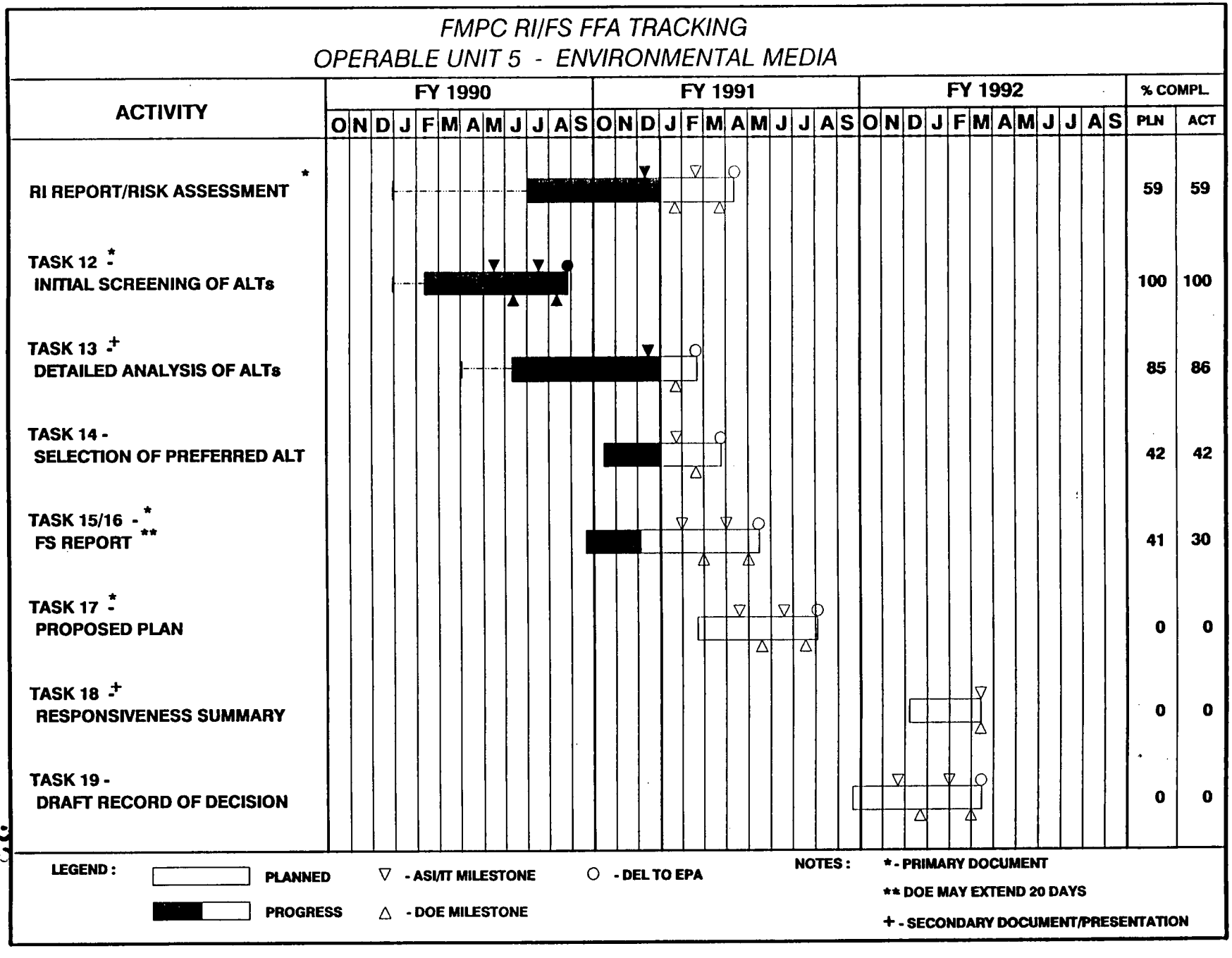

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RI/FS Community Relations

6.0 RI/FS Community Relations

a. **Status of Work**

Community Meeting

A community meeting was held December 11, 1990, at The Plantation Restaurant in Harrison, Ohio. Approximately 35 community members attended. An availability session was held for 1-1/2 hours prior to the formal meeting. The availability session featured exhibits about each operable unit, the recent DOE/U.S. EPA agreement to build a treatment facility to remove uranium from FMPC waste streams, and the 1989 FMPC Environmental Report. The presentations focused on:

- DOE-Site Office staffing;
- The local scoping meeting for the Programmatic Environmental Impact Statement, scheduled for January 14, 1991;
- Expansion of the FMPC siren warning system to include weather warnings;
- The School for Environmental Excellence;
- Announcement of a community roundtable focusing on the 1989 Environmental Monitoring Report and the first issue of the site's new community publication, the Cleanup Update;
- The DOE/U.S. EPA decision to build the wastewater treatment facility for uranium removal;
- Public role in FMPC decision to treat organic contaminants in pumped perched water;
- Removal action status (Pit 6, Waste Pit Stormwater Runoff Control, perched water in the Production Area, South Plume, K-65 silos);
- Operable Unit status (documents, sampling);
- Studies to determine if anything is buried at the north end of the FMPC near the old administration building;
- Issues pertaining to schedules;

6.0 **RI/FS Community Relations (continued)**

Representatives of the U.S. EPA, Ohio EPA, and FRESH made brief statements. The Ohio EPA discussed the environmental benefits of the new interim wastewater treatment facility and the Paddy's Run Road Site RI/FS. The U.S. EPA discussed the EPA-approved Technical Assistance Grant to FRESH and the OU4 Notice of Violation. FRESH criticized the FMPC for distributing meeting announcements about the Center for Disease Control (CDC) risk assessment study and general site management.

A transcript from the meeting was delivered to the Reading Rooms and the Administrative Record on December 31, 1990.

Public Information Strategy: Notices of Violation

FMPC representatives met with core members of FRESH to discuss RI/FS schedule issues related to Operable Unit 4. Responses to media inquiries regarding the Notice of Violation for the Operable Unit 4 RI/RA Report and the Operable Unit 3 Initial Screening of Alternatives report were prepared. There has been minimal press coverage of the issue. A long-range strategy is being developed to inform the public of developments on these issues.

Community Questionnaire

Approximately 51 questionnaires (which were distributed in the November 1990 FMPC Cleanup Update) were returned to the FMPC. A summary of the results follows:

- All wanted to receive future issues of the Cleanup Update.
- Most respondents were aware of the recently opened FMPC Public Environmental Information Center, and found the location and hours convenient; few have actually used the center, but most respondents plan to visit.
- Most respondents have attended FMPC community meetings.

6.0 **RI/FS Community Relations (continued)**

Community Questionnaire (cont'd.)

- Preferences for current public information activities were (in descending order): written information, opportunity to ask questions at meetings, EPA and FRESH comments (at meetings), meetings about many subjects, FMPC presentations, meetings about one subject, large meetings, and finally, small meetings.
- About half the respondents expressed interest in attending Community Roundtables focusing on groundwater contamination, removal actions, stored waste, air emissions, radiation, waste pits (OU1), Solid Waste Units (OU2), the silos (OU4), and Environmental Impact Statements; a few respondents were interested in the Production Area (OU3), the effluent line, health effects of contamination, and the annual Environmental Monitoring Report. Weekday evenings were preferred for roundtables.
- Recommendations: provide videotapes of meetings or topics for at-home viewing; provide written materials to get a broader background in environmental issues.

Administrative Record

FMPC personnel initiated a process to reduce the document filing backlog and to ensure that the Administrative Record contains all relevant RI/FS documents. Plans were made to hold meetings twice monthly to ensure the timely availability of documents to the public.

b/c. **Problems/Corrective Action**

None to report and none required.

d. **Planned Activities for January 1991**

A scoping meeting for the DOE Programmatic Environmental Impact Statement is scheduled for January 14, 1991 at the Hilton North in Cincinnati. FRESH plans to attend.

A Community Roundtable focusing on the 1989 FMPC Environmental Report is scheduled for January 29, 1991. Community meeting follow-up activities will be conducted.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1990

7.0 Field Activities

Surveying Activities

Surveying activities continued during December focusing on establishing the horizontal and vertical coordinates for borings and installed monitoring wells. Surveying activities also continued in December on establishing landowner boundaries in support of the Paddy's Run South Seepage Investigation.

Monitoring Wells Installations

One monitoring well was installed in December, Well 2555, in support of the Paddy's Run South Seepage Investigation. Table 1 summarizes pertinent information for Monitoring Well 2555. The well boring log can be found in Enclosure C.

TABLE 1: MONITORING WELL INSTALLATIONS

Monitoring Well No.	Date Completed	Depth Drilled (Ft.)	Depth to Bottom of Casing (Ft.)
2555	12-02-90	36.5	32.0

Monitoring Well Development and Sampling

During December, two monitoring wells, Wells MW2550 and MW2555 were developed and sampled. These wells are a portion of the Paddy's Run South Seepage Investigation.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1990

7.0 Field Activities (cont'd.)

Water Sampling: Surface Water Sampling

As part of the Paddy's Run Seepage Investigation Work Plan, five locations on Paddy's Run were sampled in December. The surface water sample locations are designated by: W-7, W-8, W-12, W-13 and W-14. These five samples were collected for full radiological analysis and general groundwater parameters as defined in the RI/FS Work Plan dated March 1, 1988.

Surface water samples will be collected at these locations monthly for one year as defined in the Paddy's Run South Seepage Investigation Work Plan.

Water Sampling: Monitoring Well and Facility Testing Groundwater

Groundwater sampling efforts were suspended in December for monitoring wells and facility testing due to the lack of appropriate personnel and equipment. Calibration and procurement of field equipment were carried out in order to resume sampling activities for the work period beginning January 3, 1991.

Production and Additional Suspect Areas Drilling Program

The production and additional suspect areas drilling program continued during December with four piezometers installed. Two of the borings, 1247 and 1674, were completed within the "wet side" of the Pilot Plant. Both were completed as flush mounted piezometers. The other two locations, 1611 and 1612, were completed as part of the Sectors 1 and 4 HSL Soil Sampling Plan, both of which were completed as four-inch stainless steel piezometers. Table 2 summarizes the Facility Testing Drill Program for December 1990. Boring logs can be found in Enclosure C.

7.0 Field Activities (cont'd.)

TABLE 2: FACILITY TESTING DRILLING PROGRAM

Boring No.	Date Completed	Depth Drilled (Ft.)	Piezometer Installed Yes/No	Sector No.
1247	12-04-90	20.0	Yes	3
1674	12-19-90	20.0	Yes	3
1611	12-13-90	20.0	Yes	1
1612	12-19-90	20.0	Yes	1

Water Level Measurements: Monitoring Wells and Piezometers

Water level measurements were completed on 227 monitoring wells and 277 piezometers contained in the RI/FS program.

K-65 Silo Sampling Project

Sampling activities progressed significantly during December. Four attempts were made to sample the residues in the southeast manway of Silo 2. One attempt was aborted when the drill rod loosened during sampling.

Two of the four attempts were very successful, each achieving 100% recovery. This success is attributed to a procedural modification to the sampling protocol. To date, this method has achieved the minimum required recovery of 77% of the total sample.

Collection of the lower one-third of Silo 2 manway sample will be made during the week of January 7, 1991. Upon completion of this attempt, the silo sampling effort will be suspended for the winter.

7.0 Field Activities (cont'd.)

The sampling methodology was revised to attempt retrieval of one-third of the silo depth per sampling event. During the first sampling event, the upper one-third of the silo is sampled per manway with the second event re-entering the same hole and collecting the middle one-third. A third attempt is directed at the lower one-third of the sampling hole.

Silo sampling is scheduled to begin after the berm sampling has been completed. The silo sampling will consist of NW manway of Silo No. 2 and Silo No. 1 SE & NW manways.

Completion of silo residue sampling and site demobilization is expected in late May 1991.

Subject to final U.S. EPA approval of the work plan, silo berm sampling is scheduled to begin in February, 1991.

The Flagpole Suspect Area

During December, the geophysical data collected over this suspect area last summer was reviewed by a Professor of Geophysics at Wright State University. The FMPC is awaiting the report containing the results of this review. The report is due to be delivered in early January, 1991.

The review is expected to assist in the definition of what, if any, further methods of investigation are necessary to confirm or deny the presence of a buried structure in the suspect area.

The testing program for the additional investigative techniques of seismic reflection, seismic refraction, and hand boring has been put on hold pending the results of the review of previously collected geophysical data.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

PERIOD ENDING DECEMBER 31, 1990

ENCLOSURE A

WASTEWATER FLOWS AND RADIONUCLIDE CONCENTRATIONS UNDER CA SECTION XXIII.B

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CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1990

Introduction

The accompanying Effluent Radiation Reports provide, in accordance with the requirements of Section XXIII.B of the Consent Agreement under CERCLA Section 120 and 106(a), data on the daily wastewater flows and radionuclide concentrations and loadings released to the Great Miami River and an estimate of runoff and radionuclide concentrations to Paddy's Run during December 1990.

Summary - December 1990

The total quantity of uranium discharged from the FMPC to the Great Miami River via Manhole 175 (Outfall 1I000004001) was 73.68 kilograms. The average uranium concentration for the previous twelve months was 0.80 mg/l. This is 90.1 percent of the Derived Concentration Guide (DOE Order 5400.5) for ingested water.

There was no discharge from the Stormwater Retention Basin (Outfall 1I000004002) to Paddy's Run via the Storm Sewer Outfall Ditch in December 1990. Based on 7.01 inches of rainfall in December 1990, the total quantity of uranium discharged to Paddy's Run from uncontrolled areas of the FMPC is estimated to be 31.54 kilograms.

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CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1990

Wastewater Flows and Radionuclide Concentrations

FACILITY: Feed Materials Production Center, U.S. Department of Energy
7400 Willey Road, P.O. Box 398704
Cincinnati, Ohio 45239 Hamilton
9002 M 9501 900212

LOCATION: 1I000004001; 001 Total Discharge MONTH: December 1990
Manhole 175 (Effluent to Great Miami River)

Day	Flow (MGD)	Total Alpha (pCi/l)	Total Beta (pCi/l)	Total U (mg/l)	Total U (kgs)	Calculated Total U-238 (pCi/l) (1)
1	0.540	279	140	0.56	1.14	189
2	0.339	342	189	0.52	0.67	176
3	1.191	302	135	0.50	2.25	169
4	1.223	396	162	0.50	2.31	169
5	1.222	248	113	0.36	1.66	122
6	1.123	405	216	0.50	2.12	169
7	0.507	387	135	0.56	1.07	189
8	0.382	266	234	0.56	0.81	189
9	0.340	234	189	0.46	0.59	155
10	0.273	189	180	0.48	0.50	162
11	0.346	135	153	0.22	0.29	74
12	0.383	270	153	0.62	0.90	209
13	0.600	279	297	0.70	1.59	236
14	0.691	306	108	0.38	0.99	128
15	0.439	338	117	0.62	1.03	209
16	0.308	581	230	0.86	1.00	291
17	0.889	369	198	0.46	1.55	155
18	1.312	207	131	0.32	1.59	108
19	1.374	401	104	0.62	3.22	209
20	1.327	369	77	0.70	3.51	236
21	1.421	356	225	0.62	3.33	209
22	1.386	500	122	0.84	4.40	284
23	1.379	405	122	0.90	4.70	304
24	1.347	383	135	0.86	4.38	291
25	1.352	473	275	0.74	3.78	250
26	1.362	450	126	0.60	3.09	203
27	1.301	288	140	0.60	2.95	203
28	1.266	311	207	0.76	3.64	257
29	1.357	505	248	0.92	4.72	311
30	1.383	396	320	0.88	4.60	297
31	1.450	405	216	0.96	5.27	324
	29.813				73.68	

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CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1990

Wastewater Flows and Radionuclide Concentrations (cont.)

FACILITY: Feed Materials Production Center

LOCATION: 001 Total Discharge

MONTH: December 1990

	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.	0.962	366	173	0.65	2.38	221
Max.	1.450	581	320	0.96	5.27	324
Min.	0.273	135	77	0.22	0.29	74

The average uranium concentration for the previous twelve months was 0.80 mg/l. This is 90.1 percent of the Derived Concentration Guide (DOE Order 5400.5) for ingested water.

Comments: (1) The calculated total U-238 is based on a conversion factor of 337.84 pCi U-238/kg Total U applied to the measured value of total uranium.

(2) Average values presented are flow-weighted.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1990

Wastewater Flows and Radionuclide Concentrations (cont.)

FACILITY: Feed Materials Production Center, U.S. Department of Energy
7400 Willey Road, P.O. Box 398704
Cincinnati, Ohio 45239 Hamilton
9002 M 9501 900212

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

MONTH: December 1990

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

Based on 7.01 inches of rainfall in December 1990, the uranium discharge to Paddy's Run from uncontrolled areas of the FMPC is estimated to be 31.54 kgs.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

PERIOD ENDING DECEMBER 31, 1990

ENCLOSURE B

FFCA: INITIAL REMEDIAL MEASURES AND OTHER OPEN ACTIONS

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1990

INTRODUCTION

Enclosure B describes actions undertaken at the Feed Materials Production Center (FMPC) during the period December 1 through December 31, 1990 that are not covered by the reporting requirements of the Consent Agreement under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120 and 106(a).

WORK ASSIGNMENTS AND PROGRESS

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

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

1. Initial Remedial Measures

Section C

K-65 Silo Project - Sampling activities progressed significantly during December. Four attempts were made to sample the residues in the southeast manway of Silo 2. One attempt was aborted when the drill rod loosened during sampling.

Two of the four attempts were very successful, each achieving 100% recovery. This success is attributed to a procedural modification to the sampling protocol. To date, this method has achieved the minimum required recovery of 77% of the total sample.

Collection of the lower one-third of Silo 2 manway sample will be made during the week of January 7, 1991. Upon completion of this attempt, the silo sampling effort will be suspended for the winter.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1990

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

1. Initial Remedial Measures

Section C

K-65 Silo Project (cont'd.)

The sampling methodology was revised to attempt retrieval of one-third of the silo depth per sampling event. During the first sampling event, the upper one-third of the silo is sampled per manway with the second event re-entering the same hole and collecting the middle one-third. A third attempt is directed at the lower one-third of the sampling hole.

Silo sampling is scheduled to begin after the berm sampling has been completed. The silo sampling will consist of NW manway of Silo No. 2 and Silo No. 1 SE & NW manways.

Completion of silo residue sampling and site demobilization is expected in late May 1991.

Subject to final U.S. EPA approval of the work plan, silo berm sampling is scheduled to begin in February, 1991.

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

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

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending December 31, 1990

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

3. Reports and Record Keeping

Section B

The RI/FS Monthly Technical Progress Report for November 1990 was transmitted to the U.S. EPA on December 18, 1990 as an integral part of the Consolidated Consent Agreement/Federal Facility Compliance Agreement (CA/FFCA) Monthly Progress Report in accordance with requirements of Section X of the Consent Agreement.

CLEAN AIR ACT (CAA)

Section E

The sixteenth Quarterly Particulate Emissions Report for the period July 3, 1990 through October 3, 1990 was submitted to the U.S. EPA on December 31, 1990.

RADIATION DISCHARGE INFORMATION

Section A

The sixteenth Quarterly Liquid Discharge Report for the period July through September 1990 was submitted to the U.S. EPA on December 31, 1990.

REPORTING REQUIREMENTS

Section B

The Federal Facilities Compliance Agreement Monthly Progress Report for November 1990 was transmitted to the U.S. EPA on December 18, 1990 as Enclosure B of the Consolidated Consent Agreement/Federal Facility Compliance Agreement (CA/FFCA) Monthly Progress Report.

TABLE 1

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

STATUS OF ACTIONS AS OF DECEMBER 31, 1990

ACTION	DESCRIPTION	COMPLETION TIME AFTER FFCA SIGNED	FY91 STATUS
CERCLA			
1.	INITIAL REMEDIAL MEASURES		
1.C	Implement radon control plan approved by the U.S. EPA.	-------	No longer applicable. Progress on actions to address radon emissions from the K-65 Silos are being reported separately under Section IX-Removal Actions of the Consent Agreement/FFCA Monthly Progress Report.
2.	REMEDIAL INVESTIGATION/FEASIBILITY STUDY		No action required.
2.A	RI/FS work is to be conducted in accordance with the U.S. EPA guidelines.	N/A	
2.B	-- No Action Required --	-------	Status information on the RI/FS is being reported in accordance with the requirements of Section X of the Consent Agreement under CERCLA Section 120 and 106(a).
2.E	Amend and submit revised RI/FS Work Plan to U.S. EPA if deficiencies are found.		Status information on the RI/FS is being reported in accordance with the requirements of Section X of the Consent Agreement under CERCLA Section 120 and 106(a).
2.F	Implement tasks described in the approved RI/FS Work Plan.		Status information on the RI/FS is being reported in accordance with the requirements of Section X of the Consent Agreement under CERCLA Section 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 November 1990 was transmitted to the U.S. EPA on December 18, 1990 (DOE-443-91).
CLEAN AIR ACT			
B.4	Prepare annual progress report on installation and replacement of emission control devices.	yearly	The Third Annual Progress Report on installation and replacement of emission control devices was transmitted to the U.S. EPA on February 22, 1990 (DOE-617-90).
C.	Provide annual reports to U.S. EPA per 40 CFR 61.94(c).	yearly	The Annual NESHAP Compliance Report for CY 1989 was transmitted to the U.S. EPA on July 9, 1990 (DOE-1392-90).
D.1	Provide U.S. EPA with yearly stack-testing schedule.	yearly	The 1989 stack testing schedule was transmitted to 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 FMPC, the 1989 FFCA Stack Testing Program was being deferred. Notification of future stack testing dates will be provided to the U.S. EPA if and when a decision on the restart of facilities at the FMPC is made.

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TABLE 1

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

STATUS OF ACTIONS AS OF DECEMBER 31, 1990

ACTION	DESCRIPTION	COMPLETION TIME AFTER FFCA SIGNED	FY91 STATUS
D.2	Provide U.S. EPA with stack-test results for stacks tested that year.	45 days	Stack testing is currently on hold pending resumption of manufacturing operations. Notification of future stack testing dates will be provided to the U.S. EPA if and when a decision on the restart of production activities at the FMPC is made.
E.1	Maintain records of monthly particulate matter emissions.	-------	Continuing.
E.2	Provide quarterly reports to U.S. EPA on these emissions.	quarterly	The fifteenth Quarterly Particulate Emissions Report for the period April 3, 1990 through July 3, 1990 was transmitted to the U.S. EPA on August 15, 1990. The sixteenth Quarterly Particulate Emissions Report for the period July 3, 1990 through October 3, 1990 was transmitted to the U.S. EPA on December 31, 1990. (DOE-112-91).
RCRA			
A.1	Conduct a hazardous waste determiniation on all waste streams.	30 days	Pursuant to the amended Consent Decree, a RCRA waste evaluation will be conducted on all site materials by 10/92.
A.2	Commence a hazardous waste analysis program for materials in the landfill and going to the incinerator.	30 days	Complete. Operations of these units was discontinued and data on the waste which had gone to them was provided in a 30-day FFCA deliverable on August 17, 1986. However, further review of both the waste streams and the potential of the units to be hazardous waste management units are being evaluated as actions required by the amended Consent Decree. Final results are due October 30, 1992.
A.5	Update the facility closure plan to reflect the year the facility expects to begin closure.	30 days	The Facility closure date is dependent upon closure schedules for individual TSD units as presented most recently in Section 1 of the RCRA Part B Permit Application submitted to the U.S. EPA on September 22, 1989. Facility closure will be completed on the date the last TSD unit is closed.

TABLE 1

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

STATUS OF ACTIONS AS OF DECEMBER 31, 1990

ACTION	DESCRIPTION	COMPLETION TIME AFTER FFCA SIGNED	FY91 STATUS
RADIATION DISCHARGE INFORMATION			
A.3	Report to U.S. EPA, Ohio EPA and Ohio Department of Health the results of the continuous liquid discharge samples.	quarterly	The fifteenth Quarterly Liquid Discharge Report for the period April through June 1990 was transmitted to the U.S. EPA on August 15, 1990. The sixteenth Quarterly Liquid Discharge Report for the period July through September, 1990 was transmitted to the U.S. EPA on December 31, 1990. (DOE-112-91)
REPORTING REQUIREMENTS			
B.	Issue monthly progress report of actions taken to ensure compliance with FFCA requirements.	monthly	November's FFCA Monthly Progress Report was transmitted to the U.S. EPA on December 18, 1990 (DOE-443-91)

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY

COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

PERIOD ENDING DECEMBER 31, 1990

ENCLOSURE C

DRILLING AND BORING LOGS

RI/FS

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 602 3.7	PROJECT NAME FMPC RI/FS		
BORING NUMBER 1247	COORDINATES	DATE	12-4-90
ELEVATION	GWL: Depth / Date/Time	DATE STARTED	12/2/90
ENGINEER/GEOLOGIST J. Lear	Depth / Date/Time	DATE COMPLETED	12/4/90
DRILLING METHODS Auger 8 in HSA		PAGE	1 OF 5

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
				S.A.A - Same as above N.R - No Recovery			
				0.0 - 1.5ft is concrete			
2	18003 1410 12-2-90	1	2	Stiff, yellowish brown (10Y/5/4) clayey silt, Trace sand & gravel moist	ML	2.0	Hnu = 0 ∝ = 0
	18004 1410 12-2-90	6	3	~~Loose~~ soft, yellowish brown (10yr, 5/4) Gravelly clay, med. plasticity, moist	CL	0.3	BΥ = 1500 cpm
	18005 1410 12-2-90	2	0	N.R.	NA	NA	
3	18006 1420 12-2-90	1	0	N.R	NA	NA	Hnu = 0 ∝ = 2 cpm
	18007 1420 12-2-90	10	4	Stiff, yellowish brown to gray (10yr, 5/4 to 10yr, 5/1) silty clay, some gravel med plasticity, moist.	CL	1.5	BΥ = 1500 cpm
4	18008 1420 12-2-90	8	4	Stiff, gray (10yr, 5/1) silty clay, some gravel, med plast. ~~N.R.~~ moist. J.L. 12-4-90	CL	1.5	
	18009 1435 12-2-90	5	0	N.R	NA	NA	Hnu = } NA ∝ = } NA BΥ = } NA
5	18010 1435 12-2-90	5	0	N.R	NA	NA	
	18011 1435 12-2-90	5	0	N.R	NA	NA	
6	18012 1445 12-2-90	5	6	very soft, yellowish brown (10y, 5/4) gravelly clay high Plasticity, wet.	CL	.25	Hnu = < 1.0 ppm ∝ = 0
	18013 1445 12-2-90	6	6	soft, yellowish brown to dark grayish brown (10yr, 5/4 To 10yr, 4/2) silty clay, some gravel high Plasticity, wet	CH	.50	BΥ = 1500 cpm
7	18014 1445 12-2-90	7	6	soft, dark grayish brown (10yr, 4/2) silty clay Trace gravel, high plasticity, moist	CH	.50	
	18015 1457 12-2-90	12	6	very soft, dark grayish brown (2.5Y, 4/2) silty clay, some gravel, high plasticity, ~~wet~~	CH	< .25	Hnu = 0 ∝ = 1 cpm
8	18016 1457 12-2-90	14	6	S.A.A	CH	< .25	BΥ = 1500 cpm
	18017 1457 12-2-90	16	6	soft, dark grayish brown (2.5y, 4/2) silty clay some gravel, med plasticity, ~~moist~~ wet. J.L. 12-4-90	CH	.50	
9							

NOTES: CONTRACTOR: Penn Drill
DRILLER: Bob Yost
ASSISTANT: Brian Strappazzon

Hnu: 0-1 ppm
∝: 0-2 cpm
BΥ: 1500 cpm

SAMPLES COLLECTED PER ASTM STANDARD PENETRATION
COLOR I.D. BY MUNSELL COLOR CHART
BACKGROUND LEVELS: Hnu: 0
∝: 5 cpm
BΥ: 1500 cpm

402-11-88

RI/FS

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 602 3.7	PROJECT NAME. FMPC RI/FS	
BORING NUMBER 1247	COORDINATES.	DATE 12-3-90
ELEVATION:	GWL: Depth Date/Time	DATE STARTED 12/2/90
ENGINEER/GEOLOGIST J. Lear	Depth Date/Time	DATE COMPLETED 12/4/90
DRILLING METHODS Auger		PAGE 2 OF 5

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	18018 1515 12-2-90	11	3	Soft, dark gray, gray to yellowish brown (10yr. 4/1 To 10yr. 5/1 To 10y. 5/4) clayey silt, Trace gravel, very moist	ML	.50	Hnu = <1.0 ppm
	18019 1515 12-2-90	13	3	S.A.A. except M. stiff	ML	.60	∝ = 1 cpm
10	18020 1515 12-2-90	15	4	SAA	ML	.6	BΥ = 1500 cpm
	18021 1000 12-2-90	10	6	very soft, yellowish brown to gray (10yr, 5/4 To 10yr, 5/1) gravelly clay, some silt, wet. (high Plasticity)	CH	<.25	Hnu = 0
11	18022 1000 12-2-90	15	6	Dense, yellowish brown (10yr, 5/4) clayey silt sand mixture, wet.	SC	NA	∝ = 0
	18023 1000 12-3-90	18	6	Dense, yellowish brown (10yr. 5/4) well graded subangular, silty sand, wet.	SM	NA	BΥ = 800 cpm
12	18024 1010 12-3-90	10	6	medium dense, yellowish brown (10yr, 5/4 well graded subangular silty sand, some gravel, Trace clay, wet	SM	NA	Hnu = 0
	52635 1010 12-3-90	2	0	N.R			∝ = 0
13	52636 1010 12-3-90	10	6	medium dense, yellowish brown (10yr, 5/4) well graded sub angular silty sand Trace clay & gravel, wet	SM	NA	BΥ = 800 cpm
	52637 1020 12-3-90	11	6	SAA	SM	NA	Hnu = 0
14	52638 1020 12-3-90	12	6	SAA	SM	NA	∝ = 0
	52639 1020 12-3-90	15	6	SAA	SM	NA	BΥ = 800 cpm
15	52640 1020 12-3-90	7	6	S.A.A.	SM	NA	Hnu = 0
	52641 1030 12-3-90	17	0	N.R.	NA	NA	∝ = 0
16	52642 1030 12-3-90	31	6	very dense, yellowish brown to gray (10yr, 5/1) Gravel sand clay mixture, wet	GC	NA	BΥ = 800 cpm

NOTES: CONTRACTOR: Penn Drill
DRILLER: B. yost
ASSISTANT: B. Strappazzon

Hnu: <1.0 ppm
∝: 1 cpm
BΥ: 800-1500 cpm

SAMPLES COLLECTED PER ASTM STANDARD PENETRATION
COLOR I.D. BY MUNSELL COLOR CHART
BACKGROUND LEVELS: Hnu: 0
∝: 5
BΥ: 1500 cpm

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402-11-86

RI/FS

VISUAL CLASSIFICATION OF SOILS

1004

PROJECT NUMBER 602 3.7	PROJECT NAME. FMPC RI/FS	
BORING NUMBER 1247	COORDINATES.	DATE 12 4 90
ELEVATION:	GWL: Depth 9.0 FT Date/Time 12/4/90 @ 0930	DATE STARTED: 12/2/90
ENGINEER/GEOLOGIST J. Lear	Depth Date/Time	DATE COMPLETED: 12/4/90
DRILLING METHODS Auger		PAGE 3 OF 5

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 16 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
17	S2643 1415 12-3-90	40	6	very dense, gray brown (10yr, 5/2) gravelly sand (well graded), wet	SP	NA	Hnu = 0 ∝ = 0
	S2644 1415 12-3-90	47	6	S.A.A	SP	NA	BY = 800-1000 cpm
	S2645 1415 12-3-90	43	6	very dense, grayish brown (10yr, 5/2) silt Trace gravel, wet.	SP	NA	
18	42646 1450 12-3-90	15	0	N.R.	NA	NA	Hnu = 0 ∝ = 0
	42647 1450 12-3-90	37	6	very dense, gray (2.5Y, 5/1) sandy silt some gravel, wet	ML	NA	BY = 1000 cpm
19	42648 1450 12-3-90	23	6	very dense, gray (2.5Y, 5/1) gravelly silt some sand, wet	GM	NA	
20	42649 1450 12-3-90	30	5	very dense, (2.5Y, 5/1) clayey silt, Trace gravel, wet. (gray)	ML	NA	Hnu = 0 ∝ = 0 BY = 1000 cpm
				End of Sampling at 20.0 ft Sample No. 42652 - TCLP " " 42653 - Total U. IT " " 42654 - Total U. WMCO (Drum samples)			
							Hnu = ∝ = BY =
							Hnu = ∝ = BY =

NOTES: CONTRACTOR: Penn Drill
DRILLER: Bob Yost
ASSISTANT: B. Strapazzon

Hnu: 0
∝: 0
BY: 1000 cpm

SAMPLES COLLECTED PER ASTM STANDARD PENETRATION
COLOR I.D. BY MUNSELL COLOR CHART
BACKGROUND LEVELS: Hnu: 0
∝: 5 cpm
BY: 1500 cpm

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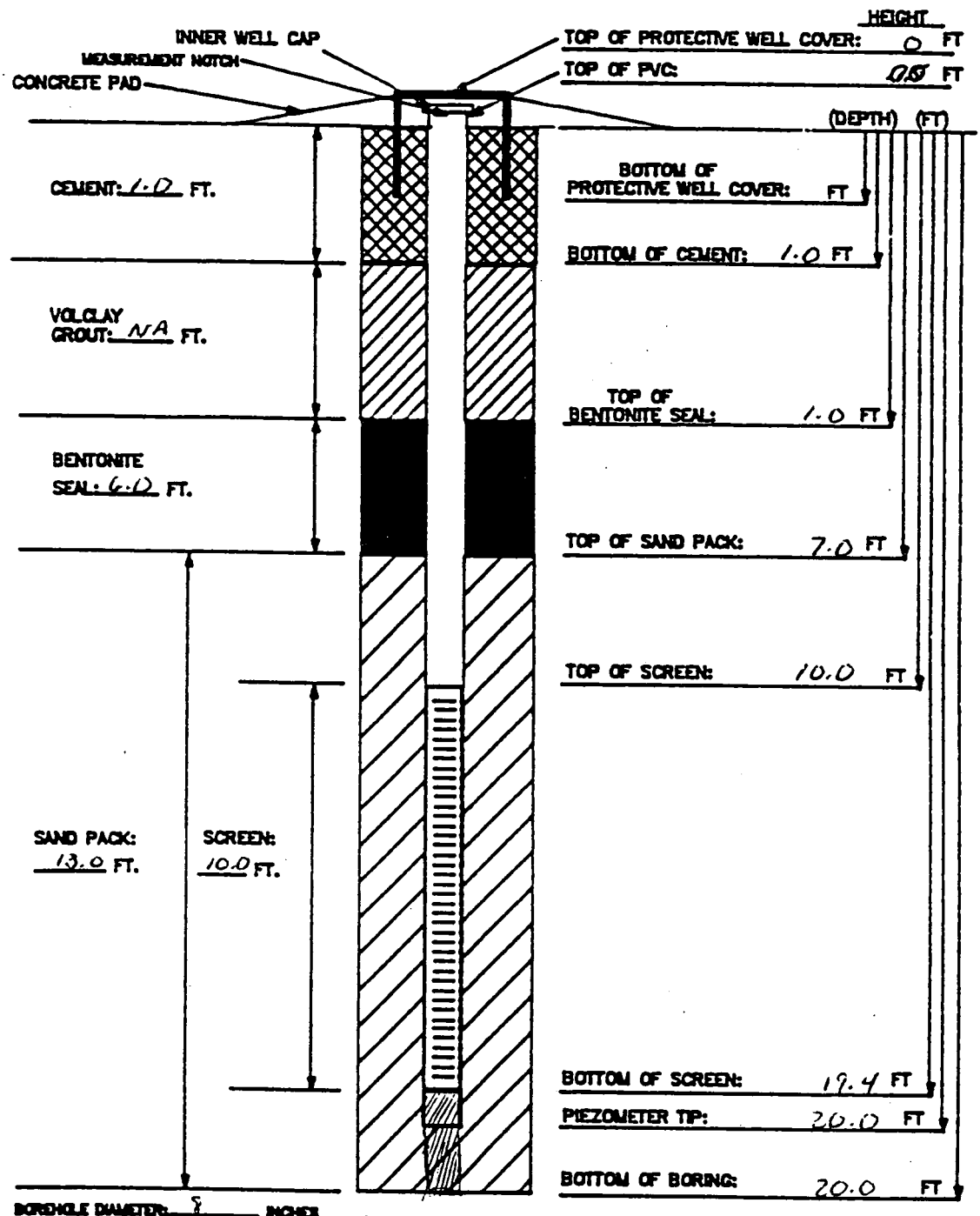
402-11-88

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.
1247

INSTALLATION DATE: 12-4-90



MATERIALS USED:
SAND TYPE AND QUANTITY: 10-20, 4 bags
BENTONITE PELLETS (5-GALLON BUCKETS): 2
BAGS OF VOLCLAY GROUT: NA
AMOUNT OF CEMENT: ½ bag
AMOUNT OF WATER USED: 2 gals
OTHER: N/A

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

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TASK: 602.3.7 GEOLOGIST/ENGINEER: J. Lear

FERNALD RI/FS

1004

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC - RIFS — FIELD ENG./GEO. J. Lear — DATE 12-5-90
PROJECT NO. 602.3.7 — CHECKED BY Everett Trollinger — DATE 12-15-90
BORING NO. 1247
PIEZOMETER NO. 1247 — DATE OF INSTALLATION 12-4-90

BOREHOLE DRILLING

DRILLING METHOD Auger	TYPE OF BIT 8in Hollow Auger
DRILLING FLUID (S) USED: NA	CASING SIZE (S) USED: NA
FLUID ~~H_2O~~ JC 12-5-90 NA FROM NA TO NA	SIZE NA FROM NA TO NA
FLUID NA FROM NA TO NA	SIZE NA FROM NA TO NA

PIEZOMETER DESCRIPTION

TYPE Schedule 40 PVC Pipe	RISER PIPE MATERIAL Schedule 40 PVC Pipe
DIAMETER OF PERFORATED SECTION 2 3/8 in	RISER PIPE DIAMETERS:
PERFORATION TYPE:	O.D. 2 3/8 in I.D. 2 in
ET 12/13/90 SLOTS ☑ HOLES ☐ SCREEN ☐	LENGTH OF PIPE SECTIONS 2-10ft sections
AVERAGE SIZE OF PERFORATIONS .0200 in	JOINING METHOD Screw type flush jointed
TOTAL PERFORATED AREA 10ft	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH .5ft	OTHER PROTECTION NA
PROTECTIVE PIPE O.D.	

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION ( )	
TOP OF RISER PIPE	0.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	.05			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY/cement	TOP 0.0	BOTTOM 1.0	TOP	BOTTOM
BENTONITE	TOP 1.0	BOTTOM 7.0	TOP	BOTTOM
SAND	TOP 7.0	BOTTOM 20.0	TOP	BOTTOM
GRAVEL	TOP NA	BOTTOM NA	TOP	BOTTOM
PERFORATED SECTION	TOP 10.0	BOTTOM 20.0	TOP	BOTTOM
PIEZOMETER TIP	20.0			
BOTTOM OF BOREHOLE	20.0			
GWL AFTER INSTALLATION	12-4-90 @ 0930 9.0 FT TOC			

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

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REMARKS

FERNALD RI/FS

1004

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.7.	PROJECT NAME: FMPC RI/FS	
BORING NUMBER: 1674	COORDINATES:	DATE: 12-16-90
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 12-16-90
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED: 12-19-90
DRILLING METHODS: HOLLOW STEM AUGER		PAGE 1 OF 5

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 in.)	RECOVERY in.	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
				0.0 - 2.0 is concrete			HNU = ppm α = cpm Bβ = cpm
1							
2	57489 1320 12-16-90	4	6	m stiff from dark yellowish brown (10yr, 4/6) gravelly clay, some silt, med plasticity V. moist.	CL	.75 2.0 J.L 12-16-90	HNU = 8.0 ppm α = 50-100 cpm Bβ = 8000 cpm
	57490 1320 12-16-90	6	6	m stiff from dark grayish brown (2.5y, 4/2) gravelly clay, med plasticity, V. moist	CL	.75 2.0 J.L 12-16-90	
3	57491 1320 12-16-90	4	6	from dark yellowish brown to dark grayish brown (10yr, 4/6 To 2.5y, 4/2) Gravelly clay med plast., V. moist	CL	.75	HNU = NA ppm α = NA cpm Bβ = NA cpm
4	57492 1330 12-16-90	5	0	N.R			
	57493 1330 12-16-90	10	0	N.R			
5	57494 1330 12-16-90	5	0	N.R			HNU = 20 ppm α = 50 cpm Bβ = 8000 cpm
	57495 1350 12-16-90	5	6	soft, dark grayish brown to dark yellowish brown (2.5y, 4/2) to (10yr, 4/6) gravelly clay high Plasticity, V. moist	CL	.75	
	57496 1350 12-16-90	7	6	soft, Gray To dark yellowish brown. (10yr, 5/1) To 10yr, 4/4) silty clay. Trace gravel, high Plasticity, V. moist	CL	.25	
6	57497 1350 12-16-90	13	6	soft, brown (10yr, 4/3) silt, some clay, moist	ML	<.25	HNU = 20 ppm α = 50 cpm Bβ = 8000 cpm
	57498 1500 12-16-90	15	6	V. soft brown. (10yr, 4/3) silty clay. Trace gravel med Plasticity, moist to V. moist. m stiff	CL	<.25	
7	57499 1500 12-16-90	12	6	soft olive (5y, 5/3) silty clay, Trace gravel med Plasticity, moist	CL	<.75	54

NOTES:

Drilling Contractor Penn Drilling

Drilling Equipment Auger

Driller: B. Yost

Helper B. Strapazzon

Geo Assistant

HNU Serial # AQ1345

Samples collected per ASTM standard penetration test

Colors identified using Munsell Color Chart

Background Levels: HNU = 0 ppm; α = 0 cpm; Bβ = 8200 cpm; LEL = NA %; O_2 = NA %

SAA=Same As Above

NR=No Recovery

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.7	PROJECT NAME: FMPC RI/FS	
BORING NUMBER: 1674	COORDINATES:	DATE: 12-17-90
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 12-16-90
ENGINEER/GEOLOGIST: J. Lear	Depth Date/Time	DATE COMPLETED: 12-19-90
DRILLING METHODS: HOLLOW STEM AUGER		PAGE 2 OF 5

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	57500 1500 12-16-90	22	6	V. stiff, very dark gray (2.5Y, 3/1) silty clay, Trace gravel, Low plasticity, moist	CL	3.25	HNU = 2.0 unsustain ppm; α = 50 cpm; Bγ = 8000 cpm
8	57501 1500 12-17-90	15	3	Stiff, (2.5Y 4/1 To 2.5Y, 5/4) dark gray To light olive brown, silty clay Trace gravel, med plasticity moist	CL	1.25	
	57502 1500 12-17-90	14	3	S.A.A	CL	1.25	
9	57503 1500 12-17-90	13	6	stiff, (10yr, 5/1 To 7.5yr, 5/6) gray To strong brown, clayey silt Trace gravel low plast. moist	ML	1.75	HNU = 0 ppm; α = 100 cpm; Bγ = 6000 cpm
	57504 1530 12-17-90	12	3	Soft, gray to brown (10yr, 5/1 To 10yr 5/3) Silty clay Trace gravel, med Plasticity, moist.	CL	.25	
10	57505 1530 12-17-90	12	6	stiff, dark gray to strong brown (2.5y, 4/1 To 7.5y, 5/6) silty clay, med plasticity, moist	CL	1.0	
	57506 1530 12-17-90	9	3	soft, strong brown (7.5yr, 4/6) Gravelly clay some silt, no plasticity, moist	CL	.5	HNU = 2.0 unsus. ppm; α = 1000 cpm; Bγ = 6000-8000 cpm
11	57507 1600 12-17-90	12	0	N.R.	NA	NA	
	57508 1600 12-17-90	15	6	Soft, yellowish brown (10yr, 5/4) gravelly clay some sand, High Plasticity, very moist	CL	.25	J.L 12-18-90
12	57509 1600 12-17-90	13	6	stiff, yellowish brown, (10yr, 5/4) gravelly clay, some sand med Plasticity, moist.	CL	1.0	HNU = ~~0~~ 10.0 unsustained ppm; α = 50-100 cpm; Bγ = 6000-8000 cpm
	57510 1310 12-18-90	2	0	N.R.	NA	NA	
13	57511 1310 12-18-90	3	6	loose, dark yellowish brown (10yr, 5/4) gravelly sand, some clay, wet	SP	NA	
	57512 1310 12-18-90	5	6	loose, dark yellowish brown To very dark grayish brown (10yr, 4/3 To 2.5y, 3/2) Gravel sand clay mixture, wet.	GC	NA	HNU = 0 ppm; α = 60-90 cpm; Bγ = 8000 cpm
14	57513 1455 12-18-90	9	6	medium dense, yellowish brown (10yr, 5/4) Gravel sand silt mixture, Trace clay, wet	GM	NA	
	57514 1455 12-18-90	12	6	medium dense, olive brown (2.5y, 4/4) Gravel sand silt mixture, Trace clay, wet.	GM	NA	
15							

NOTES:

Drilling Contractor: Penn Drilling

Drilling Equipment: CME 45 Auger

Bob Yost

Brian Strapazzon

Samples collected per ASTM standard penetration test

Colors identified using Munsell Color Chart

SAA=Same As Above

NR=No Recovery

243B-3-86

FERNALD RI/FS

1004

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1674	COORDINATES:	DATE: 12-19-90	
ELEVATION:	GWL: Depth / Date/Time	DATE STARTED: 12-16-90	
ENGINEER/GEOLOGIST: J. Lear	Depth / Date/Time	DATE COMPLETED: 12-19-90	
DRILLING METHODS: HOLLOW STEM AUGER		PAGE 3 OF 5	

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 in.)	RECOVERY in.	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15	S7515 1465 12-19-90	25	6	S.A.A.			HNU = <1.0 ppm ∝ = 80-100 cpm Bϒ = 7000-9000 cpm
	S7516 1510 12-19-90	15	6	Soft, dark gray to yellowish brown (2.5Y 4/1 to 10YR 5/4) clay Trace gravel V. moist med Plasticity	CL	.40	
16	S7517 1510 12-19-90	23	6	Soft, dark gray to yellowish brown (2.5Y 4/1 to 10YR, 5/4) Gravelly clay, med Plasticity, V. moist.	CL	.40	
	S7518 1510 12-19-90	17	6	Dense, yellowish brown. (10YR, 5/4) S.lt some clay, V. moist.	ML	NA	HNU = 0 ppm ∝ = 50-1000 cpm Bϒ = 8000 cpm
17	S7519 1520 12-19-90	22	6	very dense, yellowish brown (10YR, 5/4) Gravel sand silt mixture, wet.	GM	NA	
	S7520 1520 12-19-90	31	6	very dense, brown (10YR 4/3) S.lt Trace clay, V. moist.	ML	NA	
18	S7521 1520 12-19-90	32	6	very dense, gray (2.5Y, 5/1) S.lt, trace clay, V. moist	ML	NA	HNU = 0 ppm ∝ = 50-100 cpm Bϒ = 8000 cpm
	S7522 1545 12-19-90	39	6	Very dense, yellowish brown (10YR, 5/4) Gravel sand silt mixture trace clay wet.	GM	NA	
19	S7523 1545 12-19-90	27	6	SAA	GM	NA	
	S7524 1545 12-19-90	33	6	SAA	GM	NA	
20				BOTTOM OF BORING @ 20.0 FT. SAMPLING ENDED @ 20.0 FT.			

ES:

Contractor Penn Drilling

Equipment CME 45 Auger

B. Yost

J. Strapazzon

Samples collected per ASTM standard penetration test

Colors identified using Munsell Color Chart

SAA=Same As Above

NR=No Recovery

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0/5

FERNALD RI/FS

1004

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC, RIFS 602.3.7 FIELD ENG./GEO. J. Lear DATE 12-19-90
PROJECT NO. 602.3.7 CHECKED BY E. Trallinger DATE 1-7-91
BORING NO. 1674
PIEZOMETER NO. 1674 DATE OF INSTALLATION 12-19-90

BOREHOLE DRILLING

DRILLING METHOD Auger	TYPE OF BIT 8 in Hollow Auger
DRILLING FLUID (S) USED:	CASING SIZE (S) USED: NA
FLUID NA ~~FROM~~ ~~TO~~	SIZE NA ~~FROM~~ TO
FLUID NA FROM ~~TO~~	SIZE NA ~~FROM~~ ~~TO~~

PIEZOMETER DESCRIPTION

TYPE 2 in PVC Pipe	RISER PIPE MATERIAL PVC Pipe Sch. 40
DIAMETER OF PERFORATED SECTION 2 5/16	RISER PIPE DIAMETERS:
PERFORATION TYPE:	O.D. 2 5/16 in I.D. 2 in
SLOTS ☑ HOLES ☐ SCREEN ☐	LENGTH OF PIPE SECTIONS 10 ft
AVERAGE SIZE OF PERFORATIONS .020 in	JOINING METHOD Threaded Flush Joints
TOTAL PERFORATED AREA 9.6 ft	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH ~~NA~~ J.L 12-20-90 8 in	OTHER PROTECTION ~~NA~~ E.T. FLUSH MOUNT
PROTECTIVE PIPE O.D. ~~NA~~ J.L 12-20-90 4 5/16 in	PROTECTIVE COVER, EXPANDABLE PLUG FOR PVC.

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION ( )	
TOP OF RISER PIPE	~~2.5A~~ E.T. 1-7-91 0.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	.5ft			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY/cement	TOP 0.0	BOTTOM 1.0	TOP	BOTTOM
BENTONITE	TOP 1.0	BOTTOM 6.75	TOP	BOTTOM
SAND	TOP 6.75	BOTTOM 20.0	TOP	BOTTOM
GRAVEL	TOP NA	BOTTOM NA	TOP	BOTTOM
PERFORATED SECTION	TOP 10.0	BOTTOM 19.6	TOP	BOTTOM
PIEZOMETER TIP	20.0			
BOTTOM OF BOREHOLE	20.0			
GWL AFTER INSTALLATION	7.85			

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

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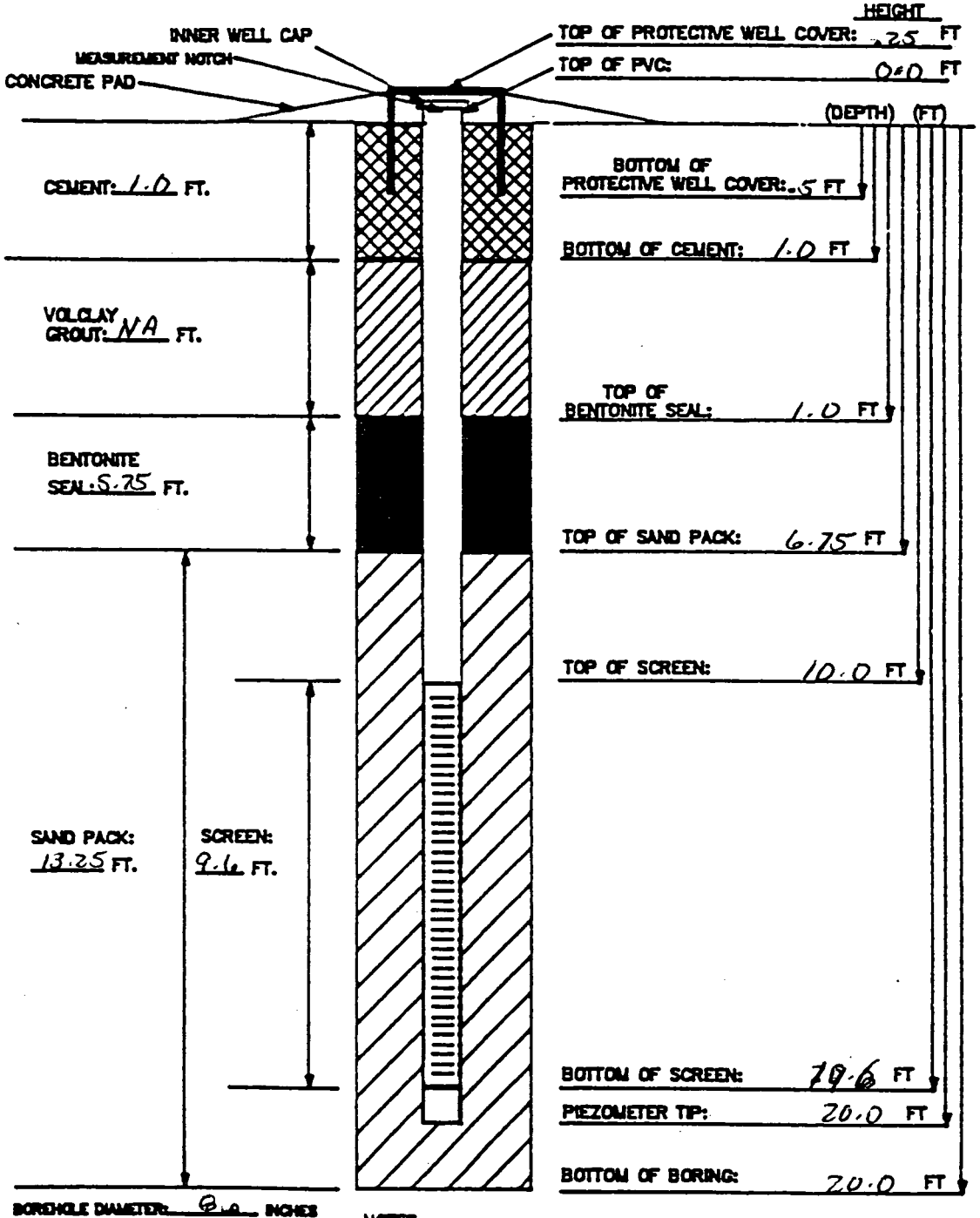
REMARKS

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.
1674

INSTALLATION DATE: 12-19-90

1004



MATERIALS USED:

SAND TYPE AND QUANTITY: 5 bags
BENTONITE PELLETS (5-GALLON BUCKETS): 4
BAGS OF VOLCLAY GROUT: N A
AMOUNT OF CEMENT: ~~6 BAGS~~ 1/2 BAG
AMOUNT OF WATER USED: 2 gals
OTHER: N A

NOTES:

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

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TASK: 602.3.7 GEOLOGIST/ENGINEER: J. Lear

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.03.07	PROJECT NAME: FMPC RI/FS – (Facility Testing Program)		
BORING NUMBER: 1611	COORDINATES:	DATE: 12-11-90, 12-12-90	
ELEVATION: (BE ADJUSTED 12-21-90)	GWL: Depth / Date/Time	DATE STARTED: 12-11-90	
ENGINEER/GEOLOGIST: M. SWANSON	Depth / Date/Time	DATE COMPLETED: 12-13-90	
DRILLING METHODS: HOLLOW STEM AUGER (SPLIT SPOON SAMPLING)		PAGE 1 OF 5	

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6" (Inches)	RECOVERY (Inches)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0.5	S7104S 1355 12-11-90	N/A	6	CONCRETE	N/A	N/A	Hnu = 0.0 α = 0 ƒB = 40-100 cpm READINGS FOR 1.0-1.5 PT
1.0	S7104S 1358 12-11-90	N/A	6				
TOT. U. 1.5	S7104T 1358 12-11-90	3	6	VERY LOOSE, BROWNISH YELLOW (10YR 6/6), WELL-GRADED SANDY GRAVEL, SUBROUNDED TO ROUNDED, TRACE OF SILT, MOIST	GW	N/A	
2.0	S7104S 1358 12-11-90	2	3	SAA ↓	GW	N/A	Hnu = 0.0 α = 0
TOT. U. 2.5	S7104V 1358 12-11-90	3	0	N/A (NR)	N/A	N/A	ƒB = 900 cpm
3.0	S7105 1434 12-11-90	4	6	STIFF, LIGHT OLIVE BROWN (2.5Y 5/6), GRAVELLY CLAY, SOME SAND, TRACE OF SILT, MOIST TO WET, LOW PLASTICITY	CL	1.25	
3.5	S7105 1434 12-11-90	4	6	SAA ↓	CL	1.25	Hnu = 0.0 α = 0
4.0	S7105 1434 12-11-90	6	6	STIFF, LIGHT OLIVE BROWN (2.5Y 5/4), SANDY CLAY, SOME GRAVEL, SILT, LOW PLASTICITY, MOIST TO WET	CL	1.9	ƒB = 1000 cpm
HSL 4.5	S7105 0910 12-12-90	11	4	VERY STIFF, OLIVE YELLOW (2.5Y 6/6), SANDY CLAY, SOME SILT, LOW PLASTICITY, MOIST	CL	2.5	
HSL 5.0	S7106 0910 12-12-90	9	6	VERY STIFF, VERY DARK GRAY (2.5Y 3/0), CLAY, TRACE OF SILT, MOIST	CL	3.5	Hnu = 0.0 α = 0
FULL RND. 5.5	S7106 0910 12-12-90	9	6	VERY STIFF, YELLOWISH BROWN (10YR 5/6), SILTY CLAY, TRACE OF SAND, GRAVEL, LOW PLASTICITY, MOIST	CL	3.0	ƒB = 2000 - 2400 cpm
6.0	S7106 1017 12-12-90	2	0	N/A (NR)	N/A	N/A	
6.5	S7106 1017 12-12-90	2	0	N/A (NR)	N/A	N/A	Hnu = 0.0 α = 0
7.0	S7106 1017 12-12-90	3	6	STIFF, VERY DARK GRAY (10YR 3/1), CLAY, SOME SILT, TRACE OF COBBLES, LOW TO MEDIUM PLASTICITY, SLIGHTLY MOIST	CL	1.25	ƒB = 1800 - 2200 cpm
7.5	S7106 1022 12-12-90	8	0	N/A (NR)	N/A	N/A	

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NOTES: Contractor : Pennsylvania Drilling
Driller : D. NEWMAN
Driller's Assistant: B. JOHNSON
All Samples collected according to ASTM Standards Soil Colors described

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

Background Readings/Levels
Hnu = 0.0 ppm
Alpha (α) = 0 cpm
ƒBETA - BETA = 1900 - 2100 cpm

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.03.07	PROJECT NAME: FMPC: RI/FS Facility Testing)		
BORING NUMBER: 1611	COORDINATES:		DATE: 12-12-90
ELEVATION:	GWL: Depth Date/Time		DATE STARTED: 12-11-90
ENGINEER/GEOLOGIST: M. SWANSON	Depth Date/Time		DATE COMPLETED: 12-13-90
DRILLING METHODS: HOLLOW STEM AUGER – (Split Spoon Sampling)			PAGE 2 OF 5

DEPTH (FT.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 INCH	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
8.0	S7110 1022 12-12-90	9	0	N/R	N/A	N/A	Hnu = 0.0 α = 0 SB = 900 - 1400 cpm
8.5	S7111 1022 12-12-90	9	6	SOFT, VERY DARK GRAY (5Y 3/1), CLAY - SILT MIXTURE, NO PLASTICITY, DRY TO SLIGHTLY MOIST	ML	0.50	
9.0	S7112 1022 12-12-90	15	6	SOFT, OLIVE YELLOW (2.5Y 6/6), CLAYEY SILT, NO PLASTICITY, DRY	ML	0.40	
9.5	S7113 1029 12-12-90	22	0	N/R	N/A	N/A	Hnu = 0.0 α = 0 SB = 1000 cpm
10.0	S7114 1029 12-12-90	23	0	N/R	N/A	N/A	
10.5	S7115 1029 12-12-90	16	6	VERY SOFT, OLIVE YELLOW (2.5Y 6/6) SILT, SOME CLAY, NO PLASTICITY, TRACE OF PEBBLES, DRY	ML	0.25	
11.0	S7116 1038 12-12-90	8	4	SAA	ML	0.25	Hnu = 0.0 α = 0 SB = 1200 - 1400
11.5	S7117 1038 12-12-90	9	6	SOFT, GRAYISH BROWN (2.5Y 5/2), CLAYEY SILT, TRACE OF SAND, NO PLASTICITY, DRY	ML	.30	
12.0	S7118 1038 12-12-90	13	6	SOFT, GRAY (5Y 5/1), SILT, SOME SAND, TRACE OF CLAY, PEBBLES, NO PLASTICITY, DRY	ML	.50	
12.5	S7119 1046 12-12-90	20	3	MEDIUM DENSE, (LIGHT OLIVE BROWN (2.5Y 5/6), GRAVEL - SILT - SAND - CLAY MIXTURE, MOIST TO WET	GC	N/A	Hnu = 0.0 α = 0 SB = 900 - 1000 cpm
13.0	S7120 1046 12-12-90	18	6	SOFT, GRAY (2.5Y 5/0), SAND - SILT MIXTURE, SOME CLAY, VERY SLIGHT PLASTICITY, MOIST	SM	.40	
13.5	S7121 1046 12-12-90	23	6	SAA	SM	.40	
14.0	S7122 1057 12-12-90	23	0	N/R	N/A	N/A	Hnu = 0.0 α = 0 SB = 800 - 1200 cpm
14.5	S7123 1057 12-12-90	18	0	N/R	N/A	N/A	
15.0	S7124 1057 12-12-90	18	6	MEDIUM STIFF, GRAY (2.5Y 5/0), SAND - SILT MIXTURE, SOME CLAY, SLIGHT PLASTICITY, DRY TO MOIST	SM	.75	

NOTES:

SEE PAGE 1

BACKGROUND
Hnu: 0.0 ppm
α: 0 cpm
SB: 2000 cpm

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.03.07	PROJECT NAME: FMPC RI/FS - (Facility Testing Program)		
BORING NUMBER: 1611	COORDINATES:		DATE: 12-12-90
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 12-11-90
ENGINEER/GEOLOGIST: M. SWANSON	Depth	Date/Time	DATE COMPLETED: 12-13-90
DRILLING METHODS: HOLLOW STEM AUGER - (Split Spoon Sampling)			PAGE 3 OF 5

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 IN.)	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15.5	57125 1057 12-12-90	17	6	STIFF, GRAY (2.5Y 5/0), CLAY, SOME SILT AND SAND, LOW PLASTICITY, DRY	CL	2.0	Ham = 0.0 α = 0 βB = 800-1000 cpm
16.0	57126 1412 12-12-90	4	0	NR	N/A	N/A	
	57127 1412 12-12-90	4	0	NR	N/A	N/A	
16.5	57128 1412 12-12-90	6	6	STIFF GRAY (10YR 5/1), SANDY CLAY, SOME GRAVEL AND COBBLES, SILT, LOW PLASTICITY, DRY TO SLIGHTLY MOIST	CL	2.0	Ham = 0.0 α = 0 βB = 1500-1700 cpm
17.0	57129 1426 12-12-90	8	0	NR	N/A	N/A	
17.5	57130 1426 12-12-90	12	3	MEDIUM STIFF, GRAY (5Y 5/1), SILTY CLAY, TRACE OF SAND, GRAVEL, LOW TO MEDIUM PLASTICITY, DRY	CL	.75	
18.0	57131 1426 12-12-90	14	6	SAA	CL	1.0	Ham = 0.0 α = 0 βB = 900-1100 cpm
18.5	57132 1441 12-12-90	6	0	NR	N/A	N/A	
19.0	57133 1441 12-12-90	19	6	STIFF, GRAY (5Y 5/1), SANDY CLAY, SOME SILT, TRACE OF PEBBLE, VERY LOW PLASTICITY, DRY.	CL	2.0	
19.5	57134 1441 12-12-90	21	6	VERY STIFF, DARK GRAY (5Y 4/1), SILTY CLAY, TRACE OF SAND, LOW PLASTICITY, DRY	CL	4.0	Ham = 0.0 α = 0 βB = 900-1100 cpm
20							

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NOTES:

BOTTOM OF BORING @ 20.0 FT
PIEZOMETER TIP @ 17.0 FT
WET ZONE @ 12.0 TO 12.5 FT

SEE Page 1 (BACKGROUND)

BACKGROUND
α = 0.0
βB = 2200 cpm

FERNALD RI/FS

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PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS
PROJECT NO. 602 3.7.4
BORING NO. 1611
PIEZOMETER NO. 1611
FIELD ENG./GEO. M. Swanson DATE 12-11-90
CHECKED BY E. Trollinger DATE
DATE OF INSTALLATION 12-13-90

BOREHOLE DRILLING

DRILLING METHOD Auger (Hollow stem)
DRILLING FLUID (S) USED:
FLUID N/A FROM N/A TO N/A
FLUID N/A FROM N/A TO N/A

TYPE OF BIT Auger
CASING SIZE (S) USED:
SIZE N/A FROM N/A TO N/A
SIZE N/A FROM N/A TO N/A

PIEZOMETER DESCRIPTION

TYPE 4 in ID Stainless
DIAMETER OF PERFORATED SECTION 4 in ID
PERFORATION TYPE:
SLOTS ☐ HOLES ☐ SLOTTED SCREEN ☒
AVERAGE SIZE OF PERFORATIONS 0.010 in.
TOTAL PERFORATED AREA 5 FT

RISER PIPE MATERIAL 316 Stainless Steel
RISER PIPE DIAMETERS:
O.D. 4 3/0 in I.D. 4 in
LENGTH OF PIPE SECTIONS 10 FT
JOINING METHOD Threaded, flush-Jointed

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH N/A
PROTECTIVE PIPE O.D. N/A

OTHER PROTECTION Flush Mount Locking Cap

ITEM	DISTANCE ABOVE(+)/BELOW(-) GROUND SURFACE (FT)		ELEVATION ( )	
TOP OF RISER PIPE	E.T. ~~N/A~~ -0.2 FT			
GROUND SURFACE	12/2/90 0.0			
BOTTOM OF PROTECTIVE PIPE	~~N/A~~ 0.7 FT			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY (cement)	TOP 0.0 FT	BOTTOM 0.5 FT	TOP	BOTTOM
BENTONITE	TOP 0.5 FT	BOTTOM 8.0 FT	TOP	BOTTOM
SAND	TOP 8.0 FT	BOTTOM 20.0	TOP	BOTTOM
GRAVEL None used	TOP N/A	BOTTOM N/A	TOP	BOTTOM
PERFORATED SECTION	TOP 10.0	BOTTOM 15.0	TOP	BOTTOM
PIEZOMETER TIP	17.0 FT			
BOTTOM OF BOREHOLE	20.0 FT			
GWL AFTER INSTALLATION	14.2 FT			

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

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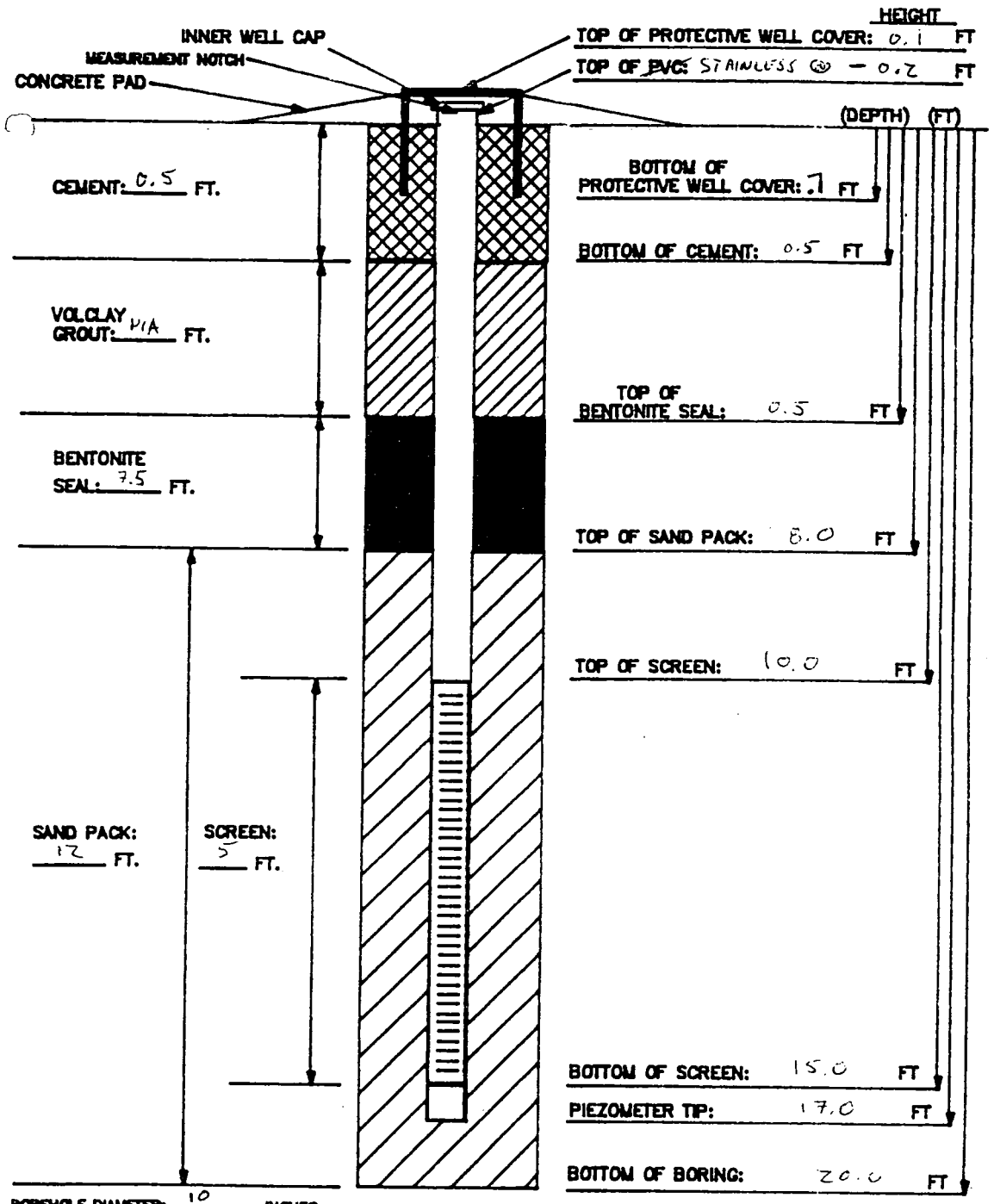
REMARKS
Wet zone @ 12.0 - 12.5 FT.
Piezometer T.P @ 17.0 FT

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.
1611

INSTALLATION DATE: 12-13-90
1994



MATERIALS USED:
SAND TYPE AND QUANTITY: 12 10/20 SAND BAGS
BENTONITE PELLETS (5-GALLON BUCKETS): 7
BAGS OF VOLCLAY GROUT: NONE
AMOUNT OF CEMENT: 1/2 BAG
AMOUNT OF WATER USED: 5 GAL.
OTHER:

NOTES:
1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS. 4-inch Sch 316 SS
2) SCREEN IS 2-INCH I.D. SCHEDULE 40 PVC PIPE WITH 0.020-INCH SLOTS. 4.0 SS .040 SLOT
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH/DATE:
5) TOP OF PVC IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK. STAINLESS STEEL
6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL.

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TASK: 6072.7.4 GEOLOGIST/ENGINEER: M Sanderson

FERNALD
RI/FS

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Data	12/16			
Initial	E.T.			
	Field Check	1st Key In	2nd Key In	Hard Copy Verification

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.7	PROJECT NAME: FMPC IR1\FS		
BORING NUMBER: 1612	COORDINATES:		DATE: 12-15-90
ELEVATION: (BE SURVEYED 1-96)	GWL: Depth	Date/Time	DATE STARTED: 12-15-90
ENGINEER/GEOLOGIST: M. GARMAN	Depth	Date/Time	DATE COMPLETED: 12-19-90
DRILLING METHODS: HOLLOW STEM AUGER			PAGE 1 OF 5

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION NR = NO RECOVERY SAA = SAME AS ABOVE	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	NA WELL CONSTRUCTION	REMARKS
	12-15 1100	NA	NA	0.0 - 1.0 FT CONCRETE	NA	NA		HNU = NA α = NA BΔ = NA
1	12-15 1100	NA	NA		NA	NA		
	12-15 1330	NA	NA	1.0 - 1.5 FT COARSE COBBLE FILL	NA	NA		HNU = 2 ppm α = 0 cpm BΔ = 800 cpm
	57138 12-15 1340	5	6	FIRM (2.5Y, 4/2) DARK GRAYISH BROWN SILTY CLAY. SOME COARSE GRAVEL. MEDIUM PLASTICITY. SLIGHTLY MOIST.	CL	1.25		
2	57140 12-15 1340	3	0	NR	NA	NA		
	57141 12-15 1345	3	6	FIRM (2.5Y N4/) ~~DARK~~ DARK GRAY SILTY CLAY. MEDIUM PLASTICITY. SLIGHTLY MOIST.	CL	1.5		HNU = 0.1 ppm α = 0 cpm BΔ = 750 cpm
3	57142 12-15 1345	2	0	NR	NA	NA		
	57143 12-15 1345	4	0	NR	NA	NA		
4	57144 12-16 1020	6	6	FIRM (5Y, 4/1) DARK GRAY MOTTLED CLAY. SOME SILT, HIGH PLASTICITY. SLIGHTLY MOIST.	CL	2.0		HNU = 0 ppm α = 0 cpm BΔ = 410 cpm
1451	57145 12-16 1020	7	6	SAA	CL	2.0		
5	57146 12-16 1020	7	6	SAA	CL	2.0		
	57147 12-16 1418	2	6	FIRM (2.5Y, 3/1) VERY DARK GRAY CLAY. SOME SILT, TRACE FINE GRAVEL. HIGH PLASTICITY. SLIGHTLY MOIST.	CL	1.5		HNU = 0 ppm α = 0 cpm BΔ = 500 cpm
6	57148 12-16 1418	3	0	NR	NA	NA		
	57149 12-16 1418	3	0	NR	NA	NA		
7	57150 12-16 1435	7	6	FIRM (2.5Y, 4/1) DARK GRAY SILTY CLAY. MOTTLED. TRACE FINE GRAVEL. HIGH PLASTICITY. SLIGHTLY MOIST.	CL	1.5		HNU = 0 ppm α = 0 cpm BΔ = 450 cpm

NOTES.

Drilling Contractor: PENN DRILL CO.

Drilling Equipment: ACKER

Driller: DAVE NEWMAN

ASST.: BOB JOHNSON

BACKGROUND:

HNU = 0 ppm

α = 0 cpm

BΔ = 540 - 820 cpm

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FERNALD
RI/FS

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.7	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1612	COORDINATES		DATE: 12-16-90
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 12-15-90
ENGINEER/GEOLOGIST: M. GARMAN	Depth	Date/Time	DATE COMPLETED: 12-19-90
DRILLING METHODS: HOLLOW STEM AUGER			PAGE 2 OF 5

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION NR = NO RECOVERY SAA = SAME AS ABOVE	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	WELL CONSTRUCTION	REMARKS
	57151 12-16 1435	13	0	NR	NA	NA		HNU = 0 ppm α = 0 cpm Bβ = 450 cpm
8	57152 12-16 1435	15	0	NR	NA	NA		
	57153 12-16 1455	25	6	VERY HARD (2.5Y, 5/4) LIGHT OLIVE BROWN SILTY CLAY, RUST STAINS. TRACE GRAVEL. LOW PLASTICITY. DRY.	CL	>4.0		HNU = 0 ppm α = 0 cpm Bβ = 410 cpm
9	57154 12-16 1455	15	6	SAA	CL	>4.0		
	57155 12-16 1455	25	6	VERY HARD (2.5Y N5/) GRAY SILTY CLAY. RUST STAINS. TRACE GRAVEL. LOW PLASTICITY. DRY.	CL	>4.0		
10	57156 12-16 1510	7	6	SAA	CL	>4.0		HNU = 0 ppm α = 0 cpm Bβ = 400 cpm
	57157 12-16 1510	13	4	SAA	CL	>4.0		
11	57158 12-16 1510	15	0	NR	NA	NA		
	57159 12-16 1518	13	6	HARD (2.5Y N5/) GRAY SILTY CLAY. TRACE FINE GRAVEL. LOW TO MEDIUM PLASTICITY. SLIGHTLY MOIST.	CL	2.75		HNU = 0 ppm α = 0 cpm Bβ = 400 cpm
12	57160 12-16 1518	13	2	SAA	CL	2.75		
	57161 12-16 1518	13	0	NR	NA	NA		
13	57162 12-16 1527	13	6	FIRM (2.5Y, N5/) GRAY SILTY CLAY. TRACE FINE GRAVEL. MEDIUM TO HIGH PLASTICITY. SLIGHTLY MOIST.	CL	1.5		HNU = 0 ppm α = 0 cpm Bβ = 400 cpm
	57163 12-16 1527	15	6	SAA	CL	1.5		
14	57164 12-16 1527	16	6	SAA	CL	1.5		
	57165 12-16 1615	9	6	FIRM (2.5Y, N5/) GRAY CLAY. SOME SILT. TRACE FINE GRAVEL. HIGH PLASTICITY. SLIGHTLY MOIST.	CL	1.0		HNU = 0 ppm α = 0 cpm Bβ = 450 cpm
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NOTES.

Drilling Contractor: PENN DRILL CO.

Drilling Equipment: ACKER

Driller: DAVE NEWMAN

ASST: BOB JOHNSON

BACKGROUND:
HNU = 0 ppm
α = 0 cpm
Bβ = 700-1000 cpm

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FERNALD
RI/FS

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.37	PROJECT NAME: FMPC RI\FS		
BORING NUMBER: 1612	COORDINATES		DATE: 12-16-90
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 12-15-90
ENGINEER/GEOLOGIST: M. GARMAN	Depth	Date/Time	DATE COMPLETED: 12-19-90
DRILLING METHODS: HOLLOW STEM AUGER			PAGE 3 OF 5

DEPTH (FT)	SAMPLE (TYPE & NO)	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN)	DESCRIPTION NR = NO RECOVERY SAA = SAME AS ABOVE	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	NA WELL CONSTRUCTION	REMARKS
15	57166 12-16 1615	13	6	SAA	CL	.75		HNU = 0 ppm α = 0 cpm BG = 450 cpm
	57167 12-16 1615	15	6	SAA	CL	.75		
16	57168 12-16 1630	8	6	FIRM (2.5Y, N5/) GRAY SILTY CLAY. TRACE GRAVEL. MEDIUM PLASTICITY. SLIGHTLY MOIST.	CL	1.75		HNU = 0 ppm α = 0 cpm BG = 400 cpm
	57169 12-16 1630	9	0	NR	NA	NA		
17	57170 12-16 1630	11	0	NR	NA	NA		
	57171 12-16 1640	21	6	FIRM (2.5Y, N5/) GRAY SILTY CLAY. SOME FINE GRAVEL. MEDIUM PLASTICITY. SLIGHTLY MOIST.	CL	.75		HNU = 0 ppm α = 0 cpm BG = 400 cpm
18	57172 12-16 1640	35	6	VERY DENSE (2.5Y, 3/2) VERY DARK GRAYISH BROWN GRAVEL - SAND - CLAY MIXTURE. SLIGHTLY MOIST TO MOIST.	GC	NA		
	57173 12-16 1640	50	0	NR	NA	NA		
19	57174 12-16 1700	~~50~~ AS 12-16-90	6	VERY DENSE (2.5Y, N5/) GRAY GRAVEL - SAND - SILT - MIXTURE. TRACE CLAY. SLIGHTLY MOIST.	GM	NA		HNU = 0 ppm α = 0 cpm BG = 400 cpm.
	57175 12-16 1700	52	0	NR	NA	NA		
20				BOTTOM OF BORING 4.0 IN. I.D STAINLESS STEEL WELL SET AS PER WORK PLAN 19.6 FT - PIEZOMETER TIP				

NOTES.

Drilling Contractor: PENNDRILL CO.

Drilling Equipment: ACKER

Driller: DAVE NEWMAN

ASST: BOB JOHNSON

BACKGROUND:
HNU = 0 ppm
α = 0 cpm
BG = 650-1000 cpm

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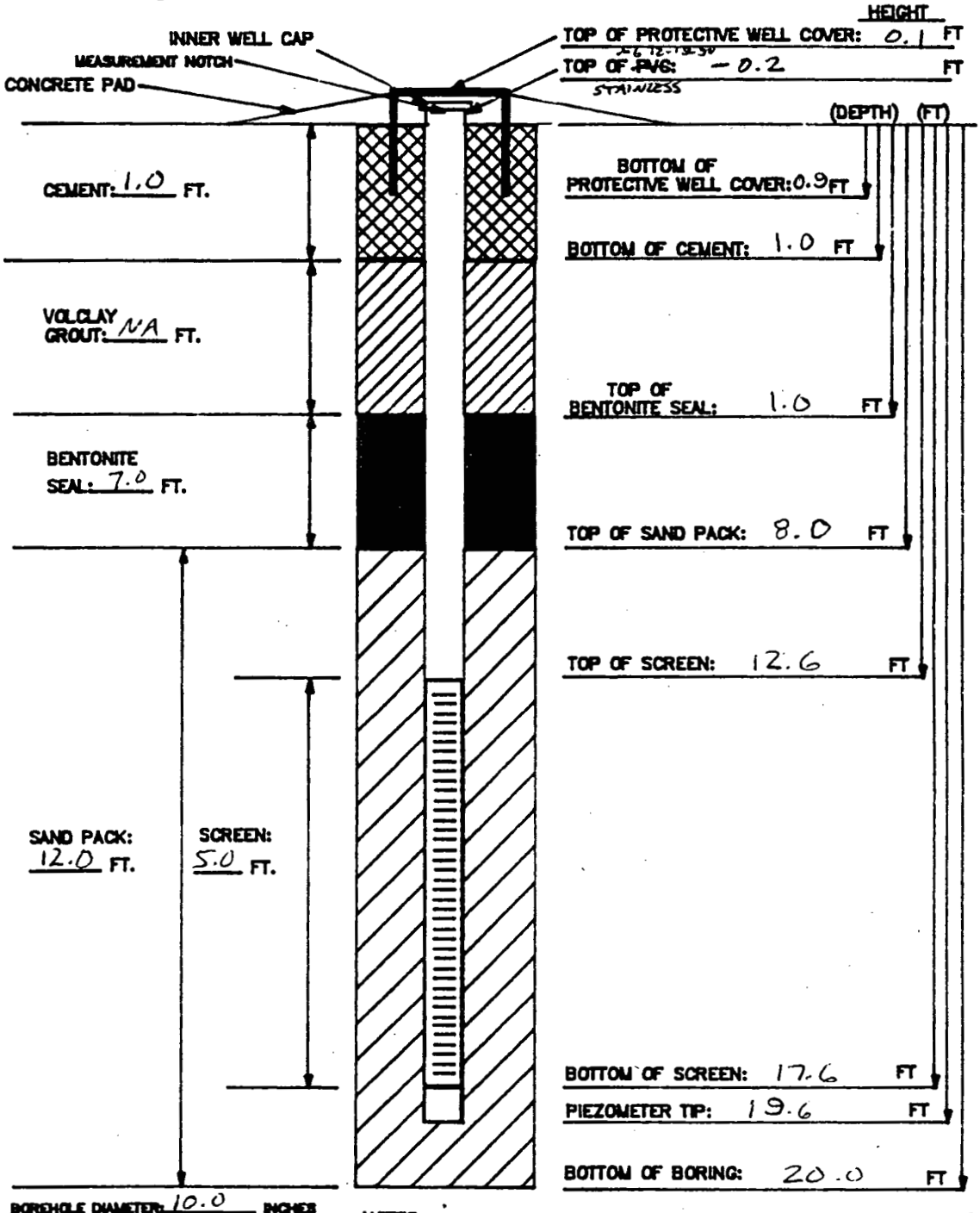
FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.
1612

INSTALLATION DATE: 12-19-90

1004



MATERIALS USED:

SAND TYPE AND QUANITITY: 10 BAGS (80 lbs. EACH) 10/20
BENTONITE PELLETS (5-GALLON BUCKETS): 8
BAGS OF VOLCLAY GROUT: NA
AMOUNT OF CEMENT: 1/2 BAG (100 lbs. each)
AMOUNT OF WATER USED: 5 gallons
OTHER:

NOTES: 4-INCH STAINLESS STEEL WAS USED AS PER WORK PLAN CG 12-13-90

1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS.
2) SCREEN IS 2-INCH I.D. SCHEDULE 40 PVC PIPE WITH 0.020-INCH SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH/DATE: DRY, 12-19-90
5) TOP OF PVC IS SECURED WITH EXPANDABLE RUBBER PLUG AND PADLOCK.
6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL.

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TASK: 602.3-7 GEOLOGIST/ENGINEER: Mark J. Laux

FERNALD RI/FS

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PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS — FIELD ENG./GEO. M GARMAN — DATE 12-17-90
PROJECT NO. 602.37 — CHECKED BY E. Trollinger — DATE 12-21-90
BORING NO. 1612
PIEZOMETER NO. 1612 — DATE OF INSTALLATION 12-19-90

BOREHOLE DRILLING

DRILLING METHOD HOLLOW STEM AUGER	TYPE OF BIT AUGER
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID NONE ~~FROM~~ ~~TO~~ →	SIZE NONE ~~FROM~~ ~~TO~~ →
FLUID NONE ~~FROM~~ ~~TO~~ →	SIZE NONE ~~FROM~~ ~~TO~~ →

PIEZOMETER DESCRIPTION

TYPE 4.0 IN. I.D. STAINLESS STEEL	RISER PIPE MATERIAL 4.0 IN I.D. STAINLESS STEEL
DIAMETER OF PERFORATED SECTION 4.0 IN I.D.	RISER PIPE DIAMETERS:
PERFORATION TYPE:	O.D. 4 3/8 IN I.D. 4.0 IN
SLOTS ☒ HOLES ☐ SCREEN ☐	LENGTH OF PIPE SECTIONS 10 FT, 2 FT
AVERAGE SIZE OF PERFORATIONS 0.010 IN	JOINING METHOD FLUSH JOINT
TOTAL PERFORATED AREA 5.0 FT	THREADED

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 1.0 FT	OTHER PROTECTION EXPANDABLE RUBBER
PROTECTIVE PIPE O.D. 10.75 in	PLUG WITH PADLOCK

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (~~FT~~)		ELEVATION ( )	
TOP OF RISER PIPE	-0.2			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	0.9			
BOREHOLE FILL MATERIALS:				
~~GROUT/SLURRY~~ CEMENT (~6 12-19-90)	TOP 0.0	BOTTOM 1.0	TOP	BOTTOM
BENTONITE	TOP 1.0	BOTTOM 8.0	TOP	BOTTOM
SAND	TOP 8.0	BOTTOM 20.0	TOP	BOTTOM
GRAVEL NONE USED	TOP NA	BOTTOM NA	TOP	BOTTOM
PERFORATED SECTION	TOP 12.6	BOTTOM 17.6	TOP	BOTTOM
PIEZOMETER TIP	19.6			
BOTTOM OF BOREHOLE	20.0			
GWL AFTER INSTALLATION	DRY			

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

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REMARKS HOLE WAS DRILLED WITH 10-INCH DIAMETER HOLLOW STEM AUGER. WELL IN 4.0 IN. I.D. STAINLESS STEEL. HOLE WAS DRY WHEN WELL WAS SET. AS PER WORK PLAN.

FERNALD RI/FS

1004

Date	12/9/90			
Initial	E.T.			
	Field Check	1st Key In	2nd Key In	Hard Copy Verification

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.2.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 2555	COORDINATES:	DATE: 12-1-90	
ELEVATION:	GWL: Depth 20.8FT Date/Time 12-02-90@1300	DATE STARTED: 12-01-90	
ENGINEER/GEOLOGIST: M.S WANSON	Depth 18.2FT Date/Time 12-03-90@1400	DATE COMPLETED: 12-02-90	
DRILLING METHODS: CABLE TOOL		PAGE 1 OF 5	

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0	33357 1406 12-01-90	1 6 2	6	SOFT, VERY DARK GRAY (10YR 3/1) ORGANIC SILT-CLAY MIXTURE, SOME PEBBLES, LOW PLASTICITY, MOIST	OL	.40	Hnu = 0.0 PPM ∝ = 0 CPM βγ = 20-60 CPM
1				1.5			
2	33358 1411 12-01	3 5 5	7	FIRM, YELLOWISH BROWN (10YR 5/4), CLAY, SILT, SAND MIXTURE, LOW PLASTICITY, DRY	CL	.75	Hnu = 0.0 PPM ∝ = 0 CPM βγ = 20-40 CPM
3							
4	33359 1417 12-01	4 4 4	18	SOFT, YELLOWISH BROWN (10YR 5/4), SANDY CLAY, SOME SILT, TRACE OF PEBBLES, LOW TO MEDIUM PLASTICITY, MOIST	CL	.30	Hnu = 0.0 PPM ∝ = 0 CPM βγ = 20-40 CPM
5	33360 1424 12-01	3 5 6	18	4.0 SOFT, GRAYISH BROWN (10YR 5/2), SILTY CLAY, SOME SAND AND GRAVEL, LOW PLASTICITY, MOIST	CL	.50	Hnu = 0.0 PPM ∝ = 0 CPM βγ = 20-30 CPM
6							
7	33361 1433 12-01	5 4 4	18	6.9 VERY SOFT, GRAYISH BROWN (10YR 5/2), SAND-CLAY MIXTURE, SOME SILT AND PEBBLES, MOIST TO WET	SC	1.25	Hnu = 0.0 PPM ∝ = 0 CPM βγ = 20-40 CPM
8	33362 1442 12-01	4 5 5	18				Hnu = 0.0 PPM ∝ = 0 CPM βγ = 20-40 CPM
9				9.5			
10	33363 1450 12-01	5 3 3	18	FIRM, YELLOWISH BROWN (10YR 5/4), SILTY CLAY, TRACE OF SAND AND GRAVEL, SLIGHTLY MOIST	CL	1.25	Hnu = 0.0 PPM ∝ = 0 CPM βγ = 40-60 CPM
11	33364 1608 12-01	1 1 1	18	11.0 FIRM, BROWN (10YR 5/3), SILTY CLAY, TRACE OF SAND, LOW PLASTICITY, SLIGHTLY MOIST TO MOIST	CL	1.0	Hnu = 0.0 PPM ∝ = 0 CPM βγ = 40-80 CPM
12				11.7			
13	33365 1615 12-01	3 4 5	18	FIRM, BROWN (10YR 5/3), SANDY SILT, SOME CLAY, LOW PLASTICITY, SLIGHTLY MOIST 12.5 ~~12.5~~ ADDENDUM	SM	1.5	Hnu = 0.0 PPM ∝ = 0 CPM βγ = 40-80 CPM
14	33366 0755 12-02-90	2 3 2	18	FIRM, YELLOWISH BROWN (10YR 5/4), SANDY-SILTY, CLAY, TRACE OF PEBBLES, VERY SLIGHT PLASTICITY, MOIST TO WET		1.20	Hnu = 0.0 PPM ∝ = 0 CPM βγ = 20-60 CPM
15							

NOTES:

Drilling Contractor PENN DRILL CO.

Drilling Equipment BUCYRUS ERIE

Driller: D. NEWMAN

ASST.: B. JOHNSON

ALL SOIL SAMPLES COLLECTED PER ASTM STANDARD PENETRATION TEST. SOIL COLORS IDENTIFIED USING MUNSELL COLOR CHARTS.

INSTRUMENT	SERIAL #	BACKGROUND READINGS
Hnu	AP1344	0.0 PPM
∝	ASI #5	0 CPM
βγ	ASI #6	20-80 CPM

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FERNALD
RI/FS

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.2.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 2555	COORDINATES:		DATE: 12-02-90
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 12-01-90
ENGINEER/GEOLOGIST: M. SWANSON	Depth	Date/Time	DATE COMPLETED: 12-02-90
DRILLING METHODS: CABLE TOOLS			PAGE 2 OF 5

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER (6 IN.)	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED CONTAMINANT (PPM)	REMARKS
15	33367	1	18	FIRM, YELLOWISH BROWN (10YR 5/6) SAND-SILT-CLAY MIXTURE, LOW PLASTICITY, MOIST TO WET	CL	1.0	Hnu = 0.0 ppm
	0805	2		16.0			α = 0 cpm
16	12-02	2					βγ = 40-60 cpm
	33368	1	15	SOFT, DARK GRAY (2.5Y 4/0) SILT, SOME SAND AND CLAY, NO PLASTICITY, SLIGHTLY MOIST	ML	0.5	Hnu = 0.0 ppm
17	0820	3		16.9 16.9			α = 0 cpm
	12-02	3		LOOSE, DARK GRAY (2.5Y 4/0), SAND-CLAY MIXTURE, SOME SILT, WET	SC	N/A	βγ = 40-80 cpm
18	33369	2	12				Hnu = 0.0 ppm
	0834	4		LOOSE, DARK GRAY (2.5Y 4/0), SAND-CLAY-SILT MIXTURE, TRACE OF PEBBLES, WET	SC	N/A	α = 0 cpm
19	12-02	5		19.5 19.5			βγ = 20-60 cpm
	33370	1	8	LOOSE, VERY DARK GRAY (2.5Y 3/0) SAND-SILT MIXTURE, COARSE GRAINED, WET	SM	N/A	Hnu = 0.0 ppm
20	0918	3					α = 0 cpm
	12-02	5					βγ = 20-60
21	33371	2	10	MEDIUM DENSE, VERY DARK GRAY (2.5Y 3/0), SILTY SAND, FINE GRAINED, WET	SM	N/A	Hnu = 0.0 ppm
	0937	6					α = 0 cpm
22	12-02	7					βγ = 40-60 cpm
23				AQUIFER WILL BE SAMPLED EVERY 5 FT STARTING AT 25.0 FT. TILL SATURATED ZONE IS ENCOUNTERED.			
24							
25	33372	6	12	MEDIUM DENSE, DARK YELLOWISH BROWN (10YR 4/4) POORLY GRADED FINE SAND, SOME SILT, WET	SP	N/A	Hnu = 0.0 ppm
	1000	9					α = 0 cpm
26	12-02	7					βγ = 40-60 cpm
27							
28							
29							
30							

NOTES

Drilling Contractor: PENN. DRILL CO.

Drilling Equipment: BUCYRUS 61E16

Driller: D. NEWMAN

Asst.: B. JOHNSON

BACKGROUND
Hnu = 0.0 ppm
α = 0 cpm
βγ = 20-80 cpm

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FERNALD
RI/FS

1004

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.2.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 2555	COORDINATES:		DATE: 12-02-90
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 12-01-90
ENGINEER/GEOLOGIST: M. SWANSON	Depth	Date/Time	DATE COMPLETED: 12-02-90
DRILLING METHODS: CABLE TOOLS			PAGE 3 OF 5

DEPTH (FT)	SAMPLE (TYPE & NO)	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED GROUNDWATER LEVEL (FT)	WELL CONSTRUCTION	REMARKS
30	33573	5		MEDIUM DENSE, YELLOWISH BROWN (10YR 5/6); POORLY GRADED FINE SAND, SOME SILT, WET	SP	N/A	N/A	HNU = 0.0 PPM α : 0 CPM βγ : 40-60 CPM
31	1040	7	14					
	12-02	8						
32								HNU : α : βγ :
33								
34								HNU : α : βγ :
35	33574	8						HNU : 0.0 PPM α : 0 CPM βγ : 20-40 CPM READINGS FOR 35.0-36.5 FT
36	1135	8	13	MEDIUM DENSE, DARK GRAY (10YR 4/1), WELL GRADED COARSE SAND, TRACE OF SILT, PEBBLES, WET	SW	N/A		
	12-02	9						
37				BOTTOM OF BORING = 36.5 FT, DRILLED, SAMPLED TO 36.5 FT.				HNU : α : βγ :
								HNU : α : βγ :
								HNU : α : βγ :
								HNU : α : βγ :
								HNU : α : βγ :
							V	HNU : α : βγ :
							N/A	

NOTES

Drilling Contractor: REED DRILL CO.

Drilling Equipment: BUCYRUS ERIE

Driller: D. NEWMAN

ASST.: B. JOHNSON

BACKGROUND
HNU : 0.0 PPM
α : 0 CPM
βγ : 40-60 CPM

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PROTECTIVE RISER CASING — HINGED LID WITH PADLOCK

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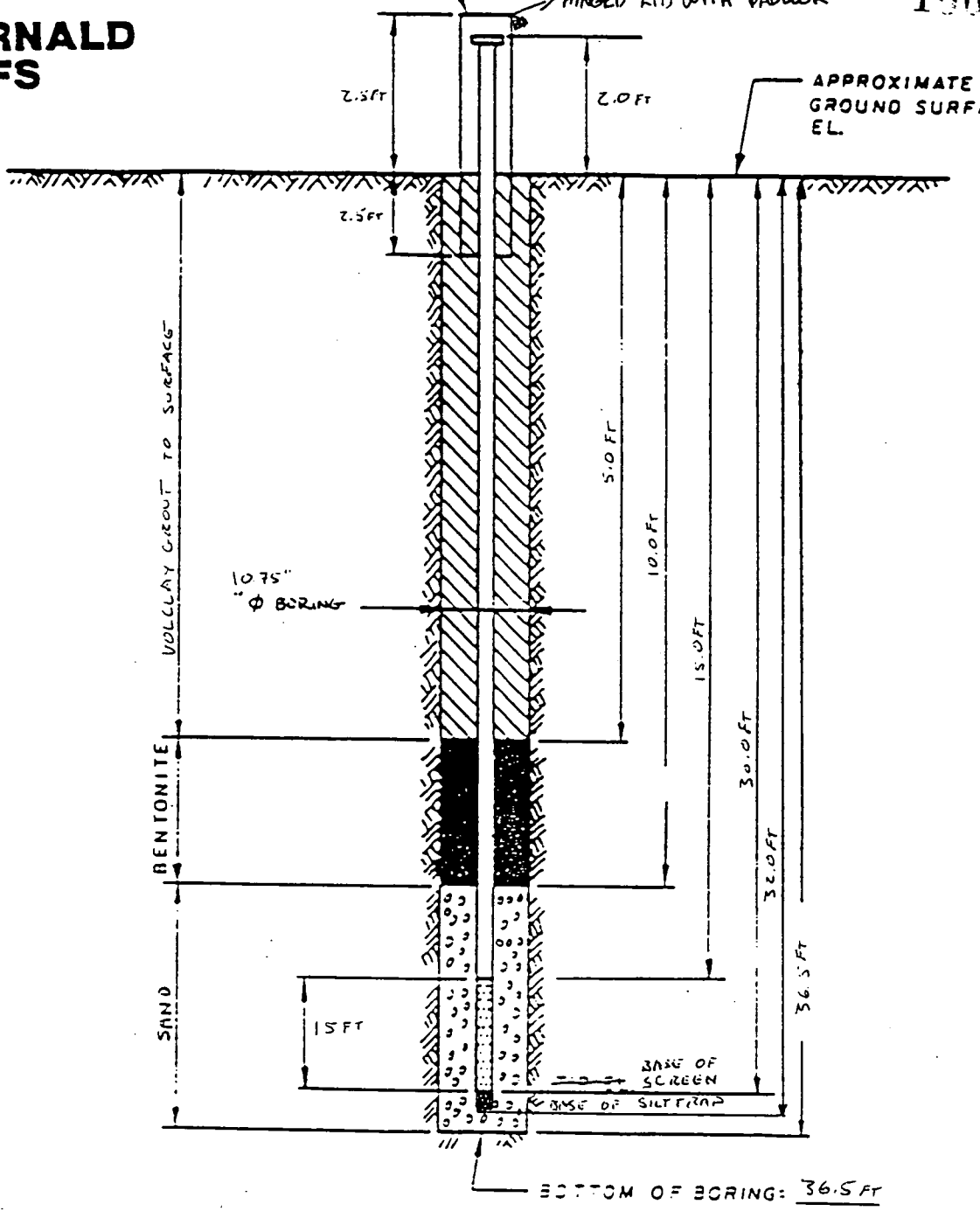
FERNALD RI/FS



DRAWING NUMBER

DRAWN BY	CHECKED BY
JMM 12-04-90	APPROVED BY

NOTES:

1. RISER PIPE IS 4 IN I.D SCHEDULE 40 PIPE, THREADED. FLUSH-JOINTED.
2. SCREEN IS 4 IN I.D SS PIPE CONTINUOUS SLOT SCREEN (0.010 IN SLOT SIZE).
3. LOWER END OF SCREEN IS CAPPED.
4. ELEVATION OF WATER LEVEL 20.8Ft ; 16.2Ft
5. WATER LEVEL READING ON 12-02-90 ; 12-03-90

MATERIALS USED DURING WELL INSTALLATION :

15	80 LB. BAGS OF 10/20 SAND
2	50 LB. BAGS OF VOLCLAY GROUT
9	5 GALLON BUCKETS OF BENTONITE PELLETS
300	GALLONS OF WATER USED DURING DRILLING AND GROUTING PROCEDURES

5S SECTIONS ; 1-15 Ft SCREEN w/ 2Ft WELDED SILTTRAP ; 1-10 Ft ; 1-5 Ft ; 1-2Ft RISERS

INSTALLATION DETAILS
MONITORING WELL # 2555

PREPARED FOR
FERNALD RI/FS

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FERNALD RI/FS

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PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS — FIELD ENG./GEO. M. SWANSON — DATE 12-02-90
PROJECT NO. 6023.2.1 — CHECKED BY E. Trollinger — DATE 12-13-90
BORING NO. 2555
PIEZOMETER NO. 2555 — DATE OF INSTALLATION 12-02-90

BOREHOLE DRILLING

DRILLING METHOD CABLE TOOLS	TYPE OF BIT HAMMER
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID H_2O FROM 0.0 FT TO 36.5 FT	SIZE 10.16 ID FROM 0.0 FT TO 36.5 FT
FLUID — FROM — TO —	SIZE — FROM — TO —

PIEZOMETER DESCRIPTION

TYPE MONITORING WELL	RISER PIPE MATERIAL 316 STAINLESS STEEL
DIAMETER OF PERFORATED SECTION 4.1 IN ID	RISER PIPE DIAMETERS:
PERFORATION TYPE:	O.D. 4 3/8 IN I.D. 4 IN
SLOTS ☐ HOLES ☐ SLOTTED SCREEN ☒	LENGTH OF PIPE SECTIONS
AVERAGE SIZE OF PERFORATIONS 0.010 IN	JOINING METHOD THREADED, FLUSH JOINTED
TOTAL PERFORATED AREA 15 FT	

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5 FT	OTHER PROTECTION HINGED, LOCKING LID COVER WITH PADLOCK
PROTECTIVE PIPE O.D. 10.75 IN	

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (FT)		ELEVATION ( )	
TOP OF RISER PIPE	+2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	-2.5			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 0.0	BOTTOM 5.0	TOP	BOTTOM
BENTONITE	TOP 5.0	BOTTOM 10.0	TOP	BOTTOM
SAND	TOP 10.0	BOTTOM 36.5	TOP	BOTTOM
GRAVEL NONE USED	TOP N/A	BOTTOM N/A	TOP	BOTTOM
PERFORATED SECTION	TOP 15.0	BOTTOM 30.0	TOP	BOTTOM
PIEZOMETER TIP	32.0 FT			
BOTTOM OF BOREHOLE	36.5 FT			
GWL AFTER INSTALLATION	18.2 FT BELOW GROUND			

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

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REMARKS 2 BUCKETS BENTONITE PELLETS ADDED AROUND PROTECTIVE CASING