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NCBC DAVISVILLE
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Phase I Remedial Investigation Report of IR Program Site 16

Volume II: Appendixes A through P

Naval Construction Battalion Center Davisville North Kingstown, Rhode Island

Contract No. N62472-92-D-1296
Task Order No. 0097

Prepared for

Department of the Navy
Engineering Field Activity Northeast
Naval Facilities Engineering Command
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EA Project No.: 29600.97.3592

01375

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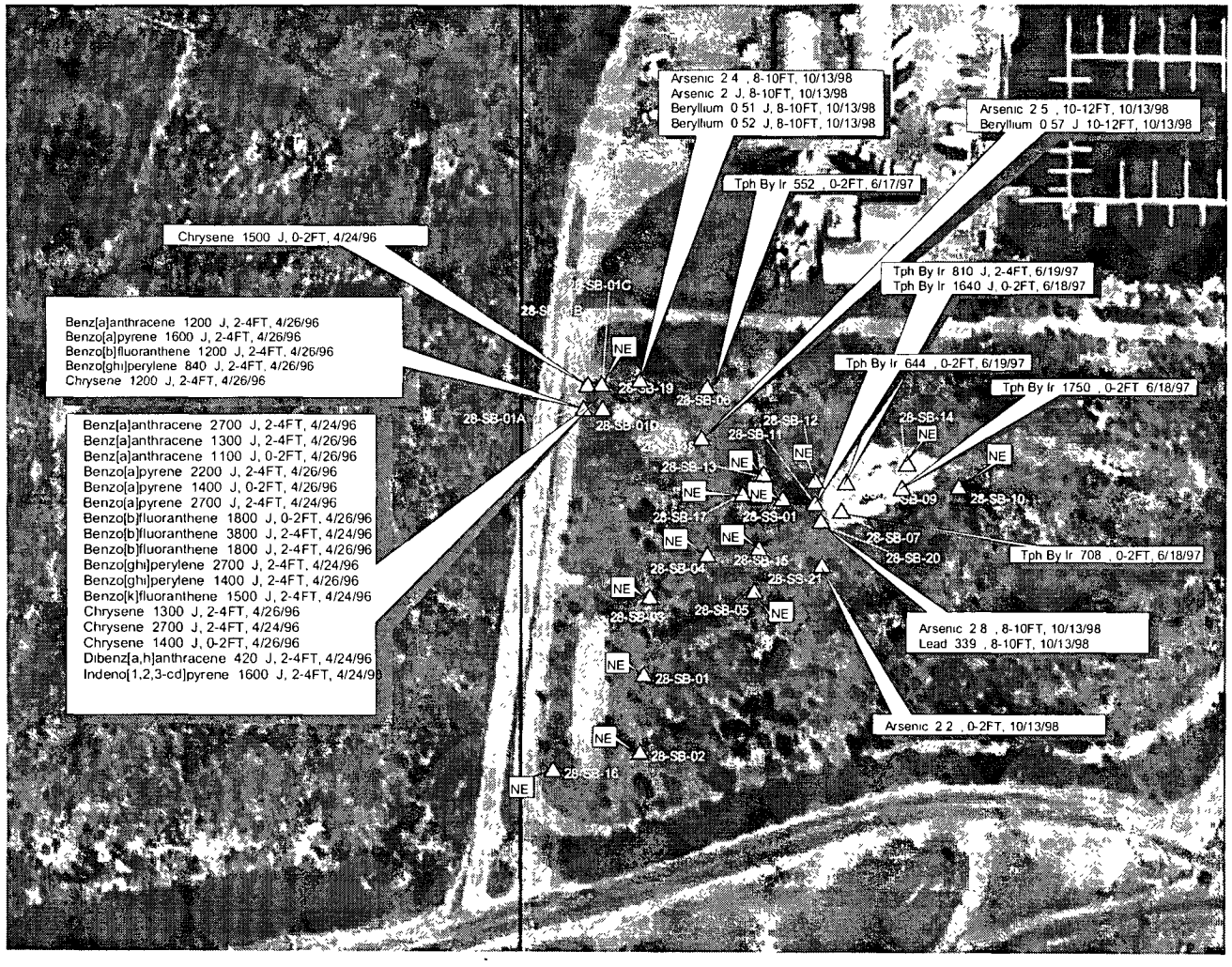
APPENDIX A
PERTINENT DATA FROM
STUDY AREA 16 COMPREHENSIVE REPORT/STUDY AREA SCREENING EVALUATION, December 1999

Table 2-1
Summary of Analytical Program
NCBC Davisville, RI

Description	Sample Matrix	No. of Locations	TPH 418.1	TPH-GRO 8015 Mod	TCL VOC CLPOLM01 8	TCL SVOC CLPOLM01.8	Pesticides OLM03.2	PCB OLM03 2	TAL Metals OLM04.0
Phase II EBS	Soil (surface and subsurface)	4				8			
Phase II EBS Follow-On	Soil (surface and subsurface)	18	33	7	33	33			
	Ground Water	1			1	1			
Phase II EBS Follow-On Addendum II	Soil (surface and subsurface)	5	5	5	5	5	5	5	5
	Ground Water	8			16	16	16		16
	Seep	1			1	1	1		1
	Total Field Samples	37	38	12	56	64	22	5	22

note: totals do not include QA/QC samples



N
W E
S

LEGEND:
△ = **soil sampling location**

Notes:

Displayed values reported as: Analyte, data and qualifier, sample depth, sample date

Metals, TPH by IR units: mg/kg
SVOC units: ug/kg

Region 9 RBC used if RIDEM Residential Direct Exposure Criteria not available.

NE = Not Exceeded

Sample data for Phase II EBS, Phase II EBS Follow-On, and Phase II EBS Follow-On Addendum II investigations

Aerial Photograph, flown 4/11/95
Scale 1:5,400
Rectified by Geofields, Inc.

EA Engineering, Science, and Technology, Inc.			STUDY AREA 16 NCBC DAVISVILLE		Figure 5-1: Constituents Exceeding RIDEM Residential Direct Exposure Criteria in Soil Samples		
PROJECT MGR JMC	DESIGNED BY LCQ	DRAWN BY LCQ	CHECKED BY JMC	SCALE 80 0 80 160 Feet	DATE 07 MAY 99	PROJECT NO 29600.60	FILE No. CTO60.apr

N
W E
S

LEGEND:

= soil sampling location

Notes:

Displayed values reported as: Analyte, data and qualifier, sample depth, sample date (concentration units = ug/kg)

Region 9 RBC used if RIDEM Industrial Direct Exposure Criteria not available.

NE = Not Exceeded

Sample data for Phase II EBS, Phase II EBS Follow-On, and Phase II EBS Follow-On Addendum II investigations

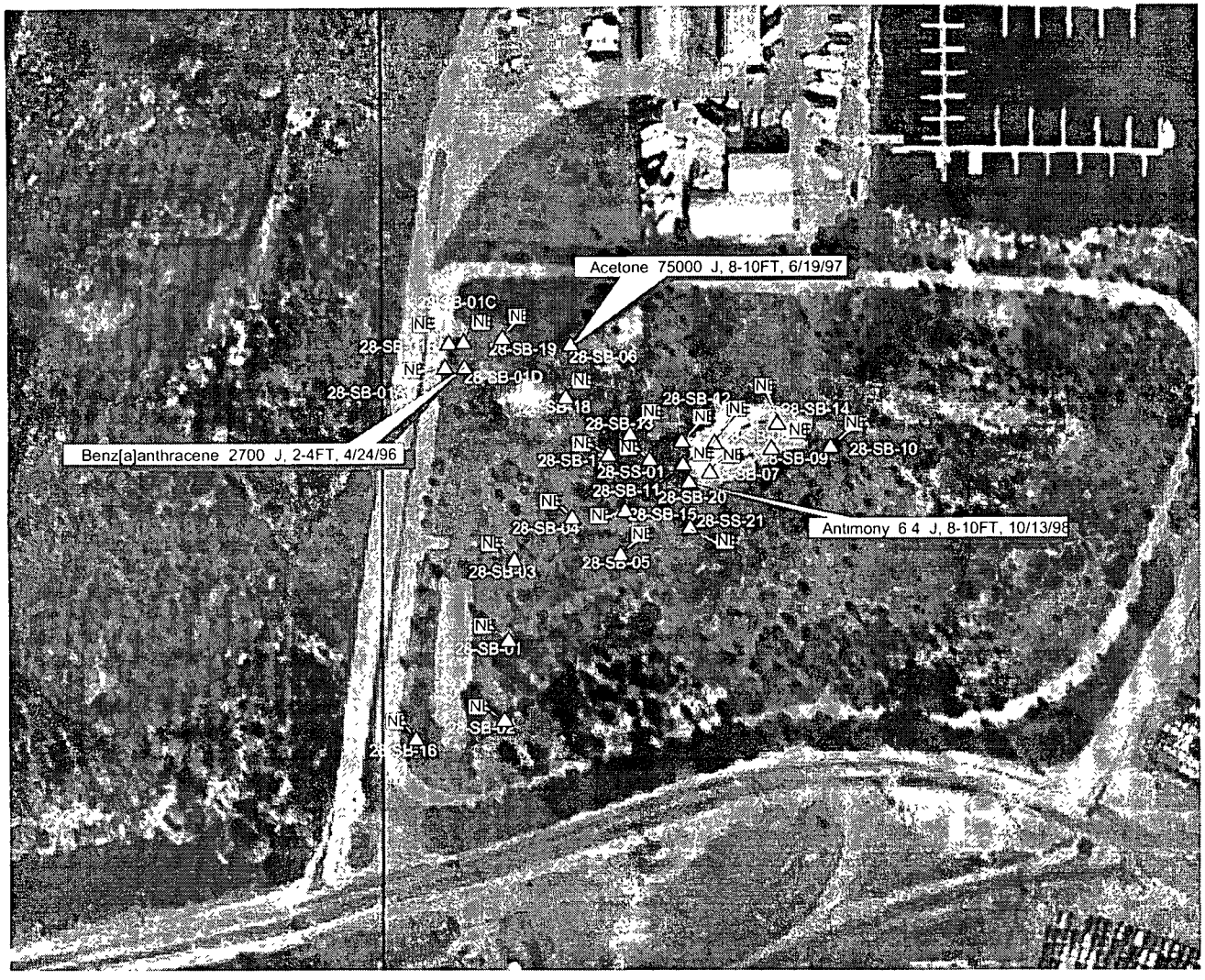
Aerial Photograph, flown 4/11/95
Scale 1:5,400
Rectified by Geofields, Inc.

EA Engineering, Science, and Technology, Inc.

STUDY AREA 16
NCBC DAVISVILLE

Figure 5-2: Constituents Exceeding RIDEM Industrial Direct Exposure Criteria in Soil Samples

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
JMC	LCQ	LCQ	JMC	60 0 60 120 Feet	05 MAY 99	29600.60	CTO60.apr



N
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S

LEGEND:

△ = soil sampling location

Notes:

Displayed values reported as: Analyte, data and qualifier, sample depth, sample date

metals units = mg/kg
organics units = ug/kg

DAF 20 criteria were used if GB Leachability Criteria were not available.

NE = Not Exceeded

Sample locations for Phase II EBS, Phase II EBS Follow-On, and Phase II EBS Follow-On Addendum II investigations

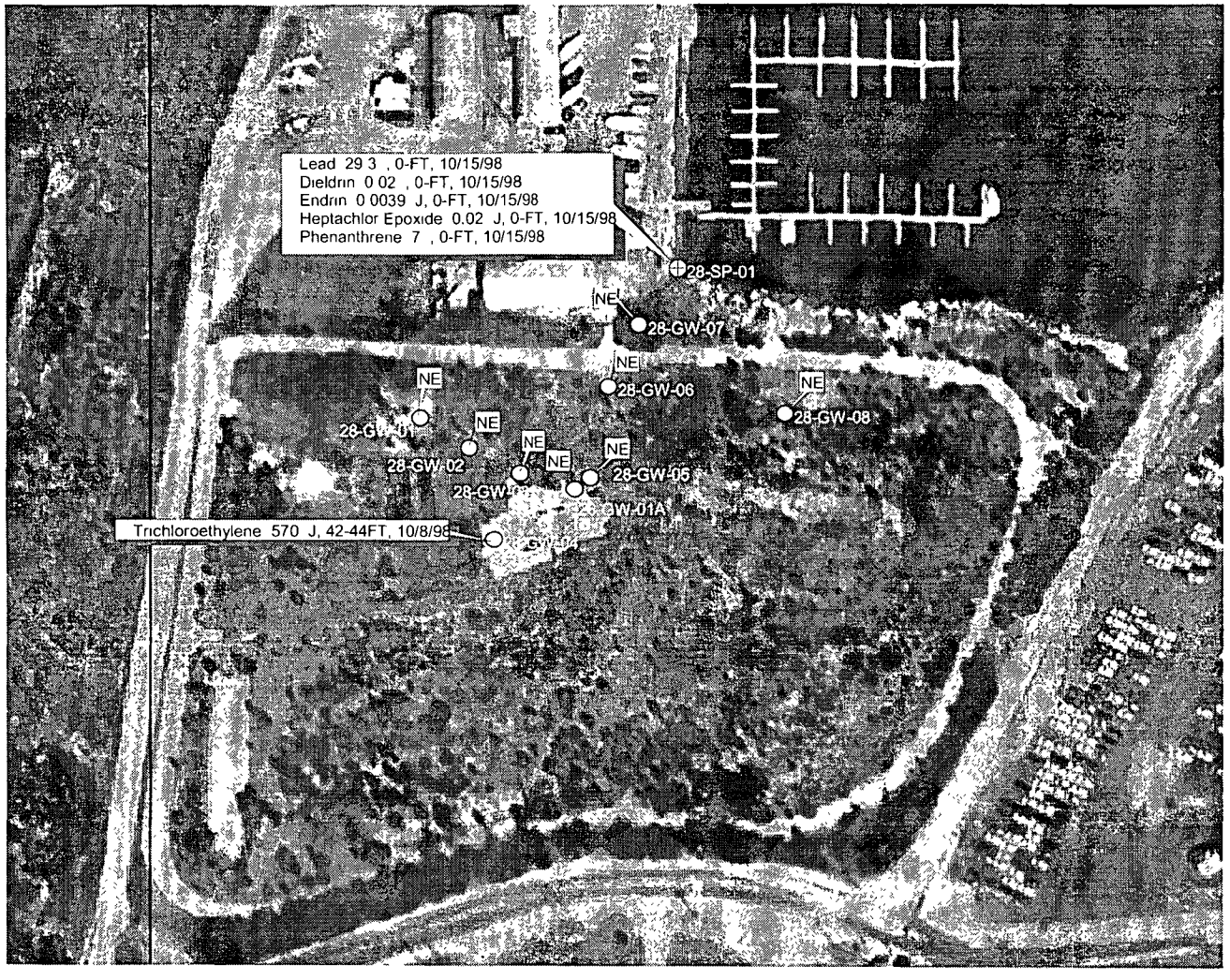
Aerial Photograph, flown 4/11/95
Scale 1:5,400
Rectified by Geofields, Inc.

EA Engineering, Science, and Technology, Inc.

STUDY AREA 16
NCBC DAVISVILLE

Figure 5-3: Constituents Exceeding RIDEM GB Leachability Criteria in Soil Samples

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
JMC	LCQ	LCQ	JMC	50 0 50 100 Feet	07 MAY 99	29600.60	CTO60.apr



N
W E
S

LEGEND:

= Ground-water sampling location

=Seep sampling location

Notes:
Displayed values reported as: Analyte, data and qualifier, sample depth, sample date (concentration units = ug/L)

NE = Not Exceeded

Sample data for Phase II EBS, Phase II EBS Follow-On, and Phase II EBS Follow-On Addendum II investigations

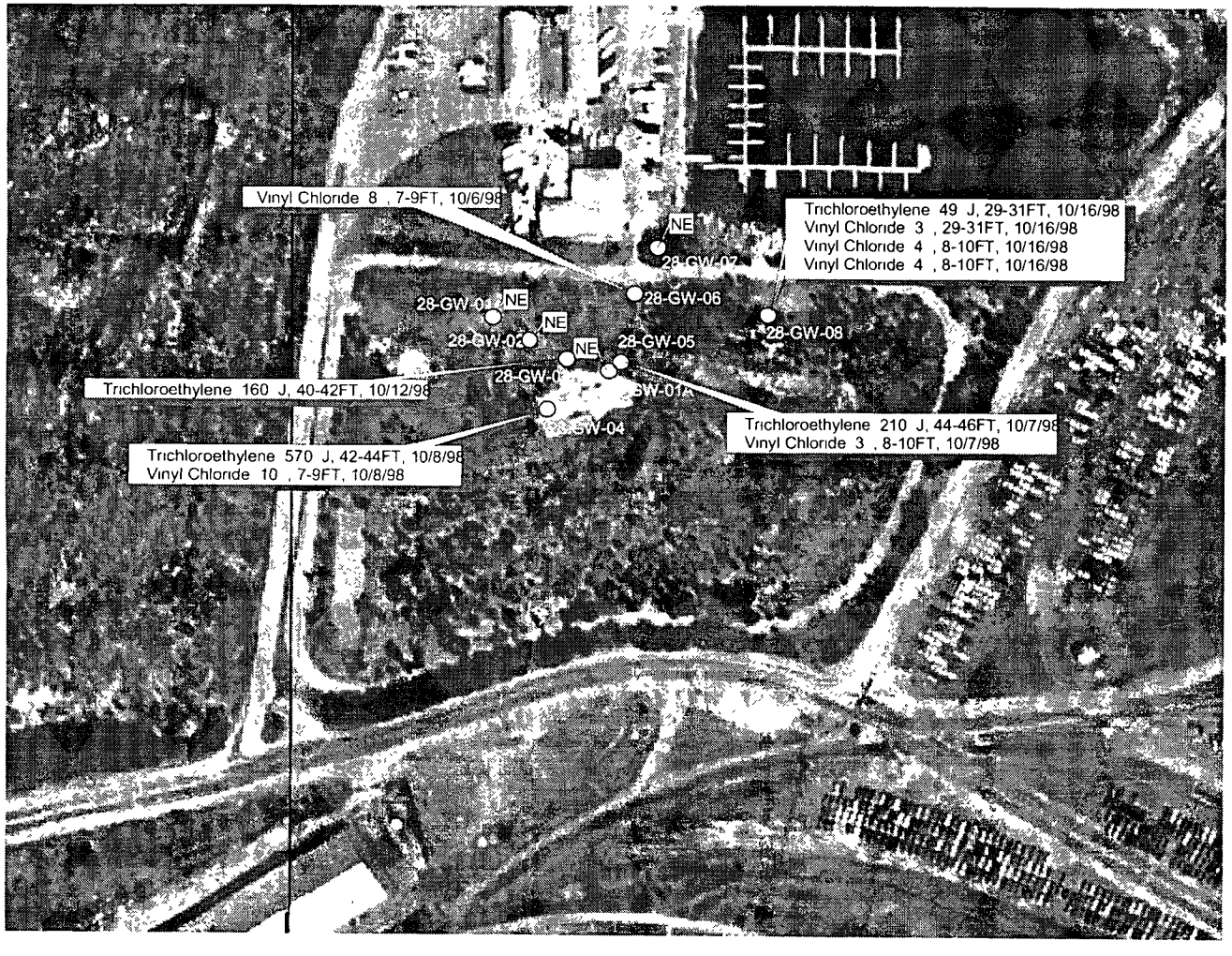
Aerial Photograph, flown 4/11/95
Scale 1:5,400
Rectified by Geofields, Inc.

EA Engineering, Science, and Technology, Inc.

STUDY AREA 16
NCBC DAVISVILLE

Figure 5-4: Constituents Exceeding RIDEM GB Objectives in Ground-water Samples and AWQC in Seep Samples

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
JMC	LCQ	LCQ	JMC	60 0 60 120 Feet	047MAY 99	29600.60	CTO60.apr



N
W E
S

LEGEND:

= Ground-water sampling location

Notes:

Displayed values reported as: Analyte, data and qualifier, sample depth, sample date (concentration units = ug/L)

NE = Not Exceeded

Sample data for Phase II EBS, Phase II EBS Follow-On, and Phase II EBS Follow-On Addendum II investigations

Aerial Photograph, flown 4/11/95
Scale 1:5,400
Rectified by Geofields, Inc.

EA Engineering, Science, and Technology, Inc.

STUDY AREA 16
NCBC DAVISVILLE

Figure 5-5: Constituents Exceeding Federal MCL in Ground-water samples

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
JMC	LCQ	LCQ	JMC	90 0 90 180 Feet	05 MAY 99	29600.60	CTO60.apr

APPENDIX B
STAGE I
SEISMIC REFRACTION GEOPHYSICAL INVESTIGATION
Report from Geophysics GPR International Inc. 2000

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SEISMIC REFRACTION INVESTIGATION

SITE 16, FORMER NCBC FACILITY

DAVISVILLE, RHODE ISLAND

Presented to:

EA ENGINEERING, SCIENCE, AND TECHNOLOGY
175 Middlesex Turnpike Third Floor
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Presented by:

GEOPHYSICS GPR INTERNATIONAL, INC.
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February 4, 2000

GPR No. B99283
EA Ref. No. 29600 94

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Seismic Profiles
Tabulation of Results: Layer Thicknesses, Depths, Elevations, and Seismic Velocities
Seismic Refraction Method

1.0 INTRODUCTION

Geophysics GPR International, Inc., under a directive of EA Engineering, Science and Technology, Inc. (EA), performed a geophysical investigation at Site 16 of the former NCBC Davisville facility, North Kingstown, Rhode Island. This task was set out in our proposal SB99712, dated December 1, 1999.

The seismic refraction survey was conducted December 13 – 18, 1999, within the specified area. The primary objective of this geophysical survey was to determine depths and seismic velocities of bedrock and other subsurface features, to aid in the geologic characterization of the site.

2.0 SITE AND AREA CONDITIONS

Site 16 is located in the northerly portion of North Kingstown; the site is bounded on the south by Davisville Road, on the east by Allen Harbor (Spink Neck) Road, on the west by Westcott Road, and on the north by Allen Harbor. With the exception of two asphalt paved areas and a circumferential roadway, the investigated area is largely overgrown and required extensive brush clearing prior to the survey. Past modifications of the site terrain include bulldozed areas, built up earth ramp structures, and large boulders used to stabilize the embankment at the edge of Allen Harbor. The water table across the investigated area ranges from about five to ten or eleven feet below ground surface (BGS), decreasing in depth toward Allen Harbor.

3.0 SITE GEOLOGY

Overburden at this site consists of fine-grained glacial deposits including sand, silts, and clay overlying bedrock. This information was taken from soil cross sections and boring logs provided by EA.

4.0 METHODS OF INVESTIGATION

4.1 Seismic Refraction Survey

A 24-channel digital seismograph was used and set up in the seismic refraction mode using 20-foot geophone spacings. The refraction traverses were performed with five to seven energy points (shots) along each spread for our quality control of field data collection: forward and reverse offset (far) shots, end shots, a center shot, and quarter shots. A minimum two geophone overlap was laid out for contiguous spreads. In most instances line overlaps were more extensive, providing greater data redundancy.

The offset (far) shots allow detailed calculation of the profile and velocity of the bedrock, while the shots within the spread provide information on the lateral variation in the velocity of the overburden, which is required to determine the depth to bedrock (see Appendix). Due to site

constraints, it was impossible to shoot many of the normal far shots.

5.0 DATA ACQUISITION

5.1 Equipment

An ABEM Terraloc Mark 6 seismograph was used for this investigation. Amplification of the signals from the geophones is accomplished using integrated floating point technology, which allows maximum trace size throughout the record. Each seismogram is recorded digitally on the seismograph hard drive and transferred to floppy disks. When higher ambient noise levels were encountered, the noise was overcome by stacking and filtering of the seismic records. This proved to be particularly important at this site due to heavy nearby truck and auto traffic. An 8-gauge Betsy Seisgun was employed as the energy source.

5.2 Survey Procedures

Traverses were flagged and cleared according to the specified configuration prior to the commencement of the survey. Minor adjustments were made to accommodate site constraints such as earth ramp structures, etc. Specific traverse lengths were reached by varying line overlaps.

Differential surface elevation levelling was performed by GPR at the conclusion of each segment of refraction data acquisition using a transit level, measuring tape, and stadia rod to determine line positions and to make corrections to the seismic data.

Approximately 3,480 linear feet of seismic refraction profiling was accomplished along the specified traverses. The seismic surveys were performed at the specified locations and modified in the field, as required, to conform to the specified objectives. Information provided by relevant boring logs and cross sections was integrated into the final geophysical interpretation.

5.3 Interpretation and Accuracy

Qualitative, preliminary interpretation of selected lines was performed on-site as a quality control measure. Detailed processing and interpretation was accomplished in the office and included cross correlation. The results were also correlated with relevant cross section and soil boring information at the time of the interpretation.

Interpretation of the seismic refraction data was accomplished using the Hawkins method, and double-checked by the crossover distance method. The Hawkins Method allows computation of depths at every geophone. This method provides information on thickness of various sediment layers, depth to bedrock, and rock quality. It is based on closure times from the inner

shots, and calculates true rock velocities using the apparent velocities computed from the outer shots. The critical distance method calculates bedrock depths at shot points only. The concurrent use of both interpretive methods provides an important means of checking the validity of the interpretation.

Generally, the seismic refraction method allows determination of bedrock depths with a precision of 10% or better for depths greater than 30 feet, and ±3 feet for depths less than 30 feet. Bedrock velocities can be determined with a precision of ±3% - 5%. Due to site constraints it was impossible to complete far shots on many lines. Due to this limitation depths and velocities of bedrock at the ends of the lines without far shots were determined by extrapolation. These depths are represented on the profiles by dashed lines, and velocities are shown in parenthesis. Bedrock depths with a precision of 20 – 25% can be expected in these areas. Calibration with boring data will increase the precision to within normal limits.

6.0 RESULTS

6.1 Discussion of Results

The results of the seismic refraction surveys are presented as profile cross-sections, and tabulations of depths, elevations, thicknesses and seismic velocities of subsurface layers (see Appendix). Overburden seismic velocities at this site are generally indicative of relatively dry, fine grained material (1500 ft/s) overlying water saturated material (5000 ft/s). The velocities of the bedrock are in distinct contrast to the overlying deposits.

The typical velocities for relatively sound unweathered metamorphic rock in southern New England range from 12,000 to 15,500 ft/s, and for well weathered and/or fractured rock from 8,000 to 10,500 ft/s (below the water saturated zone).

Bedrock seismic velocities do provide information concerning the degree to which bedrock is weathered, fractured and, for metamorphic rocks, foliated. In general, higher velocities indicate hard, massive bedrock, while lower velocities are often associated with rock that is less solid and more weathered and fractured.

Within a foliated rock unit, such as schist and gneiss, seismic velocities may be higher when seismic lines are oriented parallel to the strike of the foliation, and lower when seismic lines are oriented obliquely or perpendicular to the strike. This is called anisotropy and can account for different velocities within the same interval where cross lines meet. This phenomenon is clearly seen at the intersection of seismic lines SL-2 and SL-4 where an anomalous zone was observed.

6.2 Seismic Lines

The following discussion summarizes characteristics of the five seismic profiles.

Seismic Line-1

Seismic Line-1, south to north 640 feet in length, starts near the intersection of Davisville and Westcott Roads, and runs approximately parallel to Westcott Road.

The bedrock surface, from south to north, starts at a depth of about 50 feet BGS, and with some variation, is inclined more or less upward over its entire length, terminating at a depth of about 27 feet. The bedrock depths show a good correlation with cross lines SL-2, 3, and 4.

This profile shows moderate bedrock velocities (13,500-15,500 ft/s) indicative of sound, unweathered bedrock. The degree of precision for the major portion of this line set is moderate to high, and fair to moderate near Davisville Road, where an off end shot was not possible.

Seismic Line-2

Seismic Line-2, northeast to southwest and 800 feet in length starts near the edge of Allen Harbor, traverses the site obliquely, and terminates at the edge of Westcott Road.

The bedrock surface, from northeast to southwest, starts at a depth of about 79 feet BGS, and slopes generally upward to a depth of 35 feet at chainage 5+00, then slopes downward to about 46 feet at 6+80, maintaining this approximate depth over the rest of the line. The bedrock depths show good correlation with borings PGU-Z3-09.

This profile shows moderate bedrock velocities (12,000 – 15,000 ft/s) indicative of sound, unweathered bedrock. A notable feature is a low bedrock velocity zone (8,000 ft/s) located from chainage 2+00 to 2+60. This zone corresponds to a similar low velocity zone on Seismic Line 4. This may indicate the presence of a fracture or shear zone. The degree of precision for this line set is moderate to high, except at the northeasterly end of the line where no farshot could be made.

Seismic Line-3

Seismic Line-3, west to east and 760 feet in length begins near the center of Westcott Road and terminates near the westerly edge of Spink Neck Road.

The bedrock surface, from west to east, starts at a depth of about 44 feet BGS, and is inclined generally downward with minor variations to a depth of about 61 feet BGS at the end of the traverse at 7+60.

This profile shows moderate and relatively consistent bedrock velocities (13,200 – 13,700 ft/s) indicative of sound, unweathered bedrock. The degree of precision for this line set is moderate to high, except at the easterly end of the line where no farshot could be made.

Seismic Line-4

Seismic Line-4, west to east and 760 feet in length starts near the center of the unnamed perimeter road next to Westcott Road, and terminates near the westerly edge of Spink Neck Road.

The bedrock surface, from west to east, starts at a depth of about 34 feet BGS, is inclined downward to about 58 feet at chainage 3+00, then slopes upward to 49 feet BGS at 4+75, and continues with about 5 feet of variation (51 – 55 feet BGS) for the remainder of the traverse.

This profile shows moderate bedrock velocities (12,500 to 15,300 ft/s) indicative of relatively sound, unweathered bedrock, with the exception of a low velocity zone (10,500 ft/s) from chainage 2+00 to 3+20. This low velocity zone corresponds to a similar zone noted on Seismic Line-2, which intersects Line-4 in this location. This velocity may indicate the presence of a fracture or shear zone in the bedrock. The degree of precision for this line set is moderate to high, except at the easterly end where no farshot could be made.

Seismic Line-5

Seismic Line-5, south to north and 520 feet in length begins near the intersection of Spink Neck Road and Davisville Road, and terminate north of the perimeter road, near Allen Harbor.

The bedrock surface, from south to north, starts at a depth of about 62 feet BGS, is more or less horizontal over the entire length of the traverse, varying between 62 and 54 feet.

This profile shows moderate bedrock velocities (13,300 ft/s) indicative of moderately sound bedrock. The degree of precision for this line set is moderate to high, except at the northerly end, where no far shot was possible.

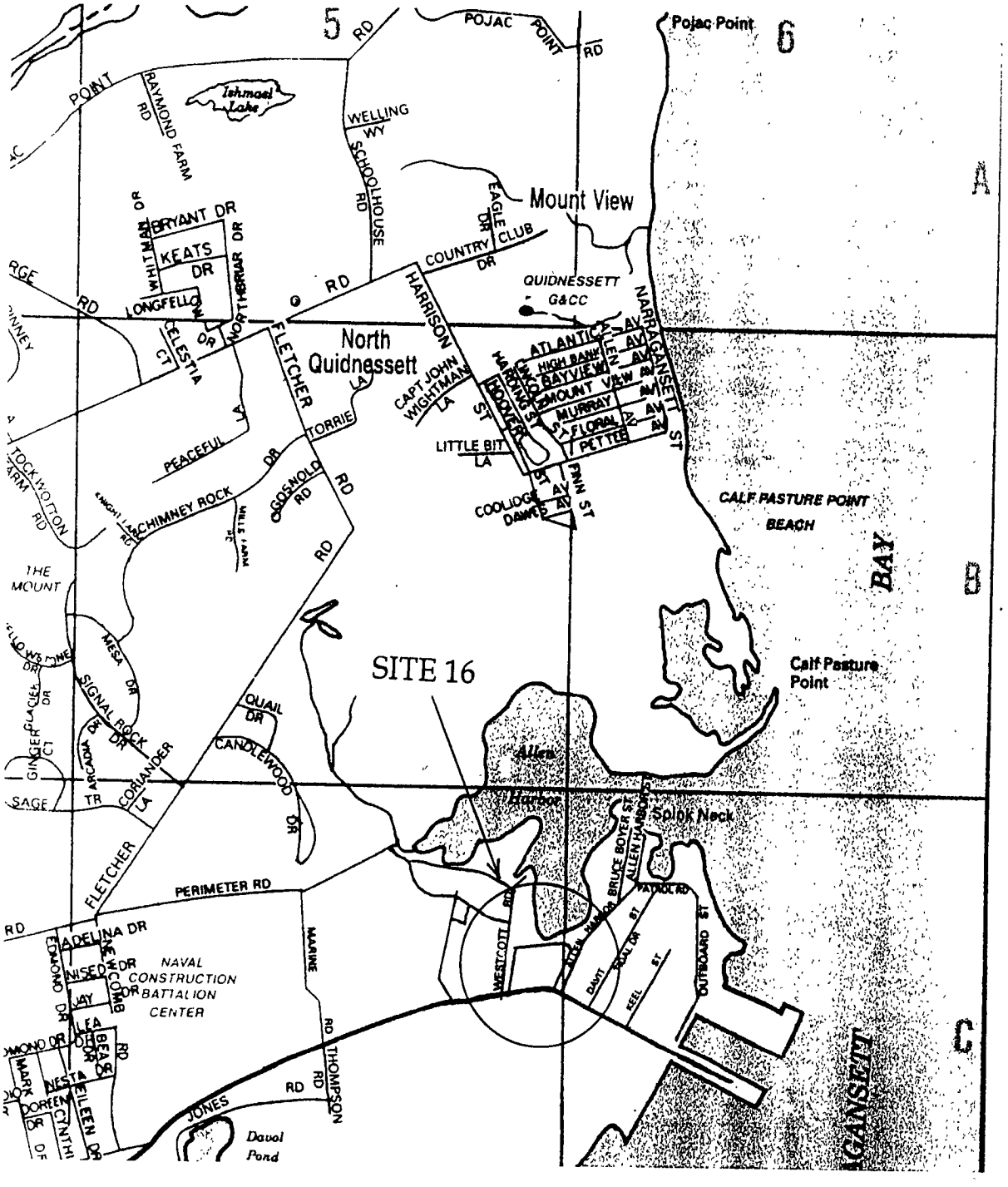
7.0 CONCLUSIONS

- The objectives for the seismic investigation were to define depths to the bedrock surface and other detectable interfaces, and to determine bedrock seismic velocities. The seismic method consistently detected bedrock, bedrock velocities, and the top of the water saturated overburden within the investigated area.

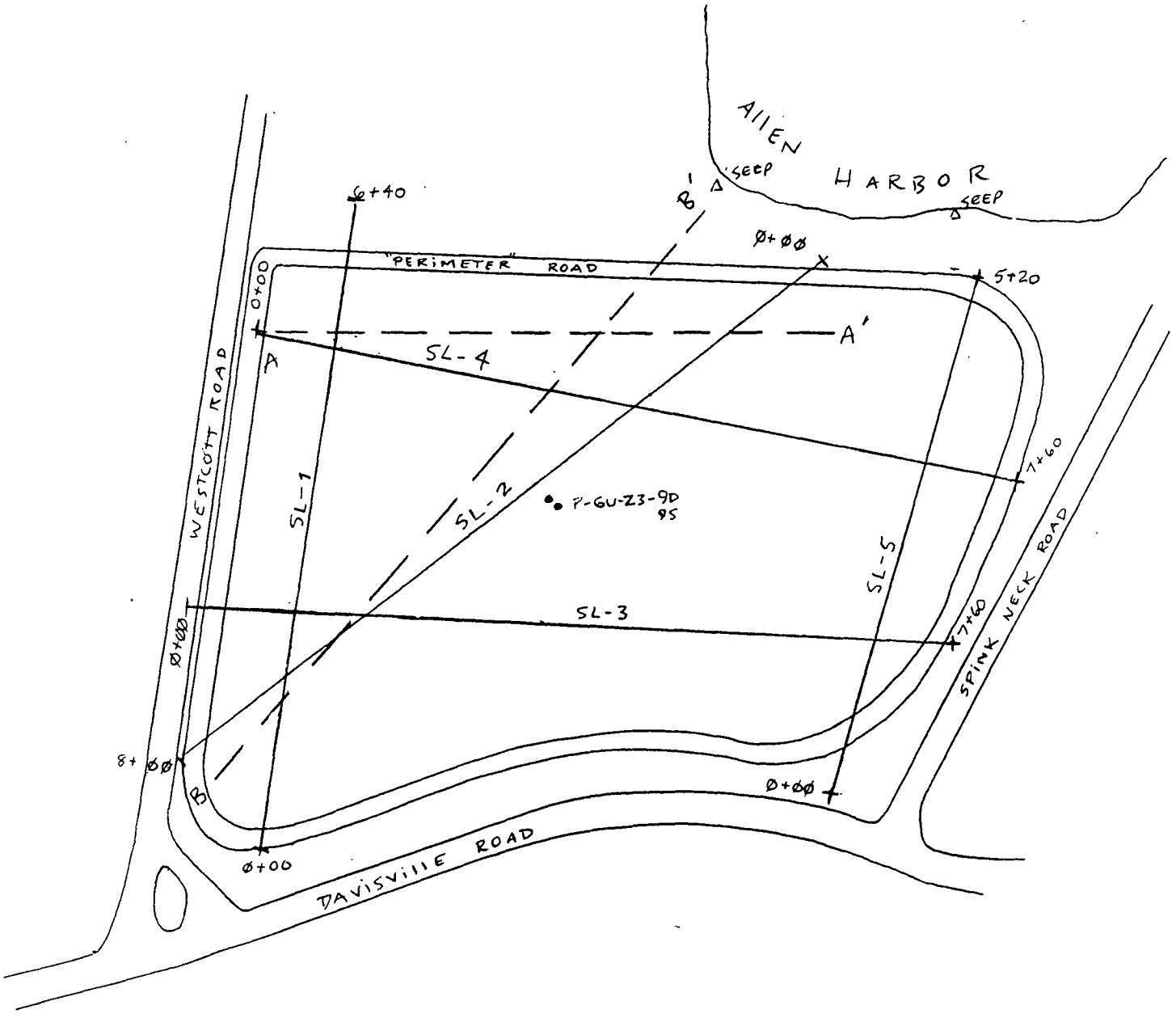
- The interpreted bedrock depths range from 27 feet to as much as 77 feet BGS. Bedrock

seismic velocities suggest relatively sound, unweathered rock over most of the site.

- A depression in the bedrock surface occurs near the intersection of seismic lines 2 and 4; the depression deepens to the northeast, toward Allen Harbor. A low bedrock velocity zone (8000 – 10, 500 ft/s) occurs approximately at the intersection of seismic lines 2 and 4, suggesting a possible fracture or shear zone in the bedrock. The correlation of this zone with the depression in the bedrock mentioned above suggests a site for further investigation.



PROJ #	TITLE		
B99283	SITE LOCUS MAP		
DRAWN BY	CLIENT		
M. Kick	EA Engineering, Science, and Technology		
CHECKED BY	PROJECT		
	SITE 16, FORMER NCBC FACILITY DAVISVILLE, RHODE ISLAND		
APPROVED BY	DRAWING DATE	SCALE	Figure No. 1
	01/07/00	1" = 1.8 MILES	

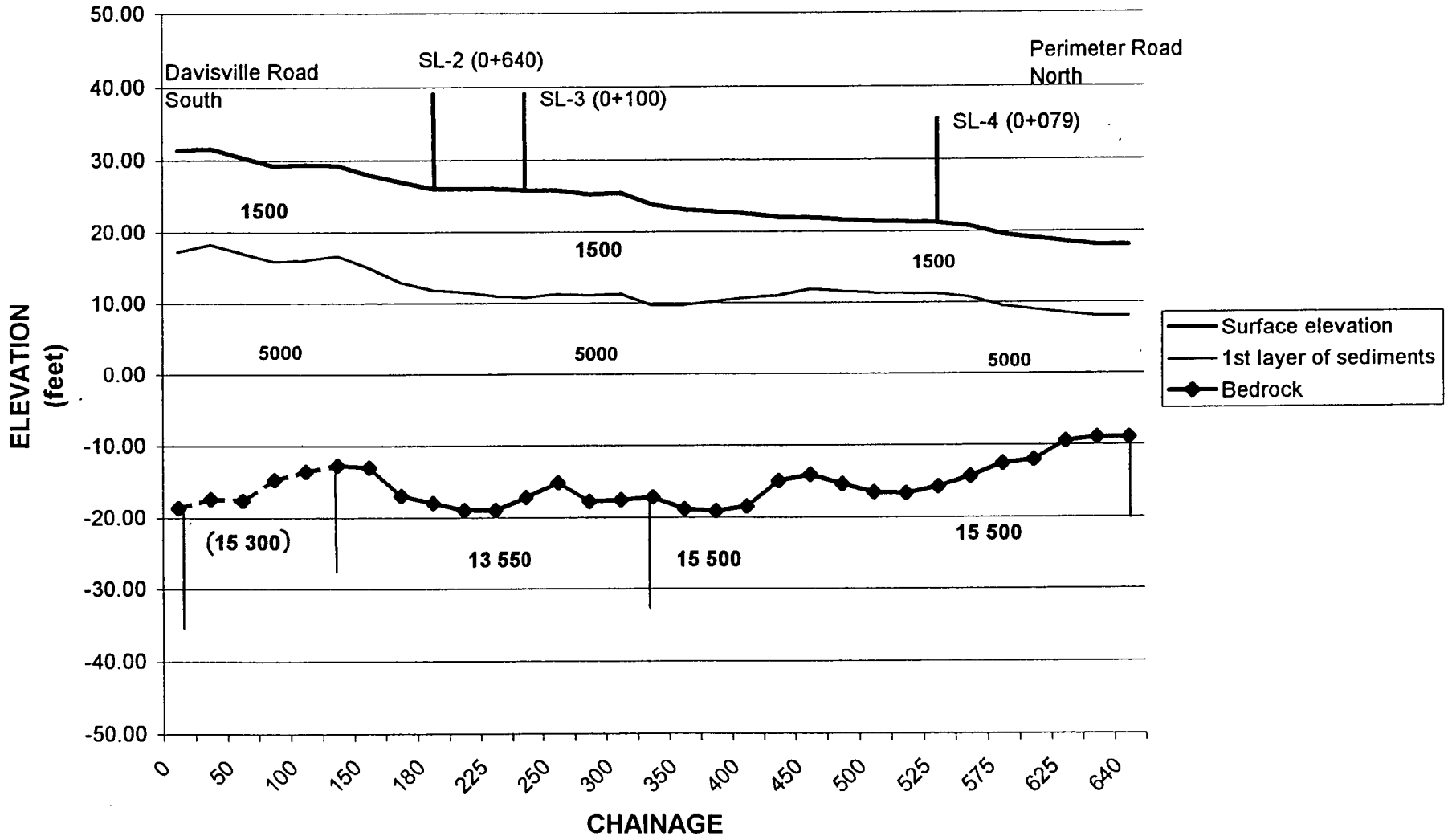


PROJ. # B99283	TITLE SEISMIC LINE LOCATION MAP		
DRAWN BY M. Kick	CLIENT EA Engineering, Science, and Technology		
CHECKED BY	PROJECT SITE 16, FORMER NCBC FACILITY DAVISVILLE, RHODE ISLAND		
APPROVED BY	DRAWING DATE 01/07/00	SCALE 1" = 150'	Figure No. 2

APPENDIX

FORMER NCBC DAVISVILLE FACILITY
SEISMIC REFRACTION SURVEY 1999

SEISMIC LINE SL-1-99



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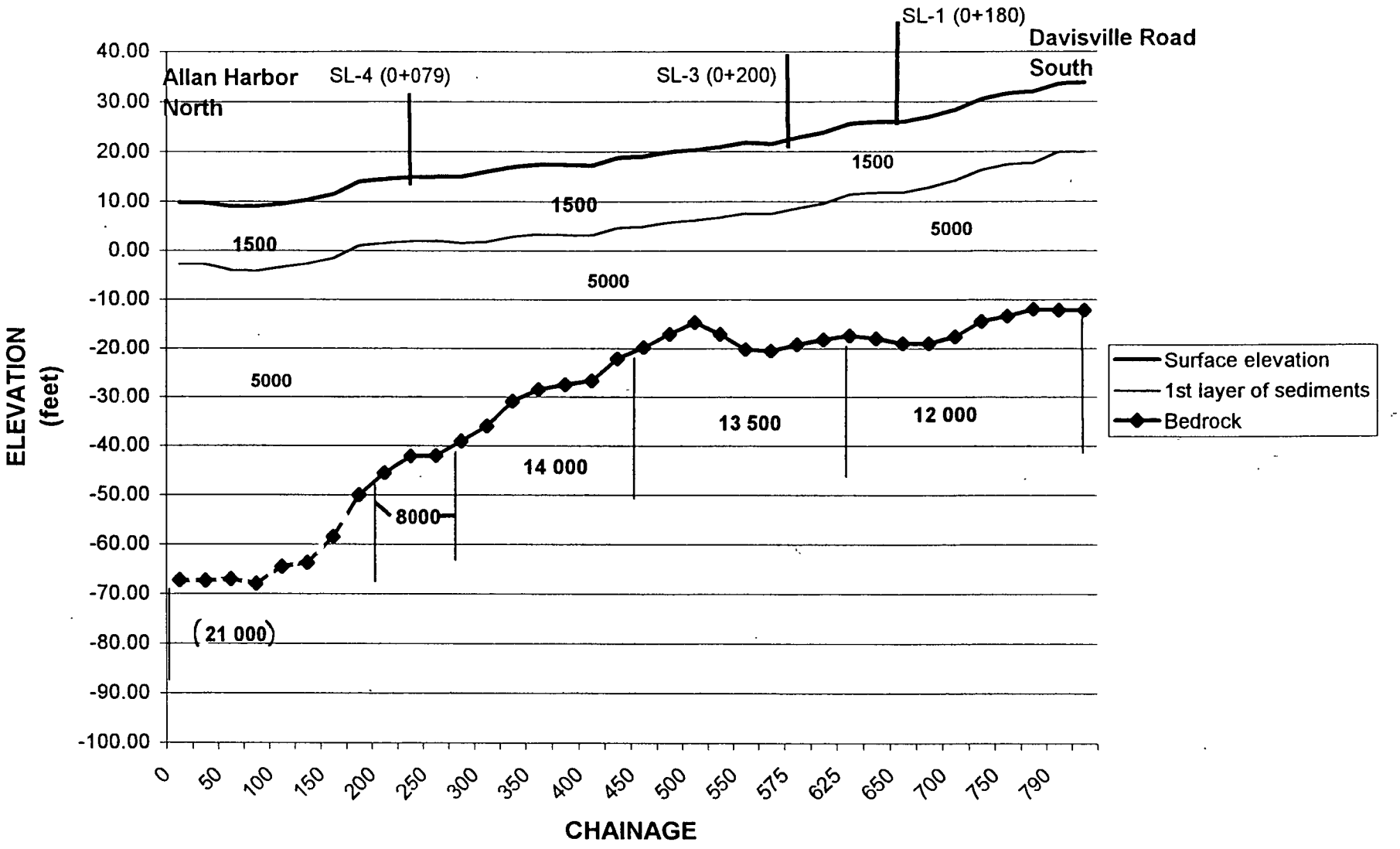
B-99283

1/13/00

SL-1-99 BEDROCK PROFILE

FORMER NCBC D[illegible]SVILLE FACILITY
SEISMIC REFRACTION SURVEY 1999

SEISMIC LINE SL-2-99



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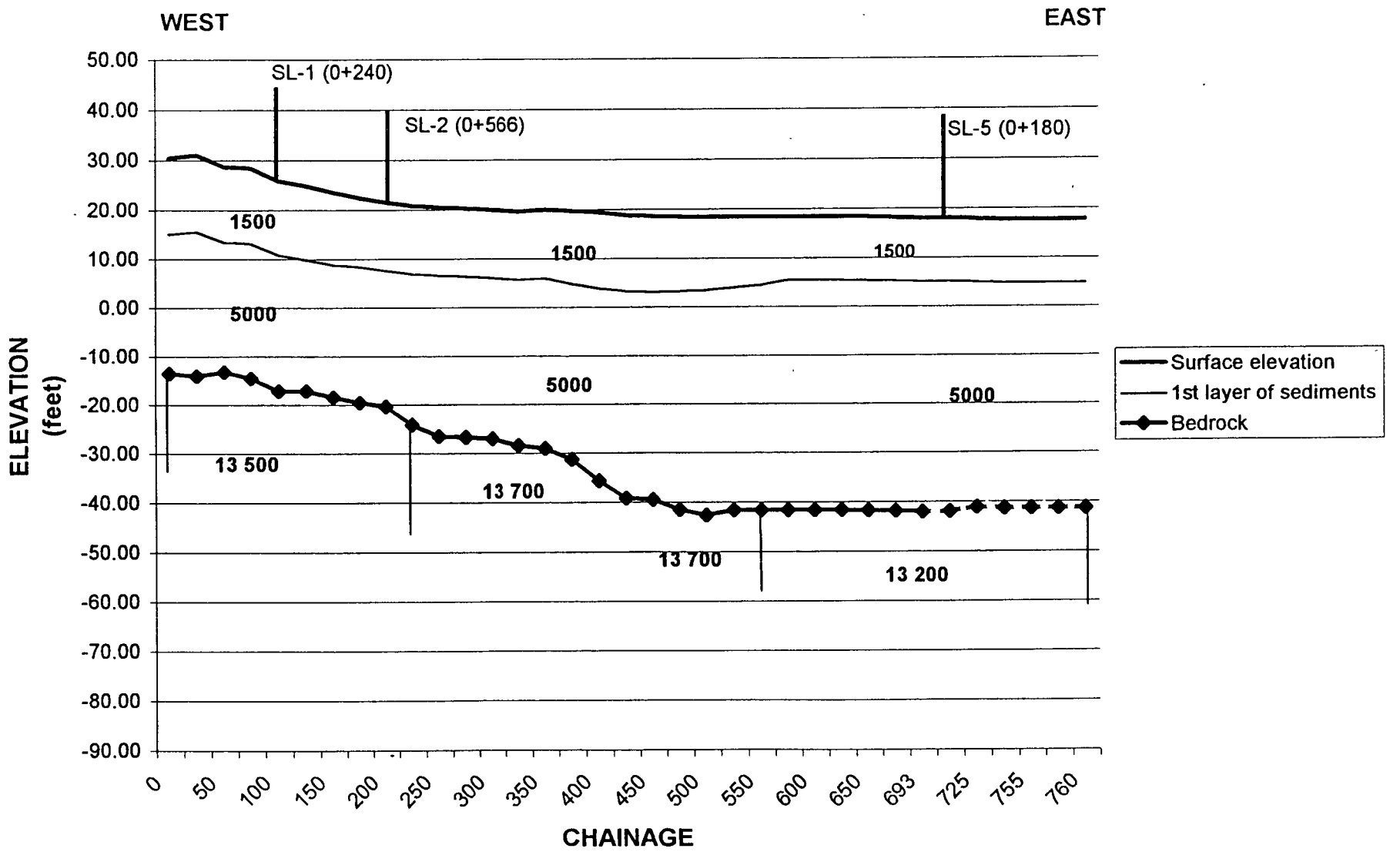
1/13/00

SL-2-99 BEDROCK PROFILE

FORMER NCBC DAVISVILLE FACILITY
SEISMIC REFRACTION SURVEY 1999

SEISMIC LINE SL-3-99



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B-99283

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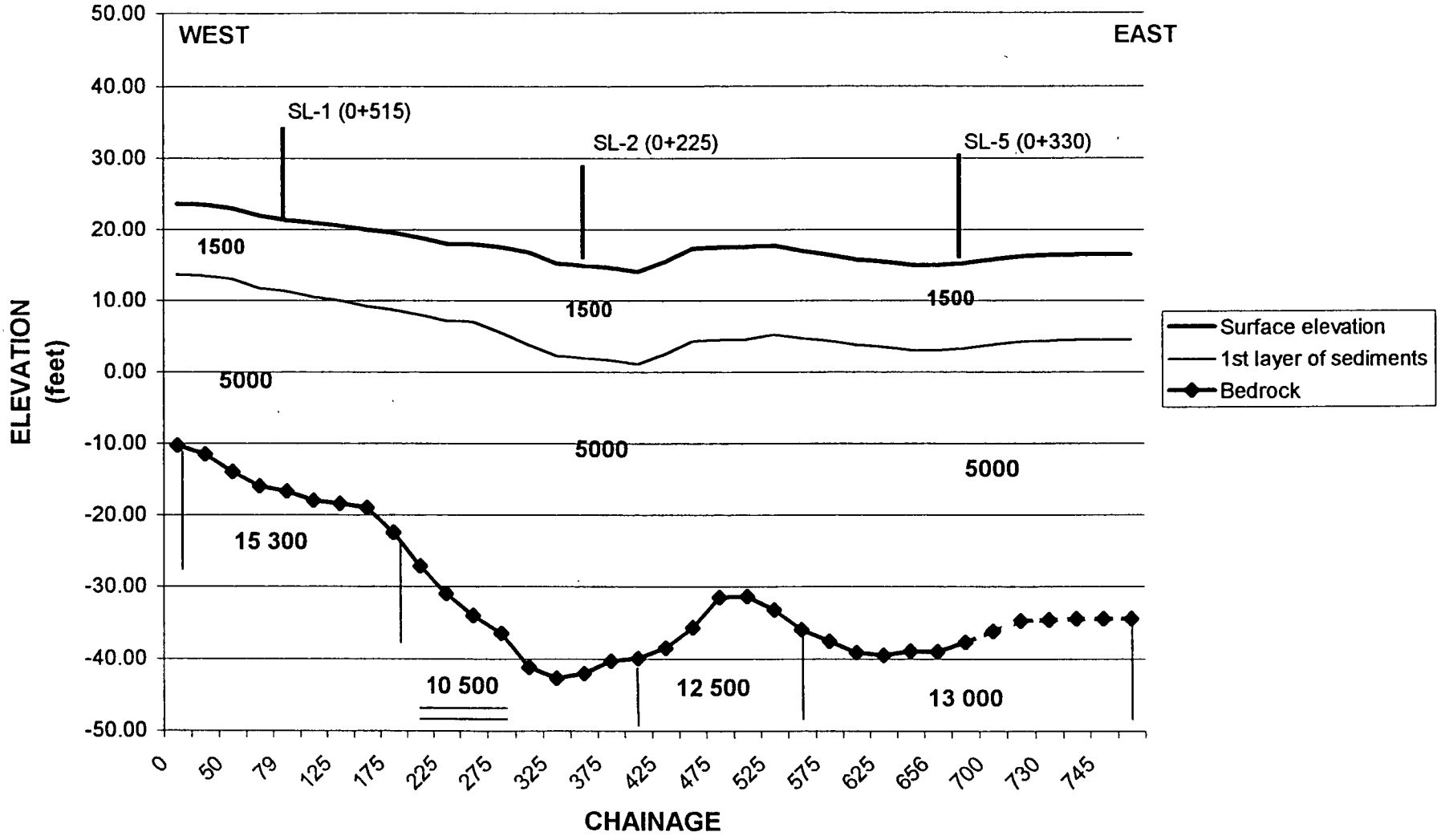
SL-3-99 BEDROCK PROFILE

FORMER NCBC ISVILLE FACILITY
SEISMIC REFRACTION SURVEY 1999

SEISMIC LINE SL-4-99



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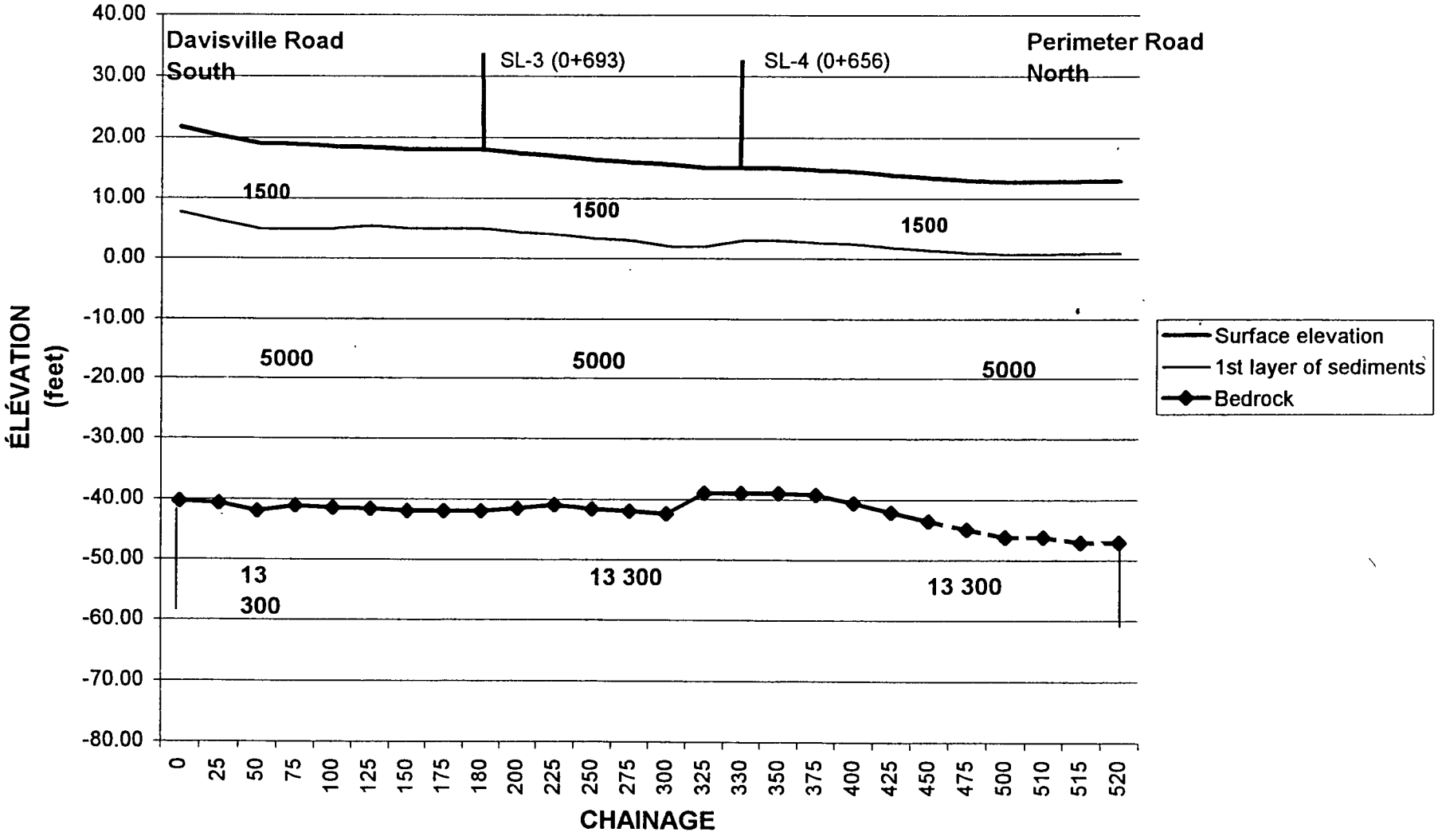
B-99283

1/26/00

SL-4-99 BEDROCK PROFILE

FORMER NCBC DAVISVILLE FACILITY
SEISMIC REFRACTION SURVEY 1999

SEISMIC LINE SL-5-99



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B-99283

1/13/00

SL-5-99 BEDROCK PROFILE

FORMER NCBC DAVISVILLE FACILITY
SEISMIC REFRACTION SURVEY 1999

SITE 16, FORMER NCBC DAVISVILLE FACILITY
SEISMIC REFRACTION RESULTS

SEISMIC LINE SL-1- 99

CHAINAGE	ELEVATION (feet)	Thickness of the 1st layer (feet)	Thickness of the 2nd layer (feet)	Bedrock depth (feet)	Seismic velocity of the 1st layer V1 (feet/sec)	Seismic velocity of the 2nd layer V2 (feet/sec)	Seismic velocity of bedrock Vr (feet/sec)
0+000	31.35	14.2	35.9	50.0	1500	5000	15300
0+025	31.58	13.4	35.6	49.0	1500	5000	15300
0+050	30.38	13.4	34.6	48.0	1500	5000	15300
0+075	29.23	13.4	30.6	44.0	1500	5000	15300
0+100	29.42	13.4	29.6	43.0	1500	5000	15300
0+125	29.25	12.6	29.4	42.0	1500	5000	15300
0+150	28.00	13.0	28.0	41.0	1500	5000	13500
0+175	27.00	14.1	29.9	44.0	1500	5000	13500
0+180	26.00	14.2	29.8	44.0	1500	5000	13500*
0+200	26.00	14.5	30.5	45.0	1500	5000	13500
0+225	26.00	15.0	30.0	45.0	1500	5000	13500
0+240	25.81	15.0	28.0	43.0	1500	5000	13500
0+250	25.80	14.5	26.5	41.0	1500	5000	13500
0+275	25.20	14.2	28.9	43.0	1500	5000	13500
0+300	25.42	14.2	28.9	43.0	1500	5000	13500
0+325	23.80	14.2	26.9	41.0	1500	5000	13500
0+350	23.10	13.4	28.6	42.0	1500	5000	15500
0+375	22.80	12.6	29.4	42.0	1500	5000	15500
0+400	22.50	11.8	29.2	41.0	1500	5000	15500
0+425	22.00	11.0	26.0	37.0	1500	5000	15500
0+450	21.88	10.0	26.0	36.0	1500	5000	15500
0+475	21.60	10.0	27.0	37.0	1500	5000	15500
0+500	21.40	10.0	28.0	38.0	1500	5000	15500
0+515	21.30	10.0	28.0	38.0	1500	5000	15500
0+525	21.20	10.0	27.0	37.0	1500	5000	15500
0+550	20.70	10.0	25.0	35.0	1500	5000	15500
0+575	19.50	10.0	22.0	32.0	1500	5000	15500
0+600	19.00	10.0	21.0	31.0	1500	5000	15500
0+625	18.50	10.0	18.0	28.0	1500	5000	15500
0+640	18.04	10.0	17.0	27.0	1500	5000	15500

SITE 16, FORMER NCBC DAVISVILLE FACILITY
SEISMIC REFRACTION RESULTS

SEISMIC LINE SL- 2 - 99

CHAINAGE	ELEVATION (feet)	Thickness of the 1st layer (feet)	Thickness of the 2nd layer (feet)	Bedrock depth (feet)	Seismic velocity of the 1st layer V1 (feet/sec)	Seismic velocity of the 2nd layer V2 (feet/sec)	Seismic velocity of bedrock Vr (feet/sec)
0+000	9.75	12.6	64.4	77.0	1500	5000	21000
0+025	9.70	12.6	64.4	77.0	1500	5000	21000
0+050	8.95	13.0	63.0	76.0	1500	5000	21000
0+075	9.00	13.3	63.7	77.0	1500	5000	21000
0+100	9.50	13.0	61.0	74.0	1500	5000	21000
0+125	10.24	13.0	61.0	74.0	1500	5000	21000
0+150	11.50	13.0	57.0	70.0	1500	5000	21000
0+175	14.00	13.0	51.0	64.0	1500	5000	21000
0+200	14.50	13.0	47.0	60.0	1500	5000	8000
0+225	14.91	13.0	44.0	57.0	1500	5000	8000
0+250	15.00	13.0	44.0	57.0	1500	5000	8000
0+275	15.00	13.5	40.5	54.0	1500	5000	14000
0+300	16.00	14.2	37.8	52.0	1500	5000	14000
0+325	17.00	14.2	33.8	48.0	1500	5000	14000
0+350	17.49	14.2	31.8	46.0	1500	5000	14000
0+375	17.44	14.2	30.8	45.0	1500	5000	14000
0+400	17.30	14.2	29.8	44.0	1500	5000	14000
0+425	18.80	14.2	26.8	41.0	1500	5000	14000
0+450	19.11	14.2	24.8	39.0	1500	5000	15500
0+475	19.90	14.2	22.8	37.0	1500	5000	15500
0+500	20.30	14.2	20.8	35.0	1500	5000	15500
0+525	20.90	14.2	23.8	38.0	1500	5000	15500
0+550	21.80	14.2	27.8	42.0	1500	5000	15500
0+556	21.50	14.0	28.0	42.0	1500	5000	15500
0+575	22.77	14.2	27.8	42.0	1500	5000	15500
0+600	23.80	14.2	27.8	42.0	1500	5000	15500
0+625	25.58	14.2	28.8	43.0	1500	5000	12000
0+640	26.00	14.2	29.8	44.0	1500	5000	12000
0+650	26.00	14.2	30.8	45.0	1500	5000	12000
0+675	27.00	14.2	31.8	46.0	1500	5000	12000
0+700	28.38	14.2	31.8	46.0	1500	5000	12000
0+725	30.50	14.2	30.8	45.0	1500	5000	12000
0+750	31.61	14.2	30.8	45.0	1500	5000	12000
0+775	32.00	14.2	29.8	44.0	1500	5000	12000
0+800	33.85	14.0	32.0	46.0	1500	5000	12000

SITE 16, FORMER NCBC DAVISVILLE FACILITY
SEISMIC REFRACTION RESULTS

SEISMIC LINE SL- 3 - 99

CHAINAGE	ELEVATION (feet)	Thickness of the 1st layer (feet)	Thickness of the 2nd layer (feet)	Bedrock depth (feet)	Seismic velocity of the 1st layer V1 (feet/sec)	Seismic velocity of the 2nd layer V2 (feet/sec)	Seismic velocity of bedrock Vr (feet/sec)
0+000	30 44	15.4	28.6	44.0	1500	6000	13500
0+025	30.95	15.4	29.6	45.0	1500	6000	13500
0+050	28.69	15.3	26.7	42.0	1500	6000	13500
0+075	28 40	15.3	27.7	43.0	1500	6000	13500
0+100	25 81	15.0	28 0	43.0	1500	6000	13500
0+125	24 78	15.0	27.0	42.0	1500	6000	13500
0+150	23.50	14.7	27.3	42.0	1500	6000	13500
0+175	22.40	14.0	28.0	42.0	1500	6000	13500
0+200	21.50	14.0	28.0	42.0	1500	6000	13500
0+225	20.83	14.0	31.0	45 0	1500	5600	13700
0+250	20.50	14.0	33.0	47.0	1500	5600	13700
0+275	20.30	14.0	33.0	47.0	1500	5600	13700
0+300	20.00	14.0	33.0	47.0	1500	5600	13700
0+325	19.58	14.0	34.0	48.0	1500	5600	13700
0+350	19 94	14.0	35.0	49.0	1500	5600	13700
0+375	19.70	15.0	36.0	51.0	1500	5600	13700
0+400	19.40	15.6	39.4	55.0	1500	5600	13700
0+425	18.80	15.6	42.4	58.0	1500	5600	13700
0+450	18 57	15.6	42 4	58.0	1500	5600	13700
0+475	18.50	15.3	44.7	60.0	1500	5600	13700
0+500	18.40	15.0	46.0	61.0	1500	5600	13700
0+525	18.43	14.5	45.5	60.0	1500	5600	13700
0+550	18.40	14.0	46.0	60.0	1500	5600	13200
0+575	18.40	13 0	47 0	60.0	1500	5600	13200
0+600	18.40	13.0	47.0	60.0	1500	5600	13200
0+625	18 39	13.0	47.0	60.0	1500	5600	13200
0+650	18.34	13.0	47.0	60.0	1500	5500	13200
0+675	18.20	13.0	47.0	60.0	1500	5500	13200
0+693	18.00	13.0	47.0	60.0	1500	5500	13200
0+700	18.10	13.0	47.0	60.0	1500	5500	13200
0+725	17.90	13.0	46.0	59.0	1500	5500	13200
0+750	17.70	13.0	46.0	59.0	1500	5500	13200
0+755	17.70	13.0	46.0	59.0	1500	5500	13200
0+760	17 73	13 0	46.0	59.0	1500	5000	13200

SITE 16, FORMER NCBC DAVISVILLE FACILITY
SEISMIC REFRACTION RESULTS

SEISMIC LINE SL- 4 - 99

CHAINAGE	ELEVATION (feet)	Thickness of the 1st layer (feet)	Thickness of the 2nd layer (feet)	Bedrock depth (feet)	Seismic velocity of the 1st layer V1 (feet/sec)	Seismic velocity of the 2nd layer V2 (feet/sec)	Seismic velocity of bedrock Vr (feet/sec)
0+000	23.68	10	24.0	34.0	1500	6000	14000
0+025	23.47	10	25.0	35.0	1500	6000	14000
0+050	23.00	10	27.0	37.0	1500	6000	14000
0+075	22.00	10.3	27.7	38.0	1500	6000	14000
0+079	21.30	10.0	28.0	38.0	1500	6000	14000
0+100	21.00	10.5	28.5	39.0	1500	6000	14000
0+125	20.53	10.5	28.5	39.0	1500	6000	14000
0+150	20.00	10 8	28.2	39.0	1500	6000	14000
0+175	19.50	10.8	31.2	42.0	1500	6000	14000
0+200	18.80	10.8	35.2	46.0	1500	6000	10500
0+225	18.00	10.8	38.2	49.0	1500	5500	10500
0+250	17.93	10.9	41.1	52.0	1500	5500	10500
0+275	17.50	12.0	42.0	54.0	1500	5500	10500
0+300	16.80	13.0	45.0	58.0	1500	5500	10500
0+325	15.30	13.0	45.0	58.0	1500	5500	10500
0+350	14.91	13.0	44.0	57.0	1500	5500	10500
0+375	14.65	13.0	42.0	55.0	1500	5500	10500
0+400	14.06	13.0	41.0	54.0	1500	5500	12500
0+425	15.50	13 0	41.0	54.0	1500	5000	12500
0+450	17.32	13 0	40.0	53.0	1500	5000	12500
0+475	17.50	13.0	36.0	49.0	1500	5000	12500
0+500	17.60	13 0	36.0	49.0	1500	5000	12500
0+525	17.76	12.5	38.5	51.0	1500	5000	13000
0+550	17.00	12 3	40 7	53.0	1500	5000	13000
0+575	16.40	12.0	42.0	54.0	1500	5000	13000
0+600	15.80	12.0	43.0	55.0	1500	5000	13000
0+625	15.50	12.0	43.0	55.0	1500	5000	13000
0+650	15.04	12.0	42.0	54.0	1500	5000	13000
0+656	15.00	12.0	42.0	54.0	1500	5000	13000
0+675	15.30	12.0	41.0	53.0	1500	5000	13000
0+700	15.80	12.0	40.0	52.0	1500	5000	13000
0+725	16.20	12.0	39.0	51.0	1500	5000	13000
0+730	16 40	12.0	39.0	51.0	1500	5000	13000
0+740	16.49	12.0	39.0	51.0	1500	5000	13000
0+750	16.49	12 0	39.0	51.0	1500	5000	13000

SITE 16, FORMER NCBC DAVISVILLE FACILITY
SEISMIC REFRACTION RESULTS

SEISMIC LINE SL- 5 - 99

CHAINAGE	ELEVATION (feet)	Thickness of the 1st layer (feet)	Thickness of the 2nd layer (feet)	Bedrock depth (feet)	Seismic velocity of the 1st layer V1 (feet/sec)	Seismic velocity of the 2nd layer V2 (feet/sec)	Seismic velocity of bedrock Vr (feet/sec)
0+000	21.67	14.0	48.0	62.0	1500	5000	13300
0+025	20.26	14.0	47.0	61.0	1500	5000	13300
0+050	19.00	14.0	47.0	61.0	1500	5000	13300
0+075	18.86	14.0	46.0	60.0	1500	5000	13300
0+100	18.50	13.5	46.5	60.0	1500	5000	13300
0+125	18.36	13.0	47.0	60.0	1500	5000	13300
0+150	18.00	13.0	47.0	60.0	1500	5000	13300
0+175	18.00	13.0	47.0	60.0	1500	5000	13300
0+180	18.00	13.0	47.0	60.0	1500	5000	13300
0+200	17.40	13.0	46.0	59.0	1500	5000	13300
0+225	17.02	13.0	45.0	58.0	1500	5000	13300
0+250	16.39	13.0	45.0	58.0	1500	5000	13300
0+275	16.00	13.0	45.0	58.0	1500	5000	13300
0+300	15.60	13.5	44.5	58.0	1500	5000	13300
0+325	15.00	13.0	41.0	54.0	1500	5000	13300
0+330	15.00	12.0	42.0	54.0	1500	5000	13300
0+350	15.00	12.0	42.0	54.0	1500	5000	13300
0+375	14.70	12.0	42.0	54.0	1500	5000	13300
0+400	14.40	12.0	43.0	55.0	1500	5000	13300
0+425	13.80	12.0	44.0	56.0	1500	5000	13300
0+450	13.40	12.0	45.0	57.0	1500	5000	13300
0+475	13.00	12.0	46.0	58.0	1500	5000	13300
0+500	12.75	12.0	47.0	59.0	1500	5000	13300
0+510	12.75	12.0	47.0	59.0	1500	5000	13300
0+520	12.89	12.0	48.0	60.0	1500	5000	13300

FORMER NCBC DAVISVILLE FACILITY
SEISMIC REFRACTION SURVEY 1999

Elevations

chainage	surface	1st layer	2nd layer	bedrock
0	31.35	17.2	-4 5	-18.65
25	31.58	18.22	-4.06	-17.42
50	30.38	17.02	-4.26	-17 62
75	29.23	15.87	-1.41	-14.77
100	29.42	16.06	-0.22	-13.58
125	29.25	16.65	-0.15	-12.75
150	28.00	15	0	-13.00
175	27.00	12.86	-2.86	-17.00
180	26.00	11.8	-3.8	-18.00
200	26.00	11.5	-4.5	-19.00
225	26.00	11	-4	-19 00
240	25.81	10.81	-2.19	-17.19
250	25.80	11.3	-0.7	-15.20
275	25.20	11.05	-3.65	-17.80
300	25.42	11.27	-3.43	-17.58
325	23.80	9.65	-3.05	-17.20
350	23.10	9.74	-5.54	-18.90
375	22.80	10.22	-6.62	-19.20
400	22.50	10.71	-6.71	-18.50
425	22.00	11	-4	-15.00
450	21.88	11.88	-4.12	-14.12
475	21.60	11.6	-5.4	-15 40
500	21.40	11.4	-6.6	-16.60
515	21.30	11.3	-6 7	-16.70
525	21.20	11.2	-5.8	-15.80
550	20.70	10.7	-4.3	-14.30
575	19.50	9.5	-2.5	-12.50
600	19.00	9	-2	-12.00
625	18.50	8.5	0.5	-9.50
630	18.04	8.04	1.04	-8.96
640	18.00	8.04	1	-8.96

Elevations are based on an elevation of 20.21 feet given for Boring No. P-GU-Z3-9D (top of riser).

FORMER NCBC DAVISVILLE FACILITY
SEISMIC REFRACTION SURVEY 1999

Elevations

chainage	surface	1st layer	2nd layer	bedrock
0	9.75	-2.85	-54.65	-67.25
25	9.70	-2.9	-54.7	-67.30
50	8.95	-4.05	-54.05	-67.05
75	9.00	-4.3	-54 7	-68.00
100	9.50	-3.5	-51.5	-64.50
125	10.24	-2.76	-50.76	-63.76
150	11.50	-1.5	-45.5	-58.50
175	14.00	1	-37	-50.00
200	14.50	1.5	-32.5	-45.50
225	14.91	1.91	-29.09	-42.09
250	15.00	2	-29	-42.00
275	15.00	1.5	-25.5	-39.00
300	16.00	1.8	-21.8	-36.00
325	17.00	2.8	-16.8	-31.00
350	17.49	3.29	-14.31	-28.51
375	17.44	3.24	-13.36	-27.56
400	17.30	3.1	-12.5	-26.70
425	18.80	4.6	-8	-22.20
450	19.11	4.91	-5.69	-19.89
475	19.90	5.7	-2.9	-17.10
500	20.30	6.1	-0.5	-14.70
525	20.90	6.7	-2.9	-17.10
550	21.80	7.6	-6	-20.20
556	21.50	7.5	-6.5	-20.50
575	22.77	8.57	-5.03	-19.23
600	23.80	9.6	-4	-18.20
625	25.58	11.38	-3.22	-17.42
640	26.00	11.8	-3.8	-18.00
650	26.00	11.8	-4.8	-19.00
675	27.00	12.8	-4.8	-19.00
700	28.38	14.18	-3.42	-17.62
725	30.50	16.3	-0.3	-14.50
750	31.61	17.41	0.81	-13.39
775	32.00	17.8	2.2	-12.00
790	33.50	19.85	1.85	-12.15
800	33.85	19.85	1.84	-12.15

Elevations are based on an elevation of 20.21 feet given for Boring No. P-GU-Z3-9D (top of riser).

FORMER NCBC DAVISVILLE FACILITY
SEISMIC REFRACTION SURVEY 1999

Elevations

chainage	surface	1st layer	2nd layer	bedrock
0	30.44	15.04	1.84	-13.56
25	30.95	15.55	1.35	-14.05
50	28.69	13.39	1.99	-13.31
75	28.40	13.1	0.7	-14.60
100	25.81	10.81	-2.19	-17.19
125	24.78	9.78	-2.22	-17.22
150	23.50	8.8	-3.8	-18.50
175	22.40	8.4	-5.6	-19.60
200	21.50	7.5	-6.5	-20.50
225	20.83	6.83	-10.17	-24.17
250	20.50	6.5	-12.5	-26.50
275	20.30	6.3	-12.7	-26.70
300	20.00	6	-13	-27.00
325	19.58	5.58	-14.42	-28.42
350	19.94	5.94	-15.06	-29.06
375	19.70	4.7	-16.3	-31.30
400	19.40	3.8	-20	-35.60
425	18.80	3.2	-23.6	-39.20
450	18.57	2.97	-23.83	-39.43
475	18.50	3.2	-26.2	-41.50
500	18.40	3.4	-27.6	-42.60
525	18.43	3.93	-27.07	-41.57
550	18.40	4.4	-27.6	-41.60
575	18.40	5.4	-28.6	-41.60
600	18.40	5.4	-28.6	-41.60
625	18.39	5.39	-28.61	-41.61
650	18.34	5.34	-28.66	-41.66
675	18.20	5.2	-28.8	-41.80
693	18.00	5	-29	-42.00
700	18.10	5.1	-28.9	-41.90
725	17.90	4.9	-28.1	-41.10
750	17.70	4.7	-28.3	-41.30
755	17.70	4.7	-28.3	-41.30
758	17.70	4.73	-28.27	-41.27
760	17.73	4.73	-28.27	-41.27

Elevations are based on an elevation of 20.21 feet given for Boring No. P-GU-Z3-9D (top of riser).

FORMER NCBC DAVISVILLE FACILITY
SEISMIC REFRACTION SURVEY 1999

Elevations

chainage	surface	1st layer	2nd layer	bedrock
0	23.68	13 68	-0.32	-10 32
25	23.47	13.47	-1 53	-11.53
50	23.00	13	-4	-14.00
75	22.00	11.7	-5 7	-16.00
79	21.30	11.3	-6.7	-16.70
100	21.00	10.5	-7.5	-18.00
125	20.53	10.03	-7.97	-18.47
150	20.00	9.2	-8.2	-19.00
175	19.50	8.7	-11 7	-22.50
200	18.80	8	-16.4	-27.20
225	18.00	7.2	-20.2	-31.00
250	17.93	7.03	-23.17	-34.07
275	17.50	5.5	-24.5	-36.50
300	16.80	3.8	-28.2	-41.20
325	15.30	2.3	-29.7	-42.70
350	14.91	1.91	-29.09	-42.09
375	14.65	1.65	-27.35	-40.35
400	14.06	1.06	-26.94	-39.94
425	15.50	2.5	-25.5	-38.50
450	17.32	4.32	-22.68	-35.68
475	17.50	4.5	-18.5	-31.50
500	17.60	4.6	-18.4	-31.40
525	17.76	5.26	-20.74	-33.24
550	17.00	4.7	-23.7	-36.00
575	16.40	4.4	-25.6	-37.60
600	15.80	3.8	-27.2	-39.20
625	15.50	3.5	-27.5	-39.50
650	15.04	3.04	-26.96	-38.96
656	15.00	3	-27	-39 00
675	15.30	3.3	-25.7	-37.70
700	15.80	3.8	-24.2	-36.20
725	16.20	4.2	-22 8	-34.80
730	16.40	4.4	-22.6	-34.60
740	16.49	4.49	-22.51	-34.51
745	16.49	4.49	-22.51	-34.51
750	16.49	4.49	-22.51	-34.51

Elevations are based on an elevation of 20.21 feet given for Boring No. P-GU-Z3-9D (top of riser).

Elevations

chainage	surface	1st layer	2nd layer	bedrock
–	0	21.67	7.67	-26.33	-40.33
	25	20.26	6.26	-26.74	-40.74
	50	19.00	6	-28	-42.00
	75	18.86	4.86	-27.14	-41.14
	100	18.50	6	-28	-41.50
	125	18.36	5.36	-28.64	-41.64
	150	18.00	6	-29	-42.00
	175	18.00	6	-29	-42.00
	180	18.00	6	-29	-42.00
	200	17.40	4.4	-28.6	-41.60
	225	17.02	4.02	-27.98	-40.98
	250	16.39	3.39	-28.61	-41.61
	275	16.00	3	-29	-42.00
	300	15.60	2.1	-28.9	-42.40
	325	15.00	2	-26	-39.00
	330	15.00	3	-27	-39.00
	350	15.00	3	-27	-39.00
	375	14.70	2.7	-27.3	-39.30
	400	14.40	2.4	-28.6	-40.60
	425	13.80	1.8	-30.2	-42.20
	450	13.40	1.4	-31.6	-43.60
	475	13.00	1	-33	-45.00
	500	12.75	0.75	-34.25	-46.25
	510	12.75	0.75	-34.25	-46.25
	515	12.89	0.89	-35.11	-47.11
	520	12.89	0.89	-35.11	-47.11

Elevations are based on an elevation of 20.21 feet given for Boring No. P-GU-Z3-9D (top of riser).

THE SEISMIC REFRACTION METHOD

The seismic refraction method is used to infer subsurface conditions on the basis of contrasting seismic wave velocities. The primary goal of the seismic survey is to rapidly and efficiently obtain subsurface information, thereby reducing direct investment costs, such as drilling. Geological information typically obtained from a well-planned and executed seismic refraction survey will include: depth and configuration of the bedrock surface, nature and competency of bedrock (degree of fracturing, alteration, weathering), whether it is faulted or sheared, nature of overburden, and depth to the water table. Modern portable equipment makes the method accessible to remote and rough regions A review of the seismic refraction theory, field methods and interpretational procedures can be found in Dobrin (1976) and Telford et al (1990).

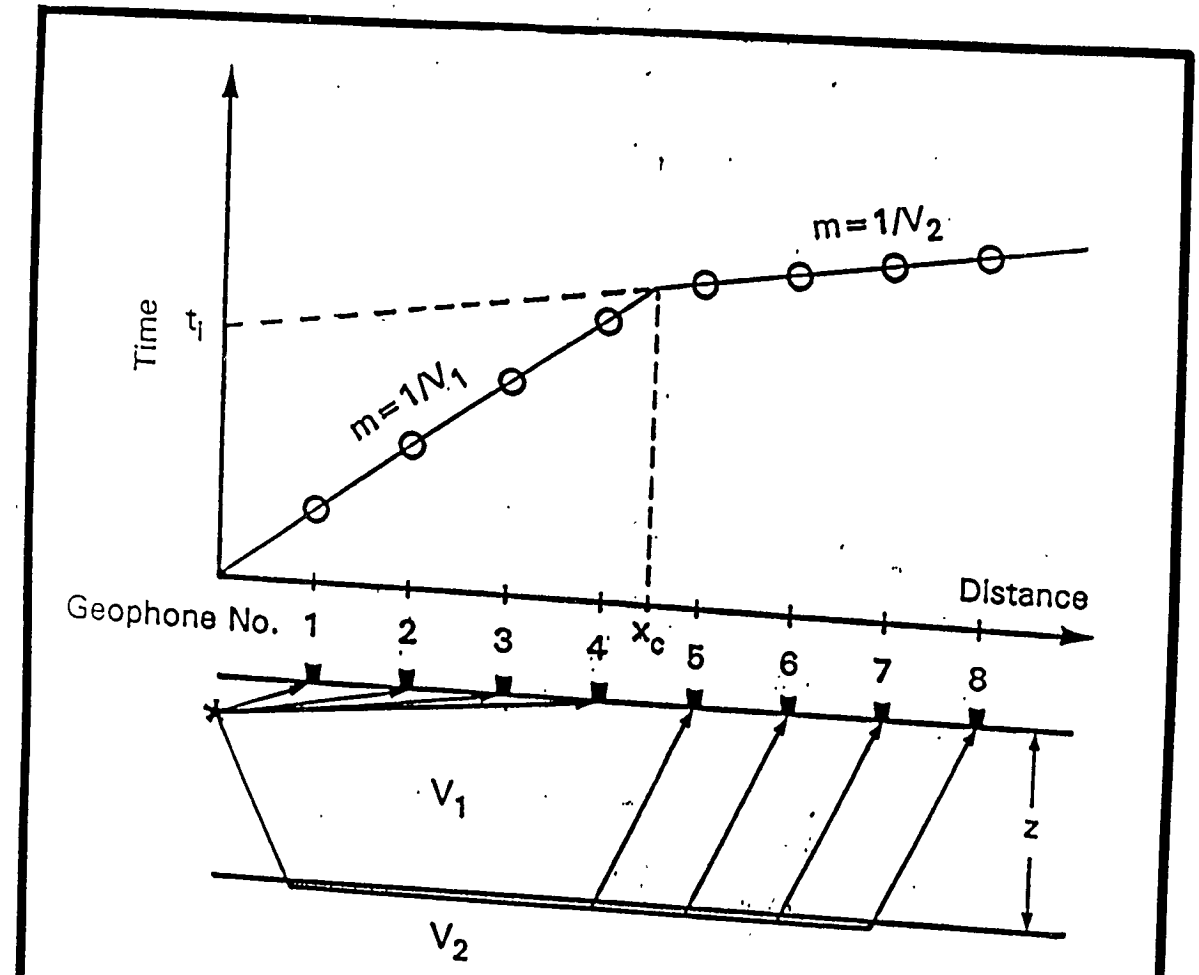
INSTRUMENTATION

The instrumentation involved in a seismic refraction survey consists of an acoustic seismic energy source to generate seismic waves, a line of geophones to detect the seismic energy, and a seismograph which is essentially a highly accurate stopwatch. By measuring the arrival times of the first seismic waves at various distances from the energy source (shotpoint), depths to interfaces and seismic velocities can be determined. Seismographs are usually 12 or 24-channel, in that they can simultaneously record the energy arrivals at 12 or 24 geophones. The record of these vibrations is a seismogram Digital seismographs (for example, ABEM Terraloc, EG&G SMARTSEIS S24) acquire data with a built-in computer, whereas analog seismographs (e.g. ABEM Trio) output the data to photographic paper as it is acquired. The energy source must be coupled to the seismograph so that the instant of detonation or impact can be recorded. Timing marks, at 1 or 2 milliseconds intervals, are provided to permit very accurate estimates of arrival times.

FUNDAMENTAL PRINCIPLES

The seismic refraction method relies on measuring the transit time of the seismic wave that takes the shortest time to travel from the shotpoint to each geophone. The fastest seismic waves are the compressional (P) or acoustic waves, where displaced particles oscillate in the direction of wave propagation. The energy that follows this first arrival, such as reflected waves or transverse (S) waves, is not considered under routine seismic refraction interpretation.

Figure 1 shows a simple geological structure, where a layer with a velocity of V_1 overlies a second layer with a higher velocity, V_2. At one end of the spread, an energy source is triggered and the vibrations at each geophone are recorded. Seismic waves will travel via the direct path from the source to each of the geophones. Waves may also be refracted at some critical angle along the interface and travel at the higher velocity V_2.



V_1 = Velocity of Upper Layer
V_2 = Velocity of Lower Layer
m = Slope of Line Segment
x_c = Crossover Distance
t_i = Intercept Time

$$z=\frac{x_c}{2}\sqrt{\frac{V_2-V_1}{V_2+V_1}} \quad \text{or} \quad z=\frac{t_i}{2}\frac{V_2V_1}{\sqrt{V_2^2-V_1^2}}$$

Principles of Seismic Refraction

Fig. 3

Energy is continually transmitted back to the surface as it travels along the interface A time-distance graph may be constructed, plotting the first arrival transit times as a function of position along the seismic line. The first arrival at the closest geophones is the direct wave. However, at the critical or crossover distance (Xc) the refracted wave which travels along the higher velocity layer overtakes the direct arrival. The inverse slope of a straight line segment of the time-distance curve is equal to the velocity in that layer The crossover distance is directly proportional to the depth of the interface.

INTERPRETATION

The simplest methods of interpretation are illustrated in figure 1. Having determined the velocity of compressional waves through each layer, the calculation of depths can be done according to crossover distance or the intercept time formulas. The case of a horizontal interface, illustrated in figure 1, becomes slightly more complicated if the planar interface is dipping. The general case of an irregular interface can be handled by more complex interpretational calculations, including various delay-time methods, the reciprocal and generalized reciprocal methods, and ray tracing. One method may be better suited than another to a particular geological environment.

LIMITATIONS

Two important limitations of the seismic refraction method must be kept in mind. First, layers of insufficient thickness and velocity contrast will not produce first arrivals at the surface. This is the **hidden layer** problem. For example, a thin layer of glacial till or weathered bedrock overlying unweathered bedrock might be such a hidden layer. The presence of a hidden layer will lead to calculated depths that are too shallow. Secondly, the seismic refraction method requires that the velocities of all layers increase with depth A low velocity layer at depth is termed a **blind zone**. Such layers will not yield first arrivals because critical refractions cannot occur. Computed depths will be greater than actual depths in this case. Fortunately, such velocity reversals are seldom encountered in shallow surveys. The generalized reciprocal method can be used to infer the absence or presence of blind zones and hidden layers. However, correlation with boreholes and uphole surveys may be necessary to accurately gauge the effects of such layers.

DESCRIPTIVE CLASSIFICATION OF BEDROCK SEISMIC VELOCITIES WITH RQD VALUES

The following table represents a descriptive classification of bedrock seismic velocities that can be correlated with RQD (Rock Quality Designation) values. The following table is extracted from a study by Coon and Merritt (ASTM STP 477).

This table may proved helpful for the developmental phase of this project, in terms of planning, security, and cost. The seismic refraction method measures the velocity of the bedrock to a depth of approximately 45 feet.

TABLE

ENGINEERING CLASSIFICATION FOR IN SITU ROCK (1)				
RQD (%)	VELOCITY INDEX	SEISMIC VELOCITY (ft/s) (2)	DESCRIPTION	SEISMIC DESCRIPTION
0 - 25	0.00 - 0.20	8000	Very poor	Low velocity
25 - 50	0.20 - 0.40	8000 - 11400	Poor	Low velocity
50 - 75	0.40 - 0.60	11400 - 14000	Fair	Intermediate
75 - 90	0.60 - 0.80	14000 - 16000	Good	Sound rock
90 - 100	0.80 - 1.00	16000 - 22000	Excellent	Sound rock

(1) Taken and adapted from: Coon,R.F. and Merritt,A.H.,**Predicting in-situ Modulus of Deformation using Rock Quality Indexes**, Determination of the in-situ modulus of deformation of rock, ASTM STP 477, American Society for testing and materials 1970, pp. 154-173.

(2) Taking into account a velocity of 18 000 ft/sec for the compressional wave measured in the laboratory (V_L)for a limestone rock.

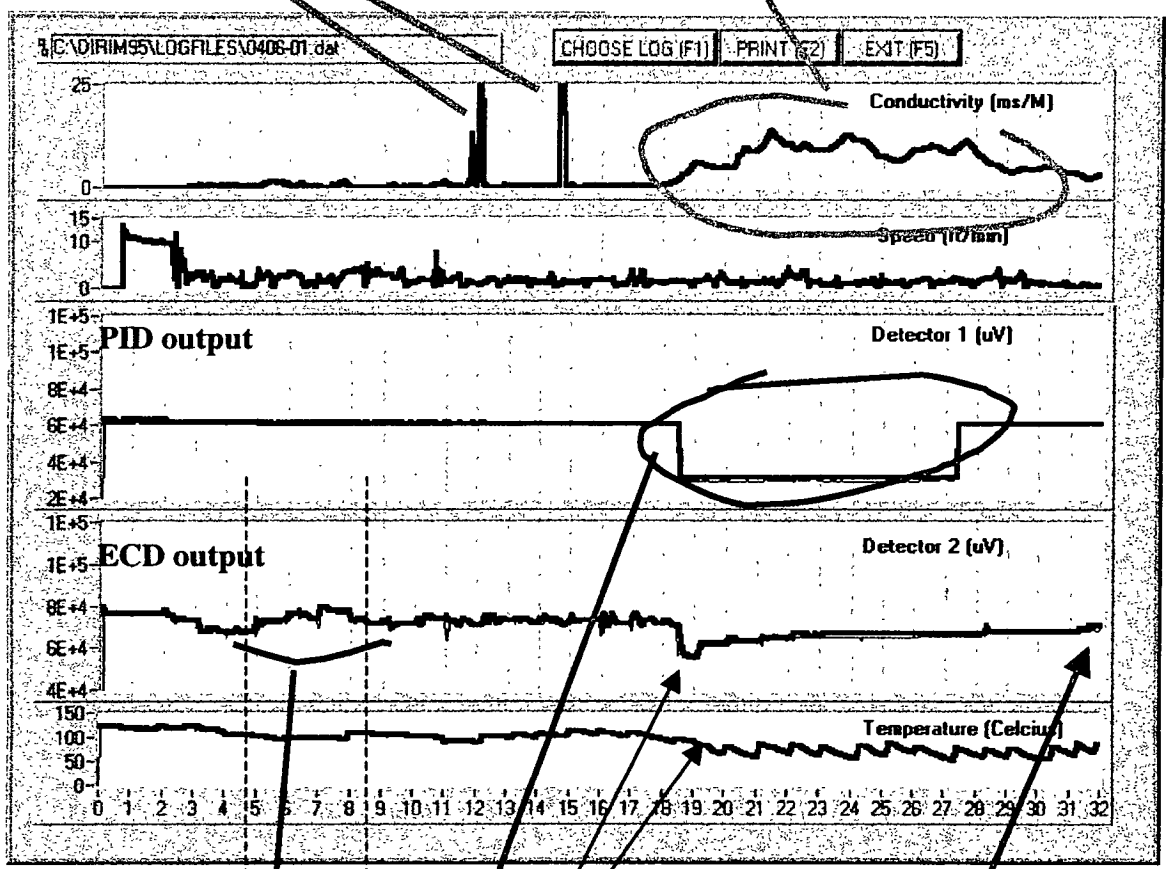
The classification of Coon and Merritt is based upon the velocity index property of in situ rock, which is a measure of the discontinuities in the rock mass. According to Coon and Merritt, the velocity index is defined as the square of the ratio of seismic field velocity to laboratory compressional wave velocities, measured on a core sample, representative of a sound rock. The field seismic velocities are normalized by the laboratory results in order to minimize the influence of lithology. Hence as the number of joints decreases, the ratio of the velocities will approach one. This ratio is then squared to make the velocity index equivalent to the ratio of dynamic moduli.

APPENDIX C
STAGE I
MIP LOGS from Zebra Environmental Corp.

LOG 16-01

Two conductivity spikes of unclear nature, I suggest grabbing a quick soil sample, since similar spikes are present on other logs (see below)

Elevated Soil Conductivity area, an indication of a layer of a fine material, a fine sand or silt, based on the conductivity scale reading



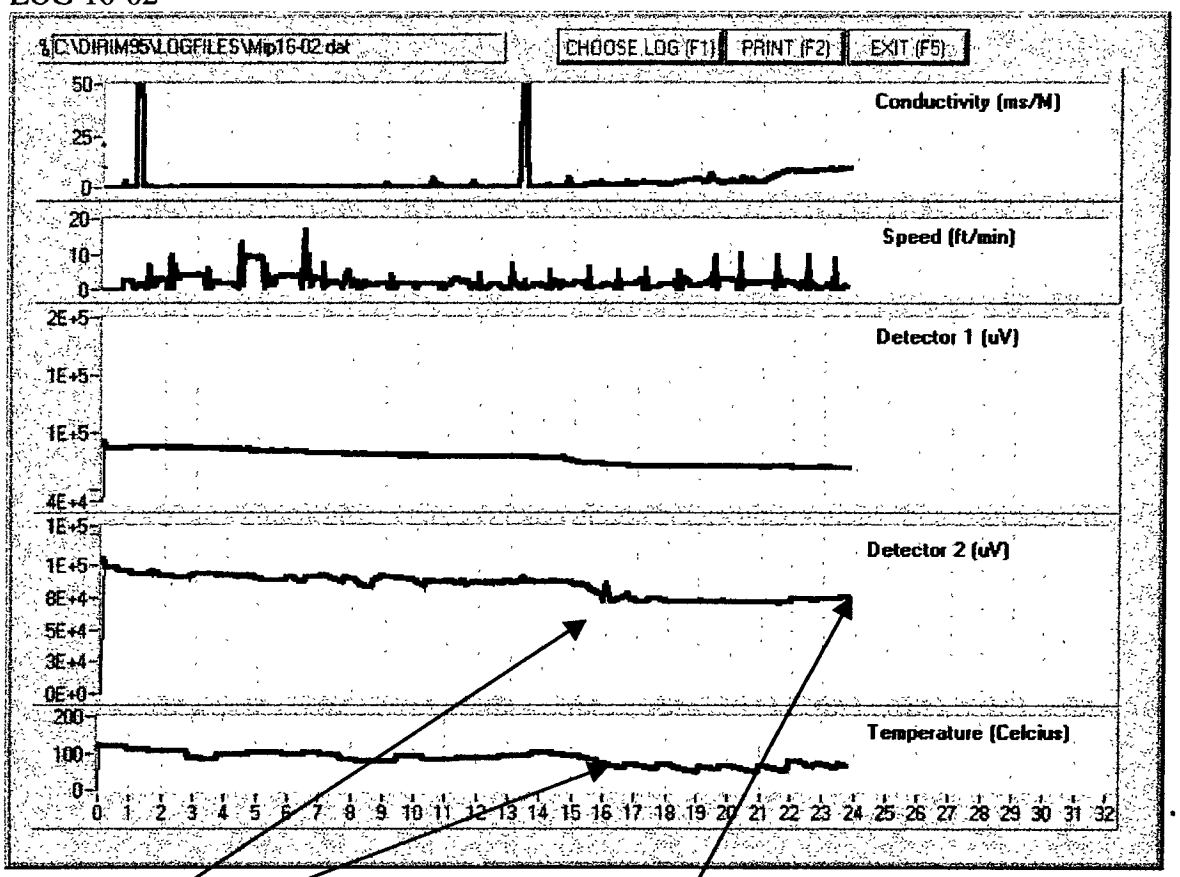
Groundwater interface: simultaneous dip of both ECD baseline (due to increase in H2O vapor concentration) and temp. reading (due to a higher heat absorption capacity of water compared to dry soils)

Elevated area, indicates low concentrations of Halogenated Hydrocarbons, likely to be in vapor phase, 100-300ppb range (confirmation sampling necessary in order to establish accurate correlation for this site)

Attenuation error on the PID. Irrelevant due to the fact that on this log PID shows ND – if there is anything, it's below PID's detection limit

The ECD response below the water table shows a small rise in the19-32' interval. This cannot be caused by signal noise or environmental factors. In fact, ECD baseline below the water table ALWAYS slopes down. My interpretation is that we are dealing with very low concentrations of CHCs, close to the system detection limit (160-200ppb for TCE). The increase of the ECD signal at the very bottom of the hole indicates higher concentrations below – we just could'nt get deep enough to see it clearly, due to the refusal.

LOG 16-02

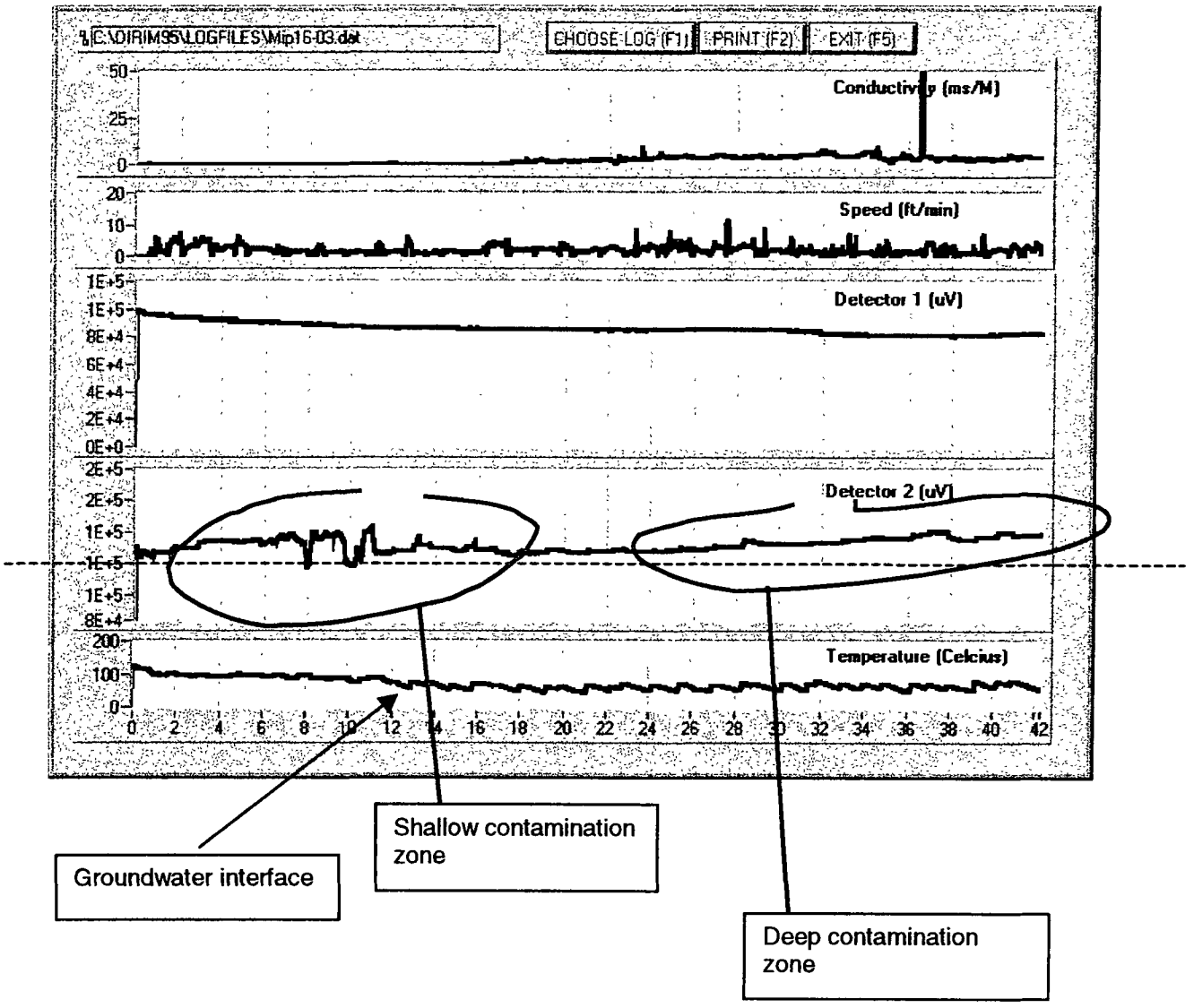


Groundwater interface

ECD signal increase

This is log 16-02 recorded on Friday, 4/7. It looks very similar to the log#1 above, including the increase on the ECD response towards the bottom of the hole. This log, however, was stopped at a shallower depth due to a refusal.

LOG 16-03



This is log 16-03 recorded on Friday, 4/7. It shows somewhat higher concentrations, especially at the groundwater interface. In fact, this the first log at this site where the ECD response at the water table is totally masking the natural "dip" due to higher water vapor concentrations. Again, ECD response is creeping up steadily as the depth increases. This is still very low levels (my estimate is below 400 ppb).
PID shows nothing, confirming absence of chlorinated VOCs in ppm range, and absence of BTEX and MTBE at concentrations above 400 ppb.

As to SemiVOCs, the MIP system is capable of detecting high concentrations of those compounds. Unfortunately, we haven't had a chance to accumulate enough data to state a detection limit for the SVOC compounds. Two other issues further complicate this matter:

1. SVOC are typically present in the form of a mixture containing tens of different compounds, all with different response factors, trip times; the mixture composition varies from site to site, which makes it very hard to establish any kind of reliable detection limit

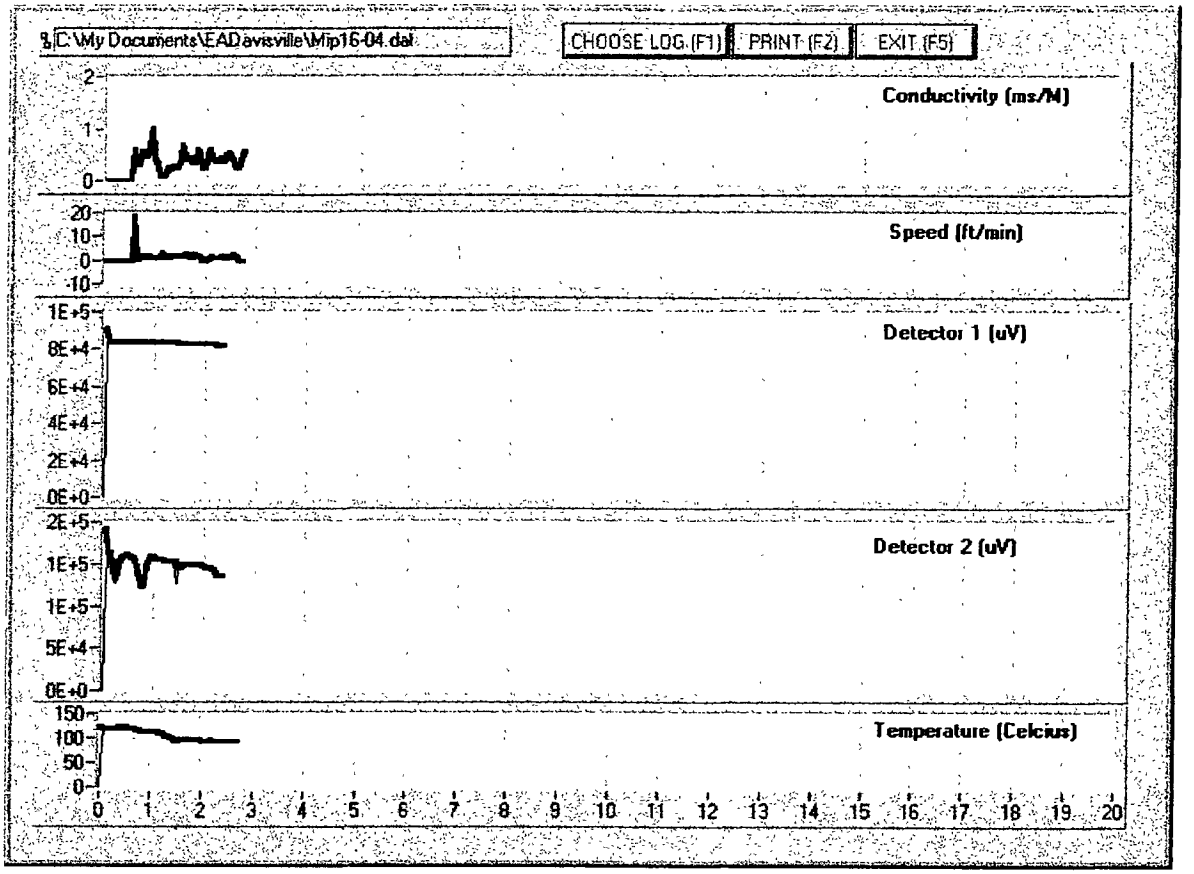
2. SVOCs are often detected by picking up light by-products of their disintegration using the FID detector. Unfortunately, present configuration of the system's data acquisition hardware and software built by Geoprobe does not allow logging of three detector channels (PID, ECD and FID) simultaneously. At this time, we can only use a combination of two detectors at a time. ZEBRA's next MIP unit, due to be assembled this summer, will solve this issue (as well as a number of others, such as field serviceability, critical component redundancy, and incorporating of a limited analytical capability, such as an on-board GC).

I would like to point out again that it is very important to collect several confirmatory samples in order to establish a good correlation for this particular site, especially because we are dealing with low concentration (have we had a DNAPL, it would not matter that much!)

Please call me with any questions regarding these logs or any other MIP-related issues at 516/359-9935 or e-mail me at anadolishny@hotmail.com

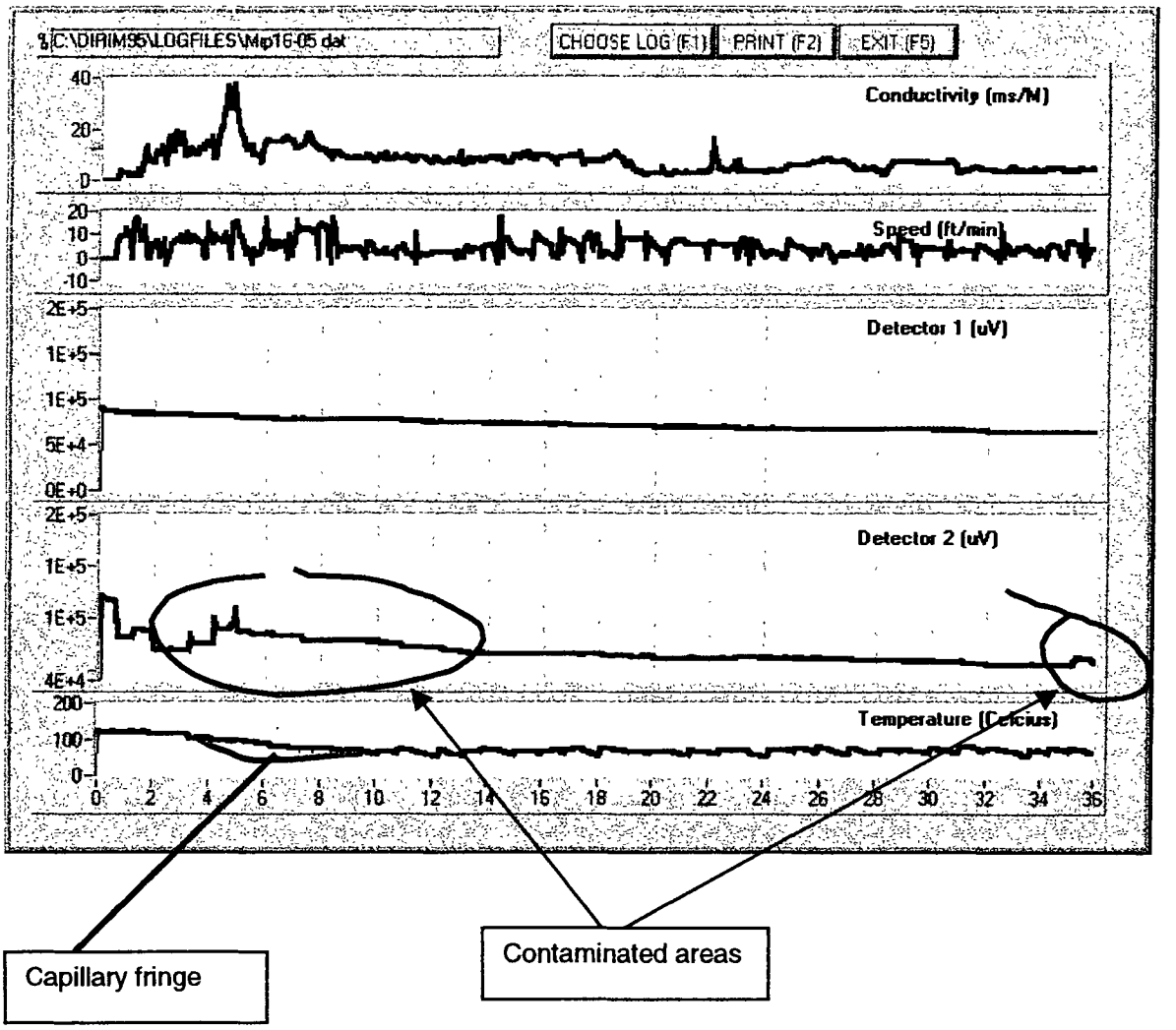
Sincerely,
Alex Nadolishny, ZEBRA Environmental Corp.

LOG 16-04



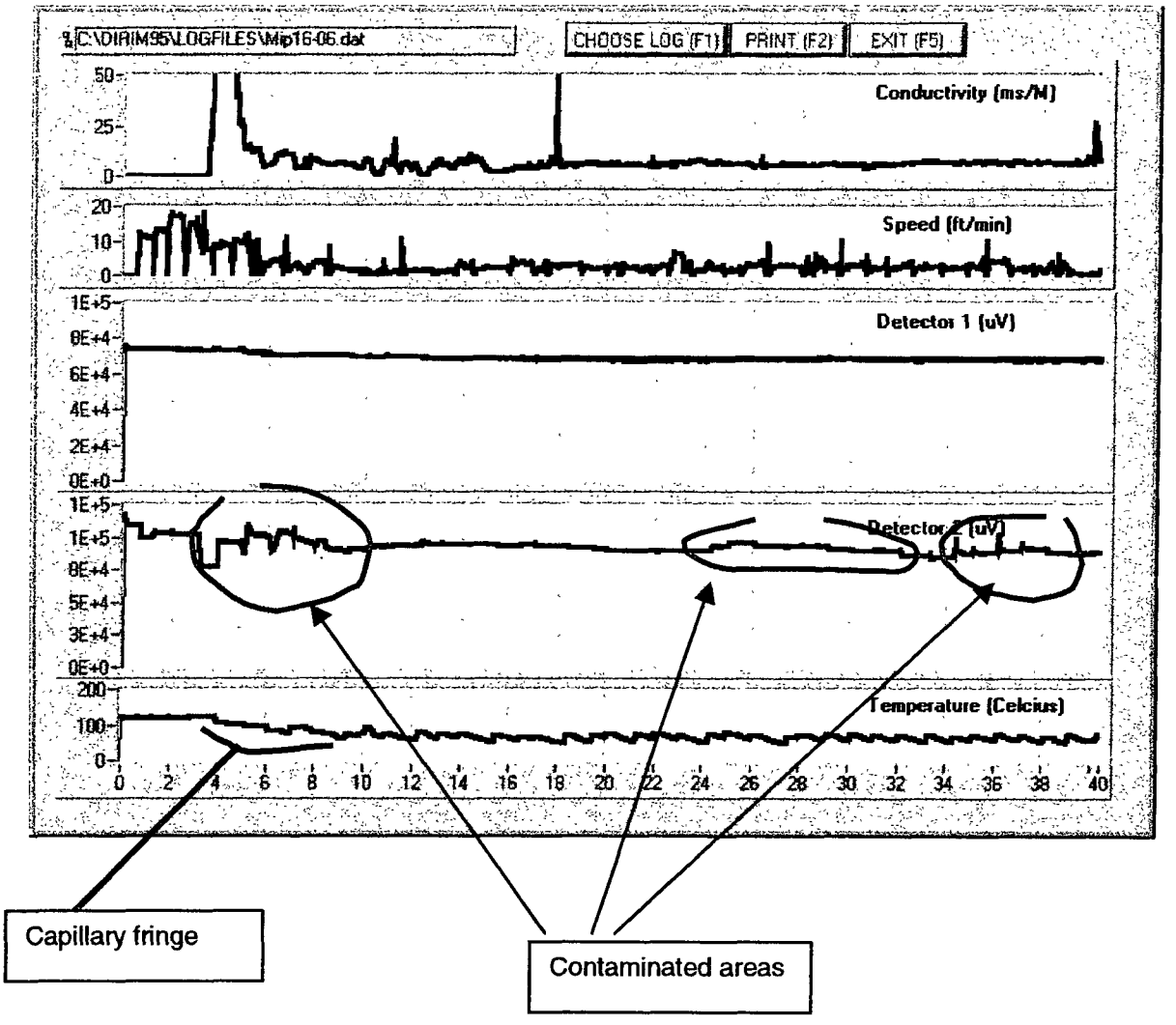
Refusal was encountered at 2.8' BG. Repeated attempts to get through were not successful.

LOG 16-05



This log shows a defined contaminated are at 3.5 – 12' BG, and – again – increase in ECD response at the very bottom of the hole. The groundwater interface appears to be much shallower: increased soil moisture content is shown beginning 3.5' BG and the temperature continues to drop until it stabilizes at 9' BG.

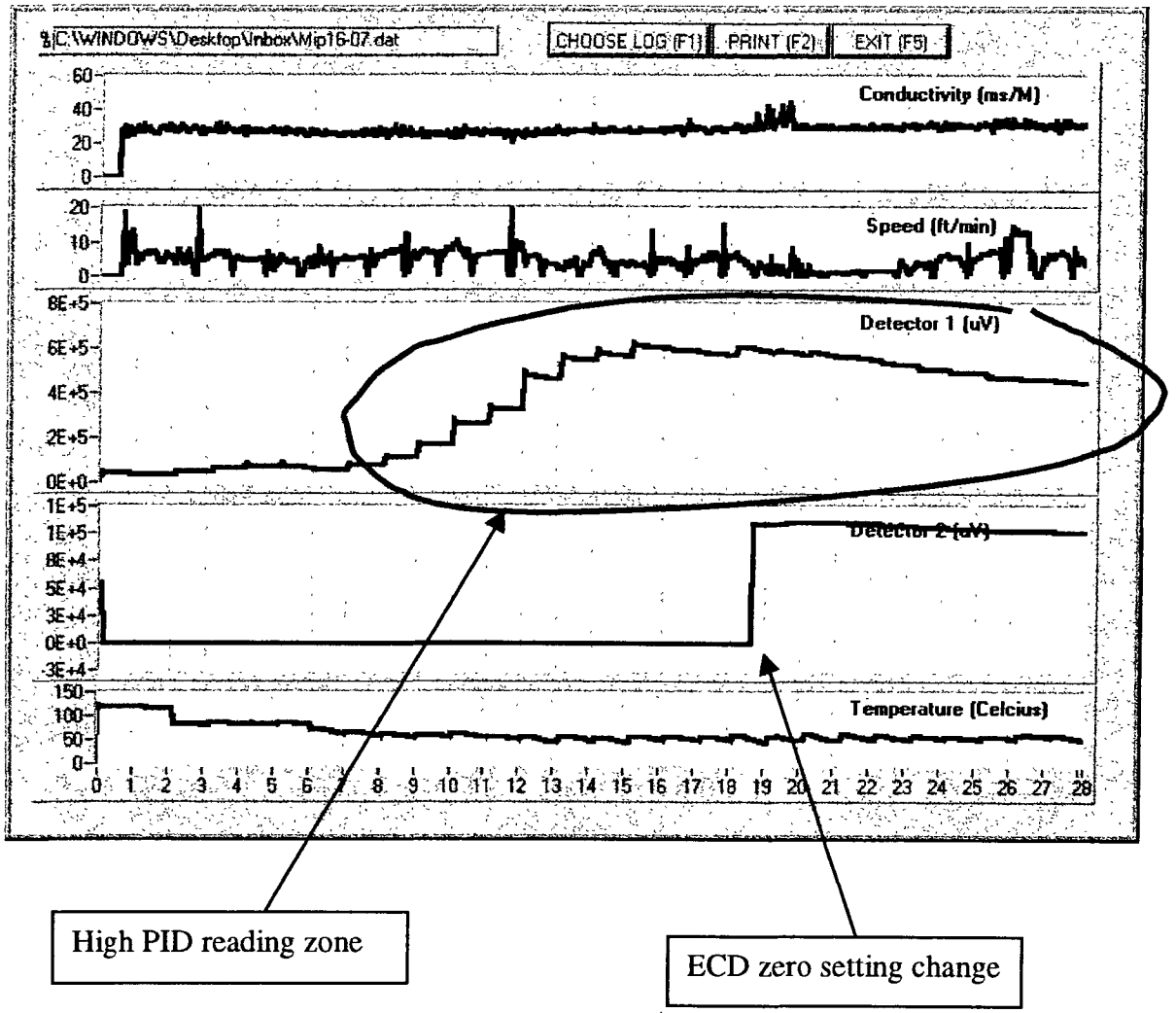
LOG 16-06



The water table is also shallow: the capillary fringe starts at 4' BG and the actual water table appears to start between 7 and 8' BG.
The contamination is represented in three distinct areas: 4-8.5'BG, 24 – 32'BG and 34-38'BG - all appear to be in the sub- 300 ppb range.

Below are the logs recorded on Friday, April 21, and Monday, April 24, 2000.

LOG 16-07



The conductivity malfunction observed on logs from 4/20 was fixed after this log was completed on Friday morning. So the conductivity data on this log do not represent actual soil conditions.

The PID channel indicates a considerable heavy petroleum contamination (most likely SVOCs) starting at 8' BG and extending to the terminal depth of 28.5' BG.

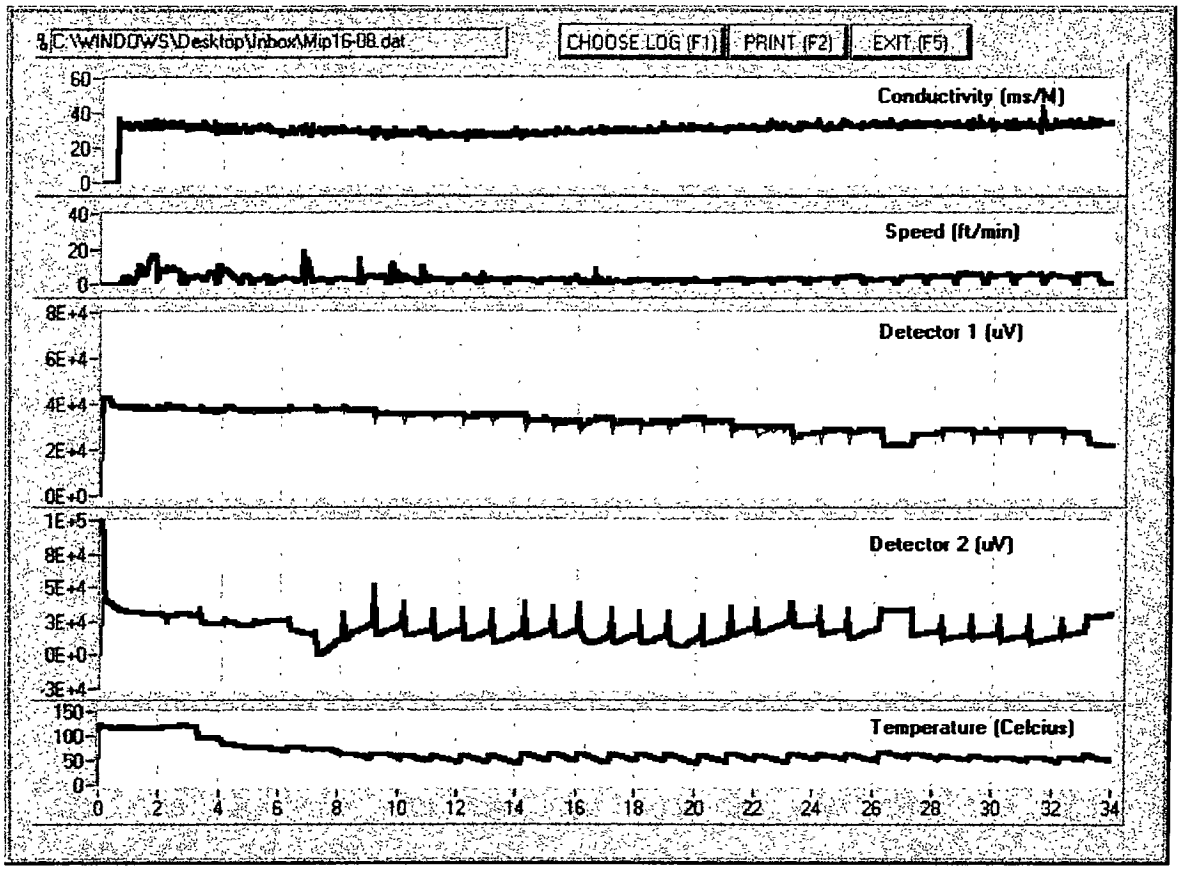
The ECD channel zero setting was adjusted at 18.5' BG (the sharp increase in ECD reading indicates a change of data interpretation by the software, and NOT an actual reading change). The analysis of the ECD data points to a small increase of the ECD reading in the area above 18' BG.

We apologize for the data loss that occurred at this logging location.

Logs recorded on April 20:

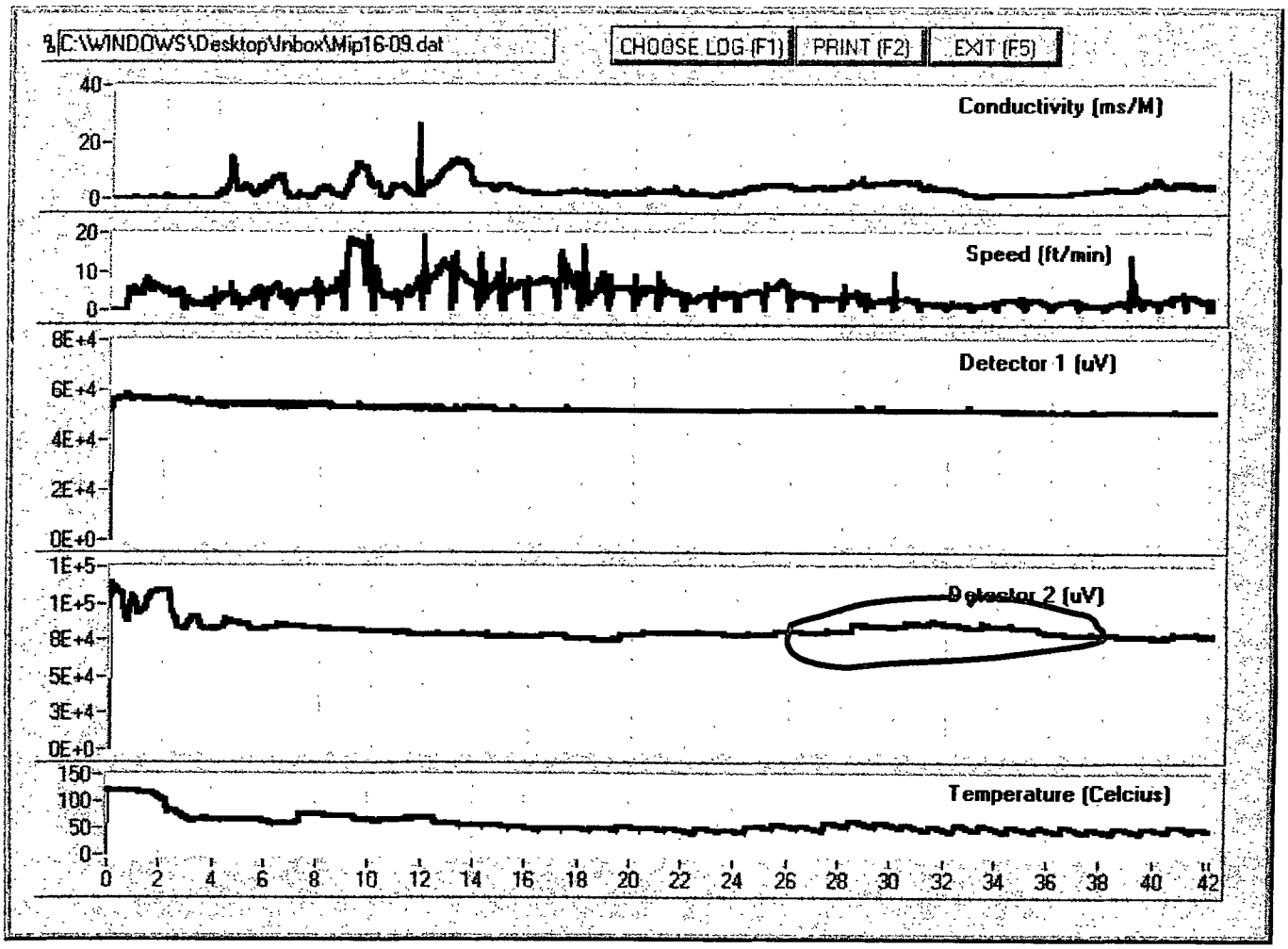
Please note: the Conductivity data on these logs are not valid due to a minor malfunction of the data acquisition system which unfortunately went unnoticed throughout the day and was corrected only on April 21.

LOG 16-08



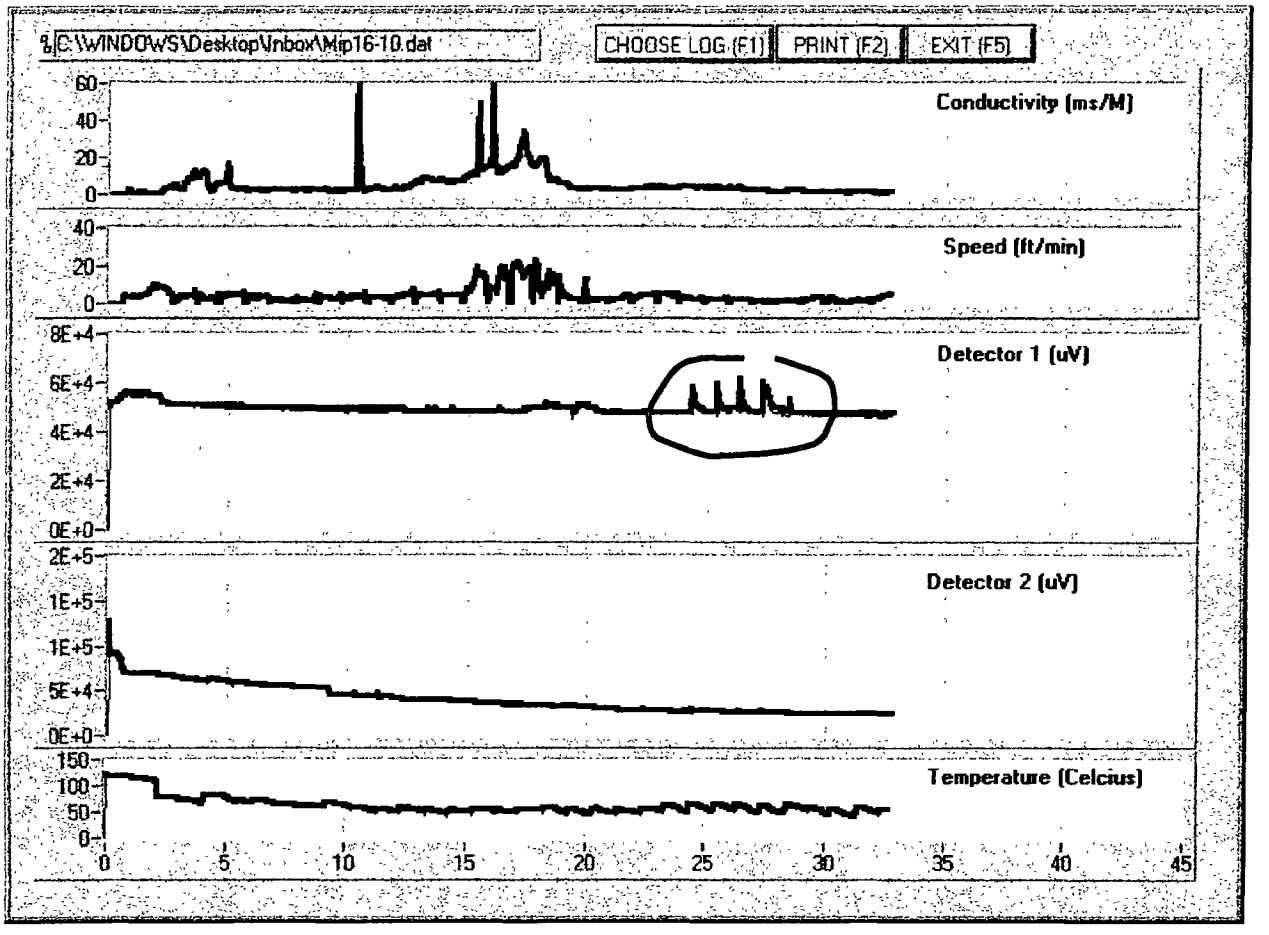
This log shows inconclusive results on both detectors – contaminant levels are below the system's detection limits. The ECD response may be interpreted to indicate low levels of chlorinated VOCs in the 8-34' BG interval.

LOG 16-09



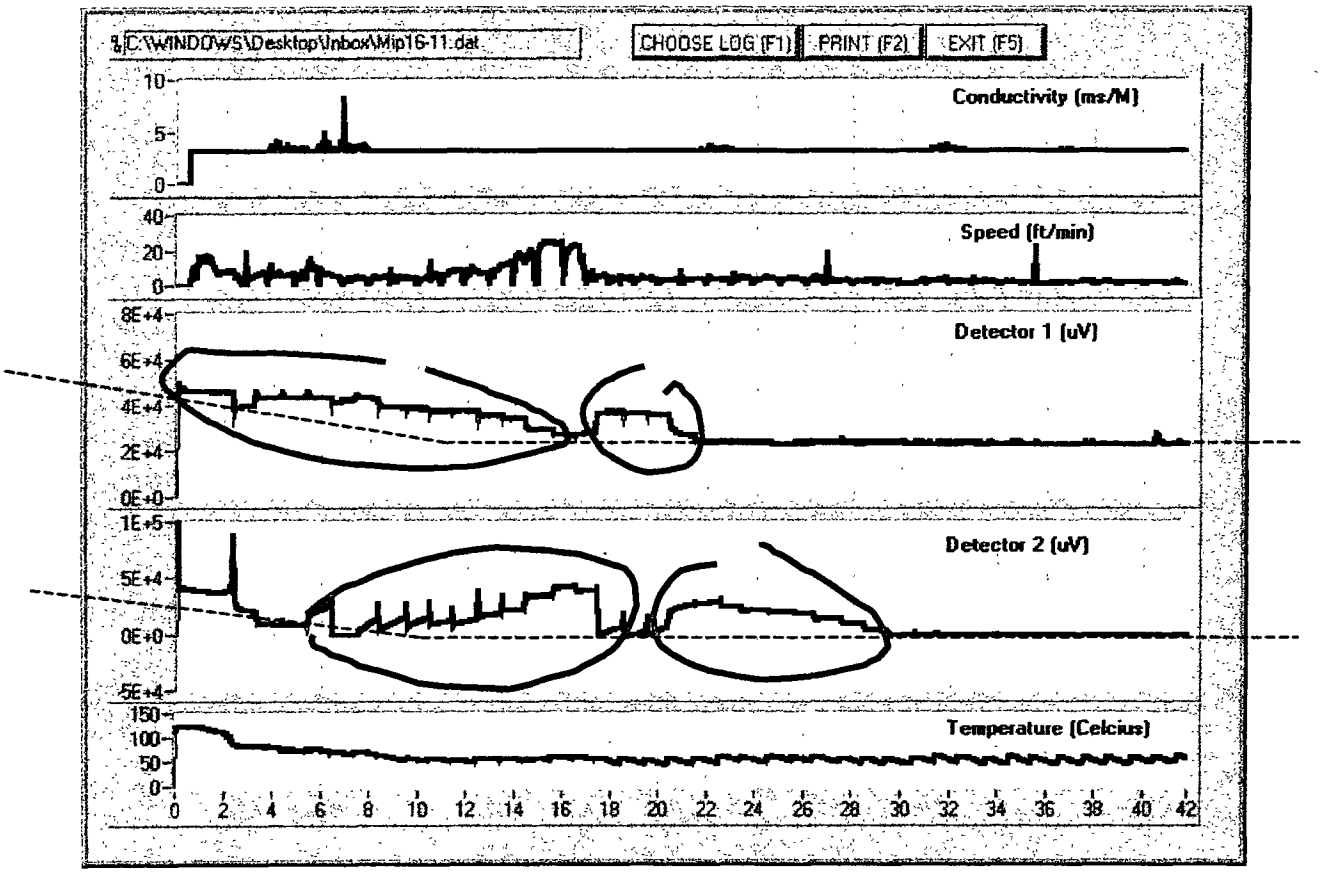
This log features only a very minor increase in the ECD signal in 26-38' BG, which may possibly indicate low concentrations of dissolved chlorinated hydrocarbons, significantly below the system's confirmed detection limit (190 ppb).

LOG 16-10

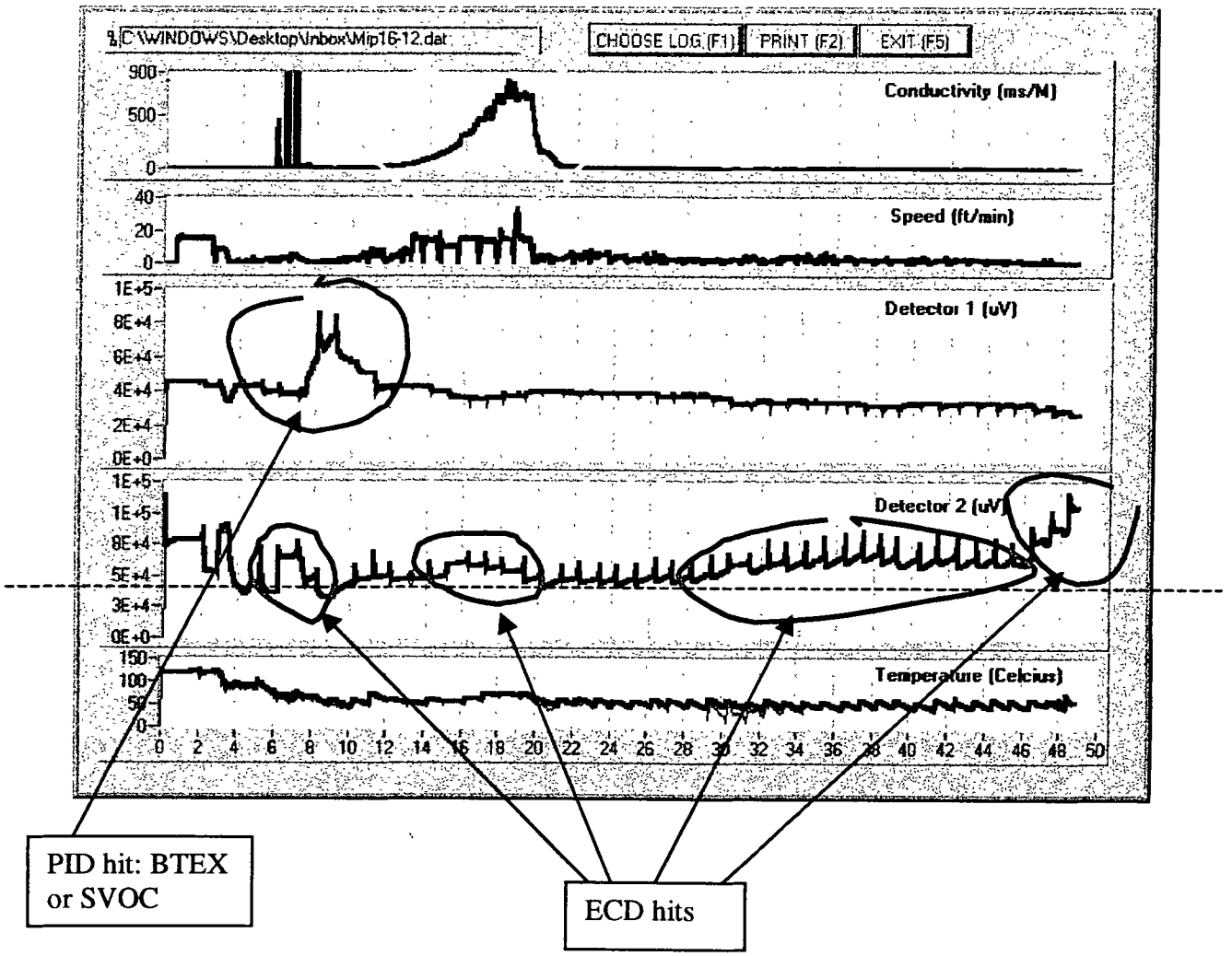


This log features a series of small hits on the PID channel at 24-28' BG interval. The ECD channel shows consistent ND reading indicating HHC concentrations (if any) way below the system's detection limit.

LOG 16-11



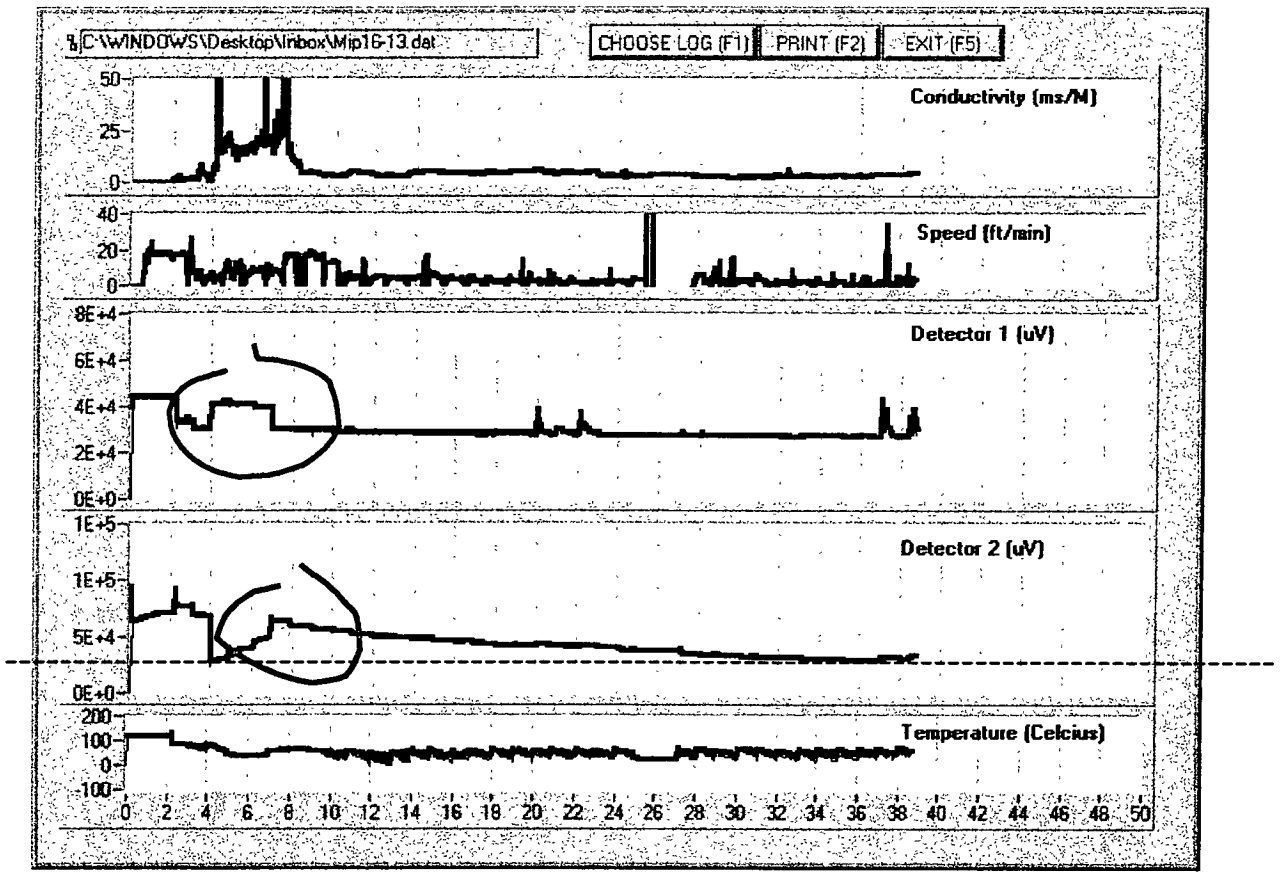
This log shows SVOC or low-level BTEX contamination at 3-16' BG and 17-21' BG (see Detector 1 channel). Chlorinated VOCs are present at 6- 17' BG and 20-29' BG (see Detector 2 data).



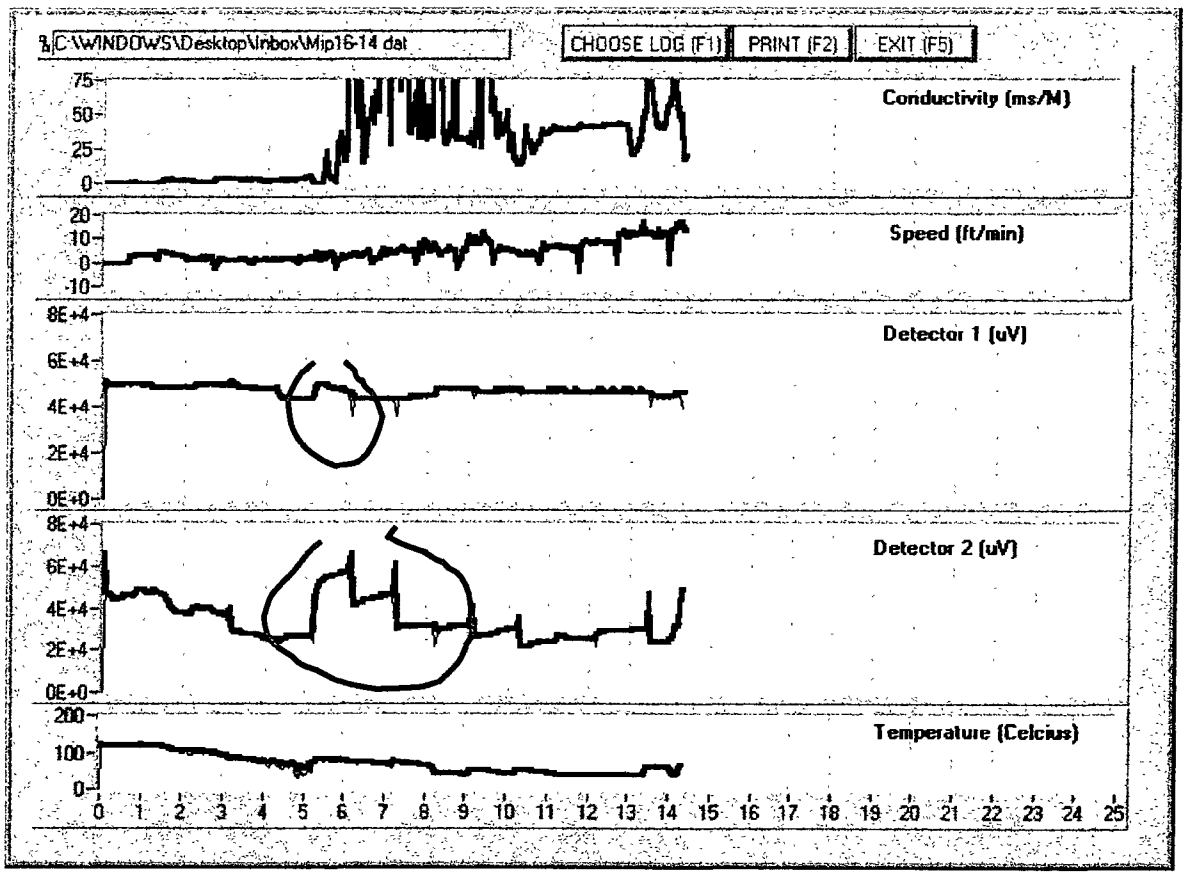
This log, recorded to a refusal at 49' BG features a salt water intrusion zone at 13-21' BG, a PID hit indicating presence of BTEX or SVOC at 7-11' BG (within the capillary fringe/groundwater interface), and four ECD hits: at 6-8' BG, 15-19'BG and 29-45' BG – all indicating low concentrations of Halogenated VOCs, and a beginning of a higher concentration zone at 47'-down, with estimated concentrations in the range of 300-400 ppb at 49' BG.
A refusal was encountered at 49' BG.

A depth measurement error occurred here due to the accidental disconnection of the transducer cable. To obtain correct depth values below this point, subtract 2 from recorded values.

LOG 16-13

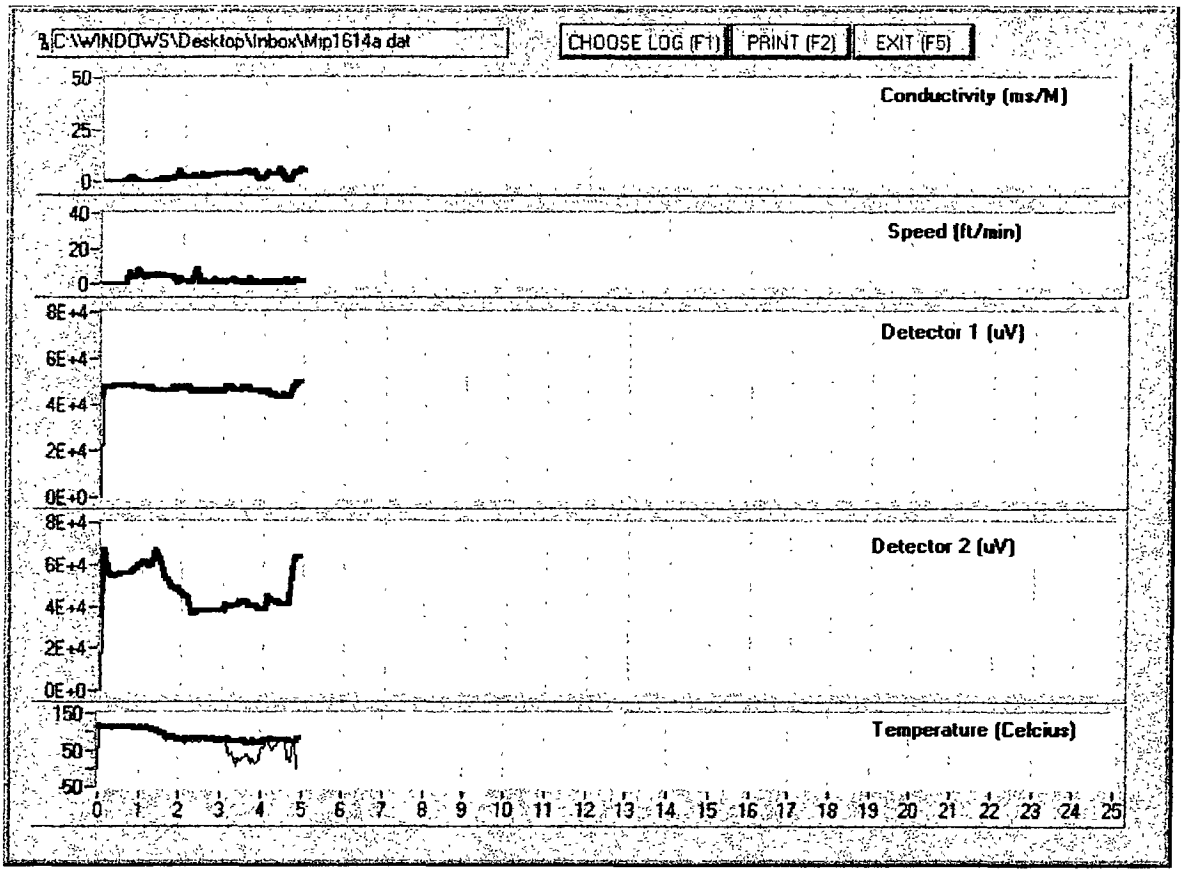


This log features only one small hit on the ECD channel: at 6-9' BG, and ones mall hit on the PID channel at 4-7' BG (at the groundwater interface).
I currently have no interpretation for the small blips on the PID at 20, 22, 37 and 39' BG.
Considering the fact that the probe membrane developed a leak on the way up after this last hole, that should probably be considered artifacts.



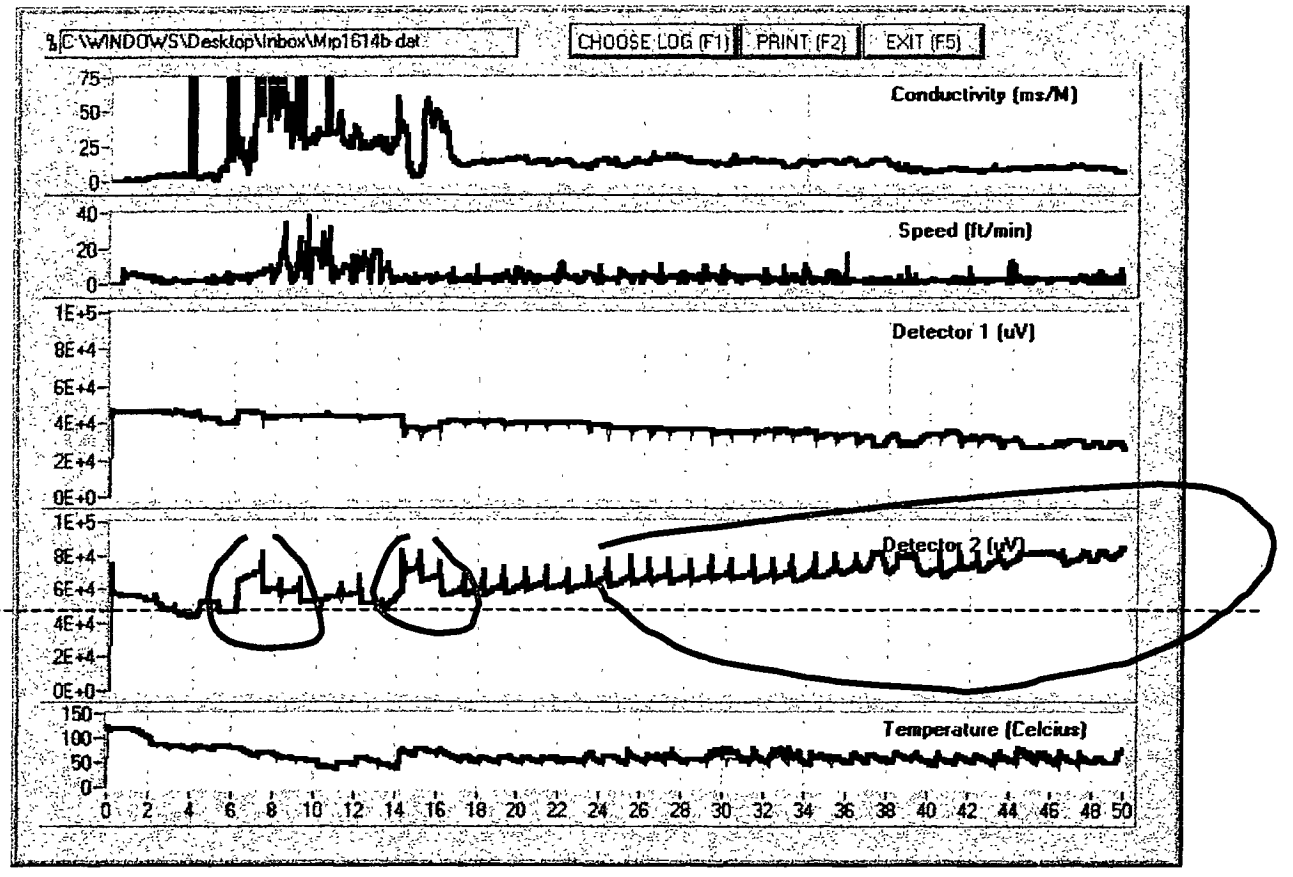
Refusal was encountered at 14.3' BG. Log shows some contamination at 5-7.5' BG on both ECD and PID, which typically indicates mixed contamination. The ECD started to rise at 14' BG, immediately prior to the refusal.

LOG 16-14a



Refusal @4.91'BG.

LOG 16-14b

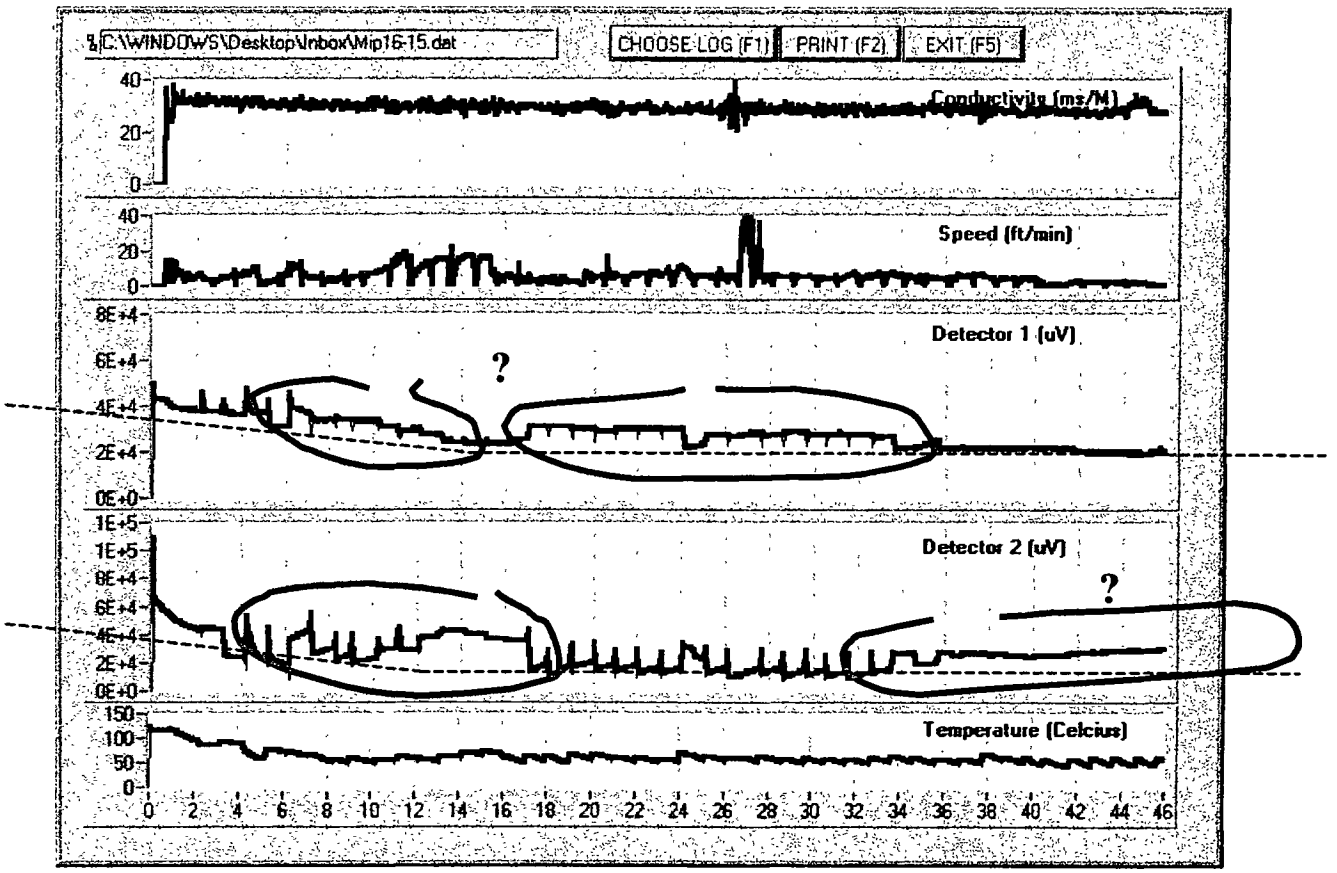


This log features three distinct areas: 6-9' BG, 14-16' BG and a steady rise of the ECD signal in the 26 to 50' BG. The first two are observed on top of high electric conductivity layers (see the SC channel) and the third one is likely to reflect increasing with depth concentrations of chlorinated solvents. Note that the ECD signal increase was able to overcome the natural slope of the detector's baselines due to the increasing with depth moisture contents (evident in the PID output).
A refusal was encountered at 50' BG.

A very typical salt water intrusion picture, reaching characteristic 800 ms/M conductivity

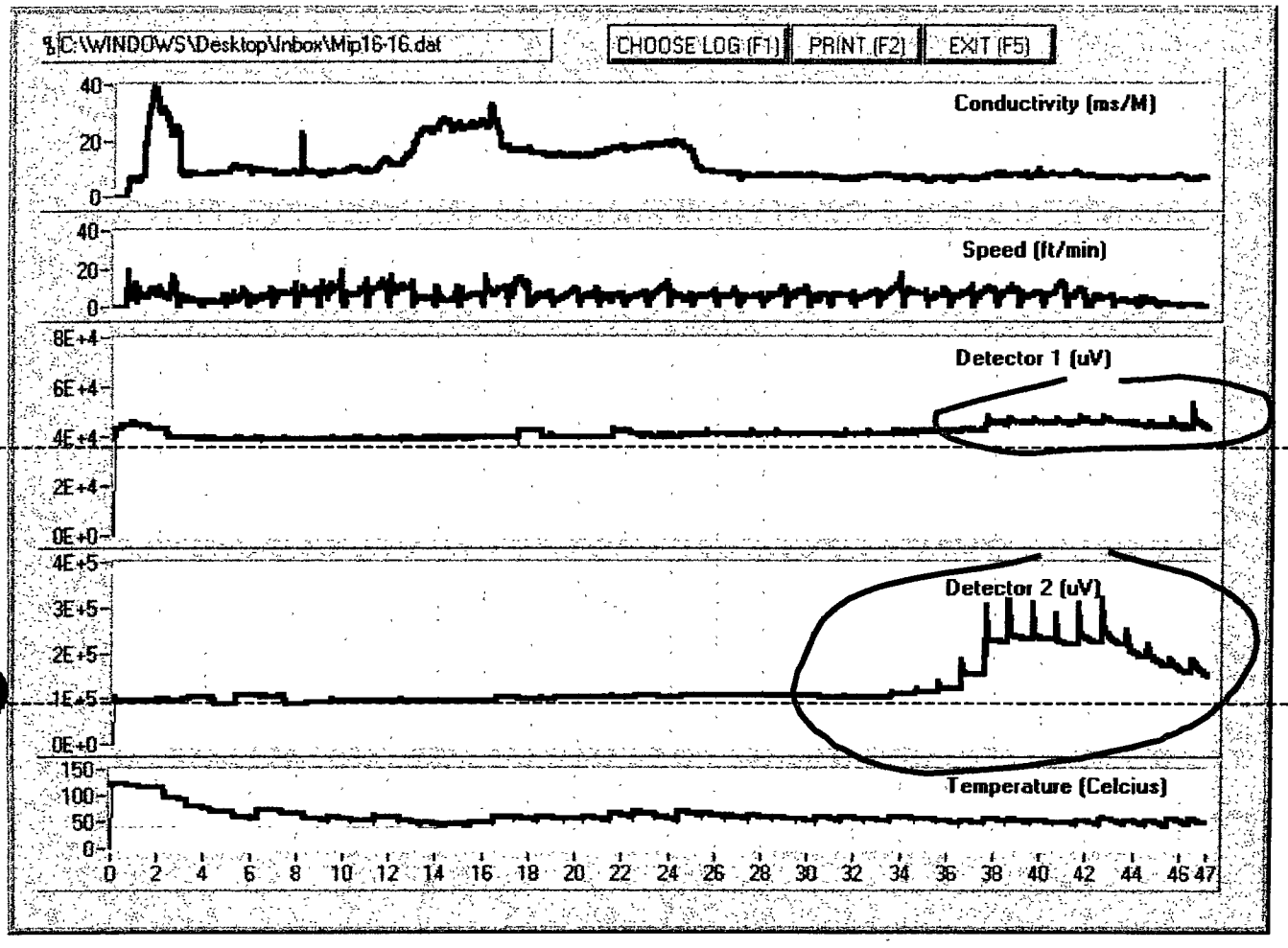
LOG 16-12

LOG 16-15



Detector 1 indicates SVOC or very low-level BTEX contamination at 6-13' BG and 17-34' BG (both inconclusive).
Detector 2 indicates Chlorinated VOC contamination at 6- 17' BG (well defined, yet low levels) and a very inconclusive 34-46' BG zone.

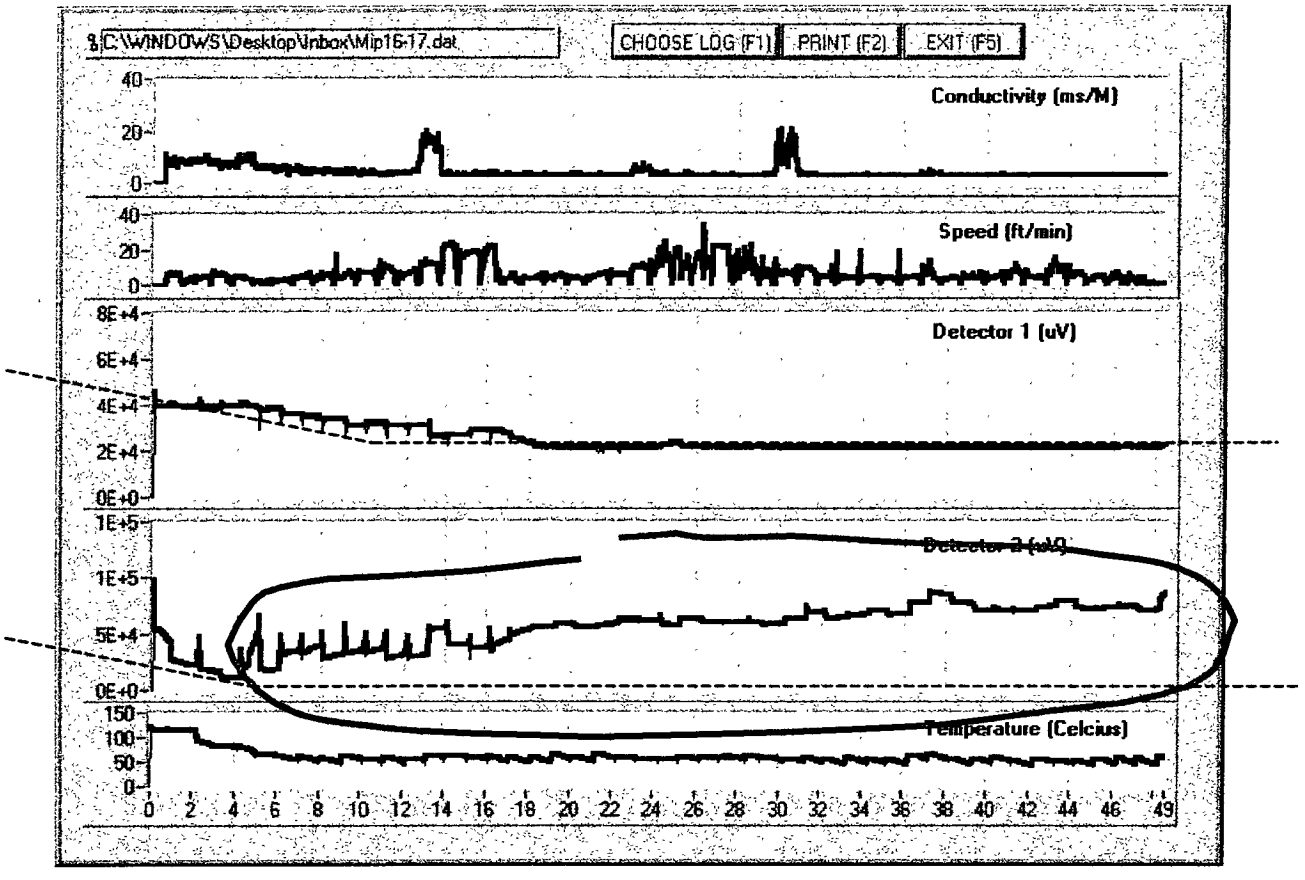
LOG 16-16



This log represents a very typical picture of chlorinated contamination in 5-20 ppm range in the 33- 47' BG interval. The highest concentrations observed in the 37-43' BG interval.
Low concentrations (~50ppb+) observed starting at ~18' BG and down.

The soil conductivity log shows silt unit at 12-25' BG interval.

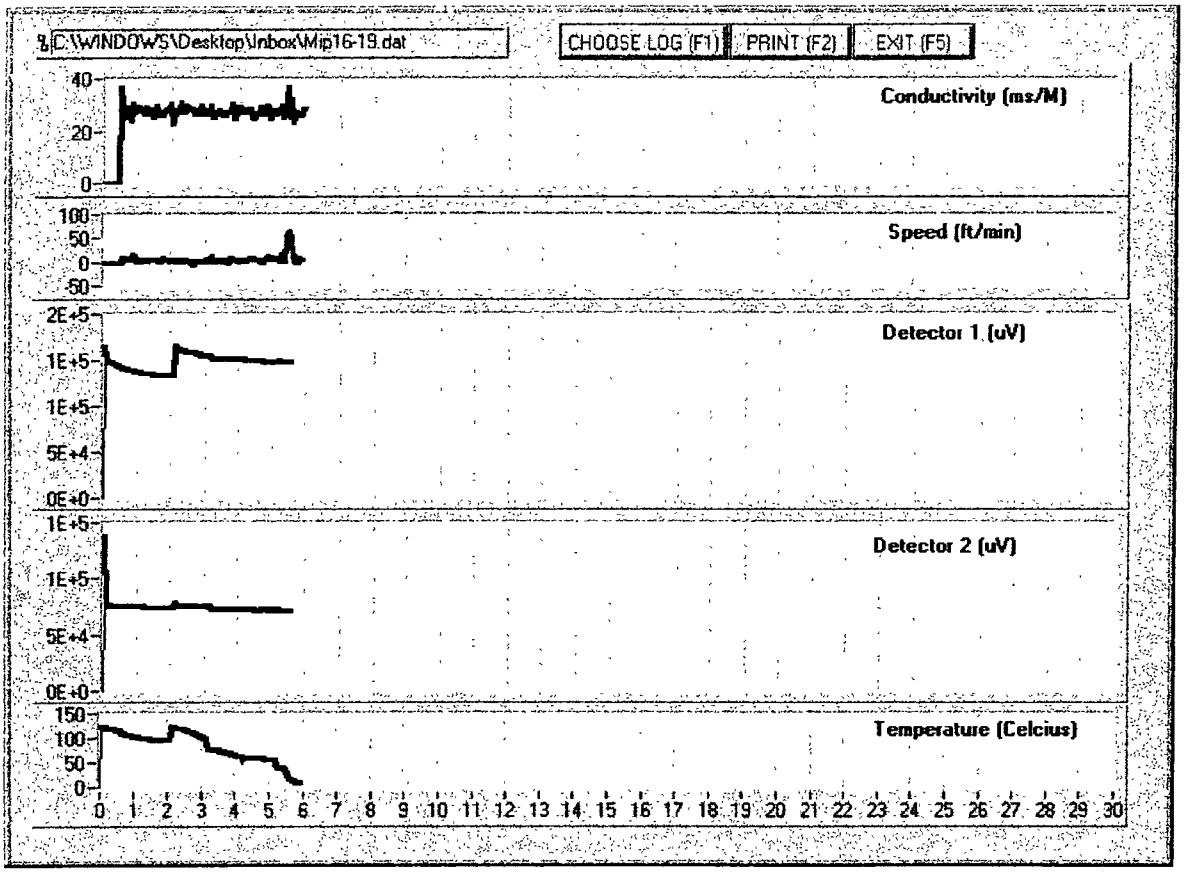
LOG 16-17



Detector 1 reading inconclusive, with possible low-level contamination between 4 and 18' BG.

Detector 2 shows extensive contamination zone beginning at 5' BG and extending all the way down. The levels should not exceed 400 ppb of total chlorinated VOCs. To compare readings on different logs refer to the height of the signal above the baseline (dashed line).

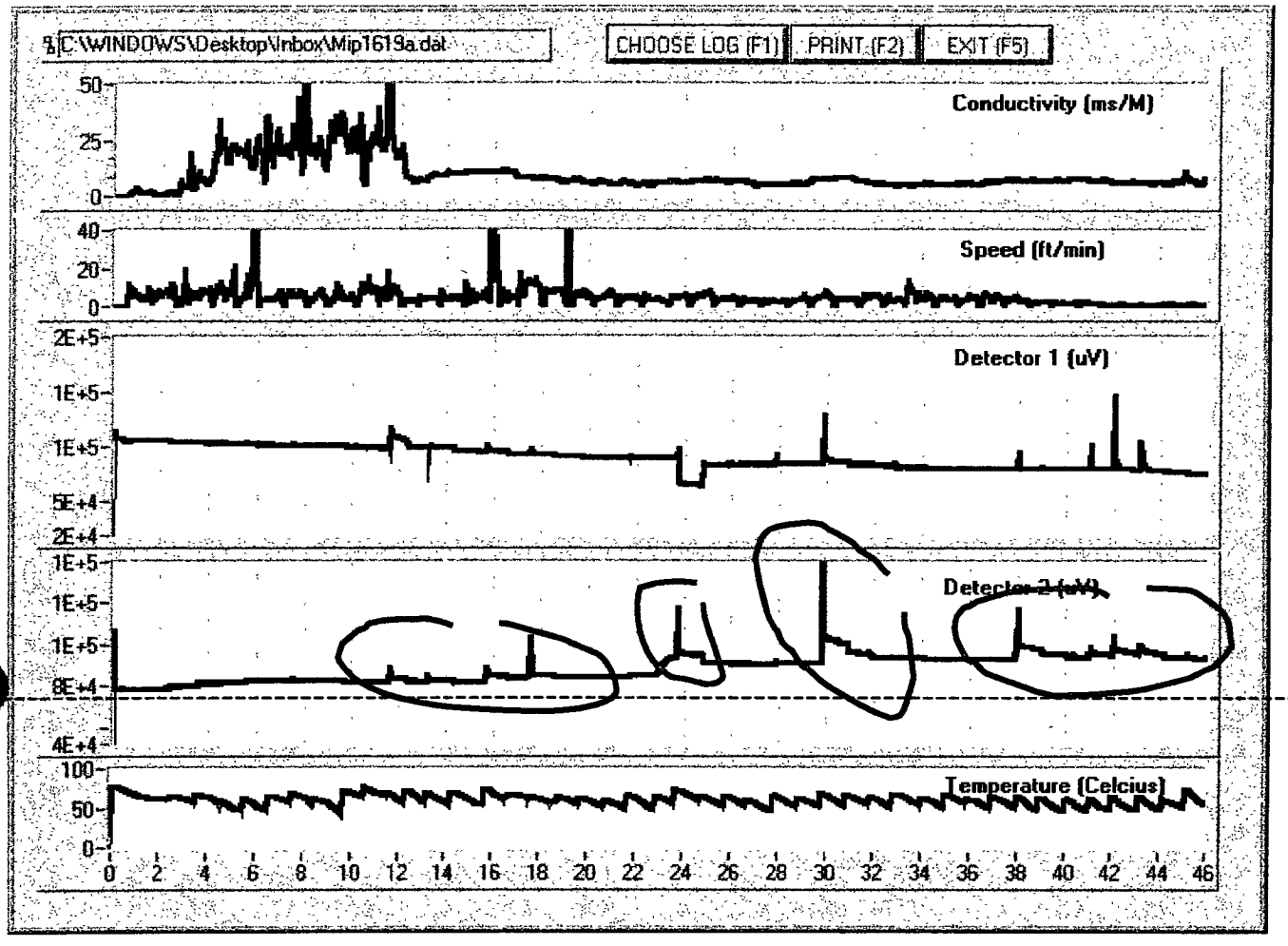
LOG 16-19



A refusal was encountered at 6' BG

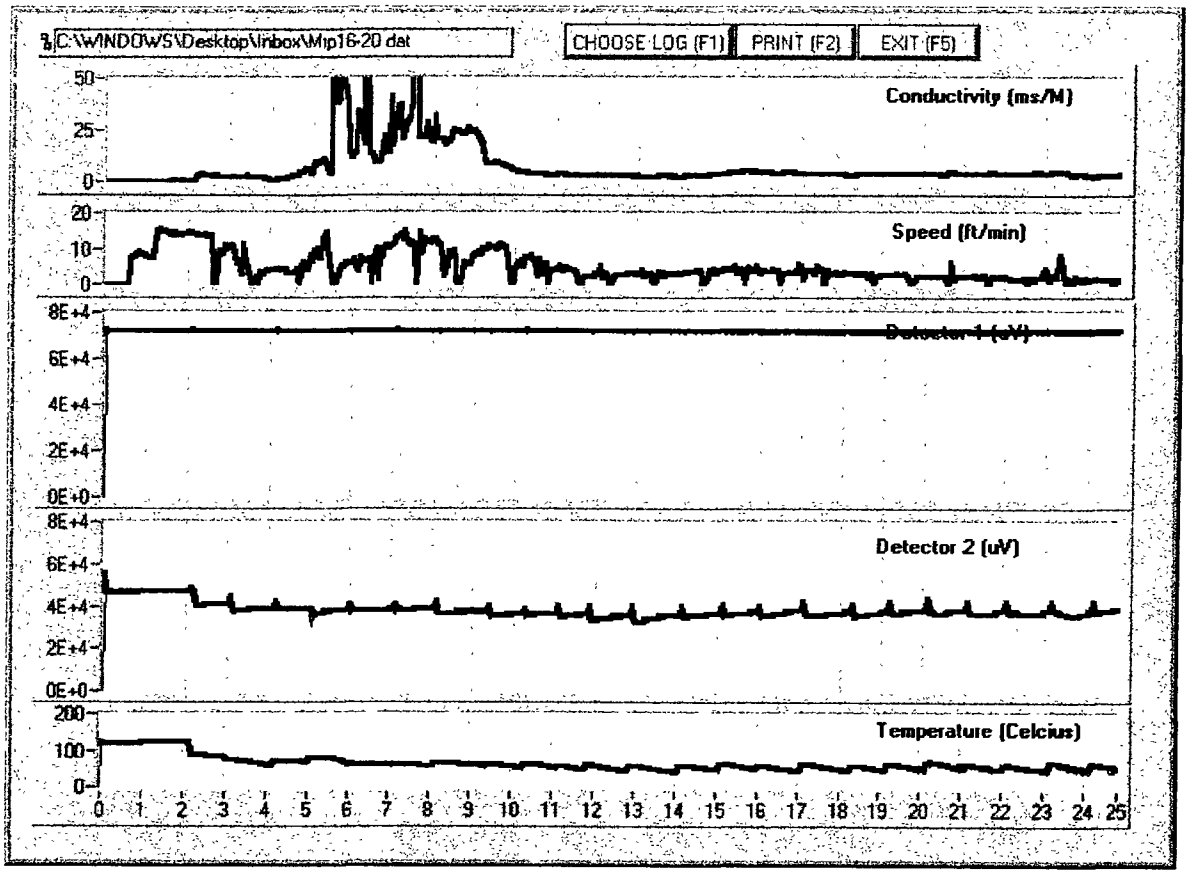
This is the log from 4/21 missing from the previous data interpretation file:

LOG 16-19a



The ECD signal exhibits a well-defined trend to increase with the depth at this location, indicating increasing with depth concentrations of chlorinated VOCs. Additionally, four areas (circled) show significantly higher concentrations.

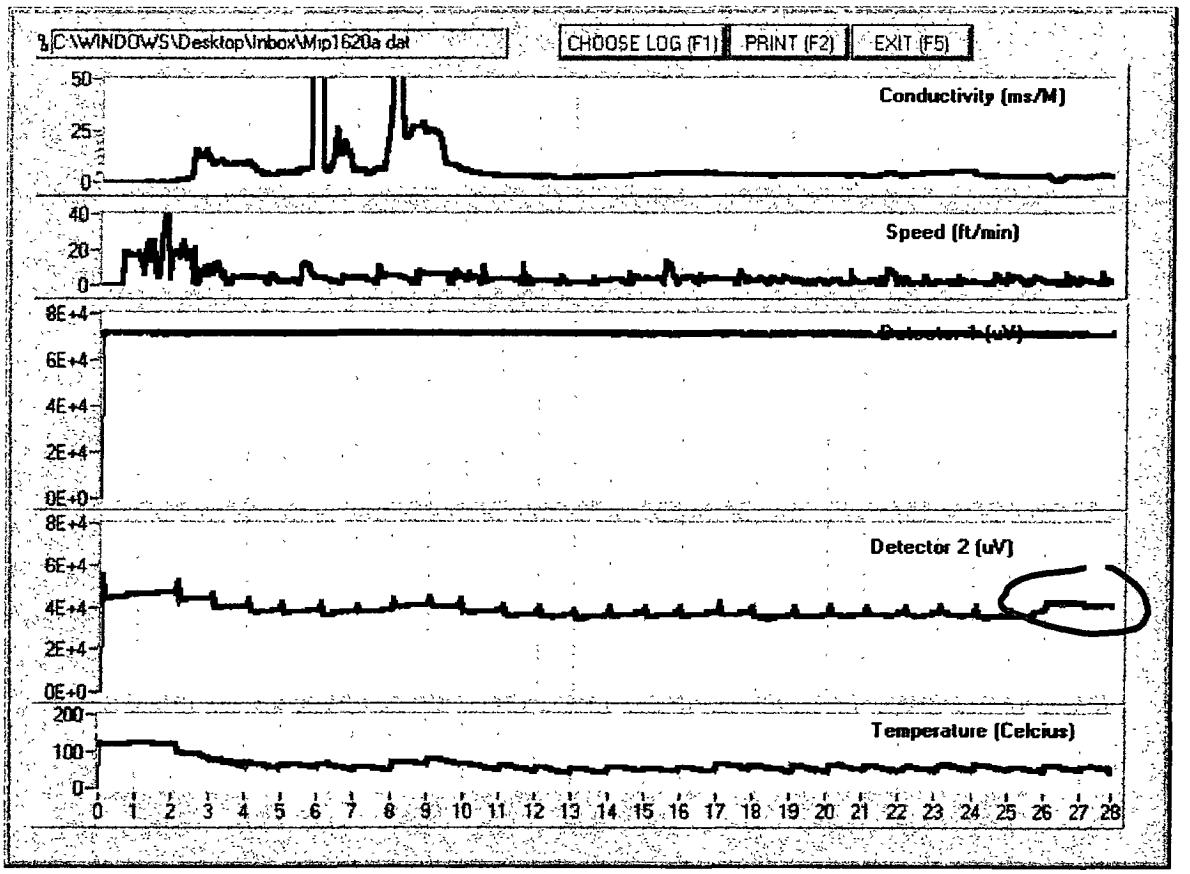
The PID channel features several spikes coinciding with the ECD hits, which may be an indication of the presence of mixed contamination or daughter products of TCE.



Blind probed to 4ft, logged to refusal @ 24.81ft.

This log shows no contamination detected by neither PID nor ECD. Area of a very high soil conductivity often observed requires confirmatory sampling, since the range of values often by far exceeds both clays and salt water ranges; it may indicate some sort of electrolyte leachate or buried conductive material.

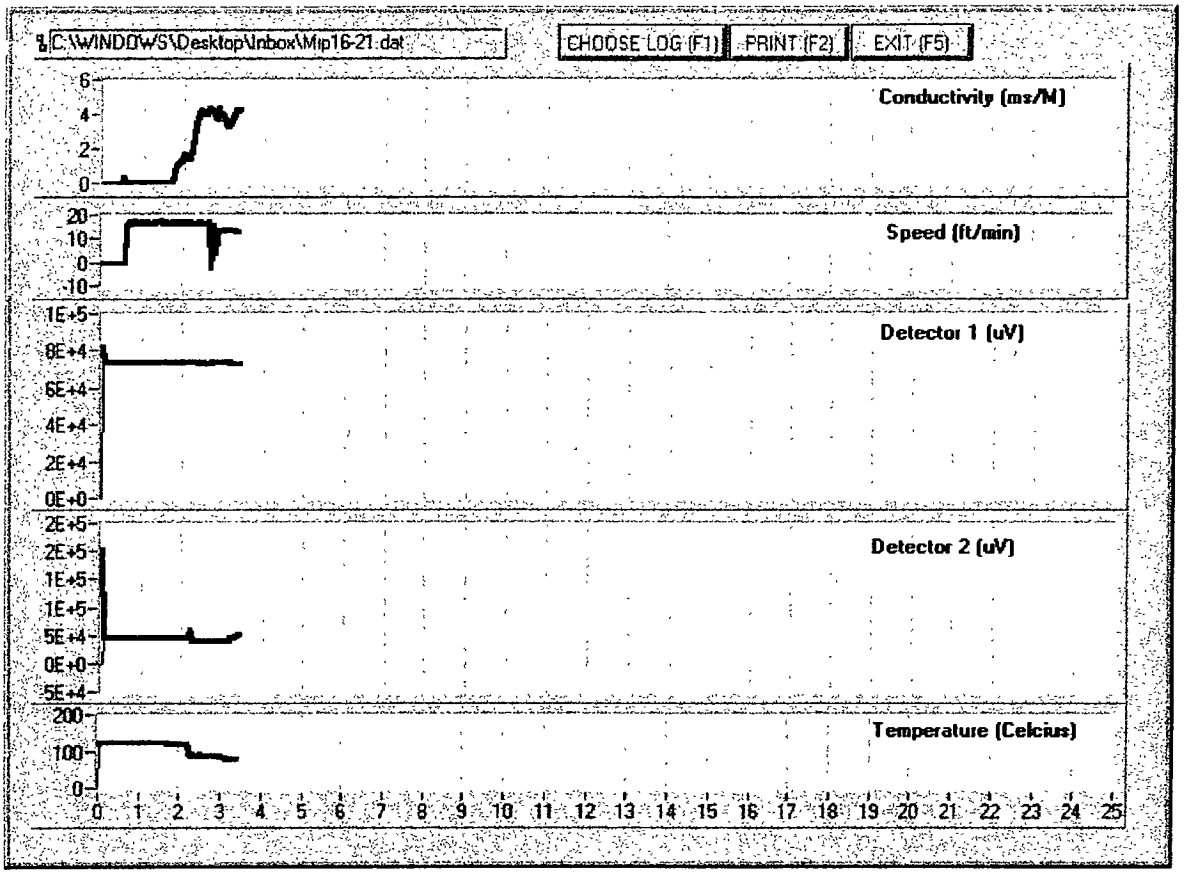
LOG 16-20a



A second attempt at the same location, this log is featureless with the exception of a slight increase in the ECD signal after 26'BG. It may or may not an indication of a contaminated zone similar to the one observed at the similar depth on 16-21a (see page 2 of this document). Unfortunately, a refusal was encountered before this reading could be confirmed.

Below are logs recorded on 4/17:

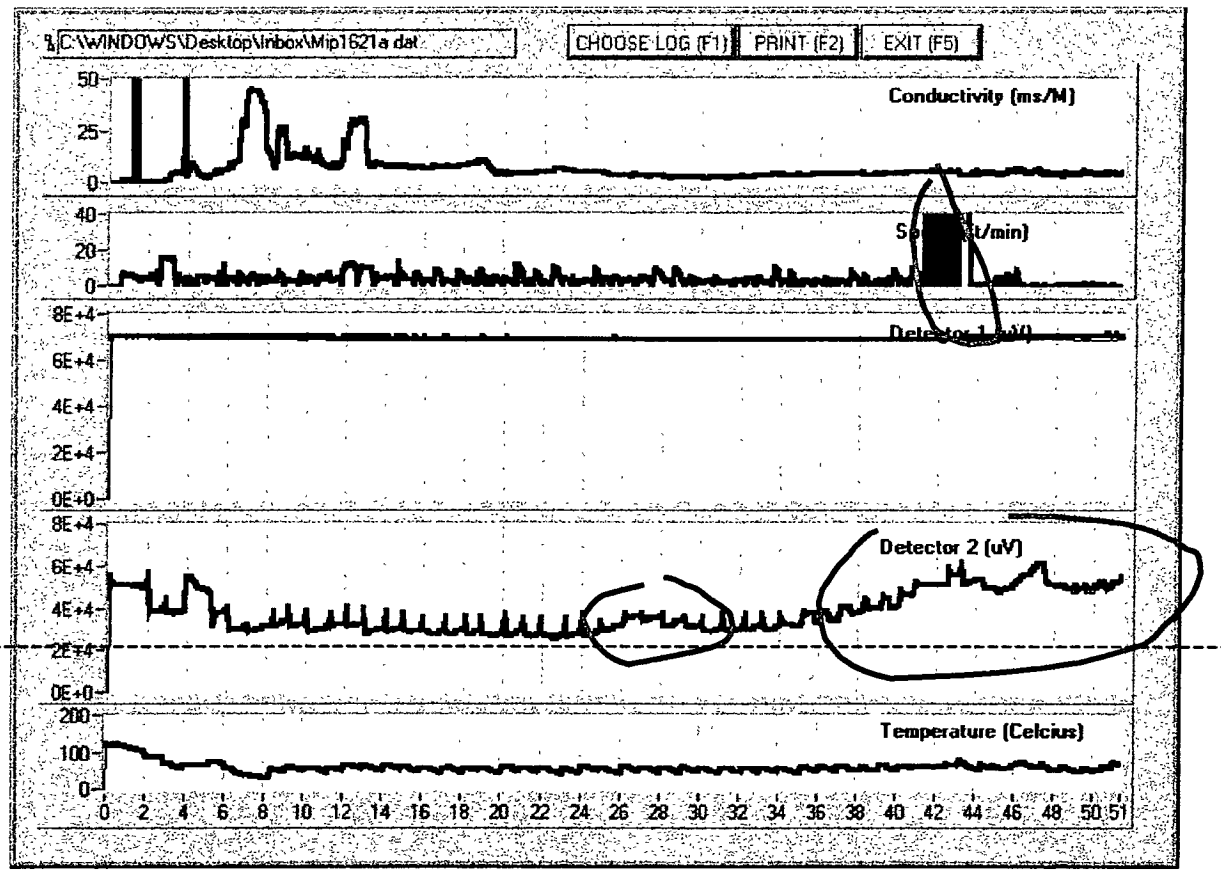
LOG 16-21



Blind probed to 2ft, MIP Refusal @ 3.38.

Loose linear transducer connection

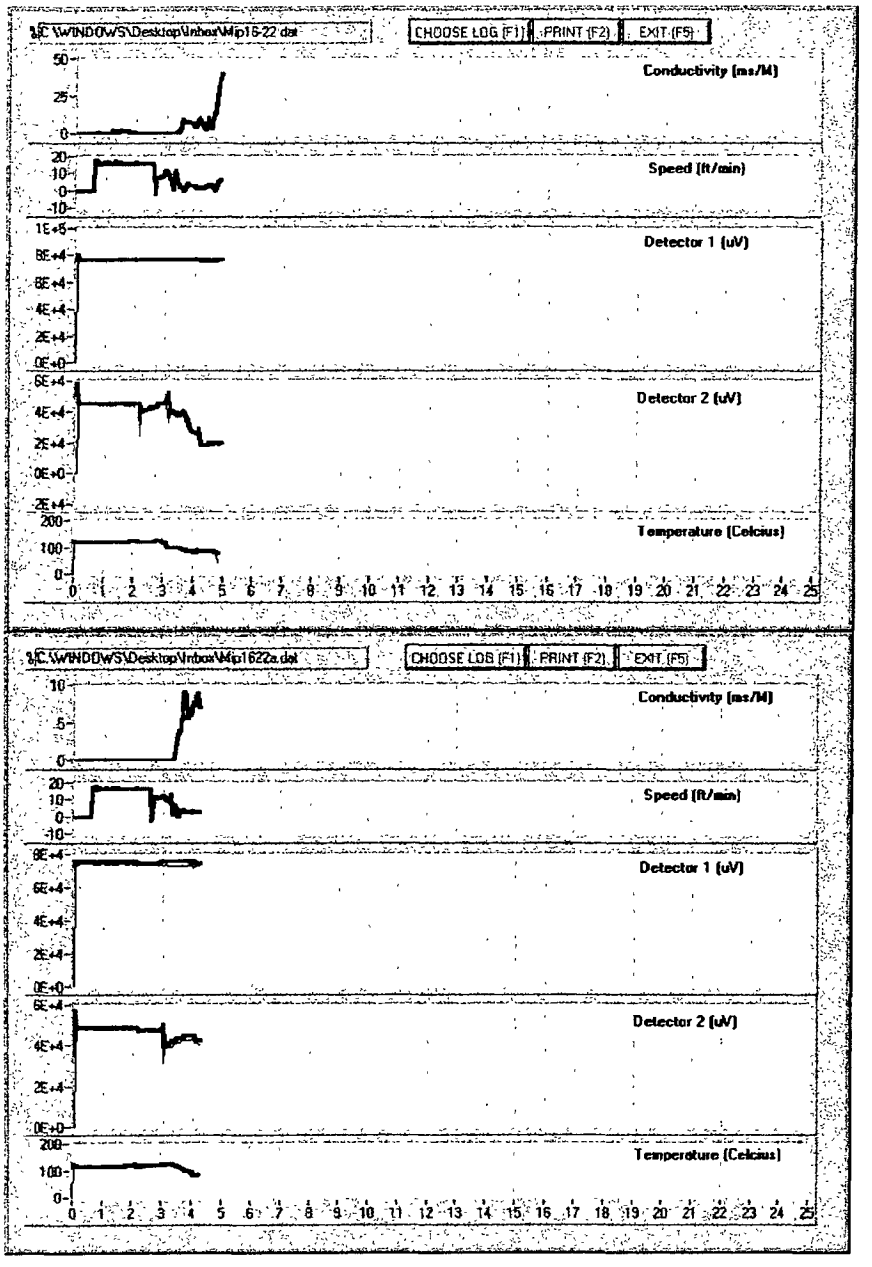
LOG 16-21a



Logged to refusal @ 51.44 ft ; really tight drilling @ 40-48ft.
NOTE: The ECD output looks different from what you've seen on the logs before: the signal line is jagged. This is due to the fact that logging is done without the in-line dryer which Brent had to remove last week after the damage occurred to it during the accidental water break through last Thursday. The absence of the dryer increases signal noise which leads to a slightly higher detection limits. The part is custom-made by Perma-Pure Inc.; a replacement dryer and a back-up unit have been ordered and will be installed as soon as they arrive.

This log features two distinct areas of contamination: 26-29' BG (low concentrations, close to the detection limit), and 37-51'BG (higher concentrations).

LOGS 16-22 and 16-22a

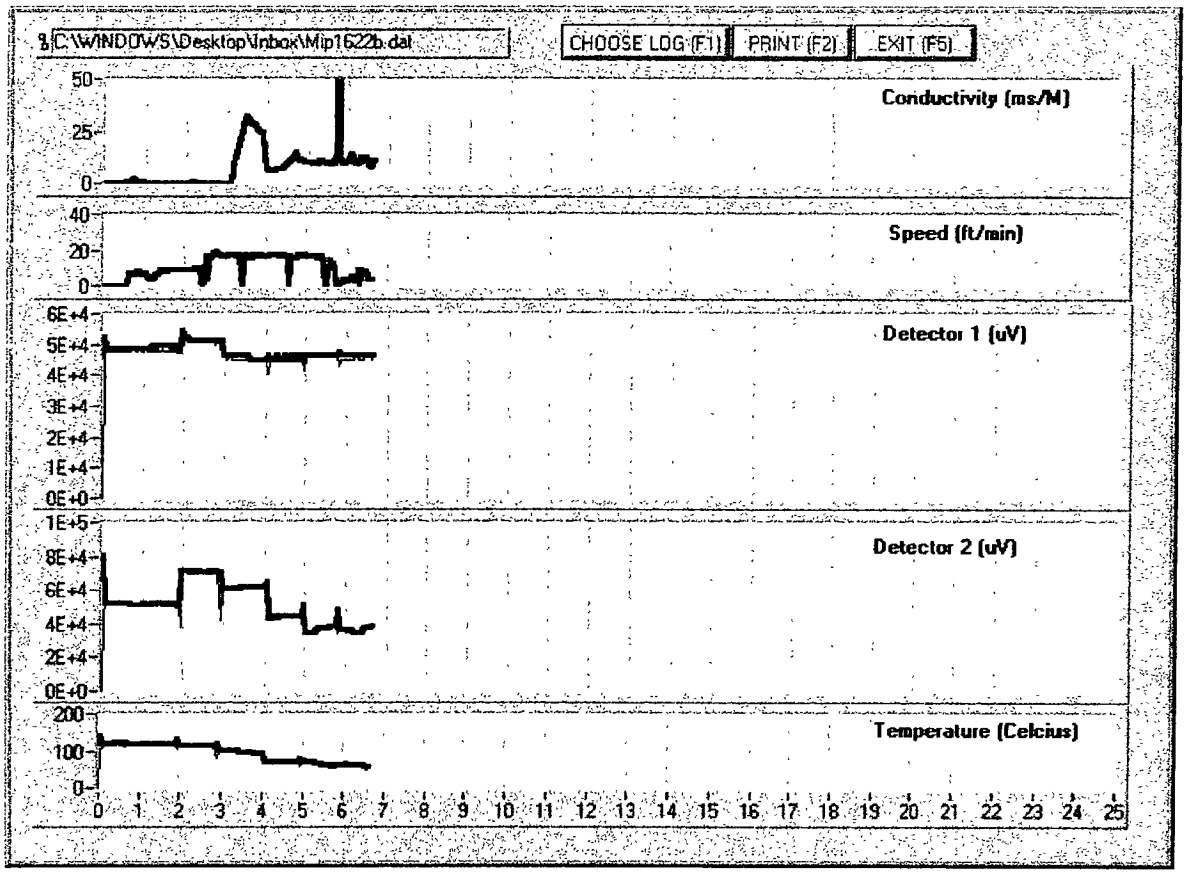


Shallow refusals were encountered during both attempts.

LOG 16-20

Logs recorded on 4/18:

LOG 16-22b



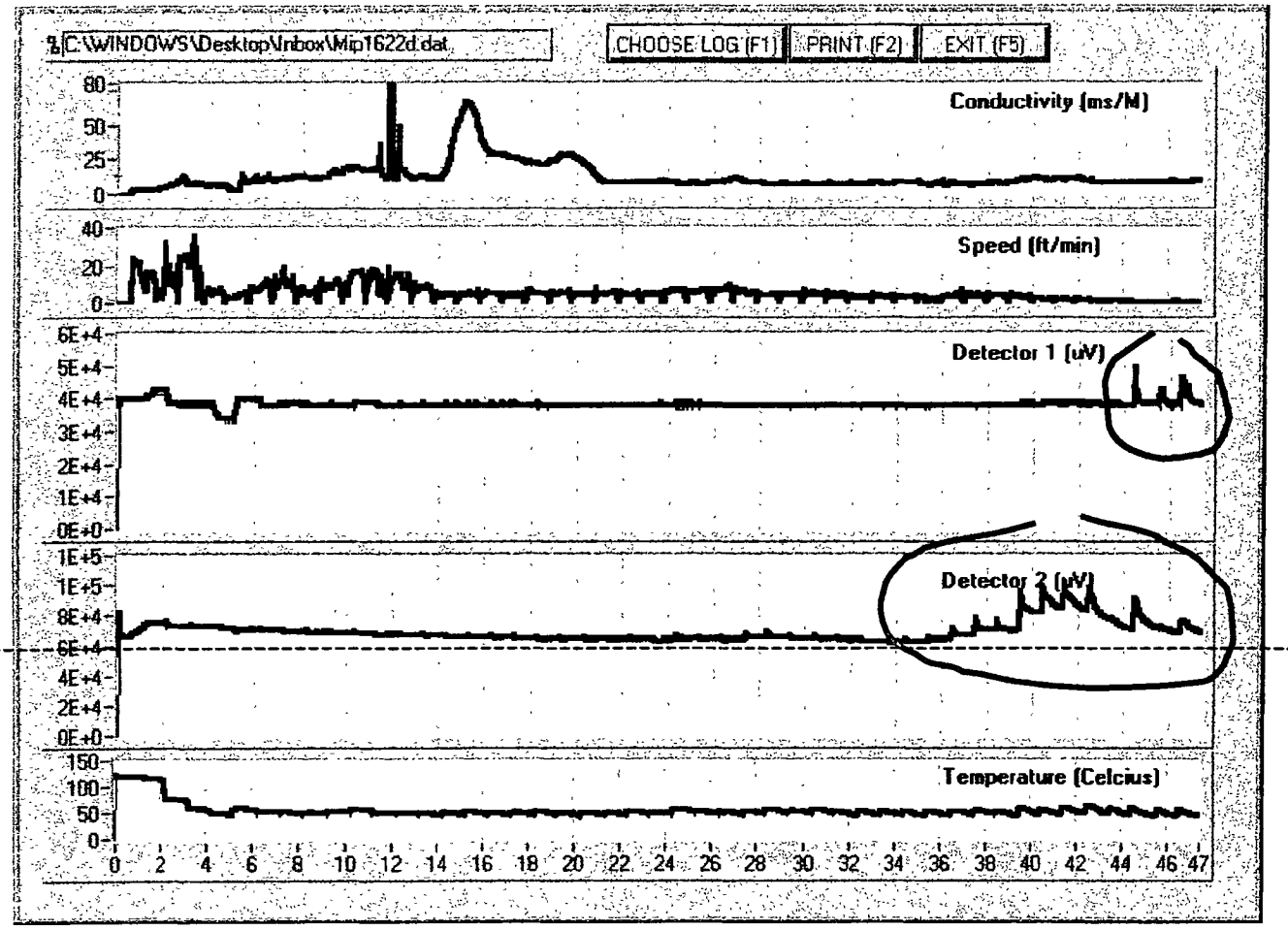
Refusal was encountered @ 6.61 ft .

LOG 16-14

LOG 16-04b - several refusals were encountered at depth of approximately 1' BG.

LOG 16-22c – membrane leak occurred at 3.5' BG; the probe was replaced.

LOG 16-22d

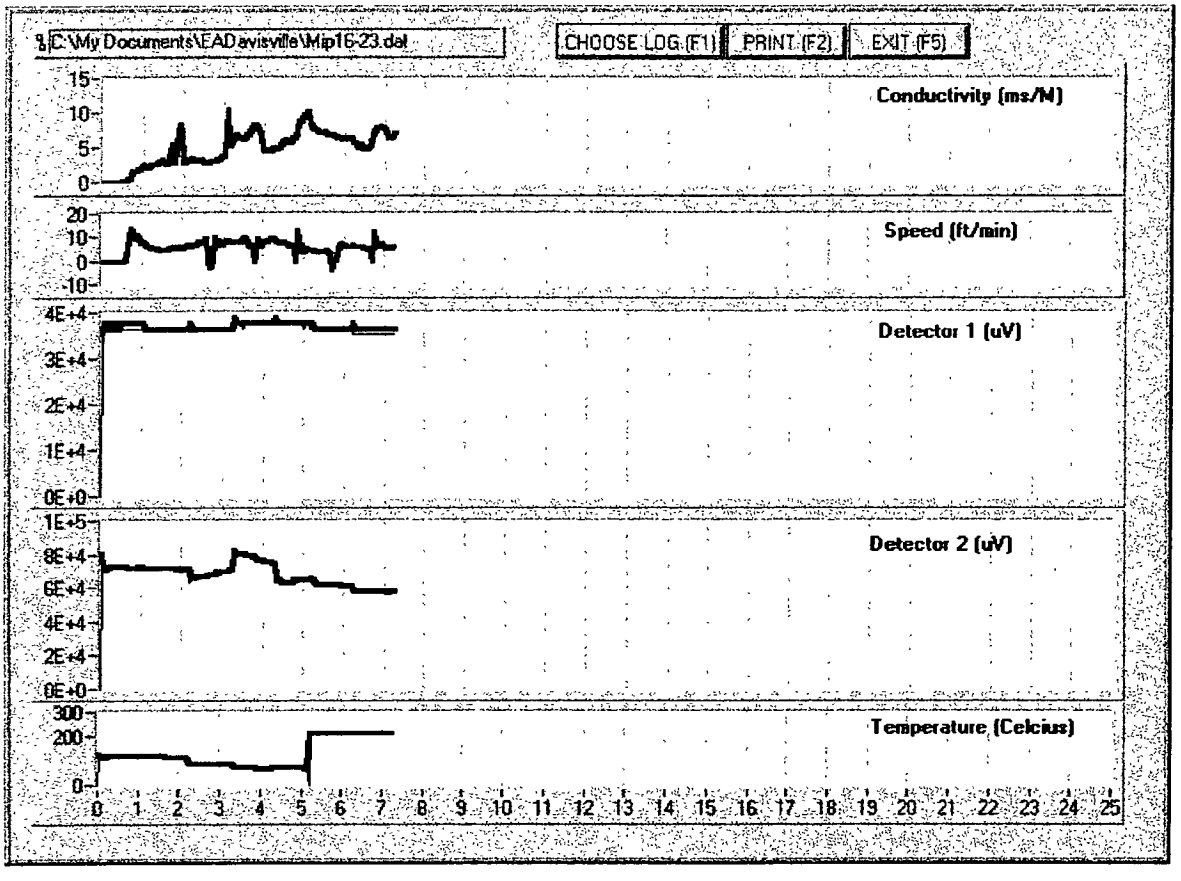


The ECD signal show a very well-defined contaminated zone at 36-47' BG (estimated ~ 1-5 ppm levels).
The ECD signal also shows area of low concentrations of the HHC at 27- 34' BG
The PID channel has several spikes below 44' BG. It is necessary to know particular chemicals present at that depth to provide accurate interpretation. It is very possible that the PID response represents daughter products of dechlorination of TCE, such as Vinyl Chloride. (The PID sensitivity increases with less chlorine content, while ECD sensitivity decreases).

At least four refusals were encountered prior to achieving the target depth at this location.

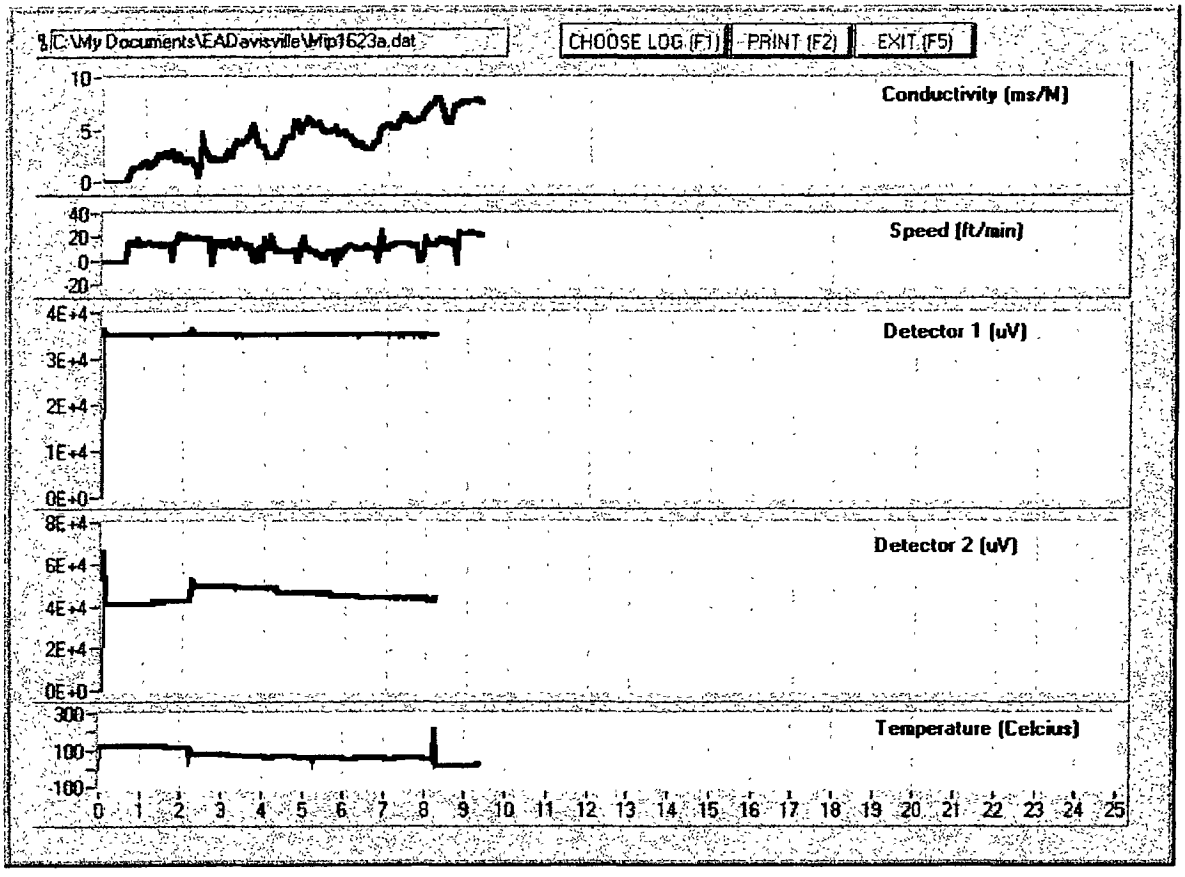
Below are logs recorded on 04/26:

LOG 16-23



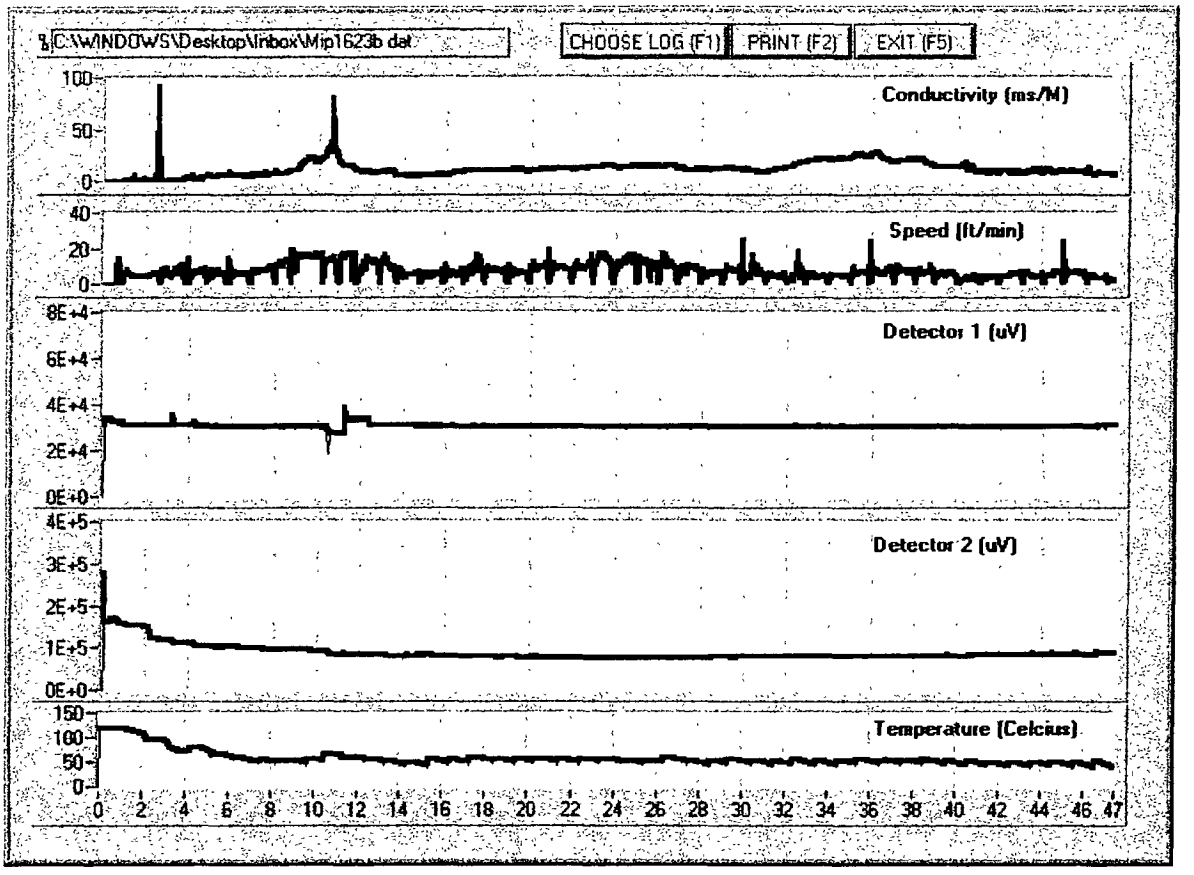
The probe heater malfunction prevented the field crew from completing this log. The probe was replaced.

LOG 16-23a



This log was also stopped due to the equipment malfunction. The trunk line was replaced.

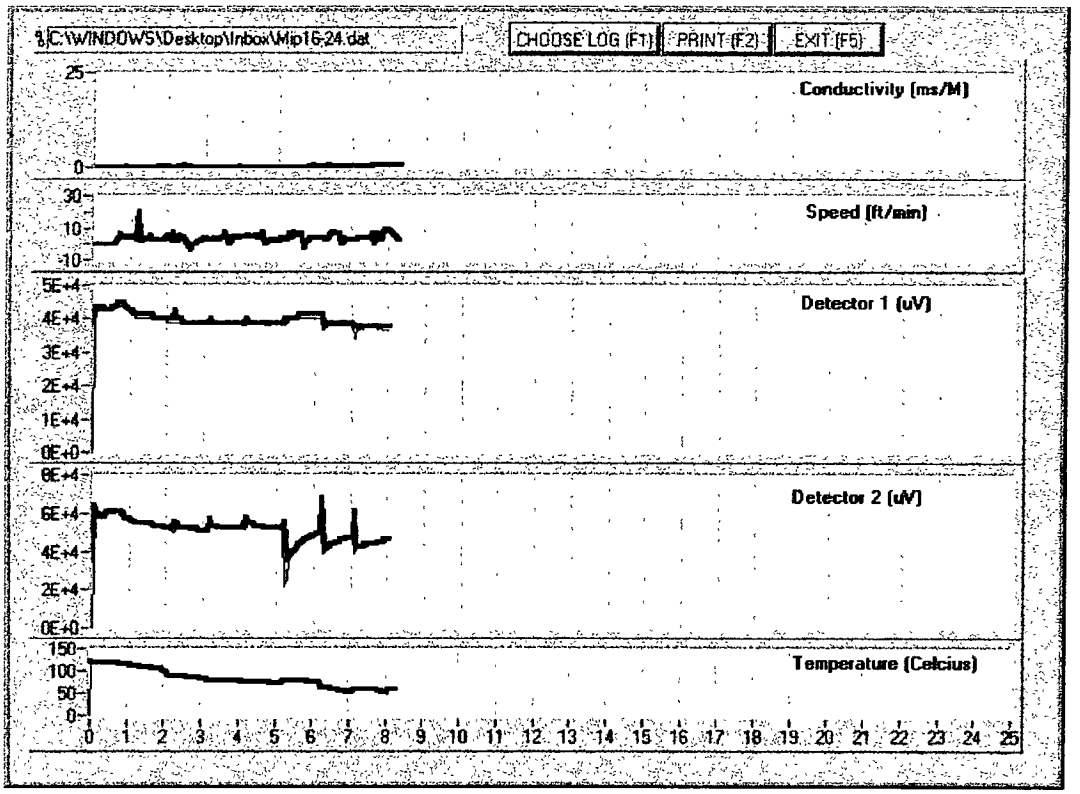
LOG 16-23b



This log was completed to a refusal at 47.46' BG. The PID channel shows a very small signal increase at 11' BG, which may be interpreted as trace amounts of BTEX, though very inconclusive.
The ECD channel shows no response throughout the logged interval.

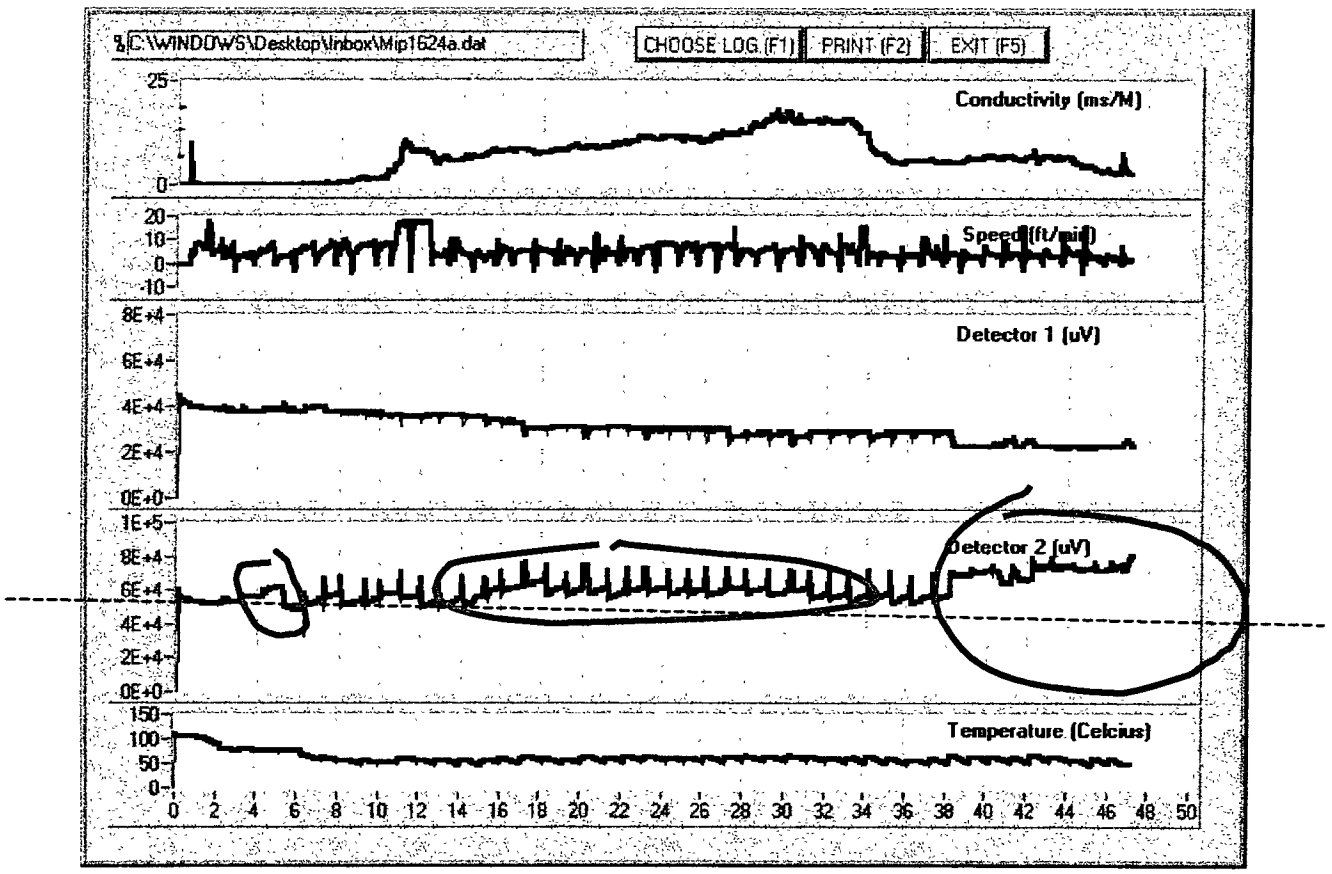
Logs recorded on 4/19:

LOG 16-24



A refusal was encountered at 8.3' BG. Information from detectors inconclusive.

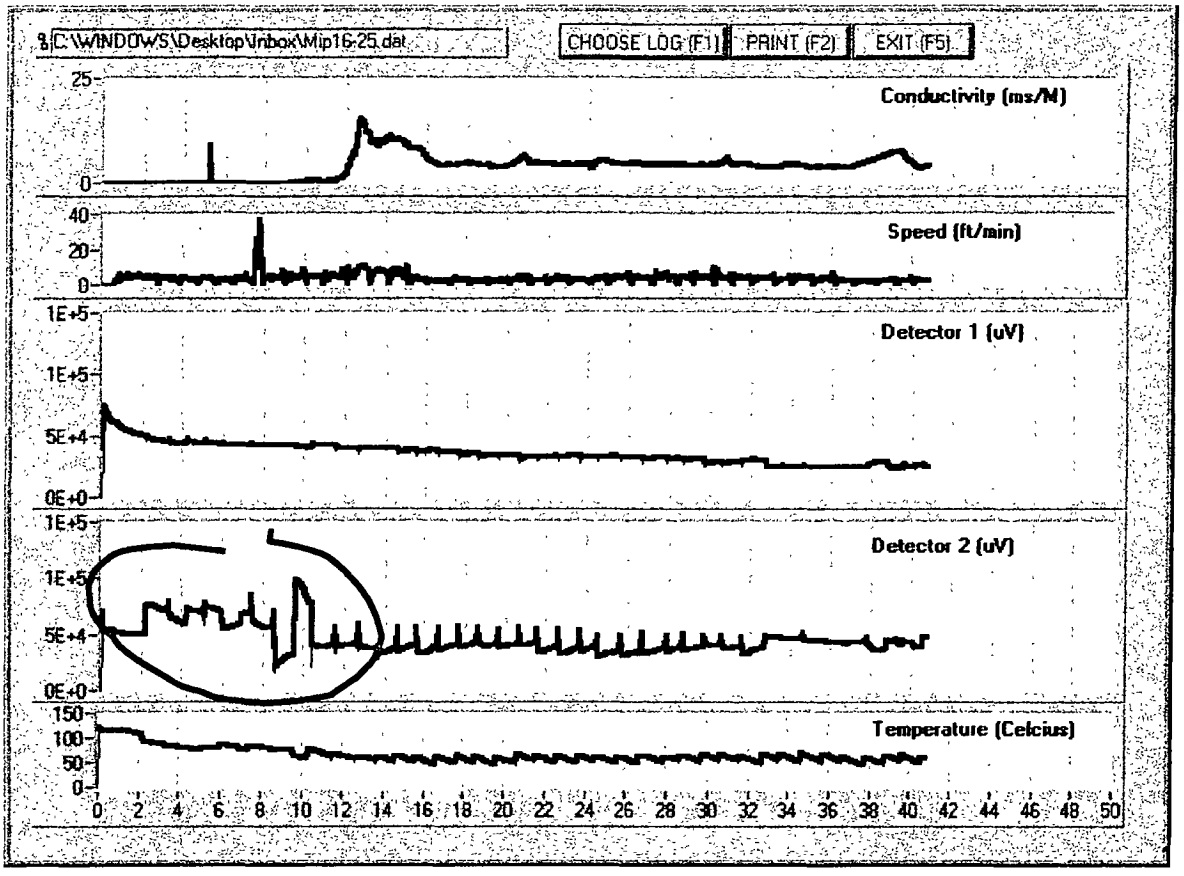
LOG 16-24a



On this log the ECD detector shows three distinct areas with chlorinated contamination present: at 4-5' BG, 15-34' BG – both at very low levels, and 38-47' BG – at higher levels. Similar to other logs at this site, the ECD signal was still climbing at the moment when refusal was encountered.

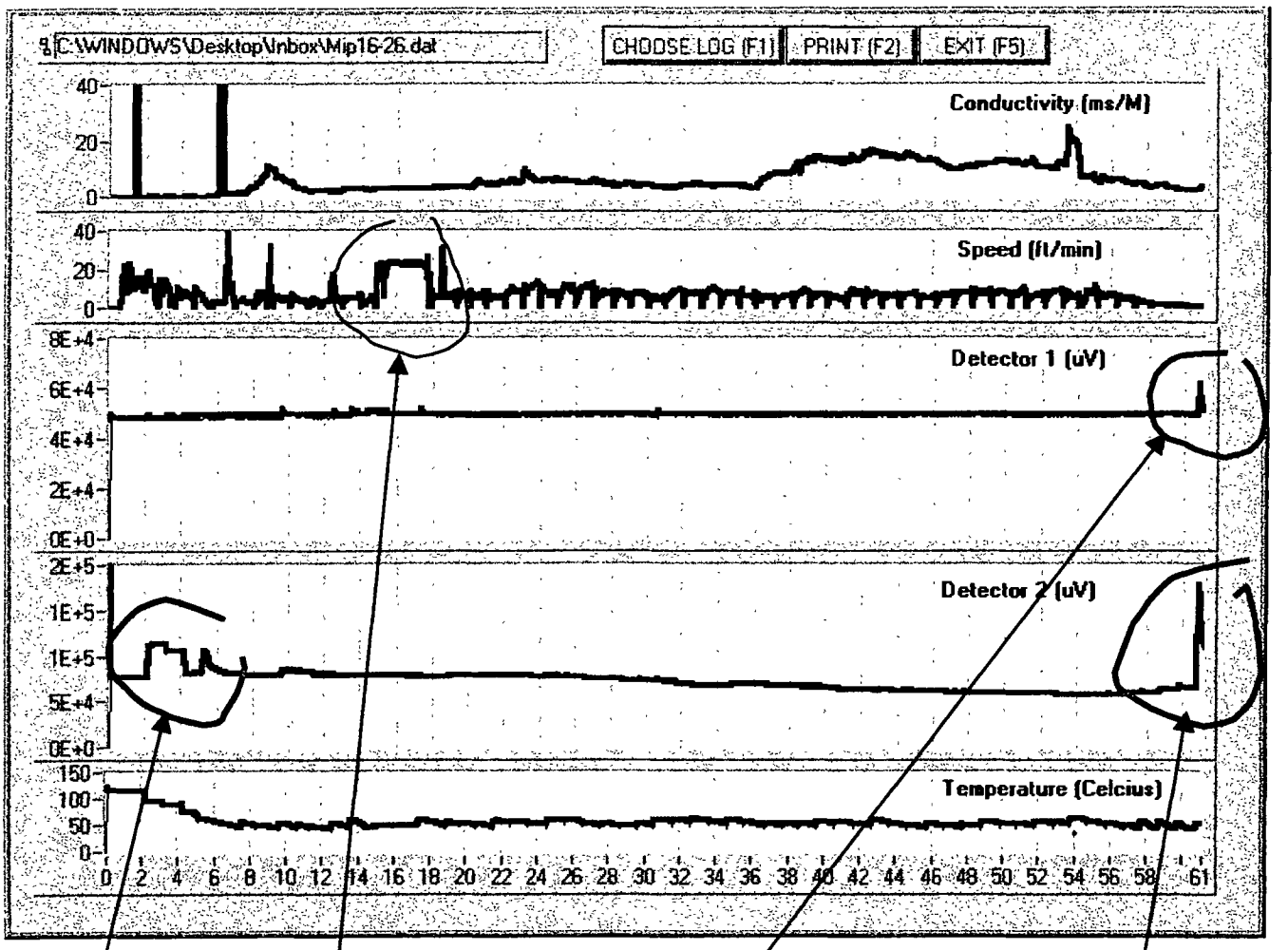
The PID signature in the 12-38' interval suggests the presence of low concentration of SVOC.

LOG 16-25



This log shows signs of low-level contamination at 2-11' BG. The rest of the log does not show the signal levels exceeding signal noise.
Initial high baseline on the PID can be caused by either surface soil contamination (motor oil spill, etc.) or by high levels of hydrocarbons in ambient air (upwind source of engine exhaust).

LOG 16-26



Shallow ECD hit

Depth measurement error

Deep PID hit

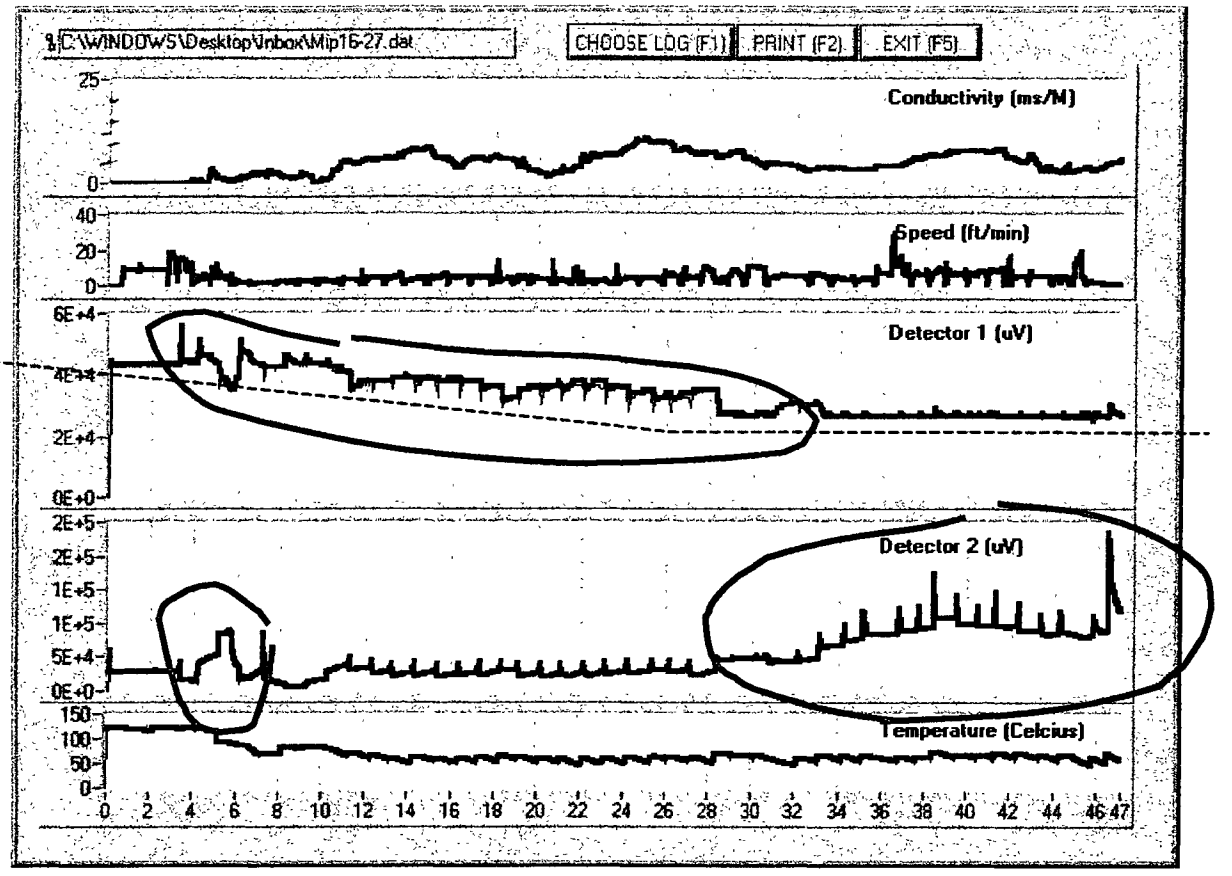
Deep ECD hit

A depth measurement error occurred at 15' BG, causing the data acquisition software to log additional 3 feet while probe was not moving in the soil. In order to get correct depth measurement, 3' should be subtracted from all the depth data below 15' BG.

The ECD channel shows two distinct areas with chlorinated contamination present: 2-6' BG and 55-58'BG (corrected depth). The sharp increase in ECD reading, backed up by small increase in otherwise very stable PID signal, observed towards the very bottom of the borehole hints on possibility of much higher concentrations at greater depth (possibly on top of bedrock).

The absence of initial dip of the ECD signal upon entering the water table is an indication of the presence of low concentrations of dissolved HHC in shallow groundwater. Confirmatory sampling is highly recommended in order to establish correlation with actual concentrations in the groundwater.

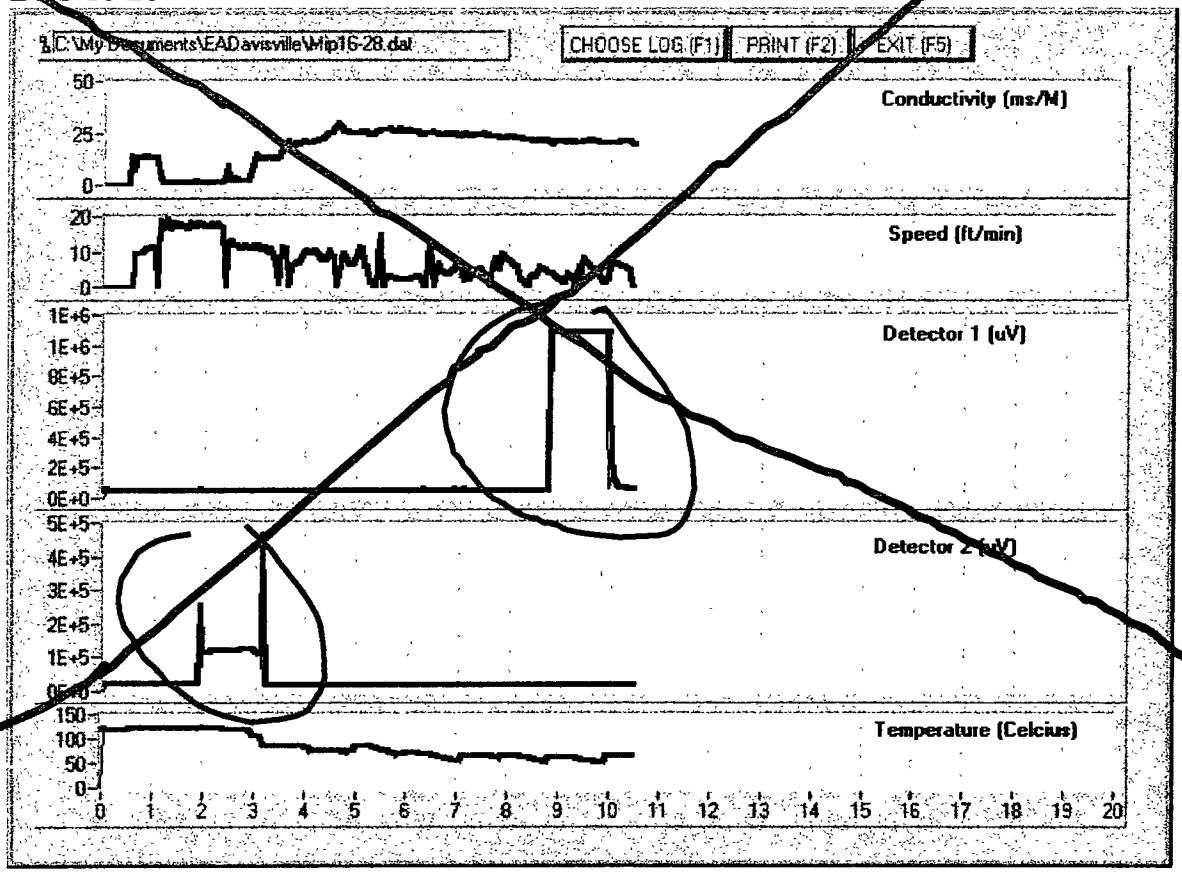
LOG 16-27



This log features what appears to be an extensive zone of SVOC contamination between 3 and 33' BG (PID signal, Detector 1), and two zones of chlorinated contamination: at 4-7' BG (at the groundwater interface), and 28- 47' BG (reaching it's maximum at 46.3' BG) – on the ECD signal channel, Detector 2. This last zone (28-47' BG) exhibits signal magnitude that corresponds to approximately 1000 ppb of total chlorinated VOCs, based on correlation established on other sites.

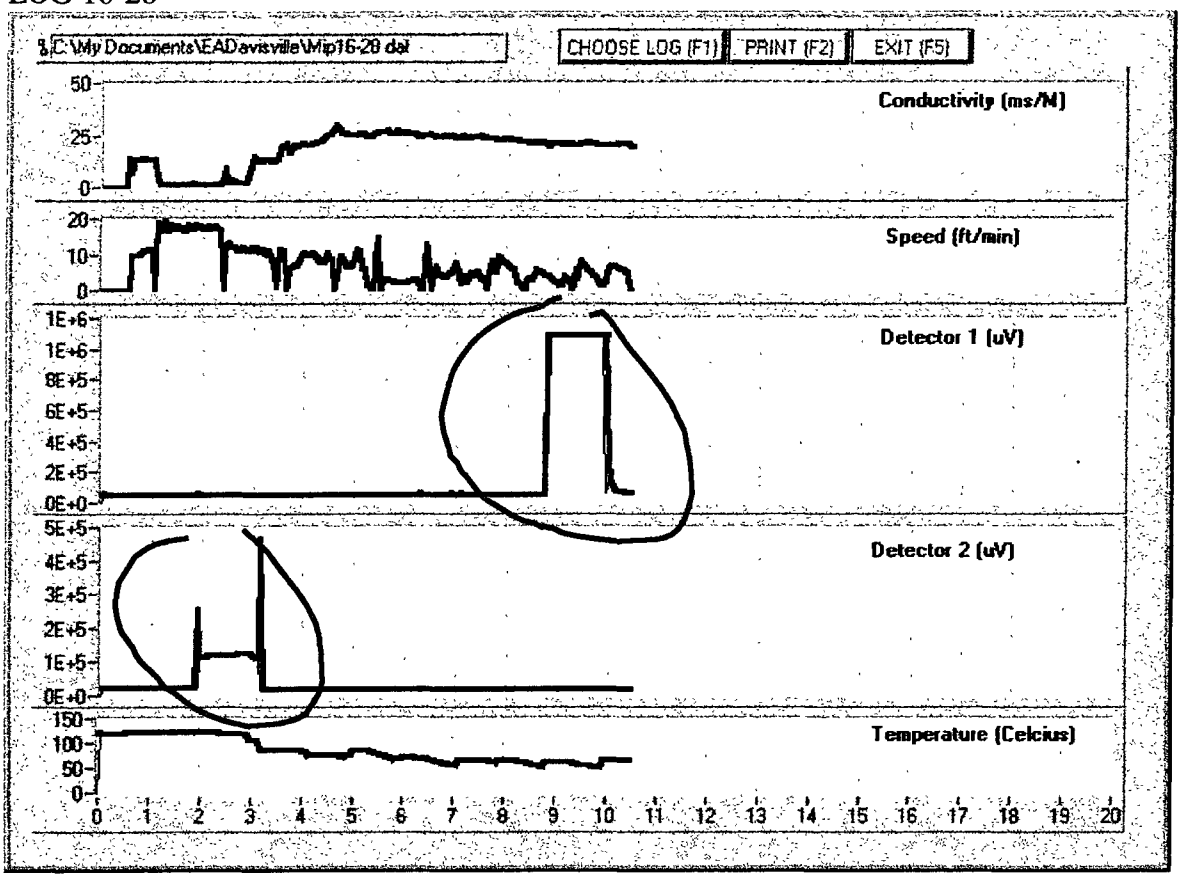
NOTE: The original 16-28 log can not be considered valid due to the fact that a water breakthrough has occurred in the course of logging. The data below, copied from the last data interpretation file covering logging done on 4/10-4/11 ARE NOT VALID:

LOG 16-28



The log shows two distinct areas of contamination: 2-3'BG with Halogenated hydrocarbons present (estim. high-ppb levels); and 8.75-10'BG where there is a clear indication of high concentrations of BTEX compounds.
A refusal was encountered at 10.5' BG.

LOG 16-28

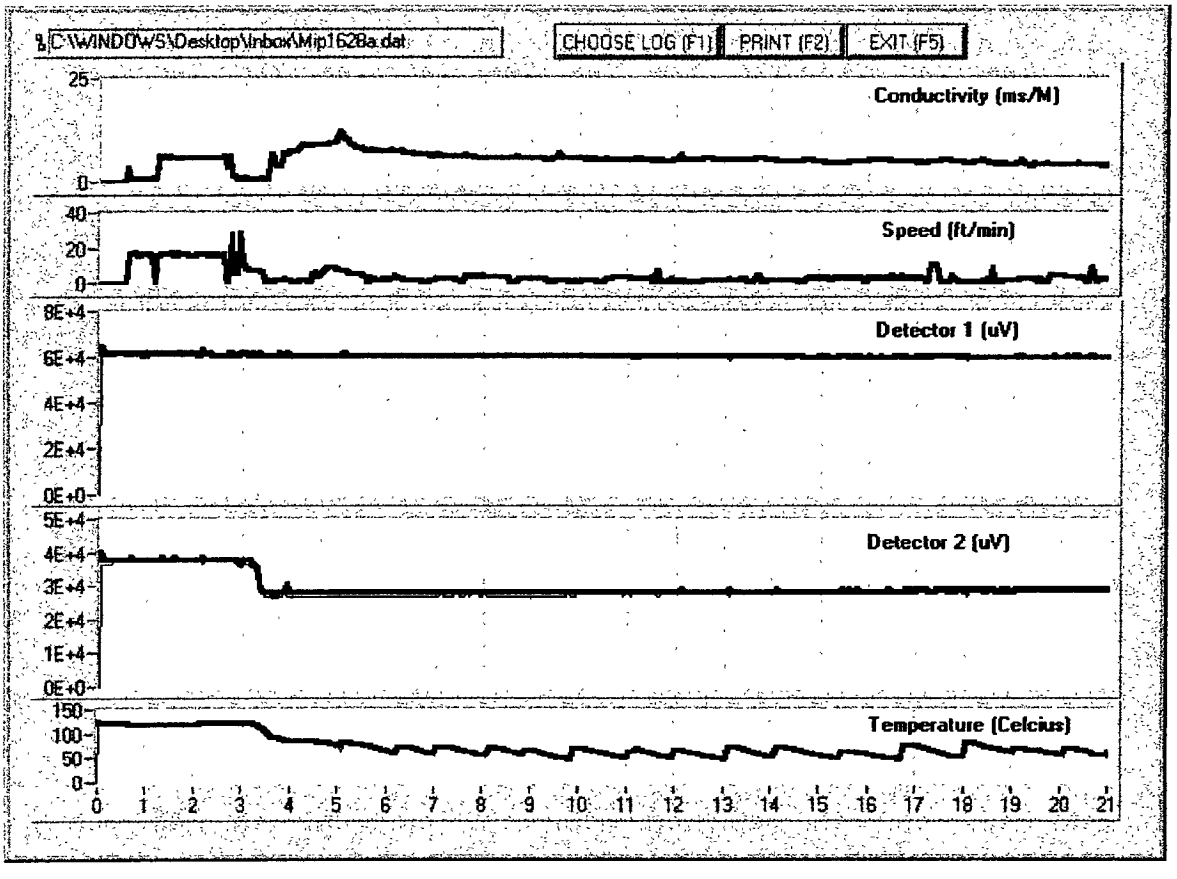


The log shows two distinct areas of contamination: 2-3'BG with Halogenated hydrocarbons present (estim. high-ppb levels); and 8.75-10'BG where there is a clear indication of high concentrations of BTEX compounds.
A refusal was encountered at 10.5' BG.

The following two logs 16-28a and 16-28b were additional attempts to complete logging at that location.

16-28a encountered a refusal at 21'BG:

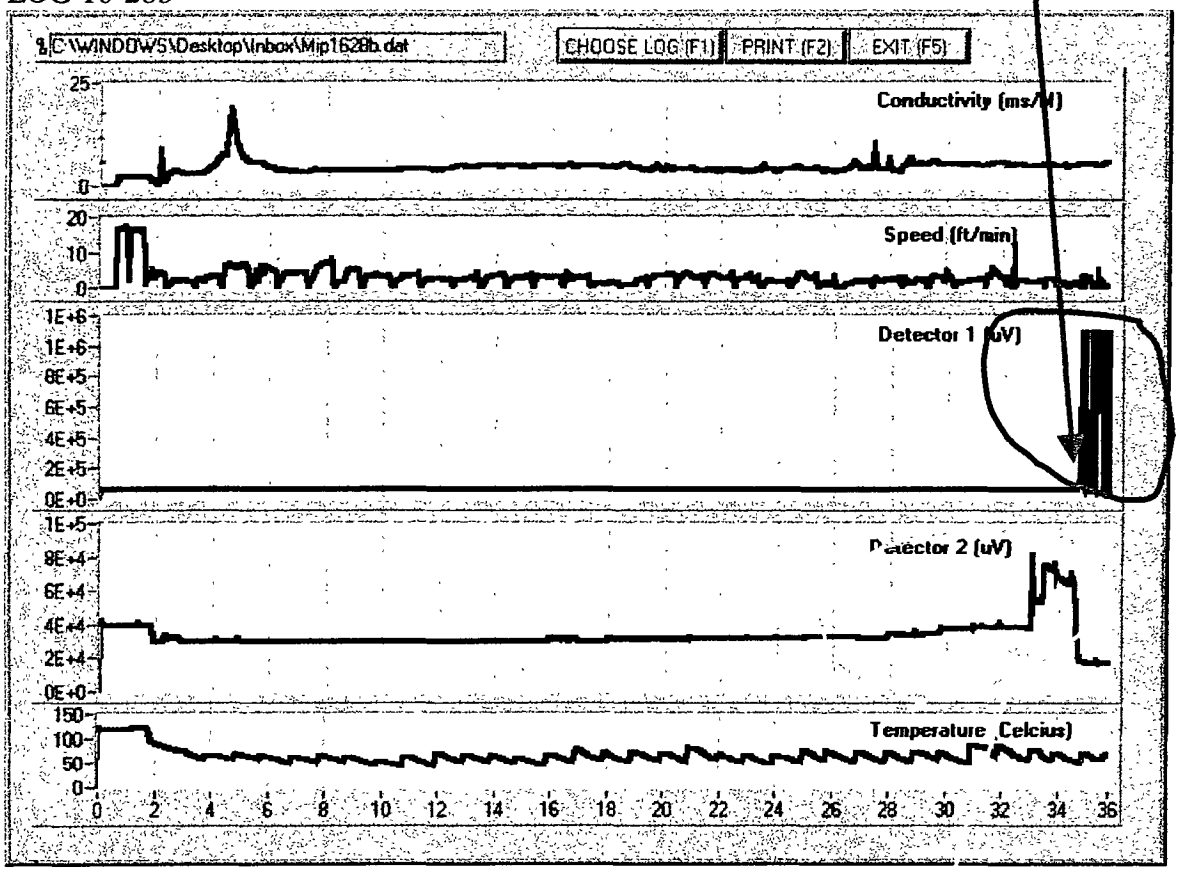
LOG 16-28a



During logging at 16-28b, an apparent hit was detected at beginning at 28' BG an ending at 34.5' when the probe membrane was ruptured which led to extensive damage to the system. The hit detected by the ECD (Detector 2) is the highest observed so far at this site.

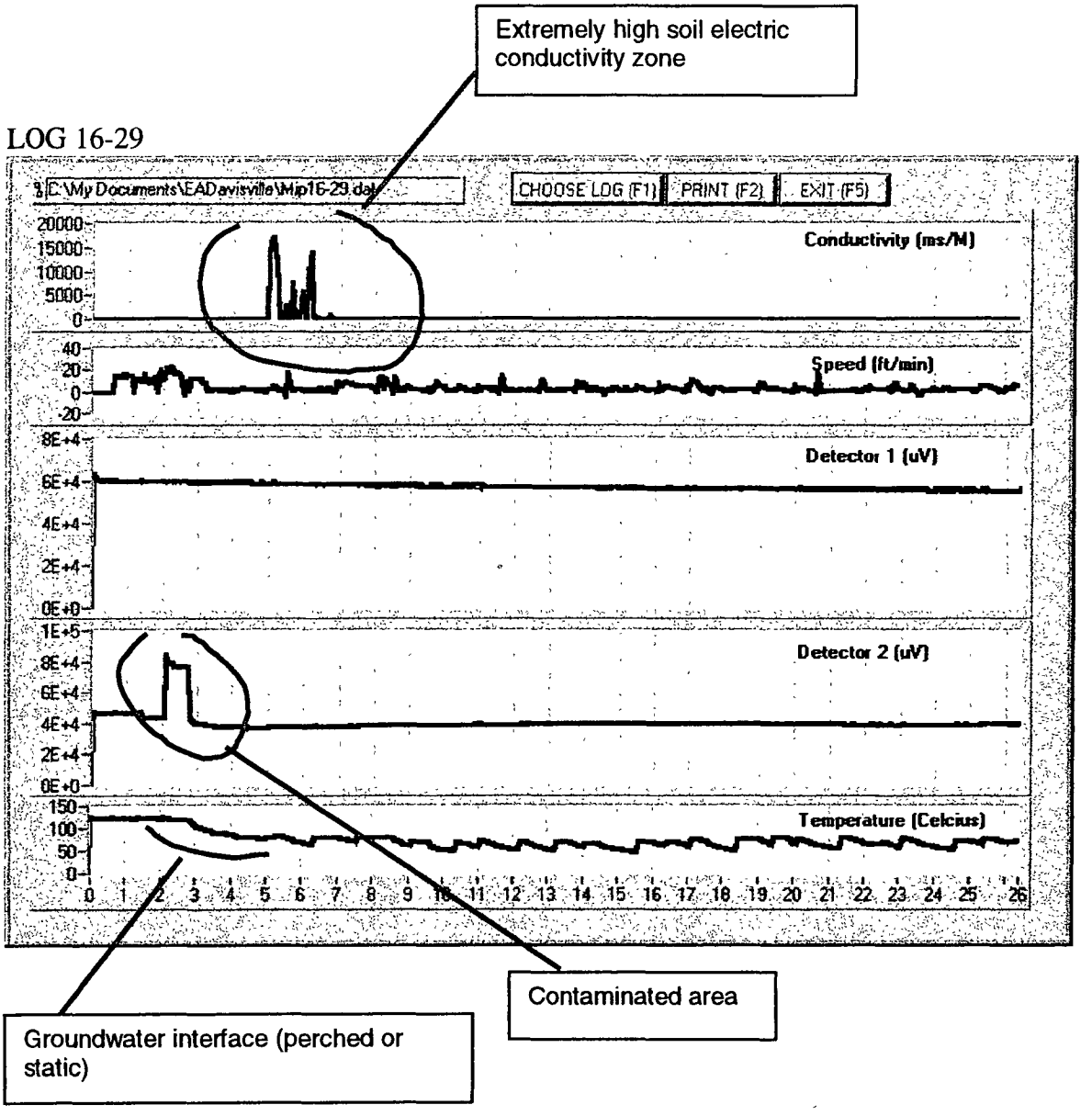
Membrane rupture

LOG 16-28b



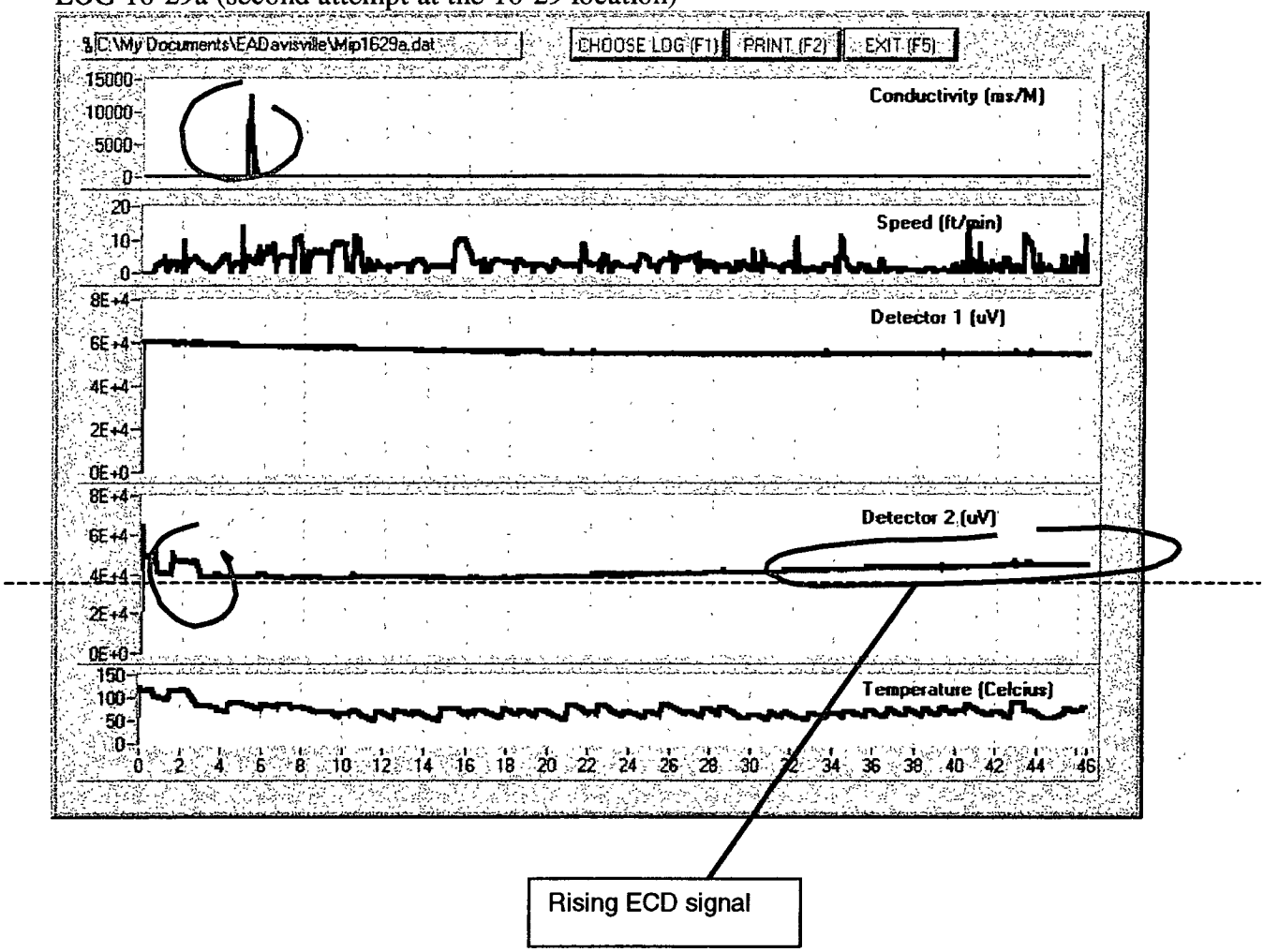
ECD hit

LOG 16-29



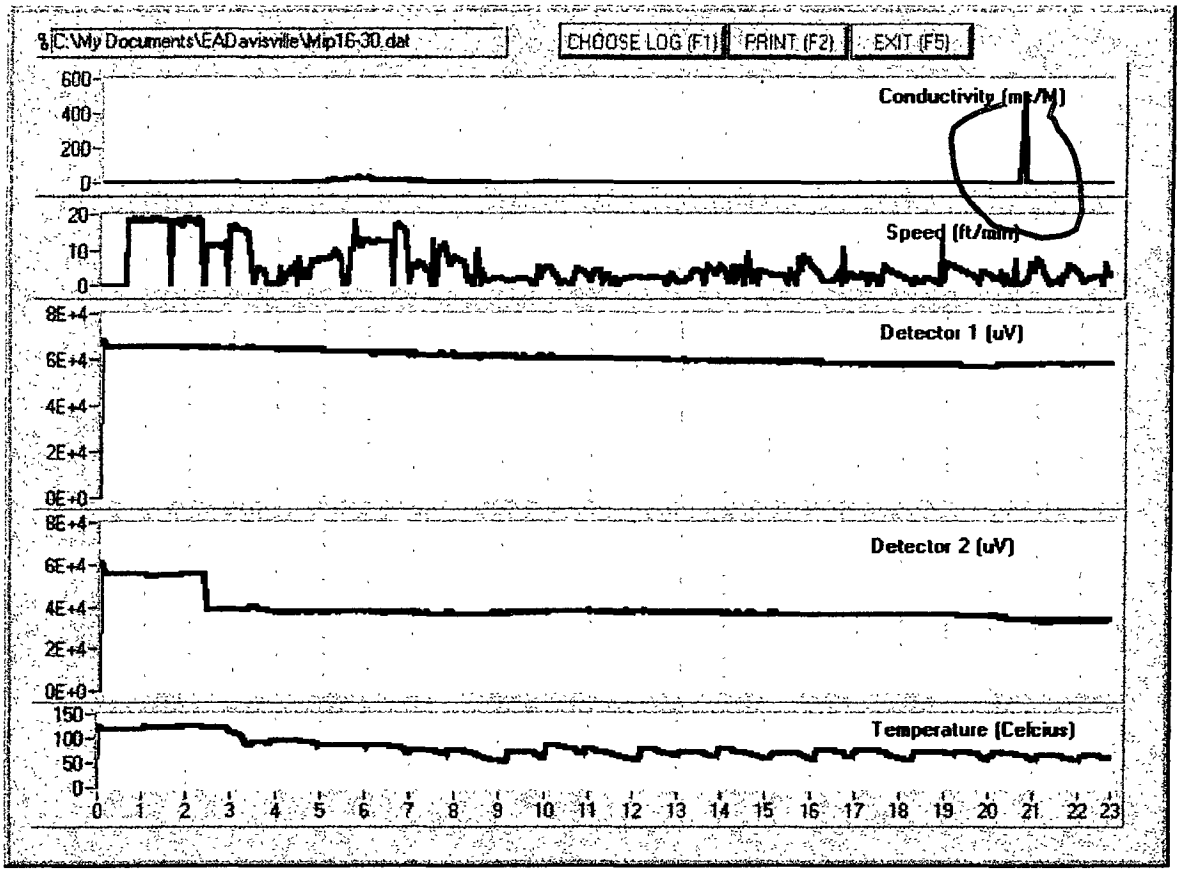
This log features a shallow HHC-contaminated area at 2-3'BG, similar to the one observed in the previous log.
Note the extremely high soil conductivity in the 5-6.5' BG interval. Values over 10,000 mS/m are likely to indicate the presence of electrolyte or small metal fragments in the soil.
A refusal was encountered at 26.5' BG.

LOG 16-29a (second attempt at the 16-29 location)



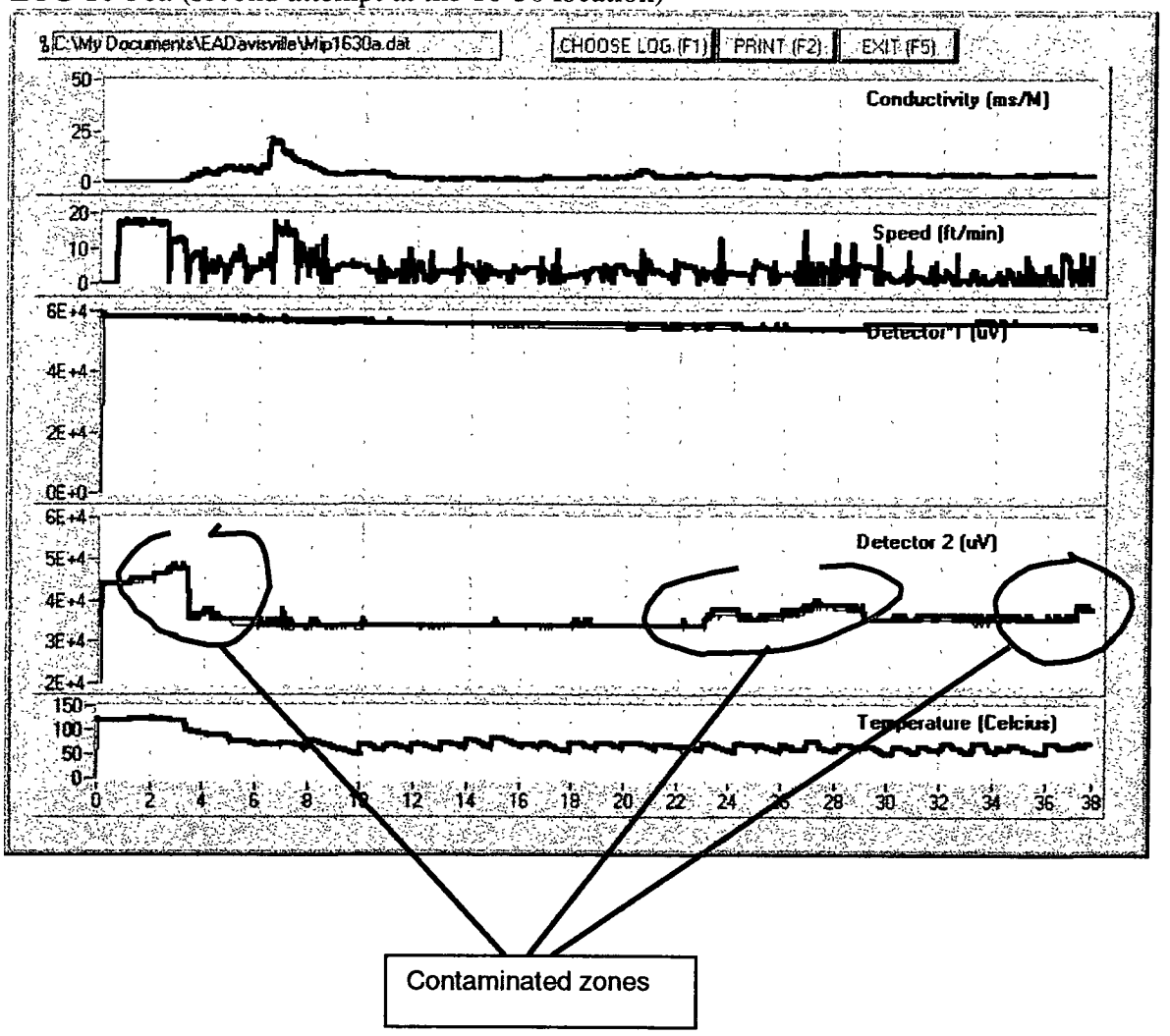
This more successful attempt to get to the target depth features both the shallow contaminated zone at 2-3' BG and the high electric conductivity zone at 6' BG, although both areas are less remarkable than on the previous log. Also note rising ECD baseline with the depth. This effect becomes noticeable after 28' BG, and should be attributed to the increase in HHC concentrations, though officially not in the detectable by MIP levels.

LOG 16-30



This log is rather unremarkable: both detectors show ND, a refusal was hit at 23'BG. Soil conductivity channel shows a spike at 20.75' BG, possibly a salt water intrusion.

LOG 16-30a (second attempt at the 16-30 location)



This log shows three contaminated zones:

1. 2-3'BG – very minor response, but it is a positive
2. 23-29' BG – a well defined chlorinated contamination in low hundreds of ppb-s
3. 37'- BG – the ECD signal started to go up immediately before the refusal

I would like to point out again that the MIP system in present configuration has a confirmed detection limit for chlorinated VOC in the vicinity of 190 ppb. Anything below may or may not be detectable.

AN 4/12/00 12:25pm

Appendix D

Stage I and II
Boring Logs

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N. 194083 E 522726
Surface Elevation:	33.9 FT MSL
Well Riser Elevation:	35.9 FT MSL

Job. No 29600.97	Client EFANE NCBC Davisville	Location: SITE 16
Drilling Method Moble B-61 Drill Rig		Boring No. **MW16-01S**
4 in. ID steel casing drive and wash		
Sampling Method 2 in. split spoon sampler driven 24 in with 140 lb hammer		Sheet 1 of 1
Drilling Water Level		Start 12/20/00
Date		Drilling Date/Times
Time		Finish 12/20/00
Surface Conditions woodland		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
						10				
										Drilled through boulder
						11				3 to 5 ft bgs
						12				
						13			No sample taken 0-19, 21-27.5 ft bgs	
									See MW16-01D for log	
						14				
						15				
						16				
						17				
						18				
2" SS	24 19	19	19-21	NA	17 15	19		SM	Olive brown very fine to fine SAND, some silt, trace fine subrounded to subangular gravel	
					12 12	20			Sample submitted for laboratory analysis	
						21				
						22				
						23				
						24				
						25				
						26				
						27				
						28				
						29				

Logged by: Tom Biolsi Date: ########

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	17.5-27.5 ft bgs	Sandpack:	15 5-27.5 ft bgs	Grout:	13 5 to grade
Bottom of Hole:	27.5 ft bgs	Riser Interval:	17 5 ft bgs - 3 ft ags	Bentonite.	13 5-15 5 ft bgs	Cover:	stickup

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job No	29600 97
Client.	EFANE NCBC Davisville
Location	SITE 16
Drilling Method.	Acker AD II Rig 4 in ID steel casing drive and wash
Boring No	**MW16-01D**
Sampling Method	Split Spoon Sampler driven 24 in with 140 lb hammer
Sheet	1 of 3
Coordinates:	N: 194077 E: 522760
Surface Elevation	33 9 FT MSL
Well Riser Elevation	36 0 FT MSL
Drilling Water Level	
Date	
Time	
Surface Conditions	woodland
Start	5/12/2000 10 25
Drilling Date/Times	
Finish	5/15/2000 9 15

Sample Type	Inches Driven/In Recvrd	Dpth Csg (ft)	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	Comments
2" SS	24 18	0	0-2	0 0	7 6	0		0-6 in · SAND, minor silt and root fibers, dark grayish brown, minor gravel 0 5" dia , damp	
					9 10	1		6-18 in · olive brown fine to medium SAND	
2" SS	24 18	0	2-4	0.0	11 11	2	SP	olive brown fine to medium SAND, damp	
					14 65	3			
2" SS	24 15	4	4-6	0 0	16 31	4	GP	0-3 in : Very dark gray fine angular to subangular GRAVEL, some coarse sand	
					21 16	5		3-15 in Very dark gray SILT, minor fine to medium gravel, minor stained sand nodules in silt matrix<0.5" dia	
2" SS	24 20	4	6-8	0	9 20	6	ML	Very dark gray SILT with minor F-M gravel<0 5" dia ,	
					19 13	7		minor stained sand nodules in silt matrix<0 5" dia	
2" SS	24 6	8	8-10	0	67 68	8	SP	Very dark grayfine to coarse SAND with some gravel subangular to subrounded, very dark gray, damp	
					42 16	9			
2" SS	24 24	8	10-12	0	12 15	10	SP	0-20 in olive brown very fine to fine SAND, damp 20-24 in. Fine to medium SAND with trace gravel	
					13 12	11			
2" SS	24 12	12	12-14	0.2	12 12	12	SP	Fine to coarse SAND with some gravel subangular to subrounded, damp, iron staining throughout	
					13 12	13			
2" SS	24 6	12	14-16	0 2	9 11	14		Fine to medium SAND with interlayered lenses of very fine to fine sand, minor iron staining, damp	
					14 16	15		at 5" olive gray fine to medium sand with trace gravel, moist	
2" SS	24 4	16	16-18	0 3	4 6	16		Olive brown very fine to fine SAND with some medium sand, moist	
					8 11	17			
2" SS	24 16	18	18-20	0.9	9 12	18		dark olive gray very fine to medium SAND with trace gravel 0 75" dia , subangular to subrounded	
					12 13	19		5" layer of F-M gravel<0.5" dia , wet	

Logged by: Jeff Norberg Date: 5/16/2000

Drilling Contractor: Subsurface Drilling and Remediation Driller: Mike Lagare/Jim Goldthwait

WELL SPECIFICATIONS:

Diam of Riser:	2 in	Screen Interval.	48 5-58 5 ft bgs	Sandpack.	46.6-59 ft bgs	Grout	44 5 ft to grade
Bottom of Hole	67 5 ft bgs	Riser Interval	48 5-2 ft ags	Bentonite	45 5-46 6 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N: 194077 E 522760
Surface Elevation	33 9 FT MSL
Well Riser Elevation	36 0 FT MSL

Job No 29600 97	Client EFANE NCBC Davisville		Location SITE 16
Drilling Method Acker AD II Rig 4 in ID steel casing drive and wash			Boring No **MW16-01D**
Sampling Method split spoon sampler driven 24 in with 140 lb hammer			Sheet 2 of 3
Drilling Water Level			Start 5/12/00 1025
Date			Drilling Date/Times
Time			Finish 05/16/00 915
Surface Conditions	woodland		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	Comments
2"	24	18	20-22		14	20			0-11 in olive brownvery fine to medium SAND, wet	
SS	20			0	15			SW	11-20 in olive brown very fine to coarse SAND with	
					19	21			minor gravel, wet	
					21					
2"	24	22	22-24		7	22			Dark olive gray very fine to fine SILTY SAND with	
SS	16			0 3	7			SM	interlayered lenses (1" thick) of very fine to medium	
					10	23			sand	
					17					
2"	24	24	24-26		11	24			same as above with trace iron staining	
SS	12			0 6	12					
					14	25				
					15					
SS	24	26	26-28		10	26			same as above	
	15			0 6	12					
					15	27				
					17					
2"	24	26	28-30		5	28			same as above	
SS	16			0 3	6					
					7	29				
					13					
2"	24	28	30-32		9	30			same as above	Loss of 20 gallons of
SS	16			0 3	13					water 0-34' BGS
					13	31				
					23					
2"	24	32	32-34		12	32		ML	dark gray SILT, some sand, wet	
SS	15			0 3	13					
					15	33				
					15					
2"	34	34	34-36		15	34			same as above	begin using 2 5" split
SS	16			0 0	18					spoon and 300 lb.
					18	35				hammer from 34' BGS
					28					
2"	24	34	36-38		42	36			same as above	
SS	21			0 0	18					
					22	37				
					29					
2"	24	38	38-40		19	38			same as above	
SS	15			0 3	28					
					28	39				
					36					

Logged by. Jeff Norberg Date. 5/16/2000

Drilling Contractor Subsurface Drilling and Remediation Driller Mike Legare

WELL SPECIFICATIONS.

Diam of Riser	2 in	Screen Interval	48 5-58 5 ft bgs	Sandpack	46 6-59 ft bgs	Grout	44 5 ft to grade
Bottom of Hole	67 5 ft bgs	Riser Interval	48 5-2 ft ags	Bentonite	45 5-46 6 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates:	N. 194077 E 522760
Surface Elevation	33.9 FT MSL
Well Riser Elevation	36 0 FT MSL

Job No 29600 97	Client EFANE NCBC Davisville	Location SITE 16
Drilling Method Acker AD II Rig 4 in ID steel casing drive and wash		Boring No **MW16-01D**
Sampling Method split spoon sampler driven 24 in. with 140 lb hammer		Sheet 3 of 3
Drilling Water Level		Start 5/12/00 10 25
Date		Drilling Date/Times
Time		Finish 05/16/00 9 15
Surface Conditions	woodland	

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
SS	24 15	38	40-42	0 0 hs	14 16	40		same as above	
					21 28	41	ML		
SS	24 17	42	42-44	0.0 hs	9 11	42		same as above	
					9 11	43			
SS	24 21	44	44-46	0.0 hs	9 7	44	CL	very dark gray CLAY, some silt	
					6 5	45			Loss of 20 gallons of water 34-48' BGS
SS	24 22	46	46-48	0 0 hs	5 6	46	ML	very dark gray SILT, some clay	
					5 5	47			
SS	24 20	46	48-50	NA	5 7	48		very dark gray SILT and very fine to fine SAND bluish gray-light gray, large quartz-biotite gravel at 20"	
					7 11	49	SM	Sample submitted for laboratory analysis	Loss of 120 gallons of water 48-51 5' BGS
SS	24 12	46	50-51 5	0 0 hs	21 25	50		same as above	
					100	51			
								rollerbit with tricone drill 51 5-53' BGS	
						52	B		
SS	24 7	53	53-55	0 0 hs	18 15	53	GP	fine to coarse GRAVEL with some small cobbles<4" dia. quartz angular-subangular	
					10 12	54			
SS	24 24	53	55-57	0 0 hs	7 10	55	SP	0-6 in very dark gray very fine to medium SAND, coarse sand lenses, trace grave, subangular to subrounded	
					20 26	56	GP	6-24in. fine to coarse GRAVEL subrounded, some fine to coarse sand, small cobble, trace silt, clay	
SS	24 0	55	57-57 2	NA	50/2	57	RX	no recovery	
						58		rollerbit with tricone drill 57 2-62 5' BGS	Loss of 200 gallons of water 57 2-67.5' BGS
		59				59		cored 62 5-67 5 'BGS	

Logged by: Jeff Norberg Date: 5/16/2000

Drilling Contractor: Subsurface Drilling and Remediation Driller: Mike Lagare/Jim Goldthwait

WELL SPECIFICATIONS

Diam of Riser	2 in	Screen Interval	48 5-58 5 ft bgs	Sandpack	46 6-59 ft bgs	Grout	44 5 ft to grade
Bottom of Hole	67 5 ft bgs	Riser Interval	48 5-2 ft ags	Bentonite.	45.5-46 6 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194077 E: 522760
Surface Elevation:	33.9 FT MSL
Well Riser Elevation:	36 0 FT MSL

Job. No: 29600.97.3201	Client: EFANE	Location: Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method: Acker AD-II Drill Rig		Boring No. **MW16-01D**
Core Barrel used: NX "New Bit"		Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	
Start	Finish

Core Run Run # REC	RQD	Strat-igraphy	Bedding/ Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min.sec)	Total Depth (ft bgs)
					62					
99%	63%						Rollerbit from 58.5-62 5'	0		62.5
					63		Core from 62 5-67.5' BGS			
								1	11:30	63.5
					64		Light Gray Quartzite with 5"-1.5" clasts (quartz)			
								2	10 00	64.5
					65		Mineral quartz, biotite, chalcopyrite in			
							fractures also lined with silt	3	9:00	65.5
					70					
								4	12 00	66.5
					71					
								5	8:00	67 5
					72					
					73					
					74					
					75					
					76					
					77					
					78					
					79					
					80					
					81					
					82					
					83					

NOTES:

Logged by: Jeff Norberg

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Mike Legare

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates	N: 194168 E 523216
Surface Elevation	20 9 FT MSL
Well Riser Elevation:	23.7 FT MSL

Job No 29600 97	Client: EFANE NCBC Davisville	Location: SITE 16
Drilling Method: Acker AD II Rig 4 in steel casing drive and wash		Boring No **MW16-02S**
Sampling Method 3 in. split spoon sampler driven 24 in. with 140 lb hammer		Sheet 1 of 1
Drilling Water Level		Start 5/24/00
Date		Drilling Date/Times
Time		Finish 5/24/00
Surface Conditions: woodland		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
						0			
						1		No sample from 0-10 ft bgs	
								See MW16-02D for soil description	
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
3" SS						10		Fine SAND, little medium sand, trace coarse sand and silt	
						11		Sample submitted for laboratory analysis	
						12			
						13			
						14			
						15			
						16			
						17			
						18			
						19			

Logged by: Jeff Norberg Date: 5/24/2000

Drilling Contractor: Subsurface Drilling and Remediation Driller: John Haliburda

WELL SPECIFICATIONS:

Diam. of Riser	2 in.	Screen Interval:	5-15 ft bgs	Sandpack:	4-15 ft bgs	Grout:	2 ft to grade
Bottom of Hole.	15 ft bgs	Riser Interval.	5 ft bgs to 3 ft ags	Bentonite.	2-4 ft bgs	Cover:	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 194169 E 523223
Surface Elevation	20 9 FT MSL
Well Riser Elevation	23 1 FT MSL

Job No 29600 97	Client EFANE NCBC Davisville	Location SITE 16
Drilling Method AD 2 Rig		Boring No **MW16-02D**
Hollow Stem 0-10' BGS		
Drive and Wash 10-71' BGS		
Sampling Method: split spoon sampler		Sheet 1 of 4
Drilling Water Level		Start 5/18/00 08 32 / Drilling Date/Times / Finish 5/25/00
Date		
Time		
Surface Conditions	woodland	

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 17	0	0-2	0 0	4	0		SP	silty sand with minor fine gravel subangular-subrounded	
					6				<0 5" dia , dark grayish brown, damp	
					8	1				
					7					
2" SS	24 17	0	2-4	NA	7	2			F-M sand, light olive brown, damp	
					8					
					8	3				
					11					
2" SS	24 16	4	4-6	0	7	4			F-M sand with minor C sand and F gravel<0 5 dia	
					11				subangular-subrounded, damp	
					11	5				
					12					
2" SS	24 15	4	6-8	0	7	6			same as 4-6' BGS	
					8				wet at 15"	
					8	7				
					10					
2" SS	24 19	8	8-10	0	3	8			F-M sand with minor C sand and trace F gravel<0 5" dia	
					4				subangular -subrounded, olive gray, wet	
					4	9				
					6					
						10				10' BGS switched to
										drive and wash with
						11				4" casing-no sample
										collected
2" SS	24 12	12	12-14	0	6	12			same as 8-10' BGS	
					5					
					5	13				
					5					
2" SS	24 12	14	14-16	0	6	14			same as 12-14' BGS but color very dark gray	
					5					
					3	15				
					3					
2" SS	24 0	14	16-18	NA	5	16			no recovery	
					3					
					3	17				
					4					
2" SS	24 16	18	18-20	0.3	7	18		SM	VF-F silty sand, very dark gray-black	
					8					
					8	19				
					7					

Logged by: Jeff Norberg/Kevin Baum Date: 5/25/2000

Drilling Contractor: Subsurface Drilling and Remediation Driller: Mike Legare/John Haliburda

WELL SPECIFICATIONS:

Diam of Riser	2 in	Screen Interval	56 5-66 5 ft bgs	Sandpack	67-54 5	Grout	51 5- grade
Bottom of Hole	76 ft bgs	Riser Interval	56 5 ft bgs - 2 ft ags	Bentonite	54.5-51 5	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 194169 E 523223
Surface Elevation	20 9 FT MSL
Well Riser Elevation	23 1 FT MSL

Job No 29600 97	Client EFANE NCBC Davisville		Location SITE 16
Drilling Method AD 2 Rig			Boring No **MW16-02D**
Hollow Stem 0-10' BGS			
Drive and Wash 10-71' BGS			
Sampling Method split spoon sampler			Sheet 2 of 4
Drilling Water Level			Start 5/18/00 08 32
Date			Drilling Date/Times
Time			Finish 5/25/00
Surface Conditions woodland			

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 15	18	20-22	1 6	7	20			same as above	
					5			SM		
					5	21				
					8					
2" SS	24 7	22	22-24	5 4	5	22			black SILTY CLAY	
					3					
					4	23				
					4			CL		
2" SS	24 7	22	24-26	0 6	3	24			same as above	
					1					
					3	25				
					3					
2" SS	24 12	26	26-28	1	2	26			black CLAYEY SILT with interlayered lenses of	
					4			ML	very fine to fine sandy silt (minor)	
					4	27				
					6					
2" SS	24 13	28	28-30	1	2	28			dark olive gray SILTY SAND, trace fine gravel<0 5" dia ,	
					3				angular to subangular	
					2	29				
					3			SM		
2" SS	24 14	28	30-32	0	4	30			same as above	
					5					
					4	31				
					5					
2" SS	24 14	32	32-34	8	2	32			very dark gray fine GRAVEL<0 5" dia subangular to	
					3				subrounded, some sand and silt	
					5	33				
					4					
2" SS	24 12	34	34-36	2 2	3	34		GM	same as above	
					5					
					4	35				
					7					
2" SS	24 15	34	36-38	29 9	3	36			0-7 in. same as above	
					4				7-15 in SILTY CLAY, minor very fine to coarse sand	
					5	37			fine gravel<0 25" dia., subangular to subrounded	
					4					
2" SS	24 5	38	38 4	16 9	3	38		CL	very dark gray to black SANDY CLAY, some silt and	
					2				trace subangular to subrounded fine gravel<0 25" dia	
					1	39				
					1					

Logged by	Jeff Norberg/Kevin Baum	Date	5/25/2000
Drilling Contractor	Subsurface Drilling and Remediation	Driller	Mike Legare/John Haliburda

WELL SPECIFICATIONS:

Diam. of Riser	2 in	Screen Interval:	56 5-66 5 ft bgs	Sandpack	67-54 5	Grout	51 5- grade
Bottom of Hole	76 ft bgs	Riser Interval	56 5 ft bgs - 2 ft ags	Bentonite	54.5-51 5	Cover.	4 in. steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 194169 E 523223
Surface Elevation	20 9 FT MSL
Well Riser Elevation	23 1 FT MSL

Job No. 29600 97	Client: EFANE NCBC Davisville	Location. SITE 16
Drilling Method AD 2 Rig		Boring No **MW16-02D**
Hollow Stem 0-10' BGS		
Drive and Wash 10-71' BGS		
Sampling Method split spoon sampler		Sheet 3 of 4
Drilling Water Level		Start 5/18/00 08 32 / Drilling Date/Times / Finish 5/25/00
Date		
Time		
Surface Conditions woodland		

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 0	38	40-42	NA	9	40			no recovery	lost sampler shoe
					4					down boring
					6	41		CL		
					4					
2" SS	24 12	42	42-44	16 4	3	42			same as above	
					4					
					4	43				
					7					
2" SS	24 18	44	44-46	16 9	7	44			very dark gray SILTY CLAY, some sand	
					10					
					12	45				
					16					
2" SS	24 20	48	46-48	26	15	46			very dark gray very fine to fine SANDY SILT, minor clay	
					28					
					37	47				
					28					
2" SS	24 18	48	48-50	55	25	48		ML	same as above	
					27					
					42	49				
					41					
2" SS	24 24	50	50-52	59	25	50			0-15 in : same as above	
					36				15-24" olive gray fine to mediumSAND, trace silt and	
					52	51			subbangular to subrounded gravel<5" dia , iron stained	
					82				bands	
2" SS	24 18	50	52-54	29 6	35	52			olive brown to gray fine to coarse SAND, some gravel,	
					48				trace silt and clay, iron stained bands	
					56	53				
					108					
2" SS	24 18	54	54-56	13 8	32	54		SP	same as above	
					68					
					76	55				
					66					
2" SS	24 14	54	56-58	12.2	62	56			same as above	
					58					
					102	57				
					126					
2" SS	24 13	58	58-60	39.6	47	58			0-6 in : gray fine to medium SAND, trace silt, iron stained	
					93				lenses	
					87	59		ML	6-13in SANDY SILT, trace gravel<2 5" dia	
					86					

Logged by	Jeff Norberg/Kevin Baum	Date	5/25/2000
Drilling Contractor.	Subsurface Drilling and Remediation	Driller:	Mike Legare/John Haliburda

WELL SPECIFICATIONS

Diam of Riser	2 in	Screen Interval	56 5-66 5 ft bgs	Sandpack	67-54 5	Grout	51 5- grade
Bottom of Hole	76 ft bgs	Riser Interval	56 5 ft bgs - 2 ft ags	Bentonite:	54 5-51 5	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 194169 E 523223
Surface Elevation	20 9 FT MSL
Well Riser Elevation	23 1 FT MSL

Job No. 29600 97	Client EFANE NCBC Davisville		Location SITE 16
Drilling Method AD 2 Rig			Boring No **MW16-02D**
Hollow Stem 0-10' BGS			
Drive and Wash 10-71' BGS			
Sampling Method split spoon sampler			Sheet 4 of 4
Drilling Water Level			Start 5/18/00 08 32
Date			Drilling Date/Times
Time			Finish 5/25/00
Surface Conditions	woodland		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 18	60	60-62	5 4	32	60			dark olive gray fine to coarse GRAVELLY SAND, trace	
					46				silt and clay, gravel<2" dia , angular to rounded	
					84	61				
					68			SP		
2" SS	24 21	60	62-64	18.8	86	62			same as above, iron staining 15-21"	
					121					
					78	63				
					102					
2" SS	24 12	64	64-66	15 1	57	64			very dark gray fine to coarse SAND, angular to	
					55				subrounded gravel<2 5" dia , trace silt	
					34	65		SP		
					70					
2" SS	24 8	64	66-66 7	34	228	66			same as above	
										Loss of 20 gallons of
						67				water 48-68' BGS
									rollerbit with tricone drill 66 7-68' BGS	
2" SS	24 0	64	68-68 1	NA	120	68			no recovery	
						69				
						70			rollerbit with tricone drill 68-71' BGS	
						71			cored 71-76' BGS	
						72				
						73				
						74				
						75				
						76				
						77				
						78				
						79				

Logged by: Jeff Norberg/Kevin Baum Date: 5/25/2000

Drilling Contractor: Subsurface Drilling and Remediation Driller: Mike Legare/John Haliburda

WELL SPECIFICATIONS

Diam of Riser	2 in.	Screen Interval	56 5-66 5 ft bgs	Sandpack:	67-54 5	Grout	51 5- grade
Bottom of Hole	76 ft bgs	Riser Interval.	56 5 ft bgs - 2 ft ags	Bentonite:	54 5-51 5	Cover	4 in. steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N 194169 E 523223
Surface Elevation:	20 9 FT MSL
Well Riser Elevation.	23 1 FT MSL

Job No 29600 97.3201	Client: EFANE	Location: Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method: Drive and Wash with Mobile B-61 Drill Rig		Boring No **MW16-02D**
Core Barrel used: NQ2 core barrel		Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	
Start	Finish
05/26/00 0928	05/26/00 0953

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fracture Filling (dip & angle)	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
				68					
				69					
88%	41%			70					
				71		0-12 in.: dark gray PHYLLITE, fractured, silty	1	6 00	72
						12-53 in.: medium gray fine grained QUARTZITE			
				72		with white meneral stringers throughout.	1	6.00	73
						vertical fractures from 17-20 in., and 24-27 in.			
				73		low angle fractures: 2, 4, 7, 17, 20, 23.5, 27, 30, 36	1	5.00	74
						40, 41, 43, and 49 in.			
				74		broken core from 7 to 14 in	1	7:00	75
						fractures rusted from 12 to 26 in.			
				75			1	6.00	75.3
				76					
				77					
				78					
				79					
				80					
				81					
				82					
				83					
				84					
				85					
				86					

NOTES:

Logged by: Robin Clark

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates	N 194170 E 523209
Surface Elevation	21 2 FT MSL
Well Riser Elevation	23.0 FT MSL

Job. No 29600 97 3201	Client NORDIV/NAVFAC	Location Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method B-61 Mobile Rig 4 in casing Drive and wash		Boring No. **MW16-02R**
Rollerbit used		Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	
Start	Finish
02/01/01 1003	02/01/01 1224

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min sec)	Total Depth (ft bgs)
				70		Rollerbit with 3 875 in tricone drill from 70-95 ft bgs			
				71					
				72		Grey speckled quartzite cuttings from 70-76 ft	1	5 41	71
				73			2	4 28	72
				74		Dark grey phyllite with trace quartzite cuttings	3	5 07	73
				75		from 76-88 ft	4	5 12	74
				76			5	4 48	75
				77		Dark grey phyllite from 88-95 ft	6	4 32	76
				78			7	5:09	77
				79			8	5 33	78
				80			9	5 58	79
				81			10	5:11	80
				82			11	5 58	81
				83			12	4 50	82
				84			13	4:21	83
				85			14	6 19	84
				86			15	5:48	85
				87			16	3:52	86
				88			17	3 27	87
				89			18	3.40	88
				90			19	3 12	89
				91			20	3.15	90
				92			21	3 22	91
				93			22	2 54	92
				94			23	3 03	93
				95			24	5 02	94
							25	3 37	95

NOTES: First gear, 800 lbs pressure

Logged by: Rob Wasserman

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Brad Haase

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N 194663 E 523084
Surface Elevation:	11.2 FT MSL
Well Riser Elevation.	14.1 FT MSL

Job No 29600 97	Client. EFANE NCBC Davisville	Location. SITE 16
Drilling Method: AD 2 Rig		Boring No. **MW16-03S**
Sampling Method. 2" split spoon sampler		Sheet 1 of 1

Drilling Water Level		
Date		
Time		
Surface Conditions	woodland	

Start	Drilling Date/Times	Finish
6/12/00 0956		6/12/00 1150

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
						0			
						1			
						2			
2" SS	24 18	0	3-5	NA	23 14	3	SP	F-M sand with trace silt, very dark gray	
					11 13	4		Sample submitted for laboratory analysis	
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			

Logged by: Kevin Baum Date: 6/12/2000

Drilling Contractor Subsurface Drilling and Remediation Driller. John Haliburda

WELL SPECIFICATIONS.

Diam. of Riser.	4 ft ags	Screen Interval	3-13 ft bgs	Sandpack:	3 5-13 ft bgs	Grout.	1' bgs to grade
Bottom of Hole	13 bgs	Riser Interval:	2-3 ft bgs	Bentonite:	1-3.5 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job. No 29600 97	Client EFANE NCBC Davisville
Location:	SITE 16
Drilling Method:	AD 2 Rig, drive and wash, 140 lb 30" stroke
Boring No	**MW16-03D**
Sampling Method	2" split spoon sampler
Sheet	1 of 3
Drilling Water Level / Date / Time	
Start	5/31/00 09.55
Drilling Date/Times	
Finish	6/1/00 1030
Surface Conditions:	woodland

Coordinates: N: 194663 E. 523089
Surface Elevation: 11 1 FT MSL
Well Riser Elevation: 13.5 FT MSL

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 10	0	0-2	0	5 5	0		SP	olive brown medium to coarse SAND, trace silt and gravel<0 5" dia , some organic content (grass and roots)	
					25 27	1				
2" SS	24 14	0	2-4	0	15 15	2		SM	dark olive gray very fine to medium SILTY SAND, trace gravel<1.5" dia.,	
					11 7	3				
2" SS	24 21	4	4-6	0	2 2	4		ML	0-12in. dark olive gray fine to medium SANDY SILT, wet; 12-21 in. dark olive gray medium to coarse SILTY SAND	
					2 2	5		SM	wet	
2" SS	24 24	4	6-8	0	2 8	6			olive brown fine to coarse SILTY SAND, trace organics	
					14 13	7				
2" SS	24 16	8	8-10	0	4 9	8			same as above	
					10 13	9				
2" SS	24 16	8	10-12	0	10 11	10			same as above; iron staining 12-16"	
					10 13	11				
2" SS	24 14	12	12-14	0	5 6	12			reddish brown very fine to fine SILTY SAND, with red banding	
					6 8	13				
2" SS	24 15	14	14-16	0	7 11	14			0-6 in . brown gray very fine to fine SILTY SAND; 6-15 in dark gray fine to medium SANDY SILT	
					11 14	15		ML		
2" SS	24 17	14	16-18	0	10 17	16			very dark gray fine to medium SANDY SILT, iron stained bands	
					12 15	17				
2" SS	24 17	18	18-20	0	15 15	18			0-6 in same as above; 6-17 in · dark gray medium to coarse SAND, trace silt	
					8 7	19		SP	and gravel<0.5" dia , iron stained bands	

Logged by: Kevin Baum Date: 6/1/2000

Drilling Contractor: Subsurface Drilling and Remediation Driller: John Haliburda

WELL SPECIFICATIONS:

Diam of Riser	2 in.	Screen Interval	38 5-48.5 ft bgs	Sandpack	36 5-49 ft bgs	Grout	34 ft bgs-grade
Bottom of Hole	56 5 ft	Riser Interval	38 5 ft bgs - 2 ft ags	Bentonite	34-36 5 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 194663 E 523089
Surface Elevation	11 08 FT MSL
Well Riser Elevation	13 47 FT MSL

Job No 29600 97	Client EFANE NCBC Davisville	Location SITE 16
Drilling Method: AD 2 Rig drive and wash 140 lb 30" stroke		Boring No **MW16-03D**
Sampling Method 2" split spoon sampler		Sheet 2 of 3
Drilling Water Level		Start 5/31/00 09 55
Date		Drilling Date/Times
Time		Finish 6/1/00 1030
Surface Conditions woodland		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 16	18	20-22	0	5 8	20		SP	0-8 in dark olive gray medium to coarse SAND, trace silt and gravel<0 5" dia , iron stained bands	
					11 22	21			dark olive gray very fine to fine SILTY SAND	
2" SS	24 13	18	22-24	0	48 23	22		SM	dark olive gray very fine to fine SILTY SAND, trace gravel<1" dia , 1" iron stained bands of medium to	
					16 18	23			coarse sand	
2" SS	24 14	24	24-26	0	6 9	24		SM/SP	dark gray bands of very fine to fine SILTY SAND and medium to coarse SAND, at 14" gravel<1" dia , angular	
					9 18	25			tosubangular	
2" SS	24 14	24	26-28	0	9 15	26		SP	olive gray medium to coarse GRAVELLY SAND, gravel<1 5" dia , rounded to subrounded	
					16 10	27				
2" SS	24 11	28	28-30	0	7 4	28		ML	dark olive gray very fine to fine CLAYEY SILT	
					3 11	29				
2" SS	24 20	32	30-32	0	3 3	30			same as above	
					3 3	31				
2" SS	24 24	32	32-34	0	8 15	32		ML	dark olive gray very fine to fine SANDY SILT grading into a very fine to fine silty sand	
					20 26	33				
2" SS	24 18	34	34-36		6 10	34			dark olive gray very fine to fine SILTY SAND	
					22 22	35				
2" SS	24 17	34	36-38	NA	25 28	36		SM	Same as above with weathered gravel at 17" angular to subangular	
					46 130	37		WTHR RX		
2" SS	12 0	38	38-39	NA	80 103	38			no recovery	Loss of 100 gallons of water 0-40' BGS
						39		B		

Logged by: Kevin Baum Date: 6/1/2000

Drilling Contractor: Subsurface Drilling and Remediation Driller: John Haliburda

WELL SPECIFICATIONS:

Diam of Riser:	2 in	Screen Interval	38.5-48 5 ft bgs	Sandpack	36.5-49 ft bgs	Grout	34 ft bgs-grade
Bottom of Hole	56 5 ft	Riser Interval:	38 5 ft bgs - 2 ft ags	Bentonite	34-36 5 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 194663 E 523089
Surface Elevation	11 1 FT MSL
Well Riser Elevation	13 5 FT MSL

Job. No 29600 97	Client EFANE NCBC Davisville	Location. SITE 16
Drilling Method AD 2 Rig		Boring No **MW16-03D**
140 lb 30" stroke		
Sampling Method 2" split spoon sampler		Sheet 3 of 3
Drilling Water Level		Start 5/31/00 09 55
Date		Drilling Date/Times
Time		Finish 6/1/00 1030
Surface Conditions woodland		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
						40	B	rollerbit with tricone drill 39-40.5' BGS through 1 5 boulder	
					24			olive gray fine to medium SAND, some gravel<1" dia	
2" SS	24 18	38	40 5-42 5	0 0	38 24	41		angular to subangular, iron staining at 0-2" and16-18"	
					35 38	42	WTHR RX	dark gray fine to coarse SAND, some silt and gravel<4"	
2" SS	24 13	38	42 5-44.5	0 0	34 34	43		dia Angular to subangular	
					55 31	44		same as above	
2" SS	24 18	44	44 5-46 5		25 38	45			
					36 102	46		dark gray fine to medium SAND, some silt and gravel<4"	
2" SS	23 17	44	46 5-48 5	NA	116 91	47		dia , subangular to subrounded Sample submitted for laboratory analysis	
					141/5	48			
2" SS	2 0	49	48 5-48 6	NA	100/2	49		no recovery	Loss of 150 gallons of water 40 51 5' BGS
						50		rollerbit with tricone drill 48.5-51.5' BGS	
						51			
						52			
						53			
						54			
						5			
						65			
						57			
						58			
						59			

Logged by: Kevin Baum Date: 6/1/2000

Drilling Contractor: Subsurface Drilling and Remediation Driller John Haliburda

WELL SPECIFICATIONS.

Diam of Riser	2 in	Screen Interval	38 5-48.5 ft bgs	Sandpack	36 5-49 ft bgs	Grout.	34 ft bgs-grade
Bottom of Hole	56 5 ft	Riser Interval	38 5 ft bgs - 2 ft ags	Bentonite.	34-36 5 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING - REVISED

Coordinates:	N 194663 E 523089
Surface Elevation	11 08 FT MSL
Well Riser Elevation	13 47 FT MSL

Job No	29600 97.3201
Client	EFANE
Drilling Method	
Core Barrel used	

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Location	Site 16 NCBC Davisville, North Kingstown, RI
Boring No	**MW16-03D**
Sheet	1 of 1

Drilling Times	Start	Finish
	06/01/00 1133	06/01/00 1226

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
100	0				52		Light Gray quartzite with quartz inclusions and quartz mineralization and soil in fractures. Highly fractured at 90 and 45 degrees.	1	6 00	52.5
					53			2	6 00	53.5
					54			3	7.00	54 5
					55			4	8:30	55 5
					56			5	7 00	56 5
					57					
					58					
					59					
					60					
					61					
					62					
					63					
					64					
					65					
					66					
					67					
					68					
					69					
					70					

NOTES:

Logged by: Kevin Baum

Drilling Contractor: Subsurface Drilling and Remediation

Driller: John Haliburda

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates	N. 194651 E 523273
Surface Elevation	10 3 FT MSL
Well Riser Elevation	9 9 FT MSL

Job. No 29600 97	Client EFANE NCBC Davisville	Location: SITE 16
Drilling Method AD 2 Rig		Boring No **MW16-04S**
Drive & Wash		
Sampling Method 2 in. split spoon sampler		Sheet 1 of 1

Drilling Water Level		
Date		
Time		

Start	Drilling Date/Times	Finish
6/14/00 0914		6/14/00 1102

Surface Conditions: woodland

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
						0			
						1		No sample from 0-3 ft bgs	
								See MW16-04D for soil description	
						2			
2" SS	24 18	0	3-5	NA	7 10 12 35	3 4	SP	Light olive brown to grey very fine to fine SAND, trace fine to medium gravel, wet	
								Sample submitted for laboratory analysis	
						5			
						6			
						7			
						8			
						9			
						10			
						11			
						12			
						3			
						4			
						5			
						6			
						7			
						8			
						9			

Logged by: Kevin Baum Date. 6/14/2000

Drilling Contractor. Subsurface Drilling and Remediation Driller· Mike Legare

WELL SPECIFICATIONS.

Diam of Riser·	2 in	Screen Interval	2 5-12 5 ft bgs	Sandpack	2-13 ft bgs	Grout	1 ft to grade
Bottom of Hole	18 ft bgs	Riser Interval	1 ft to grade	Bentonite	1-2 ft bgs	Cover	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates:	N. 194649 E: 523268
Surface Elevation.	10 4 FT MSL
Well Riser Elevation	11 9 FT MSL

Job. No 29600.97	Client. EFANE NCBC Davisville	Location SITE 16
Drilling Method AD 2 Rig		Boring No. **MW16-04D**
Drive and Wash		
140 lb hammer with 3' drop		
Sampling Method. 2" split spoon sampler		Sheet 1 of 3
Drilling Water Level		Start 6/9/00 0847
Date		Drilling Date/Times
Time		Finish 6/13/00 1430
Surface Conditions woodland		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 14	0	0-2	6 6	3	0			dark brown fine to medium SAND, some grass and	
					3				roots, dry	
					4	1				
					7			FILL		
2" SS	24 15	0	2-4	0 0	6	2			0-11in : olive brownvery fine to medium SAND	
					8				11-15" dark olive brown very fine to medium SAND,	
					12	3			some gravel and trace silt, gravel<1" dia subangular to	
					12				subrounded, wet	
2" SS	24 17	4	4-6	19 8	14	4			very fine to medium SAND, trace silt and gravel<2" dia,	
					18				subangular to subrounded	
					13	5				
					7					
2" SS	24 10	4	6-8	0.0	6	6		FILL	dark olive brown very fine to fine SAND, some silt and	
					12				subangular-subrounded trace gravel<0 5" dia	
					18	7				
					9					
2" SS	2 2	8	8-8 2	0.0	50/2	8		FILL	same as above	rods hitting boulders
										and driving at an angle
						9				unable to send casing
										auger to 10' BGS
						10				
									No recovery 8 2-14' BGS	auger at new boring
						11			4 5' boulder (8 2-13' BGS)	to 14'
						12				
						13				
2" SS	24 8	14	14-16	0.0	12	14		SM	0-5 in.: dark olive brown fine to medium SAND, some silt	
					6				5-8 in . very dark gray very fine to fine SILTY SAND	
					4	15				
					4					switch from auger to
2" SS	24 12	16	16-18	0.0	4	16			very dark gray very fine to fine SAND, some silt	drive and wash
					4					
					6	17				
					8					lost lead casing, make
2" SS	24 5	18	18-20	0.0	10	18			very dark gray very fine to fine SAND, some silt and	attempt at new boring
					10				subangular to subrounded trace gravel<0 5" dia	from 18' BGS
					9	19				
					9					

Logged by: Kevin Baum Date 6/13/2000

Drilling Contractor. Subsurface Drilling and Remediation Driller. Mike Legare

WELL SPECIFICATIONS

Diam of Riser.	2 in.	Screen Interval.	43-53 ft bgs	Sandpack.	41-53.5 ft bgs	Grout	38 ft bgs to grade
Bottom of Hole:	61 ft bgs	Riser Interval	43 ft bgs - 1 5 ft ags	Bentonite	38-41ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 194649 E. 523268
Surface Elevation	10 4 FT MSL
Well Riser Elevation	11 9 FT MSL

Job No. 29600 97	Client EFANE NCBC Davisville	Location SITE 16
Drilling Method AD 2 Rig 140 lb hammer with 3' drop		Boring No **MW16-04D**
Sampling Method 2" split spoon sampler		Sheet 2 of 3
Drilling Water Level Date Time		Start 6/9/00 0847 / Drilling Date/Times / Finish 6/13/00 1430
Surface Conditions woodland		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 8	18	20-22	0 0	7 7	20		SM	same as above with gravel<1 5" dia	
					5 6	21				
2" SS	24 9	22	22-24	0 8	4 18	22			0-3 in. same as above with iron staining 3-9 in dark olive gray very fine to fine SILTY SAND,	
					58 9	23			some angular to subangular gravel<1" dia ,,	
2" SS	24 10	22	24-26	0 0	4 5	24			very dark gray very fine to fine SILTY SAND, trace subrounded to rounded gravel<0 5" dia	
					6 6	25				
2" SS	24 9	26	26-28	0	11 13	26			dark olive gray very fine to medium SILTY SAND, trace fine gravel	
					12 4	27				
2" SS	24 10	28	28-30	1 6	5 6	28			dark gray very fine to medium SILTY SAND	
					7 6	29				
2" SS	24 16	28	30-32	0 0	6 5	30			dark olive gray very fine to medium SILTY SAND, trace fine gravel	
					6 5	31				
2" SS	24 14	32	32-34	0 0	9 7	32			dark olive gray very fine to fine SAND, some silt,	
					17 20	33				
2" SS	24 9	32	34-36	0 0	10 13	34			same as above	
					28 26	35				
2" SS	24 18	36	36-38	0 0	16 17	36		SP	dark olive gray very fine to fine SAND, trace silt, iron stained bands	
					25 33	37				loss of 75 gallons of water 16-38' BGS
2" SS	24 17	36	38-40	0 1	5 7	38			same as above	
					8 13	39				

Logged by	Kevin Baum	Date	6/13/2000
Drilling Contractor	Subsurface Drilling and Remediation	Driller	Mike Legare

WELL SPECIFICATIONS

Diam. of Riser	2 in	Screen Interval	43-53 ft bgs	Sandpack	41-53 5 ft bgs	Grout.	38 ft bgs to grade
Bottom of Hole	61 ft bgs	Riser Interval	43 ft bgs - 1 5 ft ags	Bentonite.	38-41ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job. No 29600.97	Client: EFANE NCBC Davisville
Location	SITE 16
Drilling Method: AD 2 Rig	Boring No **MW16-04D**
140 lb hammer with 3' drop	
Sampling Method: 2" split spoon sampler	Sheet 3 of 3

Coordinates: N: 194649 E 523268
Surface Elevation: 10 4 FT MSL
Well Riser Elevation: 11 9 FT MSL

Drilling Water Level			Start	Drilling Date/Times	Finish
Date			6/9/00		6/13/00
Time			0847		1430

Surface Conditions: woodland

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 / 23	40	40-42	0 1	5, 21, 31, 27	40, 41	SP	0-10 in same as above; 10-23in. olive gray fine to medium SAND, iron staining	
2" SS	24 / 15	42	42-44	0 0	20, 22, 33, 66	42, 43	SM	0-6 in.: very fine to fine SAND, trace fine subrounded to rounded gravel; 6-15 in.: dark gray very fine to fine SAND, some silt and angular to subrounded gravel<2" dia.	
2" SS	24 / 5	44	44-46	0.5	22, 12, 18, 80	44, 45	SP	fine to medium SAND, trace rounded to subrounded fine gravel	loss of 120 gallons of water 38-53' BGS
2" SS	11 / 7	44	46-48	1	48, 108(5")	46		same as above, angular-subangular gravel<2" dia.	
						47, 48	B	rollerbit with tricone drill 47-49" BGS	
2" SS	24 / 5	48	49-51	5	25, 31, 33, 56	49, 50	SM	dark gray very fine to fine SAND, some silt and subangular to subrounded gravel<1.5" dia	
2" SS	11 / 5	48	51-52	4.9	36, 100(5")	51	WTHR RX	same as above; 3" piece of phyllite in tip	
2" SS	11 / 11	52	52-53	NA	29, 110(5")	52, 53		same as above; Sample submitted for laboratory analysis	used 300 lb hammer and 3" split spoon 52-53' BGS
						54		rollerbit with tricone drill 53-56' BGS; cored 56-61' BGS	loss of 125 gallons of water 53-61' BGS
						55, 56, 57, 58, 59			

Logged by: Kevin Baum Date: 6/13/2000

Drilling Contractor: Subsurface Drilling and Remediation Driller: Mike Legare

WELL SPECIFICATIONS.

Diam of Riser	2 in	Screen Interval	43-53 ft bgs	Sandpack	41-53 5 ft bgs	Grout	38 ft bgs to grade
Bottom of Hole	61 ft bgs	Riser Interval:	43 ft bgs - 1.5 ft ags	Bentonite	38-41ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Job. No. 29600 97 3201	Client: EFANE
Location. Site 16 NCBC Davisville, North Kingstown, RI	
Drilling Method: AD2 Drill Rig	
Boring No. **MW16-04D**	
Core Barrel used. NX	
Sheet 1 of 1	

Coordinates: N: 194699 E 523267
Surface Elevation. 10.4 FT MSL
Well Riser Elevation: 11.9 FT MSL

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times		
Start		Finish
06/13/00		06/16/00
1346		1430

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min.sec)	Total Depth (ft bgs)
92	62.5				57		Light gray metaconglomerate grading to light gray quartzite with large clasts (0.5-2"). Fractures show quartz mineralization and iron staining. Fractures occur primanly at 60 and 30 degress.	1	9 00	57
					58			2	9 00	58
					59			3	5 00	59
					60			4	7:00	60
					61			5	6:00	61
					62					
					63					
					64					
					65					
					66					
					67					
					68					
					69					
					70					
					71					
					72					
					73					
					74					
					75					

NOTES:

Logged by: Kevin Baum

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Mike Legare

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates.	N: 194557 E: 523570
Surface Elevation:	13 8 FT MSL
Well Riser Elevation.	15 8 FT MSL

Job No. 29600 97	Client: EFANE NCBC Davisville	Location: SITE 16
Drilling Method: Mobile B-61 Drill Rig		Boring No. **MW16-05S**
Sampling Method 3 in split spoon sampler		Sheet 1 of 1
Drilling Water Level		Start 12/20/00 / Drilling Date/Times / Finish 12/20/00
Date		
Time		
Surface Conditions.	woodland	

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
						0				
						1				
						2				
						3				
						4				
						5			fine SAND, little medium sand, trace coarse sand, fine gravel, silt	
						6			Sample submitted for laboratory analysis	
						7				
						8			No sample from 0-5, 7-18 ft bgs See MW16-05D for soil description	
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				

Logged by: Tom Biolsi Date: 5/24/2000

Drilling Contractor Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam of Riser:	2 in	Screen Interval.	8-18 ft bgs	Sandpack:	6-18 ft bgs	Grout	4 ft to grade
Bottom of Hole:	18 ft bgs	Riser Interval:	8 ft bgs to 3 ft ags	Bentonite:	4-6 ft bgs	Cover	stickup

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 194563 E 523571
Surface Elevation	13 7 FT MSL
Well Riser Elevation	13 2 FT MSL

Job No 29600 97	Client EFANE NCBC Davisville	Location SITE 16
Drilling Method. AD 2 Rig 140 lb 30" stroke Drive and Wash		Boring No **MW16-05D**
Sampling Method 2" split spoon sampler		Sheet 1 of 4
Drilling Water Level		Start 5/24/00 14.40
Date		Drilling Date/Times
Time		Finish 5/26/00 11:00
Surface Conditions: woodland		

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 7	0	0-2	0 0	3	0			olive brown fine to coarse SAND, trace silt and gravel	
					19				organic content (grass and roots), dry	
					21	1			2" cobble at 7"	
					8			FILL		
2" SS	24 10	0	2-4	0.0	8	2			olive brown fine to coarse SAND, trace silt, gravel<0 5"	
					8				dia., and organics (grass), dry	
					35	3				
					17					
2" SS	24 19	4	4-6	23 9	4	4			0-12 in.: reddish grayvery fine to fine SILTY SAND,	
					2				trace organics and 1" cobble,	
					4	5			12-19 in. reddish grayfine to medium SAND, trace	
					9				gravel<0.5" dia., damp	
2" SS	24 20	8	6-8	15	14	6			0-13in Gray very fine to medium SAND with iron	
					13				stained bands, wet	
					11	7			13-20 in.: very dark gray very fine to fine SILTY SAND,	
					10				wet	
2" SS	24 8	8	8-10	14	6	8			dark gray very fineSILTY SAND, trace gravel<0.5" dia ,	
					8			FILL	organics	
					10	9				
					9					
2" SS	24 15	8	10-12	11	3	10			0-4 in . same as above	
					4			SM	4-8 in.. dark olive gray fine to medium SILTY SAND	
					3	11			8-15in..very dark gray very fine to fine SANDY SILT	
					3					
2" SS	24 24	8	12-14	0 0	4	12			very dark gray very fine to fine SANDY SILT	
					3			ML		
					5	13				
					4					
2" SS	24 16	14	14-16	0.0	6	14		SP	0-6 in very dark gray fine to medium SAND	
					9			ML	6-16 in.. very dark gray very fine to fine SANDY SILT,	
					11	15			trace clay	
					7			SP		
2" SS	24 20	14	16-18	0 0	7	16			brown gray fine to medium SAND, trace silt	
					9					
					10	17				
					11					
2" SS	24 17	14	18-20	6.5	4	18			very dark gray very fine to fine CLAYEY SILT	
					1			ML		
					2	19				
					2					

Logged by	Kevin Baum	Date	5/26/2000
Drilling Contractor:	Subsurface Drilling and Remediation	Driller:	John Haliburda

WELL SPECIFICATIONS.

Diam of Riser.	2 in	Screen Interval:	42-52 ft bgs	Sandpack	40-52 5 ft bgs	Grout:	38 ft bgs - grade
Bottom of Hole.	70 5 ft bgs	Riser Interval	42 ft bgs - 2 5 ft ags	Bentonite	38-40 ft bgs	Cover:	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job No 29600.97	Client EFANE NCBC Davisville	Location SITE 16	
Drilling Method AD 2 Rig		Boring No **MW16-05D**	
140 lb 30" stroke			
Drive and Wash			
Sampling Method 2" split spoon sampler		Sheet 2 of 4	
Drilling Water Level		Start 5/24/00 14 40	Drilling Date/Times	Finish 5/26/00 11.00
Date				
Time				
Surface Conditions woodland				

Coordinates N 194563 E 523571
Surface Elevation 13 7 FT MSL
Well Riser Elevation 13 2 FT MSL

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 24	14	20-22	5 6	2	20			0-18 in . same as above	
					4			ML	18-24 in ·fine to medium SAND, trace silt, iron staining	
					5	21				
					8			SP		
2" SS	24 16	20	22-24	13 5 4 6	2	22			0-10 in.: reddish brown fine to medium SAND	
					6				10-16 in brownish red fine to medium SAND, some silt	
					10	23		SM		
					12					
2" SS	24 16	24	24-26	3 8	4	24			reddish brown very fine to fine SAND	
					6					
					7	25		SP		
					6					
2" SS	24 17	24	26-28	9	5	26			brown gray-olive gray fine to medium SAND	
					5			ML	5-8 in dark gray sandy silt lens	
					7	27				
					9					
2" SS	24 15	24	28-30	3	4	28		SP	olive gray fine to medium SAND	
					2					
					4	29				
					4					
2" SS	24 16	28	30-32	2	3	30			same as above	
					3			ML	4-7 in. very dark gray sandy silt lens	
					5	31		SP		
					4					
2" SS	24 24	28	32-34	11 1	5	32			dark olive gray very fine to fine SAND, trace silt	
					6					
					7	33				
					7					
2" SS	24 16	34	34-36	14 3	4	34			same as above	
					3					
					3	35				
					4					
2" SS	24 24	34	36-38	27 1	4	36			very dark gray SILT	
					3					
					1	37				
					1			ML		
2" SS	24 18	38	38-40	14.5	WHO	38			very dark gray CLAYEY SILT	
					WHO					
					1	39				
					WHO					

Logged by Kevin Baum Date 5/26/2000

Drilling Contractor Subsurface Drilling and Remediation Driller John Haliburda

WELL SPECIFICATIONS

Diam. of Riser	2 in	Screen Interval	42-52 ft bgs	Sandpack:	40-52 5 ft bgs	Grout	38 ft bgs - grade
Bottom of Hole	70 5 ft bgs	Riser Interval	42 ft bgs - 2 5 ft ags	Bentonite	38-40 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates:	N.194563 E 523571
Surface Elevation	13 7 FT MSL
Well Riser Elevation:	13 2 FT MSL

Job. No 29600 97	Client EFANE NCBC Davisville	Location SITE 16
Drilling Method: AD 2 Rig		Boring No. **MW16-05D**
140 lb 30" stroke		
Drive and Wash		
Sampling Method 2" split spoon sampler		Sheet 3 of 4
Drilling Water Level		Start 5/24/00 14.40 / Drilling Date/Times / Finish 5/26/00 11 00
Date		
Time		
Surface Conditions	woodland	

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 21	38	40-42	22.4	3	40		0-14 in same as above	
					1		ML	14-21 in very dark gray fine to medium SAND	
					4	41			Loss of 100 gallons of
					8				water 14-44' BGS
2" SS	24 24	38	42-44	53.7	6	42		dark gray medium to coarse SAND, trace silt and	
					7		SP	gravel<1" dia.	
					14	43			
					23				
2" SS	24 15	44	44-46	55 8	19	44		0-4 in.. dark gray medium to coarse SAND	
					23		ML	4-9 in very dark gray very fine to fine SANDY SILT	
					24	45		9-15 in dark gray medium to coarse SAND	Loss of 50-60 gallons
					31		SP		of water at 46' BGS
2" SS	24 16	44	46-48	59 6	26	46		0-13 in : dark gray sandy silt	
					28		ML	13-16 in : dark gray medium to coarse SAND	
					38	47			
					45				
2" SS	24 16	48	48-50	61.5	21	48	SP	0-10 in dark gray medium to coarse SAND, trace silt	
					22			10-16 in : very dark gray SANDY SILT	
					25	49	ML		
					33				
2" SS	24 18	50	50-52	42.5	55	50		very dark gray very fine to fine SILTY SAND, some	3" split spoon used
					64			angular to subrounded gravel<3 5" dia.	50-52' BGS
					63	51			
					54				
2" SS	24 11	52	52-54	24 1	54	52		same as above	
					52				
					40	53	SM		
					40				
2" SS	24 11	54	54-56	NA	113	54		Same as above	3" split spoon used
					63			4" cobble at 11"	54-56' BGS
					56	55		Sample submitted for laboratory analysis	
					41				
2" SS	24 17	56	56-58	46 6	18	56		0-4 in : very dark gray very fine to fine SILTY SAND	
					19		GP	4-9 in.; dark gray subangular to subrounded, SANDY	
					28	57	SM	gravel<1" dia	
					21			9-17 in very dark gray very fine to fine SILTY SAND	
2" SS	24 14	56	56-58	11 5	30	58		very dark gray fine to medium angular to subangular	
					32		SP	GRAVELLY SAND, trace silt, gravel<2" dia	Loss of 300 gallons of
					42	59			water 46-60" BGS
					53				

Logged by: Kevin Baum Date: 5/26/2000

Drilling Contractor: Subsurface Drilling and Remediation Driller: John Haliburda

WELL SPECIFICATIONS

Diam of Riser.	2 in	Screen Interval	42-52 ft bgs	Sandpack:	40-52.5 ft bgs	Grout	38 ft bgs - grade
Bottom of Hole.	70 5 ft bgs	Riser Interval	42 ft bgs - 2.5 ft ags	Bentonite	38-40 ft bgs	Cover	4 in. steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 194563 E 523571
Surface Elevation	13.7 FT MSL
Well Riser Elevation	13 2 FT MSL

Job. No 29600 97	Client. EFANE NCBC Davisville	Location SITE 16
Drilling Method AD 2 Rig		Boring No **MW16-05D**
140 lb 30" stroke		
Drive and Wash		
Sampling Method 2" split spoon sampler		Sheet 4 of 4
Drilling Water Level		Start 5/24/00 14 40 / Drilling Date/Times / Finish 5/26/00 11 00
Date		
Time		
Surface Conditions woodland		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 12	60	60-62	13 0	48 58 68 80	60 61	SP	very dark gray very fine to coarse SAND, some gravel and trace silt, gravel<2 5" dia., subangular-subrounded	Loss of 150 gallons of water 60-62 5' BGS
2" SS	5 3	62	62-60 5	NA	150/5	62	WTHR RX	3" of broken phyllite	
						63			
								rollerbit with tricone drill 62 5-65 5' BGS	
						64			
								cored 65 5-70 5' BGS	
						65			
						66			
						67			
						68			
						69			
						70			
						71			
						72			
						73			
						74			
						75			
						76			
						77			
						78			
						79			

Logged by	Kevin Baum	Date	5/26/2000
Drilling Contractor	Subsurface Drilling and Remediation	Driller	John Haliburda

WELL SPECIFICATIONS.

Diam of Riser.	2 in	Screen Interval	42-52 ft bgs	Sandpack.	40-52 5 ft bgs	Grout	38 ft bgs - grade
Bottom of Hole	70 5 ft bgs	Riser Interval	42 ft bgs - 2 5 ft ags	Bentonite	38-40 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Job No	29600 97 3201
Client	EFANE
Location	Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method.	AD-2 Drill Rig
Boring No	**MW16-05D**
Core Barrel used:	NX
Sheet	1 of 1

Coordinates:	N. 194563 E. 523571
Surface Elevation	13 7 FT MSL
Well Riser Elevation	13 2 FT MSL

Packer Tes

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	Start	Finish
	05/27/00 0928	05/27/00 0953

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min sec)	Total Depth (ft bgs)
					63					
99%	88%				64					
					65					
							65 5-70.5 ft bgs	1		66 5
					66		dark gray fine grained PHYLLITE, gradually grading			
							to fine grained QUARTZITE at 29 in	2		67 5
					67		vertical fractures 0-5 in			
							low angle fractures at 3, 13, 21 5, 22, 24, and 26 25 in.	3		68 5
					68		45 degree fracture 46-49 in			
								4		69 5
					69					
								5		70 5
					70					
					71					
					72					
					73					
					74					
					75					
					76					
					77					
					78					
					79					
					80					
					81					

NOTES:

Logged by: R Clark

Drilling Contractor: Subsurface Drilling and Remediation

Driller: John Halaburda

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N 194453 E: 522779
Surface Elevation:	25.2 FT MSL
Well Riser Elevation.	27 4 FT MSL

Job No. 29600 97	Client EFANE NCBC Davisville	Location: SITE 16
Drilling Method: AD 2 Rig		Boring No. **MW16-06S**
Sampling Method. 3 in split spoon sampler		Sheet 1 of 1

Drilling Water Level			Start	Drilling Date/Times	Finish
Date			6/21/00		6/21/00
Time			0738		1008

Surface Conditions: woodland

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
						0			
						1		No sample from 0-10 ft bgs	
								See MW16-06D for soil description	
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
SS	24	10	10-12	NA	9	10		Very dark grey SANDY SILT, some coarse angular	
	20				24		ML	to subangular gravel, wet	
					34	11			
					65			Sample submitted for laboratory analysis	
						12			
						13			
						14			
						15			
						16			
						17			
						18			
						19			

Logged by: Kevin Baum Date: 6/21/2000

Drilling Contractor: Subsurface Drilling and Remediation Driller: Jim Goldthwait

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	7-17 ft bgs	Sandpack:	6-18 ft bgs	Grout:	6 ft to grade
Bottom of Hole:	36 ft bgs	Riser Interval:	7 ft bgs to 3 ft ags	Bentonite:	3-6 ft bgs	Cover:	stickup

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N: 194457 E 522780
Surface Elevation	25 2 FT MSL
Well Riser Elevation	27 8 FT MSL

Job. No 29600 97	Client: EFANE NCBC Davisville	Location. SITE 16
Drilling Method: AD-2 Rig, drive and wash		Boring No. **MW16-06D**
Sampling Method: 2 in. split spoon		Sheet 1 of 3
Drilling Water Level / Date / Time		Start 6/20/00 0730 — Drilling Date/Times — Finish 6/22/00 1205
Surface Conditions: woodland		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 16	0	0-2	0.0	3 9	0		FILL	gray brown very fine to fine SAND, trace angular to subrounded gravel< 0.5" dia , organics (grass + roots)	
					5 6	1		?	clay	
2" SS	24 21	0	2-4	0.0	3 3	2			brown very fine to fine SAND, dry	
					3 2	3				
2" SS	24 17	0	4-6	0 0	3 4	4			Same as above	
					5 23	5				
2" SS	12 10	0	6-7	0.0	16 102	6		SP	very fine to fine SAND, trace silt and angular to subangular gravel < 2" dia (in bottom 5"), damp	Augered to 8' BGS.
						7				
2" SS	24 17	8	8-10	0 0	18 12	8		SM	dark gray very fine to fine SILTY SAND, trace angular to subangular gravel, damp	
					13 18	9				
2" SS	24 13	10	10-12	0 0	23 24	10		ML	0-10 in. SANDY SILT, some angular to subangular gravel < 2 5" dia.	
					24 25	11		GP / ML	10-13 in.: v dark gray angular rock fragments, moist	
2" SS	24 23	10	12-14	0.0	21 25	12			Same as above, wet	
					23 19	13				
2" SS	24 14	14	14-16	0 0	59 33	14		ML	very dark gray SILT, trace sand and subangular to gravel < 0 5	Switched to 4" ID casing drive and wash.
					31 59	15				
2" SS	24 10	14	16-18	0.0	48 44	16		SP	0-5 in · very dark gray medium to coarse SAND, trace silt and angular to subangular gravel < 1" dia	
					71 29	17		SM	5-10 in. very dark gray SILTY SAND, trace angular to subangular gravel <0.5" dia	
2" SS	24 9	18	18-20	0 0	7 9	18		SP	dark olive gray medium to coarse SAND, trace silt	
					9 7	19				

Logged by: Kevin Baum Date: 6/20/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: Jim Goldthwait/John Haliburda

WELL SPECIFICATIONS.

Diam. of Riser	2 in	Screen Interval.	38 5' - 44.5' BGS	Sandpack·	36 5 - 45 ft bgs	Grout	33 5 ft bgs - grade
Bottom of Hole	52 5 ft bgs	Riser Interval	38 5 ft bgs - 2 5 ft ags	Bentonite·	33 5-36 5 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates.	N 194457 E 522780
Surface Elevation	25 2 FT MSL
Well Riser Elevation	27 7 FT MSL

Job No 29600 97	Client· EFANE NCBC Davisville	Location SITE 16
Drilling Method: AD-2 Rig, drive and wash		Boring No **MW16-06D**
Sampling Method: 2 in. split spoon		Sheet 2 of 3
Drilling Water Level / Date / Time		Start 6/20/00 0730; Drilling Date/Times; Finish 6/22/00 1205
Surface Conditions	woodland	

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 / 14	18	20-22	0 0	9 / 12	20		SP	Same as above, some iron staining / trace gravel 7-14" < 0 5" angular-rounded	
					15 / 13	21				
2" SS	24 / 10	18	22-24	0 0	17 / 21	22			0-5 in dark gray fine to medium SAND, trace silt and subrounded-rounded gravel < 0 5" dia	Loss of 75 gal water 0-24' BGS
					25 / 31	23		SM	iron staining 5-8 in / 8-10 in very fine to fine SILTY SAND, iron stained	
2" SS	24 / 11	24	24-26	0 0	12 / 22	24		ML	0-4 in dark gray SANDY SILT, trace angular to subangular gravel < 1" dia, iron staining	
					17 / 13	25			4-11in dark gray SILT, 1" band of medium to coarse sand at 9".	
2" SS	24 / 4	24	26-28	0 0	17 / 11	26			dark gray SILT	
					12 / 14	27				
2" SS	24 / 16	28	28-30	0 0	7 / 4	28			Same as above	
					3 / 5	29				
2" SS	24 / 16	28	30-32	0 0	7 / 9	30			Same as above	
					10 / 13	31				
2" SS	9 / 8	28	32-33	0 0	27 / 100/3"	32		SM	very dark gray very fine to fine SILTY SAND	
	15 / 4	33	33-35	1 7	19 / 44	33		ML	very dark gray SANDY SILT, some angular to subangular gravel<3" dia.	Unable to
					121/3	34				get casing to depth beyond 34'
						35			Rollerbit to 38 ft bgs	Set MW16-06S in borehole and rollerbit
						36				to 33 ft bgs 3 ft. to the north
						37				
2" SS	24 / 6	38	38-40		22 / 75	38		SM	very dark grey fine to coarse angular GRAVELLY SAND, some silt	
					56 / 22	39				

Logged by: Kevin Baum Date: 6/20/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: Jim Goldthwait/John Haliburda

WELL SPECIFICATIONS

Diam of Riser	2 in	Screen Interval	38 5' - 44 5' BGS	Sandpack	36 5 - 45 ft bgs	Grout	33 5 ft bgs - grade
Bottom of Hole·	52 5 ft bgs	Riser Interval	38 5 ft bgs - 2 5 ft ags	Bentonite	33 5-36.5 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job No	29600 97
Client	EFANE NCBC Davisville
Location	SITE 16
Drilling Method.	AD-2 Rig drive and wash
Boring No	MW16-06D
Sampling Method	2 in. split spoon
Sheet	3 of 3
Coordinates	N 194457 E 522780
Surface Elevation	25 2 FT MSL
Well Riser Elevation	27.7 FT MSL
Drilling Water Level	
Date	
Time	
Start Date/Times	6/20/00 0730
Finish	6/22/00 1205
Surface Conditions	woodland

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2' SS	24 12	38	40-42	0.0	30	40		SM	Same as above	
					35				Sample submitted for laboratory analysis	
					26	41				
					22					
2" SS	24 10	38	42-44	0 0	25	42		ML	Very dark grey sandy silt, some medium to coarse	
					30				angular to subangular gravel	
					28	43				
					51					
2" SS	6 6	44	44-44.5	0 0	116	44			Same as above	
									Rollerbit to 47 5 ft bgs	
									Cored 47 5-52.5 ft bgs	

Logged by: Kevin Baum Date: 6/20/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: Jim Goldthwait/John Haliburda

WELL SPECIFICATIONS

Diam of Riser	2 in	Screen Interval:	38 5' - 44 5' BGS	Sandpack	36 5 - 45 ft bgs	Grout	33 5 ft bgs - grade
Bottom of Hole	52 5 ft bgs	Riser Interval:	38.5 ft bgs - 2 5 ft ags	Bentonite	33 5-36.5 ft bgs	Cover:	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194457 E: 522780
Surface Elevation.	25.2 FT MSL
Well Riser Elevation:	27.75 FT MSL

Job No. 29600.97.3201	Client. EFANE	Location: Site 16 NCBC Davisville, North Kingstown, RI	
Drilling Method	AD-2 Drill Rig	Boring No **MW16-06D**	
Core Barrel used:	NX	Sheet 1 of 1	

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	
Start	Finish
06/22/00 1205	06/22/00 1310

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
					48					
98	79						Light gray fine grained quartzite with quartz sanding	1	5:30	48.5
					49		and quartz mineralization in fractures. Fractures at			
							60,30, and 90 degrees	2	9 00	49.5
					50					
								3	7:00	50.5
					51					
								4	6.00	51.5
					52					
								5	7.00	52.5
					53					
					54					
					55					
					56					
					57					
					58					
					59					
					60					
					61					
					62					
					63					
					64					
					65					
					66					

NOTES:

Logged by: Kevin Baum

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Jim Goldwait

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N 194424 E: 522907
Surface Elevation	19.6 FT MSL
Well Riser Elevation	22.3 FT MSL

Job. No. 29600 97	Client: EFANE NCBC Davisville	Location: SITE 16
Drilling Method AD 2 Rig		Boring No. **MW16-07S**
Sampling Method: 3 in split spoon sampler		Sheet 1 of 1
Drilling Water Level		Start 6/19/00 1321 / Drilling Date/Times / Finish 6/19/00 1434
Date		
Time		
Surface Conditions: woodland		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
						0			
						1		No sample from 0-5 ft bgs	
								See MW16-07D for soil description	
						2			
						3			
						4			
SS	24	4	5-7	NA	18	5	SP	Olive grey very fine to fine SAND, trace silt, wet	
	20				14				
					12	6		Sample submitted for laboratory analysis	
					13				
						7			
						8			
						9			
						10			
						11			
						12			
						13			
						14			
						15			
						16			
						17			
						18			
						19			

Logged by: Kevin Baum Date: 6/21/2000

Drilling Contractor: Subsurface Drilling and Remediation Driller: John Haliburda

WELL SPECIFICATIONS:

Diam of Riser:	2 in	Screen Interval.	3-13 ft bgs	Sandpack:	2.5-13 5 ft bgs	Grout:	1.5 ft to grade
Bottom of Hole:	13.5 ft bgs	Riser Interval.	3 ft bgs to 3 ft ags	Bentonite:	1 5-2.5 ft bgs	Cover.	stickup

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N. 194418 E 522908
Surface Elevation.	19.4 FT MSL
Well Riser Elevation.	22 3 FT MSL

Job. No	Client: EFANE NCBC Davisville	Location	SITE 16
29600.97			
Drilling Method AD 2 Rig		Boring No	MW16-07D
140 lb hammer with 3' drop			
drive and wash			
Sampling Method 2" split spoon sampler		Sheet 1 of 2	
Drilling Water Level		Start	Drilling Date/Times	Finish
Date		6/15/00		6/15/00
Time		0746		1504
Surface Conditions	woodland			

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2"	24	0	0-2	0.1	25	0			dark brown fine to medium SAND, trace silt and	
SS	21				19			FILL	subangular to subrounded gravel<2" dia., damp, trace	
					9	1		or	grass and roots	
					21			REWORK-		
2"	24	0	2-4	148	19	2		ED	0-3 in. light brown fine to coarse SAND, trace	
SS	7				15			SOIL	subangular to subrounded gravel<2" dia., damp	
					17	3			3-7 in : very dark gray very fine to medium SAND, some	
					11				silt, wet	
2"	24	4	4-6	366	30	4			very dark gray very fine to medium SAND, trace silt and	3" split spoon used
SS	16				61				angular to subangular gravel<1.5" dia , 3" wood chip	4-6' BGS
					42	5			and glass shards at 10", wet	
					24					
2"	24	4	6-8	235	14	6			dark olive gray very fine to fine SAND, trace silt	
SS	16				7					
					8	7				
					9					
2"	24	8	8-10	NA	11	8			no recovery	
SS	0				8					
					10	9				
					10					
2"	24	8	10-12	380	18	10			0-4 in · dark olive gray very fine to fine SAND	
SS	11				16				4-11 in. very dark gray very fine to fine SAND, some silt	
					18	11				
					31					
2"	21	12	12-14	73 8	11	12			light olive gray very fine to fine SAND, trace silt	
SS	8				15				5-8 in broken cobble angular-subangular, phyllite and	loss of 75 gallons of
					17	13			quartzite	water 0-14' BGS
					103/3				rollerbit to 14' BGS	
2"	3	14	14-16	NA	90/3	14			4 in metal shard	
SS	0								rollerbit 14-16' BGS	
						15				
2"	24	14	16-18	37 1	12	16			0-5 in :finr to coarse angular to subrounded GRAVEL,	
SS	17				28			ML	trace sand & silt 5-9 in SANDY SILT, trace angular to	
					17	17			subangular gravel<1" dia. pynte rich, light brown	
					12			ML/SM	9-17 in. dark gray SANDY SILT grading to SILTY SAND	
2"	24	18	18-20	5 5	10	18		SP	0-4 in · dark gray medium to coarse SAND, trace silt	
SS	10				7				4-10 in very dark gray silt, iron stained and weathered	
					22	19			phyllite in last 2"	
					34			ML		

Logged by	Kevin Baum	Date	06/15/00
Drilling Contractor.	Subsurface Drilling and Remediation	Driller	John Haliburda

WELL SPECIFICATIONS

Diam of Riser:	2 in.	Screen Interval:	27 5-37 5 ft bgs	Sandpack:	25 5-38 ft bgs	Grout	22 5 ft bgs-grade
Bottom of Hole	46 ft bgs	Riser Interval:	27 5 ft bgs-2 9 ft ags	Bentonite:	22 5-25.5 ft bgs	Cover	4 in. steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N. 194418 E 522908
Surface Elevation	19 5 FT MSL
Well Riser Elevation	22 4 FT MSL

Job No 29600 97	Client. EFANE NCBC Davisville	Location SITE 16
Drilling Method AD 2 Rig		Boring No **MW16-07D**
140 lb hammer with 3' drop		
Sampling Method 2" split spoon sampler		Sheet 2 of 2
Drilling Water Level		Start 6/15/00 0746
Date		Drilling Date/Times
Time		Finish 6/15/00 1504
Surface Conditions	woodland	

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 20	18	20-22	1 7	98	20		SM	0-8 in dark olive gray SAND, some silt, and	
					63				subangular to subrounded gravel<0 5" dia	
					71	21			8-12 in SILTY SAND, some angular to subangular	
					78				gravel<0 5" dia 12-20" light gray silt with pyrite flakes	
2" SS	24 12	22	22-24	0.0	25	22			0-8 in gray SAND, some silt and angular to	
					18				subrounded gravel<0 5" dia	
					10	23		ML	8-12 in very dark gray SILT, some sand	
					9					
2" SS	24 16	24	24-26	0 0	6	24			very dark gray SILT	
					7				black medium to coarse SAND at 2-3"	
					4	25				
					4					
2" SS	24 19	24	26-28	0.0	9	26			same as above	
					9					
					9	27				
					7					
2" SS	24 12	28	28-30	0 0	25	28			very dark gray SANDY SILT, weathered rock fragments	
					24				at 10-12" angular to subangular	
					37	29				
					41					
2" SS	24 5	28	30-32	3 7	25	30		GM	very dark gray angular to subangular SILTY GRAVEL,	
					50				some coarse sand, gravel<1" dia	
					26	31				
					20					
2" SS	24 11	28	32-34	0 0	11	32		ML/GM	very dark gray SANDY SILT and angular to subangular	
					15				GRAVEL<1" dia	
					12	33				
					10					
2" SS	24 6	34	34-36	32 0	69	34			same as above	
					57					
					22	35				
					16					
3" SS	24 14	34	36-38	NA	31	36			same as above, gravel<3" dia	used 3" split spoon
					52					36-38' BGS
					51	37			Sample submitted for laboratory analysis	
					108					
						38			rollerbit with tricone drill 38-41' BGS	
									cored 41-46' BGS	
						39				

Logged by	Kevin Baum	Date	06/15/00
Drilling Contractor	Subsurface Drilling and Remediation	Driller	John Haliburda

WELL SPECIFICATIONS

Diam of Riser	2 in	Screen Interval	27 5-37 5 ft bgs	Sandpack	25 5-38 ft bgs	Grout.	22 5 ft bgs-grade
Bottom of Hole:	46 ft bgs	Riser Interval	27 5 ft bgs-2 9 ft ags	Bentonite	22 5-25 5 ft bgs	Cover	4 in. steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Job. No	29600.97.3201
Client	EFANE
Location.	Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method:	AD2
Boring No.	**MW16-07D**
Core Barrel used:	NX
Sheet	1 of 1

Coordinates: N. 194418 E: 522907
Surface Elevation: 19.5 FT MSL
Well Riser Elevation: 22.37 FT MSL

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	
Start	Finish
06/15/00 1523	06/15/00 1612

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fracture (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
98	78				42		dark gray phyllite with some quartz banding and mineralization in fractures lined with silt and occur primarily at 60 degrees and 90 degrees.	1	9 00	42
					43			2	9:00	43
					44			3	6:00	44
					45			4	4:00	45
					46			5	5:00	46
					47					
					48					
					49					
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					
					60					

NOTES:

Logged by: Kevin Baum

Drilling Contractor: Subsurface Drilling and Remediation

Driller: John Haliburda

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 194122 E 522905
Surface Elevation	28 0 FT MSL
Well Riser Elevation	30 4 FT MSL

Job No 29600 97	Client EFANE	Location: SITE 16 NCBC Davisville
Drilling Method Mobile B-61 rig		Boring No MW16-08D
Drive and Wash		
Sampling Method: 2" or 3" split spoon		Sheet 1 of 3
Drilling Water Level		Start 02/01/01 1000
Date		Drilling Date/Times
Time		Finish 02/05/01 1026
Surface Conditions asphalt		

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
3" SS	18 10	0	0-2	0.0	- 14	0	FILL or reworked soil	Rollerbit through 6 in asphalt; 0-10 in : Dark olive brown fine to medium SAND, some fine to coarse angular to subrounded gravel, damp
					150 128	1		
2" SS	24 15	0	2-4	0 0	30 28	2		0-2 in.. Light grey fine to coarse SAND, trace medium to coarse angular to subangular gravel 2-7 in Light brown fine to medium SAND,
					37 26	3		trace fine angular to subangular gravel 7-15 in : Dark brown very fine to medium SAND, trace fine rounded to subrounded gravel
2" SS	24 10	0	4-6	1.6	14 15	4		0-4 in : Dark brown fine to medium SAND, trace fine angular gravel; 4-7 in Light orange WEATHERED ROCK (fine sand, trace silt) and CHARCOAL
					16 19	5	SP	7-10 in : Dark olive brown very fine to fine SAND, trace silt, coarse angular to subangular gravel
2" SS	24 8	0	6-8	0.0	6 63	6		Dark olive brown fine to medium SAND, trace silt, medium to coarse angular to subrounded gravel, damp
					66 48	7		
3" SS	24 8	0	8-10	0 7	34 18	8		0-3 in Dark olive grey very fine to fine SAND, trace silt, 3 in flat quartzite disc at top of spoon
					5 5	9		3-8 in : Dark brown very fine to fine SAND, trace silt, organics
2" SS	24 18	0	10-12	0 0	10 14	10		0-4 in.: Very dark brown very fine to fine SAND, trace fine to medium angular to subangular gravel, damp 4-12 in : Dark brown very fine to fine
					8 6	11		SAND, trace organics, fine subangular to subrounded gravel; 12-18 in. Light brown fine to medium SAND, trace medium to coarse gravel
2" SS	24 14	0	12-14	0.0	8 9	12	SM	0-4 in.: Very dark brown very fine to medium SAND, trace silt; 4-14 in.. Alternating layers of dark olive brown very fine to fine SAND, some
					11 8	13		silt and light brown fine to medium SAND
3" SS	24 22	0	14-16	0.0	7 9	14		0-6 in Very dark grey very fine to fine SAND, some silt
					14 10	15	SP	6-18 in Light reddish brown very fine to fine SAND, damp
2" SS	24 20	0	16-18	0.0	5 5	16		Olive brown fine to medium SAND, wet
					6 8	17		
2" SS	24 10	18	18-20	0.0	5 16	18	SW	Dark olive brown fine to coarse SAND, loose, red staining in last 2 in
					9 10	19		

Logged by: Kevin Baum Date: 02/05/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS.

Diam of Riser	2 in	Screen Interval	40-55 ft bgs	Sandpack	38-55 5 ft bgs	Grout	36 ft bgs - grade
Bottom of Hole	63 5 ft bgs	Riser Interval	40 ft bgs - 2 ft ags	Bentonite	36-38 ft bgs	Cover.	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N. 194122 E 522905
Surface Elevation	28 0 FT MSL
Well Riser Elevation	30 4 FT MSL

Job No 29600 97	Client. EFANE	Location SITE 16 NCBC Davisville
Drilling Method Mobile B-61 rig		Boring No MW16-08D
Drive and Wash		
Sampling Method 2" or 3" split spoon		Sheet 2 of 3
Drilling Water Level		Start 02/01/01 1000
Date		Drilling Date/Times
Time		Finish 02/05/01 1026
Surface Conditions asphalt		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 18	18	20-22	0 0	9 13	20		SP	Dark brown medium to coarse SAND, trace fine to medium subangular to subrounded gravel, loose
					9 11	21			
2" SS	24 16	18	22-24	0 0	10 15	22		SM	0-8 in Same as above 8-16 in Very dark grey SILTY SAND, some fine to coarse angular to subangular gravel, 1 in olive brown medium to coarse sand lens at 13-14 in
					17 23	23			
2" SS	24 10	24	24-26	0 0	6 7	24			0-4 in Very dark grey SILTY SAND, trace clay 4-8 in Dark reddish brown very fine to fine SAND, some silt
					5 6	25			8-10 in Very dark grey SANDY SILT, trace clay
2" SS	24 12	24	26-28	0.0	7 6	26			Very dark grey SILTY SAND
					7 10	27			
2" SS	24 14	28	28-30	0 0	11 7	28		ML	Very dark grey SILT, trace very fine sand, clay, plastic
					10 11	29			
2" SS	1 1	28	30-32	0 0	100/1	30		B	Very dark grey SILT, 2 in angular rock fragment
						31			Boulder from 30 1-31 9 ft bgs
2" SS	24 14	29	32-34	0 0	15 19	32		SP	0-4 in · Very dark grey very fine to fine SAND, trace silt 4-14 in dark olive grey fine to medium SAND, loose, reddish black staining from 2-8 in
					19 18	33			
2" SS	24 11	34	34-36	0 0	7 10	34			Very dark grey very fine to fine SAND, trace silt
					11 13	35			
2" SS	24 16	34	36-38	0 0	11 10	36			Same as above
					17 26	37			
2" SS	24 12	38	38-40	1 4	17 16	38			Dark olive grey fine to medium SAND, trace silt, very fine to fine subangular to subrounded gravel
					18 19	39			

Logged by	Kevin Baum	Date	02/05/01
Drilling Contractor	Subsurface Drilling and Remediation	Driller	Phil Thornsbury

WELL SPECIFICATIONS

Diam of Riser	2 in	Screen Interval	40-55 ft bgs	Sandpack	38-55 5 ft bgs	Grout	36 ft bgs - grade
Bottom of Hole	63 5 ft bgs	Riser Interval	40 ft bgs - 2 ft ags	Bentonite	36-38 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job. No. 29600 97	Client EFANE
Location	SITE 16 NCBC Davisville
Drilling Method. Mobile B-61 rig	
Drive and Wash	
Boring No.	MW16-08D
Sampling Method 2" or 3" split spoon	
Sheet 3 of 3	

Coordinates: N 194122 E 522905
Surface Elevation 28 0 FT MSL
Well Riser Elevation 30 4 FT MSL

Drilling Water Level		
Date		
Time		
Surface Conditions: asphalt		

Start	Drilling Date/Times	Finish
02/01/01 1000		02/05/01 1026

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 19	38	40-42	4.7	17 16	40		SP	0-11 in . Dark olive grey medium to coarse SAND, trace silt, fine subangular to subrounded gravel
					19 17	41			11-19 in · Reddish/orange/brown medium to coarse SAND, trace silt, fine subangular to subrounded gravel
2" SS	24 24	38	42-44	7.3	14 21	42			0-16 in Dark olive brown fine to medium SAND, trace fine subangular to subrounded gravel
					32 23	43		SM	16-24 in. Dark olive grey very fine to fine SAND, some silt, layer of fine angular gravel at 4-4.5 in.
2" SS	24 10	44	44-46	3 7	14 11	44		SP	0-6 in : Very dark grey very fine to fine SAND, trace silt
					23 31	45		SM	6-10 in.: Very dark grey very fine to fine SAND, some silt, very fine to coarse angular to subangular gravel
2" SS	24 10	44	46-48	1.1	61 47	46			Same as above
					31 26	47			
2" SS	24 8	48	48-50	0.8	12 16	48		SM/GM	Very dark grey fine to medium SAND and fine to coarse subangular to subrounded GRAVEL, some silt, loose
					18 12	49			
2" SS	24 4	48	50-52	1.1	17 15	50			Same as above
					8 12	51			
2" SS	24 3	48	52-54	0 8	17 16	52			Same as above
					26 31	53			
2" SS	13 10	54	54-55 1	0 8	61 67	54		SP/GP	Very dark grey fine to coarse SAND and fine to coarse angular to subangular GRAVEL, trace silt, very loose
					100/1"	55			
									Rollerbit to 58 5 ft bgs
						56			
									Cored from 58.5-63 5 ft bgs
						57			
						58			
						59			

Logged by: Kevin Baum Date. 02/05/01

Drilling Contractor: Subsurface Drilling and Remediation Driller Phil Thornsbury

WELL SPECIFICATIONS:

Diam of Riser	2 in.	Screen Interval:	40-55 ft bgs	Sandpack:	38-55 5 ft bgs	Grout	36 ft bgs - grade
Bottom of Hole	63 5 ft bgs	Riser Interval	40 ft bgs - 2 ft ags	Bentonite.	36-38 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194122 E: 522905
Surface Elevation:	28.0 FT MSL
Well Riser Elevation	30.4 FT MSL

Job. No 29600 97.3201	Client: EFANE	Location. Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method: Mobile B-61 rig Drive and Wash		Boring No **MW16-08D**
Core Barrel used: NX		Sheet 1 of 1

Packer Test		
Tested	NA	
Interval	NA	
See packer test log if applicable		

Drilling Times	
Start	Finish
02/05/01 1026	02/05/01 1130

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min.sec)	Total Depth (ft bgs)
					88		gray quartzite with few low angle fractures	1	7:56	59.5
95%	88%						no visible silt or staining in fractures			
					89			2	8:04	60.5
							total run 58 5-63 5 ft bgs			
					90			3	9 29	61.5
					91			4	7 54	62.5
					92			5	6 44	63.5
					93					
					94					
					95					
					96					
					97					
					98					
					99					
					100					
					101					
					102					
					103					
					104					
					105					
					106					

NOTES:

Logged by: Kevin Baum

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job No 29600 97	Client EFANE
Location:	SITE 16 NCBC Davisville
Drilling Method B-61 Mobile Drill Rig	Boring No. MW16-09D
140 lb. 30" Stroke	
Drive & Wash	
Sampling Method. 2" split spoon	Sheet 1 of 4

Drilling Water Level		
Date		
Time		
Surface Conditions	woodland	

Start	Drilling Date/Times	Finish
12/4/2000 1425		12/6/00 0837

Coordinates: N 193746 E 522373
Surface Elevation: 32 3 FT MSL
Well Riser Elevation: 34.6 FT MSL

This area was regraded in October 2002 This well is now a flush mounted well. New grade is 34.4, well riser elevation is 33.90

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 18	0	1 0-2	0	3 8	0		SP	0-6 in. Topsoil very organic and grey, medium to fine SAND, dry
					11 11	1			6-12 in Black, dark grey, medium to fine SAND, trace fine gravel, rounded, moist
2" SS	24 18	2	2 2-4	0	9 8	2			Grey fine to very fine SAND, trace organics grading to blackish grey medium to fine SAND, moist.
					8 7	3			
2" SS	24 18	4	3 4-6	2.4	6 7	4			Grey fine to very fine SAND, moist, very well sorted
					7 8	5			
2" SS	24 18	4	4 6-8	3.2	6 8	6			Same as above
					10 10	7			
2" SS	24 18	8	5 8-10	6 7	5 7	8			Same as above with yellow banding in last 3 in.
					9 10	9			
2" SS	24 18	8	6 10-12	5 9	10 10	0			Same as above with yellow/tan banding in last 6 in.
					8 11	11			
2" SS	24 22	8	7 12-14	19.1	10 10	12			Mottled grey and yellow/tan fine to very fine SAND, moist
					12 12	13			
2" SS	24 20	14	8 14-16	3 9	6 6	14			Grey/brown/black medium to fine SAND, trace fine subangular gravel, moist, well sorted.
					7 8	15			
2" SS	24 18	14	9 16-18	0	11 12	16			Black/grey coarse to medium SAND, trace medium to fine gravel, subangular rounded, trace
					11 10	17			fine sand, moist to wet
2" SS	24 17	18	10 18-20	0	10 10	18			Same as above, wet.
					10 13	19			

Logged by: Tom Biolsi Date: 12/6/2000

Drilling Contractor: Subsurface Drilling and Remediation Driller: Philip Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	57-67 ft bgs	Sandpack	53-65.5 ft bgs	Grout:	50 ft bgs- grade
Bottom of Hole	72 ft bgs	Riser Interval:	55 ft bgs - 2 ft ags	Bentonite:	50-53 ft bgs	Cover:	4 in. steel
as of 10/02:	Diam of Riser	2 in	Screen Interval	55-65 ft bgs	Sandpack	55-67 5 ft bgs	Grout 52 ft bgs- grade
	Bottom of Hole	73 1ft bgs	Riser Interval	57 ft bgs -grade	Bentonite	52-55 ft bgs	Cover 4 in. steel

EA Engineering, Science, and Techn logy, Inc.

LOG OF SOIL BORING - REVISED

Job No	29600 97
Client	EFANE
Location	SITE 16 NCBC Davisville
Drilling Method	B-61 Mobile Drill Rig
	140 lb 30" Stroke
	Drive & Wash
Boring No	MW16-09D
Sampling Method	2" split spoon
Sheet	2 of 4
Drilling Water Level	
Date	
Time	
Surface Conditions	woodland
Start Date/Times	12/04/00 1425
Drilling Date/Times	
Finish Date/Times	12/6/00 0837

Coordinates	N. 193746 E 522373
Surface Elevation	32 3 FT MSL
Well Riser Elevation	34 6 FT MSL

This area was regraded in October 2002 This well is now a flush mounted well New grade is 34 4, well riser elevation is 33 90

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 20	18	11 20-22	0 0	6 9 10 13	20 21			0-18 in Same as above 18-20 in Grey, brown fine to very fine SAND, wet, well sorted	
2" SS	24 24	18	12 22-24	0 0	12 18 18 14	22 23			0-14 in : Black to grey, medium to very fine SAND, wet, well sorted 14-24 in . Mottled orange/brown and grey/brown, fine to very fine SAND, trace silt	
2" SS	24 5	24	13 24-26	0 0	8 18 10 12	24 25		ML	Grey SANDY SILT, trace of sand, wet	
2" SS	24 19	24	14 26-28	0	7 11 12 15	26 27		SP	Dark grey, very fine SAND, moist to wet, very well sorted	
2" SS	24 14	28	15 28-30	0	7 11 16 18	28 29			Same as above	
2" SS	24 24	28	16 30-32	0	12 15 21 25	30 31		ML	Dark grey/black, SANDY SILT, very fine sand, trace clay, wet, glossy appearance of saturated surfaces	
2" SS	24 24	28	17 32-34	0 0	17 21 15 18	32 33		SP	Dark grey, very fine SAND, trace silt, very well sorted, moist to wet	
2" SS	24 12	34	18 34-36	0 0	7 11 15 16	34 35			Dark grey, very fine SAND, trace silt, wet Glossy appearance on saturated surfaces, well sorted	
2" SS	24 18	34	19 36-38	0.0	15 16 21 24	36 37			Dark grey, very fine SAND, trace silt, dense very well sorted, moist to wet	
2" SS	24 12	38	20 38-40	0 0	10 6 6 9	38 39			Same as above	

Logged by. Tom Biolsi Date: 12/6/2000

Drilling Contractor. Subsurface Drilling and Remediation Driller Philip Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser	2 in.	Screen Interval	57-67 ft bgs	Sandpack	53-65 5 ft bgs	Grout	50 ft bgs- grade
Bottom of Hole	72 ft bgs	Riser Interval	55 ft bgs - 2 ft ags	Bentonite:	50-53 ft bgs	Cover	4 in steel
as of 10/02: Diam of Riser	2 in	Screen Interval	55-65 ft bgs	Sandpack:	55-67 5 ft bgs	Grout.	52 ft bgs- grade
Bottom of Hole	73 1ft bgs	Riser Interval	57 ft bgs -grade	Bentonite	52-55 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job No 29600 97	Client EFANE
Location.	SITE 16 NCBC Davisville
Drilling Method B-61 Mobile Drill Rig	Boring No. MW16-09D
140 lb 30" Stroke	
Drive & Wash	
Sampling Method 2" split spoon	Sheet 3 of 4
Drilling Water Level	Start 12/04/00 1425 / Drilling Date/Times / Finish 12/6/00 0837
Date	
Time	
Surface Conditions: woodland	

Coordinates: N 193746 E 522373
Surface Elevation: 32.3 FT MSL
Well Riser Elevation: 34.6 FT MSL

This area was regraded in October 2002 This well is now a flush mounted well. New grade is 34.4, well riser elevation is 33 90

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 18	38	21 40-42	0.0	4 7 11 14	40 41		ML	Dark grey, SANDY SILT, wet.	
2" SS	24 18	38	22 42-44	0 0	7 10 15 14	42 43		SP	Dark grey, very fine SAND, trace silt wet, very well sorted.	
2" SS	24 12	44	23 44-46	0 0	8 8 11 13	44 45		SM	Dark grey, SILTY SAND, wet	
2" SS	24 10	44	24 46-48	0	7 11 15 14	46 47		ML	Dark grey, SANDY SILT, wet, glossy appearance on saturated surfaces of the sample.	
2" SS	24 16	48	25 48-50	0	14 6 5 8	48 49			Same as above, wet	
2" SS	24 18	48	26 50-52	0	7 5 4 6	50 51			Dark grey/black SILT, glossy appearance on saturated surface of sample.	
2" SS	24 22	48	27 52-54	0 0	8 15 51 58	52 53		SM/SM	0-10 in.: Same as above, wet 10-22 in : Dark grey SAND and SILT and medium to fine angular to subrounded GRAVEL, very dense, wet	
2" SS	9 4	54	28 54-54.75	0 0	33 100/3	54 55 56		GP	Grey, coarse to fine angular GRAVEL, some coarse to fine sand. Roller bit to 57 bgs.	
2" SS	24 13	54	29 57-59	0 0	33 54 24 51	57 58		ML/GM	Dark grey SANDY SILT and medium to fine GRAVEL, subangular, to rounded, trace of coarse gravel, wet	
2" SS	24 6	59	30 59-61	0 0	14 13	59			Same as above.	

Logged by: Tom Biolsi Date. 12/6/2000

Drilling Contractor: Subsurface Drilling and Remediation Driller. Philip Thornsbury

WELL SPECIFICATIONS

Diam. of Riser	2 in	Screen Interval.	57-67 ft bgs	Sandpack	53-65 5 ft bgs	Grout.	50 ft bgs- grade
Bottom of Hole:	72 ft bgs	Riser Interval:	55 ft bgs - 2 ft ags	Bentonite	50-53 ft bgs	Cover	4 in steel
as of 10/02:	Diam of Riser 2 in	Screen Interval	55-65 ft bgs	Sandpack	55-67 5 ft bgs	Grout	52 ft bgs- grade
	Bottom of Hole 73.1ft bgs	Riser Interval	57 ft bgs -grade	Bentonite	52-55 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job No	29600 97
Client	EFANE
Location	SITE 16 NCBC Davisville
Drilling Method	B-61 Mobile Drill Rig, 140 lb 30" Stroke, Drive & Wash
Boring No	MW16-09D
Sampling Method	2" split spoon
Sheet	4 of 4
Coordinates	N 193746 E 522373
Surface Elevation	32 3 FT MSL
Well Riser Elevation	34 6 FT MSL
Drilling Water Level / Date / Time	
Start Date/Times	12/04/00 1425
Finish Drilling Date/Times	12/6/00 0837
Surface Conditions	woodland

This area was regraded in October 2002 This well is now a flush mounted well New grade is 34 4, well riser elevation is 33 90

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
					10	60	SP		
					8				
2" SS	24 12	59	31 61-63	0	8	61		Dark grey to very fine SAND, medium to fine	
					6			GRAVEL, wet	
					5	62			
					4				
2" SS	21 3	63	32 63-64 75	0 0	22	63		Dark grey, very fine SAND and coarse to	
					30			fine (subangular) GRAVEL, wet	
					52	64			
					100/3				
						65			
						66			
						67		67-72 cored (NX cored) quartzite	
						68			
						69			
						70			
						71			
						72		End of boring at 72' bgs	
						73			
						74			
						75			
						76			
						77			
						78			
						79			

Logged by: Tom Biolsi Date: 12/6/2000

Drilling Contractor: Subsurface Drilling and Remediation Driller: Philip Thornsbury

WELL SPECIFICATIONS

Diam. of Riser:	2 in	Screen Interval	57-67 ft bgs	Sandpack	53-65 5 ft bgs	Grout.	50 ft bgs- grade
Bottom of Hole	72 ft bgs	Riser Interval	55 ft bgs - 2 ft ags	Bentonite	50-53 ft bgs	Cover	4 in steel
as of 10/02: Diam of Riser	2 in	Screen Interval	55-65 ft bgs	Sandpack	55-67 5 ft bgs	Grout	52 ft bgs- grade
Bottom of Hole	73 1ft bgs	Riser Interval	57 ft bgs -grade	Bentonite.	52-55 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates.	N 193746 E· 522373
Surface Elevation:	32 3 FT MSL
Well Riser Elevation:	34.6 FT MSL

This area was regraded in October 2002. This well is now a flush mounted well. New grade is 34.4, well riser elevation is 33 90

Job. No 29600.97.3201	Client· EFANE	Location· Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method: Drive and Wash with Mobile B-61 Drill Rig		Boring No **MW16-09D**
Core Barrel used: NX Core, 3 in. diameter		Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	
See packer test log if applicable		

Drilling Times	Start	Finish
	12/06/00 0811	12/06/00 0837

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min.sec)	Total Depth (ft bgs)
					65					
					66					
97%	90%				67		Light grey medium to fine grained quartzite	1	5:00	68
					68		few low angle fractures at 11,27.5, 35, 40 ,43, 44, and 48 in. An unknown black	1	5:00	69
					69		feature from 2 ft 1 in. to 2 ft 3 in. with elongated black crystals directly above and below	1	5:00	70
					70		feature in random orientations	1	6:00	71
					71		4 ft 10 in. total core length	1	5:00	72
					72					
					73					
					74					
					75					
					76					
					77					
					78					
					79					
					80					
					81					
					82					
					83					

NOTES:

Logged by: Tom Biolsi/Robin Clark

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job. No	29600.97
Client.	EFANE
Location.	SITE 16 NCBC Davisville
Drilling Method	Mobil Drill
	drive and wash
	rollerbit, core
Boring No	MW16-10D
Sampling Method.	2" split spoon
Sheet	1 of 3
Coordinates.	N 193518 E. 522317
Surface Elevation.	31 7 FT MSL
Well Riser Elevation	31 3 FT MSL
Drilling Water Level	
Date	
Time	
Surface Conditions	woodland

Start	Drilling Date/Times	Finish
12/04/00		12/06/00
1425		1120

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 10	0	0-2	0	13 17	0		SP	Brown medium to coarse SAND, trace angular to subrounded medium gravel, dry.	
					19 21	1				
2" SS	15 12	0	2-4	0	28 29	2			Brown, fine to medium SAND, trace angular to subangular fine gravel, dry	
					100/3	3				
2" SS	6 4	5	5-7.5	0	100	4			Dark gray very fine to fine SAND, trace angular to subangular fine gravel, dry.	
						5				
2" SS	24 18	7	7-9	0	17 18	6			dark gray, very fine to fine SAND, trace silt, trace angular to subangular fine gravel, dry	
					23 20	7				
2" SS	11 6	9	9-10	0	12 80/5	8			0-3 in . dark gray medium to coarse SAND, dry 3-6 in dark gray very fine to fine SAND, trace	
2" SS	6 4	10	10-10 5	0	100	9			angular to subangular fine gravel, damp same as 3-6 in (above).	
						0				
						11				
2" SS	24 18	12	12-14	0	7 11	12			0-4 in light gray fine to medium SAND 4-6 in.. dark gray SILT	
					11 11	13			6-18 in.: light grayish brown medium to coarse SAND.	
2" SS	24 12	12	14-16	0	8 8	14			0-10 in : light grayish brown medium to coarse SAND, damp, 10-12 in grayish brown medium to coarse	
					11 9	15			SAND, 2" red gravel, angular to subangular, wet	
2" SS	24 18	12	16-18	0	12 9	16			0-10 in : same as above (10-12 in) 10-12 in black fine to medium SAND	
					12 18	17		SM	12-14 in : very fine to fine SILTY SAND.	
2" SS	24 10	18	18-20	0	15 18	18		SP	olive brown very fine to fine SAND	
					16 23	19				

Logged by: Kevin Baum Date: 12/06/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS.

Diam of Riser	2 in	Screen Interval	48 5-58 5 ft bgs	Sandpack:	46 5-59 ft bgs	Grout:	44.5 ft bgs - grade
Bottom of Hole	67 ft bgs	Riser Interval	48 5 ft bgs - grade	Bentonite	44 5-46 5 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job No. 29600 97	Client: EFANE
Location	SITE 16 NCBC Davisville
Drilling Method	Mobil Drill, drive and wash, rollerbit, core
Boring No	MW16-10D
Sampling Method	2" split spoon
Sheet	2 of 3
Drilling Water Level / Date / Time	
Start	12/04/00 1425
Drilling Date/Times	
Finish	12/06/00 1120
Surface Conditions	woodland

Coordinates: N 193518 E: 522317
Surface Elevation: 31 7 FT MSL
Well Riser Elevation: 31 3 FT MSL

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 16	18	20-22	0	15 12	20		SP	same as above	
					9 17	21				
2" SS	24 21	18	22-24	0	12 18	22			dark olive brown fine to medium SAND, trace fine subangular to subrounded gravel	
					22 23	23				
2" SS	24 12	24	24-26	0	15 17	24			0-4 in . olive brown fine to medium SAND, reddish banding	
					21 23	25			9-12 in olive gray very fine to fine SAND	
2" SS	24 20	24	26-28	0	19 23	26			gray very fine to fine SAND, trace silt	
					23 24	27				
2" SS	24 24	24	28-30	0	17 16	28		ML	0-18 in same as above; 18-24 in very dark gray very fine to fine SANDY SILT	
					18 19	29				
2" SS	24 24	24	30-32	0	15 18	30		SM	dark olive gray silty SAND	
					16 18	31				
2" SS	24 18	24	32-34	0	15 20	32			0-12 in same as above; 12-18 in gray very fine to fine SAND, trace silt	
					19 18	33		SP		
2" SS	24 10	24	34-36	0	6 6	34		ML	olive gray SILT	
					5 8	35				
2" SS	24 11	24	36-38	0	10 6	36		SP	0-7 in same as above; 7-11 in. dark olive gray very fine to fine SAND,	
					7 7	37			trace silt	
2" SS	24 13	24	38-40	0	3 4	38		SM	0-8 in.: same as above; 8-13 in dark gray SILTY SAND.	
					11 9	39				

Logged by: Kevin Baum Date: 12/06/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser	2 in	Screen Interval	48 5-58 5 ft bgs	Sandpack	46 5-59 ft bgs	Grout	44 5 ft bgs - grade
Bottom of Hole	67 ft bgs	Riser Interval	48 5 ft bgs - grade	Bentonite	44.5-46 5 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates:	N: 193518 E: 522317
Surface Elevation.	31 7 FT MSL
Well Riser Elevation	31 3 FT MSL

Job No 29600 97	Client: EFANE	Location: SITE 16 NCBC Davisville
Drilling Method Mobil Drill		Boring No MW16-10D
drive and wash		
rollerbit, core		
Sampling Method: 2" split spoon		Sheet 3 of 3
Drilling Water Level		Start 12/04/00 1425
Date		Drilling Date/Times
Time		Finish 12/06/00 1120
Surface Conditions	woodland	

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 24	24	40-42	0	3	40		SM	Same as above	
					6					
					7	41				
					11					
2" SS	24 5	24	42-44	0	20	42			Same as above	
					19					
					34	43				
					30					
2" SS	24 12	44	44-46	3	10	44			Same as above	
					8					
					8	45				
					7					
2" SS	24 18	44	46-48	3	6	46		ML	dark gray SANDY SILT	
					7					
					7	47				
					8					
2" SS	24 20	44	48-50	4	5	48			dark gray SILT	
					6					
					6	49				
					13					
2" SS	24 14	44	50-52	2	37	50		WTHR RX	dark gray SILT with angular rock fragements	
					38					
					55	51				
					28					
2" SS	24 10	44	52-54	2	17	52			same as above	
					34					
					36	53				
					27					
						54		B	rollerbit 54-55	
2" SS	24 8	54	55-57		24	55		WTHR RX	dark gray SILTY SAND and angular to subangular	
					35				fine to medium GRAVEL	
					12	56				
					13					
2" SS	24 12	54	57-59		29	57			same as above	
					54					
					77	58				
					98				rollerbit 59-62	
						59			cored from 62-67 ft bgs	

Logged by: Kevin Baum Date: 12/06/00

Drilling Contractor: Subsurface Drilling and Remediation Driller Brad Haase

WELL SPECIFICATIONS

Diam of Riser:	2 in	Screen Interval:	48 5-58 5 ft bgs	Sandpack.	46 5-59 ft bgs	Grout	44 5 ft bgs - grade
Bottom of Hole	67 ft bgs	Riser Interval	48 5 ft bgs - grade	Bentonite	44 5-46 5 ft bgs	Cover	road box

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N 193518 E 522317
Surface Elevation:	31.7 FT MSL
Well Riser Elevation:	31.3 FT MSL

Job No 29600 97 3201	Client EFANE	Location Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method: Drive and Wash		Boring No. **MW16-10D**
Core Barrel used: NX		Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	
See packer test log if applicable		

Drilling Times	
Start	Finish
12/05/00 1350	12/12/00 1200

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
93.3%	91%				62					
					63		Light grey fine to medium grained quartzite, few low angle fractures at 3, 7, 22, 27.5, 35.5	1	4.00	63
					64		and 41 in. Fractures rusted from 39-43 in. Trace silt and iron staining in fractures.	2	4 00	64
					65		Coring interval: 62-67 ft bgs	3	4 00	65
					66			4	4 00	66
					67			5	4:00	67
					68					
					69					
					70					
					71					
					72					
					73					
					74					
					75					
					76					
					77					
					78					
					79					
					80					

NOTES:

Logged by: Kevin Baum/Robin Clark

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Brad Haase

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N 193512 E 522320
Surface Elevation:	31 5 FT MSL
Well Riser Elevation.	3' 4 FT MSL

Job No. 29600 97 3201	Client: EFANE
Drilling Method B-61 Mobile Rig	
4 in casing Drive and wash	
Rollerbit used 3 875 in	

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Location	Site 16
NCBC Davisville, North Kingstown, RI	
Boring No	**MW16-10R**
Sheet 1 of 1	

Drilling Times	Start	Finish
	12/14/00 1442	12/15/00 1339

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min sec)	Total Depth (ft bgs)
				66		Rollerbit from 66-91 ft bgs			
				67					
				68		Dark grey phyllite cuttings from 66-69 ft	1	3:42	67
				69			2	3 23	68
				70		Light grey quartzite cuttings from 69-71 ft	3	3.17	69
				71		dark grey phyllite cuttings from 71-76 ft	4	4 36	70
				72			5	3 30	71
				73		Light grey quarztite cuttings from 76-91ft	6	3 43	72
				74			7	4:43	73
				75			8	3 07	74
				76			9	3:43	75
				77			10	3 40	76
				78			11	5 52	77
				79			12	8:22	78
				80			13	6:33	79
				81			14	5:14	80
				82			15	4:38	81
				83			16	6.41	82
				84			17	6:52	83
				85			18	6 38	84
				86			19	8 59	85
				87			20	10:48	86
				88			21	8 01	87
				89			22	9.00	88
				90			23	7 29	89
				91			24	9 38	90
							25	10.32	91

NOTES:

First gear, 700 psi downpressure

Logged by: Kevin Baum

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Brad Haase

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates:	N: 193786 E 522544
Surface Elevation:	29.7 FT MSL
Well Riser Elevation	29 5 FT MSL

Job. No 29600 97	Client EFANE	Location: SITE 16 NCBC Davisville
Drilling Method: B-61 Mobile Drill Rig		Boring No MW16-11D
Hollow Stem/drive and wash		
Sampling Method 2" split spoon		Sheet 1 of 4
Drilling Water Level		Start 12/7/2000 0740
Date		Drilling Date/Times
Time		Finish 12/8/00 0945
Surface Conditions: woodland		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 15	0	0-2	0	4 9	0		FILL	0-0 25 ft asphalt 0.25-1 3 ft: gray to brown to black medium to fine SAND	
					9 8	1			and medium to fine GRAVEL, subangular, dry to moist, trace silt.	
2" SS	24 14	0	2-4	0	8 8	2			same as above	
					9 9	3				
2" SS	24 24	4	4-6	0	7 6	4		SP	light brown and gray medium to fine SAND, some medium to fine gravel, moist to dry	
					6 5	5				
2" SS	24 18	4	6-8	3	8 12	6			brown to black coarse to fine SAND, little medium to fine gravel, dry to moist.	
					15 12	7				
2" SS	24 23	8	8-10	0	5 9	8			mottled brown/gray medium to fine SAND grading to medium to fine sand from 12-20 in., little silt from	
					8 9	9			9-12 in., moist	
2" SS	24 16	8	10-12	0	5 8	10			0-12 in: brown/gray coarse to fine SAND, trace medium to fine gravel, dry to moist	
					9 14	11			12-16 in. gray fine SAND, very well sorted, moist.	
2" SS	24 15	8	12-14	16	9 14	12			mottled gray/brown/black fine SAND, trace medium sand, well sorted, moist.	
					15 13	13				
2" SS	24 22	14	14-16	0	3 4	14			0-8 in.: mottled gray/brown/black medium to fine SAND well sorted, moist	
					5 3	15			8-22 in.: dark gray fine to very fine SAND, very well sorted, wet.	
2" SS	24 24	14	16-18	0	3 4	16			dark gray fine to very fine SAND, very well sorted, wet	
					7 9	17				
2" SS	24 18	18	18-20	0	10 10	18			gray/brown fine to very fine SAND, very well sorted, wet	
					11 14	19				

Logged by: Tom Biolsi Date: 12/08/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: Philip Thornsbury

WELL SPECIFICATIONS.

Diam of Riser	2 in	Screen Interval	53.5-63.5 ft bgs	Sandpack:	51 5-64 ft bgs	Grout	48.5 ft bgs - grade
Bottom of Hole	70 8 ft bgs	Riser Interval	53 5 ft bgs - grade	Bentonite:	48 5-51.5 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N. 193786 E 522544
Surface Elevation	29 7 FT MSL
Well Riser Elevation	29 5 FT MSL

Job No 29600.97	Client EFANE	Location **SITE 16 NCBC Davisville**
Drilling Method: B-61 Mobile Drill Rig		Boring No **MW16-11D**
Hollow Stem/drive and wash		
Sampling Method 2" split spoon		Sheet 2 of 4
Drilling Water Level		Start 12/07/00 0740 / Drilling Date/Times / Finish 12/8/00 0945
Date		
Time		
Surface Conditions	woodland	

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 19	18	20-22	0	15 15	20	SP	dark gray fine to very fine SAND, very well sorted, wet	
					20 16	21			
2" SS	24 22	10	22-24	0	9 10	22		0-15 in same as above	
					10 20	23	ML	15-22 in . dark gray CLAYEY SILT, trace very fine sand, wet	
2" SS	24 18	24	24-26	0	3 4	24	SP	dark gray very fine SAND, little silt grading to banded brown/gray very fine sand, trace silt, wet	
					10 13	25			
2" SS	24 20	24	26-28	1	10 13	26		0-15 in · banded brown/gray fine to very fine SAND, wet	
					16 16	27	SM	15-20 in gary very fine SAND, little silt, very well sorted, wet	
2" SS	24 18	28	28-30	0	14 15	28		dark gray very fine SAND grading to SILTY SAND toward bottom of spoon, very well sorted, wet	
					14 15	29			
2" SS	24 20	28	30-32	0	16 21	30		dark gray very fine SAND, little silt, very well sorted, wet	
					18 15	31			
2" SS	24 20	28	32-34	0	17 20	32		same as above	
					24 28	33			
2" SS	24 8	34	34-36	0	16 25	34	GP	dark gray coarse to fine GRAVEL subangular to angular some very fine sand, wet	
					52 13	35			
2" SS	24 18	24	36-38	0	12 14	36	SP	dark gray very fine SAND, some coarse to fine gravel subangular to rounded, trace silt, wet	
					16 17	37			
2" SS	24 4	38	38-40	0	5 9	38	GP	dark gray coarse to fine GRAVEL, some medium to fine sand, wet. Gravel is subangular to angular, one large quartz fragment, rounded	
					10 7	39			

Logged by: Tom Biolsi Date: 12/08/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: Philip Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in	Screen Interval:	53 5-63 5 ft bgs	Sandpack:	51 5-64 ft bgs	Grout	48 5 ft bgs - grade
Bottom of Hole:	70.8 ft bgs	Riser Interval:	53 5 ft bgs - grade	Bentonite	48 5-51 5 ft bgs	Cover	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job. No 29600 97	Client EFANE
Location	SITE 16 NCBC Davisville
Drilling Method	B-61 Mobile Drill Rig
	Hollow Stem/drive and wash
Boring No.	MW16-11D
Sampling Method	2" split spoon
Sheet	3 of 4
Coordinates	N: 193786 E: 522544
Surface Elevation:	29.7 FT MSL
Well Riser Elevation	29 5 FT MSL
Drilling Water Level	
Date	
Time	
Surface Conditions	woodland
Start	12/07/00 0740
Drilling Date/Times	
Finish	12/8/00 0945

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 0	38	40-42	----	7	40			no recovery
					7				
					9	41			
					7				
2" SS	24 12	38	42-44	0	7	42		SP	dark gray/black coarse to fine SAND, little medium to fine
					12				gravel, wet
					21	43			
					19				
2" SS	24 0	44	44-46	----	14	44			no recovery
					12				
					5	45			
					8				
2" SS	24 12	44	46-48	0	7	46		SP/GP	dark gray fine to very fine SAND and coarse to fine
					32				GRAVEL, wet
					9	47			
					11				
						48		B	drilled to 49 ft, boulder 48-49 ft
2" SS	12 3	48	49-50	0	10	49		GP	dark gray coarse to fine GRAVEL, wet, large
					13				fragment stuck in bottom of spoon, gravel is angular to subangular
2" SS	24 8	48	50-52	0	25	50		SP/GP	dark gray medium to very fine SAND and coarse to
					20				fine GRAVEL, wet
					19	51			
					17				
2" SS	24 19	48	52-54	0	40	52		SP	0-12 in. dark gray coarse to fine SAND, trace fine gravel, wet.
					30				12-19 in : dark gray SILTY SAND and medium to fine GRAVEL,
					26	53		SM/GM	trace rounded coarse gravel, wet
					39				
2" SS	24 6	54	54-56	0	12	54			same as above
					11				
					10	55			
					13				
2" SS	24 9	54	56-58	0	10	56			same as above, large gravel fragment stuck in spoon
					12				
					12	57			
					13				
2" SS	24 3	58	58-60	0	14	58		GP	dark gray coarse to fine GRAVEL, angular to subangular, wet
					10				
					9	59			
					8				

Logged by: Tom Biolsi Date: 12/08/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: Philip Thornsbury

WELL SPECIFICATIONS:

Diam of Riser.	2 in	Screen Interval	53.5-63 5 ft bgs	Sandpack	51 5-64 ft bgs	Grout	48.5 ft bgs - grade
Bottom of Hole:	70 8 ft bgs	Riser Interval:	53 5 ft bgs - grade	Bentonite:	48 5-51 5 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job No	29600 97
Client	EFANE
Location	SITE 16 NCBC Davisville
Drilling Method	B-61 Mobile Drill Rig
	Hollow Stem/drive and wash
Boring No.	MW16-11D
Sampling Method	2" split spoon
Sheet	4 of 4
Coordinates.	N 193786 E. 522544
Surface Elevation	29 7 FT MSL
Well Riser Elevation	29 5 FT MSL
Drilling Water Level	
Date	
Time	
Surface Conditions	woodland

Start	Drilling Date/Times	Finish
12/07/00 0740		12/8/00 0945

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 24	58	60-62	0	30 51	60		SP	dark gray medium to fine SAND grading to dark gray fine to very fine sand, trace fine gravel, wet	
					65 68	61				
2" SS	5 4	58	62-62.4	0	100/5	62			dark gray very fine SAND, trace fine gravel	spoon was full
								RX	Refusal at 62.4 ft bgs	and bowed out
						63				very dense material
										same as 60-62 ft
						64				
						65				
						66			rollerbit to 66 ft bgs	
						67			Cored from 66-70 8 ft bgs	
						68				
						69				
						70				
						71				
						72				
						73				
						74				
						75				
						76				
						77				
						78				
						79				

Logged by: Tom Biolsi Date: 12/08/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: Philip Thornsbury

WELL SPECIFICATIONS.

Diam. of Riser	2 in	Screen Interval:	53.5-63 5 ft bgs	Sandpack:	51 5-64 ft bgs	Grout:	48 5 ft bgs - grade
Bottom of Hole	70 8 ft bgs	Riser Interval	53 5 ft bgs - grade	Bentonite	48 5-51 5 ft bgs	Cover	road box

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N 193786 E 522544
Surface Elevation:	29 7 FT MSL
Well Riser Elevation:	29 5 FT MSL

Job. No 29600 97 3201	Client. EFANE	Location. Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method.	Drive and Wash	Boring No. **MW16-11D**
Core Barrel used:	NX	Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	
Start	Finish
12/08/00 0911	12/08/00 0945

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
92.5%	95%				66		Light grained medium grained meta-			
							conglomerate to quartzite with shadow pebbles			
					67		grading to fined grained gneissic quartzite	1	9:00	67
							Low angle fractures at 9 5, 19, 22, 34, 40			
					68		and 48 in.	2	9:00	68
							Broken core 19-22 in.			
					69			3	7:00	69
							Coring Interval. 66-70.8 ft bgs			
					70			4	7:00	70
					71			5	6:00	70.8
					72					
					73					
					74					
					75					
					76					
					77					
					78					
					79					
					80					
					81					
					82					
					83					
					84					

NOTES:

Logged by: Kevin Baum/Robin Clark

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Phil Thomsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job. No 29600 97	Client. EFANE
Location.	SITE 16 NCBC Davisville
Drilling Method: Mobile Drill Rig drive and wash	Boring No. MW16-12D
Sampling Method 2" split spoon	Sheet 1 of 4
Drilling Water Level / Date / Time	Start 12/18/00 1410 — Drilling Date/Times — Finish 12/20/00 1105
Surface Conditions	near Railroad tracks

Coordinates: N 193640 E: 522663
Surface Elevation: 29.3 FT MSL
Well Riser Elevation: 31 4 FT MSL

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 18	0	0-2	0	4 9	0		FILL	0-4 in.: topsoil, very organic, dry; 4-18 in :brown to dark brown coarse to fine SAND,
					10 14	1			trace medium to fine gravel, subangular, dry to moist
2" SS	24 15	0	2-4	0	19 21	2			Dark brown medium to fine SAND, trace medium to fine gravel, trace silt, moist.
					28 24	3			
2" SS	24 21	4	4-6	0	14 16	4			0-11 in . black medium to fine SAND and medium to fine GRAVEL subangular to subrounded, moist
					15 12	5			
2" SS	24 17	4	6-8	0	13 15	6		SP	0-13 in. grayish brown fine to very fine SAND, very well sorted, moist.
					16 14	7			13-14 in . black coarse to fine SAND and fine GRAVEL, moist. 14-17 in.: dark gray SANDY SILT, trace fine sand, moist.
2" SS	24 16	8	8-10	0	14 24	8			0-12 in grayish brown fine to very fine SAND very well sorted, moist; 12-16 in : black coarse to fine SAND and medium to fine subrounded GRAVEL
					26 28	9		SP/GP ML	last 1 in mostly SANDY SILT, moist
2" SS	24 22	8	10-12	0	19 20	10		SP	0-20 in . grayish brown fine to very fine SAND, well sorted, moist; 20-22 in : black coarse to fine SAND and medium to fine GRAVEL, moist.
					24 28	11			
2" SS	24 12	8	12-14	0	28 30	12			grayish brown fine to very fine SAND, well sorted, grading to black coarse to fine sand and gravel
					52 54	13			
2" SS	24 12	14	14-16	0	8 9	14			brown and gray coarse to fine SAND, trace rounded medium to fine gravel, wet.
					10 9	15			
2" SS	24 20	14	16-18	0	11 9	16			same as above
					10 11	17			
2" SS	24 12	18	18-20	0	9 7	18			0-9 in.: same as above, iron staining at 8-9 in., wet. 9-12 in. dark gray very fine SAND, very well sorted,
					8 9	19			trace silt, wet

Logged by: Tom Biolsi — Date: 12/20/00

Drilling Contractor: Subsurface Drilling and Remediation — Driller: Phil Thornsbury

WELL SPECIFICATIONS

Diam of Riser	2 in	Screen Interval	52-62 ft bgs	Sandpack.	51-62 5 ft bgs	Grout:	51 ft bgs - grade
Bottom of Hole:	71 ft bgs	Riser Interval	51 ft bgs - 2 ft ags	Bentonite.	51-52 5 ft bgs	Cover:	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates.	N 193640 E 522663
Surface Elevation.	29 3 FT MSL
Well Riser Elevation	31 4 FT MSL

Job No 29600 97	Client EFANE	Location SITE 16 NCBC Davisville
Drilling Method Mobile Drill Rig drive and wash		Boring No MW16-12D
Sampling Method· 2" split spoon		Sheet 2 of 4
Drilling Water Level		
Date		
Time		
Surface Conditions near Railroad tracks		

Start	Drilling Date/Times	Finish
12/18/00		12/20/00
1410		1105

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 0	18	20-22	----	8	20			no recovery
					7				
					8	21			
					8				
2" SS	24 24	18	22-24	0	10	22		SP	0-18 in brown to gray coarse to fine SAND, trace fine
					9				gravel, wet
					14	23			18-24 in dark gray SILT, trace very fine sand, wet
					19			ML	
2" SS	24 10	24	24-26	0	7	24		SP	mottled dark gray green brownish very fine SAND,
					8				trace silt, wet
					8	25			
					8				
2" SS	24 12	24	26-28	0	6	26		ML	dark gray SILT, trace very fine sand, wet
					6				
					5	27			
					8				
2" SS	24 3	28	28-30	0	8	28			as above
					11				
					9	29			
					13				
2" SS	24 15	28	30-32	0	9	30		SM	dark gray SILTY SAND, wet
					8				
					8	31			
					11				
2" SS	24 15	28	32-34	0	8	32			0-11 in · same as above
					11				11-15 in dark gray SANDY SILT, wet
					15	33			
					19				
2" SS	24 14	34	34-36	0	8	34			same as above
					8				
					10	35			
					18				
2" SS	24 15	34	36-38	0	14	36			same as above
					21				
					36	37			
					44				
2" SS	24 15	34	38-40	0	18	38			dark gray SILTY SAND, wet
					24				
					28	39			
					34				

Logged by: Tom Biolsi Date. 12/20/00

Drilling Contractor Subsurface Drilling and Remediation Driller Phil Thornsbury

WELL SPECIFICATIONS.

Diam of Riser	2 in	Screen Interval·	52-62 ft bgs	Sandpack.	51-62 5 ft bgs	Grout	51 ft bgs - grade
Bottom of Hole	71 ft bgs	Riser Interval	51 ft bgs - 2 ft ags	Bentonite	51-52.5 ft bgs	Cover·	4 in steel

EA Engineering, Science, and Technol gy, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 193640 E· 522663
Surface Elevation·	29 3 FT MSL
Well Riser Elevation	31.4 FT MSL

Job No. 29600 97	Client EFANE	Location SITE 16 NCBC Davisville
Drilling Method Mobile Drill Rig drive and wash		Boring No. MW16-12D
Sampling Method 2" split spoon		Sheet 3 of 4
Drilling Water Level		
Date		
Time		
Surface Conditions near Railroad tracks		

Start	Drilling Date/Times	Finish
12/18/00 1410		12/20/00 1105

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	24 24	34	40-42	0	11 24	40	SP	0-18 in . grayish brown fine to very fine SAND, trace silt, wet.
					46 48	41	SM	18-24 in · dark gray SILTY SAND, wet.
2" SS	24 24	34	42-44	0	23 30	42	SP	grayish brown very fine SAND grading to dark gray vey fine SAND little silt toward bottom of spoon
					46 54	43		
2" SS	24 15	44	44-46	0	2 4	44	ML	dark gray SILT, trace very fine sand, grading to clayey silt towards bottom of spoon wet
					4 4	45		
2" SS	24 24	44	46-48	0	6 8	46		dark gray CLAYEY SILT, wet, grading to dark gray SILTY CLAY, towards bottom 9 in of
					9 11	47	CL	spoon, able to roll 1/4 in. to 1/8 in. stringers, wet
2" SS	3 0	48	48-48.3		100/3	48	B	no recovery Refusal at 48 3 ft, spoon bouncing.
						49		drill to 50 ft, 48-50 ft quartzite cuttings, slow steady drilling drill to 52 ft 17 minutes 50-51 ft (800 psi down
grab		51	50-52			50		pressure in first gear)
						51		broke through boulder at 52 ft
2" SS	24 13	51	52-54	0	7 11	52	ML	0-13 in : dark gray SANDY SILT, wet
					15 17	53		
2" SS	24 24	51	54-56	0	15 18	54	SP	0-9 in. dark gray fine to very fine SAND, wet 9-11 in.. dark gray medium to fine GRAVEL, subangular, some fine to very
					24 28	55		fine sand, wet 11-24 in.: dark gray very fine SAND, trace silt, wet.
2" SS	24 24	51	56-58	0	17 21	56		same as above, grading to little silt. towards the bottom of spoon.
					28 31	57		
2" SS	24 5	58	58-60	0	15 11	58	SM/GM	dark gray SILTY SAND and coarse to fine subangular GRAVEL, wet (till)
					7 6	59		

Logged by: Tom Biolsi Date: 12/20/00

Drilling Contractor· Subsurface Drilling and Remediation Driller· Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in	Screen Interval	52-62 ft bgs	Sandpack:	51-62 5 ft bgs	Grout.	51 ft bgs - grade
Bottom of Hole	71 ft bgs	Riser Interval	51 ft bgs - 2 ft ags	Bentonite	51-52 5 ft bgs	Cover.	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 193640 E 522663
Surface Elevation	29 3 FT MSL
Well Riser Elevation	31 4 FT MSL

Job No. 29600 97	Client EFANE	Location **SITE 16 NCBC Davisville**
Drilling Method: Mobile Drill Rig drive and wash		Boring No **MW16-12D**
Sampling Method 2" split spoon		Sheet 4 of 4
Drilling Water Level		Start 12/18/00 1410
Date		Drilling Date/Times
Time		Finish 12/20/00 1105
Surface Conditions	near Railroad tracks	

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 20	58	60-62	0	5 8	60		SP	0-10 in dark gray fine to very fine SAND, wet
					17 40	61		GP	10-20 in : dark gray medium to fine GRAVEL, little coarse to fine sand, wet (till)
2" SS	1 0	58	62-62 1	0	100/1	62			no recovery refusal at 62 1 ft
						63			
						64			
						65			
						66			rollerbit to 66 ft bgs
						67			
						68			
						69			
						70			
						71			core 66-71 ft bgs
						72			
						73			
						74			
						75			
						76			
						77			
						78			
						79			

Logged by: Tom Biolsi Date: 12/20/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser	2 in	Screen Interval	52-62 ft bgs	Sandpack	51-62 5 ft bgs	Grout	51 ft bgs - grade
Bottom of Hole	71 ft bgs	Riser Interval	51 ft bgs - 2 ft ags	Bentonite	51-52 5 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 193640 E: 522663
Surface Elevation:	29 3 FT MSL
Well Riser Elevation:	31.4 FT MSL

Job. No 29600.97.3201	Client EFANE	Location. SITE 16 NCBC Davisville
Drilling Method: Mobile B-61 Drill Rig Drive and Wash		Boring No **MW16-12D**
Core Barrel used: NX Core (3 in. diameter)		Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	Start	Finish
	12/20/00 1025	12/20/00 1105

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
					65					
					66					
95%	88%				67		Cored interval: 67-71 ft bgs	1	10:00	67
							total core length: 4 ft 9 in.			
					68		interbedded quartzite and phyllite from 0 ft to	1	8:30	68
							approximately 2 ft 4 in. Then grading to primarily			
					69		quartzite at bottom	1	7:30	69
							Few low angle fractures with several weathered			
					70		surfaces at 4, 5, 7, 18, 31, 33, 38.5 and 51 in.	1	6:30	70
					71			1	6:00	71
					72					
					73					
					74					
					75					
					76					
					77					
					78					
					79					
					80					
					81					
					82					
					83					

NOTES:

Logged by: Tom Biolsi

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 193724 E: 522489
Surface Elevation	30.0 FT MSL
Well Riser Elevation	29 3 FT MSL

Job No 29600 97	Client: EFANE	Location.	SITE 16 NCBC Davisvill
Drilling Method: B-61 Mobile Drill Rig		Boring No.	MW16-13D
Hollow Stem/drive and wash			
Sampling Method 2" or 3" split spoon		Sheet 1 of 4	
Drilling Water Level		Start 01/15/01 1045	Drilling Date/Times	Finish 01/17/01 0910
Date			
Time			
Surface Conditions asphalt adjacent to Bldg 41			

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 20	0	01 0-2	0	119 106	0		FILL	0-4 in.: Asphalt 4-12 in Dark brown to black coarse to fine SAND and fine subangular to angular GRAVEL, moist, (fill)
					51 39	1			12-20 in.. Brown to grey medium to fine SAND, trace fine gravel, moist,
2" SS	24 18	0	02 2-4	0	20 29	2			0-8 in.: Same as above 8-18 in Dark grey very fine SAND, little silt, trace fine gravel at bottom of spoon, moist
					30 21	3			
2" SS	24 20	4	03 4-6	0	8 9	4			Light grey to brown very fine SAND, moist
					11 13	5			
2" SS	24 20	4	04 6-8	0	20 21	6			0-6 in.: Same as above 6-20 in.: Black to brownish gray coarse to fine SAND and medium to fine subrounded to subangular GRAVEL, trace iron staining, moist (fill)
					21 20	7			
2" SS	24 12	8	05 8-10	3.1	25 25	8			0-11 in.: Same as above, moist 11-12 in.: Dark brown to grey very fine SAND and SILT, moist
					17 18	9			0-14 in Black to brownish gray coarse to fine SAND and medium to fine angular to subrounded GRAVEL, trace iron staining, moist to wet
2" SS	24 15	8	06 10-12	0	23 17	10			14-15 in.: Dark grey very fine SAND, little silt,
					18 20	11			
2" SS	24 20	8	07 12-14	0	20 24	12			Dark grey to brown to tan to black coarse to fine SAND and medium to fine GRAVEL, trace iron staining, (fill)
					23 21	13			
2" SS	24 8	14	08 14-16	0	12 11	14		SP	Dark grey to brown medium to fine SAND grading to fine to very fine sand toward bottom of spoon, wet
					11 14	15			
2" SS	24 22	14	09 16-18	0	10 13	16			0-12 in.: Same as above 12-22 in : Brown to grey medium to fine SAND, trace very fine sand, wet
					11 15	17			
2" SS	24 8	18	10 18-20	0	11 13	18		SP/GP	Dark grey coarse to fine SAND and medium to fine GRAVEL grading to medium to fine SAND with iron staining from 6-7 in , wet
					9 11	19			

Logged by: Tom Biolsi Date: 01/17/01

Drilling Contractor. Subsurface Drilling and Remediation Driller: Jim Goldthwait

WELL SPECIFICATIONS:

Diam. of Riser:	2 in	Screen Interval:	57-67 ft bgs	Sandpack	55-67 5 ft bgs	Grout:	53 ft bgs - grade
Bottom of Hole:	75 ft bgs	Riser Interval	57 ft bgs - grade	Bentonite:	53-55 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates.	N 193724 E 522489
Surface Elevation	30 0 FT MSL
Well Riser Elevation	29 3 FT MSL

Job No. 29600 97	Client EFANE	Location: SITE 16 NCBC Davisville
Drilling Method B-61 Mobile Drill Rig Hollow Stem/drive and wash		Boring No. MW16-13D
Sampling Method 2" or 3" split spoon		Sheet 2 of 4
Drilling Water Level / Date / Time		Start 01/15/01 1045 — Drilling Date/Times — Finish 01/17/01 0910
Surface Conditions asphalt adjacent to Bldg 41		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	24 20	18	11 20-22	0	9 9 10 12	20 21	SP	0-10 in Dark grey medium to fine SAND, little fine gravel, wet 10-20 in Greyish brown very fine SAND, trace silt, wet
2" SS	24 22	18	12 22-24	0	5 13 13 18	22 23		Mottled black to brownish grey very fine SAND, trace fine sand, wet
2" SS	24 12	24	13 24-26	0	15 15 17 13	24 25		0-6 in Banded orange/brown very fine SAND, wet 6-12 in Dark grey very fine SAND, trace silt, wet
2" SS	24 18	24	14 26-28	0	9 9 12 13	26 27	SM	Dark grey very fine SAND, some silt, especially toward bottom of the spoon, wet
2" SS	24 12	28	15 28-30	0	11 17 22 26	28 29	SP	Dark grey very fine SAND, trace silt, wet
2" SS	24 22	28	16 30-32	0	18 22 22 26	30 31	SM	Dark grey SILTY SAND, wet
2" SS	24 21	28	17 32-34	0	18 23 23 25	32 33		Dark grey very fine SAND, some silt, wet
2" SS	24 10	34	18 34-36	0	9 8 8 9	34 35	ML	Dark grey SANDY SILT, wet
2" SS	24 19	34	19 36-38	0	8 8 10 10	36 37	SM	Dark grey SILTY SAND, wet
2" SS	24 9	38	20 38-40	0	8 8 11 7	38 39	ML	Dark grey SILT, trace very fine sand, wet

Logged by	Tom Biolsi	Date.	01/17/01
Drilling Contractor	Subsurface Drilling and Remediation	Driller	Jim Goldthwait

WELL SPECIFICATIONS:

Diam of Riser	2 in	Screen Interval	57-67 ft bgs	Sandpack	55-67 5 ft bgs	Grout:	53 ft bgs - grade
Bottom of Hole	75 ft bgs	Riser Interval	57 ft bgs - grade	Bentonite	53-55 ft bgs	Cover:	road box

EA Engineering, Science, and Techn logy, Inc.

LOG OF SOIL BORING - REVISED

Job No. 29600 97	Client EFANE
Location	SITE 16 NCBC Davisville
Drilling Method	B-61 Mobile Drill Rig
	Hollow Stem/drive and wash
Boring No.	MW16-13D
Sampling Method:	2" or 3" split spoon
Sheet	3 of 4
Drilling Water Level	
Date	
Time	
Start	01/15/01 1045
Drilling Date/Times	
Finish	01/17/01 0910
Surface Conditions	asphalt adjacent to Bldg 41

Coordinates: N. 193724 E 522489
Surface Elevation: 30.0 FT MSL
Well Riser Elevation: 29 3 FT MSL

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	24 18	38	21 40-42	0	5 8	40	ML	Same as above
					20 15	41		
2" SS	24 14	38	22 42-44	0	31 23	42		0-4 in : Same as above
							SP	4-12 in Dark grey fine to very fine SAND, trace silt
					18 18	43	SP/GP	12-14 in · Dark grey coarse to fine SAND and coarse to fine GRAVEL, wet
2" SS	24 7	44	23 44-46	0	16 30	44		Dark grey coarse to fine GRAVEL and coarse to fine SAND, wet
					34 13	45		
2" SS	24 22	44	24 46-48	0	6 10	46	SP	Dark grey coarse to fine SAND, some fine subangular gravel, wet
					15 12	47		
3" SS	24 8	48	25 48-50	0	15 14	48		Dark gray fine to very fine SAND, some medium to fine subangular gravel, wet
					15 15	49		
2" SS	24 18	48	26 50-52	0	7 13	50		Dark grey medium to very fine SAND, little fine subangular gravel, trace silt, wet
					11 13	51		
2" SS	24 18	48	27 52-54	0	23 10	52	SM	Dark grey very fine SAND, little silt, little fine subangular gravel, wet
					10 13	53		
3" SS	24 0	54	28 54-56	-	28 15	54		no recovery
					17 15	55		
3" SS	24 4	54	29 56-58	-	17 11	56		(no sample recovery, most likely wash)
					17 13	57		
3" SS	24 10	58	30 58-60	0	15 25	58	SP/GP	Dark grey fine to very fine SAND and medium to fine subangular to subrounded GRAVEL, wet
					17 17	59		Sample submitted for laboratory analysis

Logged by: Tom Biolsi Date: 01/17/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Jim Goldthwait

WELL SPECIFICATIONS:

Diam. of Riser:	2 in	Screen Interval	57-67 ft bgs	Sandpack:	55-67.5 ft bgs	Grout:	53 ft bgs - grade
Bottom of Hole:	75 ft bgs	Riser Interval:	57 ft bgs - grade	Bentonite:	53-55 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 193724 E 522489
Surface Elevation	30 0 FT MSL
Well Riser Elevation	29 3 FT MSL

Job No 29600 97	Client EFANE	Location	SITE 16 NCBC Davisville
Drilling Method B-61 Mobile Drill Rig		Boring No	MW16-13D
Hollow Stem/drive and wash			
Sampling Method 2" or 3" split spoon		Sheet 4 of 4	
Drilling Water Level		Start 01/15/01 1045	Drilling Date/Times / Finish 01/17/01 0910
Date			
Time			
Surface Conditions asphalt adjacent to Bldg 41			

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	24 6	58	31 60-62	0	10 14	60	SP/GP	Same as above
					17 41	61		
2" SS	24 20	58	32 62-64	0	55 28	62	SP	0-14 in. Dark grey coarse to fine SAND, little fine subangular gravel, wet
					41 47	63	SP/GP	14-20 in · Dark grey fine to very fine SAND and medium to fine GRAVEL, trace silt, wet
2" SS	24 10	64	33 64-66	0	35 41	64	GP	Dark grey coarse to fine GRAVEL, subangular, some fine to very fine sand, wet,
					47 50	65		
2" SS	9 6	64	34 66-66 75	0	76 100/3	66		Same as above Refusal at 66 8 ft bgs
						67		
						68		Rollerbit to 70 ft bgs
						69		Core from 70-75 ft bgs
						70		
						71		
						72		
						73		
						74		
						75		
						76		
						77		
						78		
						79		

Logged by: Tom Biolsi Date: 01/17/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Jim Goldthwait

WELL SPECIFICATIONS

Diam. of Riser:	2 in	Screen Interval	57-67 ft bgs	Sandpack	55-67 5 ft bgs	Grout	53 ft bgs - grade
Bottom of Hole:	75 ft bgs	Riser Interval.	57 ft bgs - grade	Bentonite	53-55 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 193724 E: 522489
Surface Elevation:	30.0 FT MSL
Well Riser Elevation.	29.3 FT MSL

Job No. 29600.97 3201	Client: EFANE
Location.	Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method: B-61 Mobile Drill Rig	Boring No. **MW16-13D**
Core Barrel used: NX	Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	Start	Finish
	01/17/00 0843	01/17/00 0910

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min.sec)	Total Depth (ft bgs)
98.3%	78%				71		Fine grained quartzite with minor low angle fractures, trace of quartz filled thin	1	5 00	71
					72		fracture from 72 to 72 5 ft bgs	2	5:00	72
					73			3	5:00	73
					74			4	6:00	74
					75			5	5:00	75
					76					
					77					
					78					
					79					
					80					
					81					
					82					
					83					
					84					
					85					
					86					
					87					
					88					
					89					

NOTES:

Logged by: Tom Biolsi

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Jim Goldthwait

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job. No 29600.97	Client EFANE	Location.	SITE 16 NCBC Davisville
Drilling Method B-61 Mobile Rig		Boring No	MW16-14D
4 in. casing Drive and wash			
Sampling Method: 2" or 3" split spoon driven 24 in. with 140 lb hammer		Sheet 1 of 4	
Drilling Water Level		Start	Drilling Date/Times / Finish
Date		01/29/01	01/30/01
Time		1135	1600
Surface Conditions: asphalt			

Coordinates. N. 193747 E: 522795
Surface Elevation: 29 9 FT MSL
Well Riser Elevation: 29.5 FT MSL

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	18 / 7	0	1 / 0-2	0	- / 15	0	FILL	0-6 in. Asphalt / Tan medium to fine SAND trace to little angular to subrounded coarse to fine
					13 / 8	1		gravel, loose
2" SS	24 / 12	0	2 / 2-4	0	9 / 9	2		Brown fine SAND, trace very fine sand, trace medium to fine angular gravel, loose
					9 / 9	3		
2" SS	24 / 9	0	3 / 4-6	0	7 / 11	4		Same as above, trace to little medium to fine angular gravel
					16 / 32	5		
2" SS	24 / 3	0	4 / 6-8	0	12 / 10	6	SP	Grey to brown fine to medium SAND, trace to little coarse sand, loose
					8 / 13	7		
2" SS	24 / 8	0	5 / 8-10	0	9 / 9	8		Same as above
					9 / 8	9		
2" SS	24 / 16	0	6 / 10-12	0	6 / 6	10	SP / SP	0-3 in.: Grey very fine SAND, trace fine sand, moderately dense / 3-16 in: Grey to tan fine to medium SAND, trace gray fine to medium to coarse
					7 / 8	11		sand (grey), loose
2" SS	24 / 12	0	7 / 12-14	0	8 / 8	12		0-11 in: Tan fine to medium SAND, trace medium to coarse sand, trace coarse subrounded gravel
					14 / 16	13	SP	11-12 in. Tan to grey very fine to fine SAND,
2" SS	24 / 13	0	8 / 14-16	0	6 / 7	14		0-12 in. Brown to tan fine to medium SAND, trace medium to coarse sand, very moist in bottom 2 in
					6 / 6	15		12-13 in.: brown to tan fine SAND, trace to little very fine sand, wet
2" SS	24 / 14	0	9 / 16-18	0	5 / 7	16		Brown fine SAND, trace to little very fine sand, trace mica, saturated
					7 / 6	17		
2" SS	24 / 0	18	10 / 18-20	-	7 / 8	18		no recovery
					8 / 8	19		

Logged by. Rob Wasserman Date. 01/29/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS

Diam. of Riser	2 in	Screen Interval	52-62 ft bgs	Sandpack:	50-62 ft bgs	Grout:	46 ft bgs - grade
Bottom of Hole	71 ft bgs	Riser Interval:	52 ft bgs - grade	Bentonite	46-50 ft bgs	Cover.	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 193747 E 522795
Surface Elevation	29 9 FT MSL
Well Riser Elevation	29 5 FT MSL

Job No 29600 97	Client EFANE	Location SITE 16 NCBC Davisville
Drilling Method B-61 Mobile Rig 4 in casing Drive and wash		Boring No MW16-14D
Sampling Method: 2" or 3" split spoon driven 24 in with 140 lb hammer		Sheet 2 of 4
Drilling Water Level		Start 1/29/01 1135 / Drilling Date/Times / Finish 1/30/2001 1600
Date		
Time		
Surface Conditions: asphalt		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	24 12	18	11 20-22	0	9 9 9 11	20 21	SP	Brown fine SAND, trace to little very fine sand, trace mica, 2 in angular quartz fragment at 7 in (quartzite)
2" SS	24 18	18	12 22-24	0	8 10 12 16	22 23		0-9 in Brown fine SAND, trace medium sand, trace mica 9-18 in Brown to dark brown very fine to fine SAND, trace fine sand and mica, moderately dense
2" SS	24 7	24	13 24-26	0	3 5 6 9	24 25		0-5 in Brown fine SAND, trace very fine sand, loose 5-7 in Grey to brown very fine to fine SAND, trace silt, moderately dense
2" SS	24 12	24	14 26-28	0	7 6 8 9	26 27		Brown to grey very fine to fine SAND, trace to little silt, trace to little iron staining in bottom 4 in
2" SS	24 9	28	15 28-30	0	5 6 6 11	28 29		Same as above
2" SS	24 12	28	16 30-32	0 1	10 12 11 12	30 31		Brown to tan very fine SAND, trace fine sand and silt
2" SS	24 12	28	17 32-34	0	10 12 14 17	32 33	SM	0-6 in . Same as above, little to some iron staining from 3-6 in 6-12 in Brown to grey SILTY SAND (very fine sand with some silt), trace fine sand
2" SS	24 9	34	18 34-36	0	10 15 14 11	34 35	SP	Brown to grey fine to very fine SAND, trace silt, trace iron staining from 5-9 in
2" SS	24 15	34	19 36-38	0	9 11 55 41	36 37	SM	Brown to grey SILTY SAND (very fine sand with some silt), distinct silt lens from 2 to 4 in , trace iron staining, trace to little fine subangular gravel from 12 to 18 in
2" SS	24 12	38	20 38-40	0	12 20 17 20	38 39	SP	Grey to brown fine to very fine SAND, trace silt and iron staining from 0 to 3 in

Logged by: Rob Wasserman Date: 01/29/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS.

Diam of Riser:	2 in	Screen Interval	52-62 ft bgs	Sandpack:	50-62 ft bgs	Grout:	46 ft bgs - grade
Bottom of Hole:	71 ft bgs	Riser Interval:	52 ft bgs - grade	Bentonite	46-50 ft bgs	Cover	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job No 29600 97	Client EFANE	Location.	SITE 16 NCBC Davisville
Drilling Method B-61 Mobile Rig		Boring No.	MW16-14D
4 in. casing Drive and wash			
Sampling Method. 2" or 3" split spoon driven 24 in. with 140 lb hammer		Sheet 3 of 4	
Drilling Water Level		Start 1/29/01 1135	Drilling Date/Times	Finish 01/30/01 1600
Date				
Time				
Surface Conditions. asphalt				

Coordinates N: 193747 E 522795
Surface Elevation 29 9 FT MSL
Well Riser Elevation 29 5 FT MSL

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 14	38	21 40-42	0	10	40		SP	Brown to grey fine SAND, trace very fine sand, loose
					13				
					13	41			
					15				
2" SS	24 3	38	22 42-44	0	50	42			Same as above, 2 in subangular quartzite fragment from 0 to 2 in , trace iron
					23				staining from 2 to 3 in.
					27	43			
					38				
2" SS	24 14	44	23 44-46	0	27	44		SP	Grey to brown coarse to fine SAND, some coarse to fine angular to subangular
					20				gravel
					28	45			
					30				
2" SS	24 5	44	24 46-48	0	25	46			Same as above, trace iron staining from 0 to 2 in.
					26				
					24	47			
					29				
3" SS	24 3	48	25 48-50	0	18	48			Same as above
					17				
					10	49			
					7				
2" SS	24 6	48	26 50-52	0	5	50			Same as above
					8				
					8	51			
					8				
2" SS	24 7	48	27 52-54	0	11	52		SP	Grey fine to very fine SAND, little to some fine rounded gravel
					3				trace very fine sand.
					6	53			
					8				
3" SS	24 2	54	28 54-56	0	91	54		SP/GP	Grey coarse to fine SAND and coarse subangular GRAVEL
					70				
					69	55			
					46				
3" SS	1 0	54	29 56-56 1	0	100/1	56		B	No recovery
					-				
					-	57			rollerbit through 1.5 ft boulder
					67				
3" SS	24 14	58	30 57.5-59 5	0	100/3	58		SP	Grey very fine to fine SAND, trace to little coarse to medium subangular gravel,
					24				dense, compact
					42	59			Sample submitted for laboratory analysis
									Switched to 300 lb hammer from 58 5-59.5 ft

Logged by. Rob Wasserman Date. 01/29/01

Drilling Contractor. Subsurface Drilling and Remediation Driller Phil Thornsbury

WELL SPECIFICATIONS

Diam of Riser.	2 in.	Screen Interval	52-62 ft bgs	Sandpack:	50-62 ft bgs	Grout.	46 ft bgs - grade
Bottom of Hole	71 ft bgs	Riser Interval	52 ft bgs - grade	Bentonite	46-50 ft bgs	Cover	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job. No. 29600 97	Client EFANE
Location	SITE 16 NCBC Davisville
Drilling Method. B-61 Mobile Rig 4 in casing Drive and wash	Boring No MW16-14D
Sampling Method 2" or 3" split spoon driven 24 in with 140 lb hammer	Sheet 4 of 4
Drilling Water Level / Date / Time	Start 1/29/01 1135 — Drilling Date/Times — Finish 01/30/01 1600
Surface Conditions asphalt	

Coordinates N 193747 E 522795
Surface Elevation 29 9 FT MSL
Well Riser Elevation 29 5 FT MSL

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	24 / 8	58	31 / 59 5-61 5	12 9	48 / 60	60	SP	Grey very fine to fine SAND, trace to little angular gravel, very dense
					70 / 94	61		
2" SS	14 / 2	58	32 / 61 5-62 7	9 3	64 / 100/2	62		Same as above
						63		Rollerbit to 66 ft bgs
						64		cored from 66-71 ft bgs
						65		
						66		
						67		
						68		
						69		
						70		
						71		
						72		
						73		
						74		
						75		
						76		
						77		
						78		
						79		

Logged by: Rob Wasserman Date. 01/29/01

Drilling Contractor: Subsurface Drilling and Remediation Driller Phil Thornsbury

WELL SPECIFICATIONS

Diam of Riser	2 in.	Screen Interval	52-62 ft bgs	Sandpack	50-62 ft bgs	Grout:	46 ft bgs - grade
Bottom of Hole	71 ft bgs	Riser Interval	52 ft bgs - grade	Bentonite	46-50 ft bgs	Cover	road box

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 193747 E: 522795
Surface Elevation.	29.9 FT MSL
Well Riser Elevation:	29 5 FT MSL

Job No 29600 97.3201	Client: EFANE
Location:	Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method	B-61 Mobile Rig 4 in. casing Drive and wash
Boring No.	**MW16-14D**
Core Barrel used:	NX
	Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	
Start	Finish
01/30/01 1420	01/30/01 1516

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
					65					
					66		light gray quartzite with significant quartz	1	12:30	67
88%	60%						banding. Highly fractured with trace staining			
					67		and much quartz crystaliztion in fractures.	2	10:00	68
							some fractures contain open space			
					68			3	12:30	69
							total run, 66-70 ft bgs			
					69			4	10 00	70
					70			5	11:00	71
					71					
					72					
					73					
					74					
					75					
					76					
					77					
					78					
					79					
					80					
					81					
					82					
					83					

NOTES:

Logged by: Kevin Baum/Rob Wasserman

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Phil Thomsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job No	29600 97
Client	EFANE
Location	SITE 16 NCBC Davisville
Drilling Method	Mobile B-61 Drill Rig
	4 in casing Drive and wash
Boring No	MW16-15D
Sampling Method:	2" or 3" split spoon
Sheet	1 of 3
Coordinates:	N 193832 E 522878
Surface Elevation	29 3 FT MSL
Well Riser Elevation.	31.8 FT MSL
Drilling Water Level	
Date	
Time	
Surface Conditions:	gravel
Start	01/17/01 1219
Drilling Date/Times	
Finish	01/18/01 1200

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 16	0	0-2	0	3 8 6 5	0 1		FILL	0-12 in : Dark brown SANDY SILT, angular gravel, cobbles, roots 12-16 in . Brown fine to medium SAND, some silt, moist
2" SS	24 9	0	2-4	0	3 4 4 3	2 3			Brown medium to coarse SAND and fine GRAVEL, silt, dry to moist
2" SS	24 8	0	4-6	0	4 2 2 5	4 5			Brown medium to coarse SAND and GRAVEL, silt and rounded cobbles, dry to moist
2" SS	24 2	0	6-8	0	8 11 10 8	6 7			Brown medium to coarse SAND and GRAVEL, silt, dry to moist
2" SS	24 16	8	8-10	0	6 5 5 10	8 9		SP SM SP	0-5 in Brown medium to coarse SAND 5-9 in . Dark brown very fine SAND and SILT 9-16 in : Brown medium to coarse SAND, dry to moist
2" SS	24 15	8	10-12	0	6 7 6 8	10 11		SP/GP SP	0-6 in . Brown medium to coarse SAND and fine GRAVEL, iron staining at base 6-15 in . Light brown to grey very fine to fine SAND, dry
2" SS	24 15	8	12-14	0	6 7 14 14	12 13			Light brown to grey very fine to fine SAND, dry
2" SS	24 15	0	14-16	0	7 10 7 6	14 15			Orange to brown medium SAND, dry to moist, wet at base
2" SS	24 12	0	16-18	0	5 7 8 12	16 17		SM ML SP	0-4 in : Tan to brown medium to coarse SAND, iron staining at base 4-6 in . Brown to grey, fine SAND, some silt 6-10 in.: Brown to grey SANDY SILT 10-12 in Tan to brown medium to coarse SAND, wet
2" SS	24 0	18	18-20		5 6 7 9	18 19			No recovery

Logged by: James Gatherer Date: 01/18/01

Drilling Contractor: Subsurface Drilling and Remeddiation Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser.	2 in.	Screen Interval:	46-56 ft bgs	Sandpack	44-56 5 ft bgs	Grout.	40 ft bgs - grade
Bottom of Hole	66 ft bgs	Riser Interval	46 ft bgs - 2 ft ags	Bentonite:	40-44 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N· 193832 E· 522878
Surface Elevation	29 3 FT MSL
Well Riser Elevation	31 8 FT MSL

Job No 29600 97	Client EFANE	Location SITE 16 NCBC Davisville
Drilling Method. Mobile B-61 Drill Rig 4 in casing Drive and wash		Boring No MW16-15D
Sampling Method 2" or 3" split spoon		Sheet 2 of 3
Drilling Water Level Date Time		Start 01/17/01 1219 / Drilling Date/Times / Finish 01/18/01 1200
Surface Conditions gravel		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 / 6	18	20-22	0	7	20		SM	Dark brown very fine to fine SAND, some silt, wet
					11				
					11	21			
					10				
2" SS	24 / 20	18	22-24	0	6	22			Dark brown very fine to fine SAND, some silt, trace clay, wet
					4				
					6	23			
					7				
2" SS	24 / 12	24	24-26	0	4	24			Same as above
					3				
					3	25			
					5				
2" SS	24 / 16	24	26-28	0	5	26			Dark brown very fine to fine SAND, little silt, trace clay, wet
					15				
					12	27			
					11				
2" SS	24 / 6	24	28-30	0	4	28			Dark brown fine SAND, little silt, wet
					4				
					4	29			
					5				
2" SS	24 / 10	24	30-32	0	3	30			0-3 in . Dark brown fine SAND, little silt with iron staining at base
					4			ML	3-7 in · Dark brown finely laminated SANDY SILT
					4	31		SM	7-10 in : Dark brown fine SAND, little silt, wet
					4				
2" SS	24 / 12	24	32-34	0	3	32		ML	Dark brown finely laminated SANDY SILT, iron staining 9 to 10 in
					3				
					3	33			
					4				
2" SS	24 / 11	34	34-36	0	11	34			Dark brown to grey finely laminated SANDY SILT, iron staining 6 to 7 in ,
					11				wet, firm
					7	35			
					3				
2" SS	24 / 17	34	36-38	0	3	36			Dark brown to grey finely laminated SANDY SILT, iron staining, wet
					5				
					5	37			
					4				
2" SS	24 / 12	34	38-40	0	5	38			Dark brown to grey finely laminated SANDY SILT, wet
					7				
					7	39			
					6				

Logged by James Gatherer Date· 01/18/01

Drilling Contractor Subsurface Drilling and Remeddiation Driller: Phil Thornsbury

WELL SPECIFICATIONS.

Diam of Riser:	2 in	Screen Interval·	46-56 ft bgs	Sandpack	44-56.5 ft bgs	Grout·	40 ft bgs - grade
Bottom of Hole	66 ft bgs	Riser Interval	46 ft bgs - 2 ft ags	Bentonite·	40-44 ft bgs	Cover·	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates.	N: 193832 E: 522878
Surface Elevation:	29.3 FT MSL
Well Riser Elevation:	31 8 FT MSL

Job. No. 29600 97	Client: EFANE	Location: SITE 16 NCBC Davisville
Drilling Method: Mobile B-61 Drill Rig 4 in. casing Drive and wash		Boring No. MW16-15D
Sampling Method: 2" or 3" split spoon		Sheet 3 of 3

Drilling Water Level			Start	Drilling Date/Times	Finish
Date			01/17/01		01/18/01
Time			1219		1200
Surface Conditions	gravel				

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	24 11	34	40-42	0	4 8	40	ML	0-7 in : Dark brown to grey SANDY SILT
					5 6	41	SP	7-11 in.: brown fine to medium SAND, heavy iron staining, wet
2" SS	24 13	34	42-44	0	4 6	42		Brown to grey fine to medium SAND, iron staining, wet
					6 16	43		
2" SS	24 7	44	44-46	0	7 7	44		0-5 in : brown to grey medium to coarse SAND, trace silt, iron staining in bottom 2 in
					4 4	45	SM	5-7 in : Brown fine SAND, silt, wet
2" SS	24 11	44	46-48	1.2	11 8	46		0-4 in : brown to grey fine to medium SAND, silt, iron staining 4-5 in : grey very fine to fine SAND, little silt
					6 7	47	SP/GP	5-11 in.: Dark grey very fine to fine SAND, coarse sand and angular gravel, wet
2" SS	24 7	44	48-50	0	7 9	48	GP SP/GP	0-2 in Dark grey coarse GRAVEL, wet 2-7 in.: Grey medium to coarse SAND and GRAVEL, wet
					5 7	49		
2" SS	24 12	44	50-52	6 2	3 4	50	GP	Dark grey fine to coarse GRAVEL, some sand and angular gravel, wet
					3 4	51		Sample from MW16-15R boring submitted for laboratory analysis
2" SS	24 8	44	52-54	6 9	12 18	52	SP/GP	Dark grey coarse SAND and angular GRAVEL, wet
					19 21	53		
2" SS	24 6	54	54-56	4 2	5 8	54		Dark grey coarse SAND and fine angular GRAVEL, trace silt, wet
					7 10	55		
2" SS	4 4	54	56-56.3	6 1	100/4	56		Same as above
						57		
						58		Rollerbit to 61 ft
						59		Cored 61-66 ft bgs

Logged by: James Gatherer Date: 01/18/01

Drilling Contractor: Subsurface Drilling and Remeddiation Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser	2 in.	Screen Interval.	46-56 ft bgs	Sandpack:	44-56 5 ft bgs	Grout.	40 ft bgs - grade
Bottom of Hole.	66 ft bgs	Riser Interval:	46 ft bgs - 2 ft ags	Bentonite	40-44 ft bgs	Cover:	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 193832 E. 522878
Surface Elevation:	29.3 FT MSL
Well Riser Elevation:	31.8 FT MSL

Job No. 29600.97.3201	Client: EFANE	Location. Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method: Mobile B-61 Drill Rig 4 in. casing Drive and wash		Boring No **MW16-15D**
Core Barrel used:		Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	
Start	Finish
01/18/01 1050	01/18/01 1148

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min.sec)	Total Depth (ft bgs)
98.3	60%				61			1	9:00	62
					62		Light grey quartzite meta-conglomerate with elliptical quartzite pebbles, more conglomerate like in bottom 2 ft.	2	9:00	63
					63			3	8:30	64
					64		Moderately fractured (mostly low angled) with iron staining (51-53 in.) and silt along fractures.	4	13:00	65
					65		Pyrite deposits on some fractures Fractures at 3, 6, 8, 12, 14, 15, 22.5, 28, 37, 37 25, 42 5, 43, 46 5, 50 and 55 in.	5	10:00	66
					66					
					67		Fractures are rusted from 51 to 53 in.			
					68					
					69					
					70					
					71					
					72					
					73					
					74					
					75					
					76					
					77					
					78					
					79					

NOTES:

Logged by: James Gatherer/Robin Clark

Drilling Contractor: Subsurface Drilling and Remeddiation

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N 193834 E. 522881
Surface Elevation:	29 3 FT MSL
Well Riser Elevation	30 6 FT MSL

Job. No. 29600 97.3201	Client EFANE	Location: Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method: Mobile B-61 Drive and Wash		Boring No. **MW16-15R**
Core Barrel used. 3 7/8" Rollerbit		Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	
Start	Finish
01/26/01 1040	01/26/01 1320

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
				60		Light grey quartzite cuttings 60 5-70.5 ft			
				61			1	4:11	61.5
				62		Rollerbit dropped rapidly from 63-63.5 ft	2	3:51	62 5
				63			3	3.21	63.5
				64		Dark grey quartzite cuttings from 70.5-72 ft	4	3:34	64.5
				65			5	3:01	65.5
				66		Grey quartzite cuttings from 72-85.5 ft	6	3:07	66.5
				67			7	3:13	67.5
				68		rapid drop from 73-73.4 ft	8	3:05	68.5
				69			9	2:45	69.5
				70		Some weathered material in last 6 in. of cuttings	10	2:39	70 5
				71			11	2:22	71.5
				72			12	3 30	72 5
				73			13	2:59	73.5
				74			14	3:10	74.5
				75			15	2:29	75.5
				76			16	2:34	76.5
				77			17	2.59	77.5
				78			18	2:59	78.5
				79			19	3:31	79.5
				80			20	2:42	80.5
				81			21	2:39	81.5
				82			22	2:38	82.5
				83			23	3:21	83.5
				84			24	2:42	84.5
				85			25	2:56	85.5
				86			25 5	1.40	86

NOTES: 800 psi down pressure

Logged by: Kevin Baum

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 193783 E 522982
Surface Elevation:	23 4 FT MSL
Well Riser Elevation:	25 5 FT MSL

Job. No 29600 97	Client: EFANE	Location	SITE 16 NCBC Davisville
Drilling Method Mobile Drill B-61		Boring No.	MW16-16D
drive and wash			
3 7/8 roller bit			
Sampling Method. 2" split spoon		Sheet 1 of 4	
Drilling Water Level		Start 01/05/01 1600	Drilling Date/Times
Date			Finish 01/09/01 1600
Time			
Surface Conditions. woodland			

Sample Type	Inches Driven/In. Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 19	0	0-2	0	32 22	0		FILL	light brown fine to medium SAND, trace subangular to subrounded gravel <l in , dry	
					17 17	1				
2" SS	24 16	0	2-4	0	14 14	2			olive brown fine to medium SAND, dry	
					20 20	3				
2" SS	24 18	0	4-6	0	31 35	4			0-10 in : olive brown fine to medium SAND, trace gravel <2 in. angular to subangular, dry.	
					40 46	5			10-18 in : dark olive brown SAND, trace silt and fine to coarse gravel <2 in. angular to subangular, damp	
2" SS	24 10	0	6-8	0	29 36	6			dark olive brown fine to medium SAND, trace silt, two rock fragments (2.5 and 1 in.) at 5-6 in. damp.	
					31 27	7				
2" SS	24 18	0	8-10	0	24 27	8		SM	dark gray fine to medium SAND, some silt, trace fine to coarse gravel angular to subangular, wet	
					20 18	9				
2" SS	24 11	0	10-12	0	15 14	10		SM	dark olive brown fine to coarse SAND, some silt, trace fine to coarse gravel angular to subangular.	
					27 20	11				
2" SS	24 12	0	12-14	0	12 10	12		SM	dark gray very fine to fine SAND, some silt.	
					11 11	13				
2" SS	24 24	0	14-16	0	13 13	14		SP	dark olive brown fine to medium SAND, some fine to medium gravel subangular to subrounded, trace silt.	
					13 12	15				
2" SS	24 20	0	16-18	0	7 9	16			0-17 in.: same as above 17-20 in.: dark olive gray very fine to fine SAND trace silt.	
					8 8	17				
2" SS	24 11	18	18-20	0	8 9	18			dark olive gray very fine to fine SAND, trace silt.	
					13 12	19				

Logged by: Kevin Baum Date: 01/09/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in	Screen Interval.	54-64 ft bgs	Sandpack:	52-64 5 ft bgs	Grout:	50 ft bgs - grade
Bottom of Hole:	72 ft bgs	Riser Interval:	54 ft bgs - 2 ft ags	Bentonite:	50-52 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates.	N. 193783 E: 522982
Surface Elevation.	23.4 FT MSL
Well Riser Elevation·	25.5 FT MSL

Job. No 29600 97	Client: EFANE	Location SITE 16 NCBC Davisville
Drilling Method Mobile Drill B-61		Boring No MW16-16D
drive and wash		
3 7/8 roller bit		
Sampling Method 2" split spoon		Sheet 2 of 4
Drilling Water Level		Start 01/05/01 1600 / Drilling Date/Times / Finish 01/09/01 1600
Date		
Time		
Surface Conditions woodland		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 14	18	20-22	0	13	20		SP	same as above with reddish stringer from 8 to 14 in	
					19					
					20	21				
					19					
2" SS	24 16	18	22-24	0	13	22			dark olive gray very fine to fine SAND, trace silt	
					19				grading to some silt.	
					15	23				
					10					
2" SS	24 10	24	24-26	0	6	24		SM	dark olive gray very fine to fine SILTY SAND	
					5					
					5	25				
					7					
2" SS	24 12	24	26-28	0	13	26			dark olive gray very fine to fine SILTY SAND grading to	
					19				very fine to fine sand with trace silt	
					20	27				
					22					
2" SS	24 16	28	28-30	0	6	28		SP	dark olive gray very fine to fine SAND, trace silt	
					5				iron staining 13-16 in	
					11	29				
					11					
2" SS	24 16	28	30-32	0	13	30			0-4 in.: dark olive gray with iron staining very fine to	
					17				fine SAND, trace silt.	
					25	31		SM	4-16 in dark olive gray very fine to fine SAND, some	
					20				silt	
2" SS	24 16	28	32-34	0	13	32		SP	0-14 in.: dark olive gray very fine to fine SAND, trace	
					22				silt.	
					25	33			14-16 in.: reddish brown and dark olive gray laminated	
					18				very fine to fine SAND, trace silt.	
2" SS	24 16	34	34-36	0	11	34		SM	dark olive gray very fine to fine SILTY SAND	
					7					
					6	35				
					6					
2" SS	24 15	34	36-38	0	11	36			dark olive gray very fine to fine SAND, some silt	
					16				reddish brown laminae last 2 in.	
					26	37				
					17					
2" SS	24 10	38	38-40	0	10	38			dark olive gray very fine to fine SAND, some silt.	
					12					
					7	39				
					3					

Logged by. Kevin Baum Date· 01/09/01

Drilling Contractor: Subsurface Drilling and Remediation Driller Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser.	2 in.	Screen Interval	54-64 ft bgs	Sandpack	52-64 5 ft bgs	Grout	50 ft bgs - grade
Bottom of Hole:	72 ft bgs	Riser Interval.	54 ft bgs - 2 ft ags	Bentonite.	50-52 ft bgs	Cover.	4 in. steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates.	N· 193783 E. 522982
Surface Elevation:	23.4 FT MSL
Well Riser Elevation:	25.5 FT MSL

Job. No. 29600.97	Client. EFANE	Location· SITE 16 NCBC Davisville
Drilling Method: Mobile Drill B-61		Boring No MW16-16D
drive and wash		
3 7/8 roller bit		
Sampling Method: 2" split spoon		Sheet 3 of 4

Drilling Water Level			Start	Drilling Date/Times	Finish
Date			01/05/01		01/09/01
Time			1600		1600

Surface Conditions: woodland

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 14	38	40-42	0	4	40		SM	very dark gray very fine to fine SILTY SAND	
					7					
					7	41				
					5					
2" SS	24 20	38	42-44	0	9	42		ML	0-15 in.. very dark gray SANDY SILT	
					6				15-20 in.: very dark gray very fine to fine SILTY SAND	
					6	43				
					13					
2" SS	24 23	44	44-46	0	9	44		SM	very dark gray very fine to fine SILTY SAND	
					12					
					6	45				
					4					
2" SS	24 12	44	46-48	0	7	46		ML	very dark gray SANDY SILT	
					7					
					6	47				
					6					
2" SS	24 17	48	48-50	0	12	48		SM	dark olive gray very fine to fine SAND, some silt	
					8					
					8	49				
					16					
2" SS	24 15	48	50-52	0.2	20	50		SP	0-10 in.. dark gray very fine to fine SAND, trace silt	
					32				reddish orange staining from 4-8 in.	
					45	51		SP	10-15 in : dark gray very fine to medium SAND, trace silt	
					31				and fine to coarse gravel <1 in. subangular to subrounded.	
2" SS	16 10	48	52-54	0	21	52			dark gray fine to coarse SAND, trace silt and fine to	
					65				medium gravel subangular to subrounded.	
					100/4	53				
								B	rollerbit to 54 ft	
2" SS	4 0	54	54-56		100/4	54			no recovery	
						55				
								B		
						56			rollerbit 54-58 ft, boulder 54-54 6 ft and 55.5-58 ft	
						57				
2" SS	24 18	58	58-60	0	39	58		SM	dark gray very fine to medium SAND, some silt, trace	
					44				medium to coarse gravel up to 2 in. subangular to	
					55	59			subrounded.	
					120					

Logged by: Kevin Baum Date: 01/09/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval·	54-64 ft bgs	Sandpack:	52-64.5 ft bgs	Grout.	50 ft bgs - grade
Bottom of Hole:	72 ft bgs	Riser Interval:	54 ft bgs - 2 ft ags	Bentonite.	50-52 ft bgs	Cover:	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates	N 193783 E 522982
Surface Elevation.	23.4 FT MSL
Well Riser Elevation:	25 5 FT MSL

Job No 29600 97	Client EFANE	Location SITE 16 NCBC Davisville
Drilling Method Mobile Drill B-61		Boring No MW16-16D
drive and wash		
3 7/8 roller bit		
Sampling Method: 2" split spoon		Sheet 4 of 4

Drilling Water Level			Start	Drilling Date/Times	Finish
Date			01/05/01		01/09/01
Time			1600		1600

Surface Conditions: woodland

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	12 6	58	60-62	0 0	41 120	60		SP	dark gray very fine to medium SAND, trace silt and medium to coarse gravel <2 in. angular to subrounded	
						61		wth rx	rollerbit 61-67 ft	
						62			in and out of hard material from 62-64 ft	
						63				
						64			competent 64-67 ft	
						65				
						66				
						67			core 67-72 ft	
						68				
						69				
						70				
						71				
						72				
						73				
						74				
						75				
						76				
						77				
						78				
						79				

Logged by: Kevin Baum Date. 01/09/01

Drilling Contractor Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS:

Diam of Riser:	2 in.	Screen Interval:	54-64 ft bgs	Sandpack:	52-64.5 ft bgs	Grout:	50 ft bgs - grade
Bottom of Hole:	72 ft bgs	Riser Interval:	54 ft bgs - 2 ft ags	Bentonite	50-52 ft bgs	Cover	4 in. steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 193783 E 522982
Surface Elevation:	23.4 FT MSL
Well Riser Elevation:	25 5 FT MSL

Job. No 29600.97.3201	Client: EFANE	Location: Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method.	B-61 Mobile Drill rig	Boring No. **MW16-16D**
Core Barrel used:	NX	Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	
See packer test log if applicable		

Drilling Times	Start	Finish
	01/09/01 1355	01/09/01 1535

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min sec)	Total Depth (ft bgs)
					67					
95%	68%				68		dark gray phyllite with white mineralization stringers throughout. Low angle fractures at 3, 4, 8 5, 9, 11 5, 12, 16, 24, 26, 28, 28.5, 38, 40 5, 43, 44, and 48 in.	1	8:00	68
					69			2	10:00	69
					70			3	9:00	70
					71			4	8:00	71
					72			5	6.00	72
					73					
					74					
					75					
					76					
					77					
					78					
					79					
					80					
					81					
					82					
					83					
					84					
					85					

NOTES:

Logged by: Kevin Baum / Robin Clark

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING -,REVISED

Coordinates:	N. 193445 E. 522897
Surface Elevation:	23 9 FT MSL
Well Riser Elevation	26 4 FT MSL

Job. No 29600 97	Client EFANE	Location: SITE 16 NCBC Davisville
Drilling Method Mobile Drill B-61		Boring No. MW16-17D
drive and wash		
Rollerbit		
Sampling Method: 2" split spoon		Sheet 1 of 4
Drilling Water Level		Start 01/02/01 1333
Date		Drilling Date/Times
Time		Finish 01/04/01 1026
Surface Conditions: woodland		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 19	0	0-2	0 9	38 26 16 10	0 1		FILL	dark gray medium to coarse SAND, trace silt, dry	
2" SS	24 16	0	2-4	2 5	9 10 10 13	2 3		SP	light brown medium to coarse SAND, dry	
2" SS	24 13	0	4-6	2.9	12 12 8 10	4 5			same as above	
2" SS	24 16	0	6-8	5 1	8 8 5 7	6 7			olive brown medium to coarse SAND, grading to fine sand, dry	
2" SS	24 16	0	8-10	0 8	7 7 6 7	8 9		SM	very fine to fine SILTY SAND, dark olive gray, wet.	
2" SS	24 17	0	10-12	1.0	6 6 7 6	10 11			dark olive brown very fine to fine SAND, some silt,wet	
2" SS	24	0	12-14	0.7	6 6 5 4	12 13			same as above	
2" SS	24 10	14	14-16	0.7	9 9 9 8	14 15		SP	olive brown very fine to fine SAND, trace silt	
2" SS	24 18	14	16-18	0.5	8 9 7 8	16 17		SM	dark olive gray very fine to fine SAND, some silt	
2" SS	24	18	18-20	0.5	5 7 7 7	18 19			same as above	

Logged by: Kevin Baum Date: 01/04/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval.	57-67 ft bgs	Sandpack:	55-67 5 ft bgs	Grout:	53 ft bgs - grade
Bottom of Hole.	75 ft bgs	Riser Interval:	57 ft bgs - 2 ft ags	Bentonite	53-55 ft bgs	Cover:	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 193445 E 522897
Surface Elevation	23.9 FT MSL
Well Riser Elevation	26 4 FT MSL

Job No 29600 97	Client EFANE	Location	SITE 16 NCBC Davisville
Drilling Method Mobile Drill B-61		Boring No.	MW16-17D
drive and wash			
Rollerbit			
Sampling Method 2" split spoon		Sheet 2 of 4	
Drilling Water Level		Start 01/02/01 1333	Drilling Date/Times
Date			Finish 01/04/01 1026
Time			
Surface Conditions: woodland			

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 17	18	20-22	0 5	5	20		SM	very dark gray SILTY SAND	
					7					
					7	21				
					9					
2" SS	24 18	18	22-24	0 5	8	22			same as above	
					8					
					8	23				
					9					
2" SS	24 11	24	24-26	0 0	9	24			same as above	
					8					
					6	25				
					7					
2" SS	24 10	24	26-28	1 0	3	26		ML	very dark gray SANDY SILT	
					11					
					13	27				
					19					
2" SS	24 10	28	28-30	0 8	9	28		SM	very dark gray very fine to fine SAND, some silt	
					8					
					8	29				
					13					
2" SS	24 13	28	30-32	0 8	8	30			same as above	
					10					
					10	31				
					18					
2" SS	24 18	28	32-34	0 6	10	32			0-8 in very dark gray very fine to fine SAND, some silt	
					9			ML	8-18 in very dark gray SANDY SILT	
					9	33				
					13					
2" SS	24 10	34	34-36	0 4	21	34			0-6 in . very dark gray SANDY SILT	
					13			SM	6-10 in · dark olive gray very fine to fine SAND, some	
					7	35			silt, weathered band at 6 in.	
					9					
2" SS	24 14	34	36-38	0 1	4	36			dark olive gray very fine to fine SILTY SAND	
					6					
					6	37				
					7					
2" SS	24 13	38	38-40	0 2	11	38			dark olive gray very fine to fine SILTY SAND	
					7					
					5	39				
					6					

Logged by: Kevin Baum Date: 01/04/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS:

Diam of Riser.	2 in	Screen Interval	57-67 ft bgs	Sandpack	55-67 5 ft bgs	Grout.	53 ft bgs - grade
Bottom of Hole:	75 ft bgs	Riser Interval	57 ft bgs - 2 ft ags	Bentonite	53-55 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job. No. 29600 97	Client EFANE
Location:	SITE 16 NCBC Davisvill
Drilling Method	Mobile Drill B-61
	drive and wash
	Rollerbit
Boring No	MW16-17D
Sampling Method	2" split spoon
Sheet	3 of 4
Drilling Water Level	
Date	
Time	
Surface Conditions	woodland

Start	Drilling Date/Times	Finish
01/02/01 1333		01/04/01 1026

Coordinates: N 193445 E: 522897
Surface Elevation: 23 9 FT MSL
Well Riser Elevation: 26 4 FT MSL

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 72	38	40-42	0 0	7	40	SM	0-5 in : dark olive gray very fine to fine SILTY SAND	
					3		ML	5-12 in.: very dark gray SILT	
					4	41			
					4				
2" SS	24 18	38	42-44	0 0	6	42		very dark gray SILT	
					5				
					6	43			
					11				
2" SS	24 11	44	44-46	0.0	7	44		very dark gray SANDY SILT	
					8				
					5	45			
					2				
2" SS	24 17	44	46-48	0.2	3	46		very dark gray SILT, trace very fine sand	
					4				
					6	47			
					6				
2" SS	24 12	48	48-50	0.2	12	48	SM	very dark gray very fine to fine SAND, trace to some	
					13			silt	
					14	49			
					21				
2" SS	24 12	48	50-52	0 2	6	50		same as above at 10-11 in: medium to coarse sand	
					10			trace rounded to subrounded gravel < 0 5 in	
					12	51	SP		
					36				
2" SS	24 22	48	52-54	0.1	16	52		dark gray fine to coarse SAND, trace gravel (< 0 5 in.)	
					17			subangular to subrounded.	
					27	53			
					34				
2" SS	16 10	54	54-55 5	0 1	39	54	SM	dark gray very fine to coarse SAND, some silt and	
					46			gravel (<1 in.) subangular to subrounded	
					100 (4)	55			
							B		
						56		rollerbit 55.5-58 ft	
						57			
2" SS	24 11	58	58-60	0.2	35	58	SP	0-6 in.: very dark gray very fine to fine SAND, trace	
					35		GP	silt and fine angular to subangular gravel	
					60	59		6-11 in.: GRAVEL (angular quartz fragments <1 in)	
					110			trace silt	

Logged by: Kevin Baum Date 01/04/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval	57-67 ft bgs	Sandpack.	55-67 5 ft bgs	Grout.	53 ft bgs - grade
Bottom of Hole	75 ft bgs	Riser Interval:	57 ft bgs - 2 ft ags	Bentonite.	53-55 ft bgs	Cover:	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N: 193445 E 522897
Surface Elevation.	23 9 FT MSL
Well Riser Elevation	26 4 FT MSL

Job. No 29600 97	Client EFANE	Location:	SITE 16 NCBC Davisville
Drilling Method Mobile Drill B-61		Boring No	MW16-17D
drive and wash			
Rollerbit			
Sampling Method 2" split spoon		Sheet 4 of 4	
Drilling Water Level		Start 01/02/01 1333	Drilling Date/Times — Finish 01/04/01 1026
Date			
Time			
Surface Conditions	woodland		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	10 7	58	60-60 3	0 3	100 130/4	60	SM	very dark gray SILTY SAND, some angular to subangular gravel, <1 in	
						61	B	rollerbit to 62 ft	
2" SS	21 13	58	62-64	0 1	55 80	62	SM	same as above	
					92 100/3	63			
2" SS	24 7	64	64-66	0 5	80 79	64		very dark gray very fine to medium SAND, some silt trace gravel <1 in subangular to subrounded	
					79 104	65			
2" SS	1 0	64	66-66 1	NA	125/1	66	RX	no recovery rollerbit 66 1-69 ft	
						67			
						68			
2" SS	3 <1	64	69-69.3	0 5	150/3	69		dark gray angular rock fragments (phyllite)	
						70		rollerbit 69 3-70 ft core 70-75 ft	
						71			
						72			
						73			
						74			
						75		bottom of boring	
						76			
						77			
						78			
						79			

Logged by: Kevin Baum Date. 01/04/01

Drilling Contractor: Subsurface Drilling and Remediation Driller Brad Haase

WELL SPECIFICATIONS.

Diam of Riser	2 in	Screen Interval	57-67 ft bgs	Sandpack:	55-67 5 ft bgs	Grout	53 ft bgs - grade
Bottom of Hole	75 ft bgs	Riser Interval	57 ft bgs - 2 ft ags	Bentonite	53-55 ft bgs	Cover.	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N. 193445 E: 522897
Surface Elevation.	23.9 FT MSL
Well Riser Elevation:	26.4 FT MSL

Job. No. 29600.97.3201	Client: EFANE
Drilling Method· Mobile Drill B-61 drive and wash	
Rollerbit	
Core Barrel used: NX core barrel	

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Location: Site 16
NCBC Davisville, North Kingstown, RI

Boring No.

MW16-17D

Sheet 1 of 1

Drilling Times	
Start	Finish
01/04/01 1150	01/04/01 1500

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
					69					
							cored 70-75 ft bgs			
77.5%	19%				70		3 ft 10 5 in recovery of dark gray	1	4:19	71
							phyllite with quartz banding and mica crystals,			
					71		Highly fractured at low angles, iron staining and silt	1	7 30	72
							in fractures as well as pyrite crystallization			
					72			1	5:58	73
					73			1	5:17	74
					74			1	5:39	75
					75					
					76					
					77					
					78					
					79					
					80					
					81					
					82					
					83					
					84					
					85					
					86					
					87					

NOTES:

Logged by: Kevin Baum

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Brad Haase

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job No	29600.97
Client	EFANE
Location	SITE 16 NCBC Davisville
Drilling Method	Mobile Drill B-62
	drive and wash
	4 in. steel casing
Boring No	MW16-18D
Sampling Method	2" split spoon
Sheet	1 of 3

Coordinates: N 193652 E 523164
Surface Elevation: 21.5 FT MSL
Well Riser Elevation: 23 8 FT MSL

Drilling Water Level		
Date		
Time		

Surface Conditions: asphalt

Start	Drilling Date/Times	Finish
01/02/01 1330		01/04/01 1145

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	18 10	0	6"-2'	0	- 28	0		FILL	0-6 in: no sample, drilled through asphalt; dark brown coarse to fine SAND, trace subangular	
					14 11	1			gravel	
2" SS	24 14	0	2-4	0	12 16	2		SP	dark brown to brown medium to fine SAND, trace mica, trace silt	
					22 22	3				
2" SS	24 13	0	4-6	0	12 16	4			tan to brown coarse to medium SAND, trace subangular fine gravel, trace rock fragments (<1 in.)	
					21 24	5				
2" SS	24 12	0	6-8	0	12 10	6			tan to brown coarse to medium SAND, trace subangular fine gravel, trace orange fine sand	
					14 17	7				
2" SS	24 5	0	8-10	0	20 27	8			same as above	
					25 18	9				
2" SS	24 11	0	10-12	0	14 12	10			brown fine to very fine SAND, trace silt and mica, saturated in lower 6 in., water table ~11 ft bgs	
					12 10	11				
2" SS	24 18	0	12-14	0	14 22	12		SM	0-15 in.: dark brown SILTY SAND (very fine sand, some silt), trace dark gray silt, saturated	
					32 27	13		SP	15-18 in.: brown medium SAND, trace mica and fine sand, wet	
2" SS	24 16	0	14-16	0	3 4	14			brown fine to very fine SAND, trace mica and silt	
					7 7	15				
2" SS	24 12	0	16-18	0	9 11	16			brown fine SAND, trace very fine sand and mica	
					12 14	17				
2" SS	24 5	0	18-20	0	10 8	18			same as above	
					11 12	19				

Logged by: Rob Wasserman Date: 01/04/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval	42 5-52 5 ft bgs	Sandpack:	40 5-61 ft bgs	Grout:	38 5 ft bgs - grade
Bottom of Hole:	61 ft bgs	Riser Interval:	42 5 ft bgs - 2 ft ags	Bentonite:	38 5-40 5 ft bgs	Cover:	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates.	N 193652 E· 523164
Surface Elevation:	21.5 FT MSL
Well Riser Elevation.	23 8 FT MSL

Job No. 29600.97	Client EFANE	Location	SITE 16 NCBC Davisville
Drilling Method. Mobile Drill B-62		Boring No	MW16-18D
drive and wash			
4 in. steel casing			
Sampling Method. 2" split spoon		Sheet 2 of 3	
Drilling Water Level		Start	Drilling Date/Times / Finish
Date		01/02/01	01/04/01
Time		1330	1145
Surface Conditions· asphalt			

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 18	18	20-22	0	5 9	20		SP	dark gray to dark brown fine to very fine SAND, trace mica and silt	
					9 11	21				
2" SS	24 16	18	22-24	0 8	8 11	22			same as above	
					14 16	23				
2" SS	24 5	24	24-26	0.7	4 6	24			dark brown fine SAND, trace very fine sand and mica	
					6 12	25				
2" SS	24 11	24	26-28	0 6	9 10	26			dark brown very fine SAND, trace silt and mica	
					12 13	27				
2" SS	24 5	28	28-30	0 6	11 7	28			0-2 in brown to tan fine SAND, trace mica 2-5 in.· dark brown to dark gray very fine SAND,	
					6 4	29			trace silt and mica	
2" SS	24 21	28	30-32	-	5 4	30		SM	dark brown to dark gray SILTY SAND (very fine sand, some silt), not enough headspace for screening	
					3 3	31				
2" SS	24 14	28	32-34	0.6	5 6	32			same as above	
					9 10	33				
2" SS	24 4	34	34-36	0.2	7 8	34		SP	dark gray very fine SAND, trace silt, moderately compact	
					9 13	35				
2" SS	24 10	34	36-38	0.1	16 17	36			dark gray very fine to fine SAND, trace fine brown sand and dark brown sand and silt	
					25 26	37				
2" SS	24 8	38	38-40	0 3	17 19	38		SM	dark gray SILTY SAND (very fine sand, some silt), moderately dense and compact	
					16 17	39				

Logged by. Rob Wasserman Date· 01/04/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval·	42 5-52.5 ft bgs	Sandpack:	40.5-61 ft bgs	Grout·	38.5 ft bgs - grade
Bottom of Hole·	61 ft bgs	Riser Interval·	42 5 ft bgs - 2 ft ags	Bentonite:	38.5-40.5 ft bgs	Cover:	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 193652 E. 523164
Surface Elevation:	21.5 FT MSL
Well Riser Elevation:	23.8 FT MSL

Job No 29600.97	Client: EFANE	Location: SITE 16 NCBC Davisville
Drilling Method: Mobile Drill B-62		Boring No MW16-18D
drive and wash		
4 in steel casing		
Sampling Method: 2" split spoon		Sheet 3 of 3
Drilling Water Level		Start 01/02/01 1330 / Drilling Date/Times / Finish 01/04/01 1145
Date		
Time		
Surface Conditions: asphalt		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
2" SS	24 12	38	40-42	0.2	8 10	40		SM	same as above	
					9 7	41				
2" SS	24 9	38	42-44	0.3	7 18	42			0-3 in.: same as above	
					19 28	43			3-9 in.: same as 38-42 ft, little to some coarse to medium subangular to angular gravel (quartzite/schist)	
2" SS	24 3	44	44-46	0.4	98 42	44		SP	dark gray very fine to fine SAND, little coarse to medium subangular to angular gravel (quartzite fragments)	
					8 6	45				
2" SS	24 4	44	46-48	0.3	6 7	46			same as above	
					7 14	47				
2" SS	24 3	48	48-50	0.4	11 12	48			same as above	
					16 20	49				
2" SS	24 8	48	50-52	0.3	12 12	50			same as above, with coarse to fine subangular to angular gravel	
					10 11	51				
2" SS	6 6	48	52-52.5	0.8	100/6	52			same as above refusal at 52.5 ft	
						53			rollerbit to 56 ft	
						54				
						55				
						56			cored from 56-61 ft	
						57				
						58				
						59			bottom of boring at 61 ft bgs	

Logged by: Rob Wasserman Date: 01/04/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam of Riser:	2 in.	Screen Interval:	42.5-52 5 ft bgs	Sandpack:	40 5-61 ft bgs	Grout:	38.5 ft bgs - grade
Bottom of Hole:	61 ft bgs	Riser Interval	42 5 ft bgs - 2 ft ags	Bentonite	38 5-40 5 ft bgs	Cover:	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N 193652 E 523164
Surface Elevation.	21 5 FT MSL
Well Riser Elevation.	23 8 FT MSL

Job. No. 29600.97.3201	Client. EFANE	Location: Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method. Mobile B-61 Drill Rig		Boring No. **MW16-18D**
Core Barrel used: 3 in. NX core		Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	
Start	Finish
01/03/01 1410	01/03/01 1503

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
					55					
							56-61 ft			
95%	46%				56		dark gray phyllite, numerous	1	10:30	57
							thin quartz veins, moderately fractured in top 3 in.			
					57		very highly fractured in lower 2 ft, all low to	1	10.00	58
							moderately angled. Low angle fractures at 3, 6,			
					58		10, 12, 17, 18, 18 5, 19, 22, and 23 ft bgs.	1	10:30	59
							Broken core 30 in. to bottom, green/yellow mineral			
					59		on fracture at bottom.	1	9:30	60
					60			1	11:00	61
					61					
					62					
					63					
					64					
					65					
					66					
					67					
					68					
					69					
					70					
					71					
					72					
					73					

NOTES:

Logged by: Rob Wasserman /Robin Clark

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 193772 E: 523318
Surface Elevation:	20.0 FT MSL
Well Riser Elevation:	22.6 FT MSL

Job. No. 29600 97	Client: EFANE	Location: SITE 16 NCBC Davisville
Drilling Method Mobil Drill B-61		Boring No. MW16-19D
drive and wash		
4 in steel casing		
Sampling Method: 2" split spoon		Sheet 1 of 3
Drilling Water Level		Start 01/08/01 1100 / Drilling Date/Times / Finish 01/09/01 1700
Date		
Time		
Surface Conditions:	woodland	

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2"	24			0	51	0		FILL	0-6 in.: wood
SS	15		0-2		27			FILL	6-8 in.: olive SAND SILT and GRAVEL
					19	1		FILL	8-10 in.: dark gray SAND and SILT
					17			FILL	10-15 in.: olive SAND, SILT, and GRAVEL
2"	24			0	16	2		FILL	brown SAND and GRAVEL, some silt
SS	12		2-4		19				
					17	3			
					17				
2"	24			0	9	4		FILL	0-2 in : dark brown SAND and SILT
SS	14		4-6		15			FILL	2-8 in.: brown SAND and SILT and GRAVEL
					16	5		FILL	8-12 in.: olive SAND and GRAVEL, with quartzite fragments.
					13				12-14 in.: olive SAND and GRAVEL with silt
2"	24			0	5	6			0-9 in.: tan to olive SAND, some gravel
SS	18		6-8		6			SM	9-18 in.: tan fine SAND, with silt
					7	7			
					11				
2"	24			0	2	8		ML	gray to olive SILT and SAND
SS	12		8-10		8				
					6	9			
					7				
2"	24			0	9	10			0-6 in.: olive SILT and SAND
SS	16		10-12		8				6-16 in.: olive SILT
					6	11			
					7				
2"	24			0.3	12	12			tan to olive SILT and SAND
SS	12		12-14		8				
					8	13			
					9				
2"	24			0.3	5	14			olive SILT and SAND
SS	12		14-16		7				
					7	15			
					12				
2"	24			0.1	10	16			0-6 in.: brown SAND and SILT
SS	14		16-18		81				6-12 in.: olive SILT
					8	17			
					8				
2"	24			0.2	9	18		SM	olive SAND and SILT
SS	8		18-20		11				
					13	19			
					13				

Logged by: David Vankeuren Date: 01/09/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Jim Goldthwait

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	45 5-54.5 ft bgs	Sandpack:	43-55 5 ft bgs	Grout:	41 ft bgs - grade
Bottom of Hole:	60 ft bgs	Riser Interval:	45 ft bgs - grade	Bentonite:	41-43 ft bgs	Cover:	4 in. steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N. 193772 E 523318
Surface Elevation	20.0 FT MSL
Well Riser Elevation.	22 6 FT MSL

Job No 29600 97	Client EFANE	Location	SITE 16 NCBC Davisville
Drilling Method Mobil Drill B-61		Boring No.	MW16-19D
drive and wash			
4 in steel casing			
Sampling Method: 2" split spoon		Sheet 2 of 3	

Drilling Water Level			Start	Drilling Date/Times	Finish
Date			01/08/01		01/09/01
Time			1100		1700
Surface Conditions.	woodland				

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2"	24			0 1	9	20		SM	0-6 in SAND and SILT
SS	18		20-22		11			SP/SM	6-18 in brown and olive layers of SAND, SILT and
					12	21			GRAVEL
					10				
2"	24			0 3	7	22		SM	0-12 in.. olive SAND and SILT
SS	13		22-24		9				12-13 in.. olive gray fine SAND and SILT
					11	23			
					13				
2"	24			0 2	4	24			gray SAND and SILT
SS	10		24-26		4				
					2	25			
					4				
2"	24			0 1	2	26			same as above
SS	11		26-28		2				
					3	27			
					2				
2"	24			0 1	1	28			gray SILTY fine SAND
SS	10		28-30		2				
					2	29			
					2				
2"	24			0	3	30		ML	gray SILT and SAND
SS	6		30-32		2				
					1	31			
					1				
2"	24			0.4	2	32		ML	0-6 in.: gray SILT with SAND
SS	8		32-34		2				6-8 in brown and gray SAND and SILT
					3	33		SM	
					5				
2"	24			0.4	3	34			0-5 in.. brown fine SAND and SILT
SS	15		34-36		4			ML	5-9 in gray SILT, loose
					1	35		SM	9-15 in. gray SAND and SILT
					2				
2"	24				1	36		ML	gray SILT, almost flowing
SS	15		36-38		WOR				
					WOR	37			
					WOR				
2"	24	36		1.0	4	38			dark gray SILT, some very fine sand
SS	8		38-40		2				
					3	39			
					3				

Logged by: David Vankeuren Date: 01/09/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Jim Goldthwait

WELL SPECIFICATIONS

Diam. of Riser:	2 in.	Screen Interval:	45.5-54 5 ft bgs	Sandpack:	43-55 5 ft bgs	Grout:	41 ft bgs - grade
Bottom of Hole:	60 ft bgs	Riser Interval:	45 ft bgs - grade	Bentonite:	41-43 ft bgs	Cover:	4 in. steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 193772 E: 523318
Surface Elevation:	20.0 FT MSL
Well Riser Elevation	22.6 FT MSL

Job No 29600 97	Client. EFANE	Location: SITE 16 NCBC Davisville
Drilling Method. Mobil Drill B-61		Boring No. MW16-19D
drive and wash		
4 in. steel casing		
Sampling Method. 2" split spoon		Sheet 3 of 3
Drilling Water Level		Start 01/08/01 1100 / Drilling Date/Times / Finish 01/09/01 1700
Date		
Time		
Surface Conditions: woodland		

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 / 24		40-42	0	8 / 8	40		ML	0-12 in dark gray SILT, some very fine sand; 12-24 in : as above
					4 / 8	41			
2" SS	24 / 24	41	42-44	0	10 / 9	42			dark gray SILT, some very fine sand
					7 / 10	43			
2" SS	24 / 8		44-46	0	6 / 3	44			dark gray SILT, some very fine sand
					4 / 5	45			
2" SS	24 / 9		46-48	1 2	7 / 6	46		wth rx	0-8 in. dark gray SILT, very fine sand; 8-9 in : dark gray PHYLLITE fragments
					8 / 11	47			
2" SS	15 / 8		48-49.3	0.4	15 / 14	48			dark gray PHYLLITE fragments
					100/3	49			split spoon refusal
						50			
						51			
2" SS	0 / 0	49	52	NA	100/0	52			no recovery
						53			
2" SS	0 / 0	49	54	NA	100/0	54			
						55			cored 55-60 ft bgs
						56			
						57			
						58			
						59			bottom of boring at 60 ft

Logged by: David Vankeuren Date. 01/09/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Jim Goldthwait

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval.	45 5-54 5 ft bgs	Sandpack:	43-55.5 ft bgs	Grout:	41 ft bgs - grade
Bottom of Hole.	60 ft bgs	Riser Interval	45 ft bgs - grade	Bentonite	41-43 ft bgs	Cover	4 in. steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N 193772 E 523318
Surface Elevation	20 0 FT MSL
Well Riser Elevation	22 6 FT MSL

Job. No 29600.97.3201	Client: EFANE
Drilling Method: Mobil Drill B-61 drive and wash	
4 in. steel casing	
Core Barrel used: NX core	

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Location: Site 16, NCBC Davisville, North Kingstown, RI

Boring No. **MW16-19D**

Sheet 1 of 1

Drilling Times	
Start	Finish
01/11/01 1124	01/11/01 1225

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
					53					
					54					
							55-60 ft	1	12 00	56
98 3%	86%				55		4 ft 11 in. recovery			
							dark gray PHYLLITE with	2	12 00	57
					56		quartz veins, moderately fractured, low angled			
							trace mica	3	13 00	58
					57					
								4	10 00	59
					58					
								5	11:00	60
					59					
					60					
					61					
					62					
					63					
					64					
					65					
					66					
					67					
					68					
					69					
					70					
					71					

NOTES:

Logged by: David Vankeuren /Rob Wasserman

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Jim Goldthwait

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates.	N: 193964 E 523487
Surface Elevation:	17 8 FT MSL
Well Riser Elevation:	17.5 FT MSL

Job. No 29600 97	Client: EFANE	Location: SITE 16 NCBC Davisville
Drilling Method Mobile B-61 Drill Rig		Boring No. MW16-20D
Drive and wash		
Sampling Method 2" split spoon		Sheet 1 of 3
Drilling Water Level		Start 01/23/01 0845
Date		Drilling Date/Times
Time		Finish 01/24/01 1030
Surface Conditions: asphalt		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	18 / 14	0	0.5-2	0	--- / 24 / 22 / 14	0 / 1	FILL	0-6 in : asphalt Light brown medium to coarse SAND, dry
2" SS	24 / 13	0	2-4	0.1	12 / 12 / 11 / 10	2 / 3		Light brown medium to coarse SAND, little fine gravel, dry
2" SS	24 / 12	0	4-6	0	8 / 7 / 8 / 12	4 / 5	SP	0-6 in.: Light brown medium to coarse SAND, little fine gravel 6-12 in : Light brown medium SAND, dry
2" SS	24 / 16	0	6-8	0	11 / 10 / 17 / 13	6 / 7		0-6 in.: Grey very fine to fine SAND, trace silt 6-16 in : Tan to brown very fine to fine SAND, trace silt, little iron staining, moist
2" SS	24 / 12	0	8-10	0	13 / 14 / 13 / 20	8 / 9		Interbedded grey to tan fine SAND, trace silt, moist
2" SS	24 / 16	0	10-12	0	11 / 11 / 18 / 19	10 / 11		Interbedded grey to tan fine SAND, trace silt, little iron staining, moist to wet
2" SS	24 / 22	0	12-14	0	20 / 28 / 37 / 37	12 / 13	SM	0-18 in : Interbedded tan fine to medium SAND and grey very fine to fine SAND, little silt 18-22 in : Grey very fine to fine SAND, little silt, moist to wet
2" SS	24 / 20	14	14-16	0	27 / 27 / 18 / 22	14 / 15	SP/SM	Interbedded tan fine to medium SAND and grey very fine to fine SAND, some silt, iron staining between beds, moist to wet
2" SS	24 / 8	14	16-18	0	11 / 26 / 27 / 28	16 / 17	SP	0-6 in.: Dark grey very fine to fine SAND 6-8 in : Interbedded dark grey very fine to fine SAND and dark brown medium SAND, moist to wet
2" SS	24 / 16	18	18-20	0	25 / 23 / 16 / 9	18 / 19	SP/GP	0-7 in.: Brown fine to medium SAND, little fine gravel 7-16 in.: Dark grey very fine to coarse SAND and subangular GRAVEL, moist to wet

Logged by: James Gatherer Date: 01/24/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in	Screen Interval.	39 5-49 5 ft bgs	Sandpack:	37 5-50 ft bgs	Grout:	35 5 ft bgs - grade
Bottom of Hole:	57 ft bgs	Riser Interval:	39 5 ft bgs - grade	Bentonite:	35 5-37 5 ft bgs	Cover.	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates	N 193964 E 523487
Surface Elevation:	17.8 FT MSL
Well Riser Elevation:	17 5 FT MSL

Job No. 29600 97	Client EFANE	Location SITE 16 NCBC Davisville
Drilling Method Mobile B-61 Drill Rig		Boring No MW16-20D
Drive and wash		
Sampling Method 2" split spoon		Sheet 2 of 3
Drilling Water Level		Start 01/23/01 0845 / Drilling Date/Times / Finish 01/24/01 1030
Date		
Time		
Surface Conditions asphalt		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	24 13	18	20-22	0	15 17	20		0-10 in Dark grey very fine to coarse SAND and subangular GRAVEL, moist to wet
					12 11	21	SP/GP	10-13 in Dark brown coarse SAND and fine GRAVEL, wet
2" SS	24 22	18	22-24	0	10 15	22		Brown coarse SAND and fine to medium GRAVEL, wet
					28 44	23		
2" SS	24 12	18	24-26	0	10 10	24	SP	Dark grey to brown very fine to fine SAND, wet
					12 19	25		
2" SS	24 16	18	26-28	0	18 12	26	SP/GP	0-11 in Grey to brown coarse SAND and fine to medium GRAVEL, 1 in iron stained band
					15 21	27	SP	11-16 in.. Dark grey fine to medium SAND, trace silt, wet, firm
2" SS	24 14	28	28-30	0	20 17	28		0-6 in Brown to grey fine SAND 6-14 in Brown to grey very fine SAND, silt, wet
					17 20	29		
2" SS	24 16	28	30-32	0	23 24	30		0-10 in.: Brown to grey very fine SAND, silt 10-16 in . Brown to grey very fine to fine SAND, wet
					30 34	31		
2" SS	24 22	28	32-34	0	18 20	32	SP/GP	0-18 in.: brown to grey very fine to fine SAND 18-22 in . brown to grey coarse SAND and fine GRAVEL, heavy iron staining,
					40 55	33		wet
2" SS	24 12	28	34-36	0	7 11	34	SM	Brown to grey very fine to fine SAND, some silt, 1 in. iron stained band, wet
					14 13	35		
2" SS	24 15	28	36-38	0	19 28	36		Brown to grey very fine to fine SAND, some silt, wet
					26 19	37		
2" SS	24 8	38	38-40	---	10 8	38		Dark grey very fine SAND and SILT, trace clay, wet
					6 7	39		

Logged by: James Gatherer Date: 01/24/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS:

Diam of Riser.	2 in	Screen Interval.	39.5-49.5 ft bgs	Sandpack:	37 5-50 ft bgs	Grout:	35 5 ft bgs - grade
Bottom of Hole:	57 ft bgs	Riser Interval.	39 5 ft bgs - grade	Bentonite	35 5-37.5 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 193964 E: 523487
Surface Elevation:	17.8 FT MSL
Well Riser Elevation:	17.5 FT MSL

Job. No 29600 97	Client: EFANE	Location: SITE 16 NCBC Davisville
Drilling Method. Mobile B-61 Drill Rig		Boring No. MW16-20D
Drive and wash		
Sampling Method: 2" split spoon		Sheet 3 of 3
Drilling Water Level		Start 01/23/01 0845 / Drilling Date/Times / Finish 01/24/01 1030
Date		
Time		
Surface Conditions	asphalt	

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	24 / 9	38	40-42	0	5 / 8	40	SM	Dark grey very fine SAND and SILT, trace clay, wet
					7 / 6	41		
2" SS	24 / 11	38	42-44	0	8 / 10	42		Same as above
					14 / 20	43		
2" SS	24 / 17	44	44-46	0	36 / 45	44		Dark grey very fine SAND and SILT, little angular to subangular coarse gravel, wet
					65 / 100	45		
2" SS	5 / 2	44	46-46.4	0	100/5	46		Same as above
						47		
2" SS	10 / 8	47	48-48.8	0	62 / 100/4	48	wth rx	Dark grey fine to coarse SAND with weathered rock fragments, wet
						49		
						50		Rollerbit to 52 ft. bgs
						51		Cored 52-57 ft bgs
						52		
						53		
						54		
						55		
						56		
						57		
						58		
						59		

Logged by: James Gatherer Date: 01/24/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS:

Diam of Riser:	2 in.	Screen Interval:	39 5-49 5 ft bgs	Sandpack:	37.5-50 ft bgs	Grout:	35 5 ft bgs - grade
Bottom of Hole:	57 ft bgs	Riser Interval:	39.5 ft bgs - grade	Bentonite:	35.5-37.5 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates.	N: 193964 E: 523487
Surface Elevation:	17 8 FT MSL
Well Riser Elevation:	17.5 FT MSL

Job No 29600.97.3201	Client. EFANE	Location. Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method: Mobile B-61 Drill Rig		Boring No.
Drive and wash		**MW16-20D**
Core Barrel used. NX		Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	
See packer test log if applicable		

Drilling Times	
Start	Finish
01/24/01 0945	01/24/01 1020

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min sec)	Total Depth (ft bgs)
100%	93%				25		Total core length: 5 ft.			
					26		Light grey to grey fine grained quartzite, several low angle fractures with silt deposits on exposed	1	6 50	53
					27		surfaces. Core grades to a mix of quartzite and dark grey phyllite from 1.7 to 2.4 ft. with	2	6:25	54
					28		several mid to high angle fractures. Low angle fractures at 1, 7, 12.5, 23, 27, 34.5, 38.5, 43, 47	3	7:00	55
					29		and 54 in. Fractures at 45° from 23-25 in.	4	6:50	56
					30			5	6:00	57
					31					
					32					
					33					
					34					
					35					
					36					
					37					
					38					
					39					
					40					
					41					
					42					
					43					

NOTES:

Logged by: James Gatherer/Tom Biolsi

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Brad Haase

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 193916 E: 523072
Surface Elevation:	22 5 FT MSL
Well Riser Elevation:	22.2 FT MSL

Job. No. 29600 97	Client: EFANE	Location: SITE 16 NCBC Davisville
Drilling Method Mobile Drill B-61		Boring No. MW16-21D
4 in. casing drive and wash		
Sampling Method: 2" split spoon		Sheet 1 of 4

Drilling Water Level			Start	Drilling Date/Times	Finish
Date			01/04/01		01/09/01
Time			1410		0955

Surface Conditions: asphalt

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2"	18	0		0	-	0		FILL	0-6 in.. no sample, drilled through asphalt
SS	11		6"-2'		142				gray to brown medium SAND, trace to little fine and
					69	1			coarse sand, trace asphalt
					21				
2"	24	0		0	19	2		SP	0-6 in.: gray fine SAND, trace mica, trace medium
SS	12		2-4		21				sand, laminated
					17	3			6-12 in . brown to dark brown fine SAND, little very fine
					16				sand, trace silt and organic
2"	24	0		0	5	4			brown fine SAND, little very fine sand, trace silt and fine
SS	12		4-6		5				to medium subangular gravel
					4	5			
					4				
2"	24	0		0	7	6		SP	brown to gray fine to medium SAND, trace coarse sand
SS	13		6-8		10				trace fine gravel
					10	7			
					12				
2"	24	0		0	6	8			0-5 in.: same as above
SS	12		8-10		6			SM	5-7 in.: dark gray to black/brown SILTY SAND (very fine sand
					9	9		SP	some silt), trace coarse gravel and coarse sand
					9				7-12 in.: brown to gray fine to medium SAND, trace coarse sand
2"	24	0		0	10	10			0-4 in.: brown to gray fine to medium SAND
SS	8		10-12		17				4-8 in.: brown to dark brown medium SAND, trace to little
					12	11			subrounded coarse to fine gravel, wet at 11 ft
					14				
2"	24	0		0	8	12			brown medium SAND, trace to little subrounded coarse
SS	3		12-14		9				to fine gravel, wet, loose
					12	13			
					19				
2"	24	14		0	5	14			brown fine SAND, trace very fine sand, grading into
SS	6		14-16		6				a silty sand (very fine sand, some silt), trace fine sand
					8	15		SM	
					10				
2"	24	14		0	7	16		SP	0-6 in : brown fine to medium SAND, trace gravel (medium
SS	12		16-18		11				to fine, subrounded) little to some gravel near base.
					11	17			6-10 in.: brown fine to very fine SAND, trace silt
					17			SM	10-12 in.: brown to dark gray SILTY SAND, distinct laminations at base
2"	24	18		0	10	18			brown to olive medium SAND, trace to little fine sand,
SS	7		18-20		9				trace subrounded coarse to fine gravel.
					14	19			
					17				

Logged by: Rob Wasserman Date: 01/09/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in	Screen Interval:	51-61 ft bgs	Sandpack:	49-61 5 ft bgs	Grout:	46 ft bgs - grade
Bottom of Hole:	70 ft bgs	Riser Interval:	51 ft bgs - grade	Bentonite.	46-49 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates	N 193916 E: 523072
Surface Elevation	22 5 FT MSL
Well Riser Elevation:	22.2 FT MSL

Job No 29600 97	Client EFANE	Location SITE 16 NCBC Davisville
Drilling Method Mobile Drill B-61		Boring No MW16-21D
4 in casing drive and wash		
0		
Sampling Method: 2" split spoon		Sheet 2 of 4
Drilling Water Level		Start 01/04/01 1410 / Drilling Date/Times / Finish 01/09/01 0955
Date		
Time		
Surface Conditions: asphalt		

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 14	18	20-22	0	15 15	20		SP	0-6 in dark gray to brown medium SAND, little coarse to fine subrounded gravel
					16 10	21			6-14 in dark gray to brown fine to very fine SAND, trace silt, little iron oxide staining
2" SS	24 18	18	22-24	0	15 17	22			0-4 in dark gray to brown medium to fine SAND, trace subangular coarse gravel
					12 16	23			4-18 in dark gray to brown fine to very fine SAND, trace silt, some iron oxide staining
2" SS	24 4	24	24-26	1 1	8 9	24			same as above
					11 10	25			
2" SS	24 13	24	26-28	1 0	10 10	26			same as above
					12 12	27			
2" SS	24 6	28	28-30	1.8	8 6	28		ML SP	0-3 in dark gray SANDY SILT (silt, some very fine sand)
					7 9	29			3-6 in : dark gray very fine to fine SAND, trace silt
2" SS	24 8	28	30-32	3.5	8 8	30			gray to dark gray very fine SAND, trace to little silt,
					9 12	31			
2" SS	24 8	34	32-34	4 2	9 10	32			same as above, with distinct 1/4 in. silt and clay lenses at 5 in.
					15 18	33			
2" SS	24 4	34	34-36	4 3	9 10	34			gray very fine SAND, trace silt and fine sand, loose
					10 12	35			
2" SS	24 9	38	36-38	4.2	9 9	36		ML	0-6 in.: same as above 6-9 in.: gray to dark gray SANDY SILT (silt, some very fine sand)
					10 10	37			
2" SS	24 12		38-40	3.1	7 12	38		CL ML	0-3 in : gray SILTY CLAY 3-9 in.: gray SANDY SILT (silt, some very fine sand)
					15 15	39		SP	9-12 in.. gray very fine to fine SAND

Logged by: Rob Wasserman Date: 01/09/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval.	51-61 ft bgs	Sandpack:	49-61 5 ft bgs	Grout:	46 ft bgs - grade
Bottom of Hole:	70 ft bgs	Riser Interval:	51 ft bgs - grade	Bentonite:	46-49 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N. 193916 E: 523072
Surface Elevation.	22 5 FT MSL
Well Riser Elevation:	22.2 FT MSL

Job. No 29600 97	Client: EFANE	Location: SITE 16 NCBC Davisville
Drilling Method: Mobile Drill B-61		Boring No. MW16-21D
4 in casing drive and wash		
0		
Sampling Method 2" split spoon		Sheet 3 of 4
Drilling Water Level		Start 01/04/01 1410 / Drilling Date/Times / Finish 01/09/01 0955
Date		
Time		
Surface Conditions: asphalt		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2"	24	38		4.5	25	40		SP	gray very fine SAND, trace silt
SS	12		40-42		22				
					30	41			
					32				
2"	24	38		2 8	15	42			gray very fine SAND, trace silt , iron oxide
SS	18		42-44		25				staining from 0-5 in , trace fine gravel from 5-18 in ,
					20	43			with distinct fine gravel lenses at 9 in., 1/4 in. thick
					39				
2"	24	44		1.6	19	44			0-3 in.: gray very fine SAND, trace silt
SS	12		44-46		20				3-10 in : Gray fine SAND, trace very fine sand, iron oxide staining
					22	45			throughout, trace medium sand
					20				10-12 in.: gray fine to very fine SAND, trace silt,
2"	24	44		1.2	9	46		SP	gray very fine to medium SAND, little coarse to fine
SS	13		46-48		12				subangular to subrounded gravel
					23	47			
					54				
2"	24	48		0.8	56	48			gray fine to very fine SAND, trace medium sand, little
SS	14		48-50		54				to some coarse to fine subangular to angular gravel, iron
					66	49			oxide staining from 0-5 in.
					84				
2"	12	48		2.4	77	50		SP	gray fine to very fine SAND, trace medium sand and silt
SS	5		50-51		100/6				trace to little coarse to medium subrounded gravel, trace
					-	51			iron oxide staining from 0-3 in.
					-				from 3-5 in (till), rollerbit to 52 ft
2"	18	48		2.9	23	52			gray fine SAND, trace medium sand, little to some coarse
SS	7		52-53 5		44				to fine subangular to subrounded gravel
					100/6	53			
					-				
2"	18	54		3.3	98	54			gray fine SAND, trace to little very fine sand, little medium
SS	11		54-55.5		84				to fine subrounded gravel
					100/6	55			rollerbit to 56 ft
					-				
2"	10	54		0.6	79	56			same as above with angular to subangular gravel
SS	9		56-56.8		100/4				
					-	57			
					-				
2"	12	58		2.6	47	58			gray very fine to fine SAND, trace silt, trace angular
SS	8		58-59		100/6				coarse gravel, trace course sand
						59			rollerbit to 60 ft

Logged by: Rob Wasserman Date: 01/09/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam of Riser:	2 in.	Screen Interval:	51-61 ft bgs	Sandpack:	49-61 5 ft bgs	Grout:	46 ft bgs - grade
Bottom of Hole:	70 ft bgs	Riser Interval.	51 ft bgs - grade	Bentonite:	46-49 ft bgs	Cover.	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates.	N 193916 E 523072
Surface Elevation:	22.5 FT MSL
Well Riser Elevation.	22 2 FT MSL

Job No 29600 97	Client EFANE	Location: SITE 16 NCBC Davisville
Drilling Method Mobile Drill B-61		Boring No MW16-21D
4 in. casing drive and wash		
0		
Sampling Method. 2" split spoon		Sheet 4 of 4
Drilling Water Level		Start 01/04/01 1410 / Drilling Date/Times / Finish 01/09/01 0955
Date		
Time		
Surface Conditions asphalt		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	10 6	58	60-60 8	2 3	47 100/4	60		SP	same as above
					- -	61			refusal at 60 8 ft
						62			rollerbit to 65 ft
						63			
						64			
						65			cored from 65 to 70 ft
						66			
						67			
						68			
						69			
						70			bottom of boring
						71			
						72			
						73			
						74			
						75			
						76			
						77			
						78			
						79			

Logged by: Rob Wasserman Date. 01/09/01

Drilling Contractor Subsurface Drilling and Remediation Driller Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser.	2 in.	Screen Interval:	51-61 ft bgs	Sandpack:	49-61.5 ft bgs	Grout:	46 ft bgs - grade
Bottom of Hole:	70 ft bgs	Riser Interval.	51 ft bgs - grade	Bentonite:	46-49 ft bgs	Cover	road box

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 193916 E: 523072
Surface Elevation:	22.5 FT MSL
Well Riser Elevation	22.2 FT MSL

Job. No. 29600.97.3201	Client: EFANE	Location: Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method: Mobile Drill B-61 4 in. casing drive and wash		Boring No. **MW16-21D**
Core Barrel used: NX core		Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	
Start	Finish
12/12/00 1200	12/12/00 1200

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG Core run Length (ft)	Drill Time/ft (min sec)	Total Depth (ft bgs)
					63					
					64					
98 3%	87%				65		Medium to light grey quartzite with white veins throughout. Low angle fractures at 5 5, 7, 10, 14, 16.5, 22, 25, 26, 27, 29, 34.5, 41.5, 47, 49 and 53 in. Iron staining at 26 in	1	9:00	66
					66			2	7:30	67
					67			3	7:30	68
					68			4	7:30	69
					69			5	9:00	70
					70					
					71					
					72					
					73					
					74					
					75					
					76					
					77					
					78					
					79					
					80					
					81					

NOTES:

Logged by: Robin Clark

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job No 29600.97	Client. EFANE	Location:	SITE 16 NCBC Davisville
Drilling Method B-61 Mobil Drill Rig		Boring No.	MW16-22D
Drive and wash			
Sampling Method 2" split spoon		Sheet 1 of 4	
Drilling Water Level		Start 01/15/01 1030	Drilling Date/Times	Finish 01/16/01 1300
Date			
Time			
Surface Conditions: asphalt			

Coordinates: N 193984 E 522941
Surface Elevation: 30.0 FT MSL
Well Riser Elevation: 29.7 FT MSL

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2"	18	0		0	---	0			0-6 in.: asphalt
SS	12		0.5-2		18			FILL	Dark brown very fine to fine SAND and SILT, rounded pebbles, dry
					18	1			
					20				
2"	9	0		0	23	2			0-3 in.: Light brown very fine to fine SAND and SILT, rounded pebbles
SS	6		2-4		100/3				3-6 in.: Dark brown very fine to fine SAND and SILT, rounded pebbles,
						3			dry
									Spoon/casing refusal, move boring
2"	0	4		0.0	100/0	4			No recovery
SS	0		4-5						
2"	24	5		0 4	32	5		FILL	0-3 in.: Rock fragments, dry
SS	15		5-7		15				3-15 in.. Very dark brown fine SAND, some srounded pebbles, dry
					9	6			
					7				
2"	24	5		0	55	7			0-8 in.: Dark brown fine to coarse SAND, 1 in angular gravel
SS	16		7-9		17				8-16 in.: Light brown very fine to fine SAND, rounded pebbles, dry
					19	8			
					32				
2"	24	0		0	98	9			0-3 in.: Light grey to brown very fine to fine SAND
SS	18		9-11		18				3-12 in.: Dark grey to brown poorly sorted fine to coarse SAND, silt,
					27	10			subangular gravel
					23				12-18 in.: Dark brown coarse SAND and fine GRAVEL, dry
2"	24	0		0	26	11		FILL	0-9 in.: Dark grey fine to coarse SAND, silt and subangular gravel,
SS	23		11-13		23			ML	9-12 in : Dark grey SILT, subangular gravel
					19	12		SP	12-20 in.: Brown medium to coarse SAND
					32				20-23 in.: Brown fine SAND, dry
2"	24	13		0	11	13		SM	Brown fine to coarse SAND and SILT, little subangular gravel,
SS	6		13-15		18				moist
					15	14			
					15				
2"	24	13		0	10	15		SP/GP	Dark brown medium to coarse SAND and fine subangular GRAVEL, wet
SS	10		15-17		13				
					15	16			
					18				
2"	24	13		0	15	17		SP	Brown fine to medium SAND, trace silt, little subangular gravel, wet
SS	12		17-19		17				
					21	18			
					26				
2"	24	19		0	11	19			Brown fine SAND, trace silt, moist
SS	8		19-21		11				

Logged by: James Gatherer Date: 01/16/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thomsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in	Screen Interval:	52-62 ft bgs	Sandpack:	50-62 5 ft bgs	Grout:	46 ft bgs - grade
Bottom of Hole:	71 ft bgs	Riser Interval:	52 ft bgs - grade	Bentonite:	46-50 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates	N. 193984 E. 522941
Surface Elevation	30.0 FT MSL
Well Riser Elevation.	29 7 FT MSL

Job. No 29600 97	Client EFANE	Location SITE 16 NCBC Davisville
Drilling Method B-61 Mobil Drill Rig		Boring No MW16-22D
Drive and wash		
Sampling Method 2" split spoon		Sheet 2 of 4
Drilling Water Level		Start 01/15/01 1030
Date		Drilling Date/Times
Time		Finish 01/16/01 1300
Surface Conditions asphalt		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
					8	20		SP	
					11				
2"	24	19		0	8	21			0-6 in Brown fine SAND, trace silt
SS	12		21-23		12			SP/GP	6-12 in Coarse SAND and GRAVEL, trace silt, wet\
					15	22			
					18				
2"	24	23		0	10	23		SP	0-6 in . Brown fine to medium SAND, little rounded pebbles
SS	11		23-25		12			ML	6-7 in · Dark grey SILT, trace clay
					11	24		SP/GP	7-11 in Brown coarse SAND and fine GRAVEL, iron staining at top,
					12				wet
2"	24	23		0	10	25		SP	0-6 in : Brown to grey fine to medium SAND
SS	10		25-27		15			SP/GP	6-9 in Brown coarse SAND and fine GRAVEL
					17	26		SP	9-10 in · Brown to grey very fine SAND, wet
					14				
2"	24	23		0.5	12	27			Brown fine SAND, wet
SS	14		27-29		15				
					18	28			
					21				
2"	24	29		0	15	29			Brown fine to medium SAND, wet
SS	12		29-31		17				
					18	30			
					18				
2"	24	29		0	14	31			0-10 in Dark grey fine to medium SAND
SS	18		31-33		21				10-18 in.: Brown fine SAND, 1 in dark red iron staining, wet
					22	32			
					18				
2"	24	33		0	11	33			Dark grey fine SAND, iron staining 7-8 in., wet
SS	14		33-35		12				
					16	34			
					19				
2"	24	33		0	12	35			0-3 in · Dark grey to brown fine SAND
SS	15		35-37		18				3-9 in.: red to brown fine SAND
					18	36			9-15 in.: Dark grey fine SAND, trace clay, finely laminated, wet
					19				
2"	24	33		0	18	37			Dark grey fine SAND, trace clay, finely laminated, wet
SS	13		37-39		26				
					37	38			
					31				
2"	24	39		0	8	39			Same as above
SS	15		39-41		9				

Logged by: James Gatherer Date: 01/16/01

Drilling Contractor: Subsurface Drilling and Remediation Driller. Phil Thornsbury

WELL SPECIFICATIONS:

Diam of Riser	2 in.	Screen Interval	52-62 ft bgs	Sandpack.	50-62.5 ft bgs	Grout:	46 ft bgs - grade
Bottom of Hole:	71 ft bgs	Riser Interval:	52 ft bgs - grade	Bentonite:	46-50 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job. No	29600.97
Client:	EFANE
Location.	SITE 16 NCBC Davisville
Drilling Method	B-61 Mobil Drill Rig
Drive and wash	
Boring No	MW16-22D
Sampling Method	2" split spoon
Sheet	3 of 4
Coordinates:	N: 193984 E 522941
Surface Elevation:	30.0 FT MSL
Well Riser Elevation:	29.7 FT MSL
Drilling Water Level	
Date	
Time	
Surface Conditions:	asphalt
Start	01/15/01 1030
Drilling Date/Times	
Finish	01/16/01 1300

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
					19	40	SP	
					18			
2" SS	24 17	39	41-43	0	8	41		Dark grey fine SAND, trace clay, laminated, wet
					15			
					12	42		
					12			
2" SS	24 15	39	43-45	2.1	5	43	ML	Dark grey SILT, little very fine sand, trace clay, moist
					8			
					10	44		
					14			
2" SS	24 15	39	45-47	3 2	8	45		Dark grey SILT, very fine sand, trace clay, moist
					12			
					16	46		
					16			
2" SS	24 13	39	47-49	2.0	16	47	SP/ML	Brown very fine interbedded (1/4 in) SAND and dark grey SANDY SILT,
					17			wet
					15	48		
					29			
2" SS	24 10	49	49-51	0	6	49	SM	Dark brown to grey fine to medium SAND, some silt, iron staining, wet
					11			
					21	50		
					35			
2" SS	24 0	49		NA	7	51		No recovery
					17			
					19	52		
					25			
2" SS	24 17	49	53-55	0.7	19	53	SP	0-11 Dark brown to grey fine to medium SAND, iron staining from 0-4 in.
					31		SP/GP	11-17 in.: Brown coarse SAND and fine GRAVEL, iron staining, wet
					35	54		
					41			
2" SS	24 24	49	55-57	1.9	31	55	SP	0-10 in.: Dark brown to grey fine SAND
					39		SP/GP	10-20 in : Dark brown coarse SAND and fine GRAVEL, iron staining at base,
					26	56		wet
					31		ML	20-24 in.. Dark grey SILT, little sand and fine gravel, moist
2" SS	24 12	49	57-59	3.0	26	57	SP/SM	Dark grey fine to medium SAND, silt, fine to coarse gravel, angular phyllite
					38			fragments, wet
					21	58		
					29			
3" SS	24 17	59	59-61	1 6	21	59		Same as above
					26			Sample submitted for laboratory analysis

Logged by: James Gatherer Date: 01/16/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser	2 in	Screen Interval:	52-62 ft bgs	Sandpack:	50-62.5 ft bgs	Grout:	46 ft bgs - grade
Bottom of Hole:	71 ft bgs	Riser Interval.	52 ft bgs - grade	Bentonite	46-50 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N. 193984 E 522941
Surface Elevation:	30 0 FT MSL
Well Riser Elevation	29.7 FT MSL

Job No 29600 97	Client. EFANE	Location: SITE 16 NCBC Davisville
Drilling Method B-61 Mobil Drill Rig		Boring No MW16-22D
Drive and wash		
Sampling Method 2" split spoon		Sheet 4 of 4
Drilling Water Level		Start 01/15/01 1030 / Drilling Date/Times / Finish 01/16/01 1300
Date		
Time		
Surface Conditions asphalt		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
					34	60	SP/SM	
					40			
2"	12	59		2 8	29	61		Dark grey fine to medium SAND, silt, fine to coarse gravel, angular phyllite
SS	11		61-62		30			fragments, wet
					100/0	62		
						63		Rollerbit to 66 ft. bgs
						64		Cored 66-71 ft bgs
						65		
						66		
						67		
						68		
						69		
						70		
						71		
						72		
						73		
						74		
						75		
						76		
						77		
						78		
						79		

Logged by: James Gatherer Date. 01/16/01

Drilling Contractor: Subsurface Drilling and Remediation Driller. Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser.	2 in.	Screen Interval	52-62 ft bgs	Sandpack.	50-62.5 ft bgs	Grout	46 ft bgs - grade
Bottom of Hole:	71 ft bgs	Riser Interval	52 ft bgs - grade	Bentonite.	46-50 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates.	N. 193984 E: 522941
Surface Elevation:	30.0 FT MSL
Well Riser Elevation.	29.7 FT MSL

Job. No. 29600.97.3201	Client: EFANE	Location. Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method B-61 Mobil Drill Rig		Boring No. **MW16-22D**
Core Barrel used: NX Core		Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	
Start	Finish
01/16/01 1117	01/16/01 1244

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min sec)	Total Depth (ft bgs)
99.1%	40%				66		Dark grey PHYLLITE, thin			
					67		quartz veins along fractures. Fractures mostly	1	6.00	67
							low angled (0-15°) some high angled (60-90°),			
					68		little graphite, iron staining along fracture planes,	2	8 00	68
							especially in highly fractured interval (68.5-70 ft)			
					69			3	6:00	69
					70			4	7:00	70
					71			5	7:00	71
					72					
					73					
					74					
					75					
					76					
					77					
					78					
					79					
					80					
					81					
					82					
					83					
					84					

NOTES:

Logged by: James Gatherer

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job. No 29600 97	Client EFANE	Location:	SITE 16 NCBC Davisville
Drilling Method Mobile Drill B-61		Boring No	MW16-23D
Hollow Stem/drive and wash			
Sampling Method. 2" or 3" split spoon		Sheet 1 of 4	
Drilling Water Level		Start 01/09/01 1155	Drilling Date/Times
Date			Finish 01/12/01 1020
Time			
Surface Conditions Asphalt			

Coordinates: N: 194017 E: 523094
Surface Elevation: 25 5 FT MSL
Well Riser Elevation: 25 3 FT MSL

Sample Type	Inches Driven/In. Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	18 6	0	1 6"-2'	0	- 14	0		FILL	0-6in.. No sample, drilled through asphalt 0-6 in : Brown fine SAND, trace very fine sand and
					17 13	1			mica, dry, trace subangular coarse gravel
2" SS	24 12	0	2 2-4	0	15 14	2		SP	brown to gray fine SAND trace very fine sand, trace subrounded coarse gravel, dry
					14 12	3			
2" SS	24 14	0	3 4-6	0	4 5	4			brown fine to medium SAND trace very fine sand, trace to little subangular to subrounded medium to fine
					9 11	5			gravel, dry
2" SS	24 14	0	4 6-8	0	12 11	6			same as above, with subangular to angular coarse gravel.
					12 12	7			
2" SS	24 12	0	5 8-10	0	9 9	8			same as above
					9 8	9			
2" SS	24 13	0	6 10-12	0	11 11	10			same as above
					13 11	11			
2" SS	24 12	0	7 12-14	0	11 5	12			0-8 in : same as above with trace subrounded to subangular coarse gravel, moist from 6-8 i8n.
					8 15	13		ML	8-12 in.. dark gray to black organic SILT trace to little very fine sand, some organics, trace to little iron oxide staining, wet, dense.
2" SS	24 20	0	8 14-16	0	wor wor	14		SP	olive fine SAND, trace to little medium sand, trace iron oxide staining, moist
					2 3	15			
2" SS	24 16	0	9 16-18	0	5 20	16		SP	olive brown fine to coarse SAND, little to some coase to fine subangular to subrounded gravel, trace to little
					15 16	17			very fine sand in lower 6 in., moist TO wet. begin drive and wash.
2" SS	24 8	18	10 18-20	0	17 21	18		SP	gray to dark gray very fine SAND, trace fine sand little to some coarse to medium subangular gravel.
					60 16	19			

Logged by: Rob Wasserman Date 01/09/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS.

Diam. of Riser	2 in.	Screen Interval:	50-65 ft bgs	Sandpack.	48-65 5 ft bgs	Grout:	45 ft bgs - grade
Bottom of Hole:	65 5 ft bgs	Riser Interval	50 ft bgs - grade	Bentonite:	45-48 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 194017 E. 523094
Surface Elevation	25 5 FT MSL
Well Riser Elevation.	25 3 FT MSL

Job No 29600 97	Client EFANE	Location SITE 16 NCBC Davisville
Drilling Method Mobile Drill B-61		Boring No MW16-23D
Hollow Stem/drive and wash		
Sampling Method 2" or 3" split spoon		Sheet 2 of 4
Drilling Water Level		Start 01/09/01 1155
Date		Drilling Date/Times
Time		Finish 01/12/01 1020
Surface Conditions Asphalt		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 5	18	11 20-22	0	10 7	20		SP	Brown to olive fine SAND, trace to little medium sand thin very fine silt laminations in upper 2 in
					9 10	21			
2" SS	24 8	18	12 22-24	0 2	6 10	22			0-2 in brown to olive medium to fine SAND, trace very fine sand 2-8 in brown to olive very fine to fine SAND,
					14 14	23			few thin iron oxide stained bands
2" SS	24 3	24	13 24-26	0	4 5	24			brown to olive very fine to fine SAND, trace fine rounded to subrounded gravel
					5 9	25			
2" SS	24 4	24	14 26-28	0	8 16	26			Brown to gray fine to very fine SAND, trace silt and mica
					13 16	27			
2" SS	24 5	28	15 28-30	0	8 9	28			same as above
					10 11	29			
2" SS	24 17	28	16 30-32	0	11 16	30			same as above
					18 14	31			
2" SS	24 9	28	17 32-34	0 2	15 19	32			same as above, with few thin very fine sand laminations in upper 6 in
					20 24	33			
2" SS	24 6	34	18 34-36	0	14 14	34			same as above, trace iron oxide staining.
					20 23	35			
2" SS	24 14	34	19 36-38	0	17 25	36			Dark gray to dark brown very fine SAND, trace silt distinct silt lenses at base
					24 23	37			
2" SS	24 12	38	20 38-40	0	7 11	38		ML	0-10 in.: dark gray very fine SAND, trace silt 10-12 in . dark gray SANDY SILT (silt with very fine sand)
					11 14	39			

Logged by Rob Wasserman Date. 01/09/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS

Diam of Riser	2 in	Screen Interval.	50-65 ft bgs	Sandpack	48-65 5 ft bgs	Grout:	45 ft bgs - grade
Bottom of Hole	65 5 ft bgs	Riser Interval	50 ft bgs - grade	Bentonite:	45-48 ft bgs	Cover.	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job. No	29600 97
Client.	EFANE
Location:	SITE 16 NCBC Davisville
Drilling Method:	Mobile Drill B-61
	Hollow Stem/drive and wash
Boring No	MW16-23D
Sampling Method:	2" or 3" split spoon
Sheet	3 of 4
Coordinates:	N: 194017 E 523094
Surface Elevation	25.5 FT MSL
Well Riser Elevation	25 3 FT MSL
Drilling Water Level	
Date	
Time	
Start	01/09/01 1155
Drilling Date/Times	
Finish	01/12/01 1020
Surface Conditions:	Asphalt

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	24 12	38	21 40-42	0	14 16	40	SP	Dark gray very fine SAND, trace to little silt, few distinct silt laminations throughout
					18 23	41		
2" SS	24 24	38	22 42-44	3 1 7	15 18	42		0-20in.: dark gray fine to very fine SAND, trace silt,
					27 21	43	SM	20-24 in : dark gray SILTY SAND (very fine sand with some silt)
3" SS	24 21	44	23 44-46	2.9	14 20	44	ML	dark gray SANDY SILT (silt with some very fine sand),
					21 24	45		
2" SS	24 13	44	24 46-48	12.8	9 14	46	SP/SM	dark gray very fine SAND, trace to little silt
					20 23	47		
2" SS	24 7	48	25 48-50	16 5	14 28	48		same as above
					24 20	49		
2" SS	24 13	48	26 50-52	22.4	20 28	50		same as above, with trace subrounded coarse gravel at base
					34 23	51		
2" SS	24 17	48	27 52-54	24.2	33 33	52	SP	dark gray fine to very fine SAND, trace silt
					41 55	53		
3" SS	24 15	54	28 54-56	-	23 39	54		0-6 in : dark gray to gray very fine to fine SAND, trace silt 6-10 in.: dark gray to orange to brown very fine to fine SAND, all iron oxide
					43 39	55		stained, trace silt 10-12 in.: gray very fine to fine SAND, trace silt. Sample submitted for laboratory analysis
2" SS	24 12	54	29 56-58	1.1	24 28	56		Gray to brown fine SAND, trace very fine sand, trace to little iron oxide staining througout, little coarse sand and
					31 34	57		fine rounded gravel from 10-12 in.
2" SS	24 13	56	30 58-60	12.3	33 34	58		Gray fine SAND, trace to little very fine sand, iron oxide staining (some) from 0-4 in , trace coarse subrounded
					35 47	59		to angular gravel from 9-13 in.

Logged by: Rob Wasserman Date: 01/09/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam of Riser:	2 in	Screen Interval:	50-65 ft bgs	Sandpack:	48-65 5 ft bgs	Grout.	45 ft bgs - grade
Bottom of Hole:	65 5 ft bgs	Riser Interval	50 ft bgs - grade	Bentonite.	45-48 ft bgs	Cover.	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 194017 E. 523094
Surface Elevation	25 5 FT MSL
Well Riser Elevation	25 3 FT MSL

Job No 29600 97	Client EFANE	Location: SITE 16 NCBC Davisville
Drilling Method Mobile Drill B-61 Hollow Stem/drive and wash		Boring No MW16-23D
Sampling Method 2" or 3" split spoon		Sheet 4 of 4
Drilling Water Level		
Date		
Time		
Surface Conditions Asphalt		

Start	Drilling Date/Times	Finish
01/09/01 1155		01/12/01 1020

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	12 7	58	31 60-61	6 4	60 100	60	WTHR RX	0-4 in gray fine SAND, trace to little medium sand; 4-7 in gray to dark gray weathered PHYLLITE,
						61		rollerbit to 62 ft
2" SS	24 7	62	32 62-64	5 2	50 59 60 54	62 63		dark gray medium and fine SAND, trace very fine sand, little to some coarse angular gravel (weathered phyllite), trace iron oxide staining
3" SS	11 10	62	33 64-64 9	-	47 200/5	64		dark gray coarse to fine SAND, some coarse to fine subangular to subrounded gravel
					- -	65		rollerbit to 69 ft
2" SS	0 0	66	34	-	160/0	66		
						67		
						68		
						69		cored from 69-74 ft
						70		
						71		
						72		
						73		
						74		bottom of boring
						75		
						76		
						77		
						78		
						79		

Logged by: Rob Wasserman Date 01/09/01

Drilling Contractor: Subsurface Drilling and Remediation Driller Phil Thornsbury

WELL SPECIFICATIONS:

Diam of Riser.	2 in	Screen Interval	50-65 ft bgs	Sandpack	48-65.5 ft bgs	Grout.	45 ft bgs - grade
Bottom of Hole	65 5 ft bgs	Riser Interval	50 ft bgs - grade	Bentonite	45-48 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194017 E: 523094
Surface Elevation:	25.5 FT MSL
Well Riser Elevation:	25.3 FT MSL

Job. No. 29600.97.3201	Client: EFANE	Location: Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method: Drive and Wash, Mobile Drill B-61		Boring No **MW16-23D**
Core Barrel used: NX Core		Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	Start	Finish
	01/11/01 0852	01/11/01 0932

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
					67					
					68					
97.5%	45%				69		core length = 4 ft 10.5 in. Light gray very fine	1	8:00	70
					70		grained QUARTZITE, slightly schistose/phyllite, grading into a gray to dark gray PHYLLITE	1	8:30	71
					71		grade occurs at approximately 71 ft bgs. Highly fractured, low to moderate angled	1	8.00	72
					72		iron oxide staining in fractures, few thick quartz Low angle fractures at 5 5, 7, 10, 14, 16.5, 22, 25,	1	7:30	73
					73		26, 27, 29, 34 5, 4 5, 47, 49, and 53 in. Iron staining from 39-50 in.	1	7:30	74
					74					
					75					
					76					
					77					
					78					
					79					
					80					
					81					
					82					
					83					
					84					
					85					

NOTES:

Logged by: Rob Wasserman/Robin Clark

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N 194037 E. 523252
Surface Elevation	21.2 FT MSL
Well Riser Elevation.	20.9 FT MSL

Job No. 29600 97	Client EFANE	Location: SITE 16 NCBC Davisville
Drilling Method: B-61 Mobil Drill Rig		Boring No. MW16-24D
4 in. casing Drive and wash		
Sampling Method: 2" split spoon		Sheet 1 of 4
Drilling Water Level		
Date		
Time		
Surface Conditions. asphalt		

Start	Drilling Date/Times	Finish
01/18/01 0950		01/22/01 1415

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 18	0	1 0-2	0	19 17	0		FILL	Brown medium to fine SAND, well sorted, dry to moist (fill)
					20 20	1			
2" SS	24 14	0	2 2-4	0	12 16	2		FILL	Brown to grey to black coarse to fine SAND, little fine subangular gravel, dry two subrounded cobbles (4"x5") removed from hole (fill)
					16 23	3			
2" SS	24 20	4	3 4-6	0	7 8	4			Same as above, trace medium subangular gravel, trace shell fragments, dry (fill)
					10 11	5			
2" SS	24 18	4	4 6-8	0	10 9	6			Same as above, no shell fragments, dry to slightly moist
					10 7	7			
2" SS	24 14	8	5 8-10	0	5 5	8		SP	Brown coarse to fine SAND, fairly well sorted, wet
					5 10	9			
2" SS	24 10	8	6 10-12	1.2	5 4	10			Same as above
					6 4	11			
2" SS	24 18	12	7 12-14	0	2 2	12			Black to dark grey medium to fine SAND, some organics, especially from 2 to 8 in wet, black organic sandy silt in bottom of spoon
					5 5	13		ML	
2" SS	24 10	12	8 14-16	0 3	2 3	14			Black to dark grey SANDY SILT, some organics, wet
					8 5	15			
2" SS	24 10	12	9 16-18	0	2 2	16		SP/GP	Black to dark grey coarse to fine SAND and medium to fine subrounded to subangular GRAVEL, wet
					6 8	17			
2" SS	24 18	18	10 18-20	0	21 31	18			Black to dark grey (0-9 in.) and orange brown (9-18 in.) coarse to fine SAND and medium to fine subangular GRAVEL, wet
					25 18	19			

Logged by: Tom Biolsi Date: 01/22/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Mike Legare

WELL SPECIFICATIONS.

Diam. of Riser.	2 in.	Screen Interval.	50-62 ft bgs	Sandpack:	48-62 5 ft bgs	Grout:	46 ft bgs - grade
Bottom of Hole.	70 ft bgs	Riser Interval:	50 ft bgs - grade	Bentonite:	46-48 ft bgs	Cover	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N: 194037 E: 523252
Surface Elevation.	21 2 FT MSL
Well Riser Elevation	20 9 FT MSL

Job No 29600 97	Client EFANE	Location	SITE 16 NCBC Davisville
Drilling Method B-61 Mobil Drill Rig		Boring No	MW16-24D
4 in casing Drive and wash			
Sampling Method 2" split spoon		Sheet 2 of 4	
Drilling Water Level		Start 01/18/01 0950	Drilling Date/Times — Finish 01/22/01 1415
Date			
Time			
Surface Conditions asphalt			

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 12	18	11 20-22	0	7 11	20		SP/GP	0-5 in Same as above 5-12 in Banded black/ brown to orange/brown SILTY SAND, wet
					22 17	21		SM	
2" SS	24 4	22	12 22-24	0	5 5	22		SP	Dark grey medium to fine SAND, trace fine gravel, wet
					11 11	23			
2" SS	24 8	22	13 24-26	0	7 12	24			Dark grey fine to very fine SAND, wet
					15 17	25			
2" SS	24 18	22	14 26-28	0	5 7	26			Same as above
					7 12	27			
2" SS	24 6	28	15 28-30	0	8 8	28		ML	Dark grey SILT, wet
					8 9	29			
2" SS	24 20	28	16 30-32	0	9 11	30			0-12 in Same as above 12-20 in Dark grey to brown SILT, trace very fine sand, trace clay,
					12 19	31			wet
2" SS	24 18	32	17 32-34	0	10 10	32			Dark grey SILT, little very fine sand, wet
					10 10	33			
2" SS	24 16	32	18 34-36	0	7 10	34			Dark grey SANDY SILT, wet
					13 17	35			
2" SS	24 12	32	19 36-38	0	9 12	36			Same as above
					18 24	37			
2" SS	24 6	38	20 38-40	0 4	11 10	38			Dark grey SILT, wet
					7 9	39			

Logged by: Tom Biolsi Date: 01/22/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Mike Legare

WELL SPECIFICATIONS:

Diam. of Riser	2 in	Screen Interval:	50-62 ft bgs	Sandpack	48-62 5 ft bgs	Grout.	46 ft bgs - grade
Bottom of Hole:	70 ft bgs	Riser Interval:	50 ft bgs - grade	Bentonite	46-48 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job. No. 29600.97	Client EFANE	Location:	SITE 16 NCBC Davisville
Drilling Method B-61 Mobil Drill Rig		Boring No.	MW16-24D
4 in casing Drive and wash			
Sampling Method 2" split spoon		Sheet 3 of 4	
Drilling Water Level		Start 01/18/01 0950	Drilling Date/Times	Finish 01/22/01 1415
Date			
Time			
Surface Conditions asphalt			

Coordinates: N: 194037 E 523252
Surface Elevation: 21 2 FT MSL
Well Riser Elevation: 20.9 FT MSL

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	24 18	38	21 40-42	0 7	10 14	40	ML	Dark grey SILT, trace very fine sand, wet
					16 16	41		
2" SS	24 18	42	22 42-44	2 2	4 11	42		Same as above
					18 31	43		
2" SS	24 20	42	23 44-46	2.0	18 39	44		0-10 in.: Dark grey CLAYEY SILT, very wet 10-20 in. Dark grey SILT, wet
					44 40	45		
2" SS	24 16	42	24 46-48	1 5	32 21	46		Same as above, trace clay from 0-6 in.
					30 32	47		
2" SS	24 18	48	25 48-50	1.9	19 17	48		Dark grey SILT, trace very fine sand, wet
					28 45	49		
2" SS	24 18	48	26 50-52	2.4	39 23	50	SP	Brown/grey to dark grey medium to fine SAND, iron staining from 6-10 in., wet
					38 70	51		
2" SS	15 9	52 5	27 52.5-55 5	0.2	- 58	52	GP	Rollerbit to 52 5 ft. encountered very hard material from 52-52 5 ft. Dark grey coarse to fine GRAVEL, some medium to fine sand,
					59 120/3"	53		wet
2" SS						54		
	3 3	52.5	28 55-55.3	0 2	100/3"	55		Same as above
2" SS						56		
	2 2	54	29 47-47 2	0	100/2"	57		Same as above, large rock fragment in bottom of split spoon
2" SS	7 6	54	30 58-58 6	0	76 100/1	58	SP WTHR	0-4 in : Very dark grey very fine to fine SAND, trace silt 4-6 in.: very dark grey very fine SAND, SILT and angular WEATHERED ROCK
						59	RX	FRAGMENTS (phyllite)

Logged by: Tom Biolsi Date. 01/22/01

Drilling Contractor: Subsurface Drilling and Remediation Driller. Mike Legare

WELL SPECIFICATIONS:

Diam of Riser:	2 in.	Screen Interval	50-62 ft bgs	Sandpack.	48-62 5 ft bgs	Grout:	46 ft bgs - grade
Bottom of Hole.	70 ft bgs	Riser Interval	50 ft bgs - grade	Bentonite	46-48 ft bgs	Cover	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N· 194037 E 523252
Surface Elevation	21 2 FT MSL
Well Riser Elevation	20 9 FT MSL

Job No 29600 97	Client EFANE	Location SITE 16 NCBC Davisville
Drilling Method B-61 Mobil Drill Rig		Boring No MW16-24D
4 in casing Drive and wash		
Sampling Method 2" split spoon		Sheet 4 of 4
Drilling Water Level		Start 01/18/01 0950
Date		Drilling Date/Times
Time		Finish 01/22/01 1415
Surface Conditions asphalt		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	5 5	54	31 60-60.4	0 6	100/5	60	WTHR RX	Very dark grey very fine to fine SAND, some fine to medium angular rock fragments, trace silt
						61		
2" SS	5 0	54	32 60-61 4	-	100/5	62		no recovery
						63		Rollerbit to 65 ft bgs
						64		Cored 65-70 ft bg
						65		
						66		
						67		
						68		
						69		
						70		
						71		
						72		
						73		
						74		
						75		
						76		
						77		
						78		
						79		

Logged by Tom Biolsi Date: 01/22/01

Drilling Contractor Subsurface Drilling and Remediation Driller Mike Legare

WELL SPECIFICATIONS·

Diam of Riser	2 in.	Screen Interval	50-62 ft bgs	Sandpack:	48-62 5 ft bgs	Grout	46 ft bgs - grade
Bottom of Hole	70 ft bgs	Riser Interval	50 ft bgs - grade	Bentonite	46-48 ft bgs	Cover	road box

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194037 E: 523252
Surface Elevation:	21.2 FT MSL
Well Riser Elevation:	20 9 FT MSL

Job No 29600 97.3201	Client EFANE	Location: Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method B-61 Mobil Drill Rig 4 in. casing Drive and wash		Boring No **MW16-24D**
Core Barrel used: NX		Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	
See packer test log if applicable		

Drilling Times	
Start	Finish
01/02/01 1340	01/02/01 1415

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
93.3%	67%				65		Total core length: 56 in.			
					66		Dark grey phyllite with low angle fractures	1	11 10	66
							and several weathered surfaces with minor silt			
					67		deposits and white veins throughout.	2	7:30	67
							Some fracture infilling with quartz present, low			
					68		angle to nearly vertical. Low angle fractures at	3	8:45	68
							19 5, 25, 29, 34, 35, 40, 42 and 46 in.			
					69			4	10:40	69
					70			5	6:10	70
					71					
					72					
					73					
					74					
					75					
					76					
					77					
					78					
					79					
					80					
					81					
					82					
					83					

NOTES: Some breaks from 65-66 ft. and 69-70 ft. may be drilling breaks due to inconsistent rpms and periodically lifting core barrel.

Logged by: Tom Biolsi/Robin Clark

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Mike Legare

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N 193805 E: 523149
Surface Elevation:	21 6 FT MSL
Well Riser Elevation:	23.0 FT MSL

Job. No 29600.97.3201	Client: EFANE
Drilling Method: B-61 Mobile Drill Rig	
Drive and Wash	
Core Barrel used: 3 875 in. Rollerbit	

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Location: Site 16
NCBC Davisville, North Kingstown, RI

Boring No.

MW16-25R

Sheet 1 of 1

Drilling Times	
Start	Finish
01/18/01 0824	01/18/01 1218

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
				61		Dark grey PHYLLITE cuttings 61-76 ft			
				62		with dark grey/black wash	1	6:28	62
				63			2	7:38	63
				64			3	6 01	64
				65			4	7.10	65
				66			5	3 42	66
				67			6	2:23	67
				68			7	3:11	68
				69			8	4:13	69
				70			9	4:28	70
				71			10	4 50	71
				72			11	4:27	72
				73			12	5:19	73
				74			13	5;24	74
				75			14	5:30	75
				76		Grey QUARTZITE cuttings from 76-80.5 ft	15	6:35	76
				77			16	9:06	77
				78			17	9:25	78
				79			18	8:35	79
				80		Dark grey PHYLLIUTE cuttings from 80 5-81.5 ft	19	9:00	80
				81		Light grey QUARTZITE cuttings from 81.5-85.5 ft	20	5:36	81
				82			21	8:22	82
				83			22	8:17	83
				84			23	8:24	84
				85		Dark grey PHYLLITE cuttings from 85.5-86 ft	24	8:27	85
				86			25	8:15	86
				87					
				88					
				89					
				90					
				91					
				92					
				93					
				94					
				95					
				96					
				97					

NOTES:

Logged by: Kevin Baum

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Brad Haase

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N. 194301 E. 522449
Surface Elevation:	16 7 FT MSL
Well Riser Elevation:	19.2 FT MSL

Job. No. 29600 97	Client: EFANE	Location: SITE 16 NCBC Davisville
Drilling Method: B-62 Mobil Drill Rig		Boring No. MW16-26D
Drive and wash		
Sampling Method. 2" split spoon		Sheet 1 of 3
Drilling Water Level		Start 01/24/01 0815 / Drilling Date/Times / Finish 01/25/01 0850
Date		
Time		
Surface Conditions: woodland		

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	24 14	0	0-2	0	2 4 9 100/6	0 1	FILL	Very dark brown fine to medium SAND, trace silt, fine subangular to subrounded gravel, two angular rock fragments (2.5 in. diam.) 11-14 in., dry
2" SS	12 12	0	2-3	0	14 100	2 3		Very dark brown fine to medium SAND, trace silt, fine to medium subangular to subrounded gravel, dry
2" SS	12 11	0	4-5	0	10 12	4		Dark olive brown fine to medium SAND, some medium to coarse subangular to rounded gravel, trace silt, wet, light grey powdery rock fragments 9-11 in
2" SS	24 14	0	5-7	0	4 6 6 5	5 6	SP	0-4 in. reddish olive brown medium to coarse SAND 4-14 in.: reddish olive brown very fine to fine SAND, trace silt
2" SS	24 20	0	7-9	0	7 12 7 6	7 8		0-11 in.: Reddish brown medium to coarse SAND 11-20 in : Dark grey fine SAND, trace silt
2" SS	24 14	9	9-11	0	5 9 11 16	9 10		0-8 in : dark olive grey very fine to fine SAND, trace silt 8-12 in.: dark olive grey medium to coarse SAND, trace silt 12-14 in.: reddish brown medium to coarse SAND, trace silt
2" SS	24 16	9	11-13	0	19 14 14 18	11 12	SM	0-3 in.: reddish black fine SAND, trace silt 3-11 in.: reddish brown fine SAND, trace silt 11-16 in.: dark olive grey very fine to fine SAND, some silt
2" SS	24 12	13	13-15	0	8 7 8 7	13 14		Dark olive grey very fine to fine SAND, some silt
2" SS	24 13	13	15-17	0	12 10 9 8	15 16	SP	Dark olive grey very fine to fine SAND, trace silt, reddish brown banding from 11-14 in. (2.5 in. diam)
2" SS	24 18	13	17-19	0	8 8 7 8	17 18	SM	Very dark grey very fine to fine SAND, some silt
						19		No recovery

Logged by: Kevin Baum Date: 01/25/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in	Screen Interval.	40-49 ft bgs	Sandpack:	39 5-49 5 ft bgs	Grout:	37 5 ft bgs - grade
Bottom of Hole:	58 ft bgs	Riser Interval.	40 ft bgs - 2 ft ags	Bentonite:	37.5-39.5 ft bgs	Cover:	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job No	29600.97
Client	EFANE
Location	SITE 16 NCBC Davisville
Drilling Method.	B-62 Mobil Drill Rig
Drive and wash	
Boring No	MW16-26D
Coordinates.	N 194301 E· 522449
Surface Elevation.	16.7 FT MSL
Well Riser Elevation	19 2 FT MSL
Sampling Method·	2" split spoon
Sheet	2 of 3
Drilling Water Level	
Date	
Time	
Start	1/24/01 0815
Drilling Date/Times	
Finish	1/25/01 0850
Surface Conditions	woodland

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						20		
2" SS	24 14	19	21-23	0	3 5	21	SM	Very dark grey very fine to fine SAND, some silt, trace clay, plastic
					6 7	22		
2" SS	24 18	19	23-25	0	8 7	23		Same as above
					9 10	24		
2" SS	24 12	25	25-27	0	4 0	25		Same as above
					6 7	26		
2" SS	24 12	25	27-29	0	7 8	27		Same as above
					8 5	28		
2" SS	24 18	29	29-31	0	4 5	29		Very dark grey SILTY SAND, trace clay
					4 4	30		
2" SS	24 24	29	31-33	0	3 2	31		Same as above
					2 3	32		
2" SS	24 22	33	33-35	0	4 7	33	ML	Very dark grey CLAYEY SILT
					7 10	34		
2" SS	24 22	33	35-37	0	11 12	35		0-10 in.: Same as above
					16 13	36	SP	10-22 in.. Very dark very fine to fine SAND, trace silt
2" SS	24 20	33	37-39	0	7 10	37	ML	Very dark grey CLAYEY SILT, trace very fine sand
					15 19	38	SM	0-7 in. Same as above 7-16 in.. Very dark grey very fine to medium SAND,
2" SS	24 16	39	39-41	0	11 15	39		some silt, trace fine angular to subangular gravel

Logged by· Kevin Baum Date: 01/25/01

Drilling Contractor: Subsurface Drilling and Remediation Driller. Phil Thornsbury

WELL SPECIFICATIONS.

Diam of Riser:	2 in	Screen Interval:	40-49 ft bgs	Sandpack:	39 5-49.5 ft bgs	Grout	37.5 ft bgs - grade
Bottom of Hole:	58 ft bgs	Riser Interval:	40 ft bgs - 2 ft ags	Bentonite:	37.5-39 5 ft bgs	Cover:	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates.	N 194301 E: 522449
Surface Elevation:	16.7 FT MSL
Well Riser Elevation:	19 2 FT MSL

Job No 29600 97	Client: EFANE	Location: SITE 16 NCBC Davisville
Drilling Method: B-62 Mobil Drill Rig Drive and wash		Boring No. MW16-26D
Sampling Method: 2" split spoon		Sheet 3 of 3
Drilling Water Level		
Date		
Time		
Surface Conditions: woodland		

Start Date/Times	Finish
1/24/01 0815	1/25/01 0850

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
					34	40		SM	
					50				
2"	24	39		0	17	41		SP	Very dark grey very fine to medium SAND, trace silt, fine to coarse, angular
SS	13		41-43		18				to subrounded gravel
					23	42			
					28				
2"	24	39		0	29	43			Very dark grey fine to coarse SAND, trace silt, trace
SS	7		43-45		12				subangular to subrounded gravel
					11	44			
					17				
2"	18	39		0	30	45			Very dark grey very fine to medium SAND, trace silt
SS	14		45-47		50				trace subangular to subrounded gravel
					100	46			
								SM	
2"	21	47		0	26	47			Dark grey very fine SAND and SILT with mica, some angular to subangular
SS	16		47-48.8		49				gravel and weathered quartzite, dense
					140	48			
					100/3				
2"	1	49		-	100/1	49			No recovery
SS	0		49-49 1						
						50			Rollerbit to 53 ft bgs
						51			Cored 53-58 ft bgs
						52			
						53			
						54			
						55			
						56			
						57			
						58			
						59			

Logged by: Kevin Baum Date: 01/25/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in	Screen Interval:	40-49 ft bgs	Sandpack:	39 5-49.5 ft bgs	Grout:	37 5 ft bgs - grade
Bottom of Hole:	58 ft bgs	Riser Interval:	40 ft bgs - 2 ft ags	Bentonite:	37 5-39 5 ft bgs	Cover:	4 in. steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194301 E. 522449
Surface Elevation:	16.7 FT MSL
Well Riser Elevation:	19.2 FT MSL

Job. No. 29600.97.3201	Client: EFANE	Location: Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method. B-62 Mobil Drill Rig		Boring No.
Drive and wash		**MW16-26D**
Core Barrel used.		Sheet 1 of 1

Packer Test		
Tested	NA	
Interval	NA	
See packer test log if applicable		

Drilling Times	
Start	Finish
01/25/01 0900	01/25/01 1000

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG Core run Length (ft)	Drill Time/ft (min sec)	Total Depth (ft bgs)
96.7%	88%				53					
					54		Light grey biotite rich quartzite, fine grained at top	1	10 11	54
							grading to medium grained at bottom. Color darkens			
					55		to 53 ft and lightens beyond Quartz vein at	2	10:09	55
							54 ft (600). Few low angle fractures with trace			
					56		silt and pyrite mineralization Low angle fractures	3	8:30	56
							at 5, 8, 16, 22, 27 5, 33.5, 44 and 50 in High			
					57		angle fractures 28-31 in	4	7:39	87
					58		Total coring interval 53-58 ft bgs	5	8:20	58
					59					
					60					
					61					
					62					
					63					
					64					
					65					
					66					
					67					
					68					
					69					
					70					
					71					

NOTES:

Logged by: Kevin Baum/Robin Clark

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N: 194369 E: 523694
Surface Elevation:	13.2 FT MSL
Well Riser Elevation:	12.9 FT MSL

Job. No. 29600 97	Client: EFANE	Location: SITE 16 NCBC Davisville
Drilling Method: Mobil B-61 Rig		Boring No MW16-27D
Drive and Wash		
140 lb hammer driven 24 in by 30 in stroke		
Sampling Method 2" split spoon		Sheet 1 of 4
Drilling Water Level		Start 12/11/00 1310
Date		Drilling Date/Times
Time		Finish 12/12/00 1400
Surface Conditions	asphalt paved lot	

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 18	0	1 0-2	0	10 6	0		FILL	Grey brown, fine to medium SAND, little fine rounded gravel, moist, loose.
					6 5	1			
2" SS	24 18	0	2 2-4	0	5 7	2			Grey brown, medium to fine SAND, grading to little fine subrounded gravel, moist
					8 18	3			
2" SS	24 12	4	3 4-6	0	14 15	4			Brownish grey, fine SAND, trace fine gravel, moist.
					14 14	5			
2" SS	24 20	4	4 6-8	0	8 4	6			0-8": Same as above. 8-12": Grey very fine SAND, moist
					6 7	7		SM	12-20": Black grey SILTY SAND, trace organics, fine roots, moist.
2" SS	24 20	8	5 8-10	0	6 6	8		ML	Black/dark grey SANDY SILT, trace medium to fine sand and fine gravel at 12" and moist.
					7 8	9			
2" SS	24 18	8	6 10-12	0	7 8	10			Same as above, wet
					10 10	11			
2" SS	24 24	8	7 12-14	0	7 8	12		SM	0-12": Dark grey fine to very fine SAND, little silt, wet
					12 14	13		ML	12-24" Dark grey SANDY SILT, wet.
2" SS	24 12	14	8 14-16	0	3 4	14			Mottled black/grey brown CLAYEY SILT, wet.
					5 4	15			
2" SS	24 20	14	9 16-18	0	3 4	16			Same as above.
					3 4	17			
2" SS	24 12	18	10 18-20	0	2 2	18			Same as above.
					3 4	19			

Logged by: Tom Biolsi Date: 12/12/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: Philip Thornsbury

WELL SPECIFICATIONS:

Diam of Riser.	2 in.	Screen Interval.	54-64 ft bgs	Sandpack:	52-64 5 ft bgs	Grout:	50 ft bgs - grade
Bottom of Hole.	71 ft bgs	Riser Interval:	54 ft bgs - grade	Bentonite.	50-52 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates	N. 194369 E 523694
Surface Elevation	13 2 FT MSL
Well Riser Elevation.	12 9 FT MSL

Job- No 29600 97	Client EFANE	Location **SITE 16 NCBC Davisville**
Drilling Method Mobil B-61 Rig		Boring No **MW16-27D**
Drive and Wash		
140 lb hammer driven 24 in by 30 in stroke		
Sampling Method 2" split spoon		Sheet 2 of 4
Drilling Water Level		Start 12/11/00 1310 / Drilling Date/Times / Finish 12/12/00 1400
Date		
Time		
Surface Conditions	asphalt paved lot	

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 12	18	11 20-22	0	3	20		ML	0-8" Same as above
					6				8-10" orange/brown (iron staining) SANDY SILT, wet
					7	21			
					8				10-12" Dark grey sandy silt, wet.
2" SS	24 20	18	12 22-24	0	3	22		SP/ML	Dark grey/brown, very fine SAND and SILT, wet
					2				
					4	23			
					6				
2" SS	24 18	24	13 24-26	0	4	24		ML	Dark grey SANDY SILT, wet
					2				
					1	25			
					1				
2" SS	24 18	24	14 26-28	0	2	26			Same as above
					2				
					2	27			
					4				
2" SS	24 18	28	15 28-30	0	4	28		SP	Mottled brown grey/black, very fine SAND, trace
					3				silt, wet
					4	29			
					6				
2" SS	24 12	28	16 30-32	0	6	30			Same as above.
					7				
					10	31			
					8				
2" SS	24 15	28	17 32-34	0	3	32		SM	Same as above, but with a little silt
					4				at bottom of spoon, wet
					5	33			
					10				
2" SS	24 20	34	18 34-36	0	2	34			Dark grey SILTY SAND, wet
					wor				
					wor	35			
					3				
2" SS	24 18	34	19 36-38	0	2	36		SP	Dark grey very fine SAND, trace silt, wet
					2				
					2	37			
					3				
2" SS	24 18	38	20 38-40	0	4	38			Same as above
					4				
					5	39			
					6				

Logged by Tom Biolsi Date 12/12/00

Drilling Contractor: Subsurface Drilling and Remediation Driller. Philip Thornsbury

WELL SPECIFICATIONS:

Diam of Riser.	2 in	Screen Interval	54-64 ft bgs	Sandpack:	52-64 5 ft bgs	Grout:	50 ft bgs - grade
Bottom of Hole	71 ft bgs	Riser Interval.	54 ft bgs - grade	Bentonite:	50-52 ft bgs	Cover	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job. No 29600.97	Client: EFANE
Location	SITE 16 NCBC Davisville
Drilling Method: Mobil B-61 Rig	
Drive and Wash	
140 lb hammer driven 24 in by 30 in. stroke	
Boring No.	MW16-27D
Sampling Method 2" split spoon	
Sheet 3 of 4	

Coordinates. N. 194369 E: 523694
Surface Elevation. 13 2 FT MSL
Well Riser Elevation 12.9 FT MSL

Drilling Water Level		
Date		
Time		

Surface Conditions: asphalt paved lot

Start	Drilling Date/Times	Finish
12/11/00		12/12/00
1310		1400

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 12	38	21 40-42	0	3 1	40		SP	Dark grey very fine SAND, little silt, especially towards the bottom of the spoon, wet.
					2 6	41			
2" SS	24 15	38	22 42-44	0	3 3	42			Same as above
					8 10	43			
2" SS	24 24	44	23 44-46	0	2 WOR	44		ML	Dark grey, CLAYEY SILT, wet
					WOR WOR	45			
2" SS	24 24	44	24 46-48	0	2 1	46			Dark grey SANDY SILT, little clay, wet.
					3 2	47			
2" SS	24 24	48	25 48-50	0	3 1	48			Dark grey CLAYEY SILT, wet.
					WOR 2	49			
2" SS	24 24	48	26 50-52	0	WOR WOR	50			Same as above. Several fine subangular gravel pieces in bottom of the spoon.
					WOR 8	51			
2" SS	24 12	48	27 52-54	0.2	11 11	52		SP/ML	Dark grey fine to very fine SAND and SILT some medium to fin subrounded gravel, wet.
					8 7	53			
2" SS	24 15	54	28 54-56	0 7	7 10	54		SP GM	0-3". grey coarse to fine SAND, trace fine gravel, wet 3-6": Dark grey very fine SAND, trace silt, wet,
					54 65	55		SP GM	6-9": Dark grey med to fine subangular GRAVEL, little sand/silt, wet 9-12". Same as 3-6". 12-15": Same as 6-9" with little silt, wet.
2" SS	1 1	54	29 56-56 1	1.5	100/1	56			Same as above. Refusal at 56.1'. Rollerbit to 59' bgs
						57			
						58			
2" SS	24 18	58	30 59-61	0	34 38	59		GP SP	0-6": Dark grey medium to fine subangular GRAVEL, trace fine sand, wet. 6-18": Dark grey fine to very fine SAND, some medium to fine

Logged by. Tom Biolsi Date: 12/12/00

Drilling Contractor: Subsurface Drilling and Remediation Driller. Philip Thornsbury

WELL SPECIFICATIONS

Diam. of Riser	2 in.	Screen Interval:	54-64 ft bgs	Sandpack.	52-64.5 ft bgs	Grout:	50 ft bgs - grade
Bottom of Hole	71 ft bgs	Riser Interval	54 ft bgs - grade	Bentonite:	50-52 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates:	N 194369 E 523694
Surface Elevation	13 2 FT MSL
Well Riser Elevation:	12 9 FT MSL

Job. No 29600 97	Client EFANE	Location **SITE 16 NCBC Davisville**
Drilling Method Mobil B-61 Rig		Boring No **MW16-27D**
Drive and Wash		
140-lb hammer driven 24 in by 30 in stroke		
Sampling Method 2" split spoon		Sheet 4 of 4
Drilling Water Level		Start 12/11/00 1310 / Drilling Date/Times / Finish 12/12/00 1400
Date		
Time		
Surface Conditions	asphalt paved lot	

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
					35	60	SP	subangular gravel, wet, zone of coarse to fine gravel at 14-17"
					54			
2"	24	59	31	0 0	54	61	SM/GM	Dark grey very fine SAND and coarse to fine
SS	18		61-63		38			GRAVEL, little silt, very dense, wet to moist
					55	62		Drill to 63'
					100			
2"	9	63	32	0.0	53	63		Same as above
SS	6		63-63 8		100/3			
						64		Bedrock encountered at 64' bgs
						65		Cored (NX core) from 66-71' bgs
						66		
						67		
						68		
						69		
						70		
						71		
						72		
						73		
						74		
						75		
						76		
						77		
						78		
						79		

Logged by: Tom Biolsi Date 12/12/00

Drilling Contractor. Subsurface Drilling and Remediation Driller. Philip Thornsbury

WELL SPECIFICATIONS.

Diam of Riser	2 in	Screen Interval	54-64 ft bgs	Sandpack.	52-64 5 ft bgs	Grout	50 ft bgs - grade
Bottom of Hole	71 ft bgs	Riser Interval.	54 ft bgs - grade	Bentonite.	50-52 ft bgs	Cover	road box

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N 194369 E 523694
Surface Elevation:	13 2 FT MSL
Well Riser Elevation:	12.9 FT MSL

Job. No. 29600.97.3201	Client: EFANE	Location: Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method:	Mobile B-61 Drive and WASH	Boring No. **MW16-27D**
Core Barrel used:	NX	Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	

See packer test log if applicable

Drilling Times	Start	Finish
	12/12/00 1320	12/12/00 1358

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
					66					
100%	92%				67		Quartzite with minor phyllite interbeds from 0-8 in. then grading to phyllite from 8-42 in. and grading	1	9 00	67
					68		back to quartzite from 42-60 in.	2	9.00	68
					69		Primarily low angle fractures except for two high angle fractures/breaks Fractures at	3	7 00	69
					70		12, 15, 23, 27, 39, 47, and 52 in. 45° fractures at 15-18 and 31-33.5 in.	4	7:00	70
					71			5	6 00	71
							Coring Interval. 66-71 ft bgs			
					72					
					73					
					74					
					75					
					76					
					77					
					78					
					79					
					80					
					81					
					82					
					83					
					84					

NOTES:

Logged by: Tom Biolsi/Robin Clark

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Job. No	29600.97
Client	EFANE
Location	SITE 16 NCBC Davisville
Drilling Method	Mobil Drill B-61
	drive and wash
	rollerbit and core
Boring No.	MW16-28D
Sampling Method	2" split spoon
Sheet	1 of 4
Coordinates	N: 194581 E: 523783
Surface Elevation	12 4 FT MSL
Well Riser Elevation	12 0 FT MSL
Drilling Water Level	
Date	
Time	
Surface Conditions	asphalt paved lot

Start	Drilling Date/Times	Finish
12/11/2000 1304		12/13/00 1234

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 12	0	1 0-2	0	21 8	0		FILL	grey medium to coarse SAND with some rounded to subrounded gravel, dry
					9 13	1			
2" SS	24 14	0	2 2-4	0	16 13	2			light brown medium to coarse SAND with trace rounded to subrounded gravel
					11 12	3			
2" SS	24 5	0	3 4-6	0	19 9	4			0-2" brown medium to coarse SAND, trace rounded to subrounded gravel
					9 10	5			2-5" very fine to fine brown SILTY SAND with angular-subangular gravel
2" SS	24 14	0	4 6-8	0	9 10	6			0-2" same as above 2-14" light brown fine to medium SAND, damp.
					8 8	7			
2" SS	24 11	0	5 8-10	0	9 8	8		SM	olive grey very fine to fine SAND with some silt, 1" angular clast in top 1', wet.
					7 5	9			
2" SS	24 17	0	6 10-12	0	3 4	10			olive very fine to medium grey SAND with some silt.
					3 6	11			
2" SS	24 18	0	7 12-14	0	3 2	12			Same as 10-12'
					3 5	13			
2" SS	24 12	14	8 14-16	0	3 10	14			olive grey SILTY SAND with trace angular-subangular gravel and shell fragments.
					11 10	15			
2" SS	24 10	14	9 16-18	0	13 14	16			olive grey SILTY SAND
					16 17	17			
2" SS	24 16	18	10 18-20	0	8 9	18			light olive grey very fine to fine SAND with some silt.
					11 14	19			

Logged by: Kevin Baum Date: 12/11/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS:

Diam of Riser	2 in.	Screen Interval:	54.5-64 5 ft bgs	Sandpack:	52 5-65 ft bgs	Grout:	50 5 ft bgs - grade
Bottom of Hole:	74 ft bgs	Riser Interval	54 5 ft bgs - grade	Bentonite:	50.5-52.5 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates.	N 194581 E 523783
Surface Elevation.	12 4 FT MSL
Well Riser Elevation	12.0 FT MSL

Job No 29600.97	Client EFANE	Location **SITE 16 NCBC Davisville**
Drilling Method Mobil Drill B-61		Boring No **MW16-28D**
drive and wash		
rollerbit and core		
Sampling Method 2" split spoon		Sheet 2 of 4
Drilling Water Level		Start 12/11/00 1304 / Drilling Date/Times / Finish 12/13/00 1234
Date		
Time		
Surface Conditions	asphalt paved lot	

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	24 17	18	11 20-22	0	11 11	20	SM	0-8" same as above 8-17" olive grey very fine to fine SAND, some silt
					12 12	21		
2" SS	24 21	18	12 22-24	0	7 8	22		Same as above
					8 13	23		
2" SS	24 10	24	13 24-26	0	7 10	24		Same as above
					13 11	25		
2" SS	24 16	24	14 26-28	0	10 11	26		Same as above
					11 12	27		
2" SS	24 12	28	15 28-30	0	5 4	28		Same as above orange staining 0-8"
					4 4	29		
2" SS	24 6	28	16 30-32	0	3 1	30		Same as 28-30'
					1 wor	31		
2" SS	24 18	28	17 32-34	0	2 2	32	ML	0-2" same as above 2-18" dark grey SANDY SILT
					2 3	33		
2" SS	24 11	34	18 34-36	0	6 3	34		Same as above
					2 3	35		
2" SS	24 12	34	19 36-38	0	4 4	36	SM	dark grey very fine to fine SILTY SAND
					5 5	37		
2" SS	24 13	38	20 38-40	0.5	9 5	38		Same as above
					7 5	39		

Logged by. Kevin Baum Date 12/11/00

Drilling Contractor Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS.

Diam of Riser	2 in	Screen Interval.	54 5-64 5 ft bgs	Sandpack:	52.5-65 ft bgs	Grout:	50.5 ft bgs - grade
Bottom of Hole:	74 ft bgs	Riser Interval.	54 5 ft bgs - grade	Bentonite.	50 5-52 5 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates.	N 194581 E 523783
Surface Elevation:	12.4 FT MSL
Well Riser Elevation:	12.0 FT MSL

Job No. 29600 97	Client EFANE	Location: SITE 16 NCBC Davisville
Drilling Method: Mobil Drill B-61 drive and wash rollerbit and core		Boring No. MW16-28D
Sampling Method: 2" split spoon		Sheet 3 of 4
Drilling Water Level		
Date		
Time		
Surface Conditions asphalt paved lot		

Start	Drilling Date/Times	Finish
12/11/00 1304		12/13/00 1234

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 16	38	21 40-42	0	9 6	40		SM	0-14" same as above 14-16" dark grey fine to medium SAND, some silt
					7 11	41			
2" SS	24 24	38	22 42-44	0 5	13 15	42			dark grey fine to medium SAND, some silt grading to medium to coarse sand with trace silt and fine gravel subrounded to
					21 30	43			rounded
2" SS	24 15	44	23 44-46	0.7	31 34	44		SP	dark grey medium to coarse SAND, trace silt and fine gravel subrounded to rounded
					41 46	45			
2" SS	21 10	44	24 46-48	1	44 47	46		SW/SM	dark grey very fine to medium SAND, some silt and medium to coarse subrounded to subangular gravel
					84 100/3	47			driving casing to 49', roller bit to 54'
						48		B	
						49			boulder 49-52.5'
						50			
						51			
						52			
						53		SP	
2" SS	11 7	54	28 54-55	0	72 100/5	54		SP	dark grey very fine to fine SAND, subrounded to subangular medium gravel and trace silt
						55			rollerbit 55-56'
2" SS	24 15	58	29 56-58	0.7	40 52	56		SP	dark grey Vf-C sand with some gravel, angular subrounded and trace silt
					54 49	57			rollerbit 58-64'
						58			
						59			

Logged by: Kevin Baum Date 12/11/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	54 5-64 5 ft bgs	Sandpack:	52.5-65 ft bgs	Grout:	50.5 ft bgs - grade
Bottom of Hole	74 ft bgs	Riser Interval	54 5 ft bgs - grade	Bentonite	50 5-52 5 ft bgs	Cover:	road box

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING - REVISED

Coordinates:	N 194581 E 523783
Surface Elevation	12.4 FT MSL
Well Riser Elevation	12 0 FT MSL

Job No 29600 97	Client EFANE	Location SITE 16 NCBC Davisville
Drilling Method Mobil Drill B-61		Boring No MW16-28D
drive and wash		
rollerbit and core		
Sampling Method 2" split spoon		Sheet 4 of 4
Drilling Water Level		Start 12/11/2000 1304
Date		Drilling Date/Times
Time		Finish 12/13/00 1234
Surface Conditions	asphalt paved lot	

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						60		
						61		
						62		
						63		
2" SS	12 7	58	30 64-65	0 2	34 120	64	SP	Same as above
						65		Rollerbit to 69 ft bgs
						66		Cored 69-74 ft bgs
						67		
						68		
						69		
						70		
						71		
						72		
						73		
						74		
						75		
						76		
						77		
						78		
						79		

Logged by: Kevin Baum Date: 12/11/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS:

Diam of Riser:	2 in	Screen Interval.	54 5-64 5 ft bgs	Sandpack:	52 5-65 ft bgs	Grout	50 5 ft bgs - grade
Bottom of Hole:	74 ft bgs	Riser Interval	54.5 ft bgs - grade	Bentonite	50 5-52 5 ft bgs	Cover	road box

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194581 E: 523783
Surface Elevation:	12 4 FT MSL
Well Riser Elevation	12 0 FT MSL

Job. No. 29600 97 3201	Client: EFANE	Location: Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method Mobil Drill B-61 drive and wash		Boring No. **MW16-28D**
Core Barrel used:		Sheet 1 of 1

Packer Test		
Tested	NA	
Interval	NA	
See packer test log if applicable		

Drilling Times	
Start	Finish
12/13/00 1148	12/13/00 1234

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
					69					
97%	93%				70		Fine to medium grained quartzite to 31 in. then dark grey fine grained phyllite with biotite and	1	4:11	70
					71		bands of quartzite throughout Low angle fractures at 4, 9, 10.5, 15 5, 21, 21.5, 23 5, 25, 55,	2	4 31	71
					72		and 30 in. 45° fracture from 43-45 in.	3	4 31	72
					73			4	4:23	73
					74			5	4:10	74
					75					
					76					
					77					
					78					
					79					
					80					
					81					
					82					
					83					
					84					
					85					
					86					
					87					

NOTES:

Logged by: Kevin Baum

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Brad Haase

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 194441 E 523410
Surface Elevation:	14 4 FT MSL
Well Riser Elevation	16.1 FT MSL

Job. No. 29600.97	Client: EFANE	Location: SITE 16 NCBC Davisville
Drilling Method. Mobile Drill B-61		Boring No. MW16-29D
Drive and Wash		
Sampling Method 2" split spoon		Sheet 1 of 3
Drilling Water Level		
Date		
Time		
Surface Conditions: woodland		

Start	Drilling Date/Times	Finish
01/29/01 1515		01/31/01 0852

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION
2" SS	24 4	0	0-2	0.0	9 14	0		FILL	Dark brown fine to medium SAND, trace silt, organics, frozen
					12 11	1			
2" SS	24 18	0	2-4	0.0	6 8	2			Very dark brown fine to medium SAND, trace silt, organics, dry; 0.5 in. piece of wood at 10 in.
					8 11	3			
2" SS	24 16	0	4-6	0.0	14 19	4			Olive brown medium to coarse SAND, trace charcoal in top 3 in., damp
					12 11	5			
2" SS	24 18	0	6-8	0.0	11 10	6		SP	Dark olive grey fine to coarse SAND, trace silt, wet
					8 3	7			
2" SS	24 6	0	8-10	0.0	2 1	8		SM ML	0-3 in : Dark olive grey very fine to fine SAND, some silt 3-6 in.: Dark olive grey CLAYEY SILT, trace very fine sand
					1 2	9			
2" SS	24 11	0	10-12	0.0	4 5	10		SM	Dark olive grey very fine to fine SILTY SAND , trace fine subrounded to rounded gravel
					6 11	11			
2" SS	24 14	0	12-14	0.0	9 11	12			Dark olive grey very fine to fine SAND, some silt
					14 17	13			
2" SS	24 13	14	14-16	0.0	14 10	14			Same as above
					9 10	15			
2" SS	24 12	14	16-18	0.0	12 11	16			0-8 in.: Same as above 8-10 in.: Very dark grey to black SILTY SAND
					10 10	17			19-12 in.: Dark olive brown very fine to fine SAND, some silt
2" SS	24 19	18	18-20	0.0	5 2	18		ML	0-4 in : Very dark grey very fine to fine SAND, some silt 4-14 in.: Very dark grey CLAYEY SILT, trace very fine sand
					2 3	19			

Logged by: Kevin Baum Date: 01/31/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in	Screen Interval:	44 5-54 5 ft bgs	Sandpack:	42 5-55 ft bgs	Grout:	40.5 ft bgs - grade
Bottom of Hole:	62 ft bgs	Riser Interval:	44 5 ft bgs - 2 ft ags	Bentonite:	40.5-42 5 ft bgs	Cover.	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates	N 194441 E 523410
Surface Elevation	14 4 FT MSL
Well Riser Elevation	16.1 FT MSL

Job No. 29600 97	Client: EFANE	Location: SITE 16 NCBC Davisville
Drilling Method: Mobile Drill B-61		Boring No MW16-29D
Drive and Wash		
Sampling Method: 2" split spoon		Sheet 2 of 3
Drilling Water Level		Start 01/29/01 1515
Date		Drilling Date/Times
Time		Finish 01/31/01 0852
Surface Conditions	woodland	

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	24 24	18	20-22	0 0	3 1	20	ML	Same as above
					1 2	21		
2" SS	24 16	18	22-24	0 0	3 2	22		Same as above
					7 9	23		
2" SS	24 22	24	24-26	0 0	6 2	24		Same as above
					1 1	25		
2" SS	24 24	24	26-28	0 0	wor 2	26		0-10 in Very dark grey CLAYEY SILT 10-24 in Very dark grey CLAYEY SILT, trace very fine sand
					1 1	27		
2" SS	24 15	28	28-30	0 0	5 2	28		Very dark grey SANDY SILT dark reddish brown very fine to fine sand lens 9-10 in
					2 3	29		
2" SS	24 11	28	30-32	0.0	3 4	30	SP	Olive grey very fine to fine SAND, trace silt
					5 5	31		
2" SS	24 16	28	32-34	0.0	6 6	32		Same as above
					7 8	33		
2" SS	24 18	34	34-36	0.0	5 2	34	SM	0-8 in · Very dark grey very fine to fine SAND, some silt 8-18 in. Very dark grey very fine SILTY SAND
					1 wor	35		
2" SS	24 10	34	36-38	0 0	3 3	36		Very dark grey very fine to fine SAND, some silt
					3 2	37		
2" SS	24 11		38-40	0 0	4 3	38		Same as above
					1 WOR	39		

Logged by: Kevin Baum Date: 01/31/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS.

Diam. of Riser	2 in	Screen Interval:	44 5-54 5 ft bgs	Sandpack	42 5-55 ft bgs	Grout:	40 5 ft bgs - grade
Bottom of Hole.	62 ft bgs	Riser Interval:	44 5 ft bgs - 2 ft ags	Bentonite.	40 5-42.5 ft bgs	Cover.	4 in. steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job. No. 29600.97	Client. EFANE
Location:	SITE 16 NCBC Davisville
Drilling Method: Mobile Drill B-61	
Drive and Wash	
Boring No.	MW16-29D
Sampling Method: 2" split spoon	
Sheet 3 of 3	

Coordinates: N: 194441 E: 523410
Surface Elevation: 14.4 FT MSL
Well Riser Elevation: 16.1 FT MSL

Drilling Water Level			Start	Drilling Date/Times	Finish
Date			01/29/01		01/31/01
Time			1515		0852

Surface Conditions. woodland

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
2" SS	24 12	38	40-42	0.0	6 9 11 13	40 41	SM SP	0-8 in : Same as above 8-12 in : Very dark grey very fine to fine SAND, trace silt
2" SS	24 8	38	42-44	0.0	13 7 8 5	42 43	SP	Very dark grey very fine to coarse SAND, trace silt and subangular to subrounded gravel
3" SS	24 11	44	44-46	0 0	14 5 4 3	44 45	SM	0-3 in 3 in. angular ROCK FRAGMENT 3-11 in. Very dark grey very fine to medium SAND, some silt, trace fine to medium angular to subangular gravel
2" SS	24 12	44	46-48	0.0	5 6 10 14	46 47		Same as above
2" SS	11 6	48	48-48 9	0.0	51 100/5	48 49	SP	Very dark grey very fine to medium SAND, some fine to coarse angular to subangular gravel, trace silt
2" SS	24 16	48	50-52	24.6	39 68 70 67	50 51		Very dark grey very fine to medium SAND, trace silt, fine to medium angular to subangular gravel
2" SS	5 1	48	52-52.4	0.0	100/5	52 53		Very dark grey very fine to fine SAND, trace silt, fine angular rock fragments
2" SS	5 5	54	54-54.4	0.0	100/5	54 55 56 57 58 59		Same as above Rollerbit to 57 ft bgs Cored from 57-62 ft bgs

Logged by: Kevin Baum Date: 01/31/01

Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser.	2 in	Screen Interval:	44 5-54 5 ft bgs	Sandpack:	42 5-55 ft bgs	Grout.	40 5 ft bgs - grade
Bottom of Hole.	62 ft bgs	Riser Interval.	44 5 ft bgs - 2 ft ags	Bentonite:	40 5-42 5 ft bgs	Cover	4 in steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Job No.	29600.97.3201
Client	EFANE
Location:	Site 16 NCBC Davisville, North Kingstown, RI
Drilling Method:	Mobile Drill B-61
	Drive and Wash
Boring No.	**MW16-29D**
Coordinates:	N. 194441 E: 523410
Surface Elevation:	14 4 FT MSL
Well Riser Elevation:	16 1 FT MSL
	Core Barrel used.
	Sheet 1 of 1

Packer Test

Tested	NA	
Interval	NA	
See packer test log if applicable		

Drilling Times	
Start	Finish
01/31/01 0852	01/31/01 0940

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG Core run Length (ft)	Drill Time/ft (min sec)	Total Depth (ft bgs)
					56					
62%	16%				57		dark gray phyllite, highly fractured and broken	1	3 25	58
							with fractures at low angles			
					58		some quartz banding, trace silt	2	3:32	59
							and pyrite mineralization			
					59			3	6 45	60
							total run, 57-62 ft bgs			
					60			4	14.20	61
					61			5	13:57	62
					62					
					63					
					64					
					65					
					66					
					67					
					68					
					69					
					70					
					71					
					72					
					73					
					74					

NOTES:

Logged by: Kevin Baum

Drilling Contractor: Subsurface Drilling and Remediation

Driller: Brad Haase

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates.	N: 194536 E 522819
Surface Elevation:	21.8 FT MSL
Well Riser Elevation.	NA

Job No. 29600.97	Client EFANE NCBC Davisville	Location: SITE 16
Drilling Method: Acker AD-II 4 1/4 in. ID Hollow Stem Auger		Boring No. **SB16-21**
Sampling Method 3" split spoon Driven 24 in. with a 140 lb hammer		Sheet 1 of 1
Drilling Water Level		
Date		
Time		
Surface Conditions: woodland		

Start	Drilling Date/Times	Finish
06/26/00		06/26/00
1454		1550

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
3" SS	24 14	0	0-2	NA	6 6 11 26	0 1 2 3 4 5 6 7	SP	0-7 in.: medium to coarse SAND, trace subangular to subrounded gravel < 1", dry. 7-14 in . Dark brown very fine to fine SAND, trace subangular to subrounded gravel < 0.5", damp Sample submitted for laboratory analysis	
3" SS	24 19		8-10	NA	4 1 1 5	8 9 10 11 12 13 14 15 16 17 18 19	SP ML	0-4 in. Black fine to medium SAND, damp 4-19 in.: Brown SANDY SILT, wet Sample submitted for laboratory analysis	

Logged by: Kevin Baum Date: 6/26/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: John Haliburda

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 194534 E: 522836
Surface Elevation:	21.2 FT MSL
Well Riser Elevation.	NA

Job. No. 29600.97	Client: EFANE NCBC Davisville	Location: SITE 16
Drilling Method: Acker AD-II 4 1/4 in. ID Hollow Stem Auger		Boring No **SB16-22**
Sampling Method 3" split spoon Driven 24 in with a 140 lb hammer		Sheet 1 of 1
Drilling Water Level		
Date		
Time		
Surface Conditions: woodland		

Start	Drilling Date/Times	Finish
06/27/00		06/27/00
820		902

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
3" SS	24 / 19	0	0-2	NA	3, 17, 12, 8	0, 1	SP	Brown fine to medium SAND, some fine to coarse angular-subangular gravel, roots, dry. Sample submitted for laboratory analysis	
3" SS	24 / 16	6	6-8	NA	13, 6, 5, 3	6, 7	SM	0-6 in.: dark brown fine to medium SAND, some silt and fine to medium angular to subangular gravel, dry. 6-16 in.: Dark brown very fine to fine SAND, some silt, trace fine to medium angular to subangular gravel, wet Sample submitted for laboratory analysis	

Logged by: Kevin Baum Date: 6/27/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: John Haliburda

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 194491 E: 523073
Surface Elevation:	10.0 FT MSL
Well Riser Elevation.	NA

Job No 29600.97	Client: EFANE NCBC Davisville	Location SITE 16
Drilling Method: Acker AD-II, 4 1/4 in. ID Hollow Stem Auger		Boring No. **SB16-23**
Sampling Method: 3" split spoon; Driven 24 in. with a 140 lb hammer		Sheet 1 of 1
Drilling Water Level		
Date		
Time		
Surface Conditions: asphalt		

Start	Drilling Date/Times	Finish
06/26/00 1340		06/26/00 1427

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
3" SS	24 / 17	0	0.5-2	NA	10, 22, 14, 26	0, 1	FILL	Very fine to fine SAND, trace fine to medium subangular to subrounded gravel, charcoal in top 7" gray-brown dry. Sample submitted for laboratory analysis	
3" SS	24 / 12	7	3-5	NA	9, 7, 6, 12	3, 4	FILL	Gray fine to coarse SAND, trace silt and fine to coarse subangular to subrounded gravel, nails and burnt wood, damp. Sample submitted for laboratory analysis	
3" SS	24 / 6	7	7-9	NA	9, 9, 54, 15	7, 8	FILL	Very dark brown to black medium to coarse SAND and SILT, nails, glass, wood, porcelain, wet.	Insufficient soil recovered for sampling.

Logged by: Kevin Baum Date: 06/26/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: John Haliburda

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 194468 E: 523129
Surface Elevation:	14.8 FT MSL
Well Riser Elevation:	NA

Job. No. 29600 97	Client: EFANE NCBC Davisville	Location: SITE 16
Drilling Method: Acker AD-II, 4 1/4 in. ID Hollow Stem Auger		Boring No. SB16-24
Sampling Method. 3" split spoon; Driven 24 in. with a 140 lb hammer		Sheet 1 of 1
Drilling Water Level / Date / Time		Start 06/26/00 1110; Drilling Date/Times; Finish 06/26/00 1149
Surface Conditions: asphalt		

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
SS	24 / 16	0	0-2	NA	6, 11, 20, 22	0, 1, 2	FILL	0-8 in · very fine to fine SAND, trace fine to medium gravel, dry 8-11 in.· dark brown very fine to fine SAND, trace silt, fine to coarse angular-subrounded gravel, damp, charcoal; Sample submitted for laboratory analysis	Sample taken from below asphalt (~8")
SS	24 / 16	7	7-9	NA	12, 18, 22, 24	7, 8	SM	Black medium to coarse SAND, some silt, trace subangular to subrounded gravel < 1", wet; Sample submitted for laboratory analysis	

Logged by: Kevin Baum Date: 06/26/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: John Haliburda

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job. No. 29600.97	Client: EFANE NCBC Davisville
Location:	SITE 16
Drilling Method.	Acker AD-II
4 1/4 in. ID Hollow Stem Auger	
Boring No.	**SB16-25**
Sampling Method: 3" split spoon	Driven 24 in. with a 140 lb hammer
Sheet 1 of 1	
Coordinates:	N: 194475 E: 522996
Surface Elevation:	16 8 FT MSL
Well Riser Elevation:	NA
Drilling Water Level	
Date	
Time	
Start 06/26/00 1012	Drilling Date/Times	Finish 06/26/00 1041
Surface Conditions:	woodland

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
SS	24	0	0-2	NA	2	0		0-7 in.: brown medium to coarse SAND, trace roots, dry	
	19				4		SP	7-19 in : dark brown fine to medium SAND, some fine to	
					12	1		medium subangular to subrounded gravel , damp,	
					15			Sample submitted for laboratory analysis	
						2			
						3			
						4			
						5			
						6			
SS	24	7	7-9	NA	22	7		Dark black to brown very fine to fine SAND, trace	
	16				23		SP	subrounded to rounded gravel, damp	
					15	8		Sample submitted for laboratory analysis	
					8				
						9			
						10			
						11			
						12			
						13			
						14			
						15			
						16			
						17			
						18			
						19			

Logged by: Kevin Baum Date: 06/26/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: John Haliburda

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 194656 E: 523196
Surface Elevation:	9.8 FT MSL
Well Riser Elevation.	NA

Job. No 29600.97	Client: EFANE NCBC Davisville	Location: SITE 16
Drilling Method: Acker AD-II 4 1/4 in. ID Hollow Stem Auger		Boring No. **SB16-26**
Sampling Method: 3" split spoon Driven 24 in. with a 140 lb hammer		Sheet 1 of 1
Drilling Water Level		Start 06/23/00 1300 / Drilling Date/Times / Finish 06/23/00 1320
Date		
Time		
Surface Conditions: woodland		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
SS	24	0	0-2	2 4	3	0		Dark gray fine to medium sand, trace angular to rounded	
	19				10		SP	gravel <2 5" with organics (grass and roots), damp	
					26	1		Sample submitted for laboratory analysis	
					17				
SS	24	0	2-4	2 5	15	2	SP	Dark gray fine to medium SAND, some angular to	
	17				18			subangular gravel < 4", damp	
					28	3		Sample submitted for laboratory analysis	
					18				
						4			
						5			
						6			
						7			
						8			
						9			
						10			
						11			
						12			
						13			
						14			
						15			
						16			
						17			
						18			
						19			

Logged by: Kevin Baum

Date: 06/23/00

Drilling Contractor: Subsurface Drilling and Remediation

Driller: John Haliburda

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates	N 194551 E: 523332
Surface Elevation	11.5 FT MSL
Well Riser Elevation	NA

Job. No. 29600.97	Client EFANE NCBC Davisville	Location: SITE 16
Drilling Method: Acker AD-II 4 1/4 in ID Hollow Stem Auger		Boring No. **SB16-27**
Sampling Method 3" split spoon Driven 24 in. with a 140 lb hammer		Sheet 1 of 1
Drilling Water Level		
Date		
Time		
Surface Conditions: woodland		

Start	Drilling Date/Times	Finish
06/26/00		06/26/00
817		917

Sample Type	Inches Driven/In Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
SS	24	0	0-2	NA	3	0	SP	Fine to medium sand, trace angular-subangular	
	20				8			gravel< 1" with organics (roots and grass)	
					24	1		Sample submitted for laboratory analysis	
					18				
SS	24	0	2-4	NA	16	2	SP	Very dark brown fine to medium sand, some	
	18				15			angular-subangular gravel<1", damp.	
					9	3		Sample submitted for laboratory analysis	
					6				
						4			
						5			
						6			
						7			
						8			
						9			
						10			
						11			
						12			
						13			
						14			
						15			
						16			
						17			
						18			
						19			

Logged by: Kevin Baum Date: 06/26/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: John Haliburda

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N. 194421 E: 522890
Surface Elevation:	19.6 FT MSL
Well Riser Elevation:	NA

Job. No. 29600.97	Client: EFANE NCBC Davisville	Location: SITE 16
Drilling Method: Acker AD-II 4 1/4 in. ID Hollow Stem Auger		Boring No. **SB16-28**
Sampling Method: 3" split spoon Driven 24 in. with a 140 lb hammer		Sheet 1 of 1
Drilling Water Level / Date / Time		Start 06/27/00 915 / Drilling Date/Times / Finish 06/27/00 1000
Surface Conditions: woodland		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
SS	24 / 17	0	0-2	NA	3, 11, 15, 27	0, 1	FILL	Dark brown very fine to fine SAND, trace very fine to fine subangular to subrounded gravel , dry Sample submitted for laboratory analysis	
						2, 3			
SS	24 / 18	4	4-6	NA	12, 22, 48, 52	4, 5	FILL	Very dark to black fine to medium SAND, some silt charred wood, glass, nails, piece of terracota pipe moist strong odor of petroleum Sample submitted for laboratory analysis	
						6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19			

Logged by: Kevin Baum Date: 06/27/00

Drilling Contractor: Subsurface Drilling and Remediation Driller: John Haliburda

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates	N. 193663 22 E 522870 34
Surface Elevation	11 1 FT MSL
Well Riser Elevation:	11 1 FT MSL

Job. No. 29600 97	Client: EFANE	Location: SITE 16 NCBC Davisville
Drilling Method Moble B-61		Boring No. SB16-29
6 in ID HAS		
Sampling Method 3" split spoon		Sheet 1 of 1
Drilling Water Level		Start 01/17/01 1113 / Drilling Date/Times / Finish 01/17/01 1240
Date		
Time		
Surface Conditions. asphalt		

Sample Type	Inches Driven/In Recvrd	Dpth Csg	Samp # / depth (ft)	PID (ppm) Above bk	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
3" SS	24 10	20	20-22	4.0	10	20	SP	Olive brown fine to medium SAND, trace fine gravel, loose, wet
					8			
					7	21		Sample submitted for laboratory analysis
					9			
						22		
						23		
						24		
						25		
						26		
						27		
						28		
						29		
3" SS	24 18	30	30-32	2.1	17	30		0-10 in.: Dark olive brown medium to fine SAND, trace silt, fine gravel
					15			loose, wet
					12	31		10-18 in.: Dark olive grey very fine to fine SAND, some silt, dense, wet
					11			
3" SS	24 22	30	32-34	1.4	4	32		0-14 in.: Dark olive gray fine to medium SAND, trace silt, loose, wet
					8			14-22 in.: Dark olive grey very fine to fine SAND, some silt, dense, wet
					14	33	SM	
					12			Sample submitted for laboratory analysis
						34		
						35		
						36		
						37		
						38		
						39		

Logged by: Kevin Baum Date. 01/17/01

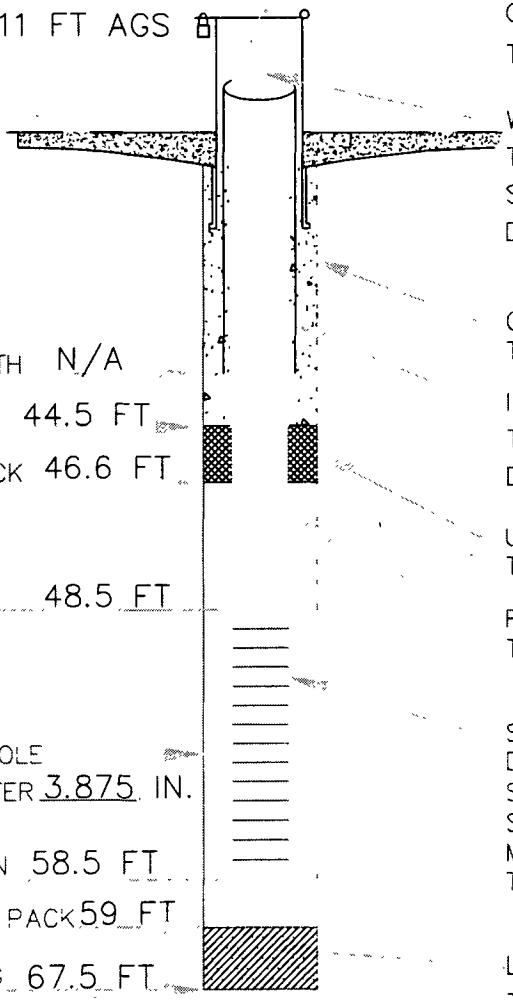
Drilling Contractor: Subsurface Drilling and Remediation Driller: Brad Haase

APPENDIX E
STAGE I AND II
MONITORING WELL CONSTRUCTION DIAGRAMS

MONITORING WELL CONSTRUCTION

MW16-01D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 5/16/00	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 33.93 MSL ELEVATION TOP OF PVC: 36.04 MSL	COORDINATES N: 194076.73 E: 522730.21
DEPTH TO WATER: 22.64 (BELOW TOP OF RISER) DATE/TIME 10/4/00	EA INSPECTOR: K BAUM/J. NORBERG
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 57.2 FT 3.875 IN. ROLLERBIT TO 62.5 FT 2 IN. NX CORE BARREL TO 67.5 FT	



TOP OF RISER 2.11 FT AGS

RISER LENGTH 50.61 FT

INNER CASING DEPTH N/A

TOP OF SEAL 44.5 FT

TOP OF FILTER PACK 46.6 FT

TOP OF SCREEN 48.5 FT

SCREEN LENGTH 10'

BOREHOLE DIAMETER 3.875 IN.

BOTTOM OF SCREEN 58.5 FT

BOTTOM OF FILTER PACK 59 FT

BOTTOM OF BORING 67.5 FT

PROTECTIVE CASING
TYPE: STEEL
LOCKING: YES
STICK UP: 2.3 FT AGS
DIAMETER: 4 IN.

GROUND SURFACE
TYPE: GRASS

WELL RISER
TYPE: PVC
STICK UP: 2.11 FT AGS
DIAMETER: 2" ID

GROUT
TYPE: CEMENT

INNER CASING
TYPE: N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE: 00 SAND

SCREEN
DIAMETER: 2" ID
SLOT SIZE: 0.006"
SCHEDULE: 40
MATERIAL: PVC
TYPE OF PIPE JOINTS: THREADED

LOWER SEAL
TYPE: BENTONITE

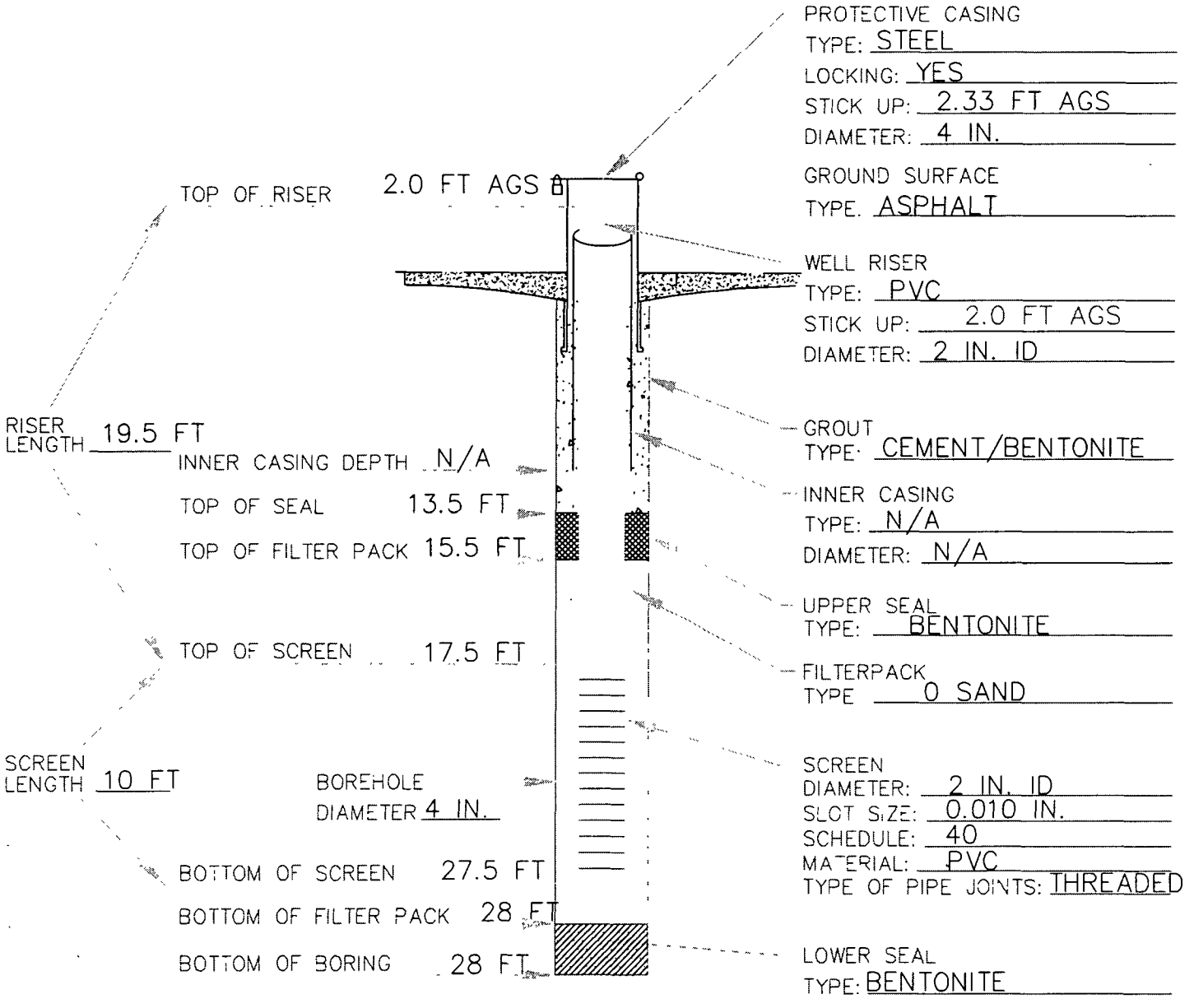
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-01S

CLIENT/SITE NAME NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 12/20/00	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 33 90' MSL ELEVATION TOP OF WELL RISER: 35.90' MSL	COORDINATES: N: 194083.34 E. 522726.77
DEPTH TO WATER: 20.32' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: K Baum
DRILLING METHOD & DEPTH 6 IN. HOLLOW STEM AUGER TO 28 FT	



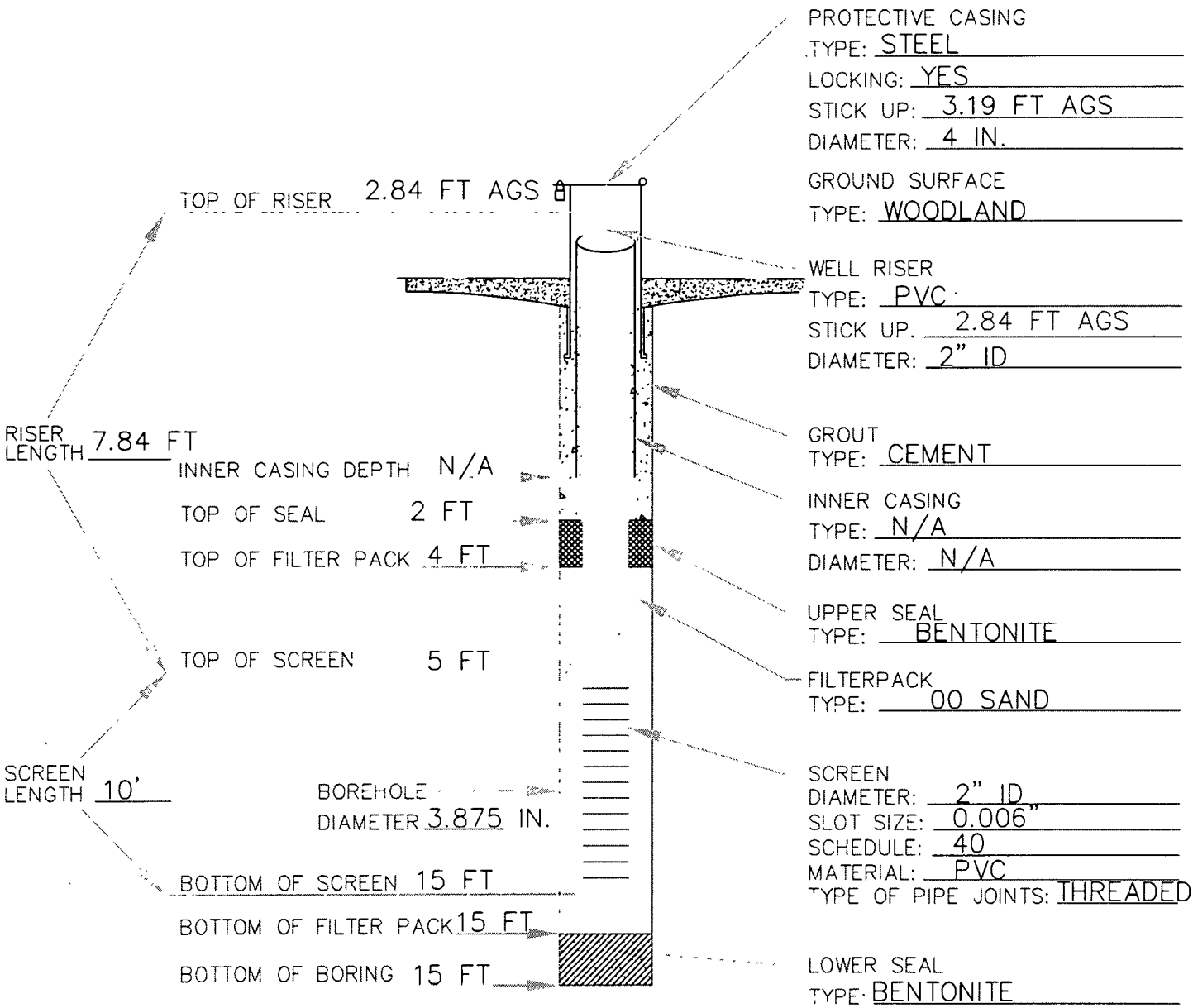
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-02S

CLIENT/SITE NAME NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 5/24/00	PROJECT No. 29600.97.3201
ELEVATION OF GROUND SURFACE: 20.88 MSL ELEVATION TOP OF PVC 23.72 MSL	COORDINATES: N 194168.75 E: 523216.02
DEPTH TO WATER: 12.74 (BELOW TOP OF RISER) DATE/TIME 10/4/00	EA INSPECTOR: J. NORBERG
DRILLING METHOD & DEPTH: 2 IN. SPLIT SPOON TO 12 FT 4.25 IN. HSA TO 15 FT	



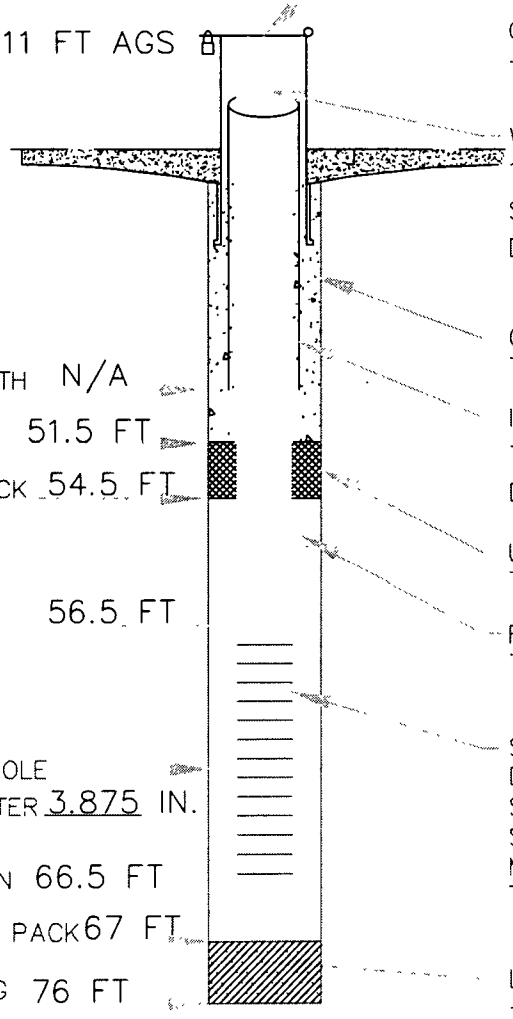
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-02D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 5/23/00	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE 20.94 MSL ELEVATION TOP OF PVC: 23.05 MSL	COORDINATES: N. 194168.33 E: 523223.45
DEPTH TO WATER: 13.22 (BELOW TOP OF RISER) DATE/TIME 10/4/00	EA INSPECTOR: K BAUM/J. NORBERG
DRILLING METHOD & DEPTH 4.25 IN. HSA TO 10 FT 4 IN. TEMPORARY STEEL CASING TO 64 FT 3.875 IN. ROLLERBIT TO 71 FT 2 IN. NX CORE BARREL TO 76 FT	



TOP OF RISER 2.11 FT AGS

RISER LENGTH 57.61 FT

INNER CASING DEPTH N/A

TOP OF SEAL 51.5 FT

TOP OF FILTER PACK 54.5 FT

TOP OF SCREEN 56.5 FT

SCREEN LENGTH 10'

BOREHOLE DIAMETER 3.875 IN.

BOTTOM OF SCREEN 66.5 FT

BOTTOM OF FILTER PACK 67 FT

BOTTOM OF BORING 76 FT

PROTECTIVE CASING
TYPE: STEEL
LOCKING: YES
STICK UP: 2.45 FT AGS
DIAMETER: 4 IN.

GROUND SURFACE
TYPE: WOODLAND

WELL RISER
TYPE: PVC
STICK UP: 2.11 FT AGS
DIAMETER: 2" ID

GROUT
TYPE: CEMENT

INNER CASING
TYPE: N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE 00 SAND

SCREEN
DIAMETER: 2" ID
SLOT SIZE: 0.006"
SCHEDULE: 40
MATERIAL: PVC
TYPE OF PIPE JOINTS: THREADED

LOWER SEAL
TYPE: BENTONITE

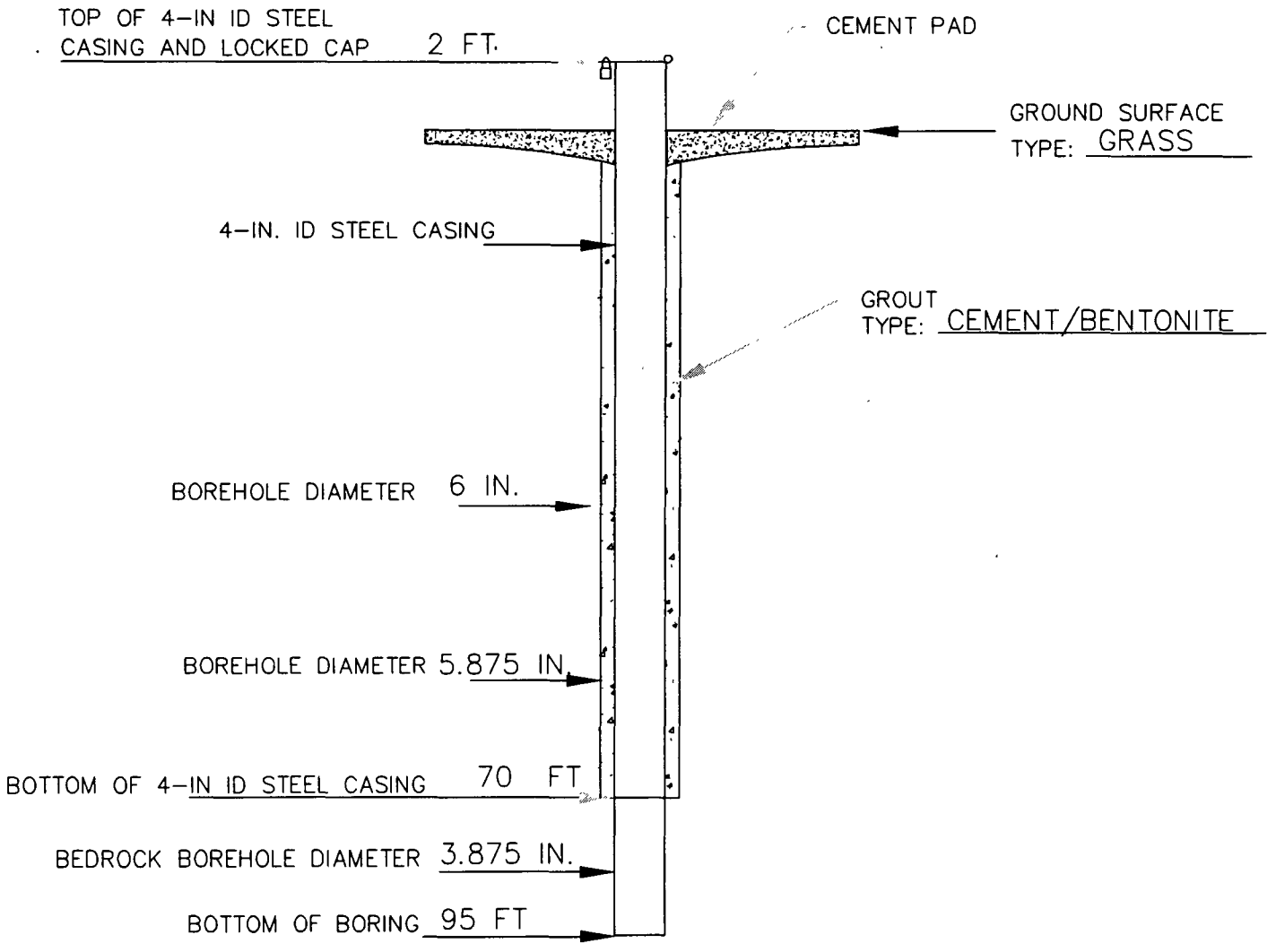
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-02R

CLIENT/SITE NAME: NORDIV NAVFAC, NCBC DAVISVILLE SITE 16, RI	
DATE INSTALLED: 02/01/01	PROJECT No. 29600.97.3201
ELEVATION OF GROUND SURFACE: 21.17' MSL ELEVATION TOP OF PUMP: 22.99' MSL	COORDINATES: N: 194170.22 E: 523209.08
DEPTH TO WATER: 11.53' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: ROB WASSERMAN
DRILLING METHOD & DEPTH: 6 IN. TEMPORARY STEEL CASING TO 67 FT 4 IN. PERMANENT STEEL CASING TO 70 FT 5.875-IN. ID ROLLERBIT TO 70 FT 3.875-IN. ID ROLLERBIT TO 95 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

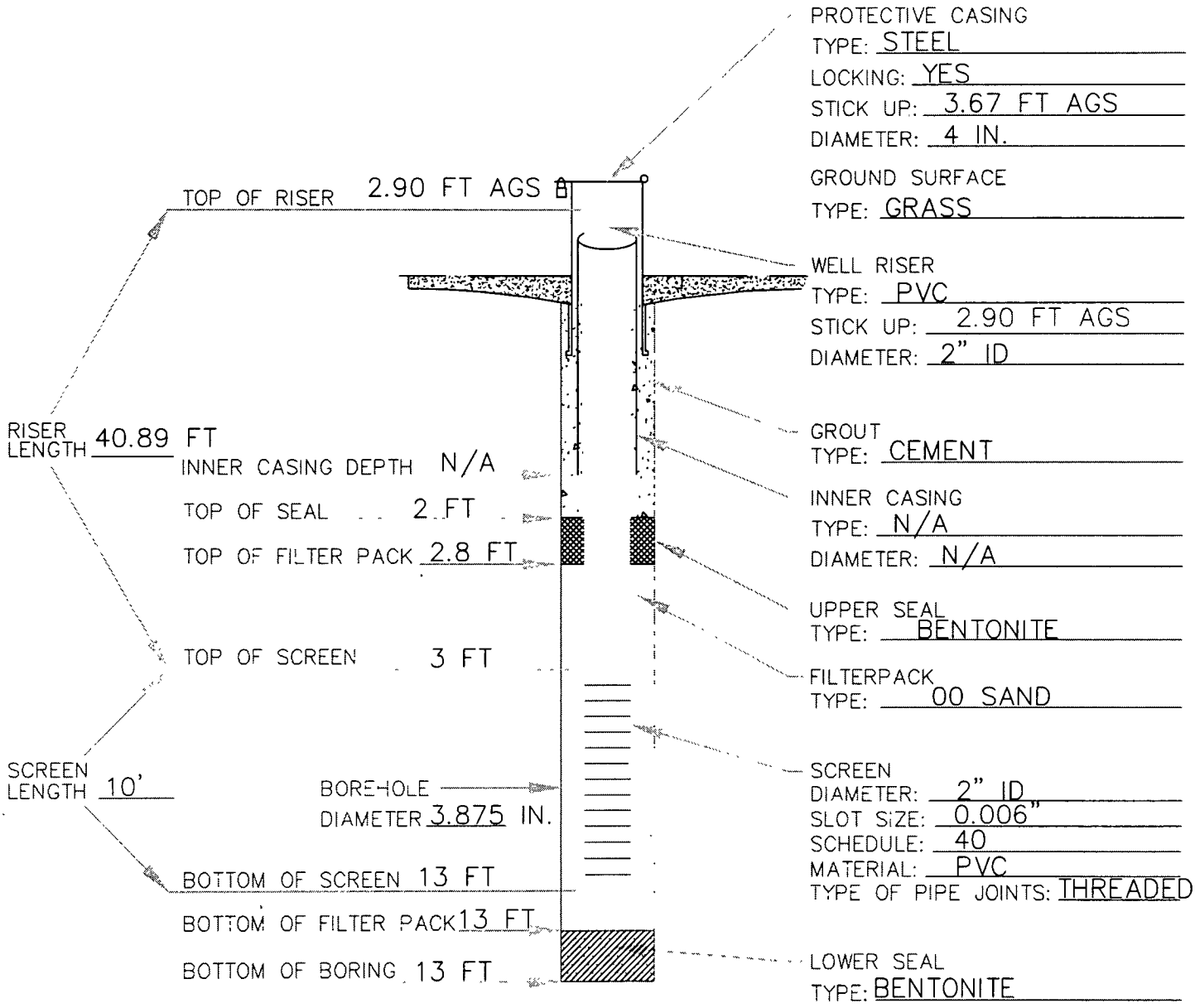
EA ENGINEERING, SCIENCE, AND TECHNOLOGY

F:\RWC\EA106R.DWG

MONITORING WELL CONSTRUCTION

MW16-03S

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 6/12/00	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 11.24 MSL ELEVATION TOP OF WELL RISER 14.14 MSL	COORDINATES: N. 194663.16 E. 523084.25
DEPTH TO WATER: 5.89 (BELOW TOP OF RISER) DATE/TIME 10/4/00	EA INSPECTOR: K BAUM
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING AND 3.875 IN. ROLLERBIT TO 13 FT	



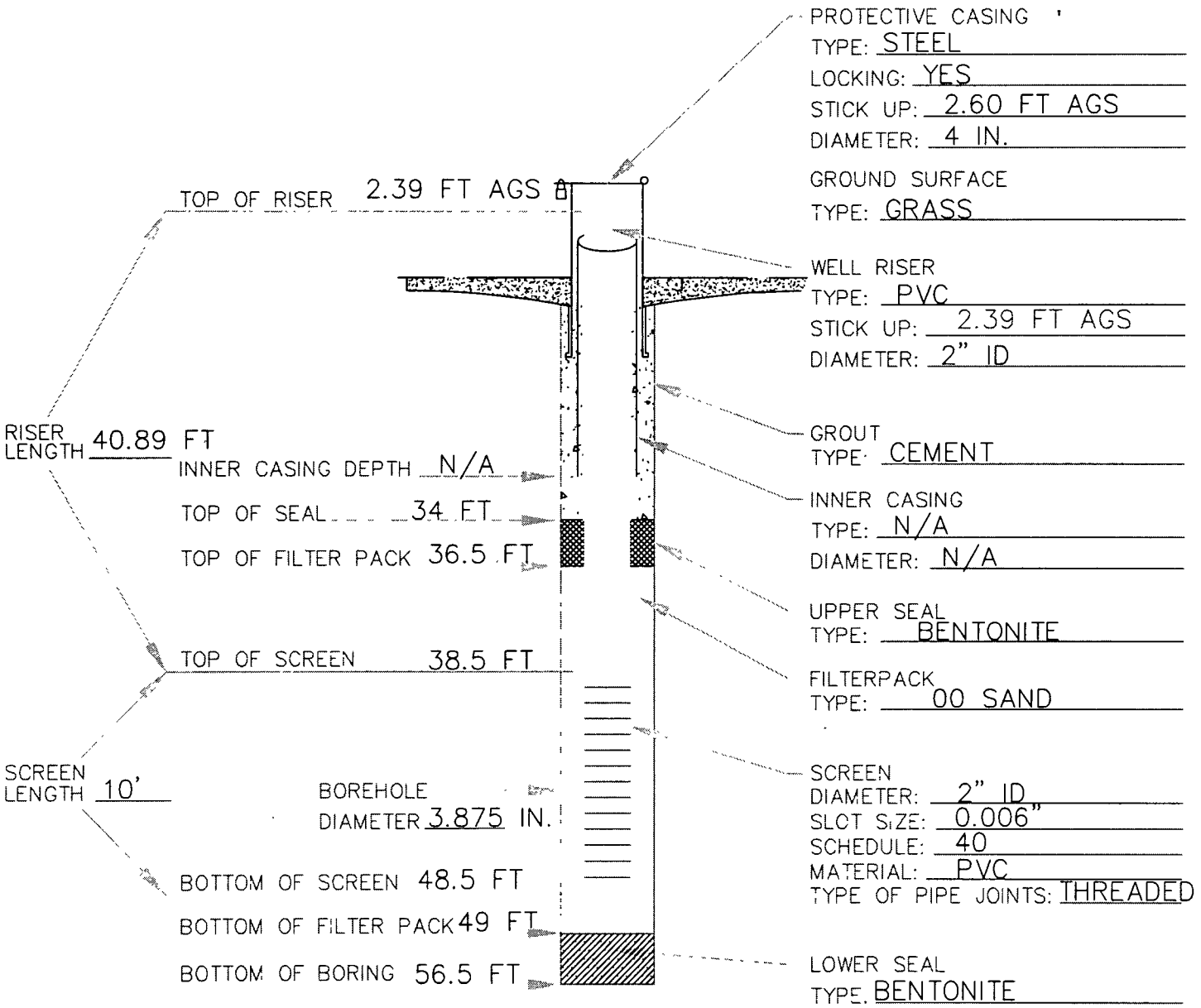
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-03D

CLIENT/SITE NAME. NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 6/1/00	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 11.08 MSL ELEVATION TOP OF WELL RISER: 13.47 MSL	COORDINATES: N: 194663.39 E: 523089.62
DEPTH TO WATER: 7.01 (BELOW TOP OF RISER) DATE/TIME 10/4/00	EA INSPECTOR: K BAUM
DRILLING METHOD & DEPTH 4 IN. TEMPORARY CASING TO 48.5 FT 3.875 IN. ROLLERBIT TO 51.5 FT 2 IN. NX CORE BARREL TO 56.5 FT	



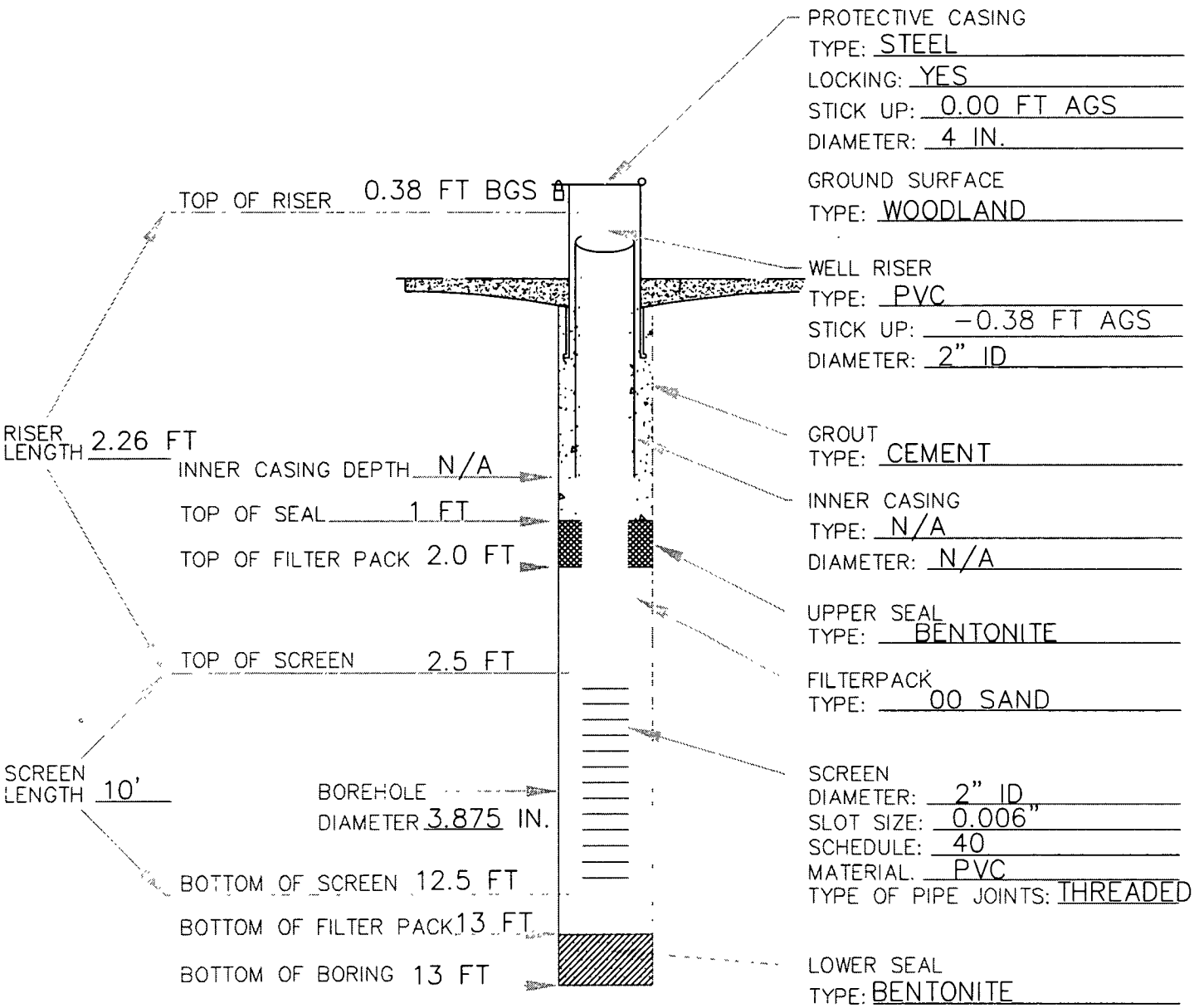
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-04S

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 6/14/00	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 10.30 MSL ELEVATION TOP OF WELL RISER: 9.92 MSL	COORDINATES N: 194651.43 E: 523273 80
DEPTH TO WATER: 4.33' (BELOW TOP OF RISER) DATE/TIME 10/4/00	EA INSPECTOR: K BAUM
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY CASING TO 13 FT 3.875 IN. ROLLERBIT TO 13 FT	



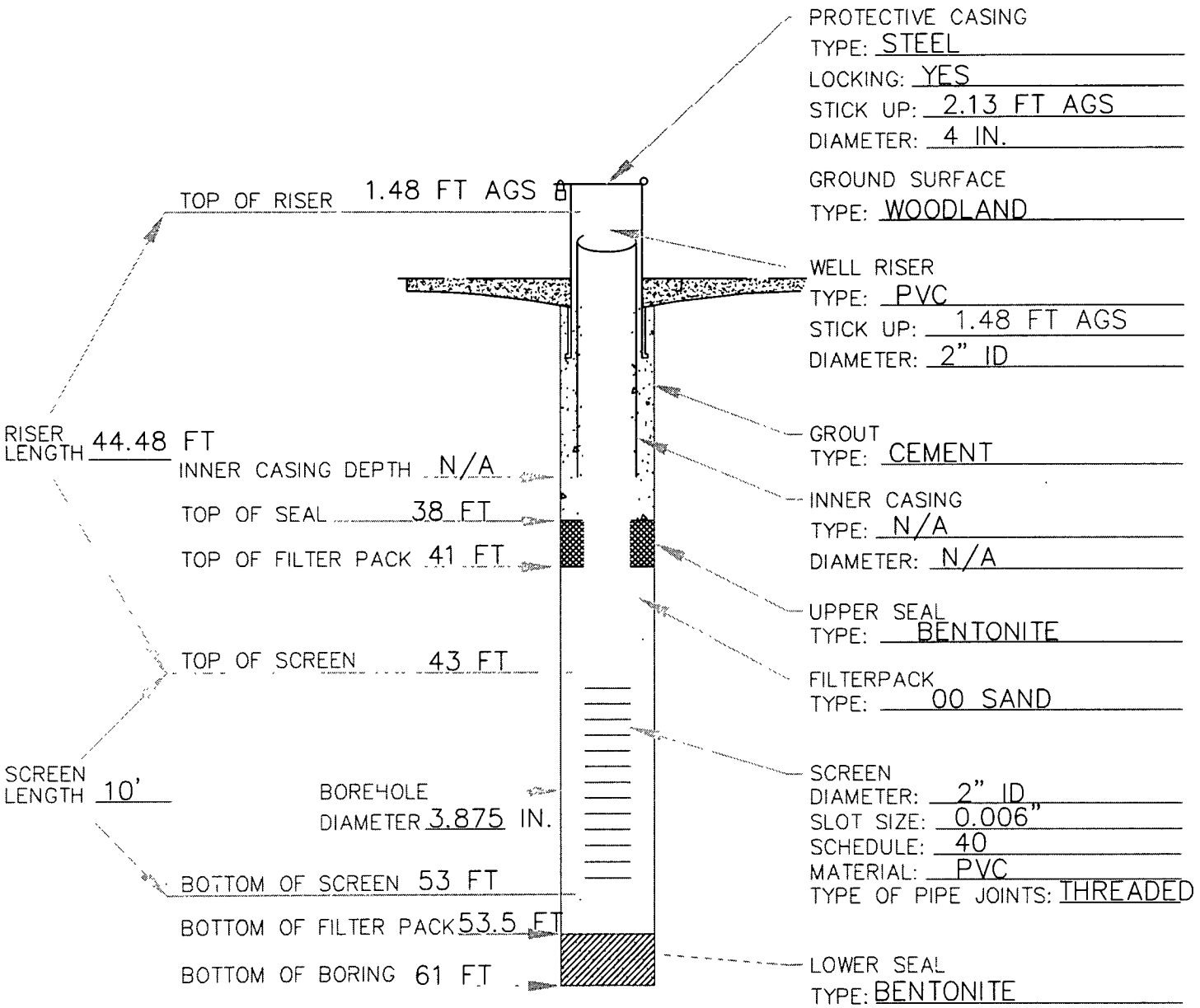
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-04D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 6/13/00	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 10.43 MSL ELEVATION TOP OF WELL RISER: 11.91 MSL	COORDINATES: N: 194649.29 E: 523267.83
DEPTH TO WATER: 7.59 (BELOW TOP OF RISER) DATE/TIME 10/4/00	EA INSPECTOR: K BAUM
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY CASING TO 53 FT 3.875 IN. ROLLERBIT TO 56 FT 2 IN. NX CORE BARREL TO 61 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-05S

CLIENT/SITE NAME NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, PHASE III RI	
DATE INSTALLED: 12/20/01	PROJECT No. 29600.97
ELEVATION OF GROUND SURFACE: 13.78' MSL ELEVATION TOP OF WELL RISER: 15.78' MSL	COORDINATES: N: 194557.80 E: 523570.10
DEPTH TO WATER: 12.57' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: K Baum
DRILLING METHOD & DEPTH. 6 IN. HOLLOW STEM AUGER TO 18.5 FT	

PROTECTIVE CASING
TYPE: STEEL
LOCKING: YES
STICK UP: 2.35 FT AGS
DIAMETER: 4 IN.

GROUND SURFACE
TYPE: GRASS

WELL RISER
TYPE: PVC
STICK UP: 2.0 FT AGS
DIAMETER: 2 IN. ID

GROUT
TYPE: CEMENT/BENTONITE

INNER CASING
TYPE: N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE: 0 SAND

SCREEN
DIAMETER: 2 IN. ID
SLOT SIZE: 0.010 IN.
SCHEDULE: 40
MATERIAL: PVC
TYPE OF PIPE JOINTS: THREADED

LOWER SEAL
TYPE: BENTONITE

TOP OF RISER 2.0 FT AGS

RISER LENGTH 10.0 FT

INNER CASING DEPTH N/A

TOP OF SEAL 4 FT

TOP OF FILTER PACK 6 FT

TOP OF SCREEN 8 FT

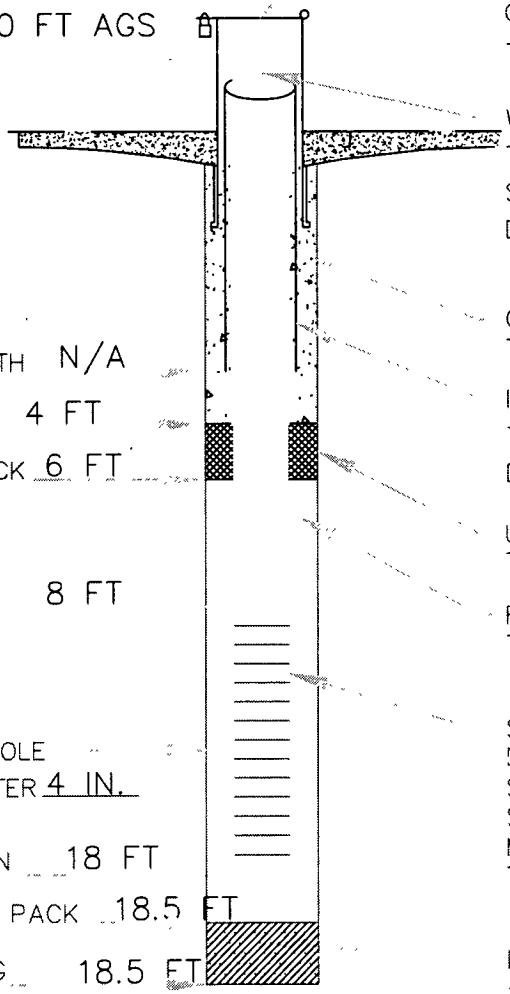
SCREEN LENGTH 10 FT

BOREHOLE DIAMETER 4 IN.

BOTTOM OF SCREEN 18 FT

BOTTOM OF FILTER PACK 18.5 FT

BOTTOM OF BORING 18.5 FT



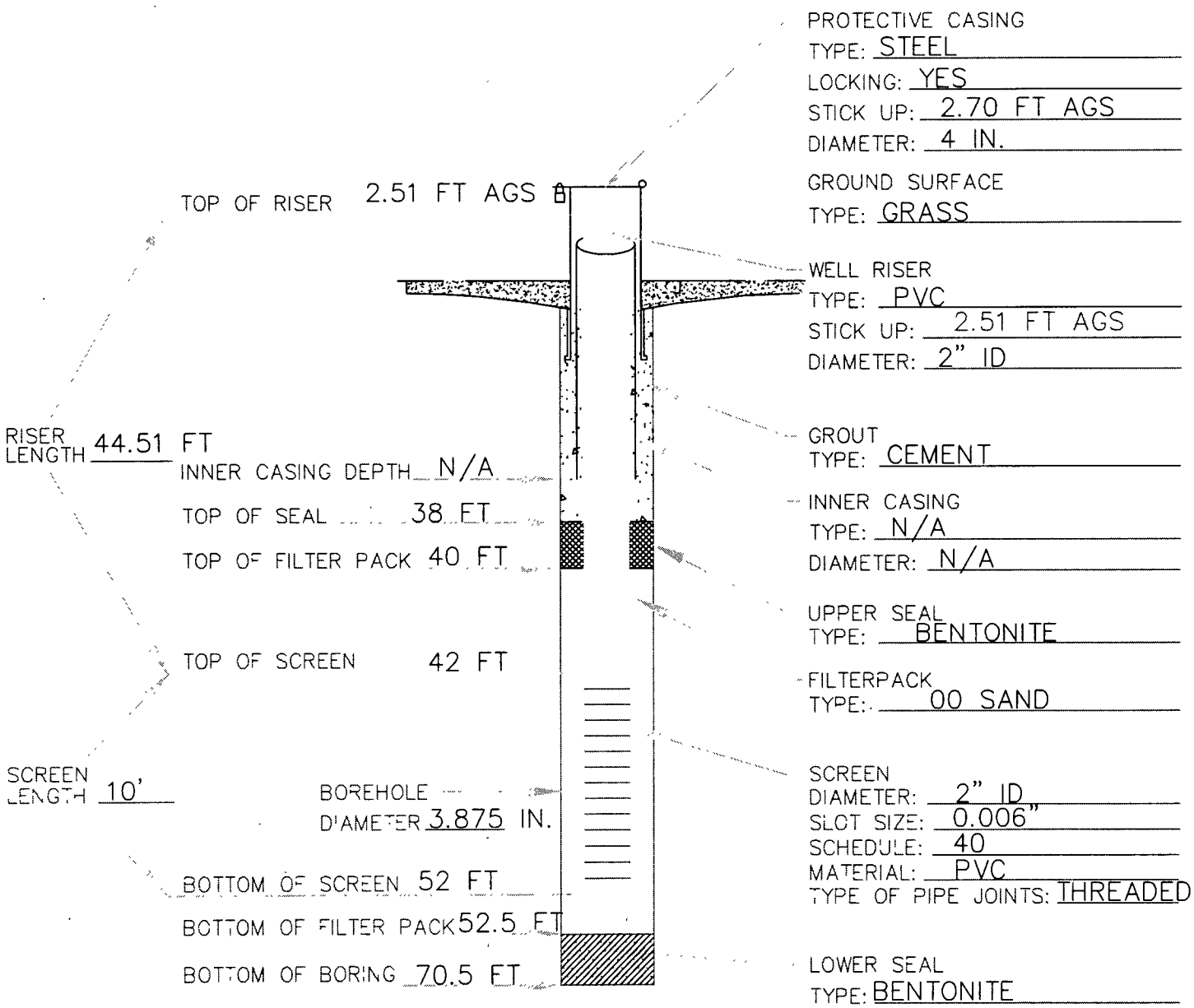
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-05D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 5/26/00	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE 13.69 MSL ELEVATION TOP OF WELL RISER: 13.20 MSL	COORDINATES: N: 194563.14 E: 523571.18
DEPTH TO WATER: 13.01 (BELOW TOP OF RISER) DATE/TIME 10/4/00	EA INSPECTOR: K BAUM/J. NORBERG
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY CASING TO 62.5 FT 3.875 IN. ROLLERBIT TO 65.5 FT 2 IN. NX CORE BARREL TO 70.5 FT	



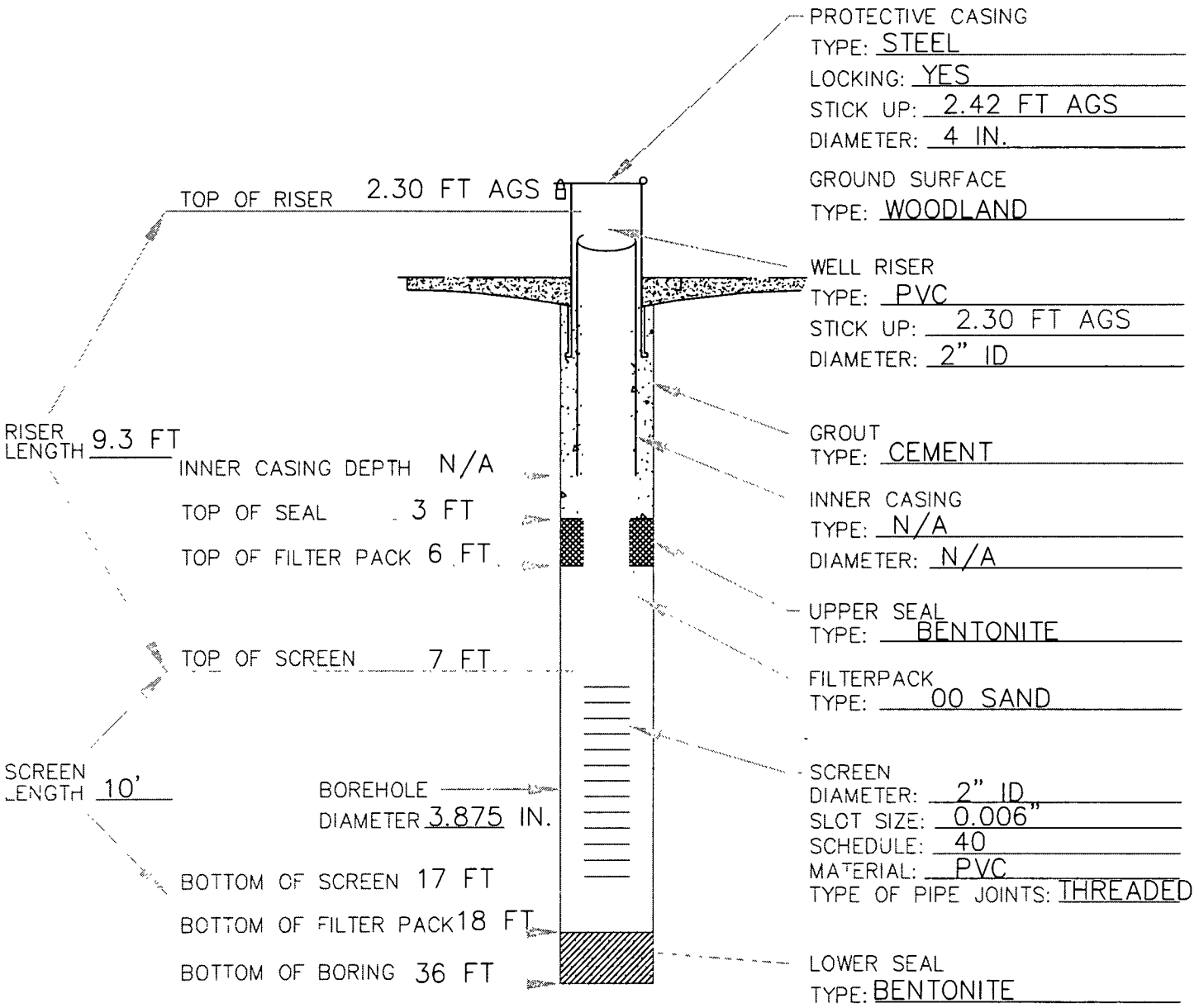
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-06S

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 6/21/00	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 25.20 MSL ELEVATION TOP OF WELL RISER: 27.43 MSL	COORDINATES: N: 194453.17 E: 522779.70
DEPTH TO WATER: 15.98 (BELOW TOP OF RISER) DATE/TIME 10/4/00	EA INSPECTOR: K BAUM
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY CASING TO 33 FT 3.875 IN. ROLLERBIT TO 36 FT	



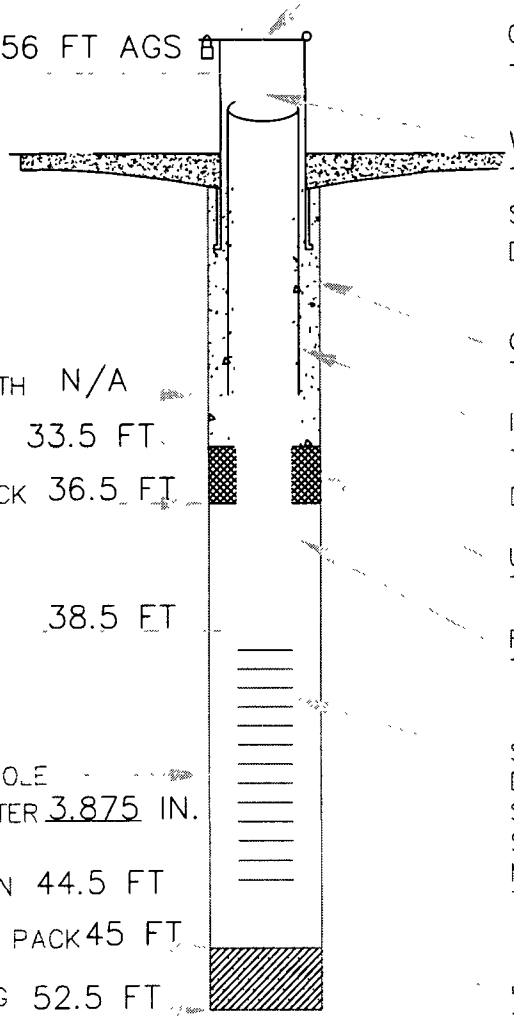
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-06D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 6/22/00	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 25.19 MSL ELEVATION TOP OF WELL RISER 27.75 MSL	COORDINATES. N: 194457.78 E: 522780.45
DEPTH TO WATER: 15.70 (BELOW TOP OF RISER) DATE/TIME 10/4/00	EA INSPECTOR K BAUM
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY CASING TO 42 FT 3.875 IN. ROLLERBIT TO 47.5 FT 2 IN. NX CORE BARREL TO 52.5 FT	



PROTECTIVE CASING
TYPE: STEEL
LOCKING: YES
STICK UP: 2.79 FT AGS
DIAMETER: 4 IN.

GROUND SURFACE
TYPE: WOODLAND

WELL RISER
TYPE: PVC
STICK UP: 2.56 FT AGS
DIAMETER: 2" ID

GROUT
TYPE: CEMENT

INNER CASING
TYPE: N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE: 00 SAND

SCREEN
DIAMETER: 2" ID
SLOT SIZE: 0.006"
SCHEDULE: 40
MATERIAL: PVC
TYPE OF PIPE JOINTS: THREADED

LOWER SEAL
TYPE: BENTONITE

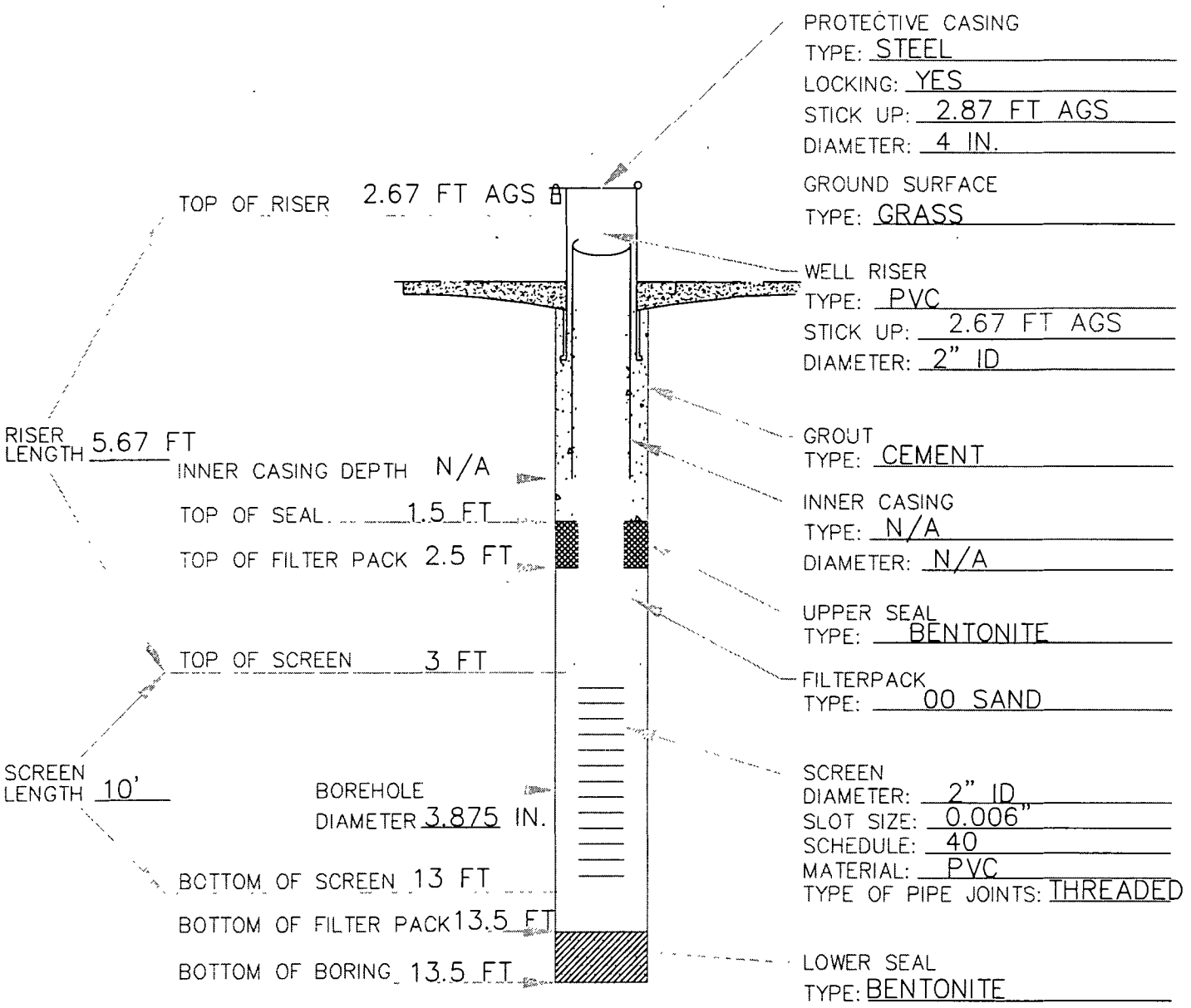
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-07S

CLIENT/SITE NAME NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 6/19/00	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE. 19.60 MSL ELEVATION TOP OF WELL RISER· 22.27 MSL	COORDINATES. N: 194424.67 E: 522907.23
DEPTH TO WATER· 10.87 (BELOW TOP OF RISER) DATE/TIME 10/4/00	EA INSPECTOR· K BAUM
DRILLING METHOD & DEPTH· 3.875 IN. ROLLERBIT TO 17 FT	



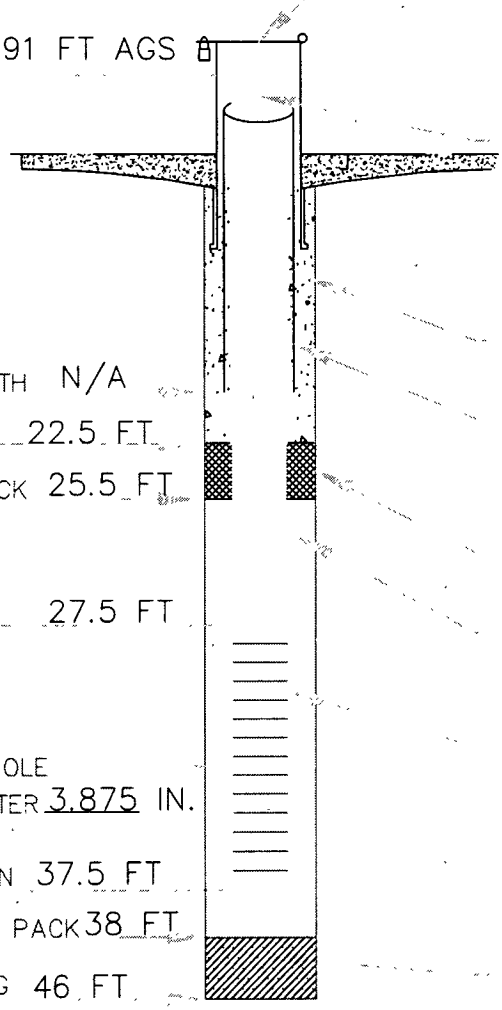
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-07D

CLIENT/SITE NAME. NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 6/16/00	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 19.46 MSL ELEVATION TOP OF WELL RISER: 22.37 MSL	COORDINATES: N: 194418.17 E: 522909.67
DEPTH TO WATER: 10.93 (BELOW TOP OF RISER) DATE/TIME 10/4/00	EA INSPECTOR: K BAUM
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY CASING TO 38 FT 3.875 IN. ROLLERBIT TO 41 FT 2 IN. NX CORE BARREL TO 46 FT	



TOP OF RISER 2.91 FT AGS

RISER LENGTH 30.41 FT

INNER CASING DEPTH N/A

TOP OF SEAL 22.5 FT

TOP OF FILTER PACK 25.5 FT

TOP OF SCREEN 27.5 FT

SCREEN LENGTH 10'

BOREHOLE DIAMETER 3.875 IN.

BOTTOM OF SCREEN 37.5 FT

BOTTOM OF FILTER PACK 38 FT

BOTTOM OF BORING 46 FT

PROTECTIVE CASING
TYPE: STEEL
LOCKING: YES
STICK UP: 3.18 FT AGS
DIAMETER: 4 IN.

GROUND SURFACE
TYPE: GRASS

WELL RISER
TYPE: PVC
STICK UP: 2.91 FT AGS
DIAMETER: 2" ID

GROUT
TYPE: CEMENT

INNER CASING
TYPE: N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE: 00 SAND

SCREEN
DIAMETER: 2" ID
SLOT SIZE: 0.006"
SCHEDULE: 40
MATERIAL: PVC
TYPE OF PIPE JOINTS: THREADED

LOWER SEAL
TYPE: BENTONITE

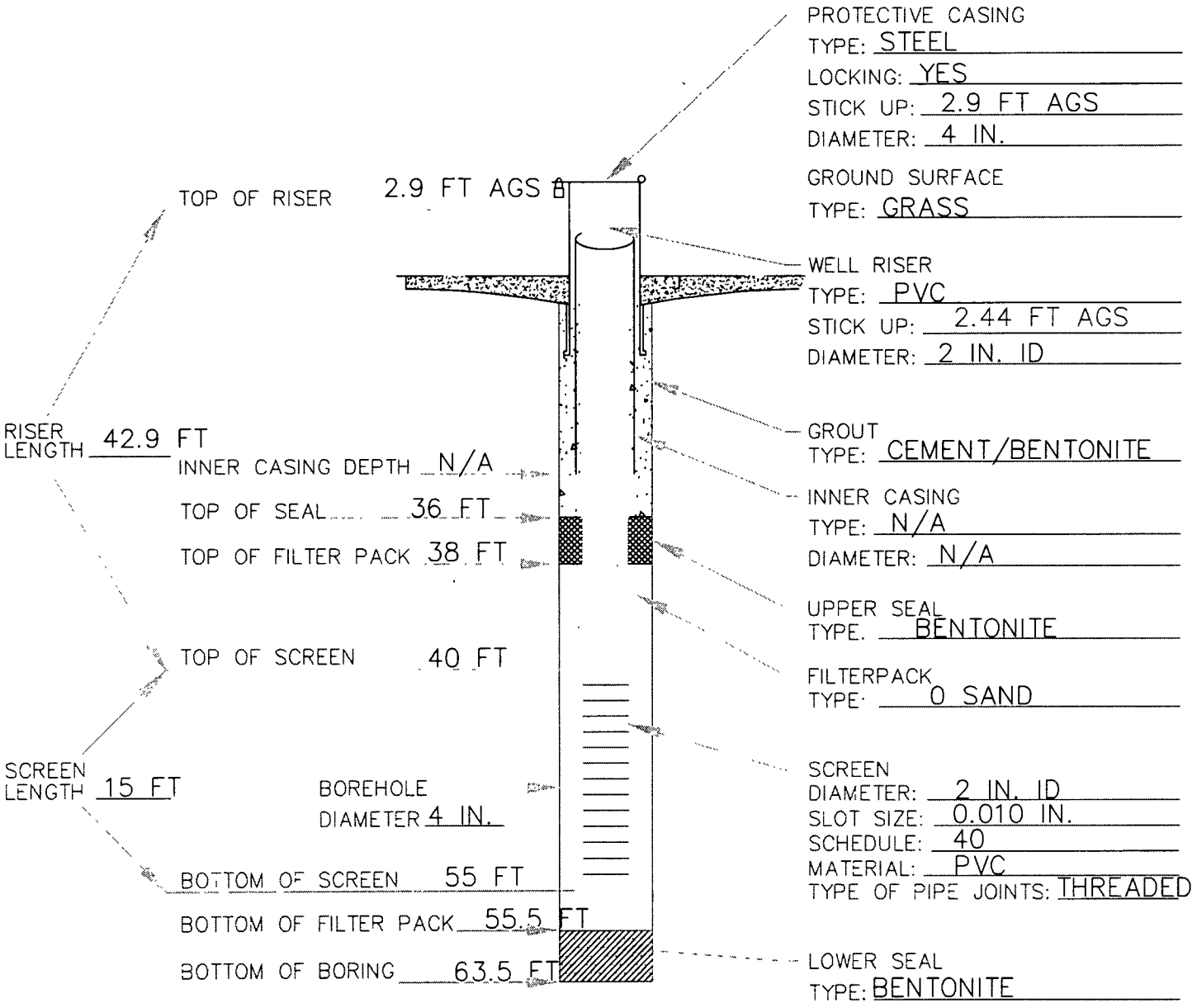
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-08D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 02/05/01	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 27.95' MSL ELEVATION TOP OF WELL RISER: 30.39' MSL	COORDINATES: N 194122.40 E: 522905.27
DEPTH TO WATER: 15.77' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: K Baum
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 54 FT 3 7/8 ROLLERBIT TO 58.5 FT NX CORE FROM 58.5 TO 63.5 FT	



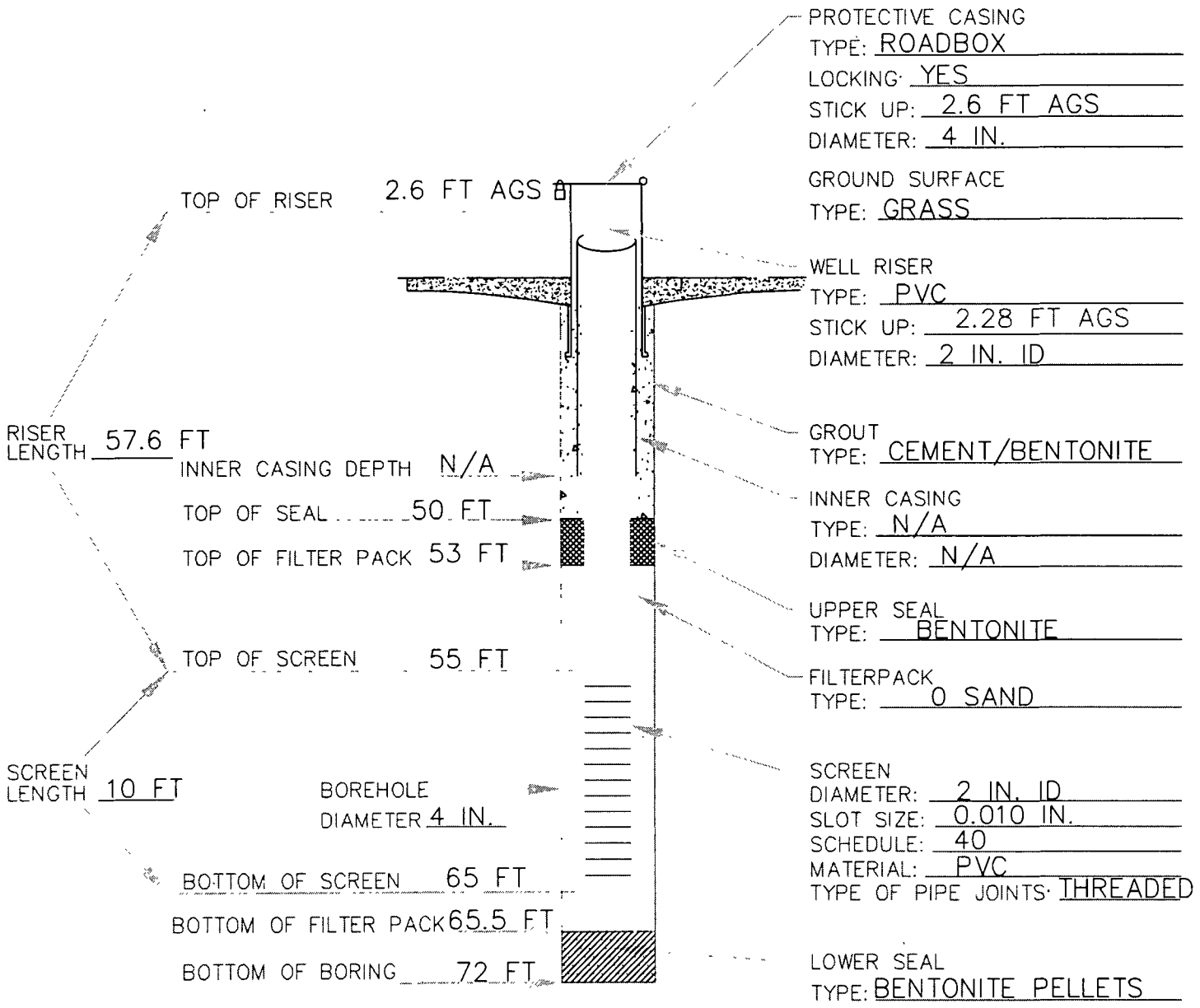
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-09D

CLIENT/SITE NAME. NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 12/06/00	PROJECT No 29600.97 3201
ELEVATION OF GROUND SURFACE: 32.33' MSL ELEVATION TOP OF WELL RISER: 34.61' MSL	COORDINATES. N: 193746.72 E: 522373.20
DEPTH TO WATER: 17.04' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR TOM BIOLSI
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 63 FT 3 7/8 ROLLERBIT TO 67 FT NX CORE FROM 67-72 FT	



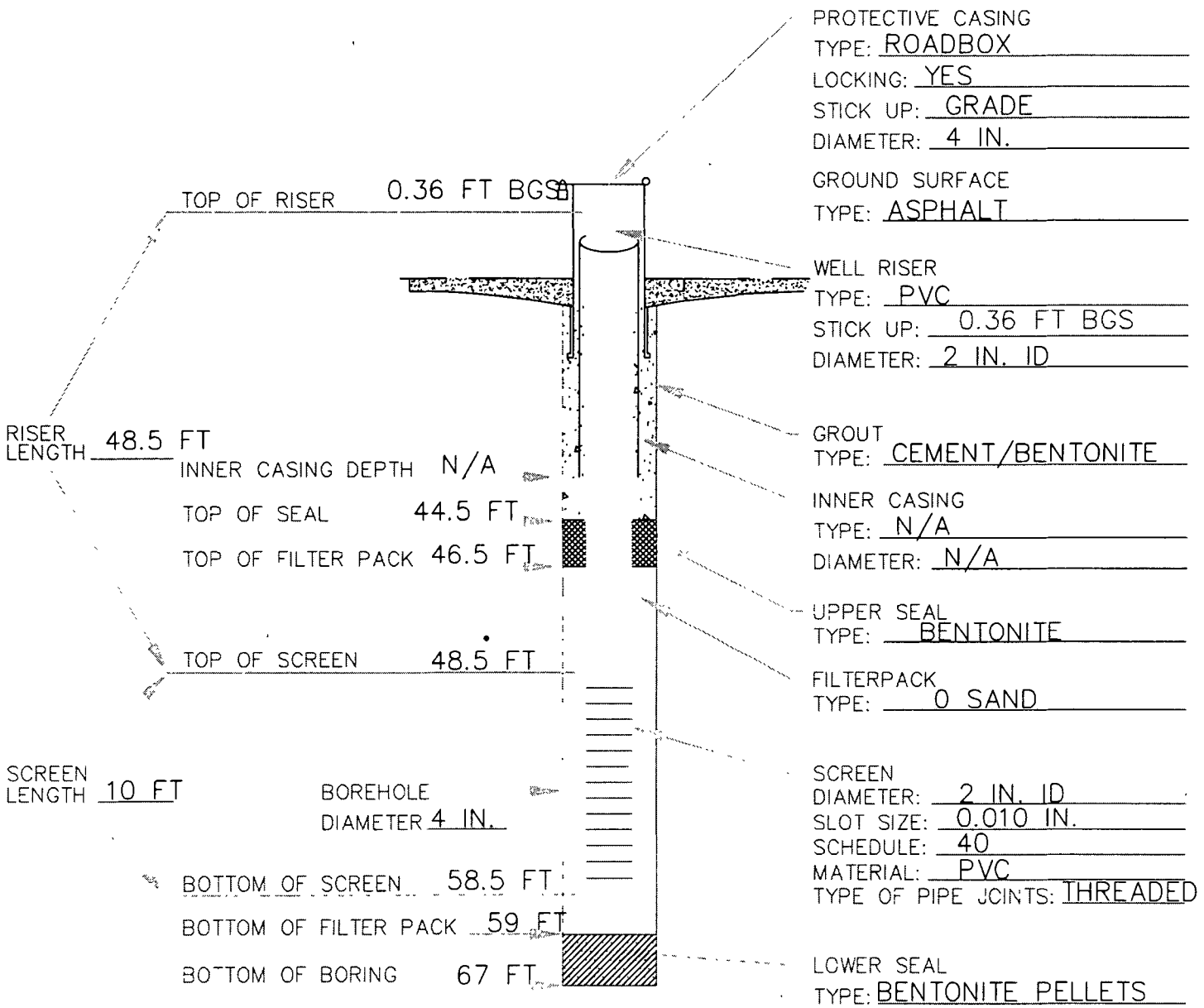
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-10D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 12/06/00	PROJECT No 29600.97 3201
ELEVATION OF GROUND SURFACE: 31.69' MSL ELEVATION TOP OF WELL RISER: 31.33' MSL	COORDINATES: N. 193518.62 E: 522317.19
DEPTH TO WATER 13.94' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: KEVIN BAUM
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 54 FT 3 7/8 IN. ROLLERBIT TO 59-62 FT NX CORE FROM 62 TO 67 FT	



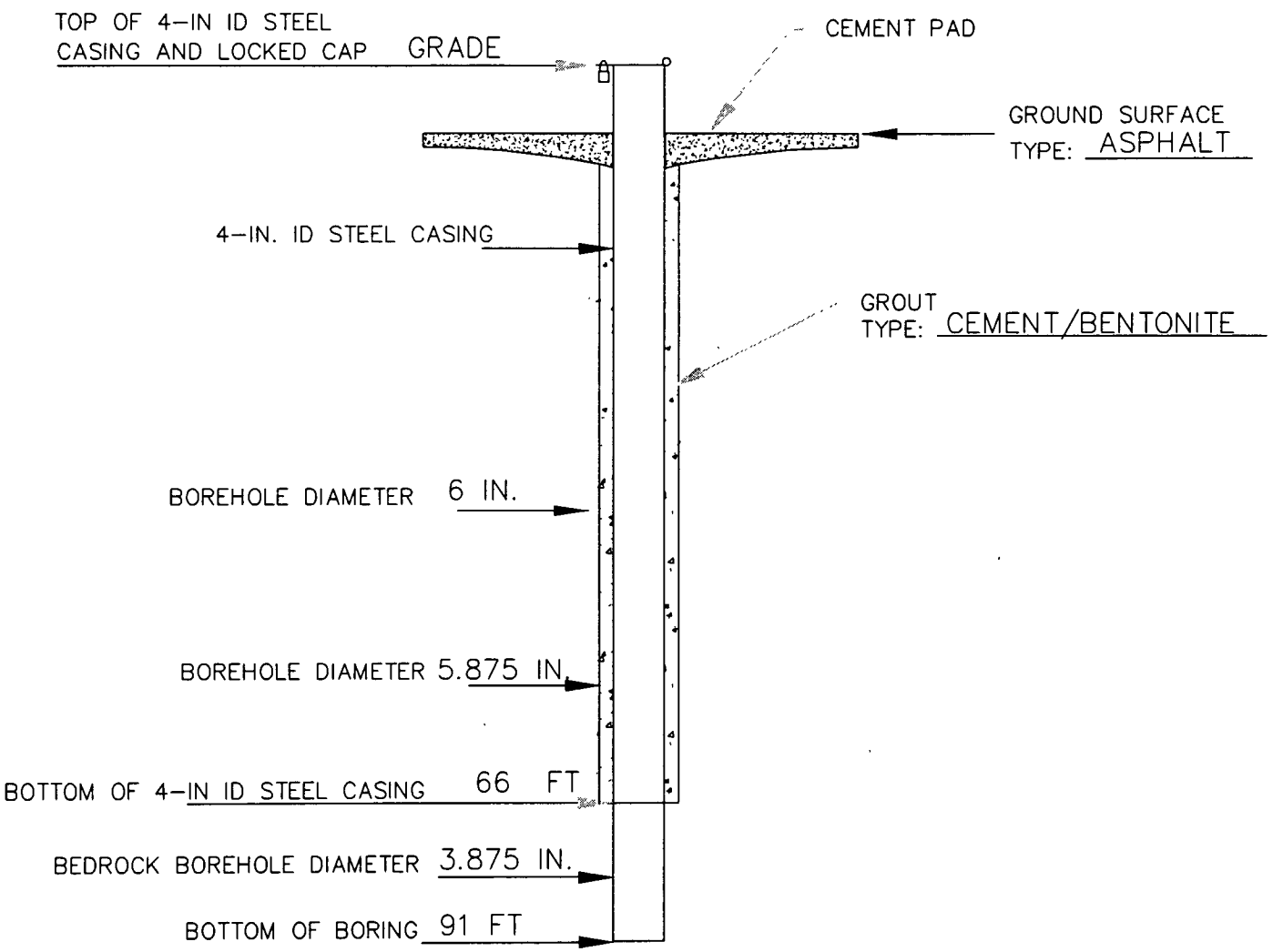
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-10R

CLIENT/SITE NAME: NORDIV NAVFAC, NCBC DAVISVILLE SITE 16, RI	
DATE INSTALLED: 12/15/00	PROJECT No. 29600.97.3201
ELEVATION OF GROUND SURFACE: 31.53 MSL ELEVATION TOP OF WELL RISER: 31.35 MSL	COORDINATES: N: 193512.66 E: 522320.02
DEPTH TO WATER: 19.55 (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: KEVIN BAUM
DRILLING METHOD & DEPTH: 6 IN. TEMPORARY STEEL CASING TO 63 FT 4 IN. PERMANENT STEEL CASING TO 63 FT 5.875-IN. ID ROLLERBIT TO 66 FT 3.875-IN. ID ROLLERBIT TO 91 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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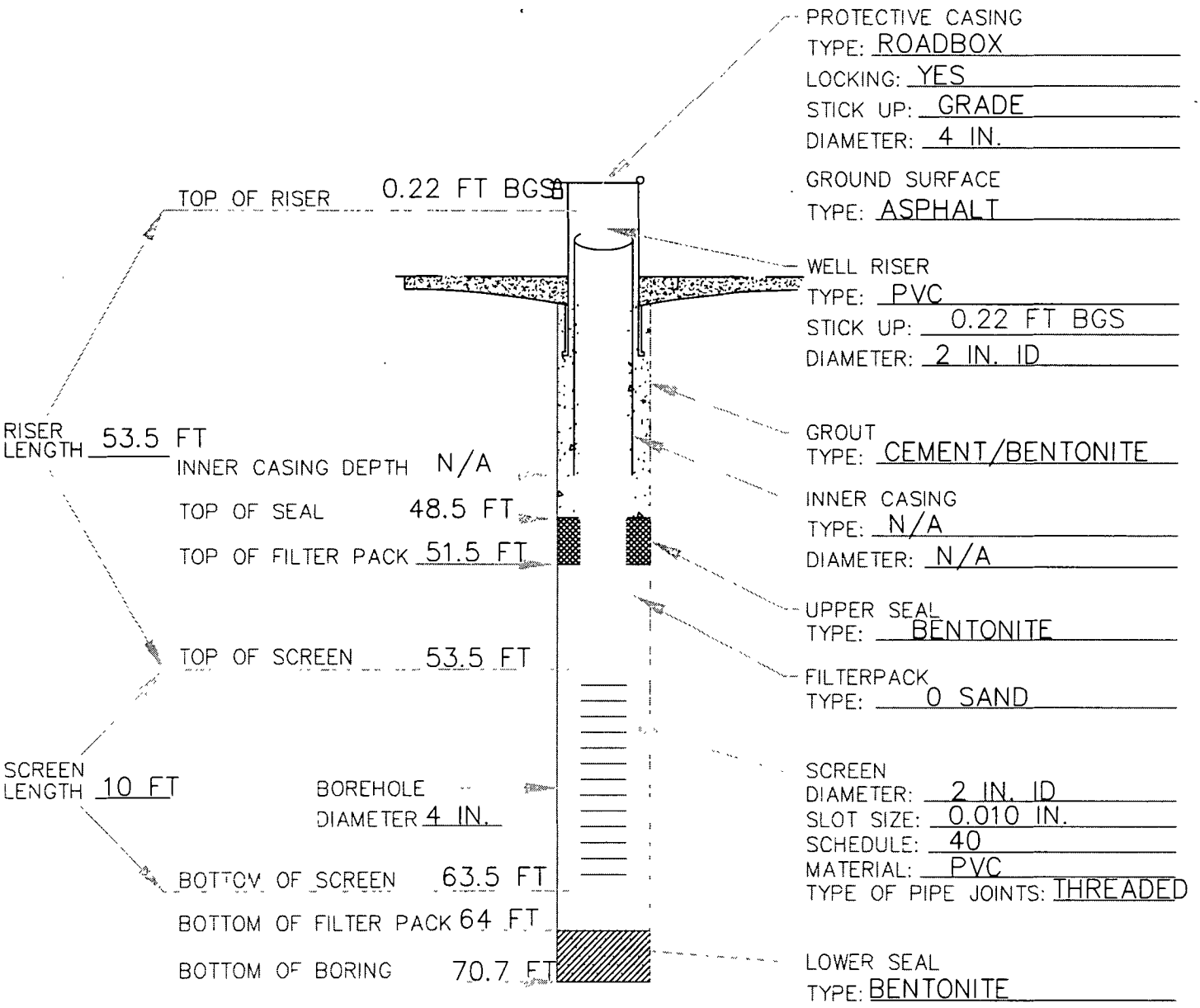
MONITORING WELL CONSTRUCTION

MW16-11D

CLIENT/SITE NAME NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 12/08/00	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 29.67' MSL ELEVATION TOP OF WELL RISER: 29.45' MSL	COORDINATES. N: 193786.47 E: 522544.61
DEPTH TO WATER: 12.26' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: TOM BIOLSI
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 58 FT 3 7/8 IN. ROLLERBIT TO 66 FT NX CORE FROM 66 TO 70.8 FT	



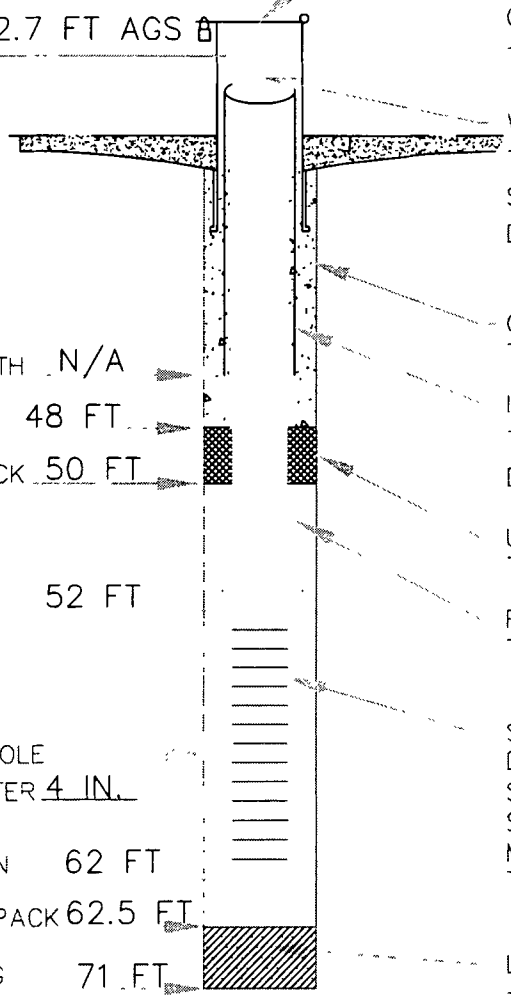
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-12D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 12/20/00	PROJECT No 29600.97 3201
ELEVATION OF GROUND SURFACE: 29.03' MSL ELEVATION TOP OF WELL RISER: 31.36' MSL	COORDINATES: N: 193640.09 E: 522663.42
DEPTH TO WATER: 15.04' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: TOM BIOLSI
DRILLING METHOD & DEPTH: 4 IN. TEMORARY STEEL CASING TO 58 FT 3 7/8 IN. ROLLERBIT TO 66 FT NX CORE FROM 66 TO 71 FT	



PROTECTIVE CASING
TYPE: STEEL
LOCKING: YES
STICK UP: 2.7 FT AGS
DIAMETER: 4 IN.

GROUND SURFACE
TYPE: ASPHALT

WELL RISER
TYPE: PVC
STICK UP: 2.33 FT AGS
DIAMETER: 2 IN. ID

GROUT
TYPE: CEMENT/BENTONITE

INNER CASING
TYPE: N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE: 0 SAND

SCREEN
DIAMETER: 2 IN. ID
SLOT SIZE: 0.010 IN.
SCHEDULE. 40
MATERIAL: PVC
TYPE OF PIPE JOINTS: THREADED

LOWER SEAL
TYPE: BENTONITE

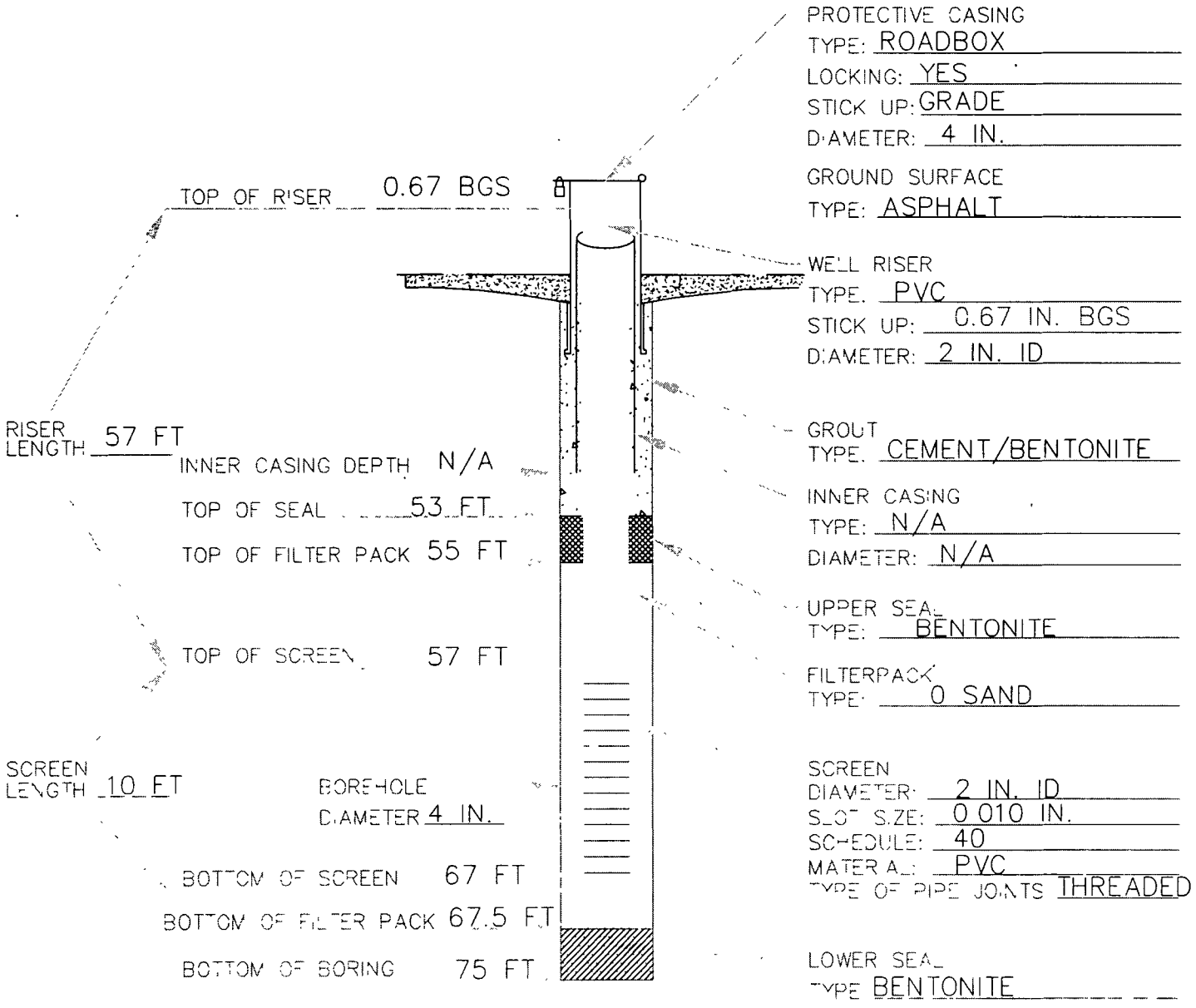
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-13D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 01/17/01	PROJECT No 29600.97 3201
ELEVATION OF GROUND SURFACE 29.99' MSL ELEVATION TOP OF PUMP. 29.32' MSL	COORDINATES. N: 193724.70 E 522489.31
DEPTH TO WATER: 12.02' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR TOM BIOLSI
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 64 FT 3 7/8 IN. ROLLERBIT TO 70 FT NX CORE FROM 70 TO 75 FT	



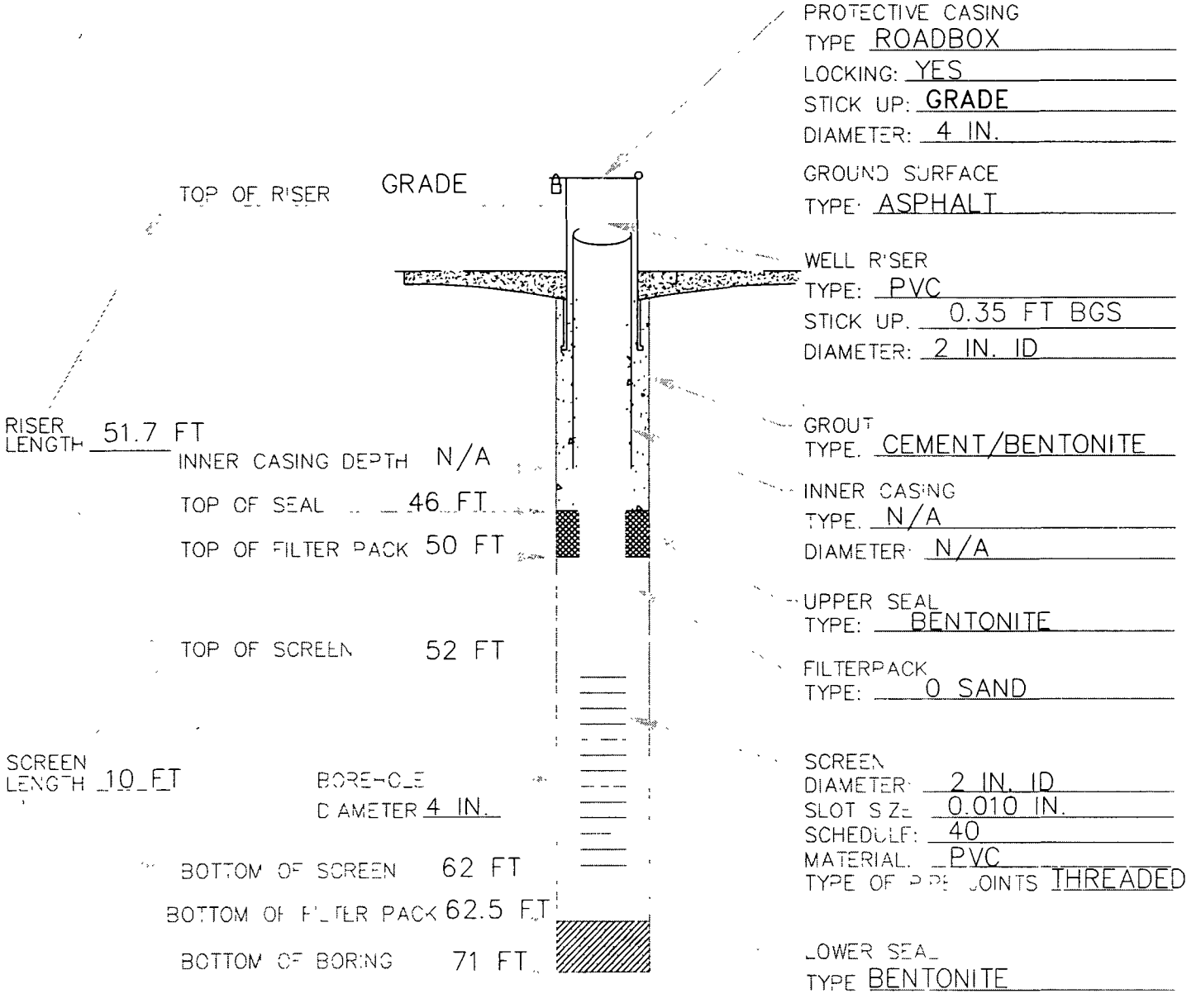
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASUREMENTS IN FT BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-14D

CLIENT/SITE NAME NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED. 01/30/01	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 29.88' MSL ELEVATION TOP OF WELL RISER: 29.53' MSL	COORDINATES: N: 193747.24 E: 522795.16
DEPTH TO WATER: 13.60' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: ROB WASSERMAN
DRILLING METHOD & DEPTH. 4 IN. TEMPORARY STEEL CASING TO 58 FT 3 7/8 IN. ROLLERBIT TO 66 FT NX CORE FROM 66 TO 71 FT	



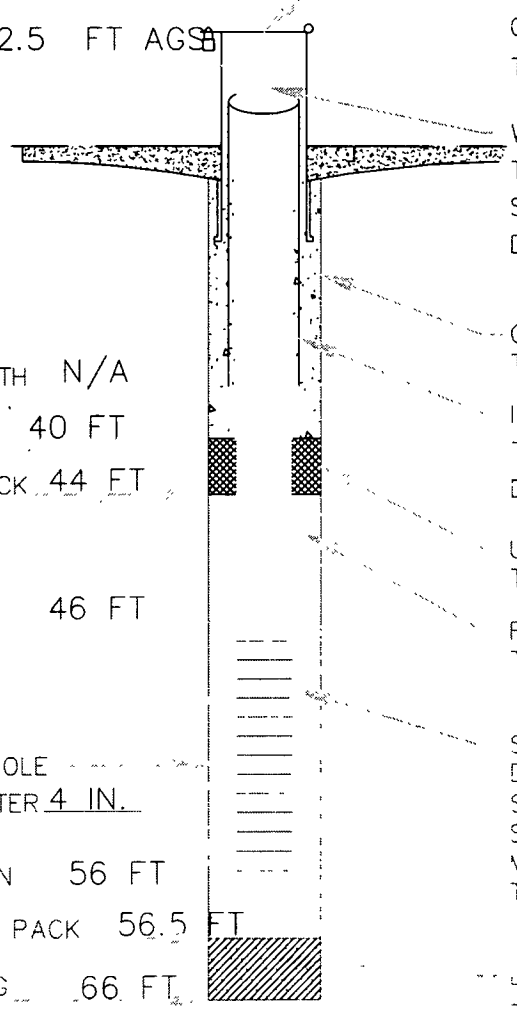
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-15D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 01/18/01	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 29.29' MSL ELEVATION TOP OF WELL RISER: 31.79' MSL	COORDINATES: N: 193832.22 E: 522878.72
DEPTH TO WATER: 16.27' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: JAMES GATHERER
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 56 FT 3 7/8 IN. ROLLERBIT TO 61 FT NX CORE FROM 61 TO 66 FT	



TOP OF RISER 2.5 FT AGS

RISER LENGTH 48 FT

INNER CASING DEPTH N/A

TOP OF SEAL 40 FT

TOP OF FILTER PACK 44 FT

TOP OF SCREEN 46 FT

SCREEN LENGTH 10 FT

BOREHOLE DIAMETER 4 IN.

BOTTOM OF SCREEN 56 FT

BOTTOM OF FILTER PACK 56.5 FT

BOTTOM OF BORING 66 FT

PROTECTIVE CASING
TYPE: STEEL
LOCKING: YES
STICK UP: 2.86 FT AGS
DIAMETER 4 IN.

GROUND SURFACE
TYPE: GRASS

WELL RISER
TYPE: PVC
STICK UP: 2.5 FT AGS
DIAMETER: 2 IN. ID

GROUT
TYPE: CEMENT/BENTONITE

INNER CASING
TYPE: N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE: 0 SAND

SCREEN
DIAMETER: 2 IN. ID
SLOT SIZE: 0.010 IN.
SCHEDULE 40
MATERIAL: PVC
TYPE OF PIPE JOINTS: THREADED

LOWER SEAL
TYPE: BENTONITE

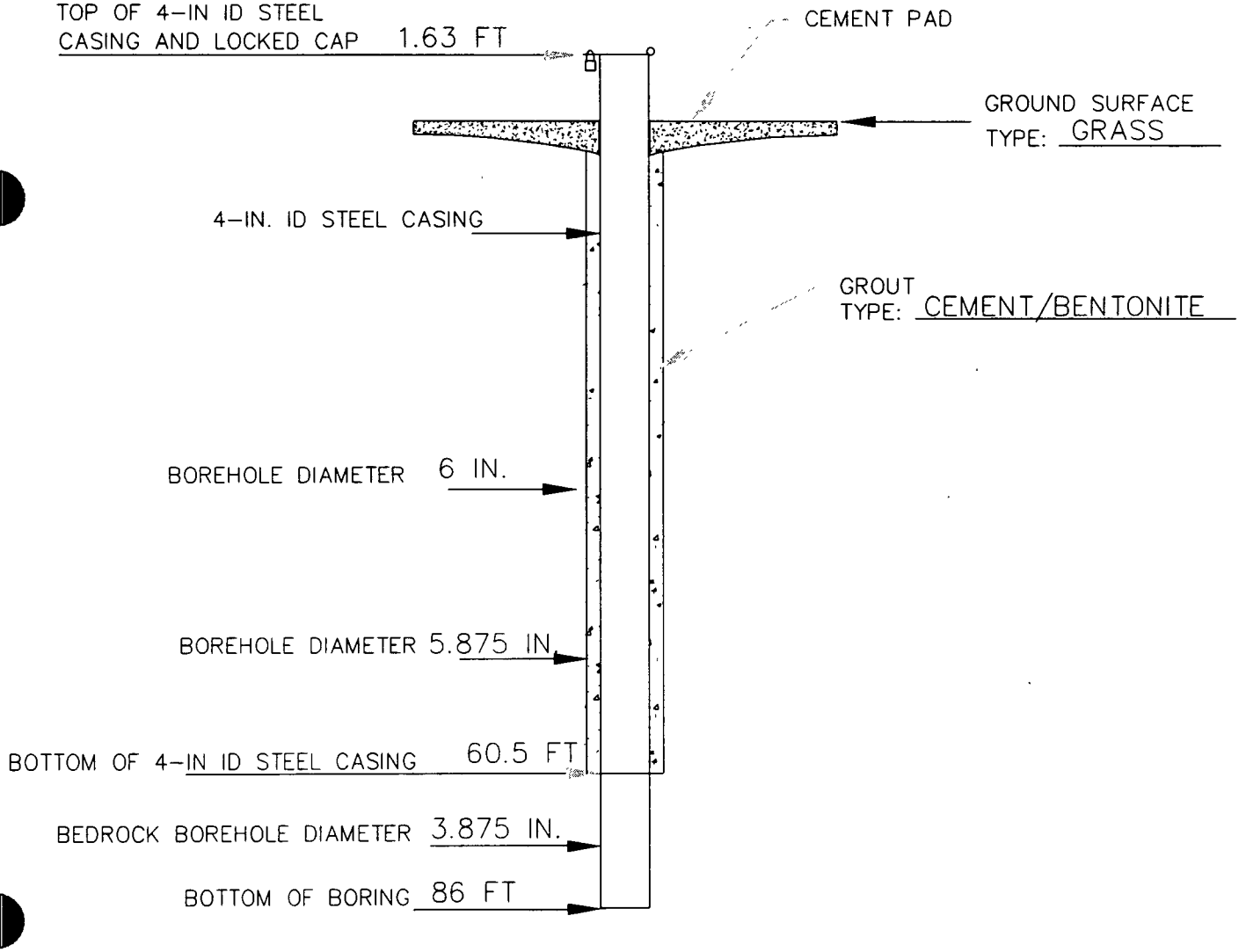
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-15R

CLIENT/SITE NAME: NORDIV NAVFAC, NCBC DAVISVILLE SITE 16, RI	
DATE INSTALLED: 01/26/01	PROJECT No. 29600.97.3201
ELEVATION OF GROUND SURFACE: 29.25 MSL ELEVATION TOP OF PUMP: 30.60 MSL	COORDINATES: N: 193834.64 E. 522881.00
DEPTH TO WATER: 15.11' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: KEVIN BAUM
DRILLING METHOD & DEPTH: 6 IN. TEMPORARY STEEL CASING TO 58 FT 4 IN. PERMANENT STEEL CASING TO 58 FT 5.875-IN. ID ROLLERBIT TO 61.5 FT 3.875-IN. ID ROLLERBIT TO 86 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

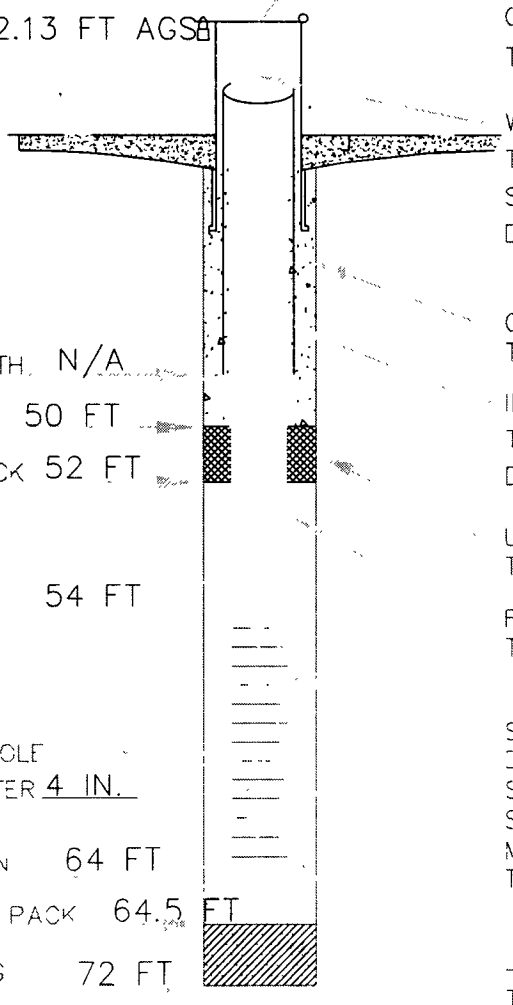
EA ENGINEERING, SCIENCE, AND TECHNOLOGY

F \RWC\EA106R DWG

MONITORING WELL CONSTRUCTION

MW16-16D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 01/09/01	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 23.38' MSL ELEVATION TOP OF WELL RISER: 25.51' MSL	COORDINATES: N 193783.07 E 522982.21
DEPTH TO WATER: 10.39' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: K Baum
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 58 FT 3 7/8 IN. ROLLERBIT TO 67 FT NX CORE FROM 67 TO 72 FT	



TOP OF RISER 2.13 FT AGS

RISER LENGTH 56 FT

INNER CASING DEPTH N/A

TOP OF SEAL 50 FT

TOP OF FILTER PACK 52 FT

TOP OF SCREEN 54 FT

SCREEN LENGTH 10 FT

BOREHOLE DIAMETER 4 IN.

BOTTOM OF SCREEN 64 FT

BOTTOM OF FILTER PACK 64.5 FT

BOTTOM OF BORING 72 FT

PROTECTIVE CASING
TYPE: STEEL
LOCKING: YES
STICK UP: 2.13 FT AGS
DIAMETER: 4 IN.

GROUND SURFACE
TYPE: GRASS

WELL RISER
TYPE: PVC
STICK UP: 2 FT AGS
DIAMETER: 2 IN. ID

GROUT
TYPE: CEMENT/BENTONITE

INNER CASING
TYPE: N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE: 0 SAND

SCREEN
DIAMETER: 2 IN. ID
SLOT SIZE: 0.010 IN.
SCHEDULE: 40
MATERIAL: PVC
TYPE OF PIPE JOINTS: THREADED

LOWER SEAL
TYPE: BENTONITE

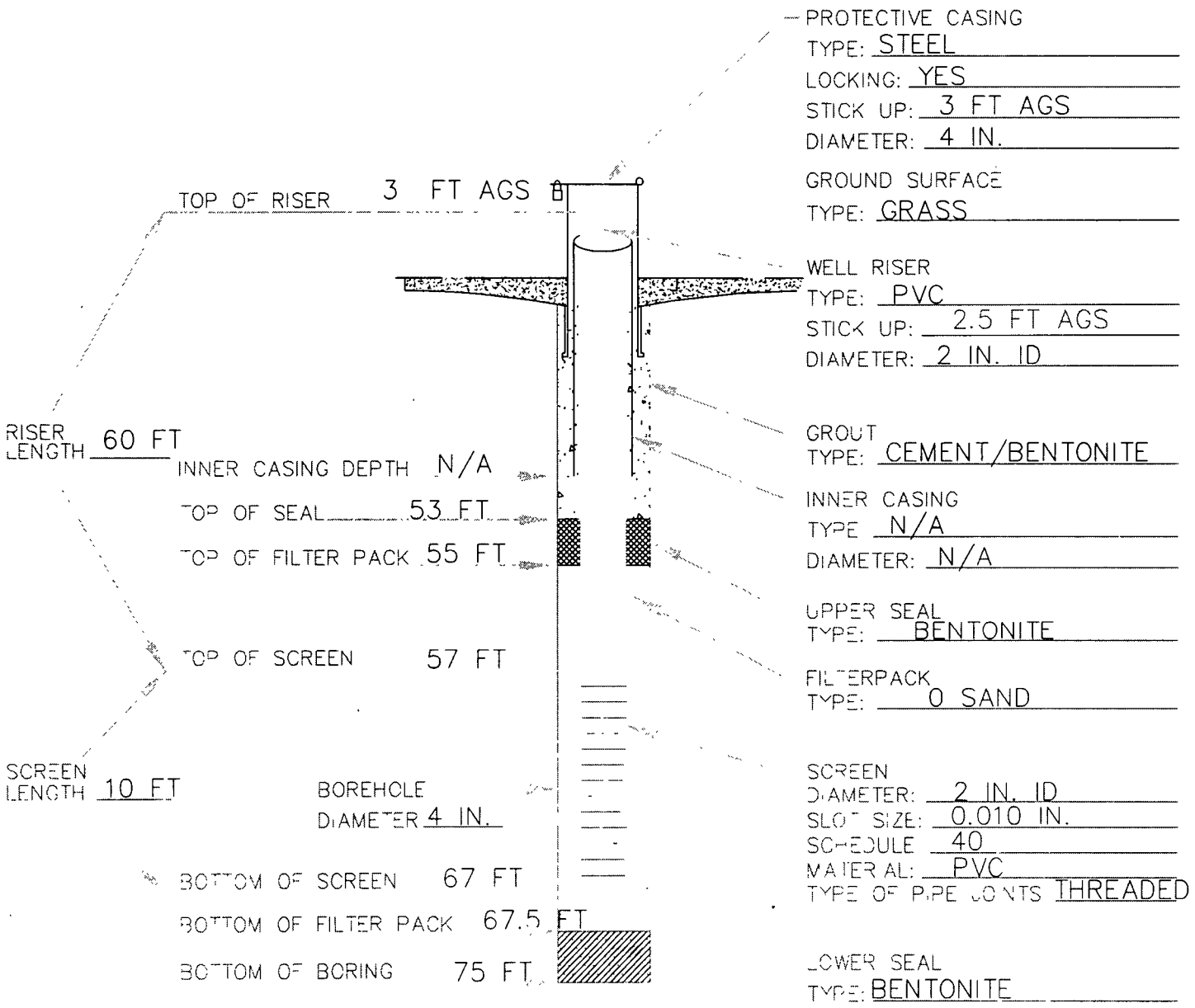
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-17D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 01/04/01	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 23.93' MSL ELEVATION TOP OF WELL RISER: 26.41' MSL	COORDINATES. N: 193445.25 E. 522897.98
DEPTH TO WATER: 10.33' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: K Baum
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 64 FT 3 7/8 IN. ROLLERBIT TO 70 FT NX CORE FROM 70 TO 75 FT	



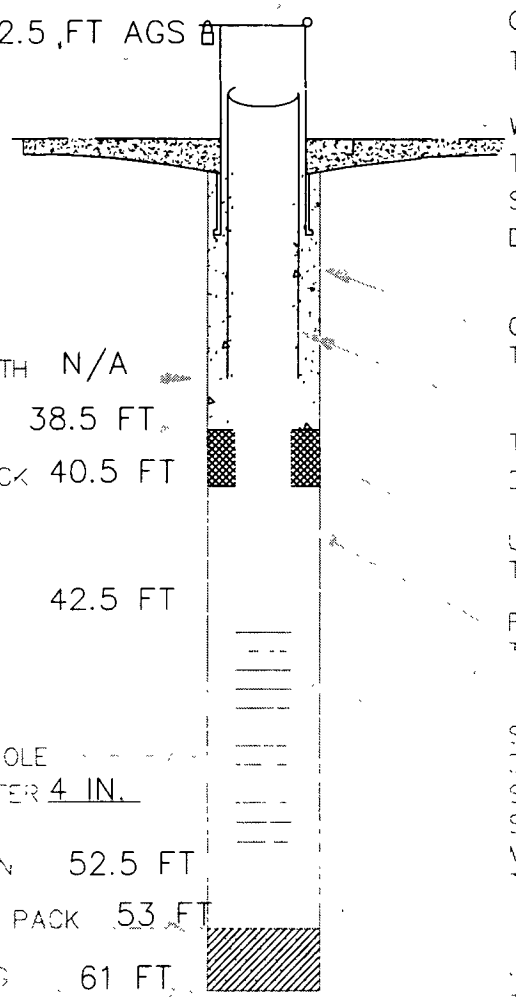
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-18D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 01/04/01	PROJECT No.: 29600.97 3201
ELEVATION OF GROUND SURFACE: 21.55' MSL ELEVATION TOP OF WELL RISER: 23.85' MSL	COORDINATES: N 193652.48 E: 523164.82
DEPTH TO WATER: 10.21' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: ROB WASSERMAN
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 48 FT 3 7/8 IN. ROLLERBIT TO 56 FT NX CORE FROM 56 TO 61 FT	



PROTECTIVE CASING
TYPE: STEEL
LOCKING: YES
STICK UP: 2.5 FT AGS
DIAMETER: 4 IN.

GROUND SURFACE
TYPE: GRASS

WELL RISER
TYPE: PVC
STICK UP: 2 FT AGS
DIAMETER: 2 IN. ID

GROUT
TYPE: CEMENT/BENTONITE

INNER CASING
TYPE: N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE: 0 SAND

SCREEN
DIAMETER: 2 IN. ID
SLOT SIZE: 0.010 IN.
SCHEDULE 40
MATERIAL: PVC
TYPE OF PIPE JOINTS: THREADED

LOWER SEAL
TYPE: BENTONITE

MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-19D

CLIENT/SITE NAME NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 01/11/01	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 20.04' MSL ELEVATION TOP OF WELL RISER: 22.59' MSL	COORDINATES: N 193772.66 E 523318.50
DEPTH TO WATER 9.48' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR DAVE VANKEUREN
DRILLING METHOD & DEPTH: 3 IN. TEMPORARY STEEL CASING TO 55 FT NX CORE FROM 55 TO 60 FT	

PROTECTIVE CASING
TYPE: STEEL
LOCKING: YES
STICK UP: 2.9 FT AGS
DIAMETER: 4 IN.

GROUND SURFACE
TYPE: GRASS

WELL RISER
TYPE: PVC
STICK UP: 2.55 FT AGS
DIAMETER: 2 IN. ID

GROUT
TYPE: CEMENT/BENTONITE

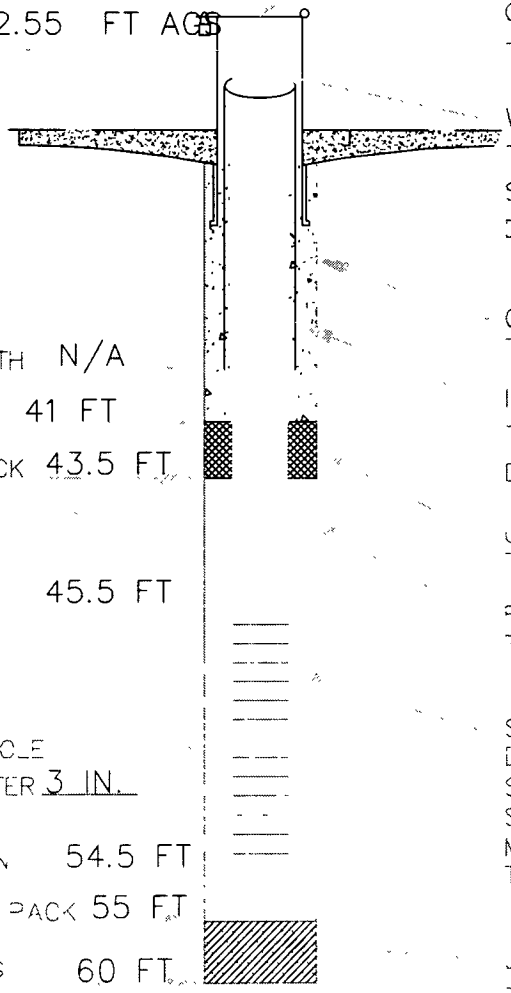
INNER CASING
TYPE: N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE: 0 SAND

SCREEN
DIAMETER 2 IN. ID
SLOT SIZE: 0.010 IN.
SCHEDULE: 40
MATERIAL: PVC
TYPE OF PIPE JOINTS THREADED

LOWER SEAL
TYPE BENTONITE



TOP OF RISER 2.55 FT AGS

RISER LENGTH 48 FT

INNER CASING DEPTH N/A

TOP OF SEAL 41 FT

TOP OF FILTER PACK 43.5 FT

TOP OF SCREEN 45.5 FT

SCREEN LENGTH 10 FT

BOREHOLE DIAMETER 3 IN.

BOTTOM OF SCREEN 54.5 FT

BOTTOM OF FILTER PACK 55 FT

BOTTOM OF BORING 60 FT

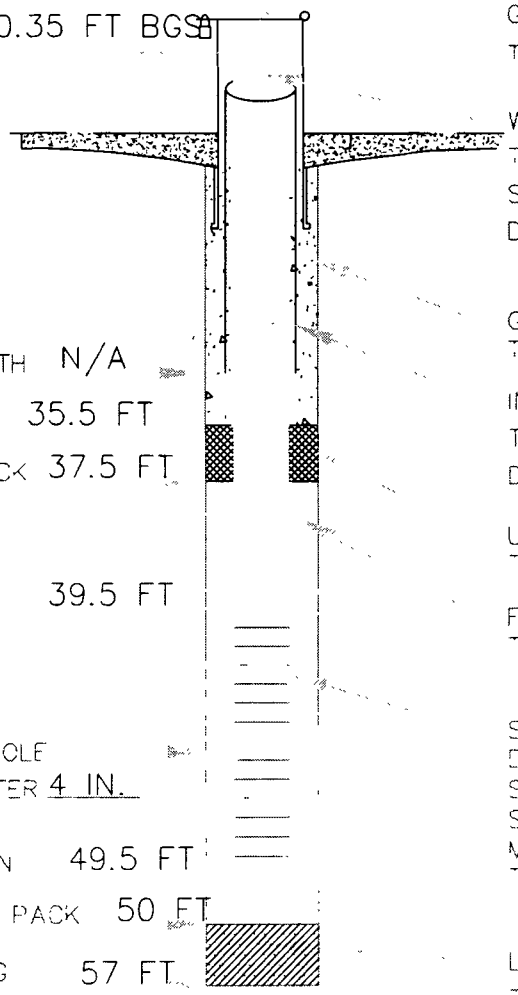
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-20D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 01/24/01	PROJECT No.: 29600.97 3201
ELEVATION OF GROUND SURFACE: 17.84' MSL ELEVATION TOP OF WELL RISER: 17.49' MSL	COORDINATES: N: 193964.53 E: 523487.02
DEPTH TO WATER: 6.47' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: TOM BIOLSI
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 49 FT 3 7/8 IN. ROLLERBIT TO 52 FT NX CORE FROM 52 TO 57 FT	



PROTECTIVE CASING
TYPE: ROADBOX
LOCKING: YES
STICK UP: GRADE
DIAMETER: 4 IN.

GROUND SURFACE
TYPE: ASPHALT

WELL RISER
TYPE: PVC
STICK UP: 0.35 FT BGS
DIAMETER: 2 IN. ID

GROUT
TYPE: CEMENT/BENTONITE

INNER CASING
TYPE: N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE 0 SAND

SCREEN
DIAMETER: 2 IN. ID
SLOT SIZE: 0.010 IN.
SCHEDULE: 40
MATERIAL: PVC
TYPE OF PIPE JOINTS: THREADED

LOWER SEAL
TYPE: BENTONITE

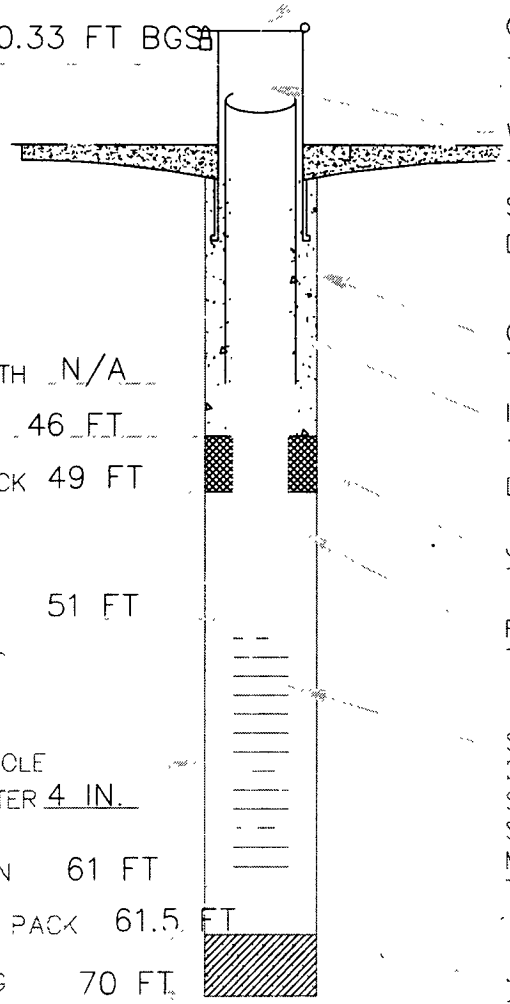
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-21D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 01/09/01	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 22.55' MSL ELEVATION TOP OF WELL RISER: 22.22' MSL	COORDINATES: N 193916.06 E: 523072.13
DEPTH TO WATER: 8.23' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: ROB WASSERMAN
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 60 FT 3 7/8 IN. ROLLERBIT TO 65 FT NX CORE FROM 65 TO 70 FT	



TOP OF RISER 0.33 FT BGS

RISER LENGTH 50.7 FT

INNER CASING DEPTH N/A

TOP OF SEAL 46 FT

TOP OF FILTER PACK 49 FT

TOP OF SCREEN 51 FT

SCREEN LENGTH 10 FT

BOREHOLE DIAMETER 4 IN.

BOTTOM OF SCREEN 61 FT

BOTTOM OF FILTER PACK 61.5 FT

BOTTOM OF BORING 70 FT

PROTECTIVE CASING
TYPE: ROADBOX
LOCKING: YES
STICK UP: GRADE
DIAMETER: 4 IN.

GROUND SURFACE
TYPE: ASPHALT

WELL RISER
TYPE: PVC
STICK UP: 0.33 FT BGS
DIAMETER: 2 IN. ID

GROUT
TYPE: CEMENT/BENTONITE

INNER CASING
TYPE N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE: 0 SAND

SCREEN
DIAMETER: 2 IN. ID
SLOT SIZE: 0.010 IN.
SCHEDULE: 40
MATERIAL: PVC
TYPE OF PIPE JOINTS THREADED

LOWER SEAL
TYPE: BENTONITE

MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-22D

CLIENT/SITE NAME. NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 01/16/01	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 30.04 MSL ELEVATION TOP OF WELL RISER: 29.73 MSL	COORDINATES: N: 193984.79 E: 522941.53
DEPTH TO WATER: 14.99' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: JAMES GATHERER
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 62 FT 3 7/8 IN. ROLLERBIT TO 66 FT NX CORE FROM 66 TO 71 FT	

PROTECTIVE CASING
TYPE: ROADBOX
LOCKING: YES
STICK UP: GRADE
DIAMETER: 4 IN.

GROUND SURFACE
TYPE: ASPHALT

WELL RISER
TYPE: PVC
STICK UP: 0.3 FT BGS
DIAMETER: 2 IN. ID

GROUT
TYPE: CEMENT/BENTONITE

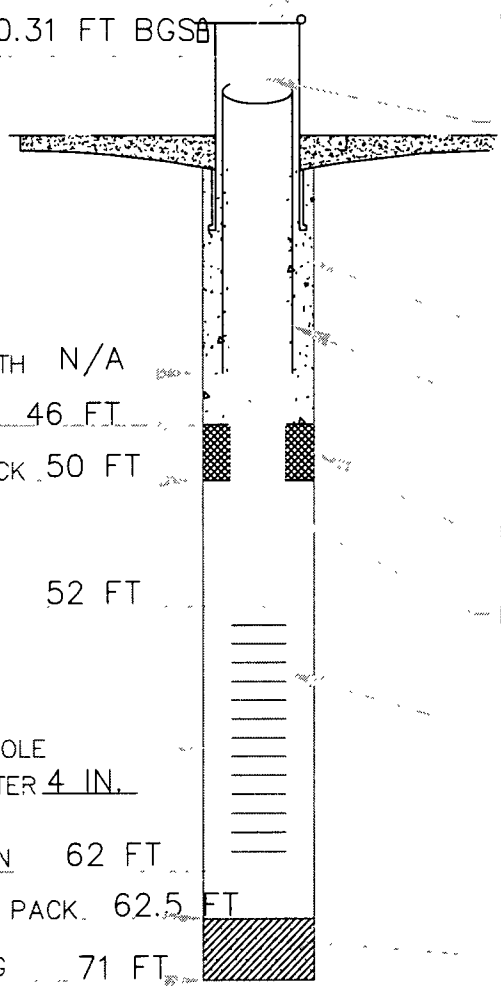
INNER CASING
TYPE: N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE: 0 SAND

SCREEN
DIAMETER: 2 IN. ID
SLOT SIZE: 0.010 IN.
SCHEDULE: 40
MATERIAL: PVC
TYPE OF PIPE JOINTS: THREADED

LOWER SEAL
TYPE: BENTONITE



TOP OF RISER 0.31 FT BGS

RISER LENGTH 51.7 FT

INNER CASING DEPTH N/A

TOP OF SEAL 46 FT

TOP OF FILTER PACK 50 FT

TOP OF SCREEN 52 FT

SCREEN LENGTH 10 FT

BOREHOLE DIAMETER 4 IN.

BOTTOM OF SCREEN 62 FT

BOTTOM OF FILTER PACK 62.5 FT

BOTTOM OF BORING 71 FT

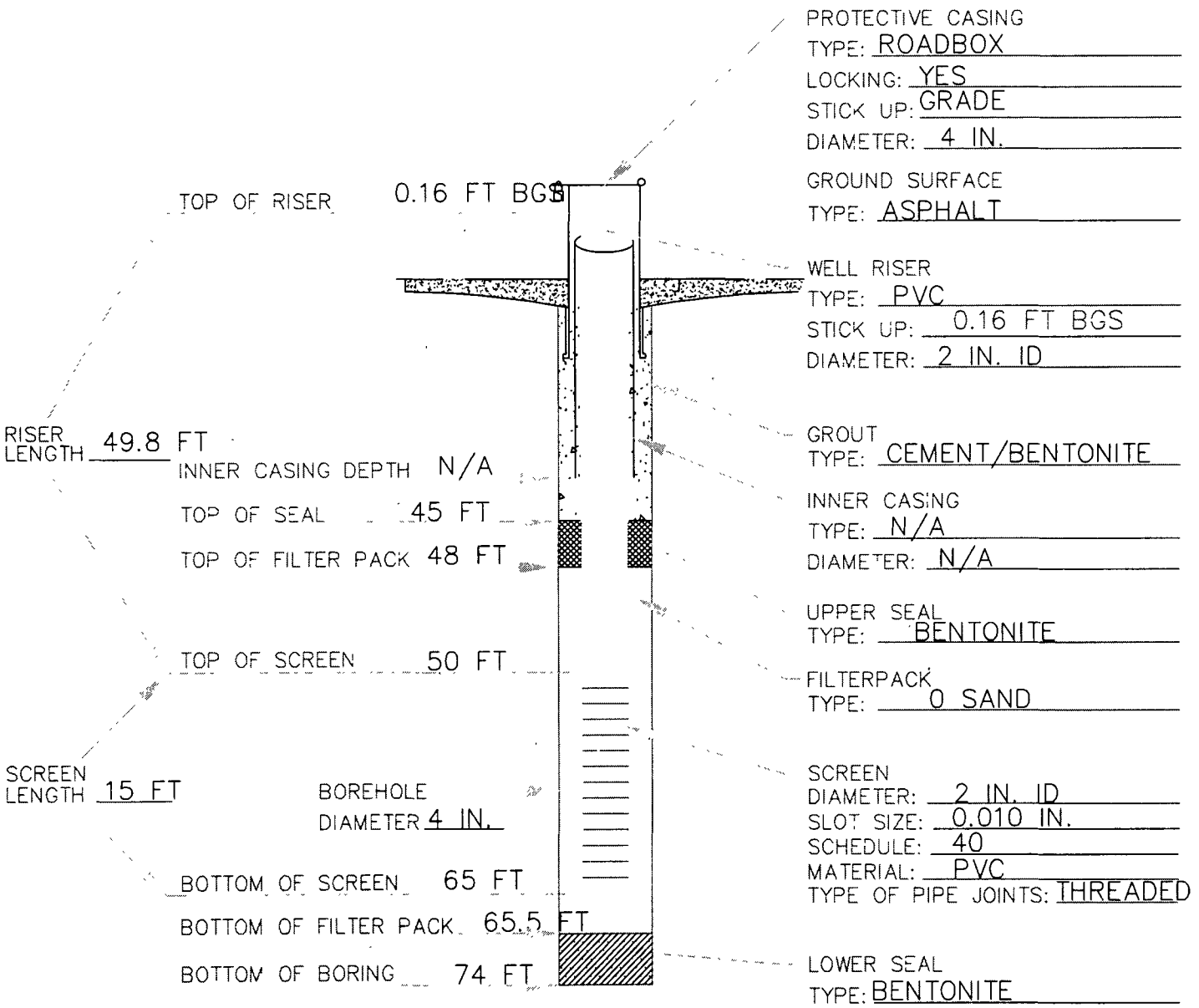
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-23D

CLIENT/SITE NAME. NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 01/12/01	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 25.48 MSL ELEVATION TOP OF WELL RISER: 25.32 MSL	COORDINATES. N: 194017.91 E: 523094.55
DEPTH TO WATER: 11.71' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: ROB WASSERMAN
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 66 FT 3 7/8 IN. ROLLERBIT TO 69 FT NX CORE FROM 69 TO 74 FT	



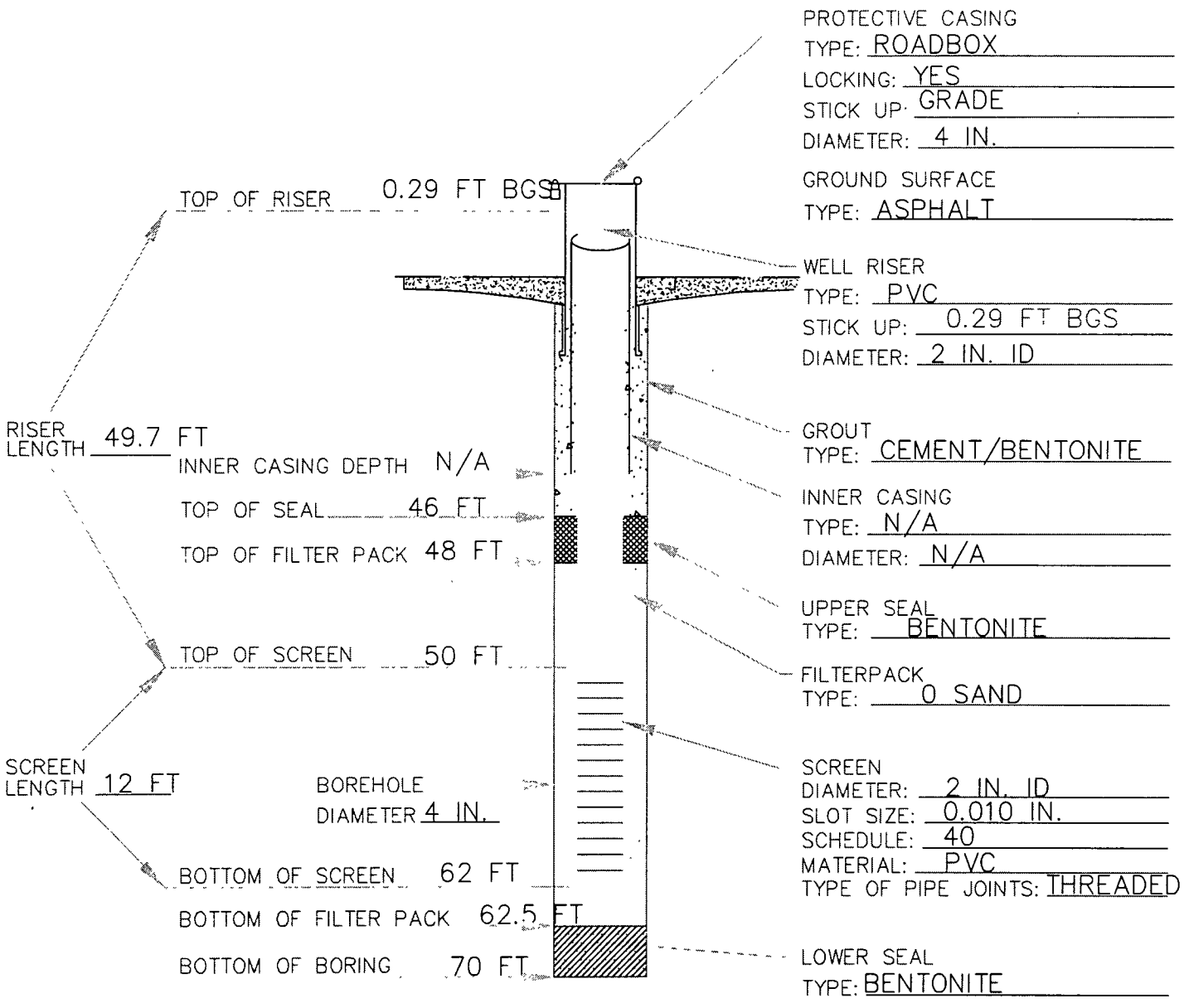
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-24D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 01/22/01	PROJECT No 29600.97 3201
ELEVATION OF GROUND SURFACE. 21.25 MSL ELEVATION TOP OF WELL RISER· 20.96 MSL	COORDINATES. N: 194037.58 E: 523252.17
DEPTH TO WATER· 8.51' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: TOM BIOLSI
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 54 FT 3 7/8 IN. ROLLERBIT TO 65 FT NX CORE FROM 65 TO 70 FT	



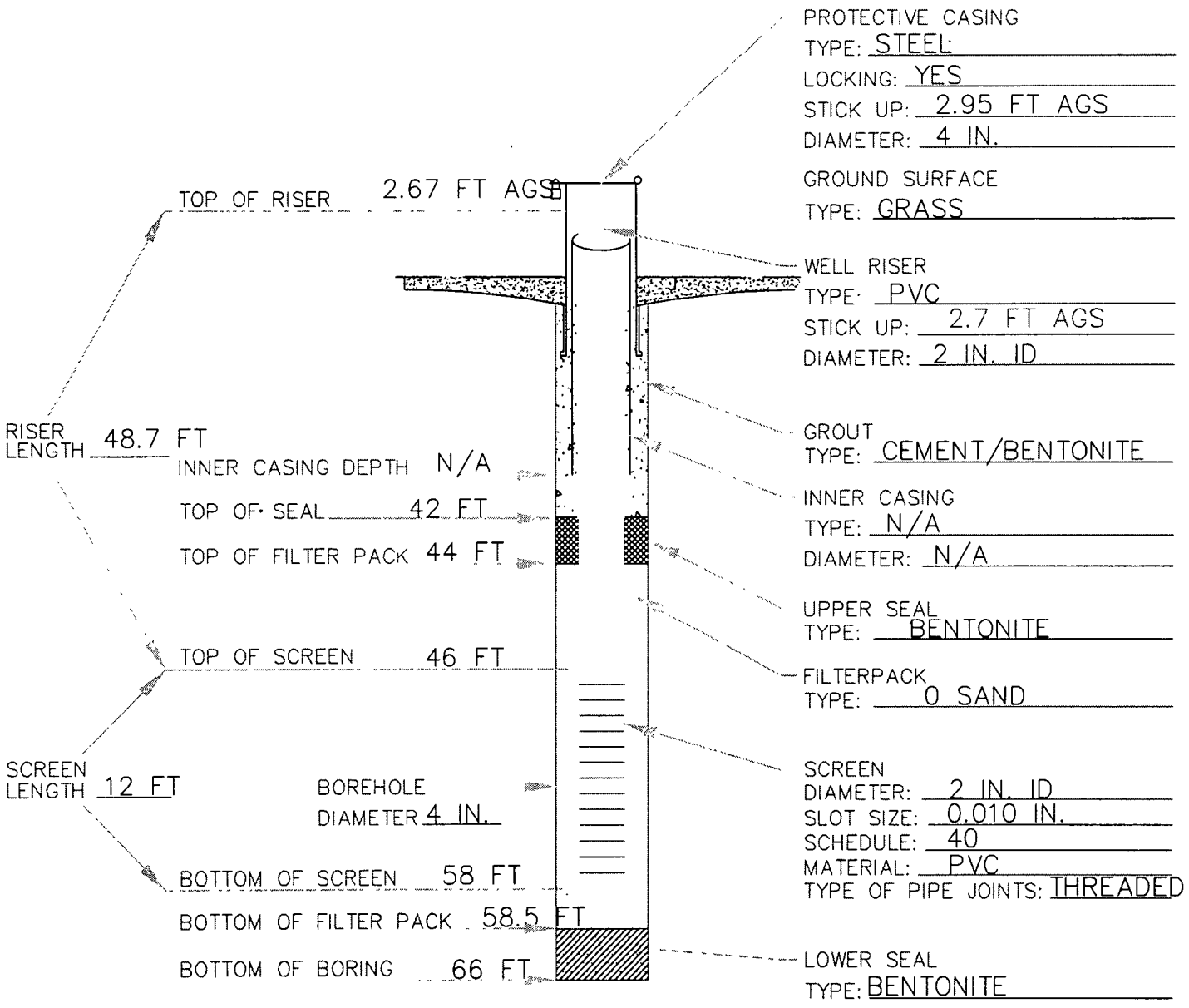
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-25D

CLIENT/SITE NAME. NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 01/12/01	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 21.75 MSL ELEVATION TOP OF WELL RISER: 24.42 MSL	COORDINATES. N: 193805.42 E: 523142.36
DEPTH TO WATER: 10.42' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: K Baum
DRILLING METHOD & DEPTH. 4 IN. TEMPORARY STEEL CASING TO 58 FT 3 7/8 IN. ROLLERBIT TO 61 FT NX CORE FROM 61 TO 66 FT	



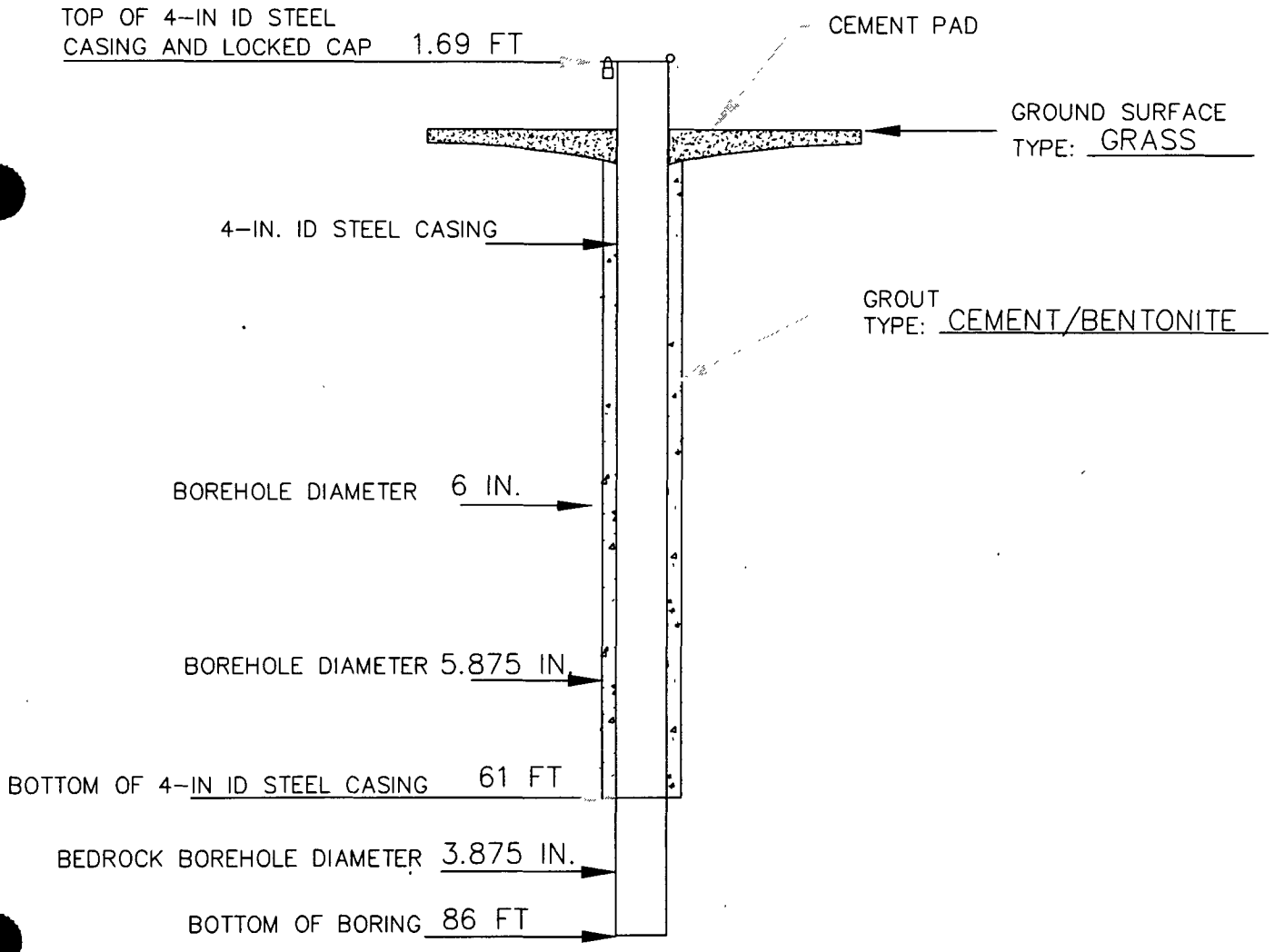
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-25R

CLIENT/SITE NAME: NORDIV NAVFAC, NCBC DAVISVILLE SITE 16, RI	
DATE INSTALLED: 01/18/01	PROJECT No. 29600.97.3201
ELEVATION OF GROUND SURFACE: 21.60 MSL ELEVATION TOP OF WELL RISER: 23.01 MSL	COORDINATES: N: 193805.75 E: 523149.03
DEPTH TO WATER: 9.50' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: KEVIN BAUM
DRILLING METHOD & DEPTH: 6 IN. TEMPORARY STEEL CASING TO 58 FT 4 IN. PERMANENT STEEL CASING TO 61 FT 3.875-IN. ID ROLLERBIT TO 86 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

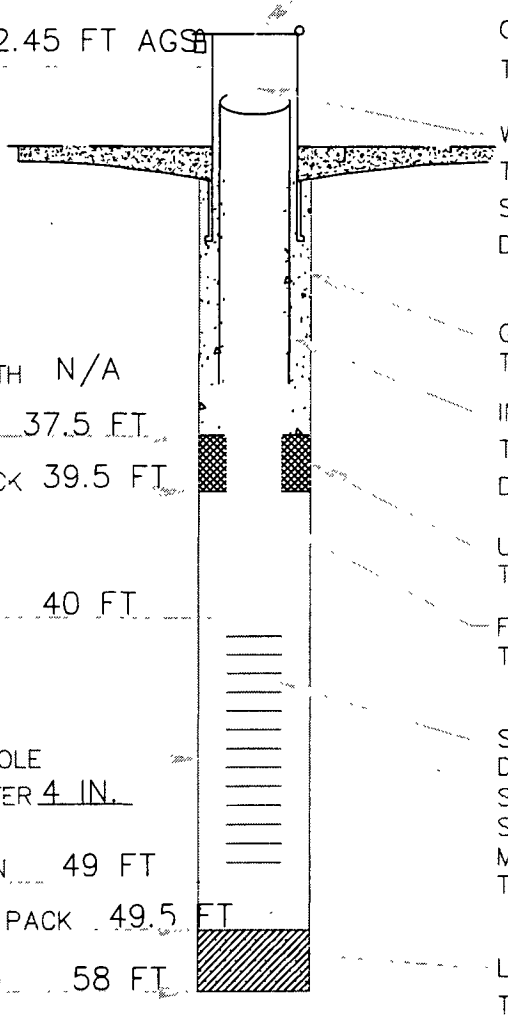
EA ENGINEERING, SCIENCE, AND TECHNOLOGY

F:\RWC\EA106R.DWG

MONITORING WELL CONSTRUCTION

MW16-26D

CLIENT/SITE NAME NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 01/25/01	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 16.75 MSL ELEVATION TOP OF WELL RISER: 19.20 MSL	COORDINATES. N: 194301.89 E: 522449.59
DEPTH TO WATER: 3.64' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: K Baum
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 49 FT 3 7/8 IN. ROLLERBIT TO 53 FT NX CORE FROM 53 TO 58 FT	



TOP OF RISER 2.45 FT AGS

RISER LENGTH 42.5 FT

INNER CASING DEPTH N/A

TOP OF SEAL 37.5 FT

TOP OF FILTER PACK 39.5 FT

TOP OF SCREEN 40 FT

SCREEN LENGTH 9 FT

BOREHOLE DIAMETER 4 IN.

BOTTOM OF SCREEN 49 FT

BOTTOM OF FILTER PACK 49.5 FT

BOTTOM OF BORING 58 FT

PROTECTIVE CASING
TYPE: STEEL
LOCKING: YES
STICK UP: 2.8 FT AGS
DIAMETER: 4 IN.

GROUND SURFACE
TYPE: WOODLAND

WELL RISER
TYPE: PVC
STICK UP: 2.45 FT AGS
DIAMETER: 2 IN. ID

GROUT
TYPE: CEMENT/BENTONITE

INNER CASING
TYPE: N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE: 0 SAND

SCREEN
DIAMETER: 2 IN. ID
SLOT SIZE: 0.010 IN.
SCHEDULE: 40
MATERIAL: PVC
TYPE OF PIPE JOINTS: THREADED

LOWER SEAL
TYPE: BENTONITE

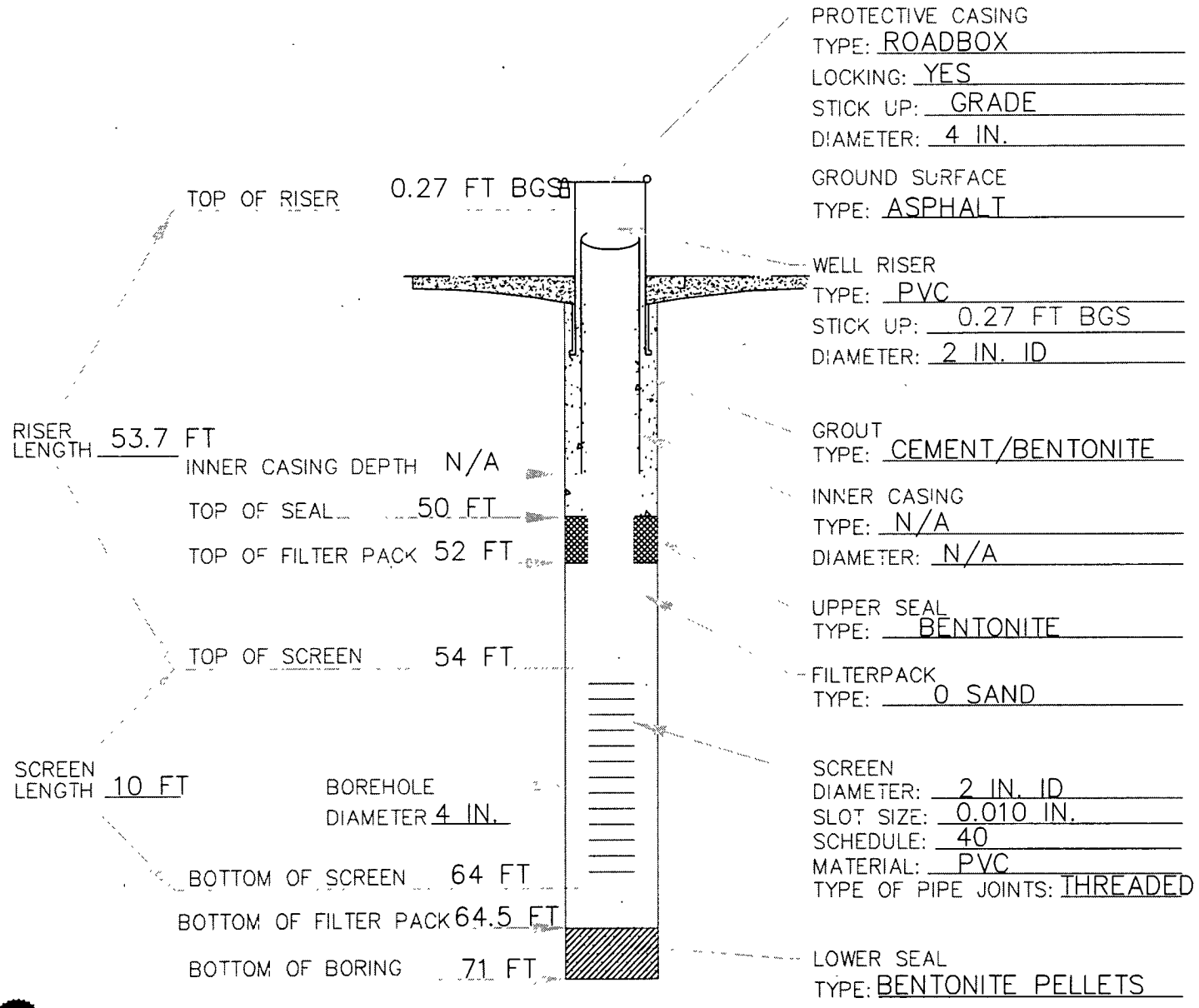
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-27D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 12/12/00	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 13.23 MSL ELEVATION TOP OF WELL RISER: 12.96 MSL	COORDINATES. N: 194369.17 E: 523694.32
DEPTH TO WATER: 8.49' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: TOM BIOLSI
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 63 FT 3 7/8 IN. ROLLERBIT TO 66 FT NX CORE FROM 66 TO 71 FT	



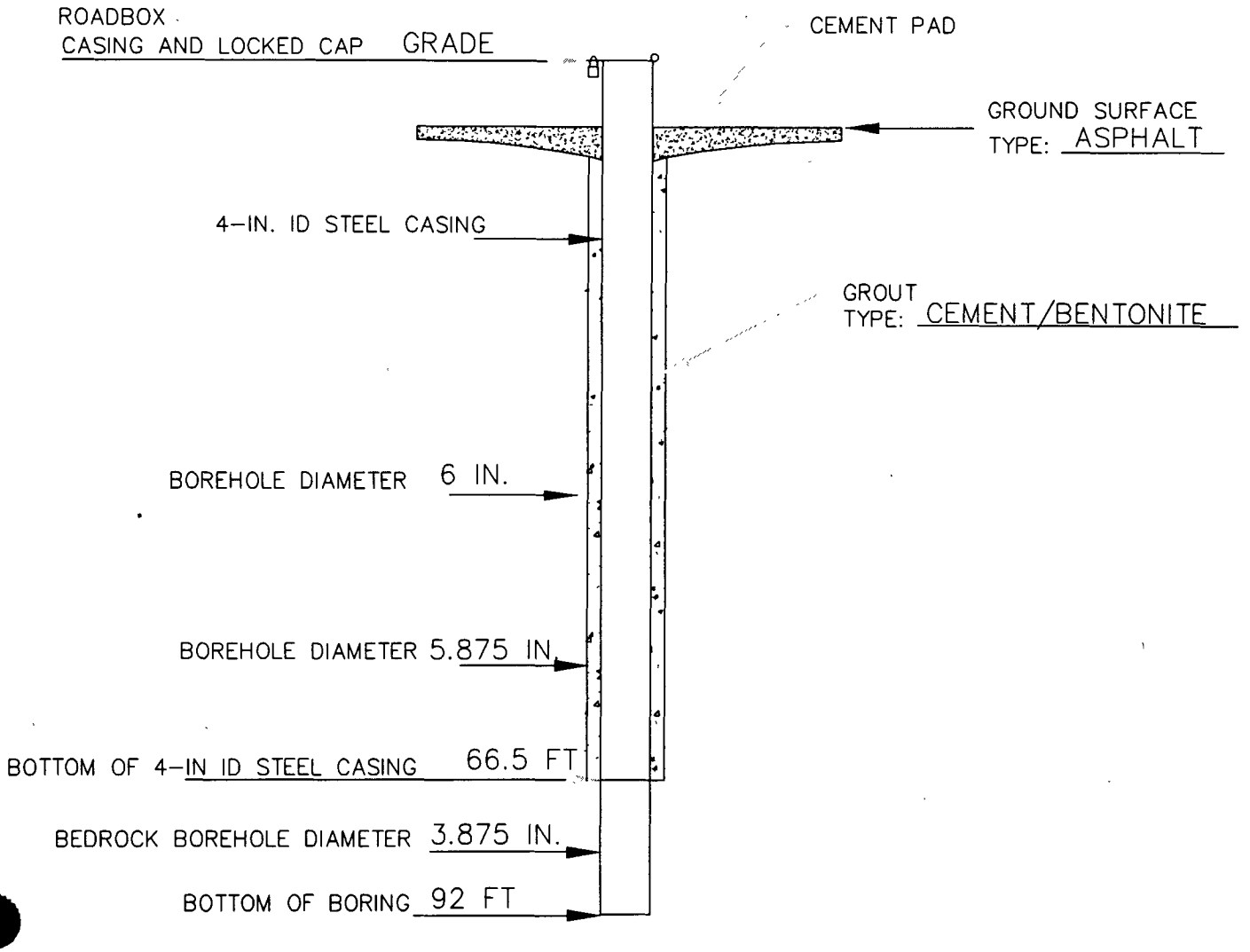
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-27R

CLIENT/SITE NAME: NORDIV NAVFAC, NCBC DAVISVILLE SITE 16, RI	
DATE INSTALLED: 12/18/00	PROJECT No. 29600.97.3201
ELEVATION OF GROUND SURFACE: 13.17 MSL ELEVATION TOP OF WELL RISER: 12.90 MSL	COORDINATES: N: 194364.20 E: 523705.21
DEPTH TO WATER: 7.70' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: TOM BIOLSI
DRILLING METHOD & DEPTH. 6 IN. TEMPORARY STEEL CASING TO 63 FT 4 IN. PERMANENT STEEL CASING TO 66.5 FT 3.875-IN. ID ROLLERBIT TO 92 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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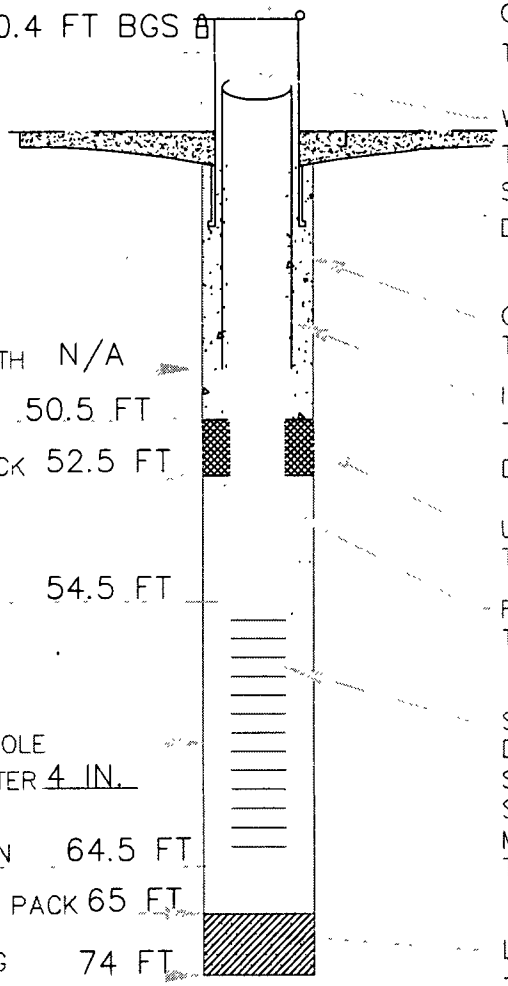
MONITORING WELL CONSTRUCTION

MW16-28D

CLIENT/SITE NAME. NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 12/13/00	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 12.42 MSL ELEVATION TOP OF WELL RISER: 12.02 MSL	COORDINATES. N: 194581.15 E: 523783.02
DEPTH TO WATER: 8.58' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: KEVIN BAUM
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 58 FT 3 7/8 IN. ROLLERBIT TO 69 FT NX CORE FROM 69 TO 74 FT	



TOP OF RISER 0.4 FT BGS

RISER LENGTH 54.1 FT

INNER CASING DEPTH N/A

TOP OF SEAL 50.5 FT

TOP OF FILTER PACK 52.5 FT

TOP OF SCREEN 54.5 FT

SCREEN LENGTH 10 FT

BOREHOLE DIAMETER 4 IN.

BOTTOM OF SCREEN 64.5 FT

BOTTOM OF FILTER PACK 65 FT

BOTTOM OF BORING 74 FT

PROTECTIVE CASING
TYPE: ROADBOX
LOCKING: YES
STICK UP: GRADE
DIAMETER: 4 IN.

GROUND SURFACE
TYPE: ASPHALT

WELL RISER
TYPE: PVC
STICK UP: 0.4 FT BGS
DIAMETER: 2 IN. ID

GROUT
TYPE: CEMENT/BENTONITE

INNER CASING
TYPE: N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE: 0 SAND

SCREEN
DIAMETER: 2 IN. ID
SLOT SIZE: 0.010 IN.
SCHEDULE: 40
MATERIAL: PVC
TYPE OF PIPE JOINTS: THREADED

LOWER SEAL
TYPE: BENTONITE PELLETS

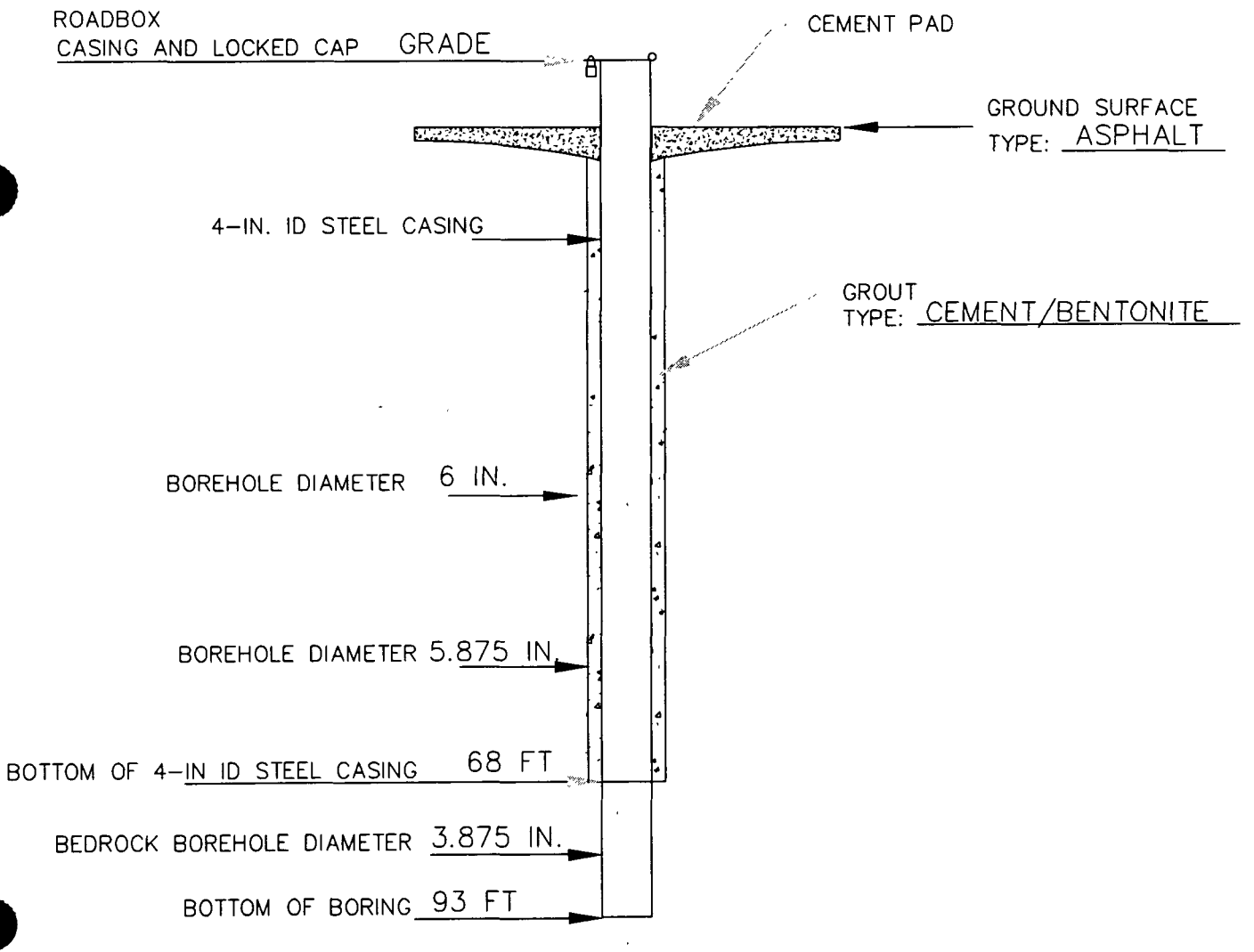
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

MW16-28R

CLIENT/SITE NAME: NORDIV NAVFAC, NCBC DAVISVILLE SITE 16, RI	
DATE INSTALLED: 12/21/00	PROJECT No. 29600.97.3201
ELEVATION OF GROUND SURFACE: 12.45 MSL ELEVATION TOP OF WELL RISER: 12.02 MSL	COORDINATES: N: 194578.21 E: 523789.50
DEPTH TO WATER: 8.62' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: KEVIN BAUM
DRILLING METHOD & DEPTH: 6 IN. TEMPORARY STEEL CASING TO 65 FT 4 IN. PERMANENT STEEL CASING TO 68 FT 3.875-IN. ID ROLLERBIT TO 93 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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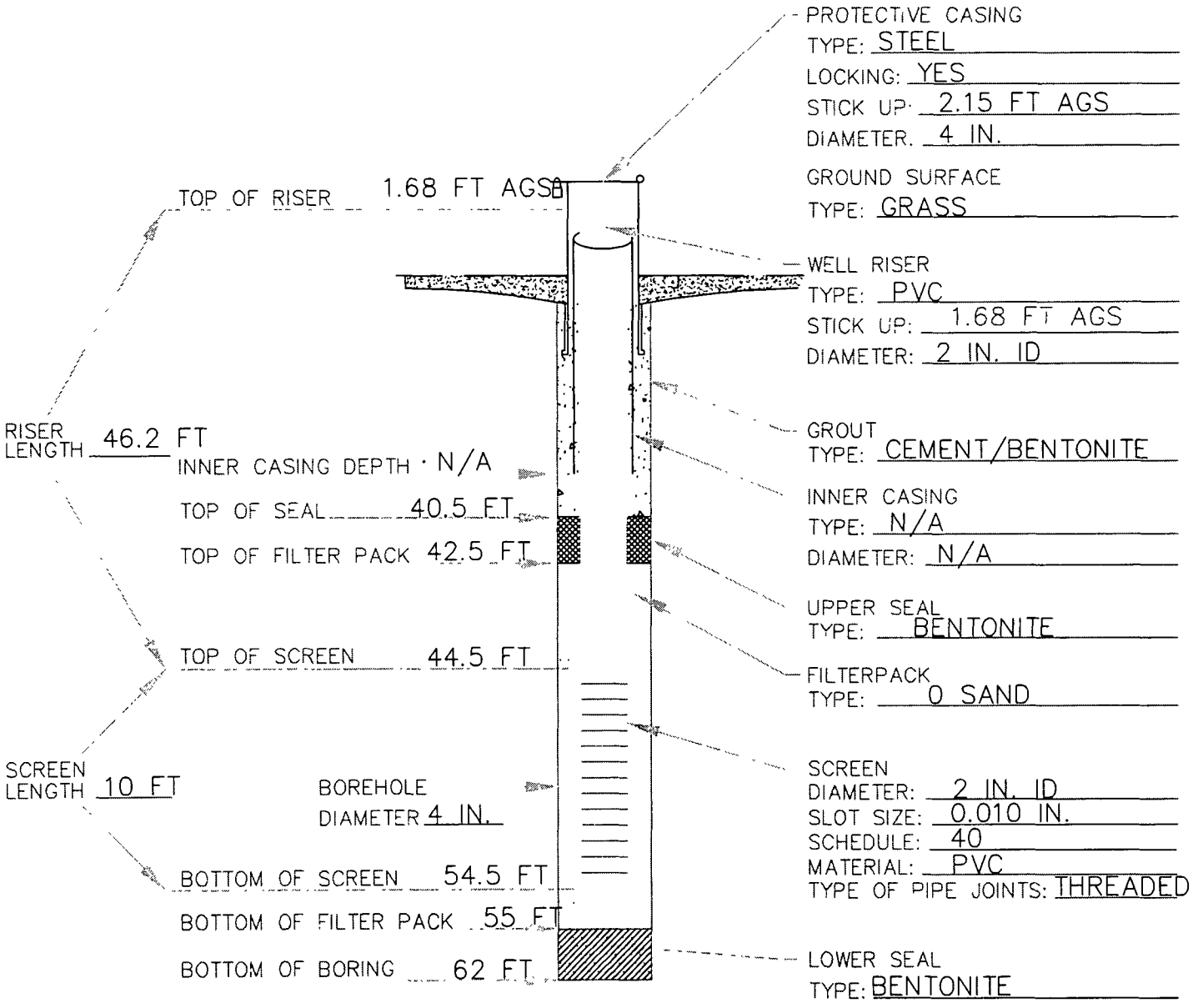
MONITORING WELL CONSTRUCTION

MW16-29D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 16, RI	
DATE INSTALLED: 01/31/01	PROJECT No. 29600.97 3201
ELEVATION OF GROUND SURFACE: 14.44 MSL ELEVATION TOP OF WELL RISER: 16.12 MSL	COORDINATES. N 194441.70 E: 523410.79
DEPTH TO WATER: 10.99' (BELOW TOP OF RISER) DATE/TIME 3/29/01	EA INSPECTOR: K Baum
DRILLING METHOD & DEPTH: 4 IN. TEMPORARY STEEL CASING TO 54 FT 3 7/8 IN. ROLLERBIT TO 57 FT NX CORE FROM 57 TO 62 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

APPENDIX F
STAGE I AND II
WELL DEVELOPMENT FORMS

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: SW
DATE: 02/07/01

Well Number: **MW16-01S**

1. Total Riser and Screen Length (ft) before well development.	28.0
2. Total Riser and Screen Length (ft) after well development	28.0
3. Water Level Below Measuring Point (ft)	21.55
4. Estimated amount of water lost in screened interval during well drilling (gal.)	No water loss

Parameters

Total Gallons	0	2.5	5.0(A)	10	25(B)	30	35	40	45
Time	0930	0935	0940	0945	1000	1005	1010	1015	1020
Temperature (°C)	13.99	14.87	14.66	14.36	14.41	14.56	14.65	14.60	14.52
Conductivity (mS/cm)	0.650	0.632	0.572	0.558	0.552	0.490	0.534	0.534	0.553
pH	5.46	5.46	5.50	5.50	5.30	5.53	5.53	5.53	5.53
Turbidity (NTU)	offscale	120	offscale	220	63	offscale	offscale	offscale	75
Salinity (ppt)	0.32	0.31	0.28	0.27	0.27	0.25	0.28	0.26	0.25
DO (mg/L)	10.53	10.57*	10.38	10.12	10.62	10.26	10.40	10.15	10.16
Eh (mV)	295.2	302.3	280.4	293.1	322.6	302.4	247.3	255.7	285.6
Water Level (ft from TOR)	23.40		23.65		23.60		23.60		23.60

Total Gallons	50	55	60	65	70	75	80	85	90
Time	1025	1030	1035	1040	1045	1050	1055	1100	1105
Temperature (°C)	14.09	14.72	14.71	14.72	14.72	14.71	14.71	14.71	14.74
Conductivity (mS/cm)	0.548	0.547	0.546	0.545	0.545	0.543	0.543	0.542	0.542
pH	5.49	5.15	5.48	5.48	5.48	5.48	5.48	5.46	5.47
Turbidity (NTU)	19	9	9	10	11	10	7	8	7
Salinity (ppt)	0.27	0.27	0.27	0.26	0.26	0.26	0.26	0.26	0.26
DO (mg/L)	10.37	10.47	10.43	10.40	10.37	10.39	10.40	10.36	10.28
Eh (mV)	292.0	307.4	300.6	300.9	301.5	302.6	303.8	317.1	312.4
Water Level (ft from TOR)		23.60		23.60		23.60		23.60	

Notes: PID: 0.0. .5 gal/min. Surged every 5 minutes for 45 minutes moving up 1 ft every surge event.
*DO probe checked, no apparent problem found. YSI runs out of batteries, pump is left running while batteries are obtained. (A) Pump turned up to 1 gal/min. (B) Water level reaches top of pump, pump is lowered to bottom of well.

Well Number: MW16-01S.									
Total Gallons	95	100	105	110	115				
Time	1110	1115	1120	1125	1130				
Temperature (°C)	14.73	14.69	14.68	14.67	14.68				
Conductivity (mS/cm)	0.541	0.539	0.538	0.538	0.537				
pH	5.47	5.47	5.48	5.48	5.48				
Turbidity (NTU)	3	4	3	3	2				
Salinity (ppt)	0.26	0.26	0.26	0.26	0.26				
DO (mg/L)	10.32	10.31	10.36	10.40	10.38				
Eh (mV)	312.8	314.3	315.5	313.8	317.9				
Water Level (ft from TOR)	23.60		23.60		23.60				

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Notes:

WELL DEVELOPMENT LOG

Client: EFANE
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No.: 29600.97.3201
Staff. Sam Whitin

Well No: **MW16-01D**

1. Total Riser and Screen Length (ft)	
2. Screen Internal Diameter (in.)	
3 Water Level Below Measuring Point (ft)	
4. Volume of Water in Well (gal) V = (1-3)*(5)	

Screen ID	5. Volume/Ft (gal/ft)
1 in	0.04
2 in	0 16
4 in.	0 65
6 in	1 47
8 in.	2.61

Parameters

Date	6/28/00								
Total Gallons	--	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8 0
Time (hours)	1555	1600	1605	1610	1615	1620	1625	1630	1635
Temperature (°C)	15.01	14.87	15.01	15.89	14.98	15.40	15.17	15.39	15.53
Conductivity (mS/cm)	0 010	0.019	0 161	0.164	0.154	0.141	0.108	0.106	0.091
PH	6.42	6.43	6.43	6.43	6 44	6 44	6.52	6.45	6 44
Turbidity (NTU)	110 0	74.0	230 0	148.0	164.0	155.0	306 0	264.0	158 0
Dissolved Oxygen (mg/L)	3 92	2 90	0 43	0.26	0 22	0.37	0.22	0 16	0 14
Water Level (FT BTOC)	23 00	22 73	22 67	22 54	22 84	22 88	22 87	22 85	22 52

NOTES. (A) pump surge
1735hrs Flow cell fails, cup falls, pump to bottom, stirs up sediment

WELL DEVELOPMENT LOG

Client NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No.: 29600.97.3201
Staff Sam Whitin

Well No.: **MW16-01D**

Parameters

Date	6/28/00								
Total Gallons	9 0	10.0	11 0	12.0	13.0	14.0	15 0	16.0	17.0
Time (hours)	1640	1645	1650	1655	1700	1705	1710	1715	1720
Temperature (°C)	15 54	15.57	15 52	15.58	15.61	15.50	15 52	15.52	15 48
Conductivity (mS/cm)	0.093	0.084	0.073	0.072	0.062	0.117	0.209	0.199	0.200
PH	6.45	6.45	6.45	6.46	6.46	6.44	6.47	6.48	6 48
Turbidity (NTU)	143 0	135.0	126 0	115.0	108 0	104 0	106.0	103.0	92.0
Dissolved Oxygen (mg/L)	0 14	0 13	0.13	0.12	0 12	0 12	0.11	0.11	0.10
Water Level (FT BTOC)	22.58	22 49	22 46	22 45	22.46	22.47	22.47	22.45	22 49

Date	6/28/00								
Total Gallons	18.0	19 0	21.0	22.0	23.00	24.00	25.00	26 00	27.00
Time (hours)	1725	1730	1740	1745	1750	1755	1800	1805	1810
Temperature (°C)	15.40	15 37	13 96	14.06	14 51	14.66	14.62	14 44	14.30
Conductivity (mS/cm)	0 205	0.026	0.286	0.100	0.095	0.100	0.139	0.154	0.255
pH	6.41	6.56	6.82	6.54	6.50	6.54	6.55	6.57	6.55
Turbidity (NTU)	90.0	95.0	153.0	54 0	42.0	48 0	33.0	46 0	34.0
Dissolved Oxygen (mg/L)	0.10	0.14	3.19	0 84	0.47	0 24	0.10	0.06	0.06
Water Level (FT BTOC)	22 50	22.46	23.42	23.19	22.56	22.50	22.53	22.53	22.48

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No.: 29600.97 3201
Staff: Sam Whitin

Well No.
MW16-01D

Parameters

Date	6/28/00								
Total Gallons	28.0	29 0	30.0	31.0	32.0	33.0	34.0	35.0	36 0
Time (hours)	1815	1820	1825	1830	1835	1840	1845	1850	1855
Temperature (°C)	14.34	14.35	14.36	14.38	14.37	14.38	14.36	14 35	14.38
Conductivity (mS/cm)	0.227	0.178	0.143	0.135	0.154	0 123	0.134	0.113	0.120
PH	6 55	6.54	6.54	6.54	6.53	6 53	6 53	6.53	6.54
Turbidity (NTU)	28 0	26.0	29.0	25.0	22.0	22.0	20.0	26.0	22.0
Dissolved Oxygen (mg/L)	0.06	0.06	0 06	0.06	0.05	0.05	0 05	0.05	0.05
Water Level (FT BTOC)	22.50	22.52	22.55	22.51	22.49	22.249	22 47	22 47	22.49

Date									
Total Gallons									
Time (hours)									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Dissolved Oxygen (mg/L)									
Water Level (FT BTOC)									

WELL DEVELOPMENT LOG

Client. EFANE
Project Title. NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No.. 29600.97.3201
Staff: Kevin Baum/Sam Whitin

Well No.:
MW16-02S

1 Total Riser and Screen Length (ft)	
2. Screen Internal Diameter (in)	
3. Water Level Below Measuring Point (ft)	
4. Volume of Water in Well (gal) V = (1-3)*(5)	

Screen ID	5 Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0 16
4 in.	0.65
6 in.	1 47
8 in.	2.61

Parameters

Date	6/29/00								
Total Gallons	--	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
Time (hours)	0957	1002	1007	1012	1017	1022	1027	1032	1037
Temperature (°C)	14.09	15.37	17.76	18 94	18.79	16.79	17.81	14.79	14.15
Conductivity (mS/cm)	0 527	0 000	0.001	0 328	0.001	0 000	0.002	0.565	0.545
pH	7.29	7.36	7 24	7.12	7 20	7.20	7.25	7.52	7.93
Turbidity (NTU)	50 0	33 0	30 0	38.0	32.0	81.0	80.0	22.0	10 0
Dissolved Oxygen (mg/L)	6 80	3 89	3.56	3.59	3.52	3.74	3.52	2.93	3.74
Water Level (FT BTOC)	11.86	11 89	11.84	11.85	11 88	11.85	11.93	11.89	11.88

NOTES: (A) Pump getting clogged, surging performed

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No. 29600 97 3201
Staff Kevin Baum/Sam Whitin

Well No
MW16-02S

Parameters

Date	6/29/00								
Total Gallons	9.0	10.0	11 0						
Time (hours)	1042	1047	1052						
Temperature (°C)	14.22	14.25	14.20						
Conductivity (mS/cm)	0.545	0 543	0.541						
PH	7.88	7.87	7.87						
Turbidity (NTU)	3.0	2.0	1.0						
Dissolved Oxygen (mg/L)	3.75	3.66	3.68						
Water Level (FT BTOC)	11.85	11.86	11.85						

Date									
Total Gallons									
Time (hours)									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Dissolved Oxygen (mg/L)									
Water Level (FT BTOC)									

WELL DEVELOPMENT LOG

Client: EFANE
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No.: 29600.97 3201
Staff: Kevin Baum/Sam Whitin

Well No : **MW16-02D**

1. Total Riser and Screen Length (ft)	
2. Screen Internal Diameter (in)	
3. Water Level Below Measuring Point (ft)	
4. Volume of Water in Well (gal) V = (1-3)*(5)	

Screen ID	5. Volume/Ft (gal/ft)
1 in	0 04
2 in.	0.16
4 in.	0.65
6 in	1 47
8 in	2.61

Parameters

Date	6/29/00								
Total Gallons	4	8	16	20	24	28	32	34	36
Time (hours)	1105	1110	1115	1120	1125	1130	1135	1140	1145
Temperature (°C)	13.6	13.7	13.75	13.75	13.74	13 75	13.88	14.23	14.42
Conductivity (mS/cm)	0.118	0 123	0 123	0 123	0.123	0.123	0.123	0 123	0 123
PH	6.45	6 16	6.12	6.11	6 11	6.12	6.13	6.14	6.17
Turbidity (NTU)		177.3	156.6	139.1	133.4	147.1	139.9	155.4	166.8
Dissolved Oxygen (mg/L)	1.55	0 53	0.39	0.38	0.37	0.34	0.34	0.33	0.34
Water Level (FT BTOC)	12.75	12.74	12.79	12.8	12 76	12 75	12.75	12 77	12.74

NOTES. begin bailing 1850hrs, pumped out 20 gal 0924 DTW; end bail 0956 DTW 12.76
1135hrs reduced flow 90-85 hz.
1205hrs-increased flow rate 85-90 hz and cleared sediment from cell
Surged with Grundfos pump. 1247, 1233

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No.: 29600.97.3201
Staff: Kevin Baum/Sam Whitin

Well No :
MW16-02D

Parameters

Date	6/29/00								
Total Gallons	38	40	42	44	46	48	52	56	60
Time (hours)	1150	1155	1200	1205	1210	1215	1220	1225	1230
Temperature (°C)	14.44	14 45	14.55	14.19	14.48	14.33	13 41	13.86	13.85
Conductivity (mS/cm)	0.123	0.122	0.123	0.064	0.070	0.093	0.123	0.123	0.124
PH	6.16	6.16	6 16	6.15	6 14	6.19	6.22	6.14	6 14
Turbidity (NTU)	167.7	174.1	179.6	172.8	177.7	151.1	94 4	65.5	59.5
Dissolved Oxygen (mg/L)	0.31	0.29	0.28	0.35	0.27	0.25	0.47	0 31	0.29
Water Level (FT BTOC)	12.76	12.76	12.75	12.79	12 8	12.83	12.89	12.95	12.9

Date	6/29/00								
Total Gallons	64	68	72	84	96	108	120	132	144
Time (hours)	1235	1240	1245	1300	1315	1330	1345	1400	1415
Temperature (°C)	14.16	13.77	13 83	13.77	13.76	13 77	13.81	13.84	13.84
Conductivity (mS/cm)	0.125	0.125	0.123	0.124	0.123	0 124	0.123	0.124	0.123
PH	6.17	6.13	6 12.	6.28	6.13	6.13	6.18	6.14	6 14
Turbidity (NTU)	--	144.8	43.1	21.4	12.4	9 6	9.84	8.71	7.11
Dissolved Oxygen (mg/L)	0 19	0 27	0 29	0.53	0.28	0 27	0.38	0.26	0.25
Water Level (FT BTOC)	12.92	12.95	12.93	12.93	12.95	12.95	12.97		

WELL DEVELOPMENT LOG

CLIENT: EFANE
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: JN/CD
DATE: 02/08/01

Well Number: **MW16-2R**

1. Total Riser and Screen Length (ft) before well development.	100.70
2. Total Riser and Screen Length (ft) after well development	Not available
3. Water Level Below Measuring Point (ft)	14.03
4. Estimated amount of water lost in screened interval during well drilling (gal.)	Not available

Parameters

Total Gallons/ Drum Headspace					/40 ppm		/54 ppm		
Time	1125	1130	1135	1140	1145	1150	1155	1200	1205
Temperature (°C)	12.94	12.99	13.06	13.41	13.37	13.35	13.36	13.41	13.35
Conductivity (mS/cm)	0.303	0.303	0.284	0.264	0.236	0.214	0.184	0.170	0.166
pH	10.05	10.12	9.97	9.81	9.48	9.06	8.05	7.43	7.21
Turbidity (NTU)	offscale	offscale	offscale	offscale	offscale	offscale	240	190	180
Salinity (ppt)	0.15	0.15	0.14	0 13	0.11	0.10	0.09	0.08	0.08
DO (mg/L)	0.88	0.36	0.21	0.45	0.23	0.21	0.22	0.19	0.17
Eh (mV)	-63.6	2.7	-356.8	-326.0	-372.9	-378.9	-415.1	-447.3	-436.4
Water Level (ft from TOR)	14.75	16.51			17.05		17.23		17.37

Total Gallons/ Drum Headspace		/55 ppm			/27 ppm				
Time	1210	1215	1220	1225	1230	1235	1240	1245	1250
Temperature (°C)	13.46	13.42	13.47	13.38	13 46	13.44	13.44	13.46	13.46
Conductivity (mS/cm)	0.162	0.161	0.160	0.159	0.157	0.157	0.156	0.156	0.155
pH	7.07	7.01	6.95	6.92	6.89	6.87	6.84	6.84	6.84
Turbidity (NTU)	140	110	95	80	60	62	65	39	40
Salinity (ppt)	0.08	0.08	0.08	0.08	0.07	0 07	0.07	0.07	0.07
DO (mg/L)	0.14	0.14	0.13	0.11	0.12	0.12	0.11	0.11	0.12
Eh (mV)	-435.4	-457.0	-429.0	-450.6	-475.6	-460.2	-463.1	-445.5	-466.7
Water Level (ft from TOR)		17.44		17.46		17.47		17.49	

Notes: PID: 1,721.0. Headspace taken with PID at 0959, was 53.9. This was not heated and was after 5 minute wait. Pump surged every 5 minutes for 45 minutes moving up 1 ft every surge event. PID headspace information is documented in "Total Gallons" section as noted. However, final number is total gallons removed. Pumping Rate: 0.5 gallons per minute

Well Number: MW16-2R									
Total Gallons/ Drum Headspace	/28 ppm								
Time	1255	1300	1305	1310	1315	1320	1325	1330	1335
Temperature (°C)	13.43	13.43	13.40	13.43	13 43	13.44	13.44	13.43	13.40
Conductivity (mS/cm)	0.155	0.154	0.154	0.154	0.154	0.154	0.154	0.153	0.153
pH	6.84	6.82	6.81	6.82	6.81	6.81	6.80	6.80	6.80
Turbidity (NTU)	40	40	38	48	35	34	34	31	31
Salinity (ppt)	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
DO (mg/L)	0.10	0.10	0.10	0.09	0.08	0.09	0.09	0.09	0.10
Eh (mV)	-450 1	-436.7	-470.7	-435.0	-460.6	-420.7	-410.4	-428.6	-431.6
Water Level (ft from TOR)	17.52		17.61		17.63		17.61		

Total Gallons/ Drum Headspace	/78 ppm								
Time	1340	1345	1350	1355	1400	1405	1410	1415	1420
Temperature (°C)	13.37	13.39	13.39	13.38	13.38	13.38	13.30	13.32	13.33
Conductivity (mS/cm)	0.153	0.152	0.152	0.153	0.153	0.153	0.152	0.151	0.151
pH	6.79	6.79	6.79	6.77	6.77	6.77	6.76	6.76	6.76
Turbidity (NTU)	31	30	29	29	26	26	24	23	22
Salinity (ppt)	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
DO (mg/L)	0.10	0.09	0.09	0.04	0.08	0.08	0.08	0.07	0.07
Eh (mV)	-449.2	-450.8	-479.0	-418.5	-467.6	-419.5	-428.4	-457.0	-403.6
Water Level (ft from TOR)	16.65		16.65		16.66		16.65		16.65

Total Gallons/ Drum Headspace	/129 ppm	110 gal							
Time	1425								
Temperature (°C)	13.34								
Conductivity (mS/cm)	0.151								
pH	6.76								
Turbidity (NTU)	25								
Salinity (ppt)	0.07								
DO (mg/L)	0.07								
Eh (mV)	-405.1								
Water Level (ft from TOR)	16.65								

Notes: Blank cells denote no available information

WELL DEVELOPMENT LOG

Client EFANE
Project Title· NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No : 29600.97.3201
Staff. Kevin Baum/Sam Whitin

Well No.:
MW16-03S

1 Total Riser and Screen Length (ft)	
2. Screen Internal Diameter (in)	
3. Water Level Below Measuring Point (ft)	
4. Volume of Water in Well (gal) V = (1-3)*(5)	

Screen ID	5 Volume/Ft (gal/ft)
1 in	0 04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	6/30/00								
Total Gallons	17.0	21.5	26.6	31.5	36.5	40.5	45.5	51.5	67.5
Time (hours)	1030	1045	1100	1115	1130	1145	1200	1215	1230
Temperature (°C)	15.39	15.36	14.92	14.78	15.13	14.69	14.61	14.60	14 59
Conductivity (mS/cm)	0.169	0.165	0.211	0.206	0.205	0.205	0.204	0.204	0.206
PH	5.89	5.95	5.97	6 03	6 00	5.99	6.05	60.1	6.02
Turbidity (NTU)	21.3	27.2	19.1	44 6	9 2	15.4	4.22	5.34	2 16
Dissolved Oxygen (mg/L)	3 25	1 59	1 45	1.99	1.37	1.50	1.64	1.36	1.31
Water Level (FT BTOC)	5 81	6 12	6 11	6.11	6.13	6.37	6.37	6.39	6 39

NOTES: 0900-0926hrs bailed
0933-1029hrs surged well with Grundfos pump-17 gal.
1049hrs- surged with Grundfos pump
1104hrs- surged with Grundfos pump
1136hrs- surged with Grundfos pump; 1205hrs surged with Grundfos pump

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No : 29600.97.3201
Staff: Kevin Baum/Sam Whitin

Well No.:
MW16-03S

Parameters

Date	6/30/00								
Total Gallons	63.5								
Time (hours)	1245								
Temperature (°C)	14.56								
Conductivity (mS/cm)	0.208								
PH	6.02								
Turbidity (NTU)	1.14								
Dissolved Oxygen (mg/L)	1.27								
Water Level (FT BTOC)	5.94								

Date									
Total Gallons									
Time (hours)									
Temperature (°C)									
Conductivity (mS/cm)									
PH									
Turbidity (NTU)									
Dissolved Oxygen (mg/L)									
Water Level (FT BTOC)									

WELL DEVELOPMENT LOG

Client EFANE
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No.: 29600.97.3201
Staff: Sam Whitin

Well No :
MIP16-03D

1 Total Riser and Screen Length (ft)	
2. Screen Internal Diameter (in.)	
3. Water Level Below Measuring Point (ft)	
4. Volume of Water in Well (gal) V = (1-3)*(5)	

Screen ID	5 Volume/Ft (gal/ft)
1 in.	0 04
2 in.	0.16
4 in	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	6/30/00								
Total Gallons	--	3.0	6.0	9 0	12.0	15.0	18.0	21.0	24.0
Time (hours)	1030	1045	1100(A)	1115(A)	1130(A)	1145	1200(A)	1215(A)	1230(A)
Temperature (°C)	13 32	13.81	13.57	12 83	13 30	13.93	13 21	13.58	13.66
Conductivity (mS/cm)	0.284	0.220	0.248	0.246	0.262	0.264	0.281	0.244	0.230
pH	6 57	6.50	6.83	6.47	6.35	6.31	6.41	6.30	6.30
Turbidity (NTU)	10.0	7.0	340 0	131.0	80.0	48.0	152.0	55 0	42 0
Dissolved Oxygen (mg/L)	0.12	0.90	1.39	1.77	0.87	0.90	2.5	2.14	1.36
Water Level (FT BTOC)	10.16	9.72	9.44	9.38	9 46	9.44	9 48	9 48	9 42

NOTES (A) Surge.

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No.: 29600.97 3201
Staff. Sam Whitin

Well No.
MW16-03D

Parameters

Date	6/30/00								
Total Gallons	27.0	30.0	33.0	36.0					
Time (hours)	1245	1300	1315	1330					
Temperature (°C)	12.75	13 18	13 90	14.21					
Conductivity (mS/cm)	0.232	0.247	0.229	0.220					
PH	6.31	3 34	6 29	6.52					
Turbidity (NTU)	30 0	5.0	3.0	3.0					
Dissolved Oxygen (mg/L)	1.07	1.77	1.48	1 42					
Water Level (FT BTOC)	9 44	9 44	9.42	9.34					

Date									
Total Gallons									
Time (hours)									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Dissolved Oxygen (mg/L)									
Water Level (FT BTOC)									

WELL DEVELOPMENT LOG

Client: EFANE	
Project Title NCBC Davisville, IR Program Site 16, Remedial Investigation	
Project No 29600.97 3201	
Staff: Sam Whitin/Kevin Baum	

Well No. MW16-04D	

Screen ID	5 Volume/Ft (gal/ft)
1 in	0 04
2 in	0 16
4 in.	0.65
6 in	1.47
8 in.	2.61

1 Total Riser and Screen Length (ft)	
2. Screen Internal Diameter (in.)	
3 Water Level Below Measuring Point (ft)	
4. Volume of Water in Well (gal) V = (1-3)*(5)	

Parameters

Date	7/5/00								
Total Gallons	1.0	4.0	7.0	10.0	13.0	16.0	19 0	22.0	25.0
Time (hours)	1110(A)	1125(A)	1140(A)	1155	1210(A)	1225	1240(A)	1255(A)	1310(A)
Temperature (°C)	13.15	13 27	14.15	15 72	15.37	16 79	16.67	12 50	12.66
Conductivity (mS/cm)	0.320	0.321	0.166	0 307	0.314	0.313	0.312	0 331	0.330
PH	6.95	6.58	6 78	6 85	6 70	6.70	6 75	6 61	6.62
Turbidity (NTU)	188	270	91 0	119	74.0	120	108	8.0	19.0
Dissolved Oxygen (mg/L)	1.49	0.31	0 80	0 47	0 27	0.50	0 43	0 19	0.17
Water Level (FT BTOC)	7.25	7.71	7.64	7 74	7 30	7 68	7 61	7.69	7 79

NOTES. (A) Surge pumps

WELL DEVELOPMENT LOG

Client NORDIV, NAVFAC
Project Title NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No · 29600.97 3201
Staff: Sam Whitin/Kevin Baum

Well No.
MW16-04D

Parameters

Date	7/05/00								
Total Gallons	28 0	31.0	34.0						
Time (hours)	1325(A)	1340	1355						
Temperature (°C)	12.70	15.05	13.23						
Conductivity (mS/cm)	0.332	0.062	0.379						
PH	6 62	6.66	6.65						
Turbidity (NTU)	106	18.0	8.0						
Dissolved Oxygen (mg/L)	0.16	0.23	0.17						
Water Level (FT BTOC)	7.80	7.62	7.65						

Date									
Total Gallons									
Time (hours)									
Temperature (°C)									
Conductivity (mS/cm)									
PH									
Turbidity (NTU)									
Dissolved Oxygen (mg/L)									
Water Level (FT BTOC)									

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF:DVK
DATE:02/07/01

Well Number: **MW16-05S**

1. Total Riser and Screen Length (ft) before well development.	Not available
2. Total Riser and Screen Length (ft) after well development	Not available
3. Water Level Below Measuring Point (ft)	Not available
4. Estimated amount of water lost in screened interval during well drilling (gal.)	Not available

Parameters

Total Gallons	0	32							
Time	1252	1345							
Temperature (°C)	9.85	10.14							
Conductivity (mS/cm)	0.365	0.278							
pH	6.27	6.31							
Turbidity (NTU)	offscale	offscale							
Salinity (ppt)	0.18	0.15							
DO (mg/L)	7.03	7.77							
Eh (mV)	103.4	126.7							
Water Level (ft from TOR)									

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Notes: Pump was bailed for about 1 hour, bailed water was retrieved and analyzed with a YSI and turbidity meter. It was not possible to operate a Grundfos pump at this well due to high levels of material. Fines were subsequently removed with a peristaltic pump.
PID 0.0

WELL DEVELOPMENT LOG

Client. EFANE
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No : 29600 97.3201
Staff Kevin Baum/Sam Whitin

Well No.. **MW16-05D**

1. Total Riser and Screen Length (ft)	
2. Screen Internal Diameter (in)	
3. Water Level Below Measuring Point (ft)	
4. Volume of Water in Well (gal) V = (1-3)*(5)	

Screen ID	5. Volume/Ft (gal/ft)
1 in	0.04
2 in	0.16
4 in.	0.65
6 in.	1.47
8 in	2.61

Parameters

Date	7/5/00								
Total Gallons	280	284	290	296	302	307	312	317	322
Time (hours)	1050	1105	1120	1135	1150	1205	1220	1235	1250
Temperature (°C)	12 85	13 41	13.31	13.44	13.55	14 02	14.62	14.95	14 47
Conductivity (mS/cm)	0 136	0 136	0.137	0.137	0.135	0.134	0.135	0.134	0.135
pH	6.09	6.06	6.08	6.15	6.13	6 15	6.19	6.20	6.19
Turbidity (NTU)	28.6	48.9	44 0	26.9	45.1	23.8	90.8	37.3	10 9
Dissolved Oxygen (mg/L)	1.86	0 52	1.36	0.41	0.15	0 11	2 25	1 44	0.95
Water Level (FT BTOC)	13.13	13.08	13.07	13.05	13.02	12.84	12.74	12.72	12.85

NOTES. 1109hrs surged with Grundfos pump
1137hrs surged with Grundfos pump, 1211hrs surged, 1257 surged

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No.: 29600.97.3201
Staff Kevin Baum/Sam Whitin

Well No..
MW16-05D

Parameters

Date	7/05/00								
Total Gallons	327	332	336						
Time (hours)	1305	1320	1335						
Temperature (°C)	14.35	14 62	14 39						
Conductivity (mS/cm)	0.133	0.134	0.134						
PH	6.21	6.22	6.23						
Turbidity (NTU)	40 1	30.5	14.13						
Dissolved Oxygen (mg/L)	0.22	0 15	0.13						
Water Level (FT BTOC)	12.79	12.91	13.05						

Date									
Total Gallons									
Time (hours)									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Dissolved Oxygen (mg/L)									
Water Level (FT BTOC)									

WELL DEVELOPMENT LOG

Client: EFANE
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No : 29600.97.3201
Staff Sam Whitin

Well No..
MW16-06S

1 Total Riser and Screen Length (ft)	
2. Screen Internal Diameter (in.)	
3. Water Level Below Measuring Point (ft)	
4 Volume of Water in Well (gal) V = (1-3)*(5)	

Screen ID	5 Volume/Ft (gal/ft)
1 in.	0.04
2 in	0 16
4 in.	0.65
6 in	1.47
8 in.	2 61

Parameters

Date	6/30/00								
Total Gallons	--	3.0	6.0	9.0	12 0	15.0	18.0	21.0	24.0
Time (hours)	1635	1650	1705	1720	1735	1750	1805	1820	1835
Temperature (°C)	16.80	15.37	14 63	15 89	15.55	13.70	15.53	15.68	15.41
Conductivity (mS/cm)	0.136	0.128	0.130	0.133	0.119	0 000	0.000	0.000	0.000
PH	5.83	5.90	6.03	5.93	5.90	6 20	5 75	5 83	5.76
Turbidity (NTU)	320	144(*A)	190(*B)	201	176	216(*D)	33 0	18.0	9.0
Dissolved Oxygen (mg/L)(*C)	7.53	6.24	6.41	6.22	7.03	6.75	6.38	7 48	6.50
Water Level (FT BTOC)	15.81	16.40	14.25	16.16	16.05	16.08	16.10	16.09	16.13

NOTES Begin bailing and take initial PID Headspace reading, (after) DTW 16 65 PID=0.0
Begin pump/surge. Attempt to keep flow at approx. 0.64 min. Difficult to keep constant rate because
Sediment keeps clogging pump.
(*A) Pump surge b/c pump is getting blocked. (*B) Flow cell mechanical failure, result in surge.
(*C) D.O. readings off, likely due to air in membrane.

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No.: 29600.97.3201
Staff Sam Whitin

Well No .
MW16-06S

Parameters

Date	6/30/00								
Total Gallons	25.0	26.0	27.0						
Time (hours)	1840	1845	1850						
Temperature (°C)	15.32	15.24	15.13						
Conductivity (mS/cm)	0.000	0.000	0.000						
PH	5.76	5.75	5.73						
Turbidity (NTU)	8.0	8 0	1.0						
Dissolved Oxygen (mg/L)	6 51	5.76	5 95						
Water Level (FT BTOC)	16.16	16.17	16.18						

Date									
Total Gallons									
Time (hours)									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Dissolved Oxygen (mg/L)									
Water Level (FT BTOC)									

WELL DEVELOPMENT LOG

Client: EFANE
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No: 29600.97.3201
Staff: Kevin Baum/Sam Whitin

Well No.:
MW16-06D

1 Total Riser and Screen Length (ft)	
2. Screen Internal Diameter (in.)	
3. Water Level Below Measuring Point (ft)	
4. Volume of Water in Well (gal) V = (1-3)*(5)	

Screen ID	5. Volume/Ft (gal/ft)
1 in	0.04
2 in.	0.16
4 in.	0.65
6 in	1.47
8 in.	2.61

Parameters

Date	6/29/00								
Total Gallons	8	11	16	20	23	26	29	33	37
Time (hours)	1630	1645	1700	1715	1730	1745	1800	1815	1830
Temperature (°C)	13.83	15.29	14.64	14.45	15.10	15.88	15.93	15.59	15.59
Conductivity (mS/cm)	0.090	0.224	0.224	0.248	0.061	0.060	0.124	0.246	0.247
PH	6.45	6.62	6.61	6.59	6.68	6.70	6.69	6.96	6.64
Turbidity (NTU)	127	279	188	170	140	163	84.0	45.0	27.9
Dissolved Oxygen (mg/L)	0.91	0 27	0.23	0.20	0 18	0 16	0 16	0.24	0.17
Water Level (FT BTOC)	15.19	--	--	15.18	15.05	--	15 02	15.05	15.04

NOTES. 1523-1541hrs bailing; 1549-1625hrs surging; 8 gallons removed
1701hrs surged; 1720hrs surged
1750hrs surged

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No.. 29600 97 3201
Staff: Kevin Baum/Sam Whitn

Well No.:
MW16-06D

Parameters

Date	6/29/00								
Total Gallons	40	44	48	53					
Time (hours)	1845	1900	1915	1930					
Temperature (°C)	15.61	15.45	15.39	15.37					
Conductivity (mS/cm)	0.246	0.246	0.246	0.247					
PH	6.62	6 63	6.61	6.60					
Turbidity (NTU)	28.2	22.6	18.4	17.9					
Dissolved Oxygen (mg/L)	0.17	0.15	0.15	0.15					
Water Level (FT BTOC)	15 02	15.05	15 04	15.06					

Date									
Total Gallons									
Time (hours)									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Dissolved Oxygen (mg/L)									
Water Level (FT BTOC)									

WELL DEVELOPMENT LOG

Client EFANE
Project Title NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No. 29600 97.3201
Staff: Sam Whitin

Well No **MW16-07S**

1. Total Riser and Screen Length (ft)	
2. Screen Internal Diameter (in.)	
3. Water Level Below Measuring Point (ft)	
4. Volume of Water in Well (gal) V = (1-3)*(5)	

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0 04
2 in	0.16
4 in	0 65
6 in.	1 47
8 in.	2.61

Parameters

Date	6/29/00								
Total Gallons	--	5.0	6.0	9.0	12.0	15.0	18 0	21.0	24.0
Time (hours)	1700(A)	1715(A)	1730(A)	1745(A)	1800(A)	1815(A)	1830(A)	1845(A)	1900(A)
Temperature (°C)	13.77	16.19	14.69	14.29	13.54	14 66	13 75	13.78	13 71
Conductivity (mS/cm)	0.582	0 156	0 163	0.515	0.579	0.580	0 578	0.575	0.574
PH	6.20	6.30	6.30	6.30	6.31	6 36	6.38	6 40	6 42
Turbidity (NTU)	240	60 0	34 0	15.0	9.0	26 0	12.0	8 0	4.0
Dissolved Oxygen (mg/L)	0 72	0.36	0 29	0.22	0 30	0 80	0.27	0.26	0.32
Water Level (FT BTOC)	11.30	11 26	11.22	10 90	11.15	11.10	11 12	11 08	11.08

NOTES (A) surged

WELL DEVELOPMENT LOG

Client. NORDIV, NAVFAC
Project Title NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No.: 29600 97.3201
Staff Sam Whitin

Well No :
MW16-07S

Parameters

Date	6/29/00								
Total Gallons	27.0								
Time (hours)	1915								
Temperature (°C)	13.65								
Conductivity (mS/cm)	0 574								
pH	6 43								
Turbidity (NTU)	3.0								
Dissolved Oxygen (mg/L)	0.30								
Water Level (FT BTOC)	11.08								

WELL DEVELOPMENT LOG

Client: EFANE
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No: 29600.97.3201
Staff. Kevin Baum/Sam Whitin

Well No..
MW16-07D

1 Total Riser and Screen Length (ft)	
2. Screen Internal Diameter (in)	
3. Water Level Below Measuring Point (ft)	
4. Volume of Water in Well (gal) V = (1-3)*(5)	

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0 04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/05/00								
Total Gallons	6.0	14	24	34	40	50	62	77	92
Time (hours)	1705	1720	1735	1750	1805	1820	1835	1835	1905
Temperature (°C)	12 11	12.28	12.28	12.32	12.39	12.42	12.36	12.84	12.53
Conductivity (mS/cm)	0 316	0.312	0.329	0.339	0.342	0.346	0.331	0.350	0.336
pH	6.72	6.73	6 74	6.96	6 80	6.81	6 88	6.79	6.81
Turbidity (NTU)	--	--	--	352	330	198	202	112.9	68.7
Dissolved Oxygen (mg/L)	1.06	0.27	0.27	0.32	0.23	0.25	0.32	0.27	0.27
Water Level (FT BTOC)	14.92	14.71	22.7	23.29	22 15	22.36	23.66	19 95	19 42

NOTES: surged with Grundfos pump: 1823, 1907hrs
1922hrs surged

WELL DEVELOPMENT LOG

Client NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No. 29600.97.3201
Staff Kevin Baum/Sam Whitin

Well No
MW16-07D

Parameters

Date	7/05/00								
Total Gallons	102	107	112	117					
Time (hours)	1920	1935	1950	2005					
Temperature (°C)	13.06	13.12	13 18	13.16					
Conductivity (mS/cm)	0.270	0.148	0 142	0 136					
PH	6 82	6.81	6.89	6.84					
Turbidity (NTU)	61.3	152	51.3	48.7					
Dissolved Oxygen (mg/L)	0.24	0.26	0 33	0.26					
Water Level (FT BTOC)	15.49	14.58	14.76	14 69					

Date									
Total Gallons									
Time (hours)									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Dissolved Oxygen (mg/L)									
Water Level (FT BTOC)									

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: CD
DATE: 02/07/01

Well Number: **MW16-08D**

1. Total Riser and Screen Length (ft) before well development.	57.17
2. Total Riser and Screen Length (ft) after well development	57.20
3. Water Level Below Measuring Point (ft)	18.25
4. Estimated amount of water lost in screened interval during well drilling (gal.)	Not available

Parameters

Total Gallons	0	15	30	45	60	75	90	105	120
Time	0900	0905	0910	0915	0920	0925	0930	0935	0940
Temperature (°C)	12.71	13.28	13.32	13.30	13.25	13.25	13.22	13.18	13.21
Conductivity (mS/cm)	0.290	0.302	0.307	0.305	0.297	0.292	0.287	0.281	0.282
pH	6.47	6.26	6.29	6.25	6.29	6.26	6.29	6.27	6.31
Turbidity (NTU)	offscale	272	130	253	145	160	135	114	65
Salinity (ppt)	0.14	0.14	0.15	0.15	0.14	0.14	0.14	0.13	0.14
DO (mg/L)	2.47	0.36	0.30	0.27	0.22	0.23	0.23	0.24	0.21
Eh (mV)	73.2	-22.3	-55.0	-40.2	-59.3	-29.7	-50.8	-28.9	-62.1
Water Level (ft from TOR)	18.4		18.35		18.4				

Total Gallons	135	150	165	180	195	210	225	240	255
Time	0945	0950	0955	1000	1005	1010	1025	1030	1035
Temperature (°C)	13.16	13.19	13.16	13.18	13.11	13.14	13.13	13.14	13.16
Conductivity (mS/cm)	0.280	0.283	0.279	0.278	0.276	0.275	0.274	0.272	0.273
pH	6.30	6.29	6.29	6.29	6.28	6.28	6.28	6.29	6.29
Turbidity (NTU)	73	71	30	12	7	5	1	0	1
Salinity (ppt)	0.13	0.14	0.13	0.13	0.13	0.13	0.13	0.13	0.13
DO (mg/L)	0.20	0.20	0.21	0.21	0.21	0.19	0.20	0.19	0.19
Eh (mV)	-61.5	-68.5	-71.7	-78.5	-79.5	-87.5	-89.6	-110.4	-128.6
Water Level (ft from TOR)									

Notes: PID 0.0
Surged every 5 minutes for 45 minutes moving up 1 ft every surge event.
3 gal/min pump rate.

Well Number: MW16-8D									
Total Gallons	270	285	300	315	330	345	360		
Time	1040	1045	1050	1055	1100	1105	1110		
Temperature (°C)	13.16	13.19	13.18	13.17	13.13	13.15	13.19		
Conductivity (mS/cm)	0.273	0.272	0.271	0.271	0.271	0.271	0.271		
pH	6.28	6.28	6.28	6.28	6.28	6.28	6.28		
Turbidity (NTU)	1	0	0	0	0	0	0		
Salinity (ppt)	0.13	0.13	0.13	0.13	0.13	0.13	0.13		
DO (mg/L)	0.19	0.19	0.19	0.18	0.18	0.18	0.18		
Eh (mV)	-144.4	-164.9	-168.3	-171.7	-189.1	-194.8	-200.2		
Water Level (ft from TOR)									

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Notes:

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: SK/SW
DATE: 02/02/01

Well Number: **MW16-09D**

1. Total Riser and Screen Length (ft) before well development.	66.85
2. Total Riser and Screen Length (ft) after well development	66.70
3. Water Level Below Measuring Point (ft)	19.30
4. Estimated amount of water lost in screened interval during well drilling (gal.)	No information available

Parameters

Total Gallons	0	5	10	15	20	25	30	35	40
Time	0950	0955	1000	1005	1010	1015	1020	1025	1030
Temperature (°C)	12.91	13.25	14.01	13.78	13.71	12.02	13.83	13.81	13.82
Conductivity (mS/cm)	0.378	0.351	0.416	0.343	0.397	0.381	0.342	0.352	0.380
pH	6.29	6.92	6.91	6.91	6.93	6.91	6.89	6.90	6.90
Turbidity (NTU)	offscale	offscale	offscale	offscale	offscale	offscale	offscale	offscale	offscale
Salinity (ppt)	0.18	0.16	0.20	0.17	0.19	0.18	0.17	0.18	0.18
DO (mg/L)	0.20	0.21	0.20	0.22	0.11	6.93	0.16	0.04	0.05
Eh (mV)	-36.7	-63.0	-42.8	-69.3	-68.3	-10.9	-68.2	-62.3	-54.0
Water Level (ft from TOR)	23.2		22.8		23.1		22.8		22.6

Total Gallons	45	50	55	60	65	70	75	80	85
Time	1035	1040	1045	1050	1055	1100	1105	1110	1115
Temperature (°C)	13.42	13.91	13.97	13.96	13.96	13.82	13.96	13.86	13.90
Conductivity (mS/cm)	0.356	0.344	0.355	0.354	0.344	0.337	0.354	0.327	0.337
pH	6.89	6.89	6.89	6.89	6.89	6.88	6.88	6.88	6.87
Turbidity (NTU)	offscale	400	389	405	210	180	190	140	100
Salinity (ppt)	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16
DO (mg/L)	2.87	0.16	0.01	0.05	0.07	0.07	0.07	0.07	0.14
Eh (mV)	-44.8	-61.3	-61.0	-62.9	-68.4	-70.0	-64.9	-76.0	-80.1
Water Level (ft from TOR)	22.8		23.1		22.6		22.4		22.55

Notes: PID: 0.0. Flow rate 1 gal. per min. Well surged every 5 minutes for 50 minutes moving up 1 ft every surge event.

Well Number: MW16-09D									
Total Gallons	90	95	100	105	110	115	120	125	130
Time	1120	1125	1130	1135	1140	1145	1150	1155	1200
Temperature (°C)	13.97	13.97	13.98	13.98	13.94	13.96	14.05	14.13	14.13
Conductivity (mS/cm)	0.322	0.319	0.311	0.308	0.304	0.302	0.296	0.304	0.302
pH	6.86	6.87	6.87	6.86	6.86	6.86	6.86	6.85	6.85
Turbidity (NTU)	100	120	80	60	55	60	offscale	offscale	offscale
Salinity (ppt)	0.16	0.15	0.15	0.15	0.15	0.15	0.14	0.15	0.15
DO (mg/L)	-0.01	-0.13	-0.10	-0.06	0.09	0.09	0.08	0.09	0.10
Eh (mV)	-70.8	-82.0	-84.2	-84.2	-84.9	-85.7	-86.5	-72.6	-73.6
Water Level (ft from TOR)		22.50		22.50		22.50		22.55	

Total Gallons	135	140	145	150	155	160	165	170	175
Time	1205	1210	1215	1220	1225	1230	1235	1240	1245
Temperature (°C)	14.13	14.15	14.28	14.03	13.97	13.31	13.17	13.18	13.18
Conductivity (mS/cm)	0.301	0.293	0.289	0.281	0.279	0.281	0.309	0.284	0.311
pH	6.85	6.85	6.85	6.84	6.84	6.86	6.86	6.85	6.85
Turbidity (NTU)	offscale	200	180	150	150	offscale	offscale	offscale	offscale
Salinity (ppt)	0.14	0.14	0.14	0.13	0.13	0.14	0.15	0.15	0.15
DO (mg/L)	0.07	0.01	0.07	0.06	0.06	0.09	0.68	0.08	0.11
Eh (mV)	-73.1	-76.1	-83.6	-86.8	-86.8	-87.9	-71.4	-80.4	-68.6
Water Level (ft from TOR)		22.50		22.15					

Notes:

WELL DEVELOPMENT LOG

CLIENT: EFANE
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: SK/CD
DATE: 1/31/01

Well Number: **MW16-10D**

1. Total Riser and Screen Length (ft) before well development.	57.5
2. Total Riser and Screen Length (ft) after well development	58.0
3. Water Level Below Measuring Point (ft)	17.0
4. Estimated amount of water lost in screened interval during well drilling (gal.)	Not available

Parameters

Total Gallons	0	5	10	15	20	25	30	35	40
Time	1340	1345	1350	1355	1400	1405	1410	1415	1420
Temperature (°C)	14 95	16.30	15 97	16.86	15.74	15.58	15.58	15.54	15.55
Conductivity (mS/cm)	0.617	0.703	0.796	0.749	0.705	0.669	0.582	0.521	0.507
pH	6.47	6.99	6.96	6.92	6.91	6.84	6.80	6.78	6.78
Turbidity (NTU)	240	240	250	240	210	210	90	33	25
Salinity (ppt)	0.30	0 35	0 38	0.37	0.55	0.33	0.27	0 25	0.25
DO (mg/L)	1.11	1 11	2 58	1.39	1.09	0.85	0.66	0.49	0.48
Eh (mV)	96.8	42.2	22 8	-59.8	-26.8	-146.7	-142.7	-47.3	-45.8
Water Level (ft from TOR)		18 2		20 9			21		21.0

Total Gallons	45	50	55	60	65	70	75	80	85
Time	1425	1430	1435	1440	1445	1450	1455	1500	1505
Temperature (°C)	15.53	15 52	15.51	15 54	15.52	15.52	15.55	15.57	15.54
Conductivity (mS/cm)	0 500	0 479	0.470	0 458	0.433	0.428	0.428	0.428	417
pH	6 77	6.77	6.76	6.76	6.75	6 74	6.74	6 73	6 73
Turbidity (NTU)	13	13	11	10	8	8	7	7	7
Salinity (ppt)	0 24	0.23	0.23	0 22	0.21	0.21	0.21	0.20	0 20
DO (mg/L)	0 47	0 43	0.41	0.38	0.36	0.32	0 32	0.32	0.30
Eh (mV)	-44.5	-36.7	-31 0	-22.1	-17 0	6.1	7.3	9.5	9.2
Water Level (ft from TOR)	21 4		21.4		21.3		21.4		21.4

Notes: PID: 0.0. Well surged every 5 minutes for 50 minutes moving up 1 ft every surge event.
Pumping rate: 1 gallon per minute

Well Number: MW16-10D									
Total Gallons	90	95	100	105	110	115			
Time	1510	1515	1520	1525	1530	1535			
Temperature (°C)	15.55	15 65	15.69	15.69	15.69	15 68			
Conductivity (mS/cm)	0 403	0 402	0.396	0.395	0.396	0 394			
pH	6.72	6.72	6.72	6.72	6 72	6.72			
Turbidity (NTU)	7	7	6	6	6	6			
Salinity (ppt)	0.20	0.19	0 19	0 19	0.19	0.19			
DO (mg/L)	0 31	0.30	0.30	0.31	0.30	0.31			
Eh (mV)	8 6	8 7	9.4	11 0	11 7	12.6			
Water Level (ft from TOR)	21 6		21.6		21.6				

Well Number: MW16-10D									
Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Notes: Blank cells denote no available information

WELL DEVELOPMENT LOG

CLIENT: EFANE
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJET NUMBER: 29600 97.3201
STAFF: CD
DATE: 1/31/01

Well Number · **MW16- 10R**

1. Total Riser and Screen Length (ft) Before well development	91.6
2. Total Riser and Screen Length (ft) After well development	Not Available
3 Water Level Below Measuring Point (ft)	16 0
4. Est amount of water lost in screened interval during well drilling (in gallons)	Not Available

Parameters

Total Gallons									
Time	1350	1355	1400	1405	1410	1415	1420	1425	1430
Temperature (°C)	13 70	13 92	13.92	14 00	14 33	14 10	14 15	14 57	14.21
Conductivity (mS/cm)	0.319	0.314	0.316	0 315	0.317	0.315	0 316	0 316	0.316
pH	8.79	9.04	9.06	9 16	9.16	9 24	9.26	9.29	9 34
Turbidity (NTU)	Offscale	Offscale	Offscale	Offscale	Offscale	Offscale	Offscale	Offscale	Offscale
Salinity	0 15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
DO (mg/L)	0 76	0.58	0.75	0 99	1.23	0.94	0 34	1.08	0.22
Eh (mV)	-593.7	-629.2	-626 6	-691 8	-637 8	-647 9	-659.6	-664.6	-684.1
Water level (ft from TOR)	18 4		22.3		30.5		34.6		41 15

Total Gallons									
Time	1435	1442	1448	1454	1500				
Temperature (°C)	14 37	14.39	14.52	14 80					
Conductivity (mS/cm)	0.319	0.318	0 317	0 317					
pH	9.37	9 39	9 41	9.43					
Turbidity (NTU)	Offscale	Offscale	Offscale	Offscale					
Salinity	0.15	0 15	0.15	0 15					
DO (mg/L)	0.64	0.12	0.52	0.04					
Eh (mV)	-702.9	-667 1	-649.5	-718.7					
Water level (ft from TOR)		44.4		44 5	Well Dry				

Notes: PID 0.0. 0.5 gal/min. Surged every 5 minutes for 45 minutes moving up 1 ft every surge event.
Blank cells denote no available information

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: CD
DATE: 02/06/01

Well Number: **MW16-11D**

1. Total Riser and Screen Length (ft) before well development.	64
2. Total Riser and Screen Length (ft) after well development	64
3. Water Level Below Measuring Point (ft)	14.68
4. Estimated amount of water lost in screened interval during well drilling (gal.)	No water loss

Parameters

Total Gallons	0	15	30	45	60	75	90	105	120
Time	1110	1115	1120	1125	1130	1135	1140	1145	1150
Temperature (°C)	12.84	12.95	13.19	13.10	13.06	13.07	12.99	13.01	12.93
Conductivity (mS/cm)	0.274	0.257	0.242	0.230	0.224	0.218	0.217	0.214	0.214
pH	8.90	8.90	7.82	7.41	7.14	7.13	7.02	7.03	7.02
Turbidity (NTU)	offscale	offscale	offscale	360	700	300	310	140	
Salinity (ppt)	0.13	0.12	0.12	0.11	0.11	0.10	0.10	0.10	0.10
DO (mg/L)	1.03	0.28	0.22	0.23	0.39	0.22	0.25	0.20	0.20
Eh (mV)	148.0	154.2	-127.0	-110.2	-87.2	-93.8	-84.2	-82.9	-88.9
Water Level (ft from TOR)		20.7		22.7		22.85		22.6	

Total Gallons	135	150	155(A)	157.5	160	162.5	165	167.5	170
Time	1155	1200	0855	0900	0905	0910	0915	0920	0920
Temperature (°C)	12.84	12.59	12.98	13.16	13.16	13.16	13.17	13.17	13.16
Conductivity (mS/cm)	0.209	0.201	0.117	0.158	0.174	0.177	0.179	0.177	0.178
pH	7.56	7.74	9.70	7.97	7.45	7.25	7.13	7.06	7.02
Turbidity (NTU)	45	23	offscale	273	110	41	25	13	13
Salinity (ppt)	0.10	0.10	0.05	0.08	0.08	0.08	0.09	0.08	0.08
DO (mg/L)	0.19	0.46	5.46	0.65	0.33	0.20	0.15	0.13	0.11
Eh (mV)	-155.2	-173.0	190.1	-41.2	-60.4	-61.4	-61.5	-61.2	-63.5
Water Level (ft from TOR)			14.5		20.1		20.1		20.2

Notes: PID: 1.3. Surged every 5 minutes for 45 minutes moving up one ft every surge event.
1150 Well began taking in water from melting snow. 1205 close up well.
02/09/01 Begin development, 0.5 gallons/minute.

Well Number: MW16-11D									
Total Gallons	172.5	175	177.5	180	182.5	185	187.5	190	
Time	9030	0935	0940	0945	0950	0955	1000	1005	
Temperature (°C)	13.17	13.17	13.17	13.17	13.17	13.17	13.18	13.18	
Conductivity (mS/cm)	0.177	0.177	0.176	0.176	0.175	0.174	0.175	0.174	
pH	6.99	6.97	6.95	6.94	6.93	6.92	6.91	6.91	
Turbidity (NTU)	8	7	5	3	5	3	3	3	
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08	0.07	0.08	0.08	
DO (mg/L)	0.11	0.10	0.08	0.07	0.08	0.08	0.06	0.06	
Eh (mV)	-65.1	-66.1	-67.3	-68.7	-69.3	-70.6	-71.8	-72.6	
Water Level (ft from TOR)		20.2		20.2		20.2		20.2	

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Notes:

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: JN/CD/DVK
DATE: 02/08/01

Well Number: **MW16-12D**

1. Total Riser and Screen Length (ft) before well development.	64.21
2. Total Riser and Screen Length (ft) after well development	64.40
3. Water Level Below Measuring Point (ft)	17.27
4. Estimated amount of water lost in screened interval during well drilling (gal.)	No water loss

Parameters

Total Gallons									
Time	1350	1355	1400	1405	1410	1415	1420	1425	1430
Temperature (°C)	12.70	12.79	13.33	13.09	13.09	13.20	13.06	12.93	12.94
Conductivity (mS/cm)	0.189	0.180	0.180	0.178	0.178	0.177	0.176	0.175	0.175
pH	6.87	6.87	6.81	6.83	6.83	6.82	6.82	6.78	6.79
Turbidity (NTU)	offscale	263	600	offscale	offscale	303	70	108	130
Salinity (ppt)	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.08
DO (mg/L)	0.42	0.28	0.60	0.21	0.20	0.25	0.19	0.40	0.27
Eh (mV)	-80.2	-188.0	-402.8	-455.3	-470.8	-464.0	-459.7	-422.1	-452.3
Water Level (ft from TOR)	19.00		19.01		18.85		19.12		19.00

Total Gallons									
Time	1445	1455	1505	1515	1525	1535	1545	1555	1605
Temperature (°C)	12.99	12.93	12.97	12.99	13.01	13.00	12.99	13.01	12.94
Conductivity (mS/cm)	0.173	0.173	0.172	0.172	0.171	0.171	0.171	0.171	0.171
pH	6.78	6.78	6.78	6.77	6.77	6.76	6.76	6.75	6.75
Turbidity (NTU)	90		8		9		15		3
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
DO (mg/L)	0.18	0.16	0.16	0.18	0.16	0.15	0.16	0.15	0.15
Eh (mV)	-483.3	-469.6	-498.3	-507.3	-521.4	-525.9	-508.6	-525.5	-538.7
Water Level (ft from TOR)	19.18		19.21		19.28		19.20		19.26

Notes: Surged every 5 minutes for 45 minutes, moving up one ft every surge event. PID 0.0
Generator failed at 1400, 1420, and 1505 creating surge events.
1 gal/min pump rate. 145 gallons pumped out.

Well Number: MW16-12D									
Total Gallons		145							
Time	1610	1615							
Temperature (°C)	12.98	12.98							
Conductivity (mS/cm)	0.171	0.170							
pH	6.75	6.74							
Turbidity (NTU)	2.96	2.84							
Salinity (ppt)	0.08	0.08							
DO (mg/L)	0.15	0.15							
Eh (mV)	-557.4	-546.6							
Water Level (ft from TOR)		19.28							

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Notes:

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: JN/CD
DATE: 02/06/01

Well Number: **MW16-13D**

1. Total Riser and Screen Length (ft) before well development.	65.28
2. Total Riser and Screen Length (ft) after well development	65.35
3. Water Level Below Measuring Point (ft)	14.26
4. Estimated amount of water lost in screened interval during well drilling (gal.)	No water loss

Parameters

Total Gallons									
Time	1145	1150	155	1200	1205	1210	1215	1220	1225
Temperature (°C)	12.81	13.35	13.50	13.89	13.69	13.68	13.62	13.55	13.58
Conductivity (mS/cm)	0.383	0.340	0.318	0.287	0.292	0.315	0.296	0.292	0.299
pH	7.89	7.52	7.31	7.15	7.12	7.02	7.08	7.04	7.03
Turbidity (NTU)	offscale	offscale	offscale	offscale	offscale	offscale	offscale	offscale	offscale
Salinity (ppt)	0.18	0.16	0.15	0.14	0.14	0.15	0.14	0.14	0.14
DO (mg/L)	0.36	0.23	0.16	0.30	0.13	0.86	0.18	0.22	0.27
Eh (mV)	-446.9	-556.4	-531.5	-552.4	-494.7	-504.1	-497.0	-462.7	-485.6
Water Level (ft from TOR)	18.49		18.00		18.16		18.22		18.41

Total Gallons									
Time	1230	1235	1240	1245	1250	1255	1300	1305	1310
Temperature (°C)	13.52	13.39	13.37	13.39	13.35	13.31	13.40	13.40	13.40
Conductivity (mS/cm)	0.285	0.279	0.272	0.260	0.256	0.262	0.257	0.248	0.241
pH	7.04	7.03	7.03	7.04	6.98	7.02	7.06	7.06	7.07
Turbidity (NTU)	offscale	offscale	offscale	500	480	450	408	400	400
Salinity (ppt)	0.14	0.13	0.13	0.12	0.12	0.13	0.13	0.12	0.12
DO (mg/L)	0.34	0.10	0.09	0.09	0.85	0.28	0.09	0.10	0.09
Eh (mV)	-487.0	-469.3	-498.2	-466.4	-481.1	-538.8	-552.3	-548.2	-549.9
Water Level (ft from TOR)		18.11		18.13		18.00		18.10	

Notes: PID: 1.3. Pumping rate 1gpm

Well Number: MW16-13D									
Total Gallons									
Time	1315	1320	1325	1330	1335	1340	1345	1350	1355
Temperature (°C)	13.42	13.29	13.30	13.32	13.31	13.28	13.21	13.24	13.30
Conductivity (mS/cm)	0.238	0.240	0.232	0.235	0.231	0.230	0.227	0.227	0.223
pH	7.07	7.08	7.07	7.08	7.06	7.06	7.04	7.02	7.02
Turbidity (NTU)	280	370	offscale	600	offscale	offscale	offscale	230	offscale
Salinity (ppt)	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
DO (mg/L)	0.08	0.07	0.06	0.05	0.06	0.05	0.02	0.04	0.04
Eh (mV)	-548.1	-549.2	-559.6	-550.5	-543.6	-549.2	-524.6	-549.5	-549.5
Water Level (ft from TOR)	18.00		18.00		18.42		20.10		20.39

Total Gallons									
Time	1400	1405	1410	1415	1420	1425	1430	1435	1440
Temperature (°C)	13.24	13.25	13.26	13.26	13.26	13.27	13.19	13.20	13.21
Conductivity (mS/cm)	0.224	0.224	0.223	0.223	0.222	0.220	0.222	0.219	0.215
pH	7.01	6.99	6.99	6.99	6.99	6.99	7.00	6.99	6.99
Turbidity (NTU)	offscale	offscale	offscale	400	180	85	45	56	70
Salinity (ppt)	0.11	0.11	0.11	0.11	0.10	0.10	0.11	0.10	0.10
DO (mg/L)	0.03	0.01	0.01	0.01	0.03	0.03	0.03	0.03	0.03
Eh (mV)	-547.2	-541.7	-542.0	-547.0	-545.6	-547.2	-546.8	-544.8	-544.9
Water Level (ft from TOR)		20.28		20.20		20.18		20.10	

Total Gallons	180								
Time	1445								
Temperature (°C)	13.06								
Conductivity (mS/cm)	0.216								
pH	6.99								
Turbidity (NTU)	170								
Salinity (ppt)	0.10								
DO (mg/L)	0.01								
Eh (mV)	-536.8								
Water Level (ft from TOR)									

Notes:

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: CD
DATE: 02/05/01

Well Number: **MW16-14D**

1. Total Riser and Screen Length (ft) before well development.	62.4
2. Total Riser and Screen Length (ft) after well development	62.6
3. Water Level Below Measuring Point (ft)	16.6
4. Estimated amount of water lost in screened interval during well drilling (gal.)	No water loss

Parameters

Total Gallons									
Time	1320	1325	1330	1335	1340	1345	1410	1415	1420
Temperature (°C)	13.07	13.56	13.90	14.08	13.82	13.77	13.79	13.83	13.89
Conductivity (mS/cm)	0.667	0.297	0.238	0.203	0.219	0.198	0.205	0.188	0.174
pH	10.90	9.54	7.81	7.30	7.07	6.93	7.80	7.03	6.73
Turbidity (NTU)	offscale	217	104	79	60	70	45	50	22
Salinity (ppt)	0.32	0.14	0.11	0.10	0.11	0.09	0.10	0.09	0.08
DO (mg/L)	2.02	0.34	0.39	0.78	0.63	0.55	0.45	0.30	0.25
Eh (mV)	-473.8	-518	-520.4	-502	-499.4	-448.5	-497.9	-475.4	-490.6
Water Level (ft from TOR)		23.9		23.9			24.5		25.4

Total Gallons									160
Time	1425	1430	1440	1450	1515	1540	1550	1600	1610
Temperature (°C)	13.83	13.88	13.80	13.04	13.76	13.78	13.76	13.73	13.78
Conductivity (mS/cm)	0.172	0.165	0.161	0.193	0.171	0.159	0.151	0.149	0.149
pH	6.68	6.65	6.62	7.10	6.72	6.57	6.41	6.40	6.41
Turbidity (NTU)	23	22	13	25	11	28	28	7	3
Salinity (ppt)	0.08	0.08	0.08	0.09	0.08	0.08	0.07	0.07	0.07
DO (mg/L)	0.16	0.14	0.20	0.62	0.26	0.19	0.09	0.09	0.09
Eh (mV)	-492.0	-400.9	-418.9	-398.9	-405.1	-468.2	-474.2	-396.7	-387.4
Water Level (ft from TOR)		25.4			25				28.1

Notes: PID 0.0. Pump surged every 5 minutes for 45 minutes moving up one ft every surge event.
At 1350 train cut extension cord and tripped fuse in generator. At 1440 pump began cutting on and off

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: CD
DATE: 02/01/01

Well Number: **MW16-15D**

1. Total Riser and Screen Length (ft) before well development.	59.6
2. Total Riser and Screen Length (ft) after well development	59.3
3. Water Level Below Measuring Point (ft)	18.82
4. Estimated amount of water lost in screened interval during well drilling (gal.)	300

Parameters

Total Gallons	0	15	30	45	60	75	90	105	125
Time	1400	1405	1410	1415	1420	1425	1430	1435	1440
Temperature (°C)								14.40	14.11
Conductivity (mS/cm)								0.156	0.162
pH								6.37	6.42
Turbidity (NTU)	500	395	280	250	150	80	60	14	80
Salinity (ppt)								0.07	0.08
DO (mg/L)								0.23	0.40
Eh (mV)								-435.4	-403.4
Water Level (ft from TOR)	19.4		19.4	19.45		19.4		19.4	

Total Gallons	145	165	185	205	225	245	265	285	305
Time	1445	1450	1455	1500	1505	1510	1515	1520	1525
Temperature (°C)	14.10	14.09	14.11	14.10	14.12	14.10	14.12	14.13	14.10
Conductivity (mS/cm)	0.165	0.166	0.164	0.167	0.166	0.166	0.167	0.168	0.168
pH	6.43	6.42	6.42	6.42	6.43	6.42	6.42	6.42	6.42
Turbidity (NTU)	75	19	50	29	17	11	4	2	2
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
DO (mg/L)	0.48	0.48	0.52	0.57	0.62	0.65	0.67	0.68	0.70
Eh (mV)	-380.2	-377.5	-348.7	-337.8	-307.6	-292.6	-278.3	-261.5	-248.1
Water Level (ft from TOR)	20.39		20.4		20.4		20.4		20.48

Notes: YSI was not operational for first 30 minutes of pump operation. PID 0.0.
Pumping rate: 3 gallons per minute; at 1435 pump rate was increased to 4 gpm.
Pump surged every 5 minutes for 45 minutes moving up one ft every surge event.

Well Number: MW16-15D									
Total Gallons	325	345							
Time	1530	1535							
Temperature (°C)	14.11	14.15							
Conductivity (mS/cm)	0.168	0.170							
pH	6.41	6.41							
Turbidity (NTU)	0.85	0.55							
Salinity (ppt)	0.08	0.08							
DO (mg/L)	0.72	0.70							
Eh (mV)	-233.9	-219.2							
Water Level (ft from TOR)									

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Notes:

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: JN/CD
DATE: 02/01/01

Well Number: **MW16-15R**

1. Total Riser and Screen Length (ft) before well development.	87.15
2. Total Riser and Screen Length (ft) after well development	Not available
3. Water Level Below Measuring Point (ft)	18.82
4. Estimated amount of water lost in screened interval during well drilling (gal.)	400

Parameters

Total Gallons	0.0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0
Time	1405	1410	1415	1420	1425	1430	1435	1440	1445
Temperature (°C)	13.18	13.23	13.52	13.62	14.01	13.64	13.72	14.00	13.64
Conductivity (mS/cm)	0.285	0.283	0.284	0.284	0.284	0.283	0.282	0.280	0.281
pH	7.55	7.41	7.47	7.19	7.30	7.31	7.32	7.31	7.34
Turbidity (NTU)	--	50	--	--	--	--	230	50	39
Salinity (ppt)	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.13	0.13
DO (mg/L)	1.09	0.35	1.52	0.43	0.29	0.30	0.45	0.51	0.44
Eh (mV)	-131.6	-93.0	-114.9	-244.6	-469.6	-475.5	-328.6	-105.8	-74.4
Water Level (ft from TOR)	23.56	25.28	26.89	26.14	26.81	28.89	30.16	30.95	32.05

Total Gallons	22.5	25.0	27.5	30.0	32.5	35.0	37.5	40.0	42.5*
Time	1450	1455	1500	1505	1510	1515	1520	1525	1530
Temperature (°C)	13.74	13.75	13.58	13.51	13.17	13.93	13.69	13.56	13.50
Conductivity (mS/cm)	0.283	0.281	0.283	0.283	0.280	0.275	0.278	0.276	0.275
pH	7.45	7.44	7.43	7.43	7.44	7.45	7.46	7.46	7.50
Turbidity (NTU)	60	40	40	37	39	36	40	50	63
Salinity (ppt)	0.14	0.13	0.14	0.14	0.13	0.13	0.13	0.13	0.13
DO (mg/L)	0.29	0.28	1.06	0.28	0.29	0.26	0.24	0.28	0.20
Eh (mV)	-117.6	-130.7	-93.9	-111.3	-133.0	-120.4	-116.7	-126.9	-153.6
Water Level (ft from TOR)	32.96	33.1	34.94	35.44	36.82	37.10	37.40	38.39	38.55

Notes: --- = ERROR ON TURBIDITY METER, 0.0 PID
After three hours the well was run dry, and run dry three more subsequent times.
*- Denotes an increase in flow rate.

Well Number: MW16-15R

Total Gallons									
Time	1535	1540	1545	1550	1555	1600	1605	1610*	1615
Temperature (°C)	13.36	14.36	13.80	13.34	13.05	14.55	14.29	13.98	14.42
Conductivity (mS/cm)	0.274	0.273	0.274	0.275	0.274	0.270	0.274	0.272	0.270
pH	7.48	7.49	7.51	7.52	7.54	7.54	7.57	7.58	7.58
Turbidity (NTU)	70	54	44	44	47	52	56	64	65
Salinity (ppt)	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
DO (mg/L)	0.19	0.16	0.17	0.19	0.19	0.14	0.17	0.19	0.14
Eh (mV)	-145.5	-153.3	-139.0	-160.1	167.0	-172.8	-159.7	-147.8	-167.8
Water Level (ft from TOR)	39.52	40.83	41.96	42.41	42.63	44.43	46.96	46.68	

Total Gallons									
Time	1620	1625	1630	1635	1640	1645 (A)	1650	1655	1700
Temperature (°C)	14.38	13.94	13.72	13.73	13.35	13.72	14.42	13.78	14.37
Conductivity (mS/cm)	0.275	0.274	0.273	0.271	0.271	0.271	0.266	0.266	0.273
pH	7.61	7.63	7.62	7.60	7.60	7.60	7.64	7.50	7.60
Turbidity (NTU)	67	60	66	88	85	83	217	228	164
Salinity (ppt)	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
DO (mg/L)	0.14	0.15	0.15	0.15	0.17	0.16	0.11	0.10	0.32
Eh (mV)	-185.7	-167.7	-153.5	-171.0	-185.9	-191.2	-189.9	-171.2	-182.0
Water Level (ft from TOR)	50.03		52.52		53.33		55.15		62.22

	≈400								
Time	1705								
Temperature (°C)	14.75								
Conductivity (mS/cm)	0.279								
pH	7.74								
Turbidity (NTU)	131								
Salinity (ppt)	0.13								
DO (mg/L)	0.08								
Eh (mV)	-207.2								
Water Level (ft from TOR)	80.85								

Notes: (A) flow rate turned upwards of 5 gallons/minute

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: DVK
DATE: 02/05/01

Well Number: **MW16-16D**

1. Total Riser and Screen Length (ft) before well development.	62.0
2. Total Riser and Screen Length (ft) after well development	62.0
3. Water Level Below Measuring Point (ft)	13.12
4. Estimated amount of water lost in screened interval during well drilling (gal.)	5

Parameters

Total Gallons	20	30	40	50	60	70	80	90	100
Time	1310	1315	1320	1325	1330	1335	1340	1355	1400
Temperature (°C)	13.34	13.47	13.32	13.29	13.23	13.24	13.22	13.23	13.22
Conductivity (mS/cm)	0.135	0.126	0.123	0.125	0.124	0.118	0.129	0.127	0.129
pH	7.01	6.77	6.48	6.51	6.54	6.47	6.48	6.51	6.48
Turbidity (NTU)	268	284	89	13	10	10	6	9	7
Salinity (ppt)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
DO (mg/L)	0.11	0.27	0.13	0.06	0.05	0.04	0.04	0.04	0.04
Eh (mV)	10.9	11.4	43.1	31.6	32.1	25.4	22.3	29.2	23.1
Water Level (ft from TOR)									

Total Gallons	110	120	130	140	150	160	170	180	190
Time	1405	1415	1425	1435	1445	1455	1505	1515	1520
Temperature (°C)	13.22	13.22	13.24	13.24	13.26	13.27	13.30	13.32	13.30
Conductivity (mS/cm)	0.130	0.129	0.133	0.136	0.133	0.132	0.132	0.134	0.134
pH	6.50	6.48	6.51	6.50	6.48	6.47	6.50	6.53	6.50
Turbidity (NTU)	4	4	4	3	3	3	3	3	3
Salinity (ppt)	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.06
DO (mg/L)	0.04	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.03
Eh (mV)	18.2	16.3	12.4	8.6	1.4	-1.9	-1.8	-2.3	-2.2
Water Level (ft from TOR)									

Notes: Surged well with bailer for 10 minutes, headspace was 0.0. Started pump @ 1305. Did no get first reading due to difficulty with pump operation.
1345 Train came through and cut extension cord, had to reset the generator and restart pump at 1355.
Surged every 5 minutes for 45 minutes, moving up one ft every surge event.

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: DVK
DATE: 02/06/01

Well Number: **MW16-17D**

1. Total Riser and Screen Length (ft) before well development.	68.9
2. Total Riser and Screen Length (ft) after well development	68.9
3. Water Level Below Measuring Point (ft)	11.68
4. Estimated amount of water lost in screened interval during well drilling (gal.)	No water loss

Parameters

Total Gallons	7.5	17.5	27.5	37.5	47.5	49.0	61.5	74.0	86.5
Time	1108	1113	1118	1123	1128	1133	1138	1143	1148
Temperature (°C)	13.83	13.90	13.93	14.03	14.03	14.38	14.70	14.68	14.23
Conductivity (mS/cm)	0.288	0.275	0.252	0.222	0.216	0.211	0.195	0.200	0.180
pH	6.88	6.83	6.71	6.73	6.72	6.68	7.02	7.03	6.25
Turbidity (NTU)	offscale	offscale	offscale	265	33	25	13	12	10
Salinity (ppt)	0.14	0.13	0.12	0.10	0.11	0.09	0.09	0.09	0.09
DO (mg/L)	0.66	0.15	0.13	0.12	0.12	0.11	0.15	0.14	0.16
Eh (mV)	-84.5	-221	-152	-333	-339	-284	-270.3	-268.4	-2.4
Water Level (ft from TOR)	26.60	31.55	36.38		39.45		46.59		

Total Gallons	96.5	107	117	127	137	147	157	167	177
Time	1153	1158	1203	1208	1213	1218	1223	1228	1233
Temperature (°C)	14.33	14.40	14.31	14.21	14.19	14.17	14.23	14.18	14.14
Conductivity (mS/cm)	0.174	0.174	0.175	0.176	0.170	0.164	0.162	0.162	0.168
pH	6.63	6.52	6.48	6.24	6.38	6.63	6.66	6.65	6.63
Turbidity (NTU)	28	24	36	110	86	22	8	6	6
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
DO (mg/L)	0.10	0.12	0.15	0.17	0.17	0.18	0.10	.010	0.07
Eh (mV)	-91.6	-76.5	-18.2	-3.9	-15.2	-39.1	-81.4	-72.4	-62.5
Water Level (ft from TOR)									

Notes: Start pump @ 1103, flow is ≈ 1.5 gal/min, Distance to Water is dropping. 1108 DTW is 26.6 ft and holding, increase flow rate to 2 gpm. 1130 increase flow to 2.5 gpm. 1146 pump cut off. DTW was 49ft and rising fast. 1147 pump back on, reduce flow rate to 2 gpm. Surge every 5 minutes for 45 minutes, moving up 1 ft every surge event.

Well Number: MW16-17D									
Total Gallons	147	177	207	217	227	237	247		
Time	1238	1243	1248	1253	1258	1303	1308		
Temperature (°C)	14.15	14.17	14.20	14.23	14.26	14.26	14.27		
Conductivity (mS/cm)	0.159	0.159	0.157	0.157	0.155	0.158	0.155		
pH	6.66	6.67	6.67	6.67	6.66	6.67	6.67		
Turbidity (NTU)	6	5	5	4	4	4	4		
Salinity (ppt)	0.08	0.08	0.07	0.07	0.07	0.07	0.07		
DO (mg/L)	0.05	0.05	0.05	0.05	0.05	0.04	0.04		
Eh (mV)	-98.2	-100.2	-103.9	-95.2	-94.3	-97.3	-95.6		
Water Level (ft from TOR)									

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Notes:

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: JN
DATE: 02/07/01

Well Number: **MW16-18D**

1. Total Riser and Screen Length (ft) before well development.	54.64
2. Total Riser and Screen Length (ft) after well development	54.85
3. Water Level Below Measuring Point (ft)	12.96
4. Estimated amount of water lost in screened interval during well drilling (gal.)	No water loss

Parameters

Total Gallons	5	10	15	20	25	30	35	40	45
Time	0925	0930	0935	0940	0945	0950	0955	1000	1010
Temperature (°C)	13.66	13.69	13.76	13.31	13.70	13.75	13.63	13.62	13.47
Conductivity (mS/cm)	0.182	0.182	0.181	0.183	0.185	0.181	0.178	0.175	0.167
pH	6.69	6.70	6.69	6.67	6.66	6.64	6.63	6.61	6.59
Turbidity (NTU)	offscale	offscale	300	290	180	110	90	55	40
Salinity (ppt)	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08
DO (mg/L)	0.40	0.34	0.28	0.52	0.20	0.25	0.21	0.15	0.22
Eh (mV)	-180.1	-339.6	-438.6	-394.8	-459.8	-446.7	-451.9	-490.6	-459.8
Water Level (ft from TOR)	20.63		21.25		21.31		21.21		21.20

Total Gallons	50	55	60	65	70	75	80	85	90
Time	1010	1015	1020	1025	1030	1035	1040	1045	1050
Temperature (°C)	13.46	13.50	13.42	13.37	13.42	13.45	13.38	13.47	13.43
Conductivity (mS/cm)	0.166	0.163	0.167	0.162	0.161	0.159	0.159	0.157	0.155
pH	6.59	6.59	6.58	6.56	6.56	6.56	6.56	6.55	6.54
Turbidity (NTU)	45	45	30	21	17	13	12	10	7
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.07	0.07
DO (mg/L)	0.16	0.71	0.22	0.17	0.14	0.13	0.13	0.12	0.12
Eh (mV)	-467.9	-300.2	-373.0	-436.4	-486.6	-495.9	-492.8	-495.6	-489.6
Water Level (ft from TOR)		20.99		21.23		21.21		21.21	

Notes: PID: 0.0. Pumping rate approx. 1 gpm.
Surged every 5 minutes for 45 minutes moving up one ft every surge event.
At completion of development rate turned up to approx. 2.5 gpm for approx. 1.5 hours to take out approx. 350gal from well.

Well Number: MW16-18D

Total Gallons	95	100	105	110	115	120	125		
Time	1055	1100	1105	1110	1115	1120	1125		
Temperature (°C)	13.52	13.51	13.59	13.69	13.56	13.53	13.49		
Conductivity (mS/cm)	0.154	0.152	0.152	0.151	0.150	0.149	0.149		
pH	6.54	6.53	6.53	6.52	6.52	6.52	6.52		
Turbidity (NTU)	5	3	3	3	2	1	2		
Salinity (ppt)	0.07	0.07	0.07	0.07	0.07	0.07	0.07		
DO (mg/L)	0.12	0.11	0.11	0.11	0.10	0.11	0.10		
Eh (mV)	-492.4	-496.4	-500.1	-496.3	-491.7	-484.6	-489.6		
Water Level (ft from TOR)	21.25		21.29		21.28		21.26		

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Notes:

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: DVK
DATE: 02/07/01

Well Number: **MW16-19D**

1. Total Riser and Screen Length (ft) before well development.	57.2
2. Total Riser and Screen Length (ft) after well development	Not available
3. Water Level Below Measuring Point (ft)	12.04
4. Estimated amount of water lost in screened interval during well drilling (gal.)	250 GALLONS

Parameters

Total Gallons	0	7.5	15	22.5	30	37.5	45	52.5	60
Time	0913	0918	0923	0928	0933	0938	0943	0948	0953
Temperature (°C)	12.86	12.97	12.96	13.00	12.97	12.97	12.98	12.98	12.95
Conductivity (mS/cm)	0.123	0.122	0.121	0.121	0.119	0.120	0.122	0.120	0.129
pH	6.07	6.42	6.44	6.43	6.42	6.42	6.42	6.42	6.42
Turbidity (NTU)	offscale	offscale	offscale	240	196	208	offscale	464	365
Salinity (ppt)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
DO (mg/L)	0.40	0.16	0.12	0.09	0.07	0.06	0.02	0.04	0.05
Eh (mV)	-106.7	-320.2	-416.8	-435.6	-444.1	-441.4	-356.0	-431	-444.4
Water Level (ft from TOR)				12.75					

Total Gallons	67.5	75	90	115	140	165	190	215	240
Time	0958	1003	1008	1013	1018	1023	1028	1033	1038
Temperature (°C)	12.97	12.95	12.99	13.08	13.11	13.10	13.08	13.07	13.08
Conductivity (mS/cm)	0.128	0.123	0.120	0.120	0.120	0.120	0.120	0.120	0.120
pH	6.41	6.40	6.41	6.41	6.40	6.41	6.41	6.40	6.40
Turbidity (NTU)	442	offscale	offscale	offscale	offscale	offscale	offscale	offscale	offscale
Salinity (ppt)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
DO (mg/L)	0.01	0.07	0.07	0.06	0.12	0.03	0.02	0.02	0.00
Eh (mV)	-401.5	-287.5	-365.5	-426.4	-337.4	-445.2	-447.3	-461.8	-376.5
Water Level (ft from TOR)		13.03	13.24	13.61				13.81	

Notes: 1004 turn pump to 3 gal/min, 1008 turn pump to 5 gal/min
Pump surged every 5 minutes for 45 minutes moving up one ft every surge event.

Well Number: MW16-19D

Total Gallons	265	280	305	330	355	380	405	430	455
Time	1043	1048	1053	1058	1103	1108	1113	1118	1123
Temperature (°C)	13.06	13.07	13.06	13.06	13.07	13.06	13.05	13.05	13.06
Conductivity (mS/cm)	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121
PH	6.40	6.40	6.40	6.37	6.35	6.38	6.34	6.40	6.41
Turbidity (NTU)	offscale	offscale	offscale	offscale	offscale	offscale	offscale	offscale	offscale
Salinity (ppt)	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06
DO (mg/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02
Eh (mV)	-386.2	-316.5	-285.2	-321.3	-297.4	-276.4	-297.3	-339.7	-389.7
Water Level (ft from TOR)									

Total Gallons	480	503	530	555	580	605	630	655	680
Time	1128	1133	1138	1143	1148	1153	1158	1203	1208
Temperature (°C)	13.05	13.05	13.06	13.05	13.06	13.06	13.06	13.06	13.06
Conductivity (mS/cm)	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121
pH	6.41	6.41	6.41	6.41	6.41	6.41	6.42	6.42	6.42
Turbidity (NTU)	offscale	offscale	offscale	offscale	offscale	offscale	offscale	offscale	offscale
Salinity (ppt)	0.006	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
DO (mg/L)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Eh (mV)	-404.0	-420.1	-434.8	-438.6	-449.6	-450.2	-458.7	-460.3	-464.4
Water Level (ft from TOR)									

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Notes:

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: CD
DATE: 02/07/01

Well Number: **MW16-20D**

1. Total Riser and Screen Length (ft) before well development.	48.8
2. Total Riser and Screen Length (ft) after well development	49.45
3. Water Level Below Measuring Point (ft)	8.25
4. Estimated amount of water lost in screened interval during well drilling (gal.)	No water loss

Parameters

Total Gallons	0	15	30	45	60	75	90	105	120
Time	1320	1325	1330	1335	1340	1345	1350	1355	1400
Temperature (°C)	13.86	14.85	15.33	15.41	15.74	15.57	15.78	15.90	15.89
Conductivity (mS/cm)	0.439	0.439	0.425	0.396	0.402	0.385	0.419	0.408	0.378
pH	6.72	7.76	7.51	7.30	7.21	7.10	7.12	7.06	7.05
Turbidity (NTU)	offscale	offscale	offscale	offscale	offscale	offscale	offscale	offscale	offscale
Salinity (ppt)	0.21	0.21	0.21	0.19	0.19	0.19	0.20	0.20	0.18
DO (mg/L)	5.25	0.65	0.44	0.64	0.27	0.40	0.28	0.41	0.56
Eh (mV)	-143.4	-330.2	-412.1	-417.6	-474.7	-468.1	-443.0	-392.5	-410.8
Water Level (ft from TOR)		22.9		23.28		22.1		20.8	

Total Gallons	135	150	165	180	195	210	225	240	255
Time	1405	1410	1415	1420	1425	1430	1435	1440	1445
Temperature (°C)	15.69	15.57	15.45	15.44	15.40	15.38	15.41	15.40	15.35
Conductivity (mS/cm)	0.379	0.379	0.356	0.334	0.324	0.309	0.297	0.286	0.282
pH	7.03	7.12	7.03	6.99	6.97	6.95	6.94	6.93	6.91
Turbidity (NTU)	offscale	700	400	280	180	130	80	75	55
Salinity (ppt)	0.18	0.18	0.17	0.16	0.15	0.15	0.14	0.14	0.13
DO (mg/L)	0.33	0.23	0.14	.11	0.09	0.09	0.07	0.08	0.05
Eh (mV)	-438.1	-470.7	--494.0	-513.6	-507.7	-514.5	-502.4	-513.6	-476.1
Water Level (ft from TOR)		24.3		27.8		27.8		27.8	

Notes: 0.0 PID.
Surged every 5 minutes for 45 minutes moving up one ft every surge event.
3 gal/min pump rate

Well Number: MW16-20D									
Total Gallons	270	285	300	315	330	345	360	375	390
Time	1450	1455	1500	1505	1510	1515	1520	1525	1530
Temperature (°C)	15.40	15.38	15.39	15.39	15.37	15.32	15.30	15.32	15.32
Conductivity (mS/cm)	0.274	0.265	0.268	0.253	0.248	0.243	0.244	0.234	0.231
pH	6.91	6.90	6.89	6.89	6.87	6.89	6.87	6.87	6.86
Turbidity (NTU)	50	45	60	120	85	55	38	33	25
Salinity (ppt)	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.11	0.11
DO (mg/L)	0.07	0.07	0.07	0.07	0.06	0.05	0.06	0.05	0.06
Eh (mV)	-503.2	-515.1	-510.8	-504.0	-482.0	-500.6	-491.2	-499.2	-496.5
Water Level (ft from TOR)	27.9		27.95		28.25		28.3		

Total Gallons	405	420	435	450	465	480	495	510	525
Time	1535	1540	1545	1550	1555	1600	1605	1610	1615
Temperature (°C)	15.31	15.30	15.29	15.33	15.46	15.41	15.43	15.42	15.41
Conductivity (mS/cm)	0.230	0.229	0.227	0.222	0.221	0.220	0.220	0.221	0.221
pH	6.85	6.85	6.85	6.85	6.83	6.84	6.84	6.85	6.85
Turbidity (NTU)	26	26	18	16	10	6	4	4	2
Salinity (ppt)	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.10
DO (mg/L)	0.08	0.10	0.09	0.07	0.06	0.06	0.06	0.06	0.06
Eh (mV)	-485.1	-464.8	-447.6	-462.7	-518.5	-513.5	-513.2	-515.7	-510.1
Water Level (ft from TOR)									

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Notes:

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJET NUMBER: 29600.97.3201
STAFF: JN
DATE: 2/2/01

Well Number: **MW16-21D**

1. Total Riser and Screen Length (ft) Before well development	56 43
2. 2 Total Riser and Screen Length (ft) After well development	56 45
3. Water Level Below Measuring Point (ft)	10.79
4. Est amount of water lost in screened interval during well drilling (in gallons)	

Parameters

Total Gallons									
Time	1020	1025	1030	1035	1040	1045	1050	1055	1100
Temperature (°C)	13.94	14.11	14.42	14.26	14.42	14.31	14.31	14.28	14.27
Conductivity (mS/cm)	0.296	0.251	0.226	0.232	0.246	0.249	0.237	0 231	0.229
PH	7.85	7.63	6.83	6.53	6.54	6.69	6.87	6 75	6.72
Turbidity (NTU)	offscale	396	253	121	95 9	30.9	13.6	13 9	11.3
Salinity	0.14	0 12	0.11	0.11	0.11	0.12	0.11	0.11	0.11
DO (mg/L)	0.49	0.18	0.16	0.18	0.21	0.20	0.15	0 15	0 15
Eh (mV)	-296.6	-367.2	-364 6	-345.5	-341 6	-327.1	-325.1	-351 6	358.3
Water level (ft from TOR)	13.92		15 58		14.58		15.79		15.93

Total Gallons									
Time	1105	1110	1115	1120	1125	1130	1135	1140	1145
Temperature (°C)	14.21	14 01	14.16	14.22	14.20	14.21	14 18	14 18	14.19
Conductivity (mS/cm)	0.226	0.230	0.223	0.223	0.214	0.216	0.213	0.212	0.207
pH	6.91	7 29	6.75	6 73	6.78	6.83	6 89	6.93	6 98
Turbidity (NTU)	11 2	10 85	9 32	9 27	7 24	7 26	5 70	5 67	5.56
Salinity	0.11	0.11	0 11	0.11	0.10	0 10	0.10	0 10	0.10
DO (mg/L)	0.12	0 45	0.14	0.20	0 10	0.11	0.11	0 10	0.08
Eh (mV)	-356.0	-333.8	-351.6	-330.6	-333.4	-355.3	-363 1	-365.0	-344.5
Water level (ft from TOR)		15 80		15 89		15 88		15.89	

Total Gallons									
Time	1150	1155	1200	1205	1210	1215	1220	1225	1230
Temperature (°C)	14.22	14 24	14.24	14.24	14.27	14.35	14.30	14 29	14.29
Conductivity (mS/cm)	0.206	0.206	0.205	0.201	0.200	0.200	0.200	0.198	0.198
pH	6.99	7.00	6.97	6 93	6.93	6.92	6.91	6.90	6.89
Turbidity (NTU)	4.51	3.75	3.41	3.03	2.49	1.96	1.32	1.26	1.09
Salinity	0.10	0.10	0.10	0.10	0 10	0.10	0.10	0.09	0.09
DO (mg/L)	0.09	0.08	0.08	0.07	0.08	0.08	0 08	0.09	0.08
Eh (mV)	-360.7	-348.0	-306.5	-306.3	-307.9	-318.6	-330 9	-331.7	-331.9
Water level (ft from TOR)	15.92		15.92		15.92		15.95		15.95

Notes: Surged every 5 minutes for 45 minutes/ moved up 1 ft PID= 0.3 distance of PVC from ground level = 3 5
Blank cells denote no information available.

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: CD
DATE: 02/01/01

Well Number: **MW16-22D**

1. Total Riser and Screen Length (ft) before well development.	62.9
2. Total Riser and Screen Length (ft) after well development	62.15
3. Water Level Below Measuring Point (ft)	17.85
4. Estimated amount of water lost in screened interval during well drilling (gal.)	400

Parameters

Total Gallons	3	15	30	45	60	75	90	105	120
Time	0933	0938	0943	0948	0953	0958	1003	1008	1013
Temperature (°C)	14.16	14.35	14.33	14.29	14.29	14.27	14.27	14.26	14.24
Conductivity (mS/cm)	0.794	0.222	0.186	0.178	0.173	0.169	0.167	0.165	0.162
pH	11.56	10.29	9.04	8.83	8.43	8.18	7.99	8.03	7.79
Turbidity (NTU)	500	190	140	85	55	50	45	36	31
Salinity (ppt)	0.37	0.11	0.09	0.08	0.08	0.08	0.08	0.08	0.08
DO (mg/L)	0.97	0.67	0.82	0.46	0.40	0.38	0.46	0.43	0.44
Eh (mV)	-464.4	-465.0	-382.7	-370.4	-343.2	-313.8	-279.2	-287.4	-314.9
Water Level (ft from TOR)	18.7		18.6		18.6		18.6		18.6

Total Gallons	135	150	165	180	195	210	225	240	255
Time	1018	1023	1028	1033	1038	1043	1048	1053	1058
Temperature (°C)	14.20	14.24	14.24	14.30	14.53	14.57	14.52	14.56	14.56
Conductivity (mS/cm)	0.163	0.157	0.155	0.155	0.155	0.155	0.153	0.152	0.153
pH	7.78	7.37	7.25	7.06	6.99	6.94	6.84	6.79	6.75
Turbidity (NTU)	32	20	10	7	6	4	3	2	2
Salinity (ppt)	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
DO (mg/L)	1.60	0.53	0.45	0.25	0.44	0.46	0.41	0.46	0.40
Eh (mV)	-245.6	-250.5	-285.2	-248.3	-252.1	-238.7	-230.9	-227.0	-223.4
Water Level (ft from TOR)		18.6		18.6		18.6		18.6	

Notes: PID: 0.0
Pump surged every 5 minutes for 4 5minutes moving up one ft every surge event.

Well Number: MW16-22D									
Total Gallons	270	285	300	315	330	345	360	375	390
Time	1103	1108	1113	1118	1123	1128	1133	1138	1143
Temperature (°C)	14.54	14.54	14.57	14.57	14.57	14.53	14.55	14.52	14.52
Conductivity (mS/cm)	0.152	0.151	0.150	0.150	0.149	0.150	0.150	0.149	0.148
pH	6.71	6.67	6.65	6.62	6.60	6.58	6.57	6.55	6.54
Turbidity (NTU)	1	1	1	1	1	0	0	0	0
Salinity (ppt)	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
DO (mg/L)	0.46	0.42	0.45	0.41	0.45	0.37	0.45	0.44	0.44
Eh (mV)	-218.6	-213.0	-212.4	-205.5	-207.1	-192.3	-201.0	-197.3	-197.1
Water Level (ft from TOR)	18.6		18.6		18.4		18.4		18.4

Total Gallons	405								
Time	1148								
Temperature (°C)	14.60								
Conductivity (mS/cm)	0.148								
pH	6.52								
Turbidity (NTU)	0.25								
Salinity (ppt)	0.07								
DO (mg/L)	0.43								
Eh (mV)	-191.6								
Water Level (ft from TOR)									

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Notes:

WELL DEVELOPMENT LOG

Client: **NORDIV NAVFAC**	
Project Title: **Remedial Investigation of IR Program Site 16** (Former Creosote Dip Tank and Fire Fighting Training Area)	
Project No.: **29600.97.3201**	
Staff: JN	
Date: 2/1/01	

Well No.: **MW16-23D**

1. Total Riser and Screen Length (ft) Before well development	59.12
2. 2. Total Riser and Screen Length (ft) After well development	60.5
3. Water Level Below Measuring Point (ft)	14.35
4. Est. amount of water lost in screened interval during well drilling (in gallons)	

Parameters

Total Gallons	1	2	3	4	5	6	7	8	9
Time	9:50	9:55	10:00	10:05	10:10	10:15	10:20	10:25	10:30
Temperature (°C)	14.52	14.49	14.46	14.57	14.47	14.47	14.46	14.45	14.49
Conductivity (mS/cm)	0.576	0.473	0.384	0.288	0.263	0.249	0.242	0.233	0.215
pH	11.12	11.05	10.74	10.34	9.98	9.98	9.78	9.62	9.53
Turbidity (NTU)	-	-	550	550	700	550	650	500	600
Salinity	0.27	0.22	0.19	0.13	0.13	0.12	0.12	0.11	0.10
DO (mg/L)	0.54	0.53	0.58	0.76	0.62	0.58	0.60	0.61	0.62
Eh (mV)	-488.9	-486.4	-447.9	-389.2	-349.9	-357.9	-327.2	-306.6	-266.6
Water level (ft from TOR)	22.83		20.32		20.45		20.47		20.39

Total Gallons	10	11	12	13	14	15	16	17	18
Time	1035	1040	1045	1050	1055	1100	1105	1110	1115
Temperature (°C)	14.48	14.53	14.45	14.72	14.72	14.86	14.62	14.58	14.49
Conductivity (mS/cm)	0.216	0.184	0.204	0.201	0.207	0.206	0.201	0.203	0.196
pH	9.62	8.97	9.35	9.18	9.23	9.37	9.26	9.32	9.15
Turbidity (NTU)	450	450	360	290	700	800	-	-	800
Salinity	0.10	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.09
DO (mg/L)	0.76	1.47	0.64	0.49	0.46	0.61	0.72	0.64	0.63
Eh (mV)	-287.5	-151.4	-237.6	-272.1	-299.3	-352.3	-275.7	-281.6	-261.2
Water level		19.31		17.29		19.02		16.51	

NOTES: Surged every 5 minutes for 45 minutes moving up 1 ft. ever surge event PID: 0.0

Well Number: MW16-23D

Total Gallons	19	20	21	22	23	24	25	26	27
Time	11:20	11:25	11:30	11:35	11:40	11:45	11:50	11:55	12:00
Temperature (□C)	14.67	14.56	14.50	14.47	14.43	14.46	14.41	14.47	14.51
Conductivity (mS/cm)	0.192	0.183	0.181	0.178	0.177	0.176	0.175	0.172	0.170
PH	8.94	8.54	8.38	8.16	8.08	8.07	8.06	8.02	8.01
Turbidity (NTU)	380	360	190	130	100	70	50	34.8	32.8
Salinity	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.08
DO (mg/L)	0.83	0.69	0.64	0.66	0.68	0.71	0.73	0.73	0.78
Eh (mV)	-81.1	-57.6	-74.6	-90.8	-101.0	-110.2	-110.9	-110.5	-98.1
Water level	17.68		17.82			17.81		17.87	

Total Gallons	28	29	30	31	32	33	34	35	36
Time	12:05	12:10	12:15	12:20	12:25	12:30	12:35	12:40	12:45
Temperature (□C)	14.54	14.49	14.48	14.52	14.44	14.49	14.54	14.53	14.54
Conductivity (mS/cm)	0.168	0.167	0.167	0.166	0.165	0.165	0.163	0.163	0.161
pH	7.93	7.88	7.73	7.66	7.61	7.48	7.40	7.38	7.33
Turbidity (NTU)	30.5	29.6	20.4	23	22	20	17	16	22
Salinity	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
DO (mg/L)	0.78	0.77	0.78	0.75	0.79	0.78	0.78	0.78	0.79
Eh (mV)	-95.8	-97.2	-92.4	-94.7	-94.9	-98.9	-98.0	-100.8	-99.6
Water level	18.75•		17.86		17.85		17.85		

Total Gallons									
Time									
Temperature (□C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity									
DO (mg/L)									
Eh (mV)									
Water level (ft from TOR)									

Notes:

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJET NUMBER: 29600.97.3201
STAFF: CD
DATE: 2/2/01

Well Number: **MW16-24D**

1. Total Riser and Screen Length (ft) Before well development	54.28
2. Total Riser and Screen Length (ft) After well development	54.2
3. Water Level Below Measuring Point (ft)	10.98
4. Est. amount of water lost in screened interval during well drilling (in gallons)	

Parameters

Total Gallons									
Time	1000	1005	1010	1015	1020	1025	1030	1035	1040
Temperature (°C)	13.74	14.85	14.55	14.46	14.51	14.63	14.60	14.57	14.54
Conductivity (mS/cm)	0.431	0.352	0.197	0 160	0.184	0.206	0.197	0.207	0.242
pH	10.59	10.68	9.41	8.31	8.87	9.44	9.47	9.32	9.86
Turbidity (NTU)	offscale	offscale	offscale	offscale	offscale	652	offscale	450	200
Salinity	0.20	0.15	0.09	0.08	0.09	0.11	0.09	0.12	0.11
DO (mg/L)	.85	2.5	0 16	0.16	0.20	0.40	0.39	0.12	0.15
Eh (mV)	-516.3	-553.9	-477.0	-513.8	-563.5	-606 5	-577.6	-565.2	-574.4
Water level (ft from TOR)		12 55		12.4		12.3		12.3	

Total Gallons									
Time	1045	1050	1055	1100	1105	1110	1115	1120	1125
Temperature (°C)	14.58	14.56	1443	14.38	14.43	14.41	14 45	14 46	14.46
Conductivity (mS/cm)	0.203	0.221	0.161	0 164	0.171	0.163	0.168	0 165	0.165
PH	9.32	9.49	8.40	7.84	7.74	7 60	7.62	7.51	7.47
Turbidity (NTU)	210	140	80	55	50	31	29	26	18
Salinity	0 10	0.10	0 07	0.08	0.08	0.08	0.08	0.08	0.08
DO (mg/L)	0 09	0.11	0 08	0 11	0.12	0.11	0.12	0.11	0.10
Eh (mV)	-515.3	-585 3	-502.8	-458.8	-483.2	-490.0	485.7	475 7	465.0
Water level (ft from TOR)	12.3		12.3		12.25		12.25		12.25

Total Gallons									
Time	1130	1135	1140	1145	1150	1155	1200	1205	1210
Temperature (□C)	14.45	14.45	14.46	14.47	14.49	14.47	14.43	14.46	14.52
Conductivity (mS/cm)	0.160	0.160	0.160	0 159	0.159	0.153	0.154	0.154	0 151
PH	7.42	7 40	7.33	7.29	7.26	7.15	7.11	7.04	6.98
Turbidity (NTU)	15	13	11	.2	7.5	11	8 2	6.4	6.3
Salinity	0.08	0.07	0.07	0.07	0.07	0.07	0.07	.07	0.07
DO (mg/L)	0.10	0.09	0.09	0.10	0.10	0.09	0 09	0.09	0 10
Eh (mV)	-466.0	-470.1	-478.0	-491.1	-504.1	-460 5	-492 1	-471.0	-457.1
Water level (ft from TOR)	12 25		12.21		12.2		12.2		12.25

Total Gallons									
Time	1215								
Temperature (□C)	14 59								
Conductivity (mS/cm)	0.150								
PH	6 96								
Turbidity (NTU)	4.6								
Salinity	0.07								
DO (mg/L)	0.08								
Eh (mV)	-457.3								
Water level (ft from TOR)									

Notes: PID 0.0. 0.5 gal/min. Surged every 5 minutes for 45 minutes moving up 1 ft every surge event.
Blank cells denote information not available.

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJET NUMBER: 29600.97.3201
STAFF: CD/SK
DATE: 1/31/01

Well Number **MW16-25D**

1. Total Riser and Screen Length (ft) Before well development	61.9
2. 2. Total Riser and Screen Length (ft) After well development	62.5
3. Water Level Below Measuring Point (ft)	13.45
4. Est. amount of water lost in screened interval during well drilling (in gallons)	

Parameters

Total Gallons	0	5	10	15	20	25	30	35	40
Time	945	955	1000	1005	1010	1015	1022	1027	1032
Temperature (°C)	13 41	13.48	13.77	13.74	13 82	13.78	13.76	13.74	13.65
Conductivity (mS/cm)	0.159	0.148	0.148	0.145	0.147	0.146	0.148	0.146	0.145
pH	6.68	6.58	6.56	6.53	6.53	6.56	6.52	6.51	6.50
Turbidity (NTU)	Error	607	419	302	227	203	165	141	117
Salinity	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
DO (mg/L)	3 7	2.4	3.5	0.37	0.26	0.85	0.35	0.34	0.33
Eh (mV)	-556.2	-534	-536	-533.1	-541.0	-531.0	-540.3	-539.3	-536 8
Water level (ft from TOR)	14.8		16.25		16.15		16.3		16.3

Total Gallons	45	50	55	60	65	70	75	80	85
Time	1040	1045	1050	1055	1100	1105	1110	1115	1120
Temperature (°C)	13.71	13.77	13.73	13.71	13.72	13.70	13.71	13.70	13.88
Conductivity (mS/cm)	0 144	0.144	0.143	0.141	0 140	0.138	0.137	0.137	0 138
pH	6 49	6 47	6.49	6.48	6 47	6.46	6.46	6.46	6 46
Turbidity (NTU)	93.8	76 5	62 6	52.4	38 1	34.0	27.7	23 6	18.8
Salinity	0 07	0.07	0 07	0.07	0 07	0 07	0.06	0.06	0.07
DO (mg/L)	2.6	4.7	0.20	0 12	0.11	0.09	0.09	0.08	0.07
Eh (mV)	-537.4	-502 4	-533.0	-533.9	-532.8	-530.7	-531.3	-530.3	-530.9
Water level		16 25		16.3		16.25		16.25	

Total Gallons	90	95	100	105	110	115	120		
Time	1125	1130	1135	1140	1145	1150	1155		
Temperature (°C)	13.87	13.80	13 81	13.96	13.98	14.00	14.03		
Conductivity (mS/cm)	0.137	0.136	0.134	0.132	0.132	0.133	0 132		
pH	6.45	6.45	6 44	6.43	6.44	6.44	6.43		
Turbidity (NTU)	18.8	13.9	13.5	10 48	9.10	7.98	7.14		
Salinity	0.06	0.06	0.06	0.06	0 06	0.06	0.06		
DO (mg/L)	0.07	0 06	0.06	0.06	0 06	0.06	0.06		
Eh (mV)	-529.8	-527.9	-527.8	525.9	-526.5	-525.4	-524.9		
Water level	16.25		16.25		16.25		16.25		

Notes PID 0.0. 0.5 gal/min. Surged every 5 minutes for 45 minutes moving up 1 ft every surge event.
Blank cells denote information not available

WELL DEVELOPMENT LOG

CLIENT: EFANE
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJET NUMBER: 29600.97.3201
STAFF: SK/CD
DATE: 1/31/01

Well Number: **MW16-25R**

1. Total Riser and Screen Length (ft) Before well development	91.7
2 Total Riser and Screen Length (ft) After well development	92.0
3. Water Level Below Measuring Point (ft)	12 5
4. Est amount of water lost in screened interval during well drilling (in gallons)	Not Available

Parameters

Total Gallons	1gal/min	5	10	15	20	25	30	35	40
Time	0940	0945	0950	0955	1000	1005	1010	1015	1020
Temperature (°C)	12.53	13.02	12.77	13.06	13.02	13.04	13.09	13.09	13.10
Conductivity (mS/cm)	0 359	0 216	0 190	0.182	0.177	0 172	0 170	0 164	0 157
pH	7 55	6 92	6.93	6.82	6.82	6.69	6.77	6 73	6.72
Turbidity (NTU)	90	21	24	21	17	15	13	10	10
Salinity (ppt)	0.17	0.10	0.09	0.09	0.08	0.08	0.08	0.08	0.07
DO (mg/L)	0 78	0.26	2 82	0.37	0 94	1 04	0.27	0.36	1 57
Eh (mV)	104.0	-487 2	-403.6	-464.3	-472.2	-401 2	-513 9	-485.3	-452.3
Water level (ft from TOR)	13.8		14.0		14.0		14 0		14.0

Total Gallons	45	50	55	60	65	70	75	80	85
Time	1025	1030	1035	1040	1045	1050	1055	1100	1105
Temperature (°C)	13 13	13 05	13.14	13.18	13.14	13.14	13 14	13.16	13.19
Conductivity (mS/cm)	0 159	0 157	0.155	0.151	0 145	0 144	0 142	0.143	0.143
pH	6 71	6 72	6 69	6.68	6.65	6 65	6 64	6.64	6.65
Turbidity (NTU)	13	12	10	10	9	9	9	9	9
Salinity (ppt)	0 07	0 07	0.07	0.07	0 07	0 07	0 07	0.07	0 07
DO (mg/L)	0 39	1 08	0.17	0 17	0.13	0.15	0.11	0.11	0.10
Eh (mV)	-4459 6	-427.6	-496.4	-481.4	-494.3	-501.5	-452.3	-470 0	-466.7
Water level (ft from TOR)	14 1		14 1		14 1		14.2		14 2

Total Gallons	90	95	100	105	110	115	120		
Time	1110	1115	1120	1125	1130	1135	1140		
Temperature (C)	13 14	13 17	13 19	13 19	13.19	13 19	13 18		
Conductivity (mS/cm)	0 143	0.141	0.141	0 143	0 141	0 142	0 142		
pH	6 64	6.63	6 64	6.64	6.63	6.63	6.62		
Turbidity (NTU)	9	9	9	9	9	9	8		
Salinity (ppt)	0.07	0 07	0 07	0 07	0.07	0 07	0.07		
DO (mg/L)	0 11	0.10	0 11	0 11	0 11	0 11	0 11		
Eh (mV)	-487.8	-485.3	-469.4	-486 6	-485.6	-486 3	-489 2		
Water level (ft from TOR)	14.2		14 2		14.2		14 2		

Notes: PID 0.0. 0.5 gal/min. Surged every 5 minutes for 45 minutes moving up 1 ft every surge event.
Blank cells denote no information recorded.

WELL DEVELOPMENT LOG

CLIENT: EFANE
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJET NUMBER: 29600 97.3201
STAFF: SK/SW
DATE: 2/1/01

Well Number: **MW16- 26D**

1 Total Riser and Screen Length (ft) Before well development	51.25
2. Total Riser and Screen Length (ft) after well development	Not Available
3 Water Level Below Measuring Point (ft)	5 62
4. Est. amount of water lost in screened interval during well drilling (in gallons)	Not Available

Parameters

Total Gallons	3	6	9	11	13	15	17	19	21
Time	1145	1150	1155	1200	1205	1210	1215	1220	1225
Temperature (°C)	11.15	12.03	11.95	12 33	11.96	12.04	11 96	12 04	11.97
Conductivity (mS/cm)	.354	341	297	.261	.230	.221	214	211	.212
pH	7.11	7.26	7 05	7.01	6 89	6.89	6 84	6.88	6.88
Turbidity (NTU)	offscale	offscale	offscale	offscale	377	offscale	378	offscale	59 3
Salinity	0 17	0.16	0 14	0.12	0 11	0.11	0 10	0 10	0.10
DO (mg/L)	0.61	0 56	1.34	0.21	0 10	0.10	0 10	0 11	0 18
Eh (mV)	-496 4	-485 8	-508 1	-484 7	-533 6	-509.1	-527 8	-532 7	-537 8
Water level (ft from TOR)	10.89		23.62	18.80	21 41	20.48		19 72	

Total Gallons	23	25	27	29	31	33	35	37	39
Time	1230	1235	1240	1245	1250	1255	1300	1305	1310
Temperature (°C)	11.99	11 99	12 00	12.02	12 00	11 99	12 00	12 02	11 99
Conductivity (mS/cm)	0 206	0.204	0 201	0 201	0 199	0 196	0 197	194	194
pH	6 88	6 88	6 89	6 89	6 89	6 89	6.89	6 89	6 88
Turbidity (NTU)	37	27	24	18	21	17	18	15	12
Salinity	0.10	0.10	0.10	0 09	0.09	0.09	0.09	0 09	0 09
DO (mg/L)	0.10	0.09	0 09	0.10	0 10	0.09	0 10	0.12	0 10
Eh (mV)	-534.6	-530 1	-528.8	-524.9	-522 9	-524.3	-516 6	-504 0	-525.6
Water level	29.4		21 02		21.08		21.10		21.16

Total Gallons	41	43	45	47	49	51	53	55	
Time	1315	1320	1325	1330	1335	1340	1345	1350	
Temperature (. C)	12 00	11 98	11.98	12 04	12 02	12.04	12.01	12 03	
Conductivity (mS/cm)	.193	194	193	191	193	.190	0 189	190	
pH	6 88	6 88	6 88	6.88	6.88	6 88	6 88	6.88	
Turbidity (NTU)	10	10	10	10	7	5	4	3	
Salinity	0.09	0 09	0.09	0.09	0 09	0.09	0.10	0 09	
DO (mg/L)	0 10	0 10	0 14	0 10	0 10	0 10	0.10	0 10	
Eh (mV)	-519 1	-512 3	-502 3	-518 0	-518 0	-522 3	-520 0	-519 7	
Water level		21.23		21 20		21 26		21 30	

Notes: NOTES PID: 0.0 (A) Flow rate turned down 0 38 ft btwn TOPVC and TOC surged every 5 min. for 45 minutes, moving up 1 ft in the screen every surge event Blank cells denote no available information.

WELL DEVELOPMENT LOG

CLIENT NORDIV NAVFAC
PROJECT TITLE Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJET NUMBER 29600.97.3201
STAFF JN/CD
DATE 1/30/01

Well Number **MW16-27D**

1. Total Riser and Screen Length (ft) Before well development	64.03
2. Total Riser and Screen Length (ft) After well development	64
3. Water Level Below Measuring Point (ft)	9 70
4. Est. amount of water lost in screened interval during well drilling (in gallons)	

Parameters

Total Gallons	0	5	10	15	20	25	30	35	40
Time	1105	1110	1115	1120	1125	1130	1135	1140	1145
Temperature (°C)	14.81	14.80	14.84	14.79	14 84	14.90	14.79	14.81	14.77
Conductivity (mS/cm)	0.218	0.221	.0225	0.228	0.227	0.237	0.237	0.237	0.236
pH	6.61	6.61	6.61	6.59	6.59	6.59	6.57	6.59	6.59
Turbidity (NTU)	210	160	290	90	95	130	85	110	70
Salinity	0.10	0 11	0.11	0.11	0.11	0.11	0.11	0 11	0.11
DO (mg/L)	0.21	0.22	1.08	0.33	1.40	0.56	0.24	0.74	0.46
Eh (mV)	-76.4	-79.6	-12.4	4.6	-7.8	25.4	-5.1	76.8	47.0
Water Level (ft from TOR)	9 63		11.01		11.02		11.20		11 20

Total Gallons	46	51	55	60	65	72	77	82	87
Time	1151	1156	1200	1205	1210	1217	1222	1227	1232
Temperature (°C)	14.85	14.90	14.83	14.84	14 86	14.81	14.90	14.84	14 82
Conductivity (mS/cm)	0.244	0.235	0.239	0.239	0.244	0 234	0.246	0.243	0.241
PH	6.59	6 58	6.58	6.58	6.54	6 51	6 55	6 56	6.51
Turbidity (NTU)	450	150	390	85	60	27	27	26	9.1
Salinity	0 12	11	0 11	0.11	0 12	0.11	0.12	0 12	0 11
DO (mg/L)	0 63	1 66	1 28	0.87	0.22	1.40	0.26	0.64	0 35
Eh (mV)	-26.6	-3 1	21.5	88.7	51.7	68.0	36 6	32.3	42.0
Water Level (ft from TOR)		11.20		11.20		10 67		10.90	

Total Gallons	92	97	102	107	112	117	122	127	
Time	1237	1242	1247	1252	1257	1302	1307	1312	
Temperature (°C)	14 92	14.89	14.81	14.89	14.83	14.77	14.77	14.75	
Conductivity (mS/cm)	0.250	0.251	0.242	0.248	0.246	0.247	0.253	0.250	
pH	6.55	6.50	6.55	6.55	6.54	6.55	6.55	6.56	
Turbidity (NTU)	11	25	19	13	8.5	6.4	6.3	3 2	
Salinity	0 12	0.12	0.12	0.12	0 12	0.12	0.12	0.12	
DO (mg/L)	0.65	0.69	0.21	0.23	0.10	0 10	0.09	0.09	
Eh (mV)	45.2	90.2	14.7	5.7	9.3	-7.2	-33 3	-45.6	
Water Level (f t from TOR)									

Notes PID 0.0. 0.5 gal/min. Surged every 5 minutes for 45 minutes moving up 1 ft every surge event.
Blank cells denote no available information.

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJET NUMBER: 29600.97.3201
STAFF: SK/JN
DATE: 1/30/01

Well Number: **MW16-27R**

1 Total Riser and Screen Length (ft) Before well development	94
2. Total Riser and Screen Length (ft) After well development	
3. Water Level Below Measuring Point (ft)	8 90
4. Est. amount of water lost in screened interval during well drilling (in gallons)	

Parameters

Total Gallons									
Time	1104	1116	1123	1127	1132	1137	1112	1147	1152
Temperature (□C)	14.31	14.09	14.59	14.40	14.22	14.21	14.23	14.24	14.31
Conductivity (mS/cm)	3.648	5.174	5.044	5.061	5.123	5.135	5.135	5.135	5.136
pH	6.99	7.08	7.22	7.23	7.21	7.24	7.23	7.23	7.14
Turbidity (NTU)	230	230	220	75	140	90	95	11	
Salinity	1 93	2.79	2.76	2.74	2.77	2 78	2.78	2.78	2.78
DO (mg/L)	3.67	4.64	4 34	4.82	4.51	4.20	5.00	5.50	6.50
Eh (mV)	-271.4	-35.0	-46.8	-27.8	-36.6	-32.0	-33.5	-12.8	-9.0
Water Level (ft to TOR)									

Total Gallons									
Time	1157	1212	1217	1222	1227	1232	1237	1242	1247
Temperature (□C)	1435	14.38	14.58	14.57	14.78	14.80	14 47	14 52	14 54
Conductivity (mS/cm)	5126	5112	5.07	5.07	5.08	5.09	5 08	4 31	4 80
PH	7.22	712	7 19	7.19	7 16	7.16	7.15	6.86	7.19
Turbidity (NTU)	85	50	31	13	22	18	7 3	6.1	4 7
Salinity	2.73	2 78	2 72	275	7.75 ·	2.26	2 75	2 50	2.59
DO (mg/L)	6 73	6.15	5.67	565	5.79	5.80	5.37	4 77	4.63
Eh (mV)	-4 8	7.5	-6 53	-73.3	-112	-123	-140	-216	-308
Water Level (ft to TOR)									

Total Gallons									
Time	1252	1257	1302	1308	1312				
Temperature (□C)	14.55	14.59	14.56	14.45	14.33				
Conductivity (mS/cm)	4.79	4 75	4.36	4.87	4 87				
PH	7.22	7 22	7.20	7 19	7.19				
Turbidity (NTU)	4 0	3.8	2.8	1.6	3.2				
Salinity	2.56	2.56	2.65	2.65	2.68				
DO (mg/L)	4.56	4.47	4 62	4 77	4 90				
Eh (mV)	-408	-443	-456	-444	-403				
Water Level (ft to TOR)									

Notes: PID 0.0. 0.5 gal/min. Surged every 5 minutes for 45 minutes moving up 1 ft every surge event.
Blank cells denote information not available

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJET NUMBER: 29600.97.3201
STAFF: SW/JN
DATE: 1/31/01

Well Number: **MW16-28D**

1. Total Riser and Screen Length (ft) Before well development	64.40
2. Total Riser and Screen Length (ft) After well development	64.01
3 Water Level Below Measuring Point (ft)	9 35
4. Est. amount of water lost in screened interval during well drilling (in gallons)	200

Parameters

Total Gallons									
Time	0950	0955	10:00	1005	1010	1015	1020	1025	1030
Temperature (□C)	14.74	14.86	14.97	15.20	15.25	15.18	15.24	15.22	15.36
Conductivity (mS/cm)	.890	.795	.981	.783	.748	.741	.710	.669	0.560
pH	6.80	6.83	6.71	6 66	6.63	6.64	6.63	6.63	6.64
Turbidity (NTU)					222	188	69	44	38
Salinity	0.44	0.44	0 49	0.39	0.37	0.36	0.35	0.32	0.28
DO (mg/L)	0.30	2.22	2.74	0.52	0.35	0.30	0.23	0.20	0.18
Eh (mV)	314.0	-137.9	-133.6	-254.4	-251.7	-253.4	-268.4	-279.1	-284
Water level (ft from TOR)	9 76	9.75		9 85		9.86		9.86	

Total Gallons									
Time	10:35	10:40	10.45	10.55	11:00	11:05	11:10	11:15	11:20
Temperature (□C)	15 14	15.13	15.06	15.04	15.04	15.04	15 07	15 06	15.08
Conductivity (mS/cm)	0.561	0.556	0.651	0.678	0.682	0.643	0 698	0 686	0 680
pH	6.63	6.62	6.63	6.59	6.61	6.61	6.61	6.61	6 60
Turbidity (NTU)	16	14	283	96.5	58 7	39.0	33.5	65	38
Salinity	0.27	0 24	0.33	0.33	0.34	0.34	0 34	0.34	0.33
DO (mg/L)	0.15	0 13	0.05	0.01	0.05	0.06	0 07	0 09	0.16
Eh (mV)	-283	-292	-556	-260.7	-359.7	-388.7	-397.0	-386.4	-321.0
Water level (ft from TOR)	9.88		10.40		10.50		10.47		10.40

Notes PID : 0.0 Surged Every 5 minutes

Total Gallons									
Time	1125	1130	1135	1140	1145	1150	1155	1200	1205
Temperature (□C)	15 06	14.84	14 73	14 78	15.30	15.11	15.16	15.26	15.26
Conductivity (mS/cm)	0.744	0.578	0.612	0.633	0.448	0 472	0 484	0.563	0.640
pH	6.58	6.58	6 59	6.59	6.69	6.60	6.64	6.63	6.61
Turbidity (NTU)	20	600	50	63	offscale	900	offscale	offscale	Offscale
Salinity	0.36	0.29	0.30	0.31	0.23	0.23	0.24	0.28	0.32
DO (mg/L)	0 19	0.28	0 19	0.19	0.22	0 639	0.28	0.14	0.13
Eh (mV)	-261.1	-449.9	-455 5	-458.3	-441.1	-489.5	-508.8	-524.7	-507.6
Water Level (ft to TOR)		9.74		9.23		9.71		10.69(a)	

Total Gallons									≈225
Time	1210	1215(b)	1220	1225	1230	1235	1240	1245	1250
Temperature (□C)	15 15	15.17	15.64	15.56	15.59	15.57	15.56	15.54	15.55
Conductivity (mS/cm)	0 699	0.805	0.614	0.628	0.628	0.630	0.638	0.643	0.644
pH	6.64	6.45	6.59	6.57	6.60	6.60	6.60	6.60	6.59
Turbidity (NTU)	offscale	offscale	110	24	18	16	8	8	5
Salinity	0 35	0.40	0.30	0.31	0 31	0.31	0.31	0.31	0.32
DO (mg/L)	0.12	0.48	0.21	0.07	0.10	0 09	0 10	0 09	0 09
Eh (mV)	-494.7	-418.9	-446.0	-409.3	-457.7	-476 1	-478.0	-435.2	-472.8
Water Level (ft to TOR)	10.41		9.62		9.60		9.60		8.91

Notes: PID 0.0. 0.5 gal/min. Surged every 5 minutes for 45 minutes moving up 1 ft every surge event.
(a): Increased Flow rate
(b): Stopped Surging

WELL DEVELOPMENT LOG

CLIENT: NORDIV NAVFAC
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF: JN/SW and DVK on 2/8
DATE: 01/31/01 and 2/8/01

Well Number: **MW16-28R**

1. Total Riser and Screen Length (ft) before well development.	67.12
2. Total Riser and Screen Length (ft) after well development	91on 2/8/01
3. Water Level Below Measuring Point (ft)	9.39
4. Estimated amount of water lost in screened interval during well drilling (gal.)	250

Parameters

Total Gallons					20				
Time	1025	1030	1035	1040	1100	0909 A	0914	0919	0924
Temperature (°C)	15.79	15.65	15.04	15.06	15.28	13.93	14.24	14.28	14.38
Conductivity (mS/cm)	1.670	1.675	1.834	1.828	4.317	11.51	11.48	11.46	11.10
pH	10.40	10.40	10.30	10.47	10.70	7.15	7.15	7.19	7.40
Turbidity (NTU)	--	--	--	--	--	166	114	359	333
Salinity (ppt)	0.85	0.85	0.93	0.93	2.44	6.59	6.57	6.56	6.32
DO (mg/L)	0.47	1.22	0.20	0.26	0.44	0.35	0.27	0.25	0.20
Eh (mV)	-557.6	-473.1	-238.9	-391.0	-633.4	-137.6	-175	-223.8	-265.7
Water Level (ft from TOR)	10.7		30.85		37.90	13.72	16.56		

Total Gallons						55			
Time	0929	0933	0939	0943	0949	0955	1000	1005	1010
Temperature (°C)	14.47	14.47	14.61	14.59	14.40	14.68	14.64	14.61	14.62
Conductivity (mS/cm)	6.373	7.404	8.238	6.804	5.720	5.010	4.450	4.273	3.996
pH	9.38	9.96	10.34	10.37	10.42	10.46	10.45	10.45	10.41
Turbidity (NTU)	187	73	57	67		83.6	38.7	15.65	9.88
Salinity (ppt)	3.49	4.14	4.58	3.70	3.11	2.70	2.40	2.36	2.13
DO (mg/L)	0.16	0.12	0.15	0.13	0.12	0.11	0.05	0.08	0.12
Eh (mV)	-432	-493.9	-528.7	525.0	-513.7	-514.7	-521.2	-486.7	-455.9
Water Level (ft from TOR)	18.95	20.26		23.66					

Notes: Between 1040 and 1100 pump stopped working. 0.0 PID
Surged every 5 minutes for 35 minutes, pump failed at 1100.
-- Denotes error 3 on turbidity meter.
A: Begin new development on 2/8/01

Well Number: MW16-28R									
Total Gallons					110				
Time	1015	1020	1025	1030	1035	1040	1045	1050	1055
Temperature (°C)	14.58	14.55	14.56	14.60	14.60	14.60	14.61	14.60	14.61
Conductivity (mS/cm)	3.900	3.804	3.887	3.949	4.003	4.103	4.081	4.261	4.488
pH	10.23	10.13	10.03	9.97	9.90	9.86	9.86	9.62	9.54
Turbidity (NTU)	5.83	4.12	2.04	1.29	1.36	1	1	2	2
Salinity (ppt)	2.08	2.03	2.05	2.10	2.08	2.14	2.23	2.36	2.42
DO (mg/L)	0.12	0.11	0.11	0.09	0.09	0.09	0.08	0.08	0.07
Eh (mV)	-444.7	-437.2	-436.2	-435.8	-432.7	-425.7	-421.3	-415.6	-408.2
Water Level (ft from TOR)									

Total Gallons				165					
Time	1100	1005	1110	1115	1120	1125	1130	1135	1140
Temperature (°C)	14.61	14.61	14.60	14.61	14.72	14.81	14.86	14.89	14.89
Conductivity (mS/cm)	4.503	4.493	4.482	4.645	4.512	4.481	4.362	4.331	4.921
pH	9.43	9.40	9.36	9.27	9.15	9.20	9.16	9.17	9.26
Turbidity (NTU)	2	2	2	3	4	8	10	28	16
Salinity (ppt)	2.43	2.38	2.41	2.49	2.40	2.41	2.38	2.32	2.27
DO (mg/L)	0.07	0.08	008	0.08	0.08	0.07	0.07	0.07	0.07
Eh (mV)	-406.3	-404.8	-405.9	-405.2	-406.4	-402.1	-398.6	-391.0	-387.4
Water Level (ft from TOR)				24.64					

Total Gallons				165				250	
Time	1145	1150	1200	1205	1210	1215	1220	1225	
Temperature (°C)	14.89	14.90	14.91	14.90	14.92	14.86		14.98	
Conductivity (mS/cm)	4.937	5.064	5.107	5.140	5.146	5.086		5.277	
pH	9.15	9.03	8.97	8.92	8.84	8.85		8.77	
Turbidity (NTU)	9	5	4	2	2	2	2	2	
Salinity (ppt)	2.35	2.41	2.57	2.68	2.70	2.76	2.80	2.86	
DO (mg/L)	0.07	0.08	0.07	0.07	0.07	0.09	0.10	0.11	
Eh (mV)	-376.5	-362.4	-348.2	-353.4	-361.6	-353.9	-357.8	-361.2	
Water Level (ft from TOR)								32.96	

Notes:

WELL DEVELOPMENT LOG

CLIENT: EFANE
PROJECT TITLE: Remedial Investigation of IR Program Site 16
(Former Creosote Dip Tank and Fire Fighting Training Area)
PROJECT NUMBER: 29600.97.3201
STAFF:JN
DATE: 02/07/01

Well Number: **MW16-29D**

1. Total Riser and Screen Length (ft) before well development.	56.34
2. Total Riser and Screen Length (ft) after well development	56.38
3. Water Level Below Measuring Point (ft)	12.51
4. Estimated amount of water lost in screened interval during well drilling (gal.)	NO WATER LOSS

Parameters

Total Gallons									
Time	1315	1320	1325	1330	1335	1340	1345	1350	1355
Temperature (°C)	11.85	12.33	12.25	12.34	12.26	12.23	12.22	12.20	12.21
Conductivity (mS/cm)	0.307	0.270	0.270	0.254	0.246	0.247	0.239	0.239	0.228
pH	6.27	6.43	6.50	6.60	6.61	6.62	6.61	6.23	6.54
Turbidity (NTU)	--	--	--	--	40	85	32	15	10
Salinity (ppt)	0.14	0.13	0.12	0.12	0.12	0.12	0.11	0.11	0.11
DO (mg/L)	11.25*	9.92	17.01	14.90	8.79	11.35	16.57 (A)	10.79	10.65
Eh (mV)	-466.8	-472.4	-482.6	-474.3	-467.2	-464.8	-465.8	-30.4	-383.6
Water Level (ft from TOR)	14.81		16.43		16.46		16.46		16.46

Total Gallons									
Time	1400	1405	1415	1420	1425	1430	1435	1440	1445
Temperature (°C)	12.21	12.11	12.20	12.16	12.15	12.15	12.13	12.15	12.14
Conductivity (mS/cm)	0.228	0.221	0.229	0.225	0.225	0.255	0.255	0.225	0.255
pH	6.54	6.48	6.02	6.47	5.98	5.94	6.22	6.34	6.44
Turbidity (NTU)	5	18	6	0.55	0.23	0.00	0	0	0
Salinity (ppt)	0.11	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.11
DO (mg/L)	12.24	10.07	12.84	12.88	13.98	13.95	13.64	13.40	13.54
Eh (mV)	-395.0	-306.6	-300.1	-360.0	-300.6	-290.3	-314.0	-336.1	-344.6
Water Level (ft from TOR)		16.47		16.43		16.43		16.43	

Notes: Surged every 5 minutes for 45 minutes.
*- Denotes that DO meter may be giving false readings
(A) Denotes a change in YSI meter. -- = ER 3, PID is 0.0

Well Number: MW16-29D									
Total Gallons									
Time	1450	1455	1500	1505	1510	1515			
Temperature (°C)	12.15	12.15	12.14	12.14	12 14	12.13			
Conductivity (mS/cm)	0.255	0.255	0.224	0.224	0.224	0.223			
pH	6.44	6.45	6.48	6.48	6.49	6.48			
Turbidity (NTU)	0	0	0	0	0	0			
Salinity (ppt)	0.11	0.11	0.11	0.11	0.11	0.11			
DO (mg/L)	13.71	13.88	13.78	13.80	13.79	13.82			
Eh (mV)	-356.2	-301.3	-359.2	-359.6	-359.7	358.5			
Water Level (ft from TOR)		16.43		16.41		16.38			

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

Total Gallons									
Time									
Temperature (°C)									
Conductivity (mS/cm)									
pH									
Turbidity (NTU)									
Salinity (ppt)									
DO (mg/L)									
Eh (mV)									
Water Level (ft from TOR)									

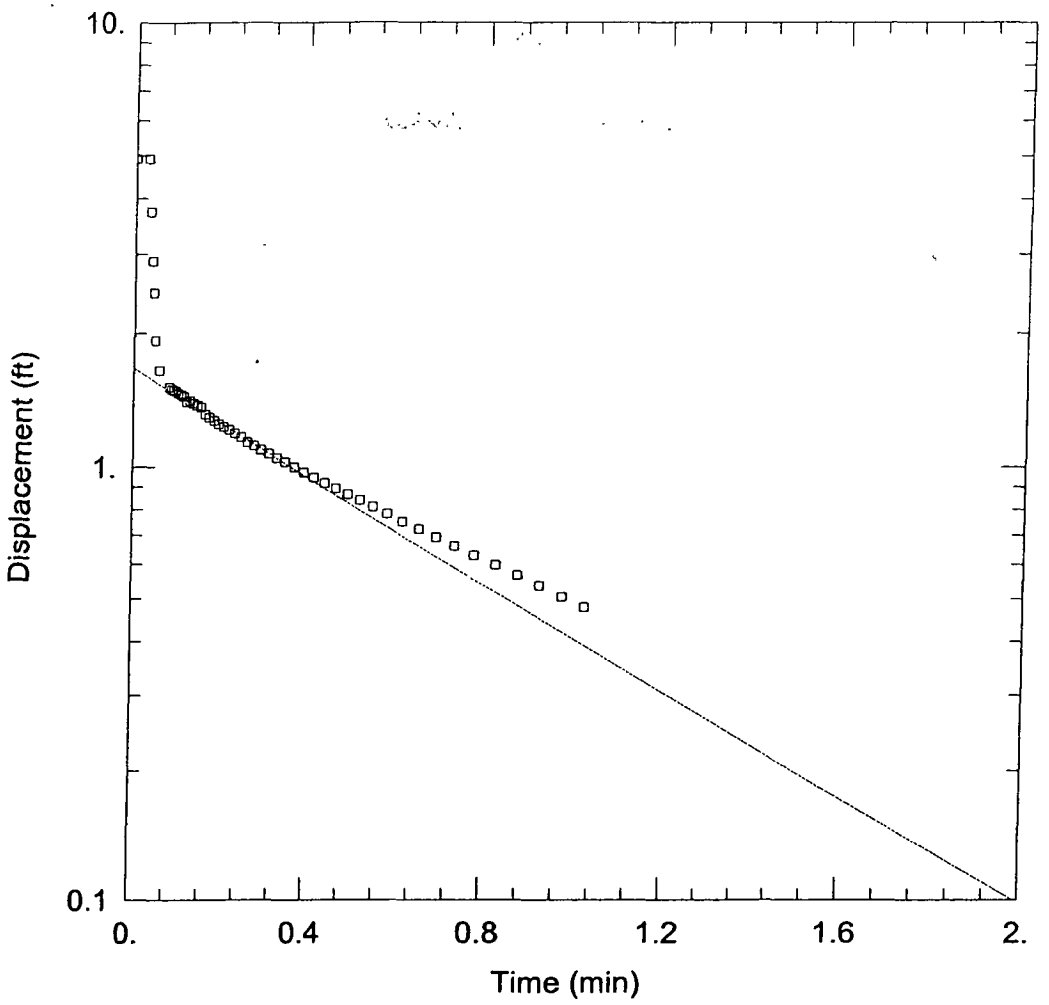
Notes: Blank cells denote no available information

Appendix G

Stage I and II
Slug Test Data and Analysis

SUMMARY OF COLLECTION OF SLUG TEST DATA
PHASE I RI, SITE 16, NCBC DAVISVILLE

Well Number	Date	Start Time	Finish Time	Notes
MW16-01D	7/19/00	0845	1000	
MW16-01S	2/14/01			Not enough water to run test.
MW16-02D	7/19/00	1010	1100	
MW16-02S	2/20/01	1430	1435	Not enough water to run test.
MW16-03D	2/13/01	1510	1515	
MW16-03S	2/13/01	1520	1530	
MW16-04D	2/15/01	1410	1424	
MW16-04S	2/15/01	1428	1444	
MW16-05D	2/16/01	1240	1304	
MW16-05S	2/16/01	1305	1312	
MW16-06D	2/20/01	1330	1338	
MW16-06S	2/20/01	1349	1400	Not enough water to run test.
MW16-07D	2/20/01	1144	1207	
MW16-07S	2/20/01	1209	1216	Not enough water to run test.
MW16-08D	2/16/01	1146	1155	
MW16-09D	2/16/01	1055	1124	
MW16-10D	2/16/01	1035	1045	
MW16-11D	2/15/01	1255	1306	
MW16-12D	2/15/01	1230	1247	
MW16-13D	2/15/01	1350	1359	
MW16-14D	2/15/01	1130	1140	
MW16-15D	2/15/01	0820	0838	
MW16-16D	2/14/01	0900	0933	
MW16-17D	2/14/01	1220	1247	
MW16-18D	2/14/01	1255	1314	
MW16-19D	2/14/01	1045	1116	
MW16-20D	2/13/01	1540	1615	
MW16-21D	2/13/01	1345	1400	
MW16-22D	2/13/01	1028	1115	
MW16-23D	2/13/01	1130	1210	
MW16-24D	2/13/01	1415	1445	
MW16-25D	2/14/01	0938	1005	
MW16-26D	2/20/01	1439	1500	
MW16-27D	2/15/01	1514	1520	
MW16-28D	2/20/01	1108	1120	
MW16-29D	2/13/01	1630	1640	



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\01D_Rise.aqt
Date: 05/20/03 Time: 14:59:44

PROJECT INFORMATION

Test Well: 01D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

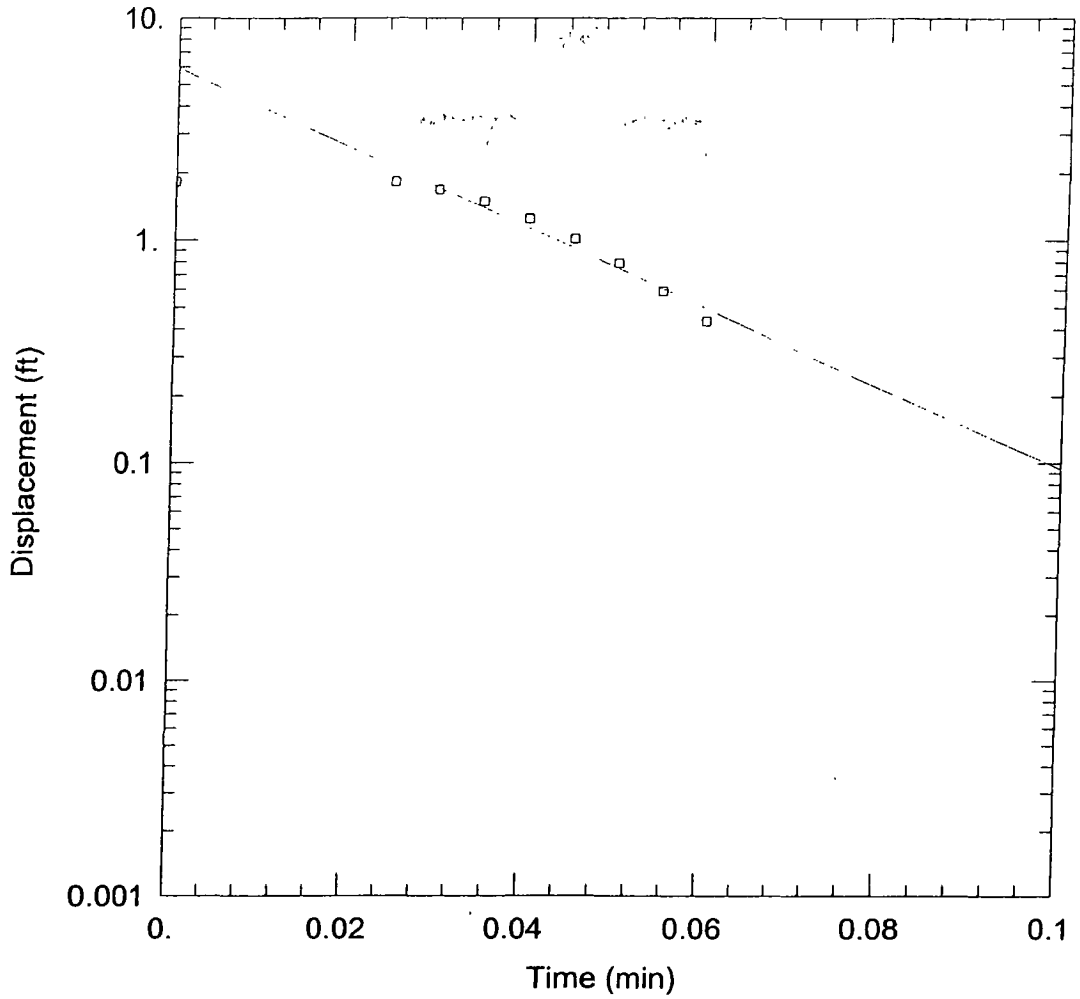
WELL DATA (01D_Rise)

Initial Displacement: 4.927 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.593 ft/day
y0 = 1.672 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\02D_Rise.aqt
Date: 05/21/03 Time: 07:57:28

PROJECT INFORMATION

Test Well: 02D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

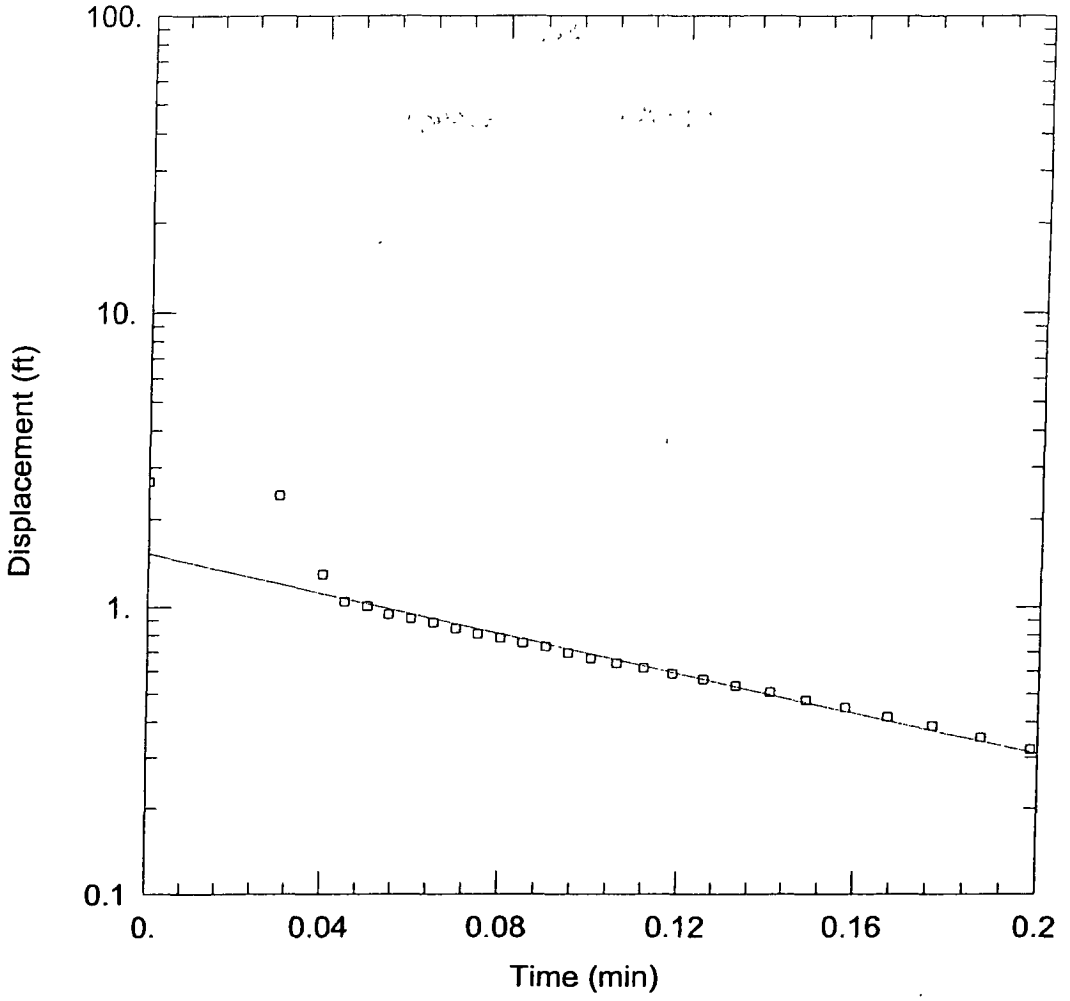
WELL DATA (02D_Rise)

Initial Displacement: 1.83 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 76.1 ft/day
y0 = 5.96 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\03S_Rise.aqt
Date: 05/21/03 Time: 07:58:07

PROJECT INFORMATION

Test Well: 03S_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

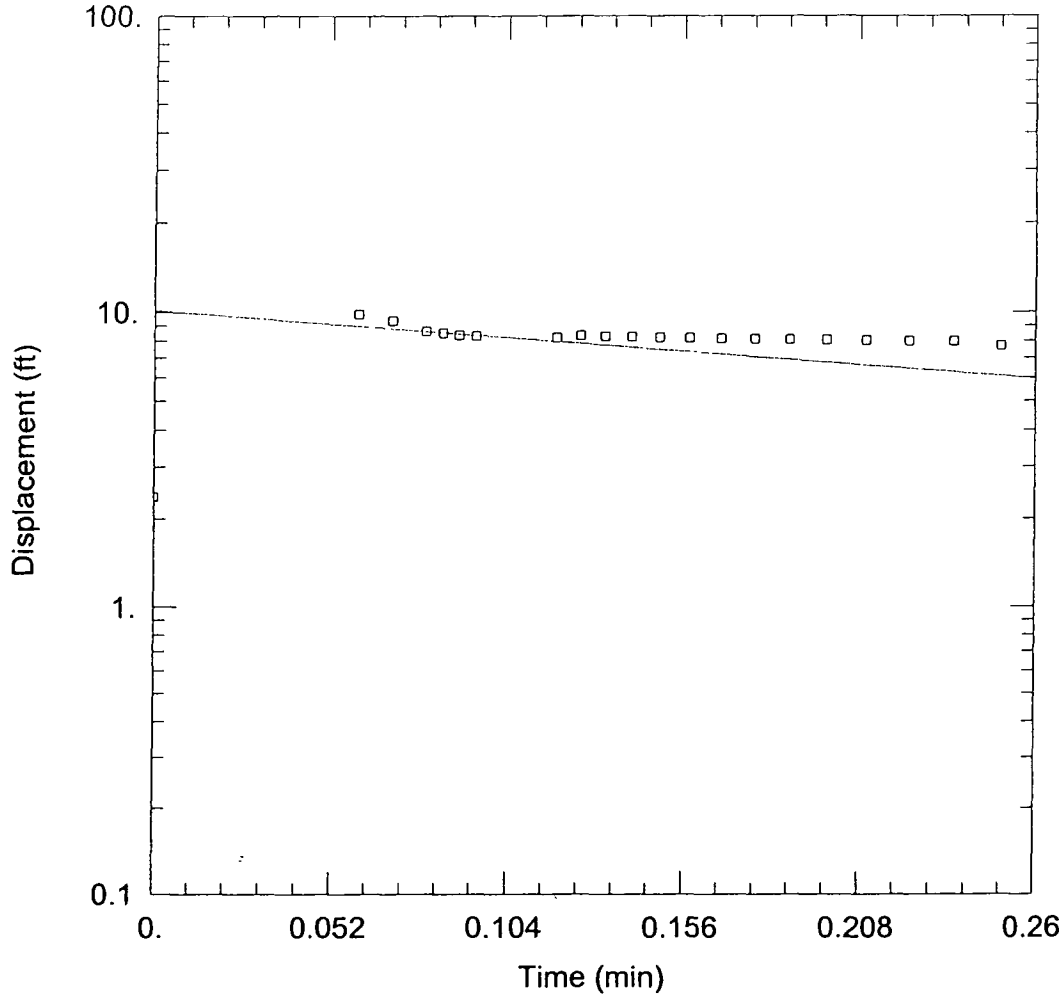
WELL DATA (03S_Rise)

Initial Displacement: 2.68 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 14.61 ft/day
y0 = 1.527 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\03S_Fall.aqt
Date: 05/21/03 Time: 07:57:55

PROJECT INFORMATION

Test Well: 03S_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

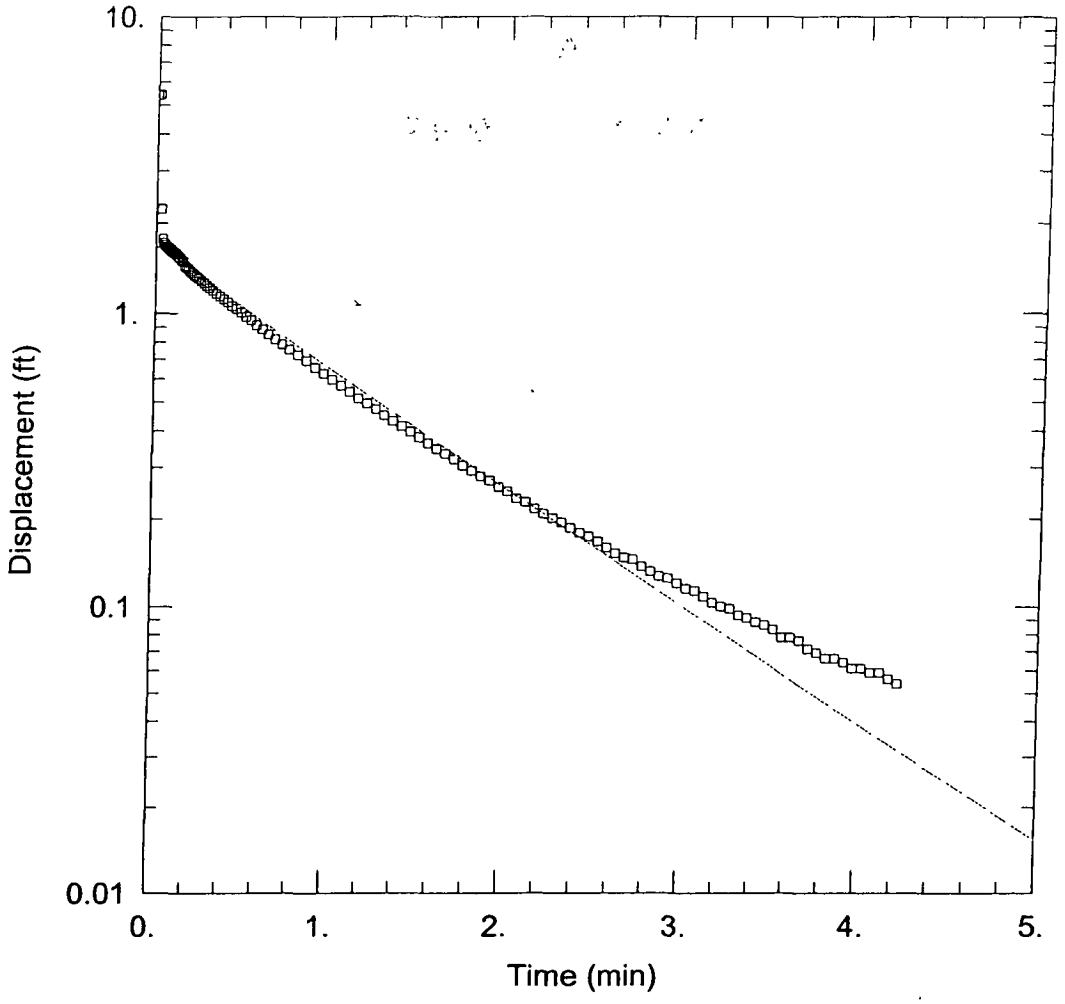
WELL DATA (03S_Fall)

Initial Displacement: 2.38 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.746 ft/day
y0 = 10.13 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\03D_Rise.aqt
Date: 05/21/03 Time: 07:57:41

PROJECT INFORMATION

Test Well: 03D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

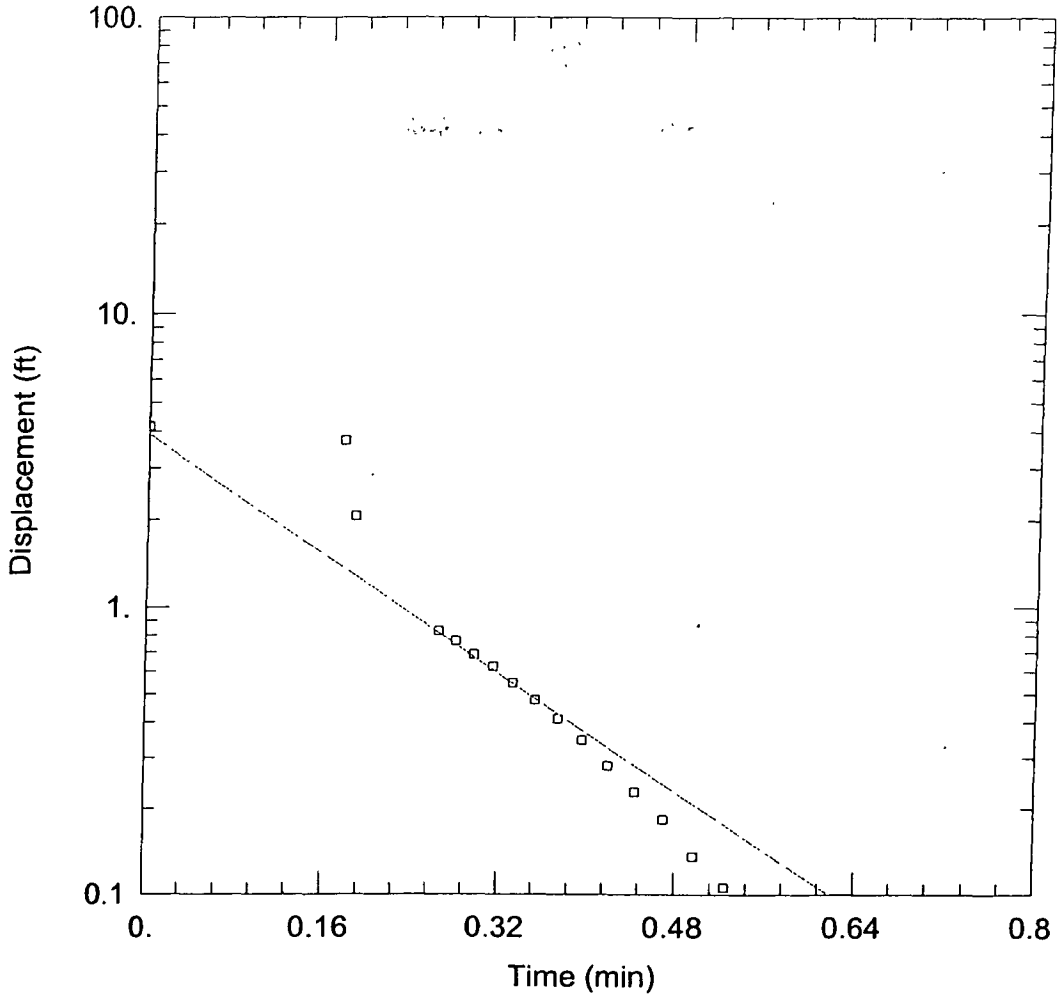
WELL DATA (03D_Rise)

Initial Displacement: 5.4 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.72 ft/day
y0 = 1.684 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\04S_Rise.aqt
Date: 05/21/03 Time: 07:59:12

PROJECT INFORMATION

Test Well: 04S_Rise

AQUIFER DATA

Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (04S_Rise)

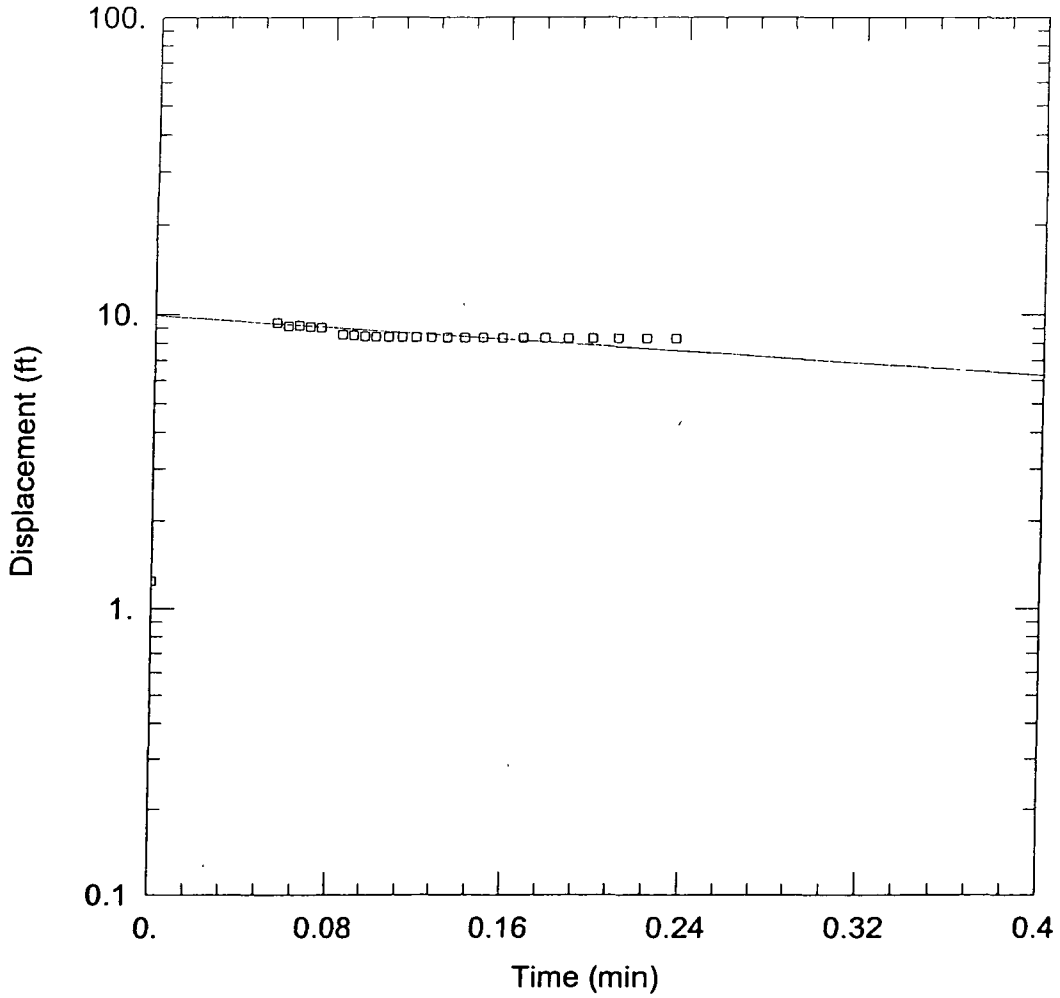
Initial Displacement: 4.164 ft Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft Well Skin Radius: 0.083 ft
Screen Length: 10. ft Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 10.86 ft/day y0 = 3.917 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\04S_Fall.aqt
Date: 05/21/03 Time: 07:58:55

PROJECT INFORMATION

Test Well: 04S_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

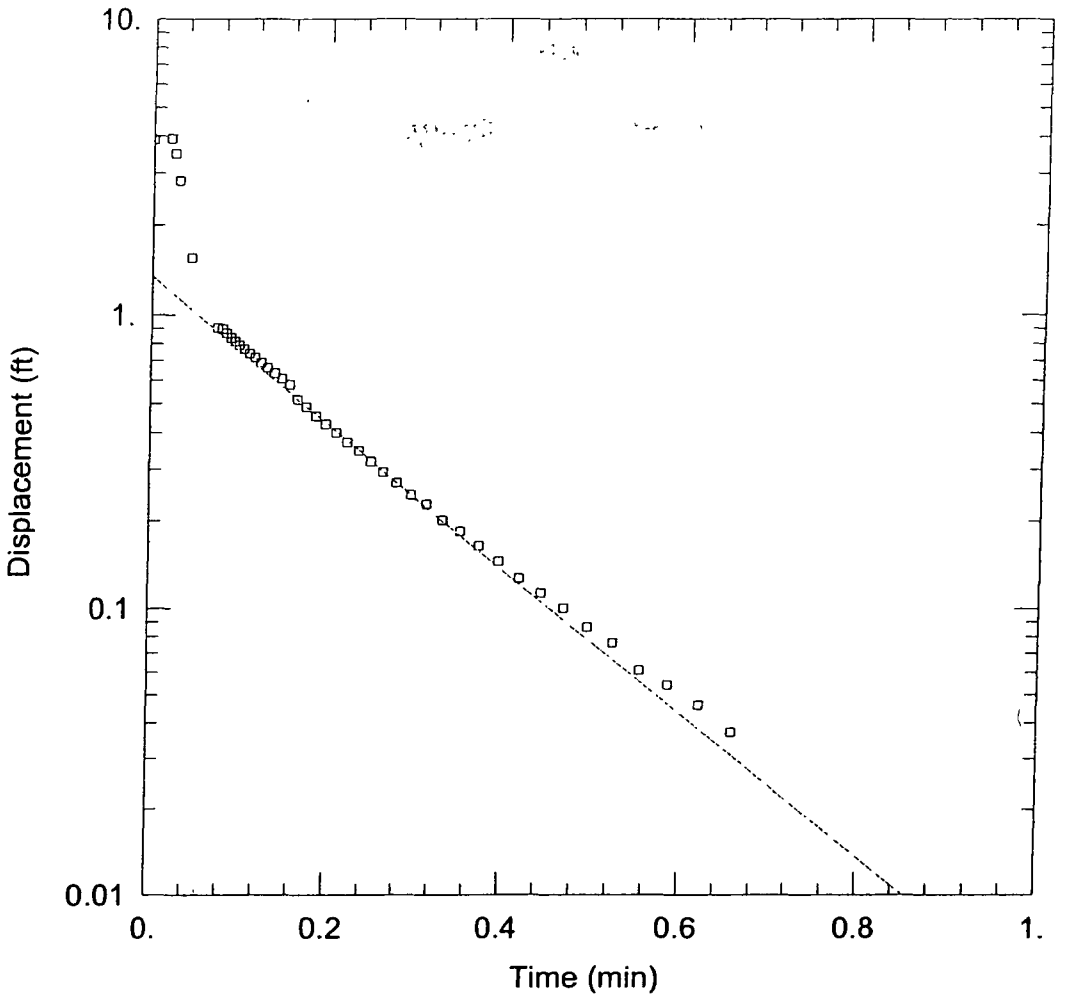
WELL DATA (04S_Fall)

Initial Displacement: 1.24 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.11 ft/day
y0 = 9.91 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\04D_Rise.aqt
Date: 05/21/03 Time: 07:58:39

PROJECT INFORMATION

Test Well: 04D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

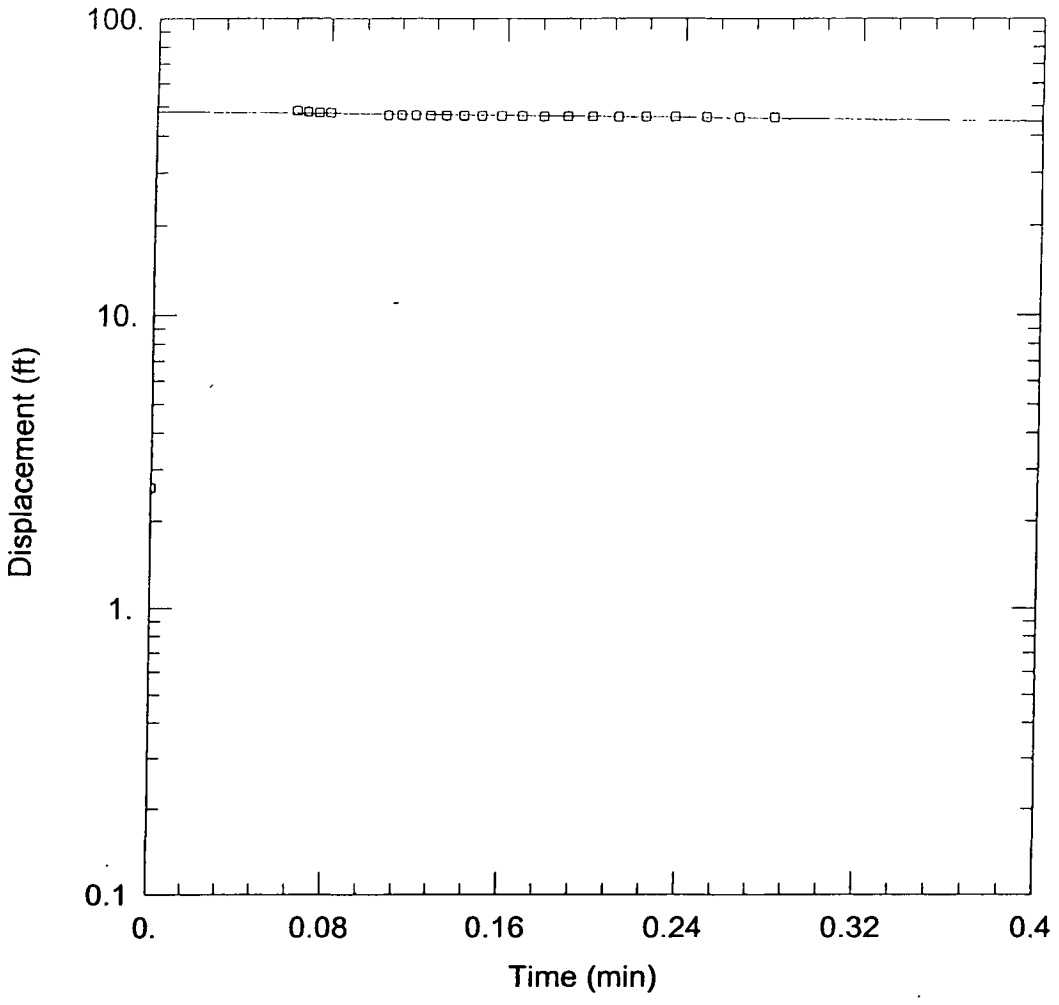
WELL DATA (04D_Rise)

Initial Displacement: 3.9 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 10.52 ft/day
y0 = 1.349 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\04D_Fall.aqt
Date: 05/21/03 Time: 07:58:20

PROJECT INFORMATION

Test Well: 04D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

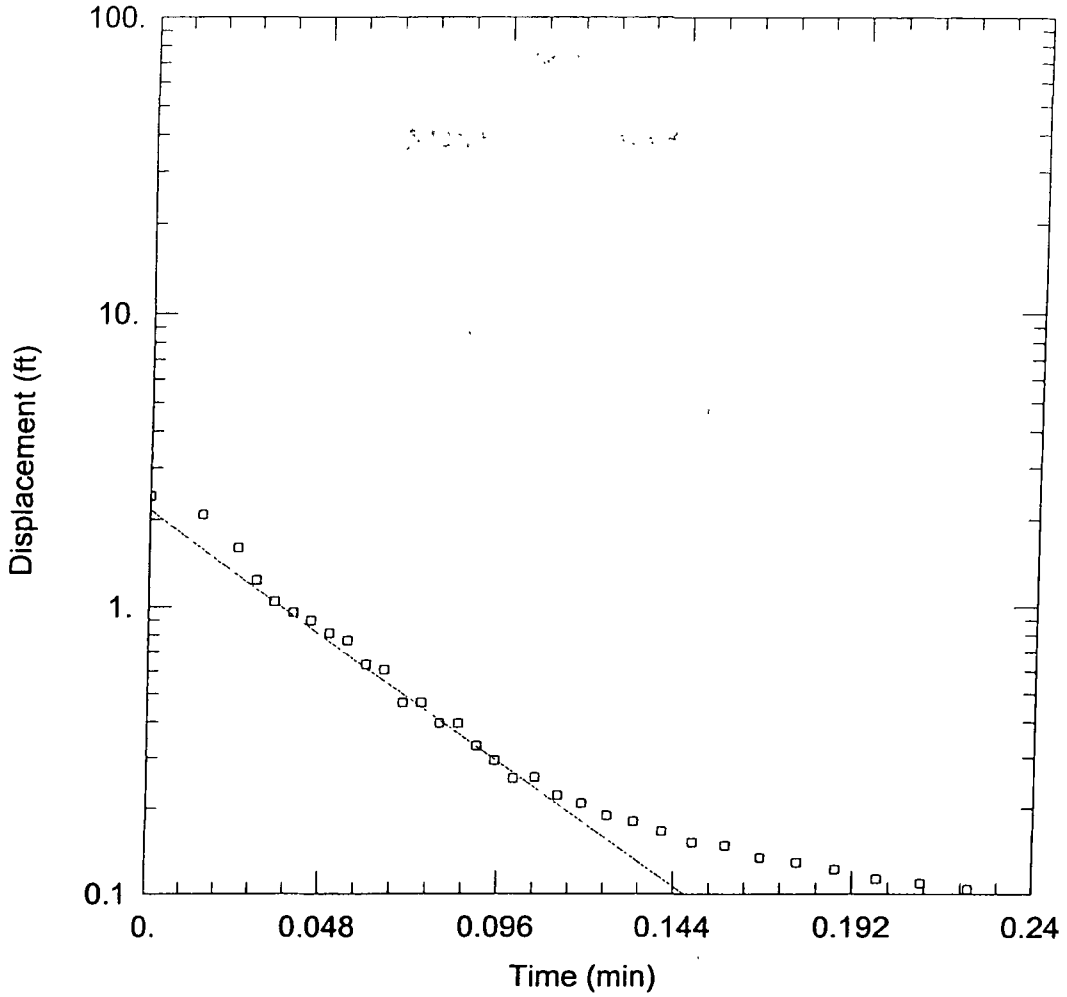
WELL DATA (04D_Fall)

Initial Displacement: 2.6 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.3403 ft/day
y0 = 47.97 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\05S_Rise.aqt
Date: 05/21/03 Time: 08:00:03

PROJECT INFORMATION

Test Well: 05S_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

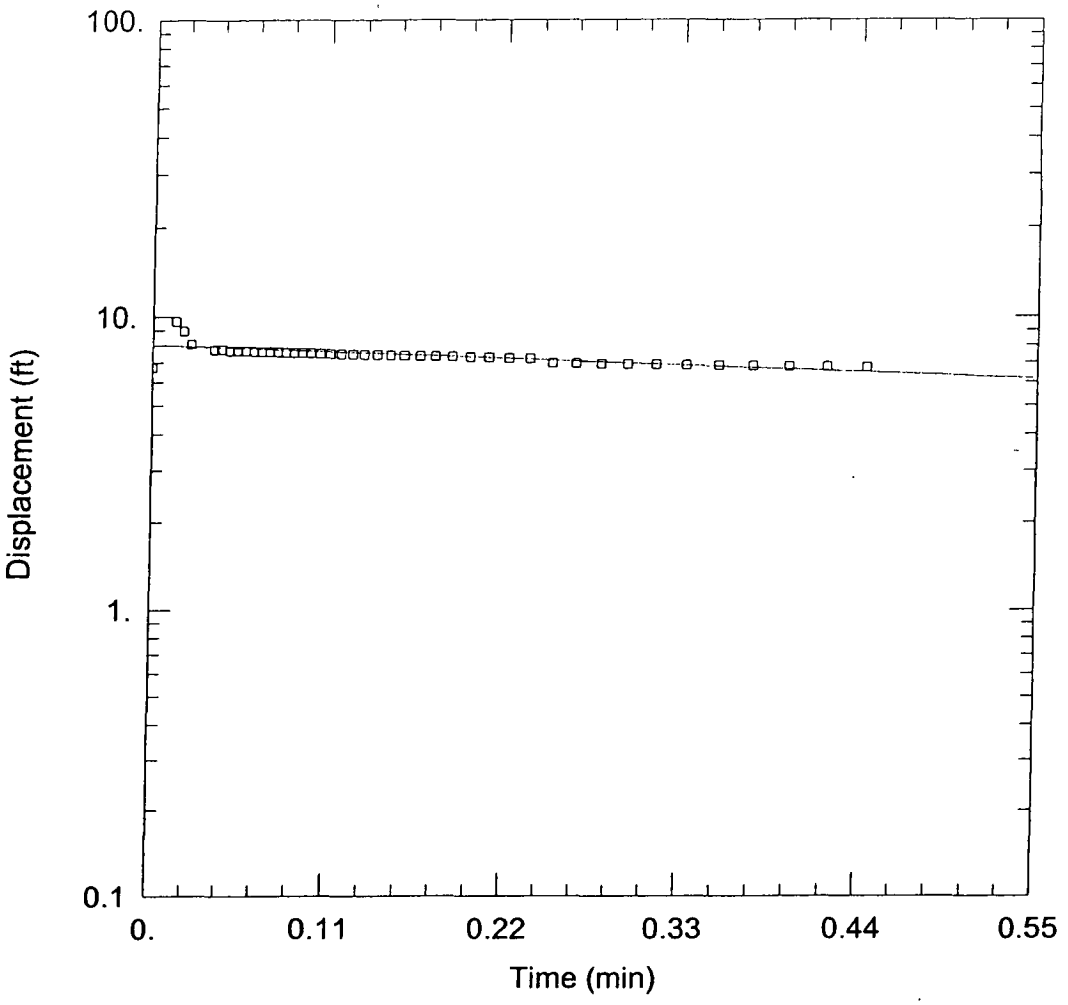
WELL DATA (05S_Rise)

Initial Displacement: 2.4 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 38.31 ft/day
y0 = 2.156 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\05S_Fall.aqt
Date: 05/21/03 Time: 07:59:48

PROJECT INFORMATION

Test Well: 05S_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

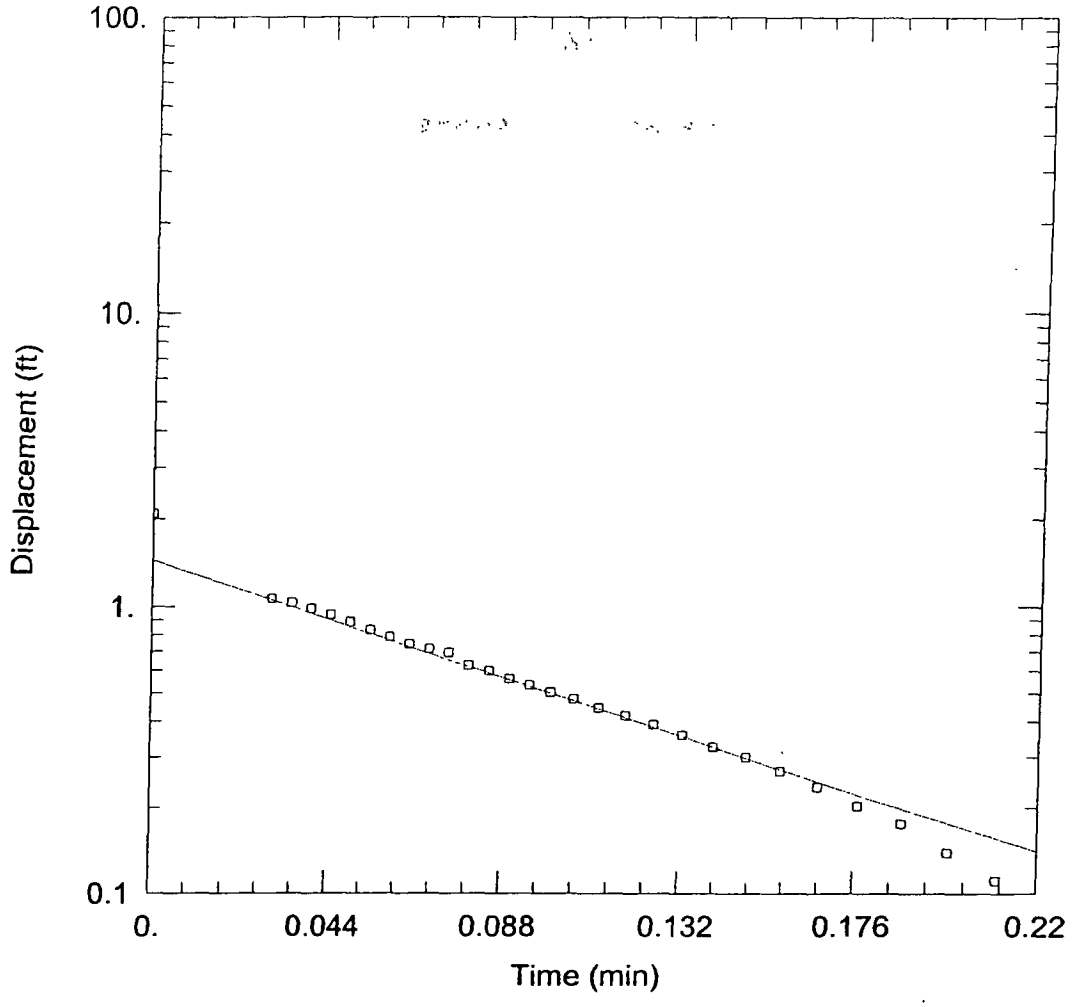
WELL DATA (05S_Fall)

Initial Displacement: 6.73 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.8782 ft/day
y0 = 8.021 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\05D_Rise.aqt
Date: 05/21/03 Time: 07:59:34

PROJECT INFORMATION

Test Well: 05D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

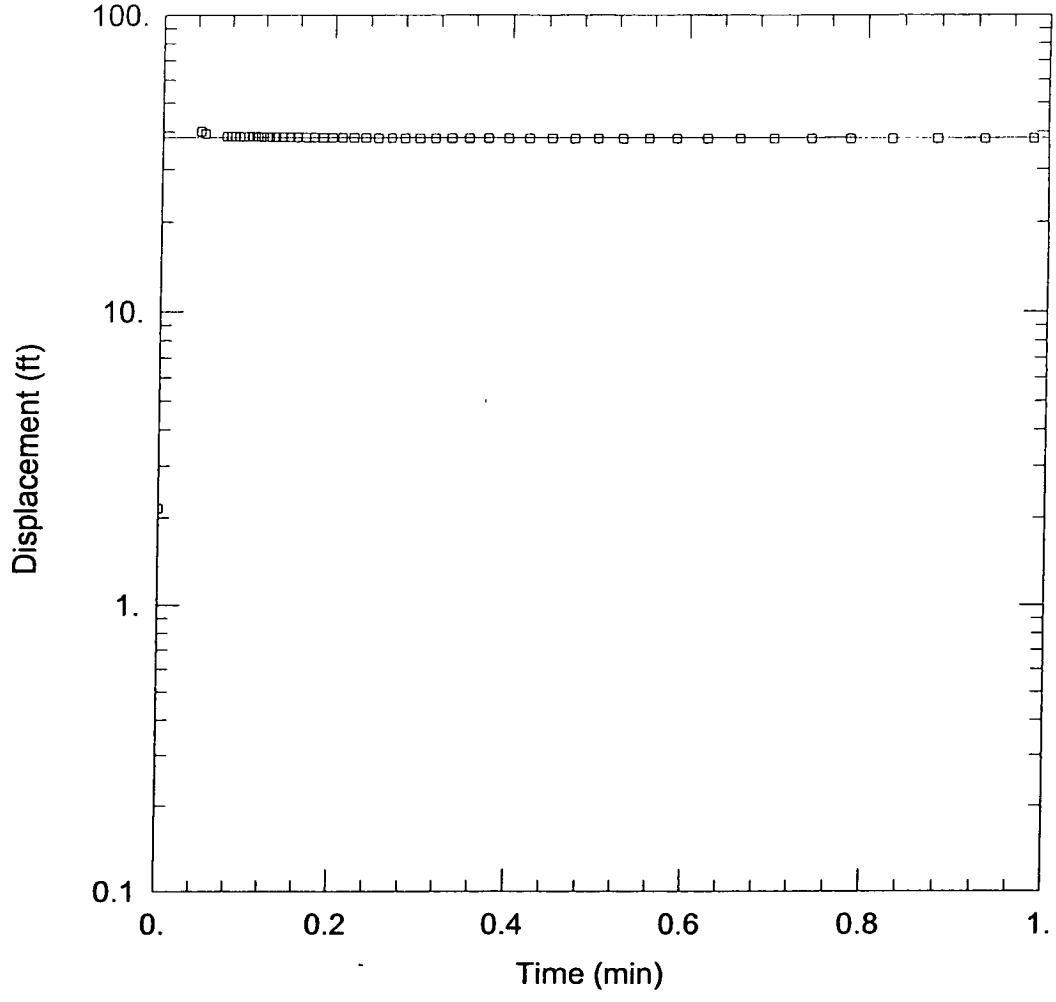
WELL DATA (05D_Rise)

Initial Displacement: 2.09 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 19.43 ft/day
y0 = 1.446 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\05D_Fall.aqt
Date: 05/21/03 Time: 08:01:57

PROJECT INFORMATION

Test Well: 05D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

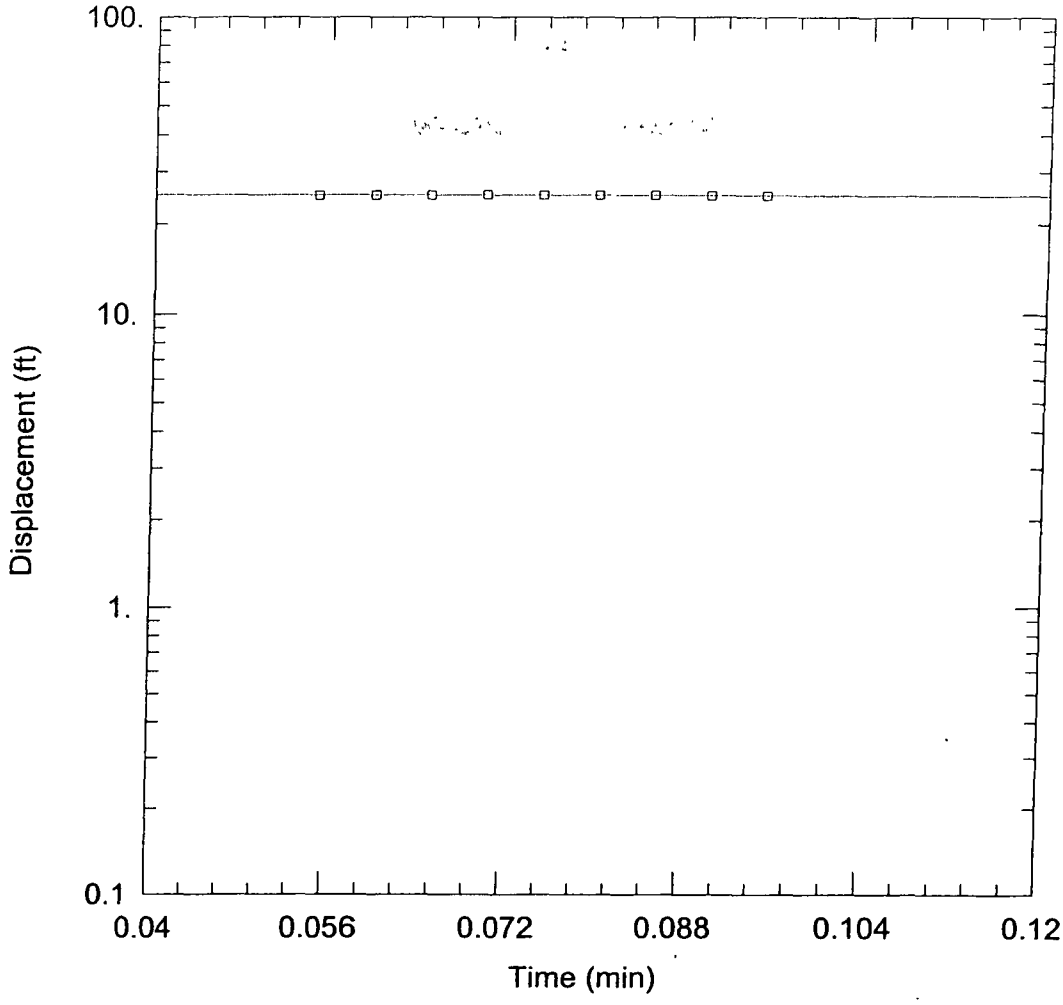
WELL DATA (05D_Fall)

Initial Displacement: 2.15 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.007103 ft/day
y0 = 38.23 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\06S_Fall.aqt
Date: 05/21/03 Time: 08:02:41

PROJECT INFORMATION

Test Well: 06S_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

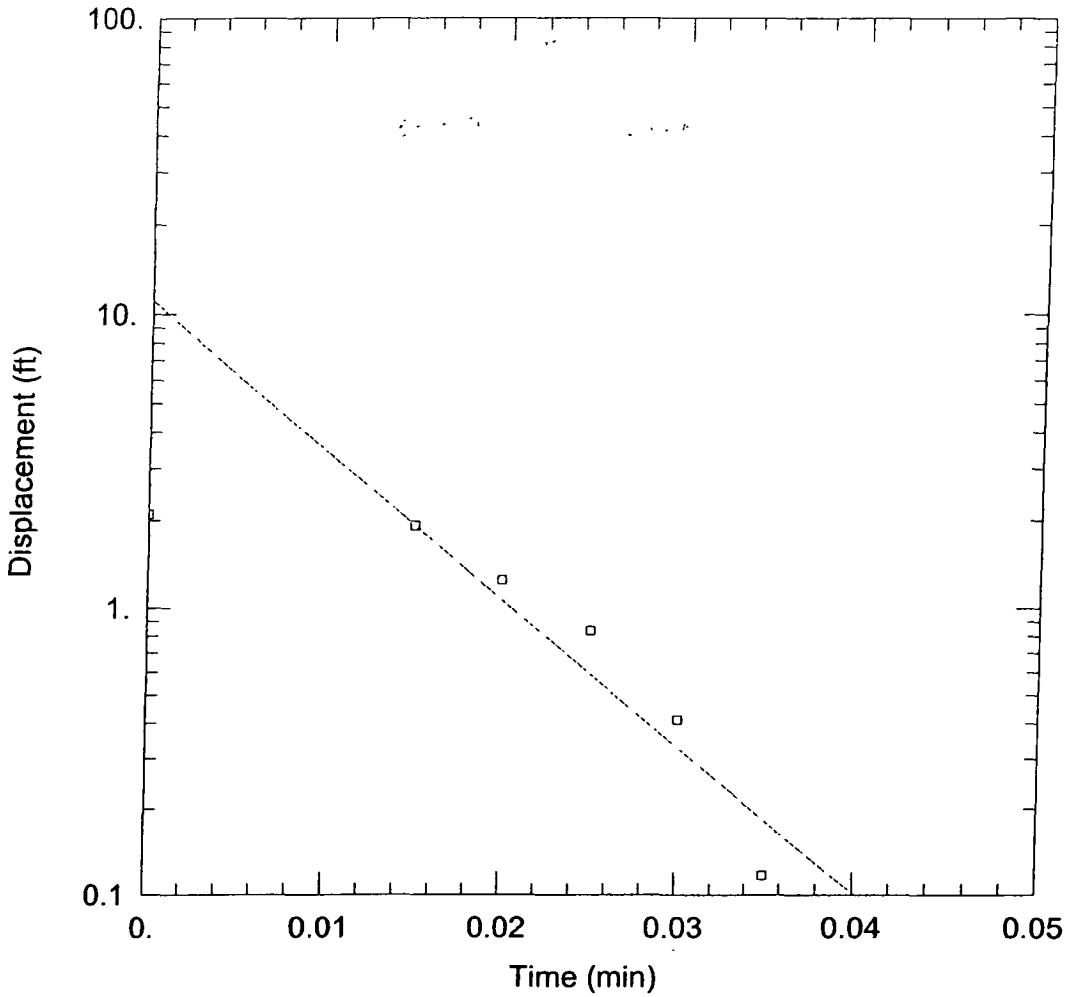
WELL DATA (06S_Fall)

Initial Displacement: 0.1 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.02867 ft/day
y0 = 24.96 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\06D_Rise.aqt
Date: 05/21/03 Time: 08:02:54

PROJECT INFORMATION

Test Well: 06D_Rise

AQUIFER DATA

Saturated Thickness: 6. ft
Anisotropy Ratio (Kz/Kr): 1.

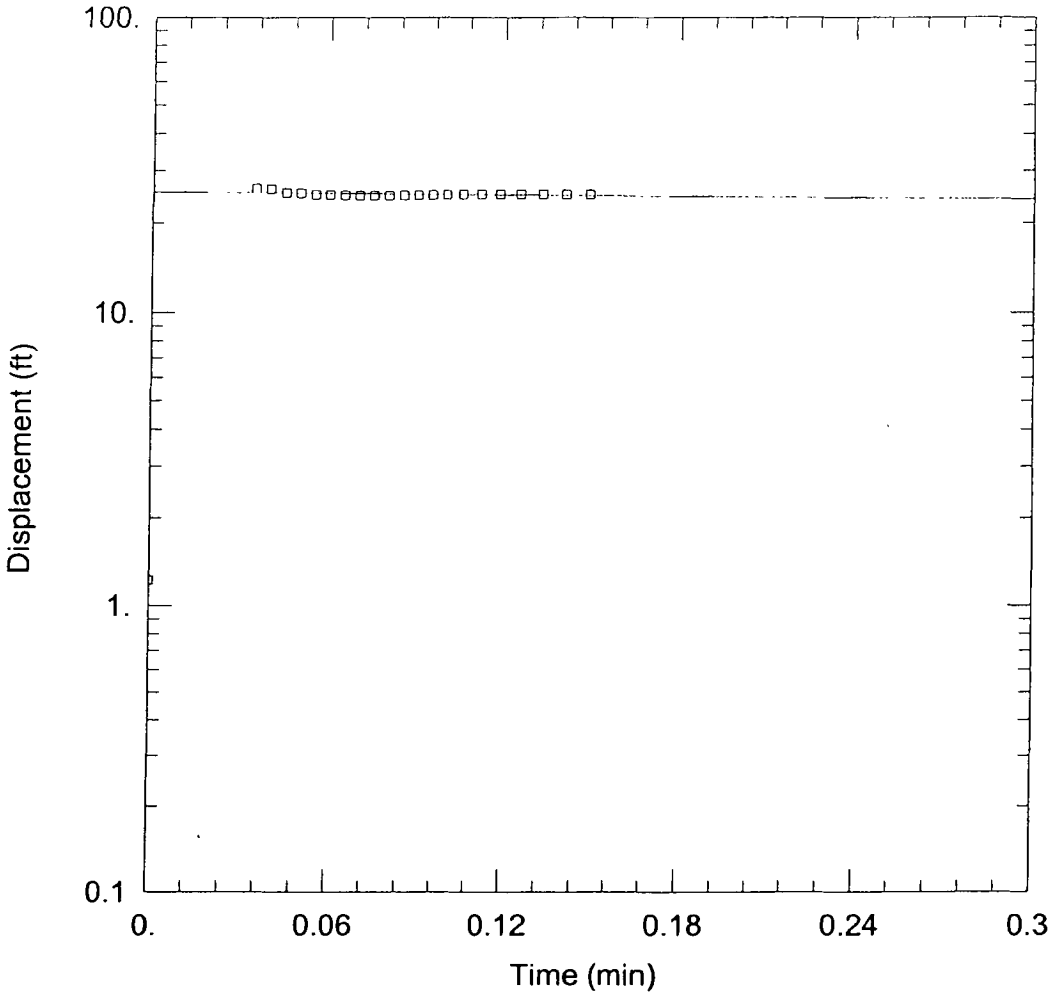
WELL DATA (06D_Rise)

Initial Displacement: 2.1 ft
Wellbore Radius: 0.083 ft
Screen Length: 6. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 6. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 319.1 ft/day
y0 = 11.14 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\06D_Fall.aqt
Date: 05/21/03 Time: 08:03:09

PROJECT INFORMATION

Test Well: 06D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

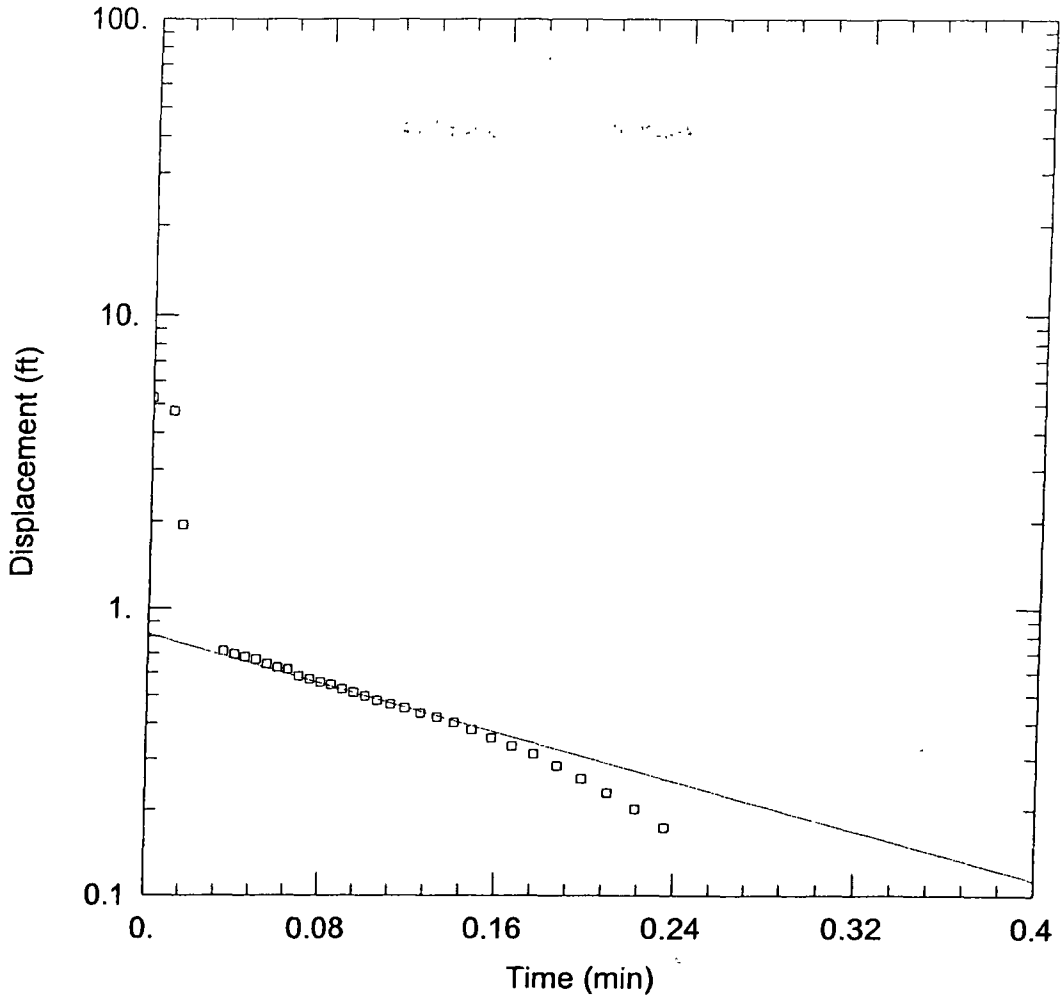
WELL DATA (06D_Fall)

Initial Displacement: 1.22 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.332 ft/day
y0 = 25.4 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\07D_Rise.aqt
Date: 05/21/03 Time: 08:03:22

PROJECT INFORMATION

Test Well: 07D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

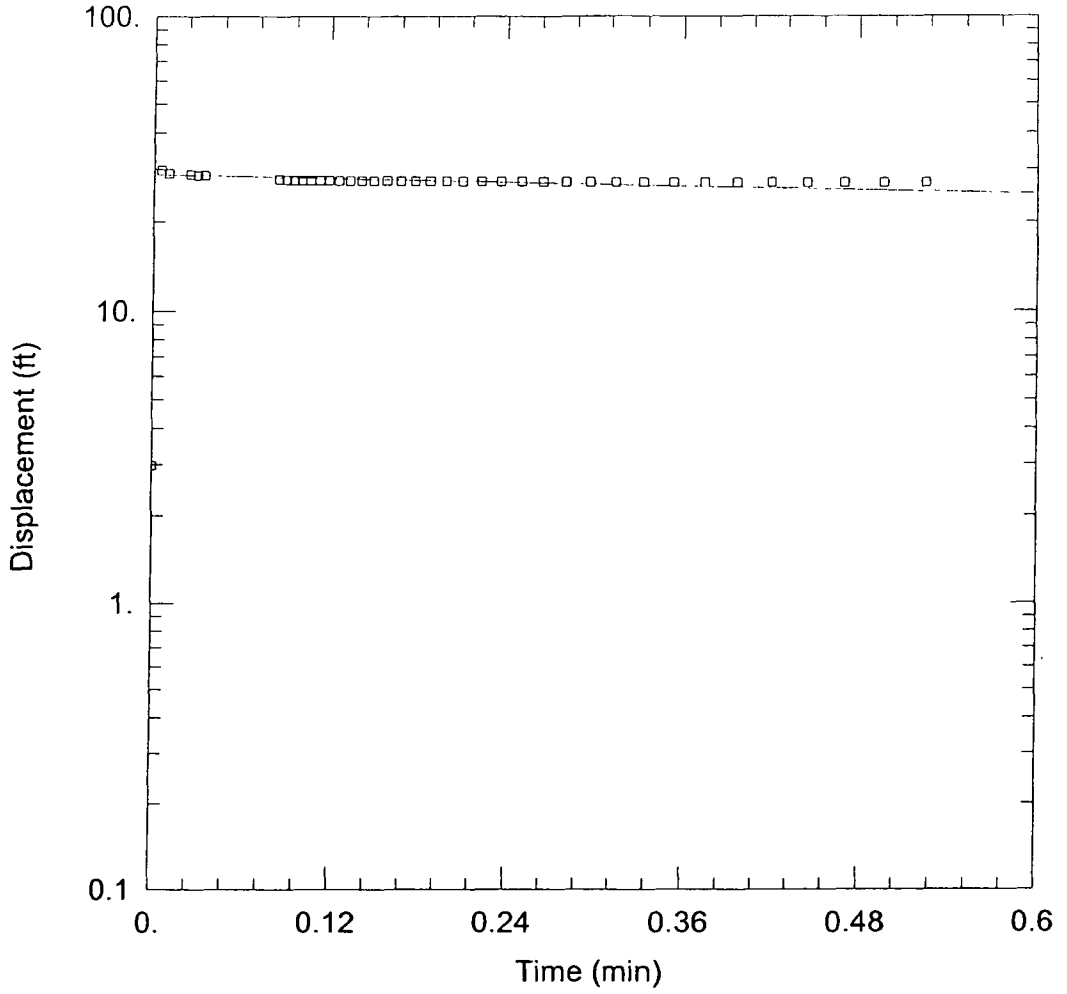
WELL DATA (07D_Rise)

Initial Displacement: 5.27 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 9.075 ft/day
y0 = 0.819 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\07D_Fall.aqt
Date: 05/21/03 Time: 08:03:38

PROJECT INFORMATION

Test Well: 07D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

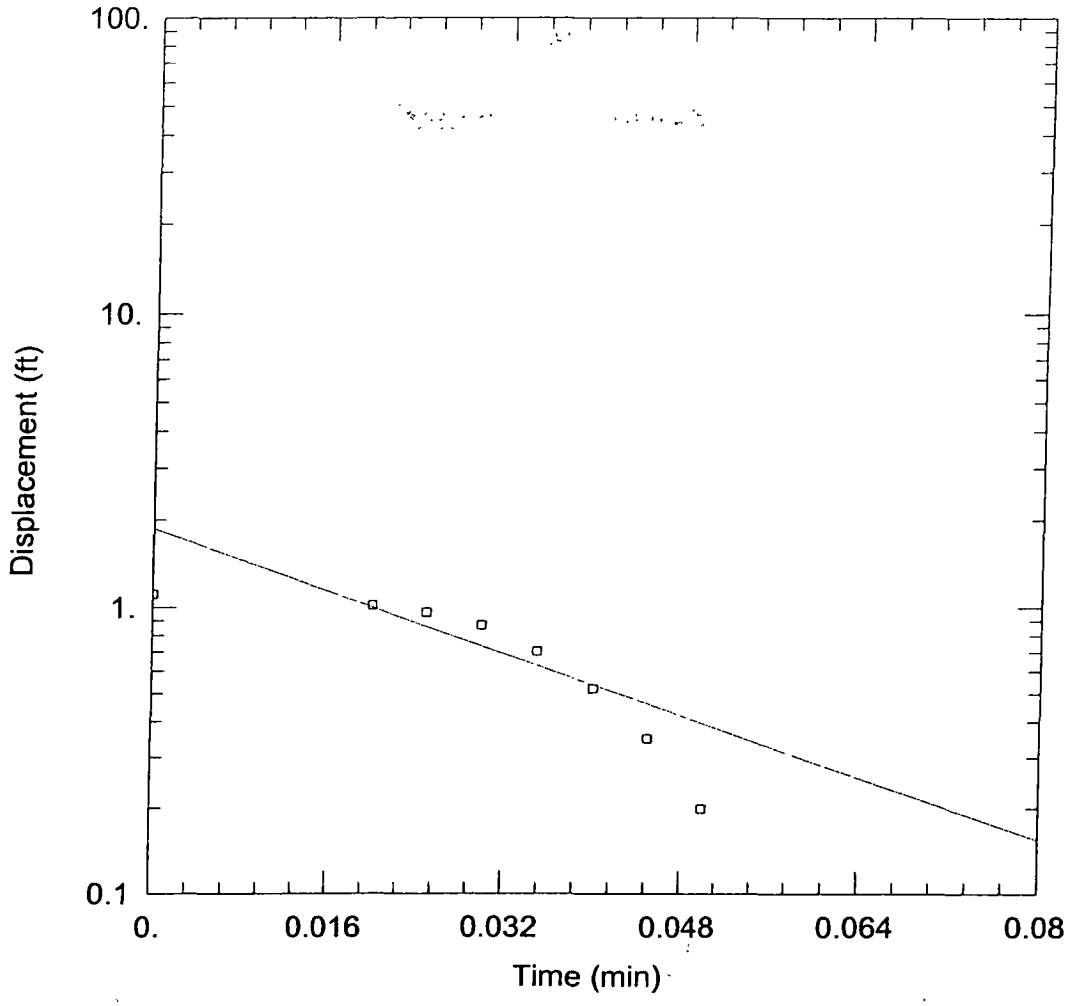
WELL DATA (07D_Fall)

Initial Displacement: 2.98 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.4588 ft/day
y0 = 28.81 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\08D_Rise.aqt
Date: 05/21/03 Time: 08:03:51

PROJECT INFORMATION

Test Well: 08D_Rise

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

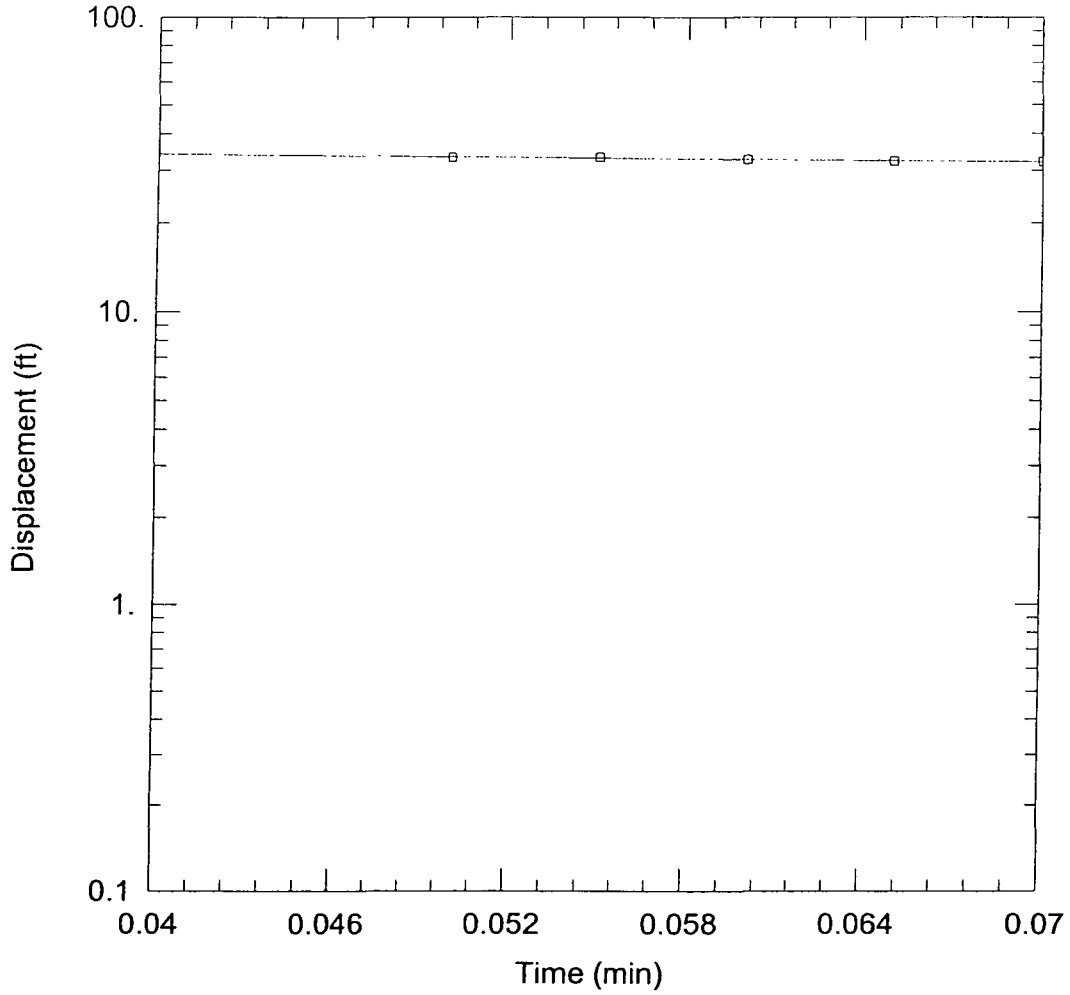
WELL DATA (08D_Rise)

Initial Displacement: 1.11 ft
Wellbore Radius: 0.083 ft
Screen Length: 15. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 15. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 41.53 ft/day
y0 = 1.866 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\08D_Fall.aqt
Date: 05/21/03 Time: 08:04:10

PROJECT INFORMATION

Test Well: 08D_Fall

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

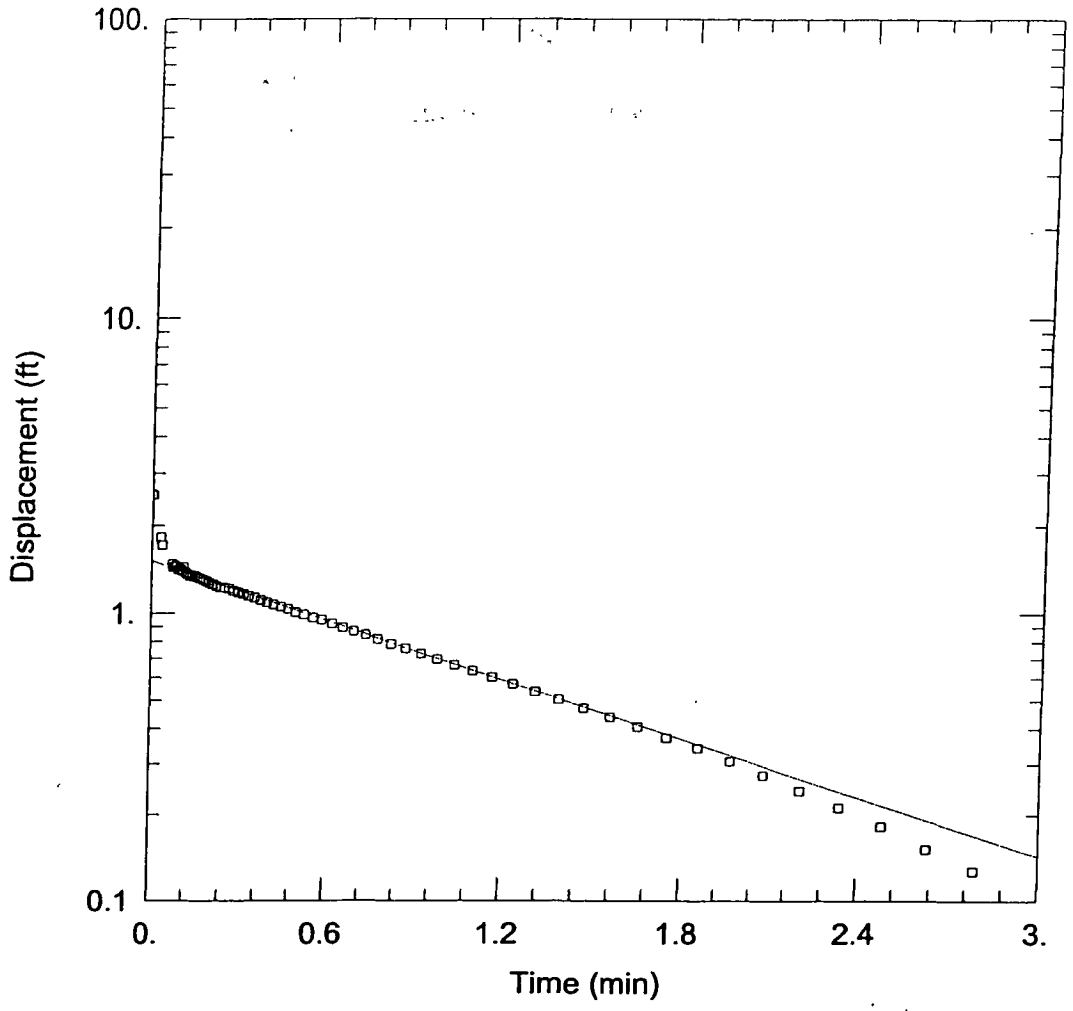
WELL DATA (08D_Fall)

Initial Displacement: 1.36 ft
Wellbore Radius: 0.083 ft
Screen Length: 15. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 15. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.791 ft/day
y0 = 37.06 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\09D_Rise.aqt
Date: 05/21/03 Time: 08:04:54

PROJECT INFORMATION

Test Well: 09D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

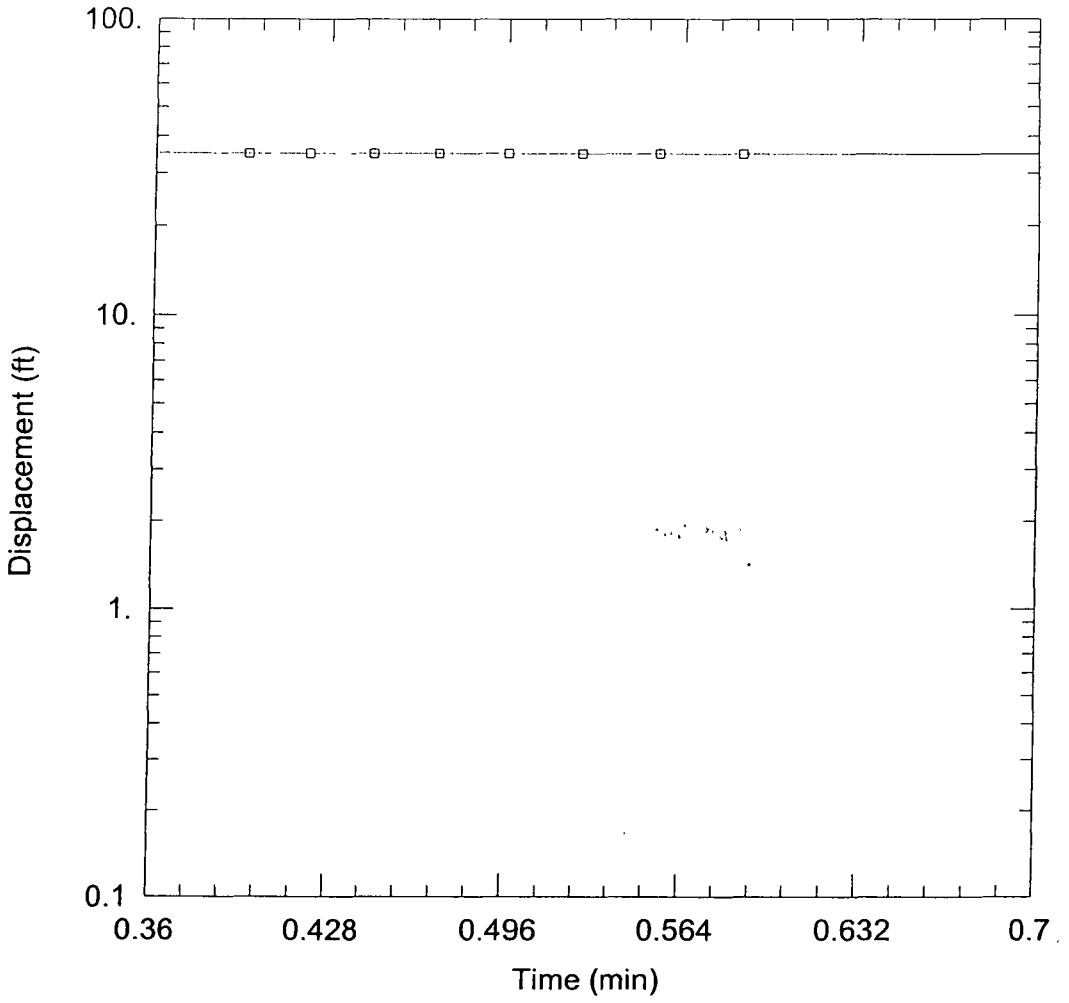
WELL DATA (09D_Rise)

Initial Displacement: 2.55 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.441 ft/day
y0 = 1.516 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\09D_Fall.aqt
Date: 05/21/03 Time: 08:05:07

PROJECT INFORMATION

Test Well: 09D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

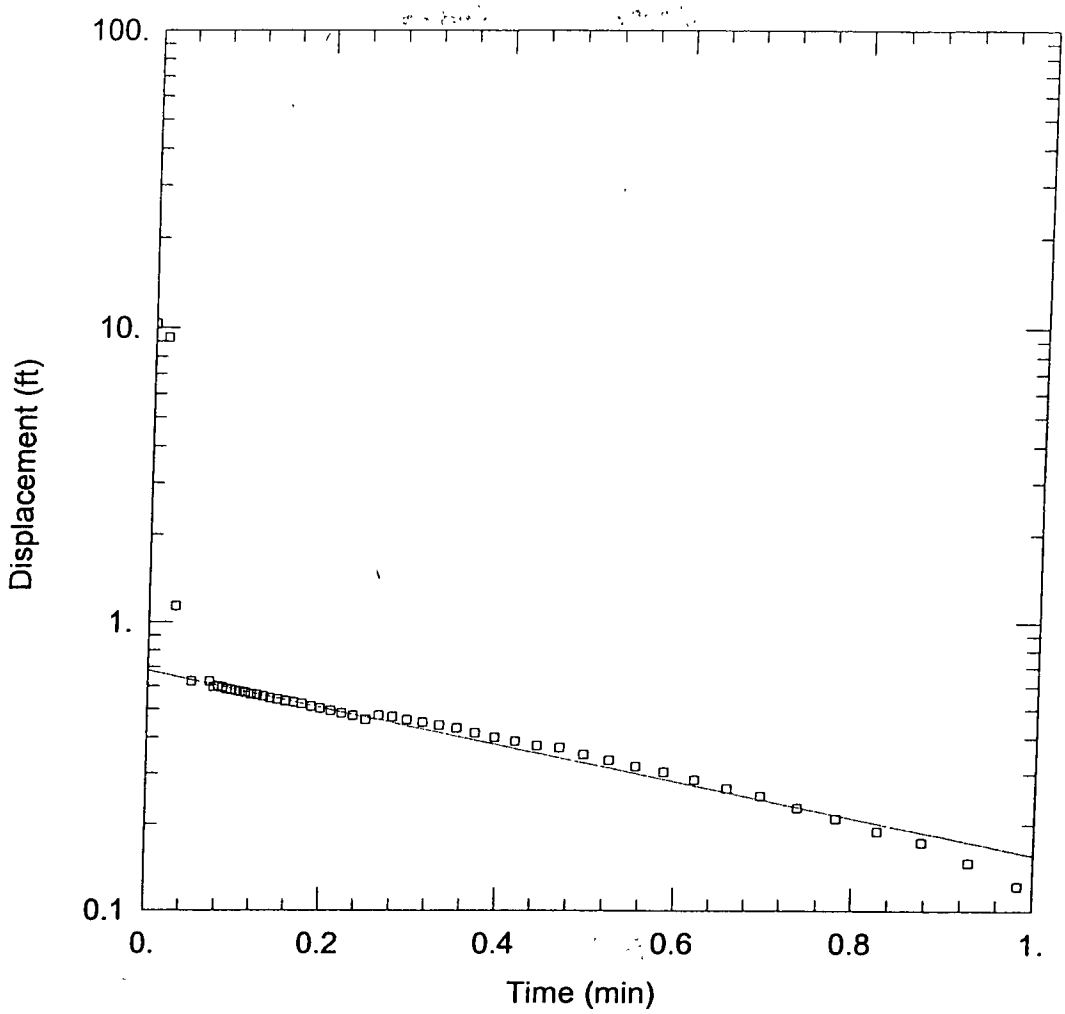
WELL DATA (09D_Fall)

Initial Displacement: 1.14 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.03697 ft/day
y0 = 35.3 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\10D_Rise.aqt
Date: 05/21/03 Time: 08:05:21

PROJECT INFORMATION

Test Well: 10D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

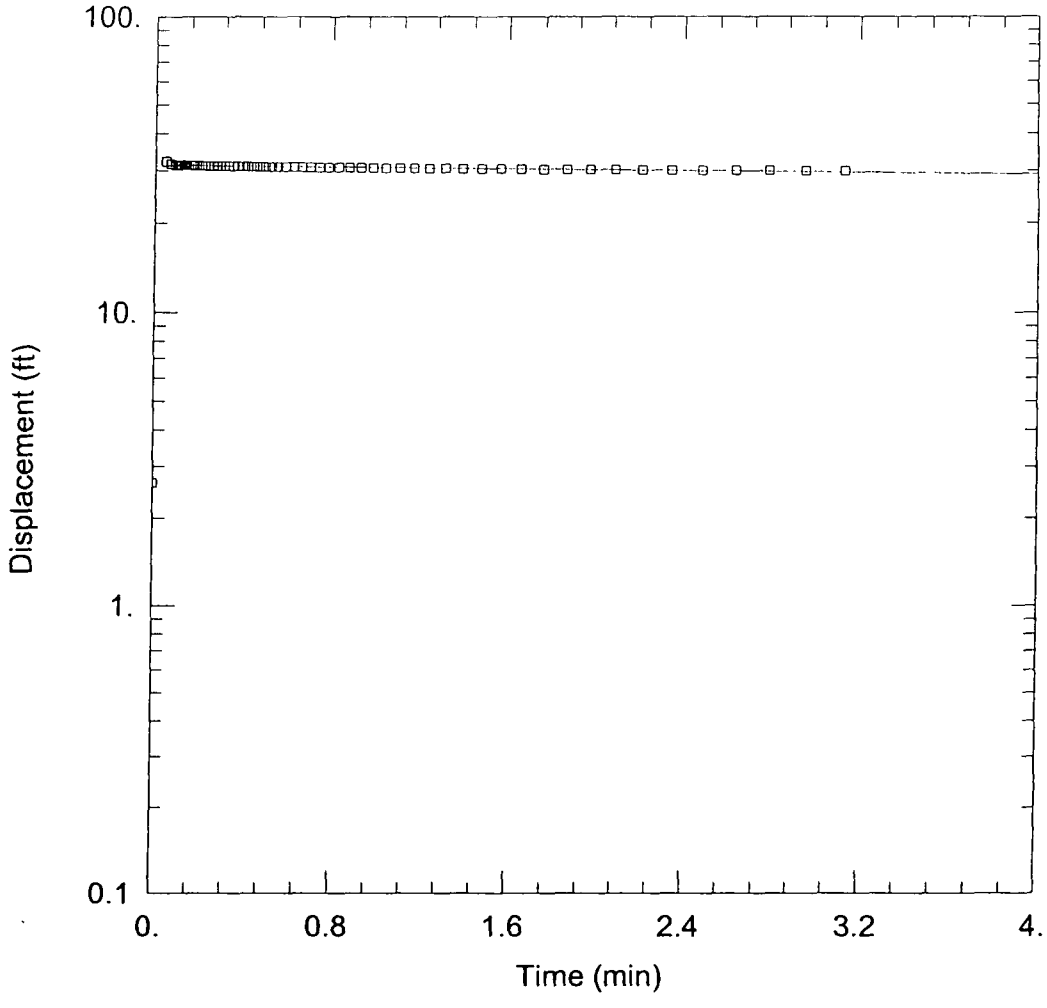
WELL DATA (10D_Rise)

Initial Displacement: 10.29 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.701 ft/day
y0 = 0.6804 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\10D_Fall.aqt
Date: 05/21/03 Time: 08:05:35

PROJECT INFORMATION

Test Well: 10D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

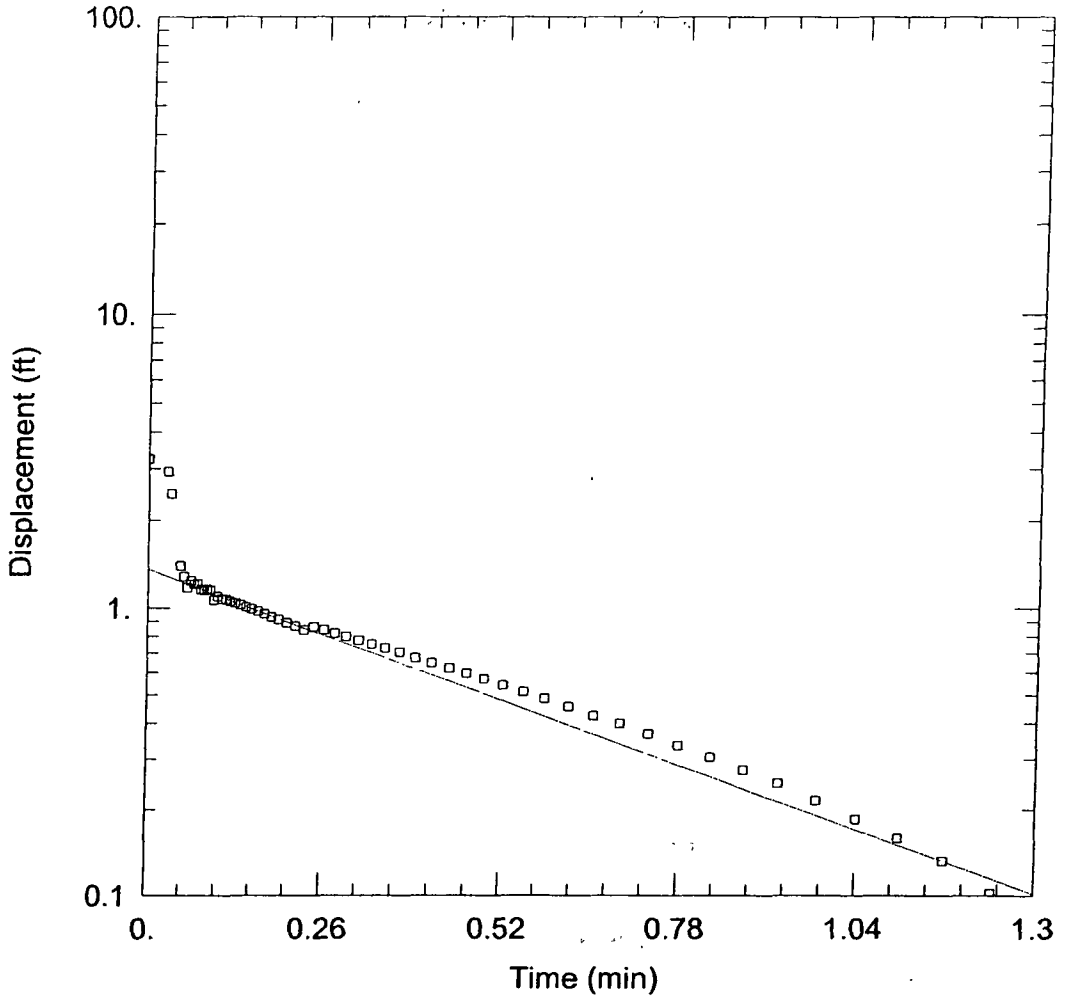
WELL DATA (10D_Fall)

Initial Displacement: 2.64 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.03126 ft/day
y0 = 31.25 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\11D_Rise.aqt
Date: 05/21/03 Time: 08:05:57

PROJECT INFORMATION

Test Well: 11D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

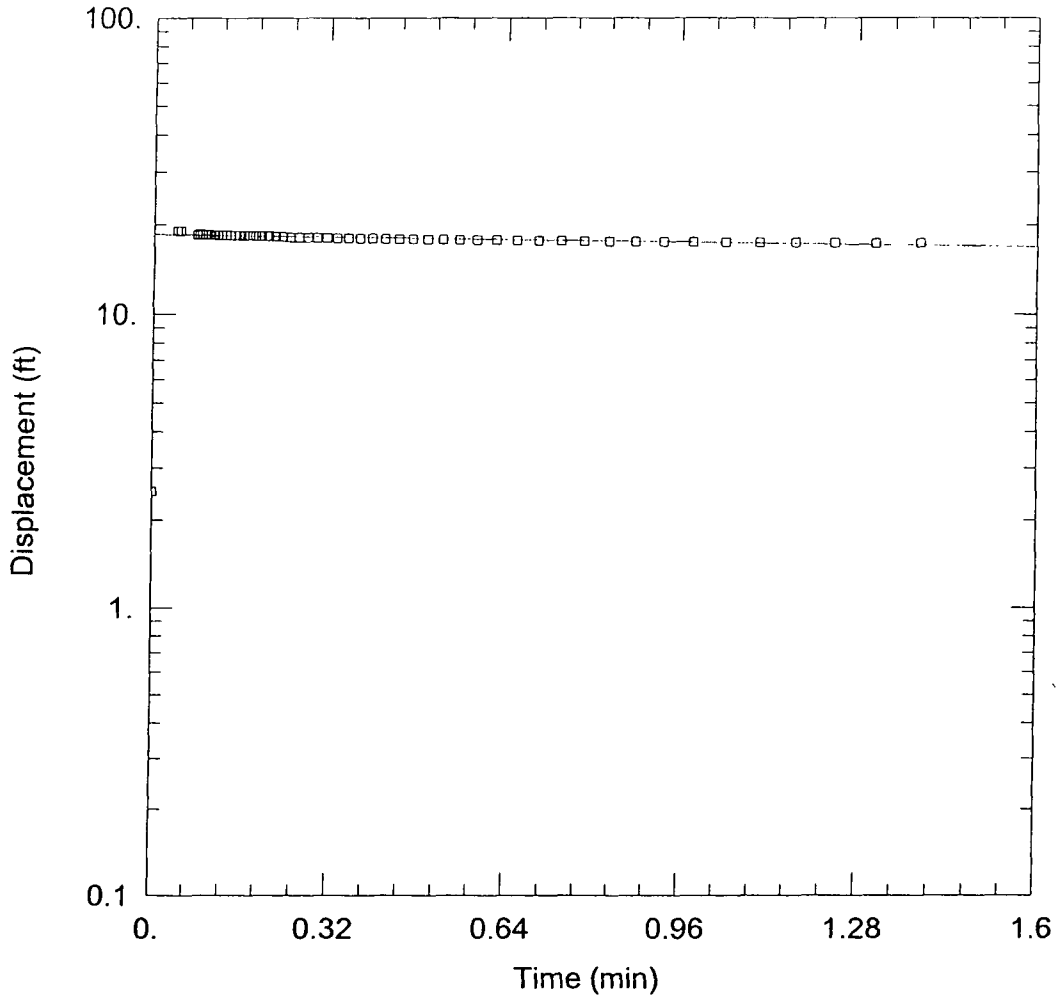
WELL DATA (11D_Rise)

Initial Displacement: 3.24 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.665 ft/day
y0 = 1.365 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\11D_Fall.aqt
Date: 05/21/03 Time: 08:06:19

PROJECT INFORMATION

Test Well: 11D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

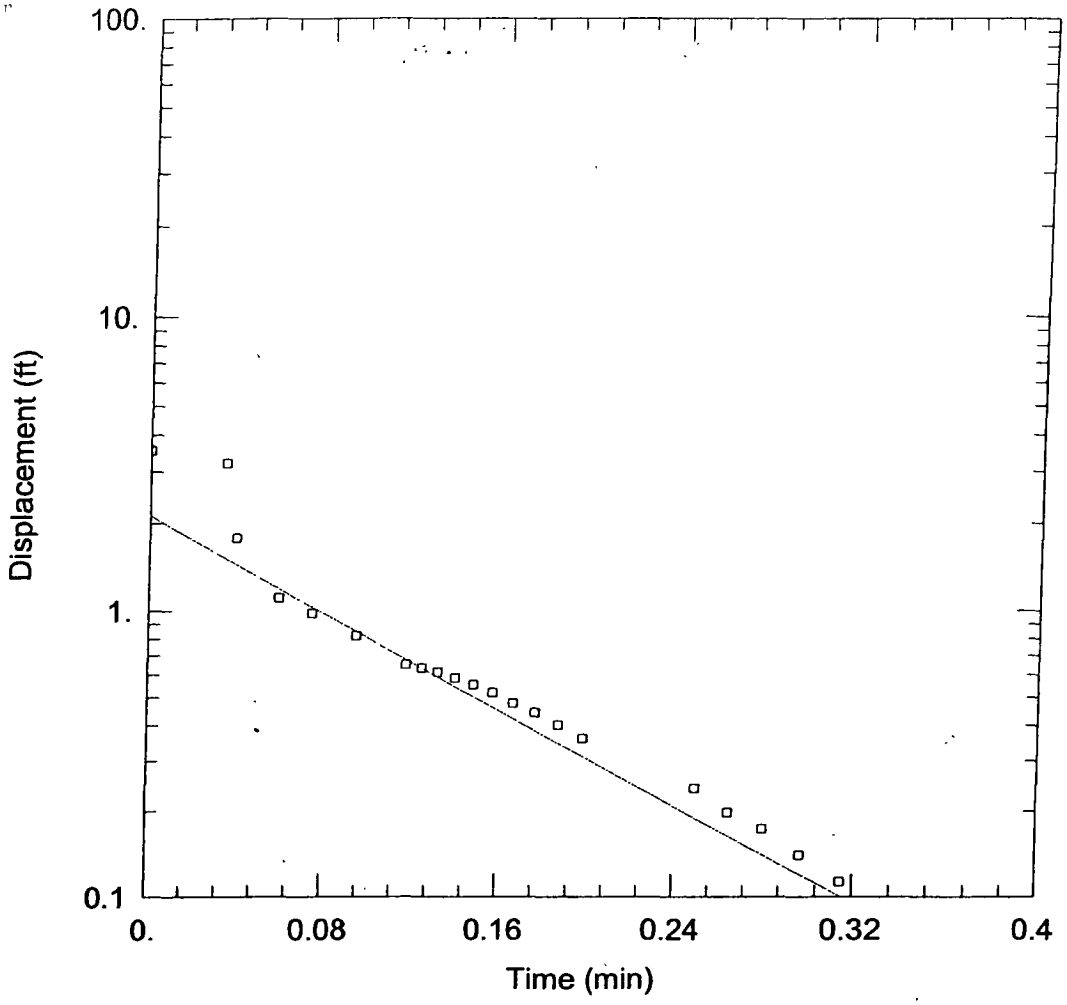
WELL DATA (11D_Fall)

Initial Displacement: 2.5 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.1077 ft/day
y0 = 18.54 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\12D_Rise.aqt
Date: 05/21/03 Time: 08:07:01

PROJECT INFORMATION

Test Well: 12D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

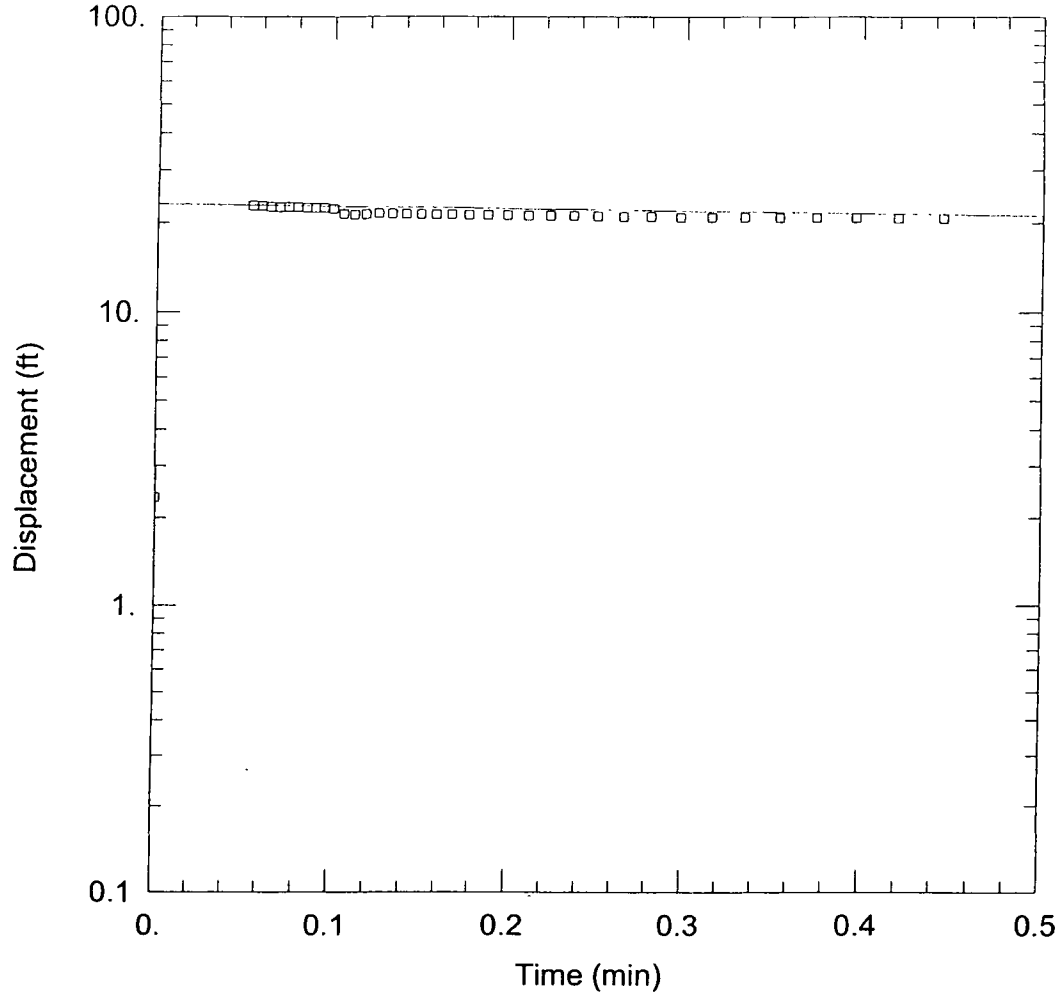
WELL DATA (12D_Rise)

Initial Displacement: 3.55 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 17.76 ft/day
y0 = 2.127 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\12D_Fall.aqt
Date: 05/21/03 Time: 08:07:24

PROJECT INFORMATION

Test Well: 12D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

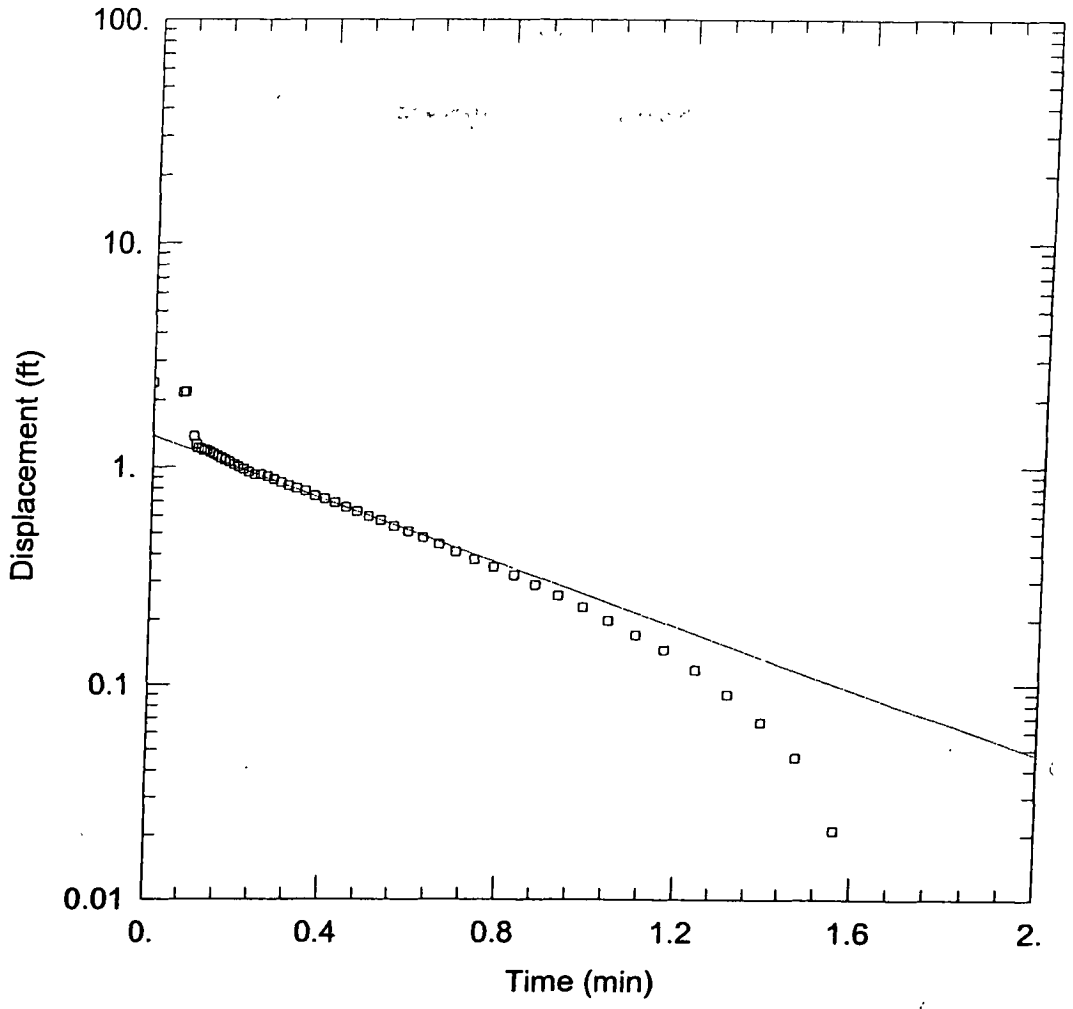
WELL DATA (12D_Fall)

Initial Displacement: 2.34 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.323 ft/day
y0 = 23.11 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\13D_Rise.aqt
Date: 05/21/03 Time: 08:07:46

PROJECT INFORMATION

Test Well: 13D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

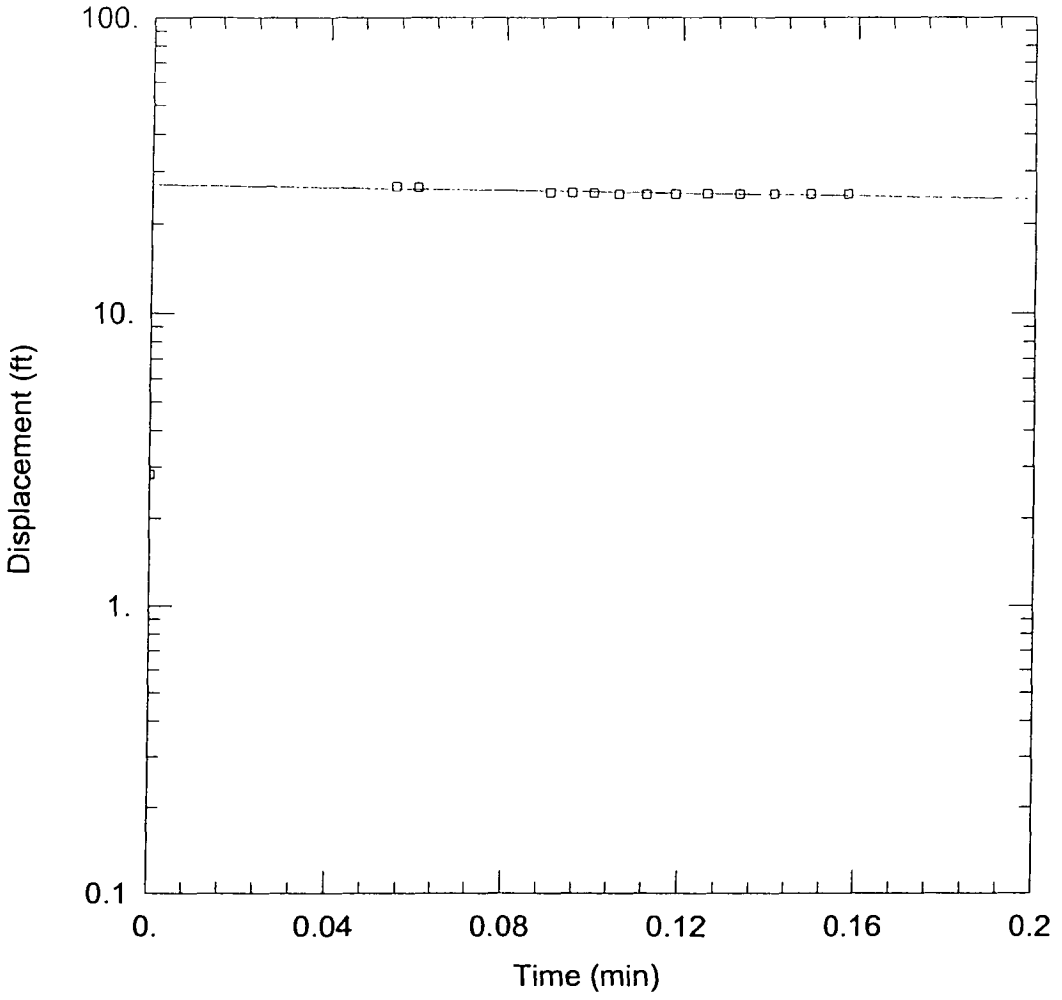
WELL DATA (13D_Rise)

Initial Displacement: 2.4 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.097 ft/day
y0 = 1.387 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\13D_Fall.aqt
Date: 05/21/03 Time: 08:08:06

PROJECT INFORMATION

Test Well: 13D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

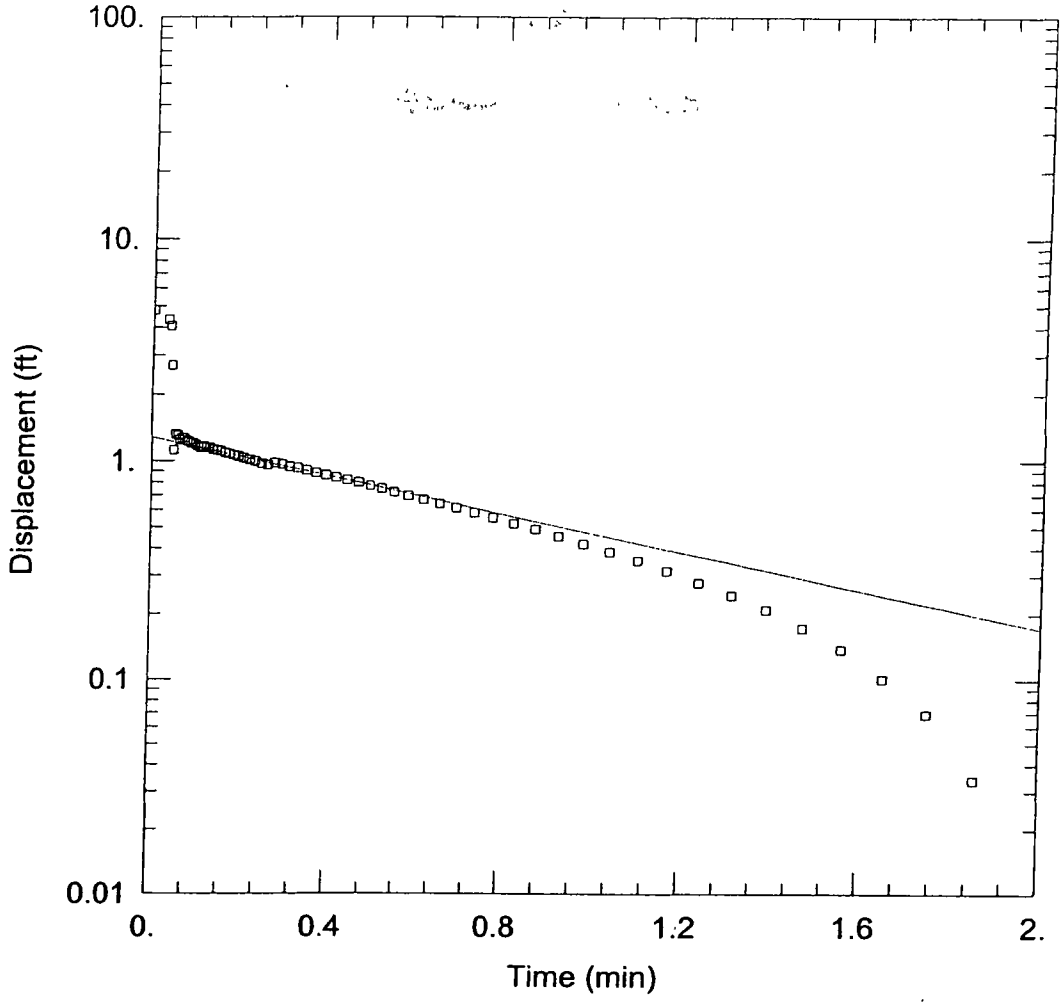
WELL DATA (13D_Fall)

Initial Displacement: 2.83 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.014 ft/day
y0 = 27.04 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\14D_Rise.aqt
Date: 05/21/03 Time: 08:08:22

PROJECT INFORMATION

Test Well: 14D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

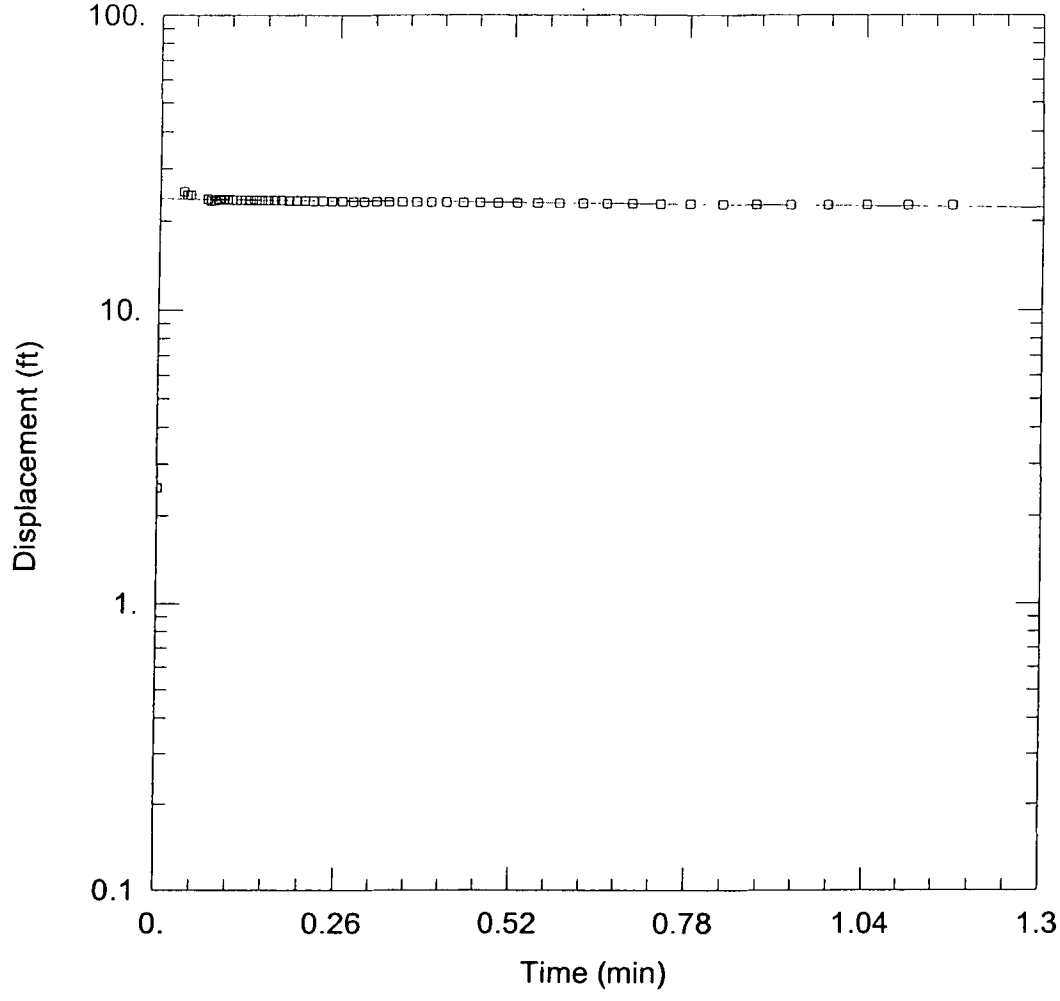
WELL DATA (14D_Rise)

Initial Displacement: 4.8 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.84 ft/day
y0 = 1.278 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\14D_Fall.aqt
Date: 05/21/03 Time: 08:08:39

PROJECT INFORMATION

Test Well: 14D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

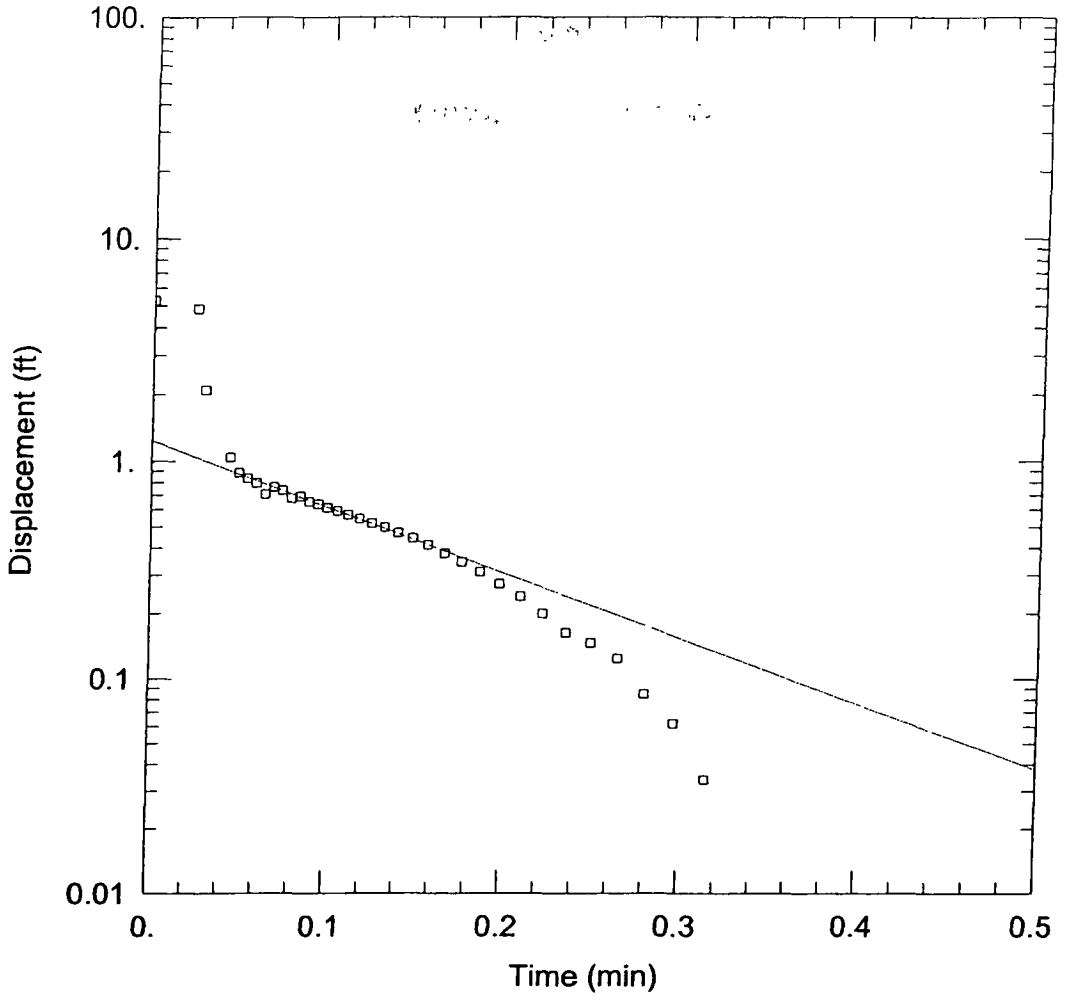
WELL DATA (14D_Fall)

Initial Displacement: 2.49 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.09669 ft/day
y0 = 23.74 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\15D_Rise.aqt
Date: 05/21/03 Time: 08:08:53

PROJECT INFORMATION

Test Well: 15D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

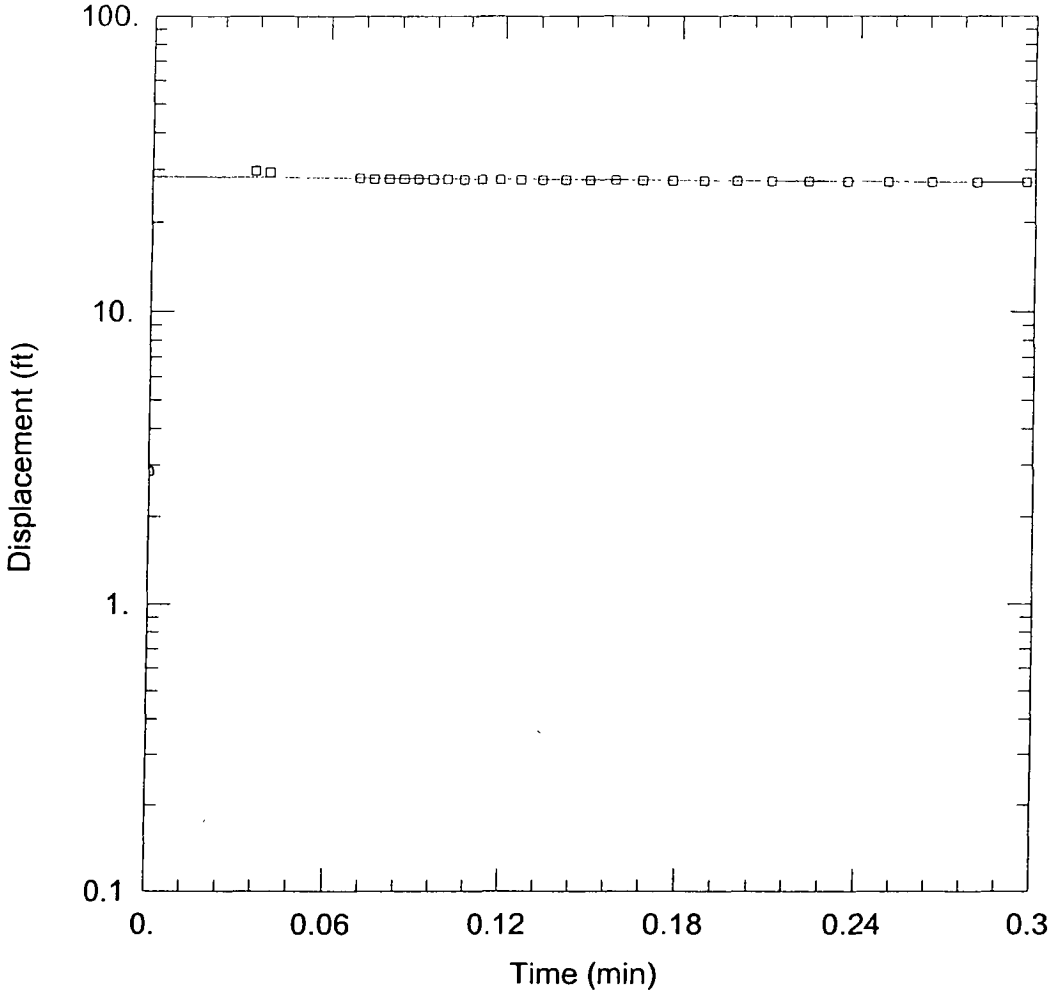
WELL DATA (15D_Rise)

Initial Displacement: 5.3 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 12.77 ft/day
y0 = 1.24 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\15D_Fall.aqt
Date: 05/21/03 Time: 08:09:06

PROJECT INFORMATION

Test Well: 15D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

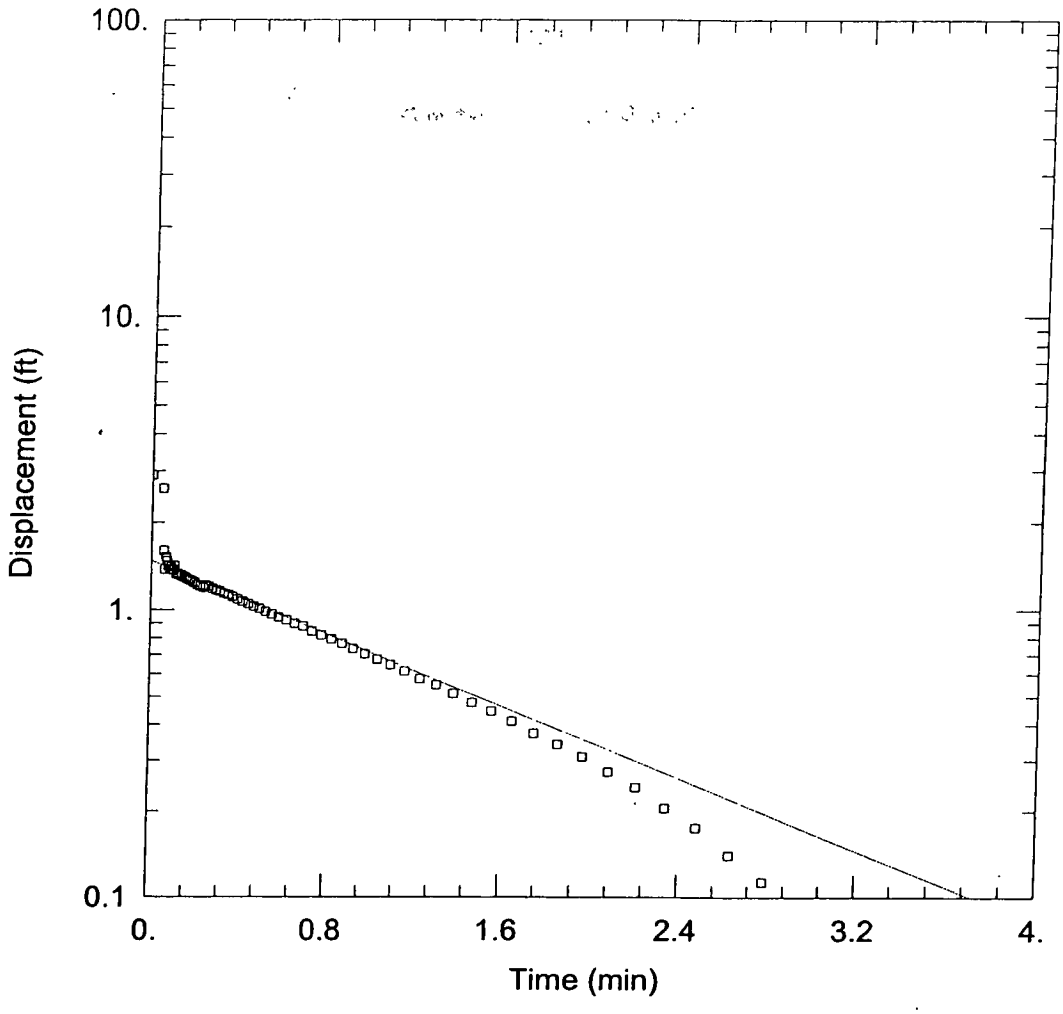
WELL DATA (15D_Fall)

Initial Displacement: 2.86 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.2837 ft/day
y0 = 28.46 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\17D_Rise.aqt
Date: 05/21/03 Time: 08:09:23

PROJECT INFORMATION

Test Well: 17D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

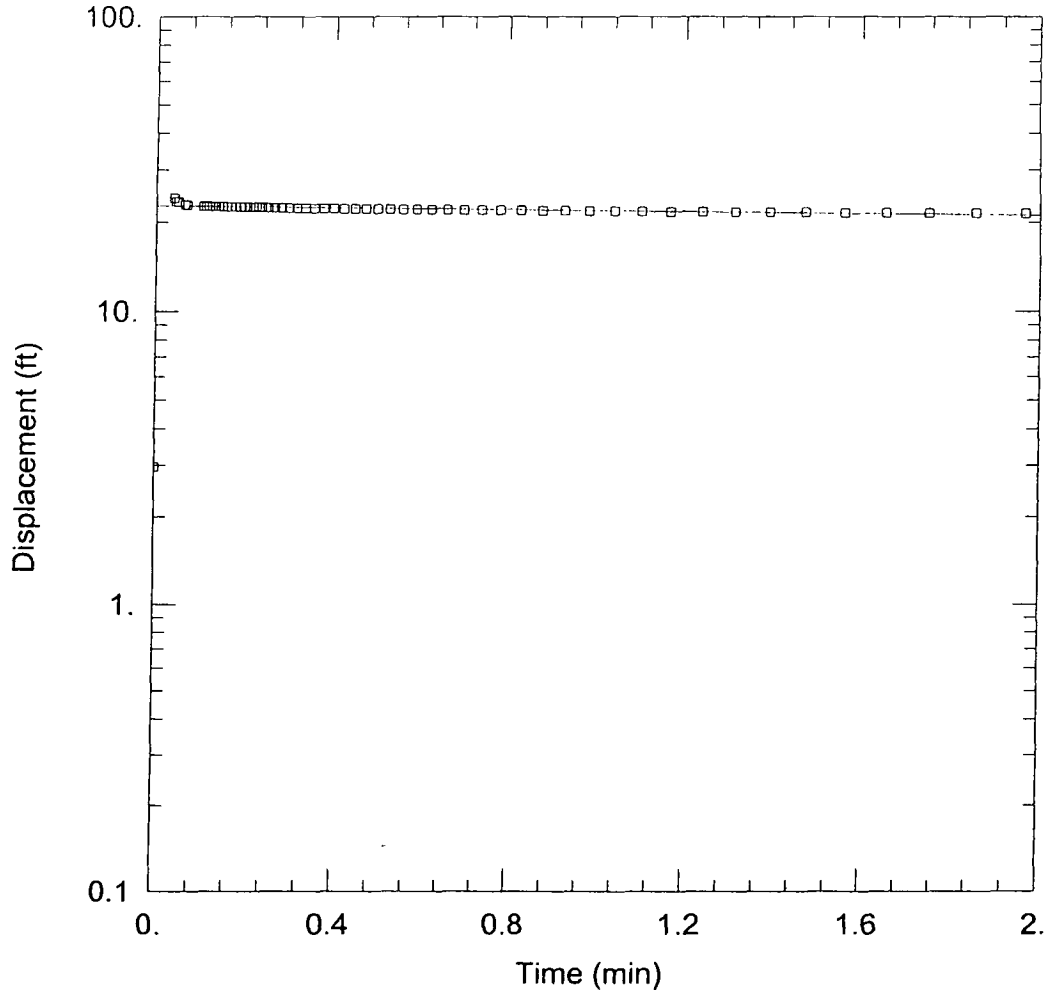
WELL DATA (17D_Rise)

Initial Displacement: 2.9 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.327 ft/day
y0 = 1.478 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\17D_Fall.aqt
Date: 05/21/03 Time: 08:09:39

PROJECT INFORMATION

Test Well: 17D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

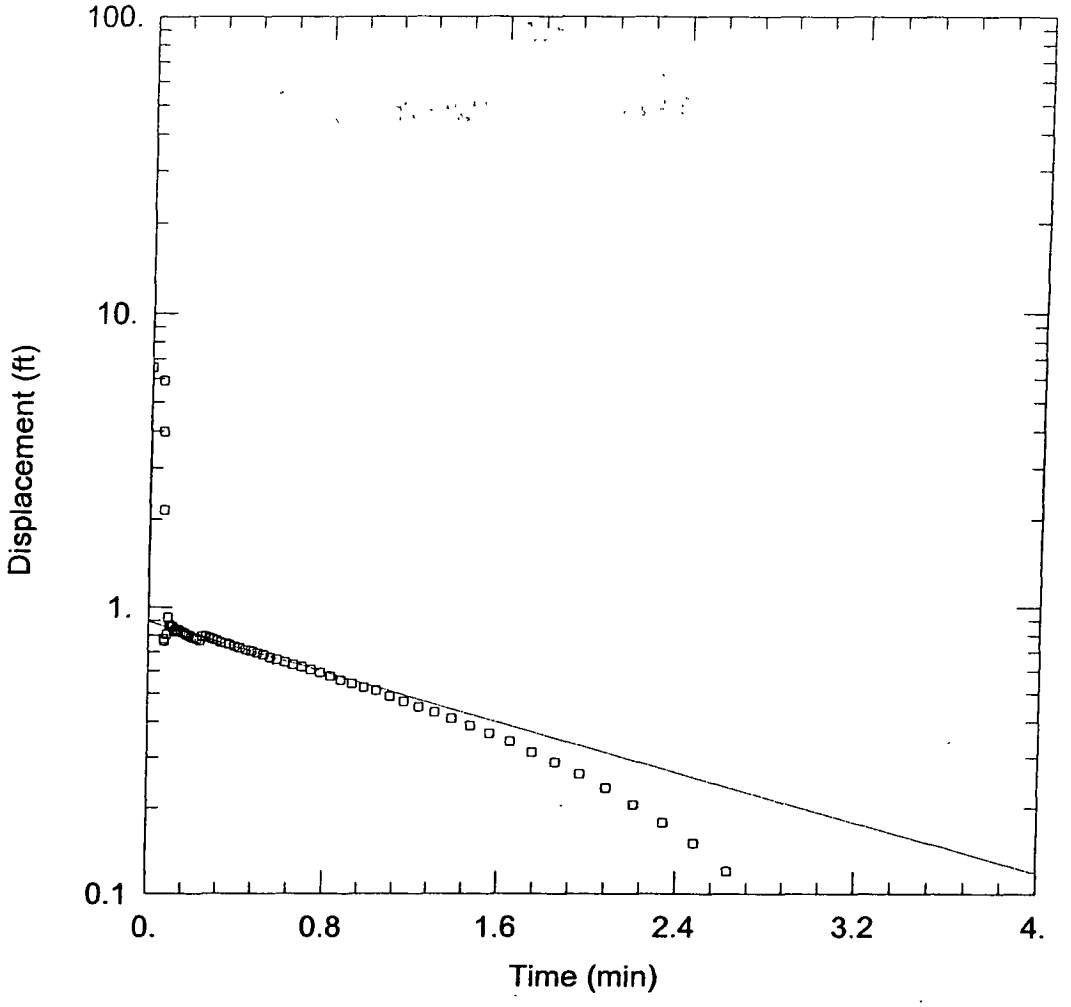
WELL DATA (17D_Fall)

Initial Displacement: 2.96 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.06838 ft/day
y0 = 22.72 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\18D_Rise.aqt
Date: 05/21/03 Time: 08:10:27

PROJECT INFORMATION

Test Well: 18D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

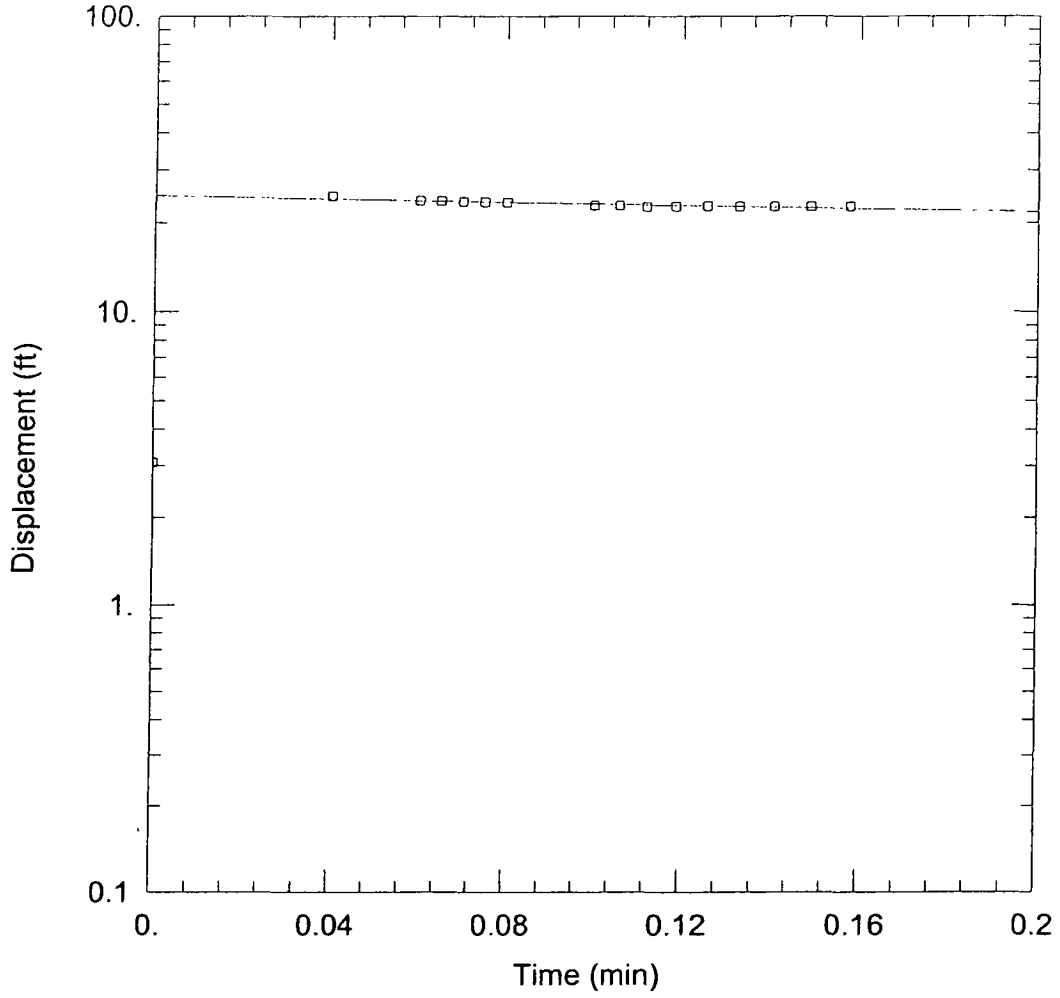
WELL DATA (18D_Rise)

Initial Displacement: 6.55 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.9265 ft/day
y0 = 0.8924 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\18D_Fall.aqt
Date: 05/21/03 Time: 08:10:42

PROJECT INFORMATION

Test Well: 18D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

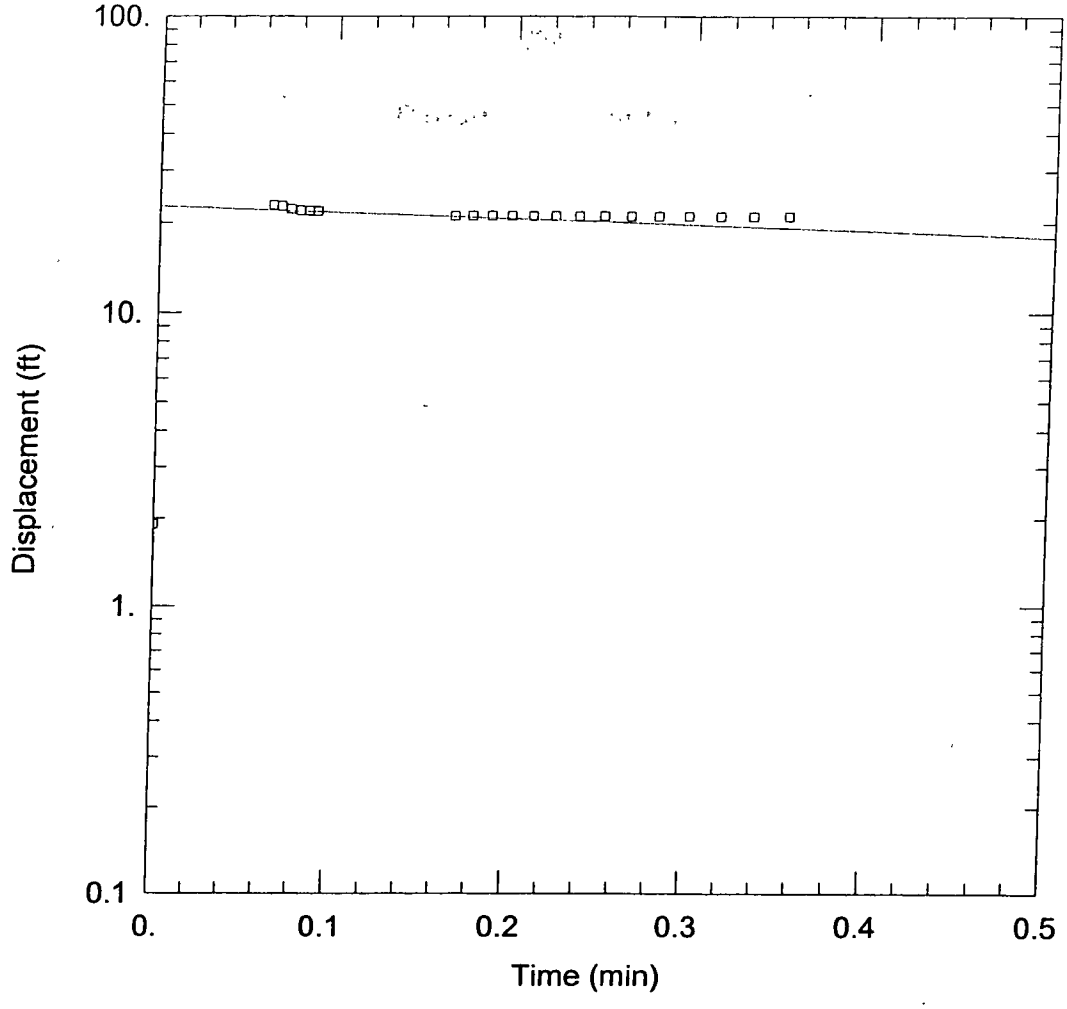
WELL DATA (18D_Fall)

Initial Displacement: 3.08 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.134 ft/day
y0 = 24.57 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\19D_Rise.aqt
Date: 05/21/03 Time: 08:10:56

PROJECT INFORMATION

Test Well: 19D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

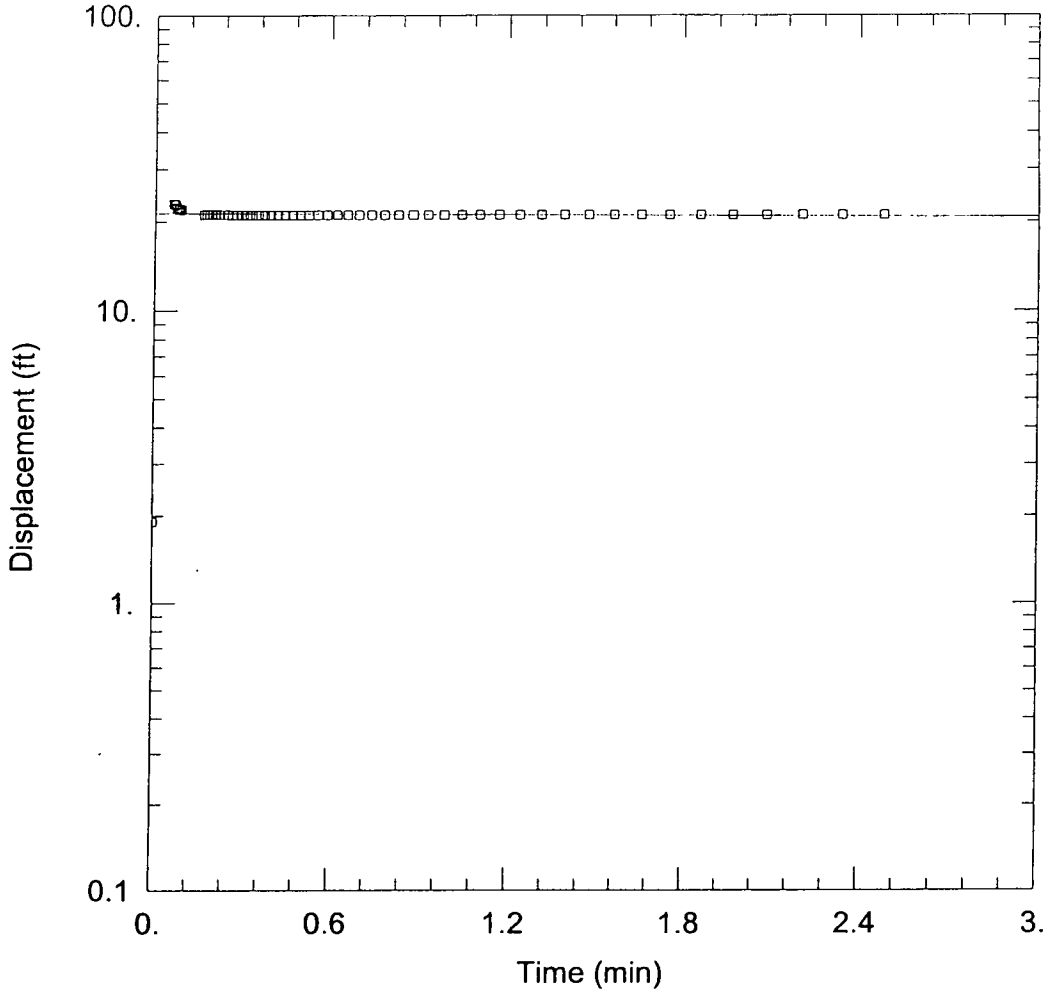
WELL DATA (19D_Fall)

Initial Displacement: 1.91 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.8733 ft/day
y0 = 22.72 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\19D_Fall.aqt
Date: 05/21/03 Time: 08:11:10

PROJECT INFORMATION

Test Well: 19D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

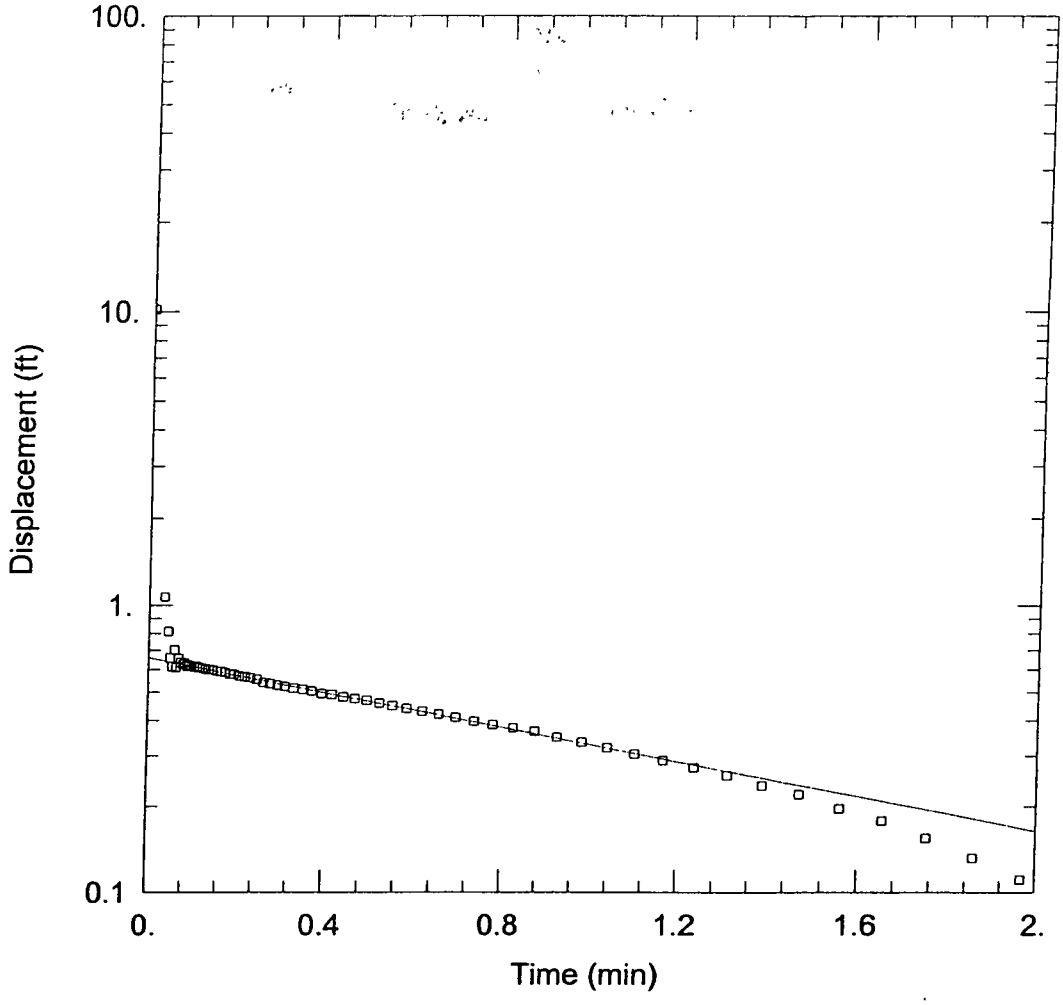
WELL DATA (19D_Fall)

Initial Displacement: 1.91 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.02099 ft/day
y0 = 21.36 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\20D_Rise.aqt
Date: 05/21/03 Time: 08:11:25

PROJECT INFORMATION

Test Well: 20D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

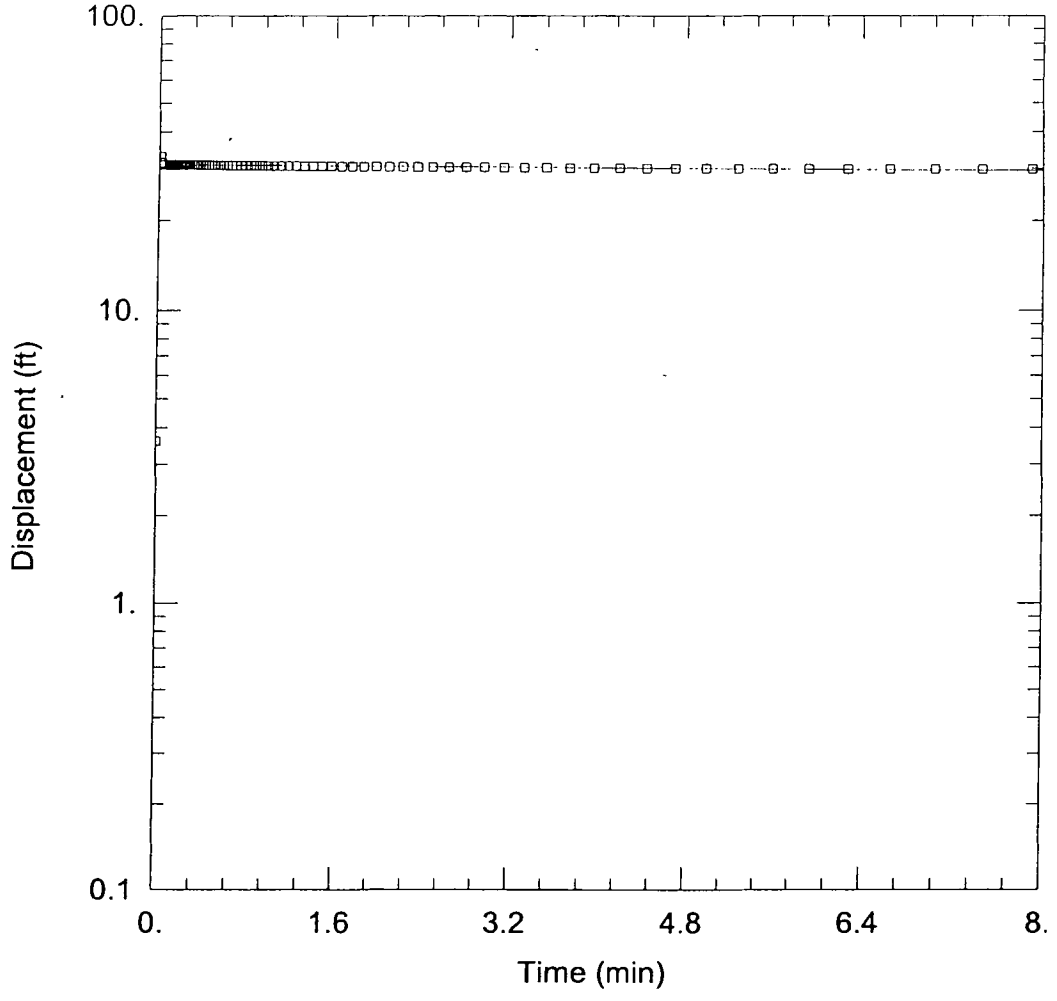
WELL DATA (20D_Rise)

Initial Displacement: 10.17 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.275 ft/day
y0 = 0.6596 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\20D_Fall.aqt
Date: 05/21/03 Time: 08:11:40

PROJECT INFORMATION

Test Well: 20D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

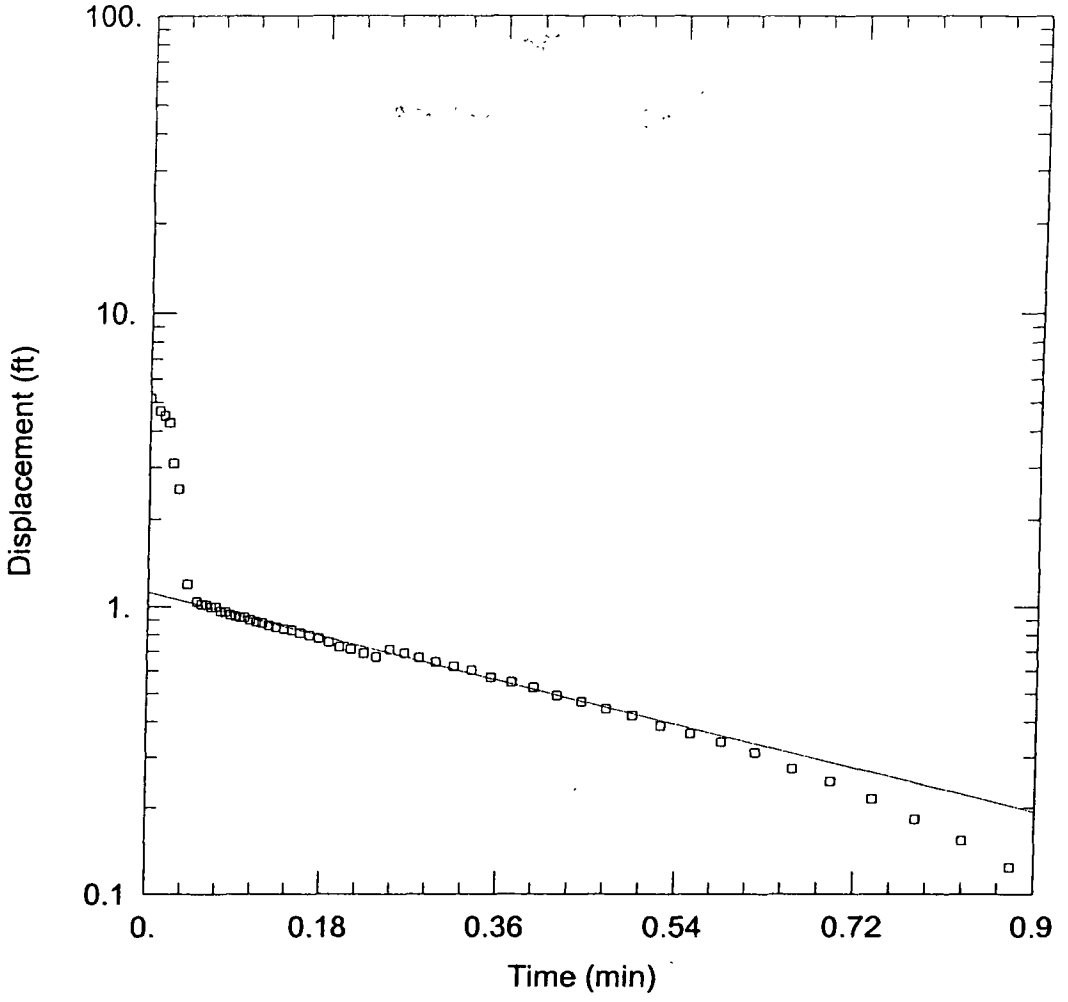
WELL DATA (20D_Fall)

Initial Displacement: 3.6 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.01075 ft/day
y0 = 30.95 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\21D_Rise.aqt
Date: 05/21/03 Time: 08:11:56

PROJECT INFORMATION

Test Well: 21D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

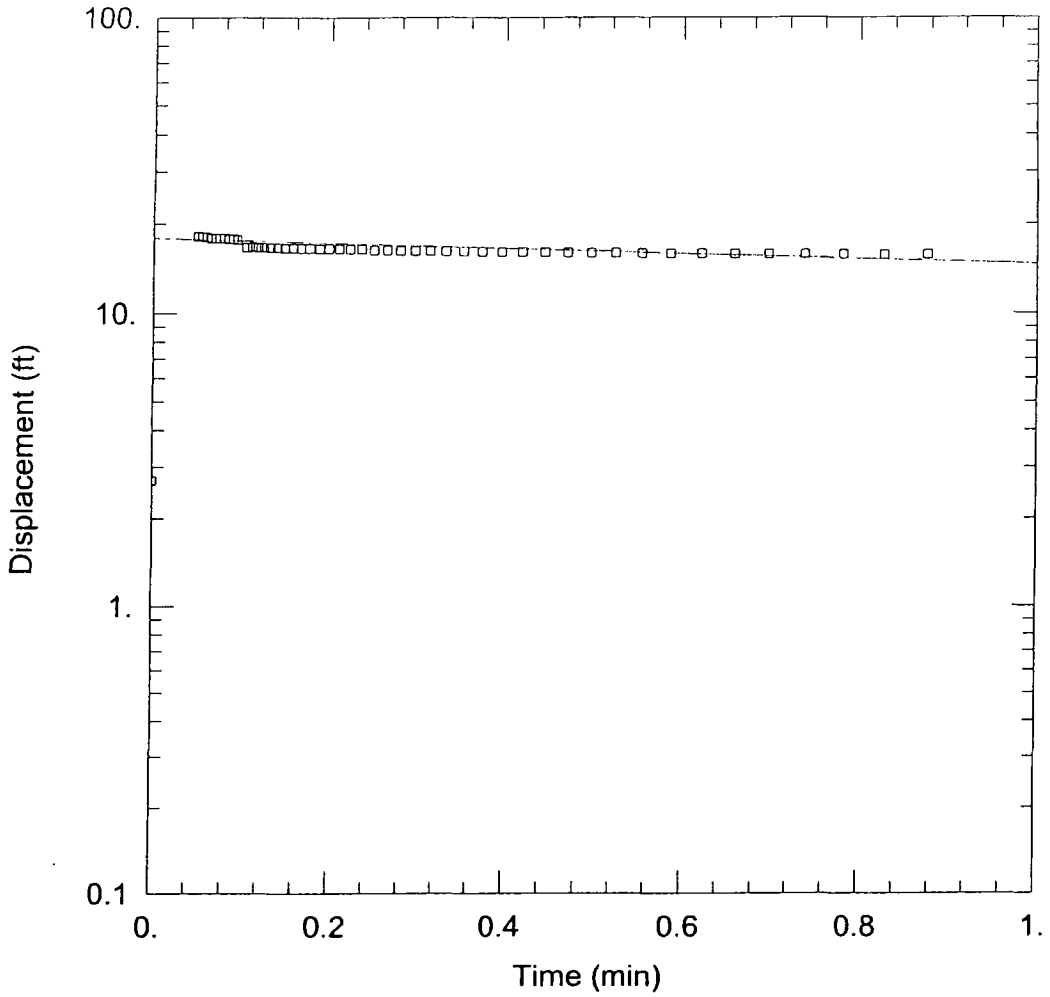
WELL DATA (21D_Rise)

Initial Displacement: 5.16 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.582 ft/day
y0 = 1.124 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\21D_Fall.aqt
Date: 05/21/03 Time: 08:12:09

PROJECT INFORMATION

Test Well: 21D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

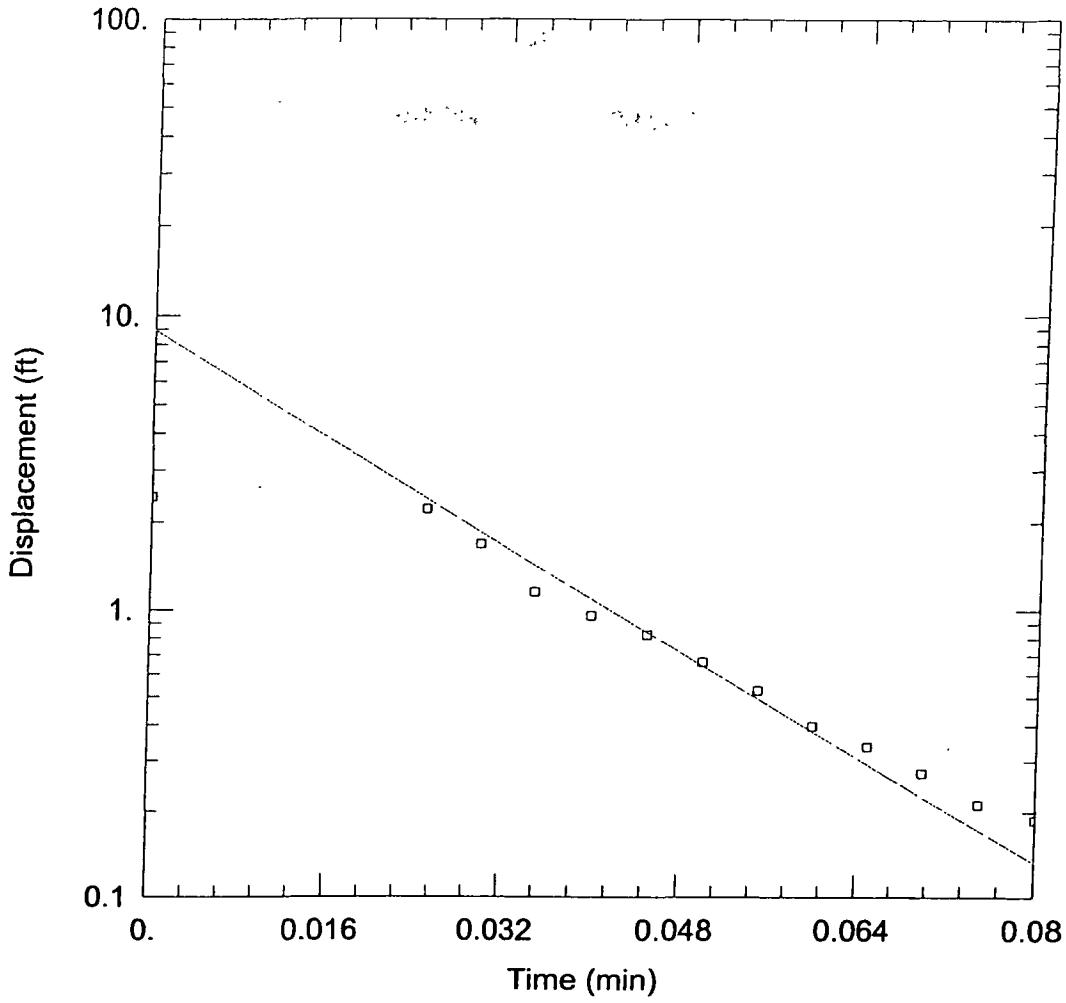
WELL DATA (21D_Fall)

Initial Displacement: 2.7 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.3724 ft/day
y0 = 17.92 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\22D_Rise.aqt
Date: 05/21/03 Time: 08:12:28

PROJECT INFORMATION

Test Well: 22D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

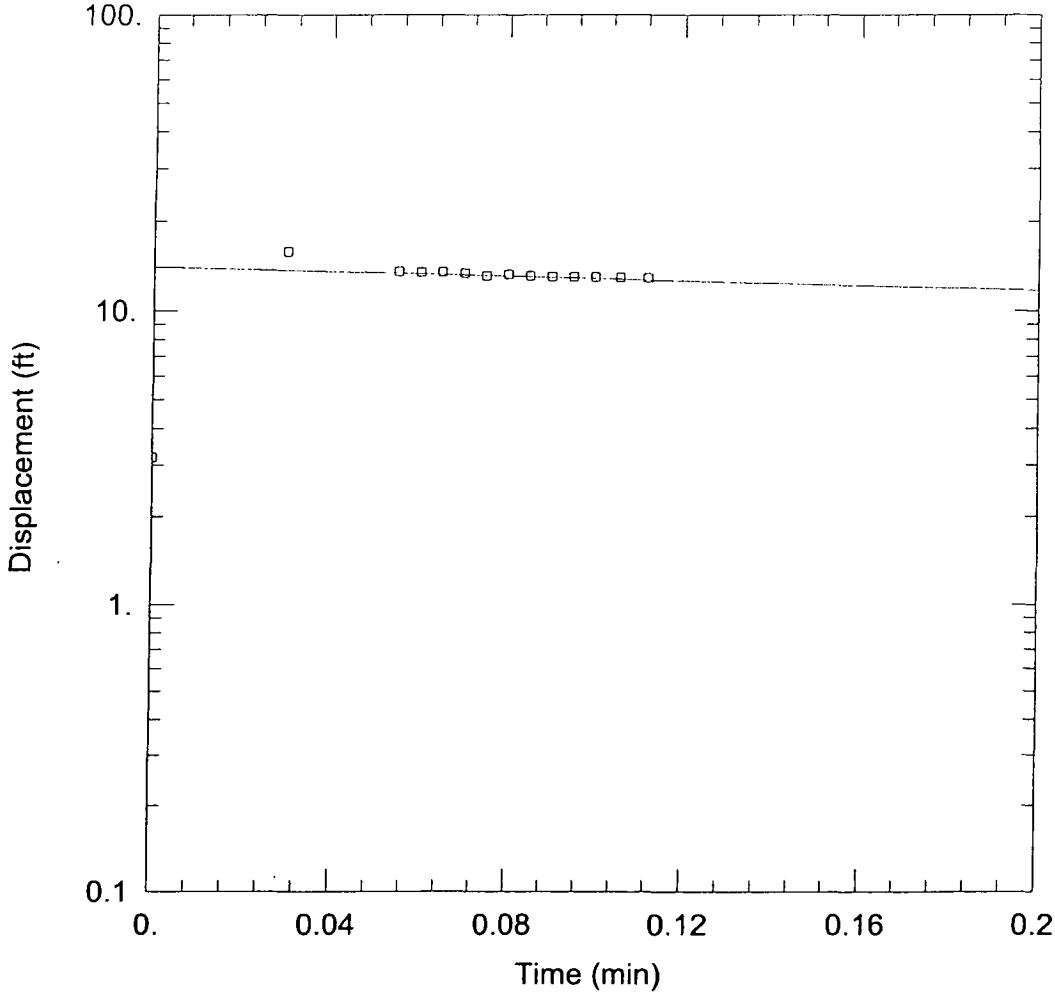
WELL DATA (22D_Rise)

Initial Displacement: 2.44 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 96.36 ft/day
y0 = 8.923 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\22D_Fall.aqt
Date: 05/21/03 Time: 08:12:43

PROJECT INFORMATION

Test Well: 22D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

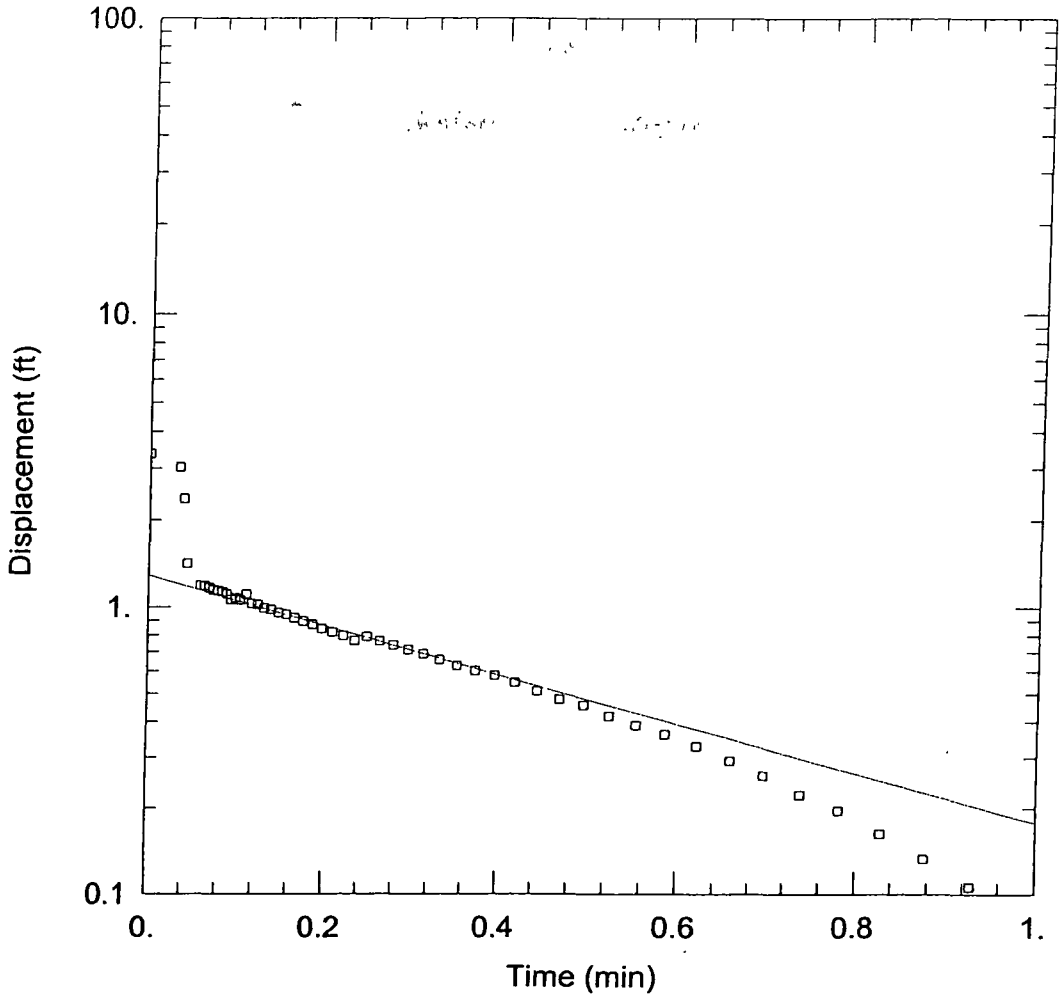
WELL DATA (22D_Fall)

Initial Displacement: 3.19 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.666 ft/day
y0 = 14.05 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\23D_Rise.aqt
Date: 05/21/03 Time: 08:12:54

PROJECT INFORMATION

Test Well: 23D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

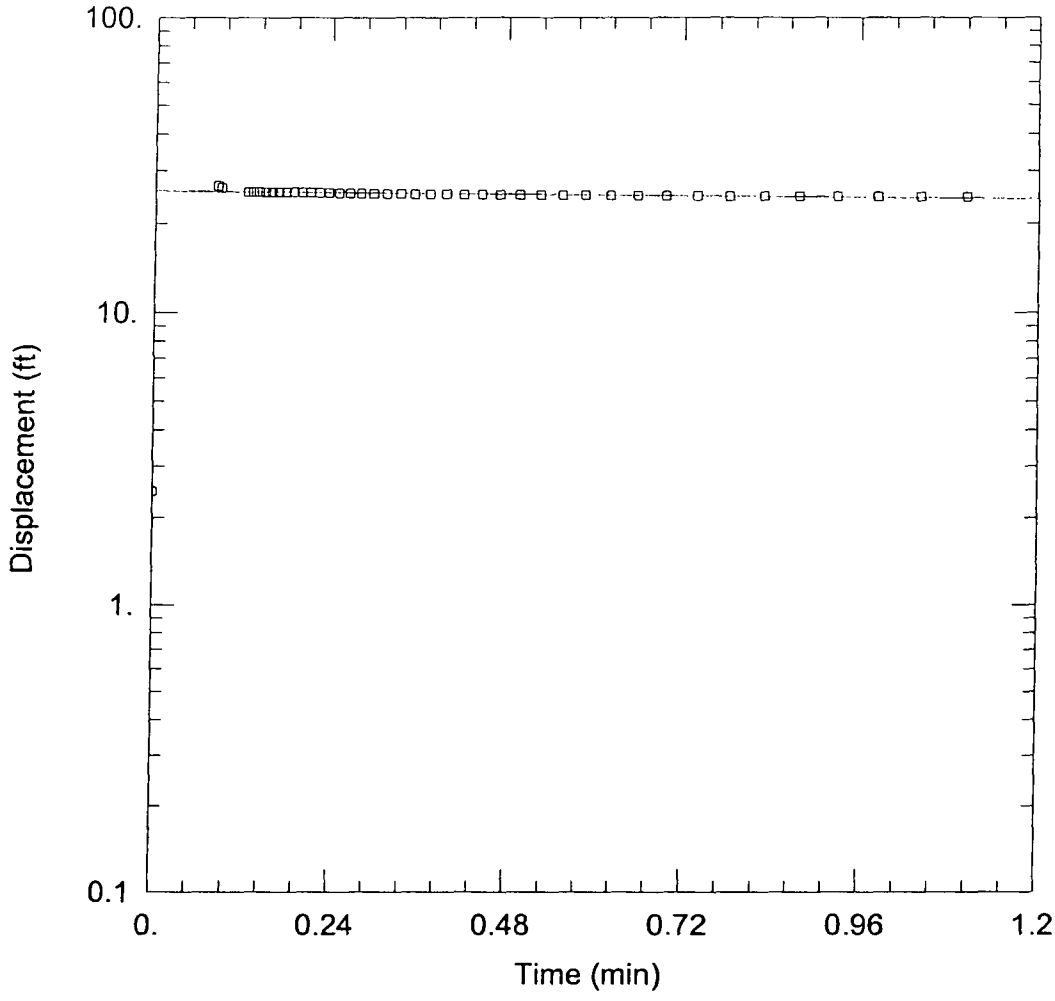
WELL DATA (23D_Rise)

Initial Displacement: 3.37 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.633 ft/day
y0 = 1.288 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\23D_Fall.aqt
Date: 05/21/03 Time: 08:13:08

PROJECT INFORMATION

Test Well: 23D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

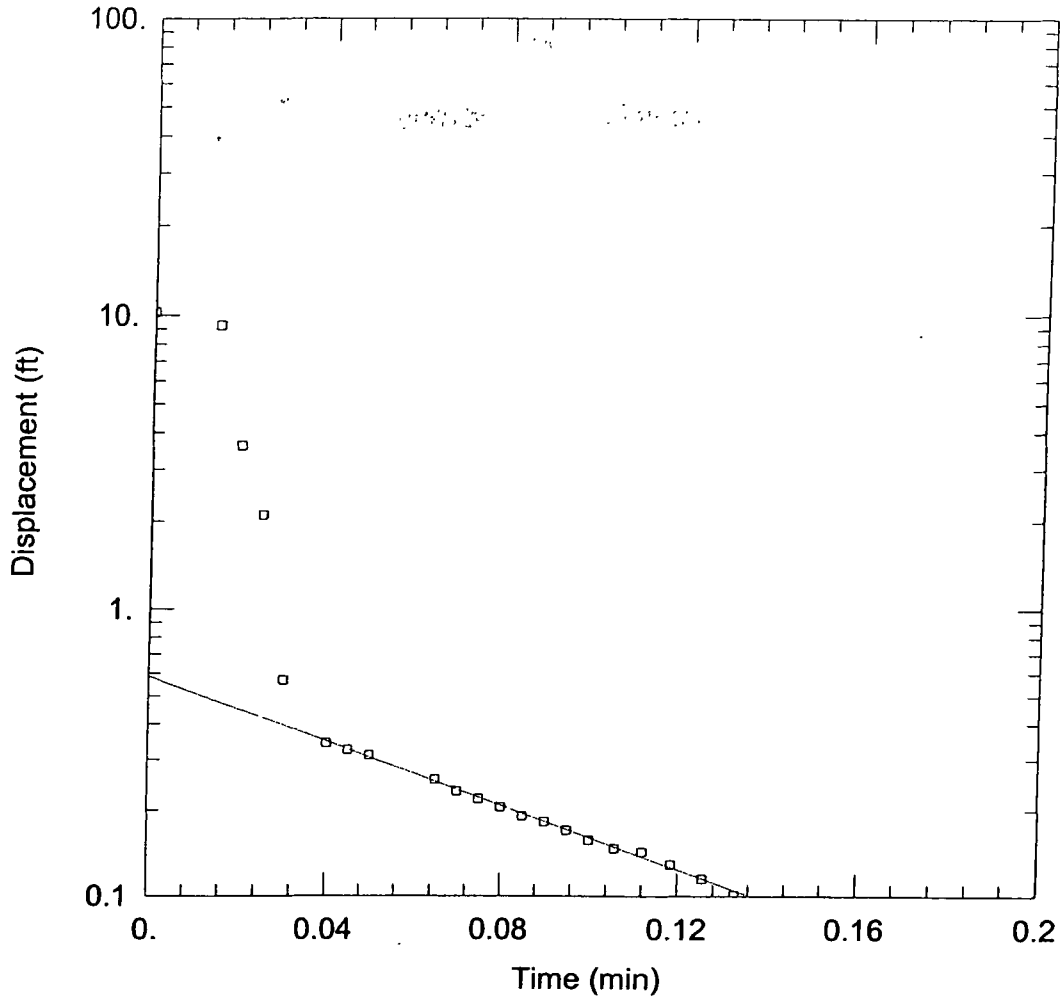
WELL DATA (23D_Fall)

Initial Displacement: 2.46 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.09328 ft/day
y0 = 25.72 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\24D_Rise.aqt
Date: 05/21/03 Time: 08:13:23

PROJECT INFORMATION

Test Well: 24D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

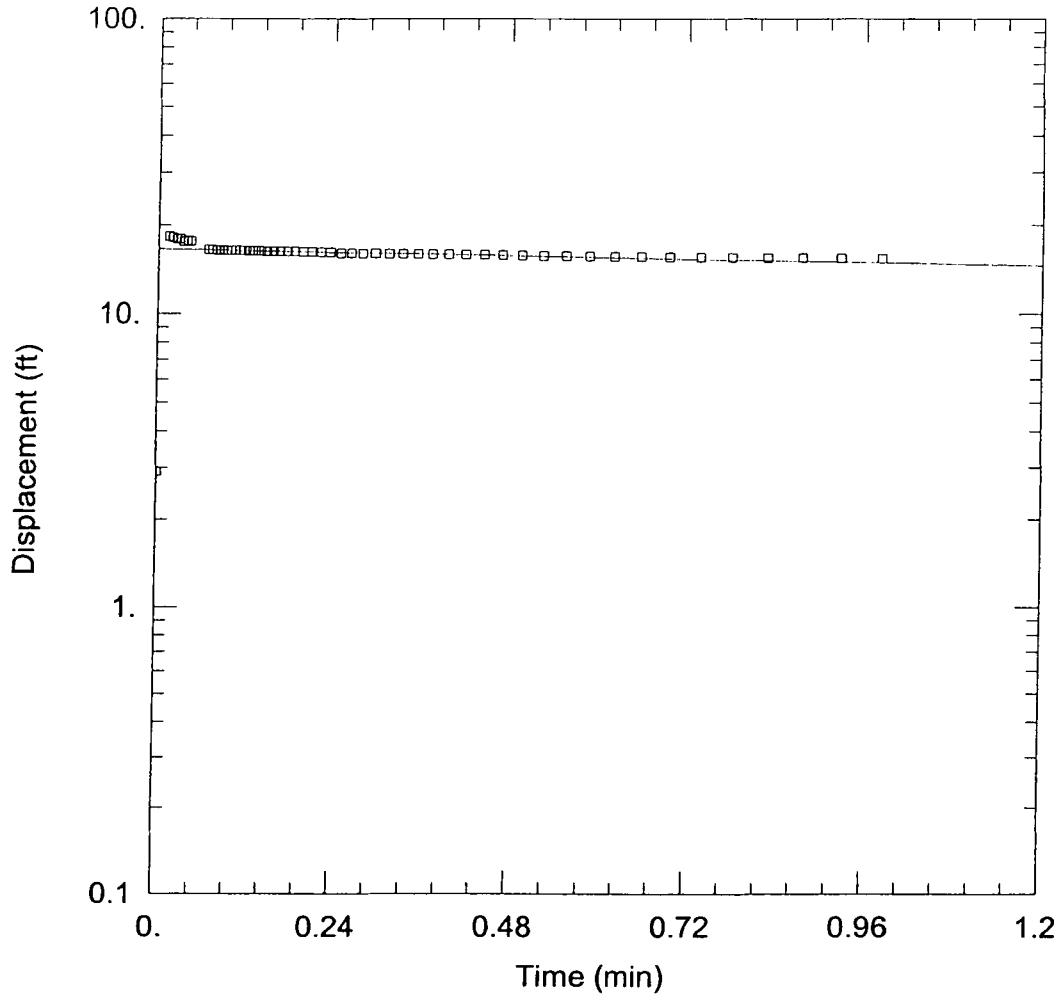
WELL DATA (24D_Rise)

Initial Displacement: 10.25 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 23.74 ft/day
y0 = 0.5861 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\24D_Fall.aqt
Date: 05/21/03 Time: 08:13:36

PROJECT INFORMATION

Test Well: 24D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

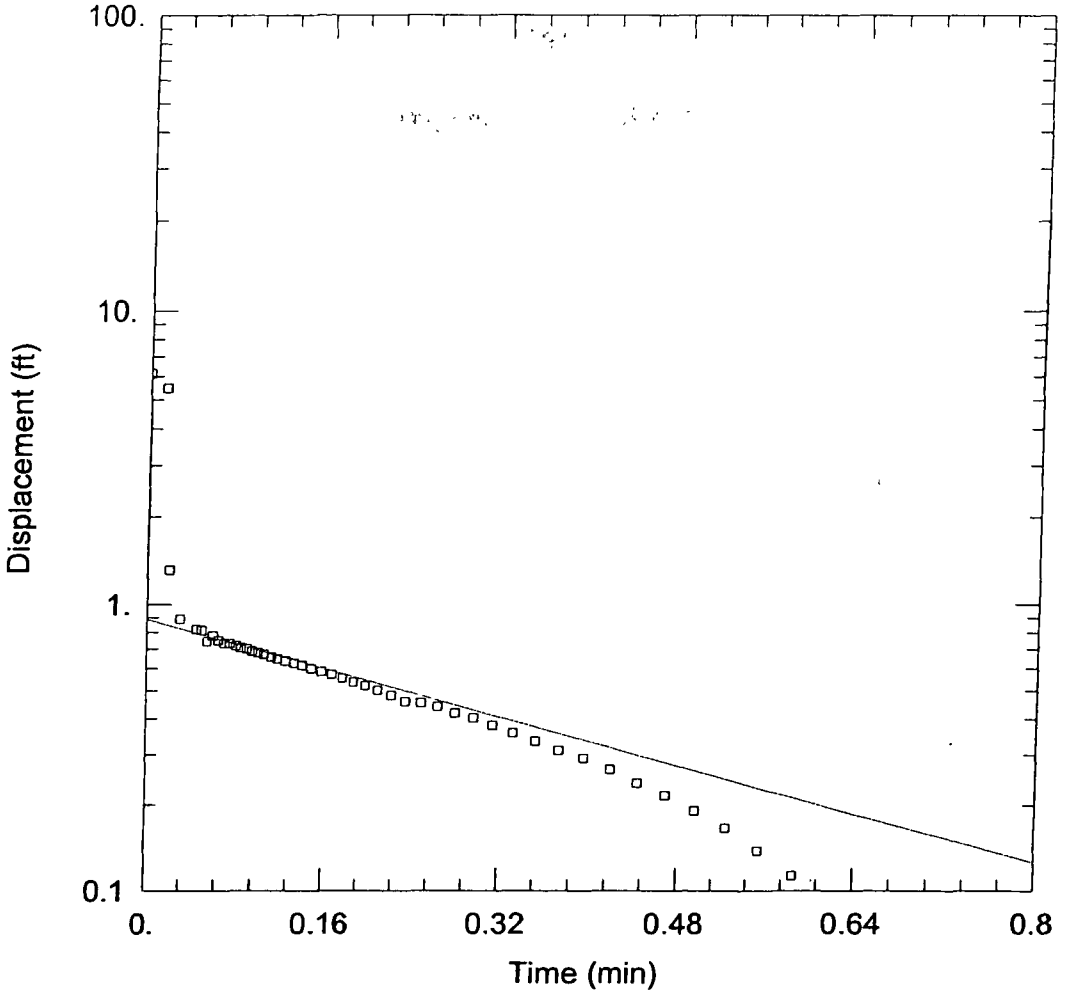
WELL DATA (24D_Fall)

Initial Displacement: 2.91 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.1954 ft/day
y0 = 16.59 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\25D_Rise.aqt
Date: 05/21/03 Time: 08:13:49

PROJECT INFORMATION

Test Well: 25D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

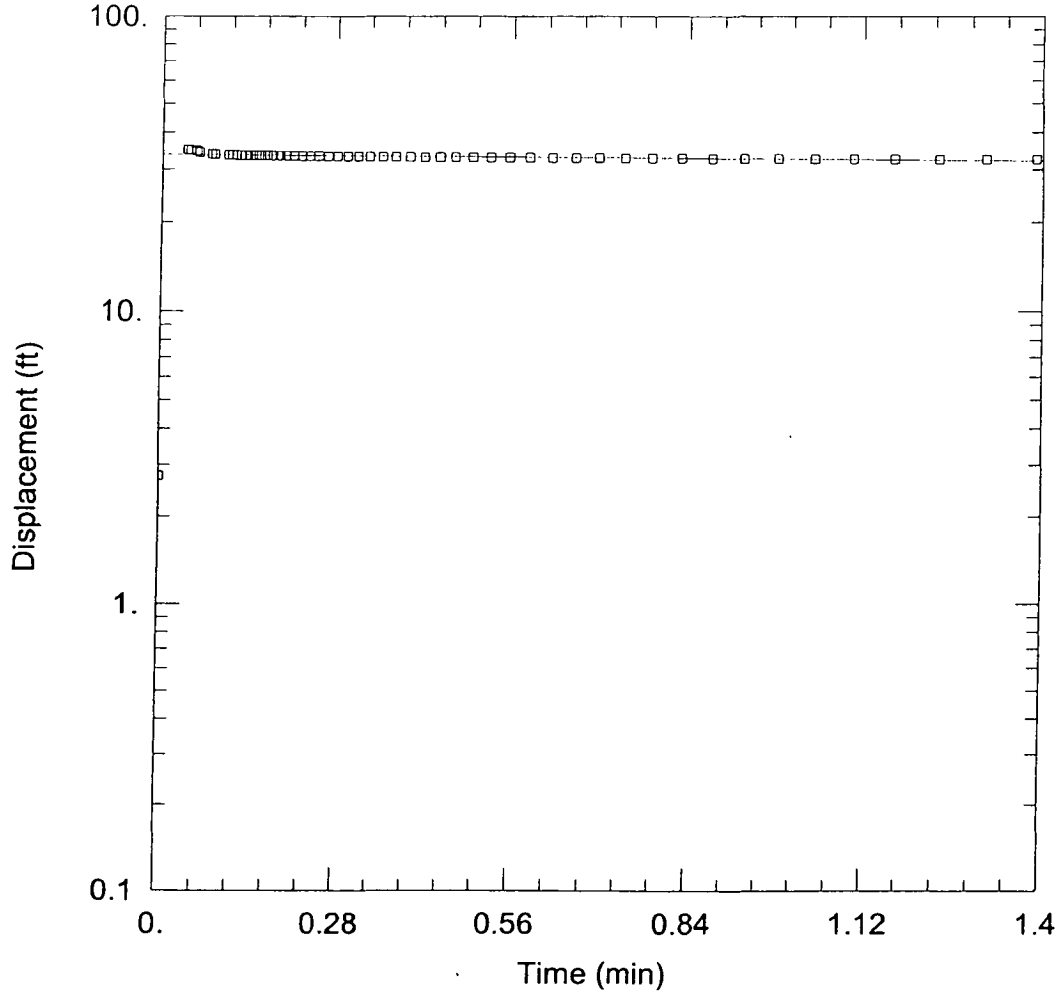
WELL DATA (25D_Rise)

Initial Displacement: 6.15 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 4.48 ft/day
y0 = 0.8874 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\25D_Fall.aqt
Date: 05/21/03 Time: 08:14:02

PROJECT INFORMATION

Test Well: 25D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

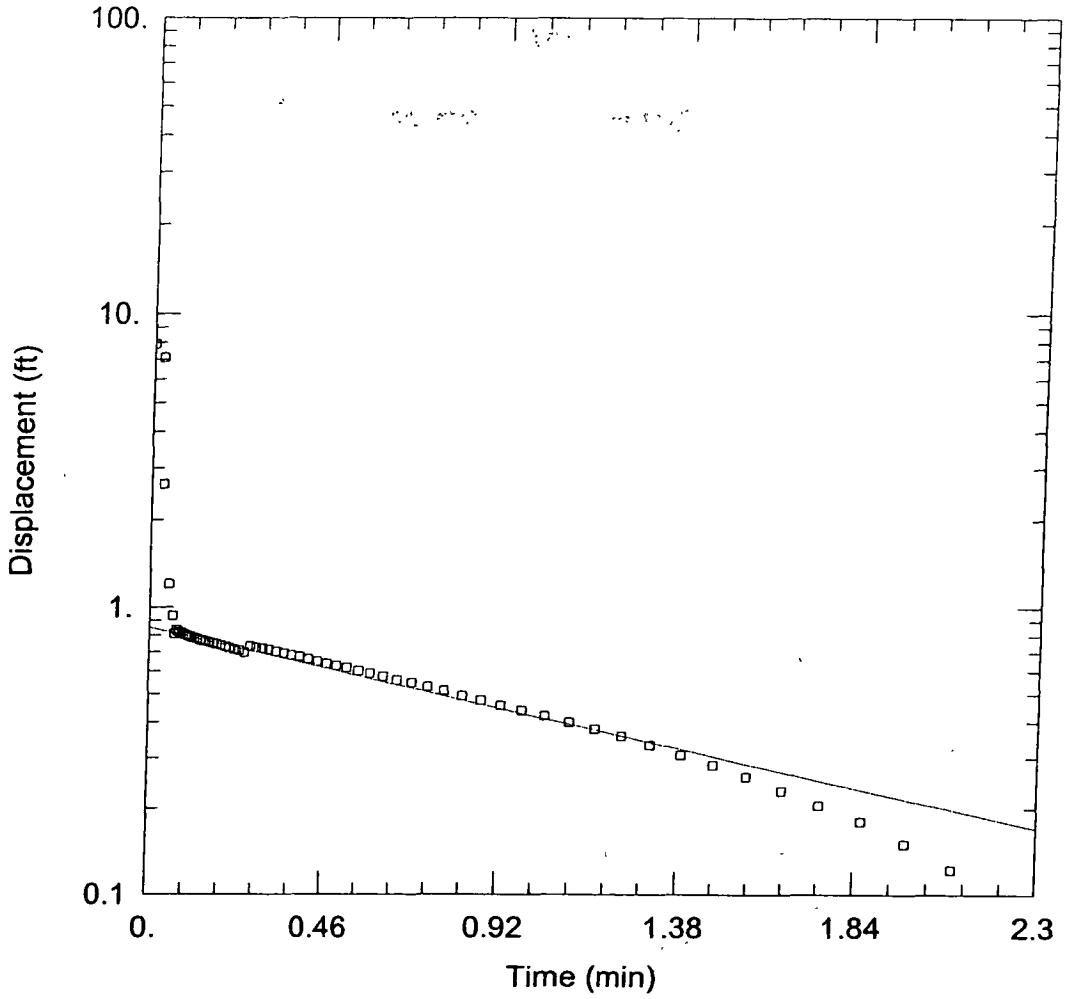
WELL DATA (25D_Fall)

Initial Displacement: 2.76 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.06086 ft/day
y0 = 33.68 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\26D_Rise.aqt
Date: 05/21/03 Time: 08:14:15

PROJECT INFORMATION

Test Well: 26D_Rise

AQUIFER DATA

Saturated Thickness: 9. ft
Anisotropy Ratio (Kz/Kr): 1.

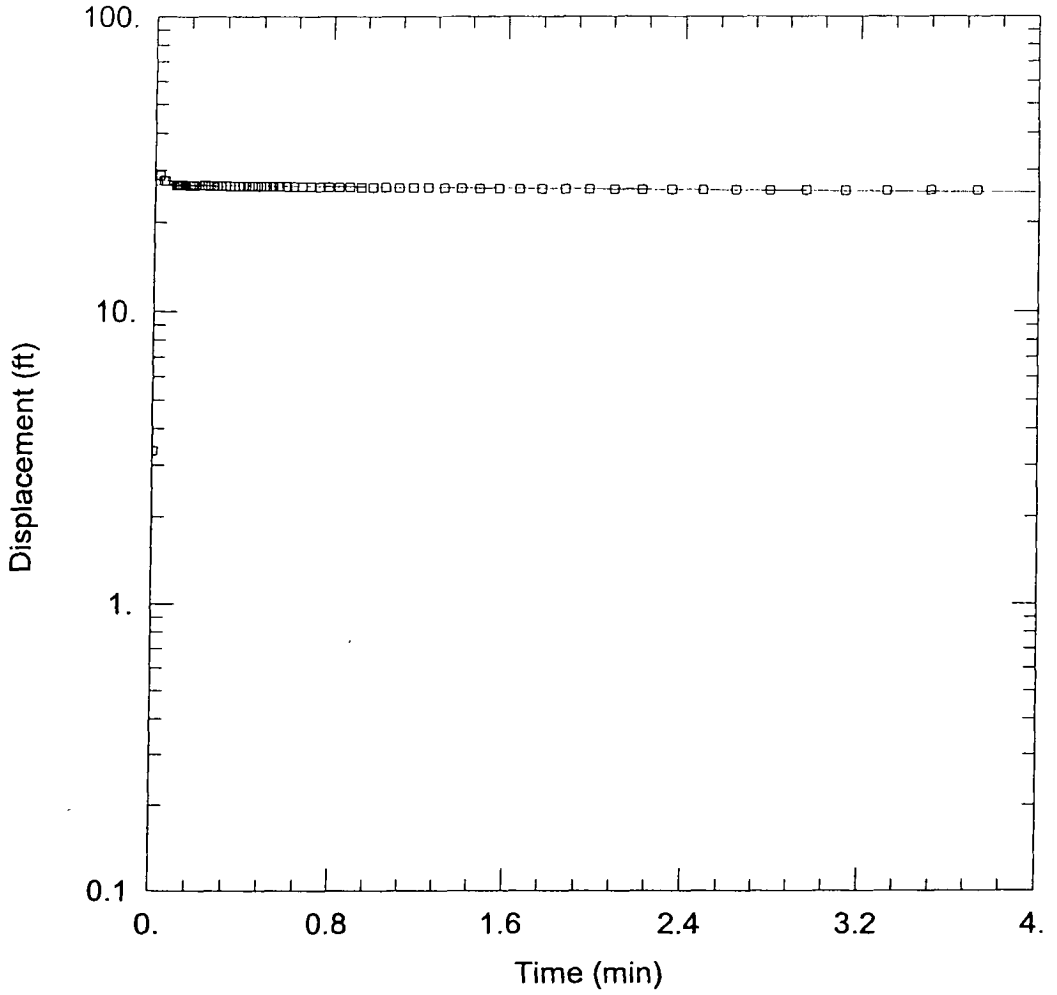
WELL DATA (26D_Rise)

Initial Displacement: 7.89 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 9. ft
Total Well Penetration Depth: 9. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.394 ft/day
y0 = 0.8516 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase I RI Slug Tests\AQTESolv Files\26D_Fall.aqt
Date: 05/21/03 Time: 08:14:29

PROJECT INFORMATION

Test Well: 26D_Fall

AQUIFER DATA

Saturated Thickness: 9. ft
Anisotropy Ratio (Kz/Kr): 1.

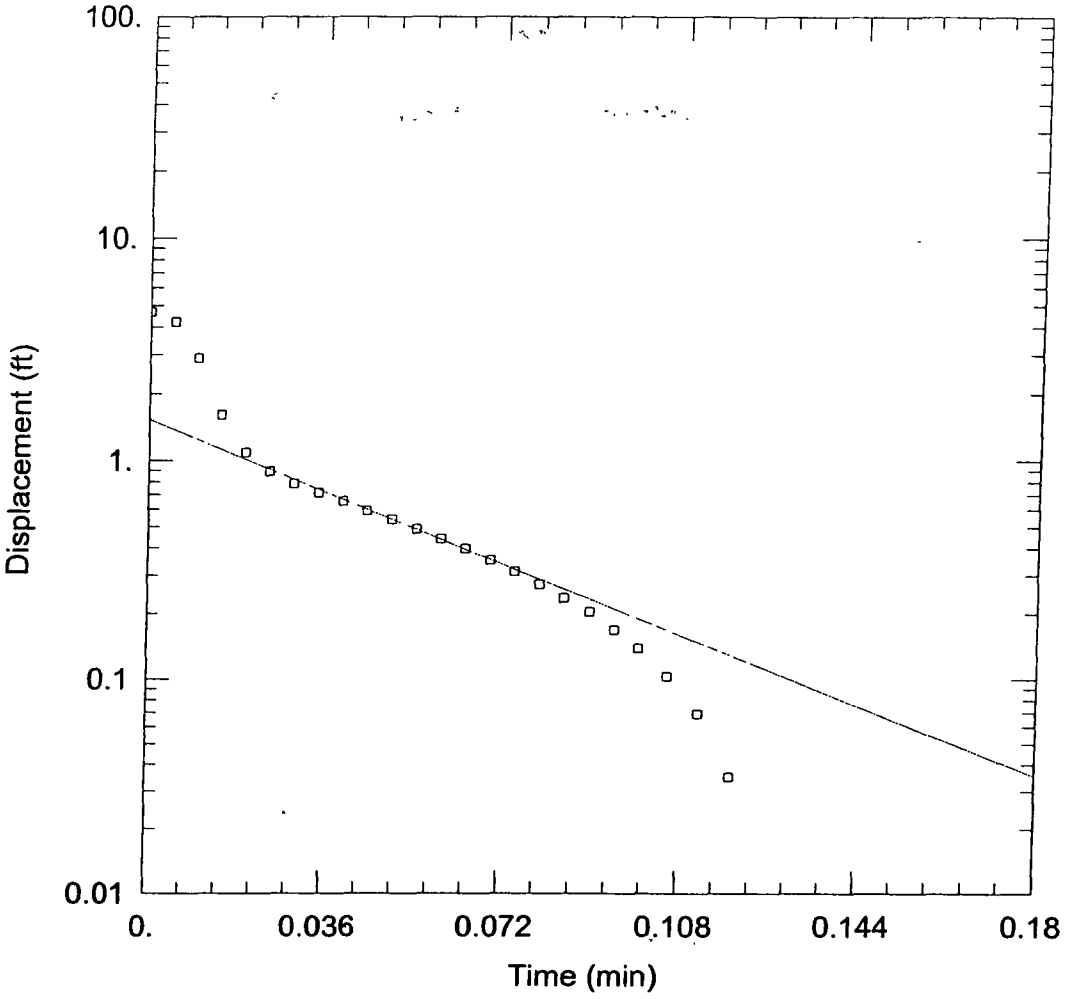
WELL DATA (26D_Fall)

Initial Displacement: 3.36 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 9. ft
Total Well Penetration Depth: 9. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.03038 ft/day
y0 = 26.74 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase II RI Slug tests\AqteSolv_Slug\27D_Rise.aqt
Date: 05/20/03 Time: 16:00:37

PROJECT INFORMATION

Test Well: 27D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

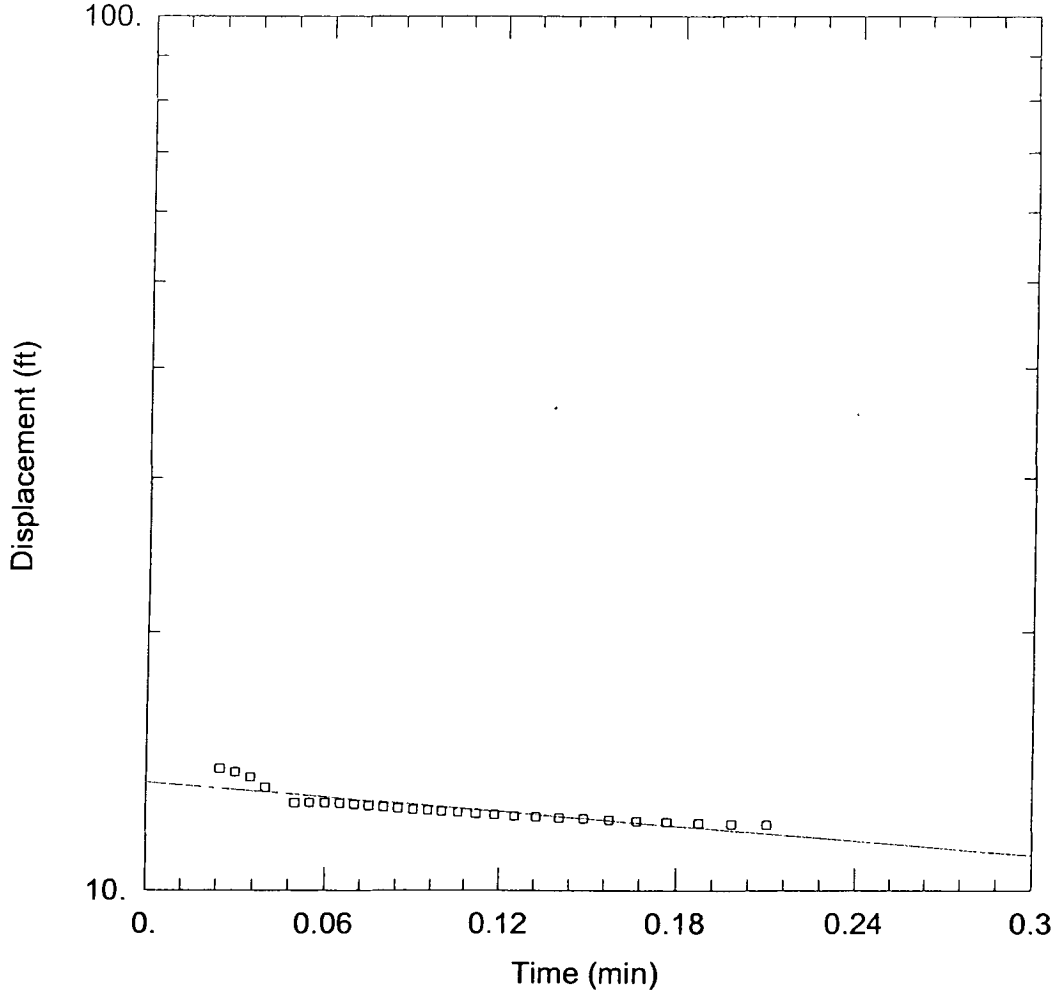
WELL DATA (27D_Rise)

Initial Displacement: 4.68 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 38.37 ft/day
y0 = 1.539 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase II RI Slug tests\AqteSolv_Slug\27D_Fall.aqt
Date: 05/21/03 Time: 07:52:59

PROJECT INFORMATION

Test Well: 27D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

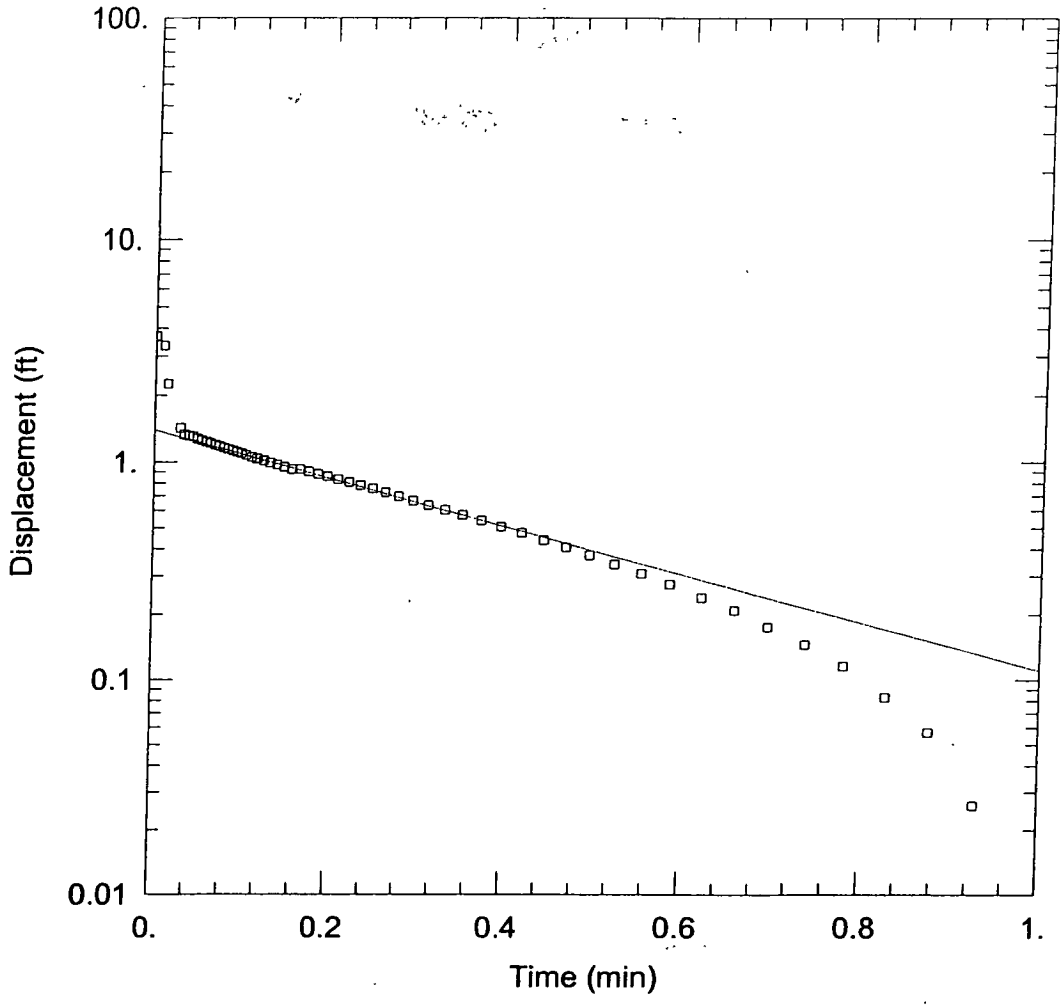
WELL DATA (27D_Fall)

Initial Displacement: 2.1 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.206 ft/day
y0 = 13.37 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase II RI Slug tests\AqteSolv_Slug\28D_Rise.aqt
Date: 05/20/03 Time: 16:00:57

PROJECT INFORMATION

Test Well: 28D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

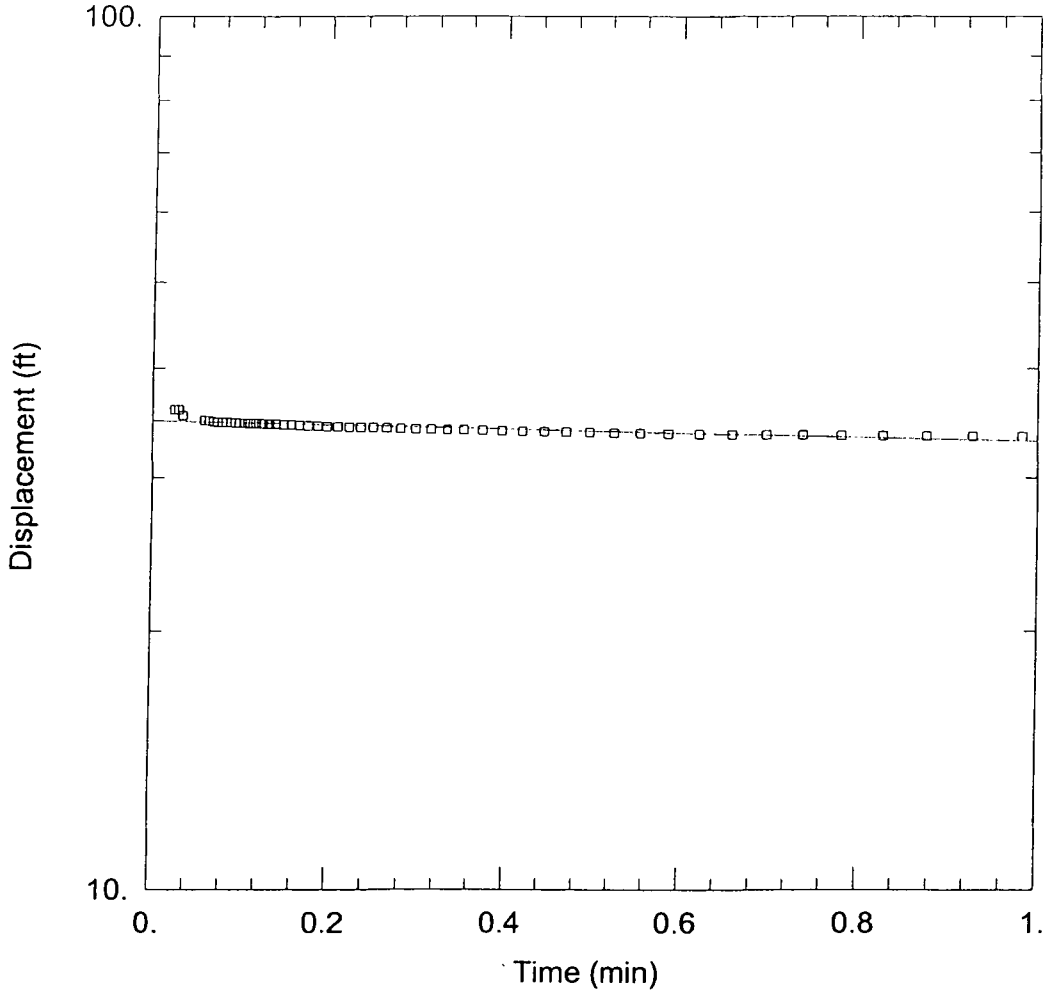
WELL DATA (28D_Rise)

Initial Displacement: 3.69 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 4.662 ft/day
y0 = 1.402 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase II RI Slug tests\AqteSolv_Slug\28D_Fall.aqt
Date: 05/21/03 Time: 07:53:04

PROJECT INFORMATION

Test Well: 28D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

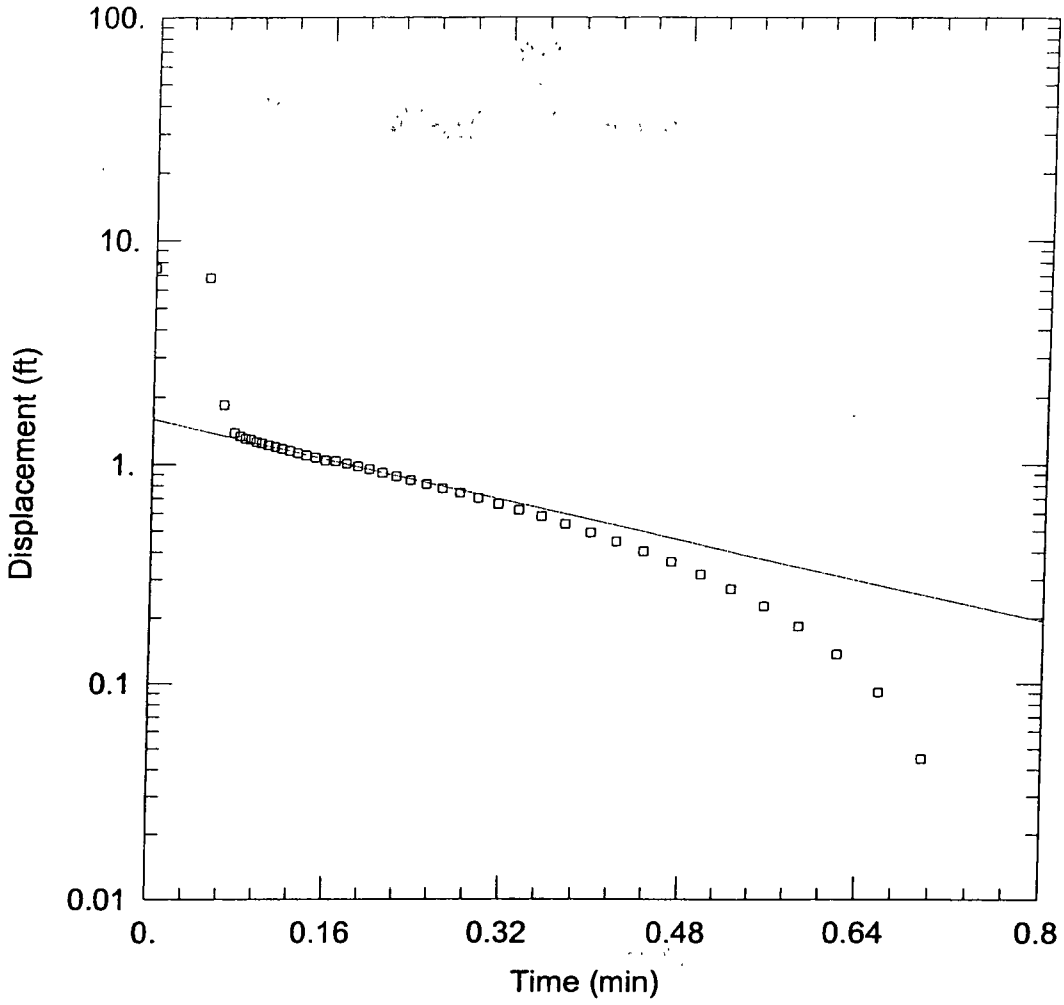
WELL DATA (28D_Fall)

Initial Displacement: 5.5 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.09797 ft/day
y0 = 34.85 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase II RI Slug tests\AqteSolv_Slug\29D_Rise.aqt
Date: 05/20/03 Time: 16:06:30

PROJECT INFORMATION

Test Well: 29D_Rise

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

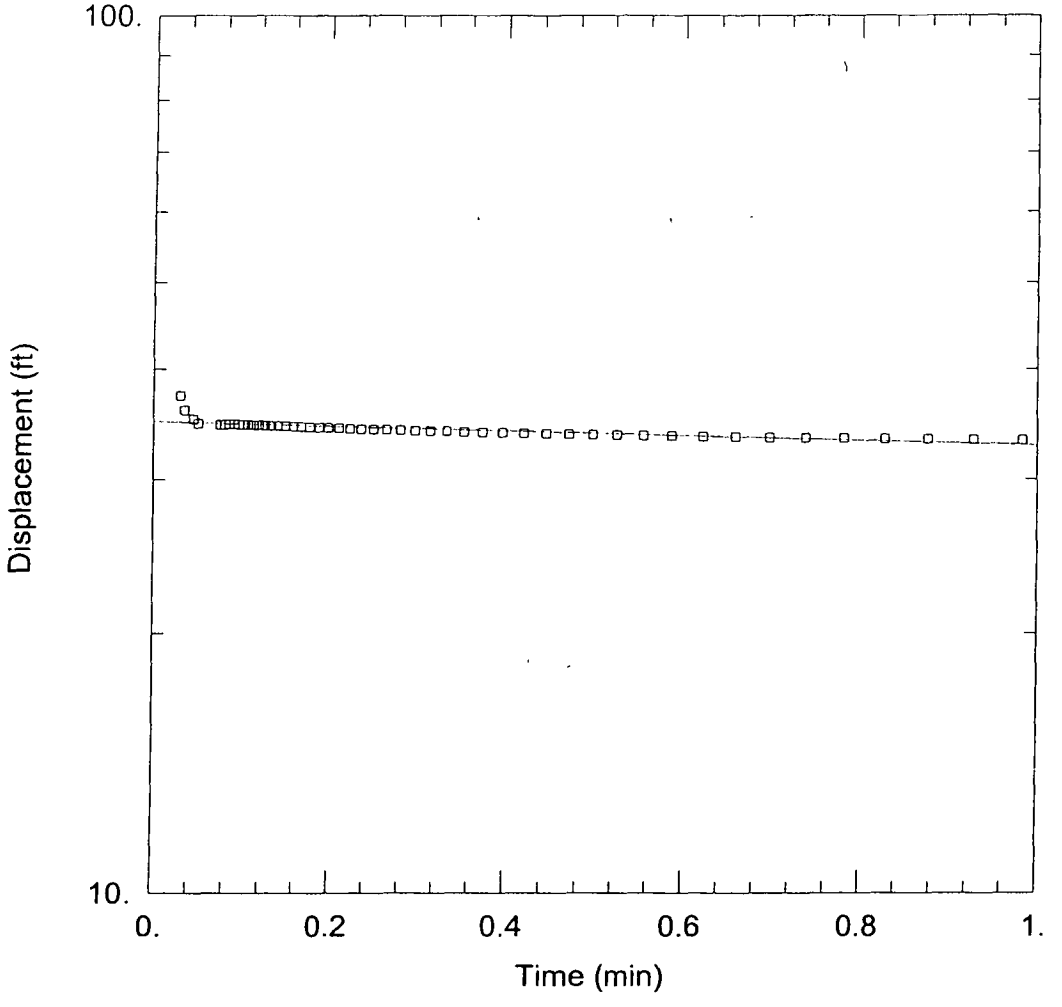
WELL DATA (29D_Rise)

Initial Displacement: 7.52 ft
Wellbore Radius: 0.083 ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 4.827 ft/day
y0 = 1.594 ft

REVISED



WELL TEST ANALYSIS

Data Set: C:\NCBC_DM\Site 16 Phase II RI Slug tests\AqteSolv_Slug\29D_Fall.aqt
Date: 05/21/03 Time: 07:53:09

PROJECT INFORMATION

Test Well: 29D_Fall

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (29D_Fall)

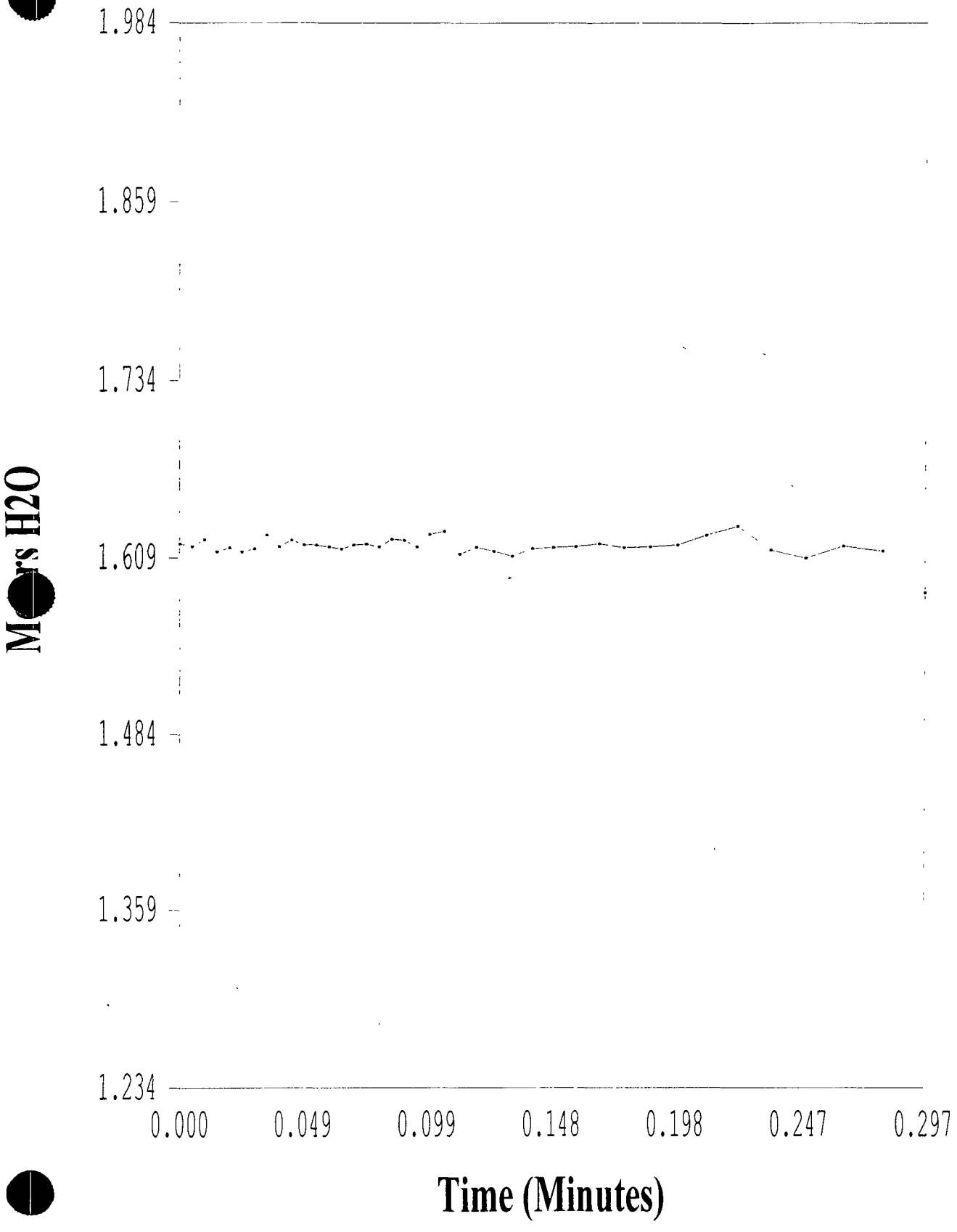
Initial Displacement: 4.5 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.083 ft
Well Skin Radius: 0.083 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.1132 ft/day
y0 = 34.91 ft

REVISED

MW16-01S, 1F



[2] - Water Levels

Slug Test Analysis Using Hvorslev Method

Well identification	MW16-01D, #1
Site Name	16
Test Date	07/19/2000
Time	845
Rising/Falling Head	R
Initial Water level (ft TOR)	20 66

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0.083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	0 9

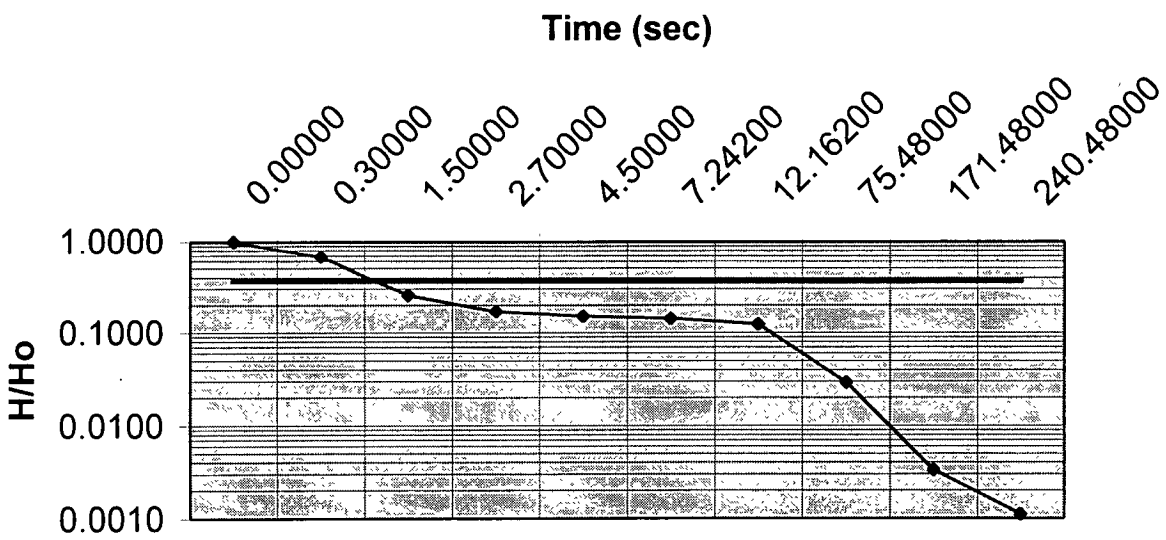
Hydraulic Cond

K value	units
1.584E+02	ft/day
1 834E-03	ft/sec
5 589E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	2 706	1 0000
0 005	0 3000	1 829	0 6759
0 025	1 5000	0 693	0 2561
0.045	2.7000	0 463	0.1711
0 075	4.5000	0 413	0.1526
0 1207	7.2420	0 39	0 1441
0 2027	12 1620	0 338	0 1249
1 258	75 4800	0.079	0 0292
2 858	171 4800	0 009	0 0033
4 008	240 4800	0 003	0 0011

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-01D, #2
Site Name	16
Test Date	07/19/2000
Time	910
Rising/Falling Head	R
Initial Water level (ft TOR)	20 66

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	2

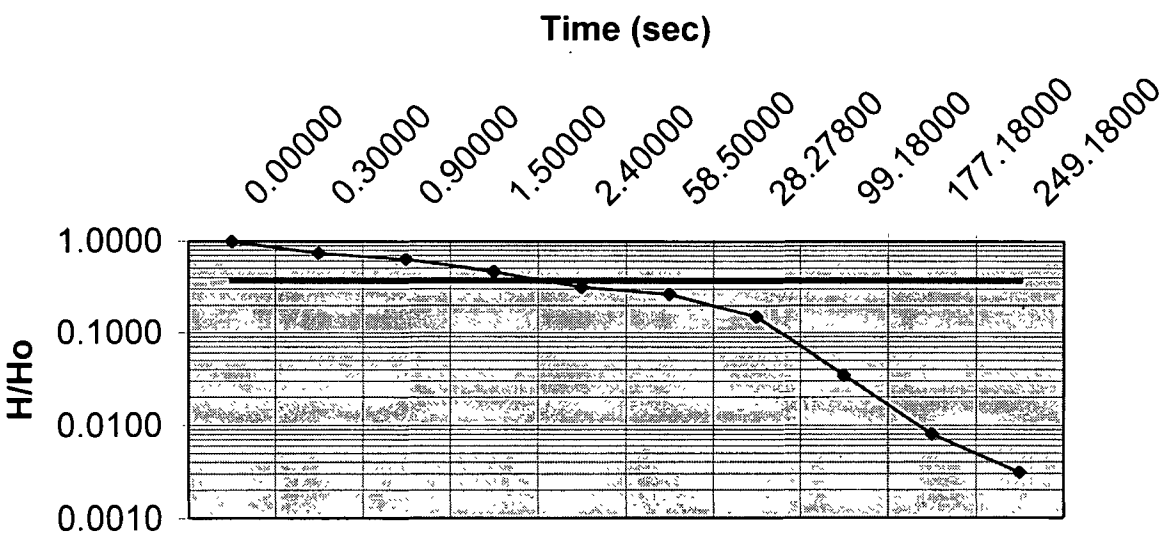
Hydraulic Cond

K value	units
7 130E+01	ft/day
8.252E-04	ft/sec
2 515E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1 62	1 0000
0 005	0 3000	1 204	0 7432
0 015	0 9000	1 017	0 6278
0 025	1 5000	0 75	0 4630
0 04	2 4000	0 511	0 3154
0 975	58 5000	0 427	0 2636
0 4713	28 2780	0 244	0 1506
1 653	99 1800	0 056	0 0346
2 953	177 1800	0 013	0 0080
4 153	249 1800	0 005	0 0031

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-01D, #3
Site Name	16
Test Date	07/19/2000
Time	935
Rising/Falling Head	R
Initial Water level (ft TOR)	20 66

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0.083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	1 6

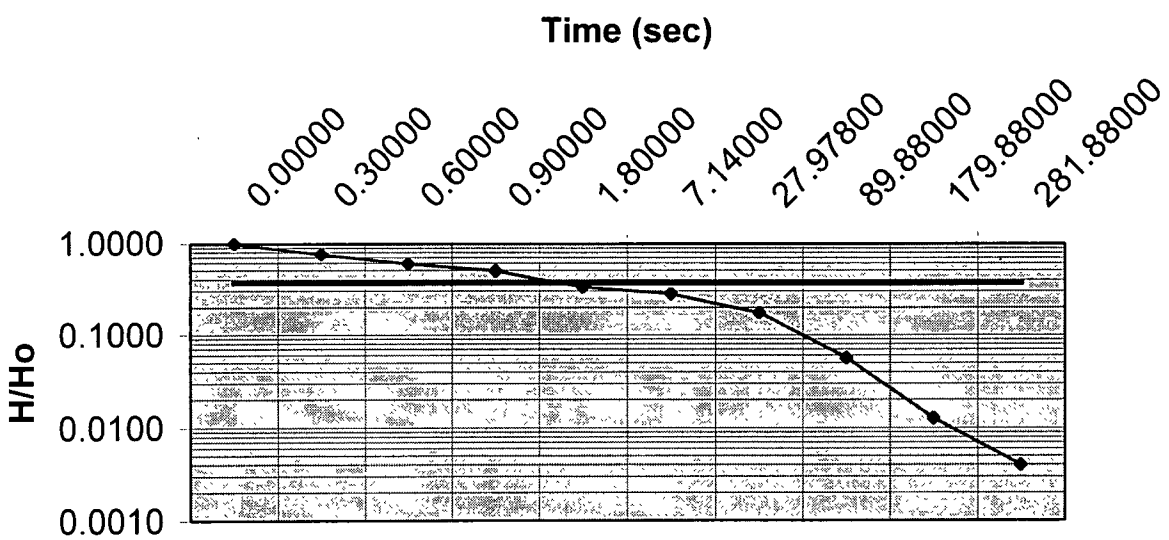
Hydraulic Cond

K value	units
8 912E+01	ft/day
1 032E-03	ft/sec
3 144E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1.502	1 0000
0 005	0.3000	1 137	0 7570
0 01	0 6000	0 882	0 5872
0 015	0 9000	0 749	0.4987
0 03	1 8000	0 503	0 3349
0 119	7 1400	0 42	0.2796
0 4663	27 9780	0 264	0.1758
1 498	89 8800	0 085	0 0566
2 998	179.8800	0 019	0 0126
4 698	281.8800	0 006	0 0040

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-02D, #1
Site Name	16
Test Date	7/19/00
Time	1010
Rising/Falling Head	R
Initial Water level (ft TOR)	12.56

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	1 9

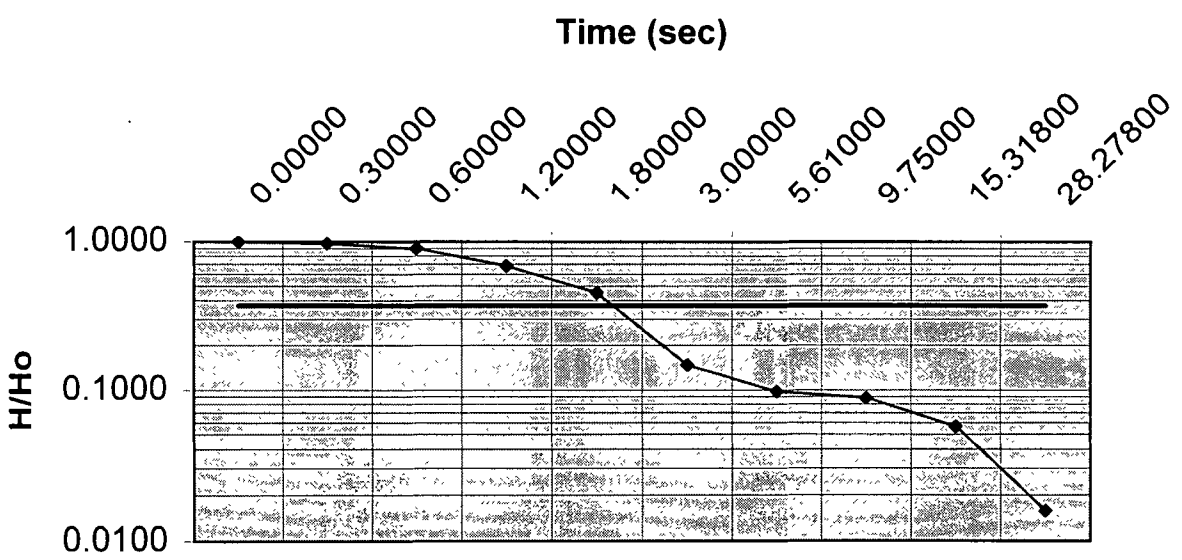
Hydraulic Cond

K value	units
7 505E+01	ft/day
8 686E-04	ft/sec
2 648E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 441	1.0000
0 005	0 3000	0 43	0.9751
0.01	0 6000	0 398	0 9025
0 02	1 2000	0 301	0 6825
0 03	1 8000	0 199	0 4512
0 05	3 0000	0 065	0 1474
0 0935	5 6100	0.043	0 0975
0.1625	9 7500	0.039	0 0884
0 2553	15 3180	0 025	0 0567
0 4713	28 2780	0 007	0 0159

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-02D, #2
Site Name	16
Test Date	07/19/2000
Time	1040
Rising/Falling Head	R
Initial Water level (ft TOR)	12.56

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	1 5

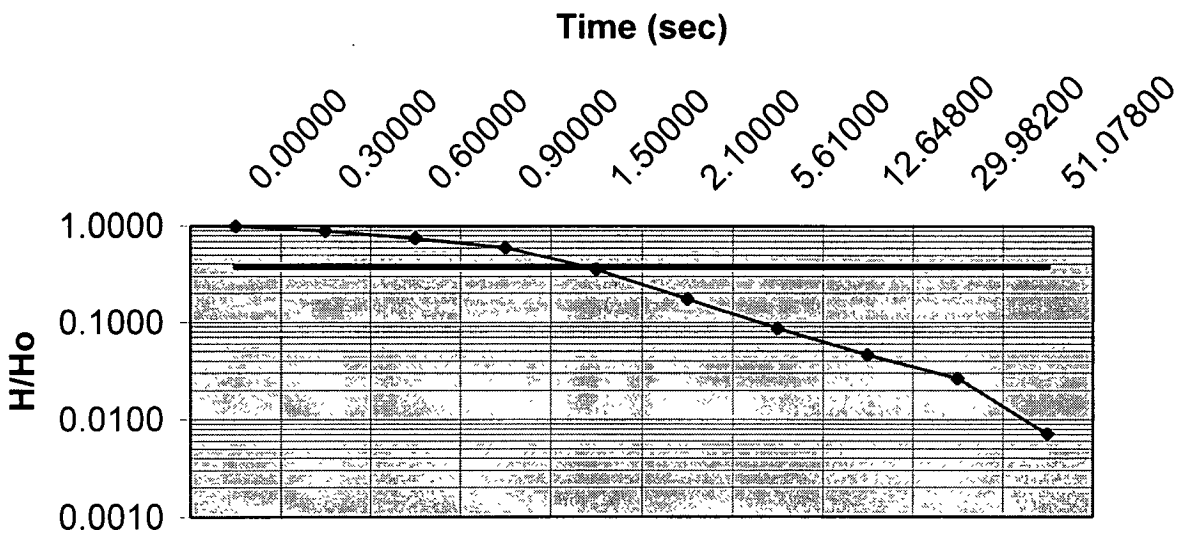
Hydraulic Cond

K value	units
9 506E+01	ft/day
1 100E-03	ft/sec
3 354E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 564	1 0000
0 005	0 3000	0 502	0 8901
0 01	0 6000	0 424	0.7518
0 015	0.9000	0 343	0 6082
0.025	1.5000	0 2	0 3546
0 035	2 1000	0.099	0 1755
0 0935	5 6100	0 049	0 0869
0 2108	12 6480	0 026	0 0461
0 4997	29.9820	0 015	0 0266
0 8513	51.0780	0.004	0.0071

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-02D, #3
Site Name	16
Test Date	07/19/2000
Time	1050
Rising/Falling Head	R
Initial Water level (ft TOR)	12.56

Well specific Data

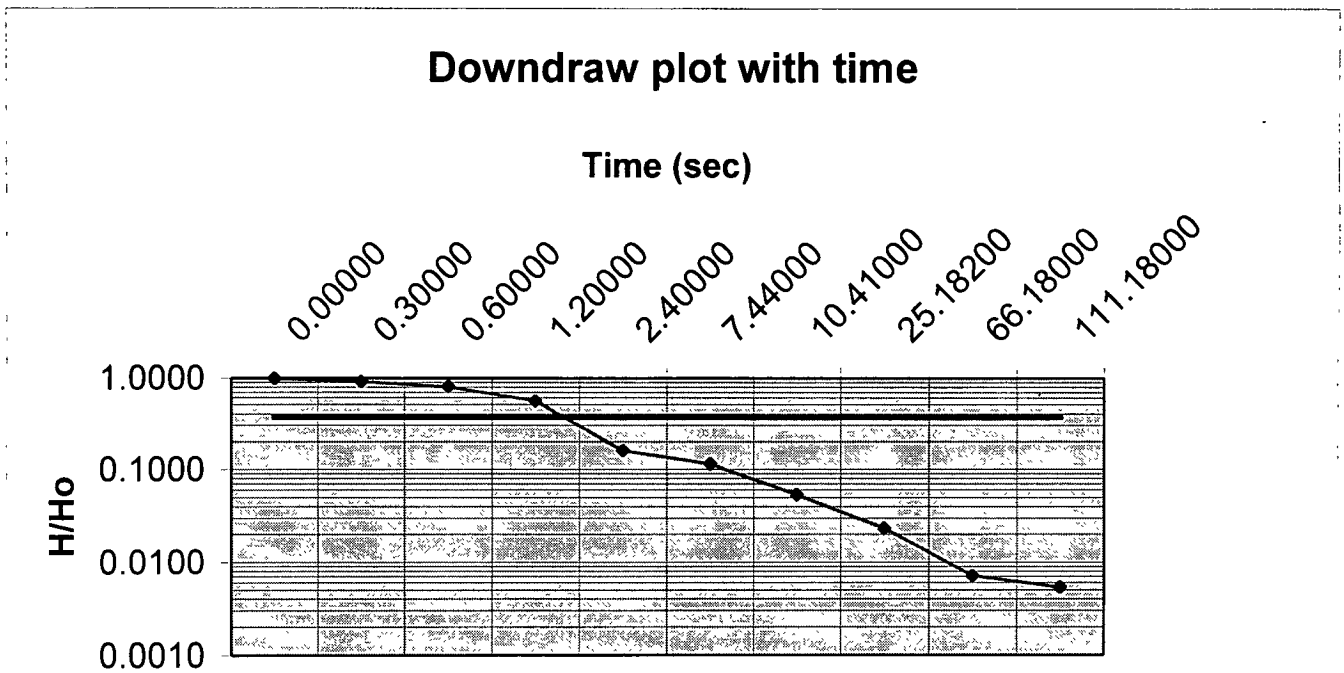
Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	1 4

Hydraulic Cond

K value	units
1 019E+02	ft/day
1.179E-03	ft/sec
3.593E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 558	1 0000
0 005	0 3000	0.515	0 9229
0 01	0.6000	0 454	0 8136
0 02	1.2000	0 309	0.5538
0 04	2 4000	0 09	0 1613
0 124	7 4400	0 064	0 1147
0.1735	10 4100	0 03	0 0538
0 4197	25.1820	0 013	0 0233
1 103	66.1800	0.004	0 0072
1 853	111 1800	0 003	0 0054



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-03S-F
Site Name	16
Test Date	02/14/2001
Time	1400
Rising/Falling Head	F
Initial Water level (ft TOR)	5 45

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	3 9

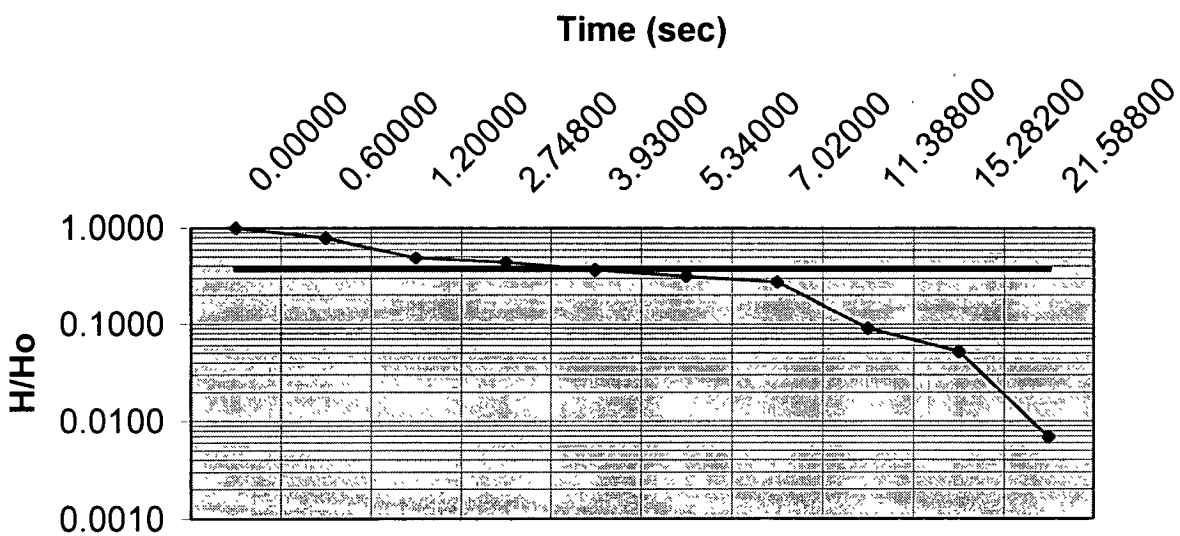
Hydraulic Cond

K value	units
3 656E+01	ft/day
4.232E-04	ft/sec
1.290E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 727	1 0000
0 01	0 6000	0 58	0 7978
0 02	1.2000	0 354	0.4869
0.0458	2 7480	0 32	0 4402
0 0655	3 9300	0 265	0 3645
0 089	5 3400	0 23	0.3164
0.117	7.0200	0 2	0.2751
0 1898	11 3880	0 066	0 0908
0 2547	15.2820	0 038	0.0523
0 3598	21.5880	0 005	0.0069

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-03S-R
Site Name	16
Test Date	02/14/2001
Time	1400
Rising/Falling Head	R
Initial Water level	5 45

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	3 6

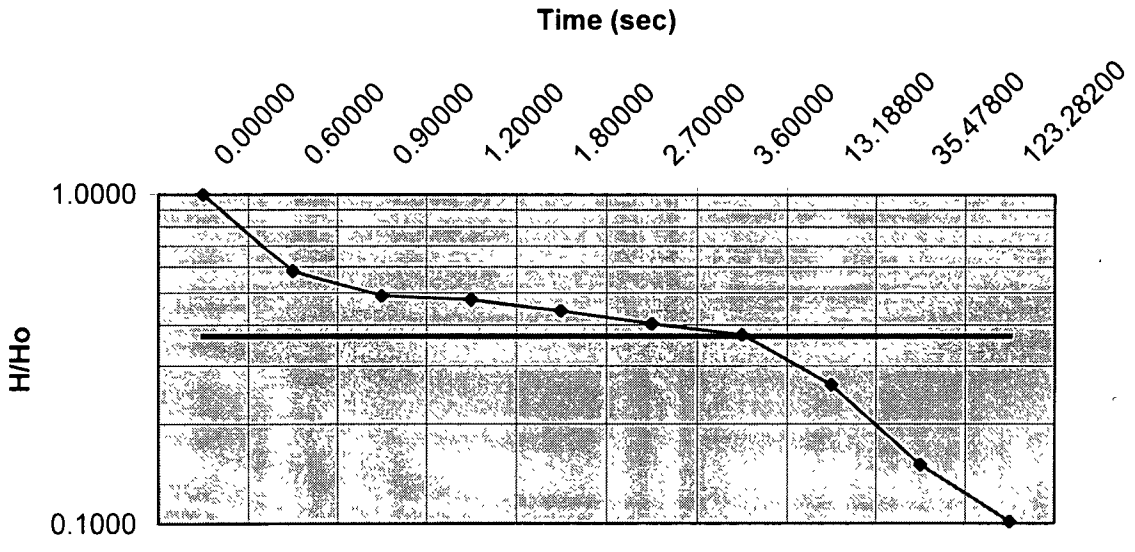
Hydraulic Cond

K value	units
3 961E+01	ft/day
4 585E-04	ft/sec
1.397E-02	cm/sec

Drawdown

Min	Time sec	head change	H/ho
0	0 0000	0 819	1 0000
0 01	0 6000	0 478	0 5836
0 015	0 9000	0 402	0 4908
0 02	1 2000	0.391	0 4774
0 03	1 8000	0 362	0 4420
0 045	2 7000	0 33	0 4029
0.06	3 6000	0 307	0 3748
0 2198	13 1880	0 216	0.2637
0 5913	35 4780	0 123	0 1502
2.0547	123 2820	0 083	0 1013

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-03D, #1
Site Name	16
Test Date	07/19/2000
Time	1640
Rising/Falling Head	R
Initial Water level (ft TOR)	7.35

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	0 2

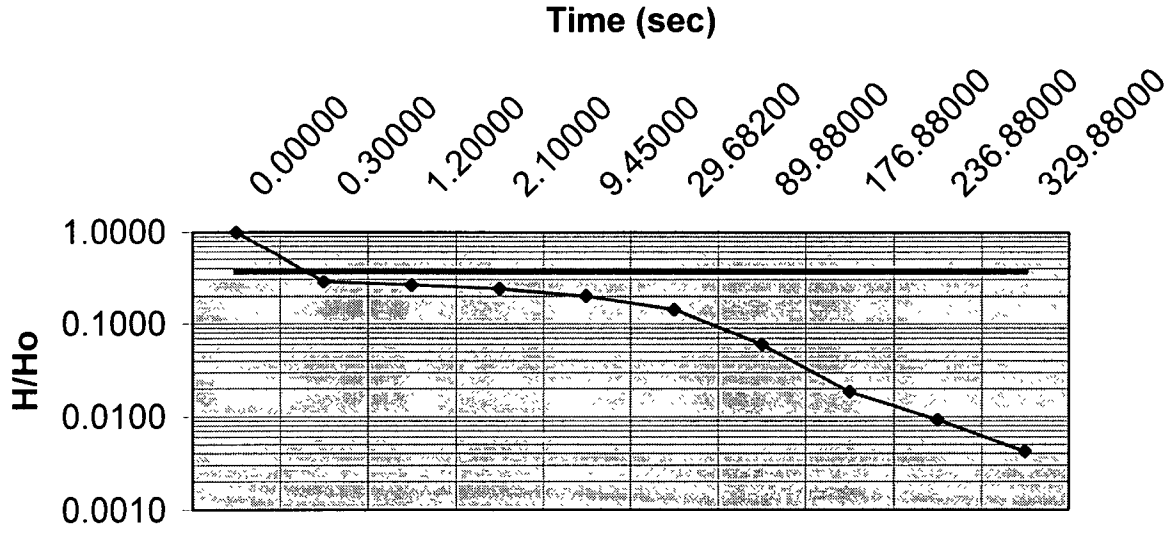
Hydraulic Cond

K value	units
7 130E+02	ft/day
8 252E-03	ft/sec
2 515E-01	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	2 15	1 0000
0.005	0 3000	0 614	0 2856
0 02	1.2000	0 568	0 2642
0 035	2.1000	0 517	0 2405
0.1575	9 4500	0 434	0 2019
0 4947	29 6820	0 308	0 1433
1 498	89 8800	0.129	0.0600
2 948	176 8800	0 04	0 0186
3.948	236 8800	0 02	0 0093
5 498	329 8800	0 009	0 0042

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-03D, #2
Site Name	16
Test Date	07/19/2000
Time	1650
Rising/Falling Head	R
Initial Water level (ft TOR)	7.35

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_0	time at 37% drawdown	0 2

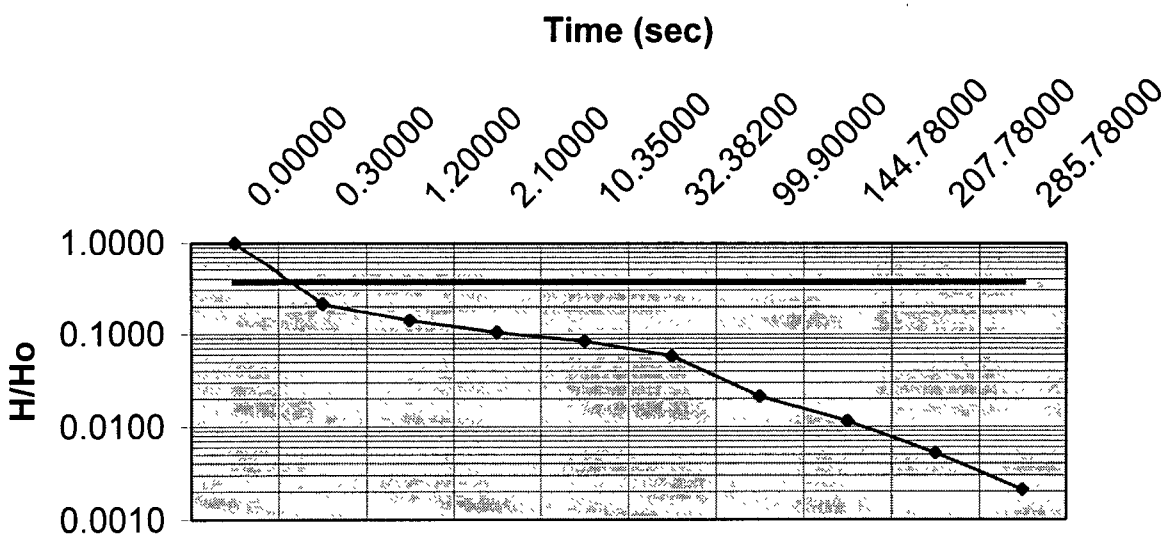
Hydraulic Cond

K value	units
7 130E+02	ft/day
8 252E-03	ft/sec
2 515E-01	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	4 793	1.0000
0 005	0 3000	1 02	0 2128
0.02	1.2000	0 678	0 1415
0 035	2 1000	0 505	0 1054
0 1725	10 3500	0 406	0 0847
0 5397	32 3820	0 28	0 0584
1 665	99 9000	0.102	0 0213
2 413	144 7800	0 055	0.0115
3 463	207.7800	0.025	0 0052
4.763	285.7800	0 01	0 0021

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-03D, #3
Site Name	16
Test Date	07/19/2000
Time	1700
Rising/Falling Head	R
Initial Water level (ft TOR)	7.35

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	1

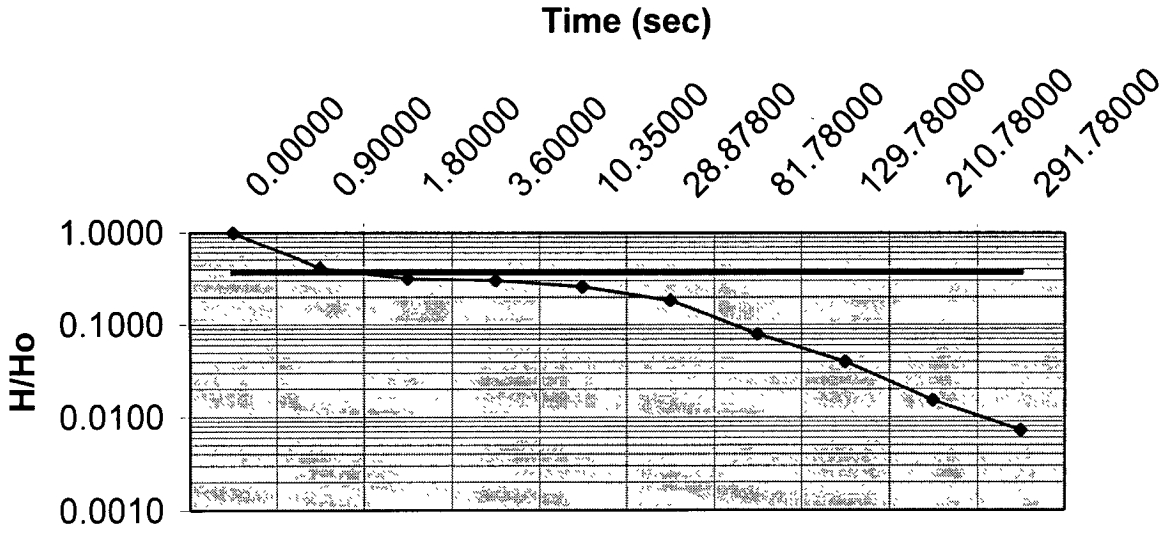
Hydraulic Cond

K value	units
1 426E+02	ft/day
1 650E-03	ft/sec
5 031E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1 655	1 0000
0 015	0 9000	0 679	0 4103
0.03	1 8000	0 524	0 3166
0 06	3 6000	0 501	0 3027
0 1725	10 3500	0 428	0 2586
0 4813	28 8780	0 306	0 1849
1.363	81 7800	0 132	0 0798
2 163	129 7800	0 066	0 0399
3.513	210 7800	0.025	0.0151
4 863	291 7800	0 012	0 0073

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-04S-F
Site Name	16
Test Date	02/15/2001
Time	1430
Rising/Falling Head	F
Initial Water level	4.05

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	screen diameter	0 083
T_o	time at 37% drawdown	2

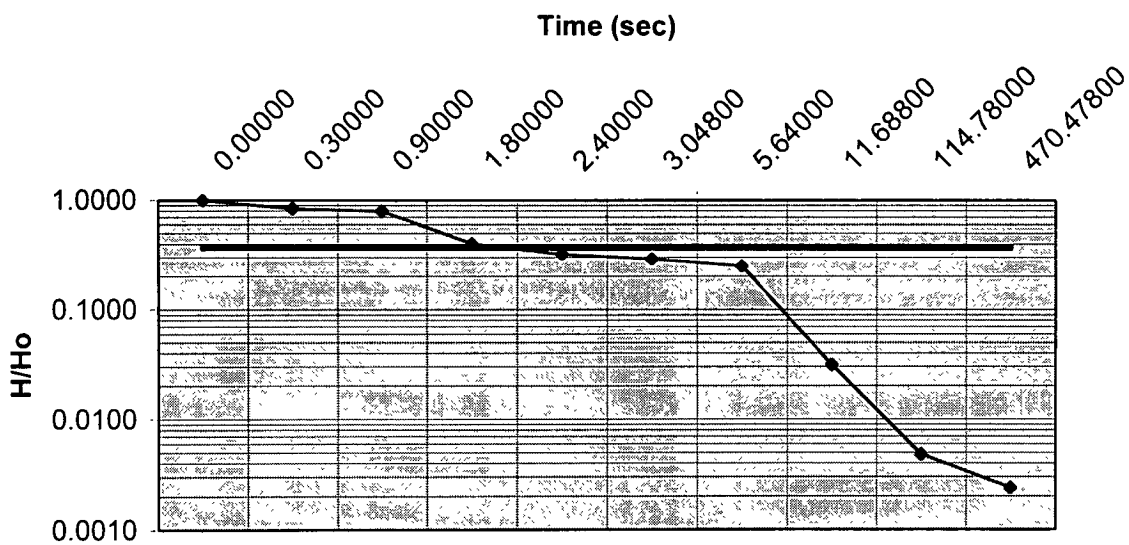
Hydraulic Cond

K value	units
7 130E+01	ft/day
8.252E-04	ft/sec
2 515E-02	cm/sec

Drawdown

Min	Time sec	head change	H/ho
0	0 0000	0 416	1 0000
0 005	0 3000	0 348	0 8365
0 015	0 9000	0 331	0 7957
0 03	1 8000	0 168	0 4038
0.04	2 4000	0.135	0 3245
0 0508	3.0480	0.122	0 2933
0 094	5 6400	0.104	0 2500
0 1948	11 6880	0 013	0 0312
1 913	114 7800	0 002	0.0048
7 8413	470 4780	0 001	0 0024

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-04S-R
Site Name	16
Test Date	02/15/2001
Time	1445
Rising/Falling Head	R
Initial Water level	4 05

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	screen diameter	0 083
T_o	time at 37% drawdown	1 5

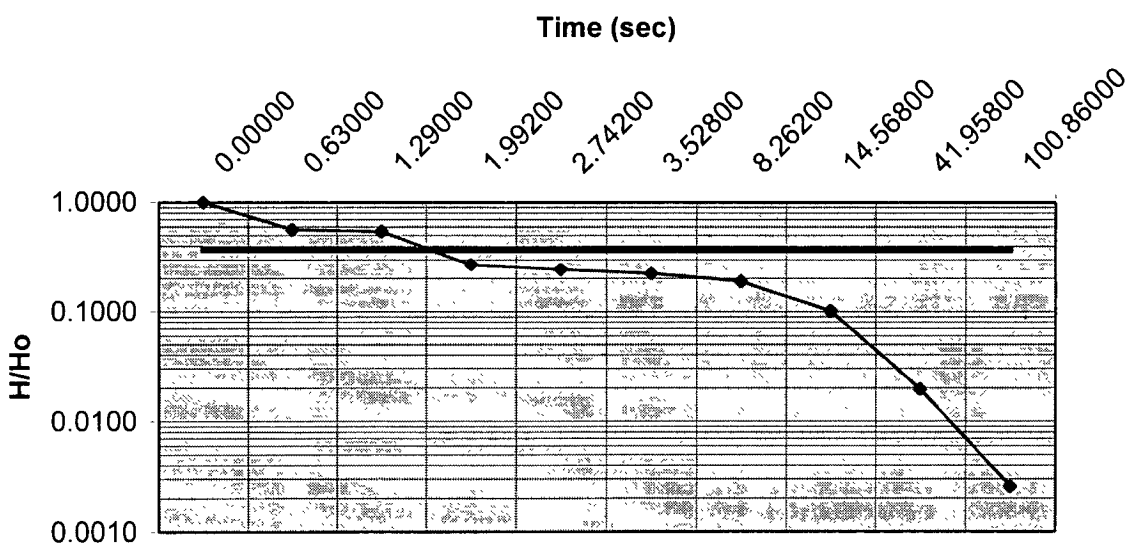
Hydraulic Cond

K value	units
9 506E+01	ft/day
1 100E-03	ft/sec
3 354E-02	cm/sec

Drawdown

Min	Time sec	head change	H/ho
0	0 0000	1 167	1 0000
0 0105	0 6300	0 66	0 5656
0 0215	1 2900	0 634	0 5433
0.0332	1 9920	0 318	0.2725
0 0457	2 7420	0 285	0 2442
0 0588	3 5280	0 26	0 2228
0 1377	8 2620	0 222	0 1902
0.2428	14 5680	0 118	0 1011
0.6993	41 9580	0.023	0 0197
1.681	100 8600	0 003	0 0026

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-04D-F
Site Name	16
Test Date	02/15/2001
Time	1415
Rising/Falling Head	F
Initial Water level	7 49

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	screen diameter	0 083
T_o	time at 37% drawdown	2

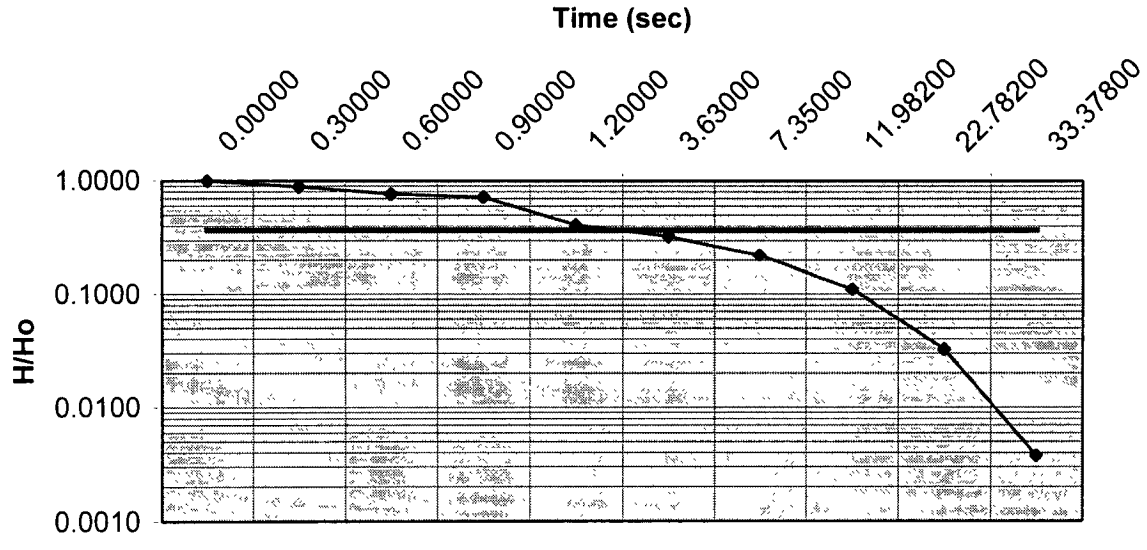
Hydraulic Cond

K value	units
7 130E+01	ft/day
8 252E-04	ft/sec
2 515E-02	cm/sec

Drawdown

Min	Time sec	head change	H/ho
0	0 0000	0 796	1 0000
0 005	0 3000	0 708	0 8894
0 01	0 6000	0 614	0 7714
0 015	0 9000	0 574	0 7211
0 02	1 2000	0 327	0 4108
0 0605	3 6300	0.261	0 3279
0 1225	7 3500	0 177	0 2224
0 1997	11 9820	0 088	0 1106
0 3797	22 7820	0.026	0 0327
0.5563	33 3780	0 003	0 0038

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-04D, #1
Site Name	16
Test Date	07/19/2000
Time	1530
Rising/Falling Head	R
Initial Water level (ft TOR)	8.3

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	·10
R	radius of screen	0 083
T_o	time at 37% drawdown	1 8

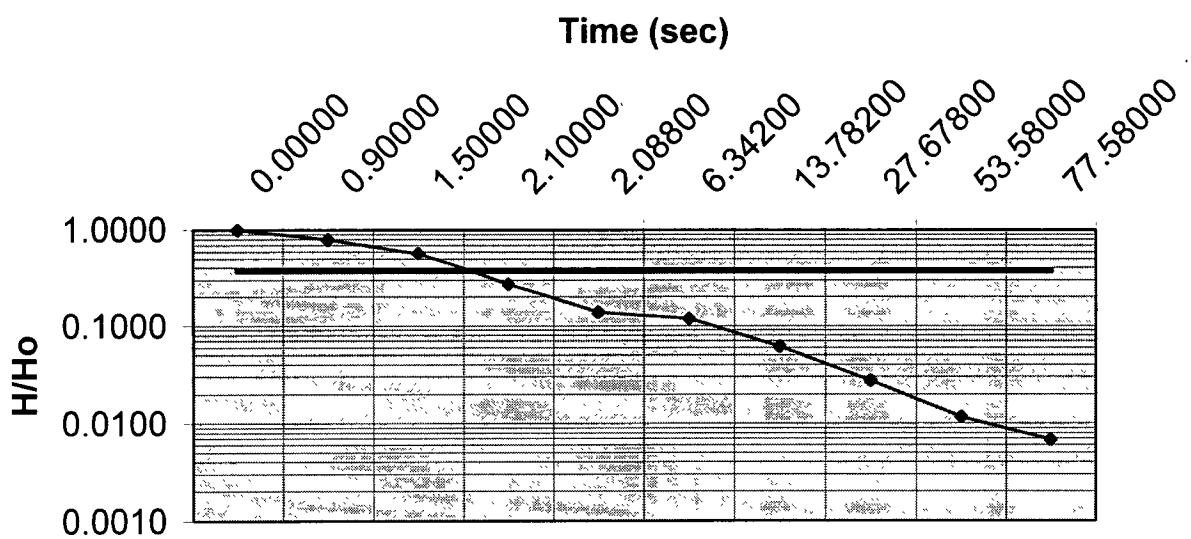
Hydraulic Cond

K value	units
7.922E+01	ft/day
9 169E-04	ft/sec
2 795E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1 459	1 0000
0 015	0 9000	1 166	0 7992
0.025	1 5000	0 845	0 5792
0 035	2 1000	0 399	0 2735
0 0348	2 0880	0.203	0 1391
0 1057	6 3420	0 175	0 1199
0 2297	13 7820	0 09	0 0617
0 4613	27 6780	0 04	0.0274
0.893	53 5800	0 017	0 0117
1.293	77 5800	0 01	0 0069

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-04D, #2
Site Name	16
Test Date	07/19/2000
Time	1555
Rising/Falling Head	R
Initial Water level (ft TOR)	8.3

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	11

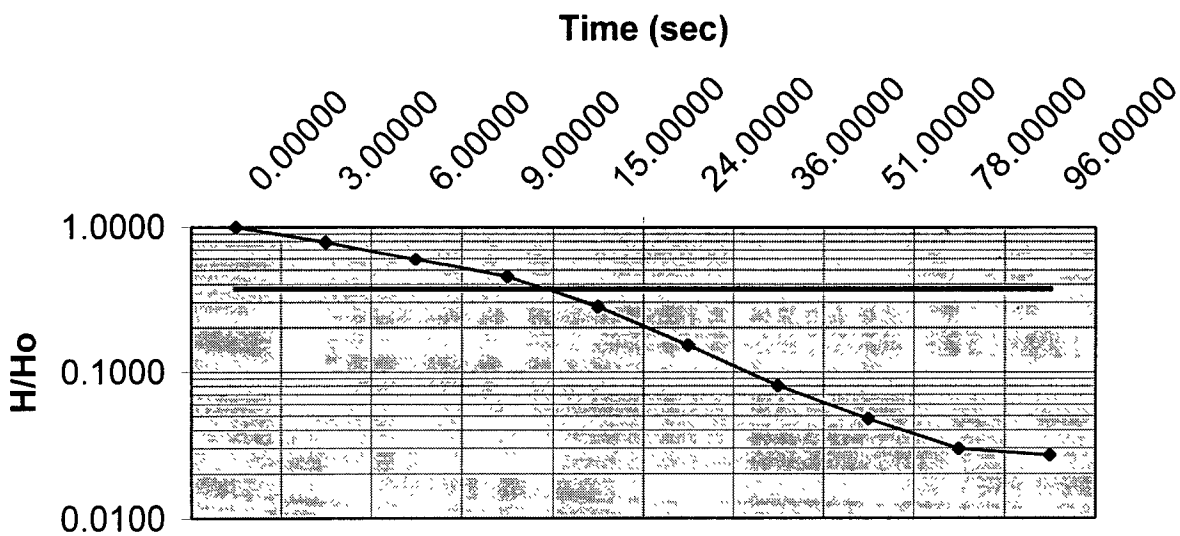
Hydraulic Cond

K value	units
1 296E+01	ft/day
1 500E-04	ft/sec
4 573E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 336	1 0000
0 05	3 0000	0 266	0 7917
0 1	6 0000	0 2	0 5952
0 15	9 0000	0 153	0 4554
0.25	15 0000	0 094	0 2798
0 4	24 0000	0 051	0 1518
0 6	36 0000	0 027	0 0804
0 85	51 0000	0 016	0 0476
1 3	78 0000	0 01	0 0298
1 6	96.0000	0 009	0 0268

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-04D, #3
Site Name	16
Test Date	07/19/2000
Time	1605
Rising/Falling Head	R
Initial Water level (ft TOR)	8.3

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	1 6

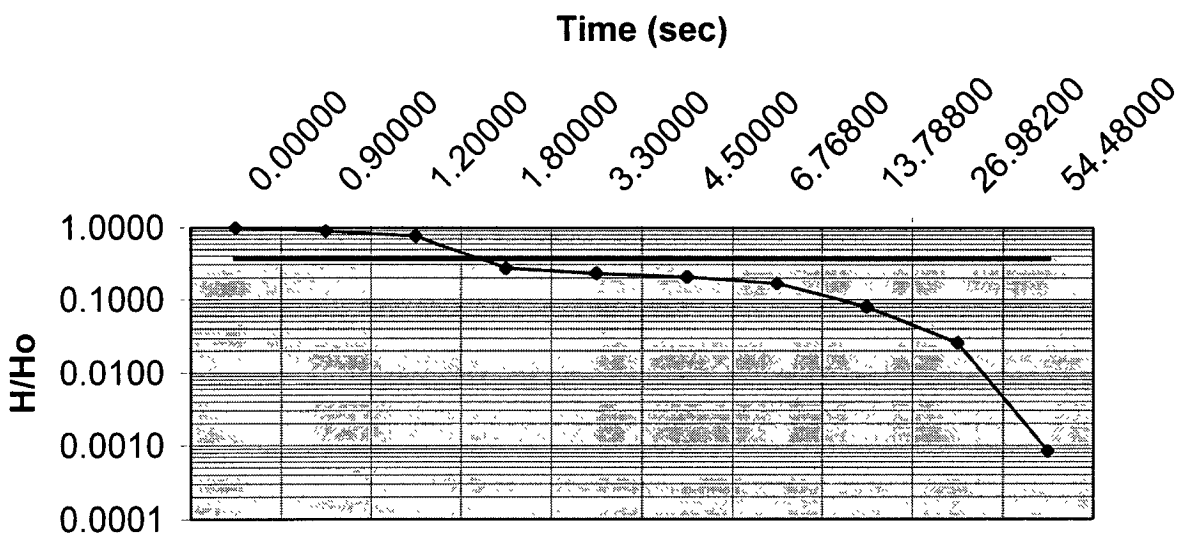
Hydraulic Cond

K value	units
8 912E+01	ft/day
1 032E-03	ft/sec
3 144E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1 197	1 0000
0 015	0 9000	1 082	0 9039
0 02	1 2000	0 925	0 7728
0 03	1 8000	0 327	0 2732
0 055	3 3000	0 276	0 2306
0 075	4 5000	0 247	0 2063
0 1128	6 7680	0.202	0 1688
0.2298	13 7880	0 097	0 0810
0 4497	26 9820	0 031	0.0259
0 908	54.4800	0 001	0 0008

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-05S-R
Site Name	16
Test Date	02/16/2001
Time	1505
Rising/Falling Head	R
Initial Water level	13.49

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	3 1

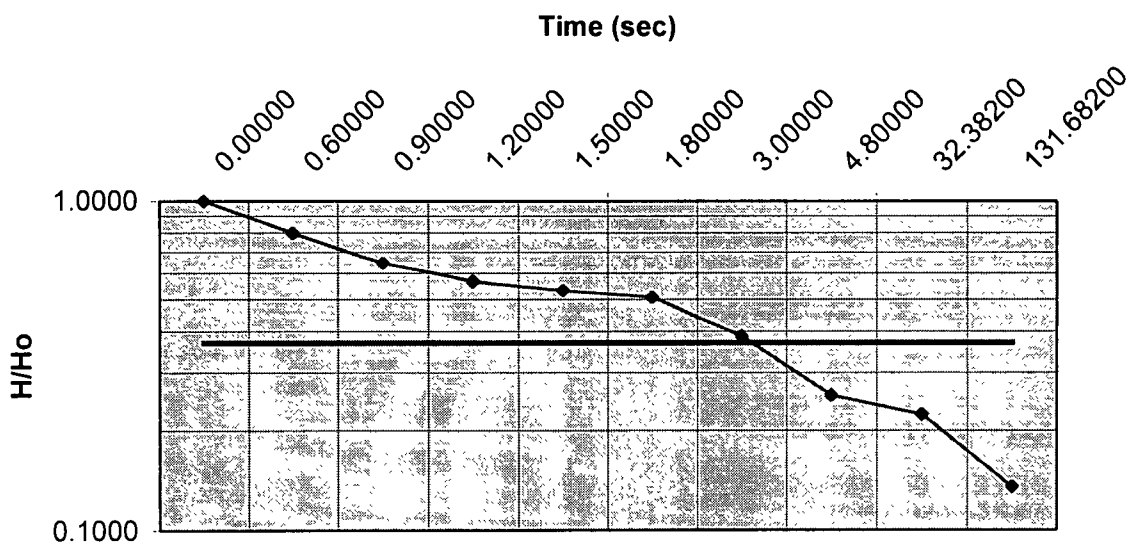
Hydraulic Cond

K value	units
4 600E+01	ft/day
5 324E-04	ft/sec
1 623E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 733	1 0000
0 01	0 6000	0 586	0 7995
0 015	0 9000	0 475	0 6480
0.02	1 2000	0.417	0 5689
0 025	1 5000	0 391	0 5334
0 03	1 8000	0.373	0 5089
0 05	3 0000	0.284	0.3874
0 08	4 8000	0 188	0.2565
0 5397	32 3820	0.164	0 2237
2 1947	131 6820	0.099	0.1351

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-05S-F
Site Name	16
Test Date	02/16/2001
Time	1300
Rising/Falling Head	F
Initial Water level	13 49

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	3

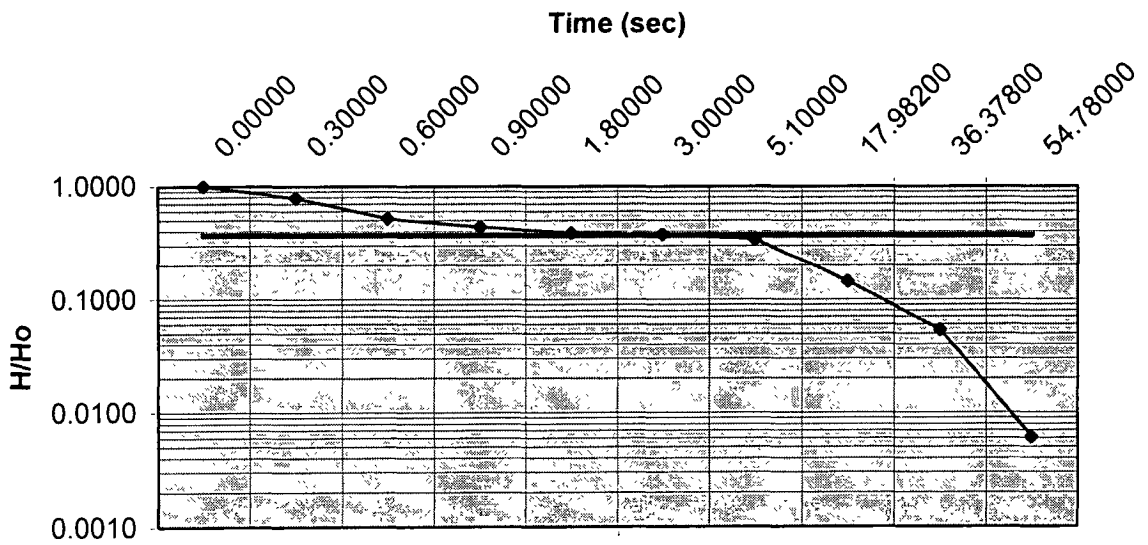
Hydraulic Cond

K value	units
4 753E+01	ft/day
5 501E-04	ft/sec
1 677E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0.0000	0 985	1 0000
0 005	0 3000	0 778	0 7898
0 01	0 6000	0.513	0 5208
0 015	0 9000	0 434	0 4406
0 03	1 8000	0 3848	0 3907
0 05	3 0000	0 37	0 3756
0.085	5 1000	0 338	0 3431
0 2997	17.9820	0 143	0 1452
0 6063	36 3780	0 053	0 0538
0 913	54 7800	0 006	0 0061

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-05D-F
Site Name	16
Test Date	02/16/2001
Time	1300
Rising/Falling Head	F
Initial Water level	13.30

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	screen diameter	0 083
T_o	time at 37% drawdown	1.2

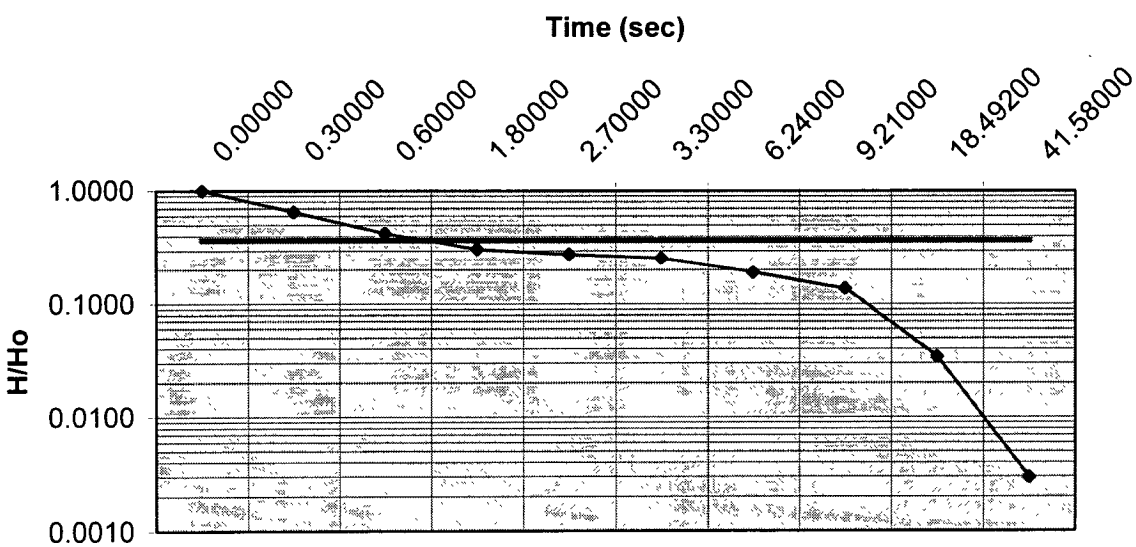
Hydraulic Cond

K value	units
1 188E+02	ft/day
1 375E-03	ft/sec
4 192E-02	cm/sec

Drawdown

Min	Time sec	head change	H/ho
0	0 0000	0 674	1.0000
0 005	0 3000	0 442	0 6558
0 01	0 6000	0 286	0 4243
0 03	1 8000	0 21	0 3116
0 045	2 7000	0 189	0.2804
0 055	3 3000	0 174	0 2582
0 104	6 2400	0 128	0 1899
0.1535	9 2100	0 093	0 1380
0 3082	18 4920	0 023	0 0341
0 693	41 5800	0 002	0.0030

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-05D-R
Site Name	16
Test Date	02/16/2001
Time	1305
Rising/Falling Head	R
Initial Water level	13.30

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	4

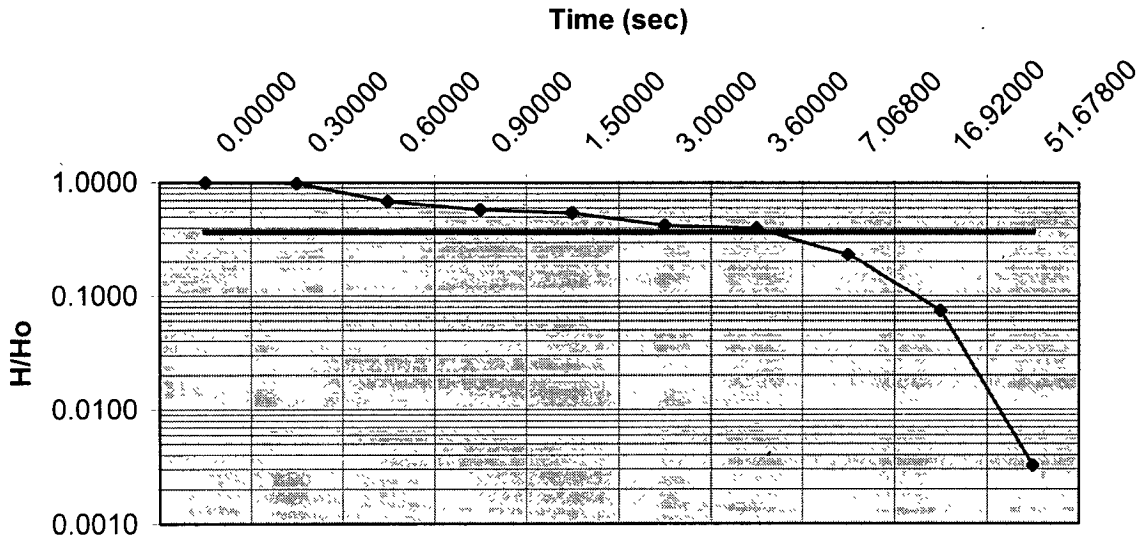
Hydraulic Cond

K value	units
3 565E+01	ft/day
4 126E-04	ft/sec
1 258E-02	cm/sec

Drawdown

Min	Time sec	head change	H/ho
0	0 0000	0 618	1 0000
0 005	0 3000	0 609	0 9854
0.01	0 6000	0 422	0 6828
0 015	0 9000	0 36	0 5825
0 025	1 5000	0 336	0 5437
0 05	3 0000	0 263	0 4256
0 06	3 6000	0 247	0 3997
0 1178	7 0680	0 145	0.2346
0 282	16 9200	0.046	0.0744
0 8613	51 6780	0 002	0 0032

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-05D, #1
Site Name	16
Test Date	07/19/2000
Time	1130
Rising/Falling Head	R
Initial Water level (ft TOR)	13.64

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	0 7

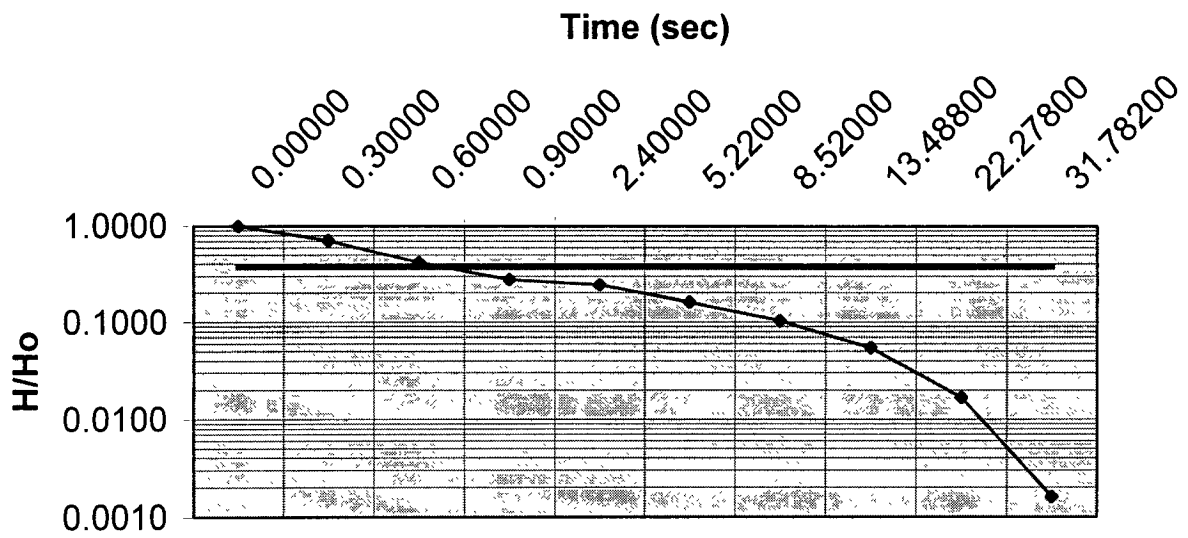
Hydraulic Cond

K value	units
2 037E+02	ft/day
2 358E-03	ft/sec
7 186E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1 243	1 0000
0 005	0 3000	0 887	0.7136
0 01	0 6000	0 516	0 4151
0 015	0 9000	0 346	0.2784
0 04	2 4000	0.303	0 2438
0 087	5 2200	0 2	0 1609
0 142	8 5200	0 129	0 1038
0 2248	13 4880	0 068	0 0547
0.3713	22 2780	0 021	0 0169
0 5297	31 7820	0 002	0 0016

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-05D, #2
Site Name	16
Test Date	07/19/2000
Time	1145
Rising/Falling Head	R
Initial Water level (ft TOR)	13.64

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	0 5

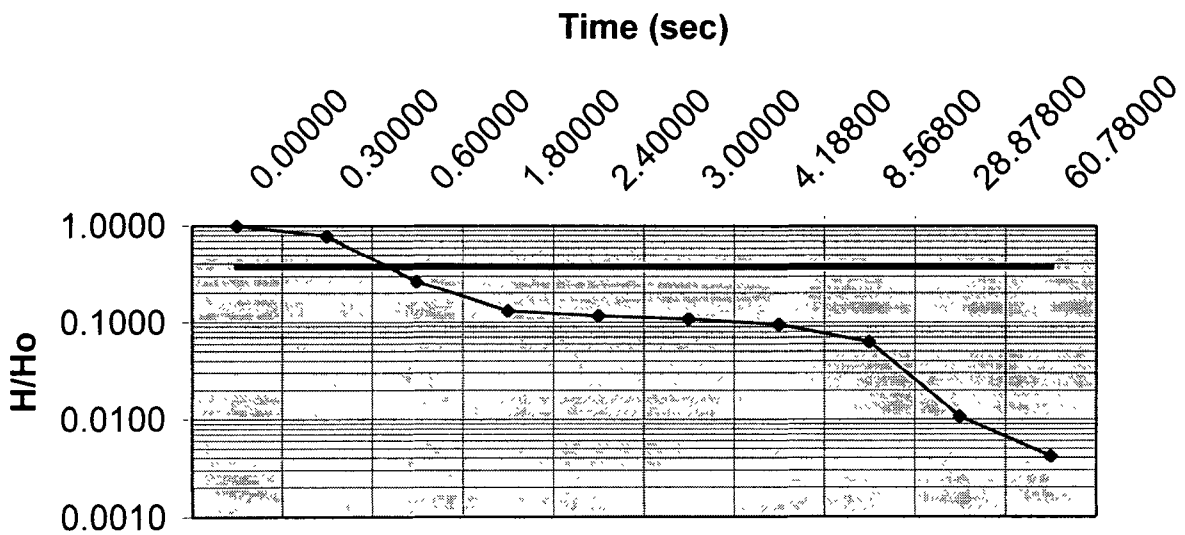
Hydraulic Cond

K value	units
2 852E+02	ft/day
3 301E-03	ft/sec
1 006E-01	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	2 137	1 0000
0 005	0 3000	1 691	0 7913
0 01	0 6000	0 564	0 2639
0 03	1 8000	0 283	0 1324
0 04	2 4000	0 251	0 1175
0 05	3 0000	0 232	0 1086
0 0698	4 1880	0.204	0 0955
0 1428	8 5680	0.135	0 0632
0 4813	28 8780	0 023	0 0108
1 013	60 7800	0 009	0 0042

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-05D, #3
Site Name	16
Test Date	07/19/2000
Time	1200
Rising/Falling Head	R
Initial Water level (ft TOR)	13.64

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	0 2

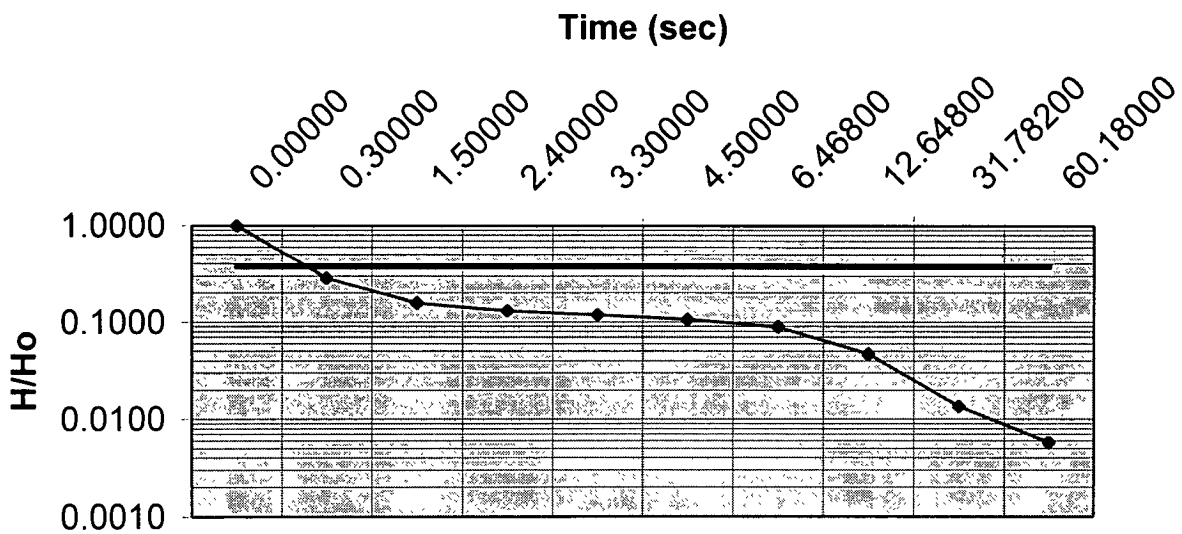
Hydraulic Cond

K value	units
7 130E+02	ft/day
8 252E-03	ft/sec
2 515E-01	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1 905	1.0000
0 005	0 3000	0 546	0 2866
0 025	1.5000	0.301	0 1580
0 04	2 4000	0 25	0 1312
0.055	3 3000	0 227	0 1192
0.075	4 5000	0 203	0 1066
0 1078	6 4680	0 171	0.0898
0 2108	12.6480	0 09	0 0472
0 5297	31.7820	0 026	0 0136
1 003	60 1800	0 011	0 0058

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-06S-F
Site Name	16
Test Date	02/20/2001
Time	1330
Rising/Falling Head	F
Initial Water level	15.07

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	3 8

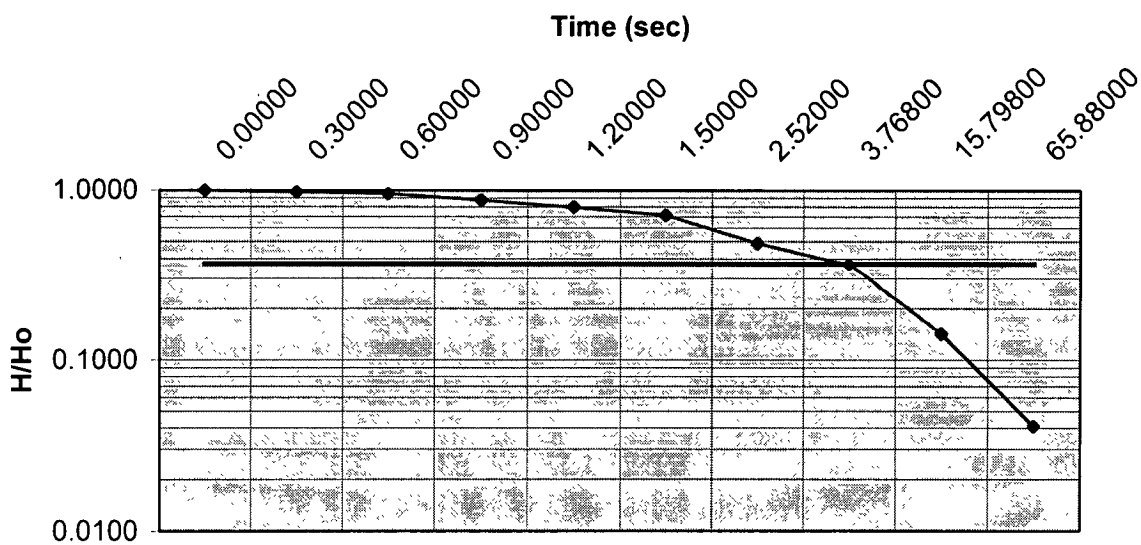
Hydraulic Cond

K value	units
3 753E+01	ft/day
4 343E-04	ft/sec
1 324E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 049	1 0000
0 005	0.3000	0 048	0 9796
0 01	0 6000	0 047	0 9592
0 015	0 9000	0.043	0 8776
0 02	1 2000	0 039	0 7959
0 025	1 5000	0 035	0.7143
0.042	2 5200	0 024	0 4898
0 0628	3 7680	0 018	0 3673
0 2633	15 7980	0 007	0 1429
1 098	65 8800	0 002	0 0408

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-06D-F
Site Name	16
Test Date	02/20/2001
Time	1345
Rising/Falling Head	F
Initial Water level	15.07

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	6
R	radius of screen	0 083
T_o	time at 37% drawdown	0 5

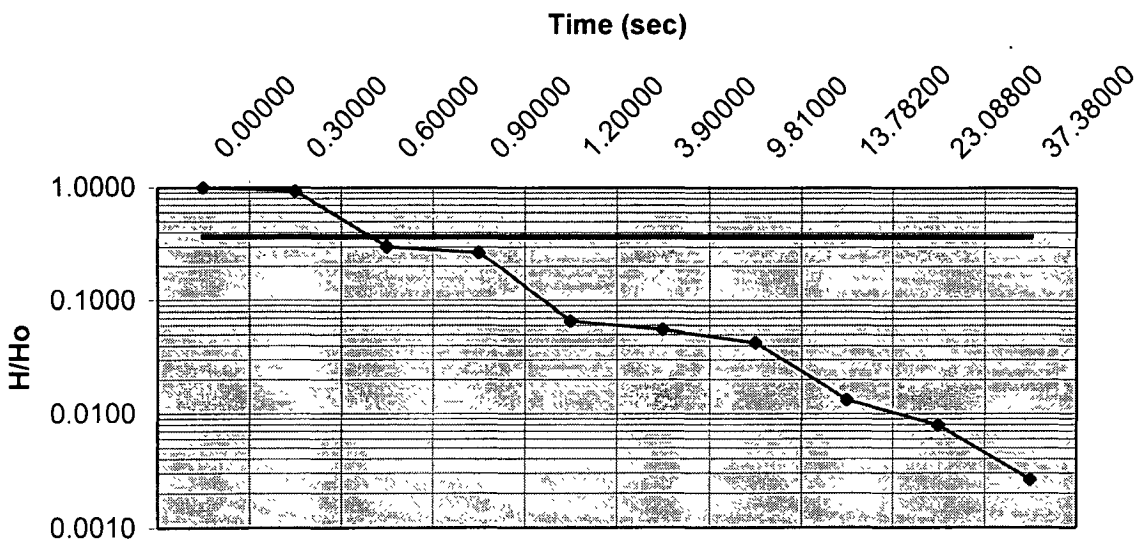
Hydraulic Cond

K value	units
4 246E+02	ft/day
4 915E-03	ft/sec
1.498E-01	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0.0000	0 377	1 0000
0 005	0 3000	0 354	0 9390
0 01	0 6000	0 114	0 3024
0 015	0 9000	0 102	0 2706
0 02	1.2000	0 025	0.0663
0 065	3 9000	0 021	0.0557
0 1635	9 8100	0 016	0 0424
0.2297	13 7820	0 005	0.0133
0 3848	23 0880	0 003	0 0080
0 623	37 3800	0 001	0 0027

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-06D-R
Site Name	16
Test Date	02/20/2001
Time	1335
Rising/Falling Head	R
Initial Water level	15 07

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	6
R	radius of screen	0 083
T_o	time at 37% drawdown	0 7

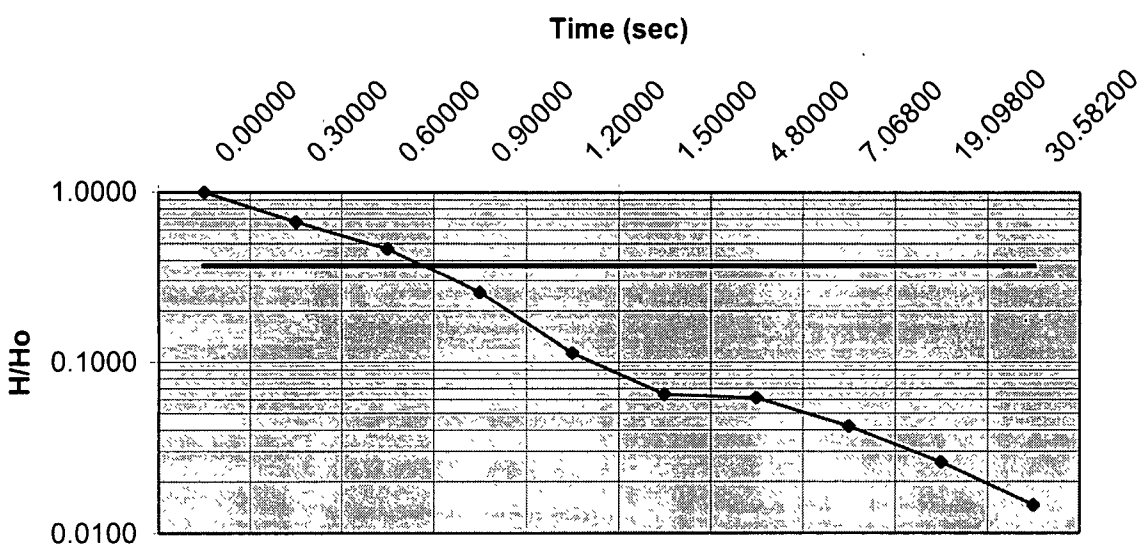
Hydraulic Cond

K value	units
3 033E+02	ft/day
3 511E-03	ft/sec
1 070E-01	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0.0000	0.617	1 0000
0 005	0 3000	0 414	0 6710
0 01	0 6000	0 288	0 4668
0 015	0 9000	0 159	0 2577
0 02	1 2000	0.07	0 1135
0 025	1 5000	0.04	0 0648
0 08	4 8000	0 038	0 0616
0 1178	7 0680	0.026	0 0421
0 3183	19.0980	0.016	0.0259
0 5097	30.5820	0.009	0 0146

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-07D-F
Site Name	16
Test Date	02/20/2001
Time	1145
Rising/Falling Head	F
Initial Water level (ft TOR)	10 32

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	4 4

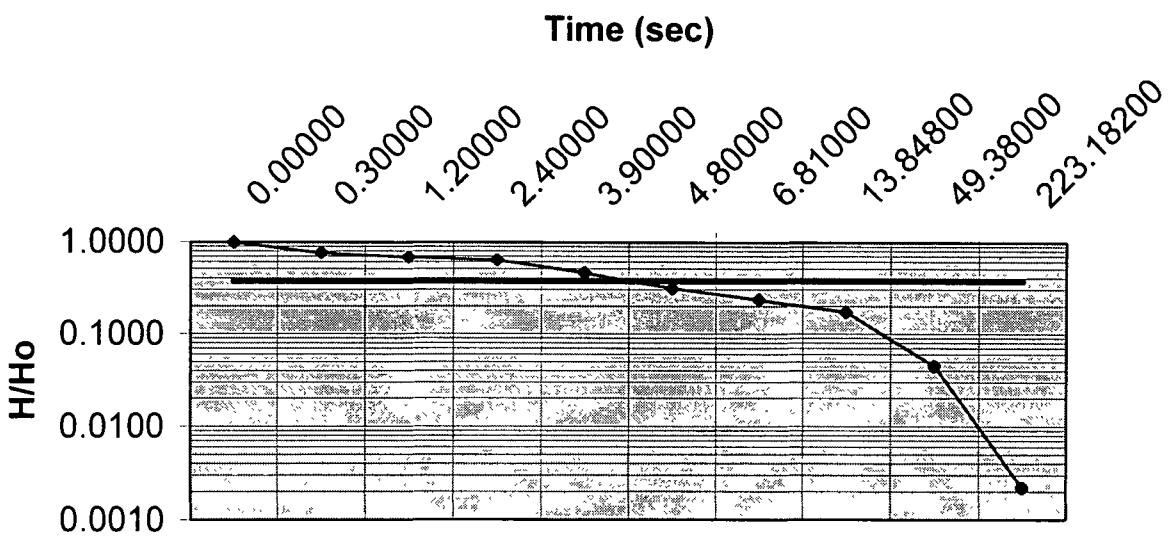
Hydraulic Cond

K value	units
3 241E+01	ft/day
3 751E-04	ft/sec
1 143E-02	cm/sec

Drawdown

Time Min	sec	head change	H/ho
0	0 0000	0 91	1 0000
0 005	0 3000	0 693	0 7615
0 02	1 2000	0 621	0 6824
0.04	2 4000	0 57	0 6264
0 065	3 9000	0.414	0 4549
0 08	4 8000	0 282	0 3099
0 1135	6 8100	0 214	0 2352
0 2308	13 8480	0 157	0 1725
0 823	49 3800	0 041	0 0451
3 7197	223 1820	0 002	0 0022

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-07D-R
Site Name	16
Test Date	02/20/2001
Time	1145
Rising/Falling Head	R
Initial Water level	10 32

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	4 2

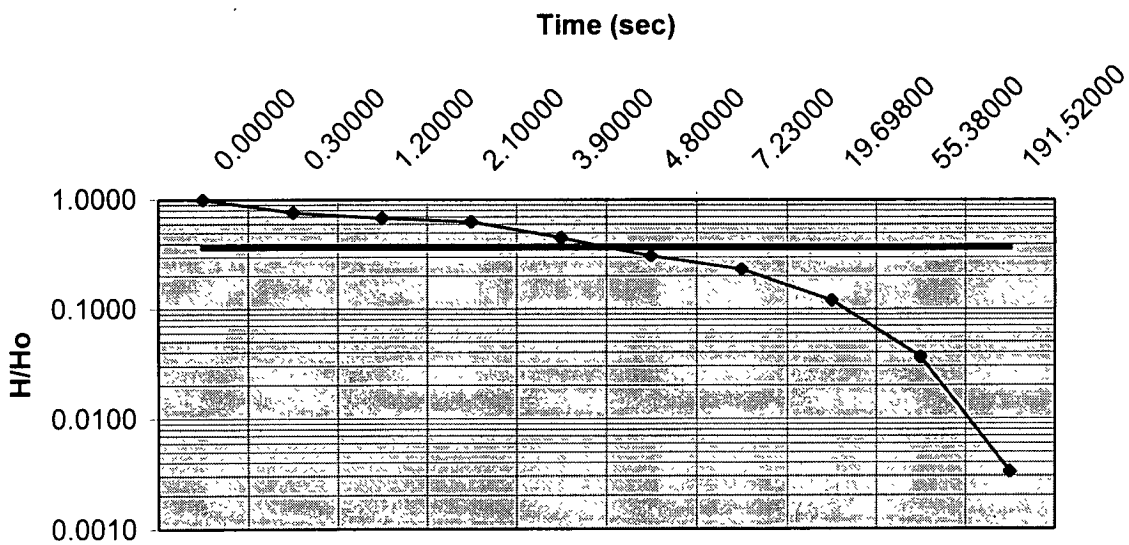
Hydraulic Cond

K value	units
3 395E+01	ft/day
3 930E-04	ft/sec
1 198E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 91	1 0000
0 005	0 3000	0 693	0 7615
0 02	1 2000	0 621	0 6824
0 035	2 1000	0 574	0 6308
0 065	3 9000	0 414	0 4549
0 08	4 8000	0.282	0.3099
0 1205	7 2300	0 21	0.2308
0 3283	19 6980	0 109	0 1198
0 923	55 3800	0 033	0.0363
3 192	191 5200	0 003	0 0033

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-08D-F
Site Name	16
Test Date	02/16/2001
Time	1146
Rising/Falling Head	F
Initial Water level	17 83

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	15
R	radius of screen	0.083
T_o	time at 37% drawdown	0 75

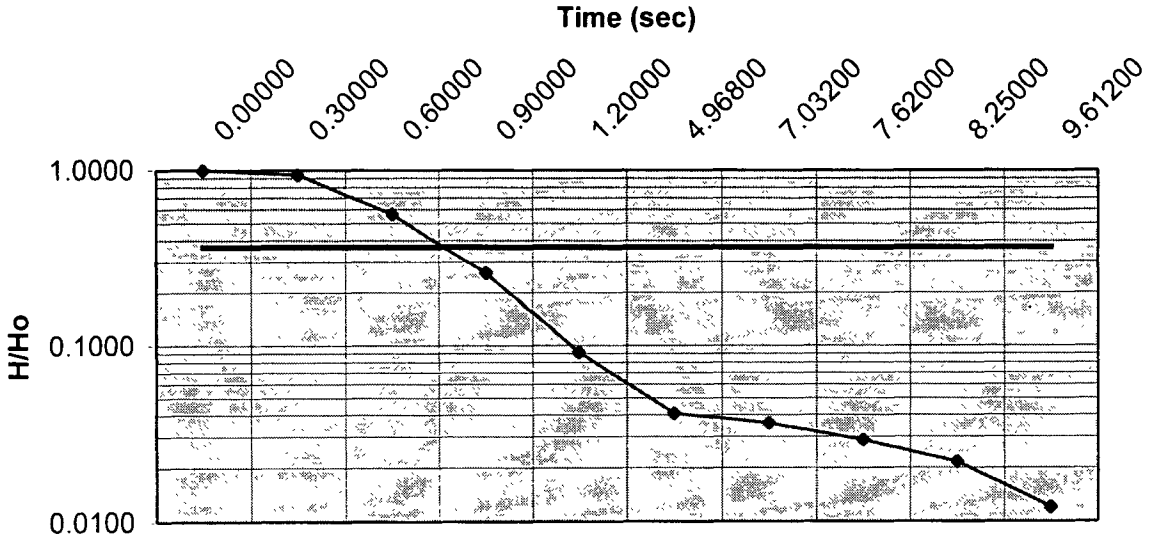
Hydraulic Cond

K value	units
1 375E+02	ft/day
1 591E-03	ft/sec
4 850E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 416	1 0000
0 005	0 3000	0 392	0 9423
0 01	0.6000	0 235	0 5649
0 015	0 9000	0 108	0 2596
0 02	1 2000	0 038	0 0913
0 0828	4.9680	0 017	0 0409
0 1172	7 0320	0 015	0.0361
0 127	7 6200	0.012	0 0288
0 1375	8 2500	0 009	0 0216
0 1602	9.6120	0.005	0 0120

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-08D-R
Site Name	16
Test Date	02/16/2001
Time	1146
Rising/Falling Head	R
Initial Water level	17 83

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0.083
L	length of screen	15
R	radius of screen	0 083
T_o	time at 37% drawdown	1 5

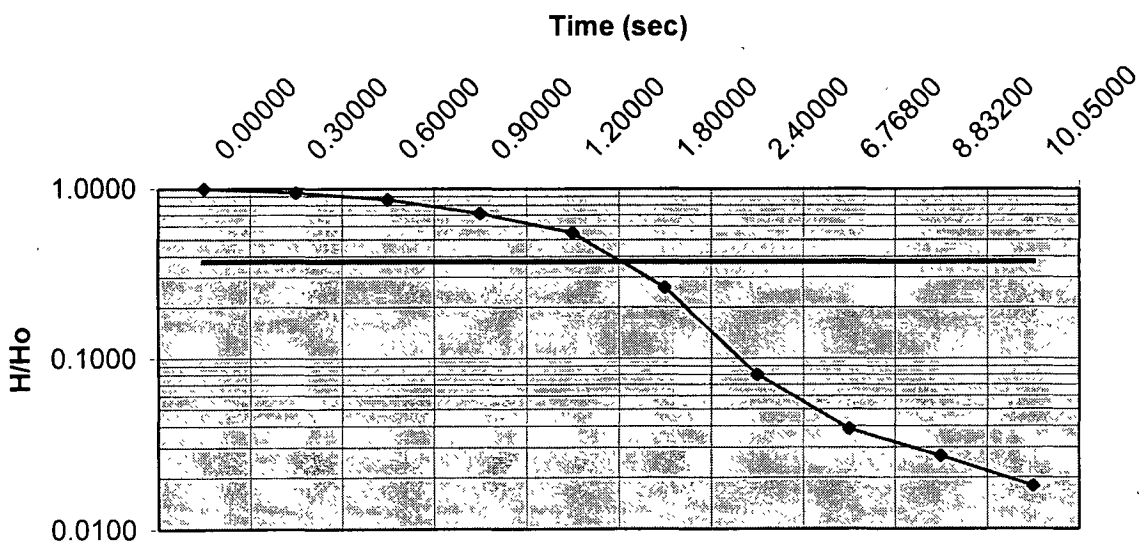
Hydraulic Cond

K value	units
6 874E+01	ft/day
7.956E-04	ft/sec
2 425E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 337	1 0000
0 005	0 3000	0.32	0 9496
0 01	0 6000	0 292	0 8665
0 015	0 9000	0 241	0.7151
0 02	1 2000	0 186	0.5519
0 03	1 8000	0 088	0.2611
0.04	2 4000	0 027	0 0801
0 1128	6.7680	0 013	0 0386
0 1472	8 8320	0 009	0 0267
0 1675	10 0500	0 006	0 0178

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-09D-F
Site Name	16
Test Date	02/16/2001
Time	1058
Rising/Falling Head	F
Initial Water level	18 75

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	94

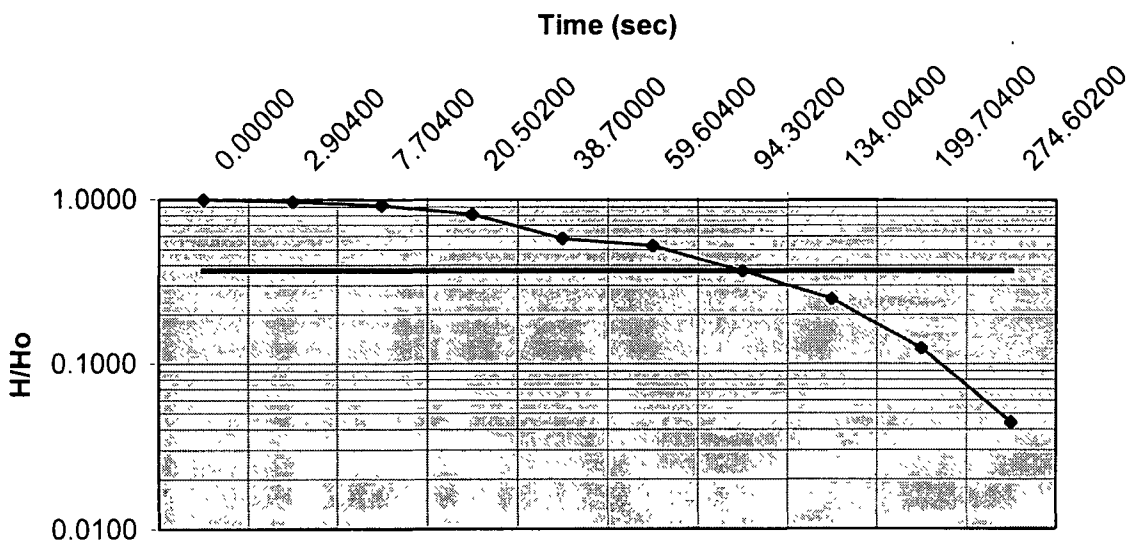
Hydraulic Cond

K value	units
1 517E+00	ft/day
1 756E-05	ft/sec
5 352E-04	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0.0000	0 362	1 0000
0 0484	2 9040	0.352	0 9724
0 1284	7 7040	0 334	0 9227
0 3417	20 5020	0 295	0 8149
0 645	38.7000	0 211	0 5829
0 9934	59 6040	0 192	0 5304
1 5717	94 3020	0 134	0 3702
2 2334	134 0040	0 09	0 2486
3 3284	199 7040	0 045	0.1243
4 5767	274 6020	0 016	0 0442

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-09D-R
Site Name	16
Test Date	02/16/2001
Time	1058
Rising/Falling Head	R
Initial Water level	18.75

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	15

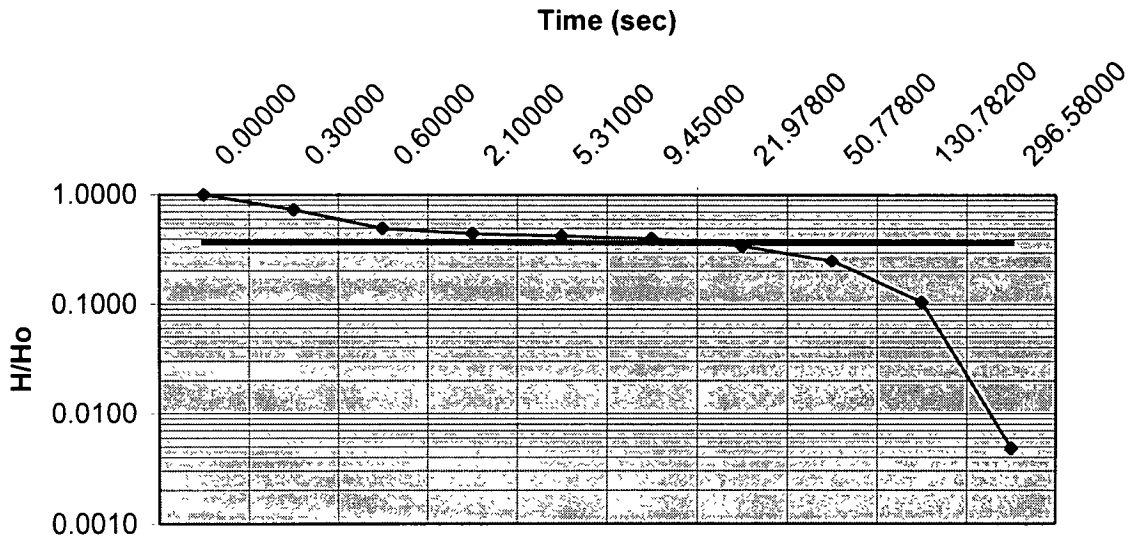
Hydraulic Cond

K value	units
9 506E+00	ft/day
1 100E-04	ft/sec
3 354E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0.0000	1 029	1 0000
0 005	0.3000	0 754	0 7328
0 01	0 6000	0 514	0 4995
0 035	2 1000	0 459	0 4461
0 0885	5 3100	0 439	0 4266
0.1575	9 4500	0 417	0 4052
0 3663	21 9780	0 358	0 3479
0 8463	50 7780	0 259	0 2517
2.1797	130 7820	0 108	0 1050
4 943	296.5800	0 005	0 0049

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-10D-F
Site Name	16
Test Date	02/16/2001
Time	1035
Rising/Falling Head	R
Initial Water level	15 45

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	50

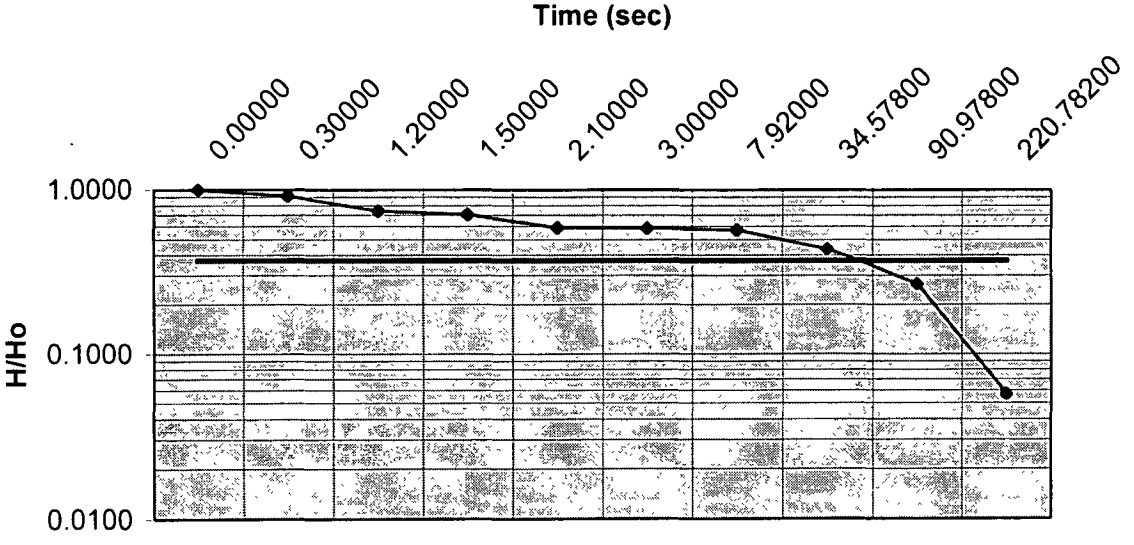
Hydraulic Cond

K value	units
2 852E+00	ft/day
3 301E-05	ft/sec
1 006E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 806	1 0000
0 005	0 3000	0 739	0 9169
0 02	1 2000	0 599	0 7432
0 025	1 5000	0 573	0 7109
0.035	2 1000	0 477	0 5918
0 05	3 0000	0 474	0 5881
0 132	7.9200	0 462	0 5732
0 5763	34 5780	0.356	0 4417
1.5163	90.9780	0.216	0 2680
3 6797	220.7820	0 046	0 0571

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-10D-R
Site Name	16
Test Date	02/16/2001
Time	1035
Rising/Falling Head	R
Initial Water level	1545

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	1

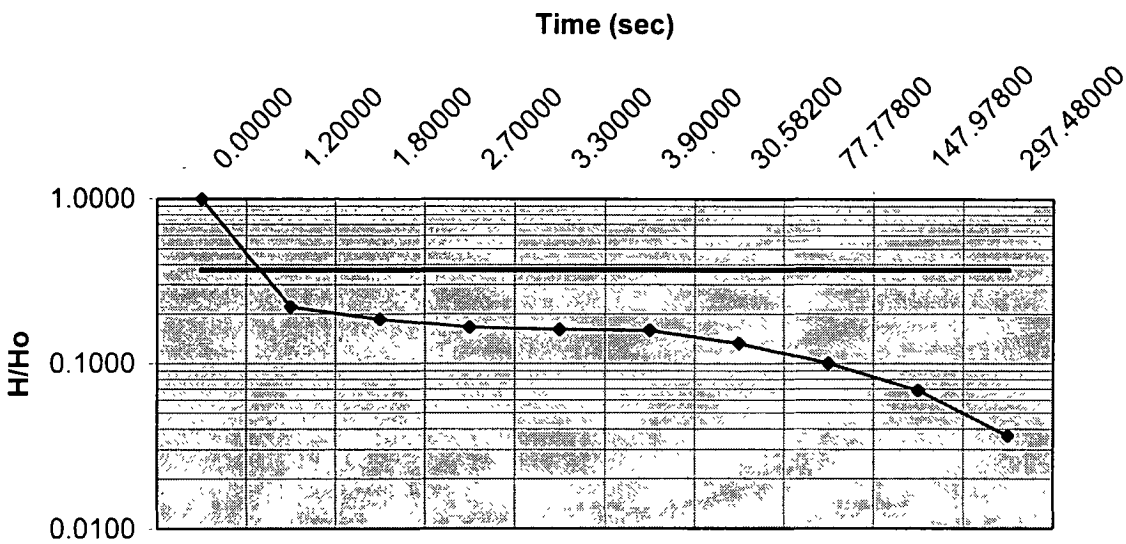
Hydraulic Cond

K value	units
1 426E+02	ft/day
1 650E-03	ft/sec
5 031E-02	cm/sec

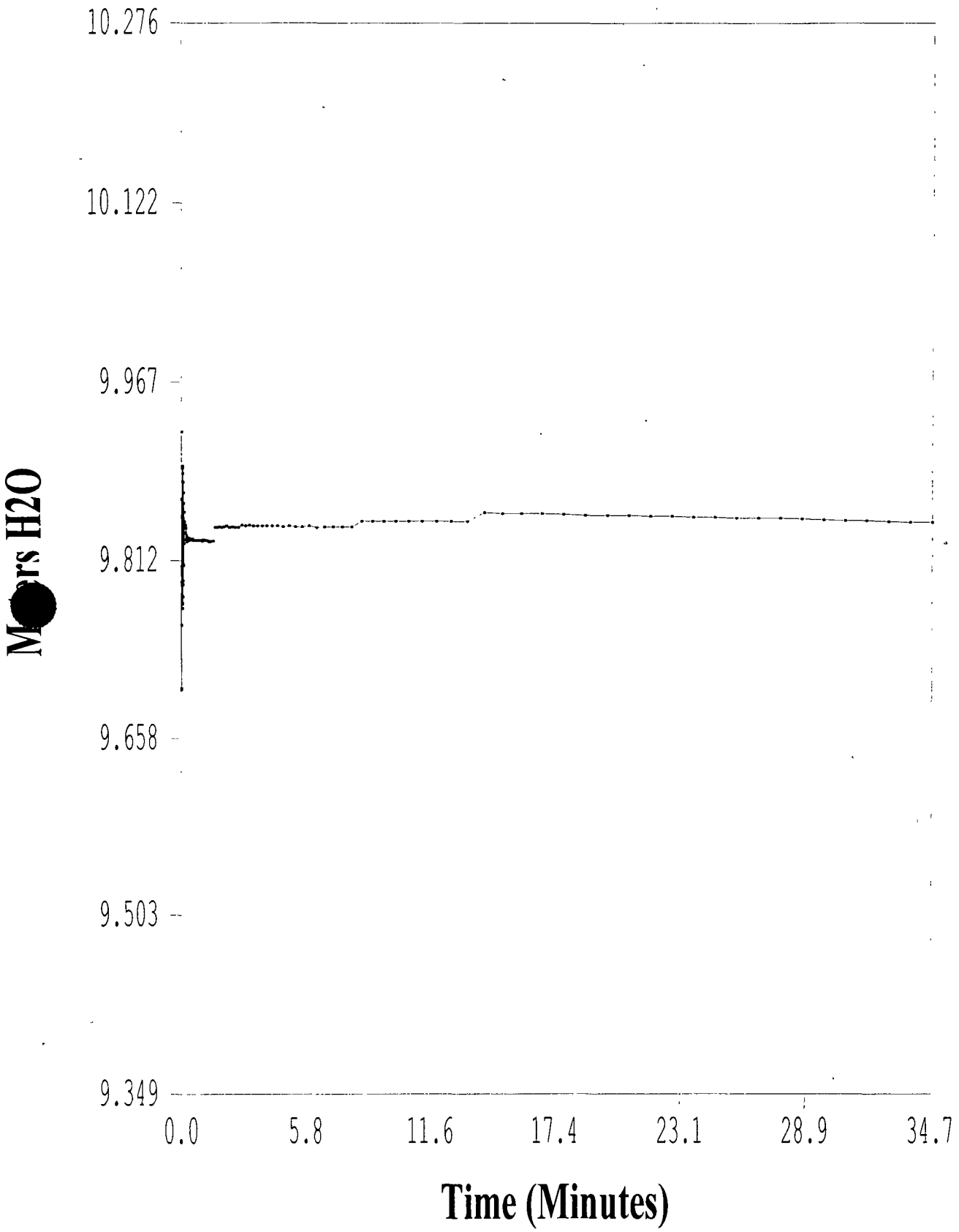
Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	3 138	1 0000
0 02	1 2000	0 691	0 2202
0 03	1 8000	0 583	0 1858
0 045	2 7000	0 52	0 1657
0.055	3 3000	0 504	0 1606
0 065	3 9000	0 497	0 1584
0 5097	30 5820	0 416	0 1326
1.2963	77 7780	0 314	0 1001
2 4663	147 9780	0 215	0 0685
4 958	297 4800	0 114	0 0363

Downdraw plot with time



MW16-10R, 1F



[2] - Water Levels

Slug Test Analysis Using Hvorslev Method

Well identification	MW16-11D-F
Site Name	16
Test Date	02/15/2001
Time	1255
Rising/Falling Head	F
Initial Water level	14.23

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	30

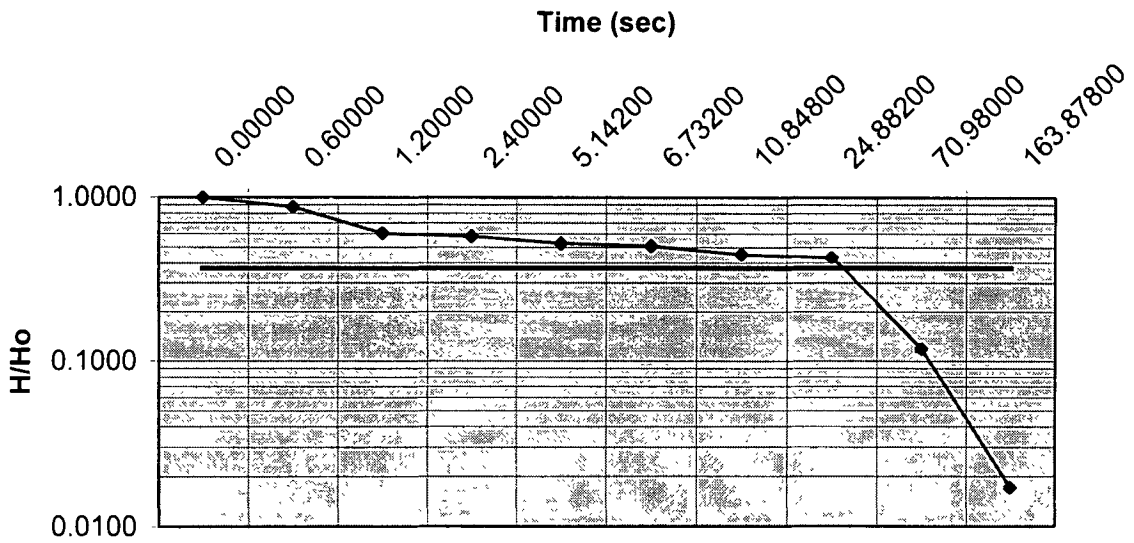
Hydraulic Cond

K value	units
4 753E+00	ft/day
5 501E-05	ft/sec
1 677E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 758	1 0000
0 01	0 6000	0 665	0 8773
0 02	1 2000	0 459	0 6055
0 04	2 4000	0.441	0 5818
0.0857	5 1420	0 402	0 5303
0 1122	6 7320	0 388	0 5119
0 1808	10.8480	0 345	0 4551
0 4147	24 8820	0 329	0 4340
1 183	70 9800	0 09	0.1187
2 7313	163 8780	0 013	0 0172

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-11D-R
Site Name	16
Test Date	02/15/2001
Time	1255
Rising/Falling Head	R
Initial Water level	14.23

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0.083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	11 5

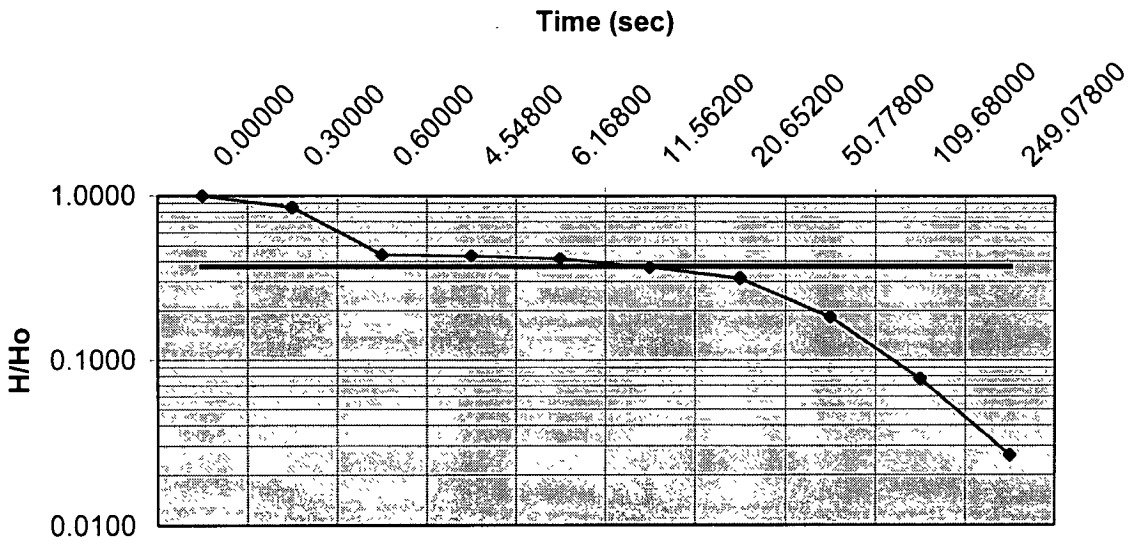
Hydraulic Cond

K value	units
1 240E+01	ft/day
1 435E-04	ft/sec
4 374E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 989	1 0000
0 005	0 3000	0 846	0 8554
0 01	0 6000	0 437	0 4419
0 0758	4 5480	0 431	0 4358
0 1028	6 1680	0 413	0 4176
0 1927	11 5620	0 361	0 3650
0 3442	20 6520	0 311	0 3145
0 8463	50 7780	0 18	0 1820
1 828	109 6800	0 076	0 0768
4 1513	249 0780	0 026	0 0263

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-12D-F
Site Name	16
Test Date	02/15/2001
Time	123
Rising/Falling Head	F
Initial Water level	16 89

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	6 2

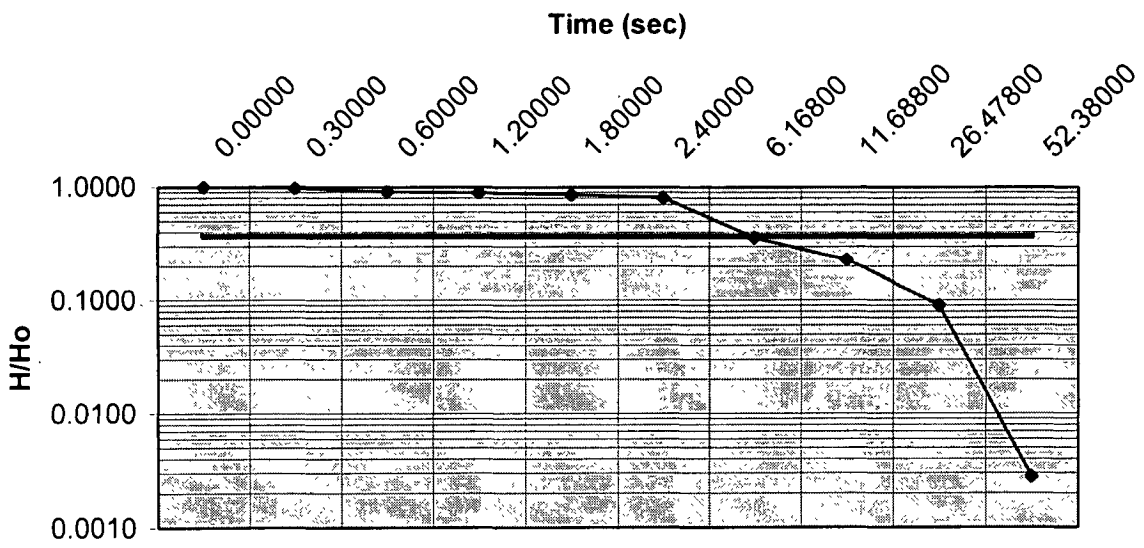
Hydraulic Cond

K value	units
2 300E+01	ft/day
2 662E-04	ft/sec
8 114E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 714	1 0000
0 005	0 3000	0 701	0 9818
0 01	0 6000	0 651	0 9118
0 02	1 2000	0 641	0 8978
0 03	1 8000	0 615	0 8613
0 04	2 4000	0 581	0.8137
0 1028	6 1680	0 256	0 3585
0 1948	11 6880	0 165	0 2311
0 4413	26 4780	0 064	0.0896
0 873	52 3800	0 002	0 0028

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-12D-R
Site Name	16
Test Date	02/15/2001
Time	1230
Rising/Falling Head	R
Initial Water level	16.89

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	1 2

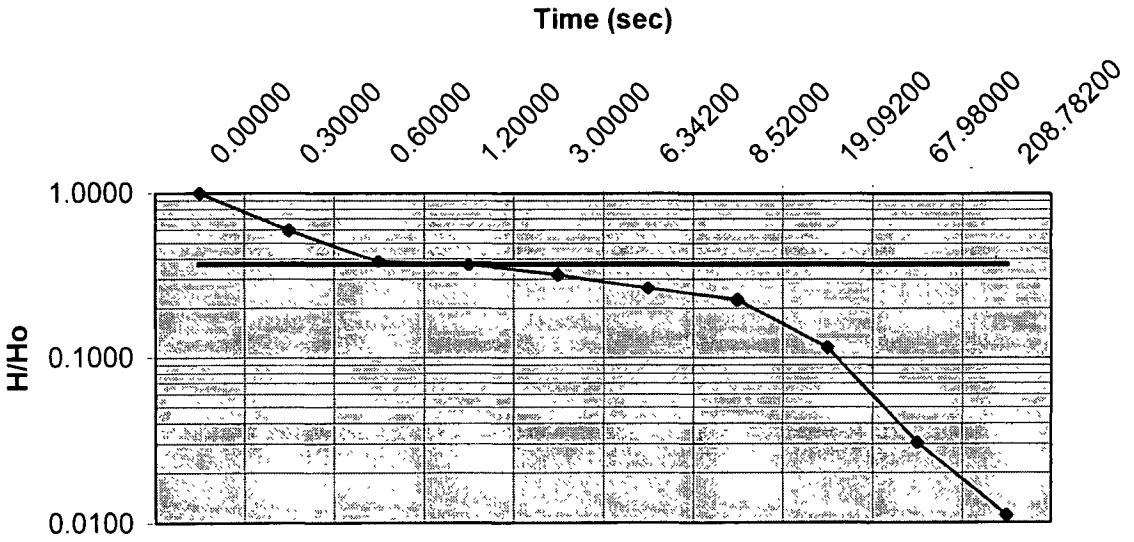
Hydraulic Cond

K value	units
1 188E+02	ft/day
1 375E-03	ft/sec
4 192E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1 083	1 0000
0 005	0 3000	0 649	0 5993
0 01	0 6000	0 418	0 3860
0 02	1 2000	0 398	0 3675
0 05	3 0000	0 346	0 3195
0 1057	6 3420	0 286	0 2641
0 142	8 5200	0 243	0 2244
0 3182	19 0920	0 124	0 1145
1 133	67 9800	0 033	0 0305
3.4797	208 7820	0 012	0 0111

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-13D-F
Site Name	16
Test Date	02/15/2001
Time	1350
Rising/Falling Head	F
Initial Water level	13.89

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	12

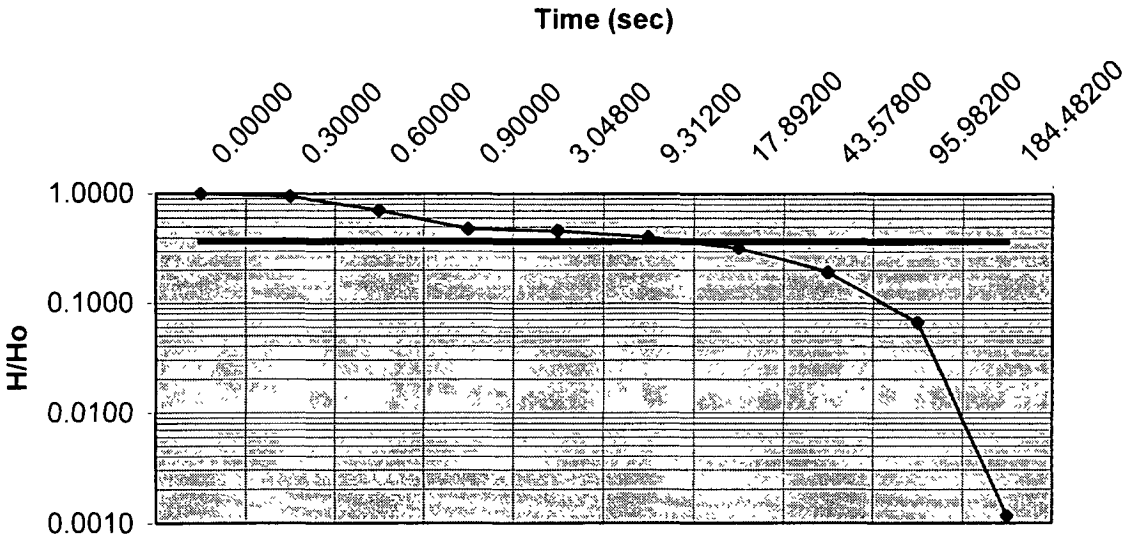
Hydraulic Cond

K value	units
1 188E+01	ft/day
1 375E-04	ft/sec
4 192E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 863	1 0000
0 005	0 3000	0 815	0 9444
0.01	0 6000	0.61	0 7068
0 015	0 9000	0 416	0 4820
0 0508	3 0480	0.399	0.4623
0 1552	9 3120	0 355	0 4114
0.2982	17 8920	0 281	0 3256
0 7263	43 5780	0 166	0 1924
1 5997	95 9820	0 057	0 0660
3 0747	184 4820	0 001	0 0012

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-13D-R
Site Name	16
Test Date	02/15/2001
Time	1350
Rising/Falling Head	R
Initial Water level	13 89

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0.083
T_o	time at 37% drawdown	22.2

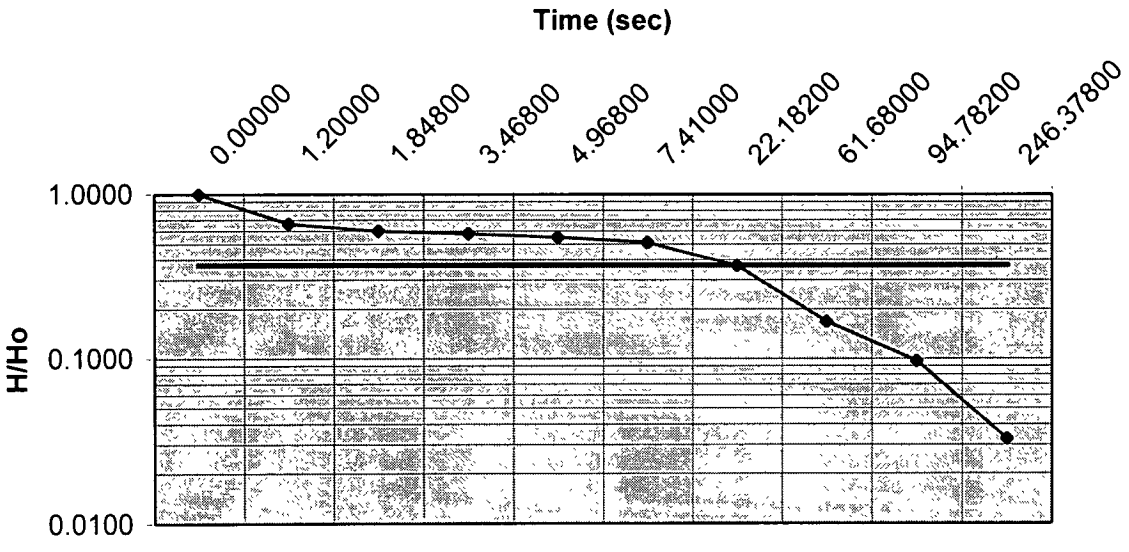
Hydraulic Cond

K value	units
6 423E+00	ft/day
7 434E-05	ft/sec
2 266E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 735	1.0000
0 02	1 2000	0 489	0 6653
0 0308	1 8480	0 442	0 6014
0 0578	3 4680	0 427	0 5810
0 0828	4 9680	0 405	0 5510
0 1235	7 4100	0 377	0 5129
0 3697	22 1820	0 271	0 3687
1.028	61 6800	0 123	0 1673
1.5797	94 7820	0 071	0 0966
4 1063	246 3780	0 024	0 0327

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-14D-R
Site Name	16
Test Date	02/15/2001
Time	1130
Rising/Falling Head	R
Initial Water level	15 89

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0.083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	1 2

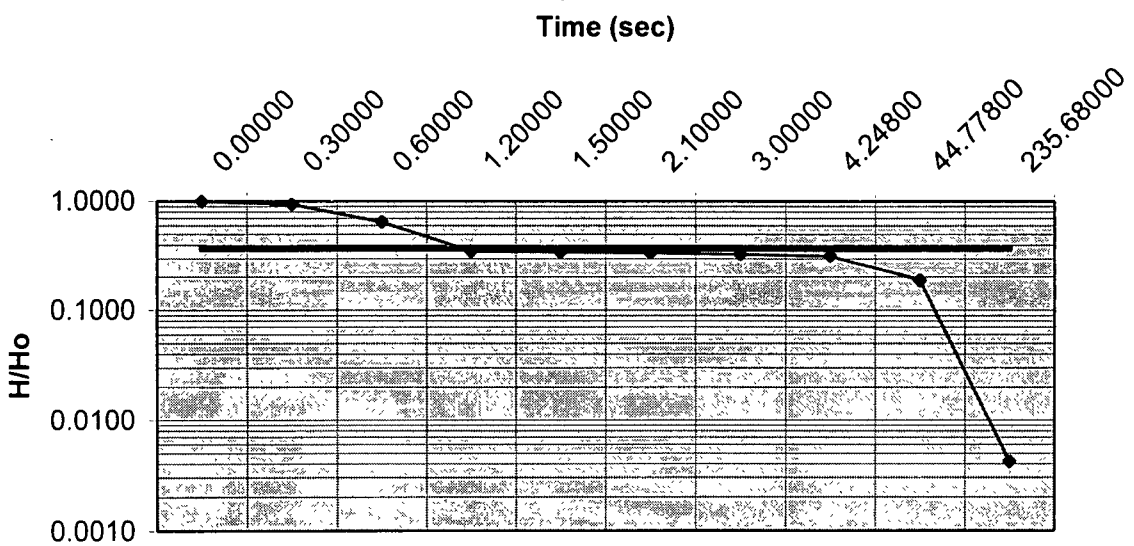
Hydraulic Cond

K value	units
1 188E+02	ft/day
1 375E-03	ft/sec
4 192E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1 423	1.0000
0 005	0 3000	1 343	0 9438
0 01	0 6000	0 925	0 6500
0 02	1 2000	0 504	0 3542
0 025	1 5000	0 497	0 3493
0 035	2 1000	0 486	0 3415
0 05	3 0000	0 474	0 3331
0 0708	4 2480	0 456	0 3204
0.7463	44 7780	0 269	0.1890
3 928	235 6800	0 006	0.0042

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-14D-F
Site Name	16
Test Date	02/15/2001
Time	1130
Rising/Falling Head	F
Initial Water level	15 89

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	19

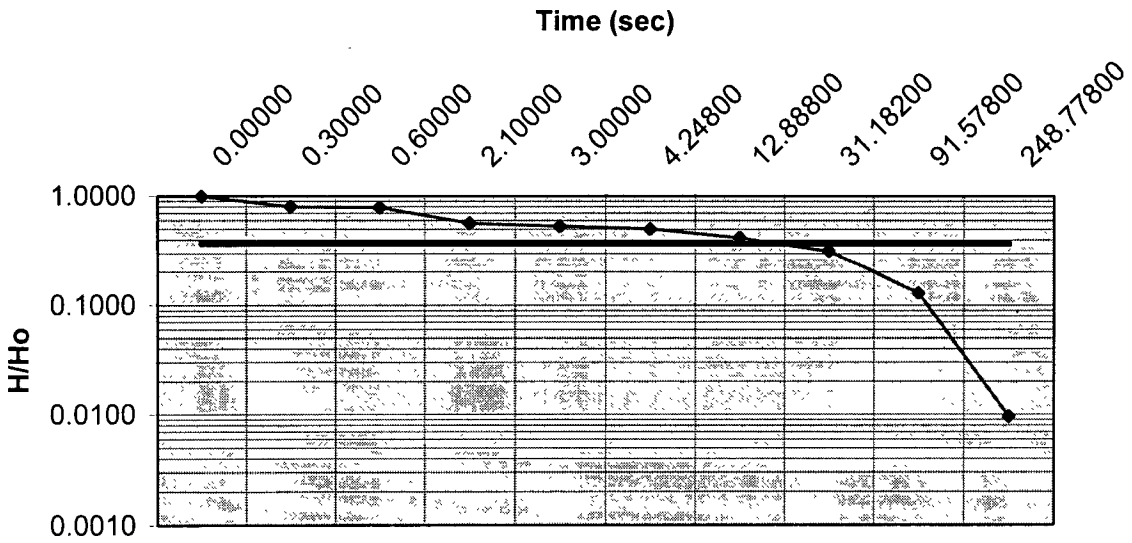
Hydraulic Cond

K value	units
7 505E+00	ft/day
8 686E-05	ft/sec
2 648E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 939	1 0000
0 005	0 3000	0 753	0 8019
0 01	0 6000	0 743	0 7913
0 035	2 1000	0 532	0.5666
0.05	3 0000	0 501	0 5335
0 0708	4 2480	0 475	0 5059
0.2148	12 8880	0.392	0 4175
0 5197	31 1820	0 297	0 3163
1.5263	91 5780	0 122	0 1299
4.1463	248 7780	0 009	0 0096

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-15D-F
Site Name	16
Test Date	02/15/2001
Time	820
Rising/Falling Head	F
Initial Water level	18 3

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0.083
T_o	time at 37% drawdown	3

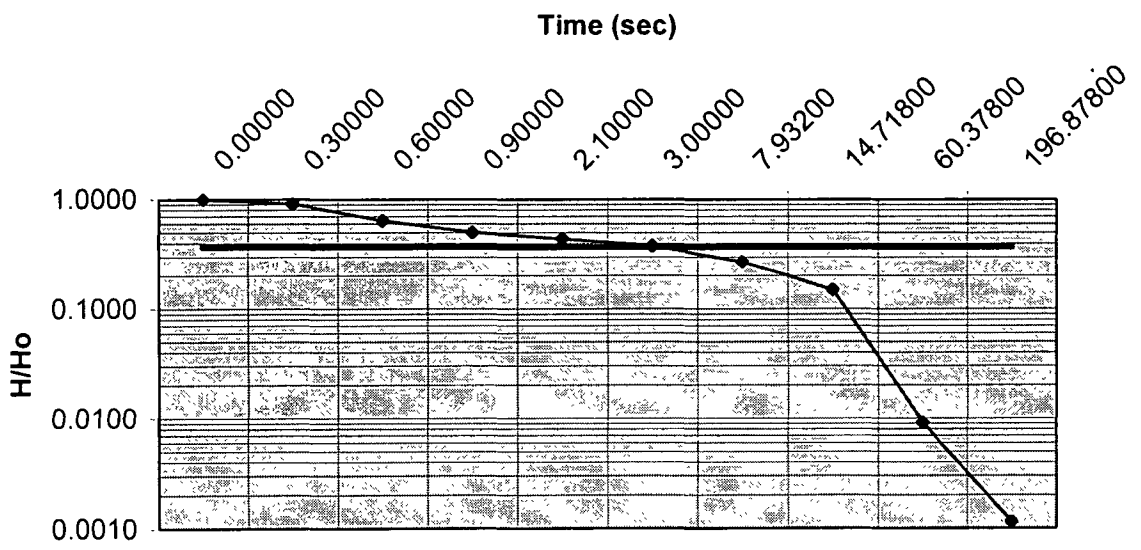
Hydraulic Cond

K value	units
4 753E+01	ft/day
5 501E-04	ft/sec
1 677E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 872	1.0000
0 005	0 3000	0 798	0 9151
0 01	0 6000	0 557	0 6388
0 015	0 9000	0 441	0 5057
0 035	2 1000	0 382	0 4381
0 05	3 0000	0 334	0 3830
0 1322	7 9320	0 237	0 2718
0.2453	14 7180	0 1307	0 1499
1.0063	60.3780	0.008	0 0092
3 2813	196 8780	0 001	0.0011

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-15D-R
Site Name	16
Test Date	02/15/2001
Time	820
Rising/Falling Head	R
Initial Water level	18 3

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	0 7

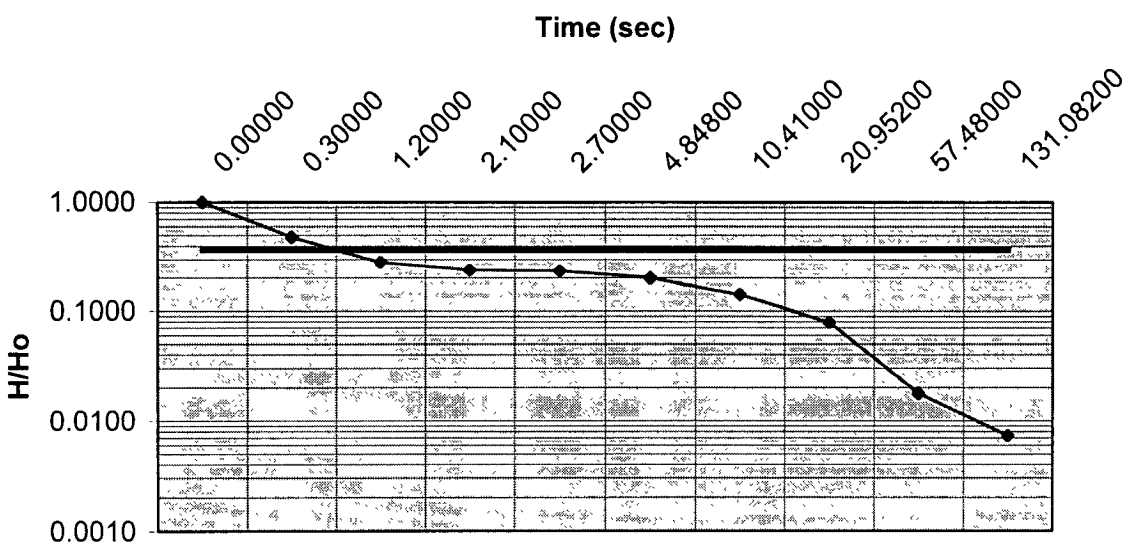
Hydraulic Cond

K value	units
2 037E+02	ft/day
2 358E-03	ft/sec
7 186E-02	cm/sec

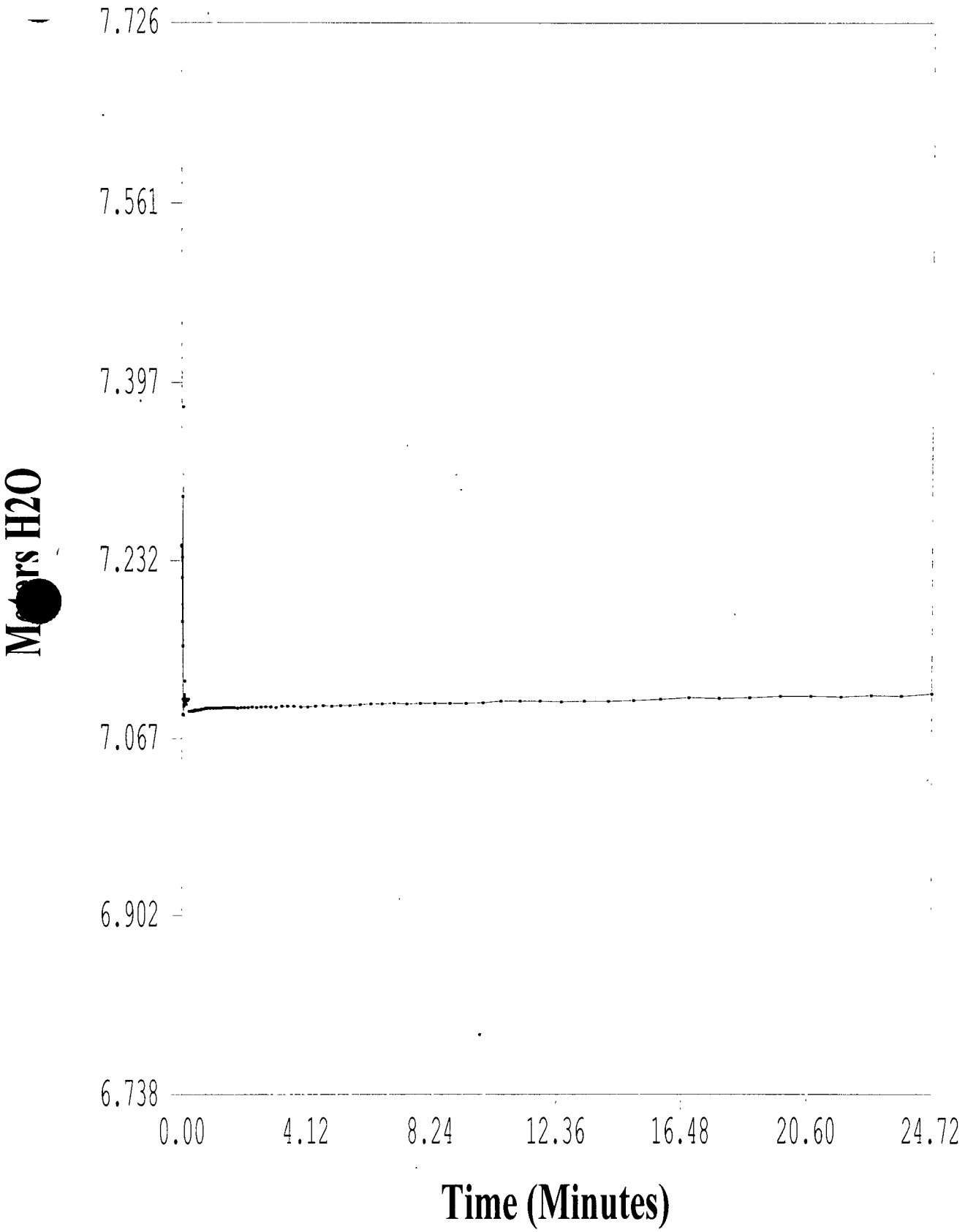
Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1 624	1 0000
0.005	0 3000	0 783	0 4821
0 02	1 2000	0 463	0 2851
0 035	2 1000	0 389	0 2395
0 045	2 7000	0 379	0 2334
0 0808	4 8480	0.327	0 2014
0 1735	10.4100	0 23	0 1416
0 3492	20 9520	0 128	0 0788
0.958	57 4800	0 029	0 0179
2 1847	131 0820	0 012	0 0074

Downdraw plot with time

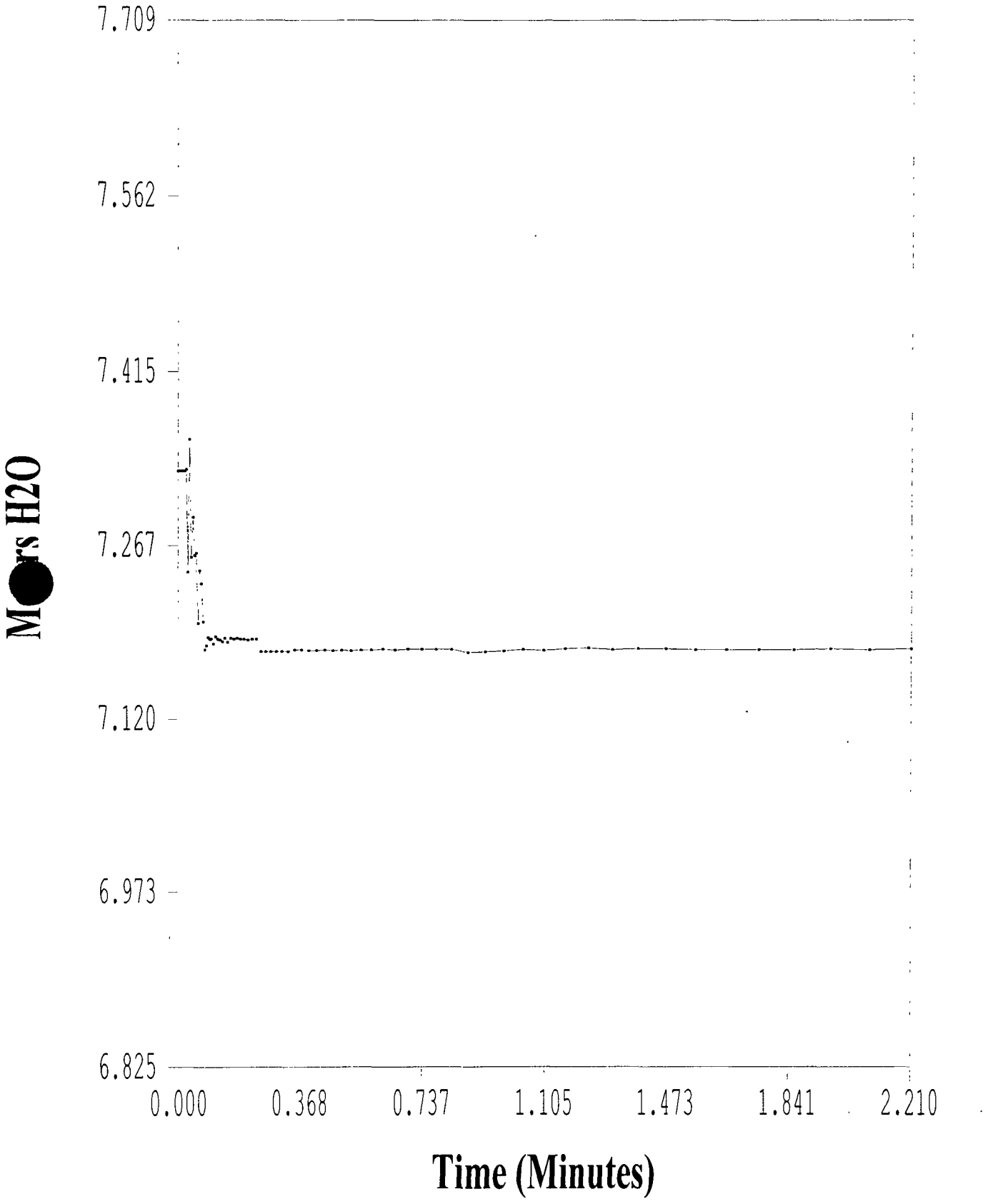


MW16-15R, 1R



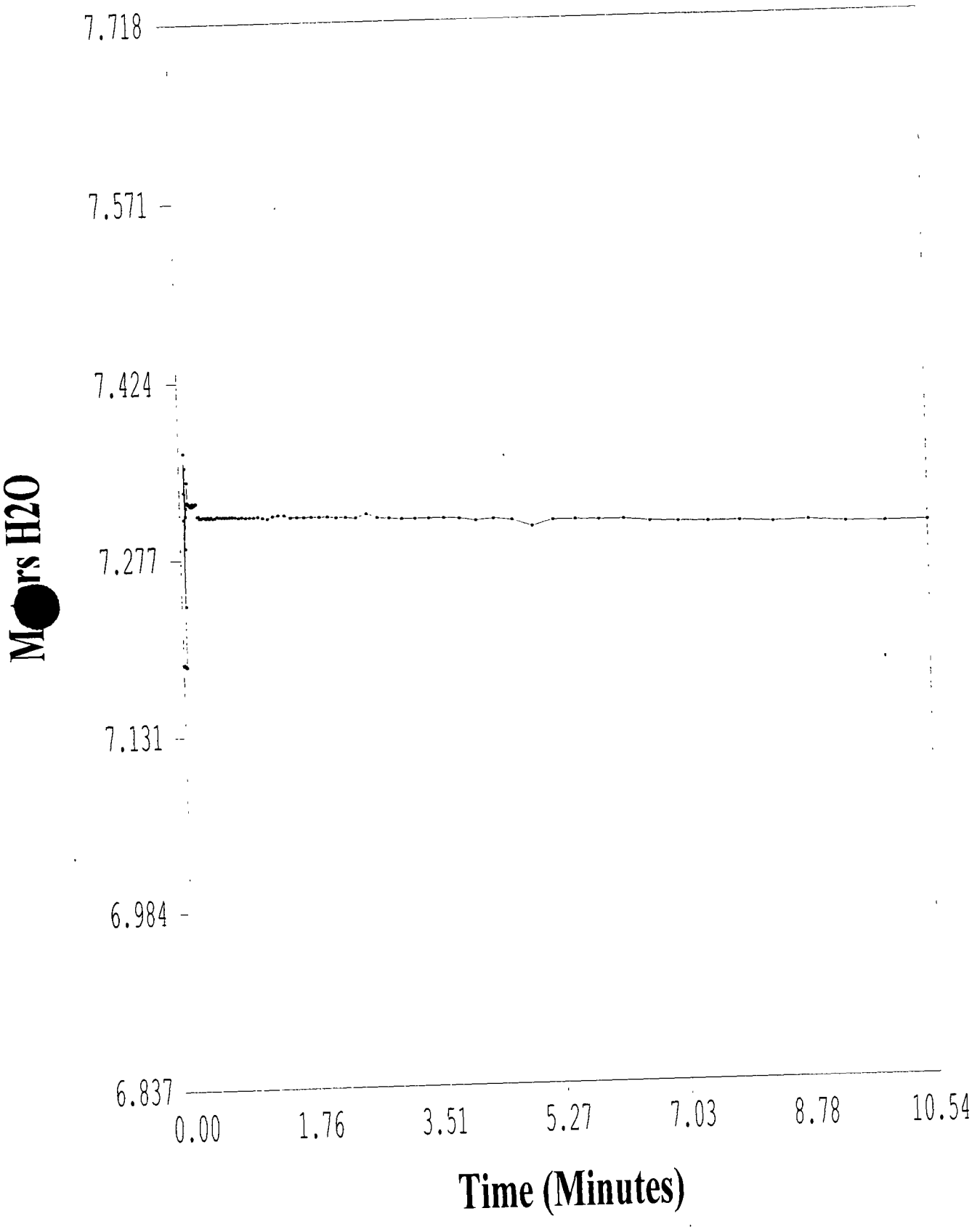
[2] - Water Levels

MW16-15R, 1R2



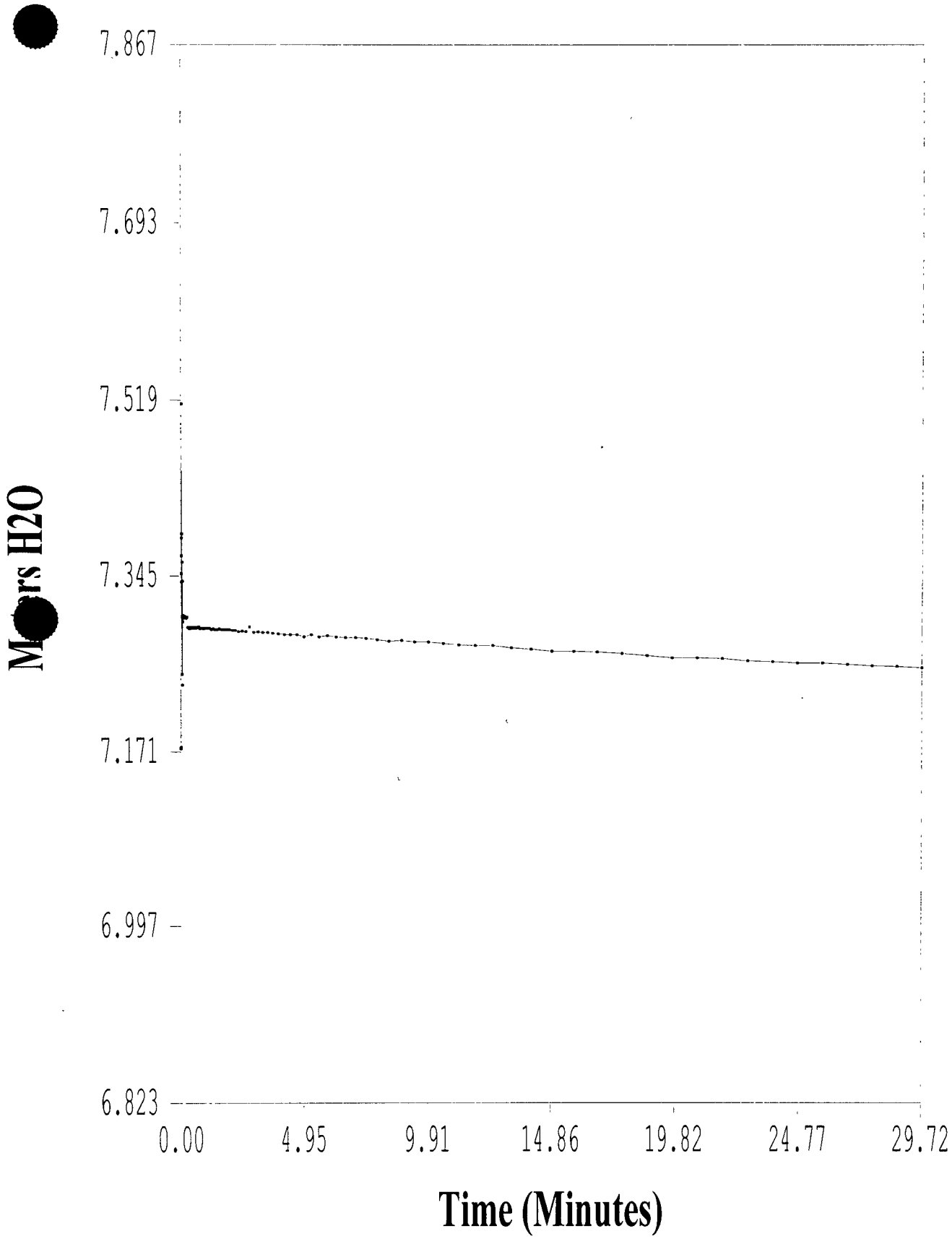
[2] - Water Levels

MW16-15R, 1F2



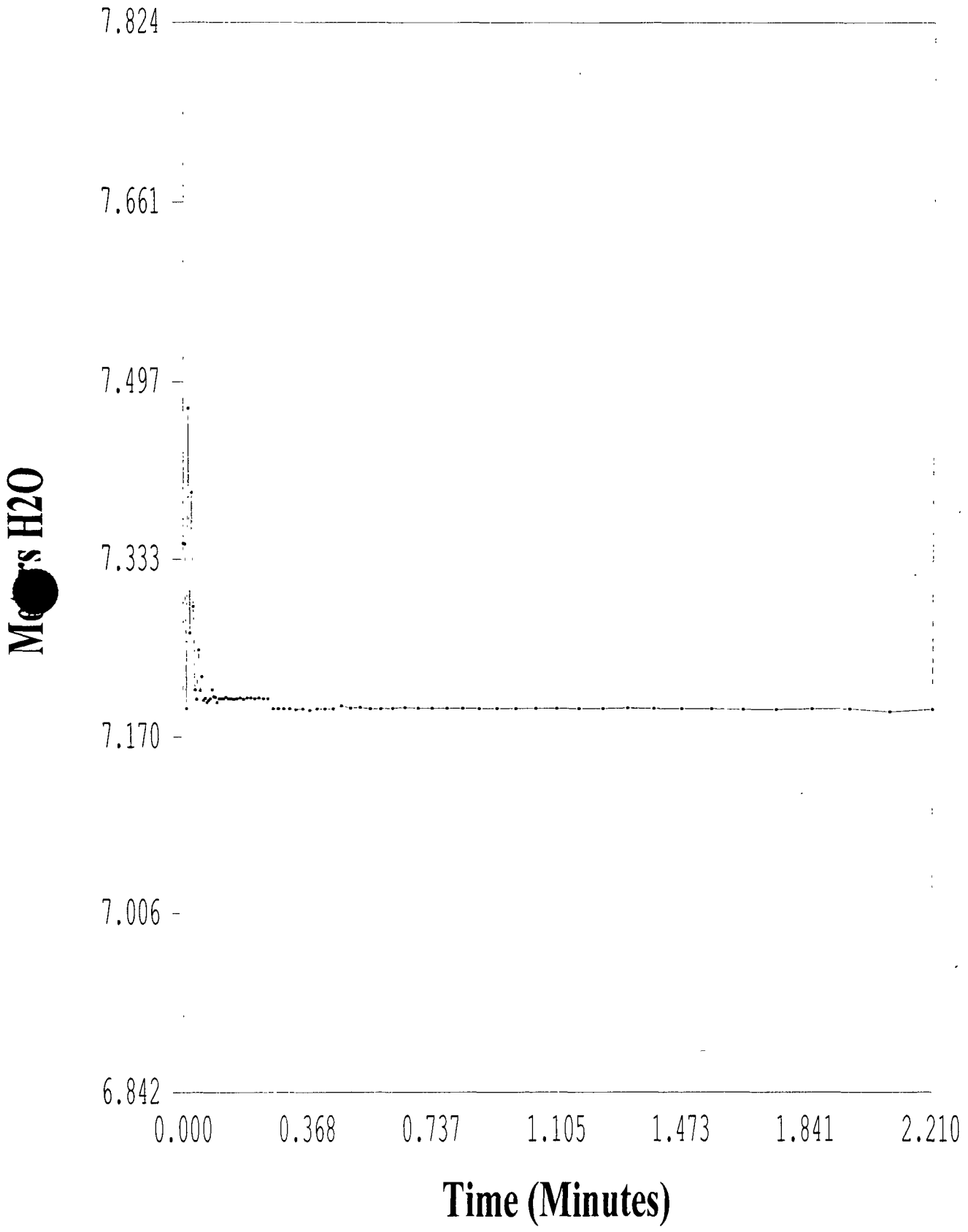
[2] - Water Levels

MW16-15R, 1F3



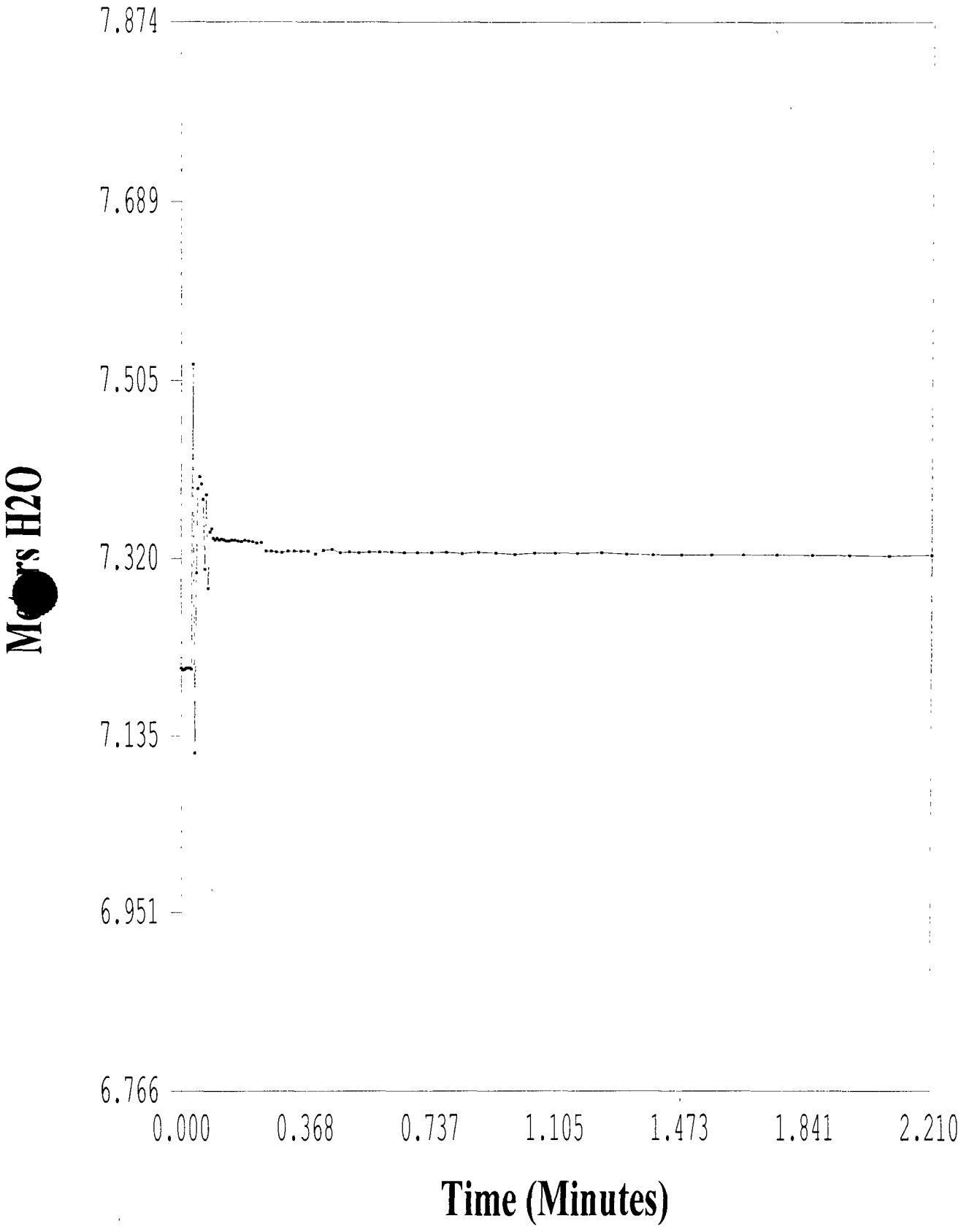
[2] - Water Levels

MW16-15R, 1R



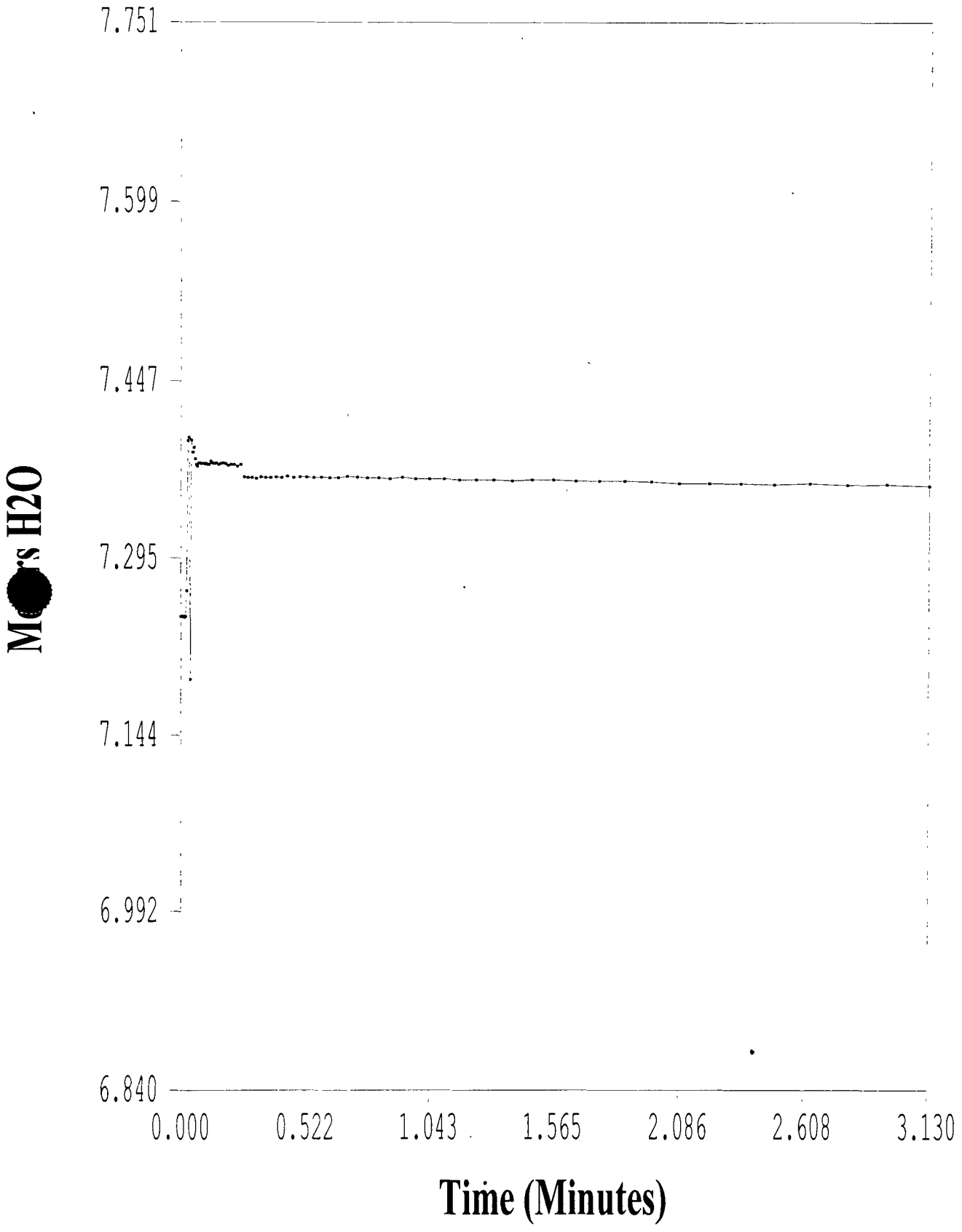
[2] - Water Levels

MW16-15R, 1F



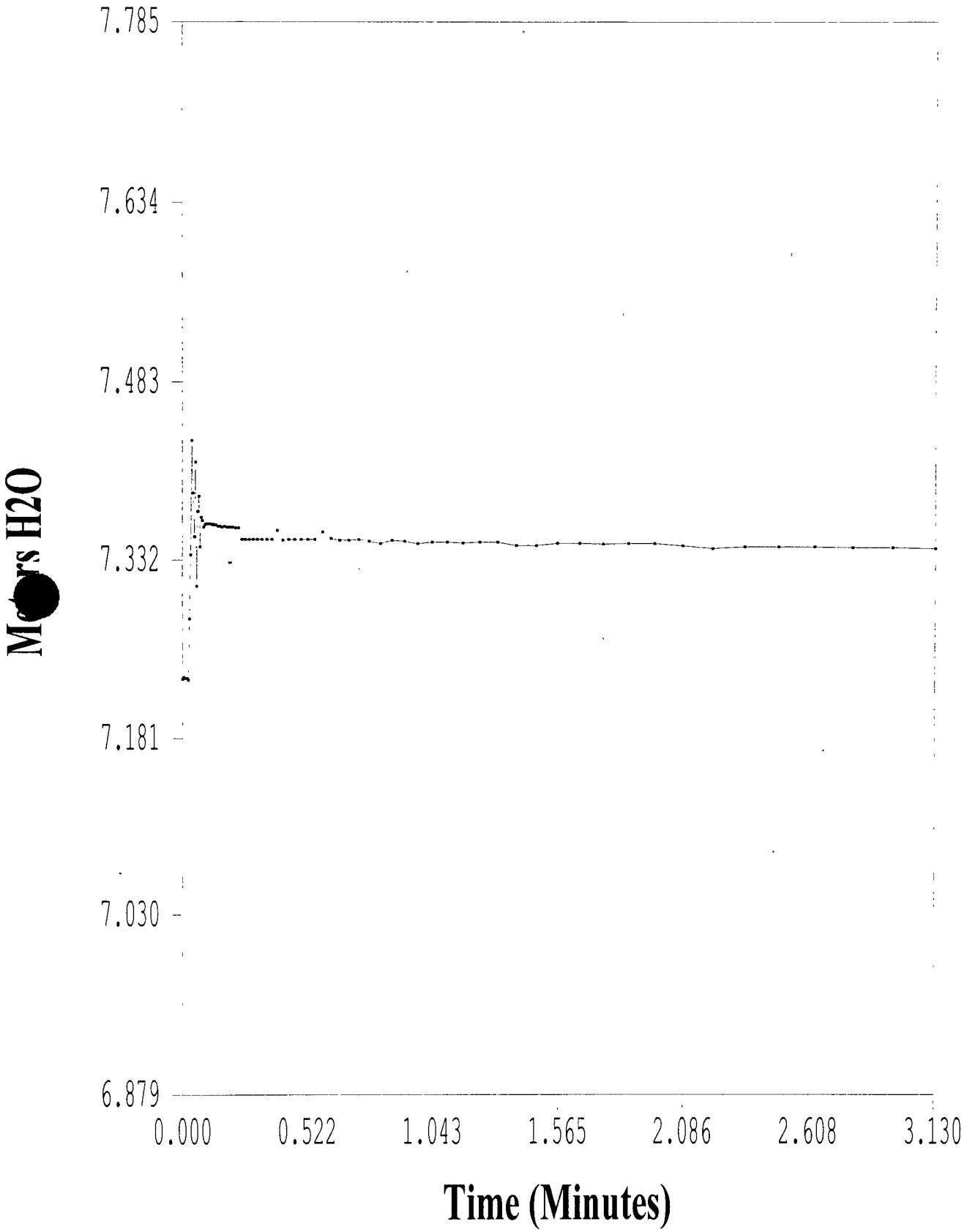
[2] - Water Levels

MW16-15R, 1F



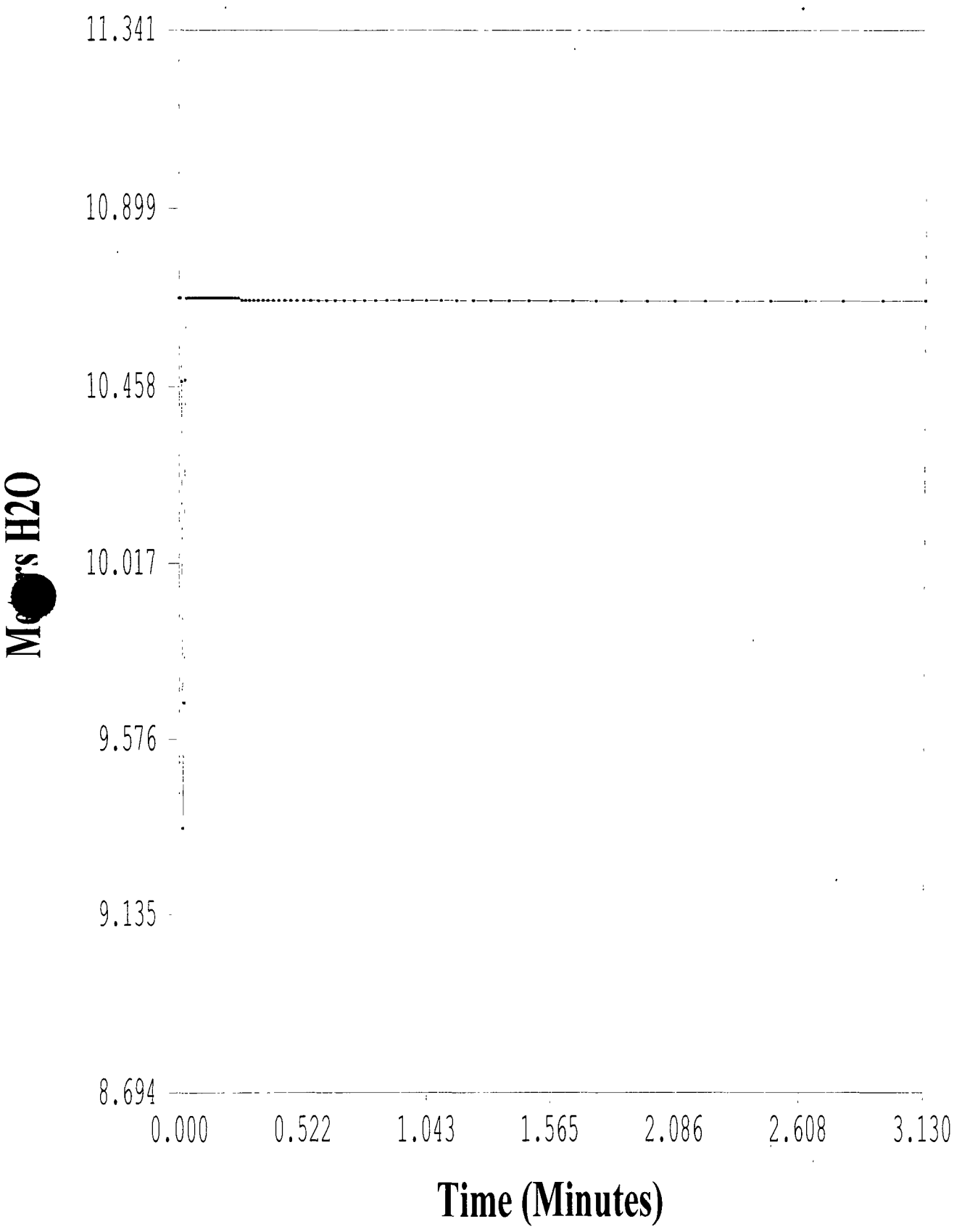
[2] - Water Levels

MW16-15R, 1F



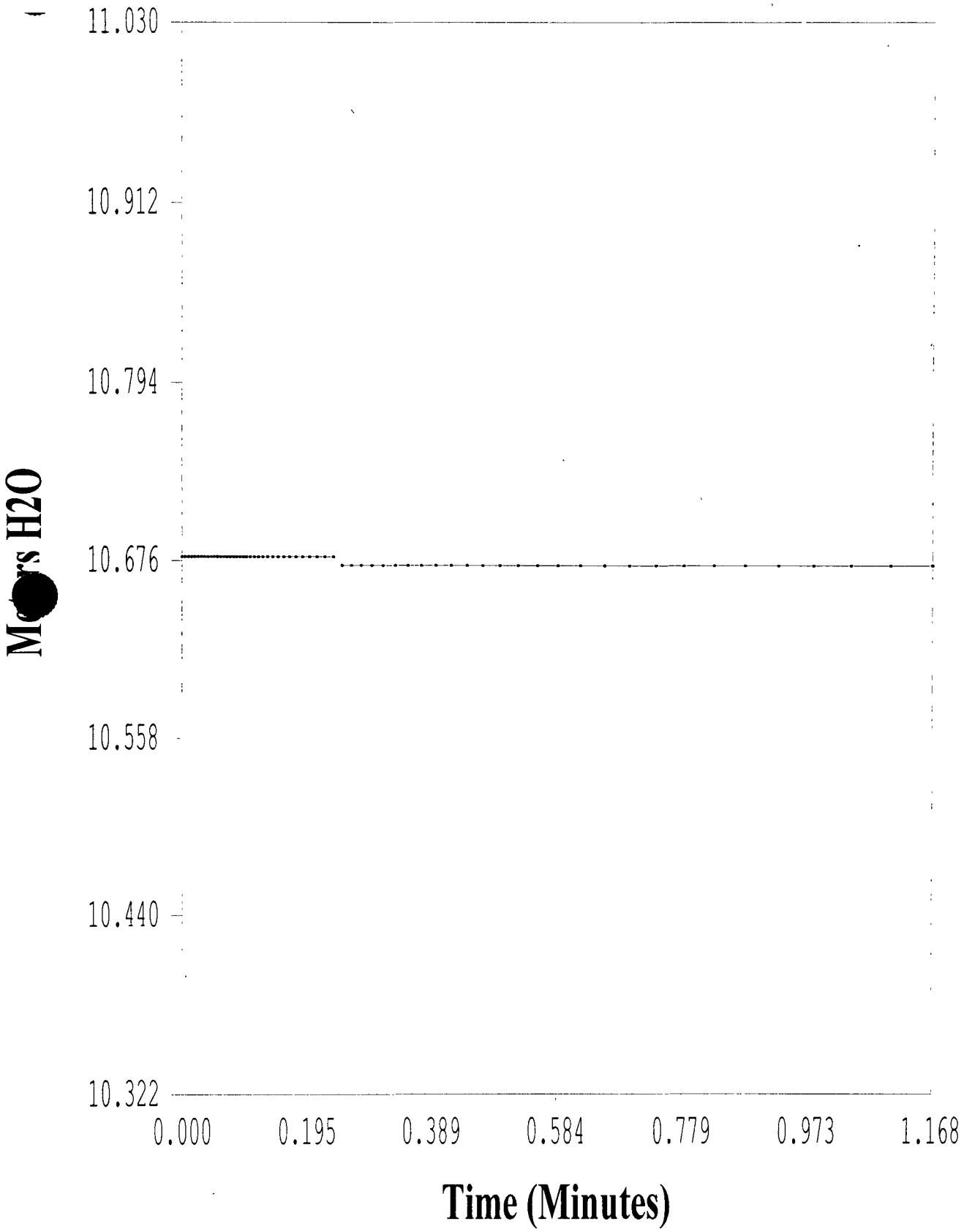
[2] - Water Levels

MW16-16D, 1R



[2] - Water Levels

MW16-16D, 1F



[2] - Water Levels

Slug Test Analysis Using Hvorslev Method

Well identification	MW16-17D-F
Site Name	16
Test Date	02/14/2001
Time	1220
Rising/Falling Head	F
Initial Water level	12.23

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	19

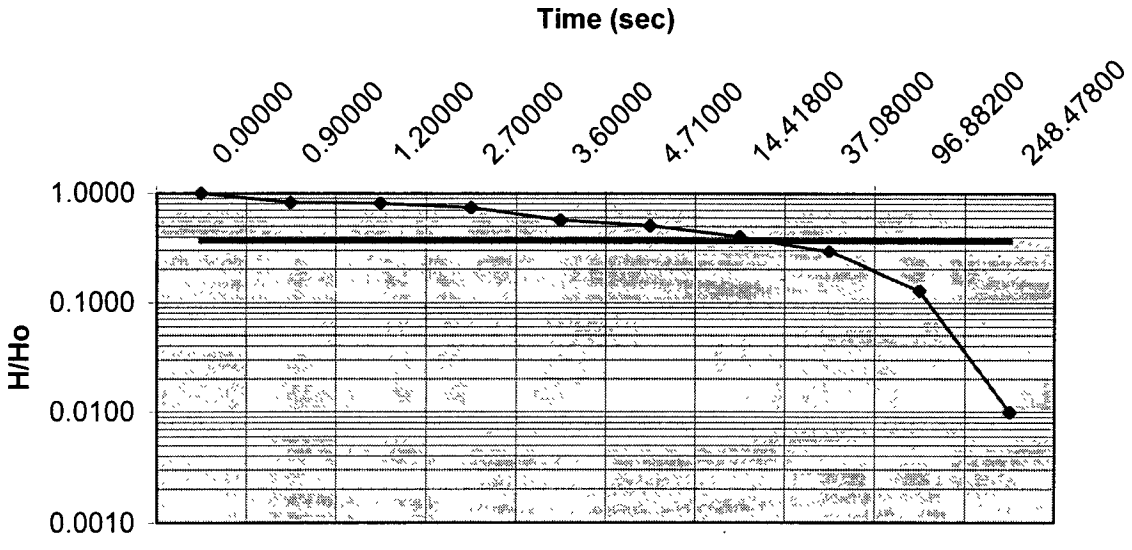
Hydraulic Cond

K value	units
7 505E+00	ft/day
8 686E-05	ft/sec
2 648E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 904	1 0000
0 015	0 9000	0 748	0 8274
0 02	1 2000	0 734	0 8119
0 045	2 7000	0 673	0 7445
0 06	3 6000	0 516	0 5708
0 0785	4 7100	0 459	0 5077
0 2403	14.4180	0 366	0 4049
0 618	37.0800	0 267	0 2954
1 6147	96 8820	0 115	0 1272
4 1413	248 4780	0 009	0 0100

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-17D-R
Site Name	16
Test Date	02/14/2001
Time	1220
Rising/Falling Head	R
Initial Water level	12.23

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	33

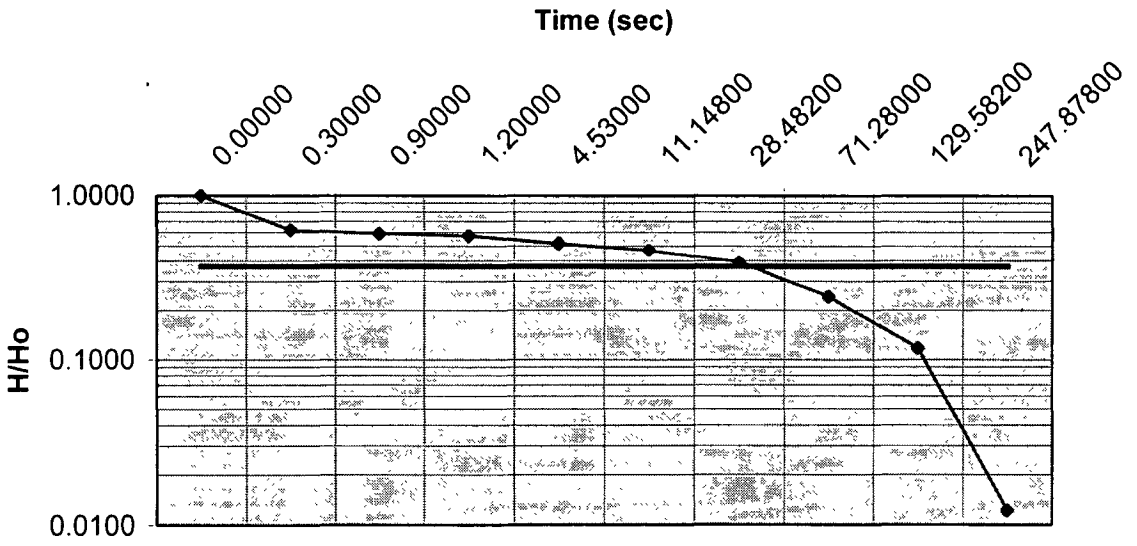
Hydraulic Cond

K value	units
4 321E+00	ft/day
5 001E-05	ft/sec
1 524E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 819	1 0000
0 005	0 3000	0 509	0.6215
0 015	0.9000	0 485	0 5922
0 02	1 2000	0 47	0 5739
0 0755	4 5300	0 425	0 5189
0 1858	11 1480	0 386	0 4713
0 4747	28 4820	0 323	0 3944
1 188	71 2800	0.198	0.2418
2 1597	129 5820	0 096	0 1172
4.1313	247 8780	0 01	0 0122

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-18D-F
Site Name	16
Test Date	02/14/2001
Time	1258
Rising/Falling Head	F
Initial Water level	12.4

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	8 9

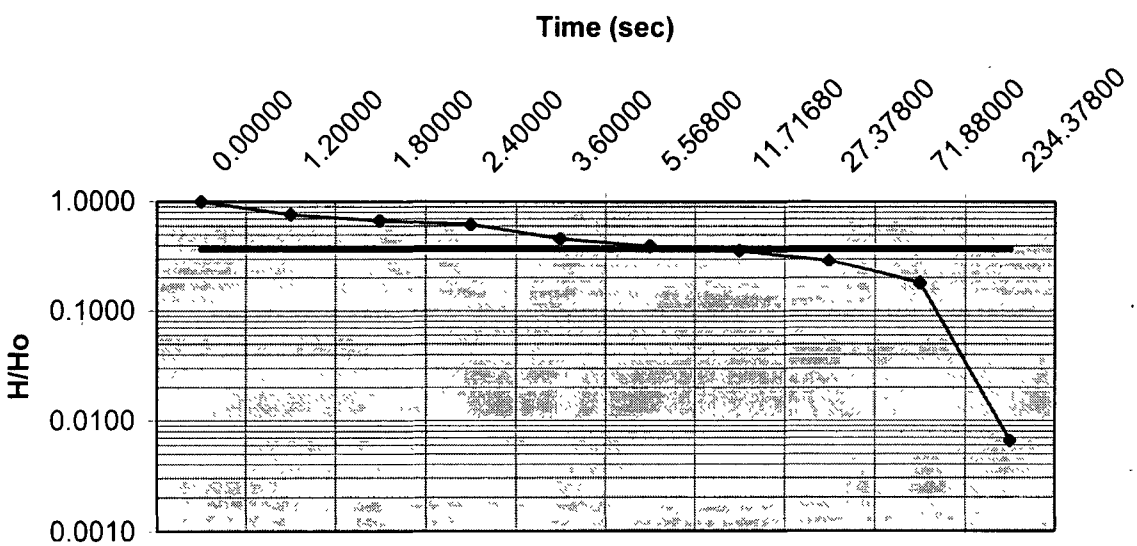
Hydraulic Cond

K value	units
1 602E+01	ft/day
1 854E-04	ft/sec
5 652E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 91	1 0000
0 02	1 2000	0 696	0 7648
0 03	1 8000	0 611	0.6714
0 04	2 4000	0 568	0 6242
0.06	3 6000	0 419	0 4604
0 0928	5 5680	0 358	0 3934
0 19528	11 7168	0 329	0 3615
0 4563	27 3780	0 266	0 2923
1 198	71 8800	0 165	0 1813
3 9063	234 3780	0 006	0 0066

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-18D-R
Site Name	16
Test Date	02/14/2001
Time	12 58
Rising/Falling Head	R
Initial Water level	12.40

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	0 8

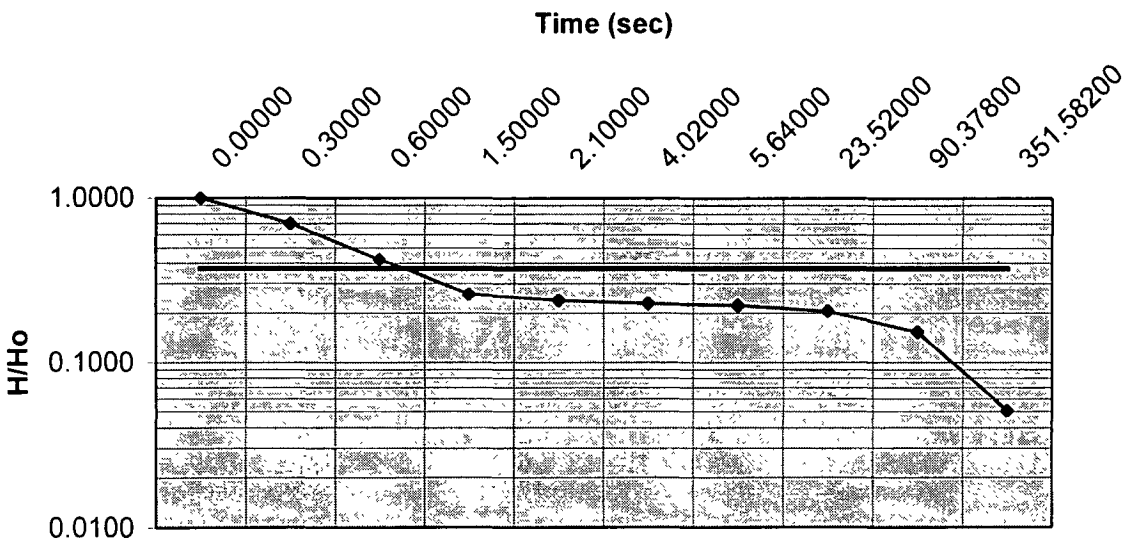
Hydraulic Cond

K value	units
1 782E+02	ft/day
2 063E-03	ft/sec
6.288E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1 997	1 0000
0.005	0 3000	1 406	0 7041
0 01	0 6000	0.85	0.4256
0 025	1 5000	0 517	0.2589
0 035	2 1000	0 474	0.2374
0 067	4 0200	0 454	0.2273
0 094	5 6400	0 444	0 2223
0 392	23 5200	0 409	0 2048
1 5063	90 3780	0 304	0 1522
5 8597	351.5820	0 102	0 0511

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-19D-F
Site Name	16
Test Date	02/14/2001
Time	1045
Rising/Falling Head	F
Initial Water level	11.67

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	9
R	radius of screen	0 083
T_o	time at 37% drawdown	1 4

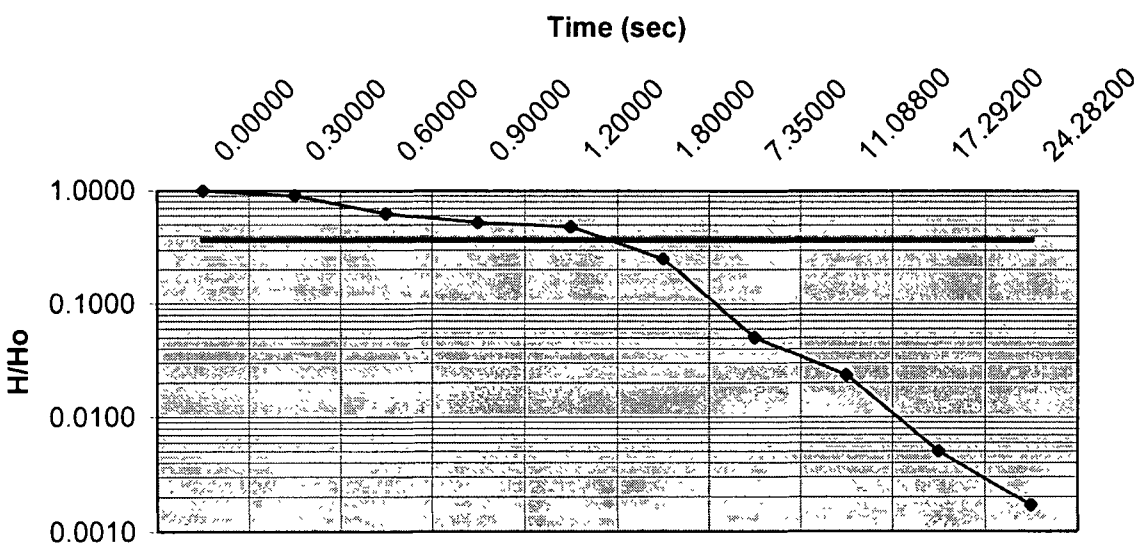
Hydraulic Cond

K value	units
1 107E+02	ft/day
1 281E-03	ft/sec
3 905E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 593	1 0000
0 005	0 3000	0.536	0 9039
0 01	0 6000	0 374	0 6307
0 015	0 9000	0 313	0 5278
0 02	1 2000	0 287	0 4840
0 03	1 8000	0 151	0 2546
0 1225	7 3500	0 03	0 0506
0 1848	11 0880	0 014	0 0236
0 2882	17 2920	0 003	0 0051
0 4047	24 2820	0.001	0 0017

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-19D-R
Site Name	16
Test Date	02/14/2001
Time	1045
Rising/Falling Head	R
Initial Water level	11.67

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0.083
L	length of screen	9
R	radius of screen	0 083
T_o	time at 37% drawdown	1 65

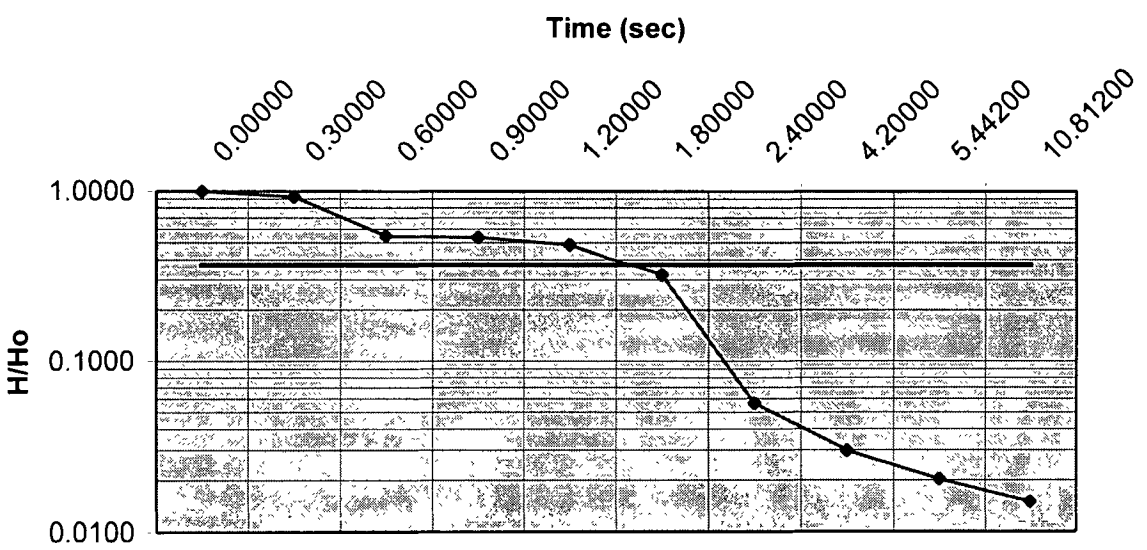
Hydraulic Cond

K value	units
9 391E+01	ft/day
1 087E-03	ft/sec
3 313E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 937	1 0000
0 005	0.3000	0 871	0 9296
0 01	0 6000	0 514	0.5486
0 015	0 9000	0 504	0 5379
0 02	1 2000	0 457	0 4877
0 03	1 8000	0 301	0 3212
0 04	2 4000	0.053	0 0566
0 07	4 2000	0.028	0 0299
0.0907	5 4420	0 019	0 0203
0 1802	10 8120	0 014	0 0149

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-20D-F
Site Name	16
Test Date	02/13/2001
Time	1600
Rising/Falling Head	F
Initial Water level	10.36

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	50

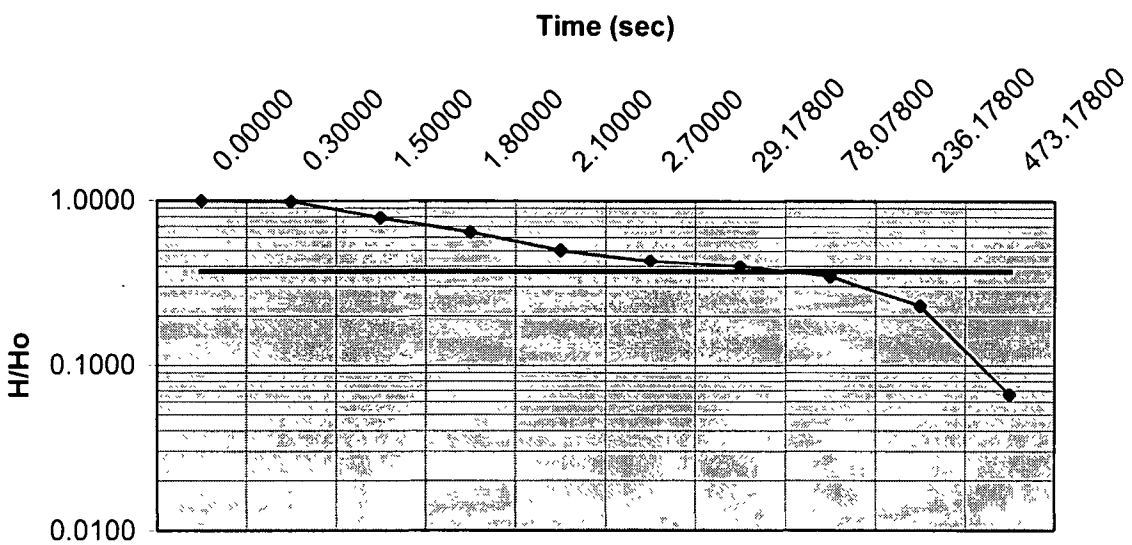
Hydraulic Cond

K value	units
2 852E+00	ft/day
3 301E-05	ft/sec
1 006E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1 117	1 0000
0 005	0 3000	1 109	0 9928
0.025	1 5000	0 884	0 7914
0 03	1 8000	0 725	0 6491
0.035	2 1000	0.563	0 5040
0.045	2 7000	0 486	0 4351
0.4863	29 1780	0 449	0 4020
1.3013	78 0780	0 386	0 3456
3 9363	236 1780	0 256	0 2292
7 8863	473 1780	0 074	0 0662

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-20D-R
Site Name	16
Test Date	02/13/2001
Time	1600
Rising/Falling Head	R
Initial Water level	10 36

Well specific Data

Well Parameter	Desc.	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	0 47

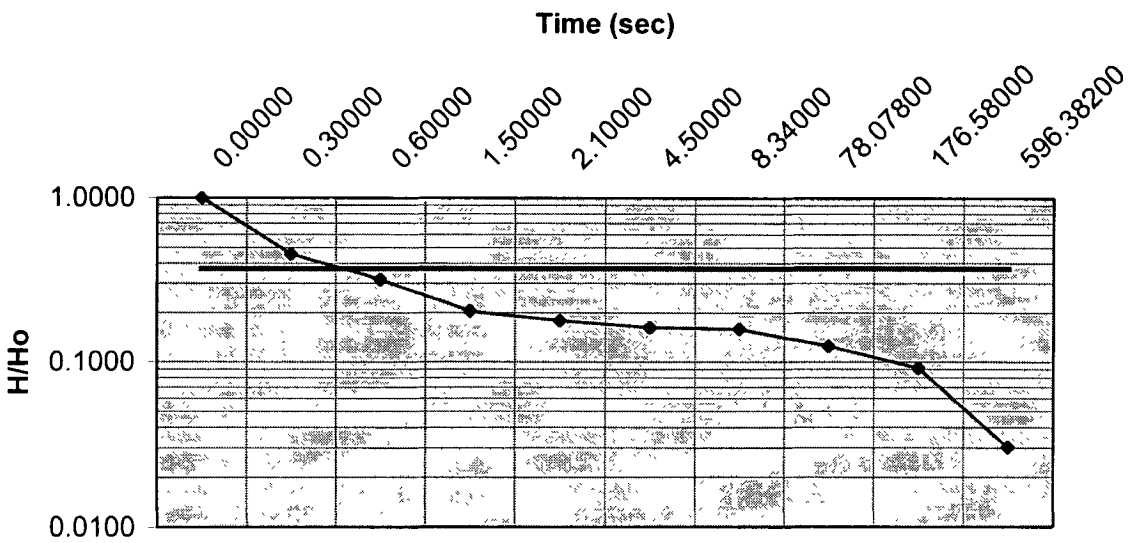
Hydraulic Cond

K value	units
3 034E+02	ft/day
3 512E-03	ft/sec
1 070E-01	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	3 1	1 0000
0 005	0 3000	1 421	0 4584
0 01	0 6000	0 985	0.3177
0 025	1 5000	0 634	0 2045
0 035	2 1000	0.556	0 1794
0 075	4 5000	0 502	0 1619
0 139	8 3400	0 491	0 1584
1 3013	78 0780	0 387	0 1248
2.943	176 5800	0 284	0 0916
9 9397	596 3820	0 094	0 0303

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-21D-R
Site Name	16
Test Date	02/13/2001
Time	1400
Rising/Falling Head	R
Initial Water level (ft TOR)	10.29

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	1 7

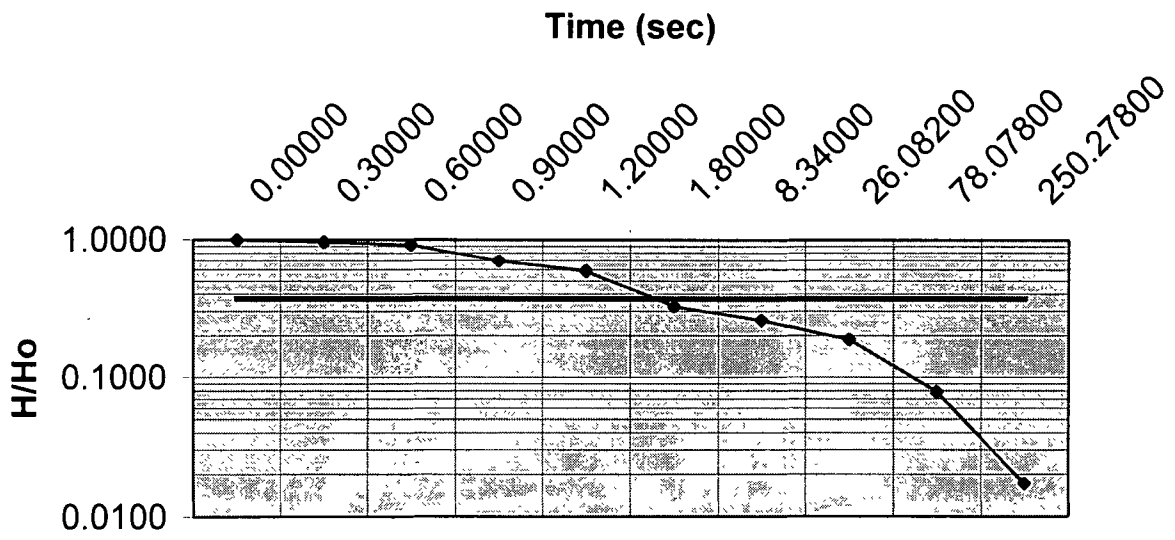
Hydraulic Cond

K value	units
8 388E+01	ft/day
9 708E-04	ft/sec
2.959E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1 575	1 0000
0 005	0 3000	1 526	0 9689
0 01	0 6000	1 454	0 9232
0 015	0 9000	1 098	0 6971
0 02	1 2000	0 926	0 5879
0 03	1 8000	0 517	0 3283
0 139	8 3400	0 405	0 2571
0 4347	26 0820	0 296	0 1879
1.3013	78 0780	0 124	0 0787
4.1713	250 2780	0 027	0 0171

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-21D-F
Site Name	16
Test Date	02/13/2001
Time	1344
Rising/Falling Head	F
Initial Water level	10.29

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	12

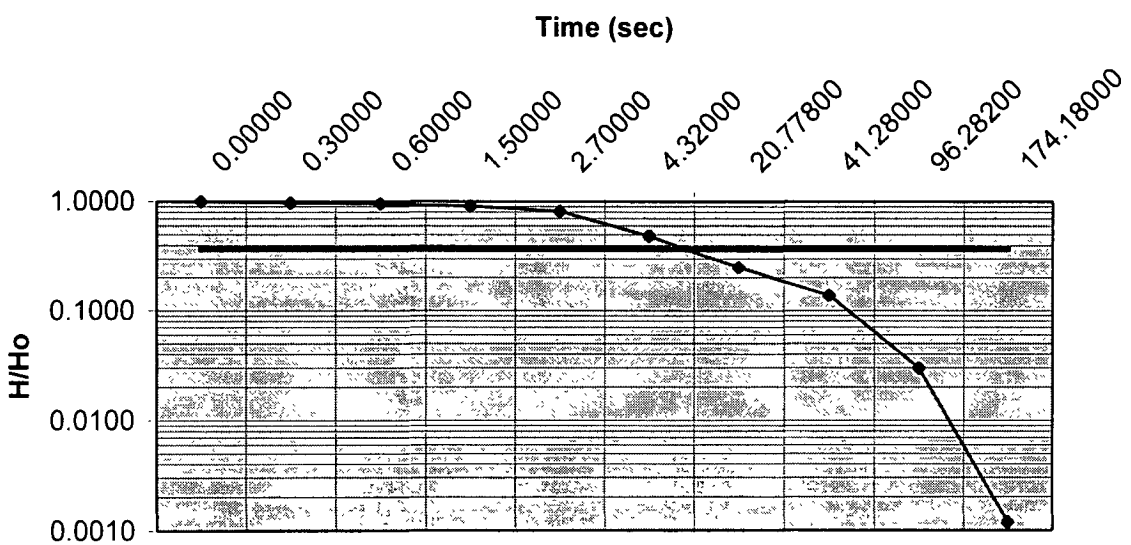
Hydraulic Cond

K value	units
1 188E+01	ft/day
1 375E-04	ft/sec
4 192E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 84	1 0000
0 005	0 3000	0.818	0 9738
0 01	0 6000	0 802	0 9548
0 025	1 5000	0 764	0.9095
0 045	2 7000	0 687	0 8179
0 072	4 3200	0 409	0 4869
0.3463	20.7780	0 21	0 2500
0 688	41 2800	0 116	0 1381
1.6047	96 2820	0 025	0 0298
2 903	174 1800	0 001	0 0012

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-22D-F
Site Name	16
Test Date	02/13/2001
Time	1100
Rising/Falling Head	F
Initial Water level (ft TOR)	17.13

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0.083
T_o	time at 37% drawdown	1 2

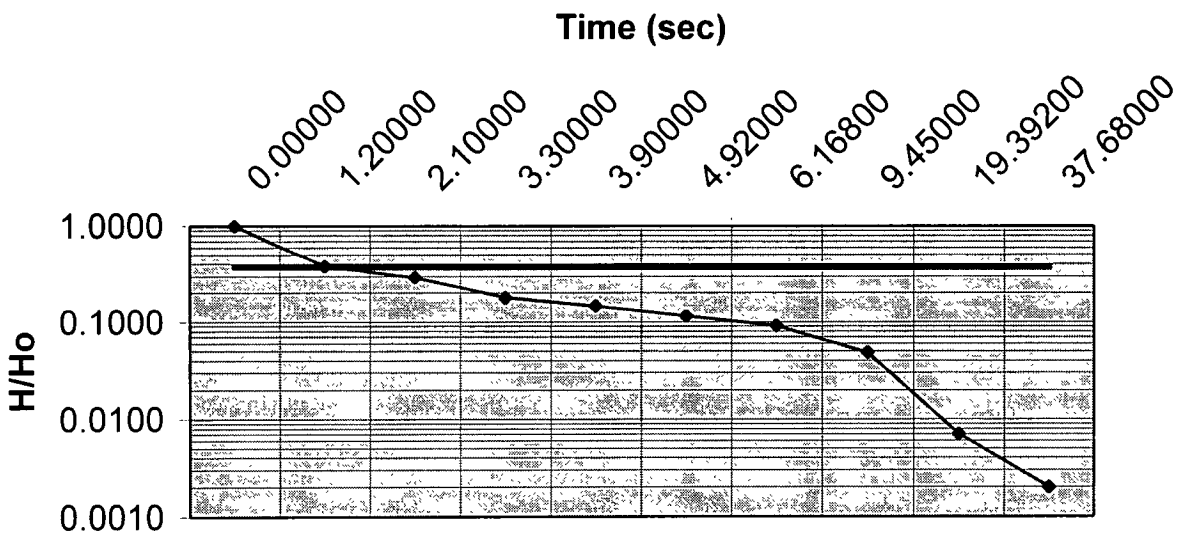
Hydraulic Cond

K value	units
1 188E+02	ft/day
1 375E-03	ft/sec
4 192E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 995	1 0000
0 02	1 2000	0 38	0 3819
0 035	2 1000	0 292	0 2935
0 055	3 3000	0 178	0 1789
0 065	3 9000	0 147	0 1477
0 082	4 9200	0 115	0 1156
0 1028	6 1680	0 091	0.0915
0 1575	9 4500	0 048	0 0482
0 3232	19.3920	0 007	0.0070
0 628	37 6800	0.002	0 0020

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-22D-R
Site Name	16
Test Date	02/13/2001
Time	1110
Rising/Falling Head	R
Initial Water level (ft TOR)	17.13

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	10
R	radius of screen	0 083
T_o	time at 37% drawdown	1 4

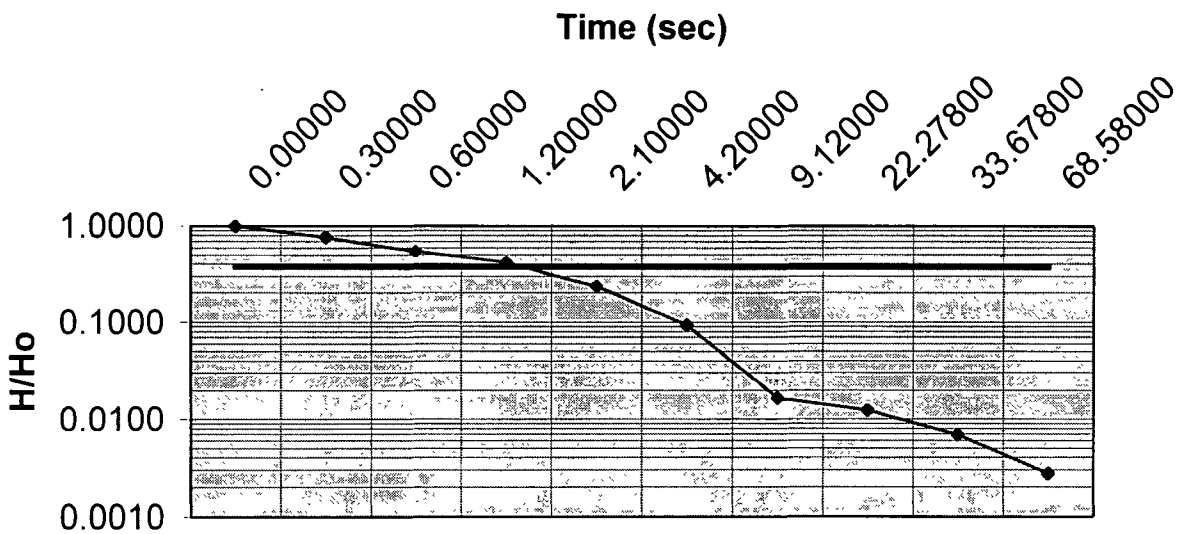
Hydraulic Cond

K value	units
1 019E+02	ft/day
1 179E-03	ft/sec
3 593E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 724	1 0000
0 005	0 3000	0.56	0 7735
0.01	0 6000	0 399	0 5511
0.02	1 2000	0 3	0 4144
0 035	2 1000	0 17	0 2348
0 07	4 2000	0 068	0 0939
0 152	9 1200	0 012	0 0166
0 3713	22 2780	0 009	0 0124
0 5613	33 6780	0 005	0 0069
1 143	68 5800	0 002	0 0028

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-23D-F
Site Name	16
Test Date	02/13/2001
Time	1130
Rising/Falling Head	F
Initial Water level	13.81

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	15
R	radius of screen	0 083
T_o	time at 37% drawdown	10.78

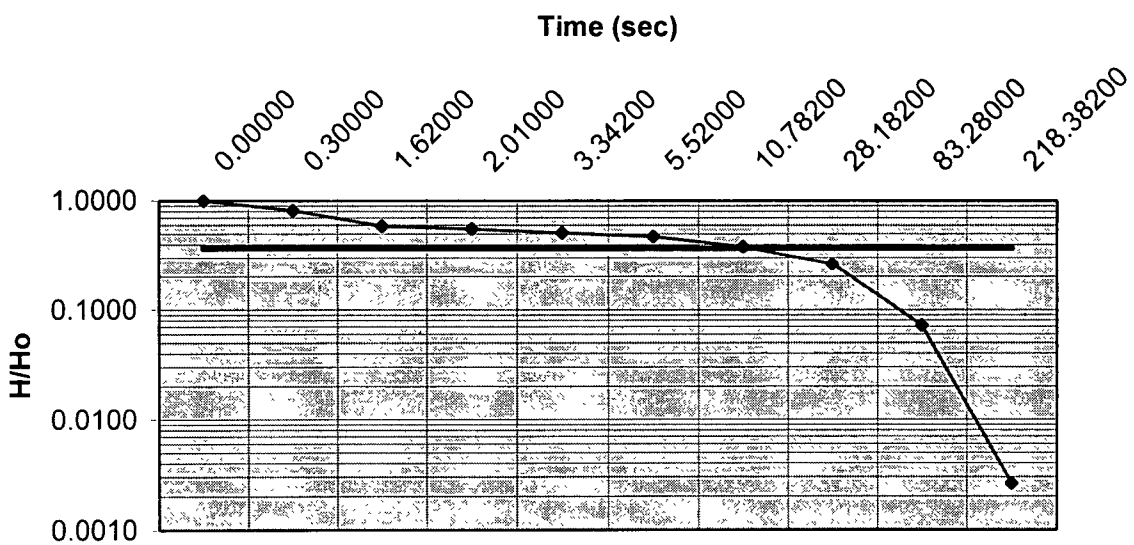
Hydraulic Cond

K value	units
9 565E+00	ft/day
1 107E-04	ft/sec
3 374E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 763	1 0000
0 005	0 3000	0 624	0 8178
0 027	1 6200	0 451	0 5911
0 0335	2.0100	0 424	0 5557
0 0557	3 3420	0 39	0 5111
0 092	5 5200	0 36	0 4718
0 1797	10 7820	0 292	0 3827
0 4697	28 1820	0 201	0 2634
1 388	83.2800	0 055	0 0721
3 6397	218.3820	0 002	0 0026

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-23D-R
Site Name	16
Test Date	02/13/2001
Time	1130
Rising/Falling Head	R
Initial Water level	13.81

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	15
R	radius of screen	0 083
T_o	time at 37% drawdown	5 43

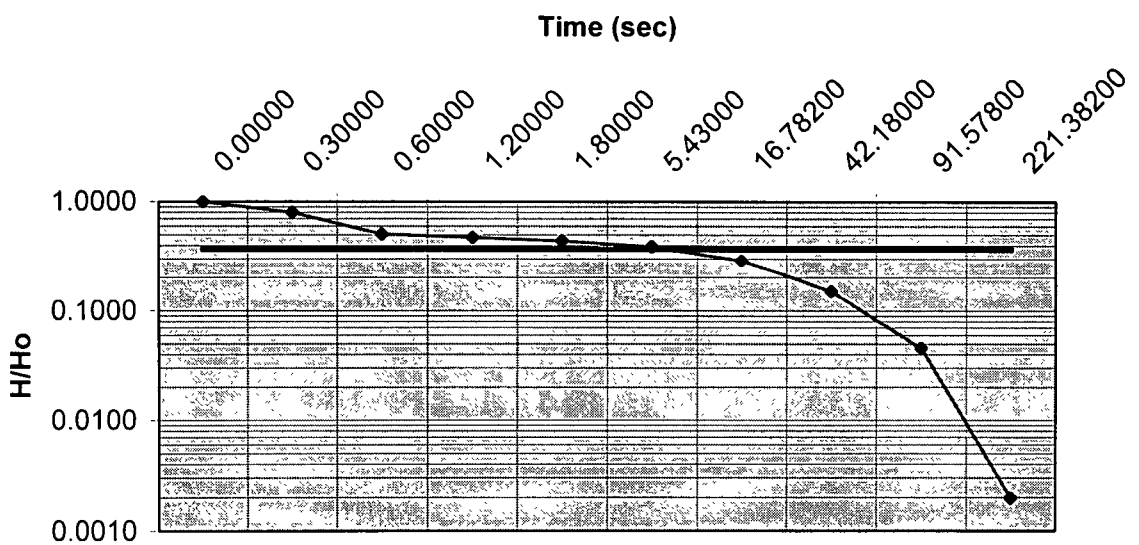
Hydraulic Cond

K value	units
1 899E+01	ft/day
2 198E-04	ft/sec
6 699E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1 009	1 0000
0 005	0 3000	0.805	0 7978
0 01	0 6000	0 515	0 5104
0 02	1 2000	0 479	0 4747
0 03	1 8000	0 445	0 4410
0 0905	5.4300	0 396	0.3925
0.2797	16 7820	0.294	0 2914
0 703	42 1800	0 152	0 1506
1.5263	91 5780	0.046	0 0456
3 6897	221 3820	0 002	0 0020

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-24D-F
Site Name	16
Test Date	02/13/2001
Time	1415
Rising/Falling Head	F
Initial Water level	10 47

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	12
R	radius of screen	0 083
T_o	time at 37% drawdown	6 4

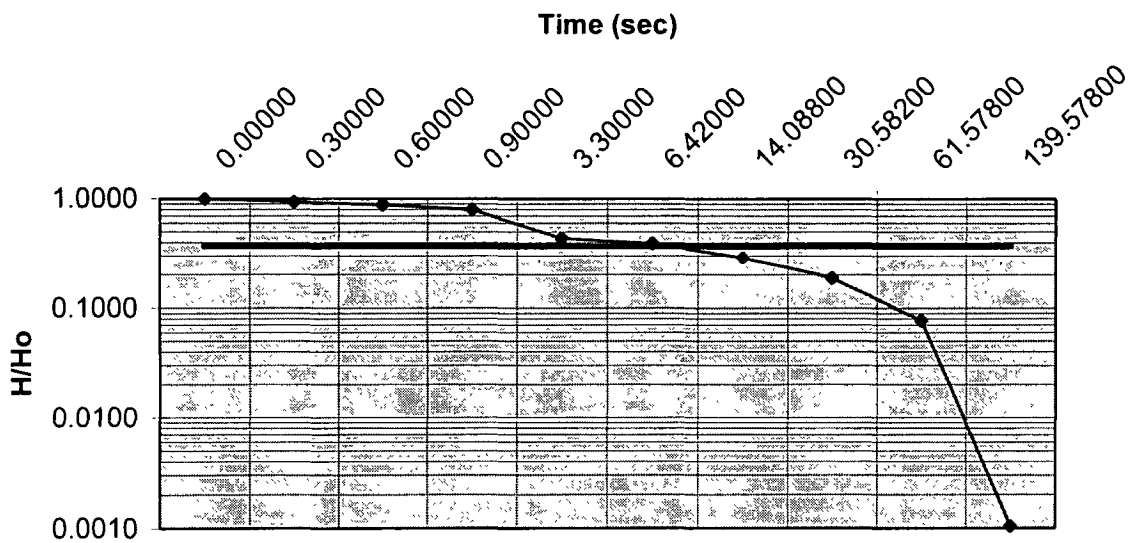
Hydraulic Cond

K value	units
1 927E+01	ft/day
2 231E-04	ft/sec
6 799E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	0 955	1 0000
0 005	0 3000	0 898	0 9403
0 01	0 6000	0 843	0 8827
0 015	0 9000	0 763	0 7990
0 055	3 3000	0 416	0 4356
0 107	6 4200	0 375	0 3927
0 2348	14.0880	0 278	0 2911
0 5097	30 5820	0 18	0 1885
1 0263	61.5780	0 074	0 0775
2 3263	139.5780	0 001	0 0010

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-24D-R
Site Name	16
Test Date	02/13/2001
Time	1415
Rising/Falling Head	R
Initial Water level	10 47

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	12
R	radius of screen	0 083
T_o	time at 37% drawdown	0 45

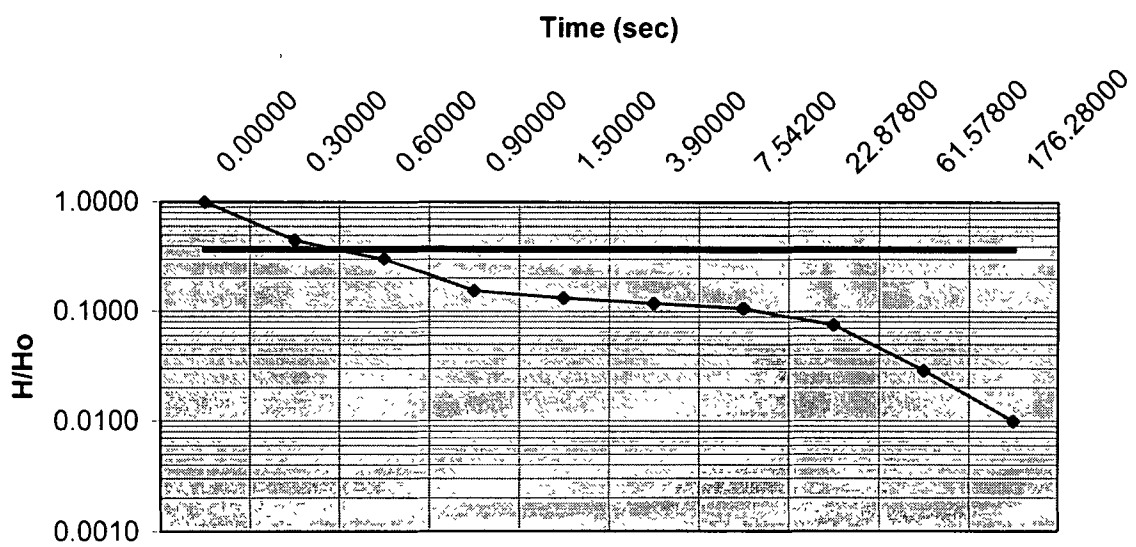
Hydraulic Cond

K value	units
2 741E+02	ft/day
3 173E-03	ft/sec
9 670E-02	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	3 124	1 0000
0 005	0 3000	1 411	0 4517
0.01	0 6000	0 948	0.3035
0 015	0 9000	0 482	0 1543
0 025	1 5000	0 413	0 1322
0 065	3 9000	0 371	0 1188
0.1257	7 5420	0 335	0 1072
0.3813	22 8780	0 236	0 0755
1 0263	61 5780	0 09	0 0288
2.938	176 2800	0 031	0 0099

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-25D-R
Site Name	16
Test Date	02/14/2001
Time	938
Rising/Falling Head	R
Initial Water level	12.55

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	12
R	radius of screen	0 083
T_o	time at 37% drawdown	0 27

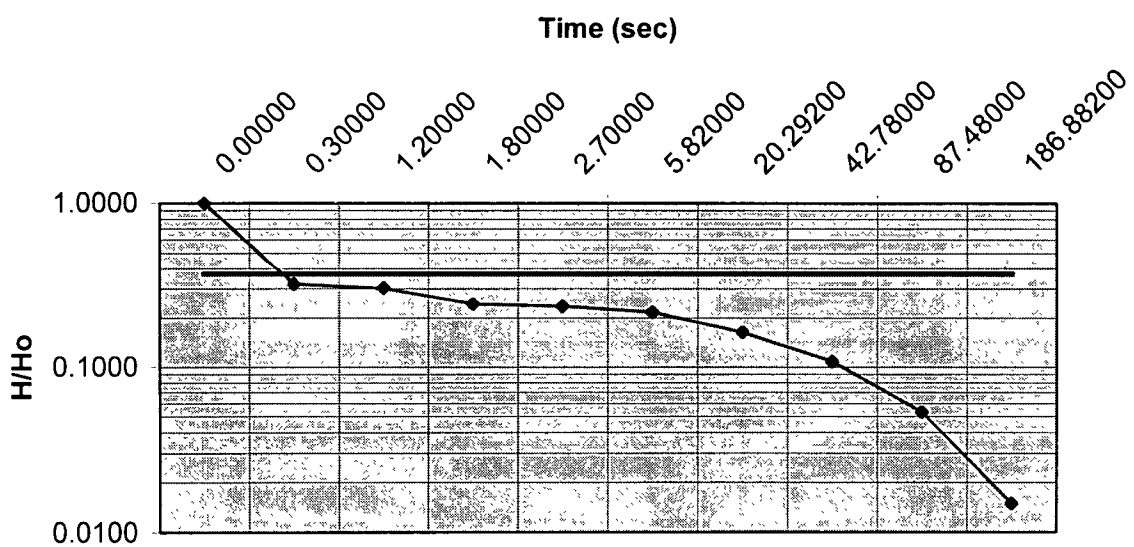
Hydraulic Cond

K value	units
4 569E+02	ft/day
5 288E-03	ft/sec
1 612E-01	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1.875	1 0000
0 005	0 3000	0 604	0 3221
0 02	1 2000	0 569	0.3035
0 03	1 8000	0 454	0 2421
0.045	2 7000	0 441	0 2352
0 097	5 8200	0 405	0 2160
0 3382	20 2920	0.305	0 1627
0 713	42 7800	0.203	0.1083
1 458	87 4800	0.1	0 0533
3 1147	186 8820	0 028	0 0149

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-26D-F
Site Name	16
Test Date	02/20/2001
Time	1439
Rising/Falling Head	F
Initial Water level	5 3

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	9
R	radius of screen	0 083
T_o	time at 37% drawdown	15

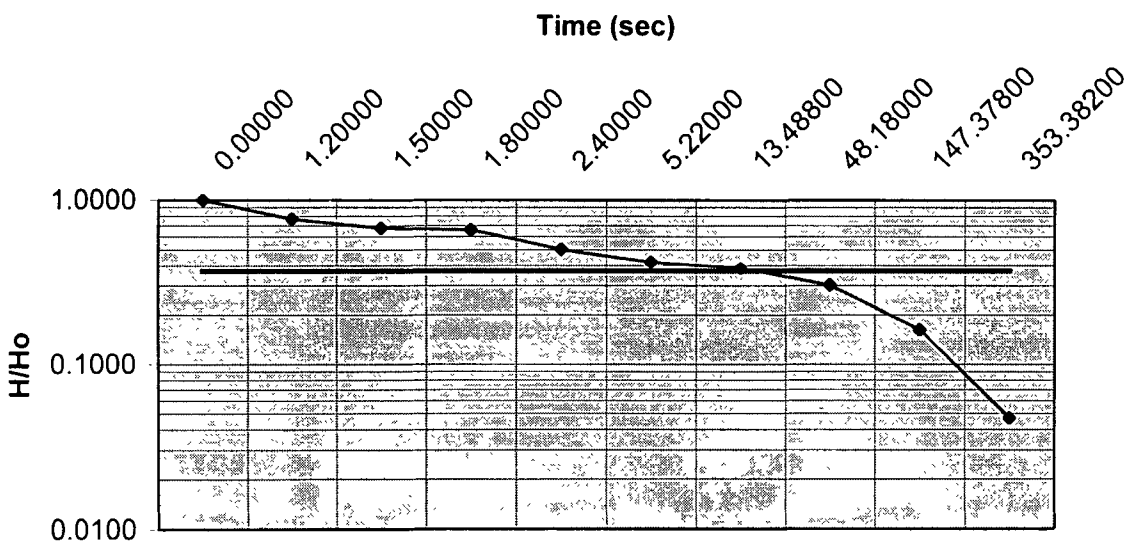
Hydraulic Cond

K value	units
1.033E+01	ft/day
1 196E-04	ft/sec
3 644E-03	cm/sec

Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	1 083	1 0000
0 02	1 2000	0 834	0 7701
0 025	1 5000	0 736	0 6796
0 03	1 8000	0 718	0 6630
0 04	2 4000	0 546	0 5042
0 087	5 2200	0 456	0 4211
0 2248	13 4880	0 417	0 3850
0 803	48 1800	0 329	0 3038
2 4563	147 3780	0.176	0 1625
5 8897	353 3820	0 051	0 0471

Downdraw plot with time



Slug Test Analysis Using Hvorslev Method

Well identification	MW16-26D-R
Site Name	16
Test Date	02/20/2001
Time	1439
Rising/Falling Head	R
Initial Water level	5.3

Well specific Data

Well Parameter	Desc	Value
r	radius of well	0 083
L	length of screen	9
R	radius of screen	0 083
T_o	time at 37% drawdown	1

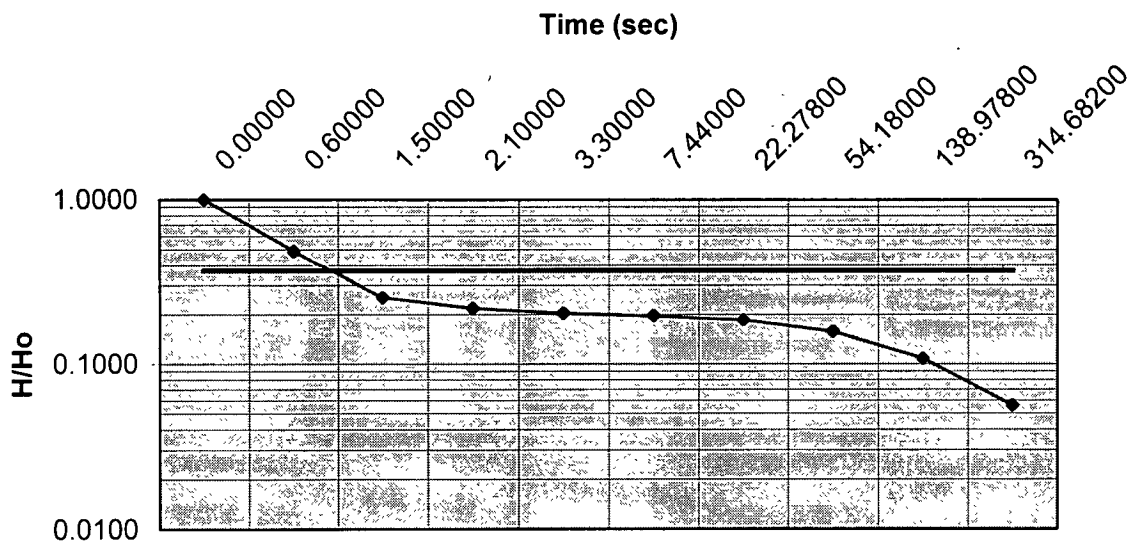
Hydraulic Cond

K value	units
1 550E+02	ft/day
1 793E-03	ft/sec
5 467E-02	cm/sec

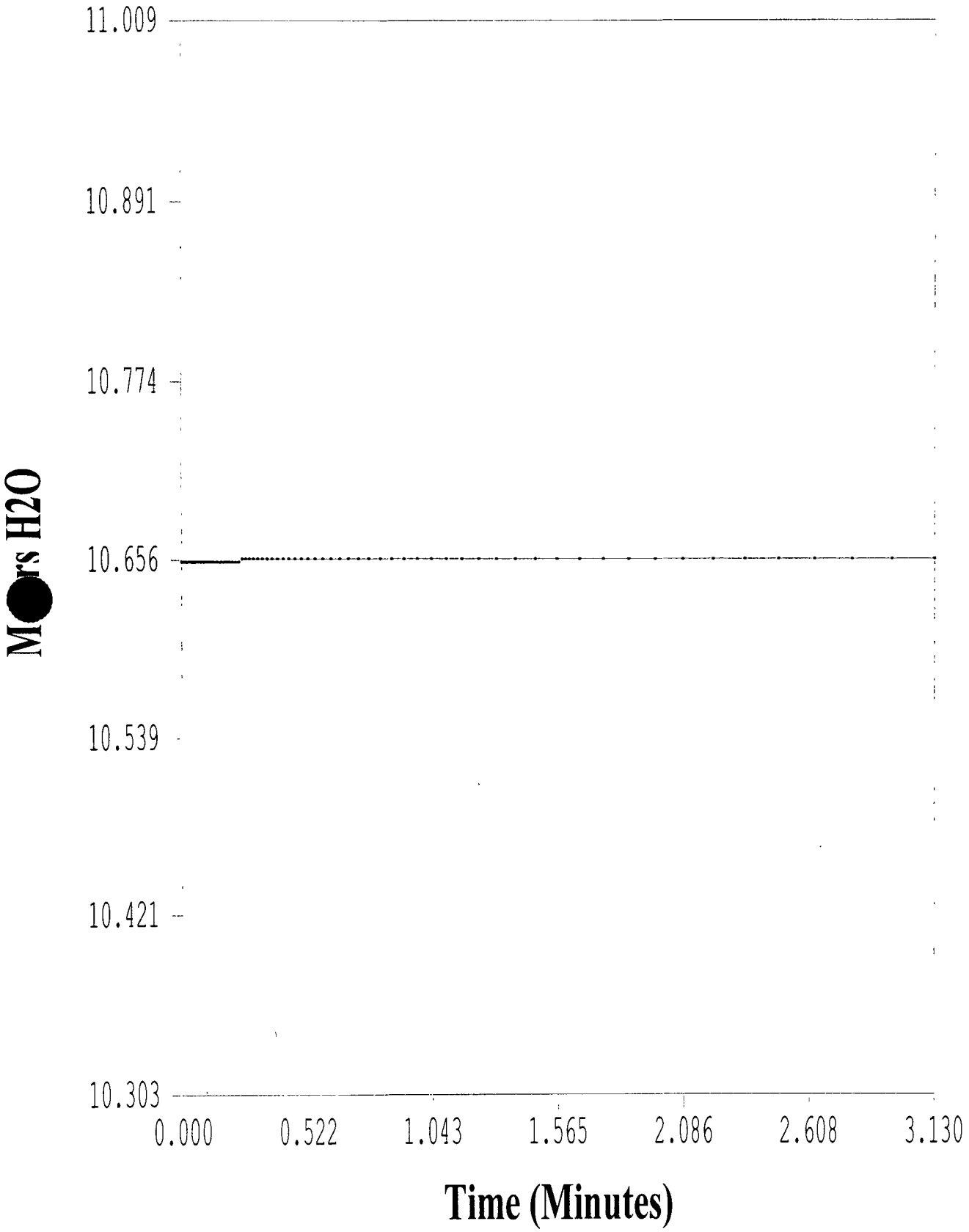
Drawdown

Time Min	Time sec	head change	H/ho
0	0 0000	2 407	1.0000
0 01	0 6000	1 18	0.4902
0 025	1 5000	0 607	0 2522
0 035	2 1000	0 524	0 2177
0 055	3 3000	0 489	0 2032
0 124	7 4400	0 472	0 1961
0 3713	22 2780	0 445	0 1849
0 903	54 1800	0.379	0 1575
2 3163	138 9780	0.259	0.1076
5.2447	314.6820	0 135	0 0561

Downdraw plot with time

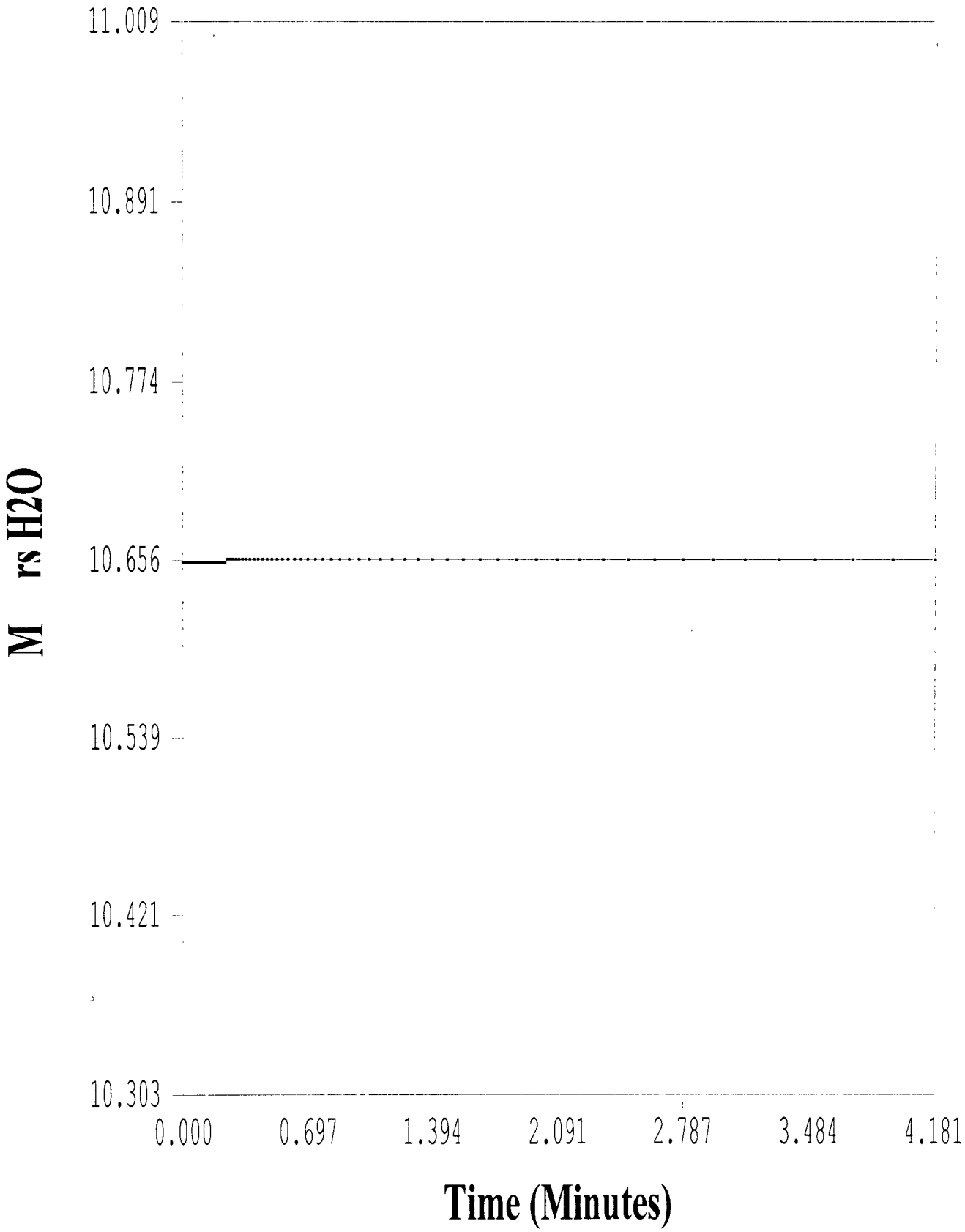


MW16-27D, 1R



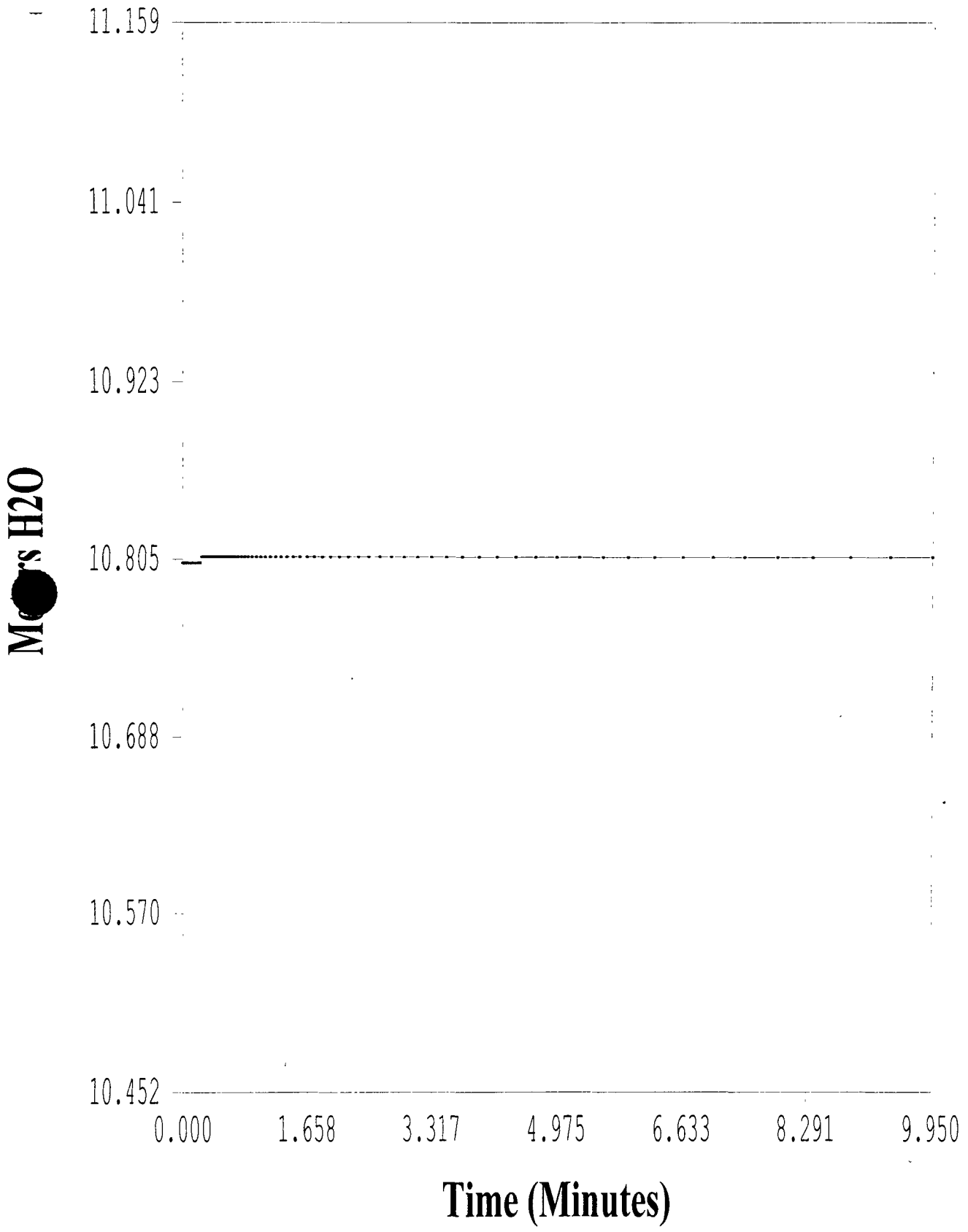
[2] - Water Levels

MW16-27D, 1F



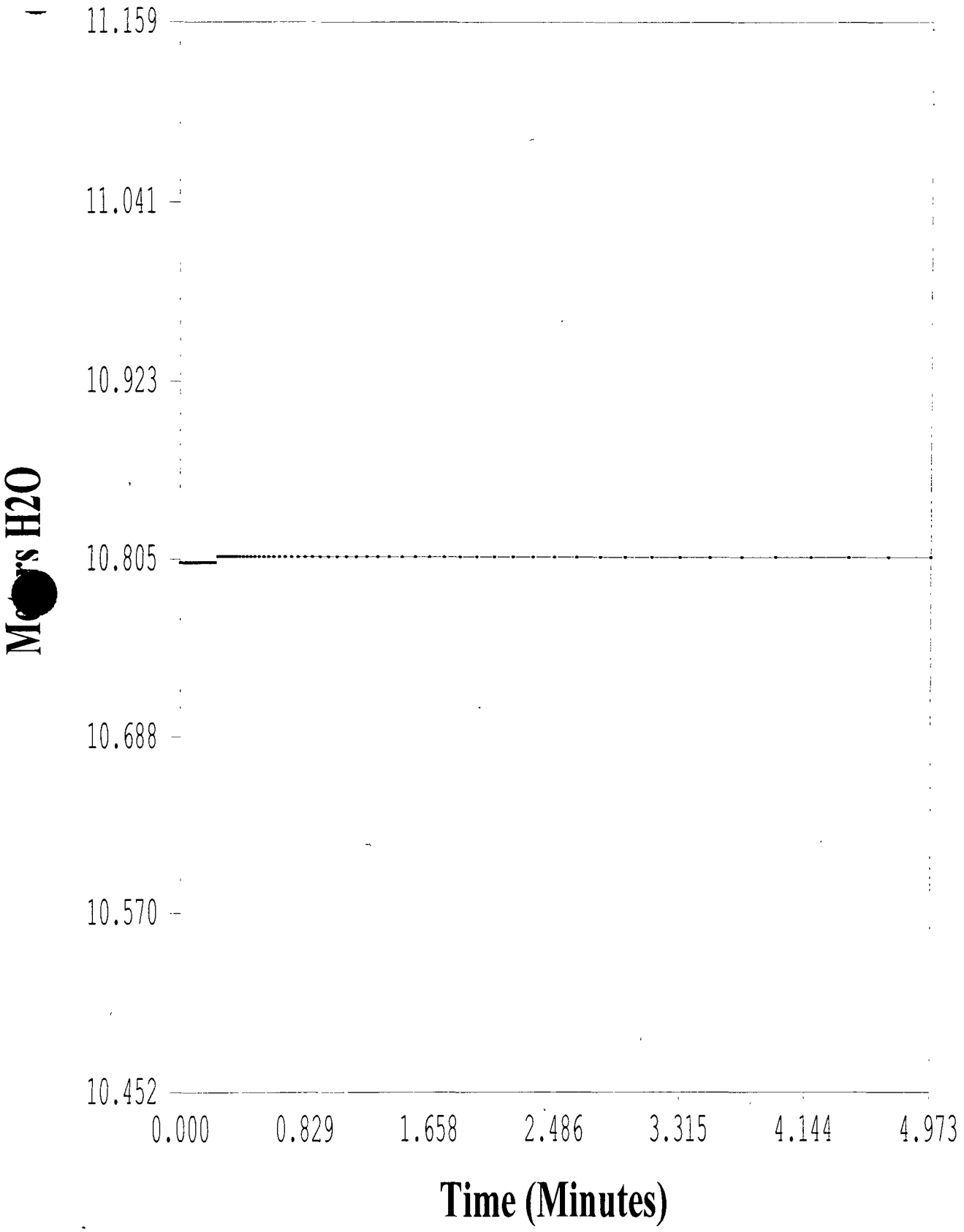
[2] - Water Levels

MW16-27R, 1F



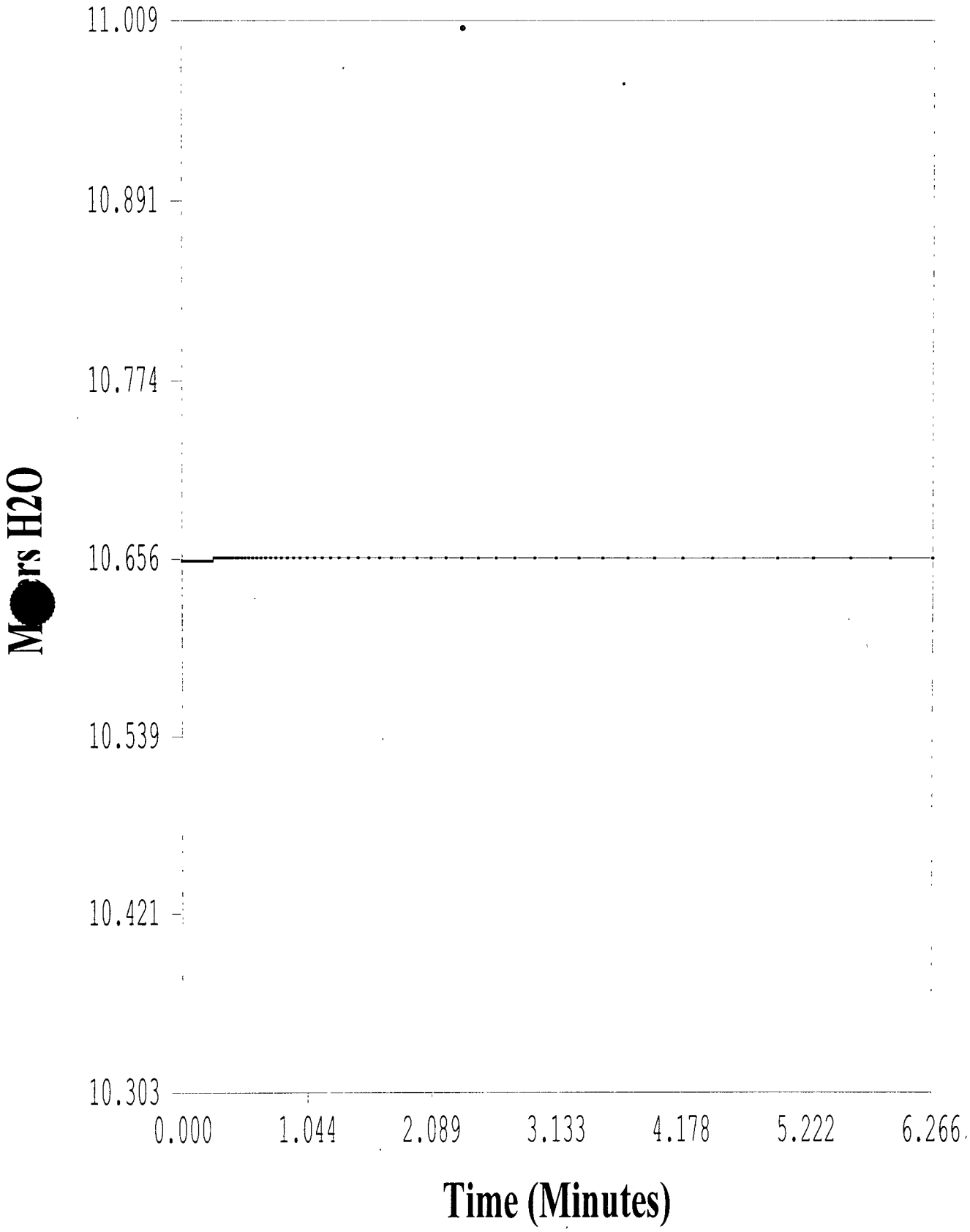
[2] - Water Levels

MW16-27R, 1R



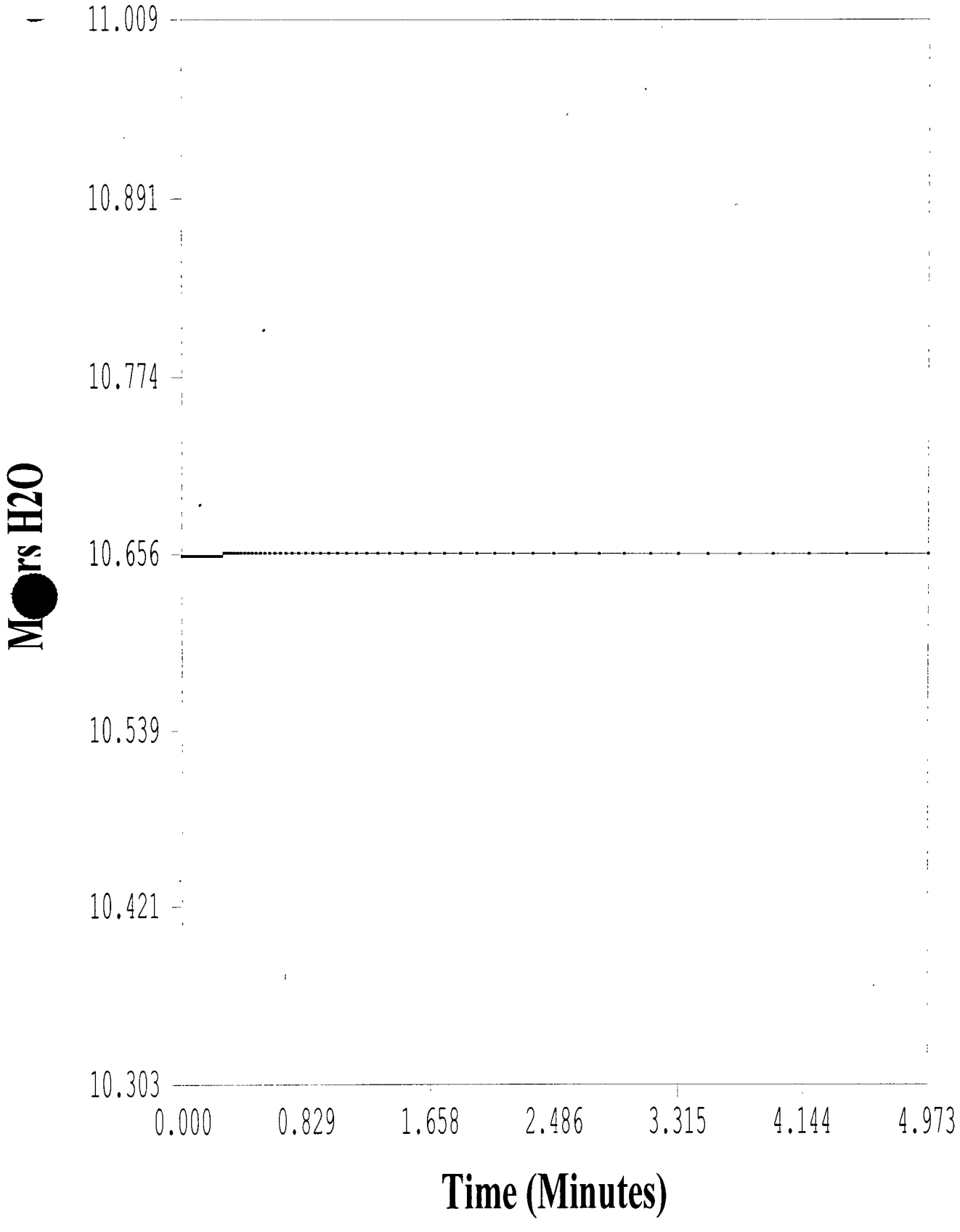
[2] - Water Levels

MW16-28D, 1R2



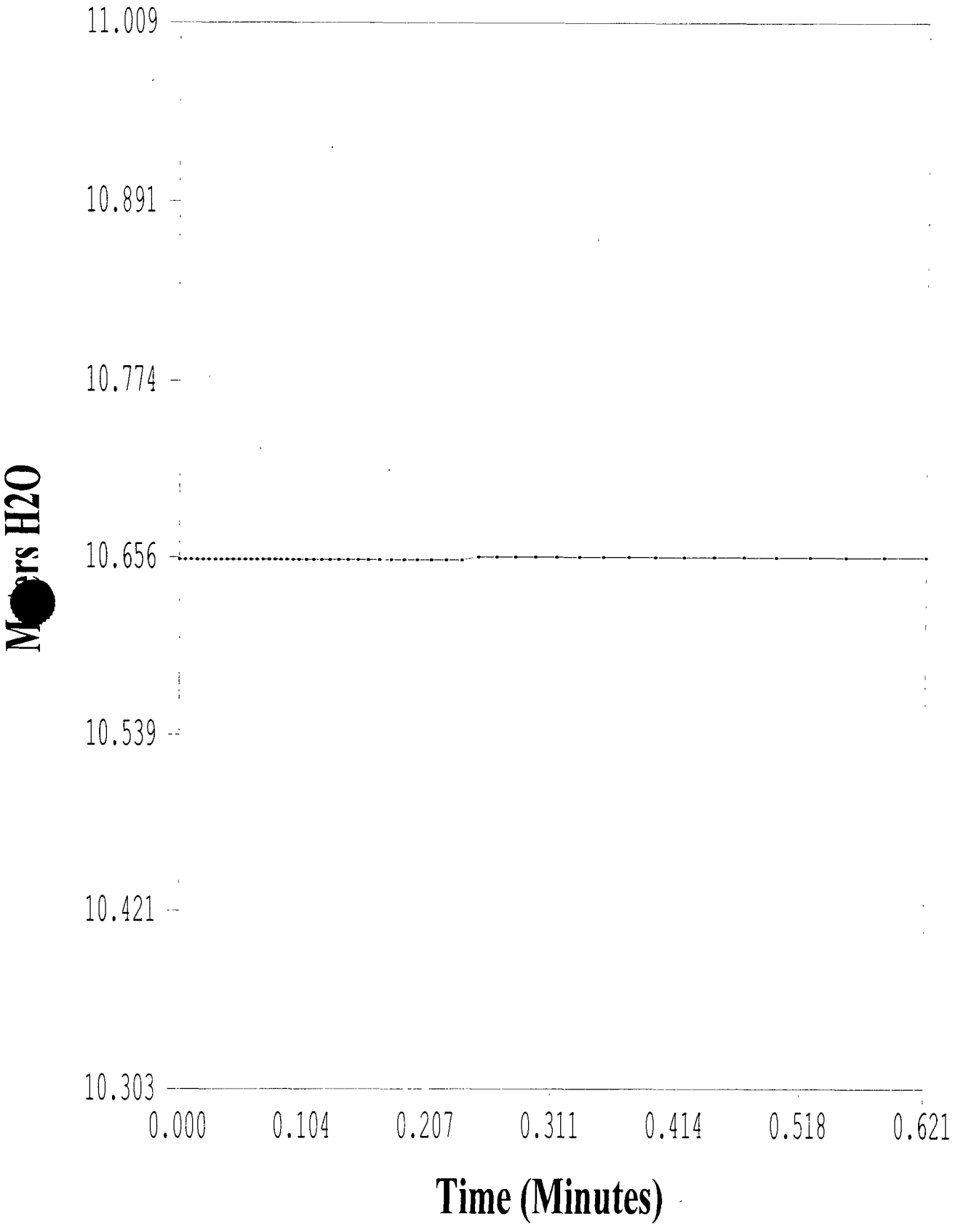
[2] - Water Levels

MW16-28D, 1F



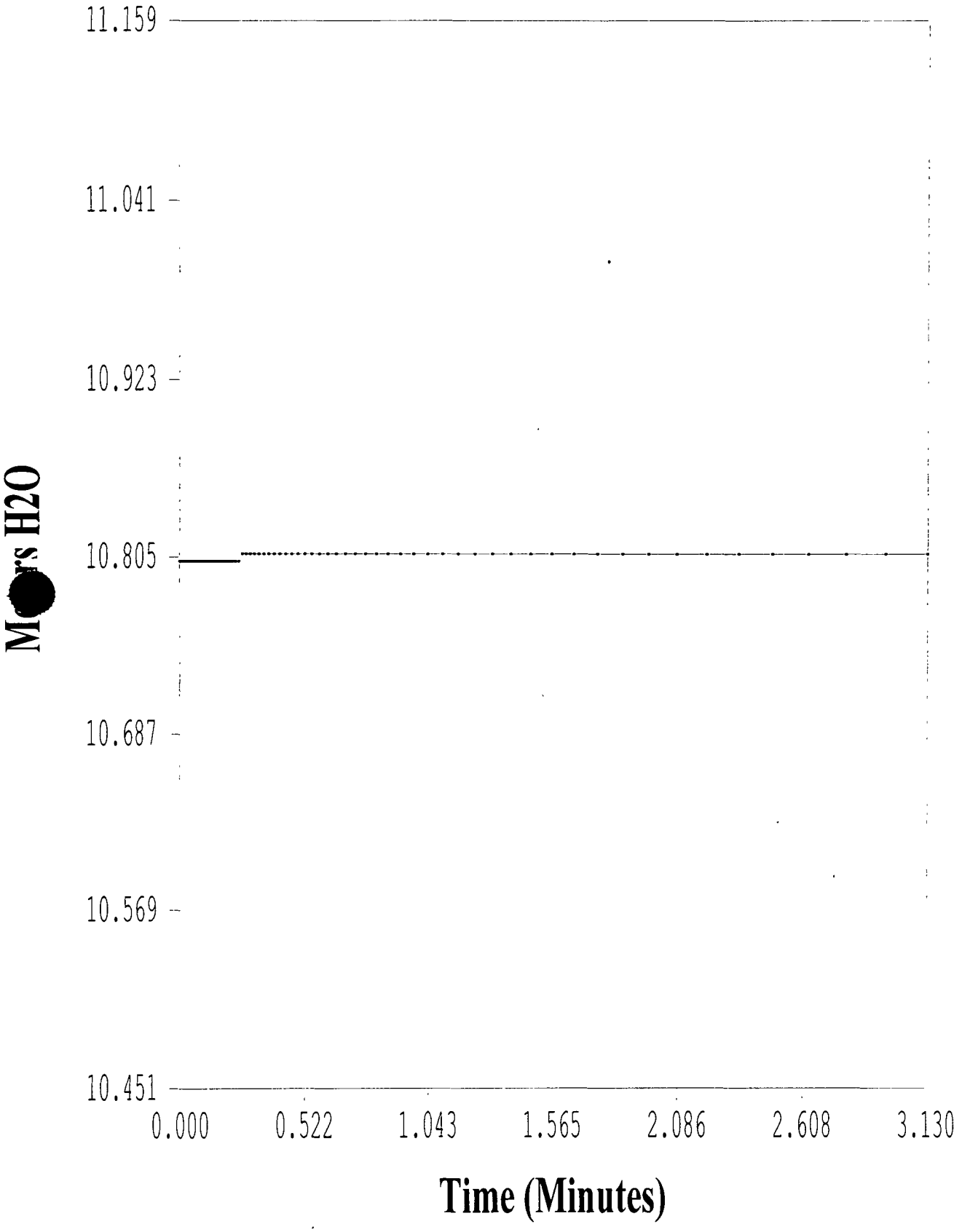
[2] - Water Levels

MW16-28D, 1R



[2] - Water Levels

MW16-29D, 1R

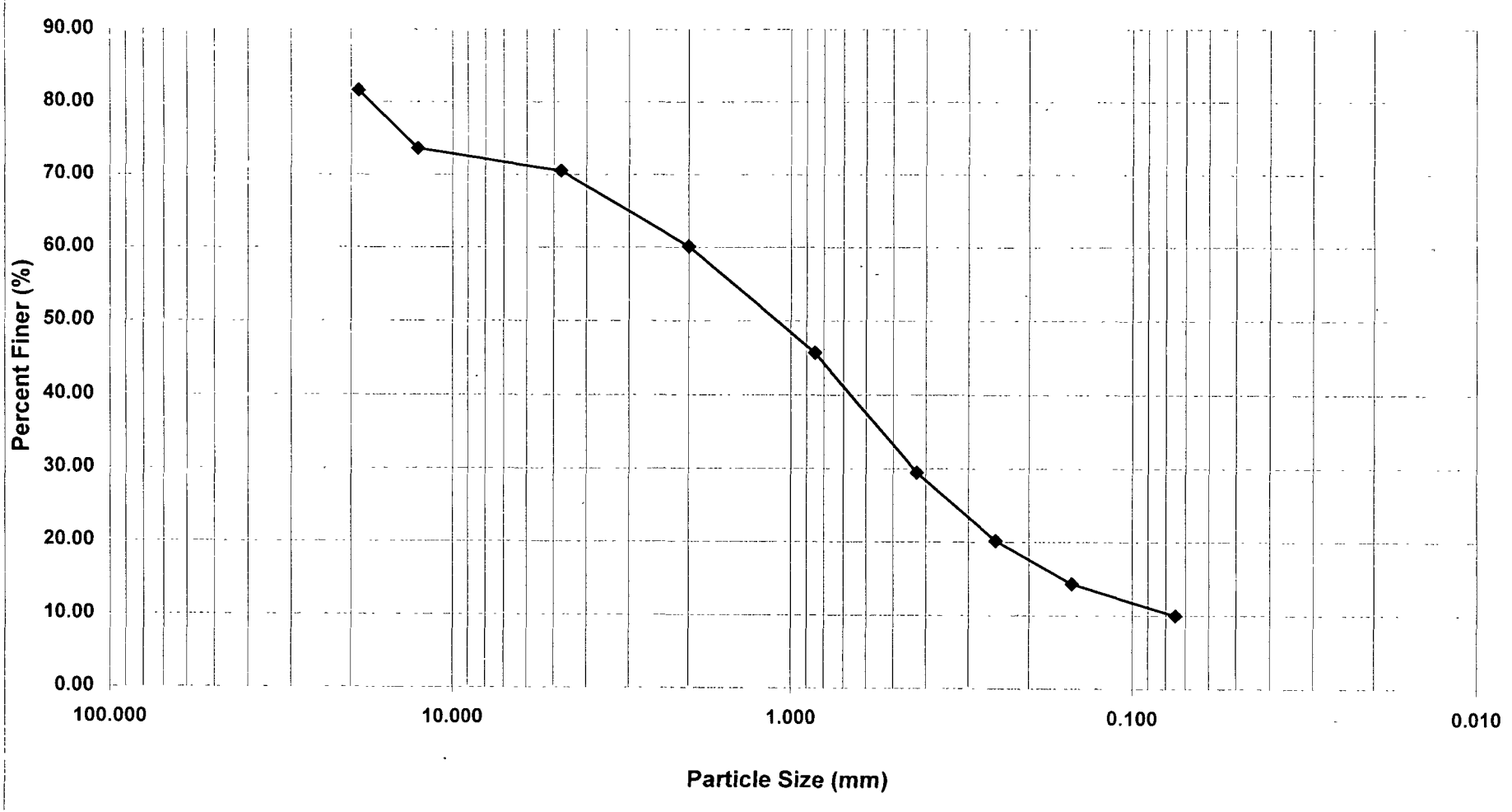


[2] - Water Levels

APPENDIX H
STAGE I AND II
GRAINSIZE DISTRIBUTION CURVES

GRAIN SIZE DISTRIBUTION CURVE

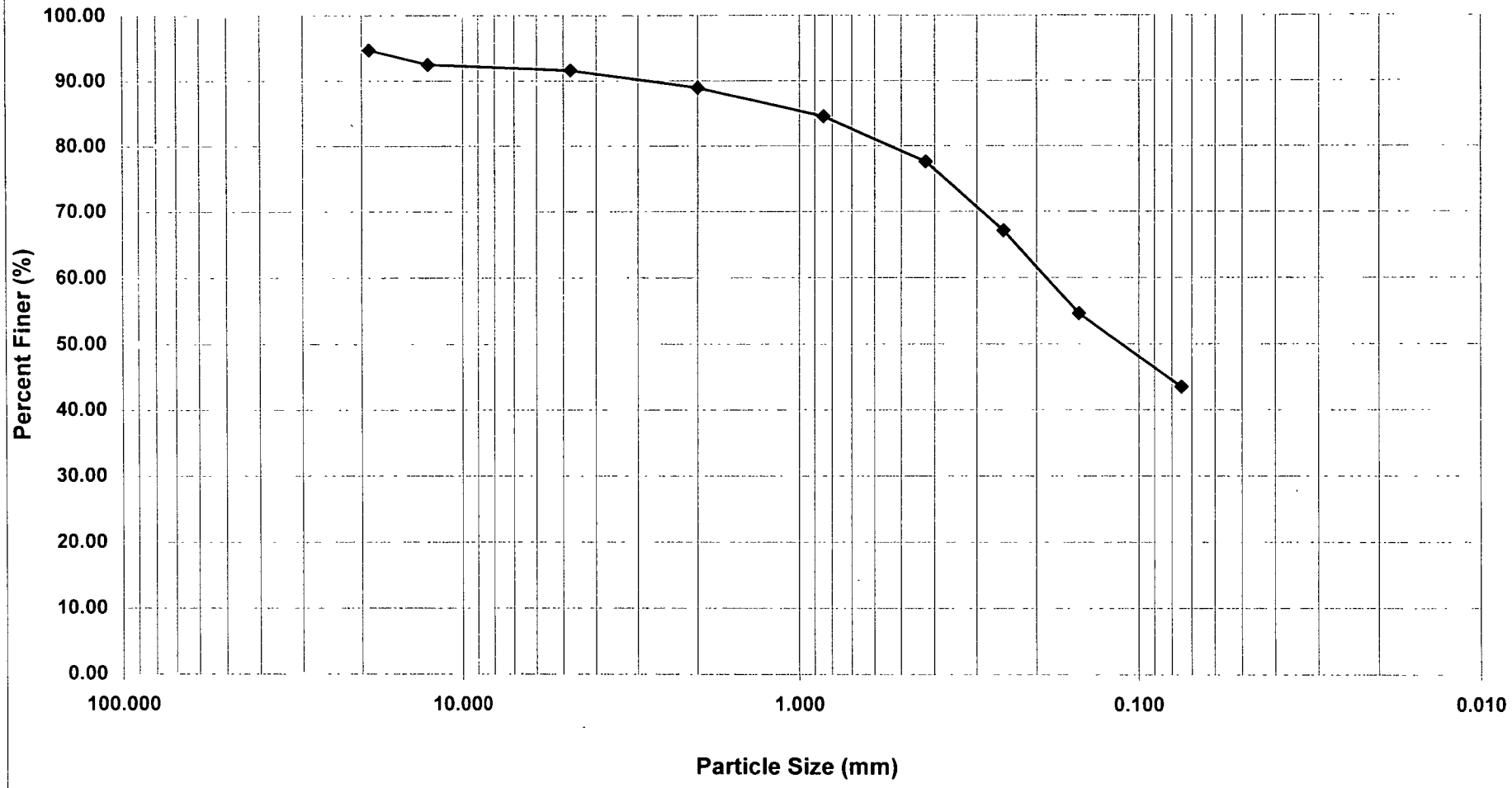
SB16-21-0-2



10 = % Clay/Silt 20 = % Fine Sand 31 = % Medium Sand 10 = % Coarse Sand 11 = % Fine Gravel 18 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

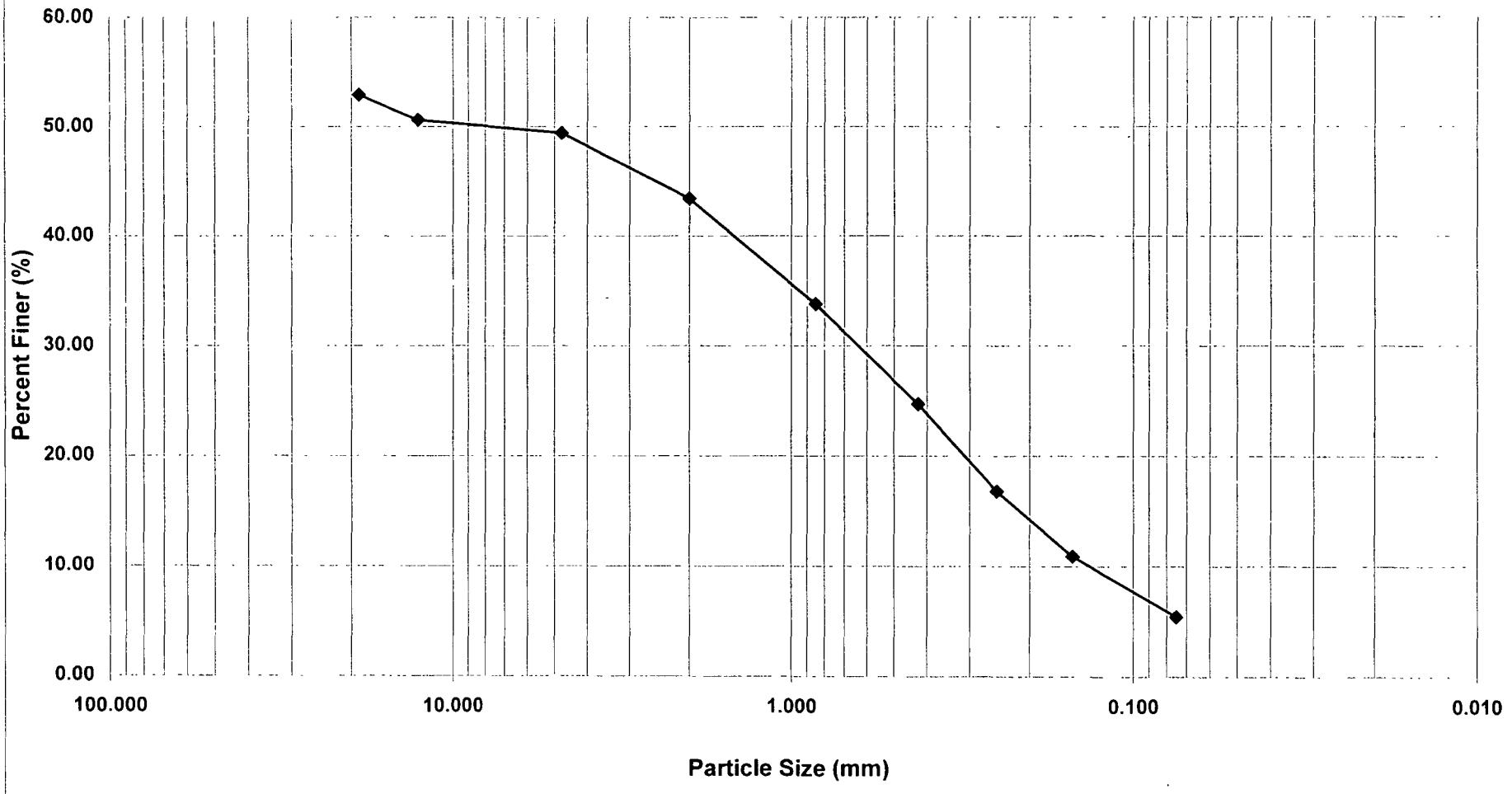
SB16-21-8-10



44 = % Clay/Silt 34 = % Fine Sand 11 = % Medium Sand 3 = % Coarse Sand 3 = % Fine Gravel 5 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

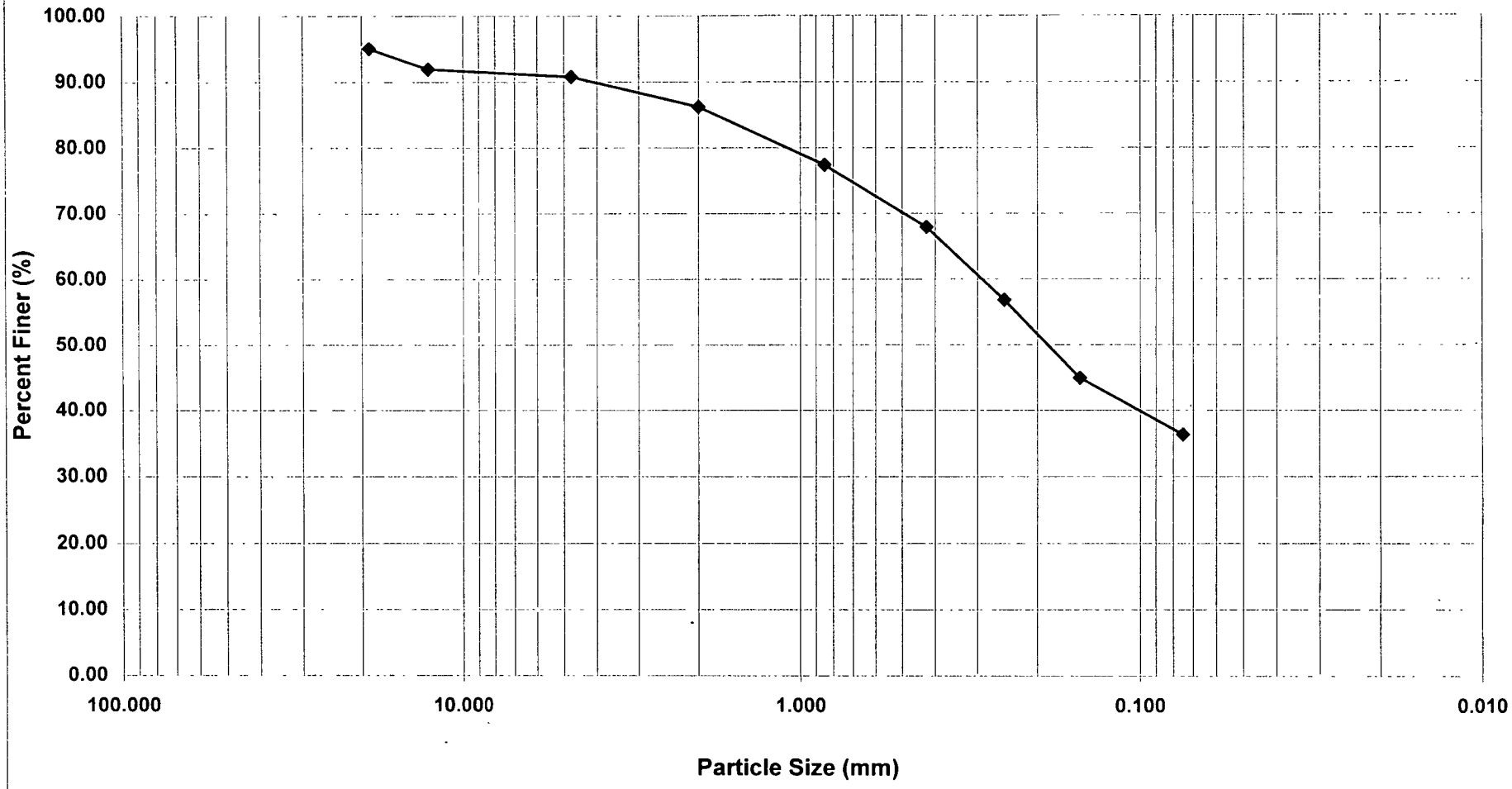
SB16-22-0-2



5 = % Clay/Silt 19 = % Fine Sand 19 = % Medium Sand 6 = % Coarse Sand 4 = % Fine Gravel 47 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

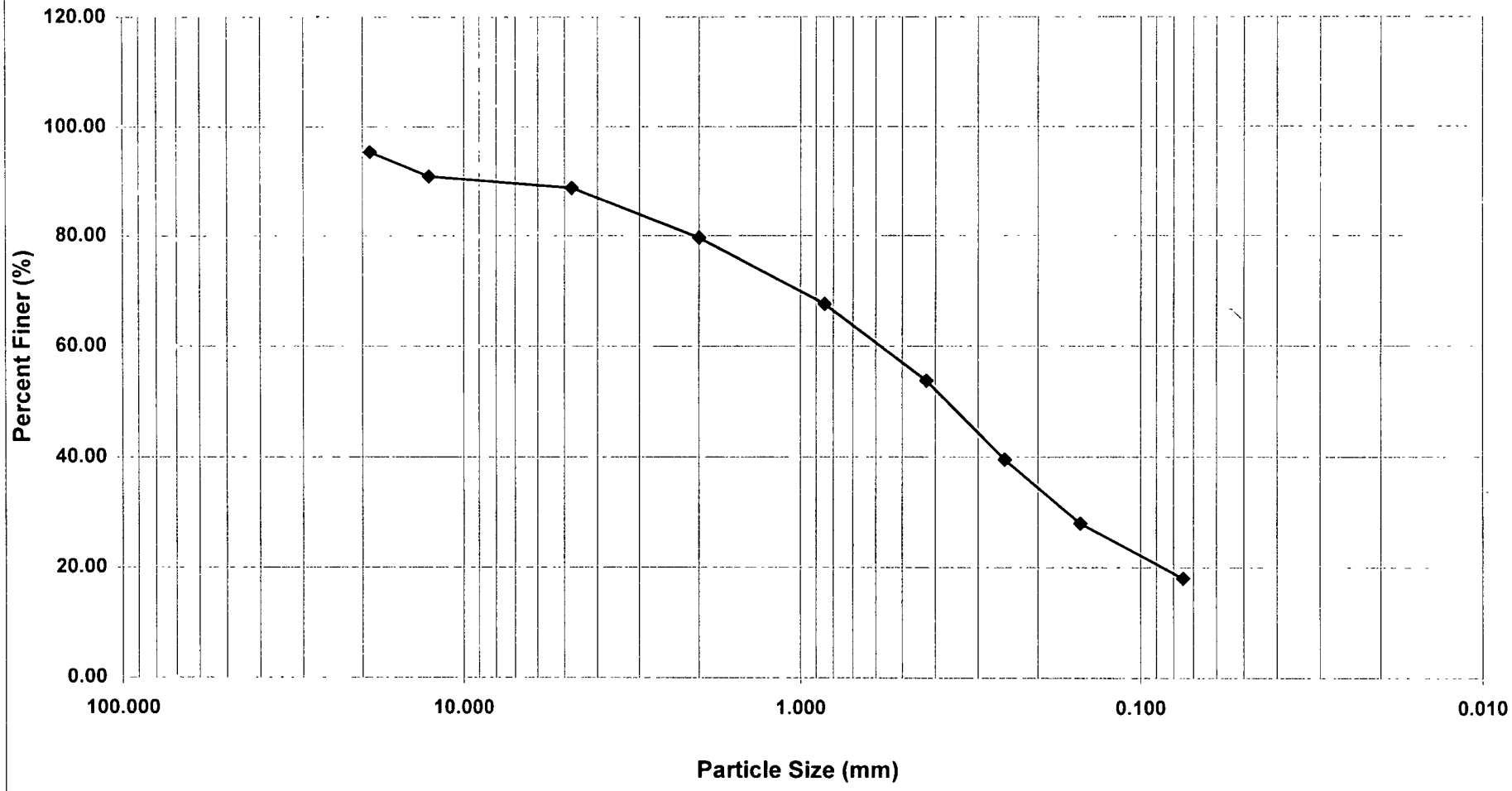
SB16-22-6-8



36 = % Clay/Silt 32 = % Fine Sand 18 = % Medium Sand 5 = % Coarse Sand 4 = % Fine Gravel 5 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

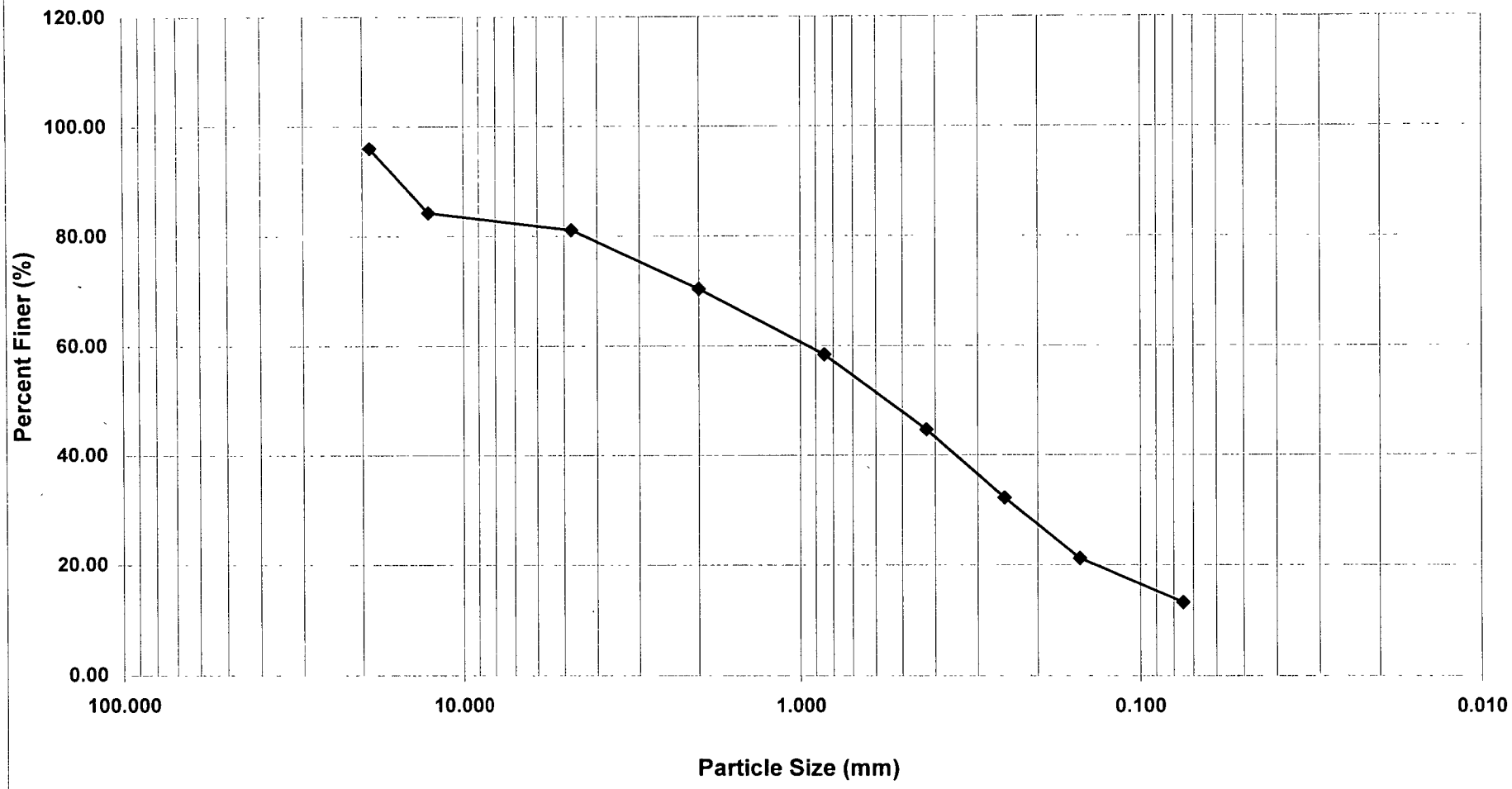
SB16-23-0-2



18 = % Clay/Silt 36 = % Fine Sand 26 = % Medium Sand 9 = % Coarse Sand 7 = % Fine Gravel 5 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

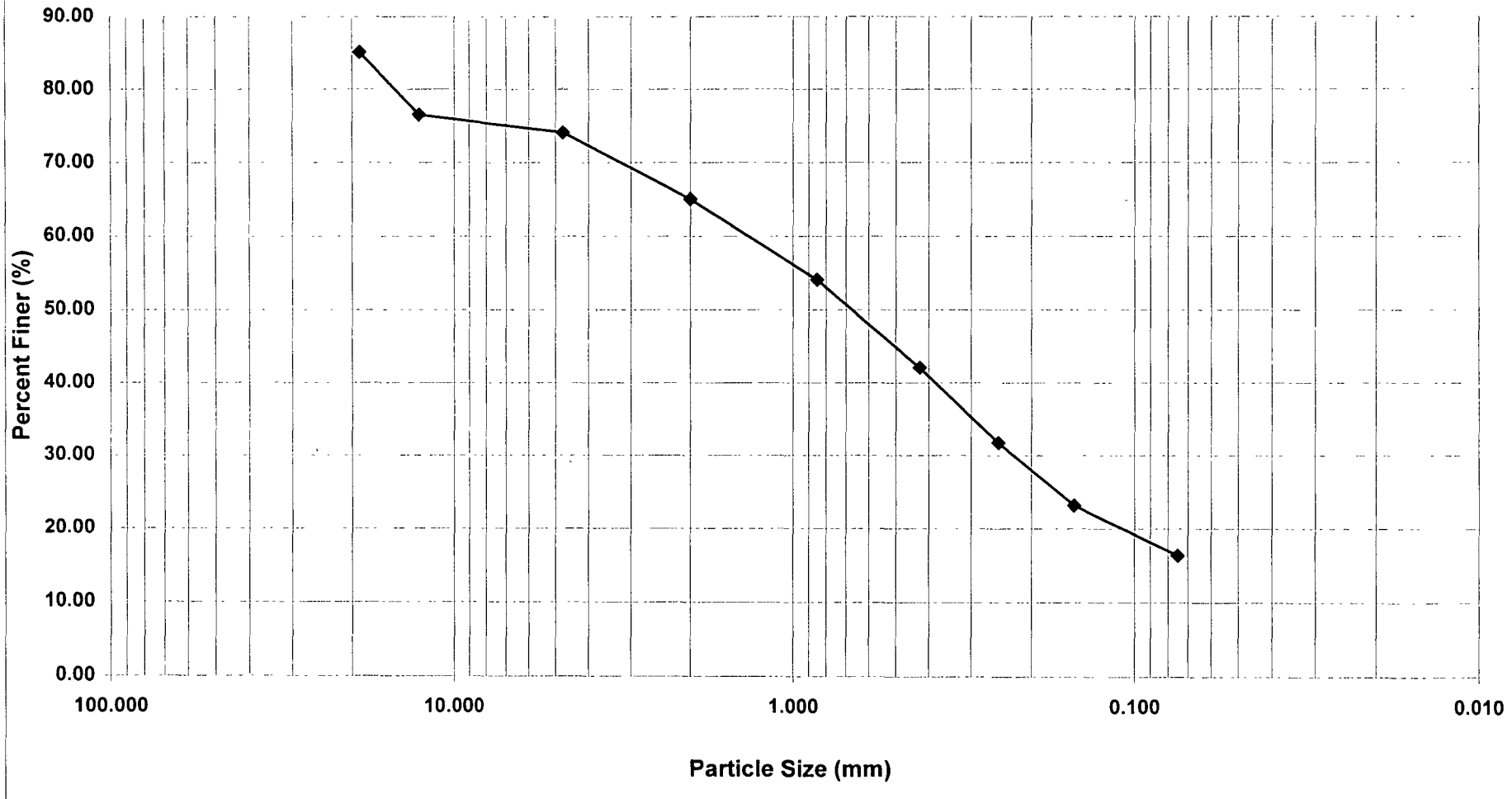
SB16-23-3-5



13 = % Clay/Silt 32 = % Fine Sand 26 = % Medium Sand 11 = % Coarse Sand 15 = % Fine Gravel 4 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

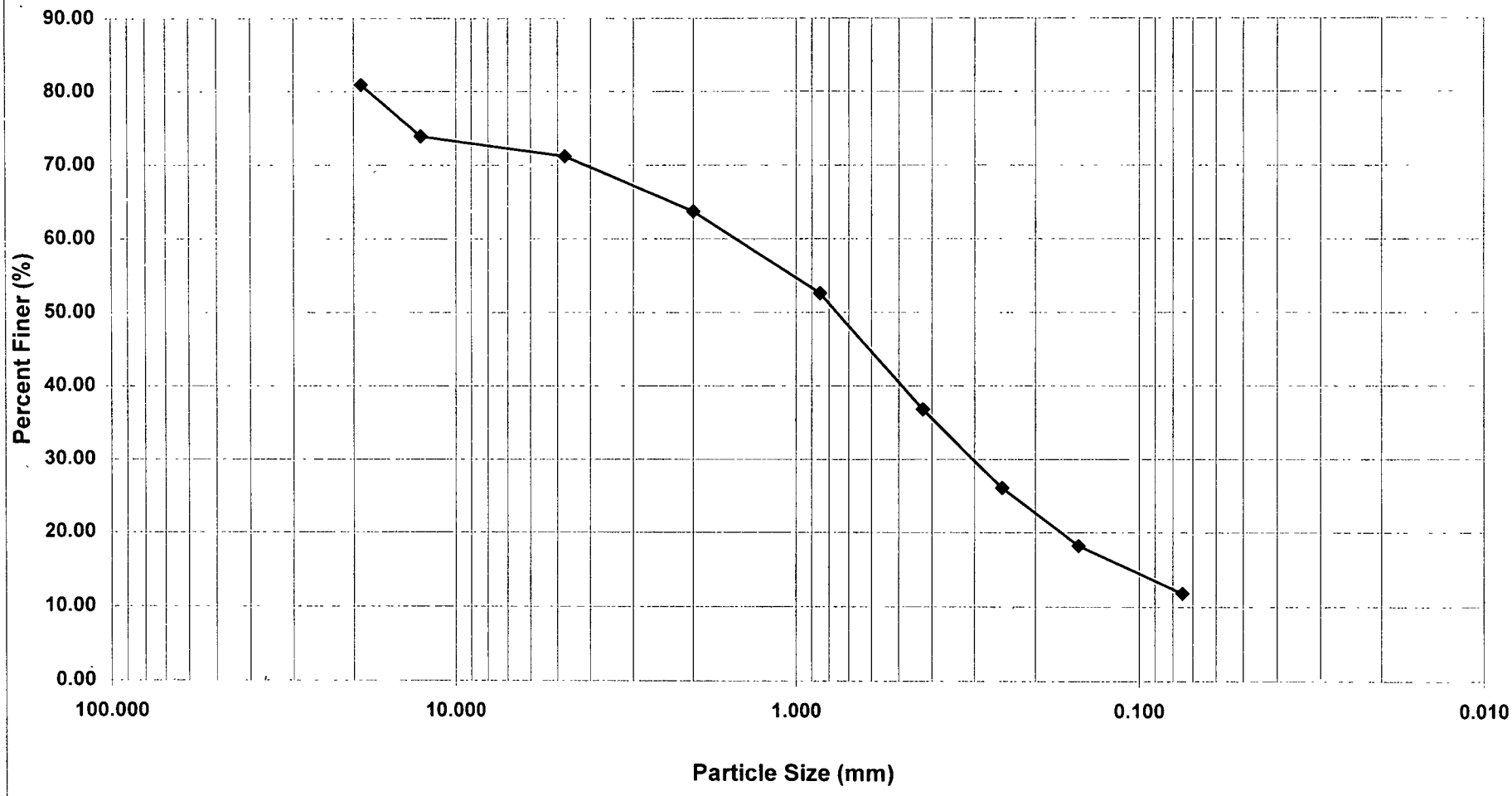
SB16-24-0-2



16 = % Clay/Silt 26 = % Fine Sand 23 = % Medium Sand 9 = % Coarse Sand 11 = % Fine Gravel 15 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

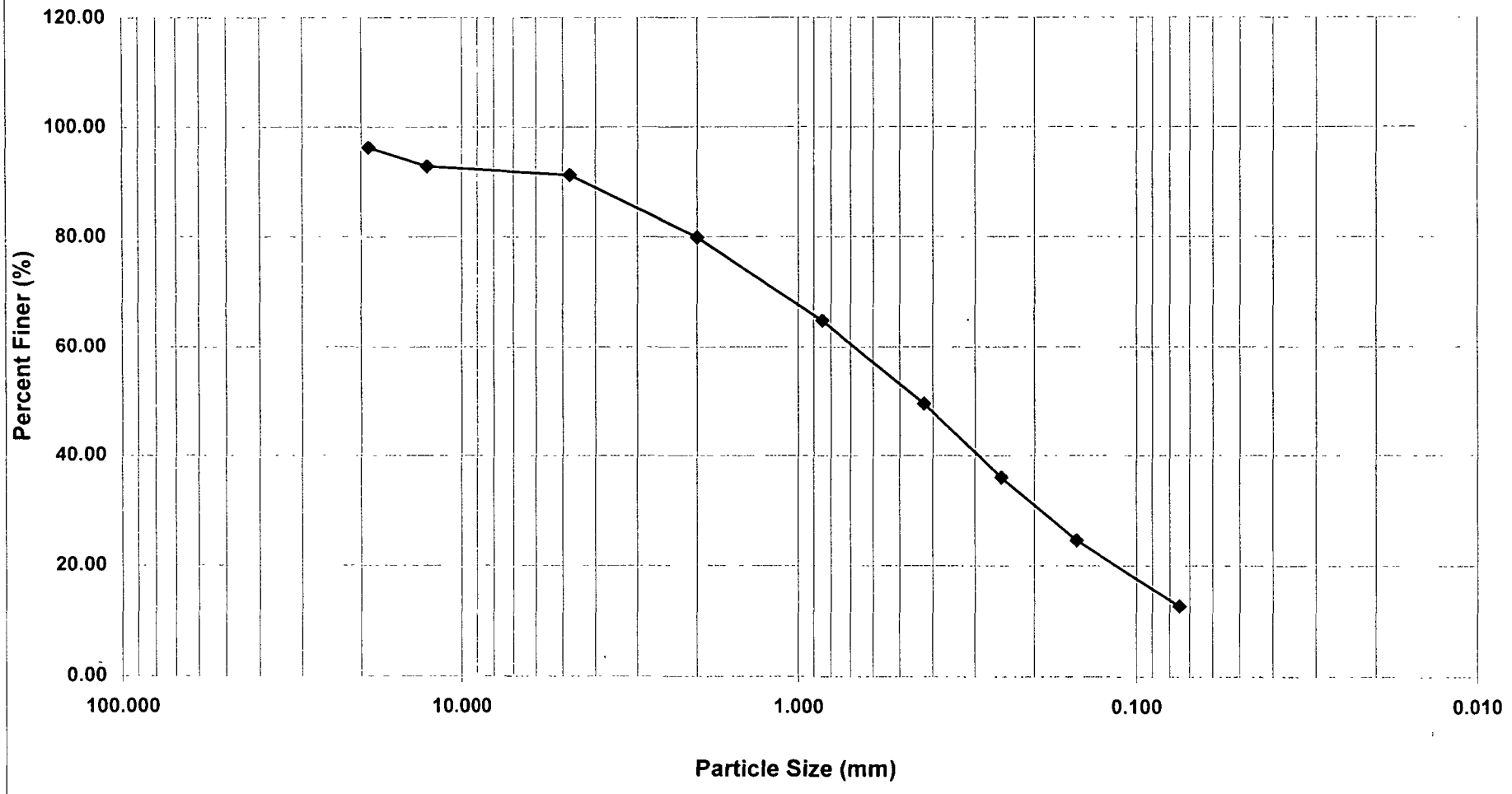
SB16-24-7-9



12 = % Clay/Silt 25 = % Fine Sand 27 = % Medium Sand 8 = % Coarse Sand 10 = % Fine Gravel 19 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

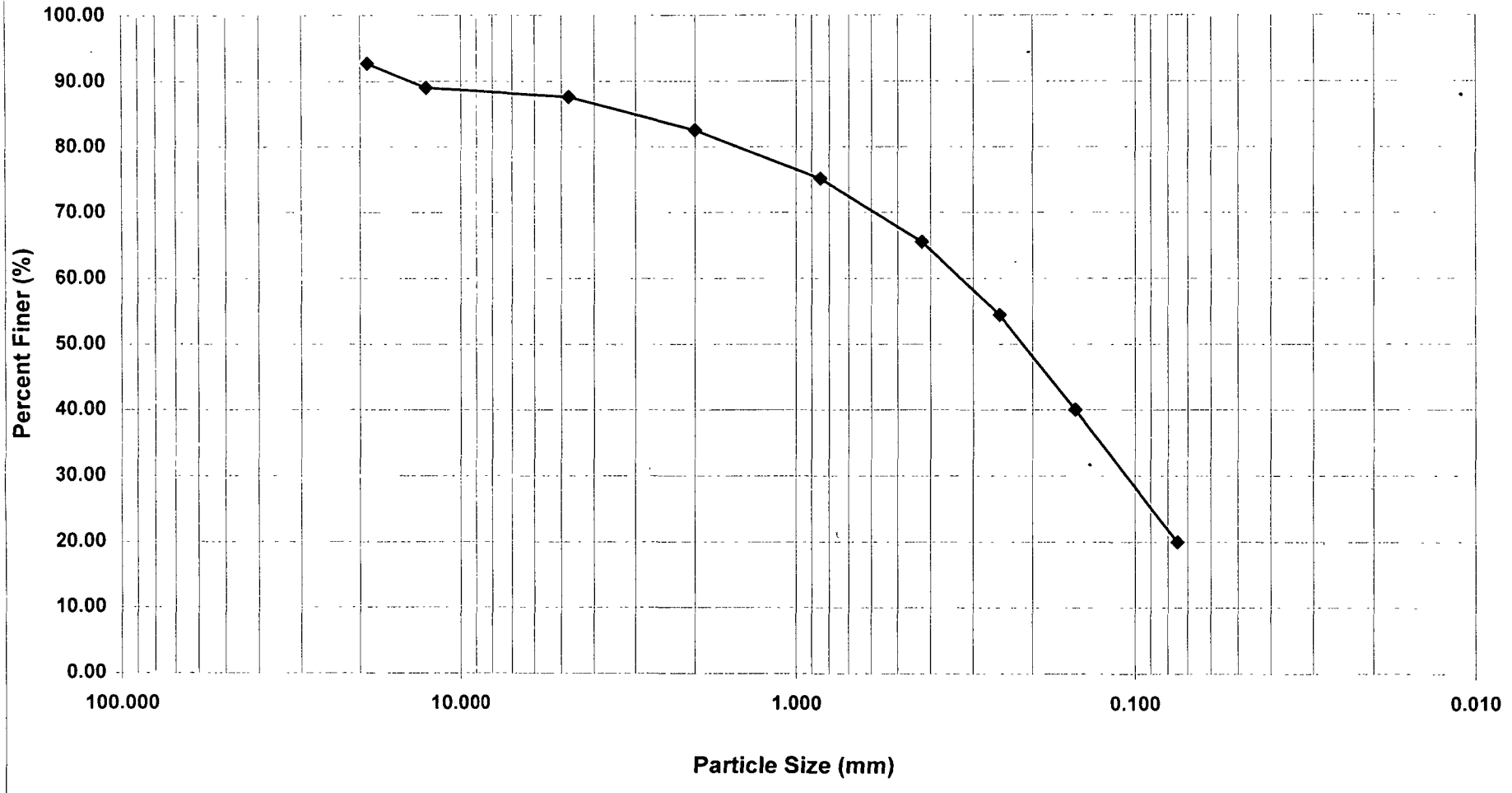
SB16-25-0-2



13 = % Clay/Silt 37 = % Fine Sand 30 = % Medium Sand 11 = % Coarse Sand 5 = % Fine Gravel 4 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

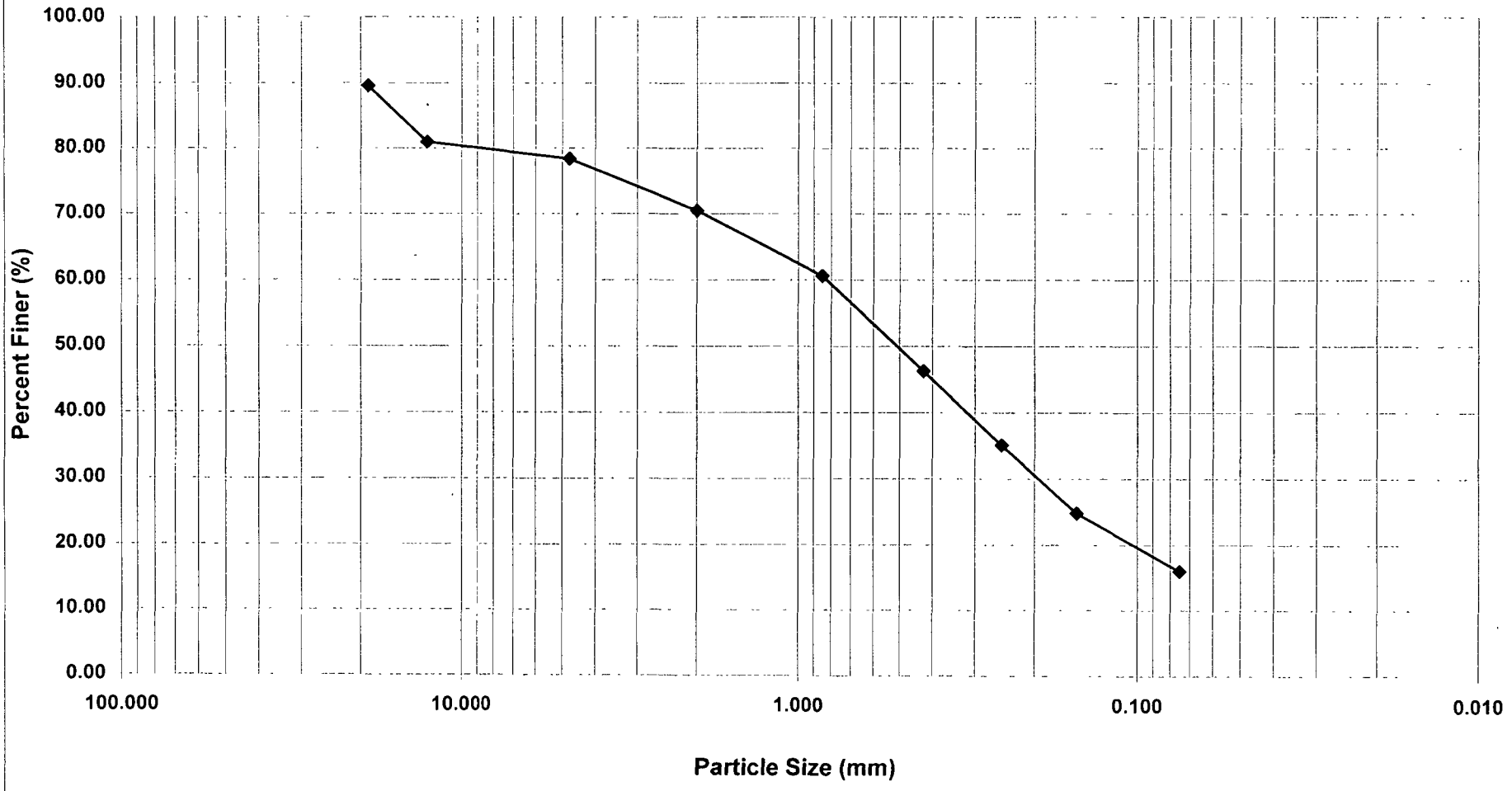
SB16-25-7-9



20 = % Clay/Silt 46 = % Fine Sand 17 = % Medium Sand 5 = % Coarse Sand 5 = % Fine Gravel 7 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

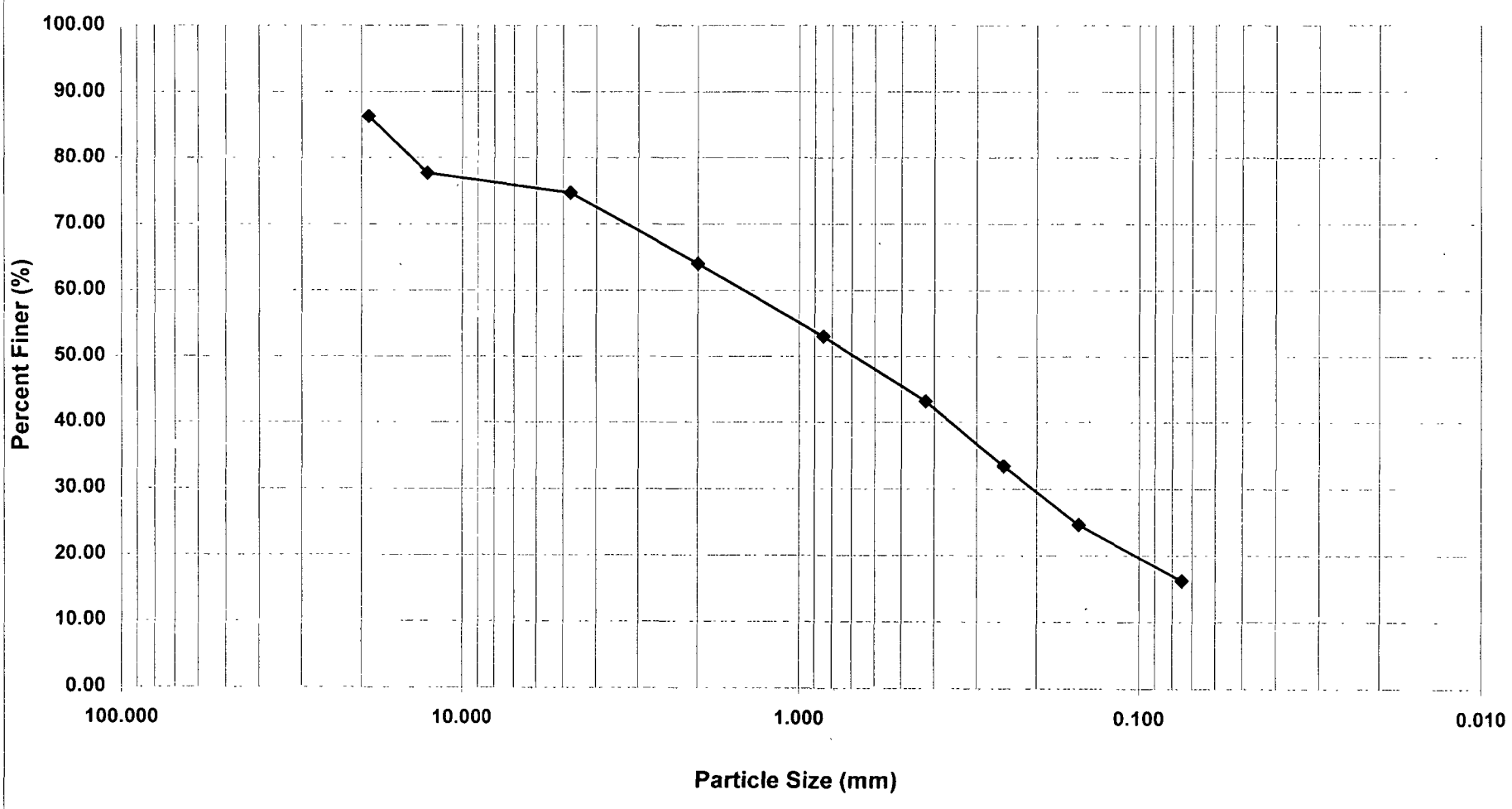
SB16-26-0-2



16 = % Clay/Silt 30 = % Fine Sand 24 = % Medium Sand 8 = % Coarse Sand 11 = % Fine Gravel 10 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

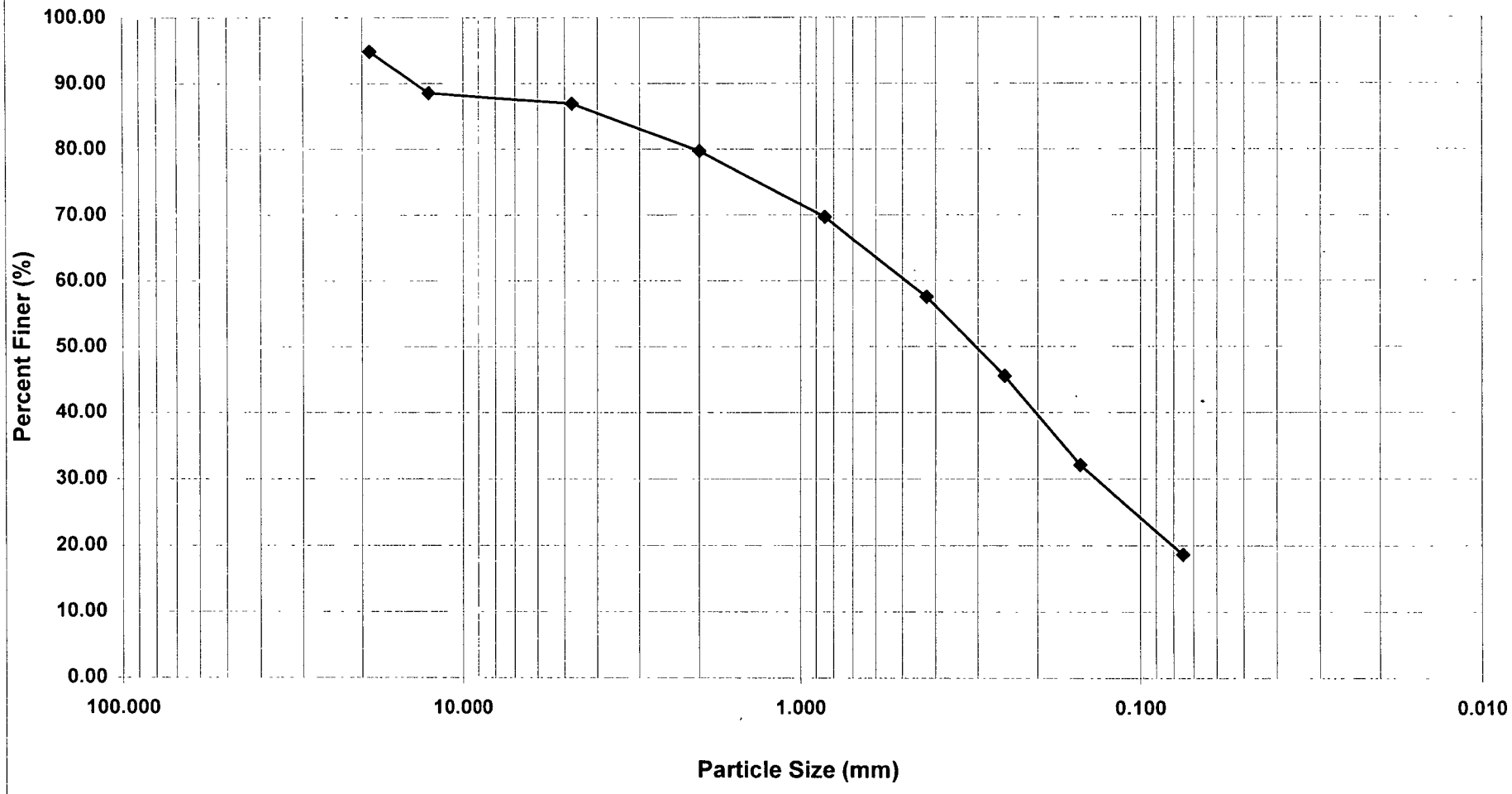
SB16-26-2-4



16 = % Clay/Silt 27 = % Fine Sand 21 = % Medium Sand 11 = % Coarse Sand 12 = % Fine Gravel 14 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

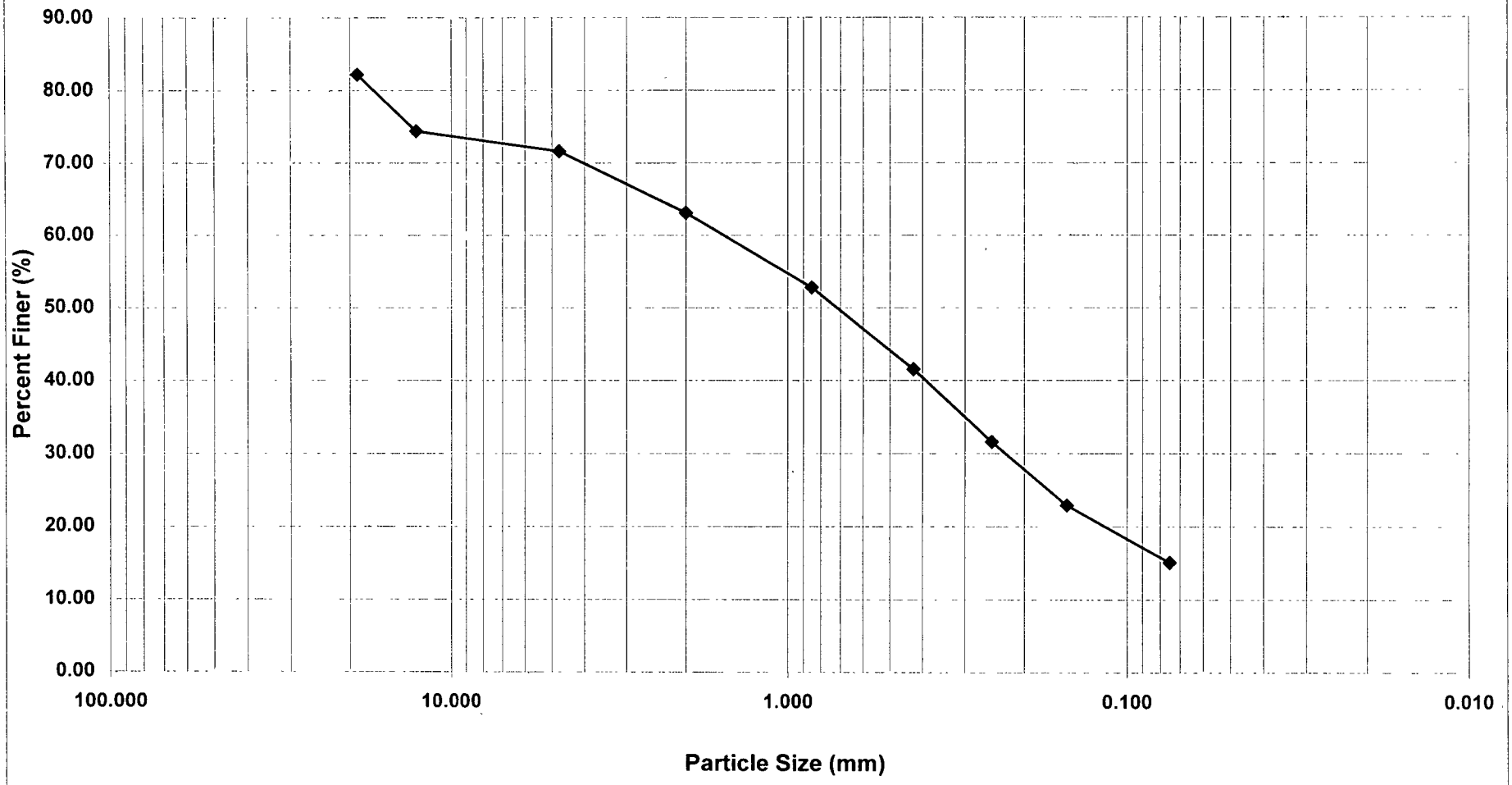
SB16-27-0-2



19 = % Clay/Silt 39 = % Fine Sand 22 = % Medium Sand 7 = % Coarse Sand 8 = % Fine Gravel 5 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

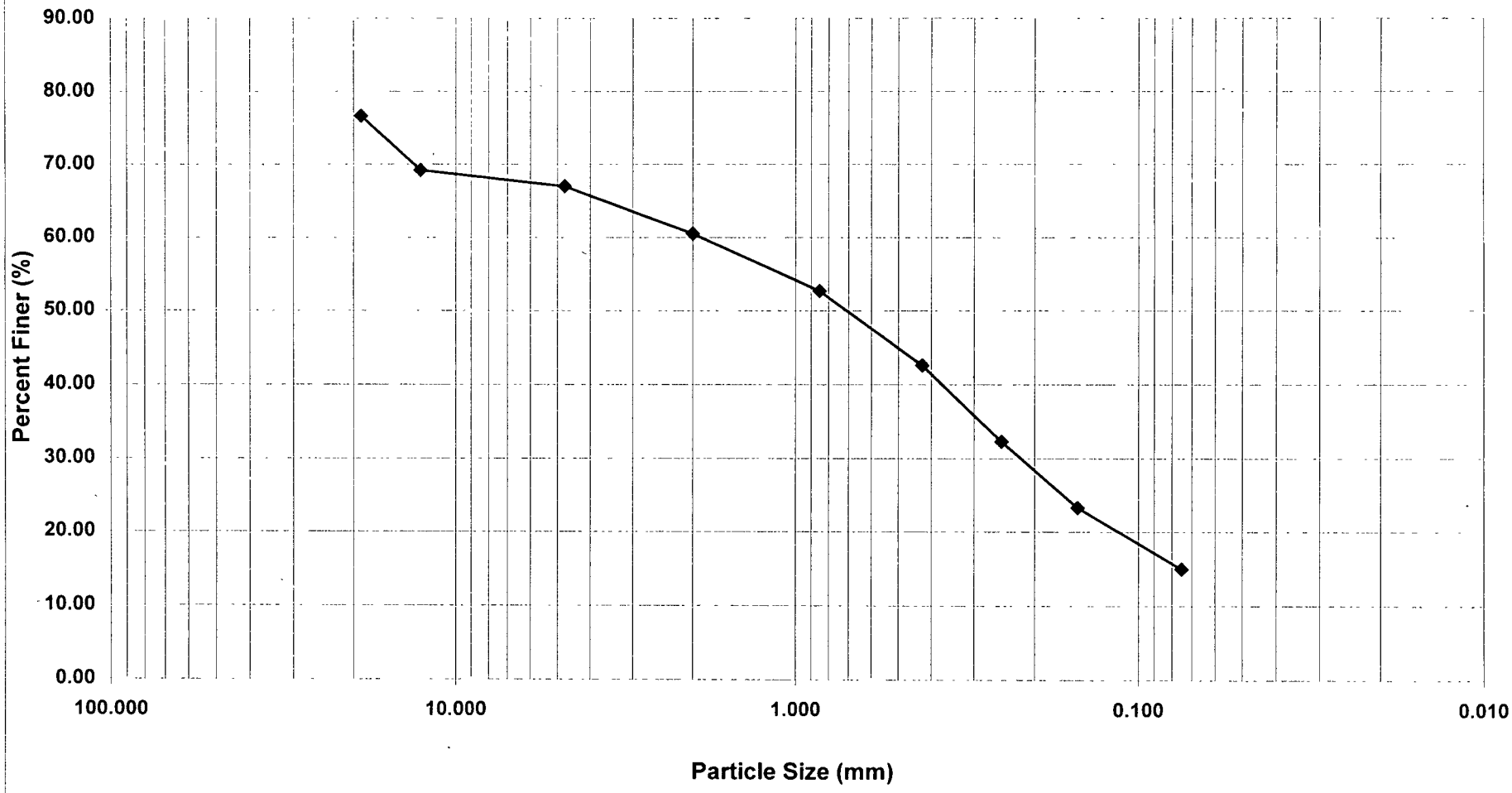
SB16-27-2-4



15 = % Clay/Silt 26 = % Fine Sand 22 = % Medium Sand 8 = % Coarse Sand 11 = % Fine Gravel 18 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

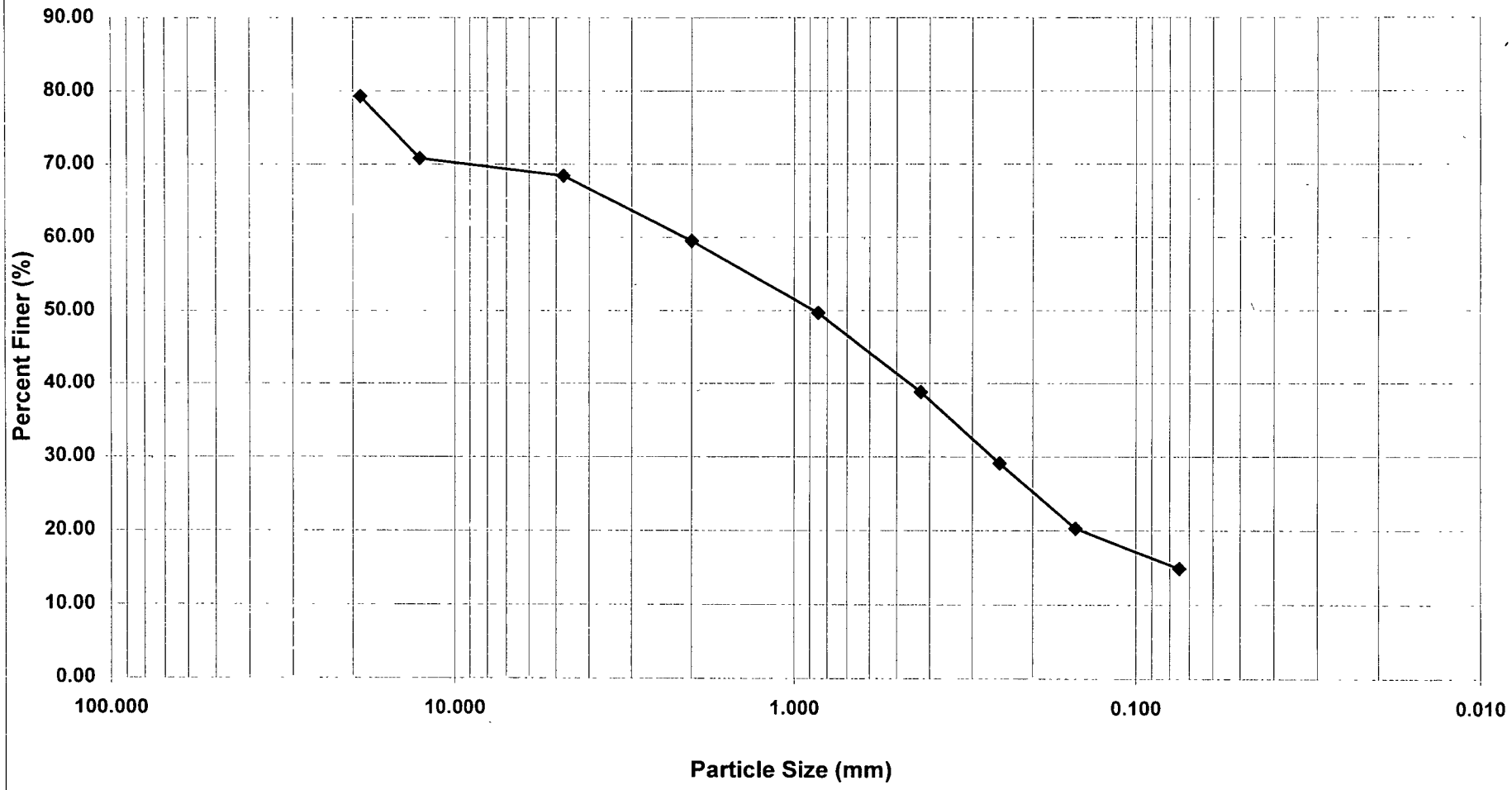
SB16-28-0-2



15 = % Clay/Silt 28 = % Fine Sand 18 = % Medium Sand 7 = % Coarse Sand 10 = % Fine Gravel 23 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

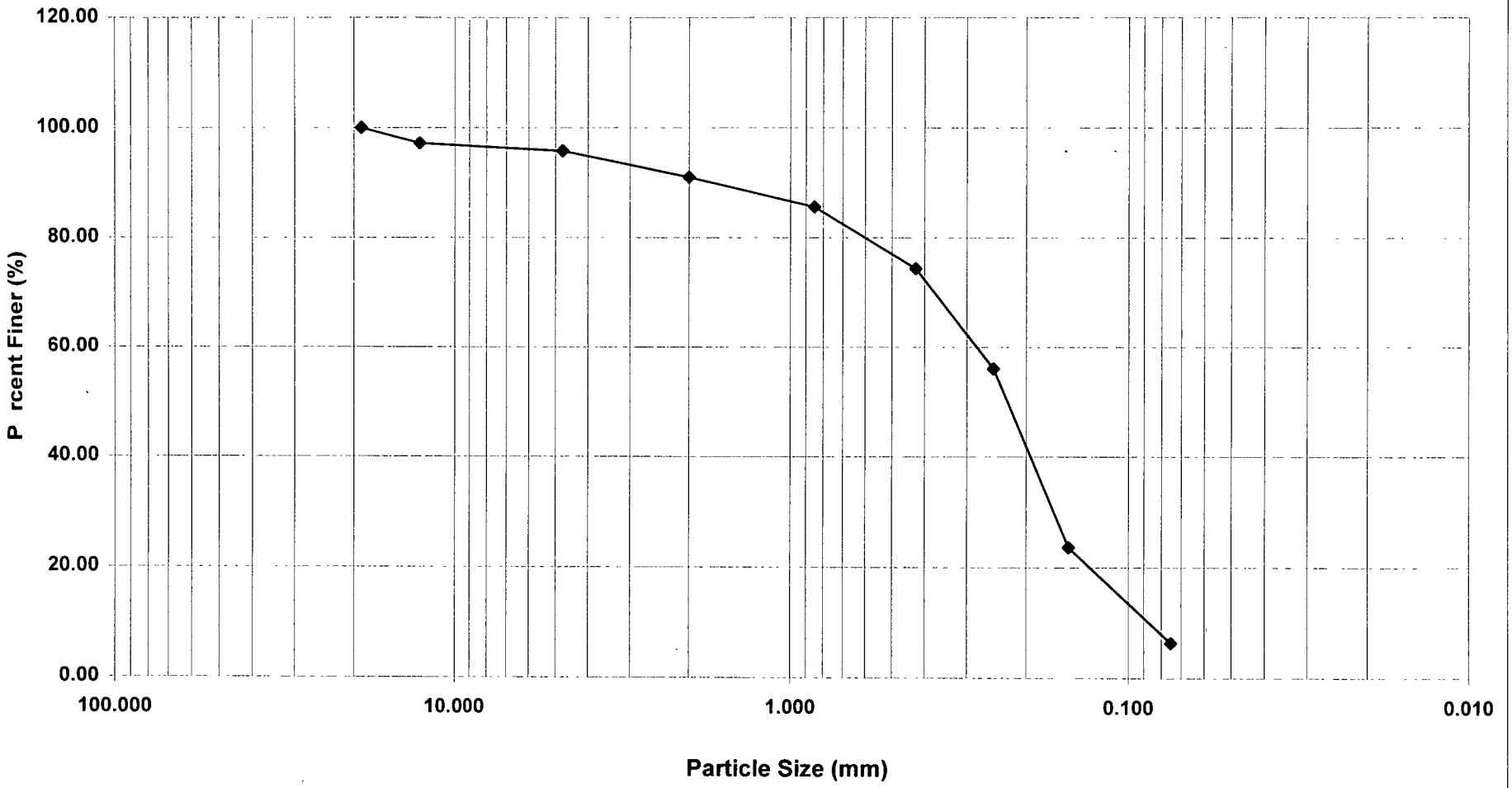
SB16-28-4-6



15 = % Clay/Silt 24 = % Fine Sand 21 = % Medium Sand 9 = % Coarse Sand 11 = % Fine Gravel 21 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

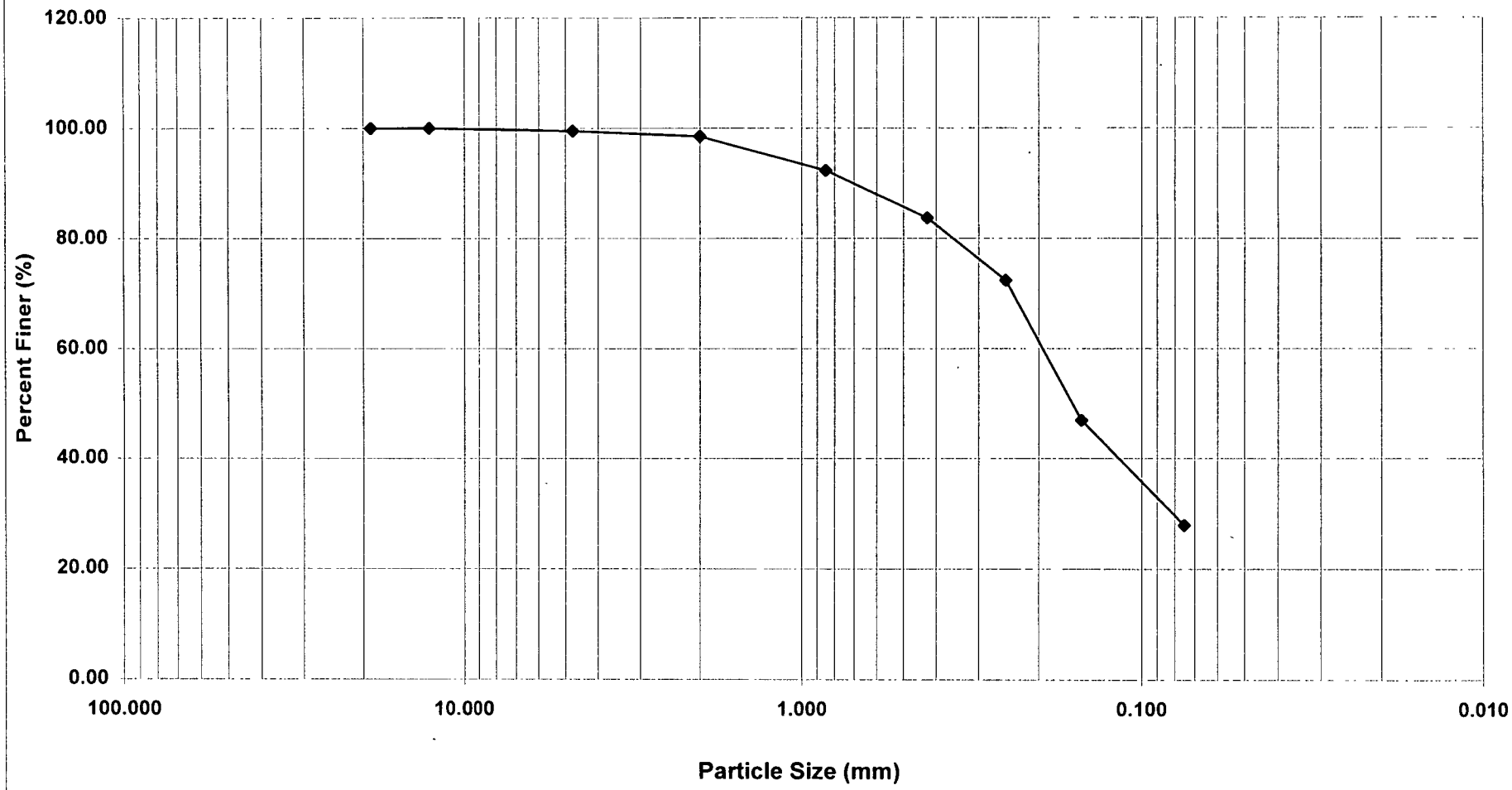
SB16-29-20-22



6 = % Clay/Silt 68 = % Fine Sand 17 = % Medium Sand 5 = % Coarse Sand 4 = % Fine Gravel 0 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

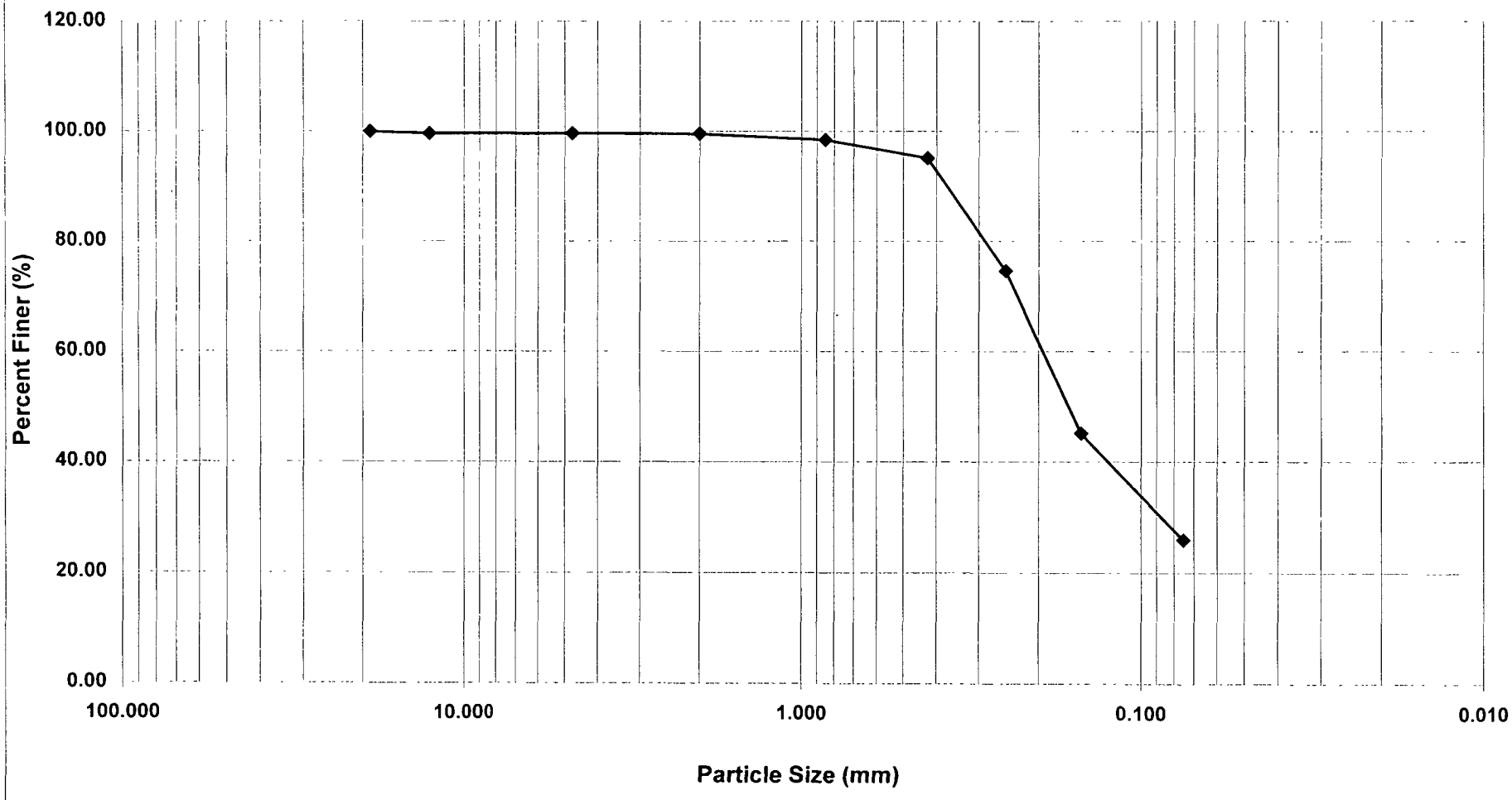
SB16-29-32-34



28 = % Clay/Silt 56 = % Fine Sand 15 = % Medium Sand 1 = % Coarse Sand 1 = % Fine Gravel 0 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

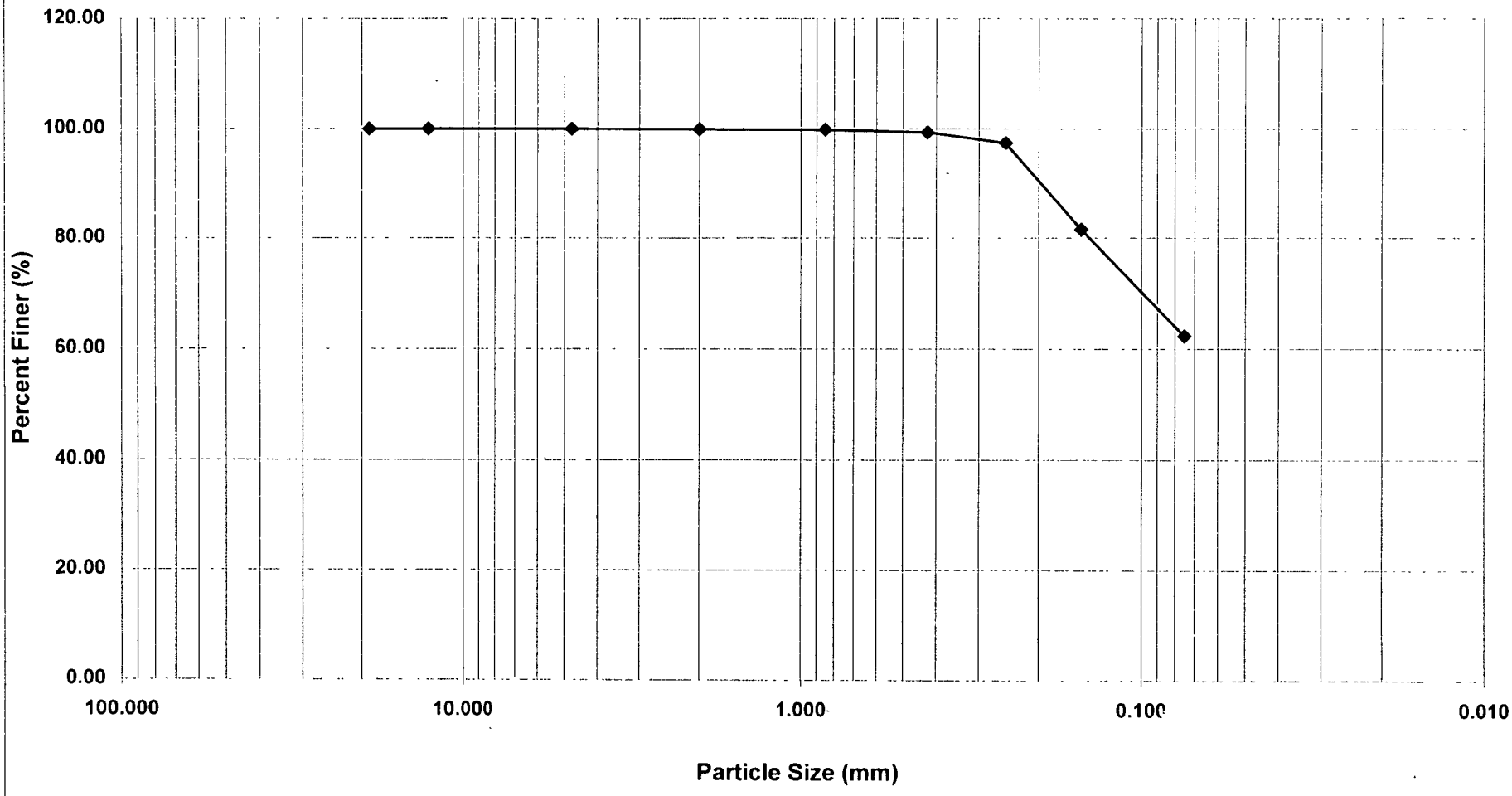
MW16-01S-19-21



26 = % Clay/Silt 69 = % Fine Sand 4 = % Medium Sand 0 = % Coarse Sand 0 = % Fine Gravel 0 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

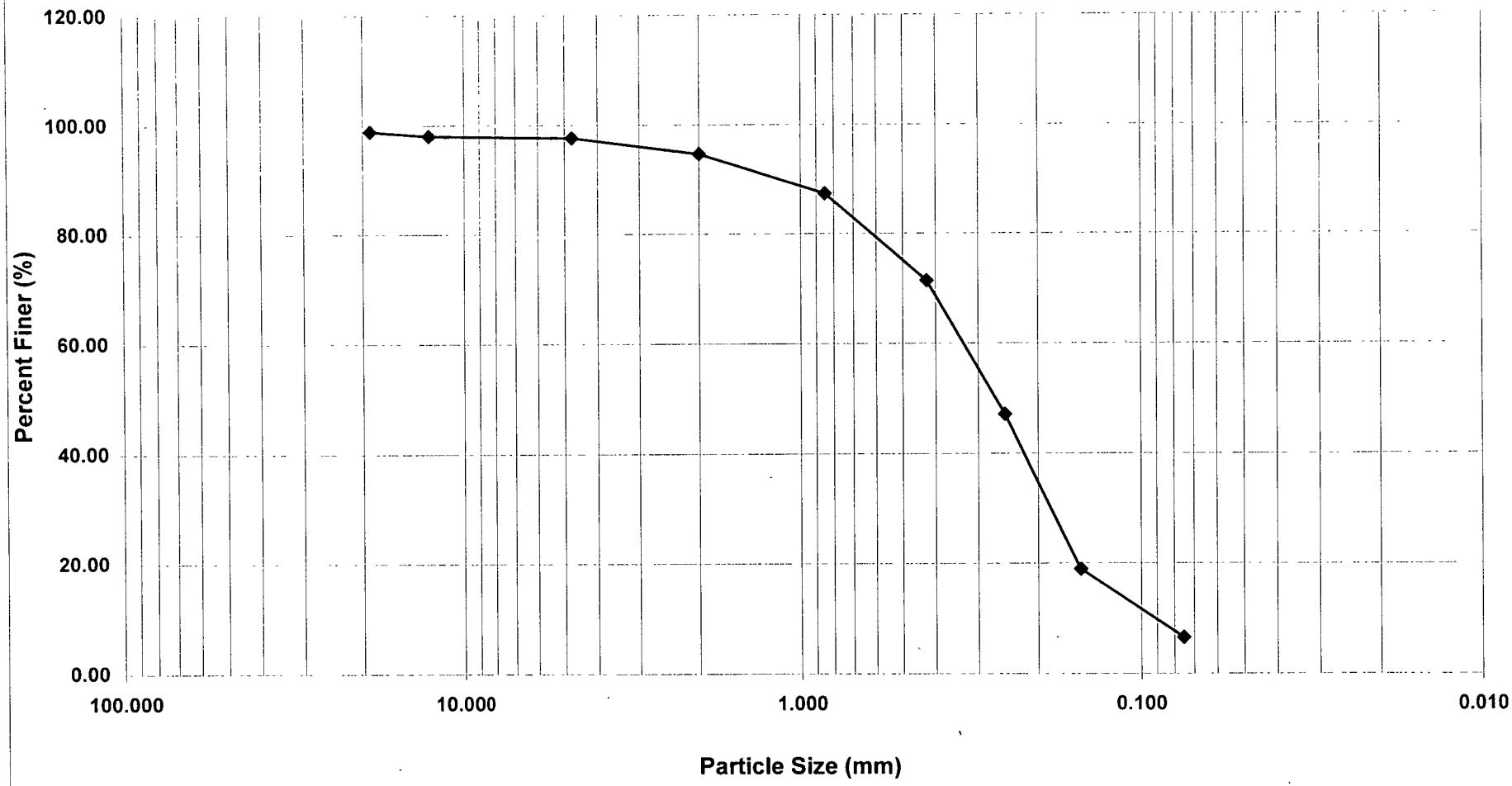
MW16-01D-48-50



62 = % Clay/Silt 37 = % Fine Sand 1 = % Medium Sand 0 = % Coarse Sand 0 = % Fine Gravel 0 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

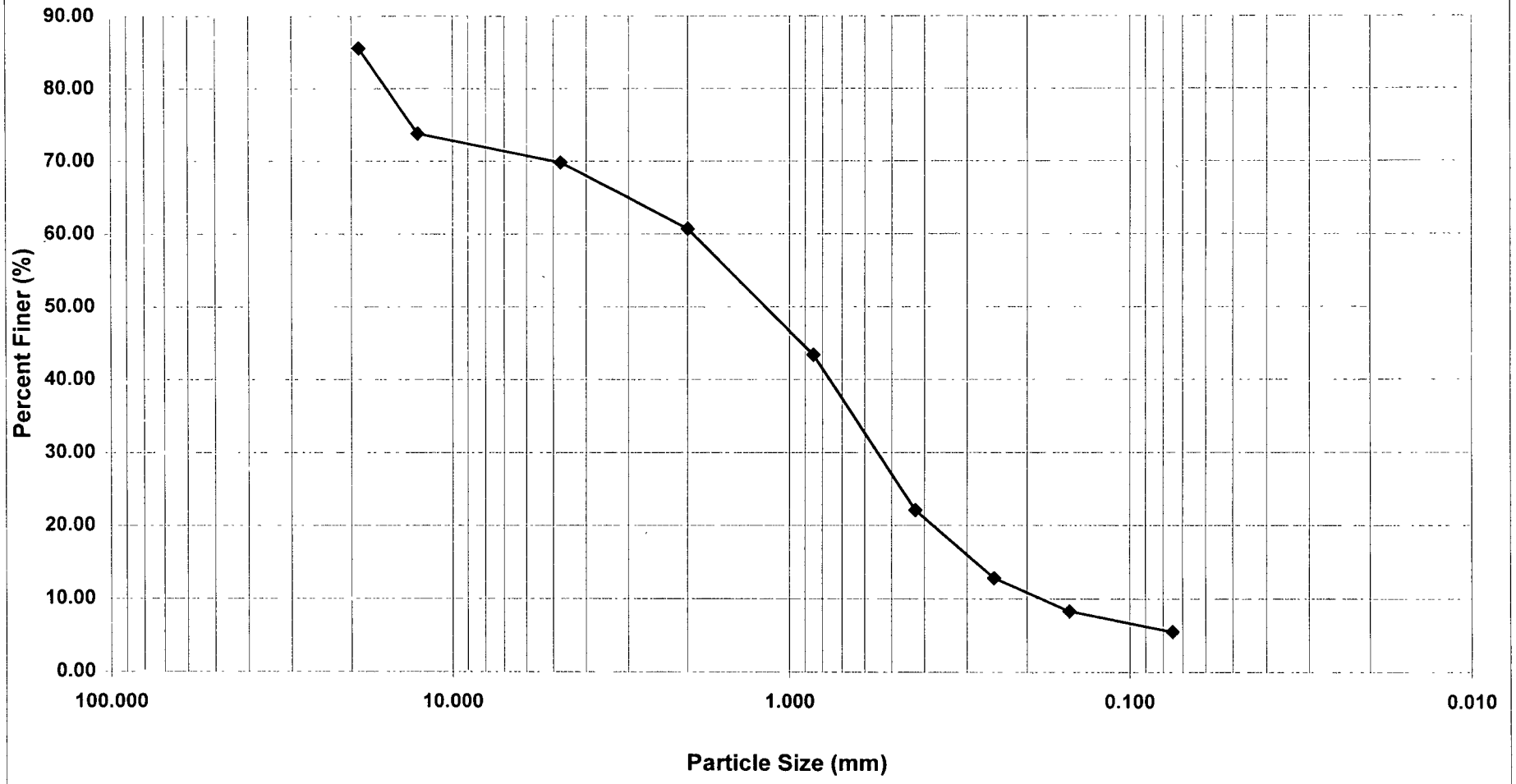
MW16-02S-10-12



7 = % Clay/Silt 65 = % Fine Sand 23 = % Medium Sand 3 = % Coarse Sand 1 = % Fine Gravel 1 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

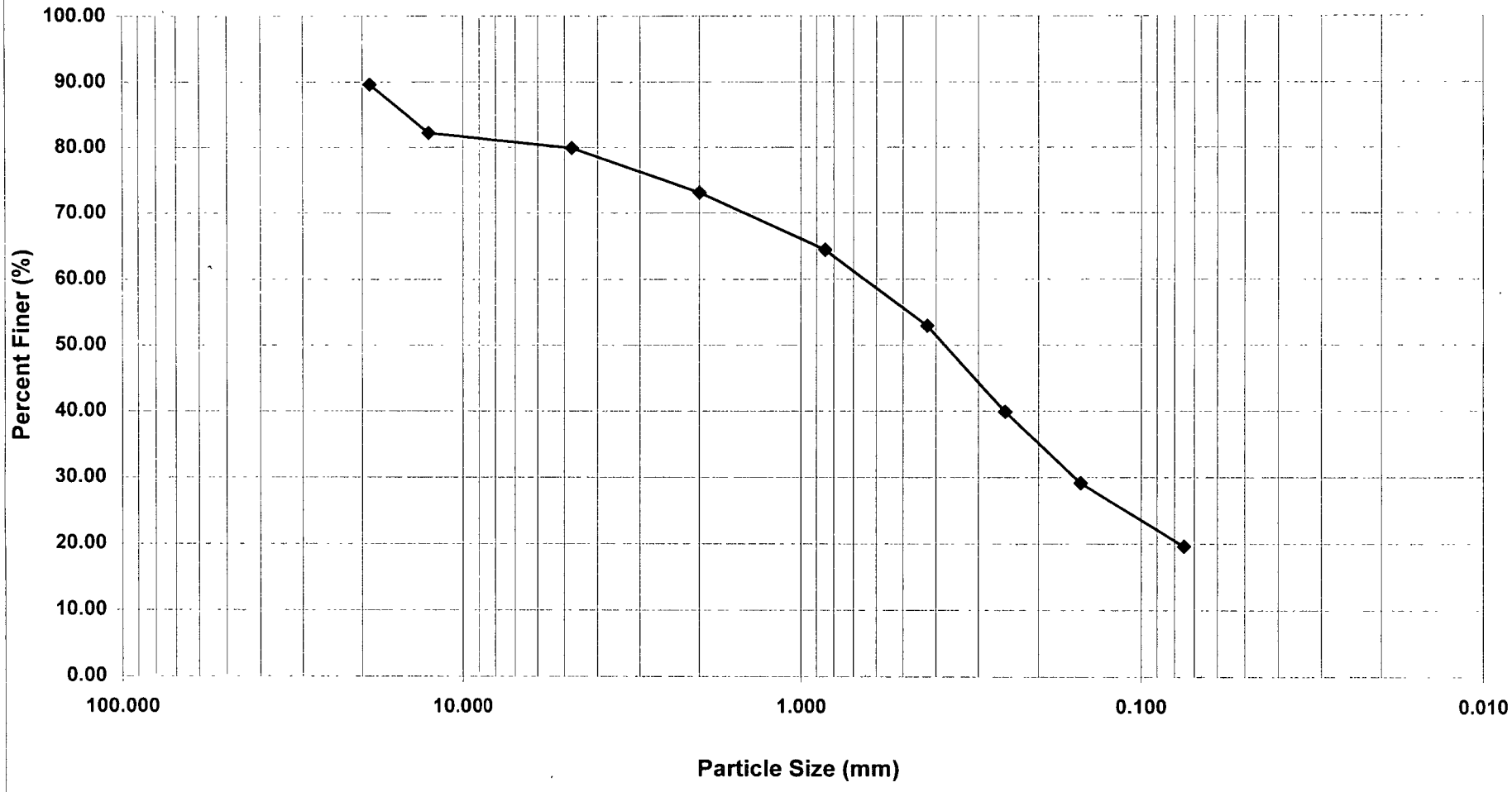
MW16-02D-66-66.7



6 = % Clay/Silt 17 = % Fine Sand 39 = % Medium Sand 9 = % Coarse Sand 16 = % Fine Gravel 14 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

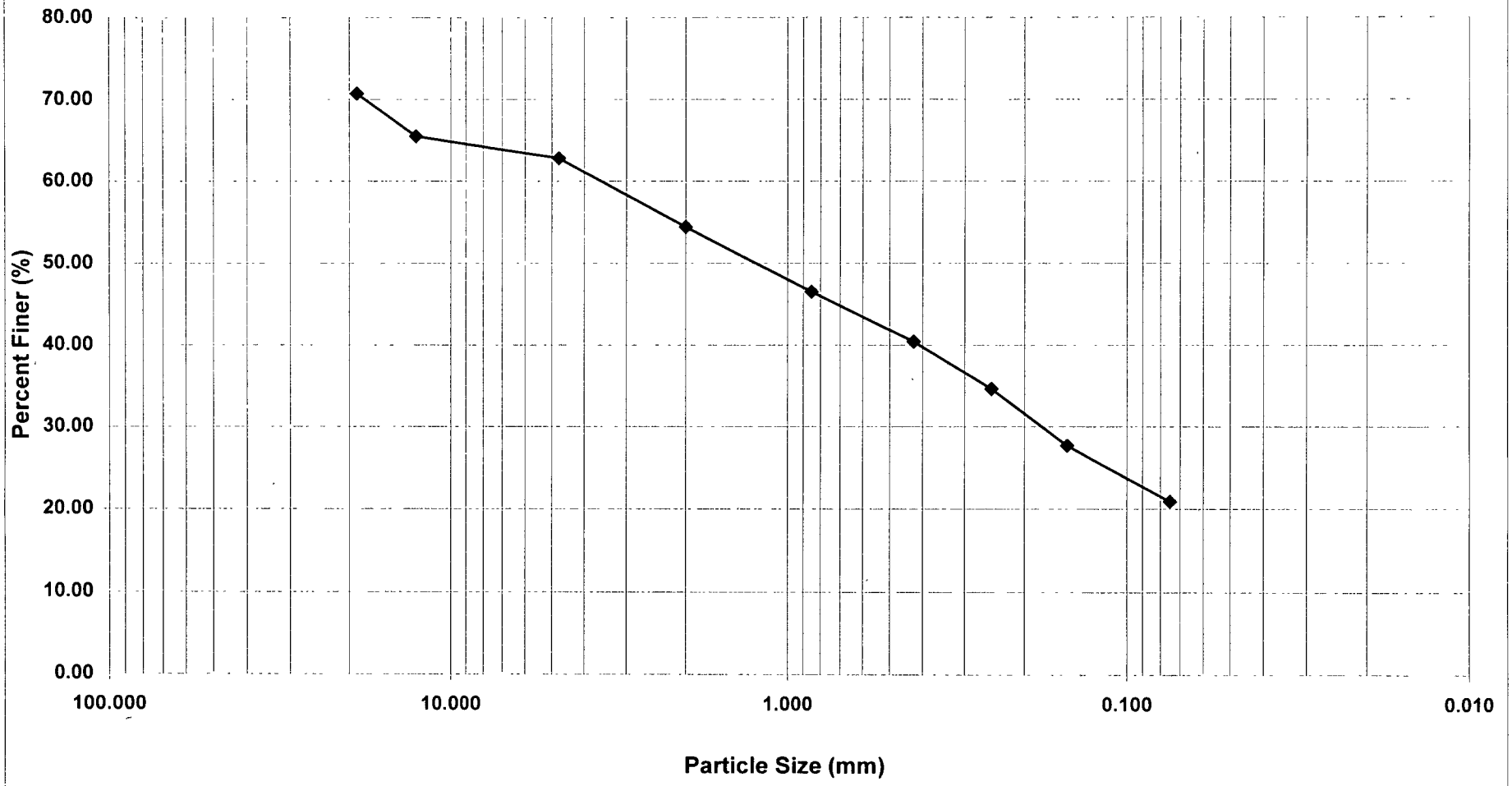
MW16-03S-3-5



20 = % Clay/Silt 33 = % Fine Sand 20 = % Medium Sand 7 = % Coarse Sand 10 = % Fine Gravel 10 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

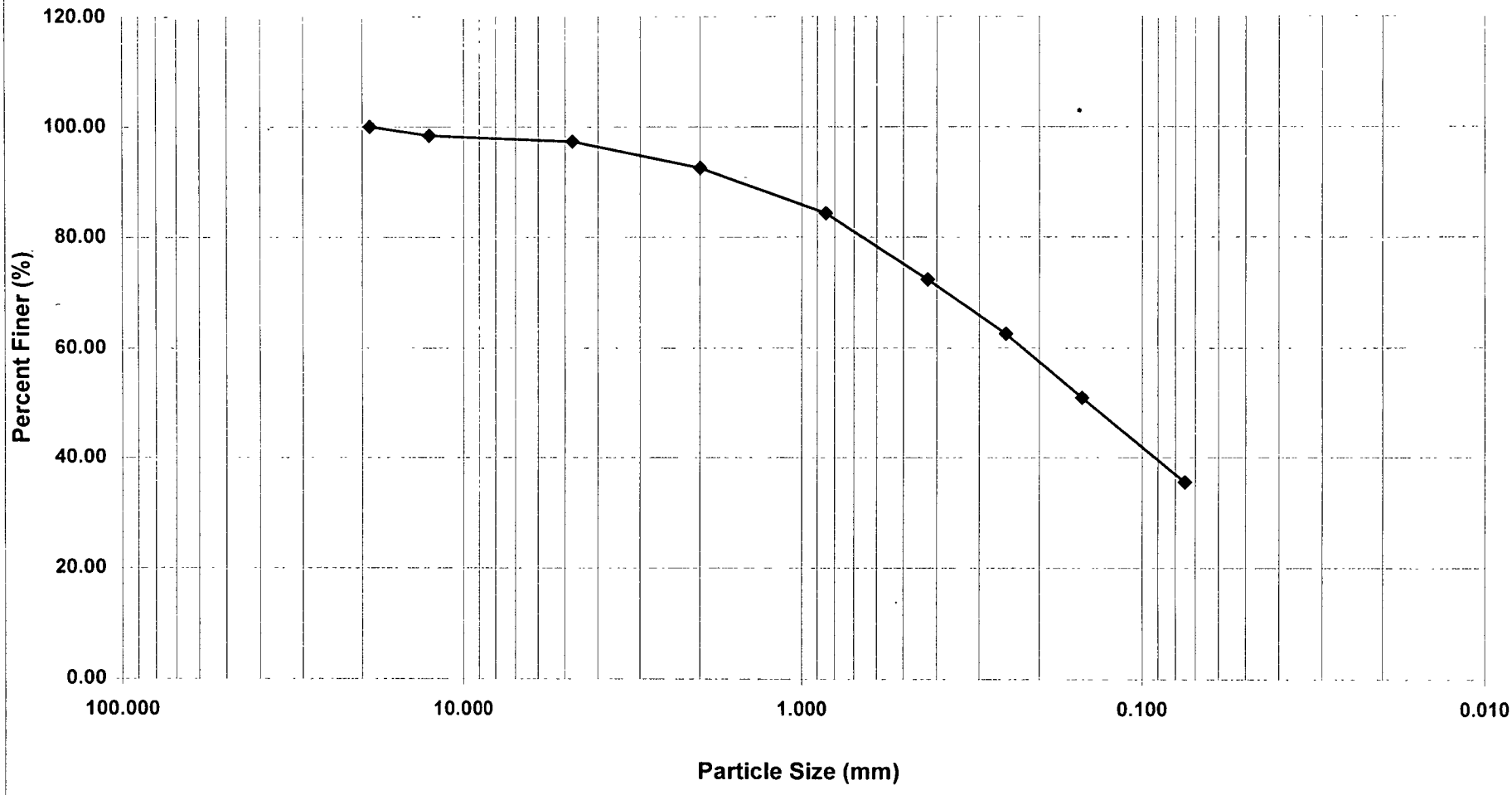
MW16-03D-46.4-48.5



21 = % Clay/Silt 20 = % Fine Sand 14 = % Medium Sand 8 = % Coarse Sand 8 = % Fine Gravel 29 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

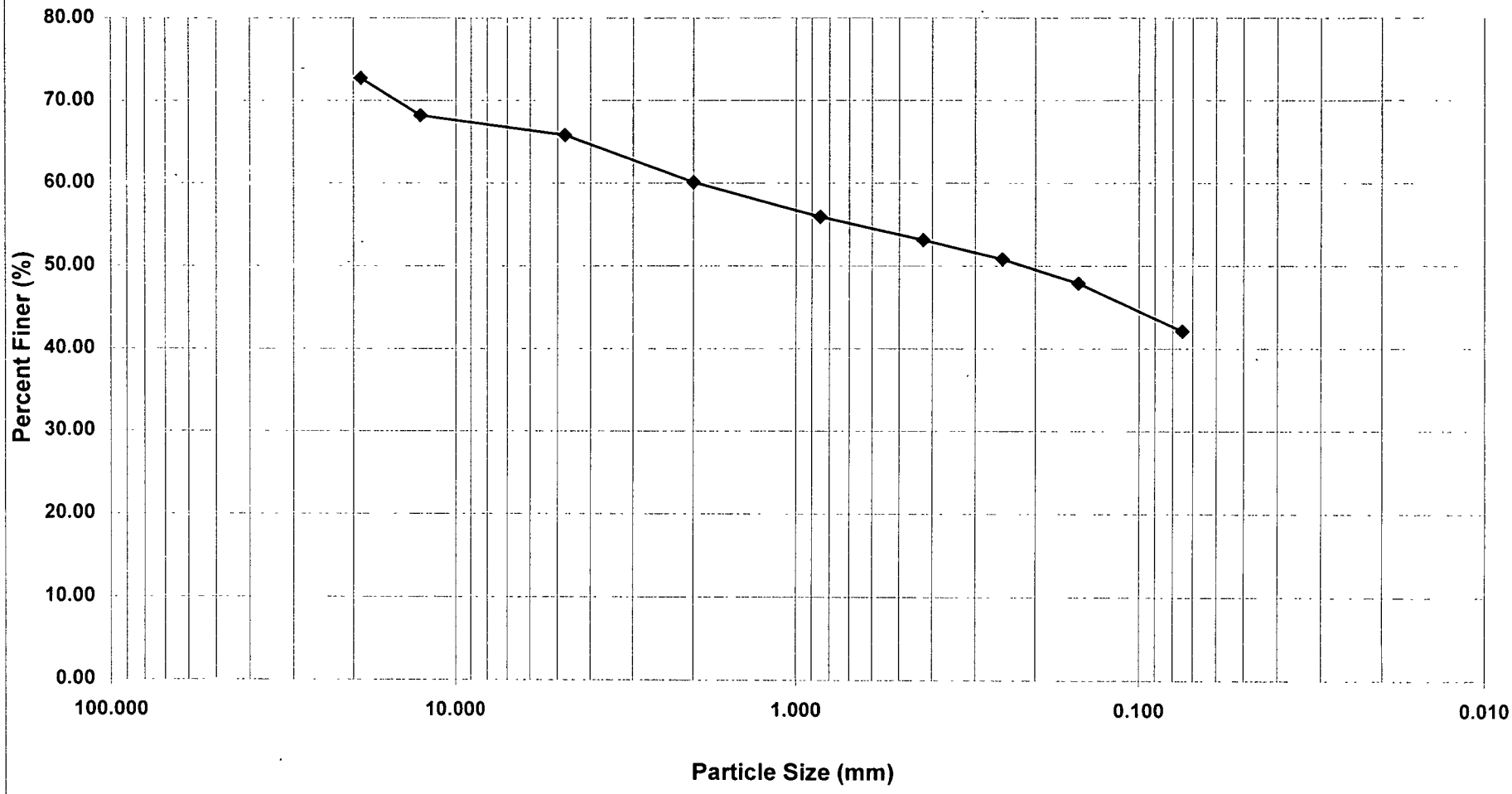
MW16-04S-3-5



36 = % Clay/Silt 37 = % Fine Sand 20 = % Medium Sand 5 = % Coarse Sand 3 = % Fine Gravel 0 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

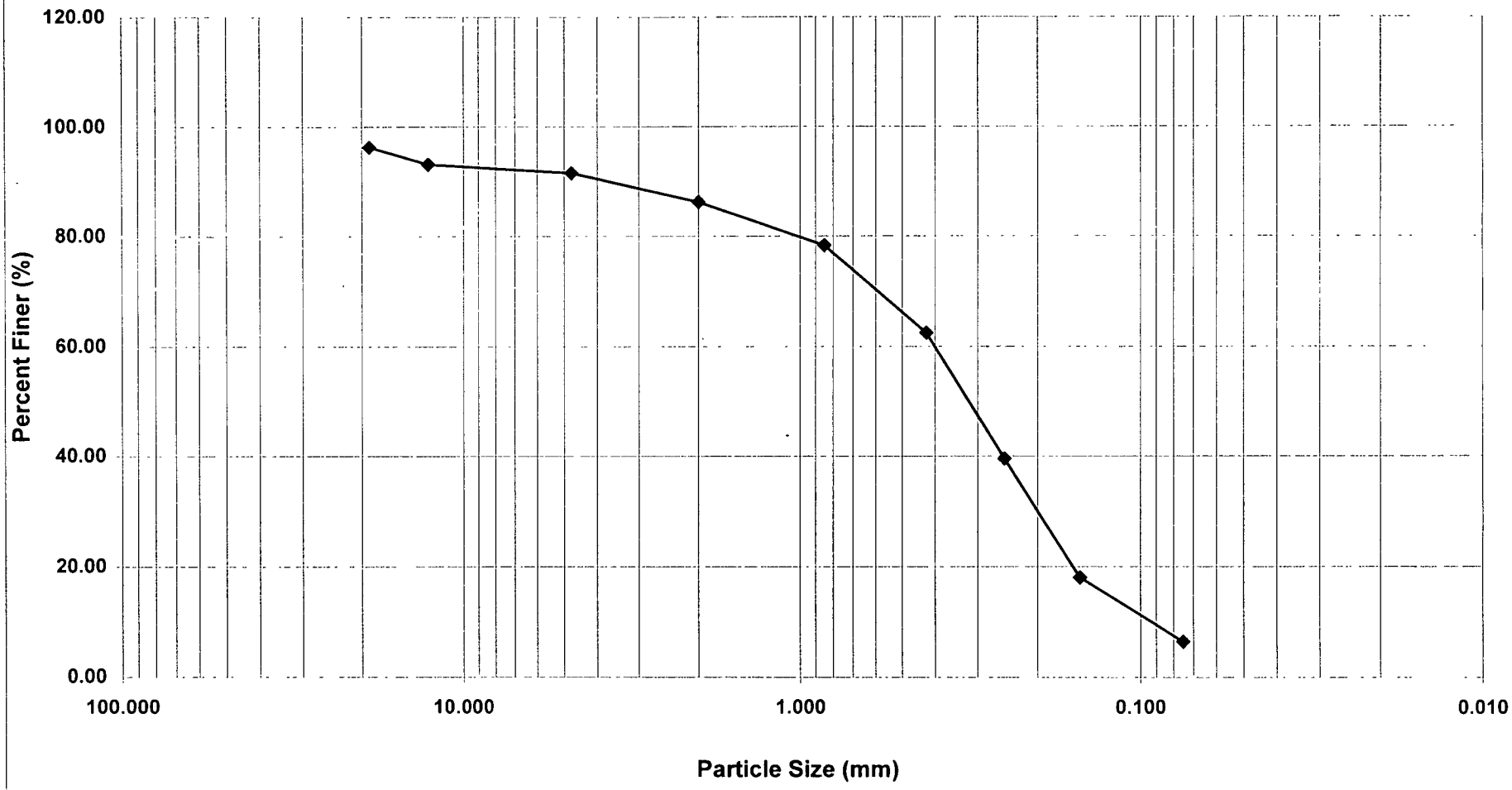
MW16-04D-52-53



42 = % Clay/Silt 11 = % Fine Sand 7 = % Medium Sand 6 = % Coarse Sand 7 = % Fine Gravel 27 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

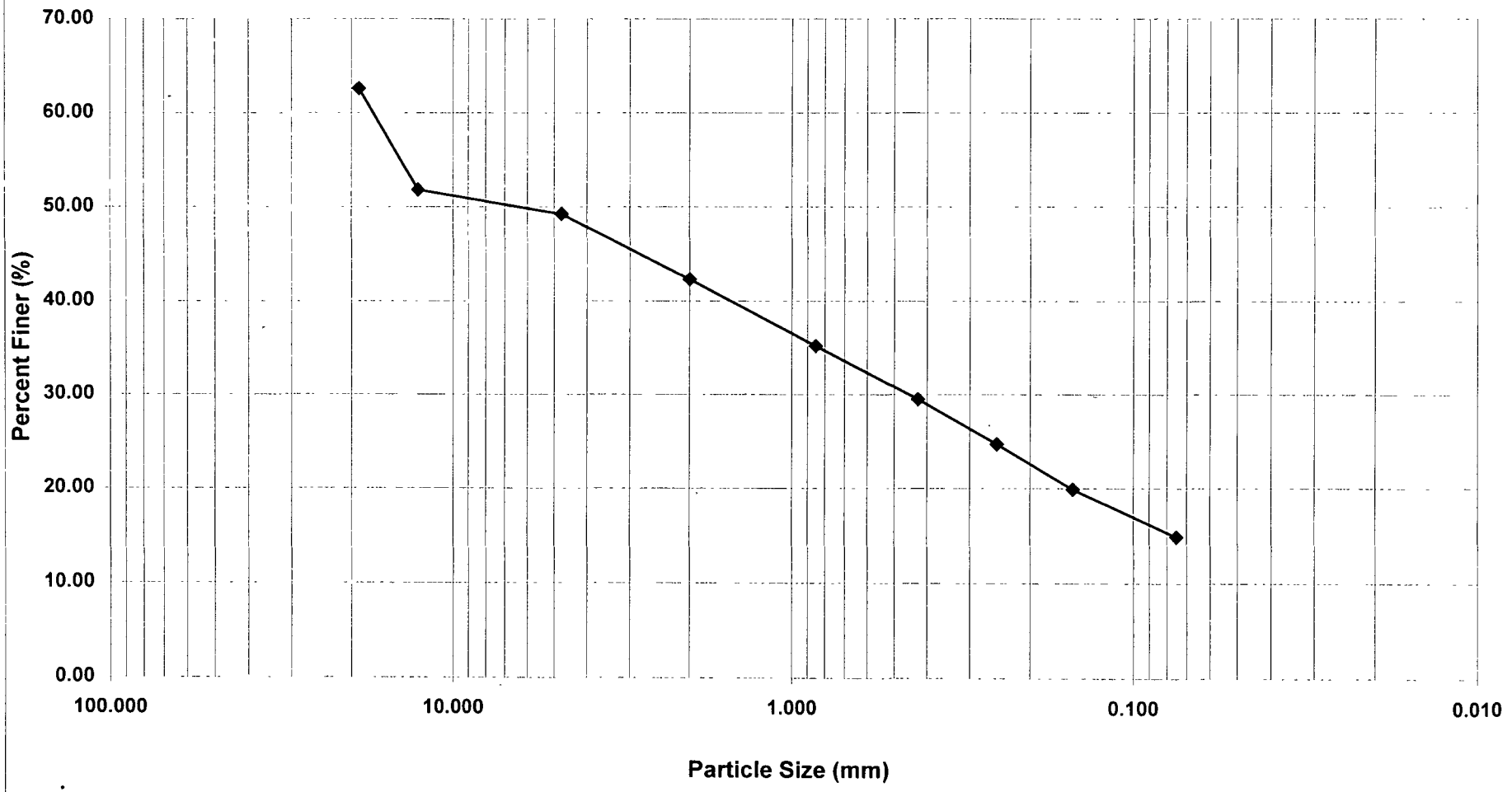
MW16-05S-5-7



6 = % Clay/Silt 56 = % Fine Sand 24 = % Medium Sand 5 = % Coarse Sand 5 = % Fine Gravel 4 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

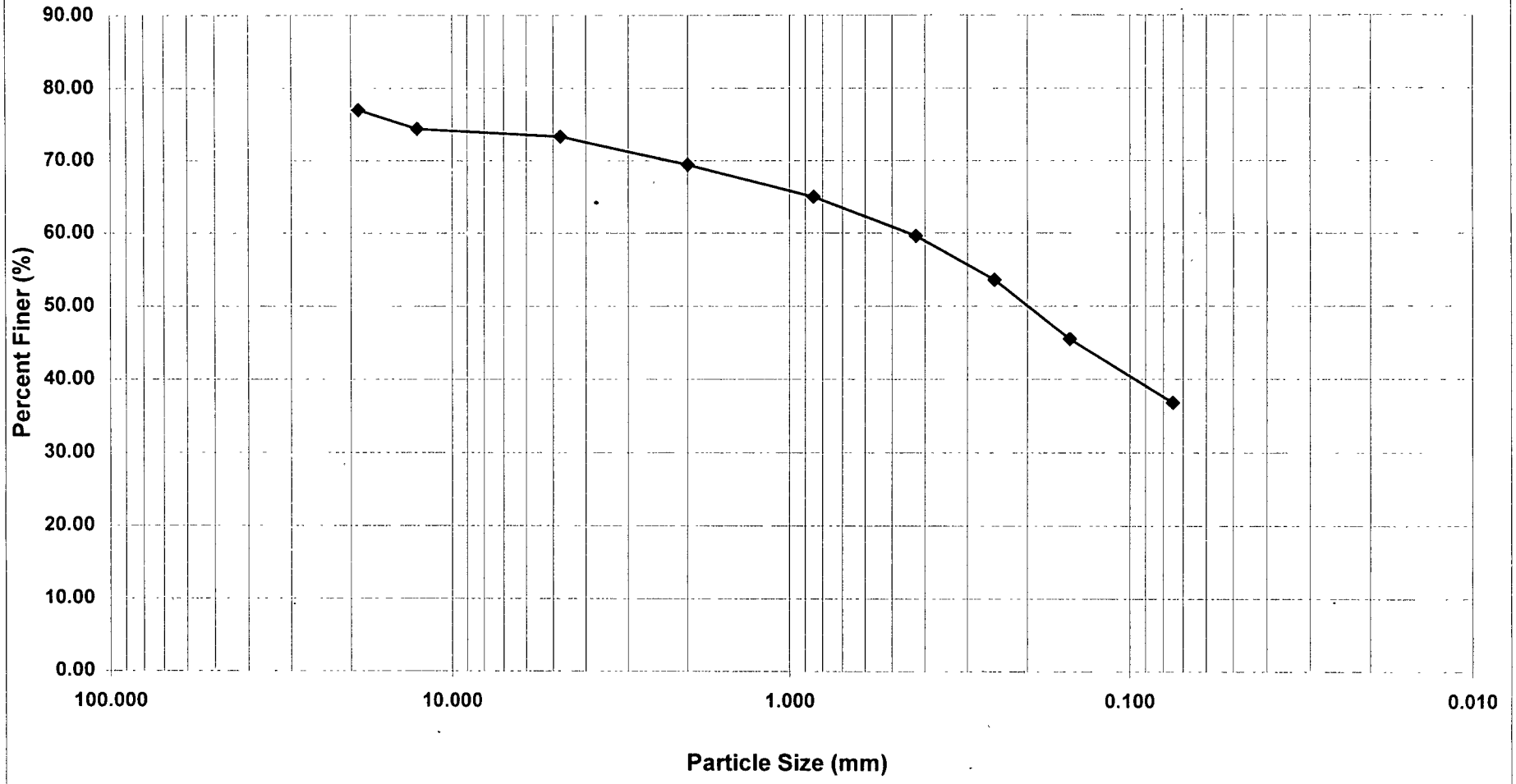
MW16-05D-54-56



15 = % Clay/Silt 15 = % Fine Sand 13 = % Medium Sand 7 = % Coarse Sand 13 = % Fine Gravel 37 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

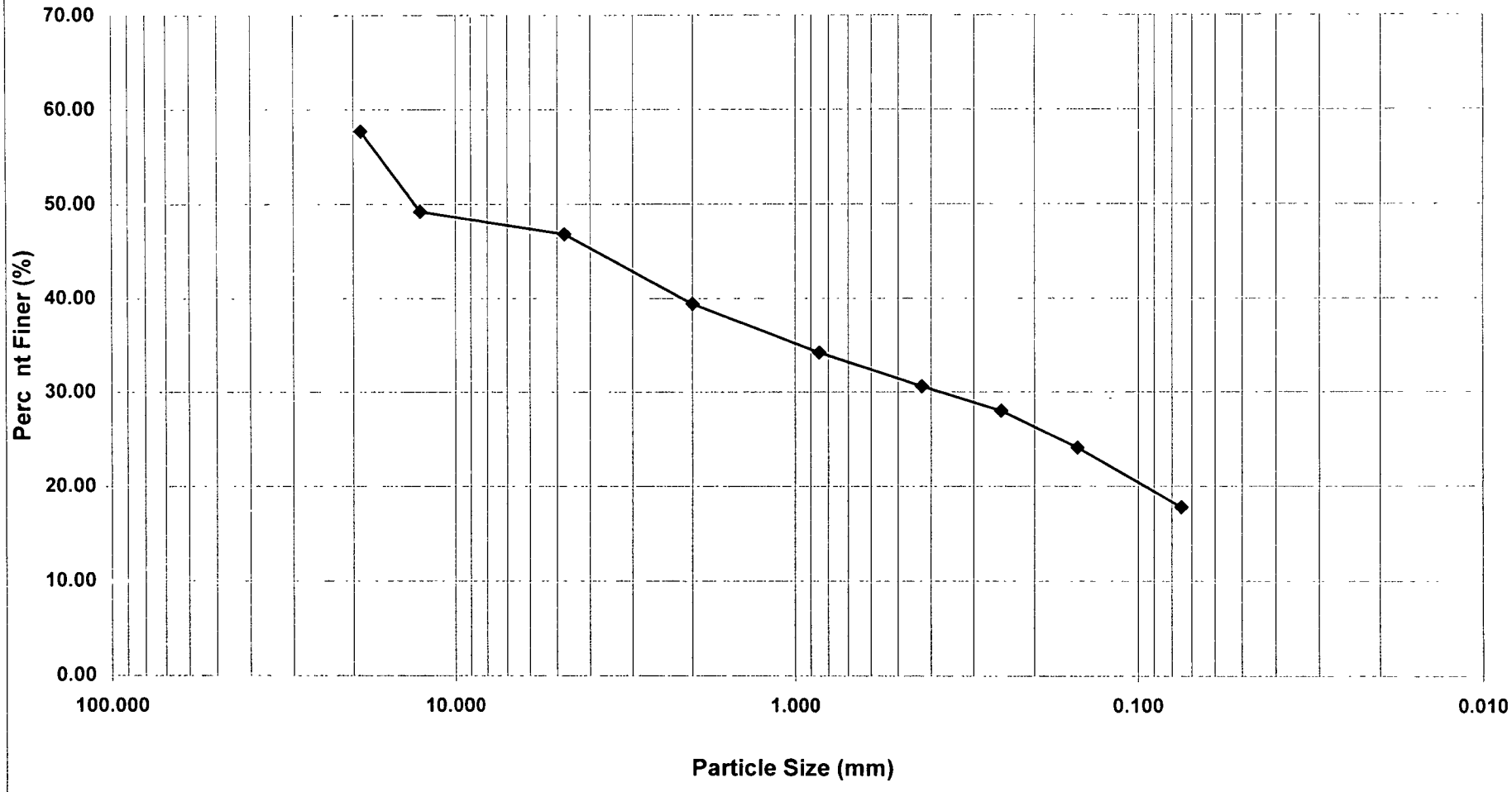
MW16-06S-10-12



37 = % Clay/Silt 23 = % Fine Sand 10 = % Medium Sand 4 = % Coarse Sand 4 = % Fine Gravel 23 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

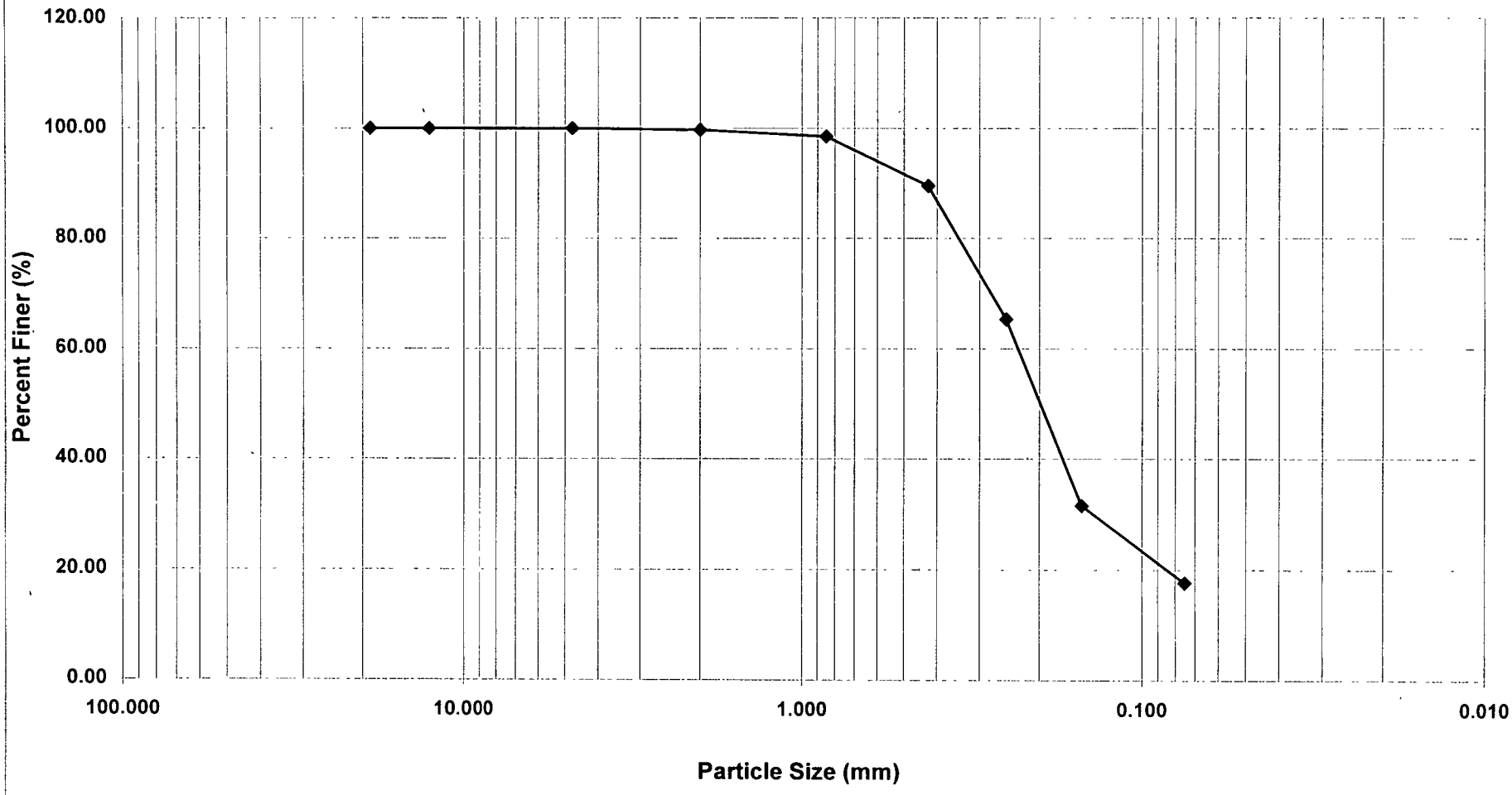
MW16-06D-40-42



18 = % Clay/Silt 13 = % Fine Sand 9 = % Medium Sand 7 = % Coarse Sand 11 = % Fine Gravel 42 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

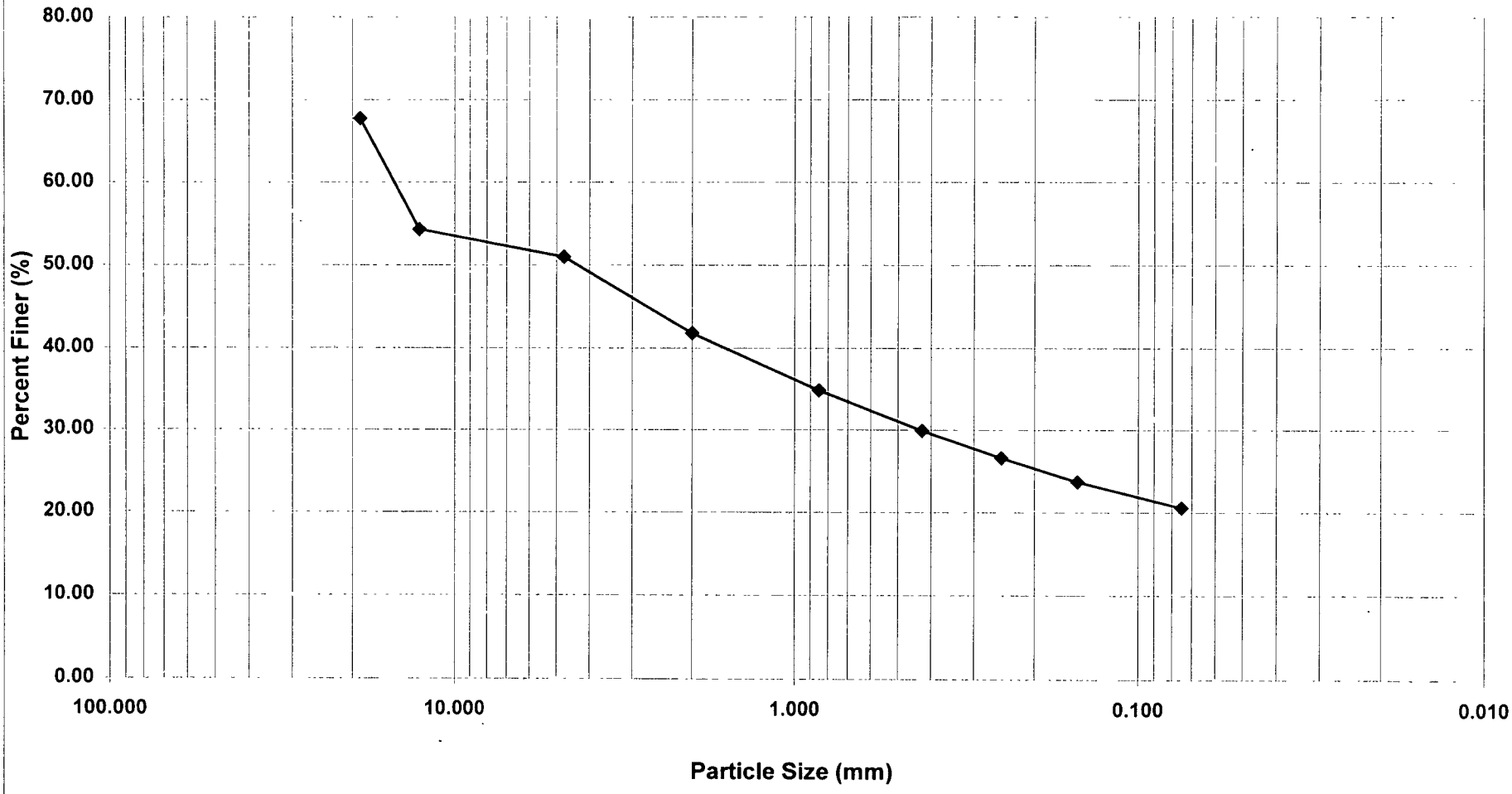
MW16-07S-5-7



18 = % Clay/Silt 72 = % Fine Sand 10 = % Medium Sand 0 = % Coarse Sand 0 = % Fine Gravel 0 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

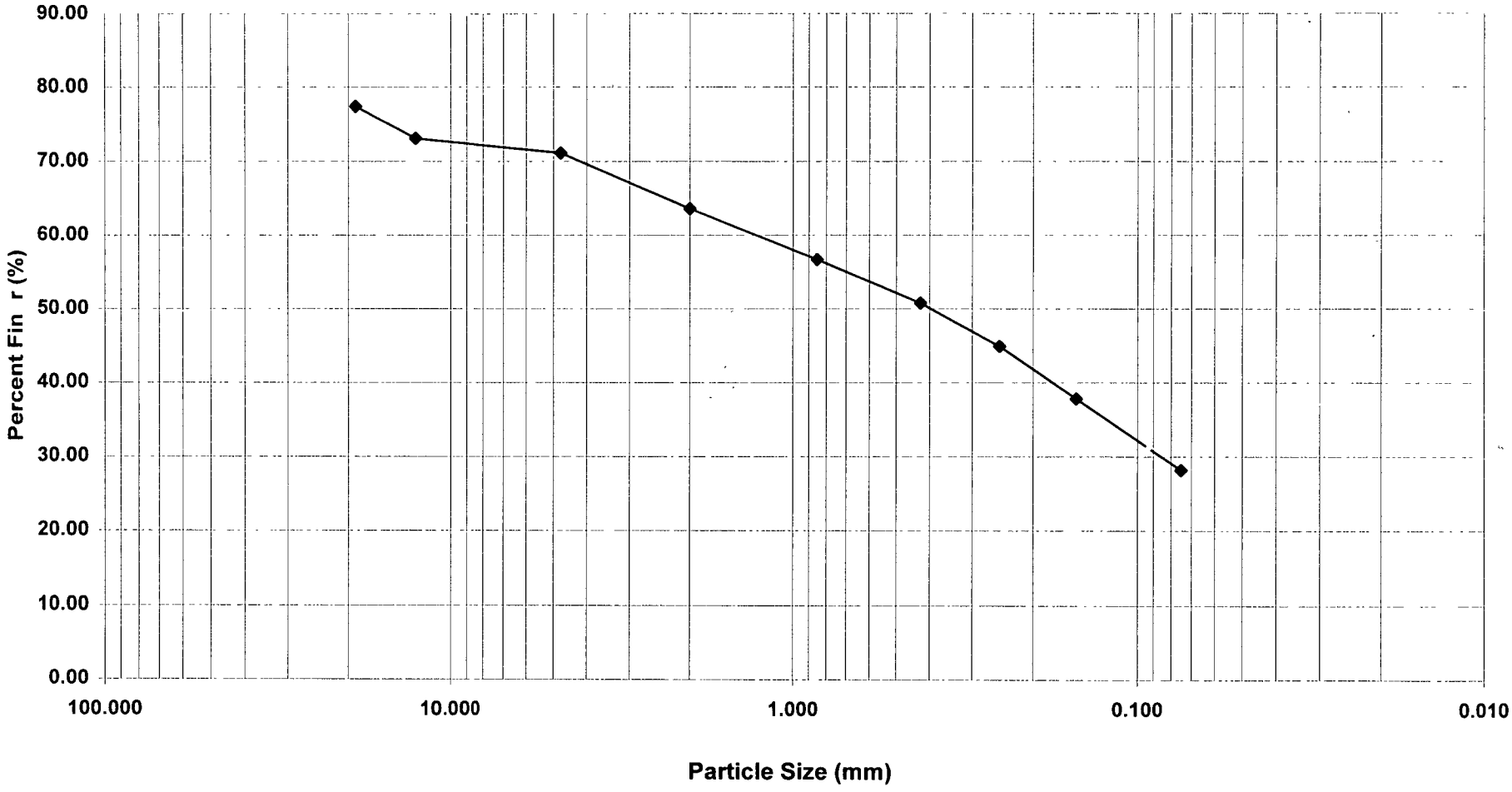
MW16-07D-36-38



21 = % Clay/Silt 9 = % Fine Sand 12 = % Medium Sand 9 = % Coarse Sand 17 = % Fine Gravel 32 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

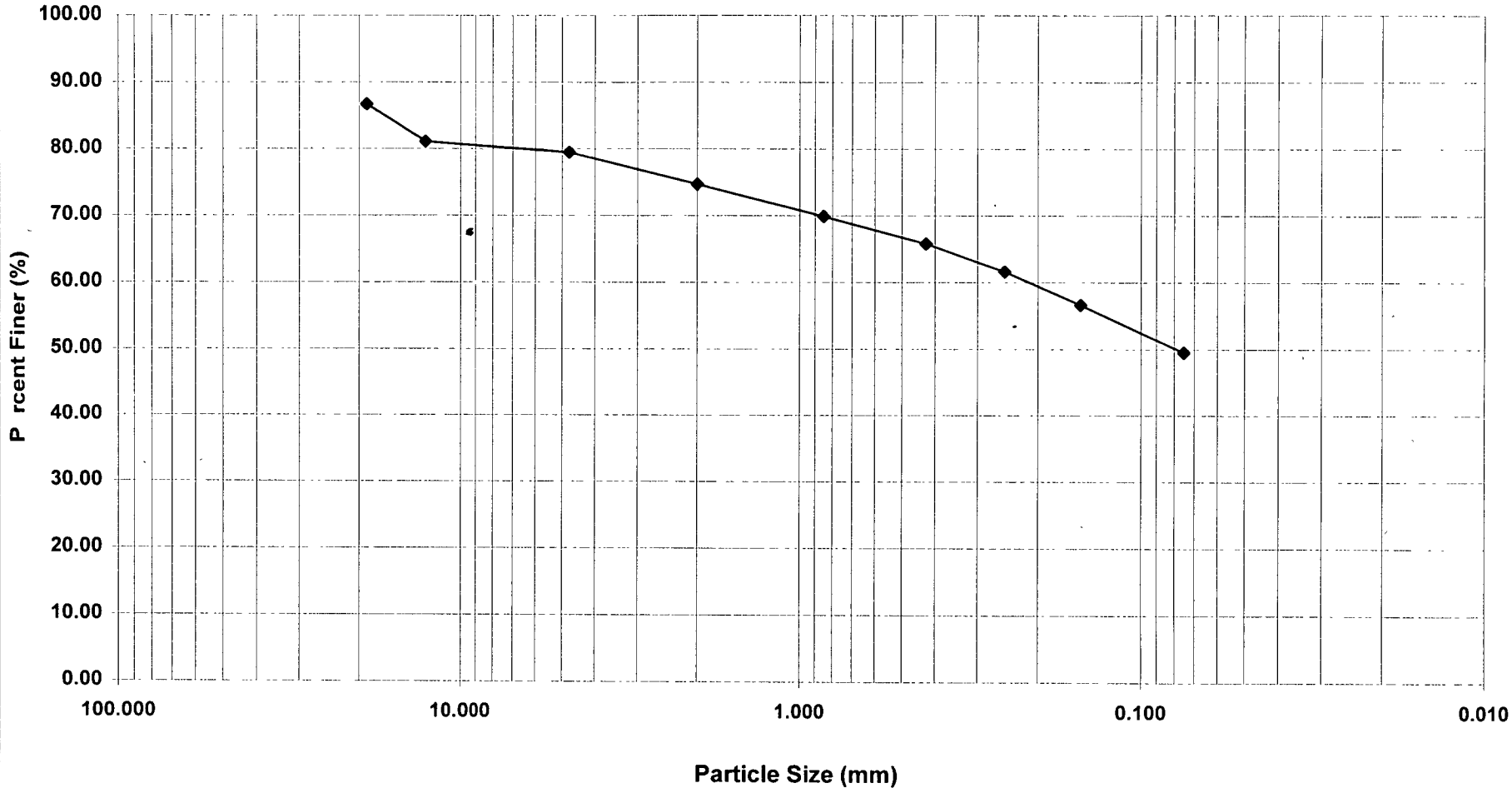
MW16-13D-58-60



28 = % Clay/Silt 23 = % Fine Sand 13 = % Medium Sand 7 = % Coarse Sand 6 = % Fine Gravel 23 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

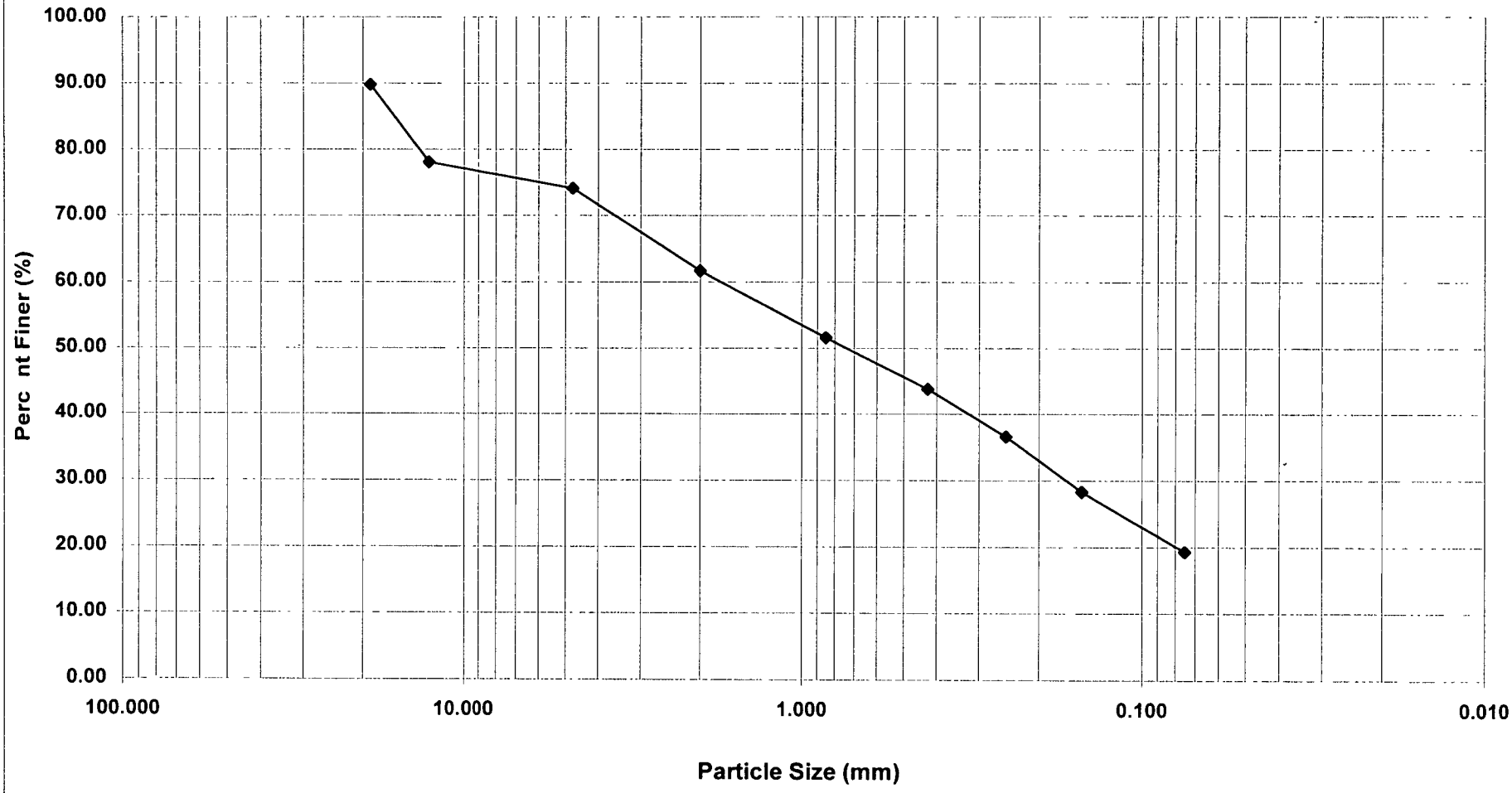
MW16-14D-57.5-59.5



50 = % Clay/Silt 16 = % Fine Sand 9 = % Medium Sand 5 = % Coarse Sand 7 = % Fine Gravel 13 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

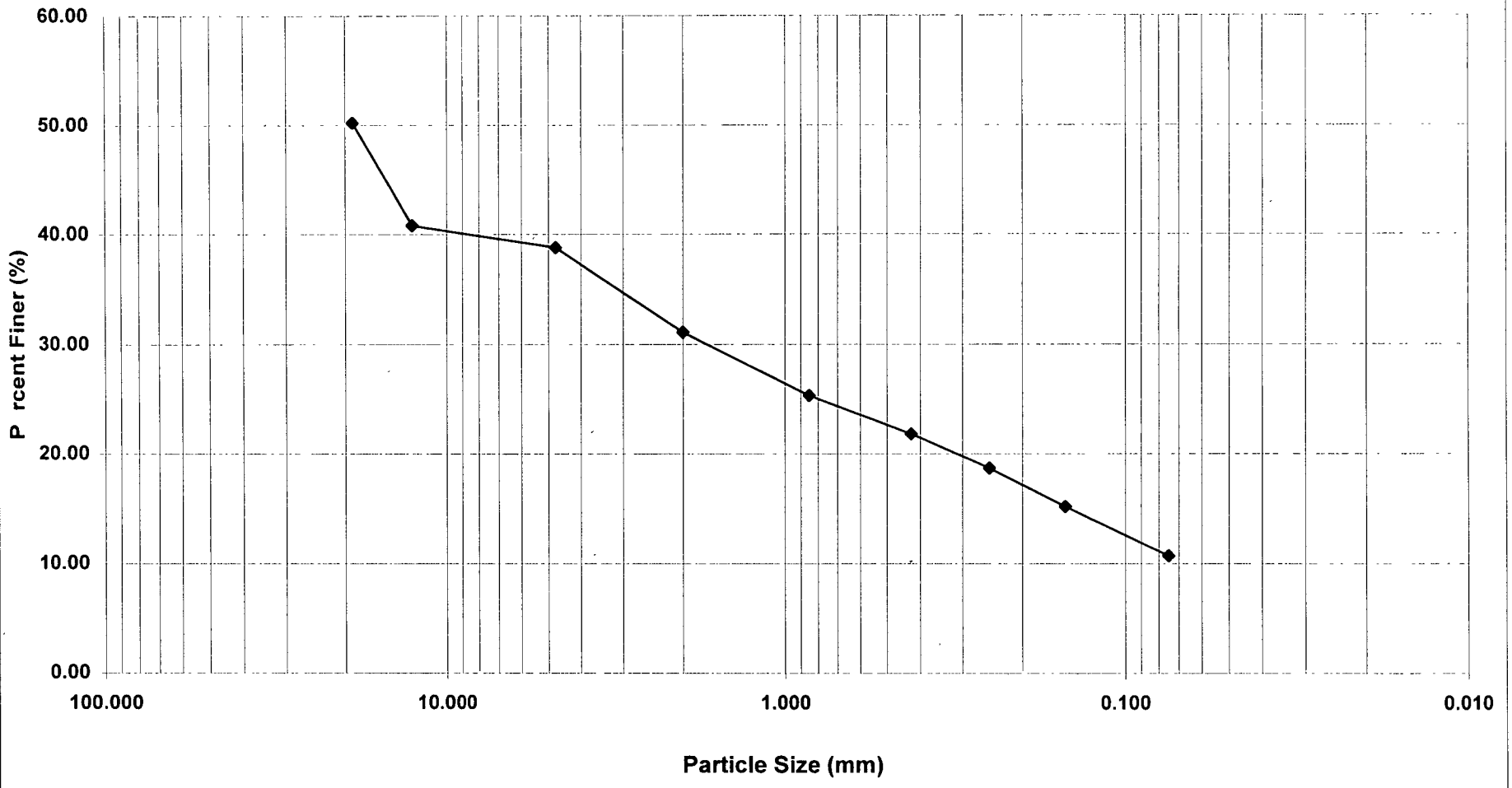
MW16-15R-51-53



19 = % Clay/Silt 25 = % Fine Sand 18 = % Medium Sand 12 = % Coarse Sand 16 = % Fine Gravel 10 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

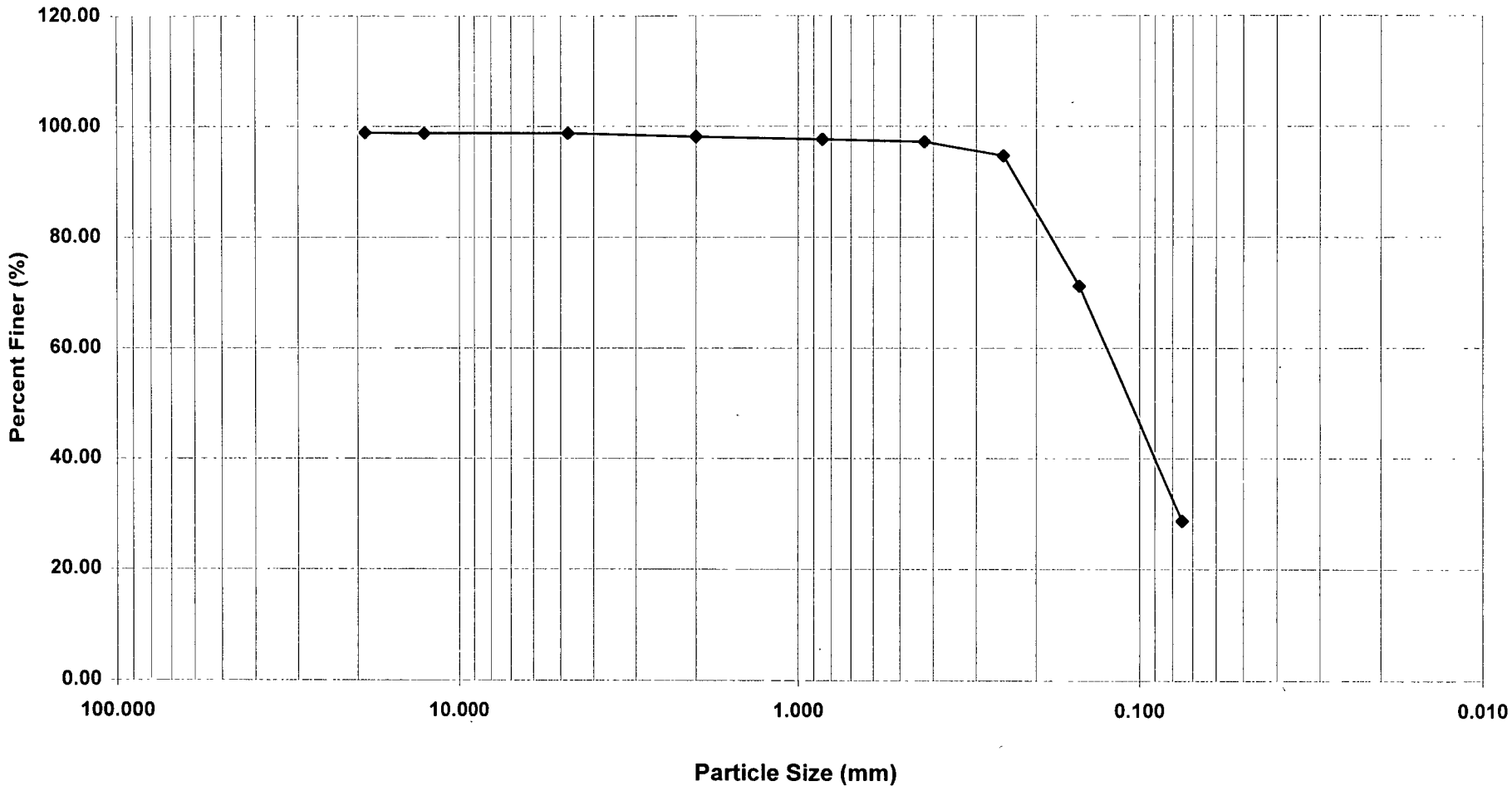
MW16-22D-59-61



11 = % Clay/Silt 11 = % Fine Sand 9 = % Medium Sand 8 = % Coarse Sand 11 = % Fine Gravel 50 = % Coarse Gravel

GRAIN SIZE DISTRIBUTION CURVE

MW16-23D-54-56



29 = % Clay/Silt 69 = % Fine Sand 1 = % Medium Sand 1 = % Coarse Sand 0 = % Fine Gravel 1 = % Coarse Gravel

APPENDIX I
STAGE II
SEISMIC REFRACTION GEOPHYSICAL INVESTIGATION REPORT
From Geophysical Applications Inc., 2000

Geophysical Survey Report
Site 16 – Offsite Area
NCBC Davisville
North Kingstown, Rhode Island
Prepared for
EA ENGINEERING SCIENCE
And TECHNOLOGY, INC.
November 2000

GEOPHYSICAL
APPLICATIONS
INCORPORATED

November 9, 2000

Mr. James Shultz
EA ENGINEERING SCIENCE & TECHNOLOGY, INC.
175 Middlesex Turnpike, 3rd floor
Bedford, MA 01730

Subject: Geophysical Survey Report
Site 16 – Offsite Area
NCBC Davisville
North Kingstown, Rhode Island

Dear Mr. Shultz:

Geophysical Applications has performed a survey to help EA characterize subsurface conditions at the above-noted site. The primary survey objective was measuring depth to bedrock.

The geophysical survey method utilized was seismic refraction profiling, as described below.

METHODS OF INVESTIGATION

Survey Control

Geophysical Applications located the survey traverses using tape and compass measurements referenced to buildings, roads, fences and railroad tracks. Seismic shotpoints were identified with spray paint on asphalt surfaces, and elsewhere with labeled pin flags. Seismic traverses were superimposed on a base map supplied by EA using coordinates supplied by EA's land surveyor.

Vertical survey control entailed ground-surface elevation measurements at seismic shot points using an electronic theodolite. Those elevation measurements were adjusted to an elevation value (33.90 feet) provided by EA for ground surface at monitoring well MW-16-01S.

Seismic Refraction

Refraction data were acquired along 7,410 feet of traverse using an ABEM Terraloc Mark 6 seismograph. Each 24-channel geophone array was 250 feet long, with 10-foot geophone spacings. High-pass filters set to 12 hertz, and 40-hertz geophones, minimized wind noise. Geophones were coupled to the ground surface with spike bases on soft ground, and tripod bases on pavement or hard ground.

Seismic energy was generated on pavement with a truck-mounted DigiPulse model AWD-1 weight-drop device. The AWD uses a thick rubber band to accelerate an 80-pound hammer onto an aluminum impact plate, thereby producing stronger seismic signals than a free-falling weight. The seismograph was triggered by a geophone adjacent to the impact plate.

Seismic energy was generated at shot points on softer ground with a Betsy® firing rod. This device initiates a blank shotgun shell 1 or 2 feet below ground surface, in a pilot hole driven with a steel bar and sledge hammer. Seismograph recording was triggered by a geophone mounted on the firing rod.

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Refraction seismograms were recorded using 0.25 millisecond sampling intervals, with record lengths of 128 milliseconds. Seismograms were stored on the ABEM's internal hard drive, and also on floppy diskette for backup data storage.

Seismic shot points were located at approximately 80-foot intervals along each 24-channel geophone spread. Additional offset shots were placed 35 to 100 feet beyond each array endpoint, where permitted by site conditions, to help profile bedrock near the endpoints. Five to six shot points were occupied along each geophone array to provide reversed seismic profiles.

Depending upon ambient noise conditions, up to six seismograms were stacked at each shot point to enhance the recorded seismic data quality. Each shot point was marked with spray paint or a pink stake flag (labeled with the line number and distance station), left in place at the survey's conclusion.

Refraction data analysis was performed by picking first-arrival times with the seismograph, followed by modeling with Rimrock Geophysics' SIPT2 delay-time interpretation software. This software uses a ray-tracing algorithm, in which calculated layer thicknesses beneath each geophone are varied to obtain good agreement between observed and modeled arrival times. The SIPT2-generated computer models were spot-checked using layer depths manually calculated with the crossover-distance technique.

Seismic interpretations were refined to obtain agreement in calculated bedrock depths within ± 1 foot at traverse intersections.

SURVEY LIMITATIONS

Seismic survey depth calculations are estimated to be accurate within ± 10% (or ± 3 feet, whichever is larger) for cross sections presented in this report, unless otherwise stated.

Weathered bedrock or till layers too thin to be detected by seismic profiling may be present along any of the interpreted bedrock surfaces shown on the attached cross sections.

Seismic velocity values shown on the cross sections were calculated over 24-channel geophone arrays, and therefore represent averaged subsurface conditions. Localized low-velocity zones (e.g. bedrock joints or fractures) occur naturally throughout the northeastern United States.

RESULTS

The geophysical survey was designed to characterize subsurface structure, including depth and topography of the bedrock surface. This survey was conducted at the locations shown on Figure 1, south, east and west of previous subsurface investigations conducted at Site 16.

Interpreted seismic cross sections are shown on Figures 2 through 6. Seismic velocity values are shown on each cross section in units of feet per second (ft/sec).

All seismic traverses disclosed dry, unconsolidated soil or backfill up to approximately 20 feet thick. Seismic velocity values calculated for this unsaturated overburden layer are approximately 1,000 to 1,700 ft/sec, typical for unsaturated granular sediments or compacted fill.

A higher-velocity overburden layer is interpreted above competent bedrock along each traverse. This layer's calculated seismic velocity is approximately 4,800 to 5,450 ft/sec, possibly representing a combination of dense soils and water-saturated soils.

Bedrock exhibited velocity values between 12,600 and 15,800 ft/sec. Velocity values greater than 13,000 ft/sec in metamorphic or igneous terrain generally represent competent bedrock with little

weathering or fracturing. Velocity values less than 13,000 ft/sec are more likely to represent bedrock with some weathering or fracturing.

Line 13 (Figure 5) was a short cross-line connecting Lines 10 and 11, as shown on Figure 1. This traverse was located in a heavily-wooded area west of Site 16. Although seismograms recorded along this traverse appeared to exhibit very good signal to noise properties, the resulting models showed an erratic bedrock surface at the traverse's west end, and poor agreement with Line 10. Consequently, depths along this traverse were hand-calculated with the cross-over distance technique, which yielded a profile in good agreement with Lines 10 and 11. The dashed bedrock surface shown on Line 13 indicates an assumed straight-line trend between Station 0+00 and the intersection with Line 11. Line 13's irregular bedrock-elevation models may have resulted partly from interference with ponded water on the ground surface near the traverse's west end.

Line 3 (Figure 3) was a north-south trending line near the survey's southwest corner. This traverse was located near a large building, as shown on Figure 1. Although data quality is generally good, the resulting models showed an erratic bedrock surface near Stations 1+50 to 2+50. The dashed line shown on Line 3 indicates a smoothed bedrock surface between these stations. Irregular data may have been caused by interference from the nearby building foundation.

* * * * *

We appreciate this opportunity to provide geophysical services, and we welcome questions concerning this report. Please call the undersigned at 508/543-1388 if we may provide additional information that would benefit EA's project.

Sincerely,
GEOPHYSICAL APPLICATIONS, INC.

Ed Rostosky cvs
Edward Rostosky
Geophysicist

C. Sullivan
Charlene Sullivan
Geophysicist

M. Blackey
Mark E. Blackey
Principal and Geophysicist

100379 - 100379 rpt

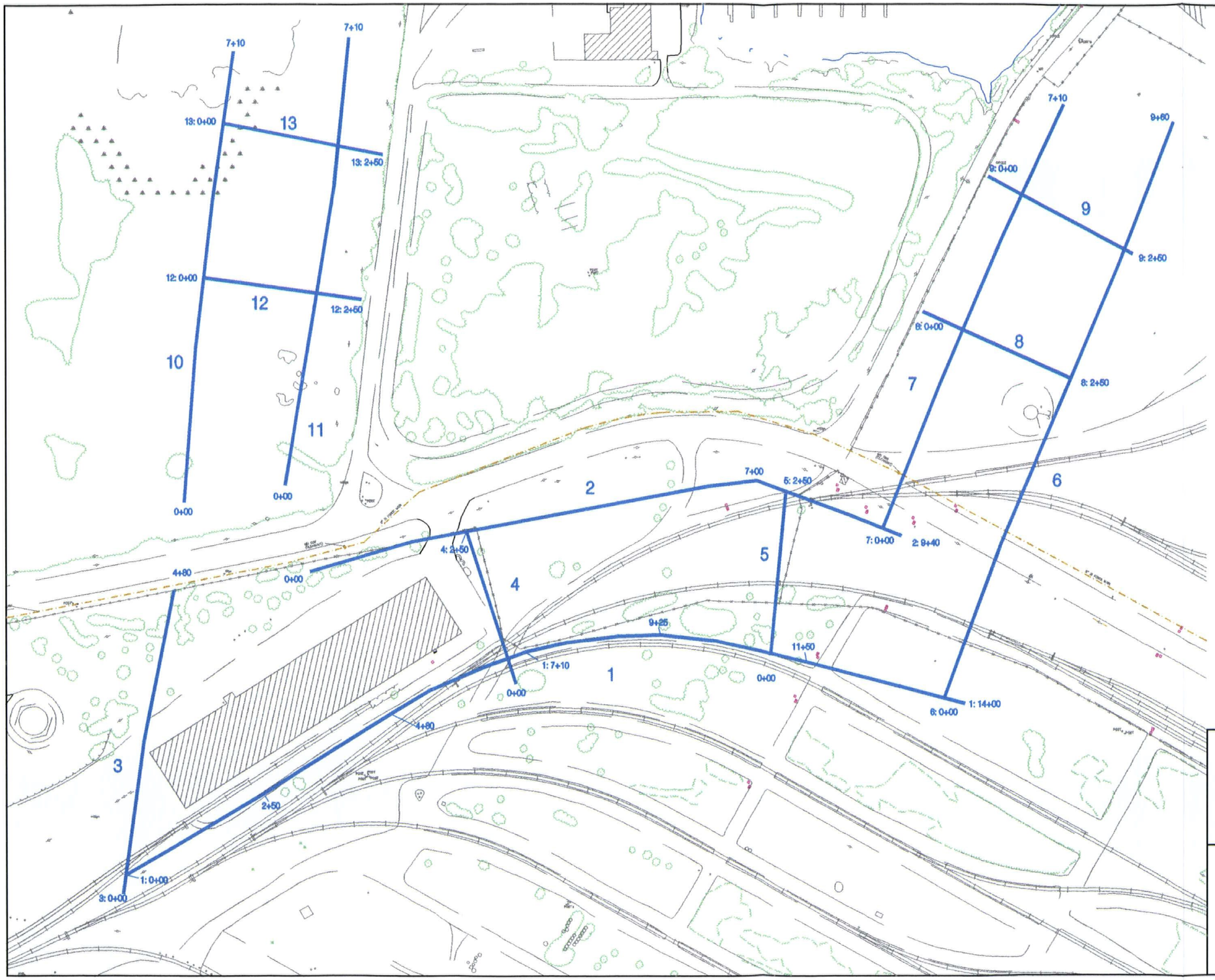
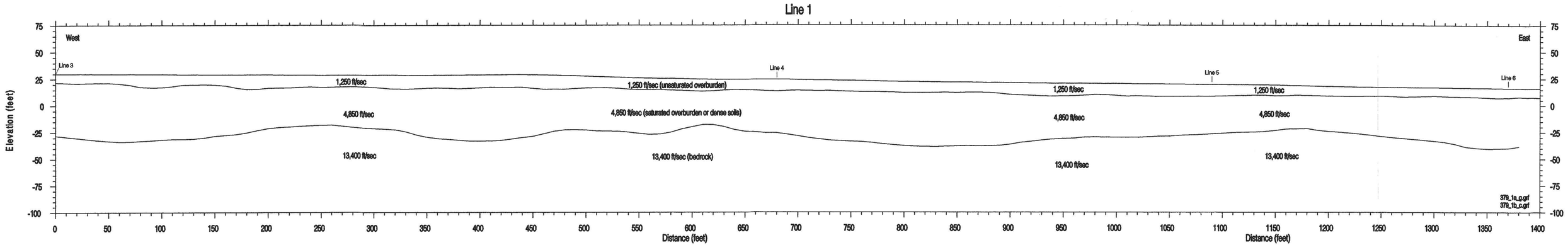
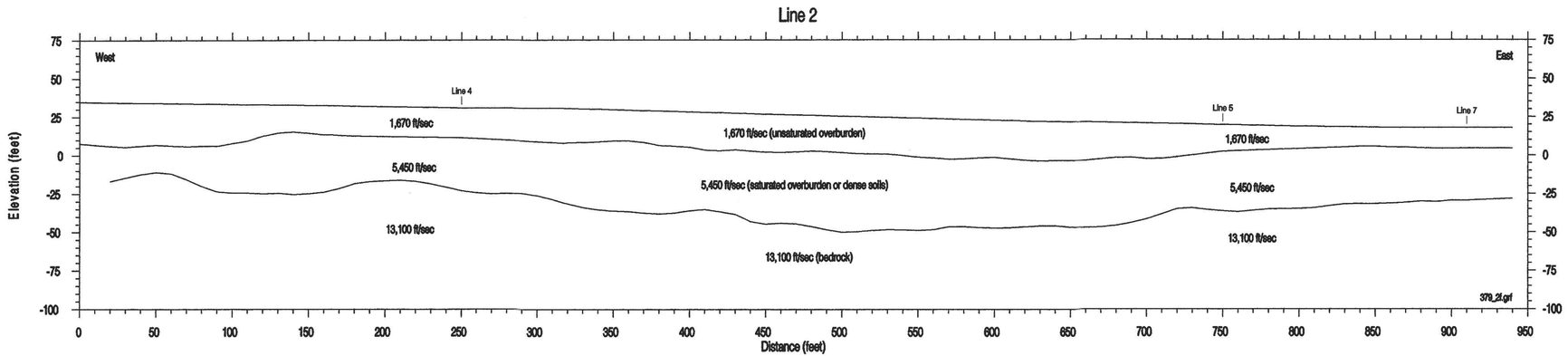


Figure 1
Seismic Refraction Traverse Locations
Site 16 - Offsite Area, NCBC Davisville
North Kingstown, Rhode Island
prepared for
EA ENGINEERING SCIENCE AND TECHNOLOGY, INC.





Notes:

1) Seismic velocity values are in units of feet per second (ft/sec)
2) Horizontal and vertical scales, 1 inch = 50 feet
3) Ground elevations were referenced to an elevation value of 33.90 at ground surface adjacent to MW16-01S

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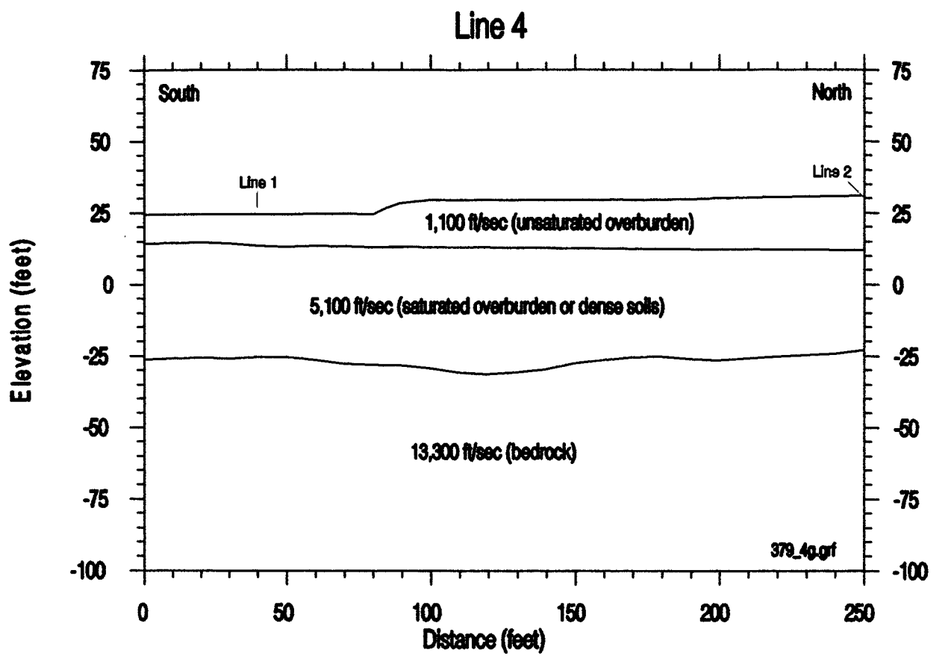
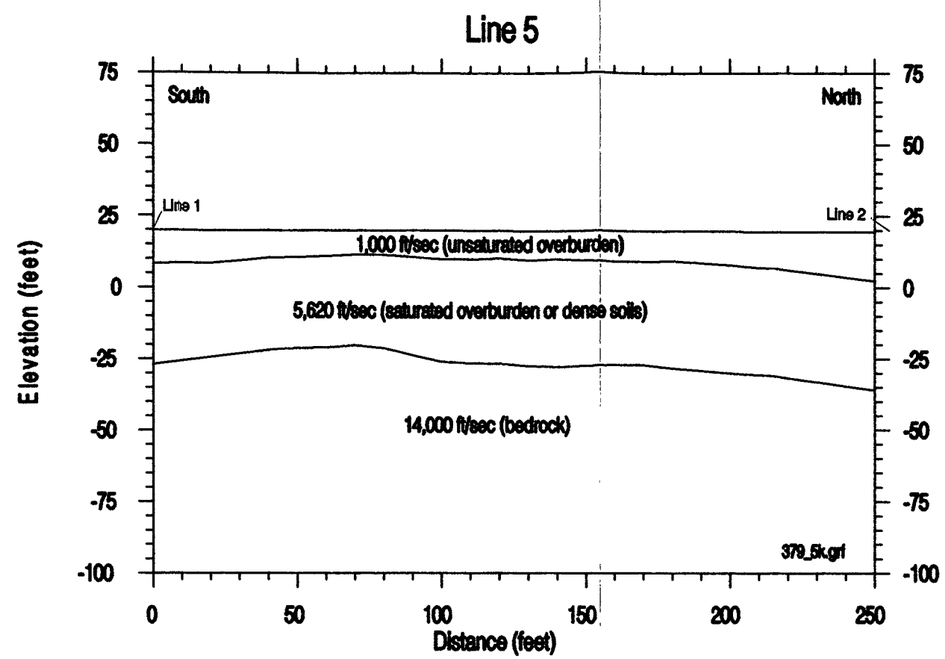
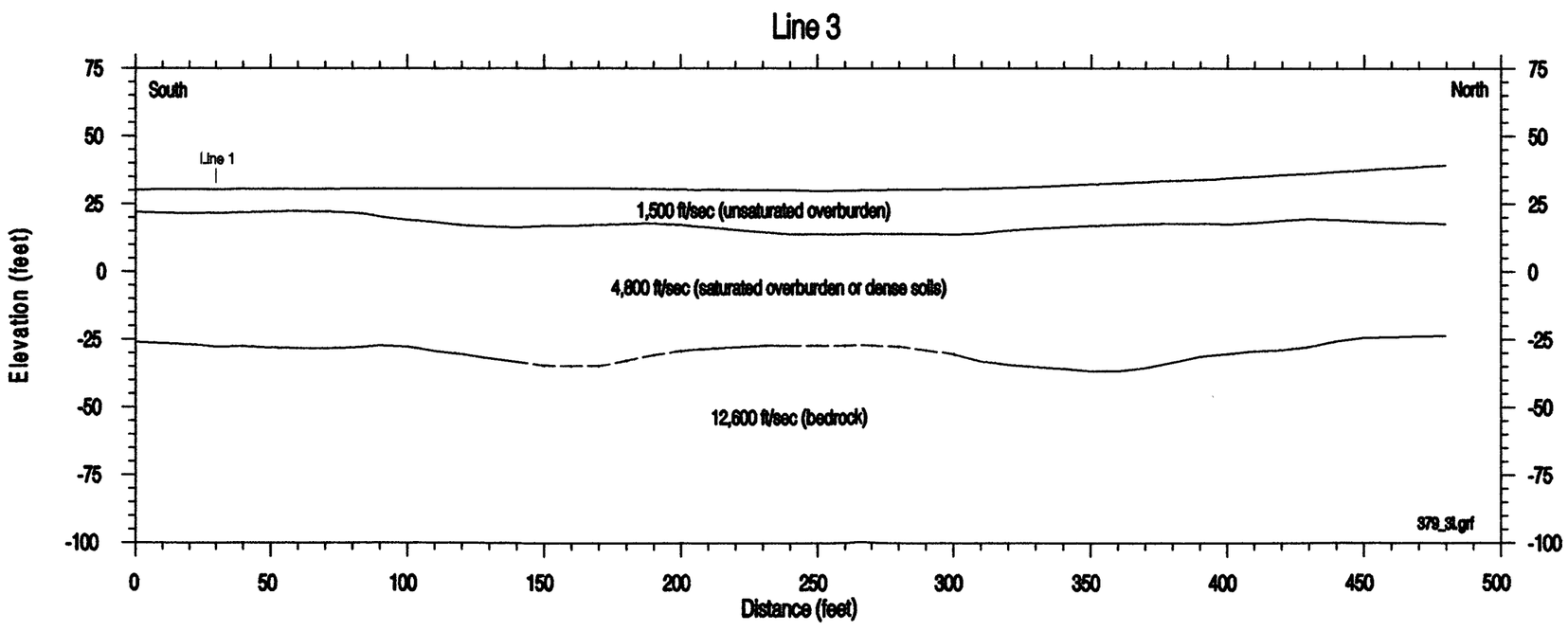
Figure 2
Seismic Refraction Cross Sections
Lines 1 and 2
Site 16 - Offsite Area, NCBC Davisville
North Kingstown, Rhode Island
prepared for
EA ENGINEERING SCIENCE AND TECHNOLOGY, INC.

001975W01X







Notes:

1) Seismic velocity values are in units of feet per second (ft/sec)

2) Horizontal and vertical scales, 1 inch = 50 feet

3) Ground elevations were referenced to an elevation value of 33.90 feet at ground surface adjacent to MW16-01S

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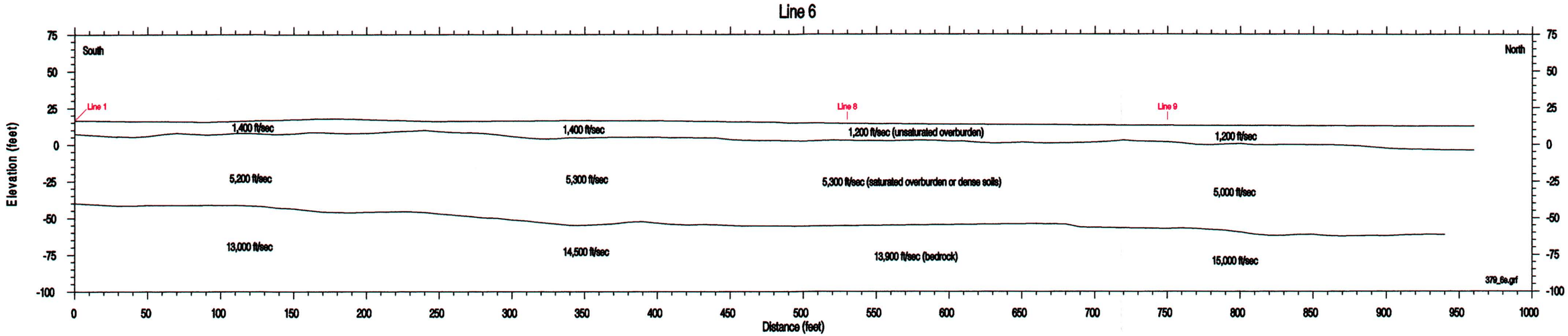
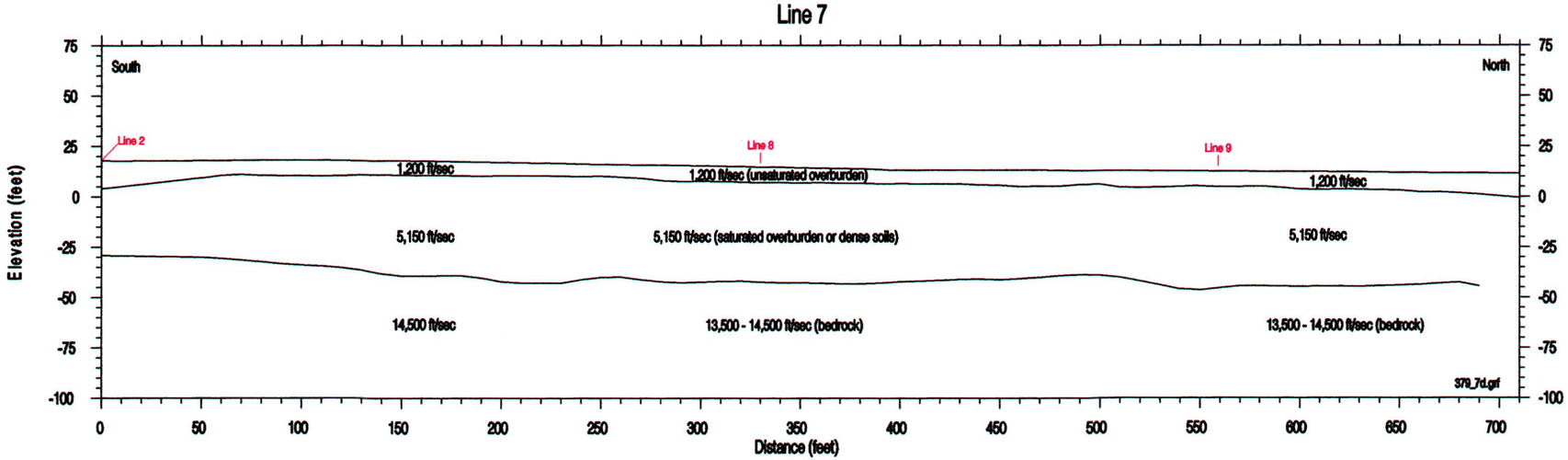
GEOPHYSICAL APPLICATIONS INCORPORATED

Figure 3
Seismic Refraction Cross Sections
Lines 3 through 5
Site 16 - Offsite Area, NCBC Davisville
North Kingstown, Rhode Island
prepared for
EA ENGINEERING SCIENCE AND TECHNOLOGY, INC.





Notes:

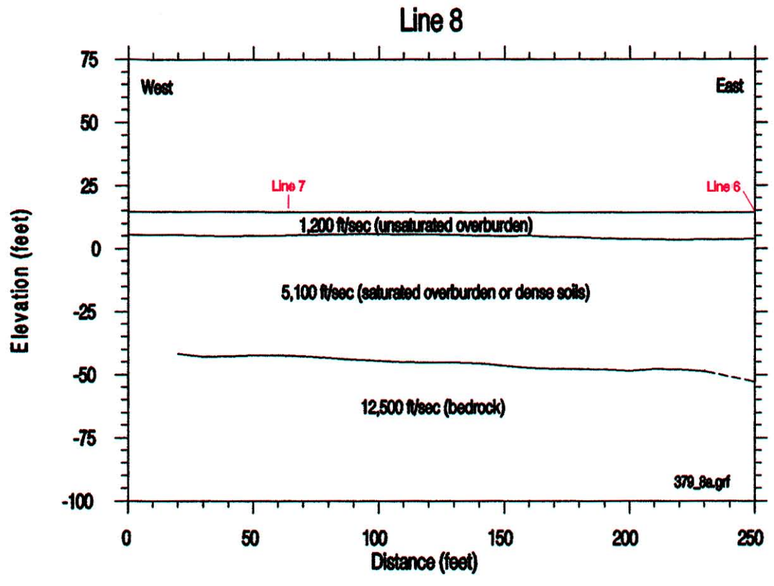
1) Seismic velocity values are in units of feet per second (ft/sec)
2) Horizontal and vertical scales, 1 inch = 50 feet
3) Ground elevations were referenced to an elevation value of 33.90 feet at ground surface adjacent to MW16-01S

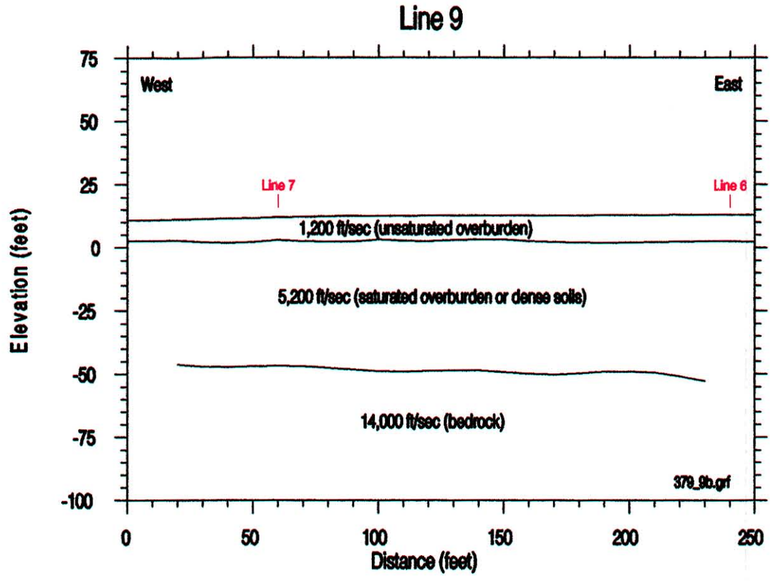
100379 - 379_xs3.dwg
last modified 11/3/00

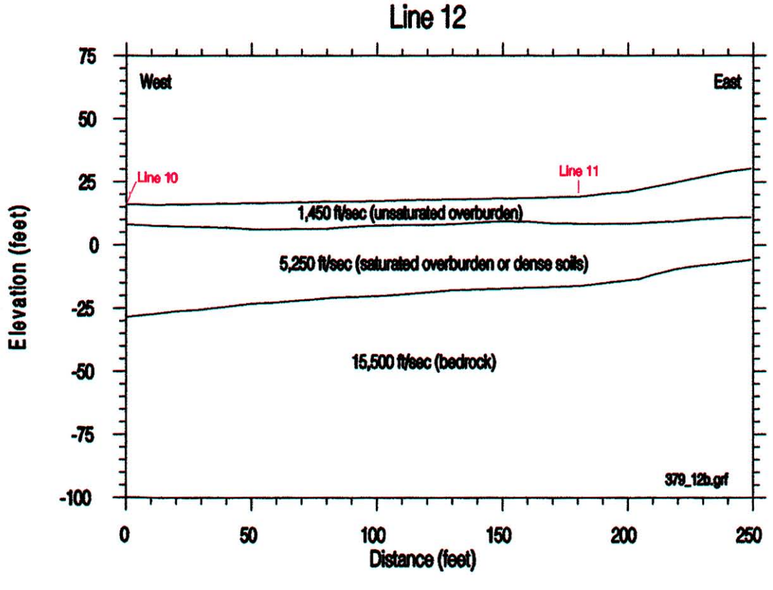
GEOPHYSICAL APPLICATIONS INCORPORATED

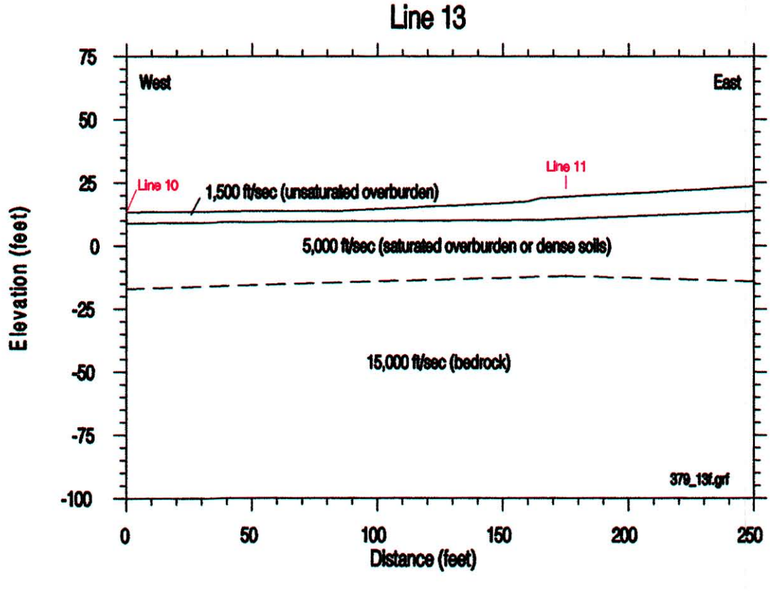
Figure 4
Seismic Refraction Cross Sections
Lines 6 and 7
Site 16 - Offsite Area, NCBC Davisville
North Kingstown, Rhode Island
prepared for
EA ENGINEERING SCIENCE AND TECHNOLOGY, INC.

001975 WB02X









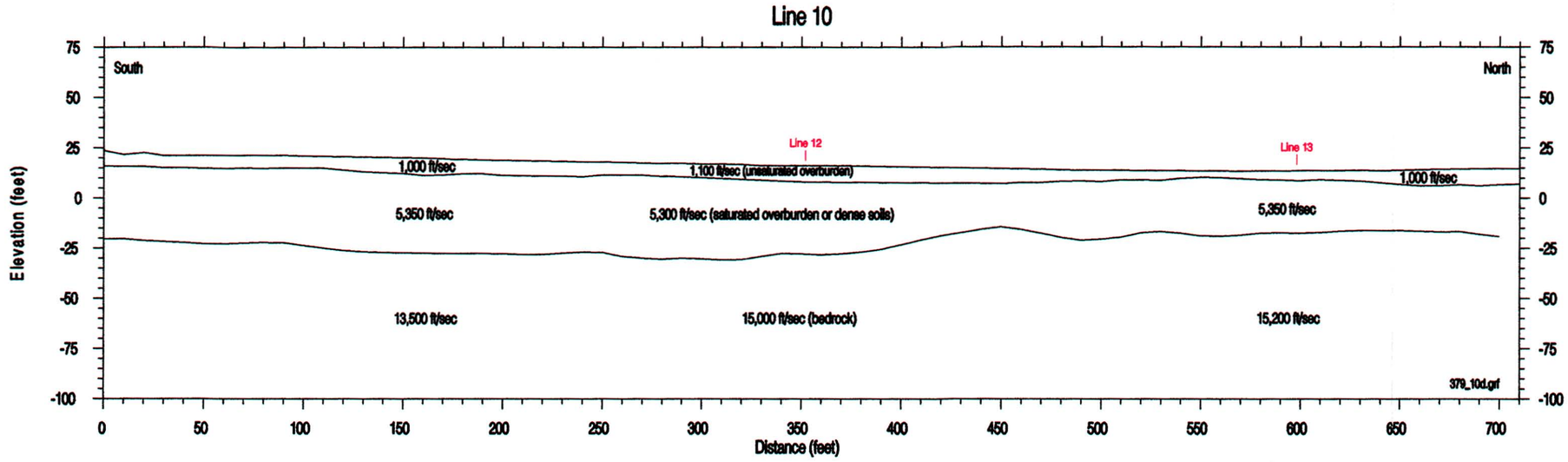
Notes:

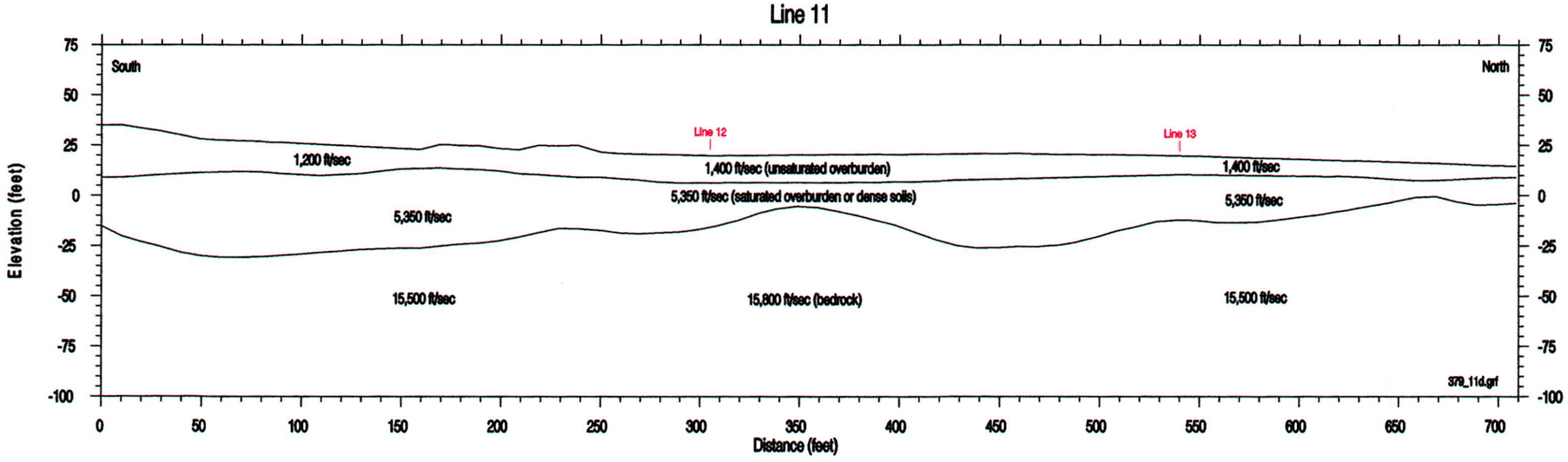
1) Seismic velocity values are in units of feet per second (ft/sec)
2) Horizontal and vertical scales, 1 inch = 50 feet
3) Ground elevations were referenced to an elevation value of 33.90 feet at ground surface adjacent to MW16-01S

100379 - 379_se4.dwg
last modified 11/6/00

GEOPHYSICAL APPLICATIONS INCORPORATED

Figure 5
Seismic Refraction Cross Sections
Lines 8, 9, 12, and 13
Site 16 - Offsite Area, NCBC Davisville
North Kingstown, Rhode Island
prepared for
EA ENGINEERING SCIENCE AND TECHNOLOGY, INC.





Notes:

1) Seismic velocity values are in units of feet per second (ft/sec)
2) Horizontal and vertical scales, 1 inch = 50 feet
3) Ground elevations were referenced to an elevation value of 33.90 feet at ground surface adjacent to MW16-01S

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last modified 11/8/00

GEOPHYSICAL APPLICATIONS INCORPORATED

Figure 6
Seismic Refraction Cross Sections
Lines 10 and 11
Site 16 - Offsite Area, NCBC Davisville
North Kingstown, Rhode Island
prepared for
EA ENGINEERING SCIENCE AND TECHNOLOGY, INC.

APPENDIX J
STAGE II
MIP SCREENING REPORT
From ZEBRA Environmental Corp., 2000

SUMMARY OF FINDINGS

MIP logging at the NCBC Site 16 (Offsite Areas)

Davisville, RI

Work performed by ZEBRA Environmental Corp.

10/10/2000 –10/26/2000

Prepared for:

EA Engineering, Science, And Technology, Inc.

Prepared by:

Alex Nadolishny

Michael Fraser

ZEBRA Environmental Corp.

10 November 2000

Acronyms and Abbreviations:

MIP	-	**Membrane Interface Probe**
PID	-	**Photoionization Detector**
FID	-	**Flame Ionization Detector**
ECD	-	**Electron Capture Detector**
NRADL	-	**No Response Above Detector Limit**
String-pot	-	**Linear transducer utilized for depth measurements**
Trunkline	-	**An assembly of wires and tubing in a protective jacketing, connecting the down hole portion of the MIP system to the system controller and detectors**
Trip Time	-	**A time interval required for the carrier gas to bring a particular VOC from the MIP probe membrane to the detectors**
Sanity Check	-	**A test performed on the MIP system at the beginning of each day and every time the system's proper operation and performance needs to be checked**

Introduction:

ZEBRA Environmental Corporation provided Membrane Interface Probe (MIP) logging and Direct Push Technology (DPT) groundwater sampling services at the former NCBC Davisville, RI, Site 16 (Offsite Areas) under contract to EA Engineering, Science and Technology.

The work was performed on October 10 through October 26, 2000.

The Membrane Interface Probe (MIP) is a percussion tolerant VOC sensor that can continuously log volatile organics that diffuse through a semi-permeable membrane. Using a carrier gas, the VOCs are brought to the surface through tubing which is connected to a laboratory grade Photoionization Detector (PID), Flame Ionization Detector (FID) and Electron Capture Detector (ECD) for immediate analysis. ZEBRA is currently using an 0.I. Analytical Model 4410 Flame Ionization Detector and an 0.I. Analytical Model 4430 Photo ionization Detector. In response to our client's requests to use the MIP on sites where chlorinated solvents were present, ZEBRA has added an Electron Capture Detector (ECD) to the MIP system. The data obtained with the detectors are being logged versus depth utilizing proprietary software. The MIP system features automatic depth measurement utilizing a linear transducer ("stringpot") attached to the side of the probe.

An integral part of the MIP system is the direct sensing soil conductivity system. This system utilizes a specially designed probe that will withstand the rigors of percussion probing while taking continuous measurements of soil conductivity as it is being driven into the ground. The sensing probe is linked to a control box where the signal is received by a lap top computer. The signal from the probe is matched with precise depth measurements and logged on the screen. The MIP operator is able to read real time data showing changes in soil conductivity/resistivity. These changes can be used to identify lithology, contaminant plumes, salt- water intrusion, or any other subsurface condition that displays a change in conductivity/resistivity.

Equipment utilized on site:

- **A modified Geoprobe MIP system mounted on a 4x4 Mazda MPV vehicle (ZEBRA MIP#1)**
- **A Geoprobe 5400 DT Track mounted sampling machine**

SUMMARY OF SITE ACTIVITIES

ZEBRA mobilized a fully equipped Membrane Interface Probe System mounted in a 4x4 Mazda MPV to the site. The "data acquisition vehicle" carried the system controller unit, notebook computer, printer, O.I. Analytical Model 4430 PID and Model 4410 FID in tandem series, Electron Capture Detector (ECD), generator and all required compressed gases, two (2) complete assemblies of MIP probes, probe rods and trunk lines, as well as all the tools and supplies needed for the MIP logging. In this site-specific scope, the PID response was displayed as "Detector 1" and the ECD response was displayed as "Detector 2". On this site the PID-FID configuration was not utilized. The MIP system utilized a Model 4200 Geoprobe unit to advance MIP probes into the subsurface. Please refer to the Attachment B "Standard Operating Procedures" and Attachment C "MIP Output Interpretation" for more information.

At each location, after penetrating pavement (if applicable) utilizing a blind probe, an MIP probe was advanced to a specified depth in 1-foot intervals, as the data were being recorded by the system's data acquisition hardware and software. For more information on logging procedures and QA/QC guidelines, please refer to the ZEBRA's MIP Standard Operating Procedures which can be found on ZEBRA Environmental Corporation's website at http://zebraenv.com/seusa/technology/DIRSENS.htm

Upon completion of the logging, the probe rod assembly was extracted from the ground and cleaned, and the borehole filled with granular bentonite.

QA/QC Procedures:

The QA/QC procedures included performing a system check ("Sanity Check") at the beginning of each day, every time there is a change or adjustment made to the system's settings, and every time there is a change in system's parameters. The procedure includes introducing a measured amount of a VOC compound onto the MIP membrane, and measuring the trip time and detector response magnitude. The obtained values are checked against standard values known to represent a properly working system. Different parameters of the MIP system and the operation of different detectors are checked with different solutions of target chemicals.

Decontamination Procedures:

The purpose of the Decontamination Procedures is to prevent cross-contamination of MIP logging locations. The MIP probe itself is self-cleaning and typically does not require decontamination (except when used in NAPL conditions). All the MIP equipment was decontaminated using Alconox wash/ tap water rinse procedure between each logging location.

Limitations of the MIP technology:

The MIP is a screening tool providing real-time, relative concentrations of Volatile Organic Compounds (VOCs). It does not provide analytical data, nor is it currently capable of distinguishing individual chemicals. In general, when used for screening for the presence of Halogenated VOCs using the ECD, the MIP system demonstrated the ability to consistently detect dissolved-phase concentrations as low as 100 ppb. In general, when applied on BTEX-contaminated sites, utilizing the PID-FID configuration, the MIP system demonstrated the ability to consistently detect dissolved-phase concentrations as low as 400 ppb. The detection limit for a specific site must be determined using approved conventional confirmatory sampling.

ZEBRA personnel on site:

Mr. Michael Fraser, MIP system operator

Mr. Jason Frederick, Geoprobe operator

Mr. Alex Nadolishny, ZEBRA MIP program director

10 October 2000

Sanity Check

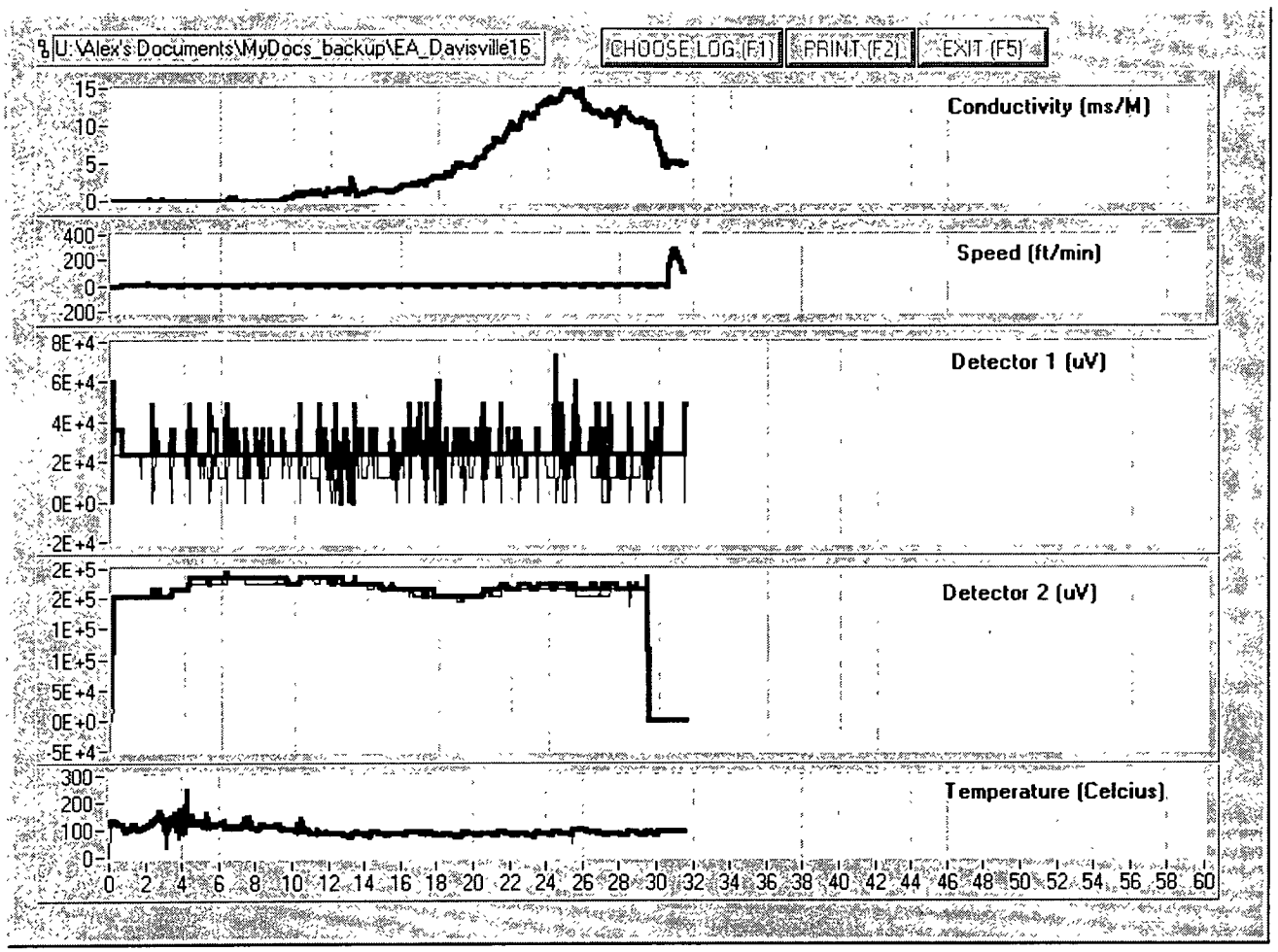
Trunkline 02	PASS	PSI Setting		12			Mass Flow		974		
Contaminant	Concentration	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
TCE	.10 MI	PID	1	10	0	24K	ECD	3	8	120	320

Trip Time	Det. 1 Response	Det. 2 Response	Temperature of Probe
60	Insignificant	6E+6	121

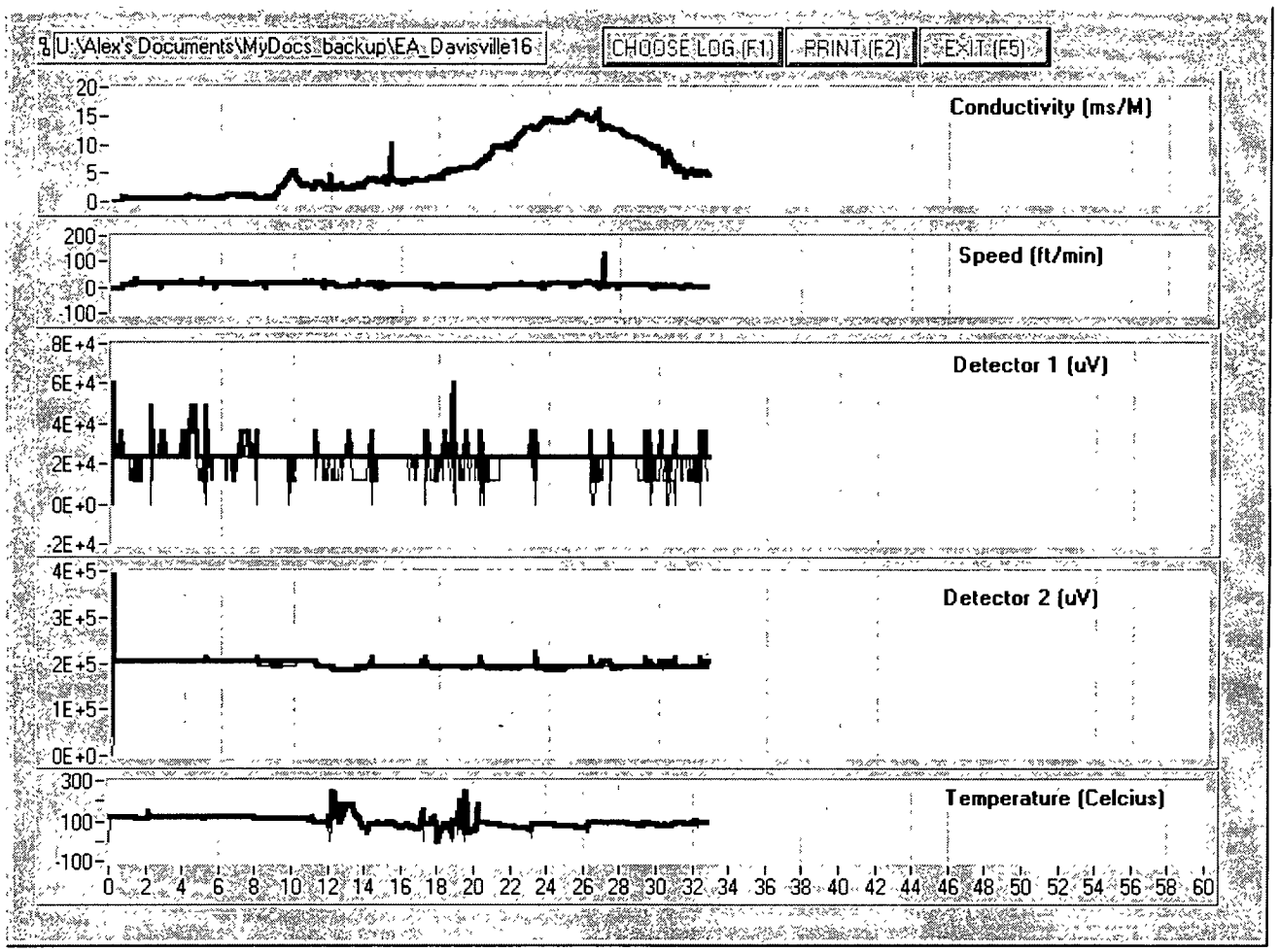
FIELD DATA SUMMARY

Trunkline 02			PSI Setting		12			Mass Flow		974		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
01	16W-01	0930	PID	1	10	0	22K	ECD	3	8	120	320

TD	Comments
31.5	PROBE MEMBRANE FAILED. CHANGED PROBE-TO-PROBE 602 (TRUNKLINE 01). NRADL



PROBE 602			PSI Setting		10			Mass Flow		980		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
02	16W-01A	1130	PID	1	10	0	10K	ECD	3	8	166	366
TD	Comments											
32'	ENCOUNTERED REFUSAL. CHANGED PROBE RAN SANITY CHECK. NRADL											



Sanity Check

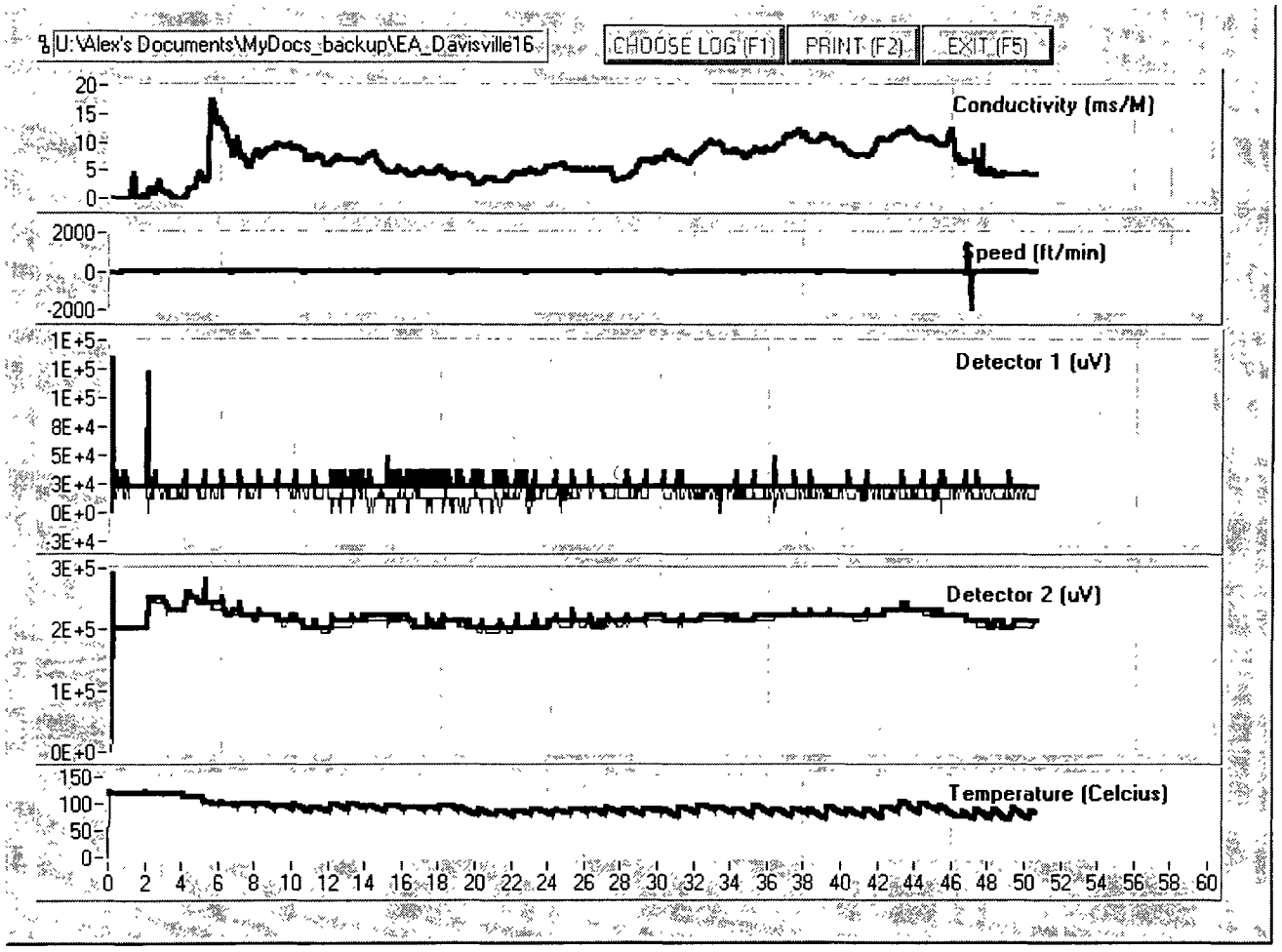
E144 (B52)	PASS	PSI Setting		12			Ma s Flow			974	
Contaminant	Concentration	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
TCE	.10 MI	PID	1	10	0	24K	ECD	3	8	100	300

Trip Time	Det. 1 Response	Det. 2 Response	Temperature of Probe
63	Insignificant	6E+6	121

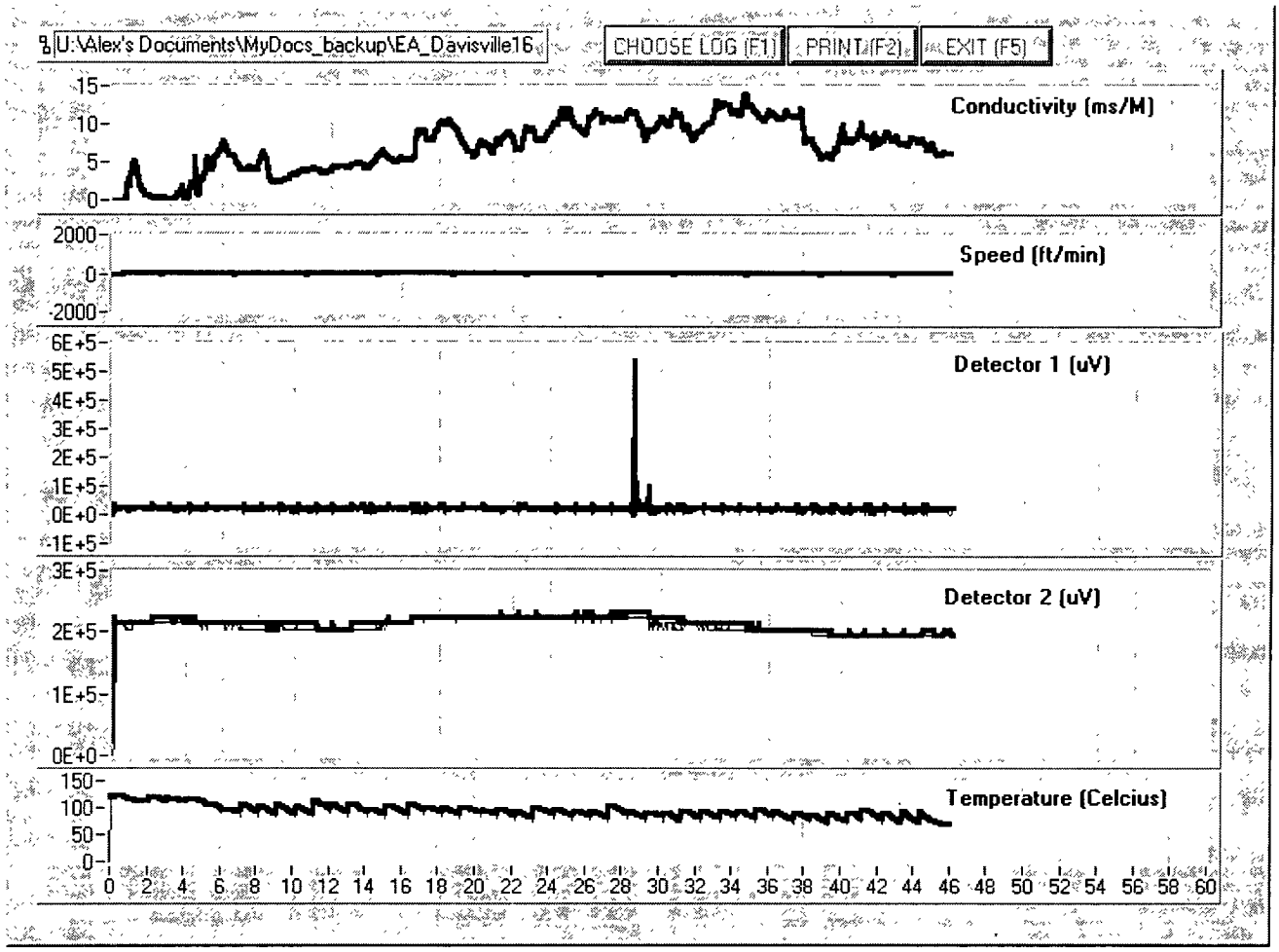
FIELD DATA SUMMARY

E144 (B52)			PSI Setting		12			Mass Flow			975	
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
03	16E-01	1300	PID	1	10	0	24K	ECD	3	8	130	330

TD	Comments
51'	ENCOUNTERED REFUSAL. 3E+5 ECD response @ 0-6' BGS.



E144 (B52)			PSI Setting		12			Mass Flow		975		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
04	16E-02	1530	PID	1	10	0	24K	ECD	3	8	130	329
TD	Comments											
46'	PID ANAMOLY POSTED AT 29' FEET DUE TO OPERATOR ERROR. ENCOUNTERED REFUSAL. NRADL											



11 October 2000

Sanity Check

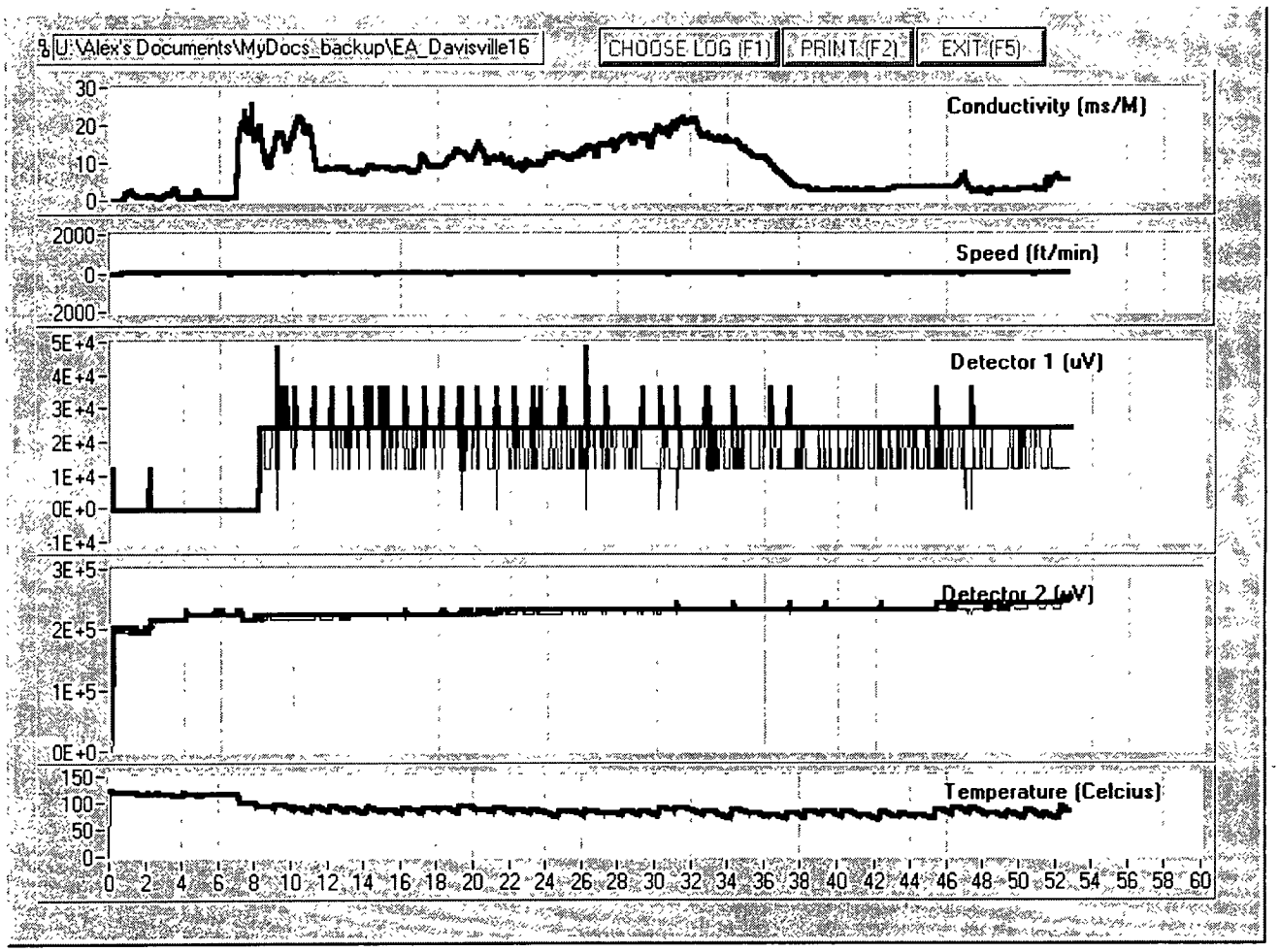
E144 (B52)	PASS	PSI Setting		12			Mass Flow		976		
Contaminant	Concentration	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
Gasoline	.01 MI	PID	1	10	0	-378	ECD	3	8	87	287

Trip Time	Det. 1 Response	Det. 2 Response	Temperature of Probe
54	2.5E+6	Insignificant	121

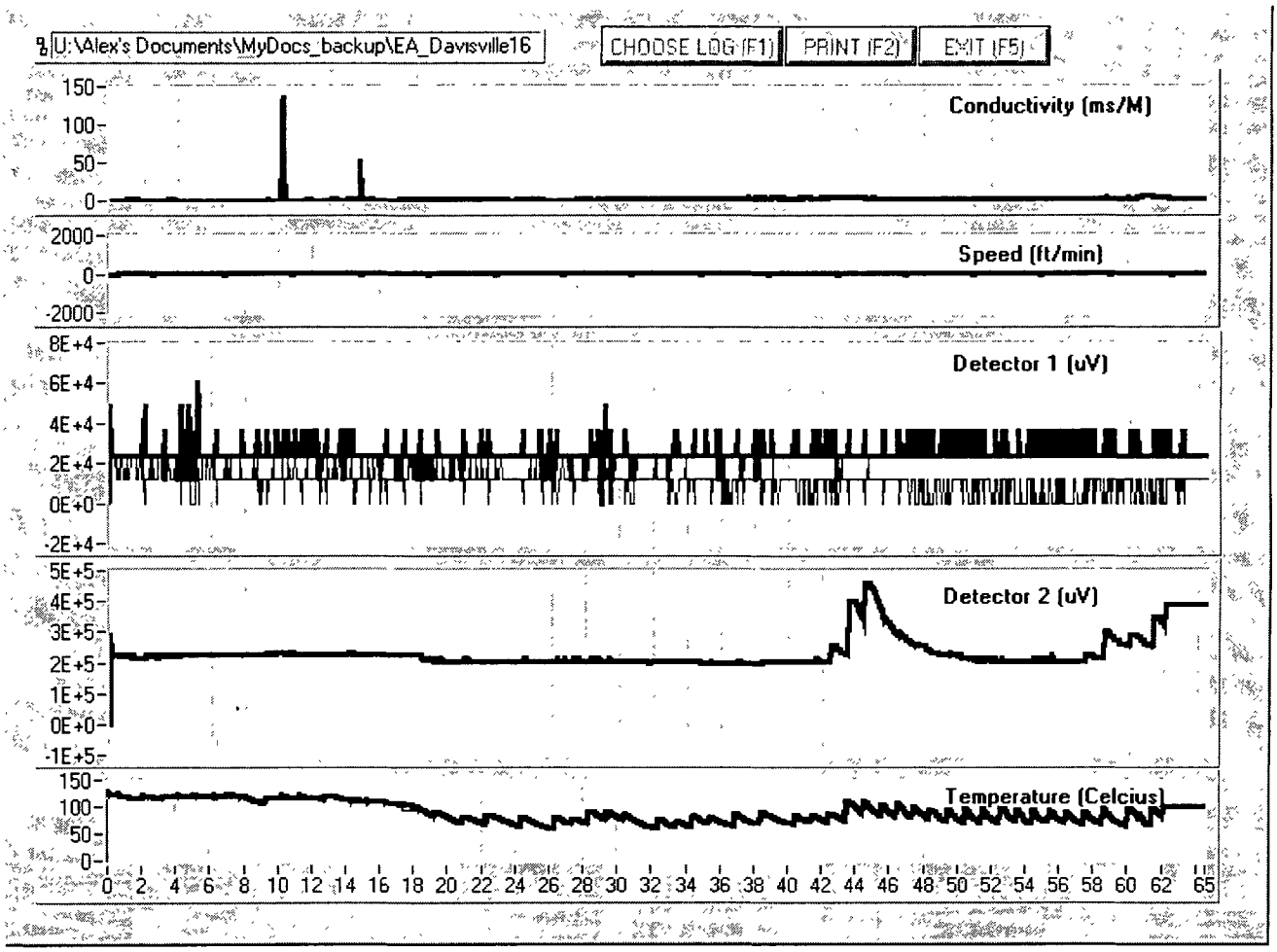
FIELD DATA SUMMARY

E144 (B52)			PSI Setting		12			Mass Flow		976		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
05	16E-03	0800	PID	1	10	0	-378	ECD	3	8	87	260k

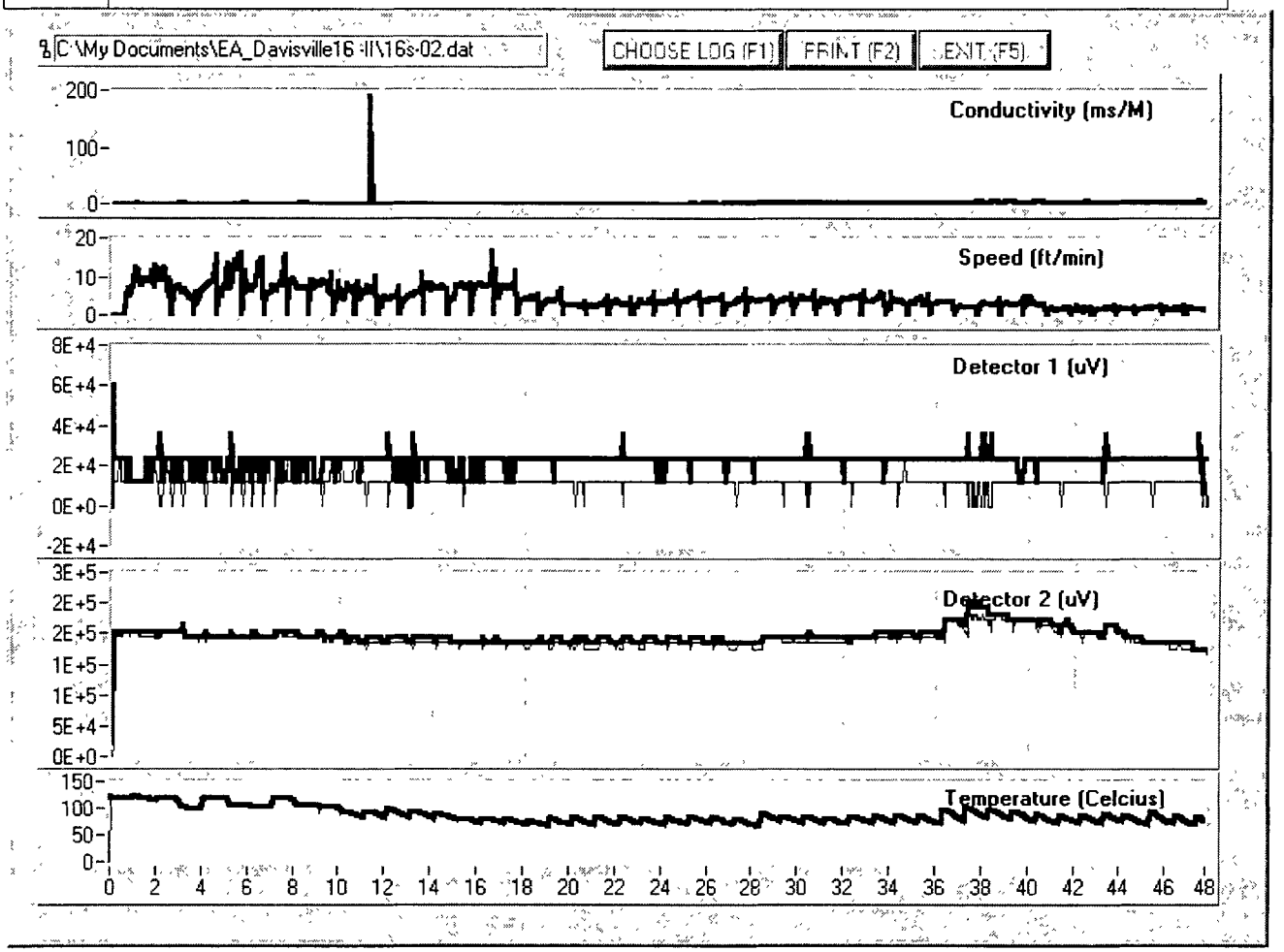
TD	Comments
53'	ENCOUNTERED REFUSAL. GENERAL UPWARD TREND ON ECD RESPONSE POSSIBLY SIGNIFYING CONTAMINANT PRESENCE AT DEPTHS BELOW MIP REFUSAL.



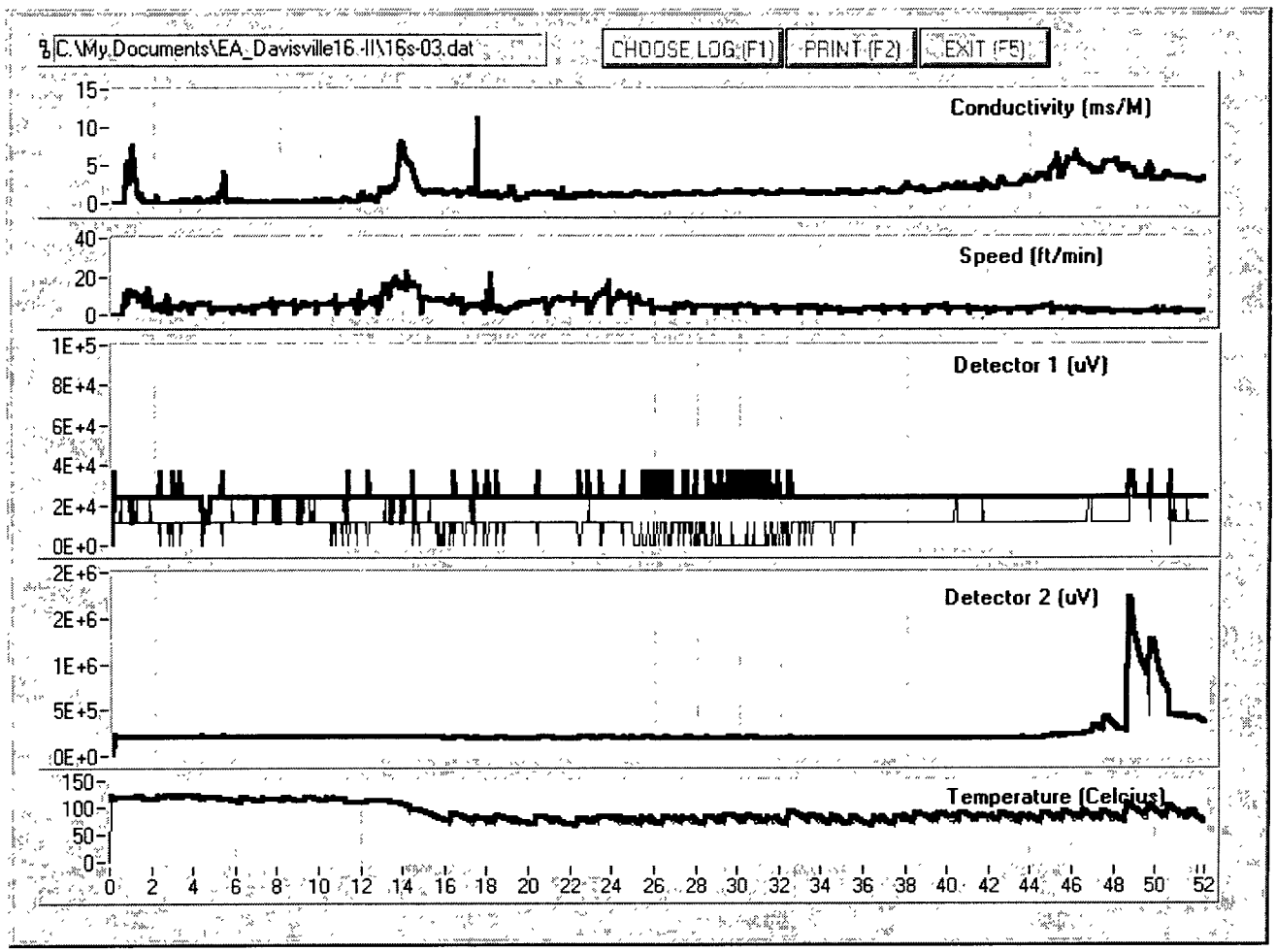
E144 (B52)			PSI Setting		12			Mass Flow		976		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
O6	16S-01	1030	PID	1	10	0	23K	ECD	3	8	140	348
TD	Comments											
62.07	Refusal. Last 2' of probe advancement simulated to post the ECD reading that occurred after the trip time. Two distinct areas of the elevated ECD response: 42-50' and 58-62' BG.											



E144 (B52)			PSI Setting		12			Mass Flow		976		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	B I
07	16S-02	1430	PID	1	10	0	18k	ECD	3	8	175	375
TD	Comments											
48'	ENCOUNTERED REFUSAL. SMALL RESPONSE INCREASE ON ECD DETECTOR STARTING AT 35' BGS.											



E144 (B52)			PSI Setting		12			Mass Flow		975		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
08	16S-03	1615	PID	1	10	0	11K	ECD	3	8	150	350
TD	Comments											
55'	ELEVATED ECD RESPONSE STARTING AT 45' BGS (high CVOC concentrations).											



12 October 2000

Sanity Check

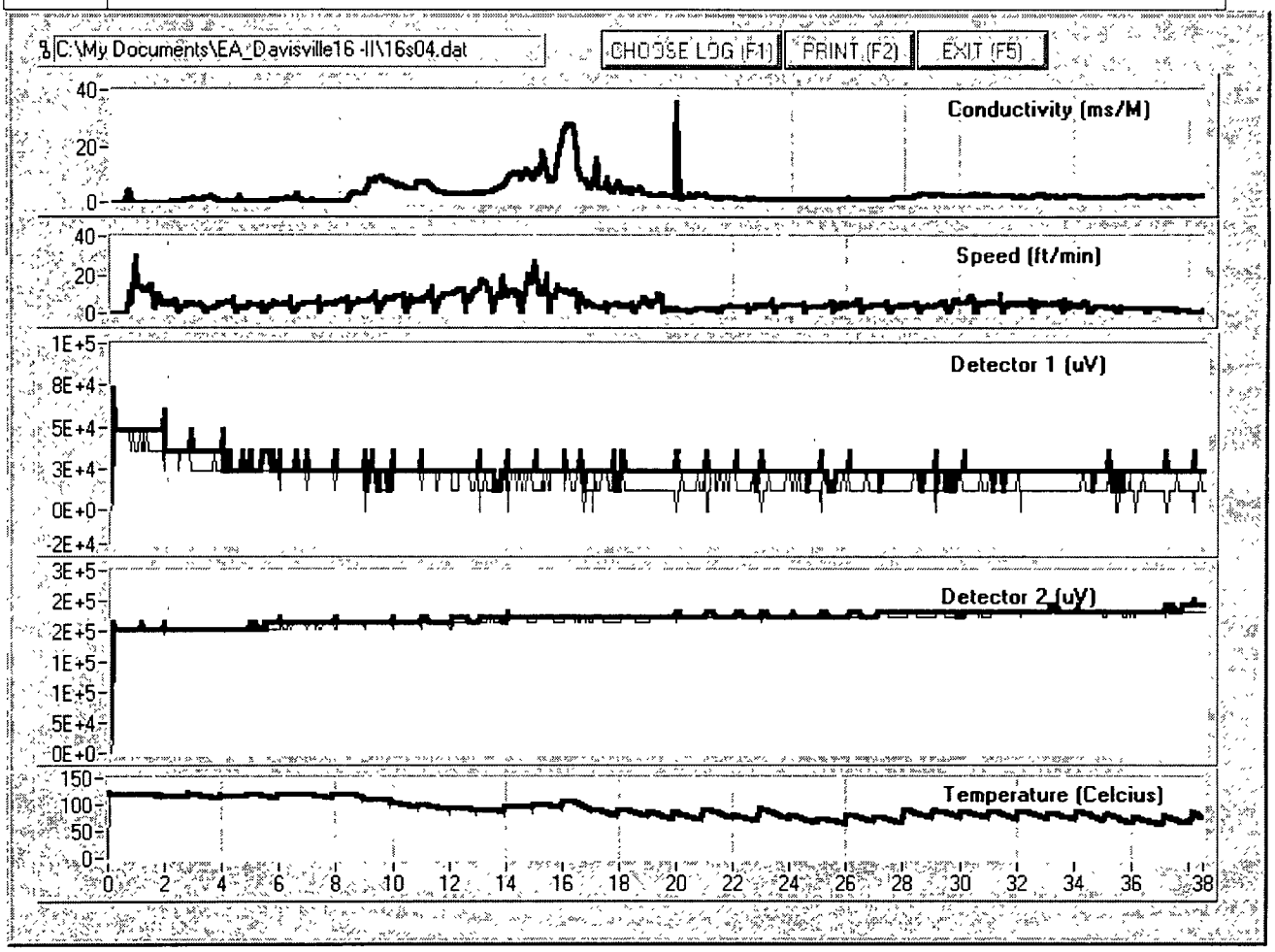
E144 (B52) : PASS		PSI Setting		12			Mass Flow		976		
Contaminant	Concentration	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
Gasoline	.01 MI	PID	1	10	0	12k	ECD	3	8	87	287

Trip Time	Det. 1 Response	Det. 2 Response	Temperature of Probe
56	2.5E+6	Insignificant	121

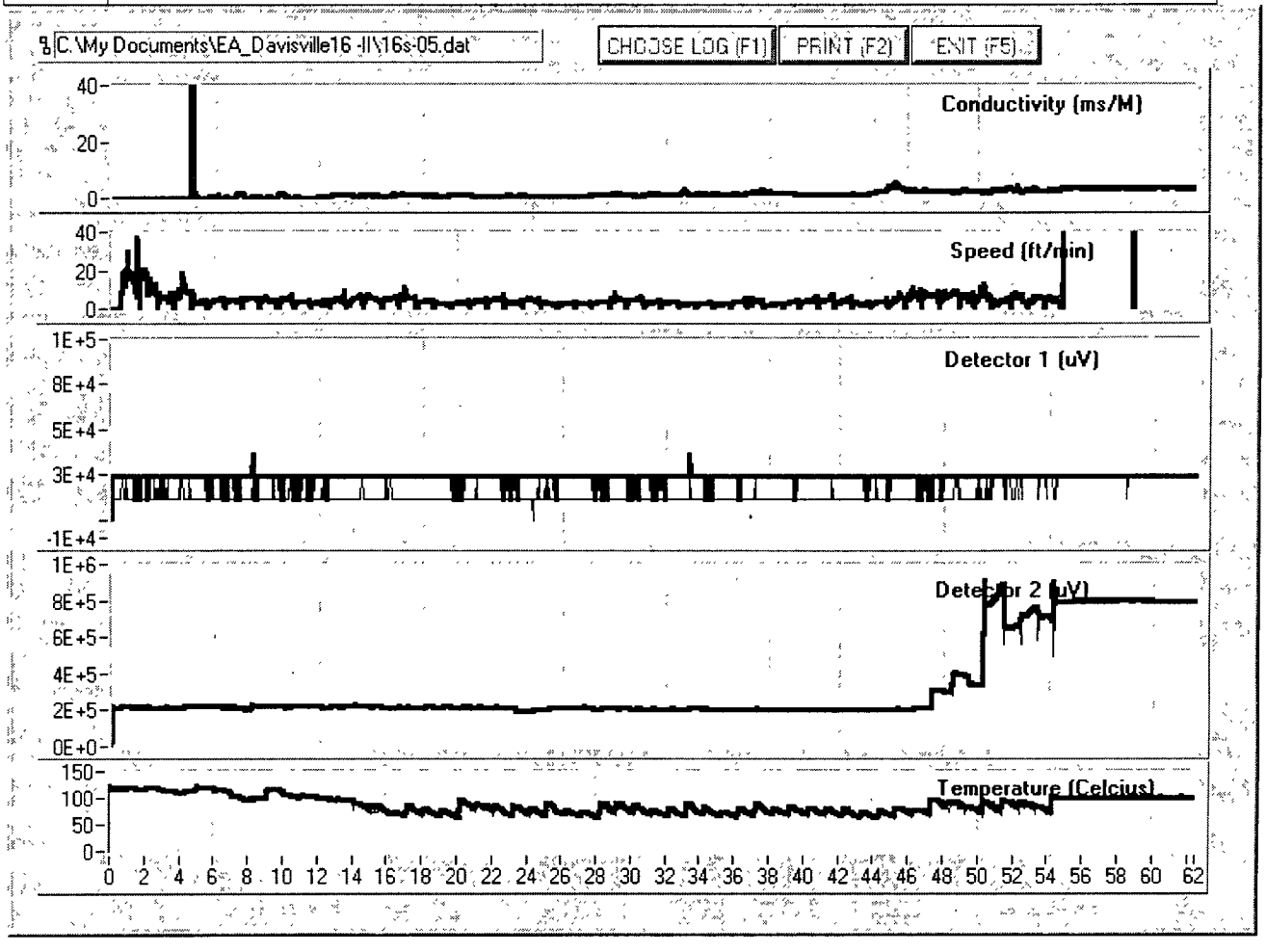
FIELD DATA SUMMARY

E144 (B52)			PSI Setting		12			Mass Flow		976		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
09	16S-04	0840	PID	1	10	0	15K	ECD	3	8	80	280

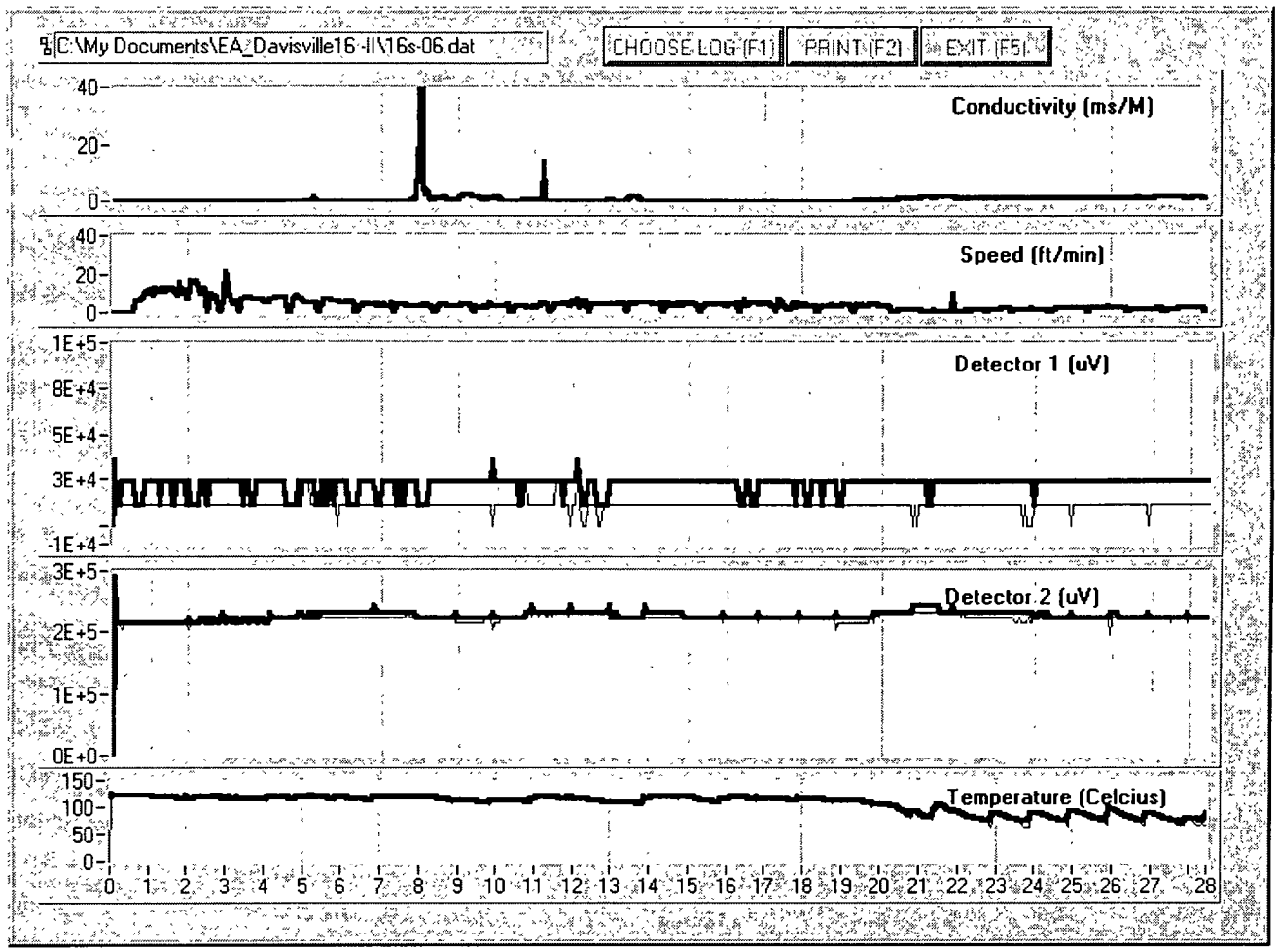
TD	Comments
38.5	Encountered refusal. No significant response on either detector. (NRADL)



E144 (B52)			PSI Setting		12			Mass Flow		976		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
10	16S-05	1030	PID	1	10	0	11K	ECD	3	8	140	340
TD	Comments											
55'	INCREASED ECD RESPONSE STARTING AT 45' UNTIL REFUSAL AT 55' BGS. LAST 6' WERE NOT LOGGED. The advancement of the last 6' is simulated to post data.											



E144 (B52)			PSI Setting		12			Mass Flow		976		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
11	16S-06	1445	PID	1	10	0	12K	ECD	3	8	140	340
TD	Comments											
28.5	ENCOUNTERED REFUSAL. NO RESPONSE ON EITHER DETECTOR. (NRADL)											



13 October 2000

Sanity Check

PROBE 602: PASS		PSI Setting		10			Mass Flow		000		
Contaminant	Concentration	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
Gasoline Methanol	.01 Ml	PID	1	10	0	11k	ECD	3	8	140	340

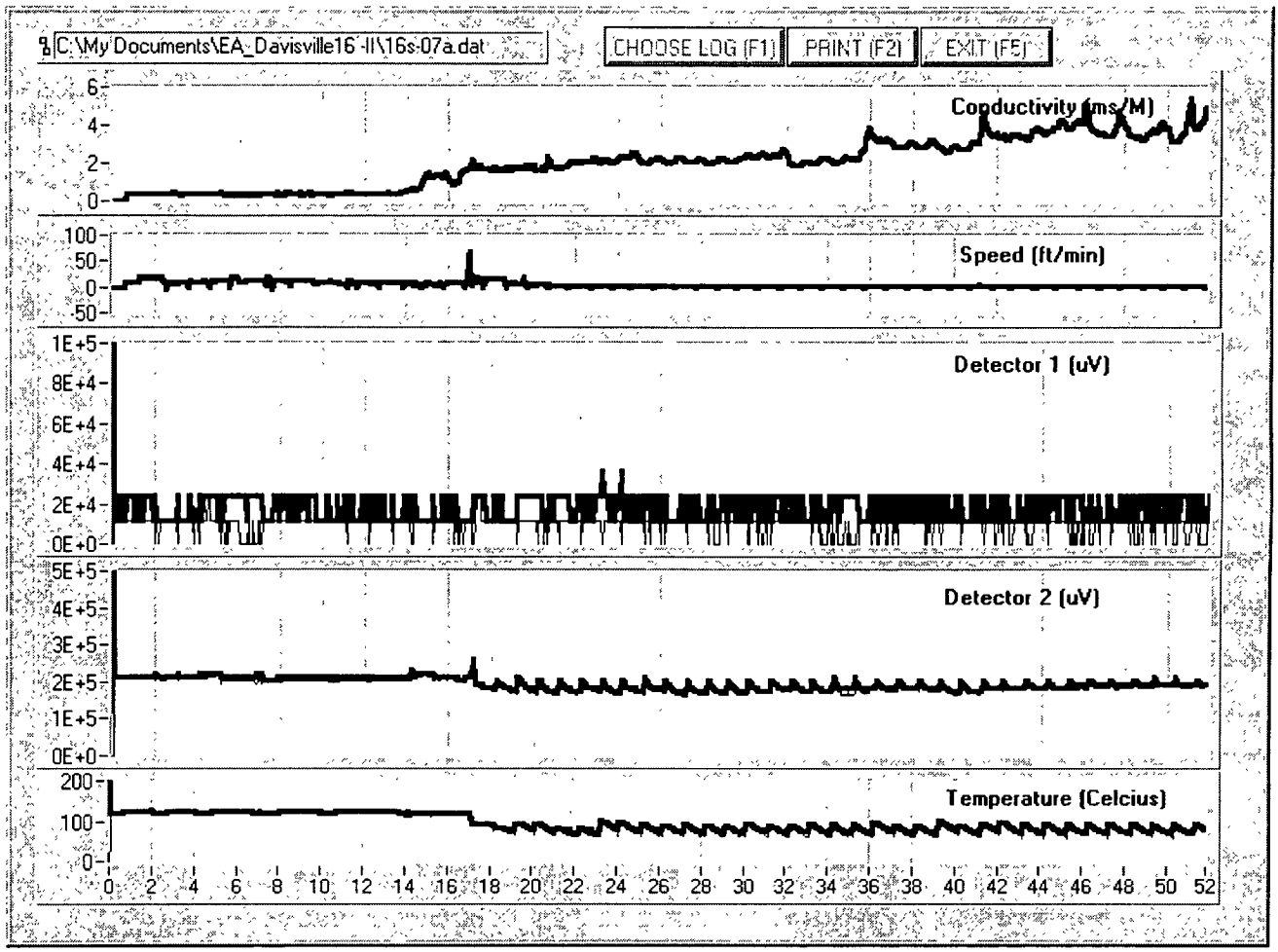
Trip Time	Det. 1 Response	Det. 2 Response	Temperature of Probe
36 35	3E+6 Insignificant	Insignificant 6E+6	121

FIELD DATA SUMMARY

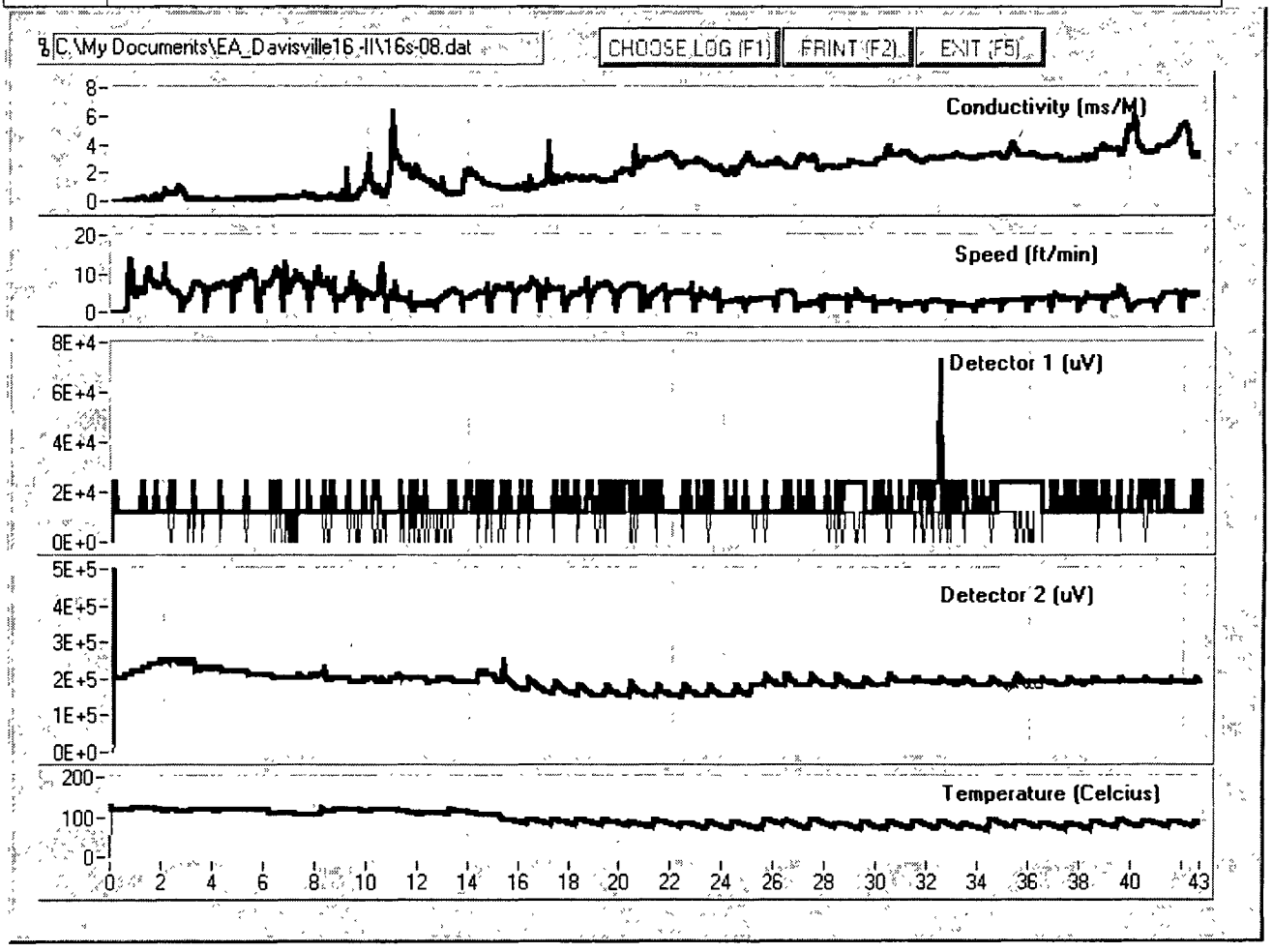
PROBE 602			PSI Setting		10			Mass Flow		000		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
12	16S-07	0800	PID	1	10	0	45K	ECD	3	8	140	340

TD	Comments
15'	REFUSAL. BLIND PROBED TO 25' BGS.

PROBE 602			PSI Setting		10			Mass Flow		000		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
13	16S-07A	1030	PID	1	10	0	11K	ECD	3	8	180	380
TD	Comments											
51'	REFUSAL. NO SIGNIFICANT RESPONSE ON EITHER DETECTOR. (NRADL)											



PROBE 602			PSI Setting		10			Mass Flow		000		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
14	16S-08	1345	PID	1	10	0	11K	ECD	3	8	200	400
TD	Comments											
42.5	REFUSAL. NO SIGNIFICANT RESPONSE ON EITHER DETECTOR. (NRADL)											



16 October 2000

Sanity Check

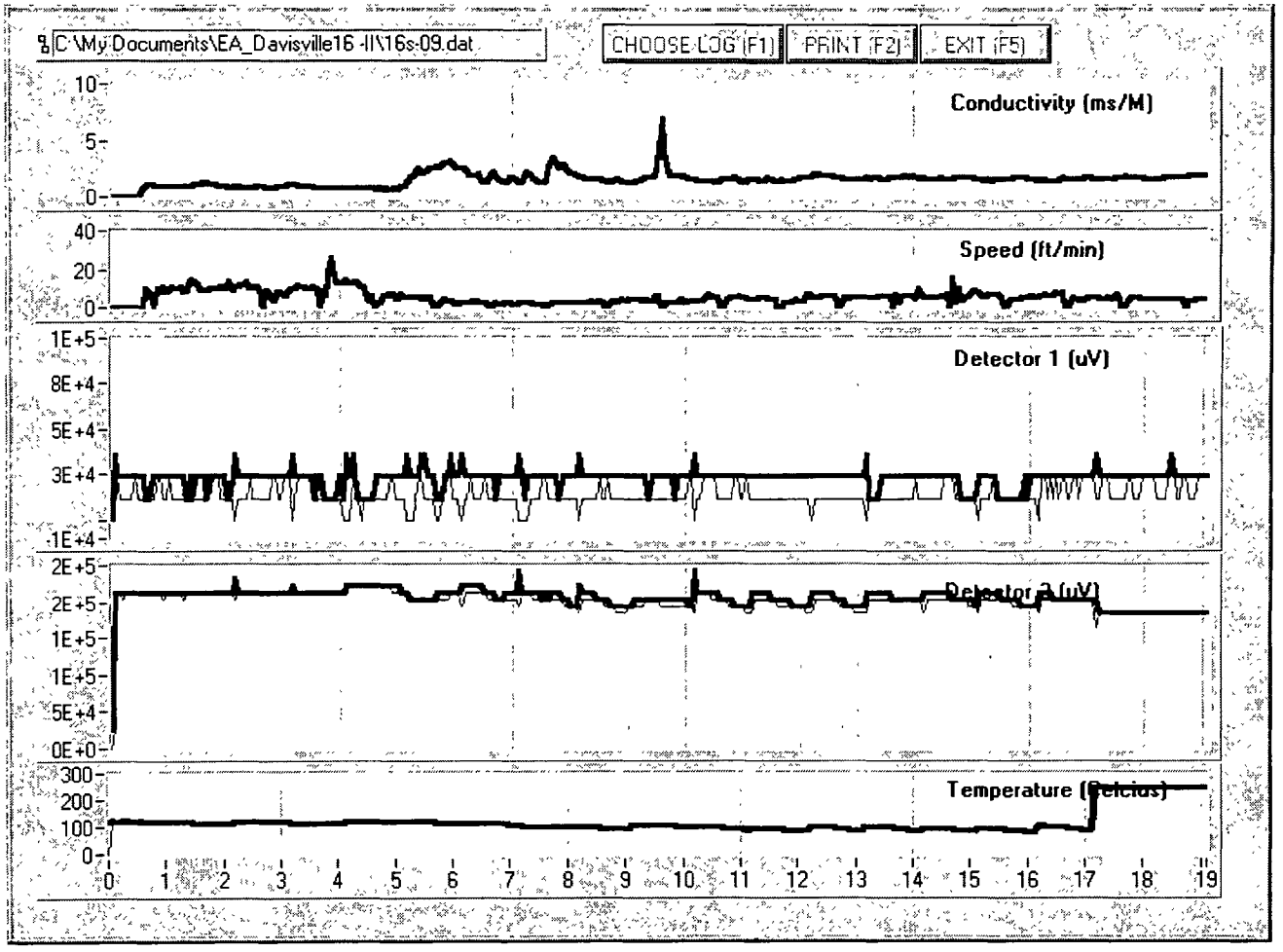
Probe 602: PASS		PSI Setting		10			Mass Flow		000		
Contaminant	Concentration	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
TCE	.10ML	PID	1	10	0	12k	ECD	3	8	140	330

Trip Time	Det. 1 Response	Det. 2 Response	Temperature of Probe
30	Insignificant	1E+7	121

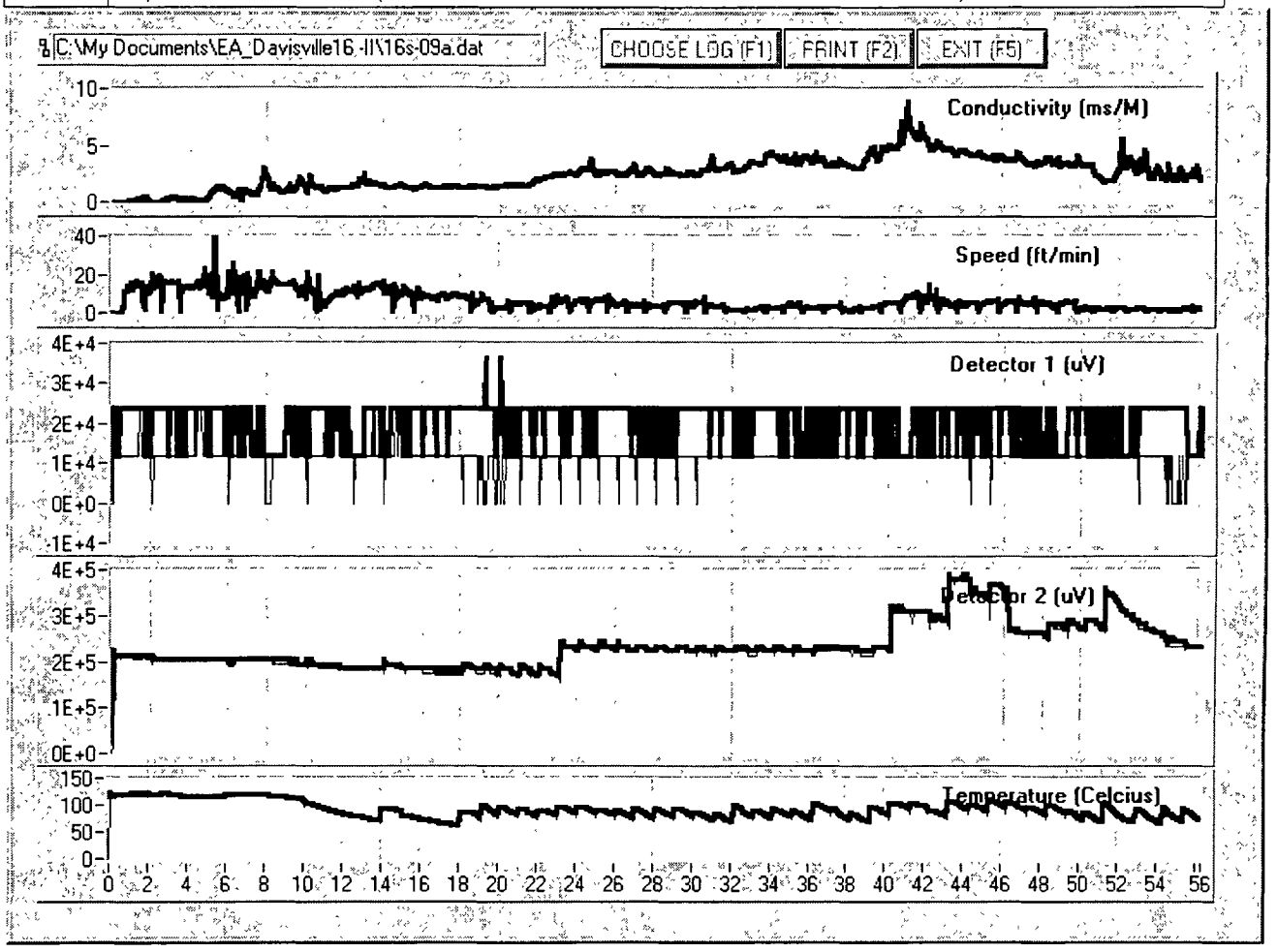
FIELD DATA SUMMARY

Probe 602			PSI Setting		10			Mass Flow		000		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
15	16S-09	0830	PID	1	10	0	24K	ECD	3	8	100	300

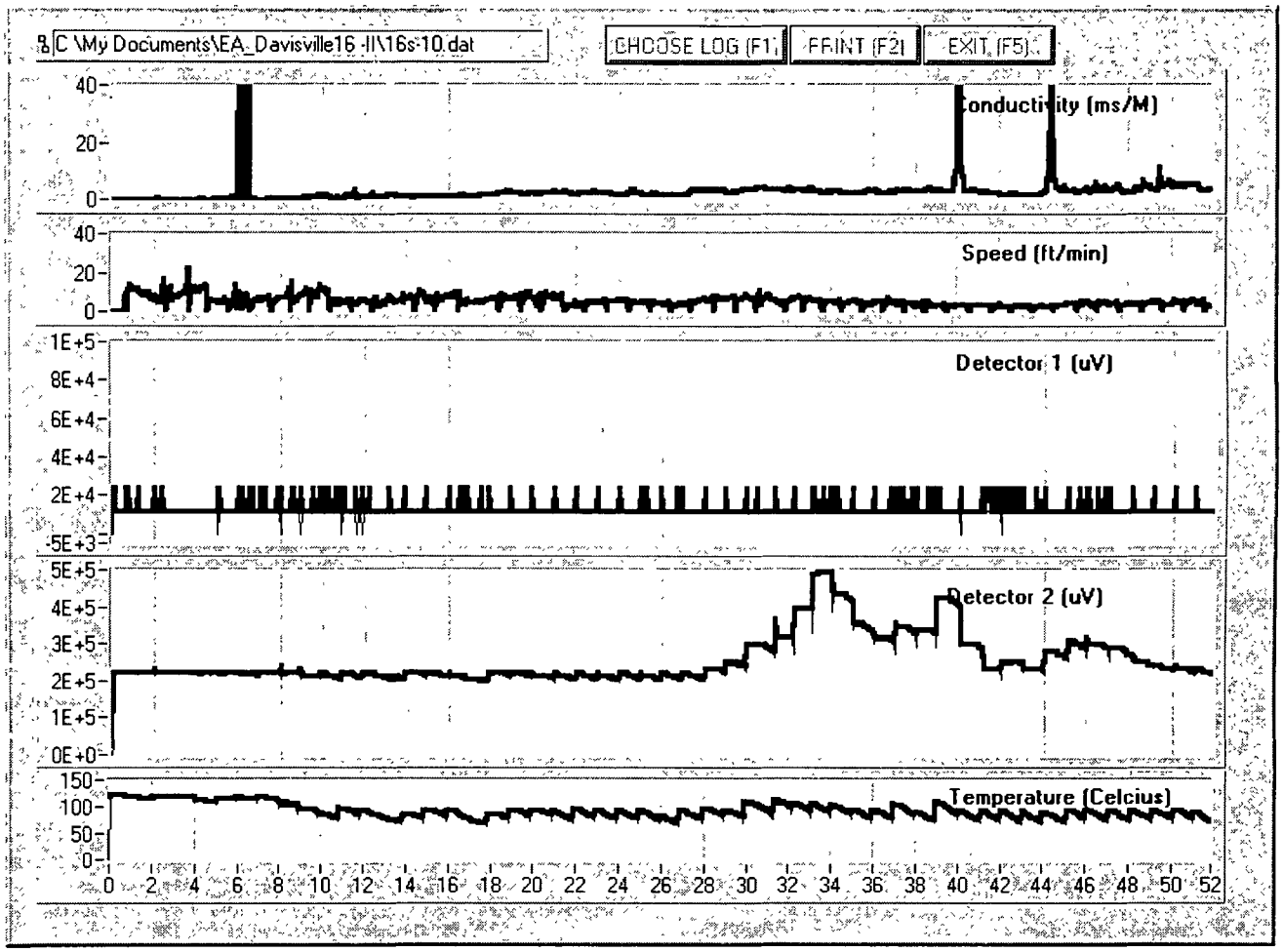
TD	Comments
19'	HEATER MALFUNCTION. PULLED PROBE RE-RAN LOG. RAN SANITY CHECK.



PROBE E44B15			PSI Setting		12			Mass Flow		976		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
16	16S-09A	1000	PID	1	10	0	24K	ECD	3	8	100	315
TD	Comments											
55'	CHANGED ZERO @ 24' DUE TO DOWNWARD TREND OF BASELINE Elevated ECD response at 40-56' BG (ONLY WHEN PROBE TEMP EXCEEDED 103° C.)											



PROBE E44B15			PSI Setting		11			Mass Flow		976		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
17	16S-10	1300	PID	1	10	0	11K	ECD	3	8	50	250
TD	Comments											
51'	ELEVATED RESPONSE INDICATED ON ECD AT28-50' BG (ONLY WHEN PROBE TEMP EXCEEDED 95° C) CHANGED ROD DUE TO SIGNIFICANT THREAD DETERIORATION. (@1700 HRS)											



17 October 2000

Sanity Check

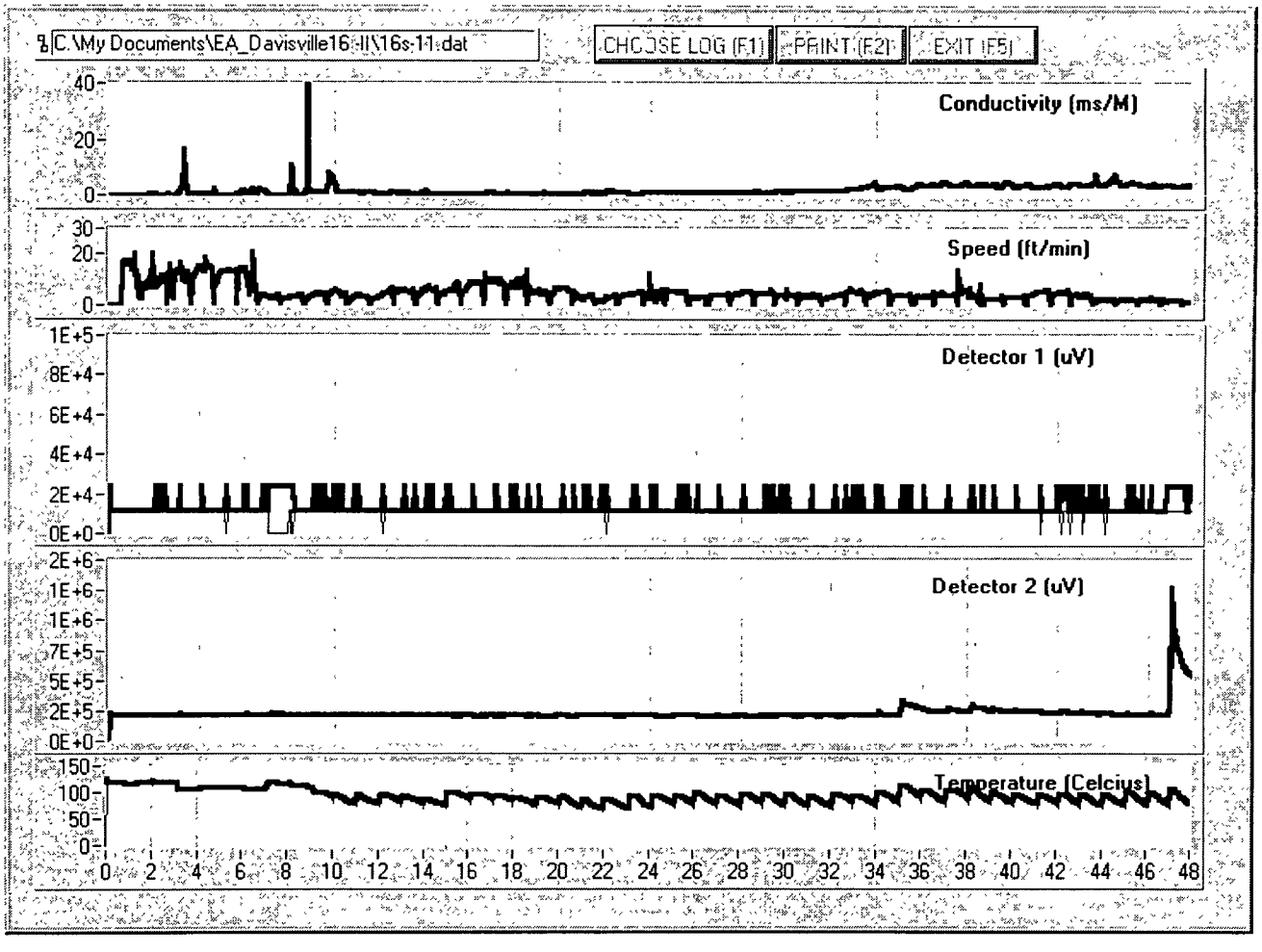
Probe 608: PASS		PSI Setting		12			Mass Flow		980		
Contaminant	Concentration	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
TCE	.05ML	PID	1	10	0	11k	ECD	3	8	50	250

Trip Time	Det. 1 Response	Det. 2 Response	Temperature of Probe
60	Insignificant	2E+6	121

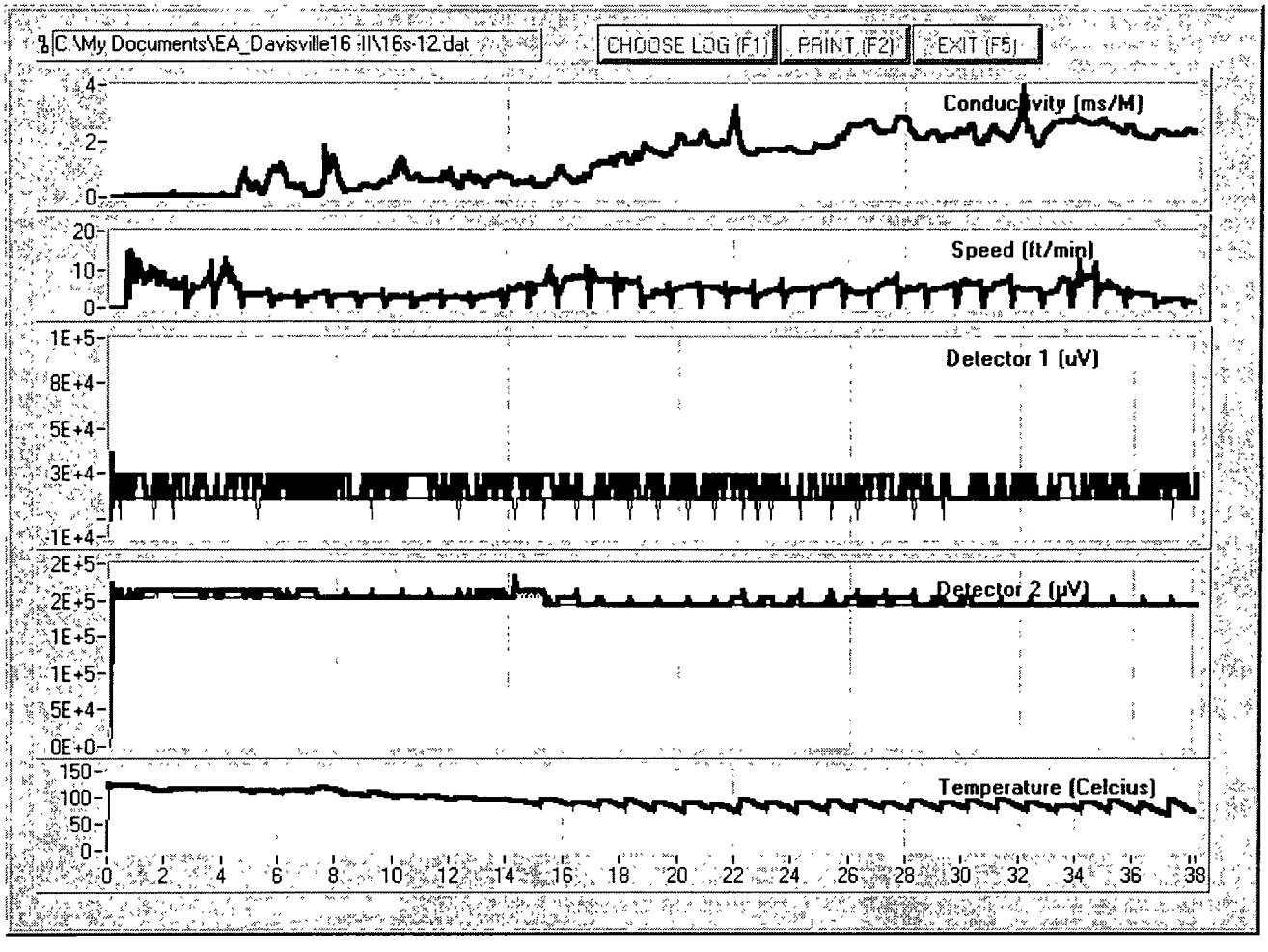
FIELD DATA SUMMARY

Probe 608			PSI Setting		12			Mass Flow		980		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
18	16S-11	0800	PID	1	10	0	13k	ECD	3	8	50	250

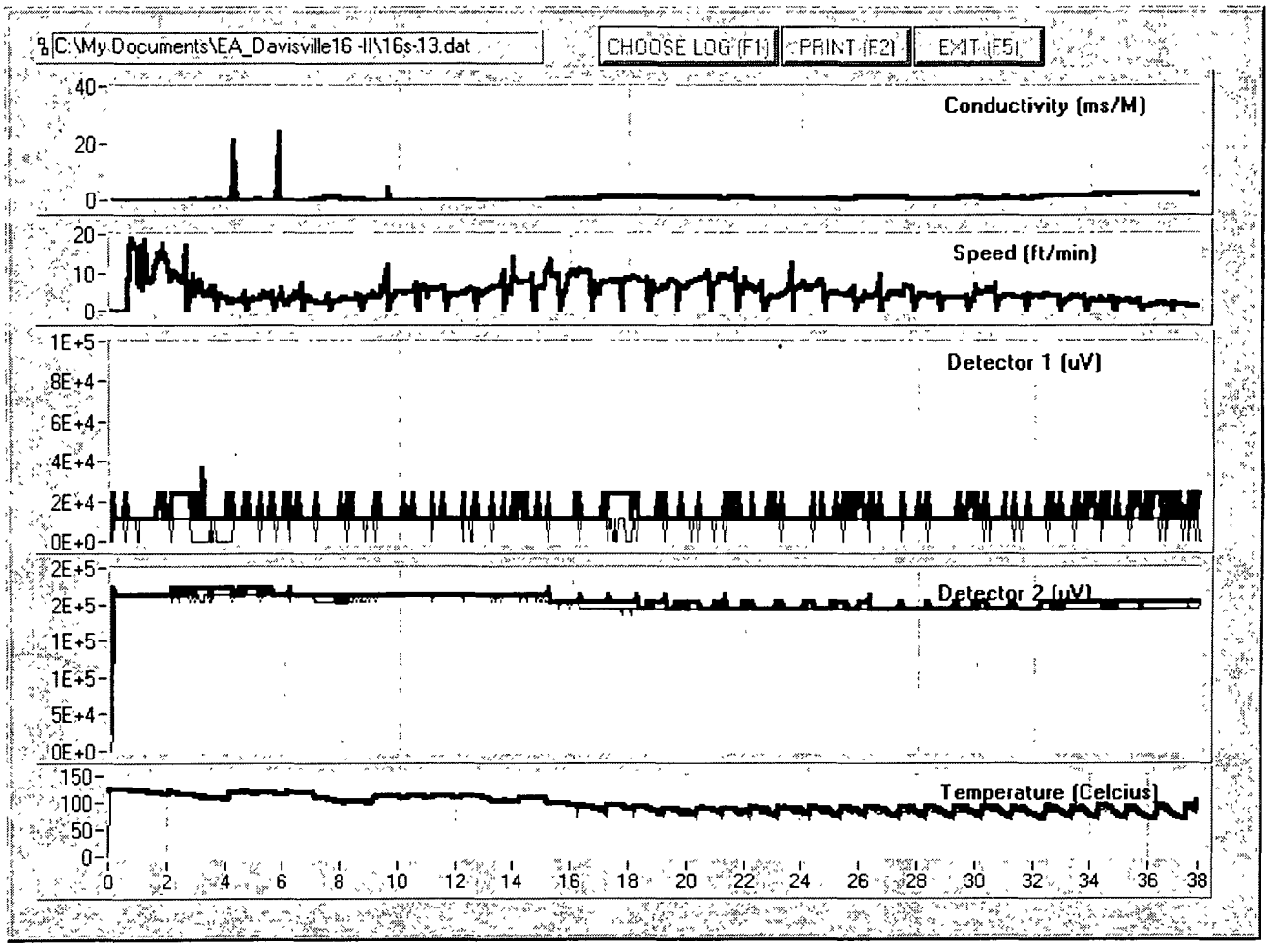
TD	Comments
48'	Indications of elevated ECD response starting at 34'bgs. Significant response on ECD detector at 46'bgs. (2E+6)



Probe 608			PSI Setting		12			Mass Flow		980		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
19	16S-12	1100	PID	1	10	0	11K	ECD	3	8	50	250
TD	Comments											
38'	(2) REFUSALS. No significant response on either detector. (NRADL) Encountered refusal.											



Probe 608			PSI Setting		13			Mass Flow		980		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
20	16S-13	1430	PID	1	10	0	11k	ECD	3	8	75	280
TD	Comments											
42'	Encountered refusal. No significant response on either detector (NRADL)											



18 October 2000

Sanity Check

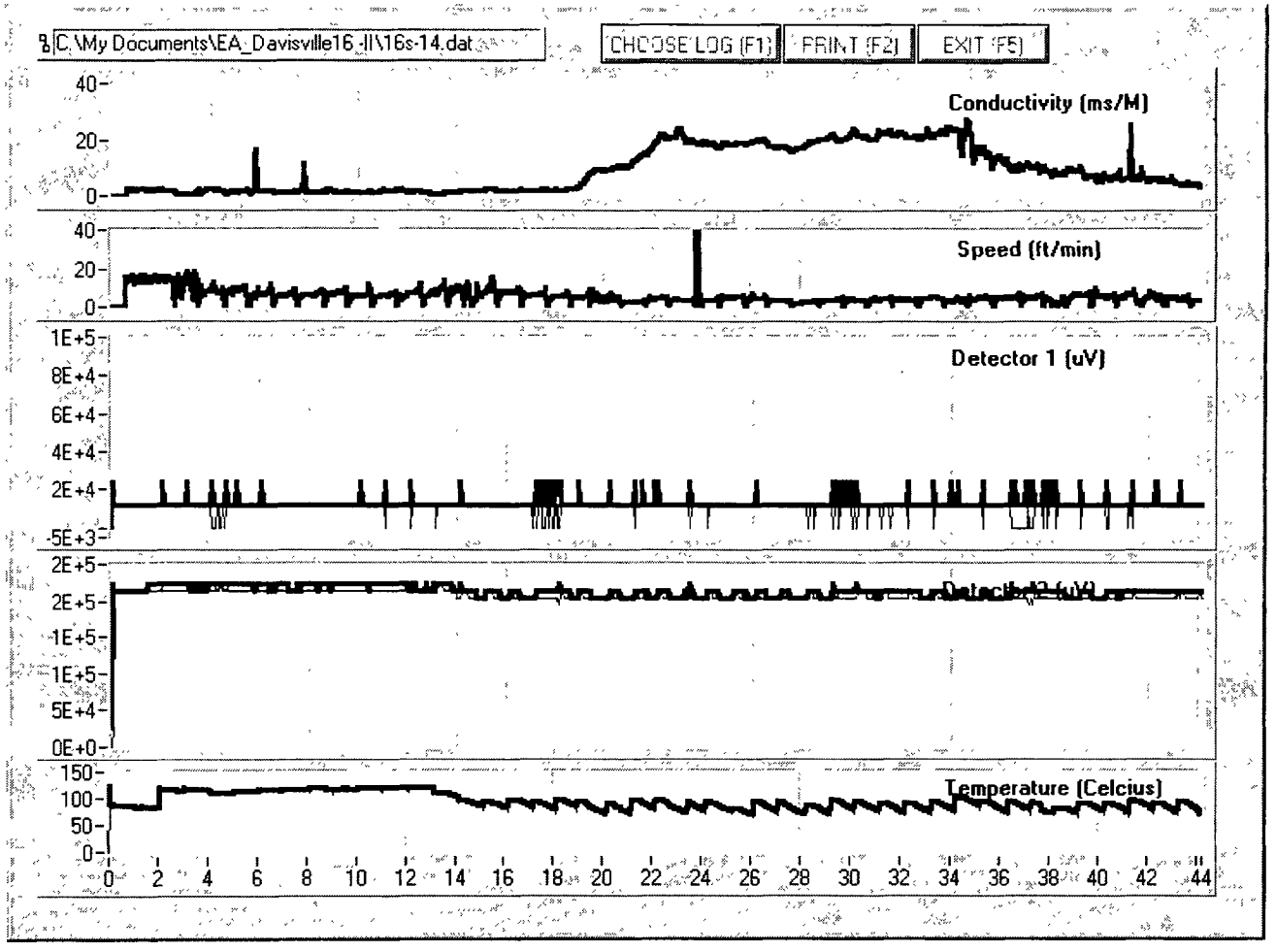
Probe 608: PASS		PSI Setting		13			Mass Flow		980		
Contaminant	Concentration	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
TCE	.10ML	PID	1	10	0	11k	ECD	3	8	50	250

Trip Time	Det. 1 Response	Det. 2 Response	Temperature of Probe
44	Insignificant	8E+6	121

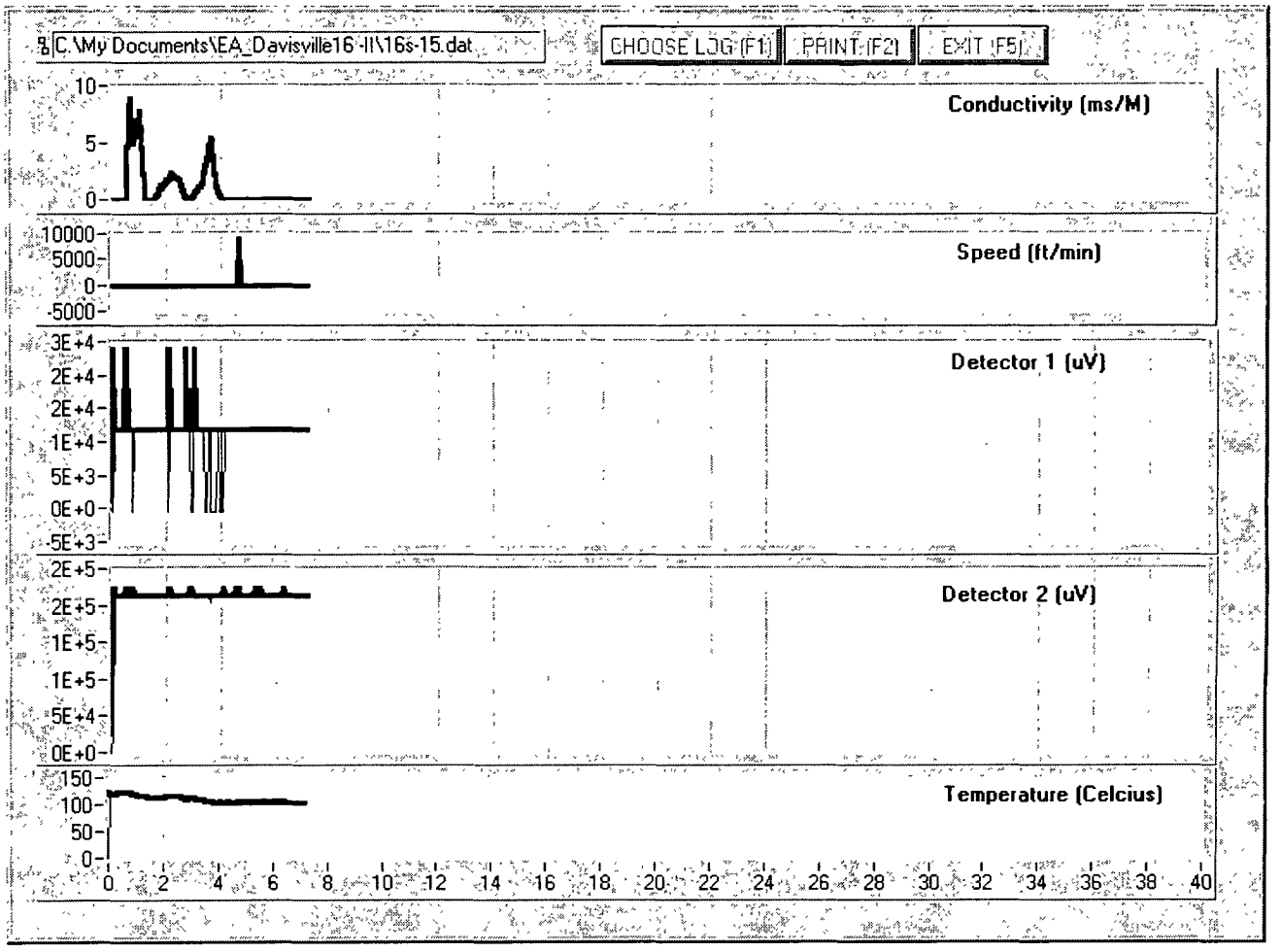
FIELD DATA SUMMARY

Probe 608			PSI Setting		12			Mass Flow		980		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
21	16S-14	0800	PID	1	10	0	11k	ECD	3	8	50	250

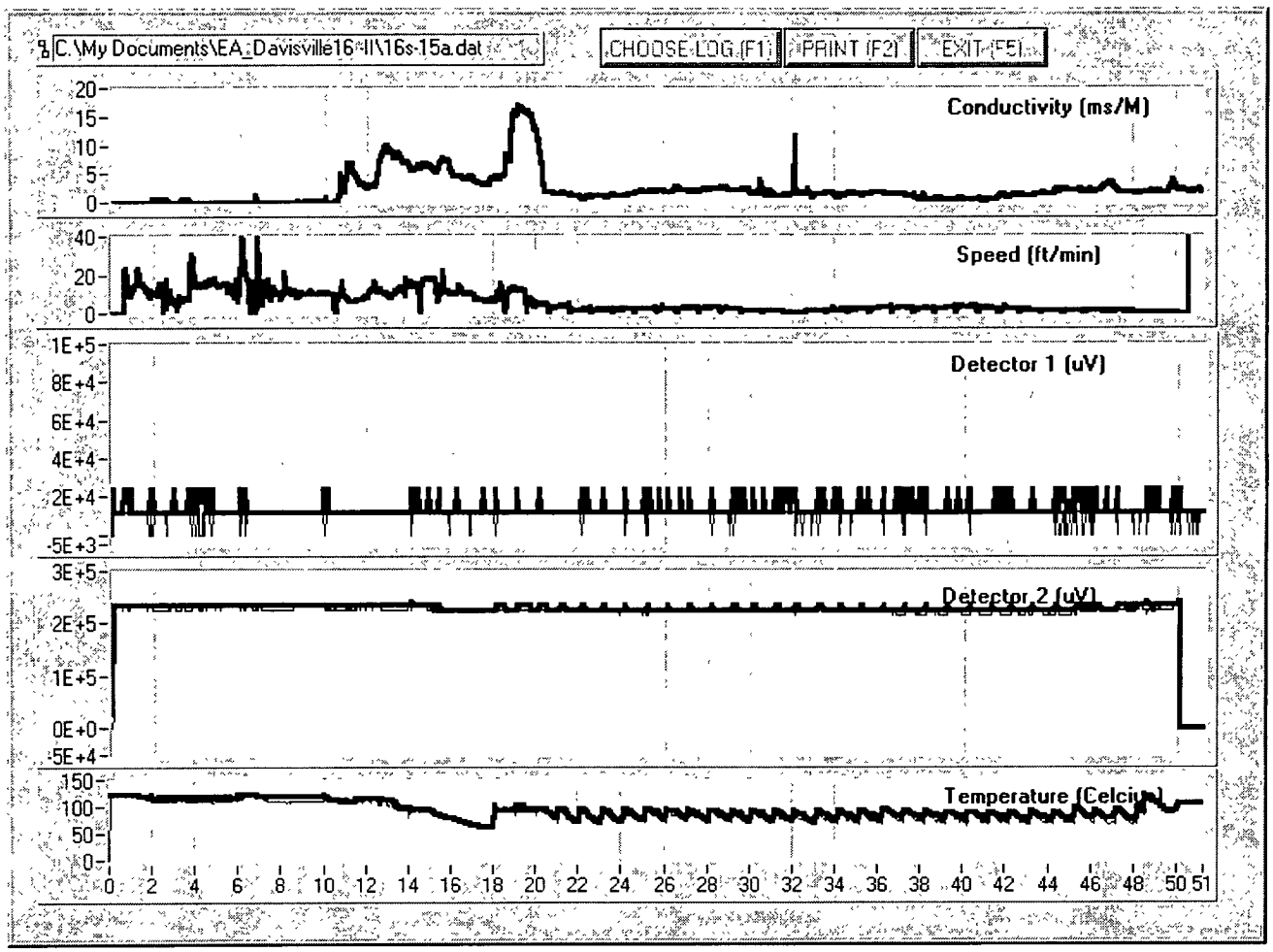
TD	Comments
44'	NRADL. Refusal (gradual).



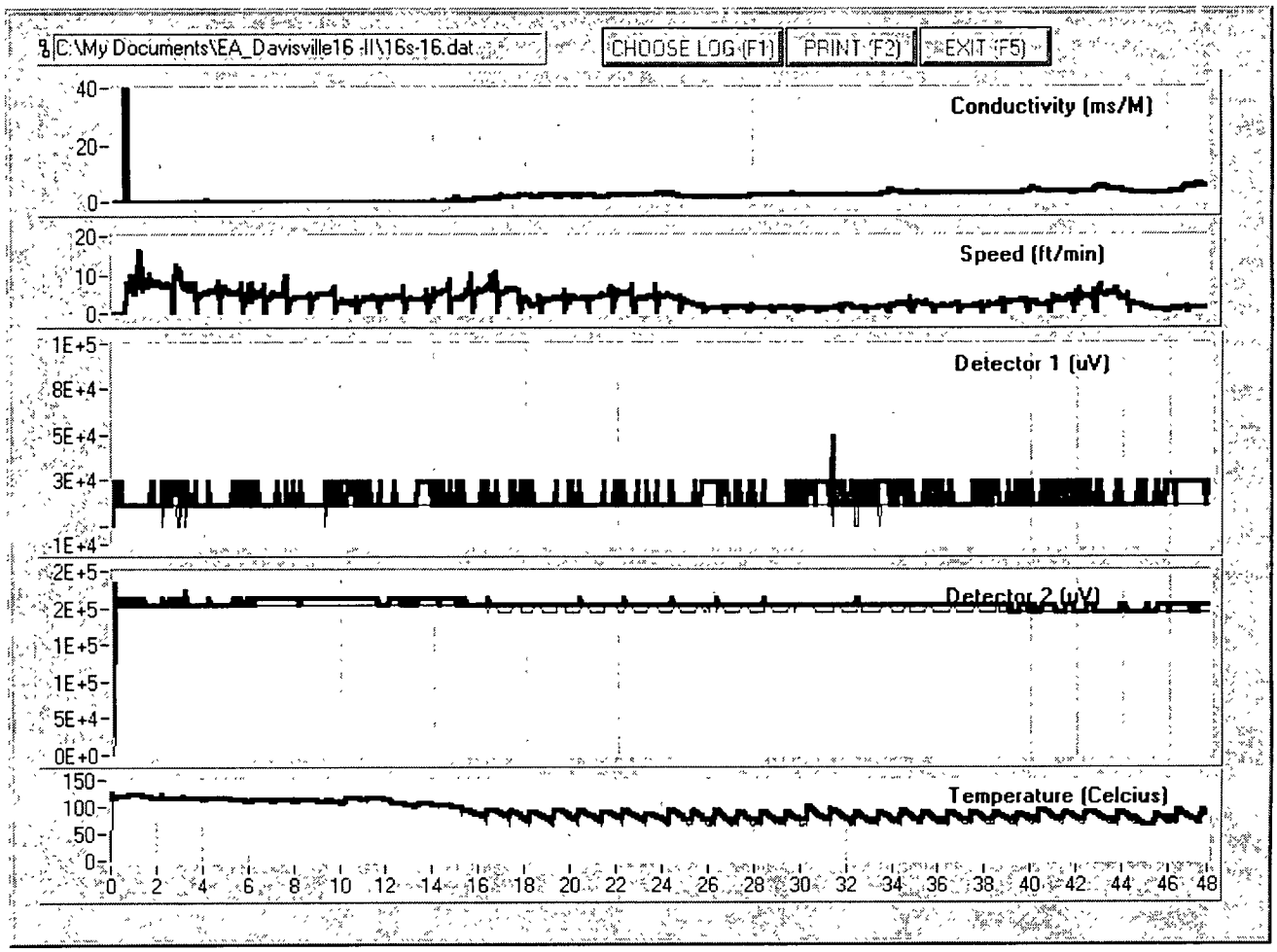
Probe 608			PSI Setting		13			Mass Flow		980		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
22	16S-15	1045	PID	1	10	0	11K	ECD	3	8	50	250
TD	Comments											
7'	Stopped logging due to stringpot malfunction											



Probe 608			PSI Setting		13			Mass Flow		980		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	B I
23	16S-15A	1130	PID	1	10	0	11K	ECD	3	8	50	250
TD	Comments											
50'	NRADL. Refusal (gradual).											



Probe 608			PSI Setting		13			Mass Flow		980		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
24	16S-16	1415	PID	1	10	0	11K	ECD	3	8	50	250
TD	Comments											
48'	NRADL. Refusal (gradual).											



19 October 2000

Sanity Check

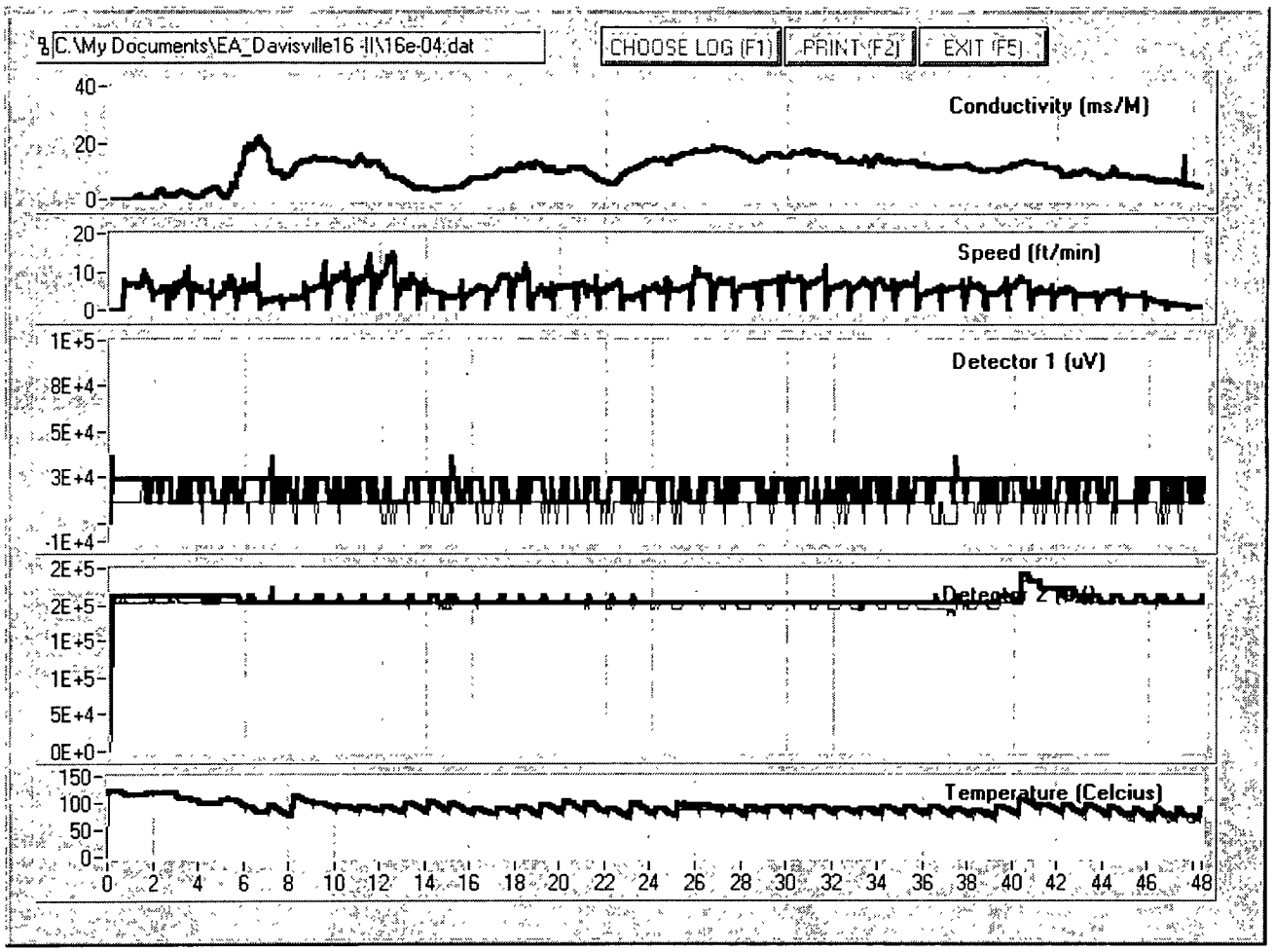
Probe 608:PASS		PSI Setting		13			Mass Flow		980		
Contaminant	Concentration	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
TCE	.10ML	PID	1	10	0	11k	ECD	3	8	70	270

Trip Time	Det. 1 Response	Det. 2 Response	Temperature of Probe
44	Insignificant	4E+6	121

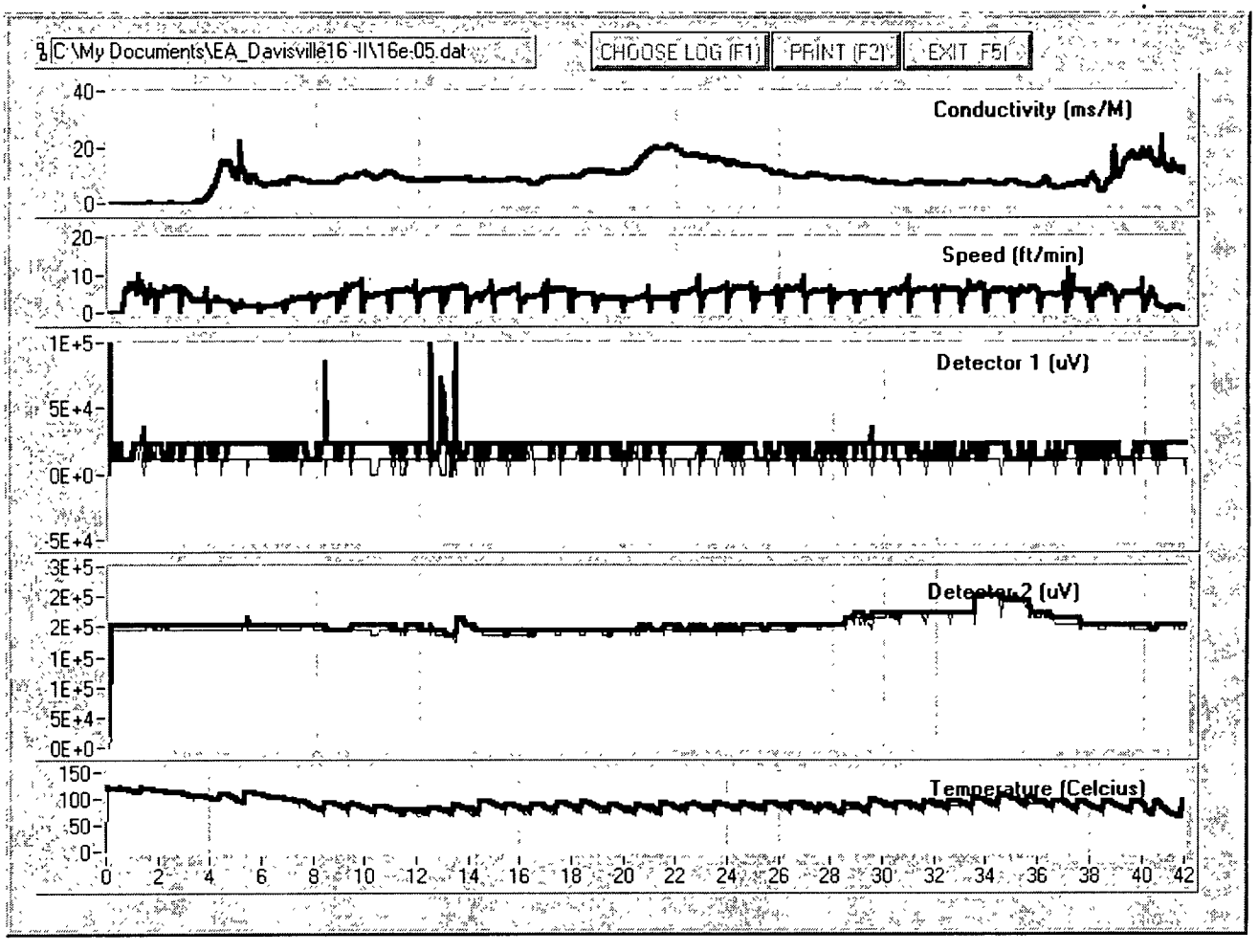
FIELD DATA SUMMARY

Probe 608			PSI Setting		13			Mass Flow		980		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
25	16E-04	0830	PID	1	10	0	11k	ECD	3	8	50	250

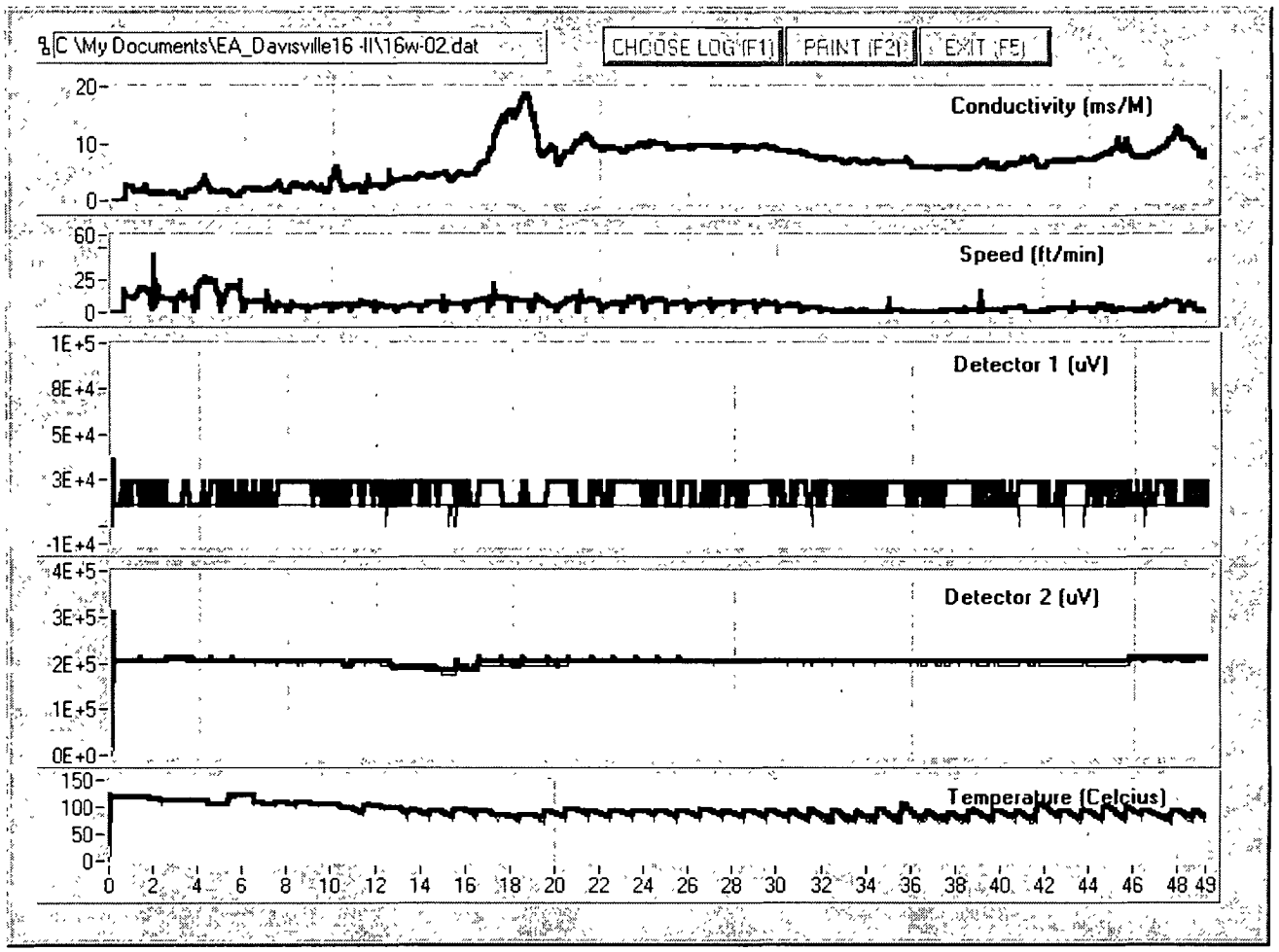
TD	Comments
48'	SMALL ELEVATED RESPONSE TO ECD @ 40' BGS. GRADUAL REFUSAL.



Probe 608			PSI Setting		13			Mass Flow		980		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
26	16E-05	1130	PID	1	10	0	24K	ECD	3	8	70	270
TD	Comments											
42'	FLOW ADJUSTED AT 13'BG: DISREGARD BASELINE FLUCTUATIONS ON BOTH DETECTORS. SMALL RESPONSE ON ECD AT 35' BGS.											



Probe 598			PSI Setting		10			Mass Flow			000	
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
27	16W-02	1500	PID	1	10	0	11K	ECD	3	8	80	290
TD	Comments											
49'	NRADL											



20 October 2000

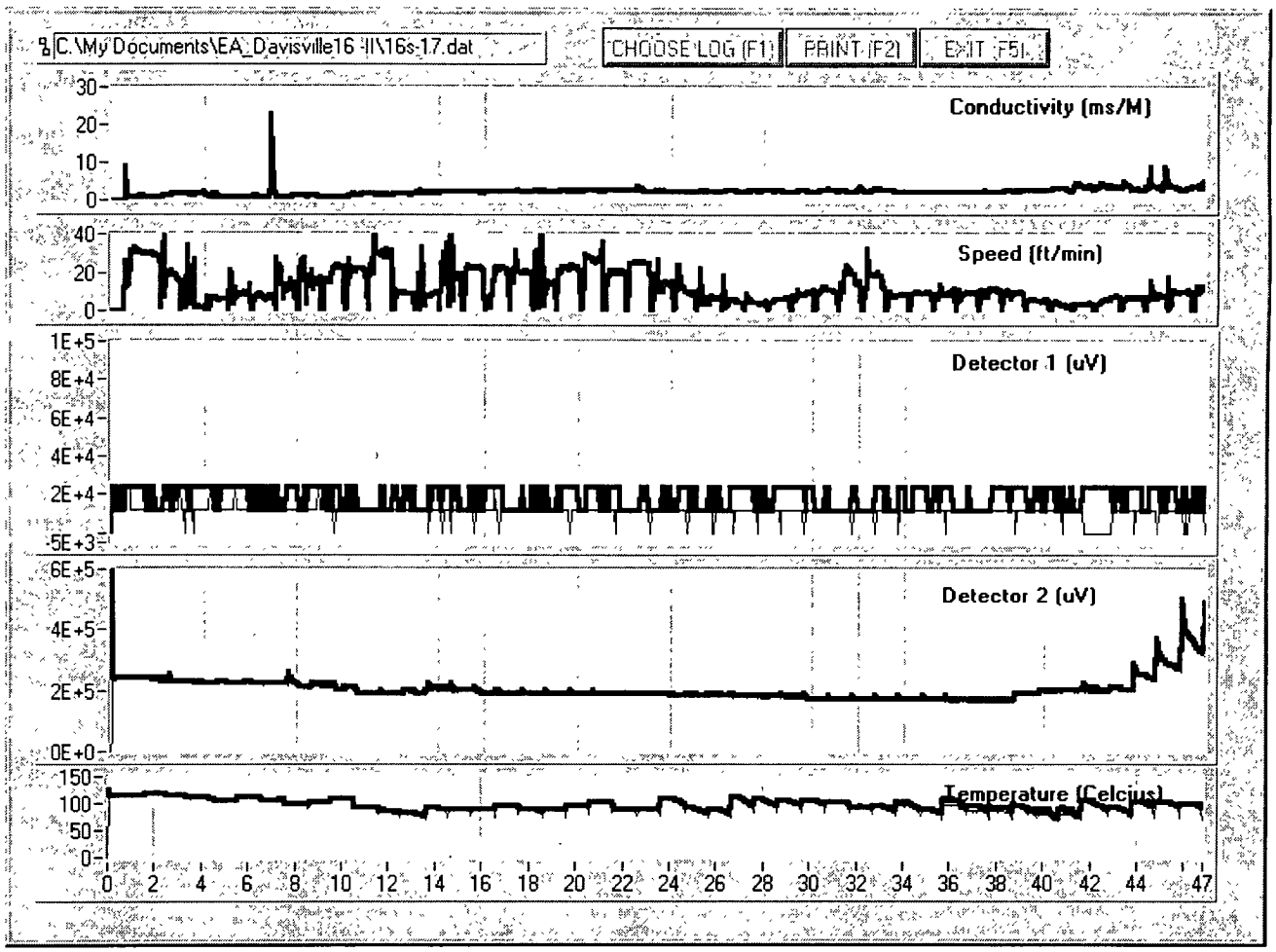
Sanity Check

Probe 598: PASS		PSI Setting		10			Mass Flow		000		
Contaminant	Concentration	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
TCE	.10ML	PID	1	10	0	11K	ECD	3	8	0	140

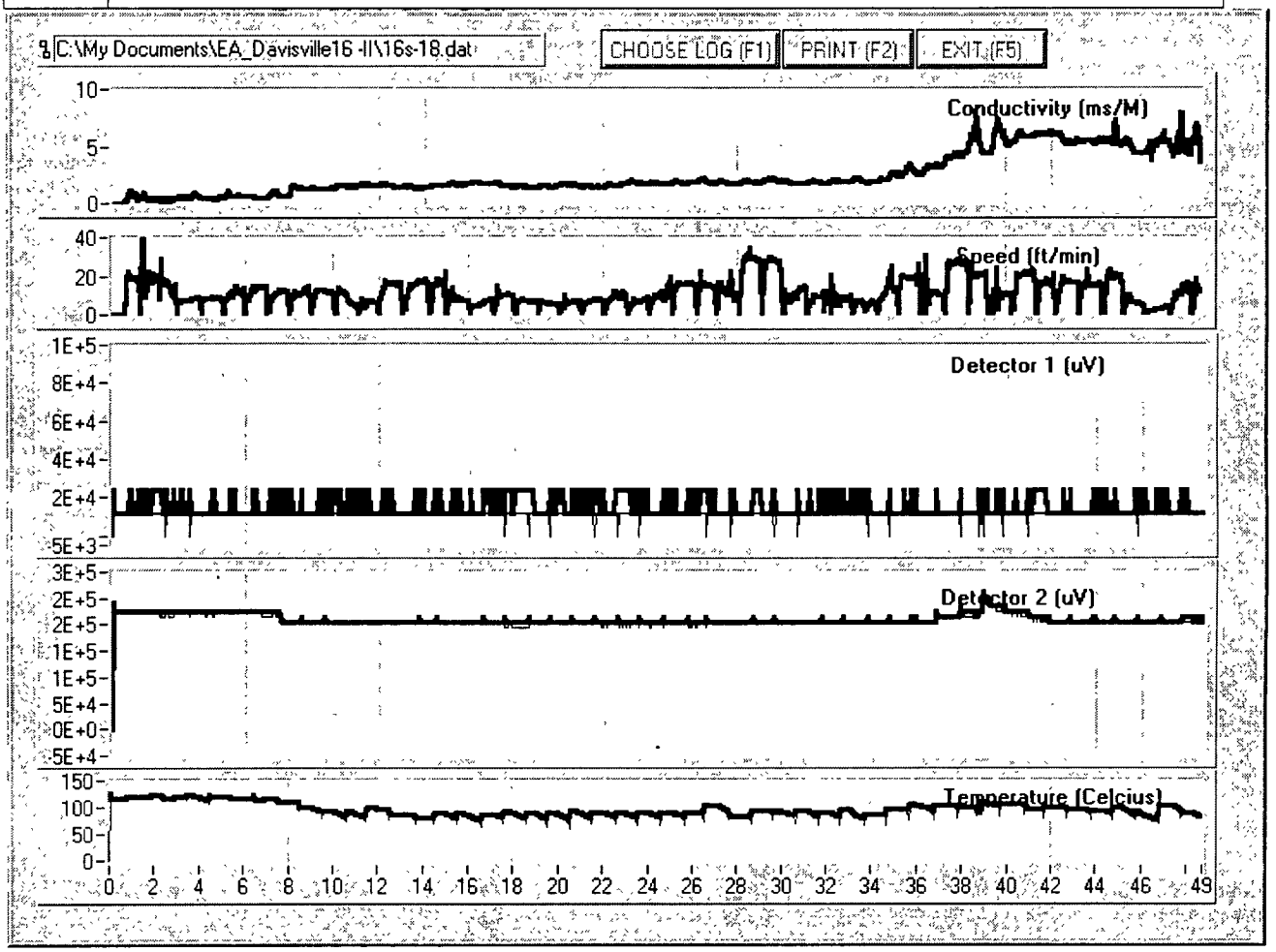
Trip Time	Det. 1 Response	Det. 2 Response	Temperature of Probe
32	Insignificant	1E+7	5

FIELD DATA SUMMARY

Probe 598			PSI Setting		10			Mass Flow		000		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
28	16S-17	0900	PID	1	10	0	12K	ECD	3	8	100	330
TD	Comments											
	ADJUSTED BASELINE AT 40' BGS TO 2E+5. (NORMAL). GRADUAL REFUSAL 5E+5 RESPONSE STARTING AT 43' BGS.											



Probe 598			PSI Setting		13			Mass Flow		980		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
29	16S-18	1130	PID	1	10	0	11K	ECD	3	8	50	250
TD	Comments											
49	GRADUAL REFUSAL. LOW RESPONSE ON ECD DETECTOR AT 40' & 49' BGS.											



23 October 2000

Sanity Check

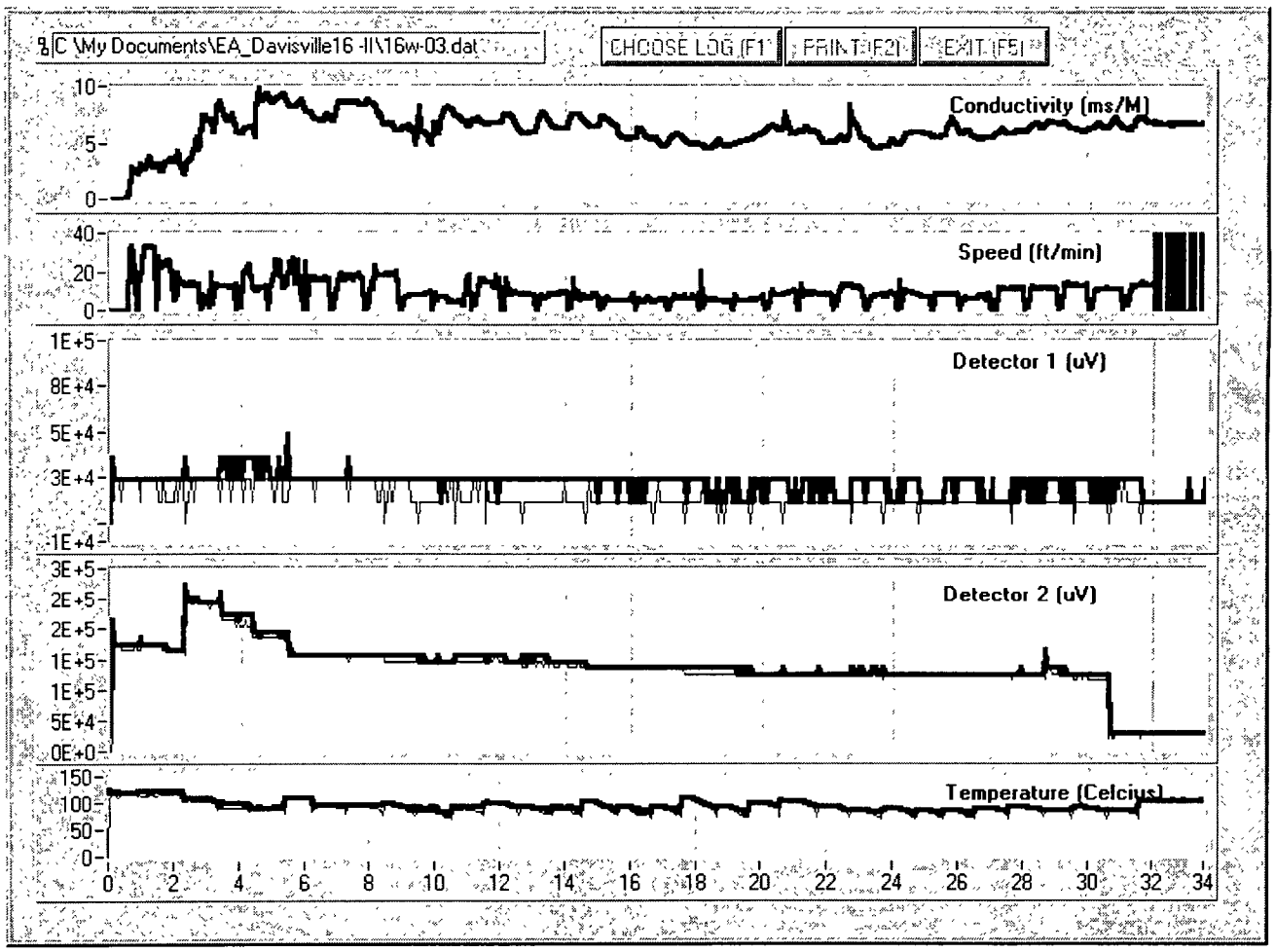
Probe 598:PASS		PSI Setting		10			Mass Flow		000		
Contaminant	Concentration	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
TCE	.10ML	PID	1	10	0	11k	ECD	3	8	0	140

Trip Time	Det. 1 Response	Det. 2 Response	Temperature of Probe
35	Insignificant	1E+7	121

FIELD DATA SUMMARY

Probe 598			PSI Setting		9			Mass Flow		000		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
30	16W-03	0830	PID	1	10	0	24K	ECD	3	8	100	330

TD	Comments
33	Small Response on ECD @ 3' BGS. Detector baseline below 2+E5 due to lack of contaminant response or clean column. Membrane Broke at 33' BGS. Changed Probe Checked Trunkline.



Sanity Check

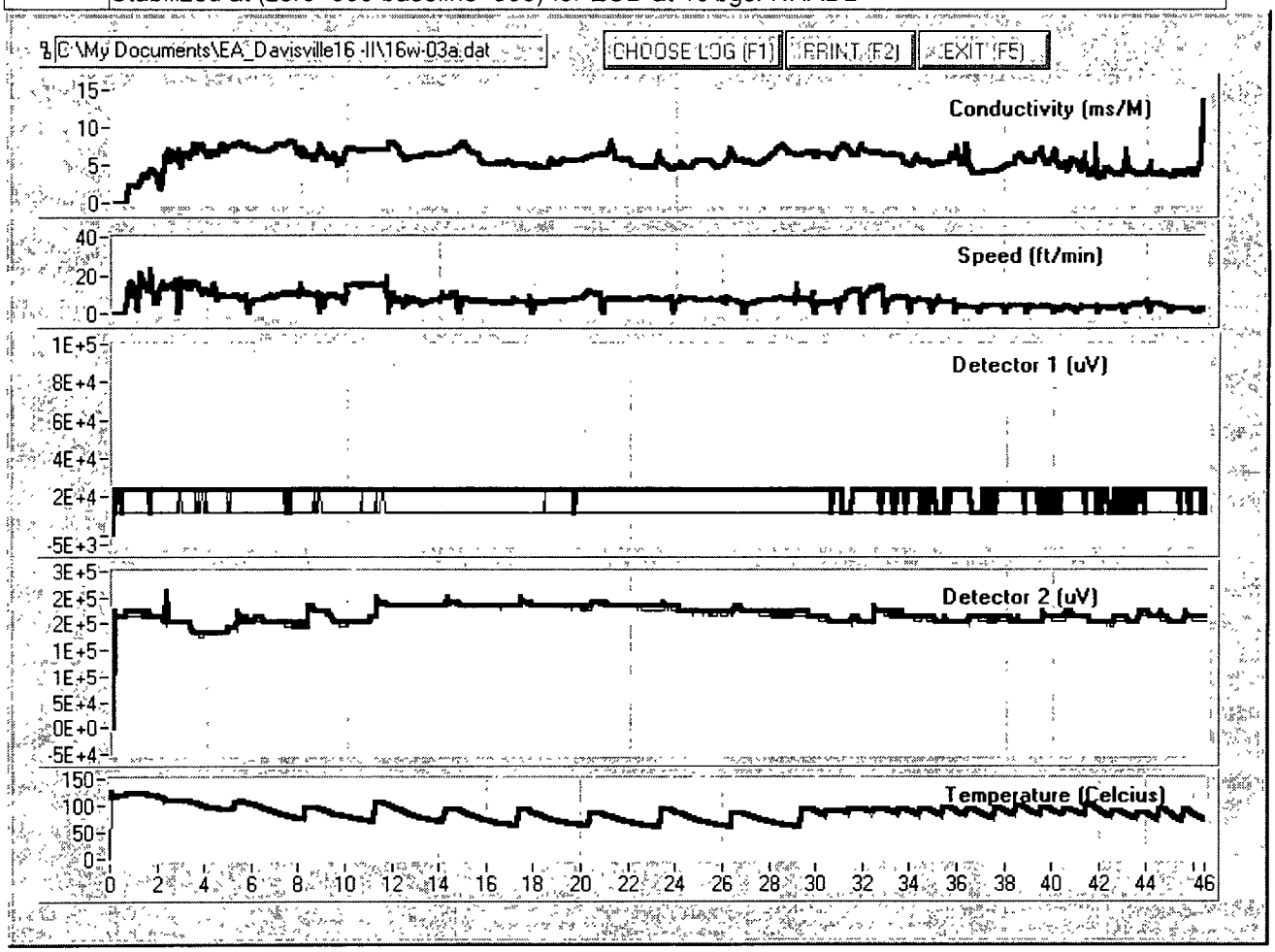
Probe 612 : PASS		PSI Setting		10			Mas Flow			0	
Contaminant	Concentration	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
TCE	.10ml	PID	1	10	0	11K	ECD	3	8	1300	1500

Trip Time	Det. 1 Response	Det. 2 Response	Temperature of Probe
29	INSIGNIFICANT	1E+7	121

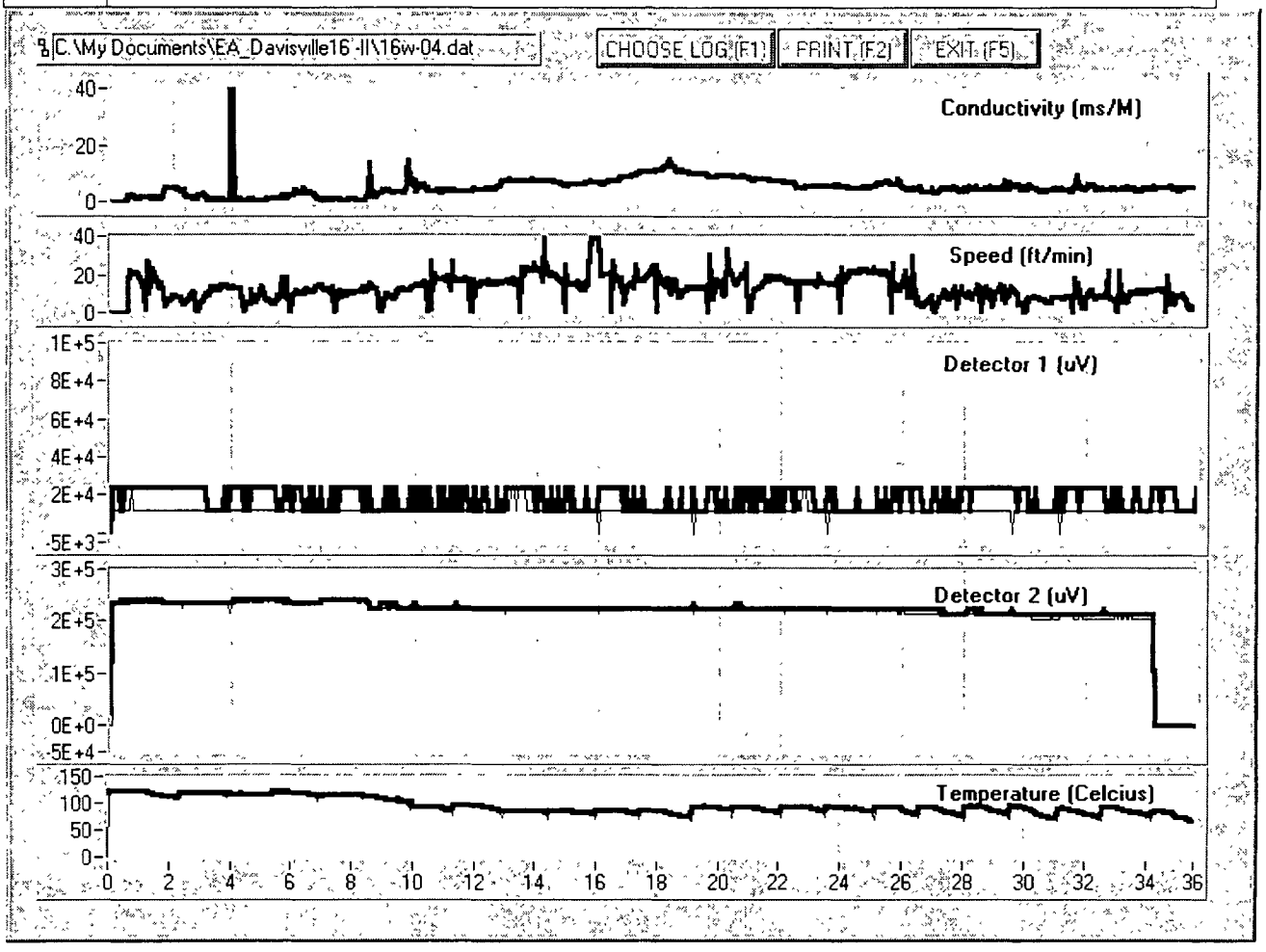
FIELD DATA SUMMARY

Probe 612			PSI Setting		10			Mass Flow			0	
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
31	16W-03A	1200	PID	1	10	0	11K	ECD	3	8	350	550

TD	Comments
47	Adjusted the ECD baseline in increments of 10 from 0-8' bgs to offset for dropping baseline. Stabilized at (zero=300 baseline=500) for ECD at 10'bgs. NRADL



Probe 612			PSI Setting		10			Mass Flow			0	
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
32	16W-04	1400	PID	1	10	0	13K	ECD	3	8	80	280
TD	Comments											
35	Membrane Leak @35' bgs Refusal. NRADL											



24 October 2000

Sanity Check

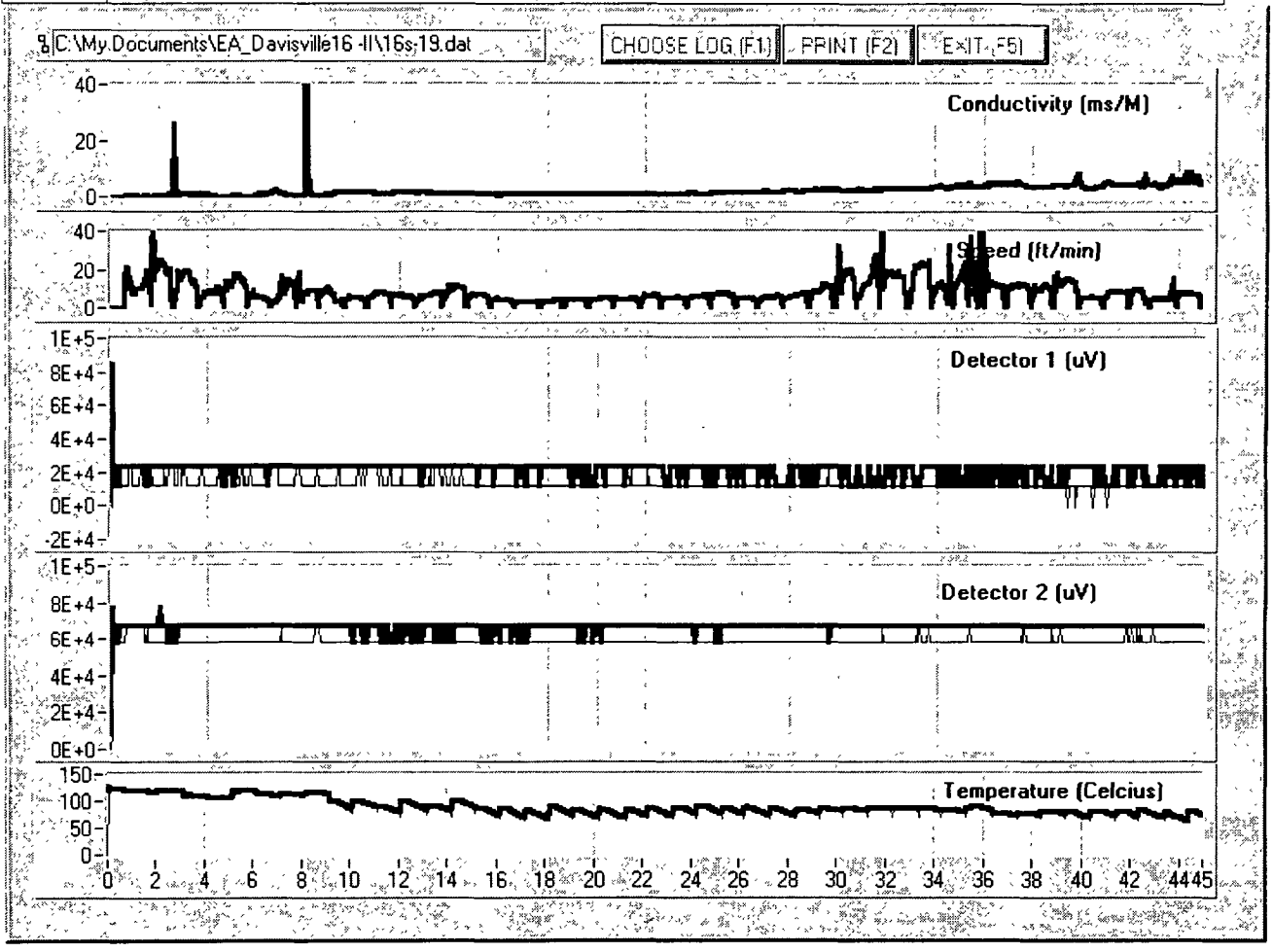
Probe 608: PASS		PSI Setting		12			Mass Flow		974		
Contaminant	Concentration	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
TCE	.10ML	PID	1	10	0	11K	ECD	3	8	0	70

Trip Time	Det. 1 Response	Det. 2 Response	Temperature of Probe
48	INSIGNIFICANT	6E+6	121

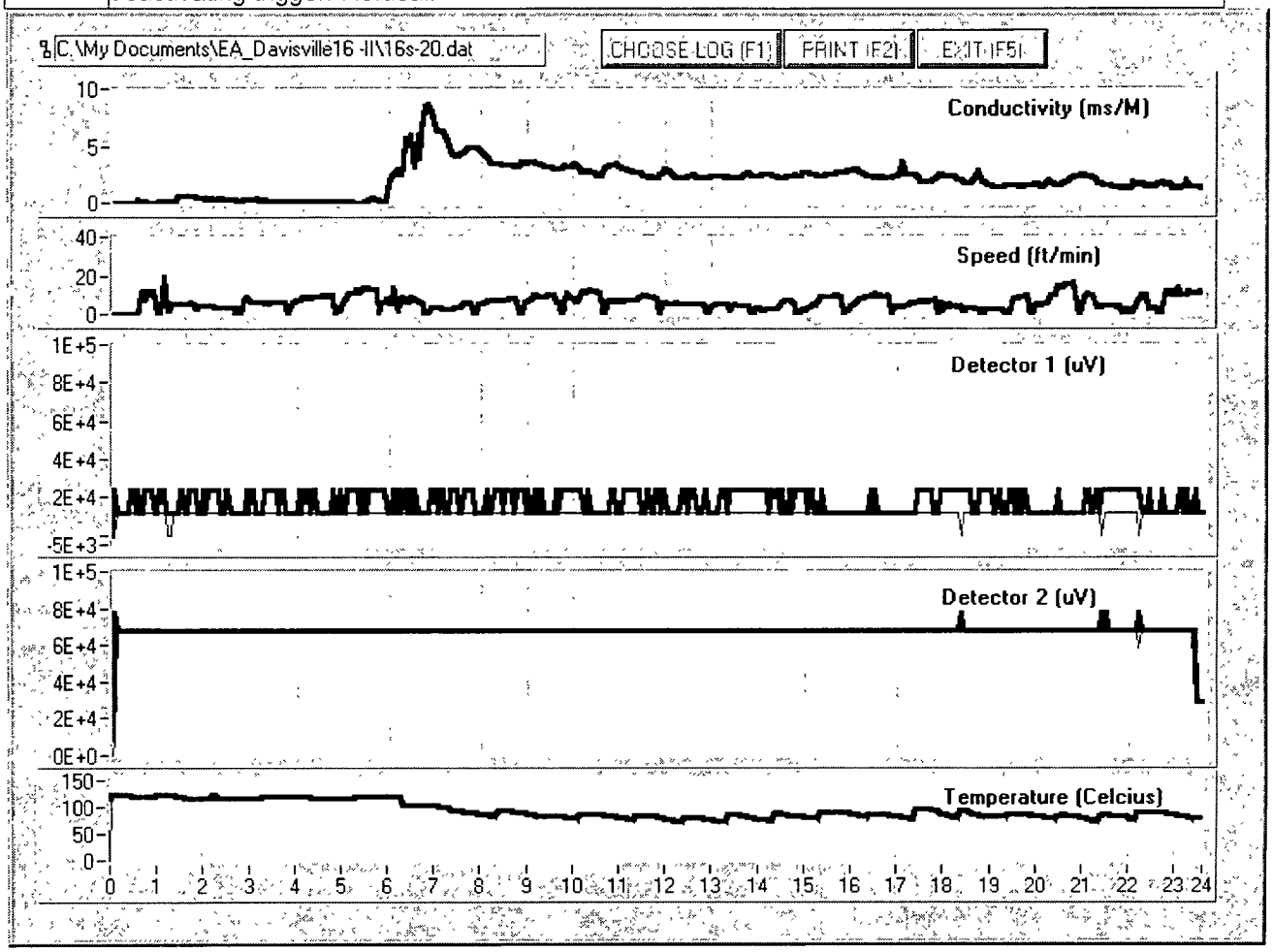
FIELD DATA SUMMARY

Probe 608			PSI Setting		12			Mass Flow		965		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
33	16S-19	0830	PID	1	10	0	20K	ECD	3	8	0	78

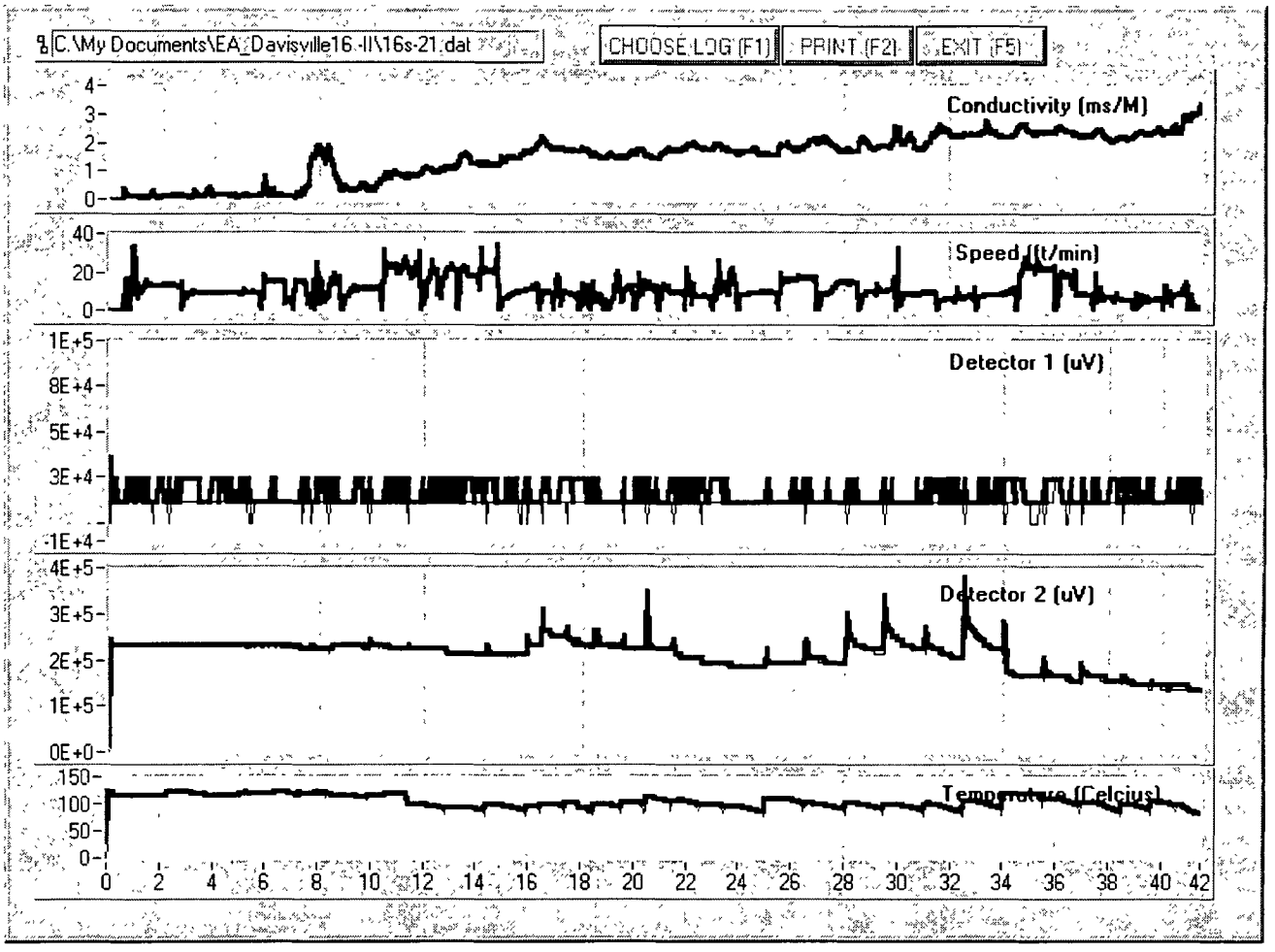
TD	Comments
45'	Very clean stable baseline. Changed mass flow to lower PSI prior to logging. No significant response on either detector. (NRADL) Refusal.



Probe 608			PSI Setting		13			Mass Flow		965		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
34	16S-20	1100	PID	1	10	0	11K	ECD	3	8	0	75
TD	Comments											
24	Drops in baseline on PID and rises on ECD between 18-22'bgs are due to possible water breakthrough. Drop in ECD baseline at 23' occurred due to shutting ECD valve before deactivating trigger. Refusal.											



Probe 612			PSI Setting		10			Mass Flow		0		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
35	16S-21	1500	PID	1	10	0	11K	ECD	3	8	80	280
TD	Comments											
32	Elevated ECD response begins at 17' bgs and rises to a max response at 33' bgs. The elevated response have occurred after trip time & after probe reached a temperature of 98 degrees Celcius.											



25 October 2000

Sanity Check

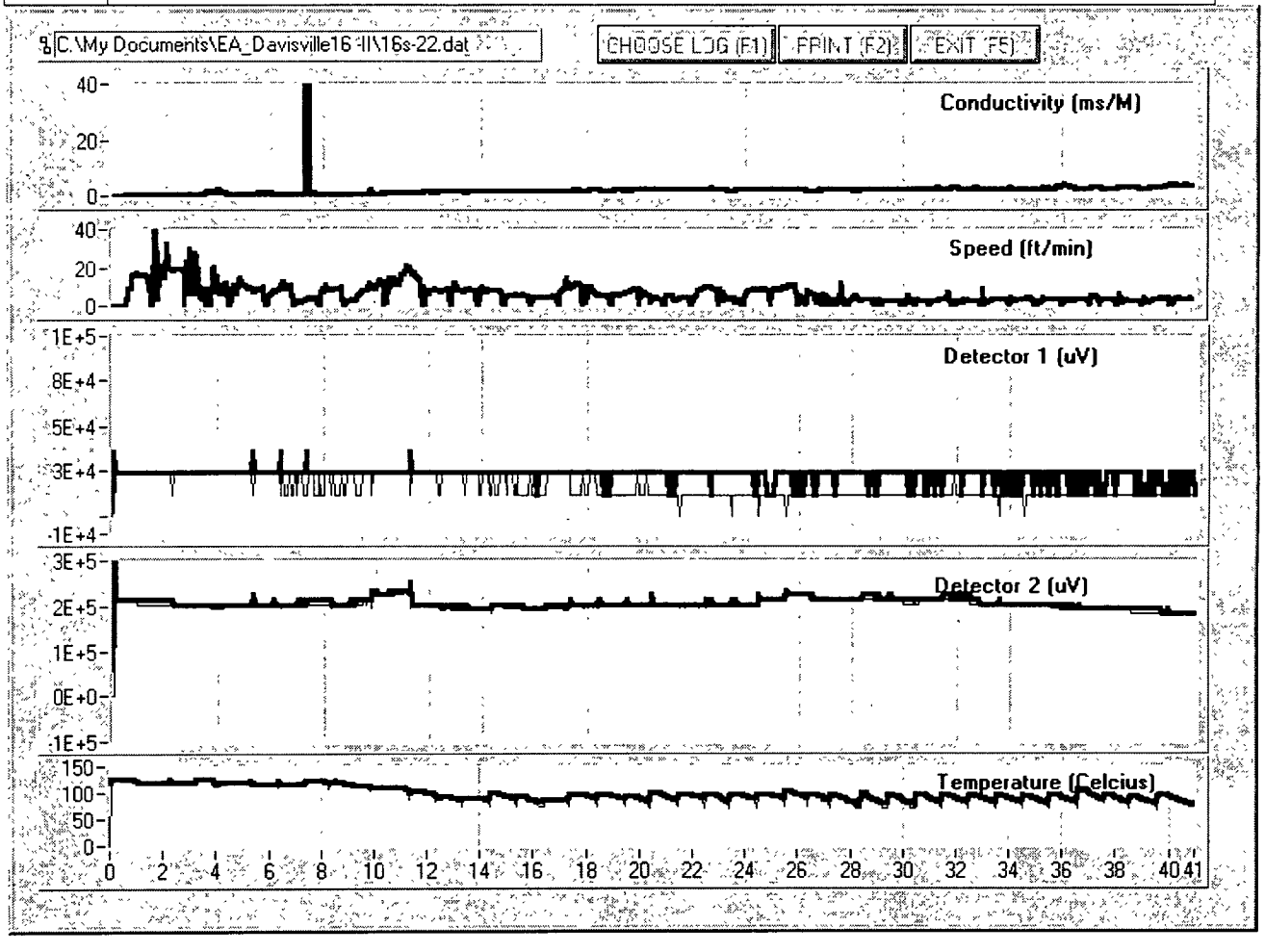
Probe E147(A6) : PASS		PSI Setting		9			Mass Flow		0		
Contaminant	Concentration	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
TCE	.10ML	PID	1	10	0	11K	ECD	3	8	0	181

Trip Time	Det. 1 Response	Det. 2 Response	Temperature of Probe
32	8E+4	1E+7	121

FIELD DATA SUMMARY

Probe E147(A6)			PSI Setting		9			Mass Flow		0		
Point #	Location Name	Start time	Det.1	Range	Atten	Zero	Bsl	Det.2	Range	Atten	Zero	Bsl
36	16S-22	1400	PID	1	10	0	11K	ECD	3	8	150	350

TD	Comments
41	Gradual refusal. Small response on ECD @ 10' bgs (3e+5). Estimated at or below detection limit.



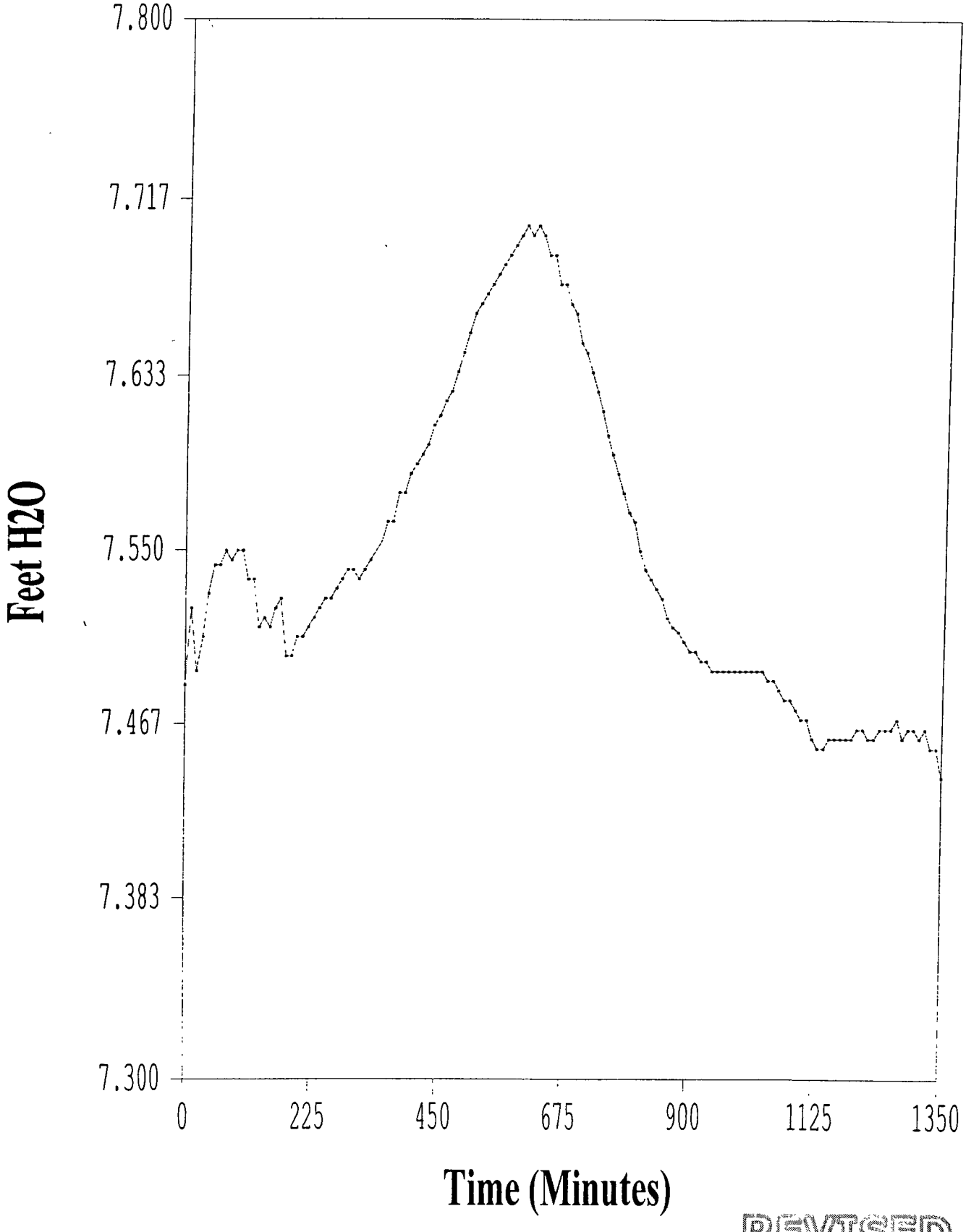
END OF REPORT

Attachments: A – Cross-sections (to be submitted separately)
B - ZEBRA MIP Standard Operating Procedures

Appendix K

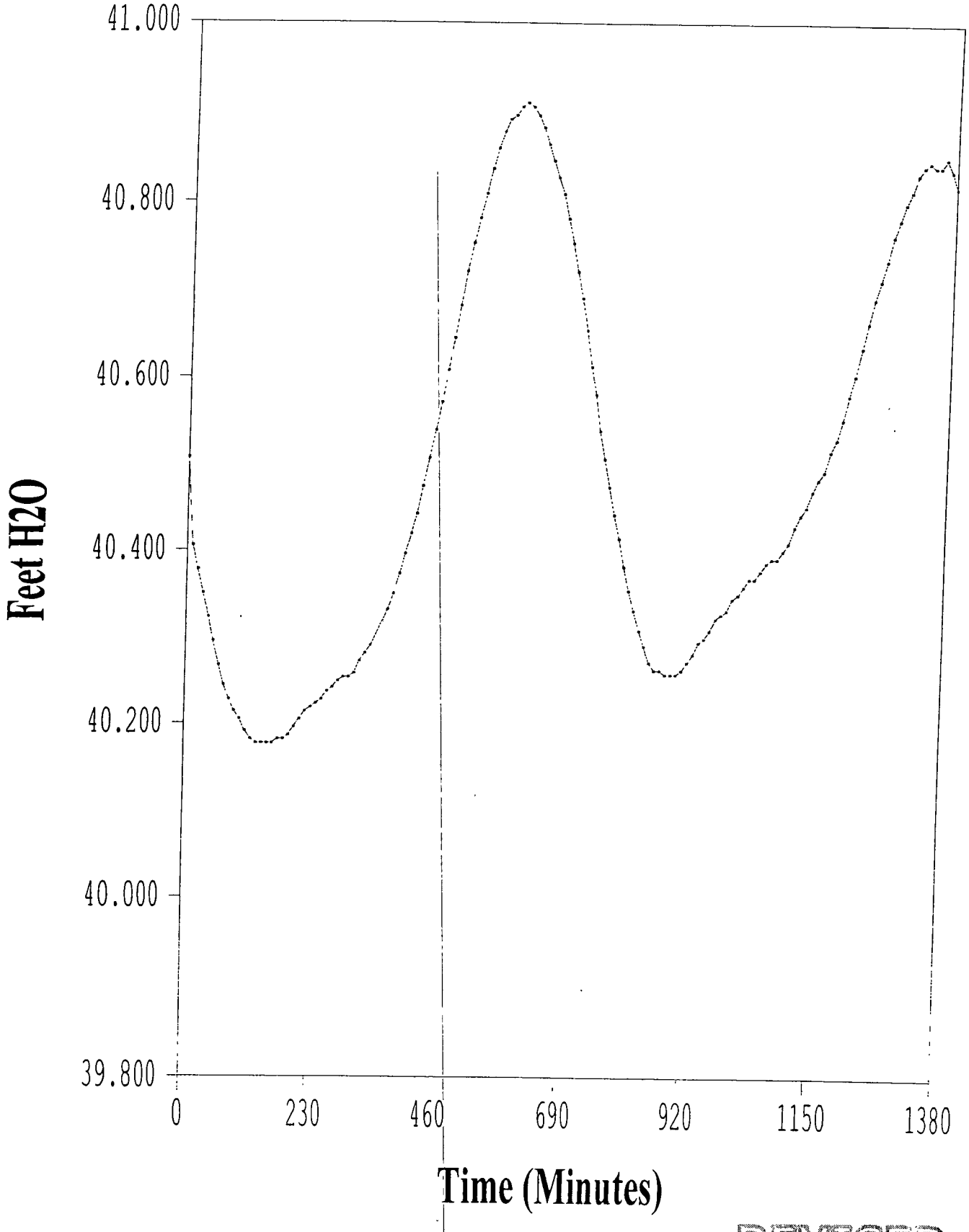
Stage II
Graphs of Tidal Impact on Ground-Water Levels in Selected Wells

MW16-03S_Tidal



REVISED

MW16-03D_Tidal



REVISED

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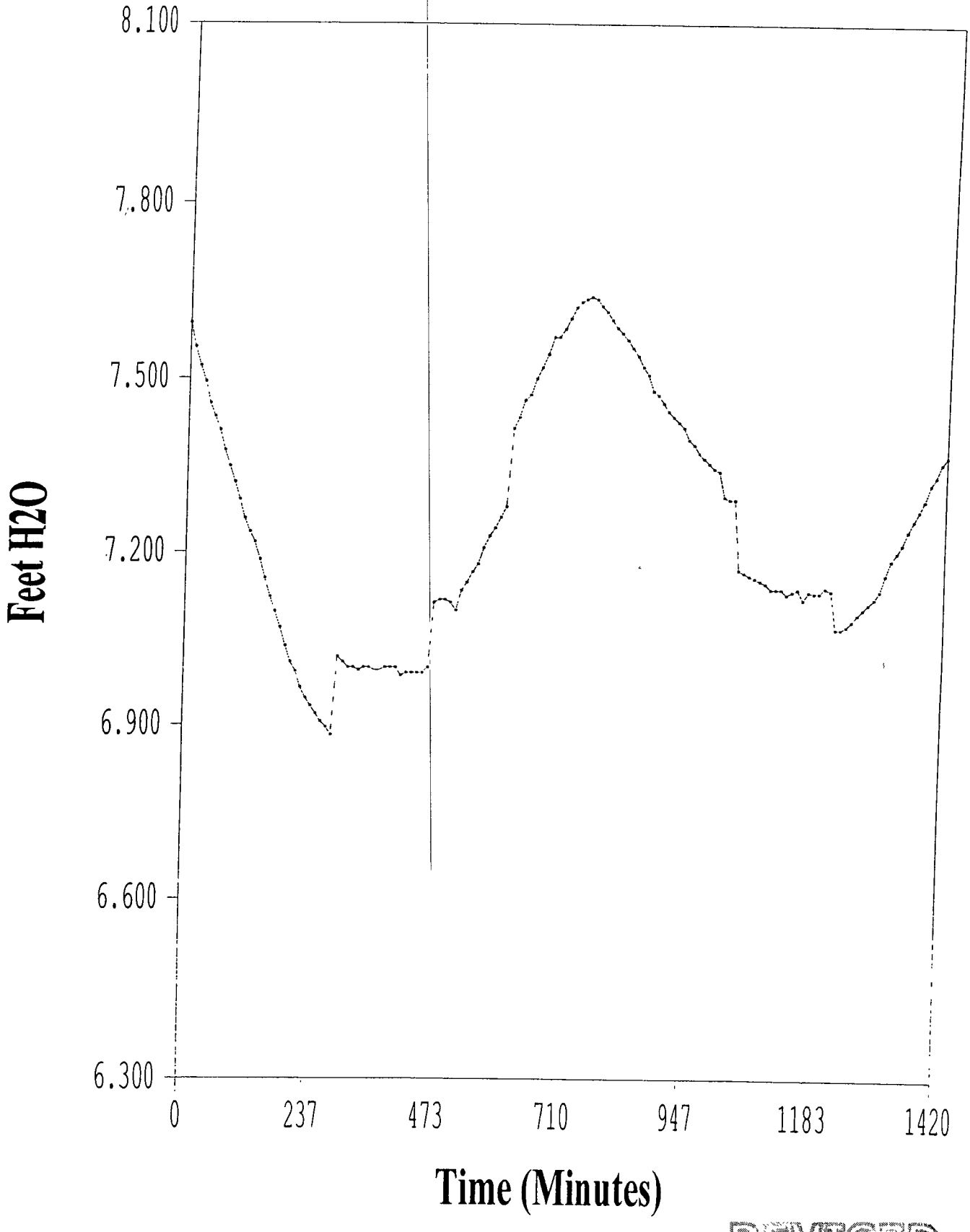

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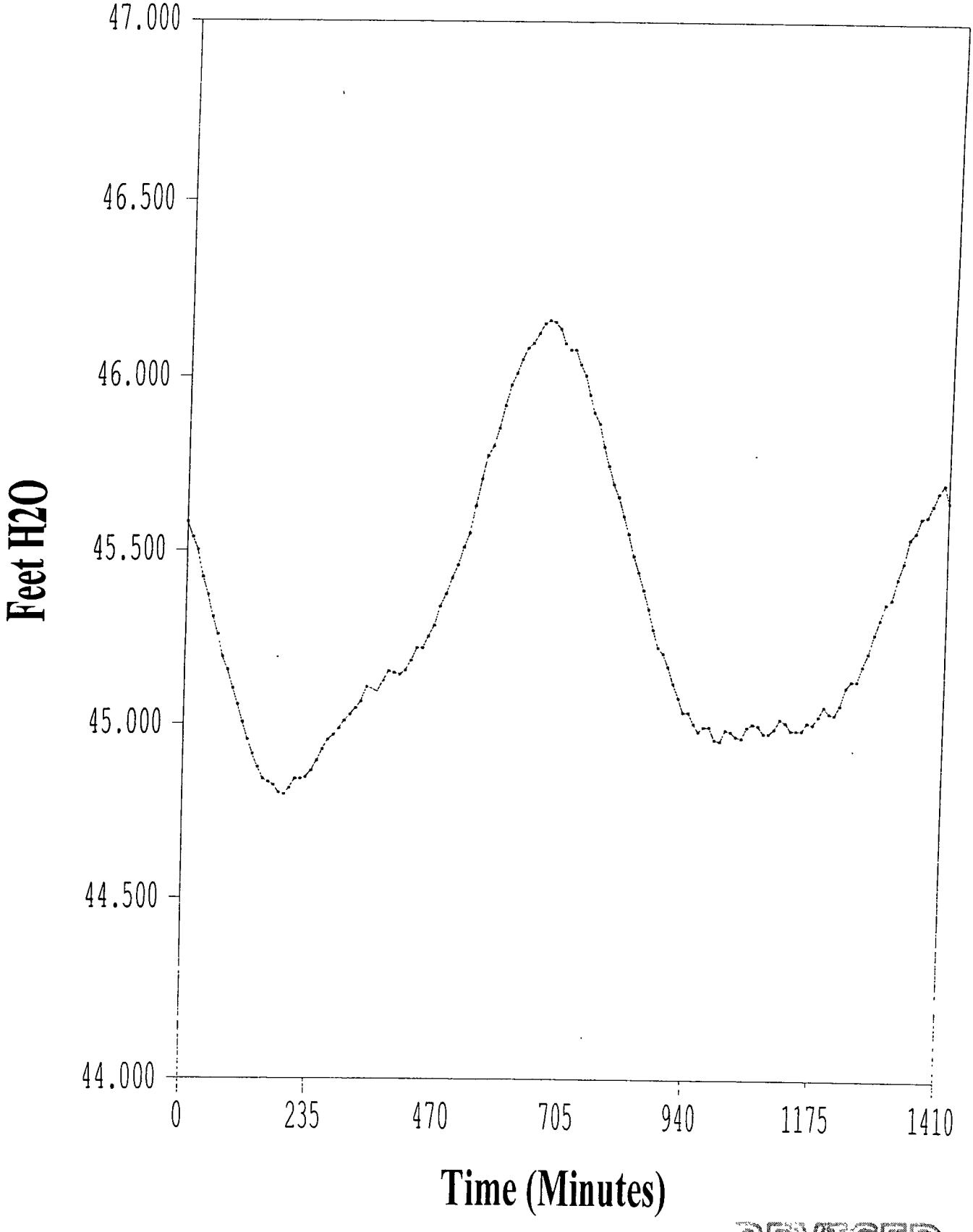

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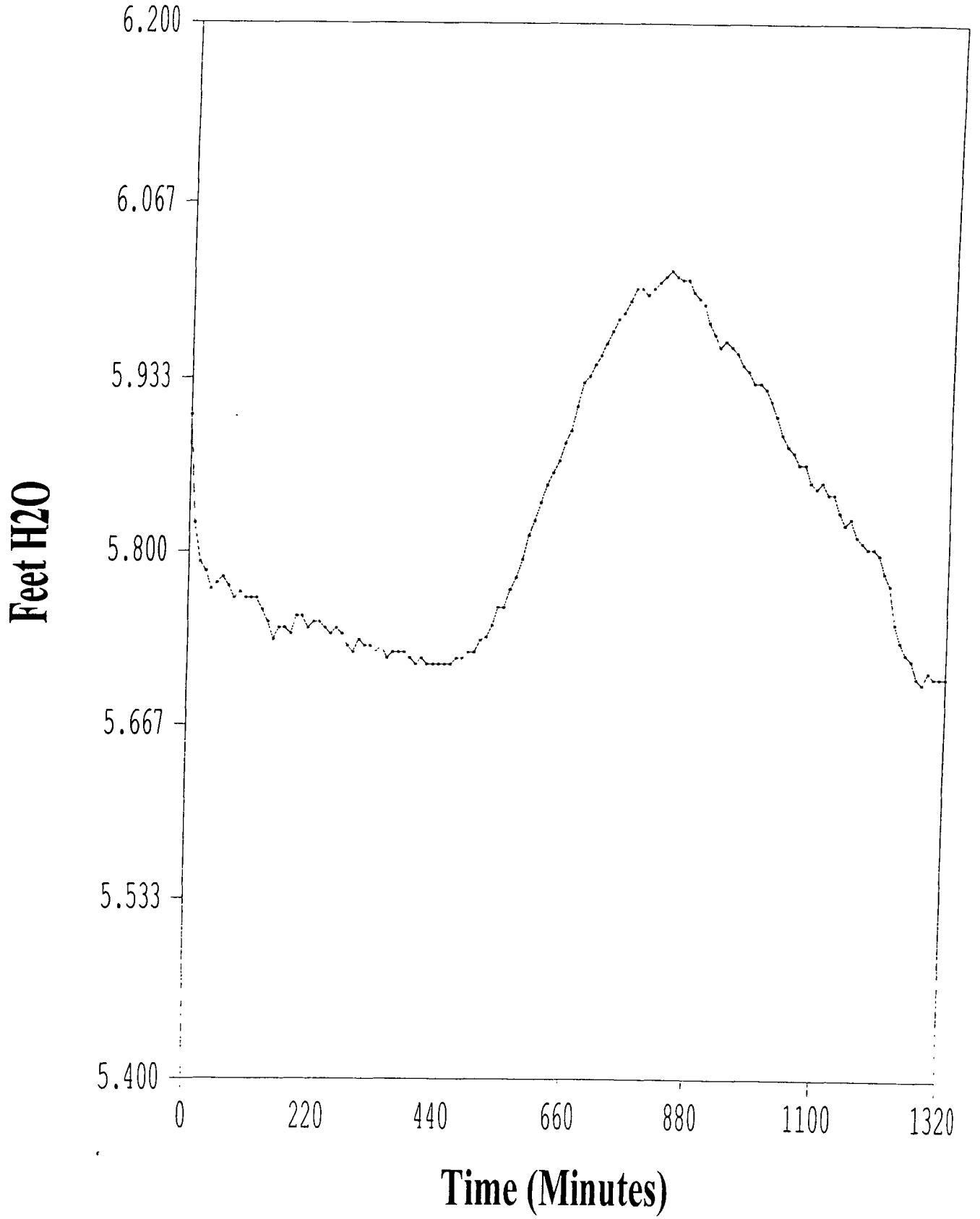

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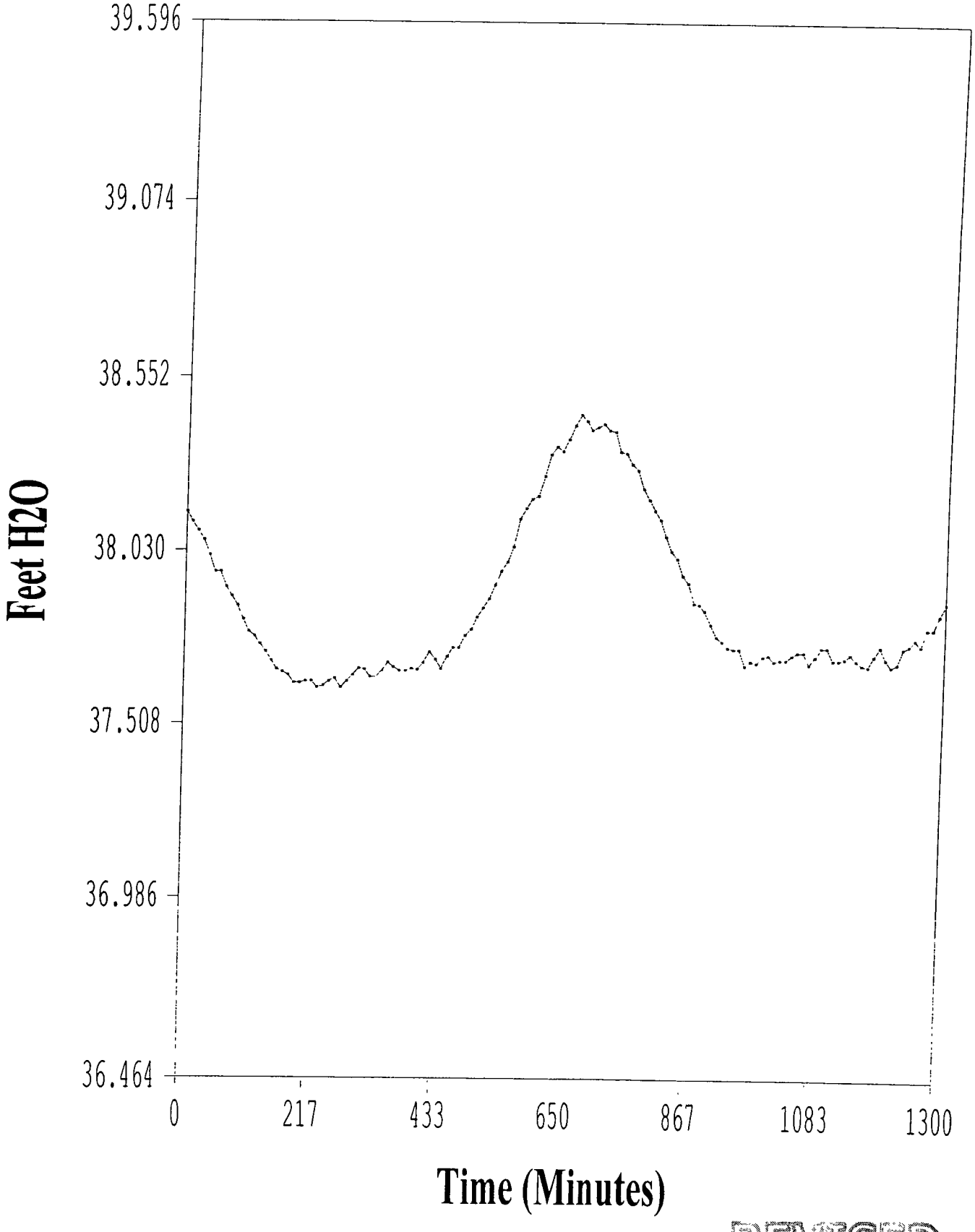

REVISED

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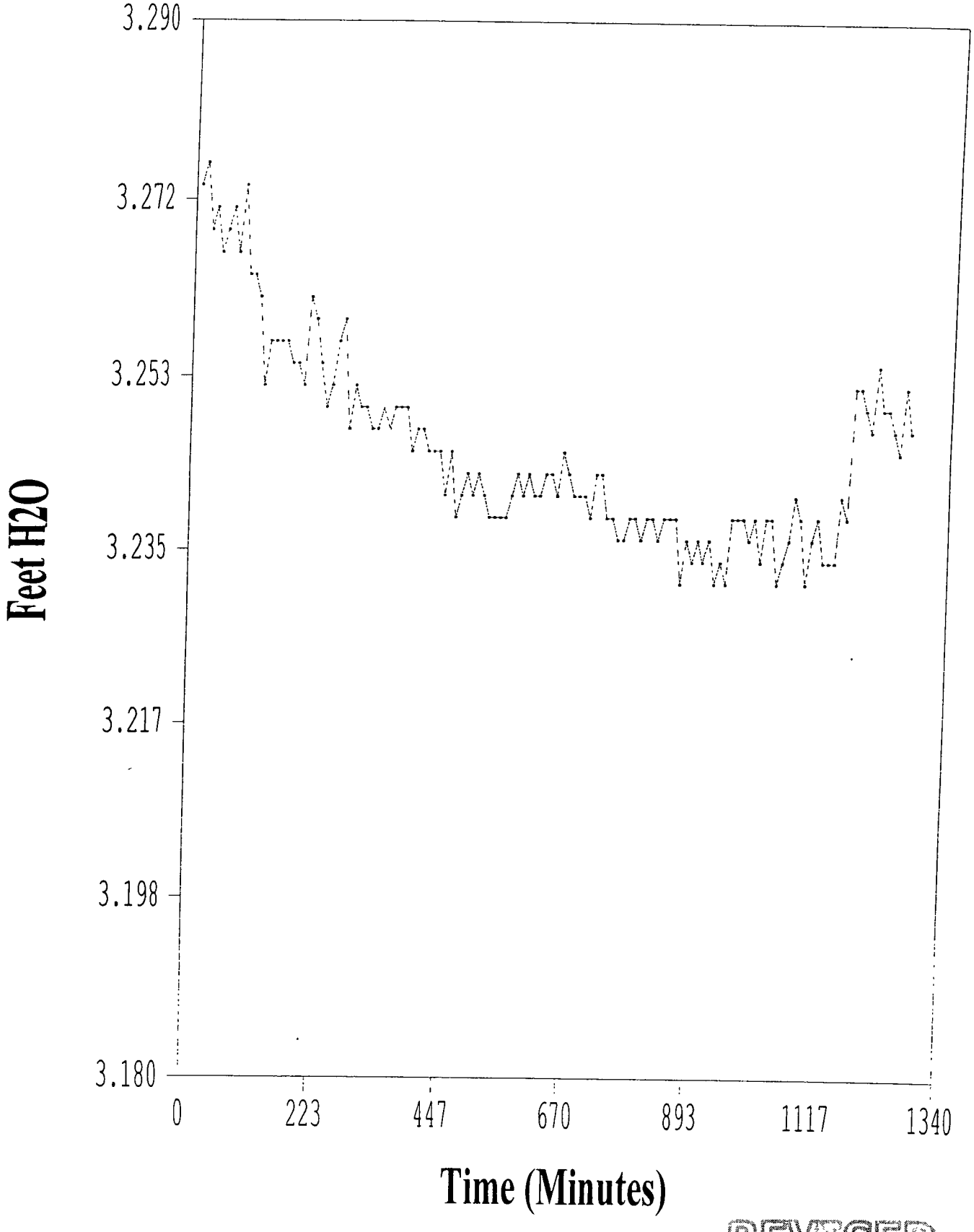

REVISED

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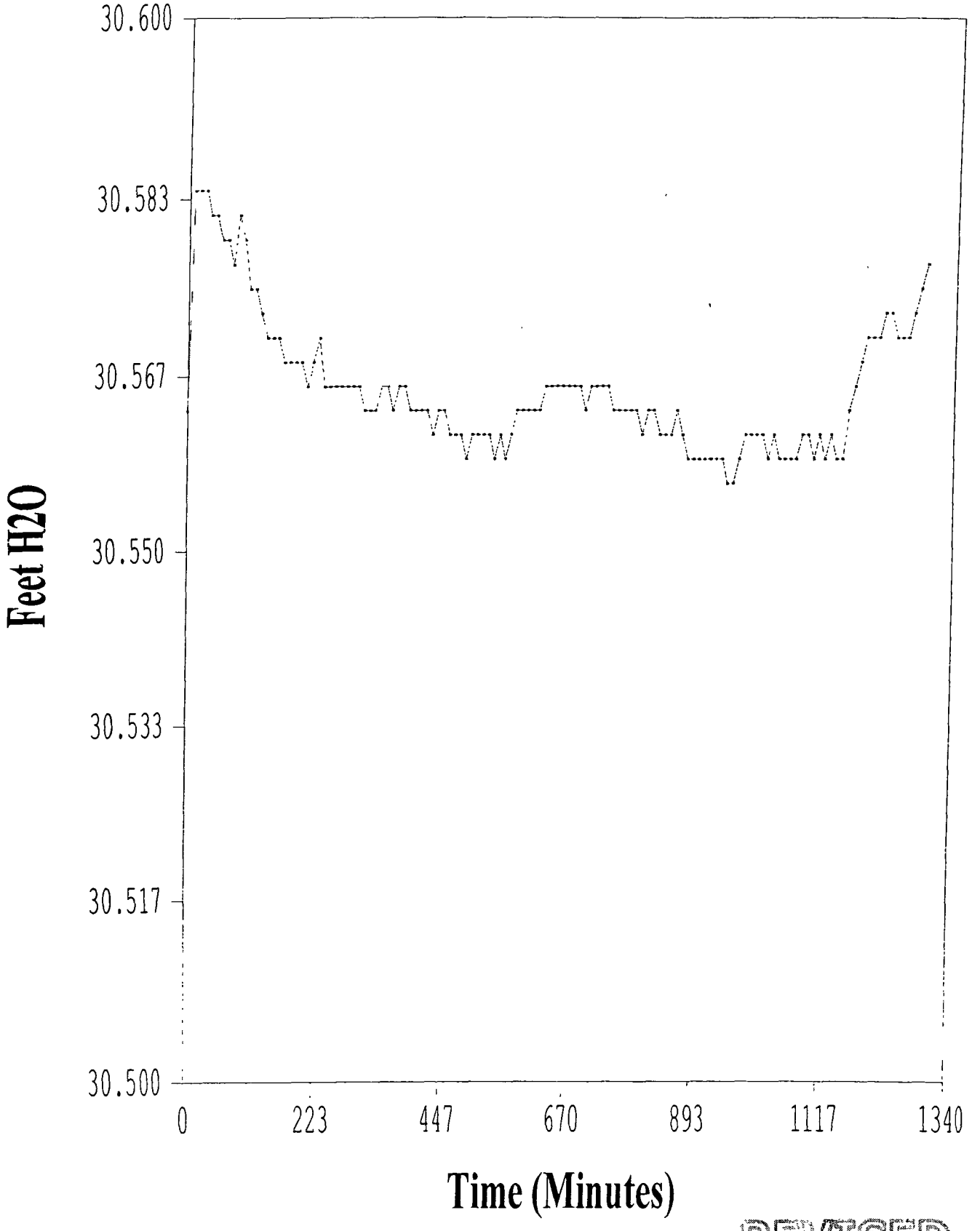
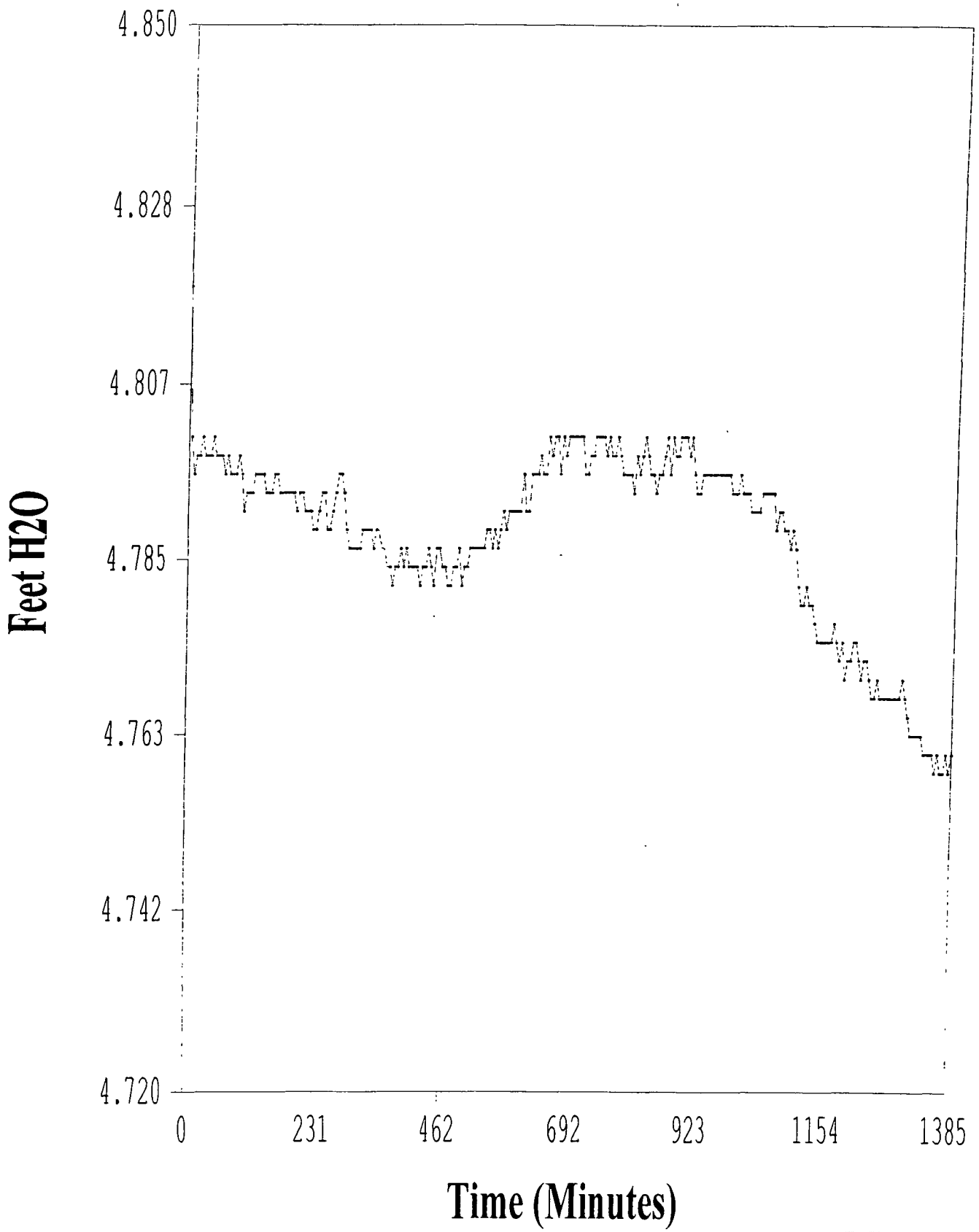


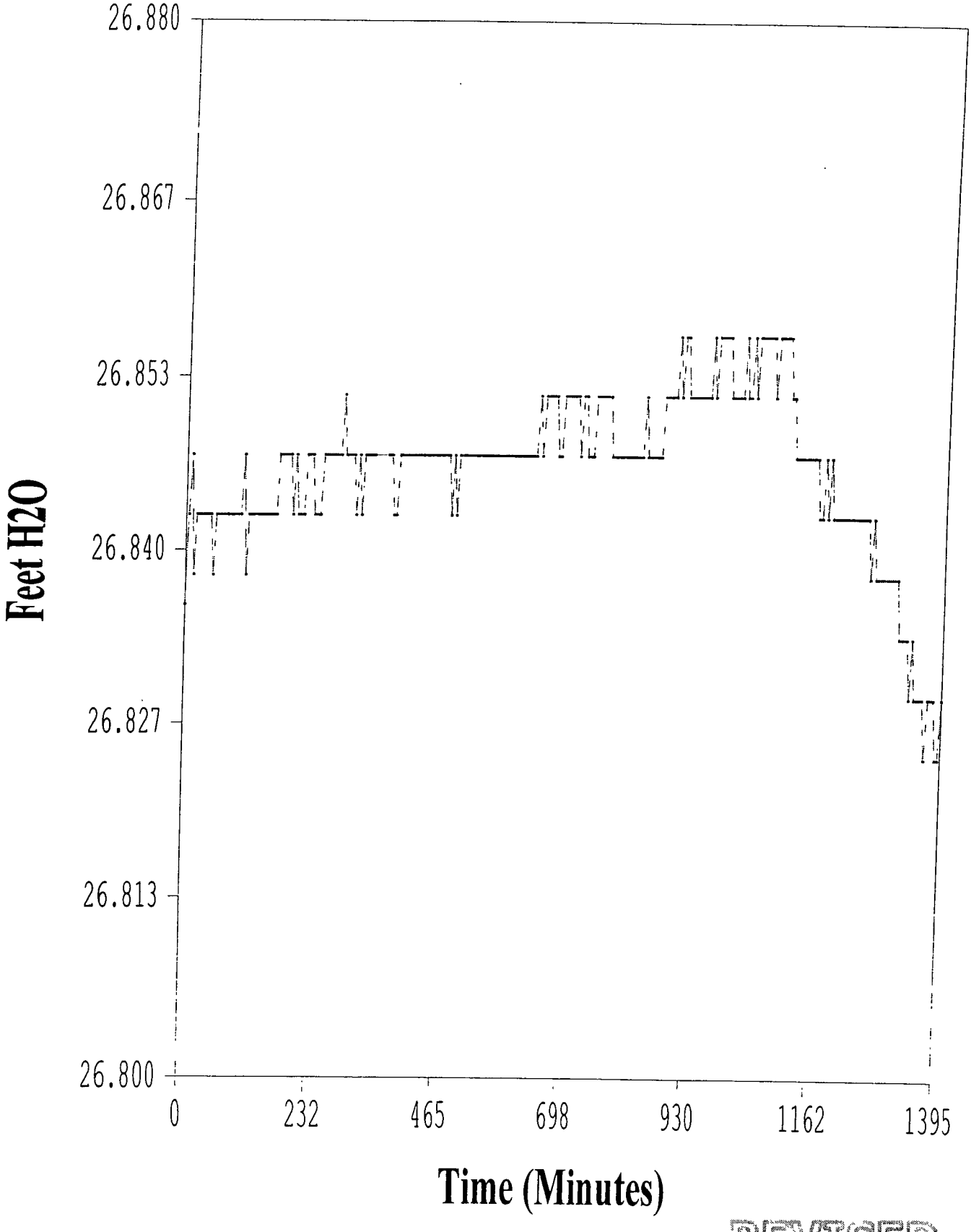
REVISED

MW16-07S_Tidal



REVISED

MW17-07D_Tidal



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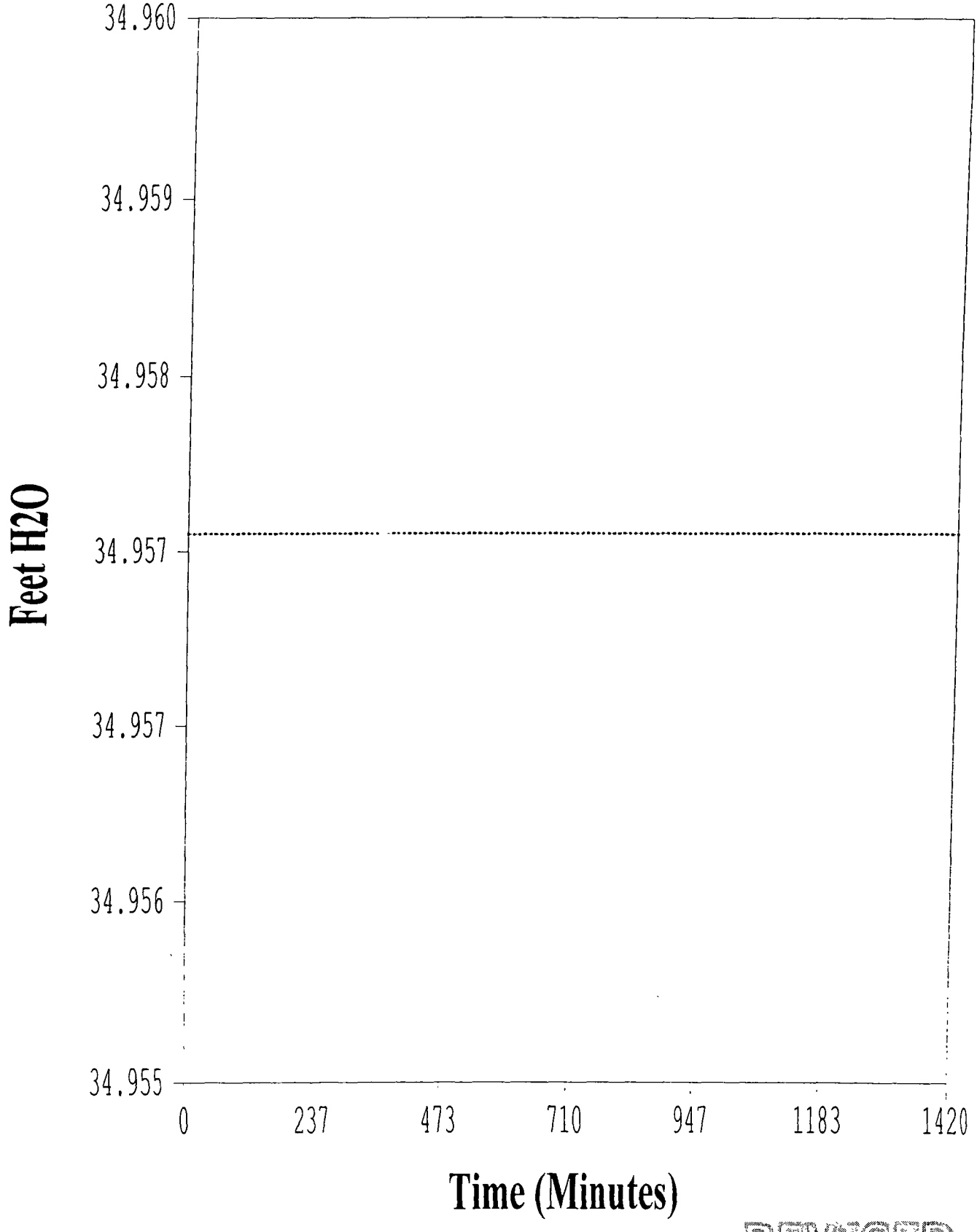
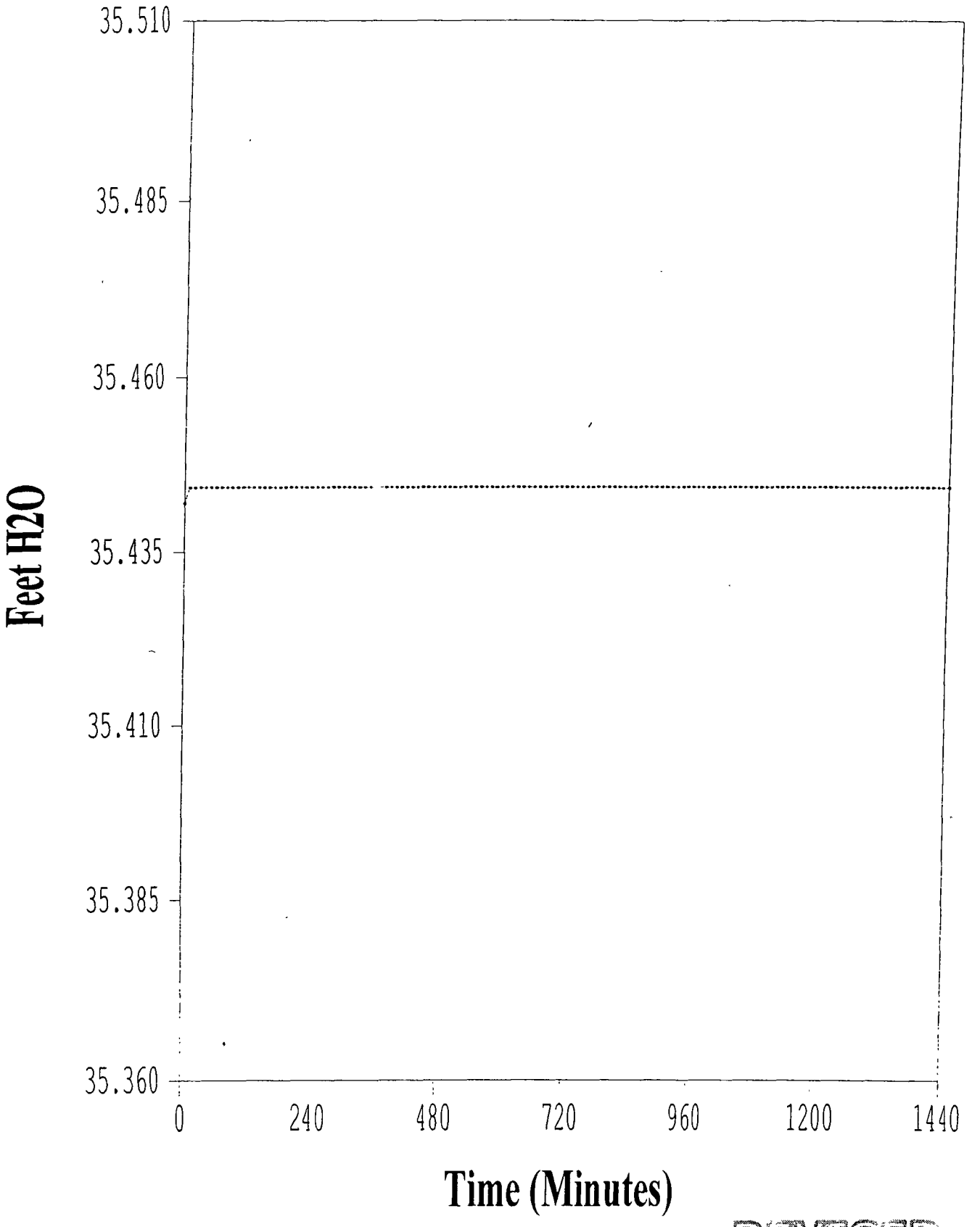


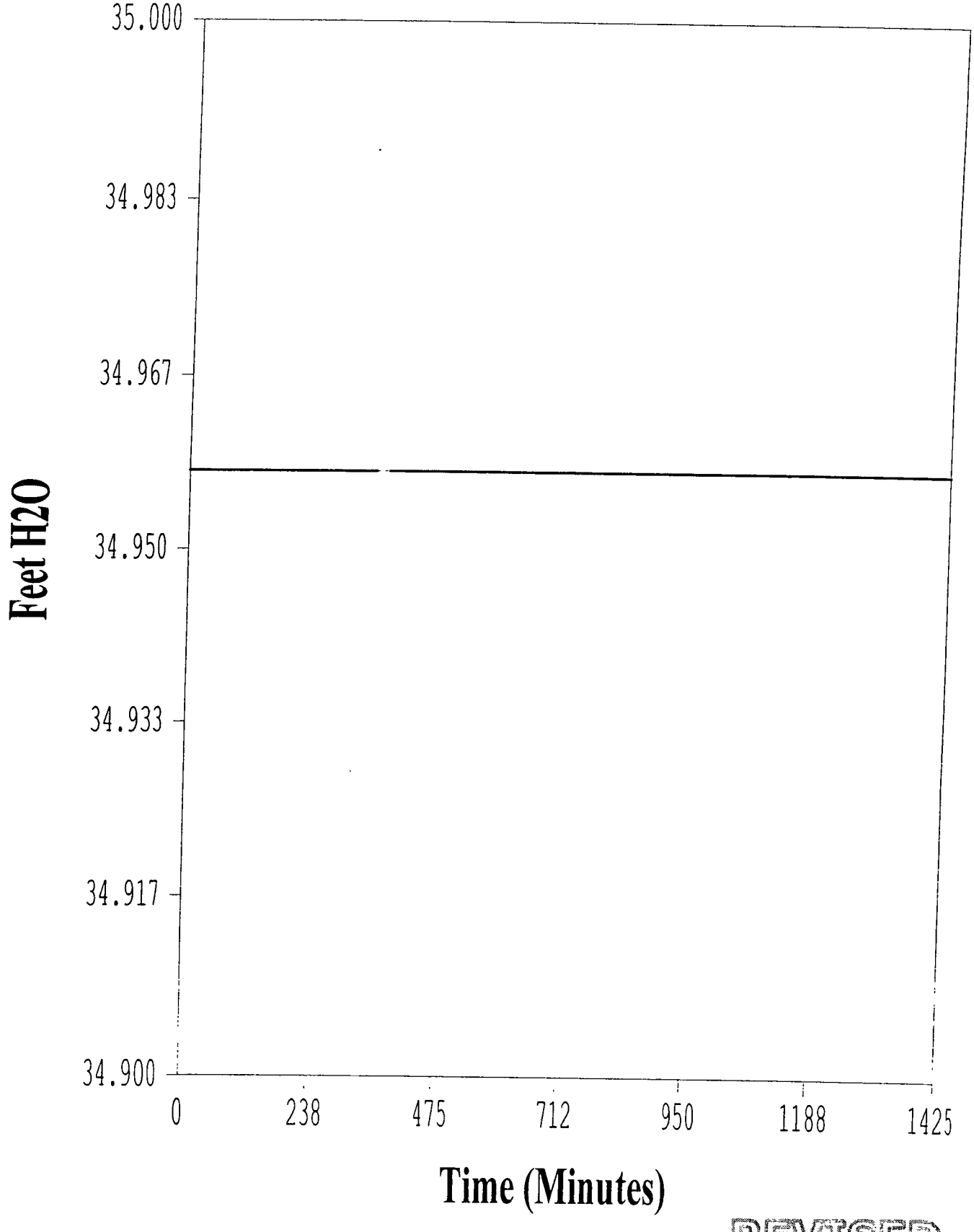
REVISED

MW16-27R_Tidal



REVISED

MW16-28D_Tidal



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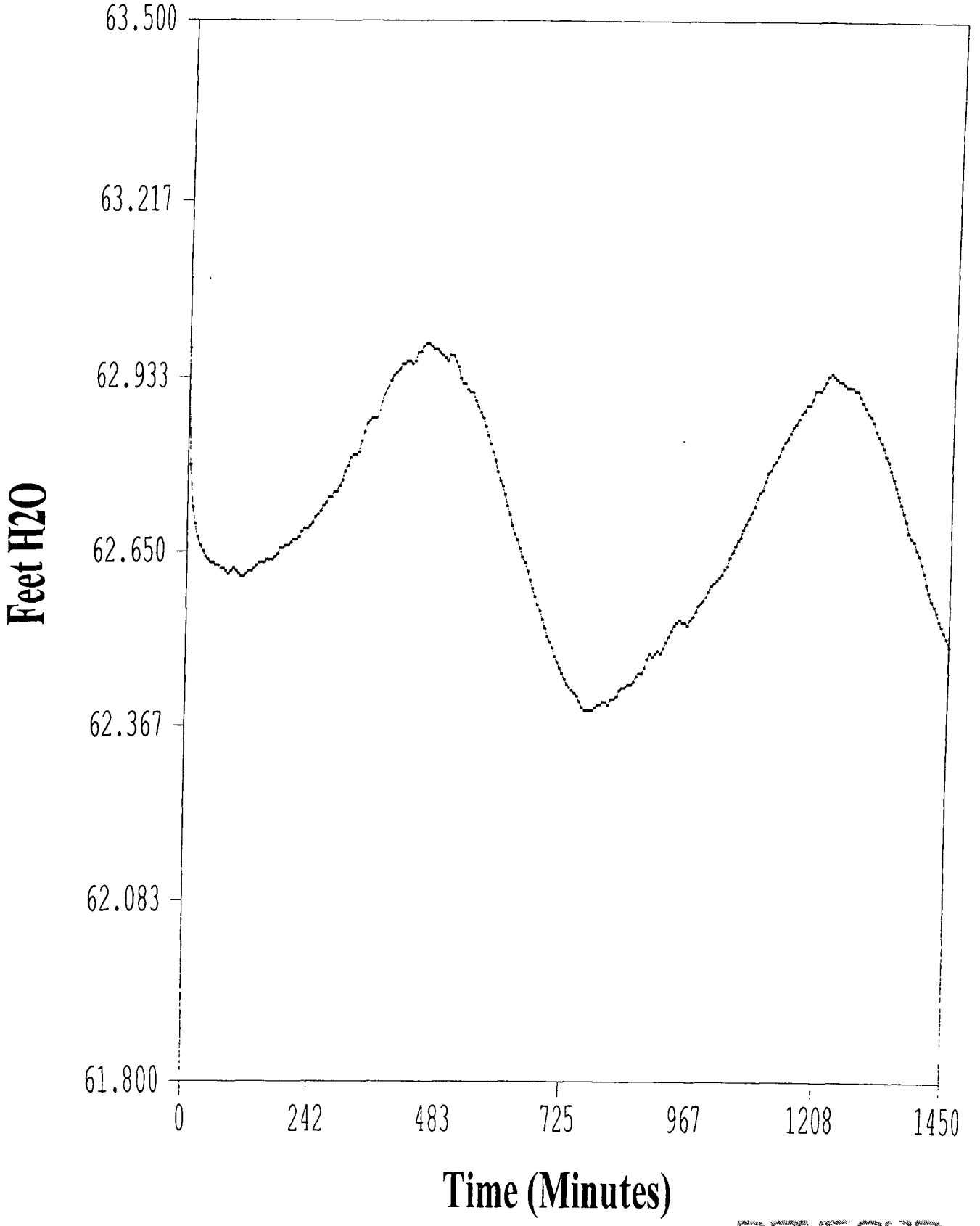
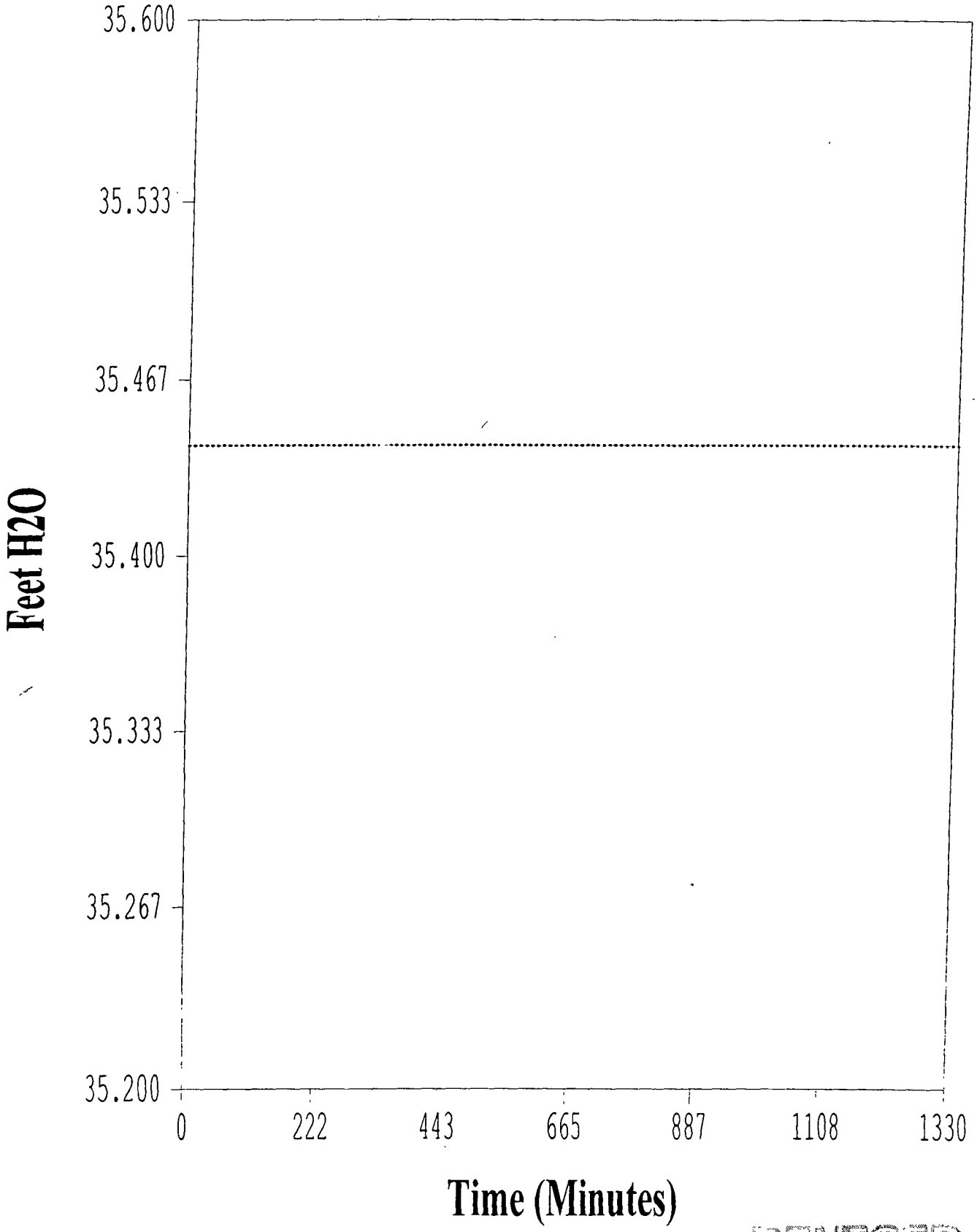
MW16-28R_Tidal



REVISED

MW16-29D_Tidal



REVISED

APPENDIX L
STAGE II
BOREHOLE GEOPHYSICAL LOGGING REPORT FOR ROCK WELLS
From Geophysical Applications, Inc., 2001

Borehole Geophysics Logging Report
NCBC Davisville - Site 16
Davisville, Rhode Island

Prepared for
EA Engineering Science & Technology, Inc.
April 2001

GEOPHYSICAL
APPLICATIONS
INCORPORATED

April 28, 2001

Mr. James Shultz
EA ENGINEERING SCIENCE & TECHNOLOGY, INC.
175 Middlesex Turnpike – 3rd floor
Bedford, MA 01730

Subject: Borehole Geophysics Logging Report
NCBC Davisville - Site 16
Davisville, Rhode Island

Dear Mr. Shultz:

Geophysical Applications has performed borehole geophysical logging at six Site 16 wells, to help EA characterize bedrock fractures and groundwater flow encountered by those borings.

The logging suite included conventional measurements (caliper, natural gamma, single-point resistance, fluid temperature, and fluid resistivity), augmented by heat-pulse flowmeter measurements and acoustic televiewer imaging. Optical televiewer logging was also performed at one well, to demonstrate that probe's capabilities and possible applicability for future work. Preliminary logging results were previously submitted to EA, to help guide sampling and well-screen placement.

METHODS OF INVESTIGATION

Survey Control

All borehole logs were referenced to depths below ground surface. The geophysical logging winches contain optical depth encoders, to maintain depth measurements accurate within approximately ± 0.2 feet throughout each borehole.

Borehole Geophysical Logging

A Mount Sopris model 4MXA digital logging winch was used with Mount Sopris heat-pulse flowmeter, polyprobe, and caliper sondes to obtain most geophysical log data. All of these geophysical logs (except heat-pulse flowmeter) were recorded at 0.1-foot depth increments, as determined by the logging winch's digital depth encoder.

Acoustic televiewer (ATV) data were recorded using an Advanced Logic Technologies (ALT) model FAC40 acoustic televiewer probe, with the Mount Sopris 4MXA logging winch. ATV data were recorded at 0.01-foot intervals throughout each borehole, at speeds of approximately 2.5 feet per minute.

Optical televiewer data were recorded at MW16-27R using an ALT model OBI40 optical televiewer probe with the Mount Sopris winch. OBI data were recorded at 0.007-foot depth intervals, at logging speeds of approximately 1.2 feet per minute.

Flowmeter data were recorded at specific depth ranges in each borehole, above and below possible bedrock fractures indicated by the caliper and fluid temperature/resistivity logs.

125 Washington Street • Suite Two • Foxboro • MA • 02035
508-543-1388 • FAX 508-543-1019

Flow data were recorded in ambient conditions on the downward run, to detect natural groundwater flow between fracture zones encountered by each boring. Flowmeter data were subsequently repeated under low-flow (approximately 0.3 to 0.5 gallons per minute, or gpm) pumping conditions, to help determine depths where groundwater was entering each borehole.

Fluid temperature and fluid resistivity logs were recorded during the first logging run at a relatively slow downward logging speed (approximately three feet per minute), to help identify subtle variations. A sub-assembly on the caliper probe's bottom obtained these fluid measurements. Caliper logging was subsequently performed while pulling that probe upwards through the borehole at approximately 10 feet per minute.

A "polyprobe" provided single-point resistance (SPR) and natural gamma logs during a single pass through each borehole, at approximately ten feet per minute.

All geophysical logs were recorded on a laptop computer's hard drive, and transferred to floppy diskette or Zip disk as a backup precaution.

Post-survey plot scales were adjusted to display as much detail as possible. All conventional and flowmeter logs from the same borehole were merged onto one log plot, to aid data correlation. Acoustic televiewer logs from all boreholes, and optical televiewer logs from selected boreholes, are presented on separate pages for clarity.

Equipment Decontamination Procedures

Decontamination consisted of an Alconox scrub and tap water rinse of logging cables and probes between logging runs.

SURVEY LIMITATIONS

Measured geophysical-log depths are estimated to be accurate within ± 0.2 feet, allowing for some slippage of the winches' depth-measurement wheels.

The caliper-probe's arms can measure borehole diameters up to approximately 16 inches. Caliper logs can most-confidently detect fractures that cross a borehole at moderate angles, e.g. less than approximately 70 degrees from horizontal. Caliper logs may not detect near-vertical fractures.

Acoustic and optical televiewer logs cannot identify fracture orientations within approximately one foot of a well's steel-casing bottom, due to interference between the casing and the televiewer probes' three-axis magnetometer.

The heat-pulse flowmeter is designed for low flow-rate environments, typically less than 1.0 gpm. Higher flow rates may produce erroneous flow-rate measurements.

Water-bearing fracture zones were inferred by correlating numerous geophysical logs. These interpretations are a subjective judgment based upon available data.

RESULTS

Logging data and generalized descriptions of log interpretations are described below. All geophysical logs described in this report are presented in Appendix A. Appendix B presents fracture orientations measured from acoustic televiewer logs. These ATV-interpretation tables are screen prints of Excel spreadsheets, containing measured fracture depths ("depth" column), down-dip compass directions for each inferred fracture ("azimuth" column; note that this is

perpendicular to the fracture strike direction), and dip angle ("tilt") column. The "category" column indicates whether the observed feature was judged "less-open" (category 100) or "open" (category 105). The "description" column in each printout was not used during this project.

The left-hand column of each conventional log plot presents single-point resistance (SPR) logs. Low SPR values may represent water-bearing fractures, or other electrically-conductive materials including clay. Minor SPR inflections within the casing often represent joints between casing segments.

The next column presents natural gamma and fluid conductivity (FCond) logs. High gamma counts often indicate increased clay content in overburden or sedimentary rocks, or increased mafic-mineral content in igneous or metamorphic rocks. The data-acquisition software calculated FCond logs from FRes data shown in the fourth column.

Caliper logs are presented in the next column. Inflections to the right indicate borehole enlargements, for example where the drill bit passed through a fracture zone.

Fluid temperature (FTemp) and fluid resistivity (FRes) logs are presented in the right-hand panel of each conventional-log plot. Localized inflections or changes in slope of FTemp or FRes logs typically represent water entering or exiting the borehole. Large inflections at the very bottom of a borehole may represent only accumulated soft sediments with temperature or electrical properties that contrast with the water column.

Heat-pulse flowmeter data are presented on the caliper panel (ambient flow measurements) and on the FTemp/FRes panel (flow measurements while pumping). Shaded boxes to the left of centerline on either panel represent downwards water flow, with the box length indicating the flow magnitude in gpm. Shaded boxes to the right of a panel's centerline represent upwards water flow. Filled circles represent depths where "zero" flow was observed (i.e., smaller than the probe's minimum detectable flow rate, approximately 0.02 gpm). Flowmeter test depths were selected using field plots of the caliper, fluid temperature, and fluid resistivity logs

Acoustic televiewer (ATV) logs were evaluated using WellCad's image-processing module, to measure fracture dip angles and down-dip azimuths. All ATV down-dip azimuths are referenced to magnetic north. Measured fracture orientations are indicated by tadpole plots, where each filled-circle indicates a fracture's dip angle from horizontal (plotted on a graph that ranges between 0 and 90 degrees from left to right). Each tadpole tail points in the down-dip azimuth, assuming that north is straight up on the printed page. Note that the down-dip azimuth indicated by the tadpole tails is perpendicular to the fracture's strike direction.

Fractures represented on both ATV travel-time and amplitude plots are likely to be "open" features (red lines in the "fracs" columns, and red tadpoles). Other fractures that are represented only on the ATV amplitude plots are likely to have smaller apertures, and are therefore less open (black lines in the "fracs" columns, and black tadpoles).

ATV interpretations were also summarized using rose diagrams, to indicate the predominant down-dip fracture azimuth(s) observed in each well. The rose diagrams are presented with magnetic north oriented straight up on the printed page. These rose plots show fracture down-dip azimuths between each 15-degree range collated into a single bin (e.g., fractures with down-dip azimuths between 15 and 30 degrees from north would be counted in a single bin). Note that fractures with similar down-dip azimuths might be collated into two separate bins. For example,

fractures dipping down towards azimuths 89 degrees and 91 degrees from north would be displayed in different bins (e.g. 75 to 90 degrees, and 90 to 105 degrees).

Annotations on the conventional log plots describe geophysical interpretations from each borehole. Selected observations that may be of particular interest to EA are described below.

MW16-02R

Most open fractures observed at this borehole dip down towards the northwest, generally between 40 and 80 degrees from horizontal.

Pumping flowmeter tests and fluid temperature/resistivity data indicate that water probably enters the borehole near 78 and 81 feet deep, and between 74 feet and the casing bottom (70 feet). Additional transmissive zones (not confirmed by the flowmeter tests) may be present near 89.5 and 92 feet deep, based on fluid resistivity variations.

MW16-10R

Only five fractures were observed crossing this borehole's uncased depth range (two open features, and three less-open features). Three of these five features dip down towards the west or west-southwest, at dip angles between 45 and 70 degrees from horizontal.

Flowmeter, fluid temperature, and fluid resistivity data all indicate that little water is entering this well. Limited water inflow occurred between 72 and 76.4 feet deep, possibly a very subtle change in fluid resistivity slope near 74 feet deep. Although a distinct increase in borehole diameter is obvious immediately below the casing bottom, the flowmeter probe did not detect water inflow from that enlargement.

MW16-15R

Only four fractures were observed crossing this borehole's uncased portion. Four of these features (three open, one less-open) dip down between 7 and 28 degrees from horizontal. One open feature dips towards the east, at approximately 62 degrees from horizontal.

Flowmeter, fluid temperature, and fluid resistivity data indicate that little water is entering this well. Inflow observed while pumping shows that water is entering the borehole between 61 and 67 feet deep, possibly near a small fluid resistivity inflection near 62 or 63 feet deep.

MW16-25R

Two of the four observed open fractures are interpreted to dip down towards the southeast, between 20 and 65 degrees from horizontal. The remaining two open features dip down towards the northwest and due east.

Ambient flowmeter tests suggest that minor water inflow occurs between 62.5 and 69 feet deep. This water flows downwards, and exits near the borehole bottom (possibly near the subtle 79.5-foot fluid temperature slope change.

Pumping flowmeter observations show that most inflow while pumping occurs between 77 and 82.5 feet deep (possibly near either the 81-foot caliper enlargement, or the 78- to 79-foot fluid resistivity anomaly).

MW16-27R

Numerous fractures (mostly judged "less-open") were observed at this well using both the optical and acoustic televiewer probes. The "less-open" features dip down predominantly

towards the south and northeast. Two of the three observed "open" features dip down towards the west-southwest, between 26 and 52 degrees from horizontal.

Note that both televiewer probes detected the three observed "open" features. The acoustic televiewer's travel-time plot is especially useful in distinguishing open fractures from thin bands of dark-colored minerals that are sometimes visible on optical televiewer logs.

Note also that the optical televiewer detected some features that were not discernable on the acoustic televiewer plots, including: a) a dark-colored mineral inclusion near the northwest side of the borehole approximately 73.6 feet deep, and b) bands of dark minerals between 86.5 and 89 feet deep, with dip orientations unrelated to nearby fractures.

Most inflow observed while pumping this well occurred between 76.5 and 83 feet deep. The straight-line appearances of the fluid resistivity and fluid temperature graphs indicate that little change in fluid properties was observed below the casing bottom, therefore fractures that intersect this well are probably inter-connected outside the borehole.

The uniformly low fluid resistivity values observed below the casing bottom indicate that brackish or saline water is present within the uncased portion of this borehole.

MW16-28R

Only one fracture was observed on the acoustic televiewer log from this borehole. This fracture is approximately 82 feet deep, and dips down towards the northeast approximately 28 degrees from horizontal. The only other noteworthy feature observed on this televiewer log is a 0.8-foot gap between the casing bottom and intact bedrock. This feature was shown by the caliper log to be at least 5.8 inches in diameter.

Ambient flowmeter tests suggest that water may be entering the casing (presumably at a casing joint), flowing downwards, and exiting the well below the casing bottom. Deeper ambient measurements indicate water entering the well between 81 and 85 feet deep, flowing upwards, and also exiting near the casing bottom.

Pumping flowmeter tests show upwards flow throughout the uncased portion of this borehole, with slight increases judged to represent additional inflow between each pair of test depths (particularly between 71 and 75 feet deep).

Fluid resistivity slope changes indicate transmissive zones near 67.5 and 73.5 feet deep. The very low fluid resistivity values observed below the casing bottom indicate brackish to saline water within the uncased borehole.

The fluid temperature plot shows a slope change near 83 feet deep that may represent an additional, minor transmissive zone.

* * * * *

We appreciate this opportunity to provide geophysical services, and we welcome questions concerning this report. Please call the undersigned at 508/543-1388 if we may provide additional information that would benefit EA's project.

Sincerely,

GEOPHYSICAL APPLICATIONS, INC.

M. E. Blackey cvs

Mark E. Blackey
Principal and Geophysicist

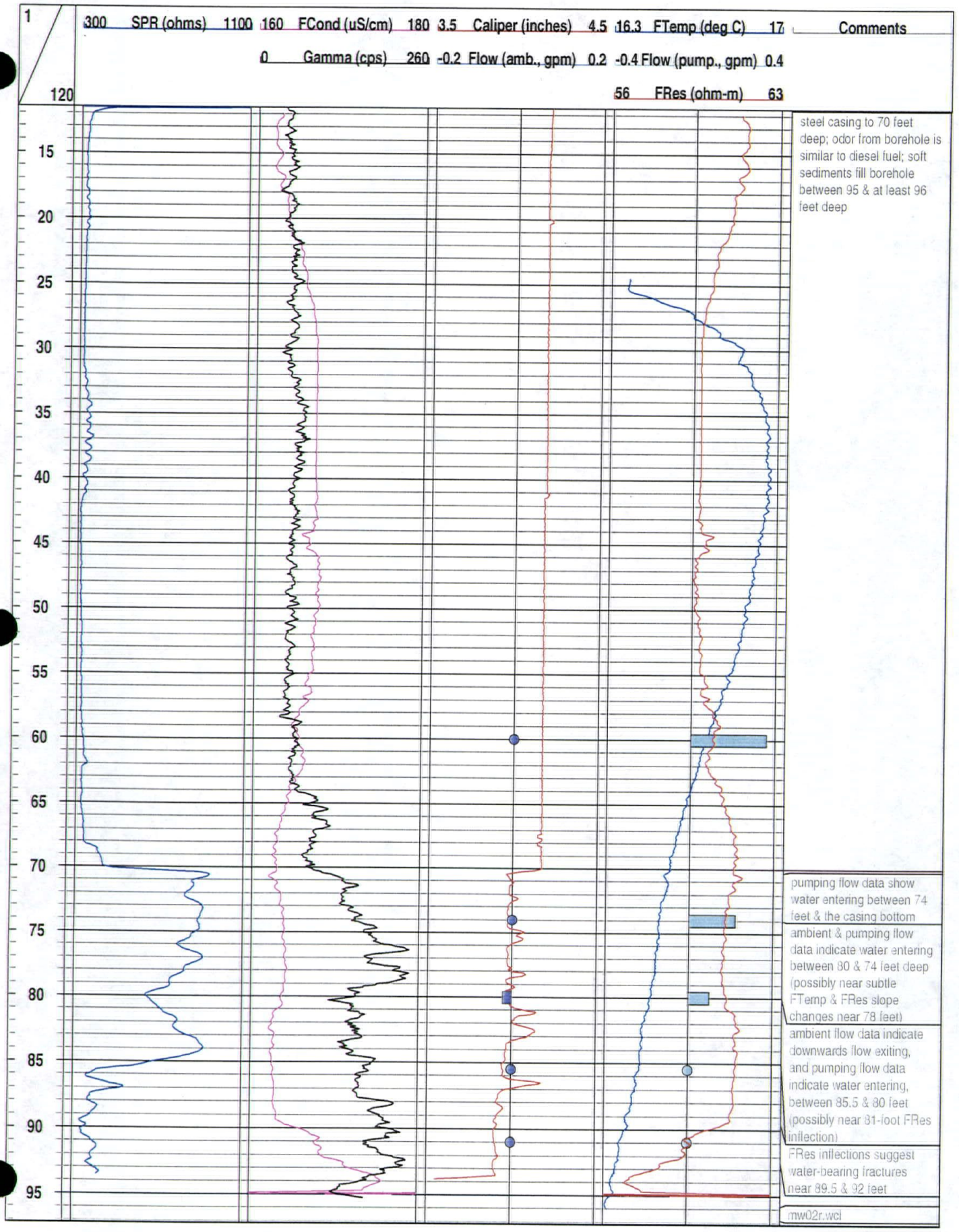
100379 - 100379b rpt

Appendix A

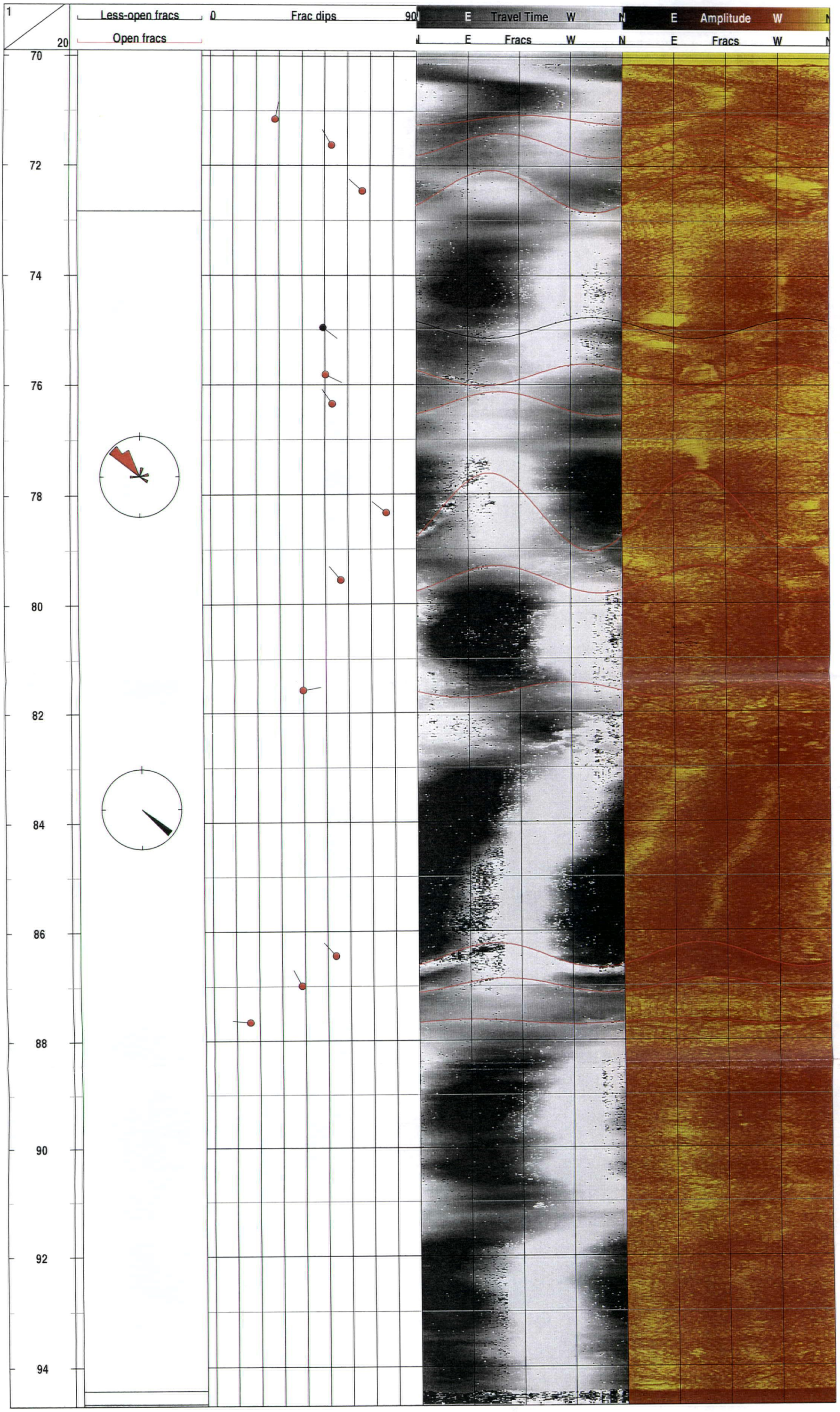
Borehole Geophysical Logs

APPENDIX L
STAGE II
BOREHOLE GEOPHYSICAL LOGGING REPORT FOR ROCK WELLS
From Geophysical Applications, Inc., 2001

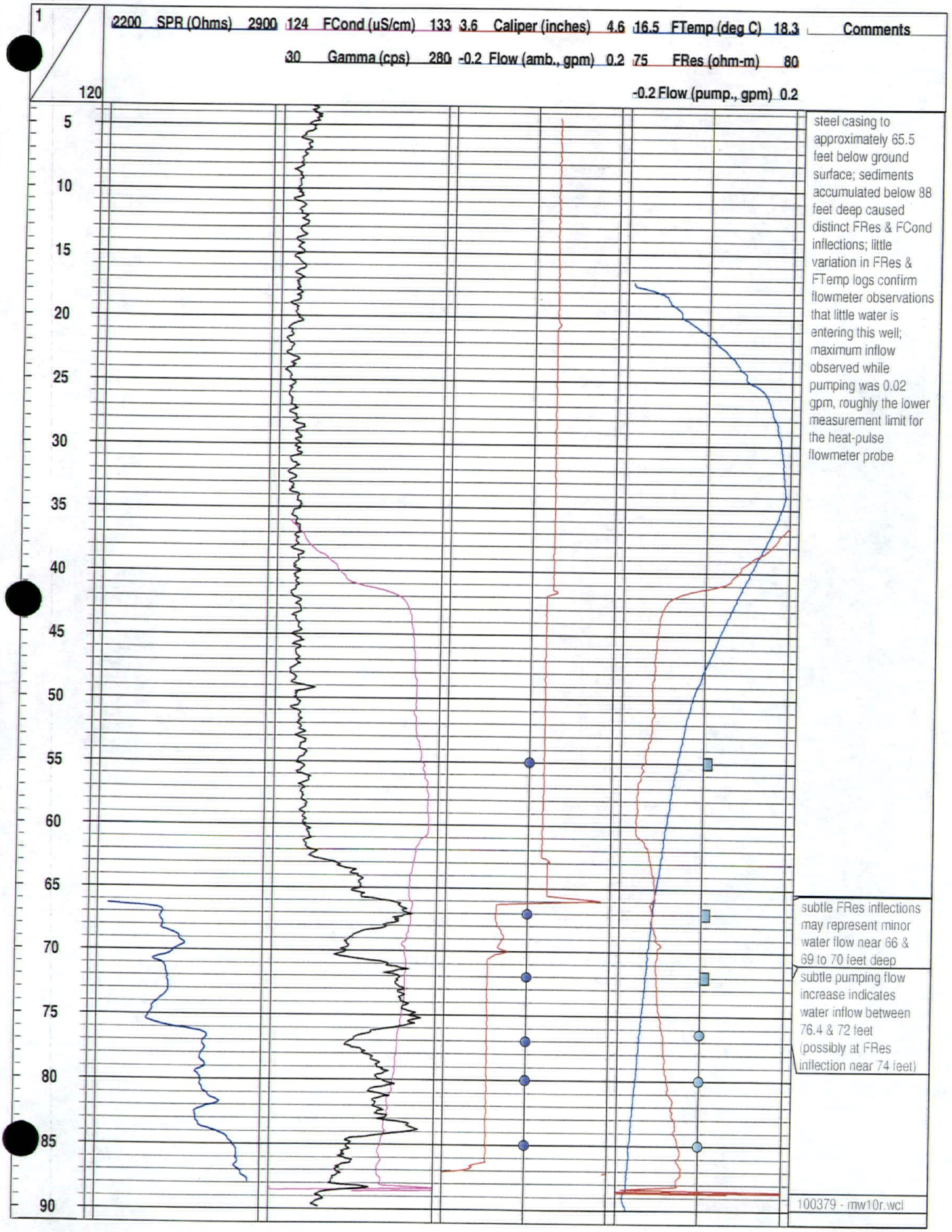
Project - Well: EA Engineering/Davisville, RI - MW16-02R conventional logs



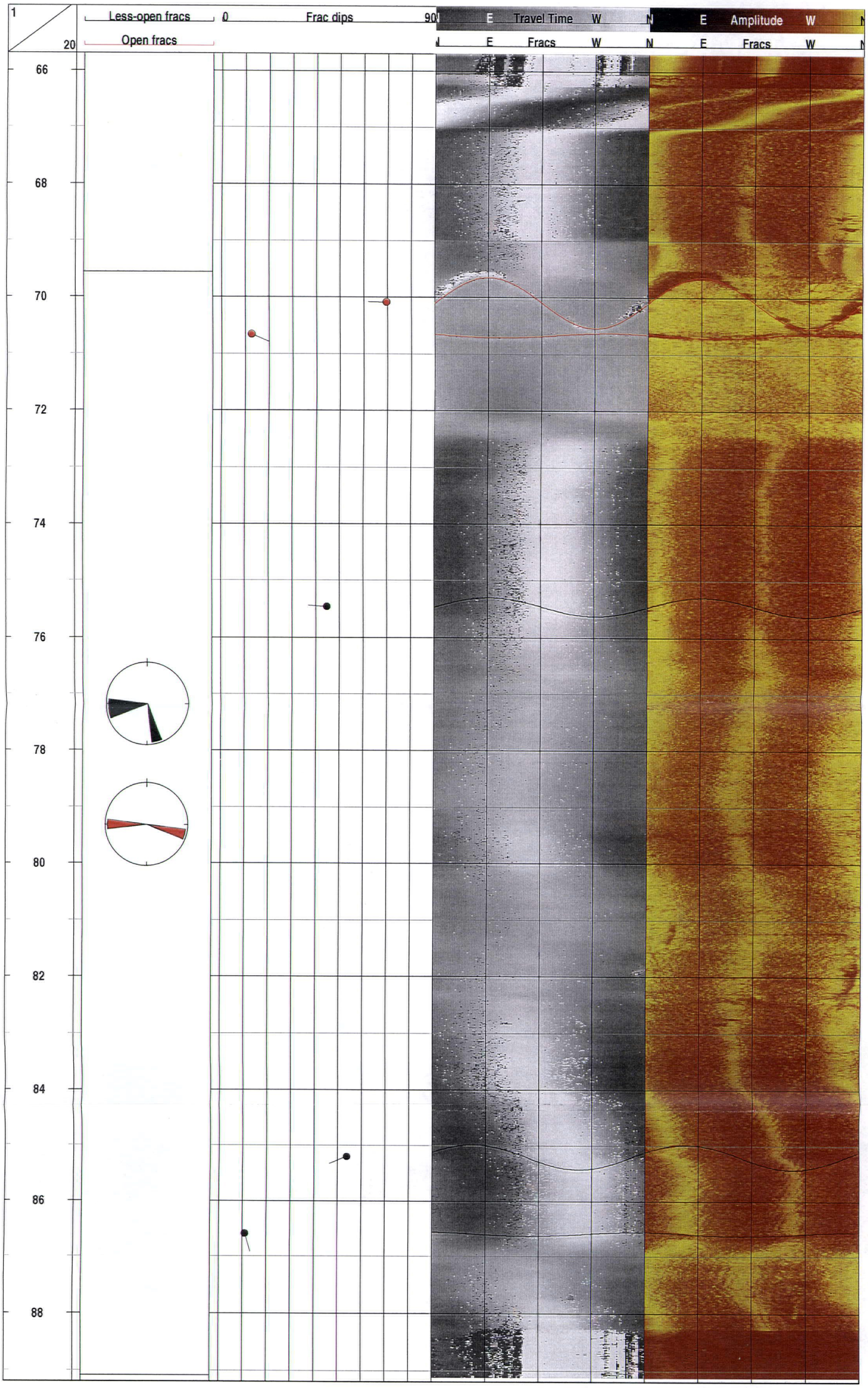
Project - Well: EA Engineering/Davisville, RI - MW16-02R image logs



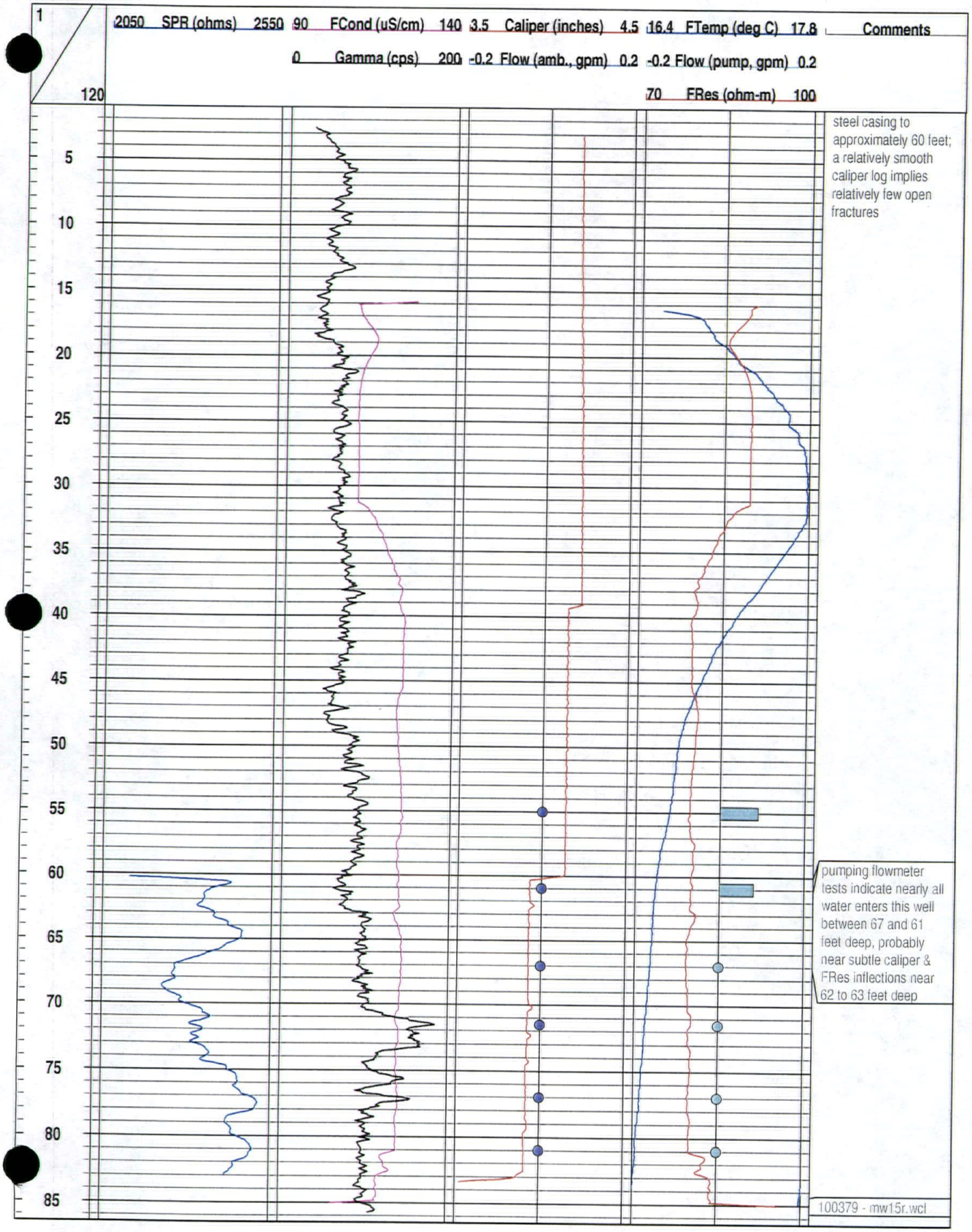
Project - Well: EA Engineering/Davisville, RI - MW16-10R conventional logs



Project - Well: EA Engineering/Davisville, RI - MW16-10R image logs



Project - Well: EA Engineering/Davisville, RI - MW16-15R conventional logs



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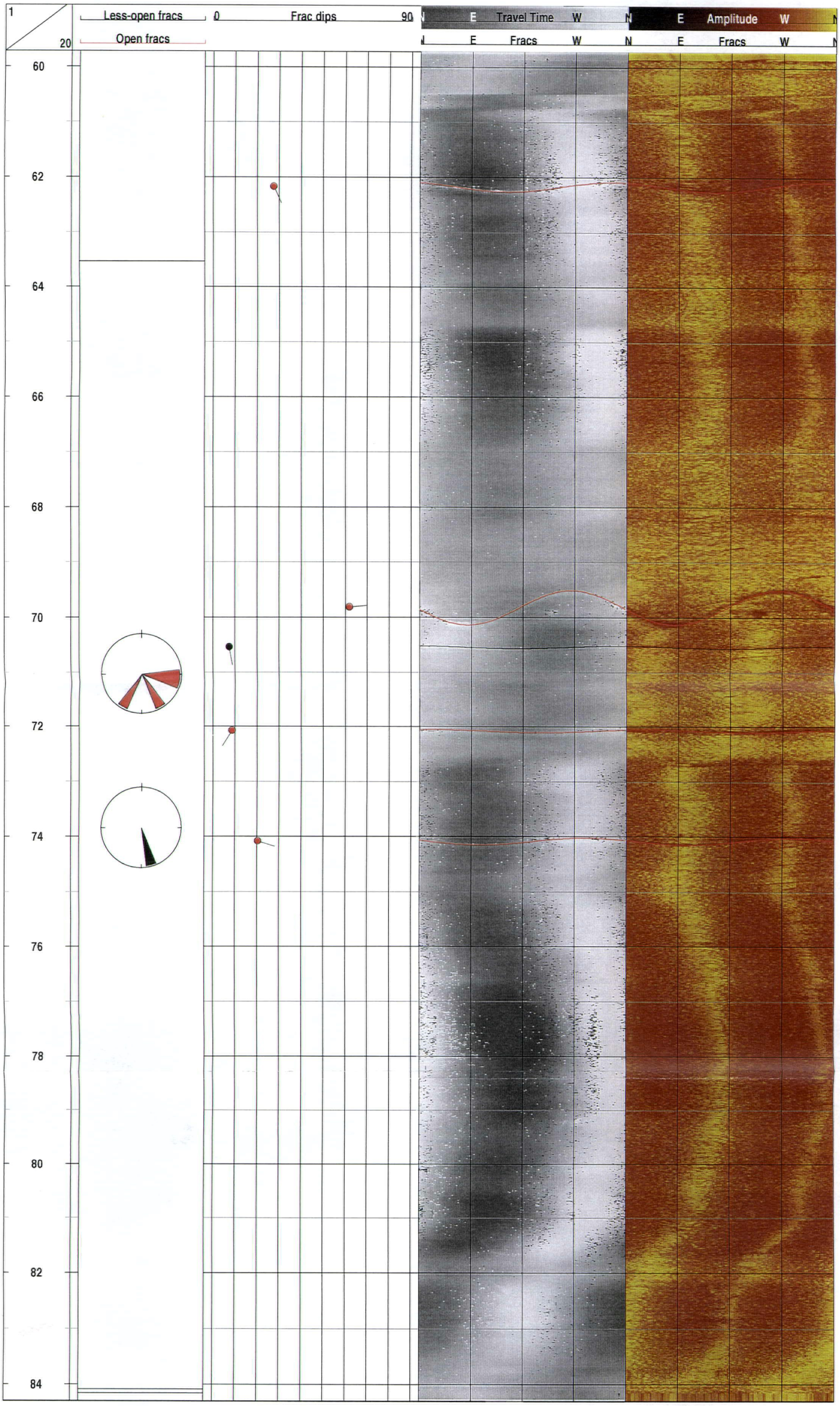
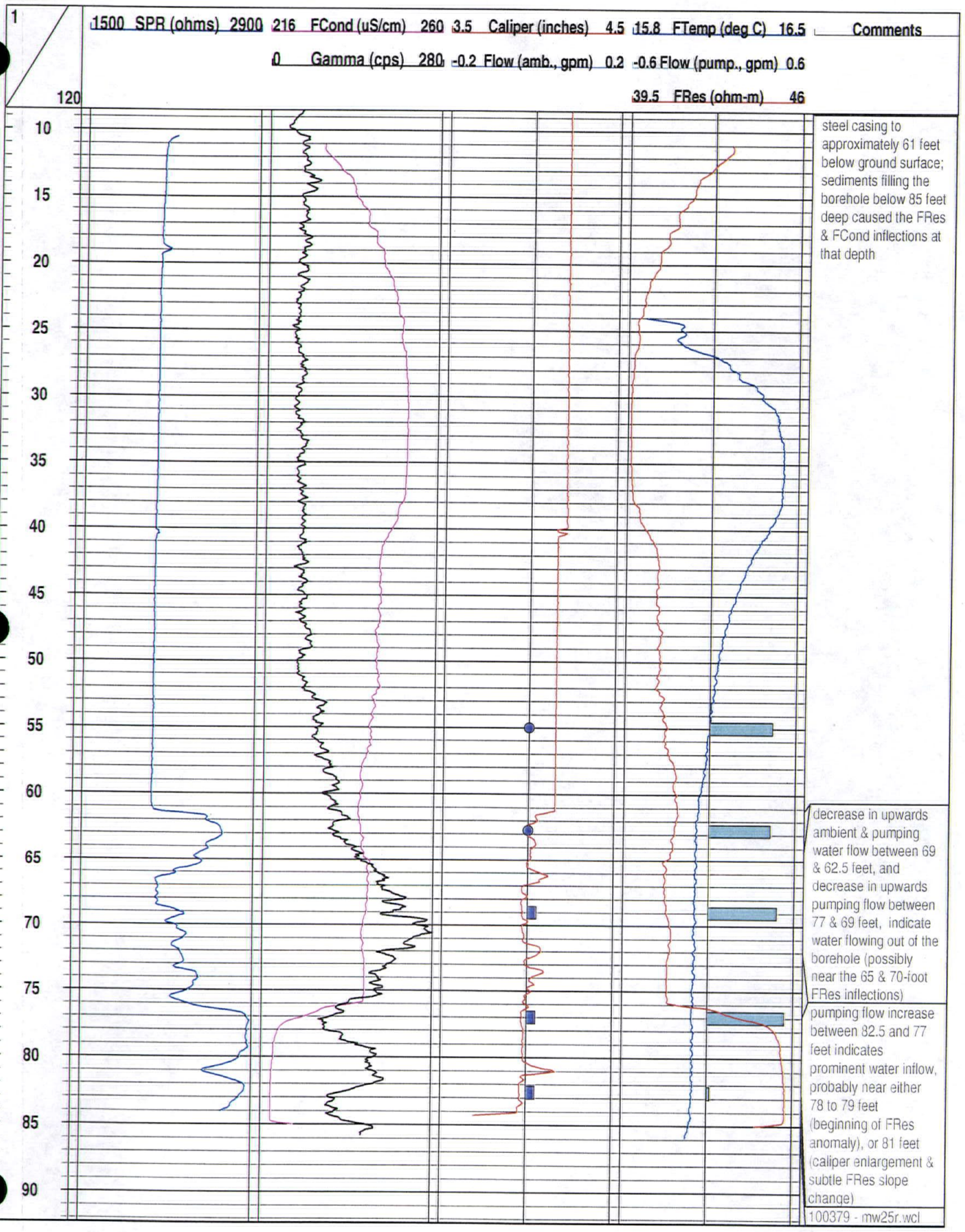


Project - Well: EA Engineering/Davisville, RI - MW16-25R conventional logs



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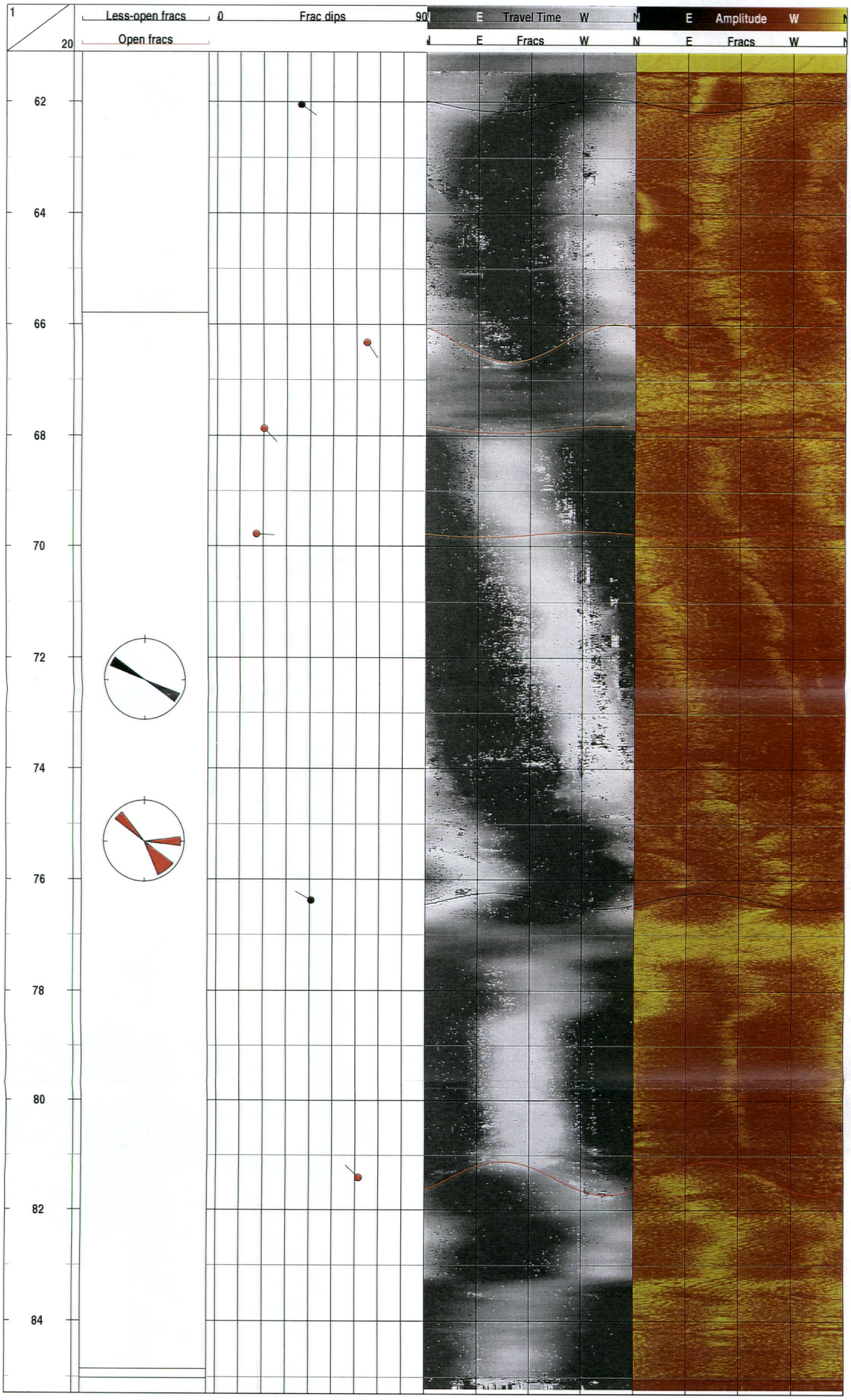
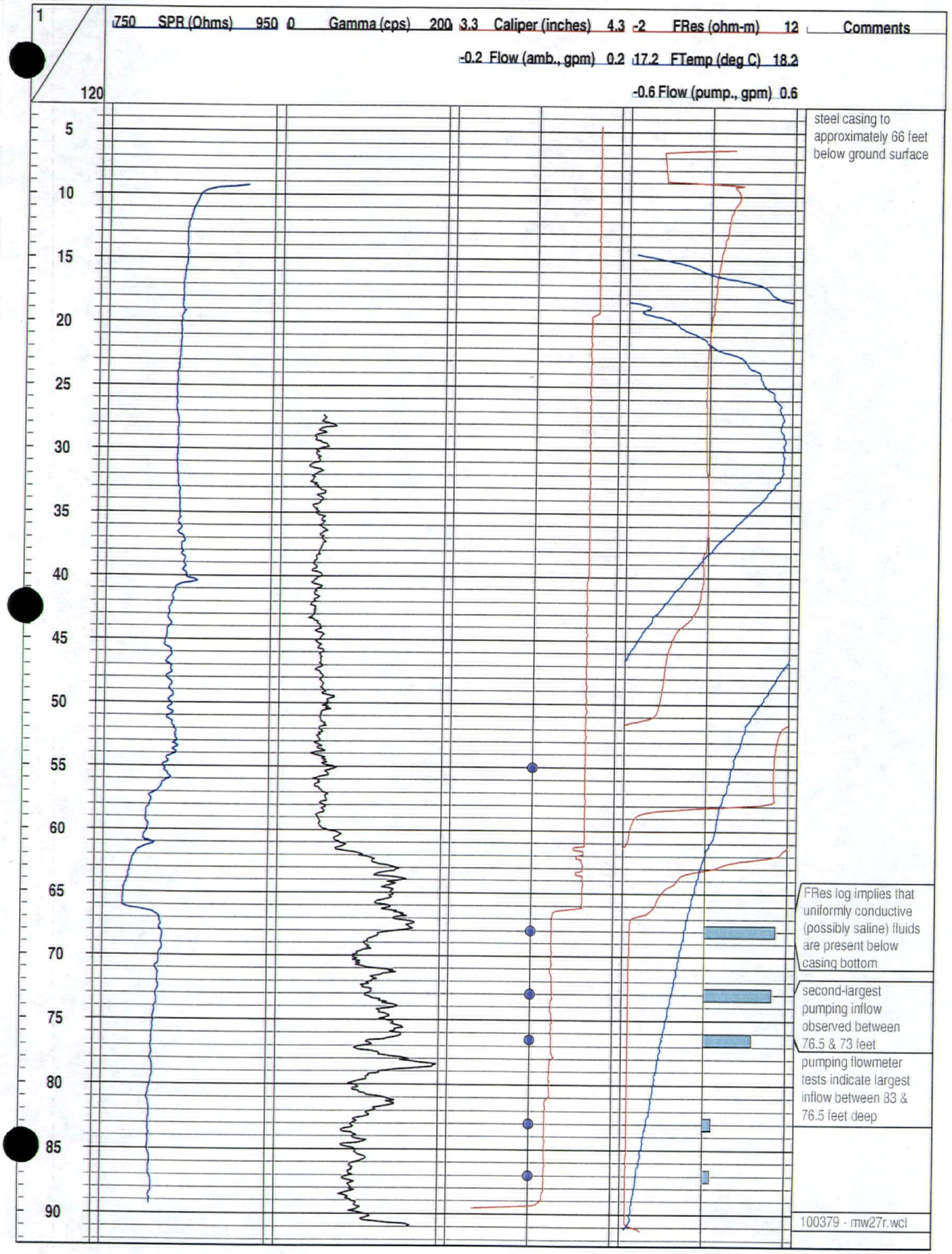
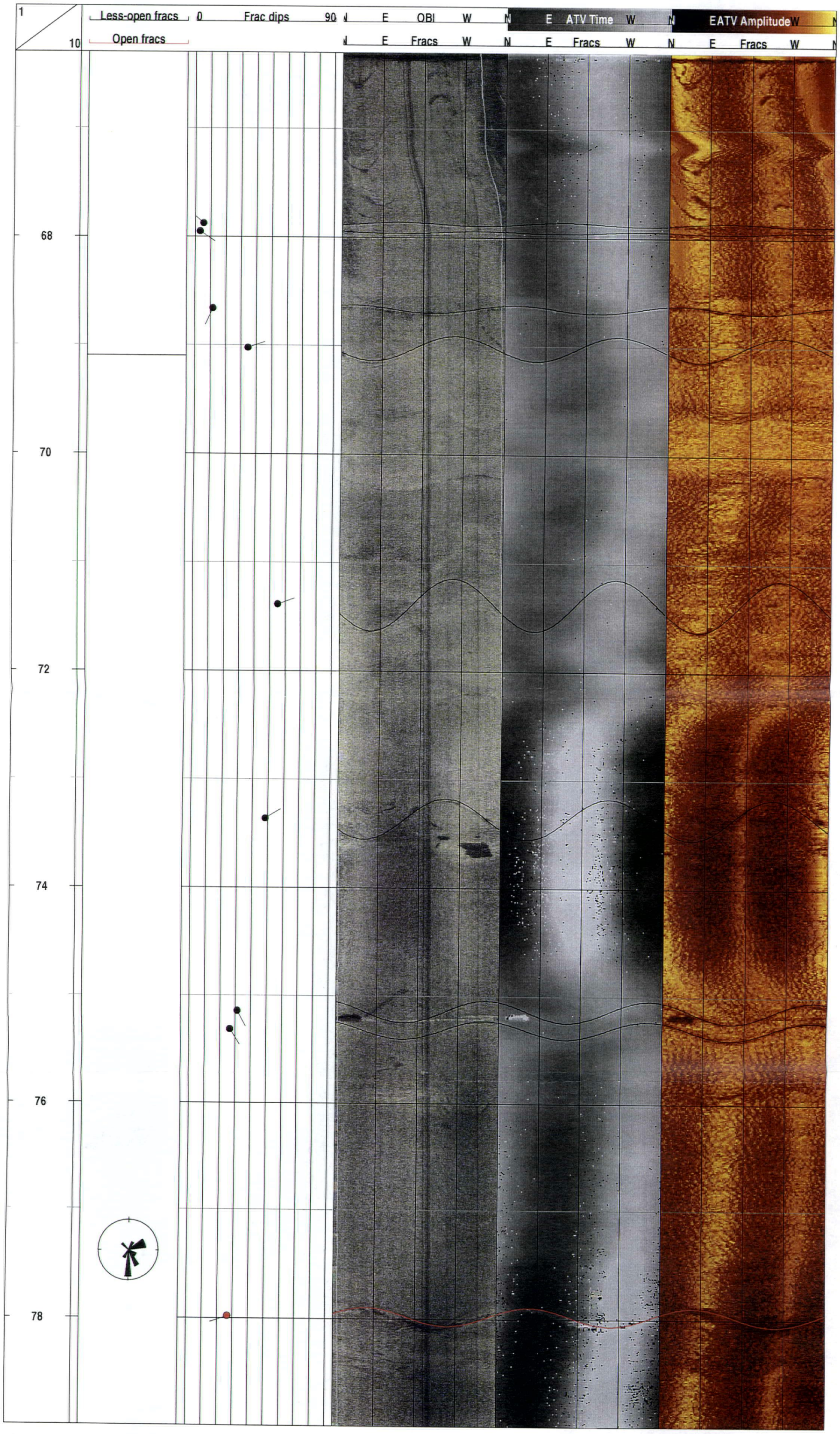
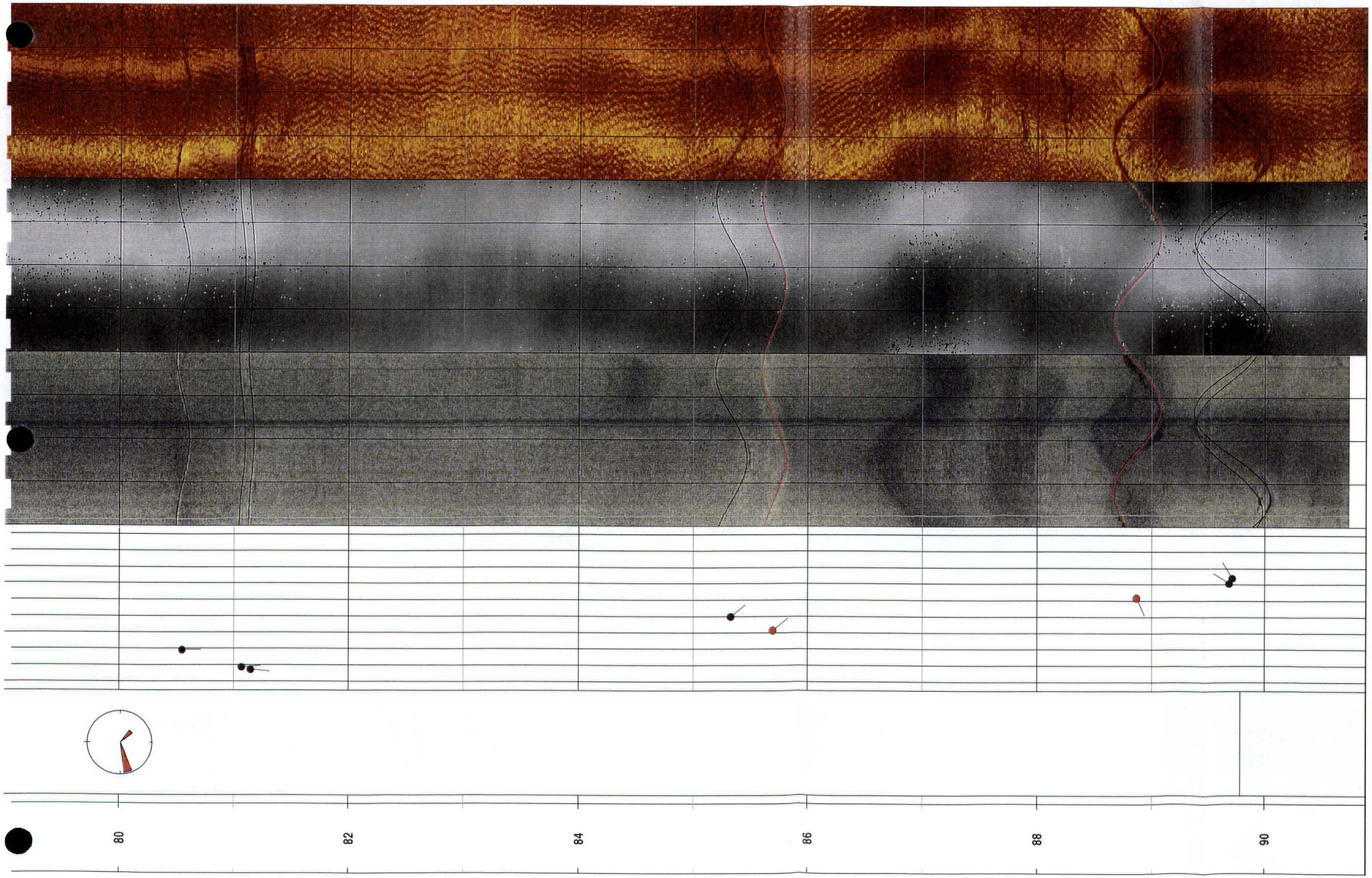


Project - Well: EA Engineering/Davisville, RI - MW16-27R conventional logs



Project - Well: EA Engineering/Davisville, RI - MW16-27R image logs

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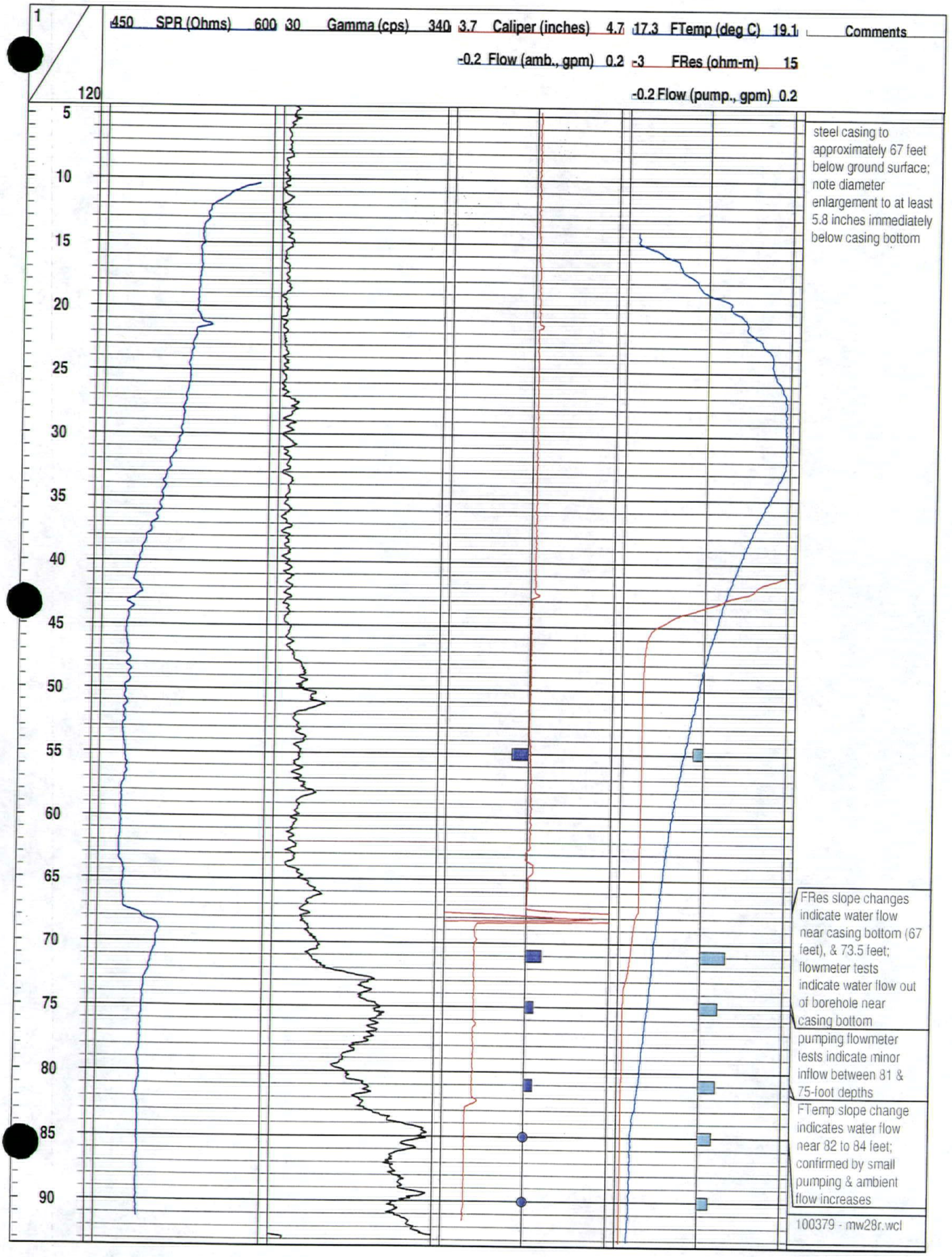
82
84
86
88
90

Project - Well: EA Engineering/Davisville, RI - MW16-28R conventional logs



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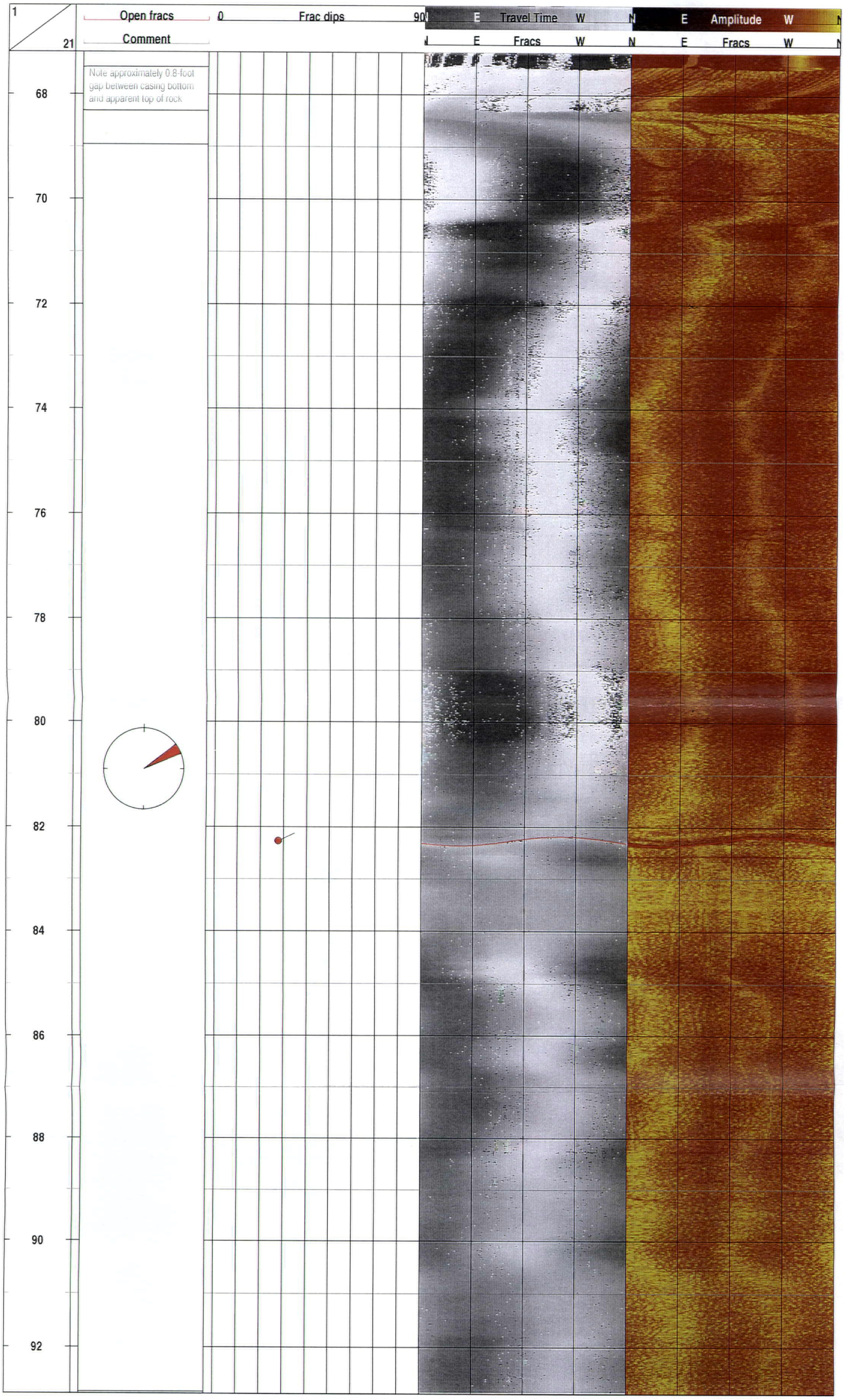


Appendix B

Fracture Orientations Measured from Acoustic Televiewer Logs

WellCAD - [mw02ri.WCL:2]

File View Row Tools Window Help

Depth	Azimuth	Tilt	Category	Description
71.2	11.4	28.4	105	n/a
71.6	329.5	53.2	105	n/a
72.5	311.6	66.7	105	n/a
75.0	127.0	49.3	100	n/a
75.8	115.3	50.3	105	n/a
76.3	324.2	53.3	105	n/a
78.3	307.7	77.1	105	n/a
79.6	320.1	56.9	105	n/a
81.6	79.9	40.1	105	n/a
86.4	315.8	53.8	105	n/a
87.0	332.5	38.7	105	n/a
87.7	275.4	16.1	105	n/a

For Help, press F1

Start | HP Status W... | WellCAD -... | 100379b.RP... | Book8

WellCAD - [mw10ri.WCL:2]

File View Row Tools Window Help

Depth	Azimuth	Tilt	Category	Description
70.1	271.1	69.7	105	n/a
70.7	112.2	12.8	105	n/a
75.5	273.0	44.8	100	n/a
85.2	248.5	53.9	100	n/a
86.6	163.9	11.3	100	n/a

For Help, press F1

Start | HP Status Window | WellCAD - [m... | 100379b RPT.do... | Microsoft Excel

WellCAD - [mw15ri.WCL:2]

File View Row Tools Window Help

Depth	Azimuth	Tilt	Category	Description
62.2	155.0	27.6	105	n/a
69.8	83.8	62.1	105	n/a
70.5	169.7	7.5	100	n/a
72.1	212.5	8.9	105	n/a
74.1	106.3	20.4	105	n/a

For Help, press F1

Start | HP Status Window | WellCAD - [m... | 100379b RPT.do... | Microsoft Excel - ...

WellCAD - [mw25ri.WCL:2]

File View Row Tools Window Help

Depth	Azimuth	Tilt	Category	Description
62.0	125.3	36.2	100	n/a
66.3	145.3	64.6	105	n/a
67.9	135.0	20.4	105	n/a
69.8	93.2	17.2	105	n/a
76.4	299.8	40.8	100	n/a
81.4	314.5	61.7	105	n/a

For Help, press F1

Start | HP Status Window | WellCAD - [m... | 100379b.RPT.do... | Microsoft Excel - ...

WellCAD - [mw27ri.WCL:2]

File View Row Tools Window Help

Depth	Azimuth	Tilt	Category	Description
67.9	309.9	5.5	100	n/a
68.0	123.8	3.4	100	n/a
68.7	203.7	12.1	100	n/a
69.0	70.4	34.8	100	n/a
71.4	70.4	55.4	100	n/a
73.4	58.9	48.6	100	n/a
75.1	150.9	31.5	100	n/a
75.3	147.4	26.8	100	n/a
78.0	251.1	26.7	105	n/a
80.6	179.3	19.2	100	n/a
81.1	175.9	8.9	100	n/a
81.1	184.7	7.5	100	n/a
85.3	141.0	40.0	100	n/a
85.7	140.6	31.5	105	n/a
88.9	247.6	51.9	105	n/a
89.7	33.1	60.8	100	n/a
89.7	58.3	64.1	100	n/a

For Help, press F1

Start | HP Status Window | WellCAD - [m... | 100379b.RPT.do... | Microsoft Excel - ...

WellCAD - [mw28ri.WCL:2]

File View Row Tools Window Help

Depth	Azimuth	Tilt	Category	Description
82.3	64.2	27.9	105	n/a

For Help, press F1

Start | HP Status Window | WellCAD - [m... | 100379b.RPT.do... | Microsoft Excel - ...

APPENDIX M
STAGE II
FIELD SAMPLING FORMS, GROUND-WATER SAMPLING, MARCH 2001

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No. 29600.97 Task 3201 Date: 03/29/01

Well ID: MW16-01S Personnel: MDC Start Time: 0815 Finish Time: 0930

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): ___
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 27.5 (ft)
Depth to Top of Water 20.30 (ft)
Depth to pump intake: 25.5 (ft)
Depth of screened interval: 17.5 to 27.5 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-01S	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-01S	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-01S	4°C
TCL Pesticides		2 x amber liter	MW16-01S	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-01S	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-01S	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6920 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/29/01

Well ID: MW16-01S Personnel. MDC Start Time: 0815 Finish Time: 0930

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	0.5	1	1.5	2		
Time	0835	0840	0845	0850	0855		
Temperature (°C)	11.99	11.34	11.44	11.42	11.67		
pH	6.23	5.62	5.55	5.55	5.54		
Conductivity (mS/cm)	0.548	0.579	0.577	0.574	0.578		
DO (mg/L)	9.63	9.54	9.51	9.50	9.44		
Turbidity (NTU)	21	10	8.5	9.2	8.6		
Salinity (ppt)	0.27	0.28	0.28	0.28	0.28		
Eh (mV)	263.7	258.7	254.6	251.8	250.3		
Water Level (ft from TOR)	20.30	20.30	20.35	20.35	20.35		
Flow rate (ml/min.)	100	100	100	100	100		

Note: DO is stable, but very high.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600 97 Task: 3201 Date: 03/20/01

Well ID: MW16-01D Personnel: RC Start Time: 0800 Finish Time: 1000

Air Monitoring

Equipment Used (Make/Model/Serial No.): Thermo w/11.7 ev
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): ___
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in /Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 58.5 (ft)
Depth to Top of Water 20.42 (ft)
Depth to pump intake: 56 (ft)
Depth of screened interval: 48.5 to 58.5 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-01D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-01D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-01D	4°C
TCL Pesticides		2 x amber liter	MW16-01D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-01D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-01D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Solinst Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See green equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/29/01

Well ID: MW16-01D Personnel. RC Start Time: 0800 Finish Time: 1000

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0.5	2	3.5	5	6.5	8	9.5
Time	0838	0843	0848	0853	0858	0903	0908
Temperature (°C)	11.69	11.70	11.77	11.83	11.89	11.92	11.74
pH	6.54	6.39	6.39	6.38	6.37	6.38	6.38
Conductivity (mS/cm)	0.268	0.280	0.282	0.282	0.282	0.283	0.283
DO (mg/L)	2.29	0.97	0 60	0.49	0.43	0.38	0.37
Turbidity (NTU)	120	40	120	140	140	110	100
Salinity (ppt)	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Eh (mV)	180.4	157.7	141.8	132.9	125.5	119.0	114.2
Water Level (ft from TOR)	20.54	20.52	20.51	20.51	20.51	20.52	20.52
Flow rate (ml/min.)	300	300	300	300	300	300	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	11	12.5	14	15.5			
Time	0913	0918	0923	0928			
Temperature (°C)	11.56	11.89	11.74	11.37			
pH	6.38	6.38	6.39	6.39			
Conductivity (mS/cm)	0.283	0.284	0.284	0.283			
DO (mg/L)	0.34	0.32	0.30	0.28			
Turbidity (NTU)	100	80	70	60			
Salinity (ppt)	0.13	0.14	0.14	0.14			
Eh (mV)	112.1	109.0	107.3	106.5			
Water Level (ft from TOR)	20.52	20.52	20.52	20.52			
Flow rate (ml/min.)	200	200	200	200			

Note: Collect sample 930.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.. 29600.97 Task: 3201 Date: 03/29/01
Well ID: MW16-02S Personnel: SK Start Time: 0850 Finish Time: 1030

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: to 100 ppm w/isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): 3
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 15 (ft)
Depth to Top of Water 11.8 (ft)
Depth to pump intake: 13.5 (ft)
Depth of screened interval: 5 to 15 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-02S	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-02S	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-02S	4°C
TCL Pesticides		2 x amber liter	MW16-02S	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-02S	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-02S	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6920 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See purple equipment calibration log

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date. 03/29/01

Well ID: MW16-02S Personnel: SK Start Time: 0850 Finish Time: 1030

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	0900	0905	0910	0915	0920	0925	0930
Temperature (°C)	7.17	7.08	7.01	7.12	7.22	7.17	7.22
pH	6.27	6.30	6.31	6.31	6.29	6.29	6.30
Conductivity (mS/cm)	0.536	0.425	0.427	0.434	0.456	0.466	0.472
DO (mg/L)	11.78	10.89	10.70	10.43	10.09	9.89	9.65
Turbidity (NTU)	5.8	3.1	2.4	1.3	0.9	0.85	0.20
Salinity (ppt)	0.26	0.20	0.21	0.21	0.22	0.23	0.23
Eh (mV)	197.6	194.2	207.0	209.2	210.3	211.9	212.3
Water Level (ft from TOR)	10.8	10.8	10 8	10.8	10.8	10.8	10.8
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9	10			
Time	0935	0940	0945	0950			
Temperature (°C)	7.23	7.25	7.26	7.25			
pH	6.30	6.31	6.30	6.32			
Conductivity (mS/cm)	0.473	0.478	0.479	0.480			
DO (mg/L)	9.48	9.36	9.23	9.23			
Turbidity (NTU)	0	0	0	0			
Salinity (ppt)	0.23	0.23	0.23	0.2			
Eh (mV)	213.7	213.0	213.2	211.1			
Water Level (ft from TOR)	10.8	10.8	10.8	10.8			
Flow rate (ml/min.)	200	200	200	200			

Note:· Collected sample at 1000.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/29/01

Well ID: MW16-02D Personnel: KB Start Time: 0830 Finish Time: 1025

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 3.5 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): 2.5
Casing/Well Difference (ft): 4

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 66.5 (ft)
Depth to Top of Water 11.58 (ft)
Depth to pump intake: 58.5 (ft)
Depth of screened interval: 56.5 to 66.5 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-02D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-02D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-02D	4°C
TCL Pesticides		2 x amber liter	MW16-02D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-02D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-02D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See yellow equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/29/01
Well ID: MW16-02D Personnel: KB Start Time: 0830 Finish Time: 1025

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	0845	0850	0855	0900	0905	0910	0915
Temperature (°C)	10.46	11.60	11.84	11.86	11.82	11.89	11.92
pH	7.91	7.41	7.13	6.97	6.83	6.77	6.74
Conductivity (mS/cm)	0.185	0.129	0.125	0.125	0.125	0.125	0.125
DO (mg/L)	2.63	0.65	0.40	0.36	0.35	0.35	0.34
Turbidity (NTU)	3.1	7.7	9.9	6.4	8.6	8.1	8.2
Salinity (ppt)	0.08	0.06	0.06	0.06	0.06	0.06	0.06
Eh (mV)	252.1	236.4	228.1	226.1	226.7	228.9	228.9
Water Level (ft from TOR)	11.58	11.62	11.62	11.61	11.62	11.62	11.62
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9	10	11	12	13
Time	0920	0925	0930	0935	0940	0945	0950
Temperature (°C)	11.95	11.99	11.99	12.00	12.08	12.02	11.98
pH	6.69	6.65	6.63	6.61	6.59	6.58	6.57
Conductivity (mS/cm)	0.125	0.125	0.126	0.126	0.127	0.127	0.127
DO (mg/L)	0.34	0.33	0.32	0.32	0.31	0.32	0.31
Turbidity (NTU)	8.2	9.4	6.9	6.9	6.8	5.5	4.7
Salinity (ppt)	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Eh (mV)	228.6	228.8	228.7	229.1	229.8	230.2	230.9
Water Level (ft from TOR)	11.62	11.62	11.62	11.62	11.62	11.62	11.62
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	14						
Time	0955						
Temperature (°C)	12.00						
pH	6.55						
Conductivity (mS/cm)	0.127						
DO (mg/L)	0.32						
Turbidity (NTU)	3.6						
Salinity (ppt)	0.06						
Eh (mV)	232.0						
Water Level (ft from TOR)	11.62						
Flow rate (ml/min.)	200						

Note: Sampled at 1010.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/29/01

Well ID: MW16-02R Personnel: SW Start Time: 0850 Finish Time: 0945

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 5.3 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): 2
Casing/Well Difference (ft): ___

Well Material: ___ PVC / ___ SS / Other Steel
Well Diameter: ___ 2-in. / x 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 95 (ft)
Depth to Top of Water 11.60 (ft)
Depth to pump intake: 80 (ft)
Depth of screened interval: 70 to 95 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-02R	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-02R	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-02R	4°C
TCL Pesticides		2 x amber liter	MW16-02R	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-02R	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-02R	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See white equipment calibration log

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/29/01

Well ID: MW16-02R Personnel: SW Start Time: 0850 Finish Time: 0945

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	2	4	6	8	10	12
Time	0850	0855	0900	0905	0910	0915	0920
Temperature (°C)	11.41	10.74	10.76	10.61	10.85	10.72	10.58
pH	6.86	6.79	6.79	6.79	6.79	6.78	6.79
Conductivity (mS/cm)	0.161	0.161	0.161	0.160	0.160	0.160	0.160
DO (mg/L)	1.30	0.72	0.59	0.58	0.59	0.49	0.42
Turbidity (NTU)	24	38	43	55	65	60	55
Salinity (ppt)	0.08	0 08	0.08	0.08	0.08	0.08	0.08
Eh (mV)	58.0	31.1	19.6	13.1	7.2	2.7	-0.1
Water Level (ft from TOR)	11.84	11.76	11.70	11.70	11.70	11.70	11.70
Flow rate (ml/min.)	400	400	400	400	400	400	400

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	14	16	18				
Time	0925	0930	0935				
Temperature (°C)	10.46	10.52	10.51				
pH	6.79	6.80	6.80				
Conductivity (mS/cm)	0.160	0.160	0.159				
DO (mg/L)	0.53	0.49	0.47				
Turbidity (NTU)	55	55	55				
Salinity (ppt)	0.08	0.08	0.08				
Eh (mV)	-2.1	-3.9	-4.7				
Water Level (ft from TOR)	11.70	11.70	11.70				
Flow rate (ml/min.)	400	400	400				

Note: Collected sample at 0945.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/21/01

Well ID: MW16-03S Personnel: MDC Start Time: 1500 Finish Time: 1700

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: to 100 ppm w/isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): ___
Casing/Well Difference (ft): 4 in.

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 13 (ft)
Depth to Top of Water 4.63 (ft)
Depth to pump intake: 8 (ft)
Depth of screened interval: 3 to 13 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-03S	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-03S	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-03S	4°C
TCL Pesticides		2 x amber liter	MW16-03S	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-03S	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-03S	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See yellow equipment calibration log

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600 97 Task: 3201 Date: 03/21/01

Well ID: MW16-03S Personnel: MDC Start Time: 1500 Finish Time: 1700

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	1	2	3	4	5	6	7
Time	1515	1520	1525	1530	1535	1540	1545
Temperature (°C)	4.96	4.24	4.84	4.84	4.84	4.84	4.84
pH	6.44	6.24	6.24	6.24	6.24	6.24	6.24
Conductivity (mS/cm)	0.162	0 167	0.167	0.167	0.167	0.167	0.167
DO (mg/L)	1.38	0.38	0.38	0.38	0.38	0.38	0.38
Turbidity (NTU)	138	10	8.2	8.5	7.5	10	10
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Eh (mV)	242.8	247.6	247.6	247.6	247.6	247.6	247.6
Water Level (ft from TOR)	4.95	4.65	4.70	4.70	4.70	4.70	4.70
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	8						
Time	1550						
Temperature (°C)	4.84						
pH	6.24						
Conductivity (mS/cm)	0.167						
DO (mg/L)	0.33						
Turbidity (NTU)	10						
Salinity (ppt)	0.38						
Eh (mV)	247.6						
Water Level (ft from TOR)	4.70						
Flow rate (ml/min.)	200						

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/22/01

Well ID: MW16-03D Personnel: MDC Start Time: 1330 Finish Time: 1630

Air Monitoring

Equipment Used (Make/Model/Serial No.): Thermo w/11.7 ev
Calibration Information: to 100 ppm w/isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): 3
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 48.5 (ft)
Depth to Top of Water 5.00 (ft)
Depth to pump intake: 43 (ft)
Depth of screened interval: 38.5 to 48.5 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-03D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-03D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-03D	4°C
TCL Pesticides		2 x amber liter	MW16-03D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-03D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-03D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Solinst Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See green equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/22/01

Well ID: MW16-03D Personnel: MDC Start Time: 1330 Finish Time: 1630

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	1330	1335	1340	1345	1350	1355	1400
Temperature (°C)	8.51	9.23	8.87	9.17	9.44	9.33	9.12
pH	6.30	5.89	5.85	5.81	5.81	5.81	5.82
Conductivity (mS/cm)	0.206	0.207	0.207	0.206	0.206	0.207	0.208
DO (mg/L)	6.26	4.66	4.41	3.96	3.88	2.82	3.55
Turbidity (NTU)	5.5	4.6	5.8	5.0	5.0	4.8	5.0
Salinity (ppt)	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Eh (mV)	122.2	153.8	159.4	167.1	167.9	169.6	172.1
Water Level (ft from TOR)	5.00	5.47	5.48	5.60	5.60	5.55	5.55
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7						
Time	1405						
Temperature (°C)	9.19						
pH	5.83						
Conductivity (mS/cm)	0.209						
DO (mg/L)	3.51						
Turbidity (NTU)	4.9						
Salinity (ppt)	0.10						
Eh (mV)	172.1						
Water Level (ft from TOR)	5.55						
Flow rate (ml/min.)	200						

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/21/01

Well ID: MW16-04S Personnel: SK Start Time: 1500 Finish Time: 1700

Air Monitoring

Equipment Used (Make/Model/Serial No.): photovac 2020
Calibration Information: to 100 ppm w/isobutylene
Ambient Air Reading: 0 ppm Well Headspace Reading: 0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): flushmount
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 13 (ft)
Depth to Top of Water 4.1 (ft)
Depth to pump intake: 11.5 (ft)
Depth of screened interval: 3 to 13 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-04S	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-04S	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-04S	4°C
TCL Pesticides		2 x amber liter	MW16-04S	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-04S	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-04S	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Notes: See purple equipment calibration log. This well is tidally influenced-tide is coming in.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/21/01

Well ID: MW16-04S Personnel: SK Start Time: 1500 Finish Time: 1700

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2				
Time	1500	1505	1510	1515			
Temperature (°C)	4.27	4.64	5.11	--			
pH	6.69	6.77	6.87	--			
Conductivity (mS/cm)	0.518	0.553	0.556	--			
DO (mg/L)	0.79	0.55	1.14	--			
Turbidity (NTU)	55	140	75	--			
Salinity (ppt)	0.25	0.27	0.27	--			
Eh (mV)	11.2	-7.0	-38.4	--			
Water Level (ft from TOR)	6.9	-xxx	-xxx	--			
Flow rate (ml/min.)	200	200	200	Went dry			

Notes: Water level dropping rapidly. Well went dry at 1515, collected sample at 1620 upon recharge final turbidity = 18 NTU's.
xxx - Cannot measure water level below top of pump.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/21/01

Well ID: MW16-04D Personnel: SK Start Time: 1330 Finish Time: 1530

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: to 100 ppm w/isobutylene
Ambient Air Reading: 0 ppm Well Headspace Reading: 0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): 3
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 53 (ft)
Depth to Top of Water 7.3 (ft)
Depth to pump intake: 50 (ft)
Depth of screened interval: 43 to 53 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-04D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-04D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-04D	4°C
TCL Pesticides		2 x amber liter	MW16-04D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-04D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-04D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See purple equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task. 3201 Date: 03/21/01

Well ID: MW16-04D Personnel: SK Start Time. 1330 Finish Time: 1530

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	1330	1335	1340	1345	1350	1355	1400
Temperature (°C)	10.52	10.59	10.61	10.60	10.60	10.68	10.67
pH	6.56	6.57	6.59	6.59	6.59	6.60	6 60
Conductivity (mS/cm)	0.304	0.304	0.304	0.304	0.304	0.304	0.304
DO (mg/L)	0.27	0.21	0.15	0.15	0.14	0.13	0.13
Turbidity (NTU)	5.8	38	38	36	38	40	40
Salinity (ppt)	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Eh (mV)	108.8	101 8	98.7	88.9	85.5	79.8	79 2
Water Level (ft from TOR)	7.2	7.2	7.2	7.2	7.3	7.3	7.3
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9	10	11	12	13
Time	1405	1410	1415	1420	1425	1430	1435
Temperature (°C)	10.65	10.69	10.70	10.71	10.71	10.73	10.73
pH	6.60	6.61	6.61	6.61	6.61	6.61	6.61
Conductivity (mS/cm)	0.304	0.304	0.305	0.305	0.305	0.305	0.305
DO (mg/L)	0.13	0.12	0.11	0.11	0.11	0.10	0.10
Turbidity (NTU)	32	23	18	15	15	14	14
Salinity (ppt)	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Eh (mV)	75.6	71.6	69.1	67.3	66.3	65.1	64.3
Water Level (ft from TOR)	7.3	7.3	7.3	7.3	7.3	7.3	7.3
Flow rate (ml/min.)	200	200	200	200	200	200	200

Notes: Orange floc. In water. Collected sample at 1440.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/21/01

Well ID: MW16-05S Personnel: RC Start Time: 1430 Finish Time: 1645

Air Monitoring

Equipment Used (Make/Model/Serial No.): Thermo w/11.7 ev
Calibration Information: to 100 ppm w/isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked: x Yes ___ No
Protective Casing Secure: x Yes ___ No
Concrete Collar Intact: x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): ___
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well: 18 (ft)
Depth to Top of Water: 12.99 (ft)
Depth to pump intake: 16 (ft)
Depth of screened interval: 8 to 18 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-05S	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-05S	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-05S	4°C
TCL Pesticides		2 x amber liter	MW16-05S	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-05S	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-05S	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Solinst Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See green equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/21/01

Well ID: MW16-05S Personnel. RC Start Time: 1430 Finish Time: 1645

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	4	5	6	7	8	9	10
Time	1445	1450	1455	1500	1505	1510	1515
Temperature (°C)	6.17	6.19	6.04	6.09	6.08	6.10	6.05
pH	6.00	6.04	5.92	5.91	5.91	5.94	5.95
Conductivity (mS/cm)	0.193	0.108	0.204	0.211	0.211	0.214	0 217
DO (mg/L)	1.97	6.41	1.15	1.51	1.46	1.10	1.13
Turbidity (NTU)	NA	230	110	60	NA	49.7	41.8
Salinity (ppt)	0.09	0.09	0.10	0.10	0.10	0.10	0.10
Eh (mV)	98.4	97.9	98.4	96.7	96.6	95.3	97.6
Water Level (ft from TOR)	13.35	NA	13.35	1345	NA	13.38	13.35
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	11	12	13	14	15	16	17
Time	1522	1528	1533	1538	1543	1548	1553
Temperature (°C)	6.05	6.04	6.04	6.03	6.02	6.01	6.00
pH	5.96	5.97	6.01	6.01	6.01	6.01	6.01
Conductivity (mS/cm)	0.219	0.222	0.224	0.225	0.227	0.229	0.229
DO (mg/L)	1.13	1.12	1.10	1.16	1.10	1.10	1.12
Turbidity (NTU)	49.5	30.6	22.9	26.6	25.7	25.5	26.7
Salinity (ppt)	0.10	0.10	0.11	0.11	0.11	0.11	0.11
Eh (mV)	98.7	97.6	12.4	29.7	38.8	42.9	45.5
Water Level (ft from TOR)	13.35	13.35	13.37	13.35	13.35	13.35	13.35
Flow rate (ml/min.)	200	200	200	200	200	200	200

Notes: Water is orange in color. Collected sample at 1600-1640.
NA = Didn't get reading - data not available.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/22/01

Well ID: MW16-05D Personnel: SW/KB Start Time. 1342 Finish Time: 1530

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020 w/10.6 ev
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0 0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): 3
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 52 (ft)
Depth to Top of Water 12.72 (ft)
Depth to pump intake: 46 (ft)
Depth of screened interval: 42 to 52 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-05D, MW16-Dup01	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-05D MW16-Dup01	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-05D MW16-Dup01	4°C
TCL Pesticides		2 x amber liter	MW16-05D MW16-Dup01	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-05D MW16-Dup01	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-05D MW16-Dup01	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See white equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/22/01

Well ID: MW16-05D Personnel: SW/KB Start Time: 1342 Finish Time: 1530

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	1345	1350	1355	1400	1405	1410	1415
Temperature (°C)	15.95	10.87	10.94	10.85	10.76	10.76	10.80
pH	7.14	6.49	6.34	6.30	6.28	6.27	6.26
Conductivity (mS/cm)	0.073	0.120	0.123	0.123	0.122	0 122	0.122
DO (mg/L)	9.00	2.68	1.22	0.82	0.70	0.59	0.53
Turbidity (NTU)	3.4	0.3	0.4	0	0	0	0
Salinity (ppt)	-0.04	0.06	0.06	0.06	0.06	0.06	0.06
Eh (mV)	235.4	185.8	185.9	185.9	185.8	186.3	185.7
Water Level (ft from TOR)	12.72	12.72	12.72	12.72	12.72	12.72	12.72
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9				
Time	1420	1425	1430				
Temperature (°C)	10.69	10.71	10.72				
pH	6.25	6.25	6.25				
Conductivity (mS/cm)	0.122	0.122	0.122				
DO (mg/L)	0.48	0.42	0.40				
Turbidity (NTU)	0	0	0				
Salinity (ppt)	0.06	0.06	0.06				
Eh (mV)	185.8	185.4	185.2				
Water Level (ft from TOR)	12.72	12.72	12.72				
Flow rate (ml/min.)	200	200	200				

Note: Collected sample at 1440.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/22/01

Well ID: MW16-06S Personnel: SK Start Time: 0950 Finish Time: 1030

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020 w/11.6 ev
Calibration Information: to 100 ppm w/isobutylene
Ambient Air Reading: 0 ppm Well Headspace Reading: 0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact ___ Yes ___ No
Other: ___
Protective Casing Stick-up (ft): 3
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 17 (ft)
Depth to Top of Water 13.2 (ft)
Depth to pump intake: 16 (ft)
Depth of screened interval: 7 to 17 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-06S	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-06S	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-06S	4°C
TCL Pesticides		2 x amber liter	MW16-06S	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-06S	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-06S	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Notes: See purple equipment calibration log. Sampling in heavy rain.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/22/01

Well ID: MW16-06S Personnel: SK Start Time: 0950 Finish Time: 1030

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	0950	0955	1000	1005	1010	1015	1020
Temperature (°C)	9.89	9.94	9.83	9.81	9.60	9.47	9.45
pH	5.91	5.88	5.87	5.86	5.85	5.85	5.85
Conductivity (mS/cm)	0.096	0.098	0.098	0.098	0.099	0.099	0.099
DO (mg/L)	7.12	7 17	7.18	7.20	7.30	7.33	7.24
Turbidity (NTU)	2.6	2.1	2.0	2.0	2.0	2.1	2.0
Salinity (ppt)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Eh (mV)	118.9	126.7	132.3	137.5	145.0	148.0	157.3
Water Level (ft from TOR)	13.8	13.8	13.9	13.9	13.9	13.9	13.9
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7						
Time	1025						
Temperature (°C)	9.47						
pH	5.83						
Conductivity (mS/cm)	0.099						
DO (mg/L)	7.18						
Turbidity (NTU)	2.0						
Salinity (ppt)	0.05						
Eh (mV)	159.2						
Water Level (ft from TOR)	13.9						
Flow rate (ml/min.)	200						

Note: Collected sample at 1030.

Fi Id Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task. 3201 Date: 03/22/01

Well ID: MW16-06D Personnel: MDC Start Time: 0950 Finish Time: 1030

Air Monitoring

Equipment Used (Make/Model/Serial No.): Thermo w/11.7 ev
Calibration Information: to 100 ppm w/isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): 3
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 44.5 (ft)
Depth to Top of Water 13.4 (ft)
Depth to pump intake: 41.5 (ft)
Depth of screened interval: 38.5 to 44.5 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-06D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-06D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-06D	4°C
TCL Pesticides		2 x amber liter	MW16-06D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-06D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-06D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Solinst Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See green equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/22/01

Well ID: MW16-06D Personnel: MDC Start Time: 0950 Finish Time: 1050

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	0955	1000	1005	1010	1015	1020	1025
Temperature (°C)	10.82	10.95	10.98	11.02	11.04	11.48	11.51
pH	6.96	6.81	6.77	6.75	6.74	6.72	6 71
Conductivity (mS/cm)	0.215	0.215	0.215	0.215	0.215	0.215	0.215
DO (mg/L)	0.55	0.31	0.31	0.23	0.22	0.64	0.84
Turbidity (NTU)	3.2	3.0	3.0	3.0	3.0	3.0	3.0
Salinity (ppt)	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Eh (mV)	30.4	23.9	17.8	14.1	8.9	9.5	11.0
Water Level (ft from TOR)	13.40	13.40	13.40	13.40	13.40	13.40	13.40
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7						
Time	1030						
Temperature (°C)	11.52						
pH	6.70						
Conductivity (mS/cm)	0.215						
DO (mg/L)	0.82						
Turbidity (NTU)	3.0						
Salinity (ppt)	0.10						
Eh (mV)	11.2						
Water Level (ft from TOR)	13.40						
Flow rate (ml/min.)	200						

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/23/01

Well ID: MW16-07S Personnel SK Start Time: 0940 Finish Time: 1130

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: with 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked: x Yes ___ No
Protective Casing Secure: x Yes ___ No
Concrete Collar Intact: ___ Yes ___ No
Other: ___
Protective Casing Stick-up (ft): ___
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in /Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 17 (ft)
Depth to Top of Water 7.7 (ft)
Depth to pump intake: 12 (ft)
Depth of screened interval: 7-17 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		6 x 40 ml VOA	MW16-07S MW16-Dup2	HCL, 4°C
TCL SVOC 8270		4 x amber liter	MW16-07S MW16-Dup2	4°C
TCL PAH (8270 SIM)		4 x amber liter	MW16-07S MW16-Dup2	4°C
TCL Pesticides		2 x amber liter	MW16-07S MW16-Dup2	4°C
TAL Inorganics (6010/7000)		2 liter poly	MW16-07S MW16-Dup2	HNO3, 4°C
Salinity (SM 2520)		2 x 250 ml poly	MW16-07S MW16-Dup2	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6920 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Notes: See purple equipment calibration log. Due to high PID - water drummed at this location.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/23/01

Well ID: MW16-07S Personnel: SK Start Time: 0940 Finish Time: 1130

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	0940	0945	0950	0955	1000	1005	1010
Temperature (°C)	7.62	7.48	7.23	7.20	7.26	7.34	7.42
pH	6.52	6.51	6.51	6.51	6.51	6.53	6.53
Conductivity (mS/cm)	0.823	0.825	0.822	0 822	0.821	0.818	0.815
DO (mg/L)	0.75	0.37	0.25	0.18	0.16	0.13	0.12
Turbidity (NTU)	65	55	45	40	37	35	35
Salinity (ppt)	0.41	0.41	0.40	0.40	0 40	0.40	0.40
Eh (mV)	16.3	8.3	-9.1	-10.2	-20.0	-29.2	-34.9
Water Level (ft from TOR)	7.7	7.7	7.7	7.7	7.7	7.7	7.7
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9	10	11		
Time	1015	1020	1025	1030	1035		
Temperature (°C)	7.49	7.47	7.45	7.43	7.40		
pH	6.53	6.54	6.54	6.54	6.54		
Conductivity (mS/cm)	0.808	0.804	0.800	0.800	0.800		
DO (mg/L)	0.12	0.12	0.12	0.12	0.12		
Turbidity (NTU)	33	30	30	29	29		
Salinity (ppt)	0.40	0.40	0.39	0.39	0.39		
Eh (mV)	-40.7	-43.5	-50.1	-50.4	-52.6		
Water Level (ft from TOR)	7.7	7.7	7.7	7.7	7.7		
Flow rate (ml/min.)	200	200	200	200	200		

Note: Collected sample at 1045, MW16-07S, MW16-Dup2

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/23/01

Well ID: MW16-07D Personnel: MDC Start Time: 0915 Finish Time: 1130

Air Monitoring

Equipment Used (Make/Model/Serial No.): Thermo w/11.7 ev
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): ___
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 37.5 (ft)
Depth to Top of Water 8.15 (ft)
Depth to pump intake: 35 (ft)
Depth of screened interval: 27.5 to 37.5 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-07D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-07D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-07D	4°C
TCL Pesticides		2 x amber liter	MW16-07D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-07D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-07D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Solinst Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See green equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/23/01

Well ID: MW16-07D Personnel: MDC Start Time: 0915 Finish Time: 1130

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	0930	0935	0940	0945	0950	0955	1000
Temperature (°C)	9.62	9.98	10.30	10.47	10.21	10.71	10.63
pH	7.23	6.83	6 84	6.85	6.86	6.86	6.86
Conductivity (mS/cm)	0.347	0.392	0.328	0.327	0.325	0.323	0.322
DO (mg/L)	3.79	1.14	0.94	0.89	0.90	0.66	0.71
Turbidity (NTU)	28	20	19	80	75	76	90
Salinity (ppt)	0.16	0.16	0.16	0.16	0.16	0.16	0.15
Eh (mV)	148.2	-63.4	-67.2	-70.3	-74.7	-78.8	-80.5
Water Level (ft from TOR)	8.15	8.20	8.20	8.20	8.20	8.20	8.20
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9	10	11	12	
Time	1005	1010	1015	1020	1025	1030	
Temperature (°C)	10.51	10.21	10.22	10.23	10.31	10.16	
pH	6.87	6.87	6.87	6.87	6.87	6.87	
Conductivity (mS/cm)	0.320	0.318	0.318	0.316	0.314	0.313	
DO (mg/L)	0.56	0.41	0.41	0.32	0.27	0.25	
Turbidity (NTU)	110	125	130	130	130	130	
Salinity (ppt)	0.15	0.15	0.15	0.15	0.15	0.15	
Eh (mV)	-83.3	-87.3	-85.8	-88.3	-89.5	-90.3	
Water Level (ft from TOR)	8.20	8.20	8.20	8.20	8.20	8.20	
Flow rate (ml/min.)	200	200	200	200	200	200	

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-08D Personnel: MDC Start Time: 1300 Finish Time: 1430

Air Monitoring

Equipment Used (Make/Model/Serial No.): Thermo 11.7 ev
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): ___
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 55 (ft)
Depth to Top of Water 15.75 (ft)
Depth to pump intake: 42 (ft)
Depth of screened interval: 40 to 55 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-08D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-08D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-08D	4°C
TCL Pesticides		2 x amber liter	MW16-08D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-08D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-08D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6920 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See green equipment calibration log

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-08D Personnel: MDC Start Time: 1300 Finish Time: 1430

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	1315	1320	1325	1330	1335	1340	1345
Temperature (°C)	11.77	11.90	11.72	11.76	11.60	11 65	11.73
pH	6.99	6.15	6.09	6.04	6.00	5.99	5.97
Conductivity (mS/cm)	0.152	0.284	0.296	0.304	0.304	0 296	0.311
DO (mg/L)	4.58	1 64	1.40	0.95	0.76	0.48	0.38
Turbidity (NTU)	3.3	11	11	11	8.7	3.8	2.8
Salinity (ppt)	0.07	0.14	0.14	0.15	0.15	0.14	0.15
Eh (mV)	111.9	134.9	138.3	141.7	145.5	144.2	144.4
Water Level (ft from TOR)	15.75	15.75	15.80	15.80	15.80	15.80	15.80
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7						
Time	1350						
Temperature (°C)	11.59						
pH	5.97						
Conductivity (mS/cm)	0.312						
DO (mg/L)	0.36						
Turbidity (NTU)	2.9						
Salinity (ppt)	0.15						
Eh (mV)	144.7						
Water Level (ft from TOR)	15.80						
Flow rate (ml/min.)	200						

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/26/01

Well ID: MW16-09D Personnel: KB Start Time: 1002 Finish Time: 1230

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020 w/10.6 ev
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): 2.5
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 65 (ft)
Depth to Top of Water 17.18 (ft)
Depth to pump intake: 61 (ft)
Depth of screened interval: 55 to 65 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-09D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-09D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-09D	4°C
TCL Pesticides		2 x amber liter	MW16-09D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-09D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-09D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See yellow equipment calibration log

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task. 3201 Date: 03/26/01

Well ID: MW16-09D Personnel: KB Start Time: 1002 Finish Time: 1230

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	2.5	3.25	4	4.5
Time	1010	1015	1020	1025	1030	1035	1040
Temperature (°C)	10.13	10.98	11.09	11.03	10.41	9.74	10.06
pH	7.96	7.43	7.26	7.12	7.09	7.04	6.99
Conductivity (mS/cm)	0.171	0.197	0.185	0.183	0.182	0.182	0.166
DO (mg/L)	3.59	0.69	0.35	0.38	0 41	0.44	0.51
Turbidity (NTU)	85	80	90	120	90	70	70
Salinity (ppt)	0.08	0.09	0.09	0.09	0.09	0 09	0.05
Eh (mV)	163.6	215.4	226.4	235.9	238.8	241.3	242.3
Water Level (ft from TOR)	17.18	17.85	17.92	17.43	17.43	17.40	17.40
Flow rate (ml/min.)	200	200	200	100	150	150	100

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	5.5	6.5	7.5	8.5	9.5	10.5	11.5
Time	1045	1050	1055	1100	1105	1110	1115
Temperature (°C)	10.72	10.95	10.91	10.79	10.83	10.82	10.95
pH	6.98	6.94	6.93	6.92	6.90	6.90	6.90
Conductivity (mS/cm)	0.176	0.173	0.171	0.168	0.167	0.167	0.166
DO (mg/L)	0.40	0.29	0.24	0.24	0.31	0.42	0.31
Turbidity (NTU)	60	55	45	45	45	50	NA
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Eh (mV)	240.0	238.9	237.4	236.0	233.1	232.3	231.5
Water Level (ft from TOR)	17.75	17.80	17.79	17.79	17.72	17.60	17.70
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	12.5	13.5	14.5	*	15	16	17
Time	1120	1125	1130	*	1140	1145	1150
Temperature (°C)	11.04	10.99	10 82	*	10.99	10.88	10.88
pH	6.88	6.88	6.87	*	6.88	6.88	6.88
Conductivity (mS/cm)	0.167	0.167	0.168	*	0.170	0.172	0.173
DO (mg/L)	0.23	0.22	0.24	*	0.22	0.20	0.23
Turbidity (NTU)	50	50	50	*	55	55	50
Salinity (ppt)	0.08	0.08	0.08	*	0.08	0.08	0.08
Eh (mV)	229.4	228.7	228.2	*	225.3	224.9	224.1
Water Level (ft from TOR)	17.82	17.82	17.75	*	17.70	17.70	17.70
Flow rate (ml/min.)	200	200	200	*	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	18	19	20				
Time	1155	1200	1205				
Temperature (°C)	10.89	10.97	10.94				
pH	6.88	6.88	6.88				
Conductivity (mS/cm)	0.177	0.178	0.178				
DO (mg/L)	0.21	0.19	0.18				
Turbidity (NTU)	45	45	45				
Salinity (ppt)	0.08	0.08	0.08				
Eh (mV)	223.5	222.6	221.8				
Water Level (ft from TOR)	17.69	17.70	17.70				
Flow rate (ml/min.)	200	200	200				

Notes: *Adjusting flow rate, water level in YSI below probe. Sample collected at 1215.
NA = Data not available - no reading taken.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/26/01

Well ID: MW16-10D Personnel: RC Start Time: 1000 Finish Time: 1230

Air Monitoring

Equipment Used (Make/Model/Serial No.): Thermo w/11.7
Calibration Information: 100 ppm w/isobutylene
Ambient Air Reading: 0 ppm Well Headspace Reading: 0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): ___
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 58.5 (ft)
Depth to Top of Water 14.08 (ft)
Depth to pump intake: 52.5 (ft)
Depth of screened interval: 48.5 to 58.5 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		6 x 40 ml VOA	MW16-10D MW16-Dup3	HCL, 4°C
TCL SVOC 8270		4 x amber liter	MW16-10D MW16-Dup3	4°C
TCL PAH (8270 SIM)		4 x amber liter	MW16-10D MW16-Dup3	4°C
TCL Pesticides		4 x amber liter	MW16-10D MW16-Dup3	4°C
TAL Inorganics (6010/7000)		2 liter poly	MW16-10D MW16-Dup3	HNO3, 4°C
Salinity (SM 2520)		2 x 250 ml poly	MW16-10D MW16-Dup3	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Solinst Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See green equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/26/01

Well ID: MW16-10D Personnel: RC Start Time: 1000 Finish Time: 1230

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	2	3.5	5	6.5	8	9.5	11
Time	1025	1030	1035	1040	1045	1050	1055
Temperature (°C)	12.87	12.74	12.88	12.83	12.98	12.88	12.87
pH	7.07	6.91	6.86	6.86	6.85	6.85	6.86
Conductivity (mS/cm)	0.431	0.444	0.442	0.443	0.428	0.418	0.406
DO (mg/L)	1.66	0.95	0.64	0.94	0.60	0.49	0.33
Turbidity (NTU)	65	70	90	150	180	170	160
Salinity (ppt)	0.21	0.22	0.21	0.21	0.21	0.20	0.20
Eh (mV)	182.5	160.1	100.7	58.9	37.7	29.1	23.5
Water Level (ft from TOR)	14.98	14.88	14.85	14.87	14.92	14.92	14.92
Flow rate (ml/min.)	300	300	300	300	300	300	300

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	12.5	14	15.5	17	18.5	20	
Time	1100	1105	1110	1115	1120	1125	
Temperature (°C)	12.81	12.59	12.61	12.63	12.55	12.45	
pH	6.85	6.89	6.85	6.85	6.85	6.84	
Conductivity (mS/cm)	0.393	0.389	0.378	0.368	0.363	0.359	
DO (mg/L)	0.30	0.46	0.67	0.78	0.69	0.45	
Turbidity (NTU)	150	130	87	70	65	70	
Salinity (ppt)	0.19	0.19	0.18	0.18	0.18	0.17	
Eh (mV)	20.4	14.9	16.4	16.6	16.7	17.5	
Water Level (ft from TOR)	14.88	14.43	14.72	14.61	14.56	14.56	
Flow rate (ml/min.)	300	300	300	300	300	300	

Note: Collect sample and Dup3 at 1130.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/26/01

Well ID: MW16-10R Personnel: MDC Start Time: 1000 Finish Time: 1600

Air Monitoring

Equipment Used (Make/Model/Serial No.): Thermo w/11 7 ev
Calibration Information: 100 ppm w/isobutylene
Ambient Air Reading: _____ ppm Well Headspace Reading: _____ ppm

Well/Data/Integrity

Well Locked ___ Yes x No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: _____
Protective Casing Stick-up (ft): _____
Casing/Well Difference (ft): _____

Well Material: ___ PVC / ___ SS / Other Steel
Well Diameter: ___ 2-in. / x 4-in. / ___ 6-in./Other _____
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ _____

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 91 (ft)
Depth to Top of Water 14.10 (ft)
Depth to pump intake: 69.5 (ft)
Depth of screened interval: 66 to 91 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-10R	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-10R	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-10R	4°C
TCL Pesticides		2 x amber liter	MW16-10R	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-10R	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-10R	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6920 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: Purged well dry on 03/26/01, collected sample on recharged groundwater on 03/27/01.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/26/01

Well ID: MW16-10R Personnel: MC Start Time: 1000 Finish Time: 1600

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	1.75	2.5	3	3.25	3.5
Time	1040	1045	1050	1055	1100	1105	1110
Temperature (°C)	12 19	13.00	12.50	11.99	11.67	11.09	10.89
pH	8.63	7.73	7.67	7.67	7.63	7.61	7.63
Conductivity (mS/cm)	0.202	0.176	0.172	0.172	0.172	0.172	0.172
DO (mg/L)	6.80	2.1	0.21	0.21	0.19	0.21	0.22
Turbidity (NTU)	28	28	28	29	28	28	28
Salinity (ppt)	0.09	0.08	0.08	0.08	0.08	0.08	0.08
Eh (mV)	94.5	-3.2	-20.6	-42.2	-48.3	-58.3	-96.2
Water Level (ft from TOR)	14.10	14.41	14.70	14.80	14.95	15.00	15.05
Flow rate (ml/min.)	200	200	150	150	100	50	50

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	3.75	4	4.25	5.25	6.25	7.25	8.25
Time	1115	1120	1125	1130	1135	1140	1145
Temperature (°C)	10.92	10.98	10.95	12.72	12.78	12.88	12.89
pH	7.64	7.62	7.61	7.63	7.67	7.67	7.68
Conductivity (mS/cm)	0.171	0.171	0.171	0.171	0.171	0.171	0.170
DO (mg/L)	0.20	0.19	0.18	0.11	0.10	0.10	0.09
Turbidity (NTU)	29	28	28	35	38	38	39
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Eh (mV)	-114	-113	-113	-141	-139.7	-142.4	-143.7
Water Level (ft from TOR)	15.15	15.20	15.25	15.75	15.95	16.12	16.50
Flow rate (ml/min.)	50	50	50	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	9.25	10.25	11.25	12.25	13.25	14.25	15.25
Time	1150	1155	1200	1205	1210	1215	1220
Temperature (°C)	12.86	12.86	12.82	12.79	12.73	12.66	12.71
pH	7.70	7.69	7.72	7.74	7.74	7.77	7.77
Conductivity (mS/cm)	0.170	0.170	0.170	0.170	0.170	0.170	0.170
DO (mg/L)	0.09	0.08	0.08	0.08	0.07	0.07	0.07
Turbidity (NTU)	37	36	35	34	33	32	31
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Eh (mV)	-146.9	-149.8	-154.4	-158.2	-161.2	-164.9	-167.8
Water Level (ft from TOR)	16.80	17.15	17.39	17.80	18.05	18.40	18.60
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	16.25	17.25	18.25	19.25	20.25	21.25	22.25
Time	1225	1230	1235	1240	1245	1250	1255
Temperature (°C)	12.80	12.83	12.82	12.87	13.00	12.89	13.16
pH	7.79	7.79	7.79	7.80	7.83	7.83	7.88
Conductivity (mS/cm)	0.171	0.171	0.171	0.172	0.172	0.171	0.172
DO (mg/L)	0.07	0.07	0.07	0.06	0.06	0.06	0.06
Turbidity (NTU)	30	30	29	29	28	28	28
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Eh (mV)	-170.3	-172.7	-175.1	-174.9	-180.3	-182.7	-182.0
Water Level (ft from TOR)	18.90	19.20	19.40	19.70	20.00	20.23	20.60
Flow rate (ml/min.)	200	200	200	200	200	200	200

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/26/01

Well ID: MW16-10R Personnel: MC Start Time: 1000 Finish Time 1600

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	≈100						
Time	1412	1417	1422	1427	1600		
Temperature (°C)	12.63	12.42	12.19	12.28			
pH	8.57	8.86	8.88	8.78			
Conductivity (mS/cm)	0.146	0.142	0.141	0.141			
DO (mg/L)	0.26	0.10	0 06	0.04			
Turbidity (NTU)	33	30	30	30			
Salinity (ppt)	0 07	0.07	0.07	0.07			
Eh (mV)	-138 9	-207.2	-268.3	-285.9			
Water Level (ft from TOR)	43.55	43.70	43.85	44.05	59.7		
Flow rate (ml/min.)	50	50	50	50	700 to 800		

Notes: Final water level = 44.50. Purge water has diesel smell. Collect sample 03/27/01 0830, water level 41.77.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/26/01

Well ID: MW16-11D Personnel: SW Start Time: 1040 Finish Time: 1220

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: 100 ppm w/isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked: x Yes ___ No
Protective Casing Secure: x Yes ___ No
Concrete Collar Intact: x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): Flush
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in /Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 63.5 (ft)
Depth to Top of Water 12.38 (ft)
Depth to pump intake: 58 (ft)
Depth of screened interval: 53.5 to 63.5 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-11D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-11D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-11D	4°C
TCL Pesticides		2 x amber liter	MW16-11D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-11D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-11D	4°C

Equipment Decon Identify equipment used (i.e , pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See white equipment calibration log

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/26/01

Well ID: MW16-11D Personnel: SW Start Time: 1040 Finish Time: 1220

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	2	4	6	8	10	12
Time	1040	1045	1050	1055	1100	1105	1110
Temperature (°C)	11.93	11.89	11.94	11.94	11.91	11.91	12.00
pH	9.07	7.77	7.58	7.51	7.39	7.33	7.29
Conductivity (mS/cm)	0.163	0.163	0.166	0.165	0.166	0.166	0.165
DO (mg/L)	2.08	0.83	0.68	0.60	0.51	0.47	0.41
Turbidity (NTU)	20	32	44	60	68	90	99
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Eh (mV)	126.8	128.2	111.1	92.9	81.1	74.3	55.4
Water Level (ft from TOR)	12.82	12.80	12.80	12.80	12.80	12.80	12.80
Flow rate (ml/min.)	400	400	400	400	400	400	400

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	14	16	18	20	22	24	26
Time	1115	1120	1125	1130	1135	1140	1145
Temperature (°C)	11.93	11.96	11.89	11.90	11.87	11.91	11.96
pH	7.27	7.22	7.18	7.14	7.10	7.08	7.07
Conductivity (mS/cm)	0.165	0.165	0.164	0.164	0.163	0.163	0.163
DO (mg/L)	0.39	0.36	0.34	0.31	0.30	0.29	0.28
Turbidity (NTU)	95	92	100	98	90	90	85
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Eh (mV)	52.1	47.0	42.5	38.8	35.1	28.7	26.3
Water Level (ft from TOR)	12.80	12.80	12.80	12.80	12.80	12.80	12.80
Flow rate (ml/min.)	400	400	400	400	400	400	400

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	28	30	32	34	36		
Time	1150	1155	1200	1205	1210		
Temperature (°C)	11.90	11.94	11.92	11.90	12.00		
pH	7.04	7.04	7.03	7.01	7.00		
Conductivity (mS/cm)	0.163	0.163	0.163	0.163	0.163		
DO (mg/L)	0.25	0.24	0.25	0.23	0.21		
Turbidity (NTU)	75	65	60	65	70		
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08		
Eh (mV)	20.8	14.6	9.2	6.7	2.0		
Water Level (ft from TOR)	12.80	12.80	12.80	12.80	12.80		
Flow rate (ml/min.)	400	400	400	400	400		

Note: Collected sample at 1220.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/23/01

Well ID: MW16-12D Personnel: SW Start Time: 0950 Finish Time: 1055

Air Monitoring

Equipment Used (Make/Model/Serial No): Photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): ___
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 62 (ft) Depth to pump intake: Depth of screened interval:
Depth to Top of Water 15.42 (ft) 57 (ft) 52 to 62 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-12D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-12D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-12D	4°C
TCL Pesticides		2 x amber liter	MW16-12D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-12D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-12D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See white equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/23/01

Well ID: MW16-12D Personnel: SW Start Time: 0950 Finish Time: 1055

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	2	4	6	8	10	12
Time	0950	0955	1000	1005	1010	1015	1020
Temperature (°C)	12.04	12.11	12.19	12.19	12.20	11.99	11 70
pH	6.42	6.47	6.51	6.52	6.55	6.56	6.57
Conductivity (mS/cm)	0.160	0.161	0.161	0.161	0.161	0.161	0.161
DO (mg/L)	0.41	0.39	0.36	0.34	0.33	0.30	0.29
Turbidity (NTU)	13	16	13	10	16	24	21
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08	0.08	0 08
Eh (mV)	163.9	160 0	157.7	154.6	153.7	152.7	151.9
Water Level (ft from TOR)	15.49	15.49	15.49	15.49	15.49	15.49	15.49
Flow rate (ml/min.)	400	400	400	400	400	400	400

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	14	16	18	20	22	24	26
Time	1025	1030	1035	1040	1045	1050	1055
Temperature (°C)	11.82	11.56	11.48	11.49	11.51	11.52	11.60
pH	6.59	6.59	6.59	6.59	6.59	6.60	6.60
Conductivity (mS/cm)	0.161	0.161	0.161	0.161	0.161	0.161	0.161
DO (mg/L)	0.29	0.27	0.26	0.25	0.24	0.24	0.23
Turbidity (NTU)	29	16	14	13	13	12	13
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Eh (mV)	151.7	150.1	147.4	146.1	144.3	142.0	139.3
Water Level (ft from TOR)	15.49	15.49	15.49	15.49	15.49	15.49	15.49
Flow rate (ml/min.)	400	400	400	400	400	400	400

Note: Collected sample at 1105.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/26/01

Well ID: MW16-13D Personnel: SK Start Time: 1040 Finish Time: 1230

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information. 100 ppm isobutylene
Ambient Air Reading: 0 ppm Well Headspace Reading: 0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): ___
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 67 (ft)
Depth to Top of Water 12.5 (ft)
Depth to pump intake: 62 (ft)
Depth of screened interval: 57 to 67 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-13D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-13D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-13D	4°C
TCL Pesticides		2 x amber liter	MW16-13D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-13D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-13D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge	S = Sample	Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6920 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See purple equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/26/01

Well ID: MW16-13D Personnel: SK Start Time: 1040 Finish Time: 1230

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	1040	1045	1050	1055	1100	1105	1110
Temperature (°C)	12.00	12.03	12.08	12.06	12.05	12.02	12.12
pH	7.36	7.12	7.02	7.01	6.98	6.98	6.97
Conductivity (mS/cm)	0.203	0.204	0.197	0.195	0.196	0.192	0.189
DO (mg/L)	0.95	0.74	0.56	0 51	0.46	0.44	0.35
Turbidity (NTU)	50	220*	220	250	250	200	206
Salinity (ppt)	0.10	0.10	0.09	0.09	0.09	0.09	0.09
Eh (mV)	-68.6	-75 7	-81.5	-82.3	-83.0	-84.2	-88.6
Water Level (ft from TOR)	12.6	12.6	12.6	12.6	12.6	12.6	12.6
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9	10	11	12	13
Time	1115	1120	1125	1130	1135	1140	1145
Temperature (°C)	12.12	12.11	12.11	12.11	12.11	12.11	12.12
pH	6.96	6.95	6.96	6.94	6.97	6.95	6.96
Conductivity (mS/cm)	0.189	0.189	0:185	0.185	0.185	0.184	0.181
DO (mg/L)	0.35	0.34	0.29	0.26	0.25	0.22	0.21
Turbidity (NTU)	200	200	190	190	180	180	180
Salinity (ppt)	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Eh (mV)	-88.8	-90.7	-92.6	-95.1	-95.2	-95.9	-97.6
Water Level (ft from TOR)	12.6	12.6	12.6	12.6	12.6	12.6	12.6
Flow rate (ml/min.)	200	200	200	200	200	200	200

Notes: *Fine silt in water. Collected sample at 1145.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/23/01

Well ID: MW16-14D Personnel: KB Start Time: 0940 Finish Time: 1145

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 3.4 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): road box
Casing/Well Difference (ft): 4 in.

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 6.2 (ft)
Depth to Top of Water 14.01 (ft)
Depth to pump intake: 60.5 (ft)
Depth of screened interval: 52 to 62 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-14D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-14D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-14D	4°C
TCL Pesticides		2 x amber liter	MW16-14D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-14D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-14D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See yellow equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600 97 Task: 3201 Date: 03/23/01

Well ID: MW16-14D Personnel: KB Start Time: 0940 Finish Time: 1145

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	0955	1000	1005	1010	1015	1020	1025
Temperature (°C)	15.14	12.91	12.92	12.89	12.58	12.55	12.46
pH	5.56	7.12	6.89	6.76	6.69	6.66	6.63
Conductivity (mS/cm)	0.203	0.165	0.154	0.154	0.151	0.150	0.149
DO (mg/L)	8.74	0.75	0.46	0.36	0.29	0.27	0.25
Turbidity (NTU)	12	38	70	100	110	130	110
Salinity (ppt)	0.09	0.08	0.07	0.07	0.07	0.07	0.07
Eh (mV)	512.2	209.6	228.8	234.4	232.2	228.1	223.7
Water Level (ft from TOR)	14.01	14.49	14.49	14.49	14.49	14.49	14.41
Flow rate (ml/min)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9	10	11	12	13
Time	1030	1035	1040	1045	1050	1055	1100
Temperature (°C)	12.48	12.47	12.40	12.44	12.50	12.49	12.49
pH	6.61	6.60	6.61	6.60	6.60	6.61	6.61
Conductivity (mS/cm)	0.149	0.149	0.150	0.149	0.149	0.149	0.149
DO (mg/L)	0.24	0.23	0.22	0.21	0.20	0.19	0.19
Turbidity (NTU)	110	95	95	90	80	80	80
Salinity (ppt)	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Eh (mV)	220.0	214.0	210.5	208.6	205.3	203.2	203.2
Water Level (ft from TOR)	14.41	14.41	14.41	14.40	14.40	14.40	14.40
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	14	15					
Time	1105	1110					
Temperature (°C)	12.49	12.49					
pH	6.61	6.61					
Conductivity (mS/cm)	0.149	0.149					
DO (mg/L)	0.19	0.19					
Turbidity (NTU)	80	80					
Salinity (ppt)	0.07	0.07					
Eh (mV)	203.2	203.2					
Water Level (ft from TOR)	14.40	14.40					
Flow rate (ml/min.)	200	200					

Note: Collected sample at 1115.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/27/01

Well ID: MW16-15D Personnel: SK/SW Start Time: 0845 Finish Time: 1100

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: _____ ppm Well Headspace Reading: _____ ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: _____
Protective Casing Stick-up (ft): 3
Casing/Well Difference (ft): _____

Well Material: x PVC / ___ SS / Other _____
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other _____
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ _____

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 56 (ft)
Depth to Top of Water 16.4 (ft)
Depth to pump intake: 52 (ft)
Depth of screened interval: 46 to 56 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		6 x 40 ml VOA	MW16-15D MW16-Dup4	HCL, 4°C
TCL SVOC 8270		4 x amber liter	MW16-15D MW16-Dup4	4°C
TCL PAH (8270 SIM)		4 x amber liter	MW16-15D MW16-Dup4	4°C
TCL Pesticides		4 x amber liter	MW16-15D MW16-Dup4	4°C
TAL Inorganics (6010/7000)		2 liter poly	MW16-15D MW16-Dup4	HNO3, 4°C
Salinity (SM 2520)		2 x 250 ml poly	MW16-15D MW16-Dup4	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6920 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Notes: See purple equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600 97 Task: 3201 Date: 03/27/01

Well ID: MW16-15D Personnel: SK/SW Start Time: 0845 Finish Time: 1100

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	0940	0945	0950	0955	1000	1005	1010
Temperature (°C)	12.16	12.33	12.46	12.38	12.47	12.50	12.54
pH	5.98	6.00	6.07	6.22	6.18	6.20	6.19
Conductivity (mS/cm)	0.136	0.136	0.139	0.138	0.138	0.138	0.137
DO (mg/L)	1.69	1.53	1.46	1.27	1.19	1.10	1.10
Turbidity (NTU)	13	12	11	11	17	21	23
Salinity (ppt)	0.06	0.06	0.07	0.07	0.07	0.07	0.06
Eh (mV)	89.4	91.3	93.6	92.8	91.3	92.9	93.9
Water Level (ft from TOR)	16.4	16.5	16.5	16.5	16.5	16.5	16.5
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9	10			
Time	1015	1020	1025	1030			
Temperature (°C)	12.47	12.56	12.58	12.0			
pH	6.20	6.18	6.19	6.20			
Conductivity (mS/cm)	0.138	0.137	0.137	0.138			
DO (mg/L)	1.08	1.02	1.01	1.00			
Turbidity (NTU)	23	15	14	17*			
Salinity (ppt)	0.07	0.07	0.07	0.07			
Eh (mV)	94.8	94.0	92.4	93.9			
Water Level (ft from TOR)	16.5	16.5	16.5	16.5			
Flow rate (ml/min.)	200	200	200	200			

*Waiting for turbidity to stabilize.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/27/01

Well ID: MW16-15R Personnel: SW Start Time: 0930 Finish Time: 1145

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: _____ ppm Well Headspace Reading: _____ ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: _____
Protective Casing Stick-up (ft): 2.5
Casing/Well Difference (ft). _____

Well Material: ___ PVC / x SS / Other _____
Well Diameter: ___ 2-in. / x 4-in. / ___ 6-in./Other _____
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ _____

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 86 (ft)
Depth to Top of Water 15.00 (ft)
Depth to pump intake: 62.5 (ft)
Depth of screened interval: 60.5 to 86 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-15R	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-15R	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-15R	4°C
TCL Pesticides		2 x amber liter	MW16-15R	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-15R	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-15R	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See white equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/27/01

Well ID: MW16-15R Personnel: SW Start Time: 0930 Time: 1145

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	2.5	3	3.5	4
Time	0930	0935	0940	0945	0950	0955	1000
Temperature (°C)	12.79	10.75	10.69	10.67	10.31	10.12	9.77
pH	7.43	7.27	7.24	7.23	7.18	7.13	7.08
Conductivity (mS/cm)	0.189	0.197	0.196	0.196	0.195	0.192	0.189
DO (mg/L)	2.30	0.93	0.77	0 79	0.78	0.77	0.75
Turbidity (NTU)	16	17	12	18	13	12	11
Salinity (ppt)	0.09	0.09	0 09	0.09	0.09	0.09	0.09
Eh (mV)	25.4	6.3	-15.1	-22.3	-23.8	-27.2	-28.7
Water Level (ft from TOR)	15.80	16.03	16.40	16.32	16.15	16.52	16.60
Flow rate (ml/min.)	200	200	100	100	100	100	100

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	5	5.5	6	6.5	7	7.5	8
Time	1005	1010	1015	1020	1025	1030	1035
Temperature (°C)	10.06	10.12	10.01	9.59	9.57	9.58	9.98
pH	7.03	7.01	6.99	6.96	6.93	6.92	6.90
Conductivity (mS/cm)	0.191	0.189	0.188	0.184	0.182	0.181	0.181
DO (mg/L)	0.73	0.72	0.70	0.66	0.64	0.63	0.71
Turbidity (NTU)	10	9	8	8	8	8	7
Salinity (ppt)	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Eh (mV)	-32.6	-41.0	-41.7	-44.5	-49.4	-51.4	-50.1
Water Level (ft from TOR)	16.50	16.38	16.40	16.40	16.40	16.40	16.40
Flow rate (ml/min.)	100	100	100	100	100	100	100

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	8.5	9	9.5	10	10.5		
Time	1040	1045	1050	1055	1100		
Temperature (°C)	9.89	9.97	9.86	10.02	9.99		
pH	6.89	6.87	6.85	6.84	6.84		
Conductivity (mS/cm)	0.180	0.179	0.177	0.179	0.181		
DO (mg/L)	0.64	0.57	0.54	0.54	0.53		
Turbidity (NTU)	7	7	7	7	7		
Salinity (ppt)	0.09	0.09	0.09	0.09	0.09		
Eh (mV)	-52.6	-54.9	-54.7	-55.9	-57.1		
Water Level (ft from TOR)	16.40	16.40	16.45	16.40	16.40		
Flow rate (ml/min.)	100	100	100	100	100		

Note: Sample collected at 1110.

Field Sampling Form

Project Name. Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/26/01

Well ID. MW16-16D Personnel: SK Start Time: 1420 Finish Time: 1600

Air Monitoring

Equipment Used (Make/Model/Serial No.). Photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0 ppm Well Headspace Reading: 0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): 3
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 64 (ft)
Depth to Top of Water 10.3 (ft)
Depth to pump intake: 59 (ft)
Depth of screened interval: 54 to 64 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-16D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-16D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-16D	4°C
TCL Pesticides		2 x amber liter	MW16-16D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-16D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-16D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6920 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See purple equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/26/01

Well ID: MW16-16D Personnel: SK Start Time: 1420 Finish Time: 1600

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	1420	1425	1430	1435	1440	1445	1450
Temperature (°C)	11.81	11.63	11.71	11.68	11.73	11.69	11.68
pH	6.75	6.49	6.38	6.37	6.36	6.36	6.35
Conductivity (mS/cm)	0 128	0.119	0.118	0.118	0.118	0.118	0.118
DO (mg/L)	1.55	0.84	0.65	0.59	0.55	0.48	0.48
Turbidity (NTU)	28	20	20	17	6.7	5.7	4.7
Salinity (ppt)	0.06	0.06	0.06	0.05	0.06	0.06	0.06
Eh (mV)	86.9	77.4	77.6	77.1	75.8	73.4	72.5
Water Level (ft from TOR)	10.3	10.6	10.6	10.6	10.6	10 6	10.6
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9	10			
Time	1455	1500	1505	1510			
Temperature (°C)	11.73	11.72	11.70	11.70			
pH	6.35	6.35	6.35	6.35			
Conductivity (mS/cm)	0.118	0.118	0.118	0.118			
DO (mg/L)	0.48	0.48	0.47	0.47			
Turbidity (NTU)	4.2	3.9	3.7	3.2			
Salinity (ppt)	0.06	0.06	0.06	0.06			
Eh (mV)	70.7	71.3	70.6	69.9			
Water Level (ft from TOR)	10.6	10.6	10.6	10.6			
Flow rate (ml/min.)	200	200	200	200			

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-17D Personnel: SK Start Time: 1340 Finish Time: 1545

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: ____ ppm Well Headspace Reading: ____ ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ____
Protective Casing Stick-up (ft): 3
Casing/Well Difference (ft): ____

Well Material: x PVC / ___ SS / Other ____
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ____
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ____

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 67 (ft)
Depth to Top of Water 11.0 (ft)
Depth to pump intake: 64.5 (ft)
Depth of screened interval: 57 to 67 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-17D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-17D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-17D	4°C
TCL Pesticides		2 x amber liter	MW16-17D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-17D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-17D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6920 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note. See purple equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-17D Personnel: SK Start Time: 1340 Finish Time: 1545

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	1340	1345	1350	1355	1400	1405	1410
Temperature (°C)	12.52	12.53	12.53	12.45	12.50	12.28	12.51
pH	7.25	7.40	7.39	7.33	7.39	7.35	7.36
Conductivity (mS/cm)	0.156	0.156	0.156	0.156	0.156	0.155	0.155
DO (mg/L)	1.34	1.32	1.30	1.34	1.40	1.21	1.22
Turbidity (NTU)	320	300	280	240	240	220	170
Salinity (ppt)	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Eh (mV)	54.6	50.9	52.7	51.0	54.9	54.2	50.1
Water Level (ft from TOR)	11.0	11.0	11.1	11.1	11.1	11.1	11.1
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9	10	11	12	13
Time	1415	1420	1425	1430	1435	1440	1445
Temperature (°C)	12.52	12.52	12.50	12.45	12.66	12.41	12.40
pH	7.35	7.37	7.35	7.36	7.34	7.36	7.32
Conductivity (mS/cm)	0.155	0.155	0.156	0.156	0.157	0.157	0.156
DO (mg/L)	1.20	1.01	0.92	1.10	1.09	0.97	1.13
Turbidity (NTU)	150	150	160	180	180	180	180
Salinity (ppt)	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Eh (mV)	57.6	56.3	50.7	51.3	49.4	49.8	50.7
Water Level (ft from TOR)	11.1	11.1	11.1	11.1	11.1	11.1	11.1
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	14	15	16				
Time	1450	1455	1500				
Temperature (°C)	12.43	12.44	12.46				
pH	7.34	7.34	7.34				
Conductivity (mS/cm)	0.156	0.156	0.156				
DO (mg/L)	1.13	1.11	1.12				
Turbidity (NTU)	180	180	180				
Salinity (ppt)	0.07	0.07	0.07				
Eh (mV)	58.9	55.5	50.1				
Water Level (ft from TOR)	11.1	11.1	11.1				
Flow rate (ml/min.)	200	200	200				

Note: Collected sample at 1510.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-18D Personnel: SW Start Time: 1345 Finish Time: 1600

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): 2.5
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 52.5 (ft)
Depth to Top of Water 10.37 (ft)
Depth to pump intake: 47.5 (ft)
Depth of screened interval: 42.5 to 52.5 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-18D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-18D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-18D	4°C
TCL Pesticides		2 x amber liter	MW16-18D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-18D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-18D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See white equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-18D Personnel: SW Start Time: 1345 Finish Time: 1600

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	2	4	6	8	10	12
Time	1345	1350	1355	1400	1405	1410	1415
Temperature (°C)	12.15	12.18	12.16	12.28	12.27	12.22	12.18
pH	6.99	6.64	6.55	6.46	6.50	6.51	6.52
Conductivity (mS/cm)	0.142	0.139	0.140	0.140	0.141	0.140	0.153
DO (mg/L)	4.55	2.18	1.85	1.39	1.07	0.98	0.88
Turbidity (NTU)	8	120	140	125	115	275	390
Salinity (ppt)	0.07	0.07	0.07	0.07	0.07	0.07	0.06
Eh (mV)	94.5	92.4	92.8	93.8	87.6	81.6	72.7
Water Level (ft from TOR)	10.37	10.37	10.37	10.37	10.37	10.37	10.40
Flow rate (ml/min.)	400	400	400	400	400	400	400

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	14	16	18	20	22	24	26
Time	1420	1425	1430	1435	1440	1445	1450
Temperature (°C)	12.27	12.24	12.26	12.36	12.13	12.29	12.10
pH	6.54	6.54	6.54	6.55	6.55	6.55	6.55
Conductivity (mS/cm)	0.135	0.134	0.133	0.134	0.134	0.132	0.132
DO (mg/L)	0.75	0.71	0.68	0.64	0.62	0.58	0.56
Turbidity (NTU)	390	390	390	390	320	290	280
Salinity (ppt)	0.06	0.07	0.06	0.06	0.06	0.06	0.06
Eh (mV)	63.9	59.8	55.2	53.6	49.6	44.8	43.4
Water Level (ft from TOR)	10.42	10.42	10.42	10.42	10.42	10.42	10.42
Flow rate (ml/min.)	400	400	400	400	400	400	400

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	28	30	32	34	36	38	40
Time	1455	1500	1505	1510	1515	1520	1525
Temperature (°C)	12.13	12.19	12.29	12.21	12.20	12.21	12.25
pH	6.55	6.55	6.56	6.56	6.57	6.57	6.57
Conductivity (mS/cm)	0.132	0.134	0.134	0.131	0.131	0.131	0.131
DO (mg/L)	0.55	0.54	0.70	0.62	0.54	0.59	0.56
Turbidity (NTU)	240	210	180	140	120	120	120
Salinity (ppt)	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Eh (mV)	40.6	38.4	43.3	40.0	32.4	31.3	30.9
Water Level (ft from TOR)	10.42	10.42	10.42	10.42	10.42	10.42	10.42
Flow rate (ml/min.)	400	400	400	400	400	400	400

Note: Collected sample at 1525.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-19D Personnel: KB Start Time: 1310 Finish Time: 1530

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): 3
Casing/Well Difference (ft): 4 in.

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 54.5 (ft)
Depth to Top of Water 9.42 (ft)
Depth to pump intake: 47 (ft)
Depth of screened interval: 45.5 to 54.5 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-19D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-19D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-19D	4°C
TCL Pesticides		2 x amber liter	MW16-19D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-19D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-19D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See yellow equipment calibration log (with green sonde).

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-19D Personnel: KB Start Time: 1310 Finish Time. 1530

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	1315	1320	1325	1330	1335	1340	1345
Temperature (°C)	19.25	12.18	12.74	12.89	12.62	12.73	12.71
pH	7.65	7.56	6.93	7.12	6.95	6.89	6.69
Conductivity (mS/cm)	0.139	0.128	0.127	0.127	0.126	0.126	0.126
DO (mg/L)	5.69	3.23	2.98	2.68	2.35	2.56	2.64
Turbidity (NTU)	4.1	6.8	3.8	3.4	4.9	3.8	2.7
Salinity (ppt)	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Eh (mV)	302.0	320.6	318.2	319.2	325.0	325.1	328.7
Water Level (ft from TOR)	9.42	9.44	9.44	9.45	9.44	9.44	9.44
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9*	10	11	12	13
Time	1350	1355	1400	1405	1410	1415	1420
Temperature (°C)	12.77	12.85	12.76	12.84	12.83	12.42	12.43
pH	6.71	6.84	6.66	6.53	6.43	6.38	6.37
Conductivity (mS/cm)	0.126	0.127	0.125	0.124	0.123	0.123	0.123
DO (mg/L)	2.66	2.68	4.42	3.68	3.16	2.95	2.92
Turbidity (NTU)	2.5	1.6	1.5	2.6	3.2	2.6	2.9
Salinity (ppt)	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Eh (mV)	328.7	328.8	62.6	61.2	60.3	60.5	60.3
Water Level (ft from TOR)	9.44	9.44	9 44	9.44	9.44	9.44	9.44
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	14						
Time	1425						
Temperature (°C)	12.43						
pH	6.36						
Conductivity (mS/cm)	0.123						
DO (mg/L)	2.78						
Turbidity (NTU)	1 9						
Salinity (ppt)	0.06						
Eh (mV)	60.2						
Water Level (ft from TOR)	9.44						
Flow rate (ml/min.)	200						

Notes: *Switched YSI sonde (from "yellow" to "green") between 1355 and 1400 readings because of erratic pH readings due to dying batteries in "yellow" sonde. Collected sample at 1500.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No. 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-20D Personnel: MDC Start Time: 0845 Finish Time: 1100

Air Monitoring

Equipment Used (Make/Model/Serial No.): Thermo
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked ___ Yes x No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): ___
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 49.5 (ft)
Depth to Top of Water 6.45 (ft)
Depth to pump intake: 44.5 (ft)
Depth of screened interval: 39.5 to 49 5 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-20D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-20D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-20D	4°C
TCL Pesticides		2 x amber liter	MW16-20D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-20D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-20D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6920 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See brown equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-20D Personnel: MDC Start Time: 0845 Finish Time: 1100

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	1.5	2	2.5	3	3.5
Time	0905	0910	0915	0920	0925	0930	0935
Temperature (°C)	13.08	13.00	12.42	12.18	11.94	12.76	12.72
pH	7.50	7.14	7 08	7.09	7.06	7.07	7.07
Conductivity (mS/cm)	0.195	0.185	0.185	0 184	0.183	0.183	0.183
DO (mg/L)	2.73	1.16	1.13	0.72	0.69	0.39	0.40
Turbidity (NTU)	11	34	27	20	14	13	16
Salinity (ppt)	0.09	0 09	0.09	0.09	0.09	0.09	0.09
Eh (mV)	129.1	60.7	36.2	13.5	8.7	-3.2	-9.2
Water Level (ft from TOR)	6 45	7.30	7.05	7.10	7.10	7.10	7.10
Flow rate (ml/min.)	200	100	100	100	100	100	100

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	4	4.5	5	5.5			
Time	0940	0945	0950	0955			
Temperature (°C)	12.49	12.62	12.57	12.67			
pH	7.07	7.08	7.12	7.03			
Conductivity (mS/cm)	0.183	0.184	0.184	0.184			
DO (mg/L)	0.37	0.35	0.34	0.32			
Turbidity (NTU)	12	11	11	11			
Salinity (ppt)	0.09	0.09	0.09	0.09			
Eh (mV)	-11.2	-14.4	-16.3	-12.2			
Water Level (ft from TOR)	7.10	7.10	7.10	7.10			
Flow rate (ml/min.)	100	100	100	100			

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-21D Personnel: RC Start Time: 0830 Finish Time: 1030

Air Monitoring

Equipment Used (Make/Model/Serial No.): thermo
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked ___ Yes x No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: _____
Protective Casing Stick-up (ft): roadbox
Casing/Well Difference (ft): _____

Well Material: x PVC / ___ SS / Other _____
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other _____
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ _____

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 61 (ft)
Depth to Top of Water 8.27 (ft)
Depth to pump intake: 54 (ft)
Depth of screened interval: 51 to 61 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-21D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-21D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-21D	4°C
TCL Pesticides		2 x amber liter	MW16-21D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-21D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-21D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Solinst Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See green equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-21D Personnel: RC Start Time: 830 Finish Time: 1030

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	2	3.2	4.4	10	11.2	12.4	16
Time	0842	0847	0852	0915	0920	0925	0940
Temperature (°C)	12.00	12.27	12.41	12.56	12.52	12.41	12.49
pH	6.54	6.23	6.14	6.08	6.08	6.08	6.07
Conductivity (mS/cm)	0.132	0.133	0.133	0.130	0.130	0.130	0.130
DO (mg/L)	1.26	0.55	0.42	0.31	0.29	0.28	0.25
Turbidity (NTU)	95	182	214	157	124	118	85
Salinity (ppt)	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Eh (mV)	31.5	6.2	-4.9	-11.4	-13.6	-14.4	-16.3
Water Level (ft from TOR)	8.43	8 43	8.43	8.42	8.42	8.42	8.42
Flow rate (ml/min.)	250	250	250	250	250	250	250

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	17.2	18					
Time	0945	0950					
Temperature (°C)	12.47	12.55					
pH	6.07	6.07					
Conductivity (mS/cm)	0.130	0.130					
DO (mg/L)	0.24	0.23					
Turbidity (NTU)	65	80					
Salinity (ppt)	0.06	0.06					
Eh (mV)	-16.2	-16.6					
Water Level (ft from TOR)	8.42	8.42					
Flow rate (ml/min.)	250	200					

Notes: Collect sample at 1000. Turbidity 60 NTU's at end of sample collection.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-22D Personnel: KB Start Time: 0840 Finish Time: 1100

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): flush
Casing/Well Difference (ft): 3 in.

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 26 (ft)
Depth to Top of Water 14.97 (ft)
Depth to pump intake: 58 (ft)
Depth of screened interval: 52 to 62 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-22D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-22D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-22D	4°C
TCL Pesticides		2 x amber liter	MW16-22D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-22D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-22D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See yellow equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-22D Personnel: KB Start Time: 0840 Finish Time: 1100

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	3	4	5	6	7
Time	0845	0850	0855	0900	0905	0910	0915
Temperature (°C)	13.57	13.19	13.27	13.29	13.42	13.29	13.25
pH	7.83	7.37	6.98	6.86	6.77	6.71	6.68
Conductivity (mS/cm)	0.149	0.147	0.148	0.147	0.147	0.147	0.147
DO (mg/L)	15.9	0.73	0.35	0.28	0.24	0.24	0.23
Turbidity (NTU)	5.4	13	23	21	17	15	14
Salinity (ppt)	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Eh (mV)	284.9	298.3	307.2	310.6	315.4	320.4	324.1
Water Level (ft from TOR)	14.97	14.99	14.99	14.99	14.99	14.99	14.99
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	8	9	10	11	12	13	14
Time	0920	0925	0930	0935	0940	0945	0950
Temperature (°C)	13.26	13.19	13.17	13.21	13.36	13.19	13.34
pH	6.64	6.62	6.62	6.58	6.58	6.57	6.56
Conductivity (mS/cm)	0.147	0.147	0.147	0.147	0.147	0.147	0.147
DO (mg/L)	0.23	0.22	0.21	0.21	0.21	0.20	0.19
Turbidity (NTU)	17	15	12	10	9.6	7.7	6.6
Salinity (ppt)	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Eh (mV)	325.9	326.7	326.3	325.7	325.1	324.3	323.6
Water Level (ft from TOR)	14.99	14.99	14.99	14.99	14.99	14.99	14.99
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	15	16	17				
Time	0955	1000	1005				
Temperature (°C)	13.31	13.34	13.28				
pH	6.55	6.55	6.54				
Conductivity (mS/cm)	0.147	0.147	0.147				
DO (mg/L)	0.19	0.19	0.19				
Turbidity (NTU)	4.8	5.0	4.2				
Salinity (ppt)	0.07	0.07	0.07				
Eh (mV)	323.2	322.9	322.8				
Water Level (ft from TOR)	14.99	14.99	14.99				
Flow rate (ml/min.)	200	200	200				

Note: Collected sample at 1015.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/25/01

Well ID: MW16-23D Personnel: SK Start Time: 0855 Finish Time: 1030

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0 ppm Well Headspace Reading: 11.8 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft). ___
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 65 (ft)
Depth to Top of Water 11.9 (ft)
Depth to pump intake: 52 (ft)
Depth of screened interval: 50 to 65 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-23D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-23D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-23D	4°C
TCL Pesticides		2 x amber liter	MW16-23D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-23D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-23D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6920 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Turbidimeter	Alconox, isopropyl, DI

Note: See purple equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-23D Personnel: SK Start Time: 0855 Finish Time: 1030

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	0850	0855	0900	0905	0910	0915	0920
Temperature (°C)	13.57	13.35	13.57	13.83	13.90	13.67	13.20
pH	8.23	8.29	8.25	8.18	8.15	8.19	8.18
Conductivity (mS/cm)	0.215	0.215	0.214	0.212	0.210	0.207	0.206
DO (mg/L)	1 49	1.17	1.06	0.91	0.78	0.68	0.70
Turbidity (NTU)	180	140	110	110	110	110	110
Salinity (ppt)	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Eh (mV)	-46.8	-68.1	-64.3	-64.2	-64.3	-60.1	-64.1
Water Level (ft from TOR)	11.9	11.9	11.9	11.9	11.9	11.9	11.9
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9	10			
Time	0925	0930	0935	0940			
Temperature (°C)	13.28	13.27	13.25	13.21			
pH	8.22	8.25	8.26	8.20			
Conductivity (mS/cm)	0.205	0.205	0.205	0.205			
DO (mg/L)	0.63	0.61	0.62	0.61			
Turbidity (NTU)	110	110	110	110			
Salinity (ppt)	0.10	0.10	0.10	0.10			
Eh (mV)	-66.7	-66.4	-68.2	-65.5			
Water Level (ft from TOR)	11.9	11.9	11.9	11.9			
Flow rate (ml/min.)	200	200	200	200			

Note: Collected sample at 0945.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-24D Personnel: SW Start Time: 0910 Finish Time. 1020

Air Monitoring

Equipment Used (Make/Model/Serial No.): photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked ___ Yes x No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): flush
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 62 (ft)
Depth to Top of Water 10.37 (ft)
Depth to pump intake: 51 (ft)
Depth of screened interval: 50 to 62 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-24D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-24D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-24D	4°C
TCL Pesticides		2 x amber liter	MW16-24D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-24D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-24D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See white equipment calibration log

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/28/01

Well ID: MW16-24D Personnel: SW Start Time: 0910 Finish Time: 1020

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	2	4	6	8	10	12
Time	0910	0915	0920	0925	0930	0935	0940
Temperature (°C)	13.58	13.35	13.20	13.29	13 42	13.18	13.22
pH	10.24	10.06	9.41	8.67	7.94	7.37	7.17
Conductivity (mS/cm)	0.507	0.451	0.360	0.297	0.254	0.214	0.198
DO (mg/L)	2.94	1.72	0.86	0.58	0.64	0.69	0.64
Turbidity (NTU)	16	36	33	25	18	12	12
Salinity (ppt)	0.25	0.22	0.17	0.14	0.12	0.10	0.09
Eh (mV)	119.9	105.1	92.0	-79.0	-84.6	-55.7	-46.3
Water Level (ft from TOR)	8.55	8.55	8.55	8.55	8.55	8.55	8.55
Flow rate (ml/min.)	400	400	400	400	400	400	400

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	14.0	16.0	18.0	20.0	22.0	24.0	26.0
Time	0940	0945	0950	0955	1000	1005	1010
Temperature (°C)	13.31	13.32	13.48	13.60	13.33	13.47	13.56
pH	6.99	6.86	6.81	6.78	6.76	6.77	6.76
Conductivity (mS/cm)	0.188	0.180	0.175	0.175	0.173	0.181	0.177
DO (mg/L)	0.70	0.69	0.70	0.74	0.76	0.73	0.70
Turbidity (NTU)	7	6	12	6	5	4	4
Salinity (ppt)	0.09	0.09	0.08	0.08	0.08	0.08	0.08
Eh (mV)	-40.1	-35.1	-33.1	-31.9	-30.8	-30.8	-30.5
Water Level (ft from TOR)	8.55	8.55	8.55	8.55	8.55	8.55	8.55
Flow rate (ml/min.)	400	400	400	400	400	400	400

Note: Collected sample at 1020.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/27/01

Well ID: MW16-25D Personnel: MDC Start Time: 0835 Finish Time: 1130

Air Monitoring

Equipment Used (Make/Model/Serial No.): Thermo
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): ___
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 62 (ft)
Depth to Top of Water 10.40 (ft)
Depth to pump intake: 51 (ft)
Depth of screened interval: 51 to 62 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-25D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-25D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-25D	4°C
TCL Pesticides		2 x amber liter	MW16-25D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-25D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-25D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Solinst Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See green equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/27/01

Well ID: MW16-25D Personnel: MDC Start Time: 0830 Finish Time: 1130

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	2	4	6	8	10	12
Time	0855	0900	0905	0910	0915	0920	0925
Temperature (°C)	9.38	10.81	11.02	10.95	11.00	11.16	11.11
pH	6.85	6.38	6.33	6.32	6.32	6.34	6.36
Conductivity (mS/cm)	0.120	0.116	0.119	0.120	0.120	0.121	0.121
DO (mg/L)	4.63	1.03	0.61	0.46	0.39	0.32	0.29
Turbidity (NTU)	31	15	10.7	8.7	12	6.4	6.8
Salinity (ppt)	0.06	0.05	0.06	0.06	0.06	0.06	0.06
Eh (mV)	139.9	45.7	-5.9	-17.1	-23.1	-32.0	-38.1
Water Level (ft from TOR)	10.40	10.35	10.35	10.30	10.30	10.30	10.30
Flow rate (ml/min.)	400	400	400	400	400	400	400

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	14	16	18	20	22	24	26
Time	0930	0935	0940	0945	0950	0955	1000
Temperature (°C)	11.09	11.20	11.25	11.27	11.29	11.34	11.26
pH	6.37	6.39	6.40	6.41	6.42	6.43	6.42
Conductivity (mS/cm)	0.121	0.122	0.123	0.123	0.123	0.123	0.124
DO (mg/L)	0.26	0.23	0.21	0.20	0.18	0.18	0.17
Turbidity (NTU)	7.0	7.0	7.4	5.5	6.5	6.6	6.6
Salinity (ppt)	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Eh (mV)	-43.1	-45.4	-45.4	-45.8	-44.8	-44.4	-42.4
Water Level (ft from TOR)	10.30	10.30	10.30	10.30	10.30	10.30	10.30
Flow rate (ml/min.)	400	400	400	400	400	400	400

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/27/01

Well ID: MW16-25R Personnel: KB Start Time: 0850 Finish Time: 1150

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): 2
Casing/Well Difference (ft): 4 in.

Well Material: ___ PVC / ___ SS / Other Steel
Well Diameter: ___ 2-in. / x 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 86 (ft)
Depth to Top of Water 9.41 (ft)
Depth to pump intake: 80 (ft)
Depth of screened interval: 61 to 86 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		6 x 40 ml VOA	MW16-25R MW16-Dup5	HCL, 4°C
TCL SVOC 8270		4 x amber liter	MW16-25R MW16-Dup5	4°C
TCL PAH (8270 SIM)		4 x amber liter	MW16-25R MW16-Dup5	4°C
TCL Pesticides		4 x amber liter	MW16-25R MW16-Dup5	4°C
TAL Inorganics (6010/7000)		2 liter poly	MW16-25R MW16-Dup5	HNO3, 4°C
Salinity (SM 2520)		2 x 250 ml poly	MW16-25R MW16-Dup5	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See yellow equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/27/01

Well ID: MW16-25R Personnel: KB Start Time: 0850 Finish Time: 1150

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1.5	3	4.5	6	7.5	9
Time	0900	0905	0910	0915	0920	0925	0930
Temperature (°C)	10.13	10.56	10.56	10.32	10.25	10.28	10.42
pH	7.92	8.02	8.06	8.02	7.97	7.90	7.79
Conductivity (mS/cm)	0.212	0.207	0.206	0.204	0.200	0.195	0.188
DO (mg/L)	2.87	0.90	0.83	1.02	0.94	0.74	0.60
Turbidity (NTU)	15	9.2	4.8	4.6	4.8	4.1	5.1
Salinity (ppt)	0.10	0 10	0.10	0.10	0.10	0.09	0.09
Eh (mV)	155.7	233.6	245.0	247.2	252.3	257.7	262.5
Water Level (ft from TOR)	9.81	9.74	9.79	9.81	9.84	9.85	9.87
Flow rate (ml/min.)	300	300	300	300	300	300	300

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	10.5	12	13.5	15	16.5	18	19.5
Time	0935	0940	0945	0950	0955	1000	1010
Temperature (°C)	10.34	10.25	10.28	10.40	10.41	10.46	9.40
pH	7.70	7.65	7.59	7.52	7.42	7.39	7.40
Conductivity (mS/cm)	0.184	0.180	0.177	0.172	0.164	0.161	0.159
DO (mg/L)	0.57	0.59	0.56	0.49	42	0.41	0.81
Turbidity (NTU)	4.4	4.7	4.8	3.9	4.3	3.0	24
Salinity (ppt)	0.09	0.09	0.08	0.08	0.08	0.08	0.08
Eh (mV)	264.0	263.8	263.8	262.0	260.8	260.1	262.8
Water Level (ft from TOR)	9.89	9.88	9.89	9.90	9.90	9.90	9.80
Flow rate (ml/min.)	300	300	300	300	300	300	300

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	21	22.5	24	25.5	27	28.5	
Time	1015	1020	1025	1030	1035	1040	
Temperature (°C)	10.02	10.39	10.80	11.03	11.01	11.07	
pH	7.37	7.37	7.37	7.36	7.32	7.32	
Conductivity (mS/cm)	0.163	0.163	0.164	0.163	0.159	0.159	
DO (mg/L)	0.62	0.50	0.31	0.24	0.23	0.21	
Turbidity (NTU)	28	23	22	23	20	21	
Salinity (ppt)	0.08	0.08	0.08	0.08	0.08	0.08	
Eh (mV)	260.4	259.5	258.2	257.0	256.7	256.3	
Water Level (ft from TOR)	9.90	9.91	9.91	9.92	9.92	9.92	
Flow rate (ml/min.)	300	300	300	300	300	300	

Notes: 1000 to 1010 changing batteries on QED. Sample taken at 1100.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/21/01

Well ID: MW16-26D Personnel: SK, KB Start Time: 1055 Finish Time: 1230

Air Monitoring

Equipment Used (Make/Model/Serial No.): photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 4.1 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact ___ Yes ___ No
Other: ___
Protective Casing Stick-up (ft): 3
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 49 (ft)
Depth to Top of Water 4.1 (ft)
Depth to pump intake: 44.5 (ft)
Depth of screened interval: 40 to 49 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-26D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-26D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-26D	4°C
TCL Pesticides		2 x amber liter	MW16-26D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-26D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-26D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Heron Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6920 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See purple equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/21/01

Well ID: MW16-26D Personnel: SK, KB Start Time: 1055 Finish Time: 1230

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	2	3	4	5	6	7
Time	1055	1100	1105	1110	1115	1120	1125
Temperature (°C)	9.88	9.60	9.27	9.38	9.35	9.38	9.32
pH	6.11	6.07	6.13	6.23	6.27	6.30	6.31
Conductivity (mS/cm)	0.341	0.321	0.302	0.298	0.288	0.284	0.282
DO (mg/L)	0.99	0.22	0.10	0.08	0.08	0.10	0.15
Turbidity (NTU)	34	18	10	12	13	12	11
Salinity (ppt)	0.16	0.15	0.14	0.14	0.14	0.14	0.13
Eh (mV)	-80.8	-100 9	-127.9	-148.1	-159.9	-170.0	-173.1
Water Level (ft from TOR)	4.1	5.8	5.4	5.15	5.15	5.15	5.15
Flow rate (ml/min.)	400	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	8	9	10	11	12	13	14
Time	1130	1135	1140	1145	1150	1155	1200
Temperature (°C)	9.25	9.30	9.40	9.44	9.48	9.49	9.50
pH	6.35	6.31	6.27	6.24	6.52	6.51	6.50
Conductivity (mS/cm)	0.277	0.276	0.274	0.273	0.271	0.273	0.273
DO (mg/L)	0.10	0.10	0.10	0.15	0.19	0.19	0.20
Turbidity (NTU)	11	11	11	11	11	11	11
Salinity (ppt)	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Eh (mV)	-179.9	-186.2	-196.3	-197.8	-196.1	-198.1	-192.3
Water Level (ft from TOR)	5.15	5.15	5.15	5.15	5.15	5.15	5.15
Flow rate (ml/min.)	200	200	200	200	200	200	200

Notes: Collected sample at 1200. Sulfur odor detected on purge water.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/27/01

Well ID: MW16-27D Personnel: SW Start Time: 1415 Finish Time: 1600

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): flush
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 64 (ft) Depth to pump intake: Depth of screened interval:
Depth to Top of Water 7.96 (ft) 55.5 (ft) 54 to 64 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-27D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-27D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-27D	4°C
TCL Pesticides		2 x amber liter	MW16-27D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-27D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-27D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See white equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/27/01

Well ID: MW16-27D Personnel: SW Start Time: 1415 Finish Time: 1600

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	2	4	5	6	7	8
Time	1415	1420	1425	1430	1435	1440	1445
Temperature (°C)	13.23	13.39	13.46	13.58	13.07	12.79	12.95
pH	6.69	6.66	6.65	6.64	6.63	6.63	6.63
Conductivity (mS/cm)	0.271	0.274	0.273	0.273	0.273	0.272	0.271
DO (mg/L)	0.54	0.50	0.44	0.46	0.43	0.41	0.40
Turbidity (NTU)	16	45	60	50	40	36	22
Salinity (ppt)	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Eh (mV)	124.7	121.4	116.8	115.7	115.9	114.7	112.3
Water Level (ft from TOR)	7.98	9.20	9.20	9.00	8.75	8.99	8.99
Flow rate (ml/min.)	400	400	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	9	10	11	12	13		
Time	1450	1455	1500	1505	1510		
Temperature (°C)	13.24	13.24	13.24	12.84	13.10		
pH	6.63	6.63	6.63	6.63	6.63		
Conductivity (mS/cm)	0.271	0.271	0.272	0.272	0.272		
DO (mg/L)	0.42	0.40	0.38	0.34	0.34		
Turbidity (NTU)	18	21	20	NA	NA		
Salinity (ppt)	0.13	0.13	0.13	0.13	0.13		
Eh (mV)	110.0	106.8	105.3	105.3	104.2		
Water Level (ft from TOR)	9.00	9.00	9.00	9.01	9.01		
Flow rate (ml/min.)	200	200	200	200	200		

Note: Collected sampled at 1515.
NA = Not available (reading not taken).

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/27/01
Well ID: MW16-27R Personnel: SK Start Time: 1420 Finish Time: 1515

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 2.4 ppm

Well/Data/Integrity

Well Locked: x Yes ___ No
Protective Casing Secure: x Yes ___ No
Concrete Collar Intact: x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): ___
Casing/Well Difference (ft): ___

Well Material: ___ PVC / ___ SS / Other Steel
Well Diameter: ___ 2-in. / x 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 92 (ft) Depth to pump intake: Depth of screened interval:
Depth to Top of Water 8.1 (ft) 79 (ft) 66.5 to 92 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-27R	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-27R	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-27R	4°C
TCL Pesticides		2 x amber liter	MW16-27R	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-27R	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-27R	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6920 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See purple equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/2701

Well ID: MW16-27R Personnel: SR Start Time: 1420 Finish Time: 1515

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	1420	1425	1430	1435	1440	1445	1450
Temperature (°C)	12.05	12.10	11.90	11.74	11.55	11.53	11.66
pH	8.02	7.60	7.41	7.33	7.28	7.24	7.23
Conductivity (mS/cm)	5.810	6.083	6.117	6.120	6.120	6.118	6.117
DO (mg/L)	0.96	0 48	0.35	0.30	0.28	0.26	0.26
Turbidity (NTU)	9.6	4.6	3.1	3.0	2.8	1.4	1.2
Salinity (ppt)	3.17	3.33	3.35	3.35	3.35	3.35	3.35
Eh (mV)	-1.1	-5.4	-7.6	-8.3	-9.1	-9.4	-9.7
Water Level (ft from TOR)	8.1	8.2	8.0	8.0	8.1	8.1	8.1
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9	10			
Time	1455	1500	1505	1510			
Temperature (°C)	11.65	11.70	11.70	11.70			
pH	7.21	7.20	7.20	7.19			
Conductivity (mS/cm)	6.117	6.114	6.114	6.112			
DO (mg/L)	0.24	0.23	0.22	0.22			
Turbidity (NTU)	1	1	1	1			
Salinity (ppt)	3.35	3.34	3.34	3.34			
Eh (mV)	-9.9	-9.5	-10.3	-10.2			
Water Level (ft from TOR)	8.1	8.1	8.1	8.1			
Flow rate (ml/min.)	200	200	200	200			

Note: This well is tidally influenced.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/27/01

Well ID. MW16-28D Personnel: KB Start Time: 1320 Finish Time: 1530

Air Monitoring

Equipment Used (Make/Model/Serial No.): Photovac 2020
Calibration Information. 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 1 9 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): roadbox
Casing/Well Difference (ft). ≈ 3 in.

Well Material. x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 64.5 (ft)
Depth to Top of Water 8,67 (ft)
Depth to pump intake: 57 (ft)
Depth of screened interval: 54.5 to 64.5 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-28D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-28D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-28D	4°C
TCL Pesticides		2 x amber liter	MW16-28D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-28D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-28D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See yellow equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/27/01

Well ID. MW16-28D Personnel: KB Start Time: 1320 Finish Time. 1530

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	1335	1340	1345	1350	1355	1400	1405
Temperature (°C)	13.57	13.61	13.78	13.97	13.90	14.02	14.03
pH	7.48	7.20	6.99	6.84	6.83	6.81	6 79
Conductivity (mS/cm)	0.224	0.220	0.262	0.411	0.476	0.508	0.589
DO (mg/L)	4.21	2.49	1.58	1.21	1.42	1.29	0.95
Turbidity (NTU)	21	11	12	13	14	11	11
Salinity (ppt)	0.11	0.11	0.13	0.20	0.23	0.25	0.29
Eh (mV)	255.0	254.8	263.5	272.8	274.4	275.1	276.9
Water Level (ft from TOR)	8.67	8.69	8.70	8.70	8.70	8.70	8.70
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9	10	11	12	
Time	1410	1415	1420	1425	1430	1435	
Temperature (°C)	13.93	14.12	14.11	14.24	13.99	14.00	
pH	6.78	6.78	6.80	6.81	6.82	6.83	
Conductivity (mS/cm)	0.703	0.862	0.955	0.973	0.940	0.918	
DO (mg/L)	0.86	0 58	0.31	0.27	0.24	0.23	
Turbidity (NTU)	13	10	10	10	10	10	
Salinity (ppt)	0.35	0.43	0.48	0.48	0.47	0.45	
Eh (mV)	278.7	280.7	280.8	281.0	280.8	280.5	
Water Level (ft from TOR)	8.70	8.70	8.70	8.70	8.70	8.70	
Flow rate (ml/min.)	200	200	200	200	200	200	

Note: All parameters stable except cond./salinity - well tidally influenced - sampled at 1500.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/27/01

Well ID: MW16-28R Personnel: MDC Start Time: 1310 Finish Time: 1530

Air Monitoring

Equipment Used (Make/Model/Serial No.): Thermo
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked ___ Yes x No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): ___
Casing/Well Difference (ft): ___

Well Material: ___ PVC / ___ SS / Other Steel
Well Diameter: ___ 2-in. / x 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 93 (ft) Depth to pump intake: Depth of screened interval:
Depth to Top of Water 8.8 (ft) 82.5 (ft) 68 to 93 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-28R	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-28R	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-28R	4°C
TCL Pesticides		2 x amber liter	MW16-28R	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-28R	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-28R	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Solinst Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See green equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/27/01

Well ID: MW16-28R Personnel. MDC Start Time: 1310 Finish Time: 1530

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	0	1	2	3	4	5	6
Time	1330	1335	1340	1345	1350	1355	1400
Temperature (°C)	11.92	12.75	12.97	12.69	12.75	12.94	12.95
pH	8.12	6.88	6.80	6.79	6.80	6.81	6.82
Conductivity (mS/cm)	2.573	11.80	11.85	11.84	11.82	11.81	11.81
DO (mg/L)	3.00	0.61	0.50	0.54	0.67	0.72	0.70
Turbidity (NTU)	55	55	45	50	75	75	70
Salinity (ppt)	1.85	6.74	6.80	6.79	6.78	6.77	6.77
Eh (mV)	67.1	28.5	28.2	28.0	26.6	25.2	24.5
Water Level (ft from TOR)	8.80	9.20	9.50	9.48	9.50	9.50	9.50
Flow rate (ml/min.)	200	200	200	200	200	200	200

Parameter (units)	Volume	Volume	Volume	Volume	Volume	Volume	Volume
Liters	7	8	9				
Time	1405	1410	1415				
Temperature (°C)	12.81	12.94	12.84				
pH	6.84	6.85	6.86				
Conductivity (mS/cm)	11.82	11.79	11.82				
DO (mg/L)	0.64	0.67	0.59				
Turbidity (NTU)	75	75	75				
Salinity (ppt)	6.77	6.76	6.77				
Eh (mV)	23.9	22.2	20.6				
Water Level (ft from TOR)	9.50	9.50	9.50				
Flow rate (ml/min.)	200	200	200				

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600 97 Task: 3201 Date: 03/21/01

Well ID: MW16-29D Personnel: RC, MC Start Time: 0945 Finish Time: 1140

Air Monitoring

Equipment Used (Make/Model/Serial No.): Thermo w/ 11 7 ev
Calibration Information: 100 ppm isobutylene
Ambient Air Reading: 0.0 ppm Well Headspace Reading: 0.0 ppm

Well/Data/Integrity

Well Locked x Yes ___ No
Protective Casing Secure x Yes ___ No
Concrete Collar Intact x Yes ___ No
Other: ___
Protective Casing Stick-up (ft): ___
Casing/Well Difference (ft): ___

Well Material: x PVC / ___ SS / Other ___
Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in./Other ___
Water Level Equip. Used: x Electr. Cond. Probe
___ Interface Probe
___ Press. Transducer
___ ___

Water Level Data Measured from: Top of Riser

Depth to Bottom of Well 54.5 (ft)
Depth to Top of Water 11.37 (ft)
Depth to pump intake: 51 (ft)
Depth of screened interval: 44.5 to 54.5 (ft)

Analytical Parameter	X if Field Filtered	Volume Required/ Sample Container	Sample ID	Preservation Method
TCL VOC (<1µg/L) 8260		3 x 40 ml VOA	MW16-29D	HCL, 4°C
TCL SVOC 8270		2 x amber liter	MW16-29D	4°C
TCL PAH (8270 SIM)		2 x amber liter	MW16-29D	4°C
TCL Pesticides		2 x amber liter	MW16-29D	4°C
TAL Inorganics (6010/7000)		1 liter poly	MW16-29D	HNO3, 4°C
Salinity (SM 2520)		250 ml poly	MW16-29D	4°C

Equipment Decon Identify equipment used (i.e., pumps, bailers, tubing, filters, etc.)

P = Purge S = Sample		Equipment Used (serial number)	Decon Method
P	S	Solinst Water Level Indicator	Alconox, isopropyl, DI
P	S	YSI 6820 Water Quality Meter w/Flow-Through Cell	Alconox, isopropyl, DI
P	S	Dedicated Geoguard Bladder Pump	NA
P	S	QED Bladder Pump Control Box	NA
P	S	Lamotte Turbidimeter	Alconox, isopropyl, DI

Note: See green equipment calibration log.

Field Sampling Form

Project Name: Site 16 - Former Creosote Dip & FFTA Project No.: 29600.97 Task: 3201 Date: 03/21/01

Well ID: MW16-29D Personnel. RC/MC Start Time: 0945 Finish Time: 1140

Parameter (units)	Initial	Volume	Volume	Volume	Volume	Volume	Volume
Liters	1	2	3	4.5	6	6.8	7.5
Time	1005	1010	1015	1022	1029	1034	1039
Temperature (°C)	9.57	9.92	10.01	9.57	9.57	9.65	9.67
pH	6.68	6.52	6.48	6.47	6.47	6.47	6.47
Conductivity (mS/cm)	0.378	0.345	0.332	0.324	0.326	0.323	0.322
DO (mg/L)	1.69	0.66	0.46	0.53	0.51	0.57	0.55
Turbidity (NTU)	1.9	0.6	0.6	1.1	0.7	0.6	0.8
Salinity (ppt)	0.18	0.17	0.16	0 16	0.16	0.16	0.15
Eh (mV)	-94.5	-106.4	-114.1	-116.2	-115.8	-114.3	-111.3
Water Level (ft from TOR)	11.57	11.59	11.63	11.56	11.55	11.55	11.56
Flow rate (ml/min.)	200	200	200	150	150	150	150

Note: Collected sample at 1045.

APPENDIX N
PHASE I RI LABORATORY REPORTS

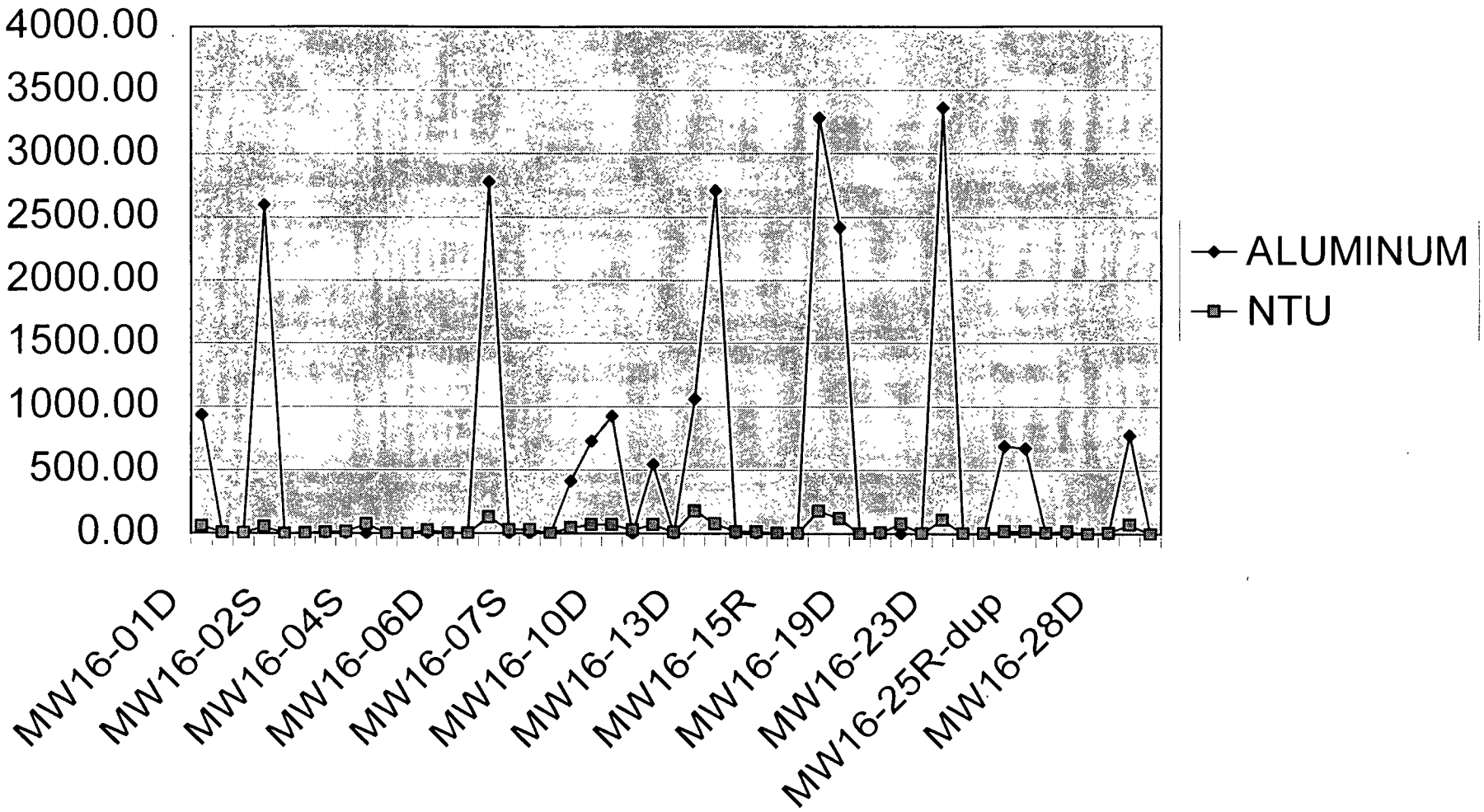
(LIMITED DISTRIBUTION SUBMITTED UNDER SEPARATE COVER BECAUSE OF LARGE SIZE)

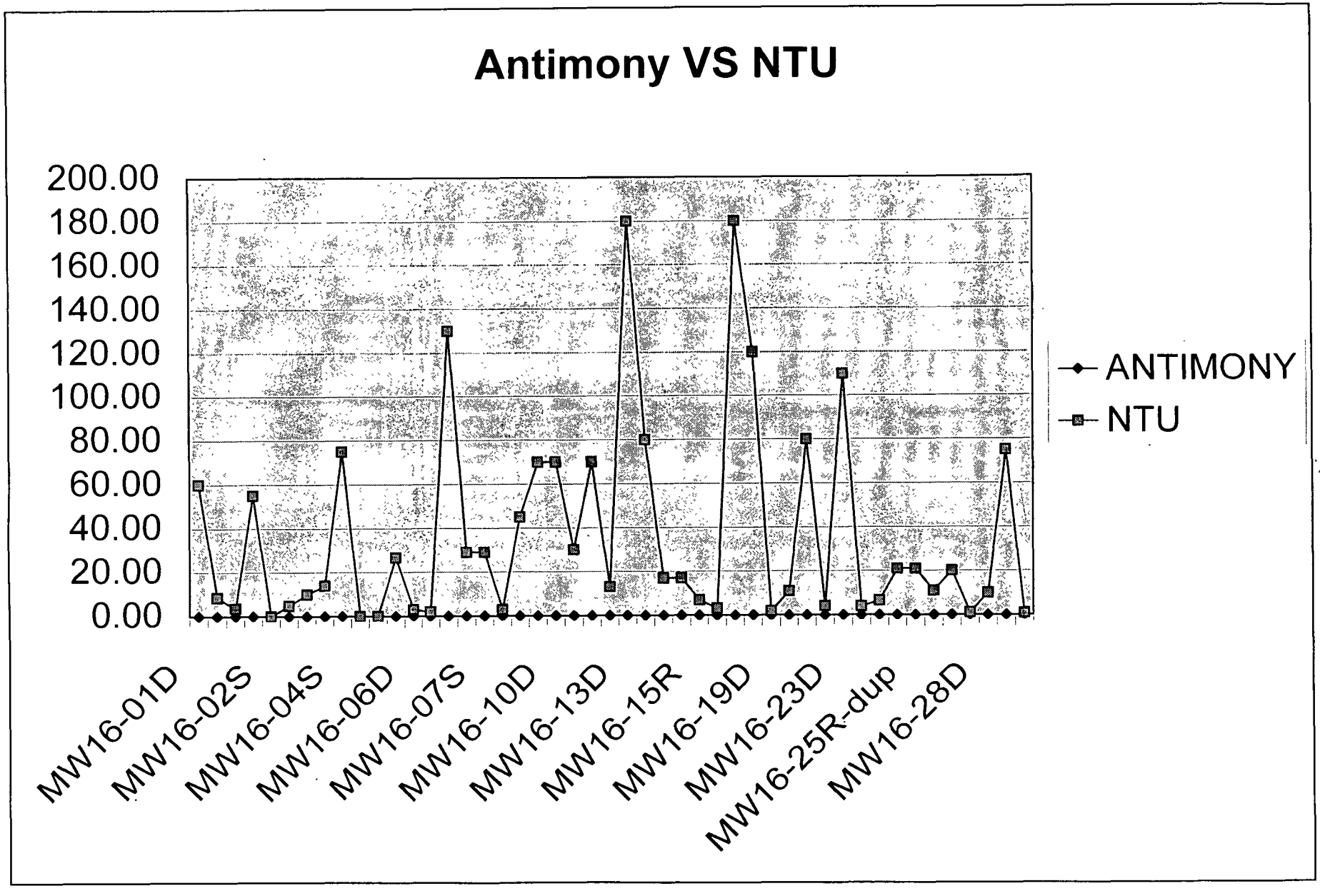
APPENDIX O
PHASE I RI SAMPLE DATA VALIDATION REPORTS

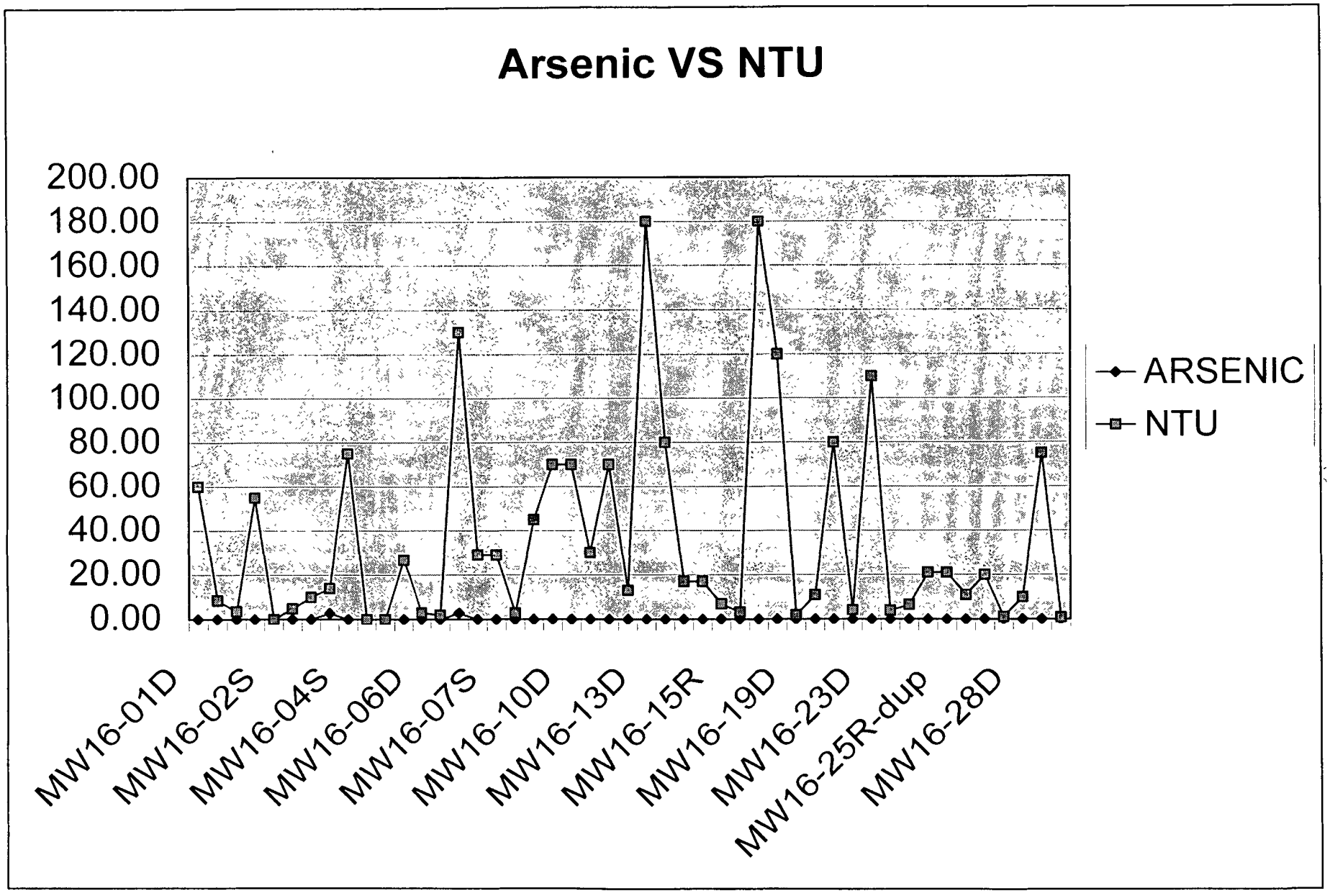
(LIMITED DISTRIBUTION SUBMITTED UNDER SEPARATE COVER BECAUSE OF LARGE SIZE)

APPENDIX P
GRAPHS FOR ASSESSMENT OF TURBIDITY (NTU) IMPACT ON METALS ANALYTICAL RESULTS FOR PHASE I RI GROUND-WATER SAMPLES

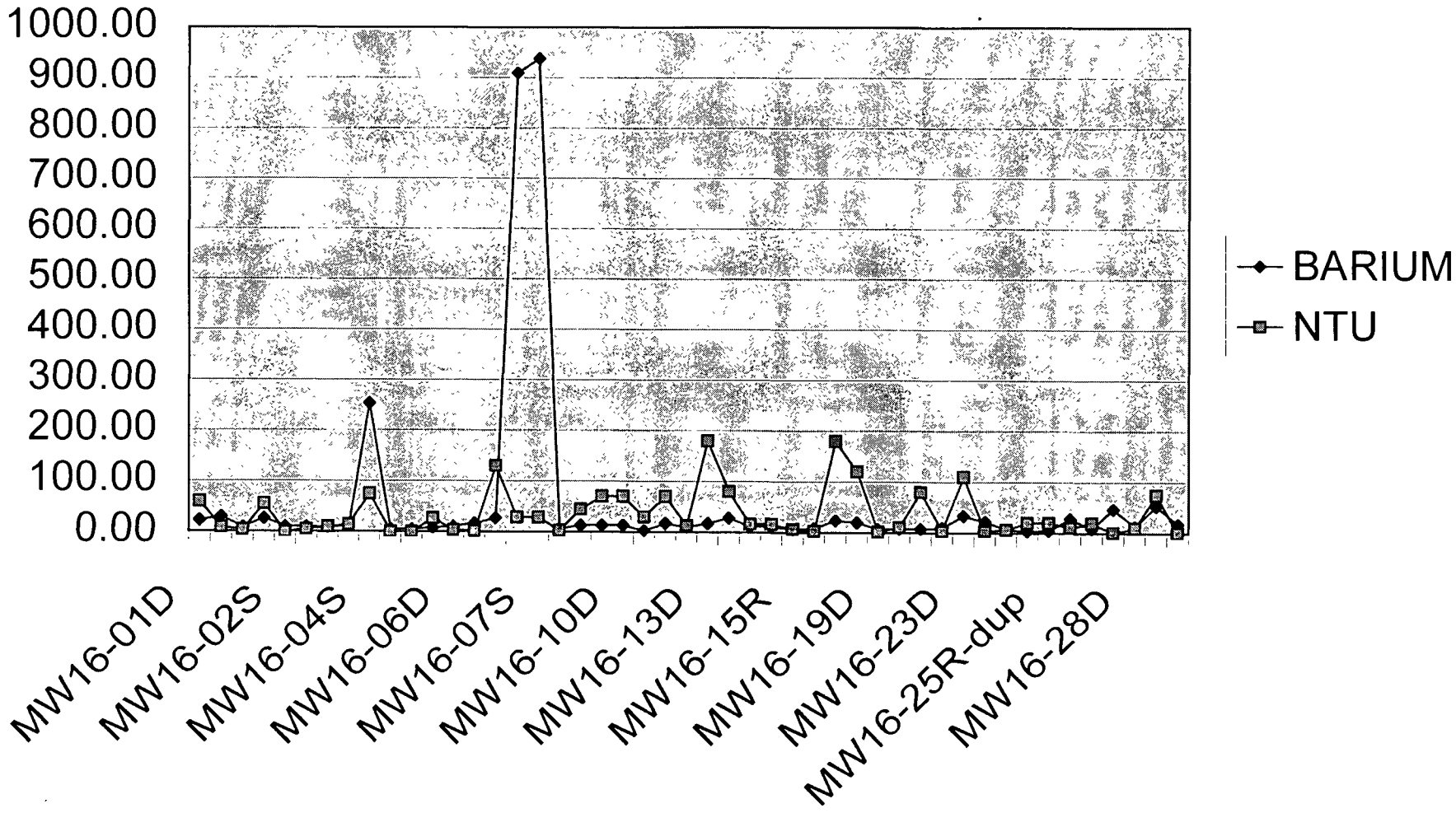
Aluminum VS NTU

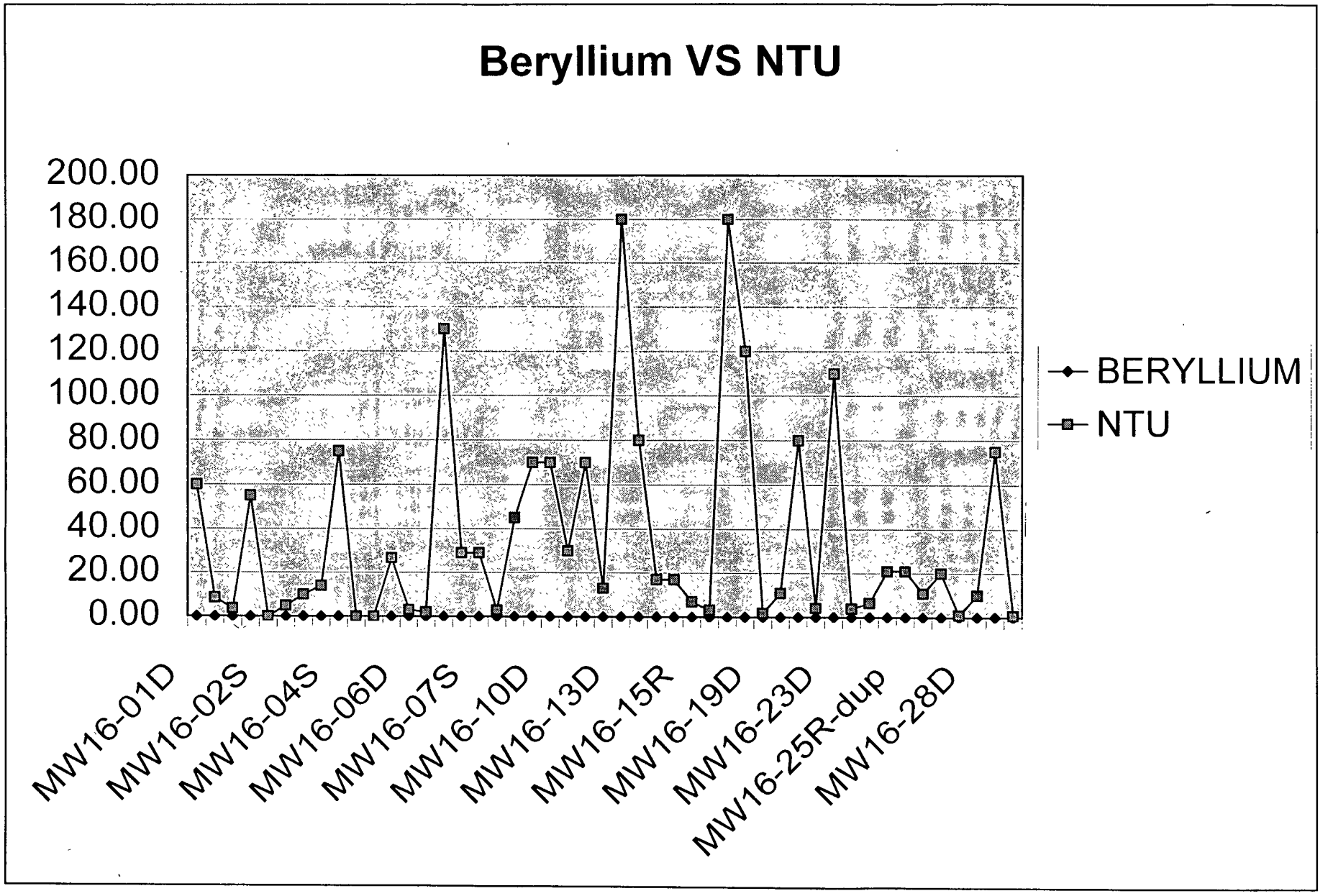


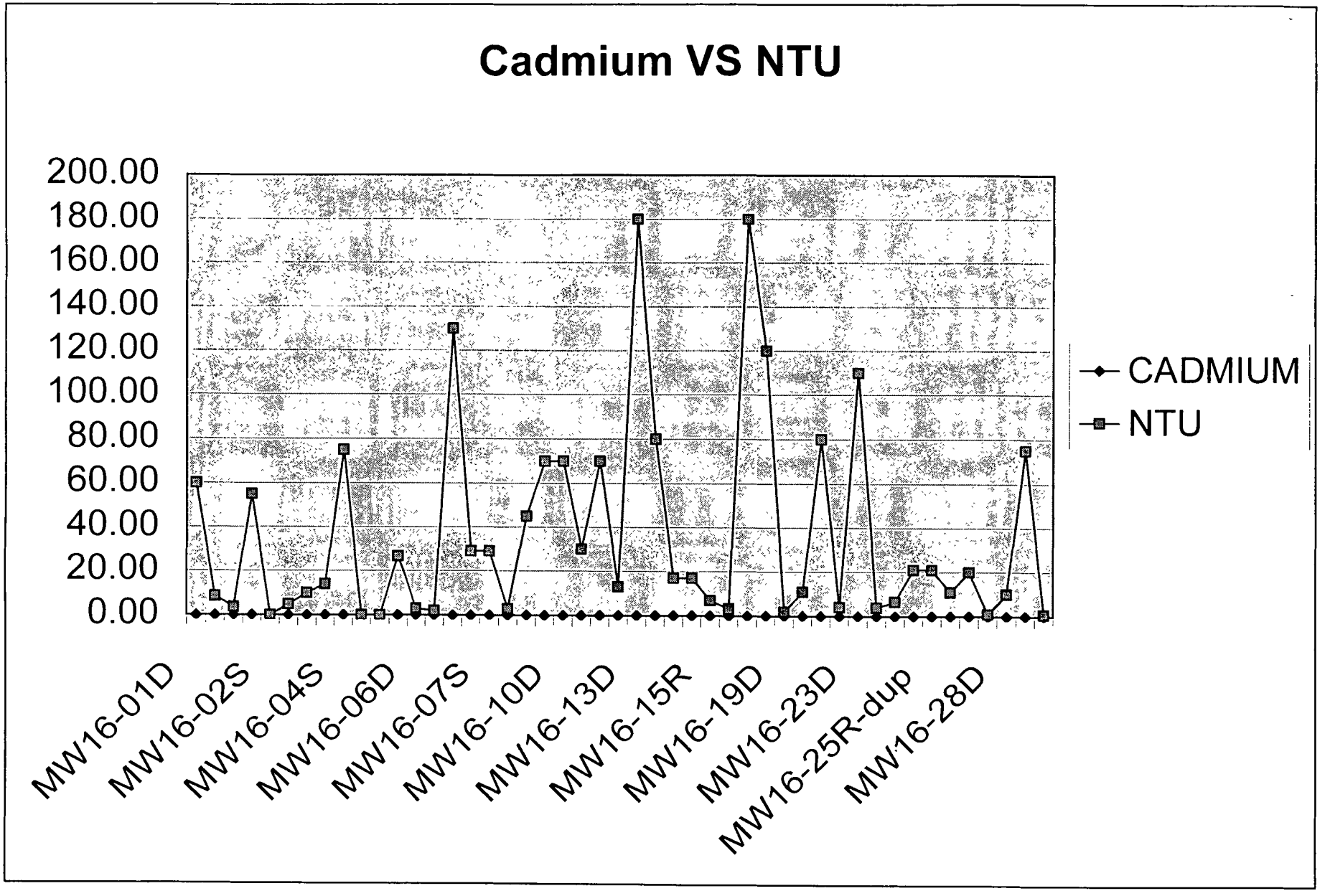

Antimony VS NTU
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
MW16-01D
MW16-02S
MW16-04S
MW16-06D
MW16-07S
MW16-10D
MW16-13D
MW16-15R
MW16-19D
MW16-23D
MW16-25R-dup
MW16-28D
ANTIMONY
NTU

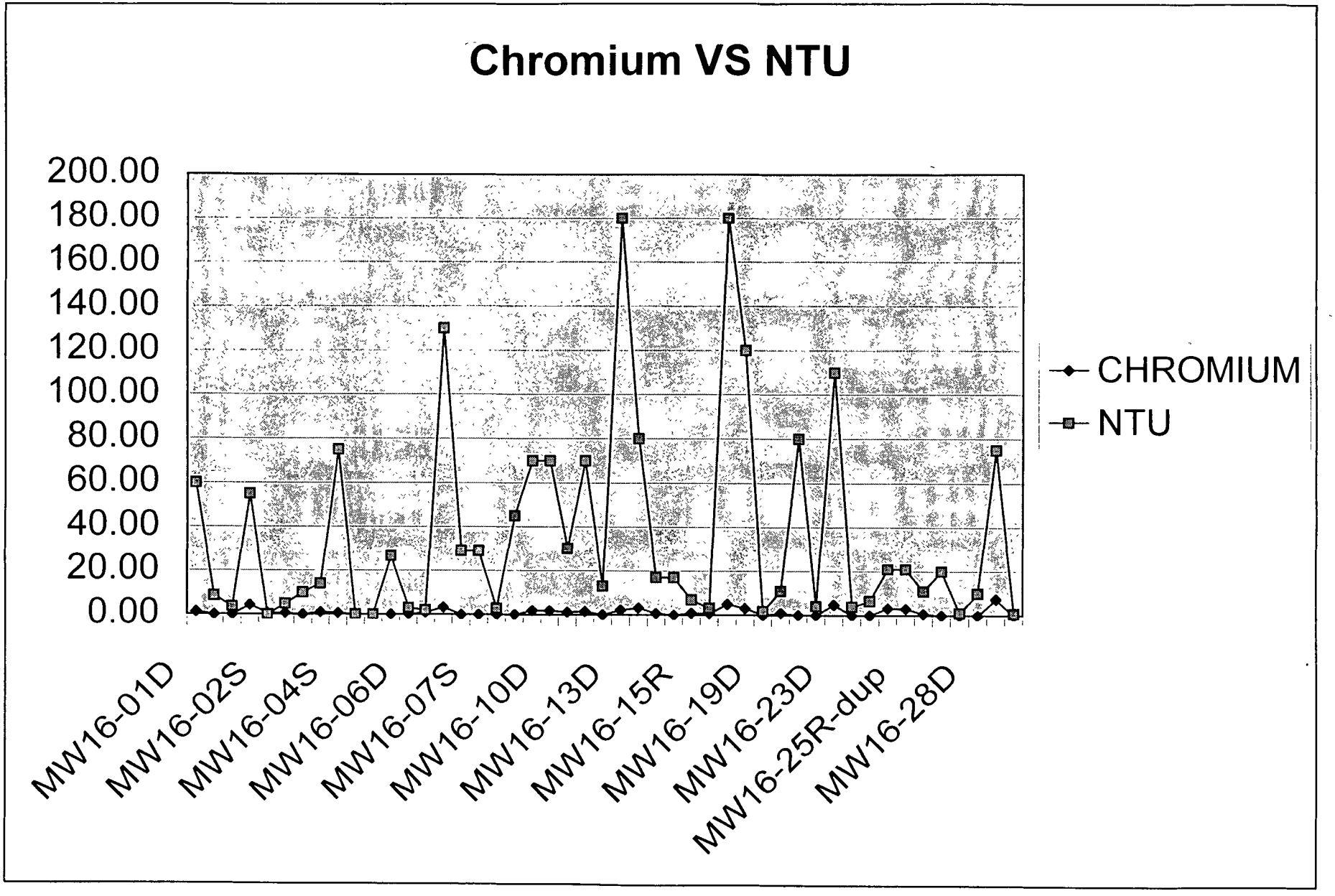

Arsenic VS NTU
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
MW16-01D
MW16-02S
MW16-04S
MW16-06D
MW16-07S
MW16-10D
MW16-13D
MW16-15R
MW16-19D
MW16-23D
MW16-25R-dup
MW16-28D
ARSENIC
NTU

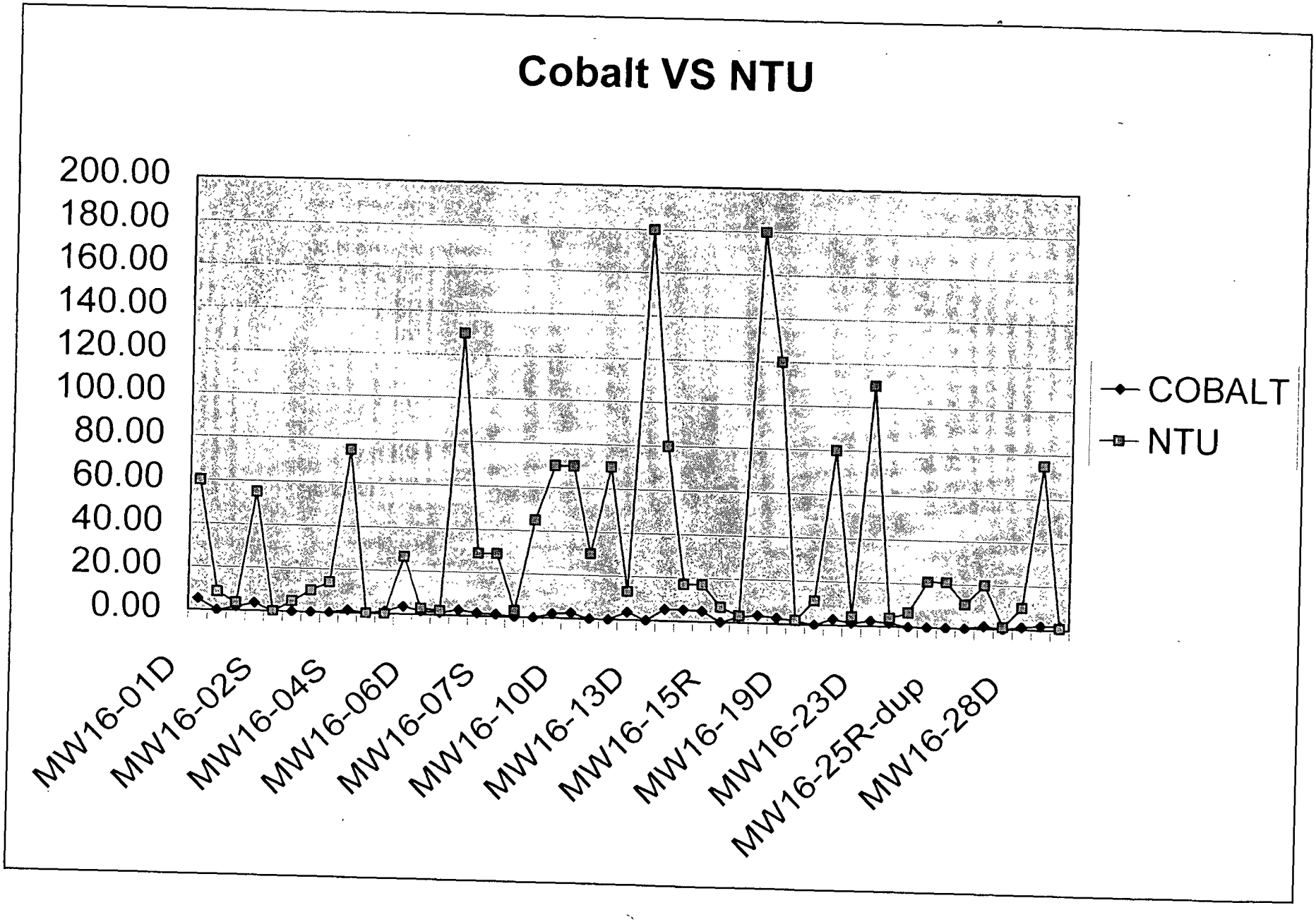
Barium VS NTU




Beryllium VS NTU
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
MW16-01D
MW16-02S
MW16-04S
MW16-06D
MW16-07S
MW16-10D
MW16-13D
MW16-15R
MW16-19D
MW16-23D
MW16-25R-dup
MW16-28D
BERYLLIUM
NTU


Cadmium VS NTU
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
MW16-01D
MW16-02S
MW16-04S
MW16-06D
MW16-07S
MW16-10D
MW16-13D
MW16-15R
MW16-19D
MW16-23D
MW16-25R-dup
MW16-28D
CADMIUM
NTU


Chromium VS NTU
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
MW16-01D
MW16-02S
MW16-04S
MW16-06D
MW16-07S
MW16-10D
MW16-13D
MW16-15R
MW16-19D
MW16-23D
MW16-25R-dup
MW16-28D
CHROMIUM
NTU


Cobalt VS NTU
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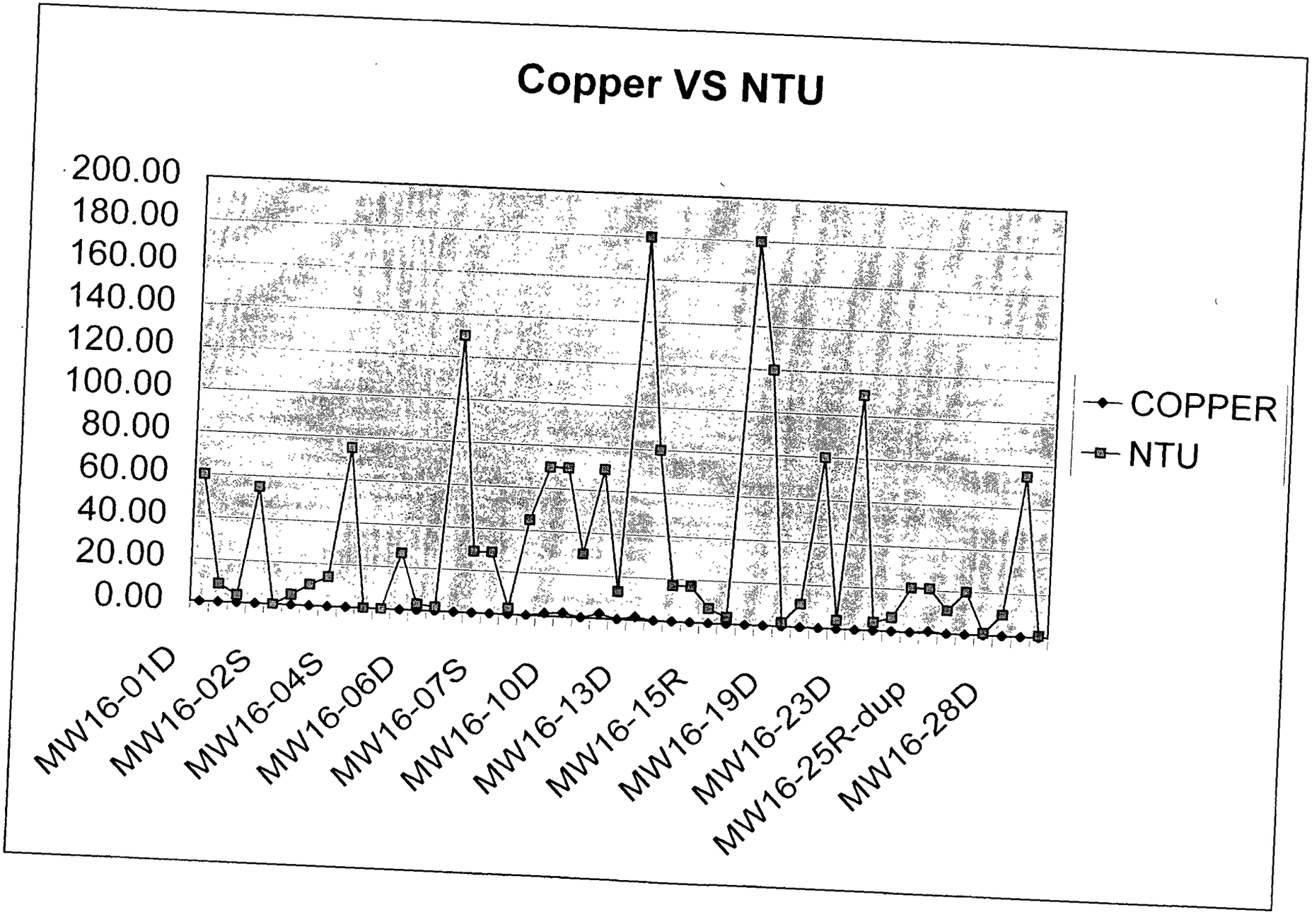
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
MW16-01D
MW16-02S
MW16-04S
MW16-06D
MW16-07S
MW16-10D
MW16-13D
MW16-15R
MW16-19D
MW16-23D
MW16-25R-dup
MW16-28D
COBALT
NTU


Copper VS NTU
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
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MW16-01D
MW16-02S
MW16-04S
MW16-06D
MW16-07S
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MW16-15R
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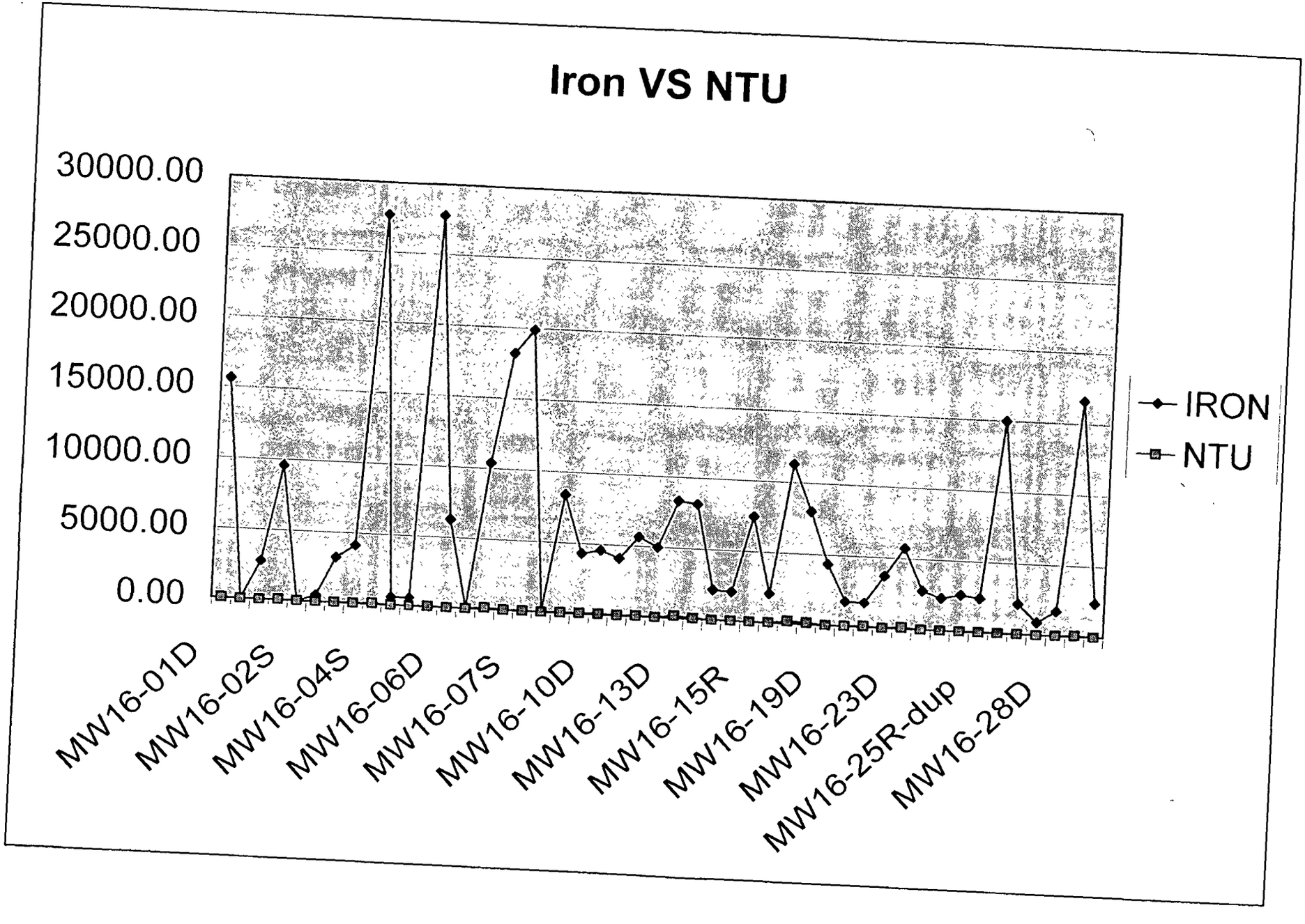
MW16-23D
MW16-25R-dup
MW16-28D
COPPER
NTU


Iron VS NTU
30000.00
25000.00
20000.00
15000.00
10000.00
5000.00
0.00
MW16-01D
MW16-02S
MW16-04S
MW16-06D
MW16-07S
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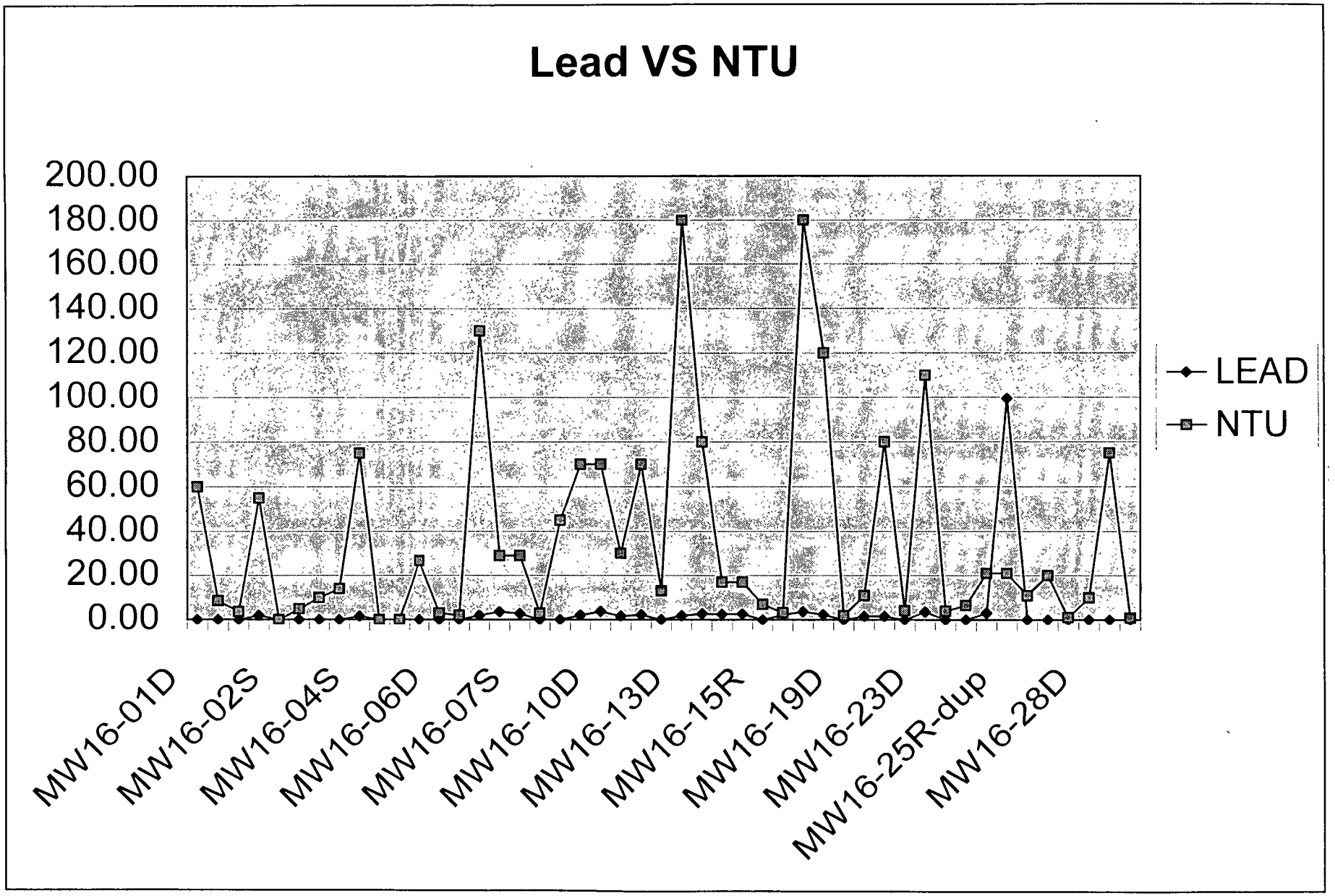
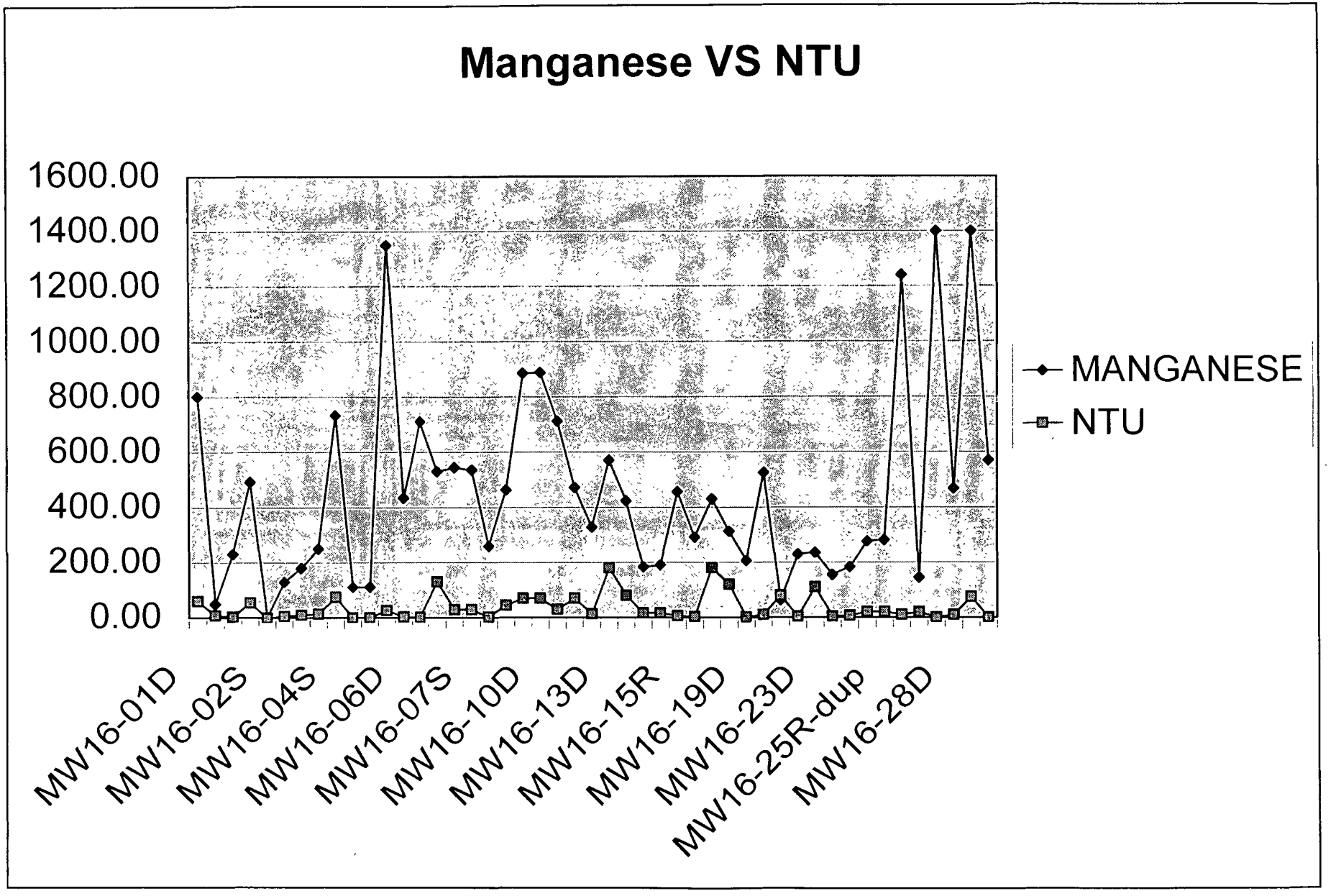
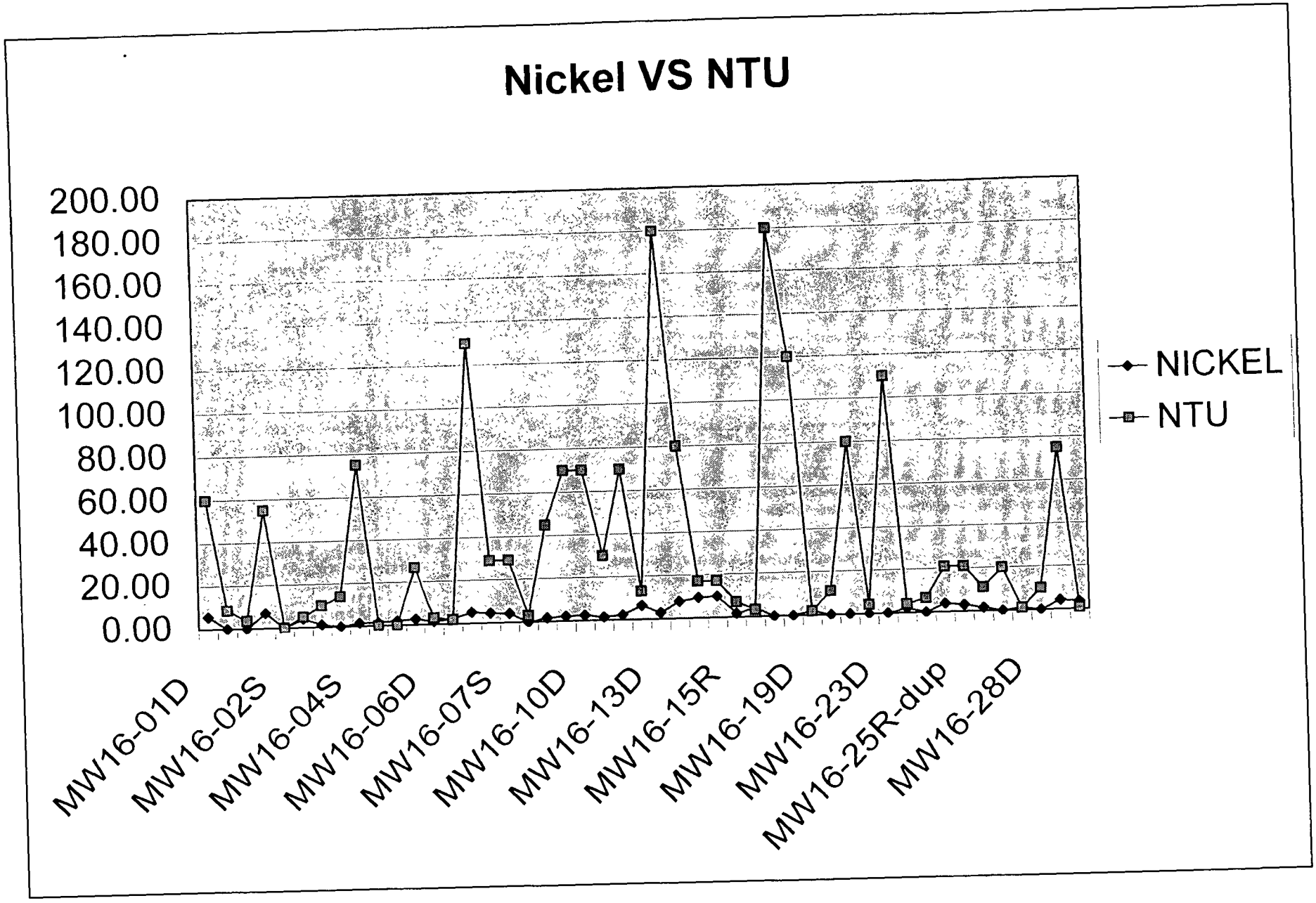
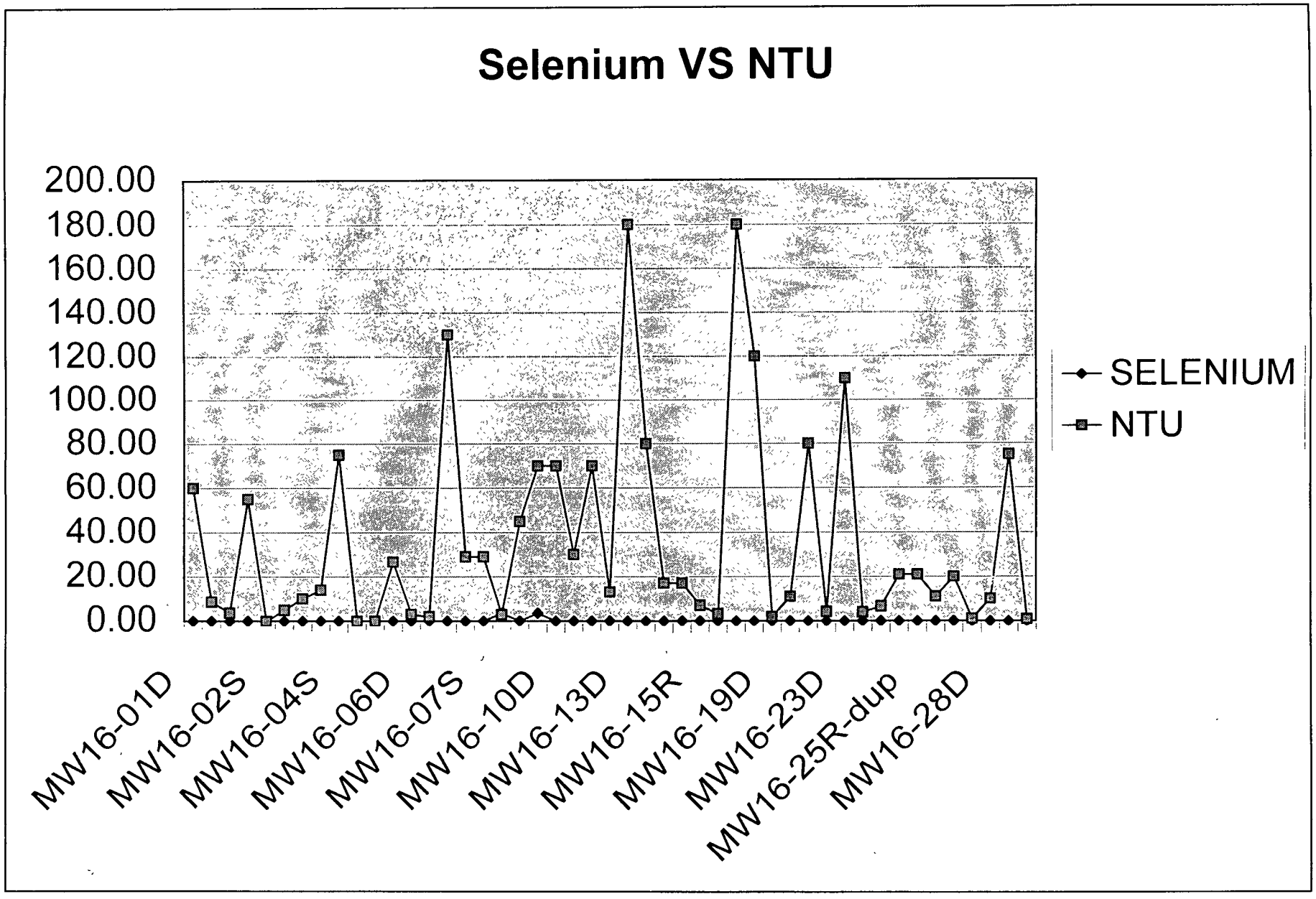
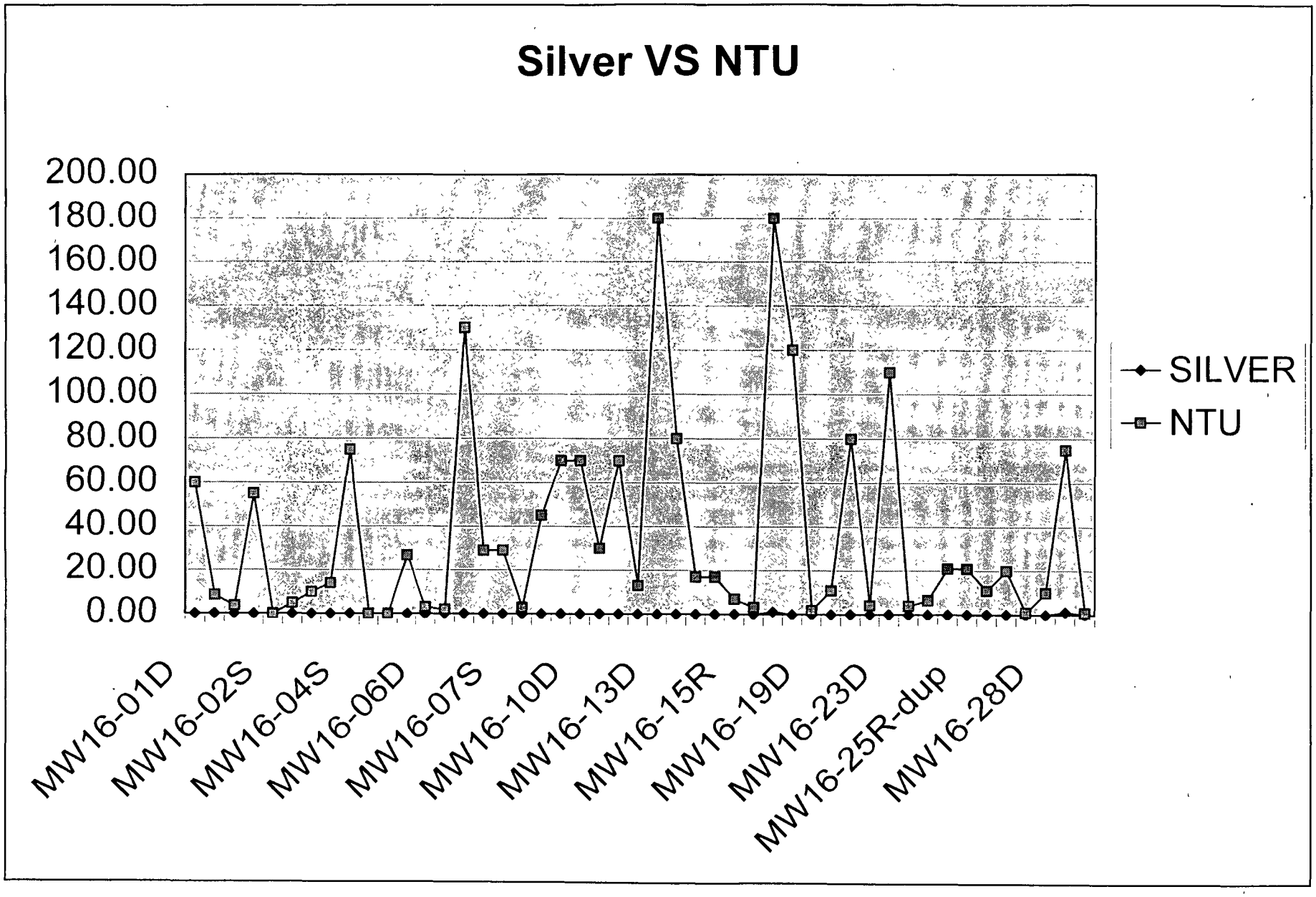
MW16-15R
MW16-19D
MW16-23D
MW16-25R-dup
MW16-28D
IRON
NTU


Lead VS NTU
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
MW16-01D
MW16-02S
MW16-04S
MW16-06D
MW16-07S
MW16-10D
MW16-13D
MW16-15R
MW16-19D
MW16-23D
MW16-25R-dup
MW16-28D
LEAD
NTU


Manganese VS NTU
1600.00
1400.00
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
MW16-01D
MW16-02S
MW16-04S
MW16-06D
MW16-07S
MW16-10D
MW16-13D
MW16-15R
MW16-19D
MW16-23D
MW16-25R-dup
MW16-28D
MANGANESE
NTU


Nickel VS NTU
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
MW16-01D
MW16-02S
MW16-04S
MW16-06D
MW16-07S
MW16-10D
MW16-13D
MW16-15R
MW16-19D
MW16-23D
MW16-25R-dup
MW16-28D
NICKEL
NTU


Selenium VS NTU
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
MW16-01D
MW16-02S
MW16-04S
MW16-06D
MW16-07S
MW16-10D
MW16-13D
MW16-15R
MW16-19D
MW16-23D
MW16-25R-dup
MW16-28D
SELENIUM
NTU


Silver VS NTU
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
MW16-01D
MW16-02S
MW16-04S
MW16-06D
MW16-07S
MW16-10D
MW16-13D
MW16-15R
MW16-19D
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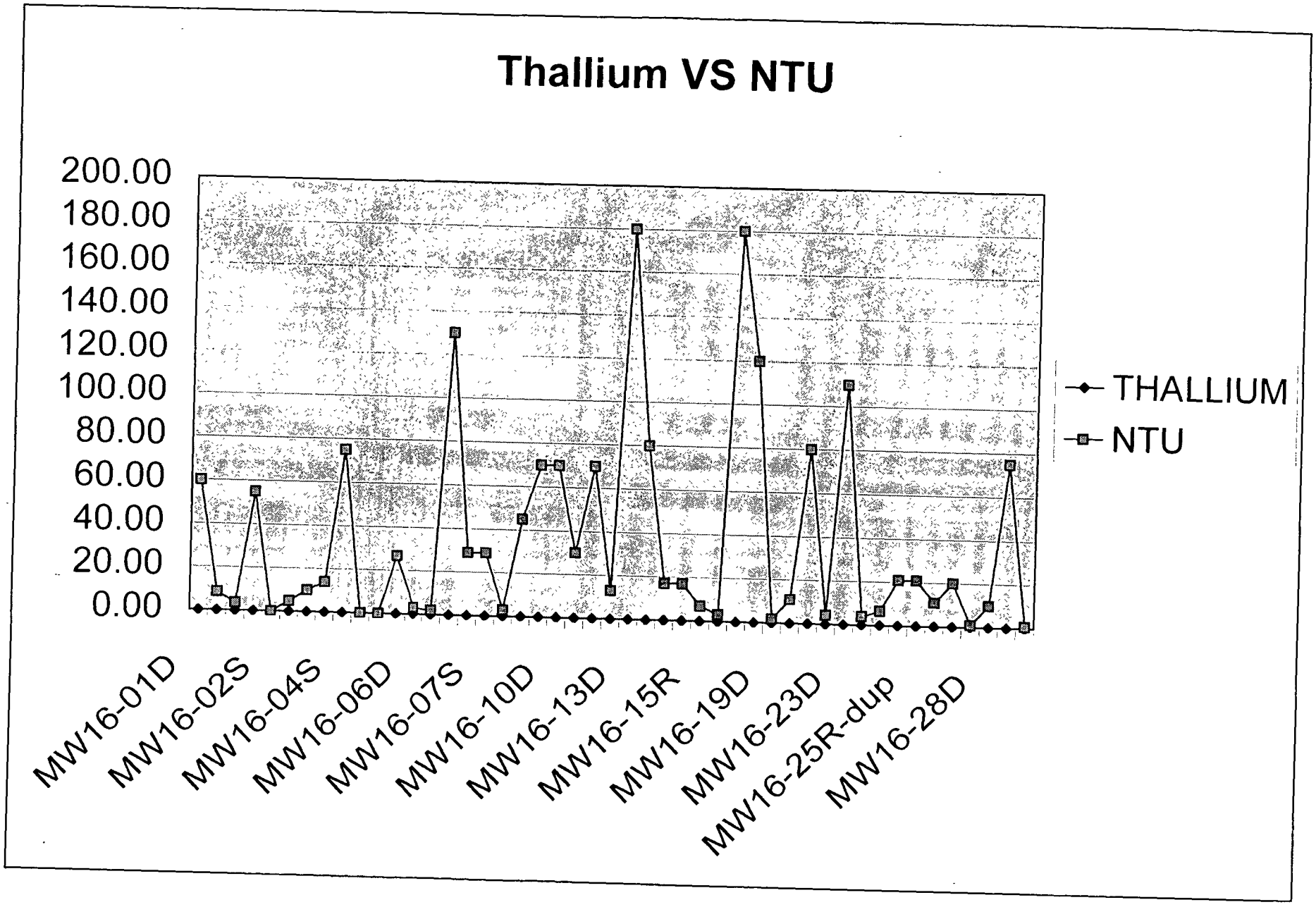
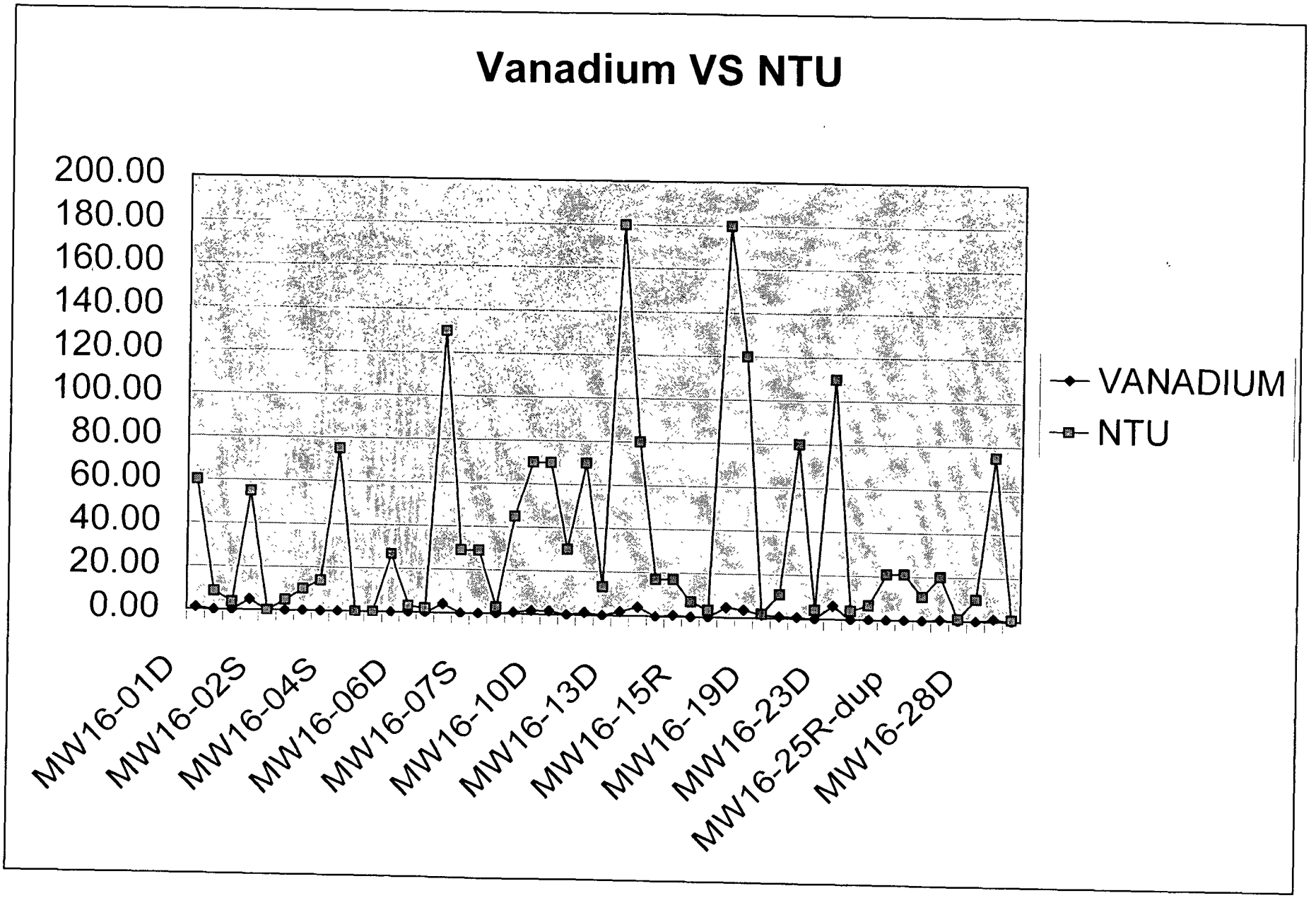
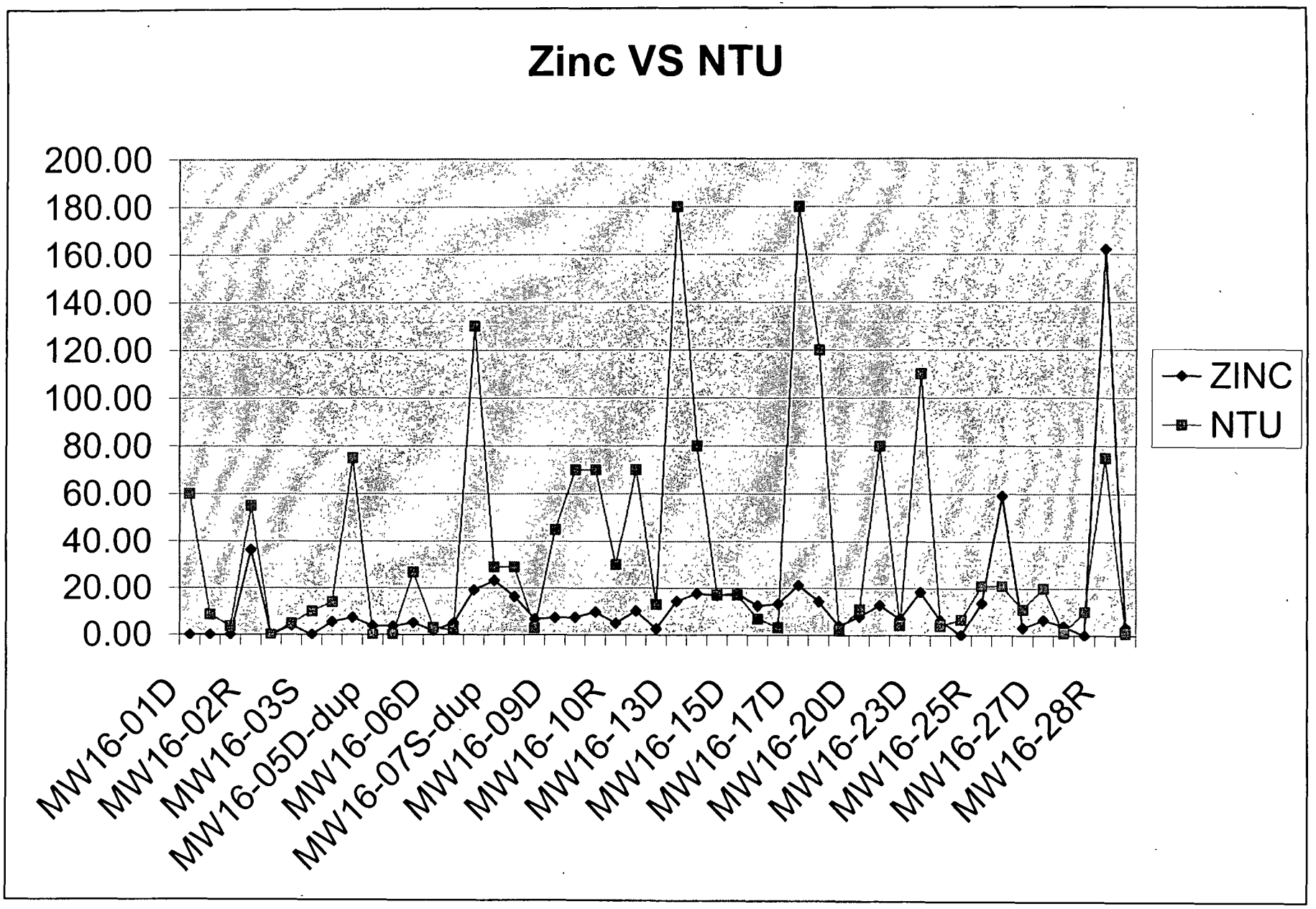
MW16-28D
SILVER
NTU


Thallium VS NTU
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
MW16-01D
MW16-02S
MW16-04S
MW16-06D
MW16-07S
MW16-10D
MW16-13D
MW16-15R
MW16-19D
MW16-23D
MW16-25R-dup
MW16-28D
THALLIUM
NTU


Vanadium VS NTU
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
MW16-01D
MW16-02S
MW16-04S
MW16-06D
MW16-07S
MW16-10D
MW16-13D
MW16-15R
MW16-19D
MW16-23D
MW16-25R-dup
MW16-28D
VANADIUM
NTU


Zinc VS NTU
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
MW16-01D
MW16-02R
MW16-03S
MW16-05D-dup
MW16-06D
MW16-07S-dup
MW16-09D
MW16-10R
MW16-13D
MW16-15D
MW16-17D
MW16-20D
MW16-23D
MW16-25R
MW16-27D
MW16-28R
ZINC
NTU