



ANNUAL MONITORING REPORT
Task Order No. 067D
Soil and Groundwater Remediation
Building AS-4158
Marine Corps Air Station
New River, North Carolina

Prepared for

The Atlantic Division, Naval Facilities Engineering Command

December 2002

Prepared by

J.A. Jones Environmental Services Company
8936 Western Way, Suite 10
Jacksonville, Florida 32256
J.A. Jones No. 005.067d

CERTIFICATION

Annual Monitoring Report

Task Order 067d

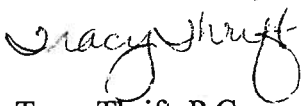
Soil and Groundwater Remediation
Building AS-4158
Marine Corps Air Station
New River, North Carolina

The material and data in this Annual Monitoring Report was prepared under the direction of the undersigned.

J.A. Jones Environmental Services Company is submitting this Annual Monitoring Report to the Navy as required under contract N62470-93-D-3033 for work performed at Building AS-4158, Marine Corps Air Station in New River, North Carolina. The report was prepared in conformance with J.A. Jones Environmental Services Company's quality assurance/quality control procedures to ensure that the report meets industry standards in terms of the methods used and the information presented. If you have any questions or comments concerning the report, please contact one of the individuals listed below.

Respectfully submitted,

J.A. JONES ENVIRONMENTAL SERVICES COMPANY



Tracy Thrift, P.G.
Project Geologist
N.C. P.G. No. 1885



Richard Garcia, P.E.
Senior Engineer
N.C. P.E. No. 20901
December 31, 2002

ACRONYM LIST

| | |
|-------------------|--|
| AFVR | aggressive fluid-vapor recovery |
| AST | aboveground storage tank |
| BQL | Below Laboratory Quantitation Limits |
| CAP | Corrective Action Plan |
| Catlin | Catlin and Associates, Inc. |
| ERC | Environmental and Regulatory Consultants, Inc |
| ft bls | feet below land surface |
| GTGS | Groundwater Technology Government Services |
| J.A. Jones | J.A. Jones Environmental Services Company |
| LNAPL | light non-aqueous phase liquid |
| Law | Law Engineering and Environmental Services, Inc. |
| µg/l | micrograms per liter |
| mg/kg | milligrams per kilogram |
| mg/m ³ | milligrams per cubic meter |
| MCAS | Marine Corps Air Station |
| NAVFACENCOM | Navy Atlantic Division, Naval Facilities Engineering Command |
| NCAC | North Carolina Administrative Code |
| NCDENR | North Carolina Department of Environment and Natural Resources |
| PAH | Polynuclear Aromatic Hydrocarbon |
| Paradigm | Paradigm Analytical Laboratories, Inc. |
| ppm | parts per million |
| SAR | Site Assessment Report |
| SVE | Soil Vapor Extraction |
| TPH | Total Petroleum Hydrocarbons |
| USEPA | United States Environmental Protection Agency |
| UST | underground storage tank |
| VOC | Volatile Organic Compound |
| MW | Monitoring Well |
| PW | Pumping Well |
| HP | hydropunch Penetrometers |
| Cfm | cubic feet per minute |

TABLE OF CONTENTS

| | |
|--|------------|
| CERTIFICATION | i |
| ACRONYM LIST | ii |
| TABLE OF CONTENTS | iii |
| LIST OF TABLES | iv |
| LIST OF FIGURES | v |
| LIST OF APPENDICES | vi |
| EXECUTIVE SUMMARY | vii |
| SECTION 1.0 INTRODUCTION | 1-1 |
| 1.1 SITE HISTORY | 1-2 |
| 1.2 SITE ASSESSMENT AND CORRECTIVE ACTION SUMMARY | 1-3 |
| 1.3 GROUNDWATER MONITORING | 1-5 |
| SECTION 2.0 OPERATION AND MAINTENANCE | 2-1 |
| 2.1 OPERATION HISTORY | 2-1 |
| 2.2 SYSTEM OPERATION AND MAINTENANCE REQUIREMENTS | 2-2 |
| 2.3 SYSTEM REPAIRS AND TROUBLESHOOTING | 2-3 |
| 2.4 SYSTEM DERIVED WASTE | 2-3 |
| SECTION 3.0 ANALYTICAL SUMMARY | 3-1 |
| 3.1 GROUNDWATER SAMPLING | 3-1 |
| 3.2 AIR SAMPLING | 3-4 |
| SECTION 4.0 CONCLUSIONS AND RECOMMENDATIONS | 4-1 |

LIST OF TABLES

| <u>Table No.</u> | <u>Title</u> |
|------------------|--|
| 1-1 | Groundwater Elevation Measurement Summary |
| 2-1 | Transportation and Disposal Log |
| 3-1 | Summary of Detected Concentrations - Groundwater Monitoring Well Samples |
| 3-2 | Summary of Detected Concentrations - Air Quality Samples |

LIST OF FIGURES

| <u>Figure No.</u> | <u>Title</u> |
|-------------------|---|
| 1-1 | Site Plan |
| 2-1 | Groundwater Elevation – Type II Wells – April 24, 1998 |
| 2-2 | Groundwater Elevation – Type II Wells – November 22, 1999 |
| 2-3 | Groundwater Elevation – Type II Wells – April 25, 2000 |
| 2-4 | Groundwater Elevation – Type II Wells – November 5, 2001 |
| 2-5 | Groundwater Elevation – Type II Wells – April 15, 2002 |
| 3-1 | Dissolved Groundwater Contaminant Isopleth Map - March 27, 1998 |
| 3-2 | Dissolved Groundwater Contaminant Isopleth Map - April 19, 1999 |
| 3-3 | Dissolved Groundwater Contaminant Isopleth Map - April 25, 2000 |
| 3-4 | Dissolved Groundwater Contaminant Isopleth Map - April 17, 2001 |
| 3-5 | Dissolved Groundwater Contaminant Isopleth Map - April 15, 2002 |

LIST OF APPENDICES

APPENDIX A GROUNDWATER SAMPLES - LABORATORY DATA

APPENDIX B AIR QUALITY SAMPLES - LABORATORY DATA

EXECUTIVE SUMMARY

As part of the installation, operation, and maintenance of the soil and groundwater treatment system at Building AS-4158 located on Marine Corps Air Station (MCAS), New River, North Carolina, J.A. Jones Environmental Services Company (J.A. Jones) has been retained by the Department of the Navy Atlantic Division, Naval Facilities Engineering Command (NAVFACENGCOM), to prepare this Annual Monitoring Report.

From April 1998 through April 2002, J.A. Jones implemented the selected approach as outlined in the September 11, 1995 Corrective Action Plan (CAP) prepared by Richard Catlin and Associates, Inc. (Catlin) at the Building AS-4158 site. The selected remedial approach consisted of the installation and operation of a soil and groundwater treatment system consisting of air sparge and soil vapor extraction (SVE) and groundwater monitoring to maintain optimum treatment system performance and track petroleum-impacted groundwater migration in order to verify remediation progress.

run on

Light non-aqueous phase liquid (LNAPL) was observed at the Building AS-4158 site during the removal of three fuel dispensing underground storage tanks (USTs) on August 18, 1992. In April 1998 the air sparge/soil vapor extraction system was installed and remained in operation until December 1999, at which time the treatment system was shut down due to consistently low concentrations of petroleum related constituents. One year of post-operation monitoring was initiated. In February 2001, however, the system was restarted due to an increase in contaminant concentrations in monitoring wells MW-9, MW-11, and MW-13. As of April 2002, the system remains operational.

Overall, since the March 27, 1998 sampling event, detected concentrations of volatile organic compounds (VOCs) have been reduced significantly. Of the fifteen monitoring wells sampled at the site, only monitoring wells MW-9, MW-11, and MW-13 have had contamination above the 15A North Carolina Administrative Code (NCAC) 2L groundwater quality since October 21, 1998.

add standard after 80

The interpreted areal extent of the dissolved polycyclic aromatic hydrocarbon (PAH) plume in the vicinity of Building AS-4158 has been determined by the Department of Environmental and Natural Resources. Each of the groundwater monitoring wells in the vicinity of Building AS-4158 has had concentrations of PAHs above the regulatory limit since April 17, 1998.

- uncapitalize monitoring.
- mention report of release to State via email dated 4/30/2002.

Two leaks from an underground fuel transfer line at well MW-9 occurred during the first quarter of 2001. Product thickness is currently measured on a regular basis to recover the LNAPL at this well. Since LNAPL has been recovered from Monitoring well

- 1st sent: how is this statement substantiated? 1st Qtr of 99?
Only suspected a release 2001/early 2002 ∴ did tightness testing early 2002 which showed leaks => report to State.

don't give w/nd TP on pg 2-2

The overall reduction in contaminant concentrations within the dissolved petroleum contaminant plume indicates that the air sparge/soil vapor extraction treatment system has been effective in volatilizing and removing the petroleum hydrocarbons present in the groundwater at the Building AS-4158 site.

J.A. Jones recommends the continued removal of LNAPL from MW-9 until it is not detected during four consecutive quarters. The leaking underground fuel line should be repaired and a tightness test performed to demonstrate its integrity. The treatment system should be again shut down and quarterly post-operation sampling be initiated until dissolved petroleum related constituent concentrations consistently meet the site rehabilitation concentrations established by the 15A NCAC 2L groundwater quality standards.

- Fuel line
was tightness
tested ~~in~~ April 2002
& repairs made
Nov 2002.

SECTION 1.0

INTRODUCTION

As part of the installation, operation, and maintenance of the soil and groundwater treatment system at Building AS-4158 located on MCAS, New River, North Carolina (N353,250; E2,463,380 based on map measurement) J.A. Jones has been retained by NAVFACENGCOM to prepare this Annual Monitoring Report. The purpose of this report is to present the findings and recommendations associated with the operation of the soil and groundwater treatment system and groundwater monitoring activities, which took place from April 1998 to April 2002.

This Annual Monitoring Report is organized into four sections of text including tables that present historical analytical data from sampling events and groundwater elevations at the site. Figures provided in this report present the site layout, groundwater elevation contour maps detailing on-site groundwater flow patterns, and dissolved groundwater contaminant isopleth maps which present the interpreted areal extent of volatile aromatic constituents detected above NCDENR groundwater quality standards. Also included are two appendices that present the laboratory data from the groundwater treatment system and groundwater monitoring well sampling events.

Section 1.0 Introduction includes the site history, a summary of the site assessment and corrective action activities, a summary of the LNAPL recovery and groundwater monitoring activities.

Section 2.0 Operation and Maintenance provides a summary of the operation of the soil and groundwater treatment system including any problems encountered and troubleshooting required during the system operation.

Section 3.0 Analytical Summary presents a summary of the analytical results from the samples collected during the quarterly groundwater monitoring well sampling events.

Section 4.0 Conclusions and Recommendations addresses the conclusions and any recommendations from the annual operation of the soil and groundwater treatment system, and quarterly groundwater monitoring well sampling events.

1.1 SITE HISTORY

Building AS-4158 is located at the MCAS New River, North Carolina. **Figure 1-1** provides a layout of the Building AS-4158 site.

According to the Leaking Underground Storage Tank Site Assessment Report (SAR), dated October 4, 1994 and prepared by Law Engineering and Environmental Services (Law), a presence of hydrocarbon material was identified by Environmental and Regulatory Consultants, Inc. (ERC) during the removal of three fuel dispensing USTs on August 18, 1992. One of the 3,000 gallon capacity steel USTs supplied gasoline for MCAS vehicles, while the other two 3,000 gallon steel USTs supplied diesel fuel for MCAS vehicles. No documentation was made of the age or condition of the USTs at the time of the removal. The three USTs were replaced with two 10,000 gallon capacity aboveground storage tanks (ASTs), which currently store diesel fuel and are located adjacent to the site of the former USTs.

During the field investigation work performed under the SAR, Law collected soil samples from the sixteen borings advanced for the installation of the Type II and Type III groundwater monitoring wells and a pumping well. Two soil samples were collected from each soil boring for MW-4, MW-5, MW-7 through MW-18 and PW-1 and analyzed for gasoline range and diesel range total petroleum hydrocarbons (TPH) using United States Environmental Protection Agency (USEPA) Methods Modified 8015/5030 and 8015/3550, respectively. Three soil samples were collected from the soil boring for MW-6 and analyzed for gasoline range and diesel range TPH using USEPA Method Modified 8015/5030 and 8015/3550, respectively. Two soil samples were retained from each soil boring for either on-site or off-site laboratory analysis. The on-site laboratory was owned and operated by Geochem, Incorporated of Morrisville, North Carolina. All off-site samples were submitted to Law Environmental National Laboratories in Pensacola, Florida. The laboratory results indicated the presence of detectable TPH-gasoline in MW-4 (1.2 milligrams/kilogram [mg/kg]), MW-9 (180 mg/kg), and MW-13 (0.87 mg/kg). All except for MW-9 fall below the NCDENR action levels of 10 mg/kg for TPH-gasoline. The laboratory results indicated the presence of detectable TPH-diesel in MW-9 (3,400 mg/kg), MW-11 (17 mg/kg), MW-15 (3.3 mg/kg), and MW-17 (5.7 mg/kg). All except for MW-9 fall below the NCDENR action levels of 40 mg/kg for TPH-diesel.

Law conducted a site assessment at Building AS-4158 to evaluate the impact to the groundwater and vadose zone soil caused by the release of petroleum hydrocarbon contaminants from the former USTs. A summary of the site assessment is presented in **Section 1.2 Site Assessment and Corrective Action Summary**.

An evaluation of appropriate remedial alternatives for the Building AS-4158 site was documented in the CAP, dated September 11, 1995. The selected remedial approach at Building AS-4158 consisted of the installation of an air sparge/soil vapor extraction system to recover LNAPL, coupled with groundwater monitoring to evaluate the

migration and attenuation of the dissolved petroleum hydrocarbon constituents from the former UST basin.

To monitor the dissolved petroleum hydrocarbon constituents in the groundwater, J.A. Jones collected groundwater samples during sixteen quarterly events from eighteen existing on-site monitoring wells, MW-1 through MW-18, from April 1998 to April 2002. A summary of the groundwater monitoring activities is presented in **Section 1.3 Groundwater Monitoring**.

1.2 SITE ASSESSMENT AND CORRECTIVE ACTION SUMMARY

In March and April of 1993, Groundwater Technology Government Services (GTGS) performed a three well site check, which involved the advancement of three soil borings that were converted to monitoring wells AS-4158MW-1, AS-4158MW-2, and AS-4158MW-3 and collection and analysis of soil and groundwater samples. Each of the monitoring wells was installed to a depth of approximately seventeen feet below land surface (ft bls) and contains a fifteen foot screened section. Groundwater samples were collected from each of the three monitoring wells and were analyzed for volatile aromatic hydrocarbons using USEPA Method 602. Hydrocarbons were detected in each of the three wells.

In December 1993 and January 1994 as part of the site assessment activities, Law installed fifteen hydropunch penetrometers, twelve Type II groundwater monitoring wells, three Type III groundwater monitoring wells, and one six inch diameter pumping well to evaluate site geology and the extent of petroleum-impacted groundwater and vadose zone soils. The groundwater monitoring wells and pumping well were designated as MW-4 through MW-18 and PW-1, respectively. Type II groundwater monitoring wells, designated MW-4, MW-5, MW-6, MW-7, MW-10, MW-12, MW-14 were installed to a depth of 16.5 ft bls with a 10 foot section of well screen set at the well completion depth. Type II groundwater monitoring wells, designated MW-8, MW-9 (product recovery well), MW-11, MW-13, MW-15 were installed to a depth of 17.0 ft bls with a 10 foot section of well screen set at the well completion depth. Type III groundwater monitoring wells, designated MW-16 through MW-18 were installed to a depth of 50.5 ft bls with a 5 foot section of well screen set at the well completion depth. In addition, the pumping well, designated PW-1 was installed to a depth of 30 ft bls with a 20 foot section of well screen set at the well completion depth.

From December 1993 to January 1994, Law collected soil samples from the sixteen borings advanced for the installation of the Type II and Type III groundwater monitoring wells and pumping well. Two soil samples were collected from each soil boring for MW-4, MW-5, MW-7 through MW-18 and PW-1 and analyzed for gasoline range and diesel range TPH using USEPA Method Modified 8015/5030 and 8015/3550, respectively. Three soil samples were collected from the soil boring for MW-6 and analyzed for gasoline range and diesel range TPH using USEPA Method Modified 8015/5030 and 8015/3550, respectively.

In December 1993, ten groundwater samples were collected using a Hydropunch sampling probe to provide delineation information concerning the dissolved petroleum hydrocarbon constituents and LNAPL plume at Building AS-4158. Groundwater samples were collected by driving the Hydropunch probe through the unsaturated zone into the water bearing zone and then opening the Hydropunch to allow groundwater to enter the sample chamber. Small-diameter, decontaminated Teflon bailers were then lowered in to the chambers to collect the samples. All samples were analyzed for volatile aromatic hydrocarbons using USEPA Method 602 and the USEPA Method 610 analyte list of polynuclear aromatic hydrocarbons using USEPA Method 625. In December of 1993 and January of 1994, groundwater samples were collected from monitoring wells MW-1 through MW-18 and PW-1 and analyzed for volatile aromatic hydrocarbons using USEPA Method 601/602 and the USEPA Method 610 analyte list of PAHs using USEPA Method 625.

Petroleum hydrocarbon constituents were detected in the groundwater samples collected from hydropunch penetrometers HP-1 through HP-8 and groundwater monitoring wells MW-2 through MW-4, MW-7, MW-9 (former product recovery well) through MW-17, and PW-1. According to the CAP dated September 11, 1995, prepared by Catlin, the primary groundwater contaminants identified at the site are benzene, ethylbenzene, acenaphthene, anthracene, benzo(a)anthracene, chrysene, fluoranthene, 1-Methylnaphthalene, 2-Methylnaphthalene, bromoform, dibromochloromethane, bromodichloromethane, and chloroform. The maximum detected groundwater concentrations of these contaminants, as presented in the CAP, with their corresponding site rehabilitation levels, as established in NCAC Title 15A Subchapter 2L groundwater quality standards, are provided as follows:

North Carolina Groundwater Quality Standards and Site Target Cleanup Concentrations

| Groundwater Constituent | Maximum Detected Concentration (µg/l) | Site Rehabilitation Concentration (µg/l) |
|--------------------------------|--|---|
| Benzene | 1,400 | 1.0 |
| Ethylbenzene | 1,700 | 29 |
| Acenaphthene | 2.8 | 80 |
| Anthracene | 1.2 | 2,100 |
| Benzo(a)anthracene | 18 | .05 |
| Chrysene | 7.0 | 5 |
| Fluoranthene | 2.7 | 280 |
| 1-Methylnaphthalene | 3.4 | * |
| 2-Methylnaphthalene | 2.9 | 28 |
| Bromoform | 2.3 | 0.19 |
| Dibromochloromethane | 1.6 | * |
| Bromodichloromethane | 0.7 | * |
| Chloroform | 2.7 | 0.00019 |

The asterisk (*) indicates that no numerical standard has been established. As a result, according to NCAC Title 15A Subchapter 2L, the target rehabilitation concentration is the laboratory detection limit.

According to the CAP, dated September 11, 1995, prepared by Catlin, the soil constituents identified at the site are TPH gasoline ranges - per EPA Method 5030 and TPH diesel ranges - per EPA Method 3550. The maximum detected soil concentrations for these TPH ranges, as presented in the CAP, with their corresponding site rehabilitation levels, are provided as follows:

Soil Maximum Detected Concentrations and Site Target Cleanup Concentrations

| Soil Constituent | EPA Method | Maximum Detected Concentration | Site Rehabilitation Concentration |
|--------------------|------------|--------------------------------|-----------------------------------|
| TPH Gasoline range | 5030 | 180 mg/Kg | 10 ppm |
| TPH Diesel range | 3550 | 3,400 mg/Kg | 40 ppm |

1.3 GROUNDWATER MONITORING

The air sparge/soil vapor extraction system is designed to reduce the dissolved petroleum hydrocarbon groundwater concentrations to site rehabilitation levels regulated by the NCDENR. These site rehabilitation levels are provided in the NCAC Title 15A Subchapter 2L *Classifications and Water Quality Standards Applicable to the Groundwaters of North Carolina*.

To monitor the effectiveness of the air sparge/soil vapor extraction system in the reduction of dissolved petroleum hydrocarbon constituents in the groundwater, J.A. Jones collected quarterly groundwater samples from eighteen monitoring wells from April 1998 to April 2002. These wells were utilized to evaluate the migration of dissolved petroleum hydrocarbon constituents from the former UST basin. Review of the analytical results from these quarterly groundwater samples indicated that there were detected concentrations above laboratory quantitation limits in ten of the monitoring wells. All samples were delivered to Paradigm Analytical Laboratories, Inc. (Paradigm) and analyzed for volatile aromatic hydrocarbons using USEPA Method 602 and the USEPA Method 610 analyte list of polynuclear aromatic hydrocarbons using USEPA Method 625.

Groundwater elevations were measured monthly from April 1998 to April 2002 in each of the eighteen on-site groundwater monitoring wells MW-1 through MW-18 and pumping well PW-1. The groundwater elevation data, including the depth to water and LNAPL, are presented in **Table 1-1**.

Table 1-1
Building AS 4158
Camp Lejeune, North Carolina
Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 4/15/2002 | | | 3/19/2002 | | | 2/12/2002 | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | Not Measured | | | Not Measured | | | Not Measured | |
| MW-2 | 15.51 | | Dry | | | Dry | | | Dry | |
| MW-3 | 17.70 | | 9.86 | 7.84 | | 6.92 | 10.78 | | 9.30 | 8.40 |
| MW-4 | 22.19 | | 10.37 | 11.82 | | 10.21 | 11.98 | | 9.82 | 12.37 |
| MW-5 | 22.10 | | 10.23 | 11.87 | | 9.83 | 12.27 | | 10.84 | 11.26 |
| MW-6 | 15.55 | | 10.57 | 4.98 | | 10.01 | 5.54 | | 9.82 | 5.73 |
| MW-7 | 22.11 | | 10.60 | 11.51 | | 10.43 | 11.68 | | 10.93 | 11.18 |
| MW-8 | 16.27 | | 11.11 | 5.16 | | 11.05 | 5.22 | | 11.60 | 4.67 |
| MW-9 (Prod. Recovery Well) | 23.14 | 10.88 | 11.68 | 11.46 | 11.59 | 13.12 | 10.02 | 11.49 | 13.99 | 9.15 |
| MW-10 | 15.73 | | 11.83 | 3.90 | | 11.69 | | | 11.40 | 4.33 |
| MW-11 | 23.84 | | 12.12 | 11.72 | | 12.12 | 11.72 | | 13.44 | 10.40 |
| MW-12 | 22.03 | | Not Measured | | | Not Measured | | | Not Measured | |
| MW-13 | 24.12 | | 12.45 | 11.67 | | 12.45 | 11.67 | | Dry | |
| MW-14 | 15.73 | | 10.70 | 5.03 | | 10.71 | 5.02 | | 11.01 | 4.72 |
| MW-15 | 23.99 | | 11.86 | 12.13 | | 11.78 | 12.21 | | 13.49 | 10.50 |
| MW-16 | 22.19 | | 10.81 | 11.38 | | 10.76 | 11.43 | | 12.10 | 10.09 |
| MW-17 | 23.05 | | 11.72 | 11.33 | | 11.58 | 11.47 | | 12.67 | 10.38 |
| MW-18 | 23.88 | | 12.50 | 11.38 | | 12.34 | 11.54 | | 13.15 | 10.73 |
| PW-1 | 22.80 | | Not Measured | | | Not Measured | | | Not Measured | |

Notes:

- ¹ System not operational during water level survey
- ² Groundwater elevation measurements same day prior to AFVR event.
- ³ Groundwater elevation measurements same day after AFVR event.

ft = feet

toc = top of casing elevation

msl = mean sea level

* Indicates that the depth to hydrocarbon product could not be measured. The product-water interface probe was being repaired.

Table 1-1 (continued)
Building AS 4158
Camp Lejeune, North Carolina
Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 1/15/2002 | | | 12/17/2001 | | | 11/5/2001 | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | Not Measured | | | 8.53 | | | 9.38 | |
| MW-2 | 15.51 | | Dry | | | Dry | | | Dry | |
| MW-3 | 17.70 | | 7.95 | 9.75 | | 9.50 | 8.20 | | 9.78 | 7.92 |
| MW-4 | 22.19 | | 10.96 | 11.23 | | 9.58 | 12.61 | | 10.11 | 12.08 |
| MW-5 | 22.10 | | 10.88 | 11.22 | | 9.90 | 12.20 | | 10.29 | 11.81 |
| MW-6 | 15.55 | | 11.16 | 4.39 | | 9.95 | 5.60 | | 10.32 | 5.23 |
| MW-7 | 22.11 | | 11.80 | 10.31 | | 9.48 | 12.63 | | 10.88 | 11.23 |
| MW-8 | 16.27 | | 12.40 | 3.87 | | 11.03 | 5.24 | | 10.85 | 5.42 |
| MW-9 (Prod. Recovery Well) | 23.14 | 12.28 | 15.18 | 7.96 | | 10.10 | 13.04 | | 10.20 | 12.94 |
| MW-10 | 15.73 | | Not Measured | | | 9.90 | 5.83 | | Not Measured | |
| MW-11 | 23.84 | | 13.69 | 10.15 | | 11.83 | 12.01 | | 11.83 | 12.01 |
| MW-12 | 22.03 | | Not Measured | | | Not Measured | | | Not Measured | |
| MW-13 | 24.12 | | 15.45 | 8.67 | | 13.35 | 10.77 | | 11.88 | 12.24 |
| MW-14 | 15.73 | | 10.70 | 5.03 | | 9.95 | 5.78 | | 9.48 | 6.25 |
| MW-15 | 23.99 | | 14.20 | 9.79 | | 10.55 | 13.44 | | 10.15 | 13.84 |
| MW-16 | 22.19 | | 11.63 | 10.56 | | 10.89 | 11.30 | | 10.89 | 11.30 |
| MW-17 | 23.05 | | 12.50 | 10.55 | | 11.57 | 11.48 | | 11.78 | 11.27 |
| MW-18 | 23.88 | | 13.64 | 10.24 | | 12.50 | 11.38 | | 12.69 | 11.19 |
| PW-1 | 22.80 | | Not Measured | | | Not Measured | | | Not Measured | |

Notes:

- ¹System not operational during water level survey
- ²Groundwater elevation measurements same day prior to AFVR event.
- ³Groundwater elevation measurements same day after AFVR event.
- ft = feet
- toc = top of casing elevation
- msl = mean sea level
- * Indicates that the depth to hydrocarbon product could not be measured

Table 1-1 (continued)
Building AS 4158
Camp Lejeune, North Carolina
Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 10/15/2001 | | | 9/24/2001 | | | 7/16/2001 | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | 9.17 | | | 9.20 | | | 8.50 | |
| MW-2 | 15.51 | | Dry | | | Not Measured | | | Not Measured | |
| MW-3 | 17.70 | | 9.48 | 8.22 | | 9.25 | 8.45 | | 8.68 | 9.02 |
| MW-4 | 22.19 | | 9.79 | 12.40 | | 9.48 | 12.71 | | 8.98 | 13.21 |
| MW-5 | 22.10 | | 9.98 | 12.12 | | 9.99 | 12.11 | | 9.50 | 12.60 |
| MW-6 | 15.55 | | 10.07 | 5.48 | | 9.65 | 5.90 | | 9.22 | 6.33 |
| MW-7 | 22.11 | | Not Measured | | | Not Measured | | | 10.94 | 11.17 |
| MW-8 | 16.27 | | 10.28 | 5.99 | | 10.82 | 5.45 | | 10.20 | 6.07 |
| MW-9 (Prod. Recovery Well) | 23.14 | | 10.35 | 12.79 | | 12.16 | 10.98 | | 10.63 | 12.51 |
| MW-10 | 15.73 | | 11.45 | 4.28 | | 13.85 | 1.88 | | 13.18 | 2.55 |
| MW-11 | 23.84 | | 11.81 | 12.03 | | 13.40 | 10.44 | | 12.76 | 11.08 |
| MW-12 | 22.03 | | Not Measured | | | Not Measured | | | Not Measured | |
| MW-13 | 24.12 | | 12.17 | 11.95 | | 16.17 | 7.95 | | 16.33 | 7.79 |
| MW-14 | 15.73 | | 10.01 | 5.72 | | 10.28 | 5.45 | | 9.87 | 5.86 |
| MW-15 | 23.99 | | 10.63 | 13.36 | | 11.29 | 12.70 | | 10.35 | 13.64 |
| MW-16 | 22.19 | | 10.65 | 11.54 | | 10.78 | 11.41 | | 10.46 | 11.73 |
| MW-17 | 23.05 | | 11.61 | 11.44 | | 11.45 | 11.60 | | 11.57 | 11.48 |
| MW-18 | 23.88 | | 12.33 | 11.55 | | 12.71 | 11.17 | | 12.41 | 11.47 |
| PW-1 | 22.80 | | Not Measured | | | Not Measured | | | Not Measured | |

Notes:

- ¹ System not operational during water level survey
- ² Groundwater elevation measurements same day prior to AFVR event.
- ³ Groundwater elevation measurements same day after AFVR event.
- ft = feet
- toc = top of casing elevation
- msl = mean sea level
- * Indicates that the depth to hydrocarbon product could not be measured

Table 1-1 (continued)
Building AS 4158
Camp Lejeune, North Carolina
Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 5/14/2001 | | | 4/17/2001 | | | 3/16/2001 | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | 6.30 | | | 7.83 | | | Not Measured | |
| MW-2 | 15.51 | | 8.30 | 7.21 | | 8.43 | 7.08 | | 7.06 | 8.45 |
| MW-3 | 17.70 | | 7.80 | 9.90 | | 7.85 | 9.85 | | 6.54 | 11.16 |
| MW-4 | 22.19 | | 8.90 | 13.29 | | 8.40 | 13.79 | | 8.18 | 14.01 |
| MW-5 | 22.10 | | 9.10 | 13.00 | | 8.60 | 13.50 | | 6.75 | 15.35 |
| MW-6 | 15.55 | | 8.98 | 6.57 | | 8.70 | 6.85 | | 7.80 | 7.75 |
| MW-7 | 22.11 | | 9.59 | 12.52 | | 9.00 | 13.11 | | 8.82 | 13.29 |
| MW-8 | 16.27 | | 10.27 | 6.00 | | 9.23 | 7.04 | | 9.31 | 6.96 |
| MW-9 (Prod. Recovery Well) | 23.14 | | 10.23 | 12.91 | | 9.28 | 13.86 | | 9.45 | 13.69 |
| MW-10 | 15.73 | | 12.91 | 2.82 | | 9.80 | 5.93 | | 10.26 | 5.47 |
| MW-11 | 23.84 | | 12.70 | 11.14 | | 10.70 | 13.14 | | 10.75 | 13.09 |
| MW-12 | 22.03 | | Not Measured | | | Not Measured | | | Not Measured | |
| MW-13 | 24.12 | | 15.83 | 8.29 | | 11.14 | 12.98 | | 11.22 | 12.90 |
| MW-14 | 15.73 | | 9.90 | 5.83 | | 9.50 | 6.23 | | 9.68 | 6.05 |
| MW-15 | 23.99 | | 10.55 | 13.44 | | 10.14 | 13.85 | | 10.30 | 13.69 |
| MW-16 | 22.19 | | 10.17 | 12.02 | | 9.12 | 13.07 | | 9.13 | 13.06 |
| MW-17 | 23.05 | | 11.36 | 11.69 | | 10.33 | 12.72 | | 10.20 | 12.85 |
| MW-18 | 23.88 | | 12.30 | 11.58 | | 11.31 | 12.57 | | 11.19 | 12.69 |
| PW-1 | 22.80 | | Not Measured | | | Not Measured | | | Not Measured | |

Notes:

- ¹ System not operational during water level survey
- ² Groundwater elevation measurements same day prior to AFVR event.
- ³ Groundwater elevation measurements same day after AFVR event.
- ft = feet
- toc = top of casing elevation
- msl = mean sea level
- * Indicates that the depth to hydrocarbon product could not be measured

Table 1-1 (continued)
Building AS 4158
Camp Lejeune, North Carolina
Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 2/15/2001 | | | 2/14/2001 | | | 2/13/2001 | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | Not Measured | | | Not Measured | | | Not Measured | |
| MW-2 | 15.51 | | 7.10 | 8.41 | | 5.59 | 9.92 | | 5.72 | 9.79 |
| MW-3 | 17.70 | | 6.80 | 10.90 | | 5.46 | 12.24 | | 6.05 | 11.65 |
| MW-4 | 22.19 | | 8.16 | 14.03 | | 7.79 | 14.40 | | 7.84 | 14.35 |
| MW-5 | 22.10 | | 7.82 | 14.28 | | 6.86 | 15.24 | | 6.30 | 15.80 |
| MW-6 | 15.55 | | 8.06 | 7.49 | | 7.81 | 7.74 | | 8.50 | 7.05 |
| MW-7 | 22.11 | | 7.31 | 14.80 | | 6.65 | 15.46 | | 4.85 | 17.26 |
| MW-8 | 16.27 | | 9.00 | 7.27 | | 8.54 | 7.73 | | 8.81 | 7.46 |
| MW-9 (Prod. Recovery Well) | 23.14 | | 8.74 | 14.40 | | 8.35 | 14.79 | | 7.68 | 15.46 |
| MW-10 | 15.73 | | 6.31 | 9.42 | | 5.45 | 10.28 | | 3.50 | 12.23 |
| MW-11 | 23.84 | | 8.80 | 15.04 | | 8.10 | 15.74 | | 9.95 | 13.89 |
| MW-12 | 22.03 | | Not Measured | | | Not Measured | | | Not Measured | |
| MW-13 | 24.12 | | 7.86 | 16.26 | | 7.65 | 16.47 | | 7.53 | 16.59 |
| MW-14 | 15.73 | | 8.77 | 6.96 | | 8.79 | 6.94 | | 8.94 | 6.79 |
| MW-15 | 23.99 | | 9.65 | 14.34 | | 9.65 | 14.34 | | 9.70 | 14.29 |
| MW-16 | 22.19 | | 8.91 | 13.28 | | 7.78 | 14.41 | | 4.04 | 18.15 |
| MW-17 | 23.05 | | 9.77 | 13.28 | | 8.79 | 14.26 | | 5.68 | 17.37 |
| MW-18 | 23.88 | | 10.62 | 13.26 | | 9.62 | 14.26 | | 7.86 | 16.02 |
| PW-1 | 22.80 | | Not Measured | | | Not Measured | | | Not Measured | |

Notes:

- ¹ System not operational during water level survey
- ² Groundwater elevation measurements same day prior to AFVR event.
- ³ Groundwater elevation measurements same day after AFVR event.
- ft = feet
- toc = top of casing elevation
- msl = mean sea level
- * Indicates that the depth to hydrocarbon product could not be measured

Table 1-1 (continued)
Building AS 4158
Camp Lejeune, North Carolina
Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 1/4/2001 | | | 12/14/00 ³ | | | 12/14/00 ² | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | Not Measured | | | Not Measured | | | Not Measured | |
| MW-2 | 15.51 | | Not Measured | | | 7.35 | 8.16 | | 5.73 | 9.78 |
| MW-3 | 17.70 | | 8.04 | 9.66 | | 7.10 | 10.60 | | 6.07 | 11.63 |
| MW-4 | 22.19 | | 8.70 | 13.49 | | 8.27 | 13.92 | | 8.38 | 13.81 |
| MW-5 | 22.10 | | 8.71 | 13.39 | | 8.04 | 14.06 | | 8.02 | 14.08 |
| MW-6 | 15.55 | | 8.98 | 6.57 | | 8.27 | 7.28 | | 8.28 | 7.27 |
| MW-7 | 22.11 | | 9.20 | 12.91 | | 8.81 | 13.30 | | 9.87 | 12.24 |
| MW-8 | 16.27 | | 9.30 | 6.97 | | 9.05 | 7.22 | | 9.12 | 7.15 |
| MW-9 (Prod. Recovery Well) | 23.14 | | 9.48 | 13.66 | | 14.18 | 8.96 | | 9.36 | 13.78 |
| MW-10 | 15.73 | | 10.45 | 5.28 | | 9.82 | 5.91 | | 9.74 | 5.99 |
| MW-11 | 23.84 | | 10.71 | 13.13 | | 10.72 | 13.12 | | 10.56 | 13.28 |
| MW-12 | 22.03 | | Not Measured | | | Not Measured | | | Not Measured | |
| MW-13 | 24.12 | | 11.13 | 12.99 | | Dry | | | 10.95 | 13.17 |
| MW-14 | 15.73 | | 9.60 | 6.13 | | 9.72 | 6.01 | | 9.60 | 6.13 |
| MW-15 | 23.99 | | 10.39 | 13.60 | | 10.23 | 13.76 | | 10.26 | 13.73 |
| MW-16 | 22.19 | | 9.35 | 12.84 | | 9.47 | 12.72 | | 8.54 | 13.65 |
| MW-17 | 23.05 | | 10.56 | 12.49 | | 10.14 | 12.91 | | 10.22 | 12.83 |
| MW-18 | 23.88 | | 11.45 | 12.43 | | 11.04 | 12.84 | | 11.08 | 12.80 |
| PW-1 | 22.80 | | Not Measured | | | Not Measured | | | Not Measured | |

Notes:

- ¹ System not operational during water level survey
- ² Groundwater elevation measurements same day prior to AFVR event.
- ³ Groundwater elevation measurements same day after AFVR event.
- ft = feet
- toc = top of casing elevation
- msl = mean sea level
- * Indicates that the depth to hydrocarbon product could not be measured

Table 1-1 (continued)
Building AS 4158
Camp Lejeune, North Carolina
Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 10/18/00 ¹ | | | 7/26/00 ¹ | | | 4/25/00 ¹ | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | 7.56 | | | Not Measured | | | Not Measured | |
| MW-2 | 15.51 | | 7.99 | 7.52 | | 5.70 | 9.81 | | 6.97 | 8.54 |
| MW-3 | 17.70 | | 7.51 | 10.19 | | 5.12 | 12.58 | | 7.56 | 10.14 |
| MW-4 | 22.19 | | 8.10 | 14.09 | | 5.75 | 16.44 | | 8.10 | 14.09 |
| MW-5 | 22.10 | | 8.25 | 13.85 | | 6.75 | 15.35 | | 8.25 | 13.85 |
| MW-6 | 15.55 | | 8.72 | 6.83 | | 7.06 | 8.49 | | 8.17 | 7.38 |
| MW-7 | 22.11 | | 8.68 | 13.43 | | 8.56 | 13.55 | | 8.14 | 13.97 |
| MW-8 | 16.27 | | 8.34 | 7.93 | | 9.83 | 6.44 | | 8.93 | 7.34 |
| MW-9 (Prod. Recovery Well) | 23.14 | | 8.97 | 14.17 | | 9.55 | 13.59 | | 9.28 | 13.86 |
| MW-10 | 15.73 | | 9.23 | 6.50 | | 10.27 | 5.46 | | 9.75 | 5.98 |
| MW-11 | 23.84 | | 10.18 | 13.66 | | 10.89 | 12.95 | | 10.08 | 13.76 |
| MW-12 | 22.03 | | Not Measured | | | Not Measured | | | Not Measured | |
| MW-13 | 24.12 | | 10.62 | 13.50 | | 11.42 | 12.70 | | 10.47 | 13.65 |
| MW-14 | 15.73 | | 9.02 | 6.71 | | 9.50 | 6.23 | | 9.16 | 6.57 |
| MW-15 | 23.99 | | 9.41 | 14.58 | | 10.10 | 13.89 | | 9.70 | 14.29 |
| MW-16 | 22.19 | | 8.87 | 13.32 | | 8.93 | 13.26 | | 8.80 | 13.39 |
| MW-17 | 23.05 | | 10.08 | 12.97 | | 10.23 | 12.82 | | 9.94 | 13.11 |
| MW-18 | 23.88 | | 10.96 | 12.92 | | 11.10 | 12.78 | | 10.72 | 13.16 |
| PW-1 | 22.80 | | Not Measured | | | Not Measured | | | Not Measured | |

Notes:

- ¹ System not operational during water level survey
- ² Groundwater elevation measurements same day prior to AFVR event.
- ³ Groundwater elevation measurements same day after AFVR event.
- ft = feet
- toc = top of casing elevation
- msl = mean sea level
- * Indicates that the depth to hydrocarbon product could not be measured

Table 1-1 (continued)
Building AS 4158
Camp Lejeune, North Carolina
Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 1/12/00 ¹ | | | 12/20/1999 | | | 11/22/1999 | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | 7.46 | | | Not Measured | | | Not Measured | |
| MW-2 | 15.51 | | Not Measured | | | Not Measured | | | 5.92 | 9.59 |
| MW-3 | 17.70 | | 8.31 | 9.39 | | 8.13 | 9.57 | | 6.50 | 11.20 |
| MW-4 | 22.19 | | 8.36 | 13.83 | | 7.53 | 14.66 | | 6.84 | 15.35 |
| MW-5 | 22.10 | | Not Measured | | | Not Measured | | | 7.37 | 14.73 |
| MW-6 | 15.55 | | 9.29 | 6.26 | | 8.50 | 7.05 | | 7.56 | 7.99 |
| MW-7 | 22.11 | | 9.28 | 12.83 | | Not Measured | | | 4.76 | 17.35 |
| MW-8 | 16.27 | | 9.63 | 6.64 | | 8.82 | 7.45 | | 7.45 | 8.82 |
| MW-9 (Prod. Recovery Well) | 23.14 | | 11.01 | 12.13 | | Not Measured | | | 9.91 | 13.23 |
| MW-10 | 15.73 | | 10.51 | 5.22 | | Not Measured | | | 4.82 | 10.91 |
| MW-11 | 23.84 | | 10.83 | 13.01 | | 10.41 | 13.43 | | 9.23 | 14.61 |
| MW-12 | 22.03 | | Not Measured | | | 6.43 | 15.60 | | 7.19 | 14.84 |
| MW-13 | 24.12 | | 11.38 | 12.74 | | 11.12 | 13.00 | | 9.35 | 14.77 |
| MW-14 | 15.73 | | 9.20 | 6.53 | | 8.93 | 6.80 | | 7.64 | 8.09 |
| MW-15 | 23.99 | | 9.66 | 14.33 | | 9.51 | 14.48 | | 8.30 | 15.69 |
| MW-16 | 22.19 | | 9.38 | 12.81 | | 10.16 | 12.03 | | 8.30 | 13.89 |
| MW-17 | 23.05 | | 10.51 | 12.54 | | 10.61 | 12.44 | | 9.62 | 13.43 |
| MW-18 | 23.88 | | 11.45 | 12.43 | | 10.44 | 13.44 | | 10.68 | 13.20 |
| PW-1 | 22.80 | | Not Measured | | | Not Measured | | | Not Measured | |

Notes:

¹System not operational during water level survey

²Groundwater elevation measurements same day prior to AFVR event.

³Groundwater elevation measurements same day after AFVR event.

ft = feet

toc = top of casing elevation

msl = mean sea level

* Indicates that the depth to hydrocarbon product could not be measured

Table I-1 (continued)
Building AS 4158
Camp Lejeune, North Carolina
Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 10/20/99 ¹ | | | 9/23/1999 | | | 8/19/1999 | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | Not Measured | | | Not Measured | | | Not Measured | |
| MW-2 | 15.51 | | Not Measured | | | 5.56 | 9.95 | | 5.66 | 9.85 |
| MW-3 | 17.70 | | 5.29 | 12.41 | | Not Measured | | | 6.14 | 11.56 |
| MW-4 | 22.19 | | 5.53 | 16.66 | | 4.46 | 17.73 | | 6.40 | 15.79 |
| MW-5 | 22.10 | | 6.34 | 15.76 | | 5.96 | 16.14 | | 7.91 | 14.19 |
| MW-6 | 15.55 | | 5.50 | 10.05 | | 4.43 | 11.12 | | 9.63 | 5.92 |
| MW-7 | 22.11 | | 7.04 | 15.07 | | 6.26 | 15.85 | | 6.00 | 16.11 |
| MW-8 | 16.27 | | 7.23 | 9.04 | | 6.65 | 9.62 | | 8.64 | 7.63 |
| MW-9 (Prod. Recovery Well) | 23.14 | | 10.66 | 12.48 | | 6.54 | 16.60 | | 8.56 | 14.58 |
| MW-10 | 15.73 | | 8.61 | 7.12 | | 10.75 | 4.98 | | 3.65 | 12.08 |
| MW-11 | 23.84 | | 9.07 | 14.77 | | 8.29 | 15.55 | | 7.91 | 15.93 |
| MW-12 | 22.03 | | 9.21 | 12.82 | | 7.15 | 14.88 | | 8.22 | 13.81 |
| MW-13 | 24.12 | | 9.72 | 14.40 | | 7.69 | 16.43 | | 5.30 | 18.82 |
| MW-14 | 15.73 | | 8.98 | 6.75 | | 7.82 | 7.91 | | 9.40 | 6.33 |
| MW-15 | 23.99 | | 9.35 | 14.64 | | 9.32 | 14.67 | | 9.58 | 14.41 |
| MW-16 | 22.19 | | 10.63 | 11.56 | | 6.57 | 15.62 | | 7.00 | 15.19 |
| MW-17 | 23.05 | | 7.99 | 15.06 | | 7.63 | 15.42 | | 7.90 | 15.15 |
| MW-18 | 23.88 | | 8.67 | 15.21 | | 8.64 | 15.24 | | 9.24 | 14.64 |
| PW-1 | 22.80 | | Not Measured | | | Not Measured | | | Not Measured | |

Notes:

¹ System not operational during water level survey

² Groundwater elevation measurements same day prior to AFVR event.

³ Groundwater elevation measurements same day after AFVR event.

ft = feet

toc = top of casing elevation

msl = mean sea level

* Indicates that the depth to hydrocarbon product could not be measured

Table 1-1 (continued)
 Building AS 4158
 Camp Lejeune, North Carolina
 Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 7/14/99 ¹ | | | 5/24/99 ³ | | | 5/24/99 ² | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | Not Measured | | | 6.65 | | | 9.03 | |
| MW-2 | 15.51 | | Not Measured | | | Not Measured | | | Not Measured | |
| MW-3 | 17.70 | | 9.54 | 8.16 | | 7.82 | 9.88 | | 9.34 | 8.36 |
| MW-4 | 22.19 | | 9.22 | 12.97 | | 8.82 | 13.37 | | 8.85 | 13.34 |
| MW-5 | 22.10 | | 10.63 | 11.47 | | 8.06 | 14.04 | | 9.89 | 12.21 |
| MW-6 | 15.55 | | 9.39 | 6.16 | | 9.27 | 6.28 | | 9.29 | 6.26 |
| MW-7 | 22.11 | | 11.91 | 10.20 | | 10.25 | 11.86 | | 10.25 | 11.86 |
| MW-8 | 16.27 | | 11.12 | 5.15 | | 10.75 | 5.52 | | 10.72 | 5.55 |
| MW-9 (Prod. Recovery Well) | 23.14 | | 12.63 | 10.51 | | 11.85 | 11.29 | | 10.72 | 12.42 |
| MW-10 | 15.73 | | 15.36 | 0.37 | | 13.26 | 2.47 | | 14.48 | 1.25 |
| MW-11 | 23.84 | | 14.18 | 9.66 | | 14.09 | 9.75 | | 14.12 | 9.72 |
| MW-12 | 22.03 | | 10.38 | 11.65 | | 6.70 | 15.33 | | 9.54 | 12.49 |
| MW-13 | 24.12 | | 16.40 | 7.72 | | 16.22 | 7.90 | | 16.18 | 7.94 |
| MW-14 | 15.73 | | 9.60 | 6.13 | | 9.01 | 6.72 | | 9.47 | 6.26 |
| MW-15 | 23.99 | | 9.80 | 14.19 | | 9.51 | 14.48 | | 9.49 | 14.50 |
| MW-16 | 22.19 | | Not Measured | | | 6.81 | 15.38 | | 10.76 | 11.43 |
| MW-17 | 23.05 | | 12.94 | 10.11 | | 8.46 | 14.59 | | 11.94 | 11.11 |
| MW-18 | 23.88 | | 13.61 | 10.27 | | 11.71 | 12.17 | | 12.78 | 11.10 |
| PW-1 | 22.80 | | Not Measured | | | Not Measured | | | Not Measured | |

Notes:

¹ System not operational during water level survey

² Groundwater elevation measurements same day prior to AFVR event.

³ Groundwater elevation measurements same day after AFVR event.

ft = feet

toc = top of casing elevation

msl = mean sea level

* Indicates that the depth to hydrocarbon product could not be measured

Table 1-1 (continued)
Building AS 4158
Camp Lejeune, North Carolina
Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 5/10/99 ³ | | | 5/10/99 ² | | | 4/22/99 ³ | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | 5.49 | | | 9.47 | | | 11.97 | |
| MW-2 | 15.51 | | 7.52 | 7.99 | | Not Measured | | | Not Measured | |
| MW-3 | 17.70 | | 6.94 | 10.76 | | 9.82 | 7.88 | | 11.33 | 6.37 |
| MW-4 | 22.19 | | 7.96 | 14.23 | | 9.20 | 12.99 | | 8.81 | 13.38 |
| MW-5 | 22.10 | | 7.09 | 15.01 | | 10.52 | 11.58 | | 11.32 | 10.78 |
| MW-6 | 15.55 | | 8.90 | 6.65 | | 8.99 | 6.56 | | 8.96 | 6.59 |
| MW-7 | 22.11 | | 6.38 | 15.73 | | 12.42 | 9.69 | | 13.66 | 8.45 |
| MW-8 | 16.27 | | 10.27 | 6.00 | | 10.62 | 5.65 | | 12.74 | 3.53 |
| MW-9 (Prod. Recovery Well) | 23.14 | | 12.62 | 10.52 | | 10.94 | 12.20 | | 14.24 | 8.90 |
| MW-10 | 15.73 | | 8.15 | 7.58 | | 15.13 | 0.60 | | 14.83 | 0.90 |
| MW-11 | 23.84 | | 11.98 | 11.86 | | 13.81 | 10.03 | | 12.06 | 11.78 |
| MW-12 | 22.03 | | 6.48 | 15.55 | | 9.72 | 12.31 | | 11.46 | 10.57 |
| MW-13 | 24.12 | | 11.45 | 12.67 | | 15.64 | 8.48 | | 13.26 | 10.86 |
| MW-14 | 15.73 | | 8.46 | 7.27 | | 9.42 | 6.31 | | 9.32 | 6.41 |
| MW-15 | 23.99 | | 9.31 | 14.68 | | 9.49 | 14.50 | | 9.46 | 14.53 |
| MW-16 | 22.19 | | 6.03 | 16.16 | | 10.72 | 11.47 | | 13.58 | 8.61 |
| MW-17 | 23.05 | | 7.62 | 15.43 | | 10.81 | 12.24 | | 14.21 | 8.84 |
| MW-18 | 23.88 | | 10.23 | 13.65 | | 12.94 | 10.94 | | 14.24 | 9.64 |
| PW-1 | 22.80 | | Not Measured | | | Not Measured | | | Not Measured | |

Notes:

¹ System not operational during water level survey

² Groundwater elevation measurements same day prior to AFVR event.

³ Groundwater elevation measurements same day after AFVR event.

ft = feet

toc = top of casing elevation

msl = mean sea level

* Indicates that the depth to hydrocarbon product could not be measured

Table 1-1 (continued)
Building AS 4158
Camp Lejeune, North Carolina
Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 4/22/99 ² | | | 4/8/99 ³ | | | 4/8/99 ² | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | 12.03 | | | 4.92 | | | 4.19 | |
| MW-2 | 15.51 | | Not Measured | | | 6.99 | 8.52 | | 7.08 | 8.43 |
| MW-3 | 17.70 | | 11.35 | 6.35 | | 6.84 | 10.86 | | 6.82 | 10.88 |
| MW-4 | 22.19 | | 9.56 | 12.63 | | 6.59 | 15.60 | Trace | 6.60 | 15.59 |
| MW-5 | 22.10 | | 11.49 | 10.61 | | 6.19 | 15.91 | | 6.10 | 16.00 |
| MW-6 | 15.55 | | 8.94 | 6.61 | | 7.81 | 7.74 | | 7.89 | 7.66 |
| MW-7 | 22.11 | | 13.67 | 8.44 | | 5.32 | 16.79 | | 5.00 | 17.11 |
| MW-8 | 16.27 | | 10.74 | 5.53 | | 8.36 | 7.91 | | 8.32 | 7.95 |
| MW-9 (Prod. Recovery Well) | 23.14 | | 11.26 | 11.88 | | 10.29 | 12.85 | | 7.95 | 15.19 |
| MW-10 | 15.73 | | 14.84 | 0.89 | | 4.51 | 11.22 | | 4.33 | 11.40 |
| MW-11 | 23.84 | | 12.96 | 10.88 | | 7.62 | 16.22 | | 7.58 | 16.26 |
| MW-12 | 22.03 | | 11.62 | 10.41 | | 7.17 | 14.86 | | 7.00 | 15.03 |
| MW-13 | 24.12 | | 13.00 | 11.12 | | 6.29 | 17.83 | | 6.19 | 17.93 |
| MW-14 | 15.73 | | 9.33 | 6.40 | | 8.44 | 7.29 | | 8.39 | 7.34 |
| MW-15 | 23.99 | | 9.43 | 14.56 | | 9.21 | 14.78 | | 9.16 | 14.83 |
| MW-16 | 22.19 | | 13.71 | 8.48 | | 5.99 | 16.20 | | 5.70 | 16.49 |
| MW-17 | 23.05 | | 14.33 | 8.72 | | 6.94 | 16.11 | | 6.64 | 16.41 |
| MW-18 | 23.88 | | 14.31 | 9.57 | | 8.28 | 15.60 | | 8.06 | 15.82 |
| PW-1 | 22.80 | | Not Measured | | | Not Measured | | | Not Measured | |

Notes:

- ¹ System not operational during water level survey
- ² Groundwater elevation measurements same day prior to AFVR event.
- ³ Groundwater elevation measurements same day after AFVR event.
- ft = feet
- toc = top of casing elevation
- msl = mean sea level
- * Indicates that the depth to hydrocarbon product could not be measured

Table 1-1 (continued)
 Building AS 4158
 Camp Lejeune, North Carolina
 Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 3/8/99 ¹ | | | 2/5/99 ¹ | | | 1/25/99 ¹ | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | Not Measured | | | Not Measured | | | Not Measured | |
| MW-2 | 15.51 | | Well Dry | | | 8.52 | 6.99 | | 7.95 | 7.56 |
| MW-3 | 17.70 | | 8.82 | 8.88 | | 9.12 | 8.58 | | 4.96 | 12.74 |
| MW-4 | 22.19 | | 8.68 | 13.51 | | 8.40 | 13.79 | | 6.30 | 15.89 |
| MW-5 | 22.10 | | 9.45 | 12.65 | | 9.55 | 12.55 | | 9.14 | 12.96 |
| MW-6 | 15.55 | | 8.61 | 6.94 | | 8.70 | 6.85 | | 7.60 | 7.95 |
| MW-7 | 22.11 | | 9.83 | 12.28 | | 11.62 | 10.49 | | 4.52 | 17.59 |
| MW-8 | 16.27 | | 9.18 | 7.09 | | 10.65 | 5.62 | | 10.20 | 6.07 |
| MW-9 (Prod. Recovery Well) | 23.14 | | 9.81 | 13.33 | | 11.35 | 11.79 | | 10.16 | 12.98 |
| MW-10 | 15.73 | | 11.04 | 4.69 | | 15.20 | 0.53 | | 11.76 | 3.97 |
| MW-11 | 23.84 | | 11.60 | 12.24 | | 15.98 | 7.86 | | 12.65 | 11.19 |
| MW-12 | 22.03 | | 8.79 | 13.24 | | 9.50 | 12.53 | | 9.33 | 12.70 |
| MW-13 | 24.12 | | 12.27 | 11.85 | | 16.20 | 7.92 | | 16.12 | 8.00 |
| MW-14 | 15.73 | | 9.44 | 6.29 | | 9.58 | 6.15 | | 9.52 | 6.21 |
| MW-15 | 23.99 | | 9.86 | 14.13 | | 9.78 | 14.21 | | 10.00 | 13.99 |
| MW-16 | 22.19 | | 10.00 | 12.19 | | 10.92 | 11.27 | | 9.90 | 12.29 |
| MW-17 | 23.05 | | 9.65 | 13.40 | | 12.20 | 10.85 | | 10.84 | 12.21 |
| MW-18 | 23.88 | | 12.41 | 11.47 | | 12.92 | 10.96 | | 11.95 | 11.93 |
| PW-1 | 22.80 | | Not Measured | | | Not Measured | | | 9.05 | 13.75 |

Notes:

- ¹System not operational during water level survey
- ²Groundwater elevation measurements same day prior to AFVR event.
- ³Groundwater elevation measurements same day after AFVR event.
- ft = feet
- toc = top of casing elevation
- msl = mean sea level
- * Indicates that the depth to hydrocarbon product could not be measured

Table 1-1 (continued)
 Building AS 4158
 Camp Lejeune, North Carolina
 Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 12/10/1998 | | | 11/16/1998 | | | 10/20/1998 | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | Not Measured | | | 6.91 | | | 8.20 | |
| MW-2 | 15.51 | | 8.20 | 7.31 | | 7.87 | 7.64 | | 8.51 | 7.00 |
| MW-3 | 17.70 | | 7.12 | 10.58 | | 7.41 | 10.29 | | 8.09 | 9.61 |
| MW-4 | 22.19 | | 7.69 | 14.50 | | 7.58 | 14.61 | | 7.89 | 14.30 |
| MW-5 | 22.10 | | 7.25 | 14.85 | | 8.61 | 13.49 | | 8.76 | 13.34 |
| MW-6 | 15.55 | | 9.21 | 6.34 | | 8.55 | 7.00 | | 8.89 | 6.66 |
| MW-7 | 22.11 | | 6.17 | 15.94 | | 7.73 | 14.38 | | 9.38 | 12.73 |
| MW-8 | 16.27 | | 9.81 | 6.46 | | 8.57 | 7.70 | | 9.30 | 6.97 |
| MW-9 (Prod. Recovery Well) | 23.14 | 8.78 | 8.80 | 14.34 | | 8.78 | 14.36 | 9.23 | 9.32 | 13.91 |
| MW-10 | 15.73 | | 6.35 | 9.38 | | 4.55 | 11.18 | | 10.86 | 4.87 |
| MW-11 | 23.84 | | 11.12 | 12.72 | | 8.39 | 15.45 | | 12.42 | 11.42 |
| MW-12 | 22.03 | | Not Measured | | | 8.91 | 13.12 | | 8.31 | 13.72 |
| MW-13 | 24.12 | | 6.44 | 17.68 | | 7.50 | 16.62 | | 16.21 | 7.91 |
| MW-14 | 15.73 | | 8.51 | 7.22 | | 8.41 | 7.32 | | 8.74 | 6.99 |
| MW-15 | 23.99 | | 9.19 | 14.80 | | 9.09 | 14.90 | | 9.31 | 14.68 |
| MW-16 | 22.19 | | 7.33 | 14.86 | | 8.48 | 13.71 | | 9.42 | 12.77 |
| MW-17 | 23.05 | | 8.27 | 14.78 | | 9.41 | 13.64 | | 10.68 | 12.37 |
| MW-18 | 23.88 | | 10.75 | 13.13 | | 10.59 | 13.29 | | 11.58 | 12.30 |
| PW-1 | 22.80 | | Not Measured | | | 7.59 | 15.21 | | 9.06 | 13.74 |

Notes:

- ¹ System not operational during water level survey
- ² Groundwater elevation measurements same day prior to AFVR event.
- ³ Groundwater elevation measurements same day after AFVR event.
- ft = feet
- toc = top of casing elevation
- msl = mean sea level
- * Indicates that the depth to hydrocarbon product could not be measured

Table 1-1 (continued)
Building AS 4158
Camp Lejeune, North Carolina
Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 9/3/1998 | | | 8/13/1998 | | | 7/31/1998 | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | Not Measured | | | Not Measured | | | 4.30 | |
| MW-2 | 15.51 | | 7.43 | 8.08 | | 7.70 | 7.81 | | 5.95 | 9.56 |
| MW-3 | 17.70 | | 7.00 | 10.70 | | 7.45 | 10.25 | | 5.29 | 12.41 |
| MW-4 | 22.19 | | 7.79 | 14.40 | | 8.17 | 14.02 | | 5.99 | 16.20 |
| MW-5 | 22.10 | | 6.89 | 15.21 | | 7.25 | 14.85 | | 10.55 | 11.55 |
| MW-6 | 15.55 | | 8.29 | 7.26 | | 8.69 | 6.86 | | 6.39 | 9.16 |
| MW-7 | 22.11 | | 6.98 | 15.13 | | 7.35 | 14.76 | | 7.30 | 14.81 |
| MW-8 | 16.27 | | 9.29 | 6.98 | | 9.65 | 6.62 | | 7.15 | 9.12 |
| MW-9 (Prod. Recovery Well) | 23.14 | 9.13 | 9.15 | 14.01 | 9.55 | 9.59 | 13.59 | 7.03 | 7.12 | 16.11 |
| MW-10 | 15.73 | | 9.99 | 5.74 | | 10.31 | 5.42 | | Not Measured | |
| MW-11 | 23.84 | | 13.09 | 10.75 | | 13.54 | 10.30 | | 7.75 | 16.09 |
| MW-12 | 22.03 | | 5.39 | 16.64 | | 5.75 | 16.28 | | 6.22 | 15.81 |
| MW-13 | 24.12 | | 15.39 | 8.73 | | 15.53 | 8.59 | | 6.84 | 17.28 |
| MW-14 | 15.73 | | 7.69 | 8.04 | | 8.04 | 7.69 | | 7.25 | 8.48 |
| MW-15 | 23.99 | | 8.71 | 15.28 | | 9.03 | 14.96 | | 8.01 | 15.98 |
| MW-16 | 22.19 | | 6.91 | 15.28 | | 7.30 | 14.89 | | 6.35 | 15.84 |
| MW-17 | 23.05 | | 9.61 | 13.44 | | 9.90 | 13.15 | | 8.73 | 14.32 |
| MW-18 | 23.88 | | 11.43 | 12.45 | | 11.83 | 12.05 | | 10.01 | 13.87 |
| PW-1 | 22.80 | | Not Measured | | | Not Measured | | | Not Measured | |

Notes:

¹System not operational during water level survey

²Groundwater elevation measurements same day prior to AFVR event.

³Groundwater elevation measurements same day after AFVR event.

ft = feet

toc = top of casing elevation

msl = mean sea level

* Indicates that the depth to hydrocarbon product could not be measured

Table 1-1 (continued)
 Building AS 4158
 Camp Lejeune, North Carolina
 Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 7/23/1998 | | | 7/7/1998 | | | 6/24/1998 | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | 8.63 | | | 3.94 | | | Not Measured | |
| MW-2 | 15.51 | | 7.91 | 7.60 | | 6.30 | 9.21 | | 7.38 | 8.13 |
| MW-3 | 17.70 | | 7.97 | 9.73 | | 5.82 | 11.88 | | 7.13 | 10.57 |
| MW-4 | 22.19 | | 7.84 | 14.35 | | 5.99 | 16.20 | | 7.57 | 14.62 |
| MW-5 | 22.10 | | 9.45 | 12.65 | | Not Measured | | | 8.43 | 13.67 |
| MW-6 | 15.55 | | 7.91 | 7.64 | | 6.68 | 8.87 | | 8.11 | 7.44 |
| MW-7 | 22.11 | | 10.75 | 11.36 | | 7.05 | 15.06 | | 8.74 | 13.37 |
| MW-8 | 16.27 | | 8.77 | 7.50 | | 7.82 | 8.45 | | 8.56 | 7.71 |
| MW-9 (Prod. Recovery Well) | 23.14 | | 9.01 | 14.13 | 7.44 | 7.78 | 15.70 | 8.90 | 9.28 | 14.24 |
| MW-10 | 15.73 | | 12.06 | 3.67 | | Not Measured | | | 9.54 | 6.19 |
| MW-11 | 23.84 | | 10.82 | 13.02 | | 9.34 | 14.50 | | 10.30 | 13.54 |
| MW-12 | 22.03 | | 9.56 | 12.47 | | 7.59 | 14.44 | | 8.01 | 14.02 |
| MW-13 | 24.12 | | 10.74 | 13.38 | | 8.93 | 15.19 | | 10.56 | 13.56 |
| MW-14 | 15.73 | | 8.49 | 7.24 | | Not Measured | | | Not Measured | |
| MW-15 | 23.99 | | 8.92 | 15.07 | | 8.63 | 15.36 | | 8.93 | 15.06 |
| MW-16 | 22.19 | | 10.63 | 11.56 | | 8.72 | 13.47 | | 9.12 | 13.07 |
| MW-17 | 23.05 | | 11.69 | 11.36 | | 9.82 | 13.23 | | 10.27 | 12.78 |
| MW-18 | 23.88 | | 12.63 | 11.25 | | 10.92 | 12.96 | | 11.35 | 12.53 |
| PW-1 | 22.80 | | Not Measured | | | 7.73 | 15.07 | | Not Measured | |

Notes:

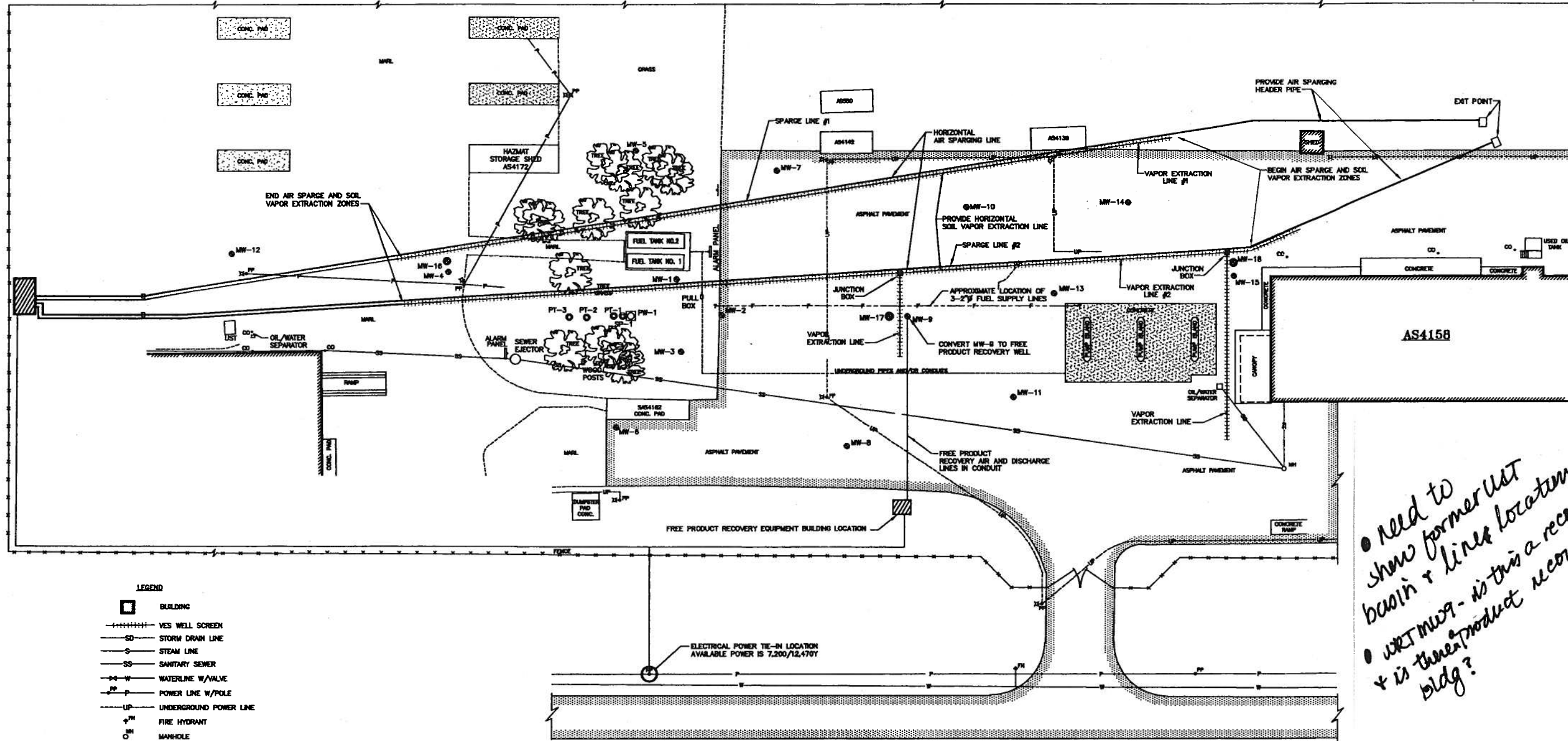
- ¹ System not operational during water level survey
- ² Groundwater elevation measurements same day prior to AFVR event.
- ³ Groundwater elevation measurements same day after AFVR event.
- ft = feet
- toc = top of casing elevation
- msl = mean sea level
- * Indicates that the depth to hydrocarbon product could not be measured

Table 1-1 (continued)
 Building AS 4158
 Camp Lejeune, North Carolina
 Water Level Measurement Summary

| Sample Point | Top of Casing Elevation (ft., msl) | 5/15/1998 | | | 4/24/1998 | | |
|----------------------------|------------------------------------|--|--------------------------------------|----------------------------------|--|--------------------------------------|----------------------------------|
| | | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) | Depth to Hydrocarbon Product (ft. below toc) | Depth to Groundwater (ft. below toc) | Groundwater Elevation (ft., msl) |
| MW-1 | | | 6.14 | | | 4.18 | |
| MW-2 | 15.51 | | 7.84 | 7.67 | | 7.55 | 7.96 |
| MW-3 | 17.70 | | 6.84 | 10.86 | | 6.31 | 11.39 |
| MW-4 | 22.19 | | 7.07 | 15.12 | | 7.85 | 14.34 |
| MW-5 | 22.10 | | 7.64 | 14.46 | | 7.14 | 14.96 |
| MW-6 | 15.55 | | 7.44 | 8.11 | | 7.06 | 8.49 |
| MW-7 | 22.11 | | 8.17 | 13.94 | | 7.69 | 14.42 |
| MW-8 | 16.27 | | 7.89 | 8.38 | | 7.78 | 8.49 |
| MW-9 (Prod. Recovery Well) | 23.14 | | Not Measured | | | Not Measured | |
| MW-10 | 15.73 | | 9.35 | 6.38 | | 9.48 | 6.25 |
| MW-11 | 23.84 | | 11.21 | 12.63 | | 9.58 | 14.26 |
| MW-12 | 22.03 | | 7.41 | 14.62 | | 7.06 | 14.97 |
| MW-13 | 24.12 | | 14.06 | 10.06 | | 9.27 | 14.85 |
| MW-14 | 15.73 | | 8.37 | 7.36 | | 8.14 | 7.59 |
| MW-15 | 23.99 | | 8.82 | 15.17 | | 8.71 | 15.28 |
| MW-16 | 22.19 | | 8.53 | 13.66 | | 6.75 | 15.44 |
| MW-17 | 23.05 | | 9.79 | 13.26 | | 9.13 | 13.92 |
| MW-18 | 23.88 | | 10.91 | 12.97 | | 10.46 | 13.42 |
| PW-1 | 22.80 | | 7.98 | 14.82 | | Not Measured | |

Notes:

- ¹ System not operational during water level survey
- ² Groundwater elevation measurements same day prior to AFVR event.
- ³ Groundwater elevation measurements same day after AFVR event.
- ft = feet
- toc = top of casing elevation
- msl = mean sea level
- * Indicates that the depth to hydrocarbon product could not be measured



- LEGEND**
- BUILDING
 - YES WELL SCREEN
 - SD STORM DRAIN LINE
 - S STEAM LINE
 - SS SANITARY SEWER
 - W WATERLINE W/VALVE
 - PP POWER LINE W/POLE
 - UP UNDERGROUND POWER LINE
 - ⊕ FIRE HYDRANT
 - MANHOLE
 - △ POWER TRANSFORMER
 - X AREA LIGHT
 - ⊙ TYPE II MONITORING WELL
 - ⊙ TYPE II MONITORING WELL
 - ⊕ HYDROPUNCH
 - ⊕ BORING
 - ⊕ PUMPING WELL
 - ⊕ PILOT TEST WELL

SITE PLAN

SURVEY NOTES:

1. VERTICAL DATUM IS BASED ON EXISTING MILITARY CONTROL MONUMENT PW-4 WITH A LISTED ELEVATION OF 21.75 FEET (MSL); NORTH CAROLINA STATE COORDINATES FOR PW-4 ARE 352,078.83(M) NORTH AND 2,483,421.81(M) EAST. STATION PW-4 IS A 2" BRASS DISK SET IN 10" DIAMETER CONCRETE FLUSH WITH THE GROUND. THE STATION IS LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF PERMETER ROAD AND THE OLD RAILROAD BED, 35.0 FEET SOUTH OF THE EDGE OF PERMETER ROAD AND 20.0 FEET WEST OF THE EDGE OF THE OLD RAILROAD BED.

2. SURVEY CONTROL POINTS ARE BASED ON AN ASSUMED DATUM AND MAGNETIC NORTH. THE COORDINATES AND THEIR RESPECTIVE ELEVATIONS ARE AS FOLLOWS:

| POINT | NORTH | EAST | ELEVATION (MSL) | DESCRIPTION |
|-------|---------|---------|-----------------|-------------|
| 1. | 5000.00 | 5000.00 | 23.93 | Pk. NAL |
| 2. | 4837.34 | 4908.09 | 23.98 | Pk. NAL |
| 3. | 4722.30 | 4839.87 | 23.35 | Pk. NAL |
| 4. | 4834.21 | 4788.81 | 22.75 | #120 NAL |
| 5. | 4504.84 | 4708.91 | 22.44 | #120 NAL |

Need to show former list basin + lines location + is there product recovery bldg?

| REVISIONS | DATE | DESCRIPTION | APPROVED BY |
|-----------|------|-------------|-------------|
| | | | |
| | | | |
| | | | |
| | | | |

J.A. JONES
 REGISTERED PROFESSIONAL ENGINEER
 STATE OF FLORIDA
 NO. N82470-93-D-3033

| | |
|------------------------|--------------|
| DEPARTMENT OF THE NAVY | ATLAN |
| NAVAL STATION | ANNAPOLIS |
| | MARINE CORPS |
| | NEW RIVER |
| CODE ID. NO. 80091 | SIZE B |
| SCALE: | 1" = 60' |
| EFD NO. | |
| STA. PROJ. NO. | |
| SPEC. NO. | |
| CONSTR. CONTR. NO. | |
| N82470-93-D-3033 | |
| NAVFAC DRAWING NO. | |
| SHEET 1 OF 11 | |
| FIGURE 1-1 | |



SECTION 2.0 OPERATION AND MAINTENANCE

2.1 OPERATION HISTORY

Free product recovery was initially recommended in the Site Assessment and initiated in April 1995. According to the CAP prepared by Catlin., from April 1995 to July 1995, 3.51 gallons of free product had been recovered from MW-9 using a passive skimmer. LNAPL gauging activities conducted July 13, 1995 indicated that product thickness in MW-9 had decreased from 6.03 feet to 0.02 feet. Measurable LNAPL thickness was not identified in any other on-site well during site assessment and corrective action activities.

Based on the CAP, the goal for soil remediation is the removal or reduction of vadose zone soil contamination to Final Cleanup Levels (40 parts per million (ppm) TPH as gasoline and 160 ppm TPH as diesel). The CAP also identified the goal for groundwater remediation to be the removal of free product and decreasing petrochemical constituent concentrations to levels required by Title 15A Subchapter 2L.

The selected remedial approach was an air sparge/soil vapor extraction system. Air sparging the groundwater involves injecting pressurized air into the subsurface via strategically located air sparging wells. As groundwater flows past these wells, air forced into the subsurface bubbles up through the groundwater volatilizing dissolved hydrocarbons. In conjunction with air sparging, shallow vapor extraction lines were installed within the unsaturated zone. These lines were used to collect vapors generated from the air sparging system and discharge the collected vapors directly into the atmosphere. In addition to volatilization, the oxygen provided to the subsurface encourages the growth of micro-organisms and contaminant degradation through bioremediation. Bioremediation assists in the destruction of PAHs.

The SVE system consists of two horizontal lines installed within the vadose zone above the sparge lines. These extraction lines collect vapors generated during air sparge. In order to sufficiently remove vapors, the system was designed to extract four times the quantity of air generated by the sparging system or 377 cubic feet per minute (cfm) for the west line and 426 cfm for the east line. Moisture generated from the soil vapor extraction process is removed using an air/water separator and any particulate is removed through a filter prior to the positive displacement blower. Pilot test results indicated a lateral influence of 15 feet could be expected from each line. In order to prevent vapors from entering Building AS-4158, an additional SVE line was installed between Building AS-4158 and AS-4165 (pump island).

The system was started on line April 4, 1998 and operated until it was shut down on December 29, 1999. The system was shut down because a measurable volume of LNAPL had not been detected in recovery well MW-9 since December 10, 1998, and dissolved concentrations of petroleum related constituents had remained at very low concentrations. The treatment system was shut down on December 29, 1999, and post-operation

sampling initiated in January 2000. Beginning in October 2000, review of analytical results from groundwater samples collected during the quarterly post-operation monitoring well sampling event indicated that benzene was detected in samples from monitoring wells MW-9, MW-11, and MW-13 at slightly higher concentrations than those detected during the previous quarterly sample from July 2000. Overall, the concentration of benzene in MW-9 had increased by an order of magnitude since the system's shut down. Concentrations of ethylbenzene, naphthalene, and 1-methylnaphthalene detected in MW-13 had increased an order of magnitude since the previous sampling event. Also, the total xylenes concentration in the MW-13 sample had increased two orders of magnitude since the July 2000 sampling event. Due to these increases, J.A. Jones conducted an aggressive fluid/vapor recovery (AFVR) event on monitoring wells MW-9 and MW-13 on December 14, 2000. This AFVR event recovered ten gallons of LNAPL and 1.73 gallons of VOCs as gasoline and diesel. Based on the increases in concentrations of volatile and semi-volatile organic compounds in groundwater samples collected from monitoring wells MW-9, MW-11, and MW-13, the air sparge/soil vapor extraction system was re-started on February 13, 2001. On February 2, 2001, J.A. Jones also recovered 0.2 gallons of LNAPL from passive skimmers in monitoring wells MW-2 and MW-3.

During the January 2002 quarterly sampling event, LNAPL was discovered in MW-9 at a thickness of 2.9 feet. This was the first time LNAPL was detected in this well since October 1998. According to Nikki Hall, EMD, transfer piping is located adjacent to monitoring well MW-9. Additionally, Ms. Hall stated that a release/leak was confirmed based on a tightness test performed on the lines. Approximately 39.24 gallons of product was removed from MW-9 in the period from January to April 2002 via hand bailing, while 5 gallons of LNAPL was removed via vacuum truck. The total amount of LNAPL recovered from the site from April 1998 to April 2002 was 82.19 gallons.

Groundwater elevation contour maps presented in Figures 2-1 through 2-5 depict the groundwater flow and the hydraulic gradient using the groundwater elevation data obtained during quarterly sampling events. The predominant direction of groundwater at the area of the release and at the dissolved groundwater plume area is to the southwest.

2.2 SYSTEM OPERATIONS AND MAINTENANCE REQUIREMENTS

Scheduled operation and maintenance inspections were performed weekly to maintain the performance and operation of the treatment equipment, to inspect moisture accumulation level in the storage tank, and to collect and record instrumentation readings. Instrumentation readings include air sparge and soil vapor extraction pressure, vacuum, and flow rate at the wells and within the treatment building. The frequency of the scheduled operations and maintenance inspections are presented as follows.

* from AST system. ~~SNA~~ ~~staple~~ ~~no~~ ~~arose~~ so tightness testing was performed to check this potential source. Tests were completed in April 2002. ^{They} confirmed a leak in the underground

transfer lines. Subsequently, repairs were made once funding was received in Nov. 2002.

| <u>Event Description</u> | <u>Frequency</u> |
|---|---|
| Record Instrumentation Readings | Monthly |
| Service Equipment | As Required by the Manufacturer's Instructions |
| Measure and Record Groundwater Elevations | Monthly |
| Collect Groundwater Monitoring Well Samples | Monthly for 1 st Quarter, then Quarterly thereafter |
| Collect Soil Vapor Extraction Effluent Sample | Monthly for 1 st Quarter, then Quarterly thereafter |

Non-scheduled operations and maintenance events were required to troubleshoot equipment and treatment system malfunctions and to repair and adjust treatment system equipment.

2.3 SYSTEM REPAIR AND TROUBLESHOOTING

Since the start-up of the soil and groundwater treatment system on April 16, 1998, there have been some repairs and troubleshooting associated with the operation of the system. This section presents a summary of the major events associated with the operations and maintenance of the system from April 16, 1998 through May 31, 2002.

In August of 1998, it was discovered that oil from the air compressor was being blown down through the air line into the coalescing filter of the system. Approximately half a pint of oil was emptied from the compressor; maintenance was performed on the compressor and the system was re-started. In August of 1999, the air sparge system was shut down for twelve days because of a damaged air compressor. The SVE system was shut down again in March 7, 2001, due to an inoperable input shaft on the blower, however, the air sparge system remained in operation. SVE system was restarted on June 27, 2001. The SVE system was shut down again due to a defective blower on February 25, 2002. The blower was shipped to the manufacture for repairs, returned, and the SVE system restarted on May 31, 2002.

Besides the system repairs outlined above, the system was non-operational during sampling events, AFVR events, power outages, replacement of flow meters, replacement of filters, LNAPL recovery at MW-9, hurricanes, and during high/high level water alarms from the condensate storage tank.

2.4 SYSTEM DERIVED WASTE

From December 22, 1997 to January 9, 1998 approximately 12,000 gallons of development water from horizontal drilling accumulated and was transported by Pridgen Trucking and treated by HOH Corporation. Approximately 2,750 gallons of development water was transported by Pridgen Trucking and treated by Shamrock Environmental Corporation during the period from January 9, 1998 to January 21, 1998. Approximately 27.13 tons of non-hazardous POL contaminated soil was transported by SouthCo Enterprises, Inc. and treated by Carlisle Farms, Inc on February 26, 1998. From May 20,

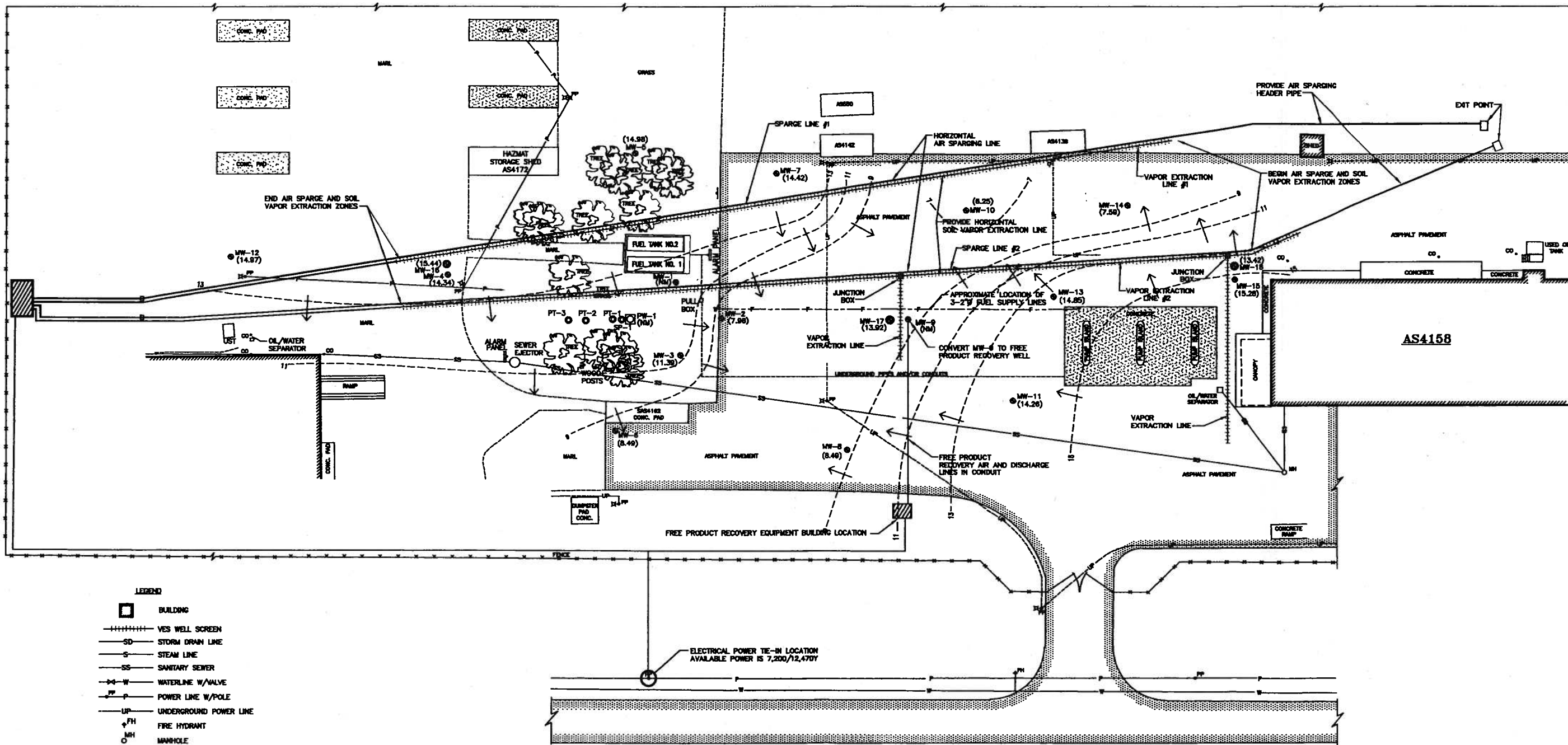
1998 to January 29, 1999 approximately 2,636 gallons of groundwater, which had accumulated during soil vapor extraction system operation, were transported by J. A. Jones and treated at the Groundwater Treatment System, former Rifle Range RR-72. From January 29, 1999 to May 25, 1999 approximately 796.5 gallons of recovered AFVR groundwater and groundwater accumulated during soil vapor extraction system operation were transported by J.A. Jones and treated at the Shaw (formerly OHM) North Plant Aquifer Treatment Facility, Camp Lejeune, North Carolina. From May 25, 1999 to June 12, 1999 approximately 500 gallons of groundwater accumulated during soil vapor extraction system operation was transported by J.A. Jones and treated at the Groundwater Treatment System, former Rifle Range RR-72. From June 12, 1999 to April 8, 2002 approximately 2,008 gallons of groundwater recovered during AFVR events, groundwater accumulated during soil vapor extraction system operation, and condensate water were transported by J. A. Jones and treated at the Shaw North Plant Aquifer Treatment Facility.

The transportation and disposal log, presented as **Table 2-1**, provides the complete history of the waste material accumulated during construction activities and derived during treatment system operation including the transporter, waste treatment destination, date of shipment, volume and/or weight.

TABLE 2-1 TRANSPORTATION AND DISPOSAL LOG
J.A. JONES ENVIRONMENTAL SERVICES COMPANY
MCAS NEW RIVER, NORTH CAROLINA
PROJECT NUMBER: 005-067d

GALLONS TO DATE 20,690.50
TONS TO DATE 27.13
DRUMS TO DATE 0.00

| DATE SHIPPED | DISPOSAL FACILITY | HAULER | TONS | GALLONS | DRUMS | MANIFEST NUMBER | LOAD NUMBER | COMMENTS |
|--------------|--|---|-------|----------|-------|-----------------|-------------|--|
| 12/22/1997 | HOH Corporation | Pridgen Trucking | | 6,000 | | 445 | W-001 | Development Water from Horizontal Drilling |
| 1/9/1998 | HOH Corporation | Pridgen Trucking | | 6,000 | | 446 | W-002 | Development Water from Horizontal Drilling |
| 1/21/1998 | Shamrock Environmental Corporation | Pridgen Trucking | | 2,750 | | 460 | W-003 | Development Water from Horizontal Drilling |
| 2/26/1998 | Carlisle Farms, Inc. | SouthCo Enterprises, Inc. | 27.13 | | | 463 | S-001 | Non-hazardous POL Contaminated Soil |
| 5/20/1998 | Groundwater Treatment System, Former Rifle Range RR-72 | J.A. Jones Environmental Services Company | | 350 | | 289 | W-004 | Recovered Soil Vapor Water |
| 8/14/1998 | Groundwater Treatment System, Former Rifle Range RR-72 | J.A. Jones Environmental Services Company | | 700 | | 294 | W-005 | Recovered Soil Vapor Water |
| 9/24/1998 | Groundwater Treatment System, Former Rifle Range RR-72 | J.A. Jones Environmental Services Company | | 125 | | 704 | W-006 | Recovered Soil Vapor Water |
| 9/30/1998 | Groundwater Treatment System, Former Rifle Range RR-72 | J.A. Jones Environmental Services Company | | 425 | | 707 | W-007 | Recovered Soil Vapor Water |
| 10/6/1998 | Groundwater Treatment System, Former Rifle Range RR-72 | J.A. Jones Environmental Services Company | | 186 | | 713 | W-008 | Recovered Soil Vapor Water |
| 11/10/1998 | Groundwater Treatment System, Former Rifle Range RR-72 | J.A. Jones Environmental Services Company | | 275 | | 714 | W-009 | Recovered Soil Vapor Water |
| 12/14/1998 | Groundwater Treatment System, Former Rifle Range RR-72 | J.A. Jones Environmental Services Company | | 300 | | 801, 804 | W-010 | Recovered Soil Vapor Water |
| 1/29/1999 | Groundwater Treatment System, Former Rifle Range RR-72 | J.A. Jones Environmental Services Company | | 275 | | 726 | W-011 | Recovered Soil Vapor Water |
| 4/9/1999 | OHM's North Plant Aquifer Treatment Facility Camp Lejeune, NC | J.A. Jones Environmental Services Company | | 41 | | 821 | W-012 | Recovered AFVR Groundwater |
| 4/23/1999 | OHM's North Plant Aquifer Treatment Facility Camp Lejeune, NC | J.A. Jones Environmental Services Company | | 58 | | 821 | W-013 | Recovered AFVR Groundwater |
| 4/28/1999 | OHM's North Plant Aquifer Treatment Facility Camp Lejeune, NC | J.A. Jones Environmental Services Company | | 350 | | 830 | W-014 | Recovered Soil Vapor Water |
| 5/11/1999 | OHM's North Plant Aquifer Treatment Facility Camp Lejeune, NC | J.A. Jones Environmental Services Company | | 14 | | 821 | W-015 | Recovered AFVR Groundwater |
| 5/25/1999 | OHM's North Plant Aquifer Treatment Facility Camp Lejeune, NC | J.A. Jones Environmental Services Company | | 333.5 | | 821 | W-016 | Recovered AFVR Groundwater |
| 6/12/1999 | Groundwater Treatment System, Former Rifle Range RR-72 | J.A. Jones Environmental Services Company | | 500 | | 734 | W-017 | Soil Vapor Water Accumulated in Storage Tank |
| 7/27/1999 | OHM's North Plant Aquifer Treatment Facility Camp Lejeune, NC | J.A. Jones Environmental Services Company | | 179 | | 821 | W-018 | Soil Vapor Water Accumulated in Storage Tank |
| 12/14/2000 | OHM's North Plant Aquifer Treatment Facility Camp Lejeune, NC | J.A. Jones Environmental Services Company | | 354 | | 1280 | W-019 | Recovered AFVR Groundwater |
| 6/28/2001 | OHM's North Plant Aquifer Treatment Facility Camp Lejeune, NC | J.A. Jones Environmental Services Company | | 300 | | 2598 | W-020 | Recovered AFVR Groundwater |
| 8/13/2001 | OHM's North Plant Aquifer Treatment Facility Camp Lejeune, NC | J.A. Jones Environmental Services Company | | 300 | | 2634 | W-021 | Recovered AFVR Groundwater |
| 9/27/2001 | OHM's North Plant Aquifer Treatment Facility Camp Lejeune, NC | J.A. Jones Environmental Services Company | | 250 | | 2669 | W-022 | Condensate Water |
| 12/14/2001 | OHM's North Plant Aquifer Treatment Facility Camp Lejeune, NC | J.A. Jones Environmental Services Company | | 325 | | 2728 | W-023 | Condensate Water |
| 12/20/2001 | OHM's North Plant Aquifer Treatment Facility Camp Lejeune, NC | J.A. Jones Environmental Services Company | | 200 | | 2734 | W-024 | Condensate Water |
| 4/8/2002 | OHM's North Plant Aquifer Treatment Facility Camp Lejeune, NC | J.A. Jones Environmental Services Company | | 100 | | 2797 | W-025 | Condensate Water |
| | | | 27.13 | 20690.50 | 0.00 | SOIL: | 1 | Loads |
| | | | | | | WATER: | 25 | Loads |
| | | | | | | DRUMS: | 0 | Loads |



- LEGEND**
- BUILDING
 - VES WELL SCREEN
 - SD STORM DRAIN LINE
 - S— STEAM LINE
 - SS— SANITARY SEWER
 - W— WATERLINE W/VALVE
 - P— POWER LINE W/POLE
 - UP— UNDERGROUND POWER LINE
 - PH FIRE HYDRANT
 - MH MANHOLE
 - △ POWER TRANSFORMER
 - x AREA LIGHT
 - TYPE II MONITORING WELL
 - ⊙ TYPE III MONITORING WELL
 - ⊕ HYDROPLUNCH
 - ⊖ BORING
 - ⊗ PUMPING WELL
 - PILOT TEST WELL
 - (14.26) GROUNDWATER ELEVATION (FT. BGS)
 - GROUNDWATER CONTOUR (FT. BGS)
 - GROUNDWATER FLOW
 - (NM) NOT MEASURED

GROUNDWATER ELEVATIONS

APRIL 24, 1998

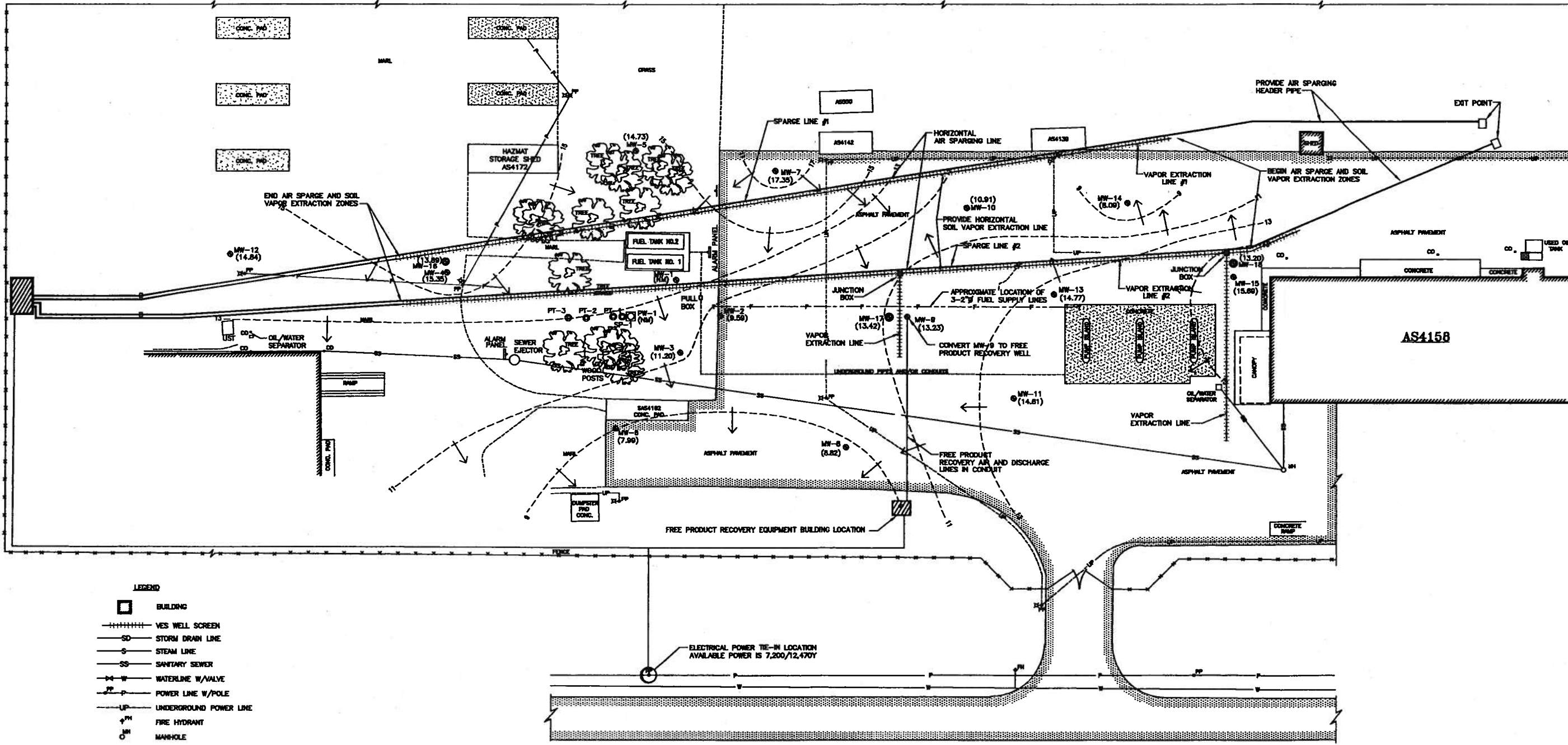
SURVEY NOTES:

- VERTICAL DATUM IS BASED ON EXISTING MILITARY CONTROL MONUMENT PW-4 WITH A LISTED ELEVATION OF 21.75 FEET (MSL); NORTH CAROLINA STATE COORDINATES FOR PW-4 ARE 352,078.63(M) NORTH AND 2,483,421.81(M) EAST. STATION PW-4 IS A 2" BRASS DISK SET IN 10" DIAMETER CONCRETE FLUSH WITH THE GROUND. THE STATION IS LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF PERIMETER ROAD AND THE OLD RAILROAD BED, 35.0 FEET SOUTH OF THE EDGE OF PERIMETER ROAD AND 20.0 FEET WEST OF THE EDGE OF THE OLD RAILROAD BED.
- SURVEY CONTROL POINTS ARE BASED ON AN ASSUMED DATUM AND MAGNETIC NORTH. THE COORDINATES AND THEIR RESPECTIVE ELEVATIONS ARE AS FOLLOWS:

| POINT | NORTH | EAST | ELEVATION (MSL) | DESCRIPTION |
|-------|---------|---------|-----------------|-------------|
| 1. | 5000.00 | 5000.00 | 23.93 | PI. NAIL |
| 2. | 4937.34 | 4908.09 | 23.98 | PI. NAIL |
| 3. | 4722.30 | 4839.67 | 23.35 | PI. NAIL |
| 4. | 4834.21 | 4788.81 | 22.75 | #120 NAIL |
| 5. | 4504.84 | 4706.91 | 22.44 | #120 NAIL |



| J.A. JONES ENVIRONMENTAL SERVICES 1111 W. WILSON AVENUE GAITHERSBURG, MD 20878-3033 TEL: (301) 281-1111 FAX: (301) 281-1112 | | | | | | | | | |
|---|---|------|-------------|------|-------------|--|--|--|--|
| DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION ANNUAL MONITORING REPORT BUILDING AS-4158 AIR STATION MARINE CORPS AIR STATION NEW RIVER, NORTH CAROLINA | NAVFAC DRAWING NO. N62470-93-D-3033 SHEET 2 OF 11 FIGURE 2-1 | | | | | | | | |
| REVISIONS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>DATE</th> <th>APPROVED BY</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> | | NO. | DESCRIPTION | DATE | APPROVED BY | | | | |
| NO. | DESCRIPTION | DATE | APPROVED BY | | | | | | |
| | | | | | | | | | |



- LEGEND**
- BUILDING
 - ||||| VES WELL SCREEN
 - STORM DRAIN LINE
 - STEAM LINE
 - SANITARY SEWER
 - WATERLINE W/VALVE
 - POWER LINE W/POLE
 - UNDERGROUND POWER LINE
 - PH FIRE HYDRANT
 - OH MANHOLE
 - ▲ POWER TRANSFORMER
 - × AREA LIGHT
 - ⊙ TYPE II MONITORING WELL
 - ⊙ TYPE III MONITORING WELL
 - ⊕ HYDROPLUNCH
 - ⊕ BORING
 - ⊕ PUMPING WELL
 - ⊕ PILOT TEST WELL
 - (14.81) GROUNDWATER ELEVATION (FT, BGS)
 - GROUNDWATER CONTOUR (FT, BGS)
 - GROUNDWATER FLOW
 - (NM) NOT MEASURED

GROUNDWATER ELEVATIONS

NOVEMBER 22, 1999

ELECTRICAL POWER TIE-IN LOCATION
AVAILABLE POWER IS 7,200/12,470Y

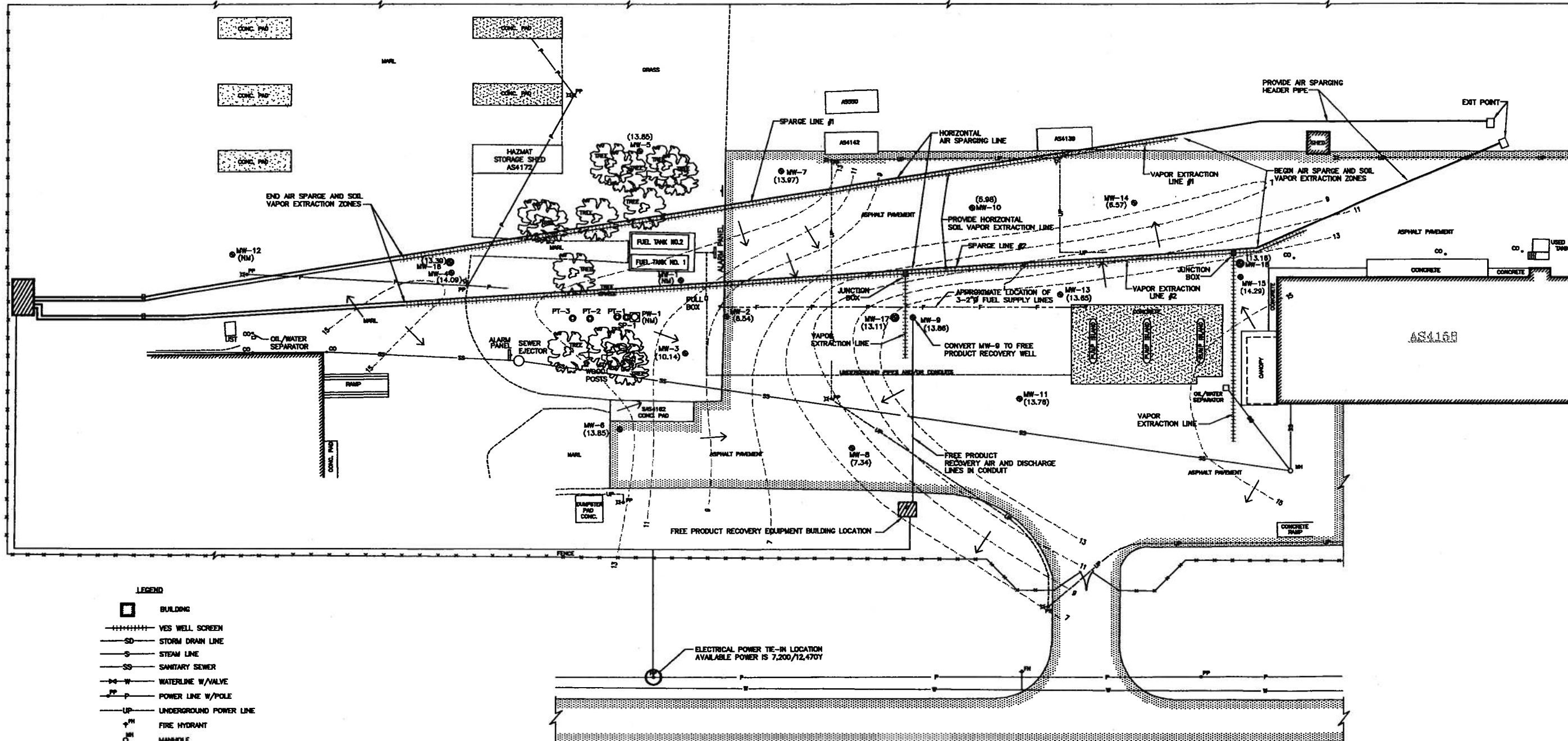
SURVEY NOTES:

- VERTICAL DATUM IS BASED ON EXISTING MILITARY CONTROL MONUMENT PW-4 WITH A LISTED ELEVATION OF 21.75 FEET (MSL); NORTH CAROLINA STATE COORDINATES FOR PW-4 ARE 332,078.83(M) NORTH AND 2,463,421.81(M) EAST. STATION PW-4 IS A 2" BRASS DISK SET IN 10" DIAMETER CONCRETE FLUSH WITH THE GROUND. THE STATION IS LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF PERMETER ROAD AND THE OLD RAILROAD BED, 35.0 FEET SOUTH OF THE EDGE OF PERMETER ROAD AND 20.0 FEET WEST OF THE EDGE OF THE OLD RAILROAD BED.
- SURVEY CONTROL POINTS ARE BASED ON AN ASSUMED DATUM AND MAGNETIC NORTH. THE COORDINATES AND THEIR RESPECTIVE ELEVATIONS ARE AS FOLLOWS:

| POINT | NORTH | EAST | ELEVATION (MSL) | DESCRIPTION |
|-------|---------|---------|-----------------|-------------|
| 1. | 5000.00 | 5000.00 | 23.83 | PK NAIL |
| 2. | 4837.34 | 4908.00 | 23.68 | PK NAIL |
| 3. | 4722.30 | 4838.67 | 23.36 | PK NAIL |
| 4. | 4834.21 | 4788.61 | 22.75 | #120 NAIL |
| 5. | 4504.84 | 4706.91 | 22.44 | #120 NAIL |



| | |
|--|---|
| J.A. JONES GEOTECHNICAL CONSULTANTS 115 WILSONVILLE, FLORIDA ALL CONTRACTS IN N82470-93-D-3033 | |
| DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION BUILDING AS-4158 MARINE CORPS AIR STATION NEW RIVER, NORTH CAROLINA | ANNUAL MONITORING REPORT GROUNDWATER ELEVATION - TYPE II WELLS - NOVEMBER 22, 1999 |
| CODE NO. 80091 EFD NO. STA. PROJ. NO. SPEC. NO. CONSTR. CONTR. NO. N82470-93-D-3033 NAVFAC DRAWING NO. | SIZE B SCALE: 1"=60' SHEET 3 OF 11 FIGURE 2-2 |
| REVISIONS SYMBOL DESCRIPTION DATE APPROVED BY | |



- LEGEND**
- BUILDING
 - YES WELL SCREEN
 - STORM DRAIN LINE
 - STEAM LINE
 - SANITARY SEWER
 - WATERLINE W/VALVE
 - POWER LINE W/POLE
 - UNDERGROUND POWER LINE
 - FIRE HYDRANT
 - MANHOLE
 - POWER TRANSFORMER
 - AREA LIGHT
 - TYPE II MONITORING WELL
 - TYPE III MONITORING WELL
 - HYDROFUNCH
 - BORING
 - PUMPING WELL
 - PILOT TEST WELL
 - (13.76) GROUNDWATER ELEVATION (FT, BGS)
 - GROUNDWATER CONTOUR (FT, BGS)
 - GROUNDWATER FLOW
 - (NM) NOT MEASURED

GROUNDWATER ELEVATIONS

APRIL 25, 2000

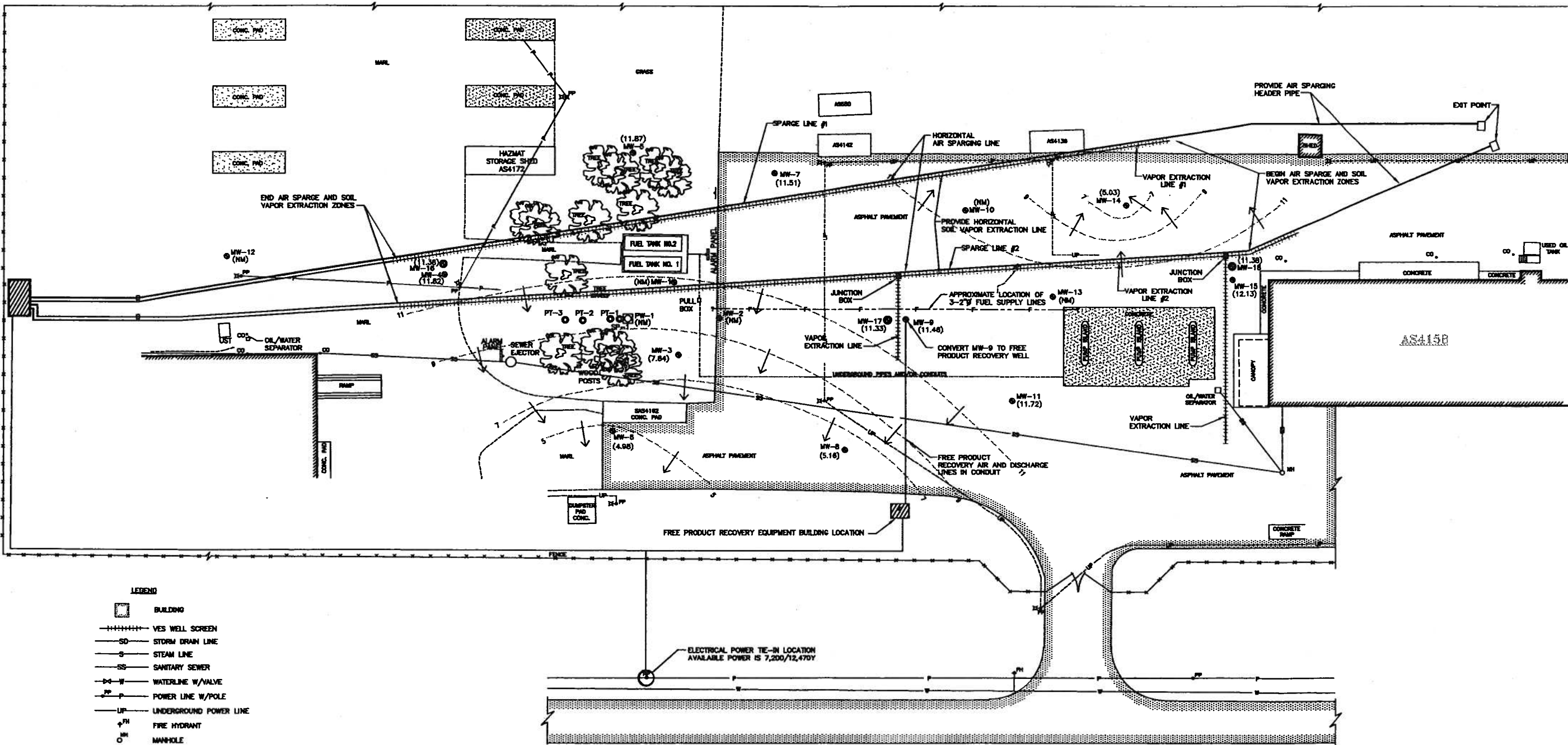
SURVEY NOTES:

- VERTICAL DATUM IS BASED ON EXISTING MILITARY CONTROL MONUMENT PW-4 WITH A LISTED ELEVATION OF 21.75 FEET (MSL); NORTH CAROLINA STATE COORDINATES FOR PW-4 ARE 352,078.83(M) NORTH AND 2,463,421.81(M) EAST. STATION PW-4 IS A 2" BRASS DISK SET IN 10" DIAMETER CONCRETE FLUSH WITH THE GROUND. THE STATION IS LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF PERMETER ROAD AND THE OLD RAILROAD BED, 35.0 FEET SOUTH OF THE EDGE OF PERMETER ROAD AND 20.0 FEET WEST OF THE EDGE OF THE OLD RAILROAD BED.
- SURVEY CONTROL POINTS ARE BASED ON AN ASSUMED DATUM AND MAGNETIC NORTH. THE COORDINATES AND THEIR RESPECTIVE ELEVATIONS ARE AS FOLLOWS:

| POINT | NORTH | EAST | ELEVATION (MSL) | DESCRIPTION |
|-------|---------|---------|-----------------|-------------|
| 1. | 5000.00 | 5000.00 | 23.93 | PI: NAL |
| 2. | 4837.34 | 4908.09 | 23.98 | PI: NAL |
| 3. | 4722.30 | 4838.87 | 23.35 | PI: NAL |
| 4. | 4634.21 | 4788.81 | 22.75 | #120 NAL |
| 5. | 4504.84 | 4708.91 | 22.44 | #120 NAL |



| <p>J.A. JONES RESIDENTIAL 14460 W. WINDY HOLLOW JACOBSONVILLE, FLORIDA A/E CONTRACT NO. N62470-93-D-3033 PROJECT - REPERMETER RD</p> | <p>DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION NORFOLK, VIRGINIA ANNUAL MONITORING REPORT BUILDING AS-415A STATION MARINE CORPS AIR STATION NEW RIVER, NORTH CAROLINA GROUNDWATER ELEVATION - TYPE II WELLS - APRIL 26, 2000</p> | | | | | | | | |
|--|---|-------------|-----------|-------------|-----------|--|--|--|--|
| <p>CODE ID. NO. 80091 SIZE B SCALE: 1" = 60' EFD NO. STA. PROJ. NO. SPEC. NO. CONSTR. CONTR. NO. N62470-93-D-3033 NAVFAC DRAWING NO. SHEET 4 OF 11 FIGURE 2-3</p> | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> <th>REVISIONS</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> | | NO. | DATE | DESCRIPTION | REVISIONS | | | | |
| NO. | DATE | DESCRIPTION | REVISIONS | | | | | | |
| | | | | | | | | | |



- LEGEND**
- [Symbol] BUILDING
 - [Symbol] YES WELL SCREEN
 - [Symbol] STORM DRAIN LINE
 - [Symbol] STEAM LINE
 - [Symbol] SANITARY SEWER
 - [Symbol] WATERLINE W/VALVE
 - [Symbol] POWER LINE W/POLE
 - [Symbol] UNDERGROUND POWER LINE
 - [Symbol] FIRE HYDRANT
 - [Symbol] MANHOLE
 - [Symbol] POWER TRANSFORMER
 - [Symbol] AREA LIGHT
 - [Symbol] TYPE II MONITORING WELL
 - [Symbol] TYPE III MONITORING WELL
 - [Symbol] HYDROPLUNCH
 - [Symbol] BORING
 - [Symbol] PUMPING WELL
 - [Symbol] PILOT TEST WELL
 - (11.72) GROUNDWATER ELEVATION (FT. BGS)
 - [Symbol] GROUNDWATER CONTOUR (FT. BGS)
 - [Symbol] GROUNDWATER FLOW
 - (NM) NOT MEASURED

GROUNDWATER ELEVATIONS

APRIL 15, 2002

SURVEY NOTES

- VERTICAL DATUM IS BASED ON EXISTING MILITARY CONTROL MONUMENT PW-4 WITH A LISTED ELEVATION OF 21.75 FEET (MSL); NORTH CAROLINA STATE COORDINATES FOR PW-4 ARE 382,078.83(M) NORTH AND 2,463,421.81(M) EAST. STATION PW-4 IS A 2" BRASS DISK SET IN 10" DIAMETER CONCRETE FLUSH WITH THE GROUND. THE STATION IS LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF PERIMETER ROAD AND THE OLD RAILROAD BED, 35.0 FEET SOUTH OF THE EDGE OF PERIMETER ROAD AND 20.0 FEET WEST OF THE EDGE OF THE OLD RAILROAD BED.
- SURVEY CONTROL POINTS ARE BASED ON AN ASSUMED DATUM AND MAGNETIC NORTH. THE COORDINATES AND THEIR RESPECTIVE ELEVATIONS ARE AS FOLLOWS:

| POINT | NORTH | EAST | ELEVATION (MSL) | DESCRIPTION |
|-------|---------|---------|-----------------|-------------|
| 1. | 5000.00 | 5000.00 | 23.93 | PK NAIL |
| 2. | 4837.34 | 4908.09 | 23.98 | PK NAIL |
| 3. | 4722.30 | 4839.67 | 23.35 | PK NAIL |
| 4. | 4634.21 | 4788.81 | 22.75 | #120 NAIL |
| 5. | 4504.84 | 4708.91 | 22.44 | #120 NAIL |



| | | | | | | | |
|---|--------|--|--|--|--|--|--|
| | | | | | | | |
| <p>J.A. JONES CIVIL ENGINEER 11111 W. BAYVIEW BLVD. JACKSONVILLE, FLORIDA 32256 A/E CONTRACT NO. N62470-93-D-3033 DESIGN - ENGINEERING, LTD.</p> | | | | | | | |
| <p>DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION NORFOLK, VIRGINIA ANNUAL MONITORING REPORT BUILDING AS-4156 MARINE CORPS AIR STATION NEW RIVER, NORTH CAROLINA GROUNDWATER ELEVATION - TYPE II WELLS - APRIL 15, 2002</p> | | | | | | | |
| CODE P. NO. 8081 | SIZE B | | | | | | |
| SCALE: 1"=60' | | | | | | | |
| EFD NO. | | | | | | | |
| STA. PROJ. NO. | | | | | | | |
| SPEC. NO. | | | | | | | |
| CONSTR. CONTR. NO. N62470-93-D-3033 | | | | | | | |
| NAVFAC DRAWING NO. | | | | | | | |
| SHEET 6 OF 11 | | | | | | | |
| FIGURE 2-5 | | | | | | | |

SECTION 3.0
ANALYTICAL SUMMARY

3.1 GROUNDWATER SAMPLING

Groundwater monitoring well and soil vapor extraction effluent samples were collected monthly during the first quarter of operation of the treatment system and collected quarterly thereafter. Groundwater samples were delivered by overnight carrier to Paradigm, and analyzed for volatile aromatic hydrocarbons using USEPA Method 602 and the USEPA Method 610 analyte list of polynuclear aromatic hydrocarbons using USEPA Method 625. The groundwater monitoring well sampling events were completed on March 27, 1998, May 15, 1998, June 24, 1998, July 23, 1998, October 23, 1998, January 21, 1999, February 16, 1999, April 19, 1999, May 07, 1999, July 14, 1999, October 20, 1999, January 12, 2000, April 25, 2000, July 26, 2000, October 18, 2000, January 4, 2001, April 17, 2001, July 16, 2001, October 15, 2001, January 15, 2002, and April 15, 2002.

Volatile aromatic and polynuclear aromatic hydrocarbon constituents were not detected above NCDENR groundwater quality standards in samples collected from monitoring wells MW-3 through MW-8, MW-12, and MW-14 through MW-18, during the quarterly sampling events conducted from March 1998 through April 2002 or in monitoring wells MW-2 and MW-10 during the sampling events conducted from June 1998 through April 2002.

The following paragraphs provide a history of analytical results above NCDENR limits at each well:

MW-1: The volatile aromatic hydrocarbon benzene was detected at 6 µg/L during groundwater samples collected on October 21, 1998. The detected benzene concentration exceeds the NCDENR groundwater quality standard of 1 µg/L. Since that sampling event, no other analytical results have been detected above laboratory quantitation limits.

MW-2: The volatile aromatic hydrocarbons benzene, ethylbenzene, and total xylenes were detected above the NCDENR groundwater quality standard in both groundwater samples collected from monitoring well MW-2 during the March 27, 1998 and May 15, 1998 sampling events. The detected benzene concentration of 23 µg/L in the March 27, 1998 sample was above the NCDENR groundwater quality standard of 1 µg/L. The detected ethylbenzene concentrations of 240 µg/L and 320 µg/L were above the NCDENR groundwater quality standard of 29 µg/L during the March 27, 1998 and May 15, 1998 sampling events. Also, during the March 27, 1998 and May 15, 1998 sampling events, detected concentrations of total xylenes, 1,020 µg/L and 1,100 µg/L, were above their NCDENR groundwater quality standard of 530 µg/L. Since the May 15, 1998 sampling event, no other analytical results have been detected above laboratory quantitation limits.

MW-9: The volatile aromatic hydrocarbons benzene and ethylbenzene were detected above the NCDENR groundwater quality standard of 1 µg/L and 29 µg/L respectively. Benzene was recorded as high as 180 µg/L during the April 17, 2001 sampling event while ethylbenzene concentrations have been recorded as high as 86 µg/L during the February 16, 1999 sampling event. Since then the concentrations had decreased to below quantitation limits during the October 15, 2001 sampling events but LNAPL was re-discovered (LNAPL was also found at this well in October 1998) at this well during the 2001 fourth quarter sampling event. The well was not sampled over the last two quarterly events due to the presence of LNAPL.

PAHs naphthalene, phenanthrene, anthracene, 1-methylnaphthalene, and 2-methylnaphthalene were detected above their NCDENR groundwater quality standard limits in groundwater samples collected from monitoring well MW-9. Naphthalene was detected as high as 68 µg/L in the July 14, 1999 sampling event but it has been below laboratory quantitation limits on the last four rounds of sampling. Only a sample taken February 16, 1999 had a phenanthrene concentration of 11,000 µg/L, which was above the NCDENR groundwater quality standard of 210 µg/L. Phenanthrene has not been detected above laboratory quantitation limits during the last five sampling events. A Sample containing detected concentrations of anthracene was collected February 16 1999, with concentrations of 11,000 µg/L. This result, which is well above the NCDENR groundwater quality standard of 2,100 µg/L, has lowered to below laboratory quantitation limits over the last three years. Concentration of 1-methylnaphthalene was detected as high as 17,000 µg/L, which is above the NCDENR groundwater quality standard of the laboratory quantitation limit. Samples containing detected concentrations of 2-methylnaphthalene were also detected, as high as 90,000 µg/L, well above the NCDENR groundwater quality standard of 28 µg/L. The detected concentrations of 1-methylnaphthalene and 2-methylnaphthalene, had decreased to below laboratory quantitation limits in the July 16, 20001 sampling event.

*Correct
2001*

MW-10: The volatile aromatic hydrocarbon benzene was detected above the laboratory quantitation limits in the groundwater sample collected from monitoring well MW-10 during the March 27, 1998 sampling event. The detected benzene concentration of 230 µg/L was above the NCDENR groundwater quality standard of 1 µg/L. Since that sampling event, benzene has not been detected above the laboratory quantitation limits.

Concentrations of the polynuclear aromatic hydrocarbons naphthalene (26 µg/L) and 1-methylnaphthalene (12 µg/L) were detected above the NCDENR groundwater quality standards of 21 µg/L and laboratory quantitation limits, respectively. The detected concentrations of naphthalene and 1-methylnaphthalene have decreased to below laboratory quantitation limits since the March 27, 1999 sampling event.

MW-11: The volatile aromatic hydrocarbon benzene had consistently exceeded the NCDENR groundwater quality standard of 1 µg/L at monitoring well MW-11.

Concentrations detected as high as 250 µg/L during the June 24, 1998 sampling event have decreased to below laboratory quantitation limits during the April 15, 2002 sampling event.

MW-13: The volatile aromatic hydrocarbons benzene, ethylbenzene, toluene, and total xylenes were detected above the NCDENR groundwater quality standards. Benzene was detected as high as 1,200 µg/L during the July 23, 1998 sampling event, which is above the NCDENR groundwater quality standard of 1 µg/L. Benzene concentrations have decreased to a concentration of 3 µg/L during the April 15, 2002 sampling event. Ethylbenzene was detected as high as 550 µg/L during the October 18, 2000 sampling event. Since the July 16, 2001 sampling event, ethylbenzene concentrations have not been detected above laboratory quantitation limits. Only one sample, which was collected in June 24, 1998, had a detected concentration of toluene of 1,300 µg/L, which was above the NCDENR groundwater quality standard of 1,000 µg/L. Three samples, which were collected March 27, 1998, June 24, 1998, and October 18, 2000, had concentrations of total xylenes, 580 µg/L, 2,020 µg/L, and 1,280 µg/L, above the NCDENR groundwater quality standard of 530 µg/L.

The PAHs naphthalene, 1-methylnaphthalene and 2-methylnaphthalene were also above the NCDENR groundwater quality standard in the groundwater samples collected from monitoring well MW-13. Detected concentrations of naphthalene, 47 µg/L, 64 µg/L, 36 µg/L, and 90 µg/L, found in the samples from March 27, 1998, June 24, 1998, April 19, 1999, and October 18, 2000, respectively, were above the NCDENR groundwater quality standard of 21 µg/L. Detected concentrations of 1-methylnaphthalene, 22 µg/L and 14 µg/L, collected during the April 19, 1999 and October 18, 2000 sampling events, were above the NCDENR groundwater quality standard of the laboratory quantitation limit. Only one sample collected on April 19, 1999 detected 2-methylnaphthalene at a concentration of 32 µg/L, which is above the NCDENR groundwater quality standard of 28 µg/L. All PAH constituents have been below the NCDENR groundwater quality standards since the April 17, 2001 sampling event.

Table 3-1 presents a summary of the detected contaminant concentrations in the groundwater samples collected from the on-site groundwater monitoring wells. **Appendix A** provides the laboratory analytical data from the groundwater monitoring well sampling events.

Dissolved contaminant plume isopleth maps, which present the areal extent of the volatile aromatic hydrocarbon benzene detected above the NCDENR groundwater quality standards, are presented in **Figures 3-1 through 3-5**.

3.2 AIR SAMPLING

The air quality effluent samples, collected on a monthly basis for the first quarter after start-up and quarterly thereafter from the soil vapor extraction system, were delivered by overnight carrier to Paradigm and analyzed for volatile aromatic hydrocarbons using USEPA Method 18.

Only one sample from the soil vapor extraction system effluent contained contaminant concentrations above the laboratory quantitation limits. The SVE sample taken April 22, 1998 had a total xylene concentration of 17.9 milligrams per cubic meter (mg/m^3). Since then, there have been no contaminants detected in the SVE system effluent.

Table 3-2 presents a summary of the detected contaminant concentrations in the air quality samples collected from the air sparge/soil vapor extraction system. **Appendix B** provides the laboratory data from the air sampling events.

Table 3-1
Summary of Detected Contaminants - Groundwater Monitoring Well Samples

Marine Corp Air Station
Building AS-4158
New River, North Carolina

| Well No./Contaminant | NC DENR Reg Limit | 3/27/1998 | 5/15/1998 | 6/24/1998 | 7/23/1998 | 10/21/1998 | 1/25/1999 | 2/16/1999 | 4/15/1999 | 5/7/1999 | 7/14/1999 | 10/28/1999 | 1/12/2000 | 3/23/2000 | 4/25/2000 | 7/25/2000 | 7/7/2000 | 10/12/2000 | 1/4/2001 | 4/7/2001 | 7/16/2001 | 10/15/2001 | 1/15/2002 | 4/15/2002 | |
|--------------------------------|-------------------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|----------|-----------|------------|-----------|-----------|-----------|-----------|----------|------------|----------|----------|-----------|------------|-----------|-----------|-----|
| MW01 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | BOL | 1 | NS | BOL | 6 | NS | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Ethylbenzene | 29 | BOL | BOL | NS | BOL | BOL | NS | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Methyl-tert-butyl ether (MTBE) | 200 | BOL | BOL | NS | BOL | BOL | NS | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Toluene | 1000 | BOL | BOL | NS | BOL | BOL | NS | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Total Xylenes | 530 | BOL | BOL | NS | BOL | BOL | NS | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Naphthalene | 21 | BOL | BOL | NS | BOL | BOL | NS | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Acenaphthene | 80 | BOL | BOL | NS | BOL | BOL | NS | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Fluorene | 280 | BOL | BOL | NS | BOL | BOL | NS | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Phenanthrene | 210 | BOL | BOL | NS | BOL | BOL | NS | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Anthracene | 2100 | BOL | BOL | NS | BOL | BOL | NS | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Pyrene | 210 | BOL | BOL | NS | BOL | BOL | NS | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| 1-Methylnaphthalen | Detection Limit | BOL | BOL | NS | BOL | BOL | NS | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| 2-Methylnaphthalen | 28 | BOL | BOL | NS | BOL | BOL | NS | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| MW02 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | BOL | 23 | NS | NS | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | BOL | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | NS |
| Ethylbenzene | 29 | 240 | 520 | NS | NS | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | BOL | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | NS |
| Methyl-tert-butyl ether (MTBE) | 2000 | BOL | BOL | NS | NS | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | BOL | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | NS |
| Toluene | 1000 | 140 | 140 | NS | NS | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | BOL | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | NS |
| Total Xylenes | 530 | 1020 | 1100 | NS | NS | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | BOL | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | NS |
| Naphthalene | 21 | 14 | 18 | NS | NS | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | BOL | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | NS |
| Acenaphthene | 80 | BOL | BOL | NS | NS | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | BOL | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | NS |
| Fluorene | 280 | BOL | BOL | NS | NS | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | BOL | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | NS |
| Phenanthrene | 210 | BOL | BOL | NS | NS | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | BOL | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | NS |
| Anthracene | 2100 | BOL | BOL | NS | NS | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | BOL | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | NS |
| Pyrene | 210 | BOL | BOL | NS | NS | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | BOL | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | NS |
| 1-Methylnaphthalen | Detection Limit | BOL | BOL | NS | NS | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | BOL | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | NS |
| 2-Methylnaphthalen | 28 | BOL | BOL | NS | NS | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | BOL | NS | BOL | NS | NS | BOL | NS | NS | NS | NS | NS |
| MW03 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | BOL | BOL | BOL | BOL | BOL | 1 | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Ethylbenzene | 29 | BOL | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Methyl-tert-butyl ether (MTBE) | 200 | BOL | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Toluene | 1000 | BOL | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Total Xylenes | 530 | BOL | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Naphthalene | 21 | BOL | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Acenaphthene | 80 | BOL | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Fluorene | 280 | BOL | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Phenanthrene | 210 | BOL | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Anthracene | 2100 | BOL | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Pyrene | 210 | BOL | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| 1-Methylnaphthalen | Detection Limit | BOL | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| 2-Methylnaphthalen | 28 | BOL | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| MW04 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | NS | BOL | BOL | BOL | BOL | 1 | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Ethylbenzene | 29 | NS | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Methyl-tert-butyl ether (MTBE) | 200 | NS | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Toluene | 1000 | NS | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Total Xylenes | 530 | NS | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Naphthalene | 21 | NS | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Acenaphthene | 80 | NS | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Fluorene | 280 | NS | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Phenanthrene | 210 | NS | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Anthracene | 2100 | NS | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| Pyrene | 210 | NS | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| 1-Methylnaphthalen | Detection Limit | NS | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |
| 2-Methylnaphthalen | 28 | NS | BOL | BOL | BOL | BOL | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL | NS | BOL |

BOL - Below Quantitation Limit

NS - Not Sampled

Above regulatory limits

Table 3-1 (continued)
 Summary of Detected Contaminants - Groundwater Monitoring Well Samples
 Building AS-4158
 Marine Corp Air Station
 New River, North Carolina

| Well No./Contaminant | NCDEMR Reg Limit | 3/27/1998 | 5/15/1998 | 6/24/1998 | 7/23/1998 | 10/21/1998 | 1/25/1999 | 2/16/1999 | 4/19/1999 | 5/7/1999 | 7/14/1999 | 7/29/1999 | 10/20/1999 | 1/12/2000 | 3/23/2000 | 4/25/2000 | 7/26/2000 | 7/27/2000 | 10/19/2000 | 1/4/2001 | 4/17/2001 | 7/16/2001 | 10/15/2001 | 1/15/2002 | 4/15/2002 | |
|--------------------------------|------------------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|------------|----------|-----------|-----------|------------|-----------|-----------|-----|
| MW05 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | BQL | NS | NS | NS | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Ethylbenzene | 29 | BQL | NS | NS | NS | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Methyl-tert-butyl ether (MTBE) | 200 | BQL | NS | NS | NS | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Toluene | 1000 | BQL | NS | NS | NS | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Total Xylenes | 530 | BQL | NS | NS | NS | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Naphthalene | 21 | BQL | NS | NS | NS | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Acenaphthene | 80 | BQL | NS | NS | NS | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Fluorene | 280 | BQL | NS | NS | NS | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Phenanthrene | 210 | BQL | NS | NS | NS | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Anthracene | 2100 | BQL | NS | NS | NS | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Pyrene | 210 | BQL | NS | NS | NS | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| 1-Methylnaphthalen | Detection Limit | BQL | NS | NS | NS | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| 2-Methylnaphthalen | 28 | BQL | NS | NS | NS | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| MW07 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Ethylbenzene | 29 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Methyl-tert-butyl ether (MTBE) | 200 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Toluene | 1000 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Total Xylenes | 530 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Naphthalene | 21 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Acenaphthene | 80 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Fluorene | 280 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Phenanthrene | 210 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Anthracene | 2100 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Pyrene | 210 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| 1-Methylnaphthalen | Detection Limit | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| 2-Methylnaphthalen | 28 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| MW08 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Ethylbenzene | 29 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Methyl-tert-butyl ether (MTBE) | 200 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Toluene | 1000 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Total Xylenes | 530 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Naphthalene | 21 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Acenaphthene | 80 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Fluorene | 280 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Phenanthrene | 210 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Anthracene | 2100 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Pyrene | 210 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| 1-Methylnaphthalen | Detection Limit | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| 2-Methylnaphthalen | 28 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| MW09 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Ethylbenzene | 29 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Methyl-tert-butyl ether (MTBE) | 200 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Toluene | 1000 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Total Xylenes | 530 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Naphthalene | 21 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Acenaphthene | 80 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Fluorene | 280 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Phenanthrene | 210 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Anthracene | 2100 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Pyrene | 210 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1-Methylnaphthalen | Detection Limit | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 2-Methylnaphthalen | 28 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |

NS - Not Sampled

BQL - Below Quantitation Limit

Table 3-1 (continued)
 Summary of Detected Contaminants - Groundwater Monitoring Well Samples
 Building AS-4158
 Marine Corp Air Station
 New River, North Carolina

| Well No./Contaminant | NCDEMR Reg Limit | 3/27/1998 | 5/15/1998 | 6/24/1998 | 7/23/1998 | 10/21/1998 | 1/25/1999 | 2/16/1999 | 4/19/1999 | 5/7/1999 | 7/14/1999 | 7/29/1999 | 10/20/1999 | 1/12/2000 | 3/23/2000 | 4/25/2000 | 7/26/2000 | 7/26/2000 | 10/18/2000 | 1/1/2001 | 4/17/2001 | 7/16/2001 | 10/15/2001 | 1/15/2002 | 4/15/2002 | | |
|--------------------------------|------------------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|------------|----------|-----------|-----------|------------|-----------|-----------|-----|-----|
| MW10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | 250 | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | NS | NS | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Ethylbenzene | 29 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | NS | NS | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Methyl-tert-butyl ether (MTBE) | 200 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | NS | NS | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Toluene | 1000 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | NS | NS | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Total Xylenes | 530 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | NS | NS | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Naphthalene | 21 | 26 | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | NS | NS | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Acenaphthene | 80 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | NS | NS | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Fluorene | 280 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | NS | NS | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Phenanthrene | 210 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | NS | NS | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Anthracene | 2100 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | NS | NS | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Pyrene | 210 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | NS | NS | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| 1-Methylnaphthalen | 12 | 12 | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | NS | NS | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| 2-Methylnaphthalen | 28 | 14 | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | NS | NS | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| MW11 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | 90 | 20 | 250 | 62 | 20 | 7 | NS | 5 | NS | 16 | NS | 2 | BQL | NS | 3 | 15 | NS | 16 | 10 | 2 | 3 | 1 | 2 | BQL | BQL | |
| Ethylbenzene | 29 | 4 | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | 2 | BQL | NS | 3 | 15 | NS | 16 | 10 | 2 | 3 | 1 | 2 | BQL | BQL | |
| Methyl-tert-butyl ether (MTBE) | 200 | 130 | 7 | 26 | 10 | 40 | 12 | NS | 8 | NS | 13 | NS | 6 | 7 | NS | 9 | 9 | NS | 7 | 4 | 5 | 8 | 12 | 13 | BQL | BQL | |
| Toluene | 1000 | 24 | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | 6 | 7 | NS | 9 | 9 | NS | 7 | 4 | 5 | 8 | 12 | 13 | BQL | BQL | |
| Total Xylenes | 530 | 56 | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | 6 | 7 | NS | 9 | 9 | NS | 7 | 4 | 5 | 8 | 12 | 13 | BQL | BQL | |
| Naphthalene | 21 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | 6 | 7 | NS | 9 | 9 | NS | 7 | 4 | 5 | 8 | 12 | 13 | BQL | BQL | |
| Acenaphthene | 80 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | 6 | 7 | NS | 9 | 9 | NS | 7 | 4 | 5 | 8 | 12 | 13 | BQL | BQL | |
| Fluorene | 280 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | 6 | 7 | NS | 9 | 9 | NS | 7 | 4 | 5 | 8 | 12 | 13 | BQL | BQL | |
| Phenanthrene | 210 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | 6 | 7 | NS | 9 | 9 | NS | 7 | 4 | 5 | 8 | 12 | 13 | BQL | BQL | |
| Anthracene | 2100 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | 6 | 7 | NS | 9 | 9 | NS | 7 | 4 | 5 | 8 | 12 | 13 | BQL | BQL | |
| Pyrene | 210 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | 6 | 7 | NS | 9 | 9 | NS | 7 | 4 | 5 | 8 | 12 | 13 | BQL | BQL | |
| 1-Methylnaphthalen | Detection Limit | 12 | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | 6 | 7 | NS | 9 | 9 | NS | 7 | 4 | 5 | 8 | 12 | 13 | BQL | BQL | |
| 2-Methylnaphthalen | 28 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | 6 | 7 | NS | 9 | 9 | NS | 7 | 4 | 5 | 8 | 12 | 13 | BQL | BQL | |
| MW13 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | 1700 | 140 | 1200 | 44 | NS | NS | NS | 38 | NS | NS | NS | 6 | BQL | NS | 180 | 89 | NS | 300 | 150 | 35 | 5 | 3 | 3 | BQL | BQL | |
| Ethylbenzene | 29 | 220 | 19 | 440 | 7 | NS | NS | NS | 3 | BQL | NS | NS | 16 | 17 | NS | 34 | 55 | NS | 550 | 43 | 3 | 3 | 3 | 3 | BQL | BQL | |
| Methyl-tert-butyl ether (MTBE) | 200 | BQL | BQL | 150 | 56 | NS | NS | NS | 18 | BQL | NS | NS | 16 | 17 | NS | 69 | 55 | NS | 550 | 43 | 3 | 3 | 3 | 3 | BQL | BQL | |
| Toluene | 1000 | 270 | BQL | 1300 | BQL | NS | NS | NS | 7 | BQL | NS | NS | 16 | 17 | NS | 190 | 26 | NS | 610 | 67 | 7 | 7 | 7 | 7 | BQL | BQL | |
| Total Xylenes | 530 | 360 | BQL | 2020 | 10 | NS | NS | NS | 7 | BQL | NS | NS | 16 | 17 | NS | 290 | 19 | NS | 1230 | 154 | 13 | 13 | 13 | 13 | BQL | BQL | |
| Naphthalene | 21 | 47 | BQL | 64 | BQL | NS | NS | NS | 36 | BQL | NS | NS | 6 | BQL | NS | 13 | 13 | NS | 90 | 11 | 11 | 11 | 11 | 11 | BQL | BQL | |
| Acenaphthene | 80 | BQL | BQL | BQL | BQL | NS | NS | NS | 36 | BQL | NS | NS | 6 | BQL | NS | 13 | 13 | NS | 90 | 11 | 11 | 11 | 11 | 11 | BQL | BQL | |
| Fluorene | 280 | BQL | BQL | BQL | BQL | NS | NS | NS | 36 | BQL | NS | NS | 6 | BQL | NS | 13 | 13 | NS | 90 | 11 | 11 | 11 | 11 | 11 | BQL | BQL | |
| Phenanthrene | 210 | BQL | BQL | BQL | BQL | NS | NS | NS | 36 | BQL | NS | NS | 6 | BQL | NS | 13 | 13 | NS | 90 | 11 | 11 | 11 | 11 | 11 | BQL | BQL | |
| Anthracene | 2100 | BQL | BQL | BQL | BQL | NS | NS | NS | 36 | BQL | NS | NS | 6 | BQL | NS | 13 | 13 | NS | 90 | 11 | 11 | 11 | 11 | 11 | BQL | BQL | |
| Pyrene | 210 | BQL | BQL | BQL | BQL | NS | NS | NS | 36 | BQL | NS | NS | 6 | BQL | NS | 13 | 13 | NS | 90 | 11 | 11 | 11 | 11 | 11 | BQL | BQL | |
| 1-Methylnaphthalen | Detection Limit | 12 | BQL | BQL | BQL | NS | NS | NS | 36 | BQL | NS | NS | 6 | BQL | NS | 13 | 13 | NS | 90 | 11 | 11 | 11 | 11 | 11 | BQL | BQL | |
| 2-Methylnaphthalen | 28 | 11 | BQL | BQL | BQL | NS | NS | NS | 36 | BQL | NS | NS | 6 | BQL | NS | 13 | 13 | NS | 90 | 11 | 11 | 11 | 11 | 11 | BQL | BQL | |
| MW14 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | BQL | NS | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Ethylbenzene | 29 | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | BQL | NS | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Methyl-tert-butyl ether (MTBE) | 200 | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | BQL | NS | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Toluene | 1000 | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | BQL | NS | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Total Xylenes | 530 | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | BQL | NS | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Naphthalene | 21 | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | BQL | NS | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Acenaphthene | 80 | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | BQL | NS | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Fluorene | 280 | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | BQL | NS | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Phenanthrene | 210 | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | BQL | NS | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Anthracene | 2100 | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | BQL | NS | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Pyrene | 210 | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | BQL | NS | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| 1-Methylnaphthalen | Detection Limit | 12 | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | BQL | NS | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| 2-Methylnaphthalen | 28 | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | BQL | NS | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |

BQL - Below Quantitation Limit
 NS - Not Sampled

Table 3-1 (continued)
 Summary of Detected Contaminants - Groundwater Monitoring Well Samples
 Building AS-4158
 Marine Corp Air Station
 New River, North Carolina

| Well No./Contaminant | NCDEMR Reg Limit | 3/27/1998 | 5/15/1998 | 6/24/1998 | 7/21/1998 | 10/21/1998 | 1/25/1999 | 2/16/1999 | 4/19/1999 | 5/7/1999 | 7/14/1999 | 7/30/1999 | 10/20/1999 | 1/12/2000 | 3/23/2000 | 4/25/2000 | 7/6/2000 | 7/27/2000 | 10/19/2000 | 1/4/2001 | 4/17/2001 | 7/16/2001 | 10/15/2001 | 1/15/2002 | 4/15/2002 | |
|--------------------------------|------------------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|----------|-----------|-----------|------------|-----------|-----------|-----------|----------|-----------|------------|----------|-----------|-----------|------------|-----------|-----------|-----|
| MW15 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Ethylbenzene | 29 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Methyl-tert-butyl ether (MTBE) | 200 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Toluene | 1000 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Total Xylenes | 530 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Naphthalene | 21 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Acenaphthene | 80 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Fluorene | 280 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Phenanthrene | 210 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Anthracene | 2100 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Pyrene | 210 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| 1-Methylnaphthalen | Detection Limit | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| 2-Methylnaphthalen | 28 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| MW17 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Ethylbenzene | 29 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Methyl-tert-butyl ether (MTBE) | 200 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Toluene | 1000 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Total Xylenes | 530 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Naphthalene | 21 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Acenaphthene | 80 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Fluorene | 280 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Phenanthrene | 210 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Anthracene | 2100 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Pyrene | 210 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| 1-Methylnaphthalen | Detection Limit | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| 2-Methylnaphthalen | 28 | BQL | BQL | BQL | BQL | BQL | BQL | NS | BQL | NS | BQL | NS | BQL | BQL | BQL | BQL | BQL | NS | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| MW18 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1 | BQL | NS | NS | NS | NS | NS | NS | BQL | NS | BQL | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Ethylbenzene | 29 | BQL | NS | NS | NS | NS | NS | NS | BQL | NS | BQL | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Methyl-tert-butyl ether (MTBE) | 200 | BQL | NS | NS | NS | NS | NS | NS | BQL | NS | BQL | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Toluene | 1000 | BQL | NS | NS | NS | NS | NS | NS | BQL | NS | BQL | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Total Xylenes | 530 | BQL | NS | NS | NS | NS | NS | NS | BQL | NS | BQL | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Naphthalene | 21 | BQL | NS | NS | NS | NS | NS | NS | BQL | NS | BQL | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Acenaphthene | 80 | BQL | NS | NS | NS | NS | NS | NS | BQL | NS | BQL | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Fluorene | 280 | BQL | NS | NS | NS | NS | NS | NS | BQL | NS | BQL | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Phenanthrene | 210 | BQL | NS | NS | NS | NS | NS | NS | BQL | NS | BQL | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Anthracene | 2100 | BQL | NS | NS | NS | NS | NS | NS | BQL | NS | BQL | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Pyrene | 210 | BQL | NS | NS | NS | NS | NS | NS | BQL | NS | BQL | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1-Methylnaphthalen | Detection Limit | BQL | NS | NS | NS | NS | NS | NS | BQL | NS | BQL | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 2-Methylnaphthalen | 28 | BQL | NS | NS | NS | NS | NS | NS | BQL | NS | BQL | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |

BQL - Below Quantitation Limit
 NS - Not Sampled

Summary of Detected Concentrations
Air Quality Samples
Building AS-4158

Marine Corps Air Station, New River, North Carolina

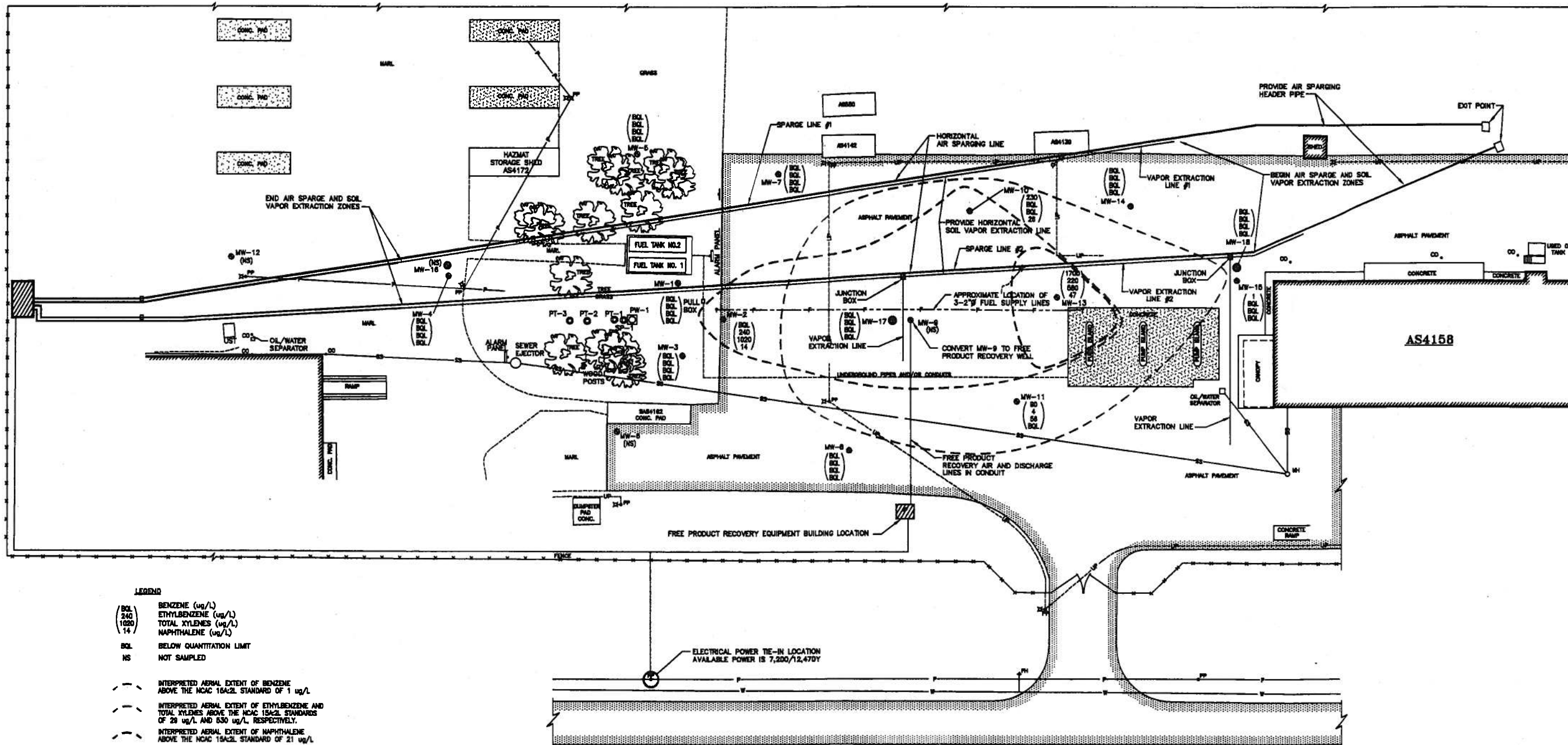
| Parameter | Sample Location | | SVE-E ¹ | | | | | | | | | |
|--|-----------------|-------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | Sample ID | Sample Date | USTAS4158-SVE-E-02A | USTAS4158-SVE-E-01D | USTAS4158-SVE-E-01C | USTAS4158-SVE-E-01A | USTAS4158-SVE-E-99D | USTAS4158-SVE-E-99C | USTAS4158-SVE-E-99B | USTAS4158-SVE-E-99A | USTAS4158-SVE-E-99E | USTAS4158-SVE-E-99F |
| Volatile Aromatic Hydrocarbons by USEPA Method 18, ppm | | | | | | | | | | | | |
| Benzene | | 1/8/2002 | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Ethylbenzene | | | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Toluene | | | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |
| Total Xylenes | | | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL | BQL |

NOTE:
¹Sample collected from Soil Vapor Extraction System Effluent.
 Shaded areas indicate detected concentrations above laboratory quantitation limits.
 BQL = Below Laboratory Quantitation Limit

Table 3-2 (continued)
 Summary of Detected Concentrations
 Air Quality Samples
 Building AS-4158
 Marine Corps Air Station, New River, North Carolina

| Parameter | Sample Location | | SVE-E ¹ | | | | | | |
|--|-----------------|-------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|--|
| | Sample ID | Sample Date | USTAS4158-SVE-E-99A | USTAS4158-SVE-E-98D | USTAS4158-SVE-E-98C1 | USTAS4158-SVE-E-98B3 | USTAS4158-SVE-E-98B2 | USTAS4158-SVE-E-98B1 | |
| Volatile Aromatic Hydrocarbons by USEPA Method 18, ppm | | | 1/18/1999 | 10/15/1998 | 7/22/1998 | 6/19/1998 | 5/8/1998 | 4/22/1998 | |
| Benzene | | | BQL | BQL | BQL | BQL | BQL | BQL | |
| Ethylbenzene | | | BQL | BQL | BQL | BQL | BQL | BQL | |
| Toluene | | | BQL | BQL | BQL | BQL | BQL | BQL | |
| Total Xylenes | | | BQL | BQL | BQL | BQL | BQL | 17.9 | |

NOTE:
¹Sample collected from Soil Vapor Extraction System Effluent.
 Shaded areas indicate detected concentrations above laboratory quantitation limits.
 BQL = Below Laboratory Quantitation Limit



- LEGEND**
- (BQL 240)
(1020)
14
 - BQL BELOW QUANTITATION LIMIT
 - NS NOT SAMPLED
 - - - INTERPRETED AERIAL EXTENT OF BENZENE ABOVE THE NCAC 15AC2L STANDARD OF 1 ug/L
 - - - INTERPRETED AERIAL EXTENT OF ETHYLBENZENE AND TOTAL XYLENES ABOVE THE NCAC 15AC2L STANDARDS OF 20 ug/L AND 530 ug/L, RESPECTIVELY.
 - - - INTERPRETED AERIAL EXTENT OF NAPHTHALENE ABOVE THE NCAC 15AC2L STANDARD OF 21 ug/L
 - BUILDING
 - VES WELL SCREEN
 - SD— STORM DRAIN LINE
 - S — STEAM LINE
 - SS— SANITARY SEWER
 - W— WATERLINE W/VALVE
 - P— POWER LINE W/POLE
 - UP— UNDERGROUND POWER LINE
 - +FH FIRE HYDRANT
 - M MANHOLE
 - △ POWER TRANSFORMER
 - ⊗ AREA LIGHT
 - ⊙ TYPE II MONITORING WELL
 - ⊙ TYPE III MONITORING WELL
 - ⊙ HYDROPLUNCH
 - ⊙ BORING
 - ⊙ PUMPING WELL
 - ⊙ PILOT TEST WELL

DISSOLVED GROUNDWATER CONTAMINANT ISOPLETH MAP

MARCH 27, 1998

NOTE:
MW-9 WAS NOT SAMPLED BECAUSE FREE PRODUCT WAS ENCOUNTERED IN THIS WELL DURING THE MARCH 27, 1998 SAMPLING EVENT.

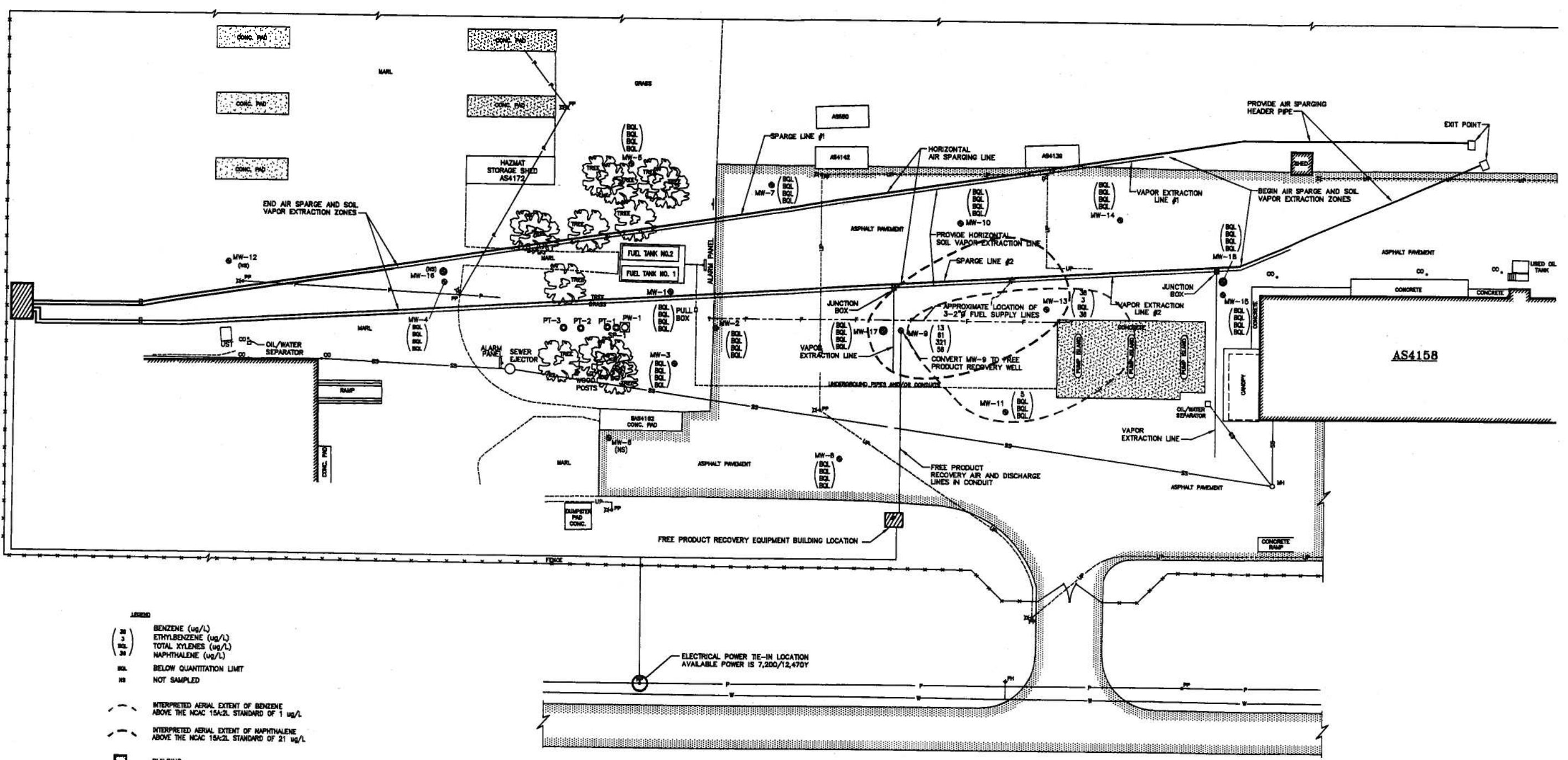
SURVEY NOTES:

- VERTICAL DATUM IS BASED ON EXISTING MILITARY CONTROL MONUMENT PW-4 WITH A LISTED ELEVATION OF 21.75 FEET (MSL); NORTH CAROLINA STATE COORDINATES FOR PW-4 ARE 332,078.63(M) NORTH AND 2,483,421.81(M) EAST. STATION PW-4 IS A 2" BRASS DISK SET IN 10" DIAMETER CONCRETE FLUSH WITH THE GROUND. THE STATION IS LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF PERIMETER ROAD AND THE OLD RAILROAD BED, 35.0 FEET SOUTH OF THE EDGE OF PERIMETER ROAD AND 20.0 FEET WEST OF THE EDGE OF THE OLD RAILROAD BED.
- SURVEY CONTROL POINTS ARE BASED ON AN ASSUMED DATUM AND MAGNETIC NORTH. THE COORDINATES AND THEIR RESPECTIVE ELEVATIONS ARE AS FOLLOWS:

| POINT | NORTH | EAST | ELEVATION (MSL) | DESCRIPTION |
|-------|---------|---------|-----------------|-------------|
| 1. | 5000.00 | 5000.00 | 23.83 | PK NAIL |
| 2. | 4837.34 | 4806.08 | 23.88 | PK NAIL |
| 3. | 4722.50 | 4838.87 | 23.35 | PK NAIL |
| 4. | 4834.21 | 4788.81 | 22.76 | #120 NAIL |
| 5. | 4804.84 | 4708.81 | 22.44 | #120 NAIL |



| <p>J.A. JONES ENVIRONMENTAL SERVICES JACKSONVILLE, FLORIDA AVE. CONTRACT NO. N62470-93-D-3033</p> | <p>DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION NORFOLK, VIRGINIA ANNUAL MONITORING REPORT BUILDING AS-4158 MARINE CORPS AIR STATION NEW RIVER, NORTH CAROLINA DISSOLVED GROUNDWATER CONTAMINANT ISOPLETH MAP - MARCH 27, 1998</p> | | | | | | | | | | | | |
|--|---|-------------|------|-------------|--|--|--|--|--|--|--|--|--|
| <p>CODE #. NO. 80091 SIZE B SCALE: 1" = 60' EFD NO. STA. PROJ. NO. SPEC. NO. CONSTR. CONTR. NO. N62470-93-D-3033 NAVFAC DRAWING NO. SHEET 7 OF 11 FIGURE 3-1</p> | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>DATE</th> <th>APPROVED BY</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> | | REVISIONS | DATE | APPROVED BY | | | | | | | | | |
| REVISIONS | DATE | APPROVED BY | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |



DISSOLVED GROUNDWATER CONTAMINANT ISOPLETH MAP

APRIL 19, 1999

- LEGEND**
- (BOL) BENZENE (ug/L)
 - (BOL) ETHYLBENZENE (ug/L)
 - (BOL) TOTAL XYLENES (ug/L)
 - (BOL) NAPHTHALENE (ug/L)
 - NS BELOW QUANTITATION LIMIT
 - NS NOT SAMPLED
 - - - INTERPRETED AERIAL EXTENT OF BENZENE ABOVE THE NCAC 15A:2L STANDARD OF 1 ug/L
 - - - INTERPRETED AERIAL EXTENT OF NAPHTHALENE ABOVE THE NCAC 15A:2L STANDARD OF 21 ug/L
 - BUILDING
 - VES WELL SCREEN
 - SD STORM DRAIN LINE
 - S STEAM LINE
 - SS SANITARY SEWER
 - W-W WATERLINE W/VALVE
 - P-P POWER LINE W/POLE
 - UP UNDERGROUND POWER LINE
 - ⊕ FIRE HYDRANT
 - MANHOLE
 - △ POWER TRANSFORMER
 - ⊗ AREA LIGHT
 - ⊙ TYPE II MONITORING WELL
 - ⊙ TYPE III MONITORING WELL
 - ⊙ HYDROPLUNCH
 - ⊙ BORING
 - ⊙ PUMPING WELL
 - ⊙ PILOT TEST WELL

NOTE:
ANALYTICAL RESULTS OF SAMPLES COLLECTED FROM MONITORING WELLS MW-2 AND MW-8 ARE FROM THE MAY 7, 1999 SAMPLING EVENT.

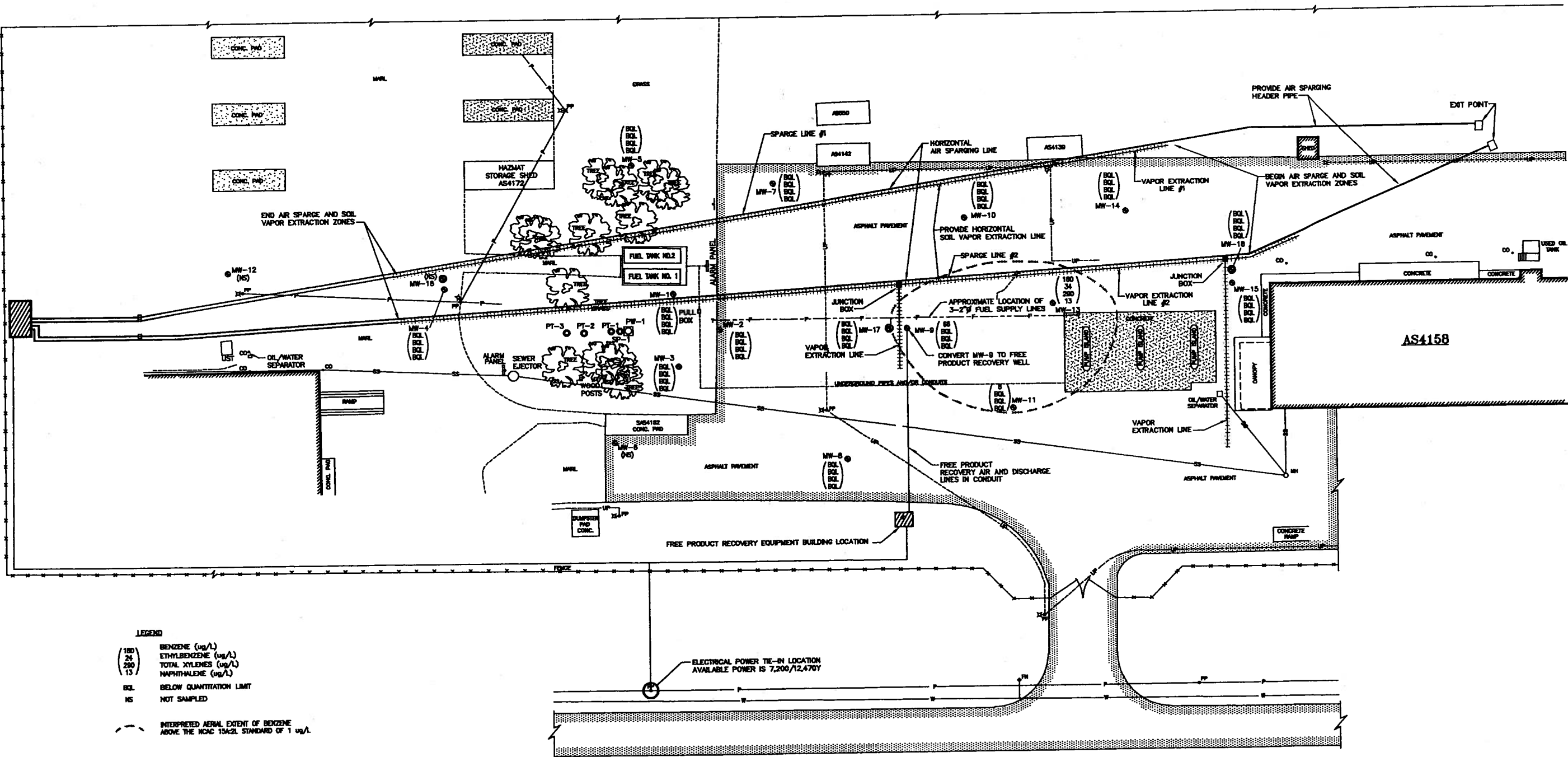
SURVEY NOTES:

- VERTICAL DATUM IS BASED ON EXISTING MILITARY CONTROL MONUMENT PW-4 WITH A LISTED ELEVATION OF 21.75 FEET (MSL); NORTH CAROLINA STATE COORDINATES FOR PW-4 ARE 392,078.63(M) NORTH AND 2,483,421.81(M) EAST. STATION PW-4 IS A 2" BRASS DISK SET IN 10" DIAMETER CONCRETE FLUSH WITH THE GROUND. THE STATION IS LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF PERIMETER ROAD AND THE OLD RAILROAD BED, 35.0 FEET SOUTH OF THE EDGE OF PERIMETER ROAD AND 20.0 FEET WEST OF THE EDGE OF THE OLD RAILROAD BED.
- SURVEY CONTROL POINTS ARE BASED ON AN ASSUMED DATUM AND MAGNETIC NORTH. THE COORDINATES AND THEIR RESPECTIVE ELEVATIONS ARE AS FOLLOWS:

| POINT | NORTH | EAST | ELEVATION (MSL) | DESCRIPTION |
|-------|---------|---------|-----------------|-------------|
| 1. | 8000.00 | 8000.00 | 23.93 | PK NAIL |
| 2. | 4837.34 | 4908.08 | 23.98 | PK NAIL |
| 3. | 4722.30 | 4838.87 | 23.35 | PK NAIL |
| 4. | 4834.21 | 4788.81 | 22.76 | #120 NAIL |
| 5. | 4504.84 | 4708.91 | 22.44 | #120 NAIL |



| | |
|---|--|
| <p style="text-align: center;">J.A. JONES ENVIRONMENTAL SERVICES JACKSONVILLE, FLORIDA A/E CONTRACT NO. N82470-93-D-3033</p> | <p style="text-align: center;">ATLANTIC DIVISION ANNUAL MONITORING REPORT BUILDING AS-4158 MARINE CORPS AIR STATION NEW RIVER, NORTH CAROLINA</p> |
| <p>DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND NORFOLK, VIRGINIA</p> | |
| <p>NAVAL STATION ATLANTIC DIVISION NORFOLK, VIRGINIA</p> | |
| <p>DISSOLVED GROUNDWATER CONTAMINANT ISOPLETH MAP - APRIL 19, 1999</p> | |
| <p>CODE ID. NO. 80001 SIZE B</p> | |
| <p>SCALE: 1" = 60'</p> | |
| <p>EFD NO.</p> | |
| <p>STA. PROJ. NO.</p> | |
| <p>SPEC. NO.</p> | |
| <p>CONSTR. CONTR. NO. N82470-93-D-3033</p> | |
| <p>NAVFAC DRAWING NO.</p> | |
| <p>SHEET 8 OF 11</p> | |
| <p>FIGURE 3-2</p> | |



DISSOLVED GROUNDWATER CONTAMINANT ISOPLETH MAP

APRIL 25, 2000

LEGEND

180 BENZENE (ug/L)
 24 ETHYLBENZENE (ug/L)
 250 TOTAL XYLENES (ug/L)
 13 NAPHTHALENE (ug/L)

BQL BELOW QUANTITATION LIMIT
 NS NOT SAMPLED

--- INTERPRETED AERIAL EXTENT OF BENZENE ABOVE THE NCAC 15AC2L STANDARD OF 1 ug/L

- BUILDING
- VES WELL SCREEN
- STORM DRAIN LINE
- STEAM LINE
- SANITARY SEWER
- WATERLINE W/VALVE
- POWER LINE W/POLE
- UNDERGROUND POWER LINE
- FIRE HYDRANT
- MANHOLE
- △ POWER TRANSFORMER
- × AREA LIGHT
- ⊙ TYPE II MONITORING WELL
- ⊙ TYPE III MONITORING WELL
- ⊙ HYDROPLUNCH
- ⊙ BORING
- ⊙ PUMPING WELL

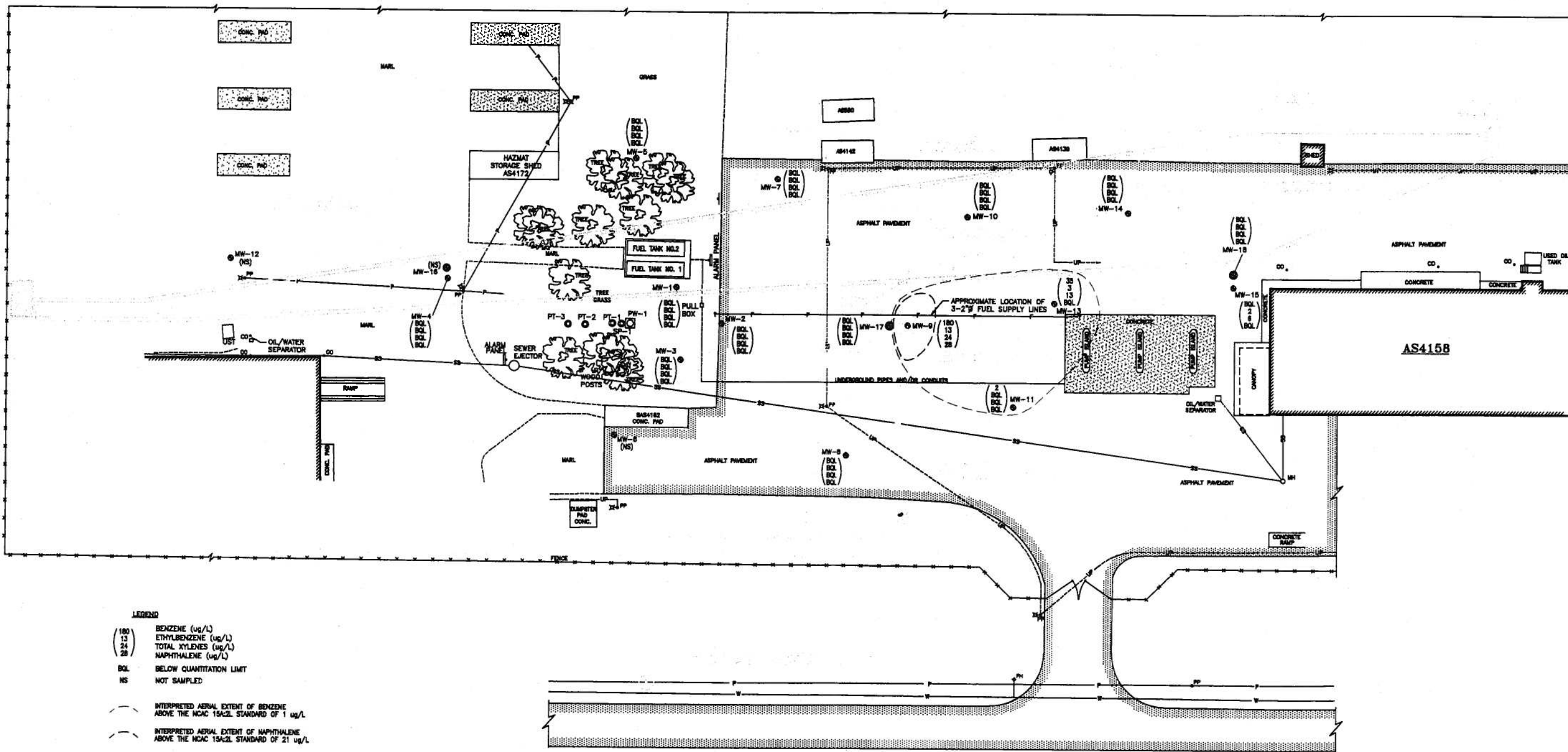
SURVEY NOTES

1. VERTICAL DATUM IS BASED ON EXISTING MILITARY CONTROL MONUMENT PW-4 WITH A LISTED ELEVATION OF 21.75 FEET (MSL); NORTH CAROLINA STATE COORDINATES FOR PW-4 ARE 352,078.63(M) NORTH AND 2,463,421.81(M) EAST. STATION PW-4 IS A 2" DIAMETER CONCRETE FLUSH WITH THE GROUND. THE STATION IS LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF PERMIER ROAD AND THE OLD RAILROAD BED, 35.0 FEET SOUTH OF THE EDGE OF PERMIER ROAD AND 20.0 FEET WEST OF THE EDGE OF THE OLD RAILROAD BED.

2. SURVEY CONTROL POINTS ARE BASED ON AN ASSUMED DATUM AND MAGNETIC NORTH. THE COORDINATES AND THEIR RESPECTIVE ELEVATIONS ARE AS FOLLOWS:

| POINT | NORTH | EAST | ELEVATION (MSL) | DESCRIPTION |
|-------|---------|---------|-----------------|-------------|
| 1. | 5000.00 | 5000.00 | 23.93 | PK NAIL |
| 2. | 4837.34 | 4906.08 | 23.88 | PK NAIL |
| 3. | 4722.30 | 4839.67 | 23.35 | PK NAIL |
| 4. | 4634.21 | 4788.81 | 22.75 | #120 NAIL |
| 5. | 4504.84 | 4708.91 | 22.44 | #120 NAIL |

| <p>J.A. JONES CONSULTING ENGINEER 14615 WILLOW HILL, FLORIDA TEL: 813-941-1111 FAX: 813-941-1112</p> | <p>REVISIONS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> <th>BY</th> <th>APPROVED BY</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> | NO. | DATE | DESCRIPTION | BY | APPROVED BY | | | | | |
|--|---|-------------|------|-------------|----|-------------|--|--|--|--|--|
| NO. | DATE | DESCRIPTION | BY | APPROVED BY | | | | | | | |
| | | | | | | | | | | | |
| <p>DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION NORFOLK, VIRGINIA ANNUAL MONITORING REPORT BUILDING AS-4158 MARINE CORPS AIR STATION NEW RIVER, NORTH CAROLINA DISSOLVED GROUNDWATER CONTAMINANT ISOPLETH MAP - APRIL 25, 2000</p> | | | | | | | | | | | |
| <p>CODE ID NO. 80081 SIZE B SCALE: 1"=60' ETD NO. STA. PROJ. NO. SPEC. NO. CONSTR. CONTR. NO. N62470-93-D-3033 NAVFAC DRAWING NO. SHEET 9 OF 11 FIGURE 3-3</p> | | | | | | | | | | | |



LEGEND

- (180) BENZENE (ug/L)
- (13) ETHYLBENZENE (ug/L)
- (24) TOTAL XYLENES (ug/L)
- (28) NAPHTHALENE (ug/L)
- BOL BELOW QUANTITATION LIMIT
- NS NOT SAMPLED
- (---) INTERPRETED AERIAL EXTENT OF BENZENE ABOVE THE NCAC 15A:2L STANDARD OF 1 ug/L
- (---) INTERPRETED AERIAL EXTENT OF NAPHTHALENE ABOVE THE NCAC 15A:2L STANDARD OF 21 ug/L
- [] BUILDING
- VES WELL SCREEN
- SD STORM DRAIN LINE
- STEAM LINE
- SS SANITARY SEWER
- W-W WATERLINE W/VALVE
- P-P POWER LINE W/POLE
- UP UNDERGROUND POWER LINE
- PH FIRE HYDRANT
- MH MANHOLE
- PT POWER TRANSFORMER
- AL AREA LIGHT
- TYPE II MONITORING WELL
- TYPE III MONITORING WELL
- HYDROPLUNCH
- BORING
- PUMPING WELL
- PILOT TEST WELL

DISSOLVED GROUNDWATER CONTAMINANT ISOPLETH MAP
APRIL 17, 2001

SURVEY NOTES

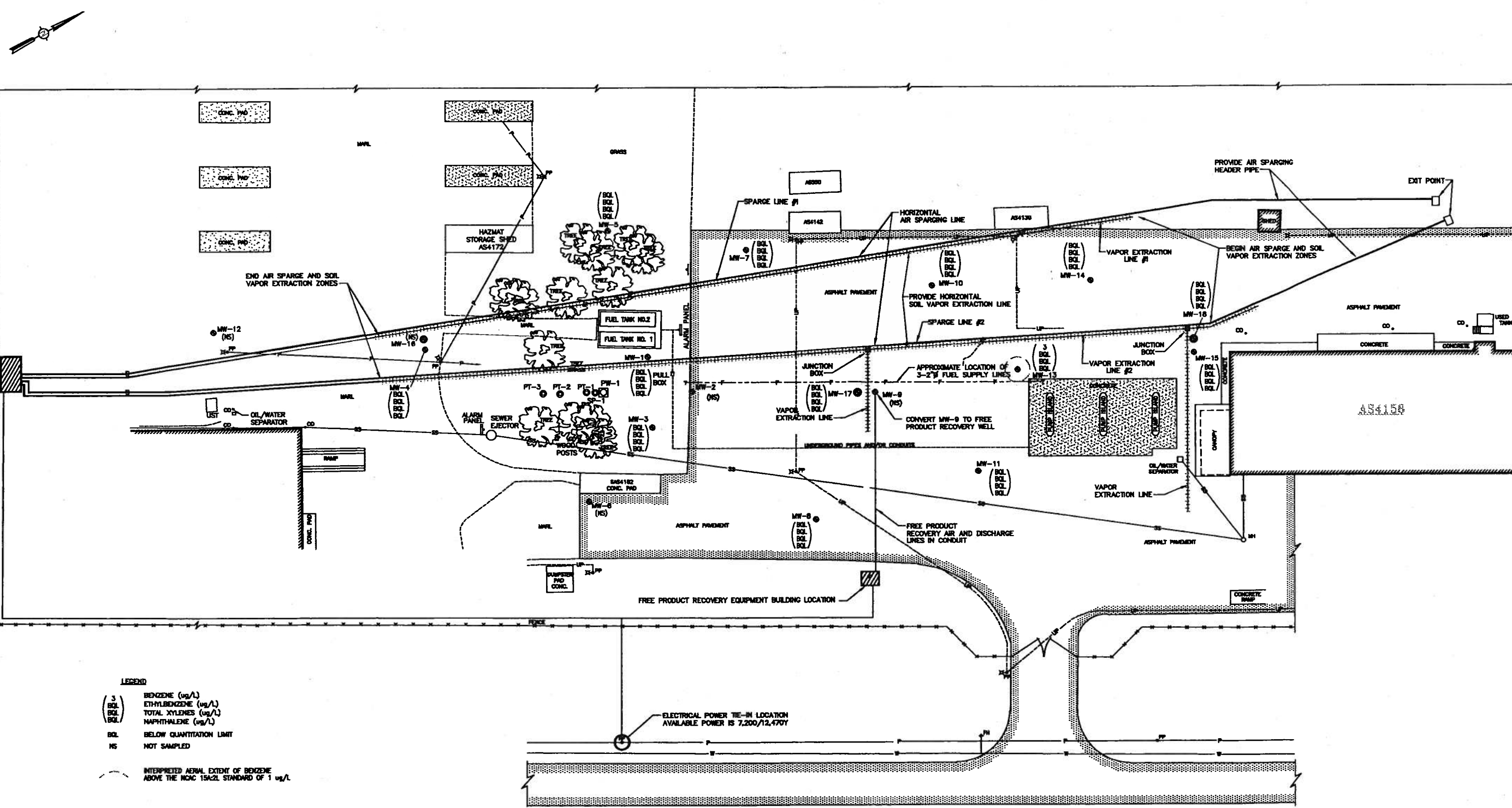
1. VERTICAL DATUM IS BASED ON EXISTING MILITARY CONTROL MONUMENT PW-4 WITH A LISTED ELEVATION OF 21.75 FEET (MSL); NORTH CAROLINA STATE COORDINATES FOR PW-4 ARE 392,078.83(M) NORTH AND 2,463,421.81(M) EAST. STATION PW-4 IS A 2" BRASS DISK SET IN 10" DIAMETER CONCRETE FLUSH WITH THE GROUND. THE STATION IS LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF PERIMETER ROAD AND THE OLD RAILROAD BED, 35.0 FEET SOUTH OF THE EDGE OF PERIMETER ROAD AND 20.0 FEET WEST OF THE EDGE OF THE OLD RAILROAD BED.

2. SURVEY CONTROL POINTS ARE BASED ON AN ASSUMED DATUM AND MAGNETIC NORTH. THE COORDINATES AND THEIR RESPECTIVE ELEVATIONS ARE AS FOLLOWS:

| POINT | NORTH | EAST | ELEVATION (MSL) | DESCRIPTION |
|-------|---------|---------|-----------------|-------------|
| 1. | 5000.00 | 5000.00 | 23.83 | PK NAIL |
| 2. | 4837.34 | 4906.09 | 23.98 | PK NAIL |
| 3. | 4722.30 | 4838.87 | 23.35 | PK NAIL |
| 4. | 4834.21 | 4788.81 | 22.75 | #120 NAIL |
| 5. | 4804.84 | 4706.81 | 22.44 | #120 NAIL |



| | | |
|---|--|----------------------------------|
| | | APPROVED BY DATE REVISIONS |
| DEPARTMENT OF THE NAVY ATLANTIC DIVISION ANNUAL MONITORING REPORT BUILDING AS-4158 MARINE CORPS AIR STATION NEW RIVER, NORTH CAROLINA | | SYMBOL DESCRIPTION DATE |
| NAVFAC DRAWING NO. N62470-93-D-3033 SHEET 10 OF 11 FIGURE 3-4 | | DATE REVISIONS |



LEGEND

(3 BQL BQL BQL) BENZENE (ug/L)
 (3 BQL BQL BQL) ETHYL BENZENE (ug/L)
 (3 BQL BQL BQL) TOTAL XYLENES (ug/L)
 (3 BQL BQL BQL) NAPHTHALENE (ug/L)
 BQL BELOW QUANTITATION LIMIT
 NS NOT SAMPLED

--- INTERPRETED AERIAL EXTENT OF BENZENE ABOVE THE NCAC 15A-2L STANDARD OF 1 ug/L

- BUILDING
- VES WELL SCREEN
- STORM DRAIN LINE
- STEAM LINE
- SANITARY SEWER
- WATERLINE W/VALVE
- POWER LINE W/POLE
- UNDERGROUND POWER LINE
- FIRE HYDRANT
- MANHOLE
- △ POWER TRANSFORMER
- × AREA LIGHT
- TYPE II MONITORING WELL
- TYPE III MONITORING WELL
- HYDROPUNCH
- BORING
- PUMPING WELL
- PILOT TEST WELL

DISSOLVED GROUNDWATER CONTAMINANT ISOPLETH MAP

APRIL 15, 2002

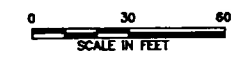
NOTE:
 MW-9 WAS NOT SAMPLED BECAUSE FREE PRODUCT WAS ENCOUNTERED IN THIS WELL DURING THE APRIL 15, 2002 SAMPLING EVENT.

SURVEY NOTES:

1. VERTICAL DATUM IS BASED ON EXISTING MILITARY CONTROL MONUMENT PW-4 WITH A LISTED ELEVATION OF 21.75 FEET (MSL) NORTH CAROLINA STATE COORDINATES FOR PW-4 ARE 352,078.63(M) NORTH AND 2,483,421.81(M) EAST. STATION PW-4 IS A 2" BRASS DISK SET IN 10" DIAMETER CONCRETE FLUSH WITH THE GROUND. THE STATION IS LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF PERIMETER ROAD AND THE OLD RAILROAD BED, 35.0 FEET SOUTH OF THE EDGE OF PERIMETER ROAD AND 20.0 FEET WEST OF THE EDGE OF THE OLD RAILROAD BED.

2. SURVEY CONTROL POINTS ARE BASED ON AN ASSUMED DATUM AND MAGNETIC NORTH. THE COORDINATES AND THEIR RESPECTIVE ELEVATIONS ARE AS FOLLOWS:

| POINT | NORTH | EAST | ELEVATION (MSL) | DESCRIPTION |
|-------|---------|---------|-----------------|-------------|
| 1. | 5000.00 | 5000.00 | 23.83 | PK NAIL |
| 2. | 4837.34 | 4908.09 | 23.88 | PK NAIL |
| 3. | 4722.30 | 4839.87 | 23.35 | PK NAIL |
| 4. | 4834.21 | 4788.81 | 22.76 | #120 NAIL |
| 5. | 4504.84 | 4708.91 | 22.44 | #120 NAIL |



| <p>J.A. JONES PROFESSIONAL ENGINEER 14511 WILLOW HILL ROAD JACOBVILLE, FLORIDA 34450 A.E. LICENSE NO. NS2470-93-D-3033</p> | <p>DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION ANNUAL MONITORING REPORT BUILDING AS-4168 MARINE CORPS AIR STATION NEW RIVER, NORTH CAROLINA</p> <p>DISSOLVED GROUNDWATER CONTAMINANT ISOPLETH MAP - APRIL 15, 2002</p> | | | | | | | | |
|---|--|-------------|-------------|-------------|-------------|--|--|--|--|
| <p>REVISIONS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> <th>APPROVED BY</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> | | NO. | DATE | DESCRIPTION | APPROVED BY | | | | |
| NO. | DATE | DESCRIPTION | APPROVED BY | | | | | | |
| | | | | | | | | | |
| <p>NAVY FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION ANNUAL MONITORING REPORT BUILDING AS-4168 MARINE CORPS AIR STATION NEW RIVER, NORTH CAROLINA</p> | | | | | | | | | |
| <p>CODE # NO. 60081 SIZE B SCALE: 1" = 60' STA. PROJ. NO. SPEC. NO. CONSTR. CONTR. NO. NS2470-93-D-3033 NAVFAC DRAWING NO. SHEET 11 OF 11 FIGURE 3-5</p> | | | | | | | | | |

*Color
 top
 sheet*

SECTION 4.0

CONCLUSIONS AND RECOMMENDATIONS

From April 1998 through April 2002, J.A. Jones implemented the selected remedial approach as outlined in the September 11, 1995 CAP, prepared by Catlin, at the Building AS-4158 site. The selected remedial approach consisted of the installation and operation of a remediation treatment system consisting of air sparge and soil vapor extraction to volatilize dissolved hydrocarbons present in the groundwater, the collection of vapors generated during air sparge, and groundwater monitoring to optimize treatment system performance and track petroleum-impacted groundwater migration in order to verify remediation progress.

According to the groundwater elevation data collected by J.A. Jones, the direction of groundwater flow is estimated to be predominantly southwest at the location of the releases.

J.A. Jones completed installation and began operation of the Building AS-4158 treatment system on April 15, 1998. Groundwater samples were collected from on-site monitoring wells monthly for the first quarter of system operation and quarterly thereafter. Samples were analyzed for volatile aromatic hydrocarbons and PAHs by USEPA Methods 602 and 610, respectively. On December 1999, the system was shut down after noting that concentrations had been consistently low, but by February 2001 the system was restarted due to an increase in concentrations in monitoring wells MW-9, MW-11, and MW-13. As ~~of~~ April 2002, the system remains in operation.

of Analytical results from groundwater samples collected from monitoring wells MW-9 (former product recovery well), MW-11, and MW-13, indicated a presence of dissolved petroleum hydrocarbon concentrations above the NCDENR groundwater quality standards. Groundwater samples collected ~~from~~ *from* monitoring wells MW-1, MW-2, MW-3, MW-4, MW-10, MW-15, and MW-17, indicated a limited presence of dissolved petroleum hydrocarbon constituent concentrations, with no concentrations above the NCDENR groundwater quality standards since October 21, 1998. Monitoring wells MW-5, MW-7, MW-8, MW-14, and MW-18, had no detected concentrations of dissolved petroleum hydrocarbon constituents above the laboratory quantitation limits during the groundwater sampling events conducted from April 1998 to April 2002.

During the most recent quarterly groundwater sampling event (April 15, 2002), the interpreted extent of the dissolved volatile aromatic hydrocarbon contamination, above the 15A NCAC 2L groundwater quality standards, encompassed only MW-13, which is located approximately 225 feet north of the site of the old USTs. Overall the VOC contamination has decreased drastically since the implementation of the air sparge/soil

*4/15
date doesn't
agree w/ T
previ*

vapor extraction system in April of 1998. There has been no dissolved polynuclear aromatic hydrocarbon contaminants detected above the NCDENR regulatory limits in the vicinity of AS-4158 since April 2001.

The overall reduction in contaminant concentrations within the dissolved petroleum contaminant plume indicates that the air sparge/soil vapor extraction treatment system has been effective in volatilizing and removing the petroleum hydrocarbons present in the groundwater at the Building AS-4158 site.

During the January 2002 quarterly sampling event, LNAPL was discovered in MW-9 at a thickness of 2.9 feet. This was the first time LNAPL was detected in this well since October 1998. According to Nikki Hall, EMD, transfer piping is located adjacent to monitoring well MW-9. Additionally, Ms. Hall stated that a release/leak was confirmed based on a tightness test performed on the lines. Approximately 39.24 gallons of product was removed from MW-9 in the period from January 2002 through April 2002 via hand bailing, while 5 gallons of LNAPL was removed via vacuum truck. The total amount of LNAPL recovered from the site from April 1998 to April 2002 was 82.19 gallons.

J.A. Jones recommends the continued removal of LNAPL from MW-9 until it is not detected during four consecutive quarterly sampling events. ~~The leaking underground fuel line should be repaired and a tightness test performed to demonstrate its integrity.~~ The treatment system should be shut down and quarterly sampling continued only at monitoring wells MW-11, MW-13, and MW-17 until dissolved petroleum related constituent concentrations consistently meet the site rehabilitation concentrations established by the 15A NCAC 2L groundwater quality standards but no less than four quarterly sampling events starting from post-operation system activities. Monitoring well MW-9 should be added to this list once the LNAPL is removed. One final sampling event should be performed at all wells once proven that the above listed wells meet the 15A NCAC 2L groundwater quality standard limits.

Update
to show
time
change
as 6th
Section
2.1

} Repairs
done
11/2002.