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SUMMARY REPORT
BIOSPARGING SYSTEM OPERATIONS
AT OLD NAVY FUEL FARM
JANUARY-JUNE 1997
NAVAL AIR STATION, BRUNSWICK, MAINE

Contract No. N62472-92-D-1296
Contract Task Order No. 0035

Prepared for

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September 1997
FINAL
296.0035

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EA CTO Manager: John A. Carnright

In compliance with EA's Quality Procedures for review of deliverables outlined in the Quality Management Plan, this final deliverable has been reviewed for quality by the undersigned Senior Technical Reviewer(s). The information presented in this report/deliverable has been prepared in accordance with the approved Implementation Plan for the Contract Task Order (CTO) and reflects a proper presentation of the data and/or the conclusions drawn and/or the analyses or design completed during the conduct of the work. This statement is based upon the standards identified in the CTO and/or the standard of care existing at the time of preparation.

Senior Technical Reviewer(s)

Ian D. MacFarlane, P.G.
Technical Director

9/23/97
Date

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1. BACKGROUND INFORMATION

1.1 INTRODUCTION

Under Contract No. N62472-92-D-1296, Northern Division, Naval Facilities Engineering Command issued Contract Task Order No. 0035 to EA Engineering, Science, and Technology to perform remedial system operations and monitoring at the Old Navy Fuel Farm, Naval Air Station (NAS) Brunswick, Maine. NAS Brunswick is located south of the Androscoggin River between Brunswick and Bath, Maine (Figure 1-1). The layout of the Old Navy Fuel Farm is shown on Figure 1-2.

NAS Brunswick is an active base owned and operated by the Federal government through the Department of the Navy. In 1987, NAS Brunswick was placed on the National Priorities List by the U.S. Environmental Protection Agency (EPA) and is currently participating in the Navy's Installation Restoration Program. In August 1996, active *in situ* remediation was instituted utilizing biosparging technology for reduction of petroleum-related hydrocarbon concentrations in site soil and ground water at the Old Navy Fuel Farm.

This report provides the results for biosparging system operating and monitoring data, including ground-water chemical and microbial analyses, for the period of 1 January - 30 June 1997.

1.2 SITE HISTORY

The Old Navy Fuel Farm site is located on the northeast portion of NAS Brunswick grounds, and is bounded on the south by Fitch Avenue, on the west by 6th Street, and to the north and east by undeveloped land. The site was previously used as a petroleum bulk storage facility and was decommissioned in 1993. Currently, only components of the biosparging system (originally constructed as a soil vapor extraction/aquifer air sparging [SVE/AAS] system), installed following facility decommissioning, and a storm sewer system, exist at the site. Surface grade consists of a level field of grass.

1.2.1 Site Geologic Conditions

The topography surrounding NAS Brunswick is somewhat irregular due to erosion of surficial sand deposits by streams. East of NAS Brunswick, the topography becomes more rounded and controlled by bedrock. Topography at NAS Brunswick exhibits little relief. Major rivers in the area which receive drainage from NAS Brunswick consist of the Androscoggin River, located less than 1 mi to the north, and Mere Brook located less than 1 mi to the east-southeast. Drainage from the eastern part of NAS Brunswick, which includes the Old Navy Fuel Farm site, is toward Mere Brook, which discharges to Harpswell Cove about 3 mi to the south. Harpswell Cove is a tidally influenced marine inlet.

Previous hydrogeologic investigations (O'Brien & Gere Engineers, Inc. 1990, 1992) confirmed that the site is underlain by a sandy deposit which is continuous and is, in turn, underlain by a glacio-marine silty clay deposit (designated as the Presumpscot Formation by the Maine Geological Survey). The sandy deposit thickness ranges from 2.5 to 9 ft with thicker zones located at the northwest section of the site. The ground-water table occurs in the sandy zone and flows generally south-southeasterly parallel to the surface topography.

1.2.2 Historical Petroleum Bulk Storage and Environmental Investigation Summary

Prior to decommissioning in 1993, the Old Navy Fuel Farm consisted of two separate petroleum bulk storage tank farms which together included nine mounded underground storage tanks. All underground storage tanks, piping, and associated appurtenances were removed during facility decommissioning. The older, western tank farm, included five underground storage tanks, previously identified as underground storage tanks T-101 through T-105. Underground storage tanks T-101 through T-103 were 100,000-gal capacity tanks used for storage of petroleum sludge, unleaded gasoline, and aviation gasoline, respectively. Underground storage tanks T-104 and T-105 were both 25,000-gal capacity tanks used for storage of ethylene glycol. The newer, eastern Fuel Farm included four underground storage tanks, previously identified as underground storage tanks T-202 through T-205. Each of these underground storage tanks were 100,000-gal capacity tanks used for storage of JP-5 fuel.

Previous environmental investigations (O'Brien & Gere Engineers, Inc. 1990, 1992) identified two distinct dissolved-phase hydrocarbon plumes. The first plume was located in the east central portion of the Old Navy Fuel Farm and appeared to originate in the vicinity of former JP-5 underground storage tank T-202. This plume previously extended downgradient from the former location of T-202 toward the south-southeast and consisted primarily of benzene, toluene, ethylbenzene, and xylene (BTEX) compounds. Monitoring well MW-211 (previously designated as MW-J) is currently located adjacent to the former location of T-202.

The second dissolved-phase hydrocarbon plume was located in the north-central portion of the western half of the Old Navy Fuel Farm and appeared to originate in the vicinity of former glycol tanks T-104 and T-105. This plume consisted principally of BTEX compounds, although at significantly lower concentrations than the eastern hydrocarbon plume. Well point WP-05 is currently located in the vicinity of the former locations of T-104 and T-105.

1.3 SUMMARY OF BIOSPARGING SYSTEM OPERATIONS

The objective of biosparging at the Old Navy Fuel Farm is to aerate the ground water and limited vadose zone within the targeted remedial area to provide sufficient oxygen for indigenous aerobic micro-organisms to metabolize petroleum-related hydrocarbons. Additional monitoring procedures necessary to evaluate the effectiveness of the biosparging system include water quality indicator parameter measurements, microbial population studies, and alternate electron acceptor and nutrient sampling. To provide sufficient ground-water sampling locations for biosparging effectiveness monitoring, 20 shallow well points were previously installed

throughout the targeted remedial area (EA 1997a). In addition, two replacement monitoring wells (MW-56R and MW-61R) were installed in December 1996 to replace damaged wells MW-56 and MW-61. Details of the well abandonment and replacement well installation program are provided in a letter report submitted on 3 February 1997 (EA 1997b).

The existing biosparging system includes a 1,350 ft^2 treatment building and a network of lateral aeration trenches and vertical sparge wells located to the east of the treatment building. The configuration of the biosparging system is provided on Figure 1-2. Operation of the existing system in biosparging mode utilizes low-flow air injection from the existing network of sparge wells.

1.3.1 Biosparging System Operation and Maintenance Activities

When operated in the biosparging mode, sparging system flow rates and injection pressures are adjusted to maximize the delivery of oxygen to the ground water and limited vadose zone, while minimizing volatilization effects. In this manner, *in situ* metabolism of hydrocarbons is theoretically maximized, while the release of volatilized hydrocarbons to the atmosphere is minimized. During long-term operations, site personnel monitor injection pressures in conjunction with hydrostatic resistance (as a function of current well gauging data) and re-adjust the system as necessary. A photoionization detector (PID)/flame ionization detector (FID) is used to monitor volatile hydrocarbon concentrations in the service vaults and vadose zone soil (via newly installed well points) to prevent excessive atmospheric discharge from occurring.

Each of the existing sparge compressors (C-1A, C-1B, and C-2) is used to supply pressurized air to the AAS injection wells. The sparge compressors are operated at low pressure (7-12 psig) and moderate flow (250-300 cubic feet per minute [cfm]) settings to provide sufficient air injection to the sparge wells. The layout of the sparge compressor and injection manifold is provided on Figure 1-3.

1.3.2 Biosparging System Effectiveness Monitoring Procedures

Since biosparging is a low pressure *in situ* aeration process, the effectiveness of biosparging systems must be assessed by verifying increased microbial activity (via direct microbial population studies and/or biodegradation indicator parameters such as electron acceptor and nutrient studies) and a corresponding reduction in hydrocarbon concentrations. Therefore, the effectiveness of biosparging operations at the Old Navy Fuel Farm is monitored by conducting ground-water sampling to quantify concentrations of petroleum-related hydrocarbons, sulfate, nitrate, iron, and hydrocarbon-degrading micro-organisms. Well gauging and water quality indicator parameter data (particularly dissolved oxygen, reduction-oxidation potential [redox], and pH) are obtained to ensure that subsurface conditions sufficient to support the hydrocarbon-degrading microbial population are maintained and to assess the effect of the biosparging system on active metabolic processes. Well riser headspace total volatile hydrocarbon (TVH), methane gas, oxygen, and carbon dioxide concentrations are also obtained to assess the effect of the biosparging system on active metabolic processes.

Chemical analyses of ground-water samples include BTEX, methyl tertiary-butyl ether (MTBE), total petroleum hydrocarbons (TPH)-Gasoline Range Organics (GRO), and TPH-Diesel Range Organics (DRO). Additional offsite laboratory analyses included nutrient availability analyses and comparative enumeration analyses. The purpose of the comparative enumeration analyses is to quantify the indigenous microbial population and the fraction of petroleum hydrocarbon degrading bacteria within the total microbial population. The microbial enumeration data are used to confirm that petroleum hydrocarbons are being metabolized by having facilitated the growth of the petroleum hydrocarbon degrading bacteria relative to the non-degrader microbial population.

Available nutrient analysis is conducted as part of the comparative enumeration analysis and includes quantification of nutrient availability as a function of dissolved-phase nitrogen (ammonia, total organic nitrogen, nitrate, and nitrite) and phosphorous concentrations. Although oxygen uptake is the primary limiting factor to *in situ* biodegradation, nutrient availability is also crucial for sustained (i.e., long-term) biodegradation processes, and is monitored to ensure that microbial nutrient uptake does not deplete the indigenous nutrient supply.

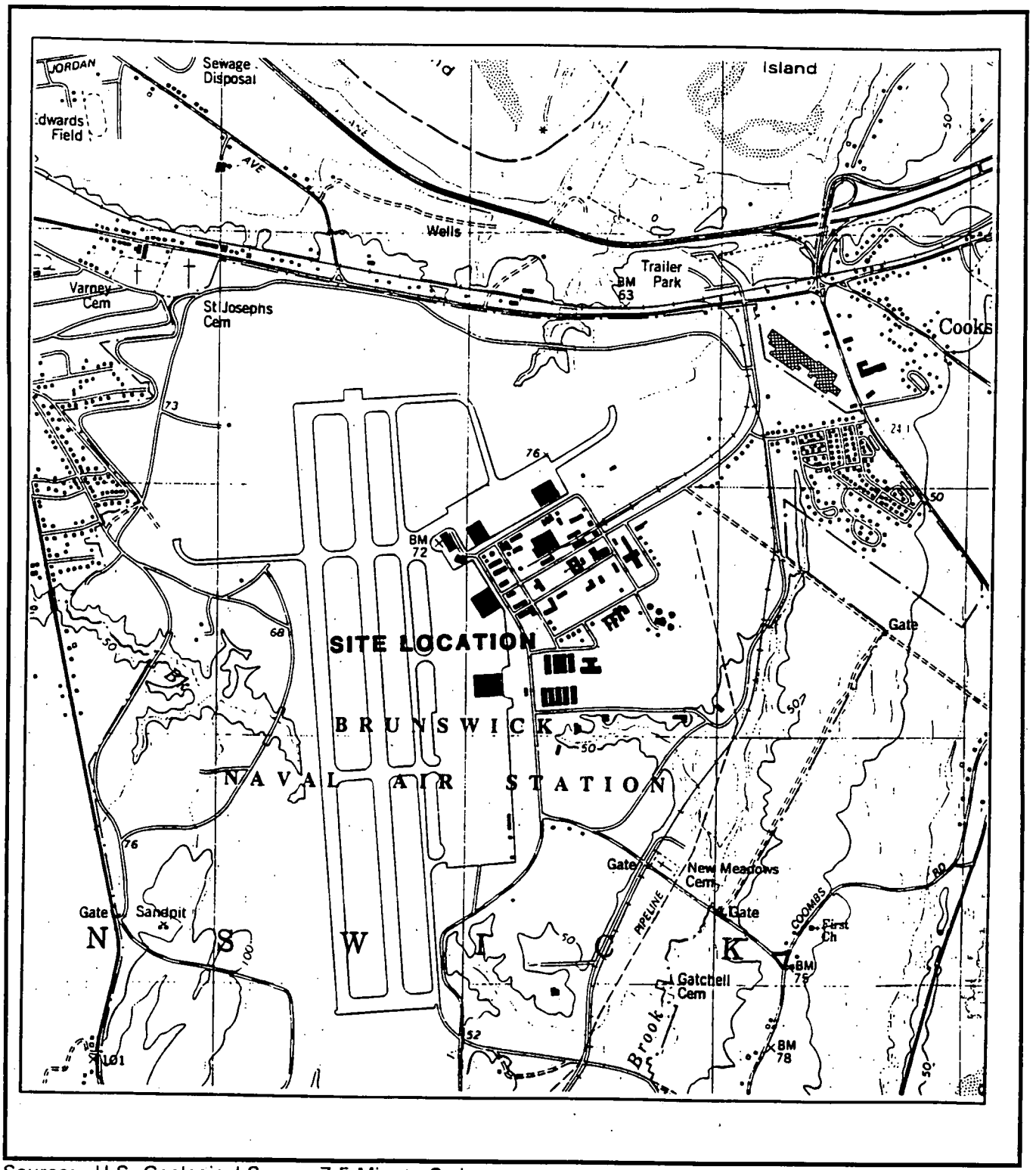
1.4 REPORT ORGANIZATION

The remaining chapters of this report address the following topics: implementation of field monitoring and sampling activities, presentation of biosparging system performance data, summarization of chemical and biological analytical results, and assessment of biosparging system performance.

Chapter 2, Monitoring and Sampling Procedures, provides a summary of the field activities, including water level gauging; measurement of water quality indicator parameters; monitoring for the presence of volatile hydrocarbons, methane, carbon dioxide, and oxygen; and ground-water sampling.

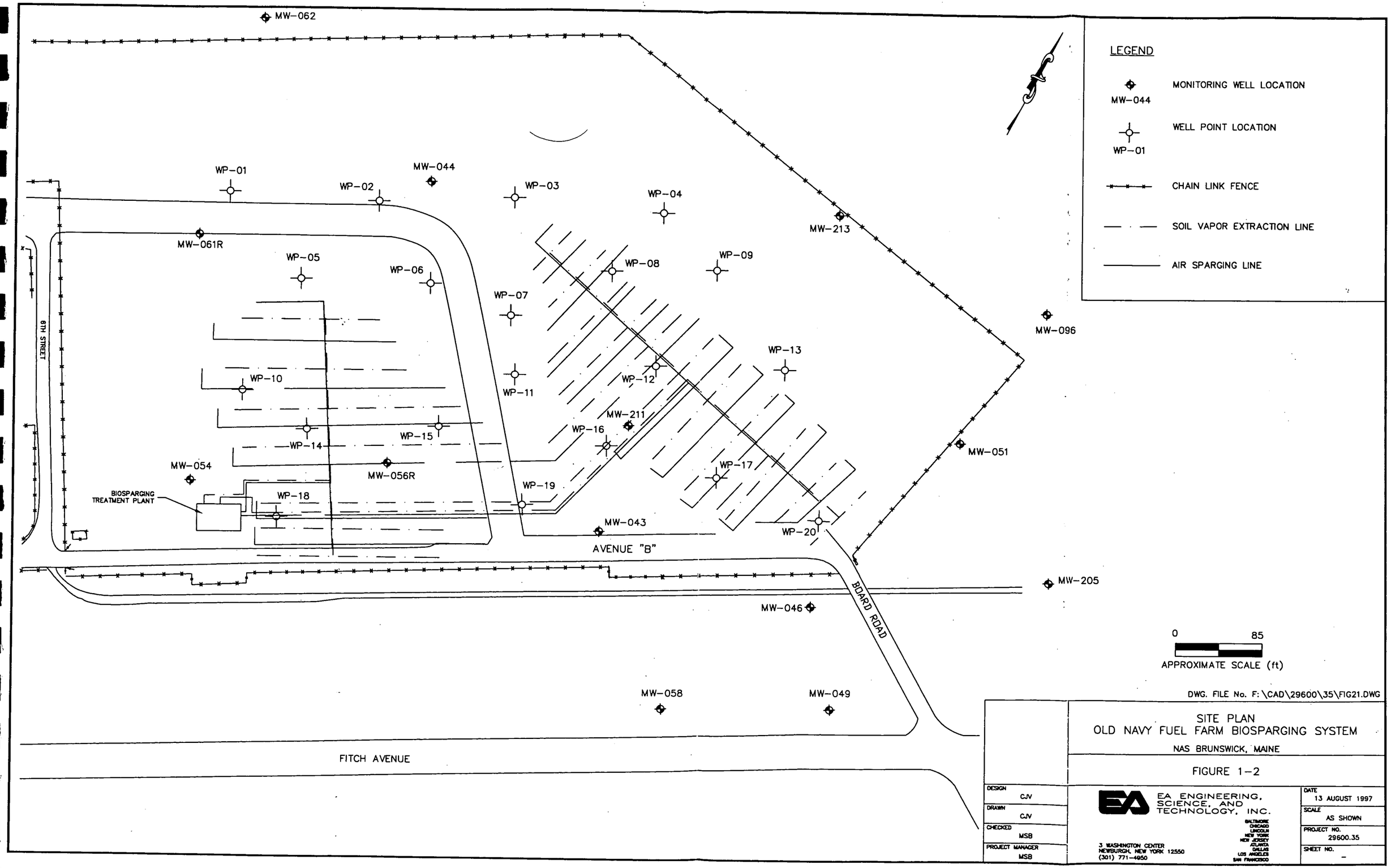
Chapter 3, Discussion of Results, discusses biosparging system operations and the results of the monitoring and sampling activities detailed in Chapter 2.

NAVAL AIR STATION, BRUNSWICK MAINE



Source: U.S. Geological Survey 7.5-Minute Series
Topographic Quandrangle Map
Brunswick, Maine Quadrangle, 1980

Figure 1-1. Site location, Naval Air Station, Brunswick, Maine, U.S. Geological Survey 7.5-minute series topographic quadrangle map.



DWG. FILE No. F:\CAD\29600\35\FIG21.DWG

SITE PLAN
OLD NAVY FUEL FARM BIOSPARGING SYSTEM
NAS BRUNSWICK, MAINE

FIGURE 1-2

DESIGN	CJV
DRAWN	CJV
CHECKED	MSB
PROJECT MANAGER	MSB

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

3 WASHINGTON CENTER
NEWBURGH, NEW YORK 12550
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BALTIMORE
CHICAGO
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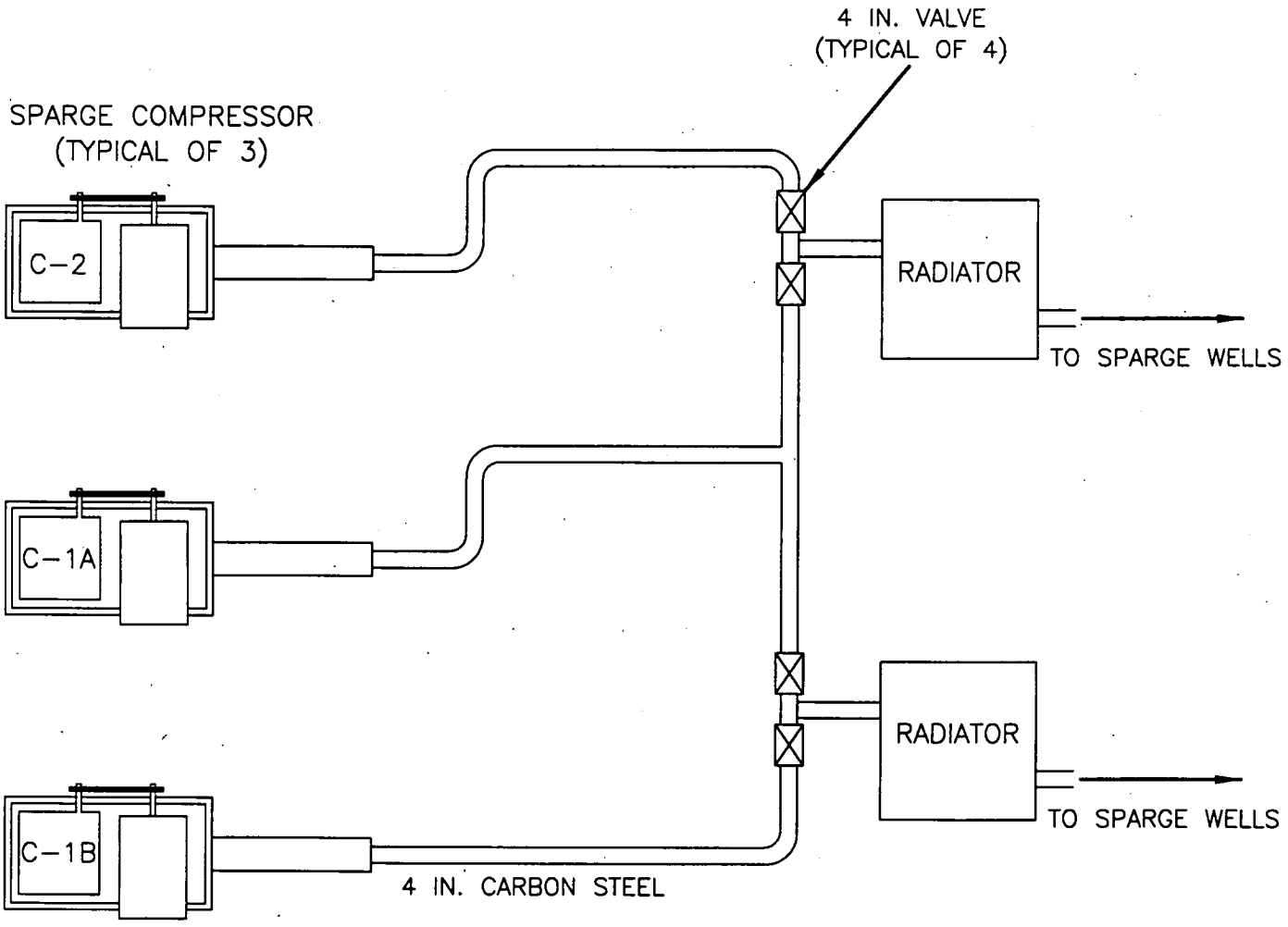
NEW YORK
NEW JERSEY
ATLANTA
DALLAS
LOS ANGELES
SAN FRANCISCO

DATE	13 AUGUST 1997
SCALE	AS SHOWN
PROJECT NO.	29600.35
SHEET NO.	–



NOTES:

1) LOCATIONS AND DIMENSIONS SHOWN ARE APPROXIMATE.

2) SPARGE COMPRESSOR AIR INTAKE FILTERS LOCATED OUTSIDE OF TREATMENT BUILDING.

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EA ENGINEERING, SCIENCE, AND TECHNOLOGY	OLD NAVY FUEL FARM BRUNSWICK NAVAL AIR STATION BRUNSWICK, MAINE	FIGURE 1-3 BIOSPARGING COMPRESSORS AND INJECTION MANIFOLD LAYOUT

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
MSB	CJV	CJV	MSB	N.T.S.	15 AUG. 97	29600.35	FIG36

2. MONITORING AND SAMPLING PROCEDURES

2.1 WELL GAUGING AND WATER QUALITY MONITORING PROGRAM

Well gauging and water quality indicator parameter data were collected during each of the 12 site operating and monitoring visits during the January-June 1997 operational period, except when prevented due to equipment failure and/or inclement weather conditions. Field personnel gauged accessible monitoring wells located within the vicinity of the Old Navy Fuel Farm (14 total) and well points (20 total) to determine depth to water and absence/presence of light, non-aqueous phase liquid (LNAPL). Immediately following well gauging, water quality indicator parameter data were recorded at these locations. Monitoring well and well point locations are shown on Figure 1-2.

2.1.1 Well Gauging Methodology

Well gauging data were collected over short time intervals to permit assessment of ground-water flow. Upon opening each well, a Foxboro TVA-1000 PID/FID was used to monitor for the presence of TVH at the well riser and in the breathing zone. Following safety and health clearance monitoring, well gauging was conducted using a Solinst Model 121 interface meter capable of detecting LNAPL at thicknesses as low as 0.01 ft. These data were recorded on the Field Record of Water Quality Analysis forms provided in Appendix A.

2.1.2 Water Quality Indicator Parameter Measurement Methodology

Measurements of water quality indicator parameters were obtained to assess variations in water quality during periods of active biosparging. Water quality indicator parameters, including temperature, pH, conductivity, dissolved oxygen, and Eh, were measured in-well using a Hydrolab Model H20®G multiparameter water quality meter. Measurements were obtained by immersing the instrument datasonde below the water level in each well. In-well measurements were taken in order to obtain measurements reflective of *in situ* ground-water quality. These data were recorded on the Field Record of Water Quality Analysis forms provided in Appendix A.

2.2 WELL POINT AIR QUALITY MONITORING PROGRAM

During biosparging system operations, the 20 well points were monitored to assess TVH, methane, oxygen, and carbon dioxide concentrations at locations within the remediation area and at background locations. Measurements of these parameters were also recorded at the biosparging system access vaults, although these data are not presented in this report since they were collected for safety and health purposes only.

TVH concentration data were collected at the well points to evaluate the degree to which volatilization of hydrocarbons was occurring as a result of active biosparging. Increases in TVH

concentrations may be attributable to excessive aeration of the saturated zone. Upon opening the top of each well point, a Foxboro TVA-1000 PID/FID was used to monitor the presence and concentration of TVH. These data were recorded on the Field Record of Biosparging Well Point Monitoring forms provided in Appendix B.

To monitor for the presence of methane and to assess the reduction of anaerobic microbial activity within the remedial target area, a Landtec Model GA-90 methane detector was used on 23 June 1997 to directly measure methane, oxygen, and carbon dioxide concentrations. These data were recorded on the Field Record of Biosparging Well Point Monitoring form provided in Appendix B.

2.3 GROUND-WATER SAMPLING PROGRAM

2.3.1 Overview

As discussed previously, the effectiveness of the biosparging system is assessed by verifying increased *in situ* biodegradation (via microbial quantification data and/or nutrient/electron acceptor biodegradation indicator parameters) and a corresponding reduction in dissolved-phase hydrocarbon concentrations. Biosparging system operations at the Old Navy Fuel Farm were monitored by conducting baseline (August 1996) and interim (December 1996 and June 1997) ground-water sampling. Ground-water sampling included chemical analyses to assess the concentrations of dissolved-phase hydrocarbons in shallow ground water, and microbial and biodegradation parameter analyses to assess the presence and stability of the indigenous hydrocarbon-degrading micro-organism population. Although the majority of micro-organisms at the Old Navy Fuel Farm are most likely attached to soil particles, ground-water samples were collected for microbial analyses concurrently with the collection of ground-water samples for chemical analyses to minimize the cost impact (associated with the collection of soil samples below the water table) of the microbial enumeration studies. Since elevated microbial population densities in ground water would be expected in areas exhibiting elevated soil populations, the data obtained from ground-water samples, which are relative to soil in the same vicinity, are considered to provide a representative indication of soil conditions.

One ground-water sampling event was conducted during this reporting period (24-26 June 1997). Chemical sampling was conducted at monitoring wells located at and in the vicinity of the Old Navy Fuel Farm (MW-44, MW-49, MW-51, MW-54, MW-56R, MW-58, MW-61R, MW-62, MW-211, and MW-213) and well points. Biological sampling was conducted at the well points. Sampling methodologies performed in the field are discussed below. A summary of the ground-water sampling and analysis program (chemical and biological) is provided in Table 2-1.

2.3.2 Sampling Methodology

A complete round of well gauging and measurement of water quality indicator parameters was completed on 23 June 1997. Following the well gauging event, new, dedicated polyethylene sample tubing was installed in each of the well points sampled. An ISCO Model 2700 peristaltic

pump with dedicated 3/8-in. outer diameter Masterflex Silicone C-Flex® tubing was affixed to the 3/8-in. inner diameter dedicated polyethylene tubing set in the well point, and all well points were purged dry. Well points were allowed to recharge overnight and were sampled within 24 hours. Ground-water sampling for chemical analyses was conducted using the ISCO peristaltic pump and dedicated polyethylene sample tubing. Ground-water samples for microbial analyses were collected using new, dedicated, disposable polypropylene bailers and nylon sampling line. During the 24-26 June 1997 sampling event, monitoring wells were sampled using new, dedicated, disposable polypropylene bailers and nylon sampling line. Sample purging was initiated following well gauging. At each well, a minimum of 3 well volumes of water was purged prior to sampling. Water quality indicator parameters were recorded during purging and immediately prior to sample collection. Measurement of these parameters was accomplished to ensure that water quality had stabilized prior to the collection of samples.

2.3.2.1 Summary of Ground-Water Sampling Conducted on 24-26 June 1997

The second interim sampling event completed during active biosparging was conducted on 24-26 June 1997 at 16 of 20 well points, 5 of 7 ground-water monitoring wells located within the remediation zone (MW-44, MW-54, MW-61R, MW-211, and MW-213), and 4 of 7 perimeter monitoring wells (MW-49, MW-51, MW-58, and MW-62). Prior to sampling, each well was gauged to determine the absence/presence of LNAPL, depth to ground water, and depth to bottom using a Solinst Model 121 interface meter graduated at 0.01-ft intervals. Well gauging confirmed the absence of measurable LNAPL at all locations. Well points WP-12, WP-16, WP-17, and WP-18 did not yield sufficient ground water and thus were not sampled. Monitoring well MW-56R was actively sparging and could not be sampled. Monitoring well MW-43 was dry during the June 1997 sampling event. Ground-water sampling was not required at monitoring wells MW-46, MW-96, and MW-205. The Field Record of Well Gauging, Purging, and Sampling forms completed during the sampling event are provided in Appendix C.

Ground-water samples collected for chemical analyses were submitted to the laboratory under two sample delivery groups. One ground-water sample was collected from each of the wells/well points (25 total); in addition, duplicate ground-water samples were collected from well point WP-7 and monitoring well MW-213. Two equipment rinsate blanks were collected by pouring de-ionized water through new dedicated polypropylene bailers and into the appropriate sample containers. To assess the potential for contamination during sample transport, a trip blank was analyzed with the shipment of well point samples. Due to field error, a trip blank was not sent with the monitoring well samples. Aqueous samples were shipped under chain-of-custody to the laboratory via overnight courier upon completion of each sample delivery group. Samples collected for chemical analyses were submitted to EA Laboratories of Sparks, Maryland. Ground-water (including duplicate) samples and rinsate blanks were analyzed for BTEX and MTBE by EPA Method 8020, TPH-GRO by Maine Department of Human Services (DHS)–Health and Environmental Testing Laboratory (HETL) Method 4.2.17, and TPH-DRO by Maine DHS–HETL Method 4.1.25. Trip blank samples were analyzed only for BTEX and MTBE by EPA Method 8020.

Ground-water samples collected from the 16 well points for microbial analyses were shipped to BioRenewal Technologies, Inc. of Madison, Wisconsin, for nutrient availability and comparative enumeration analyses. One ground-water sample was collected from each of the 16 well points in which sufficient ground-water was available (i.e., all well points except WP-12, WP-16, WP-17, and WP-18); in addition, duplicate ground-water samples were collected from well points WP-7 and WP-11 to assess the precision of the analytical process. One equipment rinsate blank was collected to assess the potential for contamination during sample collection and transport by pouring de-ionized water through new dedicated polypropylene bailers and into the appropriate sample containers.

Following sample collection for offsite laboratory analyses, an additional grab sample was collected to permit onsite colorimetric testing for ferrous iron and manganese. Following vacuum filtration to remove particulate matter, a Hach Model DR-2000 spectrometer was used to measure concentrations of ferrous iron and manganese in the filtrate by Hach Methods 8146 and 8034, respectively. Ground-water chemical and microbial laboratory reports are provided in Appendixes D and E, respectively.

TABLE 2-1 SUMMARY OF CHEMICAL AND BIOLOGICAL ANALYTICAL PROGRAM
OLD NAVY FUEL FARM, NAVAL AIR STATION, BRUNSWICK, MAINE

Chemical Analyses	
Analyte	Method
BTEX and MTBE	EPA 602
TPH-GRO	Maine DHS-HETL Method 4.2.17
TPH-DRO	Maine DHS-HETL Method 4.1.25
Sulfate	EPA Method 300
Nitrate	EPA Method 300
Ferrous Iron	HACH Method 8146
Manganese	HACH Method 8034
Methane (vapor phase)	Landtec GA-90
Biological and Physicochemical Analyses	
Analysis	Parameters Measured
Comparative Microbial Enumeration	Total Heterotrophic Bacteria/Total Hydrocarbon Degrading Bacteria
Nutrient Availability Assessment	Nitrogen and Phosphorous Concentrations

NOTE:
BTEX = Benzene, toluene, ethylbenzene, and total xylenes.
DRO = Diesel Range Organics.
GRO = Gasoline Range Organics.
LOP = Laboratory operating procedure.
MEDEP = Maine Department of Environmental Protection.
MTBE = Methyl tertiary-butyl ether.
TPH = Total petroleum hydrocarbons.
DHS = Department of Human Services
HETL = Health and Environmental Testing Laboratory

3. DISCUSSION OF RESULTS

This chapter summarizes the Old Navy Fuel Farm biosparging system field monitoring and analytical results as well as operations and monitoring data for the period of 1 January - 30 June 1997. An assessment of the *in situ* biodegradation occurring at the Old Navy Fuel Farm is provided based on biosparging system monitoring data and results of both chemical and microbial ground-water sampling conducted in June 1997.

3.1 SUMMARY OF BIOSPARGING SYSTEM OPERATION AND MONITORING DATA

Field personnel performed a total of 12 operations and maintenance and monitoring site visits during the period from 1 January to 30 June 1997. Site visits were conducted on 3 and 24 January, 4 and 28 February, 15 and 27 March, 7 and 30 April, 15 and 30 May, and 6 and 23 June 1997. Biosparging system performance and monitoring data are provided in Field Record of Biosparging System Operations forms provided in Appendix F. Tasks performed during each site visit are summarized below:

- Monitored biosparging system operation parameters (i.e., flow rates, pressures, temperatures, etc.)
- Gauged water levels and measured water quality indicator parameters at monitoring wells and well points
- Analyzed well point head space TVH concentrations
- Inspected biosparging system components and remedial area for evidence of air injection
- Inspected biosparging system components for functionality and repaired as necessary.

3.1.1 Biosparging System Operational Summary

The Old Navy Fuel Farm biosparging system was activated on 8 August 1996 with the injection of compressed air in both lateral aeration trenches and sparge wells. Due to limited effectiveness of the lateral aeration trenches (with respect to ground-water aeration), exclusive operation of the sparge wells was initiated during the previous reporting period on 2 October 1996. Ambient air injection was accomplished by sparge compressors C-1A, C-1B, and C-2 which supplied compressed air (approximately 250-300 cfm each at 7-12 psig) to the eastern and western sparge well networks. Injection pressures and flow rates were measured at field service vaults using dedicated gauges or were confirmed by visual and/or audio evidence (i.e., obvious surface water/service vault water aeration and audible supply line air flow).

During this reporting period, all three sparge compressors were operated except when prevented due to mechanical failure and/or during site activities requiring temporary de-activation of the biosparging system. The biosparging system was de-activated to allow site maintenance activities during the periods of 28 January - 3 February 1997 and 15-20 March 1997. Sparge compressor C-1A was found to be inactive on 24 January 1997 due to failure of the main blower shaft. Once replacement parts were received, compressor C-1A was repaired and reactivated on 8 April 1997. Sparge compressor C-1B was found to be inactive on 21 February 1997 due to drive belt failure. This compressor was reactivated on 21 February 1997 after replacement of drive belts from inactive compressor C-1A. However, on 20 March 1997, compressor C-1B was again deactivated due to pending belt failure. On 10 April 1997, after completing repairs to the drive pulley, compressor C-1B was reactivated. Compressor C-2 was found to be inactive on 25 June 1997 due to belt failure. The belts were replaced and the compressor reactivated on 26 June 1997. The Old Navy Fuel Farm biosparging system was operated in this mode (i.e., all three sparge compressors active) for the remainder of the reporting period.

Soil excavation was initiated on 30 June 1997 to remove product seeps observed along the drainage swale located in the vicinity of well point WP-01. Excavation and associated soil sampling is scheduled to be completed in early July 1997. It is expected that soil excavation and storm sewer/headwall removal/replacement activities will be performed to mitigate the remaining product seep area. Chemical analysis of soil samples will be for BTEX and MTBE by EPA Method 8020, TPH-GRO by Maine DHS-HETL Method 4.2.17, and TPH-DRO by Maine DHS-HETL Method 4.1.25.

3.1.2 Monitoring Well and Well Point Gauging Data

Field personnel gauged the 20 well points and 14 shallow monitoring wells located at and in the vicinity of the Old Navy Fuel Farm (MW-43, MW-44, MW-46, MW-49, MW-51, MW-54, MW-56R, MW-58, MW-61R, MW-62, MW-96, MW-205, MW-211, and MW-213) during each of the 12 operating and monitoring site visits, except when prevented by weather conditions and/or blocked well casings. A summary of the well gauging data is provided in Table 3-1. The water table elevation fluctuated by no more than 3.4 ft, increased gradually from January to April 1997, and then decreased nominally during the remainder of the reporting period.

Measurable LNAPL (i.e., >0.01 ft) was observed in well points WP-04 (0.5 ft maximum) and WP-07 (0.32 ft maximum) on 3 January 1997. LNAPL was not detected in any of the 14 monitoring wells.

3.1.3 Water Quality Indicator Parameter Data

Field personnel measured water quality indicator parameters in the 20 well points and 14 shallow monitoring wells located at and in the vicinity of the Old Navy Fuel Farm during each of the 12 operations and monitoring site visits, except when prevented by weather conditions, blocked well casings, and/or the presence of LNAPL. A summary of water quality indicator parameter data is provided in Table 3-2.

Due to seasonal conditions, the average temperature of ground water increased from 7.30°C to 11.27°C during the reporting period. The average pH, dissolved oxygen, conductivity, and redox values remained essentially unchanged throughout the reporting period.

3.1.4 Monitoring Well and Well Point Headspace Vapor Measurements

Field personnel measured headspace TVH concentrations in the 20 well points during each of the 12 operating and monitoring site visits except when prevented due to severe weather conditions. Since the FID responds to methane as well as TVH, the PID was used for final TVH assessments at the Old Navy Fuel Farm. Elevated FID responses observed without corresponding PID responses served as indicators of methane gas. Measurements of well point headspace TVH concentrations were not recorded at any well point on 3 January 1997, and were not recorded at well points WP-01, WP-02, WP-03, WP-05, and WP-06 on 24 January 1997 due to severe weather conditions (i.e., extreme cold). During the reporting period, TVH concentrations greater than 10 ppm_v were observed in all but 1 of the 20 well point risers. TVH concentrations greater than 10 ppm_v were not detected within well point riser WP-17. TVH concentrations greater than 10 ppm_v continue to be observed in the remaining well point risers. A summary of the well point headspace monitoring data is provided in Table 3-3.

To monitor for the presence of methane, a Landtec GA-90 methane detector was used to directly measure methane, carbon dioxide, and oxygen headspace concentrations on 23 June 1997. Methane was detected in only 2 of the well points (WP-02 and WP-07) at concentrations of 0.2 and 3.2 percent, respectively. However, although not directly measured by the Landtec GA-90, the presence of methane at a low concentration (i.e., < 0.1 percent) was indicated at WP-13 due to an elevated FID reading (1,369 ppm_v) relative to a correspondingly low PID reading (35.2 ppm_v). It was demonstrated during the previous reporting period that large discrepancies between FID and PID responses at the Old Navy Fuel Farm were due to elevated methane concentrations, which are not detected by the PID. Carbon dioxide measurements ranged from 0.0 percent at 11 of 20 well points to 2.2 percent (WP-18). Oxygen measurements ranged from 19.9 percent (WP-10) to 21.7 percent (WP-12 and WP-13). Methane, carbon dioxide, and oxygen headspace concentration data are provided in Table 3-4.

3.2 SUMMARY OF JUNE 1997 SAMPLING PROGRAM RESULTS

Ground-water sampling was conducted at the Old Navy Fuel Farm during the period of 24-26 June 1997 to document ground-water conditions after approximately 11 months of active biosparging. Water level gauging and water quality indicator parameter data were collected from 13 out of 14 shallow monitoring wells located at and in the vicinity of the Old Navy Fuel Farm (MW-43, MW-44, MW-46, MW-49, MW-51, MW-54, MW-58, MW-61R, MW-62, MW-96, MW-205, MW-211, and MW-213) and the 20 well points. Monitoring well MW-56R was actively sparging and was, therefore, not gauged or sampled.

Ground-water samples were collected from 9 monitoring wells and at 16 of 20 well points. Monitoring well MW-43 and well points WP-12, WP-16, WP-17, and WP-18 were found to be dry and were, therefore, not sampled. Ground-water samples were not collected at monitoring wells MW-46, MW-96, and MW-205. Each sample was analyzed onsite for ferrous iron and manganese using a Hach Model DR-2000 spectrometer. Samples from the monitoring wells and well points were sent to EA Laboratories and analyzed for BTEX and MTBE by EPA Method 8020, TPH-GRO by Maine DHS-HETL Method 4.2.17, and TPH-DRO by Maine DHS-HETL Method 4.1.25.

Additional ground-water samples were collected from the 16 well points sampled and submitted to BioRenewal Technologies, Inc. of Madison, Wisconsin, for biological and physicochemical analyses including: total heterotrophic bacteria and total hydrocarbon-degrading bacteria quantification, sulfate by EPA Method 300, and nitrate by EPA Method 300. Kerosene was used as the substrate hydrocarbon during the degrader bacteria identification analyses since it was the most similar petroleum product to JP-5 available to the laboratory.

3.2.1 Well Gauging Data

Field personnel gauged 13 of 14 monitoring wells located at and in the vicinity of the Old Navy Fuel Farm and the 20 well points on 23 June 1997 (prior to ground-water sampling) to determine depth to water and note absence/presence of LNAPL. Monitoring well MW-56R was not gauged due to active sparging conditions. LNAPL was not observed in any of the monitoring wells or well points. Monitoring well MW-43 and well points WP-12, WP-16, WP-17, and WP-18 were dry. The ground-water elevation ranged from 60.93 ft mean sea level in MW-49 to 71.46 ft mean sea level in MW-62. Table 3-1 provides a summary of Old Navy Fuel Farm gauging data for the reporting period.

Figure 3-1 provides the interpreted water table elevations for the 23 June 1997 gauging event. The overall ground-water flow direction observed during the 23 June 1997 gauging event, when the biosparging system was active, was similar to that observed during the August 1996 gauging event (prior to activation of the biosparging system). However, operation of the biosparging system appears to have caused minor fluctuations in water table elevations, most notably in the vicinity of well points WP-05, WP-08, and WP-09.

3.2.2 Water Quality Indicator Parameter Data

Concurrent with the 23 June 1997 gauging event, field personnel measured baseline water quality indicator parameters (including temperature, pH, conductivity, dissolved oxygen, and Eh) at 16 well points and 9 of the 10 monitoring wells included in the sampling program using a Hydrolab Model H20®G multiparameter water quality meter. Water quality parameter data were not obtained from monitoring well MW-43 and well points WP-12, WP-16, WP-17, and WP-18 due to lack of sufficient ground water and from monitoring well MW-56R due to active sparging conditions.

Ground-water pH ranged from 4.58 (WP-211) to 8.01 (MW-58) with an average value of 5.66. Temperature ranged from 7.92°C (MW-49) to 16.62°C (WP-14) with an average of 11.27°C. Dissolved oxygen ranged from 0.18 mg/L (MW-44) to 8.88 mg/L (MW-211) with an average of 2.50 mg/L. Although not directly measured at monitoring well MW-56R, it is assumed that the dissolved oxygen concentration was near saturation at this location due to active sparging conditions. Conductivity ranged from 1.6 μhmos (MW-211) to 429 μhmos (WP-01) with an average of 190.42 μhmos. Redox ranged from 33 mV (MW-58) to 371 mV (MW-211) with an average of 236 mV. Table 3-2 provides a summary of Old Navy Fuel Farm water quality indicator parameter data for the reporting period.

3.2.3 Microbial Sampling Results

During 25-26 June 1997, ground-water samples were collected from 16 of 20 well points and submitted to BioRenewal Technologies, Inc. of Madison, Wisconsin for microbial analysis. Microbial samples were not collected from well points WP-12, WP-16, WP-17, and WP-18 due to lack of available ground water. Microbial population density (both total heterotrophic micro-organisms and petroleum degrading micro-organisms) was expressed in colony forming units per mL (CFU/mL). Results for the baseline (August 1996), December 1996, and June 1997 microbial sampling events are summarized in Table 3-5.

The June 1997 (i.e., after approximately 11 months of active biosparging) total microbial populations ranged from 8.0×10^4 CFU/mL (WP-02) to 1.4×10^7 CFU/mL (WP-13) with an average of 2.3×10^6 CFU/mL. Degrader microbial populations ranged from 1.4×10^4 CFU/mL (WP-03) to 9.4×10^6 CFU/mL (WP-13) with an average of 1.1×10^6 CFU/mL. Table 3-5 provides a comparison of baseline (August 1996), December 1996, and June 1997 microbial sampling results. As evident in the table, although the total heterotrophic microbial population approximately doubled from an average of 1.1×10^6 CFU/mL to 2.3×10^6 CFU/mL during this reporting period, the hydrocarbon degrading microbial population increased by 2 orders of magnitude from an average of 6.8×10^4 CFU/mL to 1.1×10^6 CFU/mL. It should be noted that the average increase of the hydrocarbon degrading microbial population was largely weighted by well points WP-04, WP-07 through WP-14, and WP-20, in which significant population increases were observed.

The rinsate blank biological sample reported a total heterotrophic microbial count of only 1.2×10^3 CFU/mL (0.05 percent of the average population density) and a hydrocarbon degrading microbial count of 2.2×10^2 CFU/mL (0.02 percent of the average population density), indicating that equipment and/or laboratory interference was negligible. The reported microbial counts for the duplicate sample collected at well point WP-07 indicated agreement with analytical results for the original sample. However, the duplicate sample collected at WP-11 reported slightly lower microbial counts than the original sample (Table 3-5).

Total organic nitrogen concentrations ranged from 0.9 to 14.4 percent in samples collected on 25-26 June 1997, with an average of 3.9 percent. The June 1997 C:N ratios ranged from 3:1 to 50:1, with an average of 11.4:1. Since available phosphorous was only detected above 0.1 mg/L

at one location during June 1997, only one C:P ratio (well point WP-04, 650:1) was reported by BioRenewal Technologies, Inc. Each average value of these parameters, with the exception of the C:N ratio, was above the minimal threshold for effective *in situ* biodegradation potential (total organic nitrogen ≥1.5 percent, C:N ratio between 10:1 and 100:1, C:P ratio between 100:1 and 200:1) given by EPA (1996). The average C:N ratio was slightly above the threshold value. Nitrate concentrations ranged from non-detect at 10 locations to 2.9 mg/L, with an average of 0.41 mg/L. Sulfate concentrations ranged from 0.8 to 320 mg/L, with an average of 48.0 mg/L. There were no spatial distribution patterns observed for nitrate or sulfate at the site. Table 3-6 provides a summary of the Old Navy Fuel Farm biodegradation parameter data for the baseline, December 1996, and June 1997 sampling events.

3.2.4 Ground-Water Sampling Results

A total of 25 ground-water samples were collected from 9 monitoring wells (MW-44, MW-49, MW-51, MW-54, MW-58, MW-61R, MW-62, MW-211, and MW-213) and 16 well points on 24-26 June 1997. Samples were not collected from monitoring well MW-43 and well points WP-12, WP-16, WP-17, and WP-18 due to lack of sufficient ground water. Monitoring well MW-56R was not sampled due to active sparging conditions. Samples from the monitoring wells and well points were sent to EA Laboratories and analyzed for BTEX and MTBE by EPA Method 8020, TPH-GRO by Maine DHS-HETL Method 4.2.17, and TPH-DRO by Maine DHS-HETL Method 4.1.25. Analytical results for the June 1997 ground-water sampling event are summarized in Table 3-7. Figures 3-2 through 3-4 provide interpreted concentration isopleths for total BTEX, TPH-GRO, and TPH-DRO concentrations in ground water, respectively.

Total BTEX was reported in 12 of 25 ground-water samples at concentrations ranging from 1.0 μg/L (WP-61R, WP-14, and WP-15) to 21,660 μg/L (MW-211). Total BTEX was reported at a concentration greater than 100 μg/L in 7 of 25 samples: WP-02 (547 μg/L), WP-04 (637 μg/L), WP-05 (11,355 μg/L), WP-10 (110 μg/L), WP-11 (7,427 μg/L), WP-13 (300 μg/L), and MW-211 (21,660 μg/L). Benzene was reported in 7 of 25 samples at concentrations ranging from 3 μg/L (WP-02 and WP-04) to 510 μg/L (MW-211). Toluene was the most frequently detected compound, reported in 13 of 25 samples. Ethylbenzene and total xylenes were each reported in 7 of 25 samples. It should be noted that toluene was reported in 1 of 2 equipment rinsate blanks (3.0 μg/L); therefore, low concentrations of toluene reported in samples collected at well points WP-14, WP-15, WP-19, WP-20, and monitoring wells MW-49 and MW-61R may be field and/or laboratory artifacts. Excluding low concentrations of toluene, total BTEX was reported in only 7 of 25 ground-water samples. No other VOC were reported in the rinsate blanks. Total BTEX was not detected in the trip blank.

MTBE was detected in only 3 of 25 ground-water samples at concentrations of 1 μg/L (WP-03 and WP-04) and 2 μg/L (WP-11). MTBE was not detected in the equipment rinsate blanks or the trip blank.

TPH-GRO was reported in 16 of 25 ground-water samples at concentrations ranging from 32 μg/L (MW-61R) to 24,000 μg/L (MW-211). Concentrations of TPH-GRO were reported above 1,000 μg/L in 7 of 25 wells: WP-02 (4,200 μg/L), WP-04 (16,000 μg/L), WP-05 (15,000 μg/L), WP-07 (4,000 μg/L), WP-08 (1,600 μg/L), WP-11 (9,100 μg/L), and MW-211 (24,000 μg/L). TPH-GRO was not detected in the equipment rinsate blanks.

TPH-DRO was reported in the 25 ground-water samples at concentrations ranging from 52 μg/L (MW-51) to 12,000,000 μg/L (MW-211). Concentrations of TPH-DRO were reported greater than 1,000 μg/L at 8 locations: WP-01 (1,800 μg/L), WP-02 (23,000), WP-04 (12,000,000 μg/L), WP-05 (2,700 μg/L), WP-07 (1,200 μg/L), WP-08 (2,400 μg/L), WP-11 (12,000 μg/L), and MW-211 (3,000 μg/L). A TPH-DRO concentration of 58 μg/L was reported in upgradient well MW-62, indicating the potential for non-petroleum related hydrocarbons to be detected in the TPH-DRO analysis. Insufficient sample volume was collected for TPH-DRO analysis at well point WP-09. TPH-DRO was not detected in the equipment rinsate blanks.

The reported concentrations of total BTEX, MTBE, TPH-GRO, and TPH-DRO for the duplicate ground-water samples collected at WP-07 and MW-213 indicated general agreement with analytical results for the original samples, except for TPH-GRO in WP-213 which was not detected in the original sample and was reported at 28 μg/L (nominally above the reporting limit of 25 μg/L) in the duplicate sample.

A Hach Model DR-2000 spectrometer was used for analysis of ferrous iron and manganese concentrations in the ground-water samples from 16 of 20 well points. Samples were not collected from well points WP-12, WP-16, WP-17, and WP-18 due to insufficient volume of ground water in the well points. Ferrous iron concentrations ranged from 0.02 mg/L in well point WP-20 to 16.0 mg/L in WP-01. Manganese concentrations ranged from non-detect in 6 well points (WP-05, WP-09, WP-11, WP-13, WP-15, and WP-16) to 1.3 mg/L in WP-08. There were no spatial distribution patterns observed for ferrous iron or manganese at the site. A summary of the ferrous iron and manganese data is provided in Table 3-8.

3.3 ASSESSMENT OF BIOSPARGING SYSTEM PERFORMANCE

Indicator parameters used to assess biosparging system performance during the reporting period include: total and petroleum degrading microbial population data, water quality indicator parameters (including temperature, pH, conductivity, dissolved oxygen, and Eh), dissolved nutrient and electron acceptor data, ground-water sampling results, and well point headspace vapor monitoring data. It should be noted that substantial changes in some or all (with the exception of methane gas and dissolved oxygen) of the indicator parameters during the present reporting period may be due to seasonal effects, since the previous sampling event was conducted in December 1996.

3.3.1 *In Situ* Biodegradation Conditions

Ground-water parameters and vapor monitoring data collected prior to biosparging system activation (i.e., August 1996) at the Old Navy Fuel Farm were indicative of an anaerobic environment which had progressed to an advanced state of reducing conditions. Anaerobic conditions were evidenced prior to biosparging by dissolved oxygen concentrations less than 0.5 mg/L in 9 of 18 well points and less than 1.0 mg/L in 16 of 18 well points. Only two well points, WP-09 and WP-20, exhibited dissolved oxygen concentrations greater than 1.0 mg/L (5.4 and 3.1 mg/L, respectively) during the baseline sampling event. Anaerobic conditions prior to biosparging were also evidenced by elevated methane gas concentrations in 13 of 28 well points. After approximately 11 months of active biosparging, ground water within the central and eastern sections of the Old Navy Fuel Farm remedial area has been converted to aerobic conditions supportive of *in situ* biodegradation of petroleum hydrocarbons by heterotrophic micro-organisms. The capacity of the biosparging system for supplying oxygen to ground water within this section of the remedial area was evidenced by significant increases in dissolved oxygen concentrations at 12 well point locations. Insufficient data were collected (due to lack of ground water) to assess dissolved oxygen increases at well point WP-07. Dissolved oxygen concentration isopleths for the June 1997 sampling events are provided in Figure 3-5.

No increases in dissolved oxygen concentrations were observed at well points WP-04, WP-10, WP-14, WP-18, and WP-19. Well points WP-04 and WP-19 are not located within the biosparging system area of influence and, therefore, are not expected to exhibit increased dissolved oxygen concentrations. Well points WP-10, WP-14, and WP-19 are located along the western section of the biosparging area, adjacent to and north of the biosparging treatment building. The biosparging system appears to have been ineffective in delivering dissolved oxygen to this area, most likely due to short circuiting of sparged air to areas of lower hydrostatic resistance. Ground water in this section of the Old Navy Fuel Farm continues to exhibit depressed oxygen conditions.

Increases in dissolved oxygen concentrations (i.e., locations >2.0 mg/L) were observed at the remaining well points, especially in the north-central and eastern sections of the remedial area (including well points WP-05, WP-06, WP-07, WP-08, WP-09, WP-11, WP-12, WP-13, WP-15, WP-16, WP-17, and WP-20, and monitoring wells MW-56R and MW-211) where dissolved oxygen concentrations ranged from 2.12 mg/L to near saturation (i.e., as evidenced by active sparging conditions and/or dissolved oxygen concentrations >8.0 mg/L). At 6 of these locations (WP-07, WP-08, WP-13, WP-15, MW-56R, and MW-211), sparged ground water was observed within the well risers; although dry, positive air pressure was observed at WP-17, indicating active aeration in this area.

Other water quality indicator parameter data which indicate that a conversion from anaerobic to aerobic conditions has occurred are pH and redox potential. As discussed previously, the ground-water pH measured during the baseline sampling event (August 1996) at the Old Navy Fuel Farm remedial area was significantly lower than pH values typical for other sites at NAS Brunswick (i.e., approximately 6.0-7.0). The average pH prior to activation of the biosparging

system was 4.87; after approximately 11 months of biosparging, the average pH had risen and stabilized at approximately 5.6-5.8. The depressed pH conditions observed during pre-operational sampling may have resulted from acetate and long-chain fatty acid accumulation during methanogenesis (NFESC 1996). Methanogenic bacteria cannot tolerate oxygen and would not have persisted in areas which experienced significant increases in dissolved oxygen, thereby minimizing the pH-reducing effects of methanogenesis (Graudy and Graudy 1988). There also appears to be a correlation between increased dissolved oxygen and increased redox potential at well points which had previously exhibited very low redox potentials (WP-01, WP-02, WP-08, and WP-11). Increased redox potential is associated with conversion to aerobic microbial processes (NFESC 1996). However, the range of redox potentials and average redox potential measured during the June 1997 sampling event (157-367 mV and 267 mV, respectively), although higher than the previous sampling events, was still below values typical in environments where engineered aerobic biodegradation has been fully established (usually greater than 750 mV).

The reduction in methanogenic bacteria in areas which exhibited increases in dissolved oxygen concentration was further evidenced at all but 1 location (well point WP-07) within the biosparging system remedial area by a corresponding decrease in well point riser headspace methane concentrations. As discussed previously, a Landtec GA-90 methane detector was used to analyze well point headspace vapor. Concurrent with activation of the biosparging system in August 1996, methane gas was detected at 13 of 20 well points at concentrations ranging from 0.1 to >90.0 percent. In June 1997, after approximately 11 months of active biosparging, methane gas was only detected in 3 of 20 well points (WP-02, WP-07, and WP-13) at concentrations ranging from <0.1 to 3.2 percent. Well point WP-02 is not located within the effective biosparging area of influence. The concentration of methane gas at well point WP-13 (3.2 percent) was significantly reduced from previous monitoring events (28 August and 3 September 1996), in which methane concentrations >90 percent were recorded. It should be noted that oxygen concentrations increased nearly to ambient at all well point risers after activation of the biosparging system. It should also be noted that volatilization effects due to active biosparging may have contributed to the reduction of methane gas concentrations.

Figure 3-6 provides an idealized illustration of microbial ground-water environments in the vicinity of a petroleum spill resulting from preferential use of electron acceptors. Facultative bacteria (i.e., able to metabolize hydrocarbons in both aerobic and anaerobic environments) utilize available electron acceptors preferentially according to energy availability per mole, beginning with oxygen (aerobic respiration) and proceeding in order through nitrate reduction, iron reduction, sulfate reduction, and then to methanogenesis (carbon dioxide reduction). Thus, the presence of methane often suggests that all other available electron acceptors have been exhausted and/or are not able to be utilized by the indigenous microbes (NFESS 1996). The presence of elevated methane concentrations in well point riser headspace observed during the baseline sampling event (August 1996) indicates that highly anaerobic conditions existed throughout the Old Navy Fuel Farm biosparging area prior to the introduction of oxygen. Results of the June 1997 sampling event and well point head space monitoring (which reported

significant reductions and/or elimination of methane gas) indicate that operation of the biosparging system has resulted in a return to aerobic biodegradation conditions in the central and eastern sections of the biosparging area.

Nitrate and sulfate concentrations observed during the June 1997 sampling event are similar to those observed during the baseline (August 1996) sampling event. Although an apparent increase in both nitrate and sulfate concentrations was observed between the August and December 1996 sampling events, results of the June 1997 sampling event (which returned to near baseline conditions) indicate that these changes may have been due, in part or whole, to seasonal effects.

Although the average C:N ratio (11.4:1) was above the minimal threshold for effective *in situ* biodegradation (range of from 10:1 to 100:1, U.S. EPA 1996), individual C:N ratios exceeded 10:1 at only 6 locations (well points WP-04, WP-06, WP-07, WP-08, WP-10, and WP-11). Hydrocarbon-degrading microbial populations ranged from 4.9×10^4 CFU/mL (WP-06) to 8.9×10^5 CFU/mL (WP-04) at these locations, whereas population densities as high as 5.2×10^6 CFU/mL and 9.4×10^6 CFU/mL were reported for well points WP-09 and WP-13, which reported C:N ratios of only 0.9:1 and 3:1, respectively. Other well point locations, which also reported C:N ratios <10:1, exhibited microbial population densities in the same range as observed for well points with C:N ratios >10:1. Therefore, as evidenced by the data, the C:N ratios at the Old Navy Fuel Farm do not appear to provide a significant indication of biodegradation potential and will not be calculated during future sampling events.

As discussed previously, phosphorous was only detected above 0.1 mg/L in one ground-water sample during the June 1997 sampling event. Phosphorous was also only detected in one ground-water sample during December 1996 and in only three samples during August 1996. Therefore, since phosphorous is not a significant component of ground-water in the vicinity of the Old Navy Fuel Farm, the C:P ratio does not serve as a site-specific indicator of biodegradation potential and will not be calculated during future sampling events.

Manganese and ferric iron (Fe^{+3}) are often used as alternate electron acceptors to oxygen under anaerobic conditions. Increases in the concentrations of manganese and/or ferric iron may be indicative of reduced utilization rates associated with conversion from anaerobic to aerobic microbial activity. Based on the June 1997 sampling data, the manganese concentrations do not appear to have changed significantly during the reporting period, and were not very significant in either the baseline or December 1996 sampling events. Ferric iron is not directly measured for microbial assessments since it is not possible to quantify its availability to the microbial population without knowing its degree of crystallinity. Therefore, its reduced form, or ferrous iron (Fe^{+2}), is measured. An increase in ferrous iron concentration is an indication that iron reduction is likely occurring (NFESC 1996). Alternately, if ferrous iron concentrations are depleted, it can be inferred that dilution and/or oxidation may be taking place in the absence of continued ferrous iron production associated with anaerobic conditions.

Out of 12 well points for which ferrous iron concentrations were quantified during the baseline (August 1996), December 1996, and June 1997 sampling events, 9 locations exhibited decreases in ferrous iron concentration. Each of these locations also exhibited significant increases in dissolved oxygen concentrations. However, as stated previously, it should be noted that these changes may be due, in part or whole, to seasonal effects. Ferrous iron concentrations at the remaining 3 sample locations were similar to those observed during December 1996.

Microbial quantification data obtained during the baseline and December 1996 sampling events indicated that the increase in dissolved oxygen concentrations resulting from active biosparging had increased the overall microbial population by approximately 40 percent, to an average of 1.1×10^6 CFU/mL. This increase is especially noteworthy since seasonal decreases in ground-water temperature between the baseline and December 1996 sampling events would have otherwise been expected to reduce the microbial population. Microbial quantification data obtained during the June 1997 sampling event indicated a further increase of the total heterotrophic population to an average of 2.3×10^6 CFU/mL, approximately 3.4 times greater than the baseline population. Based on the June 1997 sampling results, the total petroleum (i.e., kerosene or JP-5) degrading microbial population had more than doubled, relative to the baseline population, from 5.4×10^5 CFU/mL to 1.1×10^6 CFU/mL. The increase in hydrocarbon-degrading microbes was especially evident in areas which exhibited increased dissolved oxygen concentrations due to biosparging (i.e., well points WP-07, WP-09, WP-11, and WP-13).

Based on water quality indicator parameter data, and nutrient and electron acceptor data collected during the June 1997 sampling event, environmental conditions required for successful aerobic biodegradation are in place at the Old Navy Fuel Farm. Ground-water dissolved oxygen concentrations throughout the majority of the remedial area have been increased to acceptable levels (i.e., greater than 2.0 mg/L) for aerobic metabolism. However, as indicated on Figure 3-5, depressed oxygen conditions continue to exist in the western section of the biosparging area north of the treatment building (i.e., in the vicinity of monitoring wells MW-54 and MW-61R and well points WP-10, WP-14, and WP-18), in the vicinity of monitoring wells MW-49 and MW-58 and well point WP-19, and in the vicinity of well point WP-04. It should be noted that monitoring wells MW-49 and MW-58 and well point WP-04 are not located within the current biosparging area of influence.

The pH of the ground water has apparently stabilized above the minimum threshold level for aerobic metabolism. Similarly, the redox potential of site ground water has increased with the establishment of aerobic processes. The average total organic nitrogen concentration (3.9 percent) and C:N ratio (11.4:1) are within acceptable ranges to sustain aerobic biodegradation of petroleum hydrocarbons. The current ground-water temperature (average of 11.27°C) is expected to enhance microbial degradation throughout the remainder of the summer and early fall seasons. It is expected that as dissolved oxygen continues to be made available as the primary electron acceptor, sustained aerobic degradation of petroleum constituents will occur at the Old Navy Fuel Farm.

3.3.2 Assessment of Dissolved-Phase Hydrocarbon Removal

Analytical data collected during baseline, December 1996, and June 1997 ground-water sampling events at the Old Navy Fuel Farm indicate that notable reductions in the dissolved-phase BTEX, MTBE, and TPH-GRO concentrations have occurred during the reporting period. A significant reduction of TPH-DRO was not observed for ground-water samples collected at the Old Navy Fuel Farm. Table 3-9 provides a summary of analytical results for the August and December 1996 and June 1997 sampling events. Concentration isopleths for the June 1997 are provided on Figures 3-2 through 3-4.

As indicated by the data, total BTEX concentrations decreased at 10 out 16 well points (WP-01, WP-02, WP-03, WP-04, WP-06, WP-07, WP-08, WP-09, WP-14, and WP-20) and at both monitoring wells (MW-44 and MW-211) for which baseline, December 1996, and June 1997 samples were collected and/or LNAPL (which is assumed to contain elevated concentrations of BTEX) was previously detected. Monitoring well MW-211 was not sampled during August 1996 due to the presence of LNAPL and samples were not collected at well points WP-02, WP-04, and WP-07 in December 1996 due to the presence of LNAPL. However, LNAPL was not detected at any location at the Old Navy Fuel Farm during 11 gauging events from 24 January to 23 June 1997. Of the 10 well points in which total BTEX concentration reductions were observed, 7 also exhibited evidence of active biosparging. Well points WP-01, WP-02, and WP-04, at which slight decreases in total BTEX concentrations were reported, were not affected by the biosparging system. Five sample locations (WP-05, WP-10, WP-12, WP-15, and WP-19) exhibited no change or increase in total BTEX concentrations. Each of these locations were within the biosparging area of influence and exhibited evidence of active biosparging (via increased dissolved oxygen and/or microbial population density). It is possible that biosparging activity may have mobilized BTEX in the vicinity of these locations, creating an apparent increase in dissolved phase BTEX concentrations.

The overall reduction of BTEX in ground-water samples collected at the Old Navy Fuel Farm is illustrated by a significant reduction in the frequency of detection and concentration range for samples collected during the baseline (August 1996), December 1996, and June 1997 sampling events. BTEX was detected in 20 of 20 samples (100 percent) collected during the baseline sampling event and in 18 of 24 samples (75 percent) collected during December 1996, but was only detected in 12 of 25 samples (50 percent) collected in June 1997. Additionally, LNAPL was observed during both the baseline and December 1996 sampling events, but was not observed during the June 1997 sampling event. The remaining areas impacted by dissolved-phase BTEX are located in the northwestern section of the biosparging area, with the highest localized concentration (11,355 μg/L) reported at WP-05 and in the eastern-central biosparging area, in the vicinity of well points WP-11, WP-12, and WP-16 and monitoring well MW-211. The concentration of BTEX at monitoring well MW-211, which appears to be most impacted area remaining at the Old Navy Fuel Farm, has been reduced from LNAPL conditions to 21,660 μg/L.

MTBE was reported at significantly lower concentrations during the reporting period. Significant MTBE removal was documented during the previous reporting period (August-December 1996), during which MTBE concentrations decreased at 12 out of 14 well points and at monitoring well MW-51. During June 1997, MTBE was only detected at 3 locations (WP-03, WP-04, and WP-11) located in the central northeastern section of the biosparging area at concentrations ranging from 1 to 2 μg/L. Prior to activation of the biosparging system, MTBE was detected in 19 of 20 samples at concentrations up to 130 μg/L.

A slight reduction in TPH-GRO concentrations may be indicated by a reduction in the detection frequency reported for TPH-GRO in ground-water samples collected during baseline, December 1996, and June 1997 sampling events (100 percent, 83.3 percent, and 64 percent, respectively) and since LNAPL was observed during both the baseline and December 1996 sampling events and was not observed during the June 1997 sampling event. TPH-GRO were detected throughout the eastern and northwestern sections of the biosparging area, but appear to be contained within the remedial target area. TPH-GRO were not detected in ground-water samples collected at perimeter monitoring wells.

Although LNAPL was not detected during the June 1997 sampling event, TPH-DRO was detected at 12,000,000 μg/L (1.2 percent) at well point WP-04 and at 12,000 μg/L at well point WP-11. TPH-DRO concentrations above 1,000 μg/L were observed in the central-eastern and northwestern sections of the Old Navy Fuel Farm. TPH-DRO were also observed in the perimeter monitoring wells (MW-49, MW-51, MW-58, and MW-62) at concentrations ranging from 52 to 140 μg/L. The highest perimeter monitoring well TPH-DRO concentrations were observed at downgradient wells MW-49 and MW-58 (140 and 100 μg/L, respectively). However, slight reductions of TPH-DRO were observed at both locations relative to the December 1996 analytical data. It should be noted that reported concentrations of TPH-DRO at monitoring well MW-61R and well points WP-01, WP-11, WP-13, and WP-14 may be due in part to other organic matter (i.e., decaying leaves, etc.) in a similar carbon range.

3.4 CONCLUSIONS AND RECOMMENDATIONS

The apparent reduction in dissolved-phase hydrocarbon concentrations is most likely attributable to a combination of volatilization and increased *in situ* biodegradation, both resulting from operation of the Old Navy Fuel Farm biosparging system. Although existing data are not sufficient to directly quantify the fraction of hydrocarbon reduction attributable to volatilization versus biodegradation, estimations can be made for specific compounds based on chemical-specific vapor pressure and biodegradability. MTBE and BTEX, for which the most significant concentration reductions were observed, are the most volatile analytes included in the sampling program. Although BTEX compounds are known to be readily biodegradable, MTBE is generally considered to be recalcitrant (Mormile et al. 1994). Therefore, the reduction of MTBE is most likely attributable to volatilization, especially since the majority of MTBE removal was observed early (i.e., by December 1996) in the biosparging system operational period and without

a correspondingly large BTEX removal. However, continued *in situ* biodegradation of petroleum hydrocarbons has been evidenced by significant increases in the aerobic hydrocarbon-degrading microbial population.

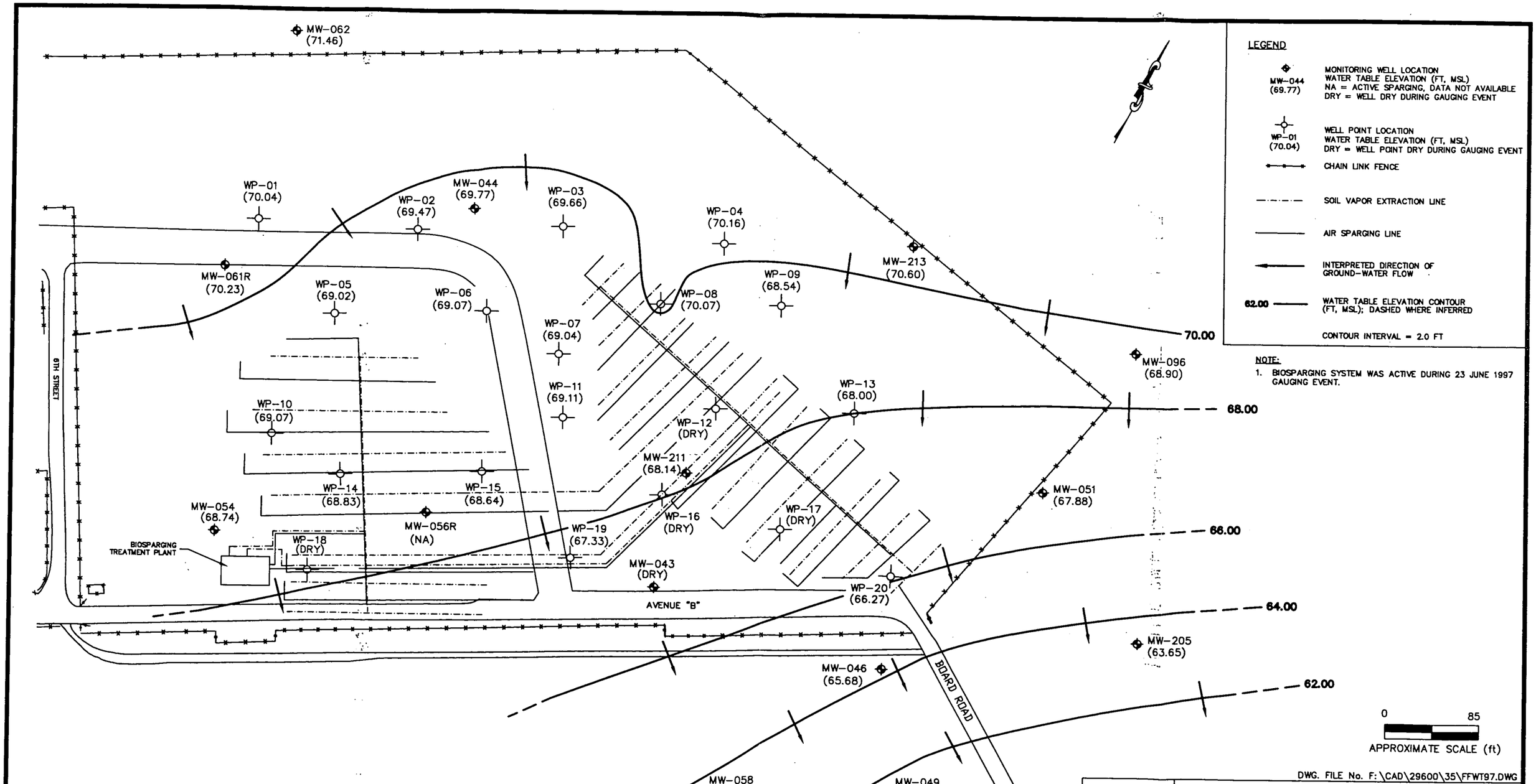
Since the collection of microbial samples during August and December 1996 and June 1997 has, at this time, served to document aerobic biodegradation, further microbial enumeration studies at the Old Navy Fuel Farm are not necessary and will be not be included in future sampling events (unless warranted by changes in the condition of the saturation zone environment).

Although volatilization is effective for removal of the more volatile compounds present at the Old Navy Fuel Farm, less volatile compounds will likely persist without effective *in situ* biodegradation. It is expected that as elevated ambient temperature persists and aerobic microbial conditions are maintained by the continued delivery of dissolved oxygen to the aquifer, these compounds and the remaining volatile constituents, will undergo sustained aerobic biodegradation. However, microbial activity is highly temperature dependent and is often significantly reduced at lower temperatures. Ground-water temperatures measured bi-weekly at the Old Navy Fuel Farm during the period 8 August 1996 - 23 June 1997 indicate that the average temperatures were in the range of 15-19°C during the summer months and gradually decreased after September 1996 to near freezing conditions (i.e., typically less than 4°C) by February 1997. Ground-water temperatures remained low until mid-April 1997, and then increased to an average of 11°C by 23 June 1997. Based on these data, the biosparging system will be de-activated upon evidence that the average ground-water temperature has decreased below 5°C (estimated to occur in early to mid-January), at which point continued biodegradation is not likely to occur (U.S. EPA 1996; NFESC 1996). Bi-weekly monitoring will continue (with the exception of well point vapor monitoring) to record depth to water, assess water quality indicator parameters, and monitor for the presence of LNAPL. Once ground-water temperatures increase above 5°C (estimated to occur in mid- to late April), the biosparging system will be re-activated. In this manner, the microbial population will be given sufficient time to become fully re-established prior to the warm season (June-September), during which the majority of hydrocarbon degradation is expected to occur.

It is also recommended that well points WP-12, WP-16, WP-17, and WP-18, which have repeatedly been dry during gauging events, be re-installed at greater depths to allow measurement of depth to water and collection of ground-water samples during future sampling events.

As indicated by Figures 3-2 through 3-5, several petroleum impacted areas (as evidenced by total BTEX concentrations >100 μg/L and/or TPH-GRO concentrations >1,000 μg/L) at the Old Navy Fuel Farm continue to exhibit depressed oxygen conditions. These areas are located in the central and western sections of the biosparging area of influence in the vicinities of well point WP-09 and WP-10, respectively, and northeast of the biosparging area of influence in the vicinity of well point WP-04. It is recommended that the biosparging air-injection system be modified to provide increased oxygen delivery to the areas indicated on Figure 3-7 by modulating injection

air delivery patterns in the western biosparging field service vaults and by installing additional sparge wells (and associated process pipe) adjacent to well points WP-04 and WP-19. It is expected that these modifications will deliver sufficient oxygen to the above mentioned areas to establish aerobic conditions supportive of enhanced microbial degradation of petroleum hydrocarbons.



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INTERPRETED GROUND-WATER ELEVATION CONTOUR MAP BASED ON DATA COLLECTED 23 JUNE 1997
OLD NAVY FUEL FARM
NAS BRUNSWICK, MAINE

FIGURE 3-1

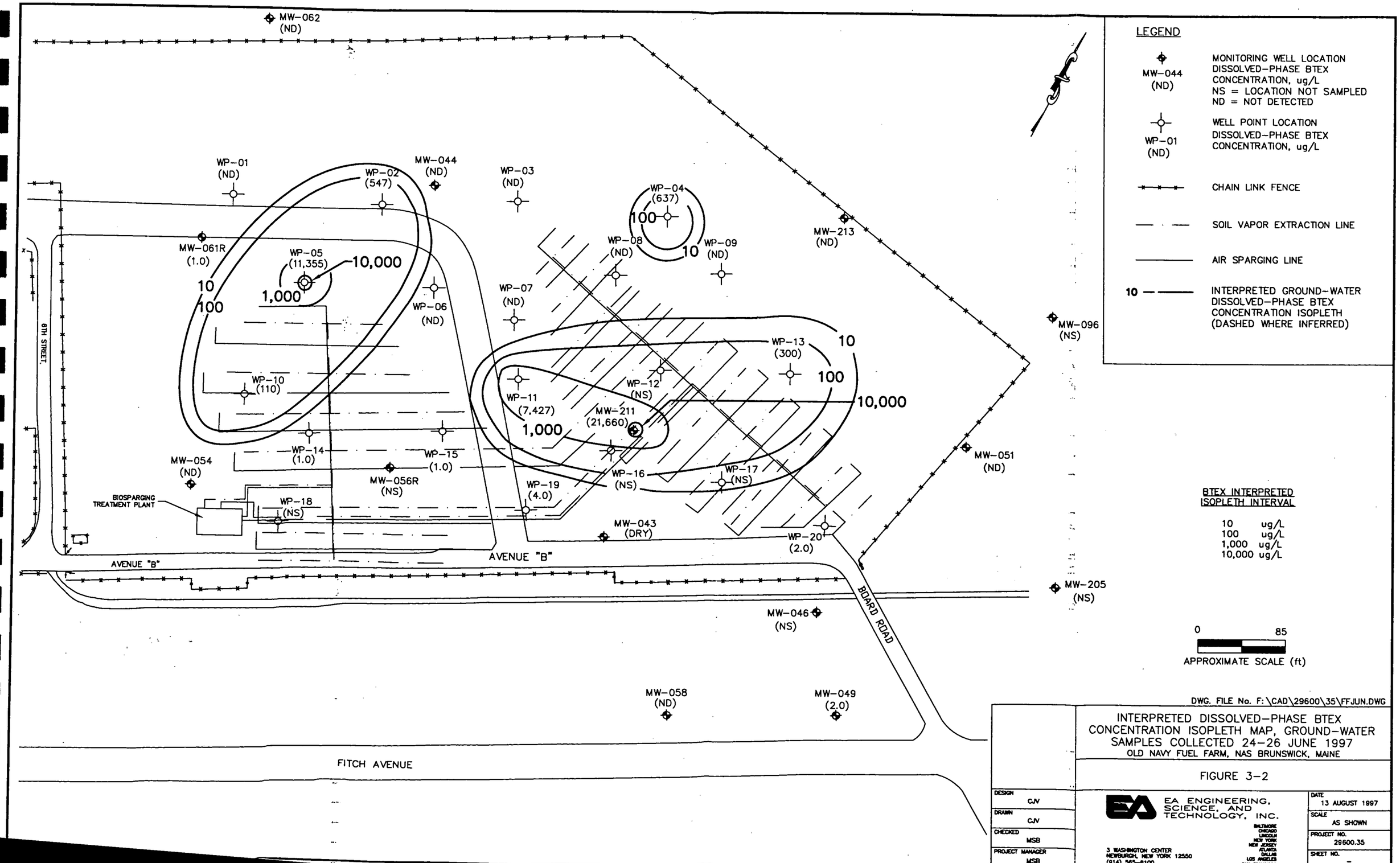
DESIGN	CJV
DRAWN	CJV
CHECKED	MSB
PROJECT MANAGER	MSB

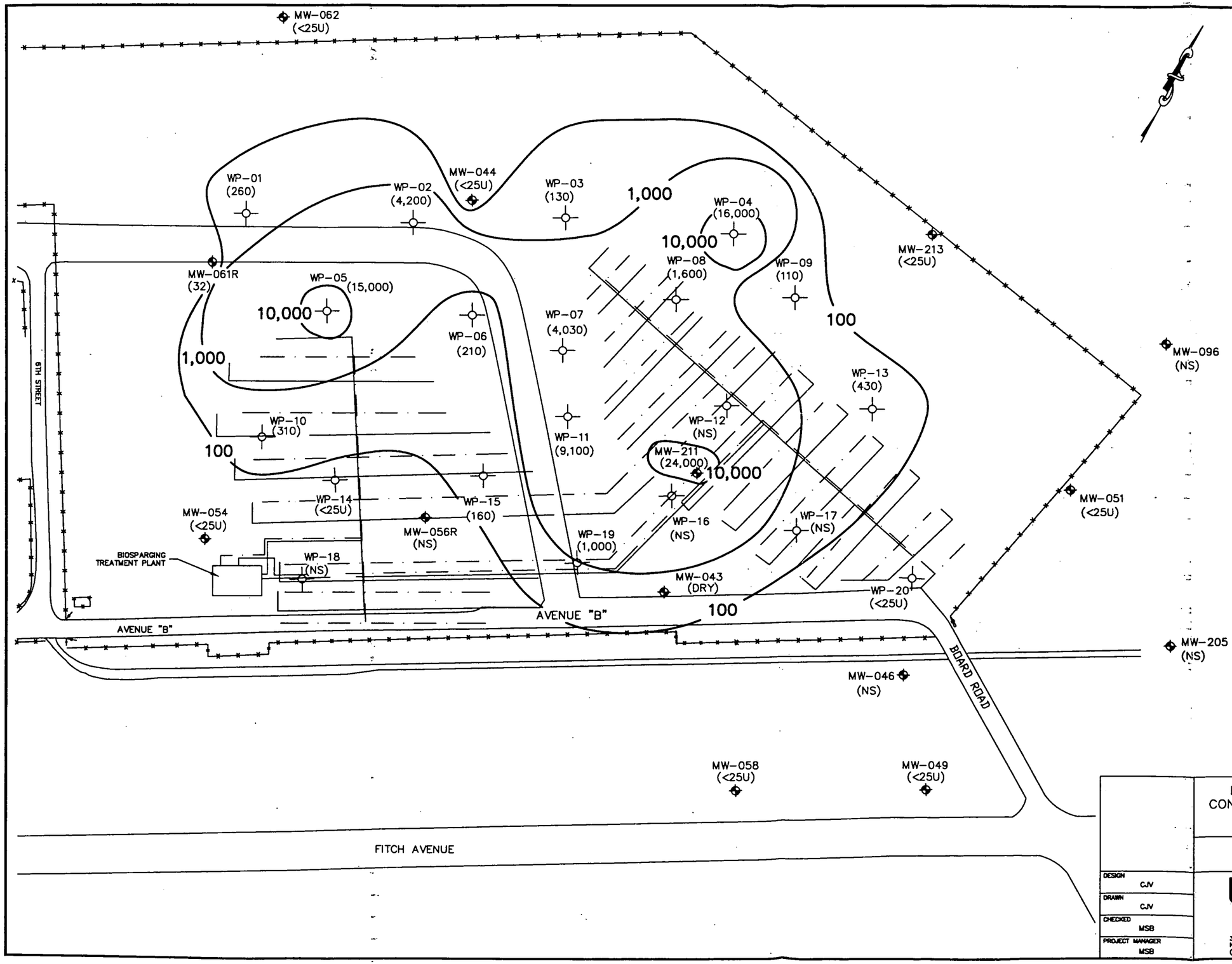
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

BALTIMORE
CHICAGO
LINCOLN
NEW YORK
NEW JERSEY
ATLANTA
DALLAS
LOS ANGELES
SAN FRANCISCO

3 WASHINGTON CENTER
NEWBURGH, NEW YORK 12550
(914) 565-8100

DATE	13 AUGUST 1997
SCALE	AS SHOWN
PROJECT NO.	29600.35
SHEET NO.	–


MW-062 (ND)
WP-01 (ND)
WP-02 (547)
MW-044 (ND)
WP-03 (ND)
WP-04 (637)
100
10
WP-08 (ND)
WP-09 (ND)
MW-213 (ND)
MW-061R (1.0)
WP-05 (11,355)
10,000
1,000
10
100
WP-06 (ND)
WP-07 (ND)
MW-096 (NS)
WP-13 (300)
10
100
10,000
WP-10 (110)
WP-12 (NS)
WP-11 (7,427)
MW-211 (21,660)
1,000
WP-14 (1.0)
WP-15 (1.0)
MW-051 (ND)
MW-054 (ND)
MW-056R (NS)
WP-16 (NS)
WP-17 (NS)
WP-19 (4.0)
BIOSPARGING TREATMENT PLANT
WP-18 (NS)
MW-043 (DRY)
WP-20 (2.0)
6TH STREET
AVENUE "B"
AVENUE "B"
BOARD ROAD
MW-205 (NS)
MW-046 (NS)
MW-058 (ND)
MW-049 (2.0)
FITCH AVENUE
LEGEND
MW-044 (ND)
MONITORING WELL LOCATION
DISSOLVED-PHASE BTEX CONCENTRATION, ug/L
NS = LOCATION NOT SAMPLED
ND = NOT DETECTED
WP-01 (ND)
WELL POINT LOCATION
DISSOLVED-PHASE BTEX CONCENTRATION, ug/L
CHAIN LINK FENCE
SOIL VAPOR EXTRACTION LINE
AIR SPARGING LINE
10
INTERPRETED GROUND-WATER DISSOLVED-PHASE BTEX CONCENTRATION ISOPLETH (DASHED WHERE INFERRED)
BTEX INTERPRETED ISOPLETH INTERVAL
10 ug/L
100 ug/L
1,000 ug/L
10,000 ug/L
0
85
APPROXIMATE SCALE (ft)
DWG. FILE No. F:\CAD\29600\35\FFJUN.DWG
INTERPRETED DISSOLVED-PHASE BTEX CONCENTRATION ISOPLETH MAP, GROUND-WATER SAMPLES COLLECTED 24-26 JUNE 1997
OLD NAVY FUEL FARM, NAS BRUNSWICK, MAINE
FIGURE 3-2
DESIGN CJV
DRAWN CJV
CHECKED MSB
PROJECT MANAGER MSB
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.
BALTIMORE CHICAGO LINCOLN NEW YORK NEW JERSEY ATLANTA DALLAS LOS ANGELES SAN FRANCISCO
3 WASHINGTON CENTER NEWBURGH, NEW YORK 12550 (914) 565-8100
DATE 13 AUGUST 1997
SCALE AS SHOWN
PROJECT NO. 29600.35
SHEET NO. -



LEGEND

MW-044 (<25U)	MONITORING WELL LOCATION DISSOLVED-PHASE TPH-GRO CONCENTRATION, ug/L NS = LOCATION NOT SAMPLED (<25U) = NOT DETECTED ABOVE LIMIT SHOWN
WP-01 (260)	WELL POINT LOCATION DISSOLVED-PHASE TPH-GRO CONCENTRATION, ug/L
	CHAIN LINK FENCE
	SOIL VAPOR EXTRACTION LINE
	AIR SPARGING LINE
100	INTERPRETED GROUND-WATER DISSOVED-PHASE TPH-GRO CONCENTRATION ISOPLETH (DASHED WHERE INFERRED)

TPH AS GASOLINE RANGE ORGANICS (TPH-GRO) ISOPLETH INTERVAL

100 ug/L
1,000 ug/L
10,000 ug/L

0 85
APPROXIMATE SCALE (ft)

DWG. FILE No. F:\CAD\29600\35\FFJUN.DWG

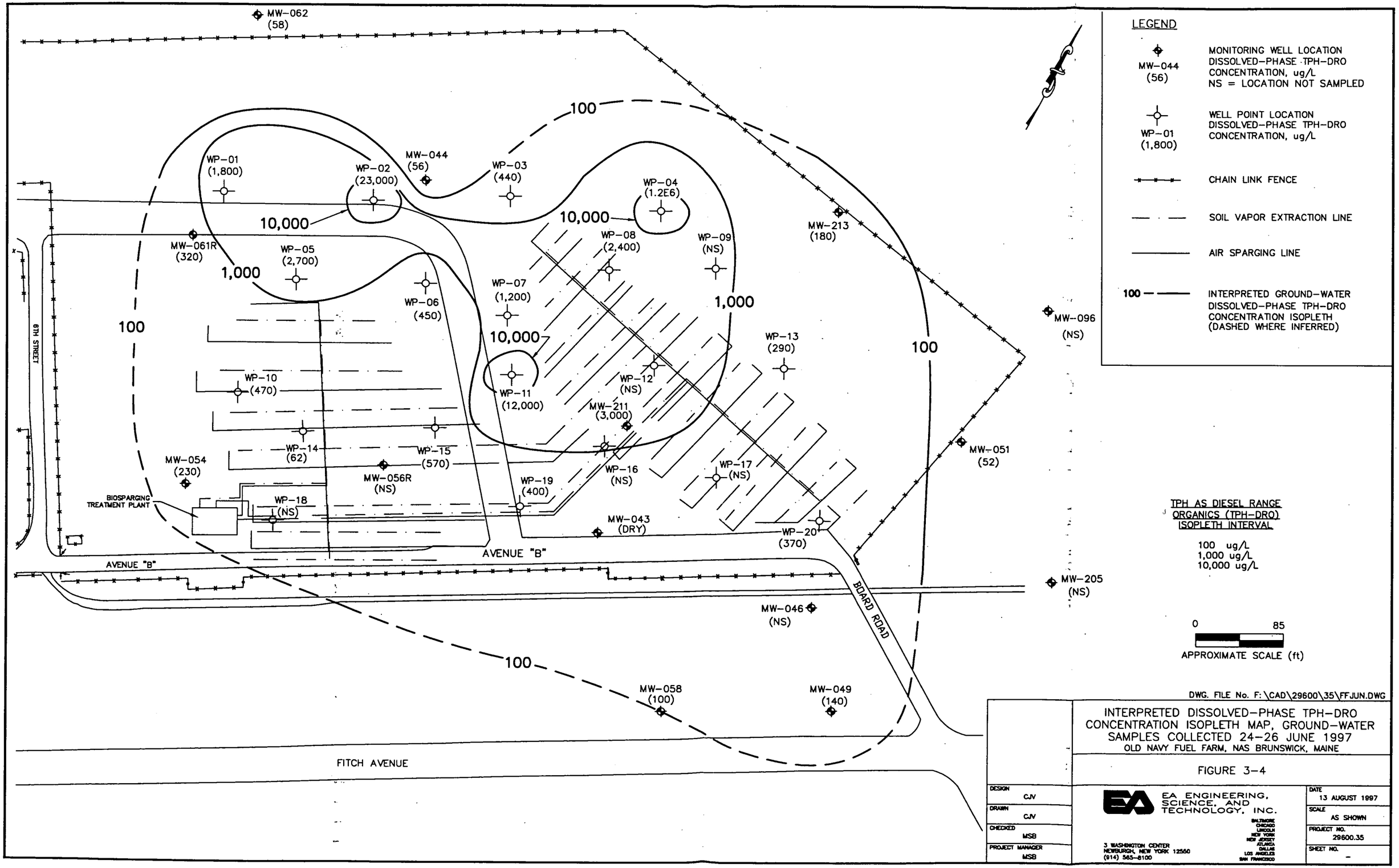
INTERPRETED DISSOLVED-PHASE TPH-GRO CONCENTRATION ISOPLETH MAP, GROUND-WATER SAMPLES COLLECTED 24-26 JUNE 1997
OLD NAVY FUEL FARM, NAS BRUNSWICK, MAINE

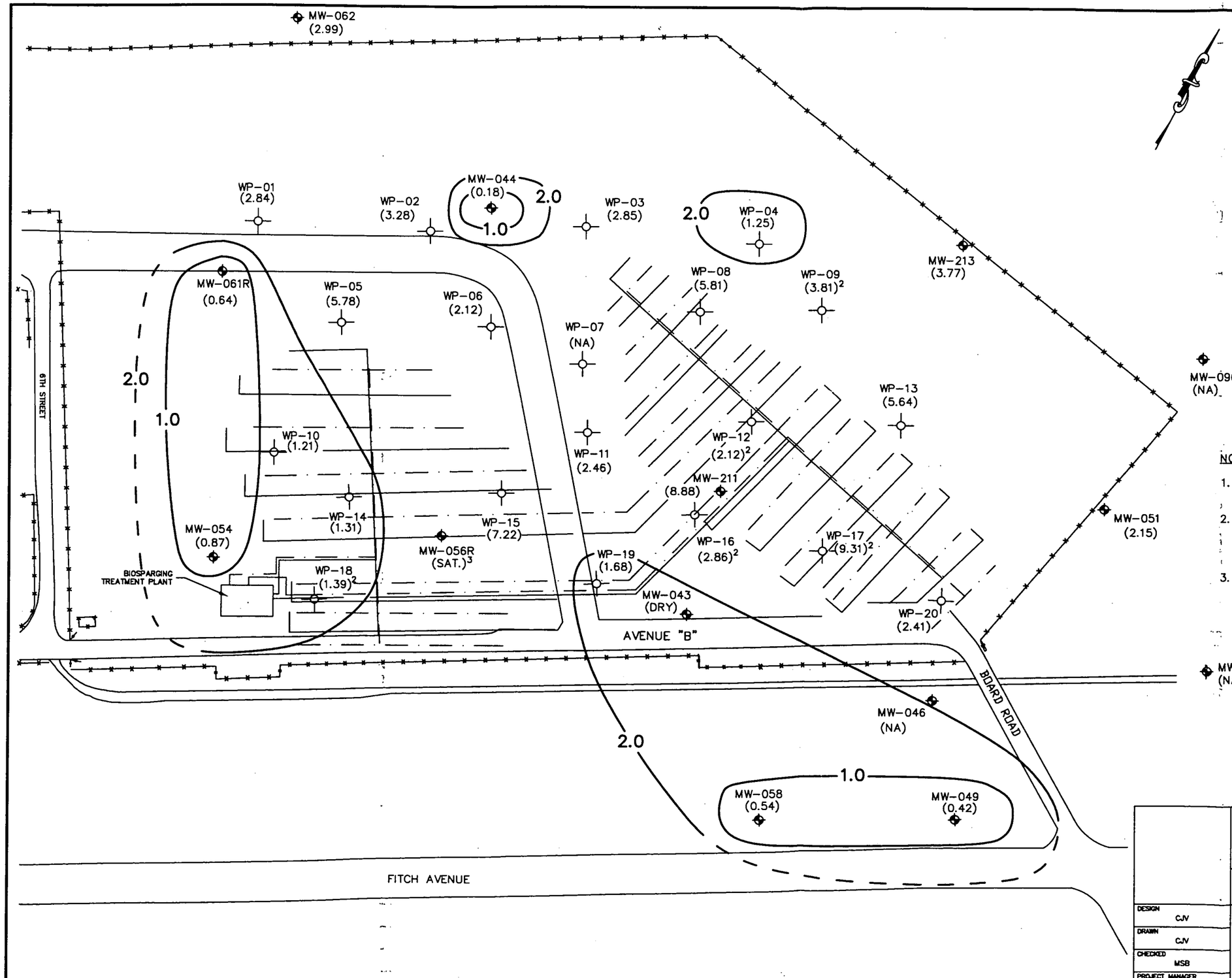
FIGURE 3-3

DESIGN	CJV
DRAWN	CJV
CHECKED	MSB
PROJECT MANAGER	MSB

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.
BALTIMORE CHICAGO LINCOLN NEW YORK NEW JERSEY ATLANTA DALLAS LOS ANGELES SAN FRANCISCO
3 WASHINGTON CENTER NEWBURGH, NEW YORK 12550 (914) 563-8100

DATE	13 AUGUST 1997
SCALE	AS SHOWN
PROJECT NO.	29600.35
SHEET NO.	-


LEGEND
MW-044 (56)
MONITORING WELL LOCATION DISSOLVED-PHASE TPH-DRO CONCENTRATION, ug/L NS = LOCATION NOT SAMPLED
WP-01 (1,800)
WELL POINT LOCATION DISSOLVED-PHASE TPH-DRO CONCENTRATION, ug/L
CHAIN LINK FENCE
SOIL VAPOR EXTRACTION LINE
AIR SPARGING LINE
100
INTERPRETED GROUND-WATER DISSOLVED-PHASE TPH-DRO CONCENTRATION ISOPLETH (DASHED WHERE INFERRED)
TPH AS DIESEL RANGE ORGANICS (TPH-DRO) ISOPLETH INTERVAL
100 ug/L
1,000 ug/L
10,000 ug/L
0
85
APPROXIMATE SCALE (ft)
MW-062 (58)
MW-044 (56)
WP-01 (1,800)
WP-02 (23,000)
WP-03 (440)
WP-04 (1.2E6)
MW-061R (320)
WP-05 (2,700)
WP-06 (450)
WP-07 (1,200)
WP-08 (2,400)
WP-09 (NS)
MW-213 (180)
MW-096 (NS)
WP-10 (470)
WP-11 (12,000)
WP-12 (NS)
WP-13 (290)
MW-211 (3,000)
WP-14 (62)
WP-15 (570)
WP-16 (NS)
WP-17 (NS)
MW-051 (52)
MW-054 (230)
MW-056R (NS)
WP-18 (NS)
WP-19 (400)
MW-043 (DRY)
WP-20 (370)
MW-205 (NS)
MW-046 (NS)
MW-058 (100)
MW-049 (140)
10,000
1,000
100
BIOSPARGING TREATMENT PLANT
6TH STREET
AVENUE "B"
BOARD ROAD
FITCH AVENUE
DWG. FILE No. F:\CAD\29600\35\FFJUN.DWG
INTERPRETED DISSOLVED-PHASE TPH-DRO CONCENTRATION ISOPLETH MAP, GROUND-WATER SAMPLES COLLECTED 24-26 JUNE 1997
OLD NAVY FUEL FARM, NAS BRUNSWICK, MAINE
FIGURE 3-4
DESIGN CJV
DRAWN CJV
CHECKED MSB
PROJECT MANAGER MSB
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.
BALTIMORE CHICAGO LINCOLN NEW YORK NEW JERSEY ATLANTA DALLAS LOS ANGELES SAN FRANCISCO
3 WASHINGTON CENTER NEWBURGH, NEW YORK 12550 (914) 565-8100
DATE 13 AUGUST 1997
SCALE AS SHOWN
PROJECT NO. 29600.35
SHEET NO. -



LEGEND

MW-044 (0.18) — MONITORING WELL LOCATION (DISSOLVED OXYGEN CONCENTRATION, mg/L)
NA = DATA NOT AVAILABLE
DRY = WELL DRY

WP-01 (2.84) — WELL POINT LOCATION (DISSOLVED OXYGEN CONCENTRATION, mg/L)

CHAIN LINK FENCE

SOIL VAPOR EXTRACTION LINE

AIR SPARGING LINE

1.0 — INTERPRETED GROUND-WATER DISSOLVED OXYGEN ISOPLETH (DASHED WHERE INFERRED)

NOTE:

1. DISSOLVED OXYGEN ISOPLETHS DRAWN FROM LOW TO HIGH CONCENTRATIONS TO INDICATE ANAEROBIC AREAS.
2. DISSOLVED OXYGEN DATA FOR WELL POINTS WP-09 AND WP-12 OBTAINED ON 6 JUNE 1997, WP-16 ON 15 MAY 1997, WP-17 ON 30 APRIL 1997, AND WP-18 ON 30 MAY 1997.
3. DISSOLVED OXYGEN CONCENTRATION ASSUMED AT SATURATION DUE TO ACTIVE SPARGING CONDITIONS.

0 85
APPROXIMATE SCALE (ft)

DWG. FILE No. F:\CAD\29600\35\FFNEW.DWG

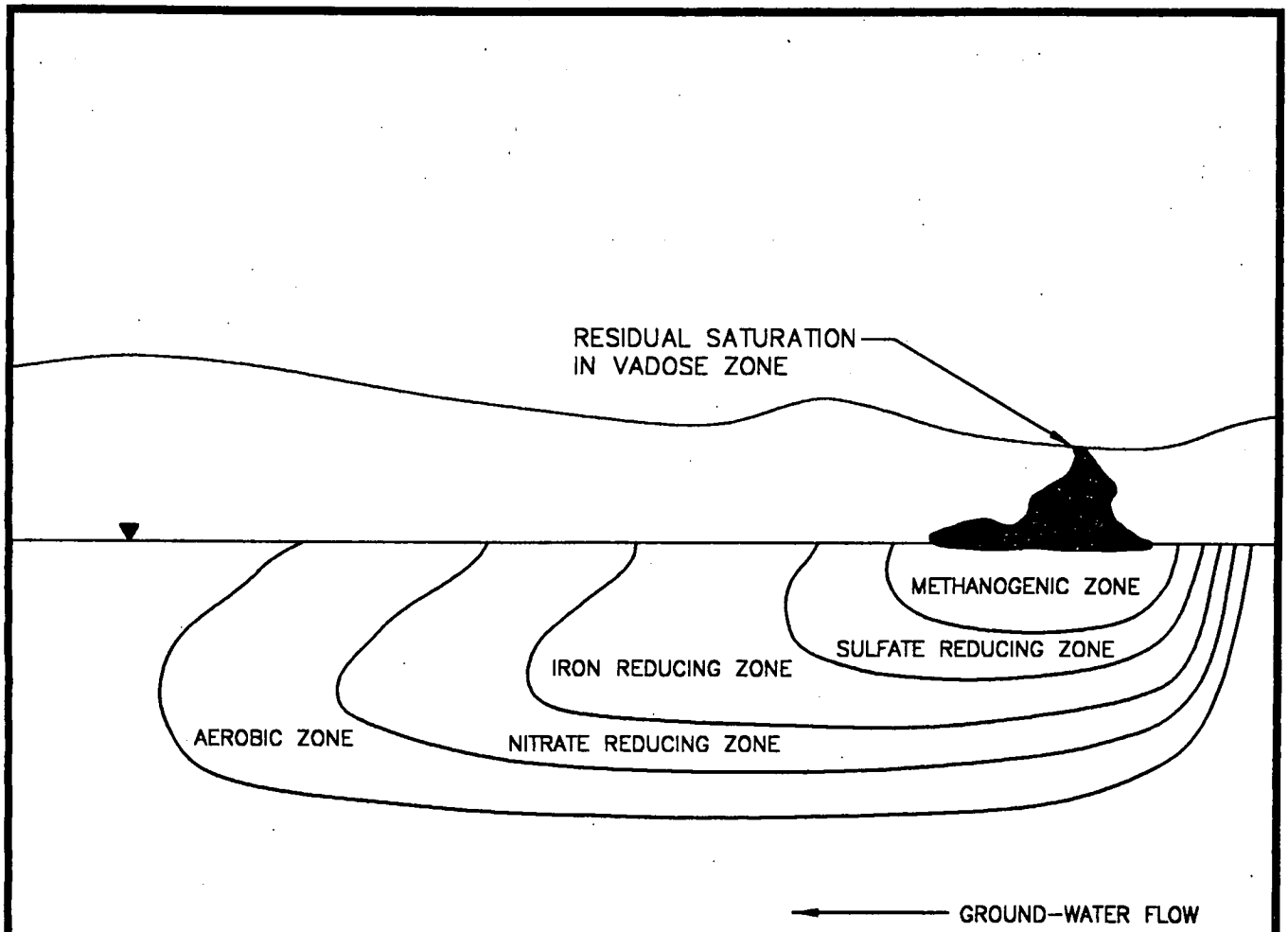
GROUND-WATER DISSOLVED OXYGEN CONCENTRATION ISOPLETH MAP, 23 JUNE 1997
OLD NAVY FUEL FARM
NAS BRUNSWICK, MAINE

FIGURE 3-5

DESIGN	CJV
DRAWN	CJV
CHECKED	MSB
PROJECT MANAGER	MSB

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.
BALTIMORE CHICAGO LINCOLN NEW YORK NEW JERSEY ATLANTA DALLAS LOS ANGELES SAN FRANCISCO
3 WASHINGTON CENTER
NEWBURGH, NEW YORK 12550
(914) 565-8100

DATE	13 AUGUST 1997
SCALE	AS SHOWN
PROJECT NO.	29600.35
SHEET NO.	–



NOTES:

1) FIGURE TAKEN FROM NAVAL FACILITIES ENGINEERING SERVICE CENTER TECHNICAL REPORT ENTITLED "INTRINSIC BIOREMEDIATION OF PETROLEUM HYDROCARBONS" (JUNE, 1996).

2) GROUND-WATER ZONES REPRESENT IDEALIZED CONDITIONS.

EA ENGINEERING, SCIENCE, AND TECHNOLOGY	OLD NAVY FUEL FARM BRUNSWICK NAVAL AIR STATION BRUNSWICK, MAINE	FIGURE 3-6 GROUND-WATER ZONES RESULTING FROM PREFERENTIAL USE OF ELECTRON ACCEPTORS

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
MSB	CJV	CJV	MSB	N.T.S.	15 AUG. 97	29600.35	FIG36

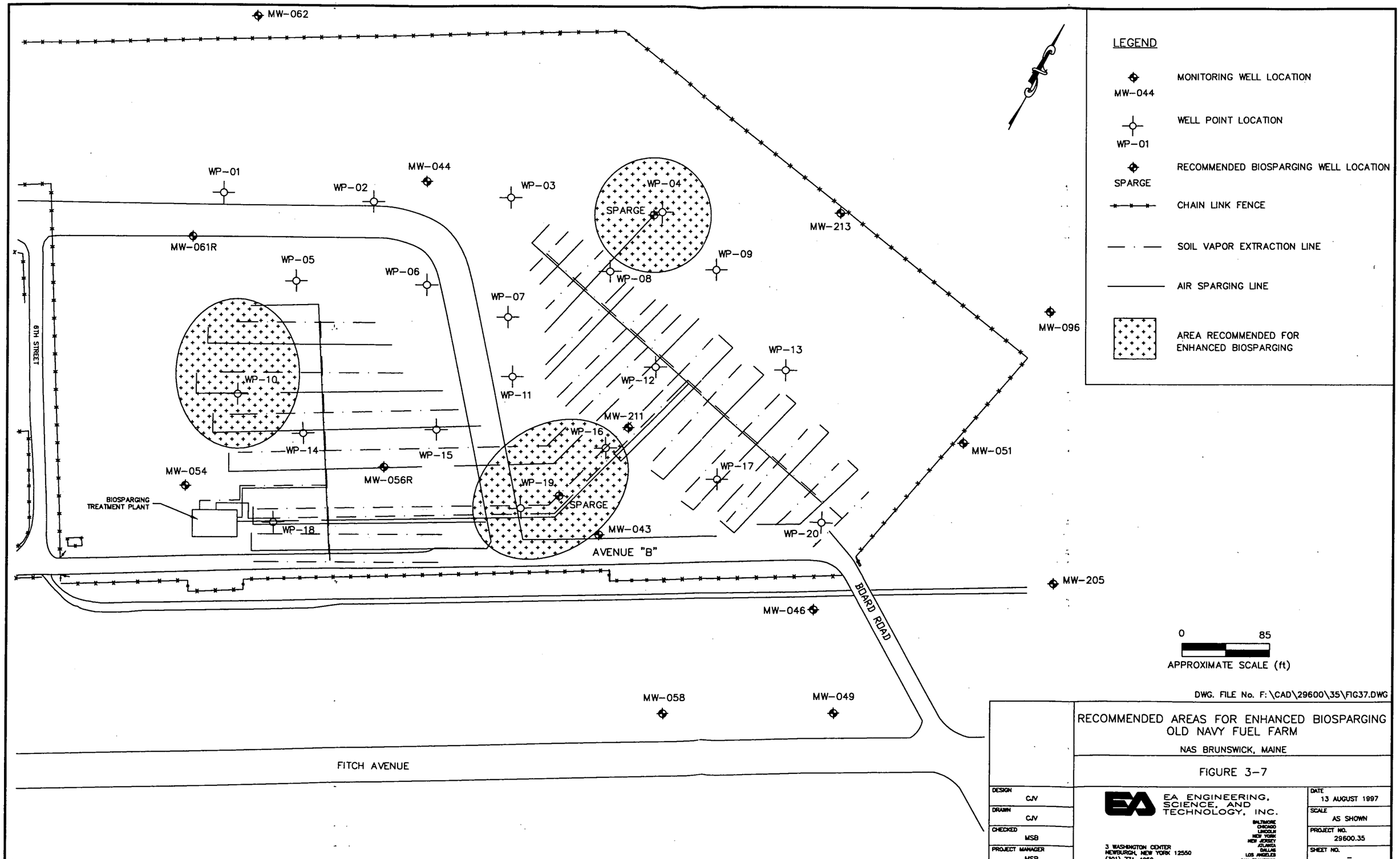

MW-062
WP-01
WP-02
MW-044
WP-03
WP-04
SPARGE
MW-213
MW-061R
WP-05
WP-06
WP-09
WP-08
WP-07
MW-096
8TH STREET
WP-13
WP-10
WP-12
WP-11
MW-211
WP-16
WP-14
WP-15
MW-051
MW-054
MW-056R
WP-17
WP-19
SPARGE
BIOSPARGING TREATMENT PLANT
WP-18
MW-043
WP-20
AVENUE "B"
MW-205
BOARD ROAD
MW-046
MW-058
MW-049
FITCH AVENUE
LEGEND
MW-044 MONITORING WELL LOCATION
WP-01 WELL POINT LOCATION
SPARGE RECOMMENDED BIOSPARGING WELL LOCATION
CHAIN LINK FENCE
SOIL VAPOR EXTRACTION LINE
AIR SPARGING LINE
AREA RECOMMENDED FOR ENHANCED BIOSPARGING
0
85
APPROXIMATE SCALE (ft)
DWG. FILE No. F:\CAD\29600\35\FIG37.DWG
RECOMMENDED AREAS FOR ENHANCED BIOSPARGING
OLD NAVY FUEL FARM
NAS BRUNSWICK, MAINE
FIGURE 3-7
DESIGN CJV
DRAWN CJV
CHECKED MSB
PROJECT MANAGER MSB
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.
BALTIMORE
CHICAGO
LINCOLN
NEW YORK
NEW JERSEY
ATLANTA
DALLAS
LOS ANGELES
SAN FRANCISCO
3 WASHINGTON CENTER
NEWBURGH, NEW YORK 12550
(301) 771-4850
DATE 13 AUGUST 1997
SCALE AS SHOWN
PROJECT NO. 29600.35
SHEET NO. -

TABLE 3-1 SUMMARY OF WELL GAUGING DATA COLLECTED FROM 3 JANUARY THROUGH 23 JUNE 1997 OLD NAVY FUEL FARM, NAVAL AIR STATION BRUNSWICK, MAINE

Gauging Data	Well Elevation (ft MSL)	Depth to Water (ft)	Depth to LNAPL (ft)	LNAPL Thickness (ft)	Water Table Elevation (ft)[a]
WP-1					
03 JAN 1997	74.84	3.85	3.85	0.00	70.99
24 JAN 1997	74.84	4.75	4.75	0.00	70.09
04 FEB 1997	74.84	4.47	4.47	0.00	70.37
28 FEB 1997	74.84	Data not available (frozen)			
15 MAR 1997	74.84	Data not available (frozen)			
27 MAR 1997	74.84	Data not available (frozen)			
07 APR 1997	74.84	3.40	3.40	0.00	71.44
30 APR 1997	74.84	3.62	3.62	0.00	71.22
15 MAY 1997	74.84	3.61	3.61	0.00	71.23
30 MAY 1997	74.84	4.16	4.16	0.00	70.68
06 JUN 1997	74.84	4.47	4.47	0.00	70.37
23 JUN 1997	74.84	4.80	4.80	0.00	70.04
WP-2					
03 JAN 1997	75.25	5.10	5.10	0.00	70.15
24 JAN 1997	75.25	5.75	5.75	0.00	69.50
04 FEB 1997	75.25	5.58	5.58	0.00	69.67
28 FEB 1997	75.25	5.39	5.39	0.00	69.86
15 MAR 1997	75.25	5.27	5.27	0.00	69.98
27 MAR 1997	75.25	5.07	5.07	0.00	70.18
07 APR 1997	75.25	5.82	5.82	0.00	69.43
30 APR 1997	75.25	4.68	4.68	0.00	70.57
15 MAY 1997	75.25	4.73	4.73	0.00	70.52
30 MAY 1997	75.25	5.27	5.27	0.00	69.98
06 JUN 1997	75.25	5.49	5.49	0.00	69.76
23 JUN 1997	75.25	5.78	5.78	0.00	69.47

(a) Water table elevations in wells containing LNAPL calculated based on an assumed specific gravity of 0.83 for the LNAPL.

NOTE: LNAPL = Light, non-aqueous phase liquid; MSL = Mean sea level.

Gauging Data	Well Elevation (ft MSL)	Depth to Water (ft)	Depth to LNAPL (ft)	LNAPL Thickness (ft)	Water Table Elevation (ft)[a]
WP-3					
03 JAN 1997	74.16	3.55	3.55	0.00	70.61
24 JAN 1997	74.16	4.20	4.20	0.00	69.96
04 FEB 1997	74.16	4.15	4.15	0.00	70.01
28 FEB 1997	74.16	Data not available (frozen)			
15 MAR 1997	74.16	Data not available (frozen)			
27 MAR 1997	74.16	3.40	3.40	0.00	70.76
07 APR 1997	74.16	3.22	3.22	0.00	70.94
30 APR 1997	74.16	2.98	2.98	0.00	71.18
15 MAY 1997	74.16	3.13	3.13	0.00	71.03
30 MAY 1997	74.16	3.71	3.71	0.00	70.45
06 JUN 1997	74.16	3.96	3.96	0.00	70.20
23 JUN 1997	74.16	4.50	4.5	0.00	69.66
WP-4					
03 JAN 1997	76.18	5.05	4.55	0.50	71.13
24 JAN 1997	76.18	6.05	5.68	0.37	70.13
04 FEB 1997	76.18	5.70	5.70	0.00	70.48
28 FEB 1997	76.18	5.45	5.45	0.00	70.73
15 MAR 1997	76.18	5.43	5.43	0.00	70.75
27 MAR 1997	76.18	4.97	4.97	0.00	71.21
07 APR 1997	76.18	4.35	4.25	0.10	71.83
30 APR 1997	76.18	3.67	3.54	0.13	72.51
15 MAY 1997	76.18	3.82	3.82	0.00	72.36
30 MAY 1997	76.18	5.04	4.96	0.08	71.14
06 JUN 1997	76.18	5.36	5.36	0.00	70.82
23 JUN 1997	76.18	6.02	6.02	0.00	70.16
WP-5					
03 JAN 1997	74.64	5.90	5.90	0.00	68.74
24 JAN 1997	74.64	5.55	5.55	0.00	69.09
04 FEB 1997	74.64	5.66	5.66	0.00	68.98
28 FEB 1997	74.64	5.40	5.40	0.00	69.24
15 MAR 1997	74.64	5.46	5.46	0.00	69.18
27 MAR 1997	74.64	5.20	5.20	0.00	69.44
07 APR 1997	74.64	4.85	4.85	0.00	69.79
30 APR 1997	74.64	4.87	4.87	0.00	69.77
15 MAY 1997	74.64	4.86	4.86	0.00	69.78
30 MAY 1997	74.64	5.26	5.26	0.00	69.38
06 JUN 1997	74.64	5.44	5.44	0.00	69.20
23 JUN 1997	74.64	5.62	5.62	0.00	69.02

Gauging Data	Well Elevation (ft MSL)	Depth to Water (ft)	Depth to LNAPL (ft)	LNAPL Thickness (ft)	Water Table Elevation (ft)[a]
WP-6					
03 JAN 1997	73.72	3.80	3.80	0.00	69.92
24 JAN 1997	73.72	4.61	4.61	0.00	69.11
04 FEB 1997	73.72	4.60	4.60	0.00	69.12
28 FEB 1997	73.72	4.35	4.35	0.00	69.37
15 MAR 1997	73.72	4.66	4.66	0.00	69.06
27 MAR 1997	73.72	3.95	3.95	0.00	69.77
07 APR 1997	73.72	3.55	3.55	0.00	70.17
30 APR 1997	73.72	3.32	3.32	0.00	70.40
15 MAY 1997	73.72	3.51	3.51	0.00	70.21
30 MAY 1997	73.72	4.14	4.14	0.00	69.58
06 JUN 1997	73.72	4.36	4.36	0.00	69.36
23 JUN 1997	73.72	4.65	4.65	0.00	69.07
WP-7					
03 JAN 1997	73.92	4.32	4.00	0.32	69.60
24 JAN 1997	73.92	5.50	5.30	0.20	68.42
04 FEB 1997	73.92		Data not available (frozen)		
28 FEB 1997	73.92		Data not available (frozen)		
15 MAR 1997	73.92	5.37	5.37	0.00	68.55
27 MAR 1997	73.92	4.15	4.15	0.00	69.77
07 APR 1997	73.92	3.92	3.92	0.00	70.00
30 APR 1997	73.92	3.64	3.64	0.00	70.28
15 MAY 1997	73.92	3.88	3.88	0.00	70.04
30 MAY 1997	73.92	4.59	4.59	0.00	69.33
06 JUN 1997	73.92	4.82	4.82	0.00	69.10
23 JUN 1997	73.92	4.88	4.88	0.00	69.04
WP-8					
03 JAN 1997	74.99	4.43	4.43	0.00	70.56
24 JAN 1997	74.99	5.12	5.12	0.00	69.87
04 FEB 1997	74.99	5.02	5.02	0.00	69.97
28 FEB 1997	74.99	4.60	4.60	0.00	70.39
15 MAR 1997	74.99	6.41	6.41	0.00	68.58
27 MAR 1997	74.99	4.20	4.20	0.00	70.79
07 APR 1997	74.99	5.28	5.28	0.00	69.71
30 APR 1997	74.99	4.00	4.00	0.00	70.99
15 MAY 1997	74.99	4.35	4.35	0.00	70.64
30 MAY 1997	74.99	5.03	5.03	0.00	69.96
06 JUN 1997	74.99	5.22	5.22	0.00	69.77
23 JUN 1997	74.99	4.92	4.92	0.00	70.07

Gauging Data	Well Elevation (ft MSL)	Depth to Water (ft)	Depth to LNAPL (ft)	LNAPL Thickness (ft)	Water Table Elevation (ft)[a]
WP-9					
03 JAN 1997	75.46	5.22	5.22	0.00	70.24
24 JAN 1997	75.46	6.73	6.73	0.00	68.73
04 FEB 1997	75.46	Data not available (dry)			
28 FEB 1997	75.46	Data not available (dry)			
15 MAR 1997	75.46	Data not available (dry)			
27 MAR 1997	75.46	Data not available (dry)			
07 APR 1997	75.46	8.09	8.09	0.00	67.37
30 APR 1997	75.46	4.22	4.22	0.00	71.24
15 MAY 1997	75.46	4.72	4.72	0.00	70.74
30 MAY 1997	75.46	5.46	5.46	0.00	70.00
06 JUN 1997	75.46	5.91	5.91	0.00	69.55
23 JUN 1997	75.46	6.92	6.92	0.00	68.54
WP-10					
03 JAN 1997	74.83	4.17	4.17	0.00	70.66
24 JAN 1997	74.83	5.78	5.78	0.00	69.05
04 FEB 1997	74.83	5.87	5.87	0.00	68.96
28 FEB 1997	74.83	5.28	5.28	0.00	69.55
15 MAR 1997	74.83	5.37	5.37	0.00	69.46
27 MAR 1997	74.83	4.92	4.92	0.00	69.91
07 APR 1997	74.83	4.17	4.17	0.00	70.66
30 APR 1997	74.83	4.25	4.25	0.00	70.58
15 MAY 1997	74.83	4.23	4.23	0.00	70.60
30 MAY 1997	74.83	5.01	5.01	0.00	69.82
06 JUN 1997	74.83	5.36	5.36	0.00	69.47
23 JUN 1997	74.83	5.76	5.76	0.00	69.07
WP-11					
03 JAN 1997	74.06	4.37	4.37	0.00	69.69
24 JAN 1997	74.06	5.30	5.30	0.00	68.76
04 FEB 1997	74.06	Data not available (frozen)			
28 FEB 1997	74.06	Data not available (frozen)			
15 MAR 1997	74.06	5.80	5.80	0.00	68.26
27 MAR 1997	74.06	4.47	4.47	0.00	69.59
07 APR 1997	74.06	4.16	4.16	0.00	69.90
30 APR 1997	74.06	4.05	4.05	0.00	70.01
15 MAY 1997	74.06	4.32	4.32	0.00	69.74
30 MAY 1997	74.06	4.91	4.91	0.00	69.15
06 JUN 1997	74.06	5.12	5.12	0.00	68.94
23 JUN 1997	74.06	4.95	4.95	0.00	69.11

Gauging Data	Well Elevation (ft MSL)	Depth to Water (ft)	Depth to LNAPL (ft)	LNAPL Thickness (ft)	Water Table Elevation (ft)[a]
WP-12					
03 JAN 1997	75.12	6.02	6.02	0.00	69.10
24 JAN 1997	75.12	7.25	7.25	0.00	67.87
04 FEB 1997	75.12	Data not available (dry)			
28 FEB 1997	75.12	7.13	7.13	0.00	67.99
15 MAR 1997	75.12	Data not available (dry)			
27 MAR 1997	75.12	6.94	6.94	0.00	68.18
07 APR 1997	75.12	6.61	6.61	0.00	68.51
30 APR 1997	75.12	5.10	5.10	0.00	70.02
15 MAY 1997	75.12	5.78	5.78	0.00	69.34
30 MAY 1997	75.12	6.51	6.51	0.00	68.61
06 JUN 1997	75.12	6.85	6.85	0.00	68.27
23 JUN 1997	75.12	Data not available (dry)			
WP-13					
03 JAN 1997	74.34	4.70	4.70	0.00	69.64
24 JAN 1997	74.34	5.99	5.99	0.00	68.35
04 FEB 1997	74.34	6.18	6.18	0.00	68.16
28 FEB 1997	74.34	6.08	6.08	0.00	68.26
15 MAR 1997	74.34	7.40	7.40	0.00	66.94
27 MAR 1997	74.34	4.98	4.98	0.00	69.36
07 APR 1997	74.34	4.88	4.88	0.00	69.46
30 APR 1997	74.34	3.49	3.49	0.00	70.85
15 MAY 1997	74.34	4.38	4.38	0.00	69.96
30 MAY 1997	74.34	4.99	4.99	0.00	69.35
06 JUN 1997	74.34	5.48	5.48	0.00	68.86
23 JUN 1997	74.34	6.34	6.34	0.00	68.00
WP-14					
03 JAN 1997	75.18	5.05	5.05	0.00	70.13
24 JAN 1997	75.18	6.31	6.31	0.00	68.87
04 FEB 1997	75.18	6.43	6.43	0.00	68.75
28 FEB 1997	75.18	5.92	5.92	0.00	69.26
15 MAR 1997	75.18	6.33	6.33	0.00	68.85
27 MAR 1997	75.18	5.57	5.57	0.00	69.61
07 APR 1997	75.18	4.74	4.74	0.00	70.44
30 APR 1997	75.18	4.98	4.98	0.00	70.20
15 MAY 1997	75.18	5.01	5.01	0.00	70.17
30 MAY 1997	75.18	5.74	5.74	0.00	69.44
06 JUN 1997	75.18	6.02	6.02	0.00	69.16
23 JUN 1997	75.18	6.35	6.35	0.00	68.83

Gauging Data	Well Elevation (ft MSL)	Depth to Water (ft)	Depth to LNAPL (ft)	LNAPL Thickness (ft)	Water Table Elevation (ft)[a]
WP-15					
03 JAN 1997	74.54	4.78	4.78	0.00	69.76
24 JAN 1997	74.54	5.97	5.97	0.00	68.57
04 FEB 1997	74.54	Data not available (frozen)			
28 FEB 1997	74.54	6.25	6.25	0.00	68.29
15 MAR 1997	74.54	4.15	4.15	0.00	70.39
27 MAR 1997	74.54	5.28	5.28	0.00	69.26
07 APR 1997	74.54	4.26	4.26	0.00	70.28
30 APR 1997	74.54	4.15	4.15	0.00	70.39
15 MAY 1997	74.54	4.70	4.70	0.00	69.84
30 MAY 1997	74.54	5.43	5.43	0.00	69.11
06 JUN 1997	74.54	5.71	5.71	0.00	68.83
23 JUN 1997	74.54	5.90	5.90	0.00	68.64
WP-16					
03 JAN 1997	75.60	Data not available (dry)			
24 JAN 1997	75.60	Data not available (dry)			
04 FEB 1997	75.60	Data not available (dry)			
28 FEB 1997	75.60	Data not available (frozen)			
15 MAR 1997	75.60	Data not available (frozen)			
27 MAR 1997	75.60	Data not available (frozen)			
07 APR 1997	75.60	6.82	6.82	0.00	68.78
30 APR 1997	75.60	5.90	5.90	0.00	69.70
15 MAY 1997	75.60	6.93	6.93	0.00	68.67
30 MAY 1997	75.60	7.42	7.42	0.00	68.18
06 JUN 1997	75.60	7.86	7.86	0.00	67.74
23 JUN 1997	75.60	Data not available (dry)			
WP-17					
03 JAN 1997	76.02	Data not available (dry)			
24 JAN 1997	76.02	Data not available (frozen)			
04 FEB 1997	76.02	Data not available (dry)			
28 FEB 1997	76.02	Data not available (dry)			
15 MAR 1997	76.02	Data not available (dry)			
27 MAR 1997	76.02	Data not available (dry)			
07 APR 1997	76.02	Data not available (frozen)			
30 APR 1997	76.02	7.04	7.04	0.00	68.98
15 MAY 1997	76.02	7.70	7.70	0.00	68.32
30 MAY 1997	76.02	Data not available (dry)			
06 JUN 1997	76.02	Data not available (dry)			
23 JUN 1997	76.02	Data not available (dry)			

Gauging Data	Well Elevation (ft MSL)	Depth to Water (ft)	Depth to LNAPL (ft)	LNAPL Thickness (ft)	Water Table Elevation (ft)[a]
WP-18					
03 JAN 1997	74.30	4.82	4.82	0.00	69.48
24 JAN 1997	74.30	Data not available (dry)			
04 FEB 1997	74.30	Data not available (dry)			
28 FEB 1997	74.30	5.76	5.76	0.00	68.54
15 MAR 1997	74.30	6.08	6.08	0.00	68.22
27 MAR 1997	74.30	5.31	5.31	0.00	68.99
07 APR 1997	74.30	4.89	4.89	0.00	69.41
30 APR 1997	74.30	5.23	5.23	0.00	69.07
15 MAY 1997	74.30	5.14	5.14	0.00	69.16
30 MAY 1997	74.30	5.79	5.79	0.00	68.51
06 JUN 1997	74.30	6.09	6.09	0.00	68.21
23 JUN 1997	74.30	Data not available (dry)			
WP-19					
03 JAN 1997	72.73	3.80	3.80	0.00	68.93
24 JAN 1997	72.73	5.19	5.19	0.00	67.54
04 FEB 1997	72.73	5.47	5.47	0.00	67.26
28 FEB 1997	72.73	5.05	5.05	0.00	67.68
15 MAR 1997	72.73	5.23	5.23	0.00	67.50
27 MAR 1997	72.73	4.80	4.80	0.00	67.93
07 APR 1997	72.73	4.10	4.10	0.00	68.63
30 APR 1997	72.73	3.67	3.67	0.00	69.06
15 MAY 1997	72.73	4.21	4.21	0.00	68.52
30 MAY 1997	72.73	4.83	4.83	0.00	67.90
06 JUN 1997	72.73	5.11	5.11	0.00	67.62
23 JUN 1997	72.73	5.40	5.40	0.00	67.33
WP-20					
03 JAN 1997	72.67	4.97	4.97	0.00	67.70
24 JAN 1997	72.67	5.63	5.63	0.00	67.04
04 FEB 1997	72.67	6.17	6.17	0.00	66.50
28 FEB 1997	72.67	4.95	4.95	0.00	67.72
15 MAR 1997	72.67	5.52	5.52	0.00	67.15
27 MAR 1997	72.67	4.37	4.37	0.00	68.30
07 APR 1997	72.67	4.89	4.89	0.00	67.78
30 APR 1997	72.67	4.00	4.00	0.00	68.67
15 MAY 1997	72.67	5.80	5.80	0.00	66.87
30 MAY 1997	72.67	5.51	5.51	0.00	67.16
06 JUN 1997	72.67	5.87	5.87	0.00	66.80
23 JUN 1997	72.67	6.40	6.40	0.00	66.27

Gauging Data	Well Elevation (ft MSL)	Depth to Water (ft)	Depth to LNAPL (ft)	LNAPL Thickness (ft)	Water Table Elevation (ft)[a]
MW-43					
03 MAR 1997	73.88	Data not available (frozen)			
15 MAR 1997	73.88	Data not available (frozen)			
27 MAR 1997	73.88	Data not available (frozen)			
07 APR 1997	73.88	6.06	6.06	0.00	67.82
30 APR 1997	73.88	5.57	5.57	0.00	68.31
15 MAY 1997	73.88	6.06	6.06	0.00	67.82
30 MAY 1997	73.88	Data not available (dry)			
06 JUN 1997	73.88	Data not available (dry)			
23 JUN 1997	73.88	Data not available (dry)			
MW-44					
03 JAN 1997	73.18	Data not available (lock frozen)			
24 JAN 1997	73.18	3.20	3.20	0.00	69.98
04 FEB 1997	73.18	3.05	3.05	0.00	70.13
03 MAR 1997	73.18	2.95	2.95	0.00	70.23
15 MAR 1997	73.18	2.67	2.67	0.00	70.51
27 MAR 1997	73.18	2.40	2.40	0.00	70.78
07 APR 1997	73.18	2.31	2.31	0.00	70.87
30 APR 1997	73.18	2.16	2.16	0.00	71.02
15 MAY 1997	73.18	2.21	2.21	0.00	70.97
30 MAY 1997	73.18	2.71	2.71	0.00	70.47
06 JUN 1997	73.18	2.95	2.95	0.00	70.23
23 JUN 1997	73.18	3.41	3.41	0.00	69.77
MW-46					
03 MAR 1997	71.02	4.75	4.75	0.00	66.27
15 MAR 1997	71.02	4.70	4.70	0.00	66.32
27 MAR 1997	71.02	4.38	4.38	0.00	66.64
07 APR 1997	71.02	3.92	3.92	0.00	67.10
30 APR 1997	71.02	3.50	3.50	0.00	67.52
15 MAY 1997	71.02	4.02	4.02	0.00	67.00
30 MAY 1997	71.02	5.48	5.48	0.00	65.54
06 JUN 1997	71.02	4.80	4.80	0.00	66.22
23 JUN 1997	71.02	5.34	5.34	0.00	65.68

Gauging Data	Well Elevation (ft MSL)	Depth to Water (ft)	Depth to LNAPL (ft)	LNAPL Thickness (ft)	Water Table Elevation (ft)[a]
MW-49					
03 MAR 1997	66.97	5.62	5.62	0.00	61.35
15 MAR 1997	66.97	5.61	5.61	0.00	61.36
27 MAR 1997	66.97	5.30	5.30	0.00	61.67
07 APR 1997	66.97	5.51	5.51	0.00	61.46
30 APR 1997	66.97	5.26	5.26	0.00	61.71
15 MAY 1997	66.97	5.42	5.42	0.00	61.55
30 MAY 1997	66.97	5.69	5.69	0.00	61.28
06 JUN 1997	66.97	5.79	5.79	0.00	61.18
23 JUN 1997	66.97	6.04	6.04	0.00	60.93
MW-51					
03 MAR 1997	73.20	3.98	3.98	0.00	69.22
15 MAR 1997	73.20	3.80	3.80	0.00	69.40
27 MAR 1997	73.20	3.50	3.50	0.00	69.70
07 APR 1997	73.20	3.94	3.94	0.00	69.26
30 APR 1997	73.20	3.71	3.71	0.00	69.49
15 MAY 1997	73.20	3.82	3.82	0.00	69.38
30 MAY 1997	73.20	4.17	4.17	0.00	69.03
06 JUN 1997	73.20	4.47	4.47	0.00	68.73
23 JUN 1997	73.20	5.32	5.32	0.00	67.88
MW-54					
03 MAR 1997	75.49	6.02	6.02	0.00	69.47
15 MAR 1997	75.49	6.20	6.20	0.00	69.29
27 MAR 1997	75.49	5.45	5.45	0.00	70.04
07 APR 1997	75.49	5.18	5.18	0.00	70.31
30 APR 1997	75.49	4.70	4.70	0.00	70.79
15 MAY 1997	75.49	5.39	5.39	0.00	70.10
30 MAY 1997	75.49	6.03	6.03	0.00	69.46
06 JUN 1997	75.49	8.35	8.35	0.00	67.14
23 JUN 1997	75.49	6.75	6.75	0.00	68.74
MW-56R					
24 JAN 1997	75.28	No data available (active sparging)			
04 FEB 1997	75.28	No data available (active sparging)			
03 MAR 1997	75.28	No data available (active sparging)			
15 MAR 1997	75.28	No data available (frozen)			
27 MAR 1997	75.28	No data available (frozen)			
07 APR 1997	75.28	No data available (active sparging)			
30 APR 1997	75.28	No data available (active sparging)			
15 MAY 1997	75.28	No data available (active sparging)			
30 MAY 1997	75.28	No data available (active sparging)			
06 JUN 1997	75.28	No data available (active sparging)			
23 JUN 1997	75.28	No data available (active sparging)			

Gauging Data	Well Elevation (ft MSL)	Depth to Water (ft)	Depth to LNAPL (ft)	LNAPL Thickness (ft)	Water Table Elevation (ft)[a]
MW-58					
03 MAR 1997	69.80	6.08	6.08	0.00	63.72
15 MAR 1997	69.80	8.02	8.02	0.00	61.78
27 MAR 1997	69.80	7.90	7.90	0.00	61.90
07 APR 1997	69.80	5.82	5.82	0.00	63.98
30 APR 1997	69.80	7.75	7.75	0.00	62.05
15 MAY 1997	69.80	5.86	5.86	0.00	63.94
30 MAY 1997	69.80	5.97	5.97	0.00	63.83
06 JUN 1997	69.80	6.07	6.07	0.00	63.73
23 JUN 1997	69.80	6.24	6.24	0.00	63.56
MW-61R					
03 JAN 1997	75.52	5.29	5.29	0.00	70.23
04 FEB 1997	75.52		Data not available (frozen)		
03 MAR 1997	75.52		Data not available (frozen)		
15 MAR 1997	75.52		Data not available (frozen)		
27 MAR 1997	75.52		Data not available (frozen)		
07 APR 1997	75.52	4.00	4.00	0.00	71.52
30 APR 1997	75.52	3.57	3.57	0.00	71.95
15 MAY 1997	75.52	4.03	4.03	0.00	71.49
30 MAY 1997	75.52	4.65	4.65	0.00	70.87
06 JUN 1997	75.52	4.92	4.92	0.00	70.60
23 JUN 1997	75.52	5.29	5.29	0.00	70.23
MW-62					
03 MAR 1997	80.78	8.07	8.07	0.00	72.71
15 MAR 1997	80.78	8.15	8.15	0.00	72.63
27 MAR 1997	80.78	8.00	8.00	0.00	72.78
07 APR 1997	80.78	7.99	7.99	0.00	72.79
30 APR 1997	80.78	7.94	7.94	0.00	72.84
15 MAY 1997	80.78	8.08	8.08	0.00	72.70
30 MAY 1997	80.78	8.31	8.31	0.00	72.47
06 JUN 1997	80.78	8.57	8.57	0.00	72.21
23 JUN 1997	80.78	9.32	9.32	0.00	71.46
MW-NASB-96					
15 MAR 1997	73.56	2.94	2.94	0.00	70.62
27 MAR 1997	73.56	2.75	2.75	0.00	70.81
07 APR 1997	73.56	3.05	3.05	0.00	70.51
30 APR 1997	73.56	2.75	2.75	0.00	70.81
15 MAY 1997	73.56	3.04	3.04	0.00	70.52
30 MAY 1997	73.56	3.55	3.55	0.00	70.01
06 JUN 1997	73.56	3.85	3.85	0.00	69.71
23 JUN 1997	73.56	4.66	4.66	0.00	68.90

Gauging Data	Well Elevation (ft MSL)	Depth to Water (ft)	Depth to LNAPL (ft)	LNAPL Thickness (ft)	Water Table Elevation (ft)[a]
MW-NASB-205					
15 MAR 1997	71.39	6.75	6.75	0.00	64.64
27 MAR 1997	71.39	3.73	3.73	0.00	67.66
07 APR 1997	71.39	3.78	3.78	0.00	67.61
30 APR 1997	71.39	6.76	6.76	0.00	64.63
15 MAY 1997	71.39	6.77	6.77	0.00	64.62
30 MAY 1997	71.39	6.87	6.87	0.00	64.52
06 JUN 1997	71.39	7.05	7.05	0.00	64.34
23 JUN 1997	71.39	7.74	7.74	0.00	63.65
MW-NASB-211					
03 JAN 1997	75.55	7.86	7.86	0.00	67.69
24 JAN 1997	75.55	7.15	7.15	0.00	68.40
04 FEB 1997	75.55	Data not available (frozen)			
03 MAR 1997	75.55	6.62	6.62	0.00	68.93
15 MAR 1997	75.55	8.77	8.77	0.00	66.78
27 MAR 1997	75.55	8.08	8.08	0.00	67.47
07 APR 1997	75.55	6.51	6.51	0.00	69.04
30 APR 1997	75.55	5.14	5.14	0.00	70.41
15 MAY 1997	75.55	5.72	5.72	0.00	69.83
30 MAY 1997	75.55	6.54	6.54	0.00	69.01
06 JUN 1997	75.55	6.87	6.87	0.00	68.68
23 JUN 1997	75.55	7.41	7.41	0.00	68.14
MW-NASB-213					
03 MAR 1997	76.81	5.00	5.00	0.00	71.81
15 MAR 1997	76.81	4.95	4.95	0.00	71.86
27 MAR 1997	76.81	4.74	4.74	0.00	72.07
07 APR 1997	76.81	4.50	4.50	0.00	72.31
30 APR 1997	76.81	3.98	3.98	0.00	72.83
15 MAY 1997	76.81	4.36	4.36	0.00	72.45
30 MAY 1997	76.81	4.92	4.92	0.00	71.89
06 JUN 1997	76.81	5.32	5.32	0.00	71.49
23 JUN 1997	76.81	6.21	6.21	0.00	70.60

TABLE 3-2 SUMMARY OF WATER QUALITY INDICATOR PARAMETER MEASUREMENTS COLLECTED FROM 3 JANUARY THROUGH 23 JUNE 1997 OLD NAVY FUEL FARM, NAVAL AIR STATION BRUNSWICK, MAINE

Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)
WP-1					
03 JAN 1997	6.36	5.76	4.20	401	83
24 JAN 1997	6.02	4.81	2.61	381	110
04 FEB 1997	6.20	0.70	4.52	373	78
28 FEB 1997	No data available (frozen)				
15 MAR 1997	No data available (frozen)				
27 MAR 1997	No data available (frozen)				
07 APR 1997	5.53	2.17	5.32	165	238
30 APR 1997	5.77	6.42	2.17	236	69
15 MAY 1997	5.48	7.59	0.65	297	390
30 MAY 1997	5.63	8.54	1.47	299	51
06 JUN 1997	5.58	9.28	1.68	278	128
23 JUN 1997	5.70	11.86	2.84	429	118
WP-2					
03 JAN 1997	6.06	4.24	2.01	177	185
24 JAN 1997	5.90	3.55	2.12	130.7	79
04 FEB 1997	6.20	2.70	2.70	125.2	82
28 FEB 1997	(b)	2.44	5.78	134.5	(b)
15 MAR 1997	5.39	2.37	2.64	180	70
27 MAR 1997	5.18	2.19	(a)	159	195
07 APR 1997	5.39	3.01	2.48	178	191
30 APR 1997	5.95	7.16	1.02	125.7	104
15 MAY 1997	5.37	8.18	2.61	218	82
30 MAY 1997	5.67	9.51	2.82	111.4	57
06 JUN 1997	5.47	10.11	2.71	168	68
23 JUN 1997	5.37	13.06	3.28	119.1	147

(a) Dissolved oxygen data inaccurate.
(b) pH and redox probes inoperable.

NOTE: LNAPL = Light, non-aqueous phase liquid; MSL = Mean sea level.

Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)
WP-3					
03 JAN 1997	6.23	6.01	1.01	51.5	292
24 JAN 1997	5.58	4.39	1.89	489	292
04 FEB 1997	5.50	3.10	0.94	54.4	256
28 FEB 1997	Data not available (frozen)				
15 MAR 1997	Data not available (frozen)				
27 MAR 1997	Data not available (frozen)				
07 APR 1997	4.86	1.24	4.72	39.5	333
30 APR 1997	5.33	7.89	5.48	42.0	438
15 MAY 1997	5.67	7.17	2.05	51.4	335
30 MAY 1997	5.23	8.32	1.80	44.7	333
06 JUN 1997	5.32	8.89	2.10	48.8	312
23 JUN 1997	5.23	14.13	2.85	60.3	367
WP-4					
03 JAN 1997	Data not available (LNAPL present)				
24 JAN 1997	Data not available (LNAPL present)				
04 FEB 1997	6.00	3.60	4.20	194	160
28 FEB 1997	(b)	3.00	4.75	186	(b)
15 MAR 1997	5.19	2.59	7.92	162	307
27 MAR 1997	5.20	1.99	(a)	183	268
07 APR 1997	Data not available (LNAPL present)				
30 APR 1997	Data not available (LNAPL present)				
15 MAY 1997	5.45	9.30	2.73	149.5	238
30 MAY 1997	Data not available (LNAPL present)				
06 JUN 1997	5.61	9.87	2.12	176	251
23 JUN 1997	5.64	13.95	1.25	242	157
WP-5					
03 JAN 1997	6.40	6.44	2.24	97.8	80
24 JAN 1997	6.11	4.54	3.16	93.5	166
04 FEB 1997	5.80	4.60	2.50	95.5	98
28 FEB 1997	(b)	4.07	2.21	99.4	(b)
15 MAR 1997	4.92	3.94	5.68	100.6	64
27 MAR 1997	4.82	3.57	(a)	120	202
07 APR 1997	4.82	4.59	4.50	80.1	235
30 APR 1997	5.08	5.10	6.30	75.9	327
15 MAY 1997	5.06	7.18	0.75	76.7	354
30 MAY 1997	5.18	8.35	1.67	74.2	108
06 JUN 1997	5.28	8.91	1.21	72.1	216
23 JUN 1997	5.36	12.14	5.78	109.4	162

Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)
WP-6					
03 JAN 1997	5.76	5.38	1.76	56.3	316
24 JAN 1997	6.00	3.94	1.62	96.9	304
04 FEB 1997	5.70	3.70	2.25	121.7	250
28 FEB 1997	(b)	3.52	3.08	118.7	(b)
15 MAR 1997	4.91	3.15	2.24	116.8	157
27 MAR 1997	5.13	2.96	(a)	134	193
07 APR 1997	4.98	1.34	3.41	79.8	443
30 APR 1997	6.89	5.15	4.87	40.1	412
15 MAY 1997	5.21	6.64	1.47	60.1	120
30 MAY 1997	5.42	7.87	1.73	87.1	212
06 JUN 1997	5.61	8.32	1.65	76.1	186
23 JUN 1997	5.08	11.51	2.12	137.6	175
WP-7					
03 JAN 1997	Data not available (bent well riser)				
24 JAN 1997	Data not available (LNAPL present)				
04 FEB 1997	Data not available (frozen)				
28 FEB 1997	Data not available (frozen)				
15 MAR 1997	Data not available (bent well riser)				
27 MAR 1997	Data not available (bent well riser)				
07 APR 1997	Data not available (bent well riser)				
30 APR 1997	Data not available (bent well riser)				
15 MAY 1997	Data not available (bent well riser)				
30 MAY 1997	Data not available (bent well riser)				
06 JUN 1997	Data not available (bent well riser)				
23 JUN 1997	Data not available (bent well riser)				
WP-8					
03 JAN 1997	6.11	5.04	6.12	436	314
24 JAN 1997	6.17	3.22	7.12	403	327
04 FEB 1997	6.50	3.10	1.81	367	179
28 FEB 1997	(b)	2.29	9.14	416	(b)
15 MAR 1997	6.29	2.86	11.90	324	377
27 MAR 1997	5.61	2.20	(a)	368	350
07 APR 1997	5.43	3.30	12.14	254	464
30 APR 1997	6.67	6.44	9.52	276	346
15 MAY 1997	6.08	7.76	9.12	259	392
30 MAY 1997	6.56	9.95	4.42	315	342
06 JUN 1997	6.28	10.36	4.68	287	368
23 JUN 1997	6.01	14.32	5.81	412	238

Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)
WP-9					
03 JAN 1997	6.58	5.28	7.1	255	296
24 JAN 1997	5.83	2.92	8.75	244	335
04 FEB 1997	Data not available (dry)				
28 FEB 1997	Data not available (dry)				
15 MAR 1997	Data not available (dry)				
27 MAR 1997	Data not available (dry)				
07 APR 1997	Data not available (insufficient water)				
30 APR 1997	6.28	6.14	6.05	142.3	370
15 MAY 1997	6.38	7.86	3.50	141.8	431
30 MAY 1997	5.68	9.48	3.65	151	380
06 JUN 1997	5.52	9.96	3.81	163	343
23 JUN 1997	Data not available (insufficient water)				
WP-10					
03 JAN 1997	5.41	6.06	1.12	102	344
24 JAN 1997	4.44	4.92	1.53	90.1	416
04 FEB 1997	5.40	5.90	1.26	100.4	298
28 FEB 1997	(b)	5.42	2.68	148	(b)
15 MAR 1997	4.42	5.15	9.05	126.9	391
27 MAR 1997	4.44	4.89	(a)	132	354
07 APR 1997	4.42	4.55	1.86	113	423
30 APR 1997	4.80	5.05	3.12	73.1	403
15 MAY 1997	4.67	6.72	2.28	80.7	427
30 MAY 1997	4.51	7.72	2.28	80.3	337
06 JUN 1997	4.98	8.32	2.39	76.5	374
23 JUN 1997	4.74	10.59	1.21	112.6	331
WP-11					
03 JAN 1997	4.94	4.54	1.20	103.3	318
24 JAN 1997	5.09	3.89	1.22	149	359
04 FEB 1997	Data not available (frozen)				
28 FEB 1997	Data not available (frozen)				
15 MAR 1997	5.16	3.12	4.76	164	315
27 MAR 1997	4.85	2.44	(a)	176	324
07 APR 1997	5.26	2.10	2.22	157	420
30 APR 1997	5.63	6.54	2.16	105.2	385
15 MAY 1997	5.62	8.23	1.20	136.2	293
30 MAY 1997	5.44	8.76	3.62	147.7	161
06 JUN 1997	5.56	9.22	2.94	134.6	198
23 JUN 1997	5.23	12.43	2.46	156	183

Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)
WP-12					
03 JAN 1997	5.46	4.87	2.36	157	319
24 JAN 1997	Data not available (insufficient water)				
04 FEB 1997	Data not available (dry)				
28 FEB 1997	(b)	1.76	8.83	116.0	(b)
15 MAR 1997	Data not available (dry)				
27 MAR 1997	4.98	2.69	(a)	109	256
07 APR 1997	4.56	2.34	7.62	87.2	484
30 APR 1997	5.60	6.67	4.53	123.4	406
15 MAY 1997	4.91	7.90	1.81	81.2	265
30 MAY 1997	5.09	8.84	2.32	84.6	181
06 JUN 1997	5.21	9.45	2.12	83.8	236
23 JUN 1997	Data not available (dry)				
WP-13					
03 JAN 1997	5.83	4.20	10.86	70.6	313
24 JAN 1997	5.45	2.43	11.70	101.4	343
04 FEB 1997	Data not available (frozen)				
28 FEB 1997	(b)	2.46	9.51	125.0	(b)
15 MAR 1997	Data not available (dry)				
27 MAR 1997	5.04	1.98	(a)	102	324
07 APR 1997	5.11	2.78	10.62	52.7	468
30 APR 1997	6.07	7.69	8.15	65.1	384
15 MAY 1997	5.11	8.17	7.61	80.2	505
30 MAY 1997	5.45	9.71	7.64	78.7	314
06 JUN 1997	5.48	10.12	7.71	75.2	386
23 JUN 1997	6.18	14.68	5.64	124.8	295
WP-14					
03 JAN 1997	6.09	4.94	2.87	90.1	332
24 JAN 1997	4.90	3.27	2.96	100.1	404
04 FEB 1997	6.20	3.30	3.71	119.4	267
28 FEB 1997	(b)	3.27	6.52	108.0	(b)
15 MAR 1997	4.85	3.25	3.17	109.9	394
27 MAR 1997	4.81	3.10	(a)	161	344
07 APR 1997	4.75	2.37	5.99	48.8	436
30 APR 1997	5.55	5.45	1.81	66.2	361
15 MAY 1997	5.44	7.92	2.29	68.9	513
30 MAY 1997	5.21	8.84	2.39	75.8	363
06 JUN 1997	5.31	9.06	2.24	71.9	394
23 JUN 1997	5.43	16.62	1.31	156	251

Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)
WP-15					
03 JAN 1997	6.39	4.60	10.01	80.6	329
24 JAN 1997	4.74	3.07	2.68	73.0	407
04 FEB 1997	Data not available (frozen)				
28 FEB 1997	(b)	3.70	12.14	122.5	(b)
15 MAR 1997	4.51	4.12	8.76	146.8	400
27 MAR 1997	4.60	3.05	(a)	207	348
07 APR 1997	4.59	2.44	5.46	109.7	469
30 APR 1997	5.58	7.51	7.78	56.0	384
15 MAY 1997	4.79	8.10	7.17	75.9	182
30 MAY 1997	5.04	9.23	2.84	78.7	381
06 JUN 1997	5.12	9.68	2.96	81.2	316
23 JUN 1997	4.85	13.37	7.22	128.2	356
WP-16					
03 JAN 1997	Data not available (dry)				
24 JAN 1997	Data not available (dry)				
04 FEB 1997	Data not available (dry)				
28 FEB 1997	Data not available (frozen)				
15 MAR 1997	Data not available (frozen)				
27 MAR 1997	Data not available (frozen)				
07 APR 1997	5.36	2.76	8.67	104.5	450
30 APR 1997	6.11	7.18	6.80	90.2	378
15 MAY 1997	5.83	8.56	2.86	138.2	242
30 MAY 1997	Data not available (insufficient water)				
06 JUN 1997	Data not available (insufficient water)				
23 JUN 1997	Data not available (dry)				
WP-17					
03 JAN 1997	Data not available (dry)				
24 JAN 1997	Data not available (frozen)				
04 FEB 1997	Data not available (dry)				
28 FEB 1997	Data not available (dry)				
15 MAR 1997	Data not available (dry)				
27 MAR 1997	Data not available (dry)				
07 APR 1997	Data not available (dry)				
30 APR 1997	6.16	6.62	9.31	75.2	384
15 MAY 1997	Data not available (insufficient water)				
30 MAY 1997	Data not available (dry)				
06 JUN 1997	Data not available (dry)				
23 JUN 1997	Data not available (dry)				

Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)
WP-18					
03 JAN 1997	6.08	7.70	2.45	168	344
24 JAN 1997	Data not available (dry)				
04 FEB 1997	Data not available (dry)				
28 FEB 1997	(b)	4.54	8.29	125.9	(b)
15 MAR 1997	5.38	5.48	11.97	112.1	431
27 MAR 1997	5.73	4.57	(a)	194	287
07 APR 1997	5.31	4.42	8.10	60.7	408
30 APR 1997	6.04	7.10	4.00	86.1	344
15 MAY 1997	Data not available (insufficient water)				
30 MAY 1997	6.24	10.63	1.39	146.4	328
06 JUN 1997	Data not available (insufficient water)				
23 JUN 1997	Data not available (dry)				
WP-19					
03 JAN 1997	6.35	4.92	1.70	259	336
24 JAN 1997	4.60	2.38	2.16	211	431
04 FEB 1997	6.20	5.10	2.53	228	311
28 FEB 1997	(b)	3.70	6.05	213	(b)
15 MAR 1997	5.55	3.64	5.75	118.6	279
27 MAR 1997	5.43	3.92	(a)	186	214
07 APR 1997	5.61	3.77	3.99	128.2	362
30 APR 1997	5.92	8.07	4.52	173	386
15 MAY 1997	4.89	8.23	1.90	148	432
30 MAY 1997	5.86	9.58	1.28	179	338
06 JUN 1997	5.76	9.96	1.38	169	352
23 JUN 1997	5.46	13.75	1.68	249	261
WP-20					
03 JAN 1997	6.46	4.19	5.56	503	330
24 JAN 1997	5.06	1.36	4.98	58.3	479
04 FEB 1997	6.50	3.20	3.87	436	277
28 FEB 1997	(b)	1.70	9.84	304	(b)
15 MAR 1997	5.63	1.70	4.97	345	347
27 MAR 1997	5.49	1.70	(a)	299	289
07 APR 1997	5.72	3.67	6.87	254	512
30 APR 1997	5.96	6.67	3.92	229	393
15 MAY 1997	5.81	8.54	4.08	367	398
30 MAY 1997	5.91	10.20	2.51	437	418
06 JUN 1997	5.94	10.36	2.89	399	401
23 JUN 1997	5.9	13.41	2.41	843	288

Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)
MW-43					
03 MAR 1997	Data not available (frozen)				
15 MAR 1997	Data not available (frozen)				
27 MAR 1997	Data not available (frozen)				
07 APR 1997	Data not available (dry)				
30 APR 1997	7.58	6.62	6.20	40.2	283
15 MAY 1997	Data not available (insufficient water)				
30 MAY 1997	Data not available (dry)				
06 JUN 1997	Data not available (dry)				
23 JUN 1997	Data not available (dry)				
MW-44					
03 JAN 1997	Data not available (lock frozen)				
24 JAN 1997	5.79	3.37	1.38	89.8	124
04 FEB 1997	6.20	4.80	1.67	91.5	55
03 MAR 1997	5.56	6.64	3.68	71.2	208
15 MAR 1997	7.58	1.76	5.40	75.8	142
27 MAR 1997	7.06	4.95	(a)	100	61
07 APR 1997	4.88	1.32	2.48	52.7	402
30 APR 1997	5.22	6.49	3.28	54.6	434
15 MAY 1997	5.28	6.79	2.55	100.0	394
30 MAY 1997	5.34	8.45	2.86	73.8	77
06 JUN 1997	5.36	8.84	2.61	76.9	108
23 JUN 1997	6.12	8.36	0.18	122.3	132
MW-46					
03 MAR 1997	5.68	6.98	7.28	143.0	541
15 MAR 1997	5.36	3.67	8.20	162	407
27 MAR 1997	5.23	3.55	(a)	203	407
07 APR 1997	5.99	4.84	6.25	133.2	326
30 APR 1997	6.81	4.45	7.35	121.7	337
15 MAY 1997	5.71	5.95	3.21	146.9	610
30 MAY 1997	6.91	7.03	1.36	168	314
06 JUN 1997	6.42	7.68	2.16	176	412
23 JUN 1997	5.83	8.28	0.28	255	344

Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)
MW-49					
03 MAR 1997	6.08	6.24	1.35	76.6	36.8
15 MAR 1997	6.84	4.90	1.74	102.7	285
27 MAR 1997	5.81	3.75	(a)	104	355
07 APR 1997	7.27	3.74	3.62	82.1	267
30 APR 1997	8.66	5.00	2.14	84.1	217
15 MAY 1997	6.12	6.21	3.16	178	321
30 MAY 1997	6.98	6.66	2.06	106.2	172
06 JUN 1997	6.68	7.12	2.32	112.4	208
23 JUN 1997	6.86	7.92	0.42	222	150
MW-51					
03 MAR 1997	7.10	2.24	5.80	64.1	428
15 MAR 1997	5.62	3.60	5.69	82.5	376
27 MAR 1997	7.92	1.68	(a)	96	275
07 APR 1997	6.85	1.63	4.68	52.6	331
30 APR 1997	6.82	6.11	5.01	49.6	360
15 MAY 1997	5.31	6.56	8.96	54.6	355
30 MAY 1997	5.98	6.59	1.61	75.4	341
06 JUN 1997	5.81	7.01	3.12	78.2	321
23 JUN 1997	5.97	10.1	2.15	74.7	357
MW-54					
03 MAR 1997	6.10	5.88	8.28	131.3	420
15 MAR 1997	3.98	5.14	7.69	131.2	439
27 MAR 1997	4.98	5.20	(a)	145	347
07 APR 1997	3.91	3.01	7.12	108.1	423
30 APR 1997	4.72	4.30	4.41	106.3	426
15 MAY 1997	6.50	6.49	3.18	229	203
30 MAY 1997	4.17	7.15	1.21	136.3	461
06 JUN 1997	5.12	7.61	2.12	169	381
23 JUN 1997	5.38	8.73	0.87	268	277

Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)
MW-56R					
24 JAN 1997	Data not available (actively sparging)				
04 FEB 1997	Data not available (actively sparging)				
03 MAR 1997	Data not available (actively sparging)				
15 MAR 1997	Data not available (frozen)				
27 MAR 1997	Data not available (frozen)				
07 APR 1997	Data not available (actively sparging)				
30 APR 1997	Data not available (actively sparging)				
15 MAY 1997	Data not available (actively sparging)				
30 MAY 1997	Data not available (actively sparging)				
06 JUN 1997	Data not available (actively sparging)				
23 JUN 1997	Data not available (actively sparging)				
MW-58					
03 MAR 1997	6.20	6.19	5.42	39.2	410
15 MAR 1997	6.42	6.29	4.28	47.8	342
27 MAR 1997	5.39	5.60	(a)	55	392
07 APR 1997	8.13	5.37	3.20	40.4	226
30 APR 1997	7.80	6.18	2.60	42.5	260
15 MAY 1997	8.29	7.17	8.31	44.4	331
30 MAY 1997	6.89	7.59	1.06	51.7	49
06 JUN 1997	6.48	7.99	2.38	68.2	184
23 JUN 1997	8.01	8.36	0.54	74.3	33
MW-61R					
24 JAN 1997	6.36	4.72	1.12	167	111
04 FEB 1997	Data not available (frozen)				
03 MAR 1997	Data not available (frozen)				
15 MAR 1997	Data not available (frozen)				
27 MAR 1997	Data not available (frozen)				
07 APR 1997	5.99	1.20	3.93	58.4	325
30 APR 1997	6.30	8.12	3.21	73.6	291
15 MAY 1997	6.94	10.23	4.61	86.8	331
30 MAY 1997	5.58	8.74	1.42	132.7	41
06 JUN 1997	5.86	9.04	2.84	144.1	196
23 JUN 1997	6.28	10.95	0.64	174	92

Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)
MW-62					
03 MAR 1997	5.93	6.72	7.51	71.4	382
15 MAR 1997	5.96	6.08	4.27	97.0	194
27 MAR 1997	5.24	6.19	(a)	108	226
07 APR 1997	5.14	6.03	1.86	72.1	242
30 APR 1997	7.09	7.38	2.99	73.4	190
15 MAY 1997	5.61	6.75	3.25	111.7	293
30 MAY 1997	5.01	6.41	1.08	82.9	161
06 JUN 1997	5.26	7.06	2.16	86.5	194
23 JUN 1997	5.36	8.74	2.99	105.8	352
MW-96					
15 MAR 1997	4.85	6.85	7.62	90.3	397
27 MAR 1997	7.30	0.77	(a)	106	311
07 APR 1997	6.04	2.09	9.12	82.3	380
30 APR 1997	5.81	5.00	5.96	58.9	401
15 MAY 1997	6.29	5.71	5.09	70.7	411
30 MAY 1997	5.31	6.24	4.89	60.6	404
06 JUN 1997	5.38	6.39	4.28	68.4	408
23 JUN 1997	5.06	7.43	4.94	81.5	459
MW-205					
15 MAR 1997	7.91	2.78	5.02	54.9	267
27 MAR 1997	5.40	2.48	(a)	54	389
07 APR 1997	7.26	3.03	5.86	48.4	273
30 APR 1997	7.22	6.75	5.10	62.6	335
15 MAY 1997	7.01	6.52	4.10	52.2	497
30 MAY 1997	6.34	8.05	2.21	45.4	306
06 JUN 1997	6.68	8.46	2.61	48.6	341
23 JUN 1997	5.76	10.94	1.62	54.8	332

Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)
MW-211					
03 JAN 1997	6.13	5.09	10.87	250	302
24 JAN 1997	5.35	5.04	6.98	177	343
04 FEB 1997	Data not available (frozen)				
03 MAR 1997	5.75	4.19	8.21	150	418
15 MAR 1997	6.71	4.67	11.36	328	222
27 MAR 1997	5.56	2.86	(a)	256	375
07 APR 1997	4.99	3.32	9.82	197	445
30 APR 1997	5.64	6.57	10.28	162	404
15 MAY 1997	5.47	7.99	9.59	120.3	402
30 MAY 1997	5.51	9.17	6.12	79.6	338
06 JUN 1997	5.62	9.34	6.01	84.3	376
23 JUN 1997	4.58	13.46	8.88	1.6	371
MW-213					
03 MAR 1997	5.93	4.10	10.12	38.3	458
15 MAR 1997	6.27	4.45	9.00	52.5	324
27 MAR 1997	5.49	2.24	(a)	50	382
07 APR 1997	5.03	4.64	7.83	36	475
30 APR 1997	6.17	8.23	6.61	33.5	393
15 MAY 1997	5.28	8.04	5.07	53.8	426
30 MAY 1997	5.33	9.84	5.96	42.8	384
06 JUN 1997	5.42	9.96	5.46	64.5	396
23 JUN 1997	5.37	10.22	3.77	58.5	345

TABLE 3-3 SUMMARY OF WELL POINT RISER HEAD SPACE METHANE AND TOTAL VOLATILE HYDROCARBON CONCENTRATIONS OBTAINED ON 23 JUNE 1997 AT THE OLD NAVY FUEL FARM, NAVAL AIR STATION, BRUNSWICK, MAINE

Location	Well Point Head Space Vapor Measurements (23 June 1997)				
	FID TVH (ppm_v)	PID TVH (ppm_v)	CH_4 (%)	CO_2 (%)	O_2 (%)
WP-01	11.0	0.0	<0.1	0.0	21.3
WP-02	1,821	299	0.2	0.0	21.0
WP-03	528	84.9	<0.1	0.3	21.4
WP-04	0.0	0.0	<0.1	0.0	20.7
WP-05	5.8	8.9	<0.1	1.0	20.3
WP-06	77.2	149	<0.1	0.0	21.2
WP-07	7,812	342	3.2	0.3	20.7
WP-08	0.0	0.0	<0.1	0.0	20.7
WP-09	0.0	0.0	<0.1	0.0	20.7
WP-10	13.2	20.1	<0.1	1.7	20.6
WP-11	0.0	0.0	<0.1	0.0	20.7
WP-12	28.1	6.0	<0.1	0.0	21.7
WP-13	1,369	35.2	<0.1	0.0	21.7
WP-14	9.3	34.2	<0.1	1.9	19.9
WP-15	13.9	5.9	<0.1	1.2	20.7
WP-16	3.4	46.2	<0.1	0.8	20.5
WP-17	2.8	3.2	<0.1	0.0	20.5
WP-18	4.6	2.7	<0.1	2.2	19.9
WP-19	109	56.2	<0.1	0.0	21.5
WP-20	2.7	100	<0.1	1.6	20.2

NOTE: FID response expressed as ppm_v except where noted.
Atmospheric oxygen approximately 21.8 percent.
Methane detection limit was 0.1 percent.
FID = Flame ionization detector.
PID = Photoionization detector
TVH = Total volatile hydrocarbons.

TABLE 3-4 SUMMARY OF FIELD MEASUREMENTS OF TOTAL VOLATILE HYDROCARBONS AT WELL POINT RISERS FROM 1 JANUARY TO 30 JUNE 1997 AT THE OLD NAVY FUEL FARM, NAVAL AIR STATION, BRUNSWICK, MAINE

Location	24 JAN 1997	4 FEB 1997	26 FEB 1997		27 MAR 1997		7 APR 1997		30 APR 1997	
	PID TVH (ppm_v)	PID TVH (ppm_v)	FID TVH (ppm_v)	PID TVH (ppm_v)	FID TVH (ppm_v)	PID TVH (ppm_v)	FID TVH (ppm_v)	PID TVH (ppm_v)	FID TVH (ppm_v)	PID TVH (ppm_v)
WP-1	No data[a]	16.2	11.6	4.2	0.0	0.0	0.9	0.0	0.8	0.0
WP-2	No data[a]	375	1,650	280	1,600	200	847	225	2,340	280
WP-3	No data[a]	135	266	59.8	80	20	8.8	0.6	59.9	17.1
WP-4	160	245	550	122	200	23	265	70.1	2,204	281
WP-5	No data[a]	71	240	25.8	70	20	1.8	0.0	2.4	0.0
WP-6	No data[a]	308	61.3	13.1	25	6.0	18.0	2.5	2.6	0.0
WP-7	530	660	1,580	330	2.0%	670	5.0%	702	3,210	370
WP-8	15	70	72.8	11.2	13	1.0	2.2	0.0	6.8	0.0
WP-9	5	0.9	130	27.8	41	9.0	48.2	17.6	3.4	0.0
WP-10	6	49.9	6.0	1.6	26.2	5.0	0.8	0.0	0.6	0.0
WP-11	440	402	2,020	290	1,700	330	7.1	0.0	21.0	0.0
WP-12	481	582	4,000	390	699	100	44.8	6.1	32.1	3.6
WP-13	453	520	2,040	260	1,250	215	631	165	3,201	306
WP-14	92	4.7	32.2	7.7	20.1	3.7	0.8	0.0	0.6	0.0
WP-15	25	2.3	8.1	2.2	36.0	6.7	26.6	2.2	2.0	0.0
WP-16	105	2.7	243	50	0.0	0.0	0.3	0.0	2.0	0.0
WP-17	0.0	1.6	0.0	0.0	0.0	0.0	0.9	0.0	3.1	0.0
WP-18	0.0	1.0	0.0	0.0	0.0	0.0	0.7	0.0	0.7	0.0
WP-19	3.0	39.6	2.0	0.0	11.2	1.5	2.1	0.0	411	12.9
WP-20	0.0	1.5	0.0	0.0	0.0	0.0	1.1	0.0	3.8	0.0

(a) Due to low temperature, batteries in MiniRae® died, unable to do reading.
(b) Polyvinyl chloride cap was not on well point.

NOTE: FID = Flame ionization detector.
PID = Photoionization detector.
TVH = Total volatile hydrocarbons.

Location	15 MAY 1997		30 MAY 1997		6 JUN 1997		23 JUN 1997	
	FID TVH (ppm_v)	PID TVH (ppm_v)	FID TVH (ppm_v)	PID TVH (ppm_v)	FID TVH (ppm_v)	PID TVH (ppm_v)	FID TVH (ppm_v)	PID TVH (ppm_v)
WP-1	64.2	0.4	192	5.9	52.1	31.8	11.0	0.0
WP-2	1,899	193	1.6%	121	3,406	269	1,821	299
WP-3	120	16.2	2,894	76.8	311	85.2	528	84.9
WP-4	4,703	335	99.9%	86.4	1.6%	1,752	0.0[b]	0.0[b]
WP-5	26.2	1.8	1,254	28.9	24.1	83.2	5.8	8.9
WP-6	2.0	0.5	232	8.1	42.1	8.2	77.2	149
WP-7	20.0%	910	10.7	487	1.8%	604	7,812	342
WP-8	54.2	6.1	438	21.3	27.8	18.1	0.0[b]	0.0[b]
WP-9	84.2	12.0	13.7	75.9	1.4	31.6	0.0[b]	0.0[b]
WP-10	0.6	0.4	4.3	6.8	0.0	46.1	13.2	20.1
WP-11	90.5	6.0	1,611	24.2	13.2	52.6	0.0[b]	0.0[b]
WP-12	154	0.7	353	10.8	33.5	33.1	28.1	6.0
WP-13	1.2%	483	10.0%	538	4,891	343	1,369	35.2
WP-14	2.3	0.4	7.6	3.8	0.0	67.2	9.3	34.2
WP-15	0.4	0.0	277	13.8	0.0	25.1	13.9	5.9
WP-16	0.0	0.0	0..0	5.8	7.4	11.7	3.4	46.2
WP-17	10.3	0.0	0.0	4.7	18.1	5.2	2.8	3.2
WP-18	1.4	0.4	129	8.4	0.0	57.2	4.6	2.7
WP-19	1,090	47	602	6.7	138	52.1	109	56.2
WP-20	42.4	0.4	80.1	5.8	3.3	28.9	2.7	100

TABLE 3-5 SUMMARY OF TOTAL AND DEGRADER MICROBIAL POPULATIONS MEASURED IN GROUND-WATER SAMPLES COLLECTED AT WELL POINTS ON 8 AUGUST 1996, 5 DECEMBER 1996, AND 25-26 JUNE 1997 OLD NAVY FUEL FARM, NAVAL AIR STATION, BRUNSWICK, MAINE

Location	8 August 1996		5 December 1996		25-26 June 1997	
	Total (CFU/mL)[a]	Degrader (CFU/mL)[a]	Total (CFU/mL)[a]	Degrader (CFU/mL)[a]	Total (CFU/mL)[a]	Degrader (CFU/mL)[a]
WP-1	6.0×10^5	2.9×10^5	4.4×10^6	1.1×10^5	2.7×10^5	4.3×10^4
WP-2	3.2×10^5	2.5×10^5	5.9×10^5	3.6×10^5	8.0×10^4	2.8×10^4
WP-3	1.5×10^6	9.2×10^5	3.4×10^6	2.2×10^4	8.3×10^4	1.4×10^4
WP-4	5.3×10^4	6.3×10^4	7.3×10^4	1.0×10^4	5.6×10^6	8.9×10^5
WP-5	7.1×10^5	7.5×10^5	1.3×10^5	2.7×10^4	6.3×10^5	9.4×10^4
WP-6	1.6×10^6	6.8×10^5	5.5×10^5	5.8×10^4	3.6×10^5	4.9×10^4
WP-7	3.0×10^5	1.0×10^5	4.1×10^6	1.2×10^5	3.6×10^6	2.5×10^5
WP-7-DUP	NS	NS	NS	NS	4.7×10^6	3.0×10^5
WP-8	4.9×10^5	2.2×10^5	7.7×10^4	1.3×10^4	1.2×10^6	2.9×10^5
WP-9	3.2×10^5	4.2×10^5	1.6×10^5	1.2×10^4	5.9×10^6	5.2×10^6
WP-10	1.4×10^5	1.9×10^5	7.4×10^4	1.3×10^4	6.6×10^5	1.0×10^5
WP-11	8.7×10^4	1.6×10^5	5.4×10^5	7.6×10^4	1.1×10^6	5.3×10^5
WP-11-DUP	NS	NS	NS	NS	5.8×10^5	8.2×10^4
WP-12	4.7×10^5	4.5×10^5	4.9×10^5	8.3×10^4	NA	NA
WP-13	8.9×10^4	8.8×10^4	3.0×10^5	9.3×10^3	1.4×10^7	9.4×10^6
WP-14	8.9×10^5	1.1×10^6	6.1×10^4	1.1×10^4	1.2×10^6	7.6×10^5
WP-15	3.3×10^4	1.1×10^5	3.5×10^6	1.8×10^5	3.7×10^5	3.4×10^4
WP-16	NA	NA	NA	NA	NA	NA
WP-17	NA	NA	NA	NA	NA	NA
WP-18	3.2×10^5	2.2×10^5	3.3×10^4	5.0×10^3	NA	NA
WP-19	7.4×10^5	7.1×10^5	1.5×10^6	5.6×10^4	4.3×10^5	3.4×10^4
WP-20	3.7×10^6	3.0×10^6	6.0×10^5	5.3×10^4	1.4×10^6	3.6×10^5
Average	6.9×10^5	5.4×10^5	1.1×10^6	6.8×10^4	2.3×10^6	1.1×10^6

(a) CFU/mL indicates colony forming units per milliliter of ground water.

NOTE: NA = Data not available (well point dry).
NS = Not sampled.
DUP = Duplicate sample.

TABLE 3-6 SUMMARY OF BIODEGRADATION INDICATOR PARAMETERS AND NUTRIENTS MEASURED IN GROUND WATER FROM 8 AUGUST 1996 THROUGH 26 JUNE 1997 OLD NAVY FUEL FARM, NAVAL AIR STATION, BRUNSWICK, MAINE

	Baseline Biodegradation Indicator Parameters 8 August 1996					First Interim Biodegradation Indicator Parameters 5 December 1996					Second Interim Biodegradation Indicator Parameters 25-26 June 1997				
Location	Total Organic Nitrogen	C:N	C:P	Sulfate (mg/L)	Nitrate (mg/L)	Total Organic Nitrogen	C:N	C:P	Sulfate (mg/L)	Nitrate (mg/L)	Total Organic Nitrogen	C:N	C:P	Sulfate (mg/L)	Nitrate (mg/L)
WP-01	9.1	9	NA	38.0	(<0.1U)	49.2	1	NA	170.0	10.0	14.4	3	NA	5.1	(<0.05U)
WP-02	19.9	8	750	60.0	2.2	7.7	4	NA	25.0	7.0	3.3	6	NA	0.8	(<0.05U)
WP-03	34.4	10	875	10.0	2.2	28.4	1	NA	42.0	5.5	2.1	5	NA	6.4	1.10
WP-04	0.8	914	NA	(<0.1U)	3.3	0.5	44	NA	75.0	5.0	1.3	50	650	9.5	(<0.05U)
WP-05	1.7	16	NA	33.0	(<0.1U)	10.6	2	NA	20.0	8.7	4.9	7	NA	3.0	(<0.05U)
WP-06	6.6	7	NA	7.5	(<0.1U)	14.5	2	NA	43.0	4.5	2.7	12	NA	7.2	(<0.05U)
WP-07	6.0	6	NA	2.5	(<0.1U)	5.3	7	NA	100.0	5.2	4.1	9	NA	53.0	(<0.05U)
WP-08	1.8	18	NA	120.0	(<0.1U)	1.2	16	NA	140.0	9.5	2.3	13	NA	120.0	(<0.05U)
WP-09	1.2	13	NA	80.0	29.0	0.6	8	NA	118.0	6.2	0.9	20	NA	59.0	2.90
WP-10	3.2	16	NA	40.0	(<0.1U)	1.9	10	NA	23.0	3.3	1.6	21	NA	22.0	(<0.05U)
WP-11	5.6	8	NA	48.0	1.1	2.5	7	NA	45.0	5.5	7.1	10	NA	5.2	0.08
WP-12	10.0	6	NA	45.0	2.2	0.6	30	NA	95.0	5.0	Data not available; well dry				
WP-13	11.4	11	NA	(<0.1U)	1.1	1.0	6	NA	40.0	7.5	5.5	3	NA	30.0	0.05
WP-14	1.6	81	NA	25.0	(<0.1U)	2.4	4	NA	20.0	7.0	2.3	6	NA	30.0	(<0.05U)
WP-15	24.5	7	600	10.0	2.2	63.2	1	180	190.0	11.0	2.9	9	NA	51.0	0.13
WP-16	Data not available; well dry					Data not available; well dry					Data not available; well dry				
WP-17	Data not available; well dry					Data not available; well dry					Data not available; well dry				
WP-18	2.7	115	NA	38.0	11.0	1.0	15	NA	43.0	6.0	Data not available; well dry				
WP-19	4.4	55	NA	35.0	(<0.1U)	5.0	5	NA	30.0	5.5	3.8	6	NA	45.0	(<0.05U)
WP-20	1.6	5	NA	78.0	(<0.1U)	1.0	6	NA	140.0	8.0	3.3	3	NA	320.0	2.30

NOTE: C:N = Carbon to nitrogen ratio.
C:P = Carbon to phosphorous ratio.
NA = Not applicable.
U = Not detected. Sample quantitation limits are shown as (<___U).

TABLE 3-7 SUMMARY OF ANALYTICAL RESULTS FOR GROUND-WATER SAMPLES COLLECTED 24-26 JUNE 1997 AT THE OLD NAVY FUEL FARM, NAVAL AIR STATION, BRUNSWICK, MAINE

	Sample Location								
Compound	WP-01	WP-02	WP-03	WP-04	WP-05	WP-06	WP-07	WP-07-DUP	WP-08
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8020 (μg/L)									
Benzene	(<1U)	3	(<1U)	3	55	(<1U)	(<1U)	(<1U)	(<1U)
Toluene	(<1U)	13	(<1U)	10	1,700D	(<1U)	(<1U)	(<1U)	(<1U)
Ethylbenzene	(<1U)	81	(<1U)	94	1,100D	(<1U)	(<1U)	(<1U)	(<1U)
Total xylenes	(<1U)	450	(<1U)	530	8,500D	(<1U)	(<1U)	(<1U)	(<1U)
Total BTEX	ND	547	ND	637	11,355	ND	ND	ND	ND
MTBE	(<1U)	(<1U)	1	1	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
TPH BY DHS-HETL METHOD 4.2.17 (μg/L)									
TPH-GRO	260	4,200	130	16,000	15,000	210	4,000	2,100	1,600
TPH BY DHS-HETL METHOD 4.1.25 (μg/L)									
TPH-DRO	1,800	23,000D	440	12,000,000D	2,700D	450	1,200	2,300D[a]	2,400D

(a) Reanalysis outside of holding time performed to meet method requirements.

NOTE: Well points WP-12, WP-16, WP-17, and WP-18 were dry and active sparging at MW-56R; thus, no samples were collected.

BTEX = Benzene, toluene, ethylbenzene, and total xylenes.
DHS-HETL = State of Maine Department of Human Services–Health and Environmental Testing Laboratory.
MTBE = Methyl tertiary-butyl ether.
TPH-GRO = Total petroleum hydrocarbons-gasoline range organics.
TPH-DRO = Total petroleum hydrocarbons-diesel range organics.
NA = Analysis not completed due to insufficient sample.
ND = No detected BTEX compounds.
D = Indicates compound identified at secondary dilution factor.
U = Not detected. Sample quantitation limits are shown as (<___U).

Compound	Sample Location									
	WP-09	WP-10	WP-11	WP-13	WP-14	WP-15	WP-19	WP-20	Trip Blank	Rinsate Blank
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8020 (μg/L)										
Benzene	(<1U)	34	320	12	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Toluene	(<1U)	26	6,700D	270	1	1	4	2	(<1U)	(<1U)
Ethylbenzene	(<1U)	9	72	3	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Total xylenes	(<1U)	41	335	15	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Total BTEX	ND	110	7,427	300	1	1	4	2	ND	ND
MTBE	(<1U)	(<1U)	2	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(1.0U)
TPH BY DHS-HETL METHOD 4.2.17 (μg/L)										
TPH-GRO	110	310	9,100	430	(<25)	160	1,000	(<25U)	NR	(<25U)
TPH BY DHS-HETL METHOD 4.1.25 (μg/L)										
TPH-DRO	NA	470	12,000D	290	280	570	400	370	NR	(<50U)

NOTE: NR = Analysis not required.

Compound	Sample Location										
	MW-44	MW-49	MW-51	MW-54	MW-58	MW-61R	MW-62	MW-211	MW-213	MW-213 DUP	Rinsate Blank
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8020 (μg/L)											
Benzene	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	510D	(<1U)	(<1U)	(<1U)
Toluene	(<1U)	2	(<1U)	(<1U)	(<1U)	1	(<1U)	20,000D	(<1U)	(<1U)	3
Ethylbenzene	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	200	(<1U)	(<1U)	(<1U)
Total xylenes	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	950	(<1U)	(<1U)	(<1U)
Total BTEX	ND	2	ND	ND	ND	1	ND	21,660	ND	ND	3
MTBE	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
TPH BY DHS-HETL METHOD 4.2.17 (μg/L)											
TPH-GRO	(<25U)	(<25U)	(<25U)	(<25U)	(<25U)	32	(<25U)	24,000	(<25U)	28	(<25U)
TPH BY DHS-HETL METHOD 4.1.25 (μg/L)											
TPH-DRO	56	140	52	230	100	320D	58	3,000D	180	140	(<50U)

TABLE 3-8 SUMMARY OF ANALYTICAL RESULTS FOR FERROUS IRON AND MANGANESE CONCENTRATIONS IN GROUND-WATER SAMPLES COLLECTED 25-26 JUNE 1997 AT THE OLD NAVY FUEL FARM, NAVAL AIR STATION, BRUNSWICK, MAINE

Location	25-26 June 1997	
	Ferrous Iron (mg/L)	Manganese (mg/L)
WP-1	16.0	0.3
WP-2	6.0	0.1
WP-3	0.20	0.1
WP-4	5.0	0.6
WP-5	5.0	0.0
WP-6	3.0	0.1
WP-7	6.0	0.4
WP-8	0.16	1.3
WP-9	0.48	0.0
WP-10	2.77	0.6
WP-11	4.0	0.0
WP-12	NA	NA
WP-13	14.0	0.0
WP-14	9.0	1.0
WP-15	1.07	0.0
WP-16	NA	NA
WP-17	NA	NA
WP-18	NA	NA
WP-19	3.10	0.0
WP-20	0.02	0.1

NOTE: NA = No data; insufficient volume of ground water in well point.

TABLE 3-9 SUMMARY OF ANALYTICAL RESULTS FOR GROUND-WATER SAMPLES COLLECTED FROM 10 JUNE 1996 TO 26 JUNE 1997 AT THE OLD NAVY FUEL FARM, NAVAL AIR STATION, BRUNSWICK, MAINE

Date	Parameters							
	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE	TPH–GRO	TPH–DRO
WP-01								
7-8 AUG 1996	(<1U)	2.1	(<1U)	12.0	14.1	16	77	1,000
4-5 DEC 1996	(<1U)	(<1U)	(<1U)	2.2	2.2	(<1U)	3,300	750
24-25 JUN 1997	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	260	1,800
WP-02								
7-8 AUG 1996	5.6	34	94	940	623.6	34	4,200	16,000
24-25 JUN 1997	3	13	81	450	547	(<1U)	4,200	23,000D[a]
WP-03								
7-8 AUG 1996	17	72	1.3	3.1	93.4	1.3	140	410
4-5 DEC 1996	(<1U)	2.6	(<1U)	5.1	7.7	(<1U)	4,100	670
24-25 JUN 1997	(<1U)	(<1U)	(<1U)	(<1U)	ND	1	130	440
WP-04								
7-8 AUG 1996	1.6	3.8	7.5	15.5	28.4	31	890	1,300
24-25 JUN 1997	3	10	94	530	637	1	16,000	12,000,000D
WP-05								
7-8 AUG 1996	12	740[b]	700[b]	4,300[b]	5,752	14	9,000	1,000
4-5 DEC 1996	17	240	350	2,420	3,027	8.7	4,800	(<50U)
24-25 JUN 1997	55	1,700D	1,100D	8,500D	11,355	(<1U)	15,000	2,700D
WP-06								
7-8 AUG 1996	(<1U)	3.8	(<1U)	3.7	7.5	32	31	150
4-5 DEC 1996	(<1U)	2.9	(<1U)	1.4	4.3	(<1U)	20	(<50U)
24-25 JUN 1997	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	210	450
WP-07								
7-8 AUG 1996	(<1U)	12.0	6.0	49.2	67.2	9.9	2,500	680
24-25 JUN 1997	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	4,000	1,200
WP-08								
7-8 AUG 1996	15	6.4	1.5	6.1	29.0	29	220	480
4-5 DEC 1996	(<1U)	(<1U)	(<1U)	1.3	1.3	(<1U)	270	150
24-25 JUN 1997	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	1,600	2,400D

(a) Chromatographic patterns indicated the presence of a heavy petroleum product, much of which eluted beyond the DRO retention time range.
(b) Reanalysis due to low surrogate recovery.

NOTE: BTEX = Benzene, toluene, ethylbenzene, and total xylenes.
MTBE = Methyl tertiary-butyl ether.
ND = Not detected.
D = Indicates compound identified at secondary dilution factor.
TPH = Total petroleum hydrocarbons; GRO = Gasoline range organics; DRO = Diesel range organics.
(<__U) = Compound not detected above method detection limit shown.
Results reported in μg/L.

Date	Parameters							
	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE	TPH–GRO	TPH–DRO
WP-09								
7-8 AUG 1996	1.0	5.4	1.3	8.7	16.4	130	93	89
4-5 DEC 1996	(<1U)	(<1U)	(<1U)	1.0	1.0	(<1U)	730	(<50U)
24-25 JUN 1997	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	110	NA
WP-10								
7-8 AUG 1996	31	46	17	72	166	49	550	420
4-5 DEC 1996	(<1U)	4.0	2.0	13.6	19.6	(<1U)	130	(<50U)
24-25 JUN 1997	34	26	9	41	110	(<1U)	310	470
WP-11								
7-8 AUG 1996	78	3,000[b]	170	750	3,998	51	5,500	3,600
4-5 DEC 1996	9.9	220	1.7	38	269.6	(<1U)	3,400	220
24-25 JUN 1997	320	6,700D	72	335	7,427	2	9,100	12,000D
WP-12								
4-5 DEC 1996	(<1U)	190	9.1	392	591.1	(<1U)	870	390
WP-13								
7-8 AUG 1996	15	380	56	315	766	89	2,200	580
4-5 DEC 1996	(<1U)	(<1U)	(<1U)	57	57	(<1U)	950	3,100
24-25 JUN 1997	12	270	3	15	300	(<1U)	430	290
WP-14								
7-8 AUG 1996	(<1U)	10	(<1U)	4.5	14.5	1.6	34	140
4-5 DEC 1996	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	15	62
24-25 JUN 1997	(<1U)	1	(<1U)	(<1U)	1	(<1U)	(<25U)	280
WP-15								
7-8 AUG 1996	5.5	19	1.7	7.6	33.8	2.0	47	500
4-5 DEC 1996	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	(<10U)	66
24-25 JUN 1997	(<1U)	1	(<1U)	(<1U)	1	(<1U)	160	570
WP-16								
4-5 DEC 1996	(<1U)	1.2	(<1U)	1.3	2.5	(<1U)	11	(<50U)
WP-18								
7-8 AUG 1996	(<1U)	7.8	(<1U)	3.8	11.6	(<1U)	22	75
4-5 DEC 1996	(<1U)	1.6	(<1U)	1.5	3.1	(<1U)	35	(<50U)
WP-19								
7-8 AUG 1996	(<1U)	3.4	(<1U)	1.2	4.6	3.9	260	100
4-5 DEC 1996	(<1U)	1.2	(<1U)	2.6	3.8	(<1U)	1,100	210
24-25 JUN 1997	(<1U)	4	(<1U)	(<1U)	4	(<1U)	1,000	400

(c) Chromatographic pattern indicated the presence of more than one petroleum product. This sample had responses which eluted before and after the DRO retention time range.

NOTE: NA = Not analyzed; insufficient water.

Date	Parameters							
	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE	TPH–GRO	TPH–DRO
WP-20								
7-8 AUG 1996	1.0	7.2	1.0	6.3	15.5	3.6	310	73
4-5 DEC 1996	(<1U)	1.2	(<1U)	3.6	4.8	(<1U)	14	(<50U)
24-25 JUN 1997	(<1U)	2	(<1U)	(<1U)	2	(<1U)	(<25U)	370
MW-44								
10 JUN 1996	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	(<50U)	(<100U)
7-8 AUG 1996	(<1U)	2.5	(<1U)	1.1	3.6	(<1U)	16	(<50U)
4-5 DEC 1996	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	110	290
24-25 JUN 1997	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	(<25U)	56
MW-49								
10 JUN 1996	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	(<50U)	(<50U)
4-5 DEC 1996	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	(<10U)	110[c]
24-25 JUN 1997	(<1U)	2	(<1U)	(<1U)	2	(<1U)	(<25U)	140
MW-51								
10 JUN 1996	(<1U)	(<1U)	(<1U)	(<1U)	ND	2.1	(<50U)	(<100U)
7-8 AUG 1996	(<1U)	1.2	(<1U)	(<1U)	1.2	4.8	14	(<50U)
4-5 DEC 1996	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	(<10U)	(<50U)[c]
24-25 JUN 1997	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	(<25U)	52
MW-54								
10 JUN 1996	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	(<50U)	(<100U)
4-5 DEC 1996	(<1U)	(<1U)	1.2	(<1U)	1.2	(<1U)	15	260[c]
24-25 JUN 1997	(<1U)	ND	(<1U)	(<1U)	ND	(<1U)	(<25U)	230
MW-56								
10 JUN 1996	(<1U)	1.8	(<1U)	1.0	2.8	(<1U)	44	56
MW-58								
10 JUN 1996	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	(<50U)	(<100U)
4-5 DEC 1996	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	(<10U)	230[c]
24-25 JUN 1997	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	(<25U)	100
MW-61R								
24-25 JUN 1997	(<1U)	1	(<1U)	(<1U)	1	(<1U)	32	320[a]
MW-62								
10 JUN 1996	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	(<50U)	(<100U)
4-5 DEC 1996	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	11	52
24-25 JUN 1997	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	(<25U)	58
MW-211								
4-5 DEC 1996	1,300[b]	12,000[b]	250	2,770	16,320	120	30,000	6,700[c]
24-25 JUN 1997	510D	20,000	200	950	21,660	(<1U)	24,000	3,000D
MW-213								
4-5 DEC 1996	(<1U)	(<1U)	2.0	(<1U)	2.0	(<1U)	100	66D
24-25 JUN 1997	(<1U)	(<1U)	(<1U)	(<1U)	ND	(<1U)	(<25U)	180

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Appendix A

Field Record of Water Quality Analysis Forms

EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC MDC	Date: 1/3/97	Time:
Weather: snow sleet, 30°, windy	Equipment: hydrolab, interface probe	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°F)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Comments
WP-1	3.85	—	6.36	5.76	4.20	.401	83	
WP-2	5.10	—	6.06	4.24	2.01	177	185	
WP-3	3.55	—	6.23	6.01	1.01	515	292	
WP-4	5.05	4.55	—	—	—	—	→	
WP-5	5.90		6.40	6.44	2.24	.0978	80	
WP-6	5.80	—	5.76	5.38	1.76	565	316	
WP-7	4.32	4.00	Bent PVC casing					
WP-8	4.43	—	6.11	5.04	6.12	436	314	
WP-9	5.22	—	6.58	5.28	9.10	255	296	
WP-10	4.17	—	5.41	6.06	1.12	1,021	344	
WP-11	4.37	—	5.94	4.54	1.20	1033	318	
WP-12	6.02	—	5.46	4.57	2.36	157	319	
WP-13	4.70	—	5.83	4.20	10.86	706	313	sparging
WP-14	5.05	—	6.09	4.94	2.87	901	332	
WP-15	4.78	—	6.39	4.66	1.01	806	327	sparging
WP-16	DRY	—	—	—	—	—	—	
WP-17	DRY	—	—	—	—	—	—	
WP-18	4.82	—	6.03	7.79	2.45	163	344	
WP-19	3.80	—	6.35	4.92	1.70	259	336	
WP-20	4.97	—	6.46	4.9	5.56	503	330	

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EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel:	Date:	Time:
Weather:	Equipment:	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°F)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Comments
MW-J	7.86	—	6.13	5.09	10.87	250	302	Sparging
MW-44	Rock	Frozen						

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EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC, MDC		Date: 1/24/97	Time:
Weather: 10°, windy		Equipment: hydrolab, interface probe	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°F)	Dissolved Oxygen (mg/L)	Conductivity (µhmos)	Redox (mV)	Comments
WP-1	4.75	—	6.02	4.81	2.61	0.381	110	*
WP-2	5.75	—	5.90	3.55	2.12	0.1307	79	
WP-3	4.20	—	5.58	4.39	1.89	0.489	292	
WP-4	6.05	5.68	—	—	—	—	—	
WP-5	5.55	—	6.11	4.54	3.16	0.0935	166	
WP-6	4.61	—	6.00	3.94	1.62	0.0969	304	
WP-7	5.50	5.30	—	—	—	—	—	
WP-8	5.12	—	6.17	3.22	7.12	0.403	327	
WP-9	6.73	—	5.83	2.92	8.75	0.244	335	
WP-10	5.78	—	4.44	4.92	1.53	0.0901	416	
WP-11	5.30	—	5.09	3.89	1.22	0.149	359	
WP-12	7.25	—	insufficient water					
WP-13	5.99	—	5.45	2.43	11.70	0.1014	343	
WP-14	6.31	—	4.90	3.27	2.96	0.1001	404	
WP-15	5.97	—	4.74	3.07	2.68	0.0730	407	
WP-16	dry at 7.90		—	—	—	—	—	
WP-17	Frozen - ice on inside of PVC casing					Could not get the equipment in the well		
WP-18	dry at 6.70		—	—	—	—	—	
WP-19	5.19	—	4.60	2.38	2.16	0.211	431	
WP-20	5.63	—	5.06	1.36	4.98	0.0583	475	

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equipment repeatably Froze up.

* had to break through ice in well point w/hydrolab

EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel:	Date: 1/24/97	Time:
Weather:	Equipment:	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°F)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Comments
MW-211	7.15	—	5.35	5.04	6.98	0.177	343	*
MW-44	3.20	—	5.79	3.37	1.38	0.0898	124	
MW-61A	5.29	—	6.36	4.72	1.12	0.167	111	
MW-56A	**							

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* very strong hydrocarbon odor, well paint is actively sparging

** Unable to gauge well. As soon as you open the well, water surges out of it.

EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: MDC	Date: 2/4/97	Time:
Weather: 25° Sunny	Equipment: Hydrolab interface probe	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°F)	Dissolved Oxygen (mg/L)	Conductivity (µhmos)	Redox (mV)	Comments
WP-1	4.47	—	6.2	.7	4.52	.373	78	
WP-2	5.58	—	6.2	2.7	2.7	.1252	82	
WP-3	4.15		5.5	3.1	.94	.0544	256	
WP-4	5.70	—	6.0	3.6	4.20	.194	160	
WP-5	5.66	—	5.8	4.6	2.50	.0955	98	
WP-6	4.60	—	5.7	3.7	2.25	.1217	250	
WP-7	Frozen at 2.65							
WP-8	5.02	—	6.5	3.1	1.81	.367	179	
WP-9	Dry	7.42						
WP-10	5.87	—	5.4	5.9	1.26	.1004	298	
WP-11	5.23	ice about 2'						
WP-12	Dry	at 7.55						
WP-13	6.18	ice in well						
WP-14	6.43	—	6.2	3.3	3.71	.1194	267	
WP-15	6.14	Blocked By Ice						
WP-16	Dry	at 7.88						
WP-17	Dry							
WP-18	Dry							
WP-19	5.47	—	6.2	5.1	2.53	.228	311	
WP-20	6.17	—	6.5	5.2	3.87	.436	277	

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FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel:	Date:	Time:
Weather:	Equipment:	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°F)	Dissolved Oxygen (mg/L)	Conductivity (µhmos)	Redox (mV)	Comments
MW211J	4.11	~~ice~~	in	well				
61A	Frozen	at 4.22						
44	3.05	~	6.2	4.8	1.67	.0915	55	
Frozen	1.70							

EA 5120 0794-7

MW 211 J PID 580, Sparging

EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC, MDC	Date: 2/28/97	Time: 2/28
Weather: overcast, 40°	Equipment: Solinst Interface meter, Hydrolab	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°F) C	Dissolved Oxygen (mg/L)	Conductivity (µhmos)	Redox (mV)	Comments
WP-1	~~sample~~			Frozen at ground level in pvc pipe				
WP-2	5.39	—		2.44	5.78	134.5		
WP-3	Frozen in pvc well pipe							
WP-4	5.45	—		3.00	4.75	186		
WP-5	5.40	—		4.07	2.21	99.4		
WP-6	4.35	—		3.52	3.08	118.7		
WP-7	Frozen ~~[illegible]~~ in pvc well pipe at ground level							
WP-8	4.60	—		2.29	9.14	416		actively sparging
WP-9	DRY	—						
WP-10	5.28	—		5.42	2.68	148		
WP-11	Frozen in pvc well pipe at ground level							
WP-12	7.13	—		1.76	8.83	116.0		
WP-13	6.08	—		2.46	9.51	125.0		
WP-14	5.92	—		3.27	6.52	108.0		
WP-15	6.25	—		3.70	12.14	122.5		actively sparging
WP-16	Frozen inside pvc pipe at ground level							positive pressure
WP-17	DRY							positive pressure
WP-18	5.76	—		4.54	8.29	125.9		
WP-19	5.05	—		3.70	6.05	213		
WP-20	~~[illegible]~~	—		~~[illegible]~~	~~[illegible]~~	~~[illegible]~~		
EA 5120 0794-7	4.95	—		1.70	9.84	304		

ph + redox probe not working

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FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC, MDC	Date: 3/3	Time:
Weather: Sunny, 35°	Equipment: Solinst Interface Meter, Hydrolab	

OTB	Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°F)	Dissolved Oxygen (mg/L)	Conductivity (µhmos)	Redox (mV)	Comments
	MW-211	6.62	—	5.75	4.19	8.21	150	418	sparging
	MW-213	5.00	—	5.93	4.10	10.12	38.3	458	
13	MW-51	3.98	—	7.10	2.24	5.80	64.1	428	
15	MW-46	4.75	—	5.68	6.98	7.28	143.0	541	
28	MW-47	10.30	—	10.32	8.05	8.54	355	302	
15	MW-49	5.62	—	6.08	6.24	1.35	76.6	368	
37	MW-50	6.58	—	8.16	6.66	12.80	301	398	
15	MW-58	6.08	—	6.20	6.19	5.42	39.2	410	
9	MW-43	Frozen at		3.20 Ft		—	—	—	
11.5	MW-56R	water gauges		from well					
36	MW-57	9.34	—	7.31	8.10	12.04	251	463	
14	MW-54	~~9.39~~ 6.02	—	6.10	5.88	8.28	131.3	420	
43	MW-55	5.51	—	7.65	7.66	8.61	236	371	
9	MW-61R	Frozen at		4.25 Ft		—	—	—	
14	MW-44	2.95	—	5.56	6.64	3.68	71.2	208	
57	MW-45	5.48	—	7.98	7.61	2.49	269	96	
15	MW-62	3.07	—	5.73	4.72	7.51	71.4	382	
50	MW-63	15.47	—	9.46	8.25	6.28	183	218	
	MW-91	13.65	—	6.02	6.47	4.71	65.2	489	

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EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC BDA	Date: 3/15/97	Time:
Weather: cold clear breezy	Equipment: interface / hydrolab	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°F)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Comments
WP-1	3.72	- Frozen						
WP-2	5.27		5.39	2.37	2.64	180	70	
WP-3	3.50	- Frozen						
WP-4	5.43		5.19	2.59	7.92	162	307	
WP-5	5.46		4.92	3.94	5.68	100.6	64	
WP-6	4.66		4.91	3.15	2.24	116.8	157	
WP-7	5.37	- pipe Bent		- No water quality		—		
WP-8	6.41		6.29	2.86	11.90	324	377	
WP-9	—	Dry						
WP-10	5.37		4.42	5.15	9.05	126.9	391	
WP-11	5.80		5.16	3.12	4.76	164	315	
WP-12		Dry						
WP-13	7.40	Dry						
WP-14	6.33		4.85	3.25	3.17	109.9	394	
WP-15	4.15		4.51	4.12	8.76	146.8	400	
WP-16	3.80	- Frozen						
WP-17	Dry							
WP-18	6.08		5.38	5.48	11.97	112.1	431	
WP-19	5.23		5.55	3.64	5.75	118.6	279	
WP-20	5.52		5.63	1.70	4.17	345	347	

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Sprayer not on due to equipment installation.

EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC / BDA		Date: 3/15/97	Time:
Weather: Cold Clear 2-4" Snow		Equipment: hydrolab / interface probe.	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°F)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Comments
MW-NASB 62	8.15		5.96	6.08	4.27	97.0	194	
MW-NASB 63	15.47		10.57	7.95	10.36	237.0	123	
MW-NASB 61R	4.25	Frozen	—	—	—	—	—	
MW-NASB 44	2.67		7.58	1.76	5.40	75.8	142	
MW-NASB 45	8.43		8.48	6.46	8.00	350	70	
MW-NASB 211	8.77		6.71	4.67	11.36	328	222	
MW-NASB 213	4.95		6.27	4.45	9.00	52.5	324	
MW-NASB 54	6.20		3.98	5.14	7.69	131.2	439	
MW-NASB 55	5.98		6.94	6.28	8.34	297	327	
MW-NASB 56R	1.5	Frozen	—	—	—	—	—	
MW-NASB 57	9.38		7.87	7.22	4.40	307	189	
MW-NASB 43	3.20	Frozen	—	—	—	—	—	
MW-NASB 91	13.81		4.85	6.85	7.62	90.3	397	
MW-NASB 51	3.80		5.62	3.60	5.69	82.5	376	
MW-NASB 46	4.70		5.36	3.67	8.20	162	407	
MW-NASB 47	10.25		11.90	6.70	13.38	451	190	
MW-NASB 49	5.61		6.84	4.90	1.74	102.7	285	
MW-NASB 50	6.50		7.84	5.57	11.63	369	318	
MW-NASB 58	8.02		6.42	6.29	4.28	47.8	342	
MW-NASB 205	6.75		7.91	2.78	5.02	54.9	267	

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EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SC, MC	Date: 3/27/97	Time: 1100
Weather: overcast, 35°, windy	Equipment: hydrolab, Solinst interface meter	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Riser	Bottom
WP-1	Frozen	-	—	—	—	—	—	3.01	8.23
WP-2	5.07	—	5.18	2.19		159	195	3.61	8.22
WP-3	3.40	—	Frozen at		3.50ft			2.81	7.51
WP-4	4.97	—	5.20	1.99		183	268	2.16	7.58
WP-5	5.20	—	4.82	3.57		120	202	2.41	7.74
WP-6	3.95	—	5.13	2.96		134	193	2.19	7.62
WP-7	4.15	—		Bent Casing		—	—	2.59	7.78
WP-8	4.20	—	5.61	2.20		368	350	2.35	7.54
WP-9	DRY	—	—	—	—	—	—	1.41	7.38
WP-10	4.92	—	4.44	4.89		132	354	1.35	7.96
WP-11	4.47	—	4.85	2.44		176	324	2.10	7.62
WP-12	6.94	—	4.98	2.69		109	256	2.39	7.80
WP-13	4.98	—	5.04	1.98		102	324	2.25	7.72
WP-14	5.57	—	4.81	3.10		161	344	2.21	7.97
WP-15	5.28	—	4.60	3.05		207	348	3.83	7.69
WP-16	Frozen	—	—	—	—	—	—	3.53	7.89
* WP-17	DRY	—	—	—	—	—	—	3.45	8.10
WP-18	5.31	—	5.73	4.57		194	287	1.97	6.62
WP-19	4.80	—	5.43	3.92		186	214	2.68	7.98
WP-20	4.37	—	5.49	1.70		299	289	3.70	7.70

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* positive pressure

EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SC, MC	Date: 3/27/97	Time: 1100
Weather: Overcast, 35°, windy	Equipment: hydrolab, Solinst interface meter	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Riser	Bottom
MW-NASB 091	13.90	—	6.19	5.85		102	360	3.50	20.65
MW-NASB 096	2.75	—	7.30	0.77		106	311	1.50	11.10
MW-NASB 051	3.50	—	7.92	1.68		96	275	1.80	16.10
MW-NASB 205	3.73	—	5.40	2.48		54	389	3.00	9.50
MW-NASB 046	4.38	—	5.23	3.55		203	407	1.10	15.30
MW-NASB 047	10.18	—	10.56	6.75		567	202	1.70	30.00
MW-NASB 049	5.30	—	5.81	3.75		104	355	2.10	12.30
MW-NASB 050	6.52	—	6.37	6.06		411	312	1.70	38.35
MW-NASB 058	7.90	—	5.39	5.60		55	392	1.90	16.30
MW-NASB 043	Frozen	—	—	—	—	—	—	2.60	6.25
MW-NASB 211	8.08	—	5.56	2.86		256	375	3.10	9.90
MW-NASB 213	4.74	—	5.49	2.24		50	382	2.35	11.58
MW-NASB 56R	Frozen	—	—	—	—	—	—	2.71	—
MW-NASB 057	9.12	—	7.16	6.77		351	166	1.81	38.58
MW-NASB 054	5.45	—	4.98	5.20		145	347	1.68	16.14
MW-NASB 055	7.65	—	5.74	5.78		331	340	1.58	41.61
MW-NASB 044	2.40	—	7.06	4.95		100	61	1.20	15.05
MW-NASB 045	8.45	—	7.75	6.64		394	34	2.00	59.49
MW-NASB 061R	Frozen	—	—	—	—	—	—	3.20	12.90
MW-NASB 062	8.00	—	5.24	6.19		108	226	1.70	16.80
MW-NASB 063	15.58	—	9.23	8.46		273	90	—	51.30

Comments:

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EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SYC, MDC	Date: 4/7/97	Time:
Weather: overcast 50°	Equipment: hydrolab Solinst interface meter	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Riser	Bottom
WP-1	3.40	—	5.53	2.17	5.32	165	238	3.01	8.23
WP-2	5.82	—	5.39	3.01	2.48	178	191	3.61	8.22
WP-3	3.22	—	4.86	1.24	4.72	39.5	333	2.81	7.51
WP-4	4.35	~~4.25~~	—	—	—	—	—	2.16	7.58
WP-5	4.85	—	4.82	4.59	4.50	80.1	235	2.41	7.74
WP-6	3.55	—	4.98	1.34	3.41	79.8	443	2.19	7.62
WP-7	3.92	—	bent casing			—	—	2.59	7.78
* WP-8	5.28	—	5.43	3.30	12.14	254	464	2.35	7.54
WP-9	8.09	—	insufficient water				—	1.41	7.38
WP-10	4.17	—	4.42	4.55	1.86	113	423	1.35	7.96
WP-11	4.16	—	5.26	2.10	2.22	157	420	2.10	7.62
WP-12	6.61	—	4.56	2.34	7.62	87.2	484	2.39	7.80
WP-13	4.88	—	5.11	2.78	10.62	52.7	468	2.25	7.72
WP-14	4.74	—	4.75	2.37	5.99	48.8	436	2.21	7.97
WP-15	4.26	—	4.59	2.44	5.46	109.7	469	3.83	7.69
WP-16	6.82	—	5.36	2.76	8.67	104.5	450	3.53	7.89
WP-17	Frozen 8.15	—	—	—	—	—	—	3.45	8.10
WP-18	4.89	—	5.31	4.42	8.10	60.7	408	1.97	6.62
WP-19	4.10	—	5.61	3.77	3.99	128.2	362	2.68	7.98
WP-20	5.89	—	5.72	3.67	6.87	254	512	3.70	7.70

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* sparging

EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SYC, MDC	Date: 4/7/97	Time:
Weather: overcast, 50°	Equipment: hydrolab, solinst interface meter	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (µhmos)	Redox (mV)	Riser	Bottom
MW-NASB 091	13.60	—	5.69	5.23	4.58	63.3	392	3.50	20.65
MW-NASB 096	3.05	—	6.64	2.09	9.12	82.3	380	1.50	11.10
MW-NASB 051	3.94	—	6.85	1.63	4.68	52.6	331	1.80	16.10
MW-NASB 205	3.78	—	7.26	3.03	5.86	48.4	273	3.00	9.50
MW-NASB 046	3.92	—	5.99	4.84	6.25	133.2	326	1.10	15.30
MW-NASB 047	9.79	—	10.56	6.29	6.09	467	191	1.70	30.00
MW-NASB 049	5.51	—	7.27	3.74	3.62	82.1	267	2.10	12.30
MW-NASB 050	6.22	—	7.13	5.47	5.18	300	266	1.70	38.35
MW-NASB 058	5.82	—	8.13	5.37	3.20	40.4	226	1.90	16.30
MW-NASB 043	6.06	—	blocked at 6.21				—	2.60	6.25
MW-NASB 211	6.51	—	4.99	3.32	9.82	197	445	3.10	9.90
MW-NASB 213	4.50	—	5.03	4.64	7.83	36	475	2.35	11.58
MW-NASB 056R	unable to gauge - water surging from well								
MW-NASB 057	8.75	—	6.40	6.01	3.91	242	300	1.81	38.58
MW-NASB 054	5.18	—	3.91	3.01	7.12	108.1	423	1.68	16.14
MW-NASB 055	5.17	—	5.66	4.96	1.89	239	354	1.58	41.61
MW-NASB 044	2.31	—	4.88	1.32	2.48	52.7	402	1.20	15.05
MW-NASB 045	8.08	—	7.67	9.40	4.12	271	270	2.00	59.49
MW-NASB 061R	4.00	—	5.99	1.20	3.93	58.4	325	3.20	12.90

Comments: water bubbling out of ground in vicinity of MW-56R.

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MW-NASB 062	7.99	—	5.14	6.03	1.86	72.1	242	16.80
MW-NASB 063	15.27	—	5.65	4.77	10.78	1.2	228	51.30
MW-NASB 59	1.48	—	6.43	4.72	9.10	50.0	310	8.71 8.75

EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SYC, BDA	Date: 4/30/97	Time:
Weather: Sunny, windy, 47°	Equipment: hydrolab, Solinst interface meter	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Riser	Bottom
WP-1	3.62	—	5.77	6.42	2.17	236	69	3.01	8.23
WP-2	4.68	—	5.95	7.16	1.02	125.7	104	3.61	8.22
WP-3	2.98	—	5.33	7.89	5.48	42.0	438	2.81	7.51
WP-4	3.67	3.54	—	—	—	—	—	2.16	7.58
WP-5	4.87	—	5.08	5.10	6.30	75.9	327	2.41	7.74
WP-6	3.32	—	6.89	5.15	4.87	40.1	412	2.19	7.62
WP-7	3.64	—	Dent riser			—	—	2.59	7.78
WP-8	4.00	—	6.67	6.44	9.52	276	346	2.35	7.54
WP-9	4.22	—	6.28	6.14	6.05	142.3	370	1.41	7.38
WP-10	4.25	—	4.80	5.05	3.12	73.1	403	1.35	7.96
WP-11	4.05	—	5.63	6.54	2.16	105.2	385	2.10	7.62
WP-12	5.10	—	5.60	6.67	4.53	1234	406	2.39	7.80
WP-13	3.49	—	6.07	7.69	8.15	65.1	384	2.25	7.72
WP-14	4.98	—	5.55	5.45	1.81	66.2	361	2.21	7.97
WP-15	4.15	—	5.58	7.51	7.78	56.0	384	3.83	7.69
WP-16	5.90	—	6.11	7.18	6.86	90.2	378	3.53	7.89
WP-17	7.04	—	6.16	6.62	9.31	75.2	384	3.45	8.10
WP-18	5.23	—	6.04	7.10	4.00	86.1	344	1.97	6.62
WP-19	3.67	—	5.92	8.07	4.52	173	386	2.68	7.98
WP-20	4.00	—	5.96	6.67	3.92	229	393	3.70	7.70

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EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SYC, MDC	Date: 4/30/97	Time:
Weather: overcast, rainy	Equipment: hydrolab, Solinst interface meter	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Riser	Bottom
MW-NASB 091	12.91	—	5.37	5.71	4.58	57.5	407	3.50	20.65
MW-NASB 096	2.75	—	5.81	5.00	5.96	58.9	401	1.50	11.10
MW-NASB 051	3.71	—	6.82	6.11	5.01	49.6	360	1.80	16.10
MW-NASB 205	6.76	—	7.22	6.75	5.10	62.6	335	3.00	9.50
MW-NASB 046	3.50	—	6.81	4.45	7.35	121.7	337	1.10	15.30
MW-NASB 077	8.92	—	10.91	5.55	5.01	574	183	1.70	30.00
MW-NASB 049	5.26	—	8.66	5.00	2.14	84.1	217	2.10	12.30
MW-NASB 050	5.48	—	8.06	5.35	5.12	299	210	1.70	38.35
MW-NASB 058	7.75	—	7.80	6.18	2.60	42.5	260	1.90	16.30
MW-NASB 043	5.57	—	7.58	6.62	6.20	40.2	283	2.60	6.25
MW-NASB 211	5.14	—	5.64	6.57	10.28	162	404	3.10	9.90
MW-NASB 213	3.98	—	6.17	8.23	6.61	33.5	393	2.35	11.58
MW-NASB 054	4.70	—	4.72	4.30	4.41	106.3	426	1.68	16.14
MW-NASB 055	4.72	—	6.56	5.23	2.02	245	339	1.58	41.61
MW-NASB 056R	sparing		—	—	—	—	—	—	—
MW-NASB 057	7.31	—	4.92	6.79	4.31	249	395	1.81	38.58
MW-NASB 044	2.16	—	5.22	6.49	3.28	54.6	434	1.20	15.05
MW-NASB 045	7.11	—	7.37	6.42	1.44	279	325	2.00	59.49
MW-NASB 061R	3.57	—	6.30	8.12	3.21	73.6	291	3.20	12.90

Comments:

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MW-NASB 062	7.94	—	7.09	7.38	2.99	73.4	190	1.70	16.80
MW-NASB 063	14.70	—	9.36	7.54	7.17	189	90	-	51.30
MW-NASB 59	1.35	—	8.09	8.36	8.23	4.4	255	0.2	8.71

EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SYC, CEM	Date: 5/15/97	Time:
Weather: Sunny, 50°	Equipment: hydrolab, Solinst interface meter	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Riser	Bottom
WP-1	3.61	—	5.48	7.59	0.65	297	390	3.01	8.23
WP-2	4.73	—	5.37	8.18	2.61	218	82	3.61	8.22
WP-3	3.13	—	5.67	7.17	2.05	51.4	335	2.81	7.51
WP-4	3.82	—	5.45	9.30	2.73	149.5	238	2.16	7.58
WP-5	4.86	—	5.06	7.18	0.75	76.7	354	2.41	7.74
WP-6	3.51	—	5.21	6.64	1.47	60.1	120	2.19	7.62
WP-7	3.88	—	—	Bent nser		—	—	2.59	7.78
WP-8	4.35	—	6.08	7.76	9.12	259	392	2.35	7.54
WP-9	4.72	—	6.38	7.86	3.50	141.8	431	1.41	7.38
WP-10	4.23	—	4.67	6.72	2.28	80.7	427	1.35	7.96
WP-11	4.32	—	5.62	8.23	1.20	136.2	293	2.10	7.62
WP-12	5.78	—	4.91	7.90	1.81	81.2	265	2.39	7.80
WP-13	4.38	—	5.11	8.17	7.61	80.2	505	2.25	7.72
WP-14	5.01	—	5.44	7.92	2.29	68.9	513	2.21	7.97
WP-15	4.70	—	4.79	8.10	7.17	75.9	182	3.83	7.69
WP-16	6.93	—	5.83	8.56	2.86	138.2	242	3.53	7.89
WP-17	7.70	—	insufficient water					3.45	8.10
WP-18	6.14	—	insufficient water					1.97	6.62
WP-19	4.21	—	4.89	8.23	1.90	148	432	2.68	7.98
WP-20	5.80	—	5.81	8.54	4.08	367	388	3.70	7.70

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EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SC, CM	Date: 5/15/97	Time:
Weather: Sunny, 50°	Equipment: hydrolab, Solinst interFacemeter	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Riser	Bottom
MW-NASB 91	13.10	—	6.71	6.08	4.38	56.7	524	3.50	20.65
MW-NASB 96	3.04	—	6.29	5.71	5.09	70.7	411	1.50	11.10
MW-NASB 051	3.82	—	5.31	6.56	8.96	54.6	355	1.80	16.10
MW-NASB 205	6.77	—	7.01	6.52	4.10	52.2	497	3.00	9.50
MW-NASB 046	4.02	—	5.71	5.95	3.21	146.9	610	1.00	15.30
MW-NASB 047	9.15	—	9.28	7.11	5.91	646	260	1.70	30.00
MW-NASB 049	5.42	—	6.12	6.21	3.16	178	321	2.10	12.30
MW-NASB 050	5.67	—	6.81	8.17	5.22	301	297	1.70	38.35
MW-NASB 058	5.86	—	8.29	7.17	8.31	44.4	331	1.90	16.30
MW-NASB 043	6.06	—	insufficient	water		—	—	2.60	6.25
MW-NASB 211	5.72	—	5.47	7.99	9.59	120.3	402	3.10	9.90
MW-NASB 213	4.36	—	5.28	8.04	5.07	53.8	426	2.35	11.58
MW-NASB 054	5.39	—	6.50	6.49	3.18	229	203	1.68	16.14
MW-NASB 055	5.24	—	6.88	6.79	2.99	247	209	1.58	41.61
MW-NASB 056R	actively sparging			—				2.71	—
MW-NASB 057	7.64	—	6.82	7.07	1.86	257	423	1.81	38.58
MW-NASB 044	2.21	—	5.28	6.79	2.55	100.0	394	1.20	15.05
MW-NASB 045	7.28	—	7.21	7.20	2.43	286	199	2.00	59.49
MW-NASB 061R	4.03	—	6.94	10.23	4.61	86.8	331	3.20	12.90
MW-NASB 062	8.08	—	5.61	6.75	3.25	111.7	293	1.70	16.80
MW-NASB 063	14.79	—	7.12	7.58	7.83	191	121	—	51.30
MW-NASB 059	1.44	—	5.06	8.50	4.01	67.2	425	0.2	8.71

Comments:

EA 5120 0794-7

EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SC, MC	Date: 5/30/97	Time:
Weather: ~~overcast~~ overcast, 50°	Equipment: hydrolab, Solinst interface meter	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Riser	Bottom
WP-1	4.16	—	5.63	8.54	1.47	299	51	3.01	8.23
WP-2	5.27	—	5.67	9.51	2.82	111.4	57	3.61	8.22
WP-3	3.71	—	5.23	8.32	1.80	44.7	383	2.81	7.51
WP-4	5.04	4.96	—	—	—	—	—	2.16	7.58
WP-5	5.26	—	5.18	8.35	1.67	74.2	108	2.41	7.74
WP-6	4.14	—	5.42	7.87	1.73	87.1	212	2.19	7.62
WP-7	4.59	—	bent casing			—	—	2.59	7.78
WP-8	5.03	—	6.56	9.95	4.42	315	342	2.35	7.54
WP-9	5.46	—	5.68	9.48	3.65	151	380	1.41	7.38
WP-10	5.01	—	4.51	7.72	2.28	80.3	337	1.35	7.96
WP-11	4.91	—	5.44	8.76	3.62	147.7	161	2.10	7.62
WP-12	6.51	—	5.09	8.84	2.32	84.6	181	2.39	7.80
WP-13	4.99	—	5.45	9.71	7.64	78.7	34	2.25	7.72
WP-14	5.74	—	5.21	8.84	2.39	75.8	363	2.21	7.97
WP-15	5.43	—	5.04	9.23	2.84	78.7	351	3.83	7.69
WP-16	7.42	—	insufficient water					3.53	7.89
WP-17	dry	—	—	—	—	—	—	3.45	8.10
WP-18	5.79	—	6.24	10.63	1.39	146.4	328	1.97	6.62
WP-19	4.83	—	5.86	9.58	1.28	179	338	2.68	7.98
WP-20	5.51	—	5.91	10.20	2.51	437	418	3.70	7.70

EA 5120 0794-7

EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SYC	Date: 5/30/97	Time:
Weather: overcast, 50	Equipment: hydrolab, Solinst interface meter	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Riser	Bottom
91	13.49	—		bont casing				3.50	20.65
96	3.55	—	5.31	6.24	4.89	60.6	404	1.50	11.10
51	4.17	—	5.98	6.59	1.61	75.4	341	1.80	16.10
205	6.87	—	6.34	8.05	2.21	45.4	306	3.00	9.50
46	5.48	—	6.91	7.03	1.36	168	314	1.10	15.30
47	9.56	—	11.13	7.45	4.76	653	193	1.70	30.00
49	5.69	—	6.98	6.66	2.06	106.2	172	2.10	12.30
50	6.01	—	7.74	7.26	4.21	306	208	1.70	38.35
58	5.97	—	6.89	7.59	1.06	51.7	49	1.90	16.30
43	dry 6.3	—						2.60	6.25
211	6.54	—	5.51	9.17	6.12	79.6	338	3.10	9.90
213	4.92	—	5.33	9.84	5.96	42.8	384	2.35	11.58
56R	obstructed at		1.5 Ft	tried to	removed	blockage	unable to		—
57	5.21	—	6.91	8.64	2.61	256	276	1.81	38.58
54	6.03	—	4.17	7.15	1.21	136.3	461	1.68	16.14
55	5.84	—	7.09	7.46	1.41	254	317	1.58	41.61
44	2.71	—	5.34	8.45	2.86	73.8	77	1.20	15.05
45	7.73	—	7.70	8.15	2.49	294	13	2.00	59.49
61R	4.65	—	5.58	8.74	1.42	132.7	41	3.20	12.90
62	8.31	—	5.01	6.41	1.08	82.9	161	1.70	16.80
63	15.15	—	9.02	7.48	5.94	188	87	—	51.30
59	1.82	—	5.39	13.34	1.18	80.8	230	-0.2	8.71

Comments:

EA 5120 0794-7

EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SC	Date: 6/6/97	Time:
Weather: Sunny, 75	Equipment: hydrolab, interfacometer	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Riser	Bottom
WP-1	4.47		5.58	9.28	1.68	2 78	128	3.01	8.23
WP-2	5.49		5.47	10.11	2.71	168	68	3.61	8.22
WP-3	3.96		5.32	8.89	2.10	48.8	312	2.81	7.51
WP-4	5.36		5.61	9.87	2.12	176	251	2.16	7.58
WP-5	~~5.94~~ 5.44		5.28	8.91	1.21	72.1	216	2.41	~~[illegible]~~ 7.74 ~~7.88~~
WP-6	4.36		5.61	8.32	1.65	76.1	186	2.19	7.62
WP-7	4.82		bent riser					2.59	7.78
WP-8	5.22		6.28	10.36	4.68	287	368	2.35	7.54
WP-9	5.91		5.52	9.96	3.81	163	343	1.41	7.38
WP-10	5.36		4.78	8.32	2.39	76.5	374	1.35	7.96
WP-11	5.12		5.56	9.22	2.94	134.6	198	2.10	7.62
WP-12	6.85		5.21	9.45	2.12	838	236	2.39	7.80
WP-13	5.48		5.48	10.12	7.71	75.2	386	2.25	7.72
WP-14	6.02		5.31	9.06	2.24	71.9	394	2.21	7.97
WP-15	5.71		5.12	9.68	2.96	81.2	316	3.83	7.69
WP-16	7.86			insufficient water				3.53	7.89
WP-17	dry			—	—	—	—	3.45	8.10
WP-18	6.09			insufficient water				1.97	6.62
WP-19	5.11		5.76	9.96	1.38	169	352	2.68	7.98
WP-20	5.87		5.94	10.36	2.89	399	401	3.70	7.70

EA 5120 0794-7

EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SYC	Date: 6/6/97	Time:
Weather: Sunny 75°	Equipment: hydrolab, interface meter	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Riser	Bottom
91	13.75		6.65	6.21	4.24	56.4	444	3.50	20.65
96	3.85		5.38	6.39	4.28	68.4	408	1.50	11.10
51	4.47		5.81	7.01	3.12	78.2	321	1.80	16.10
205	7.05		6.68	8.46	2.61	48.6	341	3.00	9.50
46	4.80		6.42	7.68	2.16	176	412	1.10	15.30
47	9.89		10.38	7.71	4.89	638	212	1.7	30.00
49	5.79		6.68	7.12	2.32	112.4	208	2.10	12.30
50	6.28		7.56	7.68	4.63	328	264	1.70	38.35
58	6.07		6.48	7.99	2.38	68.2	184	1.90	16.30
43	dry		—	—	—	—	—	2.60	6.25
211	6.87		5.62	9.34	6.01	84.3	376	3.10	9.90
213	5.32		5.42	9.96	5.46	64.5	396	2.35	11.58
56R	blocked		—	—	—	—	—	2.71	—
57	8.61		6.89	9.04	2.21	268	316	1.81	38.58
54	8.35		5.12	7.61	2.12	169	381	1.68	16.14
55	6.12		6.96	7.91	1.89	264	289	2.58	41.61
44	2.95		5.36	8.84	2.61	76.9	108	1.2	15.05
45	8.07		7.52	8.68	2.39	276	67	2.0	59.49
61R	4.92		5.86	9.04	2.84	144.1	196	3.2	12.90
62	8.57		5.26	7.06	2.16	86.5	194	1.70	16.80
63	15.46		8.94	7.82	5.84	189	108		51.30
59	1.95		5.44	10.84	2.31	74.6	312	0.2	8.71

Comments:

EA 5120 0794-7

EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SYC, MDC	Date: 6/23/97	Time:
Weather: Sunny, 80	Equipment: hydrolab, interface probe	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Riser	Bottom
WP-1	4.80	—	5.70	11.86	2.84	429	118	3.01	8.23
WP-2	5.78	—	5.37	13.06	3.28	119.1	147	3.61	8.22
WP-3	4.50	—	5.23	14.13	2.85	60.3	367	2.81	7.51
WP-4	6.02	—	5.64	13.95	1.25	242	157	2.16	7.58
WP-5	5.62	—	5.36	12.14	5.78	109.4	162	2.41	7.74
WP-6	4.65	—	5.08	11.51	2.12	137.6	175	2.19	7.62
WP-7	4.88	—	—	bent casing			—	2.59	7.78
WP-8	4.92	—	6.01	14.32	5.81	412	238	2.35	7.54
WP-9	6.92	—	insufficient water					1.41	7.38
WP-10	5.76	—	4.74	10.59	1.21	112.6	331	1.35	7.96
WP-11	4.95	—	5.23	12.43	2.46	156	183	2.10	7.62
WP-12	dry	—	—	—	—	—	—	2.39	7.80
WP-13	6.34	—	6.18	14.68	5.64	124.8	295	2.25	7.72
WP-14	6.35	—	5.43	16.62	1.31	156	251	2.21	7.97
WP-15	5.90	—	4.85	13.37	7.22	128.2	356	3.83	7.69
WP-16	dry	—	—	—	—	—	—	3.53	7.89
WP-17	dry	—	—	—	—	—	—	3.45	8.10
WP-18	dry	—	—	—	—	—	—	1.97	6.62
WP-19	5.40	—	5.46	13.75	1.68	249	261	2.68	7.98
WP-20	6.40	—	5.90	13.41	2.41	843	288	3.70	7.70

EA 5120 0794-7

EA Engineering, Science, and Technology

FIELD RECORD OF WATER QUALITY PARAMETER ANALYSIS

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: CJV, SYC	Date: 6/23/97	Time: 1315
Weather: Sunny, 80	Equipment: interface probe, hydrolab	

Location	Depth to Water (ft)	Depth to Product (ft)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (μhmos)	Redox (mV)	Riser	Bottom
43	DRY		—	—	—	—	—	2.60	6.25
44	3.41		6.12	8.36	0.18	122.3	132	1.20	15.05
45	8.74		8.28	9.76	0.33	391	24	2.00	59.49
46	5.34		5.83	8.28	0.28	255	344	1.10	15.30
47	10.46		11.54	8.52	3.67	919	143	1.70	30.00
49	6.04		6.86	7.92	0.42	222	150	2.10	12.30
50	6.72		7.68	8.82	2.52	403	168	1.70	38.35
51	5.32		5.97	10.10	2.13	74.7	357	1.80	16.10
54	6.75		5.38	8.73	0.87	268	277	1.68	16.14
55	6.51		6.89	8.36	0.86	333	211	1.58	41.61
56R	active sparging		4.68	9.92	Sat	420	446	2.71	—
57	9.37		6.45	8.46	0.72	339	350	1.81	38.58
58	6.24		8.01	8.36	0.54	74.3	33	1.90	16.30
59	2.16		5.61	13.70	0.25	124.4	145	-0.2	8.71
61R	5.29		6.28	10.95	0.64	174.0	92	3.20	12.90
62	9.32		5.36	8.74	2.99	105.8	352	1.70	16.80
63	15.90		9.13	8.04	7.95	253	110		51.30
91	14.28		5.25	7.74	5.29	92.9	412	3.50	20.65
96	4.66		5.06	7.43	4.94	81.5	459	1.50	1.10
205	7.74		5.76	10.94	1.62	54.8	332	3.00	9.50
211	7.41		4.58	13.46	8.88	1.6	371	3.10	9.90
213	6.21		5.37	10.22	3.77	58.5	345	2.35	11.58

Comments:

EA 5120 0794-7

Appendix B

Field Record of Biosparging Well Point Monitoring Forms

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

FIELD RECORD OF BIOSPARGING WELL POINT MONITORING
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC MDC	Date: 1/3/97	Time:
Weather: Snow, Sleet, 30°F	Instrument(s):	

Location	FID TVH (ppm$_v$)	PID TVH (ppm$_v$)	Other	Other	Comments
WP-1					
WP-2					
WP-3					
WP-4					
WP-5					
WP-6					
WP-7					
WP-8					
WP-9					
WP-10					
WP-11					
WP-12					
WP-13					
WP-14					
WP-15					
WP-16					
WP-17					
WP-18					
WP-19					
WP-20					

EA 5120 0794-4

Tess - NO - DATA -

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

FIELD RECORD OF BIOSPARGING WELL POINT MONITORING
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel:	Date: 1/24/97	Time:
Weather:	Instrument(s): MiniRae	

Location	FID TVH (ppm$_v$)	PID TVH (ppm$_v$)	Other	Other	Comments
WP-1		*			
WP-2		*			
WP-3		*			
WP-4		160			
WP-5		*			
WP-6		*			
WP-7		530			
WP-8		15			
WP-9		5			
WP-10		6			
WP-11		440			
WP-12		481			
WP-13		453			
WP-14		92			
WP-15		25			
WP-16		105			
WP-17		0.0			
WP-18		0.0			
WP-19		3			
WP-20		0.0			

EA 5120 0794-4

* Due to low temperature, batteries in the MiniRae died and we were unable to collect the information.

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

FIELD RECORD OF BIOSPARGING WELL POINT MONITORING
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: MDC	Date: 2/4/97	Time:
Weather: 25° Sunny	Instrument(s): mini-RAE	

Location	FID TVH (ppm$_v$)	PID TVH (ppm$_v$)	Other	Other	Comments
WP-1		14.2			
WP-2		375			
WP-3		135			
WP-4		245			
WP-5		71			
WP-6		308			
WP-7		660			
WP-8		70			
WP-9		.9			
WP-10		49.9			
WP-11		402			
WP-12		582			
WP-13		520			
WP-14		4.7			
WP-15		2.3			
WP-16		2.7			
WP-17		1.0			Positive Pressure
WP-18		1.0			
WP-19		39.6			
WP-20		1.5			

EA 5120 0794-4

TVA acting up used mini RAE so we have no FID numbers

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

FIELD RECORD OF BIOSPARGING WELL POINT MONITORING
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC MDC	Date: 2/26/97	Time:
Weather: overcast, windy, 35°	Instrument(s): TVA-1000	

Location	FID TVH (ppm$_v$)	PID TVH (ppm$_v$)	Other	Other	Comments
WP-1	11.6	4.2			
WP-2	1650	280			
WP-3	266	59.8			
WP-4	550	122			
WP-5	240	25.8			
WP-6	61.3	13.1			
WP-7	1580	330			
WP-8	728	11.2			
WP-9	130	27.8			
WP-10	6.0	1.6			
WP-11	2020	290			
WP-12	4000	390			
WP-13	2040	260			
WP-14	32.2	7.7			
WP-15	8.1	2.2			
WP-16	243	50			
WP-17	0.0	0.0			
WP-18	0.0	0.0			
WP-19	2.0	0.0			
WP-20	0.0	0.0			

EA 5120 0794-4

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

FIELD RECORD OF BIOSPARGING WELL POINT MONITORING

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SC, BDA	Date: 3/15/97	Time:
Weather: clear, sunny, windy	Instrument(s): TVA 1000,	

Location	FID TVH (ppm_v)	PID TVH (ppm_v)	Other	Other	Comments
WP-1	11.0	7.2			
WP-2	4580	481			
WP-3	250	70.2			
WP-4	1080	259			
WP-5	130	72.7			
WP-6	620	100			
WP-7	3%	513			
WP-8	4.2	2.7			
WP-9	39.8	10.2			
WP-10	13.2	4.1			
WP-11	6000	440			
WP-12	208	60.4			
WP-13	630	190			
WP-14	1.2	1.3			
WP-15	0.0	0.0			
WP-16	3.8	2.4			
WP-17	0.0	0.0			
WP-18	0.0	0.0			
WP-19	9.8	1.5			
WP-20	0.0	0.0			

EA 5120 0794-4

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

FIELD RECORD OF BIOSPARGING WELL POINT MONITORING
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC, MOC	Date: 3/27/97	Time: 0830
Weather: Sunny, 35°, windy	Instrument(s): TVA-1000	

Location	FID TVH (ppm$_v$)	PID TVH (ppm$_v$)	Other	Other	Comments
WP-1	0	0			
WP-2	1600	300			
WP-3	80	20			
WP-4	200	23			
WP-5	70	20			
WP-6	25	6			
WP-7	2%	670			
WP-8	13	1			
WP-9	41	9			
WP-10	26.2	5.0			
WP-11	1700	330			
WP-12	699	100			
WP-13	1250	215			
WP-14	20.1	3.7			
WP-15	36.0	6.7			
WP-16	0.0	0.0			
WP-17	0.0	0.0			positive pressure
WP-18	0.0	0.0			
WP-19	11.2	1.5			
WP-20	0.0	0.0			

EA 5120 0794-4

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING WELL POINT MONITORING

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SYC, MDC	Date: 4/7/97	Time:
Weather: overcast, 50°	Instrument(s): TVA-1000	

Location	FID TVH (ppm_v)	PID TVH (ppm_v)	Other	Other	Comments
WP-1	0.9	0.0			
WP-2	847	225			
WP-3	8.8	0.6			
WP-4	265	70.1			
WP-5	1.8	0.0			
WP-6	18.0	2.5			
WP-7	5%	702			
WP-8	2.2	0.0			
WP-9	48.2	17.6			
WP-10	0.8	0.0			
WP-11	7.1	0.0			
WP-12	44.8	6.1			
WP-13	631	165			
WP-14	0.8	0.0			
WP-15	26.6	2.2			large hole ≈ 30 ft NW of well point. water bubbling in hole
WP-16	0.3	0.0			
WP-17	0.9	0.0			
WP-18	0.7	0.0			
WP-19	~~0.9~~ 2.1	0.0			
WP-20	1.1	0.0			

EA 5120 0794-4

hole - 40 ft south of WP-15 - can hear air

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING WELL POINT MONITORING

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SYC, BDA	Date: 4130197	Time:
Weather: Sunny, windy, 470°	Instrument(s): TVA-1000	

Location	FID TVH (ppm_v)	PID TVH (ppm_v)	Other	Other	Comments
WP-1	0.8	0.0			
WP-2	2340	286			
WP-3	599	17.1			
WP-4	2204	281			
WP-5	2.4	0.0			
WP-6	2.6	0.0			
WP-7	3210	370			
WP-8	6.8	0.0			
WP-9	3.4	0.0			
WP-10	0.6	0.0			
WP-11	21.0	0.0			
WP-12	32.1	3.6			
WP-13	3201	306			
WP-14	0.6	0.0			
WP-15	2.0	0.0			
WP-16	2.0	0.0			
WP-17	3.1	0.0			
WP-18	0.7	0.0			
WP-19	411	12.9			
WP-20	3.8	0			

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING WELL POINT MONITORING

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SC, CEM	Date: 5/15/97	Time:
Weather: Sunny, 50°	Instrument(s): TVA-1000	

Location	FID TVH (ppm_v)	PID TVH (ppm_v)	Other	Other	Comments
WP-1	4.2	0.4			
WP-2	1899	193			
WP-3	120	16.2			
WP-4	4703	335			
WP-5	26.2	1.8			
WP-6	2.0	0.5			
WP-7	20.0%	910			
WP-8	54.2	6.1			
WP-9	84.2	12.0			
WP-10	0.6	0.4			
WP-11	90.5	6.0			
WP-12	154	0.7			
WP-13	1.2%	483			
WP-14	2.3	0.4			
WP-15	0.4	0.0			
WP-16	0.0	0.0			
WP-17	10.3	0.0			
WP-18	1.4	0.4			
WP-19	1090	47			
WP-20	42.4	0.4			

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING WELL POINT MONITORING

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SYC	Date: 5/30/97	Time:
Weather: overcast, 50	Instrument(s): TVA-1000	

Location	FID TVH (ppm$_v$)	PID TVH (ppm$_v$)	Other	Other	Comments
WP-1	192	5.9			
WP-2	1.6%	121			
WP-3	2894	76.8			
WP-4	99.9%	86.4			
WP-5	1254.	28.9			
WP-6	232	8.1			
WP-7	10.7%	487			
WP-8	438	21.3			
WP-9	13.7	~~13~~ 75.9			
WP-10	4.3	10.8			
WP-11	1611	24.2			
WP-12	353	10.8			
WP-13	10.0%	538			
WP-14	7.6	3.8			
WP-15	277	13.8			
WP-16	0	5.8			
WP-17	0	~~3~~ 4.7			
WP-18	129	8.4			
WP-19	602	6.7			
WP-20	86.1	5.8			

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING WELL POINT MONITORING

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SYC	Date: 6/6/97	Time:
Weather: Sunny, 75°	Instrument(s):	

Location	FID TVH (ppm_v)	PID TVH (ppm_v)	Other	Other	Comments
WP-1	52.1	31.8			
WP-2	3906	269			
WP-3	311	85.2			
WP-4	1.6%	175.2			
WP-5	24.1	83.2			
WP-6	42.1	8.2			
WP-7	~~604~~ 18%	~~1.8%~~	604		
WP-8	27.8	18.1			
WP-9	1.4	31.6			
WP-10	0.0	46.1			
WP-11	13.2	52.6			
WP-12	33.5	33.1			
WP-13	4891	343			
WP-14	0.0	67.2			
WP-15	0.0	25.1			
WP-16	7.4	11.7			
WP-17	18.1	5.2			
WP-18	0.0	57.2			
WP-19	138	~~138~~ 52.1			
WP-20	3.3	28.9			

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING WELL POINT MONITORING

Biosparging System, Old Navy Fuel Farm, Naval Air Station, Brunswick Maine

EA Personnel: SYC, MOC	Date: 6/23/97	Time:
Weather: Sunny, 80	Instrument(s): TVA-1000, GA-90	

Location	FID TVH (ppm_v)	PID TVH (ppm_v)	CH_4	CO_2 %	O_2	%LEL	Comments
WP-1	11.0	0	0	0	21.3	0	
WP-2	1821	299	0.2	0	21.0	4.0	
WP-3	528	84.9	0	0.3	21.4	0	
WP-4	0	0	0	0	20.7	0	cap off
WP-5	5.8	8.9	0	1.0	20.3	0	
WP-6	77.2	149	0	0	21.2	0	
WP-7	18 ~~3342~~	~~7842~~ 342	3.2	0.3	20.7	70	
WP-8	0	0	0	0	20.7	0	cap off
WP-9	0	0	0	0	20.7	0	cap off
WP-10	13.2	20.1	0	1.7	20.6	0	
WP-11	0	0	0	0	20.7	0	cap off
WP-12	28.1	6.0	0	0	21.7	0	
WP-13	1369	35.2	0	0	21.7	0	
WP-14	9.3	34.2	0	1.9	19.9	0	
WP-15	13.9	5.9	0	1.2	20.7	0	
WP-16	3.4	46.2	0	0.8	20.5	0	
WP-17	2.8	3.2	0	0	20.5	0	
WP-18	4.6	2.7	0	2.2	19.9	0	
WP-19	109	56.2	0	0	21.5	0	
WP-20	2.7	100	0	1.6	20.2	0	

Appendix C

Field Record of Well Gauging, Purging, and Sampling Forms

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel farm	Project No.: 29600.35	Date: 6/25
EA Personnel: CJV, SC	Purge Method: isco, bailer	
Weather/Temperature/Barometric Pressure: Sunny, 90°		Time:

Well No. WP-1	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC
Well Volume Calculations	
A. Depth to Water (ft): 4.80	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 8.23	E. Total Well Volume (gal) [C*D]: 0.55
C. Water Column Height (ft): 3.43	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):

COMMENTS AND OBSERVATIONS: purged dry 6/24/97 ½gal

FF-03-WP001 845 BTEX, MTBE DRO GRO

FF-03-WPRB1 830

biosample WPA rinsebank 1310

biosample WPB 1310

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/25
EA Personnel: CJV, SC	Purge Method: ISCO, bailer	
Weather/Temperature/Barometric Pressure: Sunny, 90°		Time: 905

Well No. WP-2	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC
Well Volume Calculations	
A. Depth to Water (ft): 5.78	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 8.22	E. Total Well Volume (gal) [C*D]: 0.4
C. Water Column Height (ft): 2.44	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):

COMMENTS AND OBSERVATIONS: purged dry 6/24 0.6gal
Sheen on water

FF-03-WP002 915 BTEX, MTBE, DRO, GRO
WP-C 1328

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/25
EA Personnel: CJV, SC	Purge Method: ISCO, bailer	
Weather/Temperature/Barometric Pressure: Sunny, 90°		Time: 915

Well No. WP.3	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC
Well Volume Calculations	
A. Depth to Water (ft): 4.50	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 7.51	E. Total Well Volume (gal) [C*D]: 0.48
C. Water Column Height (ft): 3.01	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):

COMMENTS AND OBSERVATIONS: purged ~~dry~~ 2 volumes 6/24
1 gal
FF-03-WP003 MS/MSD 920 Sheen
WP-D 1330

BTEX, MTBE, DRO, GRO

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/25
EA Personnel: CJV, SC	Purge Method: 1500, bailer	
Weather/Temperature/Barometric Pressure: Sunn, 90°		Time: 940

Well No. WP-4	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC
Well Volume Calculations	
A. Depth to Water (ft): 6.02	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 7.62	E. Total Well Volume (gal) [C*D]: 0.26
C. Water Column Height (ft): 1.60	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):

COMMENTS AND OBSERVATIONS: purged dry 6/24 0.3 gal

FF-03-WP004 945 only 1 amber liter

purged dry while sampling

Sheen allowed to recharge

WP-E 1332

BTEX MTBE, DRO, GRO

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/25
EA Personnel: SC, CV	Purge Method: isco, bailer	
Weather/Temperature/Barometric Pressure: Sunny, 90°		Time:

Well No. WP5	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC

Well Volume Calculations

A. Depth to Water (ft): 5.62	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 7.74	E. Total Well Volume (gal) [C*D]: 0.34
C. Water Column Height (ft): 2.12	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):

COMMENTS AND OBSERVATIONS: purged dry 0.6 gals 6/25 AM

FF-03-WP-009 1055 BTEX, MTBE, DRO, GRO

WP-K 1352

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600 35	Date: 6/25
EA Personnel: SC, CV	Purge Method: ISCO bailer	
Weather/Temperature/Barometric Pressure: Sunny, 90°		Time:

Well No. WP-6	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC

Well Volume Calculations

A. Depth to Water (ft): 4.65	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 7.62	E. Total Well Volume (gal) [C*D]: 0.48
C. Water Column Height (ft): 2.97	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):

COMMENTS AND OBSERVATIONS: ~~purged dry~~ 2 volumes 6/25 AM

FF-03-WP008 1045 BTEX, MTBE, GRO, DRO

WP-J 1349 Slight Sheen

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600 35	Date: 6/25
EA Personnel: CV SC	Purge Method: ISCO, bailer	
Weather/Temperature/Barometric Pressure: Sunny, 90°		Time: 1034

Well No. WP-7	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC

Well Volume Calculations

A. Depth to Water (ft): 4.88	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 7.78	E. Total Well Volume (gal) [C*D]: 0.46
C. Water Column Height (ft): 2.90	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):

COMMENTS AND OBSERVATIONS: purged 2 volumes 6/25 1Pm 1gal

FF-03 - WP007 1035 BTEX MTBE

WPX01 DRO GRO

WP14 1343 Sheen

WP II 1345

EA-5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/25
EA Personnel: CJV, SC	Purge Method: ISCO, bailer	
Weather/Temperature/Barometric Pressure: sunny, 90°		Time: 1025

Well No. WP-8	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC

Well Volume Calculations

A. Depth to Water (ft): 4.92	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 7.54	E. Total Well Volume (gal) [C*D]: 0.42
C. Water Column Height (ft): 2.62	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):

COMMENTS AND OBSERVATIONS: purged dry 6/24 0.6991

FF-03-MW0016 1030 Sheen on water

WP-6 1338

BTEX MTBE

GRO DRO

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/25
EA Personnel: CV, SC	Purge Method: 15co, bailer	
Weather/Temperature/Barometric Pressure: Sunny, 900		Time: 950

Well No. WP-9	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC

Well Volume Calculations

A. Depth to Water (ft): 6.92	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 7.80	E. Total Well Volume (gal) [C*D]: 0.14
C. Water Column Height (ft): 0.88	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):

COMMENTS AND OBSERVATIONS: purged dry 6/24/97 0.2gal

FF-03-WP005 955 BTEX, MTBE, GRO

no amber liters

WP-F 1335

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/25
EA Personnel: CV, SC	Purge Method: Isco, bailer	
Weather/Temperature/Barometric Pressure: Sunny, 90°		Time: 1110

Well No. WP-10	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC

Well Volume Calculations

A. Depth to Water (ft): 5.76	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 7.96	E. Total Well Volume (gal) [C*D]: 0.35
C. Water Column Height (ft): 2.20	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):

COMMENTS AND OBSERVATIONS: purged dry 0.7 gal 6/25 AM

FF-03-WP010 1115 BTEX, MTBE DRO, GRO

WP-L 1355

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING ~~6/25/97~~

Project Name: Fuel Farm	Project No.: 29600.35.3696	Date: 6/26/97
EA Personnel: CJV, SC	Purge Method: ISCO, bailer	
Weather/Temperature/Barometric Pressure: Sunny, 90°		Time: 820

Well No. WP-11	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC

Well Volume Calculations

A. Depth to Water (ft): 4.95	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 7.62	E. Total Well Volume (gal) [C*D]: 0.43
C. Water Column Height (ft): 2.67	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):

COMMENTS AND OBSERVATIONS: ~~per~~ collected sample NASB-FF-03-WP011 at 825 for BTEX, MTBE DRO, GRO
purged 2 volumes 6/25/97 PM

6/26/97 Biosample WPM 1315
WPN 1320

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/25
EA Personnel: CJV, SC	Purge Method: NA	
Weather/Temperature/Barometric Pressure: Sunny, 90		Time:

Well No. WP-12	Well Condition:
Well Diameter: 2	Measurement Reference:
Well Volume Calculations	
A. Depth to Water (ft: dry	D. Well Volume/ft:
B. Total Well Depth (ft): 7.80	E. Total Well Volume (gal) [C*D]:
C. Water Column Height (ft): —	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)		DRY				
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal): _____

COMMENTS AND OBSERVATIONS: _____

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35.3696	Date: 6/26
EA Personnel: CJV, SC	Purge Method: 1500, bailer	
Weather/Temperature/Barometric Pressure: Sunny, 90°		Time: 830

Well No. WP-13	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC
Well Volume Calculations	
A. Depth to Water (ft): 6.34	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 7.72	E. Total Well Volume (gal) [C*D]: 0.22
C. Water Column Height (ft): 1.38	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):

COMMENTS AND OBSERVATIONS: purged dry 6/25/97 PM

NASB-FF-03-WP012 835 BTEX, MTBE, GRO, DRO

WP-0 1325 bosample lamber liter

Slight sheen

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35.3696	Date: 6/26
EA Personnel: CJV, SC	Purge Method: Isco, bailer	
Weather/Temperature/Barometric Pressure: sunny, 90°		Time:

Well No. WP-14	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC
Well Volume Calculations	
A. Depth to Water (ft): 6.35	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 7.97	E. Total Well Volume (gal) [C*D]: 0.26
C. Water Column Height (ft): 1.62	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):

COMMENTS AND OBSERVATIONS: purged dry 6/25 PM 0.3gal

NASB-FF-03-WP016 950 BTEX, MTBE, DRO, GRO

Bio Sample WP-S 1345

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35.3696	Date: 6/26
EA Personnel: SC, CJV	Purge Method: isco, bailer	
Weather/Temperature/Barometric Pressure: Sunny, 90°		Time:

Well No. WP-15	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC
Well Volume Calculations	
A. Depth to Water (ft): 5.90	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 7.69	E. Total Well Volume (gal) [C*D]: 0.29
C. Water Column Height (ft): 1.79	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):

COMMENTS AND OBSERVATIONS: purged dry 6/25/97 PM 0.3gal

FF-03-WP015 930 BTEX, GRO, DRO, MTBE

Biosample WP-R 1340

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/25
EA Personnel: SYC, CV	Purge Method: NA	
Weather/Temperature/Barometric Pressure: Sunny, 90°		Time:

Well No. WP-16	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC
Well Volume Calculations	
A. Depth to Water (ft: dry	D. Well Volume/ft:
B. Total Well Depth (ft): 7.89	E. Total Well Volume (gal) [C*D]:
C. Water Column Height (ft): —	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)		DRY				
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal): _____

COMMENTS AND OBSERVATIONS: _____

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.39	Date: 6/25
EA Personnel: CV, SC	Purge Method: NA	
Weather/Temperature/Barometric Pressure: Sunny, 90°		Time:

Well No. WP-17	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC

Well Volume Calculations

A. Depth to Water (ft: dry	D. Well Volume/ft:
B. Total Well Depth (ft): 8.10	E. Total Well Volume (gal) [C*D]:
C. Water Column Height (ft): —	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)			DRY			
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal): _____

COMMENTS AND OBSERVATIONS: _____

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/25
EA Personnel: SC, CV	Purge Method: NA	
Weather/Temperature/Barometric Pressure: Sunny, 90°		Time:

Well No. WP-18	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC
Well Volume Calculations	
A. Depth to Water (ft: dry	D. Well Volume/ft:
B. Total Well Depth (ft): 6.62	E. Total Well Volume (gal) [C*D]:
C. Water Column Height (ft): —	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)		DRY				
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal): _____

COMMENTS AND OBSERVATIONS: _____

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.39.3696	Date: 6/26
EA Personnel: SC, CJV	Purge Method: ISCO, bailer	
Weather/Temperature/Barometric Pressure: Sunny, 90°		Time:

Well No. WP-19	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC
Well Volume Calculations	
A. Depth to Water (ft): 5.40	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 7.98	E. Total Well Volume (gal) [C*D]: 0.41
C. Water Column Height (ft): 2.58	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):

COMMENTS AND OBSERVATIONS: purged 2 volumes 6/25 PM 0.8 gal

FF-03-WP014 925 BTEX, MTBE, GRO, DRO

bio sample WP-Q 1335

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35.3696	Date: 6/26
EA Personnel: CJV, SC	Purge Method: Isco, bailer	
Weather/Temperature/Barometric Pressure: Sunny, 90°		Time:

Well No. WP-20	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC
Well Volume Calculations	
A. Depth to Water (ft): 6.40	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 7.70	E. Total Well Volume (gal) [C*D]: 0.21
C. Water Column Height (ft): 1.30	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):
COMMENTS AND OBSERVATIONS: purged 2 vol 6/25/97 pm 0.4gal

NASB-FF-03-WP013 SSS BTEX, MTBE, GRO RDO

Biosample WP-P 1330

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/24
EA Personnel: CJV, SC	Purge Method: bailer	
Weather/Temperature/Barometric Pressure: Sunny, 80°		Time: 937

Well No. 44	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC
Well Volume Calculations	
A. Depth to Water (ft: 3.41	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 15.05	E. Total Well Volume (gal) [C*D]: 1.9
C. Water Column Height (ft): 11.64	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)	937	942	945	947		
Depth to Water (ft)	3.41	3.60	3.64	3.71		
Purge Rate (gpm)	—	0.4	0.7	1		
Volume Purged (gal)	—	2	4	6		
pH	6.12	5.50	5.46	5.46		
Temperature (°C)	8.36	13.22	12.94	12.86		
Conductivity (μmhos/cm)	122.3	56.0	55.0	58.7		
Dissolved Oxygen (mg/L)	0.18	2.32	2.49	2.50		
eH (mV)	132	218	221	218		

TOTAL QUANTITY OF WATER REMOVED (gal): 7

COMMENTS AND OBSERVATIONS: ~~MW~~ NASB-FF-03-MW004
950

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/24
EA Personnel: CJU, SC	Purge Method: bailer	
Weather/Temperature/Barometric Pressure: Sunny, 88°		Time: 1100

Well No. 49	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC

Well Volume Calculations

A. Depth to Water (ft: 6.04	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 12.30	E. Total Well Volume (gal) [C*D]: 1
C. Water Column Height (ft): 6.26	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)	1102	1105	1107	1109	1111	
Depth to Water (ft)	6.04	7.69	9.12	10.50	10.98	
Purge Rate (gpm)	—	0.3	0.5	0.5	0.5	
Volume Purged (gal)	—	1	2	3	4	
pH	6.86	5.77	5.93	6.04	6.17	
Temperature (°C)	7.92	11.18	10.41	10.84	10.62	
Conductivity (μmhos/cm)	222	107.7	130.9	137.6	140.1	
Dissolved Oxygen (mg/L)	0.42	1.73	1.86	1.74	1.78	
eH (mV)	150	147	156	148	143	

TOTAL QUANTITY OF WATER REMOVED (gal): 5

COMMENTS AND OBSERVATIONS: MW 008 1115

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/24
EA Personnel: CJU, SC	Purge Method: bailer	
Weather/Temperature/Barometric Pressure: Sunny, 80		Time: 1126

Well No. 51	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC

Well Volume Calculations

A. Depth to Water (ft: 5.32	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 16.10	E. Total Well Volume (gal) [C*D]: 1.7
C. Water Column Height (ft): 10.78	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)	1126	1129	1132	1135		
Depth to Water (ft)	5.32	5.51	5.78	6.02		
Purge Rate (gpm)	—	0.6	0.7	0.7		
Volume Purged (gal)	—	1.7	3.4	5.1		
pH	5.97	6.52	6.42	6.28		
Temperature (°C)	10.10	11.17	10.94	10.84		
Conductivity (μmhos/cm)	74.7	61.2	59.2	57.5		
Dissolved Oxygen (mg/L)	2.15	3.12	3.09	3.01		
eH (mV)	357	253	248	240		

TOTAL QUANTITY OF WATER REMOVED (gal): 6

COMMENTS AND OBSERVATIONS: MW009 1140

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/24
EA Personnel: CJV, SYC	Purge Method: bailer	
Weather/Temperature/Barometric Pressure: 80°, Sunny		Time: 815

Well No. 54	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC

Well Volume Calculations

A. Depth to Water (ft: 6.75	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 16.14	E. Total Well Volume (gal) [C*D]: 1.5
C. Water Column Height (ft): 9.39	F. Five Well Volumes (gal): 1

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)	815	819	822	824	826	
Depth to Water (ft)	6.75	6.98	7.02	6.96	6.91	
Purge Rate (gpm)	—	0.4	0.5	0.8	0.8	
Volume Purged (gal)	—	1.5	3.0	4.5	6.0	
pH	5.38	5.57	5.58	5.32	5.41	
Temperature (°C)	8.93	10.88	10.74	10.64	10.58	
Conductivity (μmhos/cm)	268	143.1	144.7	144.4	151	
Dissolved Oxygen (mg/L)	0.87	1.13	1.25	1.30	1.31	
eH (mV)	277	297	287	288	280	

TOTAL QUANTITY OF WATER REMOVED (gal): 7

COMMENTS AND OBSERVATIONS: FF-03-MW-001 830 MS/MSD

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/24/97
EA Personnel: CJV, SC	Purge Method: bailer	
Weather/Temperature/Barometric Pressure: Sunny, 80°		Time:

Well No. 56R	Well Condition:
Well Diameter: 2	Measurement Reference:
Well Volume Calculations	
A. Depth to Water (ft:	D. Well Volume/ft:
B. Total Well Depth (ft):	E. Total Well Volume (gal) [C*D]:
C. Water Column Height (ft):	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)						
Depth to Water (ft)						
Purge Rate (gpm)						
Volume Purged (gal)						
pH						
Temperature (°C)						
Conductivity (μmhos/cm)						
Dissolved Oxygen (mg/L)						
eH (mV)						

TOTAL QUANTITY OF WATER REMOVED (gal):
COMMENTS AND OBSERVATIONS: no sample actively sparging

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/24
EA Personnel: CJV, SC	Purge Method: bailer	
Weather/Temperature/Barometric Pressure: Sunny, 80		Time: 1042

Well No. 58	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC
Well Volume Calculations	
A. Depth to Water (ft: 6.24	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 16.30	E. Total Well Volume (gal) [C*D]: 1.6
C. Water Column Height (ft): 10.06	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)	1042	1047	1049	1051		
Depth to Water (ft)	6.24	6.29	6.38	6.50		
Purge Rate (gpm)	—	0.3	0.8	0.8		
Volume Purged (gal)	—	1.6	3.2	4.8		
pH	8.01	5.77	5.56	5.54		
Temperature (°C)	8.36	11.87	11.05	10.94		
Conductivity (μmhos/cm)	74.3	45.7	42.5	44.6		
Dissolved Oxygen (mg/L)	0.54	2.48	2.57	2.51		
eH (mV)	33	157	156	159		

TOTAL QUANTITY OF WATER REMOVED (gal): 6

COMMENTS AND OBSERVATIONS: FF.03-MW007 1055

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/24
EA Personnel: CJV, SC	Purge Method: bailer	
Weather/Temperature/Barometric Pressure: Sunny, 80		Time: 1000

Well No. 61R	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC

Well Volume Calculations

A. Depth to Water (ft): 5.29	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 12.90	E. Total Well Volume (gal) [C*D]: 1.2
C. Water Column Height (ft): 7.61	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)	1000	1003	1006	1009		
Depth to Water (ft)	5.29	5.40	5.52	5.61		
Purge Rate (gpm)	—	0.4	0.4	0.4		
Volume Purged (gal)	—	1.2	2.4	3.6		
pH	6.28	5.92	6.00	6.04		
Temperature (°C)	10.95	12.42	13.12	13.39		
Conductivity (μmhos/cm)	174	113.9	113.7	111.2		
Dissolved Oxygen (mg/L)	0.64	1.31	1.36	1.34		
eH (mV)	92	103	103	96		

TOTAL QUANTITY OF WATER REMOVED (gal): 5

COMMENTS AND OBSERVATIONS: FF03-MW005 1015

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel farm	Project No.: 29600.35	Date: 6/24
EA Personnel: CJV, SC	Purge Method: bailer	
Weather/Temperature/Barometric Pressure: Sunny, 80		Time: 1018

Well No. 62	Well Condition: Good
Well Diameter: 2	Measurement Reference: TOC

Well Volume Calculations

A. Depth to Water (ft: 9.32	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 16.80	E. Total Well Volume (gal) [C*D]: 1.2
C. Water Column Height (ft): 7.48	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)	1018	1026	1028	1030	1032	
Depth to Water (ft) 9.32	~~5.29~~	9.55	9.61	9.68	9.74	
Purge Rate (gpm)	—	0.2	0.6	0.6	0.6	
Volume Purged (gal)	—	1.2	2.4	3.6	4.8	
pH	5.36	5.89	5.60	5.42	5.53	
Temperature (°C)	8.74	11.68	9.43	9.12	9.32	
Conductivity (μmhos/cm) 105.8	~~2.99~~	63.2	65.6	63.4	64.5	
Dissolved Oxygen (mg/L)	~~74.99~~	3.29	3.43	3.49	3.28	
eH (mV)	92	281	312	321	333	

TOTAL QUANTITY OF WATER REMOVED (gal): 6

COMMENTS AND OBSERVATIONS: FF-03-MW006 1035

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/24
EA Personnel: CJU, SC	Purge Method: Bailer	
Weather/Temperature/Barometric Pressure: Sunny, 80°		Time: 850

Well No. MW-211	Well Condition:
Well Diameter: 2	Measurement Reference:

Well Volume Calculations

A. Depth to Water (ft: 7.41	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 9.90	E. Total Well Volume (gal) [C*D]: 0.40
C. Water Column Height (ft): 2.49	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)	850	852	854	856		
Depth to Water (ft)	7.41	7.98	8.21	8.42		
Purge Rate (gpm)	—	0.3	0.2	0.2		
Volume Purged (gal)	—	0.5	1.0	1.5		
pH	4.58	5.74	5.60	5.50		
Temperature (°C)	13.46	13.31	13.27	13.01		
Conductivity (μmhos/cm)	1.6	154	155	156		
Dissolved Oxygen (mg/L)	8.88	6.22	6.10	6.01		
eH (mV)	3.71	288	264	268		

TOTAL QUANTITY OF WATER REMOVED (gal): 3

COMMENTS AND OBSERVATIONS: FF-03-MW002 900

EA 5120 0794-2

EA Engineering, Science, and Technology

FIELD RECORD OF WELL GAUGING, PURGING, AND SAMPLING

Project Name: Fuel Farm	Project No.: 29600.35	Date: 6/24
EA Personnel: CJV, SC	Purge Method: bailer	
Weather/Temperature/Barometric Pressure: Sunny, 80°		Time: 9/18

Well No. MW-213	Well Condition: ~~Toc~~ Good
Well Diameter: 2	Measurement Reference: TOC

Well Volume Calculations

A. Depth to Water (ft): 6.21	D. Well Volume/ft: 0.16
B. Total Well Depth (ft): 11.58	E. Total Well Volume (gal) [C*D]: 0.86
C. Water Column Height (ft): 5.37	F. Five Well Volumes (gal):

Parameter	Beginning	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes
Time (min.)	916	918	921	924	926	
Depth to Water (ft)	6.21	6.34	6.34	6.38	6.38	
Purge Rate (gpm)	—	0.5	0.4	0.3	0.5	
Volume Purged (gal)	—	1	2	3	4	
pH	5.37	5.66	5.40	5.23	5.24	
Temperature (°C)	10.22	14.37	13.90	13.84	13.76	
Conductivity (μmhos/cm)	58.5	48.9	51.6	53.1	52.4	
Dissolved Oxygen (mg/L)	3.77	4.76	4.72	4.85	4.86	
eH (mV)	345	316	328	343	356	

TOTAL QUANTITY OF WATER REMOVED (gal): 6

COMMENTS AND OBSERVATIONS: ~~MW003~~ FF-03-MW003 930

MWX01

EA 5120 0794-2

Appendix D

Laboratory Report
Chemical Analysis of Ground Water

SAMPLE DESIGNATIONS

Sample Location	Sample Designation
WP-01	WP001
WP-02	WP002
WP-03	WP003
WP-04	WP004
WP-05	WP009
WP-06	WP008
WP-07	WP007
WP-07 Dup	WPXD1
WP-08	WP006
WP-09	WP005
WP-10	WP010
WP-11	WP011
WP-13	WP012
WP-14	WP016
WP-15	WP015
WP-19	WP014
WP-20	WP013
TRIP BLANK	TRIP BLANK
RINSE BLANK	WP-RB1

EA Laboratories

19 Loveton Circle
Sparks, MD 21152
Telephone: 410-771-4920
Fax: 410-771-4407

July 31, 1997

Mr. Mike Battle
EA Engineering, Science, & Technology, Inc.
3 Washington Center
Newburgh, NY 12550

RECEIVED
AUG 01 1997
EA Engineering, Science, & Technology, Inc.
Newburgh, NY 12550

Re: NAS Brunswick-Fuel Farm (29600.35)

Dear Mr. Battle:

Enclosed is our report on the analysis of 18 water samples collected for the NAS Brunswick- Fuel Farm project on 25 and 16 June 1997. The invoice is included.

Please contact me if you have any questions or require further information and refer to report 970932. Unless other arrangements are made, we reserve the right to dispose of your samples sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

David J. Brennan, for

Mary E. Asper
Laboratory Project Manager

enclosure

LABORATORY DATA REPORT

Prepared for:

NAS Brunswick - Fuel Farm
29600.35

Prepared by:

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
(410) 771-4920

Report 970932

July 1997

TABLE OF CONTENTS

NAS Brunswick

EA Laboratories Report 970932

Section	Page
1. NARRATIVE	
2. CHAIN OF CUSTODY	
3. ORGANIC DATA	
A. Volatiles	
B. TPH-Gas	
C. TPH-Diesel	

1. NARRATIVE

EA Laboratories
ANALYTICAL NARRATIVE

Client: **EA Engineering**
Site: **NAS Brunswick**
Project number: **29600.35**

Laboratory Project Manager: **Mary E. Asper**
EA Laboratories Report: **970932**
Date: **31 July 1997**

This report contains the results of the analysis of 18 water samples collected on 25 and 26 June 1997 in support of the referenced project.

SAMPLE RECEIPT

The samples and one trip blank arrived by Federal Express at EA Laboratories on 27 June 1997. Upon receipt, the samples and blank were inspected and compared with the chain-of-custody record. The samples and blank were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis. Operating under a variance from NFESC laboratory QA guidance, EA Laboratories stores aqueous samples for the determination of metals at 4C± 2C until disposal.

Client Sample Designation	EA Lab Number
NASB-FF-03-WPRB1	9706974
NASB-FF-03-WP001	9706975
NASB-FF-03-WP002	9706976
NASB-FF-03-WP003	9706977
NASB-FF-03-WP004	9706978
NASB-FF-03-WP005	9706979
NASB-FF-03-WP006	9706980
NASB-FF-03-WP007	9706981
NASB-FF-03-WP008	9706982
NASB-FF-03-WP009	9706983
NASB-FF-03-WP010	9706984
NASB-FF-03-WPXD1	9706985
NASB-FF-03-WP011	9706986
NASB-FF-03-WP012	9706987
NASB-FF-03-WP013	9706988
NASB-FF-03-WP014	9706989
NASB-FF-03-WP015	9706990
NASB-FF-03-WP016	9706991
TRIP BLANK	9706992

Following this narrative section are a list of analyical methods used (Table 1), a glossary of data qualifiers used in this report (Table 2), and the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been

formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument tune, calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

AROMATIC VOLATILES by GC - WATER (EA9706974-EA9706992)

Sample Chronology: The samples and associated quality control were analyzed on 7-8, 8-9 and 24 July 1997 by SW-846 Methods 5030/8020 for BTEX plus methyl tert-butyl ether (MTBE). The reported analysis for sample NASB-FF-03-WP005 was performed 15 days outside of holding time (an attempted analysis of this sample within holding time yielded no usable data because of carryover from a standard). All holding times were met for the remainder of the samples associated with this report.

Samples NASB-FF-03-WP009 and NASB-FF-03-WP011 were reanalyzed at a 20X dilution to bring the concentrations of target analytes within instrument calibration range. The results of both the

undiluted and diluted analyses are included in this report.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples with the following exceptions:

The continuing calibration verification standard (CCV) analyzed in the middle of the 7-8 July 1997 analytical sequence was not usable because of clogged lines associated with the sparging vessel this standard was placed in. However, the CCV analyzed at the beginning and the end of the analytical sequence were acceptable and the surrogate recoveries of all reported samples were acceptable indicating that the analyses were in-control. Data usability should not be impacted.

Sample Performance: All quality control criteria were met for the reported samples.

PURGEABLE TPH by GC - WATER (EA9706974-EA9706991)

Sample Chronology: The samples and associated quality control were analyzed on 8-9 and 9-10 July 1997 by the Maine Method 4.2.17 for gasoline range organics (GRO). All holding times were met.

Samples NASB-FF-03-WP002 (5X), NASB-FF-03-WP004 (5X), NASB-FF-03-WP009 (10X), NASB-FF-03-WPXD1 (5X) and NASB-FF-03-WP011 (3X) were analyzed at a dilution to bring the concentrations of GRO within instrument calibration range.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples.

EXTRACTABLE TPH by GC - WATER (EA9706974 - EA9706978, EA9706980 - EA9706991)

Sample Chronology: Seventeen water samples and associated quality control were extracted according to Maine Method 4.1.25 (continuous extraction) on 1 July 1997. The sample extracts and associated quality control extracts were analyzed by the same method on 11 July 1997 for diesel range organics (GRO). All holding times were met.

- The batch matrix spike/matrix spike duplicate (MS/MSD) was performed on sample NASB-FF-03-WP003. One laboratory control sample (LCS) was extracted with the samples.

EA Laboratories
ANALYTICAL NARRATIVE

Client: **EA Engineering**
Site: **NAS Brunswick**
Project number: **29600.35**

Laboratory Project Manager: **Mary E. Asper**
EA Laboratories Report: **970932**
Date: **31 July 1997**

- One sample, NASB-FF-03-WP004 was concentrated to a final extract volume of 25 mL (rather than the usual 1.0 mL final volume). This sample also required a 500 times dilution in order to bring the concentration of diesel range organics within calibration range.

- Several additional samples required dilutions in order to bring the concentration of diesel range organics within calibration range. Sample NASB-FF-03-WP002 required a 20 times dilution, sample NASB-FF-03-WP006 was reanalyzed at a 2X dilution, sample NASB-FF-03-WP009 required a 2.5X dilution, and sample NASB-FF-03-WP011 was reanalyzed at a dilution of ten times. Both undiluted and diluted analyses are included in the data package.

- Because the method requirements for a 5% frequency LCS/LCSD (nor the alternate 10% frequency MS/MSD or sample duplicate) were not met, one sample (NASB-FF-03-WPXD1) was re-extracted on 17 July (8 days outside of the method holding time) and reanalyzed on 22 July 1997. Duplicate LCSs were included in this extraction batch. The re-extracted sample was also analyzed at a 2X dilution on 23 July 1997.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples except as noted above.

Sample Performance: All quality control criteria were met for the reported samples with the following exceptions:

- Recovery of the surrogate o-terphenyl was below 50% in the undiluted analysis of sample NASB-FF-03-WP002 (42%). Recovery in the diluted (20X) analysis was 84%, indicating acceptable sample recovery.

- Recovery of the surrogate o-terphenyl in sample NASB-FF-03-WP004 was masked by the high concentration of petroleum hydrocarbons native to the sample and diluted out by the 25 mL final extraction volume.

- Recovery of spiked diesel fuel in the MSD performed on sample NASB-FF-03-WP003 (20%) was less than the method QC limit of 60%; the relative percent difference between the recovered concentrations of diesel fuel in the MS and MSD was 125%, above the QC limit of 20%. These results may be indicative of a precision deficit or may be an effect of sample homogeniety.

EA Laboratories
ANALYTICAL NARRATIVE

Client: **EA Engineering**
Site: **NAS Brunswick**
Project number: **29600.35**

Laboratory Project Manager: **Mary E. Asper**
EA Laboratories Report: **970932**
Date: **31 July 1997**

- Comparison of the two results collected for sample NASB-FF-03-WPXD1 (1800 ug/L and 2300 ug/L) showed a relative percent difference of 25%, above the method QC limit of 20%.

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in EA Laboratories Quality Assurance program for other than the conditions detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. EA Laboratories is not responsible for any assumptions of data quality if partial packages are used to interpret data. Release of the data contained in this report has been authorized by the appropriate Laboratory Manager as verified by the following signature.

David J. Brennan, for 31 July 1997
Mary E. Asper, Laboratory Project Manager

TABLE 1. ORGANIC ANALYSIS DATA QUALIFIERS

ND or U Indicates a compound on the target compound list (TCL) was analyzed for but not detected. The sample quantitation limit must be corrected for dilution and, if a soil sample, for percent moisture. For example, 10 U is used for phenol in water if the sample final volume is the protocol-specified final volume. If a 1-to-10 dilution of the extract was necessary, the reported limit is (10 x 10 U) or 100 U. For a soil sample, the value is also adjusted for percent moisture. For example, if the sample had 24% moisture and a 1-to-10 dilution factor, the soil sample quantitation limit for phenol (330 U) would be corrected as follows:

Reported limit = (330 U) x df / D

where: df = dilution factor = 10

D = (100 - % moisture) / 100 (At 24% moisture, D = (100-24) / 100 = 0.76)

Reported limit = (330 U) x 10 / 0.76 = 4300 U (rounded to two significant figures)

For soil samples subjected to gel permeation chromatography (GPC) cleanup procedures, the contract required quantitation limit (CRQL) is also multiplied by 2 to account for the fact that only half of the extract is recovered. Note: If GPC procedures are employed, the factor of 2 is not included in the dilution factor reported; a "Y" is entered for GPC (Y/N).

TR or J Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, 2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the CRQL but greater than zero, 3) when the retention time data indicate the presence of a compound that meets the pesticide/Aroclor identification criteria and the result is less than the CRQL but greater than zero. Note: the "J" code is not used and the compound is not reported as being identified for pesticide/Aroclor results less than the CRQL, if the technical judgement of the pesticide residue analysis expert determines that the peaks used for compound identification resulted from instrument noise or other interferences (column bleed, solvent contamination, etc.). For example, if the sample quantitation limit is 10 ug/L but a concentration of 3 ug/L is calculated, report it as 3 J. The sample quantitation limit must be adjusted for dilution as discussed for the U flag

C This flag applies to pesticide results where the identification has been confirmed by GC/MS. Single component pesticides with concentration equal to or greater than 10 ng/uL in the final extract must be confirmed by GC/MS.

B This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. This flag is used for a TIC as well as for a positively identified TCL compound.

E This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis. This flag does not apply to pesticides/PCBs analyzed by GC/EC methods. If one or more compounds have a response greater that full scale, the sample or extract must be diluted and reanalyzed according to the specifications listed in the SOW. All such compounds with a response greater than full scale should have a concentration flagged with an "E" on Form I for the original analysis. If the dilution of the extract causes any compounds identified in the first analysis to be below the calibration range in the second analysis, then the results of both analyses are reported on separate Forms I. The Form I for the diluted sample will have the "DL" suffix appended to the sample number. NOTE: For total xylenes, where three isomers are quantified as two peaks, the calibration range of each peak is considered separately; e.g., a diluted analysis is not required for total xylenes unless the concentration of either peak separately exceeds 200 ug/L.

D This flag identifies all compounds identified in the analysis at a secondary dilution factor. If a sample or extract is reanalyzed at a higher dilution factor, as in the "E" flag above, the "DL" suffix is appended to the sample number on the Form I for the diluted sample, and all concentration values reported on that Form I are flagged with the "D" flag.

A This flag indicates that a TIC is a suspected aldol-condensation product.

X Other specific flags may be required to properly define the results. If used, they are fully described and such description attached to the Sample Data Summary Package and the Case Narrative. The flags begin by using "X". If more that one flag is required, "Y" and "Z" are used, as needed. For instance, the "X" flag might combine the "A", "B", and "D" flags for some sample.

N Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.

P This flag is used for GC analyses when there is greater than 25% difference for detected concentrations between the two GC columns. The lower of the two values is reported on Form 1 and flagged with a "P".

2. CHAIN OF CUSTODY

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Company Name: EA Engineering

Project Manager or Contact: Mike Battle

Phone: 914-565 8100

Project No: 29600 35

Project Name: Fuel Farm

Dept.: 2151 Task: 3696

Sample Storage Location: F3

ATO Number: 5026

Page 1 of 1

Report #: 970932

Report Deliverables: 1 2 3 4 D E

EDD: Yes No

DUE TO CLIENT: 7/18/97

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	BTEX + MTBE 602	MSDSP LOD TPHGRO 4.2.17	MSDSP LOD TPH DRO 4.1.25	EA Labs Accession Number	Remarks
6/25/97	830	X		NASB-FF-03-WPRB1	6	X	X	X	9706974	LPM: Mary Asper
6/25/97	845	X		NASB-FF-03-WP001	6	X	X	X	9706975	
6/25/97	915	X		NASB-FF-03-WP002	6	X	X	X	9706976	
6/25/97	920	X		NASB-FF-03-WP003	18	X	X	X	9706977	MS/MSD
6/25/97	945	X		NASB-FF-03-WP004	5	X	X	X	9706978	
6/25/97	955	X		NASB-FF-03-WP005	4	X	X		9706979	
6/25/97	1030	X		NASB-FF-03-WP006	6	X	X	X	9706980	Follow Project
6/25/97	1035	X		NASB-FF-03-WP007	6	X	X	X	9706981	Summary requirements
6/25/97	1045	X		NASB-FF-03-WP008	6	X	X	X	9706982	
6/25/97	1055	X		NASB-FF-03-WP009	6	X	X	X	9706983	Use Maine Methods
6/25/97	1115	X		NASB-FF-03-WP010	6	X	X	X	9706984	for GRO & DRO
6/25/97	—	X		NASB-FF-03-WPXD1	6	X	X	X	9706985	
6/26/97	825	X		NASB-FF-03-WP011	6	X	X	X	9706986	L1 #919
6/26/97	835	X		NASB-FF-03-WP012	5	X	X	X	9706987	
6/26/97	855	X		NASB-FF-03-WP013	6	X	X	X	9706988	
6/26/97	925	X		NASB-FF-03-WP014	6	X	X	X	9706989	
6/26/97	930	X		NASB-FF-03-WP015	6	X	X	X	9706990	
6/26/97	950	X		NASB-FF-03-WP016	6	X	X	X	9706991	
—	—	X		TRIP BLANK	2	X			9706992	
										CCC 000001

Samples by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
Suzanne Y Chase	6/26/97 950	Suzanne Y Chase	6/26/97 1300		
Relinquished by: (Signature)	Date/Time	Received by Laboratory: (Signature)	Date/Time	Airbill Number:	Sample Shipped by: (Circle)
		Cheryl Smith	6/27/97 1000	9562642616	Fed Ex. Puro. UPS

Cooler Temp 2.1 C pH: X Yes ☐ No Comments: Custody Seals Intact X Yes ☐ No

Hand Carried

Other:

NOTE: Please indicate method number for analyses requested. This will help clarify any questions with laboratory techniques.

WHITE—EA Laboratories YELLOW—EA Laboratories PINK—Project Manager *Shaded Areas for Lab Use Only*

3. ORGANIC DATA

A. Volatiles

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WPRB1

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706974

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I121F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/7/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP001

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706975

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I122F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/8/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.
WP002

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 9706976

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I156F.D

Level: (low/med) Date Received: 6/27/97

% Moisture: not dec. Date Analyzed: 7/9/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	3	
108-88-3	Toluene	13	
100-41-4	Ethylbenzene	81	
	m&p-Xylenes	350	
95-47-6	o-Xylene	100	

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP003

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 9706977

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I142F.D

Level: (low/med) Date Received: 6/27/97

% Moisture: not dec. Date Analyzed: 7/8/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP004

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706978

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I157F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/9/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	
71-43-2	Benzene	3	
108-88-3	Toluene	10	
100-41-4	Ethylbenzene	94	
	m&p-Xylenes	420	
95-47-6	o-Xylene	110	

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP005

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: #9706979

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I339F.D

Level: (low/med) Date Received:

% Moisture: not dec. Date Analyzed: 7/24/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP006

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706980

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I128F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/8/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP007

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706981

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I129F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/8/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP008

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706982

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I130F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/8/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP009

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706983

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I131F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/8/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	55	
108-88-3	Toluene	1500	E
100-41-4	Ethylbenzene	1000	E
	m&p-Xylenes	4500	E
95-47-6	o-Xylene	2400	E

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP009DL

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706983DL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I151F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/9/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 20.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	20	U
71-43-2	Benzene	73	D
108-88-3	Toluene	1700	D
100-41-4	Ethylbenzene	1100	D
	m&p-Xylenes	5600	D
95-47-6	o-Xylene	2900	D

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP010

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706984

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I141F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/8/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	34	
108-88-3	Toluene	26	
100-41-4	Ethylbenzene	9	
	m&p-Xylenes	26	
95-47-6	o-Xylene	15	

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WPXD1

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706985

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I133F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/8/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP011

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706986

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I155F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/9/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	2	
71-43-2	Benzene	320	
108-88-3	Toluene	5400	E
100-41-4	Ethylbenzene	72	
	m&p-Xylenes	270	
95-47-6	o-Xylene	65	

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP011DL

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706986DL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I154F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/9/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 20.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L.

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	20	U
71-43-2	Benzene	340	D
108-88-3	Toluene	6700	D
100-41-4	Ethylbenzene	92	D
	m&p-Xylenes	370	D
95-47-6	o-Xylene	110	D

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP012

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706987

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I145F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/9/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	12	
108-88-3	Toluene	270	
100-41-4	Ethylbenzene	3	
	m&p-Xylenes	12	
95-47-6	o-Xylene	3	

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP013

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706988

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I146F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/9/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	2	
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP014

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706989

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I147F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/9/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	4	
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP015

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706990

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I149F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/9/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: WP016

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706991

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I150F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/9/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: TRIP BLANK

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706992

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I120F.D

Level: (low/med) _____ Date Received: 6/27/97

% Moisture: not dec. _____ Date Analyzed: 7/7/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: VBLK01

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: VB707075

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I116F.D

Level: (low/med) _____ Date Received: _____

Moisture: not dec. _____ Date Analyzed: 7/7/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: VBLK02

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: VB707083

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I140F.D

Level: (low/med) _____ Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 7/8/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: VBLK03

Lab Name: EA LABORATORIES Report#: 970932

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: VB07246

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I338F.D

Level: (low/med) _____ Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 7/24/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

B. TPH-Gas

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WPRB1

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706974

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J325

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/08/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	TPH	25	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP001

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706975

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J326

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/08/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	----------TPH	260	

1A

VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP002

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706976

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J359

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/09/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 5

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	----------TPH	4200	

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP003

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706977

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J366

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/09/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
----------	TPH	130	

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP004

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706978

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J365

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/09/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 5

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
----------	TPH	16000	

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP005

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706979

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J355

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/09/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
----------	TPH	110	

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP006

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706980

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J332

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/08/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
----------	TPH	1600	

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP007

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706981

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J369

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/09/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
----------	TPH	4000	

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP008

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706982

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J356

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/09/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	TPH	210	

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP009

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706983

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J345

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/09/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 10

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	----------TPH	15000	

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP010

Lab Name: EA LABS Contract:NAS BRUNSWICK

Lab Code: EAENG Case No:4217 SAS No: _____ SDG No:

Matrix: (soil/water)WATER Lab Sample ID: 9706984

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J357

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/09/97

GC Column:RTX1 ID:0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
----------	TPH	310	

1A

VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

XD1 WP~~007~~ wem 7/24/97

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706985

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J363

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/09/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 5

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	----------TPH	2100	

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP011

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706986

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J374

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/10/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 3

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	TPH	9100	

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP012

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706987

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J358

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/09/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
----------	TPH	430	

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP013

Lab Name: EA LABS Contract:NAS BRUNSWICK

Lab Code: EAENG Case No:4217 SAS No: _____ SDG No:

Matrix: (soil/water)WATER Lab Sample ID: 9706988

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J339

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/08/97

GC Column:RTX1 ID:0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	----------TPH	25	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP014

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706989

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J340

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/09/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
----------	TPH	1000	

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP015

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706990

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J341

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/09/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
----------	TPH	160	

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

WP016

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706991

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J344

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/09/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
----------	TPH	25	U

1A

VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

VBLK01

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: VB707081

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J322

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/08/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	TPH	25	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

VBLK02

Lab Name: EA LABS Contract: NAS BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: VBL70709

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J354

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/09/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	----------TPH	25	U

C. TPH-Diesel

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N ASB-FF-03-WPRB 1

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706974

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q966F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	50	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-WP001

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706975

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q967F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
	DIESEL RANGE ORGANICS	1800	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-WP002

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706976

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q968F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	17000	E

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NA SB-FF-03-WP002 DL

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706976DL

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q992F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 20.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
	DIESEL RANGE ORGANICS	23000	D

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-WP003

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706977

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q969F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
	DIESEL RANGE ORGANICS	440	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N ASB-FF-03-WP004

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706978

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q974F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 25000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	~~14047729~~ 14000000	E

Hg 7/30/97

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NA SB-FF-03-WP004 DL

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706978DL

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q993F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 25000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 500.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	~~11837575~~ 12,000,000	D

Hg 7/30/97

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-WP06

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706980

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q975F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	2300	E

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-FF-03-WP006 DL

Lab Name: EA LABS Contract: BRUNSWIC NA

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706980DL

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R003F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/12/97

Injection Volume: 1.0 (uL) Dilution Factor: 2.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
	DIESEL RANGE ORGANICS	2400	D

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-WP007

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 9706981

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q976F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
	DIESEL RANGE ORGANICS	1200	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-WP008

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 9706982

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q977F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
	DIESEL RANGE ORGANICS	450	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-WP0C9

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706983

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q978F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	2700	E

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NA SB-FF-03-WP009 DL

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706983DL

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R004F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/12/97

Injection Volume: 1.0 (uL) Dilution Factor: 2.5

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	2700	D

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-WP00

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 9706984

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q979F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
	DIESEL RANGE ORGANICS	470	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-WPX01

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706985

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q980F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	1800	

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'03-WPD1

BLS 7-28-97

Lab Name: EA LABS Contract: 970932

Lab Code: EAENG Case No.: SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 9706985DUP

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SX4G645F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: decanted:(Y/N) N Date Extracted: 07/17/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/22/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
	~~C10-C28 EVEN~~	2300	E

DIESEL RANGE ORGANICS

Hg 7/30/97

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'03-WPD1 DL

BLS 7-28-97

Lab Name: EA LABS Contract: 970932

Lab Code: EAENG Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706985DUPD

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SX4G669F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/17/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/97

Injection Volume: 1.0 (uL) Dilution Factor: 2.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
	~~C10-C28 EVEN~~	2300	D

DIESEL RANGE ORGANICS

Hg 7/30/97

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-WP01

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706986

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q981F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	9400	E

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NA SB-FF-03-WP011 DL

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706986DL

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R005F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/12/97

Injection Volume: 1.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
	DIESEL RANGE ORGANICS	12000	D

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N ASB-FF-03-WP01 2

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706987

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q982F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	290	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N ASB-FF-03-WP01 3

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706988

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q983F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	370	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-WP01

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 9706989

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q986F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
	DIESEL RANGE ORGANICS	400	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-WP01

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706990

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q987F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
	DIESEL RANGE ORGANICS	570	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-WP01

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970932 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706991

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3Q988F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/11/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	280	

SAMPLE DESIGNATIONS

Sample Location	Sample Designation
MW-44	FF-03 - MW004
MW-49	FF-03 - MW008
MW-51	FF-03 - MW009
MW-54	FF-03 - MW001
MW-58	FF-03 - MW007
MW-61R	FF-03 - MW005
MW-62	FF-03 - MW006
MW-211	FF-03 - MW002
MW-213	FF-03 - MW003
MW-213 Dup	FF-03 - MWXD1
RINSE BLANK	FF-03 - MWRB1
TRIP BLANK	TRIP BLANK

EA Laboratories

19 Loveton Circle
Sparks, MD 21152
Telephone: 410-771-4920
Fax: 410-771-4407

July 31, 1997

Mr. Mike Battle
EA Engineering, Science, & Technology, Inc.
3 Washington Center
Newburgh, NY 12550

RECEIVED
AUG 01 1997
EA Engineering, Science, & Technology, Inc.
Newburgh, NY 12550

Re: NAS Brunswick NEX Service Station (29600.35)

Dear Mr. Battle:

Enclosed is our report on the analysis of eleven water samples collected for the NAS Brunswick NEX Service Station project on 24 June 1997. The invoice is included.

Please contact me if you have any questions or require further information and refer to report 970909. Unless other arrangements are made, we reserve the right to dispose of your samples sixty (60) days from the date of this letter. We will retain the raw data for seven years from this date.

Sincerely,

David J. Brennan, for

Mary E. Asper
Laboratory Project Manager

enclosure

LABORATORY DATA REPORT

Prepared for:

NAS Brunswick NEX Service Station
29600.35

Prepared by:

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
(410) 771-4920

Report 970909

July 1997

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NAS Brunswick

EA Laboratories Report 970909

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1. NARRATIVE

2. CHAIN OF CUSTODY

3. ORGANIC DATA

   A. Volatiles
   B. TPH-GRO
   C. TPH-DRO

1. NARRATIVE

EA Laboratories
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., & Tech., Inc.**
Site: **NAS Brunswick**
Project number: **29600.35**

Laboratory Project Manager: **Mary E. Asper**
EA Laboratories Report: **970909**
Date: **31 July 1997**

This report contains the results of the analysis of eleven water samples and collected on 24 June 1997 in support of the referenced project.

SAMPLE RECEIPT

The samples arrived by Federal Express at EA Laboratories on 25 June 1997. Upon receipt, the samples and blanks were inspected and compared with the chain-of-custody record. The samples and blanks were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis.

Client Sample Designation	EA Lab Number
NASB-FF-03-MWRB1	9706818
NASB-FF-03-MW001	9706819
NASB-FF-03-MW002	9706820
NASB-FF-03-MW003	9706821
NASB-FF-03-MW004	9706822
NASB-FF-03-MW005	9706823
NASB-FF-03-MW006	9706824
NASB-FF-03-MW007	9706825
NASB-FF-03-MW008	9706826
NASB-FF-03-MW009	9706827
NASB-FF-03-MWXD1	9706828

Following this narrative section are a glossary of data qualifiers used in this report (Table 1) and the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

EA Laboratories
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., & Tech., Inc.**
Site: **NAS Brunswick**
Project number: **29600.35**

Laboratory Project Manager: **Mary E. Asper**
EA Laboratories Report: **970909**
Date: **31 July 1997**

Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument tune, calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

AROMATIC VOLATILES by GC - WATER (EA9706818-EA9706828)

Sample Chronology: The samples and associated quality control were analyzed on 3-4, 7-8 and 9 July 1997 by SW-846 Methods 5030/8020 for BTEX plus methyl tert-butyl ether (MTBE). The reported analysis for sample NASB-FF-03-MW006 was performed 1 day outside of holding time (an attempted analysis of this sample within holding time yielded no usable data). All holding times were met for the remainder of the samples associated with this report.

Sample NASB-FF-03-MW002 was reanalyzed at a 100X dilution to bring the concentrations of target analytes within instrument calibration range. The results of both the undiluted and diluted analyses are included in this report.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples with the following exceptions:

The continuing calibration verification standards (CCVs) analyzed in the middle of the 3-4 July and 7-8 July 1997 analytical sequences were not usable because of clogged lines associated with the sparging vessel these standards were placed in (the same vessel for both sequences). However, the CCV analyzed at the beginning and the end of the analytical sequences were acceptable and the surrogate recoveries of all reported samples were acceptable indicating that the analyses were in-

control. Data usability should not be impacted.

Sample Performance: All quality control criteria were met for the reported samples.

PURGEABLE TPH by GC - WATER (EA9706818-EA9706828)

Sample Chronology: The samples and associated quality control were analyzed on 7-8 July 1997 by the Maine Method 4.2.17 for gasoline range organics (GRO). All holding times were met.

Sample NASB-FF-03-MW002 was analyzed at a 10X dilution to bring the concentration of GRO within instrument calibration range.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples.

EXTRACTABLE TPH by GC - WATER (EA9706818 - EA9706828)

Sample Chronology: Eleven water samples and associated quality control were extracted according to Maine Method 4.1.25 (continuous extraction) on 1 July 1997. The sample extracts and associated quality control extracts were analyzed by the same method on 14-15 July 1997 for diesel range organics (GRO). All holding times were met.

- The batch matrix spike/matrix spike duplicate (MS/MSD) was performed on sample NASB-FF-03-MW001. One laboratory control sample (LCS) was extracted with the samples.

- Sample NASB-FF-03-MW002 required a 3 times dilution in order to bring the concentration of diesel range organics within calibration range. Both analyses are included in the data package.

- Because the method requirements for a 5% frequency LCS/LCSD (nor the alternate 10% frequency MS/MSD) were not met, one sample (NASB-FF-03-MW005) was re-extracted on 17 July (9 days outside of the method holding time) and reanalyzed on 22 July 1997. Duplicate LCSs were included in this extraction batch.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples except as noted above.

Sample Performance: All quality control criteria were met for the reported samples with the following exceptions:

EA Laboratories
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., & Tech., Inc.**
Site: **NAS Brunswick**
Project number: **29600.35**

Laboratory Project Manager: **Mary E. Asper**
EA Laboratories Report: **970909**
Date: **31 July 1997**

- Recovery of the surrogate o-terphenyl was below 50% in the undiluted analysis of sample NASB-FF-03-MW002 (47%). Recovery in the diluted analysis was 72%, indicating acceptable sample recovery.

- Comparison of the two results collected for sample NASB-FF-03-MW005 (310 ug/L and 320 ug/L) showed a relative percent difference of 3%, indicating that the second analysis is acceptable.

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in EA Laboratories Quality Assurance program for other than the conditions detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. EA Laboratories is not responsible for any assumptions of data quality if partial packages are used to interpret data. Release of the data contained in this report has been authorized by the appropriate Laboratory Manager as verified by the following signature.

David F. Brennan, for 31 July 1997
Mary E. Asper, Laboratory Project Manager

TABLE 1. ORGANIC ANALYSIS DATA QUALIFIERS

ND or U Indicates a compound on the target compound list (TCL) was analyzed for but not detected. The sample quantitation limit must be corrected for dilution and, if a soil sample, for percent moisture. For example, 10 U is used for phenol in water if the sample final volume is the protocol-specified final volume. If a 1-to-10 dilution of the extract was necessary, the reported limit is (10 x 10 U) or 100 U. For a soil sample, the value is also adjusted for percent moisture. For example, if the sample had 24% moisture and a 1-to-10 dilution factor, the soil sample quantitation limit for phenol (330 U) would be corrected as follows:

Reported limit = (330 U) x df / D

where: df = dilution factor = 10
D = (100 - % moisture) / 100 (At 24% moisture, D = (100-24) / 100 = 0.76)
Reported limit = (330 U) x 10 / 0.76 = 4300 U (rounded to two significant figures)

For soil samples subjected to gel permeation chromatography (GPC) cleanup procedures, the contract required quantitation limit (CRQL) is also multiplied by 2 to account for the fact that only half of the extract is recovered. Note: If GPC procedures are employed, the factor of 2 is not included in the dilution factor reported; a "Y" is entered for GPC (Y/N).

TR or J Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, 2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the CRQL but greater than zero, 3) when the retention time data indicate the presence of a compound that meets the pesticide/Aroclor identification criteria and the result is less than the CRQL but greater than zero. Note: the "J" code is not used and the compound is not reported as being identified for pesticide/Aroclor results less than the CRQL, if the technical judgement of the pesticide residue analysis expert determines that the peaks used for compound identification resulted from instrument noise or other interferences (column bleed, solvent contamination, etc.). For example, if the sample quantitation limit is 10 ug/L but a concentration of 3 ug/L is calculated, report it as 3 J. The sample quantitation limit must be adjusted for dilution as discussed for the U flag

C This flag applies to pesticide results where the identification has been confirmed by GC/MS. Single component pesticides with concentration equal to or greater than 10 ng/uL in the final extract must be confirmed by GC/MS.

B This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. This flag is used for a TIC as well as for a positively identified TCL compound.

E This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis. This flag does not apply to pesticides/PCBs analyzed by GC/EC methods. If one or more compounds have a response greater that full scale, the sample or extract must be diluted and reanalyzed according to the specifications listed in the SOW. All such compounds with a response greater than full scale should have a concentration flagged with an "E" on Form I for the original analysis. If the dilution of the extract causes any compounds identified in the first analysis to be below the calibration range in the second analysis, then the results of both analyses are reported on separate Forms I. The Form I for the diluted sample will have the "DL" suffix appended to the sample number. NOTE: For total xylenes, where three isomers are quantified as two peaks, the calibration range of each peak is considered separately; e.g., a diluted analysis is not required for total xylenes unless the concentration of either peak separately exceeds 200 ug/L.

D This flag identifies all compounds identified in the analysis at a secondary dilution factor. If a sample or extract is reanalyzed at a higher dilution factor, as in the "E" flag above, the "DL" suffix is appended to the sample number on the Form I for the diluted sample, and all concentration values reported on that Form I are flagged with the "D" flag.

A This flag indicates that a TIC is a suspected aldol-condensation product.

X Other specific flags may be required to properly define the results. If used, they are fully described and such description attached to the Sample Data Summary Package and the Case Narrative. The flags begin by using "X". If more that one flag is required, "Y" and "Z" are used, as needed. For instance, the "X" flag might combine the "A", "B", and "D" flags for some sample.

N Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.

P This flag is used for GC analyses when there is greater than 25% difference for detected concentrations between the two GC columns. The lower of the two values is reported on Form 1 and flagged with a "P".

2. CHAIN OF CUSTODY

L11106

Company Name:	Project Manager or Contact:
EA Engineering	Mike Battle
	Phone: 914-565-8100
Project No.: 29600.35.3696	Project Name: New Brunswick Fuel Farm
Sample Storage Location: J10	ATO Number: 5026
Page of	Job ID: 970909

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
(410) 771-4920
Fax (410) 771-4407

Report/Deliverables: Report level 1E NO EDDS Hard copy due 7/16/97

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	BTEX+MTBE 602	MSDEP TPH GRO 4.2.17	MSDEP TPH DRO 4.1.25									EA Labs Accession Number	Remarks
6/24/97	800	X		NASB-FF-03-MWRB1	6	X	X	X									9706818	LPM: Mary E. Aspere
6/24/97	830	X		NASB-FF-03-MW001	18	X	X	X									9706819	MS/MSD
6/24/97	900	X		NASB-FF-03-MW002	6	X	X	X									9706820	
6/24/97	935	X		NASB-FF-03-MW003	6	X	X	X									9706821	
6/24/97	950	X		NASB-FF-03-MW004	6	X	X	X									9706822	L11897
6/24/97	1015	X		NASB-FF-03-MW005	6	X	X	X									9706823	
6/24/97	1035	X		NASB-FF-03-MW006	6	X	X	X									9706824	
6/24/97	1055	X		NASB-FF-03-MW007	6	X	X	X									9706825	
6/24/97	1115	X		NASB-FF-03-MW008	6	X	X	X									9706826	DO MS/MSD on
6/24/97	1140	X		NASB-FF-03-MW009	6	X	X	X									9706827	Client sample
6/24/97	~~1140~~	X		NASB-FF-03-MWXD1	6	X	X	X									9706828	
																		NASB-FF-03-MW004
																		Follow Project
																		Summary
																		Requirements
																		COC0000978

Sampled by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
Suzanne Y Chase	6/24/97 1140	Suzanne Y Chase	6/24/97		
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Airbill Number:	Sample Shipped by: (Circle)
		Sheryl Smith	6/25/97 930	4073777105	Fed Ex. Puro. UPS

Cooler Temp: 2 C pH: ☐ Yes ☒ No Comments: Custody Seals Intact ☒ Yes ☐ No

Hand Carried

Other:

NOTE. Please indicate method number for analyses requested. This will help clarify any questions with laboratory techniques.

[redacted] WH[redacted]A Lab[redacted]s [redacted] [redacted] [redacted] [redacted] [redacted] YELLOW - EA[redacted]tories [redacted] [redacted] PINK - Pr[redacted]anage[redacted] [redacted] [redacted]ded [redacted] for L[redacted]e Onl[redacted]

3. ORGANIC DATA

A. Volatiles

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: MWRB1

Lab Name: EA LABORATORIES Report#: 970909

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706818

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I098F.D

Level: (low/med) _____ Date Received: 6/25/97

% Moisture: not dec. _____ Date Analyzed: 7/3/97

GC Column: DBVRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	3	
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: MW001

Lab Name: EA LABORATORIES Report#: 970909

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706819

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I099F.D

Level: (low/med) _____ Date Received: 6/25/97

% Moisture: not dec. _____ Date Analyzed: 7/3/97

GC Column: DBVRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: MW002

Lab Name: EA LABORATORIES Report#: 970909

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706820

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I103F.D

Level: (low/med) _____ Date Received: 6/25/97

% Moisture: not dec. _____ Date Analyzed: 7/4/97

GC Column: DBVRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	540	E
108-88-3	Toluene	12000	E
100-41-4	Ethylbenzene	200	
	m&p-Xylenes	790	
95-47-6	o-Xylene	160	

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: MW002DL

Lab Name: EA LABORATORIES Report#: 970909

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706820DL

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I134F.D

Level: (low/med) _____ Date Received: 6/25/97

% Moisture: not dec. _____ Date Analyzed: 7/8/97

GC Column: DBVRX ID: 0.45 (mm) Dilution Factor: 100.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	100	U
71-43-2	Benzene	510	D
108-88-3	Toluene	20000	D
100-41-4	Ethylbenzene	230	D
	m&p-Xylenes	930	D
95-47-6	o-Xylene	190	D

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: MW003

Lab Name: EA LABORATORIES Report#: 970909

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706821

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I102F.D

Level: (low/med) _____ Date Received: 6/25/97

% Moisture: not dec. _____ Date Analyzed: 7/4/97

GC Column: DBVRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: MW004

Lab Name: EA LABORATORIES Report#: 970909

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706822

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I117F.D

Level: (low/med) _____ Date Received: 6/25/97

% Moisture: not dec. _____ Date Analyzed: 7/7/97

GC Column: DBVRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: MW005

Lab Name: EA LABORATORIES Report#: 970909

Lab Code: EA ENG Case No.: Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 9706823

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I105F.D

Level: (low/med) Date Received: 6/25/97

% Moisture: not dec. Date Analyzed: 7/4/97

GC Column: DBVRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: MW006

Lab Name: EA LABORATORIES Report#: 970909

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706824RE

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I169F.D

Level: (low/med) _____ Date Received: 6/25/97

% Moisture: not dec. _____ Date Analyzed: 7/9/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: MW007

Lab Name: EA LABORATORIES Report#: 970909

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706825

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I108F.D

Level: (low/med) _____ Date Received: 6/25/97

% Moisture: not dec. _____ Date Analyzed: 7/4/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: MW008

Lab Name: EA LABORATORIES Report#: 970909

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706826

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I109F.D

Level: (low/med) _____ Date Received: 6/25/97

% Moisture: not dec. _____ Date Analyzed: 7/4/97

GC Column: DBVRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	2	
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: MW009

Lab Name: EA LABORATORIES Report#: 970909

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706827

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I110F.D

Level: (low/med) _____ Date Received: 6/25/97

% Moisture: not dec. _____ Date Analyzed: 7/4/97

GC Column: DBVRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: MWXD1

Lab Name: EA LABORATORIES Report#: 970909

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706828

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I111F.D

Level: (low/med) _____ Date Received: 6/25/97

% Moisture: not dec. _____ Date Analyzed: 7/4/97

GC Column: DB-VRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: VBLK01

Lab Name: EA LABORATORIES Report#: 970909

Lab Code: EA ENG Case No.: Method: 8020 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: VB707035

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I097F.D

Level: (low/med) Date Received:

% Moisture: not dec. Date Analyzed: 7/3/97

GC Column: DBVRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: VBLK02

Lab Name: EA LABORATORIES Report#: 970909

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: VB707075

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I116F.D

Level: (low/med) _____ Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 7/7/97

GC Column: DBVRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Client ID No.: VBLK03

Lab Name: EA LABORATORIES Report#: 970909

Lab Code: EA ENG Case No.: _____ Method: 8020 SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: VB707094

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VG7I161F.D

Level: (low/med) _____ Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 7/9/97

GC Column: DBVRX ID: 0.45 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Concentration Units: (ug/L or ug/Kg) ug/L

CAS No.	Compound		Q
1634-04-4	Methyl t-Butyl Ether	1	U
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
	m&p-Xylenes	1	U
95-47-6	o-Xylene	1	U

FORM I VOA

B. TPH-Gas

1A

VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

MWRB1

Lab Name: EA LABS Contract: NEW BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706818

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J300

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/07/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	----------TPH	25	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

MW001

Lab Name: EA LABS Contract:NEW BRUNSWICK

Lab Code: EAENG Case No:4217 SAS No: _____ SDG No:

Matrix: (soil/water)WATER Lab Sample ID: 9706819

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J301

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/07/97

GC Column:RTX1 ID:0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
----------	TPH	25	U

1A

VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

MW002

Lab Name: EA LABS Contract: NEW BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706820

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J316

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/08/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 10

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
----------	TPH	24000	

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

MW003

Lab Name: EA LABS Contract: NEW BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706821

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J315

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/07/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	----------TPH	25	U

1A

VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

MW004

Lab Name: EA LABS Contract: NEW BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706822

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J304

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/07/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	TPH	25	U

LOEM 7/24/97

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

MW005

Lab Name: EA LABS Contract:NEW BRUNSWICK

Lab Code: EAENG Case No:4217 SAS No: _____ SDG No:

Matrix: (soil/water)WATER Lab Sample ID: 9706823

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J305

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/07/97

GC Column:RTX1 ID:0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
----------	TPH	32	

1A

VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

MW006

Lab Name: EA LABS Contract: NEW BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706824

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J307

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/07/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	----------TPH	25	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

MW007

Lab Name: EA LABS Contract:NEW BRUNSWICK

Lab Code: EAENG Case No:4217 SAS No: _____ SDG No:

Matrix: (soil/water)WATER Lab Sample ID: 9706825

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J308

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/07/97

GC Column:RTX1 ID:0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	----------TPH	25	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

MW008

Lab Name: EA LABS Contract: NEW BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706826

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J309

Level: (low/med) LOW Date Received: / /

Moisture: not dec. _____ Date Analyzed: 07/07/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	TPH	25	U

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

MW009

Lab Name: EA LABS Contract: NEW BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706827

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J310

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/07/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
----------	TPH	25	U

1A

VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

D
MWXØ1 wem 7/24/97

Lab Name: EA LABS Contract: NEW BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 9706828

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J311

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/07/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	----------TPH	28	

1A
VOLATILE COMPOUNDS ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

VBLK01

Lab Name: EA LABS Contract: NEW BRUNSWICK

Lab Code: EAENG Case No: 4217 SAS No: _____ SDG No:

Matrix: (soil/water) WATER Lab Sample ID: VB707071

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: VD4J298

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 07/07/97

GC Column: RTX1 ID: 0.53 (mm) Dilution Factor: 1

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg) ug/L	Q
	----------TPH	25	U

C. TPH-Fuel Oil

C. TPH-Diesel

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

~~ASB-FF-03-MWB~~ NASB-FF-03-MWB

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970909 SAS No.: _____ SDG No.: _____ HJ 7/30/97

Matrix: (soil/water) WATER Lab Sample ID: 9706818

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R021F.D

Level: (low/med) LOW Date Received: 06/25/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/14/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	50	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-MW00

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970909 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 9706819

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R022F.D

Level: (low/med) LOW Date Received: 06/25/97

% Moisture: decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/14/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	230	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N ASB-FF-03-MW0C 2

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970909 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706820

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R025F.D

Level: (low/med) LOW Date Received: 06/25/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/15/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	2900	E

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NA SB-FF-03-MW002 DL

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970909 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706820DL

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R045F.D

Level: (low/med) LOW Date Received: 06/25/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/15/97

Injection Volume: 1.0 (uL) Dilution Factor: 3.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	3000	D

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N ASB-FF-03-MW003

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970909 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706821

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R026F.D

Level: (low/med) LOW Date Received: 06/25/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/15/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	180	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-MW004

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970909 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 9706822

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R029F.D

Level: (low/med) LOW Date Received: 06/25/97

% Moisture: decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/15/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	56	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

'03-MW005

Lab Name: EA LABS Contract: 970909

Lab Code: EAENG Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706823DUP

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SX4G646F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/17/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/22/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	~~C10-C28 EVEN~~ DIESEL RANGE ORGANICS	320	

Hg 7/30/97

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-MW006

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970909 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706824

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R031F.D

Level: (low/med) LOW Date Received: 06/25/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/15/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
	DIESEL RANGE ORGANICS	58	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-MW007

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970909 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706825

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R032F.D

Level: (low/med) LOW Date Received: 06/25/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/15/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	100	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-MW008

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970909 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 9706826

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R033F.D

Level: (low/med) LOW Date Received: 06/25/97

% Moisture: decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/15/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	140	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASB-FF-03-MW009

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970909 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706827

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R034F.D

Level: (low/med) LOW Date Received: 06/25/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/15/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	52	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

N ASB-FF-03-MWXD

Lab Name: EA LABS Contract: BRUNSWIC

Lab Code: EAENG Case No.: 970909 SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: 9706828

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SW3R035F.D

Level: (low/med) LOW Date Received: 06/25/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/01/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/15/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
	DIESEL RANGE ORGANICS	140	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB707173

Lab Name: EA LABS Contract: 970909

Lab Code: EAENG Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix: (soil/water) WATER Lab Sample ID: TB707173

Sample wt/vol: 1000 (g/ml) ML Lab File ID: SX4G640F.D

Level: (low/med) LOW Date Received: 06/27/97

% Moisture: _____ decanted:(Y/N) N Date Extracted: 07/17/97

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/22/97

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
	~~C10-C28 EVEN~~ DIESEL RANGE ORGANICS	50	U

HG 7/30/97

Appendix E

Laboratory Report
Microbial Enumeration Study

Facsimile Cover Sheet

BioRenewal
Technologies, Inc.

To: **Curt Varner**
Company: **EA Engineering**
Phone: **914/565-8100**
Fax: **914/565-8203**

From: **M. Lynn Haugh**
Company: **BioRenewal Technologies, Inc.**
Phone: **608/ 276-8980**
Fax: **608/ 273-6989**

Date: **29-Jul-97**
Pages (incl cover): **10**

NOTICE: This facsimile is intended only for the addressee shown below and may contain confidential or privileged information. If the recipient of this material is not the intended recipient or if you have received this transmission in error, please notify us immediately by telephone and return the original material to BioRenewal Technologies at the below address via U.S. Postal Service. Thank you for your cooperation.

If there is a problem with this transmission, please call (608) 276-8980

FAXED 7/29/97

Comments:

Curt: re: BioRenewal Job Code BMV

This report presents the results from Comparative Enumeration Assays and Physio-chemical analyses performed on 19 groundwater samples we received on 7/26 & 7/27/97 in connection with the NASB Fuel Farm site located in Brunswick, ME (project number 29600.35.3626). The invoice and chain-of-custody for this project will accompany a confirmation copy sent via mail.

The analytical results requested are presented in the following sections:

- Site suitability for passive bioremediation in relation to suggested guidelines
- Microbial data summary
- Nutrient conditions

These samples were analyzed by BioRenewal using kerosene as the sole carbon source for enumerating the "degrader" microbial populations.

Please give me a call if you have any questions or wish to discuss these results further. We look forward to working with you in the future.

Sincerely,

M. Lynn Haugh

Enclosures: Analytical results
Invoice
Chain-of-custody

NOTE: Visit our new web site at **www.biorenewal.com**.

The Faraday Center • 2800 South Fish Hatchery Rd • Madison, WI 53711 • (608) 276-8980 • Fax: (608) 273-6989

BioRenewal Technologies, Inc.
Bio-Analytical Summary Report

Job Code: **BMV (Part 1)**

Site Information

Site Name	NASB Fuel Farm	Date received	26-Jun-97
Location	Brunswick, ME	Date of this report	28-Jul-97
Consultant	EA Engineering	BioRenewal Job Code	BMV (Part 1)
Proj. Contact	Curt Varner		
Project Ref ID	29600.35.3626	Number of soil samples	0
Contaminant	Kerosene	Number of gw samples	8

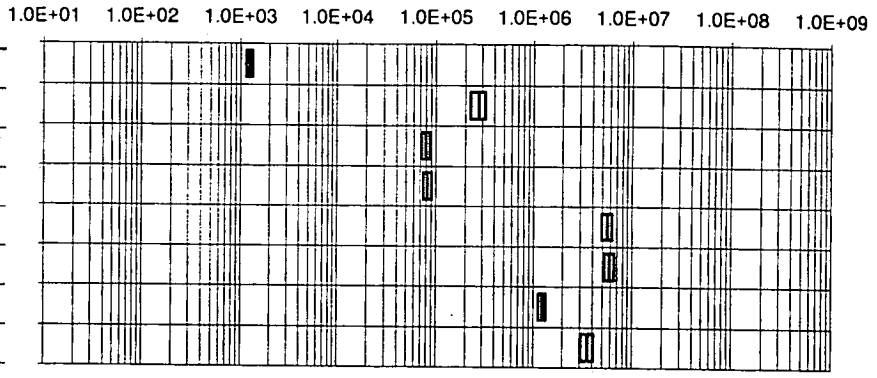
Microbial Data Summary

All values in cfu/ml*

Groundwater Samples
Total populations

Low and high indicate 95% confidence range

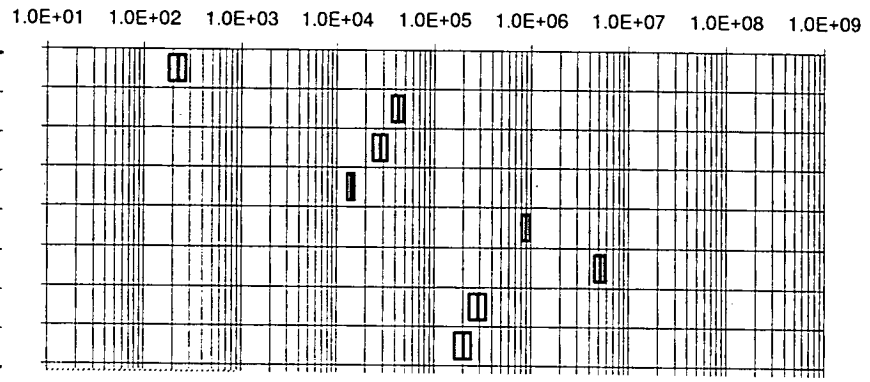
Sample ID	Mean	Low	High
WP-A	1.2E+03	1.1E+03	1.3E+03
WP-B	2.7E+05	2.3E+05	3.2E+05
WP-C	8.0E+04	7.2E+04	8.8E+04
WP-D	8.3E+04	7.4E+04	9.1E+04
WP-E	5.6E+06	5.0E+06	6.3E+06
WP-F	5.9E+06	5.3E+06	6.6E+06
WP-G	1.2E+06	1.1E+06	1.3E+06
WP-H	3.6E+06	3.1E+06	4.1E+06



Groundwater Samples
Degrader populations

Low and high indicate 95% confidence range

Sample ID	Mean	Low	High
WP-A	2.2E+02	1.8E+02	2.7E+02
WP-B	4.3E+04	3.7E+04	4.9E+04
WP-C	2.8E+04	2.4E+04	3.3E+04
WP-D	1.4E+04	1.3E+04	1.5E+04
WP-E	8.9E+05	8.1E+05	9.8E+05
WP-F	5.2E+06	4.5E+06	5.8E+06
WP-G	2.9E+05	2.3E+05	3.5E+05
WP-H	2.0E+05	1.6E+05	2.4E+05



Assay conditions

Sample ID	Degrader Media		Temp.	Growth	DOF **		Percent
	Carbon source	% Carbon (v/v)	(Celcius)	Conditions	Total	Degrader	Degraders
WP-A	kerosene	1.0	22	Aerobic	9	9	18%
WP-B	kerosene	1.0	22	Aerobic	4	4	16%
WP-C	kerosene	1.0	22	Aerobic	4	4	35%
WP-D	kerosene	1.0	22	Aerobic	4	9	17%
WP-E	kerosene	1.0	22	Aerobic	4	4	16%
WP-F	kerosene	1.0	22	Aerobic	4	4	87%
WP-G	kerosene	1.0	22	Aerobic	9	9	23%
WP-H	kerosene	1.0	22	Aerobic	4	9	6%

* cfu/ml = colony forming units per ml of groundwater

** DOF = Degrees of freedom is number of replicates minus one. This parameter is used in calculation of 95% confidence intervals.

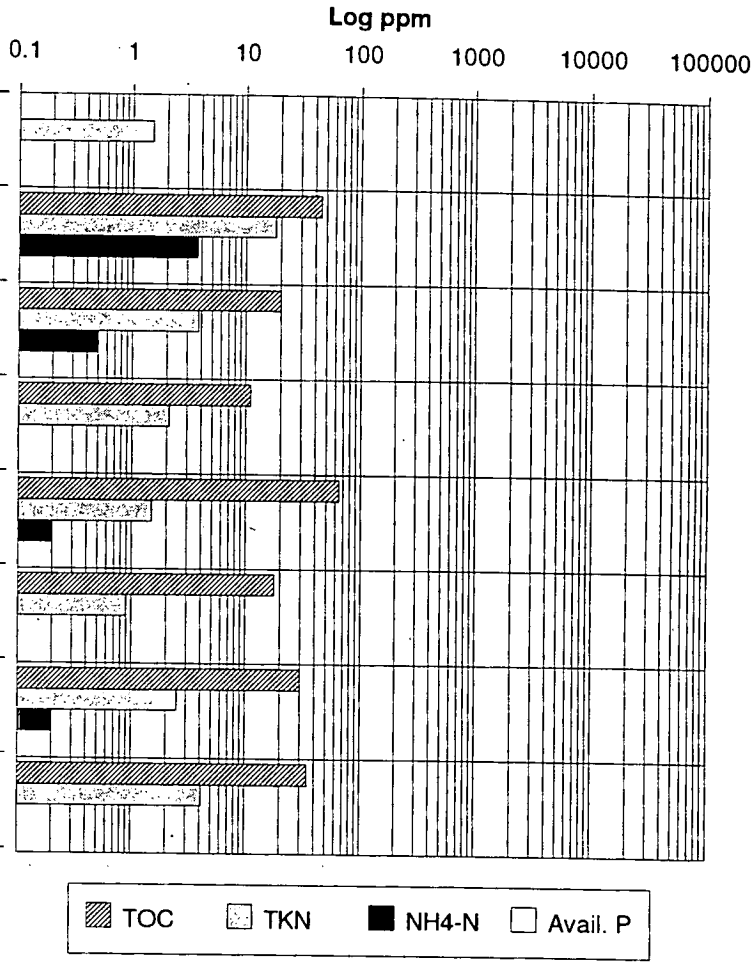
Nutrient Conditions

All results reported as parts per million (ppm) unless otherwise indicated.

Standard Nutrient Panel

Sample ID	TOC*	TKN	NH4-N	Avail. P
WP-A	<0.1	1.5	<0.1	<0.1
WP-B	45	18.1	3.7	<0.1
WP-C	20	3.8	0.5	<0.1
WP-D	11	2.1	<0.1	<0.1
WP-E	65	1.5	0.2	0.1
WP-F	18	0.9	<0.1	<0.1
WP-G	30	2.5	0.2	<0.1
WP-H	35	4.1	<0.1	<0.1

* Total Organic Carbon



Other Analyses and Calculations

Guideline Published Threshholds*		C:N	C:P
Wis Dept. Natural Resources	Below:	40	120
Nat'l Academy of Sciences	Below:	6	30

Sample ID	% Organic* Matter	TON**	Calculated Ratios C:N	Calculated Ratios C:P	pH	Sulfate# (as SO4)	Nitrate## (as N)	Avail. K	Total Fe	CEC meq/100g
WP-A	n/a	1.5	<0.1	n/a	7.7	0.7	<0.05	NR	NR	NR
WP-B	n/a	14.4	3	n/a	6.1	5.1	<0.05	NR	NR	NR
WP-C	n/a	3.3	6	n/a	6.3	0.8	<0.05	NR	NR	NR
WP-D	n/a	2.1	5	n/a	6.0	6.4	1.10	NR	NR	NR
WP-E	n/a	1.3	50	650	5.8	9.5	<0.05	NR	NR	NR
WP-F	n/a	0.9	20	n/a	6.1	59.0	2.90	NR	NR	NR
WP-G	n/a	2.3	13	n/a	6.1	120.0	<0.05	NR	NR	NR
WP-H	n/a	4.1	9	n/a	5.9	53.0	<0.05	NR	NR	NR

Sources: Naturally Occurring Biodegradation as a Remedial Action Option for Soil Contamination: Interim Guidance (Revised), 1994.
In-situ Bioremediation: When Does it Work?, B. Rittman, Ed., National Academy of Sciences, 1993. p 117.

* = Estimated % organic matter - See Methods.

** = Total Organic Nitrogen (Calculated as Total Kjeldahl Nitrogen (TKN) minus ammonium nitrogen).

NR = Not requested.

n/a = Not applicable.

= EPA method 300.0

= EPA method 300.0

Site Information

Site Name	NASB Fuel Farm	Date received	26-Jul & 27-Jul-97
Location	Brunswick, ME	Date of this report	28-Jul-97
Consultant	EA Engineering	BioRenewal Job Code	BMV (Part 2)
Proj. Contact	Curt Varner		
Project Ref ID	29600.35.3626	Number of soil samples	0
Contaminant	Kerosene	Number of gw samples	8

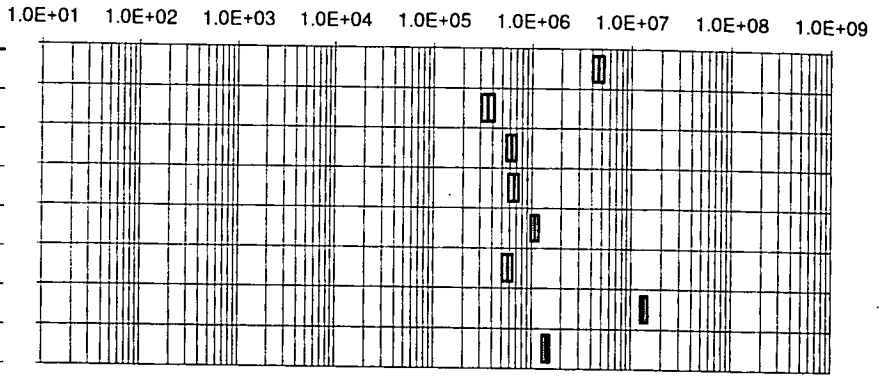
Microbial Data Summary

All values in cfu/ml*

Groundwater Samples
Total populations

Low and high indicate 95% confidence range

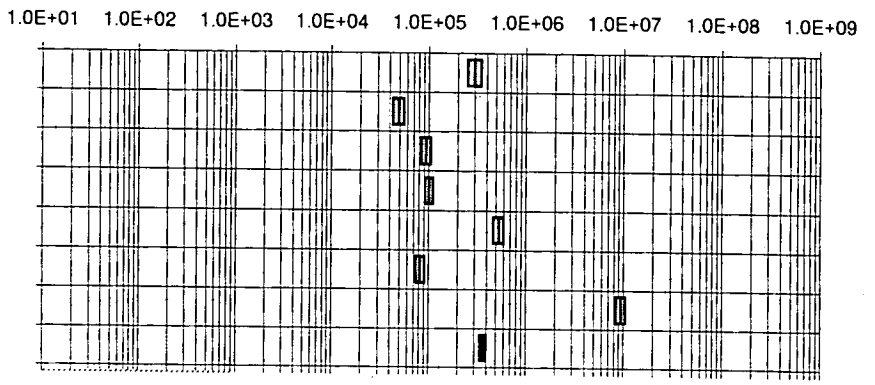
Sample ID	Mean	Low	High
WP-I	4.7E+06	4.1E+06	5.3E+06
WP-J	3.6E+05	3.1E+05	4.1E+05
WP-K	6.3E+05	5.6E+05	7.0E+05
WP-L	6.6E+05	5.9E+05	7.5E+05
WP-M	1.1E+06	1.0E+06	1.2E+06
WP-N	5.8E+05	5.1E+05	6.5E+05
WP-O	1.4E+07	1.3E+07	1.5E+07
WP-P	1.4E+06	1.3E+06	1.5E+06



Groundwater Samples
Degrader populations

Low and high indicate 95% confidence range

Sample ID	Mean	Low	High
WP-I	3.0E+05	2.5E+05	3.5E+05
WP-J	4.9E+04	4.3E+04	5.6E+04
WP-K	9.4E+04	8.4E+04	1.0E+05
WP-L	1.0E+05	9.3E+04	1.1E+05
WP-M	5.3E+05	4.7E+05	6.0E+05
WP-N	8.2E+04	7.4E+04	9.1E+04
WP-O	9.4E+06	8.5E+06	1.0E+07
WP-P	3.6E+05	3.4E+05	3.9E+05



Assay conditions

Sample ID	Degrader Media		Temp.	Growth	DOF **		Percent
	Carbon source	% Carbon (v/v)	(Celcius)	Conditions	Total	Degrader	Degraders
WP-I	kerosene	1.0	22	Aerobic	4	4	6%
WP-J	kerosene	1.0	22	Aerobic	4	4	14%
WP-K	kerosene	1.0	22	Aerobic	4	9	15%
WP-L	kerosene	1.0	22	Aerobic	3	4	15%
WP-M	kerosene	1.0	22	Aerobic	4	4	49%
WP-N	kerosene	1.0	22	Aerobic	4	4	14%
WP-O	kerosene	1.0	22	Aerobic	4	4	69%
WP-P	kerosene	1.0	22	Aerobic	4	3	26%

* cfu/ml = colony forming units per ml of groundwater

** DOF = Degrees of freedom is number of replicates minus one. This parameter is used in calculation of 95% confidence intervals.

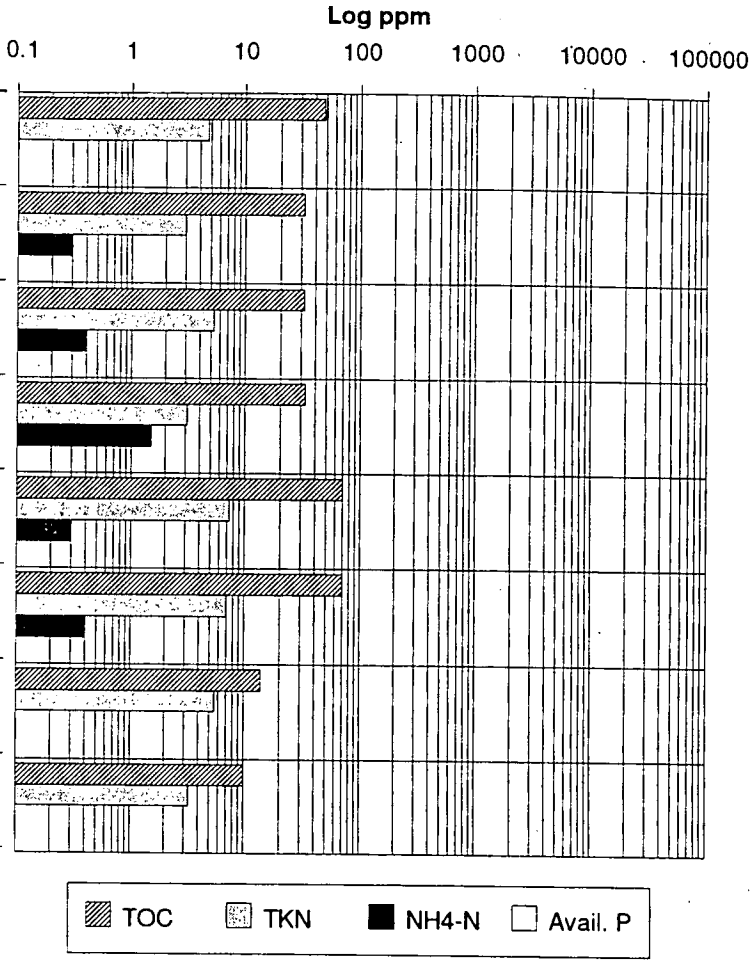
Nutrient Conditions

All results reported as parts per million (ppm) unless otherwise indicated.

Standard Nutrient Panel

Sample ID	TOC*	TKN	NH4-N	Avail. P
WP-I	48	4.7	<0.1	<0.1
WP-J	32	3.0	0.3	<0.1
WP-K	32	5.3	0.4	<0.1
WP-L	33	3.1	1.5	<0.1
WP-M	70	7.4	0.3	<0.1
WP-N	70	7.0	0.4	<0.1
WP-O	14	5.5	<0.1	<0.1
WP-P	10	3.3	<0.1	<0.1

* Total Organic Carbon



Other Analyses and Calculations

Guideline Published Threshholds*		C:N	C:P
Wis Dept. Natural Resources	Below:	40	120
Nat'l Academy of Sciences	Below:	6	30

Sample ID	% Organic* Matter	TON**	Calculated Ratios C:N	Calculated Ratios C:P	pH	Sulfate# (as SO4)	Nitrate## (as N)	Avail. K	Total Fe	CEC meq/100g
WP-I	n/a	4.7	10	n/a	5.8	50.0	<0.05	NR	NR	NR
WP-J	n/a	2.7	12	n/a	5.8	7.2	<0.05	NR	NR	NR
WP-K	n/a	4.9	7	n/a	5.5	3.0	<0.05	NR	NR	NR
WP-L	n/a	1.6	21	n/a	5.3	22.0	<0.05	NR	NR	NR
WP-M	n/a	7.1	10	n/a	6.2	5.2	0.08	NR	NR	NR
WP-N	n/a	6.6	11	n/a	5.9	29.0	0.06	NR	NR	NR
WP-O	n/a	5.5	3	n/a	5.9	30.0	0.05	NR	NR	NR
WP-P	n/a	3.3	3	n/a	5.9	320.0	2.30	NR	NR	NR

Sources: Naturally Occurring Biodegradation as a Remedial Action Option for Soil Contamination: Interim Guidance (Revised), 1994.
In-situ Bioremediation: When Does it Work?, B. Rittman, Ed., National Academy of Sciences, 1993. p 117.

* = Estimated % organic matter - See Methods.

** = Total Organic Nitrogen (Calculated as Total Kjeldahl Nitrogen (TKN) minus ammonium nitrogen).

NR = Not requested.

n/a = Not applicable.

= EPA method 300.0

= EPA method 300.0

Site Information

Site Name	NASB Fuel Farm	Date received	27-Jun-97
Location	Brunswick, ME	Date of this report	28-Jul-97
Consultant	EA Engineering	BioRenewal Job Code	BMV (Part 3)
Proj. Contact	Curt Varner		
Project Ref ID	29600	Number of soil samples	0
Contaminant	Kerosene	Number of gw samples	3

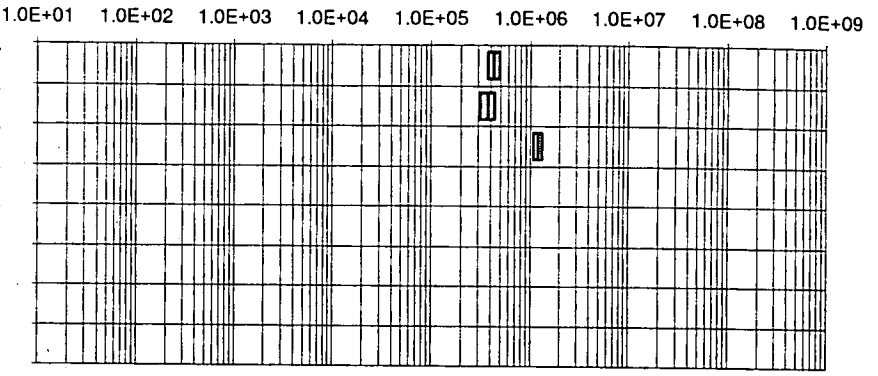
Microbial Data Summary

All values in cfu/ml*

Groundwater Samples
Total populations

Low and high indicate 95% confidence range

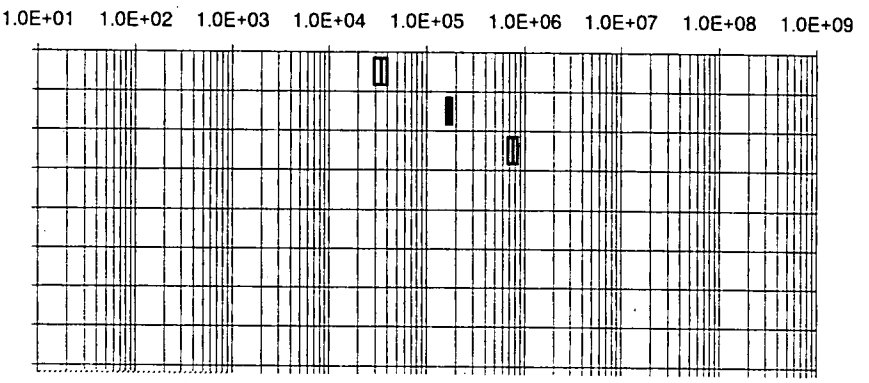
Sample ID	Mean	Low	High
WP-Q	4.3E+05	3.8E+05	4.9E+05
WP-R	3.7E+05	3.1E+05	4.4E+05
WP-S	1.2E+06	1.1E+06	1.3E+06



Groundwater Samples
Degrader populations

Low and high indicate 95% confidence range

Sample ID	Mean	Low	High
WP-Q	3.4E+04	2.9E+04	4.0E+04
WP-R	1.7E+05	1.6E+05	1.8E+05
WP-S	7.6E+05	6.8E+05	8.5E+05



Assay conditions

Sample ID	Degrader Media: Carbon source	Degrader Media: % Carbon (v/v)	Temp. (Celcius)	Growth Conditions	DOF ** Total	DOF ** Degrader	Percent Degraders
WP-Q	kerosene	1.0	22	Aerobic	9	9	8%
WP-R	kerosene	1.0	22	Aerobic	3	9	46%
WP-S	kerosene	1.0	22	Aerobic	3	3	64%

* cfu/ml = colony forming units per ml of groundwater

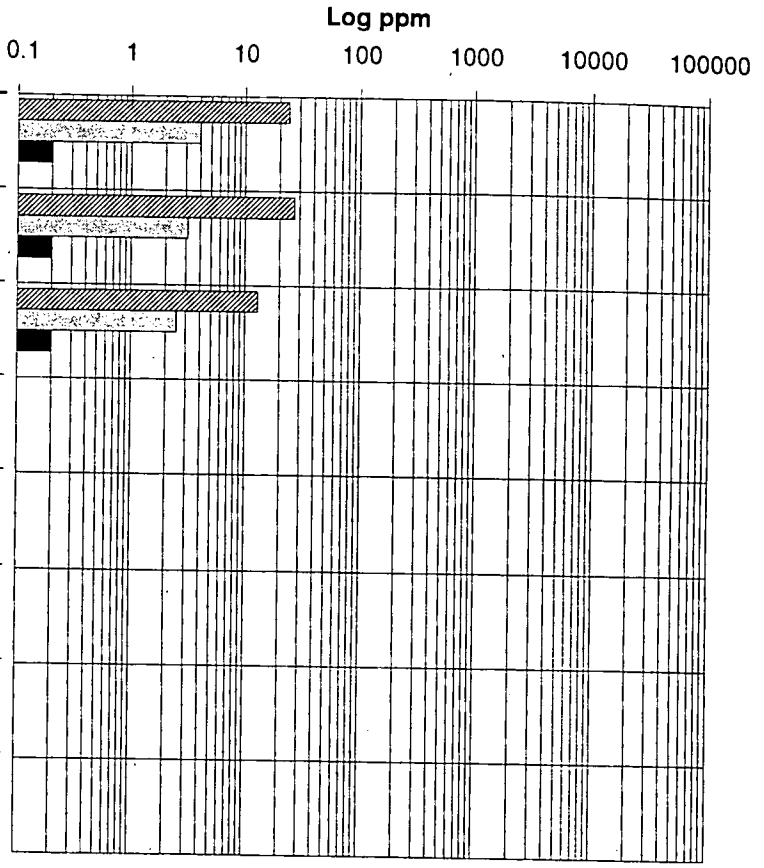
** DOF = Degrees of freedom is number of replicates minus one. This parameter is used in calculation of 95% confidence intervals.

Nutrient Conditions

All results reported as parts per million (ppm) unless otherwise indicated.

Standard Nutrient Panel

Sample ID	TOC*	TKN	NH4-N	Avail. P
WP-Q	24	4.0	0.2	<0.1
WP-R	27	3.1	0.2	<0.1
WP-S	13	2.5	0.2	<0.1



* Total Organic Carbon

Other Analyses and Calculations

Guideline Published Threshholds*		C:N	C:P
Wis Dept. Natural Resources	Below:	40	120
Nat'l Academy of Sciences	Below:	6	30

Sample ID	% Organic* Matter	TON**	Calculated Ratios C:N	Calculated Ratios C:P	pH	Sulfate# (as SO4)	Nitrate## (as N)	Avail. K	Total Fe	CEC meq/100g
WP-Q	n/a	3.8	6	n/a	6.1	45.0	<0.05	NR	NR	NR
WP-R	n/a	2.9	9	n/a	6.1	51.0	0.13	NR	NR	NR
WP-S	n/a	2.3	6	n/a	5.7	30.0	<0.05	NR	NR	NR

Sources: Naturally Occurring Biodegradation as a Remedial Action Option for Soil Contamination: Interim Guidance (Revised), 1994.
In-situ Bioremediation: When Does it Work?, B. Rittman, Ed., National Academy of Sciences, 1993. p 117.

* = Estimated % organic matter - See Methods.

** = Total Organic Nitrogen (Calculated as Total Kjeldahl Nitrogen (TKN) minus ammonium nitrogen).

NR = Not requested.

n/a = Not applicable.

= EPA method 300.0

= EPA method 300.0

Chain-of-Custody

Contact person Curt Varner / Mike Battle Sampler Curt Varner / Sue Chase
Project name NASB Fuel Farm Project # 29600.
Project location NASB Brunswick (City) Maine (state)

Site contaminant * JP-5 (use Kerosene if necessary)
(Used in test for degrader microbial populations, give ratios if applicable, e.g. 50:50, gasoline:diesel)

* If available, a sample of free product is preferred for use as the carbon source for enumerating the degrader microbial populations. Free product included? ☐ yes ☒ No

Sample ID	Lab use only	Date	Time	(✓) Soil	(✓) Gw	Sample depth	(#) Jars	(#) Vials	(#) Core	Additional comments	Comparative Enumeration Assay (Total heterotroph and degrader microbial populations) ☒ Aerobic, ☐ Microaerophilic (s/gw)	Standard nutrient panel (soil/gw) - incl. TKN, ammonium nitrogen, available P, pH, total organic carbon, % moisture (s)	Particle size analysis (soil) ☐ sieve and hydrometer, ☐ sieve only	% air-filled pore space (soil) (includes bulk density)	Intact core: Soil moisture at field capacity	Intact core: Bulk density (soil)	Sulfate by EPA 300	Nitrate by EPA 300			
WP-A	BMV01	6/25/97	13:10		X	6 ft		1			X	X					X	X			
WP-B	BMV02	6/25/97	13:25		X	6 ft		1			X	X					X	X			
WP-C	BMV03	6/25/97	13:28		X	6 ft		1			X	X					X	X			
WP-D	BMV04	6/25/97	13:30		X	6 ft		1			X	X					X	X			
WP-E	BMV05	6/25/97	13:32		X	6 ft		1			X	X					X	X			
WP-F	BMV06	6/25/97	13:35		X	6 ft		1			X	X					X	X			
WP-G	BMV07	6/25/97	13:38		X	6 ft		1			X	X					X	X			
WP-H	BMV08	6/25/97	13:43		X	6 ft		1			X	X					X	X			

Relinquished by: Curt Varner — Date/time: 6/25/97 14:45

Received by: Jim Andrews — Date/time: 6-26-97 11:00

Comments: 1 of 2 — 12 Samples Total

Sample condition upon arrival: On ice? ☐ Yes, ☒ No

BioRenewal Technologies, Inc.
The Faraday Center
2800 S. Fish Hatchery Rd.
Madison, WI 53711
(608)276-8980
Fax (608)273-6989

Send results to:
Name Curt Varner
Company EA Engineering
Address ~~Newburgh~~ 3 Washington Center
City Newburgh State NY Zip 12550
Phone (914) 565-8100 Fax (914) 565-8203

Send invoice to: ☒ Same as results
Name
Company
Address
City State Zip
Phone Fax

White - Original Copy Canary - BioRenewal Copy Pink - Sampler Copy

2 of 2

Chain-of-Custody

Contact person: Curt Varner / Mike Battle Sampler: Curt Varner / Sue Chase
Project name: NASB Fuel Farm Project #: 29600.35.3626
Project location: NASB Brunswick (City) Maine (state)

Site contaminant *: JP-5 (use Kerosene if necessary)
(Used in test for degrader microbial populations, give ratios if applicable, e.g. 50:50, gasoline:diesel)

* If available, a sample of free product is preferred for use as the carbon source for enumerating the degrader microbial populations. Free product included? ☐ yes ☒ No

Sample ID	Lab use only	Date	Time	(✓) Soil	(✓) Gw	Sample depth	(#) Jars	(#) Vials	(#) Core	Additional comments	Comparative Enumeration Assay (Total heterotroph and degrader microbial populations) ☒ Aerobic, ☐ Microaerophilic (s/gw)	Standard nutrient panel (soil/gw) - incl. TKN, ammonium nitrogen, available P, pH, total organic carbon, % moisture (s)	Particle size analysis (soil) ☐ sieve and hydrometer, ☐ sieve only	% air-filled pore space (soil) (includes bulk density)	Intact core: Soil moisture at field capacity	Intact core: Bulk density (soil)	Sulfate by EPA 300	Nitrate by EPA 300			
~~WP-2A~~					X	6 ft		1			X	X					X	X			
WP - I	BMV09	6/25/97	13:45		X	6 ft		1			X	X					X	X			
WP - J	BMV10	6/25/97	13:49		X	6 ft		1			X	X					X	X			
WP - K	BMV11	6/25/97	13:52		X	6 ft		1			X	X					X	X			
WP - L	BMV12	6/25/97	13:55		X	6 ft		1			X	X					X	X			
					X	6 ft		1			X	X					X	X			
					X	6 ft		1			X	X					X	X			
					X	6 ft		1			X	X					X	X			

Relinquished by: [signature] Date/time: 6/25/97 14:45
Received by: Jim Andrews Date/time: 6-26-97 11:00

Comments: 2 of 2
12 Samples Total

Sample condition upon arrival:
On ice? ☒ Yes, ☐ No

BioRenewal Technologies, Inc.
The Faraday Center
2800 S. Fish Hatchery Rd.
Madison, WI 53711
(608)276-8980
Fax (608)273-6989

Send results to:
Name: Curt Varner
Company: EA Engineering
Address: 3 Washington Center
City: Newburgh State: NY Zip: 12550
Phone: (914) 565-8100 Fax: (914) 565-8203

Send invoice to: ☒ Same as results
Name
Company
Address
City State Zip
Phone Fax

White - Original Copy Canary - BioRenewal Copy Pink - Sampler Copy

Chain-of-Custody

Contact person Curt Varner/Mike Battle Sampler Curt Varner/Sue Chase
Project name NASB Fuel Farm Project # 29600-35, 3626
Project location NASB Brunswick (City) Maine (state)

Site contaminant * JP-5 (use Kerosene if necessary)
(Used in test for degrader microbial populations, give ratios if applicable, e.g. 50:50, gasoline:diesel)

* If available, a sample of free product is preferred for use as the carbon source for enumerating the degrader microbial populations. Free product included? ☐ yes ☒ No

CSV

Sample ID	Lab use only	Date	Time	(✓) Soil	(✓) Gw	Sample depth	(#) Jars	(#) Vials	(#) Core	Time ~~Additional comments~~	Comparative Enumeration Assay (Total heterotroph and degrader microbial populations) ☒ Aerobic, ☐ Microaerophilic (s/gw)	Standard nutrient panel (soil/gw) - incl. TKN, ammonium nitrogen, available P, pH, total organic carbon, % moisture (s)	Particle size analysis (soil) ☐ sieve and hydrometer, ☐ sieve only	% air-filled pore space (soil) (includes bulk density)	Intact core: Soil moisture at field capacity (soil)	Intact core: Bulk density (soil)	Sulfate by EPA-300	Nitrate by EPA-300			
WP-M	BMV13	6/26	13:15		x	6 ft		1		13:15	X	X					X	X			
WP-N	BMV14	6/26	13:20		x	6 ft		1		13:20	X	X					X	X			
WP-O	BMV15	6/26	13:25		x	6 ft		1		13:25	X	X					X	X			
WP-P	BMV16	6/26	13:30		x	6 ft		1		13:30	X	X					X	X			
WP-Q	BMV17	6/26	13:35		x	6 ft		1		13:35	X	X					X	X			
WP-R	BMV18	6/26	13:40		x	6 ft		1		13:40	X	X					X	X			
WP-S	BMV19	6/26	13:45		x	6 ft		1		13:45	X	X					X	X			

Requested analyses (✓)

Relinquished by: Curt Varner
Date/time: 6/26/97 14:30
Received by: Jim Andrea
Date/time: 6-27-97
Comments: -7 Samples Total-
Sample condition upon arrival:
On ice? ☑ Yes, ☐ No

BioRenewal Technologies, Inc.
The Faraday Center
2800 S. Fish Hatchery Rd.
Madison, WI 53711
(608)276-8980
Fax (608)273-6989

Send results to:
Name Curt Varner
Company EA Engineering
Address 3 Washington Center
City Newburgh State NY Zip 12550
Phone (914) 565-8100 Fax (914) 565-8203

Send invoice to: ☒ Same as results
Name
Company
Address
City State Zip
Phone Fax

White - Original Copy Canary - BioRenewal Copy Pink - Sampler Copy

Appendix F

Field Record of Biosparging System Operations Forms

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC MDC	Date: 1/3/97	Time:
Weather: Snow sleet 30° windy	Main Gauge (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
SVE-1					
SVE-2					
SVE-3					
SVE-4					
SVE-5					
SVE-6					
SVE-7					
SVE-8					
SVE-9					
SVE-10					
SVE-11					
SVE-12					
SVE-13					
SVE-14					
SVE-15					
SVE-16					
SVE-17					
SVE-18					

EA 5120 0794-4

no PID / FID due to snow + sleet.
Precip causes TVA to go haywire.

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: MOC, SYC	Date: 1/24/97	Time: 900
Weather: 10°, windy	Main Gauge (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
SVE-1				0.7	
SVE-2				0.0	
SVE-3				0.0	
SVE-4				94	
SVE-5				0.0	
SVE-6				0.0	
SVE-7				0.0	
SVE-8				5	
SVE-9				30	water in vault sparging
SVE-10				80	
SVE-11				0.0	positive pressure
SVE-12				18	positive pressure
SVE-13				550	
SVE-14				490	positive pressure
SVE-15				400	positive pressure
SVE-16				120	positive pressure
SVE-17				0.0	
SVE-18				0.2	

EA 5120 0794-4

Mini Rae

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC, MDC	Date: 1/24/97	Time:
Western (Pressure/Flow/Temp.): OFF*	Eastern (Pressure/Flow/Temp.): >300cfm 3psi	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
AAS-1				0.0	
AAS-2				0.0	
AAS-3				0.4	
AAS-4				0.0	
AAS-5				0.2	
AAS-6				0.0	
AAS-7				0.0	
AAS-8				0.2	
AAS-9				9	
AAS-10				30	
AAS-11				300	positive pressure
AAS-12				135	positive pressure
AAS-13				400	
AAS-14				140	
AAS-15				204	
AAS-16				61	positive pressure
AAS-17				2	positive pressure
AAS-18				0.0	

EA 5120 0794-4

* Found Compressor OFF. Reset at 1100

Middle compressor would not come on

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC, MDC	Date: 2/26/97	Time:
Weather: overcast, 35°, windy	Main Gauge (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
SVE-1			0	0	
SVE-2			72	10	
SVE-3			Froze		
SVE-4			0	6.2	
SVE-5			Froze		
SVE-6			0	0	
SVE-7			0	0	
SVE-8			4687	390	
SVE-9			295	47.6	hole by concrete vault
SVE-10			190	13.2	
SVE-11			35.2	4.4	
SVE-12			81.3	15.2	
SVE-13			602	100	
SVE-14			2.2%	510	
SVE-15			1530	215	
SVE-16			135	25.6	
SVE-17			0	0	
SVE-18			1.9	1.3	

EA 5120 0794-4

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC / MDC	Date: 2/26/97	Time:
Western (Pressure/Flow/Temp.): 250 scfm / 7 PSI	Eastern (Pressure/Flow/Temp.): 250 scfm / 7 psi	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
AAS-1			181	26.4	
AAS-2			0	0	
AAS-3			Froze		
AAS-4			Froze		
AAS-5			0	0	
AAS-6			0	6.5	
AAS-7			0	0	
AAS-8			1490	150	
AAS-9			1085	164	
AAS-10			134	14.2	
AAS-11			190	24.8	
AAS-12			160	22.2	
AAS-13			2250	300	
AAS-14			1.0%	463	
AAS-15			10%	435	
AAS-16			19.0	4.2	
AAS-17			0	0	
AAS-18			0	0	

EA 5120 0794-4

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC / BDA	Date: 3/15/97	Time:
Weather: clear sunny 2"-4" Snow	Main Gauge (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
SVE-1					NOT completed due to
SVE-2					Snow and ice cover
SVE-3					
SVE-4					
SVE-5					
SVE-6					
SVE-7					
SVE-8					
SVE-9					
SVE-10					
SVE-11					
SVE-12					
SVE-13					
SVE-14					
SVE-15					
SVE-16					
SVE-17					
SVE-18					

EA 5120 0794-4

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC/BDA	Date: 3/15/97	Time:
Western (Pressure/Flow/Temp.):	Eastern (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
AAS-1					Not Completed due
AAS-2					to 2"-4" Snow and ice
AAS-3					cover
AAS-4					
AAS-5					
AAS-6					
AAS-7					
AAS-8					
AAS-9					
AAS-10					
AAS-11					
AAS-12					
AAS-13					
AAS-14					
AAS-15					
AAS-16					
AAS-17					
AAS-18					

EA 5120 0794-4

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SC, MC	Date: 3/27/97	Time: 1100
Weather: overcast, 35°, windy	Main Gauge (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
SVE-1			—	—	Snow/ice cover
SVE-2			—	—	Snow/ice cover
SVE-3			—	—	Snow/ice cover
SVE-4			—	—	Snow/ice cover
SVE-5			—	—	Snow/ice cover
SVE-6			—	—	Snow/ice cover
SVE-7			—	—	Snow/ice cover
SVE-8			1500	250	
SVE-9			125	26	
SVE-10			—	—	Snow/ice cover
SVE-11			—	—	Snow/ice cover
SVE-12			—	—	Snow/ice cover
SVE-13			700	130	
SVE-14			1.5%	550	
SVE-15			1000	200	
SVE-16			90	21	
SVE-17			0	0	
SVE-18			—	—	Snow/ice cover

EA 5120 0794-4

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS
Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SC, MC	Date: 3/27/97	Time: 1100
Western (Pressure/Flow/Temp.): OFF	Eastern (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm$_v$)	PID TVH (ppm$_v$)	Comments
AAS-1			—	—	snow/ice cover
AAS-2			—	—	snow/ice cover
AAS-3			—	—	snow/ice cover
AAS-4			—	—	snow/ice cover
AAS-5			—	—	snow/ice cover
AAS-6			—	—	snow/ice cover
AAS-7			—	—	snow/ice cover
AAS-8			—	—	snow/ice cover
AAS-9			—	—	snow/ice cover
AAS-10			76	7	
AAS-11			20	4	
AAS-12			25	4	
AAS-13			2550	325	
AAS-14			—	—	snow/ice cover
AAS-15			—	—	snow/ice cover
AAS-16			5	2	
AAS-17			0	0	
AAS-18			0	0	

EA 5120 0794-4

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: MDC SYC	Date: 4/7/97	Time:
Weather: Overcast, 50°	Main Gauge (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
SVE-1			1.3	0.0	
SVE-2			2.0	0.0	
SVE-3			2.3	0.0	
SVE-4			168	27.5	
SVE-5			5.1	0.0	
SVE-6			1.9	0.0	
SVE-7			1.2	0.0	
SVE-8			4.4	0.0	
SVE-9			6.0	0.0	Large hole by vault
SVE-10			230	19.2	
SVE-11			4.6	0.0	
SVE-12			25.3	1.2	
SVE-13			16.8	1.3	
SVE-14			754	116	Small hole by concrete vault
SVE-15			630	111	
SVE-16			104	18.0	
SVE-17			0.8	0.0	
SVE-18			0.8	0.0	

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: STC, MDC	Date: 4/7/97	Time:
Western (Pressure/Flow/Temp.):	Eastern (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
AAS-1			1.3	6.0	
AAS-2			1.2	0.0	
AAS-3			2.3	0.0	
AAS-4			8.3	0.0	
AAS-5			95.2	0.5	
AAS-6			62.1	0.0	
AAS-7			1.2	0.0	
AAS-8			2.0	0.0	
AAS-9			2.6	0.0	
AAS-10			35.3	2.8	
AAS-11			7.5	0.0	
AAS-12			52.8	5.8	
AAS-13			920	157	
AAS-14			328	49.2	
AAS-15			106	28	
AAS-16			3.5	0.0	
AAS-17			1.0	0.0	
AAS-18			0.9	0.0	

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC, BDA	Date: 4/30/97	Time:
Weather: Sunny, windy, 47°	Main Gauge (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
SVE-1			5.5	0.0	
SVE-2			5.4	0.0	
SVE-3			5.4	0.3	
SVE-4			80.4	9.4	
SVE-5			5.0	0.0	
SVE-6			5.9	0.0	
SVE-7			6.0	0.0	
SVE-8			11.6	0.0	
SVE-9			45.1	1.1	
SVE-10			263	4.4	
SVE-11			55.4	0.0	
SVE-12			12.6	0.0	
SVE-13			10.4	0.0	
SVE-14			2741	283	
SVE-15			743	101	
SVE-16			108	13.8	
SVE-17			1.7	0.0	
SVE-18			2.4	0.0	

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC, BDA	Date: 4/30/97	Time:
Western (Pressure/Flow/Temp.):	Eastern (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
AAS-1			5.6	0.0	
AAS-2			6.1	0.0	
AAS-3			5.3	0.0	
AAS-4			6.1	0.0	
AAS-5			21.7	1.5	
AAS-6			7.3	0.0	
AAS-7			4.8	0.0	
AAS-8			4.5	0.0	
AAS-9			5.1	0.0	
AAS-10			9.7	0.0	
AAS-11			5.0	0.0	
AAS-12			67.8	0.0	
AAS-13			14.3	0.0	
AAS-14			15.1	0.2	
AAS-15			34.9	4.0	
AAS-16			5.7	0.0	
AAS-17			3.9	0.0	
AAS-18			3.3	0.0	

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC, CEM	Date: 5/15/97	Time:
Weather: Sunny, 50°	Main Gauge (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
SVE-1			0.8	0.0	
SVE-2			1.0	0.0	
SVE-3			1.3	0.6	
SVE-4			82.1	5.3	
SVE-5			0.0	0.0	
SVE-6			0.1	0.0	
SVE-7			1.0	0.2	
SVE-8			7.0	0.8	
SVE-9			17.6	0.8	
SVE-10			909	14.8	
SVE-11			274	1.1	
SVE-12			16.7	1.8	
SVE-13			11.0	1.2	
SVE-14			2908	151	
SVE-15			1712	108	
SVE-16			260	18	
SVE-17			0.4	0.0	
SVE-18			0.0	0.0	

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SC, CM	Date: 5/15/97	Time:
Western (Pressure/Flow/Temp.):	Eastern (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
AAS-1			0.3	0.0	
AAS-2			1.4	0.0	
AAS-3			1.1	0.4	
AAS-4			1.5	0.5	
AAS-5			1.2	0.0	
AAS-6			4.2	0.0	
AAS-7			0.2	0.0	
AAS-8			2.9	0.6	
AAS-9			3.4	0.6	
AAS-10			39.2	1.2	
AAS-11			3.6	0.6	
AAS-12			14.3	0.9	
AAS-13			464	28.9	
AAS-14			345	19.2	
AAS-15			170	10.1	
AAS-16			5.0	0.2	
AAS-17			0.6	0.0	
AAS-18			0.6	0.2	

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC	Date: 5/30/97	Time:
Weather: overcast, 50	Main Gauge (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
SVE-1			0	9.9	
SVE-2			0.7	11.8	
SVE-3			0	13.2	
SVE-4			0	6.4	
SVE-5			13.8	11.4	
SVE-6			6.4	8.8	
SVE-7			5.3	11.5	
SVE-8			146	16.8	
SVE-9			166	15.8	
SVE-10			963	24.4	
SVE-11			164	5.2	
SVE-12			149	7.8	
SVE-13			86.2	5.4	
SVE-14			2127	28.8	
SVE-15			8421	89.9	
SVE-16			2094	28.8	
SVE-17			18.2	5.4	
SVE-18			0	4.8	

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC	Date: 5/30/97	Time:
Western (Pressure/Flow/Temp.):	Eastern (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
AAS-1			6.8	14.7	
AAS-2			11.8	9.5	
AAS-3			4.8	13.6	
AAS-4			0	0	
AAS-5			0.8	8.8	
AAS-6			7.6	11.8	
AAS-7			7.8	9.2	
AAS-8			96.2	13.5	
AAS-9			132	11.9	
AAS-10			308	15.3	
AAS-11			68.2	5.6	
AAS-12			235	2.6	
AAS-13			5028	58.2	
AAS-14			114	4.8	
AAS-15			237	6.8	
AAS-16			27.4	2.1	
AAS-17			9.2	4.6	
AAS-18			5.4	5.4	

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC	Date: 6/6	Time:
Weather: Sunny, 75	Main Gauge (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
SVE-1			0.0	134	
SVE-2			0.0	120	
SVE-3			0.0	84	
SVE-4			0.0	61	
SVE-5			0.0	56	
SVE-6			0.0	49	
SVE-7			0.0	86	
SVE-8			4.2	38.7	
SVE-9			5.9	51.2	
SVE-10			59.3	52.6	
SVE-11			67.8	58.1	
SVE-12			4.9	32.1	
SVE-13			4.8	43.2	
SVE-14			108	69.2	
SVE-15			474	75.6	
SVE-16			175	302	
SVE-17			1.3	82.1	
SVE-18			2.1	18.9	

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SC	Date: 6/6	Time:
Western (Pressure/Flow/Temp.):	Eastern (Pressure/Flow/Temp.):	

Location	Pressure (psi)	Flowrate (cfm)	FID TVH (ppm_v)	PID TVH (ppm_v)	Comments
AAS-1			0.0	128	
AAS-2			0.0	143	
AAS-3			0.0	104	
AAS-4			0.0	82	
AAS-5			0.0	49.2	
AAS-6			0.0	59.1	
AAS-7			0.0	68.2	
AAS-8			3.2	10.7	
AAS-9			4.2	16.5	
AAS-10			79.2	46.5	
AAS-11			9.1	38.2	
AAS-12			35.4	48.1	
AAS-13			114	38.1	
AAS-14			6.4	39.8	
AAS-15			13.3	41.2	
AAS-16			3.1	1.8	
AAS-17			1.2	24.1	
AAS-18			1.8	52.1	

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: SYC, MDC	Date: 6/23/97	Time: 800
Weather: Sunny, 80	Main Gauge (Pressure/Flow/Temp.):	

Location	FID TVH (ppm_v)	PID TVH (ppm_v)	CH_4	CO_2	O_2	%LEL	Comments
SVE-1	0.6	0.6	0	0.3	20.8	0	
SVE-2	2.0	0.9	0	0.3	20.7	0	
SVE-3	1.5	1.2	0	0.5	20.8	0	
SVE-4	4.3	2.4	0	0	21.0	0	
SVE-5	0	0	0	0	21.0	0	
SVE-6	0	0	0	0	21.0	0	
SVE-7	0	0	0	0	20.8	0	
SVE-8	3.8	2.4	0	0	21.7	0	
SVE-9	50.1	5.9	0	0	21.7	0	
SVE-10	10.8	10.7	0	0	21.7	0	
SVE-11	123	30.2	0	0	21.7	0	
SVE-12	10.1	4.8	0	0	21.7	0	
SVE-13	9.6	2.4	0	0	21.7	0	
SVE-14	8.8	2.1	0	0	21.7	0	
SVE-15	817	58.8	0	0	21.7	0	
SVE-16	385	42.2	0.1	0.1	21.4	2	
SVE-17	1.2	20.2	0	2.0	19.3	0	
SVE-18	2.5	10.6	0	0.1	21.1	0	

EA Engineering, Science, and Technology

FIELD RECORD OF BIOSPARGING SYSTEM OPERATIONS

Brunswick Naval Air Station Fuel Farm Biosparging System

EA Personnel: S.C, MDC	Date: 6/23/97	Time: 800
Western (Pressure/Flow/Temp.):	Eastern (Pressure/Flow/Temp.):	

Location	FID TVH (ppm_v)	PID TVH (ppm_v)	CH_4	CO_2	O_2	%LEL	Comments
AAS-1	1.2	1.8	0	0	21.2	0	
AAS-2	1.4	2.2	0	0.1	21.1	0	
AAS-3	1.0	0.9	0	0.1	21.0	0	
AAS-4	1.2	1.8	0	0	21.0	0	
AAS-5	0	0	0	0	21.1	0	
AAS-6	0	0	0	0.2	20.9	0	
AAS-7	1.1	2.6	0	0.1	20.9	0	
AAS-8	3.2	11.6	0	0	21.7	0	
AAS-9	4.8	6.8	0	0	21.7	0	
AAS-10	3.6	1.8	0	0	21.7	0	
AAS-11	29.7	1.0	0	0	21.8	0	
AAS-12	40.4	2.5	0	0	21.7	0	
AAS-13	91.2	8.4	0	0	21.7	0	
AAS-14	41.2	2.7	0	0	21.7	0	
AAS-15	32.6	1.8	0	0	21.7	0	
AAS-16	6.2	1.5	0	0	21.6	0	
AAS-17	2.1	1.8	0	0	21.5	0	
AAS-18	2.3	32.8	0	0	21.4	0	