Corrective Action Groundwater Monitoring Rounds 4 – 6 for Former Building 44 (Pump House) UST Site

Naval Station Newport
Newport, Rhode Island

Environmental Field Activity Northeast
Naval Facilities Engineering Command

Contract No. N62467-94-D-0888
Contract Task Order 0809

January 2004

TETRA TECH NUS, INC.

W5203298F

CORRECTIVE ACTION
GROUNDWATER MONITORING
ROUNDS 4 – 6
FOR
FORMER BUILDING 44 (PUMP HOUSE) UST SITE

NAVAL STATION NEWPORT
NEWPORT, RHODE ISLAND

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION - NAVY (CLEAN) CONTRACT

Submitted to:
Environmental Branch, (Code EV2)
Environmental Field Activity Northeast
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 No. N62467-94-D-0888
Contract Task Order 0809

January 2004

PREPARED UNDER THE DIRECTION OF:

JAMES R. FORRELLI, P.E.
PROJECT MANAGER
TETRA TECH NUS, INC.
WILMINGTON, MASSACHUSETTS

APPROVED FOR SUBMISSION BY:

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

TABLE OF CONTENTS

SECTION		PAGE
1.0	INTRODUCTION	1-1
2.0	GROUNDWATER MONITORING RESULTS	2-1
2.1	ROUNDS 4 THROUGH 6 GROUNDWATER MONITORING ACTIVITIES	2-1
2.2	GROUNDWATER ELEVATIONS	2-2
2.3	UPGRADIENT WELL MONITORING RESULTS	2-3
2.4	SOURCE AREA WELLS MONITORING RESULTS	2-5
2.5	DOWNGRADIENT WELLS MONITORING RESULTS	2-7
3.0	FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS	3-1
3.1	FINDINGS	3-1
3.2	CONCLUSIONS	3-3
3.3	RECOMMENDATIONS	3-4
REFERENCES		

TABLES

NUMBER	
2-1	Monitoring Well Summary
2-2	Well Construction Summary and Groundwater Elevations
2-3	Groundwater VOCs and SVOCs Analytical Summary
2-4	Groundwater GRO, DRO-TPH and Metals Analytical Summary

FIGURES

NUMBER	
1-1	Site Location Map
1-2	Site Map
2-1	Rounds 1 Through 3 Monitoring Well Locations
2-2	Round 4 (September 2002) Groundwater Level Map
2-3	Round 5 (March 2003) Groundwater Level Map
2-4	Round 6 (September 2003) Groundwater Level Map

APPENDICES

A	Monitoring Well Modification Activities Report
B	Field Parameters – Rounds 4 Through 6
C	Analytical Results – Rounds 4 Through 6

1.0 INTRODUCTION

This Rounds 4-6 Corrective Action Groundwater Monitoring Report for the former Building 44 (Former Pump House) Underground Storage Tank (UST) Site has been prepared by Tetra Tech NUS, Inc. (TtNUS), under the Comprehensive Long-Term Environmental Action Navy (CLEAN) contract. This report describes monitoring activities conducted at the former Building 44 UST Site located at the Naval Station Newport (NAVSTA Newport) in Newport, Rhode Island from September 2002 to September 2003.

The site is located on the northern end of Gould Island, in the East Passage of Narragansett Bay, approximately 1.5 miles off the coast of Middletown, Rhode Island. Building 44 served as the pump house for seven USTs before it was demolished in 1989. The remainder of the island is inactive. Demolition and remedial activities are on-going for other sites in the northern part of the island. A site location map is presented on Figure 1-1.

The USTs consisted of two 5,000-gallon steel tanks and five 50,000-gallon concrete tanks. These USTs were installed in the 1940s to supply fuel to the power generation plant on Gould Island. The UST area is located north of former Building 32 (abandoned torpedo overhaul facility). The locations of the former USTs and of Buildings 44 and 32 are shown on Figure 1-2.

In 1997, TtNUS (formerly Brown & Root Environmental) performed a supplemental site investigation (SSI) of the groundwater and soil petroleum hydrocarbon contamination at this former location of seven underground storage tanks. In a 1998 follow-up investigation field-filtered groundwater samples were collected to accurately determine the level of dissolved lead concentrations in groundwater at the site. A corrective action plan (CAP) prepared by TtNUS recommended soil excavation and long-term groundwater monitoring. In the fall of 2000 another Navy contractor completed the UST removal and soil excavation phase in conjunction with the Building 32 demolition activities. Demolition debris (red brick and crushed concrete) was used to back fill the USTs excavation area. As part of the corrective action, six groundwater sampling rounds, Rounds 1 through 6, have been conducted.

The objectives of the groundwater monitoring program are to monitor groundwater to confirm contamination is not entering the surficial aquifer and to recover mobile free product, if detected. In addition, the monitoring will determine if the existing network of groundwater monitoring wells is adequate to monitor contaminant migration. This report has been prepared to summarize and evaluate the data collected from the last three rounds of corrective action groundwater monitoring.

Detailed information on the former Building 44 UST Site description, history, and previous investigations is provided in the Corrective Action Plan (CAP), Former Building 44 (Former Pump House), January 1999, prepared by TtNUS.

2.0 GROUNDWATER MONITORING RESULTS

The former Building 44 UST Site corrective action groundwater monitoring program studied contamination migration in site groundwater over a 2½-year period to confirm that contamination is not entering the surficial aquifer. Detailed information on the first three groundwater monitoring rounds is provided in the Rounds 1-3 Corrective Action Groundwater Monitoring Report, Former Building 44 (Pump House), July 2002, prepared by TtNUS. A discussion of the Rounds 4 through 6 monitoring activities and results is presented below.

2.1 ROUNDS 4 THROUGH 6 GROUNDWATER MONITORING ACTIVITIES

Table 2-1 presents a summary of the corrective action groundwater monitoring activities. Rounds 4 through 6, the second set of three corrective action groundwater monitoring events at the site, took place from September 2002 to September 2003. Rounds 1 through 3 were conducted from April 2001 through April 2002. Site monitoring wells are shown in Figure 2-1. The designated wells for the corrective action groundwater monitoring program consisted of seven of the eleven overburden wells that existed at the site prior to the UST removal and soil excavation in the fall of 2000. As a result of the soil excavation and Building 32 demolition several of the previously installed monitoring wells had been damaged or destroyed. Damaged wells were repaired or abandoned and replacement wells were installed in December 2000 and June 2001. Replacement wells are designated with an "R" in the well identification. One monitoring well, MW208, was not replaced.

During Rounds 4 through 6, site re-grading activities performed as part of on-going Gould Island building demolition impacted the monitoring wells. During Round 4 sampling event three wells (MW001R, MW204R and MW205R) were found buried under several inches of material and during the Round 5 sampling event MW204R was found covered by several inches of standing water that had collected as a result of site re-grading. This well was not opened at that time due to cross-contamination concerns.

In August 2003, the casings for all ten monitoring wells at the site were modified from flush-mount protective casings to stick-up protective casings. A well modification activities report is presented in Appendix A which includes adjusted measuring point elevations and modified well construction logs. During well modification activities it was discovered that several wells (MW001R, MW202R, MW204R) appeared to have been compromised or damaged (buried, damaged or missing casing and/or j-plugs) since Round 5. It is believed that these conditions allowed solids to enter the wells, leading to solids deposition in some wells and high turbidity readings in several wells during the Round 6 sampling event. Other wells did not show external evidence of damage, however, observations made during the Round 6 sampling event (a soft bottom and/or obviously foreign materials such as grass and bird feathers) indicate

that some wells had been compromised. These wells included MW001R, MW003R, MW201R, MW202R, MW204R, and MW209.

During each sampling event groundwater levels were measured using an electronic oil/water interface probe. Table 2-2 presents groundwater elevation data. The probe was also used to check for the presence of dense or light non-aqueous phase liquid (DNAPL or LNAPL) or free product layers in all serviceable monitoring wells. Wells and sample bailers were also inspected for evidence of free product. No evidence of free product was recorded during the sampling rounds. The designated wells were purged with peristaltic pumps and sampled using bailers. In Round 6 silt and foreign material (grass and bird feathers) clogged the tubing of the peristaltic pumps normally used for purging the wells; in an effort to remove the material, a submersible pump and/or bailers were used. A table of observed groundwater field parameters is presented in Appendix B. Samples were shipped to an off-site laboratory for analysis of the following parameters:

- volatile organic compounds (VOCs) by USEPA SW-846 Method 8260B
- semivolatile organic compounds (SVOCs) by USEPA SW-846 Method 8270C
- gasoline range organics (GRO) by USEPA SW-846 Method 8015M
- diesel range organics-total petroleum hydrocarbons (DRO-TPH) by USEPA SW-846 Method 8015M/8100M
- RCRA total and dissolved metals by USEPA SW-846 Methods 6010B/7471A (Rounds 5 and 6)
- TAL total and dissolved metals by USEPA SW846, Methods 6010/7470 (Round 4)

A partial Tier II data validation was performed on the analytical results. Complete analytical results are provided in Appendix C. Analytical results for detected VOCs and SVOCs are presented in Table 2-3 (Note: The laboratory reported naphthalene in both the VOC and SVOC results. For consistency with previous analyses at the site the SVOC results for naphthalene were used in evaluating the data.). Analytical results for GRO, DRO-TPH and detected total and dissolved metals are presented in Table 2-4. Analytical results are compared to GA groundwater quality standards (GWQS) in Tables 2-3 and 2-4. Chemical concentrations at or higher than the preventive action limit (PAL) are italicized, while chemical concentrations at or higher than the GA groundwater quality standard are bolded and italicized.

2.2 GROUNDWATER ELEVATIONS

As discussed in the CAP, the surficial materials at the site primarily consist of silty sand and sand with silt and some gravel. These materials become more compacted with depth and overlie weathered bedrock. The bedrock consists of a phyllite, with depth to refusal ranging from 9 to 25 feet in the on-site borings.

Depths to groundwater were measured during all three sampling rounds and were converted to elevations to construct water table maps for each sampling round. The depth to groundwater measurements and conversion to groundwater elevations during Round 6 were based on the new riser measuring point elevations.

The highest water elevations in Rounds 1 through 3 were located in the source area wells. For Rounds 4 and 5, the highest water elevation was west of the source area, at MW209. For Round 6, the highest water elevation was at MW204R, the upgradient well, followed by the source area wells. A review of the water level maps (Figures 2-2 through 2-4) indicates that the groundwater levels, and thus the groundwater flow directions, in wells closest to the former Building 32 appear to fluctuate the most, while the flow directions around the downgradient wells have remained stable throughout the six rounds. These fluctuations are believed to be related to site activity. The change in groundwater flow pattern is believed to be the result of a large number of 1.5-inch holes drilled through the concrete road adjacent to MW209 during demolition activities, which may allow greater groundwater recharge from precipitation in the area, altering the groundwater elevations at the site, and to some extent, the groundwater flow direction. The change from Round 5 to 6 may be due to surface water runoff changes from re-grading the site prior to Round 5; however, MW204R was not serviceable during Round 5. If the highest groundwater level was at MW204R during Round 5, Rounds 5 and 6 would have similar flow patterns. For the purpose of this report, MW204R is considered to be an upgradient well and MW203R is considered to be a source area well.

Based on the groundwater flow directions observed in Rounds 4 through 6 the current groundwater monitoring well network is still effective in monitoring the potential for contaminants to migrate from the former USTs area.

2.3 UPGRADIENT WELL MONITORING RESULTS

One upgradient well, MW204R, provides background water quality data for the six sampling rounds. MW204R is located southeast of the former tank locations.

SSI Groundwater Results

During the 1997 SSI field investigation, total petroleum hydrocarbons (TPH) were not detected in the MW204 sample. Two VOC detections (chloroform and total xylenes) were reported at low levels for MW204 during the SSI field investigation. No SVOCs were detected in MW204 during the SSI. In addition, lead was detected at 15.8 µg/L in the unfiltered bailer sample, slightly above the GWQS of 15

µg/L. Lead was not detected in the field-filtered groundwater sample (indicating the level of dissolved lead concentrations in the groundwater) collected in 1998 from MW204.

Rounds 1 through 3 Groundwater Results

During Rounds 1 through 3, no GRO detections were reported for MW204, while DRO-TPH was detected during all three rounds at low levels. No visual evidence of petroleum hydrocarbon contamination or free product was found in MW204. No VOCs were detected; however, several SVOCs were detected, including two exceedances of the GWQS for naphthalene and pentachlorophenol. Two metals, lead and mercury, were detected in the unfiltered (total) metals samples at levels above the GWQS. No exceedances of the GWQS were observed for the filtered (dissolved) metals samples.

Rounds 4 through 6 Groundwater Results

As discussed in Section 2.1, during Round 5 MW204R was observed to be covered with several inches of standing water and therefore not sampled. Also, in Round 6 purge water from MW204R was observed to contain foreign material (leaf litter, grass, and bird feathers) indicating that the flush-mount well cover had been compromised. A high sample turbidity (101 NTU) also indicates that solids had entered the well since the previous sampling event.

In Rounds 4 and 6, no indication of free product was observed and GRO was not detected in MW-204. DRO-TPH was detected during both rounds at levels of 0.55 mg/L (Round 4) and 1.2 mg/L (Round 6). No VOCs were detected. Six SVOCs were detected in the Round 4 samples and 17 SVOCs were detected in the Round 6 samples. The only exceedance of the GWQS was for benzo(a)pyrene in Round 6, with a concentration of 15 µg/L.

One metal, lead, was detected in the unfiltered (total metals) bailer samples at levels above the GWQS. The lead concentration exceeds the GWQS of 15 µg/L in the Round 4 sample (26.6 µg/L), as well as the Round 6 sample (109 J µg/L). Up to four metals were detected in the filtered bailer samples in the two rounds with no exceedances occurring.

In summary, visual observations and GRO and TPH analyses indicate that levels of petroleum-related products have remained at their previous low levels in MW204. Both SVOCs that exceeded the GWQS in the first three sampling rounds have declined to concentrations below the GWQS by Round 6. However, the benzo(a)pyrene level exceeds the GWQS for the first time in Round 6. Lead (unfiltered samples only) was the only metal that exceeds the GWQS in Rounds 4 and 6. However, the filtered (dissolved) metal concentrations have been consistently below the GWQS. The Round 6 benzo(a)pyrene and lead

detections may be anomalies resulting from surface water leakage into the well prior to the well modification.

2.4 SOURCE AREA WELLS MONITORING RESULTS

The source area corrective action monitoring wells consisted of wells MW001R, located along the northeastern perimeter of the former UST area, MW203R, located along the southwestern perimeter of the former UST area, and MW205R, located within the former UST area.

SSI Groundwater Results

During the 1997 SSI, a layer of floating free product, approximately 0.4 feet thick and most closely resembling No. 2 fuel oil, was observed in MW001. TPH was identified in the samples from MW001 at 1,700 mg/L and from MW203 at 6.4 mg/L; TPH was not identified in MW205. Low level detections of VOCs and SVOCs were noted in MW203 and MW205 during the SSI, however, the highest detections of VOCs and SVOCs were observed in MW001. These include the VOCs toluene (69 µg/L), ethylbenzene (37 µg/L) and total xylenes (120 µg/L) and the SVOCs naphthalene (200 µg/L), 2-methylnapthalene (720 µg/L), dibenzofuran (60 µg/L), fluorene (42 µg/L) and phenanthrene (65 µg/L). Lead was detected in the unfiltered bailer samples at 38.1 µg/L and 49.9 µg/L in MW203 and MW205, respectively. The MW001 sample was not analyzed for metals during the 1997 study. In the 1998 field-filtered groundwater samples, low level results for lead were noted for MW001 (1.7 µg/L) and MW205 (1.5 µg/L). Lead was not detected in the MW203 field-filtered groundwater sample.

Rounds 1 through 3 Groundwater Results

Source area well observations and petroleum-related analyses indicated a significant reduction in petroleum hydrocarbon contamination when compared to the SSI results. No evidence of free product was observed in any of the source area wells. DRO-TPH was identified in all source area wells during the three rounds at low levels, ranging from 1.4 to 20 mg/L. GRO was detected once, in MW001R, at a concentration of 57 µg/L. The only VOC detections were low-level detections of 4-methyl-2-pentanone and toluene in MW001R with no VOC exceedances of the GA standards observed. Several SVOCs were detected in the source-area wells in the three rounds. Levels of three SVOCs, benzo(a)pyrene, naphthalene and pentachlorophenol, exceed the GWQS. Neither benzo(a)pyrene nor pentachlorophenol was detected during the SSI. Levels of naphthalene decreased from 200 µg/L as reported in the SSI to a maximum of 24 µg/L in MW205R. Lead was detected in unfiltered samples at levels higher than those found in the SSI. For the field-filtered samples, lead exceeded the GWQS in two samples. For both

filtered and unfiltered samples, Round 3 lead levels were observed to be less than half of Round 1 levels, indicating a decreasing trend.

Rounds 4 through 6 Groundwater Results

As discussed in Section 2.1, two source area wells (MW001R and MW205R) were found to be buried in Round 4 and during well modification activities in August 2003, MW001R was observed have been damaged. High sample turbidity readings of 432 NTU and 191 NTU in MW001R and MW205R, respectively, also indicate that solids had entered the wells since the previous sampling event.

During Round 4 and Round 5, no evidence of free product was observed in any of the source area wells (see Appendix B). DRO-TPH was identified in the three source area wells during all three rounds, with a maximum of 4.1 mg/L at MW001R in Round 4 and a minimum of 0.86 mg/L at MW203R in Round 5. GRO was detected during Round 4 in MW001R (100 µg/L) and in MW205R (130 µg/L); was not detected in any of the wells during Round 5; and was detected in only MW001R (92 µg/L) during Round 6.

During Round 4, low level detections of the VOC toluene (1 J µg/L) were reported from wells MW001R and MW205R. VOCs were not detected in samples from MW203R. No VOC detections were reported in the source area wells during Round 5. During Round 6, four VOCs (acetone, carbon disulfide, methyl acetate, and toluene) were detected in MW001R and none were detected in MW203R and MW205R. No exceedances of the GA standards were observed.

Several SVOCs were detected in the source area wells during Rounds 4 through 6. Exceedances of the GWQS were observed for three compounds: benzo(a)pyrene, naphthalene and pentachlorophenol. Benzo(a)pyrene, with a GWQS of 0.2 µg/L, was detected at a maximum of 4 J µg/L in MW001R during Round 6. Pentachlorophenol, with a GWQS of 1 µg/L, was detected at a maximum of 36 µg/L at MW001R in Round 4. Both compounds were well below the maximum levels noted during Rounds 1 through 3. Napthalene, with a GWQS of 20 µg/L, had one exceedance at MW205R (68 µg/L) during Round 4, an increase from the previous maximum of 24 µg/L in MW205R during Round 2.

During Rounds 4 through 6, seven metals were detected. Lead and cadmium were the only metals detected above the GWQS for the total metals analyses. Lead levels exceed the GWQS (15 µg/L) in the source area wells during all three rounds, with the exception of MW203R in Round 5. The highest lead concentration of 168 µg/L was detected in MW001R during Round 5. This is below the previous maximum of 278 µg/L recorded in Round 1. Cadmium exceeds the GWQS (5 µg/L) for all three wells in Round 5, with a maximum of 24.7 µg/L at MW203R. For the field-filtered samples, the lead concentration equals the GWQS in one sample (15 µg/L at MW205R) during Round 4. Cadmium was detected above

its GWQS (5 µg/L) in all three wells during Round 5, with a maximum of 25 µg/L at MW203R. No other filtered sample metals were detected above the GWQS.

In summary, petroleum-related analyses indicate a reduction in groundwater petroleum hydrocarbon contamination from the first three sampling rounds to the last three rounds. DRO-TPH concentrations ranged from 1.4 to 20 mg/L during Rounds 1 through 3 versus a range of 0.86 to 4.2 mg/L for Rounds 4 through 6. For organic compounds exceeding the GA GWQS, benzo(a)pyrene was detected at the same low concentrations, while pentachlorophenol concentrations have dropped slowly over time. Naphthalene had a higher concentration in Round 4 than in the earlier rounds, but the concentration dropped below the GWQS for Round 5 and Round 6. Concentrations of two metals, lead and cadmium, exceed the GA GWQS, for both filtered and unfiltered samples. Lead concentrations continued to decline in all three rounds, and filtered lead concentrations dropped below the GWQS after Round 4. Both filtered and unfiltered sample cadmium concentrations exceed the GWQS for the first time during Round 5 in all three wells. However, none of the Round 6 sample results exceed the groundwater standards.

Some of the metal exceedances may be attributed to the high sample turbidity levels in the Round 6 samples that resulted from solids entering the wells prior to the well modification.

2.5 DOWNGRADIENT WELLS MONITORING RESULTS

Downgradient monitoring wells consisted of MW003R, located immediately west of the former UST area; MW202R, located northwest of the former UST area; and MW207, located north of the former UST area.

SSI Groundwater Results

During the SSI field investigation, TPH was not detected in four of the six downgradient wells, and was detected at low levels (1.8 mg/L) in the other two downgradient wells. SSI VOC detections included benzene in MW201 (0.8 µg/L), and xylenes in MW003 (2 µg/L) and MW202 (0.7J µg/L). In addition, VOCs were detected at low levels in MW209 (chloroform at 1 µg/L, bromodichloromethane at 1 µg/L, trichloroethene at 1 µg/L, and dibromochloromethane at 0.8 µg/L). Only one SVOC, acenapthene, was detected in MW207 (15 µg/L). No VOCs or SVOCs were identified at levels in excess of the groundwater standards. For unfiltered metals samples (collected with a bailer), lead was identified in three of the seven downgradient wells at levels exceeding the GA GWQS (15 µg/L). Exceedances ranged from 30 µg/L (MW201) to 243 µg/L (MW003). In addition, cadmium was detected above the GA GWQS (5 µg/L) in MW003 (8.8 µg/L). No other metals were identified at levels exceeding the GWQS. Analyses of filtered samples yielded lead concentrations ranging from non-detect to a maximum of 1.9 µg/L.

Rounds 1-3 Groundwater Results

No evidence of free product was observed in any of the three downgradient wells. DRO-TPH was identified in all samples collected from the downgradient wells at low levels. GRO was only detected once in the MW202R Round 3 sample (140 µg/L). Only one low-level VOC detection was observed in the downgradient wells. For SVOCs, exceedances of the GA GWQS were observed for benzo(a)pyrene, naphthalene, and pentachlorophenol, none of which were detected in the downgradient wells during the SSI. Exceedances of the GA lead GWQS were observed in unfiltered samples, but not in the filtered samples. Cadmium was detected in unfiltered samples at one location above the GA GWQS; however, it was not detected in the filtered samples.

Rounds 4 through 6 Groundwater Results

Based on observations made during the well modification activities and the turbidity levels recorded for Round 6 samples, as discussed in Section 2.1, there are indications that some of the downgradient wells were comprised. MW202R was found to have almost 3 feet of solids in the bottom of the well and a obstructed riser. The well was redeveloped manually; however it was not possible to remove all solids. High sample turbidity readings were recorded in wells MW003R (999 NTU), MW202R (484 NTU), and MW207 (239 NTU).

During Rounds 4 and 5, no evidence of free product was observed in any of the downgradient wells (see Appendix B). Detected DRO-TPH levels ranged from 0.59 µg/L at MW202R (Round 5) to 3.5 mg/L at MW202R (Round 4). During Round 4, GRO levels ranged from 48 µg/L at MW003R to 150 µg/L at MW202R; was not detected in any of the downgradient wells during Round 5; and was detected in MW202R only (55 µg/L) during Round 6.

No VOCs were detected in any of the downgradient wells during Rounds 4 and 5. Two VOCs, carbon disulfide and toluene, were detected in MW003R and MW202R during Round 6. None of the samples exceeded the GWQS. For SVOCs, exceedances of the benzo(a)pyrene GA GWQS (0.2 µg/L) were observed in MW207 in all three rounds, with detections of 3 µg/L (Round 5) and 1 µg/L (Rounds 4 and 6). No other exceedances were recorded. At MW003R, only one SVOC was detected; at MW202R, only two SVOCs were detected, both in Round 6; and at MW207, between 10 and 11 SVOCs were detected in each of the three rounds. Caprolactam was detected for the first time in Round 6 and appeared in all of the wells sampled.

For unfiltered metals samples, exceedances of the GA area groundwater lead standard (15 µg/L) were observed in all three downgradient monitoring wells for Round 4 and 5; and in MW207 for Round 6. Exceedances ranged from 17 µg/L in MW202R to 3,580 µg/L in MW207. The GWQS for cadmium (5

µg/L) was exceeded in MW207 (17.2 µg/L) during Round 4, and in all three wells during Round 5, with detections ranging from 10.7 µg/L (MW207) to 27.9 (MW003R). For filtered metals samples, lead was detected in all three rounds but concentrations did not exceed the GWQS. Cadmium levels in the filtered samples exceed the GWQS (5 µg/L) in MW003R at 21.2 µg/L and in MW202R at 8.5 µg/L in Round 5. No other exceedances were recorded.

In summary, petroleum-related analytical results for downgradient wells rounds indicate a slight decrease in the low level petroleum hydrocarbon groundwater contamination from Round 4 to Round 6. A number of SVOCs not detected in the SSI were detected in the three later corrective action sampling rounds; however, the overall number and concentration of SVOCs detected has decreased over the sampling program, especially for MW207 from Rounds 3 to 6. Filtered and unfiltered lead concentrations were higher in Rounds 4 through 6 than in the SSI; however, the lead concentrations decreased from Round 4 to Round 6. Cadmium levels exceed its GWQS in one Round 4 downgradient well sample and in all three downgradient well Round 5 unfiltered samples. Only two of these four sample locations have filtered samples with cadmium levels that exceed the cadmium GWQS. No cadmium exceedances were noted in Round 6.

3.0 FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The findings and conclusions for Rounds 4 through 6 of corrective action groundwater monitoring conducted from September 2002 to September 2003 at the former Building 44 UST Site at Naval Station Newport are presented below. Recommendations regarding further site actions are also presented.

3.1 FINDINGS

The findings of the former Building 44 UST Site corrective action groundwater monitoring program are as follows.

Groundwater Elevations

Groundwater elevation measurements during Rounds 4 and 5 indicate that the groundwater flows away from MW209, in the southwest portion of the site, to the northwest and northeast toward Narragansett Bay. This groundwater flow direction is consistent with the groundwater pattern from Round 3 and slightly different from the pattern observed during Rounds 1 and 2, which indicated flow originating at the source area and moving north, east, and west of the tank locations. Groundwater elevations noted in Round 6 indicate that the area with the highest groundwater elevations has shifted to the southeast of the former tank locations, instead of the southwest. This shift may reflect a change in surface water runoff patterns due to site demolition and re-grading. The groundwater flow directions from all six sampling rounds indicate that the current groundwater monitoring well network is sufficient to evaluate the potential for contaminants migration from the former UST site.

Groundwater Quality

Observations made during the last two sampling events indicate that most of site flush-mount well covers were damaged or impacted during other Gould Island remedial activities prior to the well modification activities in August 2003. It is believed that these conditions allowed solids to enter some wells. During Round 6 two wells were found to have excess solids deposition and in most of the wells high turbidity levels were observed in most of the samples. Attempts were made to mitigate these impacts by manually redeveloping the wells prior to sampling. However, the Round 6 results for affected wells, and to a lesser extent the Round 5 results for affected wells, may not be representative of the site groundwater quality.

The groundwater analytical data collected during Rounds 4 through 6 shows that contamination has decreased from the first three sampling rounds and the 1997 SSI. As observed in Rounds 1 through 3, exceedances of the GA groundwater standards were observed for five contaminants: benzo(a)pyrene;

naphthalene; pentachlorophenol; cadmium; and lead. Levels of a sixth contaminant, mercury, also exceeded the GWQS in the first three rounds but did not exceed the GWQS in Rounds 4 through 6.

Naphthalene was detected in the 1997 SSI at 200 µg/L and has been detected in at least one source area well in all six rounds with only four results at or above the GQWS (20 µg/L). The maximum detection occurred in Round 4 at a concentration of 68 µg/L; however, the Round 5 and 6 samples from this well had levels at or below 10 µg/L. Overall naphthalene levels have decreased with no samples detected above the GWQS in Rounds 5 and 6. The other two SVOC compounds, benzo(a)pyrene and pentachlorophenol, were not detected during the SSI. Benzo(a)pyrene has been detected in most of the source area samples collected in the last three rounds at low levels (2 to 4 µg/L) that exceed its GWQS (0.2 µg/L). It has also been detected consistently in one downgradient well (MW207) at levels (1 to 9 µg/L), also exceeding the GWQS. The only detection of benzo(a)pyrene in the upgradient well at 15 µg/L in Round 6 is appears to be an anomaly related to the surface water leakage into the well casing. This situation has been corrected by conversion to a stick-up protective casing. Pentachlorophenol, has been detected in upgradient, source area and downgradient wells with most detections recorded during Rounds 1 through 3. Only one well had pentachlorophenol detections in Rounds 5 and 6 with the levels at 9 and 25 µg/L above the GWQS (1 µg/L). Therefore, with the exception of this one well the overall trend has been a decrease in detections of this compound.

The detection of naphthalene may be related to small amounts of residual oil that may be present at the site, since this compound is a constituents of fuel oil. This is consistent with the low-level DRO-TPH detections in all wells. The detection of benzo(a)pyrene and pentachlorophenol occurred after the removal of the UST at Building 44 and placement of demolition debris in the UST tank locations. The SVOC samples were not filtered prior to sampling and there is a possibility that for Round 6 these detections as well as other SVOC detections, may be attributed to high turbidity levels of the samples.

Detections of both lead and cadmium were documented during the 1997 SSI. Cadmium levels were detected at approximately the same levels as observed in the SSI, with the exception of Round 5, when all unfiltered (total) and most filtered cadmium concentrations exceeded the GWQS. The cadmium concentrations returned to low (below the GWQS) concentrations in Round 6. Concentrations of lead detected in unfiltered total samples during Rounds 4 through 6 have decreased from the first three rounds, but are within the range of concentrations noted in the SSI. However, dissolved (filtered) lead concentrations are much lower than the total (unfiltered) concentrations, indicating that the lead concentrations are related to turbidity in the samples.

3.2 CONCLUSIONS

Based on Rounds 4 through 6 groundwater monitoring, the following conclusions have been made regarding the former Building 44 UST Site corrective action.

Groundwater elevation measurements during Rounds 4 through 6 show that groundwater flows toward the north and east through the former UST area. The groundwater flow directions for all of the sampling rounds indicate that the current groundwater monitoring well network should provide sufficient data to evaluate the potential for contaminants to migrate from the former UST area.

The tank closure and corrective action activities were successful in removing petroleum-related contamination at the former USTs. No free product was observed in these sampling events. Low level DRO-TPH detections in the source and downgradient wells are not significantly different from the levels in the upgradient (background) well.

Even though the soil removal has resulted in a decrease in petroleum-related groundwater contamination, five contaminants were found at levels exceeding the GWQS for GA areas in Rounds 4 through 6. The five exceedances from Rounds 4 through 6 consist of three SVOCs (benzo(a)pyrene, naphthalene, and pentachlorophenol) and two metals (cadmium and lead). Detections of both metals and naphthalene were documented during the 1997 SSI. Naphthalene concentrations have decreased in response to the soil remediation. Benzo(a)pyrene and pentachlorophenol were not detected during the SSI. One contaminant, mercury, exceeded the GWQS in the first three sampling rounds, but did not exceed the GWQS in any of the wells in Rounds 4-6. Cadmium was detected at approximately the same levels in Rounds 4 and 6 as observed in the SSI, but cadmium levels (filtered and unfiltered) were significantly higher in all monitoring wells in Round 5 than in the SSI. Lead concentrations were detected in unfiltered (total) samples at higher levels than found in the SSI in some downgradient wells. It should be noted that for dissolved (filtered) samples, lead was either not detected or detected at concentrations that are much lower than the total (unfiltered) concentrations, indicating that the lead concentrations are related to turbidity in the samples.

The elevated metal concentrations in unfiltered samples, as well as SVOC detections, may result from suspended solids imparted to groundwater by fines in the debris fill or by solids that entered the compromised wells prior to modification to stick-up protective casing wells. The well modification should prevent further impacts from surface solids entering the wells. However, the use of the bailer sampling method is not appropriate for this situation as it causes disturbance to the well and the formation that results in samples with excessive turbidity levels that are not representative of groundwater quality. The

effects are more significant in a well that monitors a formation where fines are present and in a well that has been impacted by solids deposition.

In summary, the corrective action groundwater monitoring results shows that petroleum-related contamination is not entering the surficial aquifer. As no free product was observed in these sampling events product recovery efforts are not necessary. Of the five contaminants detected at levels exceeding the GA GWQS only naphthalene, lead and cadmium were detected in the SSI. The detection of benzo(a)pyrene and pentachlorophenol is not likely related to the former USTs. Furthermore, some of the detections of these contaminants during Round 6 and possibly Round 5, may be attributed to high turbidity in the some samples due to the compromised condition of the wells and the bailer sampling method.

3.3 RECOMMENDATIONS

Based on the above findings and conclusions, it is recommended that the former Building 44 UST Site corrective action groundwater monitoring be discontinued. The groundwater monitoring program has shown that petroleum-related contamination is not entering the surficial aquifer; no further action is necessary for the site.

REFERENCES

Brown & Root Environmental, 1997. Underground Storage Tank (UST) Site Investigation Report, Building 44 (Former Pump House) Gould Island. Naval Education and Training Center, Newport, Rhode Island. November.

Rhode Island Department of Environmental Management, 1996. Rules and Regulations for Groundwater Quality, Regulation 12-100-006. August.

Tetra Tech NUS, Inc. (TtNUS), 2002. Rounds 1 – 3 Corrective Action Groundwater Monitoring Report for Former Building 44 (Pump House) UST Site. Naval Station Newport, Newport, Rhode Island. July.

TtNUS, 1999. Corrective Action Plan, Building 44 (Former Pump House) Gould Island. Naval Education and Training Center, Newport, Rhode Island. January.

TABLES

TABLE 2-1
MONITORING WELL SUMMARY
CORRECTIVE ACTION GROUNDWATER MONITORING
ROUNDS 1 - 6 (APRIL 2001 – SEPTEMBER 2003)
FORMER BUILDING 44 UST SITE
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Monitoring Wells [1]	Designated Corrective Action Well	Round 1 (4/19/01-4/20/01)	Round 2 (10/10/01-10/11/01)	Round 3 (4/2/02-4/3/02)	Round 4 (9/4/02-9/5/02)	Round 5 (3/5/03-3/7/03)	Round 6 (9/3/03-9/4/03)	Comments
Upgradient Wells								
MW204/MW204R	X	X	X	X	X	NS	X	MW204R installed December 2000 - replaced MW204 destroyed during soil remediation. Not serviceable in round 5 due to surface water (concrete area runoff) covering the well New protective casing installed August 2003
MW209	wl	wl	wl	wl	wl	wl	Wl	Repaired and redeveloped June 2001 New protective casing installed August 2003
Source Area Wells								
MW001/MW001R	X	X	X	X	X	X	X	MW001R installed December 2000 - replaced MW001 destroyed during soil remediation New protective casing installed August 2003
MW203R/MW203R	X	X	X	X	X	X	X	MW203R installed December 2000 - replaced MW203 destroyed during soil remediation. New protective casing installed August 2003.
MW205/MW205R	X	X	X	X	X	X	X	MW205R installed December 2000 - replaced MW205 destroyed during soil remediation. New protective casing installed August 2003
Downgradient Wells								
MW003/MW003R	X	NS	X	X	X	X	X	MW003R installed June 2001 - replaced MW003 destroyed during soil remediation New protective casing installed August 2003
MW201/MW201R	wl	NS	wl	wl	wl	wl	Wl	MW201 damaged during soil remediation – abandoned and replaced by MA201R in June 2001 New protective casing installed August 2003
MW202/MW202R	X	NS	X	X	X	X	X	MW202R installed June 2001 - replaced MW202 not serviceable in Round 1 due to obstruction and/or damage. New protective casing installed August 2003
MW207	X	X	X	X	X	X	X	Repaired June 2001. New protective casing installed August 2003.
MW208	wl	NS	NA	NA	NA	NA	NA	Abandoned June 2001 – not replaced
MW206	wl	wl	wl	wl	wl	wl	Wl	Repaired June 2001 New protective casing installed August 2003.
Total Wells Sampled	7	5	7	7	7	6	7	

Notes.
(1) R designates a replacement well at that location
NS not serviceable
wl water level measurement
X groundwater sample collected
NA Not applicable

TABLE 2-2
WELL CONSTRUCTION SUMMARY AND GROUNDWATER ELEVATIONS
CORRECTIVE ACTION GROUNDWATER MONITORING
ROUNDS 1 THROUGH 6
FORMER BUILDING 44 UST SITE
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

							Round 1		Round 2		Round 3		Round 4		Round 5		Round 6	
Well No. [1]	Well Dia. (inch)	Well Screen Interval (ft bgs)	Ground Surface Elev. [2] (ft-MLW)	Original MP Elev. [2] (ft-MLW)	8/18/03 MP Elev. [3] (ft-MLW)	Well Screen Elev. (ft-MLW)	Water Depth (ft bpvc) 4/19/01	Ground-water Elev. (ft-MLW)	Water Depth (ft bpvc) 10/10/01	Ground-water Elev. (ft-MLW) 10/10/01	Water Depth (ft bpvc) 4/2/02	Ground-water Elev. (ft-MLW) 4/2/02	Water Depth (ft bpvc) 9/4/02	Ground-Water Elev. (ft-MLW) 9/4/02	Water Depth (ft bpvc) 3/5/03	Ground-Water Elev. (ft-MLW) 3/5/03	Water Depth [3] (ft bpvc) 9/3/03	Ground-Water Elev. [3] (ft-MLW)
Upgradient wells																		
MW204R	2.0	4 0 - 9.0	12 2	11 63	15 09	8 2 - 3 2	4 36	7 27	4.54	7 09	4 05	7 58	5 00	6 63	NA	NA	8 10	6.99
MW206	2 0	4 0 - 9.5	12.1	11.75	15.23	8 1 - 2 6	5.11	6.64	5 75	6 00	4.93	6 82	5 41	6 34	5 65	6 10	9.23	6.00
Source area wells																		
MW001R	2 0	4 0 - 9 0	11.72	11.30	14.90	7 7 - 2 7	3 95	7 35	4.2	7.10	3 71	7 59	4 65	6 65	5 00	6 30	8 09	6 81
MW203R	2 0	4 5 - 9 5	12 8	12.44	16 27	8 3 - 3.3	4 15	8 29	5.67	6.77	4 65	7 79	6 08	7 67	5 51	6 93	9 51	6 76
MW205R	2.0	4 0 - 9.0	12.6	12.21	15 54	8.6 - 3 6	4.93	7 28	5.1	7 11	4 63	7.58	5.54	6 67	5.95	6 26	8 82	6 72
Downgradient wells																		
MW003/MW003R	2 0	4.0 - 14.0	12.4	12 05	15 38	8.4 - 1 6	NA	NA	6.21	5.84	5 27	6.78	6.08	5 97	6 40	5.65	9 91	5.47
MW201/MW201R	2.0	4.0 - 14 0	11 9	11 49	14 79	7.9 - 2.1	NA	NA	5.71	5.78	5 45	6 04	5 71	5.78	6 02	5.47	9 77	5 02
Mw202/MW202R	2 0	4.5 - 14.5	12.1	11 72	15 07	7.6 - 2 4	NA	NA	6.6	5.12	6 04	5 68	6.08	5 64	6 39	5.33	10 27	4 80
MW207	2.0	5.0 - 10.0	12.0	11.80	14 83	7 0 - 2 0	7 07	4 73	6.97	4 83	6 51	5 29	6.05	5 75	6.51	5.29	10.19	4.64
MW209	2 0	4.0 - 9.0	12 7	12 48	15 94	8 7 - 3.7	5.14	7.34	6 21	6 27	4 62	7.86	4.90	7 58	4 83	7 65	9 70	6 24

Notes

(1) R designates a replacement well at that location
(2) Ground Surface Elev and MP Elev. based on June 2001 survey
(3) Wells modified on 8/18/03; water levels after 8/18/03 based on revised MP elevation
ft-MLW feet, based on mean low water elevation datum
NA not applicable – well not serviceable
feet bgs feet below ground surface
feet bpvc feet below PVC riser
MP measuring point (top of PVC riser)

TABLE 2-3
GROUNDWATER VOCS AND SVOCS ANALYTICAL SUMMARY
CORRECTIVE ACTION GROUNDWATER MONITORING ROUNDS 4 THROUGH 6
FORMER BUILDING 44 UST SITE,
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Monitoring Well			MW204R (Upgradient)				MW001R (Source Area)						MW203R (Source Area)						MW205R (Source Area)					
Round			4		6		4		5		6		4		5		6		4		5		6	
Date Sampled	GWQS	PAL	9/5/2002		9/3/2003		9/5/2002		3/7/2003		9/4/2003		9/4/2002		3/5/2003		9/3/2003		9/5/2002		3/7/2003		9/3/2003	
Volatile Organic Analysis (UG/L)																								
Acetone			5	U	5	U	5	U	56	U	21		5	U	6	U	5	U	5	U	5	U	5	U
Carbon Disulfide			5	U	5	U	5	U	5	U	5	J	5	U	5	U	5	U	5	U	5	U	5	U
Methyl Acetate			5	U	5	U	5	U	5	U	12		5	U	5	U	5	U	5	U	5	U	5	U
Toluene	1000	500	5	U	5	U	1	J	5	U	1	J	5	U	5	U	5	U	1	J	5	U	5	U
Semivolatile Organic Analysis (UG/L)																								
1,1'-Biphenyl			10	U	10	U	10	U		NA	10	U	10	U		NA	10	U	3	J		NA	10	U
2,4-Dimethylphenol			10	U	10	U	10		5	U	5	J	10	U	5	U	10	U	10	U	5	U	10	U
2-Methylnaphthalene			10	U	10	U	2	J	5	U	1	J	10	U	5	U	10	U	7	J	1	J	10	U
2-Methylphenol			10	U	10	U	2	J	5	U	1	J	10	U	5	U	10	U	10	U	5	U	10	U
4-Methylphenol			10	U	10	U	26		9		12		10	UJ	5	U	10	U	10	U	5	U	10	U
Acenaphthene			10	U	4	J	6	J	2	J	3	J	10	U	5	U	10	U	15		9		4	J
Acetophenone			10	U	10	U	2	J		NA	10	U	10	U		NA	10	U	10	U		NA	10	U
Anthracene			10	U	7	J	3	J	5	U	2	J	10	U	5	U	10	U	3	J	2	J	10	U
Benzo(a)anthracene			10	U	18		10	U	2	J	5	J	10	U	5	U	2		10	U	3	J	2	J
Benzo(a)pyrene	*0.2*	*0.1*	10	U	***15***		10	U	***2***	***J***	***4***	***J***	10	U	5	U	***2***		10	U	***2***	***J***	***2***	***J***
Benzo(b)fluoranthene			1	J	23		10	U	3	J	6	J	1	J	5	U	2		10	U	4	J	2	J
Benzo(g,h,i)perylene			10	U	8	J	10	U	5	U	2	J	10	U	5	U	1		10	U	5	U	10	U
Benzo(k)fluoranthene			10	U	9	J	10	U	1	J	3	J	10	U	5	U	1		10	U	2	J	1	J
bis(2-Ethylhexyl)phthalate	6	3	10	U	10	U	10	U	5	U	1	J	10	U	5	U	10	U	10	U	5	U	10	U
Caprolactam			10	U	5	J	10	U		NA	14		10	U		NA	7		10	U		NA	5	J
Carbazole			3	J	5	J	16	J		NA	5	J	10	U		NA	10	U	34	J		NA	1	J
Chrysene			10	U	17		10	U	2	J	4	J	1	J	5	U	2		10	U	3	J	2	J
Dibenzo(a,h)anthracene			10	U	2	J	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
Dibenzofuran			10	U	2	J	2	J	5	U	1	J	10	U	5	U	10	U	9	J	4	J	2	J
Diethylphthalate			10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U	2	J	2	J	10	U
Fluoranthene			2	J	35		2	J	4	J	8	J	3	J	2		4		3	J	7		5	J
Fluorene			10	U	4	J	2	J	5	U	1	J	10	U	5	U	10	U	12		7		1	J
Indeno(1,2,3-cd)pyrene			10	U	8	J	10	U	1	J	2	J	10	U	5	U	1		10	U	5	U	10	U
Naphthalene	*20*	*10*	10	U	10	U	*18*		7		*13*		10	U	5	U	10	U	***68***		10		10	U
Pentachlorophenol	*1*	*0 5*	20	U	20	U	***36***		***9***	***J***	***25***		20	U	20	U	20	U	20	U	20	U	20	U
Phenanthrene			2	J	26		5	J	3	J	6	J	2	J	5	U	2		13		9		2	J
Phenol			10	U	10	U	230	•	85		96		10	U	5	U	10	U	3	J	5	U	10	U
Pyrene			1	J	30	J	1	J	4	J	7	J	2	J	2		4		2	J	6		4	J

TABLE 2-3 (CONT.)
GROUNDWATER VOCS AND SVOCS ANALYTICAL SUMMARY
CORRECTIVE ACTION GROUNDWATER MONITORING ROUNDS 4 THROUGH 6
FORMER BUILDING 44 UST SITE,
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Monitoring Well			MW003R (Downgradient)						MW202R (Downgradient)						MW207 (Downgradient)					
Round			4		5		6		4		5		6		4		5		6	
Date Sampled	GWQS	PAL	9/4/2002		3/7/2003		9/4/2003		9/5/2002		3/5/2003		9/4/2003		9/5/2002		3/6/2003		9/4/2003	
Volatile Organic Analysis (UG/L)																				
Acetone			5	U	6	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Carbon Disulfide			5	U	5	U	5	U	5	U	5	U	1	J	5	U	5	U	5	U
Methyl Acetate			5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Toluene	1000	500	5	U	5	U	2	J	5	U	5	U	9		5	U	5	U	5	U
Semivolatile Organic Analysis (UG/L)																				
1,1'-Biphenyl			10	U		NA	10	U	10	U		NA	10	U	10	U		NA	10	U
2,4-Dimethylphenol			10	U	5	U	10	U	10	U		R	10	U	10	U	5	U	10	U
2-Methylnaphthalene			10	U	5	U	10	U	10	U	5	UJ	10	U	10	U	5	U	10	U
2-Methylphenol			10	U	5	U	10	U	10	U		R	10	U	10	U	5	U	10	U
4-Methylphenol			10	U	5	U	10	U	10	U		R	10	U	10	U	5	U	10	U
Acenaphthene			10	U	5	U	10	U	1	J	5	UJ	10	U	5	J	5	U	10	U
Acetophenone			10	U		NA	10	U	10	U		NA	10	U	10	U		NA	10	U
Anthracene			10	U	5	U	10	U	10	U	5	UJ	10	U	10	U	5	U	10	U
Benzo(a)anthracene			10	U	5	U	10	U	10	U	5	UJ	10	U	10	U	3	J	2	J
Benzo(a)pyrene	*0.2*	*0 1*	10	U	5	U	10	U	10	U	5	UJ	10	U	*1*	*J*	*3*	*J*	*1*	*J*
Benzo(b)fluoranthene			10	U	5	U	10	U	10	U	5	UJ	10	U	2	J	5		3	J
Benzo(g,h,i)perylene			10	U	5	U	10	U	10	U	5	UJ	10	U	10	U	2	J	1	J
Benzo(k)fluoranthene			10	U	5	U	10	U	10	U	5	UJ	10	U	10	U	2	J	1	J
bis(2-Ethylhexyl)phthalate	6	3	10	U	5	U	10	U	10	U	5	UJ	2	J	10	U	5	U	10	U
Caprolactam			10	U		NA	6	J	10	U		NA	14		10	U		NA	13	
Carbazole			10	U		NA	10	U	10	J		NA	10	U	6	J		NA	10	U
Chrysene			10	U	5	U	10	U	10	U	5	UJ	10	U	1	J	4	J	2	J
Dibenzo(a,h)anthracene			10	U	5	U	10	U	10	U	5	UJ	10	U	10	U	5	U	10	U
Dibenzofuran			10	U	5	U	10	U	2	J	5	UJ	10	U	4	J	5	U	10	U
Diethylphthalate			10	U	5	U	10	U	10	U	5	UJ	10	U	10	U	5	U	10	U
Fluoranthene			10	U	5	U	10	U	10	U	5	UJ	10	U	4	J	9		4	J
Fluorene			10	U	5	U	10	U	2	J	5	UJ	10	U	1	J	5	U	10	U
Indeno(1,2,3-cd)pyrene			10	U	5	U	10	U	10	U	5	UJ	10	U	10	U	2	J	1	J
Naphthalene	*20*	*10*	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U	5	U	10	U
Pentachlorophenol	*1*	*0 5*	20	U	20	U	20	U	20	U		R	20	U	20	U	20	U	20	U
Phenanthrene			10	U	5	U	10	U	10	U	5	UJ	10	U	2	J	4	J	2	J
Phenol			10	U	5	U	10	U	10	U		R	10	U	10	U	5	U	10	U
Pyrene			10	U	5	U	10	U	10	U	5	UJ	10	U	2	J	8		4	J

Notes·
MW204R not serviceable dunng Round 5
Bold italics - GA Groundwater Quality Standard (GWQS) exceeded; Italics - Preventive Action Limit (PAL) exceeded
NA not analyzed
U not detected
J quantitation approximate
UJ detection limit approximate

TABLE 2-4
GROUNDWATER GRO, DRO-TPH AND METALS ANALYTICAL SUMMARY
CORRECTIVE ACTION GROUNDWATER MONITORING ROUNDS 4 THROUGH 6
FORMER BUILDING 44 UST SITE
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

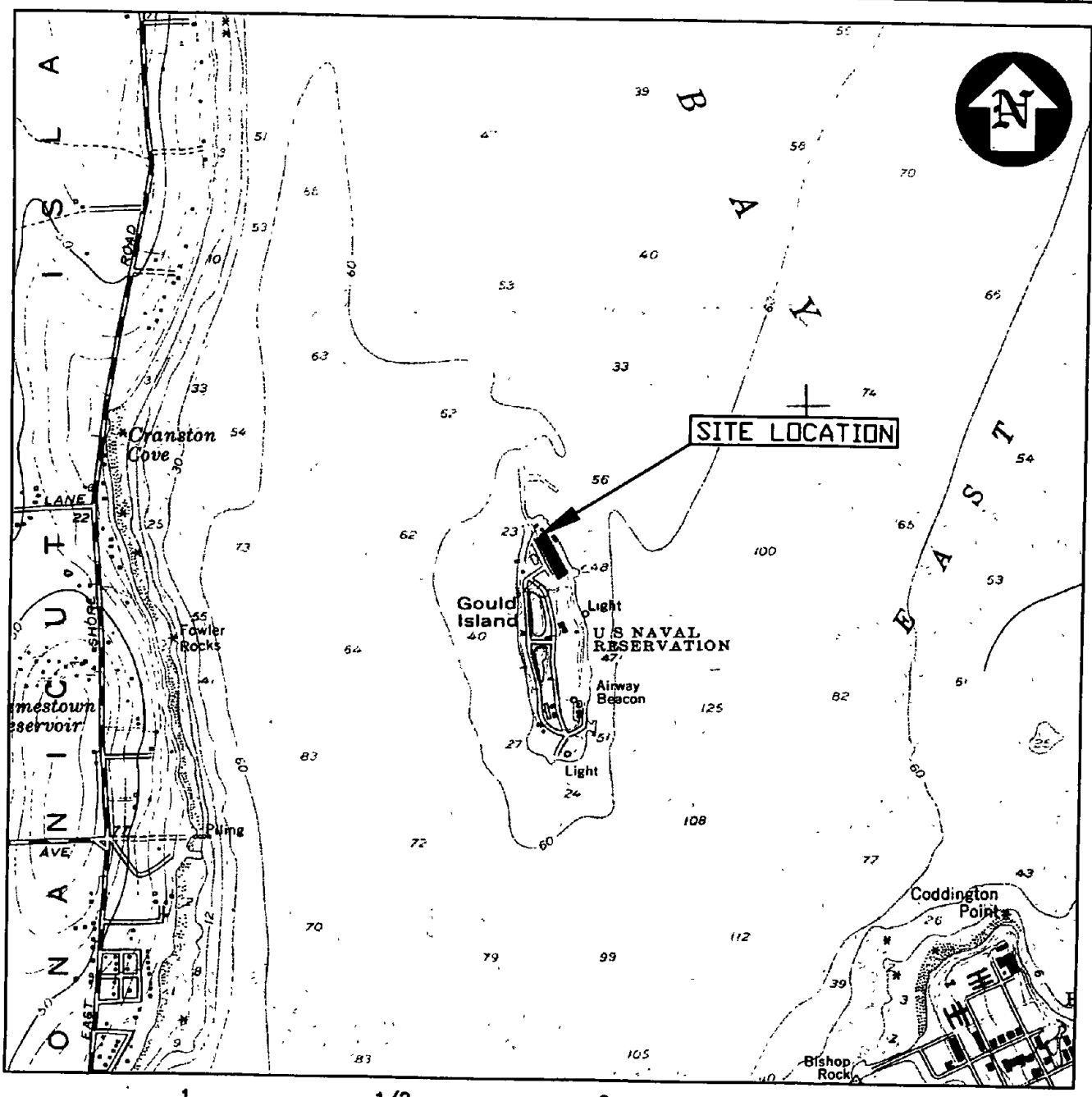
Monitoring Well			MW204R (Upgradient)				MW001R (Source Area)						MW203R (Source Area)						MW205R (Source Area)					
Round			4		6		4		5		6		4		5		6		4		5		6	
Date Sampled	GWQS	PAL	9/5/2002		9/3/2003		9/5/2002		3/7/2003		9/4/2003		9/4/2002		3/5/2003		9/3/2003		9/5/2002		3/7/2003		9/3/2003	
Gasoline Range Organic Analysis (UG/L)																								
Gasoline Range Organics			50	U	50	U	100		50	U	92		50	U	72	U	50	U	130		52	U	50	U
Total Petroleum Hydrocarbon Analysis (MG/L)																								
Total Petroleum Hydrocarbons			0 55		1 2		4 1		1 4		3 2		2 6		0 86		1 8		2.4		0 91		1 2	
Metal Analysis (UG/L)																								
Aluminum			260	U		NA	1690			NA		NA	23600			NA		NA	199	U		NA		NA
Arsenic	50	*25*	3 0	U	3 0	U	4 0	J	13 9	U	6 7	U	12.2		3 0	U	3 0	U	3 0	U	5 8	UJ	3.0	U
Barium	2000	1000	110		104		99 6		151		108		243		322		404		75.9		88 9		73 8	U
Cadmium	***5***	*2 5*	2 0	U	0 70	U	2 0	U	***13.0***		1.0	J	2 0	U	***24.7***		1 1		2.0	U	***17.2***		0.70	U
Calcium			170000			NA	215000			NA		NA	193000			NA		NA	330000			NA		NA
Chromium	100	50	3 0	U	2 9	J	3 0	U	12 4		6 7	J	32 5		7 2		17.4		3 0	U	8 8		2 5	J
Cobalt			3 0	U		NA	3 0	U		NA		NA	13 1			NA		NA	3.0	U		NA		NA
Copper			11 1	U		NA	19.8	U		NA		NA	50 9	U		NA		NA	22 0	U		NA		NA
Iron			500			NA	1180			NA		NA	39700			NA		NA	2470			NA		NA
Lead	***15***	*7 5*	***26.6***		***109***	***J***	***112***		***168***		***140***	***J***	***91.9***		*13 6*		***34.1***		***27.0***		***26.0***		***17.1***	***J***
Magnesium			26600			NA	3940			NA		NA	17000			NA		NA	28800			NA		NA
Manganese			319			NA	43 8			NA		NA	636			NA		NA	106			NA		NA
Mercury	2	1	0 14	U	0 14	U	0 31		0.37		0 47		0 14	U	0 12	U	0 13	U	0 14	U	0.13	U	0 19	J
Nickel	100	50	3 5			NA	24.2			NA		NA	31 2			NA		NA	6 0			NA		NA
Potassium			44900			NA	317000			NA		NA	162000			NA		NA	129000			NA		NA
Silver			2 0	U	2.0	UJ	2 0	U	2 0	U	2 0	UJ	2.0	U	2 0	U	2.0	UJ	2 0	U	2 0	U	2 0	UJ
Sodium			349000	J		NA	516000	J		NA		NA	1580000	J		NA		NA	253000	J		NA		NA
Thallium	***2***	*1*	4 0	U		NA	4 0	U		NA		NA	4 0	U		NA		NA	4 0	U		NA		NA
Vanadium			3.7	J		NA	57 8			NA		NA	39 4			NA		NA	11.5			NA		NA
Zinc			32 1			NA	101			NA		NA	129			NA		NA	118			NA		NA
Dissolved Metal Analysis (UG/L)																								
Arsenic	50	25	3 0	UJ	3 0	U	3 4	J	5 8	UJ	3 0	U	3.0	UJ	3 0	U	3 0	U	3 0	UJ	3 0	U	3.0	U
Barium	2000	1000	102		92.0	U	72 3		75 2		75 6	U	147		319		362		64 3		47 8		69 5	U
Cadmium	***5***	*2.5*	2 0	U	0 70	U	2 0	U	***10.3***		0 70	U	2 0	U	***25.0***		0 53		2 0	U	***14.3***		0 70	U
Calcium			176000			NA	187000			NA		NA	175000			NA		NA	315000			NA		NA
Chromium	100	50	3.0	U	0.74	J	3 0	U	0 83	UJ	0 60	U	3 0	U	0 60	U	0 60	U	3 0	U	0.87	UJ	1.0	J
Cobalt			3 0	U		NA	3.0	U		NA		NA	3.0	U		NA		NA	3 0	U		NA		NA
Iron			35 0	U		NA	80 3	U		NA		NA	35 0	U		NA		NA	83.1	U		NA		NA
Lead	15	*7 5*	*8 6*		*9.7*		*13 0*		4.0	U	4 0	U	*7 7*		4.0	U	4 0	U	*15 0*		4 0	U	4 0	U
Magnesium			26000			NA	2430			NA		NA	8640			NA		NA	27700			NA		NA
Manganese			327			NA	3 0	UJ		NA		NA	177			NA		NA	90 4			NA		NA
Nickel	100	50	3 2	U		NA	22.2			NA		NA	2 6	U		NA		NA	4 7			NA		NA
Potassium			40400			NA	307000			NA		NA	158000			NA		NA	124000			NA		NA
Sodium			337000	J		NA	506000	J		NA		NA	1560000	J		NA		NA	266000	J		NA		NA
Vanadium			3 1	J		NA	47.4			NA		NA	3.0	U		NA		NA	3 7	J		NA		NA
Zinc			18.0			NA	8.0	U		NA		NA	8 0	U		NA		NA	8 0	U		NA		NA

TABLE 2-4 (CONT.)
GROUNDWATER GRO, DRO-TPH AND METALS ANALYTICAL SUMMARY
CORRECTIVE ACTION GROUNDWATER MONITORING ROUNDS 4 THROUGH 6
FORMER BUILDING 44 UST SITE
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Monitoring Well			MW003R (Downgradient)						MW202R (Downgradient)						MW207 (Downgradient)					
Round			4		5		6		4		5		6		4		5		6	
Date Sampled	GWQS	PAL	9/4/2002		3/7/2003		9/4/2003		9/5/2002		3/5/2003		9/4/2003		9/5/2002		3/6/2003		9/4/2003	
Gasoline Range Organic Analysis (UG/L)																				
Gasoline Range Organics			48		53	U	50	U	150		72	UJ	55		88		50	U	50	U
Total Petroleum Hydrocarbon Analysis (MG/L)																				
Total Petroleum Hydrocarbons			1 8		0 50	U	0 90		3 5		0 59		2 3		2 3		0.65		1 1	
Metal Analysis (UG/L)																				
Aluminum			3680			NA		NA	423	U		NA		NA	26000			NA		NA
Arsenic	50	*25*	3.0	U	16 0	U	3 0	U	3 0	U	***44 1***		3 0	U	11 0		8 9		3 0	U
Banum	2000	1000	69 0		212		83 0		90.2		255		163		335		186		187	
Cadmium	*5*	*2.5*	2 0	U	***27.9***		0 70	U	2 0	U	***20.8***		0 70	U	***17.2***		***10.7***		2 4	
Calcium			294000			NA		NA	309000			NA		NA	274000			NA		NA
Chromium	100	50	5 4		39 5		11 7	J	3.0	U	33.0		6.9	J	32 6		16 8		3.8	J
Cobalt			23 0			NA		NA	3 0	U		NA		NA	20 6			NA		NA
Copper			13.5	U		NA		NA	2.0	U		NA		NA	924			NA		NA
Iron			8110			NA		NA	6540			NA		NA	67100			NA		NA
Lead	*15*	*7.5*	***21.1***		***26.3***		*10 2*	*J*	***17.0***		***112***		*12.1*	*J*	***3580***		***777***		***104***	***J***
Magnesium			27600			NA		NA	58600			NA		NA	48500			NA		NA
Manganese			6730			NA		NA	1390			NA		NA	6040			NA		NA
Mercury	2	1	0.14	U	0 12	U	0 16	U	0 14	U	0 12	U	0 15	U	0 79		0 38		0 15	U
Nickel	100	50	11 6			NA		NA	2.4	U		NA		NA	27.4			NA		NA
Potassium			160000			NA		NA	156000			NA		NA	103000			NA		NA
Silver			2 0	U	2 0	U	2.0	UJ	2 0	U	2 0	U	2.0	UJ	5.0		2 0	U	2.0	UJ
Sodium			464000			NA		NA	616000	J		NA		NA	804000	J		NA		NA
Thallium	***2***	*1*	4.0	U		NA		NA	4 0	U		NA		NA	***4.3***	***J***		NA		NA
Vanadium			9 9			NA		NA	3 0	U		NA		NA	26.5			NA		NA
Zinc			16 0			NA		NA	8 0	U		NA		NA	2070			NA		NA
Dissolved Metal Analysis (UG/L)																				
Arsenic	50	25	2 2		3.0	U	3.0	U	3 0	UJ	3 0	U	3 0	U	3 0	UJ	5.2	UJ	3.0	U
Banum	2000	1000	59 4		126		58 7	U	79 1		89.5		156		188		57 4		144	
Cadmium	*5*	*2 5*	2 0	U	***21.2***		0 70	U	2 0	U	***8.5***		0 70	U	2 0	U	*4.6*		0 70	U
Calcium			279000			NA		NA	317000			NA		NA	265000			NA		NA
Chromium	100	50	3 0	U	0.60	U	0 60	U	3.0	U	0 60	U	0 60	U	3 0	U	0 66	UJ	0 60	U
Cobalt			16 2			NA		NA	3 0	U		NA		NA	9 8			NA		NA
Iron			336			NA		NA	2650			NA		NA	26800			NA		NA
Lead	15	*7.5*	*13 0*		4 0	U	4 0	U	*14.8*		4 0	U	4 0	U	*13 3*		4.0	U	4 0	U
Magnesium			26000			NA		NA	61700			NA		NA	46400			NA		NA
Manganese			5610			NA		NA	1500			NA		NA	5430			NA		NA
Nickel	100	50	6 0			NA		NA	1.6	U		NA		NA	4 6			NA		NA
Potassium			146000			NA		NA	154000			NA		NA	103000			NA		NA
Sodium			370000			NA		NA	67600	J		NA		NA	856000	J		NA		NA
Vanadium			3.0	U		NA		NA	3 0	U		NA		NA	3 0	U		NA		NA
Zinc			8.0	U		NA		NA	8 0	U		NA		NA	44 9			NA		NA

Notes
MW204R not serviceable during Round 5
Bold italics - GA Groundwater Quality Standard (GWQS) exceeded, Italics - Preventive Action Limit (PAL) exceeded
NA not analyzed
U not detected
J quantitation approximate
UJ detection limit approximate

FIGURES



QUADRANGLE LOCATION

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

BASE MAP IS A PORTION OF THE FOLLOWING 7.5 X 15 MINUTE USGS QUADRANGLE: PRUDENCE ISLAND, RHODE ISLAND, 1955, PHOTOREVISED 1970 AND 1975

SITE LOCATION MAP

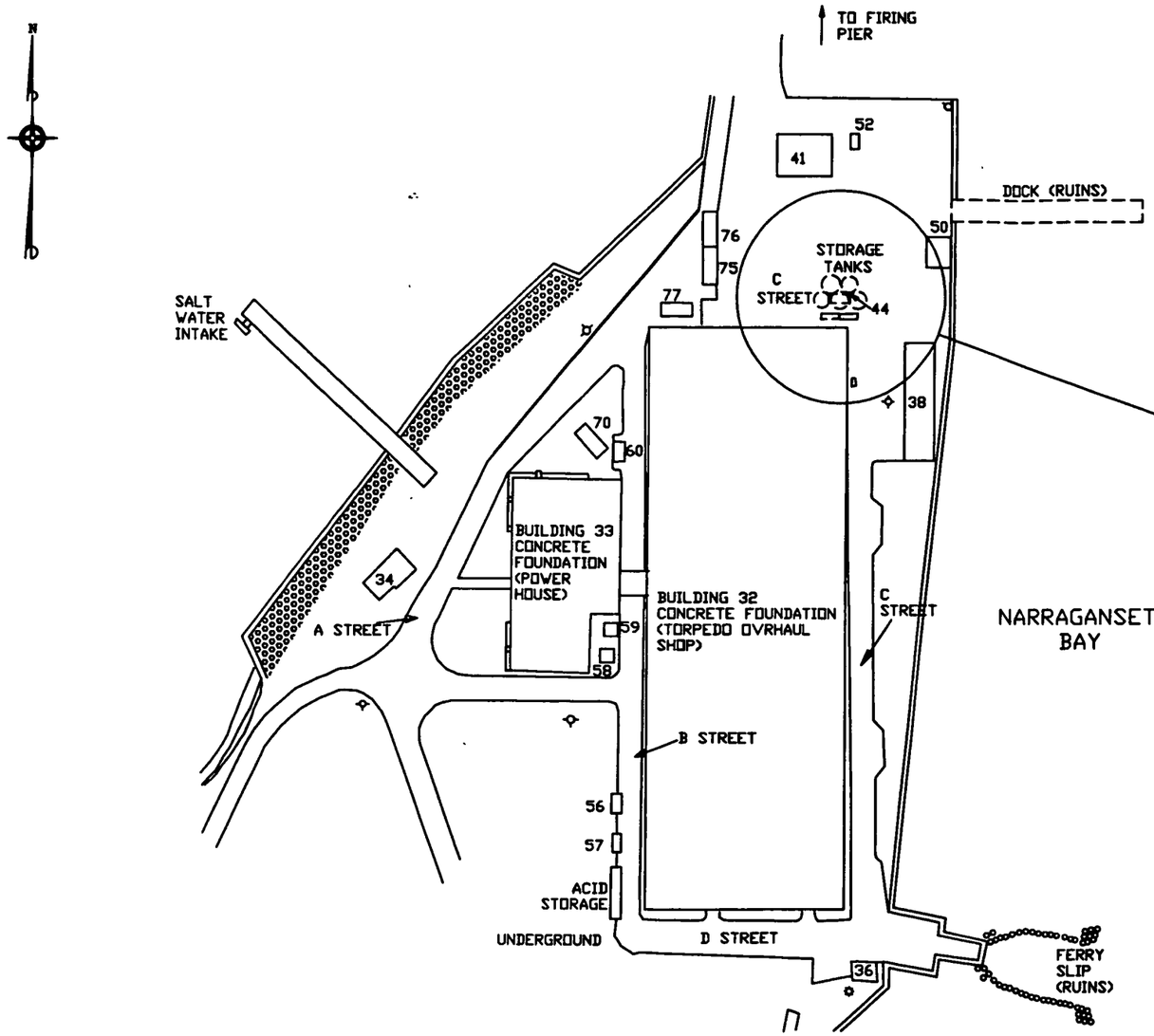
BUILDING 44 (FORMER PUMP HOUSE)

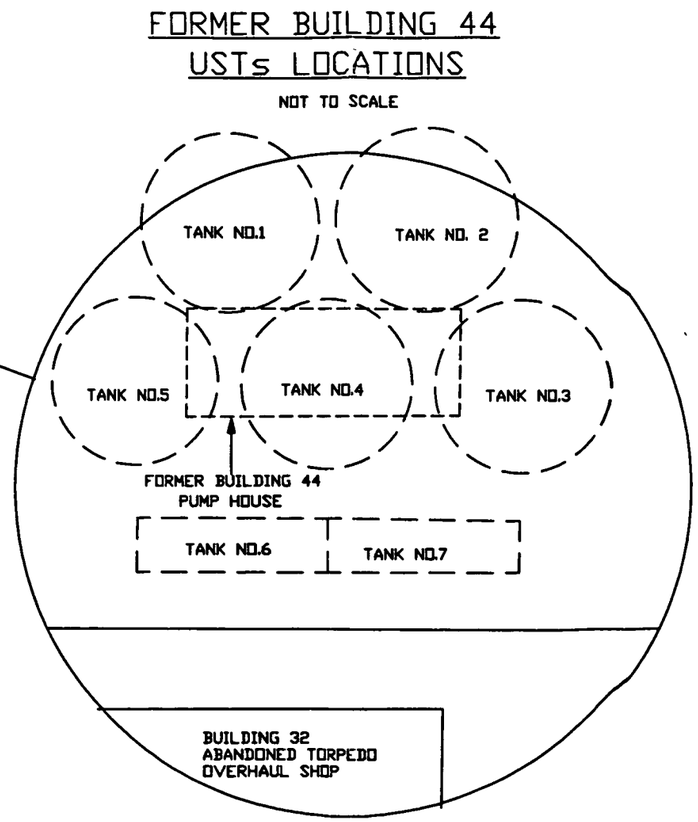
GOULD ISLAND – JAMESTOWN, RHODE ISLAND

FIGURE 1–1

DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	J. FORRELLI	DATE:	JUNE 2002
SCALE:	AS NOTED	ACAD NAME:	DWG\2842\1076\FIG_1-1.DWG

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899





NOTES:

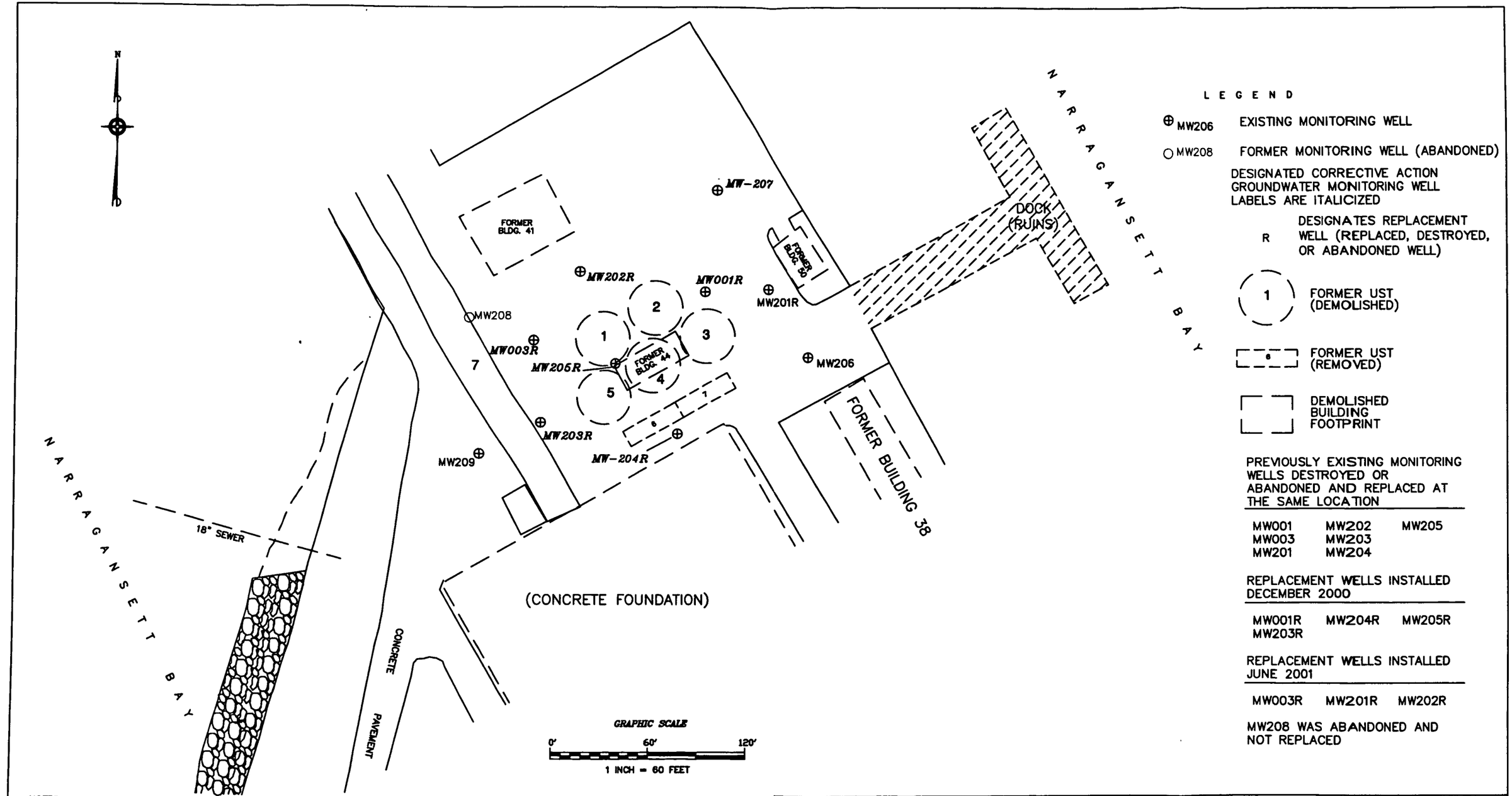
GRAPHIC SCALE

0' 300' 600'

1 INCH = 300 FEET

SITE MAP			FIGURE 1-2
BUILDING 44 (FORMER PUMP HOUSE)			
GOULD ISLAND – JAMESTOWN, RHODE ISLAND			
DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	J. FORRELLI	DATE:	JUNE 20, 2002
SCALE:	1" = 300'	FILE NO.:	DWG\2842\1076\FIG_1-2.DWG

TETRA TECH NUS, INC.
55 Jonspin Road Wilmingt n, MA 01887
(978)658-7899



LEGEND

⊕ MW206 EXISTING MONITORING WELL

○ MW208 FORMER MONITORING WELL (ABANDONED)

DESIGNATED CORRECTIVE ACTION GROUNDWATER MONITORING WELL LABELS ARE ITALICIZED

R DESIGNATES REPLACEMENT WELL (REPLACED, DESTROYED, OR ABANDONED WELL)

1 FORMER UST (DEMOLISHED)

6 FORMER UST (REMOVED)

DEMOLISHED BUILDING FOOTPRINT

PREVIOUSLY EXISTING MONITORING WELLS DESTROYED OR ABANDONED AND REPLACED AT THE SAME LOCATION

MW001	MW202	MW205
MW003	MW203	
MW201	MW204	

REPLACEMENT WELLS INSTALLED DECEMBER 2000

MW001R	MW204R	MW205R
MW203R		

REPLACEMENT WELLS INSTALLED JUNE 2001

MW003R	MW201R	MW202R

MW208 WAS ABANDONED AND NOT REPLACED

NOTES:

1. PLAN COMPILED FROM PORTIONS OF A DIGITIZED COPY OF "GOULD ISLAND, U.S. NAVAL TORPEDO STATION, NEWPORT R.I., SHOWING CONDITIONS ON JUNE 30, 1948". A PLAN ENTITLED "GEOTECHNICAL SURVEY PLAN AT BUILDING 32 – GOULD ISLAND, U.S. NAVAL BASE, NEW, RHODE ISLAND, FOR TETRA TECH NUS, INC.", PLAN DATE: 4/25/00, AND DONE BY LOUIS FEDERICI & ASSOCIATES, PROVIDENCE, RHODE ISLAND. A PLAN ENTITLED: "LOCATION OF MONITORING WELLS AT BUILDING 32 – GOULD ISLAND, U.S. NAVAL BASE, NEW, RHODE ISLAND, FOR TETRA TECH NUS, INC.", PLAN DATE: 5/9/00, AND DONE BY LOUIS FEDERICI & ASSOCIATES, PROVIDENCE, RHODE ISLAND.
2. ALL LOCATIONS ARE TO BE CONSIDERED APPROXIMATE.
3. PLAN NOT TO BE USED FOR DESIGN.

ROUNDS 1 THROUGH 3 MONITORING WELL LOCATIONS

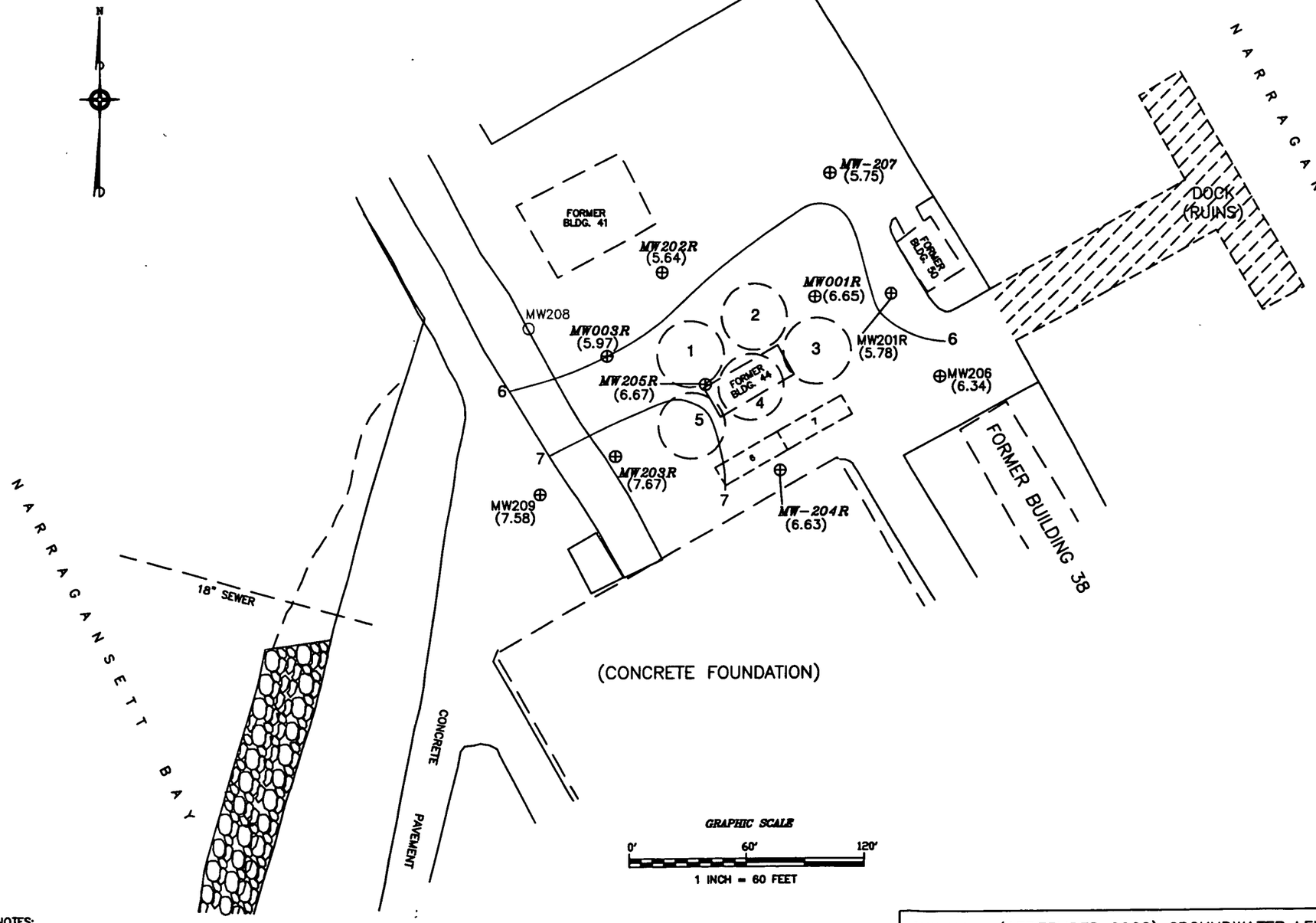
FORMER BUILDING 44 UST SITE

GOULD ISLAND – NAVSTA NEWPORT, RHODE ISLAND

DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	J.R. FORRELLI	DATE:	JUNE 20, 2002
SCALE:	1" = 60'	FILE NO.:	DWG\2842\1078\FIG_2-1.DWG

FIGURE 2-1

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899



LEGEND

- ⊕ MW206 — EXISTING MONITORING WELL
- ○ MW208 — FORMER MONITORING WELL (ABANDONED)

DESIGNATED CORRECTIVE ACTION GROUNDWATER MONITORING WELL LABELS ARE ITALICIZED

R — DESIGNATES REPLACEMENT WELL (REPLACED, DESTROYED, OR ABANDONED WELL)

1 — FORMER UST (DEMOLISHED)

6 — FORMER UST (REMOVED)

DEMOLISHED BUILDING FOOTPRINT

7 —— GROUNDWATER CONTOUR

(6.63) — GROUNDWATER ELEVATION OBSERVED ON 09/04/02

PREVIOUSLY EXISTING MONITORING WELLS DESTROYED OR ABANDONED AND REPLACED AT THE SAME LOCATION

MW001	MW202	MW205
MW003	MW203	
MW201	MW204	

REPLACEMENT WELLS INSTALLED DECEMBER 2000

MW001R	MW204R	MW205R
MW203R		

REPLACEMENT WELLS INSTALLED JUNE 2001

MW003R	MW201R	MW202R

MW208 WAS ABANDONED AND NOT REPLACED

NOTES:

1. PLAN COMPILED FROM PORTIONS OF A DIGITIZED COPY OF "GOULD ISLAND, U.S. NAVAL TORPEDO STATION, NEWPORT R.I., SHOWING CONDITIONS ON JUNE 30, 1948". A PLAN ENTITLED "GEOTECHNICAL SURVEY PLAN AT BUILDING 32 – GOULD ISLAND, U.S. NAVAL BASE, NEW, RHODE ISLAND, FOR TETRA TECH NUS, INC.", PLAN DATE: 4/25/00, AND DONE BY LOUIS FEDERICI & ASSOCIATES, PROVIDENCE, RHODE ISLAND. A PLAN ENTITLED: "LOCATION OF MONITORING WELLS AT BUILDING 32 – GOULD ISLAND, U.S. NAVAL BASE, NEW, RHODE ISLAND, FOR TETRA TECH NUS, INC.", PLAN DATE: 5/9/00, AND DONE BY LOUIS FEDERICI & ASSOCIATES, PROVIDENCE, RHODE ISLAND.
2. ALL LOCATIONS ARE TO BE CONSIDERED APPROXIMATE.
3. PLAN NOT TO BE USED FOR DESIGN.

ROUND 4 (SEPTEMBER 2002) GROUNDWATER LEVEL MAP

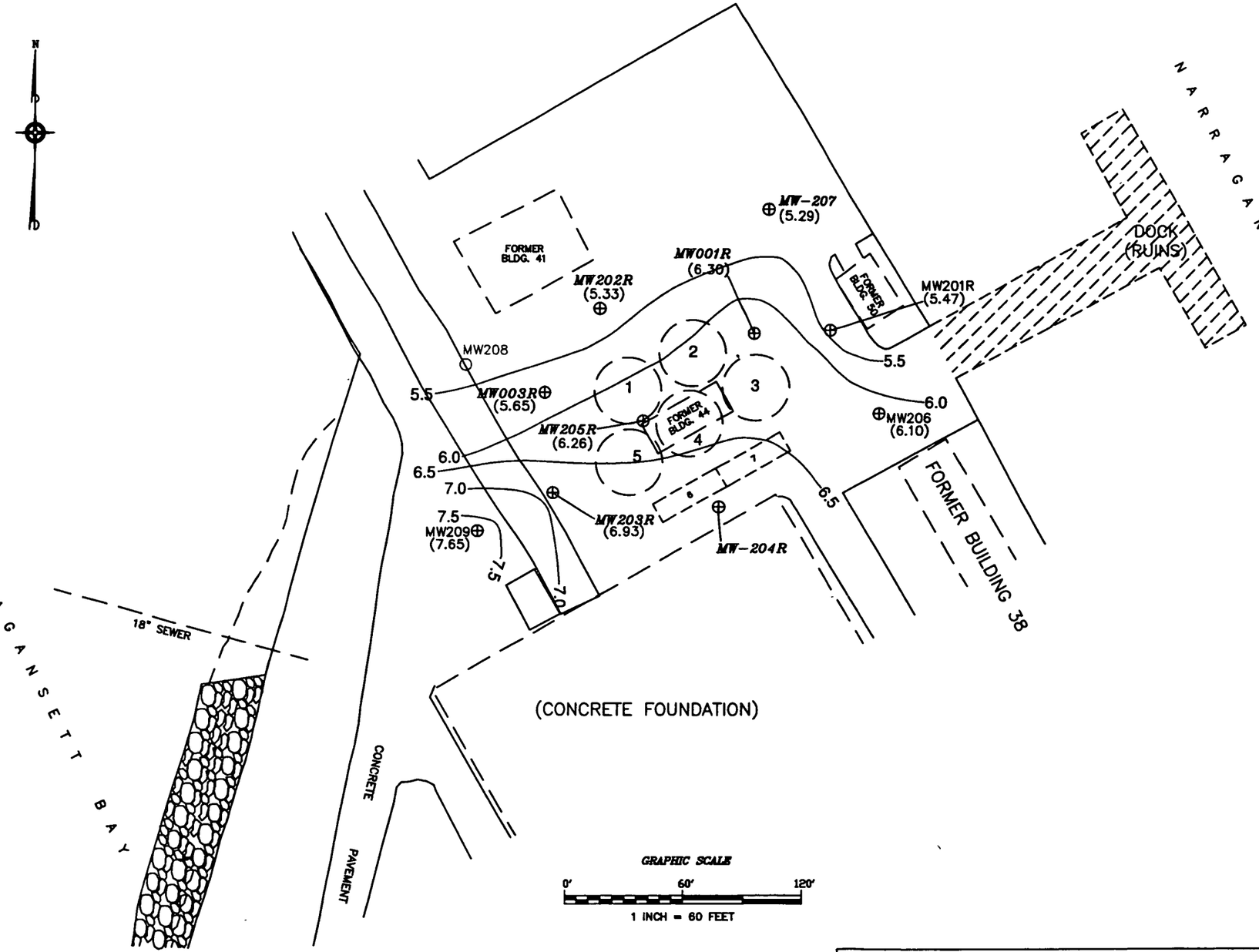
FORMER BUILDING 44 UST SITE

GOULD ISLAND – NAVSTA NEWPORT, RHODE ISLAND

DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	J.R. FORRELLI	DATE:	NOVEMBER 3, 2003
SCALE:	1" = 60'	FILE NO.:	DWG\2842\1081\FIG_2-2.DWG

FIGURE 2-2

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899



LEGEND

- ⊕ MW206 — EXISTING MONITORING WELL
- ○ MW208 — FORMER MONITORING WELL (ABANDONED)
- DESIGNATED CORRECTIVE ACTION GROUNDWATER MONITORING WELL LABELS ARE ITALICIZED
- R — DESIGNATES REPLACEMENT WELL (REPLACED, DESTROYED, OR ABANDONED WELL)
- 1 — FORMER UST (DEMOLISHED)
- 6 — FORMER UST (REMOVED)
- DEMOLISHED BUILDING FOOTPRINT
- 7.0 ——— GROUNDWATER CONTOUR
- (6.10) GROUNDWATER ELEVATION OBSERVED ON 03/05/03

PREVIOUSLY EXISTING MONITORING WELLS DESTROYED OR ABANDONED AND REPLACED AT THE SAME LOCATION

MW001	MW202	MW205
MW003	MW203	
MW201	MW204	

REPLACEMENT WELLS INSTALLED DECEMBER 2000

MW001R	MW204R	MW205R
MW203R		

REPLACEMENT WELLS INSTALLED JUNE 2001

MW003R	MW201R	MW202R

MW208 WAS ABANDONED AND NOT REPLACED

NOTES:

1. PLAN COMPILED FROM PORTIONS OF A DIGITIZED COPY OF "GOULD ISLAND, U.S. NAVAL TORPEDO STATION, NEWPORT R.I., SHOWING CONDITIONS ON JUNE 30, 1948". A PLAN ENTITLED "GEOTECHNICAL SURVEY PLAN AT BUILDING 32 – GOULD ISLAND, U.S. NAVAL BASE, NEW, RHODE ISLAND, FOR TETRA TECH NUS, INC.", PLAN DATE: 4/25/00, AND DONE BY LOUIS FEDERICI & ASSOCIATES, PROVIDENCE, RHODE ISLAND. A PLAN ENTITLED: "LOCATION OF MONITORING WELLS AT BUILDING 32 – GOULD ISLAND, U.S. NAVAL BASE, NEW, RHODE ISLAND, FOR TETRA TECH NUS, INC.", PLAN DATE: 5/9/00, AND DONE BY LOUIS FEDERICI & ASSOCIATES, PROVIDENCE, RHODE ISLAND.
2. ALL LOCATIONS ARE TO BE CONSIDERED APPROXIMATE.
3. PLAN NOT TO BE USED FOR DESIGN.

ROUND 5 (MARCH 2003) GROUNDWATER LEVEL MAP

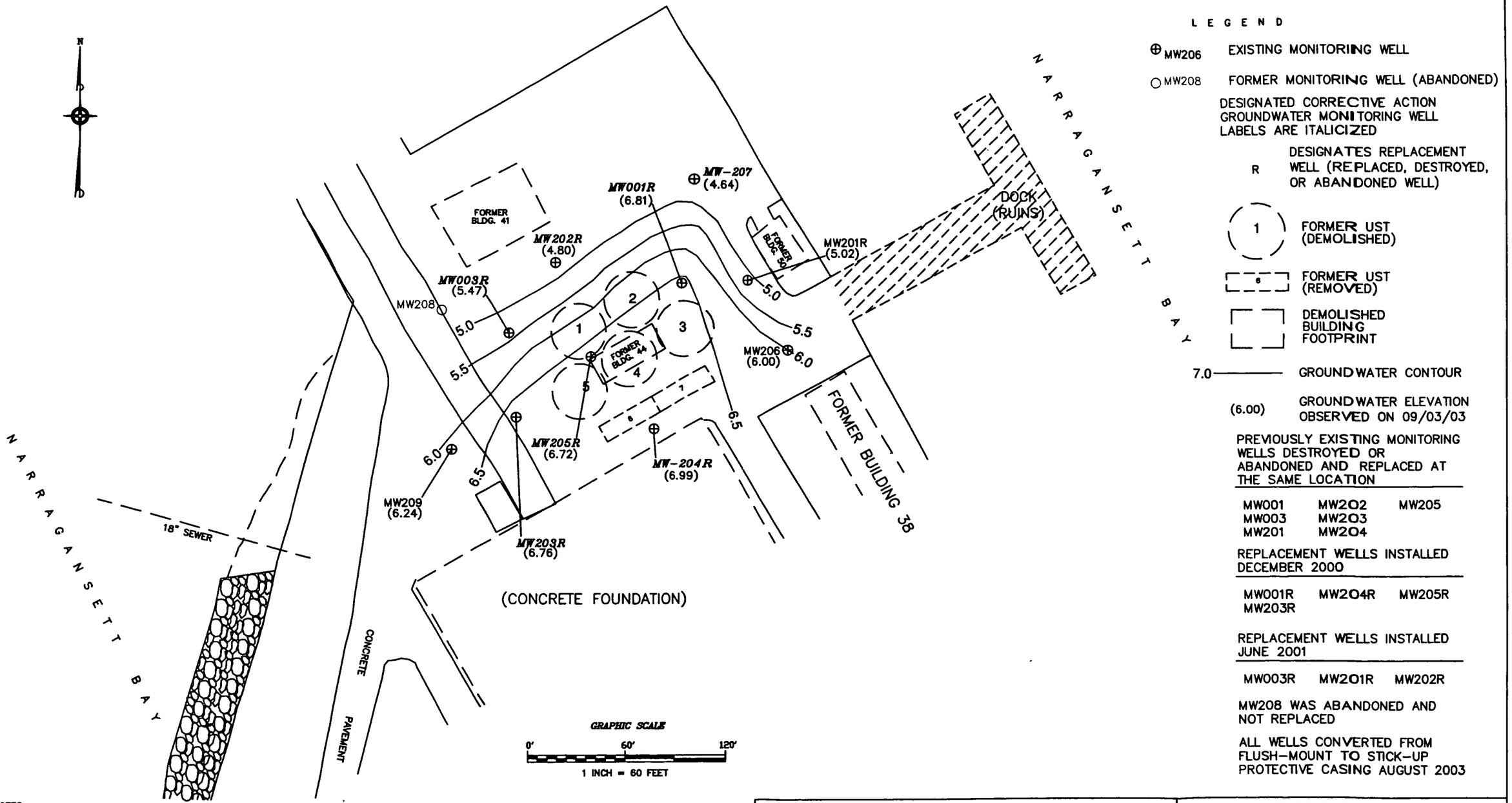
FORMER BUILDING 44 UST SITE

GOULD ISLAND – NAVSTA NEWPORT, RHODE ISLAND

DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	J. LAMBERT	DATE:	NOVEMBER 3, 2003
SCALE:	1" = 60'	FILE NO.:	DWG\2842\1082\FIG_2-3.DWG

FIGURE 2-3

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899



LEGEND

- ⊕ MW206 — EXISTING MONITORING WELL
- ○ MW208 — FORMER MONITORING WELL (ABANDONED)

DESIGNATED CORRECTIVE ACTION GROUNDWATER MONITORING WELL LABELS ARE ITALICIZED

R — DESIGNATES REPLACEMENT WELL (REPLACED, DESTROYED, OR ABANDONED WELL)

1 — FORMER UST (DEMOLISHED)

6 — FORMER UST (REMOVED)

DEMOLISHED BUILDING FOOTPRINT

7.0 — GROUNDWATER CONTOUR

(6.00) — GROUNDWATER ELEVATION OBSERVED ON 09/03/03

PREVIOUSLY EXISTING MONITORING WELLS DESTROYED OR ABANDONED AND REPLACED AT THE SAME LOCATION

MW001	MW202	MW205
MW003	MW203	
MW201	MW204	

REPLACEMENT WELLS INSTALLED DECEMBER 2000

MW001R	MW204R	MW205R
MW203R		

REPLACEMENT WELLS INSTALLED JUNE 2001

MW003R	MW201R	MW202R

MW208 WAS ABANDONED AND NOT REPLACED

ALL WELLS CONVERTED FROM FLUSH-MOUNT TO STICK-UP PROTECTIVE CASING AUGUST 2003

NOTES:

1. PLAN COMPILED FROM PORTIONS OF A DIGITIZED COPY OF "GOULD ISLAND, U.S. NAVAL TORPEDO STATION, NEWPORT R.I., SHOWING CONDITIONS ON JUNE 30, 1948". A PLAN ENTITLED "GEOTECHNICAL SURVEY PLAN AT BUILDING 32 – GOULD ISLAND, U.S. NAVAL BASE, NEW, RHODE ISLAND, FOR TETRA TECH NUS, INC.", PLAN DATE: 4/25/00, AND DONE BY LOUIS FEDERICI & ASSOCIATES, PROVIDENCE, RHODE ISLAND. A PLAN ENTITLED: "LOCATION OF MONITORING WELLS AT BUILDING 32 – GOULD ISLAND, U.S. NAVAL BASE, NEW, RHODE ISLAND, FOR TETRA TECH NUS, INC.", PLAN DATE: 5/9/00, AND DONE BY LOUIS FEDERICI & ASSOCIATES, PROVIDENCE, RHODE ISLAND.
2. ALL LOCATIONS ARE TO BE CONSIDERED APPROXIMATE.
3. PLAN NOT TO BE USED FOR DESIGN.

ROUND 6 (SEPTEMBER 2003) GROUNDWATER LEVEL MAP

FORMER BUILDING 44 UST SITE

GOULD ISLAND – NAVSTA NEWPORT, RHODE ISLAND

DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	J. LAMBERT	DATE:	NOVEMBER 3, 2003
SCALE:	1" = 60'	FILE NO.:	DWG\2842\1083\FIG_2-4.DWG

FIGURE 2-4

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899

APPENDIX A

MONITORING WELL MODIFICATION ACTIVITIES REPORT

TETRA TECH NUS, INC.
55 Jonspin Road • Wilmington, MA 01887-1020
Tel 978.658.7899 • Fax 978.658.7870 • www.tetratech.com

C-NAVY-08-03-1648W

Project Number N2842

August 25, 2003

Mr. Brian Helland
Remedial Project Manager
Northern Division
Engineering Field Activity Northeast
10 Industrial Highway, Mail Stop #82
Lester, Pennsylvania 19113

Reference: CLEAN Contract No. N62467-D-94-0888
Contract Task Order 809

Subject: Former Building 44 UST Site (Gould Island)
Monitoring Well Modification Activities
Corrective Action Groundwater Monitoring

Dear Mr. Helland:

This letter presents a summary of monitoring well modification activities performed by Tetra Tech NUS (TtNUS) in August 2003 at the former Building 44 UST Site at Naval Station Newport (NAVSTA Newport) at the direction of the Engineering Field Activity Northeast Naval Facilities Engineering Command (EFA Northeast). During this activity ten wells at the site were converted from flush-mount covers to stick-up protective casing.

The former Building 44 UST Site is located on the northern end of Gould Island, which is located in the east passage of Narragansett Bay, approximately 1.5 miles off Middletown, Rhode Island. TtNUS previously performed a site investigation (SI) of the groundwater and soil petroleum hydrocarbon contamination at this former location of seven underground storage tanks and is conducting semi-annual groundwater monitoring as part of the corrective action. All ten monitoring wells were originally installed with flush mount covers due to the frequent demolition activity on Gould Island.

The wells at the location of the former Building 44 UST Site were converted from flush-mount cov r wells to stick-up protective casing wells on August 19, 2003 by TtNUS's subcontractor, Geosearch, Inc. A TtNUS geologist supervised the activities. The well modification consisted of removing the existing road box and protective casing, extending the existing PVC riser, installing a new stickup protective casing and installing a new surface seal. The new protective casing, equipped with a lockable cov r, was installed to a depth of approximately 2 feet below ground surface and approximately 3 feet above ground surface. The 2-inch PVC well riser was extended by approximately 2 feet above the ground surface using a coupling. The PVC extension was measured to calculate the elevation of the top of the riser pipe. The adjusted well riser pipe top elevations (measuring point) are provided in the attached Table 1. All wells were secured with keyed-alike locks.

If you have any comments or questions on this transmittal, please contact me.

Very truly yours,

James R. Forrelli

James R. Forrelli, P.E.
Project Manager

JRF/rp

Enclosures

c: A. Sylvester, NAVSTA Newport (w/encl.)
J. Trepanowski/G. Glenn, TtNUS (w/encl.)
File N2842-3.2 w/o enc./N2842-C8.0 (w/encl.)

TABLE 1
ADJUSTED MONITORING WELL RISER PIPE TOP (MEASURING POINT) ELEVATIONS
CORRECTIVE ACTION GROUNDWATER MONITORING
FORMER BUILDING 44 UST SITE
NAVAL STATION NEWPORT, NEWPORT, RHODE ISLAND

Well No. [1]	Ground Surface Elev. (ft-MLW) [2]	Original MP Elev. (ft-MLW) [2]	8/19/03 MP Elev. (ft-MLW)[3]
Upgradient wells			
MW203R	12.8	12.44	16.27
MW204R	12.2	11.63	15.09
MW209	12.7	12.48	15.94
Source area wells			
MW001R	11.7	11.30	14.90
MW205R	12.6	12.21	15.54
Downgradient wells			
MW003R	12.4	12.05	15.38
MW201R	11.9	11.49	14.79
MW202R	12.1	11.72	15.07
MW206	12.1	11.75	15.23
MW207	12.0	11.80	14.83

Notes:
All wells installed with 2-inch diameter PVC riser.
MW208 was previously abandoned and not replaced.
All wells were converted from flush-mount cover wells to stick-up protective casing wells on August 19, 2003.
(1) "R" designates a replacement well at that location.
(2) Ground Surface Elev. and Original MP Elev. based on June 2001 survey.
(3) 8/19/03 MP Elev. based on riser extension measurements.
MP measuring point (top of PVC riser)
ft-MLW elevation in feet based on mean low water elevation datum

ATTACHMENT

REVISED MONITORING WELL CONSTRUCTION LOGS

OVERBURDEN MONITORING WELL CONSTRUCTION LOG — TETRA TECH NUS, INC.

PROJECT NAME: Fmr. Bldg. 44 UST Site Corrective Action GW Monitoring — PROJECT NO: N0288-1072 (CTO 143)

PROJECT LOCATION: Naval Station Newport, Rhode Island — WELL NO: MW001R

CLIENT: Engineering Field Activity Northeast, Naval Facilities Engineering Command — BORING NO: SB001R

CONTRACTOR: Guild Drilling Co., E. Providence, RI — DRILLER: Paul Brescia — BORING LOCATION: Source Area

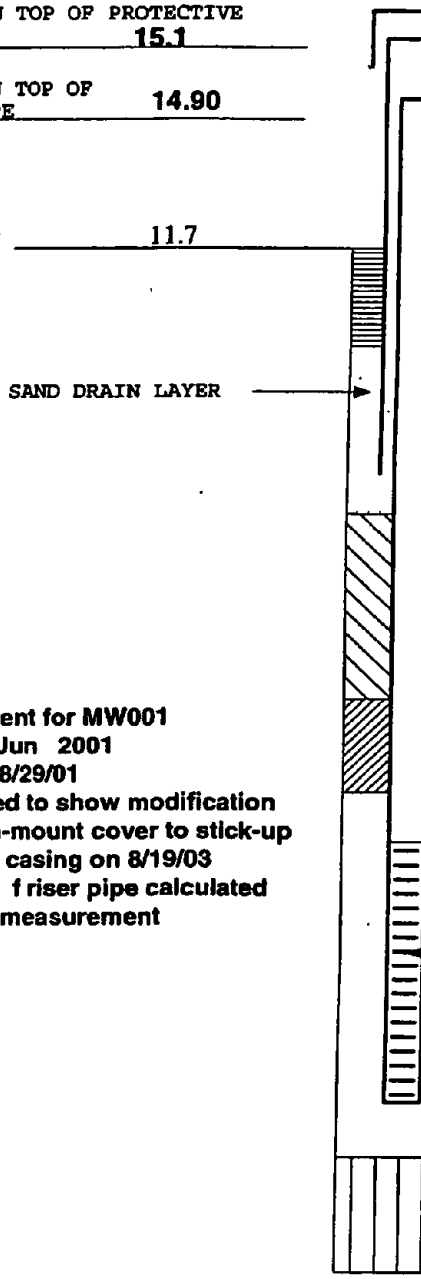
LOGGED BY: M Healey — DATE: 12/19/00

CHECKED BY: J. Lambert JL — DATE: 8/20/03 (revised log)

ELEVATION TOP OF PROTECTIVE CASING: 15.1

ELEVATION TOP OF RISER PIPE: 14.90

GROUND ELEVATION: 11.7



LENGTH OF PROTECTIVE CASING ABOVE GROUND SURFACE (Ft.)	3.4
LENGTH OF RISER PIPE ABOVE GROUND SURFACE (Ft.)	3.2
TYPE OF SURFACE SEAL	cement
DIA. SURFACE SEAL BGS (In.)	18
DEPTH TO BOTTOM OF SURFACE SEAL (Ft.)	1.5
I.D. OF PROTECTIVE CASING (In.)	4
TYPE OF PROTECTIVE CASING	5.5 ft standpipe
DEPTH BOTTOM OF PROTECTIVE CASING (Ft.)	2.1
DEPTH BOTTOM OF DRAIN LAYER (Ft.)	2.5
RISER PIPE (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF RISER PIPE	PVC
TYPE OF BACKFILL AROUND RISER PIPE	---
DEPTH TOP OF SEAL (Ft.)	2.5
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL (Ft.)	3.0
DEPTH TOP OF PERVIOUS SECTION (Ft.)	4.0
DIAMETER OF BOREHOLE (In.)	4.0
TYPE OF PERVIOUS SECTION	PVC
TYPE OF OPENINGS	0.010
PERVIOUS SECTION (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF FILTER PACK AROUND PERVIOUS SECTION	20-30 Sand
DEPTH BOTTOM OF PERVIOUS SECTION (Ft.)	9.0
DEPTH BOTTOM OF FILTER PACK (Ft.)	10.0
TYPE OF BACKFILL BELOW FILTER PACK	N/A
END OF BORING (Ft.)	10.0

Not s:
R placement for MW001
Repaired Jun 2001
Surv yed 8/29/01
Log revised to show modification from flush-mount cover to stick-up protective casing on 8/19/03
El vati n f riser pipe calculated from field measurement

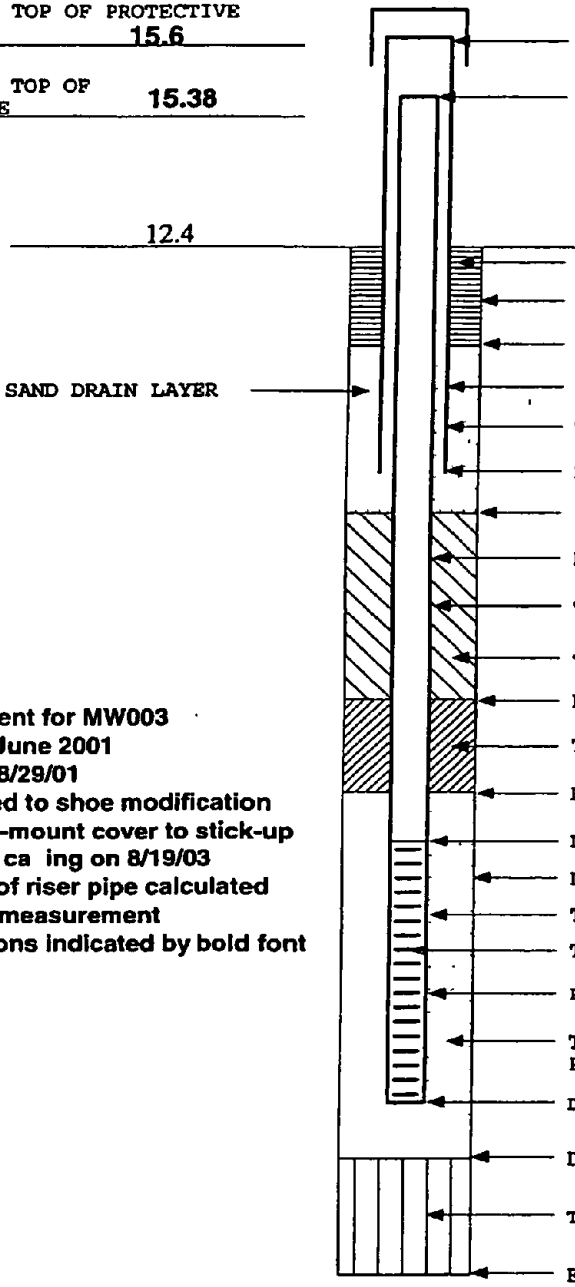
GENERAL NOTE:

1. Entry of 0.00 for Ground Elevation, Elev. Top of Riser Pipe & Elev. Top of Protective Casing Indicates that Surveyed Ground Elevation Not Available.

OVERBURDEN MONITORING WELL CONSTRUCTION LOG — TETRA TECH NUS, INC.

PROJECT NAME: Frmr. Bldg. 44 UST Site Corrective Action GW Monitoring
PROJECT NO: N0288-1902 (CTO 143)
PROJECT LOCATION: Naval Station Newport, Rhode Island
WELL NO: MW003R
CLIENT: Engineering Field Activity Northeast, Naval Facilities Engineering Command
BORING NO: SB003R
CONTRACTOR: Guild Drilling Col., E. Providence, RI
DRILLER: Paul Brescia
BORING LOCATION: Downgradient - Northwest
LOGGED BY: M Healey
DATE: 6/18/01
CHECKED BY: J. Lambert JL
DATE: 8/20/03 (revised log)
PAGE: 1 OF 1

ELEVATION TOP OF PROTECTIVE CASING: 15.6
ELEVATION TOP OF RISER PIPE: 15.38
GROUND ELEVATION: 12.4



LENGTH OF PROTECTIVE CASING ABOVE GROUND SURFACE (Ft.)	3.2
LENGTH OF RISER PIPE ABOVE GROUND SURFACE (Ft.)	2.98
TYPE OF SURFACE SEAL	cement
DIA. SURFACE SEAL BGS (In.)	18
DEPTH TO BOTTOM OF SURFACE SEAL (Ft.)	1.5
I.D. OF PROTECTIVE CASING (In.)	4
TYPE OF PROTECTIVE CASING	5.5 ft standpipe
DEPTH BOTTOM OF PROTECTIVE CASING (Ft.)	2.3
DEPTH BOTTOM OF DRAIN LAYER (Ft.)	2.5
RISER PIPE (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF RISER PIPE	PVC
TYPE OF BACKFILL AROUND RISER PIPE	---
DEPTH TOP OF SEAL (Ft.)	2.5
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL (Ft.)	3
DEPTH TOP OF PERVIOUS SECTION (Ft.)	4
DIAMETER OF BOREHOLE (In.)	4
TYPE OF PERVIOUS SECTION	Schedule 40 PVC
TYPE OF OPENINGS	0.010
PERVIOUS SECTION (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF FILTER PACK AROUND PERVIOUS SECTION	Sand
DEPTH BOTTOM OF PERVIOUS SECTION (Ft.)	14
DEPTH BOTTOM OF FILTER PACK (Ft.)	15
TYPE OF BACKFILL BELOW FILTER PACK	N/A
END OF BORING (Ft.)	N/A

Notes:
Replacement for MW003
Repaired June 2001
Surveyed 8/29/01
Log revised to shoe modification from flush-mount cover to stick-up protective casing on 8/19/03
Elevation of riser pipe calculated from field measurement
Modifications indicated by bold font

GENERAL NOTE:

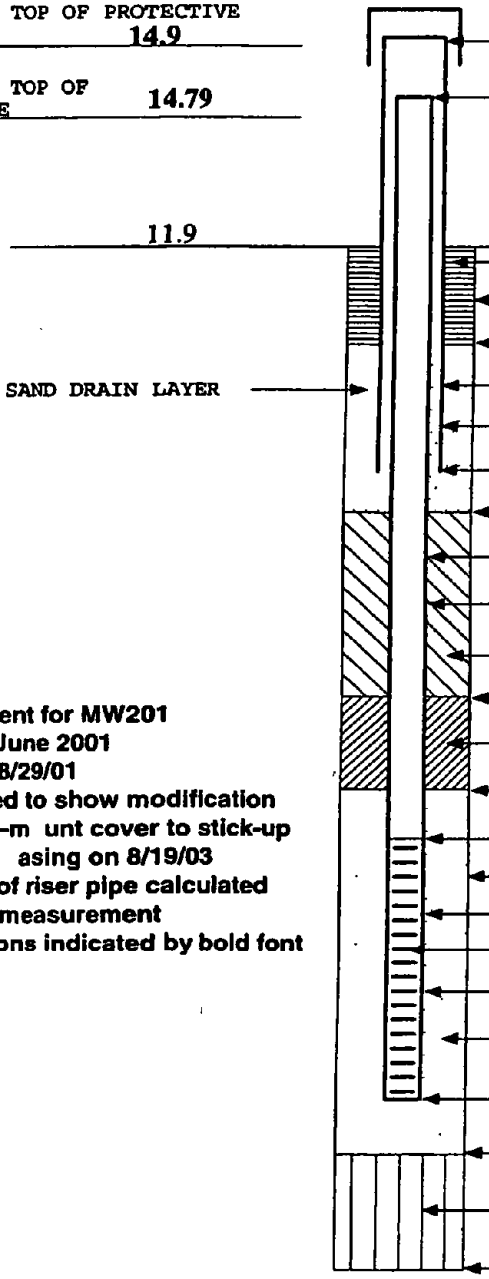
1. Entry of 0.00 for Ground Elevation, Elev. Top of Riser Pipe & Elev. Top of Protective Casing Indicates that Surveyed Ground Elevation Not Available.

TtNUS Form 0059

OVERBURDEN MONITORING WELL CONSTRUCTION LOG — TETRA TECH NUS, INC.

PROJECT NAME: Frmr. Bldg. 44 UST Site Corrective Action GW Monitoring
PROJECT NO: N0288-1902 (CTO 143)
PROJECT LOCATION: Naval Station Newport, Rhode Island
WELL NO: MW201R
CLIENT: Engineering Field Activity Northeast, Naval Facilities Engineering Command
BORING NO: SB201R
CONTRACTOR: Guild Drilling Col., E. Providence, RI
DRILLER: Paul Brescia
BORING LOCATION: Downgradient - Northeast
LOGGED BY: G. Sturgeon
DATE: 6/15/01
CHECKED BY: J. Lambert JL
DATE: 8/20/03 (revised log)
PAGE: 1 OF 1

ELEVATION TOP OF PROTECTIVE CASING: 14.9
ELEVATION TOP OF RISER PIPE: 14.79
GROUND ELEVATION: 11.9



LENGTH OF PROTECTIVE CASING ABOVE GROUND SURFACE (Ft.)	3.0
LENGTH OF RISER PIPE ABOVE GROUND SURFACE (Ft.)	2.89
TYPE OF SURFACE SEAL	cement
DIA. SURFACE SEAL BGS (In.)	18
DEPTH TO BOTTOM OF SURFACE SEAL (Ft.)	1.5
I.D. OF PROTECTIVE CASING (In.)	4
TYPE OF PROTECTIVE CASING	5.5 ft standpipe
DEPTH BOTTOM OF PROTECTIVE CASING (Ft.)	2.5
DEPTH BOTTOM OF DRAIN LAYER (Ft.)	2.0
RISER PIPE (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF RISER PIPE	PVC
TYPE OF BACKFILL AROUND RISER PIPE	---
DEPTH TOP OF SEAL (Ft.)	2.0
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL (Ft.)	2.5
DEPTH TOP OF PERVIOUS SECTION (Ft.)	4.5
DIAMETER OF BOREHOLE (In.)	4.0
TYPE OF PERVIOUS SECTION	Schedule 40 PVC
TYPE OF OPENINGS	0.01
PERVIOUS SECTION (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF FILTER PACK AROUND PERVIOUS SECTION	00 sand
DEPTH BOTTOM OF PERVIOUS SECTION (Ft.)	14
DEPTH BOTTOM OF FILTER PACK (Ft.)	15
TYPE OF BACKFILL BELOW FILTER PACK	N/A
END OF BORING (Ft.)	15

Not s:
Replac ment for MW201
Repaired June 2001
Surveyed 8/29/01
Log revised to show modification from flush-m unt cover to stick-up pr tective asing on 8/19/03
Elevation of riser pipe calculated fr m fi ld measurement
Modifications indicated by bold font

GENERAL NOTE:

1. Entry of 0.00 for Ground Elevation, Elev. Top of Riser Pipe & Elev. Top of Protective Casing Indicates that Surveyed Ground Elevation Not Available.

OVERBURDEN MONITORING WELL CONSTRUCTION LOG — TETRA TECH NUS, INC.

PROJECT NAME: Frmr. Bldg. 44 UST Site Corrective Action GW Monitoring — PROJECT NO: N0288-1902 (CTO 143)

PROJECT LOCATION: Naval Station Newport, Rhode Island — WELL NO: MW202R

CLIENT: Engineering Field Activity Northeast, Naval Facilities Engineering Command — BORING NO: SB202R

CONTRACTOR: Guild Drilling Col., E. Providence, RI — DRILLER: Paul Brescia — BORING LOCATION: Downgradient - North

LOGGED BY: G. Sturgeon — DATE: 6/14/01

CHECKED BY: J. Lambert JL — DATE: 8/20/03 (revised log)

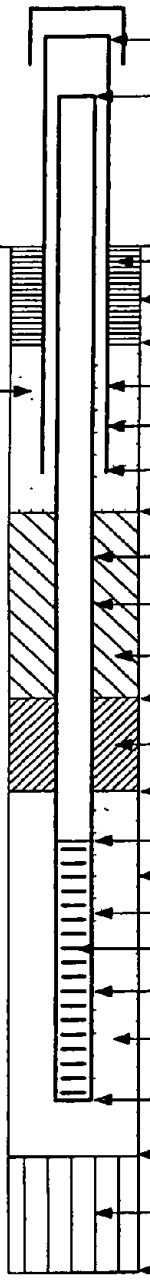
PAGE: 1 OF 1

ELEVATION TOP OF PROTECTIVE CASING: 15.2

ELEVATION TOP OF RISER PIPE: 15.07

GROUND ELEVATION: 12.1

SAND DRAIN LAYER



LENGTH OF PROTECTIVE CASING ABOVE GROUND SURFACE (Ft.)	3.1
LENGTH OF RISER PIPE ABOVE GROUND SURFACE (Ft.)	2.97
TYPE OF SURFACE SEAL	cement
DIA. SURFACE SEAL BGS (In.)	18
DEPTH TO BOTTOM OF SURFACE SEAL (Ft.)	1.5
I.D. OF PROTECTIVE CASING (In.)	4
TYPE OF PROTECTIVE CASING	5.5 ft standpipe
DEPTH BOTTOM OF PROTECTIVE CASING (Ft.)	2.4
DEPTH BOTTOM OF DRAIN LAYER (Ft.)	2.5
RISER PIPE (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF RISER PIPE	PVC
TYPE OF BACKFILL AROUND RISER PIPE	---
DEPTH TOP OF SEAL (Ft.)	2.5
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL (Ft.)	3.5
DEPTH TOP OF PERVIOUS SECTION (Ft.)	4.5
DIAMETER OF BOREHOLE (In.)	4.0
TYPE OF PERVIOUS SECTION	Schedule 40 PVC
TYPE OF OPENINGS	0.01
PERVIOUS SECTION (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF FILTER PACK AROUND PERVIOUS SECTION	00 sand
DEPTH BOTTOM OF PERVIOUS SECTION (Ft.)	14.5
DEPTH BOTTOM OF FILTER PACK (Ft.)	15
TYPE OF BACKFILL BELOW FILTER PACK	N/A
END OF BORING (Ft.)	15

Not s:
Replacem nt for MW202
Repaired Jun 2001
Surv yed 8/29/01
Log revised t show modification from flush-mount cover to stick-up protective casing on 8/19/03
El vation of ri er pipe calculated from field measurement
Modifications indicated by bold font

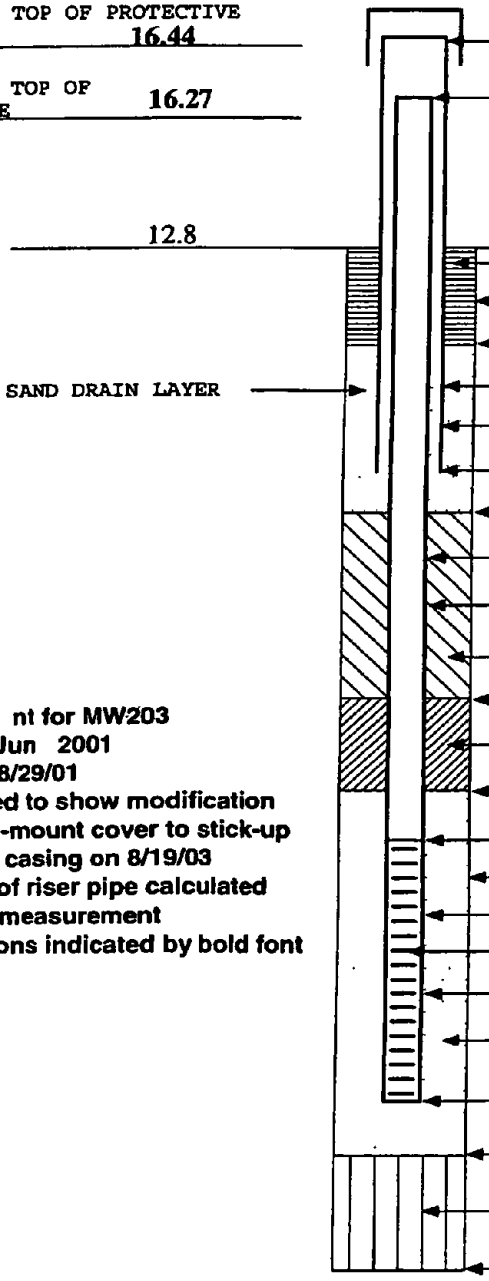
GENERAL NOTE:

1. Entry of 0.00 for Ground Elevation, Elev. Top of Riser Pipe & Elev. Top of Protective Casing Indicates that Surveyed Ground Elevation Not Available.

OVERBURDEN MONITORING WELL CONSTRUCTION LOG — TETRA TECH NUS, INC.

PROJECT NAME: Frmr. Bldg. 44 UST Site Corrective Action GW Monitoring
PROJECT NO: N0288-1072 (CTO 143)
PROJECT LOCATION: Naval Station Newport, Rhode Island
WELL NO: MW203R
CLIENT: Engineering Field Activity Northeast, Naval Facilities Engineering Command
BORING NO: SB203R
CONTRACTOR: Guild Drilling Col., E. Providence, RI
DRILLER: Paul Brescia
BORING LOCATION: Source Area
LOGGED BY: M. Healey
DATE: 12/22/00
CHECKED BY: J. Lambert JL
DATE: 8/20/03 (revised log)
PAGE: 1 OF 1

ELEVATION TOP OF PROTECTIVE CASING: 16.44
ELEVATION TOP OF RISER PIPE: 16.27
GROUND ELEVATION: 12.8



LENGTH OF PROTECTIVE CASING ABOVE GROUND SURFACE (Ft.)	3.5
LENGTH OF RISER PIPE ABOVE GROUND SURFACE (Ft.)	3.4
TYPE OF SURFACE SEAL	cement
DIA. SURFACE SEAL, BGS (In.)	18
DEPTH TO BOTTOM OF SURFACE SEAL (Ft.)	1.5
I.D. OF PROTECTIVE CASING (In.)	4
TYPE OF PROTECTIVE CASING	5.5 ft standpipe
DEPTH BOTTOM OF PROTECTIVE CASING (Ft.)	2
DEPTH BOTTOM OF DRAIN LAYER (Ft.)	2.2
RISER PIPE (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF RISER PIPE	PVC
TYPE OF BACKFILL AROUND RISER PIPE	---
DEPTH TOP OF SEAL (Ft.)	2.2
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL (Ft.)	3.0
DEPTH TOP OF PERVIOUS SECTION (Ft.)	4.5
DIAMETER OF BOREHOLE (In.)	4.0
TYPE OF PERVIOUS SECTION	PVC
TYPE OF OPENINGS	0.010
PERVIOUS SECTION (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF FILTER PACK AROUND PERVIOUS SECTION	20-30 sand
DEPTH BOTTOM OF PERVIOUS SECTION (Ft.)	9.5
DEPTH BOTTOM OF FILTER PACK (Ft.)	10.0
TYPE OF BACKFILL BELOW FILTER PACK	N/A
END OF BORING (Ft.)	10.0'

Notes:
Repla m nt for MW203
Repaired Jun 2001
Surv yed 8/29/01
L g r vised to show modification from flush-mount cover to stick-up protective casing on 8/19/03
Elevati n of riser pipe calculated fr m field measurement
Modifications indicated by bold font

GENERAL NOTE:

1. Entry of 0.00 for Ground Elevation, Elev. Top of Riser Pipe & Elev. Top of Protective Casing Indicates that Surveyed Ground Elevation Not Available.

TtNUS Form 0059

OVERBURDEN MONITORING WELL CONSTRUCTION LOG — TETRA TECH NUS, INC.

PROJECT NAME: Frmr. Bldg. 44 UST Site Corrective Action GW Monitoring — PROJECT NO: N0288-1072 (CTO 143)

PROJECT LOCATION: Naval Station Newport, Rhode Island — WELL NO: MW204R

CLIENT: Engineering Field Activity Northeast, Naval Facilities Engineering Command — BORING NO: SB204R

CONTRACTOR: Guild Drilling Col., E. Providence, RI — DRILLER: Paul Brescia — BORING LOCATION: Upgradient

LOGGED BY: M. Healey — DATE: 12/18/00

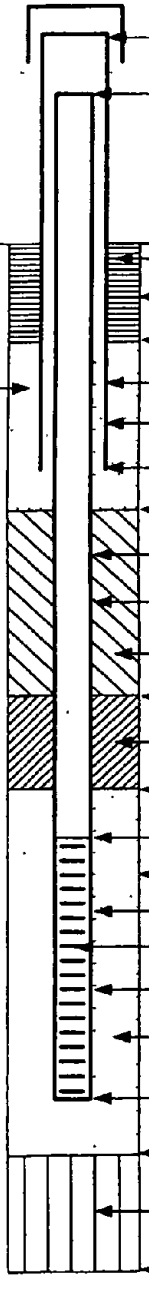
CHECKED BY: J. Lambert JC — DATE: 8/20/03 (revised log)

PAGE: 1 OF 1

ELEVATION TOP OF PROTECTIVE CASING: 15.25

ELEVATION TOP OF RISER PIPE: 15.09

GROUND ELEVATION: 12.2



LENGTH OF PROTECTIVE CASING ABOVE GROUND SURFACE (Ft.)	3.0
LENGTH OF RISER PIPE ABOVE GROUND SURFACE (Ft.)	2.85
TYPE OF SURFACE SEAL	cement
DIA. SURFACE SEAL BGS (In.)	18
DEPTH TO BOTTOM OF SURFACE SEAL (Ft.)	1.5
I.D. OF PROTECTIVE CASING (In.)	4
TYPE OF PROTECTIVE CASING	5.5 ft standpipe
DEPTH BOTTOM OF PROTECTIVE CASING (Ft.)	2.5
DEPTH BOTTOM OF DRAIN LAYER (Ft.)	2.5
RISER PIPE (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF RISER PIPE	PVC
TYPE OF BACKFILL AROUND RISER PIPE	---
DEPTH TOP OF SEAL (Ft.)	2.5
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL (Ft.)	3.0
DEPTH TOP OF PERVIOUS SECTION (Ft.)	4.5
DIAMETER OF BOREHOLE (In.)	4.0
TYPE OF PERVIOUS SECTION	PVC
TYPE OF OPENINGS	0.010
PERVIOUS SECTION (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF FILTER PACK AROUND PERVIOUS SECTION	20-30 sand
DEPTH BOTTOM OF PERVIOUS SECTION (Ft.)	9.0
DEPTH BOTTOM OF FILTER PACK (Ft.)	10.0
TYPE OF BACKFILL BELOW FILTER PACK	N/A
END OF BORING (Ft.)	10.0'

Notes:
R placem nt for MW204
Repaired June 2001
Surv yed 8/29/01
Log revi ed t show modification from flush-mount cover to stick-up protective casing on 8/19/03
El vation of riser pipe calculated from field m asurement
Modifications indicated by bold font

GENERAL NOTE:

1. Entry of 0.00 for Ground Elevation, Elev. Top of Riser Pipe & Elev. Top of Protective Casing Indicates that Surveyed Ground Elevation Not Available.

TtNUS Form 0059

OVERBURDEN MONITORING WELL CONSTRUCTION LOG — TETRA TECH NUS, INC.

PROJECT NAME: Frmr. Bldg. 44 UST Site Corrective Action GW Monitoring — PROJECT NO: N0288-1072 (CTO 143)

PROJECT LOCATION: Naval Station Newport, Rhode Island — WELL NO: MW205R

CLIENT: Engineering Field Activity Northeast, Naval Facilities Engineering Command — BORING NO: SB205R

CONTRACTOR: Guild Drilling Col., E. Providence, RI — DRILLER: Paul Brescia — BORING LOCATION: Source Area

LOGGED BY: M. Healey — DATE: 12/20/00

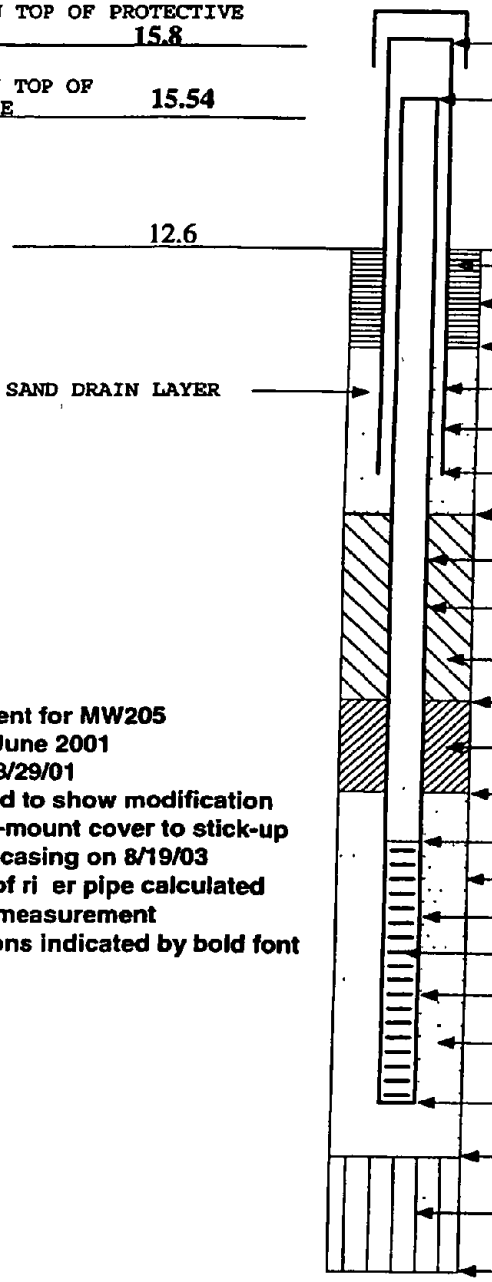
CHECKED BY: J. Lambert JC — DATE: 8/20/03

PAGE: 1 OF 1

ELEVATION TOP OF PROTECTIVE CASING: 15.8

ELEVATION TOP OF RISER PIPE: 15.54

GROUND ELEVATION: 12.6



LENGTH OF PROTECTIVE CASING ABOVE GROUND SURFACE (Ft.)	3.2
LENGTH OF RISER PIPE ABOVE GROUND SURFACE (Ft.)	2.94
TYPE OF SURFACE SEAL	cement
DIA. SURFACE SEAL BGS (In.)	18
DEPTH TO BOTTOM OF SURFACE SEAL (Ft.)	1.5
I.D. OF PROTECTIVE CASING (In.)	4
TYPE OF PROTECTIVE CASING	5.5 ft standpipe
DEPTH BOTTOM OF PROTECTIVE CASING (Ft.)	2.3
DEPTH BOTTOM OF DRAIN LAYER (Ft.)	2.5
RISER PIPE (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF RISER PIPE	PVC
TYPE OF BACKFILL AROUND RISER PIPE	---
DEPTH TOP OF SEAL (Ft.)	2.5
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL (Ft.)	3.0
DEPTH TOP OF PERVIOUS SECTION (Ft.)	4.0
DIAMETER OF BOREHOLE (In.)	4.0
TYPE OF PERVIOUS SECTION	PVC
TYPE OF OPENINGS	0.010
PERVIOUS SECTION (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF FILTER PACK AROUND PERVIOUS SECTION	20-30 sand
DEPTH BOTTOM OF PERVIOUS SECTION (Ft.)	9.0
DEPTH BOTTOM OF FILTER PACK (Ft.)	10.0
TYPE OF BACKFILL BELOW FILTER PACK	N/A
END OF BORING (Ft.)	10.0'

Notes:
Replacement for MW205
Repaired June 2001
Surv yed 8/29/01
Log revised to show modification fr m flush-mount cover to stick-up protective casing on 8/19/03
Elevation of ri er pipe calculated fr m fi ld measurement
M difications indicated by bold font

GENERAL NOTE:

1. Entry of 0.00 for Ground Elevation, Elev. Top of Riser Pipe & Elev. Top of Protective Casing Indicates that Surveyed Ground Elevation Not Available.

OVERBURDEN MONITORING WELL CONSTRUCTION LOG — TETRA TECH NUS, INC.

PROJECT NAME: Frmr. Bldg. 44 UST Site Corrective Action GW Monitoring — PROJECT NO: 0288

PROJECT LOCATION: Naval Station Newport, Rhode Island — WELL NO: MW206

CLIENT: Engineering Field Activity Northeast, Naval Facilities Engineering Command — BORING NO: SB06

CONTRACTOR: Guild Drilling Col., E. Providence, RI — DRILLER: Paul Brescia — BORING LOCATION: East of SB04, South of SB01

LOGGED BY: J. Rudders — DATE: 7/18/97

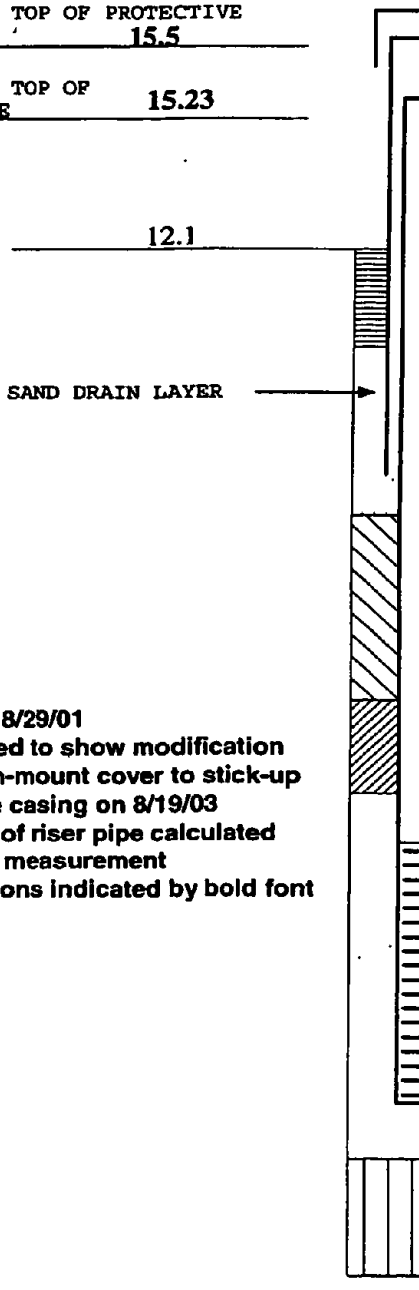
CHECKED BY: J. Lambert JC — DATE: 8/20/03 (revised log)

PAGE: 1 OF 1

ELEVATION TOP OF PROTECTIVE CASING: 15.5

ELEVATION TOP OF RISER PIPE: 15.23

GROUND ELEVATION: 12.1



LENGTH OF PROTECTIVE CASING ABOVE GROUND SURFACE (Ft.)	3.4
LENGTH OF RISER PIPE ABOVE GROUND SURFACE (Ft.)	3.13
TYPE OF SURFACE SEAL	cement
DIA. SURFACE SEAL BGS (In.)	18
DEPTH TO BOTTOM OF SURFACE SEAL (Ft.)	1.5
I.D. OF PROTECTIVE CASING (In.)	4
TYPE OF PROTECTIVE CASING	5.5 ft standpipe
DEPTH BOTTOM OF PROTECTIVE CASING (Ft.)	2.1
DEPTH BOTTOM OF DRAIN LAYER (Ft.)	2.5
RISER PIPE (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF RISER PIPE	PVC
TYPE OF BACKFILL AROUND RISER PIPE	----
DEPTH TOP OF SEAL (Ft.)	2.5
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL (Ft.)	3
DEPTH TOP OF PERVIOUS SECTION (Ft.)	4
DIAMETER OF BOREHOLE (In.)	4
TYPE OF PERVIOUS SECTION	Slotted PVC
TYPE OF OPENINGS	0.010
PERVIOUS SECTION (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF FILTER PACK AROUND PERVIOUS SECTION	Morie Sand
DEPTH BOTTOM OF PERVIOUS SECTION (Ft.)	9.5
DEPTH BOTTOM OF FILTER PACK (Ft.)	10.5
TYPE OF BACKFILL BELOW FILTER PACK	Bentonite/Sand
END OF BORING (Ft.)	14

Not s:
Surv yed 8/29/01
Log revised to show modification from flush-mount cover to stick-up pr tective casing on 8/19/03
Elevation of riser pipe calculated from field measurement
Modifications indicated by bold font

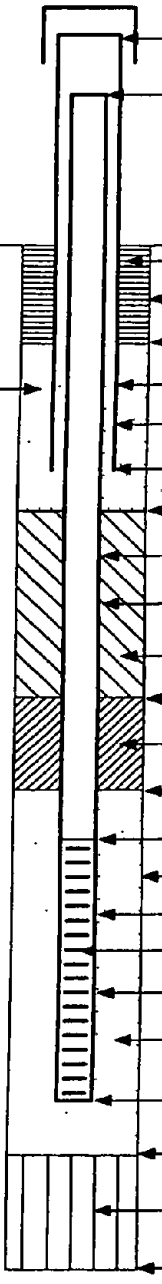
GENERAL NOTE:

1. Entry of 0.00 for Ground Elevation, Elev. Top of Riser Pipe & Elev. Top of Protective Casing Indicates that Surveyed Ground Elevation Not Available.

OVERBURDEN MONITORING WELL CONSTRUCTION LOG — TETRA TECH NUS, INC.

PROJECT NAME: Frmr. Bldg. 44 UST Site Corrective Action GW Monitoring
PROJECT NO: 0288
PROJECT LOCATION: Naval Station Newport, Rhode Island
WELL NO: MW207
CLIENT: Engineering Field Activity Northeast, Naval Facilities Engineering Command
BORING NO: SB07
CONTRACTOR: Guild Drilling Col., E. Providence, RI
DRILLER: Paul Brescia
BORING LOCATION: north of SB01, east of SB02
LOGGED BY: J. Rudders
DATE:
CHECKED BY: J. Lambert TC
DATE: 8/20/03 (revised log)
PAGE: 1 OF 1

ELEVATION TOP OF PROTECTIVE CASING: 15.1
ELEVATION TOP OF RISER PIPE: 14.83
GROUND ELEVATION: 12.0



LENGTH OF PROTECTIVE CASING ABOVE GROUND SURFACE (Ft.)	3.1
LENGTH OF RISER PIPE ABOVE GROUND SURFACE (Ft.)	2.83
TYPE OF SURFACE SEAL	cement
DIA. SURFACE SEAL BGS (In.)	18
DEPTH TO BOTTOM OF SURFACE SEAL (Ft.)	1.5
I.D. OF PROTECTIVE CASING (In.)	4
TYPE OF PROTECTIVE CASING	5.5 ft standpipe
DEPTH BOTTOM OF PROTECTIVE CASING (Ft.)	2.4
DEPTH BOTTOM OF DRAIN LAYER (Ft.)	3.0
RISER PIPE (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF RISER PIPE	PVC
TYPE OF BACKFILL AROUND RISER PIPE	---
DEPTH TOP OF SEAL (Ft.)	3
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL (Ft.)	4
DEPTH TOP OF PERVIOUS SECTION (Ft.)	5
DIAMETER OF BOREHOLE (In.)	4
TYPE OF PERVIOUS SECTION	Slotted PVC
TYPE OF OPENINGS	0.010
PERVIOUS SECTION (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF FILTER PACK AROUND PERVIOUS SECTION	Morie Sand
DEPTH BOTTOM OF PERVIOUS SECTION (Ft.)	10
DEPTH BOTTOM OF FILTER PACK (Ft.)	11
TYPE OF BACKFILL BELOW FILTER PACK	Bentonite/Sand
END OF BORING (Ft.)	12

Notes:
Surv yed 8/29/01
Log revised to show modification from flush-mount cover to stick-up protective casing on 8/19/03
Elevation of riser pipe calculated from field m asurement
Modifications indicated by bold font

GENERAL NOTE:

1. Entry of 0.00 for Ground Elevation, Elev. Top of Riser Pipe & Elev. Top of Protective Casing Indicates that Surveyed Ground Elevation Not Available.

TtNUS Form 0059

OVERBURDEN MONITORING WELL CONSTRUCTION LOG — TETRA TECH NUS, INC.

PROJECT NAME: Frmr. Bldg. 44 UST Site Corrective Action GW Monitoring — PROJECT NO: 0288

PROJECT LOCATION: Naval Station Newport, Rhode Island — WELL NO: MW209

CLIENT: Engineering Field Activity Northeast, Naval Facilities Engineering Command — BORING NO: SB14

CONTRACTOR: Guild Drilling Col., E. Providence, RI — DRILLER: Paul Brescia — BORING LOCATION: north of SB01, east of SB02

LOGGED BY: J. Rudders — DATE: 7/24/97

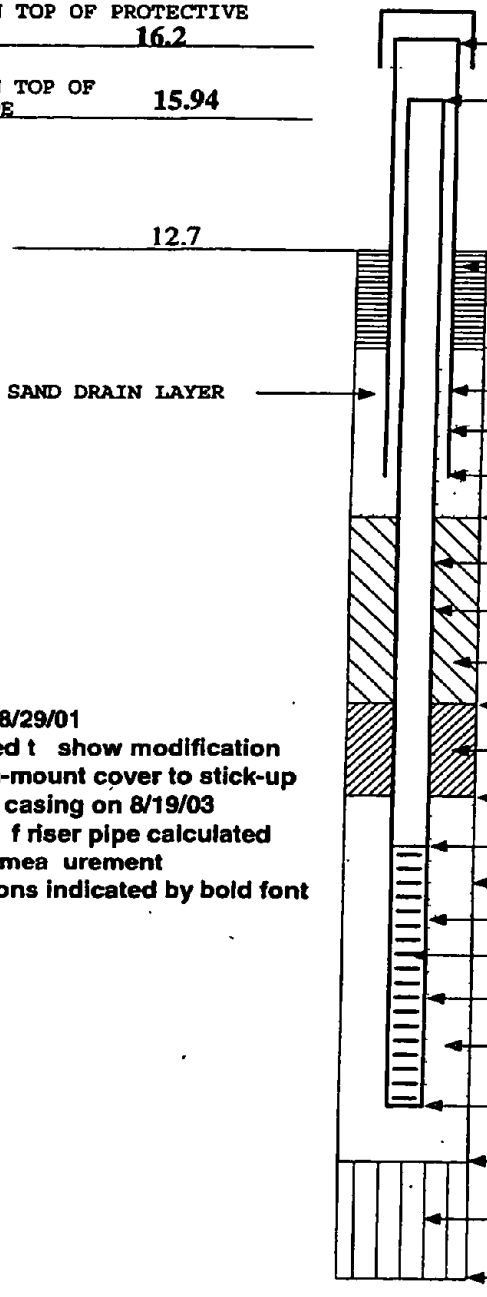
CHECKED BY: J. Lambert JL — DATE: 8/20/03 (revised log)

PAGE: 1 OF 1

ELEVATION TOP OF PROTECTIVE CASING: 16.2

ELEVATION TOP OF RISER PIPE: 15.94

GROUND ELEVATION: 12.7



LENGTH OF PROTECTIVE CASING ABOVE GROUND SURFACE (Ft.)	3.5
LENGTH OF RISER PIPE ABOVE GROUND SURFACE (Ft.)	3.24
TYPE OF SURFACE SEAL	cement
DIA. SURFACE SEAL BGS (In.)	20
DEPTH TO BOTTOM OF SURFACE SEAL (Ft.)	1.5
I.D. OF PROTECTIVE CASING (In.)	4
TYPE OF PROTECTIVE CASING	5.5 ft standpipe
DEPTH BOTTOM OF PROTECTIVE CASING (Ft.)	2.0
DEPTH BOTTOM OF DRAIN LAYER (Ft.)	2.5
RISER PIPE (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF RISER PIPE	PVC
TYPE OF BACKFILL AROUND RISER PIPE	----
DEPTH TOP OF SEAL (Ft.)	2.5
TYPE OF SEAL	Bentonite
DEPTH BOTTOM OF SEAL (Ft.)	3
DEPTH TOP OF PERVIOUS SECTION (Ft.)	4
DIAMETER OF BOREHOLE (In.)	4
TYPE OF PERVIOUS SECTION	Slotted PVC
TYPE OF OPENINGS	0.010
PERVIOUS SECTION (In.) I.D.: 2	O.D.: 2 3/8
TYPE OF FILTER PACK AROUND PERVIOUS SECTION	Morie Sand
DEPTH BOTTOM OF PERVIOUS SECTION (Ft.)	9
DEPTH BOTTOM OF FILTER PACK (Ft.)	10
TYPE OF BACKFILL BELOW FILTER PACK	N/A
END OF BORING (Ft.)	10

Notes:
Surveyed 8/29/01
Log revised t show modification fr m flush-mount cover to stick-up protective casing on 8/19/03
Elevation f riser pipe calculated from field mea urement
Modifications indicated by bold font

GENERAL NOTE:

1. Entry of 0.00 for Ground Elevation, Elev. Top of Riser Pipe & Elev. Top of Protective Casing Indicates that Surveyed Ground Elevation Not Available.

APPENDIX B

FIELD PARAMETERS ROUNDS 4 THROUGH 6

FIELD PARAMETER SUMMARY
CORRECTIVE ACTION GROUNDWATER MONITORING
ROUNDS 4 THROUGH 6
FORMER BUILDING 44 UST SITE (GOULD ISLAND)
NAVAL STATION NEWPORT, NEWPORT, RHODE ISLAND

Well ID [1]	Round [5]	Date Sampled	pH (S.U.)	Spec. Cond (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mv)	Salinity (%)	Interface Probe Signal (Yes/No)	NAPL Thickness via Signal (ft)	Visual Petroleum Impact (Yes/No)	Type of Visual Impact	TPVC Elevation[2]	Water Depth (TPVC or Steel)[3]	Water Elevation (MSL)	Comments
Upgradient wells																	
MW204R	4	9/5/2002	6 83	2 69	19 89	2 0	6 30	-16	0 1	No	--	No	--	11 63	5 0	6 63	buried under several inches of material
	5	--	--	--	--	--	--	--	--	No	--	No	--	11 63	--	--	not serviceable - covered by standing water
	WM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	casing loose, PVC/J-plug intact
	6	9/3/2003	7 6	2 18	18 76	101 0	3 88	58	0 0	No	--	No	--	15 09	8 10	6 99	foreign material in purge water
MW209	4	--	--	--	--	--	--	--	--	No	--	No	--	12 48	4 9	7 58	not sampled
	5	--	--	--	--	--	--	--	--	No	--	No	--	12 48	4 83	7 65	not sampled
	WM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	casing loose, PVC/J-plug intact
	6	--	--	--	--	--	--	--	--	No	--	No	--	15 94	9 70	6 24	not sampled
Source area																	
MW001R	4	9/5/2002	11 32	3 90	19 32	4 7	6 00	-116	0 2	No	--	No	--	11 3	4 65	6 65	
	5	3/7/2003	8 49	9 19	7 93	4 9	8 10	-84	0 5	No	--	No	--	11 3	5 00	6 30	
	WM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	partially buried
	6	9/4/2003	11 12	4 17	17 91	432 0	3 69	-248	0 2	No	--	No	--	14 9	8 09	6 81	
MW203R	4	9/4/2002	8 28	9 50	23 08	1 5	-- [4]	-6	0 5	No	--	No	--	12 44	4 77	7 67	
	5	3/5/2003	6 95	6 72	6 55	3 3	9 40	5	0 3	No	--	No	--	12 44	5 51	6 93	
	WM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	cover missing, PVC/J-plug intact
	6	9/3/2003	6 65	9 81	19 20	9 4	4 74	1	0 5	No	--	No	--	16 27	9 51	6 76	
MW205R	4	9/5/2002	7 26	2 74	19 75	3 5	4 69	-161	0 1	No	--	No	--	12 21	5 54	6 67	buried under several inches of material
	5	3/7/2003	7 75	2 98	8 07	7 3	5 80	-69	0 1	No	--	No	--	12 21	5 95	6 26	
	WM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	partially buried, casing damaged, PVC/J-plug intact
	6	9/3/2003	7 80	2 62	18 40	101 0	3 31	-175	0 0	No	--	No	--	15 54	8 82	6 72	
Downgradient wells																	
MW003R	4	9/4/2002	6 66	5 55	21 40	6 3	1 96	-0 62	--	No	--	No	--	12 05	6 08	5 97	
	5	3/7/2003	6 88	5 23	8 52	1 0	10 70	26 00	--	No	--	No	--	12 05	6 40	5 65	
	WM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	casing loose, PVC/J-plug intact
	6	9/4/2003	7 33	6 07	18 24	999 0	4 03	-37	0 0	No	--	No	--	15 38	9 91	5 47	
MW201R	4	--	--	--	--	--	--	--	--	No	--	No	--	11 49	5 71	5 78	not sampled
	5	--	--	--	--	--	--	--	--	No	--	No	--	11 49	6 02	5 47	not sampled
	WM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	casing loose, PVC/J-plug intact
	6	--	--	--	--	--	--	--	--	No	--	No	--	14 79	9 77	5 02	not sampled
MW202R	4	9/5/2002	6 98	5 69	19 50	1 1	1 15	-175	0 3	No	--	No	--	11 72	6 1	5 64	buried under several inches of material
	5	3/5/2003	6 65	2 38	7 03	13 5	10 20	-2	0 1	No	--	No	--	11 72	6 39	5 33	
	WM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	cover and casing missing, PVC damaged, J-plug loose
	6	9/4/2003	7 45	7 81	20 75	484 0	4 53	-166	0 4	No	--	No	--	15 07	10 27	4 80	solid deposition/foreign material
MW207	4	9/5/2002	7 60	5 99	19 51	4 7	7 25	-115	0 3	No	--	No	--	11 8	6 05	5 75	
	5	3/6/2003	6 54	0 78	3 76	28 1	9 20	170	0 0	No	--	No	--	11 8	6 51	5 29	
	WM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	casing loose, J-plug loose
	6	9/4/2003	6 97	5 63	20 31	239 0	4 83	-139	0 3	No	--	No	--	14 83	10 19	4 64	
MW206	4	--	--	--	--	--	--	--	--	No	--	No	--	11 75	5 41	6 34	not sampled
	5	--	--	--	--	--	--	--	--	No	--	No	--	11 75	5 65	6 10	not sampled
	WM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	casing loose, PVC/J-plug intact
	6	--	--	--	--	--	--	--	--	No	--	No	--	15 23	9 23	6 00	not sampled

Notes
(1) R designates a replacement well at that location
(2) Rounds 4 and 5 TPVC Elevation based on June 2001 survey; Round 6 TPVC Elevation based on TPVC Elevation as modified August 2003
(3) Round 4 water levels observed 9/4/2002, Round 5 water levels observed 3/5/2003, Round 6 water levels observed 9/3/2003
(4) No reading due to DO probe malfunction
(5) WM indicates well modification activities undertaken prior to Round 6 on 8/19/03 to convert wells from flush-mount protective casing to stick-up protective casing

APPENDIX C

ANALYTICAL RESULTS ROUNDS 4 THROUGH 6

ROUNDS 4-6 ANALYTICAL RESULTS (CONT.)
CORRECTIVE ACTION GROUNDWATER MONITORING
FORMER BUILDING 44 UST SITE
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Sample Location	MW001R		MW001R		MW001R		MW003R		MW003R		MW003R		MW202R		MW202R		MW202R		MW203R	
Date Sampled	9/5/2002		3/7/2003		9/4/2003		9/4/2002		3/7/2003		9/4/2003		9/5/2002		3/5/2003		9/4/2003		9/4/2002	
Volatile Organic Analysis (UG/L)																				
1,1,1-Trichloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,1,2,2-Tetrachloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,1,2-Trichloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,1-Dichloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,1-Dichloroethene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2,4-Trichlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2-Dibromo-3-chloropropane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2-Dibromoethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2-Dichlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2-Dichloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2-Dichloropropane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,3-Dichlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,4-Dichlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Butanone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-Pentanone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	5	U	56	U	21		5	U	6	U	5	U	5	U	5	U	5	U	5	U
Benzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Bromodichloromethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Bromoform	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	UJ
Bromomethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Carbon Disulfide	5	U	5	U	5	J	5	U	5	U	5	U	5	U	5	U	1	J	5	U
Carbon Tetrachloride	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Chlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Chloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Chloroform	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Chloromethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
cis-1,2-Dichloroethene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
cis-1,3-Dichloropropene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Cyclohexane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Dibromochloromethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Dichlorodifluoromethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Ethylbenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Isopropylbenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
m&p-Xylene		NA	5	U	5	U		NA	5	U	5	U		NA	5	U	5	U		NA
Methyl Acetate	5	U	5	U	12		5	U	5	U	5	U	5	U	5	U	5	U	5	U
Methyl tert-Butyl Ether	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Methylcyclohexane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Methylene Chloride	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
o-Xylene		NA	5	U	5	U		NA	5	U	5	U		NA	5	U	5	U		NA
Styrene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	UJ
Tetrachloroethene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Toluene	1	J	5	U	1	J	5	U	5	U	2	J	5	U	5	U	9		5	U
Total Xylenes	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
trans-1,2-Dichloroethene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
trans-1,3-Dichloropropene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	UJ
Trichloroethene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Trichlorofluoromethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Vinyl Chloride	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U

U - Not detected, UJ - Detection limit approximate, J - Quantitation approximate,
R - Rejected, NA - Not Analyzed

ROUNDS 4-6 ANALYTICAL RESULTS (CONT.)
CORRECTIVE ACTION GROUNDWATER MONITORING
FORMER BUILDING 44 UST SITE
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 2 OF 8

Sample Location	MW001R		MW001R		MW001R		MW003R		MW003R		MW003R		MW202R		MW202R		MW202R		MW203R	
Date Sampled	9/5/2002		3/7/2003		9/4/2003		9/4/2002		3/7/2003		9/4/2003		9/5/2002		3/5/2003		9/4/2003		9/4/2002	
Semivolatile Organic Analysis (UG/L)																				
1,1'-Biphenyl	10	U		NA	10	U	10	U		NA	10	U	10	U		NA	10	U	10	U
2,2'-oxybis(1-Chloropropane)	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
2,4,5-Trichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U		R	20	U	20	U
2,4,6-Trichlorophenol	10	U	5	U	10	U	10	U	5	U	10	U	10	U		R	10	U	10	U
2,4-Dichlorophenol	10	U	5	U	10	U	10	U	5	U	10	U	10	U		R	10	U	10	U
2,4-Dimethylphenol	10		5	U	5	J	10	U	5	U	10	U	10	U		R	10	U	10	U
2,4-Dinitrophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U		R	20	U	20	U
2,4-Dinitrotoluene	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
2,6-Dinitrotoluene	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
2-Chloronaphthalene	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
2-Chlorophenol	10	U	5	U	10	U	10	U	5	U	10	U	10	U		R	10	U	10	U
2-Methylnaphthalene	2	J	5	U	1	J	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
2-Methylphenol	2	J	5	U	1	J	10	U	5	U	10	U	10	U		R	10	U	10	U
2-Nitroaniline	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	UJ	20	U	20	U
2-Nitrophenol	10	U	5	U	10	U	10	U	5	U	10	U	10	U		R	10	U	10	U
3,3'-Dichlorobenzidine	10	U	5	UJ	10	U	10	U	5	UJ	10	U	10	U		R	10	U	10	U
3-Nitroaniline	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	UJ	20	U		R
4,6-Dinitro-2-methylphenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U		R	20	U	20	U
4-Bromophenyl-phenylether	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
4-Chloro-3-methylphenol	10	U	5	U	10	UJ	10	U	5	U	10	UJ	10	U		R	10	UJ	10	U
4-Chloroaniline	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
4-Chlorophenyl-phenylether	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
4-Methylphenol	26		9		12		10	U	5	U	10	U	10	U		R	10	U	10	UJ
4-Nitroaniline	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	UJ	20	U	20	U
4-Nitrophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U		R	20	U	20	U
Acenaphthene	6	J	2	J	3	J	10	U	5	U	10	U	1	J	5	UJ	10	U	10	U
Acenaphthylene	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Acetophenone	2	J		NA	10	U	10	U		NA	10	U	10	U		NA	10	U	10	U
Anthracene	3	J	5	U	2	J	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Atrazine	10	U		NA	10	U	10	U		NA	10	U	10	U		NA	10	U	10	U
Benzaldehyde	10	U		NA	10	U	10	U		NA	10	U	10	U		NA	10	U	10	U
Benzo(a)anthracene	10	U	2	J	5	J	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Benzo(a)pyrene	10	U	2	J	4	J	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Benzo(b)fluoranthene	10	U	3	J	6	J	10	U	5	U	10	U	10	U	5	UJ	10	U	1	J
Benzo(g,h,i)perylene	10	U	5	U	2	J	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Benzo(k)fluoranthene	10	U	1	J	3	J	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Bis(2-Chloroethoxy)methane	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Bis(2-Chloroethyl)ether	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
bis(2-Ethylhexyl)phthalate	10	U	5	U	1	J	10	U	5	U	10	U	10	U	5	UJ	2	J	10	U
Butylbenzylphthalate	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Caprolactam	10	U		NA	14		10	U		NA	6	J	10	U		NA	14		10	U
Carbazole	16	J		NA	5	J	10	U		NA	10	U	10	J		NA	10	U	10	U
Chrysene	10	U	2	J	4	J	10	U	5	U	10	U	10	U	5	UJ	10	U	1	J
Dibenzo(a,h)anthracene	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Dibenzofuran	2	J	5	U	1	J	10	U	5	U	10	U	2	J	5	UJ	10	U	10	U
Diethylphthalate	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Dimethylphthalate	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Di-n-Butylphthalate	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Di-n-octylphthalate	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Fluoranthene	2	J	4	J	8	J	10	U	5	U	10	U	10	U	5	UJ	10	U	3	J
Fluorene	2	J	5	U	1	J	10	U	5	U	10	U	2	J	5	UJ	10	U	10	U
Hexachlorobenzene	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Hexachlorobutadiene	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Hexachlorocyclopentadiene	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Semivolatile Organic Analysis (UG/L) (cont.)																				

U - Not detected, UJ - Detection limit approximate, J - Quantitation approximate,
R - Rejected, NA - Not Analyzed

ROUNDS 4-6 ANALYTICAL RESULTS (CONT.)
CORRECTIVE ACTION GROUNDWATER MONITORING
FORMER BUILDING 44 UST SITE
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Sample Location	MW001R		MW001R		MW001R		MW003R		MW003R		MW003R		MW202R		MW202R		MW202R		MW203R	
Date Sampled	9/5/2002		3/7/2003		9/4/2003		9/4/2002		3/7/2003		9/4/2003		9/5/2002		3/5/2003		9/4/2003		9/4/2002	
Hexachloroethane	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Indeno(1,2,3-cd)pyrene	10	U	1	J	2	J	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Isophorone	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Naphthalene	18		7		13		10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Nitrobenzene	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
N-Nitroso-di-n-propylamine	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
N-Nitroso-diphenylamine	10	U	5	U	10	U	10	U	5	U	10	U	10	U	5	UJ	10	U	10	U
Pentachlorophenol	36		9	J	25		20	U	20	U	20	U	20	U		R	20	U	20	U
Phenanthrene	5	J	3	J	6	J	10	U	5	U	10	U	10	U	5	UJ	10	U	2	J
Phenol	230	*	85		96		10	U	5	U	10	U	10	U		R	10	U	10	U
Pyrene	1	J	4	J	7	J	10	U	5	U	10	U	10	U	5	UJ	10	U	2	J
Gasoline Range Organic Analysis (UG/L)																				
Gasoline Range Organics	100		50	U	92		48		53	U	50	U	150		72	UJ	55		50	U
Total Petroleum Hydrocarbon Analysis (MG/L)																				
Total Petroleum Hydrocarbons	4 1		1 4		3 2		1 8		0 50	U	0 90		3 5		0 59		2 3		2 6	

U - Not detected, UJ - Detection limit approximate, J - Quantitation approximate,
R - Rejected, NA - Not Analyzed

ROUNDS 4-6 ANALYTICAL RESULTS (CONT.)
CORRECTIVE ACTION GROUNDWATER MONITORING
FORMER BUILDING 44 UST SITE
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 4 OF 8

Sample Location	MW001R		MW001R		MW001R		MW003R		MW003R		MW003R		MW202R		MW202R		MW202R		MW203R	
Date Sampled	9/5/2002		3/7/2003		9/4/2003		9/4/2002		3/7/2003		9/4/2003		9/5/2002		3/5/2003		9/4/2003		9/4/2002	
Metal Analysis (UG/L)																				
Aluminum	1690			NA		NA	3680			NA		NA	423	U		NA		NA	23600	
Antimony	9 8	U		NA		NA	3 9	UJ		NA		NA	3 0	U		NA		NA	5 0	UJ
Arsenic	4 0	J	13 9	U	6 7	U	3 0	U	16 0	U	3 0	U	3 0	U	44 1		3 0	U	12 2	
Barium	99 6		151		108		69 0		212		83 0		90 2		255		163		243	
Beryllium	2 0	U		NA		NA	2 0	U		NA		NA	2 0	U		NA		NA	2 0	U
Cadmium	2 0	U	13 0		1 0	J	2 0	U	27 9		0 70	U	2 0	U	20 8		0 70	U	2 0	U
Calcium	215000			NA		NA	294000			NA		NA	309000			NA		NA	193000	
Chromium	3 0	U	12 4		6 7	J	5 4		39 5		11 7	J	3 0	U	33 0		6 9	J	32 5	
Cobalt	3 0	U		NA		NA	23 0			NA		NA	3 0	U		NA		NA	13 1	
Copper	19 8	U		NA		NA	13 5	U		NA		NA	2 0	U		NA		NA	50 9	U
Iron	1180			NA		NA	8110			NA		NA	6540			NA		NA	39700	
Lead	112		168		140	J	21 1		26 3		10 2	J	17 0		112		12 1	J	91 9	
Magnesium	3940			NA		NA	27600			NA		NA	58600			NA		NA	17000	
Manganese	43 8			NA		NA	6730			NA		NA	1390			NA		NA	636	
Mercury	0 31		0 37		0 47		0 14	U	0 12	U	0 16	U	0 14	U	0 12	U	0 15	U	0 14	U
Nickel	24 2			NA		NA	11 6			NA		NA	2 4	U		NA		NA	31 2	
Potassium	317000			NA		NA	160000			NA		NA	156000			NA		NA	162000	
Selenium	8 0	U	9 0	U	9 0	U	8 0	U	9 0	U	9 0	U	8 0	U	9 0	U	9 0	U	8 0	U
Silver	2 0	U	2 0	U	2 0	UJ	2 0	U	2 0	U	2 0	UJ	2 0	U	2 0	U	2 0	UJ	2 0	U
Sodium	516000	J		NA		NA	464000			NA		NA	616000	J		NA		NA	1580000	J
Thallium	4 0	U		NA		NA	4 0	U		NA		NA	4 0	U		NA		NA	4 0	U
Vanadium	57 8			NA		NA	9 9			NA		NA	3 0	U		NA		NA	39 4	
Zinc	101			NA		NA	16 0			NA		NA	8 0	U		NA		NA	129	
Dissolved Metal Analysis (UG/L)																				
Aluminum	360	U		NA		NA	31 3	U		NA		NA	12 0	U		NA		NA	101	U
Antimony	10 3	U		NA		NA	4 3	UJ		NA		NA	3 0	U		NA		NA	3 0	U
Arsenic	3 4	J	5 8	UJ	3 0	U	2 2		3 0	U	3 0	U	3 0	UJ	3 0	U	3 0	U	3 0	UJ
Barium	72 3		75 2		75 6	U	59 4		126		58 7	U	79 1		89 5		156		147	
Beryllium	2 0	U		NA		NA	2 0	U		NA		NA	2 0	U		NA		NA	2 0	U
Cadmium	2 0	U	10 3		0 70	U	2 0	U	21 2		0 70	U	2 0	U	8 5		0 70	U	2 0	U
Calcium	187000			NA		NA	279000			NA		NA	317000			NA		NA	175000	
Chromium	3 0	U	0 83	UJ	0 60	U	3 0	U	0 60	U	0 60	U	3 0	U	0 60	U	0 60	U	3 0	U
Cobalt	3 0	U		NA		NA	16 2			NA		NA	3 0	U		NA		NA	3 0	U
Copper	2 9	UJ		NA		NA	2 0	U		NA		NA	2 0	U		NA		NA	9 1	U
Iron	80 3	U		NA		NA	336			NA		NA	2650			NA		NA	35 0	U
Lead	13 0		4 0	U	4 0	U	13 0		4 0	U	4 0	U	14 8		4 0	U	4 0	U	7 7	
Magnesium	2430			NA		NA	26000			NA		NA	61700			NA		NA	8640	
Manganese	3 0	UJ		NA		NA	5610			NA		NA	1500			NA		NA	177	
Mercury	0 13	U	0 14	UJ	0 14	U	0 16	U	0 15	UJ	0 15	U	0 15	U	0 14	UJ	0 15	U	0 14	U
Nickel	22 2			NA		NA	6 0			NA		NA	1 6	U		NA		NA	2 6	U
Potassium	307000			NA		NA	146000			NA		NA	154000			NA		NA	158000	
Selenium	8 0	U	9 0	U	9 0	U	8 0	U	9 0	U	9 0	U	8 0	U	9 0	U	9 0	U	8 0	U
Silver	2 0	U	2 0	U	2 0	UJ	2 0	U	2 0	U	2 0	UJ	2 0	U	2 0	U	2 0	UJ	2 0	U
Sodium	506000	J		NA		NA	370000			NA		NA	67600	J		NA		NA	1560000	J
Thallium	4 0	U		NA		NA	4 0	U		NA		NA	4 0	U		NA		NA	4 0	U
Vanadium	47 4			NA		NA	3 0	U		NA		NA	3 0	U		NA		NA	3 0	U
Zinc	8 0	U		NA		NA	8 0	U		NA		NA	8 0	U		NA		NA	8 0	U

U - Not detected, UJ - Detection limit approximate, J - Quantitation approximate,
R - Rejected, NA - Not Analyzed

ROUNDS 4-6 ANALYTICAL RESULTS (CONT.)
CORRECTIVE ACTION GROUNDWATER MONITORING
FORMER BUILDING 44 UST SITE
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 5 OF 8

Sample Location	MW203R		MW203R		MW204R		MW204R		MW205R		MW205R		MW205R		MW207R		MW207		MW207R	
Date Sampled	3/5/2003		9/3/2003		9/5/2002		9/3/2003		9/5/2002		3/7/2003		9/3/2003		9/5/2002		3/6/2003		9/4/2003	
Volatile Organic Analysis (UG/L)																				
1,1,1-Trichloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,1,2,2-Tetrachloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,1,2-Trichloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,1-Dichloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,1-Dichloroethene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2,4-Trichlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2-Dibromo-3-chloropropane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2-Dibromoethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2-Dichlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2-Dichloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,2-Dichloropropane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,3-Dichlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
1,4-Dichlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Butanone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-Pentanone	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	6	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Benzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Bromodichloromethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Bromoform	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Bromomethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Carbon Disulfide	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Carbon Tetrachloride	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Chlorobenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Chloroethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Chloroform	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Chloromethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
cis-1,2-Dichloroethene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
cis-1,3-Dichloropropene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Cyclohexane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Dibromochloromethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Dichlorodifluoromethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Ethylbenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Isopropylbenzene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
m&p-Xylene	5	U	5	U		NA	5	U		NA	5	U	5	U		NA	5	U	5	U
Methyl Acetate	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Methyl tert-Butyl Ether	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Methylcyclohexane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Methylene Chloride	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
o-Xylene	5	U	5	U		NA	5	U		NA	5	U	5	U		NA	5	U	5	U
Styrene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Tetrachloroethene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Toluene	5	U	5	U	5	U	5	U	1	J	5	U	5	U	5	U	5	U	5	U
Total Xylenes	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
trans-1,2-Dichloroethene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
trans-1,3-Dichloropropene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Trichloroethene	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Trichlorofluoromethane	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Vinyl Chloride	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U

U - Not detected, UJ - Detection limit approximate, J - Quantitation approximate,
R - Rejected, NA - Not Analyzed

ROUNDS 4-6 ANALYTICAL RESULTS (CONT.)
CORRECTIVE ACTION GROUNDWATER MONITORING
FORMER BUILDING 44 UST SITE
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 6 OF 8

Sample Location	MW203R		MW203R		MW204R		MW204R		MW205R		MW205R		MW205R		MW207R		MW207		MW207R	
Date Sampled	3/5/2003		9/3/2003		9/5/2002		9/3/2003		9/5/2002		3/7/2003		9/3/2003		9/5/2002		3/6/2003		9/4/2003	
Semivolatile Organic Analysis (UG/L)																				
1,1'-Biphenyl		NA	10	U	10	U	10	U	3	J		NA	10	U	10	U		NA	10	U
2,2'-oxybis(1-Chloropropane)	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
2,4,5-Trichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4,6-Trichlorophenol	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
2,4-Dichlorophenol	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
2,4-Dimethylphenol	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
2,4-Dinitrophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4-Dinitrotoluene	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
2,6-Dinitrotoluene	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
2-Chloronaphthalene	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
2-Chlorophenol	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
2-Methylnaphthalene	5	U	10	U	10	U	10	U	7	J	1	J	10	U	10	U	5	U	10	U
2-Methylphenol	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
2-Nitroaniline	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Nitrophenol	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
3,3'-Dichlorobenzidine	5	U	10	U	10	U	10	U	10	U	5	UJ	10	U	10	U	5	UJ	10	U
3-Nitroaniline	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4,6-Dinitro-2-methylphenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Bromophenyl-phenylether	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
4-Chloro-3-methylphenol	5	U	10	UJ	10	U	10	UJ	10	U	5	U	10	UJ	10	U	5	U	10	UJ
4-Chloroaniline	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
4-Chlorophenyl-phenylether	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
4-Methylphenol	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
4-Nitroaniline	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
4-Nitrophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Acenaphthene	5	U	10	U	10	U	4	J	15		9		4	J	5	J	5	U	10	U
Acenaphthylene	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
Acetophenone		NA	10	U	10	U	10	U	10	U		NA	10	U	10	U		NA	10	U
Anthracene	5	U	10	U	10	U	7	J	3	J	2	J	10	U	10	U	5	U	10	U
Atrazine		NA	10	U	10	U	10	U	10	U		NA	10	U	10	U		NA	10	U
Benzaldehyde		NA	10	U	10	U	10	U	10	U		NA	10	U	10	U		NA	10	U
Benzo(a)anthracene	5	U	2		10	U	18		10	U	3	J	2	J	10	U	3	J	2	J
Benzo(a)pyrene	5	U	2		10	U	15		10	U	2	J	2	J	1	J	3	J	1	J
Benzo(b)fluoranthene	5	U	2		1	J	23		10	U	4	J	2	J	2	J	5		3	J
Benzo(g,h,i)perylene	5	U	1		10	U	8	J	10	U	5	U	10	U	10	U	2	J	1	J
Benzo(k)fluoranthene	5	U	1		10	U	9	J	10	U	2	J	1	J	10	U	2	J	1	J
Bis(2-Chloroethoxy)methane	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
Bis(2-Chloroethyl)ether	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
bis(2-Ethylhexyl)phthalate	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
Butylbenzylphthalate	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
Caprolactam		NA	7		10	U	5	J	10	U		NA	5	J	10	U		NA	13	
Carbazole		NA	10	U	3	J	5	J	34	J		NA	1	J	6	J		NA	10	U
Chrysene	5	U	2		10	U	17		10	U	3	J	2	J	1	J	4	J	2	J
Dibenzo(a,h)anthracene	5	U	10	U	10	U	2	J	10	U	5	U	10	U	10	U	5	U	10	U
Dibenzofuran	5	U	10	U	10	U	2	J	9	J	4	J	2	J	4	J	5	U	10	U
Diethylphthalate	5	U	10	U	10	U	10	U	2	J	2	J	10	U	10	U	5	U	10	U
Dimethylphthalate	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
Di-n-Butylphthalate	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
Di-n-octylphthalate	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
Fluoranthene	2		4		2	J	35		3	J	7		5	J	4	J	9		4	J
Fluorene	5	U	10	U	10	U	4	J	12		7		1	J	1	J	5	U	10	U
Hexachlorobenzene	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
Hexachlorobutadiene	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
Hexachlorocyclopentadiene	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
Semivolatile Organic Analysis (UG/L) (cont.)																				

U - Not detected, UJ - Detection limit approximate, J - Quantitation approximate,
R - Rejected, NA - Not Analyzed

ROUNDS 4-6 ANALYTICAL RESULTS (CONT.)
CORRECTIVE ACTION GROUNDWATER MONITORING
FORMER BUILDING 44 UST SITE
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND

Sample Location	MW203R		MW203R		MW204R		MW204R		MW205R		MW205R		MW205R		MW207R		MW207		MW207R	
Date Sampled	3/5/2003		9/3/2003		9/5/2002		9/3/2003		9/5/2002		3/7/2003		9/3/2003		9/5/2002		3/6/2003		9/4/2003	
Hexachloroethane	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
Indeno(1,2,3-cd)pyrene	5	U	1		10	U	8	J	10	U	5	U	10	U	10	U	2	J	1	J
Isophorone	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
Naphthalene	5	U	10	U	10	U	10	U	68		10		10	U	10	U	5	U	10	U
Nitrobenzene	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
N-Nitroso-di-n-propylamine	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
N-Nitroso-diphenylamine	5	U	10	U	10	U	10	U	10	U	5	U	10	U	10	U	5	U	10	U
Pentachlorophenol	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Phenanthrene	5	U	2		2	J	26		13		9		2	J	2	J	4	J	2	J
Phenol	5	U	10	U	10	U	10	U	3	J	5	U	10	U	10	U	5	U	10	U
Pyrene	2		4		1	J	30	J	2	J	6		4	J	2	J	8		4	J
Gasoline Range Organic Analysis (UG/L)																				
Gasoline Range Organics	72	U	50	U	50	U	50	U	130		52	U	50	U	88		50	U	50	U
Total Petroleum Hydrocarbon Analysis (MG/L)																				
Total Petroleum Hydrocarbons	0 86		1 8		0 55		1 2		2 4		0 91		1 2		2 3		0 65		1 1	

U - Not detected, UJ - Detection limit approximate, J - Quantitation approximate,
R - Rejected, NA - Not Analyzed

ROUNDS 4-6 ANALYTICAL RESULTS (CONT.)
CORRECTIVE ACTION GROUNDWATER MONITORING
FORMER BUILDING 44 UST SITE
NAVSTA NEWPORT, NEWPORT, RHODE ISLAND
PAGE 8 OF 8

Sample Location	MW203R		MW203R		MW204R		MW204R		MW205R		MW205R		MW205R		MW207R		MW207		MW207R	
Date Sampled	3/5/2003		9/3/2003		9/5/2002		9/3/2003		9/5/2002		3/7/2003		9/3/2003		9/5/2002		3/6/2003		9/4/2003	
Metal Analysis (UG/L)																				
Aluminum		NA		NA	260	U		NA	199	U		NA		NA	26000			NA		NA
Antimony		NA		NA	3 7	UJ		NA	7 2	U		NA		NA	5 6	UJ	-	NA		NA
Arsenic	3 0	U	3 0	U	3 0	U	3 0	U	3 0	U	5 8	UJ	3 0	U	11 0		8 9		3 0	U
Barium	322		404		110		104		75 9		88 9		73 8	U	335		186		187	
Beryllium		NA		NA	2 0	U		NA	2 0	U		NA		NA	2 0	U		NA		NA
Cadmium	24 7		1 1		2 0	U	0 70	U	2 0	U	17 2		0 70	U	17 2		10 7		2 4	
Calcium		NA		NA	170000			NA	330000			NA		NA	274000			NA		NA
Chromium	7 2		17 4		3 0	U	2 9	J	3 0	U	8 8		2 5	J	32 6		16 8		3 8	J
Cobalt		NA		NA	3 0	U		NA	3 0	U		NA		NA	20 6			NA		NA
Copper		NA		NA	11 1	U		NA	22 0	U		NA		NA	924			NA		NA
Iron		NA		NA	500			NA	2470			NA		NA	67100			NA		NA
Lead	13 6		34 1		26 6		109	J	27 0		26 0		17 1	J	3580		777		104	J
Magnesium		NA		NA	26600			NA	28800			NA		NA	48500			NA		NA
Manganese		NA		NA	319			NA	106			NA		NA	6040			NA		NA
Mercury	0 12	U	0 13	U	0 14	U	0 14	U	0 14	U	0 13	U	0 19	J	0 79		0 38		0 15	U
Nickel		NA		NA	3 5			NA	6 0			NA		NA	27 4			NA		NA
Potassium		NA		NA	44900			NA	129000			NA		NA	103000			NA		NA
Selenium	9 0	U	9 0	U	8 0	U	9 0	U	8 0	U	9 0	U	9 0	U	8 0	U	9 0	U	9 0	U
Silver	2 0	U	2 0	UJ	2 0	U	2 0	UJ	2 0	U	2 0	U	2 0	UJ	5 0		2 0	U	2 0	UJ
Sodium		NA		NA	349000	J		NA	253000	J		NA		NA	804000	J		NA		NA
Thallium		NA		NA	4 0	U		NA	4 0	U		NA		NA	4 3	J		NA		NA
Vanadium		NA		NA	3 7	J		NA	11 5			NA		NA	26 5			NA		NA
Zinc		NA		NA	32 1			NA	118			NA		NA	2070			NA		NA
Dissolved Metal Analysis (UG/L)																				
Aluminum		NA		NA	12 0	U		NA	12 0	U		NA		NA	12 0	U		NA		NA
Antimony		NA		NA	4 4	UJ		NA	4 1	UJ		NA		NA	3 0	U		NA		NA
Arsenic	3 0	U	3 0	U	3 0	UJ	3 0	U	3 0	UJ	3 0	U	3 0	U	3 0	UJ	5 2	UJ	3 0	U
Barium	319		362		102		92 0	U	64 3		47 8		69 5	U	188		57 4		144	
Beryllium		NA		NA	2 0	U		NA	2 0	U		NA		NA	2 0	U		NA		NA
Cadmium	25 0		0 53		2 0	U	0 70	U	2 0	U	14 3		0 70	U	2 0	U	4 6		0 70	U
Calcium		NA		NA	176000			NA	315000			NA		NA	265000			NA		NA
Chromium	0 60	U	0 60	U	3 0	U	0 74	J	3 0	U	0 87	UJ	1 0	J	3 0	U	0 66	UJ	0 60	U
Cobalt		NA		NA	3 0	U		NA	3 0	U		NA		NA	9 8			NA		NA
Copper		NA		NA	4 4	U		NA	2 0	U		NA		NA	2 0	U		NA		NA
Iron		NA		NA	35 0	U		NA	83 1	U		NA		NA	26800			NA		NA
Lead	4 0	U	4 0	U	8 6		9 7		15 0		4 0	U	4 0	U	13 3		4 0	U	4 0	U
Magnesium		NA		NA	26000			NA	27700			NA		NA	46400			NA		NA
Manganese		NA		NA	327			NA	90 4			NA		NA	5430			NA		NA
Mercury	0 14	U	0 15	U	0 14	U	0 16	U	0 14	U	0 13	UJ	0 14	U	0 14	U	0 13	UJ	0 15	U
Nickel		NA		NA	3 2	U		NA	4 7			NA		NA	4 6			NA		NA
Potassium		NA		NA	40400			NA	124000			NA		NA	103000			NA		NA
Selenium	9 0	U	9 0	U	8 0	U	9 0	U	8 0	U	9 0	U	9 0	U	8 0	U	9 0	U	9 0	U
Silver	2 0	U	2 0	UJ	2 0	U	2 0	UJ	2 0	U	2 0	U	2 0	UJ	2 0	U	2 0	U	2 0	UJ
Sodium		NA		NA	337000	J		NA	266000	J		NA		NA	856000	J		NA		NA
Thallium		NA		NA	4 0	U		NA	4 0	U		NA		NA	4 0	U		NA		NA
Vanadium		NA		NA	3 1	J		NA	3 7	J		NA		NA	3 0	U		NA		NA
Zinc		NA		NA	18 0			NA	8 0	U		NA		NA	44 9			NA		NA

U - Not detected, UJ - Detection limit approximate, J - Quantitation approximate,
R - Rejected, NA - Not Analyzed