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NWIRP BETHPAGE  
5090.3a

ABBREVIATED WORK PLAN DECEMBER 2013 OUTPOST MONITORING WELL  
REHABILITATION (BPOW-4-1 AND BPOW 4-1) PRE-DESIGN FIELD INVESTIGATION  
OPERABLE UNIT 2 (OU 2 ) GROUNDWATER NWIRP BETHPAGE NY  
12/03/2013  
RESOLUTION COLSULTANTS

**ABBREVIATED WORK PLAN – DECEMBER 2013  
OUTPOST MONITORING WELL REHABILITATION (BPOW 4-1 and BPOW 4-2)  
PRE-DESIGN FIELD INVESTIGATION, OPERABLE UNIT 2 GROUNDWATER  
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP), BETHPAGE, NEW YORK**

This abbreviated work plan addendum has been prepared for the Mid-Atlantic Division of the Naval Facilities Engineering Command (NAVFAC) pursuant to Contract Task Order (CTO) WE15, issued under Comprehensive Long-term Environmental Action Navy (CLEAN) contract number N62470-11-D-8013. This abbreviated work plan addresses activities to be conducted at the Naval Weapons Industrial Reserve Plant (NWIRP) located in Bethpage, New York.

### **Scope and Objectives**

The objective of the field activities defined in this abbreviated work plan is to rehabilitate two outpost monitoring wells (BPOW 4-1 and BPOW 4-2) that have failed well integrity testing performed in September 2013 in accordance with the UFP SAP Addendum – Well Integrity Testing Investigation and Testing Protocol (Resolution Consultants, 2013). New 2-inch wells will be installed inside of the 4-inch casings. The rehabilitated outpost monitoring wells will be land surveyed and one round of groundwater samples will be collected for VOC analysis following repair. The location of the wells is shown on Figure 1.

### **Background**

As part of the Public Water Supply Contingency Plan (PWSCP) two outpost monitoring wells (BPOW 4-1 and 4-2) were installed for purposes of providing an early warning of potential impacts to the Levittown public water supply (5303). In May 2012, Trichlorotrifluoroethane (Freon 113) was detected in outpost well 4-1 at a concentration that met the established trigger value of 1.5 micrograms per liter (ug/L) for this well. As directed in the PWSCP, outpost well 4-1 was re-sampled and similar results were detected. The integrity of both of the wells was tested according to the procedures outlined in the UFP SAP Addendum – Well Integrity Investigation and Testing Protocol, and it was determined that both were compromised. Because of the potential for the migration of contaminated shallow groundwater to deeper intervals via the compromised wells, it is determined that they should be rehabilitated. Rehabilitation will be performed according to the UFP SAP Addendum – Outpost Monitoring Well Rehabilitation (Resolution Consultants, 2013).

### **Well Repair Task Plan**

Details of the repair plan are provided below. All aspects of the field investigation specified in the UFP SAP Addendum - Outpost Monitoring Well Rehabilitation - Operable Unit 2 (Resolution Consultants, 2013) will be followed.

### **Outpost Monitoring Well Installation**

The construction of the 2-inch wells will be as close as possible to the original construction of the existing outpost wells. Specifications for the existing wells are listed in Table 1. BPOW 4-1 has a total well depth of 692 feet (ft) below ground surface (bgs). The screened interval is 652 to 692 ft bgs. BPOW 4-2 has a total well depth of 765 ft bgs. The screened intervals are 725 to 735 ft bgs and 745 to 765 ft bgs. The repair of BPOW 4-2 will be finished off with one 40 foot screen. The boring logs and well construction logs for the two outpost monitoring wells are provided in Appendix A.

The 2-inch wells will be installed to the same depth as the original outpost monitoring wells. The wells will be constructed of 2-inch diameter, Schedule 80, National Sanitation Foundation-approved polyvinyl chloride (PVC) well screen and riser pipe. The well screens will have slot sizes of 0.010 inches (10 slot). Threaded bottom caps will be fitted to the bottom of each well. All pipe sections and bottom caps will be flush-jointed and flush-threaded.

Primary filter packs will be installed in the annuli around the well screens. The filter packs will consist of FilterPro #1 quartz sand installed using a tremie pipe. The depths of the primary filter pack for BPOW 4-1 and BPOW 4-2 are listed in Table 1. For BPOW 4-1, the original primary filter pack is approximately 70 ft thick. For BPOW 4-2, the original primary filter pack is approximately 60 ft thick. The replacement primary filter pack for both BPOW 4-1 and 4-2 will be 65 feet thick to follow the current work practices.

Secondary filter packs comprised of a finer sand (FilterPro #0 quartz sand) will be installed in the annulus around the well riser above the primary filter pack. The depths of the secondary filter pack for BPOW 4-1 and BPOW 4-2 are listed in Table 1. For BPOW 4-1, the secondary filter pack is approximately 20 ft thick. For BPOW 4-4, the secondary filter pack is approximately 15 ft thick.

A 2- to 4-foot thick bentonite seal will be installed above the secondary filter pack. The annulus above the bentonite seal will be grouted with high-solids bentonite slurry. Both the bentonite seal and bentonite slurry will be installed using a tremie pipe.

The existing BPOW 4-1 has a K packer and 2-inch stainless steel screen inside the 4-inch casing. The K packer and screen will be removed and properly disposed.

### **Monitoring Well Development and Groundwater Sample Collection**

BPOW 4-1 and 4-2 will be developed using a combination of air lift and mechanical surging. Field parameters, including pH, temperature, specific conductivity, and turbidity will be monitored and recorded throughout well development.

Well development of BPOW 4-1 and 4-2 will also include purging stagnant water from the well above the screen interval and rinsing the interior well casing above the water table using only water from that well. The well will be covered with a clean well cap.

In compliance with New York State Department of Environmental Conservation (NYSDEC) policy, wells will be developed until turbidity is less than 50 nephelometric turbidity units (NTU). However, in some instances, the 50 NTU standard may not be attainable. If after a "best well development effort", the 50 NTU standard cannot be attained and turbidity stabilizes (above the 50 NTU standard), the well will be considered acceptable.

After initial sampling, which will be conducted according to the UFP SAP Addendum - Groundwater Sampling Using Low Stress (Low Flow) Purging and Sampling Protocol (Resolution Consultants, 2013), a dedicated sampling pump system may be installed in the monitoring wells. These pumps will be 3-inch variable speed submersibles with an associated packer system. The pumps will be installed at a depth of approximately 20 feet above the screen interval, but no deeper than 500 feet below top of well casing.

### **IDW**

Investigation Derived Waste (IDW) accumulated during drilling activities will be collected, containerized, accumulated at NWIRP Bethpage, and disposed off-site. All IDW activities will be consistent with the UFP SAP Addendum – VPB and Monitoring Well Installation and Sampling (Resolution Consultants, November 2013).

## **Decontamination**

A centrally located decontamination pad at NWIRP Bethpage will be used for the collection of all decontamination-generated fluids. All decontamination fluids will be collected and staged for characterization and subsequent disposal. All decontamination activities will be consistent with the UFP SAP Addendum – VPB and Monitoring Well Installation and Sampling (Resolution Consultants, November 2013).

## **Surveying**

Upon completion of the well repair, BPOW 4-1 and 4-2 will be surveyed by a New York State licensed surveyor. All surveying activities will be consistent with the UFP SAP Addendum – VPB and Monitoring Well Installation and Sampling (Resolution Consultants, November 2013).

## **Data Validation**

Data validation will be conducted for the VOC groundwater samples scheduled for analyses. Data will be reviewed and qualified in accordance with the requirements of the EPA National Functional Guidelines, modified as appropriate for the DoD Quality Systems Manual (QSM) version 4.2 and method-specific requirements. The TOC data and data generated for waste characterization will not be validated or reviewed. Validation will consist of reviewing of the associated QA/QC samples and measurement performance indicators as presented on the summary forms provided in the laboratory deliverable, and will not include confirmation of calculations or review of raw data. The results of the data validation will be documented in reports which will detail any issues impacting the data quality along with qualifications affecting data bias and usability. All data validation activities will be consistent with the UFP SAP Addendum – VPB and Monitoring Well Installation and Sampling (Resolution Consultants, November 2013)

## **Reporting**

A summary report will be developed to provide documentation of this investigation. Documentation required to support this project will consist of the following items:

- Field notebook
- Groundwater and air sample log sheets
- Well completion form for each well
- Well development record
- Map identifying newly repaired outpost monitoring wells.

## **Tables**

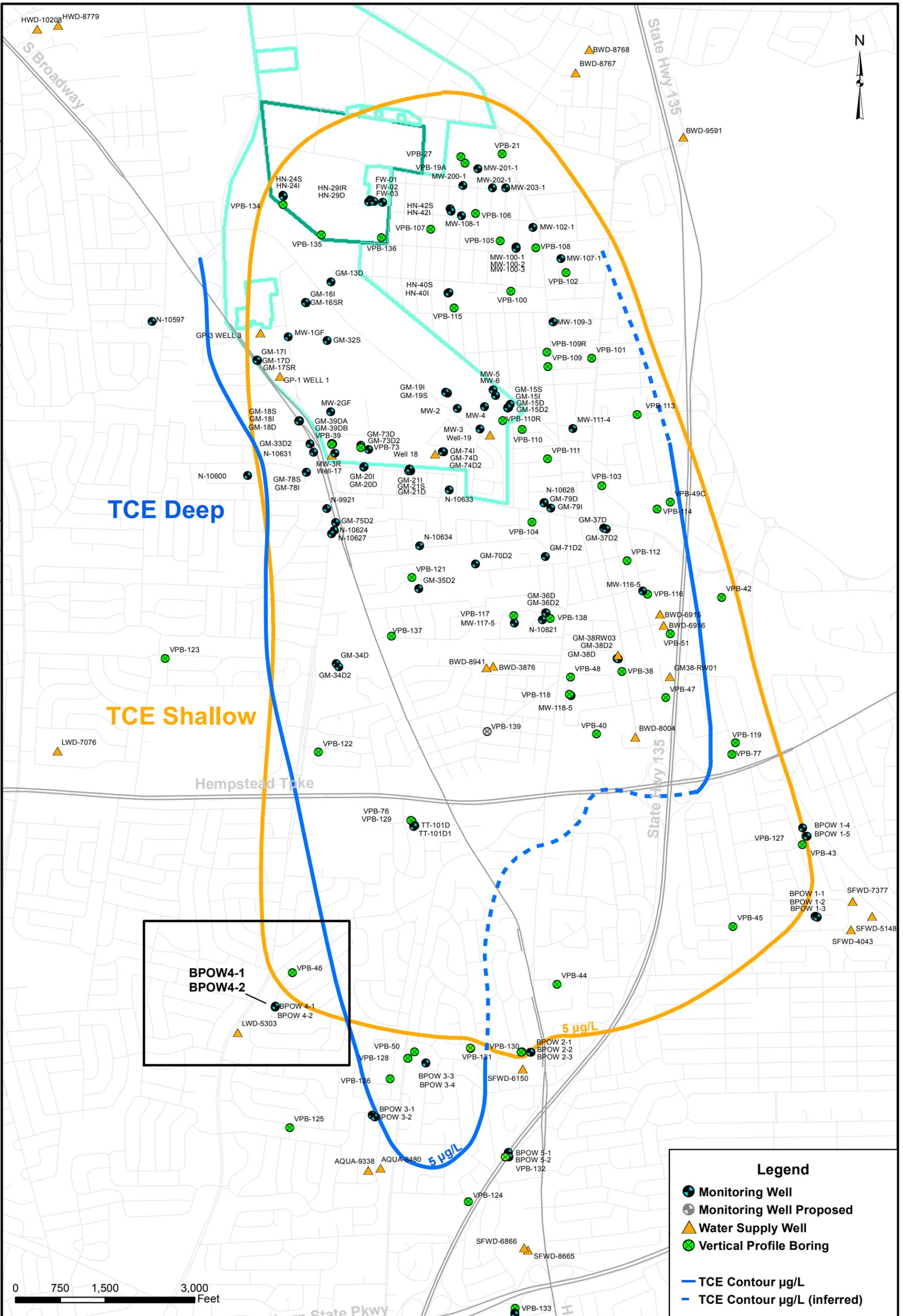
**Table 1**  
**Outpost Monitoring Well Summary**  
**Pre-Design Field Investigation Analysis**  
**Page 1 of 1**

<b>Well Number</b>	<b>Casing Set (ft bgs)</b>	<b>Total Depth (ft bgs)</b>	<b>Total Well Depth (ft bgs)</b>	<b>Screened Interval (ft bgs)</b>	<b>Top of Primary Sand Pack (ft bgs)</b>	<b>Top of Secondary Sand Pack (ft bgs)</b>	<b>Comments</b>
BPOW4-1	87	700	692	652-692	620	602	Primary filter pack will be brought up to 627 feet
BPOW4-2	100	780	765	725-735 and 745-765	705	690	Well will have a 40 ft screen; Primary filter pack will be brought up to 700 feet

ft bgs: feet below ground surface

Blank Sect.: schedule 80 PVC riser place between screened sections of the well

## **Figures**



**BPOW4-1**  
**BPOW4-2**



LOCATION OF BPOW4-1 AND BPOW4-2  
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT  
BETHPAGE, NEW YORK

CONTRACT NUMBER N62470-11-D8013		CTO NUMBER WE15	
APPROVED BY	DATE	APPROVED BY	DATE
APPROVED BY	DATE	APPROVED BY	DATE
FIGURE NO.	1	REV	0

**Appendix A**  
**Outpost Monitoring Well Completion Logs and Boring Logs**



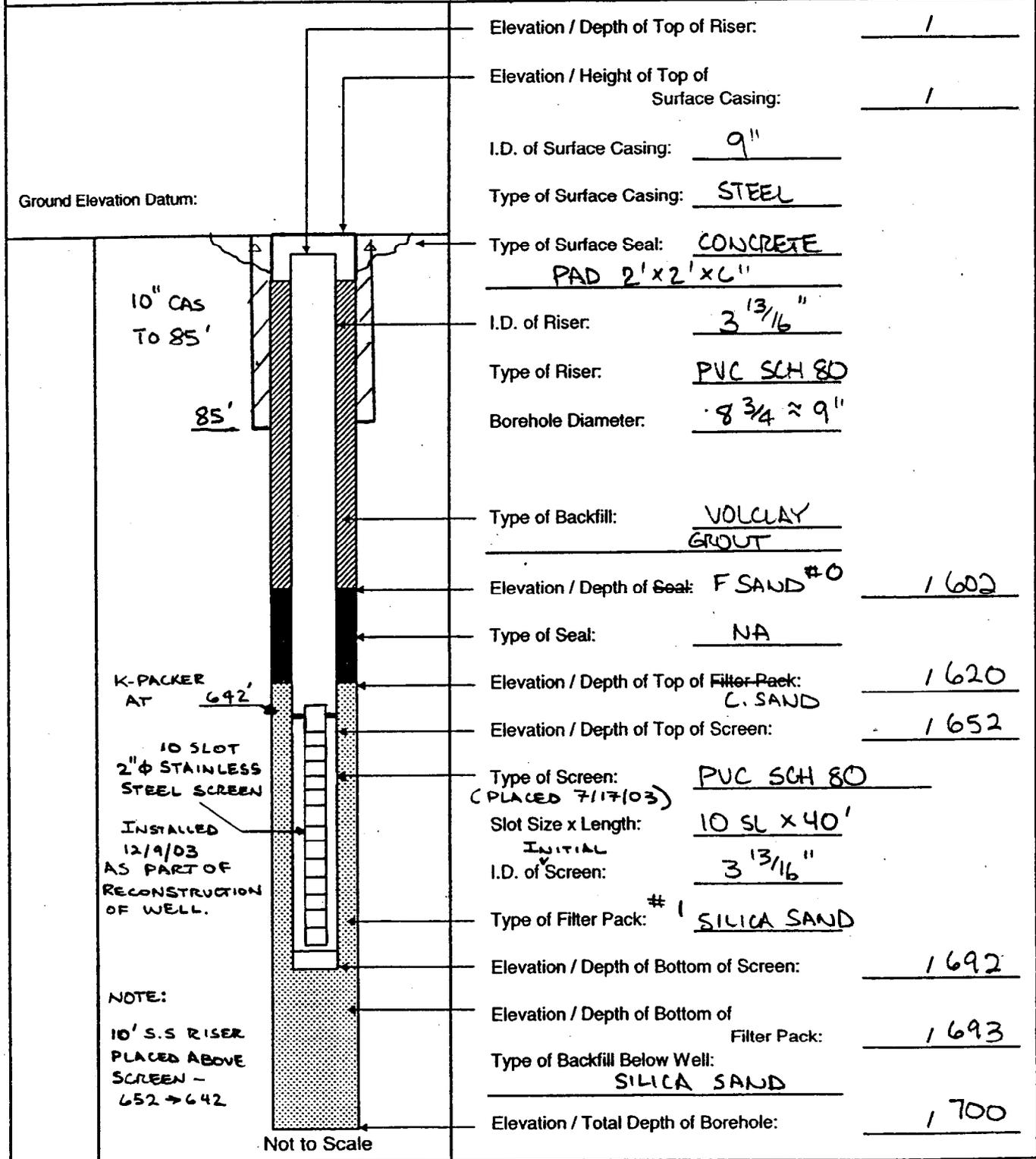
Tetra Tech NUS, Inc.

WELL No.: BPOW4-1

**MONITORING WELL SHEET**

PERMIT No:

PROJECT:	<u>NWIRP</u>	DRILLING Co.:	<u>UNITECH</u>	BORING No.:	<u>BPOW4-1</u>
PROJECT No.:	<u>N4037</u>	DRILLER:	<u>BLEMMINGS</u>	DATE COMPLETED:	<u>7/17/03</u>
SITE:	<u>BETHPAGE</u>	DRILLING METHOD:	<u>MUD ROT</u>	RECONSTRUCTED	<u>2 → 12/9/03</u>
GEOLOGIST:	<u>CONTI</u>	DEV. METHOD:	<u>AIR/PUMP</u>	NORTHING:	
				EASTING:	





# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: FAILING 1500

BORING No.: BPOW4-1  
 DATE: 7-8-03  
 GEOLOGIST: Conti / Shickora  
 DRILLER: J BLEMINGS

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)				
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole*	Driller BZ**	
	0	/					TOP 6" TOPSOIL							
	10	/					SAND AND GRAVEL		(FROM CUTTINGS)					0
	20	/												0
	30	/												0
	40	/					SAND AND GRAVEL		1" $\phi$ SUB ROUND FROM CUTTINGS					0
	50	/												0

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: START W 8"  $\phi$  MUD ROTARY - REAM TO 12" TO SET 10" CASING.

Drilling Area Background (ppm): 0

Converted to Well: Yes  No  Well I.D. #: BPOW4-1



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: FAILING 1500

BORING No.: BPOW 4-1  
 DATE: 7-8-03 / 7-9-03  
 GEOLOGIST: Conti  
 DRILLER: J BLEMINGS

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD Recovery (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)				
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**	
	50	/			DENSE		SAND AND GRAVEL							0
	60	/												
	70	/												0
	80	/					SAND							
	90	/					CLAYEY SAND		± 90'					0
	100	/					Sand and Gravel		1/4" φ Sub round					0

7/8  
7/9

7/11  
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\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Ream to 12" φ ON 7-10-03  
Set 10" CASING TO 85' ON 7-10-03  
8 3/4" φ drilling from 85' to T.D.

Drilling Area  
Background (ppm):

Converted to Well: Yes  No  Well I.D. #: BPOW 4-1



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: FAILING 1500

BORING No.: BPOW4-1  
 DATE: 7-11-03 / 7-14-03  
 GEOLOGIST: Conti / Shickora  
 DRILLER: J BLEMINGS

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)							
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**				
	100	/	/														
	1055	110	/				Sand (Trace gravel)		(from cuttings)								0
	0925		/														
	120		/				Sand + Gravel		1/2" $\phi$ sub round								
	1050	130	/				Sand and Gravel		1" $\phi$ sub round from cuttings								0
	1445	140	/														
	1515	150	/				clayey Sand + Gravel		1" $\phi$ sub round								0

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7/11  
7/14  
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\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area  
 Background (ppm):

Converted to Well: Yes  No \_\_\_\_\_ Well I.D. #: BPOW 4-1



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: Failing 1500

BORING No.: BPOW 4-1  
 DATE: 7-14-03  
 GEOLOGIST: Conti / Shickora  
 DRILLER: J. Blening

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)				
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**	
	150	/												
	1540/160	/					Sand + Gravel		1" $\phi$ subround					0
	1617/170	/					Same as above							0
	1647/180	/												
	1719/190	/					Same as above							0
	200	/												

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7/14  
7/15  
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\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area Background (ppm): 0

Converted to Well: Yes  No  Well I.D. #: BPOW 4-1



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: Failing 1500

BORING No.: BPOW 4-1  
 DATE: 7-15-03  
 GEOLOGIST: Conti Shickoff  
 DRILLER: J. Blenkins

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Fl.) or Screened Interval	MATERIAL DESCRIPTION			U S C S .	Remarks	PID/FID Reading (ppm)							
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**				
	200	/															
	0930 210	/					Clayey Sand (Trace gravel)		From cuttings								0
	220	/															
	1005 230	/					Sandy Silt + Clay		From cuttings								0
	240	/					Same as above										0
	1033 250	/					Sand (Trace clay)										0

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area  
 Background (ppm):

Converted to Well: Yes  No  Well I.D. #: BPOW 4-1



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: Falling 1500

BORING No.: BPOW 4-1  
 DATE: 7-15-03  
 GEOLOGIST: Conti Shickora  
 DRILLER: J. Blenkins

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)								
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**					
	250	/																
	260	/																
1059	270	/					Black Sand (Trace Silt/clay) Some lignite		From cuttings									0
	280	/																
1123	290	/					Sand (some clay)		From cuttings									0
	300	/																

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area  
 Background (ppm):

Converted to Well: Yes  No  Well I.D. #: BPOW 4-1



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: Falling 1500

BORING No.: BPOW 4-1  
 DATE: 7-15-03  
 GEOLOGIST: Genti Shickora  
 DRILLER: J-Blenings

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)							
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**				
	300	/	/														
1151	310	/	/				Sand (some clay)		From cuttings								0
	320	/	/														
1320	330	/	/				Same as above		From cuttings								0
	340	/	/														
1957	350	/	/				Same as above		From cuttings								0

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area  
 Background (ppm):

Converted to Well: Yes  No  Well I.D. #: BPOW 4-1



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: Falling 1500

BORING No.: BPOW 4-1  
 DATE: 7-15-03  
 GEOLOGIST: Conti Shickora  
 DRILLER: J. Blenkins

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)								
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**					
	350	/																
	360	/																
1423	370	/					Sand (Trace silt/clay)		From cuttings									0
	380	/																
1455	390	/					Same as above		From cuttings									0
	400	/																

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area  
 Background (ppm): 0

Converted to Well: Yes  No  Well I.D. #: BPOW 4-1



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: Fairing 1500

BORING No.: BPOW 4-1  
 DATE: 7-15-03  
 GEOLOGIST: Conti Shickora  
 DRILLER: J. Blenings

Sample No. and Type or ROD	Depth (Ft.) or Run No.	Blows / 6" or RGD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)								
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**					
	400	/																
1521	410	/					Same as above		From cuttings									0
	420	/																
1605	430	/					Sandy clay (Trace silt)		From cuttings									0
	440	/																
1642	450	/					Same as above											0

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7/15

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No \_\_\_\_\_ Well I.D. #: BPOW 4-1



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: Failing 1500

BORING No.: BPOW 4-1  
 DATE: 7-15-03  
 GEOLOGIST: Contr Shickora  
 DRILLER: J. Blenkins

Sample No. and Type or RQD	Depth (FT.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)								
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**					
	450	/	/															
	460	/	/															
0940	470	/	/				Sand (Trace Silt and clay and Lignite)		From cuttings									0
	480	/	/															
1009	490	/	/				Same as above		From cuttings									0
	500	/	/															

7/16  
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\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area Background (ppm):

Converted to Well: Yes  No  Well I.D. #: BPOW4-1



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: Failing 1500

BORING No.: BPOW 4-1  
 DATE: 7-16-03  
 GEOLOGIST: Conti Shickora  
 DRILLER: J. Blenkins

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
	500	/					Same as above		From cuttings				0
1038	510	/					Sand (Trace silt and clay)						
	520	/											
1103	530	/					Same as above		From Cuttings				0
	540	/											
1132	550	/					Same as above		From Cuttings				0

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area  
 Background (ppm):

Converted to Well: Yes  No  Well I.D. #: BPDWA-1



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: Failing 1500

BORING No.: BPOW 4-1  
 DATE: 7-16-03  
 GEOLOGIST: Conti Shickora  
 DRILLER: J. Blenings

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)							
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**				
	550	/															
	560	/															
1334	570	/					Sand (Trace fine gravel + lignite)		From cuttings								0
	580	/															
1402	590	/					Sand (Trace clay and gravel)		From cuttings								0
	600	/															

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area  
 Background (ppm):

Converted to Well: Yes  No  Well I.D. #: BPOW 4-1



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: Failing 1500

BORING No.: BPOW 4-1  
 DATE: 7-16-03  
 GEOLOGIST: Conti - Shickora  
 DRILLER: J. Blenings

Sample No. and Type or RQD	Depth (FT.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FT.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)								
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**					
	600	/																
1433	610	/					Sand (Trace clay and lignite)		From cuttings									0
	620	/																
1509	630	/					Sand (Trace Clay)		From cuttings									0
	640	/					medium to coarse grain Sand & Fine Gravel		Losing mud to formation at a 635' Bbs									
	640	/							Losing mud to formation									
↑ 7/16	1710	650	/				Sand + Fine Gravel											0

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area  
 Background (ppm):

Converted to Well: Yes  No  Well I.D. #: BPOW4-1



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: Failing 1500

BORING No.: BPOW 4-1  
 DATE: 7-17-03  
 GEOLOGIST: Conti Shickora  
 DRILLER: J. Blenings

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)							
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**				
	650	/		652													
0852	660	/		/			Medium to coarse grain Sand (Trace silt and clay fine gravel)		From cuttings								0
0923	670	/		/			Same as above		From cuttings								0
	680	/		/													
1005	690	/		/			Same as above		From cuttings								0
		/		692													
1031	700	/		EOB			Same as above										0

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area  
 Background (ppm):

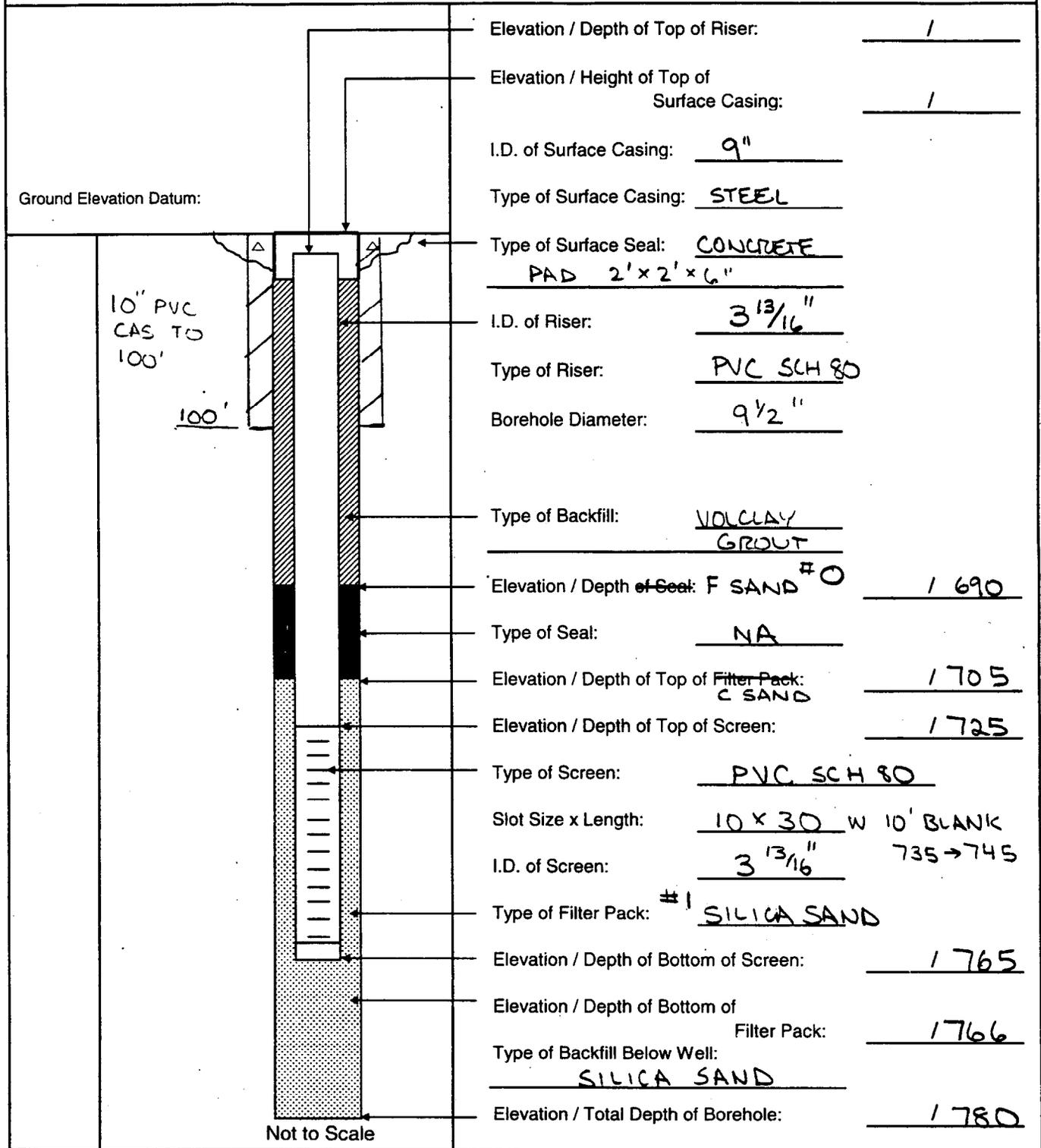
Converted to Well: Yes  No  Well I.D. #: BPOW 4-1



MONITORING WELL SHEET

PERMIT No:

PROJECT: NWIRP DRILLING Co.: UNITECH BORING No.: BPOW4-2  
 PROJECT No.: N4037 DRILLER: BLEMINGS DATE COMPLETED: 7/7/03  
 SITE: BETH PAGE DRILLING METHOD: MUD ROT NORTHING: \_\_\_\_\_  
 GEOLOGIST: CONTI DEV. METHOD: AIR/PUMP EASTING: \_\_\_\_\_



Elevation / Depth of Top of Riser: 1  
 Elevation / Height of Top of Surface Casing: 1  
 I.D. of Surface Casing: 9"  
 Type of Surface Casing: STEEL  
 Type of Surface Seal: CONCRETE PAD 2'x2'x6"  
 I.D. of Riser: 3 13/16"  
 Type of Riser: PVC SCH 80  
 Borehole Diameter: 9 1/2"  
 Type of Backfill: VOLCLAY GROUT  
 Elevation / Depth of Seal: F SAND #0 1690  
 Type of Seal: NA  
 Elevation / Depth of Top of Filter Pack: C SAND 1705  
 Elevation / Depth of Top of Screen: 1725  
 Type of Screen: PVC SCH 80  
 Slot Size x Length: 10 x 30 W 10' BLANK 735-745  
 I.D. of Screen: 3 13/16"  
 Type of Filter Pack: #1 SILICA SAND  
 Elevation / Depth of Bottom of Screen: 1765  
 Elevation / Depth of Bottom of Filter Pack: 1766  
 Type of Backfill Below Well: SILICA SAND  
 Elevation / Total Depth of Borehole: 1780



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: FALING 1500

BORING No.: BPOW4-2  
 DATE: 6/4/03 →  
 GEOLOGIST: Conti  
 DRILLER: J. BLEMINGS

Sample No. and Type or ROD	Depth (Ft.) or Run No.	Blows / 6" or ROD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
6/4 1130	0	/			DENSE	BRN	SAND AND GRAVEL		LOGGED FROM CUTTINGS IN BETWEEN SAMPLES				0
	0900	/							RODS "CHATTERING" FROM 0' TO 20'.				0
6/5	10	/							RESTART @ NEW LOCATION - ~ 1' WEST - 0-20 ≈ 15 MIN. NO OBSTRUCTIONS GOOD RETURN OF DRILL CUTTINGS-S.				0
	0915	20			M DENSE	BRN	SAND - SOME GRAVEL SW		MIX MORE MUD				0
	1030	30											0
	1100	40					SAND AND GRAVEL		(FROM CUTTINGS)				0
	1120	50											0

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: START W/ 8" Φ MUD ROT. GOT TO 6' - LOST RETURN      Drilling Area Background (ppm): 0  
TOO CLOSE TO STORM SEWER - MOVE ~ 1' WEST (CLOSER TO CURB)  
DRILL TO 150 ± W/ 8" Φ - REAM W/ 12" Φ TO 150 - SET 10" Φ CASING.

Converted to Well: Yes  No  Well I.D. #: BPOW4-2



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: FAILING 1500

BORING No.: BPOW4-2  
 DATE: 6-5-03 / 6-17-03  
 GEOLOGIST: Conti  
 DRILLER: J BLEMINGS

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)								
					Soil Density/Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**					
	50																	
S-1 1120	52	100/6"	5/5		V DENSE	YELLOW BRN	SAND AND GRAVEL	GW	WET									0
									SUBROUND 1" GRAVEL W/ 1/2" PCS IN WASH PORTION OF SAMPLE.									
	1200	60																0
	1230	70					SAND AND GRAVEL		LESS GRAVEL ≈ 70' TO 80'									0
	1300	80																0
	1330	90					DENSE BRN	SILTY F/M SAND	SP									0
	1400	100																0

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: SET 10" @ 110' (GROUTED IN) SEE NB1351 FOR Drilling Area Background (ppm): 0  
DETAILS - SET 10" @ 100' ON 6/17/03 - AT 2ND LOCATION.

Converted to Well: Yes  No  Well I.D. #: BPOW4-2





# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: FAILING 1500

BORING No.: BPOW4-2  
 DATE: 6/19/03  
 GEOLOGIST: Conti  
 DRILLER: J BLEMINGS

Sample No. and Type or RQD	Depth (FT) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FT) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)								
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**					
	150																	
S <sub>e</sub> 2	152	100/16	.5/5		V DENSE	BRN	SAND-SOME GRAVEL TR WHITE CLAY	SP	WET	0								0
	1440																	
	1500	160																0
	1520	170																0
	1540	180																0
	1600	190																0
	1620	200																0

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area Background (ppm): 0

Converted to Well: Yes  No  Well I.D. #: BPOW4-2



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: FAILING 1500

BORING No.: BPOW4-2  
 DATE: 6/19/03 → 6/20/03  
 GEOLOGIST: Conti  
 DRILLER: J. BLEMINGS

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)									
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**						
	200																		
S-3	210	50	2/2																
K640	212	28	32		V DENSE GRAY	BEN TO GRAY	F/M SAND - TR CLAY SP SEAM ≈ 2 1/2" THICK	SP	WET		0								0
	220									HT SOME CLAY									0
	230									REACHED 230' ON 6/19/03 MORE CLAY NOTICED ≈ 230' IN CUTTINGS.									0
	240																		0
	250																		

6/19  
6/20

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area Background (ppm):

Converted to Well: Yes  No  Well I.D. #: BPOW4-2



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: FAILING 1500

BORING No.: BPOW4-2  
 DATE: 6/30/03  
 GEOLOGIST: Conti  
 DRILLER: J BLEMINGS

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
S-4 e	250	28 38	1.5/2.0		V DENSE	MOTTLED ORANGE BRN GRAY	SILTY F/M SAND	SM	WET/MICACEOUS	0			0
0945		109%					SOME CLAY IN "WASH" PORTION OF SAMPLE.						
	260												0
	270												0
	280												0
	290												0
	300												0

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area  
 Background (ppm):

Converted to Well: Yes  No  Well I.D. #: BPOW4-2





# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: FALLING 1500

BORING No.: BPOW4-2  
 DATE: 6/23/03  
 GEOLOGIST: Conti  
 DRILLER: J BLEMINGS

Sample No. and Type or RQD	Depth (FT.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FT.) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)									
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**						
	350																		
S-6 1345	351	50 50	1/1		V STIFF / HARD	BRN GRAY	SILTY CLAY	CL	MOIST  VERY HARD - WAS DIFFICULT TO PRY LOOSE FROM SPOON	0								0	
	360																		
	1400	370																	
	1430	380																	
	1500	390																	
	1515	400																	

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area Background (ppm):

Converted to Well: Yes  No \_\_\_\_\_ Well I.D. #: BPOW4-2



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: FAILING 1500

BORING No.: BPOW4-2  
 DATE: 6/23/03  
 GEOLOGIST: Conti  
 DRILLER: J BLEMINGS

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)								
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**					
	400																	
	5-7 410																	
6/23/03	1550 411	100/6	0.9/1		V DENSE / STIFF	GRAY	SANDY CLAY - STREAKS OF LIGNITE MATL	SC	MOIST MICACEOUS			0						0
	1600 420						STILL IN SOME CLAY		(CLIPPINGS)									
MON 6/23	1630 430																	
6/24 TUE.																		
	0900 440																	
	0930 450																	

\* When rock coring, enter rock brokeness.  
 \*\* Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.  
 Remarks: \_\_\_\_\_

Drilling Area Background (ppm):

Converted to Well: Yes  No \_\_\_\_\_ Well I.D. #: BPOW4-2



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: FAILING 1500

BORING No.: BPOW 4-2  
 DATE: 6/24/03  
 GEOLOGIST: Conti  
 DRILLER: J BLEMINGS

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)								
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**					
	450																	
S-B 0930		100/6'	0.2/5		N DENSE	GRAY	SILTY F/M SAND	SM SP	WET MICACEOUS									
	0945																	
	1000																	
	1030																	
	1100																	
	500																	

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area Background (ppm):

Converted to Well: Yes  No  Well I.D. #: BPOW 4-2





# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: FAILING 1500

BORING No.: BPOW4-2  
 DATE: 6/24/03  
 GEOLOGIST: Conti  
 DRILLER: J BLEMINGS

Sample No. and Type or RQD	Depth (FT) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FT.) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)									
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**						
	550																		
S-10 1330	551	100% 6"	4/5		DENSE	GRAY	F/M SAND	SP	WET MICACEOUS	0									0
	560																		0
	570																		0
1430	580																		0
	590																		0
1560																			0
	600																		0

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area  
 Background (ppm):

Converted to Well: Yes  No  Well I.D. #: BPOW4-2



# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: FAILING 1500

BORING No.: BPOW4-2  
 DATE: 6/24/03  
 GEOLOGIST: Conti  
 DRILLER: J BLEMINGS

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION			USCS	Remarks	PID/FID Reading (ppm)										
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**							
	600																			
1520																				
S-11 610	100																			
1550 611	6'	5/5			DENSE	TAN GRAY	F/M SAND - SOME TAN SANDY CLAY - TOP 2" OF SPOON	SP/SM	WET → MOIST											
	620																			
	630																			
	640																			
6124	650																			

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area Background (ppm):

Converted to Well: Yes  No  Well I.D. #: BPOW4-2







# BORING LOG

PROJECT NAME: NWIRP Bethpage  
 PROJECT NUMBER: N4037  
 DRILLING COMPANY: Uni-Tech  
 DRILLING RIG: FAILING 1500

BORING No.: BPOW4-2  
 DATE: 6/25/03  
 GEOLOGIST: Conti  
 DRILLER: J BLEMINGS

Sample No. and Type or RGD	Depth (FL) or Run No.	Blows / 6" or RGD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)					
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**		
	750			765	DENSE	GRAY	F/C SAND							0	
	1540 760														0
	770									NOTICED SOME CLAY IN CUTTINGS DRILLER ALSO NOTED CLAY @ 770' ±					0
	780									GAMMA LOG TO 775.					0

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area Background (ppm):

Converted to Well: Yes  No  Well I.D. #: BPOW4-2