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— G-000-711.33 —

CONSOLIDATED CONSENT AGREEMENT/ FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT PERIOD ENDING JUNE 30, 1990

07/16/90

WMCO/DOE-FMPC
3T 99
REPORT

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

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Period Ending June 30, 1990

Introduction

Attachment A with its accompanying tables provides (1) data on daily wastewater flows and radionuclide concentrations and loadings released to the Great Miami River and (2) an estimate of runoff and radionuclide concentrations to Paddy's Run during June 1990 in accordance with the requirements of Section XXIII.B of the Consent Agreement under CERCLA Section 120 and 106(a).

Summary - June 1990

The total quantity of uranium discharged from the FMPC to the Great Miami River via Manhole 175 (Outfall 1I000004001) was 68.92 kilograms. The average uranium concentration for the previous twelve months was 0.72 mg/l. This is 80.9 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. Based on 3.92 inches of rainfall for the month, the total quantity of uranium discharged to Paddy's Run from uncontrolled areas of the FMPC is estimated to be 17.64 kilograms.

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EFFLUENT RADIATION REPORT

FACILITY: Feed Materials Production Center
U.S. Department of Energy
7400 Willey Road, P.O.Box 398704
Cincinnati, Ohio 45239 Hamilton
8502 M 8612 801002

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

DATE: JUNE 1990

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	0.986	324	131	0.58	2.16	196
2	1.028	252	144	0.60	2.33	203
3	0.913	455	95	0.86	2.97	291
4	0.955	360	167	0.52	1.88	176
5	0.951	347	90	0.58	2.09	196
6	0.423	54	212	0.10	0.16	34
7	0.707	261	122	0.40	1.07	135
8	0.851	482	239	0.86	2.77	291
9	1.011	419	347	0.80	3.06	270
10	1.077	941	532	2.10	8.56	709
11	1.038	1023	581	2.60	10.21	878
12	0.696	568	324	0.98	2.58	331
13	0.671	617	176	0.90	2.28	304
14	0.643	509	203	0.88	2.14	297
15	0.616	712	419	1.30	3.03	439
16	0.688	306	234	0.56	1.46	189
17	0.235	383	108	0.70	0.62	236
18	0.575	536	198	0.94	2.04	318
19	0.524	459	270	0.98	1.94	331
20	0.548	550	387	0.90	1.87	304
21	0.370	374	239	0.66	0.92	223
22	0.279	671	477	1.14	1.20	385
23	0.245	550	541	1.12	1.04	378
24	0.212	577	500	1.02	0.82	345
25	0.078	955	288	1.78	0.53	601
26	0.420	518	347	1.02	1.62	345
27	0.508	464	126	0.62	1.19	209
28	0.561	401	185	0.80	1.70	270
29	0.480	257	505	0.86	1.56	291
30	0.614	640	473	1.34	3.11	453
Total	18.903				68.92	

EFFLUENT RADIATION REPORT (cont.)

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FACILITY: Feed Materials Production Center

LOCATION: 001 Total Discharge

DATE: JUNE 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.	0.630	495	277	0.96	2.30	326
Max.	1.077	1023	581	2.60	10.21	878
Min.	0.078	54	90	0.10	0.16	34

The average uranium concentration for the previous twelve months was 0.72 mg/l. This is 80.9 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 applied to the measured value of total uranium.

(2) Average values presented are flow-weighted.

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EFFLUENT RADIATION REPORT

FACILITY: Feed Materials Production Center
U.S. Department of Energy
7400 Willey Road, P.O.Box 398704
Cincinnati, Ohio 45239 Hamilton
8502 M 8612 801002

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

DATE: June 1990

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

Based on 3.92 inches of rainfall for the month, the uranium discharge to Paddy's Run from uncontrolled areas of the FMPC is estimated to be 17.64 kgs.

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CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

INTRODUCTION

Attachment B describes actions undertaken at the Feed Materials Production Center (FMPC) during the period June 1 through June 30, 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 both ongoing and completed work in support of the Federal Facility Compliance Agreement (FFCA) is summarized in Table 1 of Attachment B. In this portion of the report and in Table 1, descriptions of actions are presented in a format consistent with that of the Federal Facility Compliance Agreement.

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

1. Initial Remedial Measures

Section C

K-65 Silo Project - The work plan for the K-65 Silo embankment and subsoils sampling and analysis has been revised by Advanced Science, Inc./International Technology (ASI/IT) to reflect review comments submitted by Department of Energy (DOE) and Westinghouse Materials Company of Ohio (WMCO). The revised work plan is in final review by DOE and WMCO.

The work plan for the Treatability Testing on the K-65 materials retrieved in 1989 has been revised to reflect review comments and is in final review by DOE and WMCO.

ASI/IT work plan for the resampling of the silos is being revised to reflect the DOE and WMCO comments. Initiation of negotiation of the ASI/IT sampling proposal is forecasted for early July 1990.

Eight of nine action items associated with the housekeeping clean-up of the K-65 Silo area in support of the resampling effort were completed in June. The ninth action item, the removal of old drilling rods east of Silos 1 and 2, was delayed until additional radiological protection measures can be made to contain and transport the contaminated equipment. The delay in completing the ninth clean-up action item is not interfering with the work preparation for the resampling effort.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period June 30, 1990

LIABILITY ACT (CERCLA)

1. **Initial Remedial Measures (cont'd.)**

Section C

K-65 Silo Project **(cont'd.)**

The cracked pipe in the Radon Treatment System (RTS) was removed during June 6-8, 1990, decontaminated and examined by engineering personnel and a material specialist to determine the mode and cause of failure. Results from the preliminary examination did not show any internal degradation of the polyvinylchloride (PVC) pipe due to the transport of radon gas but some external deterioration was noted which has been attributed to ultraviolet radiation. Thermal stress on the rigid pipeline system appears to be an important consideration. A final report identifying the cause of the pipeline failure, recommendations to prevent future pipeline cracks and an assessment of the state of repair of the remainder of the existing PVC pipeline was received from the vendor and is being reviewed by WMCO. Plans for the repair of the RTS are being reviewed by the Site's Operational Readiness Review (ORR) Board. Modifications to the repair checklist based on the board's input have been made, and approval of the ORR Board's recommendation for the repair of the RTS is expected in early July 1990.

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).

3. Reports and Record Keeping

Section B

The RI/FS Monthly Technical Progress Report for May 1990 was transmitted to USEPA on June 20, 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.

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CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period June 30, 1990

CLEAN AIR ACT (CAA)

Section D

Stack Tests - The stack testing schedule for 1989 was submitted to USEPA on June 16, 1989. The USEPA was informed by letter (DOE-1615-89) on September 15, 1989, that due to the current uncertainty concerning resumption of production activities, the 1989 FFCA Stack Testing Program was being deferred. Notification of future stack testing dates will be provided to the USEPA if and when a decision on the restart of production activities at the FMPC is made.

Section E

The fourteenth Quarterly Particulate Emissions Report for the period January 3, 1989 through April 3, 1990 was transmitted to the USEPA on May 18, 1990.

RADIATION DISCHARGE INFORMATION

Section .4

The fourteenth Quarterly Liquid Discharge Report covering the period January through March 1990 was transmitted to the USEPA on May 18, 1990.

REPORTING REQUIREMENTS

Section B

The Federal Facilities Compliance Agreement Monthly Progress Report for May 1990 was transmitted to the USEPA on June 20, 1990 as Attachment 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 JUNE 30, 1990

ACTION	DESCRIPTION	COMPLETION TIME AFTER FFCA SIGNED	FY90 STATUS
CERCLA			
1.	INITIAL REMEDIAL MEASURES		
1.A	Develop and implement O&M procedures and work practices to control radioactive emissions, including radon gas and decay products.	60 days	Completed.
1.B	Develop and provide to EPA a plan and implementation schedule for the interim control of radon at the K-65 Silos.	30 days	Completed.
	Develop and provide to EPA a plan and implementation schedule for control of thorium compounds.		Completed.
1.C	Implement radon control plan approved by the 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.
	Implement interim control plan for thorium compounds as approved by the USEPA.		Completed.
2.	REMEDIAL INVESTIGATION/FEASIBILITY STUDY		No action required.
2.A	RI/FS work is to be conducted in accordance with 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.C	Provide to EPA the analysis results for laboratory certification -- SOW Task 7b.	45 days	Completed.
2.D	Submit a work plan to EPA for a complete sitewide RI/FS.	90 days	Completed.
2.E	Amend and submit revised RI/FS Work Plan to 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).

TABLE 1

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

STATUS OF ACTIONS AS OF JUNE 30, 1990

ACTION	DESCRIPTION	COMPLETION TIME AFTER FFCA SIGNED	FY90 STATUS
2.F	Implement tasks detailed 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 May 1990 was transmitted to the USEPA on June 20, 1990 (DOE-1307-90).
CLEAN AIR ACT			
A.	-- No Action Required --	-------	
B.1	Install real-time alarm monitors on all MAJOR emission points. Also list non-alarmed emission points.	30 days	Completed.
B.2	Establish and implement administrative controls for real-time monitors to ensure any unplanned releases will be detected and dealt with in 24 hours.	30 days	Completed.
B.3	Establish and implement sample collection and analysis procedures and a QA plan to monitor ALL radionuclide emission points.	30 days	Completed.
B.4	Establish schedule for the installation and replacement of emission control devices.	30 days	Completed.
	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 USEPA on February 22, 1990 (DOE-617-90).
	Respond to USEPA comments on Air Monitoring Network (WDF-JAR dated 12-May-87).		Completed.
C.	Provide annual reports to EPA per 40 CFR 61.94(c).	yearly	The Annual Radionuclide Air Emission Report for CY 1989 was transmitted to the USEPA on July 9, 1990 (DOE-1392-90).

TABLE 1

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

STATUS OF ACTIONS AS OF JUNE 30, 1990

ACTION	DESCRIPTION	COMPLETION TIME AFTER FFCA SIGNED	FY90 STATUS
D.1	Provide EPA with yearly stack-testing schedule.	yearly	The 1989 stack testing schedule was transmitted to USEPA on June 16, 1989. A letter (DOE-1615-89) was forwarded to the USEPA 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 USEPA if and when a decision on the restart of production at the FMPC is made.
D.2	Provide EPA with stack-test results for stacks tested that year.	45 days after test	Stack testing is currently on hold pending resumption of manufacturing operations. Notification of future stack testing dates will be provided to the USEPA 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 EPA on these emissions.	quarterly	The thirteenth Quarterly Particulate Emissions Report was transmitted to the USEPA on February 28, 1990. The fourteenth Quarterly Particulate Emissions Report for the period January 3, 1990 through April 3, 1990 was transmitted to the USEPA on May 18, 1990 (DOE-1121-90).
F.	Provide EPA with a list of environmental air monitoring equipment, including location and the O&M program.	60 days	Completed.
G.	Develop and provide EPA with an O&M program for air pollution control devices.	90 days	Completed.
RCRA			
A.	Achieve compliance with interim status regulations.	30 days	Completed.
A.1	Conduct a hazardous waste determination on all waste streams.	30 days	Initial waste characterization for known waste streams was completed on August 17, 1986 and submitted as a 30-day FFCA deliverable. 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.3	Update operating records pursuant to 40 CFR 265.73 and 265.309.	30 days	Completed.
A.4	Include full name, signature, and date received on manifests pursuant to 40 CFR 265.71.	30 days	Completed.

TABLE 1

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

STATUS OF ACTIONS AS OF JUNE 30, 1990

ACTION	DESCRIPTION	COMPLETION TIME AFTER FFCA SIGNED	FY90 STATUS
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 was submitted to the Ohio EPA on September 22, 1989. Facility closure will be completed on the date the last TSD unit is closed.
A.6	Begin collection of all run-off from the active portions of Pit 4.	30 days	Completed.
A.7	Prepare and maintain an outline for a groundwater quality assessment program.	30 days	Completed.
B.	Submit to EPA for approval a detailed groundwater monitoring plan.	90 days	Completed. Revision 1 of the Groundwater Quality Assessment Program Plan was submitted to EPA on March 24, 1989 to fulfill comments received from the USEPA in 2/89.
B.1	Determine groundwater flow at the RCRA-regulated units.	90 days	Completed.
B.2	Provide a map showing the locations of all RCRA monitoring wells.	90 days	Completed.
B.3	Include design and construction specifications for all RCRA wells.	90 days	Completed.
B.4	Monitor for all Appendix VIII constituents, including radionuclides.	90 days	Completed.
B.5	Include a sampling and analysis plan to meet 40 CFR 265.92.	90 days	Completed.
C.1	Develop a closure plan for the landfill pursuant to 40 CFR 265.112.	60 days	Completed.
C.2	Develop a post-closure plan for the landfill pursuant to 40 CFR 265.118.	60 days	Completed. The post-closure plan for Waste Pit 4 was submitted as part of RCRA Part B Permit Application which was transmitted to Ohio EPA on September 22, 1989 (DOE-1653-89).
RADIATION DISCHARGE INFORMATION			
A.	Respond to USEPA comments on Items A.1. - A.3. (WDF-JAR dated May 12, 1987).		Completed.
A.1	Provide EPA with existing offsite environmental monitoring program.	30 days	Completed.
A.2	Provide EPA the QA program associated with the environmental monitoring program.	30 days	Completed.
A.3	Report to USEPA, OEPA and Ohio Department of Health the results of the continuous liquid discharge samples.	quarterly	The thirteenth Quarterly Liquid Discharge Report was transmitted to the USEPA on February 28, 1990. The fourteenth Quarterly Liquid Discharge Report for the period January through March 1990 was transmitted to the USEPA on May 18, 1990 (DOE-1121-90).
REPORTING REQUIREMENTS			
B.	Issue monthly progress report of actions taken to ensure compliance with FFCA requirements.	monthly	May's FFCA Monthly Progress Report was transmitted to the USEPA on June 20, 1990 (DOE-1307-90).

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

PERIOD ENDING JUNE 30, 1990

ATTACHMENT C

DRILLING AND BORING LOGS

FERNALD
RI/FS

	Date			
Initial	7/4/90			
	ET.			
	Field Check	1st Key In	2nd Key In	Hard Copy for Verification

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2.1	PROJECT NAME: FMPC RI\FS		
BORING NUMBER: 4125	COORDINATES: N.471,367.0 E.1,319,481.77		DATE: 6-14-90
ELEVATION: 527.5 GROUND	GWL: Depth	Date/Time	DATE STARTED: 6-14-90
ENGINEER/GEOLOGIST: M. GARMAN	Depth	Date/Time	DATE COMPLETED: 6-28-90
DRILLING METHODS: CABLE TOOL			PAGE 1 OF 6

DEPTH (FT)	SAMPLE TYPE & NO.	SAMPLE DIVISION (IN.)	RECOVERY (IN.)	DESCRIPTION	VISUAL SYMBOL	MEASURED CONTAMINANT (PPM)	NA WELL CONSTRUCTION	REMARKS
0				SEE VISUAL CLASSIFICATION OF SOILS FOR MONITOR WELLS 2125 AND 3125				
5								
10								
15				SAMPLING BEGINS @ 85.0 FT.				
20								
25								
30								
35								
40								
45								
50								
55								
60								
65								
70								
75								
80								
85								

NOTES.

Drilling Contractor: PENNSYLVANIA DRILLING

Drilling Equipment: CYCLONE 43

Driller: CRAIG COULTER

Asst.: CHRIS COULTER

BACKGROUND:

HNU = 0 PPM

α = 0 cpm

$\beta\gamma$ = 40-80 cpm

FERNALD
RI/FS

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2.1	PROJECT NAME: FMPC RI\FS		
BORING NUMBER: 4125	COORDINATES:		DATE: 6-17-90
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 6-14-90
ENGINEER/GEOLOGIST: M. GARMAN	Depth	Date/Time	DATE COMPLETED: 6-28-90
DRILLING METHODS: CABLE TOOL			PAGE: 2 OF 6

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED ORGANIC VAPOR (PPM)	N.A. WELL CONSTRUCTION	REMARKS
85	32821 6-17 0845	50/5in.	5	VERY DENSE (10YR, 5/2) GRAYISH BROWN SILTY SAND (WELL GRADED). WET.	SM	NA		HNV = 0 α = 0 γB = 80cpm
86								
87								
88								
89								
90	32822 6-17 0920	11 21 20	18	DENSE (10YR, 5/2) GRAYISH BROWN WELL GRADED SAND. SOME SILT. WET.	SW	NA		HNU = 0 α = 0 γB = 60 cpm
91								
92								
93								
94								
95	32823 6-17 1100	50/4in.	4	VERY DENSE (10YR, 5/3) BROWN WELL GRADED SAND. TRACE SILT. TRACE GRAVEL. WET.	SW	NA		HNU = 0 α = 0 γB = 50cpm
96								
97								
98								
99								
100								

NOTES.

Drilling Contractor: PENNSYLVANIA DRILLING

Drilling Equipment: CYCLONE 43

Driller: CRAIG COULTER

Asst. CHRIS COULTER

BACKGROUND:
HNU = 0
α = 0
γB = 40-80cpm

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VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 6023.2.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 4125	COORDINATES:		DATE: 6-17-90
ELEVATION:	GWL: Depth / Date/Time		DATE STARTED: 6-14-90
ENGINEER/GEOLOGIST: M GARMAN	Depth / Date/Time		DATE COMPLETED: 6-28-90
DRILLING METHODS: CABLE TOOL			PAGE 3 OF 6

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER (6 IN.)	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED CONTAMINANT (ppm)	NA WELL CONSTRUCTION	REMARKS
100	32824 6-17 1140	11 17 22	18	Dense (10yr, 5/2) Grayish Brown well graded Gravel some sand Trace S.I.T. WET.	GW	NA		HNU = 0 α = 0 ßB = 60cpm
101								
102								
103								
104								
105	32825 6-17 1512	20 25 32	18	very dense (10yr, 5/2) Grayish Brown well graded sand, some s.i.t. wet.	SW	NA		HNU = 0 α = 0 ßB = 40cpm
106								
107								
108								
109								
110	32826 6-18 0940	50/4 in.	4	VERY DENCE (5Y, 5/1) GRAY CLAYEY GRAVEL (WELL GRADED) SOME SILT. TRACE SAND. WET.	GC	NA		HNU=0 α=0 ßB=60cpm
111	32827 6-18 1100	33 36 42	10	HARD (5Y, 3/1) VERY DARK GRAY SILTY CLAY. TRACE SAND. TRACE GRAVEL. LOW PLASTICITY. LOW MOISTURE.	CL	>4.0		HNU = 0 α = 0 ßB = 60cpm
112	32829 6-18 1148	33 100/5in. —	6	HARD (5Y, 5/1) GRAY GRAVELLY CLAY. (GRAVEL FRAGMENTED AND ANGULAR). LOW PLASTICITY. LOW MOISTURE.	CL	>4.0		HNU = 0 α = 0 ßB = 60cpm
113								
114								
115								

NOTES.

Drilling Contractor: PENNSYLVANIA DRILLING

Drilling Equipment: CYCLONE 43

Driller: CRAIG COULTER

Asst: CHRIS COULTER

BACKGROUND
HNU = 0 ppm
α = 0 cpm
ßB = 40-50cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 6023.2.1	PROJECT NAME: FMPC RIFS		
BORING NUMBER: 4125	COORDINATES:		DATE: 6-18-90
ELEVATION:	GWL: Depth / Date/Time		DATE STARTED: 6-14-90
ENGINEER/GEOLOGIST: MGARMAN	Depth / Date/Time		DATE COMPLETED: 6-28-90
DRILLING METHODS: CABLE TOOL			PAGE 4 OF 6

DEPTH (FT)	SAMPLE (TYPE & NO.)	BLOWS ON SAMPLER PER 6 (IN.)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONTAMINANT (PPM)	WELL INSTALLATION	REMARKS
115								
116	32865 6-18 1410	50 50/5IN -	5	Hard (5y 5/2) Olive gray clay some silt, trace fine gravel, medium plasticity, low moisture.	CL	>4.0		HNU = 0 α = 0 βB = 50cpm
117								
118								
119								
120	32866 6-18 1530	15 50/3IN	5	Hard (5y 4/1) dark gray clay. Some Gravel (fine - coarse gravel predominately angular and/or freshly fragmented. low plasticity. low moisture.	CL	4.0		HNU = 0 α = 0 βB = 60cpm
121								
122								
123								
124								
125	32867 6-18 1715	50/3IN - -	3	Hard (5y 6/1) light gray gravely clay (predominatley coarse gravel) low plasticity. low moisture	CL	4.0		HNU = 0 α = 0 βB = 50cpm
126								
127								
128	32868 6-19 1105	100/2IN - -	2	very dense (5y 6/1) light gray limestone Bedrock (fractured by drilling procedures) dry	NA	NA		HNU = 0 α = 0 βB = 50cpm
129								
130				BOTTOM OF BORING @ 129.5 FT. SAMPLING ENDED @ 129.5 FT.				

NOTES.

Drilling Contractor: PENNSYLVANIA DRILLING

Drilling Equipment: CYCLONE 43

Driller: Craig Coulter

Asst.: Chris Coulter

BACKGROUND
HNU = 0 ppm
α = 0cpm
βB = 40-80cpm

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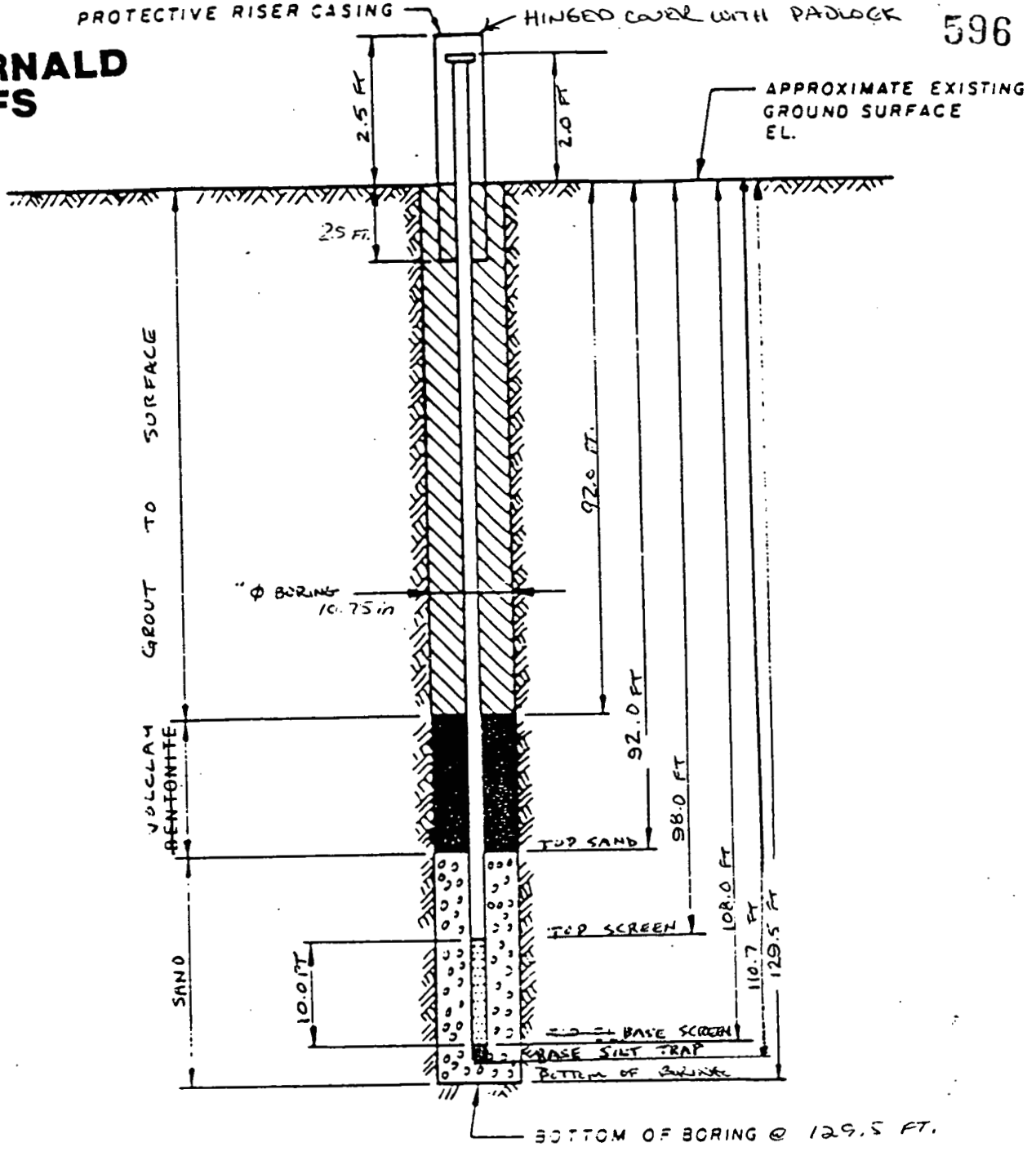
FERNALD RI/FS

DRAWING NUMBER		
CHECKED BY	APPROVED BY	
MS 6-26-90		
DRAWN BY		



NOTES:

1. RISER PIPE IS 4.0 IN I.D SCHEDULE PIPE, THREADED. FLUSH-JOINTED.
2. SCREEN IS 4.0 IN I.D SS PIPE CONTINUOUS SLOT SCREEN (0.010 IN SLOT SIZE).
3. LOWER END OF SCREEN IS CAPPED (W/ FLUSH JOINT THREADED SILT TRAP)
4. ELEVATION OF WATER LEVEL = 6.90 FT.
5. WATER LEVEL READING ON 6-28-90

MATERIALS USED DURING WELL INSTALLATION:

27 BAGS 10\20 SAND (80 LB. EACH)
25 BAGS VOLCLAY GROUT (50 LB. EACH)
3 BUCKETS BENTONITE PELLETS (5 GAL. EACH)
1 - 10 FT. SCREEN WITH 2.7 FT. FLUSH JOINT THREADED SILT TRAP AND 0.4 FT. BLANK STICK UP,
10 - 10 FT. SECTIONS OF 4.0 IN. I.D. STAINLESS STEEL RISER.

TOTAL WATER ADDED DURING DRILLING AND GROUTING = 600 GAL.

INSTALLATION DETAILS
MONITORING WELL # 4125

PREPARED FOR
FERNALD RI\FS

FERNALD RI/FS

596

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS — FIELD ENG./GEO. M.GARMAN — DATE 6-26-90
PROJECT NO. 602 3.2.1 — CHECKED BY E. Trollinger — DATE 7-2-90
BORING NO. 4125
PIEZOMETER NO 4125 — DATE OF INSTALLATION 6-28-90

BOREHOLE DRILLING

DRILLING METHOD CABLE TOOLS — TYPE OF BIT HAMMER
DRILLING FLUID(S) USED:
FLUID H₂O — FROM OFT TO 129.5 FT — CASING SIZE (S) USED: SIZE 10 IN ID FROM 0 FT TO 125.0 FT
FLUID — FROM — TO — — SIZE — FROM — TO —

PIEZOMETER DESCRIPTION

TYPE MONITORING WELL — RISER PIPE MATERIAL 316 STAINLESS STEEL
DIAMETER OF PERFORATED SECTION 4 3/8 IN. I.D. — RISER PIPE DIAMETERS:
PERFORATION TYPE: — O.D. 4 3/8 IN. I.D. 4 IN.
SLOTS ☐ HOLES ☐ SLOTTED SCREEN ☒ — LENGTH OF PIPE SECTIONS 10 FT
AVERAGE SIZE OF PERFORATIONS 0.010 IN. — JOINING METHOD THREADED - FLUSH JOINTED
TOTAL PERFORATED AREA 10.0 FT

PROTECTION SYSTEM

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

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 92.0	TOP	BOTTOM
~~BENTONITE~~ NONE USED	TOP NA	BOTTOM NA	TOP	BOTTOM
SAND 10/20 SIZE	TOP 92.0	BOTTOM 129.5 FT	TOP	BOTTOM
~~GRAVEL~~ NONE USED	TOP NA	BOTTOM NA	TOP	BOTTOM
PERFORATED SECTION	TOP ~~98.0~~ 108.0	BOTTOM 108.0	TOP	BOTTOM
PIEZOMETER TIP	110.7			
BOTTOM OF BOREHOLE	129.5			
GWL AFTER INSTALLATION	6.90 FT			

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

REMARKS — PIEZOMETER TIP SET AT BASE OF SAND AND GRAVEL (110.7 FT), BOREHOLE IN THE UNDERLYING CLAY WAS BACKFILLED W/ 10/20 SAND. - 3 BUCKETS BENTONITE USED IN AND AROUND PROTECTIVE WELL COVER.

FERNALD RI/FS

Date	7/2/90			
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: 2388	COORDINATES: N.480,483.16, E.1,381,424.85	DATE: 06-17-90
ELEVATION: 578.9 Ground	GWL: Depth 55 ft Date/Time 6-19-90/1100	DATE STARTED: 06-17-90
ENGINEER/GEOLOGIST: C. Grube	Depth Date/Time	DATE COMPLETED: 06-28-90
DRILLING METHODS: CABLE TOOL		PAGE 1 OF 5 7

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 in)	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1	32774 1415 6-17	5 10 26	15	Dense (10YR 5/4) Yellowish Brown, clayey silt trace of sand and fine to medium gravel, dry to slightly moist	ML	NA	HNU = 0 ppm α = 0-10 cpm Bγ = 90-100 cpm
2 3	32775 1420 6-17	10 32 37	14	SAA, slightly moist to moist	ML	NA	HNU = 0 ppm α = 0 cpm Bγ = 80-90 cpm
4	32776 1430 6-17	30 40 43	17	very dense (10YR 5/4) yellowish brown silty sand, wet Very dense (5Y 4/1) dark gray clayey silt, trace of fine to medium gravel, moist	SM ML	NA NA	HNU = 0.2 ppm α = 0-10 cpm Bγ = 60-70 cpm
5 6	32777 1435 6-17	40 48 50	15	SAA	ML	NA	HNU = 0 ppm α = 0 cpm Bγ = 60-70 cpm
7	32778 1445 6-17	5 10 15	10	Hard (5Y 4/1) dark gray silty clay, trace of sand and fine gravel medium plasticity, moist	CL	2.5	HNU = 0.4 ppm α = 0 cpm Bγ = 60-70 cpm
8 9	32779 0930 6-18	10 10 15	12	Hard, SAA	CL	2.75	HNU = 0.3 ppm α = 0 cpm Bγ = 60-70 cpm
10	32780 1415 6-18	3 8 16	10	SAA	CL	2.5	HNU = 0.3 ppm α = 0 cpm Bγ = 70-80 cpm
11 12	32781 1430 6-18	15 25 30	18	Firm, SAA	CL	1.75	HNU = 0.2 ppm α = 0 cpm Bγ = 75-80 cpm
13	32782 1510 6-18	5 8 18	14	SAA plus medium gravel also	CL	1.75	HNU = 0.3 ppm α = 0 cpm Bγ = 60-70 cpm
14 15	32783 1525 6-18	25 32 37	15	SAA	CL	1.50	HNU = 0.2 ppm α = 0 cpm Bγ = 70-80 cpm

NOTES:

Drilling Contractor Pennsylvania Drilling Co.

Drilling Equipment 72 Speed Star

Driller: Joseph Barile

Helper: Gary Kropps

H+S Officer: Bill Brier

HNU Serial # A01345

Samples collected per ASTM standard penetration test

Munsell color chart used for sample color identification

SAA = Same As Above

NR = No Recovery

Background Levels:
HNU = 0.2 ppm
α = 0 cpm
Bγ = 100-160 w/o lead
90-100 w/ lead

*Note Bγ readings on spoons taken within lead shelter

VISUAL CLASSIFICATION OF SOILS

596

PROJECT NUMBER: 602 3.2.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 2388	COORDINATES:	DATE: 6-18-90	
ELEVATION:	GWL: Depth 55 ft Date/Time 6-19-90/1100	DATE STARTED: 6-18-90	
ENGINEER/GEOLOGIST: C. Gruber	Depth Date/Time	DATE COMPLETED: 6-28-90	
DRILLING METHODS: CABLE TOOL		PAGE 2 OF 5 7	

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 in)	RECOVERY ( ) in	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
16	32784 1555 6-18	4 9 13	9	Firm (5Y4/1) dark gray silty clay, trace of sand and fine to medium gravel, med. plasticity, moist	CL	1.75	HNU = 0.2 ppm α = 0 cpm Bγ = 60-70 cpm
17 18	32785 1610 6-18	7 15 20	16	SAA	CL	1.25	HNU = 0.3 ppm α = 0 cpm Bγ = 60-70 cpm
19	32786 1630 6-18	7 15 17	14	SAA	CL	1.25	HNU = 0.3 ppm α = 0 cpm Bγ = 60-70 cpm
20 21	32787 1030 6-19	5 10 15	5	SAA	CL	.75	HNU = 0.4 ppm α = 0 cpm Bγ = 60-70 cpm
Bottom of Till 22	32788 1055 6-19	4 9 13	12	SAA Bottom of till at 22.5 FT	CL	1.0	HNU = 0.4 ppm α = 0 cpm Bγ = 50-60 cpm
Top of Aquifer 23	32789 1107 6-19	15 25 50	13	Very Dense (5Y4/1) to (5Y5/1) dark gray to gray well graded sand, trace of silt, dry	SW	NA	HNU = 0.4 ppm α = 0 cpm Bγ = 60-70 cpm
24 25	~~32790~~ 2 6/19/90			↓			HNU = α = Bγ =
26 27	~~32791~~ 2 6/19/90			Aquifer will be sampled every 5.0 FT starting at 30.0 FT. Once saturated zone is encountered approximately 15 FT more will be sampled			HNU = α = Bγ =
28	~~32792~~ 2 6/19/90						HNU = α = Bγ =
29 30	~~32793~~ 2 6/19/90						HNU = α = Bγ =

NOTES:

Drilling Contractor Pennsylvania Drilling Co.
Drilling Equipment 72 Speed Star
Driller: Joseph Bacile
Helper: Gary Krepps
H+S Officer: Ben Brier

HNU Serial #AO1345

Samples collected per ASTM standard penetration test
Munsell color chart used for sample Color identification
SAA = Same As Above
NR = No Recovery

Background Level:
HNU = 0.3 ppm
α = 0 cpm
Bγ = 80-160 cpm w/lead 50-100 cpm w/o lead

* Note: Bγ readings on spoons taken from within lead shelter

2438-3-86

VISUAL CLASSIFICATION OF SOILS

596

PROJECT NUMBER 602 3.2.1	PROJECT NAME FMPC RI/FS	
BORING NUMBER 2388	COORDINATES	DATE 6-19-90
ELEVATION	GWL: Depth 55ft Date/Time 6-14-90/1100	DATE STARTED 6-11-90
ENGINEER/GEOLOGIST C. Grube	Depth Date/Time	DATE COMPLETED 6-28-90
DRILLING METHODS Cable Tool		PAGE 3 OF 17

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
30	32790	25					
31	1355	40	13	Very dense (2.5Y5/2) grayish brown poorly graded sand, trace of silt and fine gravel, dry to slightly moist	SP	NA	HNU = 0.4 ppm α = 0 cpm BΔ = 80-90 cpm
	6-19	40					
32							
33							
34							
35	32791	17					
36	1415	27	14	Very dense (2.5Y5/2) grayish brown well to poorly graded sand, trace of fine gravel, dry to slightly moist	SW to SP	NA	HNU : 0.4 ppm α : 0 cpm BΔ = 50-60 cpm
	6-19	50					
37							
38							
39							
40	32792	15					
41	1510	25	15	SAA	SW to SP	NA	HNU = 0.4 ppm α = 0 cpm BΔ = 50-60 cpm
	6-19	35					
42							
43							
44							
45							

NOTES:
Drilling Contractor: Pennsylvania Drilling Co.
Drilling Equipment: 72 Speed Star
Driller: Joseph Barile
Helper: Gary Krepps
H+S Officer: Ben Brier
HNU serial # AO1345.

Samples collected per ASTM standard penetration test
Munsell color chart used for sample Color Identification
SAA = Same As Above
NR = No Recovery

Background Levels:
HNU = 0.4 ppm
α = 0 cpm
BΔ = 90-140 (1/4 load) cpm
40-90 cpm (1 load)

402-11-88

FERNALD
RI/FS

VISUAL CLASSIFICATION OF SOILS

596

PROJECT NUMBER 602 3.2.1	PROJECT NAME FMPC RI/FS		
BORING NUMBER 2398	COORDINATES	DATE 6-19-90	
ELEVATION	GWL: Depth 55 ft Date/Time 6-19-90/1100	DATE STARTED 06-17-90	
ENGINEER/GEOLOGIST C. Grube	Depth Date/Time	DATE COMPLETED 6-20-90	
DRILLING METHODS Cable Tool		PAGE 4 OF 87	

DEPTH (FT.)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
46	32793 1540 6-19	25 40 50/3	12	Very dense (2.5Y5/2) grayish brown poorly graded sand, trace of fine to coarse gravel, moist	SP	NA	HNU = 0.4 ppm α = 0 cpm BX = 40-50 cpm
47							
48							
49							
50							
51	32830 0900 6-21	25 40 50/4	12	Very Dense (2.5Y4/2) dark grayish brown poorly graded sand, trace of fine to coarse gravel, very moist	SP	NA	HNU = 0.4 ppm α = 0 cpm BX = 40-50 cpm
52							
53							
54							
55							
56	32831 1100 6-21	25 50/4	8	Very Dense (2.5Y4/2) dark grayish brown well graded gravel, some sand, (fine to coarse gravel), wet	GW	NA	HNU = 0.2 ppm α = 0 cpm BX = 40-50 cpm
57							
58							
59							
60							

NOTES
Drilling Contractor: Pennsylvania Drilling Co.
Drilling Equipment: 72 speed star
Driller: Joseph Barile
Helper: Gary Krepps
H+S Officer: Ben Brier
HNU serial # AO1345

Samples collected per ASTM standard penetration test
Munsell color chart used for sample color identification
SAA = Same As Above
NR = No Recovery

Background Levels:
HNU = 0.4 ppm
α = 0 cpm
BX = 90-190 cpm w/ 1 rod
40-100 cpm w/ 2 rod

402-11-86

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 602 3.2.1	PROJECT NAME Fernald	
BORING NUMBER 2388	COORDINATES	DATE 6-27-90
ELEVATION:	GWL: Depth 55' Date/Time 6-19-90/1100	DATE STARTED 6-17-90
ENGINEER/GEOLOGIST C. Grube/B. Nies	Depth Date/Time	DATE COMPLETED 6-28-90
DRILLING METHODS Cable Too		PAGE 5 OF 7

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in.)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
60	32832 0850 6-27	47-50/1	NR	very dense (2.5Y) dark grayish brown medium to course sand, trace silt, wet	SW	NA	2 attempts at sample 32832 - no recovery on first attempt. HNU - .2 ppm α - 0 cpm B,γ - 100 cpm
61		35,30 30	16				
62							
63							
64							
65	32833 0950 6-27	30-42 50	18	very dense (2.5Y) dark grayish brown well graded SAND, trace silt, trace f-gravel, wet	SW	NA	HNU = 0 ppm α = 0 cpm B,γ = < 100 cpm
66							
67							
68							
69							
70	32834 1022 6-27	13-13 12	3	SAA	SW	NA	HNU = 0 ppm α = 0 cpm B,γ - <100 cpm
71				Bottom of Boring 71.5' DRILLING AND SAMPLING ENDED AT 71.5 FT.			

NOTES
Pennsylvanin Drilling Co.
72 speed star
3o c Barite
Gary Kepps
H&S - Ben Brker

402-11-88

FERNALD RI/FS

596

PIEZOMETER INSTALLATION SHEET

PROJECT NAME Fernald RI/FS — FIELD ENG./GEO. B. Nies — DATE 6-28-90
PROJECT NO. 602.3.2.1 — CHECKED BY ET — DATE 7-2-90
BORING NO. 2388
PIEZOMETER NO. 2388 — DATE OF INSTALLATION 6-28-90 E.T.

BOREHOLE DRILLING

DRILLING METHOD Cable Tool	TYPE OF BIT hammer
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID H_2O FROM 0 TO 55'	SIZE 10 inch FROM 0 TO 70.0 ft
FLUID NA FROM NA TO NA	SIZE NA FROM NA TO NA

PIEZOMETER DESCRIPTION

TYPE Monitoring well	RISER PIPE MATERIAL Stainless steel
DIAMETER OF PERFORATED SECTION 4.0 in ID	RISER PIPE DIAMETERS:
PERFORATION TYPE:	O.D. 4. 3/8 inch I.D. 4.0 inch
SLOTS ☒ HOLES ☐ SCREEN ☐	LENGTH OF PIPE SECTIONS 10 & 5 ft
AVERAGE SIZE OF PERFORATIONS 0.02 inch	JOINING METHOD flush, threaded
TOTAL PERFORATED AREA 15.0FT.	Screw type.

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5.0 ft	OTHER PROTECTION locking CAP with
PROTECTIVE PIPE O.D. 10.75 E.T. 4.0 inch	padlock.

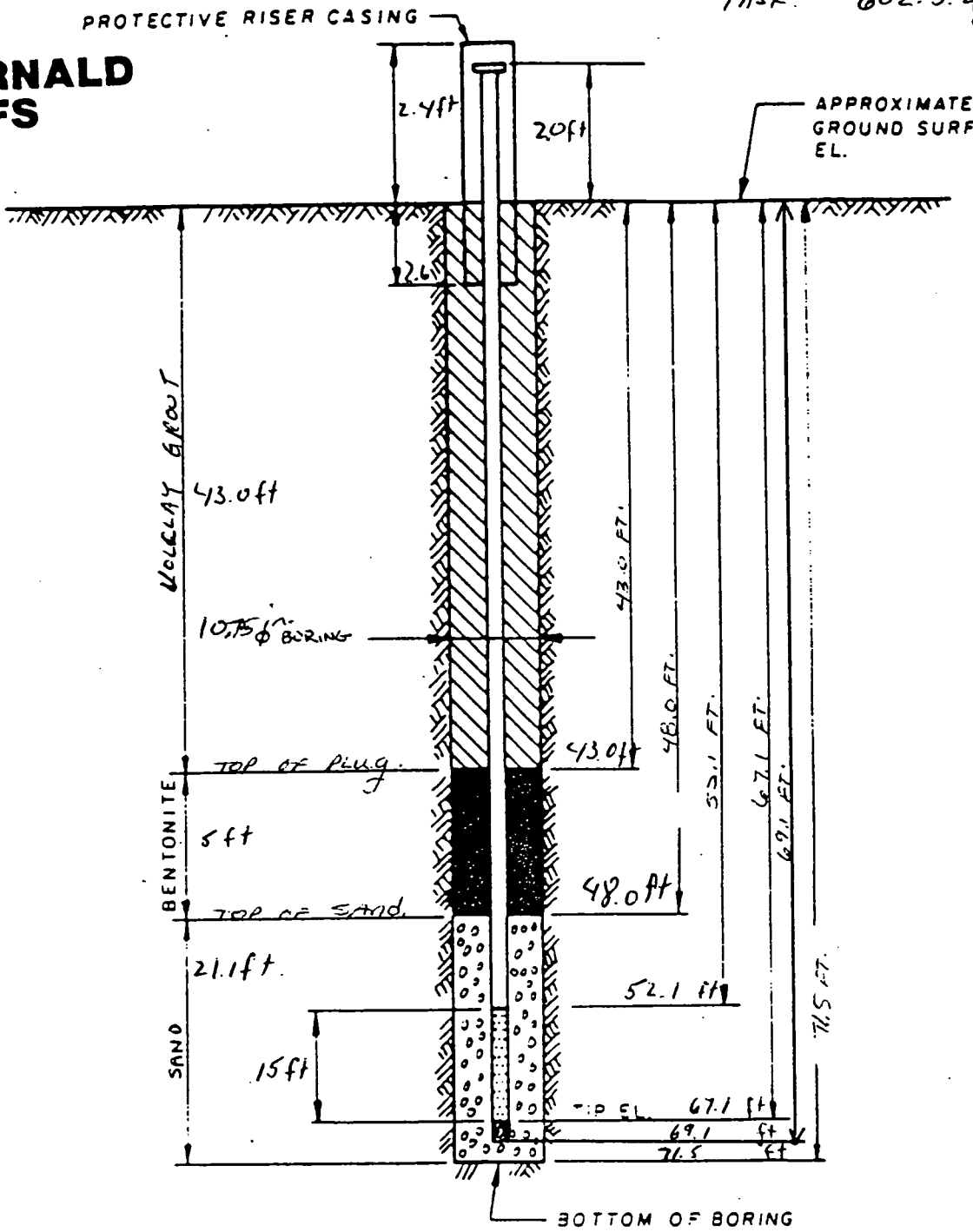
ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION ( )	
TOP OF RISER PIPE	+2.0			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	2.6			
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 0.0	BOTTOM 43.0'	TOP	BOTTOM
BENTONITE	TOP 43.0	BOTTOM 48.0	TOP	BOTTOM
SAND	TOP ~~43.0~~	BOTTOM ~~48.0~~	TOP	BOTTOM
GRAVEL	TOP 48.0	BOTTOM 52.1	TOP	BOTTOM
PERFORATED SECTION	TOP 52.6	BOTTOM 67.6	TOP	BOTTOM
PIEZOMETER TIP	69.6'			
BOTTOM OF BOREHOLE	71.5'			
GWL AFTER INSTALLATION	NR			

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

REMARKS water level at 53.8 ft before installation
water level during installation was 55.0 ft

FERNALD RI/FS

DRAWING NUMBER | CHECKED BY / APPROVED BY | DRAWN BY



NOTES:

1. RISER PIPE IS 4 IN I.D. ~~SCHEDULE~~ 316 stainless steel PIPE, THREADED. FLUSH-JOINTED
2. SCREEN IS 4 IN I.D 316 PIPE CONTINUOUS stainless steel SLOT SCREEN (0.010 IN. SLOT SIZE).
3. LOWER END OF SCREEN IS ~~CAPPED~~ welded SILT TRAP 20 FT sump.
4. ELEVATION OF WATER LEVEL 55.0 ft
5. WATER LEVEL READING ON 6-19-90 & 6-28-90

INSTALLATION DETAILS
MONITORING WELL 2388

PREPARED FOR
MW-2388
FMPC RI/FS

Materials Used:

Sand type & Quantity: 1020/15 bags
Bentonite: 5 buckets
Bags Volclay: 10 + 10 bag initiator
cement: 2 bags
water used: 800 gal

- 1 protective stand pipe
- 1 lock

pipe - S.S. screen 15.0 ft w/ 2.0 sump.
- S.S. pipe 5 - 10 ft sections

25

FERNALD
RI/FS

Date	4/29/90			
Initial	E.T.		586	
	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: 2390 | COORDINATES: N.476,548.05, E.1,379,876.50 | DATE: 5-23-90
ELEVATION: 567.6 GROUND | GWL: Depth / Date/Time | DATE STARTED: 5-23-90
ENGINEER/GEOLOGIST: M. GARMAN | Depth / Date/Time | DATE COMPLETED: 6-1-90
DRILLING METHODS: CABLE TOOL | PAGE 1 OF 7

DEPTH (FT.)	SAMPLE (TYPE & NO.)	BLOWS ON SAMPLER (PER 6 IN.)	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED CONTAMINANT (PPM)	NA WELL CONSTRUCTION	REMARKS
1	32610 5-23 1534	3 5 9	9	HARD (10YR, 5/4) YELLOWISH BROWN SILTY CLAY. LOW PLASTICITY. LOW MOISTURE.	CL	3.75		HNU = 0 α = 0 βB = 100 cpm
2	32611 5-23 1539	3 6 5	8	MEDIUM DENSE (10YR, 5/3) BROWN CLAYEY SILT. TRACE GRAVEL. LOW MOISTURE.	ML	NA		HNU = 0 α = 0 βB = 100 cpm
3 4	32612 5-23 1541	6 11 8	17	MEDIUM DENSE (10YR, 5/3) BROWN CLAYEY SILT. TRACE SAND. TRACE GRAVEL. LOW MOISTURE.	ML	NA		HNU = 0 α = 0 βB = 80 cpm
5 6	32613 5-23 1544	8 9 12	18	MEDIUM DENSE (10YR, 5/3) BROWN SANDY SILT. (TOP 9 IN.) (10YR, 5/3) BROWN CLAYEY SILT (BOTTOM 9 IN.). LOW MOISTURE.	ML	NA		HNU = 0 α = 0 βB = 90 cpm
7	32614 5-23 1546	12 12 4	18	MEDIUM DENSE (10YR, 5/3) BROWN SANDY SILT. MOIST. (TOP 10 IN.) (10YR, 5/3) BROWN CLAYEY SILT. LOW MOISTURE. (BOTTOM 8 IN.)	ML	NA		HNU = 0 α = 0 βB = 90 cpm
8 9	32615 5-23 1550	12 12 8	16	HARD (10YR, 5/2) GRAYISH BROWN SILTY CLAY. TRACE GRAVEL. LOW PLASTICITY. LOW MOISTURE.	CL	2.5		HNU = 0 α = 0 βB = 80 cpm
10	32616 5-24 0901	5 9 7	1	MEDIUM DENSE (10YR, 5/3) BROWN CLAYEY SILT. SOME GRAVEL. LOW MOISTURE.	ML	NA		HNU = 0 α = 0 βB = 80 cpm
11 12	32617 5-24 0908	8 12 10	14	HARD (5Y, 4/1) DARK GRAY CLAY. SOME SILT. TRACE GRAVEL. LOW TO MEDIUM PLASTICITY. LOW MOISTURE.	CL	2.75		HNU = 0 α = 0 βB = 80 cpm
13	32618 5-24 0915	13 18 12	10	HARD (5Y, 4/1) DARK GRAY CLAY. SOME SILT. TRACE GRAVEL. LOW TO MEDIUM PLASTICITY. LOW MOISTURE.	CL	2.75		HNU = 0 α = 0 βB = 70 cpm
END OF TILL 14	32794 5-24 0944	16 33 36	16	(6 IN.) HARD (10YR, 5/4) YELLOWISH BROWN CLAY. SOME SILT. TRACE GRAVEL. LOW MOISTURE. (10 IN.) VERY DENSE (10YR, 5/2) GRAYISH BROWN WELL GRADED SANDY GRAVEL. SOME SILT. LOW MOISTURE.	CL / GW	2.5 / NA		HNU = 0 α = 0 βB = 80 cpm
15								

NOTES.
Drilling Contractor: PENNSYLVANIA DRILLING
Drilling Equipment: CYCLONE 43
Driller: CRAIG COULTER
Asst.: CHRIS COULTER

BACKGROUND:
HNU = 0
α = 0
βB = 40-100 cpm

FERNALD
RI/FS

596

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 2390	COORDINATES:		DATE: 5-24-90
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 5-23-90
ENGINEER/GEOLOGIST: M. GARMAN	Depth	Date/Time	DATE COMPLETED: 6-1-90
DRILLING METHODS: CABLE TOOL			PAGE 2 OF 7

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED GROUNDWATER ELEVATION	NA WELL CONSTRUCTION	REMARKS
16	32795 5-24 0950	8 14 23	13	DENSE (10YR, 5/4) YELLOWISH BROWN. WELL GRADED SAND. TRACE SILT. LOW MOISTURE.	SW	NA		HNU = 0 ∝ = 0 BB = 80 cpm
17								HNU = ∝ = N/A BB =
18								
19								
20	32796 5-24 1100	8 13 18	10	DENSE (10YR, 4/6) DARK YELLOWISH BROWN SILTY SAND (FINE TO COARSE GRAINED). LOW MOISTURE.	SM	NA		HNU = 0 ∝ = 0 BB = 90 cpm
22								
23								
24								
25	32797 5-30 0920	31 50/4in	10	VERY DENSE (10YR, 4/3) BROWN SILTY WELL GRADED SAND. ~~LOW~~ TRACE GRAVEL. LOW MOISTURE.	SM	NA		HNU = 0 ∝ = 0 BB = 60 cpm
27								
28								
29								
30								

NOTES.

Drilling Contractor: PENNSYLVANIA DRILLING

Drilling Equipment: CYCLONE 43

Driller: CRAIG COULTER

ASST: CHRIS COULTER

BACKGROUND

HNU = 0

∝ = 0

BB = 40 - 100 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2.1	PROJECT NAME:		
BORING NUMBER: 2390	COORDINATES:		DATE: 5-30-90
ELEVATION:	GWL: Depth 45.0 FT Date/Time 5-30/1710		DATE STARTED: 5-23-90
ENGINEER/GEOLOGIST M. GARMAN	Depth	Date/Time	DATE COMPLETED: 6-1-90
DRILLING METHODS: CABLE TOOL			PAGE 3 OF 7

DEPTH (FT)	SAMPLE (TYPE & NO.)	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED RADIOACTIVITY (cpm)	NA WELL CONSTRUCTION	REMARKS
30	32798	11		VERY DENSE (10YR, 5/4) YELLOWISH BROWN MEDIUM GRAINED SAND. SOME SILT TRACE GRAVEL. LOW MOISTURE.	SP	NA		HNU = 0 α = 0 βB = 60 cpm
31	5-30 0945	20 33	15					
32								
33								
34								
35	32799	41		VERY DENSE (10YR, 5/3) BROWN WELL GRADED SAND. SOME SILT. LOW MOISTURE.	SW	NA		HNU = 0 α = 0 βB = 60 cpm
36	5-30 1045	50/4in	10					
37								
38								
39								
40	32800	19		DENSE (10YR, 5/3) BROWN WELL GRADED SAND. TRACE GRAVEL. TRACE SILT. LOW MOISTURE.	SW	NA		HNU = 0 α = 0 βB = 60 cpm
41	5-30 1110	19 25	16					
42								
43								
44								
45								

NOTES.

Drilling Contractor PENNSYLVANIA DRILLING

Drilling Equipment CYCLONE 43

Driller: CRAIG COULTER

Asst: CARLS COULTER

BACKGROUND:

HNU = 0 ppm

α = 0 cpm

βB = 40-100 cpm

FERNALD
RI/FS

596

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2.1	PROJECT NAME: FMPC RI\FS		
BORING NUMBER: 2390	COORDINATES:		DATE: 5-30-90
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 5-25-90
ENGINEER/GEOLOGIST: A. GARMAN	Depth	Date/Time	DATE COMPLETED: 6-1-90
DRILLING METHODS: CABLE TOOL			PAGE 4 OF 7

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED [illegible] (ppm)	NA WELL CONSTRUCTION	REMARKS
45	32801	16		VERY DENSE (10YR, 5/3) BROWN WELL GRADED SAND. SOME GRAVEL. TRACE SILT. WET.	SW	NA		HNU = 0
	5-30	23	18					α = 0
46	1358	48						BB = 80 cpm
47								
48								
49								
50	32802	16		DENSE (10YR, 4/2) DARK GRAYISH BROWN WELL GRADED SAND. SOME GRAVEL. SOME SILT. WET.				HNU = 0
	5-30	18	18		SW	NA		α = 0
51	1430	19						BB = 80 cpm
52								
53								
54								
55	32803	16		VERY DENSE (10YR, 5/3) BROWN WELL GRADED SAND. SOME SILT. TRACE GRAVEL. WET.				HNU = 0
	5-30	22	18		SW	NA		α = 0
56	1520	32						BB = 60 cpm
57								
58								
59								
60								

NOTES.

Drilling Contractor: PENNSYLVANIA DRILLING

Drilling Equipment: CYCLONE 43

Driller: CRAIG COULTER

Asst: CHRIS COULTER

BACKGROUND:

HNU = 0 ppm

α = 0 cpm

BB = 40-80 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 2390	COORDINATES:		DATE: 5-30-90
ELEVATION:	GWL: Depth 41.0FT Date/Time 6-30/1715		DATE STARTED: 5-23-90
ENGINEER/GEOLOGIST: M. GARMAN	Depth	Date/Time	DATE COMPLETED: 6-1-90
DRILLING METHODS: CABLE TOOL			PAGE 5 OF 7

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED RADIOACTIVITY (cpm)	NA WELL CONSTRUCTION	REMARKS
60	32804	17		DENSE (10YR, 5/2) GRAYISH BROWN WELL GRADED SAND. TRACE SILT. WET.	SW	NA		HNU = 0
61	5-30	19	18					∠ = 0
	1555	20						γB = 60 cpm
62								
63								
64								
65	32805	15		DENSE (10YR, 5/2) GRAYISH BROWN, WELL GRADED SAND. TRACE SILT. WET.				HNU = 0
66	5-30	18	17		SW	NA		∠ = 0
	1705	21						γB = 60 cpm
				SAMPLING ENDED @ 66.5 FT. BOTTOM OF BORING @ 66.5 FT.				

NOTES.

Drilling Contractor: PENNSYLVANIA DRILLING

Drilling Equipment: CYCLONE 43

Driller: CRAIG COULTER

Asst.: CHRIS COULTER

BACKGROUND:

HNU = 0 ppm

∠ = 0 cpm

γB = 40-80 cpm

FERNALD RI/FS

596

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FERNALD RI/FS — FIELD ENG./GEO. M. GARMAN — DATE 5-31-90
PROJECT NO. 602.3.2.1 — CHECKED BY E. Trollinger — DATE 6-19-90
BORING NO. 2390
PIEZOMETER NO. 2390 — DATE OF INSTALLATION 6-1-90

BOREHOLE DRILLING

DRILLING METHOD CABLE TOOLS — TYPE OF BIT HAMMER
DRILLING FLUID (S) USED:
FLUID WATER FROM 0 TO 66.5 FT — CASING SIZE (S) USED:
FLUID NA ~~FROM~~ ~~TO~~ → — SIZE 10.0 IN. I.D. FROM 0 TO 65.0 FT
SIZE NA ~~FROM~~ ~~TO~~ →

PIEZOMETER DESCRIPTION

TYPE MONITOR WELL — RISER PIPE MATERIAL 316 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 10.0 FT, 2.0 FT
AVERAGE SIZE OF PERFORATIONS 0.01 IN. — JOINING METHOD FLUSH JOINT
TOTAL PERFORATED AREA 15.0 FT. — THREADED

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5.0 FT — OTHER PROTECTION HINGED LOCKING
PROTECTIVE PIPE O.D. 10 3/4 IN — COVER WITH PADLOCK

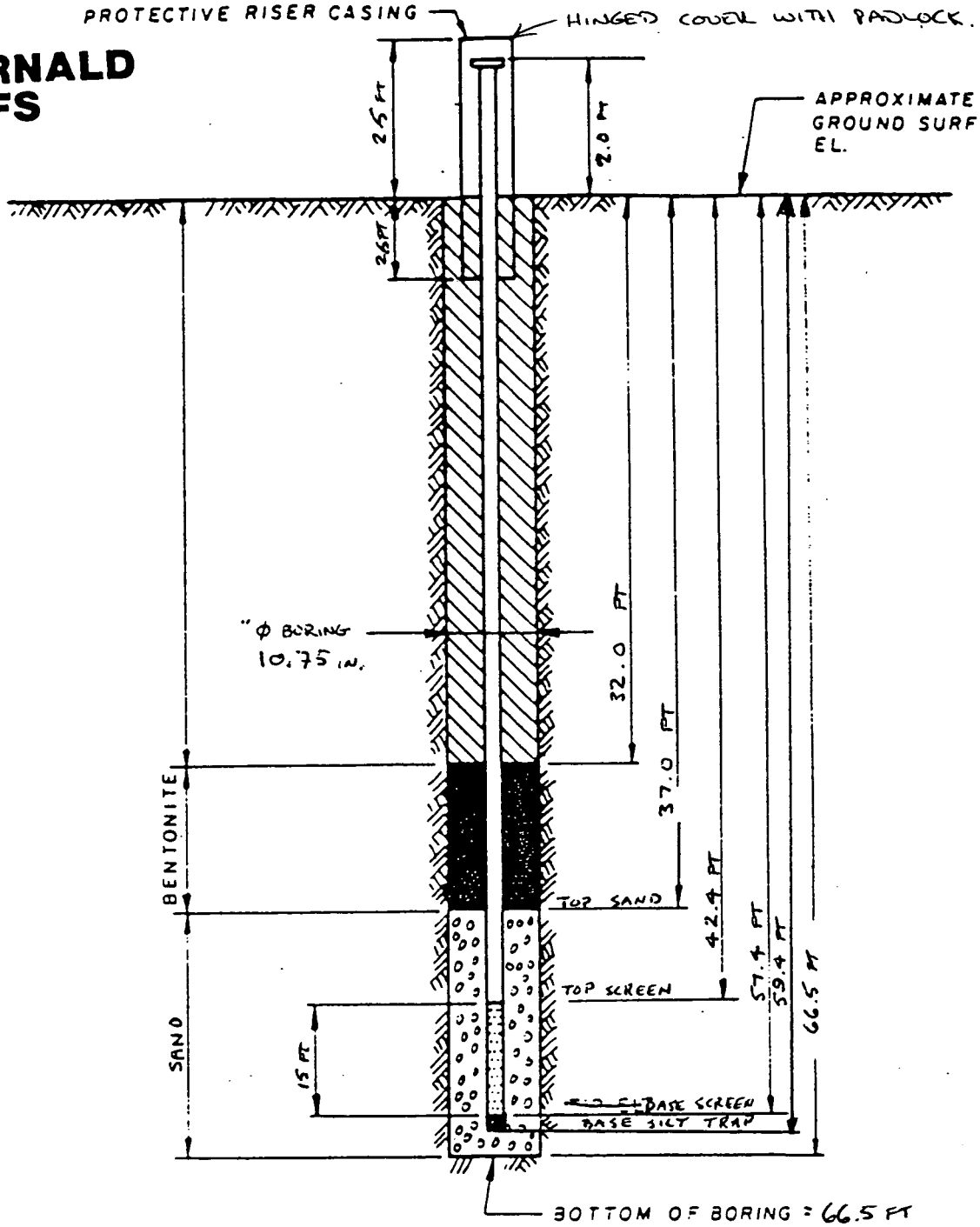
ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (FT)		ELEVATION (FT.) E.T. 6/28/90	
TOP OF RISER PIPE	2.0		569.6	
GROUND SURFACE	0.0		567.6	
BOTTOM OF PROTECTIVE PIPE	2.5		565.1	
BOREHOLE FILL MATERIALS:				
Volcany GROUT / ~~SLURRY~~ EI	TOP 0.0	BOTTOM 32.0	TOP 567.6	BOTTOM 535.6
BENTONITE PELLETS	TOP 32.0	BOTTOM 37.0	TOP 535.6	BOTTOM 530.6
SAND 10/20 SIZE	TOP 37.0	BOTTOM 66.5	TOP 530.6	BOTTOM 501.1
GRAVEL NONE USED	TOP NA	BOTTOM NA	TOP N/A	BOTTOM NA
PERFORATED SECTION	TOP 42.4	BOTTOM 57.4	TOP 525.2	BOTTOM 510.2
PIEZOMETER TIP	59.4			
BOTTOM OF BOREHOLE	66.5			
GWL AFTER INSTALLATION	43.5			

WAS THE PIEZOMETER FLUSHED AFTER INSTALLATION? YES ☐ NO ☒
WAS A SENSITIVITY TEST PERFORMED ON THE PIEZOMETER? YES ☐ NO ☒
REMARKS 1 BUCKET BENTONITE USED IN AND AROUND PROTECTIVE WELL COVER.

DRAWING NUMBER		
CHECKED BY	APPROVED BY	
MG	5-31-90	
DRAWN BY		

FERNALD RI/FS

596



NOTES:

1. RISER PIPE IS 4.0 IN I.D. SCHEDULE PIPE, THREADED. FLUSH-JOINTED.
2. SCREEN IS 4.0 IN I.D SS PIPE CONTINUOUS SLOT SCREEN (0.010 IN SLOT SIZE).
3. LOWER END OF SCREEN IS CAPPED (W/ WELDED SILT TRAP)
4. ELEVATION OF WATER LEVEL 43.5 FT
5. WATER LEVEL READING ON 6-1-90

MATERIALS USED DURING WELL INSTALLATION:

20 BAGS 10/20 SAND (80 LB EACH)
6 BUCKETS BENTONITE PELLETS (5 GAL. EACH)
9 BAGS VOLCLAY GROUT (50 LB. EACH)
1 - 15 FT. SCREEN WITH 2 FT. SILT TRAP AND 0.4 FT. BLANK STICK-UP, 4 - 10 FT. SECTIONS, 2 - 10 FT. SECTIONS OF 4.0 IN. I.D. STAINLESS STEEL RISER.

INSTALLATION DETAILS
MONITORING WELL #2390

PREPARED FOR
FERNALD RI/FS

TOTAL WATER ADDED TO BORING DURING DRILLING AND GROUTING = 500 gal.

FERNALD
RI/FS

VISUAL CLASSIFICATION OF SOILS

Date	6/26/90			
Initial	ET		595	
#	Field Check	Lead Key In	2nd Key In	Hard Copy Verification

PROJECT NUMBER: 602 3.2.1	PROJECT NAME: FMPC RI/FS	
BORING NUMBER: 2033	COORDINATES: N 480,411.1, E 1,378,687.33	DATE: 05-31-90
ELEVATION: 577.0 GROUND	GWL: Depth Date/Time	DATE STARTED: 05-31-90
ENGINEER/GEOLOGIST: C. Grube	Depth Date/Time	DATE COMPLETED: 06-14-90
DRILLING METHODS: CABLE TOOL		PAGE 1 OF 7

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 in)	RECOVERY ( ) in	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1				For soil classification and description of first 21.0FT, refer to Visual Classification of Soils for MW#1033			
2							
3				Sampling and describing of soil samples begins on 2033 from 21.0 FT			
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

NOTES:

Drilling Contractor: Pennsylvania Drilling Co.
Drilling Equipment: 72 Speed Star
Driller: Joseph Barile
Helper: Gary Krepps
H+S Officer: Ben Brier

HNU serial # 002221

Samples collected per ASTM standard penetration test — Munsell color chart used for sample Color identification

SAA = Same As Above
NR = No Recovery

Background Levels:
HNU = 0 ppm
α = 0 cpm
$B\gamma$ = 1000-1500 cpm

2438-3-86

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.2.1	PROJECT NAME: FMPC RI/FS	
BORING NUMBER: 2033	COORDINATES:	DATE: 05-31-90
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 05-31-90
ENGINEER/GEOLOGIST: C. Grube	Depth Date/Time	DATE COMPLETED: 06-14-90
DRILLING METHODS: CABLE TOOL		PAGE 2 OF 7

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 in)	RECOVERY ( )in	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
~~15~~ 16 17 18 19 20				See page 1			
21 22	32759 1535 05-31	7 14 15	5	Hard (5Y 4/1) dark gray sandy clay, trace of fine to coarse gravel, low plasticity, moist	CL	2.0	HNU = 0.2 ppm α = 0 cpm Bβ = 220-240 cpm
23 24	32760 1600 05-31	5 7 9	6	Firm (5Y 4/1) dark gray silty clay, trace of sand and fine to medium gravel, medium plasticity, moist	CL	1.75	HNU = 0.2 ppm α = 0 cpm Bβ = 190-200 cpm
25 ~~26~~	32761 1035 06-05 ~~05-31~~	10 50 32	6	Firm (5Y 4/1) dark gray silty clay, some sand, trace of fine to coarse gravel, low plasticity, very moist	CL	.75	HNU = 1.0 ppm α = 0 cpm Bβ = 190-200 cpm
26 27	32762 1100 06-05	32 27 30	9	Very hard (5Y 4/1) dark gray silty clay, trace of sand trace of fine to medium gravel, medium plasticity moist	CL	4.5	HNU = 1.0 ppm α = ~~0 cpm~~ 05/31/90 Bβ = 200-220 cpm
28	32763 1108 06-05	6 15 22	6	Very hard (5Y 4/1) dark gray silty clay, trace of sand, trace of fine to coarse gravel, low plasticity, moist	CL	>4.5	HNU = 1.0 ppm α = 0 cpm Bβ = 220-240 cpm
29 ~~30~~	32764 1400 06-05	4 12 18	7	Firm (5Y 4/1) dark gray silty clay, some fine to coarse gravel, trace of sand, low plasticity, moist Bottom of TH 29.7 FT medium dense (10 5Y 5/4) light olive brown fine grained poorly graded sand, trace of silt, dry	CL SP	1.0 NA	HNU = 1.2 ppm α = 0 cpm Bβ = 230-240 cpm

Bottom of TH 29.7 FT
Top of aquifer 30

NOTES:

Drilling Contractor Pennsylvania Drilling Co.
Drilling Equipment 72 Speed Star
Driller: Joseph Barile
Helper: Gary Krepps
H+S Officer: Ben Brier

SAA = Same As Above
NR = No Recovery

Background Levels:
HNU = 0.2 ppm
α = 0 cpm
Bβ = 1000-1500 cpm
Bβ = 200-300 cpm w/ lead brick

HNU Serial # 002221 on 5/31/90 HNU # A01345 on 6-5-90

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 602.32.1	PROJECT NAME FMPC RI/FS	
BORING NUMBER 2033	COORDINATES	DATE 06-05-90
ELEVATION	GWL: Depth Date/Time	DATE STARTED 05-31-90
ENGINEER/GEOLOGIST C. Grube	Depth Date/Time	DATE COMPLETED 06-14-90
DRILLING METHODS Cable Tool		PAGE 3 OF 7

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 in	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	MEASURED RADIOACTIVITY (TSF)	REMARKS
30				Top of aquifer at 29.7 FT Aquifer will be sampled every 5.0 FT after 30.0 FT. Once saturated zone is encountered 15 or more feet will be sampled ↓			
31							
32							
33							
34							
35	32765	10		Dense (10YR 5/4) yellowish brown well to poorly graded sand, trace of silt and fine to medium grained moist	SW to SP	NA	HNU = 10 ppm α = 0 cpm Bβ = 200-220 cpm
36	1435	14	12				
	0605	18					
37							
38							
39							
40	32766	15		very dense (2.5Y 5/4) light olive brown to (2.5Y 6/4) light yellowish brown poorly graded to silty sand, trace of fine gravel, moist	SP to SM	NA	HNU = 1.0 ppm α = 0 cpm Bβ = 180-200 cpm
41	1455	45	18				
	06-05	45					
42							
43							
44							
45							

NOTES:
Drilling Contractor: Pennsylvania Drilling Co.
Drilling Equipment: 72 Speedstar
Driller: Joseph Barile
Helper: Gary Krepps
H+S Officer: Ben Brier
HNU Serial # AQ1345

SAA = Same As Above
NR = No Recovery

Background Levels:
HNU = 1.0 ppm
α = 0 cpm
Bβ = 200-250 cpm w/lead
1000-1500 cpm w/o lead

402-11-86

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 602 3.2.1	PROJECT NAME FMPC RI/FS	
BORING NUMBER 2033	COORDINATES	DATE 06-05-90
ELEVATION	GWL: Depth Date/Time	DATE STARTED 05-31-90
ENGINEER/GEOLOGIST C. Grube	Depth Date/Time	DATE COMPLETED 06-14-90
DRILLING METHODS Cable Tool		PAGE 4 OF 7

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 in)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
45	32767	35	10	Very Dense (2.5Y 6/4) light yellowish brown silty to gravelly well graded sand, dry to slightly moist	SM to SW	NA	HNU = 0.6 ppm α = 0 cpm Bγ = 220-230 cpm
46	1600	50/4					
	06-05						
47							
48							
49							
50	32768	18	12	very dense (10 YR 5/4) yellowish brown, well to poorly graded sand, trace of fine to medium gravel, very moist	SW to SP	NA	HNU = 0.2 ppm α = 0 cpm Bγ = 200-220 cpm
51	0955	25					
	06-07	45					
52							
53							
54							
55	32769	3	8	medium dense (10YR 4/4) dark yellowish brown poorly graded sand, trace of silt and fine gravel, wet	SP	NA	HNU = 0.2 ppm α = 0 cpm Bγ = 190-200 cpm
56	1100	8					
	06-07	20					
57 Sample							
58							
58							
59							
60							

NOTES: Drilling Contractor: Pennsylvania Drilling Co
Drilling Equipment: 72 Speedstar
Driller: Joseph Barile
Helper: Gary Krepps
H_2S Officer: Ben Brice

HNU serial # A01345

SAA = Same As Above
NR = No Recovery

Background levels:
HNU = 1.0 ppm
α = 0 cpm
Bγ = 170-230 cpm w/ lead
1000-1500 cpm w/o lead

402-11-86

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER 6023.2.1	PROJECT NAME FMPC RI/FS	
BORING NUMBER 2039	COORDINATES	DATE 06-12-90
ELEVATION:	GWL: Depth Date/Time	DATE STARTED 05-31-90
ENGINEER/GEOLOGIST C. Grube	Depth Date/Time	DATE COMPLETED: 06-14-90
DRILLING METHODS Cable Tool		PAGE 5 OF 7

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED (TSF)	REMARKS
60	32770 1015 06-12	6 9 15	11	medium dense (10YR 5/4) yellowish brown silty to poorly graded sand, trace of fine gravel, wet	SM to SP	NA	HNU = 0.4 ppm α = 0 cpm Bβ = 200-220 cpm
61							
62							
63							
64							
65	32771 1120 06-12	20 50/4	14	Very Dense (2.5 Y 5/4) light olive brown poorly to well graded sand, trace of fine to medium gravel wet	SP to SW	NA	HNU = 0.2 ppm α = 0 cpm Bβ = 160-170 cpm
66							
67							
68							
69							
70	32772 1555 06-12	10 20 35	10	Very dense (2.5 Y 5/4) light olive brown well graded sand, trace of fine to coarse gravel, wet	SW	NA	HNU = 0.4 ppm α = 0 cpm Bβ = 180-200 cpm
71							
72				Bottom of sampling at 71.5 FT Bottom of Borehole at 70.0 FT			
73							
74							
75							

NOTES:
Drilling contractor: Pennsylvania Drilling Co.
Drilling equipment: 72 speedstar
Driller: Joseph Barile
Helper: Gary Kropps
H+S officer: Ben Brier
HNU serial # A0138 5 EB 4/12/90

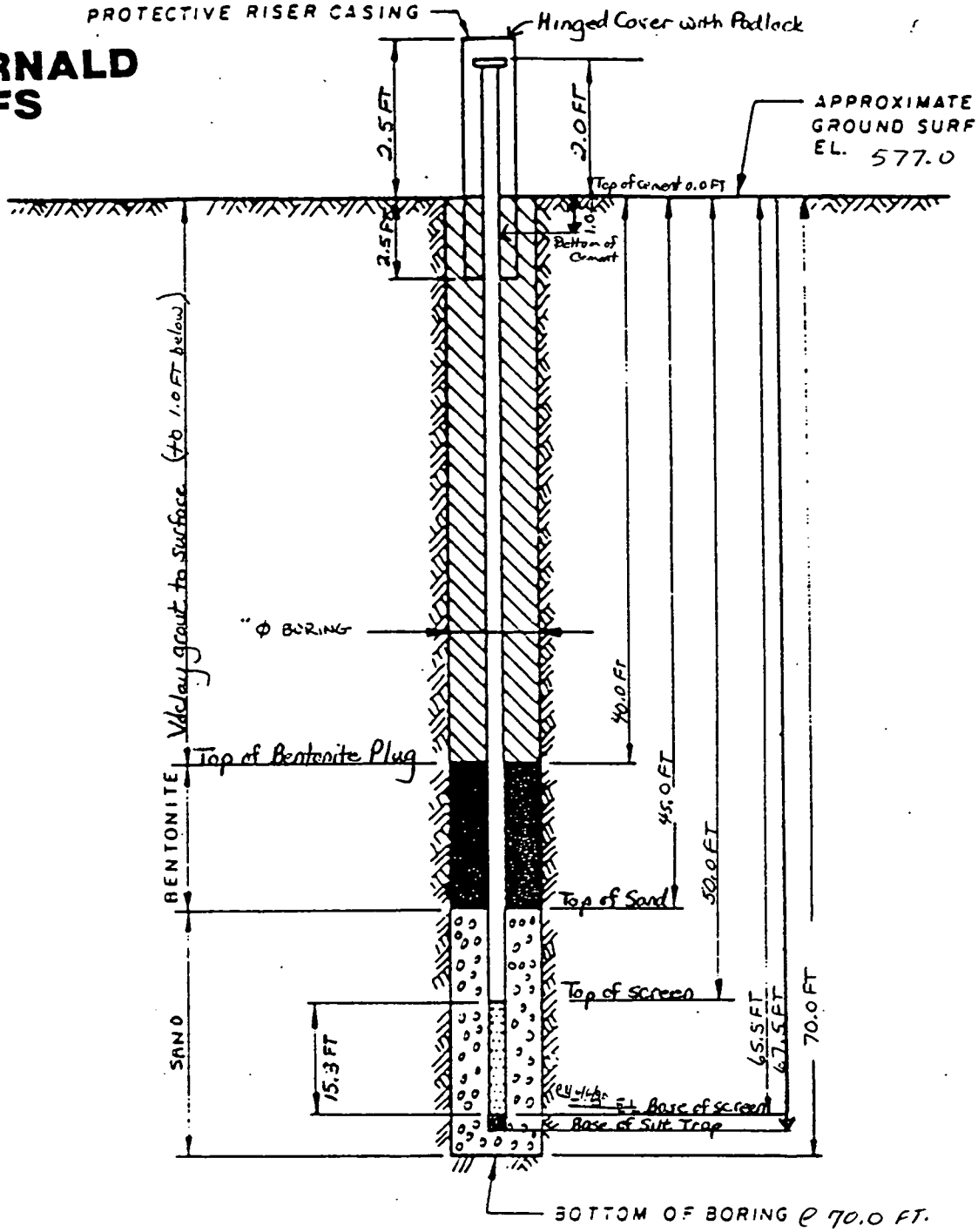
SAA = Same As Above
NR = No Recovery

Background levels:
HNU = 0.4 ppm
α = 0 cpm
Bβ = 160-250 cpm w/ rod
800-1400 cpm w/ bead

402-11-88

596

FERNALD RI/FS



DRAWING NUMBER

DRAWN BY	CHECKED BY	APPROVED BY
CG 6-15-90		

NOTES:

1. RISER PIPE IS 4.0 IN I.D. SCHEDULE PIPE, THREADED. FLUSH-JOINTED.
2. SCREEN IS 4 IN I.D S.S. PIPE CONTINUOUS SLOT SCREEN (0.010 IN SLOT SIZE).
3. LOWER END OF SCREEN IS CAPPED (w/welded silt trap)
4. ELEVATION OF WATER LEVEL 57.25 FT – From top of stainless)
5. WATER LEVEL READING ON 06-15-90

Materials used during well installation:

Sacks 10/20 sand (80 lb each) – 17
Sacks Volclay grout (50 lb each) – 10
Buckets Bentonite Pellets (5 gal. each) – 8
1 – 15.5 FT screen with 2.0 FT welded silt trap (0.5 of screen length is blank stick-up)
5 – 10 FT risers
1 – 2 FT riser

INSTALLATION DETAILS
MONITORING WELL # 2033

PREPARED FOR
Fernald RI/FS

Total water added during drilling and grouting = 600 gal

FERNALD
RI/FS

596

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS — FIELD ENG./GEO. C. Gruber — DATE 06-14-90 (14 E.T.)
PROJECT NO. 602 3.2.1 — CHECKED BY E.T. — DATE 6/28/90
BORING NO. 2033
PIEZOMETER NO. 2033 — DATE OF INSTALLATION 06-14-90

BOREHOLE DRILLING

DRILLING METHOD Cable Tool — TYPE OF BIT Hammer
DRILLING FLUID (S) USED:
FLUID Water FROM 0.0 FT TO —
FLUID NA FROM — TO —
CASING SIZE (S) USED:
SIZE 10.0 in ID FROM 0.0 FT TO 70.0 FT
SIZE NA FROM — TO —

PIEZOMETER DESCRIPTION

TYPE Monitor Well — RISER PIPE MATERIAL 316 Stainless Steel
DIAMETER OF PERFORATED SECTION 4.0 in ID — RISER PIPE DIAMETERS:
PERFORATION TYPE: O.D. 4 3/8 in I.D. 4.0 in
SLOTS ☒ HOLES ☐ SCREEN ☐ — LENGTH OF PIPE SECTIONS 5-10.0 FT; 1-2 FT
AVERAGE SIZE OF PERFORATIONS 0.010 in — JOINING METHOD Threaded, flush jointed
TOTAL PERFORATED AREA 15.0 FT

PROTECTION SYSTEM

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

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (FT)		ELEVATION (FT) E.T. 6/28/90	
TOP OF RISER PIPE	2.0		579.0	
GROUND SURFACE	0.0		577.0	
BOTTOM OF PROTECTIVE PIPE	2.5		574.5	
BOREHOLE FILL MATERIALS:	Top 0.0	Bottom 1.0		
CEMENT GROUT/SLURRY	TOP 1.0	BOTTOM 40.0	TOP 576.0	BOTTOM 537.0
BENTONITE PELLETS	TOP ~~40.0~~ E.T. 6/28/90 40.0	BOTTOM 45	TOP 537.0	BOTTOM 532.0
SAND 10/20 SIZE	TOP 45	BOTTOM ~~50~~ E.T. 6/28/90 70.0	TOP 532.0	BOTTOM 517.0
GRAVEL (None used)	TOP NA	BOTTOM NA	TOP N/A	BOTTOM N/A
PERFORATED SECTION	TOP 50	BOTTOM 65.5 FT	TOP 527.0	BOTTOM 511.5
PIEZOMETER TIP	67.5			
BOTTOM OF BOREHOLE	70.0			
GWL AFTER INSTALLATION	57.25 TOP OF RISER			

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

FERNALD
RI/FS

Date	4/28/93		
Initials	E.T.		596
	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: 3387	COORDINATES: N.477,117.3, E.1,350,451.65	DATE: 6-2-90	
ELEVATION: 570.0 Ground	GWL: Depth / Date/Time	DATE STARTED: 6-2-90	
ENGINEER/GEOLOGIST: M. GARMAN	Depth / Date/Time	DATE COMPLETED: 6-13-90	
DRILLING METHODS: CABLE TOOL		PAGE 1 OF 8	

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 1 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONTAMINANCY (PPM)	N/A WELL CONSTRUCTION	REMARKS
0				SEE VISUAL CLASIFICATION LOGS FOR MONITOR WELL 2387 (0.0 - 66.5 FT)				
5								
10								
15				15.0 FT - END OF FILL				
20								
25								
30								
35								
40								
45				▼ 45.92 FT				
50								
55								
60								
65								
70								

NOTES.

Drilling Contractor: PENNSYLVANIA DRILLING

Drilling Equipment: CYCLONE 43

Driller: CRAIG COULTER

Asst. CHRIS COULTER

BACKGROUND:
HNU = 0 ppm
∝ = 0 cpm
βB = 60 cpm

FERNALD
RI/FS

596

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2.1	PROJECT NAME: FMPC RI\FS		
BORING NUMBER: 3387	COORDINATES:		DATE: 6-3-90
ELEVATION:	GWL: Depth / Date/Time		DATE STARTED: 6-2-90
ENGINEER/GEOLOGIST: M. GARMAN	Depth / Date/Time		DATE COMPLETED: 6-13-90
DRILLING METHODS: CABLE TOOL			PAGE 2 OF 8

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 (IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED RADIOACTIVITY (cpm)	NA WELL CONSTRUCTION	REMARKS
70	32807	6		MEDIUM DENSE (10YR, 4/3) BROWN WELL GRADED SAND. SOME SILT. TRACE GRAVEL. WET.	SW	NA		HNU = 0
71	6-3 1546	6 7	17					α = 0
								γB = 50 cpm
72								
73								
74								
75	32808	30		Very dense (10yr 4/2) dark grayish Brown Gravely well graded sand. Some Silt. wet.	SW	NA		HNU = 0
76	6-3 1645	30 35	18					α = 0
								γB = 60 cpm
77								
78								
79								
80	32809	5		Dense (10yr 5/3) Brown Well graded Sand Some silt Some Gravel. wet.	SW	NA		HNU = 0
81	6-4 0910	15 17	19					α = 0
								γB = 60 cpm
82								
83								
84								
85								

NOTES.

Drilling Contractor: PENNSYLVANIA DRILLING

Drilling Equipment: CYCLONE 43

Driller: CRAIG COULTER
CHRIS COULTER

BACKGROUND:
HNU = 0
α = 0
γB = 40-80 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 3387	COORDINATES:		DATE: 6-4-90
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 6-2-90
ENGINEER/GEOLOGIST: M. GARMAN	Depth	Date/Time	DATE COMPLETED: 6-13-90
DRILLING METHODS: CABLE TOOL			PAGE 3 OF 8

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED RADIOACTIVITY (cpm) NA WELL CONSTRUCTION	REMARKS
85	32810	39					
86	6-4 1115	50/4in	10	Very dense (10yr 4/2) dk grayish brown Well graded sand. Some gravel some Silt. Wet.	SW	NA	HNU = 0 α = 0 βB = 60 cpm
87							
88							
89							
90	32811	4					
91	6-4 1418	5 7	18	Medium Dense (10yr 4/2) dark grayish brown well graded sand Trace Silt. ~~Amount of gravel is as significant~~ Wet. BA 6-4-90	SW	NA	HNU = 0 α = 0 βB = 70 CPM
92							
93							
94							
95	32812	23					
96	6-4 1533	35 40	18	Very dense (10yr 5/3) brown well graded sand some Silt some gravel. ~~dry~~ wet. BA 6-4-90	SW	NA	HNU = 0 α = 0 βB = 80 cpm
97							
98							
99							
100							

NOTES.

Drilling Contractor: PENNSYLVANIA DRILLING

Drilling Equipment: CYCLONE 43

Driller: CRAIG COULTER

Asst: CHRIS COULTER

BACKGROUND:

HNU = 0

α = 0

βB = 40 - 80 cpm

FERNALD
RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 3387	COORDINATES:		DATE: 6-4-90
ELEVATION:	GWL: Depth / Date/Time		DATE STARTED: 6-2-90
ENGINEER/GEOLOGIST: M. GARMAN	Depth / Date/Time		DATE COMPLETED: 6-13-90
DRILLING METHODS: CABLE TOOL			PAGE 4 OF 8

DEPTH (FT)	SAMPLE (TYPE & NO)	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED RADIOACTIVITY (CPM)	NA WELL CONSTRUCTION	REMARKS
100	32813 6-4 1650	16 21 39	18	Very dense (10yr 5/3) Brown Well graded sand some silt Some gravel. wet.	SW	NA		HNU = 0 α = 0 βB = 70cpm
101								
102								
103								
104								
105	32814 6-5 09:20	50/5"	5	very dense (10yr 5/2) grayish brown Well graded sand some silt some gravel (fine) wet	SW	NA		HNU = 0 α = 0 βB = 50cpm
106								
107								
108								
109								
110	32815 6-5 1007	3 4 5	7	LOOSE (10YR, 5/2) GRAYISH BROWN WELL GRADED SAND. SOME GRAVEL. TRACE SILT. WET.	SW	NA		HNU = 0 α = 0 βB = 60cpm
111								
112								
113								
114								
115								

NOTES.

Drilling Contractor: PENNSYLVANIA DRILLING

Drilling Equipment: CYCLONE 43

Driller: CRAIG COULTER

ASST.: CHRIS COULTER

BACKGROUND:
HNU = 0
α = 0
βB = 70-80 cpm

FERNALD
RI/FS

596

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2.1	PROJECT NAME: FMPC RI\FS		
BORING NUMBER: 3387	COORDINATES:		DATE: 6-5-90
ELEVATION:	GWL: Depth / Date/Time		DATE STARTED: 6-2-90
ENGINEER/GEOLOGIST: M. GARMAN	Depth / Date/Time		DATE COMPLETED: 6-13-90
DRILLING METHODS: CABLE TOOL			PAGE 5 OF 8

DEPTH (FT.)	SAMPLE (TYPE & NO.)	BLOWS ON SAMPLER (6"/N)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED RADIOACTIVITY (mR/hr)	NA WELL CONSTRUCTION	REMARKS
115	32816	21		VERY DENSE (10YR, 4/1) DARK GRAY				HNU = 0
116	6-5 1400	50/4in	18	WELL GRADED SAND. SOME SILT. WET.	SW	NA		α = 0 βB = 60cpm
117								
118								
119								
120	32817	11		DENSE (10YR, 4/1) DARK GRAY WELL				HNU = 0
121	6-5 1450	20 27	18	GRADED SAND. TRACE SILT. TRACE GRAVEL. WET.	SW	NA		α = 0 βB = 60cpm
122								
123								
124								
125	32818	50		VERY DENSE (10YR, 4/1) DARK GRAY				HNU = 0
126	6-5 1605	50/3in	8	WELL GRADED SAND. TRACE SILT. TRACE GRAVEL. WET.	SW	NA		α = 0 βB = 60cpm
127								
128								
129								
130								

NOTES.

Drilling Contractor: PENNSYLVANIA DRILLING

Drilling Equipment: CYCLONE 43

Driller: CRAIG COULTER

ASST: CHRIS COULTER

BACKGROUND
HNU = 0
α = 0
βB = 40-80 cpm

FERNALD
RI/FS

596

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.2.1	PROJECT NAME: FMPC RI\FS		
BORING NUMBER: 3387	COORDINATES:		DATE: 6-5-90
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 6-2-90
ENGINEER/GEOLOGIST: M. GARMAN	Depth	Date/Time	DATE COMPLETED: 6-13-90
DRILLING METHODS: CABLE TOOL			PAGE 6 OF 8

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 (IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONTAMINANCY (PPM)	NA WELL CONSTRUCTION	REMARKS
130	32819	39	7	VERY DENSE (10YR, 4/1) DARK GRAY. SANDY WELL GRADED GRAVEL. TRACE SILT. WET.	GW	NA		HNU = 0 α = 0 βB = 60cpm
131	G-5	50/2IN						
	1635							
132				131.5FT - BOTTOM OF BORING MONITOR WELL INSTALLED				
133				Sampling ended @ 131.5 FT.				
134								
135								

NOTES.

Drilling Contractor: PENNSYLVANIA DRILLING

Drilling Equipment: CYCLONE 43

Driller: CRAIG COULTER

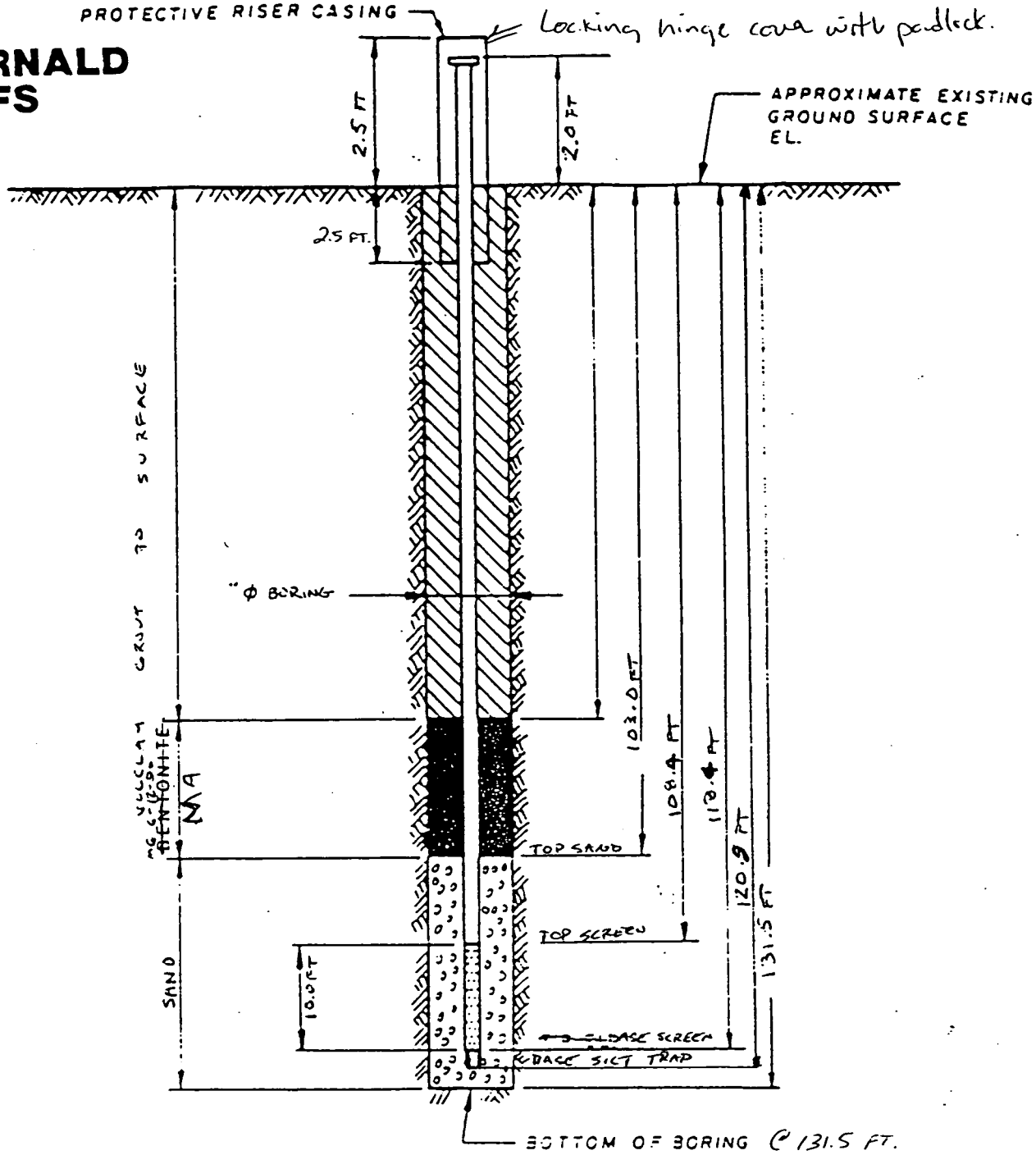
ASST. CHRIS COULTER

BACKGROUND:
HNU = 0
α = 0
βB = 40-80 cpm

7/8

DRAWING NUMBER		
CHECKED BY		APPROVED BY
MG	6-7-90	
DRAWN BY		

FERNALD RI/FS



NOTES:

1. RISER PIPE IS 4.0 IN I.D SCHEDULE PIPE, THREADED. FLUSH-JOINTED.
2. SCREEN IS 4.0 IN I.D S.S. PIPE CONTINUOUS SLOT SCREEN (0.010 IN SLOT SIZE).
3. LOWER END OF SCREEN IS CAPPED (W/ FLUSH JOINT THREADED SILT TRAP)
4. ELEVATION OF WATER LEVEL 45.92
5. WATER LEVEL READING ON 6-13-90

MATERIALS USED DURING WELL INSTALLATION:

16 BAGS 10\20 SAND (80 lb. EACH)
35 BAGS VOLCLAY GROUT (50 lb. EACH)
1 - BUCKETS BENTONITE PELLETS (5 gal. EACH)

1 - 10.0 FT SCREEN WITH 2.5 FT FLUSH JOINT THREADED SILT TRAP AND 0.4 FT BLANK STICK UP,
11 - 10.0 FT SECTIONS OF 4.0 IN I.D. STAINLESS STEEL RISER.

INSTALLATION DETAILS
MONITORING WELL #3387

PREPARED FOR
FERNALD RI\FS

TOTAL WATER ADDED DURING DRILLING AND GROUTING = 1500 gallons

FERNALD RI/FS

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI\FS — FIELD ENG./GEO. M. GARMAN — DATE 6-6-90
PROJECT NO. 602.3.2.1 — CHECKED BY E.T. — DATE 6/28-90
BORING NO. 3387
PIEZOMETER NO. 3387 — DATE OF INSTALLATION 6-13-90

BOREHOLE DRILLING

DRILLING METHOD CABLE TOOL	TYPE OF BIT HAMMER
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID WATER FROM 0 TO 131.5	SIZE 10.0 IN. ID FROM 0 TO 130.0
FLUID NA FROM ~~FROM~~ TO ~~TO~~ →	SIZE NA FROM ~~FROM~~ TO ~~TO~~ →

PIEZOMETER DESCRIPTION

TYPE MONITOR WELL	RISER PIPE MATERIAL 316 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 10.0 FT
AVERAGE SIZE OF PERFORATIONS 0.010 IN.	JOINING METHOD THREADED, FLUSH JOINTED
TOTAL PERFORATED AREA 10.0 FT	

PROTECTION SYSTEM

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

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (FT)		ELEVATION E.T. (FT.) 6/28/90	
TOP OF RISER PIPE	2.0		572.0	
GROUND SURFACE	0.0		570.0	
BOTTOM OF PROTECTIVE PIPE	2.5		567.5	
BOREHOLE FILL MATERIALS:				
GROUT/SLURRY	TOP 0.0	BOTTOM 103.0	TOP 570.0	BOTTOM 467.0
BENTONITE NONE USED	TOP NA	BOTTOM NA	TOP N/A	BOTTOM N/A
SAND 10/20 SIZE	TOP 103.0	BOTTOM 131.5	TOP 467.0	BOTTOM 438.5
GRAVEL NONE USED	TOP NA	BOTTOM NA	TOP N/A	BOTTOM N/A
PERFORATED SECTION	TOP 108.4	BOTTOM 118.4	TOP 461.6	BOTTOM 451.6
PIEZOMETER TIP	120.9			
BOTTOM OF BOREHOLE	131.5			
GWL AFTER INSTALLATION	45.92			

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

REMARKS - 1 BUCKET BENTONITE USED IN AND AROUND PROTECTIVE WELL COVER
- NO BLUE CLAY ENCOUNTERED IN THE 120 TO 130 FT. RANGE

FERNALD
RI/FS

Date	4/2/92		ET	96
Initial	E.T.			
	Field Check	1st Key In	2nd Key In	Hard Copy Verification

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 607 3.2.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 3046	COORDINATES: N.478,051.23 E.1,319,48.64	DATE: 5/23/90	
ELEVATION: 578.6 TOP OF RISER	GWL: Depth 52.05 FT Date/Time 5/30/90 @ 0800	DATE STARTED: 5/22/90	
ENGINEER/GEOLOGIST: M. SWANSON	Depth 53.7 FT Date/Time 6/4/90 @ 0905	DATE COMPLETED: 6/04/90	
DRILLING METHODS: CABLE TOOL		PAGE 1 OF 8	

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER (/)	RECOVERY (")	DESCRIPTION	USCS SYMBOL	MEASURED CONTAMINANCY (PPM)	WELL CONSTRUCTION	REMARKS
0				SEE VCS LOG OF B-2046 FOR SOIL CLASSIFICATIONS OF FIRST 75 FEET OF B-3046. SAMPLING OF B-3046 WILL BEGIN AT 75.0 FT., IN 5 FT. INCREMENTS.				
12								
24								
36								
48								
60								
72								

NOTES.

Drilling Contractor: Penn-Drill

Drilling Equipment: Bucyrus Erie

Driller: Dave Newman

Bob Johnson Asst.

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.2.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 3046	COORDINATES:		DATE: 5/24/90 ; 5/30/90
ELEVATION:	GWL: Depth / Date/Time		DATE STARTED: 5/22/90
ENGINEER/GEOLOGIST: M. SWANSON	Depth / Date/Time		DATE COMPLETED: 6/4/90
DRILLING METHODS: CABLE TOOL			PAGE 2 OF 8

DEPTH (FT)	SAMPLE (TYPE & NO.)	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED RADIOACTIVITY (CPM)	WELL CONSTRUCTION	REMARKS
75	32704	16		DENSE, GRAY TO DARK GRAY (10YR 5/1 TO 4/1)				H_{AU} = 0.1 ppm
76	1041	21	18	WELL GRADED COARSE SAND, SOME SILT	SW	N/A		α = 0 CPM
	5/24/90	27		AND COBBLES (TO .75 in.), SATURATED				$\beta\gamma$ = 60-85 CPM
77								
78								
79								
80	32705	10		DENSE, DARK GRAYISH BROWN (10YR 4/2)				H_{AU} = 0.2 ppm
81	0905	21	15	POORLY GRADED FINE SAND; TRACE OF	SP	N/A		α = 0 CPM
	5/30/90	22		SUBROUNDED PEBBLES; SOME SILT,				$\beta\gamma$ = 40-50 CPM
82				SATURATED				
83								
84								
85	32706	15		DENSE, DARK BROWN (7.5YR 4/2)				H_{AU} = 0.2 ppm
86	0925	20	18	SILTY FINE GRAINED POORLY GRADED	SM	N/A		α = 0 CPM
	5/30	22		SAND, SOME ROUNDED PEBBLES, (TO .5 in.)				$\beta\gamma$ = 40-60 CPM
87				SATURATED				
88								
89								
90								

NOTES.

Drilling Contractor: PENN DRILL CO.

Drilling Equipment: BUCYRUS ERIE

Driller: D. NEWMAN
ASSY. B. JOHNSON

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

INSTRUMENT	SERIAL #	INST. #	BACKGROUND READINGS
H_{AU}	N/A	1015	0.2-0.4 ppm
α	50767	13	0 CPM
$\beta\gamma$	55339	8	20-80 CPM

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.2.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 3046	COORDINATES:		DATE: 5/30/90
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 5/22/90
ENGINEER/GEOLOGIST: M. SWANSON	Depth	Date/Time	DATE COMPLETED: 6/04/90
DRILLING METHODS: CABLE TOOLS			PAGE 3 OF 8

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED RADIOACTIVITY (cpm)	WELL CONSTRUCTION	REMARKS
90	32707	7		MEDIUM DENSE, BROWN (10YR [illegible]), SILTY WELL GRADED COARSE SAND; SOME ROUNDED PEBBLES, SATURATED	SM	WIR		H_{AV} = 0.1 ppm α = 0 cpm $\beta\gamma$ = 50-70 cpm
91	0956 5/30	7 8	15					
92								
93								
94								
95	32708	33		VERY DENSE, GRAYISH BROWN (10YR 5/2), POORLY GRADED COARSE SAND; TRACE OF SILT, PEBBLES (TO 1.5 in.); SATURATED	SP	WIR		H_{AV} = 0.2 ppm α = 0 cpm $\beta\gamma$ = 70-90 cpm
96	1347 5/30	76 50/4 in.	17					
97								
98								
99								
100	32709	3		DENSE, GRAYISH BROWN (10YR 5/2) WELL GRADED COARSE SAND, SOME SILT, SATURATED	SW	WIR		H_{AV} = 0.1 ppm α = 0 cpm $\beta\gamma$ = 60-80 cpm
101	1418 5/30	9 22	18					
102								
103								
104								
105								

NOTES.

Drilling Contractor: PENN DRILL CO.

Drilling Equipment: BUCYRUS ERIE

Driller: D. NEWMAN

ASST.: B. JOHNSON

BACKGROUND:

H_{AV} = 0.2-0.6 ppm

α = 0 cpm

$\beta\gamma$ = 40-100 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.2.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 3046	COORDINATES:		DATE: 5/30/90 ; 5-31-90
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 5/22/90
ENGINEER/GEOLOGIST: M. SWANSON	Depth	Date/Time	DATE COMPLETED: 6/04/90
DRILLING METHODS: CABLE TOOL			PAGE 4 OF 8

DEPTH (FT.)	SAMPLE (TYPE & NO.)	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED RADIOACTIVITY (cpm)	WELL CONSTRUCTION	REMARKS
105	32710 1620 5/30	9 11 15	16	MEDIUM DENSE, GRAYISH BROWN (10YR 5/2), WELL GRADED FINE SAND, SOME SILT, SATURATED	SW	N/A		H_{au} = 0.1 ppm α = 0 cpm $\beta\gamma$ = 40-50 cpm
106								
107								
108								
109								
110	32711 1642 5/30	2 3 11	14	MEDIUM DENSE, DARK GRAY (2.5Y 4/1), WELL GRADED FINE SAND, SOME SILT, TRACE OF ROUNDED PEBBLES (1 TO .25 IN.); SATURATED	SW	N/A		H_{au} = 0.06 ppm α = 0 cpm $\beta\gamma$ = 60-70 cpm
111								
112								
113								
114								
115	32712 1033 5/31/90	8 20 22	16	DENSE, DARK GRAY (10YR 4/1), POORLY GRADED FINE SILTY SAND, SATURATED	SM	N/A		H_{au} = 0.15 ppm α = 0 cpm $\beta\gamma$ = 40-50 cpm
116								
117								
118								
119								
120								

NOTES.

Drilling Contractor: PENN DRILL CO.

Drilling Equipment: BUCYRUS ERIE CABLE TOOL

Driller: D. NEWMAN

ASST.: D. JOHNSON

BACKGROUND:

H_{au} = 0.1 - 0.4 ppm

α = 0 cpm

$\beta\gamma$ = 20 - 80 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.2.1		PROJECT NAME: FMPC RI/FS			
BORING NUMBER: 3046		COORDINATES:		DATE: 5-21-90	
ELEVATION:		GWL: Depth	Date/Time	DATE STARTED: 5-22-90	
ENGINEER/GEOLOGIST: M. SWANSON		Depth	Date/Time	DATE COMPLETED: 6/04/90	
DRILLING METHODS: CABLE TOOL				PAGE 5 OF 8	

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 IN.)	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED GROUNDWATER LEVEL (DATE)	WELL CONSTRUCTION	REMARKS
120	32713	6		DENSE, DARK GRAY (10YR 4/1), WELL-GRADED SILTY SAND, SOME PEBBLES (TO 2 in.), SUBROUNDED, COARSE SAND; SATURATED	SW	N/A		H_{NU} = 0.15 ppm α = 0 cpm $\beta\gamma$ = 60-80 cpm
121	1441	13	13					
	5/31	20						
122								
123								
124								
125	32714	7		MEDIUM DENSE, GRAY (2.5Y 5/0), POORLY GRADED MEDIUM TO COARSE SAND, SOME SILT, SATURATED.	SP	N/A		H_{NU} = 0.1 ppm α = 0 cpm $\beta\gamma$ = 40-70 cpm
126	1552	9	17					
	5/31	18						
127								
128								
129								
130	32715	2		MEDIUM DENSE, DARK GRAY (2.5Y 4/0) WELL GRADED GRAVEL-SAND MIXTURE, SOME SILT, GRAVEL TO 1.0 in. FRACTURED LIMESTONE COBBLE, SATURATED	GW	N/A		H_{NU} = 0.1 ppm α = 0 cpm $\beta\gamma$ = 40-60 cpm
131	1727	3	18					
	5/31	16						
132								
133								
134								
135								

NOTES.

Drilling Contractor: PENN DRILL CO.

Drilling Equipment: BUCYRUS ERIE

Driller: D. NEWMAN

ASST.: B. JOHNSON

BACKGROUND:
H_{NU} = 0.05 - 0.2 ppm
α = 0 cpm
$\beta\gamma$ = 20-60 cpm

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.2.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 3046	COORDINATES.		DATE: 6-1-90
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 5-22-90
ENGINEER/GEOLOGIST: M. SWANSON	Depth	Date/Time	DATE COMPLETED: 6/01/90
DRILLING METHODS: CABLE TOOL			PAGE 6 OF 8

DEPTH (FT.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED RADIOACTIVITY (CPM)	WELL CONSTRUCTION	REMARKS
135	32716	22						
	1115	16	14	DENSE, GRAY (2.5Y 5/0) SILT-GRAVEL-SAND MIXTURE, GRAVEL TO 1.25 IN., SATURATED	GM	N/A		H_{no} = 0.08 PPM α = 0 CPM $\beta\gamma$ = 50 CPM
136	6-1-90	15						
137				BOTTOM OF BORING, DRILLED & SAMPLED TO 136.5 FT. NO "BLUE CLAY" ENCOUNTERED.				
138								
139								
140								

NOTES.

Drilling Contractor: PENN DRILL CO.

Drilling Equipment: BUCYRUS ERIE

Driller: D. NEWMAN

ASST. B. JOHNSON

BACKGROUNDS

H_{no} = 0.08 PPM

α = 0 CPM

$\beta\gamma$ = 40-50 CPM

7/6

596

FERNALD RI/FS

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS — FIELD ENG./GEO. M. SWANSON — DATE 6-1-90
PRCJECT NC. 602 3.2.1 — CHECKED BY E. Trollinger — DATE 4/28/90
BORING NO. 3046
PIEZOMETER NO. 3046 — DATE OF INSTALLATION 6-04-90

BOREHOLE DRILLING

DRILLING METHOD CABLE TOOLS	TYPE OF BIT HAMMER
DRILLING FLUID (S) USED:	CASING SIZE (S) USED:
FLUID H_2O FROM 0 FT TO 136.5 FT	SIZE 10 in ID FROM 0 FT TC 136.5 FT
FLUID — FROM — TO —	SIZE — FROM — TC —

PIEZOMETER DESCRIPTION

TYPE MONITORING WELL	RISER PIPE MATERIAL 316 STAINLESS STEEL
DIAMETER OF PERFORATED SECTION 4 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 10 FT
AVERAGE SIZE OF PERFORATIONS 0.010 in.	JOINING METHOD THREADED - FLUSH JOINTED
TOTAL PERFORATED AREA 10 FT	

PROTECTION SYSTEM

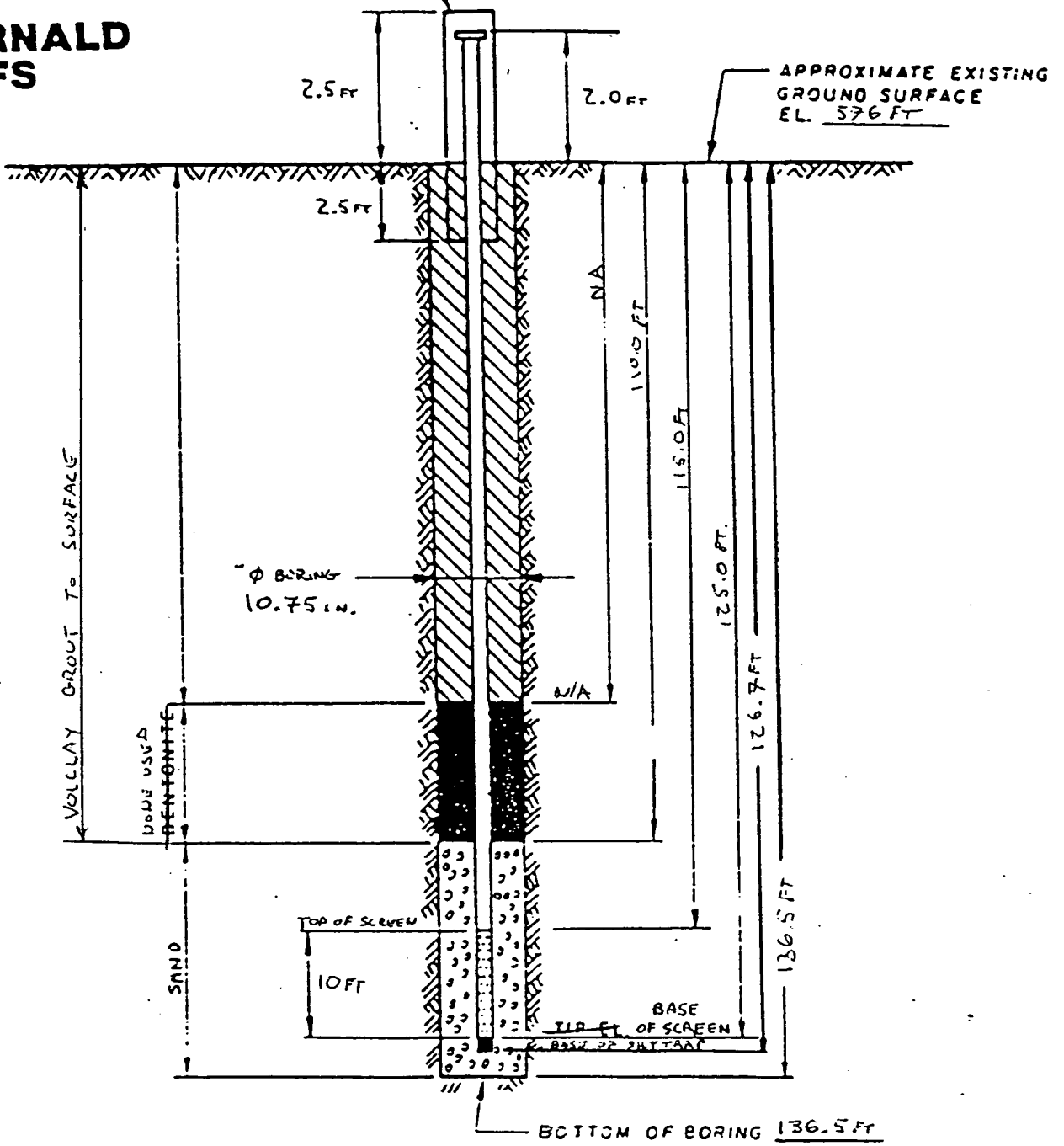
RISER PROTECTIVE PIPE LENGTH 5 FT	OTHER PROTECTION HINGED, LOCKING
PROTECTIVE PIPE O.D. 10.75 in.	LID COVER

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (FT)		ELEVATION E.T. 6/28/90 (FT)	
TOP OF RISER PIPE	+ 2.0		578.6	
GROUND SURFACE	0.0		Ground Elevation NOT MEASURED	
BOTTOM OF PROTECTIVE PIPE	- 2.5			
BOREHOLE FILL MATERIALS:				
Volclay GROUT ~~SLURRY~~ ET 6/28/90	TOP 0.0 FT	BOTTOM 110.0 FT	TOP	BOTTOM
BENTONITE None used	TOP N/A	BOTTOM N/A	TOP	BOTTOM
SAND 10/20 SIZE	TOP 110.0 FT	BOTTOM 136.5 FT	TOP	BOTTOM
GRAVEL None used	TOP N/A	BOTTOM N/A	TOP	BOTTOM
PERFORATED SECTION	TOP 115.0 FT	BOTTOM 125.0 FT	TOP	BOTTOM
PIEZOMETER TIP	126.7 FT			
BOTTOM OF BOREHOLE	136.5 FT			
GWL AFTER INSTALLATION	52.8 FT BELOW GROUND SURFACE			

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

REMARKS 3 BUCKETS OF BENTONITE PELLETS ADDED AROUND PROTECTIVE CASING.

FERNALD RI/FS



DRAWING NUMBER

DRAWN BY	CHECKED BY	APPROVED BY
MLD 6-3-90		

NOTES:

1. RISER PIPE IS 4.0 IN I.D SCHEDULE PIPE, THREADED. FLUSH-JOINTED.
2. SCREEN IS 4.0 IN I.D SS PIPE CONTINUOUS SLOT SCREEN (0.010 IN SLOT SIZE).
3. LOWER END OF SCREEN IS CAPPED. (WITH WELDED SILTTRAP)
4. ELEVATION OF WATER LEVEL 5/30/90 ; 576.05 FT, 6/1/90 ; 53.7 FT
5. WATER LEVEL READING ON

MATERIALS USED DURING WELL INSTALLATION:

- 20 80 LB. BAGS OF 10/20 SAND
- 24 50 LB. BAGS OF VOLCLAY GROUT
- 3 5 GAL. BUCKETS OF BENTONITE PELLETS
- 800 GALLONS OF WATER USED DURING GROUTING AND DRILLING PROCEDURES
- SS PIPE SECTIONS: 11-10' SECS. ; 1-5' SEC. ; 1-10' SCREEN W/WELDED SILT TRAP

INSTALLATION DETAILS
MONITORING WELL #3046

PREPARED FOR
FERNALD RI/FS

FERNALD
RI/FS

Data	7/3/90			
Initial	E.T.			
	Input Check	1st Key In	2nd Key In	Hard Copy Verification

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 7.7.1	PROJECT NAME: FMPC RI/FS	
BORING NUMBER: 1519	COORDINATES: N.479,415.68, E.1,379,823.08	DATE: 6-29-90
ELEVATION: 5743 GROUND	GWL: Depth / Date/Time	DATE STARTED: 6-29-90
ENGINEER/GEOLOGIST: J MASON	Depth / Date/Time	DATE COMPLETED: 6-29-90
DRILLING METHODS: AUGER (HOLLOW STEM) CME 45		PAGE 1 OF 3

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	55659 6-29-90 1530	13	6	very dense 10yr 5/6 yellowish brown silty gravel, some clay	GM	NA	Hnu: 0 α: 0 BY: 200 cpm
	55660 6-29-90 1530	25	0	NR			
1	55661 6-29-90 1530	19	0	NR			
	55662 6-29-90 1555	12	6	medium dense 10yr 5/6 yellow brown clayey silt, MOIST	ML	N/A	Hnu: 0 α: 0 BY: 200 cpm
2	55663 6-29-90 1555	9	0	NR			
	55664 6-29-90 1535	10	0	NR			
3	55665 6-29-90 1537	7	4	10yr 5/6 yellowish brown clayey silt, organic matter present	OL	N/A	Hnu: 0 α: 0 BY: 200 cpm
	55666 6-29-90 1537	7	0	NR			
4	55667 6-29-90 1537	9	0	NR ET 6/3/90			
	55668 6-29-90 1540	4	0	NR; GRAVEL STUCK IN BIT TIP OF SPOON	NA	NA	Hnu: N/A α: N/A BY: N/A
5	55669 6-29-90 1540	3	0		NA	NA	
	55670 6-29-90 1540	2	0				
6	55671 6-29-90 1548	2	0				
	55672 6-29-90 1548	1	0	SAA	NA	NA	Hnu: NA α: NA BY: NA
7	55673 6-29-90 1548	3	0				

NOTES: CONTRACTOR: PENN DRILL
RIG CME 45
DRILLER: BOB YOST
ASSISTANT: BRIAN STRAPAZZON
Hnu: B 221
α: ASI # 6
BY: ASI # 11

SAMPLES COLLECTED PER ASTM STANDARD PENETRATION
COLORS IDENTIFIED USING MUNSELL COLOR CHART
BACKGROUND LEVELS: Hnu = 0
α = 0
BY = 150 cpm
LEL = } NOT MEASURED outside
O2 = } drilling

SAA - SAME AS ABOVE
NR - NO RECOVERY

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.7.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1519	COORDINATES:		DATE: 6-29-90
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 6-29-90
ENGINEER/GEOLOGIST: J MASON	Depth	Date/Time	DATE COMPLETED: 6-29-90
DRILLING METHODS: AUGER (HOLLOW STEM) CME 45			PAGE 2 OF 3

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
8	55674 6-29-90 1555	3	6	Loose 10yr 5/6 yellowish brown clayey silt, moist, trace sand	ML	NA	HNu: 0 α 0 BS 200 cpm
	55675 6-29-90 1555	5	3	SAA	ML	NA	
9	55676 6-29-90 1555	5	0	NR			
	55677 6-29-90 1557	7	6	medium dense, 10yr 5/6 yellowish brown sandy silt, some clay, wet	ML	NA	HNu: 0 α 0 BS 200 cpm
	55678 6-29-90 1557	7	6	very loose 10yr 5/6 yellowish brown sandy clayey silt, wet	ML		
10	55679 6-29-90 1557	7	6	med. dense 10yr 5/1 gray clayey silt, trace sand, wet	ML		
	55680 6-29-90 1604	5	6	very soft 10yr 5/6 yellowish brown silty clay, trace sand, moist	CL	<.25	HNu: 0 α 0 BS 200 cpm
11	55681 6-29-90 1604	3	6	loose 10yr 5/1 gray clayey silt, trace sand, moist	ML	NA	
	55682 6-29-90 1604	6	6	SAA	ML	NA	
12	55683 6-29-90 1610	5	6	soft 10yr 5/6 yellowish brown silty clay, trace sand, slightly moist	CL	<.25	HNu: 0 α: 0 BS 200 cpm
	55684 6-29-90 1610	7	6	medium dense 10yr 5/1 gray clayey silt, trace sand, slightly moist	ML	NA	
13	55685 6-29-90 1610	10	6	SAA	ML	NA	
	55686 6-29-90 1615	5	6	very soft 10yr 5/6 yellowish brown silty gravelly clay, wet	CL	<.25	HNu: 0 α: 0 BS: 100 cpm
14	55687 6-29-90 1615	10	6	med. dense 10yr 5/1 gray clayey silt, trace sand & gravel, wet	ML	NA	
	55688 6-29-90 1615	15	6	SAA	ML	NA	

NOTES: CONTRACTOR: PENNDRILL
RIG CME 45
DRILLER: BOB YOST
ASSISTANT: BRIAN STRAPAZZON
HNu: B 221
α : AS1 # 6
BS: AS1 # 11

SAMPLES COLLECTED PER ASTM STANDARD PENETRATION
COLORS IDENTIFIED USING MUNSELL COLOR CHART
BACKGROUND LEVELS: HNu = 0
α = 0
BS = 200 cpm
LEL = } NA
O2 = }

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602.3.7	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1519	COORDINATES:		DATE.
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED: 6-29-90
ENGINEER/GEOLOGIST: J MASON	Depth	Date/Time	DATE COMPLETED: 6-29-90
DRILLING METHODS: CME 45 AUGER			PAGE 3 OF 3

DEPTH (Ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 1 6in	RECOVERY (in)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	55689 6-29-90 1623	1	6	very soft 10yr 5/6 yellowish brown sandy silty clay, trace gravel, wet	CL	C.25	H_r = 0 α = 0 β = 200 cpm
16	55690 6-29-90 1623	3	0	NR			
	55691 6-29-90 1623	5	0	NR			
	55692 6-29-90 1627	4	6	very loose 10yr 5/1 gray clayey silt, trace sand, wet	ML	NA	H_r = 0 α = 0 β = 200 cpm
	55693 6-29-90 1627	11	6	medium dense 10yr 5/1 gray sandy, clayey silt, wet, some gravel	ML	↓	
18	55694 6-29-90 1627	17	2	SAA	ML	↓	
	55695 6-29-90 1635	11	6	very loose, 10yr 5/1 gray clayey, silty, sandy, gravel - sand present is wkly graded, wet	GC	NA	H_r = 0 α = 0 β = 100 cpm
19	55696 6-29-90 1635	12	6	SAA	↓	↓	
	55697 6-29-90 1635	15	3	SAA			
20	55698 6-29-90 1635	17	5	medium dense 10yr 5/1 gray clayey silt; wet	ML	NA	H_r = [illegible] JCM 6-29-90 α =
JCM 6-29-90 6				BOTTOM OF BORING @ 20.0 FT. SAMPLING ENDED @ 20.0 FT			β =
JCM 6-29-90 7				*ET 7/3/90 ~~BORINGS WILL HAVE PIEZOMETER INSTALLED~~ BORING WAS PLUGGED WITH BENTONITE AND CAPPED WITH 2.0 FT PLUG OF CEMENT. NO BURIED MATERIAL FOUND.			H_r = α = β =

NOTES: CONTRACTOR: PENDRILL
DRILLER: BOB YOST
ASSISTANT: BRIAN STRAPAZZON
H_r - B 221
α - AS1 #6
β - AS1 #11

SAMPLES COLLECTED PER ASTM STANDARD PENETRATION
COLORS IDENTIFIED USING MUNSELL COLOR CHART
BACKGROUND LEVELS: H_r = 0
α = 0
β = 150 cpm

FERNALD
RI/FS

Date	7/3/92			
Initials	ET		59	6
	Total Date	1st Keyle	2nd Keyle	Hard Copy Production

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.7.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1520	COORDINATES: N: 479,412.63 E: 1,379,852.33	DATE	6-29-90
ELEVATION: 574.5 GROUND	GWL: Depth / Date/Time	DATE TARTED:	6-29-90
ENGINEER/GEOLOGIST: J MASON	Depth / Date/Time	DATE COMPLETED:	6-29-90
DRILLING METHODS: AUGER (HOLLOW STEM) CME 45		PAGE	1 OF 3

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	SS617 6-29-90 0856	8	6	HARD (10yr 3/2) very dark grayish brown gravelly clay	CL	>4.0	Hnu = 0 ∝ = 0 BR = 250 cpm
1	SS619 6-29-90 0856	10	0	NR			
	SS620 6-29-90 0856	13	0	NR			
	SS621 6-29-90 0902	11	6	very stiff 10yr 5/6 yellowish brown gravelly clay (silty), moist	CL	3.5	H = 0 ∝ = 0 B = 250 cpm
2	SS622 6-29-90 0902	7	4	very stiff 10yr 2/2 very dark brown silty clay, moist.	~~CL~~ CL	2.5	
	SS623 6-29-90 0902	7	0	NR			
3	SS624 6-29-90 0907	5	4	very stiff 10yr 5/6 yellowish brown silty clay, moist.	CL	2.5	H = 0 ∝ = 0 B = 250 cpm
	SS625 6-29-90 0907	5	0	NR } TWO ATTEMPTS.			
4	SS626 6-29-90 0907	4	0	NR }			
	SS627 6-29-90 0910	5	0	NR AFTER 2 ATTEMPTS			H = 0 ∝ = 0 B = 100 cpm
5	SS628 6-29-90 0910	5	0	↓			
	SS629 6-29-90 0910	4	0	↓			
6	SS630 6-29-90 0922	2	6	very soft 10yr 3/3 dark brown silty clay, some sand, moist	CL	<.25	H = 0 ∝ = 0 B = 200 cpm
	SS631 6-29-90 0922	2	2	loose 10yr 5/6 yellowish brown silty, sand (poorly graded), wet	SP	NA	
7	SS632 6-29-90 0922	2	0				

NOTES: CONTRACTOR: PENNDRILL
RIG CME 45
DRILLER: BOB YOST
ASSISTANT: BRIAN STRAPAZZON
Hnu: PID 221
∝: OVI #6
BR: OVI #11

SAMPLES COLLECTED PER ASTM STANDARD PENETRATION
COLORS IDENTIFIED USING MUNSELL COLOR CHART
BACKGROUND LEVELS: Hnu = 0
∝ = 0
BR = 250 cpm
LEL =
O_2 = } OUTSIDE DRILLING

SAA - SAME AS ABOVE
NR - NO RECOVERY

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 7.7.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1520	COORDINATES:	DATE	6-29-90
ELEVATION:	GWL: Depth Date/Time	DATE STARTED:	6-29-90
ENGINEER/GEOLOGIST: J MASON	Depth Date/Time	DATE COMPLETED:	6-29-90
DRILLING METHODS: AUGER (HOLLOW STEM) CME 45		PAGE	2 OF 3

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
8	55633 6-29-90 0930	8	6	Loose 10yr 5/6 yellowish brown poorly graded sand, some gravel, wet	SP	NA	H = 0
	55634 6-29-90 0930	3	6	stiff 10yr 5/4 yellowish brown silty clay, wet	CL	1.0	C = 200 cpm
	55635 6-29-90 0930	6	0	NR			
9	55636 6-29-90 0935	3	6	very loose 10yr 5/6 yellowish brown sandy silty gravel, wet	GM	NA	H = 0 C = 0 B = 200 cpm
	55637 6-29-90 0935	7	6	very stiff 10yr 5/6 yellowish brown silty clay, wet	CL	2.5	
10	55638 6-29-90 0935	7	6	stiff 10yr 5/1 gray silty clay, wet	CL	1.5	
	55639 6-29-90 0945	4	6	stiff 10yr 5/6 yellowish brown gravelly clay (silty), some sand moist	CL	1.5	H = 0 C = 0
11	55640 6-29-90 0945	5	4	~~stiff layer~~ ICM 6-29-90 SAA	CL	1.0	C = 200 cpm
	55641 6-29-90 0945	5	0	NR	NA	NA	
12	55642 6-29-90 0950	3	6	very soft 10yr 5/6 yellowish brown gravelly silty clay, wet	CL	<.25	H = 0 C = 0 B = 200 cpm
	55643 6-29-90 0950	5	6	very soft 10yr 5/1 gray silty clay, wet	CL	<.25	
13	55644 6-29-90 0950	5	0	NR			
	55645 6-29-90 0953	9	6	very stiff 10yr 5/6 yellowish brown silty clay, wet, some sand	CL	3.5	H = 0 C = 0
14	55646 6-29-90 0953	11	6	stiff 10yr 5/1 gray silty clay, trace sand, wet	CL	1.5	B = 200 cpm
	55647 6-29-90 0953	14	6	stiff 10yr 5/1 gray silty clay, some sand, wet	CL	2.0	

NOTES: CONTRACTOR: PENNDRILL
RIG GE-45
DRILLER: BOB YOST
ASSISTANT: BRIAN STRAPAZZON
Hnu: B 221
∝ : ASI #6
BB: ASI #11

* SAMPLES COLLECTED PER: ASTM STAN -20 PENETRATION
COLORS IDENTIFIED USING MUN ELL COLOR CHART
BACKGROUND LEVEL: Hnu = 0
∝ = 0
BR = 200 cpm
LEL = } outside drilling 60 N A
O_2 = }

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.7.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1520	COORDINATES:	DATE	6-29-90
ELEVATION:	GWL: Depth / Date/Time	DATE STARTED:	6-29-90
ENGINEER/GEOLOGIST: J. MASON	Depth / Date/Time	DATE COMPLETED:	6-29-90
DRILLING METHODS: AUGER (HOLLOW STEM)		PAGE	3 OF 3

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	55648 6-29-90 1055	2	6	MEDIUM DENSE (10yr 5/6) yellowish brown silty clayey sand wet	ML	NA	HNU: 0 ∝: 0 BY: 200 cpm,
16	55649 6-29-90 1055	4	6	very stiff (10yr 5/1) gray silty clay trace gravel trace sand wet	CL	3.0	
	55650 6-29-90 1055	7	0	NR	NA		
	55651 6-29-90 1100	15	6	stiff 10y - 5/1 gray sandy, silty clay, some gravel, wet	CL	.30	HNU: 0 ∝: 0 BX: 200 cpm
17	55652 6-29-90 1100	20	0	NR			
	55653 6-29-90 1100	14	0	NR	NA	NA	
18	55654 6-29-90 1105	10	6	medium dense, 5yr 4/2 dark greenish gray clayey silty gravel some sand wet.	GC	NA	HNU: 0 ∝: 0 BX: 200 cpm
	55655 6-29-90 1105	13	6	SAA	GC	NA	
19	55656 6-29-90 1105	14	6	STIFF (10yr 5/1) gray silty clay trace sand wet	CL	1.5	
	55657 6-29-90 1105	15	6	SAA	CL	1.5	HNU: ∝: BY:
20				BOTTOM OF BORING @ 20.0 FT. SAMPLING ENDED @ 20.0 FT.			
				* BORING WAS PLUGGED WITH BENTONITE PELLETS, VERY WET CONDITIONS FROM 10.0 FT TO 20.0 FT., TOP 2.0 FT PLUGGED WITH PORTLAND CEMENT.			H =
				* NO BURIED MATERIAL FOUND			

NOTES: CONTRACTOR: PENNDRILL
RIG
DRILLER: BOB YOST
ASSISTANT: BIJAN STRAFAZZON
Hnu: 8 221
∝: ASI # 6
BX: ASI # 11

SAMPLES COLLECTED PE. ASTM STAN. -20 PENETRATION
COLORS IDENTIFIED SING MUN ELL COLOR CHART
BACKGROUND LEVE.: Hnu = 0
∝ = 0
BY = 200 cpm
LEL =
O_2 =

61

FERNALD
RI/FS

Date	7/3/90		CT	
Initial	ET		CT	
	Field Check	1st Key In	2nd Key In	Hard Copy Verification

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 6023.7.1 | PROJECT NAME: FMPC RI/FS

BORING NUMBER: 1521 | COORDINATES: N 479,410.73 E 1,379,883.13 | DATE: 6-28-90

ELEVATION: 574.8 GROUND | GWL: Depth / Date/Time | DATE STARTED: 6-28-90

ENGINEER/GEOLOGIST: J MASON | Depth / Date/Time | DATE COMPLETED: 6-28-90

DRILLING METHODS: AUGER (HOLLOW STEM) CME 45 | PAGE 1 OF 3

Depth (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
1	55577 6-28-90 1445	10	6	MEDIUM DENSE (10yr 5/4) yellow sh Brown clayey gravel	GC	NA	H = 0
	55578 6-28-90 1445	14	0	NR			= 0
	55579 6-28-90 1445	9	0	NR			500 cpm
2	55580 6-28-90 1450	6	~~6~~ 0 ET	~~packing for gravel fall in~~ GRAVEL ~~ET~~ MATERIAL CAUGHT IN TIP OF SPOON / NR			H = 0
	55581 6-28-90 1450	8	0		NR	NA	= 0
	55582 6-28-90 1450	6	0				= 500 cpm
3	55583 6-28-90 1451	7	6	stiff 10yr 3/3 dark brown clay, some silt, appears organic in origin	CL	ET 2.0	H = 0
	55584 6-28-90 1451	7	0	NR			= 0
4	55585 6-28-90 1451	7	6	NR			= 500 cpm
	55586 6-28-90 1500	7	C	NR			H = 0
5	55587 6-28-90 1500	6	C	NOTE: GRAVEL CAUGHT IN BIT DISALLOWS SAMPLE COLLECTION			= 0
	55588 6-28-90 1500	6	0				= 500 cpm
6	55589 6-28-90 1510	1	C	NR AFTER 2 ATTEMPTS; SAME CONDITION AS ABOVE SUSPECTED			H = 0
	55590 6-28-90 1510	2	C				= 0
7	55591 6-28-90 1510	3	C				= 500 cpm

NOTES: CONTRACTOR: PENNZOIL
RIG CME 45
DRILLER: BOB YOST
ASSISTANT: BRIAN STRATTON
HNU: B 221
OVA: ASI # 6
BH: ASI # 11

SAMPLES COLLECTED PER ASTM STANDARD PENETRATION
COLORS IDENTIFIED USING MUNSELL COLOR CHART
BACKGROUND LEVEL: HNU = 0
OVA = 0
BH = 500 cpm
LEL = } NOT NEEDED OUTSIDE
O_2 = }

SAA - SAME AS ABOVE
NR - NO RECOVERY

FERNALD
RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 6027.7.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1521	COORDINATES:	DATE:	6-28-90
ELEVATION:	GWL: Depth / Date/Time	DATE STARTED:	6-28-90
ENGINEER/GEOLOGIST: J. MASON	Depth / Date/Time	DATE COMPLETED:	6-28-90
DRILLING METHODS: AUGER (HOLLOW STEM) CME 45		PAGE	2 OF 3

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN.)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
8	55593 6-28-90 1515	2	6	very soft 10yr 5/6 yellowish brown silty clay - ranges to 10yr yellowish brown ~~clayey sand~~ SANDY CLAY	CL	<.25	H: 0 ∝: 0
	55593 6-28-90 1515	3	6	E.T. SAA, except sand to clay	CL	<.25	B: 550 cpm
	55594 6-28-90 1515	2	0	NR			
9	55595 6-28-90 1520	1	6	SAA	CL	<.25	H: 0 ∝: 0
	55596 6-28-90 1520	1	2	very soft 10yr 5/6 yellowish brown silty clay	CL	<.25	B: 500 cpm
10	55597 6-28-90 1520	3	0	NR			
	55598 6-28-90 1528	2	6	stiff 10yr 5/6 yellowish brown silty clay, some gravel	CL	2.0	H: 0 ∝: 0
11	55599 6-28-90 1528	3	6	SAA	CL	2.0	B: 500 cpm
	55600 6-28-90 1528	4	6	stiff 10yr 5/6 yellowish brown silty poorly graded sand WITH 10yr 5/1 gray silty clay	SP/CL	NA	
12	55601 6-28-90 1535	6		very soft 10yr 5/6 yellowish brown silty clay, some gravel, slight moisture	CL	<.25	H: 0 ∝: 0
	55602 6-28-90 1535	10		very soft, 10yr 5/1 gray silty clay, moist	CL	<.25	B: 550 cpm
13	55603 6-28-90 1535	9		very stiff 10yr 5/1 gray silty clay ranging to 10yr 5/6 yellowish brown poorly graded sand, moist	CL/SP	3.0	
	55604 6-28-90 1553	12	6	loose 10yr 5/6 yellowish brown poorly graded sand, some silt	SP	NA	H: 0 ∝: 0
14	55605 6-28-90 1553	11	6	stiff 10 yr 5/1 gray silty clay	CL	2.0	B: 500 cpm
	55606 6-28-90 1553	15	6	stiff 10 yr 5/1 gray silty clay, trace of black gravel	CL	2.0	

OTHS: CONTRACTOR: PENN DRILL
RIG CME 45
DRILLER: BOB YOST
ASSISTANT: BRIAN STRAPAZZON
Hnu: B 221
∝: ASI #6
BB: ASI #11

SAMPLES COLLECTED PE-
COLORS IDENTIFIED
BACKGROUND LEVE

ASTM STAN[illegible]RD PENETRATION
SING MUN[illegible]ELL COLOR CHART
: Hnu = 0
∝ = 0
BK = 450 cpm
LEL = 3
O_2 = 3 NOT NEEDED) AV LOCA[illegible]

FERNALD
RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.7.1 | PROJECT NAME: FMPC RI/FS
BORING NUMBER: 1521 | COORDINATES:
ELEVATION: | GWL: Depth Date/Time
ENGINEER/GEOLOGIST: J. MASON | Depth Date/Time
DRILLING METHODS: AUGER (HOLLOW STEM) CME 45

DATE: 6-28-90
DATE STARTED: 6-28-90
DATE COMPLETED: 6-28-90
PAGE 3 OF 3

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	55607 6-28-90 1607	9	6	Hard, 10yr 5/1 gray silty clay, some black gravel, wet	CL	>4	H : 0 O : 0 B : 500 cpm
16	55608 6-28-90 1607	9	2	very stiff 10yr 5/1 gray silty clay, some black gravel, wet	CL	2.5	
	55609 6-28-90 1607	14	0	NR			
	55610 6-28-90 1615	9	6	Soft 10yr 5/1 gray gravelly silty clay, wet	CL	.30	H : 0 O : 0 B : 400 cpm
17	55611 6-28-90 1615	12	6	medium stiff 10yr 5/1 gray gravelly silty clay, some sand, wet	CL	1.0	
	55612 6-28-90 1615	14	6	SAA	CL	1.0	
18	55613 6-28-90 1622	17	6	very soft 10yr 5/1 gray silty clay, some gravel, wet	CL	<.25	H : 0 O : 0 B : 480 cpm
	55614 6-28-90 1622	18	6	SAA	CL	<.25	
19	55615 6-28-90 1622	19	6	stiff 10yr 5/1 gray silty clay, some gravel, some sand, wet	CL	1	
	55616 6-28-90 1622	32	6	very stiff 10yr 5/1 gray silty sandy clay, some gravel, wet	CL	2.5	H : O : B :
20				BOTTOM OF BORING @ 20.0 FT. SAMPLING ENDED @ 20.0 FT.			
				* BORING WAS BACKFILLED WITH BENTONITE AND CAPPED WITH 2.0 FT CEMENT PLUG. NO BURIED MATERIALS FOUND.			H : O : L :

NOTES: CONTRACTOR: PENN DRILL
RIG CME 45
DRILLER: BOB YOST
ASSISTANT: BRIAN STRAPAZZON
Hnu: B 221
α : ASI #6
BB: ASI #11

SAMPLES COLLECTED AT
COLORS IDENTIFIED USING MUNSELL COLOR CHART
BACKGROUND LEVEL: Hnu = 0
α = 0
BB = 460 cpm
LEL = 2
O_2 = 5 NA

ASTM STAN. 2" PENETRATION

FERNALD RI/FS

596

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.7.1	PROJECT NAME: FMPC RI / FS		
BORING NUMBER: 1522	COORDINATES: N 479,411.87, E 1,379,913.73	DATE	6-28-90
ELEVATION: 575.1	GWL: Depth Date/Time	DATE STARTED:	6-28-90
ENGINEER/GEOLOGIST: J MASON	Depth Date/Time	DATE COMPLETED:	6-28-90
DRILLING METHODS: AUGER (HOLLOW STEM) CME 45		PAGE	1 OF 2

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	55536 6-28-90 0810	9	6	~~very dense~~ 10YR 4/6 dark yellowish brown, hard, CLAY, DRY	~~3.4~~ CL	74	H = 0, = 0, = 500 cpm
1	55537 6-28-90 0810	19	0	NR			
	55538 6-28-90 0810	20	0	NR	7/3/90 ET		
2	55539 6-28-90 0820	7	6	~~medium dense~~ 10yr 5/6 yellowish brown hard gravelly, sandy clay	~~##~~ CL	74	H = 0, = 0, B = 500 cpm
	55540 6-28-90 0820	4	2	SAA	CL		
3	55541 6-28-90 0820	6	0	NR	7/3/90 ET		
	55542 6-28-90 0822	8	6	very stiff, 10yr 5/6 yellowish brown gravelly clay, ~~trace~~ silt, trace sand	~~7.5~~ CL	3.5	H = 0, = 0, C = 500 cpm
4	55543 6-28-90 0822	9	0	NR			
	55544 6-28-90 0822	8	0	NR	JCM 6/28/90		
5	55545 6-28-90 0825	7	6	very soft 10yr 5/3 brown clay trace sand, trace gravel	~~2.5~~ CL	2.5	H = 0, = 0, B = 500 cpm
	55546 6-28-90 0825	10	2	SAA, but slightly wet	CL	2.5	
6	55547 6-28-90 0825	9	0	NR			
	55548 6-28-90 0845	4	0	NR after 2 attempts			H = } NA
7	55549 6-28-90 0845	3	0	↓			
	55550 6-28-90 0845	4	0				

NOTES: CONTRACTOR: PENNDRILL
RIG CME 45
DRILLER: BOB YOST
ASSISTANT: BRAN STRAPAZZON
Hnu: [illegible] B 221
α: [illegible] ASI #6
βγ: [illegible] ASI #11
JCM 6/28/90

SAMPLES COLLECTED PER ASTM STANDARD PENETRATION
COLORS IDENTIFIED USING MUNSELL COLOR CHART
BACKGROUND LEVEL: Hnu = 0
α = 0
β = 500 cpm
LEL = } NOT NEEDED OUTSIDE
O₂ = } DRILLING

SAA - SAME AS ABOVE
NR - NO RECOVERY

FERNALD
RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.7.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1522	COORDINATES:	DATE	6-28-90
ELEVATION:	GWL: Depth Date/Time	DATE STARTED:	6-28-90
ENGINEER/GEOLOGIST: J MASON	Depth Date/Time	DATE COMPLETED:	6-28-90
DRILLING METHODS: AUGER (HOLLOW STEM) CME 45		PAGE	2 OF 3

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
8	55551 6-28-90 0855	2	0	NR AFTER 2 ATTEMPTS			
	55552 6-28-90 0855	3	0				
	55553 6-28-90 0855	2	0	very soft			
9	55554 6-28-90 0857	9	6	[illegible], 10yr 6/6 brownish yellow sandy, gravelly clay; trace silt	CL	<.25	Hnu = 0 α = 0 βγ = 500 cpm
	55555 6-28-90 0857	2	0	NR			
10	55556 6-28-90 0857	5	0	NR			
	55557 6-28-90 0903	3	6	stiff 10yr 5/6 yellowish brown silty clay, slightly moist	CL	1.5	Hnu = 0 α = 0 βγ = 500 cpm
11	55558 6-28-90 0903	3	6	SAA, moist	CL	1.5	
	55559 6-28-90 0903	6	0	NR			
12	55560 6-28-90 0910	4	6	very soft 10yr 5/6 yellowish brown silty clay, trace gravel, wet	CL	<.25	Hnu = 0 α = 0 βγ = 500 cpm
	55561 6-28-90 0910	6	6	very soft 10yr 5/6 yellowish brown silty clay, moist – ranges to 10yr 5/1 gray in color	CL	<.25	
13	55562 6-28-90 0910	8	6	very stiff 10yr 5/6 yellowish brown silty clay, some sand, moist	CL	3.5	
	55563 6-28-90 0915	5	6	hard 10yr 5/6 yellowish brown to 10yr 5/1 gray silty clay, some sand, some gravel, wet	CL	>4	Hnu = 0 α = 0 βγ = 500 cpm
14	55564 6-28-90 0915	7	6	soft 10yr 5/1 gray silty clay, wet	CL	.30	
	55565 6-28-90 0915	8	0	NR			

NOTES: CONTRACTOR: PENN DRILL
RIG
DRILLER: BOB YOST
ASSISTANT: BRIAN STRAPAZZON
Hnu: ~~ASI~~ 8221
α: ~~ASI~~ ASI #6
βγ: ~~8221~~ ASI #11

SAMPLES COLLECTED PER ASTM STANDARD PENETRATION
COLORS IDENTIFIED USING MUNSELL COLOR CHART
BACKGROUND LEVELS: Hnu = 0
α = 0
βγ = 500 cpm
LEL =
O_2 =

FERNALD
RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.7.1	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1522	COORDINATES:		DATE: 6-28-90
ELEVATION:	GWL: Depth / Date/Time		DATE STARTED: 6-28-90
ENGINEER/GEOLOGIST: J. MASON	Depth / Date/Time		DATE COMPLETED: 6-28-90
DRILLING METHODS: AUGER (HOLLOW STEM) CME 45			PAGE 3 OF 3

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 (IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	55566 6-28-90 0928	1	6	very soft 10yr 5/6 yellowish brown to 10yr 5/1 gray silty clay; some sand, trace gravel, wet	CL	<.25	Hnu: 0 α: 0 BY: 500 cpm
16	55567 6-28-90 0928	3	2	SAA		<.25	
	55568 6-28-90 0928	3	0	NR			
	55569 6-28-90 0935	3	6	very loose 10yr 5/3 brown poorly graded sand, trace silt, wet	SP	NA	Hnu: 0 α: 0 BY: 600 cpm
17	55570 6-28-90 0935	1	6	very soft, 10yr 5/3 brown sandy clay some silt	CL	<.25	
	55571 6-28-90 0935	2	6	very soft 10yr 5/3 brown sandy clay; some small gravels, trace silt	CL	<.25	
18	55572 6-28-90 0945	3	6	very loose 10yr 5/3 brown poorly graded sand, some silt, wet	SP	NA	Hnu: 0 α: 0 BY: 550 cpm
	55573 6-28-90 0945	3	6	SAA	SP		
19	55574 6-28-90 0945	4	6	very soft 5yr 4/2 dark reddish gray silty clay, some gravel, some sand, wet	CL	<.25	
	55575 6-28-90 0945	5	6	SAA	CL	<.25	Hnu: α: BY:
20							
							Hnu: α: BY:

NOTES: CONTRACTOR: PENNDRILL
RIG CME 45
DRILLER: BOB YOST
ASSISTANT: BRIAN STRAPAZZON
Hnu: 8.2 21
α: ASI #6
BY: ASI #11

SAMPLES COLLECTED PER ASTM STANDARD PENETRATION
COLORS IDENTIFIED USING MUNSELL COLOR CHART
BACKGROUND LEVELS: Hnu = 0
α = 0
BY = 500 cpm
LEL = NA
O_2 = NA

FERNALD RI/FS

DAR	7/3/90			
Initial	E.T.		CT	96
	Field Check	1st Review	2nd Sign	Final Data Verification

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.7	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1523	COORDINATES: N.479,406.55, E.1,379,945.37	DATE	6-26-90
ELEVATION: 574.3 ft GROUND	GWL: Depth Date/Time	DATE	STARTED: 6-26-90
ENGINEER/GEOLOGIST: J. MASON	Depth Date/Time	DATE	COMPLETED: 6-27-90
DRILLING METHODS: CME 45 AUGER RIG		PAGE	1 OF 5

DEPTH (Ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 in.	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	CONSISTENCY (TSF)	REMARKS
1	55495 6-26-90 1625	8	5	medium dence (10yr 4/4) dark yellowish brown clayey gravel	GC	NA	Hnu = 0 ∝ = 0 βγ = 500 cpm
	55496 6-26-90 1625	12	0	NR			
	55497 6-26-90 1625	12	0	NR			
2	55498 6-26-90 1628	10	6	very stiff (10yr 4/4) dark yellowish brown clayey gravel	GC	NA	Hnu = 0 ∝ = 0 βγ = 440 cpm
	55499 6-26-90 1628	8	6	SAA	GC		
3	55500 6-26-90 1628	10	0	NR			
4	55501 6-26-90 1630	5	6	very stiff (10yr 3/2) very dark grayish brown clayey gravel	GC	NA	Hnu = 0 ∝ = 0 βγ = 510 cpm
	55502 6-26-90 1630	9	6	SAA	GC		
	55503 6-26-90 1630	10	0	NR			
5	55504 6-26-90 1635	5	6	medium stiff, (10yr 5/3) brown clay, some gravel (small + broken up)	CL	<1	Hnu = 0 ∝ = 0 βγ = 400 cpm
	55505 6-26-90 1635	6	0	NR			
6	55506 6-26-90 1635	4	0	NR			
7	55507 6-26-90 1639	6	6	very soft, (10yr 3/6) dark yellowish brown clay (silty)	CL	<.25	Hnu = 0 ∝ = 0 βγ = 340 cpm
	55508 6-26-90 1639	2	2	SAA	CL	<.25	
	55509 6-26-90 1639	3	0	NR			

NOTES: CONTRACTOR: PENNDRILL
RIG: CME 45
DRILLER: BOB YOST
ASSISTANT: BRIAN STRAPAZZON
∝ METER: ASI # 9
βγ METER: ASI # 11
Hnu METER: E 221

SAMPLES COLLECTED PER ASTM STANDARD PENETRATION
COLORS IDENTIFIED USING MUNSELL COLOR CHART
BACKGROUND LEVELS Hnu: 0 ppm
∝: 0 cpm
βγ: 400 cpm
LEL: } NOT NEEDED FOR THIS LOCATION
O2: }

NR - NO RECOVERY
SAA - SAME AS ABOVE

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.7.1	PROJECT NAME: FERNALD RI/FS	
BORING NUMBER: 1523	COORDINATES:	DATE: 6-26-90 / 6-27/90
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 6-26-90
ENGINEER/GEOLOGIST: J MASON	Depth Date/Time	DATE COMPLETED: 6-27-90
DRILLING METHODS: AUGER (HOLLOW STEM) CME 45		PAGE 2 OF 3

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER 6 (12")	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
8	55510 6-26-90 1646	1	0	NR	NA	NA	HNU = 0 α: 0 Bβ: 400 cpm
	55511 6-26-90 1646	2	0				
	55512 6-26-90 1646	2	0				
9	55513 6-26-90 1718	3	6	stiff, 10yr 5/6, yellowish brown silty clay (some gravel), WET	CL	2.0	HNU: 0 α: 0 Bβ: 460 cpm
	55514 6-26-90 1718	8	0	NR			
10	55515 6-26-90 1718	4	0	NR			
	55516 6-26-90 1723	4	6	stiff (10yr 5/6) yellowish brown silty clay, WET	CL	2.0	HNU: 0 α: 0 Bβ: 460 cpm
11	55517 6-26-90 1723	4	0	NR			
	55518 6-26-90 1723	4	0	NR			
12	55519 6-27-90 0820	4	6	Loose, 10yr 5/2 grayish brown clayey silt, WET	ML	NA	HNU: 0 α: 0 Bβ: 350 cpm
	55520 6-27-90 0820	3	2	SAA			
13	55521 6-27-90 0820	2	0	NR			
	55522 6-27-90 0845	3	6	MEDIUM DENSE (10yr 5/3) Brown clayey silt, wet.	ML	NA	HNU: 0 α: 0 Bβ: 400 cpm
14	55523 6-27-90 0845	5	6	SAA	ML	NA	
	55524 6-27-90 0845	9	0	NR			

NOTES: CONTRACTOR: PENNDRILL
RIG: CME 45
DRILLER: BOB YOST
ASSISTANT: BRIAN STRAPAZZON
α METER: ASI # 9
Bβ METER: ASI # 11
HNU METER: B 221

SAMPLES COLLECTED PER ASTM STANDARD PENETRAT
COLORS IDENTIFIED USING MUNSELL COLOR CHART

BACKGROUND LEVELS HNU: 0 ppm
α: 0 cpm
Bβ: 400 cpm
LEL: N/A

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 602 3.7.1	PROJECT NAME: FERNALD RI/FS	
BORING NUMBER: 1523	COORDINATES:	DATE: 6-27-90
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 6-27-90
ENGINEER/GEOLOGIST: J MASON	Depth Date/Time	DATE COMPLETED: 6-27-90
DRILLING METHODS: AUGER (HOLLOW STEM)		PAGE 3 OF 3

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (ISF)	REMARKS
	55525 6-27-90 0850	4	4	Loose 10yr 5/2 grayish brown clayey silt, some gravel, wet	ML	NA	HNU: 0 α: 0 BB: 350 cpm
	55526 6-27 0850	4	0	NR			
16	55527 6-27 0850	8	0	NR			
	55523 6-27 0900	8	6	Medium dense 10yr 5/2 grayish brown sand, poorly graded, wet some silt, some clay	SP	NA	HNU: 0 α: 0 BB: 400 cpm
17	55529 6-27 0900	10	6	SAA	SP	NA	
	55530 6-27 0900	11	0	NR			
18	55531 6-27 0905	7	5	Loose 10yr 5/2 grayish brown sandy silt, some gravel,	ML	NA	HNU: 0 α: 0 BB: 380 cpm
	55532 6-27 0905	5	0	NR			
19	55533 6-27 0905	7	0	NR			
	55534 6-27 0905	5	0	NR			HNU: α: BB:
20				BOTTOM OF BORING @ 20.0 FT. SAMPLING ENDED @ 20.0 FT.			

NOTES: CONTRACTOR: PENNDRILL
RIG:
DRILLER: BOB YOST
ASSISTANT: BRIAN STRAPAZZON
α METER: ASI # 9
BB METER: ASI # 11
HNU METER: P 221

SAMPLES COLLECTED PER ASTM STANDARD PENETRATION
COLORS IDENTIFIED USING MUNSEL COLOR CHART
BACKGROUND LEVELS HNU: 0
α: 0
BB: 375 cpm
LEL: } NA
O_2: }

FERNALD RI/FS

PIEZOMETER INSTALLATION SHEET

PROJECT NAME FMPC RI/FS FIELD ENG./GEO. J MASON DATE 6-27-90
PROJECT NO. 602 3.7.1 CHECKED BY E Trollinger DATE ~~7~~-3-90
BORING NO. 1523
PIEZOMETER NO. 1523 DATE OF INSTALLATION 6-27-90

BOREHOLE DRILLING

DRILLING METHOD AUGER (8 in) | TYPE OF BIT AUGER
DRILLING FLUID (S) USED: NA | CASING SIZE (S) USED: NA
FLUID 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 PIEZOMETER
DIAMETER OF PERFORATED SECTION 2 in I.D.
PERFORATION TYPE:
SLOTS ☑ HOLES ☐ SCREEN ☐
AVERAGE SIZE OF PERFORATIONS .020 in.
TOTAL PERFORATED AREA 10 feet

RISER PIPE MATERIAL SCH. 40 PVC
RISER PIPE DIAMETERS:
O.D. 2 3/8 in. I.D. 2 in I.D.
LENGTH OF PIPE SECTIONS 10 feet, 2 feet
JOINING METHOD Screw type flush jointed

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5 feet
PROTECTIVE PIPE O.D. 4 5/8 in.
OTHER PROTECTION Locking, hinged lid with padlock

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (FT)		ELEVATION (FT)	
TOP OF RISER PIPE	ET 7-3-90 ~~1.583~~ 1.8		576.2	
GROUND SURFACE	0.0		574.4	
BOTTOM OF PROTECTIVE PIPE	ET 7-3-90 ~~2.17~~ ~~5~~ 2.8		571.6	
BOREHOLE FILL MATERIALS:				
~~GROUT/SLURRY~~ CEMENT (ET)	TOP ~~2~~ 0.0 (JCM 6-29-90)	BOTTOM ~~8~~ 2.0 (JCM 6-29-90)	TOP 574.4	BOTTOM 572.4
BENTONITE PELLETS	TOP 2.0	BOTTOM 8.0	TOP 572.4	BOTTOM 566.4
SAND 10/20 SIZE	TOP 8.0	BOTTOM 20.0	TOP 566.4	BOTTOM 554.4
GRAVEL NOT USED	TOP NA	BOTTOM NA	TOP NA	BOTTOM NA
PERFORATED SECTION	TOP 10.0	BOTTOM 20.0	TOP 564.4	BOTTOM 554.4
PIEZOMETER TIP	20.0		554.4	
BOTTOM OF BOREHOLE	20.0		554.4	
GWL AFTER INSTALLATION	NOT MEASURED		NA	

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

REMARKS PIEZOMETER WAS SET IN THIS LOCATION ON BOB GOLDSMITH'S DIRECTION, THIS WILL BE THE ONLY ONE SET FOR THESE BORINGS 1519-1523.

* NOTE (4) 4 in DIAMETER GUARD POSTS INSTALLED AROUND THIS LOCATION BECAUSE OF PARK LOT LOCATION. 2 FT ABOVE GROUND.

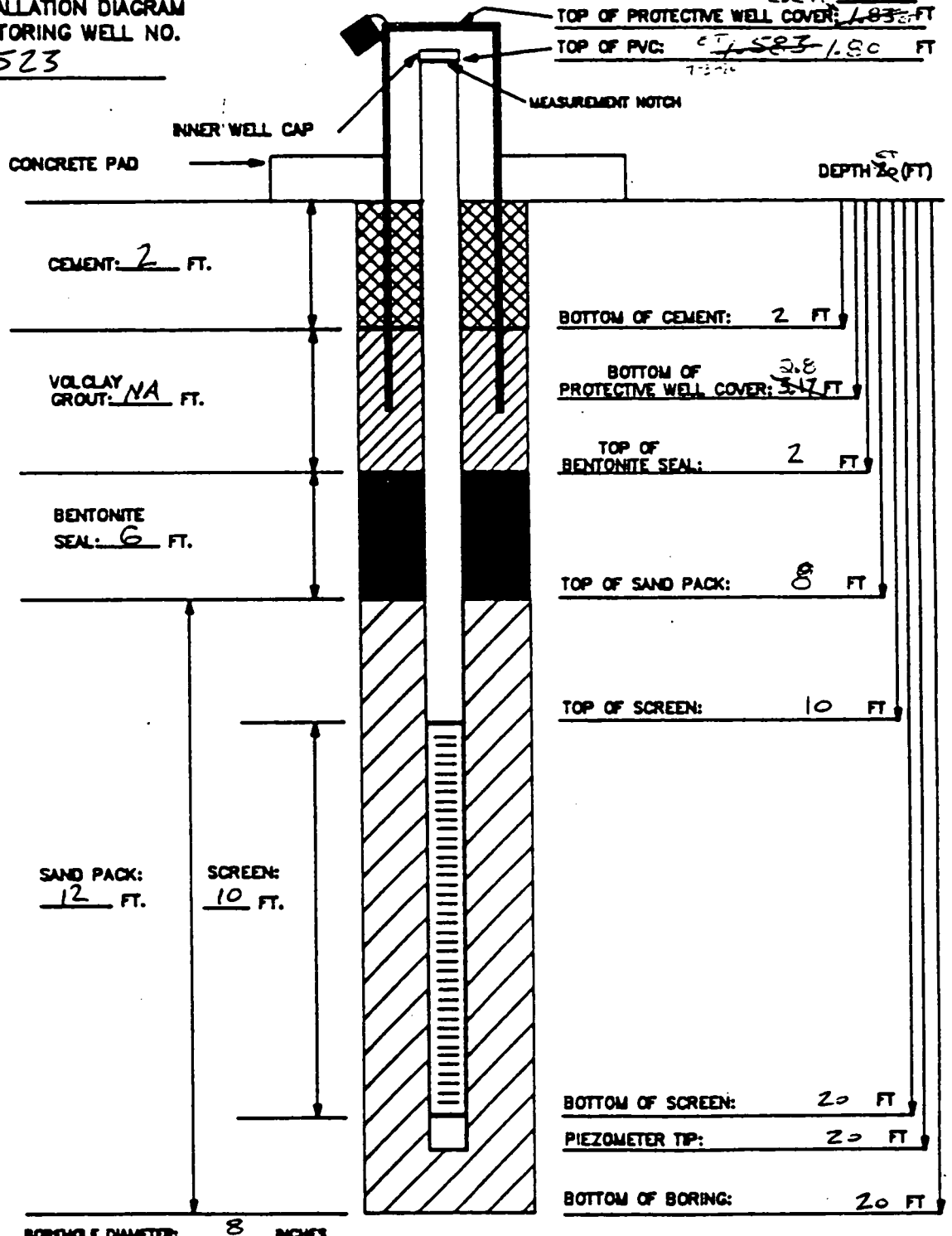
5/5

INSTALLATION DATE: 6-27-90

FERNALD RI/FS

INSTALLATION DIAGRAM
MONITORING WELL NO.
1523

5396



BOREHOLE DIAMETER: 8 INCHES

MATERIALS USED:
SAND TYPE AND QUANTITY: 10/20 #20 SILICA @ 4 BAGS
BENTONITE PELLETS (5-GALLON BUCKETS): 3 BUCKETS
BAGS OF VOLCLAY GROUT: NA
AMOUNT OF CEMENT: 1 BAG
AMOUNT OF WATER USED: 5 GAL
OTHER:

NOTES:
1) RISER PIPE IS 2-INCH SCHEDULE 40 PVC PIPE, FLUSH-THREADED JOINTS.
2) SCREEN IS 2-INCH I.D. SCHEDULE 40 PVC PIPE WITH 0.020-INCH SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH/DATE: NOT MEASURED

TASK: 3.7.1

GEOLOGIST/ENGINEER: J. MASON

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

Introduction

The Consent Agreement (CA) under 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 June 1 through June 30, 1990 and planned actions for the period July 1 through July 31, 1990.

Highlights of work performed in June include the following:

- The Community Relations Plan for the Waste Pit Area Stormwater Runoff Control Removal Action was completed and placed into the Administrative Record on June 4, 1990.
- The Waste Pit Area Stormwater Runoff Control Engineering Evaluation/Cost Analysis document was transmitted to the U.S. EPA on June 1, 1990 for review and approval.
- The Revised Plant 6 Work Plan was transmitted to the U.S. EPA on June 8, 1990.
- U.S. EPA's comments on the Plant 2/3 and Plant 9 Work Plans were received.
- Six RI/FS monitoring wells were installed in June and five wells were developed during the period.
- Forty-four facility-testing piezometers and twelve monitoring wells were sampled in June.
- The RI/FS Community Relations Plan was revised to reflect U.S. EPA's comments and resubmitted to U.S. EPA on June 4, 1990.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

WORK ASSIGNMENTS AND PROGRESS

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

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

CA Section IX. Removal Actions

Section IX provides an update of activities associated with the implementation of Removal Actions (RAs) at the FMPC for June 1990. The information is presented for each of the four removal actions identified in the Consent Agreement, including:

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

RA No. 1, Contaminated Water Beneath FMPC Buildings

Plant 6 - The ongoing pumping activity from the three wells and the clarifier pit remained curtailed during June. The appropriate solution to the HSL/VOC contamination concerns were investigated and the removal action work plan was modified in accordance with the U.S. EPA's May request. A modified work plan was developed and transmitted for the U.S. EPA's review/approval on June 8, 1990.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

RA No. 1, Contaminated Water Beneath FMPC Buildings

Plant 6 (cont'd.)

The CA specifies that the U.S. EPA has a 30 day review/approval period, closing on July 8, 1990. The modifications to the work plan identified sampling, analytical and treatability testing and the design/procurement/construction actions necessary to restart the pumping of the perched water beneath Plant 6. Actions specified in the modified work plan associated with the collection & analysis and laboratory testing of potential treatment technologies have been initiated.

Plant 2/3 and Plant 9 - The work plans for Plant 2/3 and Plant 9 were submitted for the U.S. EPA's review/approval on May 4, 1990. The U.S. EPA's comments on the two work plans were received on June 19, 1990. The U.S. EPA comments disapproved the work plans as submitted and requested the DOE to submit revised work plans, incorporating their comments, and responsiveness summaries to U.S. EPA comments within thirty days.

Activities for the month of July will center around responding to the U.S. EPA's comments and on the continuation of planning and engineering necessary to implement the activities. In addition, actions necessary to sample and analyze borings in areas suspected of being contaminated with hazardous material in Plant 2/3 and Plant 9 have been initiated. Preliminary testing of potential treatment technologies is ongoing.

KEY MILESTONES	STATUS	DATE
o Issue revised Plant 6 Work Plan for U.S. EPA review/approval	Completed	June 8, 1990
o Receive U.S. EPA's comments/approval on Plant 2/3 Work Plan	Completed	June 19, 1990
o Receive U.S. EPA's comments/approval on Plant 9 Work Plan	Completed	June 19, 1990
o Receive U.S. EPA's comments/approval on Plant 6 Work Plan	Open	July 8, 1990

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

RA No. 1, Contaminated Water Beneath FMPC Buildings

Plant 2/3 and Plant 9 (cont'd)

KEY MILESTONES	STATUS	DATE
o Issue revised Plant 2/3 Work Plan for U.S. EPA's review/approval	Open	July 18, 1990
o Issue revised Plant 9 Work Plan for U.S. EPA's review/approval	Open	July 18, 1990

RA No. 2, Waste Pit Runoff Control

The Engineering Evaluation/Cost Analysis (EE/CA) was prepared and submitted for U.S. EPA and public review on May 29, 1990. The U.S. EPA and public review period is scheduled to close on July 2, 1990. A public workshop to discuss the Waste Pit Runoff Control EE/CA was held on June 6, 1990, at Crosby Elementary School. This workshop provided the public with pertinent information regarding the EE/CA process and the alternative selection process. The information session was followed by both an informal question and answer session and a formal verbal comment period. No formal verbal comments were received from the public at the meeting. The Community Relations Plan for the Waste Pit Runoff Control removal action was prepared and placed into the Administrative Record on June 4, 1990.

Activities in July will center on the receipt of U.S. EPA, Ohio EPA and public comments and on the development and transmittal of responsiveness summaries and a revised EE/CA to the U.S. EPA.

RA No. 3, South Groundwater Contamination Plume

The extended public comment period for the South Plume EE/CA closed on June 18, 1990, fifteen days after the close of the U.S. EPA's comment period. Consistent with the provisions of the CA, DOE was scheduled to provide a responsiveness summary and a revised EE/CA incorporating the U.S. EPA's comments by June 16, 1990. The DOE formally requested an extension until August 1, 1990 to allow for the simultaneous incorporation of all review comments. On June 19, 1990, the DOE received notification from the U.S. EPA that its extension request had been denied.

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

The U.S. EPA did grant a fifteen (15) day extension period for the submittal of the responsiveness summary and the revised EE/CA until July 2, 1990. The DOE will formally request an additional extension and notify the U.S. EPA of DOE's intention to initiate informal dispute resolution. Work in the upcoming month will center around the reconciliation of comments, the development of responsiveness summaries and the resubmittal of the EE/CA. The revised EE/CA document will be submitted to the U.S. EPA and Ohio EPA by August 1, 1990.

RA No. 4, Silos 1 and 2

During June, the second draft of the Silos 1 and 2 EE/CA was submitted to DOE-HQ for review. Work is progressing on schedule to meet the August 1, 1990 EE/CA submittal date to the U.S. EPA as specified in the CA.

CA Section X. Remedial Investigation and Feasibility Study

Section X provides a FMPC operable unit and RI/FS Community Relations and Field Activities update of activities for June 1990. Status information is presented for each of the five Operable Units identified in the Consent Agreement. The five Operable Units are:

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

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

Operable Unit 1: Waste Pits

1.1 Remedial Investigation

a. Status of Work - Key Milestones

The following activity was in progress during this period.

Activity	Comment
Prepare Draft RI Report	40% completed

b. Issues/Problems

Contractor internal comments on the OU4 RI Report which were also applicable to the OU1 RI Report are being resolved.

Issues include:

- QA review of RI data/data validation;
- Focus of RI - Report should highlight both accomplishments and/or data deficiencies;
- Lack of timely preparation of data tables and map production from master database.

c. Corrective Actions

The issues described above will be resolved by consensus between involved organizations.

To resolve internal issues relative to data management, a system of database, table, and map request priorities have been developed to provide timely support.

d. Planned Activities for July 1990

Activities will center around continued preparation of the Draft RI Report and resolution of internally generated comments.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

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

1.2 Feasibility Study

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

Activity	Comment
Bench scale testing plan	Internal Review ongoing
Sampling and Analysis Plan	Internal Review ongoing
Prepare Revised Initial Screening of Alternatives Report	80% complete
Detailed Analysis of Alternatives (Detailed Analysis of Alternatives)	55% complete
Applicable Relevant and Appropriate Requirements (ARAR) refining and updating	ARARs are approximately 70% complete for Detailed Analysis of Alternatives

b. **Issues/Problems**

None to report

c. **Corrective Actions**

None to report

d. **Planned Activities for July 1990**

Activities will center around the preparation of the Detailed Analysis of Alternatives (DAA), presentation for DAA Report contractor internal review in August 1990 and issuing the Draft Final Initial Screening of Alternatives Report to EPA on July 24, 1990. The initial listing of ARARs and To Be Considered (TBC) requirements are to be presented to the U.S. EPA, Region V on July 13, 1990.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

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

1.3 Risk Assessment

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

The following activities were in progress or completed during June 1990.

Sub-tasks in progress:

- o Compilation of environmental sampling data for radionuclides;
- o Preparation of fate and transport calculations for groundwater pathways;
- o Review of calculational models for transport via surface water and air pathways;
- o Estimation of contaminant intake for each pathway;
- o Toxicity assessment; and
- o Completion of Draft Baseline RA Report comment resolutions.

FS risk assessment sub-tasks in progress:

- o The RA team is working directly with the FS engineering task teams for all operable units on a routine basis. The FS RAs are in their initial phases and are proceeding on schedule as an integral part of the FS activities. Risk assessment involvement in the determination of remedial objectives and goals is proceeding. A method for the incorporation of risk assessment activities into the evaluation of "Detailed Analysis of Alternatives" has been developed and adopted to ensure consistency for all operable units.

b. **Issues/Problems**

None to report

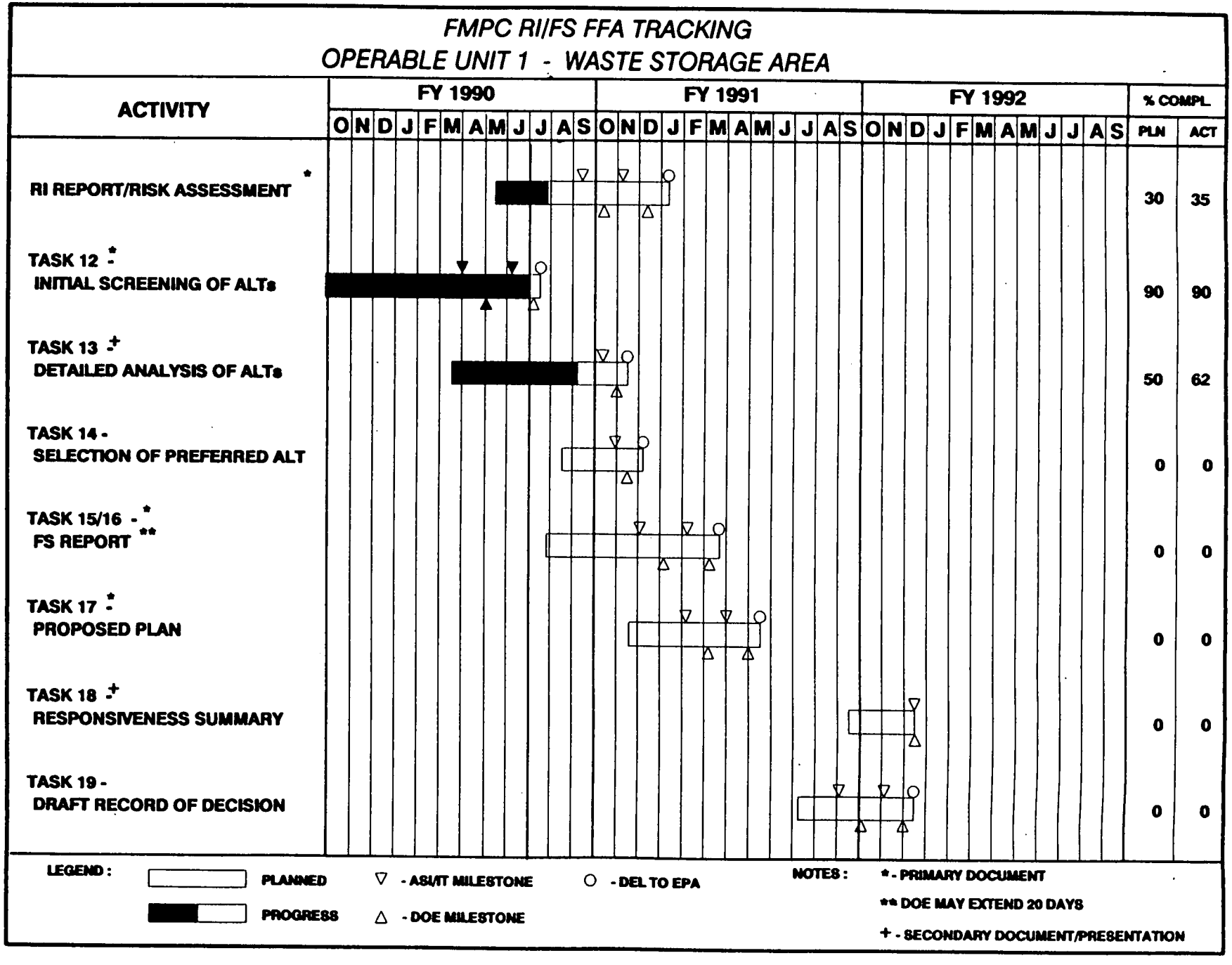
c. **Corrective Actions**

None to report

d. **Planned Activities for July 1990**

See Section 1.3-a. "Sub-tasks in progress" and "FS risk assessment sub-tasks in progress."

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT
Period Ending June 30, 1990



CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

Operable Unit 2: Other Waste Units

2.1 Remedial Investigation

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

The initial draft of the RI Reports is in progress. The document was submitted for internal review and comments are being incorporated. A draft copy of the Baseline Risk Assessment was completed for inclusion in the Draft RI Report.

b. **Issues/Problems**

None to report

c. **Corrective Actions**

None to report

d. **Planned Activities for July 1990**

The RI Report is scheduled for delivery in mid-July to the DOE Site Office for initial review.

2.2 Feasibility Study

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

DOE HQ comments were received on the Initial Screening of Alternatives Report at the end of June as scheduled. The comments are being evaluated concurrently with the completion of the Detailed Analysis of Alternatives.

The Detailed Analysis of Alternatives is in progress. The various criteria are being addressed by team members. Completion of this task is expected in late July or early August.

b. **Issues/Problems**

Fate and Transport modeling results for groundwater are being completed so that the alternative specific risk assessment can proceed for the groundwater pathway.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

Operable Unit 2: Other Waste Units (cont'd.)

2.2 Feasibility Study (cont'd.)

c. **Corrective Actions**

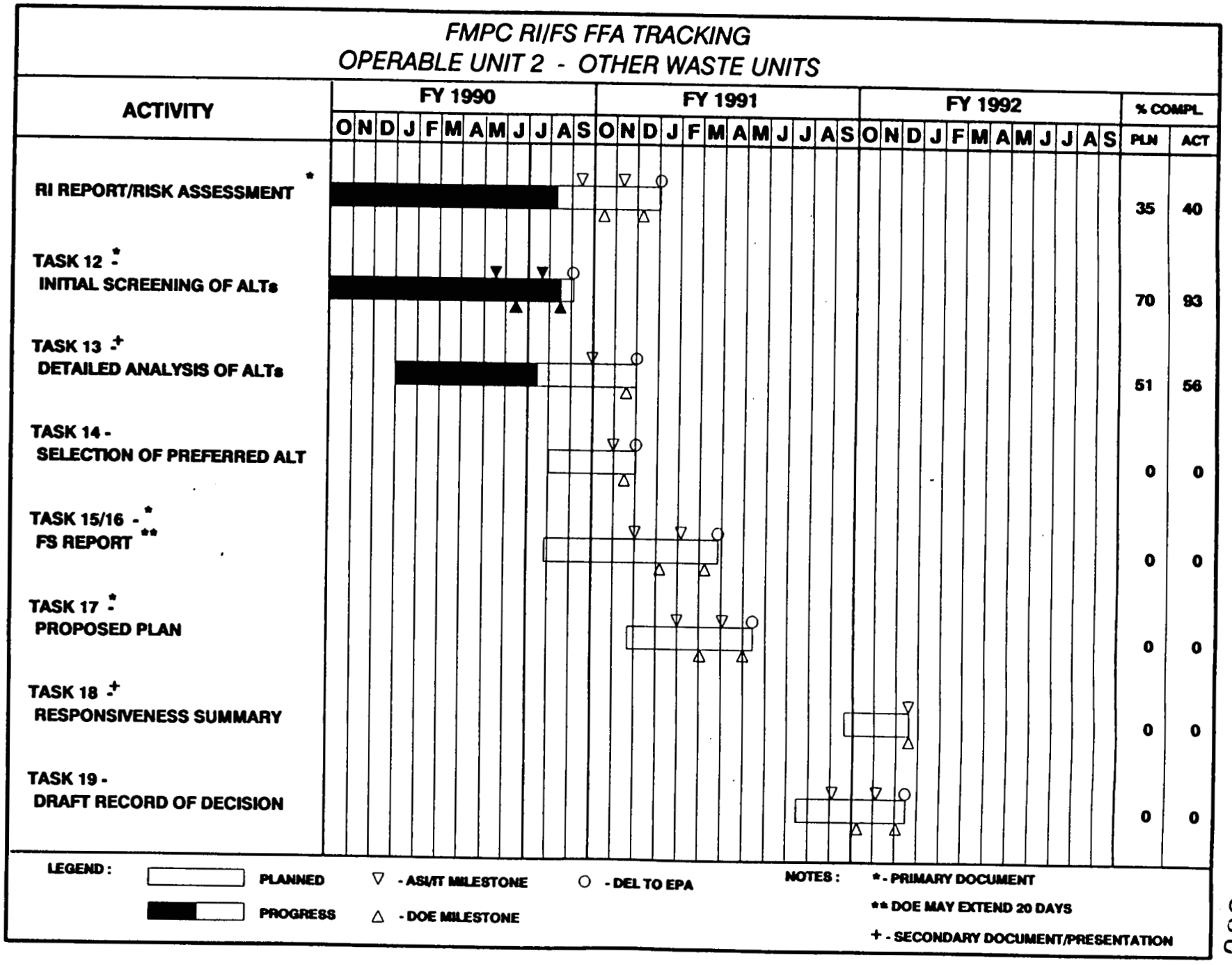
None to report

d. **Planned Activities for July 1990**

The presentation of Detailed Analysis of Alternatives to DOE is expected to occur in August. Selection of Preferred Alternative, can then proceed. Draft FS Report is expected to begin in late July.

2.3 Risk Assessment

The draft Baseline Risk Assessment was received in June. The Alternative Specific Risk Assessments document is forecasted for completion in late July or early August.


FMPC RI/FS FFA TRACKING
OPERABLE UNIT 2 - OTHER WASTE UNITS
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 *
35
40
TASK 12 - *
INITIAL SCREENING OF ALTs
70
93
TASK 13 - +
DETAILED ANALYSIS OF ALTs
51
56
TASK 14 -
SELECTION OF PREFERRED ALT
0
0
TASK 15/16 - *
FS REPORT **
0
0
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

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

Operable Unit 3: Production Area and Suspect Areas

3.1 Remedial Investigation

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

The Remedial Investigation Report work is currently 25% complete which will result in submittal of the draft document by the CA date of April 8, 1991. Tabulation and evaluation of perched groundwater data is the primary technical emphasis now underway. Progress during the month included planning and technical meetings of the groundwater working group.

b. **Issues/Problems**

Remedial Investigation work is currently on schedule for CA submittal, however, the schedule reporting does not reflect this as this report is tied via schedule logic to the Risk Assessment Report.

c. **Corrective Actions**

Review and modify RA progress reporting.

d. **Planned Activities for July 1990**

Continue work on groundwater modelling to support RI.

3.2 Feasibility Study

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

The Feasibility Study work continues on schedule. During June, a draft Initial Screening of Alternatives report under went contractor internal review.

Detailed Analysis of Alternatives activities were initiated and significant progress was made after the completion of a one week, on-site, information gathering inspection.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

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

3.2 Feasibility Study (cont'd.)

b. **Issues/Problems**

None to report

c. **Corrective Actions**

None required

d. **Planned Activities for July 1990**

Initial Screening of Alternatives activities will center on addressing first round internal comments. The primary Detailed Analysis of Alternatives activities focus on preparing detailed construction cost estimates.

3.3 Risk Assessment

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

This work is 35% complete versus a plan of 40%. During June, data available from RI/FS facilities testing and other sources were reviewed and tabulated. This was followed by initiation of work related to source term identification by production area quadrant and suspect area.

b. **Issues/Problems**

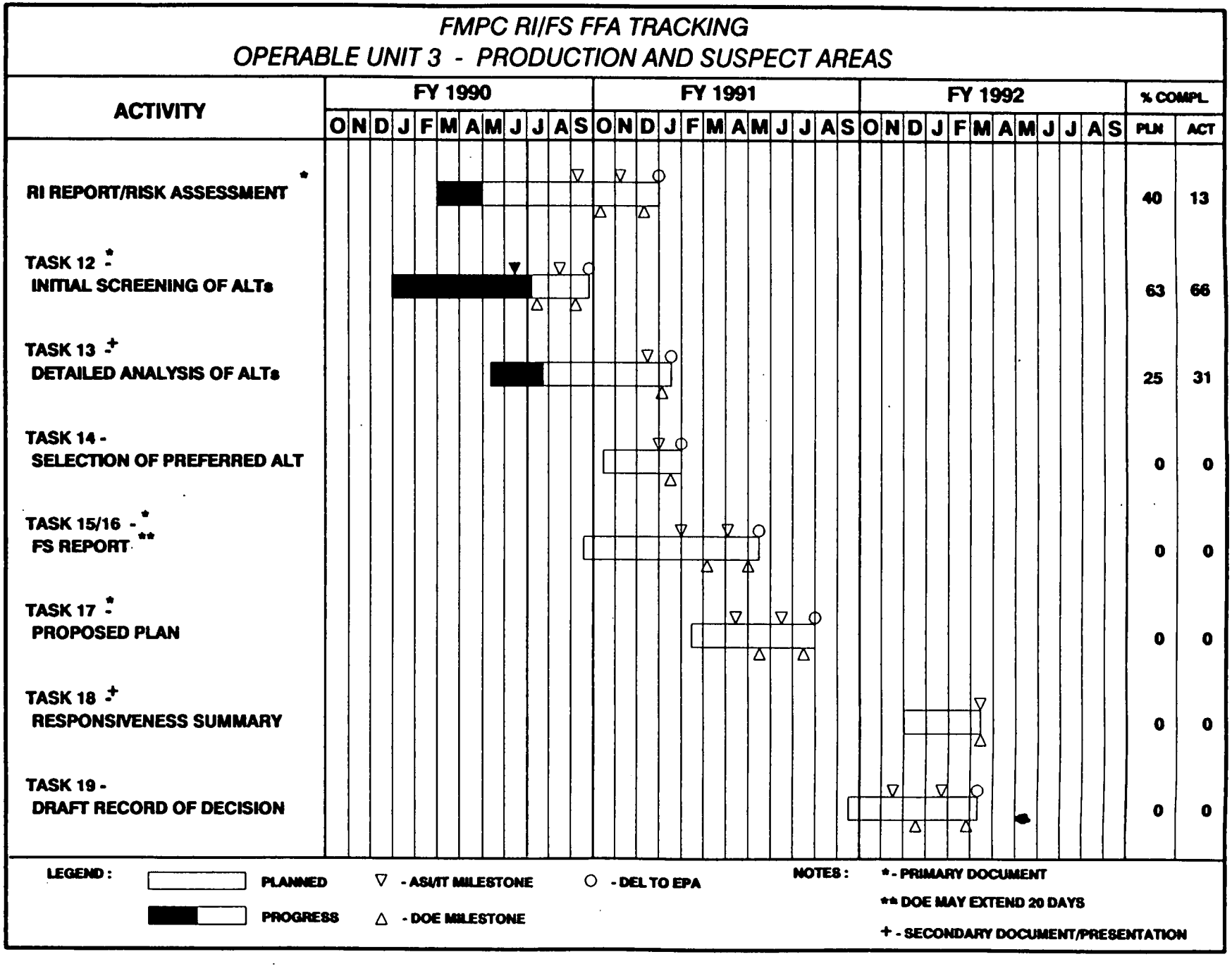
Schedule status report shows RA progress as 13% versus a plan of 40%.

c. **Corrective Actions**

Correct schedule status reporting to reflect actual progress. The 5% lag in schedule can be easily made up given that 60% of the task remains to be done. Toxic profiles and other data/reports developed during the OU2 RA effort will be utilized in part on OU3 RA.

d. **Planned Activities for July 1990**

Complete source term identification work.


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 *
40
13
TASK 12 - *
INITIAL SCREENING OF ALTs
63
66
TASK 13 - +
DETAILED ANALYSIS OF ALTs
25
31
TASK 14 -
SELECTION OF PREFERRED ALT
0
0
TASK 15/16 - * **
FS REPORT
0
0
TASK 17 - *
PROPOSED PLAN
0
0
TASK 18 - +
RESPONSIVENESS SUMMARY
0
0
TASK 19 -
DRAFT RECORD OF DECISION
0
0
LEGEND :
PLANNED
PROGRESS
▽ - ASI/IT MILESTONE
△ - DOE MILESTONE
○ - DEL TO EPA
NOTES :
* - PRIMARY DOCUMENT
** DOE MAY EXTEND 20 DAYS
+ - SECONDARY DOCUMENT/PRESENTATION

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

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

4.1 Remedial Investigation

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

The following activity was in progress during June.

Activity	Comment
Revise Draft RI Report	80% complete

b. **Issues/Problems**

Contractor internal comments on the OU4 RI Report, which were also applicable to the OU1 RI Report, are being resolved.

Policy issues raised in the OU4 RI Report comments needing to be resolved include:

- o QA review of RI data;
- o Cut-off date for inclusion of new data;
- o Addressing of NEPA requirements in RI Reports;
- o Lack of earlier preparation of data tables and map production from the master database.

c. **Corrective Actions**

Resources are being focused on the OU4 RI Report in an effort to meet the scheduled deadlines.

Most of the issues described will be resolved during a conference to be held among all parties.

FMPC management has developed a system of database, table, and map request priorities to provide timely support.

d. **Planned Activities for July 1990**

Activities will focus on revision of the Draft RI Report.

Operable Unit 4: Silos 1, 2, 3, and 4 (cont'd.)

4.2 Feasibility Study

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

The following activities were in progress or completed in June.

- o Detailed Analysis of Alternatives Presentation to the Site Office;
- o Tasks 14 and 15 underway;
- o Updating Detailed Analysis of Alternatives Presentation for U.S. EPA;
- o OU4 ARARs delivered to U.S. EPA

b. **Issues/Problems**

- o Delays in sampling K-65 Silos (residues & berm).

c. **Corrective Actions**

- o Sampling plans are being completed.

d. **Planned Activities for July 1990**

- o Detailed Analysis of Alternatives Presentation to EPA.
- o Radon Treatment System repairs to be completed in July.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

Operable Unit 4: Silos 1, 2, 3, and 4 (cont'd.)

4.3 Risk Assessment

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

The baseline risk assessment has been revised to address Site Office comments on the interim draft and to incorporate recent analytical results of silo samples obtained under the OU4 Supplemental Sampling Analysis Plan. Recently promulgated Report Style Guide comments and suggestions to provide consistency with other operable unit reports will be reflected in future reports.

b. **Issues/Problems**

The OU4 Risk Assessment Team is providing risk assessment information and support to both the RI and FS teams for OU4 as required. There are no reportable issues or concerns unique to OU4's risk assessment.

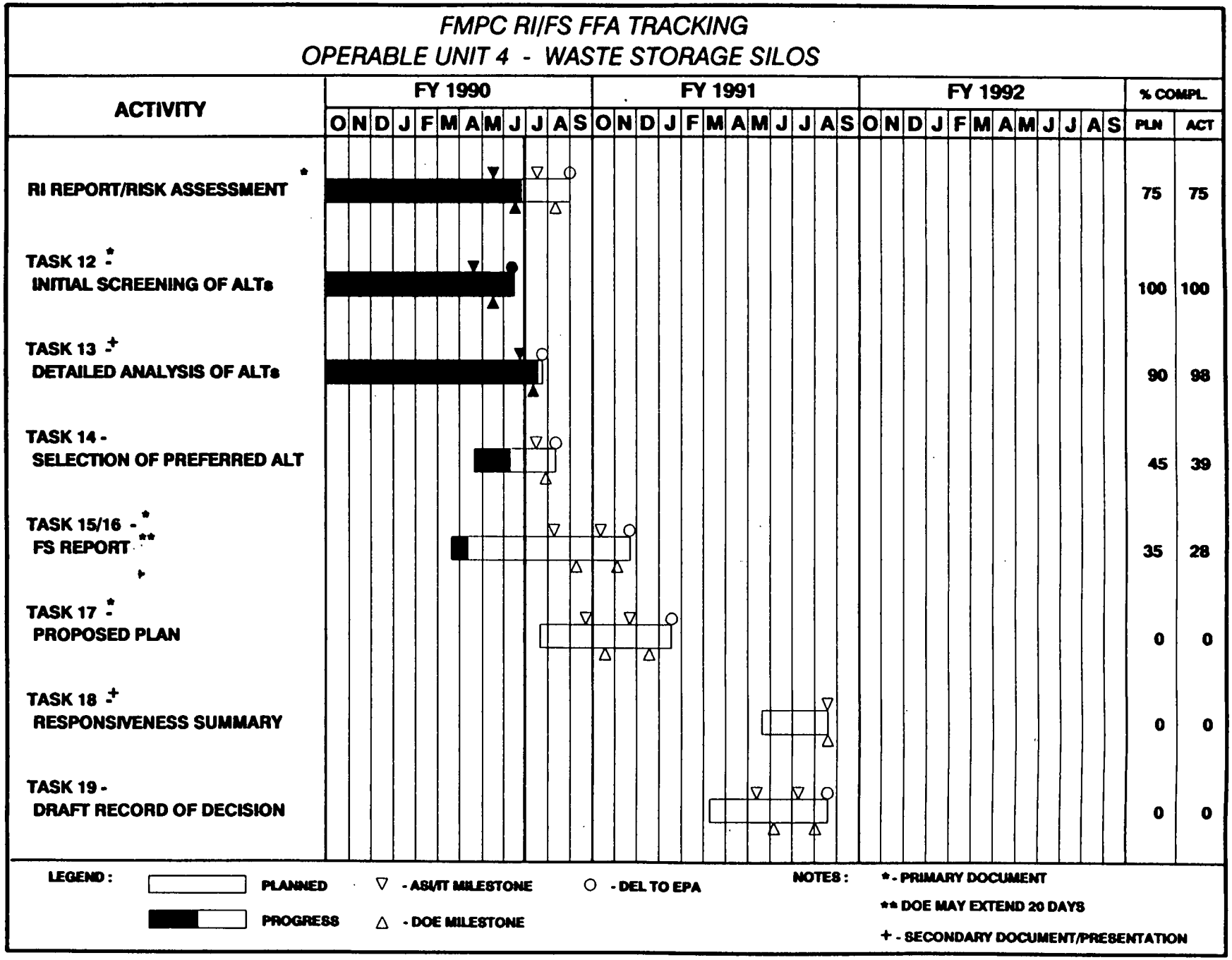
c. **Corrective Actions**

None to report

d. **Planned Activities for July 1990**

The Baseline Risk Assessment is being prepared for comment resolution and final redrafting and will include a groundwater pathway analysis.

Estimation of the risk to the public and workers resulting from remedial alternatives is being evaluated under the FS.


FMPC RI/FS FFA TRACKING
OPERABLE UNIT 4 - WASTE STORAGE SILOS
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 *
75 75
TASK 12 - *
INITIAL SCREENING OF ALTs
100 100
TASK 13 - +
DETAILED ANALYSIS OF ALTs
90 98
TASK 14 -
SELECTION OF PREFERRED ALT
45 39
TASK 15/16 - * **
FS REPORT
35 28
TASK 17 - *
PROPOSED PLAN
0 0
TASK 18 - +
RESPONSIVENESS SUMMARY
0 0
TASK 19 -
DRAFT RECORD OF DECISION
0 0
LEGEND :
PLANNED
PROGRESS
▽ - ASI/IT MILESTONE
△ - DOE MILESTONE
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CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

Operable Unit 5: All Environmental Media

5.1 Remedial Investigation

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

RI Report is 60% complete and on schedule.

Work continued on the completion of the comprehensive site groundwater report and other media components (sediment, soil, air) within the RI.

b. **Issues/Problems**

None

c. **Corrective Actions**

None

d. **Planned Activities for July 1990**

Continuation of work on the draft RI report.

5.2 Feasibility Study

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

The OU5 Initial Screening of Alternatives report is in internal review.

Work was initiated on Detailed Analysis of Alternatives.

b. **Issues/Problems**

None to Report.

c. **Corrective Actions**

None to Report

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

Period Ending June 30, 1990

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

5.2 Feasibility Study (Cont'd)

d. **Planned Activities for July 1990**

Continue work on draft Initial Screening of Alternatives report.

The draft Initial Screening of Alternatives report is scheduled for submittal to U.S. EPA on August 27, 1990. Work will continue on Detailed Analysis of Alternatives.

5.3 Risk Assessment

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

The Baseline Risk Assessment is on schedule.

b. **Issues/Concerns**

None to report

c. **Corrective Actions**

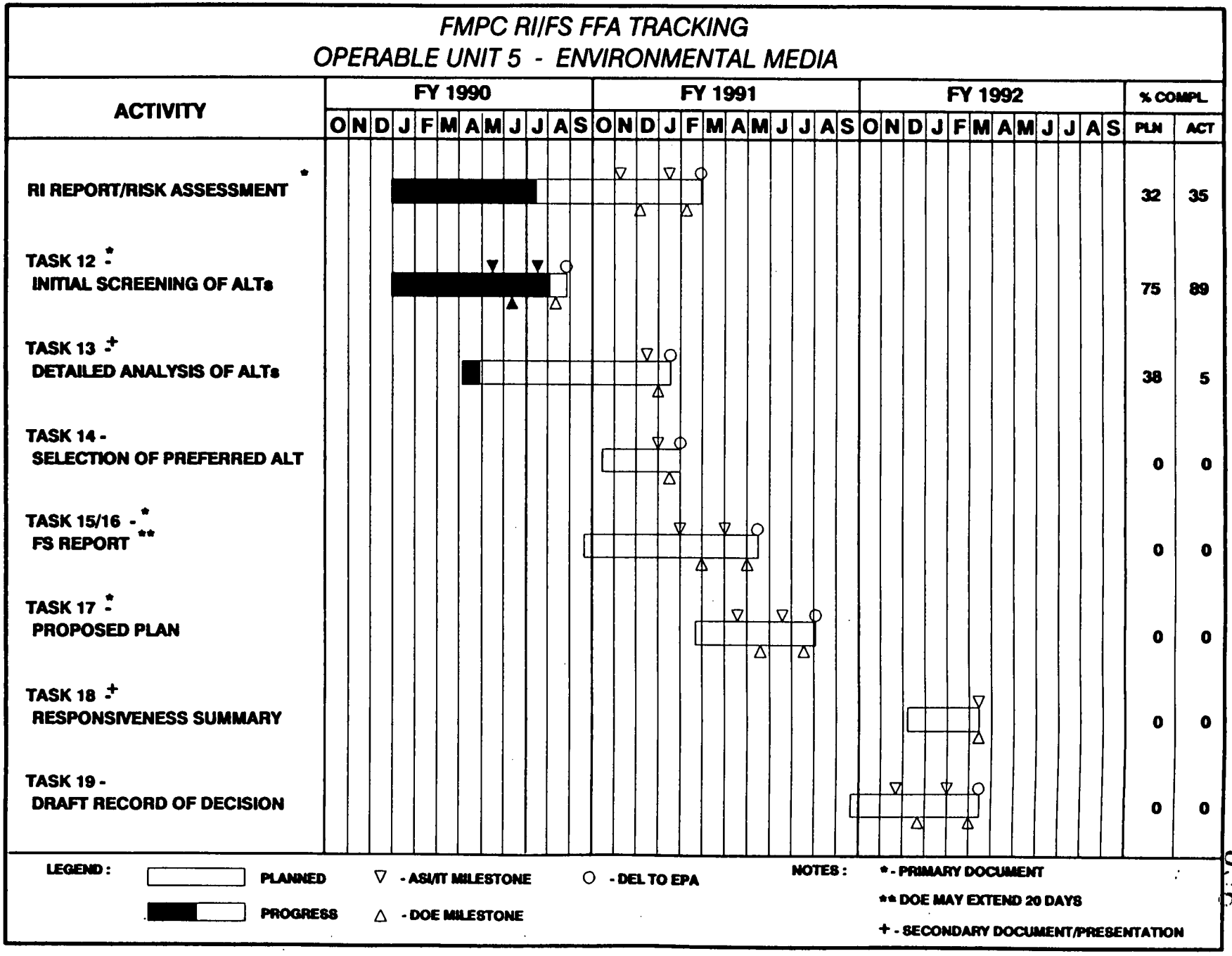
None

d. **Planned Activities for July 1990**

Continuation of FS Risk Assessment.

Continuation of Baseline Risk Assessment.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY
COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT
Period Ending June 30, 1990



RI/FS Community Relations and Field Activities

6.1/6.2 Remedial Investigation

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

May 22, 1990 RI/FS Community Meeting

Follow-up activities continued. These included:

- o Submitting copies of the meeting transcript to the Administrative Record and Reading Rooms;
- o Responding to eight requests for information; and
- o Adding 44 names to the RI/FS mailing list.

Removal Action: South Plume

- o Seven public comments were received during the public comment period (May 2 - June 18) focusing on the EE/CA.

Removal Action: Waste Pit Stormwater Runoff Control

- o Approximately 15 area residents attended the Waste Pit EE/CA workshop held on June 6.
- o Two comments from the public were received during the public comment period (May 30 - July 2) focusing on the EE/CA.

Roundtables

- o Five community members attended a community roundtable concerning radiation on June 19, 1990.

RI/FS Community Relations Plan

- o Resubmitted to U.S. EPA on June 4, incorporating U.S. EPA comments.
- o The Plan included strategy and a schedule for removal action community relations activities.

RI/FS Community Relations and Field Activities (cont'd.)

6.1/6.2 Remedial Investigation (cont'd.)

Announced Monitoring Wells Results

- Issued press release and notified affected property owners on June 4; - 17 RI/FS wells had elevated levels of uranium, most of which were on FMPC property.

RI/FS-EIS Scoping Materials

- Community Relations assisted with the scoping meetings--running newspaper ads, preparing a fact sheet, and preparing and distributing flyers to area businesses.
- Refer to the EIS summary for full details.

Other Activities

- Prepared for the scheduled July 5 Congressional Hearing to be held by U.S. Representative Thomas Luken at the Crosby Township School.
- Revised and distributed the RI/FS Community Calendar.

b. **Issues/Problems**

None to report

c. **Corrective Actions**

None needed

d. **Planned Activities for July 1990**

- Revise the draft RI/FS progress report, named the "FMPC Cleanup Update." Expect to publish first issue in August.
- Update and distribute RI/FS community calendar.
- Develop strategy for responsiveness summaries for community comments received during public comment periods; prepare summaries for comment periods ending in June.

RI/FS Community Relations and Field Activities (cont'd.)

6.1/6.2 Remedial Investigation (cont'd).

- o Develop workshop strategy for the RI/FS.
- o Develop strategy for ensuring that the FMPC Advisory Committee receives RI/FS primary deliverables in a timely manner.
- o Seek U.S. EPA comments on the revised Community Relations Plan submitted on June 4, 1990.

e. Field Activities

Monitoring Wells Installed in June

Monitoring Well 4125 was installed across from Delta Steel on Paddy's Run Road. Monitoring Well 2388 was installed between Plants 5 and 6 at the FMPC. Monitoring Well 2033 was installed directly east of K-65 Silo #1. Monitoring Well 2390 was installed in the field south of the WMCO/DOE west parking lot, and Monitoring Well 3387 was installed by the outfall ditch in the same field, adjacent to Well 2387. Monitoring Well 3046 was installed by the roadside of the trailer access road, forming a cluster with Wells 1046 and 2046. A total of six monitoring wells were installed in June.

Monitoring Well Development

The five monitoring wells developed in June include: 2028, 3046, 2390, 2033, and 3387.

Facility Testing Borings

The facility testing boring program resumed late in June with five borings completed. The laboratory burial pits (suspect areas) were drilled to a maximum depth of 20.0 feet. No buried material was encountered during the boring of Locations 1519, 1520, 1521, 1522, and 1523. Location 1523 had a piezometer installed. All other borings were plugged with bentonite.

Surveying Activities

Surveying continued establishing the horizontal and vertical coordinates as well as the elevation of the various locations selected for facilities testing borings.

RI/FS Community Relations and Field Activities (cont'd.)

6.1/6.2 Remedial Investigation (cont'd).

Water Sampling

Forty-four facility-testing piezometers were sampled during June. Twelve monitoring wells were sampled. Manhole 175 was sampled for full radiological and general groundwater parameters.

Water Level Measurements

Water level measurements were completed in late June for all monitoring wells and all piezometers installed under the FMPC RI/FS.

CONSOLIDATED CONSENT AGREEMENT/FEDERAL FACILITY COMPLIANCE AGREEMENT MONTHLY PROGRESS REPORT

596

Period Ending June 30, 1990

Introduction

Attachment A with its accompanying tables provides (1) data on daily wastewater flows and radionuclide concentrations and loadings released to the Great Miami River and (2) an estimate of runoff and radionuclide concentrations to Paddy's Run during June 1990 in accordance with the requirements of Section XXIII.B of the Consent Agreement under CERCLA Section 120 and 106(a).

Summary - June 1990

The total quantity of uranium discharged from the FMPC to the Great Miami River via Manhole 175 (Outfall 1I000004001) was 68.92 kilograms. The average uranium concentration for the previous twelve months was 0.72 mg/l. This is 80.9 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. Based on 3.92 inches of rainfall for the month, the total quantity of uranium discharged to Paddy's Run from uncontrolled areas of the FMPC is estimated to be 17.64 kilograms.