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FINAL REMEDIAL ACTION PLAN SITE 1586 WITH TRANSMITTAL NS MAYPORT FL
6/22/2012
TETRA TECH

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888

Rev. 2
05/18/12

Remedial Action Plan
for
Underground Storage Tank Site 1586

Naval Station Mayport
Jacksonville, Florida

Contract Task Order 0386

May 2012

NAVFAC Naval Facilities Engineering Command
NAVFAC SOUTHEAST
NAS Jacksonville
Jacksonville, Florida 32212-0030

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Document Tracking Number 12JAX0122

June 22, 2012

Project Number 112G00103

Naval Facilities Engineering Command, Southeast
ATTN: Mr. Brian Syme (OPC 6)
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Jacksonville, FL 32212-0030

Reference: CLEAN III Contract Number N62467-94-D-0888
Contract Task Order Number 0386

Subject: Final Remedial Action Plan, Site 1586
Naval Station Mayport, Jacksonville, Florida

Dear Mr. Syme:

Tetra Tech is pleased to submit the Final Remedial Action Plan for Site 1586 (dated May 18, 2012) that was prepared for the United States Navy, Naval Facilities Engineering Command Southeast under Contract Task Order (CTO) 0386 for the Comprehensive Long-term Environmental Action Navy (CLEAN) III Contract Number N62467-94-D-0888. Members of the Naval Station (NAVSTA) Mayport Environmental Tier I Partnering Team (Partnering Team) reviewed the draft-final (Revision 1) report, and no comments were received.

If you have any questions with regard to this submittal, please do not hesitate to contact me by telephone at (904) 730-4669, extension 213, or via e-mail at Mark.Peterson@TetraTech.com.

Sincerely,

Mark A. Peterson
Project Manager

MAP/lc

Enclosure

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Paul Malewicki, NAVSTA Mayport (1 hardcopy, 1 CD)
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Administrative Record (electronic only)
CTO 0386 Project File

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REMEDIAL ACTION PLAN
FOR
UNDERGROUND STORAGE TANK SITE 1586

NAVAL STATION MAYPORT
JACKSONVILLE, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command
Southeast
NAS Jacksonville
Jacksonville, Florida 32212-0030

Submitted by:
Tetra Tech
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CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0386

MAY 2012

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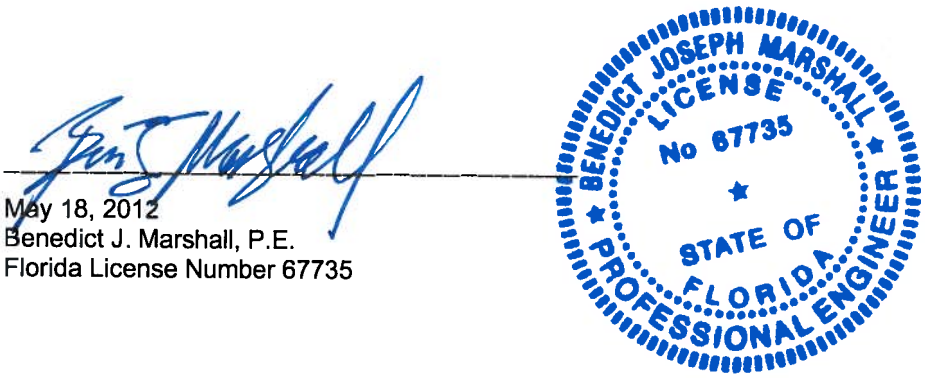
This Remedial Action Plan for Underground Storage Tank Site 1586 has been prepared under the direction of a Florida Registered Professional Engineer. The work and professional opinions rendered in this report were conducted or developed in accordance with commonly accepted procedures consistent with applicable standards of practice. This document was prepared for Naval Station Mayport, Jacksonville, Florida, and should not be construed to apply to any other site.



May 18, 2012
Benedict J. Marshall, P.E.
Florida License Number 67735

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ACRONYMS

bls	below land surface
BMS	BioManagement Services, Inc.
COC	constituent of concern
CTO	Contract Task Order
DPT	direct-push technology
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FID	flame ionization detector
FL-PRO	Florida Residual Petroleum Organic Method
GAG	gasoline analytical group
GCTL	Groundwater Cleanup Target Level
HLA	Harding Lawson Associates
HSA	hollow stem auger
KAG	kerosene analytical group
µg/L	microgram per liter
mg/kg	milligram per kilogram
mg/L	milligram per liter
MNA	Monitoring for Natural Attenuation
NAVFAC	Naval Facilities Engineering Command
NAVSTA	Naval Station
O&M	operations and maintenance
OVA	organic vapor analyzer
PAH	polynuclear aromatic hydrocarbon
Partnering Team	NAVSTA Mayport Installation Restoration Tier I Partnering Team
ppm	part per million
PVC	polyvinyl chloride
RAP	Remedial Action Plan
SAR	Site Assessment Report
SARA	Site Assessment Report Addendum
SCTL	Soil Cleanup Target Level
SVE	soil vapor extraction
TRPH	total recoverable petroleum hydrocarbons
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound

EXECUTIVE SUMMARY

Tetra Tech has completed this Remedial Action Plan (RAP) for Site 1586 at Naval Station Mayport in accordance with the requirements of Chapter 62-770, Florida Administrative Code. This RAP is being submitted to the Florida Department of Environmental Protection for approval.

Tetra Tech performed the following tasks during the preparation of this RAP:

- Reviewed and summarized the findings from the Site Assessment Report (Tetra Tech, 2003), the Free Product Summary Report (Tetra Tech, 2010), and additional historical site assessment and free product recovery field work.

- Evaluated remedial alternatives for free product recovery and remediation of soil contamination due to a release of petroleum-based fuel oil at the site.

- Prepared a conceptual design for the recovery of free product including remedial technology specifications and treatment timeframe.

- Specified a monitoring plan to track the remediation progress at the site.

This RAP identifies BIOX® technology as the primary remedial alternative to remediate the residual free product associated with the soil and groundwater contamination at Site 1586. BIOX® is a patented and accepted innovative technology that employs chemical and biological agents that aggressively attack and break down petroleum components and gradually act to convert petroleum components to innocuous compounds. BIOX® technology was selected over other remedial alternatives based on being cost-effective (least intrusive), having a proven record of performance and having an acceptable remediation time frame. The BIOX® vendor has provided the design specifications to remediate the remaining free product and residual soil and groundwater contamination.

In the interim, this RAP recommends the continued use of the New Pig Monitoring Well Skimming Socks for removal of petroleum free product from monitoring wells at the site. The New Pig Skimming socks have been proven effective in removing residual free product from wells at the site.

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

This Remedial Action Plan (RAP) for Underground Storage Tank (UST) Site 1586 was prepared by Tetra Tech for the United States Navy, Naval Facilities Engineering Command (NAVFAC) Southeast under Contract Task Order (CTO) 0386 for the Comprehensive Long-term Environmental Action Navy III Contract Number N62467-94-D-0888. This RAP was prepared to evaluate and recommend technologies for the recovery of petroleum-based free product and reducing the impacts to soils at UST Site 1586 at Naval Station (NAVSTA) Mayport, Jacksonville, Florida.

The purpose of this RAP is to select a non-invasive remedial technology that will recover petroleum-based free product and remediate soils impacted with petroleum constituents in accordance with the requirements of Chapter 62-770, Florida Administrative Code (F.A.C.). This RAP is only focusing on the removal of free product. Soil and groundwater remedial actions will be determined once the free product has been removed. This RAP considers applicable alternatives that pertain to the remediation of free product and reducing impacts to soils and groundwater for the protection of human health and the environment. In addition, the recommended remedial alternative shall be cost-effective and performed in a timely manner. This RAP also provides a conceptual design and implementation schedule for the recommended free product removal alternative.

1.2 SITE DESCRIPTION

NAVSTA Mayport is located within the corporate limits of the city of Jacksonville, Duval County, Florida, approximately 12 miles to the northeast of downtown Jacksonville and adjacent to the town of Mayport. The Station complex is located on the northern end of the peninsula bound by the Atlantic Ocean to the east and the St. Johns River to the north and west. NAVSTA Mayport occupies the entire northern part of the peninsula except for the town of Mayport, which is located to the west between the Station and the St. Johns River (see Figure 1-1).

Building 1586 is located in the northeastern area of the Station as indicated on Figure 1-2. Building 1586 is used as the Bachelors' Enlisted Quarters, constructed with brick and cement block, and constructed in the shape of a "Y". Site 1586 is an impacted area near the northeastern corner of Building 1586 where a UST containing fuel oil is located (Tetra Tech, 2000). The UST is located under a cement slab and has a flush mount manhole covering the fill port. A pump house is located on the northeastern end of

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DRAWN BY J. ENGLISH	DATE 05/19/10	FACILITY LOCATION MAP NAVAL STATION MAYPORT JACKSONVILLE, FLORIDA	CONTRACT NUMBER ____
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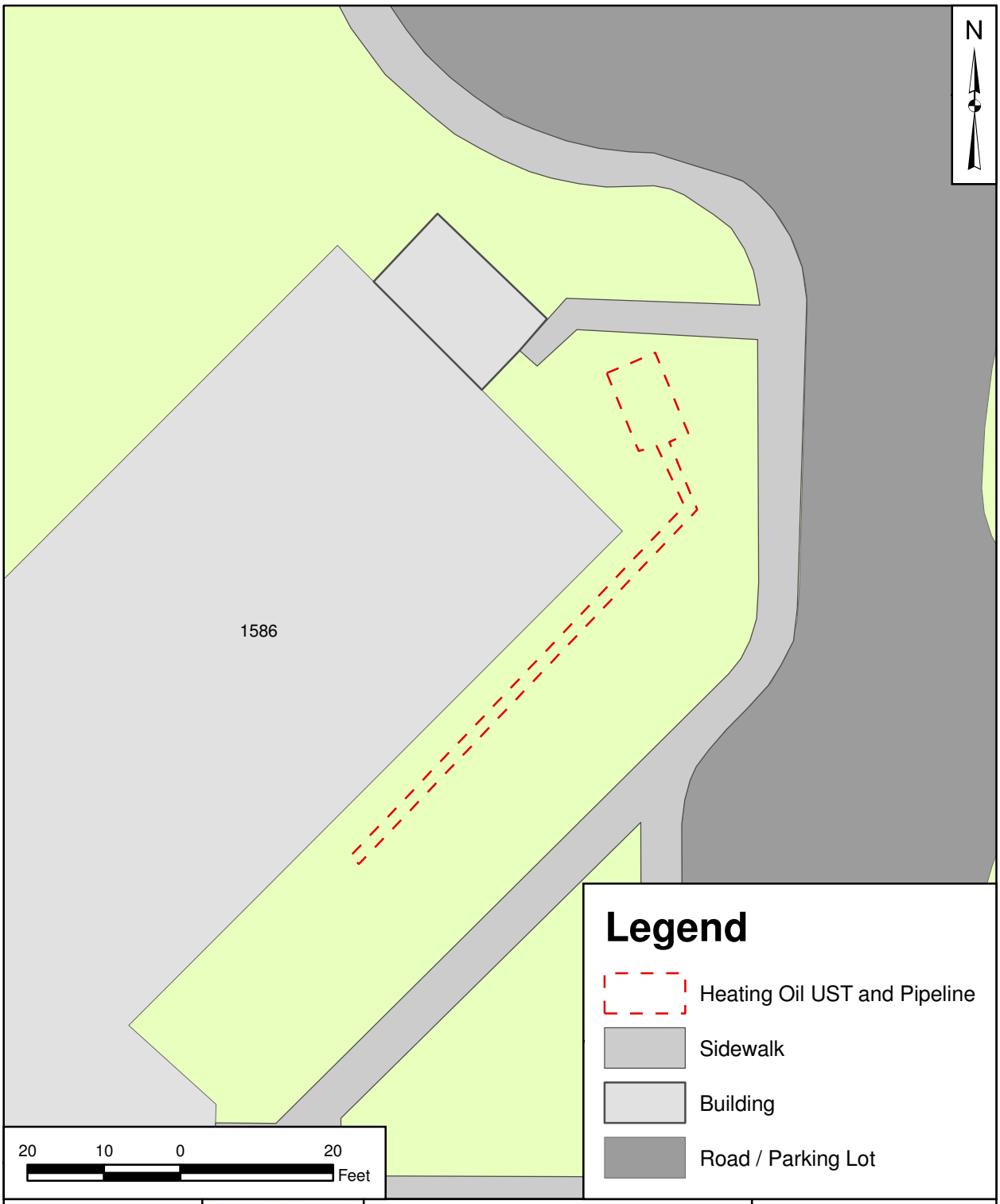

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Building 1586, and the piping for the UST runs along the southeastern corner of the building. The UST system currently has an active leak detection system.

The UST and piping are surrounded by gravel backfill and covered with sod. The backfilled area extends from the area surrounding the UST approximately 40 feet along the southern wall of Building 1586 and extends out from the building 15 to 20 feet to the sidewalk. Currently, a network of 17 monitoring wells and 1 recovery well have been installed on site.

1.3 SITE ASSESSMENT HISTORY

UST Site 1586 has been the focus of a petroleum investigation since 1991 when a fuel oil line ruptured. Due to this fuel oil release, a series of investigations, remediation work, and site investigations were conducted that resulted in the mitigation of fuel oil-impacted soil and free product. In a letter dated December 4, 1998, Mr. Jim Cason, Florida Department of Environmental Protection (FDEP), recommended the most prudent course of action was to pursue the Monitoring for Natural Attenuation (MNA) option under Chapter 62-770.690, F.A.C., and stated a Site Assessment Report (SAR) Addendum (SARA) should be submitted for Building 1586 with justification and recommendation for MNA status. A copy of the letter is included in Appendix A. Based on the December 1998 FDEP letter from Mr. Cason, Harding Lawson Associates (HLA) submitted the February 1999 SARA with MNA recommendations, which was then approved by the FDEP.

With the understanding that MNA was required, Tetra Tech conducted quarterly sampling from August 1999 through March 2000 that included groundwater analysis for volatile organic compound (VOC), polynuclear aromatic hydrocarbon (PAH), and total recoverable petroleum hydrocarbons (TRPH) constituents. As part of the MNA plan, monitoring wells MPT-BE-MW01S, MPT-BE-MW04S, MPT-BE-MW06S, MPT-BE-MW09S, and MPT-BE-MW10S were designated as the monitoring well network. During this period of groundwater monitoring, concentrations were declining since the original SAR and SARA, and no free product had been observed in any site well since 1997. The Tetra Tech November 2000 Groundwater Monitoring Report (provided in Appendix A) summarized all of the quarterly monitoring events conducted.

During spring 2000, the 4,000-gallon steel UST was replaced in the same tank pit with a new 5,000-gallon double-walled fiberglass UST. Pea-sized gravel was used to backfill the new tank pit and surrounding area. In April 2000, approximately 1,400 gallons of fuel was mistakenly pumped into a fill port previously connected to the removed 4,000-gallon UST. The release was reported to Mr. Jim Cason of the FDEP and discussed during the NAVSTA Mayport Installation Restoration Tier I Partnering Team (Partnering Team) meetings. Based on these conversations, a letter from Mr. Jim Cason, dated February 21, 2001,

stated the MNA status was no longer applicable, monitoring efforts should cease, and requested a site assessment be conducted. This letter is also included in Appendix A.

During August 2002, Tetra Tech assessed the vertical and horizontal extent of the soil and groundwater impacts associated with the new release. The assessment included soil and groundwater sample screening and fixed-base laboratory analyses. As part of the site assessment, four additional monitoring wells were installed within the existing monitoring well network. These monitoring wells included MPT-1586-MW14S, MPT-1586-MW15S, MPT-1586-MW16S, and MPT-1586-MW17S.

A portion of the conclusions and recommendations from the subsequent SAR (Tetra Tech, 2003) are as follows:

- Free product was present in four monitoring wells surrounding the tank pit (MPT-BE-MW06S, MPT-1586-MW15S, MPT-1586-MW16S, and MPT-1586-MW17S). Free product thicknesses at the time of the SAR ranged from 0.58 foot to 1.14 feet. Approximate extents of free product are included in Appendix A (Figure 1-6 from the 2003 SAR).

- The horizontal extent of constituents of concern (COCs) identified in groundwater by the mobile laboratory or fixed-base laboratory appeared to be limited to the area surrounding the tank pit.

- Groundwater levels indicated a northerly flow direction as shown on Figure 1-7 of the 2003 SAR (included in Appendix A). This flow direction positions the 2000 release upgradient from the original 1999 release.

The SAR recommended a RAP be prepared and an additional monitoring well be installed down gradient from the source area.

On January 6, 2004, monitoring well MPT-1586-MW18S, the additional monitoring well requested by the FDEP, was installed approximately 45 feet north of the UST area. The monitoring well was sampled for gasoline analytical group (GAG) and kerosene analytical group (KAG) constituents; no FDEP Groundwater Cleanup Target Levels (GCTLs) were exceeded.

During the initial release period, NAVSTA Mayport Base Operation personnel were key in removing free product from this site, although not all NAVSTA Mayport documentation is available for review. References to an aggressive fluid and free product recovery event conducted on May 5, 2003, are recorded in the Mayport Site Management Plan; however, the volume of recovered water and free product were not recorded. In addition, through conversations with Ms. Diane Fears of NAVSTA Mayport,

Base Operation personnel manually removed free product monthly using a bailer until August 2005 when Tetra Tech began the free product removal operations. The recovered free product was reportedly disposed at the oily waste water processing facility.

Since August 2005, Tetra Tech personnel have recorded free product thickness measurements and removed free product when present. Free product collected was contained for disposal at a State-licensed facility. The Tetra Tech free product removal operation was temporarily postponed from January 2006 through February 2008 to allow CH2M HILL to conduct a Free Product Treatability Study. During this time, a 4-inch recovery well (MPT-1586-RW-01) was installed near the operating UST.

On March 21, 2007, during a Partnering Team meeting, it was discussed and agreed upon to utilize petroleum sorbent booms (or socks) in the wells. From this point to current day, socks were installed in all wells that were believed to have the potential to contain free product.

In August 2008, in an effort to determine the mobility of groundwater contaminants, Tetra Tech collected groundwater samples for laboratory analyses. During the groundwater sampling event, all wells were measured for the presence and thickness of free product. Measurable free product was identified in the same four wells that contained free product during the 2003 Tetra Tech SAR. These monitoring wells included MPT-BE-MW01S, MPT-BE-MW06S, MPT-1586-MW16S, and MPT-1586-MW17S. Recovery well MPT-1586-RW-01 also contained free product. Monitoring well locations are shown on Figure 1-3. The down gradient and side gradient wells remained below FDEP GCTLs.

Free product measurement and removal activities by Tetra Tech occurred from August 28, 2005, to January 21, 2006, and from March 5, 2008, to present day. As of December 2010, free product removal has yielded 324.19 liters of free product. A detailed discussion on the removal of free product is provided in Section 3.0.

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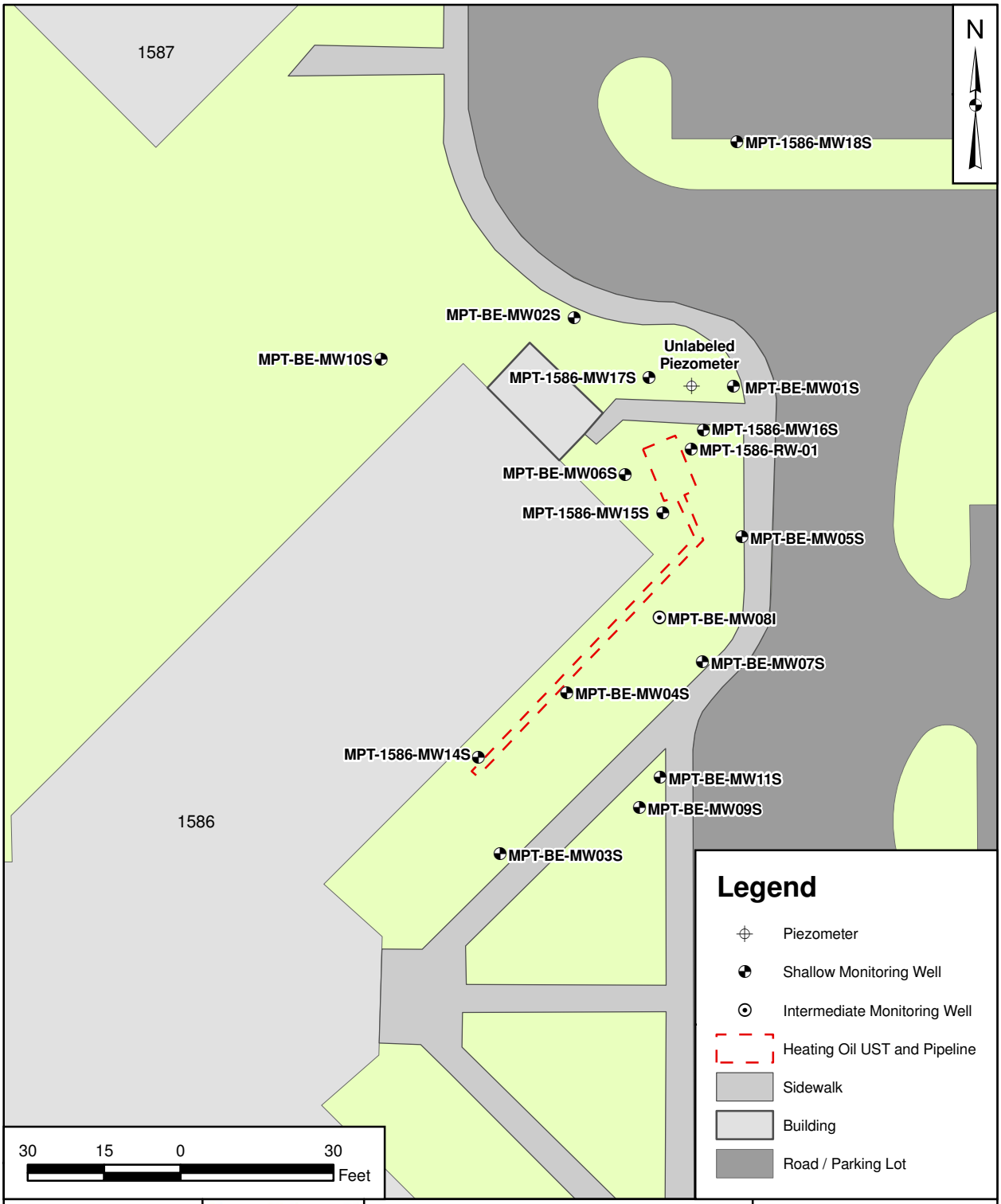

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1.4 REPORT ORGANIZATION

This report is organized into eight sections. Below is a list of the sections and a brief description of their content:

Section 1.0	Introduction	Summarizes the report's purpose, scope, site background, and report organization.
Section 2.0	Site Assessment Findings and Conclusions	Reviews the approved SAR and summarizes the SAR's and SARA's findings and conclusions.
Section 3.0	Free Product Removal	Provides a summary of free product discovery, measurement, and removal operations.
Section 4.0	Contaminant Distribution	Estimates the extent and mass of free product and contaminants in the soil and groundwater.
Section 5.0	RAP Requirements and Goals	Establishes the free product removal objectives for the remedial activities.
Section 6.0	Remedial Alternative Technology Screening	Presents the alternatives for remediation, determines the suitability for the site, and develops budgetary costs for each alternative.
Section 7.0	Remedial System Design	Presents all of the assumptions made and provides the detailed design of the recommended remedial alternative(s).
Section 8.0	Operation & Maintenance (O&M) and Monitoring Remediation Progress	Establishes the implementation and O&M procedures for the selected remedial alternative(s) and provides a monitoring plan to evaluate the effectiveness of the selected approach.
References		Lists all references used.

2.0 SITE ASSESSMENT FINDINGS AND CONCLUSIONS

This section summarizes the site assessment activities and sampling results after the April 2000 release of fuel oil at Site 1586. Due to the release, Tetra Tech conducted a site assessment in 2002 to determine the groundwater contamination and the presence of soil impacts at the site. A SAR was submitted to the Partnering Team in June 2003 detailing the assessment activities and approved by the FDEP on October 14, 2003. Additional site assessment activities were summarized in subsequent groundwater sampling reports and free product recovery reports. Currently, free product is present at the site.

2.1 LITHOLOGIC FINDINGS

As reported in the June 2003 SAR, 13 soil borings were placed throughout the site to determine the extent of soil impacts. Soil boring logs indicate the upper 40 feet of substratum underlying the site is composed of light brown to green and gray fine sand with varying percentages of shell fragments. The depth of concern at Site 1586 is based on the depth of groundwater contamination that has been defined to be less than 20 feet below land surface (bls). Soil boring logs can be found in the 2003 SAR (Tetra Tech, 2003).

2.2 GROUNDWATER AND AQUIFER CHARACTERISTICS

The following site aquifer parameters were reported in the SAR (Tetra Tech, 2003):

Hydraulic conductivity	(K)	=	4.34 feet per day or 1.53×10^{-3} centimeters per second
Hydraulic gradient	(i)	=	0.003 foot per foot
Seepage Velocity	(V)	=	15.84 feet per year (0.0434 foot per day) in northeasterly direction
Effective Porosity	(n_e)	=	0.30 (dimensionless)

2.3 CONTAMINATED SOIL ASSESSMENT

The 2003 SAR (Tetra Tech, 2003) detailed the most recent soil assessment results conducted in response to the April 2000 release of petroleum fuel oil. Site assessment field activities for soil impacts were performed in August 2002 and consisted of collecting soil from sample depths of 1 foot, 3 feet, and 5 feet bls for organic vapor analyzer (OVA) screening. The OVA-flame ionization detector (FID) screening results depict the 5-foot bls location having the greatest concentration of petroleum vapors with six additional samples exceeding 50 parts per million (ppm). Thirteen samples collected from the 5-foot bls interval were also screened by a mobile laboratory. The constituents analyzed by the mobile laboratory consisted of eight common VOCs. Soil boring sample MPT-1586-SB04 was the only sample to

exceed the FDEP Soil Cleanup Target Levels (SCTLs) for leachability of toluene, xylenes, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene.

Three soil samples (MPT-1586-SB01, MPT-1586-SB04, and MPT-1586-SB11) were collected from sample locations and depths that exceeded the 50 ppm OVA-FID screening value and were submitted to a fixed-base laboratory. Each of the three fixed-base samples exceeded FDEP leachabilty SCTLs for petroleum compounds. Soil samples MPT-1586-SB01 and MPT-1586-SB04 exceeded leachability SCTLs for VOCs and PAHs. Soil samples collected from MPT-1586-SB01, MPT-1586-SB04, and MPT-1586-SB11 exceeded leachability and residential SCTLs for TRPH.

A soil assessment under Building 1586 was not conducted. All soil boring locations and the estimated extent of soil contamination exceeding FDEP SCTLs is indicated on Figure 2-1. The soil impacts appeared to be located primarily near boring locations MPT-1586-SB01, MPT-1586-SB04, and MPT-1586-SB11 at approximately 2 to 5 feet bls. Figure 2-1 from the Tetra Tech 2003 SAR depicts soil sample locations and the area of gravel backfill and is included in Appendix A.

2.4 CONTAMINATED GROUNDWATER ASSESSMENT

Groundwater sampling events (May 2000, August 2002, August 2008, and January and April 2011) were conducted by Tetra Tech at Site 1586 after the release of the fuel oil in April 2000. It should be noted that free product was present during each of the above sampling events. During each groundwater sampling event, monitoring wells were measured for the presence and thickness of free product. Monitoring wells with measured free product were not sampled. In addition to measuring free product, the groundwater level in each monitoring well was also measured to determine the direction of groundwater flow.

As reported in the Annual Groundwater Monitoring Report (Tetra Tech, 2000), groundwater samples collected on May 25, 2000, were conducted as part of the quarterly monitoring program. During this event, monitoring wells MPT-BE-MW-01S, MPT-BE-MW04S, MPT-BE-MW09S, and MPT-BE-MW10S were sampled for petroleum compounds. Laboratory results indicated no exceedances greater than FDEP GCTLs. Monitoring well MPT-BE-MW06S was not sampled due to the measurement of approximately 3 feet of free product. This was the last monitoring event before the site assessment was conducted in 2002.

The August 2002 sampling event was conducted as part of the SAR (Tetra Tech, 2003) and included the collection of groundwater samples from the same soil boring locations. During the August 2002 soil boring event, grab groundwater samples were collected from each of the 13 soil boring locations (MPT-1586-SB01 through MPT-1586-SB13) at Site 1586. Groundwater samples were labeled according to the soil boring location as GW-01 from MPT-1586-SB01, and so on.

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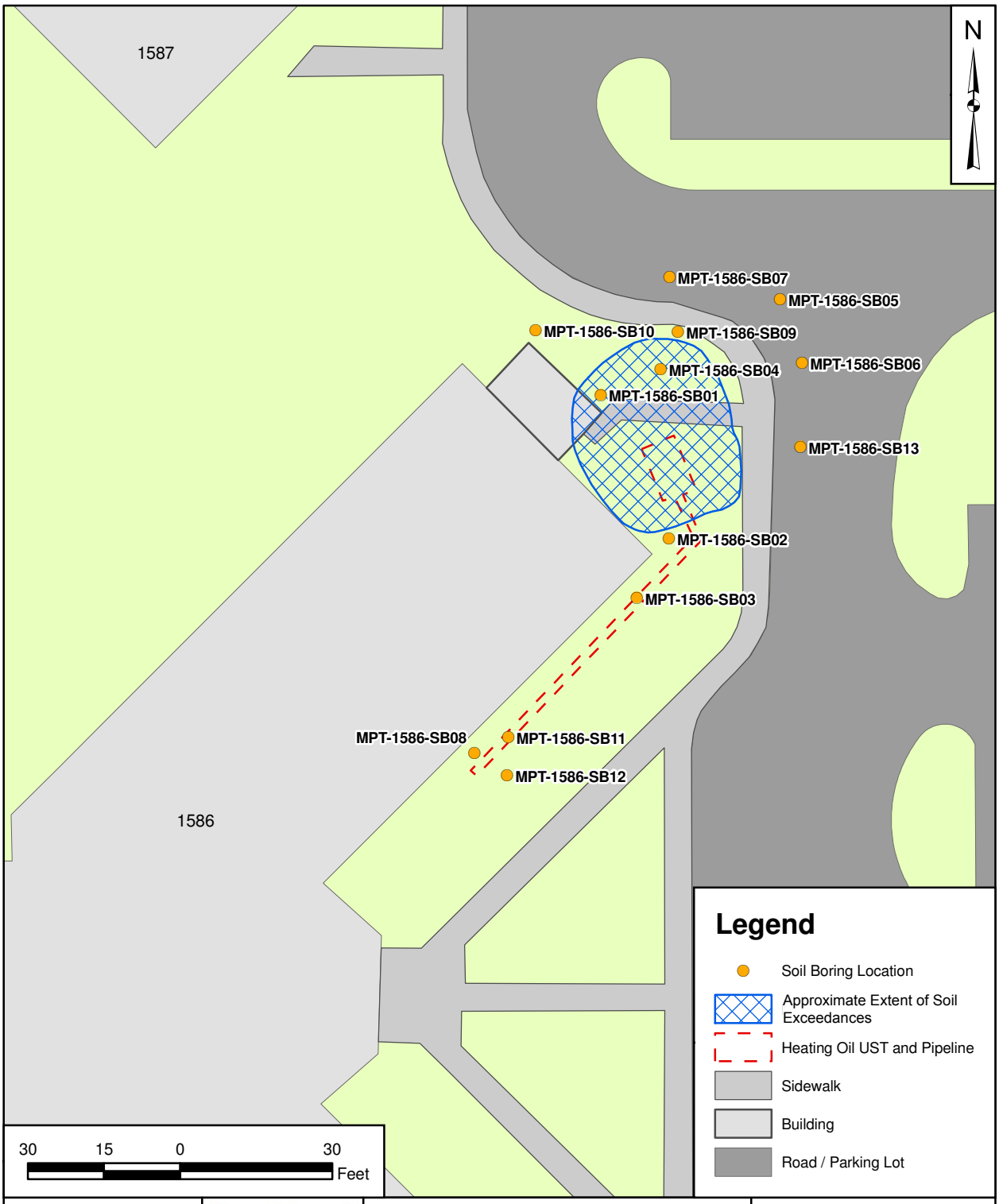

DRAWN BY T. WHEATON	DATE 11/09/10	ESTIMATED EXTENT OF SOIL CONTAMINATION RAP SITE 1586 NAVAL STATION MAYPORT JACKSONVILLE, FLORIDA	CONTRACT NUMBER CTO
CHECKED BY D. SIEFKEN	DATE 05/18/11		OWNER NUMBER —
REVISED BY —	DATE —		APPROVED BY — DATE —
SCALE AS NOTED			FIGURE NO. FIGURE 2-1 REV 0

Results from the mobile laboratory for groundwater analysis indicated that the groundwater sample collected from soil boring location GW-01 and one sample collected from monitoring well MPT-BE-MW01S had concentrations exceeding FDEP GCTLs for naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene. It should be noted that free product was encountered in locations GW-02 and GW-04 and, therefore, groundwater samples were not collected. In addition, a groundwater sample was not collected from the GW-03 location due to lack of water in the well. The site assessment activities also included the installation of four additional monitoring wells (MPT-1586-MW14S, MPT-1586-MW15S, MPT-1586-MW16S, and MPT-1586-MW17S) at Site 1586.

Monitoring wells MPT-BE-MW06S, MPT-1586-MW15S, MPT-1586-MW16S, and MPT-1586-MW17S were not sampled in August 2002 due to the presence of free product at the time of the sampling event. Fixed-base laboratory analyses of samples collected during the August 2002 investigation reported the presence of GAG and KAG constituents at concentrations greater than FDEP GCTLs.

During August 2002, groundwater samples were collected from monitoring wells MPT-BE-MW01S, MPT-BE-MW02S, MPT-BE-MW04S, MPT-BE-MW05S, MPT-BE-MW07S, MPT-BE-MW08I, and MPT-BE-MW14S for laboratory analyses. Of the monitoring wells sampled, MPT-BE-MW01S indicated benzene, 1-methylnaphthalene, and 2-methylnaphthalene at concentrations exceeding FDEP GCTLs. Groundwater samples collected from monitoring well MPT-BE-MW04S indicated 1-methylnaphthalene and chloromethane concentrations exceeding FDEP GCTLs. Chloromethane (at 4 micrograms per liter [µg/L]) was also found in excess of the FDEP GCTL for monitoring wells MPT-BE-MW07S, MPT-BE-MW08I, MPT-BE-MW10S, and MPT-1586-MW14S. The FDEP GCTLs for these reported contaminants at the time of the August 2002 investigation were benzene at 1 µg/L, 1-methylnaphthalene at 20 µg/L, 2-methylnaphthalene at 20 µg/L, and chloromethane at 2.7 µg/L. The estimated extent of groundwater contamination is provided on Figure 2-2. A summary table depicting the detections of the August 2002 groundwater analysis is provided as Table 2-1.

The SAR recommended the installation of a down gradient monitoring well to delineate groundwater impacts at Site 1586. On January 6, 2004, monitoring well MPT-1586-MW18S was installed approximately 45 feet north of the UST area. Once installed, the monitoring well was sampled. No groundwater exceedances above FDEP GCTLs were reported. The monitoring well installation details for MPT-1586-MW18S are discussed in Section 2.6 of this report.

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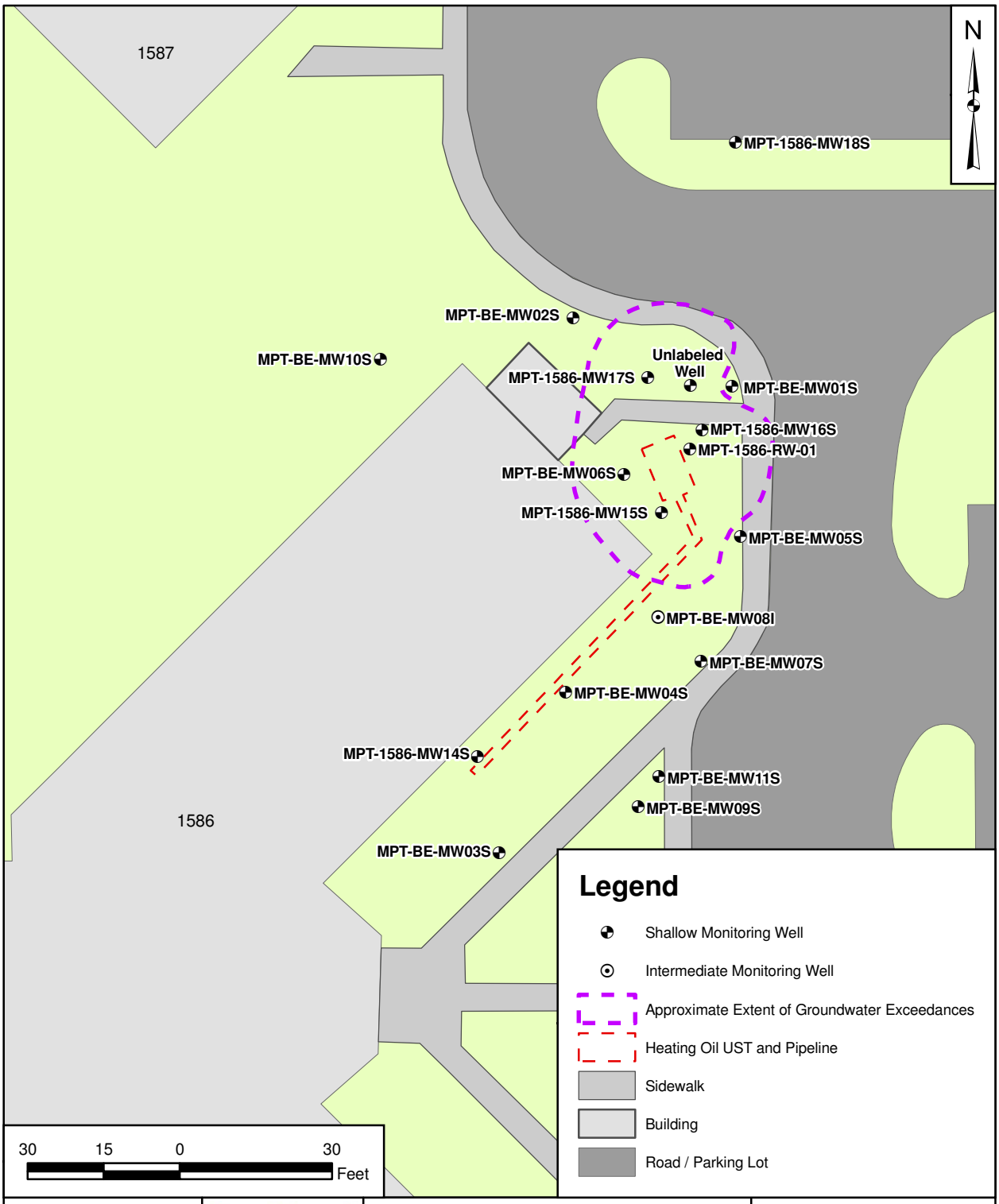


DRAWN BY T. WHEATON	DATE 11/09/10	ESTIMATED EXTENT OF GROUNDWATER CONTAMINATION RAP SITE 1586 NAVAL STATION MAYPORT JACKSONVILLE, FLORIDA	CONTRACT NUMBER CTO
CHECKED BY D. SIEFKEN	DATE 05/18/11		OWNER NUMBER —
REVISED BY —	DATE —		APPROVED BY — DATE —
SCALE AS NOTED			FIGURE NO. FIGURE 2-2 REV 0

TABLE 2-1
SUMMARY OF FIXED-BASE LABORATORY GROUNDWATER ANALYTICAL RESULTS FROM 2002

Remedial Action Plan for Site 1586
Naval Station Mayport
Jacksonville, Florida

Compound	FDEP Target	MW01S	MW02S	MW04S	MW05S	MW07S	MW08I	MW09S	MW10S	MW14S
Sample Date	**Level[1]**	8/21/2002	8/21/2002	8/21/2002	8/21/2002	8/21/2002	8/21/2002	8/21/2002	8/21/2002	8/21/2002
VOCs (USEPA Method 8260B) (µg/L)										
Benzene	1	**4**	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	40	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	30	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Xylenes	20	13	<1	<1	<1	<1	<1	<1	<1	<1
Chloromethane	2.7	1	<1	**6**	2	**4**	**4**	2	4	4
MTBE	50	<10	<10	<10	<10	<10	<10	<10	<10	<10
USEPA 504.1 (µg/L)										
EDB	0.02	<0.3	<0.3	< 0.02	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
PAHs (USEPA Method 8310) (µg/L)										
1-Methylnaphthalene	20	**33**	<1	**35**	<1	<1	<1	<1	<1	<1
2-Methylnaphthalene	20	**34**	<1	4	<1	<1	<1	<1	<1	<1
Acenaphthene	20	2.2	<1	4	<1	<1	0.49J	<1	<1	<1
Anthracene	2100	0.34	<1	<1	<1	<1	<1	<1	<1	<1
Fluoranthene	280	1	<1	0.12	<1	<1	<1	<1	<1	<1
Fluorene	280	3	<1	6	0.28	0.22	<1	<1	<1	<1
Phenanthrene	210	1.4	<1	1.8	<1	<1	<1	<1	<1	<1
Acenaphthylene	210	0.36	<1	0.57	<1	<1	<1	<1	<1	<1
Pyrene	210	0.7	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	20	17	<1	5	<1	<1	<1	<1	<1	<1
FL-PRO (USEPA Method 8270) (µg/L)										
TRPH	5000	280	<100	770	<100	<100	<100	<100	<100	<100
Metals Analysis (µg/L)										
Total Lead	15	< 1	1.7	< 1	< 1	< 1	< 1	< 1	< 1	< 1

Notes:

[1]Chapter 62-770, F.A.C. (April 30, 1999)

Bold indicates values in excess of GCTLs.

Monitoring wells MPT-BE-MW06S, MPT-1586-MW15S, MPT-MW-1586-MW16S, and MPT-1586-MW17S were not sampled on 08/21/2002 due to the presence of free product.

On August 26, 2008, groundwater samples were collected from monitoring wells MPT-BE-MW01S, MPT-BE-MW02S, MPT-BE-MW05S, MPT-BE-MW07S, MPT-BE-MW10S, and MPT-1586-MW18S for laboratory analyses of VOCs using United States Environmental Protection Agency (USEPA) Method 8260B, PAHs using USEPA Method 8270C, and TRPH using the Florida Residual Petroleum Organic Method (FL-PRO). The six monitoring wells largely made up the perimeter of the impacted area. Laboratory analytical results for the monitoring wells indicated no petroleum-based COCs exceeding FDEP GCTLs. Wells with historical detection for free product (MPT-1586-RW-01, MPT-BE-MW06S, MPT-1586-MW15S, MPT-1586-MW16S, and MPT-1586-MW17S) had measured free product during the sampling event and were not sampled. In general, analytical results indicate concentrations of petroleum impacts detected in groundwater samples since the August 2002 sampling event have decreased. A summary of laboratory detections from the 2008 sampling event is provided in Table 2-2.

During January, April, and July 2011, additional groundwater monitoring was conducted. The three sampling events were part of quarterly monitoring of the site for calendar year 2011. The monitoring wells that were part of monitoring network included MPT-BE-MW01S, MPT-BE-MW02S, MPT-BE-MW04S, MPT-BE-MW05S, MPT-BE-MW07S, MPT-BE-MW08I, and MPT-1586-MW15S. All samples were analyzed for benzene, toluene, ethylbenzene, xylenes, and methyl tert-butyl ether using USEPA Method 8260B, PAHs using USEPA Method 8270, and TRPH using FL-PRO. Laboratory results of groundwater samples collected for analyses from the seven monitoring wells did not indicate any COCs exceeding their respective GCTLs. Groundwater impacts are present, but remain localized near the tank pit area and free product remains on site in several wells.

2.5 SAR CONCLUSIONS AND RECOMMENDATIONS

The 2003 SAR concluded that free product exists near the UST, and petroleum constituents have impacted soils and groundwater at Site 1586. The SAR further concluded that petroleum impacts to the site require active remediation and periodic monitoring. In the SAR, free product was reported present in monitoring wells MPT-BE-MW06S, MPT-1586-MW15S, MPT-1586-MW16S, and MPT-1586-MW17S and recovery well MPT-1586-RW-01.

The soil contamination appears to be mostly limited to the areas where free product is present and may be associated with the capillary fringe (5 feet bls) in the area of soil boring MPT-1586-SB11 placed in August 2002. Confirmatory soil samples collected in the area of MPT-1586-SB11 exhibited several COCs, which exceeded SCTLs for leachability and residential direct exposure.

TABLE 2-2
MONITORING WELL ANALYTICAL RESULTS

Remedial Action Plan for Site 1586
Naval Station Mayport
Jacksonville, Florida

Constituents	GCTLs (µg/L)	NADCs (µg/L)	MPT-BE-MW01S				
			Aug 2002	Aug 2008	Jan 2011	Apr 2011	July 2011
Benzene	1	100	**4**	0.46 U	0.250 U	0.250 U	0.250 U
Ethylbenzene	30	300	1 U	0.68 U	0.250 U	0.250 U	0.250 U
Toluene	40	400	1 U	0.56 U	0.250 U	0.250 U	0.250 U
Xylene (total)	20	200	13	0.76 U	0.750 U	0.750 U	0.750 U
1-Methylnaphthalene	28	280	**33**	0.27	0.0463 U	0.0463 U	0.0463 U
2-Methylnaphthalene	28	280	**34**	0.16	0.0463 U	0.0463 U	0.0463 U
Acenaphthene	20	200	2.2	0.48	0.524	0.438	0.432
Anthracene	2100	21000	1 U	0.08 J	0.0788 J	0.0463 U	0.0463 U
Fluoranthene	280	2800	1	0.05 J	0.0589 J	0.0463 U	0.148 IV
Fluorene	280	2800	3	0.6	2.67	2.18	2.04 V
Naphthalene	14	140	**17**	0.24	0.0463 U	0.0463 U	0.0463 U
Phenanthrene	210	2100	1.4	0.04 J	0.0669 J	0.0463 U	0.573 V
Pyrene	210	2100	1 U	0.14	0.0819 J	0.0506 I	0.111 I
TRPH (mg/L)	5	50	0.28 U	0.475	0.649	0.789	0.507 I

Constituents	GCTLs (µg/L)	NADCs (µg/L)	MPT-BE-MW02S				
			Aug 2002	Aug 2008	Jan 2011	Apr 2011	July 2011
Benzene	1	100	1 U	0.23 U	0.250 U	0.250 U	0.250 U
Ethylbenzene	30	300	1 U	0.34 U	0.250 U	0.250 U	0.250 U
Toluene	40	400	1 U	0.28 U	0.250 U	0.250 U	0.250 U
Xylene (total)	20	200	1 U	0.38 U	0.750 U	0.750 U	0.750 U
1-Methylnaphthalene	28	280	1 U	0.04 J	0.0463 U	0.0463 U	0.0463 U
2-Methylnaphthalene	28	280	1 U	0.03 J	0.0463 U	0.0463 U	0.0463 U
Acenaphthene	20	200	1 U	0.02 J	0.0463 U	0.0463 U	0.0463 U
Anthracene	2100	21000	1 U	0.02 U	0.0463 U	0.0463 U	0.0463 U
Fluoranthene	280	2800	1 U	0.01 U	0.0463 U	0.0463 U	0.140 IV
Fluorene	280	2800	1 U	0.01 U	0.0463 U	0.0463 U	0.0463 U
Naphthalene	14	140	1 U	0.02 U	0.0463 U	0.0463 U	0.0463 U
Phenanthrene	210	2100	1 U	0.02 U	0.0463 U	0.0463 U	0.359 V
Pyrene	210	2100	1 U	0.02 U	0.0463 U	0.0463 U	0.0843 I
TRPH (mg/L)	5	50	0.10 U	0.035 UJ	0.521 J	0.157 U	0.348 I

TABLE 2-2
MONITORING WELL ANALYTICAL RESULTS

Remedial Action Plan for Site 1586
Naval Station Mayport
Jacksonville, Florida

Constituents	GCTLs (µg/L)	NADCs (µg/L)	MPT-BE-MW04S			
			Aug 2002	Jan 2011	Apr 2011	July 2011
Benzene	1	100	1 U	0.250 U	0.250 U	0.250 U
Ethylbenzene	30	300	1 U	0.250 U	0.250 U	0.250 U
Toluene	40	400	1 U	0.250 U	0.250 U	0.250 U
Xylene (total)	20	200	1 U	0.750 U	0.750 U	0.750 U
1-Methylnaphthalene	28	280	**35**	1.23	1.25	1.43
2-Methylnaphthalene	28	280	4	0.117 J	0.0467 U	0.0463 U
Acenaphthene	20	200	4	1.6	1.29	1.87
Anthracene	2100	21000	0.34	0.0463 U	0.0467 U	0.292
Fluoranthene	280	2800	0.12	0.0894 J	0.0467 U	0.227 V
Fluorene	280	2800	6	3.55	0.0467 U	3.79 V
Naphthalene	14	140	5	0.0463 U	0.0467 U	0.399
Phenanthrene	210	2100	1.8	0.0463 U	0.0467 U	0.488 V
Pyrene	210	2100	0.70	0.485	0.510	0.551
TRPH (mg/L)	5	50	0.77 U	1.05	4.93	2.86

Constituents	GCTLs (µg/L)	NADCs (µg/L)	MPT-BE-MW05S			
			Aug 2002	Aug 2008	Jan 2011	Apr 2011
Benzene	1	100	1 U	0.23 U	0.250 U	0.250 U
Ethylbenzene	30	300	1 U	0.34 U	0.250 U	0.250 U
Toluene	40	400	1 U	0.28 U	0.250 U	0.250 U
Xylene (total)	20	200	1 U	0.38 U	0.750 U	0.750 U
1-Methylnaphthalene	28	280	1 U	0.01 U	0.0463 U	0.0463 U
2-Methylnaphthalene	28	280	1 U	0.02 U	0.0463 U	0.0463 U
Acenaphthene	20	200	1 U	0.02 U	0.0463 U	0.0463 U
Anthracene	2100	21000	1 U	0.02 U	0.0463 U	0.0463 U
Fluoranthene	280	2800	1 U	0.01 U	0.0463 U	0.0463 U
Fluorene	280	2800	0.28	0.01 U	0.0463 U	0.0463 U
Naphthalene	14	140	1 U	0.02 U	0.0463 U	0.0463 U
Phenanthrene	210	2100	1 U	0.02 U	0.0463 U	0.0463 U
Pyrene	210	2100	1 U	0.009 U	0.0463 U	0.0463 U
TRPH (mg/L)	5	50	0.10 U	0.035 U	0.157 U	0.157 U

TABLE 2-2
MONITORING WELL ANALYTICAL RESULTS

Remedial Action Plan for Site 1586
Naval Station Mayport
Jacksonville, Florida

Constituents	GCTLs (µg/L)	NADCs (µg/L)	MPT-BE-MW07S				
			Aug 2002	Aug 2008	Jan 2011	Apr 2011	July 2011
Benzene	1	100	1 U	0.23 U	0.250 U	0.250 U	0.250 U
Ethylbenzene	30	300	1 U	0.34 U	0.250 U	0.250 U	0.250 U
Toluene	40	400	1 U	0.28 U	0.250 U	0.250 U	0.250 U
Xylene (total)	20	200	1 U	0.38 U	0.750 U	0.750 U	0.750 U
1-Methylnaphthalene	28	280	1 U	0.01 U	0.0463 U	0.0463 U	0.0463 U
2-Methylnaphthalene	28	280	1 U	0.02 U	0.0463 U	0.0463 U	0.0463 U
Acenaphthene	20	200	0.12	0.02 U	0.145 J	0.0867 I	0.133 I
Anthracene	2100	21000	1 U	0.02 U	0.0463 U	0.0463 U	0.0882 I
Fluoranthene	280	2800	1 U	0.01 U	0.0463 U	0.0463 U	0.154 IV
Fluorene	280	2800	0.22	0.01 U	0.491	0.413	0.335 V
Naphthalene	14	140	1 U	0.02 U	0.0463 U	0.0463 U	0.0642 I
Phenanthrene	210	2100	1 U	0.02 U	0.0463 U	0.0463 U	0.517 V
Pyrene	210	2100	1 U	0.009 U	0.0463 U	0.0463 U	0.0929 I
TRPH (mg/L)	5	50	0.10 U	0.035 UJ	0.157 U	0.411 I	0.157 U

Constituents	GCTLs (µg/L)	NADCs (µg/L)	MPT-BE-MW08I				MPT-BE-MW09S
			Aug 2002	Jan 2011	Apr 2011	July 2011	Aug 2002
Benzene	1	100	1 U	0.250 U	0.250 U	0.250 U	1 U
Ethylbenzene	30	300	1 U	0.250 U	0.250 U	0.250 U	1 U
Toluene	40	400	1 U	0.250 U	0.250 U	0.250 U	1 U
Xylene (total)	20	200	1 U	0.750 U	0.750 U	0.750 U	1 U
1-Methylnaphthalene	28	280	1 U	0.0463 U	0.0463 U	0.0463 U	1 U
2-Methylnaphthalene	28	280	1 U	0.0463 U	0.0463 U	0.0463 U	1 U
Acenaphthene	20	200	0.49 J	2.2	1.56	1.25	1 U
Anthracene	2100	21000	1 U	0.0463 U	0.0463 U	0.0509 I	1 U
Fluoranthene	280	2800	1 U	0.0463 U	0.0463 U	0.218 V	1 U
Fluorene	280	2800	1 U	0.0463 U	0.0463 U	0.113 IV	1 U
Naphthalene	14	140	1 U	0.0463 U	0.0463 U	0.0513 I	1 U
Phenanthrene	210	2100	1 U	0.0463 U	0.0463 U	0.544 V	1 U
Pyrene	210	2100	1 U	0.0463 U	0.0463 U	0.139 I	1 U
TRPH (mg/L)	5	50	0.10 U	0.159 U	0.157 U	0.157 U	0.10 U

TABLE 2-2
MONITORING WELL ANALYTICAL RESULTS

Remedial Action Plan for Site 1586
Naval Station Mayport
Jacksonville, Florida

Constituents	GCTLs (µg/L)	NADCs (µg/L)	MPT-BE-MW10S		MPT-1586-MW14S
			Aug 2002	Aug 2008	Aug 2002
Benzene	1	100	1 U	0.23 U	1 U
Ethylbenzene	30	300	1 U	0.34 U	1 U
Toluene	40	400	1 U	0.28 U	1 U
Xylene (total)	20	200	1 U	0.38 U	1 U
1-Methylnaphthalene	28	280	1 U	0.01 U	1 U
2-Methylnaphthalene	28	280	1 U	0.02 U	1 U
Acenaphthene	20	200	1 U	0.02 U	1 U
Anthracene	2100	21000	1 U	0.02 U	1 U
Fluoranthene	280	2800	1 U	0.01 U	1 U
Fluorene	280	2800	1 U	0.01 U	1 U
Naphthalene	14	140	1 U	0.02 U	1 U
Phenanthrene	210	2100	1 U	0.02 U	1 U
Pyrene	210	2100	1 U	0.009 U	1 U
TRPH (mg/L)	5	50	0.10 U	0.035 UJ	0.10 U

Constituents	GCTLs (µg/L)	NADCs (µg/L)	MPT-1586-MW15S			MPT-1586-MW18S	
			Jan 2011	Apr 2011	July 2011	Aug 2008	July 2011
Benzene	1	100	0.250 U	0.250 U	0.250 U	0.76 J	0.250 U
Ethylbenzene	30	300	0.250 U	0.250 U	0.250 U	0.68 U	0.250 U
Toluene	40	400	0.250 U	0.250 U	0.250 U	0.56 U	0.250 U
Xylene (total)	20	200	0.750 U	0.750 U	0.750 U	1.6 J	0.750 U
1-Methylnaphthalene	28	280	0.331	1.29	0.111 I	23	0.300
2-Methylnaphthalene	28	280	0.463 U	0.0463 U	0.0463 U	23	0.0463 U
Acenaphthene	20	200	1.33	1.40	0.942	2.5	2.26
Anthracene	2100	21000	0.0808 J	0.0463 U	0.123 I	0.16	0.185
Fluoranthene	280	2800	0.0463 U	0.0463 U	0.194 V	0.15	0.223 V
Fluorene	280	2800	1.66	2.40	1.42 V	2.7	3.06 V
Naphthalene	14	140	0.144 J	0.0463 U	0.145 I	0.6	0.221
Phenanthrene	210	2100	0.0666 J	0.0463 U	0.330 V	0.88	0.277 V
Pyrene	210	2100	0.291	0.200	0.282	0.04 J	0.132 I
TRPH (mg/L)	5	50	2.53	1.14	**5.79**	3.9	1.47

Notes:
All values are micrograms per liter (µg/L), except where noted.
GCTLs = Groundwater Cleanup Target Levels per Chapter 62-777, F.A.C.
NADCs = Natural Attenuation Default Concentrations per Chapter 62-777, F.A.C.
mg/L = milligram per liter
U = not detected
J = estimated result
I = Result is greater than the detection limit but less than the reporting limit
V = Compound was also detected in the laboratory method blank

August 2008 groundwater samples taken from outside the area of free product did not indicate exceedances of GCTLs; however, the sample from the furthest down gradient monitoring well (MPT-1586-MW18S) indicated detections of petroleum constituents. In addition, no petroleum constituents exceeded GCTLs in fixed-base groundwater analyses from the intermediate monitoring well located south of the source area, which indicates the depth of groundwater impacts do not exceed 20 feet bls.

Laboratory results of the January, April, and July 2011 groundwater samples collected for analyses from the seven monitoring wells indicated no concentrations of COCs exceeding their respective GCTLs. Groundwater impacts are present, but remain localized near the tank pit area. Free product remains on site in wells not part of the groundwater monitoring regime.

2.6 ADDITIONAL WELL INSTALLATION AND GROUNDWATER FLOW DIRECTION

On January 6, 2004, an additional down gradient monitoring well, MPT-1586-MW18S, was installed by Partridge Well Drilling, a Florida-licensed well drilling company, under the supervision of Tetra Tech personnel. Monitoring well MPT-1586-MW18S is located approximately 45 feet north-northeast of monitoring well MPT-BE-MW01S as indicated on Figure 1-3. This location was chosen to delineate the extent of down gradient groundwater exceedances. The monitoring well identification was selected as part of the sequential numbering of permanent monitoring wells currently or once located at the site.

2.6.1 Monitoring Well Installation Details

NAVSTA Mayport personnel cleared underground utilities prior to monitoring well installation, and a posthole digger was used to excavate the borehole for MPT-1586-MW18S from ground surface to a depth of 5 feet bls to verify the absence of subsurface utilities. From that point (5 feet bls) to total depth, the borehole was advanced using 4¼-inch inside diameter hollow stem augers (HSAs) via a truck-mounted drill rig. The borehole for MPT-1586-MW18S was advanced to a total depth of 13.5 feet bls. The monitoring well was constructed of 2-inch diameter, 0.010-inch mill slotted Schedule 40 polyvinyl chloride (PVC) with a 10-foot screen and a 3-foot solid PVC riser (flush threaded) inserted through the HSAs after attaining total depth. Graded 20/30 silica sand was poured between the PVC well and HSAs at the surface as the augers were being slowly removed from the borehole to create a filter pack in the annular space between the borehole and monitoring well. The filter pack was poured into the annular space to a depth approximately 1 foot above the top of the screen (i.e., 1 foot bls) and was sealed by approximately 6 to 12 inches of 30/65 fine sand. The remaining annular space from the top of the fine sand seal to within approximately 6 inches of ground surface was filled with Type I Portland cement grout. The monitoring well was completed at the surface with an 8-inch diameter steel manhole

equipped with a sealed bolt down cover. The manhole was secured in place with a concrete pad 2 feet square and 6 inches thick.

Monitoring well MPT-1586-MW18S was developed using a submersible pump. Field measurements of pH, temperature, and specific conductance were recorded during development. The monitoring well was developed until field measurements became stable and purge water became clear. Water quality stabilization was determined using the following criteria: temperature ±5 degrees Celsius, pH ±0.1 unit, and specific conductance ±10 micro-ohms per centimeter. Development water was containerized in a 55-gallon steel drum and transported to a staging area for proper disposal. The shallow monitoring well construction diagram for monitoring well MPT-1586-MW18S is provided in Appendix B.

2.6.2 Groundwater Flow Direction

Groundwater flow directions were recorded from historical documents prepared in 1999, 2000, and 2003. The groundwater flow direction was calculated by subtracting depth-to-water measurements from corresponding top-of-casing elevations in select monitoring wells to determine the potentiometric surface underlying the site. Based on water table elevation data recorded in preparation of a 1999 HLA SARA, an inferred northern to northeastern direction of groundwater flow was determined (HLA, 1999), while the inferred groundwater flow direction recorded in the 2000 Tetra Tech Annual Groundwater Monitoring Report depicted a northwestern flow direction (Tetra Tech, 2000). The groundwater flow direction depicted in the 2003 Tetra Tech SAR inferred a northeastern flow direction (Tetra Tech, 2003). Figures from the 1999 HLA SARA, the 2000 Tetra Tech Annual Groundwater Monitoring Report, and the 2003 Tetra Tech SAR are provided in Appendix A.

3.0 FREE PRODUCT REMOVAL

Free product removal at Site 1586 was initially conducted by NAVSTA Mayport Base Operation personnel by manually bailing free product from site wells. Although documentation of the start date of this work cannot be obtained, it is known that Base Operation personnel relinquished the manual free product removal to Tetra Tech in August 2005. Six months later during February 2006, NAVFAC requested that Tetra Tech cease free product removal to allow CH2M HILL to conduct a free product treatability study. CH2M HILL investigated the removal of free product using different methods. Tetra Tech's role in removing free product began again in March 2008 and has continued to the current date. Currently, seven wells are monitored for free product (MPT-1586-RW-01, MPT-BE-MW01S, MPT-BE-MW06S, MPT-1586-MW15S, MPT-1586-MW16S, MPT-1586-MW17S, and an unmarked well. Figure 1-3 depicts the well locations relative Building 1586 and the fuel oil UST. Free product removal is currently being conducted passively (petroleum absorbent socks) and actively (peristaltic pump) at the seven selected wells.

Of the seven wells monitored for free product removal, historically no free product has been observed in monitoring well MWT-BE-MW01S, and relatively small volumes of free product have been removed from monitoring wells MPT-BE-MW06S, MPT-1586-MW15S, and MPT-1586-MW17S. The unlabeled monitoring well initially contained free product recovered from March 2010 to July 2010; however, since late August 2010, this monitoring well has not contained free product. The majority of free product is removed from the recovery well MPT-1586-RW-01 located east of the active UST and MPT-1586-MW16S located northeast of the active UST. Both wells are installed in the pea-sized gravel area associated with the tank pit.

As of May 2011, 324.19 liters of free product have been removed from the monitoring wells near the UST. Table 3-1 summarizes volume of free product recovered by Tetra Tech from August 2005 to August 2006 and from March 2008 to May 2011. As depicted in the Table 3-1, recovery well MPT-1586-RW-01 accounts for 66 percent of free product recovered.

Table 3-2 displays the gauging and volume recovery data from March 2008 through May 2011. Recovery well MPT-1586-RW-01 has displayed a nearly consistent presence of free product from March 2008 through May 2011. As seen in Table 3-2, the overall trend of free product recovery is continually decreasing. More details pertaining to the method of free product recovery are provided in Section 7.0. The approximate extent of the free product that remains at Site 1586 is presented on Figure 3-1.

TABLE 3-1
FREE PRODUCT RECOVERY SUMMARY
(from August 2005 to May 2011)

Remedial Action Plan for Site 1586
Naval Station Mayport
Jacksonville, Florida

Monitoring (or Recovery) Well	Total Liters Recovered	Percentage of Total Liters Removed per Well
MPT-BE-MW01S	0	0
MPT-1586-RW-01	213.95	66.00
MPT-BE-MW06S	27.15	8.37
MPT-1586-MW15S	5.75	1.77
MPT-1586-MW16S	50.64	15.62
MPT-1586-MW17S	20.90	6.45
Unlabeled Monitoring Well	5.80	1.79
Total Volume Recovered (liters)	**324.19**	

TABLE 3-2
FREE PRODUCT MEASUREMENTS AND RECOVERY

Remedial Action Plan for Site 1586
Naval Station Mayport
Jacksonville, Florida

DATE	MW01S		RW01		MW06S		MW15S	
	THICKNESS (feet)	VOLUME RECOVERED (mL)	THICKNESS (feet)	VOLUME RECOVERED (mL)	THICKNESS (feet)	VOLUME RECOVERED (mL)	THICKNESS (feet)	VOLUME RECOVERED (mL)
08/28/05	NM	NM	NP	NP	0.50	200	NM	NM
10/01/05	NM	NM	NP	NP	1.00	500	NM	NM
10/29/05	NM	NM	NP	NP	0.90	500	NM	NM
11/24/05	NM	NM	NP	NP	9.40	350	NM	NM
12/27/05	NM	NM	NP	NP	1.00	700	NM	NM
01/21/06	NM	NM	NP	NP	0.62	500	NM	NM
08/28/05	NM	NM	NP	NP	0.50	200	NM	NM
10/01/05	NM	NM	NP	NP	1.00	500	NM	NM
10/29/05	NM	NM	NP	NP	0.90	500	NM	NM
11/24/05	NM	NM	NP	NP	9.40	350	NM	NM
12/27/05	NM	NM	NP	NP	1.00	700	NM	NM
01/21/06	NM	NM	NP	NP	0.62	500	NM	NM
03/05/08	0	0	0.7	1700	0.87	900	0.37	400
04/08/08	0	0	0.29	3000	0.22	900	0.07	700
05/29/08	0	0	0.23	2500	0.3	900	0	500
06/20/08	0	0	0.14	2300	0	0	0	0
07/15/08	0	0	0.18	2350	0.18	800	0	0
08/01/08	0	0	0.27	2500	0.06	800	0	0
08/14/08	0	0	0.31	2500	0.07	700	0.09	700
08/28/08	0	0	0.35	2500	0.05	600	0.05	600
09/04/08	0	0	0.5	3500	0.1	700	0	0
09/08/08	0	0	0.35	2000	0.16	600	0	0
09/18/08	0	0	0.31	2400	0.05	700	0	0
09/25/08	0	0	0.31	3500	0	200	0	0
10/02/08	0	0	0.43	3500	0	0	0	0
10/07/08	0	0	0.3	3000	0	0	0	0
10/16/08	0	0	0.24	3500	0	0	0	0
10/27/08	0	0	0.131	4000	0.03	500	0	0
11/07/08	0	0	0.2	3000	0	0	0	0
11/26/08	0	0	0.23	4000	0	300	0	300
12/11/08	0	0	0.24	3000	0	200	0	0
12/31/08	0	0	0.21	2000	0	0	0	0
01/09/09	0	0	0.15	1500	0	0	0	0
01/16/09	0	0	0.21	2000	0	0	0	0
01/22/09	0	0	0	0	0	0	0	0
01/30/09	0	0	0.2	2000	0	0	0	0
02/02/09	0	0	0.16	3000	0	0	0	0
02/09/09	0	0	1.23	2000	0	0	0	0
02/19/09	0	0	0.2	2000	0	0	0	0
02/26/09	0	0	0.23	2000	0	0	0	0
02/27/09	0	0	0.24	2500	0	0	0	0
03/02/09	0	0	0.19	2500	0	0	0	0

TABLE 3-2
FREE PRODUCT MEASUREMENTS AND RECOVERY

Remedial Action Plan for Site 1586
Naval Station Mayport
Jacksonville, Florida

DATE	MW16S		MW17S		Unlabeled Well	
	THICKNESS (feet)	VOLUME RECOVERED (mL)	THICKNESS (feet)	VOLUME RECOVERED (mL)	THICKNESS (feet)	VOLUME RECOVERED (mL)
08/28/05	1.30	350	0.70	200	NM	NM
10/01/05	0.50	500	0.90	1000	NM	NM
10/29/05	0.50	500	0.60	1000	NM	NM
11/24/05	1.09	600	0.78	500	NM	NM
12/27/05	0.70	700	0.90	800	NM	NM
01/21/06	0.39	270	1.10	800	NM	NM
08/28/05	1.30	350	0.70	200	NM	NM
10/01/05	0.50	500	0.90	1000	NM	NM
10/29/05	0.50	500	0.60	1000	NM	NM
11/24/05	1.09	600	0.78	500	NM	NM
12/27/05	0.70	700	0.90	800	NM	NM
01/21/06	0.39	270	1.10	800	NM	NM
03/05/08	0.83	600	1.15	1800	NM	NM
04/08/08	0.33	1100	0.59	1700	NM	NM
05/29/08	0.3	1100	0.31	900	NM	NM
06/20/08	0.39	1000	0	500	NM	NM
07/15/08	0.25	800	0	0	NM	NM
08/01/08	0.48	1150	0	0	NM	NM
08/14/08	0.19	1000	0.29	700	NM	NM
08/28/08	0.75	1000	0	500	NM	NM
09/04/08	0.08	400	0	300	NM	NM
09/08/08	0	0	0	0	NM	NM
09/18/08	0.08	700	0	0	NM	NM
09/25/08	0.01	300	0	0	NM	NM
10/02/08	0	0	0.02	100	NM	NM
10/07/08	0	500	0	0	NM	NM
10/16/08	0.07	1000	0	0	NM	NM
10/27/08	0	500	0	0	NM	NM
11/07/08	0.3	800	0	0	NM	NM
11/26/08	0.27	1000	0	0	NM	NM
12/11/08	0.1	700	0	0	NM	NM
12/31/08	0.1	500	0	0	NM	NM
01/09/09	0	0	0	0	NM	NM
01/16/09	0	300	0	0	NM	NM
01/22/09	0	0	0	0	NM	NM
01/30/09	0	0	0	0	NM	NM
02/02/09	0	0	0	0	NM	NM
02/09/09	0	300	0	0	NM	NM
02/19/09	0	500	0	0	NM	NM
02/26/09	0	0	0	0	NM	NM
02/27/09	0	0	0	0	NM	NM
03/02/09	0	0	0	0	NM	NM

TABLE 3-2
FREE PRODUCT MEASUREMENTS AND RECOVERY

Remedial Action Plan for Site 1586
Naval Station Mayport
Jacksonville, Florida

DATE	MW01S		RW01		MW06S		MW15S	
	THICKNESS (feet)	VOLUME RECOVERED (mL)	THICKNESS (feet)	VOLUME RECOVERED (mL)	THICKNESS (feet)	VOLUME RECOVERED (mL)	THICKNESS (feet)	VOLUME RECOVERED (mL)
03/13/09	0	0	0.22	2000	0	0	0	0
03/19/09	0	0	0.49	3000	0	0	0	0
04/13/09	0	0	0.34	2700	0	0	0	0
04/16/09	0	0	0.35	3000	0	0	0	0
04/22/09	0	0	0	2000	0	0	0	0
05/01/09	0	0	0.2	2600	0	0	0	500
06/05/09	0	0	0.19	2600	0	500	0	500
06/08/09	0	0	0.4	1500	0	500	0	500
06/24/09	0	0	0	2200	0	0	0	0
07/01/09	0	0	0.33	2700	0	0	0	0
07/07/09	0	0	0.24	1500	0	500	0	0
07/17/09	NM	NM	0	1500	NM	NM	NM	NM
07/31/09	0	0	0	1500	0	0	0	0
08/05/09	0	0	0.24	2200	0	0	0	0
08/10/09	0	0	0.09	2500	0	0	0	0
8/19/009	0	0	0	2300	0	0	0	0
09/03/09	0	0	0.24	2700	0	0	0	0
09/25/09	0	0	0.27	2700	0	0	0	0
10/02/09	0	0	0.21	2200	0	0	0	0
10/07/09	NM	NM	0	1500	0	0	0	0
10/13/09	0	0	0.1	2200	0	100	0	100
10/21/09	0	0	0.07	2200	0	0	0	0
10/27/09	0	0	0.07	2200	0	0	0	0
11/18/09	0	0	0	2200	0	0	0	0
11/25/09	0	0	0.02	2200	0	200	0	0
12/04/09	0	0	0.17	2200	0	0	0	0
12/08/09	0	0	0	1500	0	0	0	0
12/14/09	0	0	0.1	2200	0	0	0	0
12/30/09	0	0	0.2	2000	0	0	0	0
1/6/2010	0	0	0	2200	0	0	0	0
1/11/2010	0	0	0.06	1800	0	0	0	0
1/22/2010	0	0	NM	2200	0	0	0	0
1/29/2010	0	0	0	2200	0	0	0	0
2/4/2010	0	0	0	1500	0	0	0	0
2/12/2010	0	0	0	1500	0	0	0	0
2/18/2010	0	0	0.02	1500	0	0	0	0
3/5/2010	0	0	0	1500	0	0	0	0
3/10/2010	0	0	0	1500	0	0	0	0
3/19/2010	0	0	0.2	3000	0	0	0	0
3/25/2010	0	0	0.02	1800	0	0	0	0
4/1/2010	0	0	0	1300	0	0	0	0
4/9/2010	0	0	0	500	0	0	0	0

TABLE 3-2
FREE PRODUCT MEASUREMENTS AND RECOVERY

Remedial Action Plan for Site 1586
Naval Station Mayport
Jacksonville, Florida

DATE	MW16S		MW17S		Unlabeled Well	
	THICKNESS (feet)	VOLUME RECOVERED (mL)	THICKNESS (feet)	VOLUME RECOVERED (mL)	THICKNESS (feet)	VOLUME RECOVERED (mL)
03/13/09	0	0	0	0	NM	NM
03/19/09	0	0	0	0	NM	NM
04/13/09	0.36	900	0	0	NM	NM
04/16/09	0.6	2000	0	0	NM	NM
04/22/09	0	0	0	0	NM	NM
05/01/09	0.1	1000	0.2	1000	NM	NM
06/05/09	0.1	1000	0.2	1000	NM	NM
06/08/09	0	1000	0	1000	NM	NM
06/24/09	0	500	0	0	NM	NM
07/01/09	0	500	0	0	NM	NM
07/07/09	0	0	0	0	NM	NM
07/17/09	NM	NM	NM	NM	NM	NM
07/31/09	0	0	0	0	NM	NM
08/05/09	0	0	0	0	NM	NM
08/10/09	0	0	0	0	NM	NM
8/19/009	0	0	0	0	NM	NM
09/03/09	0	0	0	0	NM	NM
09/25/09	0	0	0	0	NM	NM
10/02/09	0.31	500	0	0	NM	NM
10/07/09	0	500	0	0	NM	NM
10/13/09	0.2	500	0	500	NM	NM
10/21/09	0.19	500	0	0	NM	NM
10/27/09	0.13	500	0	0	NI	NI
11/18/09	0	0	0	0	NI	NI
11/25/09	0.18	800	0	200	NI	NI
12/04/09	0.24	900	0	0	NI	NI
12/08/09	0.4	900	0	0	NI	NI
12/14/09	0.28	900	0	0	NI	NI
12/30/09	0	0	0	900	NI	NI
1/6/2010	0.00	0	0	0	NM	NM
1/11/2010	0.00	500	0	0	NM	NM
1/22/2010	0.00	500	0	0	NM	NM
1/29/2010	0.00	0	0	0	NM	NM
2/4/2010	0.00	1000	0	0	NM	NM
2/12/2010	0.00	1000	0	0	NM	NM
2/18/2010	0.00	800	0	0	NM	NM
3/5/2010	0.00	1000	0	0	NM	NM
3/10/2010	0.00	600	0	0	NM	NM
3/19/2010	0.00	750	0	0	NM	NM
3/25/2010	0.00	1000	0	0	NM	500
4/1/2010	0.00	800	0	0	NM	500
4/9/2010	0.00	500	0	0	0.00	500

TABLE 3-2
FREE PRODUCT MEASUREMENTS AND RECOVERY

Remedial Action Plan for Site 1586
Naval Station Mayport
Jacksonville, Florida

DATE	MW01S		RW01		MW06S		MW15S	
	THICKNESS (feet)	VOLUME RECOVERED (mL)	THICKNESS (feet)	VOLUME RECOVERED (mL)	THICKNESS (feet)	VOLUME RECOVERED (mL)	THICKNESS (feet)	VOLUME RECOVERED (mL)
4/16/2010	0	0	0	200	0	0	0	0
4/19/2010	0	0	0	300	0	0	0	0
4/28/2010	0	0	0	1200	0	0	0	0
5/7/2010	0	0	0.3	1500	0	0	0	0
5/14/2010	0	0	0	500	0	0	0	0
7/30/2010	0	0	0.15	3000	0	0	0	0
8/13/2010	0	0	0.16	2200	0	500	0	0
8/18/2010	0	0	0.22	2200	0	0	0	0
8/27/2010	NM	0	NM	2200	NM	0	NM	0
9/1/2010	0	0	0.15	2200	0	0	0	0
9/17/2010	0	0	0.25	2200	NM	0	0	0
9/23/2010	0	0	0.12	2200	0.26	500	0	0
10/1/2010	0	0	0.05	2200	0.26	500	0	0
10/7/2010	0	0	0	2000	0	0	0	0
10/15/2010	0	0	0.09	2200	0.08	500	0	250
10/21/2010	0	0	0.12	2200	0	700	0	0
10/29/2010	0	0	0.10	2200	0.05	500	0	0
11/3/2010	0	0	0.06	2200	0	300	0	0
11/12/2010	0	0	0.05	2200	0.03	500	0	0
11/23/2010	0	0	0.03	2200	0.08	500	0	0
12/8/2010	0	0	0.07	1500	0.33	500	0	0
12/17/2010	0	0	0.10	2200	0.08	1000	0	0
12/22/2010	0	0	0.09	1500	0.03	500	0	0
12/27/2010	0	0	0.09	2200	0	0	0.0	0
1/27/2011	0	0	0.06	2200	0	250	0	0
2/4/2011	0	0	0	0	0	0	0	0
2/11/2011	0	0	0	0	0	0	0	0
2/17/2011	0	0	0	0	0	0	0.07	500
2/25/2011	0	0	0	0	0.14	500	0	0
3/3/2011	0	0	0	0	0	0	0	0
3/10/2011	0	0	0	0	0.18	500	0	200
3/14/2011	0	0	0	0	0.13	500	0	0
3/24/2011	0	0	0	0	0.11	500	0	0
4/1/2011	0	0	0	0	0.02	400	0	0
4/8/2011	0	0	0	0	0	100	0	0
4/12/2011	0	0	0	0	0	0	0	0
4/22/2011	0	0	0	0	0	0	0	0
4/29/2011	0	0	0	0	0	0	0	0
5/6/2011	0	0	0.05	1500	0.2	500	0	0
5/12/2011	0	0	0	1000	0.03	500	0	0
5/19/2011	0	0	0.06	1000	0.26	500	0	0
5/27/2011	0	0	0.08	1000	0.05	300	0	0

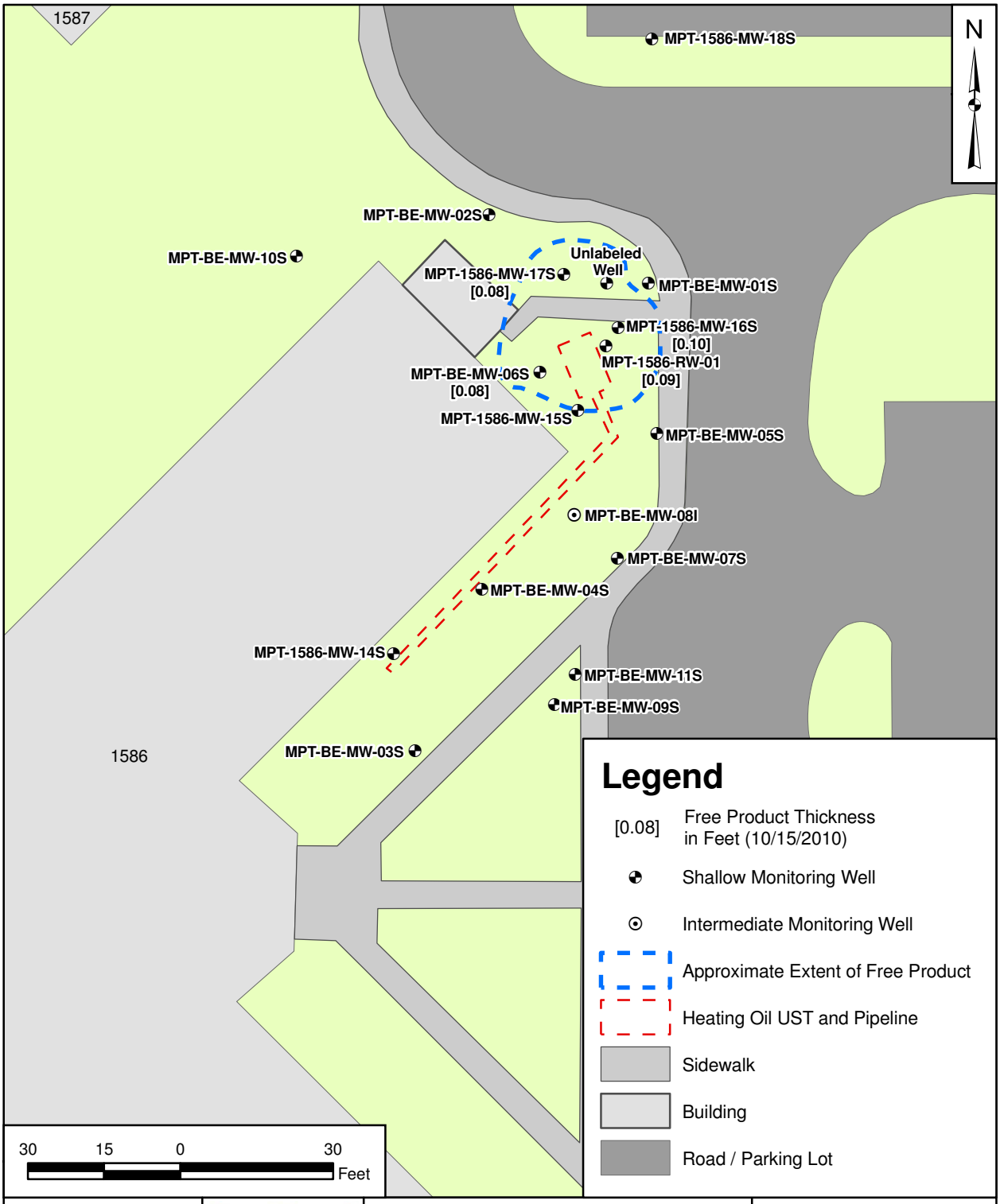
TABLE 3-2
FREE PRODUCT MEASUREMENTS AND RECOVERY

Remedial Action Plan for Site 1586
Naval Station Mayport
Jacksonville, Florida

DATE	MW16S		MW17S		Unlabeled Well	
	THICKNESS (feet)	VOLUME RECOVERED (mL)	THICKNESS (feet)	VOLUME RECOVERED (mL)	THICKNESS (feet)	VOLUME RECOVERED (mL)
4/16/2010	0.00	200	0	0	0.00	500
4/19/2010	0.00	0	0	0	0.78	500
4/28/2010	0.00	0	0	0	0.00	1000
5/7/2010	0.00	500	0	0	0.00	1000
5/14/2010	0.00	0	0	0	0.00	1000
7/30/2010	0.09	500	0	200	0.00	300
8/13/2010	0.03	500	0	0	1.50	0
8/18/2010	0.00	0	0	0	0.00	0
8/27/2010	NM	0	NM	0	dry	0
9/1/2010	0.00	0	0	0	dry	0
9/17/2010	0.00	0	0	0	dry	0
9/23/2010	0.03	500	0	0	NM	0
10/1/2010	0.00	0	0	0	NM	0
10/7/2010	0.00	0	0	0	0.00	0
10/15/2010	0.10	500	0	500	NM	0
10/21/2010	0.04	500	0	500	NM	0
10/29/2010	0.00	0	0	0	NM	0
11/3/2010	0.00	300	0	0	NM	0
11/12/2010	0.04	500	0	0	NM	0
11/23/2010	0.00	500	0	0	NM	0
12/8/2010	0.00	0	0	0	NM	0
12/17/2010	0.00	0	0	0	NM	0
12/22/2010	0.00	0	0	0	NM	0
12/27/2010	0.0	0	0	0	NM	0
1/27/2011	0	500	0	0	0	0
2/4/2011	0	0	0	0	0	0
2/11/2011	0	0	0	0	0	0
2/17/2011	0	0	0	0	0	0
2/25/2011	0	0	0	0	0	0
3/3/2011	0	0	0	0	0	0
3/10/2011	0.25	500	0	0	0	0
3/14/2011	0.16	500	0	0	0	0
3/24/2011	0	200	0	0	0	0
4/1/2011	0	0	0	0	0	0
4/8/2011	0	0	0	0	0	0
4/12/2011	0	0	0	0	0	0
4/22/2011	0	0	0	0	0	0
4/29/2011	0	0	0	0	0	0
5/6/2011	0.2	500	0	0	0	0
5/12/2011	0.2	500	0	0	0	0
5/19/2011	0.15	500	0	0	0	0
5/27/2011	0.25	500	0	0	0	0

Notes:
NM = not measured
NP = not present
NI = not indicated

PIT P:\GIS\MAYPORT_NS\MAPDOCS\MXD\SITE1586_GW_FREEPRODUCT.MXD 05/18/11 SS



DRAWN BY T. WHEATON	DATE 11/09/10	ESTIMATED EXTENT OF FREE PRODUCT RAP SITE 1586 NAVAL STATION MAYPORT JACKSONVILLE, FLORIDA	CONTRACT NUMBER CTO
CHECKED BY D. SIEFKEN	DATE 05/18/11		OWNER NUMBER —
REVISED BY —	DATE —		APPROVED BY — DATE —
SCALE AS NOTED			FIGURE NO. FIGURE 3-1 REV 0

4.0 CONTAMINANT DISTRIBUTION

4.1 ESTIMATED MASS OF FREE PRODUCT IN SUBSURFACE SOIL

To estimate the mass of free product remaining in the subsurface soil at Site 1586, a conservative thickness of free product measured from the six active wells was used. Beginning in March 2010 (the date when the unlabeled well was discovered), the maximum thickness measured from each active well was taken and averaged. The result gives a conservative free product thickness of 0.43 foot over the entire area containing free product.

To determine a more representative estimate of the actual thickness of free product versus the measured well bore thickness above, the equation by Ballestero, et al., was used (Ballestero et al, 1994). Using this equation and an estimated impacted area of 705 square feet gives an actual free product thickness of 0.17 inch on top of the water table across the area containing free product. Using this actual thickness calculation, the estimated impacted area gives an estimated 23 gallons (87 liters) of free product remaining on the surface of the water table at Site 1586. Free product calculation tables are presented in Appendix C, and Figure 3-1 presents the estimated area of free product.

4.2 ESTIMATED MASS OF CONTAMINANTS IN SOIL

During the August 2002 soil assessment, OVA-FID readings at the site determined two areas of petroleum contamination in the subsurface soil interval from approximately 2 to 5 feet bls. The average TRPH concentration from the fixed-base laboratory analyses of the soil samples was used for the two areas indicating soil impacts. The impacted area near the UST was increased to include the approximate area of free product. This assumption gives a conservative estimate of the mass of TRPH contaminants in the subsurface soil.

Using the average TRPH concentration, the larger area (815 square feet) near the UST is impacted by 11,250 milligrams per kilogram (mg/kg) of TRPH, and the average for the smaller area (100 square feet) (MPT-1586-SB11) is impacted by 4,300 mg/kg of TRPH, which results in an estimated mass of 1,737 pounds (approximately 236 gallons or 893 liters). The estimated area of petroleum contaminants in the soil is depicted on Figure 2-1. Soil contaminant mass calculation tables are presented in Appendix C. Natural attenuation processes have likely reduced the soil concentrations detected in the MPT-1586-SB11 area to below Natural Attenuation Default Concentration levels. Future confirmatory samples will determine if natural attenuation processes have reduced the soil concentrations.

4.3 ESTIMATED MASS OF CONTAMINANTS IN GROUNDWATER

The estimated aerial extent of groundwater contamination will be used together with the solubility of fuel oil in water to estimate the mass of contaminants in the groundwater. Since the depth to water is approximately 5 feet bls and the vertical extent of contamination does not exceed 20 feet bls, the depth of impacted groundwater will be taken at the interval of 5 to 20 feet (15 feet in aquifer thickness).

Using a porosity of 0.3 and an area of approximately 1,200 square feet, the mass of petroleum contaminants in groundwater is estimated to be 1 pound. The significant difference between the soil and groundwater contaminant mass is mainly due to the very low solubility of fuel oil in water of 3 milligrams per liter (mg/L). By comparison, the solubility of benzene in water is 1,800 mg/L. Groundwater contaminant mass calculation tables are presented in Appendix C.

5.0 REMEDIAL ACTION PLAN REQUIREMENTS AND GOALS

The objective of this RAP is to present feasible and efficient remedial methods and technologies that can bring Site 1586 into compliance with FDEP regulations concerning petroleum site remediation. Requirements to meet this objective include the following:

- Protect and preserve human health, the environment, and property by conducting operations in a safe manner.

- Remove free product to a measureable thickness of less than 0.01 inch in groundwater monitoring wells.

- Reduce the migration of petroleum-related contamination at the site by removing free product and treating impacted soils and groundwater at the site.

- Ensure compliance with FDEP regulations, adhere to site restrictions, and maintain site operability.

The goals and expected accomplishments of the RAP include the following:

- Identify the most effective methods and technologies to recover free product and reduce petroleum impacts to soil and groundwater.

- Evaluate the applicable methods and technologies for each media and select remedial alternatives that will result in maximum recovery of free product and reduction of COCs in a cost-effective and timely manner.

- Provide a conceptual design for the selected technology for implementation at the site.

The reduction of free product is the focus of this RAP. Reducing the volume of free product in the subsurface is paramount in facilitating the chemical and biological processes of petroleum degradation. The FDEP RAP checklist is provided in Appendix D.

5.1 TARGET BENCHMARKS FOR FREE PRODUCT REMOVAL SUCCESS

To establish free product target benchmarks, it was decided that free product thickness measurements collected near the center of the plume would provide the most resolute data in quantifying free product thickness over time. Such access is facilitated by recovery well MPT-1586-RW-01. Free product is

historically greater in thickness at recovery well MPT-1586-RW-01 and is present more often in comparison to the other site monitoring wells. Therefore, free product monitoring data from this recovery well should provide insight into the amount of free product present at the site.

Free product thickness measurements from recovery well MPT-1586-RW-01 did not begin until March 2008. Beginning in March 2008, continuous measurements were recorded at a minimum of once a month and have been collected up to present day. Free product monitoring and measurements have continued for three years. Each year of free product measurement and recovery efforts were documented beginning in March and ending in February. For reporting purposes, yearly monitoring periods from March to February are described by the year the monitoring began such as 2008, 2009, and 2010.

A discussion of the estimated time that current strategies are anticipated to remove free product to acceptable levels is provided in Section 7.3. The benchmark for free product removal success will be a measured thickness of 0.0 to 0.01 foot of free product and will be measured from the center of the plume at recovery well MPT-1586-RW-01.

5.2 SITE RESTRICTIONS AFFECTING REMEDIAL ALTERNATIVES

Building 1586 is constructed with brick and cement block and is used as the Bachelor's Enlisted Quarters. This building is currently occupied, and interruption of the residence is not acceptable. The ground surface surrounding the building is covered with grass and concrete.

The area under investigation consists of the northeastern area just outside the building where an active UST containing fuel oil is located. The UST is located under a cement slab and has a flush mount manhole covering the fill port. The UST and associated piping must be left in service, and road access adjacent to the building must not be impeded during remedial activities.

Underground utilities traverse the site near the UST, and gravel has been used as backfill surrounding the UST and associated piping. This backfilled area extends from the area of the UST approximately 40 feet along the southeastern wall of the building, and the area of gravel extends out from the southeastern wall of the building approximately 20 feet to the sidewalk. The gravel area outlines the UST area and extends along the southern side of the building. The water table at the site is shallow (approximately 5.5 feet to 6 feet bls), thus, limiting the effectiveness of available remedial alternatives.

6.0 REMEDIAL ALTERNATIVE TECHNOLOGY SCREENING

Tetra Tech conducted a screening of applicable technologies to determine an appropriate remedial alternative for the removal of free product and remediation of soil and groundwater impacts at Site 1586. Potential remedial technologies and process options for free product recovery were identified and evaluated based on their ability to meet the criteria in Section 5.0 of this report. These criteria included protection of human health and the environment; reduction of subsurface free product; meeting cleanup objectives (effectiveness); limiting the spread of contamination; applicability based on site conditions and limitations; and feasibility of implementation, reliability, anticipated duration, and cost.

Site 1586 has undergone free product recovery using several methods since the release in April 2000. One study to optimize free product recovery efforts, discussed in this section, was performed in 2009. The results of this study were used to support the remedial recommendation for free product removal at the site.

6.1 EVALUATION OF FREE PRODUCT RECOVERY ALTERNATIVES

After the April 2000 release of free product, recovery of free product was conducted at the site using recovery wells, vacuum trucks, hand bailing, and a peristaltic pump and tubing. Prior to Tetra Tech's involvement, free product recovery utilizing absorbent socks inside wells was used at Site 1586 on an intermittent basis. Tetra Tech has consistently recovered free product utilizing absorbent socks since March 2008 as detailed in Section 3.0 of this report. Currently, the extent of free product is limited to the area of the UST. The use of absorbent socks by Tetra Tech to recover free product is based on the proven effectiveness of the socks versus the other methods.

In November 2009, CH2M HILL completed a Product Recovery Pilot Test Report to determine a feasible technology to recover free product at Site 1586 (CH2M HILL, 2009). The pilot test compared active and passive technologies for recovery of free product from the existing wells at the site. The active technology included using an automatic free product skimmer, and the passive technology included using a peristaltic pump with down well tubing. Results for the automatic skimmer were unsuccessful using the 2-inch monitoring wells. Installation of a 4-inch recovery well (MPT-1586-RW-01) and use of the automatic skimmer resulted in marginal recovery of free product. Use of the peristaltic pump and down-well tubing resulted in an inefficient and ineffective method of free product recovery. The Product Recovery Pilot Test Report recommended using a more passive technology, such as absorbent socks, to remove free product effectively from the site monitoring wells and the recovery well.

Tetra Tech has evaluated three applicable methods for the treatment of the soil contamination detailed in Section 4 of this report. The following actions have been identified for remediation of soil and evaluated based on the criteria listed in Section 5. A brief background of the each method and technology is given below along with an evaluation against the criteria listed in Section 5.0.

- Natural Attenuation
- Soil Vapor Extraction (SVE) with Air Sparging
- BIOX® Technology and Petroleum Sorbent Socks

6.1.1 Natural Attenuation

Natural attenuation (also known as passive bioremediation, intrinsic bioremediation, or intrinsic remediation) is a passive remedial approach that depends upon natural processes occurring at the site to reduce the impact of petroleum hydrocarbon releases. Remediation is performed by reducing constituent concentrations to less harmful levels using the process of in-situ bioremediation. The natural attenuation process to reduce petroleum related concentrations is aerobic biodegradation; however, this process is generally ineffective for high concentrations of petroleum compounds typically present at sites with free product because the free product is toxic to bacteria. Based on these limitations and the inability to meet cleanup goals, natural attenuation is not a recommended remedial alternative for Site 1586.

6.1.2 Soil Vapor Extraction with Air Sparging

SVE involves utilizing monitoring wells screened in the vadose zone to apply a vacuum across the soil matrix to extract hydrocarbon vapors and enhance volatilization of adsorbed hydrocarbons. A typical SVE system consists of vapor extraction wells, associated underground piping network, a blower, electrical connections, and one or more trailers staged at the site to house equipment. During SVE operations, a vacuum is applied to vapor extraction wells situated within the vadose zone. In addition, air sparge injection points typically installed 5 feet below the water table are strategically placed to inject air at low pressure to enhance the circulation of air in the subsurface water and soils. As air is forced through the soil pores, soil gas containing VOCs is typically displaced, drawn to the extraction wells, and subsequently aboveground via a blower and associated piping for treatment. Extracted vapors are typically treated with a vapor treatment unit (e.g., activated carbon) prior to discharge to the atmosphere.

As the process continues, adsorbed- and dissolved-phase hydrocarbons remaining in the vadose zone are gradually stripped from the soil matrix. In addition, volatilization of contaminants on the surface of the water table is enhanced. The SVE system promotes oxygen recharge, which also stimulates existing biological activity in the soil and enhanced aerobic biodegradation. SVE is not typically used at sites with groundwater tables at less than 3 feet bls since groundwater upwelling can occur within wells under

vacuum pressures, potentially occluding screens and reducing or eliminating vacuum-induced soil vapor flow. SVE is most effective on volatile compounds and would be expected to be marginal or ineffective on the heavier class of fuel oil that has affected Site 1586.

In addition, SVE implementation would disrupt the site access for at least one week and, due to the presence of multiple underground utilities, the risk of utility disruption is significant. SVE implementation requires an operator to monitor and adjust process equipment on a daily, weekly, and monthly basis. There is limited area for the placement of the SVE equipment and trailer and connection to electrical services would prove difficult. Based on these limitations and the unlikely probability of effectively removing the free product, SVE is not a recommended alternative for Site 1586.

6.1.3 BIOX® Technology and Petroleum Sorbent Socks

BIOX® technology is a process that utilizes both chemical and biological treatment methods to reduce petroleum contaminant concentrations in the vadose and saturated zones to acceptable cleanup levels. The technology has also proven effective in the remediation of petroleum free product in subsurface soils. The patented BIOX® formulation includes but is not limited to combinations of solid peroxides, pH buffer systems and nutrients (United States Patent Number 6,268,205). The BIOX® formulation will be made to order for this site and is primarily based on contaminant concentration, soil type, geochemical parameters, and contaminant distribution. The pH of BIOX® typically ranges from 7 to 8.5.

The chemical oxidation phase of BIOX® technology is based on the widely known Fenton-type reactions, which are catalyzed reactions that produce hydroxyl radicals. These radicals are highly reactive and aggressively attack petroleum based compounds and breakdown the petroleum constituents eventually into carbon dioxide and water. In addition, partially oxidized BIOX® components are more soluble and act to release hydrophobic organic compounds, such as benzene, from soil particles. The BIOX® formulation also promotes enhanced aerobic biodegradation of petroleum based compounds using bacteria and supporting nutrients. And as is typical with Fenton type of reactions, the BIOX® formulation will not produce excessive heat or gas that may cause a safety issue. Application of the BIOX® technology has shown to be effective at similar sites at NAVSTA Mayport (Site 351 and Site 425) and is an effective technology to remediate the free product and soil and groundwater impacts at UST Site 1586.

Petroleum sorbent socks are a passive, easy to install, and an effective means to recover free product. The Product Recovery Pilot Test Report completed by CH2M HILL in 2009 determined sorbent socks were a feasible technology to recover free product at Site 1586 (CH2M HILL, 2009). The pilot test compared active and passive technologies for recovery of free product from the existing wells at the site. Petroleum sorbent socks remove free product at any thickness and are not dependent upon a select

thickness before removal is initiated, which is a common drawback with automated skimming devices. In addition, the installation of petroleum sorbent socks in multiple wells provides the ability to remove free product at different rates from different wells. If additional free product is present, additional petroleum sorbent socks may be added to account for the additional free product. The number of socks installed per well and frequency of servicing the socks are site dependent and will vary as free product is removed.

The continued use of petroleum sorbent socks is recommended during the implementation of BIOX® technology to recover free product at UST Site 1586. BIOX® technology used with petroleum sorbent socks is expected to meet each of the screening criteria with relatively minimal disruption of site conditions or utility interference.

6.2 COST FOR RECOMMENDED REMEDIAL TECHNOLOGIES

The estimated cost for Tetra Tech to maintain the sorbent socks for one calendar year is approximately $9,500. This cost includes the weekly recording of free product thicknesses, monitoring of the socks, and the disposal of socks at a Resource Conservation and Recovery Act Part B Hazardous Waste Storage Facility. The cost is broken down into general tasks such as labor, socks, fuel, etc., for a total of $11,746 per year. The cost quoted by the vendor, BioManagement Services, Inc. (BMS), for the application of BIOX® technology is $49,392. This cost does not include Tetra Tech personnel management and oversight. A detailed cost breakdown is provided as Appendix E, and the quote by BMS is provided in Appendix F.

7.0 REMEDIAL TECHNOLOGY DESIGN

The recommended remedial alternative presented in this RAP is the petroleum sorbent sock technology. As mentioned in Section 6.1.3, the continued use of the socks to recover free product is recommended. The following provides details on the New Pig Monitoring Well Skimming Sock in-situ treatment technology.

7.1 PETROLEUM SORBENT SOCK DESIGN DETAILS

The New Pig Monitoring Well Skimming Socks currently being employed at Site 1586 include Model Numbers SKM401 (for the 2-inch monitoring wells) and SKM404 (for the 4-inch recovery well). These models are designed to recover from 500 to 2,200 milliliters, respectively, of petroleum-based free product when fully saturated. The socks are attached to the top of the well cap using twine with enough slack to allow the sock to sit on top of the water table. This allows the sock to absorb petroleum liquid that migrates into the well casing. The socks are designed to absorb petroleum-based liquids up to their absorption limit. If a sock is saturated, the capacity of the sock (in milliliters) is used to estimate the volume of free product recovered. Occasionally, a sock is only partially saturated, and the field technician estimates the volume of free product absorbed into the sock. Socks as determined by Tetra Tech field personnel requiring removal are stored in 55-gallon Department of Transportation-approved drums. The drums are temporarily staged at a NAVSTA Mayport investigation-derived waste storage area. Since March 2008, the socks have been inspected weekly for the presence of free product. Specification sheets from the vendor for these sorbent socks are provided in Appendix G.

7.2 BIOX® DESIGN DETAILS

Based on site information provided by Tetra Tech, the conceptual design of the proposed BIOX® remedial application was developed by the vendor, BMS. The BIOX® formulation is a patented technology, and field implementation details are proprietary information of the vendor. Since BIOX® technology has been successfully applied at similar sites (Site 351 and Site 425) at NAVSTA Mayport, a field pilot study is deemed unnecessary to determine applicability at UST Site 1586.

For design purposes, BMS assumed a uniform geology of fine- to medium-grained sands with depth to groundwater at approximately 5 to 6 feet below bls. The areal extent of the treatment area is estimated at 1,256 square feet with a vertical treatment interval from 1 to 20 feet bls. BMS selected an injection point spacing of 4 feet resulting in a total of 79 injection points. The BIOX® formulation is proposed to be injected in 1- to 4-foot lifts. A direct-push technology (DPT) rig is typically used to place injection wells into the subsurface; however, if necessary and if site conditions allow, injection wells could be advanced

by hand. A total of 4,419 gallons of BIOX® formulation has been calculated to be sufficient, which corresponds to approximately 55 gallons of solution injected at each treatment point. BMS is planning to utilize DPT equipment to deliver the formulation at each injection point, and the field implementation is expected to last 6 days. The areal treatment for BIOX® technology per the remedial design is presented on Figure 7-1. Note that the actual area of treatment will exceed the area in Figure 7-1 since the BIOX® solution will also move slightly up and side gradient due to the injection process, and the solution will move down gradient with normal groundwater flow. The design proposal and specification sheet from BMS is provided in Appendix F.

7.3 EXPECTED REMEDIATION TIMEFRAME

It was estimated by the BIOX® technology vendor BMS that, depending on the mass of free product encountered during the implementation phase, it may take a relatively short time period (a matter of weeks) to successfully remediate the free product at the site. In the next section, Tetra Tech proposes to monitor the progress of the BIOX® treatment on a weekly basis for the first month and then on a monthly and quarterly basis as necessary. Tetra Tech anticipates the effectiveness of the treatment will occur within a timeframe of weeks and will be shown by measurements for free product and analyses of groundwater analytical results.

7.4 EXPECTED REMEDIATION TIMEFRAME

The remediation timeframe for the removal of free product using BIOX® technology and petroleum sorbent socks depends on a number of factors. These factors include the successful application of the correct quantity of BIOX® solution in areas containing free product and the continued collection of free product by the sorbent socks. In determining the expected remediation timeframe, the following assumptions are made:

1. As free product is treated using BIOX® and socks, residual free product at the site is expected to continue to replace the removed free product and, therefore, the size of the free product area will decrease.

2. The influx of surface runoff water percolating through the vadose zone may disrupt the treatment and collection of free product by raising the water table and dispersing free product from the treatment and collection points.

The estimated timeframe for the remediation of free product (defined as achieving an average thickness equal to or less than 0.01 foot) using sorbent socks along with BIOX® technology is estimated to take a

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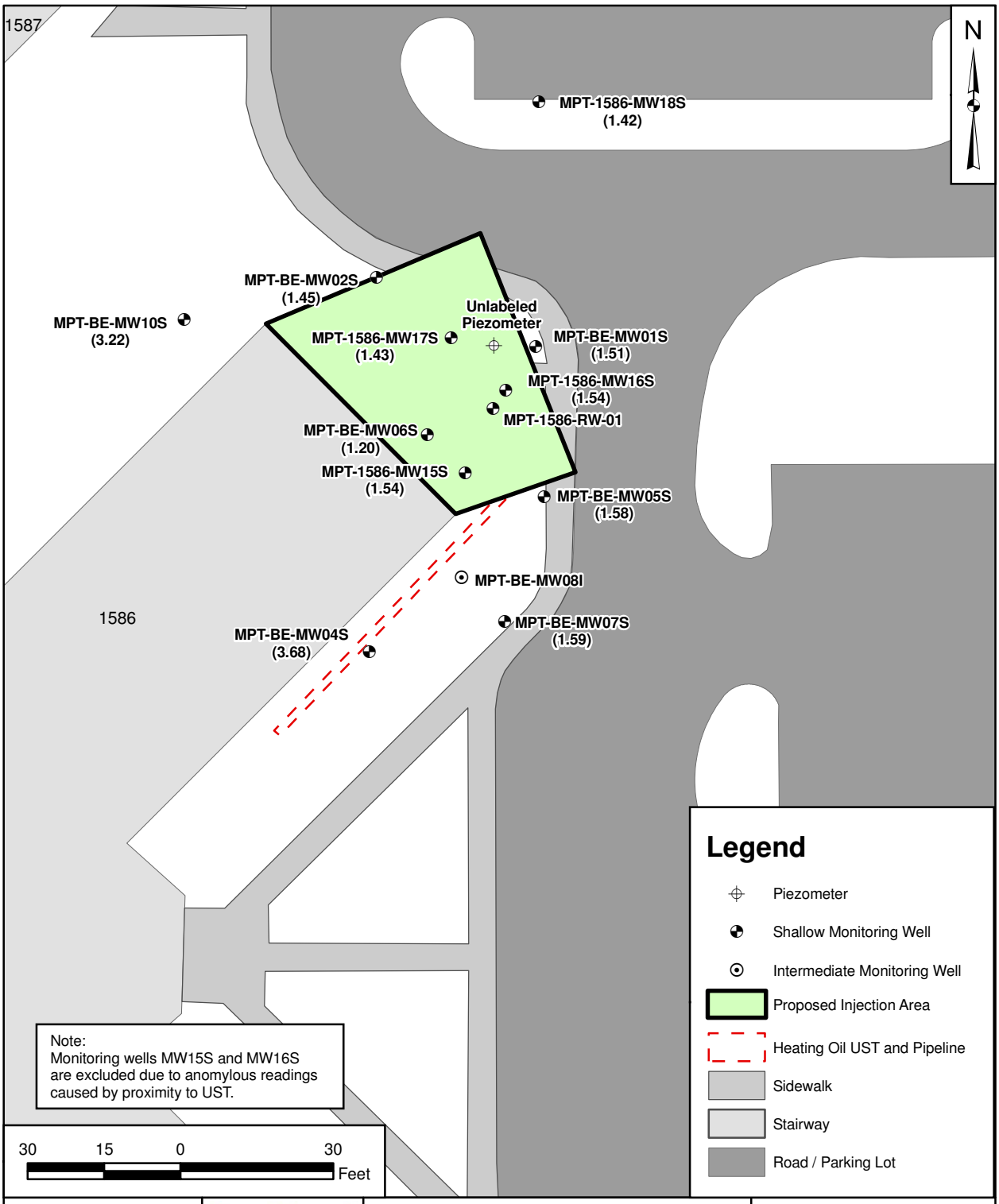


DRAWN BY S. STROZ	DATE 10/21/11	PROPOSED INJECTION AREA SITE 1586 NAVAL STATION MAYPORT JACKSONVILLE, FLORIDA	CONTRACT NUMBER CTO JM33
CHECKED BY D. SIEFKEN	DATE 10/21/11		OWNER NUMBER —
REVISED BY —	DATE —		APPROVED BY — DATE —
SCALE AS NOTED			FIGURE NO. FIGURE 7-1 REV 0

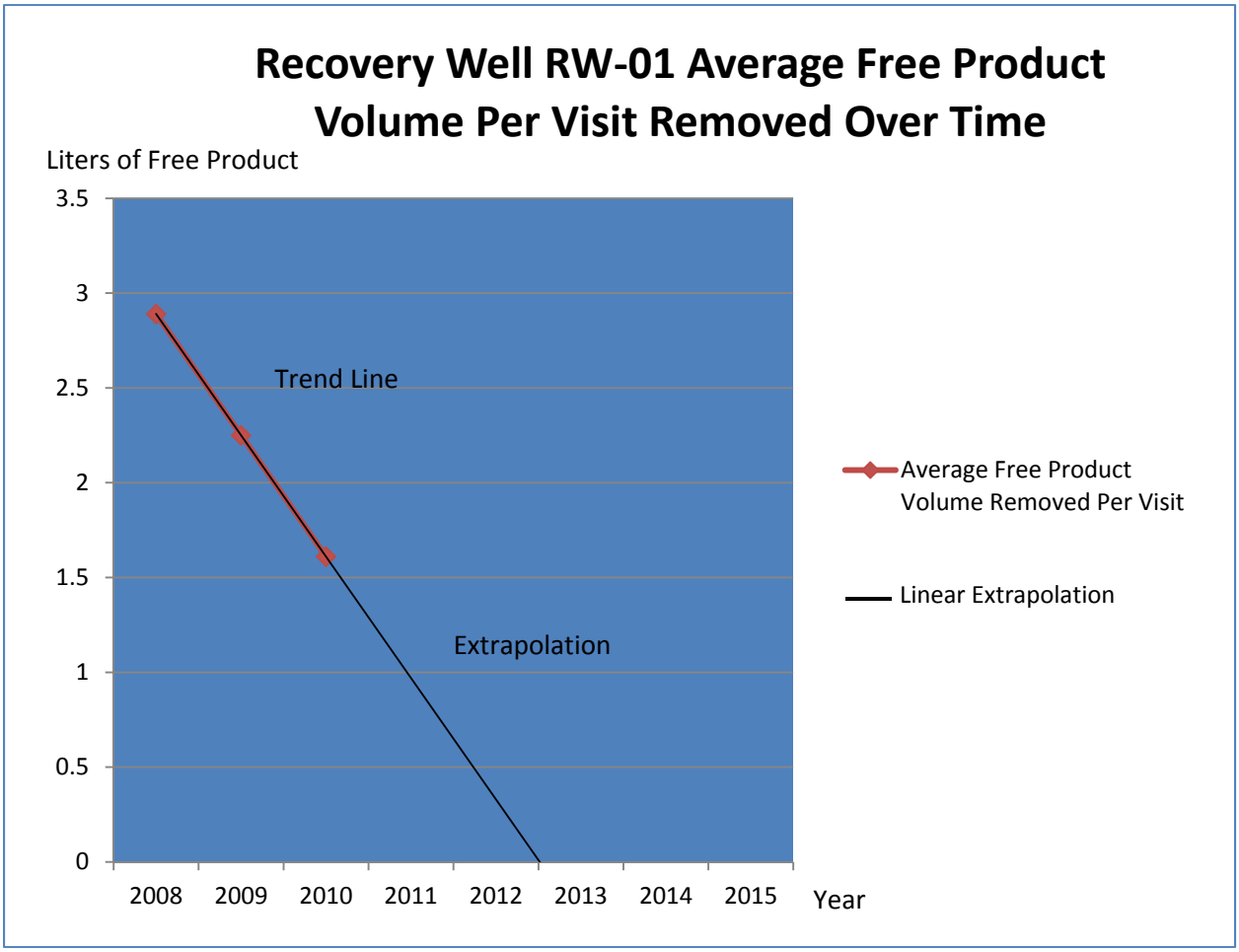
minimum of 3 years of free product removal and monitoring. This removal timeframe is based on an extrapolation of the historic trend of the average volume of free product removed over time.

To calculate the site visit volume average, the volume of free product removed from recovery well MPT-1565-RW-01 during each visit was averaged for a period of one year. The calculations were based on MPT-1586-RW-01 because this recovery well has been the most consistent in containing free product and is the most centrally-located well within the plume area. Data for each year's calculations of free product removal began in March and ended in February the following year, with the first of three years of measurements beginning March 2008. Based on the yearly average derived for data presented in Table 3-1, recovery rates per site visit have consistently decreased for the past 3 years. The first year of monitoring and removal averaged 2.54 liters of free product removed per site visit, and the two subsequent years of monitoring and removal averaged 2.1 liters and 1.61 liters per visit, significantly decreasing each year. Table 3-2 displays the gauging and volume recovery data from March 2008 through May 2011. The overall trend of free product recovery is continually decreasing and is depicted in Figure 7-2. Based on the extrapolation of this current trend of nearly constant free product presence, the free product will be removed in 2013. If free product moves away from the recovery wells within the tank pit area, the timeline for free product removal is anticipated to increase.

Employing BIOX® technology in addition to the use of sorbent socks will significantly reduce the estimated remediation timeframe. It was estimated by the BIOX® technology vendor BMS that depending the mass of free product encountered during the implementation phase that it may take a only a matter of weeks to successfully remediate the free product at the site. BIOX® technology biological processes will continue to actively breakdown residual petroleum constituents for several months after the initial application. The next section will provide implementation details for the successful application of BIOX® technology at UST Site 1586.

FIGURE 7-2
AVERAGE FREE PRODUCT VOLUME RECOVERED

Remedial Action Plan for Site 1586
Naval Station Mayport
Jacksonville, Florida



8.0 O&M AND MONITORING REMEDIATION PROGRESS

The following sections establish procedures for the implementation of the petroleum sorbent socks and any maintenance activities required. In addition, monitoring of the progress, effectiveness, and site status reporting is detailed.

8.1 SORBENT SOCK IMPLEMENTATION

Implementation of petroleum absorbent socks was initiated in 2008 and is currently ongoing. More details on the use of petroleum socks at Site 1586 are provided in Sections 3, 6, and 7.

8.2 BIOX® TECHNOLOGY IMPLEMENTATION

Following acceptance by the Navy and FDEP of the use BIOX® injection technology, the injection process will be scheduled for implementation. Tetra Tech recommends collecting groundwater samples as a baseline to evaluate the effectiveness of the treatment progress. The initial round of measurements and groundwater analytical results will establish the baseline contaminant profiles and comparable monitoring parameters. The BIOX® injection shall commence no later than one month following the baseline round of sampling. Tetra Tech proposes background samples be collected from monitoring wells MPT-BE-MW01S, MPT-BE-MW02S, MPT-BE-MW04S, MPT-BE-MW05S, MPT-BE-MW08I, and MPT-158618S, and from monitoring wells MPT-1586-MW06S, MPT-1586-MW15S, and MPT-1586-MW17S provided free product is not present.

8.3 DESIGNATION OF OBSERVATION WELLS FOR REMEDIATION PROGRESS

Based on the estimated extent of free product and monitoring wells indicating historic presence of free product, Tetra Tech proposes monitoring wells MPT-BE-MW01S, MPT-BE-MW06S, MPT-1586-RW-01, MPT-1586-MW15S, MPT-1586-MW16S, MPT-1586-MW17S, and the unlabeled monitoring well be gauged for free product thickness and designated for free product recovery using petroleum sorbent socks. After the initial well placement, the socks should be inspected and replaced as necessary and free product gauging should be conducted at a minimum of monthly and a maximum of weekly. If measurable free product is continually present on the groundwater surface that requires the exchanging of used socks with a new sock, then more frequent visits are recommended.

8.4 MONITORING OF REMEDIATION PROGRESS

Based on the estimated extent of free product and wells indicating historic presence of free product Tetra Tech proposes wells MPT-BE-MW01S, MPT-BE-MW04S, MPT-BE-MW05S, MPT-BE-MW06S,

MPT-1586-RW-01, MPT-1586-MW15S MPT-1586-MW16S MPT-1586-MW17S, and the unlabeled well be gauged for free product thickness weekly for one month following the injection to monitor the effectiveness of the BIOX® treatment. If free product still exists in any of these wells after one month, Tetra Tech proposes a reevaluation of site conditions to determine if another application of BIOX® solution is warranted. If the BIOX® treatment is proving effective, Tetra Tech proposes the wells continued to be gauged weekly for the presence of free product.

Provided that application of BIOX® has remediated the free product levels to less than 0.01 inch, Tetra Tech proposes monitoring of groundwater to gauge treatment effectiveness. Tetra Tech anticipates the levels of free product to decrease to less than 0.01 inch after one month of treatment. Based on the estimated extent of groundwater contamination impacts and the hydraulic gradient, monitoring wells MPT-BE-MW01S, MPT-BE-MW05S, MPT-BE-MW06S, MPT-1586-RW-01, MPT-1586-MW15S MPT-1586-MW16S MPT-1586-MW17S, and the unlabeled well are proposed to be gauged and sampled quarterly to monitor the effectiveness of the BIOX® injection. Samples shall be analyzed in the laboratory for VOCs, PAHs, and TRPH. In addition, sulfate, total dissolved solids, sodium, iron, ammonia, and nitrate will be monitored to measure the biological activity. Field parameters (pH, conductivity, temperature, dissolved oxygen, and oxidation-reduction potential) will also be collected for each monitoring well during field sampling events.

8.5 BIOX® TECHNOLOGY AND SORBENT SOCK O&M

The proposed BIOX® remediation technology is designed to perform in-situ for several months after application without maintenance or additional operation. The deployment of petroleum sorbent socks in wells containing free product requires a long-term commitment to maintaining the socks. Optimum free product well inspection frequency and maintenance is the core of this approach. Weekly inspection of wells containing free product will be conducted initially until the uptake of free product by the socks declines. The frequency of the inspections should equal the frequency the socks reach their sorption capacity. Inspection of the wells will include the following:

- An inspection of well pad integrity including any compromise in the concrete pad and steel manhole cover.

- An inspection of each sorbent sock to determine if a replacement is needed. If required, the volume of free product removed by the sock, and observations about color and percent of petroleum-to-water mix contained in each sock is to be documented.

- The saturated sock will be transported in a sealed container to the temporary drum storage area for placement into a drum containing solids.

- Free product thicknesses will be measured, when present, using an electronic water and free product sounding probe.

- All data and observations are recorded in a field logbook.

REFERENCES

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Ballestero, T. P., F. R. Feidler, and N. E. Kinner, 1994. An Investigation of the relationship between actual and apparent gasoline thickness in a uniform sand aquifer, Groundwater, 32(5), 708.

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APPENDIX A

HISTORIC INFORMATION

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Kirby B. Green, III
Secretary

December 4, 1998

Ms. Beverly Washington
Department of the Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive, PO Box 190010
North Charleston, SC 29419-9010

file: 3cars_1.doc

RE: Response to FDEP Comments on Sites 460, 1587 and 1586, NAVSTA Mayport

Dear Ms. Washington,

I have reviewed above letter response dated November 13, 1998 (received November 17, 1998). In addition, I have met with Mr. Frank Lesesne of Harding Lawson and Associates (HLA) concerning the report. In the report, HLA has stated agreement with my prior comments on Building 460 and BEQ Building 1587; therefore a Remedial Action Plan should be prepared for each site, as I have stated previously. HLA did not concur with my previous comments concerning BEQ Building 1586; it was pointed out that the area where soil is contaminated is the area where soil had been previously removed and that it was felt that the soil contamination is caused by contaminated ground water movement with the natural fluctuations of the water table. Frank and I met with Mr. Tim Bahr, my Supervisor, and we agreed that the most prudent course of action was to pursue the "Monitoring for Natural Attenuation" option under Chapter 62-770.690, F.A.C. This was the course of action that was also recommended by HLA in the current letter response; therefore of a Site Assessment Report Addendum should be submitted for BEQ Building 1586 with justification and recommendation for "Monitoring for Natural Attenuation" status.

Thank you for the opportunity to review this document. If you need further clarification or other assistance, please contact me at (850) 921-4230.

Sincerely,

James H. Cason, P.G.
Remedial Project Manager

cc: Randy Bishop, NAVSTA Mayport
Jim Williams, HLA, Tallahassee

TJB JJC ESN

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(904) 281-0400 ▪ FAX (904) 281-0070 ▪ www.tetratech.com

TtNUS-JAX-FY01-0006

November 8, 2000

Project Number 0397

James H. Cason, P.G.
Remedial Project Manager
Technical Review/Federal Facilities
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Reference: **Clean Contract No. N62467-94-D0888**
Contract Task Order No. 0109

Subject: **Annual Groundwater Monitoring Report**
BEQ Building 1586, Naval Station Mayport
Mayport, Florida

Tetra Tech NUS, Inc. (TtNUS) is pleased to submit the Annual Groundwater Monitoring Report for the referenced Contract Task Order (CTO). This report has been prepared for the U. S. Navy Southern Division Naval Facilities Engineering Command under CTO-0109, for the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract Number N62467-94-D-0888. This report provides the results of the 4th quarter monitoring activities combined with a review of the prior three quarters for the purpose of evaluating the site and determining recommended future actions.

MONITORING OBJECTIVES

The objective of the quarterly groundwater monitoring program at Building 1586 is to monitor the natural attenuation of a groundwater contaminant plume until cleanup levels are achieved. Groundwater contamination resulted from a 1991 release of heating oil from a pipeline associated with an underground storage tank (UST) at Building 1586. The location of the line release is shown in Figure 1. The monitoring program, contaminants of concern, and target concentrations are presented in the Florida Department of Environmental Protection (FDEP) approved Site Assessment Report Addendum with Monitoring Only Plan. The monitoring has been conducted pursuant to the FDEP requirements outlined in the comment letter and Monitoring Only Approval Order dated May 14, 1999 and Rule 62-770.690 (7) of the Florida Administrative Code (FAC).

Pursuant to the Monitoring Only Approval Order, Table V action levels or Groundwater Cleanup Target Levels (GCTLs) are appropriate for the downgradient well (MPT-BE-MW01S) and Table VIII GCTLs are appropriate for the source wells (MPT-BE-MW04S, MPT-BE-MW06S, and MPT-BE-MW09S).

First Quarterly Monitoring

Activities and results from the first quarter of free product monitoring and first quarter groundwater sampling event at Building 1586 conducted in August of 1999, are detailed in the first quarter monitoring report submitted to the FDEP on December 17, 1999. A summary of the data is included in Tables 1 and 2.

Second Quarterly Monitoring

Activities and results from the second quarter of free product monitoring and second quarter groundwater sampling event at Building 1586 conducted in December of 1999, are detailed in the second quarter monitoring report submitted to the FDEP on February 7, 2000. A summary of this data is included in Tables 1 and 2.

Third Quarterly Monitoring

Activities and results from the third quarter of free product monitoring and third quarter groundwater sampling event at Building 1586 conducted in February of 2000, are detailed in the third quarter monitoring report submitted to the FDEP on April 15, 2000. A summary of this data is included in Tables 1 and 2.

Fourth Quarterly Monitoring

On May 25, 2000, TtNUS personnel collected groundwater samples from four monitoring wells (MPT-BE-MW01S, MPT-BE-MW04S, MPT-BE-MW09S, and MPT-BE-MW10S) at Building 1586. A groundwater duplicate sample and an equipment blank water sample were also collected for quality control purposes. All sampling activities were conducted in accordance with TtNUS', FDEP approved, Comprehensive Quality Assurance Plan (CompQAP) #980038. A site map depicting well locations is presented as Figure 1.

Immediately prior to the collection of the groundwater samples, water level and product measurements were recorded from each site monitoring well. Approximately three feet of free phased petroleum product was detected in monitoring well MPT-BE-MW06S during this event (see below). The water level data was used to determine purge volumes and to construct a potentiometric surface map. Water level data collected on May 25, 2000 is presented in Table 1 and was used to produce Figure 2, which shows groundwater flowing primarily to the northwest. Water sampling logs, which detail the purge process, are provided in Attachment A.

Following collection of the groundwater samples, the sample bottles were packed on ice and shipped via overnight transport to Katahdin Analytical Services in Westbrook, Maine. The groundwater samples were analyzed for volatile organic aromatic (VOA) compounds by EPA Method 8260 and for semi-volatile organic compounds (SVOCs) including Polynuclear Aromatic Hydrocarbons (PAHs) by EPA Methods 8270 and 3510. The analytical results of the fourth quarterly groundwater sampling event are summarized in Table 2. A copy of the laboratory report is provided in Attachment B.

VOA concentrations were not detected in any of the monitoring wells sampled. PAH concentrations were detected in the sample collected from monitoring well MPT-BE-MW04S. The detected PAH compounds were acenaphthene, phenanthrene, pyrene and naphthalene. No PAH values exceeded respective GCTLs. A summary of groundwater analytical results is presented as Figure 3.

FREE PRODUCT OCCURRENCE

On April 30, 2000, a contractor installing a new UST in the same tank pit as the previously removed fuel oil UST spilled 1400 gallons of fuel oil. The release was reported to Mr. Jim Cason of FDEP. The contractor installed free product recovery wells. However, free product extraction was not initiated. As noted in the second and third quarter reports, a free product sheen was noted in well MPT-BE-MW06S. During the third quarter monitoring event conducted in February of 2000, 0.75 feet of free product was noted in the same well. During the fourth quarter monitoring event conducted in May of 2000, approximately three feet of free product was noted in the same well. No free product has been detected in any other site monitoring wells over the year long monitoring period.

The increasing thickness of free product in monitoring well MPT-BE-MW06S indicates that free product is migrating away from the Tank Pit area in which the spill occurred. Groundwater flow has been determined to be toward the northwest. Monitoring well MPT-BE-MW06S is located adjacent to the northwest side of the Tank Pit area.

DATA SUMMARY

Table 2 provides the results of all four quarter's monitoring data. Monitoring wells MPT-BE-MW01S, MPT-BE-MW04S, MPT-BE-MW06S, and MPT-BE-MW09S were sampled each of the four quarters while well MPT-BE-MW10S was sampled only in the fourth quarter. Review of the analytical data for quarters 1 through 4 shows that VOA constituents detected at the site include benzene, toluene, and ethylbenzene. PAH constituents detected at the site include the following: benzo(a)anthracene, acenaphthene, phenanthrene, pyrene, fluorene, and naphthalene.

Review of the distribution of contaminants at the site reveals that maximum concentrations have been encountered in well MPT-BE-MW06S located adjacent to the tank pit. Naphthalene has also been detected at elevated concentrations in well MPT-BE-MW04S located near the product line, which experienced the original 1991 release. However, PAH concentrations in this well decreased over the year long monitoring program to levels below GCTLs during the fourth quarter.

Constituents were not detected in monitoring well MPT-BE-MW-01S located north of the tank pit with the exception of a trace level of phenanthrene in the first quarter. Constituents were not detected in monitoring well MPT-BE-MW-09S, located upgradient of the site, with the exception of a trace level of benzo(a) anthracene in the second quarter. Monitoring well MPT-BE-MW10S, the farthest downgradient well, was tested in the fourth quarter only and was found to contain no detectable constituents.

Comparison of the data to Florida GCTLs show an exceedence of GCTL values in the two-source area wells (MPT-BE-MW04S and MPT-BE-MW06S). Based on FDEP guidance, a site with source area concentrations below Natural Attenuation Maximum Default Concentrations are candidates for monitoring only. Comparison of site data to these criteria shows that values for acenaphthene and naphthalene in well MPT-BE-MW06S exceed the criteria in second quarter data. Maximum default concentrations for natural attenuation monitoring are provided on Table 2.

CONCLUSIONS

Due to the February 30, 2000 oil spill, free product has been detected in well MPT-BE-MW06S. Based on FDEP guidance, petroleum sites that exhibit free product are not candidates for natural attenuation monitoring only status. Free product must be removed under the FDEP requirements outlined in FAC 62-770.300.

The second source area (1991 line release) has shown decreasing concentrations of PAH constituents over the monitoring program. As a result, it appears that impact to this area is attenuating with the most recent results falling below GCTLs.

RECOMMENDATIONS

This effort was designed to evaluate the natural attenuation of constituents in groundwater, which resulted from the 1991 product line release at Building 1586. Data collected in support of this objective has shown impacts to groundwater from this release have attenuated to levels below GCTLs. As a result, we recommend no further action in regards to monitoring associated with the 1991 release.

However, due to the recent free product release in the UST pit, free product has been detected. This release requires additional action in accordance with FDEP requirements. We recommend that an interim remedial action (IRA) be undertaken to mitigate the migration of free product from the vicinity of the tank pit. After completion of an IRA, an evaluation should be made to determine the course of further action, if any. Other potential actions may include additional site assessment work and evaluation for further corrective actions.

If you should have any questions or require additional information with regard to this submittal, please feel free to contact me at (904) 281-0400.

Sincerely,

Mark A. Peterson

Mark Peterson, P.G. # 1852
Task Order Manager

Mark T. Perry for

Debbie Wroblewski
Program Manager

Enclosures

c: B. Washington, SDIV
J. Bovier, NS Mayport
D. Wroblewski (cover letter), TtNUS
M. Perry / File, TtNUS

Table 1
Well Construction Data

BEQ Building 1586
Naval Station Mayport
Mayport, Florida

			August 30. 1999		December 2, 1999		February 29, 2000		May 25, 2000	
Well ID	Total Depth	Top of Casing Elevation	Groundwater Level	Groundwater Elevation	Groundwater Level	Groundwater Elevation	Groundwater Level	Groundwater Elevation	Groundwater Level	Groundwater Elevation
MPT-BE-MW01S	13	9.38	4.91	4.47	4.45	4.93	4.88	4.5	5.41	3.97
MPT-BE-MW02S	13	9.49	NM	NM	NM	NM	NM	NM	NM	NM
MPT-BE-MW03S	13	10.35	NM	NM	NM	NM	NM	NM	NM	NM
MPT-BE-MW04S	13	9.98	5.33	4.65	4.88	5.1	5.23	4.75	5.85	4.13
MPT-BE-MW05S	13	9.27	NM	NM	NM	NM	NM	NM	NM	NM
MPT-BE-MW06S	13	10.98	8.57	2.41	6.89	4.09	5.91	5.07(FP)	5.61	5.37(FP)
MPT-BE-MW07S	13	9.31	NM	NM	NM	NM	NM	NM	NM	NM
MPT-BE-MW08I	30	9.73	NM	NM	NM	NM	NM	NM	NM	NM
MPT-BE-MW09S	13	9.8	5.04	4.76	4.65	5.15	4.97	4.83	5.6	4.2
MPT-BE-MW10S	13	10.26	NM	NM	NM	NM	NM	NM	6.26	4

NOTES:
Top of casing and groundwater elevations are relative to an arbitrary site reference elevation of 8.82 feet.
All measurements reported in feet.
NM – not measured.
FP - Free product in monitoring well.

Table 2
Groundwater Monitoring Well Analytical Summary

BEQ Building 1586
Naval Station Mayport
Mayport, Florida

Sample Location	QTR	Date	Benzene	Toluene	Ethyl-benzene	Benzo(a) Anthracene	Acenaphthene	Phenanthrene	Pyrene	Fluorene	Naphthalene
GCTL[1]			1	40	30	0.20	20	210	210	280	20
MADC[2]			100	400	300	20.00	200	2100	2100	2800	200
MPT-BE-MW01S	Q1	8/30/99	<1	<1	<1	<0.05	<10	13.0	<10	<6	<10
	Q2	12/2/99	<1	<1	<1	<0.05	<10	<10	<10	<10	<10
	Q3	2/29/00	<1	<1	<1	<0.05	<10	<10	<10	<10	<10
	Q4	5/25/00	<1	<1	<1	<0.06	<10	<10	<10	<10	<10
MPT-BE-MW04S	Q1	8/30/99	<1	<1	<1	<0.05	<1	<10	<10	11.0	**43.0**
	Q2	12/2/99	<1	<1	<1	**0.6**	7.0	7.0	<40	11.0	**28.0**
	Q3	2/29/00	0.6	<1	<1	<0.05	<10	<5	<10	<10	**34.0**
	Q4	5/25/00	<1	<1	<1	<0.05	11.0	22.0	J 6.0	17.0	16.0
MPT-BE-MW06S	Q1	8/30/99	**14.0**	<1	**72.0**	<1	<10	12.0	ND	<10	16.0
	Q2	12/2/99	**32.0**	9.0	**110.0**	**8.0**	**460.0**	**1000.0**	200.0	630.0	**1100.0**
	*Q3	2/29/00	**7.0**	2.0	**57.0**	**0.5**	**34.0**	**99.0**	17.0	45.0	**140.0**
	Q4	5/25/00	**Free Product**								
MPT-BE-MW09S	Q1	8/30/99	<1	<1	<1	<1	<10	<10	<10	<10	<10
	Q2	12/2/99	<1	<1	<1	0.1	<48	<48	<48	<48	<48
	Q3	2/29/00	<1	<1	<1	<0.05	<10	<10	<10	<10	<10
	Q4	5/25/00	<1	<1	<1	<0.06	<10	<10	<10	<10	<10
MPT-BE-MW10S	Q4	5/25/00	<1	<1	<1	<1	<10	<10	<10	<10	<10

NOTES:

[1] GCTL Groundwater cleanup target levels as specified in Table VIII of Chapter 62-770, Florida Administrative Code.

Concentrations reported in micrograms per liter for all chemicals

[2] MADC= Maximum Attenuation Default Concentrations Chapter 62-777, FAC

* = Free product was encountered in well. A groundwater sample was extracted and analyzed.

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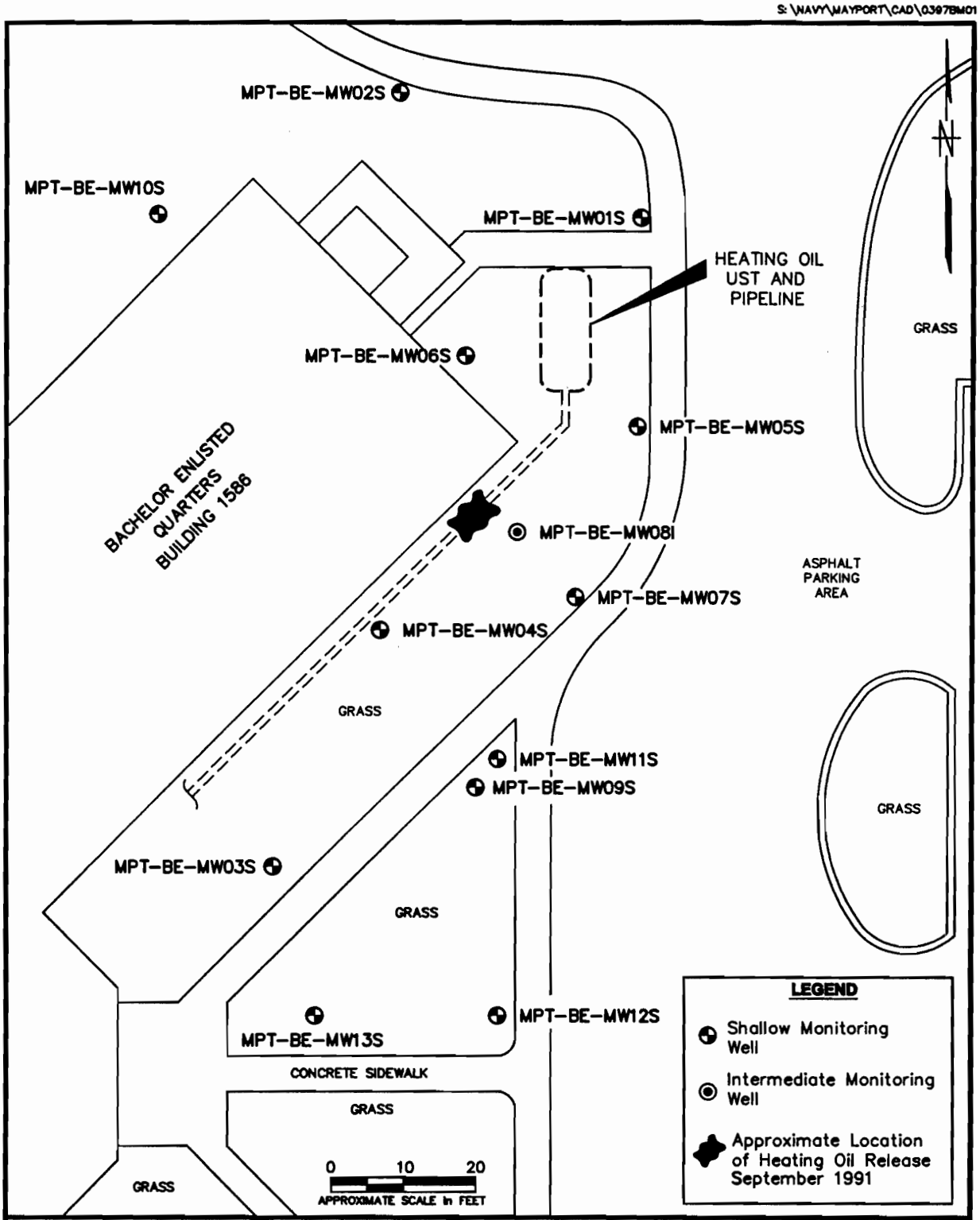

DRAWN BY LK DATE 9/30/99		MONITORING WELL LOCATIONS BACHELOR ENLISTED QUARTERS BUILDING 1586 U.S. NAVAL STATION MAYPORT, FLORIDA	CONTRACT NO. 0397
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 REV. 0

FORM CADD NO. SDIV_AV.DWG – REV 0 – 1/20/98

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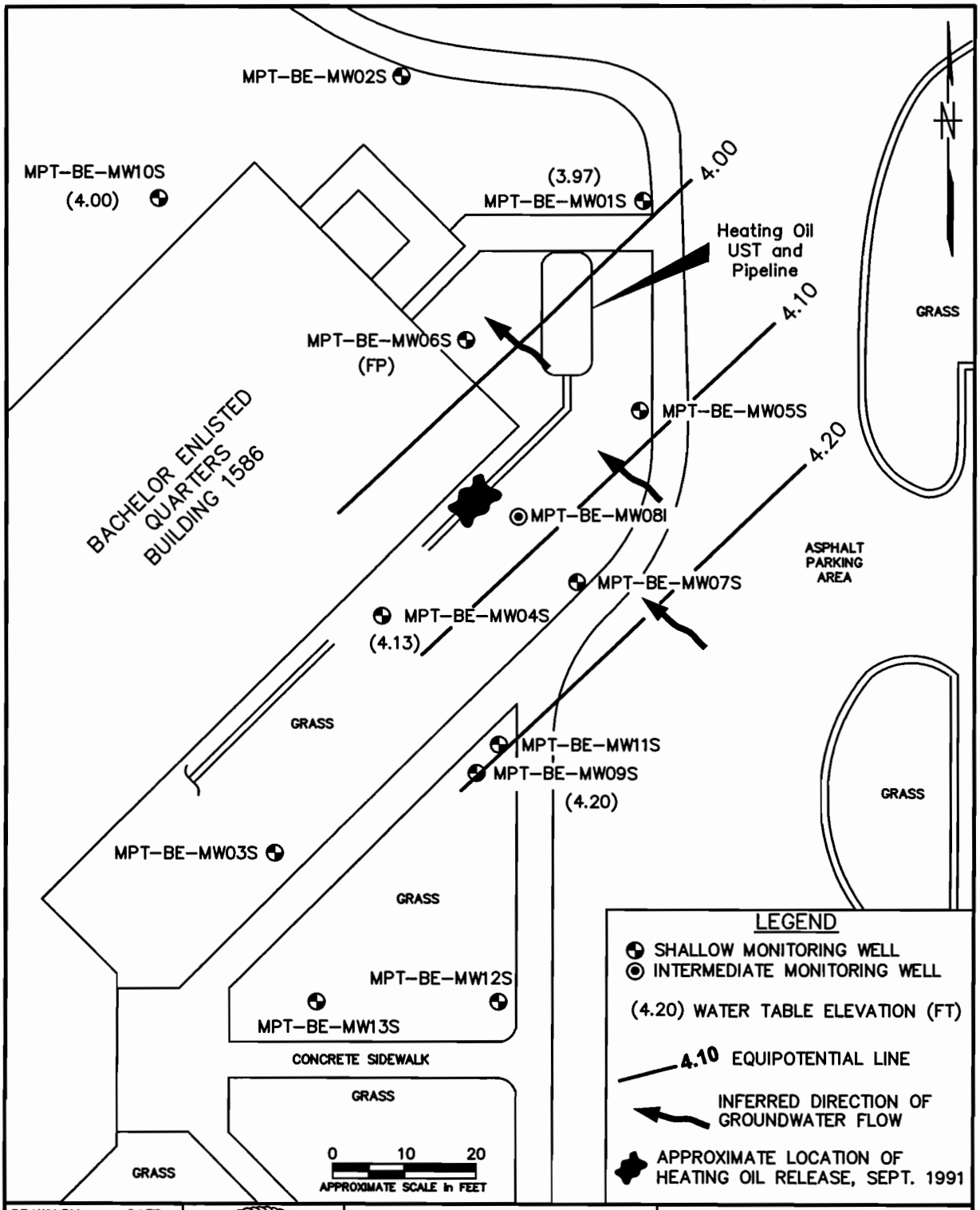

DRAWN BY CW DATE 9/5/00	DEPARTMENT OF THE NAVY — WRITTEN BY FACILITIES ENGINEERING COMD	POTENTIAL SURFACE MAP MAY 25, 2000 BACHELOR ENLISTED QUARTERS BUILDING 1586 U.S. NAVAL STATION MAYPORT, FLORIDA	CONTRACT NO. 0397
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2 REV. 0

FORM CADD NO. SDIV_AV.DWG – REV 0 – 1/20/98

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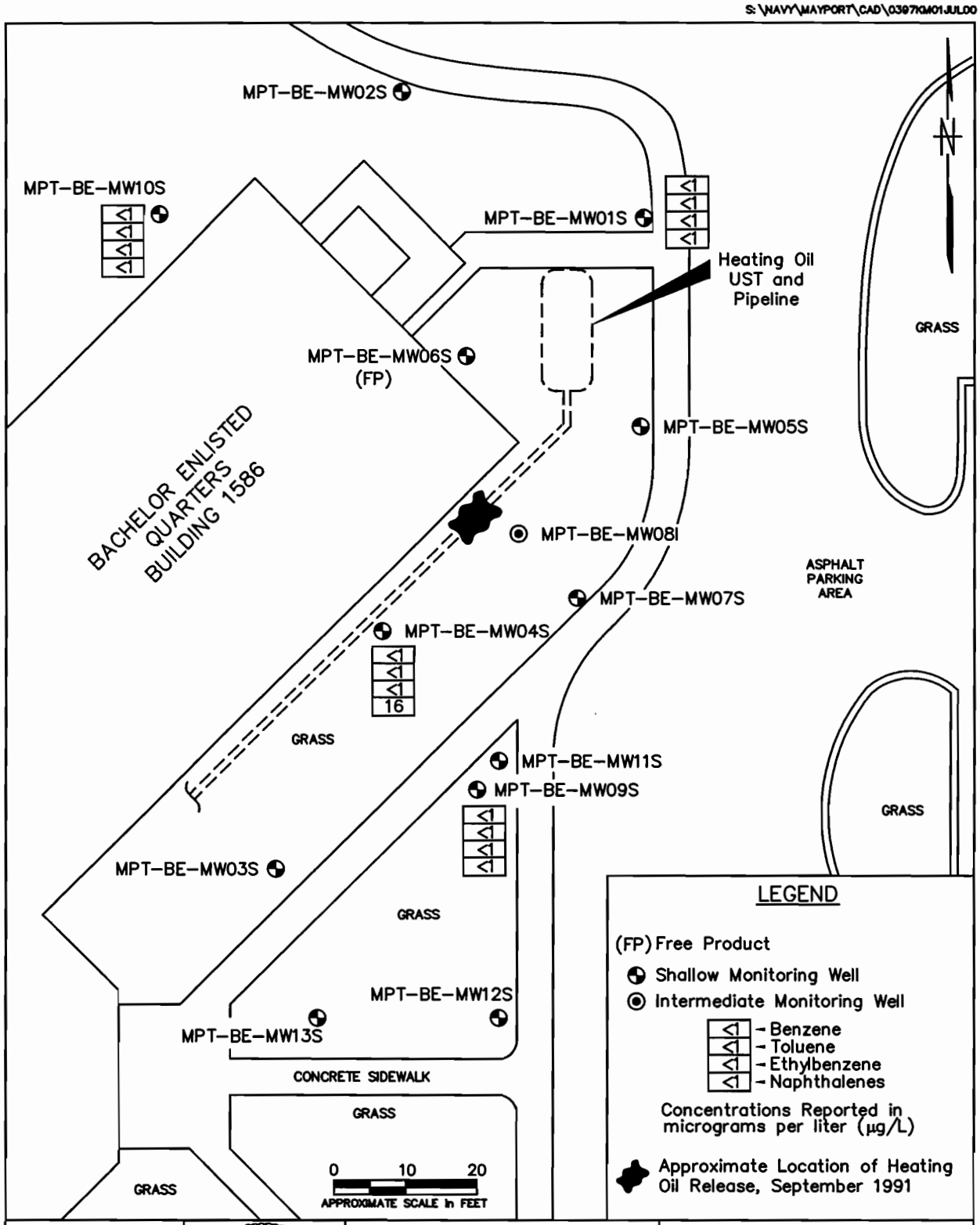

DRAWN BY CW DATE 9/5/00		GROUNDWATER ANALYTICAL SUMMARY MAP MAY 25, 2000 BACHELOR ENLISTED QUARTERS BUILDING 1586 U.S. NAVAL STATION MAYPORT, FLORIDA	CONTRACT NO. 0397
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3 REV. 0

FORM CADD NO. SDIV_AV.DWG REV 0 - 1/20/98

ATTACHMENT A

WATER SAMPLING LOGS

DEP Form # 62-770.900(3)
Form Title: Petroleum or Petroleum Products Water Sampling Log
Effective Date: September 13, 1997

Petroleum or Petroleum Products
Water Sampling Log

FDEP FACILITY NO.:	WELL NO.:	SAMPLE ID: MW-06	DATE: 5/25/05
SITE NAME: 1586 Holiday 1586		SITE LOCATION: NS Mangrove	

PURGE DATA

WELL DIAMETER (in): 2"	TOTAL WELL DEPTH (ft): N/A	DEPTH TO WATER (ft): 5.60	WELL CAPACITY (gal/ft): 0.16

1 WELL VOLUME (gal) = (TOTAL WELL DEPTH - DEPTH TO WATER) x WELL CAPACITY =

= (N/A -) x N/A = N/A

PURGE METHOD:	PURGING INITIATED AT:	PURGING ENDED AT:
	PURGE RATE (gpm):	TOTAL VOLUME PURGED (gal):

WELL VOLS. PURGED	CUMUL. VOLUME PURGED (gal)	pH	TEMP. (°C)	COND. (µmhos)	COLOR	ODOR	APPEARANCE	OTHER
		FREE PHASE PRODUCT.						

SAMPLING DATA

SAMPLED BY / AFFILIATION	SAMPLER(S) SIGNATURE(S)	
SAMPLING METHOD(S):	SAMPLING INITIATED AT:	SAMPLING ENDED AT:

FIELD DECONTAMINATION: Y N | FIELD-FILTERED: Y N | DUPLICATE: Y N

SAMPLE CONTAINER SPECIFICATIONS			SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD
NO.	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOLUME ADDED IN FIELD (ml)	FINAL pH	

REMARKS:

MATERIAL CODES: AG = AMBER GLASS; CG = CLEAR GLASS; HDP = HIGH DENSITY POLYETHYLENE; O = OTHER (SPECIFY)

WELL CAPACITY: 1.25" = 0.06 gal/ft; 2" = 0.16 gal/ft; 4" = 0.65 gal/ft; 6" = 1.47 gal/ft; 8" = 2.61 gal/ft; 12" = 5.88 gal/ft

NOTE: this does not constitute all the information required by Chapter 62-160, F.A.C.

DEP Form # 62-770.900(1)
Form Title: Petroleum or Petroleum Products Water Sampling Log
Effective Date: September 23, 1997

Petroleum or Petroleum Products
Water Sampling Log

FDEP FACILITY NO.:	WELL NO.:	SAMPLE ID: MW-09	DATE: 5/25/00
SITE NAME: Bldg 1586		SITE LOCATION: Mayport	

PURGE DATA

WELL DIAMETER (in): 2"	TOTAL WELL DEPTH (ft): 13.05	DEPTH TO WATER (ft): 5.60	WELL CAPACITY (gal/ft): 0.16

1 WELL VOLUME (gal) = (TOTAL WELL DEPTH − DEPTH TO WATER) x WELL CAPACITY =

= (13.05 − 5.60) x 0.16 = 1.192 x 5 = 5.96

PURGE METHOD: Bailer	PURGING INITIATED AT:	PURGING ENDED AT:
	PURGE RATE (gpm):	TOTAL VOLUME PURGED (gal):

WELL VOLS. PURGED	CUMUL. VOLUME PURGED (gal)	pH	TEMP. (°C)	COND. (µmhos)	COLOR	ODOR	APPEARANCE	OTHER
1	-	N/A	N/A	N/A	clear	none	-	-
2		↓	↓	↓	↑	↓		
3								
4			↓	↓	↓	↓		
5		↓						

SAMPLING DATA

SAMPLED BY / AFFILIATION: GPD + AP / TTNUS.	SAMPLER(S) SIGNATURE(S):	
SAMPLING METHOD(S):	SAMPLING INITIATED AT:	SAMPLING ENDED AT:

FIELD DECONTAMINATION: Y N	FIELD-FILTERED: Y N	DUPLICATE: Y N

SAMPLE CONTAINER SPECIFICATIONS			SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD
NO.	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOLUME ADDED IN FIELD (ml)	FINAL pH	

REMARKS:

MATERIAL CODES: AG = AMBER GLASS; CG = CLEAR GLASS; HDP = HIGH DENSITY POLYETHYLENE; O = OTHER (SPECIFY)

WELL CAPACITY: 1.25" = 0.06 gal/ft; 2" = 0.16 gal/ft; 4" = 0.65 gal/ft; 6" = 1.47 gal/ft; 8" = 2.61 gal/ft; 12" = 5.88 gal/ft

NOTE: this does not constitute all the information required by Chapter 62-160, F.A.C.

FLORIDA

DEP Form # 62-770.900(3)
Form Title: Petroleum or Petroleum Products Water Sampling Log
Effective Date: September 23, 1997

Petroleum or Petroleum Products
Water Sampling Log

FDEP FACILITY NO.:	WELL NO.:	SAMPLE ID: MW01	DATE: 5/22/00
SITE NAME: Bobby 1586		SITE LOCATION: NS Mayport	

PURGE DATA

WELL DIAMETER (in): 2"	TOTAL WELL DEPTH (ft): 12.15	DEPTH TO WATER (ft): 5.41	WELL CAPACITY (gal/ft): 0.16

1 WELL VOLUME (gal) = (TOTAL WELL DEPTH − DEPTH TO WATER) x WELL CAPACITY =

= (12.15 − 5.41) x 0.16 = 1.07 x 5 = 5.39

PURGE METHOD: Bailer	PURGING INITIATED AT:	PURGING ENDED AT:
	PURGE RATE (gpm):	TOTAL VOLUME PURGED (gal):

WELL VOLS. PURGED	CUMUL. VOLUME PURGED (gal)	pH	TEMP. (°C)	COND. (µmhos)	COLOR	ODOR	APPEARANCE	OTHER
1	1	N/A	N/A	N/A	clear	none	—	—
1	2	↓	↓	↓	↓	↓		
1	3							
1	4							
1	5	↓	↓	↓	↓	↓		

SAMPLING DATA

SAMPLED BY / AFFILIATION	SAMPLER(S) SIGNATURE(S)	
SAMPLING METHOD(S):	SAMPLING INITIATED AT:	SAMPLING ENDED AT:

FIELD DECONTAMINATION: Y N | FIELD-FILTERED: Y N | DUPLICATE: Y N

SAMPLE CONTAINER SPECIFICATIONS			SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD
NO.	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOLUME ADDED IN FIELD (ml)	FINAL pH	

REMARKS:

MATERIAL CODES: AG = AMBER GLASS; CG = CLEAR GLASS; HDP = HIGH DENSITY POLYETHYLENE; O = OTHER (SPECIFY)

WELL CAPACITY: 1.25" = 0.06 gal/ft; 2" = 0.16 gal/ft; 4" = 0.65 gal/ft; 6" = 1.47 gal/ft; 8" = 2.61 gal/ft; 12" = 5.88 gal/ft

NOTE: this does not constitute all the information required by Chapter 62-160, F.A.C.

DEP Form # 62-770.900(1)
Form Title Petroleum or Petroleum Products Water Sampling Log
Effective Date September 13, 1997

Petroleum or Petroleum Products
Water Sampling Log

FDEP FACILITY NO.:	WELL NO.:	SAMPLE ID: MW-105	DATE: 5/25/00
SITE NAME: Bldg 1586		SITE LOCATION: NS Mayport	

PURGE DATA

WELL DIAMETER (in):	TOTAL WELL DEPTH (ft):	DEPTH TO WATER (ft):	WELL CAPACITY (gal/ft):
2"	12.65	6.26	0.16

1 WELL VOLUME (gal) = (TOTAL WELL DEPTH – DEPTH TO WATER) x WELL CAPACITY =

= (12.65 - 6.26) x 0.16 = 1.0224 x 5 = 5.11

PURGE METHOD:	PURGING INITIATED AT:	PURGING ENDED AT:
Bailer		

WELL VOLS. PURGED	CUMUL. VOLUME PURGED (gal)	pH	TEMP. (°C)	COND. (µmhos)	PURGE RATE (gpm): COLOR	ODOR	TOTAL VOLUME PURGED (gal): APPEARANCE	OTHER
1	1	N/A	N/A	N/A	clear	none	—	—
1	2	↓	↓	↓	↓	↓		
1	3							
1	4							
1	5							

SAMPLING DATA

SAMPLED BY / AFFILIATION	SAMPLER(S) SIGNATURE(S)	
SAMPLING METHOD(S):	SAMPLING INITIATED AT:	SAMPLING ENDED AT:

FIELD DECONTAMINATION: Y (N) | FIELD-FILTERED: Y (N) | DUPLICATE: Y N

SAMPLE CONTAINER SPECIFICATIONS			SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD
NO.	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOLUME ADDED IN FIELD (ml)	FINAL pH	

REMARKS:

MATERIAL CODES: AG = AMBER GLASS; CG = CLEAR GLASS; HDP = HIGH DENSITY POLYETHYLENE; O = OTHER (SPECIFY)

WELL CAPACITY: 1.25" = 0.06 gal/ft; 2" = 0.16 gal/ft; 4" = 0.65 gal/ft; 6" = 1.47 gal/ft; 8" = 2.61 gal/ft; 12" = 5.88 gal/ft

NOTE: this does not constitute all the information required by Chapter 62-160, F.A.C.

DEP Form # 62-770.900(1)
Form Title: Petroleum or Petroleum Products Water Sampling Log
Effective Date: September 23, 1997

Petroleum or Petroleum Products
Water Sampling Log

FDEP FACILITY NO.:	WELL NO.:	SAMPLE ID: MW-04	DATE: 5/25/00
SITE NAME: Bldg 1586		SITE LOCATION: NS Mayport.	

PURGE DATA

WELL DIAMETER (in):	TOTAL WELL DEPTH (ft):	DEPTH TO WATER (ft):	WELL CAPACITY (gal/ft):
4	13.15	5.85	0.16

1 WELL VOLUME (gal) = (TOTAL WELL DEPTH – DEPTH TO WATER) x WELL CAPACITY =

= (13.15 - 5.85) x 0.16 = 1.168 X 5 = 5.84

PURGE METHOD:	PURGING INITIATED AT:	PURGING ENDED AT:
	PURGE RATE (gpm):	TOTAL VOLUME PURGED (gal):

WELL VOLS. PURGED	CUMUL. VOLUME PURGED (gal)	pH	TEMP. (°C)	COND. (µmhos)	COLOR	ODOR	APPEARANCE	OTHER
1	1	N/A	N/A	N/A	clear	none	–	–
1	2	↓	↓	↓	↓	↓		
1	3							
1	4							
1	5							

SAMPLING DATA

SAMPLED BY / AFFILIATION: GPO + AP / TTNUS.	SAMPLER(S) SIGNATURE(S):	
SAMPLING METHOD(S):	SAMPLING INITIATED AT:	SAMPLING ENDED AT:

FIELD DECONTAMINATION: Y (N) | FIELD-FILTERED: Y (N) | DUPLICATE: Y N

SAMPLE CONTAINER SPECIFICATIONS			SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD
NO.	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOLUME ADDED IN FIELD (ml)	FINAL pH	

REMARKS:

MATERIAL CODES: AG = AMBER GLASS; CG = CLEAR GLASS; HDP = HIGH DENSITY POLYETHYLENE; O = OTHER (SPECIFY)

WELL CAPACITY: 1.25" = 0.06 gal/ft; 2" = 0.16 gal/ft; 4" = 0.65 gal/ft; 6" = 1.47 gal/ft; 8" = 2.61 gal/ft; 12" = 5.88 gal/ft

NOTE: this does not constitute all the information required by Chapter 62-160, F.A.C.

ATTACHMENT B

LABORATORY ANALYTICAL REPORT

Katahdin
ANALYTICAL SERVICES

June 21, 2000

Mr. Rick Ofsanko
Tetra Tech NUS
794 Military Trail
Deerfield Beach, FL 33442

RE: Katahdin Lab Number: WQ1512
Project ID: CTO#109
Project Manager: Ms. Andrea J. Colby
Sample Receipt Date(s): 5/26/00

Dear Mr. Ofsanko:

Please find enclosed the following information:

* Report of Analysis
* Quality Control Data Summary
* Chain of Custody (COC)
* Confirmation

A copy of the Chain of Custody is included in the paginated report. The original COC is attached as an addendum to this report.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. This cover letter is an integral part of the ROA.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Sincerely,

KATAHDIN ANALYTICAL SERVICES

Maria Crouch
Authorized Signature

06/22/00
Date

340 County Road No. 5
P.O. Box 720, Westbrook, ME 04098
Tel: (207) 874-2400 Fax: (207) 775-4029

http://katahdinlab.com

210 West Road No. 5, Portsmouth, NH 03801
Tel: (603) 431-5777 Fax: (603) 436-3356

Katahdin
ANALYTICAL SERVICES

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH
CASE MAYPORT, FL

Sample Receipt

The following samples were received on May 26, 2000 and were logged in under Katahdin Analytical Services work order number WQ1512 for a hardcopy due date of June 23, 2000.

KATAHDIN Sample No.	TTNUS Sample Identification
WQ1512-1	MAY-BE-MW01S
WQ1512-2	MAY-BE-MW04S
WQ1512-3	MAY-BE-MW09S
WQ1512-4	MAY-BE-DUP
WQ1512-5	MAY-BE-MW10S
WQ1512-6	TRIP BLANK

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Andrea J. Colby**. This narrative is an integral part of the Report of Analysis.

Volatile Organic Analysis

Six aqueous samples were received by the Katahdin Analytical Services, Inc. GC/MS laboratory on May 26, 2000 and were specified to be analyzed for the priority pollutant list of volatile organics in accordance with USEPA method 8260B.

Analyses for this SDG were performed on instrument 5972-S. A VSTD050 (50 ppb standard) was used for the continuing calibration standard. Internal standard and surrogate compounds were also spiked at 50 ppb.

Batch QC (VBLK, and LCS) was performed in the twelve hour window. Results are included in this data package. The LCS QC sample was spiked with the entire list of compounds quantitated for at 50 ppb. No matrix spike/matrix spike duplicate pair was analyzed on any of the samples in this workorder.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" (Software-generated) on the pertinent quantitation reports. All "M" flags have been dated and initialed by the analyst performing the integration. In addition, all "M" flags have been reviewed and approved by the GC/MS supervisor. Copies of each manual integration are included in the pertinent quantitation reports.

No other protocol deviations were noted by the volatile organics staff.

Katahdin
ANALYTICAL SERVICES

Semivolatile Organic Analysis

Five aqueous samples were received by the Katahdin GC/MS laboratory on March 26, 2000 for analysis for the priority pollutant list of analytes in accordance with USEPA method 8270C. The samples were also requested to be analyzed for the PAH list of analytes in accordance with USEPA method 8270C, modified to use selected ion monitoring to achieve lower detection limits.

Extraction of the samples occurred following method 3520 protocols on June 1, 2000, along with a laboratory control sample/laboratory control sample duplicate. No matrix spike/matrix spike duplicate pair was extracted on any of the samples in this workorder.

The LCS/LCSD pair was analyzed by both scan and SIM methods. The spiking levels were for scan analyses, and were reported for both these and SIM analyses even though over the upper limit of the calibration curve for SIM. Surrogate recoveries were only reported for the scan analyses due to the high spiking levels.

Several manual integrations were performed due to split peaks; all have been flagged with a "M" by the data system. All manual integrations have been dated and initialed by the responsible analyst. Copies of each manual integration are included in the data package. All manual integrations have been reviewed and approved by the GC/MS supervisor.

No other protocol deviations were noted by the semivolatiles organics staff.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager and/or his designee, as verified by the following signature.

Hana Couch
Authorized Signature
06/22/00

340 County Road No. 5
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KATAHDIN ANALYTICAL SERVICES

Summary of Report Notes

Report Note	Note Text
J	'J' flag denotes an estimated value less than the Laboratory's Practical Quantitation Level.

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-1
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8270
Date Analyzed: 6/13/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW01S	AQ	5/25/00	5/26/00	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
N-NITROSODIMETHYLAMINE	<10	ug/L	1.0	10	10
PHENOL	<10	ug/L	1.0	10	10
BIS(2-CHLOROETHYL)ETHER	<10	ug/L	1.0	10	10
2-CHLOROPHENOL	<10	ug/L	1.0	10	10
1,3-DICHLOROBENZENE	<10	ug/L	1.0	10	10
1,4-DICHLOROBENZENE	<10	ug/L	1.0	10	10
1,2-DICHLOROBENZENE	<10	ug/L	1.0	10	10
2,2'-OXYBIS(1-CHLOROPROPANE)	<10	ug/L	1.0	10	10
N-NITROSO-DI-N-PROPYLAMINE	<10	ug/L	1.0	10	10
HEXACHLOROETHANE	<10	ug/L	1.0	10	10
NITROBENZENE	<10	ug/L	1.0	10	10
ISOPHORONE	<10	ug/L	1.0	10	10
2-NITROPHENOL	<10	ug/L	1.0	10	10
2,4-DIMETHYLPHENOL	<10	ug/L	1.0	10	10
BIS(2-CHLOROETHOXY)METHANE	<10	ug/L	1.0	10	10
2,4-DICHLOROPHENOL	<10	ug/L	1.0	10	10
1,2,4-TRICHLOROBENZENE	<10	ug/L	1.0	10	10
NAPHTHALENE	<10	ug/L	1.0	10	10
HEXACHLOROBUTADIENE	<10	ug/L	1.0	10	10
4-CHLORO-3-METHYLPHENOL	<10	ug/L	1.0	10	10
HEXACHLOROCYCLOPENTADIEN	<10	ug/L	1.0	10	10
2,4,6-TRICHLOROPHENOL	<10	ug/L	1.0	10	10
2-CHLORONAPHTHALENE	<10	ug/L	1.0	10	10
DIMETHYL PHTHALATE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
2,6-DINITROTOLUENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
2,4-DINITROPHENOL	<25	ug/L	1.0	25	25
4-NITROPHENOL	<25	ug/L	1.0	25	25
2,4-DINITROTOLUENE	<10	ug/L	1.0	10	10
DIETHYLPHTHALATE	<10	ug/L	1.0	10	10
4-CHLOROPHENYL-PHENYLETHE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10

Report Notes: J

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-1
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8270
Date Analyzed: 6/13/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW01S	AQ	5/25/00	5/26/00	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
4,6-DINITRO-2-METHYLPHENOL	<25	ug/L	1.0	25	25
N-NITROSODIPHENYLAMINE	<10	ug/L	1.0	10	10
4-BROMOPHENYL-PHENYLETHER	<10	ug/L	1.0	10	10
HEXACHLOROBENZENE	<10	ug/L	1.0	10	10
1,2-DIPHENYLHYDRAZINE	<10	ug/L	1.0	10	10
PENTACHLOROPHENOL	<25	ug/L	1.0	25	25
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
DI-N-BUTYLPHTHALATE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
BENZIDINE	<25	ug/L	1.0	25	25
PYRENE	<10	ug/L	1.0	10	10
BUTYLBENZYLPHTHALATE	<10	ug/L	1.0	10	10
3,3'-DICHLOROBENZIDINE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BIS(2-ETHYLHEXYL)PHTHALATE	J5	ug/L	1.0	10	10
DI-N-OCTYLPHTHALATE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
2-FLUOROPHENOL	67	%	1.0		
PHENOL-D6	72	%	1.0		
NITROBENZENE-D5	60	%	1.0		
2-FLUOROBIPHENYL	64	%	1.0		
2,4,6-TRIBROMOPHENOL	62	%	1.0		
TERPHENYL-D14	78	%	1.0		

Report Notes: J

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-1
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: EPA 8270
Date Analyzed: 6/9/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW01S	AQ	5/25/00	5/26/00	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZO[A]ANTHRACENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[B]FLUORANTHENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[K]FLUORANTHENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[A]PYRENE	<0.05	ug/L	1.0	0.05	0.05
INDENO[1,2,3-CD]PYRENE	<0.05	ug/L	1.0	0.05	0.05
DIBENZ[A,H]ANTHRACENE	<0.05	ug/L	1.0	0.05	0.05

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-1
SDG: WQ1512
Report Date: 6/16/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8260
Date Analyzed: 6/1/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW01S	AQ	5/25/00	5/26/00	6/1/00	BEM	5030	BEM

Compound	Result	Units	DF	Sample PQL	Method PQL
CHLOROMETHANE	<2	ug/L	1.0	2	2
BROMOMETHANE	<2	ug/L	1.0	2	2
VINYL CHLORIDE	<2	ug/L	1.0	2	2
CHLOROETHANE	<2	ug/L	1.0	2	2
METHYLENE CHLORIDE	<1	ug/L	1.0	1	1
TRICHLOROFLUOROMETHANE	<2	ug/L	1.0	2	2
ACROLEIN	<5	ug/L	1.0	5	5
ACRYLONITRILE	<50	ug/L	1.0	50	50
1,1-DICHLOROETHENE	<1	ug/L	1.0	1	1
1,1-DICHLOROETHANE	<1	ug/L	1.0	1	1
1,2-DICHLOROETHENE (TRANS)	<1	ug/L	1.0	1	1
TOTAL 1,2-DICHLOROETHENE	<1	ug/L	1.0	1	1
CHLOROFORM	<1	ug/L	1.0	1	1
1,2-DICHLOROETHANE	<1	ug/L	1.0	1	1
1,1,1-TRICHLOROETHANE	<1	ug/L	1.0	1	1
CARBON TETRACHLORIDE	<1	ug/L	1.0	1	1
BROMODICHLOROMETHANE	<1	ug/L	1.0	1	1
1,2-DICHLOROPROPANE	<1	ug/L	1.0	1	1
CIS-1,3-DICHLOROPROPENE	<1	ug/L	1.0	1	1
TRICHLOROETHENE	<1	ug/L	1.0	1	1
DIBROMOCHLOROMETHANE	<1	ug/L	1.0	1	1
1,1,2-TRICHLOROETHANE	<1	ug/L	1.0	1	1
BENZENE	<1	ug/L	1.0	1	1
TRANS-1,3-DICHLOROPROPENE	<1	ug/L	1.0	1	1
TOTAL 1,3-DICHLOROPROPENE	<2	ug/L	1.0	2	2
2-CHLOROETHYLVINYLETHER	<10	ug/L	1.0	10	10
BROMOFORM	<1	ug/L	1.0	1	1
TETRACHLOROETHENE	<1	ug/L	1.0	1	1
1,1,2,2-TETRACHLOROETHANE	<1	ug/L	1.0	1	1
TOLUENE	<1	ug/L	1.0	1	1
CHLOROBENZENE	<1	ug/L	1.0	1	1
ETHYLBENZENE	<1	ug/L	1.0	1	1
1,2-DICHLOROETHANE-D4	100	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-1
SDG: WQ1512
Report Date: 6/16/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8260
Date Analyzed: 6/1/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW01S	AQ	5/25/00	5/26/00	6/1/00	BEM	5030	BEM

Compound	Result	Units	DF	Sample PQL	Method PQL
TOLUENE-D8	101	%	1.0		
P-BROMOFLUOROBENZENE	86	%	1.0		
DIBROMOFLUOROMETHANE	103	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-2
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8270
Date Analyzed: 6/13/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW04S	AQ	5/25/00	5/26/00	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
N-NITROSODIMETHYLAMINE	<10	ug/L	1.0	10	10
PHENOL	<10	ug/L	1.0	10	10
BIS(2-CHLOROETHYL)ETHER	<10	ug/L	1.0	10	10
2-CHLOROPHENOL	<10	ug/L	1.0	10	10
1,3-DICHLOROBENZENE	<10	ug/L	1.0	10	10
1,4-DICHLOROBENZENE	<10	ug/L	1.0	10	10
1,2-DICHLOROBENZENE	<10	ug/L	1.0	10	10
2,2'-OXYBIS(1-CHLOROPROPANE)	<10	ug/L	1.0	10	10
N-NITROSO-DI-N-PROPYLAMINE	<10	ug/L	1.0	10	10
HEXACHLOROETHANE	<10	ug/L	1.0	10	10
NITROBENZENE	<10	ug/L	1.0	10	10
ISOPHORONE	<10	ug/L	1.0	10	10
2-NITROPHENOL	<10	ug/L	1.0	10	10
2,4-DIMETHYLPHENOL	<10	ug/L	1.0	10	10
BIS(2-CHLOROETHOXY)METHANE	<10	ug/L	1.0	10	10
2,4-DICHLOROPHENOL	<10	ug/L	1.0	10	10
1,2,4-TRICHLOROBENZENE	<10	ug/L	1.0	10	10
NAPHTHALENE	16	ug/L	1.0	10	10
HEXACHLOROBUTADIENE	<10	ug/L	1.0	10	10
4-CHLORO-3-METHYLPHENOL	<10	ug/L	1.0	10	10
HEXACHLOROCYCLOPENTADIEN	<10	ug/L	1.0	10	10
2,4,6-TRICHLOROPHENOL	<10	ug/L	1.0	10	10
2-CHLORONAPHTHALENE	<10	ug/L	1.0	10	10
DIMETHYL PHTHALATE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
2,6-DINITROTOLUENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	11	ug/L	1.0	10	10
2,4-DINITROPHENOL	<25	ug/L	1.0	25	25
4-NITROPHENOL	<25	ug/L	1.0	25	25
2,4-DINITROTOLUENE	<10	ug/L	1.0	10	10
DIETHYLPHTHALATE	<10	ug/L	1.0	10	10
4-CHLOROPHENYL-PHENYLETHE	<10	ug/L	1.0	10	10
FLUORENE	17	ug/L	1.0	10	10

Report Notes: J

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-2
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8270
Date Analyzed: 6/13/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW04S	AQ	5/25/00	5/26/00	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
4,6-DINITRO-2-METHYLPHENOL	<25	ug/L	1.0	25	25
N-NITROSODIPHENYLAMINE	<10	ug/L	1.0	10	10
4-BROMOPHENYL-PHENYLETHER	<10	ug/L	1.0	10	10
HEXACHLOROBENZENE	<10	ug/L	1.0	10	10
1,2-DIPHENYLHYDRAZINE	<10	ug/L	1.0	10	10
PENTACHLOROPHENOL	<25	ug/L	1.0	25	25
PHENANTHRENE	22	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
DI-N-BUTYLPHTHALATE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
BENZIDINE	<25	ug/L	1.0	25	25
PYRENE	J6	ug/L	1.0	10	10
BUTYLBENZYLPHTHALATE	<10	ug/L	1.0	10	10
3,3'-DICHLOROBENZIDINE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BIS(2-ETHYLHEXYL)PHTHALATE	J7	ug/L	1.0	10	10
DI-N-OCTYLPHTHALATE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
2-FLUOROPHENOL	71	%	1.0		
PHENOL-D6	70	%	1.0		
NITROBENZENE-D5	71	%	1.0		
2-FLUOROBIPHENYL	66	%	1.0		
2,4,6-TRIBROMOPHENOL	76	%	1.0		
TERPHENYL-D14	41	%	1.0		

Report Notes: J

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-2
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: EPA 8270
Date Analyzed: 6/9/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW04S	AQ	5/25/00	5/26/00	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZO[A]ANTHRACENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[B]FLUORANTHENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[K]FLUORANTHENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[A]PYRENE	<0.05	ug/L	1.0	0.05	0.05
INDENO[1,2,3-CD]PYRENE	<0.05	ug/L	1.0	0.05	0.05
DIBENZ[A,H]ANTHRACENE	<0.05	ug/L	1.0	0.05	0.05

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-2
SDG: WQ1512
Report Date: 6/16/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8260
Date Analyzed: 6/1/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW04S	AQ	5/25/00	5/26/00	6/1/00	BEM	5030	BEM

Compound	Result	Units	DF	Sample PQL	Method PQL
CHLOROMETHANE	<2	ug/L	1.0	2	2
BROMOMETHANE	<2	ug/L	1.0	2	2
VINYL CHLORIDE	<2	ug/L	1.0	2	2
CHLOROETHANE	<2	ug/L	1.0	2	2
METHYLENE CHLORIDE	<1	ug/L	1.0	1	1
TRICHLOROFLUOROMETHANE	<2	ug/L	1.0	2	2
ACROLEIN	<5	ug/L	1.0	5	5
ACRYLONITRILE	<50	ug/L	1.0	50	50
1,1-DICHLOROETHENE	<1	ug/L	1.0	1	1
1,1-DICHLOROETHANE	<1	ug/L	1.0	1	1
1,2-DICHLOROETHENE (TRANS)	<1	ug/L	1.0	1	1
TOTAL 1,2-DICHLOROETHENE	<1	ug/L	1.0	1	1
CHLOROFORM	<1	ug/L	1.0	1	1
1,2-DICHLOROETHANE	<1	ug/L	1.0	1	1
1,1,1-TRICHLOROETHANE	<1	ug/L	1.0	1	1
CARBON TETRACHLORIDE	<1	ug/L	1.0	1	1
BROMODICHLOROMETHANE	<1	ug/L	1.0	1	1
1,2-DICHLOROPROPANE	<1	ug/L	1.0	1	1
CIS-1,3-DICHLOROPROPENE	<1	ug/L	1.0	1	1
TRICHLOROETHENE	<1	ug/L	1.0	1	1
DIBROMOCHLOROMETHANE	<1	ug/L	1.0	1	1
1,1,2-TRICHLOROETHANE	<1	ug/L	1.0	1	1
BENZENE	<1	ug/L	1.0	1	1
TRANS-1,3-DICHLOROPROPENE	<1	ug/L	1.0	1	1
TOTAL 1,3-DICHLOROPROPENE	<2	ug/L	1.0	2	2
2-CHLOROETHYLVINYLETHER	<10	ug/L	1.0	10	10
BROMOFORM	<1	ug/L	1.0	1	1
TETRACHLOROETHENE	<1	ug/L	1.0	1	1
1,1,2,2-TETRACHLOROETHANE	<1	ug/L	1.0	1	1
TOLUENE	<1	ug/L	1.0	1	1
CHLOROBENZENE	<1	ug/L	1.0	1	1
ETHYLBENZENE	<1	ug/L	1.0	1	1
1,2-DICHLOROETHANE-D4	100	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-2
SDG: WQ1512
Report Date: 6/16/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8260
Date Analyzed: 6/1/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW04S	AQ	5/25/00	5/26/00	6/1/00	BEM	5030	BEM

Compound	Result	Units	DF	Sample PQL	Method PQL
TOLUENE-D8	103	%	1.0		
P-BROMOFLUOROBENZENE	91	%	1.0		
DIBROMOFLUOROMETHANE	108	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-3
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8270
Date Analyzed: 6/14/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW09S	AQ	5/25/00	5/26/00	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
N-NITROSODIMETHYLAMINE	<10	ug/L	1.0	10	10
PHENOL	<10	ug/L	1.0	10	10
BIS(2-CHLOROETHYL)ETHER	<10	ug/L	1.0	10	10
2-CHLOROPHENOL	<10	ug/L	1.0	10	10
1,3-DICHLOROBENZENE	<10	ug/L	1.0	10	10
1,4-DICHLOROBENZENE	<10	ug/L	1.0	10	10
1,2-DICHLOROBENZENE	<10	ug/L	1.0	10	10
2,2'-OXYBIS(1-CHLOROPROPANE)	<10	ug/L	1.0	10	10
N-NITROSO-DI-N-PROPYLAMINE	<10	ug/L	1.0	10	10
HEXACHLOROETHANE	<10	ug/L	1.0	10	10
NITROBENZENE	<10	ug/L	1.0	10	10
ISOPHORONE	<10	ug/L	1.0	10	10
2-NITROPHENOL	<10	ug/L	1.0	10	10
2,4-DIMETHYLPHENOL	<10	ug/L	1.0	10	10
BIS(2-CHLOROETHOXY)METHANE	<10	ug/L	1.0	10	10
2,4-DICHLOROPHENOL	<10	ug/L	1.0	10	10
1,2,4-TRICHLOROBENZENE	<10	ug/L	1.0	10	10
NAPHTHALENE	<10	ug/L	1.0	10	10
HEXACHLOROBUTADIENE	<10	ug/L	1.0	10	10
4-CHLORO-3-METHYLPHENOL	<10	ug/L	1.0	10	10
HEXACHLOROCYCLOPENTADIEN	<10	ug/L	1.0	10	10
2,4,6-TRICHLOROPHENOL	<10	ug/L	1.0	10	10
2-CHLORONAPHTHALENE	<10	ug/L	1.0	10	10
DIMETHYL PHTHALATE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
2,6-DINITROTOLUENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
2,4-DINITROPHENOL	<25	ug/L	1.0	25	25
4-NITROPHENOL	<25	ug/L	1.0	25	25
2,4-DINITROTOLUENE	<10	ug/L	1.0	10	10
DIETHYLPHTHALATE	<10	ug/L	1.0	10	10
4-CHLOROPHENYL-PHENYLETHE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10

Report Notes: J

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-3
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8270
Date Analyzed: 6/14/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW09S	AQ	5/25/00	5/26/00	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
4,6-DINITRO-2-METHYLPHENOL	<25	ug/L	1.0	25	25
N-NITROSODIPHENYLAMINE	<10	ug/L	1.0	10	10
4-BROMOPHENYL-PHENYLETHER	<10	ug/L	1.0	10	10
HEXACHLOROBENZENE	<10	ug/L	1.0	10	10
1,2-DIPHENYLHYDRAZINE	<10	ug/L	1.0	10	10
PENTACHLOROPHENOL	<25	ug/L	1.0	25	25
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
DI-N-BUTYLPHTHALATE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
BENZIDINE	<25	ug/L	1.0	25	25
PYRENE	<10	ug/L	1.0	10	10
BUTYLBENZYLPHTHALATE	<10	ug/L	1.0	10	10
3,3'-DICHLOROBENZIDINE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BIS(2-ETHYLHEXYL)PHTHALATE	J9	ug/L	1.0	10	10
DI-N-OCTYLPHTHALATE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
2-FLUOROPHENOL	60	%	1.0		
PHENOL-D6	66	%	1.0		
NITROBENZENE-D5	57	%	1.0		
2-FLUOROBIPHENYL	64	%	1.0		
2,4,6-TRIBROMOPHENOL	93	%	1.0		
TERPHENYL-D14	71	%	1.0		

Report Notes: J

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-3
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: EPA 8270
Date Analyzed: 6/9/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW09S	AQ	5/25/00	5/26/00	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZO[A]ANTHRACENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[B]FLUORANTHENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[K]FLUORANTHENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[A]PYRENE	<0.05	ug/L	1.0	0.05	0.05
INDENO[1,2,3-CD]PYRENE	<0.05	ug/L	1.0	0.05	0.05
DIBENZ[A,H]ANTHRACENE	<0.05	ug/L	1.0	0.05	0.05

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-3
SDG: WQ1512
Report Date: 6/16/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8260
Date Analyzed: 6/1/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW09S	AQ	5/25/00	5/26/00	6/1/00	BEM	5030	BEM

Compound	Result	Units	DF	Sample PQL	Method PQL
CHLOROMETHANE	<2	ug/L	1.0	2	2
BROMOMETHANE	<2	ug/L	1.0	2	2
VINYL CHLORIDE	<2	ug/L	1.0	2	2
CHLOROETHANE	<2	ug/L	1.0	2	2
METHYLENE CHLORIDE	<1	ug/L	1.0	1	1
TRICHLOROFLUOROMETHANE	<2	ug/L	1.0	2	2
ACROLEIN	<5	ug/L	1.0	5	5
ACRYLONITRILE	<50	ug/L	1.0	50	50
1,1-DICHLOROETHENE	<1	ug/L	1.0	1	1
1,1-DICHLOROETHANE	<1	ug/L	1.0	1	1
1,2-DICHLOROETHENE (TRANS)	<1	ug/L	1.0	1	1
TOTAL 1,2-DICHLOROETHENE	<1	ug/L	1.0	1	1
CHLOROFORM	<1	ug/L	1.0	1	1
1,2-DICHLOROETHANE	<1	ug/L	1.0	1	1
1,1,1-TRICHLOROETHANE	<1	ug/L	1.0	1	1
CARBON TETRACHLORIDE	<1	ug/L	1.0	1	1
BROMODICHLOROMETHANE	<1	ug/L	1.0	1	1
1,2-DICHLOROPROPANE	<1	ug/L	1.0	1	1
CIS-1,3-DICHLOROPROPENE	<1	ug/L	1.0	1	1
TRICHLOROETHENE	<1	ug/L	1.0	1	1
DIBROMOCHLOROMETHANE	<1	ug/L	1.0	1	1
1,1,2-TRICHLOROETHANE	<1	ug/L	1.0	1	1
BENZENE	<1	ug/L	1.0	1	1
TRANS-1,3-DICHLOROPROPENE	<1	ug/L	1.0	1	1
TOTAL 1,3-DICHLOROPROPENE	<2	ug/L	1.0	2	2
2-CHLOROETHYLVINYLETHER	<10	ug/L	1.0	10	10
BROMOFORM	<1	ug/L	1.0	1	1
TETRACHLOROETHENE	<1	ug/L	1.0	1	1
1,1,2,2-TETRACHLOROETHANE	<1	ug/L	1.0	1	1
TOLUENE	<1	ug/L	1.0	1	1
CHLOROBENZENE	<1	ug/L	1.0	1	1
ETHYLBENZENE	<1	ug/L	1.0	1	1
1,2-DICHLOROETHANE-D4	93	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-3
SDG: WQ1512
Report Date: 6/16/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8260
Date Analyzed: 6/1/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW09S	AQ	5/25/00	5/26/00	6/1/00	BEM	5030	BEM

Compound	Result	Units	DF	Sample PQL	Method PQL
TOLUENE-D8	101	%	1.0		
P-BROMOFLUOROBENZENE	89	%	1.0		
DIBROMOFLUOROMETHANE	100	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-4
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8270
Date Analyzed: 6/13/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-DUP	AQ	5/25/00	5/26/00	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
N-NITROSODIMETHYLAMINE	<10	ug/L	1.0	10	10
PHENOL	<10	ug/L	1.0	10	10
BIS(2-CHLOROETHYL)ETHER	<10	ug/L	1.0	10	10
2-CHLOROPHENOL	<10	ug/L	1.0	10	10
1,3-DICHLOROBENZENE	<10	ug/L	1.0	10	10
1,4-DICHLOROBENZENE	<10	ug/L	1.0	10	10
1,2-DICHLOROBENZENE	<10	ug/L	1.0	10	10
2,2'-OXYBIS(1-CHLOROPROPANE)	<10	ug/L	1.0	10	10
N-NITROSO-DI-N-PROPYLAMINE	<10	ug/L	1.0	10	10
HEXACHLOROETHANE	<10	ug/L	1.0	10	10
NITROBENZENE	<10	ug/L	1.0	10	10
ISOPHORONE	<10	ug/L	1.0	10	10
2-NITROPHENOL	<10	ug/L	1.0	10	10
2,4-DIMETHYLPHENOL	<10	ug/L	1.0	10	10
BIS(2-CHLOROETHOXY)METHANE	<10	ug/L	1.0	10	10
2,4-DICHLOROPHENOL	<10	ug/L	1.0	10	10
1,2,4-TRICHLOROBENZENE	<10	ug/L	1.0	10	10
NAPHTHALENE	28	ug/L	1.0	10	10
HEXACHLOROBUTADIENE	<10	ug/L	1.0	10	10
4-CHLORO-3-METHYLPHENOL	<10	ug/L	1.0	10	10
HEXACHLOROCYCLOPENTADIEN	<10	ug/L	1.0	10	10
2,4,6-TRICHLOROPHENOL	<10	ug/L	1.0	10	10
2-CHLORONAPHTHALENE	<10	ug/L	1.0	10	10
DIMETHYL PHTHALATE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
2,6-DINITROTOLUENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	19	ug/L	1.0	10	10
2,4-DINITROPHENOL	<25	ug/L	1.0	25	25
4-NITROPHENOL	<25	ug/L	1.0	25	25
2,4-DINITROTOLUENE	<10	ug/L	1.0	10	10
DIETHYLPHTHALATE	<10	ug/L	1.0	10	10
4-CHLOROPHENYL-PHENYLETHE	<10	ug/L	1.0	10	10
FLUORENE	30	ug/L	1.0	10	10

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-4
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8270
Date Analyzed: 6/13/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-DUP	AQ	5/25/00	5/26/00	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
4,6-DINITRO-2-METHYLPHENOL	<25	ug/L	1.0	25	25
N-NITROSODIPHENYLAMINE	<10	ug/L	1.0	10	10
4-BROMOPHENYL-PHENYLETHER	<10	ug/L	1.0	10	10
HEXACHLOROBENZENE	<10	ug/L	1.0	10	10
1,2-DIPHENYLHYDRAZINE	<10	ug/L	1.0	10	10
PENTACHLOROPHENOL	<25	ug/L	1.0	25	25
PHENANTHRENE	47	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
DI-N-BUTYLPHTHALATE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
BENZIDINE	<25	ug/L	1.0	25	25
PYRENE	12	ug/L	1.0	10	10
BUTYLBENZYLPHTHALATE	<10	ug/L	1.0	10	10
3,3'-DICHLOROBENZIDINE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BIS(2-ETHYLHEXYL)PHTHALATE	13	ug/L	1.0	10	10
DI-N-OCTYLPHTHALATE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
2-FLUOROPHENOL	76	%	1.0		
PHENOL-D6	72	%	1.0		
NITROBENZENE-D5	81	%	1.0		
2-FLUOROBIPHENYL	62	%	1.0		
2,4,6-TRIBROMOPHENOL	87	%	1.0		
TERPHENYL-D14	38	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-4
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: EPA 8270
Date Analyzed: 6/9/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-DUP	AQ	5/25/00	5/26/00	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZO[A]ANTHRACENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[B]FLUORANTHENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[K]FLUORANTHENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[A]PYRENE	<0.05	ug/L	1.0	0.05	0.05
INDENO[1,2,3-CD]PYRENE	<0.05	ug/L	1.0	0.05	0.05
DIBENZ[A,H]ANTHRACENE	<0.05	ug/L	1.0	0.05	0.05

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-4
SDG: WQ1512
Report Date: 6/16/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8260
Date Analyzed: 6/1/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-DUP	AQ	5/25/00	5/26/00	6/1/00	BEM	5030	BEM

Compound	Result	Units	DF	Sample PQL	Method PQL
CHLOROMETHANE	<2	ug/L	1.0	2	2
BROMOMETHANE	<2	ug/L	1.0	2	2
VINYL CHLORIDE	<2	ug/L	1.0	2	2
CHLOROETHANE	<2	ug/L	1.0	2	2
METHYLENE CHLORIDE	<1	ug/L	1.0	1	1
TRICHLOROFLUOROMETHANE	<2	ug/L	1.0	2	2
ACROLEIN	<5	ug/L	1.0	5	5
ACRYLONITRILE	<50	ug/L	1.0	50	50
1,1-DICHLOROETHENE	<1	ug/L	1.0	1	1
1,1-DICHLOROETHANE	<1	ug/L	1.0	1	1
1,2-DICHLOROETHENE (TRANS)	<1	ug/L	1.0	1	1
TOTAL 1,2-DICHLOROETHENE	<1	ug/L	1.0	1	1
CHLOROFORM	<1	ug/L	1.0	1	1
1,2-DICHLOROETHANE	<1	ug/L	1.0	1	1
1,1,1-TRICHLOROETHANE	<1	ug/L	1.0	1	1
CARBON TETRACHLORIDE	<1	ug/L	1.0	1	1
BROMODICHLOROMETHANE	<1	ug/L	1.0	1	1
1,2-DICHLOROPROPANE	<1	ug/L	1.0	1	1
CIS-1,3-DICHLOROPROPENE	<1	ug/L	1.0	1	1
TRICHLOROETHENE	<1	ug/L	1.0	1	1
DIBROMOCHLOROMETHANE	<1	ug/L	1.0	1	1
1,1,2-TRICHLOROETHANE	<1	ug/L	1.0	1	1
BENZENE	J0.7	ug/L	1.0	1	1
TRANS-1,3-DICHLOROPROPENE	<1	ug/L	1.0	1	1
TOTAL 1,3-DICHLOROPROPENE	<2	ug/L	1.0	2	2
2-CHLOROETHYLVINYLETHER	<10	ug/L	1.0	10	10
BROMOFORM	<1	ug/L	1.0	1	1
TETRACHLOROETHENE	<1	ug/L	1.0	1	1
1,1,2,2-TETRACHLOROETHANE	<1	ug/L	1.0	1	1
TOLUENE	<1	ug/L	1.0	1	1
CHLOROBENZENE	<1	ug/L	1.0	1	1
ETHYLBENZENE	<1	ug/L	1.0	1	1
1,2-DICHLOROETHANE-D4	94	%	1.0		

Report Notes: J

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-4
SDG: WQ1512
Report Date: 6/16/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8260
Date Analyzed: 6/1/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-DUP	AQ	5/25/00	5/26/00	6/1/00	BEM	5030	BEM

Compound	Result	Units	DF	Sample PQL	Method PQL
TOLUENE-D8	103	%	1.0		
P-BROMOFLUOROBENZENE	92	%	1.0		
DIBROMOFLUOROMETHANE	104	%	1.0		

Report Notes: J

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-5
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8270
Date Analyzed: 6/13/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW10S	AQ	5/25/00	5/26/00	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
N-NITROSODIMETHYLAMINE	<10	ug/L	1.0	10	10
PHENOL	<10	ug/L	1.0	10	10
BIS(2-CHLOROETHYL)ETHER	<10	ug/L	1.0	10	10
2-CHLOROPHENOL	<10	ug/L	1.0	10	10
1,3-DICHLOROBENZENE	<10	ug/L	1.0	10	10
1,4-DICHLOROBENZENE	<10	ug/L	1.0	10	10
1,2-DICHLOROBENZENE	<10	ug/L	1.0	10	10
2,2'-OXYBIS(1-CHLOROPROPANE)	<10	ug/L	1.0	10	10
N-NITROSO-DI-N-PROPYLAMINE	<10	ug/L	1.0	10	10
HEXACHLOROETHANE	<10	ug/L	1.0	10	10
NITROBENZENE	<10	ug/L	1.0	10	10
ISOPHORONE	<10	ug/L	1.0	10	10
2-NITROPHENOL	<10	ug/L	1.0	10	10
2,4-DIMETHYLPHENOL	<10	ug/L	1.0	10	10
BIS(2-CHLOROETHOXY)METHANE	<10	ug/L	1.0	10	10
2,4-DICHLOROPHENOL	<10	ug/L	1.0	10	10
1,2,4-TRICHLOROBENZENE	<10	ug/L	1.0	10	10
NAPHTHALENE	<10	ug/L	1.0	10	10
HEXACHLOROBUTADIENE	<10	ug/L	1.0	10	10
4-CHLORO-3-METHYLPHENOL	<10	ug/L	1.0	10	10
HEXACHLOROCYCLOPENTADIEN	<10	ug/L	1.0	10	10
2,4,6-TRICHLOROPHENOL	<10	ug/L	1.0	10	10
2-CHLORONAPHTHALENE	<10	ug/L	1.0	10	10
DIMETHYL PHTHALATE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
2,6-DINITROTOLUENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
2,4-DINITROPHENOL	<25	ug/L	1.0	25	25
4-NITROPHENOL	<25	ug/L	1.0	25	25
2,4-DINITROTOLUENE	<10	ug/L	1.0	10	10
DIETHYLPHTHALATE	<10	ug/L	1.0	10	10
4-CHLOROPHENYL-PHENYLETHE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-5
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8270
Date Analyzed: 6/13/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW10S	AQ	5/25/00	5/26/00	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
4,6-DINITRO-2-METHYLPHENOL	<25	ug/L	1.0	25	25
N-NITROSODIPHENYLAMINE	<10	ug/L	1.0	10	10
4-BROMOPHENYL-PHENYLETHER	<10	ug/L	1.0	10	10
HEXACHLOROBENZENE	<10	ug/L	1.0	10	10
1,2-DIPHENYLHYDRAZINE	<10	ug/L	1.0	10	10
PENTACHLOROPHENOL	<25	ug/L	1.0	25	25
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
DI-N-BUTYLPHTHALATE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
BENZIDINE	<25	ug/L	1.0	25	25
PYRENE	<10	ug/L	1.0	10	10
BUTYLBENZYLPHTHALATE	<10	ug/L	1.0	10	10
3,3'-DICHLOROBENZIDINE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BIS(2-ETHYLHEXYL)PHTHALATE	<10	ug/L	1.0	10	10
DI-N-OCTYLPHTHALATE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
2-FLUOROPHENOL	65	%	1.0		
PHENOL-D6	67	%	1.0		
NITROBENZENE-D5	65	%	1.0		
2-FLUOROBIPHENYL	66	%	1.0		
2,4,6-TRIBROMOPHENOL	78	%	1.0		
TERPHENYL-D14	53	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-5
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: EPA 8270
Date Analyzed: 6/9/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW10S	AQ	5/25/00	5/26/00	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZO[A]ANTHRACENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[B]FLUORANTHENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[K]FLUORANTHENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[A]PYRENE	<0.05	ug/L	1.0	0.05	0.05
INDENO[1,2,3-CD]PYRENE	<0.05	ug/L	1.0	0.05	0.05
DIBENZ[A,H]ANTHRACENE	<0.05	ug/L	1.0	0.05	0.05

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-5
SDG: WQ1512
Report Date: 6/16/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8260
Date Analyzed: 6/1/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW10S	AQ	5/25/00	5/26/00	6/1/00	BEM	5030	BEM

Compound	Result	Units	DF	Sample PQL	Method PQL
CHLOROMETHANE	<2	ug/L	1.0	2	2
BROMOMETHANE	<2	ug/L	1.0	2	2
VINYL CHLORIDE	<2	ug/L	1.0	2	2
CHLOROETHANE	<2	ug/L	1.0	2	2
METHYLENE CHLORIDE	<1	ug/L	1.0	1	1
TRICHLOROFLUOROMETHANE	<2	ug/L	1.0	2	2
ACROLEIN	<5	ug/L	1.0	5	5
ACRYLONITRILE	<50	ug/L	1.0	50	50
1,1-DICHLOROETHENE	<1	ug/L	1.0	1	1
1,1-DICHLOROETHANE	<1	ug/L	1.0	1	1
1,2-DICHLOROETHENE (TRANS)	<1	ug/L	1.0	1	1
TOTAL 1,2-DICHLOROETHENE	<1	ug/L	1.0	1	1
CHLOROFORM	<1	ug/L	1.0	1	1
1,2-DICHLOROETHANE	<1	ug/L	1.0	1	1
1,1,1-TRICHLOROETHANE	<1	ug/L	1.0	1	1
CARBON TETRACHLORIDE	<1	ug/L	1.0	1	1
BROMODICHLOROMETHANE	<1	ug/L	1.0	1	1
1,2-DICHLOROPROPANE	<1	ug/L	1.0	1	1
CIS-1,3-DICHLOROPROPENE	<1	ug/L	1.0	1	1
TRICHLOROETHENE	<1	ug/L	1.0	1	1
DIBROMOCHLOROMETHANE	<1	ug/L	1.0	1	1
1,1,2-TRICHLOROETHANE	<1	ug/L	1.0	1	1
BENZENE	<1	ug/L	1.0	1	1
TRANS-1,3-DICHLOROPROPENE	<1	ug/L	1.0	1	1
TOTAL 1,3-DICHLOROPROPENE	<2	ug/L	1.0	2	2
2-CHLOROETHYLVINYLETHER	<10	ug/L	1.0	10	10
BROMOFORM	<1	ug/L	1.0	1	1
TETRACHLOROETHENE	<1	ug/L	1.0	1	1
1,1,2,2-TETRACHLOROETHANE	<1	ug/L	1.0	1	1
TOLUENE	<1	ug/L	1.0	1	1
CHLOROBENZENE	<1	ug/L	1.0	1	1
ETHYLBENZENE	<1	ug/L	1.0	1	1
1,2-DICHLOROETHANE-D4	95	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-5
SDG: WQ1512
Report Date: 6/16/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8260
Date Analyzed: 6/1/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
MAY-BE-MW10S	AQ	5/25/00	5/26/00	6/1/00	BEM	5030	BEM

Compound	Result	Units	DF	Sample PQL	Method PQL
TOLUENE-D8	100	%	1.0		
P-BROMOFLUOROBENZENE	94	%	1.0		
DIBROMOFLUOROMETHANE	103	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-6
SDG: WQ1512
Report Date: 6/16/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8260
Date Analyzed: 6/1/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
TRIP BLANK	AQ	5/23/00	5/26/00	6/1/00	BEM	5030	BEM

Compound	Result	Units	DF	Sample PQL	Method PQL
CHLOROMETHANE	<2	ug/L	1.0	2	2
BROMOMETHANE	<2	ug/L	1.0	2	2
VINYL CHLORIDE	<2	ug/L	1.0	2	2
CHLOROETHANE	<2	ug/L	1.0	2	2
METHYLENE CHLORIDE	<1	ug/L	1.0	1	1
TRICHLOROFLUOROMETHANE	<2	ug/L	1.0	2	2
ACROLEIN	<5	ug/L	1.0	5	5
ACRYLONITRILE	<50	ug/L	1.0	50	50
1,1-DICHLOROETHENE	<1	ug/L	1.0	1	1
1,1-DICHLOROETHANE	<1	ug/L	1.0	1	1
1,2-DICHLOROETHENE (TRANS)	<1	ug/L	1.0	1	1
TOTAL 1,2-DICHLOROETHENE	<1	ug/L	1.0	1	1
CHLOROFORM	<1	ug/L	1.0	1	1
1,2-DICHLOROETHANE	<1	ug/L	1.0	1	1
1,1,1-TRICHLOROETHANE	<1	ug/L	1.0	1	1
CARBON TETRACHLORIDE	<1	ug/L	1.0	1	1
BROMODICHLOROMETHANE	<1	ug/L	1.0	1	1
1,2-DICHLOROPROPANE	<1	ug/L	1.0	1	1
CIS-1,3-DICHLOROPROPENE	<1	ug/L	1.0	1	1
TRICHLOROETHENE	<1	ug/L	1.0	1	1
DIBROMOCHLOROMETHANE	<1	ug/L	1.0	1	1
1,1,2-TRICHLOROETHANE	<1	ug/L	1.0	1	1
BENZENE	<1	ug/L	1.0	1	1
TRANS-1,3-DICHLOROPROPENE	<1	ug/L	1.0	1	1
TOTAL 1,3-DICHLOROPROPENE	<2	ug/L	1.0	2	2
2-CHLOROETHYLVINYLETHER	<10	ug/L	1.0	10	10
BROMOFORM	<1	ug/L	1.0	1	1
TETRACHLOROETHENE	<1	ug/L	1.0	1	1
1,1,2,2-TETRACHLOROETHANE	<1	ug/L	1.0	1	1
TOLUENE	<1	ug/L	1.0	1	1
CHLOROBENZENE	<1	ug/L	1.0	1	1
ETHYLBENZENE	<1	ug/L	1.0	1	1
1,2-DICHLOROETHANE-D4	92	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: WQ1512-6
SDG: WQ1512
Report Date: 6/16/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8260
Date Analyzed: 6/1/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
TRIP BLANK	AQ	5/23/00	5/26/00	6/1/00	BEM	5030	BEM

Compound	Result	Units	DF	Sample PQL	Method PQL
TOLUENE-D8	101	%	1.0		
P-BROMOFLUOROBENZENE	89	%	1.0		
DIBROMOFLUOROMETHANE	100	%	1.0		

Report Notes:

4A

VOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKS01A

Lab Name: Katahdin Analytical Services SDG No.: WQ1512

Lab File ID: S0214 Lab Sample ID: VBLKS01A

Date Analyzed: 06/01/00 Time Analyzed: 10:12

GC Column: RTX-624 ID: 0.18 (mm) Heated Purge: (Y/N) N

Instrument ID: 5972-S

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCSS01A	LCSS01A	S0213	6/1/00	9:25:00 AM
MAY-BE-MW01S	WQ1512-1	S0215	6/1/00	11:09:00 AM
MAY-BE-MW04S	WQ1512-2	S0216	6/1/00	11:49:00 AM
MAY-BE-MW09S	WQ1512-3	S0217	6/1/00	12:29:00 PM
MAY-BE-DUP	WQ1512-4	S0218	6/1/00	1:09:00 PM
MAY-BE-MW10S	WQ1512-5	S0219	6/1/00	1:49:00 PM
TRIP BLANK	WQ1512-6	S0220	6/1/00	2:29:00 PM

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: VBLKS01A
SDG: WQ1512
Report Date: 6/16/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8260
Date Analyzed: 6/1/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKS01A	AQ	-	-	6/1/00	BEM	5030	BEM

Compound	Result	Units	DF	Sample PQL	Method PQL
CHLOROMETHANE	<2	ug/L	1.0	2	2
BROMOMETHANE	<2	ug/L	1.0	2	2
VINYL CHLORIDE	<2	ug/L	1.0	2	2
CHLOROETHANE	<2	ug/L	1.0	2	2
METHYLENE CHLORIDE	2	ug/L	1.0	1	1
TRICHLOROFLUOROMETHANE	<2	ug/L	1.0	2	2
ACROLEIN	<5	ug/L	1.0	5	5
ACRYLONITRILE	<50	ug/L	1.0	50	50
1,1-DICHLOROETHENE	<1	ug/L	1.0	1	1
1,1-DICHLOROETHANE	<1	ug/L	1.0	1	1
1,2-DICHLOROETHENE (TRANS)	<1	ug/L	1.0	1	1
TOTAL 1,2-DICHLOROETHENE	<1	ug/L	1.0	1	1
CHLOROFORM	<1	ug/L	1.0	1	1
1,2-DICHLOROETHANE	<1	ug/L	1.0	1	1
1,1,1-TRICHLOROETHANE	<1	ug/L	1.0	1	1
CARBON TETRACHLORIDE	<1	ug/L	1.0	1	1
BROMODICHLOROMETHANE	<1	ug/L	1.0	1	1
1,2-DICHLOROPROPANE	<1	ug/L	1.0	1	1
CIS-1,3-DICHLOROPROPENE	<1	ug/L	1.0	1	1
TRICHLOROETHENE	<1	ug/L	1.0	1	1
DIBROMOCHLOROMETHANE	<1	ug/L	1.0	1	1
1,1,2-TRICHLOROETHANE	<1	ug/L	1.0	1	1
BENZENE	<1	ug/L	1.0	1	1
TRANS-1,3-DICHLOROPROPENE	<1	ug/L	1.0	1	1
TOTAL 1,3-DICHLOROPROPENE	<2	ug/L	1.0	2	2
2-CHLOROETHYLVINYLETHER	<10	ug/L	1.0	10	10
BROMOFORM	<1	ug/L	1.0	1	1
TETRACHLOROETHENE	<1	ug/L	1.0	1	1
1,1,2,2-TETRACHLOROETHANE	<1	ug/L	1.0	1	1
TOLUENE	<1	ug/L	1.0	1	1
CHLOROBENZENE	<1	ug/L	1.0	1	1
ETHYLBENZENE	<1	ug/L	1.0	1	1
1,2-DICHLOROETHANE-D4	94	%	1.0		

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: VBLKS01A
SDG: WQ1512
Report Date: 6/16/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8260
Date Analyzed: 6/1/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
VBLKS01A	AQ	-	-	6/1/00	BEM	5030	BEM

Compound	Result	Units	DF	Sample PQL	Method PQL
TOLUENE-D8	98	%	1.0		
P-BROMOFLUOROBENZENE	84	%	1.0		
DIBROMOFLUOROMETHANE	104	%	1.0		

Report Notes:

Katahdin Analytical Services
8260 LCS Recovery Sheet

Lab File: S0213 **Sample ID:** LCSS01A **Date Run:** 6/1/00

Analyst: BEM **Time Injected:** 9:25:00 AM **Matrix:** AQ

Compound Name	Spike Amt (ug/L)	Result (ug/L)	Rec (%)	Limits (%)
1,1,1-TRICHLOROETHANE	50	42.5	85	60-140
1,1,2,2-TETRACHLOROETHANE	50	49.7	99	60-140
1,1,2-TRICHLOROETHANE	50	53.4	107	60-140
1,1-DICHLOROETHANE	50	45.0	90	60-140
1,1-DICHLOROETHENE	50	40.9	82	60-140
1,2-DICHLOROETHANE	50	50.5	101	60-140
1,2-DICHLOROETHENE (TRANS)	50	46.4	93	60-140
1,2-DICHLOROPROPANE	50	45.6	91	60-140
2-CHLOROETHYLVINYLETHER	50	41.6	83	60-140
ACROLEIN	50	45.7	91	60-140
ACRYLONITRILE	50	48.6	97	60-140
BENZENE	50	43.7	87	60-140
BROMODICHLOROMETHANE	50	45.9	92	60-140
BROMOFORM	50	58.9	118	60-140
BROMOMETHANE	50	40.9	82	60-140
CARBON TETRACHLORIDE	50	49.5	99	60-140
CHLOROBENZENE	50	45.6	91	60-140
CHLOROETHANE	50	36.8	74	60-140
CHLOROFORM	50	47.5	95	60-140
CHLOROMETHANE	50	38.6	77	60-140
CIS-1,3-DICHLOROPROPENE	50	52.0	104	60-140
DIBROMOCHLOROMETHANE	50	49.9	100	60-140
ETHYLBENZENE	50	46.1	92	60-140
METHYLENE CHLORIDE	50	45.5	91	60-140
TETRACHLOROETHENE	50	46.6	93	60-140
TOLUENE	50	44.2	88	60-140
TOTAL 1,2-DICHLOROETHENE	100	90.9	91	60-140
TOTAL 1,3-DICHLOROPROPENE	100	108	108	60-140
TRANS-1,3-DICHLOROPROPENE	50	55.8	112	60-140
TRICHLOROETHENE	50	47.1	94	60-140
TRICHLOROFLUOROMETHANE	50	42.8	86	60-140
VINYL CHLORIDE	50	36.8	74	60-140

*** Out of Limits** *1*

4B

SEMIVOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK;060100

Lab Name: Katahdin Analytical Services SDG No.: WQ1512

Lab File ID: K4530

Lab Sample ID: SBLK;060100

Instrument ID: 5970-K

Date Extracted: 6/1/2000

GC Column: RTX-5 ID: 0.25 (mm)

Date Analyzed: 06/13/00

Matrix: (soil/water) WATER

Time Analyzed: 17:34

Level: (low/med) LOW

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
MAY-BE-MW01S	WQ1512-1	K4531	6/13/00	6:19:00 PM
MAY-BE-MW04S	WQ1512-2	K4532	6/13/00	7:04:00 PM
MAY-BE-DUP	WQ1512-4	K4534	6/13/00	8:34:00 PM
MAY-BE-MW10S	WQ1512-5	K4535	6/13/00	9:19:00 PM
MAY-BE-MW09S	WQ1512-3	K4547	6/14/00	4:06:00 PM

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: SBLK;060100
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8270
Date Analyzed: 6/13/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;060100	AQ	-	-	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
N-NITROSODIMETHYLAMINE	<10	ug/L	1.0	10	10
PHENOL	<10	ug/L	1.0	10	10
BIS(2-CHLOROETHYL)ETHER	<10	ug/L	1.0	10	10
2-CHLOROPHENOL	<10	ug/L	1.0	10	10
1,3-DICHLOROBENZENE	<10	ug/L	1.0	10	10
1,4-DICHLOROBENZENE	<10	ug/L	1.0	10	10
1,2-DICHLOROBENZENE	<10	ug/L	1.0	10	10
2,2'-OXYBIS(1-CHLOROPROPANE)	<10	ug/L	1.0	10	10
N-NITROSO-DI-N-PROPYLAMINE	<10	ug/L	1.0	10	10
HEXACHLOROETHANE	<10	ug/L	1.0	10	10
NITROBENZENE	<10	ug/L	1.0	10	10
ISOPHORONE	<10	ug/L	1.0	10	10
2-NITROPHENOL	<10	ug/L	1.0	10	10
2,4-DIMETHYLPHENOL	<10	ug/L	1.0	10	10
BIS(2-CHLOROETHOXY)METHANE	<10	ug/L	1.0	10	10
2,4-DICHLOROPHENOL	<10	ug/L	1.0	10	10
1,2,4-TRICHLOROBENZENE	<10	ug/L	1.0	10	10
NAPHTHALENE	<10	ug/L	1.0	10	10
HEXACHLOROBUTADIENE	<10	ug/L	1.0	10	10
4-CHLORO-3-METHYLPHENOL	<10	ug/L	1.0	10	10
HEXACHLOROCYCLOPENTADIEN	<10	ug/L	1.0	10	10
2,4,6-TRICHLOROPHENOL	<10	ug/L	1.0	10	10
2-CHLORONAPHTHALENE	<10	ug/L	1.0	10	10
DIMETHYL PHTHALATE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
2,6-DINITROTOLUENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
2,4-DINITROPHENOL	<25	ug/L	1.0	25	25
4-NITROPHENOL	<25	ug/L	1.0	25	25
2,4-DINITROTOLUENE	<10	ug/L	1.0	10	10
DIETHYLPHTHALATE	<10	ug/L	1.0	10	10
4-CHLOROPHENYL-PHENYLETHE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: SBLK;060100
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8270
Date Analyzed: 6/13/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;060100	AQ	-	-	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
4,6-DINITRO-2-METHYLPHENOL	<25	ug/L	1.0	25	25
N-NITROSODIPHENYLAMINE	<10	ug/L	1.0	10	10
4-BROMOPHENYL-PHENYLETHER	<10	ug/L	1.0	10	10
HEXACHLOROBENZENE	<10	ug/L	1.0	10	10
1,2-DIPHENYLHYDRAZINE	<10	ug/L	1.0	10	10
PENTACHLOROPHENOL	<25	ug/L	1.0	25	25
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
DI-N-BUTYLPHTHALATE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
BENZIDINE	<25	ug/L	1.0	25	25
PYRENE	<10	ug/L	1.0	10	10
BUTYLBENZYLPHTHALATE	<10	ug/L	1.0	10	10
3,3'-DICHLOROBENZIDINE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BIS(2-ETHYLHEXYL)PHTHALATE	<10	ug/L	1.0	10	10
DI-N-OCTYLPHTHALATE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
2-FLUOROPHENOL	87	%	1.0		
PHENOL-D6	87	%	1.0		
NITROBENZENE-D5	79	%	1.0		
2-FLUOROBIPHENYL	77	%	1.0		
2,4,6-TRIBROMOPHENOL	75	%	1.0		
TERPHENYL-D14	98	%	1.0		

Report Notes:

4B

SEMIVOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK;060100.

Lab Name: Katahdin Analytical Services SDG No.: WQ1512

Lab File ID: Z4860

Lab Sample ID: SBLK;060100.

Instrument ID: 5972-Z

Date Extracted: 6/1/2000

GC Column: RTX-5 ID: 0.25 (mm)

Date Analyzed: 06/03/00

Matrix: (soil/water) WATER

Time Analyzed: 20:25

Level: (low/med) LOW

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCS;060100	LCS;060100	Z4861	6/3/00	9:09:00 PM
LCSD;060100	LCSD;060100	Z4862	6/3/00	9:51:00 PM

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: SBLK;060100.
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8270
Date Analyzed: 6/3/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;060100.	AQ	-	-	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
N-NITROSODIMETHYLAMINE	<10	ug/L	1.0	10	10
PHENOL	<10	ug/L	1.0	10	10
BIS(2-CHLOROETHYL)ETHER	<10	ug/L	1.0	10	10
2-CHLOROPHENOL	<10	ug/L	1.0	10	10
1,3-DICHLOROBENZENE	<10	ug/L	1.0	10	10
1,4-DICHLOROBENZENE	<10	ug/L	1.0	10	10
1,2-DICHLOROBENZENE	<10	ug/L	1.0	10	10
2,2'-OXYBIS(1-CHLOROPROPANE)	<10	ug/L	1.0	10	10
N-NITROSODI-N-PROPYLAMINE	<10	ug/L	1.0	10	10
HEXACHLOROETHANE	<10	ug/L	1.0	10	10
NITROBENZENE	<10	ug/L	1.0	10	10
ISOPHORONE	<10	ug/L	1.0	10	10
2-NITROPHENOL	<10	ug/L	1.0	10	10
2,4-DIMETHYLPHENOL	<10	ug/L	1.0	10	10
BIS(2-CHLOROETHOXY)METHANE	<10	ug/L	1.0	10	10
2,4-DICHLOROPHENOL	<10	ug/L	1.0	10	10
1,2,4-TRICHLOROBENZENE	<10	ug/L	1.0	10	10
NAPHTHALENE	<10	ug/L	1.0	10	10
HEXACHLOROBUTADIENE	<10	ug/L	1.0	10	10
4-CHLORO-3-METHYLPHENOL	<10	ug/L	1.0	10	10
HEXACHLOROCYCLOPENTADIEN	<10	ug/L	1.0	10	10
2,4,6-TRICHLOROPHENOL	<10	ug/L	1.0	10	10
2-CHLORONAPHTHALENE	<10	ug/L	1.0	10	10
DIMETHYL PHTHALATE	<10	ug/L	1.0	10	10
ACENAPHTHYLENE	<10	ug/L	1.0	10	10
2,6-DINITROTOLUENE	<10	ug/L	1.0	10	10
ACENAPHTHENE	<10	ug/L	1.0	10	10
2,4-DINITROPHENOL	<25	ug/L	1.0	25	25
4-NITROPHENOL	<25	ug/L	1.0	25	25
2,4-DINITROTOLUENE	<10	ug/L	1.0	10	10
DIETHYLPHTHALATE	<10	ug/L	1.0	10	10
4-CHLOROPHENYL-PHENYLETHE	<10	ug/L	1.0	10	10
FLUORENE	<10	ug/L	1.0	10	10

Report Notes:

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: SBLK;060100.
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: SW8270
Date Analyzed: 6/3/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;060100.	AQ	-	-	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
4,6-DINITRO-2-METHYLPHENOL	<25	ug/L	1.0	25	25
N-NITROSODIPHENYLAMINE	<10	ug/L	1.0	10	10
4-BROMOPHENYL-PHENYLETHER	<10	ug/L	1.0	10	10
HEXACHLOROBENZENE	<10	ug/L	1.0	10	10
1,2-DIPHENYLHYDRAZINE	<10	ug/L	1.0	10	10
PENTACHLOROPHENOL	<25	ug/L	1.0	25	25
PHENANTHRENE	<10	ug/L	1.0	10	10
ANTHRACENE	<10	ug/L	1.0	10	10
DI-N-BUTYLPHTHALATE	<10	ug/L	1.0	10	10
FLUORANTHENE	<10	ug/L	1.0	10	10
BENZIDINE	<25	ug/L	1.0	25	25
PYRENE	<10	ug/L	1.0	10	10
BUTYLBENZYLPHTHALATE	<10	ug/L	1.0	10	10
3,3'-DICHLOROBENZIDINE	<10	ug/L	1.0	10	10
BENZO[A]ANTHRACENE	<10	ug/L	1.0	10	10
CHRYSENE	<10	ug/L	1.0	10	10
BIS(2-ETHYLHEXYL)PHTHALATE	<10	ug/L	1.0	10	10
DI-N-OCTYLPHTHALATE	<10	ug/L	1.0	10	10
BENZO[B]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[K]FLUORANTHENE	<10	ug/L	1.0	10	10
BENZO[A]PYRENE	<10	ug/L	1.0	10	10
INDENO[1,2,3-CD]PYRENE	<10	ug/L	1.0	10	10
DIBENZ[A,H]ANTHRACENE	<10	ug/L	1.0	10	10
BENZO[G,H,I]PERYLENE	<10	ug/L	1.0	10	10
2-FLUOROPHENOL	75	%	1.0		
PHENOL-D6	75	%	1.0		
NITROBENZENE-D5	78	%	1.0		
2-FLUOROBIPHENYL	77	%	1.0		
2,4,6-TRIBROMOPHENOL	68	%	1.0		
TERPHENYL-D14	95	%	1.0		

Report Notes:

Katahdin Analytical Services

LCS/LCSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
LCS;060100	Z4861	6/3/00	21:09	JG	AQ	8270
LCSD;060100	Z4862	6/3/00	21:51	JG	AQ	8270

Compound Name	Spk Amt ug/L	LCS Result ug/L	LCSD Result ug/L	LCS Rec (%)	LCSD Rec (%)	Rec. Limits (%)	RPD (%)	RPD Limit (%)
1,2,4-TRICHLOROBENZENE	50	26.0	33.3	*52	*67	70-130	25	30
1,2-DICHLOROBENZENE	50	24.7	32.4	*49	*65	70-130	28	30
1,3-DICHLOROBENZENE	50	23.2	30.5	*46	*61	70-130	28	30
1,4-DICHLOROBENZENE	50	23.8	31.8	*48	*64	70-130	28	30
2,2'-OXYBIS(1-CHLOROPROPANE)	50	37.6	46.9	75	94	70-130	22	30
2,4,6-TRICHLOROPHENOL	100	62.9	73.0	*63	73	70-130	15	30
2,4-DICHLOROPHENOL	100	62.6	76.2	*63	76	70-130	19	30
2,4-DIMETHYLPHENOL	100	59.9	72.0	*60	72	70-130	18	30
2,4-DINITROPHENOL	100	78.4	87.6	78	88	70-130	12	30
2,4-DINITROTOLUENE	50	34.7	38.7	*69	77	70-130	11	30
2,6-DINITROTOLUENE	50	36.5	41.3	73	83	70-130	13	30
2-CHLORONAPHTHALENE	50	38.4	42.8	77	86	70-130	11	30
2-CHLOROPHENOL	100	59.5	77.1	*60	77	70-130	25	30
2-NITROPHENOL	100	62.0	78.0	*62	78	70-130	23	30
3,3'-DICHLOROBENZIDINE	50	33.3	35.1	*67	70	70-130	4.4	30
4,6-DINITRO-2-METHYLPHENOL	100	78.0	90.5	78	90	70-130	14	30
4-BROMOPHENYL-PHENYLETHER	50	34.5	38.0	*69	76	70-130	9.6	30
4-CHLORO-3-METHYLPHENOL	100	69.5	77.7	70	78	70-130	11	30
4-CHLOROPHENYL-PHENYLETHER	50	34.0	38.2	*68	76	70-130	11	30
4-NITROPHENOL	100	48.1	53.6	*48	*54	70-130	12	30
ACENAPHTHENE	50	32.1	36.3	*64	73	70-130	13	30
ACENAPHTHYLENE	50	30.6	35.3	*61	71	70-130	15	30
ANTHRACENE	50	36.0	40.3	72	81	70-130	12	30
BENZO[A]ANTHRACENE	50	33.2	36.2	*66	72	70-130	8.7	30
BENZO[A]PYRENE	50	33.3	36.2	*67	72	70-130	7.2	30
BENZO[B]FLUORANTHENE	50	35.4	38.1	71	76	70-130	6.8	30
BENZO[G,H,I]PERYLENE	50	33.0	36.2	*66	72	70-130	8.7	30
BENZO[K]FLUORANTHENE	50	35.0	38.8	70	78	70-130	11	30
BIS(2-CHLOROETHOXY)METHANE	50	29.8	36.7	*60	73	70-130	20	30
BIS(2-CHLOROETHYL)ETHER	50	33.4	42.4	*67	85	70-130	24	30
BIS(2-ETHYLHEXYL)PHTHALATE	50	34.6	39.4	*69	79	70-130	14	30
BUTYLBENZYLPHTHALATE	50	35.2	38.8	70	78	70-130	11	30
CHRYSENE	50	34.3	37.6	*69	75	70-130	8.3	30
DI-N-BUTYLPHTHALATE	50	36.2	40.2	72	80	70-130	10	30
DI-N-OCTYLPHTHALATE	50	37.5	41.6	75	83	70-130	10	30
DIBENZ[A,H]ANTHRACENE	50	31.3	34.4	*63	*69	70-130	9.1	30
DIETHYLPHTHALATE	50	35.8	39.6	72	79	70-130	9.3	30
DIMETHYL PHTHALATE	50	34.4	39.0	*69	78	70-130	12	30

RPD = (lcs rec - lcsd rec) /[(lcsd rec +lcsd rec)/2] * 100

*** Out of Limits**

1

Katahdin Analytical Services

LCS/LCSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
LCS;060100	Z4861	6/3/00	21:09	JG	AQ	8270
LCSD;060100	Z4862	6/3/00	21:51	JG	AQ	8270

Compound Name	Spk Amt ug/L	LCS Result ug/L	LCSD Result ug/L	LCS Rec (%)	LCSD Rec (%)	Rec. Limits (%)	RPD (%)	RPD Limit (%)
FLUORANTHENE	50	36.2	39.0	72	78	70-130	8	30
FLUORENE	50	33.4	36.6	*67	73	70-130	8.6	30
HEXACHLOROBENZENE	50	32.9	37.4	*66	75	70-130	13	30
HEXACHLOROBUTADIENE	50	22.2	29.0	*44	*58	70-130	27	30
HEXACHLOROCYCLOPENTADIENE	50	11.7	15.9	*23	*32	70-130	*33	30
HEXACHLOROETHANE	50	21.6	29.1	*43	*58	70-130	30	30
INDENO[1,2,3-CD]PYRENE	50	31.9	34.8	*64	70	70-130	9	30
ISOPHORONE	50	30.2	36.1	*60	72	70-130	18	30
N-NITROSODI-N-PROPYLAMINE	50	32.5	39.2	*65	78	70-130	18	30
N-NITROSODIPHENYLAMINE	100	78.6	88.1	79	88	70-130	11	30
NAPHTHALENE	50	29.4	36.3	*59	73	70-130	21	30
NITROBENZENE	50	32.2	40.2	*64	80	70-130	22	30
PENTACHLOROPHENOL	100	75.2	85.0	75	85	70-130	12	30
PHENANTHRENE	50	35.7	40.0	71	80	70-130	12	30
PHENOL	100	62.5	79.0	*62	79	70-130	24	30
PYRENE	50	34.5	39.0	*69	78	70-130	12	30

RPD = (lcs rec - lcsd rec) /[(lcsd rec +lcsd rec)/2] * 100

*** Out of Limits**

4B

SEMIVOLATILE ORGANICS METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK;060100

Lab Name: Katahdin Analytical Services SDG No.: WQ1512

Lab File ID: Z4955

Lab Sample ID: SBLK;060100

Instrument ID: 5972-Z

Date Extracted: 6/1/2000

GC Column: RTX-5 ID: 0.25 (mm)

Date Analyzed: 06/09/00

Matrix: (soil/water) WATER

Time Analyzed: 8:37

Level: (low/med) LOW

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS'S, MS AND MSD'S :

Client Sample ID	Lab Sample ID	Lab Data File	Date Injected	Time Injected
LCS;060100	LCS;060100	Z4956	6/9/00	9:21:00 AM
LCSD;060100	LCSD;060100	Z4957	6/9/00	10:06:00 AM
MAY-BE-MW01S	WQ1512-1	Z4958	6/9/00	10:50:00 AM
MAY-BE-MW04S	WQ1512-2	Z4959	6/9/00	11:34:00 AM
MAY-BE-MW09S	WQ1512-3	Z4960	6/9/00	12:18:00 PM
MAY-BE-DUP	WQ1512-4	Z4961	6/9/00	1:02:00 PM
MAY-BE-MW10S	WQ1512-5	Z4962	6/9/00	1:46:00 PM

KATAHDIN ANALYTICAL SERVICES
REPORT OF ANALYTICAL RESULTS

Client: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL

DEERFIELD BEACH, FL 33442

Proj. ID: MAYPORT,FL

Lab Number: SBLK;060100
SDG: WQ1512
Report Date: 6/19/00
PO No. : FLOR-N0397-P99632
Project: CTO#109
% Solids: N/A
Method: EPA 8270
Date Analyzed: 6/9/00

Sample Description	Matrix	Sampled Date	Rec'd Date	Ext. Date	Ext'd By	Ext. Method	Analyst
SBLK;060100	AQ	-	-	6/1/2000	JRN	SW3520	JG

Compound	Result	Units	DF	Sample PQL	Method PQL
BENZO[A]ANTHRACENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[B]FLUORANTHENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[K]FLUORANTHENE	<0.05	ug/L	1.0	0.05	0.05
BENZO[A]PYRENE	<0.05	ug/L	1.0	0.05	0.05
INDENO[1,2,3-CD]PYRENE	<0.05	ug/L	1.0	0.05	0.05
DIBENZ[A,H]ANTHRACENE	<0.05	ug/L	1.0	0.05	0.05

Report Notes:

Katahdin Analytical Services

LCS/LCSD Report

Sample	File Name	Date Acquired	Time inj	Analyst	Matrix	Method
LCS;060100	Z4956	6/9/00	9:21	JG	AQ	8270
LCSD;060100	Z4957	6/9/00	10:06	JG	AQ	8270

Compound Name	Spk Amt ug/L	LCS Result ug/L	LCSD Result ug/L	LCS Rec (%)	LCSD Rec (%)	Rec. Limits (%)	RPD (%)	RPD Limit (%)
BENZO[A]ANTHRACENE	50	34.2	40.6	*68	81	70-130	17	30
BENZO[A]PYRENE	50	34.5	38.9	*69	78	70-130	12	30
BENZO[B]FLUORANTHENE	50	36.6	47.8	73	96	70-130	27	30
BENZO[K]FLUORANTHENE	50	35.8	32.0	72	*64	70-130	12	30
DIBENZ[A,H]ANTHRACENE	50	32.7	37.4	*65	75	70-130	14	30
INDENO[1,2,3-CD]PYRENE	50	34.8	38.2	70	76	70-130	8.2	30

RPD = (lcs rec - lcsd rec) /[(lcsd rec +lcsd rec)/2] * 100

*** Out of Limits**

1

KATAHDIN ANALYTICAL SERVICES, INC.
SAMPLE RECEIPT CONDITION REPORT
Tel. (207) 874-2400
Fax (207) 775-4029

LAB (WORK ORDER) #: WQ1512

PAGE: 1 OF 1

COOLER: 1 OF 1

CLIENT: TetraTech

PROJECT: Mayport

COC#: -
SDG#: -
DATE / TIME RECEIVED: 5-26-00 0840
DELIVERED BY: FedEx
RECEIVED BY: SAM
LIMS ENTRY BY: SAM
LIMS REVIEW BY / PM: PC

	YES	NO	EXCEPTIONS	COMMENTS	RESOLUTION
1. CUSTODY SEALS PRESENT / INTACT?	☑	☐	☐		
2. CHAIN OF CUSTODY PRESENT IN THIS COOLER?	☑	☐	☐		
3. CHAIN OF CUSTODY SIGNED BY CLIENT?	☑	☐	☐		
4. CHAIN OF CUSTODY MATCHES SAMPLES?	☐	☑	☐	(1)	KC left thick of sanko vm 5/26 that we will assume SV needed. KC notified thick of sanko by voicemail 5/26/00.
5. TEMPERATURE BLANKS PRESENT?	☑	☐	☐	TEMP BLANK TEMP (°C)= 1.5	
6. SAMPLES RECEIVED AT 4°C +/- 2? ICE / ICE PACKS PRESENT (Y) or N?	☐	☑	☐	COOLER TEMP (°C)= NA (RECORD COOLER TEMP ONLY IF TEMP BLANK IS NOT PRESENT)	
7. VOLATILES FREE OF HEADSPACE?	☑	☐	☐		
8. TRIP BLANK PRESENT IN THIS COOLER	☑	☐	☐		
9. PROPER SAMPLE CONTAINERS AND VOLUME?	☑	☐	☐		
10. SAMPLES WITHIN HOLD TIME UPON RECEIPT?	☑	☐	☐		
SAMPLES PROPERLY PRESERVED[1]?	☐	☐	☑		
CORRECTIVE ACTION REPORT FILED?	☐	☑	N/A		

ANALYTICAL PROGRAMS (CIRCLE ONE) (COMMERCIAL) CLP HAZWRAP (NFESC) ACOE AFCEE OTHER (STATE OF ORIGIN):

LOG - IN NOTES[1]: Received SVOA for MW-105, not marked on COC
Trip Blank is not on COC

Use this space (and additional sheets if necessary) to document samples that are received broken or compromised, C-O-C discrepancies, radiation checks, residual chlorine check, results of pH check if required. If samples required pH adjustment, record volume and type of preservative added.

Katahdin Analytical Services (800047

Katahdin
ANALYTICAL SERVICES
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04092
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE PRINT IN PEN Page 1 of 1

Client	Contact	Phone #	Fax #
TETRA TECH NUS	Rick Ofsanko	(954) 570-5885	(954) 570-5974

Address	City	State	Zip Code
794 S. Military Trail	Deerfield Beach	FL	33442

Purchase Order #	Proj. Name / No.	Katahdin Quote #
	NS Mayport, Bldg 1582	

Bill (if different than above) Address

Sampler (Print / Sign) GARY BRAGANZA / Gary Braganza Copies To:

LAB USE ONLY WORK ORDER #: WQ1512

KATAHDIN PROJECT MANAGER

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Filt. ☐Y ☒N VOA 40ml - HCl(pres.)	Filt. ☐Y ☒N SVOA 1 Liter	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N
	MAY-BE-MW01S	5/25 /13:40	GW	5	✓	✓								
	MAY-BE-MW04S	/14:10		5	✓	✓								
	MAY-BE-MW09S	/14:45		5	✓	✓								
	MAY-BE-MW10S	/13:00		5	✓									
	MAY-BE-DUP	/		5	✓	✓								
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												
		/												

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Gary Braganza	5/25 16:00	Kelly Wilson 5-26-00 0840			
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

FORMSOURCE INC. ☎ (207) 782-3311
FORM # CHN-OF-CSTDY

ORIGINAL
Katahdin Analytical Services 0000048

ORDER NO WQ-1512

Project Manager: Andrea J. Colby
ORDER DATE: 05/26/00

REPORT TO: RICK OFSANKO
TETRA TECH NUS
794 MILITARY TRAIL
DEERFIELD BEACH, FL 33442

PHONE: 954/570-5885
FAX: 954/570-5974
DUE: 23 JUN
FAC.ID: MAYPORT,FL

INVOICE: ACCOUNTS PAYABLE
TETRA TECH NUS, INC.
FOSTER PLAZA 7, 661 ANDERSEN DR.
PITTSBURGH, PA 15220

PHONE: 412/921-7090
PO: PITT-N0397-P99632

PROJECT: CTO#109

SAMPLED BY: G.BRAGANZA DELIVERED BY: FEDEX DISPOSE: AFTER 25 JUL

ITEM	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
1	WQ1512-1	MAY-BE-MW01S	25 MAY 1340	26 MAY	AQ
	WQ1512-2	MAY-BE-MW04S	25 MAY 1410		
	WQ1512-3	MAY-BE-MW09S	25 MAY 1445		
	WQ1512-4	MAY-BE-DUP	25 MAY		
	WQ1512-5	MAY-BE-MW10S	25 MAY 1300		

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Priority Pollutant Volatile Organics by	SW8260	5	110.00	550.00
Priority Pollutant Semivolatile Organics	SW8270	5	210.00	1050.00
PAHs by EPA8270	EPA 8270	5	80.00	400.00
TOTALS		5	400.00	2000.00

	LOG NUMBER	SAMPLE DESCRIPTION	SAMPLED DATE/TIME	RECEIVED	MATRIX
2	WQ1512-6	TRIP BLANK	23 MAY 1245	26 MAY	AQ

DETERMINATION	METHOD	QTY	PRICE	AMOUNT
Priority Pollutant Volatile Organics by	SW8260	1	110.00	110.00

ORDER NOTE: QC-II & NARRATIVE
DD(KAS007QC-DB3)
NFESC
MAYPORT
INVOICE X 3

REPORT COPY: LEE LECK
TETRA TECH NUS
FOSTER PLAZA 7
661 ANDERSEN DR.
PITTSBURGH,PA 15220
REPORT & DISK

INVOICE: With Report

TOTAL ORDER AMOUNT $2,110.00
This is NOT an Invoice

AJC/BKR/WEST.AJC(dw)
05-26Please contact KATAHDIN ANALYTICAL SERVICES promptly if you have any questi

ADDENDUM
ORIGINAL CHAIN OF CUSTODY

Katahdin
ANALYTICAL SERVICES
340 County Road No. 5
P.O. Box 720
Westbrook, ME 04092
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE PRINT IN PEN

Page 1 of 1

Client	Contact	Phone #	Fax #
TETRA TECH NUS	Rick Ofsanko	(954) 570-5885	(954) 570-5974

Address: 794 S. Military Trail | City: Deerfield Beach | State: FL | Zip Code: 33442

Purchase Order # | Proj. Name / No.: NS Mayport, Bldg 1586 | Katahdin Quote #

Bill (if different than above) | Address

Sampler (Print / Sign): GARY BRAGANZA / Gary Braganza | Copies To:

LAB USE ONLY | WORK ORDER #: WQ1512

KATAHDIN PROJECT MANAGER

REMARKS:

SHIPPING INFO: ❒ FED EX ❒ UPS ❒ CLIENT

AIRBILL NO:

TEMP°C ❒ TEMP BLANK ❒ INTACT ❒ NOT INTACT

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	ANALYSIS AND CONTAINER TYPE PRESERVATIVES: Filt. ❒Y ☑N — VOA 40ml - HCl(pres.)	Filt. ❒Y ☑N — SVOA 1 Liter	Filt. ❒Y ❒N	Filt. ❒Y ❒N	Filt. ❒Y ❒N	Filt. ❒Y ❒N	Filt. ❒Y ❒N	Filt. ❒Y ❒N	Filt. ❒Y ❒N	Filt. ❒Y ❒N
	MAY-BE-MW01S	5/25 /13:40	GW	5	✓	✓								
	MAY-BE-MW04S	/14:10		5	✓	✓								
	MAY-BE-MW09S	/14:45		5	✓	✓								
	MAY-BE-MW10S	/13:00		5	✓									
	MAY-BE-DUP	/		5	✓	✓								
		/												
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		/												

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Gary Braganza	5/25 16:00	Shelly Wolf $26.00 0840			
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

FORMSOURCE INC. ☎ (207) 782-3311
FORM # CHN-OF-CSTDY

ORIGINAL

Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

February 21, 2001

Ms. Beverly Washington
Department of the Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive, PO Box 190010
North Charleston, SC 29419-9010

file: 1586AM1100.doc

RE: Annual Groundwater Monitoring Report, BEQ Building 1586, Naval Station, Mayport, Florida

Dear Ms. Washington:

I have reviewed the above document dated November 8, 2000 (received November 9, 2000). We have also discussed the information at our Partnering meeting earlier this month. At the meeting, we agreed that MNA status for the site is no longer appropriate since a 1400-gallon fuel oil spill occurred at the site. The report recommended that monitoring efforts cease and that site assessment should take place. I concur and the above document is acceptable.

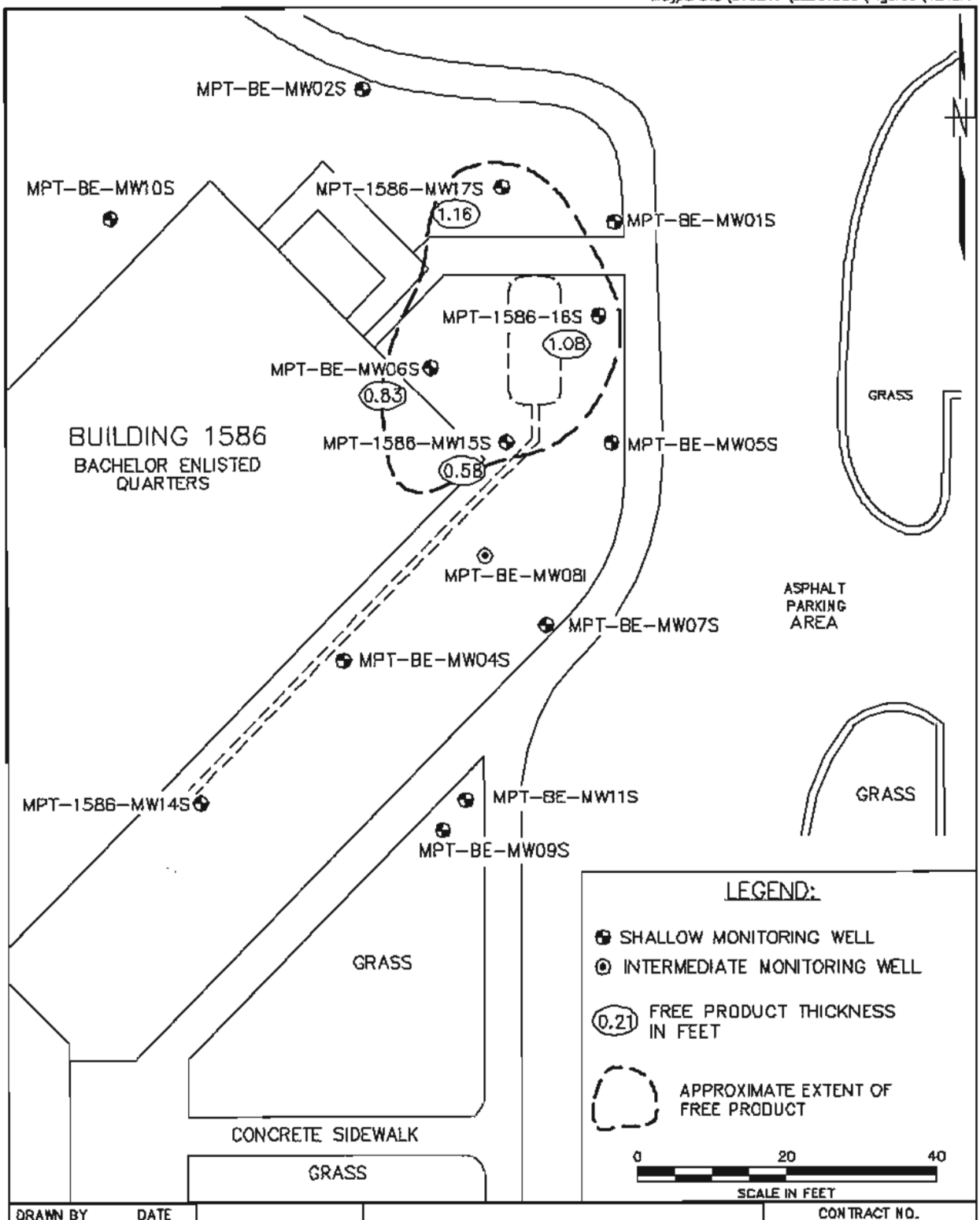
If you need further clarification or any additional information, please feel free to contact me at 850-921-4230.

Sincerely,

James H. Cason, P.G.
Remedial Project Manager

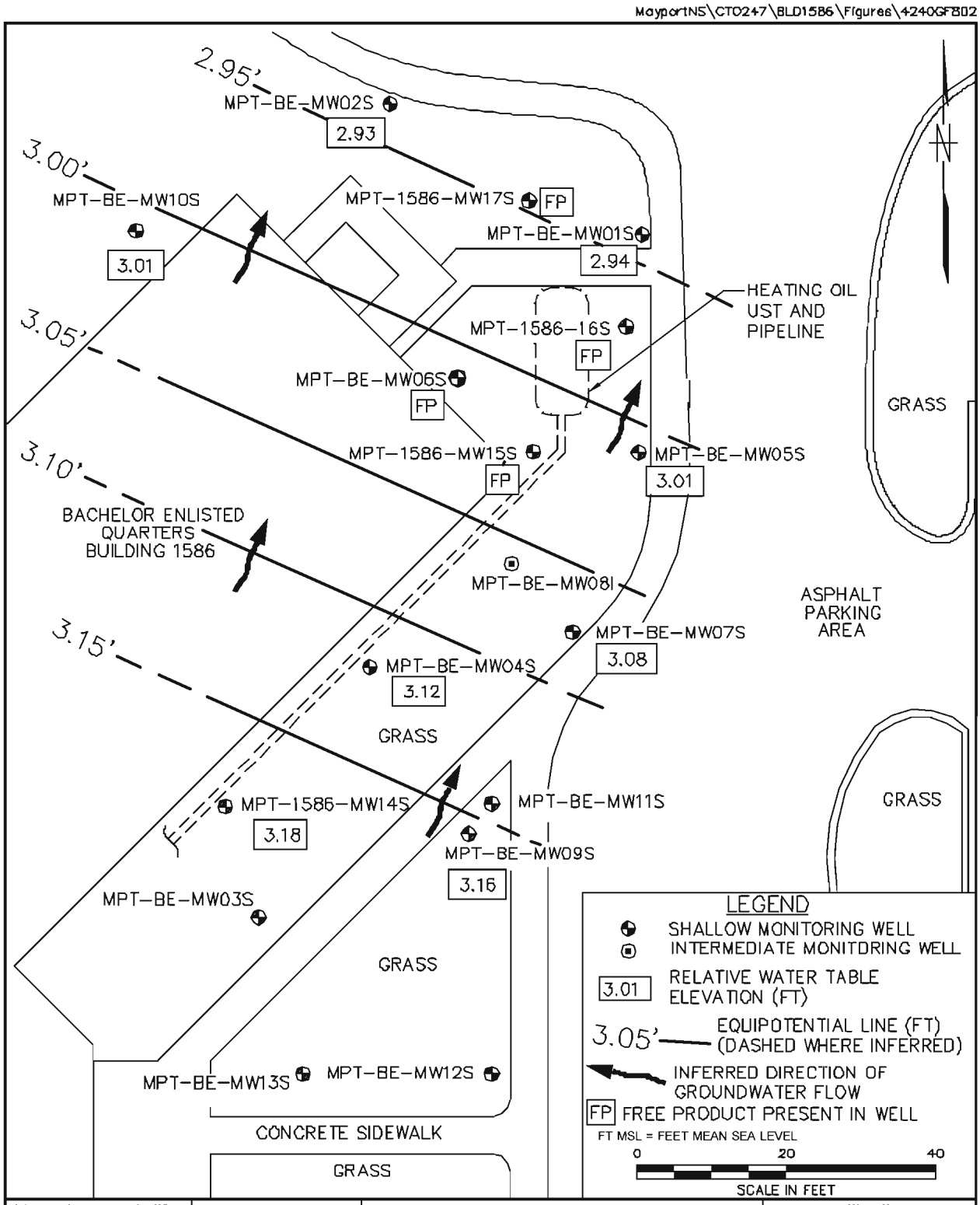
CC: Randy Bishop, NAVSTA Mayport
Terry Hansen, TetraTech, Tallahassee

TJB JJC for ESN



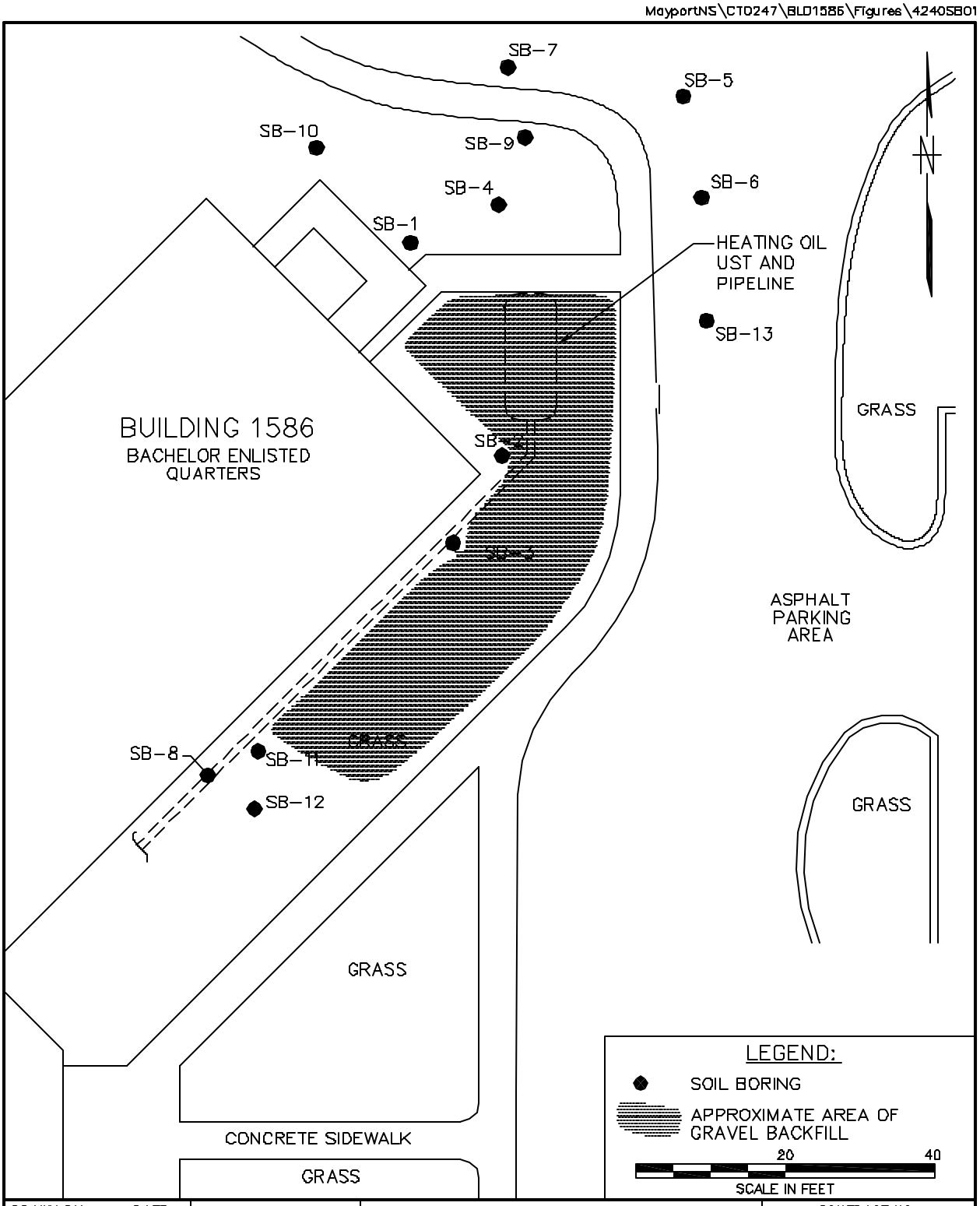
DRAWN BY LLK DATE 3/31/03		APPROXIMATE EXTENT OF FREE PRODUCT SITE 1586 SITE ASSESSMENT REPORT MAYPORT NAVAL STATION MAYPORT, FLORIDA	CONTRACT NO. 4240
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-6 / REV. 0

Mayport\NS\CTO247\BLD1586\Figures\4240GF802



DRAWN BY LLK DATE 1/20/03		GROUNDWATER ELEVATION CONTOUR MAP AUGUST 23, 2002 SITE 1586 SITE ASSESSMENT REPORT NAVAL STATION MAYPORT MAYPORT, FLORIDA	CONTRACT NO. 4240
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-7 REV. 0

FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/20/98



DRAWN BY LLK DATE 10/15/02		SOIL BORING LOCATIONS SITE 1586 SITE ASSESSMENT REPORT NAVAL STATION MAYPORT MAYPORT, FLORIDA	CONTRACT NO. 4240
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-1 / REV. 0

FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/20/98

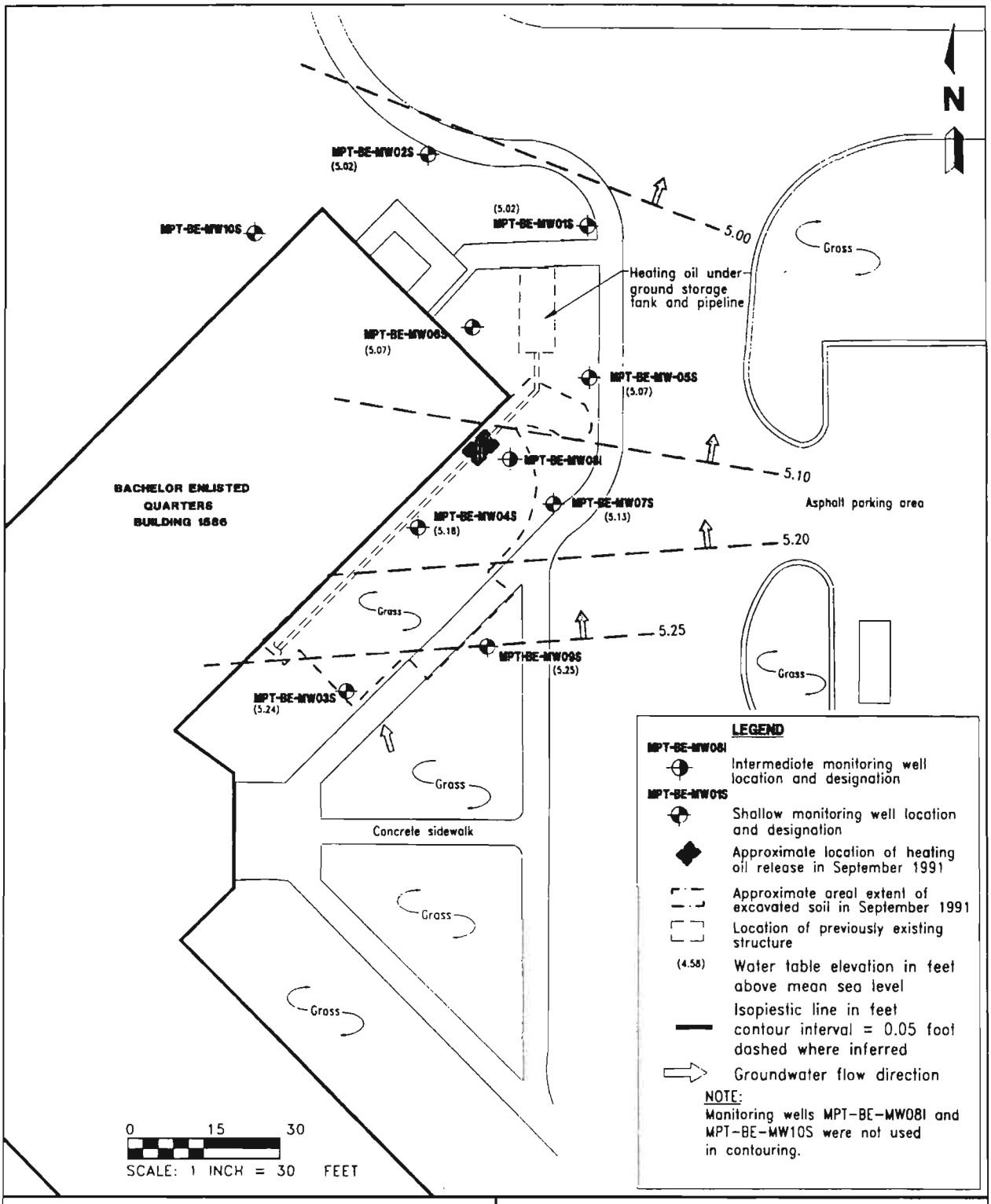
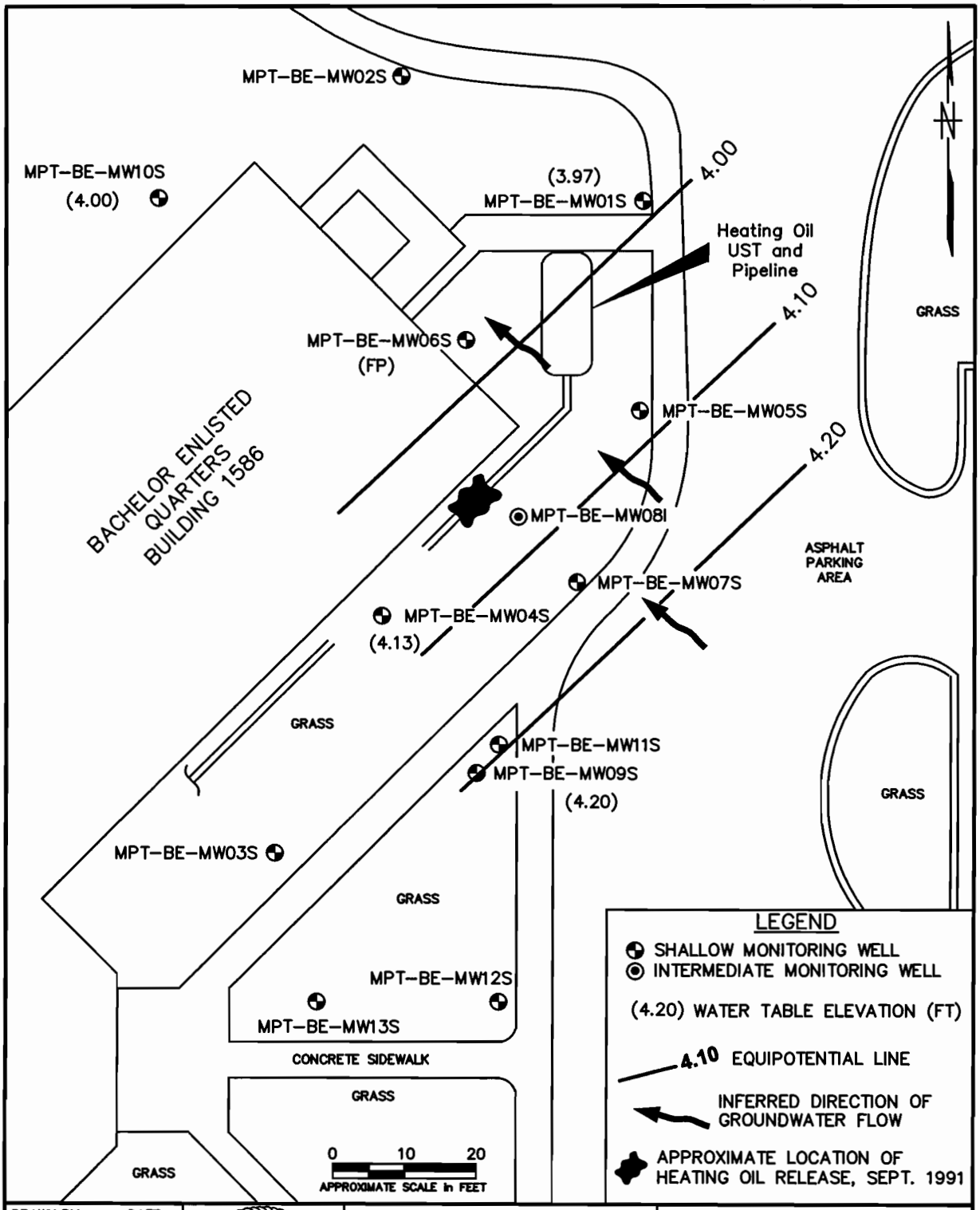


FIGURE 3-8
POTENTIOMETRIC SURFACE MAP, NOVEMBER 13, 1996

H:\MPT\BLDG1586\PSUR-NOV\NAB\03-31-97

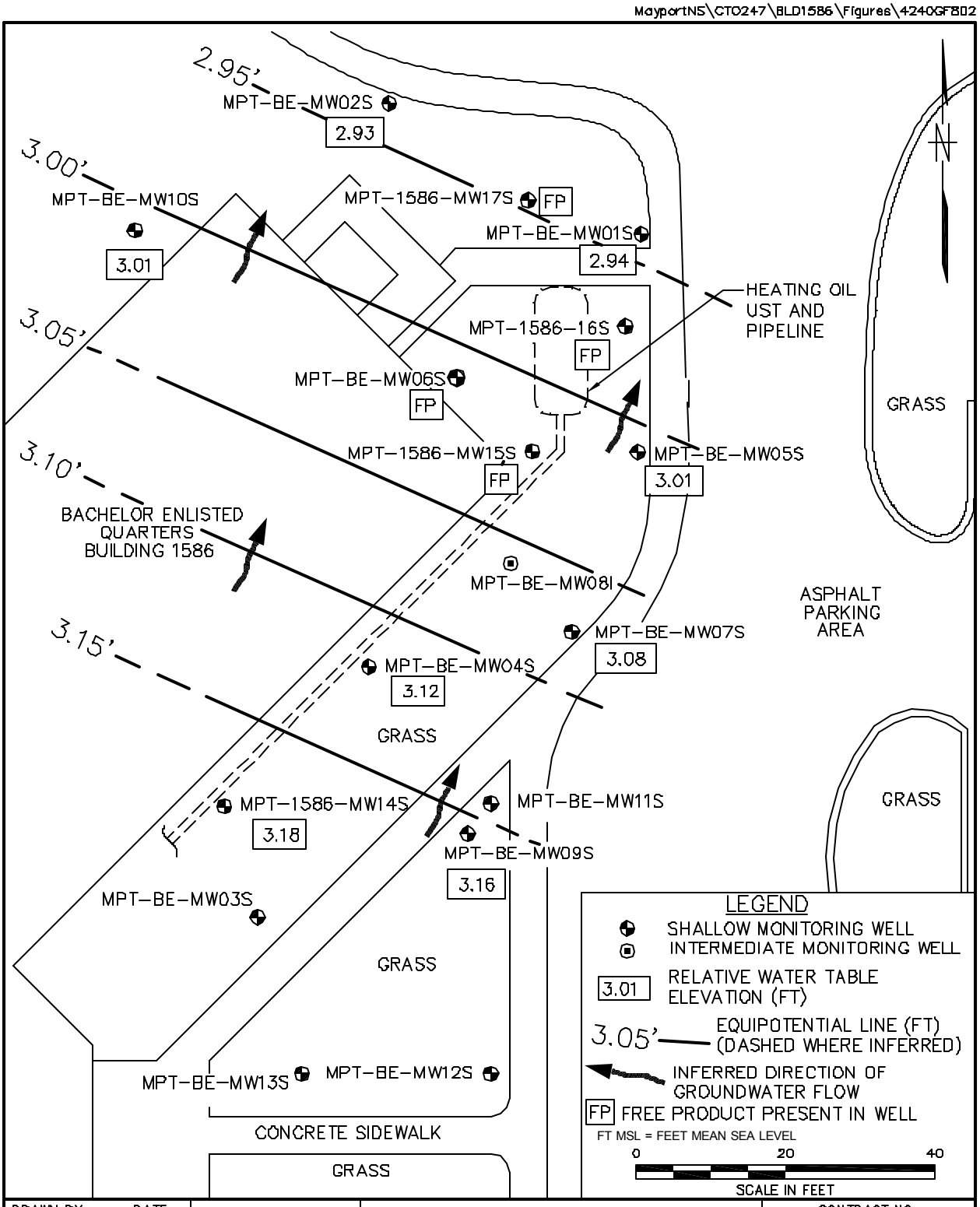
SITE ASSESSMENT REPORT ADDENDUM
BACHELOR ENLISTED QUARTERS
BUILDING 1586
U.S. NAVAL STATION
MAYPORT, FLORIDA

S:\NAVY\MAYPORT\CAD\0397GM01.JUL00



DRAWN BY CW DATE 9/5/00	DEPARTMENT OF THE NAVY — WRITTEN BY FACILITIES ENGINEERING COMD	POTENTIAL SURFACE MAP MAY 25, 2000 BACHELOR ENLISTED QUARTERS BUILDING 1586 U.S. NAVAL STATION MAYPORT, FLORIDA	CONTRACT NO. 0397
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2 REV. 0

FORM CADD NO. SDIV_AV.DWG – REV 0 – 1/20/98



DRAWN BY LLK DATE 1/20/03		GROUNDWATER ELEVATION CONTOUR MAP AUGUST 23, 2002 SITE 1586 SITE ASSESSMENT REPORT NAVAL STATION MAYPORT MAYPORT, FLORIDA	CONTRACT NO. 4240
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3-1 REV. 0

FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/20/98

APPENDIX B

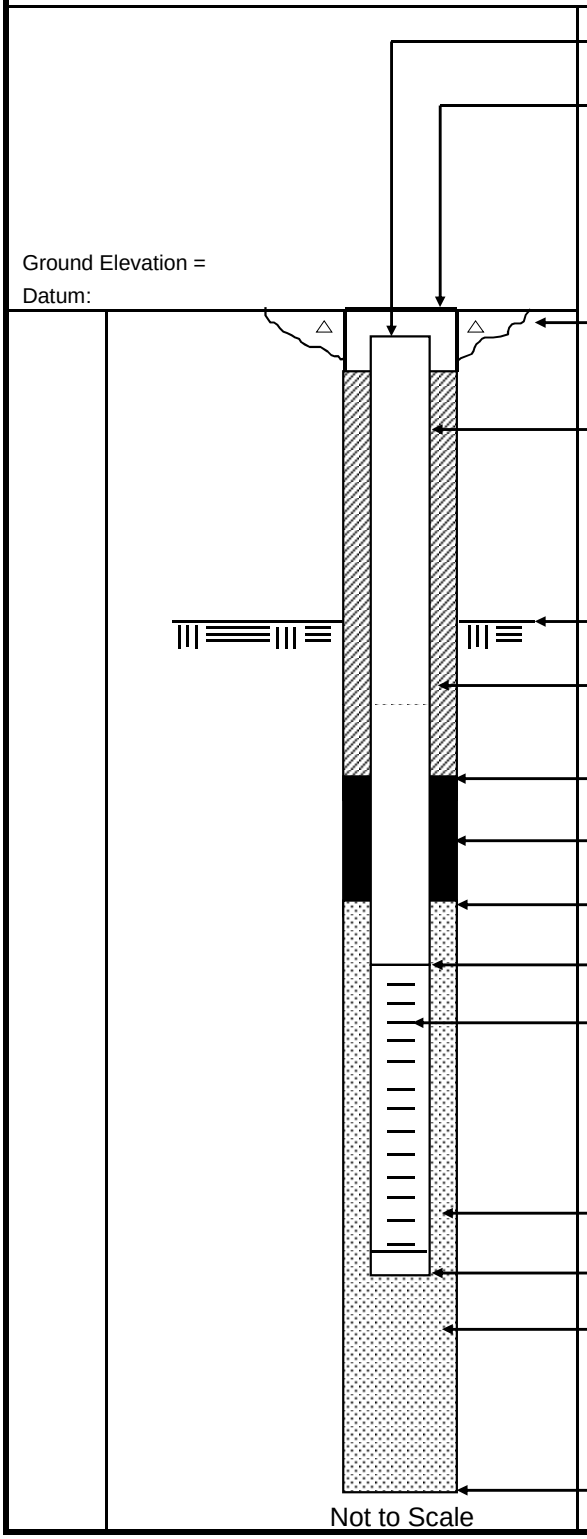
SHALLOW MONITORING WELL SHEET FOR MPT-1586-MW18S

Tetra Tech NUS, Inc.

MONITORING WELL SHEET

WELL No.:

PROJECT:	CTO 247	DRILLING Co.:	Partridge Well	BORING No.:	MW-18 S
PROJECT No.:		DRILLER:	Mike Nicholeson	DATE COMPLETED:	01/06/04
SITE:	1586	DRILLING METHOD:	HAS	NORTHING:	
GEOLOGIST:	D.Siefken	DEV. METHOD:	Submersible	EASTING:	



Elevation / Depth of Top of Riser:		/NA
Elevation / Height of Top of Surface Casing:		/NA
I.D. of Surface Casing:	8 in	
Type of Surface Casing:	steel	
Type of Surface Seal:	concrete	
I.D. of Riser:	2 in	
Type of Riser:	Schedule 40 PVC	
Borehole Diameter:	8	
Elevation / Depth Top of Rock:		/ NA
Type of Backfill:	30/65 Sand	
Elevation / Depth of Seal:		/ 1 ft
Type of Seal:	20/30 sand	
Elevation / Depth of Top of Filter Pack:		/ 2 ft
Elevation / Depth of Top of Screen:		/ 3 ft
Type of Screen:	Schedule 40 PVC	
Slot Size x Length:	0.01 mill slot	
I.D. of Screen:	2 in	
Type of Filter Pack:	20/30	
Elevation / Depth of Bottom of Screen:		/ 13 ft
Elevation / Depth of Bottom of Filter Pack:		/ 13.5 ft
Type of Backfill Below Well:		
Elevation / Total Depth of Borehole:		/ 13.5 ft

APPENDIX C

CONTAMINANT MASS CALCULATION TABLES

Table C1
Estimated Mass of Free Product

Remedial Action Plan
UST Site 1586
Naval Station Mayport
Jacksonville, Florida

Using the equation by Ballestero, et. Al.
tg = t(1-Sg) - ha
tg - actual (formation) free product thickness
t - apparent (well thickness) product thickness
Sg - specific gravity of free product (for fuel oil taken as 0.85)
ha - distance from bottom of free product to water table (taken as height of capillary rise hc as 0.61 inches*)
given t = 5.2 inches
This gives tg = 0.17 inches
The estimated area of free product impact is 750 sq ft.
Volume = Area x thickness x porosity
Using Porosity = 0.30
This gives a volume of approximately 23 gallons of free product remaining in the on the surface of the water table.

***Capillary Rise in course sand- Fetter, C.W., Jr, Applied Hydrology, 1980**

NOTES:

TRPH - Total recoverable petroleum hydrocarbons (from fixed-base laboratory results)
mg/kg - milligrams per kilogram
ft - feet
ft^2 - square feet
ft^3 - cubic feet
lbs - pounds
1 ft^3 = 7.48 gallons
m - meter
m^2 - square meters
m^3 - cubic meters

Prepared By _____ Checked By _____

Date

Table C-2
Estimated Mass of Contaminants in Vadose Zone Soil Matrix

Remedial Action Plan for UST Site 1586
Naval Station Mayport
Jacksonville, Florida

Area 1:				
Estimated Impacted Area	875	ft^2	81	m^2
Estimated Average Impacted Thickness	3	ft	1	m
Estimated Impacted Volume	2,625	ft^3	74	m^3
Average TRPH Concentration			11,250	mg/kg
Using average density of sandy soil of	115	Lb/ft3		
Gives total mass soils	301875	Lbs or	136,928	kg
Using porosity of 30%				
Leads to total mass TRPH of	1078308669	mg or	1,664	Lbs
Area 2:				
Estimated Impacted Area	100	ft^2	9	m^2
Estimated Average Impacted Thickness	3	ft	1	m
Estimated Impacted Volume	300	ft^3	8	m^3
Average TRPH Concentration			4,300	mg/kg
Using average density of sandy soil of	115	Lb/ft3		
Gives total mass soils	34500	Lbs or	15,649	kg
Using porosity of 30%				
Leads to total mass TRPH of	47103261.2	mg or	73	Lbs
TOTAL MASS	1737	lbs	788	kg

NOTES:

TRPH - Total recoverable petroleum hydrocarbons (from fixed-base laboratory results)
mg/kg - milligrams per kilogram
ft - feet
ft^2 - square feet
ft^3 - cubic feet
m - meter
m^2 - square meters
m^3 - cubic meters
lbs - pounds
Water levels vary from approx. 3 to 5 feet bls (August 2008 & August 2002, respectively)
From fixed-base laboratory analyses of soil samples from SB-1, SB-4, and SB-11
Estimated Mass of Impacted Unsaturated Soil = impacted volume (ft3) x (1 yd3/27 ft3) x (1.4 tons/1 yd3) x (907.2 kg/ton)
Estimated mass of hydrocarbons = hydrocarbon concentration (mg/kg) x mass of soil (kg)

Prepared By Checked By

Date

Table C-3
Estimated Mass of Contaminants in Groundwater

Remedial Action Plan for UST Site 1586
Naval Station Mayport
Jacksonville, Florida

Given the solubility of fuel oil in water as 3 mg/L*
Also volume of water impacted is given by
Volume = Area x thickness x porosity
Area = 1, 200 square feet
Thickness = 15 feet
Porosity = 0.30
Gives volume groundwater of 5,400 cubic feet or 40,392 gallons(152,900 liters)
Using solubility factor this gives mass of 458.7 grams or approximately 1 pound.

*** Environment Canada - Emergencies Science and Technology Division**

NOTES:

TRPH - Total recoverable petroleum hydrocarbons (from fixed-base laboratory results)
mg/kg - milligrams per kilogram
ft - feet
ft^2 - square feet
ft^3 - cubic feet
lbs - pounds
1 ft^3 = 7.48 gallons
m - meter
m^2 - square meters
m^3 - cubic meters

Prepared By _____ Checked By _____

Date

APPENDIX D

FDEP RAP CHECKLIST

REMEDIAL ACTION PLAN & SYSTEM DESIGN CHECKLIST

Bureau of Petroleum Storage Systems
Florida Department of Environmental Protection

Facility Name:	Underground Storage Tank Site 1586	Preapproval Site:	[ ]
Location:	NAVSTA Mayport, Jacksonville, Florida	State Cleanup Site:	[ ]
FAC ID No:	None Assigned	Voluntary Cleanup Site:	[ ]
Reviewer:		Contractor:	Tetra Tech, Inc.

This checklist should not be applied in blanket fashion. Technical judgment may be necessary in determining the applicability of some items. However, all information listed that is relevant to the remedial design should be provided.

☑

I. GENERAL

✓ (1) RAP signed, sealed, and dated by Florida P.E. (per Section 471.025, FS)

N/A (2) indication whether proposed plan is for preapproval program, state contracted cleanup, or voluntary cleanup

✓ (3) recap of SAR information and conclusions pertinent to RAP preparation

✓ (4) current sampling results [within nine (9) months] used for remediation system design

N/A (5) potable water considerations:

- ♦ method of potable water supply to site and surrounding area
- ♦ locations of private wells within 1/4-mile, and public wells within 1/2-mile radius of site
- ♦ indication whether FDEP district office drinking water program was notified if contaminated groundwater could be expected to reach any public or private water well. Method of notification, person notified, and date

✓ (6) identification underground utilities locations, and those which may enhance transport of contaminants

✓ (7) • cleanup time: estimated cleanup time for the groundwater, for the soil

N/A (8) fencing of treatment area required, unless public access is restricted by institutional controls

✓ (9) local, state, and federal permits to be obtained, and conditions stated

✓ (10) recap of alternatives discussed and/or alternative selected during pre-RAP conference, or cost-effectiveness analysis of alternatives and identification of recommended alternative

N/A (11) statement that signed and sealed as-built (record) drawings will be provided

N/A (12) nuisance noise and odor to neighbors avoided by careful location of equipment items and exhaust stacks or other mitigating measures

II. REQUIREMENTS OF THE PRE-APPROVAL PROGRAM REMEDIAL ACTION INITIATIVE (RAI) Not Applicable to this Site.

For cleanup projects affected by the Pre-Approval Program Remedial Action Initiative, the requirements of this section apply. The items listed below in this section are to be taken into account for each of the operations covered by the other sections of this checklist.

_____ (1) Cleanup Goals established. End of Active Remediation goal: 70% of natural attenuation default concentrations (NADC), or 90% reduction of each contaminant group, in each key well in the source area, whichever is more

FAC ID No: None Assigned

stringent, in the specified time frame (typically one to four years). Longer cleanup times to achieve end of active remedial action goal require special justification.

_____ (2) Pilot testing of the proposed remediation strategy is generally required. Exceptions require special justification.

_____ (3) Remediation equipment must meet the specifications contained in the Remedial Action Initiative including reasonable safety factors.

_____ (4) System designs includes adequate source area treatment wells, e.g. a safety factor of 2, and consideration of using parallel or zoned systems.

_____ (5) Ultimate cleanup target levels need to be indicated, either (CTLs) of Chapter 62-770 for unconditional NFA, or Alternative CTLs for conditional NFA. For conditional NFA, owner's acknowledgement of future institutional controls at cleanup completion should be documented

_____ (6) End of Active Remediation to be followed by Natural Attenuation Monitoring. An evaluation of "time to switch" from active remedial action to Natural Attenuation Monitoring to reach ultimate cleanup target levels may be performed to allow for the continuation of active remedial action if justified.

_____ (7) Milestones schedule must be included in RAP using the BPSS milestone model. The schedule must identify key wells, contaminants of concern, baseline contaminant concentrations, and time to reach the end of active remedial action. A linear concentration vs. time profile shall apply to each contaminant group in each key well.

_____ (8) Applicability of "difficult sites" evaluation procedures established (mandatory if post-assessment cleanup cost will likely exceed $500,000 or cleanup time will exceed 4 years). Some elements of the "difficult sites" evaluation procedures may be applicable to sites with cleanups, which will not exceed $500,000, or a 4 year cleanup time. If applicability established, FDEP PE must complete difficult sites checklist attached to May 21, 2003 Difficult Sites memorandum.

_____ (9) RAP must include a Construction Plan and a construction schedule.

_____ (10) RAP must include a Startup Test Plan, and startup testing must be conducted in accordance with manufacturer's recommendations.

_____ (11) RAP must include a Preventative and Routine Maintenance Plan and checklist, a Repair Response Plan and maintenance visit schedule. The repair response plan must address sytem monitoring, equipmant operation and replacement part availability and supply.

_____ (12) RAP must indicate that equipment will be UL approved (or equivalent) and will have a warranty

_____ (13) Hour meters, flow meters, pressure gauges, and vacuum gauges specified for all critical components, including individual wells if necessary for optimization of system efficiency

_____ (14) Autodialer system specified (telemetry may be specified with justification)

_____ (16) Equipment items must be protected (covered or housed in a trailer).

_____ (17) Specifications, and an Operations Manual must be provided to FDEP/LP, and a copy must be kept at the site.

_____ (18) RAP specifies that Startup, Quarterlyand Annual Reports will be provided, and must include the information detailed in the RAI.

III. FREE PRODUCT REMOVAL

✓ (1) free product plume identification

FAC ID No: None Assigned

✓ (2) description/design details of free product recovery system including:
♦oil/water separator sizing calculations and detention time ♦ free product storage tank of adequate size

N/A (3) automated product pump shutdown for high level in product tank

N/A (4) safety considerations: ♦ static electricity ♦ electrical & instruments per National Electrical Code

✓ (5) proper disposal and safe handling of flammable free product recovered

IV. SOIL REMEDIATION - GENERAL

✓ (1) volume of contaminated soil

✓ (2) recap of Source Removal activities and soil volume already excavated, if any

✓ (3) indication that contaminated soil will be remediated, or provide rationale for 'no action'

(4) soil cleanup target levels identified, extent of soil contamination should be delineated by use of both OVA screening results and laboratory analysis results

(5) Use of Level I Risk Management Options for soil considered, if applicable, including SPLP, TRPH fractionation, and calculation of site specific SCTLs based on soil properties

✓ (6) proper handling & treatment of excavated, contaminated soil, or proper handling & disposal of hazardous soil (e.g., ignitable, corrosive, reactive, toxic, or petroleum refining waste)

V. LAND FARMING OF SOIL Not Applicable to this Site.

_____ (1) adequate surface area available (_____ sq ft) to spread soil 6 to 12 inches thick

_____ (2) location of land farming operation

_____ (3) land farming area is flat (less than 5% slope)

_____ (4) impermeable base provided. Type: _____

_____ (5) surface water runoff controls provided

_____ (6) groundwater monitoring plan proposed if land farm is outside of immediate contamination area

_____ (7) frequency of tilling provided

_____ (8) frequency and details of nutrient application or other enhancements provided (if proposed)

_____ (9) soil sampling frequency and sampling methods provided

_____ (10) potential for land farm causing nuisance conditions evaluated

(11) underlying soil and groundwater monitoring procedures provided and acceptable

_____ (12) land farming will be continued until the contaminants of concern meet soil cleanup target levels

_____ (13) cost-effectiveness

_____ (14) ultimate disposition of soil discussed

_____ (15) need to fence land farm area considered

VI. LANDFILLING OF SOIL Not Applicable to this Site.

_____ (1) landfill lined and permitted by FDEP

_____ (2) name and location of landfill provided along with conditions of acceptance

_____ (3) cost-effectiveness

FAC ID No: None Assigned

_____ (4) For out-of-state landfill disposal, evidence provided that petroleum contaminated soil disposal in the landfill complies with the landfill regulations of the other state.

VII. SOIL THERMAL TREATMENT

Not Applicable to this Site.

_____ (1) name and location of thermal treatment facility provided

_____ (2) facility is permitted for thermal treatment of petroleum contaminated soil

_____ (3) pretreatment soil sample analyses

_____ (4) cost-effectiveness

VIII. COMMERCIAL BIOREMEDIATION OF SOIL

Not Applicable to this Site.

_____ (1) name and location of bioremediation facility provided

_____ (2) facility is permitted for bioremediation of petroleum contaminated soil

_____ (3) pretreatment soil sample analyses

_____ (4) cost-effectiveness

IX. IN SITU BIOVENTING OF SOIL

Not Applicable to this Site.

_____ (1) soil cleanup criteria identification

_____ (2) estimated mass of contaminants of concern in the vadose zone

_____ (3) recap of information and data from pilot study that is pertinent full-scale system design

_____ (4) layout

- ♦ well type — vertical or horizontal
- ♦ well construction details
- ♦ location of air injection and air extraction wells with respect to contaminated soil plume location and depth
- ♦ location and depth of soil gas monitoring probes with respect to contaminated soil plume and the air injection and extraction wells

_____ (5) design and operating parameters, equipment sizing calculations, mechanical details

_____ (6) instruments, controls, gauges, and valves

_____ (7) monitoring plan: CO_2; pertinent bioremediation parameters; contaminants of concern

_____ (8) air emissions

- ♦ demonstration that primary mechanism of remediation will be bioremediation and not volatilization. Air flow rates will be limited based on oxygen demand for bioremediation as demonstrated by pilot study results
- ♦ evaluation of methods for off-gas treatment if pilot test indicated that a significant amount of hydrocarbon volatilization will occur

X. SOIL VAPOR EXTRACTION

Not Applicable to this Site.

_____ (1) prerequisites: ♦ relatively permeable soil ♦ depth to groundwater > 3 ft ♦ relatively volatile contaminants

_____ (2) recap of information and data from pilot study that is pertinent to full-scale system design:

(3) full-scale design

FAC ID No: None Assigned

_____ (a) layout and spacing of SVE wells (consideration given to radius of influence and overlapping of radii)

_____ (b) vapor extraction well(s)

- ♦ no. of wells ♦ cfm each well ♦ total cfm ♦ well type (vertical or horizontal) ♦ well construction details

_____ (c) pneumatic design

- ♦ operating vacuum @ wellhead(s) (inches of water)
- ♦ piping system friction losses
- ♦ pump motor (hp) based on system losses plus required vacuum at wellhead

_____ (d) vacuum source type: regenerative blower; positive displacement vacuum pump; other

- ♦ design specifications: cfm @ inches of water; operating cfm @ inches of water
- ♦ mfr; model; motor hp; rpm; performance curves
- ♦ nonferrous materials of construction and/or assembly to minimize potential for sparking and friction
- ♦ explosion-proof motor

_____ (e) moisture separator/condensation trap ("knock out pot") prior to inlet of vacuum pump

_____ (f) surface sealing provided for vacuum extraction, or existing concrete or asphalt adequate

_____ (g) safety

- ♦ system operation at approximately 25% of Lower Explosive Limit (LEL)
- ♦ bleed valve provided to control flammable vapor concentrations

_____ (h) instrumentation, gauges, and appurtenances

_____ (i) air emissions control (general)

- ♦ method of off-gas treatment to be provided during first month of system operation (provide details in Section X or XI for carbon adsorption or thermal oxidation of off-gas, or provide details of an alternative method)

_____ (j) system monitoring

- ♦ sample and analyze air emissions for total petroleum hydrocarbons, weekly for first month, monthly for next two months, quarterly thereafter
- ♦ vacuum measurement locations (suggestion: use monitor wells at various radial distances from extraction wells)
- ♦ acknowledge that air emission controls must be provided for at least first 30 days, but may have to be continued longer until petroleum hydrocarbon emissions to the atmosphere are less than 13.7 lbs/day

XI. VAPOR-PHASE CARBON ADSORPTION (for control of air emissions) Not Applicable to this Site.

_____ (1) recap of information and data from pilot study that is pertinent to full-scale system design, if a pilot was conducted

_____ (2) cost-effectiveness evaluation in comparison to other alternatives for control of air emissions

_____ (3) mechanical details, sizing calculations, and operating parameters

_____ (4) instrumentation, controls, gauges, sampling and valves

_____ (5) safety

- ♦ operation of system below Lower Explosive Limit (LEL) for type of vapors being handled

FAC ID No: None Assigned

- observance of appropriate requirements in Series 500 articles of the National Electrical Code — equipment shall meet either Class I, Group D, Division 1 or Class I, Group D, Division 2 hazardous area requirements, whichever is applicable, when an equipment item is located in a hazardous area as defined by the code

XII. THERMAL/CATALYTIC OXIDATION (for control of air emissions) Not Applicable to this Site.

_____ (1) cost-effectiveness evaluation in comparison to other alternatives for control of air emissions

_____ (2) mechanical details, equipment sizing calculations, and operating parameters

_____ (3) instrumentation, controls, gauges, and valves. [schematic or mobile unit manufacturer's drawings indicating instrumentation, controls, gauges, and valves for all process streams (contaminant-laden influent, fuel gas, and combustion air)]

_____ (4) safety considerations include, but are not limited to:

- bleed valve or dilution control valve to maintain influent flammable vapor concentration at 25% of the Lower Explosive Limit (LEL)
- air purge prior to re-ignition
- observance of appropriate requirements in Series 500 articles of the National Electrical Code — equipment shall meet either Class I, Group D, Division 1 or Class I, Group D, Division 2 hazardous area requirements, whichever is applicable, when located in a hazardous area as defined by the code
- use of thermal or catalytic oxidizers which meet appropriate fire codes for handling natural or propane gas and prevention of furnace explosions — National Fire Protection Association, Industrial Risk Insurer's, Factory Mutual, etc. Some of the most important safety shutdowns for gas-fired burners occur upon: high gas pressure; low gas pressure; loss of combustion supply air; loss or failure to establish flame; loss of control system actuating energy; power failure

XIII. GROUNDWATER EXTRACTION Not Applicable to this Site.

_____ (1) feasibility of using existing on-site wells for groundwater extraction considered

_____ (2) recovery well summary

- recovery well or trench location(s) and construction details included (diameter, screen length, grout, etc.)
- recovery well depth and screen length appropriate for depth of contamination

_____ (3) predicted horizontal and vertical area of influence provided

_____ (4) expected drawdown in recovery well or trench

_____ (5) consideration of multiple well configuration to minimize drawdown

_____ (6) groundwater pump performance requirements, sizing, and description

- hydraulic design considerations (friction losses and suction lift)
- pump performance curve or information provided (flow rate vs. pressure)
- pump manufacturer, model; hp, rpm

_____ (7) automated well level controls provided for stopping/starting groundwater pump(s)

_____ (8) totalizing flowmeter installed on influent line from each groundwater recovery pump

_____ (9) check valve provided on pump discharge piping if not integral to pump

FAC ID No: None Assigned

_____ (10) shutoff/throttling valve provided on pump discharge piping

XIV. GROUNDWATER TREATMENT SYSTEM - GENERAL

Not Applicable to this Site.

_____ (1) influent concentrations for each contaminant of concern, for design of treatment system, based on either actual dynamic pump test sample, weighted averaging procedure, or other reasonable assumption

_____ (2) feasibility & cost-effectiveness of direct discharge of recovered contaminated groundwater to sewer treatment plant, instead of onsite treatment

_____ (3) site piping summary

- ♦ schematics of all treatment components, piping, valves, controls and appurtenances provided
- ♦ influent and effluent sampling ports provided
- ♦ piping type and size provided

_____ (4) fouling & scaling considerations

- ♦ whether control of iron fouling is necessary, either by filtration of influent to remove particulately-bound iron, and/or by removal or sequestering of dissolved iron to prevent precipitation in process equipment items
- ♦ whether pretreatment or other measures necessary to prevent precipitation of calcium carbonate (Langelier Index)
- ♦ whether pretreatment or scheduled O&M measures will be needed for control of biofouling

XV. AIR STRIPPING TREATMENT PROCESS

Not Applicable to this Site.

_____ (1) packed tower

- ♦ type, size, and surface area of packing
- ♦ design and operating parameters, sizing calculations, mechanical details (tower height; packing type, height, surface area; air/water ratio; pressure drop; blower type, model, hp; mist eliminator; etc.)

_____ (2) diffused aerator (tank type)

- ♦ design and operating parameters, sizing calculations, mechanical details (tank volume; contact time; air flow rate; pressure drop; removal efficiency of contaminants of concern; blower type, model, hp; etc.)

_____ (3) low profile air stripper

- ♦ design and operating parameters, sizing calculations, mechanical details (number of trays; water flow rate; air flow rate; air/water ratio; pressure drop; blower type, model, hp; mist eliminator)

_____ (4) general

- ♦ instrumentation, controls, gauges and valves
- ♦ air emissions calculations; emissions stack height
- ♦ equipment description if emissions treatment necessary
- ♦ automated recovery well shutdown when blower failure occurs
- ♦ sampling of effluent, daily for first three days, monthly for next two months, quarterly thereafter

XVI. LIQUID-PHASE CARBON ADSORPTION

Not Applicable to this Site.

_____ (1) recap of information and data from pilot study that is pertinent to full-scale system design, if a pilot was conducted

_____ (2) indication whether adsorption is for primary treatment of groundwater or polishing of effluent

FAC ID No: None Assigned

_____ (3) carbon specifications

_____ (4) carbon unit(s) sizing calculations (carbon usage rate, contact time, pressure losses) design assumptions

_____ (5) TOC in groundwater determined and effect on carbon usage considered

_____ (6) need for sand filter or cartridge unit prior to carbon unit considered

_____ (7) pressure gauge and pressure relief valve provided on carbon (and sand) filter

_____ (8) carbon disposal and replacement method

_____ (9) series configuration of carbon units considered to allow for maximum carbon utilization and prevention of contaminant breakthrough to system effluent

_____ (10) automated recovery well shutdown if primary carbon unit pressure too high

_____ (11) schedule for sampling between and after carbon adsorption units

XVII. IN SITU AIR SPARGING OF GROUNDWATER

Not Applicable to this Site.

_____ (1) prerequisites

- no or little free product which could spread via sparge turbulence, or prolong sparging
- volatile (C_3-C_{10}) petroleum fractions with Henry's Constant ≥ 0.00001 atm∗m^3/mol (approx. rule of thumb, unless biosparging is proposed)
- no high concentrations of metals (iron, magnesium) to form oxides which plug aquifer or well screens, or high concentrations of dissolved calcium, which could react with CO_2 in air to clog aquifer w/calcium carbonate

_____ (2) recap of information and data from pilot study that is pertinent to full-scale system design

(3) full-scale design

_____ (a) groundwater contamination plume coverage

- location(s) and radius of influence for full-scale air injection well(s)
- adequate coverage by overlapping radii of influence if multiple well system

_____ (b) air injection well(s): no. of wells; well design; operating air pressure at wellheads; cfm each well; total cfm

_____

_____ (c) avoidance of long screen allowing air to diffuse at top portion only, where air flow resistance is least (typ screen is 1 to 3 ft long)

_____ (d) well depth and screened interval (or depth of sparge tip) appropriate w/respect to depth of contamination

_____ (e) vapor extraction well(s) in conjunction w/sparging situated properly to recover volatiles and prevent their release to atmosphere

- injection cfm of air typically 20 to 80% of vapor extraction cfm (0.2 to 0.8)
- automatic shutdown of air injection upon loss of, or low, vapor extraction system vacuum, or failure of vacuum pump motor, in order to prevent air emissions
- adequate and cost-effective treatment of vapor extraction system off-gas proposed to prevent air emissions

_____ (f) compressor

- design: cfm @ psig; operating cfm @ psig

FAC ID No: None Assigned

- ♦ type; mfr; model; motor hp; rpm; performance curves; air filter at compressor inlet; oil trap or oil-free compressor to avoid introducing more contamination to aquifer

_____ (g) safety: pressure relief valve at discharge of compressor and/or high pressure switch for automatic shutdown

_____ (h) instrumentation and gauges: pressure indicating gauges at each sparging well

_____ (i) air flow control: shutoff/throttling valve at each well; other flow control device or method

XVIII. IN SITU BIOREMEDIATION

✓ (1) general:

- ♦ media to be remediated: groundwater; soil
- ♦ application method: direct-injection; recirculating/re-injection type system; addition to excavation pit
- ♦ aerobic or anaerobic
- ♦ stimulation of indigenous microorganisms or addition of microorganisms

N/A (2) recap of information and data from pilot study that is pertinent to full-scale system design

✓ (3) design and operating parameters (e.g.: injection well construction details; layout and spacing of wells commensurate with injection radius of influence for adequate horizontal coverage; screened interval of injection wells commensurate with vertical extent of contamination for adequate vertical coverage; injection pump develops adequate pressure and flow rate for injection , for the site-specific conditions.)

✓ (4) dosage (of nutrients and/or microorganisms, per pound of hydrocarbon contaminants to be biodegraded) (Some bioremediation products may express dosage as a required amount per cubic yard of contaminated media.)

✓ (5) RAP (or RAP Mod) must contain the necessary underground injection control information required by Chapter 62-528 FAC. [That is, the RAP must contain enough information for a state or local program reviewer to fill out the 2-page UIC notification memorandum titled "Proposed Injection Well(s) for In Situ Aquifer Remediation at a Petroleum Remedial Action Site".] This includes the following information: See BIOX Proposal

- ♦ chemical analysis (composition) of the fluid to be injected. Note: The injected fluid must meet primary and secondary drinking water standards of Chapter 62-550, FAC, and the minimum groundwater criteria of Chapters 62-520 and 62-777 FAC, otherwise Rule 62-522.300(2)(c) may apply and/or a zone of discharge variance may be necessary.
- ♦ no. of injection wells ♦ no. of injection events ♦ injection volume per well per injection event
- ♦ total injection volume (i.e. the total for all injection wells, all injection events)

✓ (7) anticipated schedule of injection events for nutrients and/or microorganisms (i.e. the timing and frequency of injections over the life of the project)

N/A (7) provide additional oxygen, if necessary, if the bioremediation is aerobic and site's groundwater is lacking in dissolved oxygen. (method by which additional oxygen will be delivered.; provide design details if method of delivery is mechanical, e.g. air sparge, O_2 injection, iSOC, etc.; provide chemical information if oxygen is supplied chemically: e.g. magnesium peroxide, calcium peroxide, hydrogen peroxide, etc.)

✓ (9) ♦ sampling plan includes not just the analysis of samples for petroleum contaminants of concern at a site, but also analyses necessary for any of the following that apply: compliance with the underground injection control

FAC ID No: None Assigned

regulations of Chapter 62-528; compliance with Rule 62-522.300(2)(c); and compliance with the terms of an injection zone of discharge variance. Also, analysis for more than just the reagents may be necessary, depending on the situation. In some cases, if there are environmental or toxicological concerns, it may be necessary to include analysis for intermediate degradation products of the reagents, or intermediate by-products formed by the interaction of those reagents with the petroleum contaminants of concern at a site.

- ♦ other samples and operating parameter measurements for a bioremediation project may inlcude, but are not necessarily limited to the following: pH, DO, ORP, N, P, Temperature, TOC, Alkalinity., microbe counts

XIX. LEAD (this section can also be adapted to other heavy metals if necessary) Not Applicable to this Site.

_____ (1) discussion of area(s) where groundwater lead concentration exceeds 15 ppb

_____ (2) lead concentrations (ppb): unfiltered (____); filtered (____); background (____)

_____ (3) proposal for lead removal by filtration if unfiltered sample is greater than 15 ppb and filtered sample is less than 15 ppb

_____ (4) method of lead removal, including pertinent design calculations

_____ (5) if lead (or other heavy metals) will not be removed by filtration, then provide details of proposed treatment

XX. INFILTRATION GALLERY Not Applicable to this Site.

_____ (1) recap of field percolation test results (preferably with double-ring infiltrometer)

_____ (2) infiltration gallery construction details and location (upgradient location if site layout allows)

_____ (3) gallery calculations/assumptions with mounding analysis

_____ (4) piezometer and cleanout pipe in gallery

_____ (5) geotextile filter fabric to be installed around and above gallery

_____ (6) discussion or modeling of gallery for effect on plume migration

XXI. INJECTION WELL (for effluent disposal) Not Applicable to this Site.

_____ (1) discussion of injection zone and relevant lithology information

_____ (2) recap of information and data from pilot study that is pertinent to full-scale system design, if a pilot was conducted

_____ (3) injection well location and construction details

_____ (4) screened interval appropriate

_____ (5) effluent discharge pump adequately sized for required injection flow rate and pressure

_____ (6) carbon polishing unit (or equivalent)

_____ (6) air release valve at highest point of effluent discharge piping

_____ (7) injection rate (well hydraulics) calculations

_____ (8) Underground Injection Control (UIC) inventory information provided. (RAP or RAP Mod must contain enough information for a technical reviewer to complete the 2-page UIC effluent injection notification.)

_____ (9) evaluation of injection well's effect on potable wells and plume migration

FAC ID No: None Assigned

XXII. ALTERNATIVE EFFLUENT DISPOSAL METHODS

Not Applicable to this Site.

_____ (1) cost-effectiveness comparison of alternatives (including general permit fee of $2,500 per year in the cost estimate for NPDES disposal, if it is one of the alternatives being compared)

_____ (2) for surface water discharge

- ♦ conditions for NPDES general permit met
- ♦ indication that notice of intent for NPDES permit will be submitted after RAP approval

_____ (3) if applicable, consumptive use permit obtained from Water Management District

_____ (4) approval from municipality for sewer discharge, and conditions and effluent standards to be met

_____ (5) applicable permits for stormwater discharge

XXIII. SAMPLING REQUIREMENTS

✓ (1) designated / key monitoring wells and frequency of their sampling per 62-770.700, FAC

✓ (2) analysis of designated / key monitoring well samples for appropriate contaminants of concern for the site

N/A (3) sampling of influent from recovery well(s); daily first 3 days, monthly next 2 months, quarterly thereafter

N/A (4) sampling of system effluent, daily for first three days, monthly for next two months, quarterly thereafter

✓ (5) water level data collected at same time & frequency of monitoring well and recovery well sampling

XXIV. IN SITU CHEMICAL OXIDATION

✓ (1) media to be remediated: groundwater; soil

N/A (2) recap of information and data from pilot study that is pertinent to full-scale system design

✓ (3) design and operating parameters (e.g.: injection well construction details; layout and spacing of wells commensurate with injection radius of influence for adequate horizontal coverage; screened interval of injection wells commensurate with vertical extent of contamination for adequate vertical coverage; flow rates; temperatures; pressures; pH; concentrations, etc.)

✓ (4) amount of reagents required per pound of hydrocarbons to be destroyed (theoretical amount, actual amount)

✓ (5) RAP (or RAP Mod) must contain the necessary underground injection control information required by Chapter 62-528 FAC. [That is, the RAP must contain enough information for a state or local program reviewer to fill out the 2-page UIC notification memorandum titled "Proposed Injection Well(s) for In Situ Aquifer Remediation at a Petroleum Remedial Action Site".] This includes the following information: See BIOX Proposal

- ♦ chemical analysis (composition) of the fluid to be injected. Note: The injected fluid must meet primary and secondary drinking water standards of Chapter 62-550, FAC, and the minimum groundwater criteria of Chapters 62-520 and 62-777 FAC, otherwise Rule 62-522.300(2)(c) may apply and/or a zone of discharge variance may be necessary.
- ♦ no. of injection wells ♦ no. of injection events ♦ injection volume per well per injection event
- ♦ total injection volume (i.e. the total for all injection wells, all injection events)

✓ (6) ♦ sampling plan includes not just the analysis of samples for petroleum contaminants of concern at a site, but also analyses necessary for any of the following that apply: compliance with the underground injection control regulations of Chapter 62-528; compliance with Rule 62-522.300(2)(c); and compliance with the terms of an

FAC ID No: None Assigned

injection zone of discharge variance. Also, analysis for more than just the reagents may be necessary, depending on the situation. In some cases, if there are environmental or toxicological concerns, it may be necessary to include analysis for intermediate degradation products of the reagents, or intermediate by-products formed by the interaction of those reagents with the petroleum contaminants of concern at a site.

- ♦ other samples and operating parameter measurements for a chemical oxidation project may inlcude, but are not necessarily limited to the following: pH, DO, ORP, Temperature, and Alkalinity.

✓ (7) anticipated schedule of injection events for reagents (i.e. the timing and frequency of injections over the life of the project)

✓ (8) safety (items applicable to fire, explosion, toxicological and safe handling of chemicals may include, but are not necessarily limited to those listed below)

- ♦ material safety data sheets, toxicity, or other information pertinent to the chemicals and catalysts involved
- ♦ safe handling of chemicals: avoidance of mixing, premature mixing, or improper storage of incompatible chemicals
- ♦ Lower Explosive Level (LEL) considerations
- ♦ potential for vapor migration, either passively or by convection, or driven by air or other gases used, or generated by the heat of exothermic chemical reactions or the vaporization of free product by such heat
- ♦ the minimum tolerable distance between underground storage tanks and product piping and any in situ heat-generating process
- ♦ the need replace the flammable contents of petroleum storage tanks and their associated piping with non-flammable inerts such as nitrogen or carbon dioxide, in order to reduce risk of fire and explosion.
- ♦ observance of National Electrical Code (typically Series 500 articles for Class I, Group D, Division 1 or 2 hazardous area requirements) (for electrical equipment items located in a hazardous area)
- ♦ appropriate chemical-resistant and/or spark-resistant materials of construction for equipment items
- ♦ personal protection of workers
- ♦ safety considerations regarding neighbors and passersby

APPENDIX E

REMEDIAL ALTERNATIVE COST ESTIMATE

APPENDIX E
REMEDIAL ALTERNATIVE COST ESTIMATE

Cost of Maintaining Petroleum Sorbent Materials at Site 1586 for a Period of One Year

2-Inch Sock - 3 boxes	$237.00
4-Inch Sock - 1 box	$107.00
Labor - 25 days at 5 hours a day	$6,750.00
Vehicle Rental - 25 days x $75.00	$1,875.00
Fuel - 45 miles x 25 days at 3.50 per gallon (18 miles per gallon)	$220.00
Interface Probe Rental	$1,875.00
IDW Disposal	$700.00
TOTAL	**$11,764.00**

APPENDIX F

BIOX® PROPOSAL FROM BMS

Project Proposal No. 986-REV

Prepared For:

Tetra Tech NUS, Inc.
8640 Phillips Highway
Jacksonville, FL 32256

Project Location:

Site 1586
Mayport Naval Station
Mayport, FL

October 19, 2010

Corporate Office
BioManagement Services, Inc.
850 Madison Street
Crown Point, Indiana 46307
(888) 477-0550
Fax: (219) 661-3411

PROPOSAL FOR IN-SITU REMEDIATION

Proposal No. 986-REV
October 19, 2010

Client: Tetra Tech, NUS, Inc. 8640 Philips Highway Jacksonville, FL 32256 ATT: Ben Marshall	Project: Site 1586 Mayport Naval Station Mayport, FL

BioManagement Services, Inc. (BMS) is pleased to submit a proposal for LNAPL mitigation at the Mayport Naval Station Site 1586, Mayport, FL. The costs contained within this proposal are based upon site-specific information provided to BMS. As such, BMS cannot guarantee the accuracy or completeness of the information provided. Should actual site conditions vary substantially, BMS reserves the right to request authorization for additional work, such as additional injection points or extension of vertical treatment zones. No additional work will be performed without written consent of the client.

BIOX® Technology Description

The BIOX® Process is a remedial technology that combines controlled chemical oxidation with enhanced biodegradation of contaminants in both soil and groundwater. The patented BIOX® formulation includes but is not limited to combinations of solid peroxides, pH buffer systems and nutrients (**Kiest and Trezzo, U.S. Patent No. 6,268,205**). The BIOX® formulation is adjusted to area-specific soil, geochemical and contaminant conditions. The pH of BIOX® fluids typically ranges from pH 7 to pH 8.5.

The chemical oxidation component of the BIOX® process is based on Fenton-type reactions. In Fenton-type reactions ferrous and ferric iron decompose hydrogen peroxide to molecular oxygen, radicals (predominantly hydroxyl radicals), and water. The Fenton-type reactions of the BIOX® process include reactions of low concentrations of hydrogen peroxide evolving from the dissolution of solid peroxides (e.g. magnesium or calcium peroxide, or sodium percarbonate) with dissolved iron as well as iron-containing minerals and fulvic and humic substances in soil. An iron catalyst may be supplemented if the naturally occurring iron species are insufficient for the activation of Fenton-type reactions. The BIOX® formulation prevents excessive degassing. Further, the controlled Fenton-type reactions induced by the BIOX® formulation generate only minimal increases in groundwater temperature (< 5 °F).

Fenton-type reactions can completely oxidize organic compounds to their elemental oxides such as carbon dioxide and water. Fenton-type reactions also yield products of partial oxidation such as hydroxylated hydrocarbons. These hydroxylated hydrocarbons are surface active and tend to desorb and dissolve organic contaminants making the

more available for remediation. Additionally, partially oxidized products of the reaction are more soluble in water, and are more readily degraded by microorganisms present in soil. Typically, the heterotrophic microbial population increases significantly in soil and groundwater within weeks after the application of the BIOX® formulation.

In the subsurface environment, an important parameter limiting chemical and biological degradation of hydrophobic organic compounds (HOCs) such as chloroethenes and chloroethanes, as well as benzene, toluene and xylene is their accessibility to reagents and microorganisms, respectively. It is generally accepted that chemical oxidation and biodegradation of HOCs is limited by their low water solubility and strong adsorption to soil. The mechanisms by which these compounds are made accessible to the degradative microorganisms are transfer by dissolution into the aqueous phase and direct interfacial uptake.

Degradative organisms are essentially bacteria and fungi. Aerobic metabolisms are the major routes through which aliphatic and aromatic hydrocarbons are degraded. In general, bacteria utilize aliphatic hydrocarbons as well as two to four ring PAHs (e.g., anthracene) as growth substrates, leading to their mineralization. In addition, bacteria degrade biorefractory chlorinated hydrocarbons (e,g., trichloroethene) as well as five and six-ring PAHs (e.g. Benzo(a)pyrene and Indeno(1,2,3-cd)pyrene, respectively) through co-metabolic processes that require the presence of a growth substrate. The chemical oxidation of biorefractory organic compounds (e.g., benzene, PAHs) transforms them into biodegradable growth substrate required for metabolic and co-metabolic processes. The nutrients, included in the BIOX® formulation and the oxygen generated by the reactions create geochemical conditions that are conducive to aerobic biological degradation. The stimulation of microbial population growth depends on the presence of an acclimated indigenous consortium capable of metabolizing the contaminants of concern and the products of partial oxidation.

The ability to place reagents in contact with contaminants is critical for the success of in-situ chemical oxidation technologies. BMS, Inc. (BMS) has more than ten years of field experience with the injection of reagents and amendments into a variety of regional and subsurface settings. Therefore, BMS determines the spacing for injection points based on its empirically developed field procedures. However, BMS' field procedures have the flexibility to increase or decrease the spacing of injection points, based on the field observations of its experienced staff and in consultation with the engineer/geologist who is intimately familiar with the site geology and the vertical and horizontal distribution of environmental impacts in the treatment area. During a BIOX® injection campaign areas of high and low contaminant concentration may be identified based on the type and intensity of the reaction that is observed at the injection point (see pictures at http://www.bioxtech.com/). BMS relocates injection points from areas of low contaminant concentration to areas of high contaminant concentration based on the field observations of its experienced staff and in consultation with the engineer/geologist who has developed the site conceptual model based on site geology, hydrogeology and the vertical and horizontal distribution of environmental impacts in the treatment area.

Project Goals

The BIOX® Process is an innovative remedial technology that quickly destroys organic contaminants through controlled chemical oxidation and subsequently establishes a subsurface environment conducive to enhanced biodegradation. As with any BIOX® project, our goal is to locate and destroy as much contaminant mass as possible utilizing the proposed resources. Although the BIOX® Process has proven to be very effective in destroying organic contaminants, BMS **cannot guarantee that site specific cleanup objectives will be achieved with a single treatment** due to factors such as the variability of subsurface stratigraphy (transmissivity) and the heterogeneous distribution and extent of contamination. The goal of BIOX® applications is to reduce and transform contaminant mass sufficiently with chemical oxidation so as to allow further reduction in contaminant mass through enhanced biodegradation processes. This approach allows for a lesser oxidant loading than might be indicated by laboratory determined oxidant demand. The nutrients included in the formulation and the oxygen generated by the reactions create geochemical conditions that are conducive to aerobic biological degradation. The stimulation of microbial population growth depends on the presence of an acclimated indigenous consortium capable of metabolizing the contaminants of concern and the products of partial oxidation. Additional treatment may be proposed by BMS based on post-treatment monitoring data collected by Tetra Tech NUS, Inc.

In order to achieve our goal of maximizing contaminant destruction, BMS reserves the right to modify the design parameters during field operations based on actual site conditions. These changes may include, but are not limited to, adjusting injection point spacing, relocating injection points, adjusting the areal and vertical treatment zones, and modifying the BIOX® formulation to treat the contamination and account for site-specific stratigraphy and chemistry observed during treatment. In any event, BMS will deliver the full scope of services proposed.

Project Monitoring

BMS recommends that an approved storage drum and bailers be available at the site so that mechanical product recovery can be conducted during the injection campaign, if necessary. Additionally, BMS recommends that the site be gauged for the presence of LNAPLs after the injection campaign on a weekly basis as deemed appropriate by Tetra Tech. Although BMS anticipates that the injection campaign will mitigate the LNAPLs, in the event that an unexpected mass of contaminants is encountered, the BIOX process will desorb and free up excess free product making it more available for mechanical recovery.

Injection Program

BMS has evaluated the project information provided by Tetra Tech NUS, Inc. and has designed a BIOX® injection campaign for the Mayport Naval Station Site 1586, Mayport, Fl. The geology of the impacted area consists of fine to medium grained sand. The depth to groundwater is approximately 5 to 6 ft below ground surface (bgs). The groundwater at the site is impacted with LNAPLs.

The areal extent of the proposed treatment zone is an irregular shaped parcel of approximately 1256 sq. ft. The vertical extent of the treatment zone is from 1 ft bgs to 20 ft bgs. BMS has selected an injection point spacing of 4 ft for this project resulting in a total of 79 injection points. A total of 4,419 gallons of BIOX will be injected into the treatment area. BMS utilizes either a direct push unit to advance the hollow probe rods into the subsurface or our soft advance fluid-jetting system. With the fluid jetting system, high velocity fluids exiting the probe orifice liquefy the soils in front of the probe rod allowing the injector probe to be advanced into the deeper subsurface by hand. The fluid-jetting system is limited to a depth of approximately 12 feet bgs. BMS has elected to use direct push technology for this project. The BIOX fluids will be injected in 1' to 4' lifts as deemed appropriate during the field application. After completing each injection point, the probe hole will be sealed with bentonite crumbles and capped with a cement grout where appropriate. The BIOX injection campaign will require approximately 6 days. A summary of the proposed project specifications is included in **Attachment A**.

Project Cost

The project cost includes all labor, material and equipment necessary to complete the proposed scope of work. A project completion report will be provided to Tetra Tech NUS, Inc. within 30 days of treatment. **The Lump Sum Price for This Project is $47,122.00.** The lump sum cost **includes** a direct-push unit for the project duration. If BMS provides direct push services, extra charges will be incurred for lost or damaged down-hole tooling. This quote shall remain in effect for a period of 90 days from issue date. Our terms of payment are Net 30 Days. This proposal is subject to the attached Terms and Conditions.

Proposal Prepared By:
John L. Kiest

_____
BioManagement Services, Inc.

Date: October 19, 2010

Terms and Conditions

Terms of Payment- Payment terms are NET DUE 30 DAYS from date of invoice unless otherwise agreed to in writing. Amounts past due will be charged interest at the rate of 1.5% per month. In the event BMS, Inc. is required to retain the services of an attorney and/or bring suit on account of client's default on the terms and conditions of this Agreement, including but not limited to failure to timely make payment of any and all invoices tendered, Client agrees to pay BMS, Inc. its reasonable attorney's fees and costs in addition to the amount of any judgment.

Proposal Acceptance – Prior to conducting any work, BMS, Inc. must have an accepted proposal signed by an authorized representative of the Client.

Notice to Proceed – Prior to mobilizing to the project site, the Client must provide a written Notice To Proceed showing desired start dates and times subject to acceptance and approval by BMS, Inc.

Access to Project Site – BMS, Inc. will make every reasonable effort to minimize disruption of normal site activities. Where necessary, BMS, Inc. project activities will take priority over normal site activities. Client agrees that BMS, Inc. will have reasonable access to the project area.

Insurance – BMS, Inc. will provide a certificate of insurance to the Client containing the following limits:

Liability	$1,000,000 per occurrence
	$2,000,000 aggregate
Vehicle	$1,000,000
Umbrella	$1,000,000
Worker's Comp	$500,000

Underground Obstructions Client shall be solely responsible for the location and marking of all underground utilities including product lines, underground storage tanks and site electrical. BMS, Inc. will not assume responsibility for damage to unmarked utilities. Client assumes responsibility for approving the location of all injection points.

Additional Work No additional work will be conducted by BMS, Inc. without written authorization from the client. Any approved additional work will be invoiced separately.

Independent Contractor BMS, Inc. is an independent contractor and shall have and maintain complete control of and responsibility for its employees, agents, methods, procedures and operations. BMS, Inc. reserves the right to modify site work plans to maximize the effectiveness of the technology.

Permits- Client agrees to advise BMS, Inc. of any State, Local or Federal permits that may be required prior to implementing the project. If client is required to obtain permits, copies of the approved permits must be provided to BMS. In the event BMS is required to obtain permits, the project will not be implemented until such permits are approved.

Delays- BMS, Inc. will notify client immediately of any project delays, and thereafter continue to advise the client concerning such delays. Project delays resulting from the actions of the client or site owner may result in additional charges for down time, per diems or travel.

Intellectual Properties and Trade Secrets- Client agrees that all right, title and interest of every kind and nature, whether known or unknown, in and to any intellectual property, including but not limited to, any patents, trademarks, trade secrets, inventions and properties or trade secrets invented, developed, or produced in the course of rendering services to the Client by BMS, Inc. shall be and remain the sole and exclusive property of BMS, Inc.

Force Majeure- Neither BMS, Inc. nor Client shall be liable for damages due to delay or failure to perform any obligation if such delay or failure results directly or indirectly from circumstances beyond the control of such party, including but not limited to, acts of God, acts of war, civil commotions, riots, strikes, lockouts, acts of government in its sovereign capacity, disruption of telecommunications transmissions, fire, water damages, flood, earthquake or other natural catastrophes.

Attorney Fees- In the event BMS, Inc. is required to retain the services of an attorney and/or bring suit on account of client's default on the terms and conditions of this agreement, including but not limited to failure to make timely payment of any or all invoices tendered, client agrees to pay BMS, Inc. its reasonable attorney's fees and costs in addition to the amount of any judgment.

Attachment A

BioManagement Services, Inc.

Project Specifications

Proposal Number: **986-REV**
Date: 18-Oct-10

Client: Tetra Tech
8640 Phillips Highway, Suite 16
Jacksonville, FL 32256

Project: Site 1586
Mayport Naval Station

Attn: Ben Marshall

Contaminant of Concern:
LNAPL

Treatment Area

Length:	0	Feet
Width:	0	Feet
Surface Area:	1256	Sq. Ft.

Vertical Interval

From:	1	feet below ground surface
To:	20	feet below ground surface
Total Vertical:	19	feet

Volume of Treatment Zone:	884 Cubic yards
Injection Point Spacing:	4 Feet
Number of Injection Points:	79
Estimated Gallons of BIOX:	4,419
Estimated Days to Complete:	6
Includes Direct Push Unit:	YES

Lump Sum Price: $ 47,122

Project specifications are subject to modification during field operations at the discretion of BMS, Inc.
Field modifications will not decrease the scope of work.

Proposal Acceptance

Printed Name: _____

Signature: _____

Title: _____

Date: _____ Purchase Order No: _____

APPENDIX G

NEW PIG SPECIFICATION SHEETS

New Pig
1-800-HOT-HOGS® (468-4647)

PIG® Monitoring Well Skimming Sock #SKM401

- Absorbs up to 17 ounces of petroleum-based liquids, not water
- 1.5" diameter lifts surface oil out of monitoring wells
- Socks meet NFPA 99 standards for static decay
- 30 Socks per box

Always in stock. Ships within 24 hours.

Qty	Price
1-2	$69.35
3-9	$67.35
10+	$63.35

Product Specifications (for SKM401)

Color:	White
Dimensions:	ext. dia. 1.5" x 18" L
Absorbency:	Up to 4 gal. per box
Absorbency per:	Up to 17 oz.
Sold as:	30 per box
Weight:	6 lbs.
# per Pallet:	30
Composition:	Skin: Polypropylene Filler: Polypropylene

Technical Information (for SKM401)

To see the PDS (Product Data Sheet) for this item, visit **newpig.com**

To see the MSDS (Material Safety Data Sheet) for this item, visit **newpig.com**

Helps you comply with 40 CFR 122.26. When applying for a National Pollutant Discharge Elimination System (NPDES) permit, facilities must have a plan in place that describes actions, procedures, control techniques, management practices and equipment available to prevent illegal discharge of pollutants into waterways.

Warnings & Restrictions (for SKM401)

There are no warnings or restrictions for this item.

100% Money-Back Guarantee

If you're not happy with a product, for any reason, we'll refund every penny of your purchase price. That means we'll refund all sales taxes, shipping costs, and any other incidentals — without tacking on a restocking fee or any other surprise charges. You get ALL your money back. Period.

One Pork Avenue, Tipton, PA 16684-0304 • 1-800-HOT-HOGS® (468-4647)
Fax: 1-800-621-PIGS (621-7447) • Email: hothogs@newpig.com • Web: newpig.com

New Pig
1-800-HOT-HOGS® (468-4647)

PIG® Sump Skimmer #SKM404

Qty	Price
1-2	$103.90
3-9	$99.60
10+	$95.35

- Polypropylene loop can be attached to rope (not included) for easy deployment and retrieval
- Contained absorbent makes cleanup quick and easy
- Polypropylene filler is chemical-resistant and hydrophobic for containing and absorbing oil-based spills in a variety of environments; holds in liquid, even when fully saturated
- Polypropylene skin is chemical- and tear-resistant; meets NFPA 99 standards for static decay
- Absorbs and retains oils and oil-based liquids—including lubricants, fuels and cleaning agents—without absorbing a drop of water
- Floats on water to soak up unwanted oil-based fluids that collect in sumps, tanks and bilges
- Bright white color makes absorbed oil easier to see; clearly shows saturation level
- Can be incinerated after use to reduce waste or for fuels blending

Always in stock. Ships within 24 hours.

Product Specifications (for SKM404)

Color:	White
Dimensions:	ext. dia. 3" x 18" L
Absorbency:	Up to 9.38 gal. per box
Absorbency per:	Up to 48 oz.
Sold as:	25 per box
Weight:	8.16 lbs.
National Stock Number (NSN):	7930-01-397-3194
# per Pallet:	30
Composition:	Skin - Polypropylene Filler - Polypropylene

Technical Information (for SKM404)

To see the PDS (Product Data Sheet) for this item, visit **newpig.com**

To see the MSDS (Material Safety Data Sheet) for this item, visit **newpig.com**

NFPA 99

Helps you comply with 40 CFR 122.26. When applying for a National Pollutant Discharge Elimination System (NPDES) permit, facilities must have a plan in place that describes actions, procedures, control techniques, management practices and equipment available to prevent illegal discharge of pollutants into waterways.

Warnings & Restrictions (for SKM404)

There are no warnings or restrictions for this item.

100% Money-Back Guarantee

If you're not happy with a product, for any reason, we'll refund every penny of your purchase price. That means we'll refund all sales taxes, shipping costs, and any other incidentals — without tacking on a restocking fee or any other surprise charges. You get ALL your money back. Period.

One Pork Avenue, Tipton, PA 16684-0304 • 1-800-HOT-HOGS® (468-4647)
Fax: 1-800-621-PIGS (621-7447) • Email: hothogs@newpig.com • Web: newpig.com