2014 OU2 GROUNDWATER INVESTIGATION BPOW4-1R, BPOW4-2R INSTALLATION REPORT BETHPAGE, NY

Prepared for:

Department of the Navy
Naval Facilities Engineering Command, Mid-Atlantic
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CTO WE15

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Table of Contents

Tables

Figures

Appendices

Appendix A – BPOW4-1, BPOW4-2 Logs

Section 1 Boring and Gamma Logs

Section 2 Monitoring Well Construction Logs

Appendix B – BPOW4-1, BPOW4-2 Integrity Testing, Rehabilitation, Decommissioning

Section 1 MEMO: NWIRP Well Integrity Testing Summary, October 4, 2013

Section 2 MEMO: 2014 Rehabilitation of BPOW4-1 and BPOW4-2 (OU2), NWIRP, Bethpage, April 28, 2014

Section 3 MEMO: Well Decommissioning for BPOW4-1 and BPOW4-2, April 30, 2014

Appendix C – BPOW4-1R, BPOW4-2R Installation

Section 1 Boring and Gamma Logs

Section 2 Monitoring Well Construction Logs

Section 3 Well Development Record

Section 4 Groundwater Sample Log Sheets

Section 5 Analytical Data Validation

Section 6 Survey

List of Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
COR	Continuously Operating Reference
Delta	Delta Well and Pump
DoD	Department of Defense
ELAP	Environmental Laboratory Accreditation Program
EPA	Environmental Protection Agency, United States
ER	Environmental Restoration
ft	feet
GOCO	Government-Owned Contractor-Operated
GPS	Global Positioning System
IDW	Investigation Derived Waste
Katahdin	Katahdin Analytical Services, Inc
lbs	pounds
NAD	North American Datum
NAVD	North American Vertical Datum
NAVFAC	Naval Facilities Engineering Command
NG	Northrop Grumman
NTU	Nephlometric Turbidity Units
NWIRP	Naval Weapons Industrial Reserve Plant
NYSDEC	New York State Department of Environmental Conservation
OU	Operable Unit
PCBs	Polychlorinated Biphenyls
PID	Photoionization Detector
POTW	Publicly Owned Treatment Works
PVC	Polyvinylchloride
PPE	Personal Protective Equipment
SAP	Sampling and analysis plan
SVOC	Semivolatile Organic Compounds
TCE	Trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
TOGS	Technical and Operational Guidance Series
TPH	Total Petroleum Hydrocarbons
UFP	United Federal Programs
VOC	Volatile Organic Compounds

1.0 PROJECT BACKGROUND

Resolution Consultants has prepared this Data Summary Report for the Naval Facilities Engineering Command, Mid-Atlantic under contract task order WE15 Contract N62470-11-D-8013. This report describes installation activities associated with replacement monitoring wells BPOW4-1R and BPOW4-2R in 2014 for the Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage Operable Unit (OU) 2 Site 1 offsite plume. NWIRP Bethpage is located in east-central Nassau County, Long Island, New York, approximately 30 miles east of New York City (Figure 1).

1.1 Scope and Objectives

This report provides information on the installation of replacement monitoring wells BPOW4-1R and BPOW4-2R. Monitoring wells BPOW4-1 and BPOW4-2 were replaced since both wells failed integrity testing. Wells BPOW4-1R and BPOW4-2R were completed to 697 feet (ft) and 770 ft below ground surface (bgs), respectively. The locations of these wells are shown in Figure 2.

Field tasks were conducted in 2014 in accordance with the *United Federal Programs Sampling and Analysis Plan (UFP SAP)*, Bethpage, New York and the UFP SAP Addendum Installation of Vertical Profile Borings and Monitoring Wells (Resolution Consultants, 2013) and the *Abbreviated Workplan for Outpost Monitoring Well Reinstallation (BPOW4-1R and 4-2R*) (Resolution Consultants 2014). The field investigation included: drilling; geophysical logging; installing two replacement monitoring wells; groundwater sampling; and surveying.

Documentation of these activities is included in the Appendices of this report.

1.2 Site History

NWIRP Bethpage is in the Hamlet of Bethpage, Town of Oyster Bay, New York. Since its inception in 1941, the plant's primary mission was the research prototyping, testing, design, engineering, fabrication, and primary assembly of military aircraft. The facilities at NWIRP included four plants used for assembly and prototype testing, a group of quality control laboratories, two warehouse complexes (north and south), a salvage storage area, water recharge basins, the Industrial Wastewater Treatment Plant, and several smaller support buildings.

The Navy's property, totaling 109.5 acres, was formerly a Government-Owned Contractor-Operated (GOCO) facility that was operated by Northrop Grumman (NG) until September 1998. Prior to 2002, the NWIRP property was bordered on the north, west, and south by current or former NG facilities, and on the east by a residential neighborhood. By March 2008, approximately 100 acres of NWIRP

property were transferred to Nassau County in three separate actions. The remaining 9 acres and access easements were retained by the Navy to continue remedial efforts at Environmental Restoration (ER) Site 1 – Former Drum Marshalling Area and Site 4 – Former Underground Storage Tanks (Area of Concern [AOC] 22). A parcel of land connecting the two sites was also retained. Currently, the 9-acre parcel of NWIRP is bordered on the east by the residential neighborhood and on the north, south, and west by Steel Los and Nassau County properties. Access to the NWIRP is from South Oyster Bay Road.

1.3 Geology and Hydrogeology

Overburden at the site consists of well over 1,000 ft of Cretaceous deposits overlying crystalline bedrock of the Hartland Formation. Overburden is divided into four geologic units: the upper Pleistocene deposits, the Magothy Formation, the clay member of the Raritan Formation ("Raritan Clay") and the Lloyd Sand member of the Raritan Formation ("Lloyd Sand") (Geraghty and Miller, 1994).

The Upper Pleistocene deposits range in thickness from approximately 50 to 100 ft and consists of till and outwash deposits of medium to coarse sand and gravel with lenses of fine sand, silt and clay (Smolensky and Feldman, 1990); these deposits form the Upper Glacial Aquifer. Directly underlying this unit is the Magothy Formation with a thickness of 650 to 900 ft bgs observed onsite. The Magothy is characterized by fine to medium sands and silts interbedded with zones of clays, silty sands and sandy clays. Sand and gravel lenses are found in some areas between depths of 600 and 875 ft bgs; these deposits form the Magothy Aquifer.

Investigations performed by the Navy since 2012 indicate that the bottom of the Magothy (top of the Raritan Clay) can extend to depths of 700 to greater than 1,000 ft bgs. The top of the Raritan Clay deepens to the south southeast, as evidenced by clay depths of 1,000 ft bgs (or more) in borings installed offsite. The Raritan Clay Unit is of continental origin and consists of clay, silty clay, clayey silt, and fine silty sand. This member acts as a confining layer over the Lloyd Sand Unit. The Lloyd Sand Unit is also of continental origin, having been deposited in a large fresh water lacustrine environment. The material consists of fine to coarse-grained sands, gravel, inter-bedded clay, and silty sand. These deposits form the Lloyd Aquifer.

The Upper Glacial Aquifer and the Magothy Aquifer comprise the aquifers of interest at the NWIRP. Regionally, these formations are generally considered to form a common, interconnected aquifer as

the coarse nature of each unit near their contact and the lack of any regionally confining clay unit allows for the unrestricted flow of groundwater between the formations.

The Magothy Aquifer is the major source of public water in Nassau County. The most productive water bearing zones are the discontinuous lenses of sand and gravel that occur within the siltier matrix. The major water-bearing zones are course sand and gravel lenses located in the lower portion of the Magothy. The Magothy Aquifer is commonly regarded to function overall as an unconfined aquifer at shallow depths and a confined aquifer at deeper depths. The drilling program at the NWIRP has revealed that clay zones beneath the facility are common but laterally discontinuous. No confining clay units of facility-wide extent have been encountered.

Groundwater is encountered at a depth of approximately 50 ft bgs at the facility. Historically, because of pumping and recharge at the facility, groundwater depths have been measured to range from 40 to 60 ft bgs. The regional groundwater flow in the area is to the south-southeast.

2.0 FIELD PROGRAM

Field investigation activities at BPOW4-1 and BPOW4-2 consisted of integrity testing, attempted rehabilitation and decommissioning. As a result of the failed integrity testing at BPOW4-1 and BPOW4-2, these wells were replaced with BPOW4-1R and BPOW4-2R.

Field investigation activities at BPOW4-1R/BPOW4-2R consisted of drilling, sampling, soil/groundwater analysis, geophysical logging, and surveying. Gamma logging was conducted in the borehole for BPOW4-2R. Drilling during this investigation was performed by Delta Well and Pump Company (Delta) of Ronkonkoma, New York. A description of these tasks is provided below.

2.1 Integrity testing, attempted rehabilitation and decommissioning of BPOW4-1 and BPOW4-2

Wells BPOW4-1 and BPOW4-2 were installed in 2003. Appendix A includes boring and gamma logs and well construction diagrams. Analysis of groundwater samples collected from these wells in May 2013 detected concentrations of Freon above the New York State Department of Environmental Conservation Technical and Operational Guidance Series (TOGS) guidance value. In order to determine if the well packers were functioning properly or if cracks had occurred in the well casing, integrity testing was conducted on wells BPOW4-1 and BPOW4-2 in July and September 2013. Appendix B includes a memo describing the integrity testing and results. Both wells failed the integrity testing and it was decided to rehabilitate the wells.

An attempt to install two-inch diameter wells within the existing four-inch wells in February 2014 was unsuccessful. A loss of grout between the inner two-inch and existing outer four-inch casing in BPOW4-2 indicated a possible crack in the original casing where grout was escaping; therefore efforts to rehabilitate BPOW4-2 were abandoned. Retrieval of the packer setup in BPOW4-1 may have resulted in a portion of the well collapsing; therefore efforts to rehabilitate BPOW4-1 were also abandoned. Appendix B includes a Memo describing the rehabilitation attempt.

As a result of the failed integrity testing, wells BPOW4-1 and BPOW4-2 were decommissioned by grouting in place on Sept. 23 and Sept 24, 2014, respectively, consistent with a protocol included in Appendix B. The pre-existing flush mounted curb boxes and surrounding concrete pad were broken apart and removed from the well sites. A mixture of cement, bentonite, and water was pumped through one- inch poly tubing from the bottom to the top of each well. Materials used at the BPOW4-1 well included twenty-four bags of cement (94 pounds [lbs] each) and 100 lbs of

Bentonite. At the BPOW4-2 site, sixteen bags of cement and 65 pounds of bentonite were used to plug the well.

The surface casing was cut approximately 2 feet below ground surface and slip caps were installed over the riser pipes. The well sites were restored with topsoil and seeded.

2.2 Drilling and Well Construction of Replacement wells BPOW4-1R and BPOW4-2R

Replacement monitoring wells BPOW4-1R and BPOW4-2R were installed between August and October 2014. Depths of monitoring wells BPOW4-1R and BPOW4-2R are 697 and 770 feet, respectively. Locations are shown on Figure 2. The wells were installed using mud rotary drilling techniques. Boring and well construction details are summarized in Tables 1 and 2. Boring logs with lithologic descriptions of the well screen interval as well as well construction diagrams are included in Appendix C.

The initial attempt to install BPOW4-1R failed due to the loss of drilling equipment (a portion of the hammer and split spoon sampler). The boring was grouted up to 706 feet bgs. Within this same boring, well BPOW4-1R was re-drilled using a 50K Gefko mud rotary rig by Delta from July 2014 to August 19, 2014 to a depth of 707 ft bgs and was constructed with 53 feet of 10-inch diameter steel surface casing. Monitoring well BPOW4-1R was installed using 4-inch diameter, schedule 80, polyvinylchloride (PVC) riser pipe, 40 feet of 0.010-slot PVC screen (652'-692') and a five-foot sump for a total depth of 697 ft. bgs. Stainless steel centralizers were attached to the bottom of the sump and to the PVC riser pipe located above the screen to stabilize the well inside the borehole. A coarse sand pack was placed beneath the well and in the annular space around the PVC screen. Additional fine sand was installed above the coarse sand to a depth of 602 ft bgs. Bentonite grout was tremied from the top of the filter sand pack to the ground surface.

The initial attempt to install BPOW4-2R failed due to the loss of drilling equipment (drilling rods). As a result, the borehole was grouted to grade. Monitoring well BPOW4-2R was moved approximately 200 feet north of the original BPOW4-2 location and was drilled from September 25 to October 20, 2014. The borehole was advanced to a depth of 785' and a total of 18 split spoon samples were collected from ground surface to the bottom of the boring (Table 1). Samples were logged by the field geologist and screened for Volatile Organic Compounds (VOCs) utilizing a photoionization detector (PID). Gamma logging was completed on the open borehole by Aqua Terra Geophysics, Inc. A copy of the gamma log report is included in Appendix C.

Monitoring well BPOW4-2R was installed using 53 feet of 10-inch diameter steel surface casing, 4-inch diameter, schedule 80, PVC riser pipe, 40 feet of 0.010-slot PVC screen (725'-765') and a five-foot sump for a total depth of 770 ft. bgs. Stainless steel centralizers were attached to the bottom of the sump and to the PVC riser pipe located above the screen to stabilize the well inside the borehole. A coarse sand pack was placed beneath the well and in the annular space around the PVC screen. Additional fine sand was installed above the coarse sand to a depth of 702 ft bgs. Bentonite grout was tremied from the top of the filter sand pack to the ground surface.

Two soil samples were collected for laboratory analysis for total organic carbon (TOC) by Environmental Protection Agency (EPA) series SW-846 method 9060A. During drilling, air sampling was conducted under a Community Air Monitoring Plan. One air sample was collected using Summa canisters and submitted for laboratory analysis by EPA Method TO-15. All analyses were performed or sub-contracted by Katahdin. Data validation of both TOC and air data was performed by Resolution Consultants. Data validation packages and analytical data tables are included in Appendix C.

Both wells were completed at the surface with a 12-inch diameter steel curb box, set in a two-foot by two-foot concrete pad. Well risers were set below grade and fit with lockable J plugs. Detailed monitoring well construction diagrams are included in Appendix C.

2.3 Well Development

Following installation, both monitoring wells were developed to evacuate silts and other fine-grained materials and to establish the filter pack to promote a hydraulic connection between the well and the surrounding aquifer. Well development was not initiated until at least 24 hours after well installation.

Monitoring well screens were developed using a combination of air lifting and manual surging, followed by pumping with a submersible pump. Turbidity was monitored during development to determine stabilization. In compliance with New York State Department of Environmental Conservation (NYSDEC) policy, wells were developed until turbidity was less than 50 nephlometric turbidity units (NTUs) if possible. Table 3 summarizes total pumped volume from air lifting and pump development and final turbidity. Well development records are included in Appendix C.

2.4 Sampling

Following development, wells were allowed to stabilize for at least 2 weeks prior to groundwater sampling in accordance with low flow sampling procedures. Wells were purged using a bladder pump with a drop tube intake placed at the approximate midpoint of the screened interval (Table 2). The following water quality parameters were continuously measured: water temperature, pH, conductivity, oxidation-reduction potential, dissolved oxygen and turbidity. Groundwater analytical samples were collected when water quality parameters stabilized. Samples were analyzed for VOCs via method 8260C and 1,4 Dioxane via method 8270D SIM by Katahdin Analytical Services, Inc (Katahdin) a Department of Defense (DoD), Environmental Laboratory Accreditation Program (ELAP), and NYSDEC-certified laboratory. All development and purge water was managed as investigation derived waste (IDW). Analytical data is summarized in Table 4 and field parameters are listed in Table 5. Groundwater sample logs and data validation packages are included in Appendix C.

2.5 Decontamination and IDW

Resolution Consultants utilized dedicated and disposable sampling equipment when possible to avoid the potential for cross-contamination of samples. The sampling equipment included dedicated plastic scoops, disposable Teflon or polyethylene tubing, disposable gloves, and laboratory supplied sample bottles. Hand held equipment, and split spoons were decontaminated using Liquinox and water wash, a potable water rinse, followed by a distilled water rinse. Water was collected in 5-gallon pails or 55-gallon drums.

As part of the IDW management practices and in accordance with the SAP, the investigation waste (consisting of soil cuttings, drilling muds, IDW fluids, and personal protective equipment (PPE)) generated during the well installation was containerized and staged at NWIRP Bethpage. IDW solids were characterized and disposed of properly. Representative samples from each roll off were submitted to Katahdin for analysis of:

- Target Compound List (TCL) VOCs
- TCL Semi-volatile Organic Compounds (SVOCs)
- Toxicity Characteristic Leaching Procedure (TCLP) Metals
- Polychlorinated Biphenyls (PCBs)
- Total petroleum hydrocarbons (TPH)

- Total solids
- Corrosivity
- Ignitability
- Reactive Cyanide
- Reactive Sulfide
- Paint Filter

IDW water was containerized in frac tanks and stored at NWIRP Bethpage for characterization and ultimate disposal to the Publicly Owned Treatment Works (POTW), in accordance with the facilities existing discharge permit. A representative water sample was collected from each frac tank and submitted to Katahdin for analysis of VOCs via Method SW 624, pH via Method SW 9040B, PCBs via Method 8082 and Total Metals via Method SW 846 (all waters). To the extent feasible, soil and water were not mixed. All analytical criteria were met for disposal of soil and water.

2.6 Surveying

A survey of the boring locations was conducted at the end of fieldwork by C. T. Male, Inc., of Latham, NY, under the direct supervision of Resolution Consultants. The locations were tied into the existing base map developed for this investigation. The survey elevations are referenced to the North American Vertical Datum (NAVD) 1988 and have a vertical accuracy of 0.01 foot. Vertical control is based on observations of the Continuously Operating Reference (COR) Stations Queens and Central Islip. The horizontal location is referenced to the North American Datum (NAD) 1983 (2011) N.Y. Long Island Zone 3104 and has an accuracy of 0.1 foot. Local horizontal and vertical control is based on Global Positioning System (GPS) observations using the NYS Net Real Time Network.

A table of survey data (ground, latitude/longitude and northing/easting) and a survey map is included in Appendix C.

3.0 REFERENCES

Geraghty and Miller, Inc., 1994. *Remedial Investigation Report, Grumman Aerospace Corporation, Bethpage, New York*. Revised September.

Naval Facilities Engineering Command (NAVFAC), 2003. *Record of Decision Naval Weapons Industrial Reserve Plant Bethpage, New York, Operable Unit 2 – Groundwater*, NYS Registry: 1-30-003B. April.

Resolution Consultants, 2013. *United Federal Programs Sampling and Analysis Plan*, *Site OU-2 Offsite TCE Groundwater Plume Investigation,* Bethpage, New York. April.

Resolution Consultants, 2013. UFP SAP Addendum, *Groundwater Sampling Using Low Stress (Low Flow) Purging and Sampling* Protocol. November.

Resolution Consultants, 2013. UFP SAP Addendum*, Installation of Vertical Profile Borings and Monitoring Wells.* December.

Resolution Consultants, 2014. Abbreviated Work plan –June 2014 Outpost Monitoring well Re installation (BPOW4-1R and BPOW4-2R) June.

Smolensky, D., and Feldman, S., 1990. *Geohydrology of the Bethpage-Hicksville-Levittown Area, Long Island, New York, U.S*. Geological Survey Water-Resourced Investigations Report 88-4135, 25 pp.

Tables

TABLE 1
BORING SUMMARY
2014 OU2 GROUNDWATER INVESTIGATION
NWIRP BETHPAGE, NY

BORING	BORING START DATE	BORING COMPLETION DATE	GROUND ELEVATION (MSL)	TOTAL DEPTH (ft bgs)	SURFACE CASING SET AT (ft bgs)	NO. OF SPOON SAMPLES	GAMMA LOG (ft bgs)	NO. GW SAMPLES COLLECTED / ATTEMPTED	TOC SAMPLES	DATE OF AIR SAMPLE
BPOW4-2R	9/25/2014	10/20/2014	66.60	784	53	18	775	none	673 - 675; 738 - 740	9/2/2014

TABLE 2
MONITORING WELL CONSTRUCTION SUMMARY
2014 OU2 GROUNDWATER INVESTIGATION
NWIRP BETHPAGE, NY

MONITORING WELL	WELL COMPLETION DATE	GROUND ELEVATION (MSL)	WELL DEPTH (ft bgs)	CASING DEPTH (ft bgs)	SCREEN INTERVAL (ft bgs)	SUMP DEPTH INTERVAL (ft bgs)	BORING DEPTH (ft bgs)
BPOW4-1R	8/19/2014	64.08	697	53	652 - 692	692 - 697	707
BPOW4-2R	10/20/2014	66.60	770	53	725 - 765	765 - 770	784

TABLE 3
MONITORING WELL DEVELOPMENT SUMMARY
2014 GROUNDWATER INVESTIGATION
NWIRP BETHPAGE, NY

MONITORING WELL	AIR DEVELOPMENT		PUMP DEVELOPMENT			APPROX. TOTAL DEVELOPMENT VOLUME (GAL)	FINAL TURBIDITY (NTUs)
	DATE	APPROX. VOLUME (GAL)	DATE	FINAL PUMP DEPTH (FT)	APPROX. VOLUME (GAL)		
BPOW4-1R	9/17/2014	6,500	9/18/2014-9/19/2014	652-692	3,000	9,500	4.48
BPOW4-2R	10/21/2014	4025	10/22/14-10/24/14	770	14,600	18,625	134

Location	NYSDEC Groundwater Guidance or Standard Value (Note 1)	BPOW4-1R	BPOW4-2R
Sample Date		12/30/2014	12/30/2014
Sample ID		BP0W4-1R-GW-123014	BP0W4-2R-GW-123014
Sample type code		N	N
VOC 8260C (ug/L)			
1,1,1-TRICHLOROETHANE	5	< 0.50 U	< 0.50 U
1,1,2,2-TETRACHLOROETHANE	5	< 0.50 U	< 0.50 U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5	**8.0**	**11**
1,1,2-TRICHLOROETHANE	1	< 0.50 U	< 0.50 U
1,1-DICHLOROETHANE	5	< 0.50 U	< 0.50 U
1,1-DICHLOROETHENE	5	< 0.50 U	< 0.50 U
1,2,4-TRICHLOROBENZENE	5	< 0.50 U	< 0.50 U
1,2-DIBROMO-3-CHLOROPROPANE	0.04	***< 0.75 U***	***< 0.75 U***
1,2-DIBROMOETHANE	NL	< 0.50 U	< 0.50 U
1,2-DICHLOROBENZENE	3	< 0.50 U	< 0.50 U
1,2-DICHLOROETHANE	5	< 0.50 U	< 0.50 U
1,2-DICHLOROETHENE, TOTAL	5	< 1.0 U	< 1.0 U
1,2-DICHLOROPROPANE	1	< 0.50 U	< 0.50 U
1,3-DICHLOROBENZENE	3	< 0.50 U	< 0.50 U
1,4-DICHLOROBENZENE	3	< 0.50 U	< 0.50 U
1,4-DIOXANE (Method 8270D_SIM)	NL	**1.2**	**1.1**
2-BUTANONE	50	< 2.5 U	< 2.5 U
2-HEXANONE	50	< 2.5 U	< 2.5 U
4-METHYL-2-PENTANONE	NL	< 2.5 U	< 2.5 U
ACETONE	50	< 2.5 U	< 2.5 U
BENZENE	1	< 0.50 U	< 0.50 U
BROMODICHLOROMETHANE	50	< 0.50 U	< 0.50 U
BROMOFORM	50	< 0.50 U	< 0.50 U
BROMOMETHANE	5	< 1.0 U	< 1.0 U
CARBON DISULFIDE	60	< 0.50 U	< 0.50 U
CARBON TETRACHLORIDE	5	< 0.50 U	< 0.50 U
CHLOROBENZENE	5	< 0.50 U	< 0.50 U
CHLOROETHANE	5	< 1.0 U	< 1.0 U
CHLOROFORM	7	< 0.50 U	< 0.50 U
CHLOROMETHANE	5	< 1.0 U	< 1.0 U
CIS-1,2-DICHLOROETHENE	5	< 0.50 U	< 0.50 U
CIS-1,3-DICHLOROPROPENE	0.4	***< 0.50 U***	***< 0.50 U***
CYCLOHEXANE	NL	< 0.50 U	< 0.50 U
DIBROMOCHLOROMETHANE	5	< 0.50 U	< 0.50 U
DICHLORODIFLUOROMETHANE	5	< 1.0 U	< 1.0 U
ETHYLBENZENE	5	< 0.50 U	< 0.50 U
ISOPROPYLBENZENE	5	< 0.50 U	< 0.50 U
M- AND P-XYLENE	NL	< 1.0 U	< 1.0 U
METHYL ACETATE	NL	< 0.75 U	< 0.75 U
METHYL CYCLOHEXANE	NL	< 0.50 U	< 0.50 U
METHYL TERT-BUTYL ETHER	10	< 0.50 U	< 0.50 U
METHYLENE CHLORIDE	5	< 2.5 U	< 2.5 U
O-XYLENE	NL	< 0.50 U	< 0.50 U
STYRENE	5	< 0.50 U	< 0.50 U
TETRACHLOROETHENE	5	< 0.50 U	< 0.50 U
TOLUENE	5	< 0.50 U	< 0.50 U
TRANS-1,2-DICHLOROETHENE	5	< 0.50 U	< 0.50 U
TRANS-1,3-DICHLOROPROPENE	0.4	***< 0.50 U***	***< 0.50 U***
TRICHLOROETHENE	5	**0.84 J**	**0.73 J**
TRICHLOROFLUOROMETHANE	5	< 1.0 U	< 1.0 U
VINYL CHLORIDE	2	< 1.0 U	< 1.0 U
XYLENES, TOTAL	5	< 1.5 U	< 1.5 U

Notes:

1 New York State Department of Environmental Conservation Division of Water Technical and Operation Guidance series (6 NYCRR 700-706, Part 703.5 summarized in TOGS 1.1.1)
Ambient water quality standards and groundwater effluent limitations, class GA; NL = Not Listed

Bold = Detected; ***Bold and Italics*** =Not detected exceeds NYS Groundwater Standards or guidance value

Yellow highlighted values exceed Groundwater Standards or guidance value

Sample type codes: N - normal environmental sample, FD - field duplicate

U = Nondetected result. The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

UJ = The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte.

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

M = the matrix spike or matrix spike duplicate did not meet recovery or precision requirements.

Well	Date	Temperature (°C)	pH	Specific Conductance (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Depth to water (ft bgs)	Flow rate (ml/min)
BPOW4-1R	12/30/2014	12.55	5.54	0.037	4.21	255.7	2.4	22.11	585
BPOW4-2R	12/30/2014	12.42	5	0.035	4.62	241.6	66.3	23.34	400

* Initial water level not equilibrated due to pump installation; drawdown during sampling not determined.

Figures

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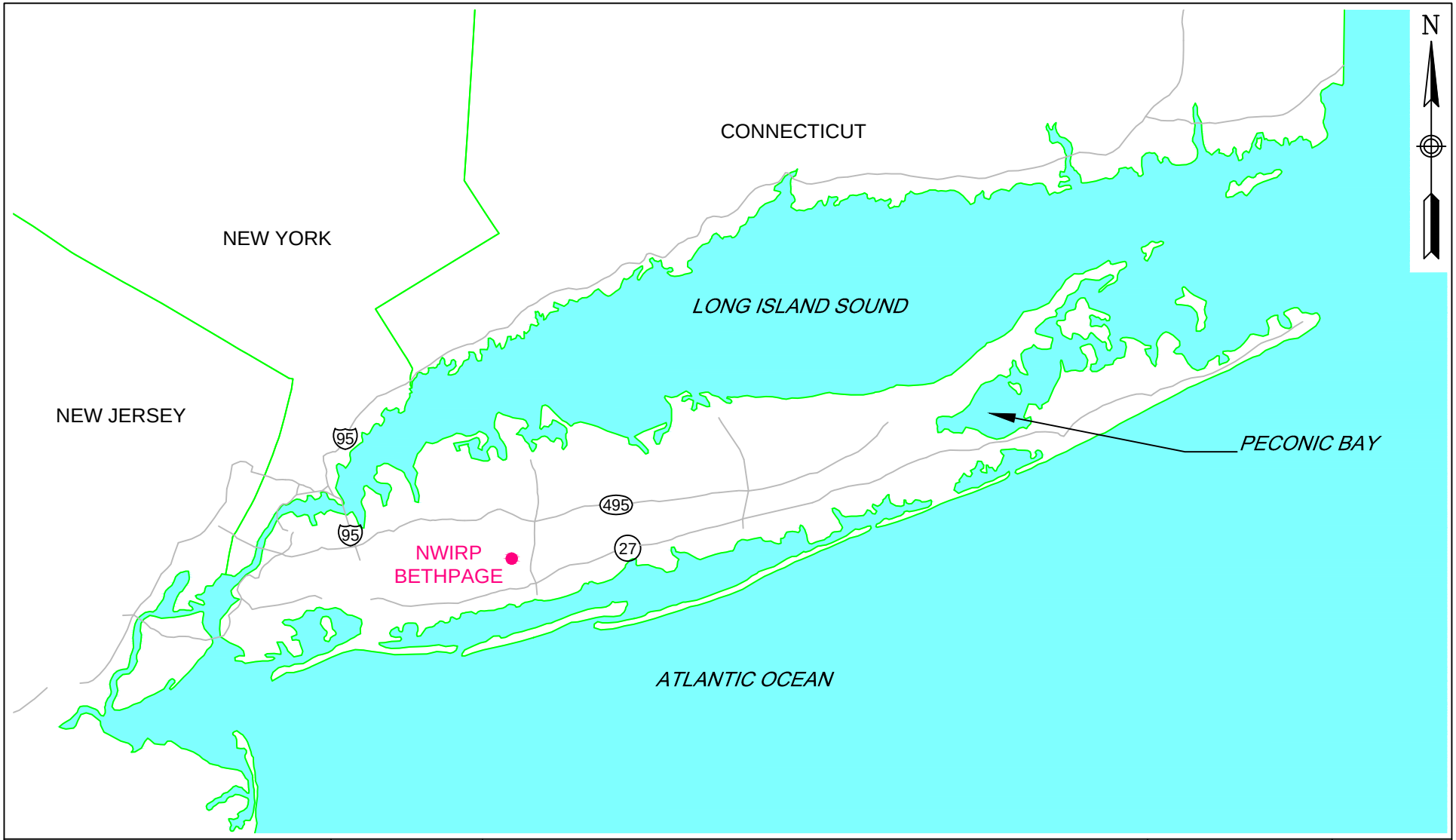


0 15 30

SCALE IN MILES

NAVFAC

GENERAL LOCATION MAP
NWIRP BETHPAGE
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D-8013	WE15
APPROVED BY --	DATE --
APPROVED BY --	DATE --
FIGURE NO. 1	REV 0

F:\Projects\Navy\Bethpage WXE0817.0 Deliverables\7.2 CADD\GIS_files\Bethpage\MAP DOCS\MXD\MISC\Location Maps\F2 VPB BPOW4-1 2014 12 23 R1.mxd

Former Naval Weapons Industrial Reserve Plant

Former Northrop Grumman Site

Hempstead Toke

Hicksville Rd

State Hwy 135

Southern State Parkway

Inset: BPOW4-1R and BPOW4-2R Locations

BPOW4-2R

BPOW4-1R

0 375 750 1,500 Feet

0 750 1,500 3,000 Feet

Legend

- Monitoring Well
- Vertical Profile Boring
- Vertical Profile Boring - Proposed
- Water Supply Well
- Extraction Well

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

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: PS	DATE: 12/23/2014
APPROVED BY: —	DATE: —
FIGURE NO.: 2	REV: 0

Appendix A

BPOW4-1, BPOW4-2 Logs

Section 1

Boring and Gamma Logs

Tetra Tech NUS, Inc.

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 (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): 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" Φ SUB ROUND FROM CUTTINGS				0
	50												0

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

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

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

Tetra Tech NUS, Inc.

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 / 7-9-03
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: Soil Density/ Consistency or Rock Hardness	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	50				DENSE		SAND AND GRAVEL						0
	60												
7/8	70												0
7/9													
	80						SAND						
	90						CLAYEY SAND		± 90'				0
7/11									80-90'- STABILIZER BAR - HAD SANDY				
↓									CLAY / CLAYEY SAND ENTIRE 10' LENGTH.				
									JAY WILL SET 10" CAS ≈ 90'.				
	100						Sand and Gravel		1/4" ϕ sub round				0

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

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.

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

Tetra Tech NUS, Inc.

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 (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	100												
1055	110						Sand (Trace gravel)		(from cuttings)				0
0925													
	120						Sand + Gravel		½" ϕ sub round				
1050	130						Sand and Gravel		1" ϕ sub round from cuttings				0
1445	140												
1515	150						clayey Sand + Gravel		1" ϕ sub round				0

7/11 ↑
7/14 ↓

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks: _____

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

Tetra Tech NUS, Inc.

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: Soil Density/ Consistency or Rock Hardness	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	150												
1540	160						Sand + Gravel		1"ϕ subround				0
1617	170						Same as above						0
1647	180												
1719	190						Same as above						0
	200												

7/14
7/15

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

Tetra Tech NUS, Inc.

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~~ 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/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): 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 brokeness.

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

Drilling Area Background (ppm): 0

Remarks: _____

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

Tetra Tech NUS, Inc.

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~~ 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: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): 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 brokeness.

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

Drilling Area Background (ppm): 0

Remarks: _____

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

Tetra Tech NUS, Inc.

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~~ 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: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): 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 brokeness.

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

Remarks: _____

Drilling Area Background (ppm): 0

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

Tetra Tech NUS, Inc.

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: ~~Centi~~ 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: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): 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 brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

Tetra Tech NUS, Inc.

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~~ 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: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): 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

↑ 7/15

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

Tetra Tech NUS, Inc.

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. 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: Soil Density/ Consistency or Rock Hardness	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification	USCS *	Remarks	PID/FID Reading (ppm): 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 ↓

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

Tetra Tech NUS, Inc.

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 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: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): 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 brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

Tetra Tech NUS, Inc.

BORING LOG

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

BORING No.: BPOW4-1
DATE: 7-16-03
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: Soil Density/ Consistency or Rock Hardness	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification	USCS *	Remarks	PID/FID Reading (ppm): 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 brokeness.

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

Drilling Area Background (ppm): 0

Remarks: _____

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

Tetra Tech NUS, Inc.

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. 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: Soil Density/ Consistency or Rock Hardness	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	600												
1433	610						Sand (Trace clay and lignite)		From cuttings				0
	620												
1508	630						Sand (Trace Clay)		From cuttings				0
									Losing mud				
									To Formation				
									at ± 635' BGS				
							medium to course grain						
	640						Sand & Fine Gravel						
									Losing mud				
									To formation				
1710	650						Sand + Fine Gravel						0

7/16

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

Tetra Tech NUS, Inc.

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. 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: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	650			652									
							Medium to course grain						
0852	660						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 brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

Tetra Tech NUS, Inc.

BORING LOG

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

BORING No.: BPOW4-2
DATE: 6/4/03 →
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: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
6/4	1130	0				DENSE	BRN	SAND AND GRAVEL		LOGGED FROM				0
										CUTTINGS				
	0900									IN BETWEEN SAMPLES				
										RODS " CHATTERING "				
6/5		10								FROM 0' TO 20'.				0
										RESTART @ NEW				
										LOCATION - ≈ 1' WEST -				
										0-20 ≈ 15 MIN. NO OBSTRUCTIONS				
										GOOD RETURN OF DRILL CUTTINGS.				
	0915	20				M DENSE	BRN	SAND - SOME GRAVEL	SW					0
										MIX MORE MUD				
	1030	30												0
	1100	40						SAND AND GRAVEL		(FROM CUTTINGS)				0
	1120	50												0

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks: START W/ 8" Φ MUD ROT. GOT TO 6' - LOST RETURN
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

Tetra Tech NUS, Inc.

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: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	50												
S-1 @ 1120	52	100/6"	.5/.5		V DENSE	YELLOW BRN	SAND AND GRAVEL	GW	WET SUBROUND 1" GRAVEL. W/ 1 1/2" PCS IN WASH PORTION OF SAMPLE.	0			0
1200	60												0
1230	70						SAND AND GRAVEL		LESS GRAVEL ≈ 70' TO 80'				0
1300	80												0
					DENSE	BRN	SILTY F/M SAND	SP					
1330	90												0
1400	100												0

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

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

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

Tetra Tech NUS, Inc.

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 / 6/19/03
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: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
6/17	100												
6/19					DENSE	BRN	SILTY F/M SAND	SM/SP					0
1130	110								10"Φ SET @ 110				
									AND GROUTED IN PERM. HAD TO MOVE 10' N. DUE TO LEAKAGE AROUND CAS. SET 2ND CAS TO 100' ON 6/17/03.				0
1230	120												
													0
	130												
													0
	140												
													0
1415	150												

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

Tetra Tech NUS, Inc.

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: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	150												
S-2	152	100/6	.5/.5		V DENSE	BRN	SAND - SOME GRAVEL	SP	WET	0			0
1440							TR WHITE CLAY						
1500	160												0
1520	170												0
1540	180												0
1600	190												0
1620	200												

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

Tetra Tech NUS, Inc.

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 (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	200												0
S-3	210	50/48	2/2										
K640	212	28/32			V DENSE	BRN TO GRAY	F/M SAND - TR CLAY	SP	WET	0			0
							SEAM ≈ 211' ≈ 2" THICK						
1700	220								HIT SOME CLAY				
													0
6/19 1730	230								REACHED 230' ON 6/19/03				0
6/20									MORE CLAY NOTICED ≈ 230 IN CUTTINGS.				
0900	240												
													0
0930	250												

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

Tetra Tech NUS, Inc.

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 (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	250												
S-4 @ 0945		28/38 10/9/6	1.5/2.0		V. DENSE	MOTTLED ORANG BRN GRAY	SILTY F/M SAND SOME CLAY IN "WASH" PORTION OF SAMPLE.	SM	WET/MICACEOUS	0			0
	260												0
	270												0
	280												0
	290												0
	300												0

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

Tetra Tech NUS, Inc.

BORING LOG

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

BORING No.: BPOW4-2
DATE: 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: Soil Density/ Consistency or Rock Hardness	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	300												0
S-5	310												
1145	311	10%	.4/.5		V DENSE	GRAY	SILTY F/M SAND	SP	WET	0			0
6/20							TR GRAVEL						
6/23													
1200	320												
													0
1230	330								DRILLER NOTED POSSIBLE CLAY.				0
1300	340												0
	350												0

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

Tetra Tech NUS, Inc.

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 (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	350												
S-6 @	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
1345													
—	360												
													0
1400	370												
													0
1430	380												
													0
1500	390												
													0
1515	400												

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks: _____

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

Tetra Tech NUS, Inc.

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: Soil Density/ Consistency or Rock Hardness	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	400												
S-7	410												
6/23/03 @ 1550	411	100%	.9/1		V DENSE / STIFF	GRAY	SANDY CLAY - STREAKS OF LIGNITE MATL	SC	MOIST MICACEOUS	0			0
1600	420						STILL IN SOME CLAY		(CUTTINGS)				
													0
MON 6/23 1630	430												
6/24 TUE.													0
0900	440												
													0
0930	450												

* When rock coring, enter rock brokeness.

** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: _____

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

Tetra Tech NUS, Inc.

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: Soil Density/ Consistency or Rock Hardness	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	450												
S-8 c		100/6"	.2/.5		V DENSE	GRAY	SILTY F/M SAND	SM	WET	0			0
0930								SP	MICACEOUS				
0945	460												0
1000	470												0
1030	480												0
1100	490												0
	500												

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

Tetra Tech NUS, Inc.

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: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	500												0
S-9 C	510	100/6"			V DENSE	GRAY	F/M SAND-TR F GRAVEL	SP	WET	0			0
1130	511						TR BLACK STREAKS (LIGNITE)?		MICACEOUS				
1200	520												0
1230	530												0
1245	540												0
1300	550												0

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

Tetra Tech NUS, Inc.

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: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	550												
S-10 C	551	100/6"	4/.5		V DENSE	GRAY	F/M SAND	SP	WET	0			0
1330									MICACEOUS				
	560												0
	570												0
1430	580												0
	590												0
1500													
	600												0

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks: _____

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

Tetra Tech NUS, Inc.

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: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	600												
1530													0
S-1 @	610	10/											
1550	611	/6"	5/1.5		V DENSE	TAN GRAY	F/M SAND - SOME TAN SANDY CLAY - TOP 2" OF SPOON	SP/ SM	WET → MOIST				0
	620												
													0
	630												0
	640												0
6/24	650												0

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks: _____

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

Tetra Tech NUS, Inc.

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 RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
		650												
6/25	S-12 @ 0935	651	100/6"	5/7.5		V DENSE	GRAY	SAND AND GRAVEL TR CLAY	SW	WET ≈ 3/4" ϕ SUB ROUND GRAVEL	0			0
		660												0
		670												0
		680												0
		690												0
		700												0

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

Tetra Tech NUS, Inc.

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 RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
1100	700												0
1115	710				DENSE	GRAY	COARSE SAND - SOME F/M SAND	SP	WET - FROM CUTTINGS NO SPOON HERE				0
	720												0
				725									
	730												0
	740												0
	742			BLANK			SANDY SOME V CLAY @ 742'		DRILLER NOTED SOME CLAY AT ~ 742 W STREAKS				
							NOTED THEN						
							F TO C SAND		TO 747.				
1500	750												0

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks: _____

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

Tetra Tech NUS, Inc.

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

* When rock coring, enter rock brokeness.

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

Drilling Area Background (ppm): 0

Remarks:

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

AQUA TERRA GEOPHYSICS INC

COMPANY	UNI TECH DRILLING
WELL ID	BPOW 4-2
FIELD	NWIRP BETHPAGE
COUNTRY	NASSAU STATE NY

CO
WELL
FLD
CTY
STE
FILING No

LOCATION

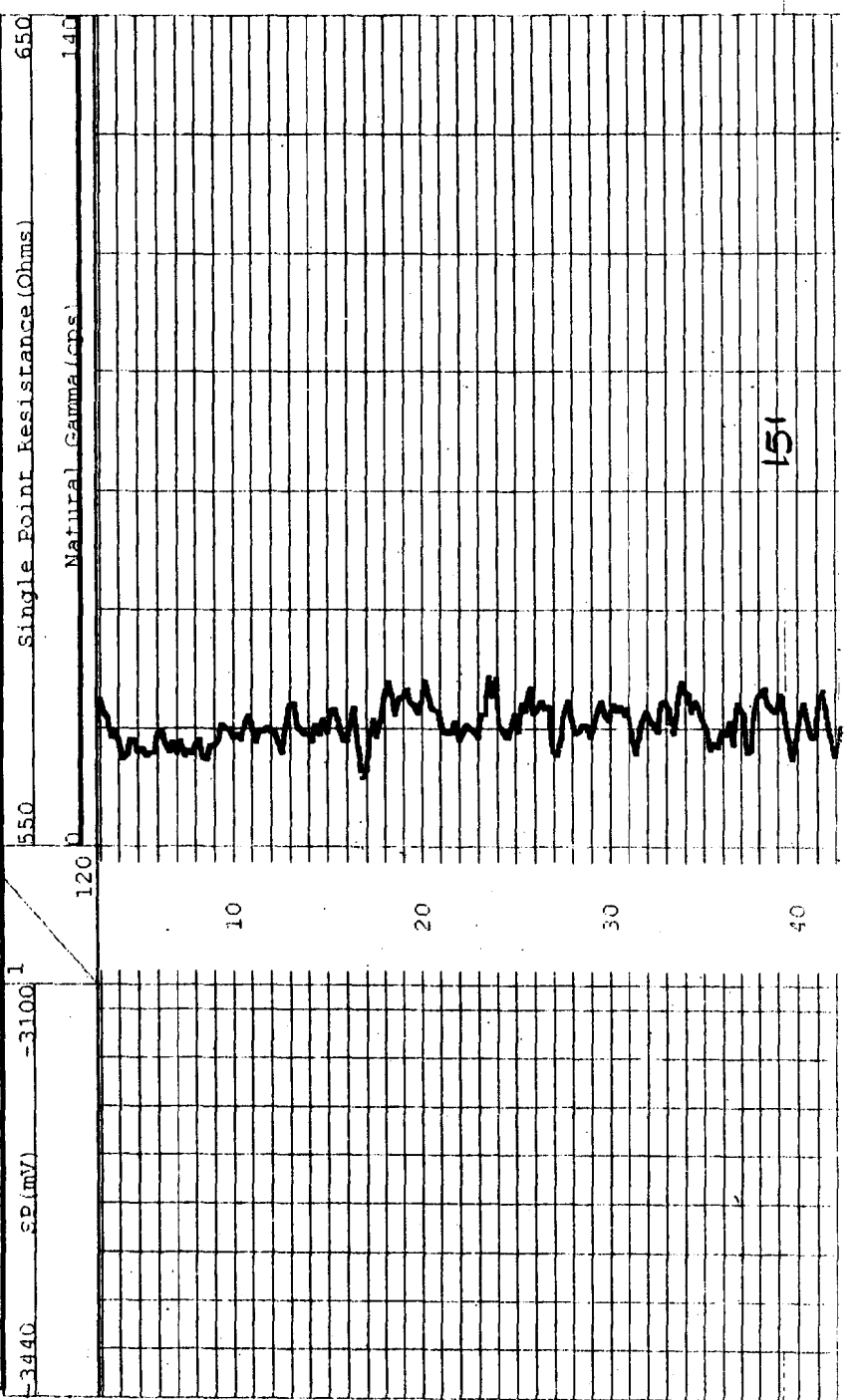
SEC TWP RGE

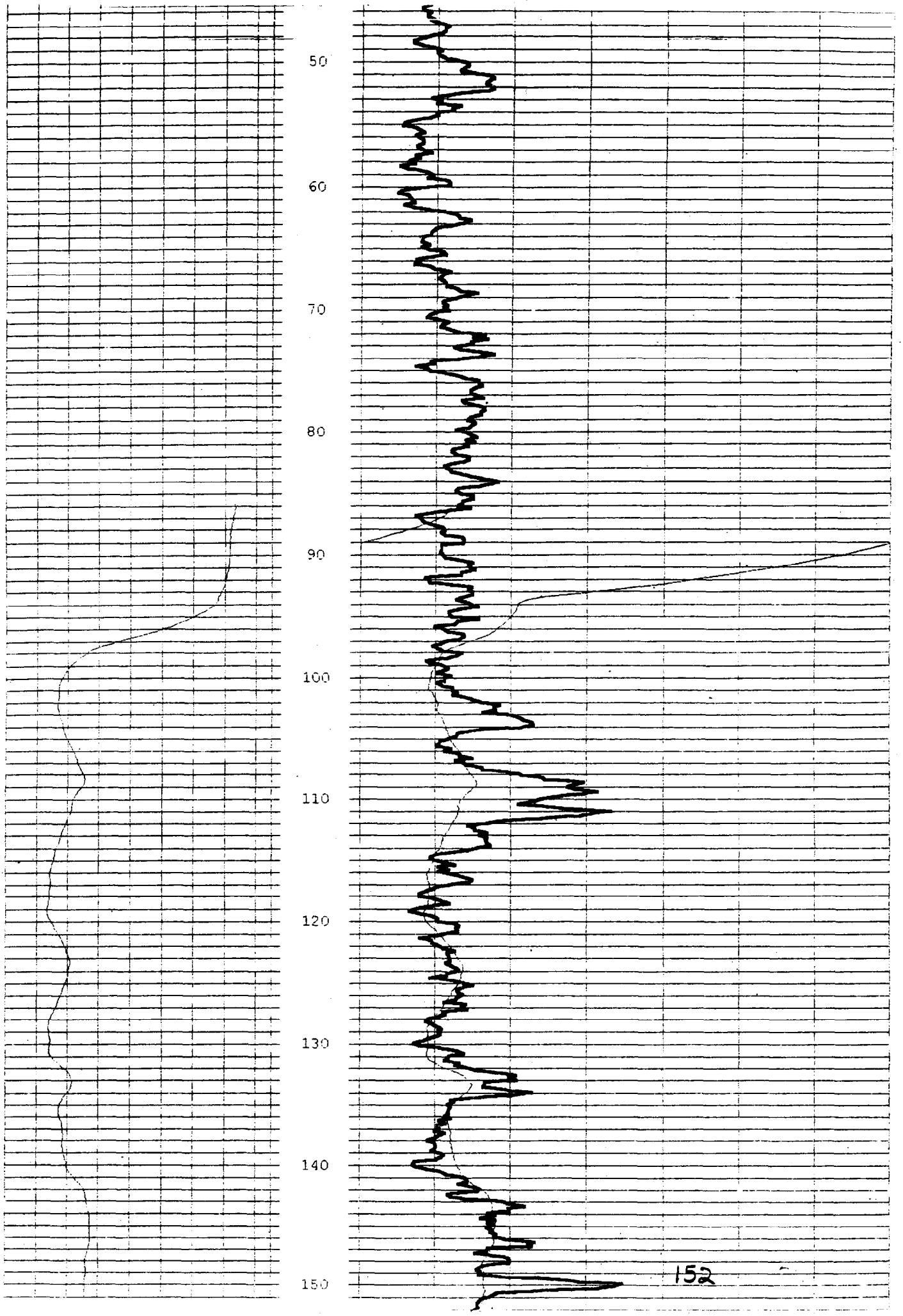
OTHER SERVICES

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND SURFACE	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

DATE	JUNE 26, 2003	TYPE FLUID IN HOLE	BENTONITE
RUN No		SALINITY	
TYPE LOG		DENSITY	
DEPTH-DRILLER	780 FEET	LEVEL	
DEPTH-LOGGER	775 FEET	MAX. REC. TEMP.	
BTM LOGGED INTERVAL			
TOP LOGGED INTERVAL			
OPERATING RIG TIME			
RECORDED BY	BENJAMIN RICE		
WITNESSED BY	STAN CONTI		

RUN NO.	BOREHOLE RECORD BIT	FROM	TO	CASING RECORD SIZE	WGT.	FROM	TO
	12 INCH	GROUND SURFACE	94 FEET	10 INCH	PVC	GROUND SURFACE	94 FEET
	8 INCH	94 FEET	TOTAL DEPTH				

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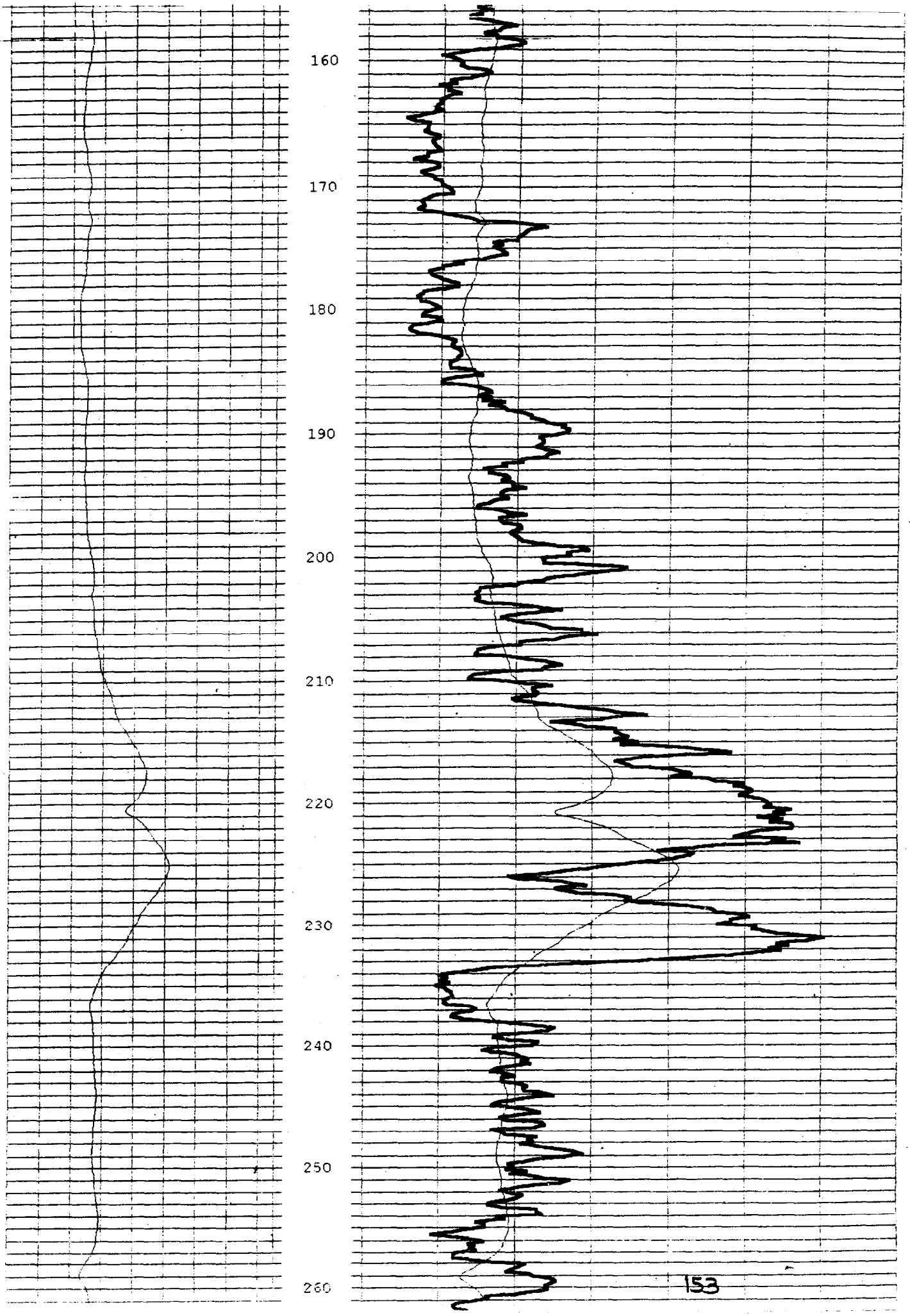
140
150
152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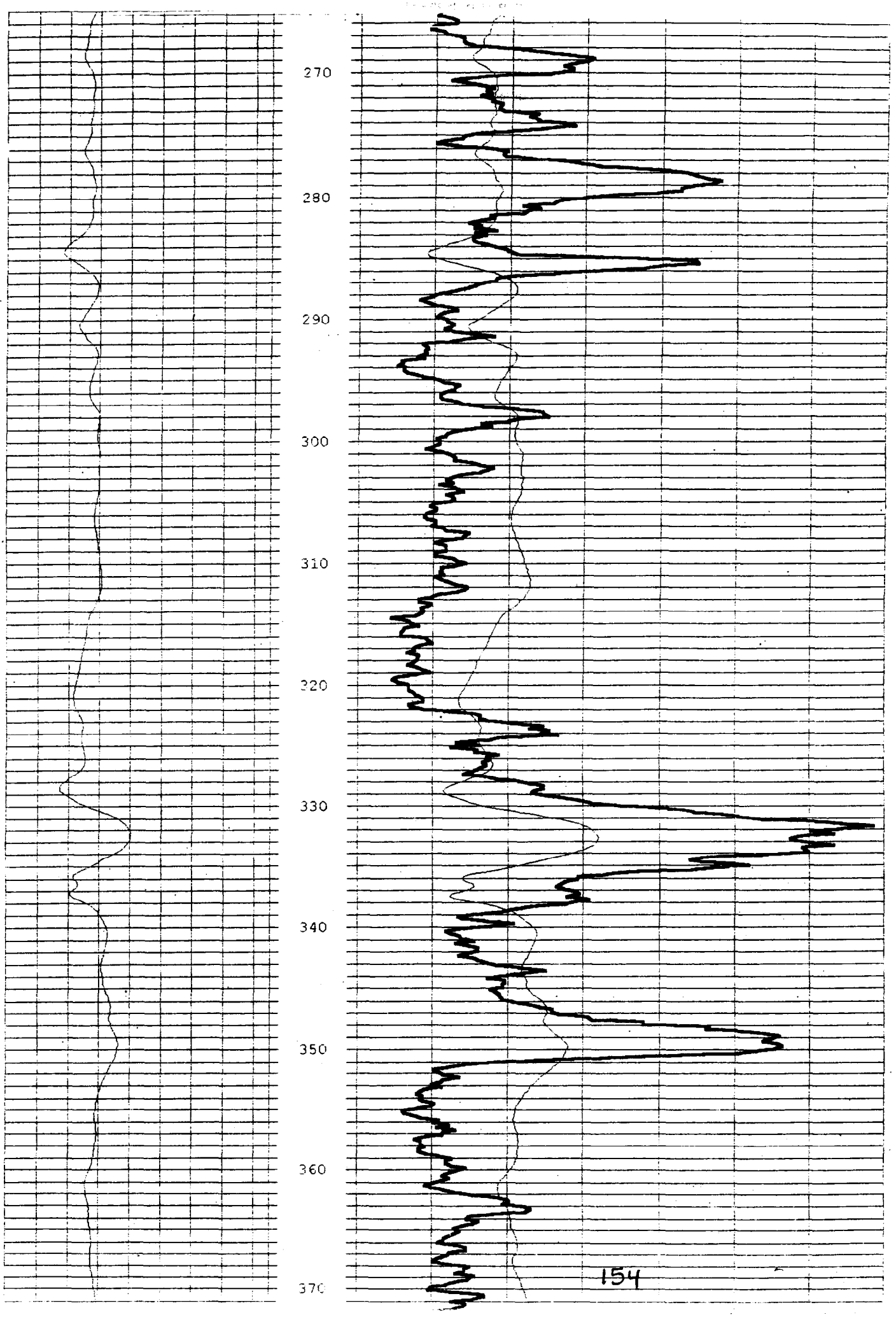
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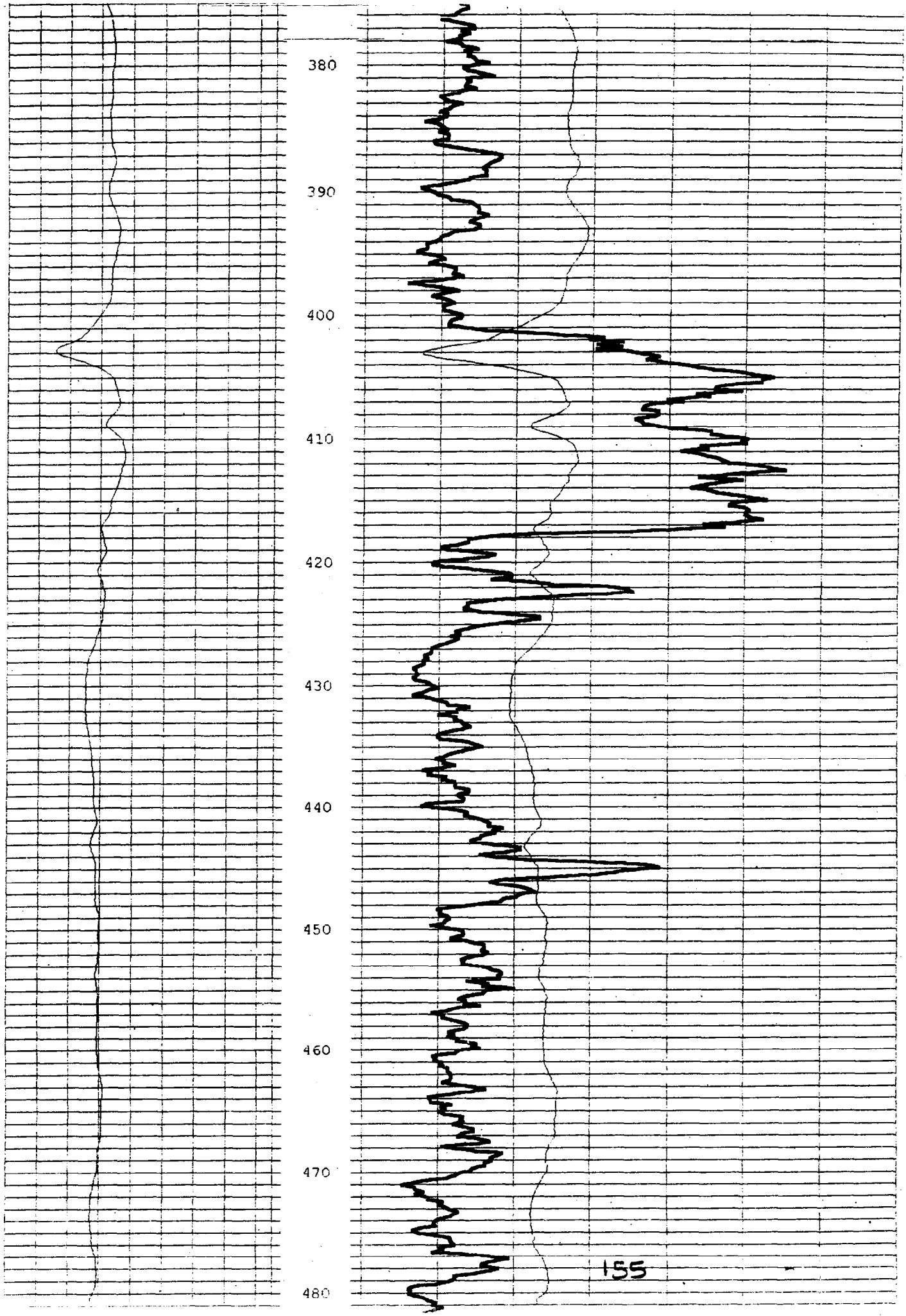
360
370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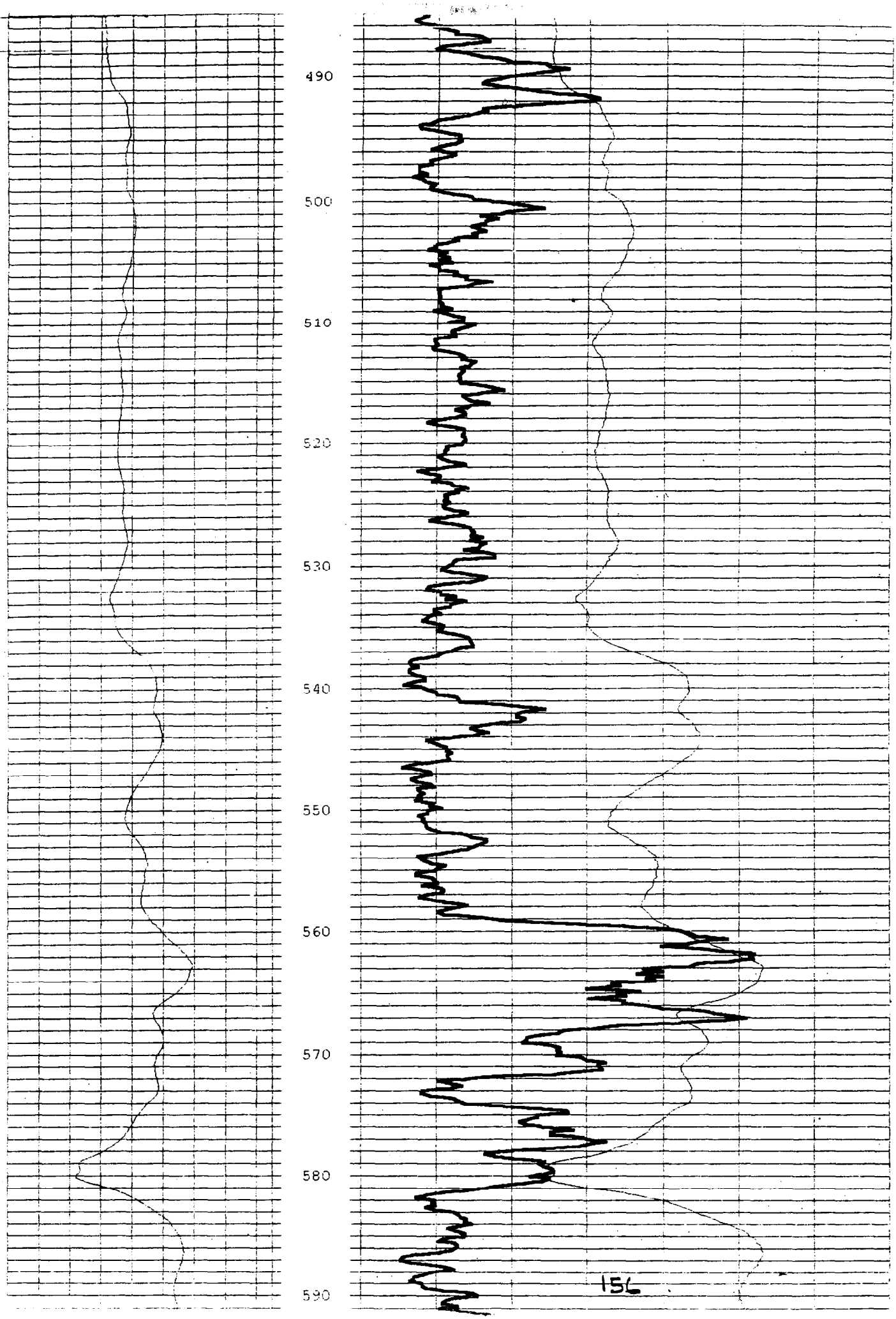
155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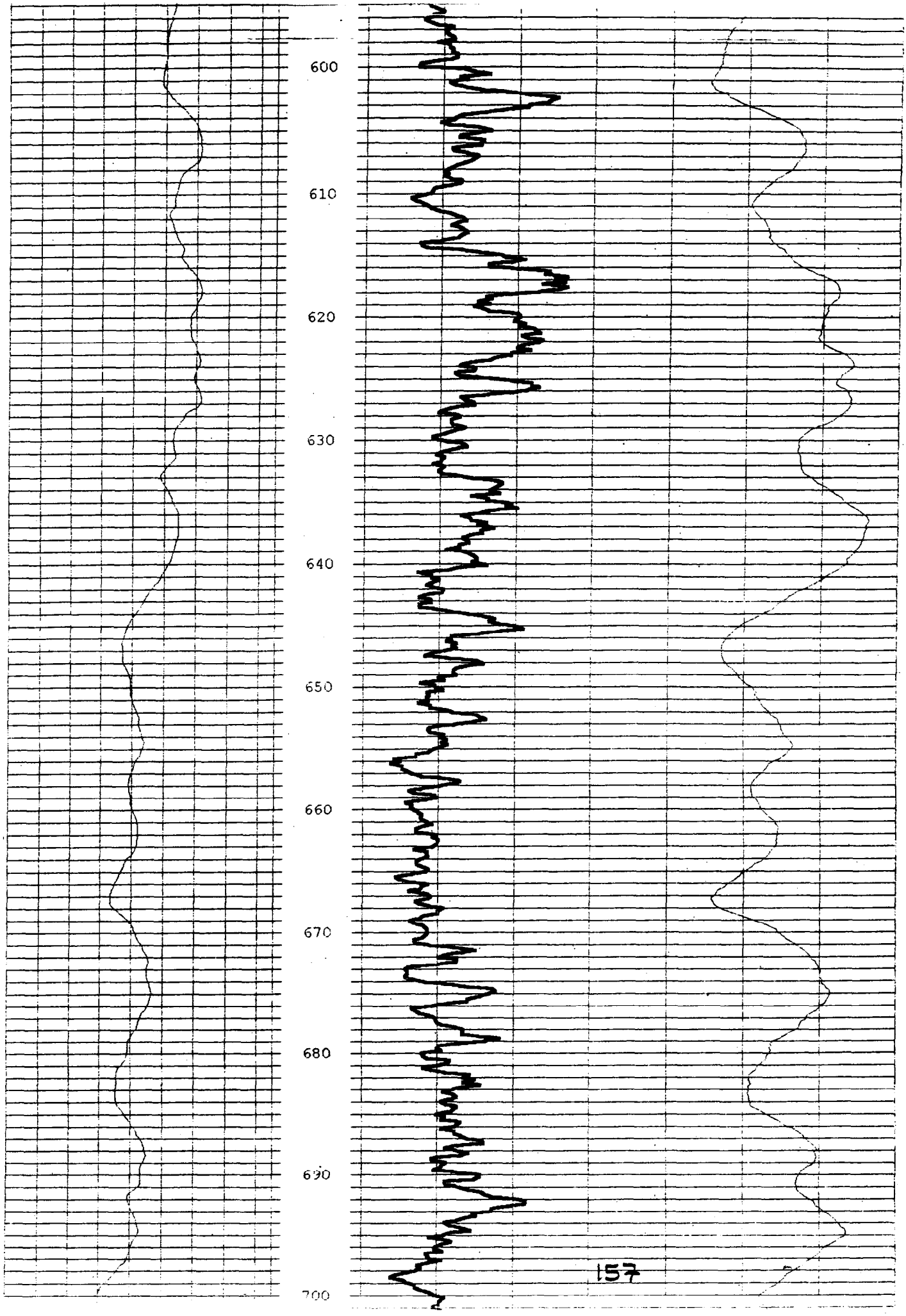
580
590
156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650
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700
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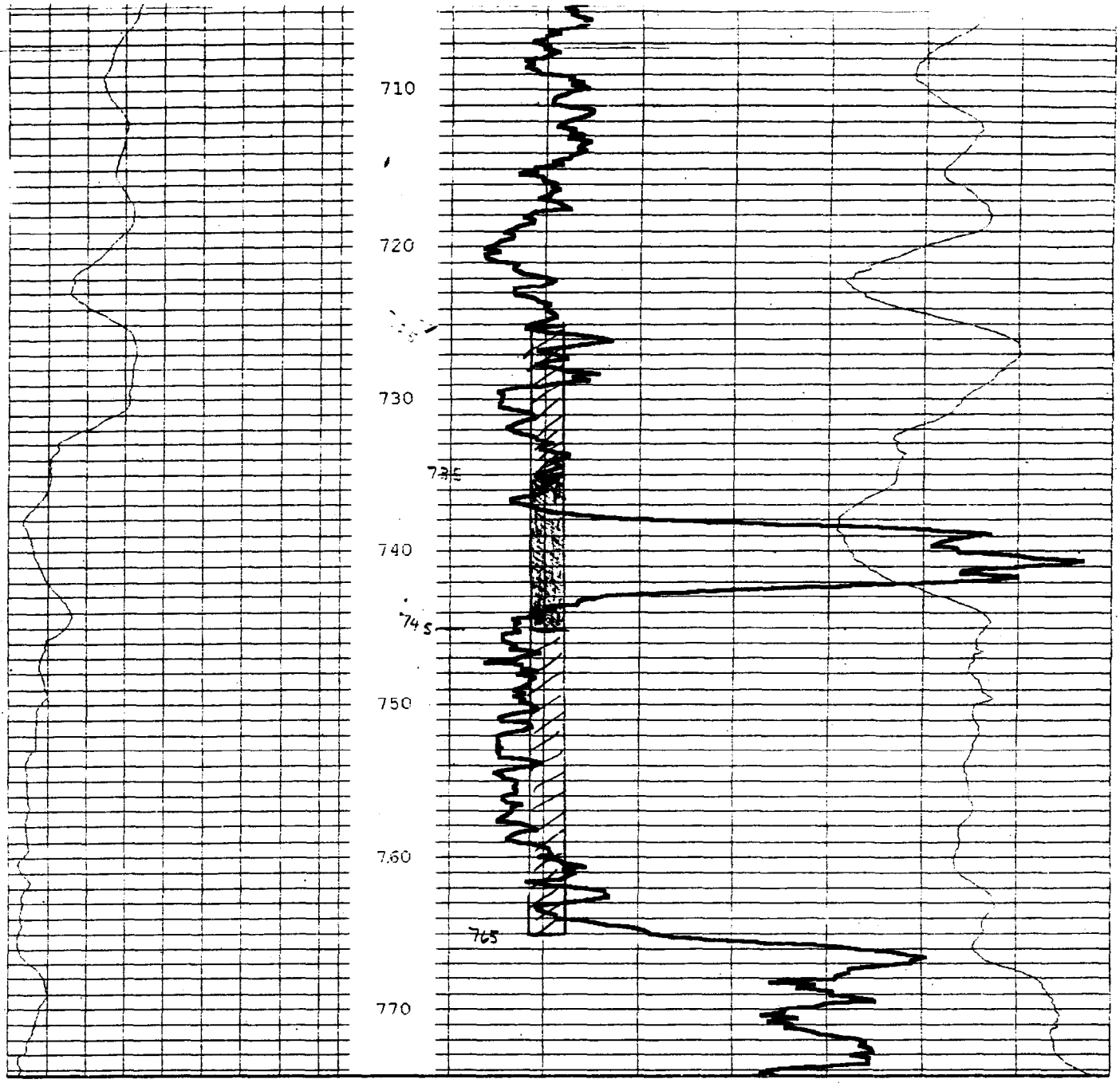

710
720
730
735
740
745
750
760
765
770

Section 2

Monitoring Well Construction Log

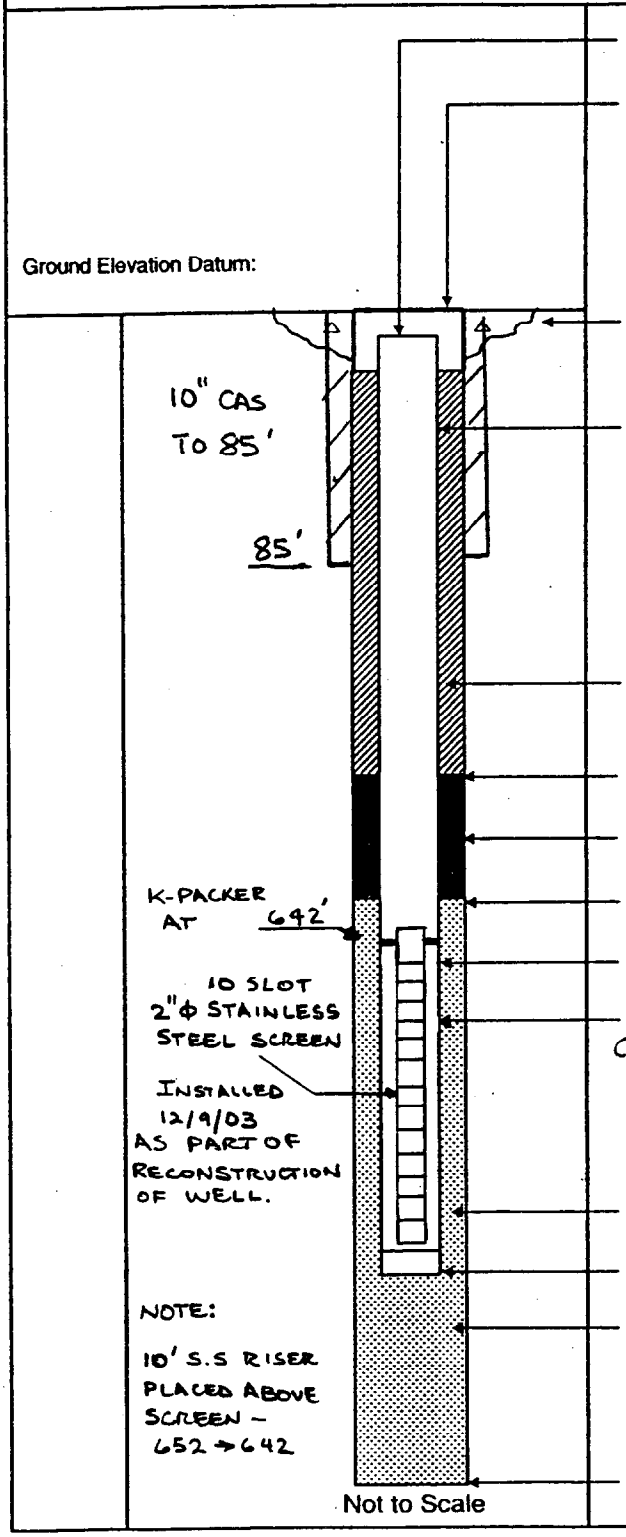
Tetra Tech NUS, Inc.

WELL No.: BPOW4-1

MONITORING WELL SHEET

PERMIT No:

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



Not to Scale

Ground Elevation Datum:

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: 8 3/4 ≈ 9"

Type of Backfill: VOLCLAY GROUT

Elevation / Depth of ~~Seal~~: F SAND #0 1602

Type of Seal: NA

Elevation / Depth of Top of ~~Filter Pack~~: C. SAND 1620

Elevation / Depth of Top of Screen: 1652

Type of Screen: PVC SCH 80 (PLACED 7/17/03)

Slot Size x Length: 10 SL x 40'

I.D. of Screen: INITIAL 3 13/16"

Type of Filter Pack: #1 SILICA SAND

Elevation / Depth of Bottom of Screen: 1692

Elevation / Depth of Bottom of Filter Pack: 1693

Type of Backfill Below Well: SILICA SAND

Elevation / Total Depth of Borehole: 1700

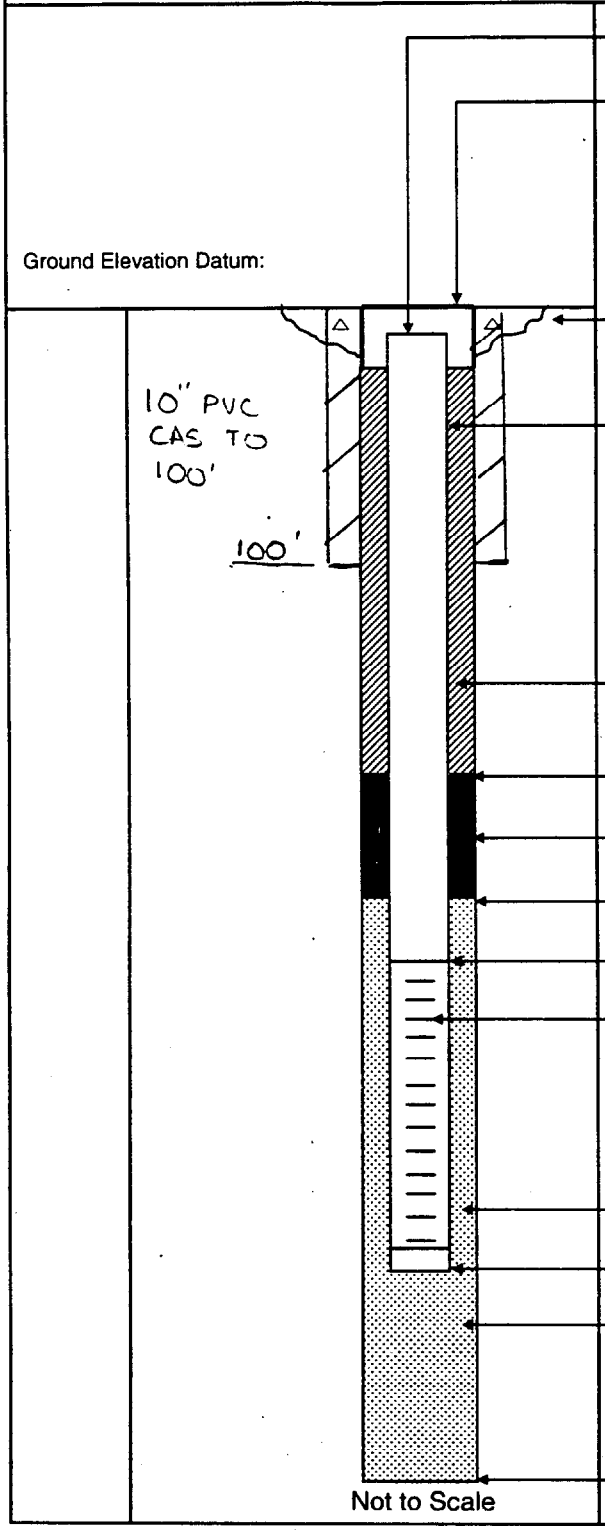
Tetra Tech NUS, Inc.

WELL No.: BPOW4-2

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:	BETHPAGE	DRILLING METHOD:	MUD ROT	NORTHING:	
GEOLOGIST:	CONTI	DEV. METHOD:	AIR/PUMP	EASTING:	



Ground Elevation Datum:

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

Appendix B

BPOW4-1, BPOW4-2

Integrity Testing

Rehabilitation

Decommissioning

Section 1

BPOW4-1, BPOW4-2

Integrity Testing

RESOLUTION CONSULTANTS

To: Lora Fly, DON, NAVFAC MIDLANT

From: Brian Caldwell, P.G., Resolution Consultants

Subject: **NWIRP Bethpage Well Integrity Test Summary**

Date: 4 October 2013

The following is a summary of the well integrity testing performed at the Naval Weapons Industrial Reserve Plant (NWIRP) located in Bethpage, New York. Resolution Consultants (ResCon) and Delta Well and Pump of Ronkonkoma, New York (Delta) conducted well integrity testing activities on July 22, 2013, and September 12-13, 2013. Well integrity testing was performed on off-site wells BPOW4-1 and BPOW4-2. The purpose of the well integrity testing was to assess well performance, determine if well packers are functioning properly, determine if cracks exist in the well casings, and complete any necessary repairs.

On July 22, 2013 ResCon and Delta tested BPOW4-1 and BPOW4-2. Delta utilized a portable nitrogen tank and regulator to inflate the packers in BPOW4-1 and BPOW4-2 to approximately

210 psi. ResCon utilized an EIP to gauge the static water level within each well casing and measure drawdown. Depth to static water in BPOW4-1 was 26.38 ft and depth to static water in BPOW4-2 was 26.08 ft.

Delta utilized the dedicated submersible pump, set below the packer, in BPOW4-1 to pump the well for approximately 70 minutes at approximately 4.5 gpm. No drawdown was observed. The final turbidity was 4.2 NTU. Delta utilized the dedicated submersible pump, set below the packer, in BPOW4-2 to pump the well for approximately 70 minutes at approximately 5 gpm. Final turbidity was 12.2 NTU. Drawdown was approximately 0.03 ft. Both wells were determined to be functioning properly and no additional well development is necessary.

On September 12, 2013 ResCon and Delta re-tested BPOW4-2 because of a concern that there could still be a crack in the casing above the packer assembly. ResCon utilized an EIP to gauge the static water level within the well casing and measure drawdown. Depth to static water in BPOW4-2 was 26.74 ft.

Delta utilized the dedicated submersible pump, set below the packer, in BPOW4-2 to pump the well for approximately 20 minutes at approximately 7 gpm. Drawdown within the well was approximately 13.22 ft. Based on a flow rate of 7 gpm, the specific capacity of BPOW4-2 was calculated to be 0.53 gpm/ft.

Once the water level returned to static, Delta utilized a portable nitrogen tank and regulator to inflate the packer in BPOW4-2 to approximately 300 psi. Delta utilized the dedicated submersible pump, set below the packer, in BPOW4-2 to pump the well for approximately 20 minutes at approximately 7 gpm. The water level in the casing rose from 26.30 ft to 26.00 feet during the 20 minute pump test. Approximately 300 total gallons were pumped from BPOW4-2 and final turbidity was 9.1 NTU.

Upon completion of the pump tests and a return to static water level, ResCon performed a static water test. The packer was inflated to approximately 300 psi and ResCon added 5 gallons of distilled water to the well. Initial depth to water was 17.80 ft. The water level within the well was gauged for 40 minutes. The water level within BPOW4-2 dropped from 17.80 ft to 25.31 ft during the 40 minute test.

On September 13, 2013 ResCon and Delta re-tested BPOW4-1. ResCon utilized an EIP to gauge the static water level within the well casing and measure drawdown. Depth to static water in BPOW4-1 was 26.21 ft.

Delta utilized the dedicated submersible pump, set below the packer, in BPOW4-1 to pump the well for approximately 20 minutes at approximately 6 gpm. Drawdown within the well was approximately 2.16 ft. Based on a flow rate of 6 gpm, the specific capacity of BPOW4-1 was calculated to be 2.78 gpm/ft.

Once the water level returned to static, Delta utilized a portable nitrogen tank and regulator to inflate the packer in BPOW4-1 to approximately 265 psi. Delta utilized the dedicated submersible pump, set below the packer, in BPOW4-1 to pump the well for approximately 20 minutes at approximately 6 gpm. The water level in the casing rose from 26.14 ft to 25.97 ft during the 20 minute pump test. Approximately 225 total gallons were pumped from BPOW4-1 and final turbidity was 7.4 NTU.

Upon completion of the pump tests and a return to static water level, ResCon performed a static water test. The packer was inflated to approximately 265 psi and ResCon added 5 gallons of distilled water to the well. Initial depth to water was 17.70 ft. The water level within the well was gauged for 60 minutes. The water level within BPOW4-1 dropped from 17.70 ft to 24.38 ft during the 60 minute test.

Based on the results of the well integrity testing, BPOW4-1 and BPOW4-2 seem to be losing water from above the packer. Due to the loss of water from water from above the packer, it is recommended that BPO W4-1 and BP OW4-2 be resleeved with 2-inch diameter PVC well screen and well casing.

Section 2

BPOW4-1, BPOW4-2

Rehabilitation

RESOLUTION CONSULTANTS

To: Lora Fly, DON, NAVFAC MIDLANT

From: Brian Caldwell, P.G., Resolution Consultants

Subject: **2014 Rehabilitation of BPOW4-1 and BPOW4-2 (OU2), NWIRP Bethpage**

Date: 28 April 2014

Starting on February 12, 2014 Resolution Consultants (ResCon), and subcontractor Delta Well and Pump Co., Inc. (Delta), was on-site at outpost well locations BPOW4-1 and BPOW4-2 to begin rehabilitation activities on both wells. These wells were constructed of 4-inch Schedule 80 PVC and the rehabilitation would include the installation of a 2" Schedule 80 PVC well within each existing casing. Work was conducted over a period of 10 days.

Initially, records indicated BPOW4-2 was a total depth of 765' below ground surface (bgs), while field gauging indicated it was a total depth of 755' bgs. Attempts using a steel bailer and air lifting to try and remove sediment from the bottom of the well were both unsuccessful. It was determined to set a 2" Schedule 80 PVC well using the field determined depth of 755' bgs. A 40' section of 0.010 slot screen with 715' of riser was placed in the well. The primary and secondary filter packs were installed to a depth of 672' bgs. A high-yield bentonite grout mixture was then installed. Over a period of 5 days, more than 100 gallons of the bentonite grout mixture was added to the well with the level of the grout only rising to approximately 668' bgs. This loss of grout indicated a possible crack in the original casing where grout was escaping; therefore, efforts to rehabilitate BPOW4-2 were abandoned.

Records indicated that well BPOW4-1 was a total depth of 692' bgs. Also, there was a 50' section of 2" stainless steel screen and riser with a k-packer stuck in the bottom of the well. This packer setup needed to be removed in order to set the new well within the 4" casing. Four retrieval attempts were made using two different retrieval tools over a period of 4 days. The packer setup was finally retrieved on February 26, 2014. Following retrieval, depth to bottom of the well was gauged to be 663' bgs, which was 29' shallower than the expected 692' bgs. It was determined that the well possibly collapsed following removal of the packer setup, therefore efforts to rehabilitate BPOW4-1 were also abandoned.

Section 3

BPOW4-1, BPOW4-2

Decommissioning

RESOLUTION CONSULTANTS

To: Lora Fly, DON, NAVFAC MIDLANT

From: Brian Caldwell, P.G., Resolution Consultants

Subject: **Well Decommissioning for BPOW4-1 and BPOW4-2**

Date: 30 April 2014

Arcadis performed groundwater sampling at outpost monitoring wells BPOW4-1 and BPOW4-2 in May 2013. Analytical results found concentrations of trichlorotrifluoromethane (Freon 113) above the trigger value. Well integrity testing was performed on both monitoring wells in September 2013 following the procedures outlined in the UFP Sampling and Analysis Plan (SAP) Addendum (August 2013). The testing found both wells were compromised.

Resolution Consultants implemented the Outpost Monitoring Well Rehabilitation Work Plan (Revision date 11/27/13) in February 2014. The objective of the work was to install new 2-inch monitoring wells inside the existing 4-inch monitoring wells. Numerous attempts were made to install the new wells. However, Delta was unable re-sleeve either well.

Well Decommissioning Proposal:

Resolution Consultants proposes to decommission these two wells in conformance with CP-43: Groundwater Monitoring Well Decommissioning Policy (NYSDEC, November 3, 2009).

The selected method for decommissioning will be grouting in place. The grout mix will follow the guidance in CP-43, Section 6.1. A tremie pipe will be lowered into the well

casing. Grout will be pumped into the well until visible at the ground surface. All groundwater displaced during grouting will be collected and properly disposed as drilling fluids. The grout level will be monitored for settling over several days. Grout will be added to the casings as needed until the level is approximately five feet below grade. Once the grout has hardened, the casings will be cut approximately five feet below grade. A ferrous marker will be embedded in the top of the grout to indicate the location of the former monitoring well. A fabric “utility” marking will be placed one foot above the grout so any future excavation will be alerted to the former monitoring well. The open hole will be backfilled with material similar to the surrounding soils. The site will be restored to match the surrounding conditions in accordance with the Sampling and Analysis Plan.

Appendix C

BPOW4-1R, BPOW4-2R Installation

Section 1

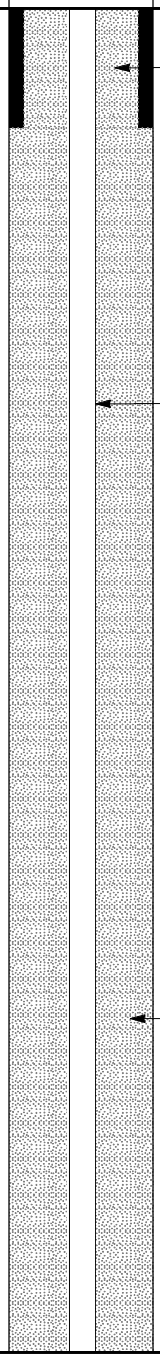
Boring and Gamma Logs

Resolution Consultants

Boring Log

BORING #: BPOW4-1R
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** G. Hicks
Location: Elm Dr. W. and Eden Ln. Levittown, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 64.08	**Well Screen Interval (ft):** 652-692
Start Date: 8/8/2014	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 8/19/2014	**Northing:** 200281.258 **Easting:** 1123067.502	**Total Depth (ft):** 707.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0					653 - 695 ft bgs: see BPOW4-2R for Descriptions		10" Diameter Steel Casing 4" Diameter Schedule 80 PVC Riser Bentonite Grout
50							
100							
150							
200							
250							
300							
350							
400							
450							
500							
550							
600							

Resolution Consultants

Boring Log

BORING #: BPOW4-1R
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** G. Hicks
Location: Elm Dr. W. and Eden Ln. Levittown, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 64.08	**Well Screen Interval (ft):** 652-692
Start Date: 8/8/2014	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 8/19/2014	**Northing:** 200281.258 **Easting:** 1123067.502	**Total Depth (ft):** 707.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
600					653 - 695 ft bgs: see BPOW4-2R for Descriptions *(continued)*		Bentonite Grout *(continued)*
602							
604							
606							
608							
610							#0 Filter Sand
612							
614							
616							
618							
620							
622							
624							
626							
628							
630							
632							
634							
636							#1 Filter Sand
638							
640							
642							
644							
646							
648							
650							
652							
654							
656							
658							
660							
662							
664							
666							
668							
670							
672							4" Diameter schedule 80 PVC, 10 Slot Well Screen (652-692 ft bgs)
674							
676							
678							
680							
682							
684							
686							
688							
690							
692							
694							Tail Pipe (692-697 ft bgs)
696							
698							
700							
702							#1 Sand to bottom of boring
704							
706							

End of boring at 707.0 ft. bgs.

Resolution Consultants

Boring Log

BORING #: BPOW4-2R
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** P. Kareth
Location: Elm Dr. W. and Elbow Ln. Levittown, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 66.6	**Well Screen Interval (ft):** 725-765
Start Date: 10/13/2014	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 10/20/2014	**Northing:** 200691.906 **Easting:** 1123200.043	**Total Depth (ft):** 784.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0							10" Diameter Steel Casing
50							
100							
150							4" Diameter Schedule 80 PVC Riser
200							
250							
300							
350							
400							
450							
500							Bentonite Grout
550							
600							
650							

Resolution Consultants

Boring Log

BORING #: BPOW4-2R
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** P. Kareth
Location: Elm Dr. W. and Elbow Ln. Levittown, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 66.6	**Well Screen Interval (ft):** 725-765
Start Date: 10/13/2014	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 10/20/2014	**Northing:** 200691.906 **Easting:** 1123200.043	**Total Depth (ft):** 784.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
650							Bentonite Grout *(continued)*
652							
654	0		SP/SM		Gray (10 YR 2/1) fine SAND, trace Silt, brown mottling		
656							
658	0		SP/SM		Gray (10 YR 7/1) fine SAND, trace Silt, trace coarse sand to fine gravel		
660							
662	0		SP/SM		Gray (10 YR 7/1) medium to fine SAND, trace Silt, some brown mottling		
664							
666	0.2		SC		Gray (10 YR 6/1) clayey coarse to fine SAND, brown mottling		
668							
670	0.1		SM		Gray (10 YR 7/3) silty medium to fine SAND, brown mottling, Clay nodule		
672							
674	0.1		SM		Reddish brown (7.5 YR 6/6) silty coarse to fine SAND, some gray mottling		
676							
678	0		SP/SM		Yellowish gray (10 YR 7/1) medium to fine SAND, trace Silt, yellow mottling		
680							
682	0.2		SP/SM		Yellowish gray (10 YR 8/1) medium to fine SAND, trace Silt		
684							
686	0		SP/SM		Yellowish gray (10 YR 7/1) medium to fine SAND, trace Silt, trace coarse sand to fine gravel		
688							
690							#0 Filter Sand
692							
694							
696							#1 Filter Sand
698							
700							
702							
704							
706							
708							
710							
712							
714							
716							
718							
720							
722							
724	0		SM		Yellowish gray (10 YR 7/1) silty coarse to fine SAND, clayey Sand nodule at top of spoon		
726							
728	0		SM		Yellowish gray (10 YR 7/3) silty coarse to fine SAND, some Clay, trace fine gravel		
730							
732	0		SP/SM		Yellowish gray (10 YR 7/1) coarse to fine SAND, trace fine Gravel, trace silt		
734							
736	0		SP/SM		Yellowish gray (10 YR 7/1) coarse to fine SAND, trace Silt		
738							
740	0.1		SP/SM		Yellowish gray (10 YR 7/1) coarse to fine SAND, trace Silt		
742							
744	0.3		SP/SM		Yellowish gray (10 YR 7/1) coarse to fine SAND, trace Silt, trace fine gravel		
746							
748	0		SP/SM		Yellowish gray (10 YR 7/1) coarse to fine SAND, trace Silt, trace fine gravel		
750							
752	0		SP/SM		Yellowish gray (10 YR 7/1) medium to fine SAND, trace Silt, trace fine gravel		
754							
756	0.3		SP/SM		Yellowish gray (10 YR 7/1) medium to fine SAND, trace Silt, trace fine gravel		
758							
760							4" Diameter schedule 80 PVC, 10 Slot Well Screen (725-765 ft bgs)
762							
764							
766							
768							
770							
772							
774							
776							
778							Tail Pipe (765-770 ft bgs)
780							
782							#1 Sand to bottom of boring
784					End of boring at 784.0 ft. bgs.		

AQUA TERRA GEOPHYSICS INC

COMPANY	DELTA WELL & PUMP
WELL ID	BPOW4 - 2R
FIELD	NWIRP BETHPAGE
COUNTRY	LEVITTOWN STATE NEW YORK

CO
WELL
FLD
CTY
STE
FILING No

LOCATION
OPPOSITE # 37 ELM DR. W.

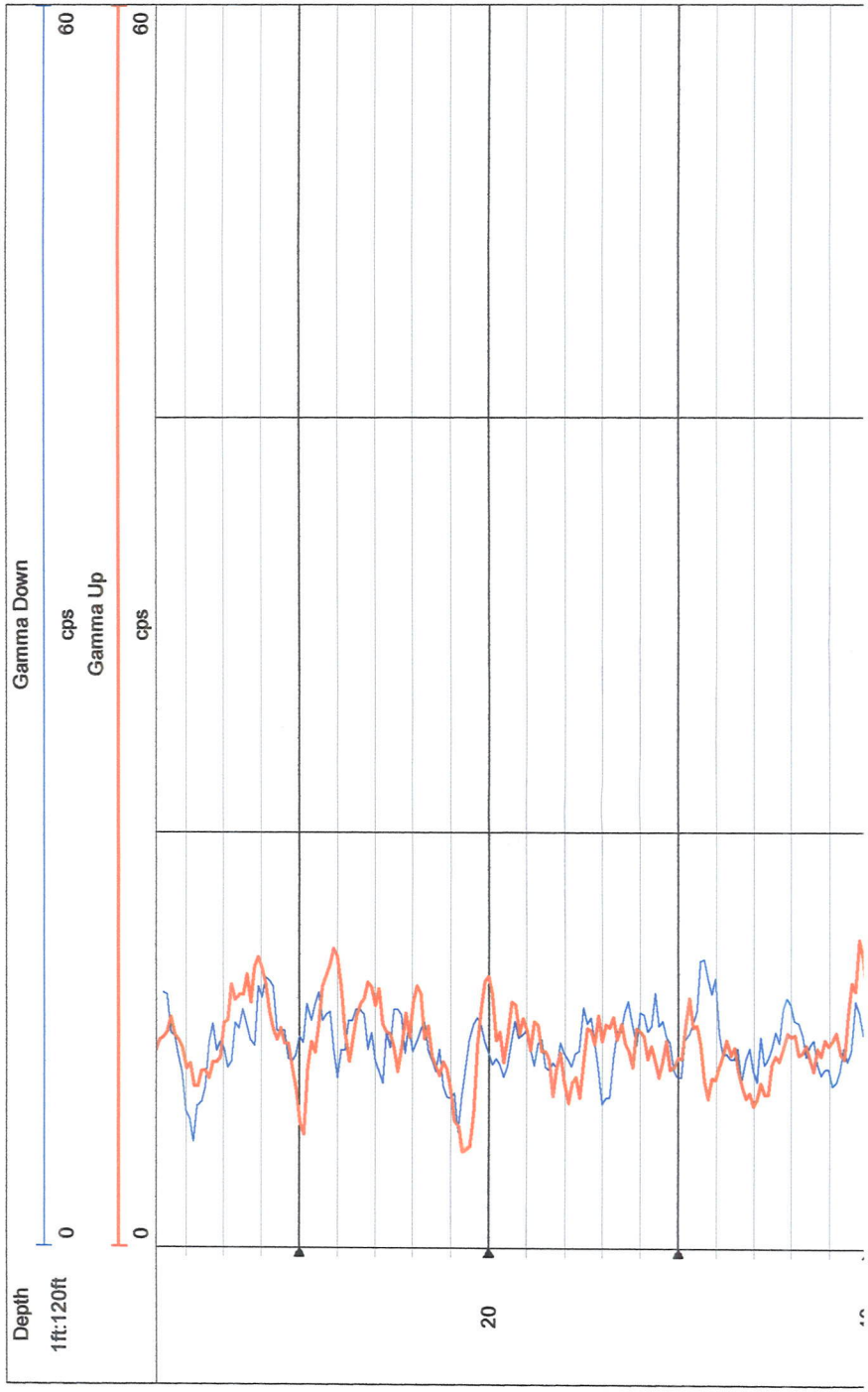
SEC TWP RGE

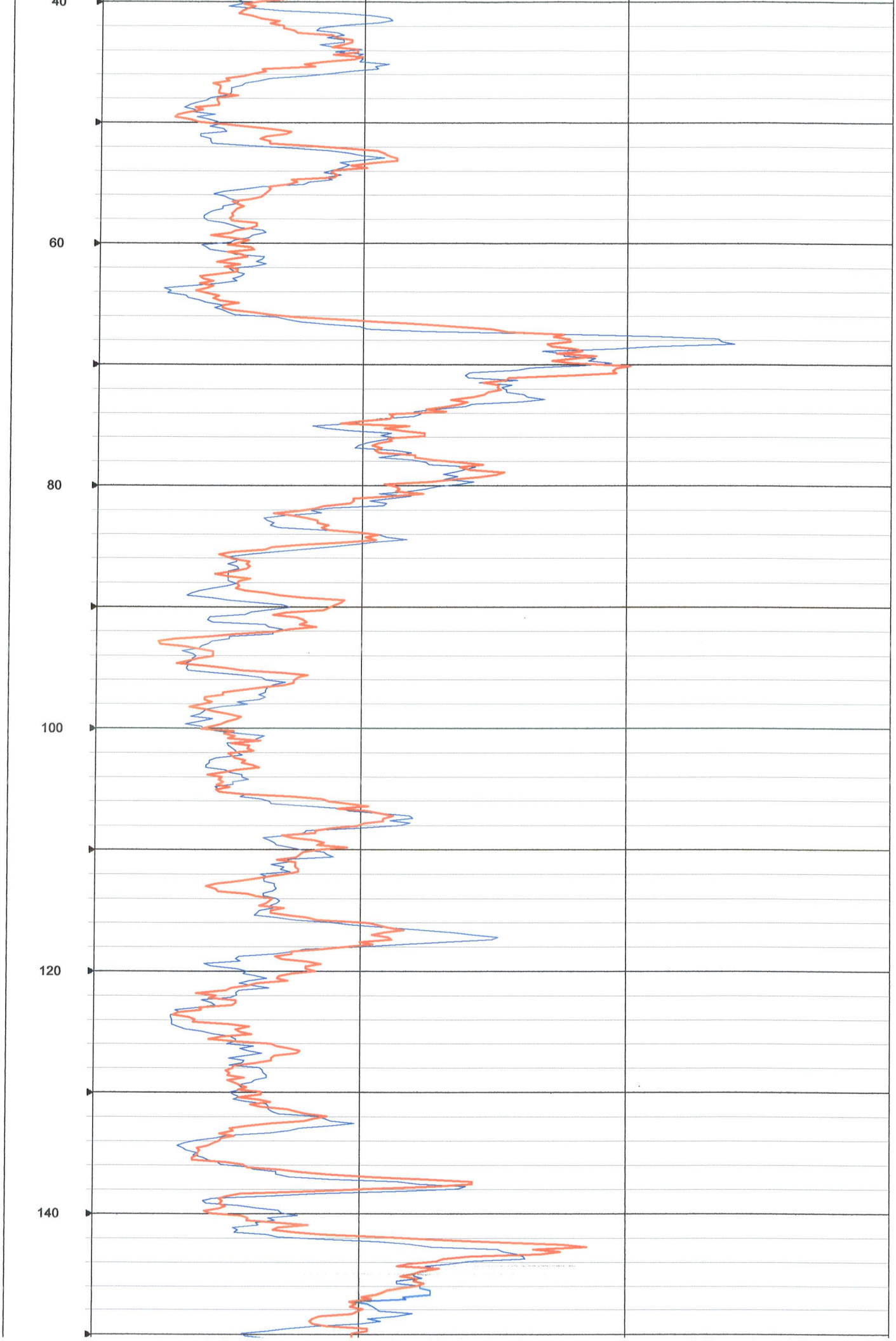
OTHER SERVICES

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND SURFACE	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

DATE	OCTOBER 10, 2014	TYPE FLUID IN HOLE	BENTONITE
RUN No		SALINITY	
TYPE LOG	NATURAL GAMMA	DENSITY	
DEPTH-DRILLER	785 FEET	LEVEL	
DEPTH-LOGGER	778 FEET	MAX. REC. TEMP.	
BTM LOGGED INTERVAL			
TOP LOGGED INTERVAL			
OPERATING RIG TIME			
RECORDED BY	BENJAMIN RICE		
WITNESSED BY	PAUL KARETH		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
	8.75 INCH	52 FEET	TOTAL DEPTH	10 INCH	STEEL	0 FEET	52 FEET
				3 INCH	DRILL PIPE	52 FEET	775 FEET

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120
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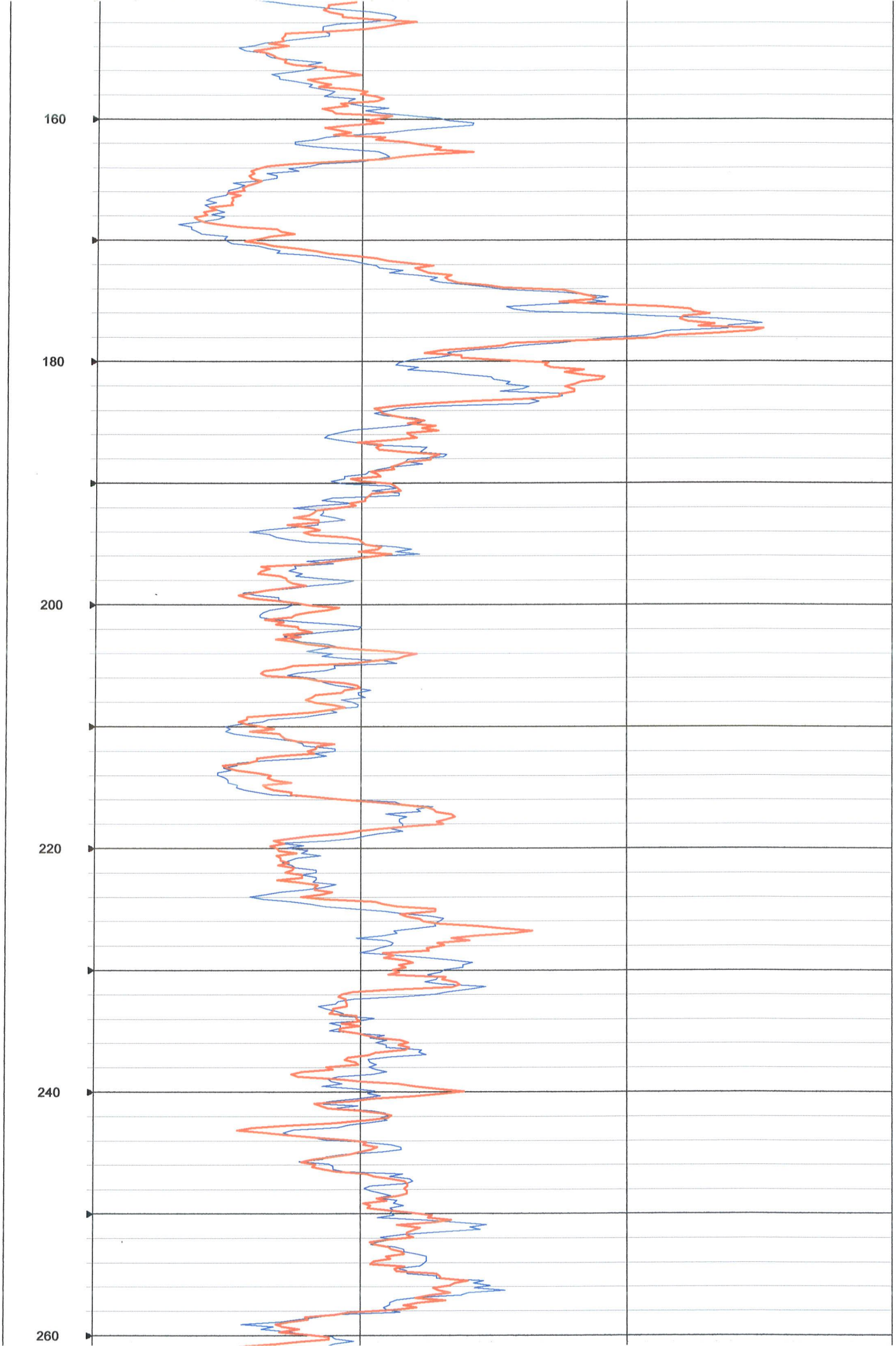
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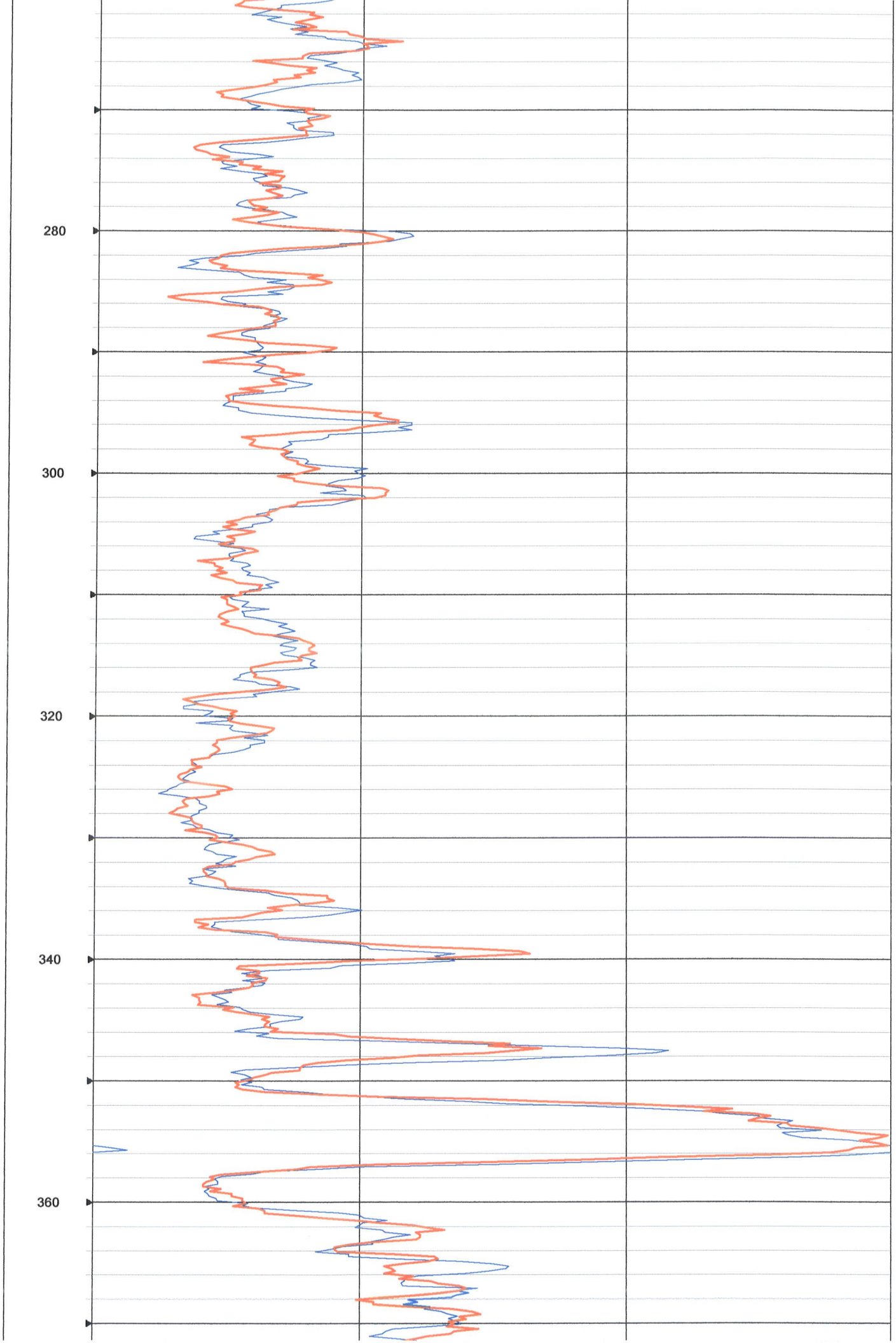
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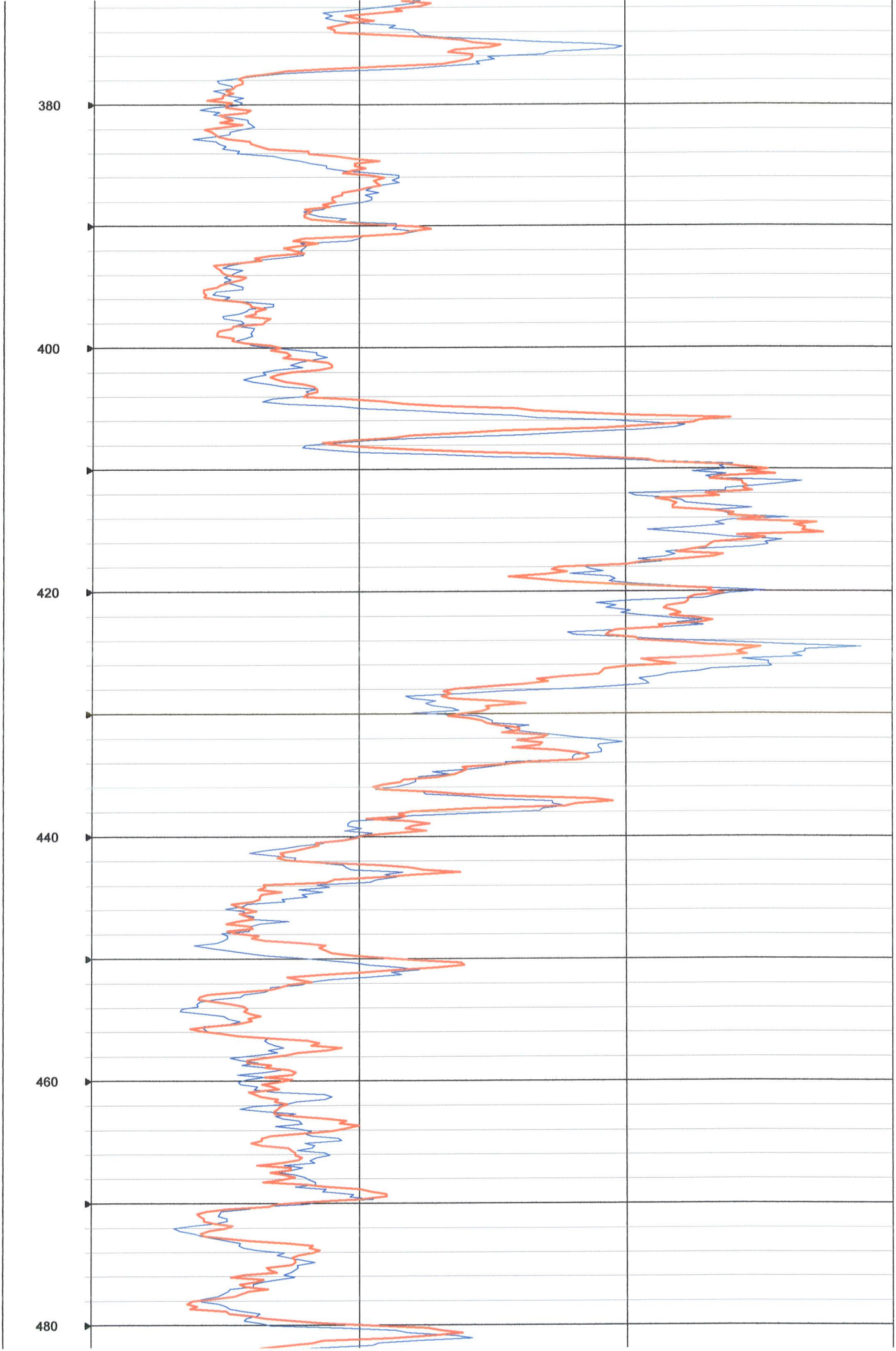
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460
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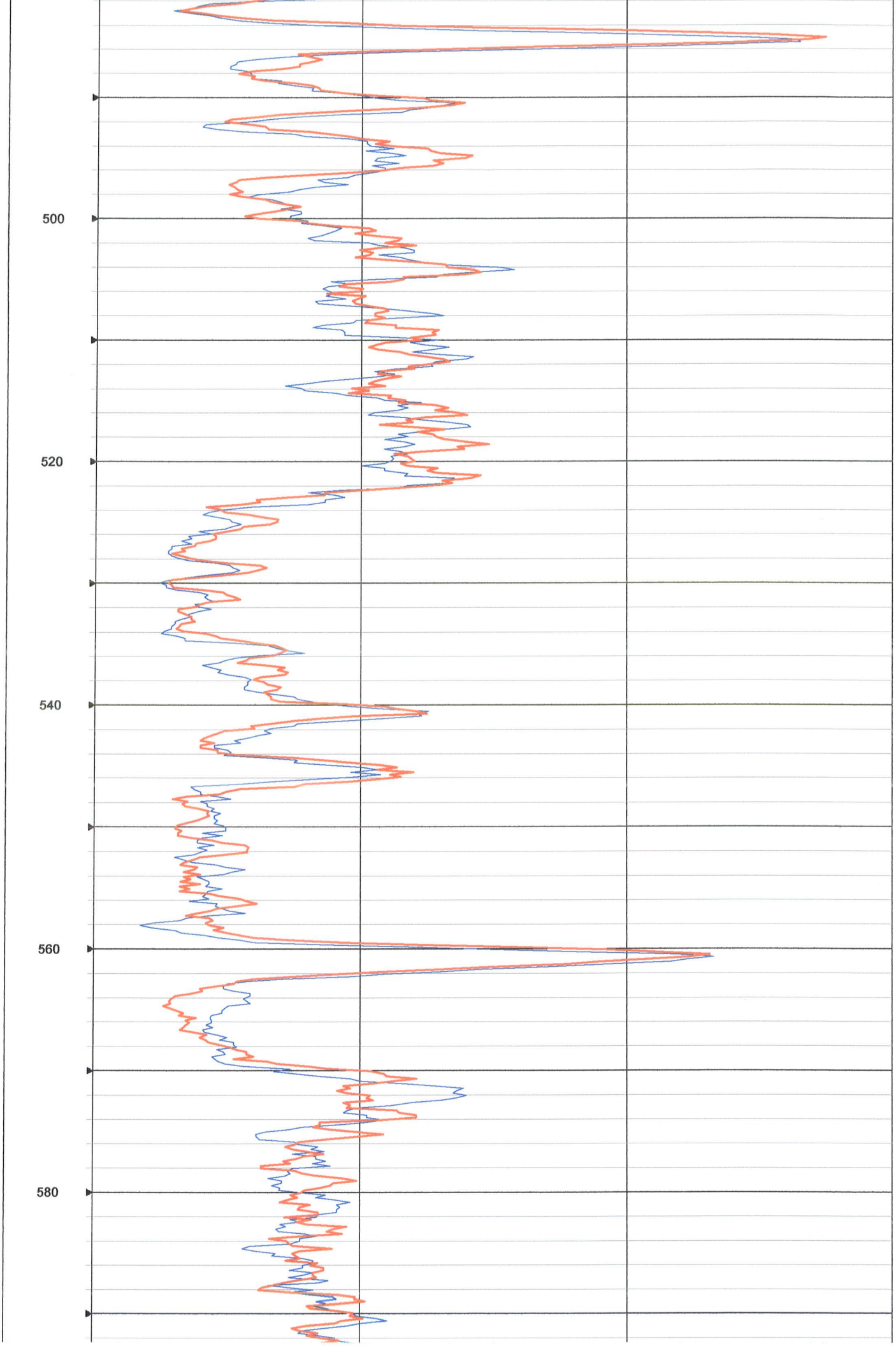
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560
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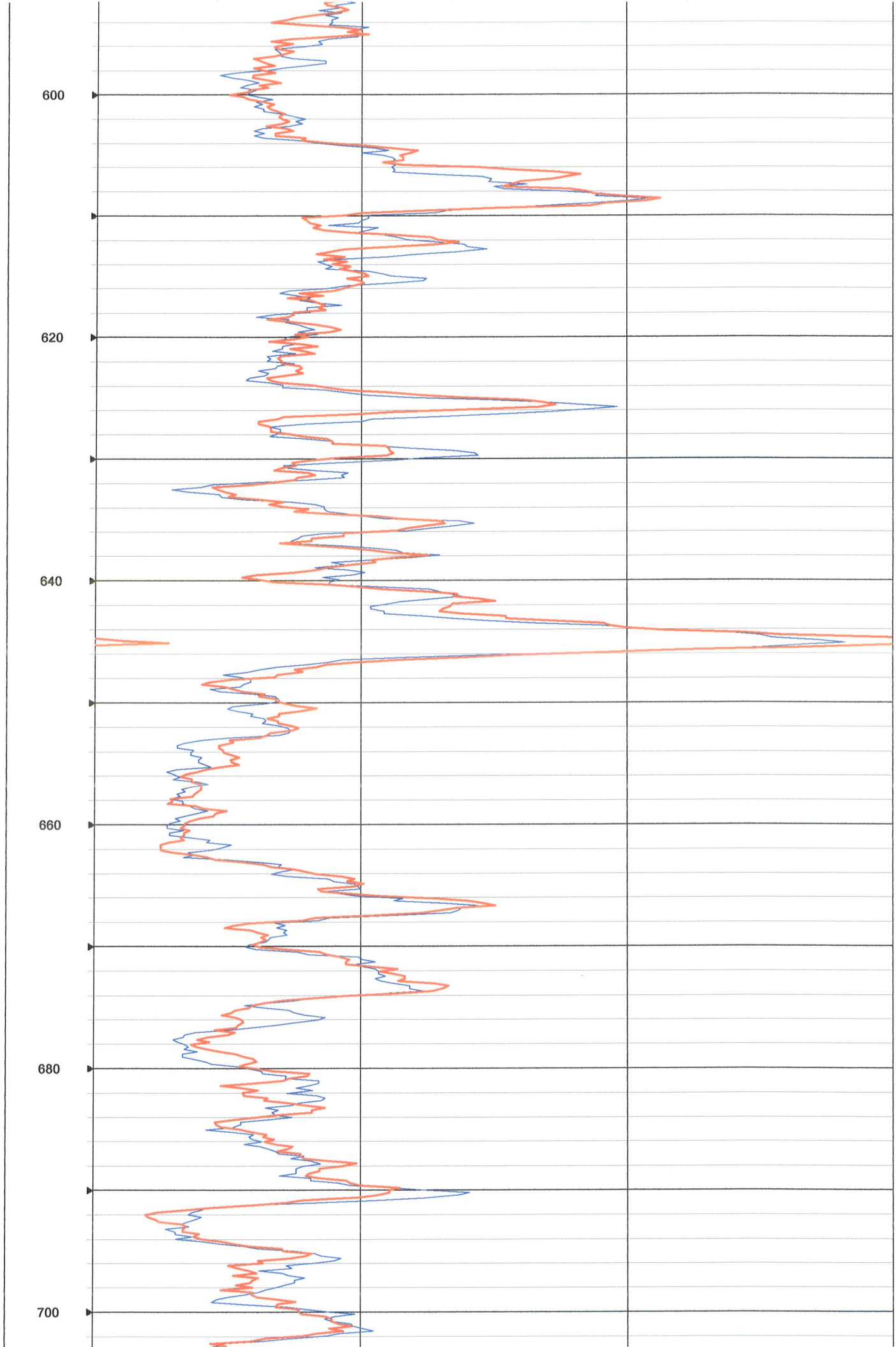
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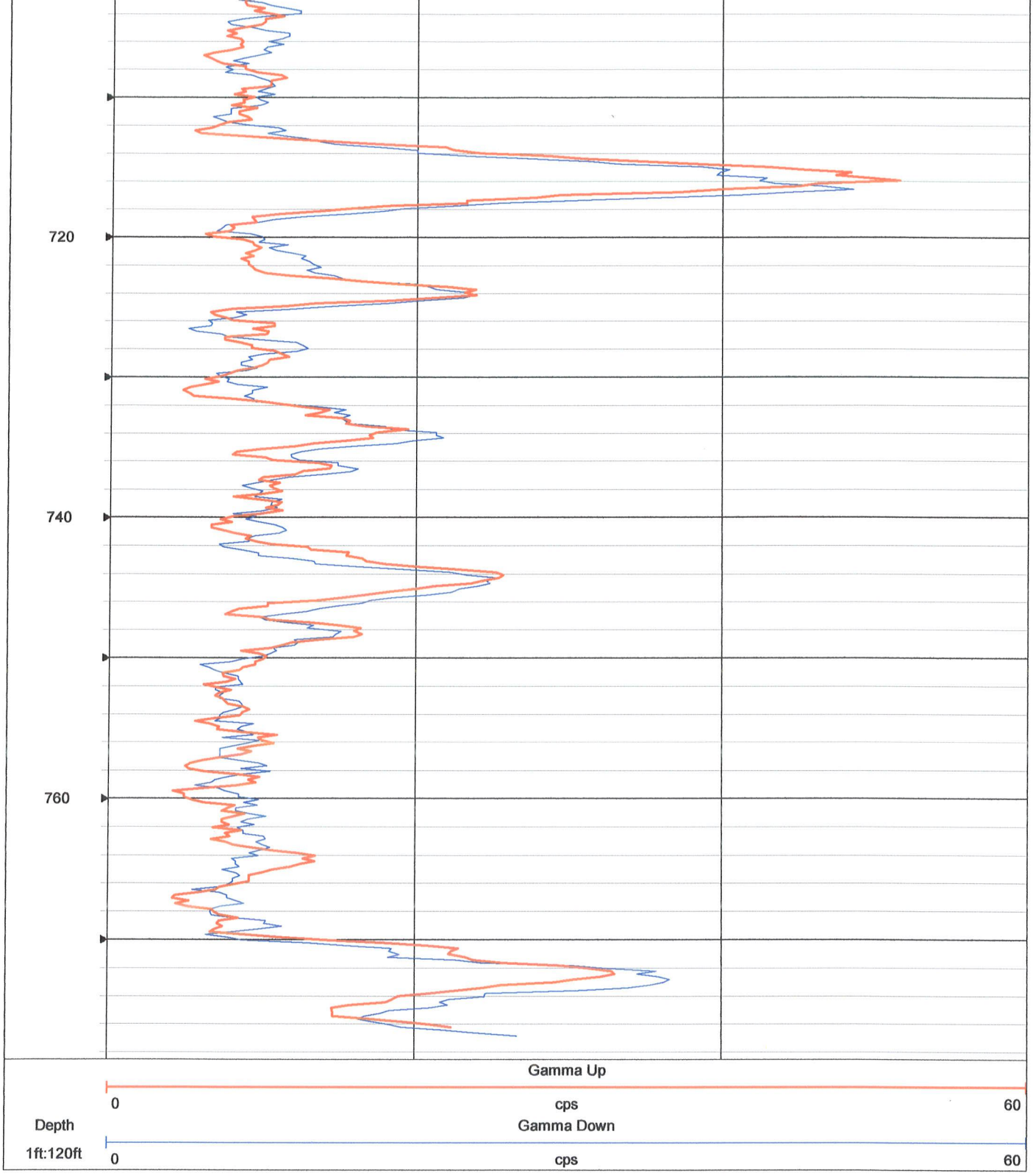
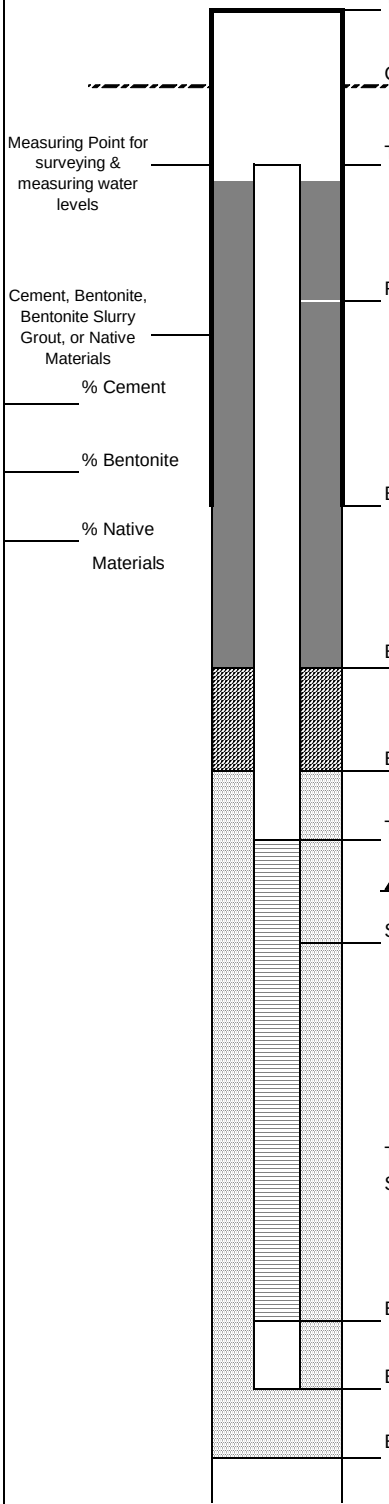

720
740
760
Gamma Up
0
cps
60
Depth
1ft:120ft
Gamma Down
0
cps
60

Section 2

Monitoring Well Construction Logs

RESOLUTION CONSULTANTS	Client: NAVFAC	Project Number: 60266526	***WELL ID: BPOW4-1R***
	Site Location: NWIRP BETHPAGE, NY		
	Well Location: Elm Dr. W. and Eden Ln., Levittown, NY		Date Installed: 8/19/14
	Method: MUD ROTARY		Inspector: G. HICKS
	Coords: Northing: 1123067.502 Easting: 200281.258		Contractor: DELTA WELL & PUMP

MONITORING WELL CONSTRUCTION DETAIL



		Depth from G.S. (feet)	Elevation(feet) Datum
Top of 12 inch diameter Steel Curb Box			64.08
Ground Surface (G.S.)		0.00	64.08
Top of Riser Pipe fit with locking j-plug			63.67
Riser Pipe:			
Length	652 feet		
Inside Diameter (ID)	4 inch		
Type of Material	PVC		
Bottom of Steel Surface Casing		53	11.1
Bottom of Bentonite		602.0	-537.9
Bottom of 0 Filter Sand/Top of #1 Filter Sand		620	-555.9
Top of Screen		652	-587.9
▲ Stabilized Water Level			
Screen:			
Length	40 feet		
Inside Diameter (ID)	4 inch		
Slot Size	10		
Type of Material	PVC		
Type/Size of Sand	#1		
Sand Pack Thickness	87 feet		
Bottom of Screen		692	-627.9
Bottom of Tail Pipe:		697	-632.9
Bottom of Borehole		707	-642.9

Borehole Diameter: 10 inch

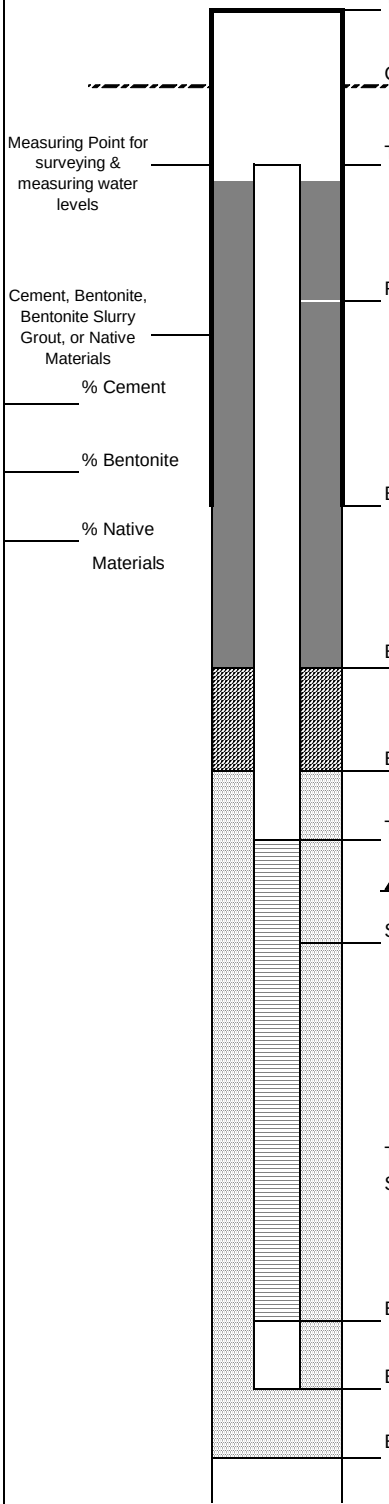
Approved: _____ Signature _____ Date

Describe Measuring Point:

Ground Surface

RESOLUTION CONSULTANTS	Client: NAVFAC	Project Number: 60266526	***WELL ID: BPOW4-2R***
	Site Location: NWIRP BETHPAGE, NY		
	Well Location: Elm Dr. W. and Elbow Ln., Levittown, NY		Date Installed: 10/20/14
	Method: MUD ROTARY		Inspector: V. THAYER
	Coords: Northing: 200691.906 Easting: 1123200.043		Contractor: DELTA WELL & PUMP

MONITORING WELL CONSTRUCTION DETAIL



		Depth from G.S. (feet)	Elevation(feet) Datum
Top of 12 inch diameter Steel Curb Box			66.6
Ground Surface (G.S.)		0.00	66.6
Top of Riser Pipe fit with locking j-plug			66.13
Riser Pipe:			
Length	725 feet		
Inside Diameter (ID)	4 inch		
Type of Material	PVC		
Bottom of Steel Surface Casing		53	13.6
Bottom of Bentonite		702.0	-635.4
Bottom of 0 Filter Sand/Top of #1 Filter Sand		712	-645.4
Top of Screen		725	-658.4
▲ Stabilized Water Level			
Screen:			
Length	40 feet		
Inside Diameter (ID)	4 inch		
Slot Size	10		
Type of Material	PVC		
Type/Size of Sand	#1		
Sand Pack Thickness	72 feet		
Bottom of Screen		765	-698.4
Bottom of Tail Pipe:		770	-703.4
Bottom of Borehole		784	-717.4

Borehole Diameter: 10 inch

Approved: _____ Signature _____ Date

Describe Measuring Point:

Ground Surface

Section 3

Well Development Record

Well Development Record

Well name/assoc. soil boring #: BPOW4-1R

Client/project: NWIRP-Bethpage

Air development

Tubing depth: 300

Initial water level: 31.6 fbgs

Date/Time	Turbidity (NTU)	Total volume purged (gal.)	Comments (field employee, tubing depth changes, purge rate groundwater appearance/odour)
9-17/0930	>1,100	20 gal/min.	Gordon Hicks + Delta; water very silty
9-17-14/1200	28.13	~2000 gal	
9-17-14/1330	21.49	6,500	

Final water level: 24.5 fbgs

Pump development

Date(s): 9-18-14 – 9-19-14

Initial water level: 28.51

Time	Turbidity (NTU)	Total volume purged (gal.)	Comments (field employee, screen zone depths, tubing depth, purge rate groundwater appearance/odour)
9-18-14/1100	27.52		pump at 652 fbgs (top of screen)
9-18-14/1130	25.12		pump at 655
9-18-14/1200	22.17		662
9-18-14/1230	17.19		667
9-18-14/1300	14.13	3000	672
9-19-14/1230	4.48		692; turbidity stable

Final water level: 25.19

Well Development Record
BPOW4-2R

Air and Pump Development

Date	Air Development	Pump Development		Approximate Total Development Volume (gal)	Final Turbidity (NTUs)
	Approximate Volume (Gal)	Final Pump Depth (ft)	Pumping Rate (gal/min)		
Oct 21 2014	4025				
Oct 22 2014		725'	11 gal/min		151
Oct 22 2014		730'	11 gal/min		172.8
Oct 22 2014		735'	11 gal/min	4000	175.1
Oct 23 2014		735'	11 gal/min		123.6
Oct 23 2014		740'	11 gal/min		121.5
Oct 23 2014		745'	11 gal/min	5600	107.9
Oct 24 2014		750'	11 gal/min		152.6
Oct 24 2014		755'	11 gal/min		145.2
Oct 24 2014		760'	11 gal/min		131.1
Oct 24 2014		765'	11 gal/min	5000	137.4
Oct 24 2014		770'	11 gal/min		134

Approximate Total Development Volume by air lifting and pumping = 18,625 gallons

PH and Conductivity

Date	Depth (ft bgs)	pH	Conductivity (µS/cm)	Turbidity (NTUs)	Comments
October 23 2014					
14:25	745			133.3	
14:30	745	7.63	38		
14:45				127.4	
October 24 2014					
13:50	765	5.00	29	183.8	
14:10	765	4.77	27		PH meter is not working correctly on YSI
15:00	765	8.30	34	162.5	Replacement YSI
15:05	765	7.89	32	172.5	
15:10	765	7.58	31	148	
15:15	765	7.18	30	140	
15:20	770	7.00	30	134	

Section 4

Groundwater Sample Log Sheets

Well ID: BPOW 4-1R

AECOM

Low Flow Ground Water Sample Collection Record

Client: Navy Bethpage | Date: 12/30/14 | Time: Start 1100 am/pm | Finish 1620 am/pm
Project No: 60266526
Site Location: NWIRP Bethpage
Weather Conds: 32°F, NW @ 10 mph | Collector(s): GH/JC

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 697 | c. Length of Water Column 675.12 (a-b) | Casing Diameter/Material 4" PVC

b. Water Table Depth 21.88 | d. Calculated ~~System~~ Screen Volume (see back) 26 gal

2. WELL PURGE DATA

a. Purge Method: Geotech bladder pump w/ drop tube

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used: Make / Model / Serial Number

YSI 6920
Hanna Turbidity Meter

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1215	-	—	—	—	—	—	—	—	21.88	—
1220		11.21	5.60	0.053	4.71	233.6	8.2	250	-	Clear / None
1230		11.75	5.59	0.053	4.93	234.1	6.9	350	-	"
1240		11.90	5.53	0.049	5.00	234.0	3.8	350	-	"
1250		12.18	5.47	0.047	5.06	237.5	2.6	350	-	"
1300		12.36	5.43	0.046	5.10	239.5	2.0	350	-	"
1310		12.21	5.41	0.045	5.15	243.1	1.4	350	21.93	"

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☒	☐	☐
Has required turbidity been reached	☒	☐	☐
Have parameters stabilized	☒	☐	☐

If no or N/A - Explain below.

3. SAMPLE COLLECTION: Method: Bladder pump, teflon bladder + tubing

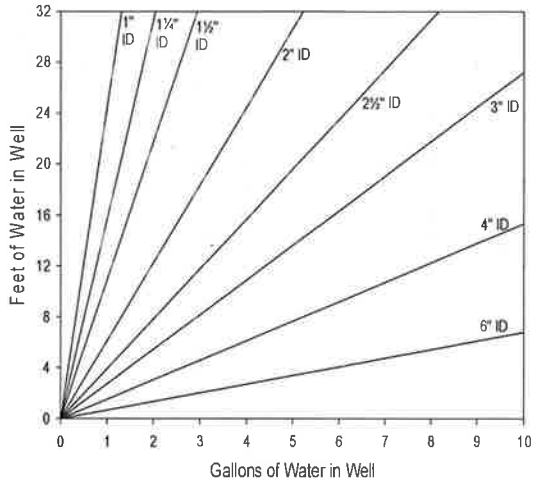
Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
BPOW4-1R-GW-123014	1L AG	2	—	Dioxane 1,4	1605
BPOW4-1R-GW-123014	40mL VOA	3	HCl	VOCs	1605

Comments: water @ 1215

Signature: [signature] Date: 12/30/14

BPOW 4-12

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (ft)	Color/Odor
1320	–	12.24	5.41	0.045	5.14	243.6	1.3	250	–	Clear / None
1330	–	12.31	5.41	0.044	5.14	245.1	1.3	250	–	"
1340	21.25	12.27	5.40	0.044	5.13	248.7	1.5	250	21.91	"
1350	–	12.27	5.40	0.039	5.12	251.9	1.3	250	–	"
1400	–	12.25	5.40	0.034	5.09	251.4	1.3	250	–	"
1410	31.25	12.25	5.39	0.035	5.07	257.3	1.2	250	22.04	"
1420	–	12.24	5.39	0.034	4.99	258.9	1.1	575	22.04	"
1430	42.75	12.25	5.40	0.034	4.91	259.3	0.9	575	–	"
1500	–	12.41	5.43	0.034	5.30	261.6	1.1	575	22.11	"
1530	–	12.09	5.49	0.035	4.43	263.1	1.8	575	22.11	"
1545	–	12.00	5.53	0.036	4.24	261.1	2.6	575	22.11	"
1555	–	12.45	5.56	0.037	4.15	256.2	1.9	575	22.11	"
1600	~99	12.55	5.54	0.037	4.21	255.7	2.4	575	22.11	"

Well ID: BPOW 4-2R

AECOM

Low Flow Ground Water Sample Collection Record

Client: Navy Bethpage | Date: 12/30/14 | Time: Start 1000 am/pm | Finish 1450 am/pm
Project No: 60266526
Site Location: NWIRP Bethpage
Weather Conds: 32°F, N @ 10 mph | Collector(s): GH / JC

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 770 | c. Length of Water Column 746.68 (a-b) | Casing Diameter/Material 4" PVC
b. Water Table Depth 23.34 | d. Calculated ~~System~~ Screen Volume (see back) 76 gal

2. WELL PURGE DATA

a. Purge Method: Geotech bladder pump w/ drop tube

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	YSI	6920	
	Hanna	Turbidity Meter	

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
1000	—	—	—	—	—	—	—	—	23.34	—
1045	—	11.42	5.45	0.053	4.75	209.2	161.1	275	—	Cloudy / None
1120	—	11.90	5.45	0.053	4.29	210.6	162.0	275	—	"
1210	8 gal	12.57	5.07	0.035	5.30	227.1	44.4	250	—	"
1240	13 gal	13.27	5.06	0.035	5.13	229.1	49.6	500	—	"
1310	18 gal	13.40	5.08	0.035	4.95	230.8	62.1	500	—	"
1325	20 gal	13.29	5.06	0.035	4.89	231.5	56.9	500	—	"

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☒	☐	☐
Has required turbidity been reached	☐	☒	☐
Have parameters stabilized	☒	☐	☐

(continued on back)

If no or N/A - Explain below.
Volume purged

3. SAMPLE COLLECTION: Method: Bladder pump, teflon bladder + tubing

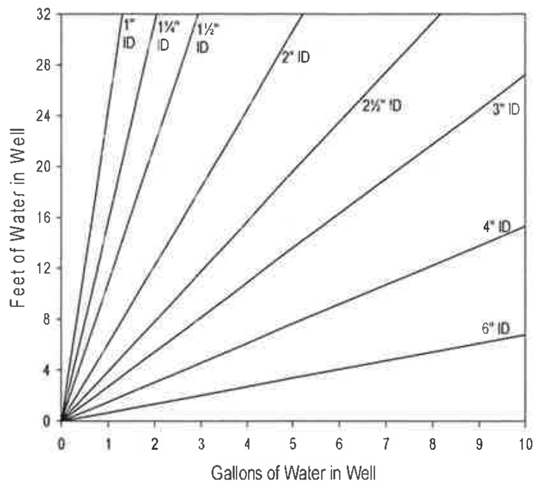
Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
BPOW4-2R-GW-123014	1L AG	2	—	Dioxane 1,4	1450
BPOW 4-2R-GW-123014	40mL VOA	3	HCl	VOCs	1430

Comments: Water @ 1035

Signature _____ Date 1/6/15

BPOW 4-2R

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (ft)	Color/Odor
1340	22 gal	12.66	5.00	0.034	4.75	238.6	68.2	400	–	"
1400	23.5 gal	12.61	5.01	0.034	4.60	238.3	68.4	400	–	"
1410	–	12.43	4.99	0.034	4.55	243.0	64.2	–	–	"
1430	26 gal	12.42	5.00	0.035	4.62	241.6	66.3	–	–	"

Section 5

BPOW4-1R and BPOW4-2R Analytical Data Validation

- Analytical Data Sheets
- Chain of Custody Records
- Validation Letter and Table

RESOLUTION CONSULTANTS

Resolution Consultants
250 Apollo Drive
Chelmsford, MA 01824

978.905.2100 tel
978.905.2101 fax

Data Validation Report

Project:	Regional Groundwater Investigation - NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Service Request:	SH5941	
Analyses/Method:	EPA SW-846 Method 8260B for VOCs (GC/MS) and Standard Method 5310 for Total Organic Carbon by High-Temperature Combustion	
Validation Level:	3	
AECOM Project Number:	60266526.SA.DV	
Prepared by:	Dawn Brule/RESCON	Completed on: 12/18/2014
Reviewed by:	Lori Herberich/RESCON	File Name: SH5941_5310B and 8260B

SUMMARY

The samples listed below were collected by Resolution Consultants from the Regional Groundwater Investigation - NWIRP Bethpage site on July 31, 2014.

Sample ID	Matrix/Sample Type
BP0W4-2R-FB-073114	Field blank
TRIP BLANK_07312014	Trip Blank

The samples were analyzed in accordance with:

- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW846,* Method 8260B, *Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry* (USEPA, 1996).
- *Standard Methods for the Examination of Water and Wastewater, Method SM5310B, Total Organic Carbon by High-Temperature Combustion*

Data validation activities were conducted with reference to these methods, *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008), *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (January 2010), and Quality Systems Manual (QSM) for Environmental Laboratories, Version 4.2 (DoD, October 2010) where applicable. In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following review elements (where applicable to the method):

✓ Data completeness (chain-of-custody [COC])/sample integrity
✓ Holding times and sample preservation
✓ GC/MS performance checks
✗ Initial calibration/continuing calibration verification

✓	Laboratory blanks/equipment blanks/trip blanks
✗	Surrogate spike recoveries
NA	Matrix spike (MS) and/or matrix spike duplicate (MSD) results
✓	Laboratory control sample (LCS) results
NA	Field duplicate results
✓	Internal standard results
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. The symbol (✗) indicates that a QC nonconformance resulted in the qualification of data. Any QC nonconformance that resulted in the qualification of data is discussed below. In addition, nonconformances or other issues that were noted during validation, but did not result in qualification of data, may be discussed for informational purposes only.

The data appear valid as reported and may be used for decision making purposes. Selected data points were estimated due to nonconformances of certain QC criteria (see discussion below). Qualified sample results are presented in Table 1.

RESULTS

Data Completeness (COC)/Sample Integrity

The data package was reviewed and found to meet acceptance criteria for completeness:

- The COCs were reviewed for completeness of information relevant to the samples and requested analyses, and for signatures indicating transfer of sample custody.
- The laboratory sample login sheet(s) were reviewed for issues potentially affecting sample integrity, including the condition of sample containers upon receipt at the laboratory.
- Completeness of analyses was verified by comparing the reported results to the COC requests.

Holding Times and Sample Preservation

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria. The QC acceptance criteria were met.

GC/MS Performance Checks

The data were reviewed to ensure that the 4-bromofluorobenzene (BFB) tuning was performed at the correct frequency and that the method acceptance criteria were met. The QC acceptance criteria were met.

Initial Calibration/Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- the initial calibration (ICAL) percent relative standard deviation (%RSD), correlation coefficient (r)/coefficient of determination (r^2), and/or response factor method acceptance criteria were met;

- the initial calibration verification (ICV) percent recovery (%R) criteria were met;
- the continuing calibration verification standard (CCV) method percent difference or percent drift (%Ds) and RF acceptance criteria were met; and/or
- the retention time method acceptance criteria were met.

Nonconformances are summarized in Attachment A in Tables A-1 and A-2.

Data qualification to the analytes associated with the specific ICAL and/or CCV was as follows:

ICAL Linearity Nonconformances:

Nonconformance	Actions	
	Detected Results	Nondetected Results
%RSD > 15% and quantitation based on mean RF	J	UJ
r or r^2 < 0.99 and quantitation based on linear regression	J*	UJ*
* No guidance in NFG, thus professional judgment was used		

ICV Recovery Nonconformances:

Nonconformance	Actions	
	Detected Compounds	Nondetected Compounds
%R > 120%	J	No qualification
20% < %R < 80%	J	UJ
%R <20% (see note)	J	R*

Notes: Based on NFG 2008 VOC guidance, professional judgment is used to reject (R) nondetects in all associated samples for any analyte with < 20% recovery. Also, professional judgment is used to estimate (UJ) rather the reject (R) sample results previously negated (U) on the basis of blank contamination.

Qualified sample results are shown in Table 1.

Laboratory Blanks/Equipment Blanks/Trip Blanks

Laboratory method blanks, equipment rinsate and trip blanks were evaluated as to whether there were contaminants detected above the detection limit (DL). An equipment blank was not submitted with the samples in this data set.

Data validation qualifications for individual samples are based on the maximum contaminant concentration detected in all associated blanks.

Method, field, and trip blank results were reviewed for conformance with the QC acceptance criteria. Detected results in blanks are not discussed in this data validation report if the associated results were nondetect or if qualification of sample results was not required. The QC acceptance criteria were met and/or qualification of the sample results was not required.

Surrogate Spike Recoveries

The surrogate recoveries (%Rs) were reviewed for conformance with the QC acceptance criteria.

Nonconformances are summarized in Attachment A in Table A-3.

Data qualification on the basis of surrogate recovery nonconformances was as follows:

	Action	
Nonconformance	**Detected Compounds**	**Nondetected Compounds**
%R > Upper Limit (UL)	J	No qualification
20% ≤%R < Lower Limit (LL)	J	UJ
%R < 20%	J	R

Qualified sample results are shown in Table 1.

MS/MSD Results

MS/MSD analyses were not performed on samples reported in this SDG. There were no validation actions taken on this basis.

LCS Results

The LCS %Rs were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

Field Duplicate Results

There were no field duplicate samples submitted with this data set. No validation actions were taken on this basis.

Internal Standard Results

The internal standard (IS) recoveries were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

Sample Results/Reporting Issues

Compounds that were not detected in the sample are reported as not detected (U) at the Limit of Detection (LOD).

Compounds detected at concentrations less than the LOQ but greater than the detection limit (DL) were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation.

Any sample that was analyzed at a dilution due to high concentrations of target or non-target compounds or matrix interferences was checked to ensure that the results and/or sample specific LODs and LOQs were adjusted accordingly by the laboratory.

QUALIFICATION ACTIONS

Sample results qualified as a result of validation actions are summarized in Table 1. All actions are described above.

ATTACHMENTS

Attachment A: Nonconformance Summary Tables

Attachment B: Qualifier Codes and Explanations

Attachment C: Reason Codes and Explanations

Table 1 - Data Validation Summary of Qualified Data

Sample ID	Matrix	Compound	Result	LOD	Units	Validation Qualifiers	Validation Reason
BP0W4-2R-FB-073114	WQ	1,2-DIBROMO-3-CHLOROPROPANE		0.75	UG/L	UJ	c
BP0W4-2R-FB-073114	WQ	ACETONE		2.5	UG/L	UJ	c
BP0W4-2R-FB-073114	WQ	CHLOROFORM	1.2	0.50	UG/L	J	s
TRIP BLANK_07312014	WQ	1,2-DIBROMO-3-CHLOROPROPANE		0.75	UG/L	UJ	c
TRIP BLANK_07312014	WQ	ACETONE		2.5	UG/L	UJ	c

Attachment A

Nonconformance Summary Tables

Table A-1 - Initial Calibration

Calibration Date/Time	Compound	% RSD	Limits
31-JULY-2014 08:18	ACETONE	23	≤15%
Associated samples: all samples in SDG SH5941			

Table A-2 - Initial Calibration Verification Standard

ICV ID	Compound	% R	Limits
WG147424-8	1,2-DIBROMO-3-CHLOROPROPANE	79	80-120%
Associated samples: all samples in SDG SH5941			

Table A-3 - Surrogates

Sample ID	Surrogate	% Recovery	Lower Limit	Upper Limit
BP0W4-2R-FB-073114	1,2-DICHLOROETHANE-D4	131	70	120
BP0W4-2R-FB-073114	DIBROMOFLUOROMETHANE	126	85	115
BP0W4-2R-FB-073114	TOLUENE-D8	122	85	120

Attachment B

Qualifier Codes and Explanations

Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Attachment C

Reason Codes and Explanations

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
c	Calibration issue
co	Analyte carryover
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate RPDs
h	Holding times
i	Internal standard areas
k	Estimated Maximum Possible Concentration (EMPC)
l	LCS or OPR recoveries
lc	Labeled compound recovery
ld	Laboratory duplicate RPDs
lp	Laboratory control sample/laboratory control sample duplicate RPDs
m	Matrix spike recovery
md	Matrix spike/matrix spike duplicate RPDs
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column RPD
q	Quantitation issue
s	Surrogate recovery
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	ICS results

Katahdin ANALYTICAL SERVICES
600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Page ____ of ____

Client: Resolution Consultants	Contact: Vivaudou	Phone #: (845) 425 4180	Fax #: ( )
Address: 100 Red Schoolhouse Rd	City: Chestnut Ridge	State: NY	Zip Code: 10977
Purchase Order #	Proj. Name / No.: NWIRP-Bethpage / 60266576	Katahdin Quote #	
Bill (if different than above)	Address		
Sampler (Print / Sign): Gordon Hicks		Copies To:	

LAB USE ONLY WORK ORDER #: SH5941

KATAHDIN PROJECT NUMBER ____

REMARKS: ____

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO: ____

TEMP°C ____ ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	ANALYSIS AND CONTAINER TYPE PRESERVATIVES: VOC (Filt. ☐Y ☐N)	TOC (Filt. ☐Y ☐N)	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N
	BPOW4-2R-FB-073114	7-31-14 / 1300	W	6	J	J								
	Trip Blank	5-2-10 / 1000	W	3	J									
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COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
[signature]	7-31-14 1330	[signature]	[signature]	7/31/14 1430	FedEX
Relinquished By: (Signature)	Date / Time	Received By: (Signature) 8-1-14 09:10	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN SERVICES, EXCEPT WHEN A SIGNED CONTRACTUAL AGREEMENT EXISTS.

0000012

ORIGINAL

KAS-COC1

Report of Analytical Results

Client: ENSAFE
Lab ID: SH5941-1RA
Client ID: BP0W4-2R-FB-073114
Project: Navy Clean WE15-03-06 NW
SDG: SH5941
Lab File ID: T2023.D

Sample Date: 31-JUL-14
Received Date: 01-AUG-14
Extract Date: 04-AUG-14
Extracted By: REC
Extraction Method: SW846 5030
Lab Prep Batch: WG147612

Analysis Date: 04-AUG-14
Analyst: REC
Analysis Method: SW846 8260C
Matrix: AQ
% Solids: NA
Report Date: 05-AUG-14

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
Chloromethane	U	1.0	ug/L	1	2	2.0	0.36	1.0
Vinyl Chloride	U	1.0	ug/L	1	2	2.0	0.25	1.0
Bromomethane	U	1.0	ug/L	1	2	2.0	0.49	1.0
Chloroethane	U	1.0	ug/L	1	2	2.0	0.55	1.0
Trichlorofluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
1,1-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.35	0.50
Carbon Disulfide	U	0.50	ug/L	1	1	1.0	0.25	0.50
Freon-113	U	0.50	ug/L	1	1	1.0	0.31	0.50
Methylene Chloride	U	2.5	ug/L	1	5	5.0	1.1	2.5
Acetone	~~U~~ UJ	2.5	ug/L	1	5	5.0	2.2	2.5
trans-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.25	0.50
Methyl tert-butyl Ether	U	0.50	ug/L	1	1	1.0	0.36	0.50
1,1-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.21	0.50
cis-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.21	0.50
Chloroform	J	1.2	ug/L	1	1	1.0	0.32	0.50
1,1,1-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
2-Butanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
Cyclohexane	U	0.50	ug/L	1	1	1.0	0.31	0.50
Carbon Tetrachloride	U	0.50	ug/L	1	1	1.0	0.22	0.50
Benzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,2-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
Trichloroethene	U	0.50	ug/L	1	1	1.0	0.28	0.50
1,2-Dichloropropane	U	0.50	ug/L	1	1	1.0	0.25	0.50
Bromodichloromethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
cis-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.19	0.50
Toluene	U	0.50	ug/L	1	1	1.0	0.27	0.50
4-Methyl-2-Pentanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
trans-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.20	0.50
1,1,2-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
Tetrachloroethene	U	0.50	ug/L	1	1	1.0	0.40	0.50
Dibromochloromethane	U	0.50	ug/L	1	1	1.0	0.30	0.50
2-Hexanone	U	2.5	ug/L	1	5	5.0	1.7	2.5
Chlorobenzene	U	0.50	ug/L	1	1	1.0	0.22	0.50
Ethylbenzene	U	0.50	ug/L	1	1	1.0	0.21	0.50

600 Technology Way
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12/22/14

Report of Analytical Results

Client: ENSAFE
Lab ID: SH5941-1RA
Client ID: BP0W4-2R-FB-073114
Project: Navy Clean WE15-03-06 NW
SDG: SH5941
Lab File ID: T2023.D

Sample Date: 31-JUL-14
Received Date: 01-AUG-14
Extract Date: 04-AUG-14
Extracted By: REC
Extraction Method: SW846 5030
Lab Prep Batch: WG147612

Analysis Date: 04-AUG-14
Analyst: REC
Analysis Method: SW846 8260C
Matrix: AQ
% Solids: NA
Report Date: 05-AUG-14

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Xylenes (total)	U	1.5	ug/L	1	3	3.0	0.25	1.5
Styrene	U	0.50	ug/L	1	1	1.0	0.23	0.50
Bromoform	U	0.50	ug/L	1	1	1.0	0.23	0.50
Isopropylbenzene	U	0.50	ug/L	1	1	1.0	0.23	0.50
1,1,2,2-Tetrachloroethane	U	0.50	ug/L	1	1	1.0	0.38	0.50
1,3-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,4-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.24	0.50
1,2-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.15	0.50
1,2,4-Trichlorobenzene	U	0.50	ug/L	1	1	1.0	0.37	0.50
Methyl Acetate	U	0.75	ug/L	1	1	1.0	0.53	0.75
Methylcyclohexane	U	0.50	ug/L	1	1	1.0	0.30	0.50
o-Xylene	U	0.50	ug/L	1	1	1.0	0.25	0.50
M+P-Xylenes	U	1.0	ug/L	1	2	2.0	0.59	1.0
1,2-Dichloroethylene (Total)	U	1.0	ug/L	1	2	2.0	0.21	1.0
1,2-Dibromoethane	U	0.50	ug/L	1	1	1.0	0.22	0.50
1,2-Dibromo-3-Chloropropane	~~U~~ UJ	0.75	ug/L	1	1	1.0	0.50	0.75
P-Bromofluorobenzene		104.	%					
Toluene-d8	*	122.	%					
1,2-Dichloroethane-d4	*	131.	%					
Dibromofluoromethane	*	126.	%					

12/22/14

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Report of Analytical Results

Client: ENSAFE
Lab ID: SH5941-2
Client ID: TRIP BLANK
Project: Navy Clean WE15-03-06 NW
SDG: SH5941
Lab File ID: T2001.D

Sample Date: 31-JUL-14
Received Date: 01-AUG-14
Extract Date: 01-AUG-14
Extracted By: REC
Extraction Method: SW846 5030
Lab Prep Batch: WG147482

Analysis Date: 01-AUG-14
Analyst: REC
Analysis Method: SW846 8260C
Matrix: AQ
% Solids: NA
Report Date: 05-AUG-14

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
Chloromethane	U	1.0	ug/L	1	2	2.0	0.36	1.0
Vinyl Chloride	U	1.0	ug/L	1	2	2.0	0.25	1.0
Bromomethane	U	1.0	ug/L	1	2	2.0	0.49	1.0
Chloroethane	U	1.0	ug/L	1	2	2.0	0.55	1.0
Trichlorofluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
1,1-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.35	0.50
Carbon Disulfide	U	0.50	ug/L	1	1	1.0	0.25	0.50
Freon-113	U	0.50	ug/L	1	1	1.0	0.31	0.50
Methylene Chloride	U	2.5	ug/L	1	5	5.0	1.1	2.5
Acetone	~~U~~ UJ	2.5	ug/L	1	5	5.0	2.2	2.5
trans-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.25	0.50
Methyl tert-butyl Ether	U	0.50	ug/L	1	1	1.0	0.36	0.50
1,1-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.21	0.50
cis-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.21	0.50
Chloroform	U	0.50	ug/L	1	1	1.0	0.32	0.50
1,1,1-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
2-Butanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
Cyclohexane	U	0.50	ug/L	1	1	1.0	0.31	0.50
Carbon Tetrachloride	U	0.50	ug/L	1	1	1.0	0.22	0.50
Benzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,2-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
Trichloroethene	U	0.50	ug/L	1	1	1.0	0.28	0.50
1,2-Dichloropropane	U	0.50	ug/L	1	1	1.0	0.25	0.50
Bromodichloromethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
cis-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.19	0.50
Toluene	U	0.50	ug/L	1	1	1.0	0.27	0.50
4-Methyl-2-Pentanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
trans-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.20	0.50
1,1,2-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
Tetrachloroethene	U	0.50	ug/L	1	1	1.0	0.40	0.50
Dibromochloromethane	U	0.50	ug/L	1	1	1.0	0.30	0.50
2-Hexanone	U	2.5	ug/L	1	5	5.0	1.7	2.5
Chlorobenzene	U	0.50	ug/L	1	1	1.0	0.22	0.50
Ethylbenzene	U	0.50	ug/L	1	1	1.0	0.21	0.50

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12/22/14

Report of Analytical Results

Client: ENSAFE
Lab ID: SH5941-2
Client ID: TRIP BLANK
Project: Navy Clean WE15-03-06 NW
SDG: SH5941
Lab File ID: T2001.D

Sample Date: 31-JUL-14
Received Date: 01-AUG-14
Extract Date: 01-AUG-14
Extracted By: REC
Extraction Method: SW846 5030
Lab Prep Batch: WG147482

Analysis Date: 01-AUG-14
Analyst: REC
Analysis Method: SW846 8260C
Matrix: AQ
% Solids: NA
Report Date: 05-AUG-14

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Xylenes (total)	U	1.5	ug/L	1	3	3.0	0.25	1.5
Styrene	U	0.50	ug/L	1	1	1.0	0.23	0.50
Bromoform	U	0.50	ug/L	1	1	1.0	0.23	0.50
Isopropylbenzene	U	0.50	ug/L	1	1	1.0	0.23	0.50
1,1,2,2-Tetrachloroethane	U	0.50	ug/L	1	1	1.0	0.38	0.50
1,3-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,4-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.24	0.50
1,2-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.15	0.50
1,2,4-Trichlorobenzene	U	0.50	ug/L	1	1	1.0	0.37	0.50
Methyl Acetate	U	0.75	ug/L	1	1	1.0	0.53	0.75
Methylcyclohexane	U	0.50	ug/L	1	1	1.0	0.30	0.50
o-Xylene	U	0.50	ug/L	1	1	1.0	0.25	0.50
M+P-Xylenes	U	1.0	ug/L	1	2	2.0	0.59	1.0
1,2-Dichloroethylene (Total)	U	1.0	ug/L	1	2	2.0	0.21	1.0
1,2-Dibromoethane	U	0.50	ug/L	1	1	1.0	0.22	0.50
1,2-Dibromo-3-Chloropropane	~~U~~ UJ	0.75	ug/L	1	1	1.0	0.50	0.75
P-Bromofluorobenzene		89.4	%					
Toluene-d8		105.	%					
1,2-Dichloroethane-d4		110.	%					
Dibromofluoromethane		111.	%					

12/22/14

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ANALYTICAL SERVICES

Accredited in accordance with nelac
Cert No E87604

Report of Analytical Results

Client: Rick Purdy
AECOM
701 Edgewater Drive
Wakefield,MA 01880

Lab Sample ID: SH5941-1
Report Date: 09-AUG-14
Client PO: 16518
Project: Navy Clean WE15-03-0
SDG: SH5941

Sample Description	Matrix	Date Sampled	Date Received
BP0W4-2R-FB-073114	AQ	31-JUL-14	01-AUG-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Organic Carbon	J0.24 mg/L	1.0	0.10	.5	SM5310B	WG147793	07-AUG-14 03:20:38	N/A	N/A	

RESOLUTION CONSULTANTS

Resolution Consultants
250 Apollo Drive
Chelmsford, MA 01824

978.905.2100 tel
978.905.2101 fax

Data Validation Report

Project:	Regional Groundwater Investigation - NWIRP Bethpage	
Laboratory:	Test-America, South Burlington, Vermont	
Service Request:	200-23996	
Analyses/Method:	EPA Method TO-15, VOCs Collected in Canisters - GC/MS	
Validation Level:	Limited	
RESCON Project Number:	60266526.SA.DV	
Prepared by:	Sheena Blair/RESCON	Completed on: 09/23/2014
Reviewed by:	Lori Herberich/RESCON	File Name: 200-23996_TO-15

SUMMARY

The sample listed below was collected by Resolution Consultants from the Regional Groundwater Investigation - NWIRP Bethpage site on September 2, 2014.

Sample ID	Matrix/Sample Type
BP0W4-2R-AIR090214	Ambient Air

Data validation activities were conducted with reference to *Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS)* (USEPA, Method TO-15) and the *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008). In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following review elements (where applicable to the method):

- ✓ Data completeness (chain-of-custody [COC])/sample integrity
- ✓ Holding times and sample preservation
- ✓ GC/MS performance checks
- ✓ Initial calibration/continuing calibration verification
- ✓ Laboratory blanks
- NA Matrix duplicate (MD) results
- ✓ Laboratory control sample (LCS) results
- NA Field duplicates
- ✓ Internal standards
- ✓ Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this

validation and therefore not reviewed. The symbol (✗) indicates that a QC nonconformance resulted in the qualification of data. Any QC nonconformance that resulted in the qualification of data is discussed below. In addition, nonconformances or other issues that were noted during validation, but did not result in qualification of data, may be discussed for informational purposes only.

The data appear valid as reported and may be used for decision making purposes. There were no data points qualified or rejected on the basis of this data review.

RESULTS

Data Completeness

The data package was reviewed and found to meet acceptance criteria for completeness:

- The COCs were reviewed for completeness of information relevant to the samples and requested analyses, and for signatures indicating transfer of sample custody.
- The laboratory sample login sheet(s) were reviewed for issues potentially affecting sample integrity, including the condition of sample containers upon receipt at the laboratory.
- Completeness of analyses was verified by comparing the reported results to the COC requests.

Holding Times/Sample Preservation

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria. The QC acceptance criteria were met.

GC/MS Performance Checks

The data were reviewed to ensure that the 4-bromofluorobenzene (BFB) tuning was performed at the correct frequency and that the method acceptance criteria were met. The QC acceptance criteria were met.

Initial Calibration/Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- the initial calibration (ICAL) percent relative standard deviation (%RSD), correlation coefficient (r)/coefficient of determination (r^2), and/or response factor method acceptance criteria were met;
- the continuing calibration verification standard (CCV) method percent difference or percent drift (%Ds) and RF acceptance criteria were met; and
- the retention time method acceptance criteria were met.

The QC acceptance criteria were met.

Laboratory Blanks

Laboratory method blanks were evaluated as to whether there were contaminants detected above the detection limit (DL). Blank results were reviewed for conformance with the QC acceptance criteria. Data validation qualifications for individual samples are based on the maximum contaminant concentration detected in all associated blanks.

The QC acceptance criteria were met; qualification of the sample results was not required.

MS/MSD Results

MS/MSD analyses were not performed on samples reported in this SDG. There were no validation actions taken on this basis.

LCS Results

The LCS recoveries were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

Field Duplicate Results

There were no field duplicate samples submitted with this data set. No validation actions were taken on this basis.

Internal Standard Results

The internal standard (IS) recoveries were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

Sample Results/Reporting Issues

Compounds that were not detected in the sample are reported as undetected (U) at the Limit of Detection (LOD).

Compounds detected at concentrations less than the LOQ but greater than the detection limit (DL) were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation.

Any sample that was analyzed at a dilution due to high concentrations of target or non-target compounds or matrix interferences was checked to ensure that the results and/or sample specific LODs and LOQs were adjusted accordingly by the laboratory.

QUALIFICATION ACTIONS

No sample results were qualified as a result of this data review.

ATTACHMENTS

Attachment A: Nonconformance Summary Tables

Attachment B: Qualifier Codes and Explanations

Attachment A

Nonconformance Summary Tables

No nonconformances were identified during this review.

Attachment B

Qualifier Codes and Explanations

Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

TestAmerica Burlington
30 Community Drive
Suite 11
South Burlington, VT 05403
phone 802-660-1990 fax 802-660-1919

Canister Samples Chain of Custody Record

TestAmerica Analytical Testing Corp. assumes no liability with respect to the collection and shipment of these samples.

Client Contact Information	**Project Manager:** Eleanor Vivaudou	**Samples Collected By:** J. Christoffel	1 of 1 COCs
Company: Recon	**Phone:** 845-425-4980		
Address: 100 Red Schoolhouse Road	**Email:** Eleanor.Vivaudou@aecom.com		
City/State/Zip Chestnut Ridge, NY 10977			
Phone: 1-845-425-4980	**Site Contact:**		
FAX:	**TA Contact:**		
Project Name: NWIRPI Navy - Bethpage	**Analysis Turnaround Time**		
Site:	**Standard (Specify)** ✓		
PO #	**Rush (Specify)**		

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, "Hg (Start)	Canister Vacuum in Field, "Hg (Stop)	Flow Controller ID	Canister ID	TO-15	MA-APH	EPA 3C	EPA 25C	ASTM D-1946	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)
BPOW4-2R AIR090214	9/2/14	7:51	16:01	-30	-9	2768	2745	X											

Temperature (Fahrenheit)

	Interior	Ambient
Start	NA	77°F
Stop		97°F

Pressure (Inches of Hg)

	Interior	Ambient
Start	NA	29.89
Stop		29.85

200-23996 Chain of Custody

Special Instructions/QC Requirements & Comments:

Samples Relinquished by J. Christoffel DATE/TIME: 9-2-14 16:10

Samples Shipped by:	**Date/Time:** 9/2/14 17:00	**Samples Received by:** Fed Ex
Samples Relinquished by:	**Date/Time:**	**Received by:**
Relinquished by:	**Date/Time:** 9/4/14 1040	**Received by:**

Lab Use Only **Shipper Name:** **Opened by:** **Condition:**

09/15/2014

000005

Client: Katahdin Analytical Services

Job Number: 200-23996-1
Sdg Number: 200-23996

Client Sample ID: **BP0W4-2R-AIR090214**

Lab Sample ID: 200-23996-1
Client Matrix: Air

Date Sampled: 09/02/2014 1601
Date Received: 09/04/2014 1040

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	200-77123	Instrument ID:	CHG.i
Prep Method:	Summa Canister	Prep Batch:	N/A	Lab File ID:	9408_011.D
Dilution:	1.0			Initial Weight/Volume:	298 mL
Analysis Date:	09/11/2014 1935			Final Weight/Volume:	200 mL
Prep Date:	09/11/2014 1935			Injection Volume:	200 mL

Analyte	Result (ppb v/v)	Qualifier	DL	LOQ
1,1,1-Trichloroethane	0.080	U	0.20	0.20
1,1,2,2-Tetrachloroethane	0.030	U	0.20	0.20
1,1,2-Trichloro-1,2,2-trifluoroethane	0.030	U	0.20	0.20
1,1,2-Trichloroethane	0.030	U	0.20	0.20
1,1-Dichloroethane	0.080	U	0.20	0.20
1,1-Dichloroethene	0.080	U	0.20	0.20
1,2,4-Trichlorobenzene	0.080	U	0.50	0.50
1,2-Dibromoethane (EDB)	0.080	U	0.20	0.20
1,2-Dichlorobenzene	0.030	U	0.20	0.20
1,2-Dichloroethane	0.030	U	0.20	0.20
1,2-Dichloropropane	0.080	U	0.20	0.20
Acetone	6.6		5.0	5.0
1,3-Dichlorobenzene	0.030	U	0.20	0.20
1,4-Dichlorobenzene	0.030	U	0.20	0.20
2-Butanone (MEK)	0.94		0.50	0.50
2-Hexanone	0.20	U	0.50	0.50
4-Methyl-2-pentanone	0.080	U	0.50	0.50
Benzene	0.35		0.20	0.20
Bromoform	0.030	U	0.20	0.20
Bromomethane	0.080	U	0.20	0.20
Carbon disulfide	0.20	U	0.50	0.50
Carbon tetrachloride	0.080	U	0.20	0.20
Chlorobenzene	0.030	U	0.20	0.20
Dibromochloromethane	0.030	U	0.20	0.20
Chloroethane	0.080	U	0.50	0.50
Chloroform	0.080	U	0.20	0.20
Chloromethane	0.70		0.50	0.50
cis-1,2-Dichloroethene	0.080	U	0.20	0.20
cis-1,3-Dichloropropene	0.080	U	0.20	0.20
Cyclohexane	0.48	M	0.20	0.20
Bromodichloromethane	0.030	U	0.20	0.20
Dichlorodifluoromethane	0.080	U	0.50	0.50
Ethylbenzene	0.030	U	0.20	0.20
Isopropylbenzene	0.030	U	0.20	0.20
Methyl tert-butyl ether	0.080	U	0.20	0.20
Methylene Chloride	0.20	U M	0.50	0.50
m,p-Xylene	0.54		0.50	0.50
Xylene, o-	0.030	U	0.20	0.20
Styrene	0.030	U	0.20	0.20
Tetrachloroethene	0.030	U	0.20	0.20
Toluene	0.99		0.20	0.20
trans-1,2-Dichloroethene	0.080	U	0.20	0.20
trans-1,3-Dichloropropene	0.080	U	0.20	0.20
Trichloroethene	0.080	U	0.20	0.20
Trichlorofluoromethane	0.23		0.20	0.20
Vinyl chloride	0.080	U	0.20	0.20

Client: Katahdin Analytical Services

Job Number: 200-23996-1
Sdg Number: 200-23996

Client Sample ID: **BP0W4-2R-AIR090214**

Lab Sample ID: 200-23996-1
Client Matrix: Air

Date Sampled: 09/02/2014 1601
Date Received: 09/04/2014 1040

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	200-77123	Instrument ID:	CHG.i
Prep Method:	Summa Canister	Prep Batch:	N/A	Lab File ID:	9408_011.D
Dilution:	1.0			Initial Weight/Volume:	298 mL
Analysis Date:	09/11/2014 1935			Final Weight/Volume:	200 mL
Prep Date:	09/11/2014 1935			Injection Volume:	200 mL

Analyte	Result (ppb v/v)	Qualifier	DL	LOQ
Xylene (total)	0.54		0.20	0.20

Analyte	Result (ug/m3)	Qualifier	DL	LOQ
1,1,1-Trichloroethane	0.44	U	1.1	1.1
1,1,2,2-Tetrachloroethane	0.21	U	1.4	1.4
1,1,2-Trichloro-1,2,2-trifluoroethane	0.23	U	1.5	1.5
1,1,2-Trichloroethane	0.16	U	1.1	1.1
1,1-Dichloroethane	0.32	U	0.81	0.81
1,1-Dichloroethene	0.32	U	0.79	0.79
1,2,4-Trichlorobenzene	0.59	U	3.7	3.7
1,2-Dibromoethane (EDB)	0.61	U	1.5	1.5
1,2-Dichlorobenzene	0.18	U	1.2	1.2
1,2-Dichloroethane	0.12	U	0.81	0.81
1,2-Dichloropropane	0.37	U	0.92	0.92
Acetone	16		12	12
1,3-Dichlorobenzene	0.18	U	1.2	1.2
1,4-Dichlorobenzene	0.18	U	1.2	1.2
2-Butanone (MEK)	2.8		1.5	1.5
2-Hexanone	0.82	U	2.0	2.0
4-Methyl-2-pentanone	0.33	U	2.0	2.0
Benzene	1.1		0.64	0.64
Bromoform	0.31	U	2.1	2.1
Bromomethane	0.31	U	0.78	0.78
Carbon disulfide	0.62	U	1.6	1.6
Carbon tetrachloride	0.50	U	1.3	1.3
Chlorobenzene	0.14	U	0.92	0.92
Dibromochloromethane	0.26	U	1.7	1.7
Chloroethane	0.21	U	1.3	1.3
Chloroform	0.39	U	0.98	0.98
Chloromethane	1.4		1.0	1.0
cis-1,2-Dichloroethene	0.32	U	0.79	0.79
cis-1,3-Dichloropropene	0.36	U	0.91	0.91
Cyclohexane	1.6	M	0.69	0.69
Bromodichloromethane	0.20	U	1.3	1.3
Dichlorodifluoromethane	0.40	U	2.5	2.5
Ethylbenzene	0.13	U	0.87	0.87
Isopropylbenzene	0.15	U	0.98	0.98
Methyl tert-butyl ether	0.29	U	0.72	0.72
Methylene Chloride	0.69	U M	1.7	1.7
m,p-Xylene	2.3		2.2	2.2
Xylene, o-	0.13	U	0.87	0.87
Styrene	0.13	U	0.85	0.85
Tetrachloroethene	0.20	U	1.4	1.4
Toluene	3.7		0.75	0.75
trans-1,2-Dichloroethene	0.32	U	0.79	0.79
trans-1,3-Dichloropropene	0.36	U	0.91	0.91

Client: Katahdin Analytical Services

Job Number: 200-23996-1
Sdg Number: 200-23996

Client Sample ID: **BP0W4-2R-AIR090214**

Lab Sample ID: 200-23996-1
Client Matrix: Air

Date Sampled: 09/02/2014 1601
Date Received: 09/04/2014 1040

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:	TO-15	Analysis Batch:	200-77123	Instrument ID:	CHG.i
Prep Method:	Summa Canister	Prep Batch:	N/A	Lab File ID:	9408_011.D
Dilution:	1.0			Initial Weight/Volume:	298 mL
Analysis Date:	09/11/2014 1935			Final Weight/Volume:	200 mL
Prep Date:	09/11/2014 1935			Injection Volume:	200 mL

Analyte	Result (ug/m3)	Qualifier	DL	LOQ
Trichloroethene	0.43	U	1.1	1.1
Trichlorofluoromethane	1.3		1.1	1.1
Vinyl chloride	0.20	U	0.51	0.51
Xylene (total)	2.3		0.87	0.87

RESOLUTION CONSULTANTS

Resolution Consultants
250 Apollo Drive
Chelmsford, MA 01824

978.905.2100 tel
978.905.2101 fax

Data Validation Report

Project:	Regional Groundwater Investigation - NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Service Request:	SH8620	
Analyses/Method:	EPA SW-846 Method 8260B for VOCs (GC/MS), EPA SW-846 Method 9060A for TOC in waters and domestic/ industrial wastes(Carbonaceous Analyzer) and Standard Method 5310 for Total Organic Carbon by High-Temperature Combustion	
Validation Level:	3	
AECOM Project Number:	60266526.SA.DV	
Prepared by:	Dawn Brule/RESCON	Completed on: 12/08/2014
Reviewed by:	Lori Herberich/RESCON	File Name: SH8620_5310B, 8260B and 9060A

SUMMARY

The samples listed below were collected by Resolution Consultants from the Regional Groundwater Investigation - NWIRP Bethpage site on October 7 and 8, 2014 and September 15, 2014.

Sample ID	Matrix/Sample Type
BPOW4-2R-EB-10072014	Equipment blank
BPOW4-2R-FB-10072014	Field blank
BPOW4-2R-SOIL-10072014-673-675	Soil
BPOW4-2R-SOIL-10082014-738-740	Soil
BPOW4-2R-TRIP BLANK	Trip Blank

The samples were analyzed in accordance with:

- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846,* Method 8260B, *Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry* (USEPA, 1996).
- *Standard Methods for the Examination of Water and Wastewater, Method SM5310B, Total Organic Carbon by High-Temperature Combustion*
- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846,* Method 9060A, *Total Organic Carbon* (USEPA, 1996).

Data validation activities were conducted with reference to these methods, *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008), *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (January 2010), and Quality Systems Manual (QSM) for Environmental Laboratories, Version 4.2 (DoD, October 2010) where applicable. In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following review elements (where applicable to the method):

✓	Data completeness (chain-of-custody [COC])/sample integrity
✓	Holding times and sample preservation
✓	GC/MS performance checks
✗	Initial calibration/continuing calibration verification
✗	Laboratory blanks/equipment blanks/trip blanks
✓	Surrogate spike recoveries
NA	Matrix spike (MS) and/or matrix spike duplicate (MSD) results
✓	Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) results
NA	Field duplicate results
✓	Internal standard results
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. The symbol (✗) indicates that a QC nonconformance resulted in the qualification of data. Any QC nonconformance that resulted in the qualification of data is discussed below. In addition, nonconformances or other issues that were noted during validation, but did not result in qualification of data, may be discussed for informational purposes only.

The data appear valid as reported and may be used for decision making purposes. Selected data points were estimated and/or negated due to nonconformances of certain QC criteria (see discussion below). Qualified sample results are presented in Table 1.

RESULTS

Data Completeness (COC)/Sample Integrity

The data package was reviewed and found to meet acceptance criteria for completeness:

- The COCs were reviewed for completeness of information relevant to the samples and requested analyses, and for signatures indicating transfer of sample custody.
- The laboratory sample login sheet(s) were reviewed for issues potentially affecting sample integrity, including the condition of sample containers upon receipt at the laboratory.
- Completeness of analyses was verified by comparing the reported results to the COC requests.

Due to limitations in the reporting system, the laboratory omitted either part of or the whole "BPOW4-" prefix and truncated "Soil" in the ID for the soil samples in the report. The submitted EDD file reflects the full sample ID.

Holding Times and Sample Preservation

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria. The QC acceptance criteria were met.

GC/MS Performance Checks

The data were reviewed to ensure that the 4-bromofluorobenzene (BFB) tuning was performed at the correct frequency and that the method acceptance criteria were met. The QC acceptance criteria were met.

Initial Calibration/Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- the initial calibration (ICAL) percent relative standard deviation (%RSD), correlation coefficient (r)/coefficient of determination (r^2), and/or response factor method acceptance criteria were met;
- the initial calibration verification (ICV) percent recovery (%R) criteria were met;
- the continuing calibration verification standard (CCV) method percent difference or percent drift (%Ds) and RF acceptance criteria were met; and/or
- the retention time method acceptance criteria were met.

Nonconformances are summarized in Attachment A in Table A-1.

Data qualification to the analytes associated with the specific ICAL and/or CCV was as follows:

ICV Recovery Nonconformances:

Nonconformance	Actions	
	Detected Compounds	Nondetected Compounds
%R > 120%	J	No qualification
20% < %R < 80%	J	UJ
%R <20% (see note)	J	R*

Notes: Based on NFG 2008 VOC guidance, professional judgment is used to reject (R) nondetects in all associated samples for any analyte with < 20% recovery. Also, professional judgment is used to estimate (UJ) rather the reject (R) sample results previously negated (U) on the basis of blank contamination.

Qualified sample results are shown in Table 1.

Laboratory Blanks/Equipment Blanks/Trip Blanks

Laboratory method blanks, equipment rinsate and trip blanks were evaluated as to whether there were contaminants detected above the detection limit (DL).

Data validation qualifications for individual samples are based on the maximum contaminant concentration detected in all associated blanks.

Method, equipment rinsate and trip blank results were reviewed for conformance with the QC acceptance criteria. Detected results in blanks are not discussed in this data validation report if the associated results were nondetect or if qualification of sample results was not required.

Nonconformances are summarized in Attachment A in Table A-2.

TOC sample results were qualified as follows:

Blank Type	Blank Result	Sample Result	Action for Samples
ICB/CCB	≥DL but ≤ LOQ	Nondetect	No action

Blank Type	Blank Result	Sample Result	Action for Samples
(Positive)		≥DL but ≤LOQ	Qualify as nondetect (U) at the LOQ
		> LOQ	Use professional judgment (see below [1])
	>LOQ	≥DL but ≤LOQ	Qualify as nondetect (U) at the LOQ
		> LOQ but < ICB/CCB Result	Qualify at level of Blank Result with a "U" or Qualify result as unusable
		>ICB/CCB but <10x the ICB/CCB result	Qualify as estimated (J)
		≥10x ICB/CCB	No action is taken based on professional judgment
PB / EB/ FB (Positive)	> LOQ	≥DL but ≤ LOQ	Qualify as nondetect (U) at the LOQ
		>LOQ but < 10x Blank Result	Qualify results as unusable
		≥10x Blank Result	No action
	≥DL but ≤LOQ	Nondetect	No action
		≥DL but ≤LOQ	Qualify as nondetect (U) at the LOQ
		> LOQ	Use professional judgment (see below [1])

[1] Establish an action level (AL) at 5x the blank contamination. If sample result is <AL, qualify the reported result with a U.
LOQ - Limit of Quantitation.

Qualified sample results are shown in Table 1.

Surrogate Spike Recoveries

The surrogate recoveries (%Rs) were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

MS/MSD Results

MS/MSD analyses were not performed on samples reported in this SDG. There were no validation actions taken on this basis.

LCS/LCSD Results

The LCS/LCSD %Rs and/or relative percent recoveries (RPDs) were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

Field Duplicate Results

There were no field duplicate samples submitted with this data set. No validation actions were taken on this basis.

Internal Standard Results

The internal standard (IS) recoveries were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

Sample Results/Reporting Issues

Compounds that were not detected in the sample are reported as not detected (U) at the Limit of Detection (LOD).

Compounds detected at concentrations less than the LOQ but greater than the detection limit (DL) were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation.

Any sample that was analyzed at a dilution due to high concentrations of target or non-target compounds or matrix interferences was checked to ensure that the results and/or sample specific LODs and LOQs were adjusted accordingly by the laboratory.

QUALIFICATION ACTIONS

Sample results qualified as a result of validation actions are summarized in Table 1. All actions are described above.

ATTACHMENTS

Attachment A: Nonconformance Summary Tables

Attachment B: Qualifier Codes and Explanations

Attachment C: Reason Codes and Explanations

Table 1 - Data Validation Summary of Qualified Data

Sample ID	Matrix	Compound	Result	LOD	Units	Validation Qualifiers	Validation Reason
BPOW4-2R-FB-10072014	WQ	2-HEXANONE		2.5	UG/L	UJ	c
BPOW4-2R-FB-10072014	WQ	4-METHYL-2-PENTANONE		2.5	UG/L	UJ	c
BPOW4-2R-SOIL-10072014-673-675	SO	TOTAL ORGANIC CARBON		540*	UG/G	U	bf
BPOW4-2R-SOIL-10082014-738-740	SO	TOTAL ORGANIC CARBON		670**	UG/G	U	bf
BPOW4-2R-TRIP BLANK	WQ	2-HEXANONE		2.5	UG/L	UJ	c
BPOW4-2R-TRIP BLANK	WQ	4-METHYL-2-PENTANONE		2.5	UG/L	UJ	c

*LOQ
**sample result

Attachment A

Nonconformance Summary Tables

Table A-1 - Initial Calibration Verification Standard

ICV ID	Compound	% R	Limits
WG151736-7	CHLOROETHANE	131	80-120%
	4-METHYL-2-PENTANONE	73	80-120%
	2-HEXANONE	78	80-120%
Associated samples: all samples in SDG SH8620			

Table A-2 - Field Blanks

Blank ID	Compound	Result	LOD	Units	Associated Samples
BPOW4-2R-FB-10072014	TOTAL ORGANIC CARBON	0.50	0.5	MG/L	BPOW4-2R-SOIL-10072014-673-675 BPOW4-2R-SOIL-10082014-738-740

Attachment B

Qualifier Codes and Explanations

Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Attachment C

Reason Codes and Explanations

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
c	Calibration issue
co	Analyte carryover
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate RPDs
h	Holding times
i	Internal standard areas
k	Estimated Maximum Possible Concentration (EMPC)
l	LCS or OPR recoveries
lc	Labeled compound recovery
ld	Laboratory duplicate RPDs
lp	Laboratory control sample/laboratory control sample duplicate RPDs
m	Matrix spike recovery
md	Matrix spike/matrix spike duplicate RPDs
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column RPD
q	Quantitation issue
s	Surrogate recovery
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	ICS results

Katahdin ANALYTICAL SERVICES

600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

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Page 1 of 1

Client: Resolution Consultants	Contact: VIVAUDOU	Phone #: ( )	Fax #: ( )
Address: 998 C Country Rd #283	City: PLAINVILLE	State: NY	Zip Code: 11803
Purchase Order #	Proj. Name / No.: NWIRP- Bethpage / 60265126		Katahdin Quote #
Bill (if different than above)	Address		
Sampler (Print / Sign): Gordon Hiles / Paul Tweet			Copies To:

LAB USE ONLY WORK ORDER #: 5H8620
KATAHDIN PROJECT NUMBER

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	ANALYSIS AND CONTAINER TYPE / PRESERVATIVES: Filt. ☐Y ☐N	TOC	VOC	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N
	BPOW4-2R-FB-10072014	10-7-14 / 0830	Water	6		3	3								
	BPOW4-2R-EB-10072014	10-7-14 / 0845	Water	3		✓									
	BPOW4-2R-SOIL-10072014-473-674ft	10-7-14 / 1340	Soil	1		✓									
	BPOW4-2R-SOIL-10082014-738-740ft	10-8-14 / 1515	Soil	1		✓									
	BPOW4-2R TRIP BLANK	9-15-14 / 1130	Water	3			✓								
		/													
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COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Paul Tweet	10-9-14 730			10-9-14 1500	Fedex
Relinquished By: (Signature)	Date / Time	Received By: (Signature) 10-10-14 0930	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

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000014 ORIGINAL

KAS-COC1

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: ENSAFE
Lab ID: SH8620-1
Client ID: POW4-2R-FB-10072014
Project: Navy Clean WE15-03-06 NW
SDG: SH8620
Lab File ID: C9445.D

Sample Date: 07-OCT-14
Received Date: 10-OCT-14
Extract Date: 10-OCT-14
Extracted By: REC
Extraction Method: SW846 5030
Lab Prep Batch: WG151846

Analysis Date: 10-OCT-14
Analyst: REC
Analysis Method: SW846 8260C
Matrix: AQ
% Solids: NA
Report Date: 13-OCT-14

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
Chloromethane	U	1.0	ug/L	1	2	2.0	0.36	1.0
Vinyl Chloride	U	1.0	ug/L	1	2	2.0	0.25	1.0
Bromomethane	U	1.0	ug/L	1	2	2.0	0.49	1.0
Chloroethane	U	1.0	ug/L	1	2	2.0	0.55	1.0
Trichlorofluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
1,1-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.35	0.50
Carbon Disulfide	U	0.50	ug/L	1	1	1.0	0.25	0.50
Freon-113	U	0.50	ug/L	1	1	1.0	0.31	0.50
Methylene Chloride	U	2.5	ug/L	1	5	5.0	1.1	2.5
Acetone	U	2.5	ug/L	1	5	5.0	2.2	2.5
trans-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.25	0.50
Methyl tert-butyl Ether	U	0.50	ug/L	1	1	1.0	0.36	0.50
1,1-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.21	0.50
cis-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.21	0.50
Chloroform	U	0.50	ug/L	1	1	1.0	0.32	0.50
1,1,1-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
2-Butanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
Cyclohexane	U	0.50	ug/L	1	1	1.0	0.31	0.50
Carbon Tetrachloride	U	0.50	ug/L	1	1	1.0	0.22	0.50
Benzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,2-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
Trichloroethene	U	0.50	ug/L	1	1	1.0	0.28	0.50
1,2-Dichloropropane	U	0.50	ug/L	1	1	1.0	0.25	0.50
Bromodichloromethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
cis-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.19	0.50
Toluene	U	0.50	ug/L	1	1	1.0	0.27	0.50
4-Methyl-2-Pentanone	~~U~~ UJ	2.5	ug/L	1	5	5.0	1.3	2.5
trans-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.20	0.50
1,1,2-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
Tetrachloroethene	U	0.50	ug/L	1	1	1.0	0.40	0.50
Dibromochloromethane	U	0.50	ug/L	1	1	1.0	0.30	0.50
2-Hexanone	~~U~~ UJ	2.5	ug/L	1	5	5.0	1.7	2.5
Chlorobenzene	U	0.50	ug/L	1	1	1.0	0.22	0.50
Ethylbenzene	U	0.50	ug/L	1	1	1.0	0.21	0.50

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12/22/14

Report of Analytical Results

Client: ENSAFE
Lab ID: SH8620-1
Client ID: POW4-2R-FB-10072014
Project: Navy Clean WE15-03-06 NW
SDG: SH8620
Lab File ID: C9445.D

Sample Date: 07-OCT-14
Received Date: 10-OCT-14
Extract Date: 10-OCT-14
Extracted By: REC
Extraction Method: SW846 5030
Lab Prep Batch: WG151846

Analysis Date: 10-OCT-14
Analyst: REC
Analysis Method: SW846 8260C
Matrix: AQ
% Solids: NA
Report Date: 13-OCT-14

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Xylenes (total)	U	1.5	ug/L	1	3	3.0	0.25	1.5
Styrene	U	0.50	ug/L	1	1	1.0	0.23	0.50
Bromoform	U	0.50	ug/L	1	1	1.0	0.23	0.50
Isopropylbenzene	U	0.50	ug/L	1	1	1.0	0.23	0.50
1,1,2,2-Tetrachloroethane	U	0.50	ug/L	1	1	1.0	0.38	0.50
1,3-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,4-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.24	0.50
1,2-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.15	0.50
1,2,4-Trichlorobenzene	U	0.50	ug/L	1	1	1.0	0.37	0.50
Methyl Acetate	U	0.75	ug/L	1	1	1.0	0.53	0.75
Methylcyclohexane	U	0.50	ug/L	1	1	1.0	0.30	0.50
o-Xylene	U	0.50	ug/L	1	1	1.0	0.25	0.50
M+P-Xylenes	U	1.0	ug/L	1	2	2.0	0.59	1.0
1,2-Dichloroethylene (Total)	U	1.0	ug/L	1	2	2.0	0.21	1.0
1,2-Dibromoethane	U	0.50	ug/L	1	1	1.0	0.22	0.50
1,2-Dibromo-3-Chloropropane	U	0.75	ug/L	1	1	1.0	0.50	0.75
P-Bromofluorobenzene		98.2	%					
Toluene-d8		104.	%					
1,2-Dichloroethane-d4		112.	%					
Dibromofluoromethane		108.	%					

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Cert No E87604

Report of Analytical Results

Client: ENSAFE
Lab ID: SH8620-5
Client ID: BPOW4-2R-TRIP BLAN
Project: Navy Clean WE15-03-06 NW
SDG: SH8620
Lab File ID: C9440.D

Sample Date: 08-OCT-14
Received Date: 10-OCT-14
Extract Date: 10-OCT-14
Extracted By: REC
Extraction Method: SW846 5030
Lab Prep Batch: WG151846

Analysis Date: 10-OCT-14
Analyst: REC
Analysis Method: SW846 8260C
Matrix: AQ
% Solids: NA
Report Date: 13-OCT-14

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
Chloromethane	U	1.0	ug/L	1	2	2.0	0.36	1.0
Vinyl Chloride	U	1.0	ug/L	1	2	2.0	0.25	1.0
Bromomethane	U	1.0	ug/L	1	2	2.0	0.49	1.0
Chloroethane	U	1.0	ug/L	1	2	2.0	0.55	1.0
Trichlorofluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
1,1-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.35	0.50
Carbon Disulfide	U	0.50	ug/L	1	1	1.0	0.25	0.50
Freon-113	U	0.50	ug/L	1	1	1.0	0.31	0.50
Methylene Chloride	U	2.5	ug/L	1	5	5.0	1.1	2.5
Acetone	U	2.5	ug/L	1	5	5.0	2.2	2.5
trans-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.25	0.50
Methyl tert-butyl Ether	U	0.50	ug/L	1	1	1.0	0.36	0.50
1,1-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.21	0.50
cis-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.21	0.50
Chloroform	U	0.50	ug/L	1	1	1.0	0.32	0.50
1,1,1-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
2-Butanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
Cyclohexane	U	0.50	ug/L	1	1	1.0	0.31	0.50
Carbon Tetrachloride	U	0.50	ug/L	1	1	1.0	0.22	0.50
Benzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,2-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
Trichloroethene	U	0.50	ug/L	1	1	1.0	0.28	0.50
1,2-Dichloropropane	U	0.50	ug/L	1	1	1.0	0.25	0.50
Bromodichloromethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
cis-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.19	0.50
Toluene	U	0.50	ug/L	1	1	1.0	0.27	0.50
4-Methyl-2-Pentanone	~~U~~ UJ	2.5	ug/L	1	5	5.0	1.3	2.5
trans-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.20	0.50
1,1,2-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
Tetrachloroethene	U	0.50	ug/L	1	1	1.0	0.40	0.50
Dibromochloromethane	U	0.50	ug/L	1	1	1.0	0.30	0.50
2-Hexanone	~~U~~ UJ	2.5	ug/L	1	5	5.0	1.7	2.5
Chlorobenzene	U	0.50	ug/L	1	1	1.0	0.22	0.50
Ethylbenzene	U	0.50	ug/L	1	1	1.0	0.21	0.50

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12/22/14

Report of Analytical Results

Client: ENSAFE
Lab ID: SH8620-5
Client ID: BPOW4-2R-TRIP BLAN
Project: Navy Clean WE15-03-06 NW
SDG: SH8620
Lab File ID: C9440.D

Sample Date: 08-OCT-14
Received Date: 10-OCT-14
Extract Date: 10-OCT-14
Extracted By: REC
Extraction Method: SW846 5030
Lab Prep Batch: WG151846

Analysis Date: 10-OCT-14
Analyst: REC
Analysis Method: SW846 8260C
Matrix: AQ
% Solids: NA
Report Date: 13-OCT-14

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Xylenes (total)	U	1.5	ug/L	1	3	3.0	0.25	1.5
Styrene	U	0.50	ug/L	1	1	1.0	0.23	0.50
Bromoform	U	0.50	ug/L	1	1	1.0	0.23	0.50
Isopropylbenzene	U	0.50	ug/L	1	1	1.0	0.23	0.50
1,1,2,2-Tetrachloroethane	U	0.50	ug/L	1	1	1.0	0.38	0.50
1,3-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,4-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.24	0.50
1,2-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.15	0.50
1,2,4-Trichlorobenzene	U	0.50	ug/L	1	1	1.0	0.37	0.50
Methyl Acetate	U	0.75	ug/L	1	1	1.0	0.53	0.75
Methylcyclohexane	U	0.50	ug/L	1	1	1.0	0.30	0.50
o-Xylene	U	0.50	ug/L	1	1	1.0	0.25	0.50
M+P-Xylenes	U	1.0	ug/L	1	2	2.0	0.59	1.0
1,2-Dichloroethylene (Total)	U	1.0	ug/L	1	2	2.0	0.21	1.0
1,2-Dibromoethane	U	0.50	ug/L	1	1	1.0	0.22	0.50
1,2-Dibromo-3-Chloropropane	U	0.75	ug/L	1	1	1.0	0.50	0.75
P-Bromofluorobenzene		96.9	%					
Toluene-d8		103.	%					
1,2-Dichloroethane-d4		108.	%					
Dibromofluoromethane		106.	%					

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Cert No E87604

Report of Analytical Results

Client: Rick Purdy
AECOM
701 Edgewater Drive
Wakefield,MA 01880

Lab Sample ID: SH8620-1
Report Date: 04-NOV-14
Client PO: 16518
Project: Navy Clean WE15-03-0
SDG: SH8620

Sample Description	Matrix	Date Sampled	Date Received
POW4-2R-FB-10072014	AQ	07-OCT-14 08:30:00	10-OCT-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Organic Carbon	J0.50 mg/L	1.0	0.10	.5	SM5310B	WG152063	13-OCT-14 19:32:22	N/A	N/A	

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ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Rick Purdy
AECOM
701 Edgewater Drive
Wakefield,MA 01880

Lab Sample ID: SH8620-2
Report Date: 04-NOV-14
Client PO: 16518
Project: Navy Clean WE15-03-0
SDG: SH8620

Sample Description	Matrix	Date Sampled	Date Received
POW4-2R-EB-10072014	AQ	07-OCT-14 08:45:00	10-OCT-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Organic Carbon	J0.38 mg/L	1.0	0.10	.5	SM5310B	WG152063	13-OCT-14 20:11:25	N/A	N/A	

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ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Rick Purdy
AECOM
701 Edgewater Drive
Wakefield,MA 01880

Lab Sample ID: SH8620-3
Report Date: 04-NOV-14
Client PO: 16518
Project: Navy Clean WE15-03-0
SDG: SH8620

Sample Description	Matrix	Date Sampled	Date Received
2R-SL100714-673-675	SL	07-OCT-14 13:40:00	10-OCT-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
TOC In Soil	540 U ~~J330~~ ug/gdrywt	540	120	410	SW846 9060A Mod.	WG152215	15-OCT-14 17:15:49	N/A	N/A	
Total Solids	85. %	1		N/A	SM2540G	WG153116	30-OCT-14 09:29:44	SM2540G	30-OCT-14	

12/22/14

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ANALYTICAL SERVICES

ACCREDITED IN ACCORDANCE WITH nelac
Cert No E87604

Report of Analytical Results

Client: Rick Purdy
AECOM
701 Edgewater Drive
Wakefield,MA 01880

Lab Sample ID: SH8620-4
Report Date: 04-NOV-14
Client PO: 16518
Project: Navy Clean WE15-03-0
SDG: SH8620

Sample Description	Matrix	Date Sampled	Date Received
2R-SL100814-738-740	SL	08-OCT-14 15:15:00	10-OCT-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
TOC In Soil	670 U ug/gdrywt	660	140	500	SW846 9060A Mod.	WG152215	15-OCT-14 17:23:41	N/A	N/A	
Total Solids	84. %	1		N/A	SM2540G	WG153116	30-OCT-14 09:29:55	SM2540G	30-OCT-14	

12/22/14

Katahdin Analytical Services 000144

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Group:	TH0899	
Analyses/Method:	Volatile Organic Compounds (VOCs) by U.S. EPA SW-846 Method 8260C Semivolatile Organic Compounds (SVOCs) by U.S. EPA SW-846 Method 8270D via Selective Ion Monitoring (SIM)	
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 02/06/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: TH0899_8260C_8270D

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 30 December 2014 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York,* April 2013.
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York, August 2014.*
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York,* November 2013.

Sample ID	Matrix/Sample Type	Analysis
BP0W4-1R-GW-123014	Ground water	8260C/ 8270D_SIM
BP0W4-2R-GW-123014	Ground water	8260C/ 8270D_SIM
TRIP BLANK_12302014	Trip Blank	8260C

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 8260C, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry* (U.S. EPA, 2006), *SW-846 Method 8270D, Semivolatile Organic Compounds by Gas Chromatograph/Mass Spectrometry* (U.S. EPA, 2007), *U.S. Environmental Protection Agency (U.S. EPA) Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (NFG, June 2008), and Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories,

Version 4.2 (October 2010). In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

✓	Data completeness (chain-of-custody (COC)/sample integrity
✓	Holding times and sample preservation
✓	GC/MS performance checks
✓	Initial calibration/continuing calibration verification
✓	Laboratory blanks/trip blanks
✓	Surrogate spike recoveries
NA	Matrix spike (MS) and/or matrix spike duplicate (MSD) results
✓	Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) results
NA	Field duplicates
✓	Internal standards
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further. The symbol (✗) indicates that a QC non-conformance resulted in the qualification of data. Any QC non-conformance that resulted in the qualification of data is discussed below.

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality and no results were qualified during this data review. All compounds detected at concentrations less than the limit of quantitation (LOQ) but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Analytical completeness was calculated to be 100% and the data are usable for their intended purpose, according to U.S. EPA guidelines and Department of Defense guidelines. Attachment A provides final results after data review.

ATTACHMENTS

Attachment A: Final Results after Data Review

Attachment A
Final Results after Data Review

		Sample Delivery Group		TH0899	
		Lab ID		TH0899-1	
		Sample ID		BP0W4-2R-GW-123014	
		Sample Date		12/30/2014	
		Sample Type		Groundwater	
Method	**Analyte**	**CAS No**	**Units**	Result	Qual
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	11	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U
8260C	ACETONE	67-64-1	UG_L	2.5	U
8260C	BENZENE	71-43-2	UG_L	0.5	U
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U
8260C	BROMOFORM	75-25-2	UG_L	0.5	U
8260C	BROMOMETHANE	74-83-9	UG_L	1	U
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U
8260C	CHLOROETHANE	75-00-3	UG_L	1	U
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U
8260C	O-XYLENE	95-47-6	UG_L	0.5	U
8260C	STYRENE	100-42-5	UG_L	0.5	U
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U
8260C	TOLUENE	108-88-3	UG_L	0.5	U
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.73	J
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U
8270D	1,4-DIOXANE	123-91-1	UG_L	1.1	

		Sample Delivery Group		TH0899	
		Lab ID		TH0899-2	
		Sample ID		BP0W4-1R-GW-123014	
		Sample Date		12/30/2014	
		Sample Type		Groundwater	
Method	**Analyte**	**CAS No**	**Units**	Result	Qual
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	8	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U
8260C	ACETONE	67-64-1	UG_L	2.5	U
8260C	BENZENE	71-43-2	UG_L	0.5	U
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U
8260C	BROMOFORM	75-25-2	UG_L	0.5	U
8260C	BROMOMETHANE	74-83-9	UG_L	1	U
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U
8260C	CHLOROETHANE	75-00-3	UG_L	1	U
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U
8260C	O-XYLENE	95-47-6	UG_L	0.5	U
8260C	STYRENE	100-42-5	UG_L	0.5	U
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U
8260C	TOLUENE	108-88-3	UG_L	0.5	U
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.84	J
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U
8270D	1,4-DIOXANE	123-91-1	UG_L	1.2	

		Sample Delivery Group		TH0899	
		Lab ID		TH0899-3	
		Sample ID		TRIP BLANK_12302014	
		Sample Date		12/30/2014	
		Sample Type		Trip Blank	
Method	**Analyte**	**CAS No**	**Units**	Result	Qual
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U
8260C	ACETONE	67-64-1	UG_L	2.5	U
8260C	BENZENE	71-43-2	UG_L	0.5	U
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U
8260C	BROMOFORM	75-25-2	UG_L	0.5	U
8260C	BROMOMETHANE	74-83-9	UG_L	1	U
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U
8260C	CHLOROETHANE	75-00-3	UG_L	1	U
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U
8260C	O-XYLENE	95-47-6	UG_L	0.5	U
8260C	STYRENE	100-42-5	UG_L	0.5	U
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U
8260C	TOLUENE	108-88-3	UG_L	0.5	U
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U
8270D	1,4-DIOXANE	123-91-1	UG_L	NA	

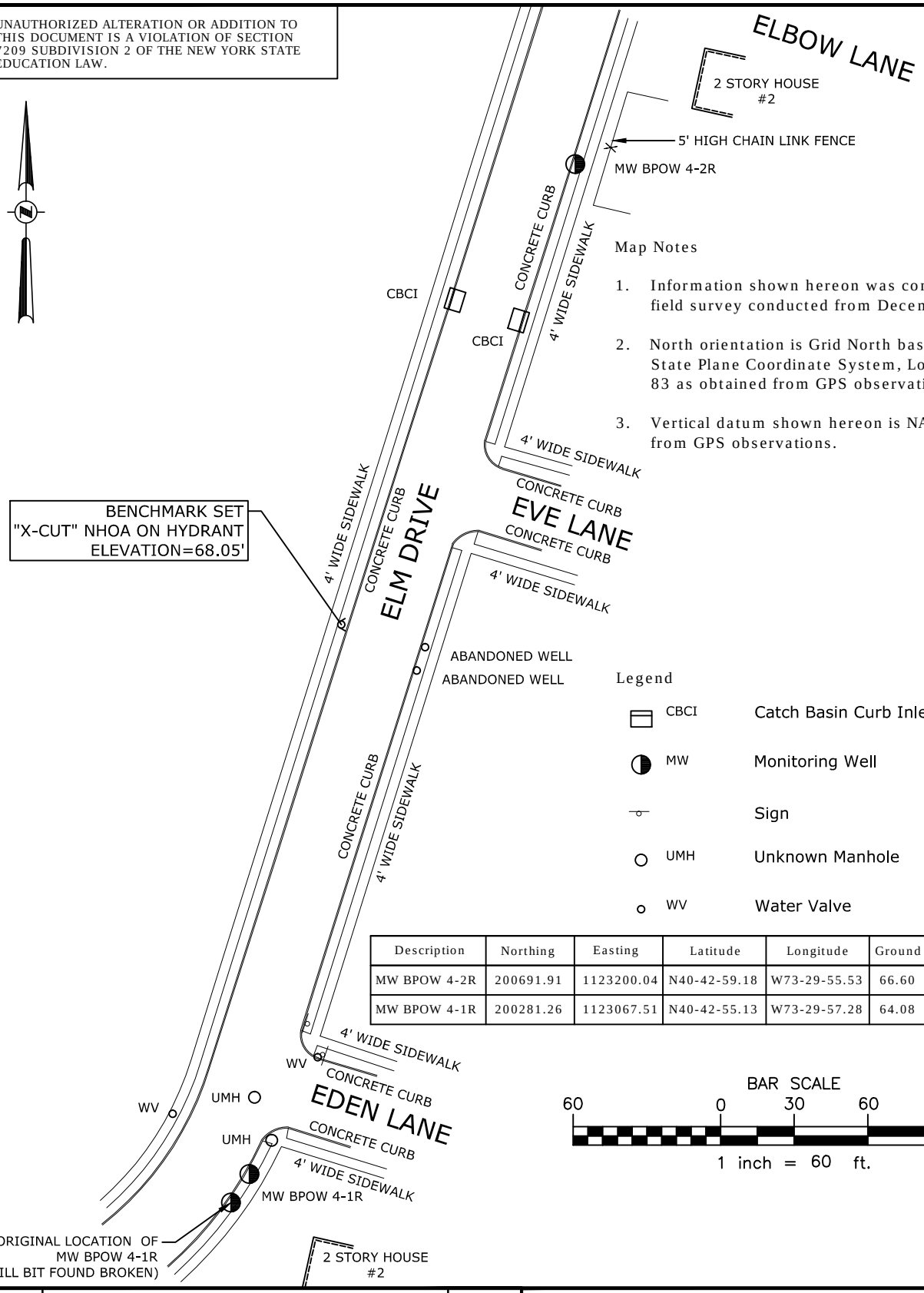
Notes:

ID	=	Identification
UG_L	=	Micrograms per liter
Qual	=	Final qualifier
U	=	The analyte was analyzed for, but was not detected above the reported quantitation limit.
J	=	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
NA	=	Analyte not analyzed

Section 6

Survey

NONE :XREFS



Map Notes

1. Information shown hereon was compiled from an actual field survey conducted from December 9, 2014.
2. North orientation is Grid North based on the New York State Plane Coordinate System, Long Island Zone, NAD 83 as obtained from GPS observations.
3. Vertical datum shown hereon is NAVD 88 as obtained from GPS observations.

Legend

	CBCI	Catch Basin Curb Inlet
	MW	Monitoring Well
		Sign
	UMH	Unknown Manhole
	WV	Water Valve

Description	Northing	Easting	Latitude	Longitude	Ground	Rim	PVC
MW BPOW 4-2R	200691.91	1123200.04	N40-42-59.18	W73-29-55.53	66.60	66.60	66.13
MW BPOW 4-1R	200281.26	1123067.51	N40-42-55.13	W73-29-57.28	64.08	64.08	63.67

BAR SCALE
60 0 30 60 120
1 inch = 60 ft.

DWG NO. 14-642

Date	RECORD OF WORK	Appr.

MW BPOW 4-1R AND MW BPOW 4-2R
ELM DRIVE

TOWN OF BETHPAGE | NASSAU COUNTY, NEW YORK

C.T. MALE ASSOCIATES
Engineering, Surveying, Architecture & Landscape Architecture, D.P.C.
50 CENTURY HILL DRIVE, LATHAM, NY 12110
518.786.7400 * FAX 518.786.7299

Drafter: LMK	Checker: JFC	SCALE: 1"=60'	DATE: DEC. 09, 2014
Appr. by: JFC	Proj. No. 14.4121		

CAD DWG. FILE NAME: K:\Projects\14412\1\Survey\Drawings and Maps\Elm Dr._Elbow Ln.dwg