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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

AREA 3
LIME SLUDGE PONDS SOIL BORING SUMMARY

APRIL 1999

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

20205-RP-0001
REVISION 0
DRAFT C

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ACRONYMS AND ABBREVIATIONS

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CIS	Characterization Investigation Study
CGU	coarse grained unit
cpm	counts per minute
DOE	U.S. Department of Energy
DOE-FEMP	U.S. Department of Energy - Fernald Area Office
ft	feet
lbs/cf	pounds per cubic foot
LSP	lime sludge pond
MSL	mean sea level
NLSP	north lime sludge pond
OU2	Operable Unit 2
RI/FS	Remedial Investigation/Feasibility Study
USCS	Unified Soil Classification System

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1.0 INTRODUCTION

This report summarizes the boring information regarding the depth and location of the lime sludge and the underlying coarse grained unit in the area of the LSPs.

Soil borings were drilled in and around the vicinity of the Lime Sludge Ponds (LSPs) during the Characterization Investigation Sampling (CIS) performed in 1987-1988 and the Operable Unit 2 (OU2) Remedial Investigation/Feasibility Study (RI/FS) in 1992-1993. These borings were drilled to obtain lithological information to support the investigations and for subsequent conversion into groundwater monitoring wells. The lithological information provides a basis to estimate the depth of the lime sludge in the LSPs and to determine the location of the underlying coarse grained unit near the LSPs. The collected information will be used to assist in development of LSP excavation design documents. The design will be developed to provide the capability to adjust to a range of conditions that may be encountered during excavation of the lime sludge.

The CIS and RI/FS investigations on the LSPs also obtained chemical and characterization data on the lime sludge and surrounding soil berms; this information is summarized in the Implementation Plan for the LSPs.

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2.0 LIME SLUDGE DEPTH

According to the original design drawing (Drawing No. 3008-A-05-A, dated February 12, 1952), the LSPs were designed to be two incised ponds with a bottom elevation of 568 feet (all elevations are reported as feet above mean sea level, or msl). The design also noted a water elevation of 573.5 ft. (water depth of 5.5 feet deep) and a top of berm elevation of 576.5 ft. (total depth of 8.5 feet deep). Visual observations and recent mapping (based on 1999 ground survey) indicate that additional material was placed around the perimeter of the south LSP to increase the height of the berm.

During the CIS and the RI/FS, borings were drilled in the LSPs to obtain samples for chemical analysis and estimate the depth of the lime sludge. No survey information regarding horizontal and vertical locations of the CIS borings was recorded, and the locations as shown are approximate. The results of those borings are summarized on Table 2-1, and the associated boring logs are presented in Attachments A and B.

Placement of material in the north LSP ended in the early 1990s, after the CIS borings were drilled in 1987; therefore, the vertical sample coordinates are not relative to the present surface. Based on topography developed from a 1999 field survey, the east side of the pond is dry and has a surface elevation of approximately 577. The west side has standing water with a water elevation of approximately 576.5 ft. As shown on Table 2-1, borings drilled in the north LSP encountered lime sludge depths of 2 to 8.5 ft. The estimated bottom of lime sludge ranges from elevation 567 to 575 ft. However, borings indicating that the bottom of the sludge is above 570.5 feet were located at the edge of the pond and probably went through the pond sideslope. The borings in the middle of the north LSP indicate that the bottom of lime sludge is in the range of elevation 567 to elevation 569 ft; this is consistent with the design bottom of elevation 568 ft.

Placement of material in the south LSP stopped in the 1960s; therefore, both the CIS and RI/FS investigations were conducted following the conclusion of material placement. Based on topography developed from the 1999 ground survey, the surface of the south LSP ranges from elevation 578 ft on the west side to elevation 580 ft at the northeast corner. The berm around the perimeter of the south pond ranges from elevation 580 ft on the west side to elevation 582 ft on the east side. As shown on Table 2-1, borings drilled in the south LSP indicate lime sludge depths range from 10 to 12 feet. The

estimated bottom of lime sludge ranges from elevation 566.5 ft to elevation 569 ft; this is consistent with the design bottom elevation of elevation 568 ft.

In situ moisture density measurements (GEO-12, GEO-13, GEO-14 and GEO-15) were collected from the LSPs (see Attachment C). As shown in Attachment C, the dry density of the material ranged from 44.4 lbs/cf to 50.5 lbs/cf and the moisture content ranged from 57.8 to 82.7 percent.

TABLE 2-1
LIME SLUDGE PONDS - DEPTH OF LIME SLUDGE

Boring No.	Location	Estimated Ground Elev. (1)	Estimated Bottom of Sludge Elev. (1)	Boring Depth (ft)	Lime Sludge Thickness (ft)	Year	Comments
47-01 CIS	North LSP	577	567	10	3.5 (2)	1987	6.5 ft water above borehole
47-02 CIS	North LSP	577	567	10	5.5 (2)	1987	4.5 ft water above borehole
47-03 CIS	North LSP	577	569	8	7 (2)	1987	1 ft water above borehole
1956 RI/FS	North LSP	577	573	9.5	4	1993	Boring located near edge of pond
1957 RI/FS	North LSP	577	575	5	2	1993	Boring located near edge of pond
1958 RI/FS	North LSP	578	574	6	4	1993	Boring located near edge of pond
1959 RI/FS	North LSP	579	570.5	13.5	8.5	1993	Boring located near edge of pond
48-01 CIS	South LSP	579	566.5	12	11.5	1987	Clay encountered at bottom of borehole
48-02 CIS	South LSP	580	568.5	12	11.5	1987	Clay encountered at bottom of borehole
48-03 CIS	South LSP	580	570	12	10	1987	Sand encountered at bottom of borehole
1960 RI/FS	South LSP	579	567.5	13.5	11.5	1993	
1961 RI/FS	South LSP	589	569	13	10	1993	
1962 RI/FS	South LSP	580	569.5	14	10.5	1993	
1963 RI/FS	South LSP	580	568	15.5	12	1993	

(1) Elevations are estimated based on map contours from the OU2 RI; no surveying information is available.
(2) Refusal encountered at bottom of borehole; depth of sludge estimated to be at point of refusal

3.0 COARSE GRAINED UNIT

A coarse grained unit (CGU) underlies much of the LSP area. It was encountered in many borings drilled in the area during previous investigations. Key information about the CGU is summarized in Table 3-1. A map showing the boring locations and the boring logs are presented in Attachment D. The CGU, as defined and referenced in this summary report, consists of material classified as sand, gravel or a combination of these materials based on Unified Soil Classification System (USCS) classification guidelines. As shown on the boring logs, there is also a layer of silt in the area tha is sometimes adjacent to the CGU.

The CGU in the LSP area is neither laterally nor vertically persistent. As shown in Table 3-1, its thickness varies from 0 feet (borings 1041 and 1034) to 8.5 feet (boring 2042). The CGU transitions to clay (borings 1041 and 1934) and silt (borings 1210 and 2935) in the southeast corner of the LSP area. In addition, the coarse grained unit transitions into clay-like sediment in a small area of the northwest corner of the LSPs near borings 1937 and 2939.

The top of the CGU varies from gravelly sand at elevation 557.9 feet msl, as encountered in boring 1039, to silty sand at elevations 571.2 feet, as encountered in boring 1176. The top of the CGU is above elevation 567 feet, as evidenced by the borings on the east side of the LSP (1134 - sand and 1176 - silty sand); therefore, the CGU will likely be encountered during excavation of the LSP to elevation 567 ft.

Measurements of the perched groundwater elevations within the CGU in the LSPs indicate that the top of the zone varies from elevation 570 ft to elevation 575 ft. Previous sampling and modeling have shown that the CGU extends eastward beneath the Former Production Area, thus indicating that groundwater may flow into the LSP area during excavation, construction of the water management facility, and subsequent operations. Control of this perched groundwater will be managed through a perimeter drain system, as discussed in the separate Water Management Plan for the LSPs.

TABLE 3-1
LIME SLUDGE PONDS - BORING LOG DATA ON COARSE GRAINED UNIT (CGU)

				CGU Interval		CGU Elevation				
Boring No.	Location Description	Ground Elevation (ft)	Boring Depth (ft)	Top	Bottom	Top (ft)	Bottom (ft)	CGU Thickness (ft)	Boring Log Description of CGU	Year
1039	North of NLSP	577.4	27	19.5	23	557.9	554.4	3.5	gravelly sand	1988
1041	Northeast of SLSP	581.3	22.5	*	*	*	*	*	--	1989
1134	Northeast of NLSP	579.8	16.5	10	16.5	569.8	563.3	6.5	sand	1989
1176	East of NLSP	579.7	12	8.5	11.5	571.2	568.2	3	sand, silty sand	1989
1210	East of SLSP	579.4	10.5	7	10	572.4	569.4	(3) **	(silt) **	1993
1934	South of SLSP	577.8	21	*	*	*	*	*	--	1993
1937	West of NLSP	576.8	20.5	12.5	20.5	564.3	556.3	8	silt & sand	1993
2042	Southwest of SLSP	575.6	66.5	12	20.5	563.6	555.1	8.5	silty sand, sand	1988
2935	East of SLSP	579.2	57.5	10	12	569.2	567.2	(2) **	(silt)[1] **	1993
2939	West of NLSP	576.6	71	11.5	16	565.1	560.6	4.5	silt with fine sand	1933

[1] Additional silt layer from 20' to 27'

* No CGU encountered in borehole

** Silt layer encountered was not considered part of CGU

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ATTACHMENT A

Map of CIS Borings and Boring Logs

Boring No	Location
47-01	North Lime Sludge Pond
47-02	North Lime Sludge Pond
47-03	North Lime Sludge Pond
48-01	South Lime Sludge Pond
48-02	South Lime Sludge Pond
48-03	South Lime Sludge Pond

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47-01

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BOREHOLE AND TEST PIT SUMMARY *

SITE ID: Lime Sludge Lagoon
LOCATION ID: NW Channel, Borehole 1
LOCATION COORDINATES:
S N 2025
E 3050
GROUND ELEVATION (FT. MSL):

BH-BOREHOLE/~~TP-TEST PIT~~: 1
DRILLER/~~EXCAVATOR~~: Bowser Morner
COMPLETION DATE: 3/12/87
BOREHOLE DIAMETER (IN): 2"
TOTAL DEPTH (FT.): 3.5'
Water Depth: 6.5', Waste Thickness: 3.5'

WELL SUMMARY

WELL OWNER: N/a
INSTALLER:
INSTALLATION DATE:
CASING ELEV. (FT. MSL):
CASING LENGTH (FT.):
CASING DIA. (IN.):
SEAL (END) DEPTH (FT.):

FILTER PACK LENGTH (FT.):
FORMATION OF COMPLETION:
STRATIGRAPHIC ORDER:
OPEN/SCREEN DEPTH (FT.):
OPEN/SCREEN LENGTH (FT.):
OPEN/SCREEN AREA (IN.^{2}/FT.):
*FLOW RELATIONSHIP:

By: John N. Dougherty

LITHOLOGICAL SUMMARY

John Dougherty 4/2/87

SOIL/ROCK PROFILE				STD. PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID FMP-PS-47	DEPTH INTERVAL (FT.)	SAMPLE METHOD	N VALUE
0"-6"			Light gray (10YR 7/1)		0-20"	Ring Sampler	
			liquid with some silt or				
			fine gr. sand like particles				
6"-42"			Grayish brown (10YR 5/2)		20"-40"	"	
3.5'			and v. dr. gray (2.5YR N3)				
			Semi-solid, pudding like				
			Consistency				
			Black (2.5YR N2.5)		40"-60"	"	
			silty semi-solid with				
			grease like consistency		000012		
42"-?			Dr. brown (10YR 4/3) silt with clay, rootlet or grass } looks like "clay liner" or original material				

fragments present. -SAMPLER REFUSAL AT 3.5'

FLOW RELATIONSHIP:
U-Upgradient
D-Downgradient
C-Cross Gradient
O-On Site
N-Not Known

SAMPLE METHODS:
A-Auger Cuttings
S-2" O.D. 1.38" I.D. drive sample
U-3" O.D. 2.42" I.D. tube sample
T-3" O.D. thin-walled Shelby tube
H-6 1/2 Hollow Stem Auger
C-4 1/2 Continous Flight Auger
GB-Gear Bit
NX-NX Rock Coring
NQ-NQ Wireline Rock Coring
B-Undisturbed Block Sample
D-Disturbed Bulk Sample

* over for notes

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BOREHOLE AND TEST PIT SUMMARY*

SITE ID: Lime Sludge Lagoon
LOCATION ID: Middle; Borehole 2
LOCATION COORDINATES:
S N 2050
E 3100
GROUND ELEVATION (FT. MSL):

BH-BOREHOLE/~~TP-TEST PIT~~: 2
DRILLER/EXCAVATOR: Bowser Morner
COMPLETION DATE: 3/12/87
BOREHOLE DIAMETER (IN): 2"
TOTAL DEPTH (FT.): 5.5' (Waste Thickness)
Water Depth: 4.5'
Sampled From: 0.5' to 5.5'

WELL SUMMARY

WELL OWNER: N/A
INSTALLER:
INSTALLATION DATE:
CASING ELEV. (FT. MSL):
CASING LENGTH (FT.):
CASING DIA. (IN.):
SEAL (END) DEPTH (FT.):

FILTER PACK LENGTH (FT.):
FORMATION OF COMPLETION:
STRATIGRAPHIC ORDER:
OPEN/SCREEN DEPTH (FT.):
OPEN/SCREEN LENGTH (FT.):
OPEN/SCREEN AREA (IN.^{2}/FT.):
*FLOW RELATIONSHIP:

LITHOLOGICAL SUMMARY

By John N. Dougherty

SOIL/ROCK PROFILE				STD. PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT.)	SAMPLE METHOD	N VALUE
6"-26"			lt. gray (10YR 7/1) soupy	FMP-PS-47-07 through 012 See Profile Soil Logbook pp 142-147	0'-20"	Ring Sampler	N/A
			liquid with some silt				
26"-46"			Grayish brown (10YR5/2)		20"-40"	"	"
			semi-solid, pudding consist				
46"-66"			V. dr. gray (2.5YR N3) to		40"-60"	"	"
			black (2.5YR N2.5) semi-				
			solid with a grease like consist				
			Some fragments of dr. brown				
			(10YR 4/3) silt with clay				
			SAMPLER REFUSAL AT 66"				

FLOW RELATIONSHIP:
U-Upgradient
D-Downgradient
C-Cross Gradient
O-On Site
N-Not Known

SAMPLE METHODS:
A-Auger Cuttings
S-2" O.D. 1.38" I.D. drive sample
U-3" O.D. 2.42" I.D. tube sample
T-3" O.D. thin-walled Shelby tube
H-6 1/2 Hollow Stem Auger
C-4 3/2 Continous Flight Auger
GB-Gear Bit
NX-NX Rock Coring
NQ-NQ Wireline Rock Coring
B-Undisturbed Block Sample
D-Disturbed Bulk Sample

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*See note 2 on back of 109 for borehole 1, lime sludge lagoon

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47-03

WESTON

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BOREHOLE AND TEST PIT SUMMARY*

SITE ID: Lime Sludge Lagoon
LOCATION ID: SE, boring #3, near discharge pipe
LOCATION COORDINATES:
S N 2075
E 3150
GROUND ELEVATION (FT. MSL):

BH-BOREHOLE/~~TP-TEST PIT~~: 3
DRILLER/EXCAVATOR: Bauser Morner
COMPLETION DATE: 3/12/87
BOREHOLE DIAMETER (IN): 2" (nominal)
TOTAL DEPTH (FT.): 7'
WATER DEPTH: 1'
WASTE Thickness: 7' SAMPLED from: 2' to 7'

WELL SUMMARY

WELL OWNER: n/a
INSTALLER:
INSTALLATION DATE:
CASING ELEV. (FT. MSL):
CASING LENGTH (FT.):
CASING DIA. (IN.):
SEAL (END) DEPTH (FT.):

FILTER PACK LENGTH (FT.):
FORMATION OF COMPLETION:
STRATIGRAPHIC ORDER:
OPEN/SCREEN DEPTH (FT.):
OPEN/SCREEN LENGTH (FT.):
OPEN/SCREEN AREA (IN.²/FT.):
*FLOW RELATIONSHIP:

LITHOLOGICAL SUMMARY

4/2/87 By: J.N. Dougherty

SOIL/ROCK PROFILE				STD. PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID FMP.BS-47	DEPTH INTERVAL (FT.)	SAMPLE METHOD	N VALUE
24"-44"			H. gray (10YR 7/1) semi	FMP-BS-47-0-20	0"-20"	Ring Sampler	N/a
			solid w/ pudding consistency				
44"-64"			Grayish brown (10YR 5/7)	FMP-BS-47-20-40	20"-40"	"	"
			and Very dark gray (2.5YR				
			N3) semi solid with pudding	FMP-BS-47-40-60			
			like consistency				
64"-84"			64" to ~76": Very dark	FMP-BS-47-60-84	40"-60"	"	"
			gray (2.5YR N3) semi solid				
			with pudding or grease like				
			consistency				
			~76" to 84": Dr. gray				
			(10YR 4/1) Clay. When worked with spoon clay is stiff, slightly moist				

FLOW RELATIONSHIP:
U-Upgradient
D-Downgradient
C-Cross Gradient
O-On Site
N-Not Known

SAMPLE METHODS: SAMPLER REFUSAL AT 84"

A-Auger Cuttings
S-2" O.D. 1.38" I.D. drive sample
U-3" O.D. 2.42" I.D. tube sample
T-3" O.D. thin-walled Shelby tube
H-6 1/2 Hollow Stem Auger
C-4 1/2 Continous Flight Auger
GB-Gear Bit
NX-NX Rock Coring
NQ-NQ Wireline Rock Coring
B-Undisturbed Block Sample
D-Disturbed Bulk Sample

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* see note 2 on back of log for Lime Sludge Lagoon, borehole 1

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BOREHOLE LOG (SOIL)

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LOCATION MAP:

SITE ID: FMPC LOCATION ID: Dry Lime Sludge Lagoon Boring 1 and 1A

SITE COORDINATES (ft.): N ~~2025~~ 2150 E ~~3050~~ 3100

GROUND ELEVATION (ft. MSL):

DRILLING METHOD: Hollow Stem Auger

DRILLING CONTR.: Bowser Morner

DATE STARTED:

DATE COMPLETED:

FIELD REP.: John N. Dougherty

Checked by:

GROUNDWATER LEVELS

DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION Football field size area, formerly used a settling basin.

SITE CONDITION Flat covered in ankle high grass.

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	CPM	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
~~0.00~~		14"	14"	U	100	1-1-1-1	2	CL	4" grayish brown (10YR 5/2) clay with rootlets underlain by 10" of white (10YR 8/2) clay like material (No CGI or HNu deflection)
~~2.00~~		20	20	U	130	1-0-1-0	1	OT	white (10YR 8/2) clay like material with a 2" streak of grayish brown (10YR 5/2 clay like material. No CGI or HNu deflection
~~4.00~~		24"	24"	U	50	1-1-0-1	1	OT	White (10YR 8/1) clay like solid material, at 4.5' streak of grayish brown (10YR 5/ material with some rootlets. Occ. 1" to 2" thick layers of greenish gray (5B 7/1) clay like material.
~~6.00~~		22"	22"	U	60	1-2-2-1	4	OT	White (10YR 8/2) clay like solid streaked with greenish gray (5B 7/1) and dark bluish gray (N/4) colors.
~~8.00~~		24	24		85	1-1-1-1	2	OT	8'-9'5": lt. gray (5Y 7/1) semi-solid, pudding consistency. streaked with v. pale brown (10YR 8/3) color.
~~10.00~~		24"	24"		60	1-6-9-18	15		9'5"-9'9": lt. greenish gray (5GY 7/1) damp clay like material 9'9"-9'11": Black (2.5Y N2/0) damp clay like material 9'11"-10' - v. pale brown (10YR 7/4) damp clay like mate
10.00									

COMMENTS: See note book #43.0 pp. 113-115, 122-123 CPM readings taken w/ an Eberline HP-210T. 3/23 B-1 was completed to 8' samples were not sent. Then on 3/31 B-1 was advanced to 12'. B-1A was then completed to 8' to provide sample for analysis. So analytical samples came from B-1 for 8-12' and

SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

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BOREHOLE LOG (SOIL)

Dry Lime Sludge

LOCATION MAP:

SITE ID: FMPC LOCATION ID: Lagoon B-1 + B-1A

SITE COORDINATES (ft.):

N _____ E _____

GROUND ELEVATION (ft. MSL): _____

DRILLING METHOD: Hollow Stem Auger

DRILLING CONTR.: Bowser Morner

DATE STARTED: 3/27/87

DATE COMPLETED: 3/31/87

FIELD REP.: JOHN N. DOUGHERTY

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION _____

SITE CONDITION _____

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
									DESCRIPTION OF 10-12 INTERVAL:
								OT	White (10YR8/1) semi-solid with clumps of clay like, lt. greenish gray (5G7/1) material grading into v. dr. gray (10YR3/1) clay like material. At 11'-2"
								CL	changes abruptly to dr. grayish brown (2.5Y4/2) clay with some silt grading into dr. grayish brown (10YR4/2) clay with patches of olive brown (2.5Y4/4), some silt
									BORING TERMINATED AT 12'.

COMMENTS: _____

SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

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48-02

WESTON

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BOREHOLE AND TEST PIT SUMMARY

SITE ID: Dry Lime Sludge Pond
LOCATION ID: Borehole 2
LOCATION COORDINATES:
N E 3200
E S 2175
GROUND ELEVATION (FT. MSL):

BH-BOREHOLE/TP-TEST PIT: 2
DRILLER/EXCAVATOR: Bowser-Morner
COMPLETION DATE: 3-31-87
BOREHOLE DIAMETER (IN): 2"
TOTAL DEPTH (FT.): 12'

WELL SUMMARY

WELL OWNER: NA
INSTALLER:
INSTALLATION DATE:
CASING ELEV. (FT. MSL):
CASING LENGTH (FT.):
CASING DIA. (IN.):
SEAL (END) DEPTH (FT.):

FILTER PACK LENGTH (FT.):
FORMATION OF COMPLETION:
STRATIGRAPHIC ORDER:
OPEN/SCREEN DEPTH (FT.):
OPEN/SCREEN LENGTH (FT.):
OPEN/SCREEN AREA (IN.^{2}/FT.):
*FLOW RELATIONSHIP:

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				STD. PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT.)	SAMPLE METHOD	N VALUE
0'-2'			Grey (7.5 YR 5/6) and yellowish				
			brown (10 YR 5/4) and white				
			(2.5 Y 8/2) Clayey material,				
			abundant rootlets, wet.				
2'-4'			White (2.5 Y 8/2) clay like				
			material numerous rootlets,				
			horizontal dark layers,				
			brown specks throughout-				
			more abundant at bottom				
			half.				

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Vance A. Peers. 4-1-87

FLOW RELATIONSHIP:
U-Upgradient
D-Downgradient
C-Cross Gradient
O-On Site
N-Not Known

SAMPLE METHODS:
A-Auger Cuttings
S-2" O.D. 1.38" I.D. drive sample
U-3" O.D. 2.42" I.D. tube sample
T-3" O.D. thin-walled Shelby tube
H-6 1/2 Hollow Stem Auger
C-4 1/2 Continous Flight Auger
GB-Gear Bit
NX-NX Rock Coring
NQ-NQ Wireline Rock Coring
B-Undisturbed Block Sample
D-Disturbed Bulk Sample

WESTON

BOREHOLE AND TEST PIT SUMMARY

SITE ID: Dry lime Sludge Pond
LOCATION ID: Borehole 2
LOCATION COORDINATES:
N E 3200
E S 2175
GROUND ELEVATION (FT. MSL):

BH-BOREHOLE/TP-TEST PIT: 2
DRILLER/EXCAVATOR: Bowser-Morner
COMPLETION DATE: 3-31-87
BOREHOLE DIAMETER (IN): 2"
TOTAL DEPTH (FT.): 12'

WELL SUMMARY

WELL OWNER: NA
INSTALLER:
INSTALLATION DATE:
CASING ELEV. (FT. MSL):
CASING LENGTH (FT.):
CASING DIA. (IN.):
SEAL (END) DEPTH (FT.):

FILTER PACK LENGTH (FT.):
FORMATION OF COMPLETION:
STRATIGRAPHIC ORDER:
OPEN/SCREEN DEPTH (FT.):
OPEN/SCREEN LENGTH (FT.):
OPEN/SCREEN AREA (IN.^{2}/FT.):
*FLOW RELATIONSHIP:

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				STD. PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT.)	SAMPLE METHOD	N VALUE
4'-7'1"			White (2.5 Y 8/2) clay like				
			material, horizontal dark				
			layers < 1/8" thick.				
7'1"-8'			Light greenish grey (5G 7/1)				
			clay like material, some				
			dark specks				
8'-9'			white (10YR 8/2) clay like				
			material, dark specks +				
			dark vertical streaks				

FLOW RELATIONSHIP:
U-Upgradient
D-Downgradient
C-Cross Gradient
O-On Site
N-Not Known

SAMPLE METHODS:
A-Auger Cuttings
S-2" O.D. 1.38" I.D. drive sample
U-3" O.D. 2.42" I.D. tube sample
T-3" O.D. thin-walled Shelby tube
H-6 1/2 Hollow Stem Auger
C-4 1/2 Continous Flight Auger
GB-Gear Bit
NX-NX Rock Coring
NQ-NQ Wireline Rock Coring
B-Undisturbed Block Sample
D-Disturbed Bulk Sample

000021

Vance A. Peers 4-1-87

-0027

48-02 Cont'd.

WESTON

2162

BOREHOLE AND TEST PIT SUMMARY

SITE ID: Dry lime sludge Pond
LOCATION ID: Borehole 2
LOCATION COORDINATES:
~~N~~ E 3200
~~E~~ S 2175
GROUND ELEVATION (FT. MSL):

BH-BOREHOLE/TP-TEST PIT: 2
DRILLER/EXCAVATOR: Bowser - Morner
COMPLETION DATE: 3-31-87
BOREHOLE DIAMETER (IN): 2"
TOTAL DEPTH (FT.): 12'

WELL SUMMARY

WELL OWNER: NA
INSTALLER:
INSTALLATION DATE:
CASING ELEV. (FT. MSL):
CASING LENGTH (FT.):
CASING DIA. (IN.):
SEAL (END) DEPTH (FT.):

FILTER PACK LENGTH (FT.):
FORMATION OF COMPLETION:
STRATIGRAPHIC ORDER:
OPEN/SCREEN DEPTH (FT.):
OPEN/SCREEN LENGTH (FT.):
OPEN/SCREEN AREA (IN.^{2}/FT.):
*FLOW RELATIONSHIP:

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				STD. PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT.)	SAMPLE METHOD	N VALUE
9'-10'			White (10YR 8/2) clay like				
			material, with light greenish				
			gray (5G 7/1) clay like				
			material through out				
			(blotches), less (5G 7/1)				
			toward last 3", wet.				
10'-11'6"			White (10YR 8/2) clay like				
			material, dark specks				
			through out, ligh greenish grey				
			(5G 7/1) throughout and forms				

000022

Vance A. Peers 4-1-87

FLOW RELATIONSHIP:
U-Upgradient
D-Downgradient
C-Cross Gradient
O-On Site
N-Not Known

SAMPLE METHODS:
A-Auger Cuttings
S-2"O.D. 1.38"I.D. drive sample
U-3"O.D. 2.42"I.D. tube sample
T-3" O.D. thin-walled Shelby tube
H-6 1/2 Hollow Stem Auger
C-4 1/2 Continous Flight Auger
GB-Gear Bit
NX-NX Rock Coring
NQ-NQ Wireline Rock Coring
B-Undisturbed Block Sample
D-Disturbed Bulk Sample

028

WESTON

BOREHOLE AND TEST PIT SUMMARY

SITE ID: Dry Lime Sludge Pond
LOCATION ID: Borehole 2
LOCATION COORDINATES:
N F 3200
E S 2175
GROUND ELEVATION (FT. MSL):

BH-BOREHOLE/TP-TEST PIT: 2
DRILLER/EXCAVATOR: Bowser Morner
COMPLETION DATE: 3-31-87
BOREHOLE DIAMETER (IN): 2"
TOTAL DEPTH (FT.): 12'

WELL SUMMARY

WELL OWNER: NA
INSTALLER:
INSTALLATION DATE:
CASING ELEV. (FT. MSL):
CASING LENGTH (FT.):
CASING DIA. (IN.):
SEAL (END) DEPTH (FT.):

FILTER PACK LENGTH (FT.):
FORMATION OF COMPLETION:
STRATIGRAPHIC ORDER:
OPEN/SCREEN DEPTH (FT.):
OPEN/SCREEN LENGTH (FT.):
OPEN/SCREEN AREA (IN.^{2}/FT.):
*FLOW RELATIONSHIP:

LITHOLOGICAL SUMMARY

SOIL/ROCK PROFILE				STD. PENETRATION TEST			
DEPTH (FT.)	UNIFIED SOIL/ROCK CLASS	STRAT. ORDER	VISUAL DESCRIPTION	SAMPLE ID	DEPTH INTERVAL (FT.)	SAMPLE METHOD	N VALUE
			horizontal layers toward				
			bottom. Wet				
11'6"-12'			Light olive brown CLAY,				
			and Silt, Wet.				

FLOW RELATIONSHIP:
U-Upgradient
D-Downgradient
C-Cross Gradient
O-On Site
N-Not Known

SAMPLE METHODS:
A-Auger Cuttings
S-2" O.D. 1.38" I.D. drive sample
U-3" O.D. 2.42" I.D. tube sample
T-3" O.D. thin-walled Shelby tube
H-6 1/2 Hollow Stem Auger
C-4 1/2 Continous Flight Auger
GB-Gear Bit
NX-NX Rock Coring
NQ-NQ Wireline Rock Coring
B-Undisturbed Block Sample
D-Disturbed Bulk Sample

Vance A. Peers 4-1-87

000023

48-03

WESTON

Installation Site Location

BOREHOLE LOG (SOIL) 2162

LOCATION MAP:

SITE ID: FMPC LOCATION ID: DLSL, B-03

SITE COORDINATES (ft.):
N 52225 E 3225

GROUND ELEVATION (ft. MSL): NA

DRILLING METHOD: Hollow Stem Auger

DRILLING CONTR.: Bowser-Morner

DATE STARTED: 4-1-87

DATE COMPLETED: 4-1-87

FIELD REP.: Vance A. Peers

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION Dry lime sludge pond, boring #3

SITE CONDITION Open, covered with short grass, soft ground surface.

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID *CPM	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
0'-2'		19"	19"	U	61	weight of hammer		ML -	(0-4")-Very pale brown (10 YR 7/3) Clayey SILT, numerous rootlets, damp.
								CL-	(4"-15")- White (10YR 8/1) CLAY size material, brown specks in upper 7", Alternating firm and soft layers, damp to moist, low plasticity.
2'-4'		16.5"	16.5"	U	53	weight of hammer		CL-	White (10 YR 8/1 + 10YR 8/2) CLAY size material, alternating firm and soft layers, horizontal layering present, brown specks - more prevalent in firm layers, wet.
4'-6'		24"	24"	U	50	weight of hammer		CL-	(4'-5'8") Same as above (4"- 3'4.5"), both white (10YR 8/1 + 10YR 8/2) occur throughout as blotches of color (not layers), wet.
								CL-	(5'8"-6) Dark grey (7.5 YR 4/0) and Light greenish grey (5BG 7/1) blotches in Pink (7.5 YR 8/4) CLAY size material.

000024

COMMENTS: Logs for DLSL, B-03 are in Field Book 44.0 pg. 5-10. CPM taken with Eberline HP 210T - conversion for HP-210T : 1mRad/hr / 1489 CPM

SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

WESTON

BOREHOLE LOG (SOIL)

LOCATION MAP:

SITE ID: FMPC LOCATION ID: DLSL, B03
SITE COORDINATES (ft.):
N 52225 E 3225
GROUND ELEVATION (ft. MSL): NA
DRILLING METHOD: Hollow Stem Auger
DRILLING CONTR.: Bowser Morner
DATE STARTED: 4-1-87
DATE COMPLETED: 4-1-87
FIELD REP.: Vance A. Peers

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION See page 1
SITE CONDITION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID CPM	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
6'-8'		23"	23"	U	60	Weight of hammer		CL	(6'-6'6") White (10YR 8/2) CLAY size material, some rootlets, layers with brown specks, soft, wet, low plasticity.
								CL	(6'6"-6'9.5") Light greenish grey (5G 7/1) CLAY size material, more solid than above, wet, Low plasticity
								CL	(6'9.5"-7'7") White (10YR 8/2) CLAY size material, firm, wet, low plasticity
								CL	(7'7"-7'11") Light greenish grey. (5G 7/1) CLAY size material, blotches of white (10YR 8/2), firm, wet, low plasticity.
8'-10'		24"	24"	U	50	Weight of hammer		CL	(8'-9') white (10YR 8/2) CLAY size materia with blotches of very pale brown 10YR 8/4 toward top, wet, firm.
								CL	(9'-10') Same as (8'-9') color change to Light greenish grey (5G 7/1), 1/8" brown layer at (9'9"). last 2" contains greenish grey (5BG 6/1), wet.

000025

COMMENTS: See page 1

SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D 2.42" I.D. tube sample
T - 3" O.D thin-walled Shelby tube

48-03 cont'd

WESTON

BOREHOLE LOG (SOIL) 2162

LOCATION MAP:

SITE ID: FMPC LOCATION ID: DLSL, B03
SITE COORDINATES (ft.):
N 5 2225 E 3225
GROUND ELEVATION (ft. MSL): NA
DRILLING METHOD: Hollow Stem Augers
DRILLING CONTR.: Bowser-Morner
DATE STARTED: 4-1-87
DATE COMPLETED: 4-1-87
FIELD REP.: Vance A. Peers

GROUNDWATER LEVELS		
DATE	TIME	DEPTH (ft.)

LOCATION DESCRIPTION See page 1
SITE CONDITION

DEPTH	SAMPLE INTERVAL	SAMPLE RECOVERY	SAMPLE RETAINED	TYPE	ID CPM	BLOWS PER 6 in.	N VALUE	USCS	VISUAL CLASSIFICATION
10'-12'		24"	24"	U	80	Weight of hammer		CL-	(10'-10'10") Light green grey (5BG 7/1) with blotches of greenish grey (5BG 6/1) CLAY size material, wet.
								CL-CH	(10'10"-11'2") Olive grey (5Y 5/2) CLAY size material, medium plasticity, not lime sludge.
								SC-	(11'2"-12') Light yellowish brown (2.5Y 6/4) medium to fine SAND, trace clay, moist to damp, saturated near top, moisture decreases toward bottom, Clay occurs as 1/4" thick seams.

000026

COMMENTS: See page 1

SAMPLE TYPE
A - Auger cuttings
S - 2" O.D. 1.38" I.D. drive sample
U - 3" O.D. 2.42" I.D. tube sample
T - 3" O.D. thin-walled Shelby tube

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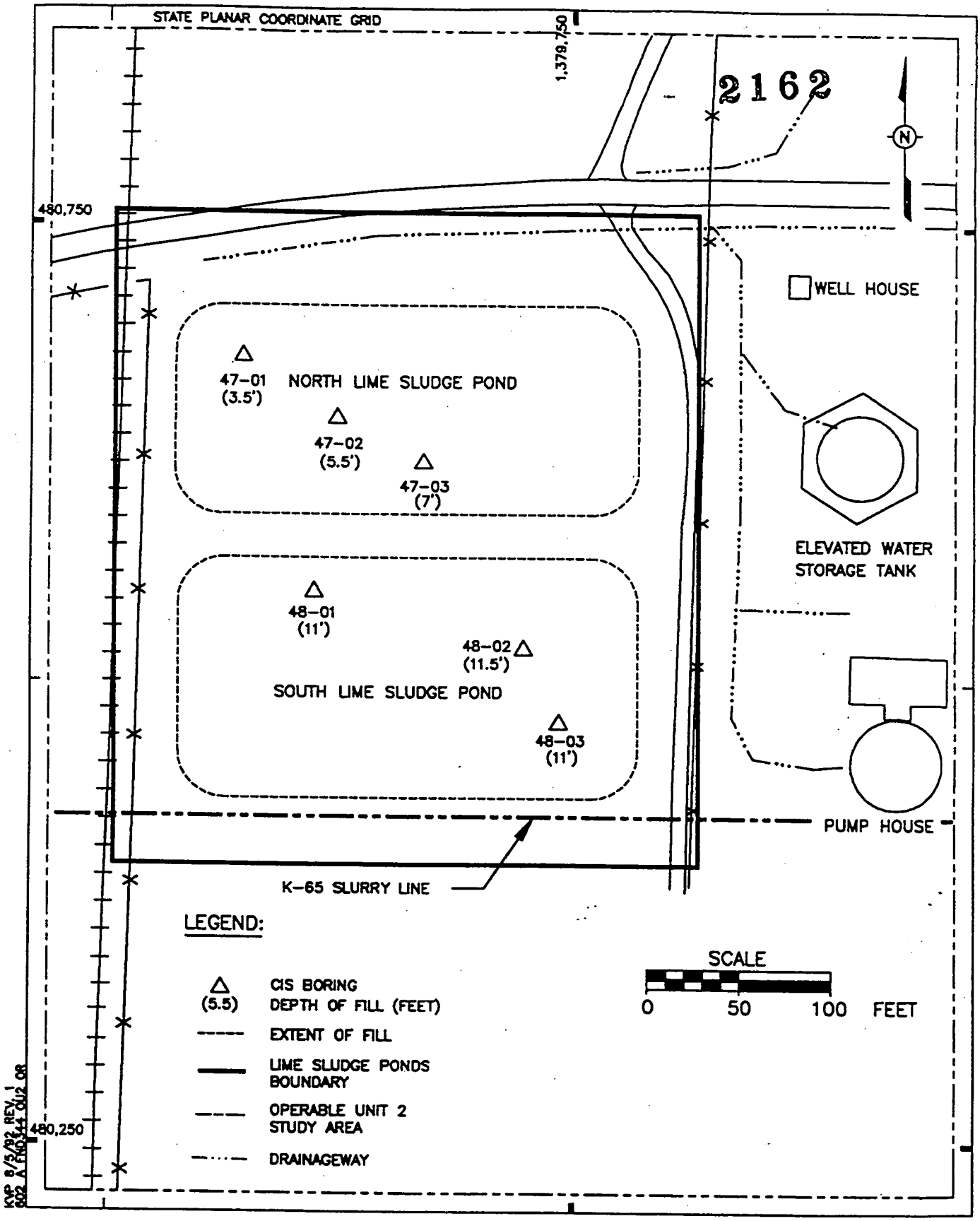
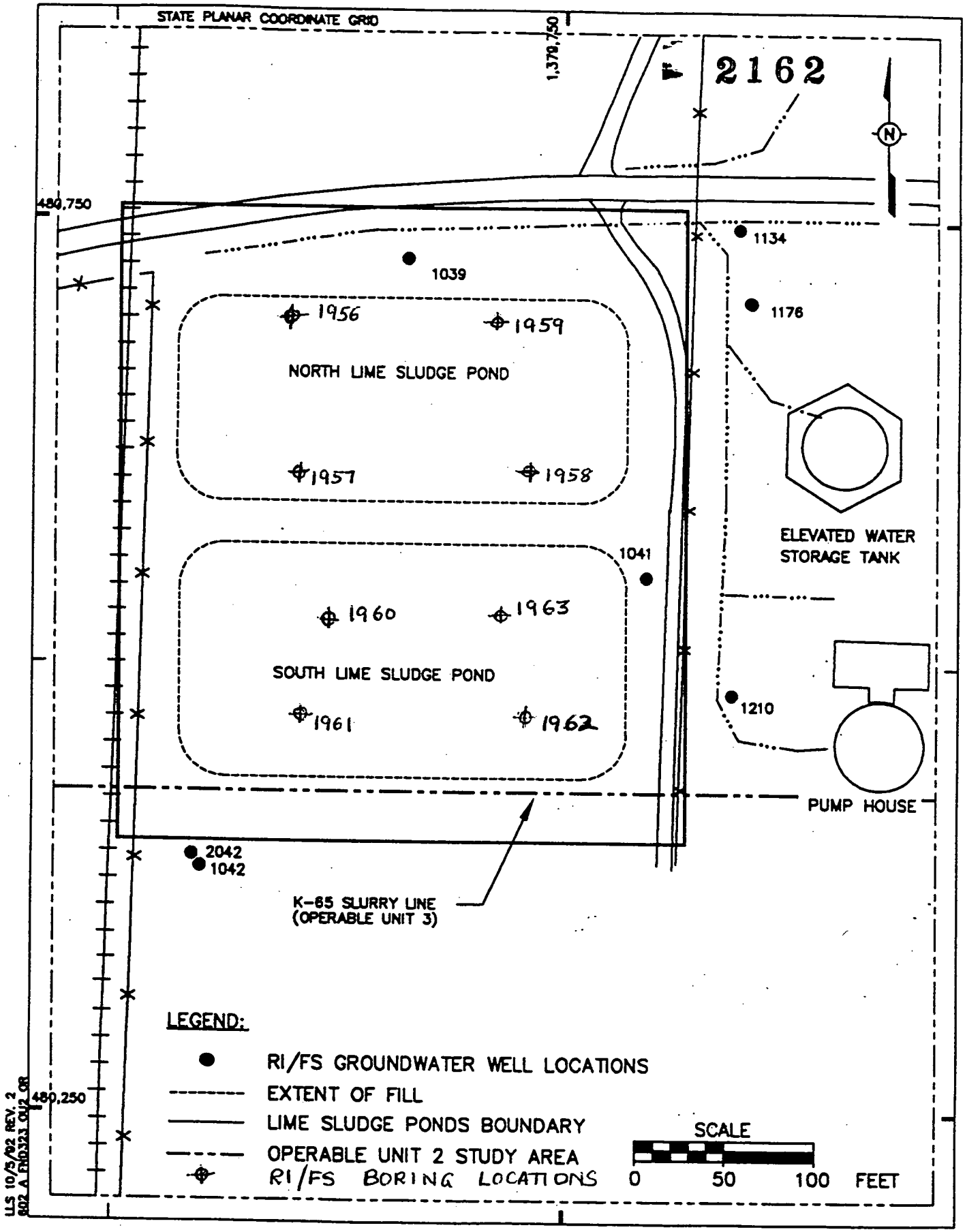


DEPTH OF LIME SLUDGE RESIDUE

ATTACHMENT B

Map of RI/FS Borings in Lime Sludge Ponds and Field Activity Daily Logs

Boring No	Location
1956	North Lime Sludge Pond
1957	North Lime Sludge Pond
1957	North Lime Sludge Pond
1958	North Lime Sludge Pond
1961	South Lime Sludge Pond
1962	South Lime Sludge Pond
1963	South Lime Sludge Pond
1964	South Lime Sludge Pond



GROUNDWATER MONITORING WELLS IN THE LIME SLUDGE PONDS STUDY AREA

FERNALD
RI/FS

2162

FIELD ACTIVITY DAILY LOG

DAILY LOG			
DATE	6	8	93
NO.	20	03	05
SHEET	1	OF	2

PROJECT NAME Lime Sludge Pond | PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Sampling + Boring at LSP-SB-1956

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

MICROTIP S.N. PA930095
ALPHA METER S.N. N/A
BETA GAMMA METER S.N. 44501

0700 Arrive at FEMP. Collect snoodles and head into plant.
0800 Collect Trip Blank. Sample No. 114860 RFA/CC-73376
0815 Tailgate safety meeting.
0820 Place one pallet on the pond and place PVC casing on the pond. Bottom of pond approx. 4ft.
0910 Collect sample from 0-4 feet. Samples taken at this interval because of shortage of sludge
TAL-20.03.05C Sample No. 114857 RFA/CC-73376 M-Tip=0ppm Be=20cpm
TAL-20.03.05H Sample No. 114858 RFA/CC-73376
TAL-20.03.05D Sample No. 114861 RFA/CC-73377 (Water Content Only) [4ft is bottom of Sludge]
0945 Auger 4ft-4.5ft. Collect archive. Sample No. 114864 RFA/CC-73379 M-Tip=0ppm Be=20cpm
0955 Auger 4.5-5ft. Collect archive. Sample No. 114865. RFA/CC-73379 M-Tip=0ppm Be=20cpm.
1000 Auger 5-5.5ft Collect archive. Sample No. 114866 RFA/CC-73379 M-Tip=0ppm Be=20cpm
1005 Auger 5.5-6ft. Collect archive. Sample No 114867 RFA/CC-73379 M-Tip=0ppm Be=20cpm
1010 Auger 6-7ft. Collect TAL-20.03.05. Sample No. 114859 RFA/CC-73376 M-Tip=0ppm Be=20cpm
1030 Auger attempt 7ft plus. Sample will not stay in the bucket (auger). Possible problem is too much water in column. Will try to pump out water after lunch.
1100 Leave area shower. Samples locked in truck.
1130 Lunch
1230 Return. Locate filter pump (masterflex) and head into plant.
1330 Arrive at LSP. Use Tygon to bring to pump out column
1430 Still pumping. Water being returned to pond (column about halfway)
1435 Locate teflon bailer and bail rest of column.
1500 Auger 7-9.5 feet. Collect TAL-20.03.05D. Sample No. 114862 RFA/CC-73377 (Geotechnical)
Sample No. 114863 RFA/CC-73376 (TOC)
M-Tip=0ppm Be=20cpm.

•(page 2)•

MICROTIP CALIBRATED BY T. Price
ON 6-8-93
USING Isobutylene
LOT # 110592-4

VISITORS ON SITE: None

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS. None

FMPC Q: 050 7/12/93

WEATHER CONDITIONS: 80°F Mostly Sunny

IMPORTANT TELEPHONE CALLS: None

000031

PERSONNEL ON SITE: Robert Thomas, Jy Price, Al Olpalko, Mike Debes

SUPERVISOR: Robert Thomas

FERNALD
RI/FS

FIELD ACTIVITY DAILY LOG

DAILY LOG			
DATE	6	8	93
NO.	20	03	05
SHEET 2 OF 2			

PROJECT NAME: Lime Sludge Pond | PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Sampling + Boring at LSP-SB-1951

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

1530 Sampling complete, clean up area and have sample finished for release
1600 Shower + return to T-305
1630 Tape + Label containers
1750 Sign RFA-73377 + samples over to sample coordination.
1800 Sign RFA-73376 + samples over to sample coordinator

RT 6-8-93

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
page 1	page 1 FMPC Q: 050 7/12/93
WEATHER CONDITIONS:	**IMPORTANT TELEPHONE CALLS:**
page 1	page 1

PERSONNEL ON SITE: page 1

SUPERVISOR:

000032

FERNALD RI/FS

2162

FIELD ACTIVITY DAILY LOG

DAILY LOG			
DATE	6	7	93
NO.	20	03	05
SHEET	1	OF	1

OJECT NAME: Lime Sludge Pond

PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Soil boring at LSP-SB-1957

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

MICROTIP S.N. PA930095
ALPHA METER S.N. N/A
BETA GAMMA METER S.N. 44501

0700 Arrive at FEMP. Collect supplies & head to field
0800 Collect Trip Blank Sample No. 114853 RFA/CL-72912
0830 Tailgate safety meeting.
0840 Set up area.
0900 Place 1 pallet on pond and insert PVC casing. Begin auger ing 0-6". Collect Archive Sample No. 114856 RFA/CL-72930
0910 Auger 6 inches to 2 feet. Collect TAL-20.03.05C 20.03.05H + 20.03.05D (water content on M)
TAL-D - Sample No 114854 RFA/CL-72929
TAL-C Sample No. 114835 RFA/CL-72912
TAL-H Sample No 114836 RFA/CL-72912
M-Tip=0ppm Be=<20ppm
Bottom of pond is 2ft
0950 Auger 2-4 feet collect 20.03.05D. Sample No. 114855 RFA/CL-72929 (GeoTechnical)
M-Tip=0ppm Be=20ppm Sample No. 114837 RFA/CL-72912 (TOC)
1010 Auger 4-5 feet. collect 20.03.05C Sample No. 114838 RFA/CL-72912
M-Tip=0ppm Be=20ppm
1030 Clean up area.
1100 Lock samples in truck. Shower.
1130 Lunch
1230 Return from Lunch. Complete paperwork while samples are being released from plant.
1330 Label samples
1525 RFA 72930 + samples signed over to sample coordination.
1530 RFA 72929 + samples signed over to sample coordination.
1535 RFA 72912 + samples signed over to sample coordination.
1540 Sample paperwork being completed.
1800 Leave FEMP.

MICROTIP CALIBRATED BY T. Price
ON 6-7-93
USING Isobutylene
LOT # 116597-4

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
None	None
WEATHER CONDITIONS:	**IMPORTANT TELEPHONE CALLS:**
72°F Sunny	None

PERSONNEL ON SITE: Robt Thomas, Mike Bebes, Tyrone Price, Al Opiallo.

SUPERVISOR: Robt Thomas DATE: 6-7-93

000033

FERNALD
RI/FS

FIELD ACTIVITY DAILY LOG

DAILY LOG	DATE	6	6	93
	NO.	20	03	05
	SHEET 1	OF 1		

PROJECT NAME Lime Sludge Pond | PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Soil boring at LSP SB-1958

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

MICROTIP S.N. PA93005
ALPHA METER S.N. N/A
BETA GAMMA METER S.N. 4501

0700 Arrive at FEMP. Start paperwork and collect sample containers.
0800 Collect Trip Blanks TAL-20.03.05K Sample No. 114825 RFA-72922
0830 Head into plant, dressout and proceed to Lime Sludge Pond.
0900 Tailgate safety meeting.
0910 Call Bruce Meyers about flow of water into Lime Sludge Pond. He will come in.
0930 Bruce Meyers on site. Proceed bus only going out 1 pallet and collect sample.
0940 Place one pallet and depth check: 3.8 ~~inches~~ feet.
Place 4 ft piece of PVC casing in pond
0950 Auger 0-6 inches. Collect archive. Sample No. 114830 RFA/CC-72927 Be=20cpm MTip=0ppm
1000 Auger .5-2.5 ft. Collect TAL-20.03.05C, H + D Water Content Only. Be=20cpm MTip=0ppm
TAL C - Sample No. 114821 RFA/CC-72922
TAL H - Sample No. 114828 RFA/CC-72922
TAL D - Sample No. 114827 RFA/CC-72922
1035 Auger 2.5-3 ft. Collect archive. Sample No. 114831 RFA/CC-72927 Be=20cpm MTip=0ppm
1045 Auger 3-3.5 ft. Collect archive. Sample No. 114832 RFA/CC-72927 Be=20cpm MTip=0ppm
1050 Auger 3.5-4 ft. Collect archive. Sample No. 114833 RFA/CC-72927 Be=20cpm MTip=0ppm
1055 Auger 4-4.5 ft. Collect archive. Sample No. 114834 RFA/CC-72927 Be=20cpm MTip=0ppm
1100 Auger 4.5-5 ft. Collect TAL-20.03.05C. Sample No. 114823 RFA/CC 72922 Be=20cpm MTip=0ppm
1130 Auger 5-6 ft. Collect TAL-20.03.05D. MTip=0ppm Be=20cpm
Sample No. 114824 RFA/CC-72922 (TOC)
Sample No. 114828 RFA/CC-72922 (Geotechnical)
215 Collect Field Blank (20.03.05B) Sample No. 114826 RFA/CC-72922
1220 Sampling complete. Clean up area and break for lunch
1330 Return. Complete paperwork and have samples finished and brought out of plant.
1430 Label samples
1700 Sign RFA/CC + Samples (~~72923~~ 72923 RT 6-6-93) over to sample coordination.
1758 Sign RFA/CC + samples (72922) over to sample coordination.
1600 Leave FEMP.

Depth of sludge is 4 feet

MICROTIP CALIBRATED BY T. Price
ON 6-6-93
USING Isobutylene
LOT # 110592-4

VISITORS ON SITE: None

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS: None

WEATHER CONDITIONS: 74°F Sunny

IMPORTANT TELEPHONE CALLS: None

FMPC 7/12/93

PERSONNEL ON SITE: Robt Thomas, Mike Debes, Tyrone Price, Al Opalko

SUPERVISOR: Robt Thomas DATE: 6-6-93

000034

FERNALD RI/FS

2162

FMPC Q. 016 7-1-93

DAILY LOG			
DATE	6	5	93
NO.	20	03	05
SHEET	1	OF	2

FIELD ACTIVITY DAILY LOG

PROJECT NAME: Lime Sludge Pond

PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Soil boring at LSP-SB-1959

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

MICROTIP S.N. PA950093
ALPHA METER S.N. N/A
BETA GAMMA METER S.N. 44501

0750 Head into Plant
0800 Collect Trio Book
0900 Tailgate safety meeting
0905 Build Platform
0910 Push auger stem down into pond to determine the depth for the casing.
0915 Bottom of pond approx 2.5ft.
0920 Call Cate Brill for direction. Told to put more pallets out. M+S okay.
0930 1 more pallet. Check depth 5.5ft
0935 Put 1 more pallet out. Check depth 6.5ft
0950 4 Pallets out. Check Depth 8ft.
1000 Auger 0-6 inches. Collect archive. Sample No. 114852. RFA/CC-72924 M-Tio=0ppm Be=20cpm.
1005 Auger 6-12 inches Collect archive. Sample No. 114839 RFA/CC-72924 M-Tio=0ppm Be=20cpm
1010 Auger 1-1.5ft. Collect archive. Sample No. 114840 RFA/CC-72924 M-Tio=0ppm Be=20cpm
1015 Auger 1.5-2ft. Collect archive. Sample No. 114841 RFA/CC-72924 M-Tio=0ppm Be=20cpm
1020 Auger 2-3ft. Collect TAL-20.03.05D. Water Content Only. M-Tio=0ppm Be=20cpm
Sample No. 114818 RFA/CC-72921
1040 Auger 3-5ft. Collect TAL-20.03.05C + 20.03-05D (Water Content). M-Tio=0ppm Be=20cpm
20.03.05C - Sample No. 114817 RFA/CC-72920
20.03.05D - Sample No 114819 RFA/CC-72921
Also Collect 20.03.05H (TCLP) Sample No. 114813 RFA/CC-72920
1115 Auger 5-5.5ft. Collect Archive. Sample No. 114842 RFA/CC-72924 M-Tio=0ppm Be=20cpm
1120 Auger 5.5-6ft. Collect Archive. Sample No 114843 RFA/CC-72924 M-Tio=0ppm Be=20cpm
1130 Auger 6-6.5ft. Collect Archive. Sample No. 114844 RFA/CC-72924 M-Tio=0ppm Be=20cpm
1140 Auger 6.5-7ft. Collect Archive. Sample No. 114845 RFA/CC-72924 M-Tio=0ppm Be=20cpm
1145 Auger 7-7.5ft Collect Archive Sample No. 114846 RFA/CC-72924 M-Tio=0ppm Be=20cpm
1150 Auger 7.5-8ft. Collect Archive. Sample No. ~~114846~~ 114847. RFA/CC-72924 M-Tio=0ppm Be=20cpm (Bottom of Pond)
1230 Auger 8-8.5ft. Collect 20.03.05C M-Tio=0ppm 20cpm=Be Native Soil (Bottom of Pond) (+ sludge)
Sample No. 114814 RFA/CC-72920
1245 Auger 8.5-9ft. Collect Archive. M-Tio=0ppm Be=20cpm
Sample No 114848 RFA/CC-72924

MICROTIP CALIBRATED BY
T. Price
ON 6-5-93
USING Isobutylene
LOT #

(page 2)

VISITORS ON SITE:
Doc Cleeter (AEDO) 6-5-93

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
None

WEATHER CONDITIONS:
Mostly 62°F Cloudy

IMPORTANT TELEPHONE CALLS:
None

000035

PERSONNEL ON SITE: Robert Thomas, Mike Debes, Tyrone Price, M. Gradka

SUPERVISOR: [signature] DATE: 6-5-93

ALD
FS

FMPC Qc: 016 7-9-93

DAILY LOG			
DATE	6	5	93
NO.	20	03	05
SHEET 2 OF 2			

FIELD ACTIVITY DAILY LOG

PROJECT NAME Lime Sludge Pond | PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Soil boring at LSP-SB-1959

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

1300 Auger 9-9.5ft. Collect Archive. Sample No. 114849 RFAKL-72924 MT-Tip=0ppm Be=20cpm
1310 Auger 9.5-10ft. Collect Archive. Sample No 114850 RFAKL-72924 MT-Tip=0ppm Be=20cpm
1315 Auger 10.5-11ft. Collect Archive Sample No 114851 RFAKL 72924 MT-Tip=0ppm Be=20cpm
1340 Auger 11-13.5ft. Collect TAL-20.03.05D + 20.03.05C. MT Tip=0ppm Be=20cpm
TAL-C Sample No 114815 RFAKL 72920
TAL-D (Geotechical) Sample No. 114816 RFAKL-72920
TAL-D (TOC) Sample No. 114820 RFAKL-72921
1410 Clean up area.
1430 Leave area lock samples in truck, shower return to T-305. Prepare paperwork.
1530 Bring samples out of plant after having them frisked.
1630 Have samples at T-305. Put fresh Ice in coolers + lock in truck
1700 ~~Prepare~~ Prepare Rinsate Paperwork RT 6-5-93
1745 Collect Rinsate on concrete pad with auger and bowl from days sounding
Sample No. 114811 RFAKL-72925. Samples locked on Ice at sample coordination
1. 0 Leave FEMP.

RT-6-5-93

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
page 1	page 1
WEATHER CONDITIONS:	**IMPORTANT TELEPHONE CALLS:**
page 1	page 1

000036

PERSONNEL ON SITE: see page 1

SUPERVISOR:

FERNALD
RI/FS

FMPC Qr. 015

DAILY LO

NO.	20	03	05
SHEET	1	OF	1

FIELD ACTIVITY DAILY LOG

PROJECT NAME: Lime Sludge Pond | PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Sampling at Lime Sludge Pond north at 1959. Setup

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

MICROTIP S.N. PA930095
ALPHA METER S.N. N/A
BETA GAMMA METER S.N. 44501

0700 Arrive at FEMP. T-305. Prepare paperwork for archives collected on 6-3-93.

0830 Talk with Tom Ernstes (H+S) about sampling off of berm told to evaluate situations as they arise. Tie off if the skid is unstable. Plan is to lay geotextile fabric on sludge and then place a pallet on top and auger 4 ft in from berm.

0840 Label archives.

2162

0845 Call Roll Tech and confirm weekend coverage. We are covered.

0910 Sign samples over to sample coordination. (RFA 173989)

0920 Get pipe (PVC) from Penn Drill.

1000 Rain. Complete paperwork

1130 Lunch

1230 Return. Complete paperwork. Rain

MICROTIP CALIBRATED BY
R. Thomas
ON 6-4-93
USING Isobutylene
LOT # 110592-4

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
None	None
WEATHER CONDITIONS:	**IMPORTANT TELEPHONE CALLS:**
63°F Rain	None

000037

PERSONNEL ON SITE: G. R. Thomas, A. Opalko, T. Price, M. Debes

SUPERVISOR: Robert Thomas DATE: 6-4-93

FERNALD RI/FS

FMPC Qr. 016

DAILY LOG			
DATE	5	27	93
NO.	20	03	05
SHEET	1	OF	2

FIELD ACTIVITY DAILY LOG

PROJECT NAME: OU2 Lime Sludge Pond — PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Hand auger in LSP-SB-1960

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

MICROTIP S.N. PP93005
ALPHA METER S.N. N/A
BETA GAMMA METER S.N. 50773

0700 ~~0800~~ Arrive at FEMP. Gather supplies
0800 Collect Trip Blank at Lab Bldg. 3 #3 1-8-93
Sample No. 114735 RFA/CC-73325 TAL-20.03.05C

2162

0900 Head into plant, dressout and proceed to LSP.
1005 Tailgate Safety Meeting.
1010 Set up area at LSP-SB-1960 Be=60cpm (Background) M-Tip=0ppm (Background)
1020 Collect soil 0"-6". Be=60cpm M-TP=0ppm Sample No. 114726 RFA/CC 73322
500ml Archive. Change Auger
1035 Collect archive 6"-12". Be=60cpm M-Tip=0ppm Sample No. 114727 7 ~~RFA/CC-73322~~ 73896
1040 Collect archive 1-1.5ft. Be=60cpm M-Tip=0ppm Sample No. 114728 8 ~~RFA/CC-73322~~ 73896
1045 Collect archive 1.5-2ft Be=60cpm MTip=0ppm Sample No. 114729 9 ~~RFA/CC-73322~~ 73896
1050 Collect archive 2-2.5ft Be=60cpm MTip=0ppm Sample No 114730 ~~RFA/CC-73322~~ 73896
1100 Clean + secure area. Lock archives in truck; shower
1130 Lunch Break
1220 Return from lunch. Paperwork.
1300 Head into plant. dressout + proceed to Lime Sludge Ponds
130 Arrive at Lime Sludge Pond.
1440 Collect TAL-20.03.05H + 20.03.05D (Water Content only) Be=60cpm M-Tip=0ppm 2.5-5 feet (2.5-5ft)
TAL-H Sample No. 114733 RFA/CC-73323
TAL-D Sample No. 114736 RFA/CC-73324
1500 Collect TAL-20.03.05C. Auger 5 to 6 feet. Be=60cpm M-Tip=0ppm
Sample No. 114734 #6 1-8-93 RFA/CC-~~73324~~ 73323 RFT 5-27-93
1525 Auger 6-7 feet. No Recovery. Encountering slurry sludge.
1530 Auger 7-10 feet. No Recovery. Slurry
1535 Auger to 11.5 feet. Bottom of Fill. Auger about 1 inch brown silty clay and pull slurry above out. Collect a archive for 6-11.5 feet. Sample No. 114732 RFA/CC 73896

Bottom of Sludge Pond = 11.5ft

MICROTIP CALIBRATED BY R. Thomas
ON 2 solutions
USING 5/27/93
LOT # 110592-4

• See page 2 •

VISITORS ON SITE: None

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS: None

WEATHER CONDITIONS: 68°F @ 1100 Partly Sunny

IMPORTANT TELEPHONE CALLS: None

000038

PERSONNEL ON SITE: Robert Thomas, Mike Debes, Tyrone Price, Al Opalko

SUPERVISOR: Robert Thomas DATE: 5-27-93

PROJECT NAME: OU2 Lime Sludge Pond	PROJECT NO. 20.03.05
FIELD ACTIVITY SUBJECT: Hand auger at LSP-SB-1960	

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

1545 Clean up area, have items finished and exit

1630 Arrive at T-305 Label + Tape samples

1737 Sign samples over to sample coordination

1800 Leave FEMP

RT 5-27-93

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
see page 1	see page 1
WEATHER CONDITIONS:	**IMPORTANT TELEPHONE CALLS:**
see page 1	see page 1

PERSONNEL ON SITE: Robert Thomas, Mike Debes, Tyrone Prie, Al Opalko

SUPERVISOR: Robert Thomas DATE: 5-27-93

327-7-86

FERNALD RI/FS

2162
FIELD ACTIVITY DAILY LOG

FMPC 9/93 015

DAILY LOG			
DATE	5	28	93
NO.	20	03	05
SHEET	1	OF	1

PROJECT NAME OU2 Lime Sludge Pond — PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Auger by hand at LSP-SB-1960

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

MICROTIP S.N. PA93005
ALPHA METER S.N. N/A
BETA GAMMA METER S.N. 44501

0700 Arrive at T-305. Get PVC Casing & Decon it a Penn Drill

0800 Collect Trip Blank TAL-20.03.05K Sample No. 114737 8 RFA/CC-73325

0835 Load truck, head into plant, dressout & proceed to Lime Sludge Ponds

0915 Arrive at Lime Sludge Pond. Tailgate safety meeting.

0920 Drive 6.5 feet of casising. Auger clean out inside to 6.5 feet.

0940 Drive at second piece of 6.5 ft casing to 11.5 ft with a foot exposed above surface. Clean out to 11.5 feet. Change Auger

1035 Collect Archive 11.5-12 ft. Sample No. 114739 RFA/CC-73896 M-Tip=0ppm Be=60cpm

1055 Collect Archive 12-12.5 ft. Sample No. 114740 RFA/CC-73896 M-Tip=0ppm Be=60cpm

1115 Collect Archive 12.5-13 ft Sample No. 114741 RFA/CC 73896 M-Tip 0ppm Be=60cpm

1140 Collect TAL-20.03.05C 13-13.5 ft. Note Sample should have been 13.5-14 ft but auger stem will not get to this level. Be=60cpm M-Tip=0ppm Sample No. 114737 RFA/CC-73325

1150 Sampling complete. Decon equipment & clean up area.

1220 Exit plant. Samples locked in truck ~~Exit~~ heavy ice.

1230 At T-305. Paperwork

1315 Lunch

1345 Lunch over - prepare labels. Samples being brought out of plant.

1400 Label + Tape samples

1500 Sign RFA/CC 73325 samples over to sample coordination

1505 Sign RFA/CC 73896 samples over to sample coordination.

1530 Complete paperwork

1800 Leave FEMP.

MICROTIP CALIBRATED BY T. Price
ON 5/28/93
USING Isobutylene
LOT # 110592-4

VISITORS ON SITE: None

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS: None

WEATHER CONDITIONS: 67°F Sunny

IMPORTANT TELEPHONE CALLS: None

000040

PERSONNEL ON SITE: Robert Thomas, Tyrone Price, Al Gallion, Mike Rebas

SUPERVISOR: Robert Thomas — DATE: 5-28-93

FERNALD RI/FS

2162

FIELD ACTIVITY DAILY LOG

DAILY LOG			
DATE	6	1	93
NO.	20	03	05
SHEET	1	OF	2

OJECT NAME: Lime Sludge Pond - Cru 2 | PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Hand augering at South Lime Sludge Pond SB# 1961

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

MICROTIP S.N. PA930095
ALPHA METER S.N. N/A
BETA GAMMA METER S.N. 44501

0800 Arrive at FEMP
0900 Head into plant. Pick-up Trip Blank TAL-20.03.05K Sample No. 114744 RFA/CC-73921
Dressout + proceed to site.
0930 Tailgate safety meeting
0935 Set up area.
0950 Start augering 0-6 inches. Collect Archive. Sample No. 114750 RFA/CC-73927
Be=40cpm M-Tio=0ppm
1000 Auger 6-12 inches. Collect Archive. Sample No. 114751 RFA/CC-73927
Be=40cpm M-Tio=0ppm
1005 Auger 1-1.5ft. Collect Archive. Sample No. 114752 RFA/CC-73927
Be=40cpm M-Tio=0ppm
1015 Auger 1.5-2ft. Collect Archive. Sample No. 114753 RFA/CC-73927
Be=40cpm M-Tio=0ppm
1030 Collect Sample 2-4.5 feet. Be=10cpm M-Tio=0ppm. Collect TAL 20.03.05 C+H
TAL-C Sample No. 114745 RFA/CC-73922
TAL-H Sample No. 114746 RFA/CC 73922
1130 Lunch
1230 Return. Collect supplies head to site
1345 Arrive at site.
1350 Collect 4-4.5ft. Collect archive. Sample No. 114754 RFA/CC-73927 Be=10cpm M-Tio=0ppm
1355 Auger 4.5-5ft. Collect archive. Sample No. 114755 RFA/CC-73927 Be=10cpm M-Tio=0ppm
1405 Auger 5-5.5ft. Collect archive Sample No 114756 RFA/CC-73927 Be=10cpm M-Tio=0ppm
1410 Auger 5.5-6ft. Collect archive. Sample No. 114757 RFA/CC-73927 Be=10cpm M-Tio=0ppm
~~1420 Auger 6.5-6.5~~ nr 6-1-93
1415 Auger 6-6.5. Collect archive. Sample No 114758 RFA/CC-73927
Be=0cpm M-Tio=0cpm

MICROTIP CALIBRATED BY B. Byer
ON 6/1/93
USING Isobutylene
LOT # 1105924

• page 2 •

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
None	None
WEATHER CONDITIONS:	**IMPORTANT TELEPHONE CALLS:**
68°F Sunny	None

000041

PERSONNEL ON SITE: Robert Thomas, Mike Dobes, Tyrone Price, Al Opalko

SUPERVISOR: Robert Thomas DATE: 6/1/93

DAILY LOG			
	6	1	93
NO.	20	03	05
SHEET	2 OF 2		

FIELD ACTIVITY DAILY LOG

PROJECT NAME: Lime Sludge Pond - Cru 2 | PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Hand augering at South Lime Sludge Pond SB#1961

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

1420 Auger 6.5-7ft. Collect archive. Sample No. 114759 RFA/CC-73927

1430 Auger 7-9 feet. Collect TAL-20.03.05D. M-Tip = 0ppm Be = 40cpm.
Sample No. 114747 RFA/CC-73922 (Screen + TOC)
Sample No. 114748 RFA/CC-73926 (Geotechnical)

1445 Auger 9-10ft. Very little recovery. Collect archive. MTip = 0ppm Be = 40cpm
Sample No. 114760 RFA/CC-73927

1515 Auger 10-12ft. Collect TAL-20.03.05D. M-Tip = 0ppm Be = 40cpm
Sample No. 114742 RFA/CC-73921 (Screen + TOC)
Sample No. 114749 RFA/CC-73926 (Geotechnical)

Bottom of Sludge Pond is 10ft

RT 6-1-93
~~1213 PM~~

1600 Auger 12-13ft. Collect 20.03.05C. MTip = 0ppm Be = 40cpm
Sample No. 114743 RFA/CC-73921

1620 Done with sampling. Clean up area + exit.

1645 No Rad Techs to finish item. Insulate coolers. Lock in truck on B-Street.

1700 Shower + head to trailers

1730 Paperwork.

1800 Leave FEMP

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
page 1	page 1
WEATHER CONDITIONS:	**IMPORTANT TELEPHONE CALLS:**
page 1	page 1

000042

PERSONNEL ON SITE: Robert Thomas, Mike Debes, Tyrone Price, Al Cipollo

SUPERVISOR: Robert Thomas DATE: 6-1-93

327-7-86

FERNALD
RI/FS

2162

FIELD ACTIVITY DAILY LOG

DAILY LOG			
DATE	5	20	93
NO.	20	03	05
SHEET	1	OF	2

PROJECT NAME: OU2 Lime Sludge Pond | PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Hand auger at LSP-SR-1962 in South Pond.

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

MICROTIP S.N. PA93005
ALPHA METER S.N. N/A
BETA GAMMA METER S.N. 50760

0700 Arrive at T-205. Collect supplies and initiate paperwork.
0800 Collect Trip Blank Sample No. 114606 RFA/CC-72445 TAI-20.03.05C
0815 Gather supplies.
1130 Lunch
1230 Return. Head into plant, dress out and proceed to Lime Sludge Pond.
1350 Tailgate safety meeting. + set up area.
1400 Auger 0"-6". Be=20cpm M-Tip=0ppm Collect 500ml Archive Sample No. 114611 RFA/CC=73283. Put excess sludge into 5 gallon bucket. Change auger.
1405 Auger 6"-12". Be=20cpm M-Tip=0ppm. Collect 500ml Archive. Sample No. 114612 RFA/CC-73283. Put excess sludge into 5 gallon bucket. Change auger.
1410 Auger 1ft-1.5ft. Be=20cpm M-Tip-0ppm Collect 500ml Archive. Sample No. 114613 RFA/CC-73283 Put excess sludge into 5 gallon bucket. Change auger.
1415 Auger 1.5-2ft. Be=20cpm M-Tip=0ppm. Collect 500ml Sample No. 114614 RFA/CC-73283 Put excess sludge into 5 gallon bucket. Change auger.
1420 Auger 2-2.5ft. Be=20cpm M-Tip=0ppm. Collect 500ml archive Sample No. 114615 RFA/CC-73283 Put excess sludge in 5 gallon bucket. Change auger.
1425 Auger 2.5-3ft. Be=20cpm. M-Tip=0ppm. Half of auger into archive other into stainless steel bowl. Archive sample No. 114616 RFA/CC-73283
1430 Auger 3-3.5ft. Be=20cpm M-Tip=0ppm. Half of auger into archive other into stainless steel bowl. Archive sample No. 114717 RFA/CC-73283
1435 Auger 3.5-4ft. Be=20cpm M-Tip=0ppm. Half of auger into archive other half in to stainless steel bowl. Archive sample No. 114718 RFA/CC-73283
1440 Auger 4-4.5ft. Be=20cpm M-Tip=0ppm. Water in the hole. Deposit half of auger in archive other into stainless steel bowl. Archive sample No. 114719 RFA/CC 73283
(see page 2)

MICROTIP CALIBRATED BY T. Price
ON 5/20/93
USING Isobutylene
LOT # 110592-4

VISITORS ON SITE: None

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS: None

FMPC Q. OIL 7-12-93

WEATHER CONDITIONS: 62°F Partly Sunny

IMPORTANT TELEPHONE CALLS: None

000043

PERSONNEL ON SITE: Robert Thomas, Mike Debes, Tyrone Price, Doug Smith

SUPERVISOR: Robert Thomas DATE: 5-20-93

RI/FS

FIELD ACTIVITY DAILY LOG

DAILY L NO. 20 03 05
SHEET 2 OF 2

PROJECT NAME 002 Lime Sludge Pond | PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: see page 1

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

1445 Composite sludge ~~and~~ RT 5-20-93 in the stainless steel bowl and collect sample of TAL-20.03.05D (Water Content only) Sample No. 114604 RFA/CC-72441 Excess sludge into 5 gallon bucket. Change auger.

1450 Auger 4.5-7 feet. Very little recovery. Obtain enough for sample. TAL-20.03.05C Sample No. 114605 RFA/CC-72442. Change Auger

1530 Auger ~~10~~ RT 5-20-93 7-10 ft. Collect 500ml Archive. Sample No. 114720 RFA/CC-73283

1540 Auger 10-11 ft. Hit bottom of fill. Be=20 cpm M-Tip=0ppm
• Collect 500ml Archive. Sample No. 114721 RFA/CC-73283

1550 Clean up and rope off area.

1600 Have ~~items~~ samples RT 5-20-93 finished and exit plant.

1700 Arrive at T-305. Label + Tape Samples

1800 Sign sample over to sample coordination. (RFA-72445, 72441, 72442

1820 Leave FEMP.

RT 5-20-93

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
page 1	page 1 FMPC Q OIL 7-12-93
WEATHER CONDITIONS:	**IMPORTANT TELEPHONE CALLS:**
page 1	page 1

000044

PERSONNEL ON SITE: see page 1

SUPERVISOR: Robert Thomas DATE: 5-20-93

327-7-86

FERNALD RI/FS

2162

FIELD ACTIVITY DAILY LOG

DAILY LOG			
DATE	5	21	93
NO.	20	03	05
SHEET	1	OF	1

PROJECT NAME: OU2 Lime Sludge Ponds — PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Hand auger at LSPSB-1962 in South Pond

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

MICROTIP S.N. PA93005
ALPHA METER S.N. N/A
BETA GAMMA METER S.N. S0760

0700 Arrive at T-305. Complete paperwork and collect supplies
0830 Head into plant dessout and proceed to Lime Sludge Pond.
0915 Tailgate safety meeting.
0930 Auger 11 to 11.5 feet. Be=20cpm M-Tip=0ppm. Collect 500ml Archive Sample No. 114722 RFAICC-73283
0945 It is determined at this time that the hole is not remaining open at approx. 6-11 feet. Will stop augering and wait for guidance from supervisors.
1000 Clean up area. Exit plant + shower.
1100 Back at T-305. No supervisors until Monday
1130 Lunch
1230 Return complete paperwork.
1600 Leave FEMP

RT 5-21-93

MICROTIP CALIBRATED BY R. Thomas
ON 5/21/93
USING Isobutylene
LOT # 110592-4

VISITORS ON SITE: None

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS: None

FMPC Q OIL 7-12-93

WEATHER CONDITIONS: 65°F Sunny

IMPORTANT TELEPHONE CALLS: None

000045

PERSONNEL ON SITE: Robert Thomas, Tyrone Price, Doug Smith, Mike Debos

SUPERVISOR: Robert Thomas — DATE: 5-21-93

FERNALD RI/FS

FIELD ACTIVITY DAILY LOG

DAILY LOG			
DATE	5	24	93
NO.	20	03	05
SHEET	1	OF	1

PROJECT NAME: OU2 Lime Sludge Ponds | PROJECT NO. 20.03.05

IELD ACTIVITY SUBJECT: Hand auger at 1967.

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

0700 Arrive at FEMP. Monday Morning Meeting.

0730 Discuss with Kate Briner about hole not remaining open. It is determined that a casing of PVC will be used.

0800 Try to Locate casing through Penn Drill. Complete paperwork during interim.

1130 Lunch

1230 Return from lunch. Drive to Penn Drill locate casing.

1315 Return to T-305. Paperwork

1430 Go to Honda Dealer to pick up generators

1630 Return. Go to Penn Drill get casing.

1800 Leave FEMP.

RT 5-24-93

VISITORS ON SITE: None

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS: N/A

FMPC Q OIL 7-12-93

WEATHER CONDITIONS: 68°F Sunny

IMPORTANT TELEPHONE CALLS:

000046

PERSONNEL ON SITE: R. Thomas, M. Debes, T. Price, D. Smith

SUPERVISOR: Robert Thomas

DATE: 5-24-93

327-7-86

FERNALD RI/FS

2162

FIELD ACTIVITY DAILY LOG

DAILY LOG			
DATE	5	25	93
NO.	20	03	05
SHEET	1	OF	1

ROJECT NAME 002 Lime Sludge Pond — PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Hand boring at LSP-SB-1962

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

MICROTIP S.N. PA93005
ALPHA METER S.N. N/A
BETA GAMMA METER S.N.

0700 Arrive at FEMP-T305. Gather supplies.
0800 Collect Trip Blank TAL-20.03.05R Sample No. 114608 RFA/CC-73004
0830 Cut PVC casing to 12.5 feet. take back to Rem Drill to decon. pipe.
1130 Break for lunch.
1230 Return. Load truck, head into plant. Dress out. + proceed to Lime Sludge Ponds.
1345 Tailgate safety meeting.
1410 Start driving PVC casing into pond.
1445 Clean out inside of casing to the level of 11.5 feet. Clean out with auger. Change auger.
Bottom of Sludge Pond is 11.5ft
1500 Collect Archive at 11.5 to 12 feet. Be = 20 cpm Microtip = 0ppm. Sample No. 114723 RFA/CC-73283. Change Auger
~~1510~~ 5-25-93
1510 Collect Archive at 12-12.5 feet. Be = 20 cpm Microtip = 0ppm Sample No. 114724 RFA=73283 Change Auger
1515 Collect TAL-20.03.05C at 12.5-14 feet. Be = 20 cpm Microtip = 0ppm Sample No. 114607 RFA/CC 73004.
1630 Finish sampling. Decon equipment and clean up area.
1650 Arrive at Rad Tech Trailer to have samples frished. No ~~Tech available~~ RCT available. Will insulate samples with towels + ice and lock in truck overnight.
1710 ~~1510~~ Showers + Head out
1735 ~~1530~~ 5-25-93 Arrive at T305 Complete paperwork
1800 Leave FEMP.

MICROTIP CALIBRATED BY R. Thomas
ON 5/25/93
USING Isobutylene
LOT # 110592-4

VISITORS ON SITE: John Berritz-CRUZ

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS: None

FMPC Q OIL 7-12-93

WEATHER CONDITIONS: 62°F Partly Cloudy

IMPORTANT TELEPHONE CALLS: None

000047

PERSONNEL ON SITE: Robert Thomas, Mike Behr, Tyrone Price, Jarrett Yuknalis, Al Opekala

SUPERVISOR: Robert Thomas DATE: 5-25-93

FERNALD RI/FS

FIELD ACTIVITY DAILY LOG

DAILY LOG			
DATE	5	26	93
NO.	20	03	05
SHEET	1	OF	1

PROJECT NAME: Lime Sludge Pond

PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Hand auger at LSP-SB-1962

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

MICROTIP S.N. PA930095
ALPHA METER S.N N/A
BETA GAMMA METER S.N. 44501

0700 Arrive at T-305. Start paperwork and gather supplies
0800 Collect Trip B Sample TAL-20.03.05K Sample No. ~~114607~~ 114610 (5-26-93) RFA/CC-73004
0810 Tailgate safety meeting.
0820 Auger 0-2.5 feet. Change Auger. Dump sludge in pile on ground
0845 Auger 2.5-4.5 feet. Collect 20.03.05H Sample No. 114609 RFA/CC-73004
0910 Done sampling. Decon equipment + clean up area.
0930 Have samples frisked at Rad Trailer. Bring truck out of plant.
1015 Arrive at T-305. Label + tape samples
1050 Sign samples (RFA/CC-73004) over to sample coordination.
1130 Lunch
1230 Return from Lunch. Label + Custody tape archives.
1340 Sign samples over to sample coordination (RFA 73283)
1400 Collect Rinsate supplies.
1445 Collect Rinsate TAL-20.03.05(Rinsate) Sample No. 114725 RFA/CC-73284
500 Label + PH, + Tape
1530 Perm drill (arrive) and grab 2 10ft PVC for next day
1630 Sign samples over to sample coordination. (RFA/CC-73284, Rinsate)
1700 Complete paperwork
1800 Leave Fernald

MICROTIP CALIBRATED BY
R. Thomas
ON 5/26/93
USING Isobutylene
LOT # 110552-4

VISITORS ON SITE:
Jeff Brownwart, QC

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:
N/A

FMPC QC 7-12-93

WEATHER CONDITIONS:
60°F Sunny

IMPORTANT TELEPHONE CALLS:
N/A

000048

PERSONNEL ON SITE: Robert Thomas, Mike Dobes, Tyrone Price, Al Opalko

SUPERVISOR: Robert Thomas

DATE: 5-26-93

NALD
~~H/FS~~

FIELD ACTIVITY DAILY LOG

2162

DAILY LOG			
DATE	6	3	93
NO.	20	03	05
SHEET	1	OF	

PROJECT NAME: Lime Sludge Pond — PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Collect soil samples at LSP-SB-1963

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

MICROTIP S.N. P193 D095
ALPHA METER S.N. N/A
BETA GAMMA METER S.N. 45150

0800 Collect Trip Blank. Sample No. 114792 RFA/CC-73986
0830 Tailgate safety meeting.
0840 Auger 0-6". Collect Archive. M-Tip=0ppm Bg=40 cpm (background)
Sample No. 114795 RFA/CC-73989
0845 Auger 6-12". Collect Archive. M-Tip=0ppm Bg=40cpm (background)
Sample No. 114796 RFA/CC-73989
0855 Auger 1-1.5. Collect Archive. M-Tip=0ppm Bg=40cpm (background)
Sample No. 114797 RFA/CC-73989
0900 Auger 1.5-2ft. Collect Archive. M-Tip=0ppm Bg=40cpm (background)
Sample No. 114798 RFA/CC-73989
0910 Auger 2-4ft Collect sample. TAL-2003.05C + H. M-Tip=0ppm Bg=40cpm (background)
TAL-C Sample No. 114762 RFA/CC-73986
TAL-H Sample No. 114763 RFA/CC-73986
0940 Auger 4-6 ft. Collect TAL 20.03.05D. M-Tip=0ppm Bg=40cpm (background)
TALD - Sample No: 114764 RFA/CC-73986 (Screen + TOC)
TALD - Sample No. 114793 RFA/CC-73983 (Geotechnical)
1000 Collect Field Blank from Blue D.I. Jug Sample No. 114761 RFA/CC-73985 TAL-2003.05B
Continue auger at same time. Auger 6-6.5ft. Collect archive. M-Tip=0ppm Bg=40cpm (background)
Sample No. 114799 RFA/CC-73989
1010 Auger 6.5-7ft. Collect archive. M-Tip=0ppm Bg=40cpm (background)
Sample No. 114800 RFA/CC-73989
1015 Auger 7-7.5ft. Collect archive M-Tip=0ppm Bg=40cpm (background)
Sample No. 114801 RFA/CC 73989
1020 Auger 7.5-8 ft. Collect archive. M-Tip=0ppm Bg=40cpm (background)
Sample No. 114802 RFA/CC-73989
1025 Auger 8-8.5ft. Collect archive. M-Tip=0ppm Bg=40cpm (background)
Sample No. 114803 RFA/CC-73989

• See page 2 •

MICROTIP CALIBRATED BY T. Price
ON 6-3-93
USING Isobutylene
LOT # 110592-4

VISITORS ON SITE: Jeff Braunwart, QA

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS: None

WEATHER CONDITIONS: 68°F Mostly Cloudy

IMPORTANT TELEPHONE CALLS: None

000049

FMPC 015 6/7/93

PERSONNEL ON SITE: Robert Thomas, Tyrone Price, Mike Debes, Al Opalko

SUPERVISOR: Robert Thomas — DATE: 6/3/93

S

FIELD ACTIVITY DAILY LOG

DAILY L NO. 20 03 05
SHEET 2 OF 2

PROJECT NAME Lime Sludge Pond | PROJECT NO. 20.03.05

FIELD ACTIVITY SUBJECT: Collect soil samples at LSP-SB

DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:

1030 Auger 8.5-9 ft. Collect archive. Be = 40 ppm (Background) M-Tip = 0 ppm
Sample No. 114804 RFA/CC-73989
1035 Auger 9-9.5 ft. Collect archive. Be = 40 ppm (Background) M-Tip = 0 ppm
Sample No. 114805 RFA/CC-73989
1040 Auger 9.5-10 ft. Collect archive. Be = 40 ppm (Background) M-Tip = 0 ppm
Sample No. 114806 RFA/CC-73989
1100 Auger 10-10.5 ft. Collect archive. Be = 40 ppm (Background) M-Tip = 0 ppm
Sample No. 114807 RFA/CC-73989
1105 Auger 10.5-11 ft. Collect archive. Be = 40 ppm (Background) M-Tip = 0 ppm
Sample No. 114808 RFA/CC-73989
1110 Auger 11-11.5 ft. Collect archive. Be = 40 ppm (Background) M-Tip = 0 ppm
Sample No. 114809 RFA/CC-73989
1115 Auger 11.5-12 ft. Collect archive. Be = 40 ppm (Background) M-Tip = 0 ppm
Sample No. 114810 RFA/CC-73989 | Bottom of Sludge Pond = 12 ft
1145 Auger 12-13.5 ft. Collect TAL-20.03.05 D. Be = 40 ppm (Background) M-Tip = 0 ppm
Sample No. 114765 RFA/CC-73986 (Screen + TOC)
Sample No. 114794 RFA/CC-73983 (GeoTechnical)
1200 Auger 13.5-15.5 ft. Collect TAL-20.03.05 C. Be = 40 ppm (Background) M-Tip = 0 ppm
Sample No. 114766 RFA/CC-73986
1215 Sampling Complete. Clean + secure area. + exit. Cannot reach next interval for no more auger stems to reach that depth
1230 Shower + out to T-305.
1245 Complete paperwork. labels + RFA/CC's. Samples being trished for release at this time.
1400 Label + Tape Samples.
1445 Samples on RFA/CC sign over to sample coordination (RFA/CC # 73985)
1600 Samples on RFA/CC # 73983 signed over to sample coordination
1608 Samples on RFA/CC # 73983 signed over to sample coordination.
1610 Paperwork
1800 Leave FEMP

VISITORS ON SITE: Page 1

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS. Page 1

WEATHER CONDITIONS: Page 1

000050

IMPORTANT TELEPHONE CALLS: Page 1

FMPC 0015

PERSONNEL ON SITE: Page 1

SUPERVISOR: Robert Thomas

DATE: 6/3/93

327-7-86

ATTACHMENT C

Map of Geotechnical Samples and Geotechnical Results

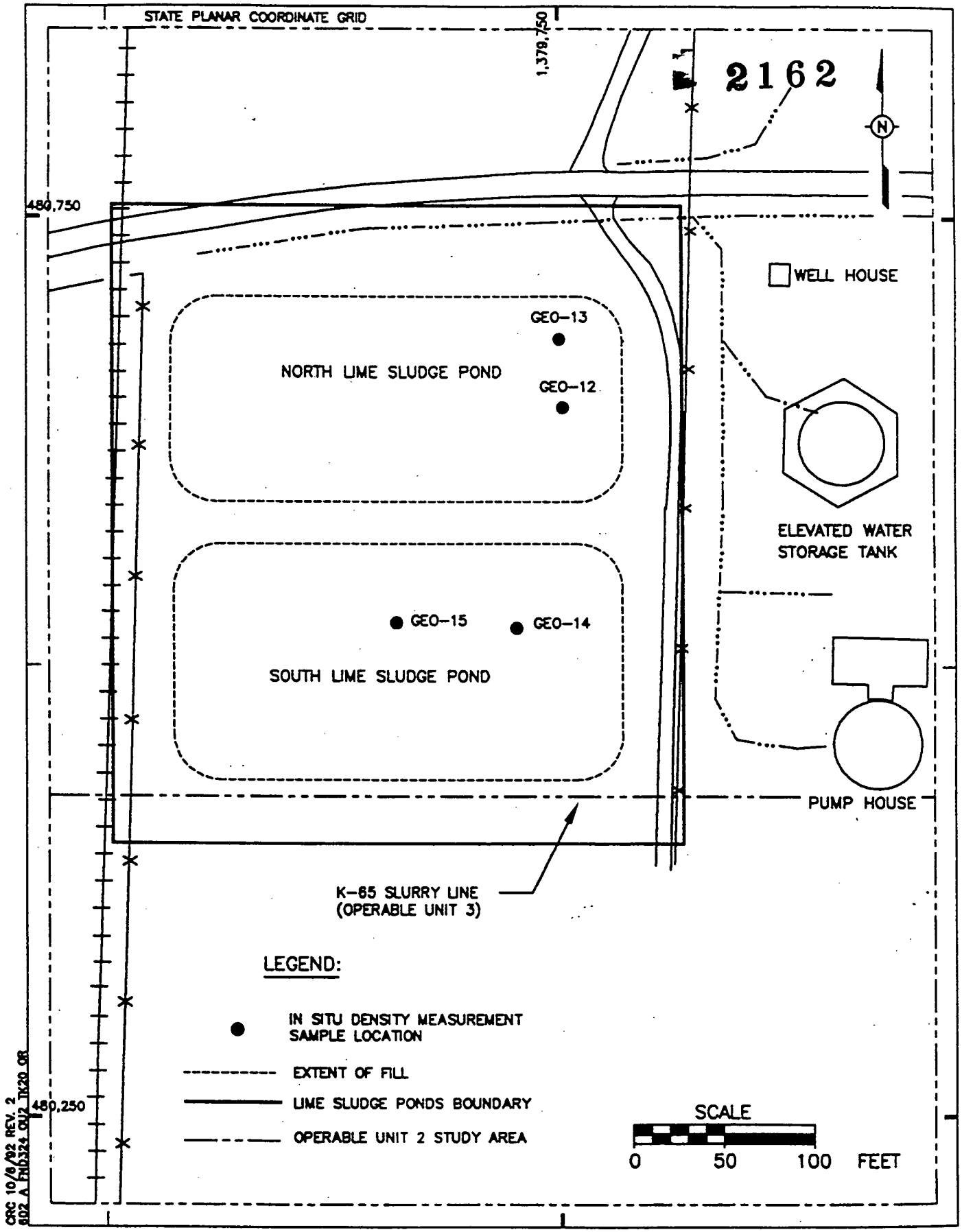
Boring No	Location
GEO-12	North Lime Sludge Pond
GEO-13	North Lime Sludge Pond
GEO-14	South Lime Sludge Pond
GEO-15	South Lime Sludge Pond

GEOTECHNICAL DATA FOR SURFACE MEDIA IN THE NORTH AND SOUTH LIME SLUDGE PONDS

Location:	North Pond		South Pond	
	#12	#13	#14	#15
North & East Coordinates	480643.67, 1379757.18	480679.97, 1379755.92	480520.20, 1379731.00	480521.49, 1379661.17
Wet Density (pcf)	83.1	80.8	79.7	81.1
Dry Density (pcf)	46.8	47.7	50.5	44.4
Moisture Content (%)	77.6	69.5	57.8	82.7

000052

2162

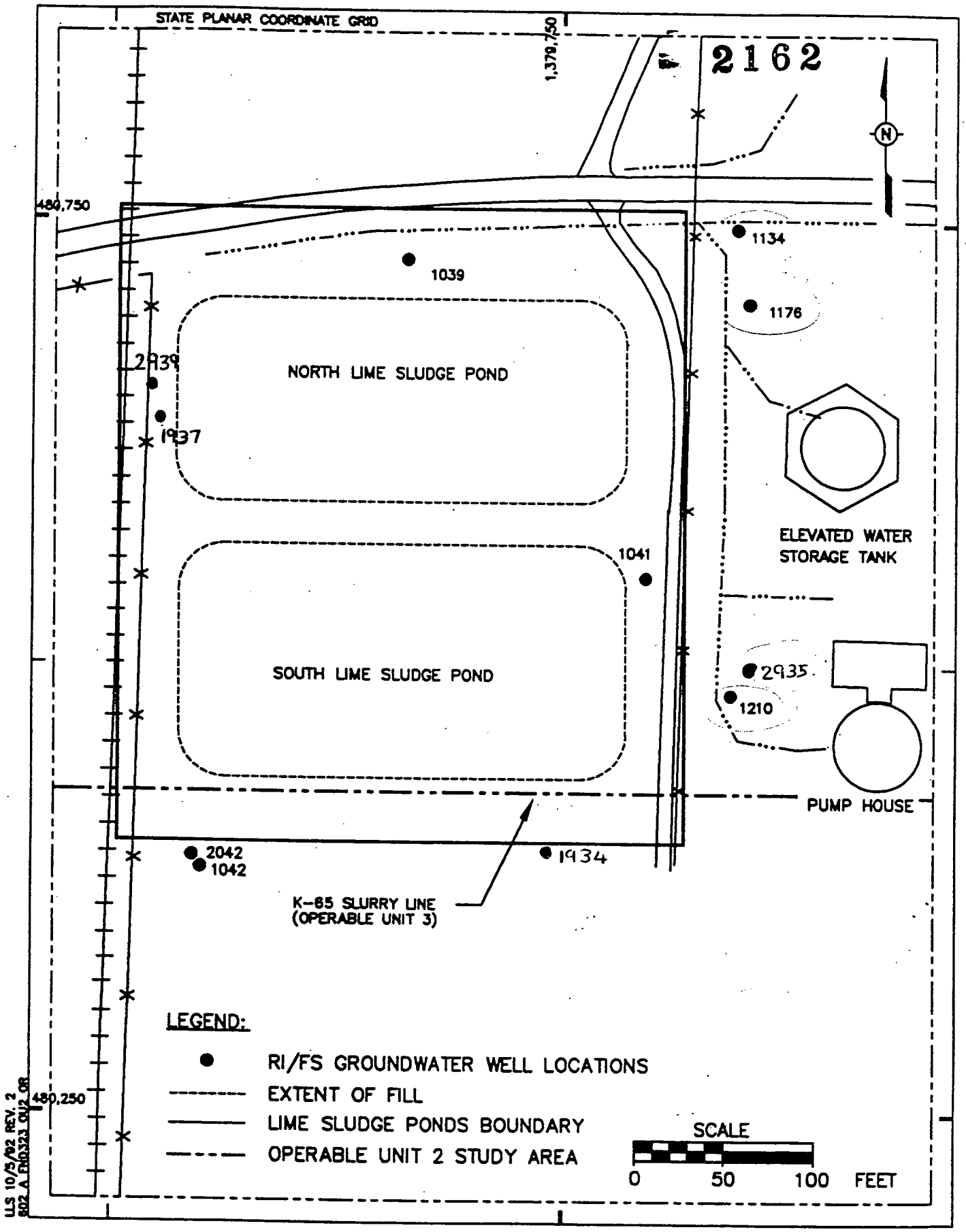


GEOTECHNICAL SAMPLE AND MEASUREMENT LOCATIONS
IN THE LIME SLUDGE PONDS

ATTACHMENT D

Map of RI/FS Wells in LSP Area and Boring Logs

Boring No	Location
1039	North of North Lime Sludge Pond
1041	Northeast of North Lime Sludge Pond
1134	Northeast of North Lime Sludge Pond
1176	East of North Lime Sludge Pond
1210	East of South Lime Sludge Pond
1934	South of South Lime Sludge Pond
1937	West of North Lime Sludge Pond
2042	South of South Lime Sludge Pond
2935	East of South Lime Sludge Pond
2939	West of North Lime Sludge Pond



GROUNDWATER MONITORING WELLS IN THE LIME SLUDGE PONDS STUDY AREA

PROJECT NUMBER: 602 3.2	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1039	COORDINATES: NORTH 480,729.12 EAST 1,379,659.05	DATE: 04/09/88	
GROUND ELEVATION: 577.4	GWL: Depth N/A Date/Time N/A	DATE STARTED: 04/08/88	
ENGINEER/GEOLOGIST: M SLUSARSKI	Depth N/A Date/Time N/A	DATE COMPLETED: 04/09/88	
DRILLING METHODS: CABLE-TOOL		PAGE 1 OF 2	

DEPTH	SAMPLE	DATE TIME	BLOWS ON SAMPLE	RECOVERY INCHES		USCS SYMBOL	TSF	REMARKS
0.0 1.5	008431	04/08/88 0921	3 8 10	12	VERY STIFF, BROWN (10YR 3/2), CLAY, ROOTLETS, DRY.	CL	2.5	Hnu= 0 ppm BΓ = 120 cpm
3.0	008432	04/08/88 0924	5 7 8	14	STIFF, GREY/BROWN (10YR 4/1), CLAY, DRY.	CL	2.0	Hnu= 0 ppm BΓ = 120 cpm
4.5	008433	04/08/88 0933	5 9 12	8	VERY STIFF, OLIVE/BROWN (5Y 4/3) MOTTLED, CLAY, DRY.	CL	3.5	Hnu= 0 ppm BΓ = 100 cpm
6.0	008434	04/08/88 0938	11 13 15	10	VERY STIFF, GREY/BROWN (10YR 5/1) MOTTLED, CLAY, DRY.	CL	2.5	Hnu= 0 ppm BΓ = 100 cpm
7.5	008435	04/08/88 0941	15 15 18	12	VERY STIFF, GREY/BROWN (10YR 5/1) MOTTLED, CLAY, DAMP.	CL	2.0	Hnu= 0 ppm BΓ = 100 cpm
9.0	008436	04/08/88 0946	11 14 14	12	STIFF, GREY (2.5Y 6/2), CLAY, DAMP.	CL	1.5	Hnu= 0 ppm BΓ = 100 cpm
11.0	008437	04/08/88 1327	N/A	24	SHELBY TUBE: PUSHED SHELBY TUBE FROM 9.0-11.0 FT; RECOVERED 2.0 FT.	N/A	N/A	Hnu= 0 ppm BΓ = 100 cpm
12.0	008438	04/08/88 1414	4 6	10	MEDIUM STIFF, GREY (5Y 5/1), SILTY CLAY, DAMP.	CL	0.5	Hnu= 0 ppm BΓ = 100 cpm
13.5	008439	04/08/88 1421	4 7 11	14	MEDIUM STIFF, GREY (5Y 5/1), SILTY CLAY, DAMP.	CL	1.0	Hnu= 0 ppm BΓ = 100 cpm
15.0	008440	04/08/88 1426	10 12 19	12	MEDIUM STIFF, GREY (5Y 5/1) SILTY CLAY, DAMP.	CL	1.0	Hnu= 0 ppm BΓ = 100 cpm
16.5	008441	04/08/88 1430	17 20 17	14	MEDIUM STIFF, GREY (5Y 5/1) SILTY CLAY, SOME FINE SAND, DAMP.	CL	1.0	Hnu= 0 ppm BΓ = 80 cpm
18.0	008442	04/08/88 1505	2 5 13	14	MEDIUM STIFF, GREY (5Y 5/1) SILTY CLAY, SOME FINE SAND, DAMP.	CL	1.5	Hnu= 0 ppm BΓ = 80 cpm
19.5	008443	04/08/88 1508	6 12 15	14	MEDIUM DENSE, GREY (5Y 4/1), WELL GRADED, GRAVELLY SAND, WET.	SW	N/A	Hnu= 0 ppm BΓ = 80 cpm
21.0	008444	04/08/88 1511	10 16 18	14	DENSE, GREY (5Y 4/1), WELL GRADED, GRAVELLY SAND, WET.	SW	N/A	Hnu= 0 ppm BΓ = 80 cpm

PROJECT NUMBER: 602 3.2	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1039	COORDINATES: NORTH 480,729.12 EAST 1,379,659.05	DATE: 04/09/88	
GROUND ELEVATION: 577.4	GWL: Depth N/A Date/Time N/A	DATE STARTED: 04/08/88	
ENGINEER/GEOLOGIST: M SLUSARSKI	Depth N/A Date/Time N/A	DATE COMPLETED: 04/09/88	
DRILLING METHODS: CABLE-TOOL		PAGE 2 OF 2	

DEPTH	SAMPLE	DATE TIME	BLOWS ON SAMPLE	RECOVERY INCHES		USCS SYMBOL	TSF	REMARKS
22.5	008445	04/08/88 1513	14 20 21	14	DENSE, GREY (5Y 4/1) WELL GRADED, GRAVELLY SAND, WET.	SW	N/A	Hnu= 0 ppm BΓ = 80 cpm
24.0	008446	04/08/88 1651	10 8 14	14	MEDIUM DENSE, GREY (5Y 4/1), CLAYEY GRAVEL, GRAVEL/SAND/CLAY MIXTURE, WET. 23.5'-VERY STIFF, GREY (5Y 4/1), CLAY, SOME FINE GRAVEL AND SILT, DRY.	GC CL	N/A 2.5	Hnu= 0 ppm BΓ = 80 cpm
25.5	008447	04/08/88 1712	7 10 11	8	VERY STIFF, GREY (5Y 4/1), CLAY, SOME FINE GRAVEL AND SILT, DRY.	CL	2.5	Hnu= 0 ppm BΓ = 80 cpm

BOTTOM OF BORING 27.0

NOTES:
SAMPLES COLLECTED PER ASTM STANDARD PENETRATION TEST. COLORS IDENTIFIED USING MUNSELL COLOR CHART.
MONITORING WELL INSTALLED.

FERNALD RI/FS — VISUAL CLASSIFICATION OF SOILS — LSP

PROJECT NUMBER: 602 3.2	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1041	COORDINATES: NORTH 480,550.15 EAST 1,379,798.62	DATE: 04/10/88	
GROUND ELEVATION: 581.3	GWL: Depth N/A Date/Time N/A	DATE STARTED: 04/10/88	
ENGINEER/GEOLOGIST: M SLUSARSKI	Depth N/A Date/Time N/A	DATE COMPLETED: 04/11/88	
DRILLING METHODS: CABLE-TOOL		PAGE 1 OF 2	

DEPTH	SAMPLE / DATE / TIME	BLOWS ON SAMPLE	RECOVERY INCHES		USCS SYMBOL	TSF	REMARKS
0.0 1.5	008448 04/10/88 1409	2 4 7	12	STIFF, YELLOW-BROWN (10YR 4/3), CLAY, SOME FINE GRAVEL, ROOTLETS, DRY.	CL	2.0	Hnu= 0 ppm BΓ = 140 cpm
3.0	008449 04/10/88 1412	3 5 17	12	STIFF, YELLOW-BROWN (10YR 4/3), CLAY, SOME FINE GRAVEL, ROOTLETS, DRY.	CL	2.0	Hnu= 0 ppm BΓ = 140 cpm
4.5	008450 04/10/88 1417	18 20 18	18	VERY STIFF, YELLOW-BROWN (5Y 4/4), CLAY, SOME FINE GRAVEL, DRY. 4.0'-STIFF, GREY-BROWN MOTTLED (10YR 3/1), CLAY, SOME FINE GRAVEL, DRY.	CL CL	2.5 2.0	Hnu= 0 ppm BΓ = 120 cpm
6.0	008451 04/10/88 1421	24 25 30	18	VERY STIFF, YELLOW-BROWN-GREY MOTTLED (10YR 4/4), CLAY, DRY.	CL	3.0	Hnu= 0 ppm BΓ = 120 cpm
7.5	008452 04/10/88 1426	24 26 24	14	STIFF, GREY-YELLOW BROWN MOTTLED (10YR 5/1), CLAY, DRY.	CL	2.0	Hnu= 0 ppm BΓ = 120 cpm
9.0	008453 04/10/88 1428	25 28 27	8	STIFF, GREY-YELLOW BROWN MOTTLED (10YR 5/1), CLAY, DRY.	CL	2.0	Hnu= 0 ppm BΓ = 120 cpm
11.0	008454 04/11/88 0908	N/A	N/A	PUSHED SHELBY TUBE FROM 9.0-11.0 FT; RECOVERED 0.75 FT.		N/A	Hnu= 0 ppm BΓ = 120 cpm
12.0	008455 04/11/88 0937	3 9	12	STIFF, GREY (5Y 5/1), CLAY, SOME SILT, DAMP.	CL	2.0	Hnu= 0 ppm BΓ = 120 cpm
13.5	008456 04/11/88 0940	5 6 8	12	STIFF, GREY (5Y 5/1), CLAY, SOME SILT, DAMP.	CL	2.0	Hnu= 0 ppm BΓ = 100 cpm
15.0	008457 04/11/88 0944	5 5 7	12	STIFF, GREY (5Y 5/1), CLAY, SOME SILT, DAMP.	CL	2.0	Hnu= 0 ppm BΓ = 100 cpm
16.5	008458 04/11/88 0948	3 4 4	12	STIFF, GREY (5Y 5/1), CLAY, SOME SILT, DAMP.	CL	2.0	Hnu= 0 ppm BΓ = 100 cpm
18.0	008459 04/11/88 0951	4 4 6	12	STIFF, GREY (5Y 5/1), CLAY, SOME SILT, DAMP.	CL	2.0	Hnu= 0 ppm BΓ = 100 cpm
19.5	008460 04/11/88 1100	1 5 6	14	STIFF, GREY (5Y 5/1), CLAY, SOME SILT, DAMP.	CL	2.0	Hnu= 0 ppm BΓ = 100 cpm
21.0	008461 04/11/88 1102	3 4 4	18	STIFF, GREY (5Y 5/1), CLAY, SOME SILT, DAMP.	CL	2.0	Hnu= 0 ppm BΓ = 100 cpm

PROJECT NUMBER: 602 3.2	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1041	COORDINATES: NORTH 480,550.15 EAST 1,379,798.62	DATE: 04/10/88	
GROUND ELEVATION: 581.3	GWL: Depth N/A Date/Time N/A	DATE STARTED: 04/10/88	
ENGINEER/GEOLOGIST: M SLUSARSKI	Depth N/A Date/Time N/A	DATE COMPLETED: 04/11/88	
DRILLING METHODS: CABLE-TOOL		PAGE 2 OF 2	

DEPTH	SAMPLE	DATE	TIME	BLOWS ON	SAMPLE	RECOVERY	INCHES		USCS SYMBOL	TSF	REMARKS
22.5	008462	04/11/88	1115	2	2	4	18	STIFF, GREY (5Y 5/1), CLAY, SOME SILT, DAMP.	CL	2.0	Hnu= 0 ppm BΓ = 100 cpm

BOTTOM OF BORING 22.5

NOTES:
SAMPLES COLLECTED PER ASTM STANDARD PENETRATION TEST. COLORS IDENTIFIED USING MUNSELL COLOR CHART.
MONITORING WELL INSTALLED.

PROJECT NUMBER: 602 3.7	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1134	COORDINATES: NORTH 480,745.16 EAST 1,379,849.31	DATE: 05/03/89	
GROUND ELEVATION: 579.8	GWL: Depth N/A Date/Time N/A	DATE STARTED: 05/03/89	
ENGINEER/GEOLOGIST: L SINFIELD	Depth N/A Date/Time N/A	DATE COMPLETED: 05/04/89	
DRILLING METHODS: B-53, HOLLOW STEM AUGER WITH SPLIT SPOON		PAGE 1 OF 3	

DEPTH	SAMPLE	DATE TIME	BLOWS ON SAMPLE	RECOVERY INCHES		USCS SYMBOL	TSF	REMARKS
0.0 0.5	15627	05/03/89 1525			HARD, DARK YELLOWISH BROWN (10YR 4/4) LEAN CLAY, ABUNDANT ROOTS , DRY.	CL	4.5	Hnu=0 ppm α =0 cpm BΓ =160-200 cpm
1.0	15628	05/03/89 1525	7 5 6	12	HARD, DARK YELLOWISH BROWN (10YR 4/4) LEAN CLAY, ABUNDANT ROOTS, DRY.	CL	4.5	Hnu=0 ppm α =0 cpm BΓ =160-200 cpm
1.5	15629	05/03/89 N/A			NO RECOVERY, NO SAMPLE TAKEN.	N/A	N/A	N/A
2.0	15630	05/03/89 1530			VERY STIFF, LIGHT BROWNISH GRAY (10YR 6/2) CLAY, MASSIVE, MOTTLED, RARE ROOTS, LEAN WITH SOME SILT, DRY.	CL	2.1 TO 2.5	Hnu=0 ppm α =0 cpm BΓ =120-160 cpm
2.5	15631	05/03/89 N/A	7 5 10	6	NO RECOVERY, NO SAMPLE TAKEN.	N/A	N/A	N/A
3.0	15632	05/03/89 N/A			NO RECOVERY, NO SAMPLE TAKEN.	N/A	N/A	N/A
3.5	15633	05/03/89 N/A			NO RECOVERY, NO SAMPLE TAKEN.	N/A	N/A	N/A
4.0	15634	05/03/89 N/A	7 9 10	5	NO RECOVERY, NO SAMPLE TAKEN.	N/A	N/A	N/A
4.5	15635	05/03/89 1535			VERY STIFF TO HARD, DARK GRAYISH BROWN (10YR 4/2), CLAY, MOTTLED, MASSIVE, MEDIUM PLASTICITY, DRY.	CL	2.6 TO 4.5	Hnu=0 ppm α =0 cpm BΓ =120-140 cpm
5.0	15636	05/03/89 1540			STIFF, DARK GRAYISH BROWN (10YR 4/2) CLAY, MOTTLED, MASSIVE, MEDIUM PLASTICITY, DRY.	CL	1.4 TO 1.6	Hnu=0 ppm α =0 cpm BΓ =140-160 cpm
5.5	15637	05/03/89 N/A	4 7 3	3	NO RECOVERY, NO SAMPLE TAKEN.	N/A	N/A	N/A
6.0	15638	05/03/89 N/A			NO RECOVERY, NO SAMPLE TAKEN.	N/A	N/A	N/A

PROJECT NUMBER: 602 3.7	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1134	COORDINATES: NORTH 480,745.16 EAST 1,379,849.31	DATE: 05/03/89	
GROUND ELEVATION: 579.8	GWL: Depth N/A Date/Time N/A	DATE STARTED: 05/03/89	
ENGINEER/GEOLOGIST: L SINFIELD	Depth N/A Date/Time N/A	DATE COMPLETED: 05/04/89	
DRILLING METHODS: B-53, HOLLOW STEM AUGER WITH SPLIT SPOON		PAGE 2 OF 3	

DEPTH	SAMPLE	DATE TIME	BLOWS ON	SAMPLE	RECOVERY	INCHES		USCS SYMBOL	TSF	REMARKS
6.5	15639	05/03/89 1605					STIFF, DARK YELLOWISH BROWN (10YR 3/4), MEDIUM PLASTICITY, LEAN CLAY, MASSIVE, RARE GRAVEL, DRY.	CL	1.2	Hnu=0 ppm α =0 cpm βΓ =140-180 cpm
7.0	15640	05/03/89 N/A	3 6 7		6		NO RECOVERY, NO SAMPLE TAKEN.	N/A	N/A	N/A
7.5	15641	05/03/89 N/A					NO RECOVERY, NO SAMPLE TAKEN.	N/A	N/A	N/A
8.0	15642	05/03/89 1610					SOFT AT TOP TO HARD AT BASE, MOTTLED GRAY (10YR 6/1) TO BROWNISH YELLOW (10YR 6/6) CLAY, MEDIUM PLASTICITY, MASSIVE, DRY.	CL	>4.5	Hnu=0 ppm α =0 cpm βΓ =180-220 cpm
8.5	15643	05/03/89 1610	5 10 15		15		SOFT AT TOP TO HARD AT BASE, MOTTLED GRAY (10YR 6/1) TO BROWNISH YELLOW (10YR 6/6) CLAY, MEDIUM PLASTICITY, MASSIVE, DRY.	CL	>4.5	Hnu=0 ppm α =0 cpm βΓ =180-220 cpm
9.0	15644	05/03/89 1610					SOFT AT TOP TO HARD AT BASE, MOTTLED GRAY (10YR 6/1) TO BROWNISH YELLOW (10YR 6/6) CLAY, MEDIUM PLASTICITY, MASSIVE, DRY.	CL	>4.5	Hnu=0 ppm α =0 cpm βΓ =180-220 cpm
9.5	15645	05/03/89 1615					VERY STIFF, MOTTLED GRAY (10YR 6/1) TO BROWNISH YELLOW (10YR 6/6) CLAY, MEDIUM PLASTICITY, MASSIVE, DRY.	CL	2.5 TO 3.7	Hnu=0 ppm α =0 cpm βΓ =180-120 cpm
10.0	15646	05/03/89 N/A	10 9 9		6		NO RECOVERY, NO SAMPLE TAKEN.	N/A	N/A	N/A
10.5	15647	05/03/89 N/A					NO RECOVERY, NO SAMPLE TAKEN.	N/A	N/A	N/A
11.0	15648	05/03/89 1640					LOOSE, SAND, BROWNISH YELLOW (10YR 6/6), MASSIVE, FINE SAND, SATURATED.	SM	N/A	Hnu=0 ppm α =0 cpm βΓ =160-200 cpm
11.5	50649	05/03/89 1640	4 6 9		18		LOOSE, SAND, BROWNISH YELLOW (10YR 6/6), MASSIVE, FINE SAND, SATURATED.	SM	N/A	Hnu=0 ppm α =0 cpm βΓ =160-200 cpm
12.0	50650	05/03/89 1640					LOOSE, SAND, BROWNISH YELLOW (10YR 6/6), MASSIVE, FINE SAND, SATURATED.	SM	N/A	Hnu=0 ppm α =0 cpm βΓ =160-200 cpm

PROJECT NUMBER: 602 3.7	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1134	COORDINATES: NORTH 480,745.16 EAST 1,379,849.31	DATE: 05/03/89	
GROUND ELEVATION: 579.8	GWL: Depth N/A Date/Time N/A	DATE STARTED: 05/03/89	
ENGINEER/GEOLOGIST: L SINFIELD	Depth N/A Date/Time N/A	DATE COMPLETED: 05/04/89	
DRILLING METHODS: B-53, HOLLOW STEM AUGER WITH SPLIT SPOON		PAGE 3 OF 3	

DEPTH	SAMPLE	DATE TIME	BLOWS ON SAMPLE	RECOVERY INCHES		USCS SYMBOL	TSF	REMARKS
12.5	55165	05/03/87 1700			LOOSE, SAND, BROWNISH YELLOW (10YR 6/6), MASSIVE, FINE SAND, SATURATED.	SM	N/A	Hnu=0 ppm α =0 cpm βΓ =160-200 cpm
13.0	55166	05/03/87 1700	4 6 6	18	LOOSE, SAND, BROWNISH YELLOW (10YR 6/6), MASSIVE, FINE SAND, SATURATED.	SM	N/A	Hnu=0 ppm α =0 cpm βΓ =160-200 cpm
13.5	55167	05/03/87 1700			LOOSE, SAND, BROWNISH YELLOW (10YR 6/6), MASSIVE, FINE SAND, SATURATED.	SM	N/A	Hnu=0 ppm α =0 cpm βΓ =160-200 cpm
14.0	55168	05/03/87 0930			LOOSE, SAND, BROWNISH YELLOW (10YR 6/6), MASSIVE, FINE SAND, SATURATED.	SM	N/A	Hnu=0 ppm α =0 cpm βΓ =160-200 cpm
14.5	55169	05/03/87 0930	5 10 10	18	LOOSE, SAND, BROWNISH YELLOW (10YR 6/6), MASSIVE, FINE SAND, SATURATED.	SM	N/A	Hnu=0 ppm α =0 cpm βΓ =160-200 cpm
15.0	55170	05/03/87 0930			LOOSE, SAND, BROWNISH YELLOW (10YR 6/6), MASSIVE, FINE SAND, SATURATED.	SM	N/A	Hnu=0 ppm α =0 cpm βΓ =160-200 cpm
15.5	50657	05/04/89 0945			LOOSE, SAND, BROWNISH YELLOW (10YR 6/6), MASSIVE, FINE SAND, SATURATED.	SM	N/A	Hnu=0 ppm α =0 cpm βΓ =120-160 cpm
16.0	50658	05/04/89 0945	6 9 10	18	LOOSE, SAND, BROWNISH YELLOW (10YR 6/6), MASSIVE, FINE SAND, SATURATED.	SM	N/A	Hnu=0 ppm α =0 cpm βΓ =120-160 cpm
16.5	50659	05/04/89 0945			LOOSE, SAND, BROWNISH YELLOW (10YR 6/6) MASSIVE, FINE SAND, SATURATED. 16.25'-CLAY, GRAY (10YR 4/1), LEAN, MEDIUM PLASTICITY, MASSIVE, DRY.	SM CL	N/A 3.5	Hnu=0 ppm α =0 cpm βΓ =120-160 cpm

BOTTOM OF BORING 16.5

NOTES:
WATER DEVELOPED IN BORING AT 10.25-16.25 FT DURING DRILLING.
MONITORING WELL INSTALLED.

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PROJECT NUMBER: 602 3.7	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1176	COORDINATES: NORTH 480,705.79 EAST 1,379,852.67	DATE: 05/08/89	
GROUND ELEVATION: 579.7	GWL: Depth N/A Date/Time N/A	DATE STARTED: 05/08/89	
ENGINEER/GEOLOGIST: C GRUBE/L ADAMS	Depth N/A Date/Time N/A	DATE COMPLETED: 05/08/89	
DRILLING METHODS: MOBILE DRILL HSA		PAGE 1 OF 2	

DEPTH	SAMPLE	DATE TIME	BLOWS ON	SAMPLE	RECOVERY INCHES		USCS SYMBOL	TSF	REMARKS
0.5	16441	05/08/89 1049	2	6	MEDIUM STIFF, DARK YELLOWISH BROWN (10YR 4/4) CLAY, SOME GRASS AND ROOTS, MEDIUM PLASTICITY, MOIST.	CL	1.75	Hnu=0 ppm α =0 cpm βΓ =80-100 cpm	
1.0	16442	05/08/89 1049	5	5	MEDIUM STIFF, DARK YELLOWISH BROWN (10YR 4/4) CLAY, SOME GRASS AND ROOTS, MEDIUM PLASTICITY, MOIST.	CL	1.75	Hnu=0 ppm α =0 cpm βΓ =80-100 cpm	
1.5	16443	05/08/89 1049	7	0	NO RECOVERY.	N/A	N/A	N/A	
2.0	16444	05/08/89 1053	5	6	STIFF, YELLOWISH BROWN (10YR 4/6) SILTY CLAY, SOME COARSE SAND, TRACE FINE GRAVEL, MOIST.	CL	1.75	Hnu=0 ppm α =0 cpm βΓ =60-80 cpm	
2.5	16445	05/08/89 1053	22	6	VERY STIFF, DARK YELLOWISH BROWN (10YR 4/4) SILTY CLAY, TRACE COARSE SAND, LOW PLASTICITY, MOIST.	CL	3.25	Hnu=0 ppm α =0 cpm βΓ =60-80 cpm	
3.0	16446	05/08/89 1053	16	0	NO RECOVERY.	N/A	N/A	N/A	
3.5	16447	05/08/89 1100	16	6	VERY STIFF YELLOWISH BROWN (10YR 5/4) SILTY CLAY, TRACE FINE GRAVEL AND SAND, LOW PLASTICITY, MOIST. 3.25'-VERY STIFF, DARK BROWN (10YR 3/3) CLAY, LOW TO MEDIUM PLASTICITY, MOIST.	CL	3.5 3.5	Hnu=0 ppm α =0 cpm βΓ =60-70 cpm	
4.0	16448	05/08/89 1100	17	6	VERY STIFF, DARK BROWN (10YR 3/3) CLAY, LOW TO MEDIUM PLASTICITY, MOIST.	CL	2.0	Hnu=0 ppm α =0 cpm βΓ =60-70 cpm	
4.5	16449	05/08/89 1100	21	0	NO RECOVERY.	N/A	N/A	N/A	
5.0	16450	05/08/89 1310	17	6	STIFF, DARK BROWN (10YR 3/3) CLAY, LOW TO MEDIUM PLASTICITY, MOIST.	CL	1.25	Hnu=0 ppm α =0 cpm βΓ =80-100 cpm	
5.5	16451	05/08/89 1310	16	6	STIFF, YELLOWISH BROWN (10YR 5/4) SILTY CLAY, TRACE SAND, MEDIUM PLASTICITY, MOIST.	CL	1.75	Hnu=0 ppm α =0 cpm βΓ =80-100 cpm	
6.0	16452	05/08/89 1310	15	5	STIFF, YELLOWISH BROWN (10YR 5/4) SILTY CLAY, TRACE SAND, MEDIUM PLASTICITY, MOIST.	CL	2.0	Hnu=0 ppm α =0 cpm βΓ =80-100 cpm	
6.5	16453	05/08/89 1317	12	6	STIFF, YELLOWISH BROWN (10YR 5/4) SILTY CLAY, TRACE SAND, MEDIUM PLASTICITY, VERY MOIST TO WET.	CL	1.0	Hnu=0 ppm α =0 cpm βΓ =50-60 cpm	

PROJECT NUMBER: 602 3.7	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1176	COORDINATES: NORTH 480,705.79 EAST 1,379,852.67	DATE: 05/08/89	
GROUND ELEVATION: 579.7	GWL: Depth N/A Date/Time N/A	DATE STARTED: 05/08/89	
ENGINEER/GEOLOGIST: C GRUBE/L ADAMS	Depth N/A Date/Time N/A	DATE COMPLETED: 05/08/89	
DRILLING METHODS: MOBILE DRILL HSA		PAGE 2 OF 2	

DEPTH	SAMPLE	DATE TIME	BLOWS ON SAMPLE	RECOVERY INCHES		USCS SYMBOL	TSF	REMARKS
7.0	16454	05/08/89 1317	7	4	STIFF, YELLOWISH BROWN (10YR 5/4) SILTY CLAY, TRACE SAND, MEDIUM PLASTICITY, VERY MOIST TO WET.	CL	1.5	Hnu=0 ppm α =0 cpm βΓ =50-60 cpm
7.5	16455	05/08/89 1317	6	0	NO RECOVERY.	N/A	N/A	N/A
8.0	16456	05/08/89 1330	4	6	VERY SOFT, YELLOWISH BROWN (10YR 5/6), SILTY CLAY, TRACE SAND, WET.	CL	0.25	Hnu=0 ppm α =0 cpm βΓ =60-80 cpm
8.5	16457	05/08/89 1330	3	6	SOFT, OLIVE GRAY (5Y 4/2) CLAY, TRACE SAND AND SILT, MEDIUM PLASTICITY, VERY MOIST.	CL	0.25	Hnu=0 ppm α =0 cpm βΓ =60-80 cpm
9.0	16458	05/08/89 1330	4	2	LOOSE, YELLOWISH BROWN (10YR 5/6) SILTY SAND, TRACE GRAVEL (1.0-1.5 IN), MOIST.	SM	N/A	Hnu=0 ppm α =0 cpm βΓ =60-80 cpm
9.5	16459	05/08/89 1445	5	6	MEDIUM STIFF, DARK BROWN (10YR 3/3) SILTY CLAY, LOW PLASTICITY, MOIST.	CL	0.75	Hnu=0 ppm α =0 cpm βΓ =60-80 cpm
10.0	16460	05/08/89 1445	3	6	LOOSE, YELLOWISH BROWN (10YR 5/6) SILTY SAND, TRACE FINE GRAVEL, POORLY GRADED, WET.	SM	N/A	Hnu=0 ppm α =0 cpm βΓ =60-80 cpm
10.5	16461	05/08/89 1445	4	0	NO RECOVERY.	N/A	N/A	N/A
11.0	16462	05/08/89 1455	12	6	MEDIUM DENSE, YELLOWISH BROWN (10YR 5/6) POORLY GRADED SAND, WET.	SP	N/A	Hnu=0 ppm α =0 cpm βΓ =60-80 cpm
11.5	55164	05/08/89 1455	10	6	MEDIUM DENSE, YELLOWISH BROWN (10YR 5/6) WELL GRADED SAND, WET. 11.25'-MEDIUM DENSE, YELLOWISH BROWN (10YR 5/6) SILT, TRACE SAND, VERY MOIST.	SW ML	N/A N/A	Hnu=0 ppm α =0 cpm βΓ =60-80 cpm
12.0	50660	05/08/89 1455	13	6	STIFF, GRAY (5Y 5/1) SILTY CLAY, TRACE FINE GRAVEL, MOIST.	CL	1.5	Hnu=0 ppm α =0 cpm βΓ =60-80 cpm

BOTTOM OF BORING 12.0

NOTES:
SAMPLES TAKEN FOR WMCO AT INTERVALS 0.0-0.5 FT, 2.0-2.5 FT, 5.0-5.5 FT, 10.0-10.5 FT, 15.0-15.5 FT.
SAMPLING IN ACCORDANCE WITH ASTM STANDARDS, DESCRIPTION OF SOIL COLOR BY MUNSELL COLOR CHART.
WATER BEARING ZONE 7.5-11.5 FT. MONITORING WELL INSTALLED.

FERNALD RI/FS — VISUAL CLASSIFICATION OF SOILS — LSP

PROJECT NUMBER: 602 3.7	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1210	COORDINATES: NORTH 480,485.42 EAST 1,379,844.46	DATE: 05/03/89	
GROUND ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 05/03/89	
ENGINEER/GEOLOGIST: TROLLINGER/GRUBE	Depth N/A Date/Time N/A	DATE COMPLETED: 05/03/89	
DRILLING METHODS: MOBILE DRILL 8 IN HSA		PAGE 1 OF 2	

DEPTH	SAMPLE	DATE TIME	BLOWS ON SAMPLE	RECOVERY INCHES		USCS SYMBOL	TSF	REMARKS
0.5	17189	05/03/89 1000	2	12	VERY STIFF, BROWN (10YR 3/3) SILTY CLAY, TRACE ORGANICS (GRASS, ROOTS), LOW PLASTICITY, MOIST.	CL	2.5	Hnu=0.0-0.2 ppm α =0 cpm βΓ =80 cpm
1.0	17190	05/03/89 1000	6		VERY STIFF, BROWN (10YR 3/3), SILTY CLAY, TRACE FINE GRAVEL, LOW PLASTICITY, MOIST.	CL	3.5	Hnu=0.0-0.2 ppm α =0 cpm βΓ =80 cpm
1.5	17191	05/03/89 1000	15		NO RECOVERY.	N/A	N/A	N/A
2.0	17192	05/03/89 1007	7	12	VERY STIFF, BROWN (10YR 4/4) SILTY CLAY, TRACE FINE GRAVEL, LOW PLASTICITY, MOIST.	CL	4.0	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm
2.5	17193	05/03/89 1007	11		VERY STIFF, BROWN (10YR 4/4), SILTY CLAY, TRACE SAND AND FINE GRAVEL, LOW PLASTICITY, MOIST.	CL	3.0	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm
3.0	17194	05/03/89 1007	15		NO RECOVERY.	N/A	N/A	N/A
3.5	17195	05/03/89 1014	9	14	VERY STIFF, YELLOWISH BROWN (10YR 5/6), SILTY CLAY, TRACE FINE GRAVEL, LOW PLASTICITY, MOIST.	CL	4.0	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm
4.0	17196	05/03/89 1014	18		VERY STIFF, YELLOWISH BROWN (10YR 5/6) TO GRAY (10YR 5/1), CLAY, MEDIUM PLASTICITY, MOIST.	CL	3.0	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm
4.5	17197	05/03/89 1014	25		VERY STIFF, YELLOWISH BROWN (10YR 5/6) TO GRAY (10YR 5/1), CLAY, MEDIUM PLASTICITY, MOIST (2 IN. RECOV. ON 17197).	CL	2.0	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm
5.0	17198	05/03/89 1023	19	15	STIFF, YELLOWISH BROWN (10YR 5/4), CLAY, MEDIUM PLASTICITY, MOIST.	CL	1.75	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm
5.5	17199	05/03/89 1023	23		STIFF, YELLOWISH BROWN (10YR 5/4), CLAY, TRACE COARSE SAND, MEDIUM PLASTICITY, MOIST.	CL	1.5	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm
6.0	17200	05/03/89 1023	26		STIFF, YELLOWISH BROWN (10YR 5/4), CLAY, TRACE COARSE SAND, MEDIUM PLASTICITY, MOIST. (3 IN RECOV. ON 17200).	CL	1.5	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm

PROJECT NUMBER: 602 3.7	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 1210	COORDINATES: NORTH 480,485.42 EAST 1,379,844.46	DATE: 05/03/89	
GROUND ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 05/03/89	
ENGINEER/GEOLOGIST: TROLLINGER/GRUBE	Depth N/A Date/Time N/A	DATE COMPLETED: 05/03/89	
DRILLING METHODS: MOBILE DRILL 8 IN HSA		PAGE 2 OF 2	

DEPTH	SAMPLE	DATE TIME	BLOWS ON SAMPLE	RECOVERY INCHES		USCS SYMBOL	TSF	REMARKS
6.5	17201 05/03/89 1325		3		VERY STIFF, OLIVE GRAY (5Y 5/2) TO YELLOWISH BROWN (10YR 4/6) SILTY CLAY, LOW TO MEDIUM PLASTICITY, MOIST.	CL	3.25	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm
7.0	17202 05/03/89 1325		6	18	VERY STIFF, OLIVE GRAY (5Y 5/2) TO YELLOWISH BROWN (10YR 4/6) SILTY CLAY, LOW TO MEDIUM PLASTICITY, MOIST.	CL	3.0	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm
7.5	17203 05/03/89 1325		7		MEDIUM DENSE, YELLOWISH BROWN (10YR 5/6) SILT, WET-SATURATED	ML	N/A	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm
8.0	17204 05/03/89 1330		4		DENSE, BROWN (10YR 5/3) CLAYEY SILT, SATURATED.	ML	N/A	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm
8.5	17205 05/03/89 1330		14	17	DENSE, YELLOWISH BROWN (10YR 5/6) SILT, WET.	ML	N/A	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm
9.0	17206 05/03/89 1330		18		DENSE, YELLOWISH BROWN (10YR 5/6) SILT, WET.	ML	N/A	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm
9.5	17207 05/03/89 1335		10		MEDIUM DENSE, YELLOWISH BROWN (10YR 5/6), SILT, WET.	ML	N/A	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm
10.0	17208 05/03/89 1335		16	18	MEDIUM DENSE, YELLOWISH BROWN (10YR 5/6), SILT, WET.	ML	N/A	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm
10.5	17209 05/03/89 1335		19		VERY STIFF, YELLOWISH BROWN (10YR 5/6) SILTY CLAY, MOIST.	CL	2.75	Hnu=0.2 ppm α =0 cpm βΓ =80 cpm

BOTTOM OF BORING 10.5

NOTES:
SAMPLES TAKEN FOR WMCO AT INTERVALS 0.0-0.5 FT, 2.0-2.5 FT, 5.0-5.5 FT, 10.0-10.5 FT, 15.0-15.5 FT.
SAMPLING IN ACCORDANCE WITH ASTM STANDARDS, DESCRIPTION OF SOIL COLOR BY MUNSELL COLOR CHART.
WATER BEARING ZONE 8.0-10.0 FT.
MONITORING WELL INSTALLED.

FERNALD RI/FS

2162

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER. 20.03.05	PROJECT NAME. LIMR SLUDGE POND INVESTIGATION		
BORING NUMBER. MW 1934	COORDINATES:		DATE 01 MAY 93
ELEVATION:	GWL: Depth	Date/Time	DATE STARTED 01 MAY 93
ENGINEER/GEOLOGIST B.E. MULLER	Depth	Date/Time	DATE COMPLETED 04 MAY 93
DRILLING METHODS HOLLOW STEM AUGER			PAGE 1 OF 5

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
	111183 01MAY93 1505	10	6	NA (10YR, 4/4) DARK YELLOWISH BROWN SANDY SILTY CLAY LOW PLASTICITY, MOIST	CL	NA	MT = 0 PPM BY = 70 CPM α = 0 CPM
1	111186 01MAY93 1505	14	6	HARD (2.5Y 5/6) LIGHT OLIVE BROWN SILTY CLAY, F. SAND LOW PLASTICITY MOIST	CL ~~2.5~~ 24.5 JEM 01MAY93	24.5 JEM 01MAY93	
	111187 01MAY93 1505	12	4	SAA	CL ~~2.5~~ 24.5 JEM 01MAY93	24.5 JEM 01MAY93	
BEGIN WOW 93 2		5	0	NR	NA	NA	TIME: 1505
	111188 01MAY93 1510	10	6	STIFF (2.5Y 5/4) LIGHT OLIVE BROWN SANDY, SILTY CLAY, LOW PLASTICITY MOIST	CL	2	MT = 0 PPM BY = 90 CPM α = 0 CPM
3	111179 01MAY93 1510	14	6	V. STIFF (10YR 4/3) BROWN, SILTY CLAY, MEDIUM PLASTICITY, MOIST	CL	2.5	
	111180 01MAY93 1510	14	6	SAA	CL	2.5	ALSO SHELBY TUBE 2-4 ANALYSIS - UC AND TAL-D SHELBY TIME: 1520 114540
4	111181 01MAY93 1510	12	6	SAA	CL	3	TIME: 1510
	111182 111183 111184	15	6	V. STIFF (2.5Y 6/3) LIGHT YELLOWISH BROWN SILTY CLAY, TRACE SAND, ORANGE MOTTLES, MEDIUM PLASTICITY MOIST	CL	3.0	MT = 0 PPM BY = 100 CPM α = 0 CPM
5	01MAY93 1530	15	6	SAA	CL	3.5	TOTAL U: 111182 TOC: 111183 TAL-D: 111184
		20	6	SAA	CL	3.0	
		21	6	SAA	CL	2.5	TIME: 1530
6	111185 01MAY93 ~~1530~~	5	6	V. STIFF (2.5 ~~5/6~~ 5/4) LIGHT OLIVE BROWN SILTY CLAY, F. SAND, ORANGE MOTTLES LOW PLASTICITY MOIST	CL ~~2.0~~ JEM 01MAY93	3.0	MT = 0 PPM BY = 80 CPM α = 0 CPM
7	111186 01MAY93 ~~1530~~	8	6	SAA	CL	3.5	
	111187 01MAY93 ~~1530~~	9	6	SAA - INCREASE WET SILT AT 1" HORIZON	CL	2.0	TIME: 1532

NOTES:

DRILLING CONTRACTOR: PENN DRILL

DRILLING RIG: MOBIL B80

DRILLER: DAN JAMISON

ASSISTANT: DON ARTHUR

DESCRIPTION BASED ON MUNSELL

BACKGROUND READINGS:

MICROTIP: 0 PPM

BY: 60-70 CPM

α: 0 CPM

VERY.

NO RECOVERY (NR)

SAME AS ABOVE (SAA)

FERNALD RI/FS

6/21/93

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER. 20.03.05	PROJECT NAME. LIME SLUDGE POND INVESTIGATION		
BORING NUMBER. MW 1934	COORDINATES:	DATE 01MAY93	
ELEVATION:	GWL: Depth Date/Time	DATE STARTED 01MAY93	
ENGINEER/GEOLOGIST B.E. MULLER	Depth Date/Time	DATE COMPLETED 01MAY93	
DRILLING METHODS HOLLOW STEM AUGER		PAGE 2 OF 5	

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
8	114518 01MAY93 1600	5	6	V. STIFF (2.5Y, 5/6) LIGHT OLIVE BROWN SILTY CLAY, TRACE ORANGE MOTTLES MEDIUM PLASTICITY, MOIST	CL	2.5	MT: 0 PPM BY: 80 CPM α: 0 CPM
	114517 01MAY93 1600	5	6	SAA BEM 01MAY93	CL	4.0	
9	114518 01MAY93 1600	8	6	V. STIFF (2.5Y, 5/2) GRAYISH BROWN SILTY CLAY, ORANGE MOTTLES, INCREASED SILT TOWARD BOTTOM LOW PLASTICITY MOIST	CL	2.5	TIME 1600
	114519 01MAY93 1606	4	6	STIFF (10YR, 5/4) YELLOWISH BROWN SILTY CLAY, LOW-MEDIUM PLASTICITY MOIST	CL	1.75	MT: 0 PPM BY: 90 CPM α: 0 CPM
10	114520 01MAY93 1606	5	6	SOFT SAA BEM 16JUN93	CL	0.5	
	114521 01MAY93 1606	5	3	SOFT (2.5Y, 5/2) GRAYISH BROWN SILTY CLAY MEDIUM PLASTICITY MOIST BEM 16JUN93	CL	0.25	TIME 1606
11	114522 01MAY93 1617	5	6	STIFF (2.5Y, 5/4) LIGHT OLIVE BROWN SILTY CLAY, LOW PLASTICITY MOIST	CL	1.0	MT: 0 PPM BY: 90 CPM α: 0 CPM
	114523 01MAY93 1617	6	6	STIFF (5Y, 5/1) GREY SILTY CLAY, INCREASED SILT AT SOME HORIZONS, LOW PLASTICITY VERY MOIST	CL	1.0	
12	01MAY93 ~~01MAY93~~ 1617	8	0	NR BEM 16JUN93	NA	NA	TIME 1617
	114524 01MAY93 1629	2	6	V. SOFT (2.5Y, 5/3) LIGHT OLIVE BROWN SILTY CLAY, MEDIUM PLASTICITY, MOIST	CL	<0.25	MT: 0 PPM BY: 90 CPM α: 0 CPM
13	114525 01MAY93 1629	3	6	STIFF (5Y, 5/2) OLIVE GRAY SILTY CLAY, LOW PLASTICITY, VERY MOIST	CL	1.5	
BEM 16JUN93		3	0	NR	NA	NA	TIME 1629
14	114526 02MAY93 0905	6	6	V. SOFT (2.5Y, 5/2) GRAYISH BROWN SILTY CLAY, MEDIUM PLASTICITY VERY MOIST BEM 16JUN93	CL	<0.25	MT: 0 PPM BY: 90 CPM α: 0 CPM
	114527 02MAY93 0905	6	6	SAA	CL	<0.25	
15	114528 02MAY93 0905	12	6	STIFF SAA MOIST	CL	1.0	TIME 0905

NOTES

DRILLING CONTRACTOR: PENN DRILL

DRILLING RIG: B80 MOBIL

DRILLER: D.W. JAMISON

ASSISTANT: DON ARTHUR

DESCRIPTION BASED ON MUNSELL

BACKGROUND READINGS:

MICROTIP: 0 PPM

BY: 60-70 CPM

α: 0 CPM

VERY (V.)

NO RECOVERY (NR)

SAME AS ABOVE (SAA)

402-11-86

FERNALD RI/FS

2162

VISUAL CLASSIFICATION OF SOILS

20.03.05

PROJECT NUMBER: ~~MW 1934~~ BSM 02MAY93	PROJECT NAME: LIME SLUDGE POND INVESTIGATION	
BORING NUMBER: MW 1934	COORDINATES:	DATE: 02 MAY 93
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 01 MAY 93
ENGINEER/GEOLOGIST: B.E. MULLER	Depth Date/Time	DATE COMPLETED: 04 MAY 93
DRILLING METHODS: HOLLOW STEM AUGER		PAGE 3 OF 5

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15	114529 02MAY93 0512	4	6	VERY SOFT (2.5Y, 5/2) GREYISH BROWN, SILTY CLAY, MODERATE PLASTICITY, MOIST	CL	<0.25	MT: 0 PPM BY: 90-100 CPM α: 0 CPM
16	114530 02MAY93 0512	8	6	STIFF SAA	CL	1.0	
	114531 02MAY93 0512	8	6	STIFF SAA	CL	1.5	TIME: 0512
17	114532 02MAY93 0520	5	6	SAA MEDIUM STIFF + 1" SILTY FINE SAND, WET MOTTLED	CL	0.75	MT: 0 PPM BY: 80-50 CPM α: 0 CPM
	114533 02MAY93 0520	8	6	STIFF SAA	CL	1.0	
18	114534 02MAY93 0520	2	6	STIFF SAA	CL	1.5	TIME: 0520
	114535 02MAY93 0528	1	6	V SOFT (2.5Y, 5/4) LIGHT OLIVE BROWN SILTY CLAY, MEDIUM PLASTICITY, MOIST	CL	<0.25	MT: 0 PPM BY: 90 CPM α: 0 CPM
19	114536 02MAY93 0528	1	6	SOFT (2.5Y, 5/2) GRAYISH BROWN, SILTY CLAY, MEDIUM PLASTICITY, MOIST	CL	0.25	
	X	3	0	NR	NA	NA	TIME: 0528
20	114537 02MAY93 0540	3	6	VERY SOFT SAA	CL	<0.25	MT: 0 PPM BY: 70-80 CPM α: 0 CPM
	114538 02MAY93 0540	3	6	VERY SOFT SAA	CL	<0.25	
21	114539 02MAY93 0540	8	6	SOFT SAA	CL	0.25	TIME: ~~0940~~ 0540

BSM 02MAY93

NOTES

DRILLING CONTRACTOR: PENN DRILL
DRILLING RIG: MOBIL B80
DRILLER: DAN JAMISON
ASSISTANT: DON ARTHUR

DESCRIPTION BASED ON MUNSELL

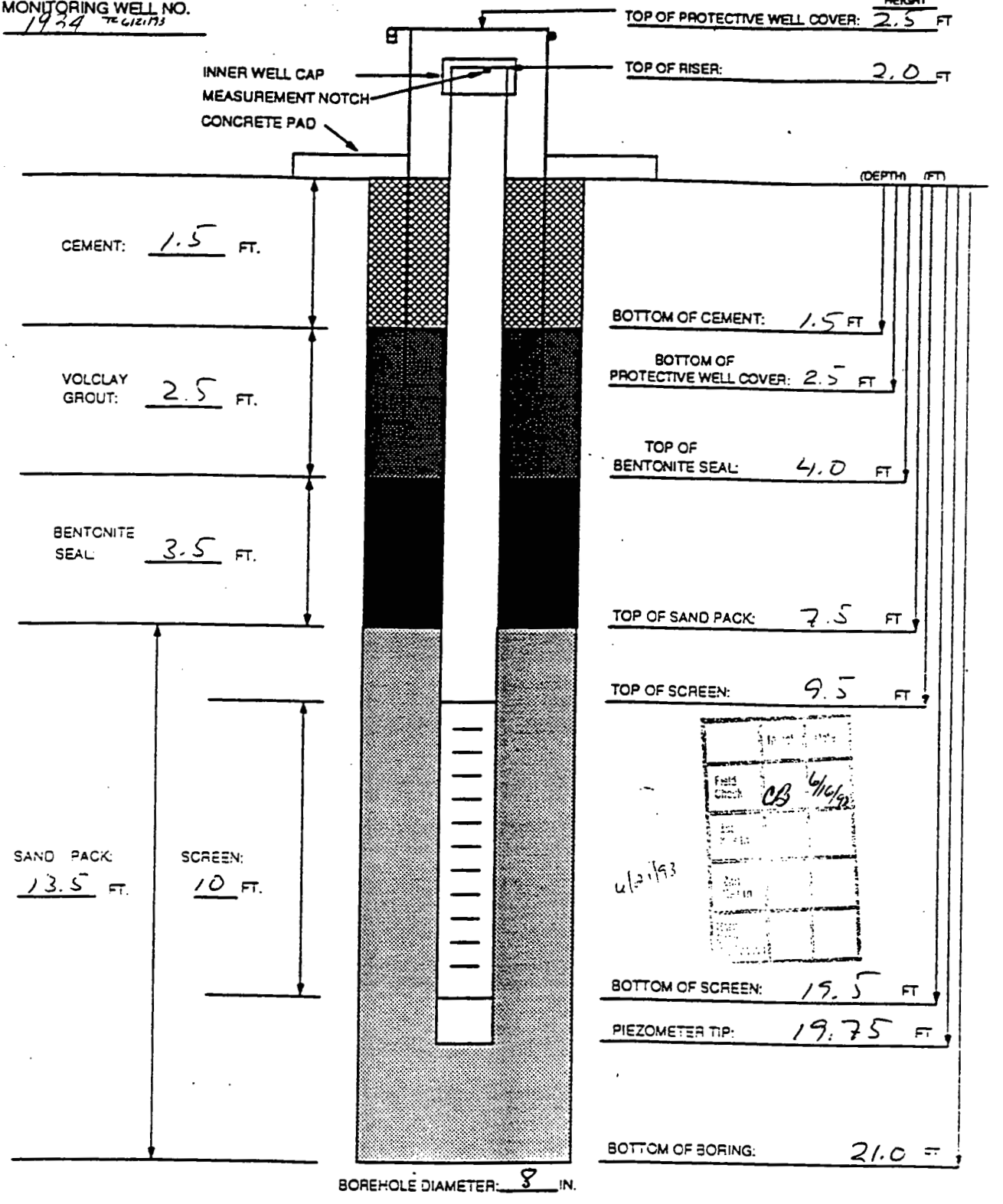
BACKGROUND READINGS:
MICROTIP: 0 PPM
BY: 50-70 CPM
α: 0 CPM

VERY (V)
NO RECOVERY (NR)
SAME AS ABOVE (SAA)

402-11-86

FERNALD RI/FS
INSTALLATION DIAGRAM
MONITORING WELL NO. 1924 TC 6/21/93

INSTALLATION DATE: 04MAY93



BOREHOLE DIAMETER: 8 IN.

MATERIALS USED

SAND TYPE AND QUANTITY: 10/20 6x50 # BAGS
BENTONITE PELLETS (5-GALLON BUCKETS): 1 BUCKET
BAGS OF VOLCLAY GROUT: 1/2 80# BAG
AMOUNT OF CEMENT: 1/2 94# BAG
AMOUNT OF WATER USED: 5 GALS
OTHER: NA
TA 20.03.05

NOTES:

1) RISER PIPE IS 2.0 IN. ID. 316 STAINLESS STEEL PIPE, FLUSH-THREADED JOINTS.
2) SCREEN IS 2.0 IN. ID. 316 STAINLESS STEEL PIPE WITH 0.010 IN. SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH AND DATE NA NA
5) TOP OF CASING IS SECURED WITH A STAINLESS STEEL CAP.
6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL
7) WELL CASING HAS A PROTECTIVE COVER WITH PADLOCK

GEOLOGIST/ENGINEER: R E. MULLER

FERNALD RI/FS

2162

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER WBS 20.03.05	PROJECT NAME LIME SLUDGE POND INVESTIGATION	
BORING NUMBER MW 1937	COORDINATES:	DATE 28APR93
ELEVATION:	GWL: Depth 1.82' Date/Time 5/1/93 1020	DATE STARTED 28APR93
ENGINEER/GEOLOGIST B.R. MULLER	Depth Date/Time	DATE COMPLETED 30APR93
DRILLING METHODS HOLLOW STEM AUGER		PAGE 1 OF 5

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	02 MAY 93 BEM REMARKS
	111138 28APR 1130	1	6	VERY SOFT (10 YR, 3/3) DARK BROWN CLAY WITH TRACE COARSE SAND, MOIST	CL	0.25	BY = 60 CPM α = 0 CPM MT = 0 PPM
1	111139 28APR 1130	4	6	HARD (10 YR, 6/4) LIGHT YELLOWISH BROWN SILTY CLAY WITH TRACE MED.-COARSE SAND MOIST	CL	4.25	
	111140 28APR 1130	13	2	SAA	CL	>4.50	
2	NA 28APR 1130	13	0	NA	NA	NA	
	111141 111142 111143 28APR 1140	11	6	VERY STIFF (2.5 Y, 6/4) LIGHT OLIVE BROWN SILTY CLAY, WITH TRACE MED-COARSE SAND MOIST	CL	3.0	BY = 80 CPM α = 0 CPM MT = 0 PPM
3	111141 111142 111143 28APR 1140	14	6	VERY STIFF (10 YR, 6/6) BROWNISH YELLOW SILTY CLAY, TRACE MEDIUM-FINE SAND, MOIST	CL	3.0	TAL-D 111141 T.U. 111142 T.O.C. 111143
	111141 111142 111143 28APR 1140	21	6	HARD, SAA INCREASED SILT AND TRACE ORANGE MOTTLES	CL	>4.5	
4	111141 111142 111143 1140	32	0	NA	NA	NA	
	111144 28APR 1330	3	6	VERY STIFF (2.5Y, 5/2) GRAYISH BROWN SILTY CLAY, MOIST	CL	2.5	BY = 70 CPM α = 0 CPM MT = 0 PPM
5	111145 28APR 1330	5	5	SAA	CL	2.75	
	NA 1330	7	0	NA	NA	NA	
	111146 28APR 1335	10	6	VERY STIFF (5Y, 5/6) OLIVE, SILTY CLAY, MOIST	CL	3.5	BY = 70 CPM α = 0 PPM MT = 0 PPM
6	111147 28APR 1335	14	6	SAA	CL	3.5	
	111148 28APR 1335	14	3	SAA	CL	3.0	
7	111149 28APR 1340	5	6	STIFF (2.5, 5/4) LIGHT OLIVE BROWN SILTY CLAY, MOIST	CL	2.0	

NOTES
DRILLING CONTRACTOR: PENN DRILL
DRILLING RIG: MOBIL B80
DRILLER: DAN JAMISON
ASSISTANT: DON ARTHUR
Samples Collected Per ASTM Standard Penetration Test.
DESCRIPTION BASED ON MUNSELL Color Chart

BACKGROUND READINGS
MICROTIP: 0 PPM
BY: 50-70 CPM
α: 0 CPM

NO RETURN = (NR)
SAME AS ABOVE = (SAA)

FERNALD
RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER. WBS 20.03.05	PROJECT NAME. LIME SLUDGE POND INVESTIGATION	
BORING NUMBER. MW 1937	COORDINATES:	DATE 28 APR 93
ELEVATION:	GWL: Depth 1.82' Date/Time 5/1/93 1020	DATE STARTED 28 APR 93
ENGINEER/GEOLOGIST B.E. MULLER	Depth Date/Time	DATE COMPLETED: 30 APR 93
DRILLING METHODS		PAGE 2 OF 5 ~~2~~ 3

02MAY93
BEM

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
8	111150 28APR 1340	7	6	VERY STIFF SAA (2.5, 5/4) LIGHT OLIVE BROWN, SILTY CLAY MOIST	CL	2.75	BY = 60 cpm α = 0 cpm MT = 0 ppm
	111151 28APR 1340	8	6	STIFF SAA	CL	1.75	TIME = 1340
9	111152 28APR 1350	5	6	STIFF (2.5Y, 5/3) LIGHT OLIVE BROWN, SILTY CLAY, MOIST	CL	1.5	BY = 60 cpm α = 0 cpm MT = 0 ppm
	111153 28APR 1350	4	6	SAA + 1" SILTY LAYER, WET	CL	1.75	
	111154 28APR 1350	5	2	VERY SOFT (2.5Y, 6/2) LIGHT BROWNISH GREY, SILTY CLAY, WET	CL	<0.25	TIME = 1350
10	111155 28APR 1400	4	6	STIFF (2.5Y, 5/4) LIGHT OLIVE BROWN, SILTY CLAY, WET	CL	1.5	BY = 60 cpm α = 0 cpm MT = 0 ppm
	111156 28APR 1400	5	6	VERY SOFT SAA	CL	<0.25	
11	111157 28APR 1400	3	2	VERY SOFT (2.5Y, N5/1) GRAY SILTY CLAY, WET	CL	<0.25	TIME = 1400
12	111158 28APR 1410	4	6	VERY SOFT (2.5Y, N4/1) DARK GRAY SILTY CLAY, WET	CL	<0.25	BY = 70 cpm α = 0 cpm MT = 0 ppm
	111159 28APR 1410	4	6	SAA	CL	<0.25	
13	111160 28APR 1410	6	6	~~MEDIUM DENSE~~ LOOSE (2.5Y, N4/1) DARK GRAY, WELL SORTED, FINE SAND AND SILT, WET	SM	NA	TIME = 1410
	111161 28APR 1415	5	6	LOOSE (2.5Y, N4/1) DARK GRAY, WELL SORTED, FINE SAND AND SILT, WET	SM	NA	BY = 60 cpm α = 0 cpm MT = 0 ppm
14	111162 28APR 1415	8	6	SAA	SM	NA	
	111163 28APR 1415	8	2	SAA	SM	NA	TIME = 1415
	111164 30APR 0905	8	6	MEDIUM DENSE (2.5Y, 6/2) LIGHT BROWNISH GREY, SILTY FINE SAND, WET	SM	NA	

NOTES
DRILLING CONTRACTOR: PENN DRILL
DRILLING RIG: B80
DRILLER: DAN JAMISON
ASSISTANT: DON ARTHUR
See Page 1
DESCRIPTION BASED ON MUNSELL

BACKGROUND READINGS:
MICROTIP: 0 PPM
BY: 50-70 CPM
α: 0 CPM

NO RETURN = (NR)
SAME AS ABOVE = (SAA)

000073

FERNALD RI/FS

2162

VISUAL CLASSIFICATION OF SOILS

OJECT NUMBER. 20.03.05	PROJECT NAME. LIME SLUDGE POND INVESTIGATION	
BORING NUMBER. MW 1537	COORDINATES:	DATE 30APR93
ELEVATION:	GWL: Depth 1.82' Date/Time 5/1/93 1020	DATE STARTED 28APR93
ENGINEER/GEOLOGIST B.E. MULLER	Depth Date/Time	DATE COMPLETED: 30APR93
DRILLING METHODS: HOLLOW STEM AUGER - CONTINUOUS SAMPLE		PAGE 3 OF 35

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN.	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15	111165 30APR93 0505	9	6	MEDIUM DENSE (2.5Y 6/2) LIGHT BROWNISH GREY, SILTY FINE SAND WET	SM	NA	BY = 70 CPM α = 0 CPM MT = 1.0 PPM
16	111166 30APR93 0505	15	6	SAA	SM	NA	TIME: 0505
	111167 30APR93 0520	7	6	VERY DENSE (2.5Y, 5/4) LIGHT OLIVE BROWN SILT SOME SAND WET SMALL SANDY CLAY LAYER	SM	NA	BY = 80 CPM α = 0 CPM MT = 1.0 PPM
17	111168 30APR93 0520	46	2	VERY DENSE (2.5Y, 6/2) LIGHT BROWNISH GRAY, SILTY FINE SAND, WET	SM	NA	
	~~111169~~ 30APR93 0520	ISEM 30APR93 50/5	0	NA	NA	NA	TIME: 0520
111169	111170 30APR93 0527	ISEM 30APR93 17	6	DENSE SAA	SM	NA	BY = 70 CPM α = 0 CPM MT = 0.0 PPM
18	111170 30APR93 0527	15	6	SAA	SM	NA	
111171	~~111172~~ 30APR93 0527	ISEM 30APR93 19	6	DENSE (5Y, 5/4) OLIVE CLAYEY SANDY SILT, VERY MOIST TRACE FINE GRAVEL	ML ~~MH~~ 6/16/93	2.6	TIME: 0527
19 111172	~~111173~~ 30APR93 0534	ISEM 30APR93 3	6	MEDIUM DENSE OLIVE CLAYEY SANDY SILT (5Y, 5/4) WET, TRACE GRAVEL	SC ~~MH~~ 6/16/93	NA	BY = 70 CPM α = 0 CPM MT = 0.6 PPM
111173	~~111174~~ 30APR93 0534	ISEM 30APR93 7	6	SAA	SC ~~MH~~ 6/16/93	NA	
20 111174	~~111175~~ 30APR93 0534	ISEM 30APR93 17	6	MEDIUM DENSE (5Y, 5/4) OLIVE CLAYEY SANDY SILT TRACE FINE GRAVEL, VERY MOIST	SC ~~MH~~ 6/16/93	NA	TIME: 0534
				Bottom of Boring 20.5 FT			BY = α = MT =
				ISEM 02 MAY 93			TIME:

NOTES:

DRILLING CONTRACTOR: PENN DRILL
DRILLING RIG: MOBIL B 80
DRILLER: DAN WAMISON
ASSISTANT: MARK REBOLD
SEE PAGE 1
DESCRIPTION BASED ON MUNSELL

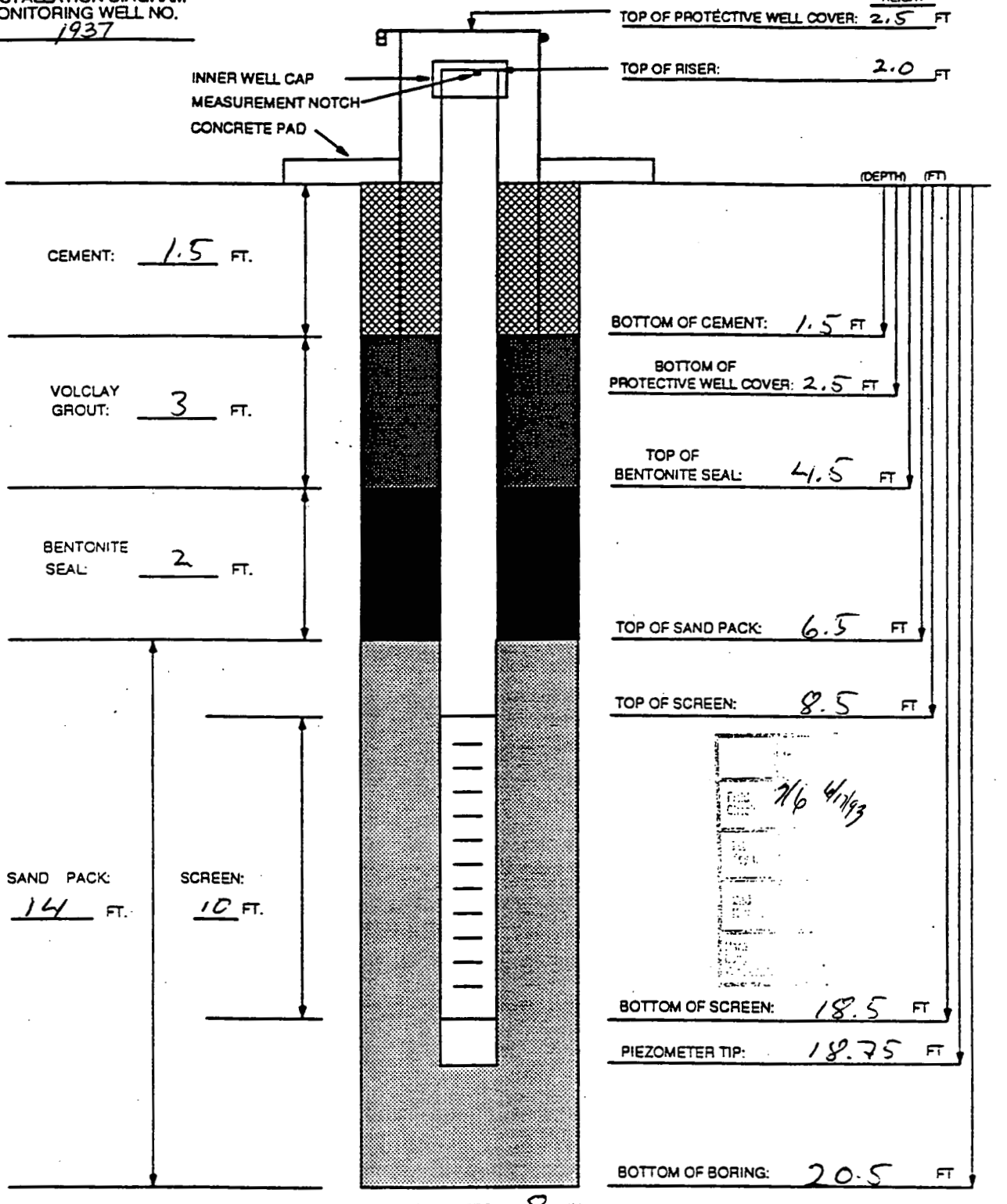
BACKGROUND READINGS:
MICROTIP: 1.6-1.1 PPM
BY: 40-50 CPM
α: 0 CPM

NO RETURN = (NR)
SAME AS ABOVE = (SAA)

402-11-86

FERNALD RI/FS
INSTALLATION DIAGRAM
MONITORING WELL NO. 1937

INSTALLATION DATE: May 1, 1993



MATERIALS USED

SAND TYPE AND QUANTITY: 10/20 7x50#
BENTONITE PELLETS (5-GALLON BUCKETS): 1
BAGS OF VOLCLAY GROUT: 1/2 BAG 50#
AMOUNT OF CEMENT: 1/2 BAG 94#
AMOUNT OF WATER USED: 8 GALLONS
BY: MA
DATE: 4/30/93 W39 20 03 05

NOTES:

1) RISER PIPE IS 2 IN. ID. 316 STAINLESS STEEL PIPE, FLUSH-THREADED JOINTS.
2) SCREEN IS 2 IN. ID. 316 STAINLESS STEEL PIPE WITH 0.010 IN. SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH AND DATE 1.82 FT; 01 MAY 93
5) TOP OF CASING IS SECURED WITH A STAINLESS STEEL CAP.
6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL.
7) WELL CASING HAS A PROTECTIVE COVER WITH PADLOCK.

GEOLOGIST/ENGINEER: B. E. MILLER

ASI FORM 0157 REV. (0)

FERNALD RI/FS

5 of 5

2162

PIEZOMETER INSTALLATION SHEET

PROJECT NAME CRU2 PHASE II
FIELD ENG./GEO. B.E. MULLER DATE 01 MAY 93
PROJECT NO. 20.03.05
CHECKED BY _____ DATE _____
BORING NO. 1937
PIEZOMETER NO. 1937
DATE OF INSTALLATION 01 MAY 93

BOREHOLE DRILLING

DRILLING METHOD HOLLOW STEM AUGER
DRILLING FLUID (S) USED:
FLUID NA FROM NA TO NA
FLUID NA FROM NA TO NA

TYPE OF BIT AUGER
CASING SIZE (S) USED:
SIZE NA FROM NA TO NA
SIZE NA FROM NA TO NA

PIEZOMETER DESCRIPTION

TYPE MONITORING WELL
DIAMETER OF PERFORATED SECTION 2.0 IN I.D.
PERFORATION TYPE:
SLOTS ☒ HOLES ☐ SCREEN ☐
AVERAGE SIZE OF PERFORATIONS 0.010 IN
TOTAL PERFORATED AREA 10 FT

RISER PIPE MATERIAL 316 STAINLESS STEEL
RISER PIPE DIAMETERS:
O.D. 2 5/16 IN I.D. 2.0 IN I.D.
LENGTH OF PIPE SECTIONS 10 ft 6 in
JOINING METHOD FLUSH JOINT - SCREWS

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5 FT
PROTECTIVE PIPE O.D. 4 3/8 IN

OTHER PROTECTION HINGED PROTECTIVE COVER WITH INSTALLED 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:				
CEMENT GROUT/SLURRY	TOP ~~0.0~~ 1.5 (Top 0.0)	BOTTOM 4.5 (Bottom 1.5)	TOP (03MAY93 BFM)	BOTTOM
BENTONITE	TOP 4.5 (03MAY93)	BOTTOM ~~6.5~~ 6.5	TOP	BOTTOM
SAND (03MAY93 BFM)	TOP ~~6.5~~ 6.5	BOTTOM 18.5	TOP	BOTTOM
GRAVEL	TOP NA	BOTTOM NA	TOP	BOTTOM
PERFORATED SECTION	TOP 8.5	BOTTOM 18.5	TOP	BOTTOM
PIEZOMETER TIP	18.75 FT			
BOTTOM OF BOREHOLE	20.50			
GWL AFTER INSTALLATION	1.82			

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

REMARKS THE TOP 6 IN SECTION OF RISER IS BENT AND NEEDS TO BE REPLACED

000076

409-11-86

PROJECT NUMBER: 602 3.2	PROJECT NAME: FMPC RI/FS		
BORING NUMBER: 2042	COORDINATES: NORTH 480,394.27 EAST 1,379,542.73	DATE: 04/11/88	
GROUND ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 04/11/88	
ENGINEER/GEOLOGIST: M GOLDBERG	Depth N/A Date/Time N/A	DATE COMPLETED: 04/19/88	
DRILLING METHODS:		PAGE 1 OF 3	

DEPTH	SAMPLE	DATE TIME	BLOWS ON SAMPLE	RECOVERY INCHES		USCS SYMBOL	TSF	REMARKS
0.0 1.5	008867	04/11/88 0845	2 3 6	14	VERY STIFF, DARK YELLOWISH BROWN (10YR 4/4), CLAY, DRY.	CL	2.5	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
3.0	008868	04/11/88 0850	6 10 9	14	VERY STIFF, DARK BROWN (10YR 3/3), CLAY, DRY.	CL	2.5	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
4.5	008869	04/11/88 0852	10 11 11	18	STIFF, DARK YELLOWISH BROWN (10YR 4/6), CLAY, DRY.	CL	1.0	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
6.0	008870	04/11/88 0855	8 8 8	8	STIFF, DARK YELLOWISH BROWN (10YR 4/6), CLAY, DRY.	CL	1.0	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
7.5	008871	04/11/88 0900	5 6 6	18	STIFF, DARK YELLOWISH BROWN (10YR 4/6), CLAY, DRY. 6.5'-LOOSE, YELLOWISH BROWN (10YR 5/8), SILTY SAND, WET. 7.0'-STIFF, LIGHT GRAY (10YR 7/1), SILTY CLAY, WET.	CL SM CL	1.0 N/A 1.5	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
8.5	008874	04/11/88 1330			SHELBY TUBE PUSHED FROM 7.5-8.5 FT. STIFF, LIGHT GRAY (10YR 7/1), SILTY CLAY, WET. TRACE SAND, WET.	CL	1.0	
9.0	008872	04/11/88 0903	6 6 7	18	STIFF, LIGHT GRAY (10YR 7/1), SILTY CLAY, WET. TRACE SAND, WET.	CL	1.0	Hnu= 0 ppm α = 0 cpm βΓ = 100 cpm
10.5	008873	04/11/88 0905	6 8 10	18	STIFF, LIGHT GRAY (10YR 7/1), SILTY CLAY, WET. TRACE SAND, WET. 9.5'-STIFF, YELLOWISH BROWN (10YR 5/8), SILTY CLAY, TRACE SAND, WET.	CL CL	1.0 1.0	Hnu= 0 ppm α = 0 cpm βΓ = 100 cpm
12.0	008490	04/11/88 1355	4 7 6	12	STIFF, LIGHT GRAY (10YR 7/1), SILTY CLAY, WITH SAND, WET.	CL	1.0	Hnu= 0 ppm α = 0 cpm βΓ = 100 cpm
13.5	008491	04/11/88 1400	9 7 13	14	MEDIUM DENSE, LIGHT GRAY (10YR 7/1), SILTY SAND, WET.	SM	N/A	Hnu= 0 ppm α = 0 cpm βΓ = 100 cpm
15.0	008492	04/11/88 1405	9 11 13	14	MEDIUM DENSE, GRAY (10YR 5/1), SILTY SAND, WET.	SM	N/A	Hnu= 0 ppm α = 0 cpm βΓ = 100 cpm
16.5	008493	04/11/88 1410	11 12 15	18	MEDIUM DENSE, GRAY (10YR 5/1), SILTY SAND, WET.	SM	<1	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
18.0	008494	04/11/88 1415	8 9 9	18	MEDIUM DENSE, GRAY (10YR 5/1), SAND, TRACE SILT, WET.	SP	<1	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm

PROJECT NUMBER: 602 3.2	PROJECT NAME: FMPC RI/FS	
BORING NUMBER: 2042	COORDINATES: NORTH 480,394.27 EAST 1,379,542.73	DATE: 04/11/88
GROUND ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 04/11/88
ENGINEER/GEOLOGIST: M GOLDBERG	Depth N/A Date/Time N/A	DATE COMPLETED: 04/19/88
DRILLING METHODS:		PAGE 2 OF 3

DEPTH	SAMPLE	DATE TIME	BLOWS ON SAMPLE	RECOVERY INCHES		USCS SYMBOL	TSF	REMARKS
19.5	008495	04/11/88 1535	3 3 3	10	STIFF, GRAY (10YR 5/1), CLAY, TRACE SAND, WET.	CL	1.5	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
21.0	008496	04/11/88 1540	10 15 11	8	MEDIUM DENSE, GRAY (10YR 5/1), SAND, WET. HARD, DARK GRAY (5Y 4/1), CLAY, DRY.	SW CL	<1 >4	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
22.0	008497	04/11/88 1630	N/A	12	SHELBY TUBE: PUSHED 1.5 FT, RECOVERED 1.0 FT.	N/A	N/A	
23.5	008498	04/12/88 0830	6 10 12	14	MEDIUM STIFF, DARK GRAY (5Y 4/1), CLAY, DRY.	CL	1.0	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
25.0	008499	04/12/88 0845	3 4 8	18	STIFF, DARK GRAY (5Y 4/1), CLAY, DRY.	CL	2.0	Hnu= 0 ppm α = 0 cpm βΓ = 100 cpm
26.5	008500	04/12/88 0920	1 2 3	10	STIFF, OLIVE GRAY (5Y 5/2), CLAY, TRACE GRAVEL, DRY.	CL	1.5	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
28.0	008501	04/12/88 0940	10 13 16	14	VERY STIFF, DARK GRAY (5Y 4/1), CLAY, TRACE GRAVEL, DRY.	CL	4.0	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
30.0	008502	04/12/88 0950	10 16 21 24	20	VERY STIFF, DARK GRAY (5Y 4/1), CLAY, TRACE GRAVEL, DRY.	CL	4.0	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
31.5	008503	04/12/88 1020	8 13 50	18	HARD, GRAY (5Y 5/1), CLAY, TRACE GRAVEL, DRY.	CL	>4.0	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
33.0	008504	04/12/88 1030	15 14 21	18	VERY STIFF, GRAY (5Y 5/1), CLAY, TRACE GRAVEL, DRY.	CL	3.0	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
34.5	008505	04/12/88 1050	8 14 15	18	VERY STIFF, GRAY (5Y 5/1), CLAY, TRACE GRAVEL, DRY.	CL	2.5	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
36.0	008506	04/12/88 1320	8 12 14	18	VERY STIFF, GRAY (5Y 5/1), CLAY, TRACE GRAVEL, DRY.	CL	2.0	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
37.5	008507	04/12/88 1340	5 9 20	18	VERY STIFF, GRAY (5Y 5/1), CLAY, TRACE GRAVEL, DRY. 36.5'-VERY STIFF, DARK YELLOWISH BROWN (10YR 4/6), CLAY, TRACE GRAVEL, DRY.	CL CL	2.0 2.5	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

LSP

PROJECT NUMBER: 602 3.2	PROJECT NAME: FMPC RI/FS	
BORING NUMBER: 2042	COORDINATES: NORTH 480,394.27 EAST 1,379,542.73	DATE: 04/11/88
GROUND ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 04/11/88
ENGINEER/GEOLOGIST: M GOLDBERG	Depth N/A Date/Time N/A	DATE COMPLETED: 04/19/88
DRILLING METHODS:		PAGE 3 OF 3

DEPTH	SAMPLE	DATE TIME	BLOWS ON SAMPLE	RECOVERY INCHES		USCS SYMBOL	TSF	REMARKS
39.0	008508	04/12/88 1400	10 16 50	10	VERY DENSE, YELLOWISH BROWN (10YR 5/8), SAND, DRY.	SW	<1	Hnu= 0 ppm α = 0 cpm βΓ = 90 cpm
45.0 46.5	008509	04/12/88 1610	25 30 50	18	VERY DENSE, YELLOWISH BROWN (10YR 5/8), GRAVEL, DRY. 46.0'-VERY DENSE, YELLOWISH BROWN (10YR 5/8), SAND, DRY.	GW SW	<1 <1	Hnu= 0 ppm α = 0 cpm βΓ = 80 cpm
50.0 51.5	008510	04/13/88 0910	10 23 29	16	DENSE, YELLOWISH BROWN (10YR 5/8), SAND, DRY.	SW	<1	Hnu= 0 ppm α = 0 cpm βΓ = 80 cpm
55.0 56.5	008511	04/13/88 1040	6 10 14	14	DENSE, YELLOWISH BROWN (10YR 5/8), SAND, WET.	SW	<1	Hnu= 0 ppm α = 0 cpm βΓ = 80 cpm
60.0 61.5	008512	04/13/88 1110	12 19 23	18	DENSE, YELLOWISH BROWN (10YR 5/8), GRAVEL, TRACE SAND, WET.	GW	<1	Hnu= 0 ppm α = 0 cpm βΓ = 80 cpm
65.0 66.5	008513	04/13/88 1430	18 16 19	16	DENSE, YELLOWISH BROWN (10YR 5/8), GRAVEL, WET.	GW	<1	Hnu= 0 ppm α = 0 cpm βΓ = 80 cpm

BOTTOM OF BORING 66.5

NOTES:
DRILLING CONTRACTOR: PENNSYLVANIA DRILLING CO., DRILLER: TIM HARRIS, HELPER: CRAIG COULTER. WATER USED - 600 GALLONS. COLOR VIA MUNCELL COLOR CHART. MONITORING WELL INSTALLED.

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FERNALD RI/FS

This well is down to the GMA

2162

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 20.03.05 (RDCII)	PROJECT NAME: CRU 2 / PHASE 2	
BORING NUMBER: 2935	COORDINATES:	DATE: 04/29/93 - 04/30/93
ELEVATION:	GWL: Depth 57.5 ft Date/Time 05/13/93 / 1545	DATE STARTED: 04/29/93
ENGINEER/GEOLOGIST: P. McCARREN	Depth Date/Time	DATE COMPLETED: 05/8/93
DRILLING METHODS: CABLE TOOL		PAGE 1 OF 7

CB 6/14/93

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0 1 2	110788 0900 04/29/93	4 10 10 8	23	Stiff, 10YR 5/6 (yellowish brown) silty clay, root zone, some coal flags, large gravels, low plasticity, moist	CL	2.0	Bz - 40-60 cpm Microrp - 3.9 ppm Alpha - 0 cpm
3 4	110789 110790 110791 110831 0920 04/29/93	6 10 10 10 13	18	Very stiff, 10YR 5/1 (grey) to 5/6 (yellowish brown), silty clay, mottling, low plasticity, moist	CL	4.0	Bz - 40-60 cpm Microrp - 13.0 ppm peak 6.0 ppm Alpha - 0 cpm
5 6	110792 0930 04/29/93	6 11 11 14	18	SAA	CL	4.0	Bz - 40-60 cpm Microrp - 19.2 ppm peak 6.0 ppm Alpha - 0 cpm
7	110793 0940 04/29/93	3 3 5	4	Stiff, 10YR 4/4 (dark yellowish brown) silty clay, some sand, medium plasticity, moist to wet at bottom of spoon	CL	2.0	Bz - 40-60 cpm Microrp - 0.0 ppm Alpha - 0 cpm
8 9	110794 1220 04/29/93	4 6 9	18	Stiff ~~2.5~~ 2.5YR 5/4 (light olive brown) silty clay, mottling, trace fine sand, medium plasticity, moist to wet - very fine sand lens, wet, at ~8.0-8.25	CL	2.5	Bz - 40-60 cpm Microrp - 0.0 ppm Alpha - 0 cpm
10 11	110795 1055 04/30/93	7 11 11	16	Stiff, 2.5YR 5/4 (light olive brown) silty clay to clayey silt, mottling, Fe staining, trace fine sand, low to medium plasticity, moist (ignore this 6")	CL-ML	2.5	Bz - 40-60 cpm Microrp - 0.0 ppm Alpha - 0 cpm
11 12	110796 1335 04/30/93	10 13 13	18	Very stiff 2.5Y 5/4 (olive brown) clayey silt, mottling, Fe staining, trace fine sand, medium plasticity, moist - ~~last 1~~ 2.5Y 5/1 clay, high plasticity	ML	4.0	Bz - 40-60 cpm Microrp - 0.0 ppm Alpha - 0 cpm
13	110797 1400 04/30/93	2 5 6	16	Stiff, 2.5Y 5/1 grey clay (lacustrine) varying, high plasticity, moist	CH	2.5	Bz - 40-60 cpm Microrp - 0.0 ppm Alpha - 0 cpm
14 15	110798 1410 04/30/93	5 7 9	16	SAA	CH	2.5	Bz - 40-60 cpm Microrp - 0.0 ppm Alpha - 0 cpm

NOTES

DRILLING CONTRACTOR: Pennsylvania Drilling

DRILLING EQUIPMENT: BUCYRUS - ERIE

DRILLER: Bob Erickson

HELPER: Richard Thomas

SAMPLE TECH: Dennis Hilbert

ABRV.'s: SAA - SAME AS ABOVE; NA - NOT APPLICABLE

000081

- SAMPLES COLLECTED PER ASTM STANDARD PENETRATION TEST
- COLORS IDENTIFIED USING MUNSELL COLOR CHART

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 20.03.05 (RDC11)	PROJECT NAME. CRU 2 / PHASE 2	
BORING NUMBER: 2935	COORDINATES:	DATE. 04/30/93 - 05/01/93
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 04/29/93
ENGINEER/GEOLOGIST: P. McCARREN	Depth Date/Time	DATE COMPLETED: 05/01/93
DRILLING METHODS: CABLE TOOL		PAGE 2 OF ~~8~~ 7

CB 6/14/93

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15 16	110799 1550 04/30/93	1 4 4	16	SAA	CH	2.0	Bz - 40-60 cpm Microtip - 0.0ppm Alpha - 0cpm
17 18	110800 1555 04/30/93	3 3 4	14	SAA	CH	2.0	Bz - 40-60 cpm Microtip - 0.0ppm Alpha - 0cpm
19	110801 1615 04/30/93	1 3 4	6	SAA	CH	2.0	Bz - 40-60 cpm Microtip - 0.0ppm Alpha - 0cpm
20 21	110802 1620 04/30/93	2 16 19	18	0-12" stiff, 2.5y 5/1 dk gray clay, varving, high plasticity, moist 12"-18" stiff, 2.5y 5/1 dk gray clayey silt, slight plasticity, small medium to fine sand lens	CH / ML	2.0 / 2.5	Bz - 40-60 cpm Microtip - 0.0ppm Alpha - 0cpm
22	110803 0815 05/01/93	1 1 7	6	Stiff, 2.5y 5/1 dk gray clayey silt, slight plasticity, medium to fine sand, moist	ML	2.5	Bz - 40-60 cpm Microtip - 0.0ppm Alpha - 0cpm
23 24	110804 0820 05/01/93	17 13 14	12	Stiff, 2.5y 5/1 dk gray clayey silt, slight plasticity, small medium to fine sand lenses, some small gravels in silt & sand, moist	ML	2.5	Bz - 40-60 cpm Microtip - 0.0ppm Alpha - 0cpm
25	110805 0920 05/01/93	1 3 5	6	Stiff, 2.5y 4/1 dk gray clayey silt, some fine to medium sand, some small gravels 10-30mm, low plasticity, moist	ML	2.5	Bz - 40-60 cpm Microtip - 0.0ppm Alpha - 0cpm
26 27	110806 0925 05/01/93	7 12 13	6	SAA	ML	2.5	Bz - 40-60 cpm Microtip - 0.0ppm Alpha - 0cpm
28	110807 1320 05/01/93	5 22 25	6	Hard, 2.5y 5/1 dk gray clay, some fine to medium sand, some small gravels 10-30mm, low plasticity, moist	ML / CL	4.5	Bz - 40-60 cpm Microtip - 0.0ppm Alpha - 0cpm
29 30	110808 1420 05/01/93	25 35 100	18	0-14" hard, 2.5y 5/1 dk gray clay, some fine to medium sand, some small gravels, low plasticity, moist 14"-16" red oxide, 10yr 4/1 dk gray silt with fe stains, moist 16"-18" 10yr 4/1 (dk yellow brown) medium sand moist	CL / ML/SM	4.5 / NA	Bz - 40-60 cpm Microtip - 0.0ppm Alpha - 0cpm

SAA as determined by blowcount as well as the soil description

NOTES

Drilling Contractor Pennsylvania Drilling
Drilling Rig Buckeye - Erie
Driller Bob Erickson
Helper Richard Thomas
Sample Tech Jennifer Mickert

ABRV.s : SAA - Same as Above
NA - Not Applicable

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

CB 6/14

FERNALD
RI/FS

VISUAL CLASSIFICATION OF SOILS

2162

PROJECT NUMBER: 20.03 05 (RACII)	PROJECT NAME: CRU 2 / PHASE 2	
BORING NUMBER: 2935	COORDINATES:	DATE: 05/01/93
ELEVATION:	GWL: Depth See p. 1 Date/Time	DATE STARTED. 04/29/93
ENGINEER/GEOLOGIST. P. McCARREN	Depth Date/Time	DATE COMPLETED. 05/8/93
DRILLING METHODS: CABLE TOOL		PAGE 3 OF 7

CB 6/14/93

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
30	110809	34		dk yellowish brown			
31	1515 05/01/93	37 41	16	VERY DENSE, 10YR 4/6 fine to coarse silty sand, poorly sorted, Fe staining damp	SM	NA	Bz - 40-60 cpm Microrp - 0.0 ppm Alpha - 0 cpm
32							BEGIN sampling AT 5.0' INTERVALS.
33							
34							
35	110810	18		(dark yellowish brown)			
36	1630 05/01/93	27 34	14	VERY DENSE, 10YR 4/6 fine to medium silty sand, poorly sorted, Fe staining some BEDDING PRESENT. DRY	SM	NA	Bz - 40-60 cpm Microrp - 0.0 ppm Alpha - 0 cpm
37							
38							
39							
40	110812	15		olive yellow			
41	0925 05/02/93	34 48	11	VERY DENSE, 2.5Y 6/6 poorly graded fine sand, DRY	SP	NA	Bz - 40-60 cpm Microrp - 0.0 ppm Alpha - 0 cpm
42							
43							
44							
45							

NOTES

DRILLING CONTRACTOR Pennsylvania Drilling

DRILLING EQUIPMENT Pollvans - Erie

DRILLER Bob Erickson

HELPER Richard Voyle

SAMPLE TECH Jennifer Milchert

ABRV.S: SAA - SAME AS ABOVE
NA - NOT APPLICABLE

000083

- SAMPLES COLLECTED PER ASTM STANDARD DEVIATIONS
- COLORS IDENTIFIED USING MUNSELL COLOR CHART

FERNALD
RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 20.03 05 (RI011)	PROJECT NAME: CRU 2 / PHASE 2	
BORING NUMBER: 2935	COORDINATES:	DATE: 05/02-03/93
ELEVATION:	GWL: Depth see p.1 Date/Time	DATE STARTED: 04/29/93
ENGINEER/GEOLOGIST: P. McCarren/J Reagan	Depth Date/Time	DATE COMPLETED: 05/13/93
DRILLING METHODS: CABLE TOOL		PAGE 4 OF 7

CB 4/14/93

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
45	110813	50/	6	very dense, 2.5Y 5/4 light olive brown,	SP	NA	Bγ = 40-60cpm
46	1035	.6		poorly graded sand, some gravels, dry			α = 0 cpm
	5/2/93						M+P = 0ppm
47							
48							
49							
50	110814	50/	1	very dense, 2.5Y 5/4 light olive	SP	NA	Bγ = 40cpm
51	1425	.1		brown, poorly graded sand, some			α = 0cpm
	5/2/93			some gravels, moist			M+P = 0ppm
52							
53							
54							
55	110815	14					
56	1335	30	4	SAA	SP	NA	Bγ - 40-60cpm
	05/03/93	30					MICROMP - 0.0ppm
							ALPHA - 0cpm
57	110816	40		0-10" VERY DENSE, 2.5Y 5/4 (light olive brown) MEDIUM TO FINE	SP		Bγ - 40-60cpm
	1355	50	16	SAND POORLY GRADED, SOME GRAVELS, MOIST			MICROMP - 0.0ppm
58	05/03/93	50/0		10"-16" VERY DENSE, 10YR 4/1 (dk gray) COARSE, MEDIUM & FINE SAND & SOME GRAVELS, WET - WATER TABLE	SM	NA	ALPHA - 0cpm
	110817	25		DENSE, 2.5Y 5/4 (light olive brown) MEDIUM TO FINE			Bγ - 40-60cpm
59	1420	20	14	SAND & SOME GRAVELS, WET	SM	NA	MICROMP - 0.0ppm
	05/03/93	20					ALPHA - 0cpm

NOTES

DRILLING CONTRACTOR Pennsylvania Drilling

DRILLING EQUIPMENT Bucyrus-Erie

DRILLER Bob Erickson

HELPER Richard Smith

SAMPLE TECH Donnie Hubert

ABRV.S: SAA - SAME AS ABOVE CB 4/14

NA - NOT APPLICABLE

- SAMPLES COLLECTED PER ASTM STANDARD PENETRATION TEST.
- COLORS IDENTIFIED USING MUNSELL COLOR CHART

000084

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

2162

PROJECT NUMBER: 20.03 05 (RCCII)	PROJECT NAME: CRU 2 / PHASE 2	
BORING NUMBER: 2935	COORDINATES:	DATE: 05/03/93 - 05/04/93
ELEVATION:	GWL: Depth See p.1 Date/Time	DATE STARTED: 04/29/93
ENGINEER/GEOLOGIST: P. McCARREN	Depth Date/Time	DATE COMPLETED: 05/13/93
DRILLING METHODS: CABLE TOOL		PAGE 5 OF ~~8~~ 7

CB 6/14/93

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
59.5 60	110818 1435 05/03/93	11 15 20	14	0-18" SAA 10"-14" DENSE, 2.5Y 5/4 to olive brown FINE SAND, with medium TO COARSE SAND, WET PMH 05/03/93	SM / SP	NA	Bz - 40-60cpm MICROTIP - 0.0ppm ALPHA - 0cpm
61	110819 1510 05/03/93	16 18 20	16	SAA	SP	NA	Bz - 40-60cpm MICROTIP - 0.0ppm ALPHA - 0cpm
62	110820 1540 05/03/93	11 15 15	16	SAA	SP	NA	Bz - 40-60cpm MICROTIP - 0.0ppm ALPHA - 0cpm
63 64	110821 1550 05/03/93	11 21 24	16	SAA	SP	NA	Bz - 40-60cpm MICROTIP - 0.0ppm ALPHA - 0cpm
65 66	110822 0815 05/05/93	6 6 12	18	SAA	SP	NA	Bz - 60-110cpm MICROTIP - 0.0ppm ALPHA - 0cpm
67	110823 0830 05/05/93	12 24 30	18	VERY DENSE, 2.5Y 5/4 to olive brown FINE SAND, WITH MEDIUM TO COARSE SAND AND SOME GRAVELS, WET	SP	NA	Bz - 60-120cpm MICROTIP - 0.0ppm ALPHA - 0cpm
68 69	110824 0845 05/05/93	20 30 27	16	SAA	SP	NA	Bz - 60-120cpm MICROTIP - 0.0ppm ALPHA - 0cpm
70				PMH 05/05/93 - BOTTOM of BORING 70.0 - DRIVE ADDITIONAL 5.0' SECTION OF CASING TO 73.0' TO MINIMIZE SAND HEAVE			COLLECTED COMPOSITE SIEVE SAMPLE 110825 FROM 55 ft - 70 ft - 8" (10.0" ID) STEEL CASING USED FROM 0.0 ft TO 70.0 ft (PMH 05/05/93) ~250 gallons of WATER USED - WILL INSTALL 4" STAINLESS STEEL WELL
71 72 73 74							

NOTES

DRILLING CONTRACTOR: Pennsylvania Drilling

DRILLING EQUIPMENT: Bucyrus - Erie

DRILLER: Bob Erickson

HELPER: Richard Thomas

SAMPLE TECH: Donald M. Wilhert

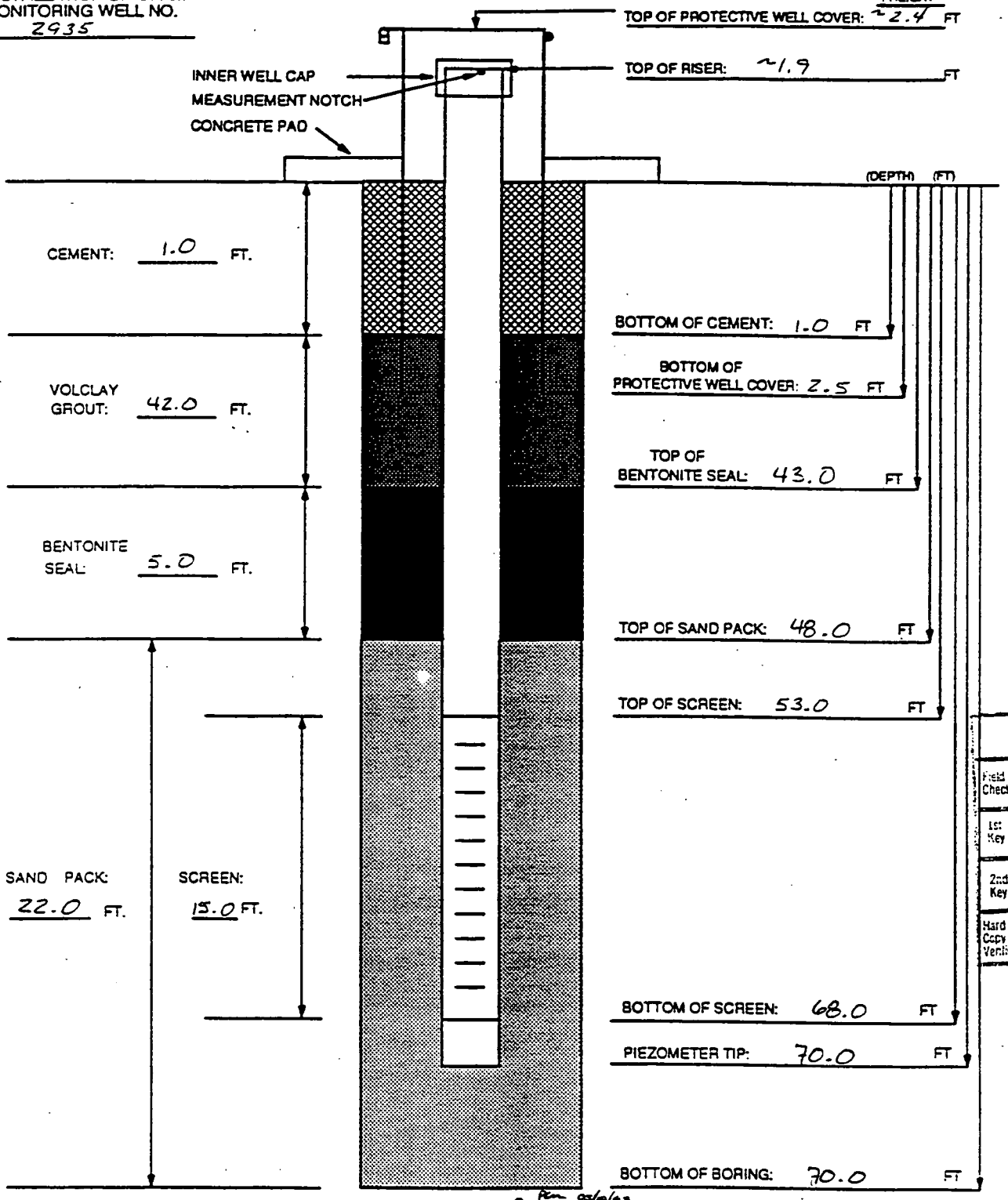
ABRV.S: SAA - SAME AS ABOVE
NA - NOT APPLICABLE

- SAMPLES COLLECTED PER ASTM STANDARD PENETRATION TEST.
- COLORS IDENTIFIED USING MUNSELL COLOR CHART.

Field Check CB 6/14
1st Review
2nd Review

FERNALD RI/FS
INSTALLATION DIAGRAM
MONITORING WELL NO. 2935

INSTALLATION DATE: 05/06-13/93



	HEIGHT	
TOP OF PROTECTIVE WELL COVER:	~2.4	FT
TOP OF RISER:	~1.9	FT

	(DEPTH)	(FT)
BOTTOM OF CEMENT:	1.0	FT
BOTTOM OF PROTECTIVE WELL COVER:	2.5	FT
TOP OF BENTONITE SEAL:	43.0	FT
TOP OF SAND PACK:	48.0	FT
TOP OF SCREEN:	53.0	FT
BOTTOM OF SCREEN:	68.0	FT
PIEZOMETER TIP:	70.0	FT
BOTTOM OF BORING:	70.0	FT

BOREHOLE DIAMETER: ~~8.0~~ 10.0 IN. 10 05/10/93

	Initials
Field Check	CB
1st Key In	
2nd Key In	
Hard Copy Verification	

MATERIALS USED

SAND TYPE AND QUANTITY: 10/20 22 50Lbs Bags
BENTONITE PELLETS (5-GALLON BUCKETS): 5 Bkts
BAGS OF VOLCLAY GROUT: ~7 1/2 50Lbs Bags
AMOUNT OF CEMENT: 3 50Lbs Bags
AMOUNT OF WATER USED: ~ 250 gallons
OTHER: 12 Drums Drill cuttings 2 Drums Decon Water
TASK: 20.03.05 (2DC11)

NOTES:

1) RISER PIPE IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE, FLUSH-THREADED JOINTS.
2) SCREEN IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE WITH 0.010 IN. SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH AND DATE 57.5 FT. 05/13/9
5) TOP OF CASING IS SECURED WITH A STAINLESS STEEL CAP.
6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL.
7) WELL CASING HAS A PROTECTIVE COVER WITH PADLOCK.

GEOLOGIST/ENGINEER: Paul C McCallen

FERNALD
RI/FS

PIEZOMETER INSTALLATION SHEET

PROJECT NAME Crv 2 / PHASE 2 FIELD ENG./GEO. P. McCarren DATE 05/13/93
PROJECT NO. 20.03.05 (RDC11) CHECKED BY _____ DATE _____
BORING NO. 2935
PIEZOMETER NO. MW 2935 DATE OF INSTALLATION 05/06-13/93

BOREHOLE DRILLING

DRILLING METHOD Cable tool
DRILLING FLUID(S) USED:
FLUID Water FROM 0.0 ft TO 70.0 ft
FLUID NA FROM — TO —

TYPE OF BIT Hammer Percussion
CASING SIZE(S) USED:
SIZE ~~8 in~~ 10 in per 05/11/93 FROM 0.0 ft TO 70.0 ft
SIZE NA FROM — TO —

PIEZOMETER DESCRIPTION

TYPE Monitoring Well
DIAMETER OF PERFORATED SECTION 4.0 in ID
PERFORATION TYPE:
SLOTS ☑ HOLES ☐ SCREEN ☐
AVERAGE SIZE OF PERFORATIONS 0.010 in
TOTAL PERFORATED AREA 15.0 ft

RISER PIPE MATERIAL 316 stainless steel
RISER PIPE DIAMETERS:
O.D. 4 3/8 in I.D. 4.0 in
LENGTH OF PIPE SECTIONS 5-10 ft 1-5 ft
JOINING METHOD Screw type - flush joint threaded

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5.0 ft
PROTECTIVE PIPE O.D. 10.0 in

OTHER PROTECTION Hinged locking cover with pad lock

ITEM	DISTANCE ABOVE/BELOW GROUND SURFACE (ft)		ELEVATION ( )	
TOP OF RISER PIPE	~1.9			
GROUND SURFACE	0.0			
BOTTOM OF PROTECTIVE PIPE	~2.6			
BOREHOLE FILL MATERIALS:	TOP 0.0	BOTTOM 1.0		
Volclay CEMENT GROUT ~~SLURRY~~ AM 05/10/93	TOP 1.0	BOTTOM 43.0	TOP	BOTTOM
BENTONITE Pellets	TOP 43.0	BOTTOM 48.0	TOP	BOTTOM
SAND 10/20	TOP 48.0	BOTTOM 70.0	TOP	BOTTOM
GRAVEL - None used	TOP NA	BOTTOM NA	TOP	BOTTOM
PERFORATED SECTION	TOP 53.0	BOTTOM 68.0	TOP	BOTTOM
PIEZOMETER TIP	70.0 ft			
BOTTOM OF BOREHOLE	70.0 ft			
GWL AFTER INSTALLATION	57.5 (Ground level)			

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 to hold protective pipe in place
Water level 05/13/93 ~57.5 below ground surface

CB 9/11/93

FEPNALD
1/FS

2162

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 20.03 05 (ROC11)	PROJECT NAME: CRU 2 / PHASE 2	
BORING NUMBER: 2939	COORDINATES:	DATE: 05/15/93
ELEVATION:	GWL: Depth ~54.1 Date/Time 05/27/93	DATE STARTED: 05/15/93
ENGINEER/GEOLOGIST: P. McCARREN	Depth Date/Time	DATE COMPLETED: 05/27/93
DRILLING METHODS: CABLE TOOL		PAGE 1 OF 7

CB 6/15/93

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
0 1 2	110826 0930 05/15/93	2 4 6 9	18	HARD, 10YR 5/6 yellowish brown SILTY CLAY, SOME MOTTELING, MEDIUM PLASTICITY, MOIST	CL	4.0	Bq - 60-80cpm Microtip - 0.0ppm α - 0cpm DROVE SPLIT SPOON 2 FT
3 4	110827 110828 0940 05/15/93	30 15 16 16	18	HARD, 2.5Y 5/4 reddish brown SILTY CLAY, SOME MOTTELING, MEDIUM PLASTICITY, MOIST	CL	4.5	Bq - 60-80cpm Microtip - 0.0ppm α - 0cpm ABOVE SPLIT SPOON 2 FT TAKE TOTAL U SAMPLE 110828
5 6	110829 0945 05/15/93	12 17 15 14	18	SAA	CL	4.5	Bq - 60-80cpm Microtip - 4.0ppm α - 0cpm DROVE SPLIT SPOON 2 FT
7	110830 0950 05/15/93	12 10 7	16	VERY STIFF, 2.5Y 5/2 grayish brown SILTY CLAY, SOME MOTTELING, OXIDE STAINING, SOME VERY FINE SAND, MEDIUM PLASTICITY, MOIST	CL	4.0	Bq - 60-80cpm Microtip - 0.0ppm α - 0cpm
8 9	110831 0955 05/15/93	7 9 8	18	0-15" SAA - GRAVEL ZONE AT ~4'6" WET, Microtip 2.9ppm 15"-18" STIFF, 2.5Y 5/1 gray CLAY, LACUSTRINE, VARVIM, HIGH PLASTICITY, MOIST	CL / CH	4.0 / 3.0	Bq - 60-80cpm Microtip - 0.0ppm α - 0cpm
10	110832 1535 05/15/93	7 12 12	12	STIFF, 2.5Y 5/1 gray CLAY, LACUSTRINE, VARVIM INCREASING SILT, HIGH PLASTICITY, MOIST	CH	3.0	Bq - 60-80cpm Microtip - 0.0ppm α - 0cpm
11 12	110833 1340 05/15/93	6 12 15	16	0-4" SAA 4"-16" SOFT, 2.5Y 4/1 dk. gray SILT, CARBONIZED PLANT FIBERS, WET	CH / ML	.5	Bq - 60-80cpm Microtip - 0.0ppm α - 0cpm
13	110834 1355 05/15/93	12 12 15	8	SOFT, 2.5Y 4/1 dark gray SILT WITH INCREASING FINE SAND, CARBONIZED PLANT FIBERS WET	ML	.5	Bq - 60-80cpm Microtip - 0.0ppm α - 0cpm
14 15	110834 1400 05/15/93	5 12 11	8	0-4" SAA 4"-8" SOFT 2.5Y 4/1 dark gray SILT w/ VERY FINE SAND CARBONIZED PLANT FIBERS, ~~LAMINATED, WET~~	ML	.5	Bq - 60-80cpm Microtip - 0.0ppm α - 0cpm

NOTES:

DRILLING CONTRACTOR: Environmental Drilling

DRILL EQUIPMENT: BUCYRUS - ERIE

DRILLER: BOB ERICKSON

HELPER: ~~Richard Thomas~~ for 05/15/93 ~~Bobby Yoor~~ - MIKE DEON

LOGGED BY: JENNIFER MILCHERT

ABRV.S: SAA - SAME AS ABOVE

NA - NOT APPLICABLE

000088

CB 6/15/93

- SAMPLES COLLECTED PER ASTM STANDARD CONSTRUCTION TEST
- COLORS IDENTIFIED USING MUNSELL COLOR CHART

FERNALD RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 20.03.05 (RDC11)	PROJECT NAME. CRU 2 / PHASE 2	
BORING NUMBER: 2939	COORDINATES:	DATE. 05/15-16/93
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 05/15/93
ENGINEER/GEOLOGIST: P. McCARREN	Depth Date/Time	DATE COMPLETED: 05/27/93
DRILLING METHODS:		PAGE 2 OF ~~8~~ 7

CB 6/15/93

DEPTH (FT)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
15 16	110836 1425 05/15/93	1 3 5	6	SAA	ML/CL	.5	Bg - 60-80 cpm Microtip - 0.0 ppm α - 0 cpm
17 18	110837 1435 05/15/93	1 11 7	6	Very stiff, 2.5Y 5/2 grayish brown silty clay, some small gravels, medium plasticity, moist	CL	3.5	Bg - 60-80 cpm Microtip - 0.0 ppm α - 0 cpm
19	114627 1445 05/15/93	12 15 12	6	SAA	CL	3.5	Bg - 60-80 cpm Microtip - 0.0 ppm α - 0 cpm
20 21	114628 1610 05/15/93	6 10 10	14	Very stiff, 2.5Y 4/1 dark gray silty clay, some small weathered gravels, med. plasticity, wet - gravel zone at 10" small gravels. wet -	CL	3.5	Bg - 60-80 cpm Microtip - 0.0 ppm α - 0 cpm
22	114629 1630 05/15/93	12 12 12	12	SAA	CL	3.0	Bg - 60-80 cpm Microtip - 0.0 ppm α - 0 cpm
23 24	114630 1640 05/15/93	7 7 10	18	SAA	CL	3.0	Bg - 60-80 cpm Microtip - 0.0 ppm α - 0 cpm
25	114631 0910 05/16/93	11 12 30	4	Very stiff, 2.5Y 4/1 dark gray silty clay, some fine sands, some small weathered gravels med. plasticity, moist - large gravel at bottom of spoon	CL	3.0	Bg - 60-80 cpm Microtip - 3.6 ppm α - 0 cpm
26 27	114632 0920 05/16/93	12 50/3	8	SAA	CL	4.0	Bg - 60-80 cpm Microtip - 0.0 ppm α - 0 cpm
28	114633 1425 05/16/93	1 3 20	4	large gravel at bottom of spoon SAA	CL	3.5	Bg - 60-80 cpm Microtip - 0.0 ppm α - 0 cpm
29 30	114634 1430 05/16/93	70/3	18	SAA	CL	4.25	Bg - 60-80 cpm Microtip - 0.0 ppm α -

NOTES

DRILLING CONTRACTOR PENNSYLVANIA DRILLING
DRILLING RIG BUCYRUS-ERIE
DRILLER BOB ERICKSON
HELPER ~~R. THOMAS - BOBBY LOST~~ - M. DEON (from 05/16/93)
SAMPLE TECH J. MILLER

ABRV.: SAA - SAME AS ABOVE
NA - NOT APPLICABLE

- SAMPLES COLLECTED PER ASTM STANDARD PENETRATION TEST
- COLORS IDENTIFIED USING MUNSELL COLOR CHART

Field Check CB 6/15

FERNALD
RI/FS

2162

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 20.03 05 (RDC11)	PROJECT NAME: CRU 2 / PHASE 2	
BORING NUMBER:	COORDINATES:	DATE: 05/17/93
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 05/15/93
ENGINEER/GEOLOGIST: P. McCARREN	Depth Date/Time	DATE COMPLETED: 05/27/93
DRILLING METHODS: CABLE TOOL		PAGE 3 OF 7

CAB 6/15/93

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER 6 IN	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
30 31	NA	NA	NA	See Remarks →	NA	NA	No sample taken from 30.0 to 31.5 - no split spoon driven
32 33	114635 0945 05/17/93	1 2 19	4	SAA	CL	4.5	Bg - 60-80 cpm Microrp - 0 ppm α - 0 cpm
34	114636 1045 05/17/93	32 34 30	4	SAA	CL	4.5	Bg - 60-80 cpm Microrp - 0.0 ppm α - 0 cpm
35 36	114637 1335 05/17/93	20 23 20	6	0-2" SAA 2"-6' Dense, 10YR 5/4 yellowish brown, med to fine silty sand ~~very~~ few oxidation, moist	CL / SM	4.0 / NA	Bg - 60-80 cpm Microrp - 0.0 ppm α - 0 cpm
37	114638 1540 05/15/93	21 41 49	18	SAA	SM	NA	Bg - 60-80 cpm Microrp - 0.0 ppm α - 0 cpm
38 39				Will begin sampling every 5.0 ft beginning from 35.0' - next sample 40.0'-41.5'			
40 41	114639 1435 05/17/93	50 50/1	8	Very dense, 10YR 5/4 yellowish brown, med to fine silty sand oxide staining, some large gravels, dry	SM	NA	Bg - 60-80 cpm Microrp - 0.0 ppm α - 0 cpm
42 43 44 45							

NOTES

DRILLING CONTRACTOR: Pennsylvania Drilling

DRILL EQUIPMENT: Buckeye - Erie

DRILLER: Bob Erickson

HELPER: Richard Thomas

LOGGED BY: Jennifer Milchert

ABRV.S: SAA - Same As Above
NA - Not Applicable

CAB 6/15/93

000090

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

FERNALD
RI/FS

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 20.03 05 (RCC11)	PROJECT NAME: CRU 2 / PHASE 2	
BORING NUMBER: 2939	COORDINATES:	DATE: 05/17 - 20/93
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 05/15/93
ENGINEER/GEOLOGIST: P. McCarren	Depth Date/Time	DATE COMPLETED: 05/27/93
DRILLING METHODS: CABLE TOOL		PAGE 4 OF ~~8~~ 7

CB 6/15/93

DEPTH (FT)	SAMPLE TYPE & NO	BLOWS ON SAMPLER PER (6 IN)	RECOVERY (IN)	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	REMARKS
45	114640	4					
46	1535 05/17/93	35 47	12	SAA	SM	NA	β_γ - 60-80cpm Microrp - 0.0ppm α - 0cpm
47							
48							
49							
50	114641	7					
51	1625 05/17/93	14 33	4	SAA	SM	NA	β_γ - 60-80cpm Microrp 0.0ppm α - 0cpm Resume continuous sampling
52	114642 0915 05/20/93	9 9 10	4	SAA	SM	NA	β_γ - 20-40cpm Microrp - 0.0ppm α - 0cpm
53							
54	114643 0925 05/20/93	8 23 28	8	SAA	SM	NA	β_γ - 20-40cpm Microrp - 0.0ppm α - 0cpm
55	114644 0935 05/20/93	50/3	4	VERY DENSE, 10YR 4/4, dk. yellowish brown, COARSE TO fine SILTY SAND, MOIST	SM	NA	β_γ - 20-40cpm Microrp - 0.0ppm α - 0cpm
56							
57	114645 1000 05/20/93	8 8 15	12	0-8" SAA 8"-12" MEDIUM DENSE, 2.5Y 4/1, dk gray COARSE TO MEDIUM GRAINED SAND, WET - TOP of Aquifer water	SM / SP	NA	β_γ - 20-40cpm Microrp - 0.0ppm α - 0cpm
58	114646 1030 05/20/93	8 12 12	12	SAA	SP	NA	β_γ - 40-60cpm Microrp - 0.0ppm α - 0cpm
59							
60	114647 1350 05/20/93	3 12 18	8	MEDIUM DENSE, 2.5Y 4/1, dark gray COARSE TO MEDIUM GRAINED SAND, some fine GRAVELS, WET	SP	NA	β_γ - 40-60cpm Microrp - 0.0ppm α - 0cpm

NOTES

DRILLING CONTRACTOR: Environmental Drilling

DRILL EQUIPMENT: Bucyrus - Erie

DRILLER: Bob Erickson

HELPER: Richard Morris

LOGGER: Jennifer Mickert

ABRV.S: SAA - SAME AS ABOVE
NA - NOT APPLICABLE

CB 6/15/93

- SAMPLES COLLECTED PER ASTM STANDARD CONSTRUCTION
- COLORS IDENTIFIED USING MUNSELL COLOR CHART

000091

FERNALD RI/FS

2162

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 20.03 05 (RACII)	PROJECT NAME: CRU 2 / PHASE 2	
BORING NUMBER: 2939 PW 05/20/93	COORDINATES:	DATE: 05/20/93
ELEVATION:	GWL: Depth Date/Time	DATE STARTED 05/15/93
ENGINEER/GEOLOGIST: D. McCARREN	Depth Date/Time	DATE COMPLETED 05/27/93
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 CONSISTENCY (TSF)	REMARKS (CB 6/15/93)
60				SEE PREVIOUS PAGE			
61	114646 1400 05/20/93	29 49 27	18	VERY DENSE, 2.5Y 4/1, dk gray COARSE TO MED GRAINED SAND, some fine sand, some fine gravels, wet * Gravels ellow chemical weathering	SP	NA	Br - 20-40 cpm Microrp - 0.0 ppm α - 0.0 cpm
62	114649 1415 05/20/93	16 30 39	18	SAA	SP	NA	Br - 20-40 cpm Microrp - 0.0 ppm α - 0 cpm
63	~~114650~~ NA ~~1515~~ ~~05/20/93~~	per 05/20/93 NA	NA	NA			Br - NA Microrp - NA α - NA - NO SAMPLE TAKEN, NO SPLIT SPOON DRIVEN
64	per 05/20/93 ~~114651~~ NA 1515 05/20/93	5 4 5	ϕ	NO RECOVERY			Br - NA Microrp - NA α - NA
65	~~114650~~ 114650 1530 05/20/93	19 19 25		SAA			Br - 20-40 cpm Microrp - 0.0 ppm α - 0.0 cpm
66				NO sample collected			
67				Bottom of Boring 69.0' - AN ADDITIONAL 5.0' of CASING DRIVEN TO HOLD SAND			COLLECTED SIEVE ANALYSIS sample from 500-65.0' 114651 - 10" STEEL CASING USED from 0.0 ft to 69.0 ft - 500 GALLONS WATER USED - WILL INSTALL 4" STAINLESS STEEL WELL
68							
69							
70							
71							

NOTES

DRILLING CONTRACTOR: Pennsylvania Drilling

DRILLING EQUIPMENT: Bucyrus-Erie

DRILLER: Bob Dickson

HELPER: Richard Thomas

SAMPLE TECH: Gary Hulbert

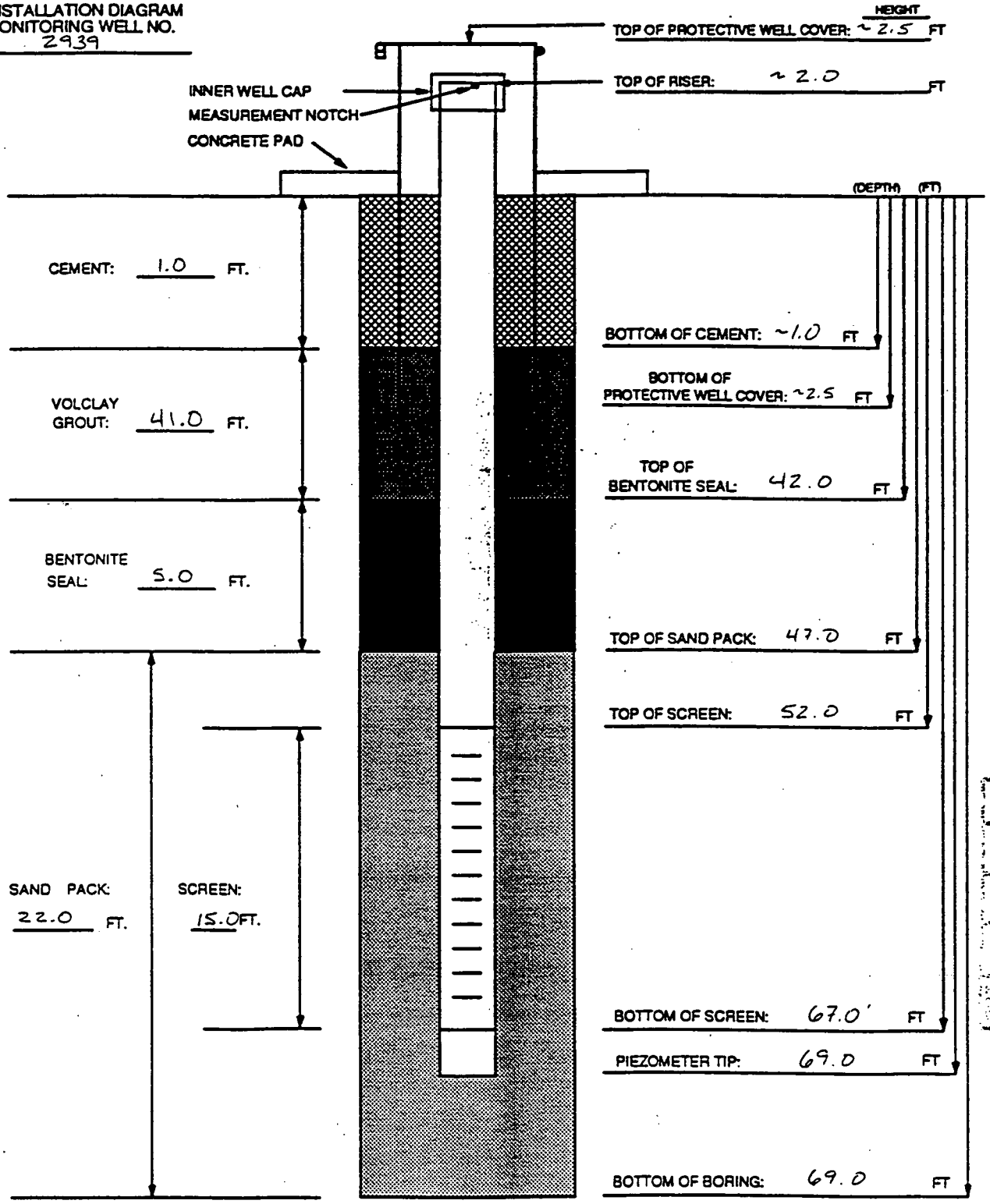
ABRV.S: SAA - SAME AS ABOVE
NA - NOT APPLICABLE

- SAMPLES COLLECTED PER ASTM STANDARD PENETRATION TEST
- COLORS IDENTIFIED USING MUNSELL COLOR CHART

Field Check CB 6/15

FERNALD RI/FS
INSTALLATION DIAGRAM
MONITORING WELL NO. 2939

INSTALLATION DATE: 05/27/93



BOREHOLE DIAMETER: 10.0 IN.

MATERIALS USED

SAND TYPE AND QUANTITY: 10/20 - 22 50lbs Bags
BENTONITE PELLETS (5-GALLON BUCKETS): 5 Bkts
BAGS OF VOLCLAY GROUT: 10 50lbs Bags
AMOUNT OF CEMENT: 1 50 lb Bag
A' INT OF WATER USED: ~ 500 gallons
C R: 13 Drums Drill Cuttings, 1 Drum Decon Water
TASK: 20.03.05 (2DC11).

NOTES:

1) RISER PIPE IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE. FLUSH-THREADED JOINTS.
2) SCREEN IS 4.0 IN. ID. 316 STAINLESS STEEL PIPE WITH 0.010 IN. SLOTS.
3) LOWER END OF SCREEN IS CAPPED WITH AN END CAP OR THREADED SUMP.
4) WATER DEPTH AND DATE 54.1 FT/ 05/27/93
5) TOP OF CASING IS SECURED WITH A STAINLESS STEEL CAP.
6) PARENTHESIS INDICATE DEPTH BELOW GROUND LEVEL.
7) WELL CASING HAS A PROTECTIVE COVER WITH PADLOCK.

GEOLOGIST/ENGINEER: Paul C McCarren

FERNALD RI/FS

2162

PIEZOMETER INSTALLATION SHEET

PROJECT NAME CRU 2 / PHASE 2 FIELD ENG./GEO. D. McCARREN DATE 05/27/93
PROJECT NO. 20.03.05 (RDC11) CHECKED BY _____ DATE _____
BORING NO. 2939
PIEZOMETER NO. MW 2939 DATE OF INSTALLATION 05/27/93

BOREHOLE DRILLING

DRILLING METHOD CABLE TOOL
DRILLING FLUID (S) USED: YES
FLUID WATER FROM 0.0 ft TO 69.0 ft
FLUID NA FROM — TO —

TYPE OF BIT HAMMER PERCUSSION
CASING SIZE (S) USED:
SIZE 10.0 IN FROM 0.0 ft TO 74.0 ft
SIZE NA FROM — TO —

PIEZOMETER DESCRIPTION

TYPE MONITORING WELL
DIAMETER OF PERFORATED SECTION 4.0 IN
PERFORATION TYPE:
SLOTS ☑ HOLES ☐ SCREEN ☐
AVERAGE SIZE OF PERFORATIONS 0.010 IN
TOTAL PERFORATED AREA 15.0 ft

RISER PIPE MATERIAL 316 STAINLESS STEEL
RISER PIPE DIAMETERS:
O.D. 4 3/8 IN I.D. 4.0 IN
LENGTH OF PIPE SECTIONS 5-10 ft 2 - 2 ft
JOINING METHOD SCREW TYPE - flush JOINT THREADED

PROTECTION SYSTEM

RISER PROTECTIVE PIPE LENGTH 5.0 ft
PROTECTIVE PIPE O.D. 10.0 IN

OTHER PROTECTION HINGED LOCKING COVER WITH PAD LOCK

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:	TOP 0.0	BOTTOM 1.0		
Holday CEMENT GROUT / ~~SLURRY~~ 05/27/93 pm	TOP 1.0	BOTTOM 42.0	TOP	BOTTOM
BENTONITE PELLETS	TOP 42.0	BOTTOM 47.0	TOP	BOTTOM
SAND 10/20	TOP 47.0	BOTTOM 69.0	TOP	BOTTOM
GRAVEL - NONE USED	TOP NA	BOTTOM NA	TOP	BOTTOM
PERFORATED SECTION	TOP 52.0	BOTTOM 67.0	TOP	BOTTOM
PIEZOMETER TIP	69.0			
BOTTOM OF BOREHOLE	69.0			
GWL AFTER INSTALLATION	54.1			

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

REMARKS CEMENT PLACED FROM 0.0 ft TO 1.0 ft TO HOLD PROTECTIVE PIPE IN PLACE
WATER LEVEL 05/27/93 ~54.1 BELOW GROUND SURFACE

Initial Date
Field Check CB 6/15/93
1st Review
2nd Review