N00129.AR.000836
NSB NEW LONDON
5090.3a

Round 9 Groundwater Monitoring Report

for

Defense Reutilization and Marketing Office

Naval Submarine Base New London

Groton, Connecticut

Northern Division Naval Facilities Engineering Command

Contract Number N62472-90-D-1298

Contract Task Order 0267

December 2000

TETRA TECH NUS, INC.

120002/P

ROUND 9 GROUNDWATER MONITORING REPORT FOR DEFENSE REUTILIZATION AND MARKETING OFFICE

NAVAL SUBMARINE BASE - NEW LONDON GROTON, CONNECTICUT

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Northern Division
Environmental Branch Code 18
Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop #82
Lester, Pennsylvania 19113-2090

Submitted by:
Tetra Tech NUS, Inc.
600 Clark Avenue, Suite 3
King of Prussia, Pennsylvania 19406-1433

CONTRACT NUMBER N62472-90-D-1298
CONTRACT TASK ORDER 0267

DECEMBER 2000

PREPARED BY:

Mark L. Mengel

MARK L. MENGEL
PROJECT MANAGER
TETRA TECH NUS, INC
PITTSBURGH, PENNSYLVANIA

APPROVED BY:

John Trepanowski

JOHN J. TREPANOWSKI, P.E.
PROGRAM MANAGER
TETRA TECH NUS, INC
KING OF PRUSSIA, PENNSYLVANIA

TABLE OF CONTENTS

SECTION		PAGE NO.
1.0	**INTRODUCTION**	**1-1**
1.1	BACKGROUND INFORMATION	1-1
1.1.1	Base Description	1-1
1.1.2	Site Description and History	1-1
1.1.3	Previous Investigations	1-2
1.2	SCOPE AND OBJECTIVE	1-5
1.3	REPORT ORGANIZATION	1-5
2.0	**FIELD INVESTIGATION ACTIVITIES**	**2-1**
2.1	WATER LEVEL MEASUREMENTS	2-1
2.2	GROUNDWATER SAMPLING	2-1
2.3	DECONTAMINATION AND INVESTIGATION-DERIVED WASTE	2-2
3.0	**MONITORING RESULTS**	**3-1**
REFERENCES		**R-1**

APPENDICES

A	**FIELD ACTIVITIES LOG BOOK**
B	**TIDE TABLES**
C	**GROUNDWATER LEVEL MEASUREMENT SHEET**
D	**MONITORING INSTRUMENT CALIBRATION LOGS**
E	**GROUNDWATER SAMPLE LOGHSEETS AND LOW-FLOW PURGE DATA SHEETS**
F	**CHAIN OF CUSTODY RECORDS**
G	**DATA VALIDATION LETTERS AND LABORATORY DATA SHEETS**

TABLES

NUMBER		PAGE NO.
2-1	Groundwater Level Measurements and Elevations	2-3
3-1	Round 9 Analytical Results Summary	3-3

FIGURES

NUMBER		PAGE NO.
1-1	Site Map	1-7
1-2	DRMO Site Plan	1-8
2-1	Monitoring Well Locations	2-5
2-2	Low Tide Potentiometric Surface Map	2-7
2-3	High Tide Potentiometric Surface Map	2-9
3-1	Positive COC Detection	3-5

1.0 INTRODUCTION

This Round 9 Groundwater Monitoring Report for the Defense Reutilization and Marketing Office (DRMO) at the Naval Submarine Base New London (NSB-NLON) in Groton, Connecticut was prepared for the U.S. Department of the Navy (Navy) by Tetra Tech NUS, Inc. (TtNUS) under the Comprehensive Long-Term Environmental Action Navy (CLEAN), Contract Number N62472-90-D-1298, Contract Task Order (CTO) 0267.

This document has been prepared in accordance with the Navy Installation Restoration Laboratory Quality Assurance Guide (Interim Guidance) of the Naval Facilities Engineering Service Center, (NFESC, February 1996).

1.1 BACKGROUND INFORMATION

1.1.1 Base Description

NSB-NLON is located in southeastern Connecticut in the Towns of Ledyard and Groton. It encompasses approximately 576 acres and lies on the east bank of the Thames River, approximately 6 miles north of Long Island Sound. NSB-NLON is bounded to the east by Connecticut Route 12, to the south by Crystal Lake Road, and to the west by the Thames River. The northern border is a low, east-southeast trending ridge extending from the Thames River to Baldwin Hill.

NSB-NLON currently provides base command for naval submarine activities in the Atlantic Ocean. It also provides housing for Navy personnel and their families and supports submarine training facilities, military offices, medical facilities, and facilities for the submarine maintenance, repair, and overhaul.

1.1.2 Site Description and History

The DRMO is adjacent to the Thames River in the northwestern section of NSB-NLON. The DRMO is the storage and collection facility for items to be sold at auctions and sales held periodically throughout the year. Figure 1-1 shows the site location within NSB-NLON, and Figure 1-2 shows the general site plan.

The DRMO was used as a major base landfill and burning ground from 1950 to 1969. The materials burned and landfilled included construction materials, combustible scrap, and other non-salvageable waste items. These materials were burned on the Thames River shoreline adjacent to the current location of the DRMO. The residue was pushed to the shoreline and partially covered.

Atlantic Environmental Service, Inc. (Atlantic) personnel reviewed archived aerial photographs of the DRMO areas part of the Phase I Remedial Investigation (RI) (Atlantic, 1992). The 1934 photographs show fill in the southern portion of the site. Fill for bulkheads and docks south of the DRMO did not exist at that time. Aerial photographs from 1951 show the land in its present configuration, except for the northwest portion, which was not filled at that time.

Atlantic personnel inspected the site on September 30, 1988. Metal and wood products were stored throughout most of the site. Buildings 479 and 355 are located within the paved area to the south and are primarily used for storage. Building 491, located in the unpaved area to the north, is used for miscellaneous storage, including batteries. Metal baling operations were performed adjacent to Building 491 on a gravel surface. Based on an inspection of the building plans, Atlantic personnel identified the presence of a former battery acid handling facility at the north section of the site, within Building 491. A large scrap yard was located north of Building 479. Submarine batteries were stored in the southeast portion of the site adjacent to the railroad tracks; no leakage was observed.

Prior to 1995, the southern half of the DRMO was covered with asphalt, most of which had deteriorated, while the northern portion was unpaved and had a gravel surface. A Time-Critical Removal Action was performed at the DRMO by OHM Remediation Services Corporation. Construction aspects of the removal action were completed in January 1995. The removal action focused on the removal of soil contaminated with lead, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) from the northern half of the DRMO. The spent acid tank was also removed. The site was subsequently remediated and a composite cap was placed over a majority of the central and northern portions of the site (OHM, September 1995). The cap consisted of a woven geotextile liner, a geosynthetic clay liner (GCL), and a nonwoven geotextile liner. Bituminous concrete pavement was then placed over the entire area of the composite cap. The paved (southern) portion of the site was upgraded with an additional asphalt layer.

1.1.3 Previous Investigations

1.1.3.1 Phase I RI

The Phase I RI (Atlantic, 1992) at this site included test borings and monitoring well installation, as well as, soil, surface water, and groundwater sampling. Twelve shallow surface soil samples and 12 subsurface soil samples were collected from 7 test borings and 5 monitoring well borings. Four surface soil samples were collected and analyzed. Six groundwater samples were collected from five shallow wells and one deep well. Additionally, one surface water sample was collected from the Thames River at the northern end of this site (B&R Environmental, March 1997).

Concentrations of Volatile Organic Compounds (VOCs) in the soil were generally low. Semivolatile Organic Compounds (SVOCs) were present in most soil samples collected in the former landfill area. They were predominately comprised of PAHs, many of which were detected at elevated levels. A PCB, Aroclor 1260, was detected at almost all soil sample locations. Pesticides were detected in one soil sample at elevated concentrations.

Trichloroethene and 1,2-dichloroethene were detected in groundwater at three shallow downgradient wells. SVOCs (including PAHs), pesticides, petroleum hydrocarbons, or PCBs were not detected in any wells at the DRMO site. The inorganic groundwater analysis results indicated that selenium exceeded the primary drinking water standards for three wells. No VOCs, SVOCs, pesticides, or PCBs were detected in the upgradient surface water sample. Comparison of the inorganic results for this sample with the downgradient water sample (Goss Cove) did not suggest any detectable impact on the Thames River from the DRMO based on this limited data set .

1.1.3.2 Draft Focused Feasibility Study Field Investigation

A field investigation in support of the draft Focused Feasibility Study (FFS) was performed at the DRMO site in October 1993 to better define the extent of soil contamination. Twelve surface soil samples and twelve subsurface soil samples were collected. One surface and two subsurface field duplicates were also collected. One of the borings was completed as a monitoring well (6MW8S) (B&R Environmental, March 1997).

The highest concentrations of VOCs were present in soil samples west of Building 491. SVOCs, predominately PAHs, were detected in soil across the site. PCBs (Aroclor 1254, Aroclor 1260, and Aroclor 1242) were detected at nearly all boring locations at low to high concentrations. Pesticides (DDE, DDD, DDT) were detected at many locations across the site, primarily at low concentrations; however, several locations were found to have elevated levels. Concentrations of inorganic compounds were above background at all locations. Of primary concern at the site were the high levels of lead.

1.1.3.3 Phase II RI

Five new groundwater monitoring wells (two shallow and three deep) were installed and sampled during the Phase II RI. Additionally, 4 previously installed shallow wells were sampled. Two rounds of groundwater sampling were completed and ten samples were collected during each sampling round. Three subsurface soil samples were collected during the installation of three of the new wells (B&R Environmental, March 1997).

Relatively high concentrations of multiple organic and inorganic compounds were detected in the soil matrix at the DRMO. Organic chemicals detected at high concentrations include various halogenated aliphatic compounds, PAHs, phthalate esters, Aroclor-1254, and Aroclor-1260.

The results of the Phase II RI suggested that, in spite of the fact that relatively high concentrations of some VOCs were detected in the subsurface soil, it did not appear that substantial impact on the groundwater had occurred to date. In addition to the various organic chemicals detected in soil at the DRMO, relatively high concentrations of lead still remained in soil after the Time-Critical Removal Action was conducted during the course of the Phase II RI. Surface and subsurface soil concentrations of lead ranged as high as 4,980 mg/kg and 2,140 mg/kg, respectively. In spite of the high lead concentrations in soil, only limited evidence of lead migration to the water table is evidenced by the groundwater analytical results. Additionally, the results indicated that the cap effectively minimized precipitation infiltration to the groundwater (B&R Environmental, March 1997).

1.1.3.4 Time-Critical Removal Action

A Time-Critical Removal Action was performed at the DRMO by OHM Remediation Services Corporation during the course of the Phase II RI. Construction aspects of the removal action were completed in January 1995. The removal action focused on the removal of soil contaminated with lead, PAHs, and PCBs from the northern half of the DRMO.

First, a total of 73 soil samples and two pavement samples were collected from the scrap yard area north of Building 479. Then, soil was excavated to a depth of approximately 3 feet (or to the water table if the depth to water was less than 3 feet). Approximately 4,700 tons of soil was removed. Confirmation sampling was initiated when excavation operations were approximately 75% complete. Some further excavation was subsequently performed. Residual contamination above the PRGs remained in the soil after excavation was complete due to the excavation being limited to 3 feet by the shallow water table and exceedances of the allotted time for the project (B&R Environmental, March 1997).

After the completion of removal activities, the area was backfilled with clean borrow material. A cap consisting of a woven geotextile liner, a geosynthetic clay liner (GCL), and a nonwoven geotextile liner was installed. Approximately 12 inches of crushed stone and 3 inches of asphalt were placed over the clay/geotextile cover. The remaining (paved) portion of the DRMO was also upgraded via placement of an additional asphalt layer.

1.2 SCOPE AND OBJECTIVE

The objective of this Round 9 Groundwater Monitoring Report is to present and evaluate the results of the ninth round of long-term groundwater monitoring at the DRMO site. This monitoring is being conducted to verify the effectiveness of the cap installed as part of the Time-Critical Removal Action to reduce precipitation infiltration and leaching of contaminants and to confirm that contamination is not migrating through the soil, into the groundwater, and ultimately discharging to the Thames River. This groundwater monitoring is part of the post-closure associated with the DRMO cap.

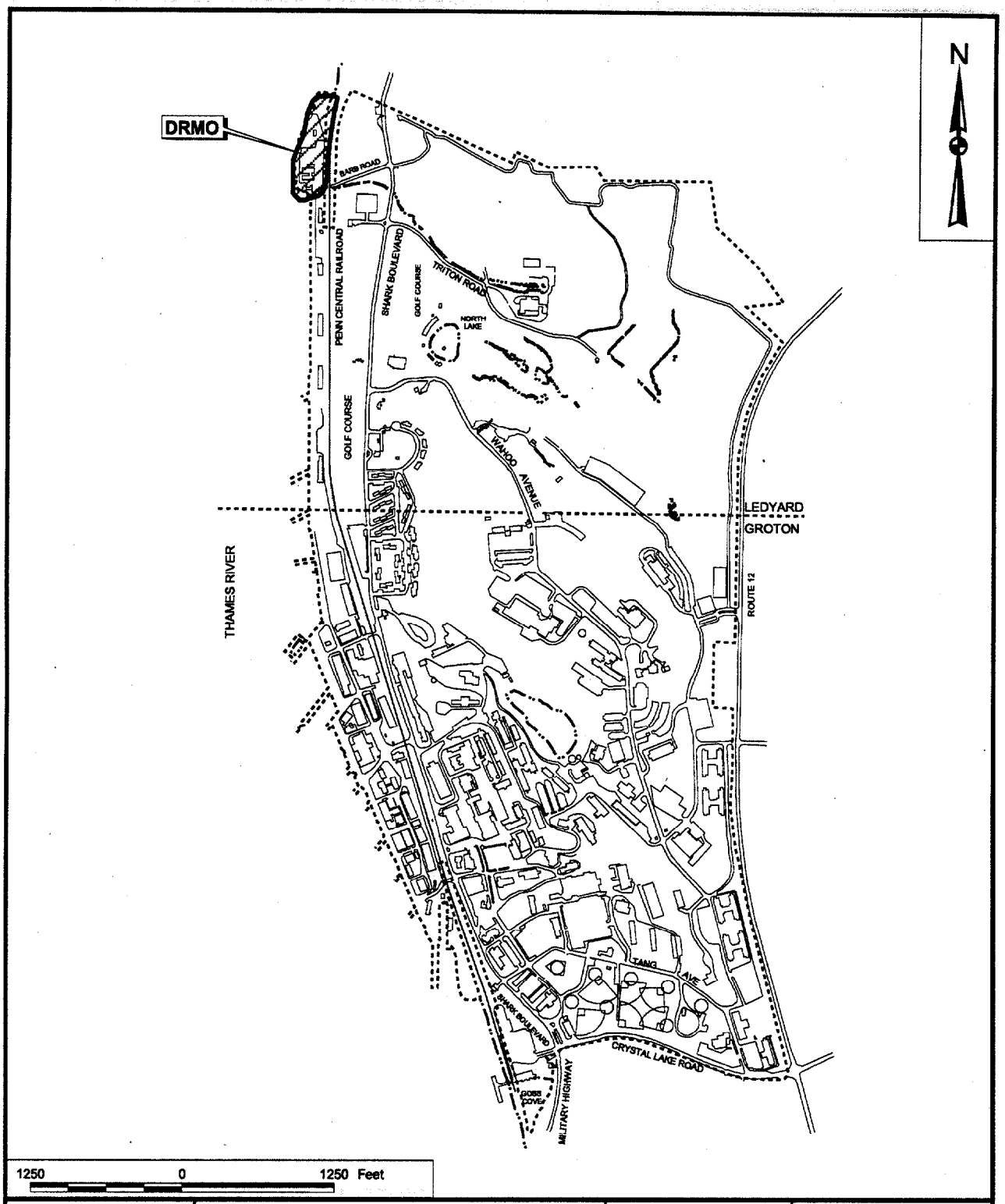
To meet this objective, five existing Phase I and Phase II RI monitoring wells and five monitoring wells installed during Rounds 1 and 2 of the DRMO Groundwater Monitoring Program were sampled and analyzed for a suite of analytes based on an evaluation of site history and previous analytical results. Sampling and analyses were performed in accordance to the Groundwater Monitoring Plan (GMP) prepared for the DRMO (B&R Environmental, February 1998).

Because this is an interim report for the ninth round of groundwater monitoring, evaluation of monitoring results is limited to a comparison of these results to the criteria identified in the DRMO GMP (B&R Environmental, February 1998).

1.3 REPORT ORGANIZATION

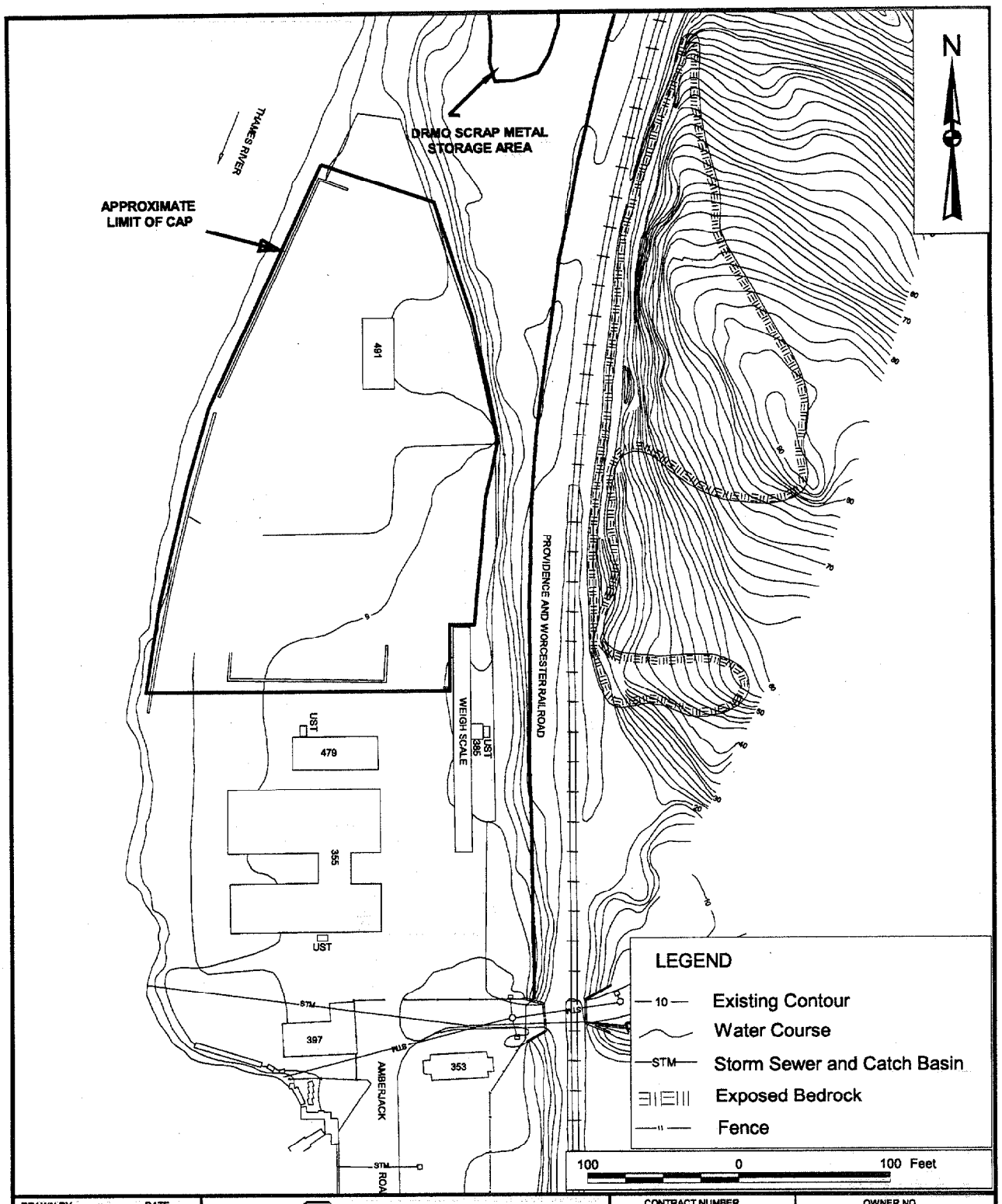
This report has been prepared in the following format to address the requirements for long-term groundwater monitoring at the DRMO. Section 1.0 of the report is this brief introduction including the project scope and objective. Section 2.0 describes field sampling activities. Section 3.0 presents and evaluates the analytical results from the sampling effort.

This page intentionally left blank.



DRAWN BY J. BELLONE DATE 4/6/00	Tetra Tech NUS, Inc.	CONTRACT NUMBER 7363	OWNER NO. —
CHECKED BY CAR DATE 12/13/00	SITE MAP NSB NLON GROTON, CONNECTICUT	APPROVED BY Mark L. Mengel DATE 12/13/00	
COST/SCHEDULE-AREA		APPROVED BY — DATE —	
SCALE AS NOTED		DRAWING NO. FIGURE 1-1	REV 0

P:\GIS\NLON\7363ANNUAL.APR\DRMO SITE MAP 11/3/00 MGS



DRAWN BY	DATE	Tetra Tech NUS, Inc.	CONTRACT NUMBER	OWNER NO.
J. BELLONE	10/1/99		7363	
CHECKED BY	DATE	DRMO SITE PLAN NSB - NLON GROTON, CONNECTICUT	APPROVED BY	DATE
CAR	12/13/00		Mark L. Mengel	12/13/00
COST/SCHEDULE-AREA			APPROVED BY	DATE
SCALE			DRAWING NO.	REV
AS NOTED			FIGURE 1-2	0

P:\GIS\NLON\7363ANNUAL.APR DRMO SITE PLAN LAYOUT 11/3/00 MGS

2.0 FIELD INVESTIGATION ACTIVITIES

Field investigation activities conducted as part of the ninth round of groundwater monitoring included two rounds of groundwater level measurements and groundwater sampling of 10 monitoring wells. Monitoring well locations are shown on Figure 2-1. These activities were performed in accordance with the procedures and methodologies described in Section 3.0: Groundwater Monitoring System Installation and Section 4.0: Sampling and Analyses of the DRMO GMP (B&R Environmental, February 1998). A copy of the field activity log book is provided as Appendix A.

2.1 WATER LEVEL MEASUREMENTS

Water levels were measured in ten monitoring wells and one staff gage (in the Thames River). The staff gage was located at the outside edge of the storm sewer outfall to the Thames River, west of Building 397. Both the high and low tide water level measurements were collected on July 27, 2000. The measurements were taken within the time periods of 16 to 49 minutes following the predicted high tide and 13 to 35 minutes following the predicted low tide for Smith Cove, opposite the DRMO on the Thames River. Tide tables are provided in Appendix B. Table 2-1 summarizes the groundwater measurements, and Figures 2-2 and 2-3 illustrate the potentiometric surface maps for the groundwater in the shallow aquifer during low tide and high tide, respectively. Groundwater level measurement sheets can be found in Appendix C.

2.2 GROUNDWATER SAMPLING

Ten monitoring wells were sampled during the ninth round of groundwater monitoring using low-flow purging and sampling techniques, in accordance with USEPA Region I Low-Flow Purging and Sampling Procedure GW-001.

The wells were purged prior to sampling using the dedicated bladder pumps with bottled nitrogen gas as the power source. Groundwater quality parameters, including pH, specific conductivity, temperature, dissolved oxygen, salinity, and Eh were measured during purging at 5 minute intervals using a YSI 610 DM datalogger and 6820 multi-parameter water quality monitor equipped with a flow-through cell. Turbidity was also measured using a LaMotte 2020 Turbidimeter. Calibration log sheets are found in Appendix D. Water levels were also measured during purging at 5-minute intervals. Purging continued until the above parameters stabilized. Copies of the low-flow purge data sheets are provided in Appendix E. All purge water was containerized in 55-gallon drums for off-site disposal by a disposal subcontractor, as discussed in Section 2.3.

Following purging, samples were collected directly from the discharge end of the Teflon®-lined pump tubing. The groundwater samples were collected and analyzed for VOCs, SVOCs, PAH, pesticides and PCBs, and total metals. Analytical results of the samples are discussed in Section 3.0. Copies of the sample log sheets are provided in Appendix E, and chain of custody records are provided in Appendix F.

2.3 DECONTAMINATION AND INVESTIGATION-DERIVED WASTE

All water quality and water level meters were decontaminated by rinsing with de-ionized water prior to and after use.

All investigation derived waste (IDW) (i.e., purge water) was turned over to NSB-NLON and disposed of offsite by a licensed disposal company.

TABLE 2-1

SUMMARY OF GROUNDWATER LEVEL MEASUREMENTS AND ELEVATIONS ROUND 9 GROUNDWATER WATER MONITORING REPORT FOR DRMO NSB-NLON, GROTON, CONNECTICUT

Well Number	Reference Elevation[1] (feet msl)	Depth to Water[2] (feet) LOW TIDE	Depth to Water[3] (feet) HIGH TIDE	Groundwater Elevation (feet above msl) LOW TIDE	Groundwater Elevation (feet above msl) HIGH TIDE	Well Screen Depth[4]
6MW1S	8.63	7.44	5.25	1.19	3.38	Shallow
6MW2S	7.30	5.96	3.98	1.34	3.32	Shallow
6MW2D	7.85	5.47	4.85	2.38	3.00	Deep
6MW6S	12.16	8.93	8.70	3.23	3.46	Shallow
6MW6D	12.50	9.25	9.17	3.25	3.33	Bedrock
6MW9S	7.52	4.31	3.95	3.21	3.57	Shallow
6MW10S	5.19	3.71	1.90	1.48	3.29	Shallow
6MW10D	5.01	2.19	1.25	2.82	3.76	Deep
6MW11S	4.92	3.50	1.45	1.42	3.47	Shallow
6MW11D	5.31	1.93	0.83	3.38	4.48	Deep
SG-01	5.67	4.52	2.31	1.15	3.36	NA

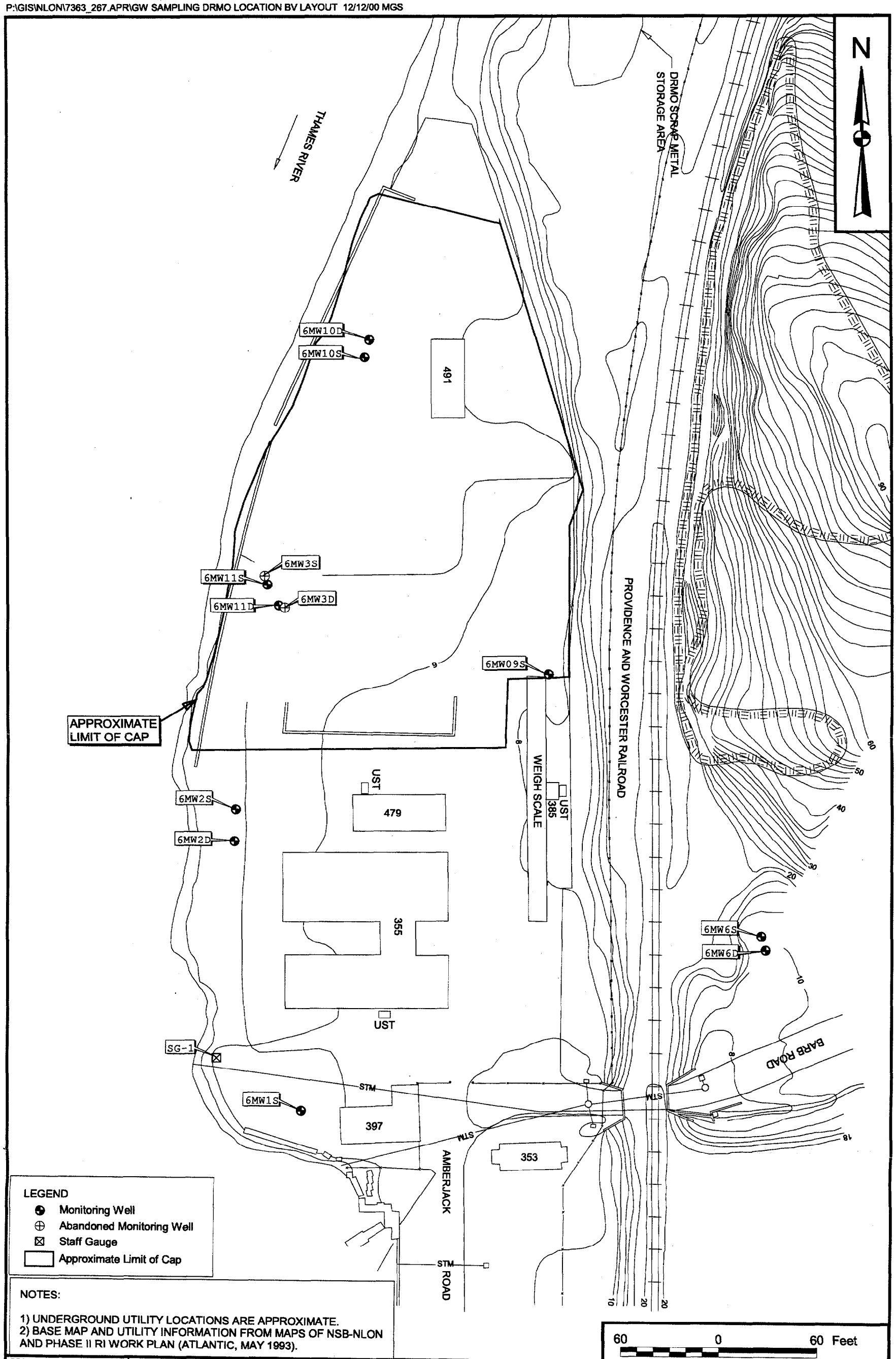
msl: mean sea level (1982 Base Traverse System)

NOTES:

1 Reference elevation is top of well casing (1982 Base Traverse System)
2 Depth to water is from top of well casing. Measured July 27, 2000.
3 Depth to water is from top of well casing. Measured July 27, 2000.
4 Well screen depths designated as shallow unconfined, deep unconfined, and bedrock groundwater.

This page intentionally left blank.

P:\GIS\NLON\7363_267.APR\GW SAMPLING DRMO LOCATION BV LAYOUT 12/12/00 MGS

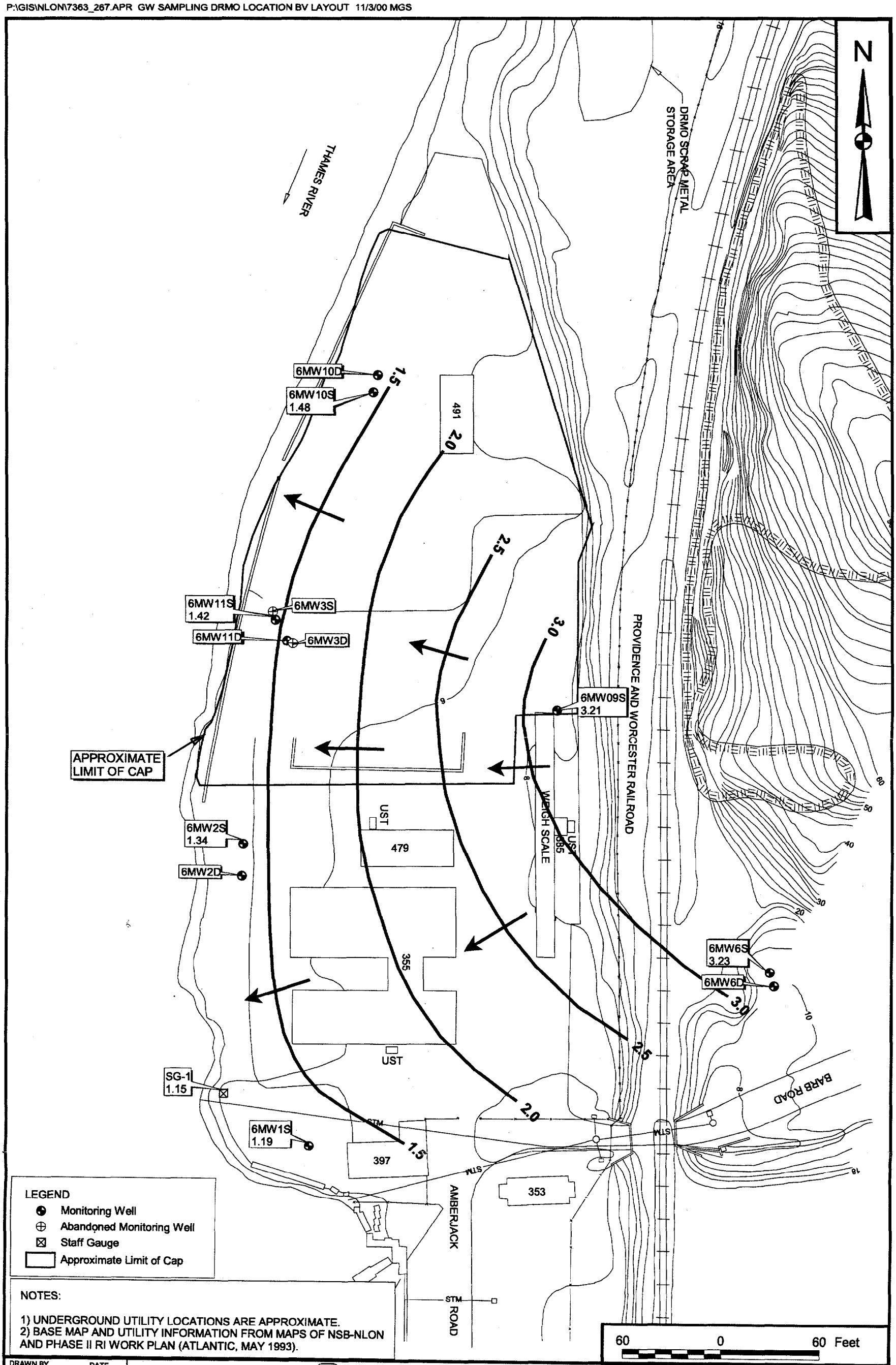


DRAWN BY M. Spangenberg DATE 12/12/00	Tetra Tech NUS, Inc.	CONTRACT NUMBER 7363	OWNER NUMBER —
CHECKED BY CAR DATE 12/13/00	MONITORING WELL LOCATIONS ROUND 9 GROUNDWATER SAMPLING DRMO NSB-NLON, GROTON, CONNECTICUT	APPROVED BY Mark L. Mongel DATE 12/13/00	
COST/SCHEDULE-AREA		APPROVED BY — DATE —	
SCALE AS NOTED		DRAWING NO. FIGURE 2-1	REV 0

DRAFT

1088BB12

P:\GIS\NLON\7363_267.APR GW SAMPLING DRMO LOCATION BV LAYOUT 11/3/00 MGS



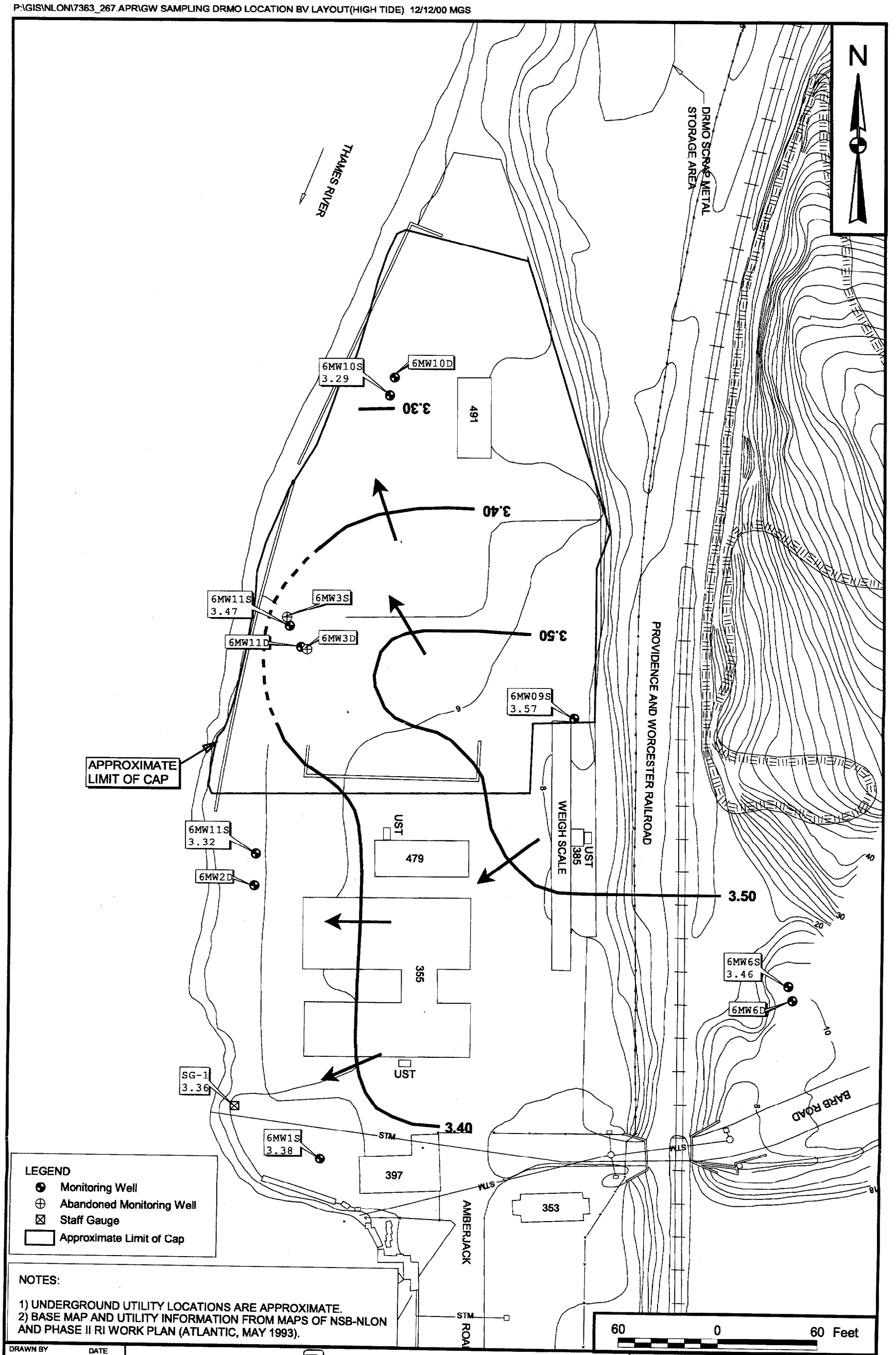
NOTES:

1) UNDERGROUND UTILITY LOCATIONS ARE APPROXIMATE.
2) BASE MAP AND UTILITY INFORMATION FROM MAPS OF NSB-NLON AND PHASE II RI WORK PLAN (ATLANTIC, MAY 1993).

DRAWN BY M. Spangenberg DATE 12/12/00	Tetra Tech NUS, Inc.	CONTRACT NUMBER 7363	OWNER NUMBER —
CHECKED BY CAR DATE 12/13/00	LOW TIDE POTENTIOMETRIC SURFACE MAP MONITORING WELL LOCATIONS ROUND 9 GROUNDWATER SAMPLING DRMO NSB-NLON, GROTON, CONNECTICUT	APPROVED BY Mark L. Mengel DATE 12/13/00	
COST/SCHEDULE-AREA		APPROVED BY — DATE —	
SCALE AS NOTED		DRAWING NO. FIGURE 2-2	REV 0

DRAFT

P:\GIS\NLON\7363_267.APR\GW SAMPLING DRMO LOCATION BV LAYOUT(HIGH TIDE) 12/12/00 MGS



DRAFT

3.0 MONITORING RESULTS

The groundwater samples collected from monitoring wells 6MW1S, 6MW2S, 6MW2D, 6MW6S, 6MW6D, 6MW9S, 6MW10S, 6MW10D, 6MW11S, and 6MW11D were analyzed for Target Compound List (TCL) organic chemicals and Target Analyte List (TAL) inorganic chemicals. Monitoring focused on the following organic and inorganic chemicals of potential concern, as identified in the GMP Monitoring Plan (B&R Environmental, February 1998):

- 1,1,2,2-Tetrachloroethane
- 1,2-Dichloroethane
- 1,2-Dichloroethene (total)
- Trichloroethene
- Vinyl Chloride
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Benzoic Acid
- Bis(2-ethylhexyl)phthalate
- Fluoranthene
- Fluorene
- Naphthalene
- Phenantrene
- Pyrene
- Heptachlor Epoxide
- Aroclors 1254 and 1260
- Hexachlorobiphenyl
- 4,4'-DDD
- Arsenic
- Barium
- Cadmium
- Chromium
- Copper
- Lead
- Silver
- Zinc

The contaminants listed were detected in soil either at concentrations that could result in exceedances of site specific Surface Water Protection Criteria (SWPCs) or at concentrations that exceed Connecticut's Pollutant Mobility Criteria for GB groundwater.

Analytical results are summarized on Table 3-1 and the positive COC detections are shown on Figure 3-1. Table 3-1 also compares the analytical results with the primary and secondary monitoring criteria, as established in the GMP (B&R Environmental, February 1998). Chemicals exceeding either primary or secondary monitoring criteria are noted by shading. The results of this comparison may be summarized as follows:

- There were no organic and inorganic exceedances of the primary monitoring criteria, which were site-specific SWPC using a dilution factor of 100.

- Bis(2-ethylhexyl)phthalate was detected in three samples obtained from monitoring wells 6MW2D, 6MW6D, and 6MW1S at concentration ranging from 10.3 µg/L to 18.1 µg/L. These concentrations exceeded the secondary monitoring criteria, which is the Federal AWQC and the Connecticut WQS for protection of human health from consumption of aquatic organisms

- Arsenic was detected in the samples from monitoring wells 6MW2D (3.4 µg/L), 6MW2S (3.4 µg/L), 6MW10D (6.5 µg/L), 6MW11D (26.1 µg/L), and 6MW11D-Dup (21.5 µg/L). These detections exceeded the secondary monitoring criteria (AWQCs and WQSs for protection of human health from consumption of aquatic organisms) of 0.14 µg/L for arsenic.

- Copper was detected in the samples from monitoring wells 6MW2D (7.8 µg/L), 6MW11D (32 µg/L), and 6MW11D-Dup (24.6 µg/L). These detections exceeded the secondary monitoring criterion of 2.4 µg/L, which is the Federal AWQC for the protection of aquatic life (chronic, saltwater).

- Lead was detected in the samples from monitoring wells 6MW11D (10.5 µg/L), and 6MW11D-Dup (8.9 µg/L). These detections slightly exceeded the secondary monitoring criterion of 8.1 µg/L, which is the Federal AWQC for the protection of aquatic life (chronic, saltwater).

- Silver was detected in the sample collected from monitoring well 6MW2S at a concentration of 20.5 µg/L. This concentration exceeded the secondary monitoring criterion of 1.9 µg/L, which is the Federal AWQC for the protection of aquatic life (chronic, saltwater).

- Zinc was detected in the samples from monitoring wells 6MW9S (94.6 µg/L), 6MW10D (99.2 µg/L), 6MW11D (108 µg/L), and 6MW11D Dup (92.6 µg/L). These detections slightly exceeded the secondary monitoring criterion of 81 µg/L, which is the Federal AWQC for protection of aquatic life (chronic, saltwater).

- No other exceedances of secondary monitoring criteria were noted.

As discussed in Section 1.2, because this is only an interim report for the ninth round of groundwater monitoring, the evaluation of the analytical results is limited to the above comparison. No conclusions or recommendations are drawn from this comparison. Initial conclusions and recommendations were made in the Year 1 and Year 2 Summary Reports. Additional conclusions and recommendations will be noted upon the completion of the third year of sampling (four rounds).

Data validation letters and laboratory data sheets are attached to this report as Appendix G.

TABLE 3-1

ROUND 9 ANALYTICAL RESULTS SUMMARY
INTERIM GROUNDWATER MONITORING REPORT FOR DRMO
NSB-NLON, GROTON, CONNECTICUT
PAGE 1 OF 2

Chemical	Primary Monitoring Criterion (1)	Secondary Monitoring Criterion (1)	6MW10D ROUND 9 07/24/00	6MW10S ROUND 9 07/24/00	6MW11D ROUND 9 07/25/00	6MW11D (DUP) ROUND 9 07/25/00	6MW11S ROUND 9 07/25/00	6MW1S ROUND 9 07/27/00
VOCs (ug/L)								
1,1,2,2-TETRACHLOROETHANE	1,100	11 (3)(4)	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE	29,700	99 (3)(4)	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	NA	NA	14	2	3	3	2	1 U
TRANS-1,2-DICHLOROETHENE	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	23,400	81 (3)(4)	4	1 U	1 U	1 U	1 U	1 J
VINYL CHLORIDE	157,500	525 (3)(4)	1	1 U	1 U	1 U	1 U	1 U
SVOCs (ug/L)								
BENZO(A)ANTHRACENE	3.0	0.049 (3)(4)	0.2 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.2 UJ	2 U
BENZO(A)PYRENE	3.0	0.049 (3)(4)	0.2 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.2 UJ	2 U
BENZO(B)FLUORANTHENE	3.0	0.049 (3)(4)	0.2 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.2 UJ	2 U
BENZO(K)FLUORANTHENE	3.0	0.049 (3)(4)	0.2 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.2 UJ	2 U
BENZOIC ACID	NA	NA						
BIS(2-ETHYLHEXYL)PHTHALATE	590	5.9 (3)(4)	2 U	5.4	2.2 U	2.1 U	2 U	17.1
FLUORANTHENE	37,000	370 (3)(4)	0.2 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.2 UJ	2 U
FLUORENE	1,400,000	14,000 (3)(4)	0.2 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.2 UJ	2 U
NAPHTHALENE	NA	NA	0.2 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.2 UJ	2 U
PHENANTHRENE	0.77	NA	0.2 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.2 UJ	2 U
PYRENE	1,100,000	11,000 (3)(4)	0.2 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.2 UJ	2 U
Pesticides/PCBs (ug/L)								
4,4'-DDD	NA	0.00084 (3)(4)	0.02 U	0.02 U	0.021 U	0.021 U	0.02 U	0.02 U
AROCLOR-1254	5.0	0.00017 (3)(4)	0.2 U	0.2 U	0.21 U	0.21 U	0.2 U	0.2 U
AROCLOR-1260	5.0	0.00017 (3)(4)	0.2 U	0.2 U	0.21 U	0.21 U	0.2 U	0.2 U
HEPTACHLOR EPOXIDE	0.5	0.00011 (3)(4)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Inorganics (total) (ug/L)								
ARSENIC	40	0.14 (3)(4)	6.5 J	2.7 U	26.1 J	21.5 J	2.7 U	2.7 U
BARIUM	NA	NA	34.9	103	265	264	107	17 U
CADMIUM	60	NA	0.32 UJ	0.32 U	1.1 U	0.9 U	0.32 U	0.32 U
CHROMIUM	1,100	50 (2)	1.3 U	1.3 U	7 J	5.8 J	1.3 U	1.3 U
COPPER	480	2.4 (2)	0.87 U	3.7 U	32 J	24.6 J	1.4 U	0.87 U
LEAD	130	8.1 (2)	1.9 UJ	1.9 U	10.5 J	8.9 J	1.9 U	1.9 U
SILVER	120	1.9 (2)	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
ZINC	1,230	81 (2)	99.2 J	21 J	108 J	92.6 J	16.9 J	25.3 J

NOTES:
Bold numbers denote exceedance of secondary monitoring criterion. There are no exceedances of primary monitoring criteria.
(1) Surface Water Protection Criteria for substances in groundwater, using a site-specific dilution factor of 100.
(2) Federal Ambient Water Quality Criteria for protection of aquatic life (chronic, saltwater).
(3) Federal Ambient Water Quality Criteria for protection of human health from consumption of organisms.
(4) Connecticut Water Quality Criteria for protection of human health from consumption of organisms.
J Estimated Value
R Rejected Value
U Undetected
NA Not Available

DRAFT

TABLE 3-1

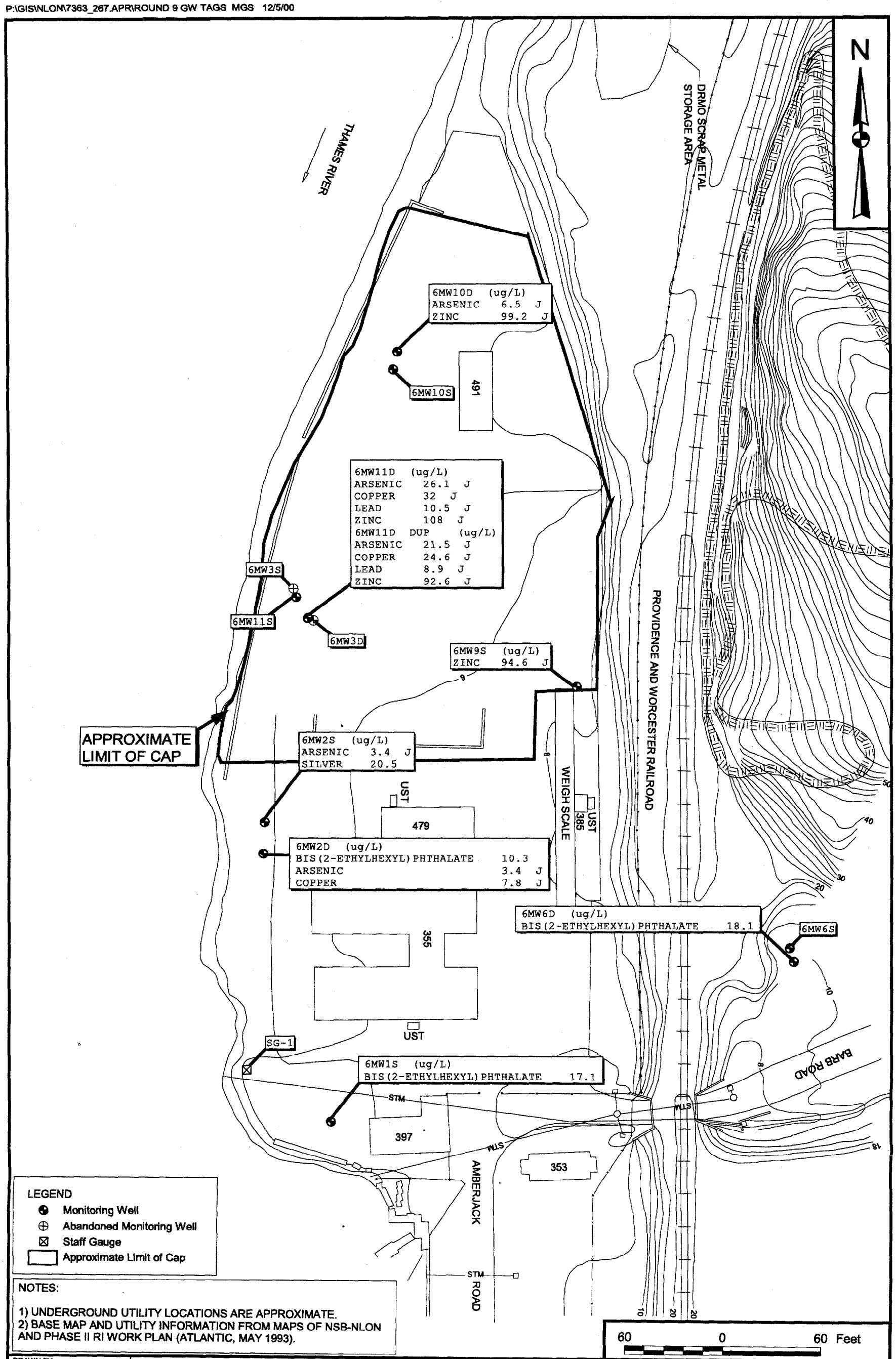
ROUND 9 ANALYTICAL RESULTS SUMMARY
INTERIM GROUNDWATER MONITORING REPORT FOR DRMO
NSB-NLON, GROTON, CONNECTICUT
PAGE 2 OF 2

Chemical	Primary Monitoring Criterion (1)	Secondary Monitoring Criterion (1)	6MW2D ROUND 9 07/26/00	6MW2S ROUND 9 07/27/00	6MW6D ROUND 9 07/23/00	6MW6S ROUND 9 07/23/00	6MW9S ROUND 9 07/25/00
VOCs (ug/L)							
1,1,2,2-TETRACHLOROETHANE	1,100	11 (3)(4)	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE	29,700	99 (3)(4)	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	NA	NA	1 U	1 U	7	1 U	1 U
TRANS-1,2-DICHLOROETHENE	NA	NA	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	23,400	81 (3)(4)	1 U	1 U	10	0.5 J	1 U
VINYL CHLORIDE	157,500	525 (3)(4)	1 U	1 U	1 U	1 U	1 U
SVOCs (ug/L)							
BENZO(A)ANTHRACENE	3.0	0.049 (3)(4)	2 U	2 U	0.2 UJ	0.2 UJ	0.2 UJ
BENZO(A)PYRENE	3.0	0.049 (3)(4)	2 U	2 U	0.2 UJ	0.2 UJ	0.2 UJ
BENZO(B)FLUORANTHENE	3.0	0.049 (3)(4)	2 U	2 U	0.2 UJ	0.2 UJ	0.2 UJ
BENZO(K)FLUORANTHENE	3.0	0.049 (3)(4)	2 U	2 U	0.2 UJ	0.2 UJ	0.2 UJ
BENZOIC ACID	NA	NA					
BIS(2-ETHYLHEXYL)PHTHALATE	590	5.9 (3)(4)	10.3	2 U	18.1	2.3	2 U
FLUORANTHENE	37,000	370 (3)(4)	2 U	2 U	0.2 UJ	0.2 UJ	0.2 UJ
FLUORENE	1,400,000	14,000 (3)(4)	2 U	2 U	0.2 UJ	0.2 UJ	0.2 UJ
NAPHTHALENE	NA	NA	2 U	2 U	0.2 UJ	0.2 UJ	0.2 UJ
PHENANTHRENE	0.77	NA	2 U	2 U	0.2 UJ	0.2 UJ	0.2 UJ
PYRENE	1,100,000	11,000 (3)(4)	2 U	2 U	0.2 UJ	0.2 UJ	0.2 UJ
Pesticides/PCBs (ug/L)							
4,4'-DDD	NA	0.00084 (3)(4)	0.021 U	0.02 U	0.02 U	0.02 U	0.02 U
AROCLOR-1254	5.0	0.00017 (3)(4)	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U
AROCLOR-1260	5.0	0.00017 (3)(4)	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U
HEPTACHLOR EPOXIDE	0.5	0.00011 (3)(4)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Inorganics (total) (ug/L)							
ARSENIC	40	0.14 (3)(4)	3.4 J	3.4 J	2.7 U	2.7 U	2.7 U
BARIUM	NA	NA	148	29.9 J	48.0	30.1 J	17 U
CADMIUM	60	NA	0.32 UJ	0.32 UJ	0.63 U	0.40 U	0.37 U
CHROMIUM	1,100	50 (2)	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
COPPER	480	2.4 (2)	7.8 J	6.6 U	0.87 U	0.87 U	2 U
LEAD	130	8.1 (2)	1.9 J	1.9 UJ	1.9 U	1.9 U	1.9 U
SILVER	120	1.9 (2)	1.1 U	20.5	1.1 U	1.1 U	1.1 U
ZINC	1,230	81 (2)	9.3 J	15.4 J	10.6	6.9 U	94.6 J

NOTES:
Bold numbers denote exceedance of secondary monitoring criterion. There are no exceedances of primary monitoring criteria.
(1) Surface Water Protection Criteria for substances in groundwater, using a site-specific dilution factor of 100.
(2) Federal Ambient Water Quality Criteria for protection of aquatic life (chronic, saltwater).
(3) Federal Ambient Water Quality Criteria for protection of human health from consumption of organisms.
(4) Connecticut Water Quality Criteria for protection of human health from consumption of organisms.
J Estimated Value
R Rejected Value
U Undetected
NA Not Available

DRAFT

P:\GIS\NLON\7363_267.APR\ROUND 9 GW TAGS MGS 12/5/00



DRAWN BY M. Spangenberg	DATE 12/5/00	Tetra Tech NUS, Inc.	CONTRACT NUMBER 7363	OWNER NUMBER —
CHECKED BY CAL	DATE 12/13/00	POSITIVE COC EXCEEDENCE DETECTION ROUND 9 GROUNDWATER SAMPLING DRMO NSB-NLON, GROTON, CONNECTICUT	APPROVED BY Mark K. Mengel	DATE 12/13/00
COST/SCHEDULE-AREA			APPROVED BY —	DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 3-1	REV 0

DRAFT

120002/P

3-5

CTO 0267

1088B02Z

REFERENCES

(Atlantic, August 1992): Phase I Remedial Investigation Naval Submarine Base - New London, Groton, Connecticut. Atlantic Environmental Services, Inc ., Colchester, CT.

(Atlantic, March 1995): Action Memorandum for the Defense Reutilization and Marketing Office and the Spent Acid Storage and Disposal Area, Installation Restoration Program. Atlantic Environmental Services, Inc., Colchester, CT.

(Atlantic, April 1995): Background Concentrations of Inorganics in Soil. Installation Restoration Program, Naval Submarine Base - New London, Groton, Connecticut. Atlantic Environmental Services, Inc., Colchester, CT

(B&R Environmental, March 1997): Phase II Remedial Investigation for Naval Submarine Base, New London, Groton, Connecticut. Brown & Root Environmental, King of Prussia, PA.

(B&R Environmental, February 1998): Groundwater Monitoring Plan for Defense Reutilization and Marketing Office, Naval Submarine Base, New London, Groton, Connecticut. Brown & Root Environmental, King of Prussia, PA.

(CT, 1995): "Standards for Quality of Public Drinking Water." Title 19, Regulation 19-13, Section 19-13-B102. State of Connecticut

(CTDEP, December 1995): "Remediation Standard Regulations.". State of Connecticut Department of Environmental Protection, Bureau of Water Management, Permitting, Enforcement and Remediation Division, Hartford, Connecticut.

(NFESC, February 1996): Navy Installation Restoration Laboratory Quality Assurance Guide (Interim Guidance). Naval Facilities Engineering Service Center.

(OHM, September 1995): Final Report for Interim Remedial Action, Site 6, Naval Submarine Base, New London, Groton, Connecticut. OHM Remediation Services Corporation, Hopkinton, MA

(SCS, 1983): Soil Survey of New London County Connecticut. Soil Conversation Service.

(USGS, 1960): Geologic Map of the Uncasville Quadrangle, Connecticut, Surficial Geology. United States Geological Survey.

(USGS, 1967): Bedrock Geologic Map of the Uncasville Quadrangle, New London County, Connecticut. United States Geological Survey.

APPENDIX A

FIELD ACTIVITIES LOG BOOK

TITLE NSB-NLON PROJECT NO 7636

Sun July 23, 2000 BOOK 2415

Work continued from Page

July 23, 2000

0400 Tetra Tech NUS personnel Chuck Meyer (CM) and Don Whalen (DW) arrive at the onsite trailer and begin calibrating and collecting Equipment and supplies for sampling at DRMO.

Trip Blank 6WTB072300 was collected using Accutest supplied bottleware and water

1550 Personnel head out to well cluster 6MW6 and begin set up

1634 Purging of 6MW06S was begun. The water was clear with no odors. For additional information see Sample Log and Low Flow Data sheets

1623 Purging of 6MW06D was begun. The water was clear with no odors for additional info see Sample Log and Low Flow data sheets.

1735 Purging of 6MW06S was completed after removing 3.5 gallons from the

Work continued to Page

DATE 7/23/00

TITLE NSB NLON PROJECT NO. 7636

7/23/00 BOOK 2415

Work continued from Page

well

1739 Sample DRMO-6MW6S-GW-09 was collected by CM from the discharge hose of the pump. The samples were sent to Accutest Labs for TCL VOC, TCL SVOC, TCL PAH, TCL Pest/PCB and TAL Metals

1739 Purging of 6MW6D was completed after removing 7 gallons from the well

1745 Sample DRMO-6MW6D-GW-09 MS/MSD was collected by DW from the discharge line of the well. The samples were sent to Accu Test Labs for TCL VOC, TCL SVOC, TCL PAH, TCL Pest/PCB and TAL Metals

1830 Sampling was complete and packaging and paperwork was begun

1915 Personnel were back at the trailer unloading and completing activities for the day

1930 Personnel leave the site for the day

Work continued to Page

DATE 7/23/00

TITLE NSB-NLON PROJECT NO 7636

DATE July 24, 00 BOOK 2415

Work continued from Page

July 24 2000

0700 Tetra Tech NUS personnel Chuck Meyer CM and Don Whalen (DW) begin setting up for sampling and purging for DRMO wells

0755 CM collects Trip Blank 6WTB072400 from Accutest Laboratory supplied bottlware

0815 Personnel head out to the DRMO to begin Recon of the site and get checked in

0840 Personnel begin set up on well cluster DRMO-6MW10.

0924 DW begins purging DRMO-6MW10S. The water was clear with a slight sulfur odor. For additional information see Sample Log and Low Flow Data sheet for DRMO-6MW10S

0925 CM begins purging DRMO-6MW10D. The water was clear with no odors. For additional information see sample log and Low Flow Data Sheets for DRMO-6MW10D

Work continued to Page

SIGNATURE [signature] DATE 7/24/00

TITLE NSB-NLON PROJECT NO. 7636

7/24/00 BOOK 2415

Work continued from Page

1023 Purging of DRMO-6MW10S was completed after removing 4.5 gallons from the well the water was clear with a sulfur odor

1025 Sample DRMO-6MW10S-GW-09 was collected by DW from the discharge hose of the pump The samples were sent to AccuTest Labs for TCL VOC TCL SVOC, TCL PAH, TCL Pest/PCB and TAL Metals analysis

1025 Purging of DRMO-6MW10D was complete after removing 5.25 gallons from the well

1027 Sample DRMO-6MW10D-GW-09 was collected by CM from the discharge hose of the pump. The samples were sent to Accutest Labs for TCL VOC TCL SVOC, TCL PAH, TCL Pest PCB and TAL Metals.

1045 Sampling was completed at both locations

1100 Packaging and paperwork was begun and decon of equipment

1230 Personnel drop samples off at the trailer

CHICAGO LEGAL PRODUCTIONS, CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 7/24/00

WITNESS DATE

TITLE NSB-N LON

PROJECT NO. 7636

BOOK 2415

7/24/00

Work continued from Page

and begin packaging and paperwork chain of custody

1300 Personnel leave site for lunch

1340 Personnel back onsite take purge water to tank and dispose of it.

1410 Personnel begin getting bottle sets and sample stickers ready for tomorrow

1500 Personnel head out to check on the other team

1550 Personnel leave site for the day to complete activities

Work continued to Page

SIGNATURE

WITNESS

DATE 7/24/00

DATE

TITLE NSB-NLON

PROJECT NO. 7636

BOOK 2415

DWCS July 25, 00

Work continued from Page

July 25, 2000

0700 Tetra Tech NUS personnel Chuck Meyer CM and Don Whalen DW arrive at the trailer and begin calibrating equipment and collecting supplies for todays activities

0800 CM and DW head up to Building 166 to pick up DI water and supplies

0905 Personnel head out to DRMO and begin set up on bmwll cluster

1000 Purging of bmwll5 was begun by CM. The water was clear with no odors. For additional Info see Sample Log and Low Flow Data Sheet

1012 Purging of 6-MW11D was begun by DW. The water was a slightly turbid light gray. For additional Info see sample Log and Low Flow Data Sh.

1115 Samples DRMO-MW11D-GW04 was collected by DW along with Duplicate GWFD-072500 from the discharge hose of the pump. The samples were sent to Eco Test for TCL VOC, TCL SVOC, TCL PA TCL Pest/PCB and TAL Metals.

Work continued to Page

SIGNATURE

WITNESS

DATE 7/25/00

DATE

TITLE NSB-NLON PROJECT NO. 7636

BOOK 2415

7/25/00

Work continued from Page

1117 Sample DRMO-6MW11S-GW-09 was collected by CM from the discharge hose of the pump. The samples were sent to Accutest Labs for TCL VOC, TCL SVOC, TCL PAH, TCL Pest/PCB and TAL Metals.

1200 CM begins set up on DRMO-6MW9S.

1220 Purging of DRMO-6MW9S was begun. The water was clear with no odors. For additional information see sample Log and Low Flow Data sheets for 6MW9S

1319 Sample DRMO-6MW9S-GW-09 was collected by CM after purging 4 gallons from the well, from the discharge hose of the pump. The samples were sent to Accutest for TCL VOC TCL SVOC, TCL PAH, TCL Pest PCB and TAL Metals.

1400 Personnel back to the trailer for packaging and paperwork preparing and clean equipment dispose of purge water

1530 Personnel leave site for the day more steady rain.

Work continued to Page

SIGNATURE [signature] DATE 7/25/00

WITNESS DATE

TITLE NSB-NLON PROJECT NO. 7636

BOOK 2415

Wed July 26, 00

Work continued from Page

July 26 2000

0800 Tetra Tech NUS personnel Chuck Meyer (CM) and Don Whalen (DW) arrive at the trailer and collect equipment and supplies. Accutest courier is onsite to pick up samples.

0845 CM collects trip blank GWTB072600 from Laboratory supplied bottleware

0900 Personnel assist in decanning equipment for RI work

0945 Personnel head out to DRMO to begin set up the weather is cloudy with rain showers

1050 CM begins purging 6MW2S water is not staying in the discharge hose. CM thinks it might be a bad bladder

1055 DW begins purging 6MW2D the was clear with a sulfur odor. For additional info see sample Log and Low Flow data sheets

Work continued to Page

SIGNATURE [signature] DATE 7/26/00

WITNESS DATE

TITLE NSB-NLON PROJECT NO. 7636

BOOK 2415

7/26/00

Work continued from Page

1130 CM heads back to the trailer and calls pittsburg and PM Mark Mengel and decides to pull the pump and see what the problem is.

1150 CM pulls the pump and finds that a swage Lock fitting has failed and a hole was in it. CM seals the hole with strapping tap and runs the pump it works but will try to find fitting at a hardware store

1210 DW completes purge and begins sampling DRMO-GMW2D-GW-09. The water was clear with a sulfur odor. The samples were sent to Accutest Labs for TCL VOC TCL SVOC TCL PAH TCL Pest/PCB and TAL Metals

1300 Personnel back at the trailer begin packaging and paperwork decomming equipment and preparing to ship back equipment.

1530 Personnel head to Home Depot to pick up replacement parts for the pump

Work continued to Page

SIGNATURE

WITNESS

DATE 7/26/00

DATE

TITLE NSB-NLON PROJECT NO. 7636

BOOK 2415

7/27/00

Work continued from Page

July 27 2000

0830 Tetra Tech NUS personnel Chuck Meyer (CM) and Don Whalen (DW) arrive at the trailer and pick up water level indicator and Decon equipment for water levels at the DRMO High Tide

0655 Water level round for high tide was begun

0735 Water Level Round For High Tide was completed the weather was cloudy with showers and temp in the 70's For additional information see Groundwater Level Measurement sheet for high tide

0745 Personnel arrive back at the trailer and collect equipment and supplies for continued sampling S202WCNW3S

0831 Personnel collect sample S202WCNW3S from the discharge hose of the pump The water was clear with a black precipitate and had a sulfur odor. The samples were sent to Comic Corp for TSS, TDS, Dissolved Metals and Perchlorate.

Work continued to Page

SIGNATURE

DATE 7/27/00

DATE

NSB-NLON

7/27/00

PROJECT NO. 7636

BOOK 2415

Work continued from Page

0900 Prepare bottleware and supplies and head out to make repairs to 6MW02S

1030 Begin set up to purge well 6MW02S and 6MW01S

1145 purging of 6MW1S was begun by DW the water was clear with a sulfur odor. For additional information see sample Log and Low Flow data sheets

1155 Purging of 6MW2S was begun by CM the water was clear with a sulfur odor For additional information see sample Log and Low Flow Data sheets

1255 sample DRMO-6MW01S-GW-09 was collected by DW from the discharge end of the hose. The water was clear with a sulfur odor. The samples were sent to Acu Test for TCL VOA, TCL SVOC TCL PAH TCL Pest/PCB and TAL metals

1303 sample DRMO-6MW2S-GW-09 was collected by CM from the discharge line of the

Work continued to Page

SIGNATURE

DATE

200

WITNESS

7/27/00

DATE

NSB-NLON

7/27/00

2415

pump after purging 4 gallons from the well. The water was clear with a sulfur odor. The samples were sent to EcoTest Labs for TCL VOA TCL SVOC TCL PAH TCL Pest/PCB and TAL Metals

1325 DW begins collecting Low Tide water levels

1345 DW completes water level collecting

1405 Personnel leave the DRMO and begin packaging and paperwork

1530 DW leaves site and heads to the lab to drop samples CM decons equipment and prepares for shippment.

1630 CM leaves site for the day and heads back to the office Round 9 was completed.

END OF ROUND 9

7/27/00

01

APPENDIX B

TIDE TABLES

29	Th	207am	L	0.0	747am	H	2.7	203pm	L	0.2	806pm H 3.7
30	F	257am	L	-0.2	840am	H	2.8	254pm	L	0.1	857pm H 3.8

New London, Connecticut
Tide Predictions (High and Low Waters) July, 2000
NOAA, National Ocean Service

Daylight Saving Time

Day		Time		Ht.	Time		Ht.	Time		Ht.	Time		Ht.
1	Sa	347am	L	-0.3	933am	H	2.9	346pm	L	0.0	948pm	H	3.9
2	Su	437am	L	-0.4	1026am	H	2.9	440pm	L	0.0	1041pm	H	3.9
3	M	529am	L	-0.4	1120am	H	3.0	536pm	L	0.0	1136pm	H	3.7
4	Tu	621am	L	-0.3	1216pm	H	3.0	634pm	L	0.1			
5	W	1232am	H	3.5	715am	L	-0.2	114pm	H	3.0	735pm	L	0.2
6	Th	131am	H	3.2	810am	L	-0.1	214pm	H	3.0	837pm	L	0.3
7	F	233am	H	3.0	906am	L	0.1	315pm	H	3.0	941pm	L	0.4
8	Sa	337am	H	2.7	1002am	L	0.2	417pm	H	3.0	1044pm	L	0.4
9	Su	442am	H	2.5	1057am	L	0.4	517pm	H	3.0	1144pm	L	0.4
10	M	545am	H	2.4	1151am	L	0.4	613pm	H	3.0			
11	Tu	1241am	L	0.4	643am	H	2.3	1241pm	L	0.5	703pm	H	3.1
12	W	132am	L	0.4	733am	H	2.3	129pm	L	0.5	747pm	H	3.1
13	Th	219am	L	0.3	818am	H	2.3	214pm	L	0.5	827pm	H	3.1
14	F	302am	L	0.3	857am	H	2.3	258pm	L	0.5	905pm	H	3.1
15	Sa	343am	L	0.2	936am	H	2.4	341pm	L	0.5	942pm	H	3.1
16	Su	423am	L	0.2	1014am	H	2.5	423pm	L	0.5	1018pm	H	3.1
17	M	504am	L	0.2	1052am	H	2.5	506pm	L	0.6	1055pm	H	3.1
18	Tu	544am	L	0.2	1131am	H	2.6	550pm	L	0.6	1133pm	H	3.0
19	W	626am	L	0.2	1211pm	H	2.6	635pm	L	0.6			
20	Th	1213am	H	2.9	708am	L	0.3	1252pm	H	2.6	723pm	L	0.7
21	F	1254am	H	2.8	751am	L	0.4	135pm	H	2.7	813pm	L	0.7
22	Sa	139am	H	2.7	836am	L	0.5	221pm	H	2.7	907pm	L	0.7
23	Su	229am	H	2.6	922am	L	0.5	310pm	H	2.8	1003pm	L	0.6
24	M	325am	H	2.5	1011am	L	0.5	404pm	H	3.0	1100pm	L	0.5
25	Tu	426am	H	2.4	1102am	L	0.5	459pm	H	3.1	1157pm	L	0.4
26	W	528am	H	2.4	1155am	L	0.4	556pm	H	3.3			
27	Th	1251am	L	0.2	629am	H	2.5	1249pm	L	0.3	652pm	H	3.5
28	F	145am	L	0.0	727am	H	2.6	143pm	L	0.2	747pm	H	3.6
29	Sa	237am	L	-0.1	822am	H	2.7	237pm	L	0.1	841pm	H	3.8
30	Su	327am	L	-0.3	916am	H	2.9	331pm	L	0.0	935pm	H	3.8
31	M	417am	L	-0.3	1009am	H	3.0	426pm	L	-0.1	1028pm	H	3.7

New London, Connecticut
Tide Predictions (High and Low Waters) August, 2000
NOAA, National Ocean Service

Daylight Saving Time

Day		Time		Ht.	Time		Ht.	Time		Ht.	Time		Ht.
1	Tu	507am	L	-0.3	1102am	H	3.1	521pm	L	-0.1	1121pm	H	3.6
2	W	558am	L	-0.3	1155am	H	3.2	617pm	L	0.0			
3	Th	1215am	H	3.4	649am	L	-0.1	1249pm	H	3.2	714pm	L	0.1
4	F	110am	H	3.1	741am	L	0.0	144pm	H	3.1	813pm	L	0.2
5	Sa	207am	H	2.8	834am	L	0.2	242pm	H	3.1	913pm	L	0.3
6	Su	307am	H	2.6	929am	L	0.4	341pm	H	3.0	1014pm	L	0.4
7	M	409am	H	2.4	1024am	L	0.5	441pm	H	2.9	1114pm	L	0.5
8	Tu	512am	H	2.3	1119am	L	0.6	539pm	H	2.9			
9	W	1211am	L	0.5	611am	H	2.2	1212pm	L	0.6	632pm	H	2.9
10	Th	103am	L	0.5	705am	H	2.2	103pm	L	0.6	719pm	H	2.9
11	F	150am	L	0.4	751am	H	2.3	150pm	L	0.6	801pm	H	3.0
12	Sa	233am	L	0.4	831am	H	2.4	235pm	L	0.6	840pm	H	3.0
13	Su	314am	L	0.3	910am	H	2.5	318pm	L	0.5	917pm	H	3.1
14	M	354am	L	0.2	947am	H	2.6	400pm	L	0.5	954pm	H	3.1
15	Tu	434am	L	0.2	1023am	H	2.7	442pm	L	0.5	1031pm	H	3.1
16	W	513am	L	0.2	1100am	H	2.8	524pm	L	0.4	1108pm	H	3.1
17	Th	552am	L	0.2	1137am	H	2.8	608pm	L	0.5	1147pm	H	3.0
18	F	632am	L	0.3	1215pm	H	2.9	653pm	L	0.5			
19	Sa	1228am	H	2.9	713am	L	0.4	1256pm	H	3.0	743pm	L	0.5
20	Su	112am	H	2.8	756am	L	0.5	141pm	H	3.0	836pm	L	0.5
21	M	202am	H	2.6	844am	L	0.6	232pm	H	3.0	933pm	L	0.5
22	Tu	258am	H	2.5	936am	L	0.6	329pm	H	3.1	1033pm	L	0.5
23	W	402am	H	2.4	1034am	L	0.6	431pm	H	3.2	1132pm	L	0.4
24	Th	508am	H	2.4	1133am	L	0.5	534pm	H	3.3			
25	F	1230am	L	0.2	613am	H	2.5	1232pm	L	0.4	635pm	H	3.4
26	Sa	125am	L	0.1	713am	H	2.7	130pm	L	0.3	734pm	H	3.5
27	Su	217am	L	0.0	809am	H	2.8	225pm	L	0.1	830pm	H	3.6
28	M	307am	L	-0.1	901am	H	3.0	319pm	L	0.0	923pm	H	3.6
29	Tu	356am	L	-0.2	952am	H	3.2	412pm	L	-0.1	1014pm	H	3.5

NOAA/NOS CO-OPS

How to apply differences (+ , -) and ratios (*)

Tidal Differences and Other Constants

CONNECTICUT, Long Island Sound

Station	Time Diff. High	Time Diff. Low	Hgt. Diff. High	Hgt. Diff. Low	Ref. Station
Stonington, Fishers Island Sound	-0 32	-0 41	*1.05	*1.05	New London
Noank, Mystic River entrance	-0 22	-0 08	*0.89	*0.90	New London
West Harbor, Fishers Island, N.Y.	0 00	-0 06	*0.97	*0.97	New London
Silver Eel Pond, Fishers Island, N.Y.	-0 16	-0 04	*0.89	*0.89	New London
Thames River					
NEW LONDON, State Pier	Daily Predictions				New London
Smith Cove entrance	0 00	+0 10	*0.97	*0.95	New London
Norwich	**+0 13**	**+0 25**	*1.16	*1.15	New London
Millstone Point	+0 09	+0 01	*1.05	*1.05	New London
Connecticut River					
Saybrook Jetty	+1 11	+0 45	*1.36	*1.35	New London
Saybrook Point	+1 11	+0 53	*1.24	*1.25	New London
Lyme, highway bridge	+1 25	+1 10	*1.20	*1.20	New London
Essex	+1 39	+1 38	*1.16	*1.15	New London
Connecticut River					
Hadlyme #7	+2 19	+2 23	*1.05	*1.05	New London
East Haddam	+2 42	+2 53	*1.12	*1.10	New London
Haddam #7	+2 48	+3 08	*0.97	*0.95	New London
Higganum Creek	+2 55	+3 25	*1.01	*1.00	New London
Portland #7	+3 51	+4 28	*0.85	*0.85	New London
Rocky Hill #7	+4 44	+5 44	*0.78	*0.80	New London
Hartford #7	+5 30	+6 52	*0.74	*0.75	New London
Westbrook, Duck Island Roads	-0 24	-0 32	*0.61	*0.60	Bridgeport
Duck Island	-0 26	-0 35	*0.67	*0.68	Bridgeport
Madison	-0 21	-0 30	*0.73	*0.72	Bridgeport
Falkner Island	-0 14	-0 25	*0.80	*0.80	Bridgeport
Sachem Head	-0 11	-0 15	*0.80	*0.80	Bridgeport
Money Island	-0 12	-0 23	*0.83	*0.84	Bridgeport
Branford Harbor	-0 08	-0 18	*0.88	*0.88	Bridgeport
New Haven Harbor entrance	-0 09	-0 14	*0.92	*0.92	Bridgeport
New Haven (city dock)	+0 01	-0 01	*0.89	*0.88	Bridgeport
Milford Harbor	-0 08	-0 10	*0.98	*0.96	Bridgeport
Stratford, Housatonic River	+0 26	+1 01	*0.82	*0.80	Bridgeport
Shelton, Housatonic River	+1 35	+2 44	*0.74	*0.72	Bridgeport
BRIDGEPORT	Daily Predictions				Bridgeport
Black Rock Harbor entrance	-0 04	-0 03	*1.02	*1.04	Bridgeport
Saugatuck River entrance	-0 02	+0 01	*1.04	*1.04	Bridgeport
South Norwalk	+0 09	+0 15	*1.05	*1.04	Bridgeport
Greens Ledge	-0 02	-0 01	*1.07	*1.08	Bridgeport
Stamford	+0 03	+0 08	*1.07	*1.08	Bridgeport
Cos Cob Harbor	+0 05	+0 11	*1.07	*1.08	Bridgeport
Greenwich	+0 01	+0 01	*1.10	*1.08	Bridgeport
Great Captain Island	0 00	+0 01	*1.08	*1.08	Bridgeport

NEW YORK

Long Island Sound, north side

Station	Time Diff. High	Time Diff. Low	Hgt. Diff. High	Hgt. Diff. Low	Ref. Station
Port Chester	-0 03	-0 14	*1.01	*1.01	Willets Point
Rye Beach	-0 22	-0 31	*1.01	*1.01	Willets Point
Mamaroneck	-0 02	-0 13	*1.02	*1.04	Willets Point
New Rochelle	-0 18	-0 21	*1.02	*1.04	Willets Point
Davids Island	+0 04	-0 09	*1.01	*1.00	Willets Point
City Island	+0 03	-0 05	*1.01	*1.00	Willets Point

APPENDIX C

GROUNDWATER LEVEL MEASURMENT SHEET

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project: NSB-NLON

Site: DRMO

Project No.: 7363

Personnel: Chuck Meyer/Don Wheeler

Temperature: 70's

Date: 7/27/00

Precipitation: Rain Showers

Level Indicator Type: Heron

Tide: High @ 0642

Serial Number:

Well/Piezometer Number	Time	(A) Elevation of Reference Point (feet)*	(B) Water Level Indicator Reading (feet)*	=(A)-(B) Groundwater Elevation (feet)*	Total Well Depth (feet)*	Tidally Influenced	Comments
6MW1S	0709	8.63	5.25	3.38	15.68	Y	
6MW2S	0712	7.30	3.98	3.32	13.63	Y	
6MW2D	0714	7.85	4.85	3.00	88.84	Y	
6MW6S	0658	12.16	8.70	3.46	18.58	N	6" OPEN BOREHOLE
6MW6D	0700	12.50	9.17	3.33	46.00	N	
6MW9S	0731	7.52	3.95	3.57	11.75	N	
6MW10S	0725	5.19	1.90	3.29	13.31	Y	
6MW10D	0727	5.01	1.25	3.76	54.06	Y	
6MW11S	0720	4.92	1.45	3.47	13.50	Y	
6MW11D	0722	5.31	0.83	4.48	85.00	Y	
SG-1	0710	5.67	2.31	3.36	--	Y	River Gauge

* Measurements to the nearest 0.01 foot.

* MEASURED @ TOP OF STEEL RISER

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project: NSB-NLON

Site: DRMO

Project No.: 7363

Personnel: Chuck Mack / Don Whalen

Temperature: 70's cloudy

Date: 7/27/00

Precipitation: Rain showers

Level Indicator Type: Heron

Tide: Low @ 1314

Serial Number:

Well/Piezometer Number	Time	(A) Elevation of Reference Point (feet)*	(B) Water Level Indicator Reading (feet)*	=(A)-(B) Groundwater Elevation (feet)*	Total Well Depth (feet)*	Tidally Influenced	Comments
6MW1S	1327	8.63	7.44	1.19	15.68	Y	
6MW2S	1347	7.30	5.96	1.34	13.63	Y	
6MW2D	1345	7.85	5.47	2.38	88.84	Y	
6MW6S	1347	12.16	8.93	3.23	18.58	N	
6MW6D	1349	12.50	9.25	3.25	46.00	N	6" open borehole *
6MW9S	1341	7.52	4.31	3.21	11.75	N	
6MW10S	1338	5.19	3.71	1.48	13.31	Y	
6MW10D	1336	5.01	2.19	2.82	54.06	Y	
6MW11S	1332	4.92	3.50	1.42	13.50	Y	
6MW11D	1330	5.31	1.93	3.38	85.00	Y	
SG-1	1328	5.67	4.52	1.15	--	Y	River Gauge

* Measurements to the nearest 0.01 foot.

* MEASURED @ TOP OF STEEL RISER

APPENDIX D

MONITORING INSTRUMENT CALIBRATION LOG

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : YSI 610DM/6920

PROJECT NAME : NSB NLON DRMO

MANUFACTURER : YSI

PROJECT NUMBER : 7363

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
7/23/00	7.00	pH 7	per manufacture instructions	—	7.00	DW	Lot# 2210 Exp 4/17/02
	4.00	pH 4	"	—	4.00	DW	2230 4/21/02
	981	cond. 1000µs	"	—	1000	DW	Lot# 2244 5/3/01
	167	ORP	"	—	100	DW	2241 5/2/01
	103.4	DO	"	—	100%	DW	—

Instrument Rented From: US ENVIRONMENTAL

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : YSI 610 DM / 6920

PROJECT NAME : NSB NLON DRMO

MANUFACTURER : YSI

PROJECT NUMBER : 7363

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
7/23/00	7.01		as per manufact. instr.	—	7.00	DW	pH 7
	3.97		"	—	4.00	DW	pH 4
	983		"	—	1000	DW	Cond. 1000 µS
	175.8		"	—	100	DW	ORP
	99.1%	—	"	—	100	DW	DO

Instrument Rented From: US ENVIRONMENTAL

APPENDIX E

GROUNDWATER SAMPLE LOGSHEETS AND LOW-FLOW PURGE DATA SHEETS

Tetra Tech NUS, Inc

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB-NLON / DRMO
Project No.: 7363

[ ] Domestic Well Data
[x] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: DRMO- 6MW1S GW-09
Sample Location: 6MW1S
Sampled By: D. Whalen
C.O.C. No.: 072600-09
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Eh	Salinity
Date: 7-27-00	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	ppt
Time: 1255								
Method: Low Flow/Bladder Pump	Clear	6.35	10.78	18.14	0.0	4.23	24.9	6.13

PURGE DATA:

Date: 7-27-00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm):
Well Casing Diameter & Material Type: 2" PVC
Total Well Depth (TD): 15.7
Static Water Level (WL): 7.18
One Casing Volume(gal): 1.4
Start Purge (hrs): 1145
End Purge (hrs): 1250
Total Purge Time (min): 65
Total Vol. Purged (gal): 4.5

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOLATILES (LOW-LEVEL)	HCL / 4° C	3 40 ml Vial	✓
TCL SEMIVOLATILES	4° C	2 Qt. Amber Glass	✓
TCL PEST/PCBs	4° C	2 Qt. Amber Glass	✓
TCL PAH	4° C	2 Qt. Amber Glass	✓
TAL METALS (TOTAL)	HNO_3 / 4° C	1 LPE	✓

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Donald W. Whalen

Tetra Tech NUS, Inc. **LOW FLOW PURGE DATA SHEET** **Well No.:** 6MW15

PROJECT:	NSB-NLON, DRMO	**DATE:**	7-27-00
PROJECT NUMBER:	7363	**WEATHER:**	rain, ~70°
SITE:	DRMO	**PERSONNEL:**	D. Whalen

Well Screen Depth: 5.7 / 15.7 ft.
Initial Water Level: 7.18 @ 1145 hrs.
Pump Type/Material: Bladder/PVC
Pump Intake Depth: 12.07 PVC
Total Purge Volume= 4.5 (gal / L)
Total Purge Time= ~~120~~ 65 (min)

Tide Cycle: ☐ High @ ☒ Low @ 1314 ☐ Not Affected

Time	Water Level feet below TOC	Volume mL	Flow Rate mL/min	Pump Settings	Temp °C	pH	Sp Cond mS/cm	DO mg/L	Turbidity NTU	Salinity ppt	Eh mV	Comments
1145	7.18	0	278	40 R 40 D 20 psi								START PURGE
1150	7.22	↓	↓	↓	18.82	6.48	7.31	7.09	7.9	4.02	-0.8	
1155	7.25				18.36	6.39	12.02	4.05	4.2	5.61	8.6	
1200	7.29				18.29	6.37	12.03	4.03	1.0	6.91	11.9	
1205	7.31				18.25	6.36	11.93	4.04	0.3	6.85	15.4	
1210	7.33				18.27	6.35	11.84	4.08	0.1	6.80	17.7	
1215	7.35				18.23	6.36	11.71	4.05	0.0	6.71	19.5	
1220	7.36				18.31	6.35	11.56	4.10	0.0	6.62	20.3	
1225	7.37				18.25	6.35	11.40	4.07	0.2	6.52	20.6	
1230	7.38				18.19	6.35	11.28	4.11	0.1	6.44	22.2	
1235	7.40				18.23	6.35	11.10	4.11	0.1	6.35	23.6	
1240	7.40				18.16	6.35	11.02	4.20	0.1	6.29	23.7	
1245	7.42	↓	↓		18.18	6.35	10.90	4.19	0.1	6.21	24.3	
1250	7.45		↓	↓	18.14	6.35	10.78	4.23	0.0	6.13	24.9	END PURGE

Water Quality Meter (S/N): YSI
Control Box Type (S/N): QED
Turbidimeter (S/N): LaMotte

Notes:

Tetra Tech NUS, Inc

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB-NLON / DRMO
Project No.: 7363

[ ] Domestic Well Data
[x] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: DRMO- 6MW 2S GW-09
Sample Location: 6MW2S
Sampled By: CHUCK M.
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Eh mV	Salinity ppt
Date: 7/27/00								
Time: 1303								
Method: Low Flow/Bladder Pump	Clear	6.90	23.315	19.66	3.3	0.22	-288.0	14.19

PURGE DATA:

Date: 7/27/00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm): 0.0
Well Casing Diameter & Material Type: 2" PVC
Total Well Depth (TD): 13.60
Static Water Level (WL): 6.74
One Casing Volume(gal): 1.28
Start Purge (hrs): 1155
End Purge (hrs): 1302
Total Purge Time (min): 67
Total Vol. Purged (gal): 4.0

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOLATILES (LOW-LEVEL)	HCL / 4° C	40 ml Vial	3
TCL SEMIVOLATILES	4° C	Qt. Amber Glass	2
TCL PEST/PCBs	4° C	Qt. Amber Glass	2
TCL PAH	4° C	Qt. Amber Glass	2
TAL METALS (TOTAL)	HNO_3 / 4° C	L PE	1

OBSERVATIONS / NOTES:

13.60
6.74
6.86
.163 gal per foot
2868
4786
3886
1.28 gal

Circle if Applicable:

MS/MSD
Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc. **LOW FLOW PURGE DATA SHEET** **Well No.:** 6MW2S

PROJECT: NSB - NLON
PROJECT NUMBER: 7363
SITE: DRMO

DATE: 7/27/00
WEATHER: Cloudy with Rain
PERSONNEL: Chuck Meyer

Well Screen Depth: 3.6 / 13.6 ft.
Initial Water Level: 5.74 @ 1155 hrs.
Pump Type/Material: Bladder/PVC
Pump Intake Depth: 10 ft
Tide Cycle: ☐ High @ ____ ☒ Low @ ____ ☐ Not Affected
Total Purge Volume= 4.0 (gal / L)
Total Purge Time= 67 (min)

Time	Water Level feet below TOC	Volume mL	Flow Rate mL/min	Pump Settings	Temp ºC	pH	Sp Cond mS/cm	DO mg/L	Turbidity NTU	Salinity ppt	Eh mV	Comments
1155	5.74	0	250	300/302 15 PSE	19.94	6.97	23.062	1.65	7.9	13.98	-221.8	
1200	5.75	1250	250		19.89	6.95	23.111	0.88	5.3	14.01	-230.9	
1205	5.75	2500	250		19.74	6.93	23.168	0.34	4.2	14.05	-257.8	
1210	5.75	3750	250		19.72	6.93	23.186	0.32	3.7	14.06	-261.0	
1215	5.79	5000	250		19.73	6.93	23.218	0.27	3.4	14.08	-267.7	
1220	5.82	6250	250		19.75	6.92	23.241	0.26	3.7	14.10	-274.3	
1225	5.85	7500	250		19.70	6.92	23.267	0.25	3.3	14.11	-277.8	
1230	5.87	8750	250		19.68	6.91	23.284	0.24	3.3	14.12	-279.3	
1235	5.89	10,000	250		19.69	6.91	23.292	0.24	3.4	14.13	-281.5	
1240	5.91	11,250	250		19.68	6.91	23.303	0.23	3.6	14.13	-283.3	
1245	5.93	12,500	250		19.67	6.91	23.299	0.23	3.4	14.13	-284.1	
1250	5.95	13,750	250		19.62	6.90	23.312	0.21	3.4	14.14	-287.3	
1255	5.98	15,000	250		19.65	6.90	23.316	0.21	3.4	14.14	-288.5	
1300	6.02	16,250	250		19.66	6.90	23.315	0.22	3.3	14.14	-289.0	
1302	Purging of 6MW2S was completed after removing 4 gallons from the well											
1303	Sample DRMO 6MW2S-0[illegible] was collected											
1330	Sampling was complete											

Water Quality Meter (S/N): YSI
Control Box Type (S/N): QED
Turbidimeter (S/N): Lamotte 2020

Notes:

Tetra Tech NUS, Inc

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB-NLON / DRMO
Project No.: 7363

[ ] Domestic Well Data
[x] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: DRMO- 6MW2D GW-09
Sample Location: 6MW2D
Sampled By: D. Whalen
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Eh	Salinity
Date: 7-26-00	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	ppt
Time: 1210								
Method: Low Flow/Bladder Pump	clear	6.63	32.25	14.58	9.5	66.82	-457	20.17

PURGE DATA:

Date: 7-26-00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm):
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 78.8'
Static Water Level (WL): 5.43
One Casing Volume(gal): 12
Start Purge (hrs): 1055
End Purge (hrs): 1205
Total Purge Time (min): 70
Total Vol. Purged (gal): 6

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements		Collected
TCL VOLATILES (LOW-LEVEL)	HCL / 4° C	3	40 ml Vial	✓
TCL SEMIVOLATILES	4° C	2	Qt. Amber Glass	✓
TCL PEST/PCBs	4° C	2	Qt. Amber Glass	✓
TCL PAH	4° C	2	Qt. Amber Glass	✓
TAL METALS (TOTAL)	HNO_3 / 4° C	1	L PE	✓

OBSERVATIONS / NOTES:

Water had sulfur odor.
- effervesced in VOA vials.

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Donald Whalen

Tetra Tech NUS, Inc. **LOW FLOW PURGE DATA SHEET** **Well No.:** 6MW2D

PROJECT: NSB-NLON, DRMO
PROJECT NUMBER: 7363
SITE: DRMO

DATE: 7-26-00
WEATHER: raining, ~65°F
PERSONNEL: D. Whalen

Well Screen Depth: 68.8 / 78.8 ft.
Initial Water Level: 5.43 @ 1053 hrs.
Total Purge Volume= 6 (gal/L)

Pump Type/Material: Bladder/PVC
Pump Intake Depth: 73.0' TPVC
Total Purge Time= 70 (min)

Tide Cycle: ☐ High @ ☒ Low @ 1220 ☐ Not Affected

Time	Water Level feet below TOC	Volume mL	Flow Rate mL/min	Pump Settings	Temp °C	pH	Sp Cond mS/cm	DO mg/L	Turbidity NTU	Salinity ppt	Eh mV	Comments
1055	5.43	0	340	35D35R 50psi								START PURGE
1100					15.19	6.78	32.92	23.26	8.9	20.65	-288	sulfur odor
1105	5.67				14.96	6.81	32.46	13.97	8.1	20.33	-297	
1110					15.09	6.64	32.03	18.02	5.6	20.07	-316	
1115	5.85				14.77	6.58	32.23	39.9	5.5	20.19	-326	
1120					14.70	6.57	32.18	56.14	5.7	20.11	-343	
1125	5.67				14.61	6.60	32.16	66.46	5.51	20.15	-359	
1130	5.80				14.62	6.61	32.29	66.88	6.1	20.21	-389	
1135					14.75	6.62	32.21	54.74	7.3	20.14	-377	
1140	5.72				14.78	6.62	32.23	64.44	8.4	20.17	-381	
1145	5.85				14.51	6.62	32.31	66.90	8.7	20.25	-384	
1150	5.91				14.47	6.63	32.44	66.67	9.1	20.26	-400	
1155	5.84				14.46	6.63	32.40	67.19	9.5	20.27	-406	
1200					14.45	6.63	32.34	67.24	9.8	20.21	-435	
1205	5.88	23800			14.58	6.63	32.25	66.82	9.5	20.17	-457	End purge

Water Quality Meter (S/N): YSI
Control Box Type (S/N): QED
Turbidimeter (S/N): La Motte

Notes:

Tetra Tech NUS, Inc

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB-NLON / DRMO
Project No.: 7363

[ ] Domestic Well Data
[x] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: DRMO- 6MW6S GW-09
Sample Location: 6MW6S
Sampled By: CHUCK M.
C.O.C. No.: 072300-09
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Eh mV	Salinity ppt
Date: 7/23/00								
Time: 1239								
Method: Low Flow/Bladder Pump	Clear	5.97	280	11.26	0.65	8.07	141.2	0.10

PURGE DATA:

Date: 7-23-00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm): 0.0
Well Casing Diameter & Material
Type: PVC 2"
Total Well Depth (TD): 18.56
Static Water Level (WL): 8.73'
One Casing Volume(gal): 1.60
Start Purge (hrs): 1634
End Purge (hrs): 1735
Total Purge Time (min): 61
Total Vol. Purged (gal): 3.5

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOLATILES (LOW-LEVEL)	HCL / 4° C	40 ml Vial	3
TCL SEMIVOLATILES	4° C	Qt. Amber Glass	2
TCL PEST/PCBs	4° C	Qt. Amber Glass	2
TCL PAH	4° C	Qt. Amber Glass	2
TAL METALS (TOTAL)	HNO_3 / 4° C	L PE	1

OBSERVATIONS / NOTES:

18.56
8.73
9.83
x.163
2949
5898
983
1.60229

Circle if Applicable:

MS/MSD —
Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc. **LOW FLOW PURGE DATA SHEET** **Well No.:** 6MW6S

PROJECT: NSB-NLON
PROJECT NUMBER: 7363
SITE: DILMO

DATE: 7/23/00
WEATHER: Sunny Warm 84
PERSONNEL: Chuck Meyer

Well Screen Depth: 8.6 / 18.6 ft.
Initial Water Level: 8.73 @ 1635 hrs.
Pump Type/Material: Bladder/PVC
Pump Intake Depth: 14.0 TPVC
Total Purge Volume= 3.5 (gal / L)
Total Purge Time= 61 (min)

Tide Cycle: ☐ High @ ☐ Low @ ☒ Not Affected

Time	Water Level feet below TOC	Volume mL	Flow Rate mL/min	Pump Settings	Temp ºC	pH	Sp Cond mS/cm	DO mg/L	Turbidity NTU	Salinity ppt	Eh mV	Comments
1635	8.73	180	180	45/45	12.04	5.97	.279	11.87	4.5	0.0	121	
1640	8.74	900	225		11.85	5.95	.279	8.83	5.4	0.0	120.6	
1645	8.74	2,025	217		11.58	5.95	.279	9.20	5.3	0.0	123.6	
1650	8.74	3,110	217		11.53	5.95	.280	9.10	3.7	0.04	124.6	
1655	8.74	4,195	217		11.51	5.95	.280	9.03	4.2	0.05	127.6	
1700	8.74	5,280	217		11.50	5.95	.279	8.72	3.5	0.07	128.6	
1705	8.74	6,365	217		11.29	5.96	.281	8.53	2.2	0.08	132.2	
1710	8.74	7,450	217		11.52	5.97	.280	8.62	1.8	0.10	133.6	
1715	8.74	8,535	217		11.45	5.95	.280	8.59	1.7	0.10	134.9	
1720	8.74	9,620	217		11.36	5.97	.280	8.45	1.5	0.10	137.2	
1725	8.74	10,705	217		11.28	5.97	.281	8.20	1.00	0.10	138.4	
1730	8.74	11,790	217		11.26	5.98	.280	8.13	0.65	0.10	140.7	
1735	8.74	12,875	217		11.26	5.97	.280	8.07	0.65	0.10	141.2	
1737	Purging was completed after removing 3.5 gallons from the well											
1739	Sampling at 6MW6S was begun											

Water Quality Meter (S/N): YSI
Control Box Type (S/N): QED
Turbidimeter (S/N): 1 month 2020

Notes:

Tetra Tech NUS, Inc

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB-NLON / DRMO
Project No.: 7363

[ ] Domestic Well Data
[x] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: DRMO- 6MW 6D GW-09
Sample Location: 6MW6D
Sampled By: D.W.
C.O.C. No.: 072300-09
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Eh	Salinity
Date: 7/23/00	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	ppt
Time: 1745								
Method: Low Flow/Bladder Pump	clear	5.55	3394	11.73	11.0	0.20	43.9	1.79

PURGE DATA:

Date: 7-23-00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm):
Well Casing Diameter & Material
Type: 4" PVC
Total Well Depth (TD):
Static Water Level (WL): 9.19'
One Casing Volume(gal):
Start Purge (hrs): 1623
End Purge (hrs): 1739
Total Purge Time (min): 76
Total Vol. Purged (gal): 6.3

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements		Collected
TCL VOLATILES (LOW-LEVEL)	HCL / 4° C	9	40 ml Vial	✓
TCL SEMIVOLATILES	4° C	6	Qt. Amber Glass	✓
TCL PEST/PCBs	4° C	6	Qt. Amber Glass	✓
TCL PAH	4° C	6	Qt. Amber Glass	✓
TAL METALS (TOTAL)	HNO_3 / 4° C	3	L PE	✓

OBSERVATIONS / NOTES:

Circle if Applicable:
MS/MSD
Duplicate ID No.:

Signature(s): Donald Wheler

Tetra Tech NUS, Inc. **LOW FLOW PURGE DATA SHEET** **Well No.:** 6MW6D

PROJECT: NSB NLON, DRMO
PROJECT NUMBER: 7363
SITE: DRMO
DATE: 7-23-00
WEATHER: p. cloudy, ~80°F
PERSONNEL: D. Whalen, K. Simpson

Well Screen Depth: 30.5 / 46.0 ft.
Initial Water Level: 9.19 @ 1623 hrs.
Pump Type/Material: Bladder/PVC
Pump Intake Depth:
Tide Cycle: ☐ High @ ☐ Low @ ☒ Not Affected
Total Purge Volume= 6.3 (gal / L) **Total Purge Time=** 76 (min)

Time	Water Level feet below TOC	Volume mL	Flow Rate mL/min	Pump Settings	Temp °C	pH	Sp Cond mS/cm	DO mg/L	Turbidity NTU	Salinity ppt	Eh mV	Comments
1623	9.19	~~350~~ 0	420									START
1629	9.19		310	350 33K 25 psi	12.08	5.75	3.396	1.12	20.6	1.79	53.8	S
1639	9.20		326		11.94	5.59	3.405	0.41	16.3	1.79	49.8	
1649	9.20				11.77	5.55	3.396	0.31	13.9	1.79	47.8	
1659	9.20				11.72	5.53	3.391	0.26	12.8	1.79	45.4	
1709	9.20				11.73	5.53	3.403	0.23	10.9	1.79	44.2	
1719					11.83	5.53	3.394	0.22	11.0	1.79	43.8	
1729					11.70	5.54	3.394	0.20	11.3	1.79	43.5	
1739		25180			11.73	5.55	3.394	0.20	11.0	1.79	43.9	END PURGE

Water Quality Meter (S/N): YSI
Control Box Type (S/N): QED
Tu[illegible]meter (S/N): 1 Not [illegible]
Notes:

Tetra Tech NUS, Inc

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB-NLON / DRMO
Project No.: 7363

[ ] Domestic Well Data
[x] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: DRMO- 6MW09S GW-09
Sample Location: 6MW9S
Sampled By: CHUCK M.
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Eh	Salinity
Date: 7/25/00	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	ppt
Time: 1319								
Method:Low Flow/Bladder Pump	Clear	4.71	0.067	14.12	0.00	0.21	121.3	0.03

PURGE DATA:

Date: 7/25/00
Method:Low Flow/Bladder Pump
Monitor Reading (ppm): 0.0
Well Casing Diameter & Material Type: 2" PVC
Total Well Depth (TD): 11.80
Static Water Level (WL): 4.38
One Casing Volume(gal): 1.21
Start Purge (hrs): 1220
End Purge (hrs): 1315
Total Purge Time (min): 55
Total Vol. Purged (gal): 4.0

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOLATILES (LOW-LEVEL)	HCL / 4° C	40 ml Vial	3
TCL SEMIVOLATILES	4° C	Qt. Amber Glass	2
TCL PEST/PCBs	4° C	Qt. Amber Glass	2
TCL PAH	4° C	Qt. Amber Glass	2
TAL METALS (TOTAL)	HNO_3 / 4° C	L PE	1

OBSERVATIONS / NOTES:

11.80
− 4.38
7.42
× .163 gallons per foot
1.21

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc. **LOW FLOW PURGE DATA SHEET** **Well No.:** 6MW9S

PROJECT: NSB NLON
PROJECT NUMBER: 7363
SITE: DRMO

DATE: 7/25/00
WEATHER: cloudy with rain showers low 80's
PERSONNEL: Chuck Meyer

Well Screen Depth: 7.8 / 11.8 ft.
Initial Water Level: 4.38 @ 1220 hrs.

Pump Type/Material: Bladder/PVC
Pump Intake Depth: 10.0 Ft

Tide Cycle: ☐ High @ ☐ Low @ ☒ Not Affected

Total Purge Volume= 4.0 (gal / L) **Total Purge Time=** 55 (min)

Time	Water Level feet below TOC	Volume mL	Flow Rate mL/min	Pump Settings	Temp ºC	pH	Sp Cond mS/cm	DO mg/L	Turbidity NTU	Salinity ppt	Eh mV	Comments
1220	4.38	0	325	30R / 300 10PSI	15.17	5.48	0.095	5.40	1.7	0.04	76.8	
1225	4.38	1,625	325		14.20	4.64	0.065	0.73	1.0	0.03	118.8	
1230	4.38	3,250	325		14.19	4.56	0.067	0.41	0.42	0.03	124.1	
1235	4.38	4,875	325		14.22	4.59	0.067	0.32	0.10	0.03	120.5	
1240	4.38	6,500	325		14.18	4.59	0.067	0.27	0.00	0.03	120.7	
1245	4.38	8,125	325		14.21	4.60	0.067	0.25	0.00	0.03	120.7	
1250	4.38	9,750	325		14.18	4.63	0.067	0.23	0.00	0.03	120.2	
1255	4.38	11,375	325		14.15	4.64	0.067	0.22	0.00	0.03	120.9	
1300	4.38	13,000	325		14.16	4.65	0.067	0.23	0.00	0.03	119.6	
1305	4.38	14,625	325		14.13	4.68	0.067	0.22	0.00	0.03	119.9	
1310	4.38	16,250	325		14.15	4.70	0.067	0.21	0.00	0.03	120.5	
1315	4.38	17,875	325		14.12	4.71	0.067	0.21	0.00	0.03	121.3	
1317	purging was complete after removing 4 gallons from the well											
1319	sampling was begun											

Water Quality Meter (S/N): YSI 193932
Control Box Type (S/N): QED 17631
T[illegible]dime[illegible] (S/N): [illegible]

Notes:

Tetra Tech NUS, Inc

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB-NLON / DRMO
Project No.: 7363

[ ] Domestic Well Data
[x] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: DRMO- 6MW105 - GW-09
Sample Location: 6MW105
Sampled By: D. Whalen
C.O.C. No.: 072400-09
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Eh	Salinity
Date: 7-24-00	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	ppt
Time: 1030								
Method: Low Flow/Bladder Pump	clear	6.99	7138	21.00	1.20	46.90	-397	3.93

PURGE DATA:

Date: 7-24-00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm):
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 13.30
Static Water Level (WL): 2.32
One Casing Volume(gal): 1.8 (1.6)
Start Purge (hrs): 0924
End Purge (hrs): 1023
Total Purge Time (min): 59
Total Vol. Purged (gal): 5.3

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements		Collected
TCL VOLATILES (LOW-LEVEL)	HCL / 4° C	3	40 ml Vial	✓
TCL SEMIVOLATILES	4° C	2	Qt. Amber Glass	✓
TCL PEST/PCBs	4° C	2	Qt. Amber Glass	✓
TCL PAH	4° C	2	Qt. Amber Glass	✓
TAL METALS (TOTAL)	HNO_3 / 4° C	1	L PE	✓

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Donald Whalen

Tetra Tech NUS, Inc. **LOW FLOW PURGE DATA SHEET** **Well No.:** 6MW10S

PROJECT: NSB-NLON, DRMO
PROJECT NUMBER: 7363
SITE: DRMO
DATE: 7-24-00
WEATHER: mostly cloudy, ~70°F
PERSONNEL: D. Whalen

Well Screen Depth: _____ / _____ ft.
Initial Water Level: 2.32 @ 0924 hrs.
Pump Type/Material: Bladder/PVC
Pump Intake Depth:
Tide Cycle: ☐ High @ ____ ☒ Low @ 1036 ☐ Not Affected
Total Purge Volume= 5.3 (gal / L) **Total Purge Time=** 59 (min)

Time	Water Level feet below TOC	Volume mL	Flow Rate mL/min	Pump Settings	Temp °C	pH	Sp Cond mS/cm	DO mg/L	Turbidity NTU	Salinity ppt	Eh mV	Comments
0924	2.32	0	360	30D 30R 30psi								START PURGE
0928	2.29	↓	↓	↓	20.41	7.24	7.698	5.26	8.51	3.97	-273	
0933	2.22				20.96	7.21	6.898	10.36	6.46	3.79	-313	
0938	2.20				20.86	7.19	6.906	13.19	2.02	3.80	-325	
0943	2.22				20.88	7.14	7.004	19.76	1.27	3.87	-343	
0948	2.20				20.89	7.10	7.095	24.63	1.13	3.91	-356	
0953					21.01	7.06	7.054	26.74	1.27	3.89	-365	
0958	2.15				21.06	7.05	7.099	30.12	1.29	3.91	-369	
1003					21.05	7.02	7.147	33.14	1.55	3.94	-378	
1008	2.21				20.96	7.00	7.144	36.38	1.41	3.94	-381	
1013	2.00				20.91	7.00	7.174	40.71	1.34	3.96	-388	
1018		↓			20.99	6.99	7.169	43.47	1.32	3.95	-392	
1023	2.36	21240	↓	↓	21.00	6.99	7.138	46.90	1.20	3.93	-397	END PURGE
			START SAMPLING				@ 1025					
			END SAMPLING				@ 1047					

Water Quality Meter (S/N): YSI
Control Box Type (S/N): QED
Tubing (S/N): Not

Notes:

Tetra Tech NUS, Inc

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB-NLON / DRMO
Project No.: 7363

[ ] Domestic Well Data
[x] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: DRMO- 6MW10D GW-09
Sample Location: 6MW10D
Sampled By: CM
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Eh mV	Salinity ppt
Date: 7/24/00								
Time: 1027								
Method: Low Flow/Bladder Pump	Clear	6.91	15632	14.65	0.88	0.17	-190.9	9.18

PURGE DATA:

Date: 7/24/00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm): 0.6
Well Casing Diameter & Material Type: 2" PVC
Total Well Depth (TD): 54.10
Static Water Level (WL): 2.38
* One Casing Volume(gal): ~~6.110~~ 1.63 CM 7/24/00
Start Purge (hrs): 0925
End Purge (hrs): 1026
Total Purge Time (min): 61
Total Vol. Purged (gal): 5.25

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOLATILES (LOW-LEVEL)	HCL / 4° C	40 ml Vial	3
TCL SEMIVOLATILES	4° C	Qt. Amber Glass	2
TCL PEST/PCBs	4° C	Qt. Amber Glass	2
TCL PAH	4° C	Qt. Amber Glass	2
TAL METALS (TOTAL)	HNO_3 / 4° C	L PE	1

OBSERVATIONS / NOTES:

* Saturated screen volumes 10' screen x 0.163 gallons per foot = 1.63 gal

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc. **LOW FLOW PURGE DATA SHEET** **Well No.:** DRMO-6MW10D

PROJECT: NSB-NLON
PROJECT NUMBER: 7363
SITE: DRMO

DATE: 7/24/00
WEATHER: Sunny Warm Mid 80's
PERSONNEL: Chuck Meyer

Well Screen Depth: 44.10 / 54.10 ft.
Initial Water Level: 2.38 @ 0925 hrs.

Pump Type/Material: Bladder/PVC
Pump Intake Depth: 49.0 ft

Tide Cycle: ☐ High @ ☒ Low @ 1036 ☐ Not Affected

Total Purge Volume= 5.25 (gal)/ L) **Total Purge Time=** _____ (min)

Time	Water Level feet below TOC	Volume mL	Flow Rate mL/min	Pump Settings	Temp ºC	pH	Sp Cond mS/cm	DO mg/L	Turbidity NTU	Salinity ppt	Eh mV	Comments
0925	2.38	360	360	30D/30A 30PSI	16.71	7.25	16.788	1.30	2.0	9.80	-136.9	
0930	2.41	1260	360	30D/30R 36PSI	14.95	7.12	16.113	0.44	0.85	9.55	-187	
0935	2.41	3960	360		14.90	7.09	15.918	0.34	0.89	9.29	-187.1	
0940	2.41	5760	360		14.77	7.08	15.736	0.27	0.40	9.26	-187.8	
0945	2.41	7560	360		14.71	7.07	15.682	0.23	0.55	9.22	-190.4	
0950	2.41	9360	360		14.71	7.05	15.641	0.21	0.20	9.18	-191.7	
0955	2.43	11,160	360		14.71	7.04	15.625	0.20	0.45	9.17	-192.5	
1000	2.43	12,960	360		14.74	7.03	15.595	0.19	0.80	9.15	-192.9	
1005	2.44	14,760	360		14.73	7.01	15.579	0.18	1.5	9.14	-193.0	
1010	2.45	16,560	360		14.69	6.99	15.560	0.17	1.2	9.16	-193.1	
1015	2.45	18,360	360		14.65	6.96	15.619	0.17	0.65	9.17	-192.2	
1020	2.46	20,160	360		14.66	6.92	15.627	0.17	0.95	9.18	-191.3	
1025	2.46	21,340	360		14.65	6.91	15.632	0.17	0.88	9.18	-190.9	
1026	Purging	completed	after	removing	5.25	gallons	from	the	well.			
1027	Sample	DRMO-6MW10D-GW-04		was	collected	by	CM					

Water Quality Meter (S/N): YSI
Control Box Type (S/N): QED
Turbidimeter (S/N): Lamotte 2020

Notes:

Tetra Tech NUS, Inc

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB-NLON / DRMO
Project No.: 7363

[ ] Domestic Well Data
[x] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: DRMO- 6MW11S GW-09
Sample Location: 6MW11S
Sampled By: CHUCK M.
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 7/25/00	Color	pH	S.C.	Temp.	Turbidity	DO	Eh	Salinity
Time: 1119	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	ppt
Method:Low Flow/Bladder Pump	clear	7.26	10.42	20.18	0.37	0.17	-358.1	5.94

PURGE DATA:

Date: 7/25/00
Method:Low Flow/Bladder Pump
Monitor Reading (ppm): 0.0
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 13.50
Static Water Level (WL): 2.96
One Casing Volume(gal): 1.72
Start Purge (hrs): 1000
End Purge (hrs): 1117
Total Purge Time (min): 77
Total Vol. Purged (gal): 4.0

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOLATILES (LOW-LEVEL)	HCL / 4° C	40 ml Vial	3
TCL SEMIVOLATILES	4° C	Qt. Amber Glass	2
TCL PEST/PCBs	4° C	Qt. Amber Glass	2
TCL PAH	4° C	Qt. Amber Glass	2
TAL METALS (TOTAL)	HNO_3 / 4° C	L PE	1

OBSERVATIONS / NOTES:

13.50
- 2.96
10.54
.163 gal per foot
3162
6324
1054
1.7182

Circle if Applicable:

MS/MSD —
Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc. **LOW FLOW PURGE DATA SHEET** **Well No.:** 6MW11S

PROJECT: NSB - NLON
PROJECT NUMBER: 7363
SITE: DRMO

DATE: 7/25/00
WEATHER: cloudy with showers Low 80s
PERSONNEL: Chuck Meyer

Well Screen Depth: 3.50 / 13.50 ft.
Initial Water Level: 2.94 @ 1000 hrs.
Pump Type/Material: Bladder/PVC
Pump Intake Depth: 11.0 ft
Tide Cycle: ☐ High @ ☒ Low @ 1127 ☐ Not Affected
Total Purge Volume= 4.0 (gal / L) **Total Purge Time=** 77 (min)

Time	Water Level feet below TOC	Volume mL	Flow Rate mL/min	Pump Settings	Temp °C	pH	Sp Cond µS/cm	DO mg/L	Turbidity NTU	Salinity ppt	Eh mV	Comments
1000	2.94	240	240	45D/45R 30PSI	20.87	7.38	9,467	2.95	15.4	5.36	-239.2	
1005	3.14	1200	240		14.85	7.31	10,500	0.48	9.2	5.84	-249.9	
1010	3.19	2400	240		20.07	7.29	10,396	0.37	5.2	5.88	-311.9	
1015	3.20	3600	240		20.18	7.29	10,454	0.25	3.4	5.94	-322.8	
1020	3.21	4800	240	50D/50R 20PSI	20.23	7.29	10,510	0.21	1.5	5.97	-331.1	
1025	3.21	5880	216		20.17	7.29	10,519	0.19	1.1	5.97	-332.9	
1030	3.21	6960	216		20.10	7.28	10,531	0.18	0.95	5.98	-336.4	
1035	3.21	8040	216		20.19	7.27	10,503	0.17	0.65	5.96	-343.8	
1040	3.21	9120	216		20.35	7.27	10,493	0.17	0.75	5.96	-345.9	
1045	3.21	10,200	216		20.24	7.27	10,506	0.16	0.60	5.96	-347.7	
1050	3.21	11,280	216		20.27	7.26	10,470	0.16	0.50	5.94	-349.5	
1055	3.21	12,360	216		20.16	7.26	10,483	0.17	0.35	5.95	-351.1	
1100	3.21	13,440	216		20.11	7.26	10,467	0.17	0.30	5.94	-353.7	
1105	3.21	14,520	216		20.19	7.26	10,449	0.17	0.45	5.94	-355.6	
1110	3.21	15,600	216		20.25	7.26	10,435	0.17	0.25	5.94	-356.4	
1115	3.23	16,680	216		20.18	7.26	10,423	0.17	0.37	5.94	-358.1	
1117	Purging completed after removing approximately 4 gallons from the well											

Water Quality Meter (S/N): YSI 19393 R
Control Box Type (S/N): QED 17631
Turbidimeter (S/N): Lamotte 2020 0920 4298

Notes: 1119 Sample DRMO-6MW11S-GW-09 was collected

Tetra Tech NUS, Inc

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB-NLON / DRMO
Project No.: 7363

[ ] Domestic Well Data
[x] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: DRMO- 6MW11D - GW-09
Sample Location: 6MW11D
Sampled By: D. Whalen
C.O.C. No.: 072400-09
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Eh	Salinity
Date: 7-25-00	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	ppt
Time: 1125								
Method: Low Flow/Bladder Pump	CLEAR	6.85	32.58	14.83	52	6.73	-281	20.49

PURGE DATA:

Date: 7-25-00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm): —
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 85'
Static Water Level (WL): 2.04
One Casing Volume(gal): 13.5
Start Purge (hrs): 1012
End Purge (hrs): 1115
Total Purge Time (min): 63
Total Vol. Purged (gal): 5.5

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements		Collected
TCL VOLATILES (LOW-LEVEL)	HCL / 4° C	3	40 ml Vial	✓
TCL SEMIVOLATILES	4° C	2	Qt. Amber Glass	✓
TCL PEST/PCBs	4° C	2	Qt. Amber Glass	✓
TCL PAH	4° C	2	Qt. Amber Glass	✓
TAL METALS (TOTAL)	HNO_3 / 4° C	1	L PE	✓

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: GWFD-072500

Signature(s): Donald Whalen

Tetra Tech NUS, Inc. **LOW FLOW PURGE DATA SHEET** **Well No.:** 6MW11D

PROJECT: NSB-NLON, DRMO
PROJECT NUMBER: 7363
SITE: DRMO
DATE: 7-25-00
WEATHER: mostly cloudy, ~75°F
PERSONNEL: D. Whalen

Well Screen Depth: 75 / 85 ft.
Initial Water Level: 2.09 @ 1012 hrs.
Pump Type/Material: Bladder/PVC
Pump Intake Depth: 82.0 TPVC
Tide Cycle: ☐ High @ ☒ Low @ 1127 ☐ Not Affected
Total Purge Volume= 5.5 (gal / L) **Total Purge Time=** 63 (min)

Time	Water Level feet below TOC	Volume mL	Flow Rate mL/min	Pump Settings	Temp ºC	pH	Sp Cond mS/cm	DO mg/L	Turbidity NTU	Salinity ppt	Eh mV	Comments
1012	2.09	0	390	30D30R 45 PSI								START PURGE
1015	2.12		390		15.83	7.08	32.60	16.16	12.7	18.69	-264	
1020	2.12		390		15.38	6.90	33.46	12.57	10.9	21.10	-282	
1025	2.12		340	35D35R 45 PSI	15.88	6.86	33.42	8.61	11.1	21.10	-284	
1030	2.13				15.75	6.87	33.14	7.41	11.6	20.80	-285	
1035	2.12				15.20	6.85	32.98	6.94	16.7	20.69	-285	
1040	2.12				15.16	6.85	32.83	6.85	20.1	20.56	-284	
1045	2.12				15.18	6.85	32.67	6.80	20.8	20.47	-283	
1050	2.11				15.14	6.85	32.63	6.95	22.0	20.45	-283	
1055	2.11				15.26	6.85	32.42	7.03	23.1	20.40	-282	
1100	2.10				15.32	6.85	32.53	6.62	26.4	20.44	-282	
1105	2.09				15.01	6.84	32.57	6.80	34.7	20.37	-281	
1110	2.09				14.84	6.85	32.56	6.78	30.8	20.37	-281	
1115	2.08	22070			14.83	6.85	32.58	6.73	52.0	20.49	-281	End PURGE
	Start Sampling @ 1119											
	Finish Sampling @ 1202											

Water Quality Meter (S/N): YSI
Control Box Type (S/N): QED
Turbidimeter (S/N): LaMotte

Notes:

APPENDIX F

CHAIN-OF-CUSTODY RECORDS

DRMO

TETRA TECH NUS, INC.

CHAIN OF CUSTODY | NUMBER 072300-09 | PAGE 1 OF 1

PROJECT NO: 7363

SITE NAME: NSB-NLON

PROJECT MANAGER AND PHONE NUMBER: MARK MENGEL 412 921 8723

LABORATORY NAME AND CONTACT: ACCUTEST

SAMPLERS (SIGNATURE): [signature]

FIELD OPERATIONS LEADER AND PHONE NUMBER: KEITH SIMPSON 412 921 5131

ADDRESS: 2235 ROUTE 130

CARRIER/WAYBILL NUMBER: ACCUTEST PICK-UP

CITY, STATE: DAYTON NJ 08810

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G G P

PRESERVATIVE USED: HCL 4°C 4°C 4°C HNO3

TYPE OF ANALYSIS

DATE YEAR 2000	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC 40 ml VIAL	TCL SVOC (L)	TCL PAH (L)	TCL PEST/PCB (L)	TOTAL TAL METALS				COMMENTS
7.23	1310	GW TB072300	AQ	G	2	2								TRIP BLANK
7-23	1745	DRMO-6MW6D-GW-09	AQ	G	30	9	6	6	6	3				D. MS/MSD
7-23	1739	DRMO-6MW6S-GW-09	AQ	G	10	3	2	2	2	1				

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	7/24/00	0730	1. RECEIVED BY [signature]	7/24/00	0730
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

3/99

FORM NO. TtNUS-001

DRMO

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 072400-09 | PAGE 1 OF 1

PROJECT NO: 7363	SITE NAME: NSB - NLON	PROJECT MANAGER AND PHONE NUMBER: Mark Mengel 412 921 8723	LABORATORY NAME AND CONTACT: Accutest
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: Keith Simpson 412 921 8131	ADDRESS: 2235 Route 130
		CARRIER/WAYBILL NUMBER: Accutest Pick-up	CITY, STATE: Dayton, NJ 08810

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2000	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC 40ml vial	TCL SVOC (L)	TCL PAH (L)	TCL Pest/PCB (L)	Total TAL Metals (L)				COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G	G	P				
PRESERVATIVE USED						HCl	–	–	–	HNO_3				
7-24	0755	GWTB072400	AQ	G	2	2								Trip Blank
7-24	1030	DRMO-6MW10S-GW-09	GW	G	10	3	2	2	2	1				
7-24	1027	DRMO-6MW10D-GW-09	GW	G	10	3	2	2	2	1				
7-25	1119	DRMO-6MW11S-GW-09	GW	G	10	3	2	2	2	1				
7-25	1125	DRMO-6MW11D-GW-09	GW	G	10	3	2	2	2	1				
7-25	0000	GWFD-072500	GW	G	10	3	2	2	2	1				Dup of DRMO-6MW11D
7-25	1319	DRMO-6MW9S-GW-09	GW	G	10	3	2	2	2	1				

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	7.26.00	0750	1. RECEIVED BY	7.26.00	0750
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD) (FILE COPY)

FORM NO. TtNUS-001 3/99

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 072600-09

PAGE 1 OF 1

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
7363	NSB-NLON	Mark Mengel 412 921 8123	Accu Test
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
Donald Whaley		Keith Simpson 412 921 8131	2235 Route 130
		CARRIER/WAYBILL NUMBER	CITY, STATE
			Dayton NJ 08810

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2000	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	40 ml VOA Vial HCl	TCL VOC 1 Liter Amber Glass	TCL SVOC 1 Liter Amber Glass	TCL PAH 1 Liter Amber Glass	TCL Pest/PCB 1 Liter Poly HNO3	Total TAL Metals				COMMENTS
					CONTAINER TYPE PLASTIC (P) or GLASS (G)	G	G	G	G	P					
					PRESERVATIVE USED	HCl	4°C	4°C	4°C	HNO3					
7/26	0845	GWTB072600	Aq	G	2	2									Trip Blank
7/26	1210	DRMO-6MW2D-GW-09	Aq	G	10	3	2	2	2	1					
7/27	1303	DRMO-6MW2S-GW-09	Aq	G	10	3	2	2	2	1					
7/27	1255	DRMO-6MW1S-GW-09	Aq	G	10	3	2	2	2	1					

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Donald Whaley	7-27-00	1954	1. RECEIVED BY TB		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

3/99
FORM NO. TtNUS-001

APPENDIX G

DATA VALIDATION LETTERS AND LABORATORY DATA SHEETS

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-10-9-070

TO: **MARK MENGEL** **DATE: NOVEMBER 20, 2000**

FROM: **JUSTIN ORBICH** **COPIES: DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – VOA/PEST/PCB**
CTO 267 – NSB NEW LONDON
SDG – E73764

SAMPLES: 11/Aqueous

DRMO-6MW10D-GW-09
DRMO-6MW11D-GW-09
DRMO-6MW1S-GW-09
DRMO-6MW2S-GW-09
GWFD-072500
GWWTB072600
DRMO-6MW10S-GW-09
DRMO-6MW11S-GW-09
DRMO-6MW2D-GW-09
DRMO-6MW9S-GW-09
GWTB072400

OVERVIEW

The sample set for the CTO 267 NSB New London, SDG E73764 consisting of eleven (11) aqueous environmental samples, which included two (2) trip blank (designated TB). The samples were analyzed for Target Compound List (TCL) volatile and pesticide/PCB organic compounds. One (1) field duplicate pair (DRMO-6MW11D-GW-09/GWFD-072500) was included within this SDG.

The samples were collected by Tetra Tech NUS on July 24th, 25th, 26th, and 27th, 2000 and were analyzed by Ceimic Corporation under Naval Facility Engineering Services Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. Analyses were conducted using the Contract Laboratory Program (CLP) Statement of Work (SOW) OLM02.1 analytical and reporting protocols.

The data were evaluated based on the following parameters

- * Data Completeness
- * Holding Times
- * GC/MS Tuning
- Initial and Continuing Calibration
- Laboratory method and field quality control blanks
- Surrogate Spike Recoveries
- Matrix Spike/Matrix Spike Duplicate Results
- * Laboratory Control Sample Results
- * Internal Standards Performance
- * Compound Identification
- * Compound Quantitation
- * Field Duplicate Precision
- Tentatively Identified Compounds (TICs)

The asterisk (*) indicates that all quality control criteria were met for this parameter. Qualified (if applicable) analytical results are summarized in Appendix A. Results as reported by the laboratory are presented in Appendix B. Appendix C contains Region I worksheets, and Appendix D contains the documentation to support the findings as discussed in this data validation report. The attached Table I summarizes the validation qualifications which were based on the following information:

CALIBRATIONS

The following tables summarize calibration non-compliances and corresponding actions:

Volatiles

Compound	IC 07/27/00	CC 07/30/00
Acetone		X
Bromomethane		X
Bromoform		X

Samples affected:

DRMO-6MW10D-GW-09
DRMO-6MW10S-GW-09
DRMO-6MW11D-GW-09
DRMO-6MW11S-GW-09
DRMO-6MW1S-GW-09
DRMO-6MW2D-GW-09
DRMO-6MW2S-GW-09
DRMO-6MW9S-GW-09
GWFD-072500
GWTB072400
GWWTB072600

Calibration Actions:

X - Percent Differences (%Ds) > 25%; Estimate (J) positive and (UJ) nondetected results.

BLANKS

Carbon disulfide was detected in the field quality control trip blank at a concentration of 1.0 μg/L. No action was warranted since field quality control contamination is not used to establish blank action levels. It should be noted that field quality control blanks are not qualified based on lab method blank contamination.

SURROGATE

The surrogate Percent Recovery (%R) exceeded the upper control limit for decachlorobiphenyl on column DB-1701 in sample DRMO-6MW2S-GW-09. No action was warranted since only nondetected results were reported, and the %R on column DB-5 was within the quality control limits.

ADDITIONAL COMMENTS

Positive results reported at concentrations below the CRQL were qualified as estimated, (J).

The text of this report has been formulated to address only those problem areas affecting data quality.

It should be noted that laboratory incorrectly labeled sample DRMO-6MW11D-GW-09 as GWFD-072500 on the Form Is. The reviewer corrected the sample on the Form Is.

OVERALL ASSESSMENT

Laboratory Performance: Several volatile continuing calibration %Ds exceeded the quality control limit for acetone, bromoform, and bromomethane.

Other Factors Affecting Data Quality: The surrogate %R exceeded the upper control limit for decachlorobiphenyl on column DB-1701.

MEMO TO: MARK MENGEL
DATE: NOVEMBER 20, 2000 – PAGE 4

The data for these analyses were reviewed with reference to the Region I EPA "Volatile and Semivolatile Data Validation Functional Guidelines - Part II" (12/96). Quality requirements outlined in the NFESC interim guidance document " Navy Installation Restoration Laboratory Quality Assurance Guide," were also referenced.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

_____
Tetra Tech NUS

Justin Orbich
Chemist/Data Validator

_____
Tetra Tech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Regional Worksheets
4. Appendix D - Support Documentation

MEMO TO: MARK MENGEL
DATE: NOVEMBER 20, 2000 – PAGE 5

NSB NEW LONDON

SDG E73764

TABLE II. Summary of Volatile Tentatively Identified Compound Summary

TIC	DRMO-6MW10D-GW-09	DRMO-6MW10S-GW-09
Unknown	X	
Ethane, 1,1,2-trichloro-1,2,2-trifluoro-	X	

TIC	DRMO-6MW11D-GW-09	DRMO-6MW11S-GW-09
None		

TIC	DRMO-6MW1S-GW-09	DRMO-6MW2D-GW-09
None		

TIC	DRMO-6MW2S-GW-09	DRMO-6MW9S-GW-09
None		

TIC	GWFD-072500	GWTB072400
Unknown	X	

TIC	GWWTB072600
None	

APPENDIX A

QUALIFIED LABORATORY RESULTS

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764

SAMPLE NUMBER:	DRMO-6MW10D-GW-09	DRMO-6MW10S-GW-09	DRMO-6MW11D-GW-09	DRMO-6MW11S-GW-09
SAMPLE DATE:	07/24/00	07/24/00	07/25/00	07/25/00
LABORATORY ID:	E73764-3	E73764-2	E73764-5	E73764-4
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %
UNITS:	UG/L	UG/L	UG/L	UG/L
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,1,1-TRICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1,2,2-TETRACHLOROETHANE	1	U		1	U		1	U		1	U	
1,1,2-TRICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1-DICHLOROETHANE	1	U		1			1	U		1	J	P
1,1-DICHLOROETHENE	1	U		1	U		1	U		1	U	
1,2-DIBROMO-3-CHLOROPROPANE	1	U		1	U		1	U		1	U	
1,2-DIBROMOETHANE	1	U		1	U		1	U		1	U	
1,2-DICHLOROBENZENE	1	U		1	U		1	U		1	U	
1,2-DICHLOROETHANE	1	U		1	U		1	U		1	U	
1,2-DICHLOROPROPANE	1	U		1	U		1	U		1	U	
1,3-DICHLOROBENZENE	1	U		1	U		1	U		1	U	
1,4-DICHLOROBENZENE	1	U		1	U		1	U		1	U	
2-BUTANONE	5	U		5	U		5	U		5	U	
2-HEXANONE	5	U		5	U		5	U		5	U	
4-METHYL-2-PENTANONE	5	U		5	U		5	U		5	U	
ACETONE	5	UJ	C	5	UJ	C	5	UJ	C	5	UJ	C
BENZENE	1	U		1	U		1	U		1	U	
BROMOCHLOROMETHANE	1	U		1	U		1	U		1	U	
BROMODICHLOROMETHANE	1	U		1	U		1	U		1	U	
BROMOFORM	1	UJ	C	1	UJ	C	1	UJ	C	1	UJ	C
BROMOMETHANE	1	UJ	C	1	UJ	C	1	UJ	C	1	UJ	C
CARBON DISULFIDE	1	U		1	J	P	1	U		1	U	
CARBON TETRACHLORIDE	1	U		1	U		1	U		1	U	
CHLOROBENZENE	1	U		1	U		1	U		1	U	
CHLOROETHANE	1	U		1	U		1	U		1	U	
CHLOROFORM	1	U		1	U		1	U		1	U	
CHLOROMETHANE	1	U		1	U		1	U		1	U	
CIS-1,2-DICHLOROETHENE	14			2			3			2		
CIS-1,3-DICHLOROPROPENE	1	U		1	U		1	U		1	U	
DIBROMOCHLOROMETHANE	1	U		1	U		1	U		1	U	
ETHYLBENZENE	1	U		1	U		1	U		1	U	
METHYLENE CHLORIDE	2	U		2	U		2	U		2	U	
STYRENE	1	U		1	U		1	U		1	U	

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764

SAMPLE NUMBER:	DRMO-6MW10D-GW-09			DRMO-6MW10S-GW-09			DRMO-6MW11D-GW-09			DRMO-6MW11S-GW-09		
SAMPLE DATE:	07/24/00			07/24/00			07/25/00			07/25/00		
LABORATORY ID:	E73764-3			E73764-2			E73764-5			E73764-4		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
TETRACHLOROETHENE	1	U		1	U		1	U		1	U	
TOLUENE	1	U		1	U		1	U		1	U	
TRANS-1,2-DICHLOROETHENE	1	U		1	U		1	U		1	U	
TRANS-1,3-DICHLOROPROPENE	1	U		1	U		1	U		1	U	
TRICHLOROETHENE	4			1	U		1	U		1	U	
VINYL CHLORIDE	1			1	U		1	U		1	U	
XYLENES, TOTAL	1	U		1	U		1	U		1	U	

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764

SAMPLE NUMBER:	DRMO-6MW1S-GW-09			DRMO-6MW2D-GW-09			DRMO-6MW2S-GW-09			DRMO-6MW9S-GW-09		
SAMPLE DATE:	07/27/00			07/26/00			07/27/00			07/25/00		
LABORATORY ID:	E73764-11			E73764-9			E73764-10			E73764-7		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,1,1-TRICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1,2,2-TETRACHLOROETHANE	1	U		1	U		1	U		1	U	
1,1,2-TRICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1-DICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1-DICHLOROETHENE	1	U		1	U		1	U		1	U	
1,2-DIBROMO-3-CHLOROPROPANE	1	U		1	U		1	U		1	U	
1,2-DIBROMOETHANE	1	U		1	U		1	U		1	U	
1,2-DICHLOROBENZENE	1	U		1	U		1	U		1	U	
1,2-DICHLOROETHANE	1	U		1	U		1	U		1	U	
1,2-DICHLOROPROPANE	1	U		1	U		1	U		1	U	
1,3-DICHLOROBENZENE	1	U		1	U		1	U		1	U	
1,4-DICHLOROBENZENE	1	U		1	U		1	U		1	U	
2-BUTANONE	5	U		5	U		5	U		5	U	
2-HEXANONE	5	U		5	U		5	U		5	U	
4-METHYL-2-PENTANONE	5	U		5	U		5	U		5	U	
ACETONE	5	UJ	C	5	UJ	C	5	UJ	C	5	UJ	C
BENZENE	1	U		1	U		1	U		1	U	
BROMOCHLOROMETHANE	1	U		1	U		1	U		1	U	
BROMODICHLOROMETHANE	1	U		1	U		1	U		1	U	
BROMOFORM	1	UJ	C	1	UJ	C	1	UJ	C	1	UJ	C
BROMOMETHANE	1	UJ	C	1	UJ	C	1	UJ	C	1	UJ	C
CARBON DISULFIDE	1	U		1	U		1	U		1	U	
CARBON TETRACHLORIDE	1	U		1	U		1	U		1	U	
CHLOROBENZENE	1	U		1	U		1	U		1	U	
CHLOROETHANE	1	U		1	U		1	U		1	U	
CHLOROFORM	1	U		1	U		1	U		1	U	
CHLOROMETHANE	1	U		1	U		1	U		1	U	
CIS-1,2-DICHLOROETHENE	1	U		1	U		1	U		1	U	
CIS-1,3-DICHLOROPROPENE	1	U		1	U		1	U		1	U	
DIBROMOCHLOROMETHANE	1	U		1	U		1	U		1	U	
ETHYLBENZENE	1	U		1	U		1	U		1	U	
METHYLENE CHLORIDE	2	U		2	U		2	U		2	U	
STYRENE	1	U		1	U		1	U		1	U	

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764

SAMPLE NUMBER:	DRMO-6MW1S-GW-09			DRMO-6MW2D-GW-09			DRMO-6MW2S-GW-09			DRMO-6MW9S-GW-09		
SAMPLE DATE:	07/27/00			07/26/00			07/27/00			07/25/00		
LABORATORY ID:	E73764-11			E73764-9			E73764-10			E73764-7		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
TETRACHLOROETHENE	1	U		1	U		1	U		1	U	
TOLUENE	1	U		1	U		1	U		1	U	
TRANS-1,2-DICHLOROETHENE	1	U		1	U		1	U		1	U	
TRANS-1,3-DICHLOROPROPENE	1	U		1	U		1	U		1	U	
TRICHLOROETHENE	1	J	P	1	U		1	U		1	U	
VINYL CHLORIDE	1	U		1	U		1	U		1	U	
XYLENES, TOTAL	1	U		1	U		1	U		1	U	

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764

SAMPLE NUMBER:	GWFD-072500			GWTB072400			GWTB072600					
SAMPLE DATE:	07/25/00			07/25/00			07/27/00			/ /		
LABORATORY ID:	E73764-6			E73764-1			E73764-8					
QC_TYPE:	NORMAL			NORMAL			NORMAL					
% SOLIDS:	0.0 %			0.0 %			0.0 %			100.0 %		
UNITS:	UG/L			UG/L			UG/L					
FIELD DUPLICATE OF:	DRMO-6MW11D-GW-09											
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,1,1-TRICHLOROETHANE	1	U		1	U		1	U				
1,1,2,2-TETRACHLOROETHANE	1	U		1	U		1	U				
1,1,2-TRICHLOROETHANE	1	U		1	U		1	U				
1,1-DICHLOROETHANE	1	U		1	U		1	U				
1,1-DICHLOROETHENE	1	U		1	U		1	U				
1,2-DIBROMO-3-CHLOROPROPANE	1	U		1	U		1	U				
1,2-DIBROMOETHANE	1	U		1	U		1	U				
1,2-DICHLOROBENZENE	1	U		1	U		1	U				
1,2-DICHLOROETHANE	1	U		1	U		1	U				
1,2-DICHLOROPROPANE	1	U		1	U		1	U				
1,3-DICHLOROBENZENE	1	U		1	U		1	U				
1,4-DICHLOROBENZENE	1	U		1	U		1	U				
2-BUTANONE	5	U		5	U		5	U				
2-HEXANONE	5	U		5	U		5	U				
4-METHYL-2-PENTANONE	5	U		5	U		5	U				
ACETONE	5	UJ	C	5	UJ	C	5	UJ	C			
BENZENE	1	U		1	U		1	U				
BROMOCHLOROMETHANE	1	U		1	U		1	U				
BROMODICHLOROMETHANE	1	U		1	U		1	U				
BROMOFORM	1	UJ	C	1	UJ	C	1	UJ	C			
BROMOMETHANE	1	UJ	C	1	UJ	C	1	UJ	C			
CARBON DISULFIDE	1	U		1	J	P	1	U				
CARBON TETRACHLORIDE	1	U		1	U		1	U				
CHLOROBENZENE	1	U		1	U		1	U				
CHLOROETHANE	1	U		1	U		1	U				
CHLOROFORM	1	U		1	U		1	U				
CHLOROMETHANE	1	U		1	U		1	U				
CIS-1,2-DICHLOROETHENE	3			1	U		1	U				
CIS-1,3-DICHLOROPROPENE	1	U		1	U		1	U				
DIBROMOCHLOROMETHANE	1	U		1	U		1	U				
ETHYLBENZENE	1	U		1	U		1	U				
METHYLENE CHLORIDE	2	U		2	U		2	U				
STYRENE	1	U		1	U		1	U				

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764

SAMPLE NUMBER:	GWFD-072500			GWTB072400			GWTB072600			/ /		
SAMPLE DATE:	07/25/00			07/25/00			07/27/00					
LABORATORY ID:	E73764-6			E73764-1			E73764-8					
QC_TYPE:	NORMAL			NORMAL			NORMAL					
% SOLIDS:	0.0 %			0.0 %			0.0 %			100.0 %		
UNITS:	UG/L			UG/L			UG/L					
FIELD DUPLICATE OF:	DRMO-6MW11D-GW-09											
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
TETRACHLOROETHENE	1	U		1	U		1	U				
TOLUENE	1	U		1	U		1	U				
TRANS-1,2-DICHLOROETHENE	1	U		1	U		1	U				
TRANS-1,3-DICHLOROPROPENE	1	U		1	U		1	U				
TRICHLOROETHENE	1	U		1	U		1	U				
VINYL CHLORIDE	1	U		1	U		1	U				
XYLENES, TOTAL	1	U		1	U		1	U				

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764

SAMPLE NUMBER:	DRMO-6MW10D-GW-09	DRMO-6MW10S-GW-09	DRMO-6MW11D-GW-09	DRMO-6MW11S-GW-09
SAMPLE DATE:	07/24/00	07/24/00	07/25/00	07/25/00
LABORATORY ID:	E73764-3	E73764-2	E73764-5	E73764-4
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %
UNITS:	UG/L	UG/L	UG/L	UG/L
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
PESTICIDES/PCBs												
4,4'-DDD	0.02	U		0.02	U		0.021	U		0.02	U	
4,4'-DDE	0.02	U		0.02	U		0.021	U		0.02	U	
4,4'-DDT	0.02	U		0.02	U		0.021	U		0.02	U	
ALDRIN	0.01	U		0.01	U		0.01	U		0.01	U	
ALPHA-BHC	0.01	U		0.01	U		0.01	U		0.01	U	
ALPHA-CHLORDANE	0.01	U		0.01	U		0.01	U		0.01	U	
AROCLOR-1016	0.2	U		0.2	U		0.21	U		0.2	U	
AROCLOR-1221	0.4	U		0.4	U		0.42	U		0.4	U	
AROCLOR-1232	0.2	U		0.2	U		0.21	U		0.2	U	
AROCLOR-1242	0.2	U		0.2	U		0.21	U		0.2	U	
AROCLOR-1248	0.2	U		0.2	U		0.21	U		0.2	U	
AROCLOR-1254	0.2	U		0.2	U		0.21	U		0.2	U	
AROCLOR-1260	0.2	U		0.2	U		0.21	U		0.2	U	
BETA-BHC	0.01	U		0.01	U		0.01	U		0.01	U	
DELTA-BHC	0.01	U		0.01	U		0.01	U		0.01	U	
DIELDRIN	0.02	U		0.02	U		0.021	U		0.02	U	
ENDOSULFAN I	0.01	U		0.01	U		0.01	U		0.01	U	
ENDOSULFAN II	0.02	U		0.02	U		0.021	U		0.02	U	
ENDOSULFAN SULFATE	0.02	U		0.02	U		0.021	U		0.02	U	
ENDRIN	0.02	U		0.02	U		0.021	U		0.02	U	
ENDRIN ALDEHYDE	0.02	U		0.02	U		0.021	U		0.02	U	
ENDRIN KETONE	0.02	U		0.02	U		0.021	U		0.02	U	
GAMMA-BHC (LINDANE)	0.01	U		0.01	U		0.01	U		0.01	U	
GAMMA-CHLORDANE	0.01	U		0.01	U		0.01	U		0.01	U	
HEPTACHLOR	0.01	U		0.01	U		0.01	U		0.01	U	
HEPTACHLOR EPOXIDE	0.01	U		0.01	U		0.01	U		0.01	U	
METHOXYCHLOR	0.1	U		0.1	U		0.1	U		0.1	U	
TOXAPHENE	1	U		1	U		1	U		1	U	

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764

SAMPLE NUMBER:	DRMO-6MW1S-GW-09	DRMO-6MW2D-GW-09	DRMO-6MW2S-GW-09	DRMO-6MW9S-GW-09
SAMPLE DATE:	07/27/00	07/26/00	07/27/00	07/25/00
LABORATORY ID:	E73764-11	E73764-9	E73764-10	E73764-7
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %
UNITS:	UG/L	UG/L	UG/L	UG/L
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
PESTICIDES/PCBs												
4,4'-DDD	0.02	U		0.021	U		0.02	U		0.02	U	
4,4'-DDE	0.02	U		0.021	U		0.02	U		0.02	U	
4,4'-DDT	0.02	U		0.021			0.02	U		0.021		
ALDRIN	0.01	U		0.01	U		0.01	U		0.01	U	
ALPHA-BHC	0.01	U		0.01	U		0.01	U		0.01	U	
ALPHA-CHLORDANE	0.01	U		0.01	U		0.01	U		0.01	U	
AROCLOR-1016	0.2	U		0.21	U		0.2	U		0.2	U	
AROCLOR-1221	0.4	U		0.42	U		0.4	U		0.4	U	
AROCLOR-1232	0.2	U		0.21	U		0.2	U		0.2	U	
AROCLOR-1242	0.2	U		0.21	U		0.2	U		0.2	U	
AROCLOR-1248	0.2	U		0.21	U		0.2	U		0.2	U	
AROCLOR-1254	0.2	U		0.21	U		0.2	U		0.2	U	
AROCLOR-1260	0.2	U		0.21	U		0.2	U		0.2	U	
BETA-BHC	0.01	U		0.01	U		0.01	U		0.01	U	
DELTA-BHC	0.01	U		0.01	U		0.01	U		0.01	U	
DIELDRIN	0.02	U		0.021	U		0.02	U		0.02	U	
ENDOSULFAN I	0.01	U		0.01	U		0.01	U		0.01	U	
ENDOSULFAN II	0.02	U		0.021	U		0.02	U		0.02	U	
ENDOSULFAN SULFATE	0.02	U		0.021	U		0.02	U		0.02	U	
ENDRIN	0.02	U		0.021	U		0.02	U		0.02	U	
ENDRIN ALDEHYDE	0.02	U		0.021	U		0.02	U		0.02	U	
ENDRIN KETONE	0.02	U		0.021	U		0.02	U		0.02	U	
GAMMA-BHC (LINDANE)	0.01	U		0.01	U		0.01	U		0.01	U	
GAMMA-CHLORDANE	0.01	U		0.01	U		0.01	U		0.01	U	
HEPTACHLOR	0.01	U		0.01	U		0.01	U		0.01	U	
HEPTACHLOR EPOXIDE	0.01	U		0.01	U		0.01	U		0.01	U	
METHOXYCHLOR	0.1	U		0.1	U		0.1	U		0.1	U	
TOXAPHENE	1	U		1	U		1	U		1	U	

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764

SAMPLE NUMBER:	GWFD-072500											
SAMPLE DATE:	07/25/00			/ /			/ /			/ /		
LABORATORY ID:	E73764-6											
QC_TYPE:	NORMAL											
% SOLIDS:	0.0 %			100.0 %			100.0 %			100.0 %		
UNITS:	UG/L											
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
PESTICIDES/PCBs												
4,4'-DDD	0.021	U										
4,4'-DDE	0.021	U										
4,4'-DDT	0.034											
ALDRIN	0.01	U										
ALPHA-BHC	0.01	U										
ALPHA-CHLORDANE	0.01	U										
AROCLOR-1016	0.21	U										
AROCLOR-1221	0.42	U										
AROCLOR-1232	0.21	U										
AROCLOR-1242	0.21	U										
AROCLOR-1248	0.21	U										
AROCLOR-1254	0.21	U										
AROCLOR-1260	0.21	U										
BETA-BHC	0.01	U										
DELTA-BHC	0.01	U										
DIELDRIN	0.021	U										
ENDOSULFAN I	0.01	U										
ENDOSULFAN II	0.021	U										
ENDOSULFAN SULFATE	0.021	U										
ENDRIN	0.021	U										
ENDRIN ALDEHYDE	0.021	U										
ENDRIN KETONE	0.021	U										
GAMMA-BHC (LINDANE)	0.01	U										
GAMMA-CHLORDANE	0.01	U										
HEPTACHLOR	0.01	U										
HEPTACHLOR EPOXIDE	0.01	U										
METHOXYCHLOR	0.1	U										
TOXAPHENE	1	U										

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**M. MENGEL**	**DATE:**	**December 5, 2000**
FROM:	**ELIZABETH MURPHY**	**COPIES:**	**DV FILE/REV 1**

SUBJECT: **ORGANIC DATA VALIDATION – SEMIVOLATILES**
CTO 267 - NSB NEW LONDON
SDG – E73764A

SAMPLES: 09/Aqueous/

DRMO-6MW10D-GW-09	DRMO-6MW2D-GW-09
DRMO-6MW10S-GW-09	DRMO-6MW2S-GW-09
DRMO-6MW11D-GW-09	DRMO-6MW9S-GW-09
DRMO-6MW11S-GW-09	GWFD-072500
DRMO-6MW1S-GW-09	

Overview

The sample set for CTO 267, NSB New London, SDG – E73764A, consists of nine (9) aqueous environmental samples. One (1) field duplicate pair (DRMO-6MW11D-GW-09/GWFD-072500) was included within this SDG.

All samples were analyzed for target compound list (TAL) semivolatile organics. The samples were collected by Tetra Tech NUS on July 24-27, 2000, and analyzed by Accutest Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. Semivolatile analyses were conducted using SW 846 method 8270C. Polynuclear Aromatic Hydrocarbons analysis were conducted using Selective Ion Monitoring (SIM).

The data was evaluated based on the following parameters:

- Data Completeness
- Holding Times
- * GC/MS Tuning and System Performance
- Initial/Continuing Calibrations
- * Laboratory Method Blanks
- * Surrogate Spike Recoveries
- * Matrix Spike/Matrix Spike Duplicate Results
- * Blank Spike Results
- Internal Standard Performance
- * Field Duplicate Results
- * Compound Identification
- * Compound Quanitation
- * Detection Limits

* - All quality control criteria were met for this parameter.

Holding Times

The laboratory failed to extract the samples for PAH analysis via method 8310 and therefore had to use the extracts for analysis. Extraction until holding time was met however, holding time until analysis was exceeded by several weeks and these results were qualified as estimated 'UJ'.

Initial/Continuing Calibrations

The initial calibration on August 1, 2000 contained a %RSD for hexachlorocyclopentadiene that was >30% quality control limit affecting the samples analyzed on instrument GCMSH. The nondetected results reported for hexachlorocyclopentadiene in the affected samples were qualified as estimated, "UJ".

The continuing calibration on August 4, 2000 contained a % Ds for hexacholoroethane and hexachlorocyclopentadiene that was >25% quality control limit affecting the samples analyzed on instrument MSH. The nondetected results reported for hexacholoroethane and hexachlorocyclopentadiene in the affected samples were qualified as estimated, "UJ".

The continuing calibration on September 23, 2000 contained a %Ds for phenanthrene that was >25% quality control limit affecting the samples analyzed on instrument MSB. The nondetected results reported for phenanthrene in the affected samples were qualified as estimated, "UJ".

Despite the chain of custody records indicating PAH analysis, samples DRMO-6MW1S-GW-09, DRMO-6MW2D-GW-09, and DRMO-6MW2S-GW-09 did not receive SIM analysis for PAHs. PAHs were reported via 8270C analysis but this analysis yields higher reporting limits.

Notes

The PAH compounds are listed on the semivolatile form 1s. They were reported using SW 846 method 8270C although the requested analyses was SW 846 method 8310. The PAHs were re-reported using the SIM analysis.

Analysis for benzoic acid was omitted in error by the laboratory.

Executive Summary

Laboratory Performance: The hold time for PAH analysis was exceeded. Hexachlorocyclopentadiene, phenanthrene, and hexacholoroethane were qualified due to calibration noncompliances.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Organic Review Data Review", February 1994, "EPA Region I Volatile/Semivolatile Data Validation Functional Guidelines", December 1996 and the NFESC document entitled "Navy Installation Restoration Chemical Data Quality Manual." (September 1999).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Elizabeth A. Murphy
Tetra Tech NUS
Elizabeth A. Murphy

Tetra Tech NUS
Joseph A. Samchuck
Quality Control Officer

Attachments:

1. Appendix A - Qualified Analytical Data
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Regional Worksheets
4. Appendix D - Support Documentation

APPENDIX A
QUALIFIED ANALYTICAL RESULTS

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764A

SAMPLE NUMBER:	DRMO-6MW10D-GW-09			DRMO-6MW10S-GW-09			DRMO-6MW11D-GW-09			DRMO-6MW11S-GW-09		
SAMPLE DATE:	07/24/00			07/24/00			07/25/00			07/25/00		
LABORATORY ID:	E73764-3A			E73764-2A			E73764-5A			E73764-4A		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
SEMIVOLATILES												
1,2,4-TRICHLOROBENZENE	2	U		2.1	U		2.2	U		2	U	
1,2-DICHLOROBENZENE	2	U		2.1	U		2.2	U		2	U	
1,3-DICHLOROBENZENE	2	U		2.1	U		2.2	U		2	U	
1,4-DICHLOROBENZENE	2	U		2.1	U		2.2	U		2	U	
2,4,5-TRICHLOROPHENOL	5	U		5.2	U		5.4	U		5	U	
2,4,6-TRICHLOROPHENOL	5	U		5.2	U		5.4	U		5	U	
2,4-DICHLOROPHENOL	5	U		5.2	U		5.4	U		5	U	
2,4-DIMETHYLPHENOL	5	U		5.2	U		5.4	U		5	U	
2,4-DINITROPHENOL	20	U		21	U		22	U		20	U	
2,4-DINITROTOLUENE	2	U		2.1	U		2.2	U		2	U	
2,6-DINITROTOLUENE	2	U		2.1	U		2.2	U		2	U	
2-CHLORONAPHTHALENE	5	U		5.2	U		5.4	U		5	U	
2-CHLOROPHENOL	5	U		5.2	U		5.4	U		5	U	
2-METHYLNAPHTHALENE	2	U		2.1	U		2.2	U		2	U	
2-METHYLPHENOL	5	U		5.2	U		5.4	U		5	U	
2-NITROANILINE	5	U		5.2	U		5.4	U		5	U	
2-NITROPHENOL	5	U		5.2	U		5.4	U		5	U	
3&4-METHYLPHENOL	5	U		5.2	U		5.4	U		5	U	
3,3'-DICHLOROBENZIDINE	5	U		5.2	U		5.4	U		5	U	
3-NITROANILINE	5	U		5.2	U		5.4	U		5	U	
4,6-DINITRO-2-METHYLPHENOL	20	U		21	U		22	U		20	U	
4-BROMOPHENYL PHENYL ETHER	2	U		2.1	U		2.2	U		2	U	
4-CHLORO-3-METHYLPHENOL	5	U		5.2	U		5.4	U		5	U	
4-CHLOROANILINE	5	U		5.2	U		5.4	U		5	U	
4-CHLOROPHENYL PHENYL ETHER	2	U		2.1	U		2.2	U		2	U	
4-NITROANILINE	5	U		5.2	U		5.4	U		5	U	
4-NITROPHENOL	20	U		21	U		22	U		20	U	
BIS(2-CHLOROETHOXY)METHANE	2	U		2.1	U		2.2	U		2	U	
BIS(2-CHLOROETHYL)ETHER	2	U		2.1	U		2.2	U		2	U	
BIS(2-CHLOROISOPROPYL)ETHER	2	U		2.1	U		2.2	U		2	U	
BIS(2-ETHYLHEXYL)PHTHALATE	2	U		5.4			2.2	U		2	U	
BUTYLBENZYL PHTHALATE	2	U		2.1	U		2.2	U		2	U	
CARB	2	U		2.1	U		2.2	U		2	U	

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764A

SAMPLE NUMBER:	DRMO-6MW10D-GW-09			DRMO-6MW10S-GW-09			DRMO-6MW11D-GW-09			DRMO-6MW11S-GW-09		
SAMPLE DATE:	07/24/00			07/24/00			07/25/00			07/25/00		
LABORATORY ID:	E73764-3A			E73764-2A			E73764-5A			E73764-4A		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
SEMIVOLATILES												
DI-N-BUTYL PHTHALATE	2	U		2.1	U		2.2	U		2	U	
DI-N-OCTYL PHTHALATE	2	U		2.1	U		2.2	U		2	U	
DIBENZOFURAN	5	U		5.2	U		5.4	U		5	U	
DIETHYL PHTHALATE	2	U		2.1	U		2.2	U		2	U	
DIMETHYL PHTHALATE	2	U		2.1	U		2.2	U		2	U	
HEXACHLOROBENZENE	2	U		2.1	U		2.2	U		2	U	
HEXACHLOROBUTADIENE	2	U		2.1	U		2.2	U		2	U	
HEXACHLOROCYCLOPENTADIENE	20	U		21	U		22	U		20	U	
HEXACHLOROETHANE	5	U		5.2	U		5.4	U		5	U	
ISOPHORONE	2	U		2.1	U		2.2	U		2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U		2.1	U		2.2	U		2	U	
N-NITROSODIPHENYLAMINE	5	U		5.2	U		5.4	U		5	U	
NITROBENZENE	2	U		2.1	U		2.2	U		2	U	
PENTACHLOROPHENOL	20	U		21	U		22	U		20	U	
PHENOL	5	U		5.2	U		5.4	U		5	U	

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764A

SAMPLE NUMBER:	DRMO-6MW1S-GW-09			DRMO-6MW2D-GW-09			DRMO-6MW2S-GW-09			DRMO-6MW9S-GW-09		
SAMPLE DATE:	07/27/00			07/26/00			07/27/00			07/25/00		
LABORATORY ID:	E73764-11A			E73764-9A			E73764-10A			E73764-7A		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
SEMIVOLATILES												
1,2,4-TRICHLOROBENZENE	2	U		2	U		2	U		2	U	
1,2-DICHLOROBENZENE	2	U		2	U		2	U		2	U	
1,3-DICHLOROBENZENE	2	U		2	U		2	U		2	U	
1,4-DICHLOROBENZENE	2	U		2	U		2	U		2	U	
2,4,5-TRICHLOROPHENOL	5.1	U		5	U		5	U		5	U	
2,4,6-TRICHLOROPHENOL	5.1	U		5	U		5	U		5	U	
2,4-DICHLOROPHENOL	5.1	U		5	U		5	U		5	U	
2,4-DIMETHYLPHENOL	5.1	U		5	U		5	U		5	U	
2,4-DINITROPHENOL	20	U		20	U		20	U		20	U	
2,4-DINITROTOLUENE	2	U		2	U		2	U		2	U	
2,6-DINITROTOLUENE	2	U		2	U		2	U		2	U	
2-CHLORONAPHTHALENE	5.1	U		5	U		5	U		5	U	
2-CHLOROPHENOL	5.1	U		5	U		5	U		5	U	
2-METHYLNAPHTHALENE	2	U		2	U		2	U		2	U	
2-METHYLPHENOL	5.1	U		5	U		5	U		5	U	
2-NITROANILINE	5.1	U		5	U		5	U		5	U	
2-NITROPHENOL	5.1	U		5	U		5	U		5	U	
3&4-METHYLPHENOL	5.1	U		5	U		5	U		5	U	
3,3'-DICHLOROBENZIDINE	5.1	U		5	U		5	U		5	U	
3-NITROANILINE	5.1	U		5	U		5	U		5	U	
4,6-DINITRO-2-METHYLPHENOL	20	U		20	U		20	U		20	U	
4-BROMOPHENYL PHENYL ETHER	2	U		2	U		2	U		2	U	
4-CHLORO-3-METHYLPHENOL	5.1	U		5	U		5	U		5	U	
4-CHLOROANILINE	5.1	U		5	U		5	U		5	U	
4-CHLOROPHENYL PHENYL ETHER	2	U		2	U		2	U		2	U	
4-NITROANILINE	5.1	U		5	U		5	U		5	U	
4-NITROPHENOL	20	U		20	U		20	U		20	U	
ACENAPHTHENE	2	U		2	U		2	U				
ACENAPHTHYLENE	2	U		2	U		2	U				
ANTHRACENE	2	U		2	U		2	U				
BENZO(A)ANTHRACENE	2	U		2	U		2	U				
BENZO(A)PYRENE	2	U		2	U		2	U				
BENZ LUC HENE	2	U		2	U		2	U				

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764A

SAMPLE NUMBER:	DRMO-6MW1S-GW-09			DRMO-6MW2D-GW-09			DRMO-6MW2S-GW-09			DRMO-6MW9S-GW-09		
SAMPLE DATE:	07/27/00			07/26/00			07/27/00			07/25/00		
LABORATORY ID:	E73764-11A			E73764-9A			E73764-10A			E73764-7A		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
SEMIVOLATILES												
BENZO(G,H,I)PERYLENE	2	U		2	U		2	U				
BENZO(K)FLUORANTHENE	2	U		2	U		2	U				
BIS(2-CHLOROETHOXY)METHANE	2	U		2	U		2	U		2	U	
BIS(2-CHLOROETHYL)ETHER	2	U		2	U		2	U		2	U	
BIS(2-CHLOROISOPROPYL)ETHER	2	U		2	U		2	U		2	U	
BIS(2-ETHYLHEXYL)PHTHALATE	17.1			10.3			2	U		2	U	
BUTYLBENZYL PHTHALATE	2	U		2	U		2	U		2	U	
CARBAZOLE	2	U		2	U		2	U		2	U	
CHRYSENE	2	U		2	U		2	U				
DI-N-BUTYL PHTHALATE	2	U		2	U		2	U		2	U	
DI-N-OCTYL PHTHALATE	2	U		2	U		2	U		2	U	
DIBENZO(A,H)ANTHRACENE	2	U		2	U		2	U				
DIBENZOFURAN	5.1	U		5	U		5	U		5	U	
DIETHYL PHTHALATE	2	U		2	U		2	U		2	U	
DIMETHYL PHTHALATE	2	U		2	U		2	U		2	U	
FLUORANTHENE	2	U		2	U		2	U				
FLUORENE	2	U		2	U		2	U				
HEXACHLOROBENZENE	2	U		2	U		2	U		2	U	
HEXACHLOROBUTADIENE	2	U		2	U		2	U		2	U	
HEXACHLOROCYCLOPENTADIENE	20	UJ	C	20	UJ	C	20	UJ	C	20	U	
HEXACHLOROETHANE	5.1	UJ	C	5	UJ	C	5	UJ	C	5	U	
INDENO(1,2,3-CD)PYRENE	2	U		2	U		2	U				
ISOPHORONE	2	U		2	U		2	U		2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U		2	U		2	U		2	U	
N-NITROSODIPHENYLAMINE	5.1	U		5	U		5	U		5	U	
NAPHTHALENE	2	U		2	U		2	U				
NITROBENZENE	2	U		2	U		2	U		2	U	
PENTACHLOROPHENOL	20	U		20	U		20	U		20	U	
PHENANTHRENE	2	U		2	U		2	U				
PHENOL	5.1	U		5	U		5	U		5	U	
PYRENE	2	U		2	U		2	U				

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764A

SAMPLE NUMBER:	GWFD-072500			
SAMPLE DATE:	07/25/00	/ /	/ /	/ /
LABORATORY ID:	E73764-6A			
QC_TYPE:	NORMAL			
% SOLIDS:	0.0 %	100.0 %	100.0 %	100.0 %
UNITS:	UG/L			
FIELD DUPLICATE OF:	DRMO-6MW11D-GW-09			

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
SEMIVOLATILES												
1,2,4-TRICHLOROBENZENE	2.1	U										
1,2-DICHLOROBENZENE	2.1	U										
1,3-DICHLOROBENZENE	2.1	U										
1,4-DICHLOROBENZENE	2.1	U										
2,4,5-TRICHLOROPHENOL	5.3	U										
2,4,6-TRICHLOROPHENOL	5.3	U										
2,4-DICHLOROPHENOL	5.3	U										
2,4-DIMETHYLPHENOL	5.3	U										
2,4-DINITROPHENOL	21	U										
2,4-DINITROTOLUENE	2.1	U										
2,6-DINITROTOLUENE	2.1	U										
2-CHLORONAPHTHALENE	5.3	U										
2-CHLOROPHENOL	5.3	U										
2-METHYLNAPHTHALENE	2.1	U										
2-METHYLPHENOL	5.3	U										
2-NITROANILINE	5.3	U										
2-NITROPHENOL	5.3	U										
3&4-METHYLPHENOL	5.3	U										
3,3'-DICHLOROBENZIDINE	5.3	U										
3-NITROANILINE	5.3	U										
4,6-DINITRO-2-METHYLPHENOL	21	U										
4-BROMOPHENYL PHENYL ETHER	2.1	U										
4-CHLORO-3-METHYLPHENOL	5.3	U										
4-CHLOROANILINE	5.3	U										
4-CHLOROPHENYL PHENYL ETHER	2.1	U										
4-NITROANILINE	5.3	U										
4-NITROPHENOL	21	U										
BIS(2-CHLOROETHOXY)METHANE	2.1	U										
BIS(2-CHLOROETHYL)ETHER	2.1	U										
BIS(2-CHLOROISOPROPYL)ETHER	2.1	U										
BIS(2-ETHYLHEXYL)PHTHALATE	2.1	U										
BUTYLBENZYL PHTHALATE	2.1	U										
CARBAZOLE	2.1	U										

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764A

SAMPLE NUMBER:	GWFD-072500											
SAMPLE DATE:	07/25/00			/ /			/ /			/ /		
LABORATORY ID:	E73764-6A											
QC_TYPE:	NORMAL											
% SOLIDS:	0.0 %			100.0 %			100.0 %			100.0 %		
UNITS:	UG/L											
FIELD DUPLICATE OF:	DRMO-6MW11D-GW-09											
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
SEMIVOLATILES												
DI-N-BUTYL PHTHALATE	2.1	U										
DI-N-OCTYL PHTHALATE	2.1	U										
DIBENZOFURAN	5.3	U										
DIETHYL PHTHALATE	2.1	U										
DIMETHYL PHTHALATE	2.1	U										
HEXACHLOROBENZENE	2.1	U										
HEXACHLOROBUTADIENE	2.1	U										
HEXACHLOROCYCLOPENTADIENE	21	U										
HEXACHLOROETHANE	5.3	U										
ISOPHORONE	2.1	U										
N-NITROSO-DI-N-PROPYLAMINE	2.1	U										
N-NITROSODIPHENYLAMINE	5.3	U										
NITROBENZENE	2.1	U										
PENTACHLOROPHENOL	21	U										
PHENOL	5.3	U										

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764A

SAMPLE NUMBER:	DRMO-6MW10D-GW-09	DRMO-6MW10S-GW-09	DRMO-6MW11D-GW-09	DRMO-6MW11S-GW-09
SAMPLE DATE:	07/24/00	07/24/00	07/25/00	07/25/00
LABORATORY ID:	E73764-3A	E73764-2A	E73764-5A	E73764-4A
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %
UNITS:	UG/L	UG/L	UG/L	UG/L
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
ACENAPHTHENE	0.2	UJ	H	0.21	UJ	H	0.22	UJ	H	0.2	UJ	H
ACENAPHTHYLENE	0.2	UJ	H	0.21	UJ	H	0.22	UJ	H	0.2	UJ	H
ANTHRACENE	0.2	UJ	H	0.21	UJ	H	0.22	UJ	H	0.2	UJ	H
BENZO(A)ANTHRACENE	0.2	UJ	H	0.21	UJ	H	0.22	UJ	H	0.2	UJ	H
BENZO(A)PYRENE	0.2	UJ	H	0.21	UJ	H	0.22	UJ	H	0.2	UJ	H
BENZO(B)FLUORANTHENE	0.2	UJ	H	0.21	UJ	H	0.22	UJ	H	0.2	UJ	H
BENZO(G,H,I)PERYLENE	0.2	UJ	H	0.21	UJ	H	0.22	UJ	H	0.2	UJ	H
BENZO(K)FLUORANTHENE	0.2	UJ	H	0.21	UJ	H	0.22	UJ	H	0.2	UJ	H
CHRYSENE	0.2	UJ	H	0.21	UJ	H	0.22	UJ	H	0.2	UJ	H
DIBENZO(A,H)ANTHRACENE	0.2	UJ	H	0.21	UJ	H	0.22	UJ	H	0.2	UJ	H
FLUORANTHENE	0.2	UJ	H	0.21	UJ	H	0.22	UJ	H	0.2	UJ	H
FLUORENE	0.2	UJ	H	0.21	UJ	H	0.22	UJ	H	0.2	UJ	H
INDENO(1,2,3-CD)PYRENE	0.2	UJ	H	0.21	UJ	H	0.22	UJ	H	0.2	UJ	H
NAPHTHALENE	0.2	UJ	H	0.21	UJ	H	0.22	UJ	H	0.2	UJ	H
PHENANTHRENE	0.2	UJ	CH	0.21	UJ	CH	0.22	UJ	CH	0.2	UJ	CH
PYRENE	0.2	UJ	H	0.21	UJ	H	0.22	UJ	H	0.2	UJ	H

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73764A

SAMPLE NUMBER:	DRMO-6MW9S-GW-09			GWFD-072500			/ /			/ /		
SAMPLE DATE:	07/25/00			07/25/00								
LABORATORY ID:	E73764-7A			E73764-6A								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	0.0 %			0.0 %			100.0 %			100.0 %		
UNITS:	UG/L			UG/L								
FIELD DUPLICATE OF:				DRMO-6MW11D-GW-09								
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
ACENAPHTHENE	0.2	UJ	H	0.21	UJ	H						
ACENAPHTHYLENE	0.2	UJ	H	0.21	UJ	H						
ANTHRACENE	0.2	UJ	H	0.21	UJ	H						
BENZO(A)ANTHRACENE	0.2	UJ	H	0.21	UJ	H						
BENZO(A)PYRENE	0.2	UJ	H	0.21	UJ	H						
BENZO(B)FLUORANTHENE	0.2	UJ	H	0.21	UJ	H						
BENZO(G,H,I)PERYLENE	0.2	UJ	H	0.21	UJ	H						
BENZO(K)FLUORANTHENE	0.2	UJ	H	0.21	UJ	H						
CHRYSENE	0.2	UJ	H	0.21	UJ	H						
DIBENZO(A,H)ANTHRACENE	0.2	UJ	H	0.21	UJ	H						
FLUORANTHENE	0.2	UJ	H	0.21	UJ	H						
FLUORENE	0.2	UJ	H	0.21	UJ	H						
INDENO(1,2,3-CD)PYRENE	0.2	UJ	H	0.21	UJ	H						
NAPHTHALENE	0.2	UJ	H	0.21	UJ	H						
PHENANTHRENE	0.2	UJ	CH	0.21	UJ	CH						
PYRENE	0.2	UJ	H	0.21	UJ	H						

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**M. MENGEL**	**DATE:**	**NOVEMBER 30, 2000**
FROM:	**JENNIFER M. MALLE**	**COPIES:**	**DV FILE**
SUBJECT:	**INORGANIC DATA VALIDATION-TAL METALS** **CTO 267 – NSB NEW LONDON** **SDG – E73764**		
SAMPLES:	10/Aqueous/		

DRMO-6MW10D-GW-09	DRMO-6MW10S-GW-09
DRMO-6MW11D-GW-09	DRMO-6MW11S-GW-09
DRMO-6MW1S-GW-09	DRMO-6MW2D-GW-09
DROM-6MW2S-GW-09	DRMO-6MW9S-GW-09
GWFD-072500	

Overview

The sample set for CTO 267, NSB New London, SDG E73764, consists of ten (10) aqueous environmental samples. One field duplicate pair, GWFD-072500/ DRMO-6MW11D-GW-09, was included within this SDG.

All samples were analyzed for Target Analyte List (TAL) metals. The samples were collected by Tetra Tech NUS on July 24-27 and analyzed by Accutest Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. Metal analyses, including mercury, were conducted under CLP Statement of Work ILM04.0 methods.

The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
• Calibration Recoveries
• Laboratory Blank Analyses
• ICP Interference Check Sample Results
* • Matrix Spike/Matrix Spike Duplicate Recoveries
* • Laboratory Duplicate Results
* • Laboratory Control Sample Results
* • Serial Dilution Results
• Field Duplicate Results
* • Sample Quanitation
* • Detection Limits

* - All quality control criteria were met for this parameter.

Calibration Recoveries

The Contract Required Detection Limit (CRDL) Percent Recovery (%R) for lead was less than 80% quality control limits. The positive results less than 3x the CRDL value for lead were qualified as estimated, "J".

Laboratory Blank Analysis

The following contaminants were detected in the laboratory method/preparation blanks at the following maximum concentrations:

Affected samples : TAL metals

Analyte	Maximum Concentration	Action Level(aqueous)
Barium	0.8 ug/L	4.0 ug/L
Cadmium	0.9 ug/L	4.5 ug/L
Calcium	58.4 ug/L	292 ug/L
Cobalt	1.3 ug/L	6.5 ug/L
Copper	1.5 ug/L	7.5 ug/L
Iron	33.7 ug/L	168.5 ug/L
Magnesium	58.6 ug/L	293 ug/L
Sodium	1679.1 ug/L	8395.5 ug/L
Thallium	7.2 ug/L	36 ug/L
Vanadium	1.1 ug/L	5.5 ug/L

An action level of 5X the maximum concentration was used to evaluate the sample data for blank contamination. Sample aliquot and dilution factors were taken into consideration in evaluation for blank contamination. Positive results less than the action level for barium, cadmium, cobalt, copper, sodium, thallium and vanadium were qualified as nondetected, "U", due to laboratory blank contamination. No validation action was required for the remaining analytes since the results reported for these analytes were either greater than the action level or nondetected.

ICP Interference Check Sample Results

The interfering analyte magnesium was present in sample DRMO-06MW10D-GW-09 at a concentration that was comparable to the level of magnesium in the Interference Check Sample (ICS) solution. Several analytes namely antimony, arsenic, cadmium, chromium, copper, lead, sodium, thallium, vanadium and zinc were present in the ICS solution at concentrations which exceeded the Instrument Detection Limit (IDL). Interference affects exist for antimony, arsenic, cadmium, lead and vanadium in the affected sample. The positive result reported for arsenic was qualified as estimated, "J". The nondetected results reported for antimony, cadmium, lead and vanadium were qualified as estimated, "UJ".

The interfering analytes calcium and magnesium were present in sample DRMO-06MW11D-GW-09 at concentrations that were comparable to the levels of calcium and magnesium in the Interference Check Sample (ICS) solution. Several analytes namely antimony, arsenic, cadmium, chromium, copper, lead, sodium, thallium, vanadium and zinc were present in the ICS solution at concentrations which exceeded the Instrument Detection Limit (IDL). Interference affects exist for antimony, arsenic, chromium, copper, lead and vanadium in the affected sample. The positive

results reported for arsenic, chromium, copper, lead and vanadium were qualified as estimated, "J". The nondetected result reported for antimony was qualified as estimated, "UJ".

The interfering analytes calcium and magnesium were present in sample DRMO-06MW2D-GW-09 at concentrations that were comparable to the levels of calcium and magnesium in the Interference Check Sample (ICS) solution. Several analytes namely antimony, arsenic, cadmium, chromium, copper, lead, sodium, thallium, vanadium and zinc were present in the ICS solution at concentrations which exceeded the Instrument Detection Limit (IDL). Interference affects exist for antimony, arsenic, cadmium, copper, lead and zinc in the affected sample. The positive results reported for arsenic, copper, lead and zinc were qualified as estimated, "J". The nondetected results reported for antimony and cadmium were qualified as estimated, "UJ".

The interfering analyte magnesium was present in sample DRMO-06MW2S-GW-09 at a concentration that was comparable to the level of magnesium in the Interference Check Sample (ICS) solution. Several analytes namely antimony, arsenic, cadmium, chromium, copper, lead, sodium, thallium, vanadium and zinc were present in the ICS solution at concentrations which exceeded the Instrument Detection Limit (IDL). Interference affects exist for antimony, arsenic, cadmium, lead and zinc in the affected sample. The positive results reported for arsenic and zinc were qualified as estimated, "J". The nondetected results reported for antimony, cadmium and lead were qualified as estimated, "UJ".

The interfering analytes calcium and magnesium were present in sample GWFD-072500 at concentrations that were comparable to the levels of calcium and magnesium in the Interference Check Sample (ICS) solution. Several analytes namely antimony, arsenic, cadmium, chromium, copper, lead, sodium, thallium, vanadium and zinc were present in the ICS solution at concentrations which exceeded the Instrument Detection Limit (IDL). Interference affects exist for antimony, arsenic, chromium, copper, lead and zinc in the affected sample. The positive results reported for arsenic, chromium, copper and lead were qualified as estimated, "J". The nondetected result reported for antimony was qualified as estimated, "UJ".

Field Duplicate Results

Field duplicate imprecision greater than 30% RPD was noted for aluminum. Positive results reported for aluminum were qualified as estimated, "J".

Additional Data Qualifiers

Results less than 2x the Instrument Detection Limit (IDL) for arsenic, barium, lead and nickel were qualified as estimated, "J", as per regional guidelines.

Negative blank results were greater than 2x the IDL for zinc. The positive results reported for zinc were qualified as estimated, "J".

Notes

A field duplicate summary table is included in Appendix C.

The Contract Required Detection Limit (CRDL) Percent Recovery (%R) for selenium was greater than 120% quality control limits. However, all results reported for selenium were nondetected and validation action was not required.

Executive Summary

Laboratory Performance: Several laboratory contaminants were present in blanks. Zinc was qualified for negative blanks greater than 2x the IDL. The CRDL %R was below the QC limits for lead.

Other Factors Affecting Data Quality: The interfering analytes calcium and magnesium were present in several samples. Arsenic, barium, lead and nickel were qualified as estimated since the results reported were less than 2x the IDL.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", February 1994, the Region I Worksheets, January 1992, and the NFESC document entitled "Navy Installation Restoration Chemical Data Quality Manual". (September 1999).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Jennifer Malle

Tetra Tech NUS
Jennifer Malle
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Regional Worksheets.
4. Appendix D - Support Documentation

APPENDIX A
QUALIFIED ANALYTICAL RESULTS

WATER DATA
Accutest, NJ
SDG: E73764

SAMPLE NUMBER:	DRMO-6MW10D-GW-09			DRMO-6MW10S-GW-09			DRMO-6MW11D-GW-09			DRMO-6MW11S-GW-09		
SAMPLE DATE:	07/24/00			07/24/00			07/25/00			07/25/00		
LABORATORY ID:	E73764-3			E73764-2			E73764-5			E73764-4		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ALUMINUM	69.1	U		69.1	U		2570	J	G	69.1	U	
ANTIMONY	2.6	UJ	K	2.6	U		2.6	UJ	K	2.6	U	
ARSENIC	6.5	J	K	2.7	U		26.1	J	K	2.7	U	
BARIUM	34.9			103			265			107		
BERYLLIUM	0.1	U		0.1			0.23	U	A	0.1	U	
CADMIUM	0.32	UJ	K	0.32	U		1.1	U	A	0.32	U	
CALCIUM	165000			83400			311000			102000		
CHROMIUM	1.3	U		1.3	U		7	J	K	1.3	U	
COBALT	1.8	U	A	0.95	U	A	4.1	U	A	0.94	U	
COPPER	0.87	U		3.7	U	A	32	J	K	1.4	U	A
IRON	1490			1520			11100			307		
LEAD	1.9	UJ	K	1.9	U		10.5	J	K	1.9	U	
MAGNESIUM	363000			133000			814000			231000		
MANGANESE	688			450			1390			282		
MERCURY	0.1	U		0.1	U		0.1	U		0.1	U	
NICKEL	4.5			8.2			9.6			1.2	U	
POTASSIUM	144000			66300			262000			90000		
SELENIUM	3.4	U		3.4	U		3.4	U		3.4	U	
SILVER	1.1	U		1.1	U		1.1	U		1.1	U	
SODIUM	3030000			1120000			6010000			1810000		
THALLIUM	5	U		5	U		5	U		5	U	
VANADIUM	0.71	UJ	K	20			6.8	J	K	16		
ZINC	99.2	J	A	21	J	A	108	J	A	16.9	J	A

10

WATER DATA
Accutest, NJ
SDG: E73764

SAMPLE NUMBER:	DRMO-6MW1S-GW-09			DRMO-6MW2D-GW-09			DRMO-6MW2S-GW-09			DRMO-6MW9S-GW-09		
SAMPLE DATE:	07/27/00			07/26/00			07/27/00			07/25/00		
LABORATORY ID:	E73764-11			E73764-9			E73764-10			E73764-7		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ALUMINUM	69.1	U		490	J	G	69.1	U		218	J	G
ANTIMONY	2.6	U		2.6	UJ	K	2.6	UJ	K	2.6	U	
ARSENIC	2.7	U		3.4	J	PK	3.4	J	PK	2.7	U	
BARIUM	17	U		148			29.9	J	P	17	U	
BERYLLIUM	0.1	U		0.1	U		0.1	U		0.45	U	A
CADMIUM	0.32	U		0.32	UJ	K	0.32	UJ	K	0.37	U	A
CALCIUM	79300			278000			193000			2730		
CHROMIUM	1.3	U		1.3	U		1.3	U		1.3	U	
COBALT	0.94	U		1.2	U	A	0.94	U		3.3	U	A
COPPER	0.87	U		7.8	J	K	6.6	U	A	2	U	A
IRON	23.8	U		3780			455			23.8	U	
LEAD	1.9	U		1.9	J	PCK	1.9	UJ	K	1.9	U	
MAGNESIUM	212000			791000			607000			1030		
MANGANESE	1.2	U		567			99.2			155		
MERCURY	0.1	U		0.1	U		0.1	U		0.1	U	
NICKEL	1.2	U		1.6	J	P	1.2	U		3.7		
POTASSIUM	89600			294000			221000			931		
SELENIUM	3.4	U		3.4	U		3.4	U		3.4	U	
SILVER	1.1	U		1.1	U		20.5			1.1	U	
SODIUM	1620000			6210000			4370000			7610	U	A
THALLIUM	5	U		5	U		5	U		5	U	
VANADIUM	0.72	U	A	3.7	U	A	2	U	A	1.1	U	A
ZINC	25.3	J	A	9.3	J	AK	15.4	J	AK	94.6	J	A

WATER DATA
Accutest, NJ
SDG: E73764

SAMPLE NUMBER:	GWFD-072500											
SAMPLE DATE:	07/25/00			/ /			/ /			/ /		
LABORATORY ID:	E73764-6											
QC_TYPE:	NORMAL											
% SOLIDS:	0.0 %			100.0 %			100.0 %			100.0 %		
UNITS:	UG/L											
FIELD DUPLICATE OF:	DRMO-6MW11D-GW-09											
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ALUMINUM	1850	J	G									
ANTIMONY	2.6	UJ	K									
ARSENIC	21.5	J	K									
BARIUM	264											
BERYLLIUM	0.11	U	A									
CADMIUM	0.9	U	A									
CALCIUM	314000											
CHROMIUM	5.8	J	K									
COBALT	3.7	U	A									
COPPER	24.6	J	K									
IRON	9860											
LEAD	8.9	J	CK									
MAGNESIUM	819000											
MANGANESE	1390											
MERCURY	0.1	U										
NICKEL	8.8											
POTASSIUM	267000											
SELENIUM	3.4	U										
SILVER	1.1	U										
SODIUM	6140000											
THALLIUM	6	U	A									
VANADIUM	4.7	U	A									
ZINC	92.6	J	A									

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: **MARK MENGEL** **DATE: November 28, 2000**

FROM: **JODI VERBANIC** **COPIES: DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION: VOA/PEST/PCB**
CTO 267, NEW LONDON
SDG E73593

SAMPLES: 3/Aqueous/

DRMO-6MW6D-GW-09
DRMO-6MW6S-GW-09
GWTB072300

OVERVIEW

The sample set for the CTO 267, New London, SDG E73593 consists of two (2) aqueous environmental samples and one (1) trip blank (TB). All of the environmental samples were analyzed for volatile organic compounds, pesticides, and polychlorinated biphenyls (PCBs). No field duplicates were included in the SDG.

The samples were collected by TetraTech NUS on July 23, 2000 and were analyzed by Accutest Laboratories. Analyses were conducted using CLP Method OLC02.1 analytical and reporting protocols.

The data were evaluated based on the following parameters:

- Data Completeness
- * Holding Times
- * GC/MS Tuning
- * Initial and Continuing Calibration
- Blank Results
- * Surrogate Spike Recoveries
- * Internal Standards Performance
- * Blank Spike/Blank Spike Duplicate Results
- Matrix Spike/Matrix Spike Duplicate Results
- * Detection Limits
- * Compound Quantitation
- * Compound Identification

The asterisk (*) indicates that all quality control criteria were met for this parameter. Qualified (if applicable) analytical results are summarized in Appendix A. Results as reported by the laboratory are presented in Appendix B. Appendix C contains Region I worksheets, and Appendix D contains the documentation to support the findings as discussed in this data validation report.

VOLATILES

Blank Results

The trip blank (GWTB072300) contained a positive detection for carbon disulfide. No action was taken on this basis because the environmental samples had nondetected results for carbon disulfide.

Matrix Spike/Matrix Spike Duplicate Results

The matrix spike percent recovery of bromoform fell below the lower quality control limit. RPD for bromoform exceeded the quality control limit. As a result, bromoform in the unspiked sample was qualified as estimated (UJ).

PESTICIDES/PCBs

Initial Calibration

Retention time windows for the initial calibration of multicomponent analytes (Form VI Pest-3) were ±0.10 minutes. According to Method OLC 02.1 Table D-1, the retention time windows for the Arochlors and Toxaphene should be ±0.07 minutes. No action was taken on this basis.

Pesticide Clean-up Check

For the Florisil Cartridge Performance Check, Accutest did not spike the Florisil cartridge with the 2,4,5-trichlorophenol solution as required in Method OLC 02.1 Section 10.2.4.2.2.3. However, the midpoint concentration of Individual Standard Mixture A was used, and the percent recoveries for all compounds meet the quality control limits. No action was taken on this basis.

ADDITIONAL COMMENTS

Accutest Laboratories failed to report results for 1,2,4-trichlorobenzene.

The Form VII (Volatile Continuing Calibration Check) provided with the data package contained incorrect average Relative Response Factors (RRF) for each compound. Tetra Tech NUS waited over five weeks for Accutest Laboratories to correctly reissue this form with the appropriate RRFs.

Accutest Laboratories has made several typographical errors regarding environmental sample identification numbers on the volatile and pesticide Form Is. Corrections have been noted in the support documentation.

Rounding differences of 0.01 to 0.001 μg/L occur between the matrix spike concentrations for the pesticides reported on Form III Pest-1 and the concentrations reported on the raw data forms. The effect on data accuracy is not expected to be significant.

Positive results reported at concentrations below the CRQL were qualified as estimated (J).

The text of this report has been formulated to address only those problem areas affecting data quality.

OVERALL ASSESSMENT

Laboratory Performance: Several volatile compounds failed to meet blank, and matrix spike/matrix spike duplicate criteria. Pesticides and PCBs meet all quality control criteria.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the Region I EPA "Volatile and Semivolatile Data Validation Functional Guidelines - Part II" (12/96).

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Jodi L. Verbanic
TetraTech NUS

Jodi L. Verbanic
Data Validator

TetraTech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Regional Worksheets
4. Appendix D - Support Documentation

APPENDIX A

QUALIFIED LABORATORY RESULTS

SAMPLE DATE:	07/23/00			07/23/00			07/23/00			/ /		
LABORATORY ID:	E73593-2			E73593-3			E73593-1					
QC_TYPE:	NORMAL			NORMAL			NORMAL					
% SOLIDS:	0.0 %			0.0 %			0.0 %			100.0 %		
UNITS:	UG/L			UG/L			UG/L					
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,1,1-TRICHLOROETHANE	1	U		1	U		1	U				
1,1,2,2-TETRACHLOROETHANE	1	U		1	U		1	U				
1,1,2-TRICHLOROETHANE	1	U		1	U		1	U				
1,1-DICHLOROETHANE	1	U		1	U		1	U				
1,1-DICHLOROETHENE	1	U		1	U		1	U				
1,2-DIBROMO-3-CHLOROPROPANE	1	U		1	U		1	U				
1,2-DIBROMOETHANE	1	U		1	U		1	U				
1,2-DICHLOROBENZENE	1	U		1	U		1	U				
1,2-DICHLOROETHANE	1	U		1	U		1	U				
1,2-DICHLOROPROPANE	1	U		1	U		1	U				
1,3-DICHLOROBENZENE	1	U		1	U		1	U				
1,4-DICHLOROBENZENE	1	U		1	U		1	U				
2-BUTANONE	5	U		5	U		5	U				
2-HEXANONE	5	U		5	U		5	U				
4-METHYL-2-PENTANONE	5	U		5	U		5	U				
ACETONE	5	U		5	U		5	U				
BENZENE	1	U		1	U		1	U				
BROMOCHLOROMETHANE	1	U		1	U		1	U				
BROMODICHLOROMETHANE	1	U		1	U		1	U				
BROMOFORM	1	UJ	D	1	U		1	U				
BROMOMETHANE	1	U		1	U		1	U				
CARBON DISULFIDE	1	U		1	U		0.7	J	P			
CARBON TETRACHLORIDE	1	U		1	U		1	U				
CHLOROBENZENE	1	U		1	U		1	U				
CHLOROETHANE	1	U		1	U		1	U				
CHLOROFORM	1	U		1	U		1	U				
CHLOROMETHANE	1	U		1	U		1	U				
CIS-1,2-DICHLOROETHENE	7			1	U		1	U				
CIS-1,3-DICHLOROPROPENE	1	U		1	U		1	U				
DIBROMOCHLOROMETHANE	1	U		1	U		1	U				
ETHYLBENZENE	1	U		1	U		1	U				
METHYLENE CHLORIDE	2	U		2	U		2	U				
STYRENE	1	U		1	U		1	U				

WAV_RES.DBF

WATER DATA
Accutest, NJ
SDG: E73593

SAMPLE NUMBER:	DRMO-6MW6D-GW-09			DRMO-6MW6S-GW-09			GWTB072300				
SAMPLE DATE:	07/23/00			07/23/00			07/23/00			/ /	
LABORATORY ID:	E73593-2			E73593-3			E73593-1				
QC_TYPE:	NORMAL			NORMAL			NORMAL				
% SOLIDS:	0.0 %			0.0 %			0.0 %			100.0 %	
UNITS:	UG/L			UG/L			UG/L				
FIELD DUPLICATE OF:											
	RESULT	**QUAL**	**CODE**	**RESULT**	**QUAL**	**CODE**	**RESULT**	**QUAL**	**CODE**	**RESULT**	**QUAL**	**CODE**
VOLATILES												
TETRACHLOROETHENE	1	U		1	U		1	U				
TOLUENE	1	U		1	U		1	U				
TRANS-1,2-DICHLOROETHENE	1	U		1	U		1	U				
TRANS-1,3-DICHLOROPROPENE	1	U		1	U		1	U				
TRICHLOROETHENE	10			0.5	J	P	1	U				
VINYL CHLORIDE	1	U		1	U		1	U				
XYLENES, TOTAL	1	U		1	U		1	U				

WATER DATA
Accutest, NJ
SDG: E73593

SAMPLE NUMBER:	DRMO-6MW6D-GW-09	DRMO-6MW6S-GW-09		
SAMPLE DATE:	07/23/00	07/23/00	/ /	/ /
LABORATORY ID:	E73593-2	E73593-3		
QC_TYPE:	NORMAL	NORMAL		
% SOLIDS:	0.0 %	0.0 %	100.0 %	100.0 %
UNITS:	UG/L	UG/L		
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
PESTICIDES/PCBs												
4,4'-DDD	0.02	U		0.02	U							
4,4'-DDE	0.02	U		0.02	U							
4,4'-DDT	0.02	U		0.02	U							
ALDRIN	0.01	U		0.01	U							
ALPHA-BHC	0.01	U		0.01	U							
ALPHA-CHLORDANE	0.01	U		0.01	U							
AROCLOR-1016	0.2	U		0.2	U							
AROCLOR-1221	0.4	U		0.4	U							
AROCLOR-1232	0.2	U		0.2	U							
AROCLOR-1242	0.2	U		0.2	U							
AROCLOR-1248	0.2	U		0.2	U							
AROCLOR-1254	0.2	U		0.2	U							
AROCLOR-1260	0.2	U		0.2	U							
BETA-BHC	0.01	U		0.01	U							
DELTA-BHC	0.01	U		0.01	U							
DIELDRIN	0.02	U		0.02	U							
ENDOSULFAN I	0.01	U		0.01	U							
ENDOSULFAN II	0.02	U		0.02	U							
ENDOSULFAN SULFATE	0.02	U		0.02	U							
ENDRIN	0.02	U		0.02	U							
ENDRIN ALDEHYDE	0.02	U		0.02	U							
ENDRIN KETONE	0.02	U		0.02	U							
GAMMA-BHC (LINDANE)	0.01	U		0.01	U							
GAMMA-CHLORDANE	0.01	U		0.01	U							
HEPTACHLOR	0.01	U		0.01	U							
HEPTACHLOR EPOXIDE	0.01	U		0.01	U							
METHOXYCHLOR	0.1	U		0.1	U							
TOXAPHENE	1	U		1	U							

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: **MARK MENGEL** **DATE: NOVEMBER 29, 2000**

FROM: **JENNIFER JEFFERY** **COPIES: DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION: SVOA/PAH**
CTO 267, NEW LONDON
SDG E73593A

SAMPLES: 2/Aqueous/SVOA/PAH

DRMO-6MW6D-GW-09
DRMO-6MW6S-GW-09

Overview

The sample set for the CTO 267, New London, SDG E73593A consists of two (2) aqueous environmental samples. All samples were analyzed for TCL semivolatile organic compounds and polynuclear aromatic hydrocarbons (PAHs). No field duplicate pairs were included in the SDG.

The samples were collected by TetraTech NUS on July 23, 2000 and were analyzed by Accutest. Semivolatile analyses were conducted using SW-846 8270C and PAHs were analyzed via Selective Ion Monitoring (SIM) method.

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times
- * GC/MS Tuning
- Calibration
- * Blanks
- * Surrogate Spike Recoveries
- * Field Duplicate Precision
- * Matrix Spike/Matrix Spike Duplicate Recoveries
- * Laboratory Control Sample Recoveries
- * Internal Standards Performance
- * Compound Identification
- * Compound Quantitation
- * Detection Limits

The asterisk (*) indicates that all quality control criteria were met for this parameter. Qualified (if applicable) analytical results are summarized in Appendix A. Results as reported by the laboratory are presented in Appendix B. Appendix C contains Region I worksheets, and Appendix D contains the documentation to support the findings as discussed in this data validation report.

HOLDING TIMES

The laboratory forgot to analyze PAHs for the two samples in this SDG. According to the analytical SOW, PAHs were to be analyzed via SW-846 8310. Once the lab realized their mistake, the PAHs were grossly outside the holding time for 8310. Tetra Tech NUS instructed the lab to analyze PAHs via 8270C SIM. The PAHs were 20 days in excess of the 40 days to analyze holding time for 8270C. The PAHs were qualified as estimated. Only nondetected results were reported for PAHs and these were qualified as estimated (UJ).

CALIBRATIONS

The following table summarizes calibration noncompliances and corresponding actions:

Compound	IC 07/25/00
Hexachlorocyclopentadiene	X
2,4 Dinitrophenol	X
Associated Samples:	DRMO-6MW6D-GW-09 DRMO-6MW6S-GW-09

Compound	CCV 07/27/00
Hexachlorocyclopentadiene	X
Associated Samples:	DRMO-6MW6D-GW-09 DRMO-6MW6S-GW-09

Compound	09/21/00
Phenanthrene	X
Associated Samples:	DRMO-6MW6D-GW-09 DRMO-6MW6S-GW-09

Calibration Actions:

X - %RSD > 30%; Estimate (UJ) non-detected results.

X - %D > 25%; Estimate (UJ) non-detected results.

LABORATORY CONTROL SAMPLE

Laboratory Control Sample (LCS) percent recovery for phenol was below the lower quality control limit but greater that 10%. Nondetected results for phenol were qualified as estimated results (UJ).

INTERNAL STANDARDS

The Internal Standard Area Summary was not used to evaluate the data since the concentrations of the internal standards were spiked at levels used for non-SIM analysis.

ADDITIONAL COMMENTS

Positive results reported at concentrations below the CRQL were qualified as estimated, (J).

EXECUTIVE SUMMARY

Laboratory Performance:

The laboratory neglected to extract the PAH samples within the required holding time. Several calibration noncompliances were noted affecting semivolatiles. A noncompliant LCS recovery was noted for phenol.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the Region I EPA "Volatile and Semivolatile Data Validation Functional Guidelines - Part II" (12/96).

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

TetraTech NUS

Jennifer Jeffery
Data Validator

TetraTech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Regional Worksheets
4. Appendix D - Support Documentation

APPENDIX A

QUALIFIED LABORATORY RESULTS

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73593A

SAMPLE NUMBER:	DRMO-6MW6D-GW-09			DRMO-6MW6S-GW-09								
SAMPLE DATE:	07/23/00			07/23/00			/ /			/ /		
LABORATORY ID:	E73593-2AR			E73593-3AR								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	0.0 %			0.0 %			100.0 %			100.0 %		
UNITS:	UG/L			UG/L								
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
ACENAPHTHENE	0.2	UJ	H	0.2	UJ	H						
ACENAPHTHYLENE	0.2	UJ	H	0.2	UJ	H						
ANTHRACENE	0.2	UJ	H	0.2	UJ	H						
BENZO(A)ANTHRACENE	0.2	UJ	H	0.2	UJ	H						
BENZO(A)PYRENE	0.2	UJ	H	0.2	UJ	H						
BENZO(B)FLUORANTHENE	0.2	UJ	H	0.2	UJ	H						
BENZO(G,H,I)PERYLENE	0.2	UJ	H	0.2	UJ	H						
BENZO(K)FLUORANTHENE	0.2	UJ	H	0.2	UJ	H						
CHRYSENE	0.2	UJ	H	0.2	UJ	H						
DIBENZO(A,H)ANTHRACENE	0.2	UJ	H	0.2	UJ	H						
FLUORANTHENE	0.2	UJ	H	0.2	UJ	H						
FLUORENE	0.2	UJ	H	0.2	UJ	H						
INDENO(1,2,3-CD)PYRENE	0.2	UJ	H	0.2	UJ	H						
NAPHTHALENE	0.2	UJ	H	0.2	UJ	H						
PHENANTHRENE	0.2	UJ	HC	0.2	UJ	HC						
PYRENE	0.2	UJ	H	0.2	UJ	H						

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73593A

SAMPLE NUMBER:	DRMO-6MW6D-GW-09			DRMO-6MW6S-GW-09								
SAMPLE DATE:	07/23/00			07/23/00			/ /			/ /		
LABORATORY ID:	E73593-2A			E73593-3A								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	0.0 %			0.0 %			100.0 %			100.0 %		
UNITS:	UG/L			UG/L								
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
SEMIVOLATILES												
1,2,4-TRICHLOROBENZENE	2	U		2	U							
1,2-DICHLOROBENZENE	2	U		2	U							
1,3-DICHLOROBENZENE	2	U		2	U							
1,4-DICHLOROBENZENE	2	U		2	U							
2,4,5-TRICHLOROPHENOL	5.1	U		5	U							
2,4,6-TRICHLOROPHENOL	5.1	U		5	U							
2,4-DICHLOROPHENOL	5.1	U		5	U							
2,4-DIMETHYLPHENOL	5.1	U		5	U							
2,4-DINITROPHENOL	20	UJ	C	20	UJ	C						
2,4-DINITROTOLUENE	2	U		2	U							
2,6-DINITROTOLUENE	2	U		2	U							
2-CHLORONAPHTHALENE	5.1	U		5	U							
2-CHLOROPHENOL	5.1	U		5	U							
2-METHYLNAPHTHALENE	2	U		2	U							
2-METHYLPHENOL	5.1	U		5	U							
2-NITROANILINE	5.1	U		5	U							
2-NITROPHENOL	5.1	U		5	U							
3&4-METHYLPHENOL	5.1	U		5	U							
3,3'-DICHLOROBENZIDINE	5.1	U		5	U							
3-NITROANILINE	5.1	U		5	U							
4,6-DINITRO-2-METHYLPHENOL	20	U		20	U							
4-BROMOPHENYL PHENYL ETHER	2	U		2	U							
4-CHLORO-3-METHYLPHENOL	5.1	U		5	U							
4-CHLOROANILINE	5.1	U		5	U							
4-CHLOROPHENYL PHENYL ETHER	2	U		2	U							
4-NITROANILINE	5.1	U		5	U							
4-NITROPHENOL	20	U		20	U							
BIS(2-CHLOROETHOXY)METHANE	2	U		2	U							
BIS(2-CHLOROETHYL)ETHER	2	U		2	U							
BIS(2-CHLOROISOPROPYL)ETHER	2	U		2	U							
BIS(2-ETHYLHEXYL)PHTHALATE	18.1			2.3								
BUTYLBENZYL PHTHALATE	2	U		2	U							
CARBAZOLE	2	U		2	U							

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73593A

SAMPLE NUMBER:	DRMO-6MW6D-GW-09	DRMO-6MW6S-GW-09	/ /	/ /
SAMPLE DATE:	07/23/00	07/23/00		
LABORATORY ID:	E73593-2A	E73593-3A		
QC_TYPE:	NORMAL	NORMAL		
% SOLIDS:	0.0 %	0.0 %	100.0 %	100.0 %
UNITS:	UG/L	UG/L		
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
SEMIVOLATILES												
DI-N-BUTYL PHTHALATE	2	U		2	U							
DI-N-OCTYL PHTHALATE	2	U		2	U							
DIBENZOFURAN	5.1	U		5	U							
DIETHYL PHTHALATE	2	U		2	U							
DIMETHYL PHTHALATE	2	U		2	U							
HEXACHLOROBENZENE	2	U		2	U							
HEXACHLOROBUTADIENE	2	U		2	U							
HEXACHLOROCYCLOPENTADIENE	20	U		20	U							
HEXACHLOROETHANE	5.1	UJ	C	5	UJ	C						
ISOPHORONE	2	U		2	U							
N-NITROSO-DI-N-PROPYLAMINE	2	U		2	U							
N-NITROSODIPHENYLAMINE	5.1	U		5	U							
NITROBENZENE	2	U		2	U							
PENTACHLOROPHENOL	20	U		20	U							
PHENOL	5.1	UJ	E	5	UJ	E						

Tetra Tech NUS

INTERNAL CORRESPONDENCE

TO:	**M. MENGEL**	**DATE:**	**OCTOBER 19, 2000**
FROM:	**GRETCHEN PHIPPS**	**COPIES:**	**DV FILE**
SUBJECT:	**INORGANIC DATA VALIDATION – TAL METALS** **CTO 267 - NSB NEW LONDON** **SDG – E73593**		
SAMPLES:	2/Aqueous/		
	DRMO-6MW6D-GW-09	DRMO-6MW6S-GW-09	

Overview

The sample set for CTO 267, NSB New London, SDG E73593, consists of two (2) aqueous environmental samples.

The samples were analyzed for target analyte list (TAL) metals,. The samples were collected by Tetra Tech NUS on July 23, 2000 and analyzed by Accutest Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. Metals analyses were conducted in accordance with ILM04.0 methodologies.

All analyses, with the exception of mercury, were conducted using Inductively Couples Plasma (ICP) methodologies. Mercury analyses were conducted using cold vapor AA.

The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
	•	Calibration Verifications
	•	Laboratory Blank Analyses
*	•	ICP Interference Check Sample Results
*	•	Laboratory Control Sample Results
*	•	Matrix Spike Results
*	•	Laboratory Duplicate Results
	•	ICP Serial Dilution Results
*	•	Sample Quanitation
*	•	Detection Limits

* - All quality control criteria were met for this parameter.

Laboratory Blank Analyses

The following contaminants were detected in the laboratory method / preparation blanks at the following maximum concentrations:

Affected samples: All

Analyte	Maximum Concentration	Action Level
Antimony	3.9 µg/L	19.5 µg/L
Beryllium	0.7 µg/L	3.5 µg/L
Cadmium	1.0 µg/L	5.0 µg/L
Calcium	92.1 µg/L	460.5 µg/L
Copper	1.2 µg/L	6.0 µg/L
Iron	33.3 µg/L	166.5 µg/L
Magnesium	57.1 µg/L	285.5 µg/L
Nickel[1]	2.15 µg/L	10.75 µg/L
Sodium	2236 µg/L	11180 µg/L
Thallium	5 µg/L	25 µg/L
Vanadium	1.3 µg/L	6.5 µg/L
Zinc	1.7 µg/L	8.5 µg/L

[1] Maximum concentration present in a preparation blank.

An action level of 5X the maximum concentration has been used to evaluate the sample data for blank contamination. Dilution factors and sample aliquots were taken into consideration when evaluating for blank contamination. Positive results < the action level for cadmium, nickel and zinc were qualified as, "U", as a result of blank contamination.

ICP Serial Dilution

The ICP Serial Dilution Percent Difference (%D) for potassium was >15% quality control limit. The positive results reported for potassium were qualified as estimated, "J".

Other Factor Affecting Data Quality

Positive results less than 2X the IDL reported for barium, cobalt and manganese were qualified as estimated, "J".

Notes

The Contract Required Detection Limit (CRDL) Percent Recovery (%R) for mercury was >120% quality control limit. However, all results reported for mercury were nondetected. Therefore, no validation action was required.

Executive Summary

Laboratory Performance: Several analytes were present in the laboratory method / preparation blanks.

Other Factors Affecting Data Quality: Potassium was qualified due to ICP Serial Dilution noncompliances. Positive results less than 2X the IDL were qualified as estimated.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", February 1994, "EPA Region I Functional Guidelines for Evaluating Inorganic Analyses", February 1989 and the NFESC document entitled "Navy IRCDQM." (September, 1999).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Gretchen A. Phipps

Tetra Tech NUS
Gretchen A. Phipps

Tetra Tech NUS
Joseph A. Samchuck
Quality Control Officer

Attachments:

1. Appendix A - Qualified Analytical Data
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Regional Worksheets
4. Appendix D - Support Documentation

APPENDIX A
QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCD% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop

CTO267-NSB NEW LONDON
WATER DATA
Accutest, NJ
SDG: E73593

SAMPLE NUMBER:	DRMO-6MW6D-GW-09	DRMO-6MW6S-GW-09		
SAMPLE DATE:	07/23/00	07/23/00	/ /	/ /
LABORATORY ID:	E73593-2	E73593-3		
QC_TYPE:	NORMAL	NORMAL		
% SOLIDS:	0.0 %	0.0 %	100.0 %	100.0 %
UNITS:	UG/L	UG/L		
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ALUMINUM	69.1	U		69.1	U							
ANTIMONY	2.6	U		2.6	U							
ARSENIC	2.7	U		2.7	U							
BARIUM	48.0			30.1	J	P						
BERYLLIUM	0.10	U		0.10	U							
CADMIUM	0.63	U	A	0.40	U	A						
CALCIUM	65500			13400								
CHROMIUM	1.3	U		1.3	U							
COBALT	1.2	J	P	0.94	U							
COPPER	0.87	U		0.87	U							
IRON	1400			23.8	U							
LEAD	1.9	U		1.9	U							
MAGNESIUM	53900			3100								
MANGANESE	2510			1.2	J	P						
MERCURY	0.10	U		0.10	U							
NICKEL	8.0	U	A	1.6	U	A						
POTASSIUM	22800	J	I	2600	J	I						
SELENIUM	3.4	U		3.4	U							
SILVER	1.1	U		1.1	U							
SODIUM	483000			34300								
THALLIUM	5.0	U		5.0	U							
VANADIUM	0.71	U		0.71	U							
ZINC	10.6			6.9	U	A						