N00639 AR 000698
MILLINGTON SUPPACT
5090 3a

FINAL

Field Application to Enhance *In-Situ* Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Site N-6, Former Naval Support Activity Mid-South, Millington, Tennessee

Naval Support Activity Mid-South
Millington, Tennessee

Prepared For

Naval Facilities Engineering Command
Port Hueneme, California

Naval Facilities Engineering Command
Southern Division
North Charleston, South Carolina

and

Naval Support Activity Mid-South
Millington, Tennessee

July 2002

PARSONS
1700 Broadway, Suite 900 • Denver, Colorado 80290

PARSONS

Parsons Infrastructure & Technology Group Inc.
1700 Broadway, Suite 900 • Denver, Colorado 80290 • (303) 831-8100 • Fax: (303) 831-8208 • www.parsons.com

31 July 2002

Mr. James Reed
Southern Division Naval Facilities Engineering Command
Mail Code 1888
2155 Eagle Drive
North Charleston, NC 29406
(843) 820-5543

Subject: Submittal of the Final Field Application to Enhance *In-Situ* Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Site N-6, Former Naval Support Activity Mid-South, Millington, Tennessee (Contract N47408-00-C-7112)

Dear Mr. Reed,

Please find enclosed 2 copies (replacement inserts) of the Final Field Application to Enhance *In-Situ* Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Site N-6, Former Naval Support Activity (NSA) Mid-South, Millington, Tennessee. The final report was prepared by the Parsons Corporation (Parsons) for the Naval Facilities Engineering Command (NAVFAC) and NSA Mid-South. Please replace the draft report cover and report sections with the enclosed copies. The appendices remain unchanged. Parsons presented the results of this study to Navy personnel and BRAC Cleanup Team members on 16 July 2002. If you have any questions or require additional information, please contact me at (303) 831-8100.

Sincerely,

PARSONS.

Bruce M Henry

Bruce M. Henry, P.G.
Project Manager

cc: Scott Wight, NAVFAC (letter only)
Rob Williamson, NSA Mid-South (4 copies)
Jack Carmichael, USGS (1 copy)
John Stedman, EnSafe (1 copy)
Jim Morrison, TDEC (1 copy)
Clayton Bullington, TDEC (1 copy)
Jennifer Herndon, USEPA (1 copy)
Greg Parker, MSCHD(1 copy)

Attachment (2 copies)

FINAL

FIELD FEASIBILITY TEST FOR *IN-SITU* BIOREMEDIATION OF CHLORINATED SOLVENTS VIA VEGETABLE OIL INJECTION AT SITE N-6, FORMER NAVAL SUPPORT ACTIVITY MID-SOUTH, TENNESSEE

July 2002

Prepared for:

NAVAL FACILITIES ENGINEERING COMMAND
PORT HUENEME, CALIFORNIA

NAVAL FACILITIES ENGINEERING COMMAND
SOUTHERN DIVISION
NORTH CHARLESTON, SOUTH CAROLINA
and
NAVAL SUPPORT ACTIVITY MID-SOUTH
MILLINGTON, TENNESSEE

Prepared by:

PARSONS
1700 Broadway, Suite 900
Denver, Colorado 80290

EXECUTIVE SUMMARY

This report documents the results of a field feasibility test to evaluate the application of vegetable oil as an organic substrate to enhance the *in situ* anaerobic reductive dechlorination of chlorinated aliphatic hydrocarbons (CAHs, or chlorinated solvents) in groundwater at Site N-6, Former Naval Support Activity (NSA) Mid-South Northside, Millington, Tennessee. Prior to the feasibility test, the distribution of parent compounds tetrachloroethene (PCE) and trichloroethene (TCE) and the degradation daughter product *cis*-1,2-dichloroethene (*cis*-1,2-DCE) in groundwater indicated that limited reductive dechlorination of chlorinated ethenes was occurring at the site, but that the process was electron donor (substrate) limited. Vegetable oil was selected as a slowly-soluble organic substrate to overcome the electron donor deficiency and enhance anaerobic reductive dechlorination of chlorinated solvents in groundwater.

A field test consisting of injection and monitoring well installations, baseline sampling, and vegetable oil injection was conducted during July and August 2000. A total of 6,115 gallons of refined soybean oil and 790 gallons of native water were injected into eight injection wells in August 2000. Process monitoring was conducted in November 2000, February 2001, August 2001, and January 2002.

FIELD TEST RESULTS

Changes in geochemical conditions during process monitoring indicates that the addition of vegetable oil at Site N-6 has induced environmental conditions conducive to reductive dechlorination in the upper and lower fluvial deposits, but that these changes are not uniform nor widespread across the study area. Dissolved oxygen (DO) concentrations decreased at many locations after injection. However, concentrations of DO have generally remained above 0.4 milligrams per liter (mg/L) throughout the test area and this suggests that an influx of relatively oxygenated groundwater may be occurring in the treatment zone.

Baseline oxidation-reduction potential (ORP) values exhibited a wide range of reducing conditions with values ranging from a high of +253 millivolts (mV) to a low of -359 mV. ORP values varied substantially even within the treatment zone, which is suggestive of a high degree of heterogeneity in the natural reducing conditions at the site prior to injection. After injection, ORP values tended to stabilize within a range from +150 mV to –150 mV, indicating reducing conditions typically are within the range of nitrate-reduction to sulfate-reduction. Increases in methane concentration at several locations indicate this oxidation-reduction process also has been stimulated by substrate addition. Iron and methane concentration data further suggest that iron-reduction and methanogenesis are the dominant terminal electron accepting processes (TEAPs) that have been stimulated at the site.

After vegetable oil injection there was an overall decrease in TCE concentrations detected in groundwater. However, this decreasing trend is not uniform for all of the monitoring locations at Site N-6. The greatest decrease in contaminant concentrations occurred at the injection locations, where contaminant concentrations have attenuated from greater than 600 micrograms per liter (μg/L) to less than method detection limits. It

is not readily apparent whether the observed decreases in TCE concentrations are a result of biodegradation, natural variations in contaminant concentrations, or partitioning of contaminant mass into the vegetable oil.

Consistent or long-term reductive dechlorination of chlorinated ethenes has not been demonstrated by monitoring completed through January 2002. Only within the past two process monitoring events has reductive dechlorination of TCE to *cis*-1,2-DCE been observed. There is currently no evidence of further reductive dechlorination to vinyl chloride (VC) and ethene. Initial changes in contaminant profiles suggested that reductive dechlorination was initially stimulated at two locations (PES-MW7S and PES-MW1S). However, these locations are distant from the injection area relative to the other monitoring locations. A lack of consistent evidence of reductive dechlorination at these locations suggests that the initial changes in contaminant profiles may have been a result of groundwater displacement immediately following injection.

Well locations where evidence of reductive dechlorination of TCE to *cis*-1,2-DCE has occurred exhibit the following characteristics:

- TOC equal to or greater than approximately 10 mg/L.
- Measurable quantities of volatile fatty acids (VFAs) equal to or greater than 20 mg/L.
- ORP less than –60 mV.
- Ferrous iron concentration greater than 4 mg/L, sulfate concentration less than 1 mg/L, and methane concentration greater than 0.5 mg/L.
- Total biomass greater than approximately 50 picomoles of phospholipid fatty acids per milliliter (pmoles PLFA/mL).

These conditions have not been induced uniformly or widespread across the treatment area, but have been limited mostly to the immediate injection area. In order to stimulate reductive dechlorination, sufficient organic substrate is required to create environmental conditions sufficiently reducing for methanogenesis to occur while stimulating microbial growth of dechlorinating microorganisms. Therefore, the lack of reductive dechlorination at Site N-6 is primarily a function of substrate distribution.

Finally, complete dechlorination to ethene has not been demonstrated. However, the presence of *Dehalococcoides Ethenogenes*, a bacteria which is known to degrade chlorinated ethenes to completion, has been established at the site. The potential for complete dechlorination to occur will likely depend on the growth and development of substantial populations of appropriate dechlorinating microorganisms in the presence of competing microbial processes.

RECOMMENDATIONS

Contaminant, daughter product, geochemical, and microbial data strongly suggest that the lack of reductive dechlorination at Site N-6 is primarily a function of substrate distribution. Until it can be demonstrated that adequate distribution of vegetable oil

substrate will enhance complete biodegradation of CAHs to innocuous byproducts, further substrate addition or system expansion is not warranted. Rather, further process monitoring, modifications to the analytical protocol, redistribution of the vegetable oil substrate, and additional monitoring well installation are recommended.

The presence of some vegetable oil in the injection wells indicates that the oil is present as a free phase within the aquifer. It is possible that this oil has reduced the relative permeability of the aquifer to the degree that there is effectively little flow of groundwater through the treatment zone. Therefore, a second injection event is recommended to redistribute the oil more uniformly throughout the treatment zone. To accomplish this, Parsons recommends a "pull-push" combination of 1) extracting free phase oil from the injection wells, 2) re-injecting the extracted oil as a dilute oil-in-water emulsion, and 3) a final water push of sufficient volume to distribute the total volume of oil at a residual saturation of less than 25 percent. This effort would be most effective using site groundwater extracted from the injection wells along with the free phase oil, or from a downgradient well (e.g., well PES-MW7S/D), in order to maintain native geochemical conditions within the treatment zone.

Alternatively, a pair of downgradient wells could be used for extraction to induce flow between the injection wells and downgradient monitoring wells within the treatment zone. Groundwater could be extracted and then re-injected into the injection wells to create a recirculation cell between the injection and extraction locations. This scenario would attempt to pull the oil through the treatment area. Circulation of at least two pore volumes is recommended to redistribute the vegetable oil within the recirculation zone of influence. It is still recommended to first extract as much free oil from the injection wells as possible to mix an initial slug of dilute oil-in-water emulsion.

Although no additional fluids (other than those already in the treatment zone) would be used under this scenario, amendment of the State of Tennessee and the Memphis and Shelby County Water Quality Control Board injection permits may be necessary. Based on microbial characterization, bioaugmentation using an established microbial population from a site known to dechlorinate TCE to completion (i.e., the Ensafe, Inc. bioremediation test site at the Former NSA-Midsouth Northside) also should be considered.

Because of the degree of aquifer heterogeneity, low hydraulic gradient, and elevated contaminant concentrations observed at upgradient well pair PES-MW1S/D, additional monitoring wells should be considered for the site. Parsons recommends additional well pairs between the injection wells and upgradient well pair PES-MW1S/D. Depending on selection of a substrate redistribution design, additional well pairs may be warranted to evaluate reductive dechlorination within the redistribution zone. Due to the potential for preferential flow paths and because the impact of the initial injection is being observed as far as 30 feet downgradient of the injection wells, additional well pairs may be warranted at distances up to 150 feet downgradient from the injection wells.

Process monitoring is recommended prior to any substrate redistribution to provide additional evaluation of the initial test. Because redistribution would cause changes in geochemical and contaminant concentrations simply by displacement, monitoring to establish a new baseline is recommended within 30 days of substrate redistribution. Semi-annual performance monitoring is recommended for at least 12 to 18 months to

determine whether substrate redistribution was effective in stimulating reductive dechlorination.

Additions to the sampling protocol also are recommended. The addition of dissolved hydrogen is recommended to further evaluate the TEAPs that are occurring across the site. Select samples for VFA and PLFA analysis are recommended to determine the change and development of microbial communities and degradation processes that contribute to reductive dechlorination. Finally, additional aquifer testing may be beneficial to establish preferential flow paths within the treatment zone.

TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY ES-1

ACRONYMS AND ABBREVIATIONS vi

EXECUTIVE SUMMARY ES-1

SECTION 1 - INTRODUCTION 1-1

1.1 Objectives 1-1
1.2 Scope of Work 1-1
1.3 Report Organization 1-2
1.4 Site History 1-2

SECTION 2 - SUMMARY OF HISTORICAL SITE CHARACTERIZATION 2-1

2.1 Historical Site Characterization 2-1
2.1.1 Geology 2-1
2.1.2 Hydrogeology 2-6
2.2 Nature and Extent of CONTAMINATION 2-6
2.2.1 Soil Analytical Results 2-6
2.2.2 Groundwater Quality 2-8
2.3 Groundwater Use and Potential Receptors 2-14

SECTION 3 - FIELD TEST IMPLEMENTATION 3-1

3.1 System Installation 3-1
3.1.1 Injection Point and Groundwater Sampling Locations 3-3
3.1.2 Injection and Groundwater Monitoring Well Installation 3-3
3.1.3 Soil Sampling 3-3
3.2 Measurement of Baseline Geochemical Conditions and Contaminant Profiles 3-8
3.3 Aquifer Testing 3-8
3.4 Substrate Addition 3-8
3.5 Process Monitoring 3-10

SECTION 4 - RESULTS 4-1

4.1 Groundwater Flow 4-2
4.2 Soil Sampling Results 4-12
4.2.1 Total Organic Carbon in Soil 4-12
4.2.2 Pre-Injection Extent of Chlorinated Aliphatic Hydrocarbons in Soil 4-12

TABLE OF CONTENTS (Continued)

Page

4.3 Pre-Injection Extent of Chlorinated Aliphatic Hydrocarbons in Groundwater 4-14
4.4 Post-Injection Profile of Chlorinated Aliphatic Hydrocarbons 4-22
4.4.1 Chlorinated Ethenes Over Time 4-22
4.4.2 Presence of Daughter Products and CAH Ratios 4-26
4.4.3 Chlorinated Aliphatic Hydrocarbons In Oil 4-34
4.5 Substrate Addition 4-34
4.5.1 Total Organic Carbon as an Indicator of Substrate Addition and Zone of Influence 4-34
4.5.2 Biomass and Volatile Fatty Acids 4-35
4.5.3 Microbial Community Characterization Results 4-40
4.6 Geochemical Results 4-41
4.6.1 Alternate Electron Acceptors and Metabolic Byproducts 4-42
4.6.1.1 Dissolved Oxygen 4-42
4.6.1.2 Nitrate and Nitrite 4-44
4.6.1.3 Ferrous Iron 4-44
4.6.1.4 Sulfate 4-46
4.6.1.5 Methane, Ethane, and Ethene in Groundwater 4-46
4.6.2 ORP as an Indicator of Redox Processes 4-48
4.6.3 Additional Geochemical Indicators 4-50
4.6.3.1 Chloride as an Indicator of Reductive Dechlorination 4-50
Carbon Dioxide and Alkalinity 4-53
4.7 Summary of Enhanced Biodegradation 4-53

SECTION 5 - CONCLUSIONS AND RECOMMENDATIONS 5-1

5.1 Conclusions 5-1
5.1.1 Observed Changes in Site Geochemistry 5-1
5.1.2 Actual/Significant Changes in Contaminant Concentrations 5-2
5.1.3 Daughter Product Formation and Persistence 5-2
5.1.4 Degree of Electron Donor Utilization for Reductive Dechlorination 5-2
5.1.5 Substrate Distribution and Potential for Future Reductive Dechlorination 5-2
5.2 Recommendations 5-3

SECTION 6 - REFERENCES 6-1

TABLE OF CONTENTS (Continued)

APPENDICES

A - Analytical Data
B - Field Test Data
- B.1 - Borehole Logs
- B.2 - Well Construction Diagrams
- B.3 - Groundwater Sampling Forms
- B.4 – Aquifer Test Data

C – Concentration and Molar Fraction Plots

LIST OF TABLES

No.	Title	Page
2.1	Summary of Historic Volatile Organic Compound Detections in Groundwater	2-9
3.1	Summary of Initial Site Activities	3-2
3.2	Well Construction Summary	3-6
3.3	Analytical Protocols for Soil, Vegetable Oil, and Groundwater Samples	3-7
3.4	Vegetable Oil Injection Summary	3-9
3.5	Summary of Performance Monitoring Activities	3-11
4.1	Summary of Groundwater Elevations	4-3
4.2	Pre-Injection Hydraulic Conductivities and Average Groundwater Velocities	4-9
4.3	Post-Injection Hydraulic Conductivities and Average Groundwater Flow Velocities	4-11
4.4	Summary of Analytical Results for Soil	4-13
4.5	Summary of Volatile Organic Compounds Detected in Groundwater, Site N-6 Process Monitoring Program	4-15
4.6	Summary of Volatile Organic Compounds Detected in Groundwater, NSA Mid-South Longterm Monitoring Program	4-19
4.7	Summary of Groundwater Geochemical Data	4-36
4.8	Biomass and Volatile Fatty Acids in Groundwater	4-39
4.9	Summary of Enhanced Bioremediation Potential	4-56

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

No.	Title	Page
1.1	Naval Support Activity Mid-South Location and Topographic Map	1-3
1.2	Site N-6 Features and Potential Source Areas	1-4
2.1	Cross Section and Historic Sampling Location Map	2-3
2.2	Hydrogeologic Cross Section A-A'	2-4
2.3	Hydrogeologic Cross Section B-B'	2-5
2.4	Fluvial Deposits Groundwater Potentiometric Surface Map (April, 1996)	2-7
2.5	Maximum Historical TCE Concentrations Measured in Fluvial Deposits Groundwater 1994 to 1998	2-11
2.6	TCE Measured in Groundwater Fluvial Deposits 1994 to 1998 – Cross Section A-A'	2-12
2.7	TCE Measured in Groundwater Fluvial Deposits 1994 to 1998 – Cross Section B-B'	2-13
3.1	Monitoring and Injection Well Location Map	3-4
3.2	Injection Well Layout	3-5
4.1	Upper Fluvial Deposits Groundwater Elevations, August 2000	4-7
4.2	Upper Fluvial Deposits Groundwater Elevations, July/August 2002	4-8
4.3	Maximum TCE Concentration in Groundwater, July/August 2000 (Pre-Injection)	4-21
4.4	Maximum TCE Concentration in Groundwater, July/August 2001 (Post-Injection)	4-23
4.5A	Concentrations of TCE in Upper Fluvial Deposits Over Time	4-24
4.5B	Concentrations of TCE in Lower Fluvial Deposits Over Time	4-24
4.6A	Concentrations of *cis*-1,2-DCE in Upper Fluvial Deposits Over Time	4-25
4.6B	Concentrations of *cis*-1,2-DCE in Lower Fluvial Deposits Over Time	4-25
4.7A	Concentrations of Select Chlorinated Ethenes Over Time, Well PES-MW1S	4-27
4.7B	Molar Fraction Of Chlorinated Ethenes at Well PES-MW1S	4-27
4.8A	Concentrations of Select Chlorinated Ethenes Over Time, Well PES-MW3S	4-28
4.8B	Molar Fraction of Chlorinated Ethenes at Well PES-MW3S	4-28
4.9A	Concentrations of Select Chlorinated Ethenes Over Time, Well PES-MW2S	4-30
4.9B	Molar Fraction of Chlorinated Ethenes at Well PES-MW2S	4-30
4.10A	Concentrations of Select Chlorinated Ethenes Over Time, Well PES-MW2D	4-31
4.10B	Molar Fraction of Chlorinated Ethenes at Well PES-MW2D	4-31
4.11A	Concentrations of Select Chlorinated Ethenes Over Time, Well PES-MW3D	4-32
4.11B	Molar Fraction of Chlorinated Ethenes at Well PES-MW3D	4-32
4.12A	Concentrations of Select Chlorinated Ethenes Over Time, Well PES-MW6D	4-33

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

No.	Title	Page
4.12B	Molar Fraction of Chlorinated Ethenes at Well PES-MW6D	4-33
4.13A	Concentrations of Dissolved Oxygen in Upper Fluvial Deposits Over Time	4-43
4.13B	Concentrations Of Dissolved Oxygen in Lower Fluvial Deposits Over Time	4-43
4.14A	Concentrations of Ferrous Iron in Upper Fluvial Deposits Over Time	4-45
4.14B	Concentrations of Ferrous Iron in Lower Fluvial Deposits Over Time	4-45
4.15A	Concentrations of Methane in Upper Fluvial Deposits Over Time	4-47
4.15B	Concentrations Of Methane in Lower Fluvial Deposits Over Time	4-47
4.16A	Concentrations of Ethene in Upper Fluvial Deposits Over Time	4-49
4.16B	Concentrations of Ethene in Lower Fluvial Deposits Over Time	4-49
4.17A	Oxidation/Reduction Potential in Upper Fluvial Deposits Over Time	4-51
4.17B	Oxidation/Reduction Potential in Lower Fluvial Deposits Over Time	4-51
4.18A	Concentrations of Chloride in Upper Fluvial Deposits Over Time	4-52
4.18B	Concentrations of Chloride in Lower Fluvial Deposits Over Time	4-52
4.19A	Concentrations of Total Alkalinity in Upper Fluvial Deposits Over Time	4-54
4.19B	Concentrations of Total Alkalinity in Lower Fluvial Deposits Over Time	4-54
4.20A	Concentrations of Carbon Dioxide in Upper Fluvial Deposits Over Time	4-55
4.20B	Concentrations of Carbon Dioxide in Lower Fluvial Deposits Over Time	4-55

ACRONYMS AND ABBREVIATIONS

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
amsl	above mean sea level
AOC A	Area of Concern A
BCT	BRAC Cleanup Team
bgs	below ground surface
BRAC	Base Closure and Realignment Act
CAHs	chlorinated aliphatic hydrocarbons
cells/mL	cells per milliliter
cm/sec	centimeters per second
COCs	chemicals of concern
CT	carbon tetrachloride
DCA	dichloroethane
DCE	dichloroethene
DGGE	denaturing gradient gel electrophoresis
DNA	deoxyribonucleic acid
DO	dissolved oxygen
DPT	direct-push techniques
ft/day	feet per day
ft/ft	foot per foot
ft/yr	feet per year
gal/ft^2	gallons per day per square foot
HSWA	Hazardous and Solid Waste Amendments
ID	inside-diameter
Fe (II)	ferrous iron
Fe (III)	ferric iron
IRP	Installation Restoration Program
LTM	long-term monitoring
MDL	method detection limit
Mn(II)	manganese
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mV	millivolts
NAPL	non-aqueous phase liquid
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
NSA	Naval Support Activity
ORP	oxidation-reduction potential
Parsons	Parsons Corporation
PCE	tetrachloroethene
PID	photo-ionization detector
PLFA	phospholipid fatty acid
PVC	polyvinyl chloride
RBCs	risk-based concentrations
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RL	reporting limit
SSL	soil screening level
SVOCs	semi-volatile organic compounds
SWMU	Solid Waste Management Unit
TCA	trichloroethane

TCE	trichloroethene
TDEC	Tennessee Department of Environment and Conservation
TEAP	terminal electron accepting process
TPH-DRO	total petroleum hydrocarbons - diesel range organics
TOC	total organic carbon
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VC	vinyl chloride
VFA	volatile fatty acids
VOCs	volatile organic compounds

SECTION 1

INTRODUCTION

This report provides results of a field-scale application for enhanced *in-situ* bioremediation of chlorinated solvents via vegetable oil injection at Site N-6, Former Naval Support Activity (NSA) Mid-South Northside, Millington, Tennessee. This report was prepared for the Naval Facilities Engineering Command (NAVFAC) and NSA Mid-South by the Parsons Corporation (Parsons).

1.1 OBJECTIVES

This project is being conducted by NAVFAC in conjunction with Parsons and NSA Mid-South to document the enhanced bioremediation of chlorinated solvents dissolved in groundwater by injecting an organic substrate (vegetable oil) into the subsurface below the water table. Specifically, the objective of this field application is to determine if vegetable oil injection is a viable treatment option for remediation of volatile organic compounds (VOCs) in groundwater at Site N-6.

1.2 SCOPE OF WORK

Site-specific activities conducted at NSA Mid-South in support of the field feasibility test included:

- Installation of 8 vegetable oil injection wells and 16 groundwater monitoring wells using Rotasonic drilling technology;
- Baseline (i.e., pre-injection) sampling of groundwater at the newly-installed injection and monitoring wells, and existing monitoring wells 007G15UF (shallow) and 007G15LF (deep), in accordance with the *Final Work Plan for Field Application to Enhance In-Situ Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Site N-6, Former Naval Support Activity Mid-South, Millington, Tennessee* (Parsons, 2000) and the *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* (United States Environmental Protection Agency [USEPA], 1998);
- Pre-injection aquifer testing (hydraulic conductivity) of four injection wells and eight monitoring wells;
- Injection of a total of 6,115 gallons of refined soybean oil;
- Post-injection aquifer testing (hydraulic conductivity) of previously tested wells;
- Surveying of the newly installed injection and monitoring wells; and

- Post-injection sampling of groundwater and vegetable oil at the system monitoring and injection wells and existing monitoring wells 007G15UF and 007G15LF in November 2000, February 2001, August 2001, and January 2002.
- This report describes the activities performed for the field test and results of process monitoring.

1.3 REPORT ORGANIZATION

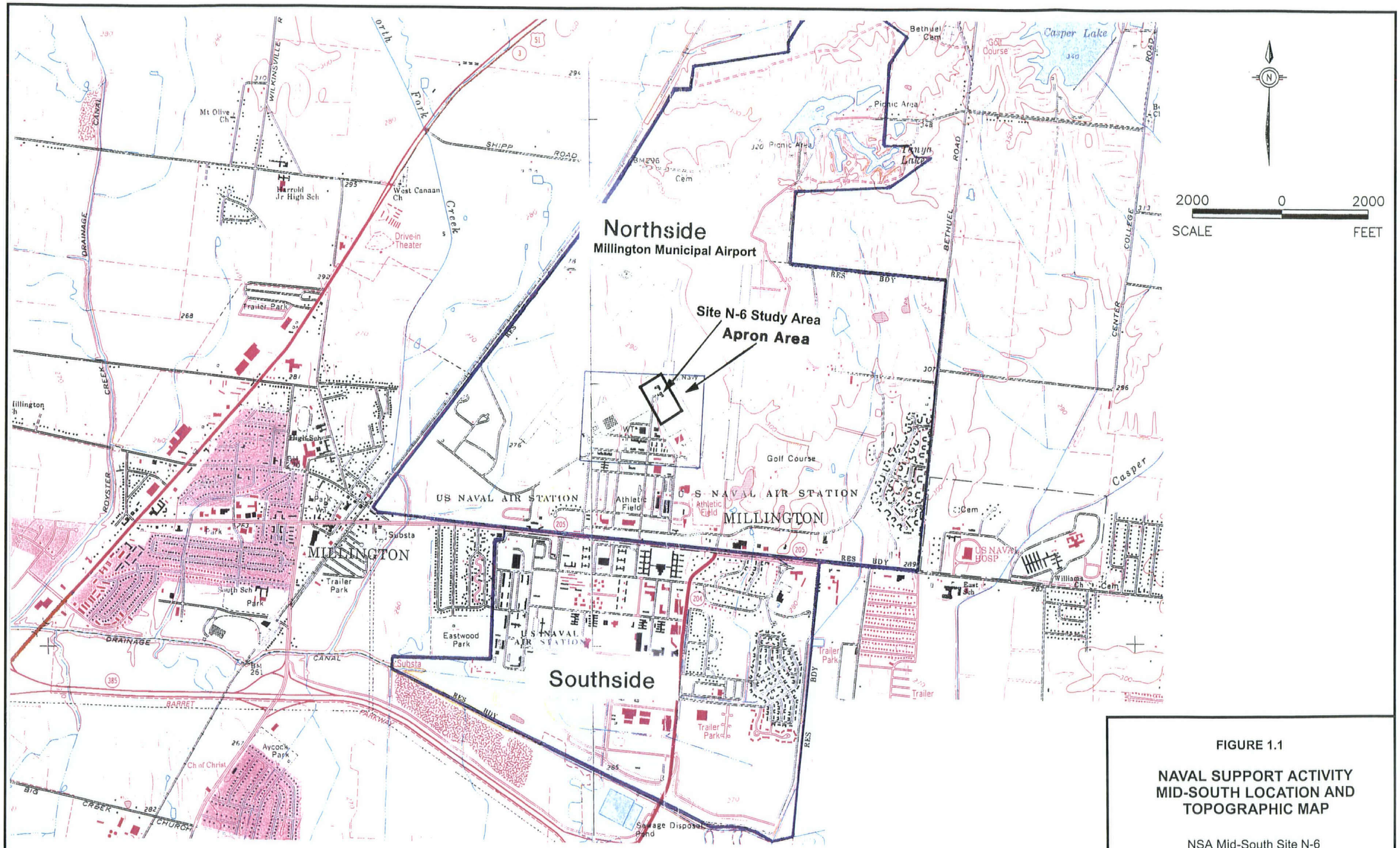
This report consists of six sections, including this introduction, and three appendices. Section 2 summarizes historical site characterization. Section 3 describes the field system installation, substrate addition, and the procedures followed for data collection. Section 4 discusses and evaluates the results of the vegetable oil injection. Section 5 provides conclusions and recommendations, and Section 6 contains the references used in preparing this document. Appendix A contains analytical results and Appendix B contains field sampling data and forms. Appendix C contains plots of contaminant concentrations and molar fractions over time for the system monitoring wells.

1.4 SITE HISTORY

NSA Mid-South is located in Millington, Tennessee (Figure 1.1). Navy airfield operations ceased in 1995, at which time the mission of this Navy facility changed from Naval Air Station (NAS) Memphis to NSA Memphis. In 1998, the facility officially became NSA Mid-South. As a result of the Base Closure and Realignment Act (BRAC) of 1990, a portion of NSA Mid-South (the Northside) has been closed and was transferred to the City of Millington in January 2000. The City of Millington now owns and operates the Northside as a municipal airport.

To expedite the transfer of the Northside to the City of Millington, the BRAC Cleanup Team (BCT) designated the NSA Northside fluvial deposits groundwater as Area of Concern A (AOC A). A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) for Solid Waste Management Unit (SWMU) 7, the Building N-126 Plating Shop Dry Well, identified multiple areas in which groundwater was contaminated with chlorinated solvents. One particular site near former Hanger N-6 is the focus of this field application. The RFI was performed pursuant to the Navy's Installation Restoration Program (IRP) and the Hazardous and Solid Waste Amendments (HSWA) section of the RCRA Permit (TNHW-094), issued to NSA Memphis in 1996 by the Tennessee Department of Environment and Conservation (TDEC).

Site N-6 is located in the Northside portion of NSA Mid-South, now City of Millington property. Figure 1.2 shows the site features and potential sources of solvents. The N-6 Site is centered around a former aircraft hanger (former Building N-6), and includes the surrounding flightline apron. The Building N-6 area was previously used for maintenance of military aircraft. Suspected releases of solvents at the site include the reported use of unspecified solvents as weed killer east of former Building N-6. Other suspected sources of solvents include a small aircraft parts stripping and painting area west of former Building N-6 and an underground waste tank present within former Building N-6 (EnSafe, 2000a). Actual dates or quantities of contaminant releases are unknown.



Source: USGS, 1993.

FIGURE 1.1

NAVAL SUPPORT ACTIVITY MID-SOUTH LOCATION AND TOPOGRAPHIC MAP

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

737490b.cdr pasteup p1 aee 0300

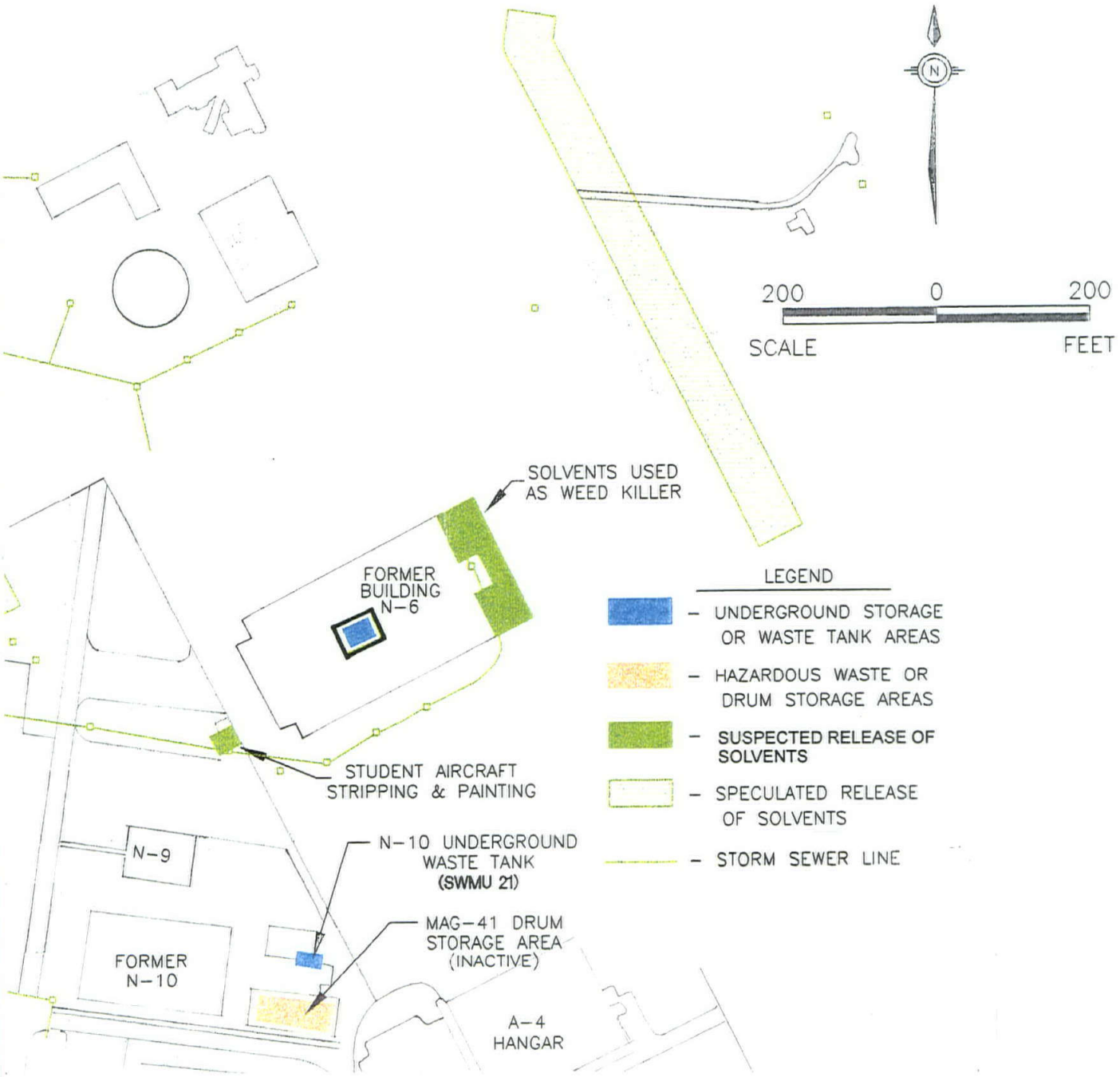


FIGURE 1.2

SITE N-6 FEATURES AND POTENTIAL SOURCE AREAS

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

Source: EnSafe, Inc., 1998.

draw\8511V.cdr pup aee 0300

Solvents reportedly used at NSA Mid-South include 1,1,1-tetrachlorethane (TCA) and trichloroethene (TCE). Chemicals of concern (COCs) identified for Site N-6 include TCE; the dichloroethene (DCE) isomers 1,1-DCE, *cis*-1,2-DCE, and *trans*-1,2-DCE; 1,1-dichloroethane (DCA); 1,2-DCA; and carbon tetrachloride (CT). The work under this project focuses on the bioremediation of these chlorinated compounds.

SECTION 2

SUMMARY OF HISTORICAL SITE CHARACTERIZATION

This section summarizes the results of site characterization conducted by NSA Mid-South.

2.1 HISTORICAL SITE CHARACTERIZATION

Site-specific data were reviewed to evaluate groundwater flow and contaminant transport and to determine locations for installation of injection and groundwater monitoring wells. Section 2.1 presents a synopsis of site characterization data made available to Parsons. Section 2.2 presents an interpretation of the data from the standpoint of biodegradation of chlorinated ethenes, ethanes, and methanes present at the site. Because chlorinated ethenes comprise the bulk of dissolved chlorinated solvents at Site N-6, they are the focus of this discussion.

The following sections are based upon review and summary of data from the following sources:

- *RCRA Facility Investigation Report, Naval Support Activity Memphis, AOC A, Northside Fluvial Groundwater* (EnSafe, 2000a);
- *Aquifer Characterization Test Report, Area of Concern A, Naval Support Activity Mid-South, Millington, Tennessee* (EnSafe, 2000b);
- *RCRA Facility Investigation Report Addendum, Naval Support Activity Memphis, AOC A, Northside Fluvial Groundwater* (EnSafe, 2000c);
- *Hydrogeology and Groundwater Quality of Naval Support Activity Memphis, Millington, Tennessee* (Carmichael *et al.*, 1997).

The reader is referred to these documents for a more detailed review of site-specific data. Additional sources of site data are referenced within the text.

2.1.1 Geology

The stratigraphic units beneath Site N-6 identified for this and previous studies in descending order are: Pleistocene age loess; Pleistocene to possibly Pliocene age fluvial deposits; and upper units of the Claiborne Group, specifically the Cockfield and Cook Mountain Formations of Eocene age. The Cockfield and Cook Mountain Formations are overlying confining units to the Memphis Sand, which comprises the regional Memphis aquifer. Alluvium is locally present beneath the alluvial plain of North Fork

Creek and its tributaries (Figure 1.1), but is generally absent in the apron area (i.e., Site N-6). Figure 2.1 shows the locations of hydrogeologic Cross Sections A-A' (Figure 2.2) and B-B' (Figure 2.3) across Site N-6. The following lithologic descriptions and stratigraphic relationships are summarized from the AOC A RFI (EnSafe, 2000a and 2000c).

Loess deposits underlying the Northside consist of silt, silty clay, and minor amounts of sand and clay. Loess deposits range in thickness from 25 to 45 feet across the apron area, and average approximately 35 feet thick at Site N-6. The color of the loess varies from differing shades of brown, yellow, orange, red, and olive-gray. It is often mottled in color and may contain trace amounts of organic matter. The loess typically becomes stiffer, less moist, and contains a greater clay content with depth. In areas not covered by the concrete apron, the loess yields water and is the shallowest water-bearing zone at NSA Mid-South.

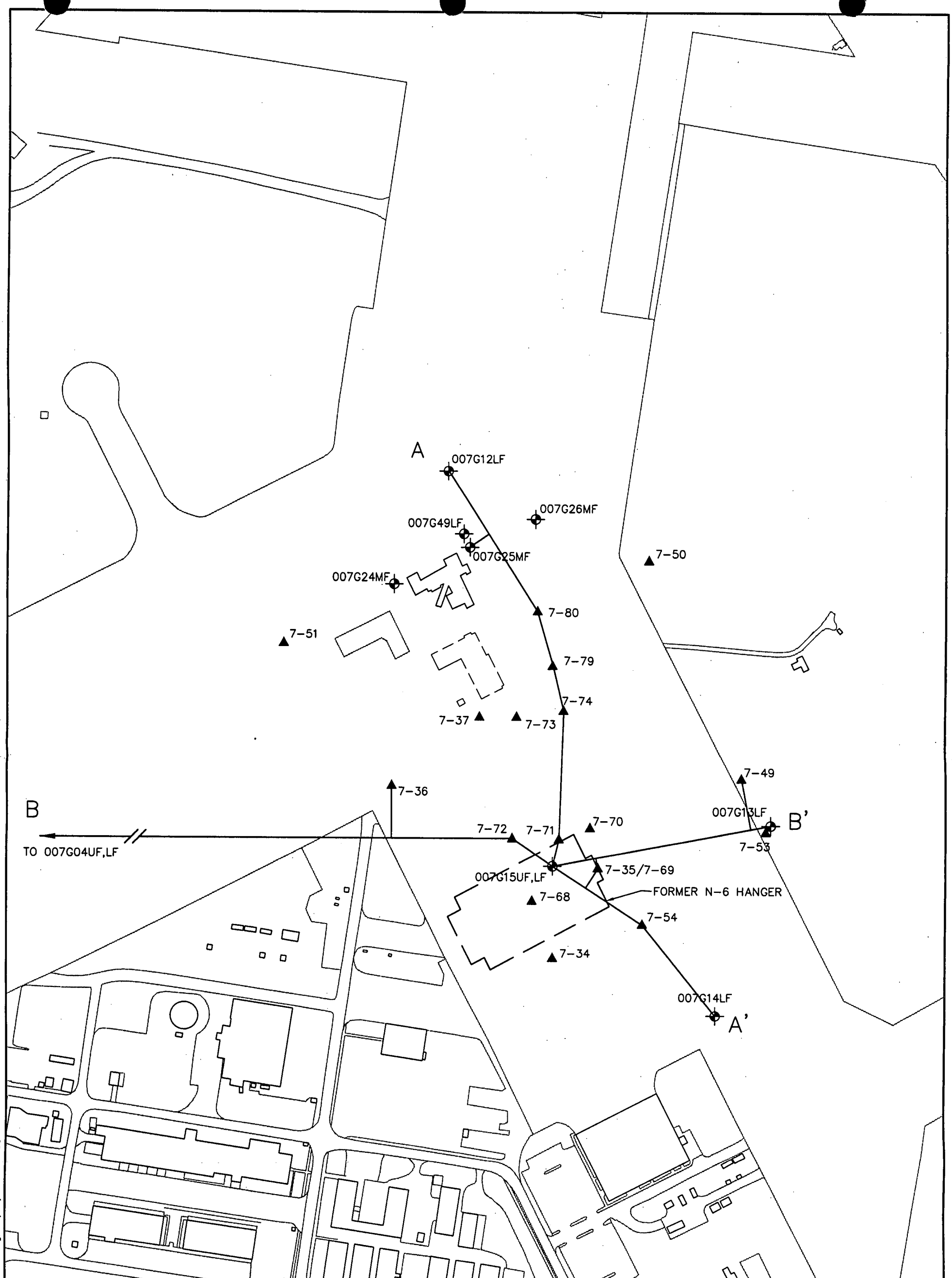
A relatively thin layer of reworked fluvial deposits is locally present between the loess and underlying fluvial deposits. Where present, this transition zone consists of sandy silt and silty and clayey fine- to medium-grained sand.

Fluvial deposits lie unconformably beneath the loess/fluvial deposits transition zone and may be recognized by the uppermost presence of very fine grained sand. Previous investigations at the site have divided the fluvial deposits into an upper sand-dominated zone and a lower gravel-dominated zone (Cross Sections A-A' and B-B'). The upper sand-dominated fluvial sediments consist of very-fine to coarse-grained sand, coarsening downward in the sequence. These sands locally contain lenses of silt and/or clay, and the sand may be finely micaceous. Scattered gravel also is present inter-fingered or interbedded with the fluvial sands. Sand-dominated fluvial deposits are commonly light brown to reddish-brown, and are locally mottled yellowish-gray to orange.

The lower gravel-dominated fluvial deposits are characterized by mixtures of poorly to moderately sorted gravels (up to 3-inch diameter) and fine- to very coarse-grained sand, in a generally coarsening downward sequence. The gravel and sand mixtures contain inter-fingering fine- to coarse-grained sand stringers with some silt and clay. The gravel-dominated fluvial deposits are generally dusky yellow to dark yellowish-orange and yellowish-gray.

The fluvial deposits beneath Site N-6 range from 35 feet to 64 feet thick, with the thickest deposits directly beneath the former N-6 hanger (source area identified on Cross Sections A-A' and B-B').

The Cockfield Formation lies unconformably below the fluvial deposits at depths of 80-100 feet below Site N-6 (Cross Sections A-A' and B-B'). The upper contact of the Cockfield Formation is typically distinguished by a marked change from the overlying gravel-dominated fluvial deposits to a heterogeneous mixture of sand, silt, clayey sand, clay, and lignite. The uppermost part of the Cockfield Formation is generally comprised of very fine- to fine-grained sand with interlaminations of silt and/or clay, and is generally dusky brown to brownish-gray.



LEGEND

7-54 ▲ – DPT SAMPLE AND LOCATION NUMBER

007G14LF ⊕ – WELL SAMPLE AND WELL NUMBER

UF – UPPER FLUVIAL DEPOSITS WELL

LF – LOWER FLUVIAL DEPOSITS WELL

N

0 100 200 400

FEET

FIGURE 2.1

CROSS SECTION AND HISTORIC SAMPLING LOCATION MAP

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS

Denv r, Colorado

S:\ES\Remed\737490\02000\WorkPlan\00DN0172.dwg, 04/17/02 at 11:38

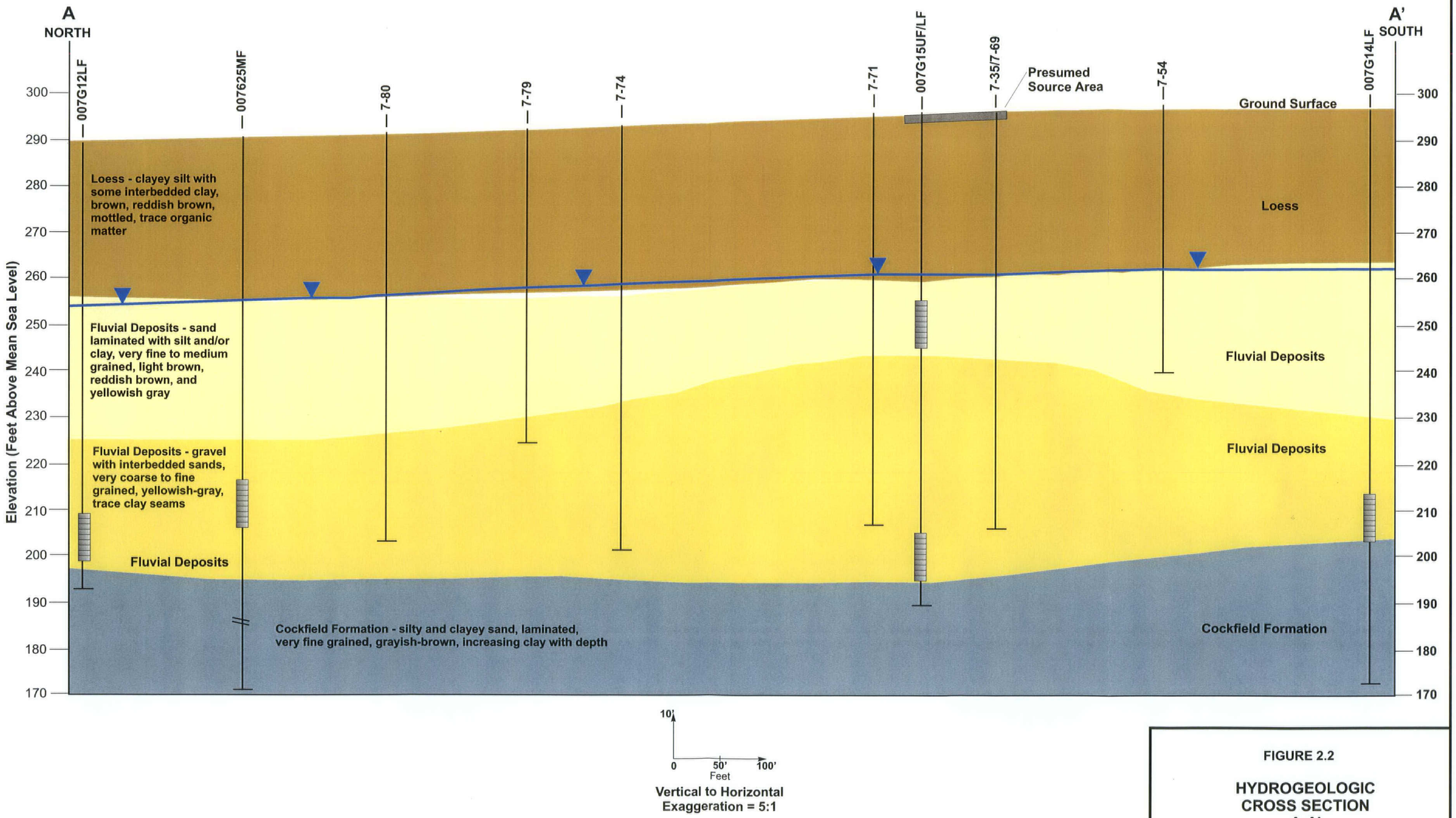


FIGURE 2.2

HYDROGEOLOGIC CROSS SECTION A-A'

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

draw\737490b.cdr p1 nap 4/24/02

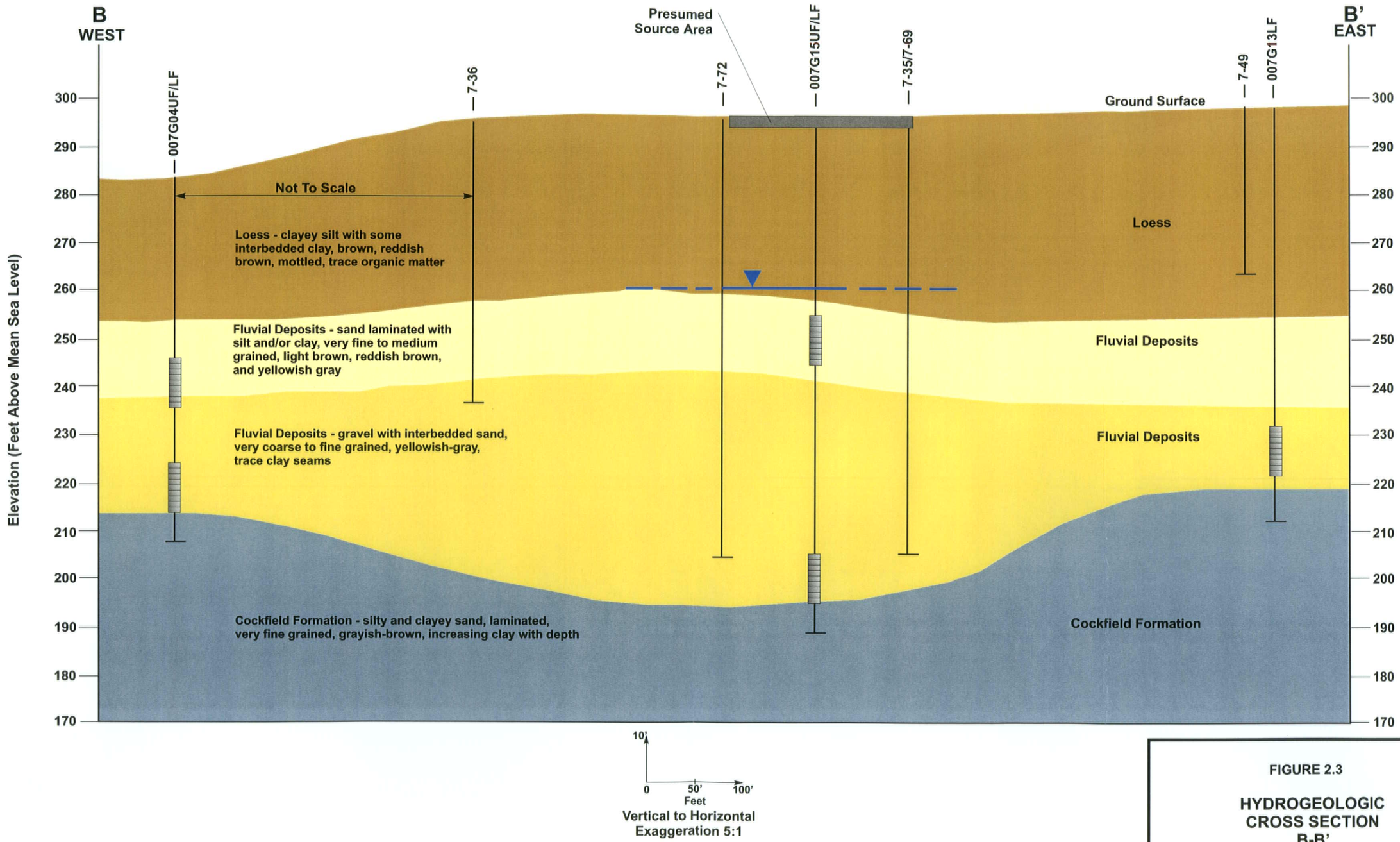


FIGURE 2.3

HYDROGEOLOGIC CROSS SECTION B-B'

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

draw\737490b.cdr p2 nap 4/24/02

2.1.2 Hydrogeology

The water table beneath Site N-6 is generally located approximately 40 feet below ground surface (bgs). The Northside fluvial groundwater flow pattern can be seen in Figure 2.4, which illustrates upper and lower fluvial deposits groundwater flow across the Northside AOC A for April 1996 (EnSafe, 2000a). The groundwater surface is generally located at the top of the fluvial deposits, but also may be locally present within the loess deposits at Site N-6. As shown, the local flow direction near Site N-6 is toward the northwest with a horizontal gradient of approximately 0.004 foot per foot (ft/ft), based on elevations from wells 007G12LF and 007G13LF. The fluvial deposits potentiometric surface occurs within the loess deposits (Cross Sections A-A' and B-B'), indicating confined or semi-confined conditions. Groundwater elevations for wells screened in the upper and lower fluvial deposits indicate that groundwater flow for these horizons are similar across the apron area. Groundwater elevation data from well pair 007G15UF/LF indicate a vertical gradient of -0.013 ft/ft in a downward direction.

Aquifer characterization conducted by the United State Geological Survey (USGS) in 1995 indicated horizontal hydraulic conductivity of the fluvial deposits across the Northside of 5.3 feet per day (ft/day) from an aquifer test; horizontal hydraulic conductivity ranging from 10 to 38 ft/day by monitoring well specific capacity testing; and horizontal hydraulic conductivity ranging from 0.004 to 1.98 ft/day using Hydrocone testing within the upper fluvial deposits/loess transitional interval. Further aquifer characterization by EnSafe (2000b) using a short-term, specific-capacity test, a step-drawdown test, and a longer-term constant-rate aquifer test yielded a hydraulic conductivity for the fluvial deposits ranging from 44.6 ft/day to 68.3 ft/day, with a geometric mean of 59.1 ft/day.

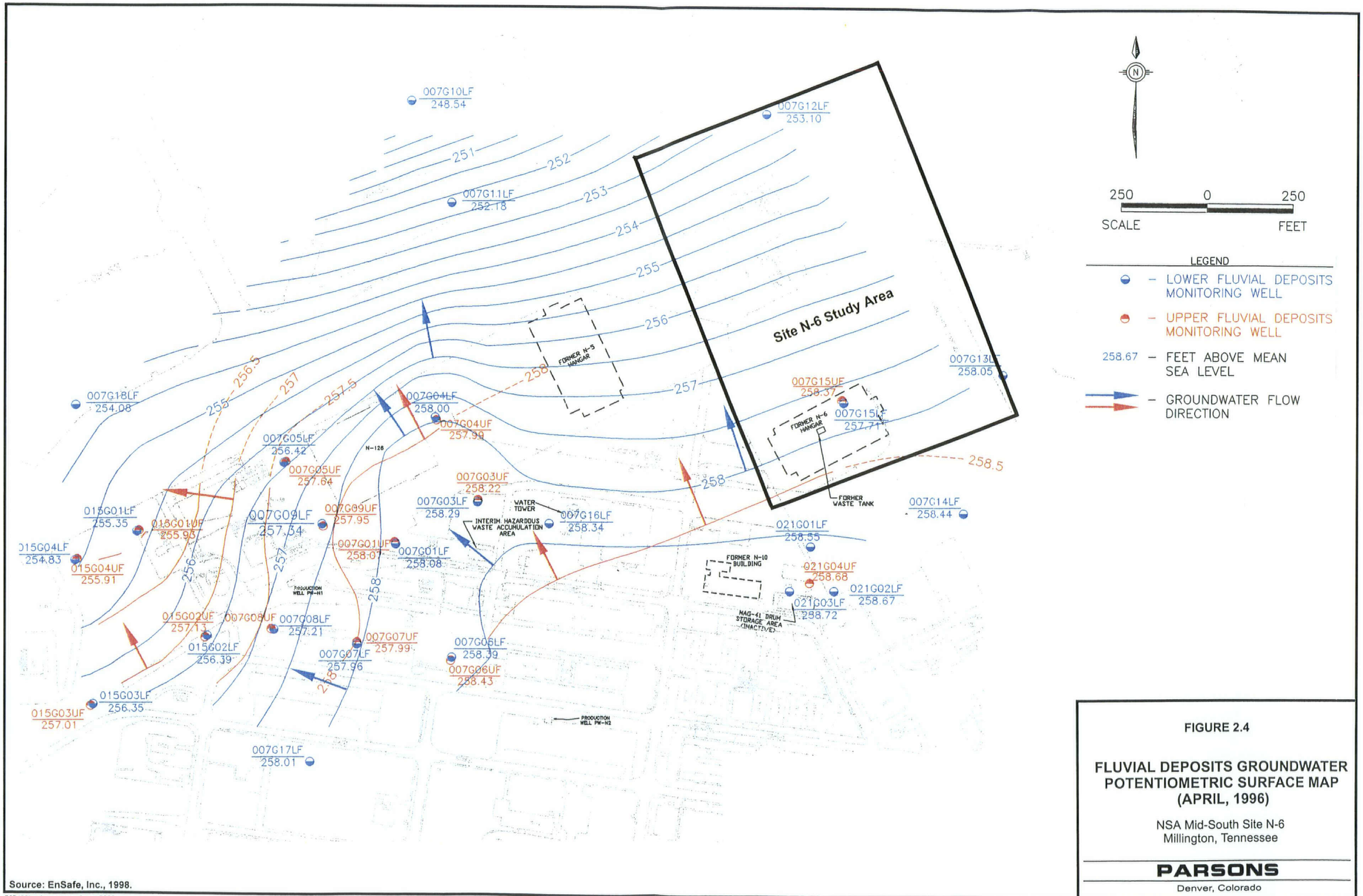
Given an estimated effective porosity of 27 percent, a hydraulic gradient of 0.004 ft/ft, and a hydraulic conductivity of 5.3 ft/day, EnSafe (2000a) calculated an advective groundwater velocity of 30 feet per year (ft/yr) for an area incorporating Site N-6. Similarly, a hydraulic conductivity of 59.1 ft/day can be used to calculate an advective groundwater velocity of 320 ft/yr. Based on the observed variation in lithology and hydraulic conductivity within the fluvial deposits, groundwater velocities may range over an order of magnitude or greater. This suggests the potential for preferential flowpaths.

2.2 NATURE AND EXTENT OF CONTAMINATION

Historical delineation of contaminants in soil and groundwater at Site N-6 has occurred over a number of sampling events involving both permanent monitoring wells and single-point sampling with direct-push techniques (DPT). The nature and extent of soil and groundwater contamination based on historical analytical results are discussed in the following sections.

2.2.1 Soil Analytical Results

Soil samples were collected near the Site N-6 source area from a single borehole (007SMW15) drilled for monitoring well location 007G15LF/UF (Figure 2.1). No constituent in any soil sample from this location exceeded soil screening levels (SSLs) for contaminant transport from soil to groundwater, or residential soil risk-based concentrations (RBCs) established for AOC A (EnSafe, 2000a). This soil borehole



Source: EnSafe, Inc., 1998.

737490b.cdr pasteup p2 aee 0300

FIGURE 2.4

FLUVIAL DEPOSITS GROUNDWATER POTENTIOMETRIC SURFACE MAP (APRIL, 1996)

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

location is within the footprint of former Hanger N-6, and may not be optimally located to characterize source-area soils. Suspected source areas at Site N-6 include a former grassy area stormwater drain to the east of former Hanger N-6 and a former subsurface waste tank located below grade and within the footprint of the former hanger (Figure 1.2).

2.2.2 Groundwater Quality

Eight permanent monitoring wells (007G12LF, 007G13LF, 007G14LF, 007G15LF, 007G15UF, 007G24MF, 007G25MF, and 007G26MF), and 37 single-point samples from 19 temporary DPT borehole locations have been sampled from 1994 to 1998 as part of the RFI and long-term monitoring (LTM) at Site N-6. Historical analytical results for VOCs in groundwater are summarized in Table 2.1.

Table 2.1 indicates that TCE, 1,1-DCE, 1,2-DCA, and CT have been detected consistently over time in samples from wells 007G15UF and 007G15LF. The degradation products 1,2-DCE and chloroform also have been detected in site groundwater, although at lower concentrations that the potential source or parent chlorinated compounds. Historically maximum concentrations of TCE ranged up to 1,160 micrograms per liter (µg/L) at a depth of 60 feet at DPT location 7-69, located just to the east of the former hanger.

The maximum concentrations of 1,2-DCE (29.2 µg/L), CT (199 µg/L), and chloroform (180 µg/L) also were detected at the same depth interval at DPT location 7-69. The maximum concentrations of 1,1-DCE (380D [diluted] µg/L), 1,1-DCA (67 µg/L), and benzene (6.6 µg/L) were detected in well 007G15UF in April 1997. Other VOC compounds detected at Site N-6 include tetrachloroethene (PCE), 1,2-DCA, bromochloromethane, dichlorofluoromethane, and acetone. Semi-volatile organic compounds (SVOCs) detected were bis(2-ethylhexyl)phthalate (BEHP) and total petroleum hydrocarbons - diesel range organics (TPH-DRO). The limited presence of benzene and TPH-DRO indicates some release of fuel hydrocarbons in addition to chlorinated solvents.

Maximum historical concentrations of TCE from 1994 to 1998 at each sampling location for fluvial deposits groundwater are contoured on Figure 2.5. The maximum identified concentrations of TCE are in groundwater at the eastern end of former Hanger N-6, coinciding with a former grassy area where solvents reportedly were spread to kill weeds (Figures 1.2 and 2.5). Based on these data, the TCE plume extended approximately 900 feet downgradient towards the north-northwest in the general direction of groundwater flow (Figures 2.4 and 2.5).

Figures 2.6 and 2.7 show the vertical profiles of TCE in groundwater along Cross Sections A-A' and B-B' (see Figure 2.1 for cross section locations). While TCE is present from the potentiometric surface to the base of the fluvial deposits, the maximum TCE concentrations are inferred to occur within the middle to lower portions of the aquifer. However, the vertical contaminant profile cannot be demonstrated conclusively because of a lack of groundwater sampling points in the upper fluvial deposits downgradient from the source area (Figure 2.6).

TABLE 2.1
SUMMARY OF HISTORIC VOLATILE ORGANIC COMPOUND DETECTIONS IN GROUNDWATER
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Stratigraphic Interval[b]	Date	PCE[a] (µg/L)[c]	TCE[a] (µg/L)	1,2-DCE[a] (µg/L)	1,1-DCE (µg/L)	1,1,1-TCA[a] (µg/L)	1,1-DCA[a] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Bromochloro -methane (µg/L)	Dichlorofuoro -methane (µg/L)	Acetone (µg/L)	Benzene (µg/L)	Semi-Volatiles BEHP[a] (µg/L)	Semi-Volatiles TPH-DRO[a] (µg/L)
PERMANENT MONITORING WELLS																	
007G12LF	LF	Mar-96	ND[d]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Aug-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA[e]	NA
		May-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Aug-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
007G13LF	LF	Mar-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0J[f]	ND
		Apr-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
007G14LF	LF	Mar-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.0J	ND
		Aug-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
007G15UF	UF	Mar-96	ND	840	20J*[g]	280	ND	48J	ND	20J	70	ND	ND	ND	7.0J	1.0J	160
		Aug-96	ND	800	22J*	290	ND	43J	ND	19J	63	ND	ND	ND	6.0J	NA	NA
		Apr-97	ND	600D	20*	380D	ND	67	ND	14	44	ND	ND	ND	6.6	NA	NA
		Nov-97	0.80J	580D	18*	320	ND	51	ND	9.8	30	ND	ND	93	4.6J	NA	NA
		Aug-98	0.58J	580D	19*	320D	ND	64	ND	4.3J	17	ND	ND	ND	4.6J	NA	NA
007G15LF	LF	Mar-96	ND	ND	ND	ND	ND	ND	ND	20	5J	ND	ND	ND	ND	14	110
		Aug-96	ND	13	ND	6.0J	ND	2J	ND	26	10	ND	ND	ND	ND	NA	NA
		Apr-97	ND	12	ND	6.3	ND	ND	ND	27	7.4	ND	ND	ND	ND	NA	NA
		Nov-97	1.1J	12	ND	ND	ND	ND	ND	2.8J	2.7J	ND	ND	ND	ND	NA	NA
		Aug-98	ND	6.5	ND	3.9J	ND	ND	ND	15	5.6	ND	ND	ND	ND	NA	NA
007G24MF	MF	Aug-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
007G25MF	MF	Aug-98	ND	18	ND	2.9J	ND	ND	ND	ND	2.0J	ND	ND	ND	ND	NA	NA
		Nov-98	ND	13J	ND	2.0J	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
007G26MF	MF	Aug-98	ND	1.8J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-98	ND	4.0J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
007G49LF	UF (58')	Jun-99	ND	2.0J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	MF (63')	Jun-99	ND	2.0J	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.0J	ND	NA	NA
	MF (68')	Jun-99	ND	2.0J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	MF (73')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.0J	ND	NA	NA
	LF (78')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF (83')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF (88')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF (93')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA

TABLE 2.1 (Continued)
SUMMARY OF HISTORIC VOLATILE ORGANIC COMPOUND DETECTIONS IN GROUNDWATER
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Stratigraphic Interval[b/]	Date	PCE[a/] (µg/L)[c/]	TCE[a/] (µg/L)	1,2-DCE[a/] (µg/L)	1,1-DCE (µg/L)	1,1,1-TCA[a/] (µg/L)	1,1-DCA[a/] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Bromochloro -methane (µg/L)	Dichlorofuoro -methane (µg/L)	Acetone (µg/L)	Benzene (µg/L)	Semi-Volatiles BEHP[a/] (µg/L)	Semi-Volatiles TPH-DRO[a/] (µg/L)
TEMPORARY MONITORING POINTS																	
7-34	UF (45')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-35	UF (49')	Nov-95	ND	117	9.9	80	ND	ND	44	10	ND	32	ND	ND	ND	NA	NA
7-36	MF (58')	Nov-95	ND	ND	28	ND	ND	ND	ND	ND	ND	ND	6.1	ND	ND	NA	NA
7-37	MF (60')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-49	LF (34')	Nov-95	ND	8.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-50	MF (61')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-51	UF (54')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-52	UF (52')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-53	MF (64')	Feb-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-54	MF (58')	Feb-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-68	UF (48')	Feb-97	ND	2.6	ND	3.2	ND	1.9	ND	ND	ND	ND	ND	200	ND	NA	NA
	UF (53')	Feb-97	ND	3.7	ND	5.1	ND	2.7	ND	ND	ND	ND	ND	51J	ND	NA	NA
	MF (58')	Feb-97	ND	1.6J	ND	4.3	ND	2.4	ND	ND	ND	ND	ND	1380	ND	NA	NA
	MF (64')	Feb-97	ND	ND	ND	2.0J	ND	ND	ND	17	28	ND	ND	562	ND	NA	NA
	MF (69')	Feb-97	ND	1.2J	ND	2.3J	ND	ND	ND	23	22	ND	ND	ND	ND	NA	NA
	LF (73')	Feb-97	ND	8.2	5.6	ND	ND	ND	ND	15	23	ND	ND	ND	ND	NA	NA
	LF (78')	Feb-97	ND	6.4	5.1	ND	ND	ND	ND	6.5	8.1	ND	ND	ND	ND	NA	NA
	LF (83')	Feb-97	ND	1.3J	ND	ND	ND	ND	ND	1.3J	4.1J	ND	ND	594	ND	NA	NA
	LF (88')	Feb-97	ND	ND	ND	ND	ND	ND	ND	1.4J	3.9J	ND	ND	ND	ND	NA	NA
7-69	MF (60')	Feb-97	ND	1160	29	183	ND	37	ND	199	180	ND	ND	ND	5.1	NA	NA
	LF (90')	Feb-97	ND	1.6J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-70	UF (46')	Feb-97	ND	17	ND	11	ND	3.2J	ND	ND	1.9J	ND	ND	ND	ND	NA	NA
	MF (68')	Feb-97	ND	190	ND	4.3J	ND	ND	ND	ND	47	ND	ND	ND	ND	NA	NA
	LF (88')	Feb-97	ND	39	ND	1.0J	ND	ND	ND	3.5J	11	ND	ND	ND	ND	NA	NA
7-71	UF (46')	Feb-97	ND	ND	ND	ND	ND	1.7J	ND	ND	ND	ND	ND	1020	ND	NA	NA
	MF (68')	Feb-97	ND	422	ND	2.7	ND	ND	ND	121	61	ND	ND	ND	ND	NA	NA
	LF (88')	Feb-97	ND	14	ND	2.6	ND	ND	ND	34	16	ND	ND	ND	ND	NA	NA
7-72	UF (46')	Feb-97	ND	16	ND	8.7	ND	4.1	ND	ND	ND	ND	ND	ND	ND	NA	NA
	MF (68')	Feb-97	ND	122	ND	1.6J	ND	ND	ND	10	31	ND	ND	ND	ND	NA	NA
	LF (90')	Feb-97	ND	8.7	ND	2.1J	ND	ND	ND	29	21	ND	ND	197	ND	NA	NA
7-73	MF (68')	Feb-97	ND	15	ND	ND	ND	ND	ND	ND	2.1J	ND	ND	164	ND	NA	NA
	LF (90')	Feb-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	44J	ND	NA	NA
7-74	MF (68')	Feb-97	ND	47	ND	1.4J	ND	ND	ND	ND	4.3J	ND	ND	ND	ND	NA	NA
	LF (91')	Feb-97	ND	1.2J	ND	ND	ND	ND	ND	ND	ND	ND	ND	33J	ND	NA	NA
7-79	MF (67')	Feb-97	ND	61	ND	10	ND	3.5J	ND	ND	7.2	ND	ND	ND	ND	NA	NA
7-80	MF (66')	Feb-97	ND	26	ND	14.2	ND	ND	ND	ND	3.3J	ND	ND	ND	ND	NA	NA
	LF (87')	Feb-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA

[a/] PCE = tetrachloroethene; TCE = trichloroethene; DCE = dichloroethene; TCA = trichloroethane; DCA = dichloroethane; BEHP = bis(2-ethylhexyl)phthalate; TPH-DRO = total petroleum hydrocarbons - diesel range organics.

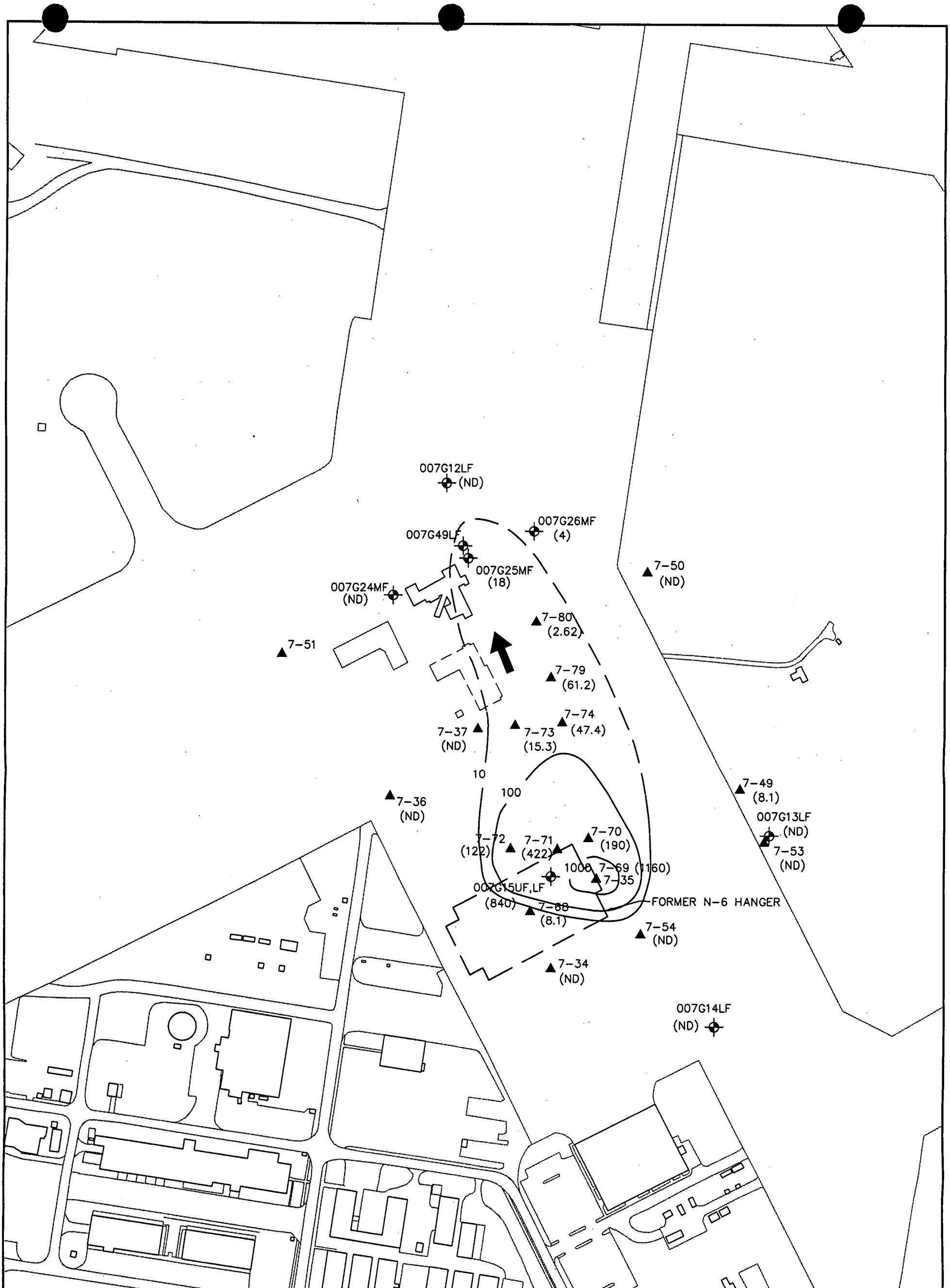
[b/] UF = upper fluvial deposits; MF = middle fluvial deposits; LF = lower fluvial deposits.

[c/] µg/L = micrograms per liter.

[d/] ND = not detected.

[f/] J = estimated concantration.

[g/] * = total *cis*- and *trans*-1,2-DCE.



LEGEND

7-54 ▲ – DPT SAMPLE AND LOCATION NUMBER

007G14LF ⊕ – WELL SAMPLE AND WELL NUMBER

UF – UPPER FLUVIAL DEPOSITS WELL

LF – LOWER FLUVIAL DEPOSITS WELL

(15.3) – TCE CONCENTRATION IN MICROGRAMS PER LITER (μg/L)

ND – NOT DETECTED

← – DIRECTION OF GROUNDWATER FLOW

N

0 100 200 400
FEET

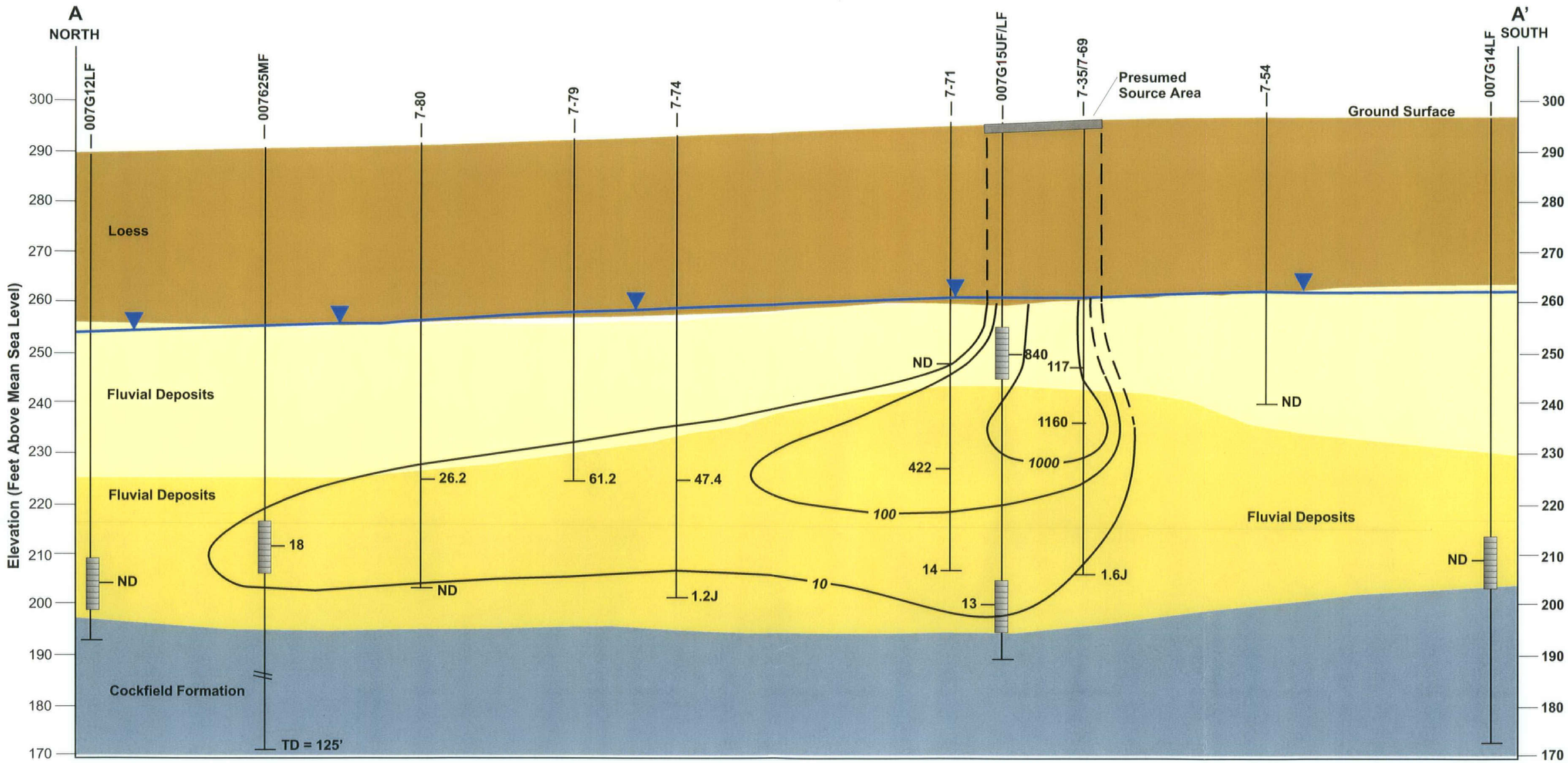
FIGURE 2.5

MAXIMUM HISTORICAL TCE CONCENTRATIONS MEASURED IN FLUVIAL DEPOSITS GROUNDWATER 1994 TO 1998

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

S:\ES\Remed\737490\02000\WorkPlan\00DN0173.dwg, 04/17/02 at 14:10



Legend

26.2 Trichloroethene (TCE) concentration in micrograms per liter (µg/L)

ND Not detected

Fluvial deposits groundwater potentiometric surface (July 1996)

10'
0 50' 100'
Feet

Vertical to Horizontal Exaggeration = 5:1

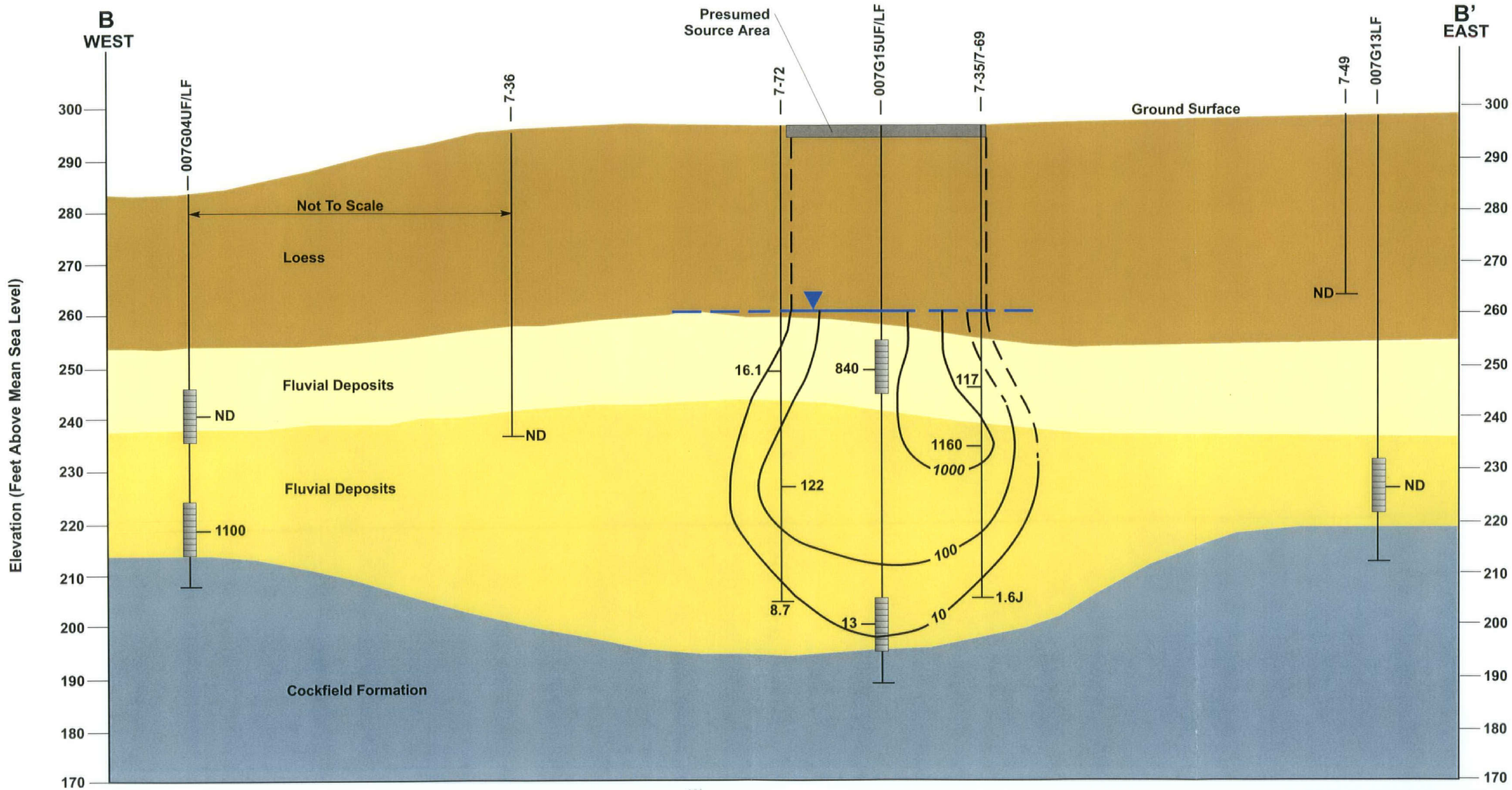
FIGURE 2.6

TCE MEASURED IN GROUNDWATER FLUVIAL DEPOSITS 1994 TO 1998

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

draw\737490a.cdr p1 nap 4/24/02



Legend

122 Trichloroethene (TCE) concentration in micrograms per liter (µg/L)

ND Not detected

Fluvial deposits groundwater potentiometric surface (July 1996)

10'
0 50' 100'
Feet
Vertical to Horizontal Exaggeration 5:1

FIGURE 2.7

TCE MEASURED IN GROUNDWATER FLUVIAL DEPOSITS 1994 TO 1998

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

draw\737490a.cdr p2 nap 4/24/02

2.3 GROUNDWATER USE AND POTENTIAL RECEPTORS

Fluvial deposits groundwater is not used for beneficial use at former NSA Mid-South Northside. The nearest potential receptor on the Northside is public supply well PW-N1, located approximately 450 feet southwest of the Building N-126 dry well (approximately 1,500 feet cross gradient from Site N-6). PW-N1 is screened in the Memphis Aquifer and hydraulically separated from the shallower fluvial aquifer by the upper Claiborne confining unit (EnSafe, 2000a). This well has been placed on emergency standby as a precautionary measure since 1994.

Points of potential exposure within the fluvial deposits groundwater consist of shallow private domestic wells outside the Northside (City of Millington) property. The nearest domestic supply well screened in the fluvial deposits is approximately 6,000 feet north-northwest of the apron area and is inactive (EnSafe, 2000a).

Because contaminated groundwater at Site N-6 has the potential to migrate off the Northside property, the objective of this field application is to determine if vegetable oil injection is a viable treatment option for chlorinated solvents in groundwater at Site N-6. The downgradient property boundary is located approximately 4,000 feet northwest from the Site N-6 source area (Figure 1.1).

SECTION 3

FIELD TEST IMPLEMENTATION

Site-specific activities conducted at Site N-6 in support of the enhanced bioremediation field application included:

- Installation of 8 vegetable oil injection wells and 16 groundwater monitoring wells using Rotasonic drilling technology;
- Baseline (i.e., pre-injection) sampling of groundwater at the newly-installed injection and monitoring wells, and existing monitoring wells 007G15UF (shallow) and 007G15LF (deep), in accordance with the *Final Work Plan for Field Application to Enhance In-Situ Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Site N-6, Former Naval Support Activity Mid-South, Millington, Tennessee* (Parsons, 2000) and the *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* (USEPA, 1998);
- Pre-injection aquifer testing (hydraulic conductivity) of four injection wells and eight monitoring wells;
- Plumbing of the pilot-scale system and injection of a total of 6,115 gallons of refined soybean oil;
- Injection of bromide (aqueous phase) in order to determine zones of influence;
- Post-injection aquifer testing (hydraulic conductivity) of the previously tested wells;
- Surveying of the newly-installed injection and monitoring wells; and
- Post-injection sampling of groundwater and vegetable oil at the system monitoring and injection wells and existing monitoring wells 007G15UF and 007G15LF in November 2000, February 2001, August 2001, and January 2002.

3.1 SYSTEM INSTALLATION

Initial field activities performed during July and August 2000 are summarized in Table 3.1. The following sections provide a description of these activities as well as performance monitoring activities completed through January 2002.

TABLE 3.1
SUMMARY OF INITIAL SITE ACTIVITIES
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Location	Monitoring Well Installation	Slug Test Analysis	Water Level Measurement	Soil Analyses		Oil Analyses	Groundwater Analyses						
				VOCs[a] SW8260B	Total Organic Carbon (SW9060)	VOCs SW8260B	VOCs SW8260B	Methane, Ethane, Ethene	Nitrate + Nitrite (E300.1)	Bromide (E320.1)	Total Organic Carbon (SW9060M)	Well Head Analyses[b]	Mobile Lab Analyses[c]
Monitoring Wells													
PES-MW-1D	X	X	X		1		1	1	1			1	1
PES-MW-1S	X	X	X		1		1	1	1			1	1
PES-MW-2D	X		X				1	1	1	1	1	1	1
PES-MW-2S	X		X				1	1	1	1	1	1	1
PES-MW-3D	X		X				1	1	1	1	1	1	1
PES-MW-3S	X		X				1	1	1	1	1	1	1
PES-MW-4D	X		X				1	1	1		1	1	1
PES-MW-4S	X		X				1	1	1		1	1	1
PES-MW-5D	X		X				1	1	1		1	1	1
PES-MW-5S	X		X				1	1	1		1	1	1
PES-MW-6D	X		X				1	1	1		1	1	1
PES-MW-6S	X		X				1	1	1		1	1	1
PES-MW-7D	X		X				1	1	1	1	1	1	1
PES-MW-7S	X		X				1	1	1	1	1	1	1
PES-MW-8D	X	X	X		1		1	1	1		1	1	1
PES-MW-8S	X	X	X		1		1	1	1		1	1	1
007GL15UF			X				1	1	1			1	1
007GL15LF			X				1	1	1			1	1
Injection Wells													
PES-INJ-1D	X		X	2			1	1	1		1	1	1
PES-INJ-1S	X		X				1	1	1		1	1	1
PES-INJ-2D	X	X	X	2			1	1	1	1	1	1	1
PES-INJ-2S	X	X	X				1	1	1	1	1	1	1
PES-INJ-3D	X	X	X	2			1	1	1	1	1	1	1
PES-INJ-3S	X	X	X				1	1	1	1	1	1	1
PES-INJ-4D	X		X	2			1	1	1		1	1	1
PES-INJ-4S	X		X				1	1	1		1	1	1
SUBTOTALS		8		8	4	0	26	26	26	10	22	26	26
QA/QC													
Duplicates				1			3	3	3	1	3		3
MS/MSD				1			2						
Trip Blanks							3						
Rinseates							1						
			TASK TOTAL:	10	4	0	35	29	29	11	25	26	29

[a] VOCs to include aromatic and chlorinated aliphatic hydrocarbons.

[b] Well head analyses include dissolved oxygen, oxidation-reduction potential, pH, temperature, and conductivity.

[c] Mobile lab analyses include chloride, carbon dioxide, alkalinity, ammonia, sulfate, ferrous iron, sulfate, hydrogen sulfide, and manganese.

3.1.1 Injection Point and Groundwater Sampling Locations

Locations for the 8 injection wells and 16 groundwater monitoring wells are shown on Figure 3.1. These locations were determined from a review of available site data, with the injection wells located to provide optimal vegetable oil distribution in the portion of the plume with the highest contaminant concentrations (i.e., greater than 1,000 µg/L TCE).

The four injection well pairs were installed approximately 15 feet apart, across the area with the highest groundwater TCE concentration (1,160 µg/L at DPT location 7-69). The vertical layout of the injection wells is shown in Figure 3.2. It was anticipated during system design that the radius of influence of the injected vegetable oil would be up to approximately 5 to 10 feet (horizontally) based upon historic hydraulic data and proposed oil injection volumes.

Monitoring well pairs were installed at distances of 10, 20, 30, 50 and 100 feet downgradient from the injection wells. Monitoring well locations were spaced to monitor the groundwater system downgradient from the injection zone over a period of 18 months, based on groundwater advective velocities ranging from 30 to 320 ft/yr (Section 2.2). One upgradient well pair (PES-MW1S and D) was installed to monitor background groundwater geochemistry and aqueous phase contaminant concentrations.

3.1.2 Injection and Groundwater Monitoring Well Installation

Newly installed monitoring and injection wells were installed with a Rotosonic drilling rig subcontracted from Alliance Environmental Incorporated. Injection and monitoring wells were installed in July 2000. Construction details are included in Appendix B.1, and are summarized in Table 3.2. Injection and monitoring well screens were constructed of 10 feet of flush-threaded, Schedule 40, 2-inch inside-diameter (ID), polyvinyl chloride (PVC) with 0.02-inch factory-slotted openings. Injection screens installed in the upper fluvial deposits were placed at least 2 to 3 feet below the water table to avoid short circuiting of injected vegetable oil to the vadose zone. Monitoring well screens were placed at similar depths as the injection screens. All injection and monitoring wells were sealed with bentonite and grouted to the surface with a cement/bentonite grout. Each injection and groundwater monitoring well was completed slightly below grade to protect each well from potential damage. Flush-mounted protective casings were used to protect the monitoring and injection wells.

3.1.3 Soil Sampling

During drilling activities, continuous soil cores were collected from ground surface to total depth in order to identify the depths of significant stratigraphic contacts or other soil properties. Boring logs prepared during drilling by the field geologist are presented in Appendix B.2. A portion of soil sample was used to measure the total concentration of ionizable VOCs in the soil headspace using a photo-ionization detector (PID). If headspace readings significantly above background readings were obtained, indicating the presence of contamination, then the associated soil sample was submitted to a laboratory for analysis of VOCs using the method specified in Table 3.3. Soil samples for total organic carbon (TOC) analysis also were collected from select fluvial deposits

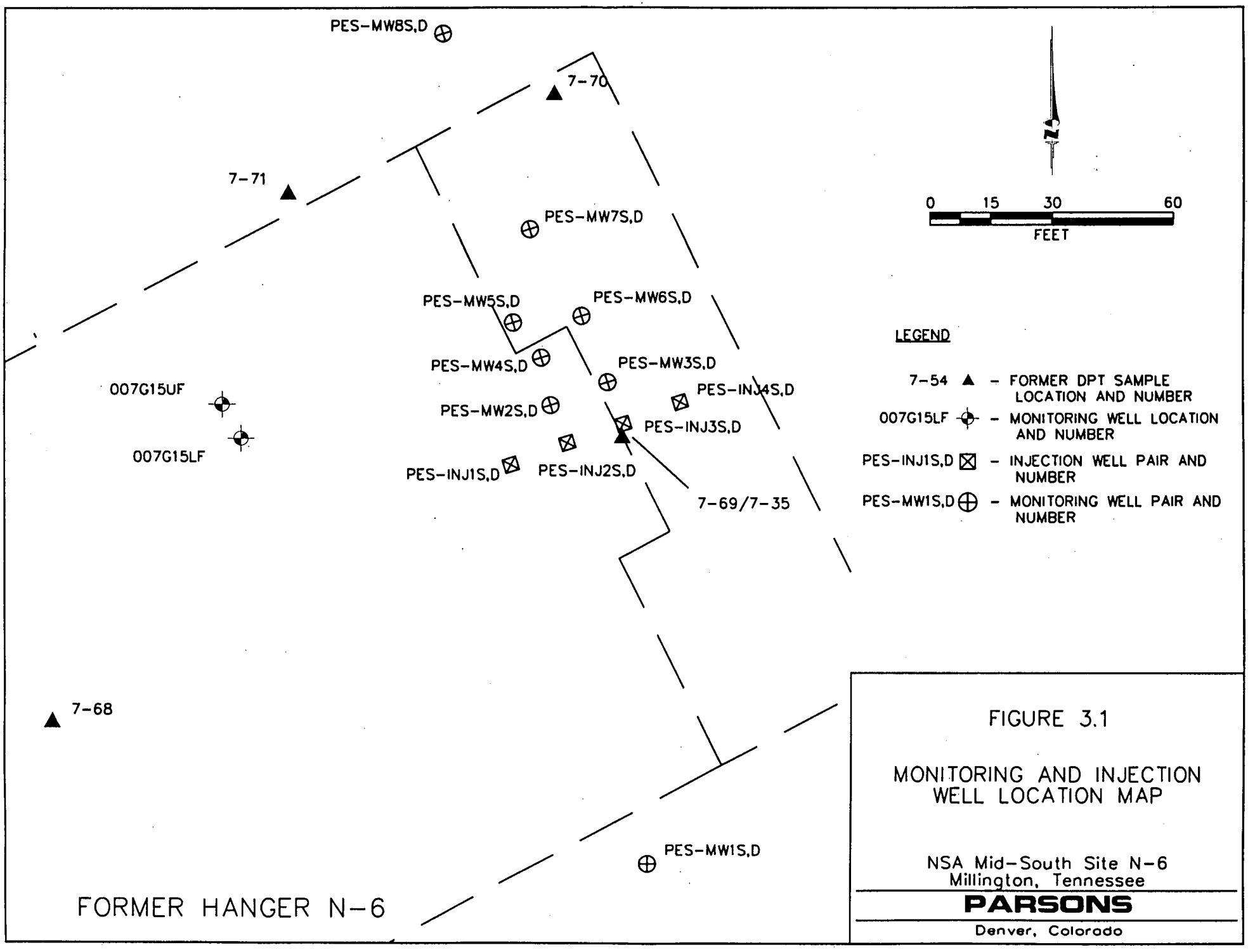


FIGURE 3.1

MONITORING AND INJECTION WELL LOCATION MAP

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS

Denver, Colorado

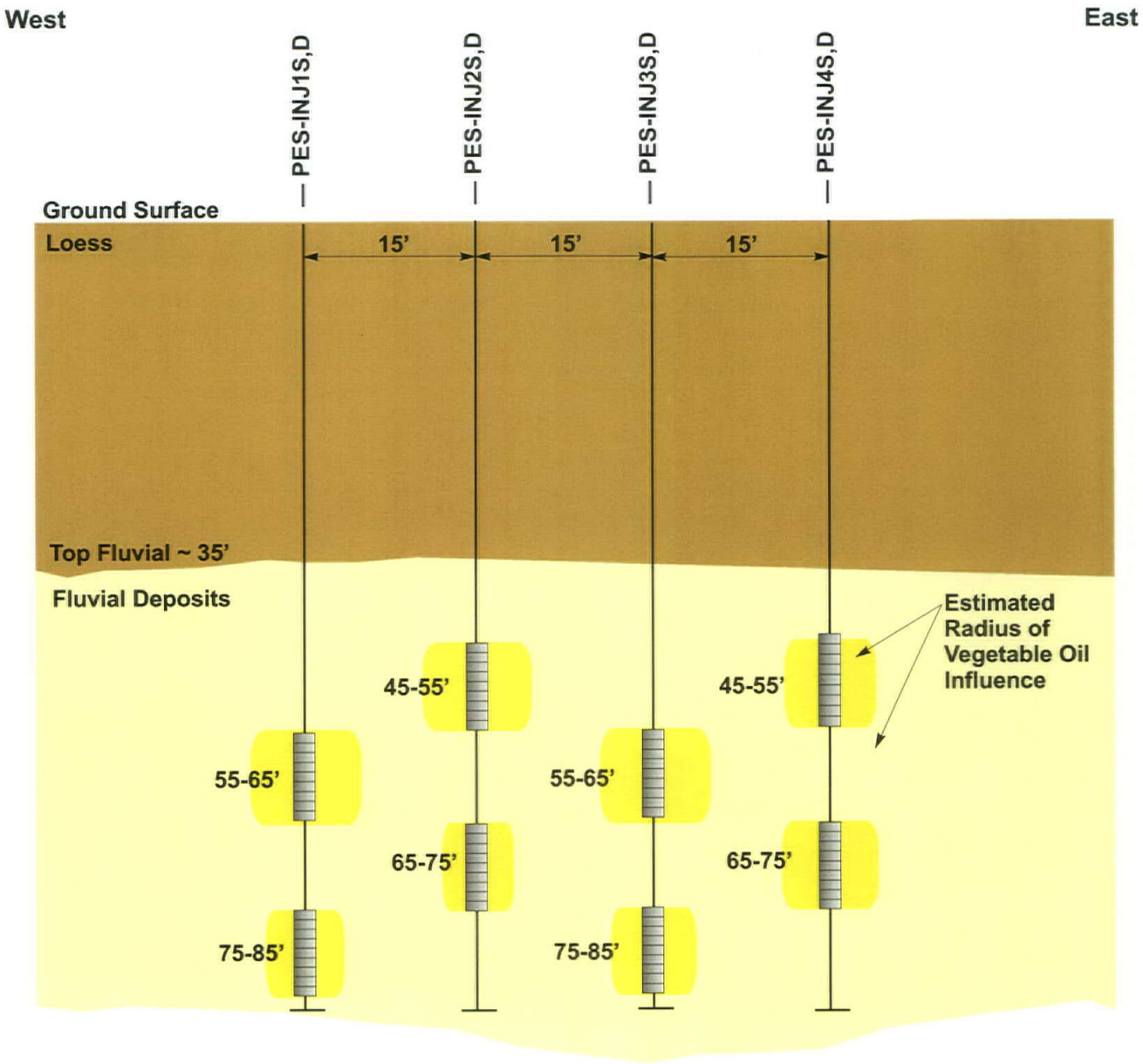


FIGURE 3.2

INJECTION WELL LAYOUT

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS

Denver, Colorado

draw\737490c.cdr nap 4/24/02

TABLE 3.2
WELL CONSTRUCTION SUMMARY
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Well Identification	Installation Date	Northing (State Plane)	Easting (State Plane)	Top of Casing Elevation (feet amsl)[a]	Screened Interval (feet bgs)[b]	Well Diameter (inches)	Stratigraphic Interval[c]
Injection Wells							
PES-INJ-1S	19-Jul-00	392214.45	815028.46	293.44	55.0 - 65.0	2.0	Upper-Fluvial
PES-INJ-1D	19-Jul-00	392214.45	815028.46	293.44	75.0 - 85.0	2.0	Lower-Fluvial
PES-INJ-2S	20-Jul-00	392219.89	815042.45	293.20	44.8 - 54.8	2.0	Upper-Fluvial
PES-INJ-2D	20-Jul-00	392219.89	815042.45	293.21	65.0 - 75.0	2.0	Lower-Fluvial
PES-INJ-3S	23-Jul-00	392224.65	815056.27	293.09	55.0 - 65.0	2.0	Upper-Fluvial
PES-INJ-3D	23-Jul-00	392224.65	815056.27	293.12	75.0 - 85.0	2.0	Lower-Fluvial
PES-INJ-4S	23-Jul-00	392230.14	815070.41	293.44	45.4 - 55.4	2.0	Upper-Fluvial
PES-INJ-4D	23-Jul-00	392230.14	815070.41	293.40	65.0 - 75.0	2.0	Lower-Fluvial
Monitoring Wells							
PES-MW-1S	18-Jul-00	392115.58	815062.15	293.37	45.3 - 55.3	2.0	Upper-Fluvial
PES-MW-1D	18-Jul-00	392115.58	815062.15	293.33	70.0 - 80.0	2.0	Lower-Fluvial
PES-MW-2S	1-Aug-00	392229.39	815038.32	293.38	55.0 - 65.0	2.0	Upper-Fluvial
PES-MW-2D	1-Aug-00	392229.39	815038.32	293.32	75.0 - 85.0	2.0	Lower-Fluvial
PES-MW-3S	24-Jul-00	392235.18	815052.39	293.39	45.0 - 55.0	2.0	Upper-Fluvial
PES-MW-3D	24-Jul-00	392235.18	815052.39	293.40	65.0 - 75.0	2.0	Lower-Fluvial
PES-MW-4S	21-Jul-00	392241.32	815036.00	293.34	55.0 - 65.0	2.0	Upper-Fluvial
PES-MW-4D	21-Jul-00	392241.32	815036.00	293.34	75.0 - 85.0	2.0	Lower-Fluvial
PES-MW-5S	20-Jul-00	392250.05	815029.07	293.27	45.4 - 55.4	2.0	Upper-Fluvial
PES-MW-5D	20-Jul-00	392250.05	815029.07	293.27	65.0 - 75.0	2.0	Lower-Fluvial
PES-MW-6S	22-Jul-00	392251.69	815045.97	293.28	55.0 - 65.0	2.0	Upper-Fluvial
PES-MW-6D	22-Jul-00	392251.69	815045.97	293.31	75.0 - 85.0	2.0	Lower-Fluvial
PES-MW-7S	21-Jul-00	392273.12	815033.08	293.10	45.0 - 55.0	2.0	Upper-Fluvial
PES-MW-7D	21-Jul-00	392273.12	815033.08	293.08	65.0 - 75.0	2.0	Lower-Fluvial
PES-MW-8S	22-Jul-00	392321.46	815011.22	292.94	55.0 - 65.0	2.0	Upper-Fluvial
PES-MW-8D	22-Jul-00	392321.46	815011.22	292.94	75.3 - 85.3	2.0	Lower-Fluvial
007G15UF	19-Mar-96	392229.59	814956.53	292.91	40.0 - 50.0	2.0	Upper-Fluvial
007G15LF	19-Mar-96	392221.04	814961.17	293.36	90.0 - 100.0	2.0	Lower-Fluvial

[a] feet amsl indicates elevation in feet above mean sea level.

[b] feet bgs indicates depth in feet below ground surface.

[c] Upper fluvial interval is defined as 40 to 65 feet bgs, and lower fluvial interval is defined as 65 to 90 feet bgs.

TABLE 3.3
ANALYTICAL PROTOCOLS FOR SOIL, VEGETABLE OIL, AND GROUNDWATER SAMPLES
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

MATRIX Analyte	METHOD	FIELD (F) OR ANALYTICAL LABORATORY (L)
WATER		
Redox Potential	Direct-reading meter	F
Dissolved Oxygen	Direct-reading meter	F
pH	Direct-reading meter	F
Specific Conductance	Direct-reading meter	F
Temperature	Direct-reading meter	F
Ferrous Iron	Colorimetric, Hach Method 8146 (or similar)	F
Manganese	Colorimetric, Hach Method 8034 (or similar)	F
Hydrogen Sulfide	Colorimetric, Hach Method 8131 (or similar)	F
Sulfate	Colorimetric, Hach Method 8051 (or similar)	F
Alkalinity (Carbonate [CO_3^{-2}] and Bicarbonate [HCO_3^{-1}])	Titrimetric, Hach Method 8221 (or similar)	F
Chloride	Titrimetric, Hach Kit 8P (or similar)	F
Carbon Dioxide	Titrimetric, CHEMetrics Method 4500 (or similar)	F
Nitrate + Nitrite [as Nitrogen (N)]	E300.1	L
Bromide	E320.1	L
Methane, Ethane, Ethene	AM-18[a/]	L
Total Organic Carbon	Walkley-Black[a/]	L
VOCs[b/]	SW8260B	L
SOIL		
Total Organic Carbon	Walkley-Black[a/]	L
VOCs	SW8260B	L
VEGETABLE OIL		
VOCs	SW8260B	L

[a/] Microseeps Inc., standard operating procedure.

[b/] VOCs = volatile organic compounds.

intervals from locations PES-MW1 and PES-MW8 in order to quantify concentrations of organic carbon in the subsurface soil at Site N-6 prior to vegetable oil injection.

3.2 MEASUREMENT OF BASELINE GEOCHEMICAL CONDITIONS AND CONTAMINANT PROFILES

After installation and development of the injection wells and groundwater monitoring wells, groundwater samples were collected to characterize initial site-specific geochemical and contaminant conditions in accordance with the *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* (USEPA, 1998). Groundwater samples were analyzed for chlorinated solvents and their degradation products, dissolved oxygen (DO), nitrate, ferrous iron [Fe(II)], manganese [Mn(II)], sulfate, hydrogen sulfide, carbon dioxide, methane, ethane, ethene, oxidation-reduction potential (ORP), alkalinity, pH, temperature, specific conductance, TOC, bromide, and chloride. Pre-injection baseline groundwater samples were collected in July and August 2000 and shipped to Microseeps, Inc., of Pittsburgh, Pennsylvania for analysis. Baseline groundwater samples were analyzed in the field and by Microseeps, Inc. following analytical protocols summarized in Table 3.3.

3.3 AQUIFER TESTING

Aquifer testing (rising head slug tests) were conducted before oil injection and after oil injection on selected injection and monitoring wells to estimate the hydraulic conductivity of unconsolidated deposits at Site N-6, and to estimate the impact of oil injection on the hydraulic conductivity of aquifer materials in close proximity to the injection wells. Aquifer test calculations are included in Appendix B.3.

3.4 SUBSTRATE ADDITION

After baseline geochemical and contaminant sampling and pre-injection aquifer testing were completed, approximately 6,100 gallons of edible (i.e., food-grade) soybean oil was injected into eight injection wells. A summary of the injection event, including volumes of oil and water, injection pressures, and injection flow rates is presented in Table 3.4. The soybean oil was injected under pressure directly into each injection well using an ARO air diaphragm pump. As soybean oil was injected into each injection well, the total volume of oil injected was monitored using a Teflon®-coated inline flow meter.

Injection pressures at wells PES-INJ2S, PES-INJ-2D, and PES-INJ4S exceeded the capacity of the injection system, resulting in lower volumes of oil injected for these wells. After the soybean oil was injected into each well, a water push consisting of approximately 100 gallons of water was injected in order to increase the horizontal distribution of oil into the aquifer matrix in the vicinity of each injection well screen. Sodium bromide was added as an aqueous phase tracer to the water push at a concentration of approximately 500 milligrams per liter (mg/L). The tracer was added in order to track movement of water that was injected during the injection event, which is anticipated to be an approximate indicator of the area of influence of the treatment zone.

TABLE 3.4
VEGETABLE OIL INJECTION SUMMARY
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Well	Screened Interval (feet bgs)[a/]	Oil (gallons)	Water Push (gallons)	Total Volume (gallons)	Percent Oil	Screened Length (feet)	Radius of Influence[b/] (feet)	Oil Injection Pressure (psi)[c/]	Oil Injection Flow Rate (gpm)[d/]	Water Push Pressure (psi)	Water Push Flow Rate (gpm)
INJECTION WELLS											
PES-INJ1S	55.0 - 65.0	1000	100	1100	90.9	10	4.2	35	3.7 - 3.9	30 - 35	5.1
PES-INJ1D	75.0 - 85.0	665	100	765	86.9	10	3.5	35	3.9 - 4.9	30 - 38	5.5
PES-INJ2S	44.8 - 54.8	500	100	600	83.3	10	3.1	28 - 40+	4.2 - 6.1	28 - 30	8.5
PES-INJ2D	65.0 - 75.0	450	90	540	83.3	10	2.9	40+	1.6 - 2.5	40+	2.1
PES-INJ3S	55.0 - 65.0	1000	100	1100	90.9	10	4.2	32 - 35	4.3 - 4.8	38 - 40	5.3
PES-INJ3D	75.0 - 85.0	1000	100	1100	90.9	10	4.2	25 - 35	5.6 - 6.5	18 - 35	8.8
PES-INJ4S	45.4 - 55.4	500	100	600	83.3	10	3.1	38 - 40	2.3 - 3.2	15 - 30	6.5
PES-INJ4D	65.0 - 75.0	1000	100	1100	90.9	10	4.2	35 - 38	3.1 - 3.4	40	4.3
	AVERAGES:	**764**	**99**	**863**	**87.6**		**3.6**				
	TOTALS:	**6115**	**790**	**6905**							

[a/] feet bgs = feet below ground surface.

[b/] Assumes an effective porosity of 27 percent.

[c/] psi = pounds per square inch.

[d/] gpm = gallons per minute.

3.5 PROCESS MONITORING

In order to monitor system performance over time, Parsons sampled newly-installed monitoring wells, select injection wells, and existing monitoring wells 007G15LF and 007G5UF at 3, 6, 12, and 18 months after injection. During the 18-month process monitoring event (January 2002), additional groundwater sample aliquots were collected at select wells and sent to Microbial Insights, Inc. for volatile fatty acid (VFA), phospholipid fatty acid (PLFA), and denaturing gradient gel electrophoresis (DGGE) analyses. These analyses were performed to provide a quantitative way to assess viable biomass, microbial community structure, metabolic activity, and provide qualitative information about the prominent microorganisms present in the subsurface at Site N-6. A summary of the Phase II process monitoring activities is shown in Table 3.5.

TABLE 3.5
SUMMARY OF PERFORMANCE MONITORING ACTIVITIES
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Location	Water Level Measurement	Oil Analyses	Groundwater Analyses						
		VOCs[a] SW8260B	VOCs SW8260B	Methane, Ethane, Ethene	Nitrate + Nitrite (E300.1)	Bromide (E320.1)	Total Organic Carbon (SW9060M)	Well Head Analyses[b]	Mobile Lab Analyses[c]
Monitoring Wells									
PES-MW-1D	X		1	1	1			1	1
PES-MW-1S	X		1	1	1			1	1
PES-MW-2D	X		1	1	1	1	1	1	1
PES-MW-2S	X		1	1	1	1	1	1	1
PES-MW-3D	X		1	1	1	1	1	1	1
PES-MW-3S	X		1	1	1	1	1	1	1
PES-MW-4D	X		1	1	1	1	1	1	1
PES-MW-4S	X		1	1	1	1	1	1	1
PES-MW-5D	X		1	1	1	1	1	1	1
PES-MW-5S	X		1	1	1	1	1	1	1
PES-MW-6D	X		1	1	1	1	1	1	1
PES-MW-6S	X		1	1	1	1	1	1	1
PES-MW-7D	X		1	1	1	1	1	1	1
PES-MW-7S	X		1	1	1	1	1	1	1
PES-MW-8D	X		1	1	1	1	1	1	1
PES-MW-8S	X		1	1	1	1	1	1	1
007GL15UF	X		1	1	1			1	1
007GL15LF	X		1	1	1			1	1
Injection Wells									
PES-INJ-1D	X		1	1	1	1	1	1	1
PES-INJ-1S	X		1	1	1	1	1	1	1
PES-INJ-2D	X	2	1	1	1	1	1	1	1
PES-INJ-2S	X	2	1	1	1	1	1	1	1
PES-INJ-3D	X	2	1	1	1	1	1	1	1
PES-INJ-3S	X	2	1	1	1	1	1	1	1
PES-INJ-4D	X		1	1	1	1	1	1	1
PES-INJ-4S	X		1	1	1	1	1	1	1
SUBTOTALS		8	26	26	26	22	22	26	26
QA/QC									
Duplicates		1	3	3	3	3	3		3
MS/MSD		1	2						
Trip Blanks			2						
Rinseates			1						
SUBTOTAL PER EVENT:		10	34	29	29	25	25	26	29

[a] VOCs to include aromatic and chlorinated aliphatic hydrocarbons.
[b] Well head analyses include dissolved oxygen, oxidation-reduction potential, pH, temperature, and conductivity.
[c] Mobile lab analyses include chloride, carbon dioxide, alkalinity, sulfate, ferrous iron, hydrogen sulfide, and manganese.

SECTION 4

RESULTS

Chlorinated aliphatic hydrocarbons (CAHs, or chlorinated solvents) can be used as electron acceptors under reductive dechlorination; however, there must be an appropriate source of carbon (electron donor) for microbial growth in order for this process to occur. Potential carbon sources include vegetable oil, fuel hydrocarbons, low-molecular-weight compounds (e.g., lactate, acetate, or methanol) present in natural organic matter, or less-chlorinated compounds such as vinyl chloride (VC) or DCE. Addition of vegetable oil to the groundwater at Site N-6 will serve to promote remediation of the CAH plume by providing a large quantity of substrate for microbial growth and as a means of lowering the reduction-oxidation (redox) conditions within the aquifer.

The separate-phase-nature and low solubility of vegetable oil allows for slow dissolution into groundwater, thus making it a slow-release carbon source. Vegetable oil is an inexpensive, innocuous, edible (i.e., food-grade) carbon source that is not regulated as an environmental groundwater contaminant by the USEPA. Because vegetable oil is a non-aqueous phase liquid (NAPL), the potential exists that a single, low-cost injection could provide sufficient carbon to drive reductive dechlorination for many years.

Therefore, the objective of adding vegetable oil to the subsurface at Site N-6 is to either promote or reduce those fate and transport processes that are key to maintaining contaminant mass control (i.e., plume stability) and increasing contaminant mass reduction (i.e., plume treatment). Given an understanding of the fate and transport processes likely to be involved at this site during treatment, a sampling program was designed and implemented to characterize the impact of vegetable oil addition on changes in contaminant mass and concentration.

Vegetable oil was injected at Site N-6 in August 2000 to create the redox and electron donor conditions necessary to promote the microbial reductive dechlorination of the chlorinated solvents present in groundwater at the site. A secondary benefit of vegetable oil injection is that dissolved contaminants will preferentially partition out of the groundwater and into the vegetable oil NAPL. This is beneficial because aqueous-phase chlorinated solvent concentrations are lowered until steady-state conditions are reached. This results in an initial attenuation of the dissolved phase plume. Contaminants are then released from the oil to groundwater at a rate dependent upon dissolution and/or degradation of the vegetable oil, and degradation of contaminants in the dissolved phase. In any event, contaminants are released back to groundwater within a zone of adequate substrate and optimal conditions for reductive dechlorination.

4.1 GROUNDWATER FLOW

Table 4.1 presents groundwater elevation measurements collected during baseline sampling, process monitoring events, and from annual monitoring by EnSafe, Inc. Figures 4.1 and 4.2 present groundwater elevations for the upper-fluvial deposits in July/August 2000 and July/August 2001, respectively. The monitoring network for the pilot test was designed assuming that groundwater flow was toward the north-northwest. However, groundwater elevation data collected since system installation within the treatment zone suggest a very flat groundwater potentiometric surface for both the upper and lower fluvial aquifer zones. In fact, in November 2000, there was at least some component of groundwater flow toward the south, from the injection wells toward monitoring well PES-MW1S (Table 4.2). This well was installed to monitor upgradient groundwater chemistry. Based on hydraulic data, and the geochemical data presented below, it appears that well PES-MW1S was impacted chemically by vegetable oil injection activities shortly after injection, but that the impact has decreased over time.

Groundwater flow in July/August 2001 (Figure 4.2) was toward the north-northwest, but the gradient within the treatment zone remains relatively flat compared to the overall gradient from well 007G14LF to well 007G12LF. Groundwater elevations for January 2002 (Table 4.2) are similar to pre-injection conditions, and indicate the gradient in the treatment zone also is toward the north-northwest. This suggests that the apparent mounding of the potentiometric surface observed in November 2000 near the injection wells may have been due to seasonal effects, and that the hydraulic gradient in the treatment zone still remained relatively flat in spite of any changes (i.e., decrease) in hydraulic conductivity as a result of the vegetable oil injection.

Table 4.2 presents the results of pre-injection aquifer testing and estimates of groundwater seepage velocity. The geometric mean for hydraulic conductivity values measured in the upper fluvial zone was 7.1 ft/day (2.5E-03 cm/sec), while the geometric mean for the hydraulic conductivity values measured in the lower fluvial zone was 9.0 ft/day (3.2E-03 cm/sec).

Aquifer test data collected during the January 2002 process monitoring event (post-injection) are presented in Table 4.3. The geometric mean for hydraulic conductivity values measured in the upper fluvial zone was 17 ft/day (6.0E-03 cm/sec), while the geometric mean for the hydraulic conductivity values measured in the lower fluvial zone was 6.2 ft/day (2.2E-03 cm/sec).

Comparison of the pre-injection aquifer testing data with the post-injection aquifer testing data indicates that hydraulic conductivities measured after injection are similar to the hydraulic conductivities measured prior to injection (within the same order of magnitude). Therefore, oil injection activities at Site N-6 do not appear to have an impact on the hydraulic conductivity of the aquifer matrix downgradient from the injection area. It should be noted that post-injection aquifer tests could not be completed in the injection wells due to the presence of substantial thicknesses of vegetable oil remaining after injection. As a result, the effect of vegetable oil injection on the hydraulic conductivity of the aquifer matrix in the immediate vicinity of the injection wells could not be directly assessed.

TABLE 4.1
SUMMARY OF GROUNDWATER ELEVATIONS
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Identification	Date	Top of Casing Elevation (feet amsl)[b]	Screened Interval (feet bgs)[c]	Stratigraphic Interval	Depth to Water (feet)	Groundwater Elevation (feet amsl)	Depth to Oil (feet)	Oil Thickness (feet)	Corrected Water Elevation[d] (feet amsl)
Injection Wells									
PES-INJ-1S	August-00	293.44	55.0 - 65.0	Upper-Fluvial	39.92	253.52	--	--	--
	November-00	293.44	55.0 - 65.0	Upper-Fluvial	65.45	227.99	39.04	26.41	252.29
	February-01	293.44	55.0 - 65.0	Upper-Fluvial	65.37	228.07	38.89	26.48	252.43
	August-01	293.44	55.0 - 65.0	Upper-Fluvial	65.50	227.94	38.07	27.43	253.18
	January-02	294.44	55.0 - 65.1	Upper-Fluvial	65.80	228.64	37.46	28.34	254.71
PES-INJ-1D	August-00	293.44	75.0 - 85.0	Lower-Fluvial	40.16	253.28	--	--	--
	November-00	293.44	75.0 - 85.0	Lower-Fluvial	82.85	210.59	38.08	44.77	251.78
	February-01	293.44	75.0 - 85.0	Lower-Fluvial	81.11	212.33	37.95	43.16	252.04
	August-01	293.44	75.0 - 85.0	Lower-Fluvial	80.17	213.27	37.16	43.01	252.84
	January-02	293.44	75.0 - 85.0	Lower-Fluvial	79.12	214.32	36.47	42.65	253.56
PES-INJ-2S	August-00	293.20	44.8 - 54.8	Upper-Fluvial	39.55	253.65	--	--	--
	November-00	293.20	44.8 - 54.8	Upper-Fluvial	52.20	241.00	40.04	12.16	252.19
	February-01	293.20	44.8 - 54.8	Upper-Fluvial	51.55	241.65	39.93	11.62	252.34
	August-01	293.20	44.8 - 54.8	Upper-Fluvial	49.80	243.40	39.10	10.70	253.24
	January-02	293.20	44.8 - 54.8	Upper-Fluvial	48.46	244.74	38.48	9.98	253.92
PES-INJ-2D	August-00	293.21	65.0 - 75.0	Lower-Fluvial	39.74	253.47	--	--	--
	November-00	293.21	65.0 - 75.0	Lower-Fluvial	67.80	225.41	36.95	30.85	253.79
	February-01	293.21	65.0 - 75.0	Lower-Fluvial	67.50	225.71	38.50	29.00	252.39
	August-01	293.21	65.0 - 75.0	Lower-Fluvial	66.30	226.91	37.82	28.48	253.11
	January-02	293.21	65.0 - 75.0	Lower-Fluvial	62.20	231.01	37.47	24.73	253.76
PES-INJ-3S	August-00	293.09	55.0 - 65.0	Upper-Fluvial	39.52	253.57	--	--	--
	November-00	293.09	55.0 - 65.0	Upper-Fluvial	64.93	228.16	38.75	26.18	252.25
	February-01	293.09	55.0 - 65.0	Upper-Fluvial	65.00	228.09	38.65	26.35	252.33
	August-01	293.09	55.0 - 65.0	Upper-Fluvial	64.95	228.14	37.80	27.15	253.12
	January-02	293.09	55.0 - 65.0	Upper-Fluvial	64.38	228.71	37.14	27.24	253.77
PES-INJ-3D	August-00	293.12	75.0 - 85.0	Lower-Fluvial	39.84	253.28	--	--	--
	November-00	293.12	75.0 - 85.0	Lower-Fluvial	80.30	212.82	38.00	42.30	251.74
	February-01	293.12	75.0 - 85.0	Lower-Fluvial	79.50	213.62	37.90	41.60	251.89
	August-01	293.12	75.0 - 85.0	Lower-Fluvial	78.02	215.10	37.03	40.99	252.81
	January-02	293.12	75.0 - 85.0	Lower-Fluvial	77.17	215.95	36.37	40.80	253.49
PES-INJ-4S	August-00	293.44	45.4 - 55.4	Upper-Fluvial	39.73	253.71	--	--	--
	November-00	293.44	45.4 - 55.4	Upper-Fluvial	74.91	218.53	36.00	38.91	254.33
	February-01	293.44	45.4 - 55.4	Upper-Fluvial	50.10	243.34	40.25	9.85	252.40
	August-01	293.44	45.4 - 55.4	Upper-Fluvial	48.32	245.12	39.45	8.87	253.28
	January-02	293.44	45.4 - 55.4	Upper-Fluvial	47.54	245.90	39.56	7.98	253.24
PES-INJ-4D	August-00	293.40	65.0 - 75.0	Lower-Fluvial	40.04	253.36	--	--	--
	November-00	293.40	65.0 - 75.0	Lower-Fluvial	74.71	218.69	40.40	34.31	250.26
	February-01	293.40	65.0 - 75.0	Lower-Fluvial	74.65	218.75	38.59	36.06	251.93
	August-01	293.40	65.0 - 75.0	Lower-Fluvial	71.18	222.22	37.81	33.37	252.92
	January-02	293.40	65.0 - 75.0	Lower-Fluvial	70.26	223.14	37.21	33.05	253.55

TABLE 4.1 (Continued)
SUMMARY OF GROUNDWATER ELEVATIONS
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Identification	Date	Top of Casing Elevation (feet amsl)[b]	Screened Interval (feet bgs)[c]	Stratigraphic Interval	Depth to Water (feet)	Groundwater Elevation (feet amsl)	Depth to Oil (feet)	Oil Thickness (feet)	Corrected Water Elevation[a] (feet amsl)
Monitoring Wells									
PES-MW-1S	August-00	293.37	45.3 - 55.3	Upper-Fluvial	39.59	253.78	--	--	--
	November-00	293.37	45.3 - 55.3	Upper-Fluvial	40.88	252.49	--	--	--
	February-01	293.37	45.3 - 55.3	Upper-Fluvial	40.86	252.51	--	--	--
	August-01	293.37	45.3 - 55.3	Upper-Fluvial	39.97	253.40	--	--	--
	January-02	293.37	45.3 - 55.3	Upper-Fluvial	39.35	254.02	--	--	--
PES-MW-1D	August-00	293.33	70.0 - 80.0	Lower-Fluvial	39.74	253.59	--	--	--
	November-00	293.33	70.0 - 80.0	Lower-Fluvial	41.02	252.31	--	--	--
	February-01	293.33	70.0 - 80.0	Lower-Fluvial	41.06	252.27	--	--	--
	August-01	293.33	70.0 - 80.0	Lower-Fluvial	40.15	253.18	--	--	--
	January-02	293.33	70.0 - 80.0	Lower-Fluvial	39.48	253.85	--	--	--
PES-MW-2S	August-00	293.38	55.0 - 65.0	Upper-Fluvial	39.79	253.59	--	--	--
	November-00	293.38	55.0 - 65.0	Upper-Fluvial	40.25	253.13	--	--	--
	February-01	293.38	55.0 - 65.0	Upper-Fluvial	41.10	252.28	--	--	--
	August-01	293.38	55.0 - 65.0	Upper-Fluvial	40.12	253.26	--	--	--
	January-02	293.38	55.0 - 65.0	Upper-Fluvial	39.51	253.87	--	--	--
PES-MW-2D	August-00	293.32	75.0 - 85.0	Lower-Fluvial	40.05	253.27	--	--	--
	November-00	293.32	75.0 - 85.0	Lower-Fluvial	41.56	251.76	--	--	--
	February-01	293.32	75.0 - 85.0	Lower-Fluvial	41.40	251.92	--	--	--
	August-01	293.32	75.0 - 85.0	Lower-Fluvial	40.45	252.87	--	--	--
	January-02	293.32	75.0 - 85.0	Lower-Fluvial	39.89	253.43	--	--	--
PES-MW-3S	August-00	293.39	45.0 - 55.0	Upper-Fluvial	39.67	253.72	--	--	--
	November-00	293.39	45.0 - 55.0	Upper-Fluvial	41.21	252.18	--	--	--
	February-01	293.39	45.0 - 55.0	Upper-Fluvial	40.90	252.49	--	--	--
	August-01	293.39	45.0 - 55.0	Upper-Fluvial	40.08	253.31	--	--	--
	January-02	293.39	45.0 - 55.0	Upper-Fluvial	39.49	253.90	--	--	--
PES-MW-3D	August-00	293.40	65.0 - 75.0	Lower-Fluvial	39.95	253.45	--	--	--
	November-00	293.40	65.0 - 75.0	Lower-Fluvial	41.46	251.94	--	--	--
	February-01	293.40	65.0 - 75.0	Lower-Fluvial	41.10	252.30	--	--	--
	August-01	293.40	65.0 - 75.0	Lower-Fluvial	40.32	253.08	--	--	--
	January-02	293.40	65.0 - 75.0	Lower-Fluvial	39.71	253.69	--	--	--
PES-MW-4S	August-00	293.34	55.0 - 65.0	Upper-Fluvial	39.69	253.65	--	--	--
	November-00	293.34	55.0 - 65.0	Upper-Fluvial	40.84	252.50	--	--	--
	February-01	293.34	55.0 - 65.0	Upper-Fluvial	41.02	252.32	--	--	--
	August-01	293.34	55.0 - 65.0	Upper-Fluvial	40.08	253.26	--	--	--
	January-02	293.34	55.0 - 65.0	Upper-Fluvial	39.48	253.86	--	--	--
PES-MW-4D	August-00	293.34	75.0 - 85.0	Lower-Fluvial	40.09	253.25	--	--	--
	November-00	293.34	75.0 - 85.0	Lower-Fluvial	41.25	252.09	--	--	--
	February-01	293.34	75.0 - 85.0	Lower-Fluvial	41.43	251.91	--	--	--
	August-01	293.34	75.0 - 85.0	Lower-Fluvial	40.58	252.76	--	--	--
	January-02	293.34	75.0 - 85.0	Lower-Fluvial	39.95	253.39	--	--	--

TABLE 4.1 (Continued)
SUMMARY OF GROUNDWATER ELEVATIONS
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Identification	Date	Top of Casing Elevation (feet amsl)[b]	Screened Interval (feet bgs)[c]	Stratigraphic Interval	Depth to Water (feet)	Groundwater Elevation (feet amsl)	Depth to Oil (feet)	Oil Thickness (feet)	Corrected Water Elevation[a] (feet amsl)
PES-MW-5S	August-00	293.27	45.4 - 55.4	Upper-Fluvial	39.56	253.71	--	--	--
	November-00	293.27	45.4 - 55.4	Upper-Fluvial	40.55	252.72	--	--	--
	February-01	293.27	45.4 - 55.4	Upper-Fluvial	40.89	252.38	--	--	--
	August-01	293.27	45.4 - 55.4	Upper-Fluvial	39.97	253.30	--	--	--
	January-02	293.27	45.4 - 55.4	Upper-Fluvial	39.93	253.34	--	--	--
PES-MW-5D	August-00	293.27	65.0 - 75.0	Lower-Fluvial	39.91	253.36	--	--	--
	November-00	293.27	65.0 - 75.0	Lower-Fluvial	40.79	252.48	--	--	--
	February-01	293.27	65.0 - 75.0	Lower-Fluvial	41.22	252.05	--	--	--
	August-01	293.27	65.0 - 75.0	Lower-Fluvial	40.36	252.91	--	--	--
	January-02	293.27	65.0 - 75.0	Lower-Fluvial	39.81	253.46	--	--	--
PES-MW-6S	August-00	293.28	55.0 - 65.0	Upper-Fluvial	39.66	253.62	--	--	--
	November-00	293.28	55.0 - 65.0	Upper-Fluvial	40.72	252.56	--	--	--
	February-01	293.28	55.0 - 65.0	Upper-Fluvial	40.93	252.35	--	--	--
	August-01	293.28	55.0 - 65.0	Upper-Fluvial	40.07	253.21	--	--	--
	January-02	293.28	55.0 - 65.0	Upper-Fluvial	39.48	253.80	--	--	--
PES-MW-6D	August-00	293.31	75.0 - 85.0	Lower-Fluvial	40.08	253.23	--	--	--
	November-00	293.31	75.0 - 85.0	Lower-Fluvial	41.13	252.18	--	--	--
	February-01	293.31	75.0 - 85.0	Lower-Fluvial	41.36	251.95	--	--	--
	August-01	293.31	75.0 - 85.0	Lower-Fluvial	40.57	252.74	--	--	--
	January-02	293.31	75.0 - 85.0	Lower-Fluvial	39.94	253.37	--	--	--
PES-MW-7S	August-00	293.10	45.0 - 55.0	Upper-Fluvial	39.40	253.70	--	--	--
	November-00	293.10	45.0 - 55.0	Upper-Fluvial	40.30	252.80	--	--	--
	February-01	293.10	45.0 - 55.0	Upper-Fluvial	40.73	252.37	--	--	--
	August-01	293.10	45.0 - 55.0	Upper-Fluvial	39.94	253.16	--	--	--
	January-02	293.10	45.0 - 55.0	Upper-Fluvial	39.24	253.86	--	--	--
PES-MW-7D	August-00	293.08	65.0 - 75.0	Lower-Fluvial	39.85	253.23	--	--	--
	November-00	293.08	65.0 - 75.0	Lower-Fluvial	40.70	252.38	--	--	--
	February-01	293.08	65.0 - 75.0	Lower-Fluvial	41.14	251.94	--	--	--
	August-01	293.08	65.0 - 75.0	Lower-Fluvial	40.30	252.78	--	--	--
	January-02	293.08	65.0 - 75.0	Lower-Fluvial	39.75	253.33	--	--	--
PES-MW-8S	August-00	292.94	55.0 - 65.0	Upper-Fluvial	39.79	253.15	--	--	--
	November-00	292.94	55.0 - 65.0	Upper-Fluvial	40.75	252.19	--	--	--
	February-01	292.94	55.0 - 65.0	Upper-Fluvial	40.43	252.51	--	--	--
	August-01	292.94	55.0 - 65.0	Upper-Fluvial	41.15	251.79	--	--	--
	January-02	292.94	55.0 - 65.0	Upper-Fluvial	39.68	253.26	--	--	--
PES-MW-8D	August-00	292.94	75.3 - 85.3	Lower-Fluvial	39.90	253.04	--	--	--
	November-00	292.94	75.3 - 85.3	Lower-Fluvial	40.95	251.99	--	--	--
	February-01	292.94	75.3 - 85.3	Lower-Fluvial	41.13	251.81	--	--	--
	August-01	292.94	75.3 - 85.3	Lower-Fluvial	40.36	252.58	--	--	--
	January-02	292.94	75.3 - 85.3	Lower-Fluvial	39.83	253.11	--	--	--

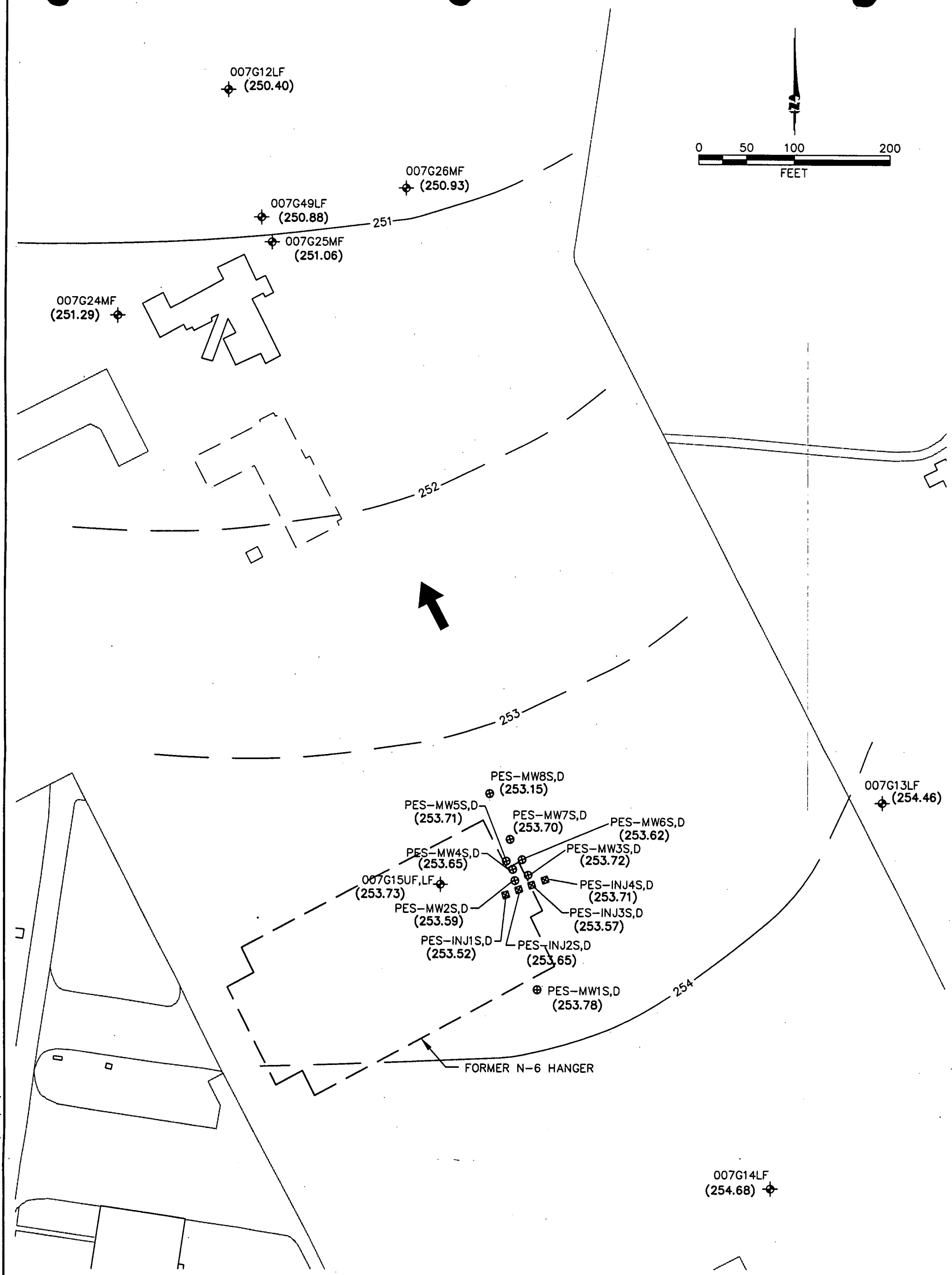
TABLE 4.1 (Continued)
SUMMARY OF GROUNDWATER ELEVATIONS
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Identification	Date	Top of Casing Elevation (feet amsl)[b]	Screened Interval (feet bgs)[c]	Stratigraphic Interval	Depth to Water (feet)	Groundwater Elevation (feet amsl)	Depth to Oil (feet)	Oil Thickness (feet)	Corrected Water Elevation[a] (feet amsl)
007G15UF	August-00	292.91	40.0 - 50.0	Upper-Fluvial	39.18	253.73	--	--	--
	November-00	292.91	40.0 - 50.0	Upper-Fluvial	40.44	252.47	--	--	--
	February-01	292.91	40.0 - 50.0	Upper-Fluvial	NM	NM	--	--	--
	August-01	292.91	40.0 - 50.0	Upper-Fluvial	39.58	253.33	--	--	--
	January-02	292.91	40.0 - 50.0	Upper-Fluvial	39.05	253.86	--	--	--
007G15LF	August-00	293.36	90.0 - 100.0	Lower-Fluvial	40.24	253.12	--	--	--
	November-00	293.36	90.0 - 100.0	Lower-Fluvial	41.45	251.91	--	--	--
	February-01	293.36	90.0 - 100.0	Lower-Fluvial	41.42	251.94	--	--	--
	August-01	293.36	90.0 - 100.0	Lower-Fluvial	40.61	252.75	--	--	--
	January-02	293.36	90.0 - 100.0	Lower-Fluvial	40.09	253.27	--	--	--
007G12LF	July-00	288.78	79.10-89.10	Lower-Fluvial	38.38	250.40	--	--	--
	July-01	288.78	79.10-89.10	Lower-Fluvial	40.13	248.65	--	--	--
007G13LF	July-00	292.96	65.20-75.20	Lower-Fluvial	38.50	254.46	--	--	--
	July-01	292.96	65.20-75.20	Lower-Fluvial	39.81	253.15	--	--	--
007G14LF	July-00	296.43	85.30-95.30	Lower-Fluvial	41.75	254.68	--	--	--
	July-01	296.43	85.30-95.30	Lower-Fluvial	43.05	253.38	--	--	--
007G24MF	July-00	289.06	60.00-70.00	Middle-Fluvial	37.77	251.29	--	--	--
	July-01	289.06	60.00-70.00	Middle-Fluvial	39.37	249.69	--	--	--
007G25MF	July-00	289.97	71.50-81.50	Middle-Fluvial	38.91	251.06	--	--	--
	July-01	289.97	71.50-81.50	Middle-Fluvial	40.58	249.39	--	--	--
007G26MF	July-00	290.13	60.00-70.00	Middle-Fluvial	39.20	250.93	--	--	--
	July-01	290.13	60.00-70.00	Middle-Fluvial	40.87	249.26	--	--	--
007G49LF	July-00	289.68	56.5-96.50	Lower-Fluvial	38.80	250.88	--	--	--
	July-01	289.68	56.5-96.50	Lower-Fluvial	40.49	249.19	--	--	--

[a] Groundwater potentiometric elevation corrected for the presence of oil using an oil specific gravity of 0.92.

[b] feet amsl indicates elevation in feet above mean sea level.

[c] feet bgs indicates depth in feet below ground surface.



LEGEND

007G14LF
- WELL SAMPLE AND WELL NUMBER

- INJECTION WELL PAIR AND NUMBER

- MONITORING WELL PAIR AND NUMBER

UF - UPPER FLUVIAL DEPOSITS WELL

LF - LOWER FLUVIAL DEPOSITS WELL

- DIRECTION OF GROUNDWATER FLOW

(253.78) - GROUNDWATER ELEVATION IN IN FEET ABOVE MEAN SEA LEVEL (ft msl)

251 - LINE OF EQUAL GROUNDWATER SURFACE ELEVATION (ft msl)

NOTE: DATA POSTED FOR LOWER OR MIDDLE FLUVIAL DEPOSITS AT WELL LOCATIONS WITHOUT UPPER FLUVIAL DATA

FIGURE 4.1

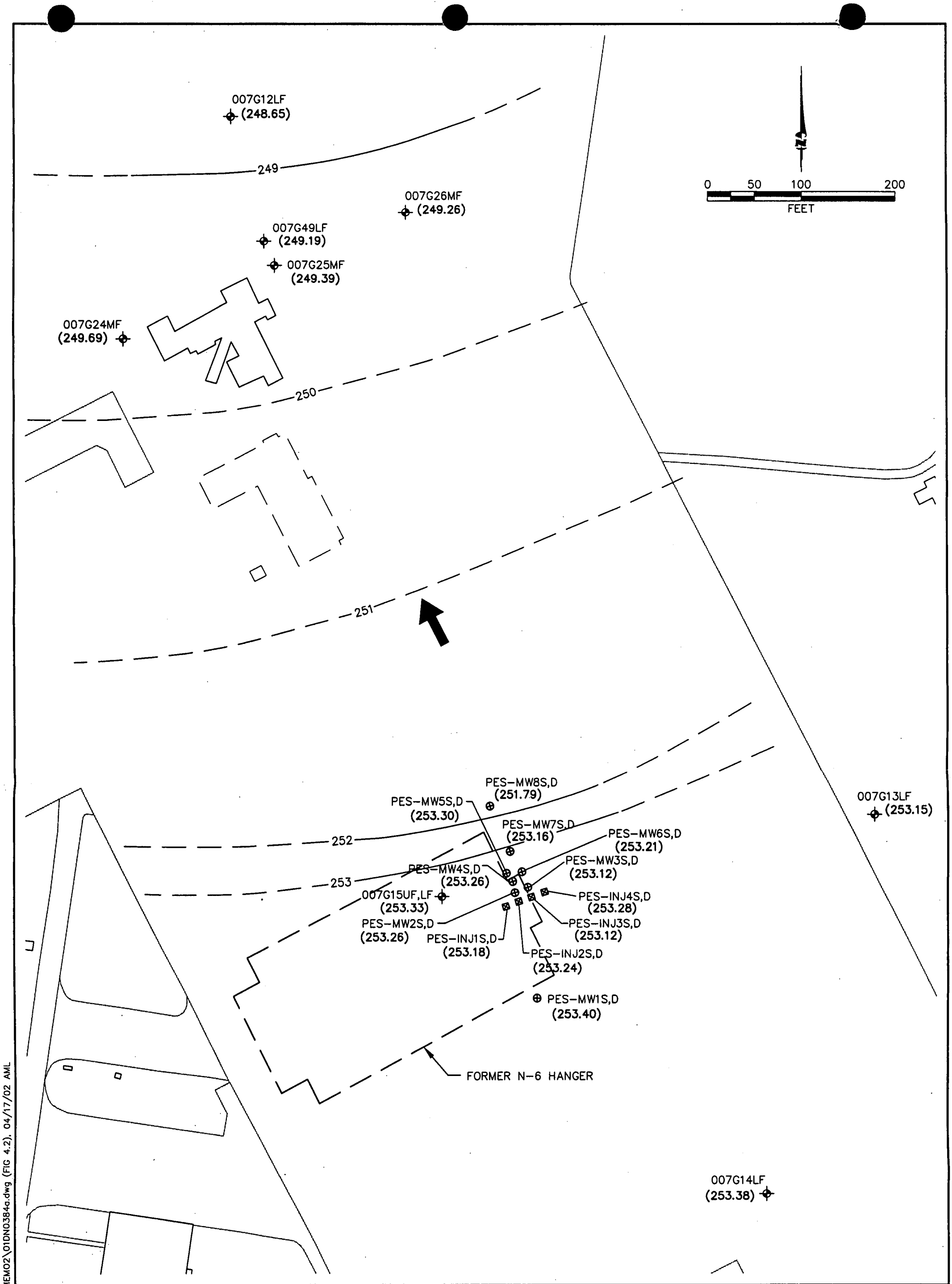
UPPER FLUVIAL DEPOSITS GROUNDWATER ELEVATIONS AUGUST 2000

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS

D nver, Colorado

S:\ES\REMED\737490\05000\FIGURES\TECHMEMO2\01DN0384.dwg (FIG 4.1), 04/04/02 AML



LEGEND

007G14LF
- WELL SAMPLE AND WELL NUMBER

- INJECTION WELL PAIR AND NUMBER

- MONITORING WELL PAIR AND NUMBER

UF - UPPER FLUVIAL DEPOSITS WELL

LF - LOWER FLUVIAL DEPOSITS WELL

- DIRECTION OF GROUNDWATER FLOW

(253.78) - GROUNDWATER ELEVATION IN IN FEET ABOVE MEAN SEA LEVEL (ft msl)

251 - LINE OF EQUAL GROUNDWATER SURFACE ELEVATION (ft msl)

NOTE: DATA POSTED FOR LOWER OR MIDDLE FLUVIAL DEPOSITS AT WELL LOCATIONS WITHOUT UPPER FLUVIAL DATA

FIGURE 4.2

UPPER FLUVIAL DEPOSITS GROUNDWATER ELEVATIONS JULY/AUGUST 2002

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

S:\ES\REMED\737490\05000\FIGURES\TECHMEMO2\01DN0384a.dwg (FIG 4.2), 04/17/02 AML

TABLE 4.2
PRE-INJECTION HYDRAULIC CONDUCTIVITIES AND AVERAGE GROUNDWATER VELOCITIES
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Monitoring Well	Test Date	Rising or Falling Test	Screened Interval (ft bgs)[a]	Casing Inside Diameter (inches)	Static Water Level (feet btoc)	Hydraulic Conductivity (K) (ft/day)[b]	(cm/sec)[c]	(gpd/ft²)[d]	Estimated Effective Porosity	Hydraulic Gradient (ft/ft)[e]	Maximum Groundwater Velocity (ft/yr)[f]
Upper Fluvial Zone - Monitoring Wells											
PES-MW5S	15-Aug-00	Rise	45.4 - 55.4	2.0	39.56	3.89	1.37E-03	29.1	0.27	0.005	26.3
	15-Aug-00	Fall	45.4 - 55.4	2.0	39.56	6.96	2.46E-03	52.1	0.27	0.005	47.1
Average for PES-MW5S						5.42	1.91E-03	40.6	0.27	0.005	36.7
PES-MW8S	15-Aug-00	Rise	55.0-65.0	2.0	39.79	2.84	1.00E-03	21.2	0.27	0.005	19.2
	15-Aug-00	Fall	55.0-65.0	2.0	39.79	3.18	1.12E-03	23.8	0.27	0.005	21.5
Average for PES-MW8S						3.01	1.06E-03	22.5	0.27	0.005	20.3
Upper Fluvial Zone - Injection Wells											
PES-INJ2S	15-Aug-00	Rise	44.8-54.8	2.0	39.55	18.29	6.46E-03	136.8	0.27	0.005	123.6
	15-Aug-00	Fall	44.8-54.8	2.0	39.55	13.68	4.83E-03	102.3	0.27	0.005	92.5
Average for PES-INJ2S						15.99	5.64E-03	119.6	0.27	0.005	108.0
PES-INJ3S	15-Aug-00	Rise	55.0-65.0	2.0	39.42	9.26	3.27E-03	69.3	0.27	0.005	62.6
	15-Aug-00	Fall	55.0-65.0	2.0	39.42	9.97	3.52E-03	74.6	0.27	0.005	67.4
Average for PES-INJ3S						9.62	3.39E-03	71.9	0.27	0.005	65.0
GEOMETRIC MEAN FOR UPPER SATURATED ZONE (PRE-INJECTION)						**7.08**	**2.50E-03**	**52.9**	**0.27**	**0.005**	**47.8**

TABLE 4.2 (Continued)
PRE-INJECTION HYDRAULIC CONDUCTIVITIES AND AVERAGE GROUNDWATER VELOCITIES
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Monitoring Well	Test Date	Rising or Falling Test	Screened Interval (ft bgs)[a]	Casing Inside Diameter (inches)	Static Water Level (feet btoc)	Hydraulic Conductivity (K) (ft/day)[b]	(cm/sec)[c]	(gpd/ft²)[d]	Estimated Effective Porosity	Hydraulic Gradient (ft/ft)[e]	Maximum Groundwater Velocity (ft/yr)[f]
Lower Fluvial Zone - Monitoring Wells											
PES-MW5D	15-Aug-00	Rise	65.0-75.0	2.0	39.91	10.51	3.71E-03	78.6	0.27	0.005	71.0
	15-Aug-00	Fall	65.0-75.0	2.0	39.91	12.81	4.52E-03	95.8	0.27	0.005	86.6
Average for PES-MW5D						11.66	4.12E-03	87.2	0.27	0.005	78.8
PES-MW8D	15-Aug-00	Rise	75.3-85.3	2.0	39.90	5.07	1.79E-03	37.9	0.27	0.005	34.3
	15-Aug-00	Fall	75.3-85.3	2.0	39.90	0.04	1.52E-05	0.3	0.27	0.005	0.3
Average for PES-MW8D						2.56	9.02E-04	19.1	0.27	0.005	17.3
Lower Fluvial Zone - Injection Wells											
PES-INJ2D	15-Aug-00	Rise	65.0-75.0	2.0	39.74	21.26	7.50E-03	159.0	0.27	0.005	143.7
	15-Aug-00	Fall	65.0-75.0	2.0	39.74	20.51	7.24E-03	153.4	0.27	0.005	138.6
Average for PES-INJ2D						20.89	7.37E-03	156.2	0.27	0.005	141.2
PES-INJ3D	15-Aug-00	Rise	75.0-85.0	2.0	39.84	9.18	3.24E-03	68.7	0.27	0.005	62.1
	15-Aug-00	Fall	75.0-85.0	2.0	39.84	11.73	4.14E-03	87.7	0.27	0.005	79.3
Average for PES-INJ3D						10.46	3.69E-03	78.2	0.27	0.005	70.7
GEOMETRIC MEAN FOR LOWER SATURATED ZONE (PRE-INJECTION)						**8.98**	**3.17E-03**	**67.2**	**0.27**	**0.005**	**60.7**

[a] ft bgs = Feet below ground surface.
[b] ft/day = Feet per day.
[c] cm/sec = Centimeters per second.
[d] gpd/ft² = Gallons per day per square foot.
[e] ft/ft = Foot per foot.
[f] ft/yr = Feet per year.

TABLE 4.3
POST-INJECTION HYDRAULIC CONDUCTIVITIES AND AVERAGE GROUNDWATER FLOW VELOCITIES
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Monitoring Well	Test Date	Rising or Falling Test	Screened Interval (ft bgs)[a]	Casing Inside Diameter (inches)	Static Water Level (feet btoc)	Hydraulic Conductivity (K) (ft/day)[b]	(cm/sec)[c]	(gpd/ft²)[d]	Estimated Effective Porosity	Hydraulic Gradient (ft/ft)[e]	Maximum Groundwater Velocity (ft/yr)[f]
Upper Fluvial Zone - Monitoring Wells Post-Injection Slug Tests											
PES-MW2S	31-Jan-02	Rise	55.0-65.0	2.0	39.51	24.45	8.63E-03	182.9	0.27	0.005	165.3
	31-Jan-02	Fall	55.0-65.0	2.0	39.51	45.89	1.62E-02	343.3	0.27	0.005	310.2
Average for PES-MW2S						35.17	1.24E-02	263.1	0.27	0.005	237.7
PES-MW3S	31-Jan-02	Rise	45.0-55.0	2.0	39.49	15.77	5.57E-03	118.0	0.27	0.005	106.6
	31-Jan-02	Fall	45.0-55.0	2.0	39.49	15.99	5.64E-03	119.6	0.27	0.005	108.1
Average for PES-MW3S						15.88	5.61E-03	118.8	0.27	0.005	107.3
PES-MW5S	31-Jan-02	Fall	45.4-55.4	2.0	39.39	8.67	3.06E-03	64.9	0.27	0.005	58.6
GEOMETRIC MEAN FOR UPPER SATURATED ZONE (POST-INJECTION)						**16.92**	**5.97E-03**	**126.5**	**0.27**	**0.005**	**114.4**
Lower Fluvial Zone - Monitoring Wells Post-Injection Slug Tests											
PES-MW2D	31-Jan-02	Rise	55.0-65.0	2.0	39.51	5.25	1.85E-03	39.3	0.27	0.005	35.5
	31-Jan-02	Fall	55.0-65.0	2.0	39.51	5.76	2.03E-03	43.1	0.27	0.005	38.9
Average for PES-MW2S						5.51	1.94E-03	41.2	0.27	0.005	37.2
PES-MW3D	31-Jan-02	Rise	45.0-55.0	2.0	39.49	21.38	7.55E-03	159.9	0.27	0.005	144.5
	31-Jan-02	Fall	45.0-55.0	2.0	39.49	22.17	7.83E-03	165.8	0.27	0.005	149.9
Average for PES-MW3S						21.78	7.69E-03	162.9	0.27	0.005	147.2
PES-MW5D	31-Jan-02	Fall	45.4-55.4	2.0	39.39	12.42	4.38E-03	92.9	0.27	0.005	84.0
GEOMETRIC MEAN FOR LOWER SATURATED ZONE (POST-INJECTION						**6.15**	**2.17E-03**	**46.0**	**0.28**	**0.005**	**77.2**

[a] ft bgs = feet below ground surface.
[b] ft/day = feet per day.
[c] cm/sec = centimeters per second.
[d] gpd/ft² = gallons per day per square foot.
[e] ft/ft = foot per foot.
[f] ft/yr = feet per year.

The average hydraulic gradient in July/August 2001 was approximately 0.005 ft/ft, as measured from well PES-MW1S to well 007G25MF. Given an estimated effective porosity of 27 percent, the average groundwater seepage velocity in July/August 2001 was approximately 48 ft/yr in the upper fluvial zone and approximately 61 ft/yr in the lower fluvial zone. Therefore, the maximum distance that the effects of the oil injection in the upper and lower fluvial deposits are likely to be observed for the period of August 2000 to January 2002 is approximately 70 feet, or approximately in the vicinity of observation wells PES-MW7S/D.

4.2 SOIL SAMPLING RESULTS

Soil analytical results collected during well installation activities are summarized on Table 4.4. The complete soil analytical data package is included in Appendix A.

4.2.1 Total Organic Carbon in Soil

Partitioning of a chemical between the dissolved phase and solid phase is commonly referred to as soil adsorption, and is quantified by the soil partition coefficient or distribution coefficient (Kd), which is the proportionality constant relating the amount of chemical sorbed to soil and the concentration at equilibrium in soil. This description of the process assumes that partitioning between the sorbed and dissolved phases is completely reversible, and that the equilibrium isotherm relating the relative concentrations in the two phases is linear (Neff *et al.*, 1994; Lyman *et al.*, 1990). Organic matter in soil controls sorption where there is sufficient organic matter present (more than 0.1 percent organic carbon). This observation has been used as the basis for normalizing the linear partition coefficient to the concentration of total organic carbon in the soil (Karickhoff *et al.*, 1979; Karickhoff, 1981). If the organic carbon content of the soils at Site N-6 can be characterized or estimated, these data can be used to evaluate chemical partitioning to the soil matrix. Specifically, the fraction of sorbed CAHs increases as the concentration of organic carbon in the soil increases.

A total of six soil samples were collected from two locations (PES-MW1 and PES-MW8) during the course of drilling and well installation activities at Site N-6 and sent to Microseeps, Inc. for TOC analysis via the Walkley Black Method. At each location soil samples were collected from the vertical interval where the monitoring well screens were to be placed in order to quantify concentrations of naturally-occurring organic carbon within the soil matrix.

TOC concentrations detected in soils at Site N-6 were all below the method detection limit (MDL) of 25 milligrams per liter (mg/kg). These results indicate that the subsurface soils beneath Site N-6 are relatively poor in naturally-occurring organic carbon. Therefore, significant contaminant adsorption to the soil matrix would not be expected at Site N-6.

4.2.2 Pre-Injection Extent of Chlorinated Aliphatic Hydrocarbons in Soil

Soil samples were collected at various intervals from bore holes PES-MW2, PES-MW3, PES-MW7, PES-MW8, and PES-INJ2 and sent to Microseeps, Inc. for VOC analysis via USEPA Method 8260B. VOC analytical results collected during this study indicate that there were a total of 16 contaminants detected at concentrations above the

TABLE 4.4
SUMMARY OF ANALYTICAL RESULTS FOR SOIL
NAA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Sample Date	Sample Depth (feet bgs)[a]	TCE[b] (µg/kg)[c]	1,1-DCE[b] (µg/kg)	1,1-DCA[b] (µg/kg)	Carbon Tetrachloride (µg/kg)	Chloroform (µg/kg)	Methylene Chloride (µg/kg)	Benzene (µg/kg)	Ethylbenzene (µg/kg)	Toluene (µg/kg)	o-Xylene (µg/kg)	m&p-Xylene (µg/kg)	1,2,3-TMB[b] (µg/kg)	1,2,4-TMB[b] (µg/kg)	n-Butyl-benzene (µg/kg)	n-Propyl-benzene (µg/kg)	Naphthalene (µg/kg)	Moisture (percent)	Total Organic Carbon (mg/kg)[d]
PES-MW1S,D	18-Jul-00	45 - 46'	NA[e]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	21	<25[f]
PES-MW1S,D	18-Jul-00	55 - 56'	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	18	<25
PES-MW1S,D	18-Jul-00	65 - 66'	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	16	<25
PES-MW1S,D	18-Jul-00	75 - 76'	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	17	<25
PES-MW2S,D	1-Aug-00	20 -22'	0.93J[g]	<4.6	<4.6	<4.6	<4.6	<4.6	2.5J	2.9J	7.4	1.5J	3.2J	<4.6	2.8J	<4.6	<4.6	<4.6	22	NA
PES-MW2S,D	1-Aug-00	40 - 42'	1.1J	<4.8	<4.8	<4.8	<4.8	1.0J	<4.8	<4.8	<4.8	<4.8	<9.7	<4.8	2.9J	<4.8	<4.8	<4.8	18	NA
PES-MW2S,D	1-Aug-00	55 - 57'	37	7.0	2.0J	1.4J	7.0	0.93J	<4.4	<4.4	<4.4	<4.4	1.3J	<4.4	2.1J	<4.4	<4.4	<4.4	14	NA
PES-MW2S,D	1-Aug-00	55-57' (dup)	41	8.8	2.1J	1.7J	7.5	1.0J	<4.8	<4.8	<4.8	<4.8	<9.6	<4.8	<4.8	<4.8	<4.8	<4.8	16	NA
PES-MW3S,D	24-Jul-00	5 - 7'	46J	<430	<430	<430	<430	59J	<430	<430	38J	<430	37J	<430	<430	45J	<430	<430	18	NA
PES-MW3S,D	24-Jul-00	30 - 32'	40J	<470	<470	<470	<470	37J	<470	<470	<470	<470	<940	<470	<470	<470	<470	<470	18	NA
PES-MW3S,D	24-Jul-00	55 - 57'	23	1.9J	<4.4	2.0J	8.6	3.6J	<4.4	3.8J	3.8J	4.4J	14	1.9J	8.2	1.1J	2.1J	0.94J	12	NA
PES-MW7S,D	21-Jul-00	5 - 7'	1.6J	<5.0	<5.0	<5.0	<5.0	2.0J	<5.0	<5.0	<5.0	<5.0	2.7J	<5.0	<5.0	<5.0	<5.0	<5.0	13	NA
PES-MW7S,D	21-Jul-00	55 - 57'	8.9	1.8J	5.2	<5.0	3.0J	3.0J	<5.0	<5.0	<5.0	<5.0	3.0J	<5.0	1.8J	<5.0	<5.0	<5.0	16	NA
PES-MW8S,D	22-Jul-00	57 - 57'	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<25
PES-MW8S,D	22-Jul-00	75 - 77'	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<25
PES-INJ2S,D	20-Jul-00	12 - 14'	4.9J	<5.0	<5.0	<5.0	1.2J	2.3J	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA
PES-INJ2S,D	20-Jul-00	34 - 36'	3.9J	<5.0	<5.0	<5.0	1.6J	2.4J	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA
PES-INJ2S,D	20-Jul-00	40 - 42'	4.4J	2.4J	3.9J	<5.0	1.8J	2.6J	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA

[a] feet bgs = feet below ground surface.

[b] TCE = trichloroethene; DCE = dichloroethene; DCA = dichloroethane, TMB = trimethylbenzene.

[c] µg/kg = micrograms per kilogram.

[d] mg/kg = milligrams per kilogram.

[e] NA = not sampled.

[f] <25 indicates that the analyte was not detected above the indicated method detection limit.

[g] J indicates that the analyte was detected at a concentration above the method detection limit but below the reporting limit resulting in an estimated value.

associated MDL (Table 4.1). All of the contaminants detected in soil were detected at relatively low concentrations (<100 micrograms per kilogram [µg/kg]). The maximum VOC concentration detected was 59 µg/kg of methylene chloride, which was detected in a soil sample collected from PES-MW3. The relatively low concentrations of VOCs detected in soil with respect to VOC concentrations detected in groundwater confirms that VOCs are not adsorbing to the soil matrix in significant quantity.

4.3 PRE-INJECTION EXTENT OF CHLORINATED ALIPHATIC HYDROCARBONS IN GROUNDWATER

Groundwater from the 24 newly-installed injection and monitoring wells as well as 2 existing monitoring wells were sampled prior to injection and analyzed for VOCs by Microseeps Inc., via USEPA Method 8260B. Analytical results for chlorinated compounds in groundwater collected prior to injection are summarized in Table 4.5. Laboratory analytical results for groundwater samples are included in Appendix A. In addition, Table 4.6 presents a summary of VOCs detected in groundwater samples collected by Ensafe, Inc. from 1998 to 2001 as part of the base-wide long-term monitoring program.

Baseline (pre-injection) groundwater sampling results indicate that TCE was detected at concentrations above its MDL at 25 of the 26 locations sampled, with a maximum concentration of 1,800 µg/L at location PES-MW6S. Other VOCs detected during the baseline sampling include *cis*-1,2-DCE at a maximum concentration of 34 µg/L; 1,1-DCE at a maximum concentration of 370 µg/L; 1,1-DCA at a maximum concentration of 81 µg/L; CT at a maximum concentration of 270 µg/L; and chloroform at a maximum concentration of 180 µg/L. The detection of the common CAH degradation byproducts *cis*-1,2-DCE and chloroform indicate that some reductive dechlorination is or has been active at Site N-6. Benzene also was detected sporadically during baseline sampling at low estimated concentrations (above the MDL but below the laboratory reporting limit [RL]), indicating that fuel hydrocarbons may have been released at this site in the past.

In all but two cases (*cis*-1,2-DCE and 1,1-DCE), maximum contaminant concentrations were detected in either injection wells or monitoring wells installed directly downgradient from the injection area. This area coincides with a former grassy area located at the east end of former Hanger N-6 where solvents were reportedly spread on the ground to kill weeds, and where a storm water drain runs beneath the site. Contaminant concentrations were generally higher in groundwater samples collected from shallow wells with respect to contaminant concentrations detected in associated deep wells. Concentrations of VOCs detected in wells 007G15UF and 007G15LF were consistent with historical results (Table 4.5).

The distribution of TCE (maximum concentration plotted for each well pair) prior to oil injection in July/August 2000 is shown on Figure 4.3. The highest TCE concentrations were detected in samples collected from wells downgradient from the injection area (PES-MW3S, PES-MW4S, and PES-MW6S).

TABLE 4.5
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER
SITE N-6 PROCESS MONITORING PROGRAM
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Date	PCE[a] (µg/L)[b]	TCE[a] (µg/L)	*cis*-1,2-DCE[a] (µg/L)	*trans*-1,2-DCE[a] (µg/L)	1,1-DCE[a] (µg/L)	Vinyl Chloride (µg/L)	1,1-DCA[a] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Methylene Chloride (µg/L)	Benzene (µg/L)	Toluene (µg/L)	n-Butyl benzene (µg/L)	1.2.3-Trichloro-benzene (µg/L)	sec-Butyl benzene (µg/L)	1,2,3-Trichloro-propane (µg/L)	1,2,4-Trichloro-benzene (µg/L)	m&p Xylenes (µg/L)	Chloro-ethane (µg/L)
MONITORING WELLS																					
PES-MW1S	25-Jul-00	<5.0[c]	150	34	1.0J[d]	15	<5.0	8.5	<5.0	<5.0	3.6J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Nov-00	<5.0	22	9.1	<5.0	23	<5.0	17	<5.0	<5.0	2.1J	<5.0	<5.0	1.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	6-Feb-01	<5.0	53	17	<5.0	26	<5.0	27	<5.0	<5.0	4.3J	<5.0	1.1J	2.1J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	6-Aug-01	<5.0	14	34	44	13	<5.0	24	<5.0	<5.0	1.1 J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	3.5 J
	29-Jan-02	<5.0	100	40	44	27	<5.0	42	<5.0	2.3J	10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW1D	6-Aug-00	<5.0	26	2.8J	<5.0	2.2J	<5.0	<5.0	<5.0	<5.0	1.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Nov-00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1.6J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	6-Feb-01	<5.0	1.2J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	2.6J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	6-Aug-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW2S	5-Aug-00	<5.0	680	4.5J	<5.0	40	<5.0	5.8	<5.0	66	110	<5.0	1.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	10-Nov-00	1.0J	1,000	14	<5.0	140	<5.0	24	<5.0	100	140	1.1J	5.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Feb-01	1.3J	1,200	18	<5.0	180	<5.0	34	<5.0	140	150	1.2J	6.6	1.3J	<5.0	21	<5.0	<5.0	<5.0	<10	<5.0
	9-Aug-01	<5.0	1,300	12	<5.0	140	<5.0	25	<5.0	62	100	<5.0	3.9J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	30-Jan-02	1.0J	1,200	250	12	310	<5.0	43	<5.0	93	130	2.6J	7.2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW2D	4-Aug-00	<5.0	180	3.6J	<5.0	110	<5.0	13	<5.0	7.5	15	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	10-Nov-00	<5.0	260	8.8	<5.0	150	<5.0	17	<5.0	8.3	29	<5.0	1.7J	1.1J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Feb-01	<5.0	220	7.7	<5.0	98	<5.0	17	<5.0	3.7J	22	<5.0	1.4J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Aug-01	<5.0	40	7.4	<5.0	23	<5.0	4.5J	<5.0	2.4J	4.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	30-Jan-02	<5.0	42	12	<5.0	44	<5.0	8.3	<5.0	1.4J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW3S	4-Aug-00	1.2J	1,600	12	<5.0	200	<5.0	32	<5.0	42	96	<5.0	4.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	10-Nov-00	<5.0	350	12	<5.0	150	<5.0	50	47	4.6J	47	1.8J	3.2J	1.3J	1.1J	1.0J	<5.0	<5.0	<5.0	<10	<5.0
	9-Feb-01	<5.0	290	14	<5.0	220	<5.0	97	1.4J	4.8J	41	1.1J	2.8J	1.0J	<5.0	<5.0	<5.0	20	<5.0	<10	<5.0
	9-Aug-01	<5.0	740	15	<5.0	380	<5.0	54	<5.0	5.7	21	<5.0	3.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	30-Jan-02	1.3J	1,000	19	<5.0	420	<5.0	66	<5.0	24	47	<5.0	5.6	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW3D	4-Aug-00	<5.0	4.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1.3J	<5.0	<5.0	<10	1.3J
	10-Nov-00	<5.0	420	9.9	<5.0	64	<5.0	13	<5.0	60	68	<5.0	1.5J	1.1J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Feb-01	<5.0	560	12	<5.0	74	<5.0	12	<5.0	100	87	<5.0	1.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Aug-01	<5.0	230	7.6	<5.0	56	<5.0	9.4	<5.0	21	48	3.0J	1.2J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	4.0J
	30-Jan-02	<5.0	160	35	<5.0	31	<5.0	4.1J	<5.0	8.3	18	3.2J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW4S	3-Aug-00	<5.0	1,600	6.4	<5.0	69	<5.0	9.7	<5.0	50	120	<5.0	2.9J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Nov-00	1.0J	1,000	13	<5.0	120	<5.0	21	<5.0	57	160	1.3J	5.1	2.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Feb-01	1.0J	990	16	<5.0	170	<5.0	30	<5.0	63	120	1.2J	5.4	1.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Aug-01	<5.0	370	13	<5.0	160	<5.0	32	<5.0	21	68	<5.0	3.2J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	30-Jan-02	1.1J	1,000	21	<5.0	310	<5.0	51	<5.0	57	89	<5.0	4.9J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW4D	3-Aug-00	<5.0	120	1.7J	<5.0	32	<5.0	6.5	<5.0	5.8	13	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	10-Nov-00	<5.0	140	3.0J	<5.0	39	<5.0	5.8	<5.0	9.1	18	<5.0	<5.0	1.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Feb-01	<5.0	95	2.9J	<5.0	34	<5.0	6.0	<5.0	7.0	16	<5.0	<5.0	1.7J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Aug-01	<5.0	110	2.2J	<5.0	27	<5.0	5.4	<5.0	7.4	15	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	30-Jan-02	<5.0	67	1.5J	<5.0	22	<5.0	4.1J	<5.0	9.1	11	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW5S	3-Aug-00	<5.0	690	5.9	<5.0	70	<5.0	37	<5.0	20	110	<5.0	2.6J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Nov-00	<5.0	220	6.9	<5.0	88	<5.0	62	<5.0	8.2	38	<5.0	1.4J	1.3J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Feb-01	<5.0	250	8.8	<5.0	120	<5.0	78	<5.0	11	40	<5.0	1.8J	1.2J	<5.0	<5.0	<5.0	21	<5.0	<10	<5.0
	8-Aug-01	<5.0	180	6.3	<5.0	92	<5.0	64	<5.0	3.3J	18	<5.0	1.1J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	30-Jan-02	<5.0	540	13	<5.0	190	<5.0	92	<5.0	24	33	<5.0	2.6J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0

TABLE 4.5 (Continued)
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER
SITE N-6 PROCESS MONITORING PROGRAM
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Date	PCE[a] (µg/L)[b]	TCE[a] (µg/L)	*cis*-1,2-DCE[a] (µg/L)	*trans*-1,2-DCE[a] (µg/L)	1,1-DCE[a] (µg/L)	Vinyl Chloride (µg/L)	1,1-DCA[a] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Methylene Chloride (µg/L)	Benzene (µg/L)	Toluene (µg/L)	n-Butyl benzene (µg/L)	1.2.3-Trichloro-benzene (µg/L)	sec-Butyl benzene (µg/L)	1,2,3-Trichloro-propane (µg/L)	1,2,4-Trichloro-benzene (µg/L)	m&p Xylenes (µg/L)	Chloro-ethane (µg/L)
PES-MW5D	3-Aug-00	<5.0	450	4.3J	<5.0	30	<5.0	4.4J	<5.0	85	99	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Nov-00	<5.0	690	6.9	<5.0	40	<5.0	6.4	<5.0	160	130	<5.0	1.4J	2.1J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Feb-01	<5.0	700	8.1	<5.0	58	<5.0	9.2	<5.0	140	130	<5.0	1.9J	1.2J	<5.0	20	<5.0	<5.0	<5.0	<10	<5.0
	8-Aug-01	<5.0	680	8.7	<5.0	77	<5.0	13	<5.0	110	120	<5.0	1.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	30-Jan-02	<5.0	1,000	12	<5.0	160	<5.0	20	<5.0	160	140	<5.0	2.7J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW6S	4-Aug-00	1.0J	1,800	9.9	<5.0	120	<5.0	17	<5.0	270	180	1.2J	3.4J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Nov-00	1.4J	1,100	17	<5.0	160	<5.0	28	<5.0	57	140	1.2J	<5.0	1.4J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Feb-01	2.1J	920	22	36	190	<5.0	36	<5.0	<5.0	130	1.2J	6.3	<5.0	<5.0	<5.0	<5.0	19	<5.0	<10	<5.0
	8-Aug-01	1.4J	860	17	<5.0	190	<5.0	39	<5.0	49	94	<5.0	5.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	1.5J	1,200	25	<5.0	300	<5.0	62	<5.0	68	120	1.4J	6.6	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW6D	3-Aug-00	<5.0	220	4.0J	<5.0	120	<5.0	16	<5.0	6.4	17	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Nov-00	<5.0	200	4.6J	<5.0	51	<5.0	5.8	<5.0	17	28	<5.0	<5.0	1.9J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Feb-01	<5.0	150	<5.0	<5.0	36	<5.0	5.2	<5.0	12	22	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Aug-01	<5.0	88	2.4J	<5.0	32	<5.0	5.1	<5.0	6.3	12	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	74	26	<5.0	58	<5.0	8.2	<5.0	4.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW7S	2-Aug-00	1.2J	660	7.2	<5.0	16	<5.0	2.5J	<5.0	74	72	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Nov-00	<5.0	150	28	<5.0	100	<5.0	82	<5.0	6.4	23	<5.0	1.1J	1.7J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Feb-01	<5.0	95	61	<5.0	95	<5.0	84	<5.0	5.1	8.8	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Aug-01	<5.0	140	28	<5.0	110	<5.0	83	<5.0	4.0J	5.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	220	22	<5.0	170	<5.0	110	<5.0	13	16	<5.0	1.2J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW7D	2-Aug-00	2.0J	570	16	<5.0	120	<5.0	81	<5.0	20	29	<5.0	1.3J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Nov-00	<5.0	980	4.5J	<5.0	20	<5.0	4.4J	<5.0	260	150	<5.0	1.6J	1.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Feb-01	<5.0	800	6.0	<5.0	23	<5.0	5.5	<5.0	210	130	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Aug-01	<5.0	670	4.5J	<5.0	27	<5.0	6.0	<5.0	200	100	<5.0	1.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	1,300	5.0J	<5.0	53	<5.0	6.9	<5.0	270	150	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW8S	2-Aug-00	<5.0	150	<5.0	<5.0	6.7	<5.0	2.2J	<5.0	8.0	27	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Nov-00	<5.0	98	1.0J	<5.0	38	<5.0	16	<5.0	8.3	17	<5.0	<5.0	1.9J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Feb-01	<5.0	100	<5.0	<5.0	40	<5.0	16	<5.0	8.1	13	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Aug-01	<5.0	61	<5.0	<5.0	33	<5.0	11	<5.0	4.8J	5.2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	220	1.2J	<5.0	72	<5.0	26	<5.0	14	15	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW8D	2-Aug-00	<5.0	380	1.4J	<5.0	7.4	<5.0	1.6J	<5.0	52	73	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Nov-00	<5.0	720	2.6J	<5.0	16	<5.0	3.6J	<5.0	97	86	<5.0	<5.0	1.9J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Feb-01	<5.0	580	<5.0	<5.0	22	<5.0	<5.0	94	96	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Aug-01	<5.0	540	3.1J	<5.0	26	<5.0	4.9J	<5.0	72	82	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	980	4.0J	<5.0	37	<5.0	6.1	<5.0	30	120	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
007G15UF	24-Jul-00	<5.0	290	14	<5.0	370	<5.0	65	<5.0	2.7J	10	<5.0	2.7J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Nov-00	<5.0	380	12	<5.0	340	<5.0	51	<5.0	3.7J	<5.0	<5.0	2.6J	2.6J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	6-Feb-01	<5.0	370	14	<5.0	330	<5.0	41	<5.0	5.8	16	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Aug-01	<5.0	310	13	<5.0	340	<5.0	50	<5.0	5.2	17	<5.0	2.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	780	23	<5.0	900	<5.0	100	<5.0	15	30	<5.0	5.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
007G15LF	25-Jul-00	<5.0	58	6.2	<5.0	3.4J	<5.0	1.0J	<5.0	19	4.8	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Nov-00	<5.0	14	<5.0	<5.0	10	<5.0	2.6J	<5.0	25	6.9	<5.0	<5.0	2.2J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	6-Feb-01	<5.0	8.7	<5.0	<5.0	6.2	<5.0	2.9J	<5.0	18	6.3	<5.0	<5.0	2.6J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Aug-01	<5.0	3.5J	<5.0	<5.0	3.9J	<5.0	1.2 J	<5.0	17	5.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	36	<5.0	<5.0	6.0	<5.0	1.5J	<5.0	27	8.5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0

TABLE 4.5 (Continued)
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER
SITE N-6 PROCESS MONITORING PROGRAM
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location		Date	PCE[a/] (µg/L)[b/]	TCE[a/] (µg/L)	*cis-* 1,2-DCE[a/] (µg/L)	*trans-* 1,2-DCE[a/] (µg/L)	1,1-DCE[a/] (µg/L)	Vinyl Chloride (µg/L)	1,1-DCA[a/] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Methylene Chloride (µg/L)	Benzene (µg/L)	Toluene (µg/L)	n-Butyl benzene (µg/L)	1.2.3-Trichloro-benzene (µg/L)	sec-Butyl benzene (µg/L)	1,2,3-Trichloro-propane (µg/L)	1,2,4-Trichloro-benzene (µg/L)	m&p Xylenes (µg/L)	Chloro-ethane (µg/L)
INJECTION WELLS																						
PES-INJ1S		5-Aug-00	<5.0	640	11	<5.0	150	<5.0	14	<5.0	20	75	1.4J	3.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-INJ1D		5-Aug-00	<5.0	55	1.7J	<5.0	9.3	<5.0	2.8J	<5.0	2.9J	5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-INJ2S		5-Aug-00	<5.0	600	14	<5.0	210	<5.0	50	<5.0	13	58	<5.0	2.9J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
		31-Jan-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	Oil	11-Nov-00	<250	170J	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<500	<250
	Oil	9-Feb-01	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<9,900	<5,000
	Oil	9-Aug-01	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<9,800	<4,900
	Oil	31-Jan-02	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<10,000	<5,000
PES-INJ2D		5-Aug-00	<5.0	140	4.0J	<5.0	40	<5.0	7.3	<5.0	2.7J	12	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
		11-Nov-00	<5.0	2.1J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	21	<5.0	<5.0	<5.0	<10	<5.0
		9-Aug-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	2.0J
		31-Jan-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	Oil	11-Nov-00	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<500	<250
	Oil	9-Feb-01	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<10,000	<5,000
	Oil	9-Aug-01	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<9,800	<4,900
	Oil	31-Jan-02	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<10,000	<5,000
PES-INJ3S		5-Aug-00	<5.0	450	5.1	<5.0	52	<5.0	6.9	<5.0	18	42	<5.0	1.7J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10.0	<5.0
	Oil	11-Nov-00	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<10	<250
	Oil	8-Feb-01	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	1,100J	<4,900	<4,900	<4,900	1,400J	1,400J	<4,900
	Oil	9-Aug-01	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	2,200J	1,800J	1,200J	<4,800	2,000J	<9,600	<4,800
PES-INJ3D		5-Aug-00	<5.0	80	2.4J	<5.0	43	<5.0	7.0	<5.0	1.1J	4.7J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
		9-Feb-01	<5.0	11	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	2.4J
		9-Aug-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	12
	Oil	11-Nov-00	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<500	<250
PES-INJ3D(DUP4)	Oil	11-Nov-00	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<500	<250
	Oil	9-Feb-01	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<10,000	<5,000
	Oil	9-Aug-01	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<10,000	<5,000
PES-INJ4S		6-Aug-00	<5.0	190	18	<5.0	170	<5.0	63	<5.0	4.8J	25	<5.0	1.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
		31-Jan-02	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<100	<50
	Oil	31-Jan-02	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<10,000	<5,000
PES-INJ4D		6-Aug-00	<5.0	560	17	<5.0	240	<5.0	75	<5.0	5.3	29	<5.0	1.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0

TABLE 4.5 (Continued)
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER
SITE N-6 PROCESS MONITORING PROGRAM
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Date	PCE[a] (µg/L)[b]	TCE[a] (µg/L)	*cis-* 1,2-DCE[a] (µg/L)	*trans-* 1,2-DCE[a] (µg/L)	1,1-DCE[a] (µg/L)	Vinyl Chloride (µg/L)	1,1-DCA[a] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Methylene Chloride (µg/L)	Benzene (µg/L)	Toluene (µg/L)	n-Butyl benzene (µg/L)	1.2.3-Trichloro-benzene (µg/L)	sec-Butyl benzene (µg/L)	1,2,3-Trichloro-propane (µg/L)	1,2,4-Trichloro-benzene (µg/L)	m&p Xylenes (µg/L)	Chloro-ethane (µg/L)
QUALITY ASSURANCE/QUALITY CONTROL																					
Field Blank	25-Jul-00	<5.0	1.2J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Rinsate Blank	4-Aug-00	<5.0	180	1.0J	<5.0	15	<5.0	1.8J	<5.0	7.1	16	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Rinsate Blank	6-Feb-01	<5.0	22	<5.0	<5.0	<5.0	<5.0	1.9J	<5.0	3.8J	1.7J	<5.0	<5.0	1.7J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Rinsate Blank	7-Aug-01	<5.0	1.1J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Rinsate Blank	30-Jan-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	2-Aug-00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	3-Aug-00	<5.0	1.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1.4J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	4-Aug-00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	6-Feb-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	6-Aug-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	8-Aug-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	29-Jan-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	30-Jan-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	31-Jan-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Tank Water	30-Jan-02	<5.0	180	8.8	5.5	59	<5.0	20	<5.0	27	26	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW4D MS	3-Aug-00	<5.0	180	1.5J	<5.0	95	<5.0	6.0	<5.0	5.8	12	<5.0	54	61	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW4D MSD	3-Aug-00	<5.0	190	1.7J	<5.0	98	<5.0	6.2	<5.0	5.8	12	<5.0	56	63	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW1S MS	6-Feb-01	<5.0	100	18	<5.0	74	<5.0	28	<5.0	<5.0	4.8J	<5.0	49	55	<5.0	<5.0	<5.0	<5.0	<5.0	<10	2.8J
PES-MW1S MSD	6-Feb-01	<5.0	99	18	<5.0	73	<5.0	27	<5.0	<5.0	4.3J	<5.0	49	53	<5.0	<5.0	<5.0	<5.0	<5.0	<10	2.8J
PES-MW1S MS	29-Jan-02	<5.0	190	43	51	130	<5.0	45	<5.0	2.2J	12	<5.0	69	64	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW1S MSD	29-Jan-02	<5.0	180	42	48	120	<5.0	43	<5.0	2.2J	11	<5.0	65	63	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-INJ3S MS	8-Feb-01	<10	99	<10	<10	100	<10	<10	<10	<10	<10	<10	98	100	<10	<10	<10	<10	2.4J	2.3J	<10
PES-INJ3S MSD	8-Feb-01	<10	97	<10	<10	98	<10	<10	<10	<10	<10	<10	97	100	<10	<10	<10	<10	<10	<20	<10
PES-MW3D MS	30-Jan-02	<5.0	250	50	<5.0	130	<5.0	5.4	<5.0	8.0	23	4.2J	66	63	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW3D MSD	30-Jan-02	<5.0	230	46	<5.0	120	<5.0	4.9J	<5.0	7.1	21	3.8J	61	59	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW6D MS	7-Feb-01	<5.0	210	<5.0	<5.0	85	<5.0	5.2	<5.0	13	23	<5.0	48	51	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW6D MSD	7-Feb-01	<5.0	220	<5.0	<5.0	88	<5.0	5.4	<5.0	14	25	<5.0	49	52	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW1D MS	8-Aug-01	<5.0	40	<5.0	<5.0	34	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	40	45	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW1D MSD	8-Aug-01	<5.0	<5.0	<5.0	<5.0	38	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	44	49	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW7D MS	7-Aug-01	<5.0	1,000	4.8J	<5.0	70	<5.0	6.1	<5.0	220	110	<5.0	47	50	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW7D MSD	7-Aug-01	<5.0	920	4.4J	<5.0	67	<5.0	5.5	<5.0	200	100	<5.0	44	46	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-INJ2S MS **Oil**	9-Aug-01	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	5,600	1,200J	<4,800	<4,800	<4,800	<4,800	<9,600	<4,800
PES-INJ2S MSD **Oil**	9-Aug-01	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	53,000	60,000	<5,000	<5,000	<5,000	<5,000	<5,000	<10,000	<5,000

[a] PCE = tetrachloroethene; TCE = trichloroethene; DCE = dichloroethene; TCA = trichloroethane; DCA = dichloroethane.

[b] µg/L = micrograms per liter.

[c] <5 indicates that the analyte was not detected above the method detection limit indicated.

[d] J indicates that the analyte was detected at a concentration above the method detection limit but below the reporting limit resulting in an estimated value.

TABLE 4.6
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER
NSA MID-SOUTH LONGTERM MONITORING PROGRAM
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Stratigraphic Interval[b]	Date	PCE[a] (µg/L)[c]	TCE[a] (µg/L)	1,2-DCE[a] (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	1,1,1-TCA[a] (µg/L)	1,1-DCA[a] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Bromochloro -methane (µg/L)	Dichlorofuoro -methane (µg/L)	Acetone (µg/L)	Benzene (µg/L)	Semi-Volatiles BEHP[a] (µg/L)	Semi-Volatiles TPH-DRO[a] (µg/L)
PERMANENT MONITORING WELLS																		
007G12LF	LF	Mar-96	ND[d]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Aug-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA[e]	NA
		May-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Aug-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Jul-00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Aug-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
007G13LF	LF	Mar-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2J[f]	ND
		Apr-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Jul-00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Aug-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
007G14LF	LF	Mar-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8J	ND
		Aug-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Jul-00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Aug-01	ND	0.28J	0.32J*[g]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.15J	ND	ND
007G15UF	UF	Mar-96	ND	840	20J*	280	ND	ND	48J	ND	20J	70	ND	ND	ND	7J	1J	160
		Aug-96	ND	800	22J*	290	ND	ND	43J	ND	19J	63	ND	ND	ND	6J	NA	NA
		Apr-97	ND	600D[h]	20*	380D	ND	ND	67	ND	14	44	ND	ND	ND	6.6	NA	NA
		Nov-97	0.8J	580D	18*	320	ND	ND	51	ND	9.8	30	ND	ND	93	4.6J	NA	NA
		Aug-98	0.58J	580D	19*	320D	ND	ND	64	ND	4.3J	17	ND	ND	ND	4.6J	NA	NA
		Jul-00	ND	400D	ND	310D	ND	ND	51	ND	4J	10	ND	ND	ND	3J	ND	ND
		Aug-01	ND	580	15*	430	ND	ND	70	ND	8.9	22	ND	ND	ND	4.4	ND	ND
007G15LF	LF	Mar-96	ND	ND	ND	ND	ND	ND	ND	ND	20	5J	ND	ND	ND	ND	14	110
		Aug-96	ND	13	ND	6J	ND	ND	2J	ND	26	10	ND	ND	ND	ND	NA	NA
		Apr-97	ND	12	ND	6.3	ND	ND	ND	ND	27	7.4	ND	ND	ND	ND	NA	NA
		Nov-97	1.1J	12	ND	ND	ND	ND	ND	ND	2.8J	2.7J	ND	ND	ND	ND	NA	NA
		Aug-98	ND	6.5	ND	3.9J	ND	ND	ND	ND	15	5.6	ND	ND	ND	ND	NA	NA
		Jul-00	ND	11	ND	7	ND	ND	ND	ND	24J	7	ND	ND	ND	ND	NA	NA
		Aug-01	ND	3.2	ND	3.1	ND	ND	1.2	ND	22	5.1	ND	ND	ND	ND	NA	NA
007G24MF	MF	Aug-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Jul-00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Aug-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
007G25MF	MF	Aug-98	ND	18	ND	2.9J	ND	ND	ND	ND	ND	2.0J	ND	ND	ND	ND	NA	NA
		Nov-98	ND	13J	ND	2J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Jul-00	ND	27	ND	ND	ND	ND	ND	ND	ND	2J	ND	ND	ND	ND	NA	NA
		Aug-01	ND	25	0.65J	3.4	ND	ND	ND	ND	1.5	2.9	ND	ND	ND	ND	NA	NA
007G26MF	MF	Aug-98	ND	1.8J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-98	ND	4J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Jul-00	ND	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Aug-01	ND	2.8	ND	0.73J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA

TABLE 4.6 (Continued)
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER
NSA MID-SOUTH LONGTERM MONITORING PROGRAM
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Stratigraphic Interval[b]	Date	PCE[a] (µg/L)[c]	TCE[a] (µg/L)	1,2-DCE[a] (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	1,1,1-TCA[a] (µg/L)	1,1-DCA[a] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Bromochloro -methane (µg/L)	Dichlorofuoro -methane (µg/L)	Acetone (µg/L)	Benzene (µg/L)	Semi-Volatiles BEHP[a] (µg/L)	Semi-Volatiles TPH-DRO[a] (µg/L)
007G49LF	UF (58')	Jun-99	ND	2J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	MF (63')	Jun-99	ND	2J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8J	ND	NA	NA
	MF (68')	Jun-99	ND	2J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	MF (73')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6J	ND	NA	NA
	LF (78')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF (83')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF (88')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF (93')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF	Jul-00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF	Aug-01	ND	0.82J	ND	ND	ND	ND	ND	ND	0.44J	ND	ND	ND	ND	ND	NA	NA
TEMPORARY MONITORING POINTS																		
7-34	UF (45')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-35	UF (49')	Nov-95	ND	117	9.92	80	ND	ND	ND	44.2	10.3	ND	31.9	ND	ND	ND	NA	NA
7-36	MF (58')	Nov-95	ND	ND	28	ND	ND	ND	ND	ND	ND	ND	ND	6.1	ND	ND	NA	NA
7-37	MF (60')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-49	LF (34')	Nov-95	ND	8.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-50	MF (61')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-51	UF (54')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-52	UF (52')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-53	MF (64')	Feb-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-54	MF (58')	Feb-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-68	UF (48')	Feb-97	ND	2.6	ND	3.2	ND	ND	1.9	ND	ND	ND	ND	ND	200	ND	NA	NA
	UF (53')	Feb-97	ND	3.7	ND	5.1	ND	ND	2.7	ND	ND	ND	ND	ND	50.9J	ND	NA	NA
	MF (58')	Feb-97	ND	1.6J	ND	4.3	ND	ND	2.4	ND	ND	ND	ND	ND	1380	ND	NA	NA
	MF (64')	Feb-97	ND	ND	ND	2.0J	ND	ND	ND	ND	17.4	27.7	ND	ND	562	ND	NA	NA
	MF (69')	Feb-97	ND	1.2J	ND	2.3J	ND	ND	ND	ND	23.2	22.4	ND	ND	ND	ND	NA	NA
	LF (73')	Feb-97	ND	8.2	5.6	ND	ND	ND	ND	ND	15.2	23.3	ND	ND	ND	ND	NA	NA
	LF (78')	Feb-97	ND	6.4	5.12	ND	ND	ND	ND	ND	6.5	8.1	ND	ND	ND	ND	NA	NA
	LF (83')	Feb-97	ND	1.3J	ND	ND	ND	ND	ND	ND	1.3J	4.1J	ND	ND	594	ND	NA	NA
	LF (88')	Feb-97	ND	ND	ND	ND	ND	ND	ND	ND	1.4J	3.9J	ND	ND	ND	ND	NA	NA
7-69	MF (60')	Feb-97	ND	1160	29.2	183	ND	ND	36.5	ND	199	180	ND	ND	ND	5.1	NA	NA
	LF (90')	Feb-97	ND	1.6J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-70	UF (46')	Feb-97	ND	16.9	ND	10.7	ND	ND	3.2J	ND	ND	1.9J	ND	ND	ND	ND	NA	NA
	MF (68')	Feb-97	ND	190	ND	4.3J	ND	ND	ND	ND	ND	47.4	ND	ND	ND	ND	NA	NA
	LF (88')	Feb-97	ND	38.9	ND	1.0J	ND	ND	ND	ND	3.5J	11.3	ND	ND	ND	ND	NA	NA
7-71	UF (46')	Feb-97	ND	ND	ND	ND	ND	ND	1.7J	ND	ND	ND	ND	ND	1020	ND	NA	NA
	MF (68')	Feb-97	ND	422	ND	2.7	ND	ND	ND	ND	121	60.8	ND	ND	ND	ND	NA	NA
	LF (88')	Feb-97	ND	14	ND	2.6	ND	ND	ND	ND	34.3	15.9	ND	ND	ND	ND	NA	NA
7-72	UF (46')	Feb-97	ND	16.1	ND	8.7	ND	ND	4.1	ND	ND	ND	ND	ND	ND	ND	NA	NA
	MF (68')	Feb-97	ND	122	ND	1.6J	ND	ND	ND	ND	10.3	30.6	ND	ND	ND	ND	NA	NA
	LF (90')	Feb-97	ND	8.7	ND	2.1J	ND	ND	ND	ND	28.5	21.1	ND	ND	197	ND	NA	NA
7-73	MF (68')	Feb-97	ND	15.3	ND	ND	ND	ND	ND	ND	ND	2.1J	ND	ND	164	ND	NA	NA
	LF (90')	Feb-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	44J	ND	NA	NA
7-74	MF (68')	Feb-97	ND	47.4	ND	1.4J	ND	ND	ND	ND	ND	4.3J	ND	ND	ND	ND	NA	NA
	LF (91')	Feb-97	ND	1.2J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	33J	ND	NA	NA
7-79	MF (67')	Feb-97	ND	61.2	ND	10.2	ND	ND	3.5J	ND	ND	7.2	ND	ND	ND	ND	NA	NA
7-80	MF (66')	Feb-97	ND	26.2	ND	14.2	ND	ND	ND	ND	ND	3.3J	ND	ND	ND	ND	NA	NA
	LF (87')	Feb-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA

[a] PCE = tetrachloroethene; TCE = trichloroethene; DCE = dichloroethene; TCA = trichloroethane; DCA = dichloroethane; BEHP = bis(2-ethylhexyl)phthalate; TPH-DRO = total petroleum hydrocarbons - diesel range organics.

[b] UF = upper fluvial deposits; MF = middle fluvial deposits; LF = lower fluvial deposits.

[c] µg/L = micrograms per liter.

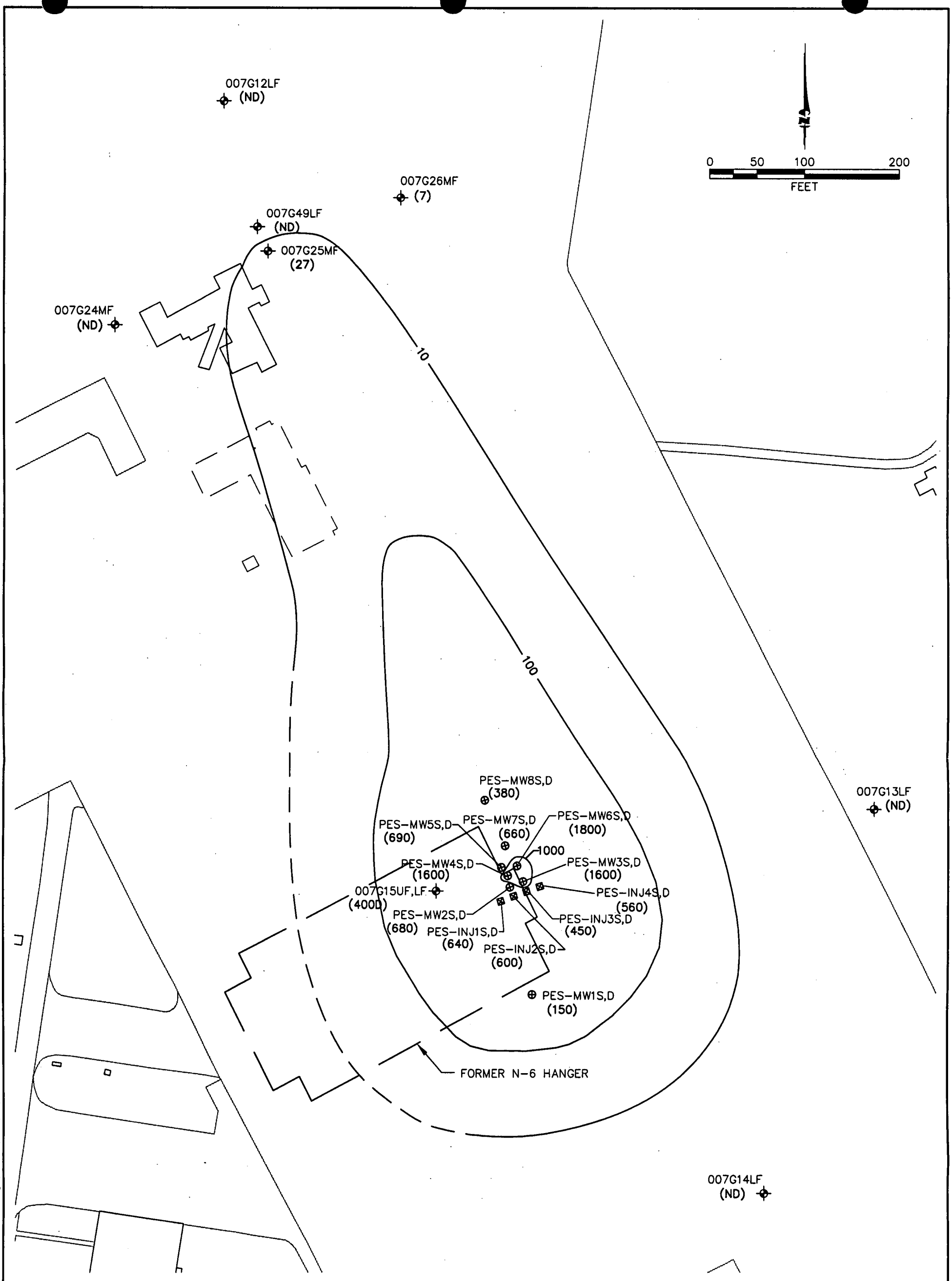
[d] ND = not detected.

[e] NA = not analyzed.

[f] J indicates that the analyte was detected at a concentration above the method detection limit but below the reporting limit resulting in an estimated value.

[g] * = total *cis*- and *trans*-1,2-DCE.

[h] D = data qualifier indicates analysis of diluted sample.



LEGEND

007G14LF
- WELL SAMPLE AND WELL NUMBER
- INJECTION WELL PAIR AND NUMBER
- MONITORING WELL PAIR AND NUMBER
UF - UPPER FLUVIAL DEPOSITS WELL
LF - LOWER FLUVIAL DEPOSITS WELL
(380) - MAXIMUM TCE CONCENTRATION IN GROUNDWATER (µg/L)

ND - NOT DETECTED
D - INDICATES SAMPLE WAS DILUTED FOR ANALYSIS
100 - LINE OF EQUAL TCE CONCENTRATION (µg/L)

NOTE: THE MAXIMUM TCE CONCENTRATION IS POSTED AND CONTOURED AT LOCATIONS WITH PAIRED SCREEN INTERVALS.

FIGURE 4.3

MAXIMUM TCE CONCENTRATION IN GROUNDWATER JULY/AUGUST 2000 (PRE-INJECTION)

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

S:\ES\REMED\737490\05000\FIGURES\TECHMEMO2\01DN0386.dwg (FIG 4.3), 04/17/02 AML

4.4 POST-INJECTION PROFILE OF CHLORINATED ALIPHATIC HYDROCARBONS

4.4.1 Chlorinated Ethenes Over Time

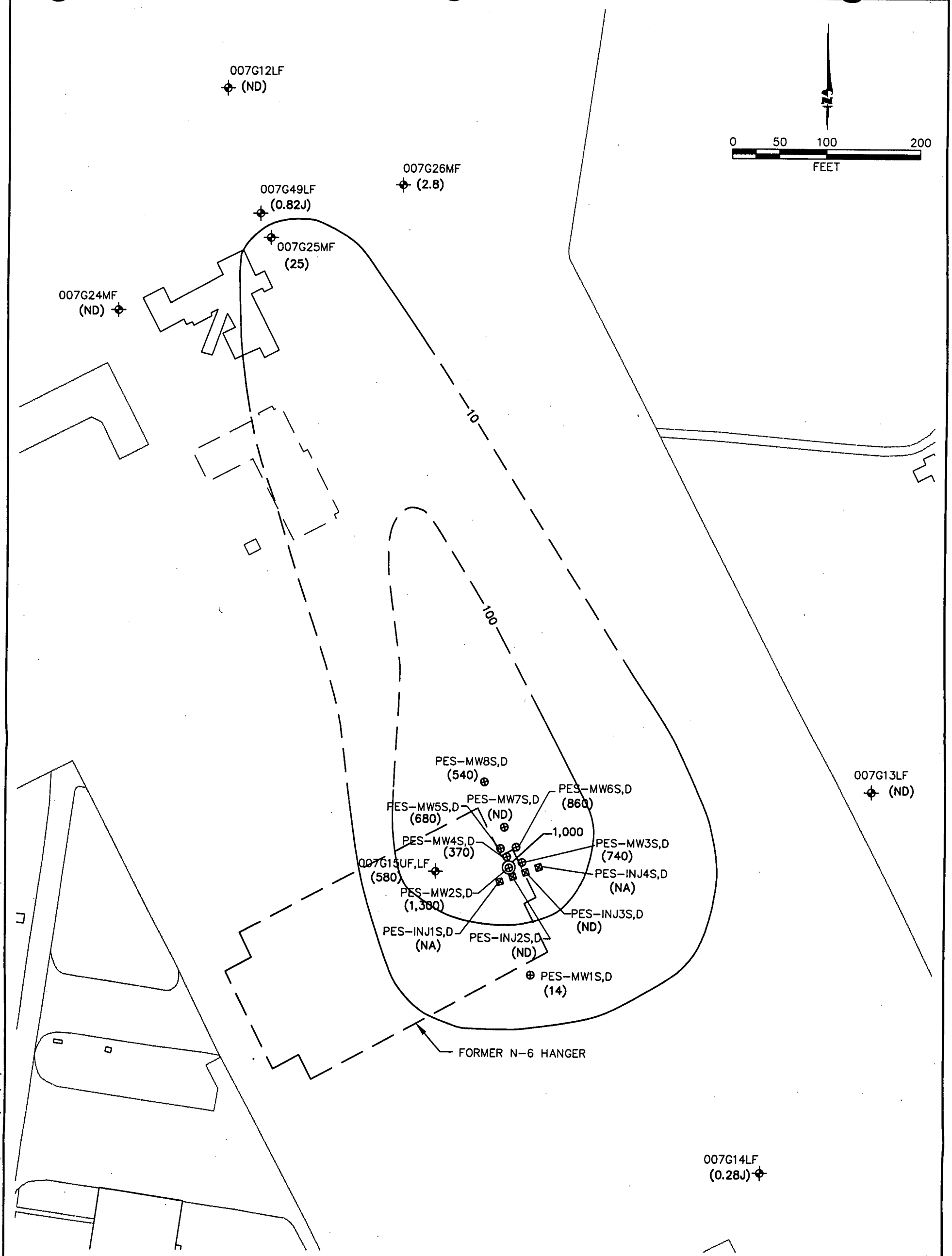
Reductions in contaminant concentrations and changing molar fractions [i.e., declining mass fraction of TCE and increasing mass fraction of daughter products such as *cis*-1,2-DCE] of dissolved constituents over time can be indicative of biodegradation. Figures 4.3 and 4.4 show the distribution of TCE (maximum concentration plotted for each well pair) for pre-injection conditions (July/August 2000) and for post-injection conditions at 12 months following injection (July/August 2001), respectively. The overall plume appears to be stable, with slightly lower concentrations of TCE in July/August 2002.

Figures 4.5 and 4.6 plot concentrations of TCE and *cis*-1,2-DCE, respectively, over time in both upper and lower fluvial deposits monitoring wells. The maximum pre-injection concentration of TCE was 1,800 µg/L at location PES-MW6S, while the maximum TCE concentration measured in January 2002 was 1,200 µg/L at locations PES-MW2S and PES-MW6S. The maximum pre-injection concentration of *cis*-1,2-DCE was 34 µg/L at location PES-MW1S, while the maximum *cis*-1,2-DCE concentration measured in January 2002 was 250 µg/L at location PES-MW2S. VC was not detected at concentrations above the MDL at any of the monitoring locations during baseline sampling or process monitoring sampling events. The lack of measurable concentrations of VC in the monitoring wells indicates that either VC is not being generated, or that VC is being degraded as fast as it is generated.

Contaminant concentrations measured in the injection wells show a dramatic decline over time. The maximum concentrations of TCE measured for the injection wells was 640 µg/L at PES-INJ1S and 600 µg/L at PES-INJ2S. By January 2002, TCE was below detection limits for all samples collected from the injection wells (PES-INJ2S, PES-INJ2D, and PES-INJ4S). Concentrations of TCE and other CAHs likely attenuated more quickly than inferred by the January 2002 data. For example, concentrations of TCE and 1,1-DCE at injection well location PES-INJ2D decreased from 140 µg/L and 40 µg/L in August 2002 (pre-injection) to an estimated concentration of 2.1J µg/L and to less than 5 µg/L in November 2000, respectively. Without a measurable increase in concentrations *cis*-1,2-DCE, VC, or ethene at the injection well locations, it cannot be determined whether the decrease in contaminant concentration was due to biodegradation or due to partitioning into the vegetable oil.

While there is an overall reduction in the maximum concentration of TCE detected over time, a decreasing trend in TCE concentration is not uniform for all wells. For example, an overall increase in TCE concentration from July 2000 (pre-injection) to January 2002 was observed for wells PES-MW2S, PES-MW3D, PES-MW5D, PES-MW6S, PES-MW7D, PES-MW8S, PES-MW8D, and 007G15UF.

For locations that do show a reduction in TCE concentration, it is not readily apparent whether the observed decreases are a result of biodegradation, natural variations in contaminant concentrations, or partitioning of contaminant mass into the vegetable oil NAPL. However, an increase in *cis*-1,2-DCE concentrations detected in the many of the monitoring wells indicates that the reduction on TCE concentrations may be a result of enhanced biodegradation.



LEGEND

007G14LF
- WELL SAMPLE AND WELL NUMBER

- INJECTION WELL PAIR AND NUMBER

- MONITORING WELL PAIR AND NUMBER

UF - UPPER FLUVIAL DEPOSITS WELL

LF - LOWER FLUVIAL DEPOSITS WELL

(680) - MAXIMUM TCE CONCENTRATION IN GROUNDWATER (µg/L)

ND - NOT DETECTED

NA - NOT ANALYZED

J - ESTIMATED

100 - LINE OF EQUAL TCE CONCENTRATION (µg/L)

NOTE: THE MAXIMUM TCE CONCENTRATION IS POSTED AND CONTOURED AT LOCATIONS WITH PAIRED SCREEN INTERVALS.

FIGURE 4.4

MAXIMUM TCE CONCENTRATION IN GROUNDWATER JULY/AUGUST 2001 (POST-INJECTION)

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

S:\ES\REMED\737490\05000\FIGURES\TECHMEMO2\01DN0387a.dwg (FIG 4.4), 04/17/02 AML

FIGURE 4.5A
CONCENTRATIONS OF TCE IN UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

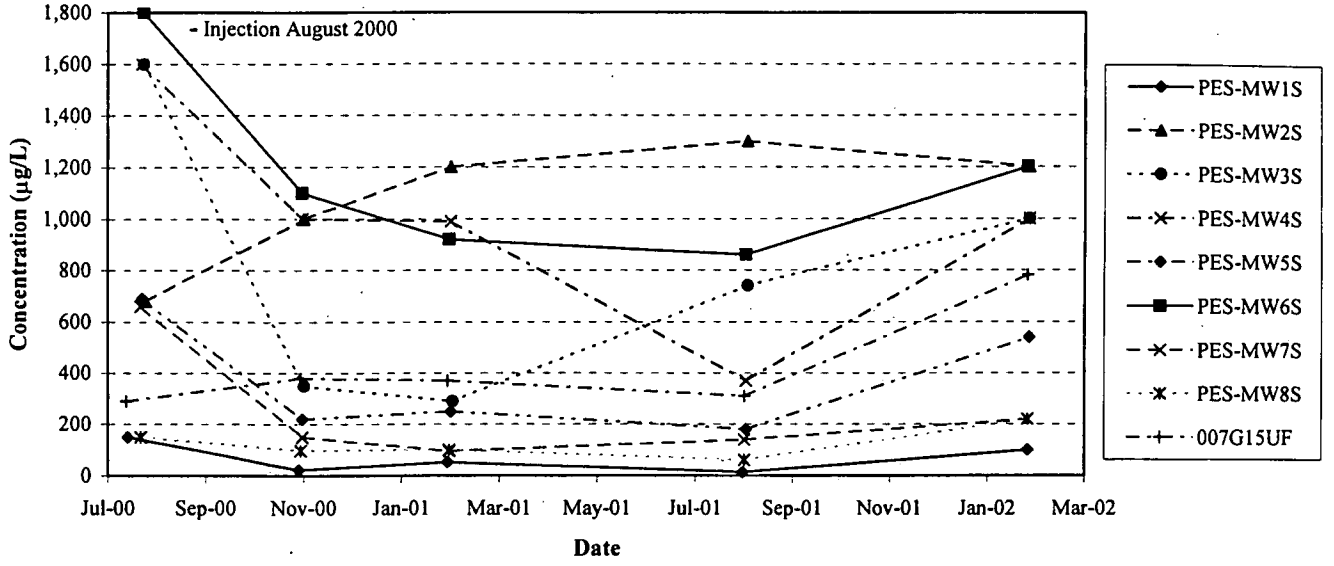


FIGURE 4.5B
CONCENTRATIONS OF TCE IN LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

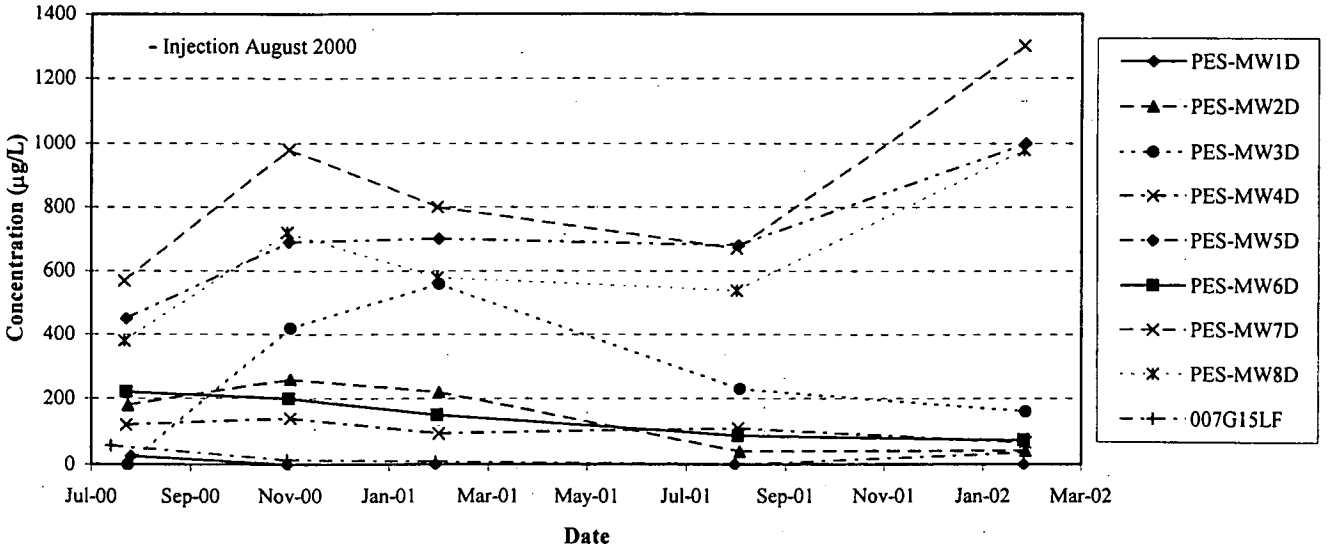


FIGURE 4.6A
CONCENTRATIONS OF cis-1,2-DCE IN UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

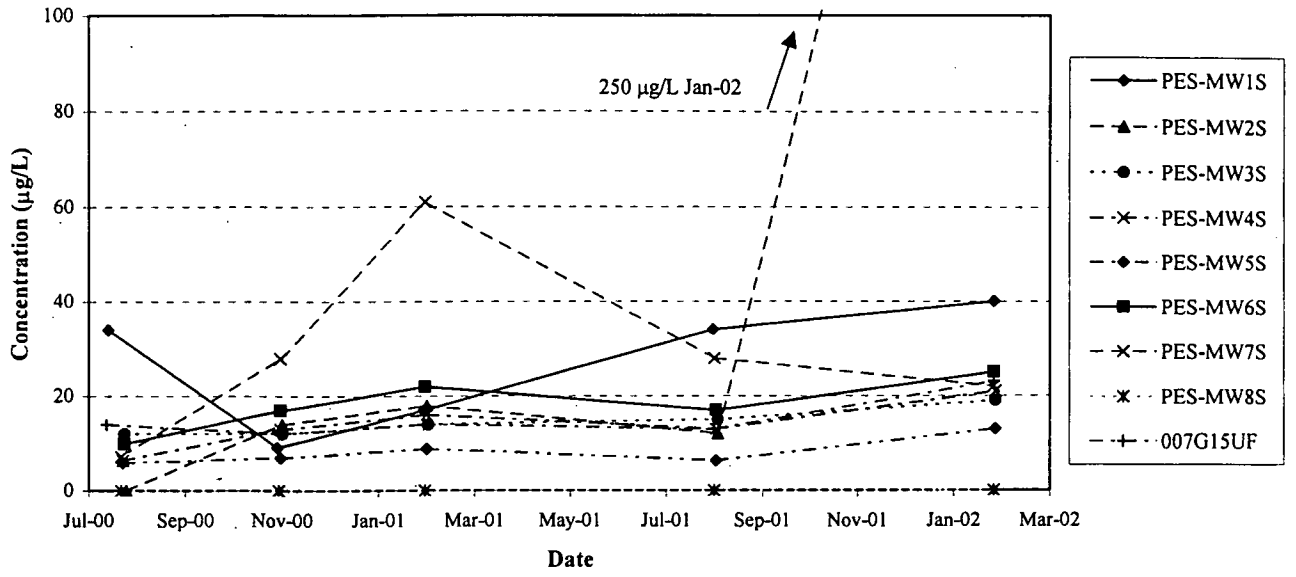
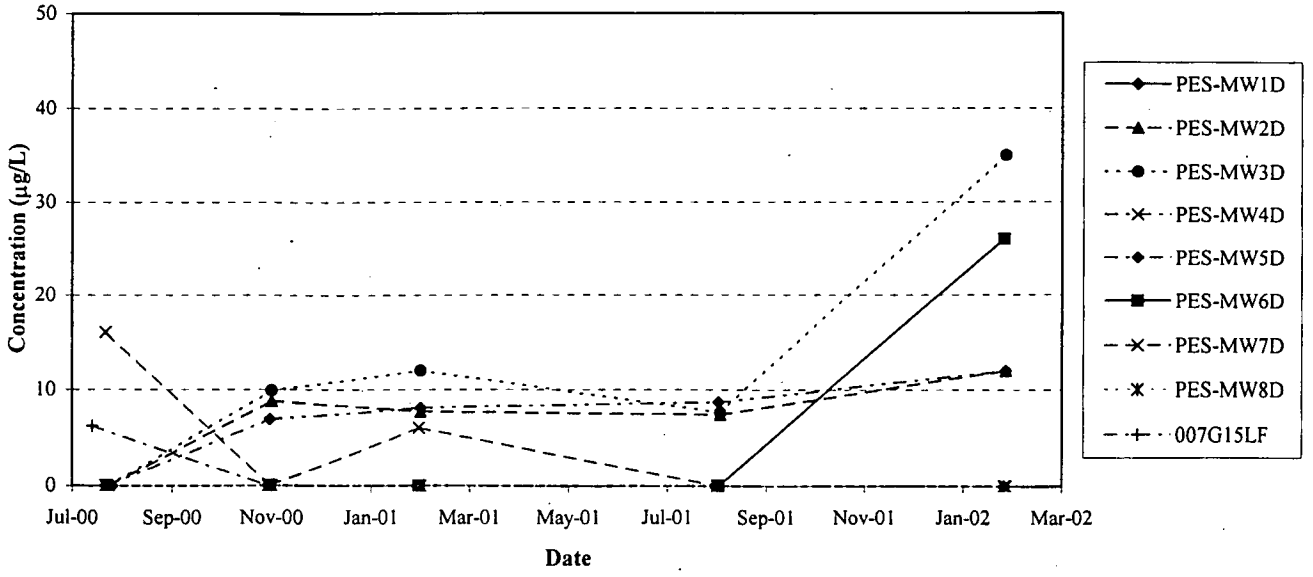


FIGURE 4.6B
CONCENTRATIONS OF cis-1,2-DCE IN LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



The change in concentrations of VOCs in the injection wells is substantial. Difficulties were encountered sampling the injection wells due to the continual presence of vegetable oil. Therefore, not all the proposed injection sampling locations were sampled during every event. VOCs were not detected in injection wells PES-INJ2S, PES-INJ2D, and PES-INJ4 for samples collected in January 2002. In August 2001, the only VOC detected in injection wells sampled (PES-INJ2D and PES-INJ3D) was chloroethane at a concentration of 12 µg/L at well PES-INJ3D. A lack of daughter products and a lack of ethene or ethane end products suggests that the attenuation in VOCs in the injection wells is due to partitioning within the vegetable oil. Detection limits for oil samples collected from the injection wells are elevated due to matrix interferences (Table 4.4), and the extent of VOCs in oil cannot be determined with current analytical procedures.

4.4.2 Presence of Daughter Products and CAH Ratios

The presence of daughter products that were not used in Base operations, particularly *cis*-1,2-DCE, ethene, and ethane provides strong evidence that PCE and TCE have been and/or are being reductively dechlorinated at this site. Progressive transformation of PCE and TCE to ethene can be indicated by computing the molar ratio of parent compounds to daughter products at a specific location. For example, because reductive dechlorination proceeds in only one direction (i.e., TCE to *cis*-1,2-DCE and not vice versa), the molar ratio of TCE to *cis*-1,2-DCE would decrease where reductive dechlorination of TCE dominates the contaminant attenuation process. Similarly, the sequential reduction of 1,1-DCA to chloroethane to ethane, and the sequential reduction of CT to chloroform to methylene chloride to chloromethane, also would indicate progressive transformation by reductive dechlorination.

Chlorinated ethene concentration plots and molar fraction plots over time for all monitoring well locations sampled in January 2002 are included in Appendix C. The following discussion includes an evaluation of chlorinated ethene data for select monitoring locations at the site.

Changes in contaminant concentrations and molar fractions over the first 18 months of the vegetable oil injection field test exhibit highly variable trends and are not uniformly indicative of enhanced biodegradation. In fact, contaminant concentrations in some wells increased from pre-injection concentrations, likely as a result of displacement from the injection event or due to natural temporal variations in contaminant concentrations.

The initial response to the vegetable injection was pronounced at several monitoring locations. Figures 4.7 and 4.8 present plots of concentration over time and of molar fractions over time for wells PES-MW1S and PES-MW3S, respectively. For these two locations, the concentration of TCE decreased substantially after injection as measured in November 2000. However, concentrations of TCE at location PES-MW3S increased over the past three monitoring events. Concentrations of TCE at location PES-MW1S are variable, but also have increased for the last monitoring event. An initial increase in *cis*-1,2-DCE and ethene suggest that reductive dechlorination was initially stimulated, but that the process was not sustained. A similar trend in contaminant concentrations was also observed at monitoring location PES-MW7S (Appendix C).

FIGURE 4.7A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW1S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

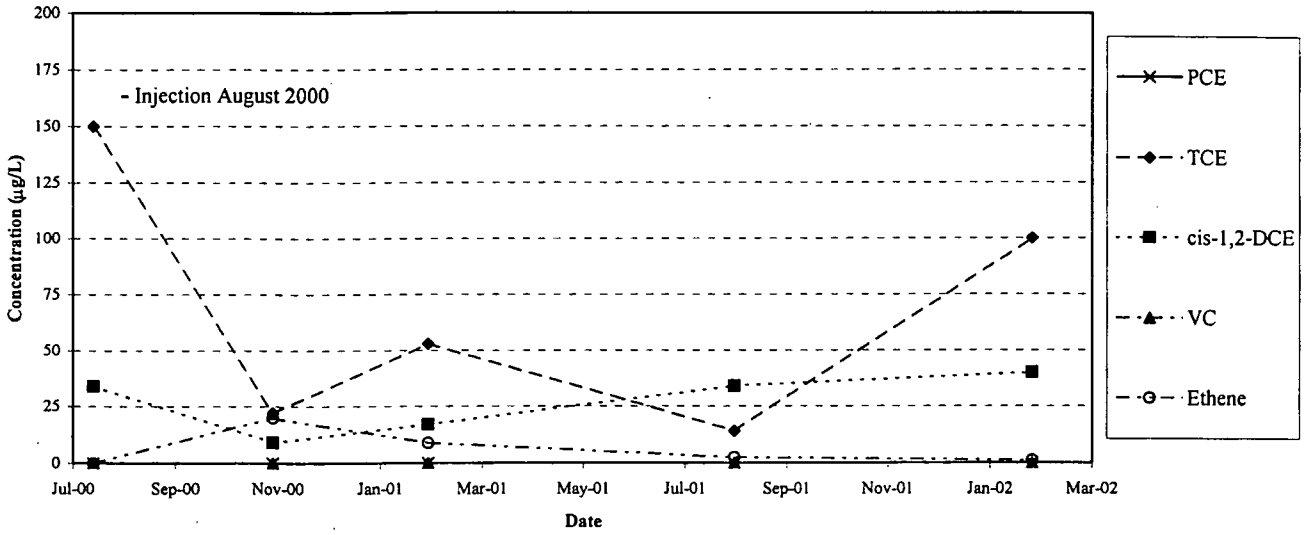


FIGURE 4.7B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW1S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

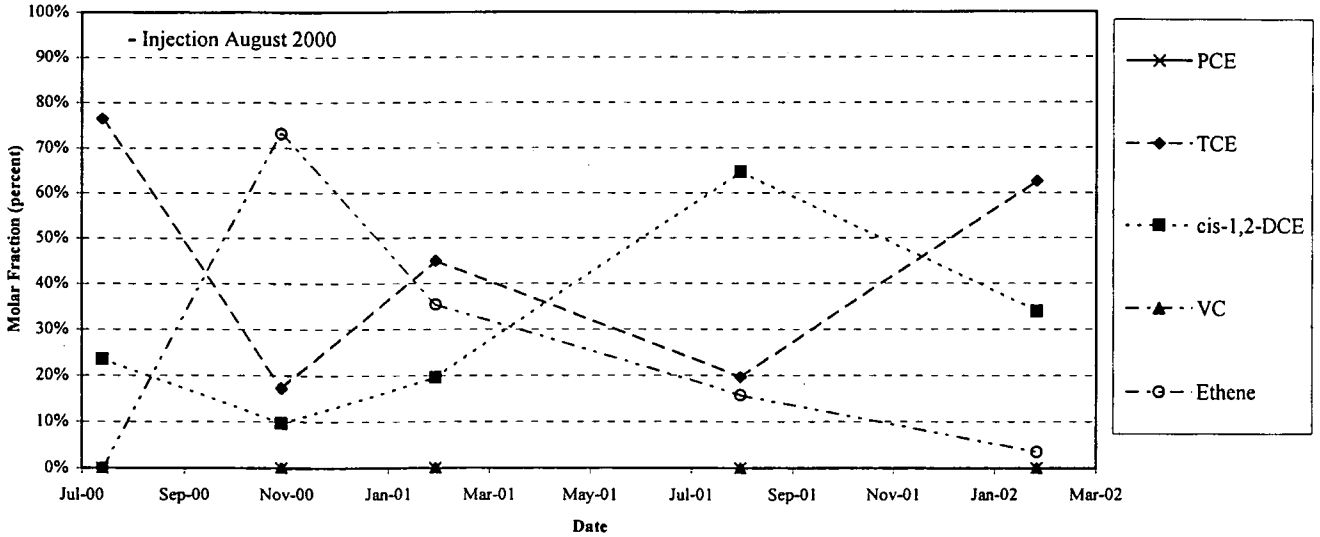


FIGURE 4.8A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW3S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

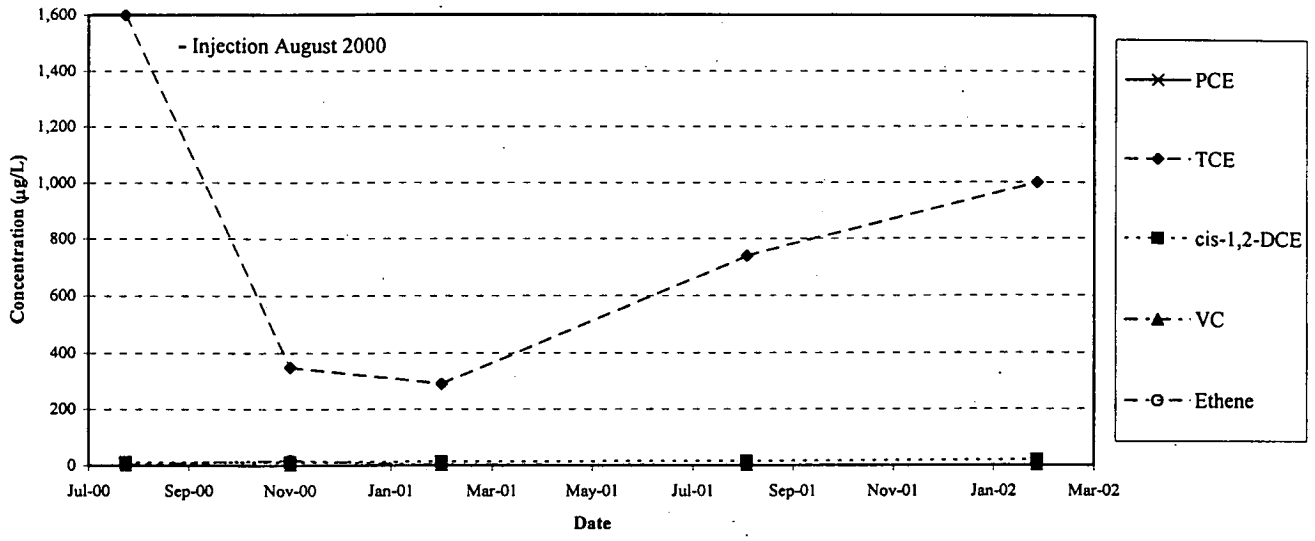
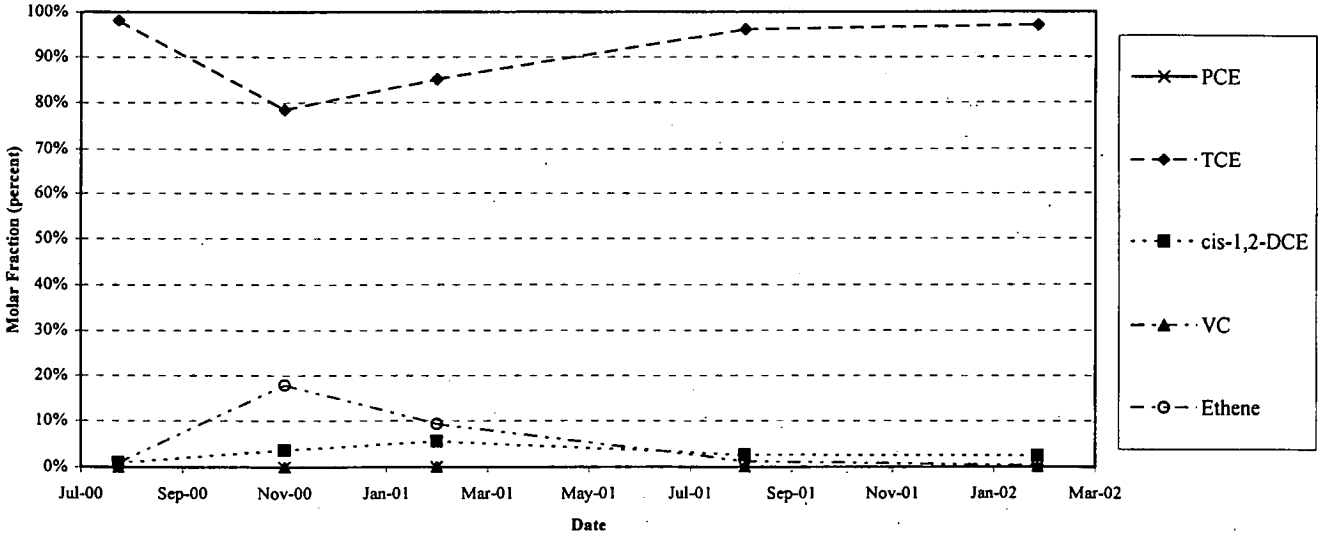


FIGURE 4.8B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW3S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



Based on the ratio of the molar fraction of the parent compound TCE to the daughter products, *cis*-1,2-DCE, VC, and ethene in these wells, biodegradation may have been stimulated by vegetable oil injection. Although concentrations of VC were not detected, concentration and molar fraction of both *cis*-1,2-DCE and ethene increased at PES-MW1S, PES-MW3S, and PES-MW7S between the baseline sampling event in August 2000 and the first monitoring event in November 2000. These trends were not expected at monitoring locations PES-MW1S and PES-MW7S because they are located 100 and 50 feet from the injection locations, respectively. It is possible that these locations were impacted when the injection caused radial groundwater flow due to displacement and a temporary mounding of the groundwater potentiometric surface. Thus, the injection caused a temporary reversal in groundwater flow direction between the injection area and upgradient location PES-MW1S.

It is difficult to distinguish whether the initial changes in contaminant concentrations at these locations are due to stimulation of reductive dechlorination, or whether the initial changes were simply caused by displacement with groundwater of differing contaminant concentrations. In either event, as the groundwater system re-equilibrated and the regional groundwater flow direction was resumed, the effects of the injection at PES-MW1S and PES-MW7S are apparently rebounding toward pre-injection (i.e., baseline) conditions. While well PES-MW3S is much closer to the injection wells, it also shows the same initial changes indicative of reductive dechlorination, followed by a subsequent trend towards baseline conditions.

Figures 4.9 through 4.12 present plots of concentration over time and of molar fractions over time for wells PES-MW2S, PES-MW2D, PES-MW3D, and PES-MW6D, respectively. Concentrations of TCE at locations PES-MW2S, PES-MW2D, and PES-MW3D all initially increased after the vegetable oil injection, but by the last monitoring event in January 2002 the trends in TCE concentrations reversed and began to decrease. The concentration of TCE at location PES-MW6D decreased consistently for each monitoring event after the injection event. What is more notable is a measurable increase in concentration and molar fraction of *cis*-1,2-DCE between the last two monitoring events from August 2001 to January 2002. Molar fractions of *cis*-1,2-DCE for locations PES-MW2S, PES-MW3D, and PES-MW6D increased from less than 5 percent to greater than 20 percent between these two sampling events. The molar fraction of *cis*-1,2-DCE at location PES-MW2D similarly increased over the period from February 2001 to January 2002.

These data suggest that reductive dechlorination of TCE to *cis*-1,2-DCE has been stimulated sporadically across the site, although a significant lag period (12 to 18 months) was required for this to be observed. Furthermore, it is not known whether subsequent degradation of *cis*-1,2-DCE is occurring. A significant increase in VC or ethene has not been observed at these locations, suggesting that reduction of *cis*-1,2-DCE is not occurring. However, *cis*-1,2-DCE or VC can potentially be oxidized under nitrate- or iron-reducing conditions with no generation of ethene, but this is difficult to ascertain.

In summary, while trends in chlorinated ethene concentrations tended to vary from sampling event to sampling event, chlorinated ethene data indicate an overall reduction of maximum contaminant concentrations. Based on contaminant trend analysis alone, it is difficult to determine whether this reduction is due to biodegradation, partitioning of dissolved contaminants into the vegetable oil NAPL, lateral spreading of contaminants

FIGURE 4.9A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW2S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

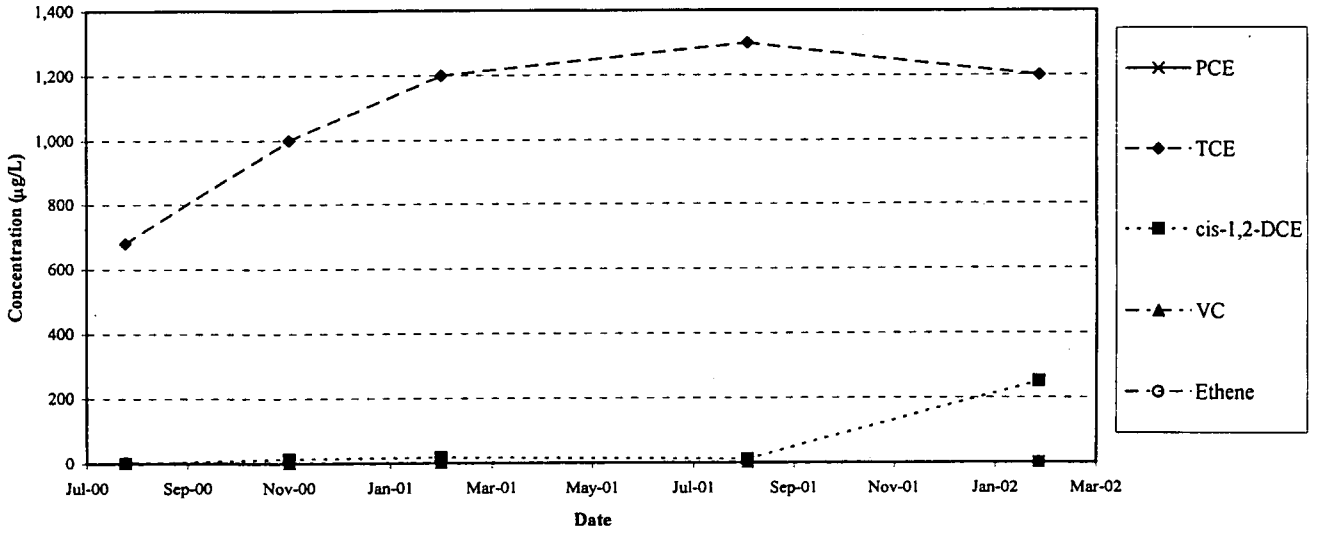


FIGURE 4.9B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW2S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

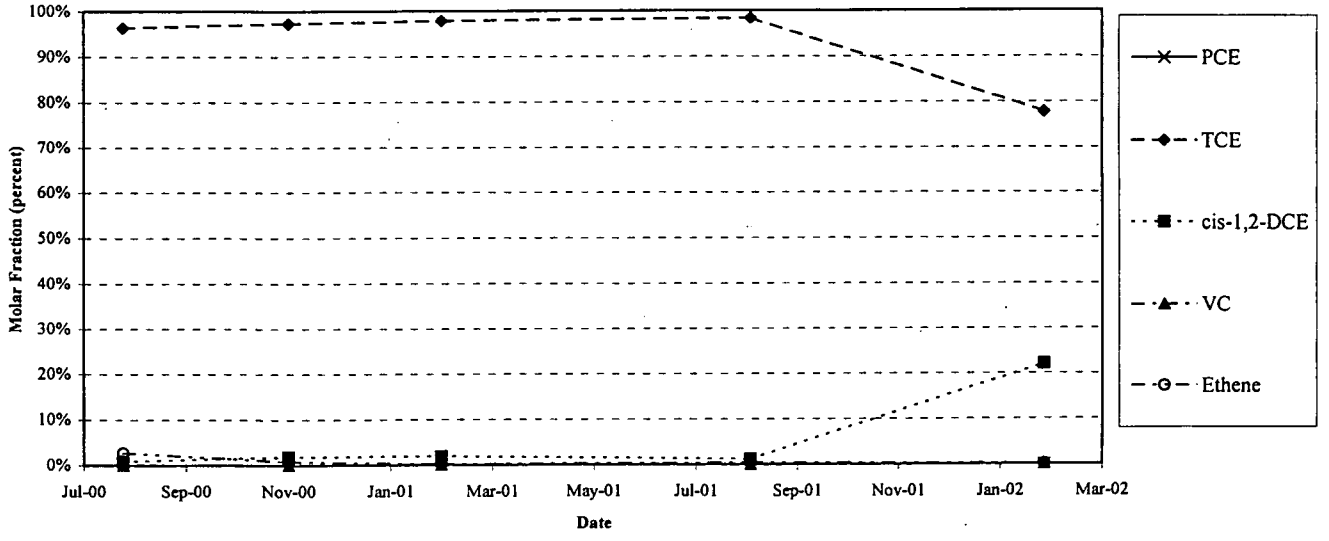


FIGURE 4.10A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW2D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

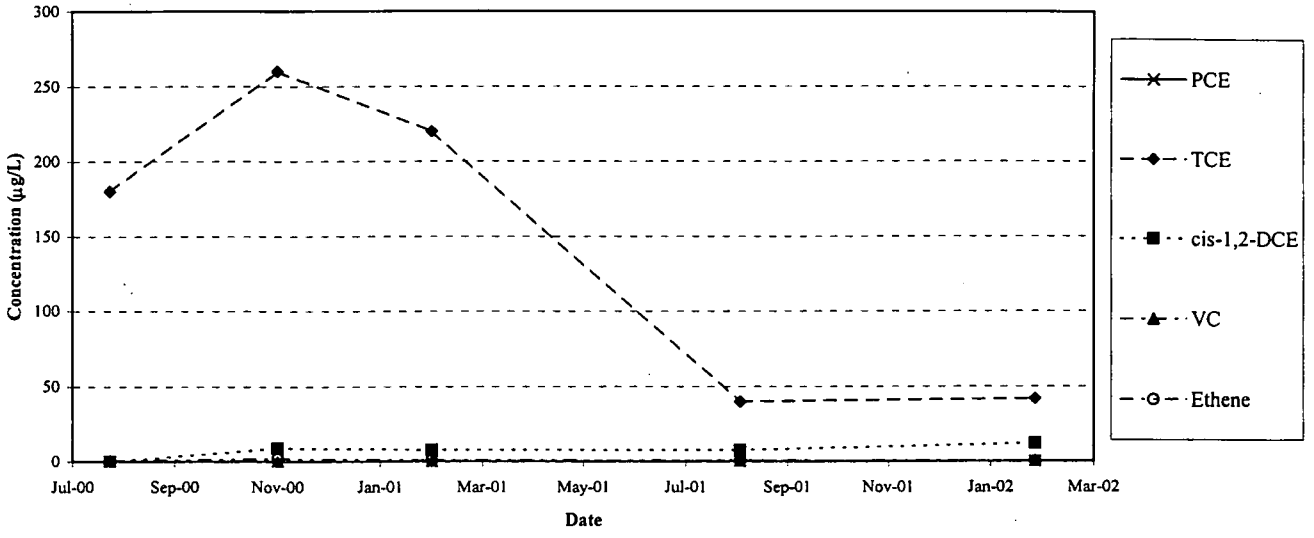


FIGURE 4.10B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW2D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

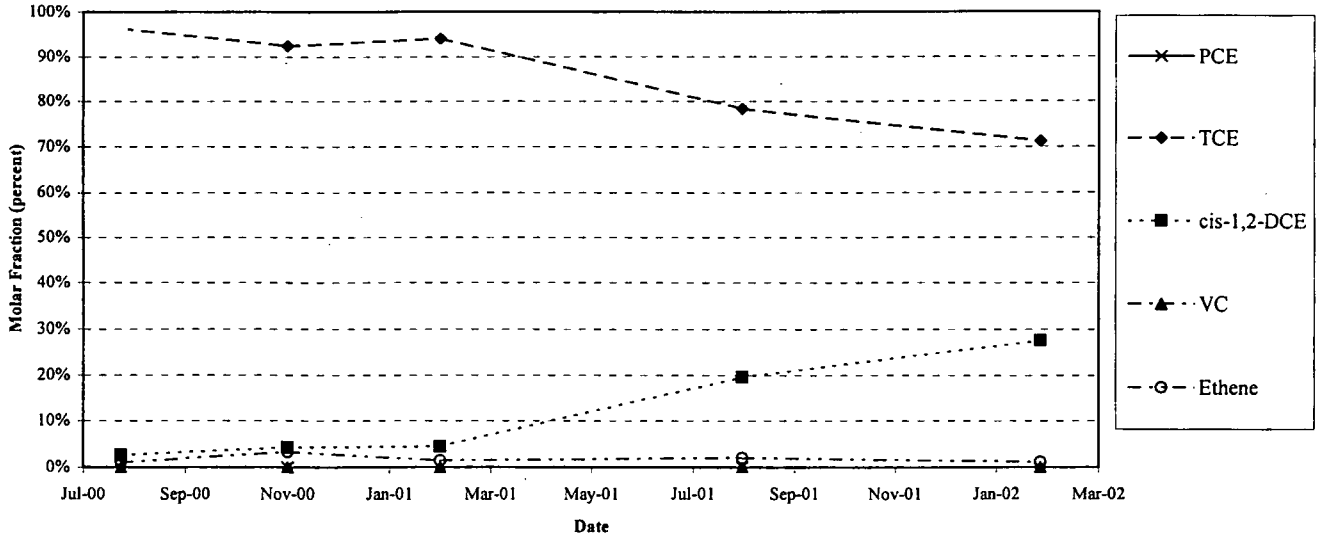


FIGURE 4.11A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW3D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

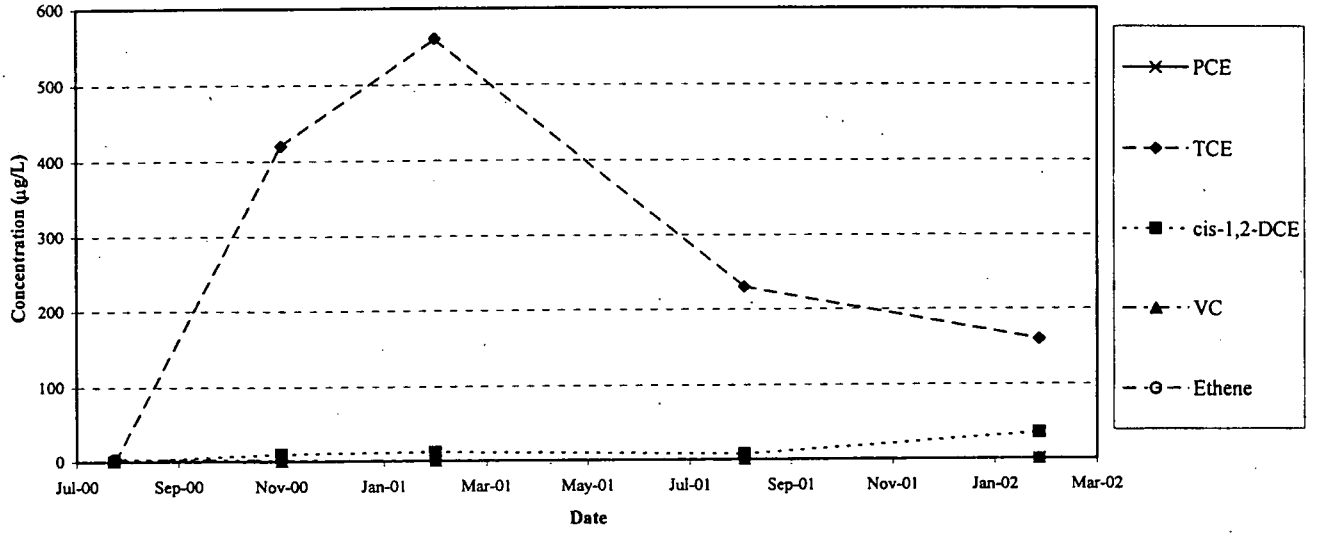


FIGURE 4.11B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW3D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

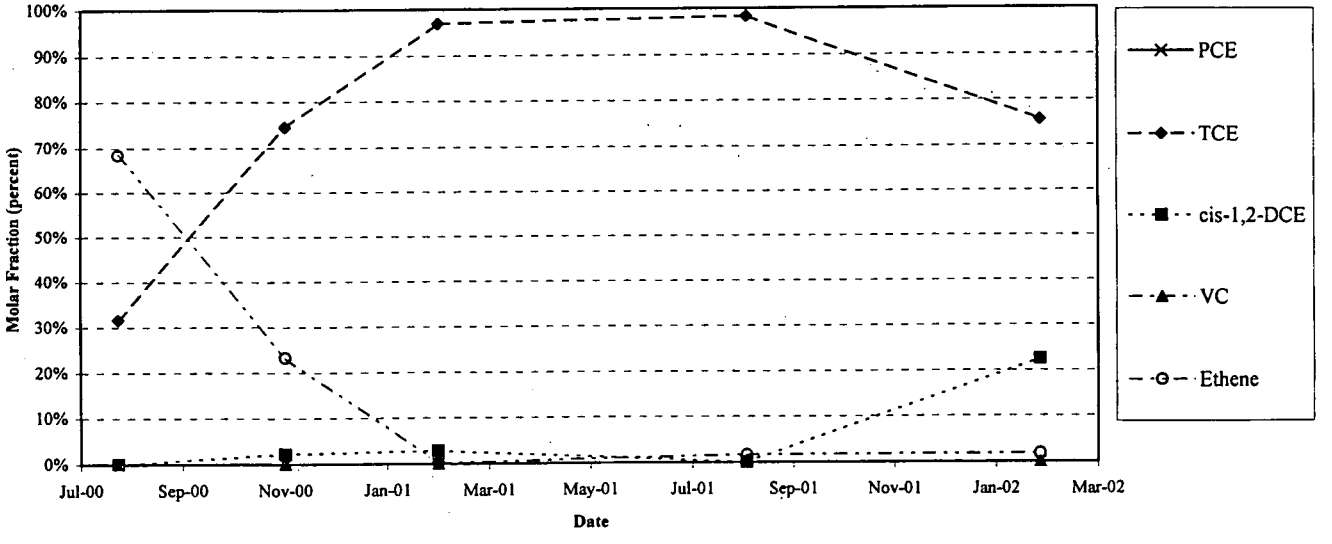


FIGURE 4.12A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW6D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

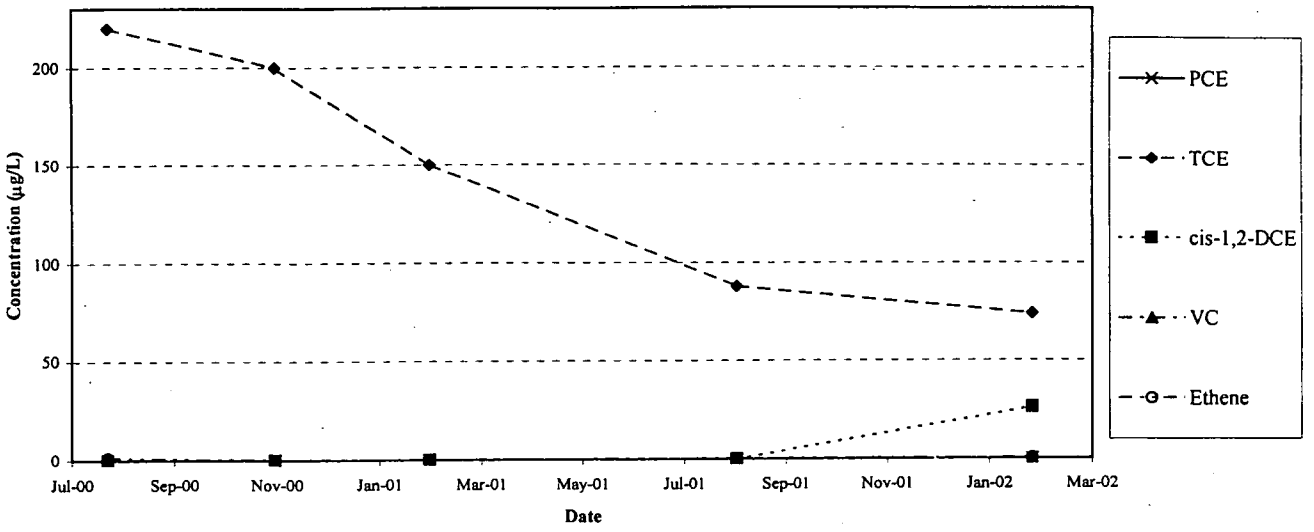
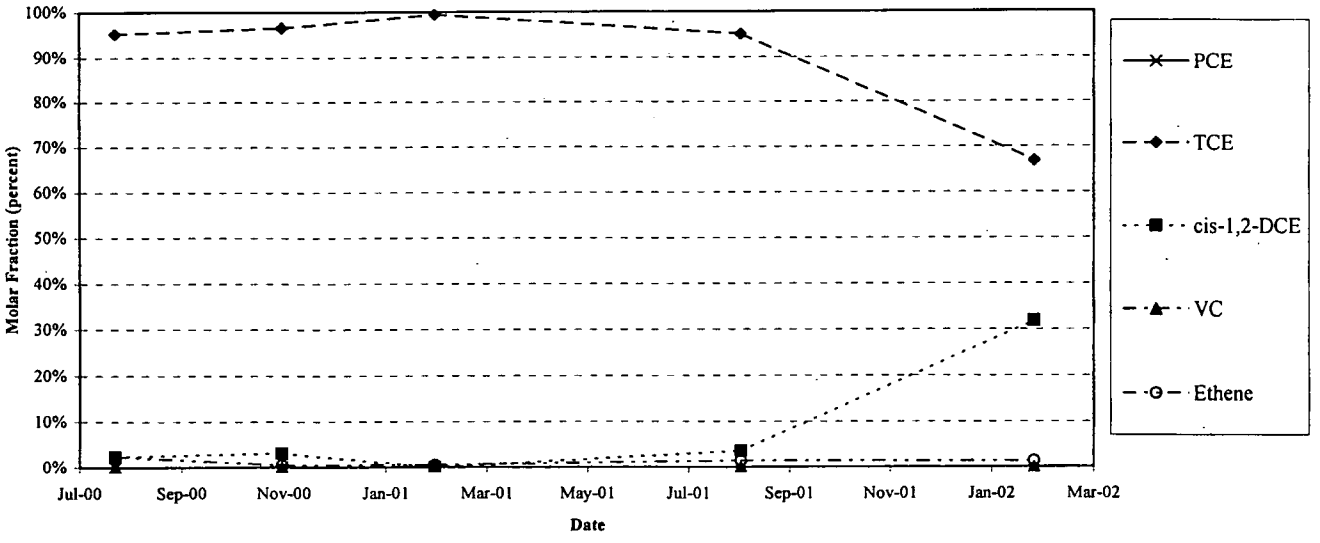


FIGURE 4.12B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW6D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



due to injection, or natural temporal variations in contaminant concentrations. Injection of vegetable oil induced a mounding of the groundwater potentiometric surface, which may have caused some lateral spreading of contaminants in groundwater and caused upgradient location PES-MW1S/D to be impacted by the vegetable oil injection. Historical concentration data from cross gradient wells 007G15UF and 007G15LF show natural fluctuation in chlorinated ethene concentrations, suggesting that some changes in contaminant concentration within the study area may be due to natural or seasonal variation in groundwater conditions. Changes in concentration and molar fraction of TCE and *cis*-1,2-DCE between August 2001 and January 2002 indicate that reductive dechlorination has occurred at several locations, but only after a lag period of 12 to 18 months. Other supporting evidence of enhanced biodegradation, including geochemical changes, are discussed later in this section.

4.4.3 Chlorinated Aliphatic Hydrocarbons In Oil

In addition to CAHs in groundwater, CAH concentrations in oil also were analyzed for in samples collected from locations PES-INJ2S and PES-INJ2D (November 2000 through January 2002), PES-INJ3S and PES-INJ3D (November 2000 through August 2001), and PES-INJ4S (January 2002) (Table 4.5). Unfortunately, the analyte specific MDLs for VOCs in vegetable oil (250 to 5,000 µg/L) are elevated due to interference of the vegetable oil sample matrix and the dilutions required for calibration. The only chlorinated ethene detected in oil was TCE at an estimated concentration of 170J µg/L in the November 2000 sample from injection well PES-INJ2S.

Therefore, it is not possible to determine to what extent CAHs are partitioning out of groundwater and into the vegetable oil. However, a significant decrease in CAH concentrations in groundwater has been observed over time in samples collected from injection wells PES-INJ2S, PES-INJ2D, PES-INJ3S, PES-INJ3D, and PES-INJ4S. This decreasing trend in CAH concentrations in groundwater in the injection wells suggests that CAHs are partitioning out of groundwater and into the vegetable oil and/or that VOCs in groundwater are being biodegraded.

4.5 SUBSTRATE ADDITION

Addition of vegetable oil as an organic substrate provides a source of carbon for microbial growth. Analytical evaluation of TOC, VFAs, and PLFAs provides an indication of the extent to which groundwater has been impacted by addition of the vegetable oil, and data relevant to determining whether microbial growth has been stimulated.

4.5.1 Total Organic Carbon as an Indicator of Substrate Addition and Zone of Influence

Groundwater samples were collected from select wells during baseline sampling and process monitoring to determine the migration of dissolved vegetable oil (by measuring TOC), and to track migration of the water push that followed the oil injection (bromide). These parameters are used to determine the approximate zone of influence of the vegetable oil injection in the fluvial deposits aquifer. Analytical results for TOC and bromide in groundwater are presented in Table 4.7.

Baseline concentrations of TOC were below the method detection limit of 5 mg/L, and baseline concentrations of bromide were below the method detection limit of 2 mg/L. Following injection, elevated concentrations of TOC (i.e., greater than 5 mg/L) were observed at monitoring well locations PES-MW2S, PES-MW2D, PES-MW3D, PES-MW6D, PES-MW7S, PES-MW8S (Table 4.7). The highest levels of TOC were measured in January 2002 with 600 mg/L at PES-MW2D and 260 mg/L at PES-MW3D. Prior to January 2002 the highest concentration of TOC measured for monitoring well locations was 24 mg/L at PES-MW2S in November 2000 and 62 mg/L at PES-MW3D in August 2001. These values are relatively low compared to TOC measured in groundwater samples collected from the injection wells, which ranged from 1,200 mg/L to 2,400 mg/L (Table 4.7).

TOC data indicate that the zone of influence of the vegetable oil injection is limited primarily to the area of wells PES-MW2S, PES-MW2D, and PES-MW3D, which are located only 10 feet from the injection wells. However, the slightly elevated levels of TOC at wells PES-MW6D (9.9 mg/L), PES-MW7S (9.2 mg/L), and PES-MW8S (7.6 mg/L) suggest the presence of preferential flow paths within the fluvial deposits between the injection area and these monitoring wells located 30 to 100 feet downgradient. It also is possible that the levels of TOC at these three wells are a result of natural variation.

Elevated concentrations of bromide (greater than a detection limit of 2 mg/L) have not been detected at any downgradient monitoring well location during process monitoring sample analysis. Bromide was detected in only one injection well at a concentration of 18 mg/L at PES-INJ3D in February 2001. Only 100 gallons of water push with a bromide concentration of approximately 100 mg/L was injected into each injection well. Because bromide has not been detected downgradient from the injection wells, it does not appear the water push has migrated a measurable distance downgradient.

4.5.2 Biomass and Volatile Fatty Acids

A total of 13 samples (including one duplicate) were collected from 12 locations during the January 2002 process monitoring event and sent to Microbial Insights, Inc. for analyses of biomass (by PLFA analysis) and VFAs. The results of these analyses are summarized on Table 4.8, and the analytical report is included in Appendix A.

Biomass is estimated as the total amount of PLFA content and provides a quantitative measure of the viable microbial biomass present. Elevated concentrations of biomass are an indicator of enhanced microbial activity. Biomass estimates were elevated in injection wells PES-INJ2S, PES-INJ2D, and PES-INJ4S, and in monitoring wells PES-MW2S, PES-MW2D, and PES-MW3D. The magnitude of the biomass estimates in these wells were 1 to 2 orders of magnitude greater than background wells 007G15UF and 007G15LF, indicating that microbial activity has been stimulated in the immediate vicinity of the vegetable oil injection locations.

VFAs (or metabolic acids) are microbial degradation byproducts and are also a quantitative indicator of microbial activity. Furthermore, these primary degradation products are further utilized as fermentation products, which can produce hydrogen for potential reductive dechlorination. VFA analyses indicate that the primary metabolic byproducts of the degradation of soybean oil in injection wells PES-INJ2S, PES-INJ2D, and PES-INJ4S is acetic, propionic, and butyric acids. Lower levels of these acids were

TABLE 4.7
SUMMARY OF GROUNDWATER GEOCHEMICAL DATA
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Sample Date	Methane (µg/L)[a]	Ethane (µg/L)	Ethene (µg/L)	TOC[b] (mg/L)[c]	Total Inorganic Carbon (mg/L)	Dissolved Oxygen (mg/L)	Nitrate + Nitrite (mg/L)	Ferrous Iron (mg/L)	Manganese (mg/L)	Sulfate (mg/L)	Hydrogen Sulfide (mg/L)	Total Alkalinity (mg/L)	Carbon Dioxide (mg/L)	Chloride (mg/L)	Bromide (mg/L)	Redox Potential (mV)[d]	pH (SU)[e]	Temperature (°C)[f]	Specific Conductivity (µs/cm)[g]
MONITORING WELLS																				
PES-MW1S	25-Jul-00	0.2	0.007	0.016	NA[h]	NA	3.4	0.029J[i]	<0.01[j]	3.3	4	0.16	112	49	5.0	NA	148	6.83	30.1	251
	7-Nov-00	430	55.0	20.0	NA	NA	0.3	0.011J	2.5	3.1	<1	0.03	84	32	2.1	NA	-163	7.33	22.7	210
	6-Feb-01	990	19.0	8.90	NA	NA	0.2	0.003J	4.8	4.8	<1	0.02	167	76	6.7	NA	-100	6.88	23.3	315
	6-Aug-01	770	6.00	2.40	NA	NA	0.5	0.086	16	7.7	<1	<0.01	179	92	26	NA	-141	6.48	28.0	350
	29-Jan-02	460	1.90	1.20	2.7J	NA	2.3	0.050J	12.15	7.7	27	0.07	136	124	87	<2.0	-47	6.40	21.2	215
PES-MW1D	6-Aug-00	19	8.06	3.43	NA	NA	0.3	0.079	3.3	0.6	<1	0.02	84	67	3.0	NA	-260	6.72	24.2	179
	8-Nov-00	56	0.720	0.420	NA	NA	0.3	0.047J	6.1	0.3	<1	0.06	87	82	NA	NA	-41	6.34	21.9	140
	6-Feb-01	82	0.085	0.150	NA	NA	0.3	0.300	2.8	<0.1	<1	0.09	76	76	2.0	NA	56	5.77	21.5	143
	6-Aug-01	30	0.054	0.420	NA	NA	1.0	0.120	0.58	<0.1	<1	<0.01	52	54	2.0	NA	63	5.80	27.6	114
	29-Jan-02	2.2	0.015	<0.005	1.8J	NA	2.1	0.130	0.36	<0.1	<1	0.07	63	82	3	<2.0	71	5.92	20.7	88
PES-MW2S	5-Aug-00	37	5.35	4.14	<5.0	NA	0.4	1.00	0.82	1.6	<1	0.01	122	87	15	<2.0	-322	6.71	25.2	319
	10-Nov-00	35	0.750	1.70	24	NA	0.3	0.200	0.57	0.2	<1	0.20	158	109	4.6	<2.0	-126	6.47	19.8	279
	8-Feb-01	40	0.210	0.530	<2.0	NA	0.4	0.039J	0.60	0.1	1	0.15	172	225	14	<2.0	-48	6.80	23.5	335
	9-Aug-01	58	0.260	1.20	6.3	NA	1.0	0.360	1.3	0.5	2	0.05	163	84	5.6	<2.0	-32	6.25	29.4	216
	30-Jan-02	570	0.160	0.360	13	710	0.4	0.160	4.5	1.2	<1	0.02	152	242	6	<2.0	-67	6.57	21.1	342
PES-MW2D	4-Aug-00	35	0.994	0.436	<5.0	NA	0.3	0.600	0.76	1.0	<1	0.02	81	121	6.2	<2.0	-15	6.26	23.5	201
	10-Nov-00	17	2.70	2.00	<2.0	NA	0.3	0.077	0.62	<0.1	<1	0.39	105	51	3.9	<2.0	46	6.42	16.7	223
	8-Feb-01	62	0.560	0.750	15	NA	0.2	0.061	8.8	2.3	26	0.42	158	180	NA	<2.0	-216	6.79	23.4	343
	9-Aug-01	640	0.220	0.550	8	NA	0.1	0.180	3.5	1.1	<1	0.06	131	86	4	<2.0	-90	6.21	24.9	175
	30-Jan-02	2,500	0.046	0.150	600	500	0.4	0.130	6.9	1.9	<1	0.21	147	200	6	<2.0	-91	6.57	20.8	245
PES-MW3S	4-Aug-00	37	4.55	2.90	<5.0	NA	1.4	0.087	0.71	2.4	5	0.13	130	130	8.4	<2.0	194	6.54	24.0	313
	10-Nov-00	130	17.0	17.0	<2.0	NA	0.3	<0.050	9.7	9.9	<1	0.07	187	77	2.0	<2.0	-134	6.90	21.3	380
	9-Feb-01	110	2.60	6.80	<2.0	NA	0.3	0.002J	16	7.6	<1	0.01	293	315	6.0	<2.0	-80	6.77	20.4	534
	9-Aug-01	910	0.450	2.10	<5.0	NA	0.7	0.060	11	3.7	<1	<0.01	202	190	5.5	<2.0	-96	6.27	29.6	278
	30-Jan-02	1,900	0.140	0.770	2.8J	850	0.9	0.050J	9.20	3.4	<1	0.01	148	384	11	<2.0	-59	6.38	21.8	321
PES-MW3D	4-Aug-00	8.6	3.54	2.08	<5.0	NA	1.3	0.330	0.79	0.9	<1	0.05	95	62	5.0	<2.0	3	6.67	23.5	224
	10-Nov-00	12	1.30	28.0	<2.0	NA	1.2	1.80	0.30	0.9	5	0.34	110	82	12	<2.0	89	6.69	16.6	200
	8-Feb-01	2.0	0.340	0.270	<2.0	NA	1.6	1.20	0.33	<0.1	1	0.08	106	90	20	<2.0	13	7.00	22.9	318
	9-Aug-01	650	0.540	0.830	62	NA	0.8	0.23	8.45	7.0	<1	0.04	177	168	4	<2.0	-124	6.53	28.9	328
	30-Jan-02	13,000	0.120	0.860	260	NA	0.7	0.050J	16.50	29.2	<1	0.02	178	458	9	<2.0	-110	6.53	21.2	702
PES-MW4S	3-Aug-00	30	7.63	4.82	<5.0	NA	1.2	0.470	1.06	2.4	<1	0.03	135	77	17	NA	-270	6.66	25.0	340
	9-Nov-00	52	1.80	4.00	<2.0	NA	0.3	0.066	2.13	0.7	<1	0.14	169	115	8	<2.0	-19	6.37	21.6	306
	8-Feb-01	70	0.370	1.10	<2.0	NA	0.2	0.057	3.00	0.3	<1	NA	160	112	10	<2.0	-2	6.51	24.2	348
	8-Aug-01	55	0.170	0.590	<5.0	NA	1.0	<0.050	1.07	NA	<1	<0.01	159	125	9	<2.0	-13	6.04	31.0	282
	30-Jan-02	74	0.170	0.220	2.6J	NA	0.7	0.080	0.15	0.2	<1	0.06	129	223	18	<2.0	4	6.39	21.2	272

TABLE 4.7 (Continued)
SUMMARY OF GROUNDWATER GEOCHEMICAL DATA
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Sample Date	Methane (µg/L)[a]	Ethane (µg/L)	Ethene (µg/L)	TOC [b] (mg/L) [c]	Total Inorganic Carbon (mg/L)	Dissolved Oxygen (mg/L)	Nitrate + Nitrite (mg/L)	Ferrous Iron (mg/L)	Manganese (mg/L)	Sulfate (mg/L)	Hydrogen Sulfide (mg/L)	Total Alkalinity (mg/L)	Carbon Dioxide (mg/L)	Chloride (mg/L)	Bromide (mg/L)	Redox Potential (mV)[d]	pH (SU)[e]	Temperature (°C) [f]	Specific Conductivity (µs/cm) [g]
PES-MW4D	3-Aug-00	8.0	2.44	1.25	<5.0	NA	0.7	0.410	0.39	4.4	<1	0.02	90	80	5	NA	-203	6.41	25.0	224
	10-Nov-00	1.6	0.420	0.200	<2.0	NA	0.5	0.470	0.59	0.6	<1	0.17	95	71	9	<2.0	90	6.41	20.4	205
	8-Feb-01	2.0	0.190	0.210	<2.0	NA	0.3	1.10	0.97	<0.1	<1	<0.01	90	91	9	<2.0	26	6.70	22..1	217
	8-Aug-01	4.9	0.170	0.700	<5.0	NA	1.1	1.50	1.38	NA	<1	0.02	98	64	10	<2.0	36	6.01	30.1	176
	30-Jan-02	46	0.068	0.150	3.1J	NA	0.9	0.690	2.05	0.9	<1	0.19	93	132	6	<2.0	-20	6.40	21.0	178
PES-MW5S	3-Aug-00	50	5.18	3.75	<5.0	NA	1.3	0.110	1.68	1.5	<1	0.02	183	111	8	NA	-250	6.71	25.4	415
	9-Nov-00	58	5.10	7.80	<2.0	NA	0.3	0.004J	11.20	3.4	<1	0.01	203	86	3	<2.0	-149	6.68	20.8	367
	8-Feb-01	65	0.980	0.980	3.2	NA	0.4	0.008J	8.36	2.3	2	0.04	280	182	10	<2.0	-75	6.60	19.9	494
	8-Aug-01	79	0.220	1.50	<5.0	NA	0.8	0.084	4.50	NA	<1	0.30	268	124	7	<2.0	-106	6.41	26.5	464
	30-Jan-02	100	0.110	0.780	2.0	NA	0.7	0.060	3.85	1.2	<1	0.02	239	252	8	<2.0	-87	6.73	21.0	417
PES-MW5D	3-Aug-00	8.3	2.60	1.63	2.7J	NA	0.8	1.70	0.23	3.5	<1	0.10	123	16	70	NA	-92	6.86	22.5	338
	9-Nov-00	13	3.60	2.70	<2.0	NA	0.2	0.810	0.01	0.4	<1	0.02	159	57	15	<2.0	91	6.64	20.3	281
	8-Feb-01	17	1.10	2.20	<2.0	NA	0.3	1.20	0.12	0.6	<1	0.06	145	76	18	<2.0	106	6.49	21.5	378
	8-Aug-01	19	0.470	1.10	<5.0	NA	0.4	1.70	<0.01	NA	<1	<0.01	140	68	20	<2.0	45	6.37	24.8	319
	30-Jan-02	25	0.250	0.290	2.1J	NA	1.2	1.70	<0.01	0.2	<1	0.01	137	128	20	<2.0	124	6.56	20.6	304
PES-MW6S	4-Aug-00	29	4.92	3.44	<5.0	NA	0.8	0.830	0.36	2.4	<1	0.03	156	88	13	NA	253	6.66	22.5	364
	9-Nov-00	58	1.00	2.70	<2.0	NA	0.3	0.180	1.47	0.3	<1	0.13	136	118	6	<2.0	87	6.26	19.3	230
	7-Feb-01	66	0.320	0.810	<2.0	NA	0.4	0.100	0.65	0.3	<1	0.01	141	153	9	<2.0	8	6.75	23.0	304
	8-Aug-01	75	0.140	0.210	<5.0	NA	0.8	0.150	0.10	NA	<1	0.03	158	104	12	<2.0	62	6.08	27.4	265
	29-Jan-02	98	0.140	0.075	2.5J	NA	0.8	0.100	<0.01	0.1	<1	0.04	183	334	9	<2.0	78	6.33	21.0	256
PES-MW6D	3-Aug-00	9.0	2.58	1.20	<5.0	NA	1.2	0.470	1.56	3.4	<1	0.10	103	94	7	NA	-158	6.45	23.6	235
	9-Nov-00	1.6	0.680	0.210	<2.0	NA	1.2	0.700	0.09	1.5	22	0.00	97	71	NA	<2.0	89	6.53	16.4	168
	7-Feb-01	2.2	0.640	0.180	<2.0	NA	1.7	0.710	0.66	0.4	2	0.31	94	149	17	<2.0	1	6.67	22.8	240
	8-Aug-01	4.9	0.330	0.280	<5.0	NA	0.9	0.460	0.38	NA	<1	<0.01	143	68	7	<2.0	10	6.25	28.4	216
	29-Jan-02	730	0.180	0.320	9.9	NA	0.7	0.070	7.55	3.1	<1	<0.01	143	268	6	<2.0	-130	6.82	20.7	269
PES-MW7S	2-Aug-00	72	3.16	2.02	<5.0	NA	1.0	0.064	0.43	1.8	<1	0.10	255	170	3	<2.0	-299	6.67	25.4	508
	9-Nov-00	67	5.60	5.90	<2.0	NA	0.3	<0.050	12.24	4.2	<1	0.04	121	136	NA	<2.0	-116	6.77	24.2	568
	7-Feb-01	68	1.30	3.10	<2.0	NA	0.3	<0.050	9.72	3.3	<1	0.05	334	280	2	<2.0	-59	6.86	21.3	563
	7-Aug-01	80	0.170	1.10	9.2	NA	0.8	0.061	5.85	NA	<1	0.02	338	102	5	<2.0	-112	6.52	26.8	524
	29-Jan-02	71	0.120	0.720	3.1J	950	1.1	0.060	3.45	1.9	<1	0.16	307	365	4	<2.0	-91	6.75	21.3	482
PES-MW7D	2-Aug-00	8.3	3.02	1.97	<5.0	NA	1.1	2.50	1.65	3.5	<1	<0.01	118	54	16	<2.0	-275	6.86	24.9	334
	9-Nov-00	18	0.640	1.50	<2.0	NA	0.3	3.00	0.16	1.1	<1	0.02	151	60	29	<2.0	32	6.70	21.1	345
	7-Feb-01	20	0.360	0.920	<2.0	NA	0.3	2.50	0.13	0.4	<1	0.08	141	67	32	<2.0	-10	7.01	23.3	429
	7-Aug-01	7.0	0.210	0.960	<5.0	NA	1.1	2.30	0.04	NA	<1	<0.01	173	58	26	<2.0	60	6.59	25.7	385
	29-Jan-02	7.9	0.270	0.130	1.9J	NA	1.0	2.40	0.01	0.0	<1	0.02	190	185	23	<2.0	74	6.80	20.8	330

TABLE 4.7 (Continued)
SUMMARY OF GROUNDWATER GEOCHEMICAL DATA
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Sample Date	Methane (µg/L)[a]	Ethane (µg/L)	Ethene (µg/L)	TOC[b] (mg/L)[c]	Total Inorganic Carbon (mg/L)	Dissolved Oxygen (mg/L)	Nitrate + Nitrite (mg/L)	Ferrous Iron (mg/L)	Manganese (mg/L)	Sulfate (mg/L)	Hydrogen Sulfide (mg/L)	Total Alkalinity (mg/L)	Carbon Dioxide (mg/L)	Chloride (mg/L)	Bromide (mg/L)	Redox Potential (mV)[d]	pH (SU)[e]	Temperature (°C)[f]	Specific Conductivity (µs/cm)[g]
PES-MW8S	2-Aug-00	14	2.29	1.47	<5.0	NA	0.5	2.00	2.01	0.2	21	0.10	202	73	21	NA	-323	6.96	24.4	505
	8-Nov-00	67	1.00	2.40	3.4	NA	0.2	0.210	4.52	0.7	<1	0.06	204	74	6	<2.0	-69	6.77	21.6	411
	7-Feb-01	100	0.320	0.790	7.9	NA	0.4	<0.050	3.72	0.0	<1	0.10	317	114	2	<2.0	-52	6.86	21.1	549
	7-Aug-01	110	0.140	0.540	<5.0	NA	0.7	0.064	2.40	NA	29	0.03	151	112	5	<2.0	-112	6.71	27.8	493
	29-Jan-02	84	0.080	0.260	2.3J	NA	1.1	0.150	1.60	0.1	26	0.16	293	129	3	<2.0	-83	7.02	21.0	479
PES-MW8D	2-Aug-00	3.1	1.00	0.402	<5.0	NA	2.2	3.00	1.53	1.9	<1	0.15	127	58	20	NA	-178	6.87	25.5	333
	8-Nov-00	8.2	1.10	1.40	<2.0	NA	0.7	0.320	2.38	0.7	23	0.20	150	142	34	<2.0	-44	6.66	21.9	375
	7-Feb-01	11	0.350	0.860	<2.0	NA	0.3	1.80	0.20	0.2	4	0.03	141	62	27	<2.0	67	6.95	21.5	400
	7-Aug-01	12	0.130	1.10	<5.0	NA	0.8	2.40	0.03	NA	<1	<0.01	156	72	23	<2.0	-1	6.54	25.9	360
	29-Jan-02	7.6	0.038	0.083	2.4J	NA	1.1	5.60	0.26	0.0	2	0.16	131	117	25	<2.0	65	6.72	20.6	315
007G15UF	25-Jul-00	40	0.028	0.097	NA	NA	0.4	0.047J	<0.01	0.1	<1	0.04	171	140	9	NA	40	6.25	28.7	412
	8-Nov-00	32	0.340	0.400	NA	NA	0.3	0.018J	0.09	0.2	1	<0.01	183	162	8	NA	123	6.11	21.1	304
	6-Feb-01	41	0.220	0.094	NA	NA	0.6	0.069	0.13	<0.1	<1	0.09	200	250	NA	NA	96	5.79	22.0	340
	7-Aug-01	18	0.130	0.079	NA	NA	1.4	0.810	<0.01	NA	<1	<0.01	197	118	10	NA	102	6.11	27.0	327
	29-Jan-02	14	0.042	0.039	NA	730	0.9	0.39	<0.01	0.1	<1	0.03	160	290	6	NA	122	6.34	21.3	292
007G15LF	25-Jul-00	13	5.72	5.62	NA	NA	0.7	1.20	<0.01	<0.1	<1	<0.01	122	74	5	NA	186	6.48	21.0	279
	8-Nov-00	0.7	0.150	0.220	NA	NA	0.8	0.120	0.13	0.0	1	0.06	140	57	41	NA	157	7.37	21.8	234
	6-Feb-01	32	0.940	0.240	NA	NA	0.8	1.90	0.85	<0.1	<1	<0.01	116	66	6	NA	80	6.58	19.5	254
	7-Aug-01	4.1	0.094	0.040	NA	NA	1.1	0.85	<0.01	<0.1	<1	<0.01	126	70	3	NA	93	6.27	23.4	228
	29-Jan-02	6.9	0.034	0.029	NA	NA	1.6	1.30	0.75	<0.1	6	0.15	153	171	4	NA	102	6.59	20.3	216
INJECTION WELLS																				
PES-INJ1S	5-Aug-00	46	18.1	10.0	<5.0	NA	0.2	0.260	3.34	8.0	<1	0.02	129	89	13	NA	-359	6.99	26.0	314
PES-INJ1D	5-Aug-00	30	5.78	2.35	<5.0	NA	0.4	0.180	2.96	4.4	<1	0.04	101	90	4	NA	-268	6.49	24.3	227
PES-INJ2S	5-Aug-00	85	5.21	2.91	<5.0	NA	0.3	0.051	2.94	1.3	<1	0.02	150	154	7	<2.0	-272	6.38	23.6	358
	31-Jan-02	2,800	0.320	1.100	1,600	770	5.1	0.060	>99	3.7	<1	0.03	246	700	18	NA	47	5.43	23.6	1,570
PES-INJ2D	5-Aug-00	19	3.70	2.13	<5.0	NA	0.6	0.800	3.50	1.4	1	0.04	101	97	10	<2.0	-144	6.55	23.0	252
	11-Nov-00	NA	NA	NA	NA	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	55	5.17	17.1	1,268
	31-Jan-02	4,000	0.540	1.90	1,200	780	6.1	0.060	60.9	6.9	<1	0.03	63	317	24	<2.0	66	5.30	14.9	1,240
PES-INJ3S	5-Aug-00	18	5.06	3.02	<5.0	NA	0.6	0.360	1.41	4.3	<1	0.09	110	70	NR	<2.0	-265	6.75	22.0	263
PES-INJ3D	5-Aug-00	11	2.46	1.41	<5.0	NA	1.1	0.180	2.83	2.3	<1	0.06	88	110	6	<2.0	-167	6.37	24.2	205
	9-Feb-01	6,200	1.60	1.70	1,200	NA	1.5	0.250	>3	NA	NA	NA	NA	NA	NA	18.0	129	NA	19.3	3
PES-INJ4S	6-Aug-00	108	2.64	1.54	<5.0	NA	0.3	0.090	1.36	2.1	19	0.07	237	126	3	NA	-186	6.61	24.0	481
	31-Jan-02	2,500	0.470	2.80	2,400	NA	4.6	0.050J	>99	3.8	<1	0.29	314	500	15	NA	6	5.58	19.0	2,650
PES-INJ4D	6-Aug-00	7.6	2.09	1.09	<5.0	NA	0.9	0.087	0.47	2.4	1	0.02	110	50	5	NA	-195	6.95	23.2	248

[a] µg/L = micrograms per liter.

[b] TOC = total organic carbon.

[c] mg/L = milligrams per liter.

[d] mV = millivolts.

[e] SU = pH standard units.

[f] °C = degrees Centigrade.

[g] µs/cm = microsiemens per centimeter.

[h] NA = Not analyzed.

[i] J indicates that the analyte was detected at a concentration above the method detection limit but below the reporting limit resulting in an estimated value.

[j] <20 indicates that the analyte was not detected above the referenced method detection limit.

TABLE 4.8
BIOMASS AND VOLATILE FATTY ACIDS IN GROUNDWATER
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Sample Date	Total Biomass (pmoles PLFA/ml)[a/]	Bacterial Biomass (pmoles PLFA/ml)	Eukaryotic Biomass (pmoles PLFA/ml)	Metabolic Acids					
					Pyruvic (mg/L)[b/]	Lactic (mg/L)	Formic (mg/L)	Acetic (mg/L)	Proprionic (mg/L)	Butyric (mg/L)
MONITORING WELLS										
PES-MW1S	29-Jan-02	9	8	1	< 4 [c/]	< 1	< 1	< 1	< 1	< 1
PES-MW2S	30-Jan-02	161	154	7*	< 4	< 1	< 1	10	17	< 1
PES-MW2D	30-Jan-02	51	51	0	< 4	< 1	< 1	10	10	< 1
PES-MW3S	30-Jan-02	2	2	0	< 4	< 1	< 1	< 1	< 1	< 1
PES-MW3S (Dup)	30-Jan-02	3	2	1	< 4	2	< 1	1	< 1	< 1
PES-MW3D	30-Jan-02	65	64	1	< 4	< 1	< 1	140	290	20
PES-MW4S	30-Jan-02	7	7	0	< 4	< 1	< 1	< 1	< 1	< 1
PES-MW7S	29-Jan-02	2	2	0	< 4	< 1	< 1	< 1	< 1	< 1
007G15UF	29-Jan-02	2	2	0	< 4	< 1	< 1	< 1	< 1	< 1
007G15LF	29-Jan-02	3	3	0	< 4	< 1	< 1	< 1	< 1	< 1
INJECTION WELLS										
PES-INJ2S	31-Jan-02	199	94	105*	< 4	< 1	< 1	163	586	305
PES-INJ2D	31-Jan-02	101	41	60*	< 40	< 10	< 10	157	523	200
PES-INJ4S	31-Jan-02	163	67	96*	< 40	< 10	< 10	239	845	713

* indicates that the results are effected by residual fatty acids found in vegetable oil.

[a/] pmoles PLFA/ml = picomoles of phospholopid fatty acid per milliliter of sample.

[b/] mg/L = milligrams per liter.

[c/] "<" indicates that the analyte was below the limit of quantitation.

measured in monitoring wells PES-MW2S, PES-MW2D, and PES-MW3D. These wells correspond to those locations exhibiting elevated biomass estimates.

Based on biomass estimates and VFA measurements, the influence of the vegetable oil injection appears to be limited to the injection wells and monitoring wells PES-MW2S, PES-MW2D, and PES-MW3D. The remainder of the wells sampled for VFA analysis do not contain significant quantities of metabolic acids or biomass. Therefore, these other location may not exhibit reductive dechlorination of CAHs due to the relative absence of microbial activity.

4.5.3 Microbial Community Characterization Results

The microbial communities in groundwater from three injection wells (PES-INJ2S, PES-INJ2D, and PES-INJ4S) and nine monitoring wells (PES-MW1S, PES-MW2S, PES-MW2D, PES-MW3S, PES-MW3D, PES-MW4S, PES-MW7S, 007GL15UF, and 007GL15LF) were characterized by PLFA analysis. In addition, bacterial profiles were obtained for wells PES-INJ2D, PES-MW3S, and PES-MW2D using DGGE analysis. The following discussion is paraphrased in part from a laboratory report prepared by Microbial Insights, Inc. for samples collected from Site N-6. This laboratory report is included in Appendix A.

All samples analyzed for PLFA content contained viable microbial biomass ranging from 10,000 to 1,000,000 cells per milliliter (cells/mL) of water (Appendix A). As discussed in Section 4.5.2, PLFA results indicate that viable biomass concentrations in all three injection wells, as well as monitoring wells PES-MW2S, PES-MW2D, and PES-MW3D, were one to two orders of magnitude higher than biomass concentrations measured in the remaining six monitoring wells. This indicates that microbial populations have been enhanced by the addition of vegetable oil only as far from the injection area as PES-MW2S in the upper fluvial deposits and PES-MW3D in the lower fluvial deposits.

Bacterial profiles provided by the DGGE analysis indicate moderate to highly diverse bacterial communities in wells PES-INJ2D, PES-MW3S, and PES-MW2D. This indicates that microbial population development has been stimulated at these locations by addition of vegetable oil. The bacterial profiles in each of the three wells showed little similarity in deoxyribonucleic acid (DNA) banding patterns suggesting that bacterial populations are widely divergent between monitoring locations.

DGGE analysis of one sample collected from PES-MW3S indicates that the microbial population in groundwater at this location is dominated by five bacterial strains. The first, and most prominent microorganism, is loosely associated with the genus *Desulfurella*. Members of the genus *Desulfurella* are sulfate-reducing bacteria, which are moderately anaerobic bacteria and that use acetate as their primary electron donor. The second most prominent microorganism is loosely associated with the genus *Bacteriodes,* which have recently been identified as organic pollutant degraders (Microbial Insights, Appendix A).

A microorganism loosely related to genus *Geobacter* represents the third most prominent microorganism at PES-MW3S. Members of the genus *Geobacter* are anaerobic, iron-reducing, gram-negative bacteria. Various studies have shown that

bacteria in this genus can remove aromatic hydrocarbons, oxidize organic contaminants, and reduce metals (Microbial Insights, Appendix A). Members of the genus *Geobacter* use a variety of electron donors including hydrogen, formate, acetate, pyruvate, succinate, fumarate, and ethanol.

The fourth most prominent microorganism is loosely associated with the genus *Azoarcus*. Some members of genus *Azoarcus* are capable of denitrification and are particularly well known for being able to degrade aromatic compounds (Microbial Insights, Appendix A). Microorganisms loosely associated with genus *Clostridium* make up the fifth most prevalent bacterial strain detected at PES-MW3S. Members of the genus *Clostridium* can be found in anaerobic environments and are commonly found in soils, sewage, marine sediments, and decaying vegetation. There have been some recent publications suggesting the involvement of *Clostridium bifermentans* in the dechlorination of PCE. However, Middeldorp *et al.* (1999) listed several members of *Clostridium* that were unable to dechlorinate PCE.

The two most prominent microorganisms in PES-MW2D are closely related to sulfate-reducing bacteria *Desulfobulbus* and ammonia-oxidizing bacteria *Nitrosomonas*. The only prominent microorganism present in groundwater at PES-INJ2D are bacteria associated with the genus *Clostridium* discussed above.

DNA-based analysis techniques were used to analyze groundwater samples collected from wells PES-MW3S, PES-MW2D, and PES-INJ2D to detect the presence of the microorganism *Dehalococcoides Ethenogenes*, which is known to degrade PCE. *Dehalococcoides Ethenogenes* was detected in PES-MW3S at a concentration above the MDL of 1,000 cells/mL of water.

In summary, bacterial populations at locations PES-MW3S, PES-MW2D, and PES-INJ2D are highly variable. The primary microorganisms present are typically iron- or sulfate-reducing bacteria. Note that the presence of methanogens are not measured in PLFA analyses. As discussed previously, monitoring location PES-MW3S initially exhibited some evidence of reductive dechlorination, but recent data suggest that this location has been relatively unaffected by the vegetable oil injection (relatively low TOC, biomass, and VFA levels). However, samples from PES-MW3S do indicate the presence of *Dehalococcoides Ethenogenes*, which is known to degrade chlorinated ethenes to completion.

Locations PES-MW2D and PES-INJ2D have been impacted by vegetable oil injection and a substantial decrease in TCE concentrations has occurred at these two locations. While it is not readily apparent whether the reduction in concentration at location PES-INJ2D is due to partitioning or to reductive dechlorination, concentration and molar concentration trends at location PES-MW2D indicate that reductive dechlorination has been stimulated. Thus, the addition of vegetable oil appears to be stimulating the growth of microorganisms (possibly *Clostridium* or *Dehalococcoides Ethenogenes*) that are capable of reductive dechlorination of CAHs at the site.

4.6 GEOCHEMICAL RESULTS

Biodegradation causes measurable changes in groundwater geochemistry that can be used to evaluate the effectiveness of vegetable oil in stimulating microbial activity. For

reductive dechlorination to be an efficient process, the groundwater typically must be sulfate-reducing or methanogenic. Thus, groundwater in which reductive dechlorination is occurring should have the following geochemical signature:

- Depleted concentrations of DO, nitrate, and sulfate;
- Elevated concentrations of Fe(II), Mn(II), methane, ethene, ethane, hydrogen, chloride, and alkalinity; and
- Reduced ORP.

The geochemistry of groundwater in the vicinity of the field test (Table 4.7) has changed significantly following injection of the vegetable oil. The following sections describe these changes and how the site geochemical conditions relate to potential biodegradation of CAHs.

4.6.1 Alternate Electron Acceptors and Metabolic Byproducts

Biodegradation of organic compounds, whether natural or anthropogenic, brings about measurable changes in the chemistry of groundwater in the affected area. Concentrations of compounds used as electron acceptors (e.g., DO, nitrate, and sulfate) are depleted, and byproducts of electron acceptor reduction (e.g., ferrous iron and methane) are enhanced. By measuring these changes, it is possible to evaluate through secondary lines of evidence what biological processes have been induced or enhanced by substrate addition. Results of alternate electron acceptor and metabolic byproduct analyses for Site N-6 are presented in Table 4.7. The following paragraphs discuss those parameters most useful in evaluating site biodegradation processes.

4.6.1.1 Dissolved Oxygen

Figure 4.13 shows concentrations of DO for the upper and lower fluvial deposits over time. DO concentrations decreased substantially within the upper fluvial deposits after injection. Decreases in DO within the vicinity of the injection wells were anticipated due to the electron acceptor demand imposed by the addition of vegetable oil. Decreases in the concentration of DO at locations more distant from the injection wells (e.g., PES-MW1S and PES-MW8S) may be due in part to displacement by groundwater with lower initial DO concentrations. Overall, DO concentrations in the upper fluvial deposits have increased slightly over the past three sampling events. With the exception of PES-MW1S, concentrations of DO in the upper fluvial deposits have remained less than 1.5 mg/L.

DO concentrations in the lower fluvial deposits aquifer were generally less than 2.0 mg/L prior to injection, and have remained relatively stable (Table 4.7 and Figure 4.13). Monitoring locations exhibiting some indications of reductive dechlorination, PES-MW2D, PES-MW3D, and PES-MW6D, had concentrations of DO less than 0.7 mg/L in January 2002.

Concentrations of DO have generally remained above 0.4 mg/L to 0.5 mg/L throughout the test area. While these conditions may be sufficient to support reductive dechlorination, it was anticipated that the vegetable oil injection would exert an electron acceptor demand sufficient to lower concentrations of DO in the treatment zone to less

FIGURE 4.13A
CONCENTRATIONS OF DISSOLVED OXYGEN IN UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

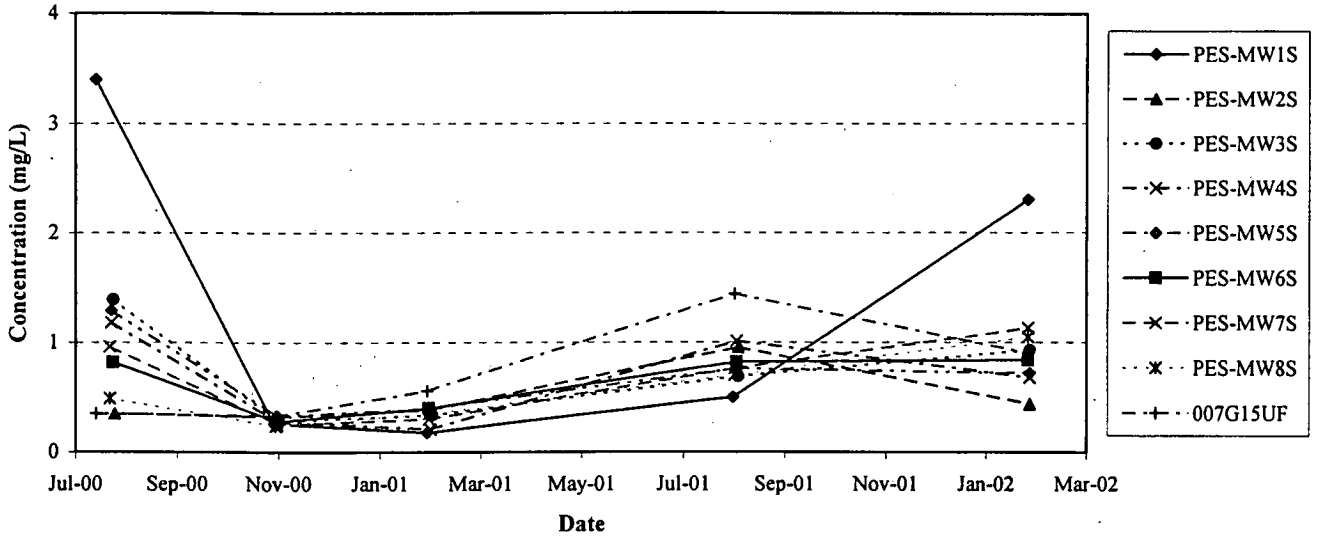
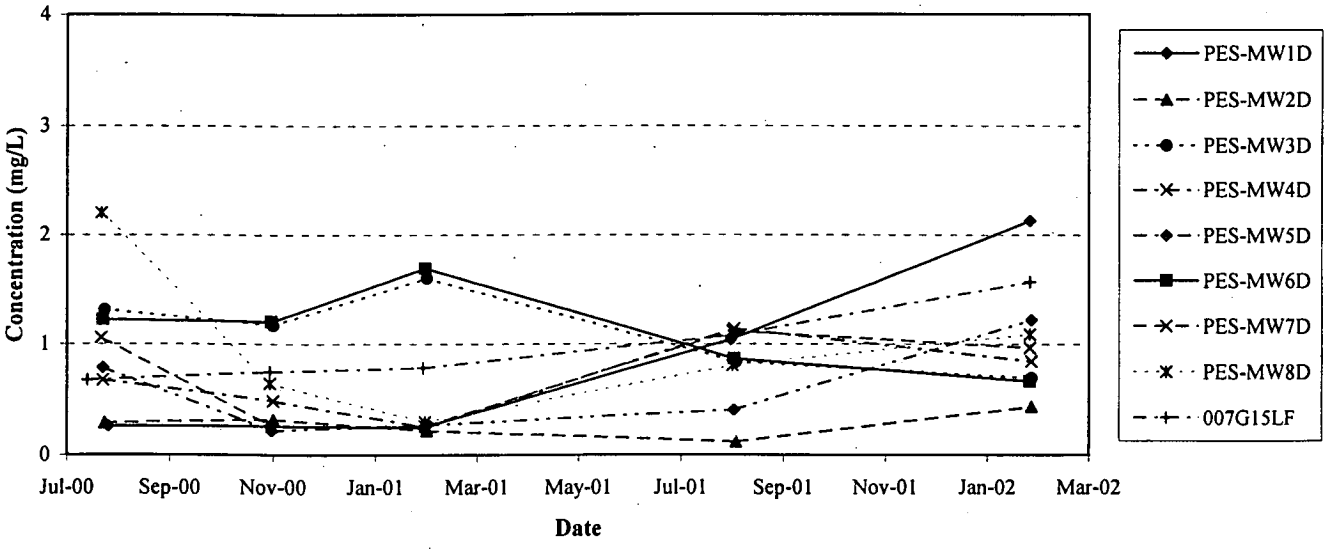


FIGURE 4.13B
CONCENTRATIONS OF DISSOLVED OXYGEN IN LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



than 0.5 mg/L. These DO measurements suggest that an influx of relatively oxygenated groundwater may be occurring in the treatment zone. Sources of recharge may include groundwater from upgradient flow, or recharge through leakage of surface water from the storm water drain that runs through the site (Figure 1.2).

4.6.1.2 Nitrate and Nitrite

After DO has been depleted in the microbiological treatment zone, nitrate may be used as an electron acceptor for anaerobic biodegradation via denitrification. Nitrate concentrations below background in areas with high organic carbon concentrations and low DO are indicative of denitrification. The oxidation of organic carbon via the process of denitrification (using nitrate as an electron acceptor) yields a relatively large amount of free energy to microbial populations. Because nitrate may compete with CAHs as an alternate electron acceptor, nitrate concentrations less than 1.0 mg/L are desired for significant reductive dechlorination to occur (USEPA, 1998).

Groundwater samples were collected from all of the newly installed monitoring wells and from existing monitoring wells 007GL15UF and 007GL15LF during all sampling events, and analyzed by Microseeps, Inc. for nitrate plus nitrite (as nitrogen [N]) via USEPA Method E300.1. Because concentrations of nitrate are usually much greater than concentrations of nitrite in groundwater systems, the measure of nitrogen is a good approximation of the measure of nitrate present. Baseline concentrations using this method were less than or equal to 1.0 mg/L with the exception of samples collected from monitoring locations PES-MW5D, PES-MW7D, PES-MW8S, PES-MW8D, and 007GL15LF. The maximum baseline concentration of nitrate + nitrite was 3.0 mg/L at location PES-MW8D.

With one exception, nitrate + nitrite concentrations decreased slightly or remained relatively constant during process monitoring, with concentrations remaining less than 3.0 mg/L. The only exception was at monitoring location PES-MW8D, where the concentration of nitrate + nitrite was 5.6 mg/L in January 2002, relative to a baseline concentration of 3.0 mg/L in August 2000. However, within the treatment zone nitrate + nitrite concentrations are generally less than 1.0 mg/L, indicating that nitrate reduction is a relatively minor oxidation-reduction process at the site and should not exert an excessive electron acceptor demand.

4.6.1.3 Ferrous Iron

The reduction of ferric iron [Fe(III)] has been shown to be a major metabolic pathway for some micro-organisms (Lovley and Phillips, 1988; Chapelle, 1993). Reduction of ferric iron produces ferrous iron [Fe(II)], which is soluble in natural groundwater systems and can be readily measured in the field. Concentrations of Fe(II) measured in groundwater samples are summarized in Table 4.7.

Concentrations of Fe(II) over time for the upper and lower fluvial aquifer zone monitoring locations are shown on Figure 4.14. In the upper fluvial deposits, Fe(II) concentrations increased sharply immediately after injection at locations PES-MW3S, PES-MW4S, and PES-MW5S. Lesser increases were observed at most of the other monitoring locations. Subsequent to the first process monitoring event, concentrations of Fe(II) began to decrease, except for locations PES-MW1S and PES-MW3S, which

FIGURE 4.14A
CONCENTRATIONS OF FERROUS IRON IN UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

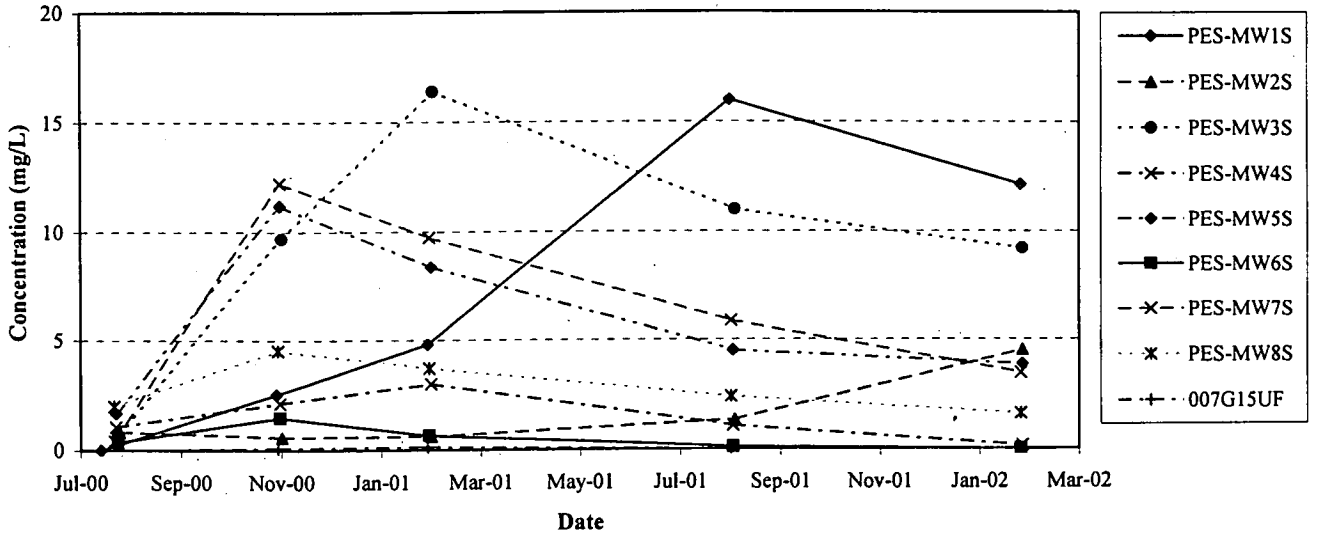
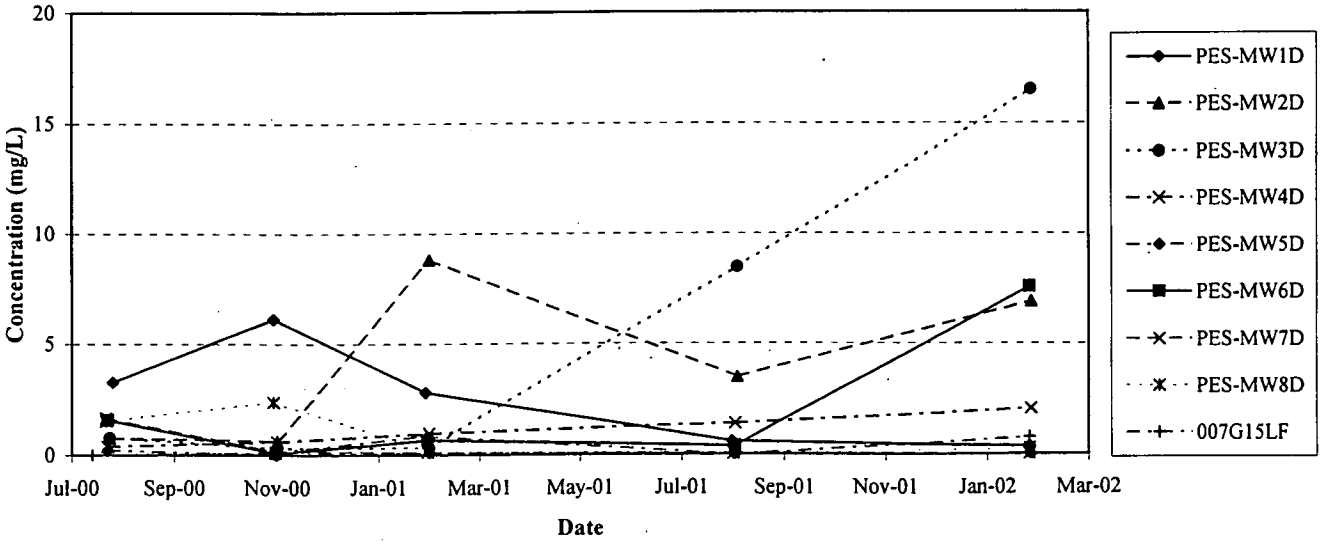


FIGURE 4.14B
CONCENTRATIONS OF FERROUS IRON IN LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



continued to increase. After February 2001, concentrations of Fe(II) began to decrease at PES-MW3S as well. The increase in Fe(II) concentrations immediately after oil injection indicates that iron-reduction was stimulated in the upper fluvial aquifer zone by the vegetable oil injection. The relatively gradual decline in Fe(II) concentrations during the past three performance monitoring events indicates that Fe(III) reduction is becoming a less prevalent oxidation-reduction reaction, either due to depletion of bioavailable iron or due to changes in groundwater reducing conditions that inhibit iron-reduction.

In the lower fluvial aquifer zone, a more gradual increase in Fe(II) concentrations was observed during performance monitoring sampling events for well locations PES-MW2D and PES-MW3D, PES-MW4D, and PES-MW6D. Concentrations of Fe(II) did increase for the first monitoring event at PES-MW1D, but have subsequently declined to less than baseline levels. Monitoring locations PES-MW2D, PES-MW3D, and PES-MW6D show recent evidence of reductive dechlorination. Therefore, the increase in Fe(II) concentrations at these locations suggests a possible correlation to stimulation of reductive dechlorination in the lower fluvial aquifer zone.

4.6.1.4 Sulfate

Sulfate also may be used as an electron acceptor (sulfate reduction) during microbial degradation of an organic substrate under anaerobic conditions (Grbic-Galic, 1990). Sulfate concentrations were measured in groundwater samples collected during baseline sampling and during each of the performance monitoring sampling events (Table 4.7). Sulfate concentrations measured during baseline sampling were generally less than 5 mg/L with the exception of samples collected from monitoring locations PES-MW8S (21 mg/L), and PES -INJ4S (19 mg/L).

With a few exceptions, sulfate concentrations detected in samples collected during performance monitoring sampling events remained less than 5 mg/L. The highest sulfate concentration detected during post-injection monitoring was 29 mg/L at upgradient location PES-MW1S in August 2001 (Table 4.7).

The overall low concentrations of sulfate detected during baseline and performance monitoring indicates that sulfate reduction is a relatively minor oxidation-reduction process at the site and should not exert an excessive electron acceptor demand with respect to CAHs.

4.6.1.5 Methane, Ethane, and Ethene in Groundwater

Although anaerobic degradation of CAHs may occur under nitrate-, iron- and sulfate-reducing conditions (Vogel *et al.*, 1987; Chapelle, 1993), the most rapid reductive dechlorination rates occur under methanogenic conditions (Bouwer, 1994). However, methanogenic organisms are known to compete with dechlorinating organisms for hydrogen (electron donor) produced by fermentation of organic substrate. Strongly elevated methane concentrations may be an indication that the majority of the organic substrate is being used to support methanogenesis, at the expense of dechlorination reactions.

Methane concentrations over time for upper and lower fluvial aquifer zone monitoring well locations are shown on Figure 4.15. Methane concentrations have increased

FIGURE 4.15A
CONCENTRATIONS OF METHANE IN
UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

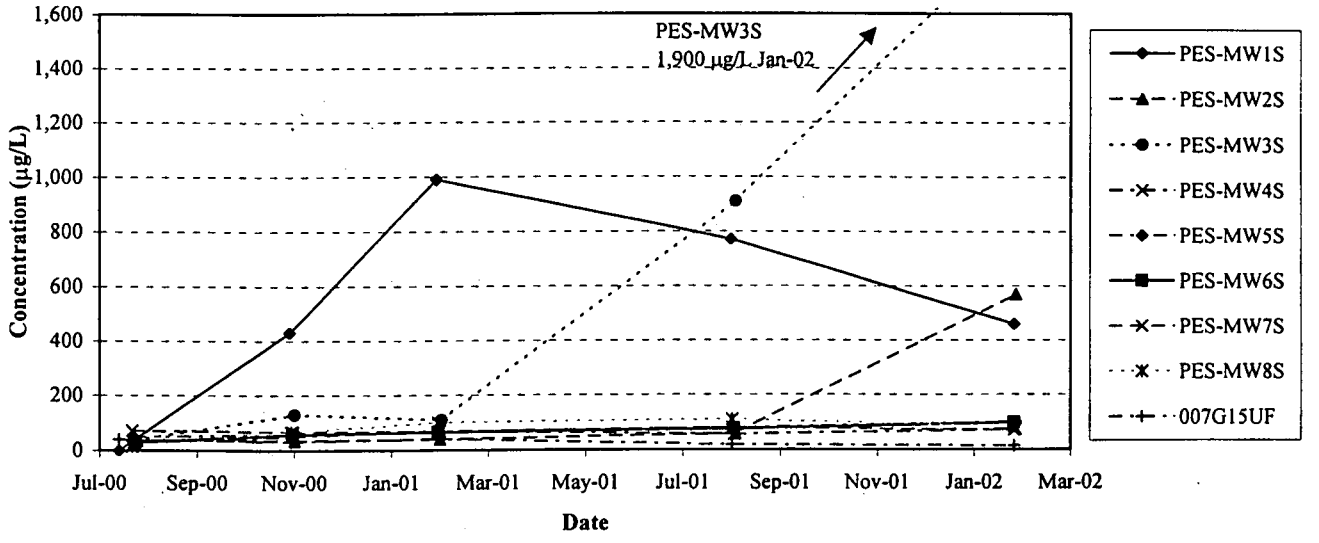
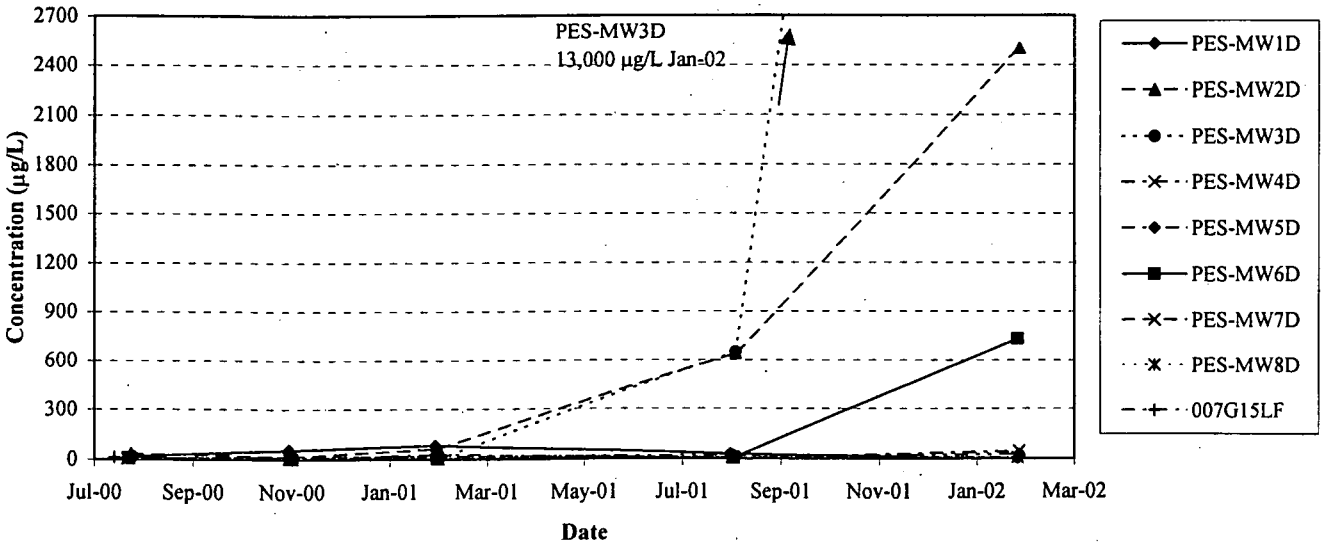


FIGURE 4.15B
CONCENTRATIONS OF METHANE IN
LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



significantly at well locations PES-MW2S, PES-MW2D, PES-MW3S, PES-MW3D, and PES-MW6D. Methane concentrations have increased from less than 100 µg/L prior to injection to a maximum of 1,900 µg/L at PES-MW3S and 13,000 at PES-MW3D in January 2002.

Methane concentrations in monitoring well PES-MW1S also increased substantially shortly after injection, but have been decreasing since the February 2001 process monitoring event. This temporary increase in methane concentrations at PES-MW1S is likely related to groundwater displacement due to a temporary reversal in groundwater gradient observed shortly after injection (Section 4.2). With the exception of monitoring wells PES-MW1S and PES-MW6D, the increase in methane concentrations observed at the locations listed above are limited to an area in the immediate vicinity of the injection area. The increase at location PES-MW6D is less pronounced and only occurred during the last monitoring event, indicating that the area of methanogenic activity is spreading in a downgradient direction.

Ethene and ethane are end products of reductive dechlorination. An increase in ethene and ethane concentration is a strong indication that complete degradation of chlorinated ethenes has occurred. Ethene concentrations over time for upper and lower fluvial aquifer zone monitoring well locations are shown on Figure 4.16. Initially, ethene concentrations increased from August 2000 to November 2000 at monitoring wells PES-MW1S, PES-MW2D, PES-MW3S, PES-MW3D, PES-MW5S, and PES-MW7S. However, ethene concentrations decreased in all monitoring wells and injection wells from November 2000 to January 2002. Because VC has not been detected at the site, it is not readily apparent that the initial increase in ethene concentration was a result of reductive dechlorination. Since the November 2000 sampling event, ethene concentrations have generally declined to below pre-injection concentrations. This indicates that complete dechlorination of CAHs to ethene is not occurring.

The observed long-term decreasing trends in ethene concentration coupled with the observed increasing trends in methane concentration further indicate that the injection of vegetable oil may have preferentially stimulated methanogenic biodegradation processes rather than reductive dechlorination processes at Site N-6.

4.6.2 ORP as an Indicator of Redox Processes

Redox potential, or ORP, is a fairly quantitative measure of the relative tendency of a solution to accept or transfer electrons. The redox potential of a groundwater system depends on which electron acceptors are being reduced by microbes during oxidation of organic compounds. In general, reactions yielding more energy tend to take precedence over processes that yield less energy (Stumm and Morgan, 1981; Godsey, 1994; Reinhard *et al.*, 1984). Oxygen reduction would be expected in an aerobic environment with microorganisms capable of aerobic respiration, because oxygen reduction yields significant energy (Bouwer, 1992; Chapelle, 1993). However, once the available DO is depleted and anaerobic conditions dominate the interior regions of a contaminant plume, anaerobic microorganisms can utilize other electron acceptors in the following order of preference: nitrate (denitrification), manganese (manganese reduction), ferric iron (iron reduction), sulfate (sulfate reduction), and finally carbon dioxide (methanogenesis). Each successive redox reaction provides less energy to the system, and each step down in

FIGURE 4.16A
CONCENTRATIONS OF ETHENE IN
UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

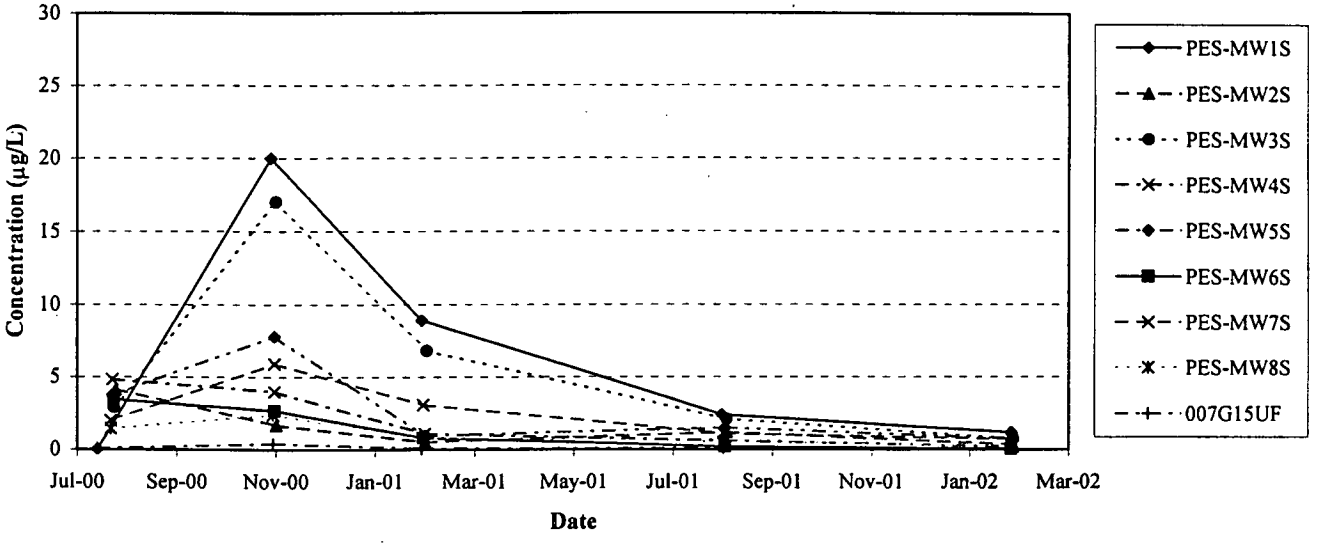
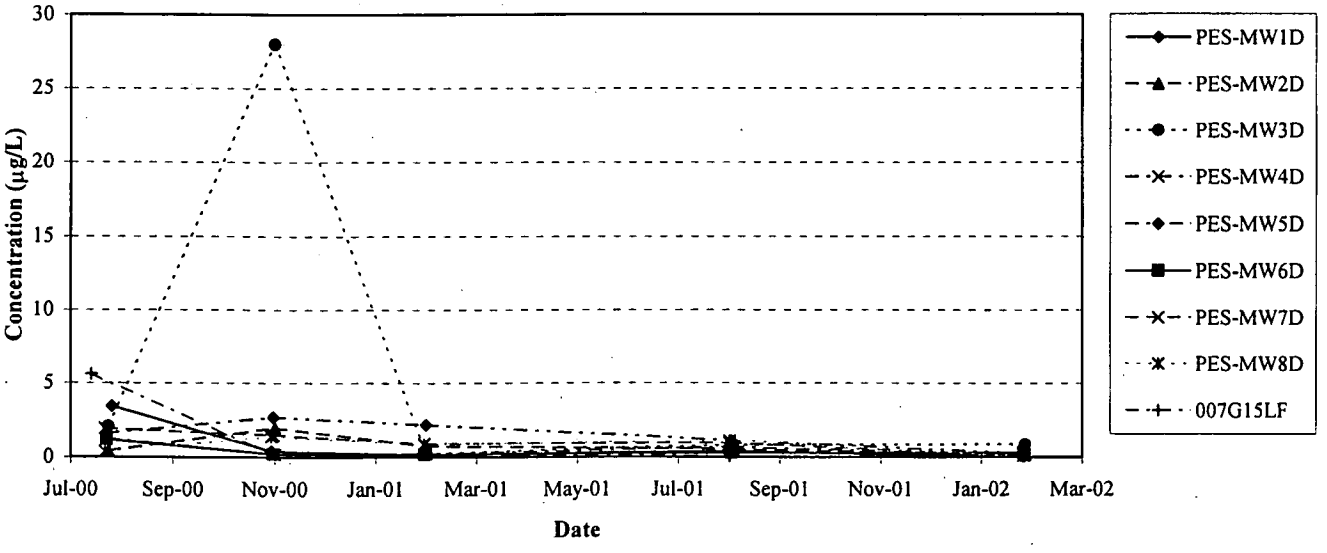


FIGURE 4.16B
CONCENTRATIONS OF ETHENE IN
LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



redox energy yield is paralleled by an ecological succession of microorganisms capable of facilitating the pertinent redox reactions.

ORP values measured during baseline and performance monitoring sampling are presented in Table 4.7, and ORP values over time for upper and lower fluvial aquifer zone monitoring well locations are presented on Figure 4.17. Baseline ORP values exhibited a wide range of reducing conditions with baseline values ranging from a high of +253 millivolts (mV) to a low of -359 mV. In general, these values indicate baseline environmental conditions suitable for both aerobic and anaerobic processes (USEPA, 1998). ORP values varied substantially even within the treatment zone. For example, the ORP value at PES-MW3S was +194 mV, while ORP at PES-MW2S was –322 mV. This suggests a high degree of heterogeneity in the natural reducing conditions present at the site prior to injection.

After injection, ORP values tended to stabilize within a range from +150 to –150 mV, indicating reducing conditions typically are within the nitrate-reduction to sulfate-reduction range. Methane data indicate that, even at locations with ORP values ranging down to only -150 mV, methanogenesis is occurring at select locations. It is notable that the three locations in the lower fluvial deposits with the lowest ORP values (PES-MW2D, PES-MW3D, and PES-MW6D) exhibit some evidence of dechlorination of TCE to *cis*-1,2-DCE.

However, the continued variation in the ORP values for both the upper and lower fluvial zones suggests that the impact of the vegetable oil injection is not uniform or widespread, and that the degree of heterogeneity in the reducing conditions present at the site remains relatively high.

4.6.3 Additional Geochemical Indicators

Other geochemical data collected for this evaluation can be used to further interpret and support the contaminant, electron donor, electron acceptor, and byproduct data previously discussed. These parameters provide additional qualitative indications of what processes may be operating at the site.

4.6.3.1 Chloride as an Indicator of Reductive Dechlorination

Chloride ions are removed from chlorinated solvents and enter solution during biodegradation, whether via reductive dechlorination or aerobic oxidation. Therefore, chloride concentrations in groundwater should increase above baseline levels in areas where reductive dechlorination is being stimulated.

Chloride concentrations are presented in Table 4.7 and Figure 4.18 presents the concentration of chloride over time in shallow and deep monitoring wells. With the exception of PES-MW1S, chloride concentrations in the upper fluvial deposits remained relatively stable over time, with chloride concentrations remaining below 20 mg/L. The chloride concentration at PES-MW1S increased from a baseline concentration of 5 mg/L to a maximum of 87 mg/L in January 2002. The cause of this increase is not readily apparent, as changes in contaminant and geochemical concentrations indicative of biodegradation have become less pronounced at this location over time.

FIGURE 4.17A
OXIDATION/REDUCTION POTENTIAL IN UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

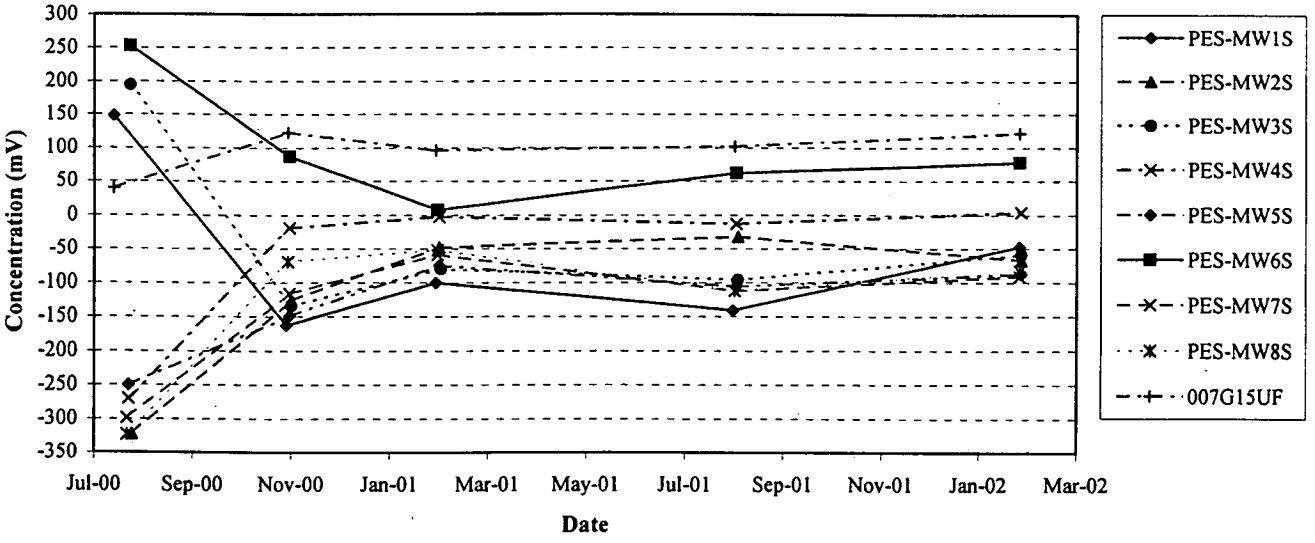


FIGURE 4.17B
OXIDATION/REDUCTION POTENTIAL IN LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

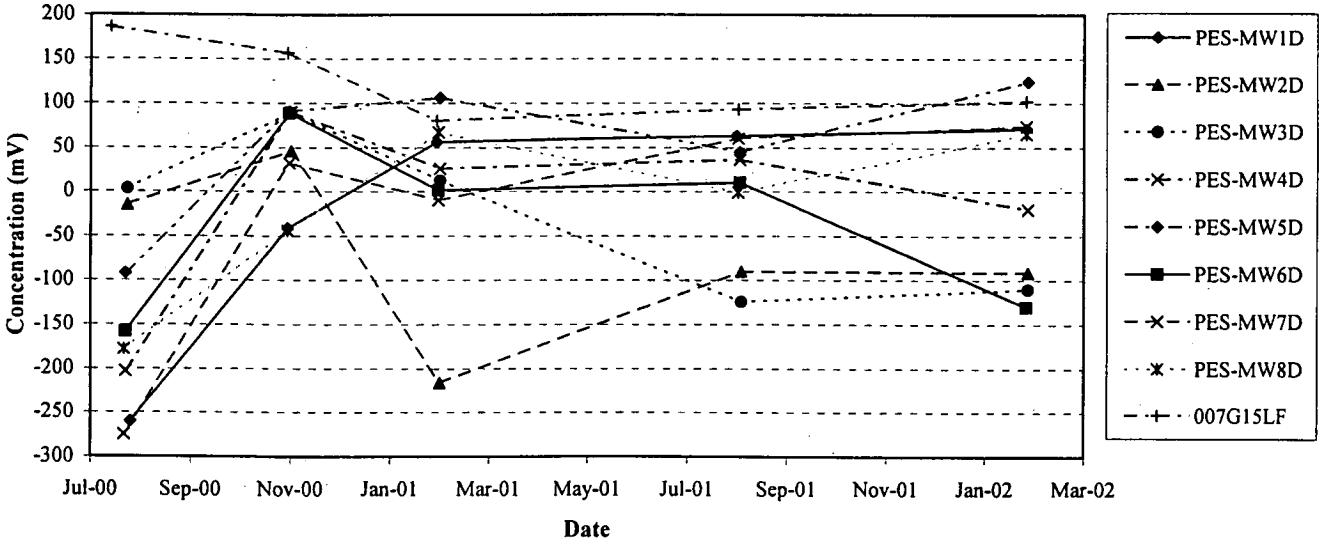


FIGURE 4.18A
CONCENTRATIONS OF CHLORIDE IN
UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

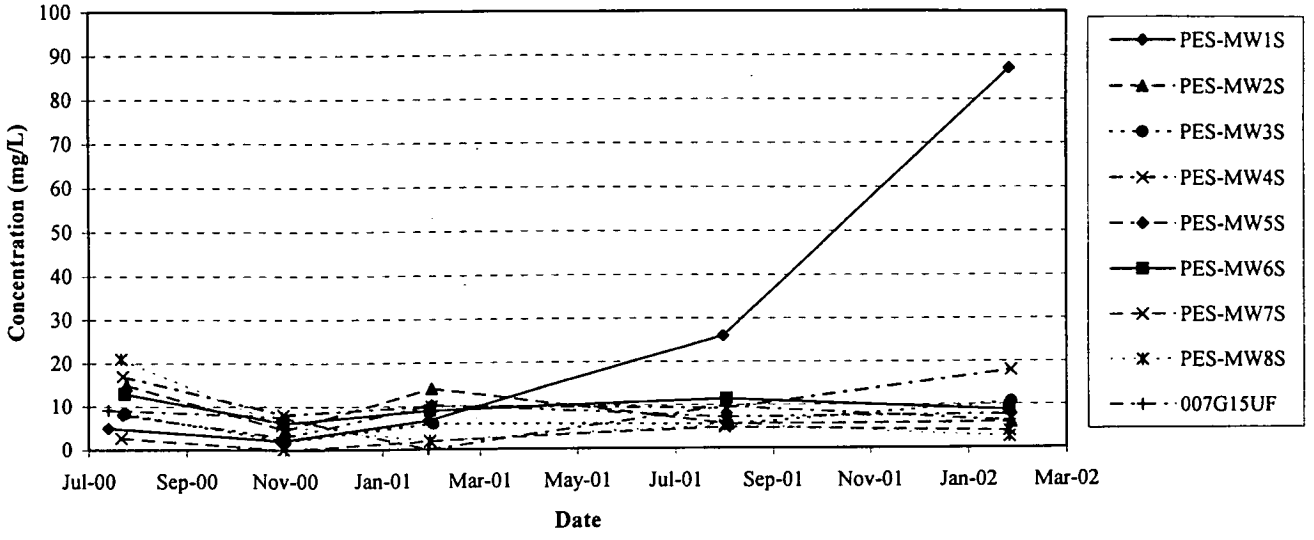
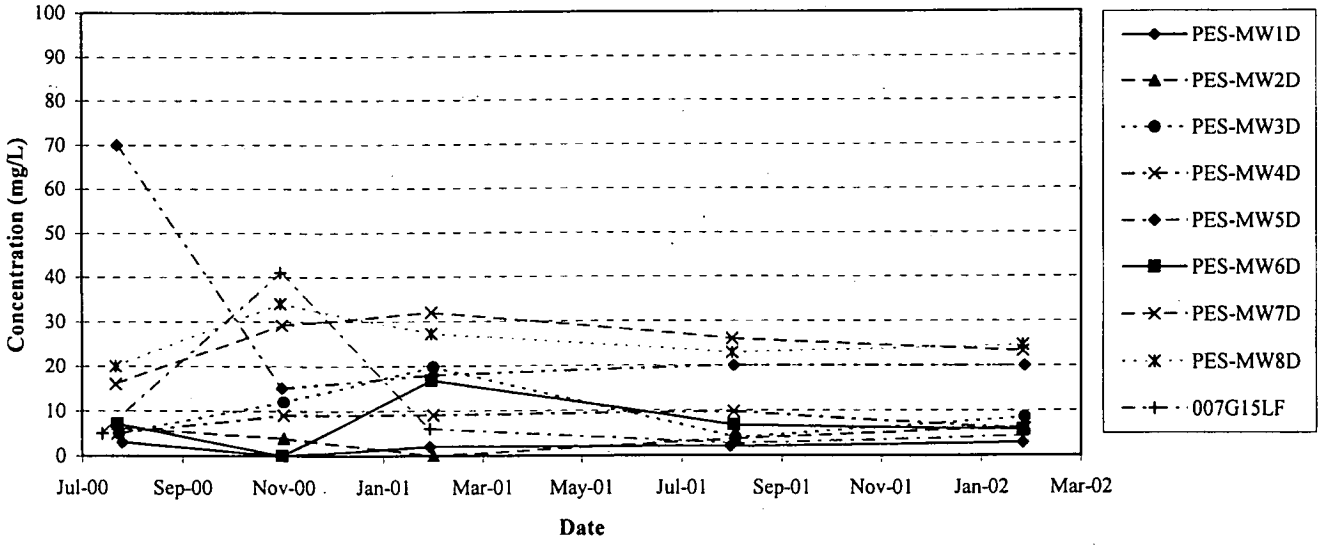


FIGURE 4.18B
CONCENTRATIONS OF CHLORIDE IN
LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



With few exceptions, chloride concentrations in the lower fluvial deposits (Figure 4.18) also remained relatively stable at concentrations less than 30 mg/L. Initially, the baseline chloride concentration at location PES-5MWD was elevated at a concentration of 70 mg/L, but decreased to less than 20 mg/L during process monitoring. Overall, chloride concentrations do not suggest that reductive dechlorination of CAHs is occurring to a significant degree at the site.

Carbon Dioxide and Alkalinity

Carbon dioxide is produced during the biodegradation of organic carbon compounds. In aquifers that have carbonate minerals as part of the matrix, carbon dioxide forms carbonic acid, which dissolves these minerals, increasing the alkalinity of the groundwater. An increase in carbon dioxide and alkalinity (measured as calcium carbonate [$CaCO_3$]) in the treatment zone can be used to infer that organic carbon (i.e., vegetable oil), and possibly less-chlorinated solvents, have been destroyed through aerobic and anaerobic microbial respiration. Alkalinity also is a measure of the ability of groundwater to buffer changes in pH. Because microbial degradation produces metabolic acids, the ability of the groundwater system to buffer these acids is beneficial to maintaining pH within the optimal range for halorespirating organisms.

Total alkalinity and carbon dioxide concentrations over time for upper and lower fluvial aquifer zone monitoring well locations are shown on Figures 4.19 and 4.20, respectively. In general, an increase in alkalinity was observed for the time period from July/August 2000 (pre-injection) until February 2001. In the upper fluvial deposits, alkalinity remained variable, ranging from 129 mg/L at PES-MW4S to 307 mg/L at PES-MW7S in January 2002. A slight increase was also observed from February 2001 to January 2002 for a few of the lower fluvial deposit wells (PES-MW3D and PES-MW4D). These data suggest that some biodegradation of organic compounds has occurred, but that it is not uniform or widespread.

Carbon dioxide measurements also showed an overall increase from baseline measurements, ranging from 82 mg/L at PES-MW1D to 458 mg/L at PES-MW3D in January 2002. The overall increase suggest that microbial activity has been stimulated in certain portions of the treatment area.

4.7 SUMMARY OF ENHANCED BIODEGRADATION

Changes in groundwater parameters indicate that the groundwater reducing environment has been changed by the addition of vegetable oil. However, consistent and long-term reductive dechlorination of chlorinated ethenes has not been demonstrated during the 18-month process monitoring period. Rather, it appears that only within the past two process monitoring events (August 2001 and January 2002) that reductive dechlorination of TCE to *cis*-1,2-DCE is occurring at well locations PES-MW2S, PES-MW2D, PES-MW3D, and PES-MW6D. There is currently no evidence of further reductive dechlorination to VC and ethene.

To evaluate what conditions may stimulate reductive dechlorination of CAHs at Site N-6, Table 4.9 presents select analytical, microbial, and geochemical parameters for monitoring locations where these three types of data were collected or where evidence of reductive dechlorination has occurred. Well locations where recent evidence of reductive

FIGURE 4.19A
CONCENTRATIONS OF TOTAL ALKALINITY IN UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

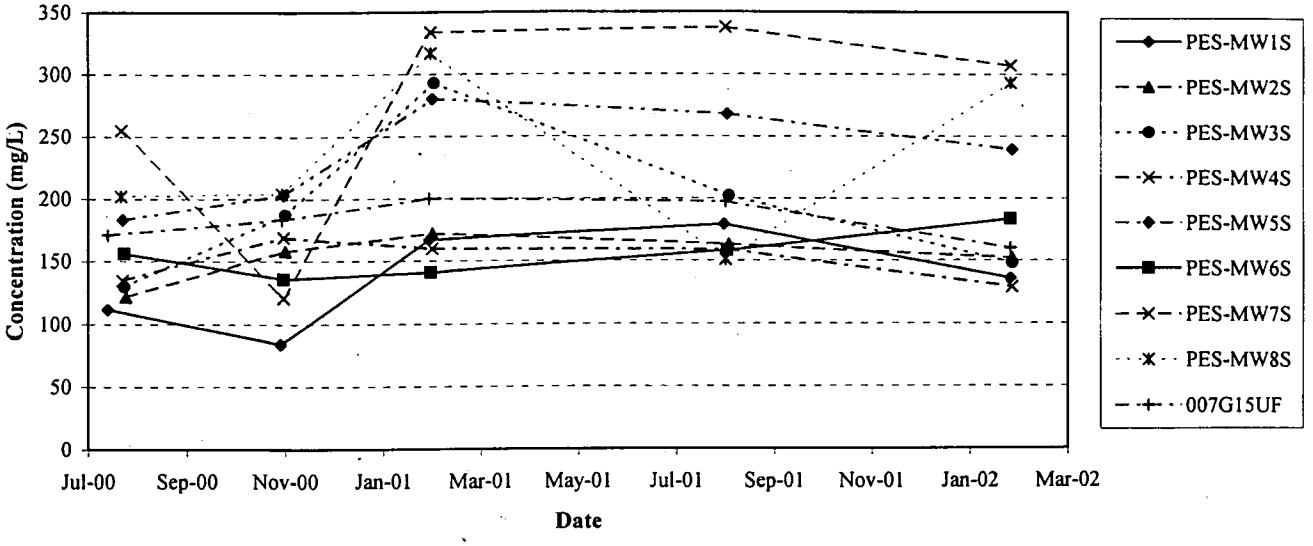


FIGURE 4.19B
CONCENTRATIONS OF TOTAL ALKALINITY IN LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

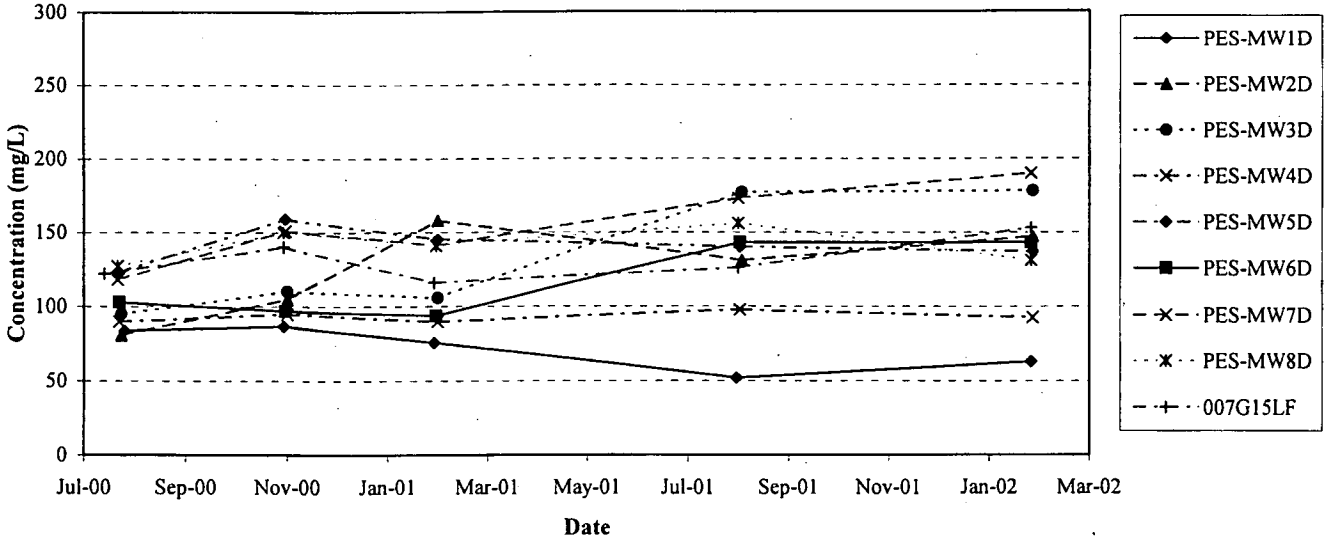


FIGURE 4.20A
CONCENTRATIONS OF CARBON DIOXIDE IN UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

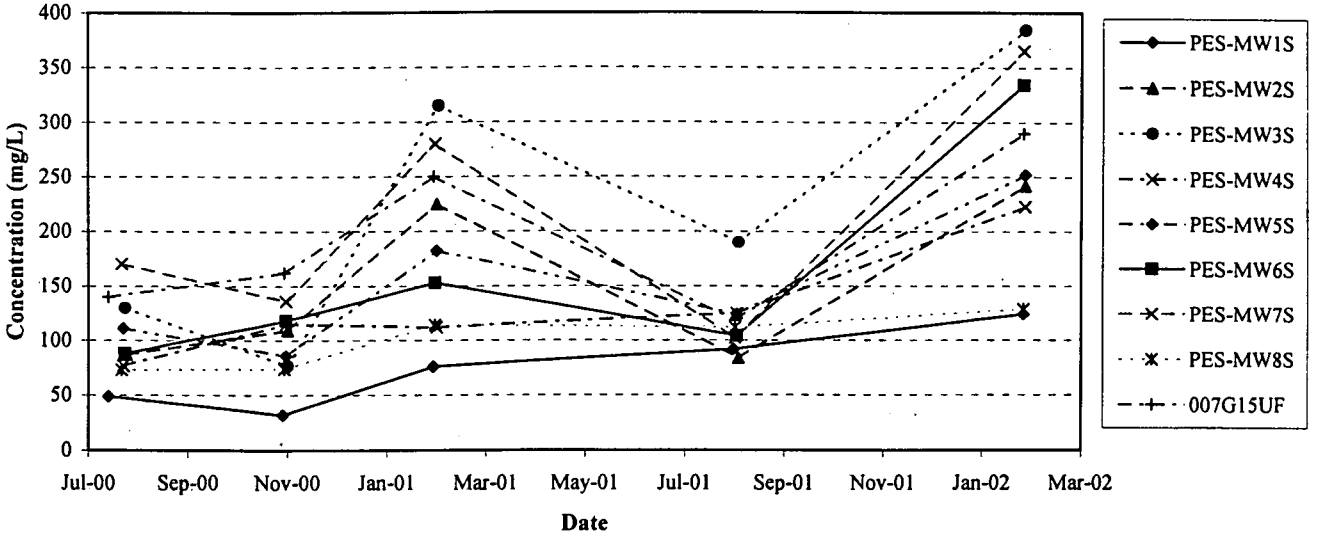


FIGURE 4.20B
CONCENTRATIONS OF CARBON DIOXIDE IN LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

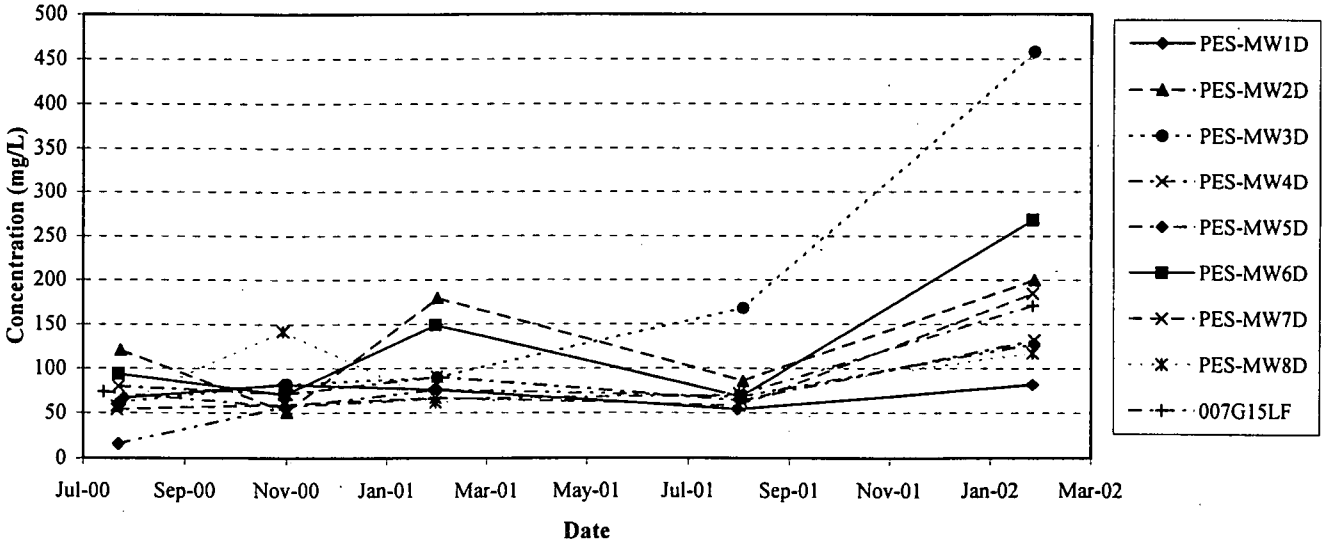


TABLE 4.9
SUMMARY OF ENHANCED BIOREMEDIATION POTENTIAL
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Sample Date	Organic Carbon		Metabolic Fatty Acids			Geochemical Parameters			Dissolved Gases			Microbial Characterization			Evidence of Dechlorination
		TOC (mg/L)[a]	Total VFAs (mg/L)	Acetic (mg/L)	Proprionic (mg/L)	Butyric (mg/L)	ORP (mV)	Ferrous Iron (mg/L)	Sulfate (mg/L)	Methane (mg/L)	Ethane (µg/L)[b]	Ethene (µg/L)	Total Biomass (pmoles PLFA/ml)[c]	Indication of Dehalocoides Ethenogenes	Presence of Clostrium	
MONITORING WELLS																
PES-MW1S	29-Jan-02	2.7J[d]	ND[e]	< 1[f]	< 1	< 1	-47	12	27	0.46	1.9	1.2	9	NA	NA	inconsistent
PES-MW2S	30-Jan-02	13	27	10	17	< 1	-67	4.5	<1	0.57	0.16	0.36	161	NA	NA	TCE to DCE
PES-MW2D	30-Jan-02	600	20	10	10	< 1	-91	6.9	<1	2.5	0.046	0.15	51	negative (-)	no	TCE to DCE
PES-MW3S	30-Jan-02	2.8J	ND	< 1	< 1	< 1	-59	9.2	<1	1.9	0.14	0.77	2	positive (++)	yes	yes, than no
PES-MW3D	30-Jan-02	260	450	140	290	20	-110	17	<1	13	0.12	0.86	65	NA	NA	TCE to DCE
PES-MW4S	30-Jan-02	2.6J	ND	< 1	< 1	< 1	4	0.15	<1	0.07	0.17	0.22	7	NA	NA	none
PES-MW6D	29-Jan-02	9.9	NA	NA	NA	NA	-130	7.6	<1	0.73	0.18	0.32	NA	NA	NA	TCE to DCE
PES-MW7S	29-Jan-02	3.1J	ND	< 1	< 1	< 1	-91	3.5	<1	0.07	0.12	0.7	2	NA	NA	inconsistent
007G15UF	29-Jan-02	NA	ND	< 1	< 1	< 1	122	<0.01	<1	0.01	0.042	0.039	2	NA	NA	none
007G15LF	29-Jan-02	NA	ND	< 1	< 1	< 1	102	0.75	6.0	0.01	0.043	0.029	3	NA	NA	none
INJECTION WELLS																
PES-INJ2S	31-Jan-02	1,600	1,054	163	586	305	-	> 99	<1	2.8	0.32	1.1	199	NA	NA	unknown
PES-INJ2D	31-Jan-02	1,200	880	157	523	200	-	61	<1	4.0	0.54	1.9	101	negative (-)	yes	unknown
PES-INJ4S	31-Jan-02	2,400	1,797	239	845	713	-	> 99	<1	2.5	0.47	2.8	163	NA	NA	unknown

[a] mg/L = milligrams per liter.

[b] µg/L = micrograms per liter.

[c] pmoles PLFA/ml = picomoles of phospholopid fatty acid per milliliter of sample.

[d] J flag indicates that the concentration is estimated.

[e] ND indicates the analyte was not detected.

[f] "<" indicates that anayte was below the limit of quantitation.

dechlorination of TCE to *cis*-1,2-DCE has occurred (PES-MW2S, PES-MW2D, PES-MW3D, and PES-MW6D) exhibit the following characteristics:

- TOC equal to or greater than approximately 10 mg/L.
- Measurable quantities of VFAs equal to or greater than 20 mg/L (VFAs were not analyzed for PES-MW6D).
- ORP less than –60 mV.
- Ferrous iron concentration greater than 4 mg/L, sulfate concentration less than 1 mg/L, and methane concentration greater than 0.5 mg/L.
- Total biomass greater than approximately 50 pmoles PLFA/mL.

In order for reductive dechlorination to be stimulated at the site it is apparent that sufficient substrate is required to create environmental conditions sufficiently reducing for methanogenesis to occur, while stimulating microbial growth and creating elevated levels of biomass. Injection wells PES-INJ2S, PES-INJ2D, and PES-INJ4S also exhibit these characteristics, but because contaminant concentrations have been reduced to below detection it cannot be determined whether reductive dechlorination has occurred, or whether the contaminant reduction is due to partitioning. Because all the wells with TOC greater than 10 mg/L demonstrated some evidence of reductive dechlorination (while those with lesser concentrations of TOC did not), it could be inferred that the contaminant reduction in the injection wells is likely a result of both reductive dechlorination and partitioning.

These data suggest that the lack of reductive dechlorination at Site N-6 is primarily a function of substrate distribution. Some changes in contaminant and geochemical concentrations suggest that reductive dechlorination was initially stimulated at locations PES-MW1S, PES-MW7S, and PES-MW3S. Locations PES-MW1S and PES-MW7S are relatively distant from the injection area relative to the other monitoring locations. Therefore, the lack of consistent evidence of reductive dechlorination at these locations suggests that those changes may have been a result of groundwater displacement immediately following injection.

It should be noted that prior to injection, ORP values indicated a very high level of aquifer environmental heterogeneity, with many localized pockets of highly reducing conditions. The historical presence of fuel hydrocarbons and *cis*-1,2-DCE suggests that some reductive dechlorination has occurred previously, likely within very localized zones. Disruption and displacement of these local groundwater zones due to injection may be the cause of some of the initial changes in contaminant and geochemical concentrations that were observed. However, this cannot be determined with confidence and therefore it may be more appropriate to look at more recent changes in contaminant and geochemical profiles (i.e., PES-MW2S, PES-MW2D, PES-MW3D, and PES-MW6D) to determine the future potential for enhanced bioremediation by reductive dechlorination.

SECTION 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

This section presents conclusions and recommendations for the field feasibility test for enhanced *in-situ* bioremediation of chlorinated solvents via vegetable oil injection at Site N-6, Former NSA Mid-South, Tennessee.

5.1.1 Observed Changes in Site Geochemistry

Changes in geochemical conditions during process monitoring indicates that the addition of vegetable oil at Site N-6 has induced environmental conditions conducive to reductive dechlorination in the upper and lower fluvial deposits, but that these changes are not uniform nor widespread across the study area. DO concentrations decreased at many locations after injection, indicating that DO was being consumed by increased microbial activity due to substrate addition. However, concentrations of DO have generally remained above 0.4 mg/L to 0.5 mg/L throughout the test area. While these conditions may be sufficient to support reductive dechlorination, it was anticipated that the substrate addition would exert an electron acceptor demand sufficient to lower concentrations of DO in the treatment zone to less than 0.5 mg/L. The DO data suggest that an influx of relatively oxygenated groundwater may be occurring in the treatment zone.

Baseline ORP values exhibited a wide range of reducing conditions with values ranging from a high of +253 mV to a low of -359 mV. ORP values varied substantially even within the treatment zone, which is suggestive of a high degree of heterogeneity in the natural reducing conditions at the site prior to injection. Both aerobic and anaerobic conditions are locally present. After injection, ORP values tended to stabilize within a range from +150 mV to –150 mV, indicating reducing conditions typically are within the nitrate-reduction to sulfate-reduction range. Although ORP values are not within the typical range for methanogenesis, increases in methane concentration at several locations indicate this oxidation-reduction process has been stimulated by substrate addition.

Iron and methane concentration data suggest that iron-reduction and methanogenesis are the dominant terminal electron accepting processes (TEAP) that have been stimulated at the site, and that bioavailable ferric iron and carbon dioxide are competing with CAHs as electron acceptors in site groundwater. Low initial concentrations of nitrate and sulfate along with concentration data collected during process monitoring indicate that nitrate-reduction and sulfate-reduction are not occurring at competitive levels.

5.1.2 Actual/Significant Changes in Contaminant Concentrations

After vegetable oil injection there was an overall decrease in the maximum TCE concentration detected in groundwater. However, a decreasing trend is not uniform for all of the wells at Site N-6. Increasing TCE concentration trends have been observed for a few monitoring locations between baseline sampling and the latest process monitoring event. The greatest decrease in contaminant concentrations occurred at the injection locations, where contaminant concentrations have attenuated to less than method detection limits. It is not readily apparent whether observed decreases in TCE concentrations are a result of biodegradation, natural variations in contaminant concentrations, or partitioning of contaminant mass into the vegetable oil NAPL. However, an increase in *cis*-1,2-DCE concentrations detected in several monitoring locations (PES-MW2S, PES-MW2D, PES-MW3D, and PES-MW6D) suggests that reduction of TCE to *cis*-1,2-DCE has occurred due to substrate addition.

5.1.3 Daughter Product Formation and Persistence

The presence of the daughter product *cis*-1,2-DCE that was not used in Base operations provides evidence that TCE is being reductively dechlorinated by halorespiration. However, consistent or long-term reductive dechlorination of chlorinated ethenes has not been demonstrated by monitoring completed through January 2002. Only within the past two process monitoring events has reductive dechlorination of TCE to *cis*-1,2-DCE been observed at well locations PES-MW2S, PES-MW2D, PES-MW3D, and PES-MW6D. There is currently no evidence of further reductive dechlorination to VC and ethene.

Initial changes in contaminant profiles at locations PES-MW1S and PES-MW7S suggest that reductive dechlorination was stimulated at these locations. However, locations PES-MW1S and PES-MW7S are distant from the injection area relative to the other monitoring locations. A lack of consistent evidence of reductive dechlorination at these locations suggests that the initial changes in contaminant profiles may have been a result of groundwater displacement immediately following injection.

5.1.4 Degree of Electron Donor Utilization for Reductive Dechlorination

It appears that a significant percentage of the substrate mass may be utilized for microbially mediated oxidation-reduction processes other than reductive dechlorination of chlorinated compounds. In particular, geochemical data indicate that iron-reduction and methanogenesis may utilize a significant percentage of substrate (i.e., this mass is not being used to enhance reductive dechlorination of CAHs). However, reduction of TCE to *cis*-1,2-DCE observed at monitoring locations PES-MW2S, PES-MW2D, PES-MW3D, and PES-MW6D suggest that some reductive dechlorination is occurring in groundwater at the site.

5.1.5 Substrate Distribution and Potential for Future Reductive Dechlorination

Well locations where evidence of reductive dechlorination of TCE to *cis*-1,2-DCE has occurred exhibit the following characteristics:

- TOC equal to or greater than approximately 10 mg/L.

- Measurable quantities of VFAs equal to or greater than 20 mg/L (VFAs were not analyzed for PES-MW6D).
- ORP less than –60 mV.
- Ferrous iron concentration greater than 4 mg/L, sulfate concentration less than 1 mg/L, and methane concentration greater than 0.5 mg/L.
- Total biomass greater than approximately 50 pmoles PLFA/mL.

These conditions have not been induced uniformly across the treatment area, but have been limited mostly to the immediate injection area. In order to stimulate reductive dechlorination, sufficient organic substrate is required to create environmental conditions sufficiently reducing for methanogenesis to occur while stimulating microbial growth of dechlorinating microorganisms. Therefore, the lack of reductive dechlorination at Site N-6 is primarily a function of substrate distribution.

The potential for future reductive dechlorination and mass reduction will be a function of substrate distribution. It was assumed that dissolution of the vegetable oil would create a reaction zone extending tens of feet downgradient from the injection zone. The reasons this has not occurred may be the result of a lack of groundwater flow due to the very low hydraulic gradient; a reduction in hydraulic conductivity caused by the saturation of the vegetable oil; and/or that the dissolved vegetable oil is rapidly degraded before migrating any substantial distance.

Finally, complete dechlorination to ethene has not been demonstrated. However, the presence of *Dehalococcoides Ethenogenes*, a bacteria which is known to degrade chlorinated ethenes to completion, has been established at the site. The potential for complete dechlorination to occur will likely depend on the growth and development of substantial populations of appropriate dechlorinating microorganisms in the presence of competing microbial processes.

5.2 RECOMMENDATIONS

Contaminant, daughter product, geochemical, and microbial data strongly suggest that the lack of reductive dechlorination at Site N-6 is primarily a function of substrate distribution. Complete dechlorination of PCE and TCE to ethene also has not been documented, although the presence of *Dehalococcoides Ethenogenes*, a bacteria known to completely dechlorinate PCE to ethene, has been detected at the site. Until it can be demonstrated that adequate distribution of vegetable oil substrate will enhance complete biodegradation of CAHs to innocuous byproducts, further substrate addition or system expansion is not warranted. Rather, Parsons recommends redistribution of the vegetable oil substrate, additional monitoring well installation, further process monitoring, and modifications to the analytical protocol.

The continued presence of vegetable oil in the injection wells indicates that the oil is present as a free phase within the aquifer. It is possible that this oil will migrate naturally over time and/or has reduced the relative permeability of the aquifer to the degree that there is effectively little flow through the treatment zone. Therefore, Parsons recommends that a second injection event be conducted to redistribute the oil more

uniformly and to increase the radius of influence of the vegetable oil. To accomplish this, Parsons recommends a "pull-push" combination of 1) extracting free phase oil and groundwater from the injection wells, 2) re-injecting the extracted oil as a dilute oil-in-water emulsion, and 3) a final water push of sufficient volume to distribute the total volume of oil at a residual saturation of less than 25 percent. This effort would be most effective using site groundwater extracted from the injection wells along with the free phase oil, or from a downgradient well (e.g., well PES-MW7S/D), in order to maintain native geochemical conditions within the treatment zone.

Alternatively, a pair of downgradient wells such as PES-MW2S/D and PES-MW3S/D, or PES-MW5S/D and PES-MW6S/D, could be used as extraction wells to create a hydraulic gradient and induce flow between the injection wells and downgradient monitoring wells. Groundwater would be extracted and then re-injected into the injection wells to create a recirculation cell between the injection and extraction locations. This scenario would attempt to pull the oil and emulsion through the treatment area. Circulation of at least two pore volumes is recommended to redistribute the vegetable oil within the recirculation zone of influence. It is still recommended to first extract as much free oil from the injection wells as possible to mix an initial slug of dilute oil-in-water emulsion.

Although no additional fluids (other than those already in the treatment zone) would be used under this scenario, amendment of the State of Tennessee and the Memphis and Shelby County Water Quality Control Board injection permits may be necessary. Based on microbial characterization, bioaugmentation using an established microbial population from a site known to dechlorinate TCE to completion (e.g., the Former NSA Mid-South bioremediation project conducted by Ensafe, Inc.) also should be considered.

Because of the degree of aquifer heterogeneity, low hydraulic gradient at the site, and elevated contaminant concentrations observed at upgradient well pair PES-MW1S/D, additional monitoring wells should be considered for the site. Parsons recommends two additional well pairs between the injection wells and upgradient well pair PES-MW1S/D. These well pairs may be distributed at approximately one-third distances between the injection wells and PES-MW1S/D, but it also is advisable to place them proximate to the storm water drain that runs through the injection area towards PES-MW1S/D. This storm water drain is a potential source of leakage and recharge. Depending on selection of a substrate re-distribution design, additional well pairs located within the treatment zone may be warranted to evaluate reductive dechlorination within the redistribution zone. Due to the potential for preferential flow paths and because the impact of the initial injection is being observed as far downgradient as PES-MW6D, two additional well pairs are recommended at approximately 50 feet downgradient from well pair PES-MW8S/D, but placed at a sufficient distance apart (cross-gradient) to account for variations in groundwater flow direction.

Further process monitoring is necessary to determine the long-term potential for enhanced bioremediation to accelerate attenuation of the contaminant plume at Site N-6. Process monitoring is recommended prior to substrate redistribution to extend the Phase I monitoring period and provide additional evaluation of the initial test. Because redistribution would cause changes in geochemical and contaminant concentrations simply by displacement, monitoring to establish a new baseline is recommended within 30 days of substrate redistribution. Semi-annual process monitoring is then

recommended for at least 12 to 18 months to determine whether substrate redistribution was effective.

Additions to the sampling protocol also are recommended. The addition of dissolved hydrogen is recommended to further evaluate the TEAPs that are occurring across the site. Select samples for VFA and PLFA analysis are recommended to determine the change and development of microbial communities and degradation processes that contribute to reductive dechlorination. Analyses of additional nutrient parameters (total nitrogen and phosphorus) also may be warranted. Finally, aquifer testing may be beneficial to establish preferential flow paths within the treatment zone. The use of *in situ* flow meters is likely to provide more definitive data over the entire screened interval of the fluvial deposits than slug tests, which measure average hydraulic conductivities.

SECTION 6

REFERENCES

Bouwer, E.J., 1994, Bioremediation of chlorinated solvents using alternate electron acceptors. In: Handbook of Bioremediation. CRC Press, Boca Raton, FL.

Bouwer, E.J., 1992, Bioremediation of Subsurface Contaminants. In: Mitchell, R., ed.: Environmental Microbiology. Wiley-Liss, New York, New York.

Carmichael, J.K., Parks, W.S., Kingsbury, J.A., and D.E. Ladd, 1997, Hydrogeology and Groundwater Quality of Naval Support Activity Memphis, Millington, Tennessee. Water Resources Investigations Report 97-4158. U.S. Geological Survey: Nashville, Tennessee.

Chapelle, F.H., 1993. Ground-Water Microbiology and Geochemistry: John Wiley & Sons, Inc., New York, 424 p.

EnSafe, Inc. (EnSafe), 2000a, RCRA Facility Investigation Report, Naval Support Activity Memphis, AOC A, Northside Fluvial Groundwater. Revision 02. Prepared for Department of the Navy, Southern Division Naval Facilities Engineering Command, North Charleston, South Carolina. February 17.

EnSafe, 2000b, Aquifer Characterization Test Report, Area of Concern A, Naval Support Activity Mid-South, Millington, Tennessee. Revision 01. Prepared for Department of the Navy, Southern Division Naval Facilities Engineering Command, North Charleston, South Carolina. February 25.

EnSafe, 2000c, RCRA Facility Investigation Report Addendum, Naval Support Activity Memphis, AOC A, Northside Fluvial Groundwater. Revision 0. Prepared for Department of the Navy, Southern Division Naval Facilities Engineering Command, North Charleston, South Carolina. February 17.

EnSafe, 1998, RCRA Facility Investigation Report, Naval Support Activity Memphis, AOC A, Northside Fluvial Groundwater. Revision 01. Prepared for Department of the Navy, Southern Division Naval Facilities Engineering Command, North Charleston, South Carolina. June 10.

Godsey, E.M., 1994, Microbiological and Geochemical Degradation Processes. In: Symposium on Intrinsic Bioremediation in Ground Water. Denver, Colorado. August 30 - September 1. p.35-40.

Grbic′-Galic′, D., 1990, Anaerobic microbial transformation of nonoxygenated aromatic and alicyclic compounds in soil, subsurface, and freshwater sediments. In: Bollag, J.M., and Stotzky, G., eds.: *Soil Biochemistry*: Marcel Dekker, Inc., New York, NY. p. 117-189.

Lovely, D.R., and Phillips, E.J.P., 1988, Novel Mode of Microbial Energy Metabolism: Organic Carbon Oxidation Coupled to Dissimilatory Reduction of Iron or Maganese: *Applied and Environmental Microbiology*, v. 54, no. 6, p. 1472-1480.

Parsons. 2000. Final Work Plan for Field Application to Enhance In-Situ Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Site N-6, Former Naval Support Activity mid-South, Millington, Tennessee. June.

Reinhard, M., Goodman, N.L., and Barker, J.F., 1984, Occurrence and distribution of organic chemicals in two landfill leachate plumes: *Environmental Science and Technology,* vol. 18, no. 12, p. 953-961.

Stumm, W. and Morgan, J.J., 1981, Aquatic Chemistry. John Wiley & Sons, New York, NY.

US Environmental Protection Agency (USEPA), 1998, Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater: EPA/600/R-98/128, September 1998; http://www.epa.gov/ada/reports.html.

US Geological Survey (USGS), 1995, Aquifer Test at NSA Memphis, Near Millington, Tennessee. December 1995.

Vogel, T.M., Criddle, C.S., and McCarty, P. L., 1987, Transformations of halogenated aliphatic compounds: *Environmental Science and Technology*, vol. 21, no. 8, p. 722-736.

PARSONS

Parsons Engineering Science, Inc. • A Unit of Parsons Infrastructure & Technology Group Inc.
1700 Broadway, Suite 900 • Denver, Colorado 80290 • (303) 831-8100 • Fax: (303) 831-8208 • www.parsons.com

07 May 2002

Mr. James Reed
Southern Division Naval Facilities Engineering Command
Mail Code 1888
2155 Eagle Drive
North Charleston, NC 29406
(843) 820-5543

Subject: Submittal of the Draft Field Application to Enhance *In-Situ* Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Site N-6, Former Naval Support Activity Mid-South, Millington, Tennessee (Contract N47408-00-C-7112)

Dear Mr. Reed,

Please find enclosed 2 copies of the Draft Field Application to Enhance *In-Situ* Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Site N-6, Former Naval Support Activity (NSA) Mid-South, Millington, Tennessee. The draft report was prepared by the Parsons Corporation (Parsons) for the Naval Facilities Engineering Command (NAVFAC) and NSA Mid-South. Please provide one of the enclosed copies to Mr. Cliff Casey. Parsons will provide additional copies as necessary.

Parsons would appreciate receiving any comments you or the staff at NSA Mid-South may have by 07 June 2002 (30 day review period). Parsons is also under contract to present the results of this study to Navy personnel and BRAC Cleanup Team members, at your convenience. If you have any questions or require additional information, please contact me at (303) 831-8100.

Sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Bruce M Henry

Bruce M. Henry, P.G.
Project Manager

cc: Scott Wight, NAVFAC (letter only)
Rob Williamson, NSA Mid-South (4 copies)
Jack Carmichael, USGS (1 copy)
John Stedman, EnSafe (1 copy)
Jim Morrison, TDEC (1 copy)
Clayton Billington, TDEC (1 copy)
Brian Donaldson, USEPA (1 copy

Attachment (2 copies)

DRAFT

FIELD FEASIBILITY TEST FOR *IN-SITU* BIOREMEDIATION OF CHLORINATED SOLVENTS VIA VEGETABLE OIL INJECTION AT SITE N-6, FORMER NAVAL SUPPORT ACTIVITY MID-SOUTH, TENNESSEE

May 2002

Prepared for:

NAVAL FACILITIES ENGINEERING COMMAND
PORT HUENEME, CALIFORNIA

NAVAL FACILITIES ENGINEERING COMMAND
SOUTHERN DIVISION
NORTH CHARLESTON, SOUTH CAROLINA

and

NAVAL SUPPORT ACTIVITY MID-SOUTH
MILLINGTON, TENNESSEE

Prepared by:
PARSONS
1700 Broadway, Suite 900
Denver, Colorado 80290

EXECUTIVE SUMMARY

This report documents the results of a field feasibility test to evaluate the application of vegetable oil as an organic substrate to enhance the *in situ* anaerobic reductive dechlorination of chlorinated aliphatic hydrocarbons (CAHs, or chlorinated solvents) in groundwater at Site N-6, Former Naval Support Activity (NSA) Mid-South Northside, Millington, Tennessee. Prior to the feasibility test, the distribution of parent compounds tetrachloroethene (PCE) and trichloroethene (TCE) and the degradation daughter product *cis*-1,2-dichloroethene (*cis*-1,2-DCE) in groundwater indicated that limited reductive dechlorination of chlorinated ethenes was occurring at the site, but that the process was electron donor (substrate) limited. Vegetable oil was selected as a slowly soluble organic substrate to overcome the electron donor deficiency and enhance anaerobic reductive dechlorination of chlorinated solvents in groundwater.

A field test consisting of injection and monitoring well installations, baseline sampling, and vegetable oil injection was conducted during July and August 2000. A total of 6,115 gallons of refined soybean oil and 790 gallons of native water were injected into eight injection wells in August 2000. Process monitoring was conducted in November 2000, February 2001, August 2001, and January 2002.

FIELD TEST RESULTS

Changes in geochemical conditions during process monitoring indicates that the addition of vegetable oil at Site N-6 has induced environmental conditions conducive to reductive dechlorination in the upper and lower fluvial deposits, but that these changes are not uniform nor widespread across the study area. Dissolved oxygen (DO) concentrations decreased at many locations after injection. However, concentrations of DO have generally remained above 0.4 milligrams per liter (mg/L) throughout the test area and this suggests that an influx of relatively oxygenated groundwater may be occurring in the treatment zone.

Baseline oxidation-reduction potential (ORP) values exhibited a wide range of reducing conditions with values ranging from a high of +253 millivolts (mV) to a low of -359 mV. ORP values varied substantially even within the treatment zone, which is suggestive of a high degree of heterogeneity in the natural reducing conditions at the site prior to injection. After injection, ORP values tended to stabilize within a range from +150 mV to –150 mV, indicating reducing conditions typically are within the nitrate-reduction to sulfate-reduction range. Increases in methane concentration at several locations indicate this oxidation-reduction process also has been stimulated by substrate addition. Iron and methane concentration data further suggest that iron-reduction and methanogenesis are the dominant terminal electron accepting processes (TEAPs) that have been stimulated at the site.

After vegetable oil injection there was an overall decrease in TCE concentrations detected in groundwater. However, this decreasing trend is not uniform for all of the wells at Site N-6. The greatest decrease in contaminant concentrations occurred at the injection locations, where contaminant concentrations have attenuated from greater than 600 micrograms per liter (µg/L) to less than method detection limits. It is not readily apparent whether observed decreases in TCE concentrations are a result of biodegradation, natural variations in contaminant concentrations, or partitioning of contaminant mass into the vegetable oil.

Consistent or long-term reductive dechlorination of chlorinated ethenes has not been demonstrated by monitoring completed through January 2002. Only within the past two process monitoring events has reductive dechlorination of TCE to *cis*-1,2-DCE been observed. There is currently no evidence of further reductive dechlorination to VC and ethene. Initial changes in contaminant profiles suggested that reductive dechlorination was initially stimulated at two locations (PES-MW7S and PES-MW1S). However, these locations are distant from the injection area relative to the other monitoring locations. A lack of consistent evidence of reductive dechlorination at these locations suggests that the initial changes in contaminant profiles may have been a result of groundwater displacement immediately following injection.

Well locations where evidence of reductive dechlorination of TCE to *cis*-1,2-DCE has occurred exhibit the following characteristics:

- TOC equal to or greater than approximately 10 mg/L.
- Measurable quantities of volatile fatty acids (VFAs) equal to or greater than 20 mg/L.
- ORP less than –60 mV.
- Ferrous iron concentration greater than 4 mg/L, sulfate concentration less than 1 mg/L, and methane concentration greater than 0.5 mg/L.
- Total biomass greater than approximately 50 picomoles of phospholipid fatty acids per milliliter (pmoles PLFA/mL).

These conditions have not been induced uniformly or widespread across the treatment area, but have been limited mostly to the immediate injection area. In order to stimulate reductive dechlorination, sufficient organic substrate is required to create environmental conditions sufficiently reducing for methanogenesis to occur while stimulating microbial growth of dechlorinating microorganisms. Therefore, the lack of reductive dechlorination at Site N-6 is primarily a function of substrate distribution.

Finally, complete dechlorination to ethene has not been demonstrated. However, the presence of *Dehalococcoides Ethenogenes*, a bacteria which is known to degrade chlorinated ethenes to completion, has been established at the site. The potential for complete dechlorination to occur will likely depend on the growth and development of substantial populations of appropriate dechlorinating microorganisms in the presence of competing microbial processes.

RECOMMENDATIONS

Contaminant, daughter product, geochemical, and microbial data strongly suggest that the lack of reductive dechlorination at Site N-6 is primarily a function of substrate

distribution. Until it can be demonstrated that adequate distribution of vegetable oil substrate will enhance complete biodegradation of CAHs to innocuous byproducts, further substrate addition or system expansion is not warranted. Rather, redistribution of the vegetable oil substrate, additional monitoring well installation, further process monitoring, and modifications to the analytical protocol are recommended.

The presence of some vegetable oil in the injection wells indicates that the oil is present as a free phase within the aquifer. It is possible that this oil has reduced the relative permeability of the aquifer to the degree that there is effectively little flow through the treatment zone. Therefore, a second injection event is recommended to redistribute the oil more uniformly throughout the treatment zone. To accomplish this, Parsons recommends a "pull-push" combination of 1) extracting free phase oil from the injection wells, 2) re-injecting the extracted oil as a dilute oil-in-water emulsion, and 3) a final water push of sufficient volume to distribute the total volume of oil at a residual saturation of less than 25 percent. This effort would be most effective using site groundwater extracted from the injection wells along with the free phase oil, or from a downgradient well (e.g., well PES-MW7S/D), in order to maintain native geochemical conditions within the treatment zone.

Alternatively, a pair of downgradient wells could be used for extraction to induce flow between the injection wells and downgradient monitoring wells within the treatment zone. Groundwater could be extracted and then re-injected into the injection wells to create a recirculation cell between the injection and extraction locations. This scenario would attempt to pull the oil through the treatment area. Circulation of at least two pore volumes is recommended to redistribute the vegetable oil within the recirculation zone of influence. It is still recommended to first extract as much free oil from the injection wells as possible to mix an initial slug of dilute oil-in-water emulsion.

Although no additional fluids (other than those already in the treatment zone) would be used under this scenario, amendment of the State of Tennessee and the Shelby and Memphis County Water Quality Control Board injection permits may be necessary.

Based on microbial characterization, bioaugmentation using an established microbial population from a site known to dechlorinate TCE to completion also should be considered.

Because of the degree of aquifer heterogeneity, low hydraulic gradient, and elevated contaminant concentrations observed at upgradient well pair PES-MW1S/D, additional monitoring wells should be considered for the site. Parsons recommends additional well pairs between the injection wells and upgradient well pair PES-MW1S/D. Depending on selection of a substrate redistribution design, additional well pairs may be warranted to evaluate reductive dechlorination within the redistribution zone. Due to the potential for preferential flow paths and because the impact of the initial injection is being observed as far as 30 feet downgradient of the injection wells, additional well pairs are recommended at distances up to 150 feet downgradient from the injection wells.

Process monitoring is recommended prior to any substrate redistribution to provide additional evaluation of the initial test. Because redistribution would cause changes in geochemical and contaminant concentrations simply by displacement, monitoring to establish a new baseline is recommended within 30 days of substrate redistribution. Semi-annual performance monitoring is recommended for at least 12 to 18 months to determine whether substrate redistribution was effective in stimulating reductive dechlorination.

Additions to the sampling protocol also are recommended. The addition of dissolved hydrogen is recommended to further evaluate the TEAPs that are occurring across the site. Select samples for VFA and PLFA analysis are recommended to determine the change and development of microbial communities and degradation processes that contribute to reductive dechlorination. Finally, additional aquifer testing may be beneficial to establish preferential flow paths within the treatment zone.

TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY ES-1

ACRONYMS AND ABBREVIATIONS vi

SECTION 1 - INTRODUCTION 1-1

1.1 Objectives 1-1
1.2 Scope of Work 1-1
1.3 Report Organization 1-2
1.4 Site History 1-3

SECTION 2 - SUMMARY OF HISTORICAL SITE CHARACTERIZATION 2-1

2.1 Historical Site Characterization 2-1
2.1.1 Geology 2-2
2.1.2 Hydrogeology 2-6
2.2 Nature and Extent of Contamination 2-9
2.2.1 Soil Analytical Results 2-9
2.2.2 Groundwater Quality 2-9
2.3 Groundwater Use and Potential Receptors 2-16

SECTION 3 - FIELD TEST IMPLEMENTATION 3-1

3.1 System Installation 3-2
3.1.1 Injection Point and Groundwater Sampling Locations 3-2
3.1.2 Injection and Groundwater Monitoring Well Installation 3-6
3.1.3 Soil Sampling 3-6
3.2 Measurement of Baseline Geochemical Conditions and Contaminant Profiles 3-9
3.3 Aquifer Testing 3-9
3.4 Substrate Addition 3-9
3.5 Process Monitoring 3-11

SECTION 4 - RESULTS 4-1

4.1 Groundwater Flow 4-2
4.2 Soil Sampling Results 4-13
4.2.1 Total Organic Carbon in Soil 4-13

TABLE OF CONTENTS (Continued)

Page

4.2.2 Pre-Injection Extent of Chlorinated Aliphatic Hydrocarbons in Soil 4-15
4.3 Pre-Injection Extent of Chlorinated Aliphatic Hydrocarbons in Groundwater 4-15
4.4 Post-Injection Profile of Chlorinated Aliphatic Hydrocarbons 4-22
4.4.1 Chlorinated Ethenes Over Time 4-22
4.4.2 Presence of Daughter Products and CAH Ratios 4-29
4.4.3 Chlorinated Aliphatic Hydrocarbons In Oil 4-38
4.5 Substrate Addition 4-38
4.5.1 Total Organic Carbon as an Indicator of Substrate Addition and Zone of Influence 4-39
4.5.2 Biomass and Volatile Fatty Acids 4-43
4.5.3 Microbial Community Characterization Results 4-45
4.6 Geochemical Results 4-48
4.6.1 Alternate Electron Acceptors and Metabolic Byproducts 4-48
4.6.1.1 Dissolved Oxygen 4-49
4.6.1.2 Nitrate and Nitrite 4-49
4.6.1.3 Ferrous Iron 4-51
4.6.1.4 Sulfate 4-52
4.6.1.5 Methane, Ethane, and Ethene in Groundwater 4-54
4.6.2 ORP as an Indicator of Redox Processes 4-56
4.6.3 Additional Geochemical Indicators 4-60
4.6.3.1 Chloride as an Indicator of Reductive Dechlorination 4-60
4.6.3.2 Carbon Dioxide and Alkalinity 4-62
4.7 Summary of Enhanced Biodegradation 4-65

SECTION 5 - CONCLUSIONS AND RECOMMENDATIONS 5-1

5.1 Conclusions 5-1
5.1.1 Observed Changes in Site Geochemistry 5-1
5.1.2 Actual/Significant Changes in Contaminant Concentrations 5-2
5.1.3 Daughter Product Formation and Persistence 5-2
5.1.4 Degree of Electron Donor Utilization for Reductive Dechlorination 5-3
5.1.5 Substrate Distribution and Potential for Future Reductive Dechlorination 5-3
5.2 Recommendations 5-4

SECTION 6 - REFERENCES 6-1

TABLE OF CONTENTS (Continued)

APPENDICES

A - Analytical Data
B - Field Test Data
B.1 - Borehole Logs
B.2 - Well Construction Diagrams
B.3 - Groundwater Sampling Forms
B.4 – Aquifer Test Data
C – Concentration and Molar Fraction Plots

LIST OF TABLES

No.	Title	Page
2.1	Summary of Historic Volatile Organic Compound Detections in Groundwater	2-10
3.1	Summary of Initial Site Activities	3-3
3.2	Well Construction Summary	3-7
3.3	Analytical Protocols for Soil, Vegetable Oil, and Groundwater Samples	3-8
3.4	Vegetable Oil Injection Summary	3-10
3.5	Summary of Performance Monitoring Activities	3-12
4.1	Summary of Groundwater Elevations	4-3
4.2	Pre-Injection Hydraulic Conductivities and Average Groundwater Velocities	4-10
4.3	Post-Injection Hydraulic Conductivities and Average Groundwater Flow Velocities	4-12
4.4	Summary of Analytical Results for Soil	4-14
4.5	Summary of Volatile Organic Compounds Detected in Groundwater Site N-6 Process Monitoring Program	4-16
4.6	Summary of Volatile Organic Compounds Detected in Groundwater NSA Mid-South Longterm Monitoring Program	4-20
4.7	Summary of Groundwater Geochemical Data	4-40
4.8	Biomass and Volatile Fatty Acids in Groundwater	4-44
4.9	Summary of Enhanced Bioremediation Potential	4-66

LIST OF FIGURES

No.	Title	Page
1.1	Naval Support Activity Mid-South Location and Topographic Map	1-4
1.2	Site N-6 Features and Potential Source Areas	1-5
2.1	Cross Section and Historic Sampling Location Map	2-3
2.2	Hydrogeologic Cross Section A-A'	2-4
2.3	Hydrogeologic Cross Section B-B'	2-5
2.4	Fluvial Deposits Groundwater Potentiometric Surface Map (April, 1996)	2-7

TABLE OF CONTENTS (Continued)

LIST OF FIGURES (Continued)

No.	Title	Page
2.5	Maximum Historical TCE Concentrations Measured in Fluvial Deposits Groundwater 1994 to 1998	2-13
2.6	TCE Measured in Groundwater Fluvial Deposits 1994 to 1998 – Cross Section A-A'	2-14
2.7	TCE Measured in Groundwater Fluvial Deposits 1994 to 1998 – Cross Section B-B'	2-15
3.1	Monitoring and injection Well Location Map	3-4
3.2	injection Well Layout	3-5
4.1	Upper Fluvial Deposits Groundwater Elevations August 2000	4-7
4.2	Upper Fluvial Deposits Groundwater Elevations July/August 2002	4-8
4.3	Maximum TCE Concentrtion in Groundwater July/August 2000 (Pre-injection)	4-23
4.4	Maximum TCE Concentration in Groundwater July/August 2001 (Post-injection)	4-25
4.5A	Concentrations of TCE in Upper Fluvial Deposits Over Time	4-26
4.5B	Concentrations of TCE in Lower Fluvial Deposits Over Time	4-26
4.6A	Concentrations of *cis*-1,2-DCE in Upper Fluvial Deposits Over Time	4-27
4.6B	Concentrations of *cis*-1,2-DCE in Lower Fluvial Deposits Over Time	4-27
4.7A	Concentrations of Select Chlorinated Ethenes Over Time Well PES-MW1S	4-30
4.7B	Molar Fraction of Chlorinated Ethenes at Well PES-MW1S	4-30
4.8A	Concentrations of Select Chlorinated Ethenes Over Time Well PES-MW3S	4-31
4.8B	Molar Fraction of Chlorinated Ethenes at Well PES-MW3S	4-31
4.9A	Concentrations of Select Chlorinated Ethenes Over Time Well PES-MW2S	4-33
4.9B	Molar Fraction of Chlorinated Ethenes at Well PES-MW2S	4-33
4.10A	Concentrations of Select Chlorinated Ethenes Over Time Well PES-MW2D	4-34
4.10B	Molar Fraction of Chlorinated Ethenes at Well PES-MW2D	4-34
4.11A	Concentrations of Select Chlorinated Ethenes Over Time Well PES-MW3D	4-35
4.11B	Molar Fraction of Chlorinated Ethenes at Well PES-MW3D	4-35
4.12A	Concentrations of Select Chlorinated Ethenes Over Time Well PES-MW6D	4-36
4.12B	Molar Fraction of Chlorinated Ethenes at Well PES-MW6D	4-36
4.13A	Concentrations of Dissolved Oxygen in Upper Fluvial Deposits Over Time	4-50
4.13B	Concentrations of Dissolved Oxygen in Lower Fluvial Deposits Over Time	4-50
4.14A	Concentrations of Ferrous Iron in Upper Fluvial Deposits Over Time	4-53

TABLE OF CONTENTS (Continued)

LIST OF FIGURES (Continued)

No.	Title	Page
4.14B	Concentrations of Ferrous Iron in Lower Fluvial Deposits Over Time	4-53
4.15A	Concentrations of Methane in Upper Fluvial Deposits Over Time	4-55
4.15B	Concentrations of Methane in Lower Fluvial Deposits Over Time	4-55
4.16A	Concentrations of Ethene in Upper Fluvial Deposits Over Time	4-57
4.16B	Concentrations of Ethene in Lower Fluvial Deposits Over Time	4-57
4.17A	Oxidation/Reduction Potential in Upper Fluvial Deposits Over Time	4-59
4.17B	Oxidation/Reduction Potential in Lower Fluvial Deposits Over Time	4-59
4.18A	Concentrations of Chloride in Upper Fluvial Deposits Over Time	4-61
4.18B	Concentrations of Chloride in Lower Fluvial Deposits Over Time	4-61
4.19A	Concentrations of Total Alkalinity in Upper Fluvial Deposits Over Time	4-63
4.19B	Concentrations of Total Alkalinity in Lower Fluvial Deposits Over Time	4-63
4.20A	Concentrations of Carbon Dioxide in Upper Fluvial Deposits Over Time	4-64
4.20B	Concentrations of Carbon Dioxide in Lower Fluvial Deposits Over Time	4-64

ACRONYMS AND ABBREVIATIONS

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
amsl	above mean sea level
AOC A	Area of Concern A
BCT	BRAC Cleanup Team
bgs	below ground surface
BRAC	Base Closure and Realignment Act
CAHs	chlorinated aliphatic hydrocarbons
cells/mL	cells per milliliter
cm/sec	centimeters per second
COCs	chemicals of concern
CT	carbon tetrachloride
DCA	dichloroethane
DCE	dichloroethene
DGGE	denaturing gradient gel electrophoresis
DNA	deoxyribonucleic acid
DO	dissolved oxygen
DPT	direct-push techniques
ft/day	feet per day
ft/ft	foot per foot
ft/yr	feet per year
gal/ft^2	gallons per day per square foot
HSWA	Hazardous and Solid Waste Amendments
ID	inside-diameter
Fe (II)	ferrous iron
Fe (III)	ferric iron
IRP	Installation Restoration Program
LTM	long-term monitoring
MDL	method detection limit
Mn(II)	manganese
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mV	millivolts
NAPL	non-aqueous phase liquid
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
NSA	Naval Support Activity
ORP	oxidation-reduction potential
Parsons	Parsons Corporation
PCE	tetrachloroethene
PID	photo-ionization detector
PLFA	phospholipid fatty acid
PVC	polyvinyl chloride
RBCs	risk-based concentrations
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RL	reporting limit
SSL	soil screening level
SVOCs	semi-volatile organic compounds
SWMU	Solid Waste Management Unit
TCA	1,1,1-trichloroethane

TCE	trichloroethene
TDEC	Tennessee Department of Environment and Conservation
TEAP	terminal electron accepting process
TPH-DRO	total petroleum hydrocarbons - diesel range organics
TOC	total organic carbon
USEPA	United States Environmental Protection Agency
VC	vinyl chloride
VFA	volatile fatty acids
VOCs	volatile organic compounds

SECTION 1

INTRODUCTION

This report provides results of a field-scale application for enhanced *in-situ* bioremediation of chlorinated solvents via vegetable oil injection at Site N-6, Former Naval Support Activity (NSA) Mid-South Northside, Millington, Tennessee. This report was prepared for the Naval Facilities Engineering Command (NAVFAC) and NSA Mid-South by the Parsons Corporation (Parsons).

1.1 OBJECTIVES

This project is being conducted by NAVFAC in conjunction with Parsons and NSA Mid-South to document the enhanced bioremediation of chlorinated solvents dissolved in groundwater by injecting an organic substrate (vegetable oil) into the subsurface below the water table. Specifically, the objective of this field application is to determine if vegetable oil injection is a viable treatment option for remediation of volatile organic compounds (VOCs) in groundwater at Site N-6.

1.2 SCOPE OF WORK

Site-specific activities conducted at NSA Mid-South in support of the field feasibility test included:

- Installation of 8 vegetable oil injection wells and 16 groundwater monitoring wells using Rotasonic drilling technology;
- Baseline (i.e., pre-injection) sampling of groundwater at the newly-installed injection and monitoring wells, and existing monitoring wells 007G15UF (shallow) and 007G15LF (deep), in accordance with the *Final Work Plan for Field*

Application to Enhance In-Situ Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Site N-6, Former Naval Support Activity Mid-South, Millington, Tennessee (Parsons, 2000) and the *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* (United States Environmental Protection Agency [USEPA], 1998);

- Pre-injection aquifer testing (hydraulic conductivity) of four injection wells and eight monitoring wells;
- Injection of a total of 6,115 gallons of refined soybean oil;
- Post-injection aquifer testing (hydraulic conductivity) of the previously tested-four injection wells;
- Surveying of the newly installed injection and monitoring wells; and
- Post-injection sampling of groundwater and vegetable oil at the system monitoring and injection wells and existing monitoring wells 007G15UF and 007G15LF in November 2000, February 2001, August 2001, and January 2002.

This report describes the activities performed for the field test and results of process monitoring.

1.3 REPORT ORGANIZATION

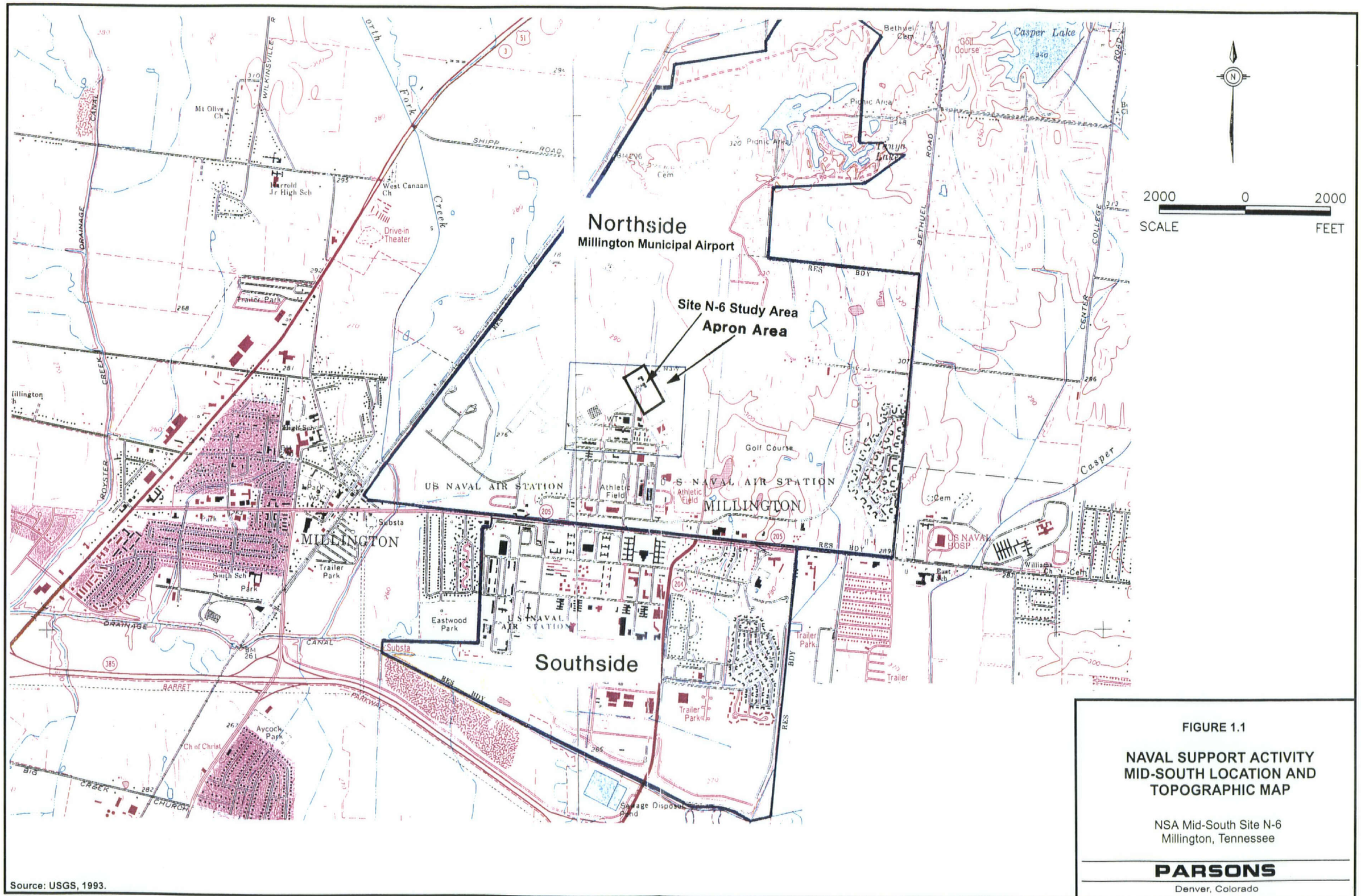
This report consists of six sections, including this introduction, and three appendices. Section 2 summarizes historical site characterization. Section 3 describes the field system installation, substrate addition, and the procedures followed for data collection. Section 4 discusses and evaluates the results of the vegetable oil injection. Section 5 provides conclusions and recommendations, and Section 6 contains the references used in preparing this document. Appendix A contains analytical results and Appendix B contains field sampling data and forms. Appendix C contains plots of contaminant concentrations and molar fractions over time for the system monitoring wells.

1.4 SITE HISTORY

NSA Mid-South is located in Millington, Tennessee (Figure 1.1). Navy airfield operations ceased in 1995, at which time the mission of this Navy facility changed from Naval Air Station (NAS) Memphis to NSA Memphis. In 1998, the facility officially became NSA Mid-South. As a result of the Base Closure and Realignment Act (BRAC) of 1990, a portion of NSA Mid-South (the Northside) has been closed and was transferred to the City of Millington in December 1999. The City of Millington now owns and operates the Northside as a municipal airport.

To expedite the transfer of the Northside to the City of Millington, the BRAC Cleanup Team (BCT) designated the NSA Northside fluvial deposits groundwater as Area of Concern A (AOC A). A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) for Solid Waste Management Unit (SWMU) 7, the Building N-126 Plating Shop Dry Well, identified multiple areas in which groundwater was contaminated with chlorinated solvents. One particular site near former Hanger N-6 is the focus of this field application. The RFI was performed pursuant to the Navy's Installation Restoration Program (IRP) and the Hazardous and Solid Waste Amendments (HSWA) section of the RCRA Permit (TNHW-094), issued to NSA Memphis in 1996 by the Tennessee Department of Environment and Conservation (TDEC).

Site N-6 is located in the Northside portion of NSA Mid-South, now City of Millington Property. Figure 1.2 shows the site features and potential sources of solvents. The N-6 Site is centered around a former aircraft hanger (former Building N-6), and includes the surrounding flightline apron. The Building N-6 area was previously used for maintenance of military aircraft. Suspected releases of solvents at the site include the reported use of unspecified solvents as weed killer east of former Building N-6. Other suspected sources of solvents include a small aircraft parts stripping and painting area west of former Building N-6 and an underground waste tank present within former Building N-6 (EnSafe, 2000a). Actual dates or quantities of contaminant releases are unknown.



Source: USGS, 1993.

FIGURE 1.1

NAVAL SUPPORT ACTIVITY MID-SOUTH LOCATION AND TOPOGRAPHIC MAP

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

737490b.cdr pasteup p1 aee 0300

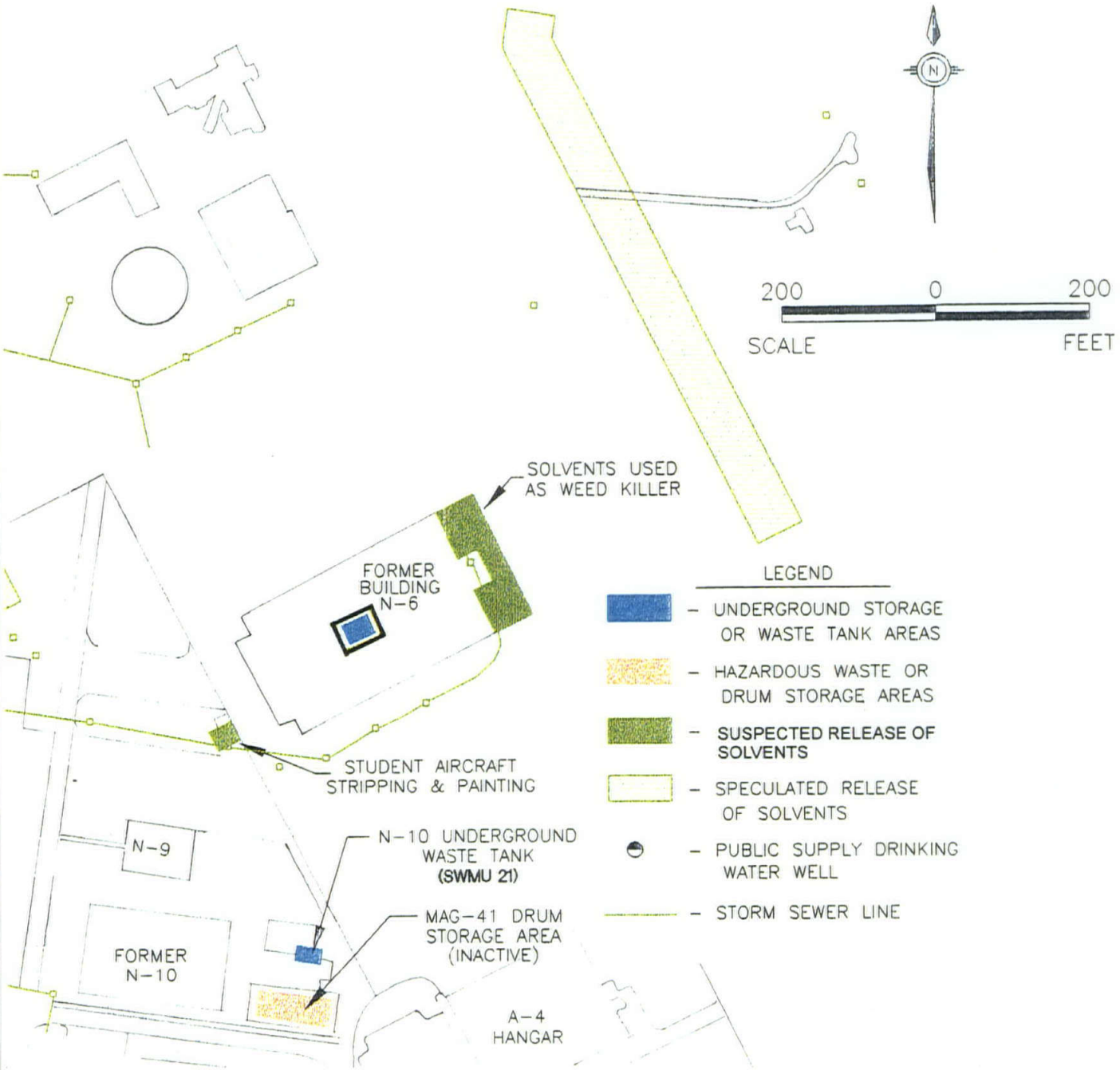


FIGURE 1.2

SITE N-6 FEATURES AND POTENTIAL SOURCE AREAS

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

Source: EnSafe, Inc., 1998.

draw\8511V.cdr pup aee 0300

Solvents reportedly used at NSA Mid-South include 1,1,1-tetrachlorethane (TCA) and trichloroethene (TCE). Chemicals of concern (COCs) identified for Site N-6 include TCE; the dichloroethene (DCE) isomers 1,1-DCE, *cis*-1,2-DCE, and *trans*-1,2-DCE; 1,1-dichloroethane (DCA); 1,2-DCA; and carbon tetrachloride (CT). The work under this project focuses on the bioremediation of these chlorinated compounds.

SECTION 2

SUMMARY OF HISTORICAL SITE CHARACTERIZATION

This section summarizes the results of site characterization conducted by NSA Mid-South.

2.1 HISTORICAL SITE CHARACTERIZATION

Site-specific data were reviewed to evaluate groundwater flow and contaminant transport and to determine locations for installation of injection and groundwater monitoring wells. Section 2.1 presents a synopsis of site characterization data made available to Parsons. Section 2.2 presents an interpretation of the data from the standpoint of biodegradation of chlorinated ethenes, ethanes, and methanes present at the site. Because chlorinated ethenes comprise the bulk of dissolved chlorinated solvents at Site N-6, they are the focus of this discussion.

The following sections are based upon review and summary of data from the following sources:

- *RCRA Facility Investigation Report, Naval Support Activity Memphis, AOC A, Northside Fluvial Groundwater* (EnSafe, 2000a);
- *Aquifer Characterization Test Report, Area of Concern A, Naval Support Activity Mid-South, Millington, Tennessee* (EnSafe, 2000b);
- *RCRA Facility Investigation Report Addendum, Naval Support Activity Memphis, AOC A, Northside Fluvial Groundwater* (EnSafe, 2000c);
- *Hydrogeology and Groundwater Quality of Naval Support Activity Memphis, Millington, Tennessee* (Carmichael *et al.*, 1997).

The reader is referred to these documents for a more detailed review of site-specific data. Additional sources of site data are referenced within the text.

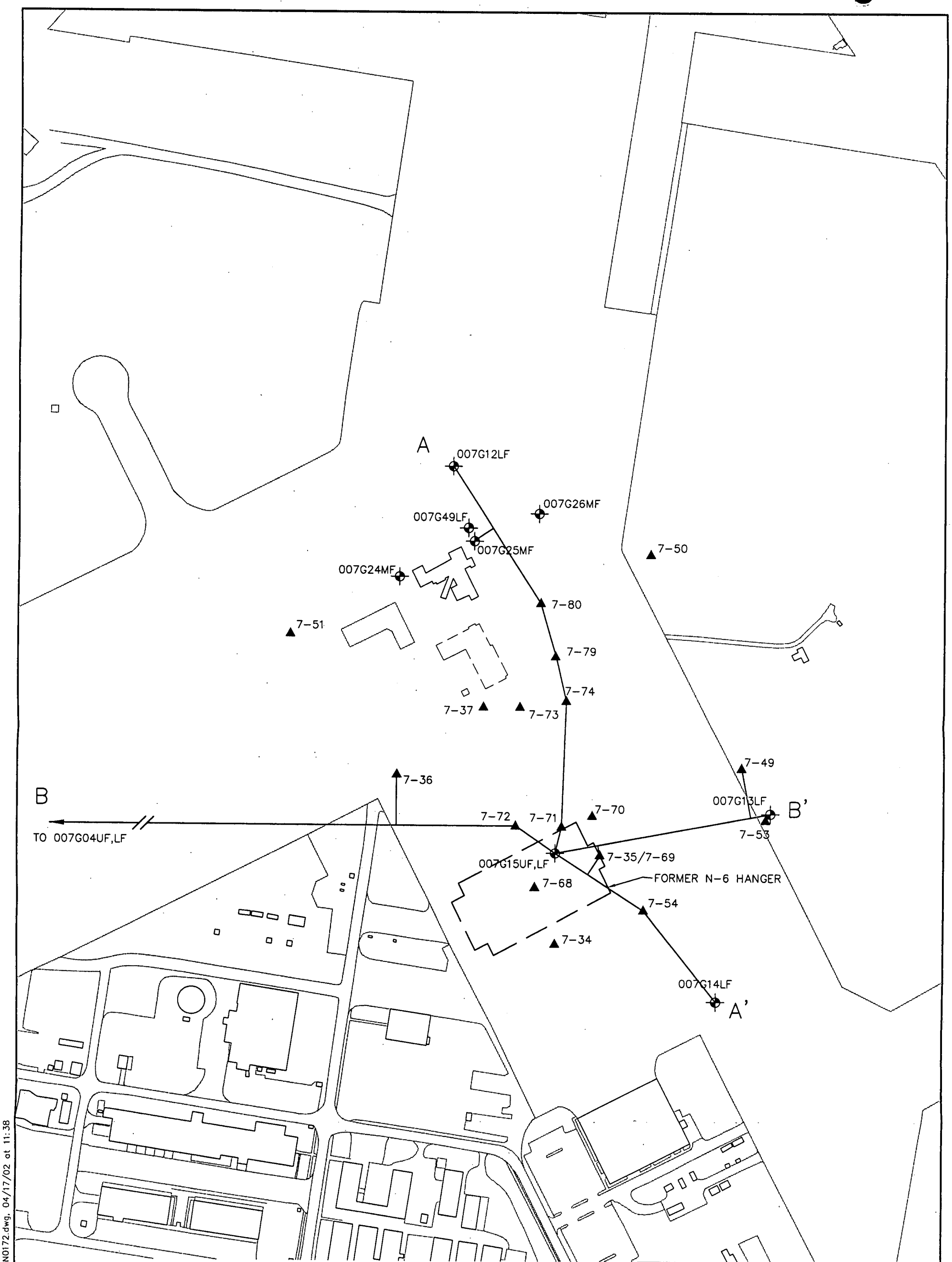
2.1.1 Geology

The stratigraphic units beneath Site N-6 identified for this and previous studies in descending order are: Pleistocene age loess; Pleistocene to possibly Pliocene age fluvial deposits; and upper units of the Claiborne Group, specifically the Cockfield and Cook Mountain Formations of Eocene age. The Cockfield and Cook Mountain Formations are overlying confining units to the Memphis Sand, which comprises the regional Memphis aquifer. Alluvium is locally present beneath the alluvial plain of North Fork Creek and its tributaries (Figure 1.1), but is generally absent in the apron area (i.e., Site N-6). Figure 2.1 shows the locations of hydrogeologic Cross Sections A-A' (Figure 2.2) and B-B' (Figure 2.3) across Site N-6. The following lithologic descriptions and stratigraphic relationships are summarized from the AOC A RFI (EnSafe, 2000a and 2000c).

Loess deposits underlying the Northside consist of silt, silty clay, and minor amounts of sand and clay. Loess deposits range in thickness from 25 to 45 feet across the apron area, and average approximately 35 feet thick at Site N-6. The color of the loess varies from differing shades of brown, yellow, orange, red, and olive-gray. It is often mottled in color and may contain trace amounts of organic matter. The loess typically becomes stiffer, less moist, and contains a greater clay content with depth. In areas not covered by the concrete apron, the loess yields water and is the shallowest water-bearing zone at NSA Mid-South.

A relatively thin layer of reworked fluvial deposits is locally present between the loess and underlying fluvial deposits. Where present, this transition zone consists of sandy silt and silty and clayey fine- to medium-grained sand.

Fluvial deposits lie unconformably beneath the loess/fluvial deposits transition zone and may be recognized by the uppermost presence of very fine grained sand. Previous



LEGEND

7-54 ▲ – DPT SAMPLE AND LOCATION NUMBER

007G14LF ⊕ – WELL SAMPLE AND WELL NUMBER

UF – UPPER FLUVIAL DEPOSITS WELL

LF – LOWER FLUVIAL DEPOSITS WELL

0 100 200 400

FEET

FIGURE 2.1

CROSS SECTION AND HISTORIC SAMPLING LOCATION MAP

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS

Denver, Colorado

S:\ES\Remed\737490\02000\WorkPlan\00DN0172.dwg, 04/17/02 at 11:38

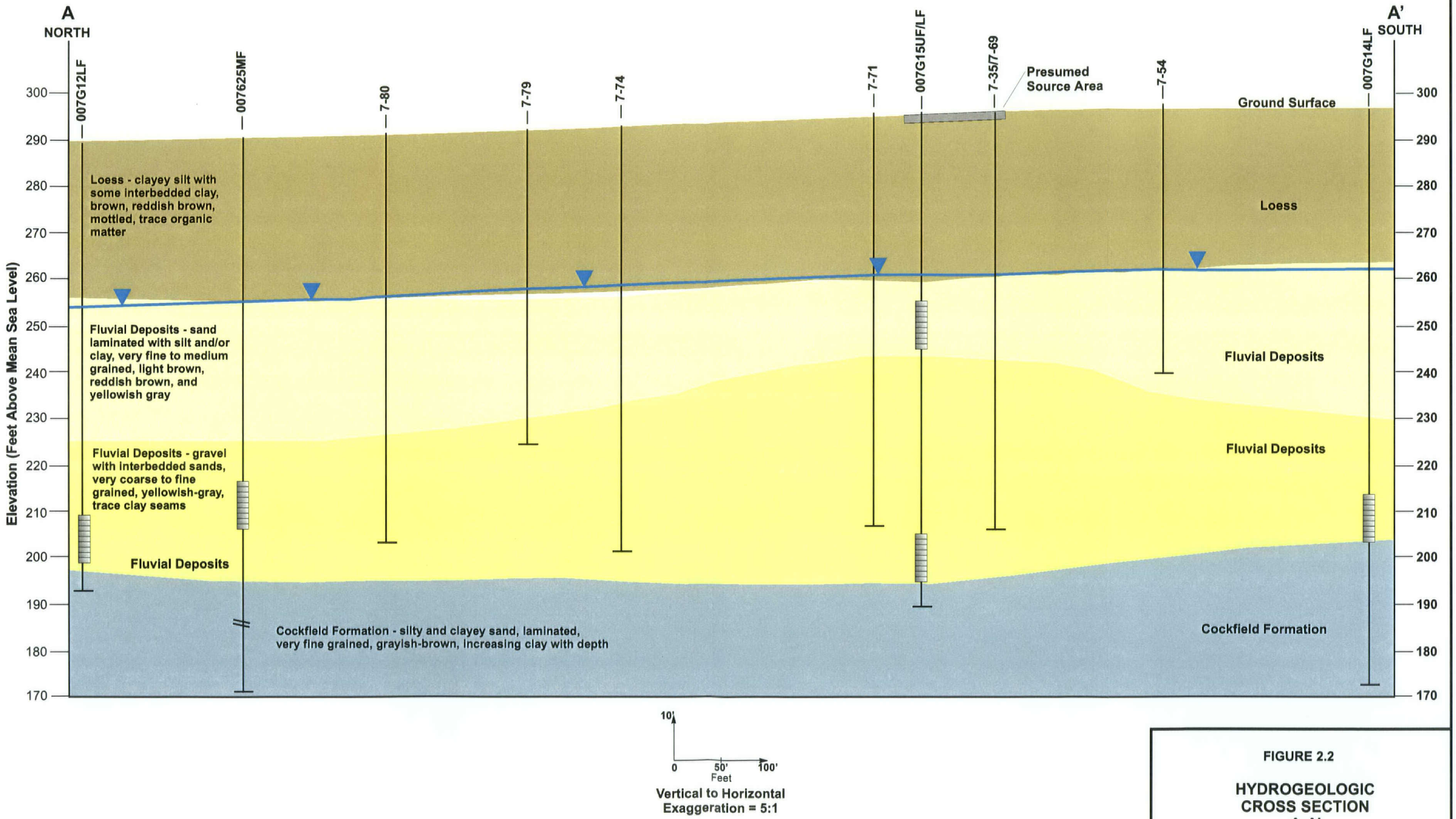


FIGURE 2.2

HYDROGEOLOGIC CROSS SECTION A-A'

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

draw\737490b.cdr p1 nap 4/24/02

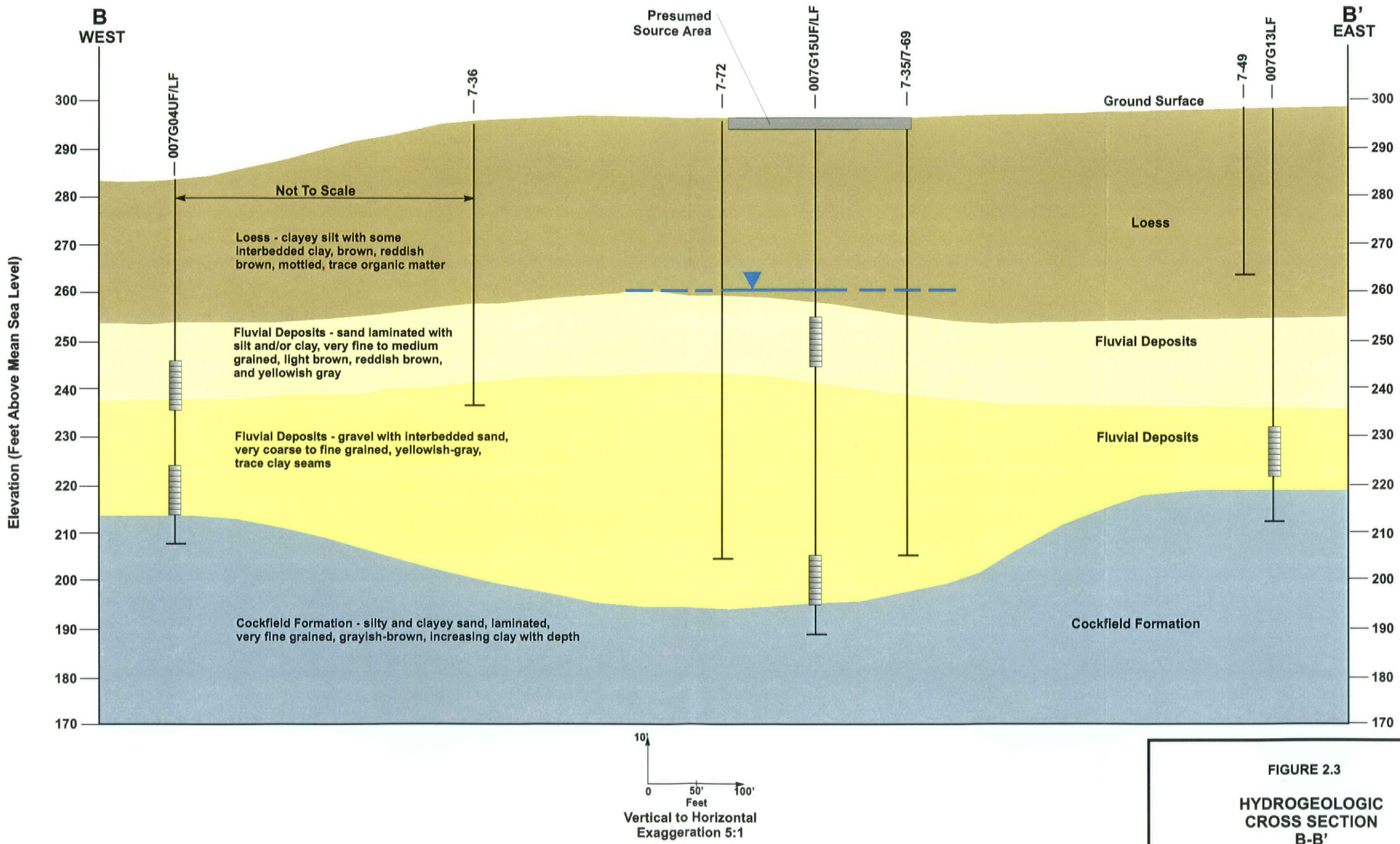


FIGURE 2.3

HYDROGEOLOGIC CROSS SECTION B-B'

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

draw\737490b.cdr p2 nap 4/24/02

investigations at the site have divided the fluvial deposits into an upper sand-dominated zone and a lower gravel-dominated zone (Cross Sections A-A' and B-B'). The upper sand-dominated fluvial sediments consist of very-fine- to coarse-grained sand, coarsening downward in the sequence. These sands locally contain lenses of silt and/or clay and the sand may be finely micaceous. Scattered gravel also is present inter-fingered or interbedded with the fluvial sands. Sand-dominated fluvial deposits are commonly light brown to reddish-brown, and are locally mottled yellowish-gray to orange.

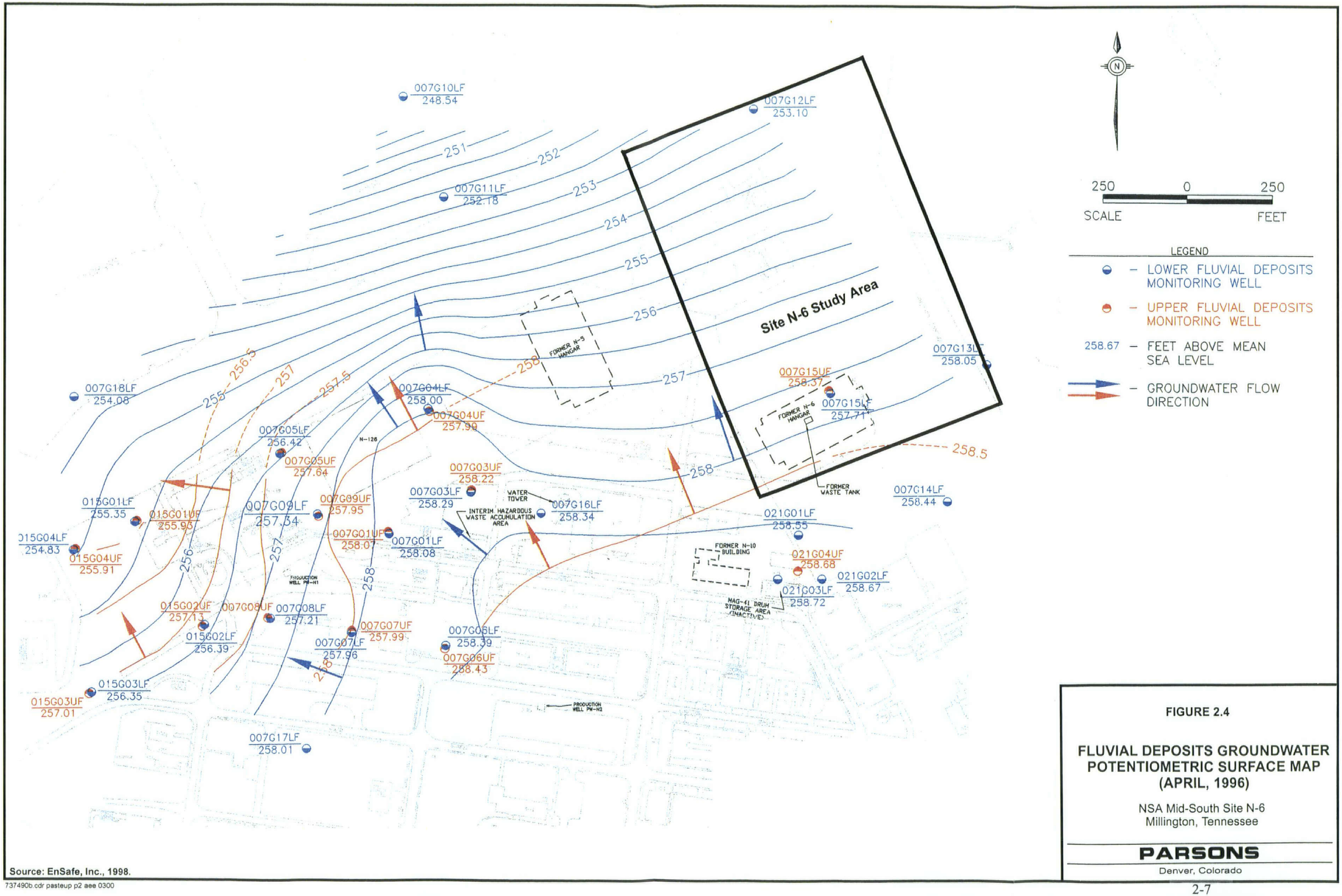
The lower gravel-dominated fluvial deposits are characterized by mixtures of poorly to moderately sorted gravels (up to 3-inch diameter) and fine- to very coarse-grained sand, in a generally coarsening downward sequence. The gravel and sand mixtures contain inter-fingering fine- to coarse-grained sand stringers with some silt and clay. The gravel-dominated fluvial deposits are generally dusky yellow to dark yellowish-orange and yellowish-gray.

The fluvial deposits beneath Site N-6 range from 35 feet to 64 feet thick, with the thickest deposits directly beneath the former N-6 hanger (source area identified on Cross Sections A-A' and B-B').

The Cockfield Formation lies unconformably below the fluvial deposits at depths of 80-100 feet below Site N-6 (Cross Sections A-A' and B-B'). The upper contact of the Cockfield Formation is typically distinguished by a marked change from the overlying gravel-dominated fluvial deposits to a heterogeneous mixture of sand, silt, clayey sand, clay, and lignite. The uppermost part of the Cockfield Formation is generally comprised of very fine- to fine-grained sand with interlaminations of silt and/or clay, and is generally dusky brown to brownish-gray.

2.1.2 Hydrogeology

The water table beneath Site N-6 is generally located approximately 40 feet below ground surface (bgs). The Northside fluvial groundwater flow pattern can be seen in Figure 2.4, which illustrates upper and lower fluvial deposits groundwater flow across



Source: EnSafe, Inc., 1998.

FIGURE 2.4

FLUVIAL DEPOSITS GROUNDWATER POTENTIOMETRIC SURFACE MAP (APRIL, 1996)

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

737490b.cdr pasteup p2 aee 0300

the Northside AOC A for April 1996 (EnSafe, 2000a). The groundwater surface is generally located at the top of the fluvial deposits, but also may be locally present within the loess deposits at Site N-6. As shown, the local flow direction near Site N-6 is toward the northwest with a horizontal gradient of approximately 0.004 foot per foot (ft/ft), based on elevations from wells 007G12LF and 007G13LF. The fluvial deposits potentiometric surface occurs within the loess deposits (Cross Sections A-A' and B-B'), indicating confined or semi-confined conditions. Groundwater elevations for wells screened in the upper and lower fluvial deposits indicate that groundwater flow for these horizons are similar across the apron area. Groundwater elevation data from well pair 007G15UF/LF indicate a vertical gradient of -0.013 ft/ft in a downward direction.

Aquifer characterization during the RFI (EnSafe, 2000a) indicated horizontal hydraulic conductivity of the fluvial deposits across the Northside of 5.3 feet per day (ft/day) from an aquifer test; horizontal hydraulic conductivity ranging from 10 to 38 ft/day by monitoring well specific capacity testing; and horizontal hydraulic conductivity ranging from 0.004 to 1.98 ft/day using Hydrocone testing within the upper fluvial deposits/loess transitional interval. Further aquifer characterization by EnSafe (2000b) using a short-term, specific-capacity test, a step-drawdown test, and a longer-term constant-rate aquifer test yielded a hydraulic conductivity for the fluvial deposits ranging from 44.6 ft/day to 68.3 ft/day, with a geometric mean of 59.1 ft/day.

Given an estimated effective porosity of 27 percent, a hydraulic gradient of 0.004 ft/ft, and a hydraulic conductivity of 5.3 ft/day, EnSafe (2000a) calculated an advective groundwater velocity of 30 feet per year (ft/yr) for an area incorporating Site N-6. Similarly, a hydraulic conductivity of 59.1 ft/day can be used to calculate an advective groundwater velocity of 320 ft/yr. Based on the observed variation in lithology and hydraulic conductivity within the fluvial deposits, groundwater velocities may range over an order of magnitude or greater. This suggests the potential for preferential flowpaths.

2.2 NATURE AND EXTENT OF CONTAMINATION

Historical delineation of contaminants in soil and groundwater at Site N-6 has occurred over a number of sampling events involving both permanent monitoring wells and single-point sampling with direct-push techniques (DPT). The nature and extent of soil and groundwater contamination based on historical analytical results are discussed in the following sections.

2.2.1 Soil Analytical Results

Soil samples were collected near the Site N-6 source area from a single borehole (007SMW15) drilled for monitoring well location 007G15LF/UF (Figure 2.1). No constituent in any soil sample from this location exceeded soil screening levels (SSLs) for contaminant transport from soil to groundwater, or residential soil risk-based concentrations (RBCs) established for AOC A (EnSafe, 2000a). This soil borehole location is within the footprint of former Hanger N-6, and may not be optimally located to characterize source-area soils. Suspected source areas at Site N-6 include a former grassy area to the east of former Hanger N-6 and a former subsurface waste tank located below grade and within the footprint of the former hanger (Figure 1.2).

2.2.2 Groundwater Quality

Eight permanent monitoring wells (007G12LF, 007G13LF, 007G14LF, 007G15LF, 007G15UF, 007G24MF, 007G25MF, and 007G26MF), and 37 single-point samples from 19 temporary DPT borehole locations have been sampled from 1994 to 1998 as part of the RFI and long-term monitoring (LTM) at Site N-6. Historical analytical results for VOCs in groundwater are summarized in Table 2.1.

Table 2.1 indicates that TCE, 1,1-DCE, 1,2-DCA, and CT have been detected consistently over time in samples from wells 007G15UF and 007G15LF. The degradation products 1,2-DCE and chloroform also have been detected in site groundwater, although at lower concentrations that the potential source or parent chlorinated compounds. Historically maximum concentrations of TCE ranged up to

TABLE 2.1
SUMMARY OF HISTORIC VOLATILE ORGANIC COMPOUND DETECTIONS IN GROUNDWATER
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Stratigraphic Interval[b]	Date	PCE[a] (µg/L)[c]	TCE[a] (µg/L)	1,2-DCE[a] (µg/L)	1,1-DCE (µg/L)	1,1,1-TCA[a] (µg/L)	1,1-DCA[a] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Bromochloro -methane (µg/L)	Dichlorofuoro -methane (µg/L)	Acetone (µg/L)	Benzene (µg/L)	Semi-Volatiles BEHP[a] (µg/L)	Semi-Volatiles TPH-DRO[a] (µg/L)
PERMANENT MONITORING WELLS																	
007G12LF	LF	Mar-96	ND[d]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Aug-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA[e]	NA
		May-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Aug-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
007G13LF	LF	Mar-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0J[f]	ND
		Apr-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
007G14LF	LF	Mar-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.0J	ND
		Aug-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
007G15UF	UF	Mar-96	ND	840	20J*[g]	280	ND	48J	ND	20J	70	ND	ND	ND	7.0J	1.0J	160
		Aug-96	ND	800	22J*	290	ND	43J	ND	19J	63	ND	ND	ND	6.0J	NA	NA
		Apr-97	ND	600D	20*	380D	ND	67	ND	14	44	ND	ND	ND	6.6	NA	NA
		Nov-97	0.80J	580D	18*	320	ND	51	ND	9.8	30	ND	ND	93	4.6J	NA	NA
		Aug-98	0.58J	580D	19*	320D	ND	64	ND	4.3J	17	ND	ND	ND	4.6J	NA	NA
007G15LF	LF	Mar-96	ND	ND	ND	ND	ND	ND	ND	20	5J	ND	ND	ND	ND	14	110
		Aug-96	ND	13	ND	6.0J	ND	2J	ND	26	10	ND	ND	ND	ND	NA	NA
		Apr-97	ND	12	ND	6.3	ND	ND	ND	27	7.4	ND	ND	ND	ND	NA	NA
		Nov-97	1.1J	12	ND	ND	ND	ND	ND	2.8J	2.7J	ND	ND	ND	ND	NA	NA
		Aug-98	ND	6.5	ND	3.9J	ND	ND	ND	15	5.6	ND	ND	ND	ND	NA	NA
007G24MF	MF	Aug-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
007G25MF	MF	Aug-98	ND	18	ND	2.9J	ND	ND	ND	ND	2.0J	ND	ND	ND	ND	NA	NA
		Nov-98	ND	13J	ND	2.0J	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
007G26MF	MF	Aug-98	ND	1.8J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-98	ND	4.0J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
007G49LF	UF (58')	Jun-99	ND	2.0J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	MF (63')	Jun-99	ND	2.0J	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.0J	ND	NA	NA
	MF (68')	Jun-99	ND	2.0J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	MF (73')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.0J	ND	NA	NA
	LF (78')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF (83')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF (88')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF (93')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA

TABLE 2.1 (Continued)
SUMMARY OF HISTORIC VOLATILE ORGANIC COMPOUND DETECTIONS IN GROUNDWATER
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Stratigraphic Interval[b]	Date	PCE[a] (µg/L)[c]	TCE[a] (µg/L)	1,2-DCE[a] (µg/L)	1,1-DCE (µg/L)	1,1,1-TCA[a] (µg/L)	1,1-DCA[a] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Bromochloro-methane (µg/L)	Dichlorofuoro-methane (µg/L)	Acetone (µg/L)	Benzene (µg/L)	Semi-Volatiles BEHP[a] (µg/L)	Semi-Volatiles TPH-DRO[a] (µg/L)
TEMPORARY MONITORING POINTS																	
7-34	UF (45')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-35	UF (49')	Nov-95	ND	117	9.9	80	ND	ND	44	10	ND	32	ND	ND	ND	NA	NA
7-36	MF (58')	Nov-95	ND	ND	28	ND	ND	ND	ND	ND	ND	ND	6.1	ND	ND	NA	NA
7-37	MF (60')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-49	LF (34')	Nov-95	ND	8.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-50	MF (61')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-51	UF (54')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-52	UF (52')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-53	MF (64')	Feb-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-54	MF (58')	Feb-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-68	UF (48')	Feb-97	ND	2.6	ND	3.2	ND	1.9	ND	ND	ND	ND	ND	200	ND	NA	NA
	UF (53')	Feb-97	ND	3.7	ND	5.1	ND	2.7	ND	ND	ND	ND	ND	51J	ND	NA	NA
	MF (58')	Feb-97	ND	1.6J	ND	4.3	ND	2.4	ND	ND	ND	ND	ND	1380	ND	NA	NA
	MF (64')	Feb-97	ND	ND	ND	2.0J	ND	ND	ND	17	28	ND	ND	562	ND	NA	NA
	MF (69')	Feb-97	ND	1.2J	ND	2.3J	ND	ND	ND	23	22	ND	ND	ND	ND	NA	NA
	LF (73')	Feb-97	ND	8.2	5.6	ND	ND	ND	ND	15	23	ND	ND	ND	ND	NA	NA
	LF (78')	Feb-97	ND	6.4	5.1	ND	ND	ND	ND	6.5	8.1	ND	ND	ND	ND	NA	NA
	LF (83')	Feb-97	ND	1.3J	ND	ND	ND	ND	ND	1.3J	4.1J	ND	ND	594	ND	NA	NA
	LF (88')	Feb-97	ND	ND	ND	ND	ND	ND	ND	1.4J	3.9J	ND	ND	ND	ND	NA	NA
7-69	MF (60')	Feb-97	ND	1160	29	183	ND	37	ND	199	180	ND	ND	ND	5.1	NA	NA
	LF (90')	Feb-97	ND	1.6J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-70	UF (46')	Feb-97	ND	17	ND	11	ND	3.2J	ND	ND	1.9J	ND	ND	ND	ND	NA	NA
	MF (68')	Feb-97	ND	190	ND	4.3J	ND	ND	ND	ND	47	ND	ND	ND	ND	NA	NA
	LF (88')	Feb-97	ND	39	ND	1.0J	ND	ND	ND	3.5J	11	ND	ND	ND	ND	NA	NA
7-71	UF (46')	Feb-97	ND	ND	ND	ND	ND	1.7J	ND	ND	ND	ND	ND	1020	ND	NA	NA
	MF (68')	Feb-97	ND	422	ND	2.7	ND	ND	ND	121	61	ND	ND	ND	ND	NA	NA
	LF (88')	Feb-97	ND	14	ND	2.6	ND	ND	ND	34	16	ND	ND	ND	ND	NA	NA
7-72	UF (46')	Feb-97	ND	16	ND	8.7	ND	4.1	ND	ND	ND	ND	ND	ND	ND	NA	NA
	MF (68')	Feb-97	ND	122	ND	1.6J	ND	ND	ND	10	31	ND	ND	ND	ND	NA	NA
	LF (90')	Feb-97	ND	8.7	ND	2.1J	ND	ND	ND	29	21	ND	ND	197	ND	NA	NA
7-73	MF (68')	Feb-97	ND	15	ND	ND	ND	ND	ND	ND	2.1J	ND	ND	164	ND	NA	NA
	LF (90')	Feb-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	44J	ND	NA	NA
7-74	MF (68')	Feb-97	ND	47	ND	1.4J	ND	ND	ND	ND	4.3J	ND	ND	ND	ND	NA	NA
	LF (91')	Feb-97	ND	1.2J	ND	ND	ND	ND	ND	ND	ND	ND	ND	33J	ND	NA	NA
7-79	MF (67')	Feb-97	ND	61	ND	10	ND	3.5J	ND	ND	7.2	ND	ND	ND	ND	NA	NA
7-80	MF (66')	Feb-97	ND	26	ND	14.2	ND	ND	ND	ND	3.3J	ND	ND	ND	ND	NA	NA
	LF (87')	Feb-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA

[a] PCE = tetrachloroethene; TCE = trichloroethene; DCE = dichloroethene; TCA = trichloroethane; DCA = dichloroethane; BEHP = bis(2-ethylhexyl)phthalate; TPH-DRO = total petroleum hydrocarbons - diesel range organics.

[b] UF = upper fluvial deposits; MF = middle fluvial deposits; LF = lower fluvial deposits.

[c] µg/L = micrograms per liter.

[d] ND = not detected.

[e] NA = not analyzed.

[f] J = estimated concantration.

[g] * = total *cis*- and *trans*-1,2-DCE.

[g] D = indicates analysis of diluted sample.

1,160 micrograms per liter (μg/L) at a depth of 60 feet at DPT location 7-69, located just to the east of the former hanger.

The maximum concentrations of 1,2-DCE (29.2 μg/L), CT (199 μg/L), and chloroform (180 μg/L) also were detected at the same depth interval at DPT location 7-69. The maximum concentrations of 1,1-DCE (380D [diluted] μg/L), 1,1-DCA (67 μg/L), and benzene (6.6 μg/L) were detected in well 007G15UF in April 1997. Other VOC compounds detected at Site N-6 include tetrachloroethene (PCE), 1,2-DCA, bromochloromethane, dichlorofluoromethane, and acetone. Semi-volatile organic compounds (SVOCs) detected were bis(2-ethylhexyl)phthalate (BEHP) and total petroleum hydrocarbons - diesel range organics (TPH-DRO). The limited presence of benzene and TPH-DRO indicates some release of fuel hydrocarbons in addition to chlorinated solvents.

Maximum historical concentrations of TCE from 1994 to 1998 at each sampling location for fluvial deposits groundwater are contoured on Figure 2.5. The maximum identified concentrations of TCE are in groundwater at the eastern end of former Hanger N-6, coinciding with a former grassy area where solvents reportedly were spread to kill weeds (Figures 1.2 and 2.5). Based on these data, the TCE plume extended approximately 900 feet downgradient towards the north-northwest in the general direction of groundwater flow (Figures 2.4 and 2.5).

Figures 2.6 and 2.7 show the vertical profiles of TCE in groundwater along Cross Sections A-A' and B-B' (see Figure 2.1 for cross section locations). While TCE is present from the potentiometric surface to the base of the fluvial deposits, the maximum TCE concentrations are inferred to occur within the middle to lower portions of the aquifer. However, the vertical contaminant profile cannot be demonstrated conclusively because of a lack of groundwater sampling points in the upper fluvial deposits downgradient from the source area (Figure 2.6).

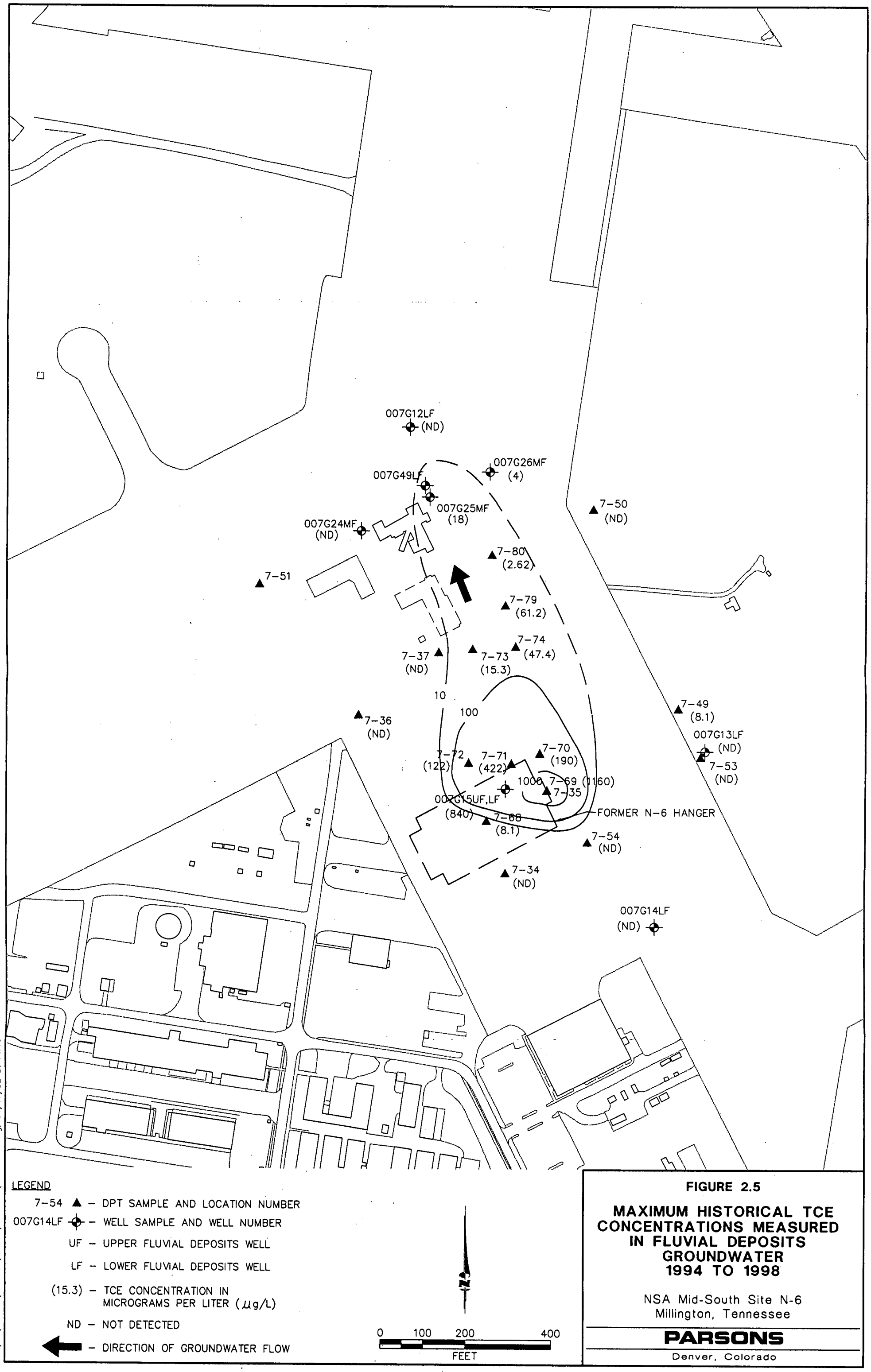


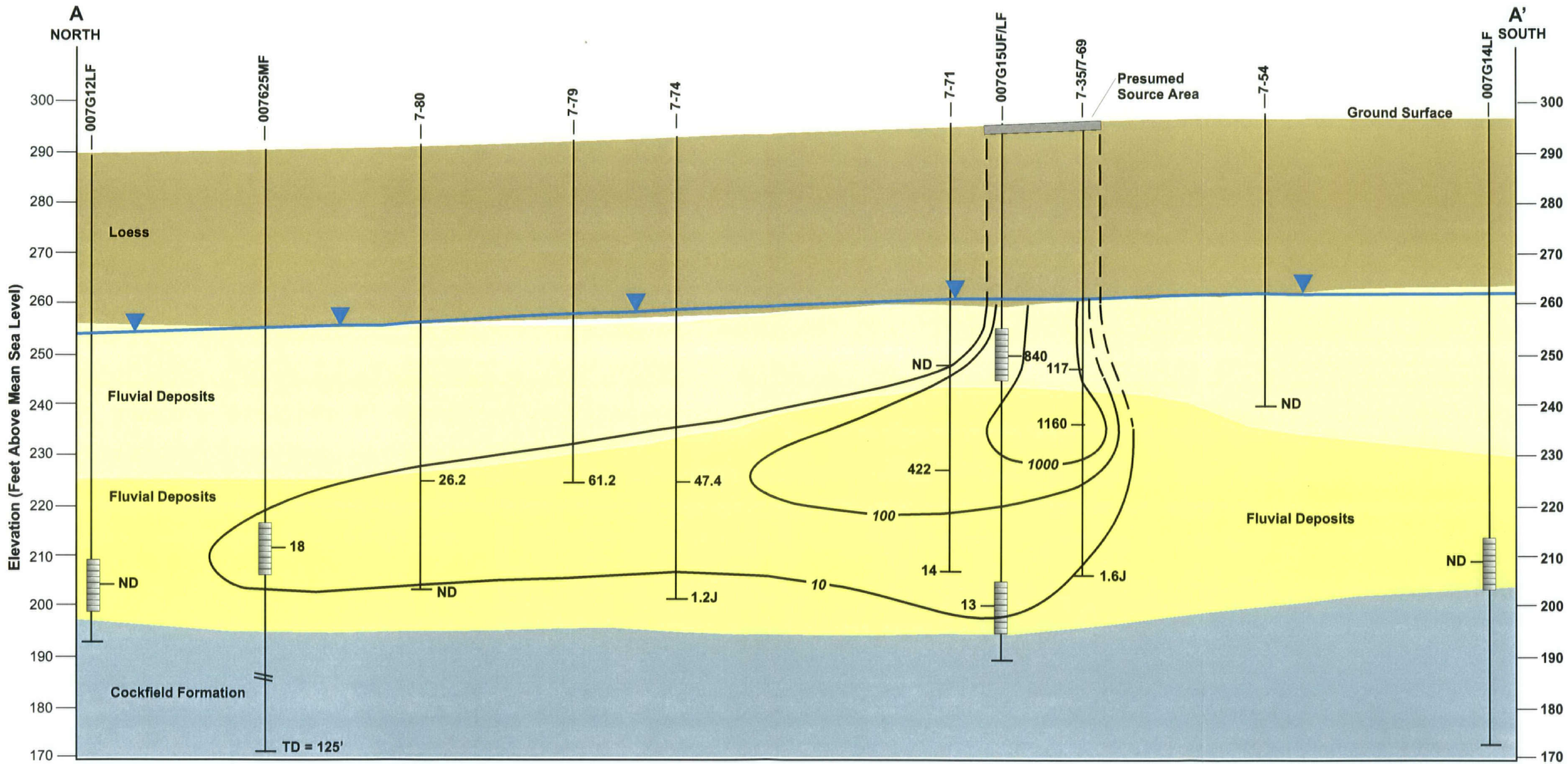
FIGURE 2.5

MAXIMUM HISTORICAL TCE CONCENTRATIONS MEASURED IN FLUVIAL DEPOSITS GROUNDWATER 1994 TO 1998

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

S:\ES\Remed\737490\02000\WorkPlan\00DN0173.dwg, 04/17/02 at 14:10



Legend

26.2 Trichloroethene (TCE) concentration in micrograms per liter (µg/L)

ND Not detected

Fluvial deposits groundwater potentiometric surface (July 1996)

10'
0 50' 100'
Feet
Vertical to Horizontal Exaggeration = 5:1

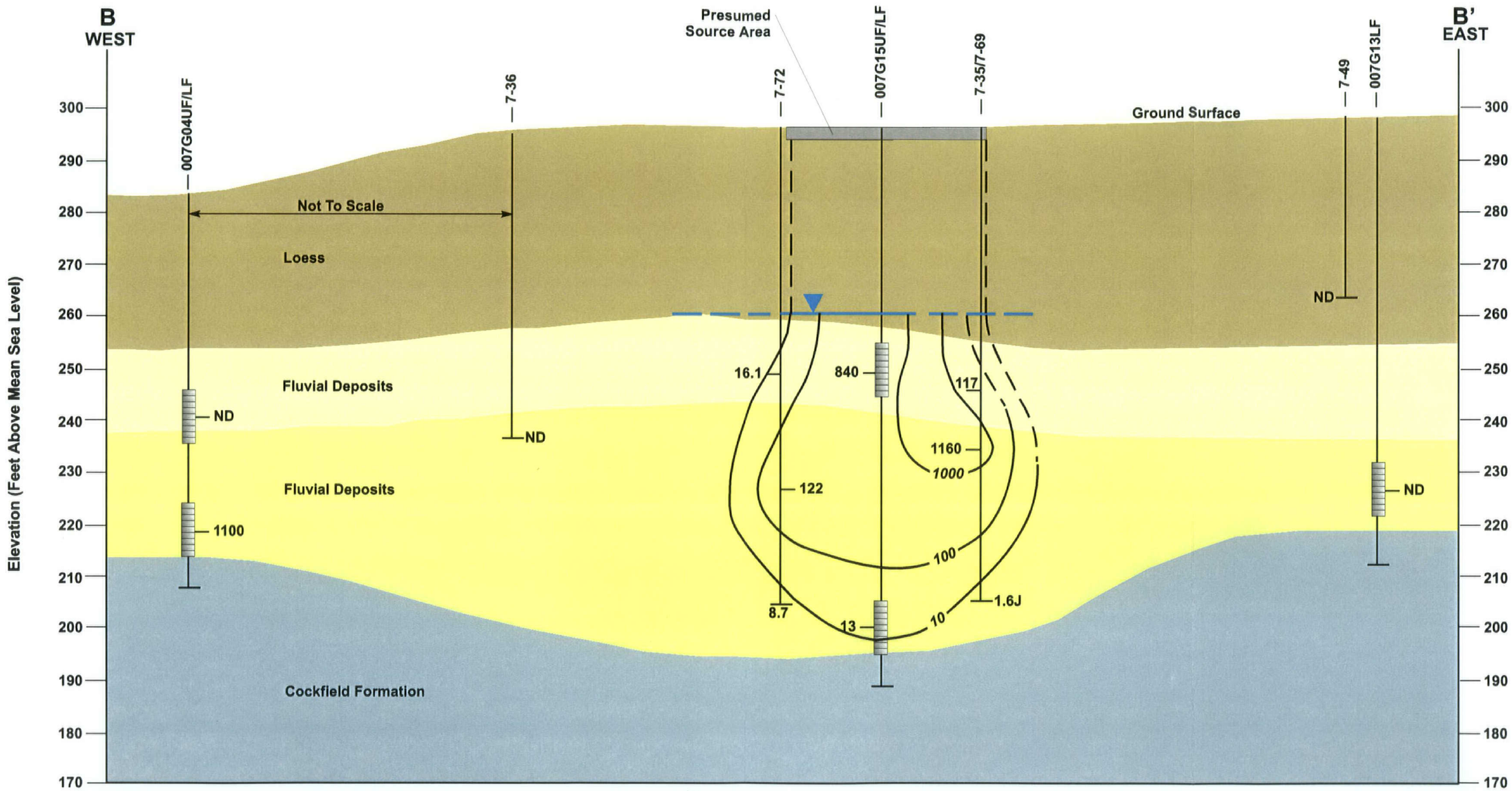
FIGURE 2.6

TCE MEASURED IN GROUNDWATER FLUVIAL DEPOSITS 1994 TO 1998

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

draw\737490a.cdr p1 nap 4/24/02



Legend

122 Trichloroethene (TCE) concentration in micrograms per liter (µg/L)

ND Not detected

Fluvial deposits groundwater potentiometric surface (July 1996)

10'
0 50' 100'
Feet
Vertical to Horizontal Exaggeration 5:1

FIGURE 2.7

TCE MEASURED IN GROUNDWATER FLUVIAL DEPOSITS 1994 TO 1998

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

draw\737490a.cdr p2 nap 4/24/02

2.3 GROUNDWATER USE AND POTENTIAL RECEPTORS

Fluvial deposits groundwater is not used for beneficial use at former NSA Mid-South Northside. The nearest potential receptor on the Northside is public supply well PW-N1, located approximately 450 feet southwest of the Building N-126 dry well (approximately 1,500 feet cross gradient from Site N-6). PW-N1 is screened in the Memphis Aquifer and hydraulically separated from the shallower fluvial aquifer by the upper Claiborne confining unit (EnSafe, 2000a). This well has been placed on emergency standby as a precautionary measure since 1994.

Points of potential exposure within the fluvial deposits groundwater consist of shallow private domestic wells outside the Northside (City of Millington) property. The nearest domestic supply well screened in the fluvial deposits is approximately 6,000 feet north-northwest of the apron area and is inactive (EnSafe, 2000a).

Because contaminated groundwater at Site N-6 has the potential to migrate off the Northside property, the objective of this field application is to determine if vegetable oil injection is a viable treatment option for chlorinated solvents in groundwater at Site N-6. The downgradient property boundary is located approximately 4,000 feet northwest from the Site N-6 source area (Figure 1.1).

SECTION 3

FIELD TEST IMPLEMENTATION

Site-specific activities conducted at Site N-6 in support of the enhanced bioremediation field application included:

- Installation of 8 vegetable oil injection wells and 16 groundwater monitoring wells using Rotasonic drilling technology;
- Baseline (i.e., pre-injection) sampling of groundwater at the newly-installed injection and monitoring wells, and existing monitoring wells 007G15UF (shallow) and 007G15LF (deep), in accordance with the *Final Work Plan for Field Application to Enhance In-Situ Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Site N-6, Former Naval Support Activity Mid-South, Millington, Tennessee* (Parsons, 2000) and the *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* (USEPA, 1998);
- Pre-injection aquifer testing (hydraulic conductivity) of four injection wells and eight monitoring wells;
- Plumbing of the pilot-scale system and injection of a total of 6,115 gallons of refined soybean oil;
- Injection of bromide (aqueous phase) in order to determine zones of influence;
- Post-injection aquifer testing (hydraulic conductivity) of the previously tested four injection wells;
- Surveying of the newly-installed injection and monitoring wells; and

- Post-injection sampling of groundwater and vegetable oil at the system monitoring and injection wells and existing monitoring wells 007G15UF and 007G15LF in November 2000, February 2001, August 2001, and January 2002.

3.1 SYSTEM INSTALLATION

Initial field activities performed during July and August 2000 are summarized in Table 3.1. The following sections provide a description of these activities as well as performance monitoring activities completed through January 2002.

3.1.1 Injection Point and Groundwater Sampling Locations

Locations for the 8 injection wells and 16 groundwater monitoring wells are shown on Figure 3.1. These locations were determined from a review of available site data, with the injection wells located to provide optimal vegetable oil distribution in the portion of the plume with the highest contaminant concentrations (i.e., greater than 1,000 µg/L TCE).

The four injection well pairs were installed approximately 15 feet apart, across the area with the highest groundwater TCE concentration (1,160 µg/L at DPT location 7-69). The vertical layout of the injection wells is shown in Figure 3.2. It was anticipated during system design that the radius of influence of the injected vegetable oil would be up to approximately 10 to 12 feet (horizontally) based upon historic hydraulic data and proposed oil injection volumes.

Monitoring well pairs were installed at distances of 10, 20, 30, 50 and 100 feet downgradient from the injection wells. Monitoring well locations were spaced to monitor the groundwater system downgradient from the injection zone over a period of 18 months, based on groundwater advective velocities ranging from 30 to 320 ft/yr (Section 2.2). One upgradient well pair (PES-MW1S and D) was installed to monitor background groundwater geochemistry and aqueous phase contaminant concentrations.

TABLE 3.1
SUMMARY OF INITIAL SITE ACTIVITIES
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Location	Monitoring Well Installation	Slug Test Analysis	Water Level Measurement	Soil Analyses		Oil Analyses	Groundwater Analyses						
				VOCs[a] SW8260B	Total Organic Carbon (SW9060)	VOCs SW8260B	VOCs SW8260B	Methane, Ethane, Ethene	Nitrate + Nitrite (E300.1)	Bromide (E320.1)	Total Organic Carbon (SW9060M)	Well Head Analyses[b]	Mobile Lab Analyses[c]
Monitoring Wells													
PES-MW-1D	X	X	X		1		1	1	1			1	1
PES-MW-1S	X	X	X		1		1	1	1			1	1
PES-MW-2D	X		X				1	1	1	1	1	1	1
PES-MW-2S	X		X				1	1	1	1	1	1	1
PES-MW-3D	X		X				1	1	1	1	1	1	1
PES-MW-3S	X		X				1	1	1	1	1	1	1
PES-MW-4D	X		X				1	1	1		1	1	1
PES-MW-4S	X		X				1	1	1		1	1	1
PES-MW-5D	X		X				1	1	1		1	1	1
PES-MW-5S	X		X				1	1	1		1	1	1
PES-MW-6D	X		X				1	1	1		1	1	1
PES-MW-6S	X		X				1	1	1		1	1	1
PES-MW-7D	X		X				1	1	1	1	1	1	1
PES-MW-7S	X		X				1	1	1	1	1	1	1
PES-MW-8D	X	X	X		1		1	1	1		1	1	1
PES-MW-8S	X	X	X		1		1	1	1		1	1	1
007GL15UF			X				1	1	1			1	1
007GL15LF			X				1	1	1			1	1
Injection Wells													
PES-INJ-1D	X		X	2			1	1	1		1	1	1
PES-INJ-1S	X		X				1	1	1		1	1	1
PES-INJ-2D	X	X	X	2			1	1	1	1	1	1	1
PES-INJ-2S	X	X	X				1	1	1	1	1	1	1
PES-INJ-3D	X	X	X	2			1	1	1	1	1	1	1
PES-INJ-3S	X	X	X				1	1	1	1	1	1	1
PES-INJ-4D	X		X	2			1	1	1		1	1	1
PES-INJ-4S	X		X				1	1	1		1	1	1
SUBTOTALS		8		8	4	0	26	26	26	10	22	26	26
QA/QC													
Duplicates				1			3	3	3	1	3		3
MS/MSD				1			2						
Trip Blanks							3						
Rinseates							1						
			TASK TOTAL:	10	4	0	35	29	29	11	25	26	29

[a] VOCs to include aromatic and chlorinated aliphatic hydrocarbons.

[b] Well head analyses include dissolved oxygen, oxidation-reduction potential, pH, temperature, and conductivity.

[c] Mobile lab analyses include chloride, carbon dioxide, alkalinity, ammonia, sulfate, ferrous iron, sulfate, hydrogen sulfide, and manganese.

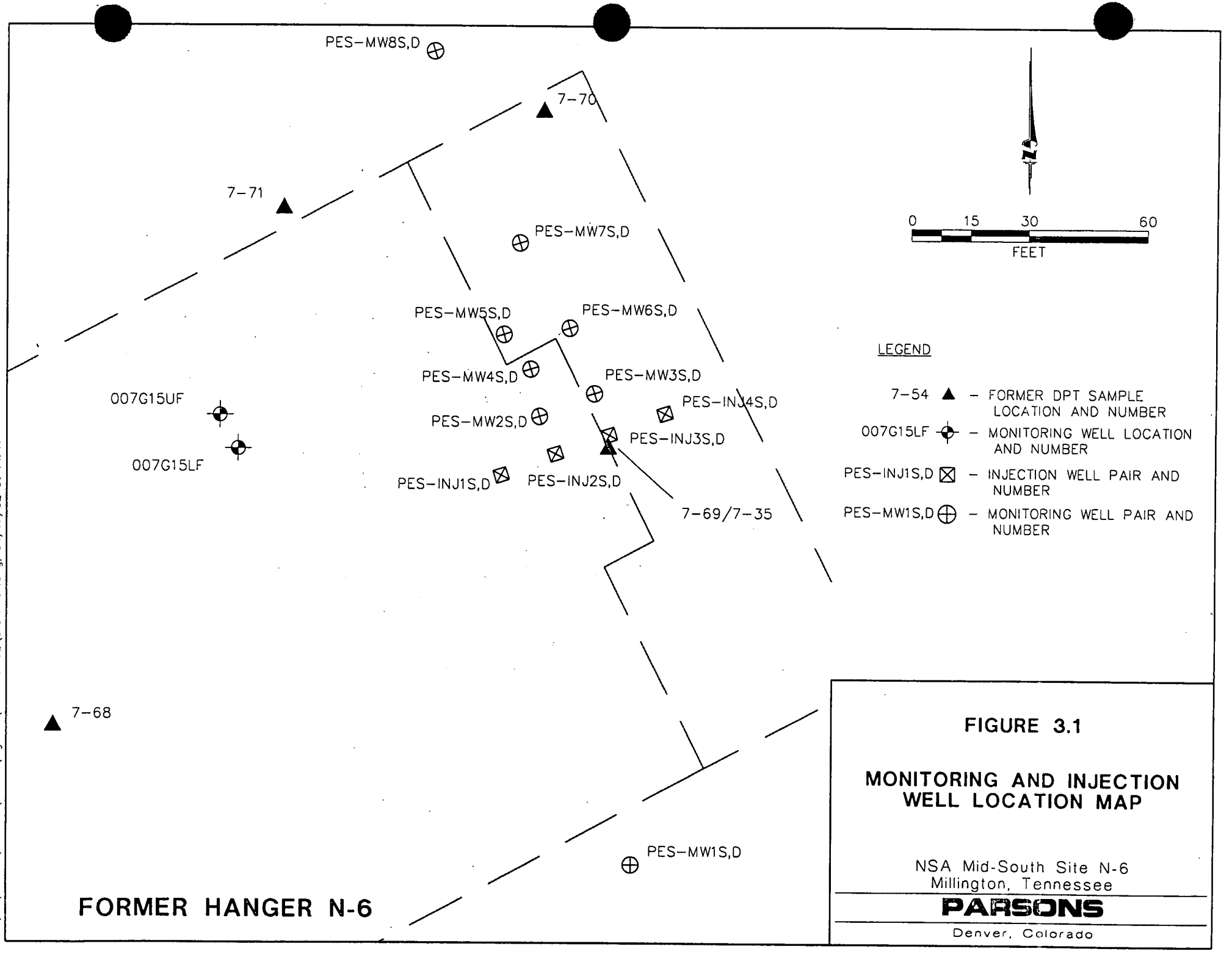


FIGURE 3.1

MONITORING AND INJECTION WELL LOCATION MAP

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS

Denver, Colorado

S:\ES\Remed\737490\05000\Figures\Techmemo2\01DN1101.dwg, 04/17/02 at 14:41

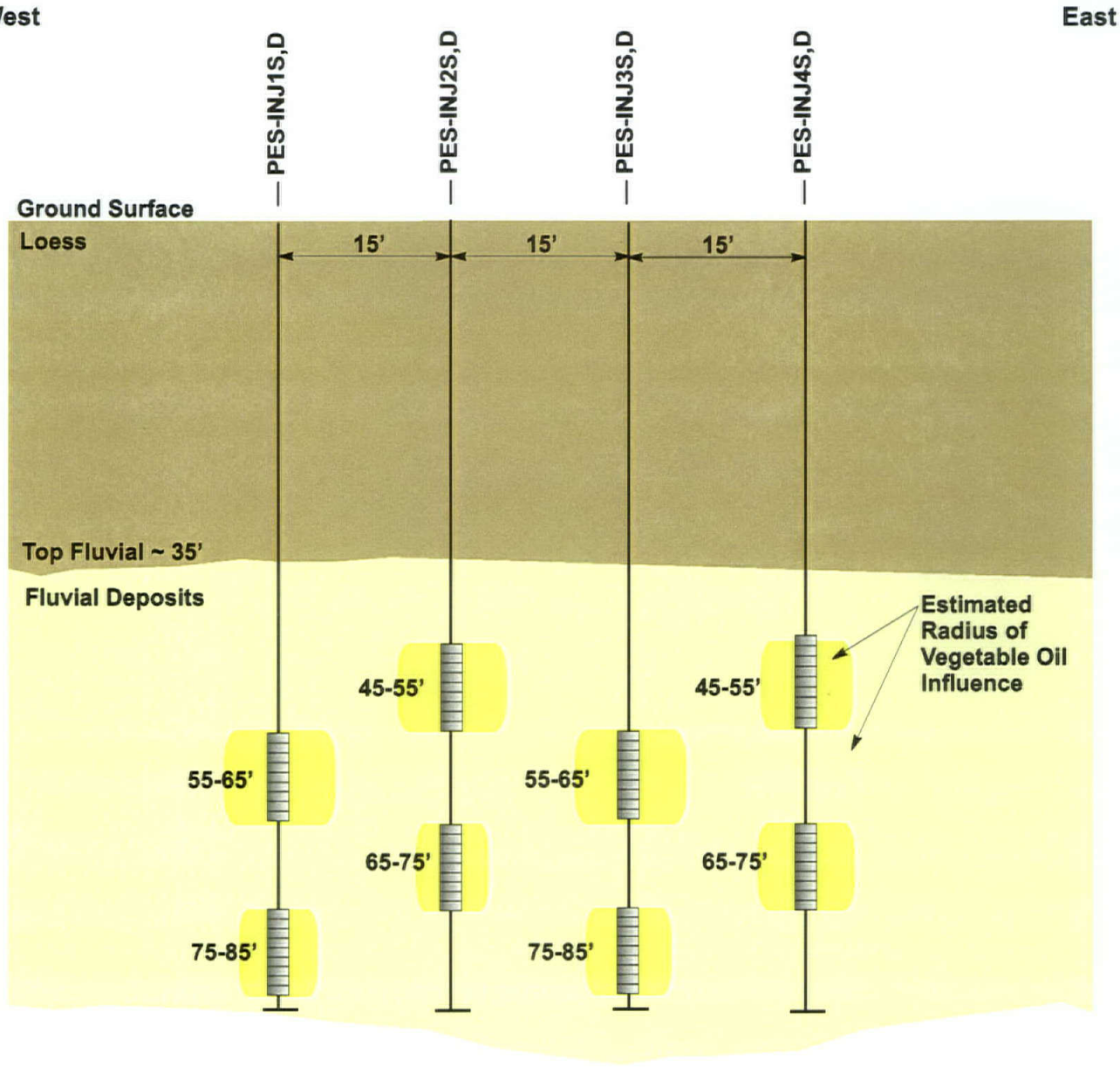


FIGURE 3.2

INJECTION WELL LAYOUT

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS

Denver, Colorado

draw\737490c.cdr nap 4/24/02

3.1.2 Injection and Groundwater Monitoring Well Installation

Newly installed monitoring and injection Wells were installed with a Rotosonic drilling rig subcontracted from Alliance Environmental Incorporated. Injection and monitoring wells were installed in July 2000. Construction details are included in Appendix B.1, and are summarized in Table 3.2. Injection and monitoring well screens were constructed of 10 feet of flush-threaded, Schedule 40, 2-inch inside-diameter (ID), polyvinyl chloride (PVC) with 0.02-inch factory-slotted openings. Injection screens installed in the upper fluvial deposits were placed at least 2 to 3 feet below the water table to avoid short circuiting of injected vegetable oil to the vadose zone. Monitoring well screens were placed at similar depths as the injection screens. All injection and monitoring wells were sealed with bentonite and grouted to the surface with a cement/bentonite grout. Each injection and groundwater monitoring well was completed slightly below grade to protect each well from potential damage. Flush-mounted protective casings were used to protect the monitoring and injection wells.

3.1.3 Soil Sampling

During drilling activities, continuous soil cores were collected from ground surface to total depth in order to identify the depths of significant stratigraphic contacts or other soil properties. Boring logs prepared during drilling by the field geologist are presented in Appendix B.2. A portion of soil sample was used to measure the total concentration of ionizable VOCs in the soil headspace using a photo-ionization detector (PID). If headspace readings significantly above background readings were obtained, indicating the presence of contamination, then the associated soil sample was submitted to a laboratory for analysis of VOCs using the method specified in Table 3.3. Soil samples for total organic carbon (TOC) analysis also were collected from select fluvial deposits intervals from locations PES-MW1 and PES-MW8 in order to quantify concentrations of organic carbon in the subsurface soil at Site N-6 prior to vegetable oil injection.

TABLE 3.2
WELL CONSTRUCTION SUMMARY
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Well Identification	Installation Date	Northing (State Plane)	Easting (State Plane)	Top of Casing Elevation (feet amsl)[a/]	Screened Interval (feet bgs)[b/]	Well Diameter (inches)	Stratigraphic Interval[c/]
Injection Wells							
PES-INJ-1S	19-Jul-00	392214.45	815028.46	293.44	55.0 - 65.0	2.0	Upper-Fluvial
PES-INJ-1D	19-Jul-00	392214.45	815028.46	293.44	75.0 - 85.0	2.0	Lower-Fluvial
PES-INJ-2S	20-Jul-00	392219.89	815042.45	293.20	44.8 - 54.8	2.0	Upper-Fluvial
PES-INJ-2D	20-Jul-00	392219.89	815042.45	293.21	65.0 - 75.0	2.0	Lower-Fluvial
PES-INJ-3S	23-Jul-00	392224.65	815056.27	293.09	55.0 - 65.0	2.0	Upper-Fluvial
PES-INJ-3D	23-Jul-00	392224.65	815056.27	293.12	75.0 - 85.0	2.0	Lower-Fluvial
PES-INJ-4S	23-Jul-00	392230.14	815070.41	293.44	45.4 - 55.4	2.0	Upper-Fluvial
PES-INJ-4D	23-Jul-00	392230.14	815070.41	293.40	65.0 - 75.0	2.0	Lower-Fluvial
Monitoring Wells							
PES-MW-1S	18-Jul-00	392115.58	815062.15	293.37	45.3 - 55.3	2.0	Upper-Fluvial
PES-MW-1D	18-Jul-00	392115.58	815062.15	293.33	70.0 - 80.0	2.0	Lower-Fluvial
PES-MW-2S	1-Aug-00	392229.39	815038.32	293.38	55.0 - 65.0	2.0	Upper-Fluvial
PES-MW-2D	1-Aug-00	392229.39	815038.32	293.32	75.0 - 85.0	2.0	Lower-Fluvial
PES-MW-3S	24-Jul-00	392235.18	815052.39	293.39	45.0 - 55.0	2.0	Upper-Fluvial
PES-MW-3D	24-Jul-00	392235.18	815052.39	293.40	65.0 - 75.0	2.0	Lower-Fluvial
PES-MW-4S	21-Jul-00	392241.32	815036.00	293.34	55.0 - 65.0	2.0	Upper-Fluvial
PES-MW-4D	21-Jul-00	392241.32	815036.00	293.34	75.0 - 85.0	2.0	Lower-Fluvial
PES-MW-5S	20-Jul-00	392250.05	815029.07	293.27	45.4 - 55.4	2.0	Upper-Fluvial
PES-MW-5D	20-Jul-00	392250.05	815029.07	293.27	65.0 - 75.0	2.0	Lower-Fluvial
PES-MW-6S	22-Jul-00	392251.69	815045.97	293.28	55.0 - 65.0	2.0	Upper-Fluvial
PES-MW-6D	22-Jul-00	392251.69	815045.97	293.31	75.0 - 85.0	2.0	Lower-Fluvial
PES-MW-7S	21-Jul-00	392273.12	815033.08	293.10	45.0 - 55.0	2.0	Upper-Fluvial
PES-MW-7D	21-Jul-00	392273.12	815033.08	293.08	65.0 - 75.0	2.0	Lower-Fluvial
PES-MW-8S	22-Jul-00	392321.46	815011.22	292.94	55.0 - 65.0	2.0	Upper-Fluvial
PES-MW-8D	22-Jul-00	392321.46	815011.22	292.94	75.3 - 85.3	2.0	Lower-Fluvial
007G15UF	19-Mar-96	392229.59	814956.53	292.91	40.0 - 50.0	2.0	Upper-Fluvial
007G15LF	19-Mar-96	392221.04	814961.17	293.36	90.0 - 100.0	2.0	Lower-Fluvial

[a/] feet amsl indicates elevation in feet above mean sea level.

[b/] feet bgs indicates depth in feet below ground surface.

[c/] Upper fluvial interval is defined as 40 to 65 feet bgs, and lower fluvial interval is defined as 65 to 90 feet bgs.

TABLE 3.3
ANALYTICAL PROTOCOLS FOR SOIL, VEGETABLE OIL, AND GROUNDWATER SAMPLES
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

MATRIX Analyte	METHOD	FIELD (F) OR ANALYTICAL LABORATORY (L)
WATER		
Redox Potential	Direct-reading meter	F
Dissolved Oxygen	Direct-reading meter	F
pH	Direct-reading meter	F
Specific Conductance	Direct-reading meter	F
Temperature	Direct-reading meter	F
Ferrous Iron	Colorimetric, Hach Method 8146 (or similar)	F
Manganese	Colorimetric, Hach Method 8034 (or similar)	F
Hydrogen Sulfide	Colorimetric, Hach Method 8131 (or similar)	F
Sulfate	Colorimetric, Hach Method 8051 (or similar)	F
Alkalinity (Carbonate [CO_3^{-2}] and Bicarbonate [HCO_3^{-1}])	Titrimetric, Hach Method 8221 (or similar)	F
Chloride	Titrimetric, Hach Kit 8P (or similar)	F
Carbon Dioxide	Titrimetric, CHEMetrics Method 4500 (or similar)	F
Nitrate + Nitrite [as Nitrogen (N)]	E300.1	L
Bromide	E320.1	L
Methane, Ethane, Ethene	AM-18[a/]	L
Total Organic Carbon	Walkley-Black[a/]	L
VOCs[b/]	SW8260B	L
SOIL		
Total Organic Carbon	Walkley-Black[a/]	L
VOCs	SW8260B	L
VEGETABLE OIL		
VOCs	SW8260B	L

[a/] Microseeps Inc., standard operating procedure.

[b/] VOCs = volatile organic compounds.

3.2 MEASUREMENT OF BASELINE GEOCHEMICAL CONDITIONS AND CONTAMINANT PROFILES

After installation and development of the injection wells and groundwater monitoring wells, groundwater samples were collected to characterize initial site-specific geochemical and contaminant conditions in accordance with the *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* (USEPA, 1998). Groundwater samples were analyzed for chlorinated solvents and their degradation products, dissolved oxygen (DO), nitrate, ferrous iron [Fe(II)], manganese [Mn(II)], sulfate, hydrogen sulfide, carbon dioxide, methane, ethane, ethane, oxidation-reduction potential (ORP), alkalinity, pH, temperature, specific conductance, TOC, bromide, and chloride. Pre-injection baseline groundwater samples were collected in July and August 2000 and shipped to Microseeps, Inc., of Pittsburgh, Pennsylvania for analysis. Baseline groundwater samples were analyzed in the field and by Microseeps, Inc. following analytical protocols summarized in Table 3.3.

3.3 AQUIFER TESTING

Aquifer testing (rising head slug tests) were conducted before oil injection and after oil injection on selected injection and monitoring wells to estimate the hydraulic conductivity of unconsolidated deposits at Site N-6, and to estimate the impact of oil injection on the hydraulic conductivity of aquifer materials in close proximity to the injection wells. Aquifer test calculations are included in Appendix B.3.

3.4 SUBSTRATE ADDITION

After baseline geochemical and contaminant sampling and pre-injection aquifer testing were completed, approximately 6,100 gallons of edible (i.e., food-grade) soybean oil was injected into eight injection wells. A summary of the injection event, including volumes of oil and water, injection pressures, and injection flow rates is presented in Table 3.4. The soybean oil was injected under pressure directly into each injection well using an ARO air diaphragm pump. As soybean oil was injected into each injection well, the total volume of oil injected was monitored using a Teflon®-coated inline flow meter.

TABLE 3.4
VEGETABLE OIL INJECTION SUMMARY
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Well	Screened Interval (feet bgs)[a/]	Oil (gallons)	Water Push (gallons)	Total Volume (gallons)	Percent Oil	Screened Length (feet)	Radius of Influence[b/] (feet)	Oil Injection Pressure (psi)[c/]	Oil Injection Flow Rate (gpm)[d/]	Water Push Pressure (psi)	Water Push Flow Rate (gpm)
INJECTION WELLS											
PES-INJ1S	55.0 - 65.0	1000	100	1100	90.9	10	4.2	35	3.7 - 3.9	30 - 35	5.1
PES-INJ1D	75.0 - 85.0	665	100	765	86.9	10	3.5	35	3.9 - 4.9	30 - 38	5.5
PES-INJ2S	44.8 - 54.8	500	100	600	83.3	10	3.1	28 - 40+	4.2 - 6.1	28 - 30	8.5
PES-INJ2D	65.0 - 75.0	450	90	540	83.3	10	2.9	40+	1.6 - 2.5	40+	2.1
PES-INJ3S	55.0 - 65.0	1000	100	1100	90.9	10	4.2	32 - 35	4.3 - 4.8	38 - 40	5.3
PES-INJ3D	75.0 - 85.0	1000	100	1100	90.9	10	4.2	25 - 35	5.6 - 6.5	18 - 35	8.8
PES-INJ4S	45.4 - 55.4	500	100	600	83.3	10	3.1	38 - 40	2.3 - 3.2	15 - 30	6.5
PES-INJ4D	65.0 - 75.0	1000	100	1100	90.9	10	4.2	35 - 38	3.1 - 3.4	40	4.3
	AVERAGES:	**764**	**99**	**863**	**87.6**		**3.6**				
	TOTALS:	**6115**	**790**	**6905**							

[a/] feet bgs = feet below ground surface.

[b/] Assumes an effective porosity of 27 percent.

[c/] psi = pounds per square inch.

[d/] gpm = gallons per minute.

Injection pressures at wells PES-INJ2S, PES-INJ-2D, and PES-INJ4S exceeded the capacity of the injection system, resulting in lower volumes of oil injected for these wells. After the soybean oil was injected into each well, a water push consisting of approximately 100 gallons of water was injected in order to increase the horizontal distribution of oil into the aquifer matrix in the vicinity of each injection well screen. Sodium bromide was added as an aqueous phase tracer to the water push at a concentration of approximately 500 milligrams per liter (mg/L). The tracer was added in order to track movement of water that was injected during the injection event, which is anticipated to be an approximate indicator of the area of influence of the treatment zone.

3.5 PROCESS MONITORING

In order to monitor system performance over time, Parsons sampled newly-installed monitoring wells, select injection wells, and existing monitoring wells 007G15LF and 007G5UF at 3, 6, 12, and 18 months after injection. During the 18-month process monitoring event (January 2002), additional groundwater sample aliquots were collected at select wells and sent to Microbial Insights Inc. for volatile fatty acid (VFA), phospholipid fatty acid (PLFA), and denaturing gradient gel electrophoresis (DGGE) analyses. These analyses were performed to provide a quantitative way to assess viable biomass, microbial community structure, metabolic activity, and provide qualitative information about the prominent microorganisms present in the subsurface at Site N-6. A summary of the Phase II process monitoring activities is shown in Table 3.5.

TABLE 3.5
SUMMARY OF PERFORMANCE MONITORING ACTIVITIES
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Location	Water Level Measurement	Oil Analyses	Groundwater Analyses						
		VOCs[a] SW8260B	VOCs SW8260B	Methane, Ethane, Ethene	Nitrate + Nitrite (E300.1)	Bromide (E320.1)	Total Organic Carbon (SW9060M)	Well Head Analyses[b]	Mobile Lab Analyses[c]
Monitoring Wells									
PES-MW-1D	X		1	1	1			1	1
PES-MW-1S	X		1	1	1			1	1
PES-MW-2D	X		1	1	1	1	1	1	1
PES-MW-2S	X		1	1	1	1	1	1	1
PES-MW-3D	X		1	1	1	1	1	1	1
PES-MW-3S	X		1	1	1	1	1	1	1
PES-MW-4D	X		1	1	1	1	1	1	1
PES-MW-4S	X		1	1	1	1	1	1	1
PES-MW-5D	X		1	1	1	1	1	1	1
PES-MW-5S	X		1	1	1	1	1	1	1
PES-MW-6D	X		1	1	1	1	1	1	1
PES-MW-6S	X		1	1	1	1	1	1	1
PES-MW-7D	X		1	1	1	1	1	1	1
PES-MW-7S	X		1	1	1	1	1	1	1
PES-MW-8D	X		1	1	1	1	1	1	1
PES-MW-8S	X		1	1	1	1	1	1	1
007GL15UF	X		1	1	1			1	1
007GL15LF	X		1	1	1			1	1
Injection Wells									
PES-INJ-1D	X		1	1	1	1	1	1	1
PES-INJ-1S	X		1	1	1	1	1	1	1
PES-INJ-2D	X	2	1	1	1	1	1	1	1
PES-INJ-2S	X	2	1	1	1	1	1	1	1
PES-INJ-3D	X	2	1	1	1	1	1	1	1
PES-INJ-3S	X	2	1	1	1	1	1	1	1
PES-INJ-4D	X		1	1	1	1	1	1	1
PES-INJ-4S	X		1	1	1	1	1	1	1
SUBTOTALS		8	26	26	26	22	22	26	26
QA/QC									
Duplicates		1	3	3	3	3	3		3
MS/MSD		1	2						
Trip Blanks			2						
Rinseates			1						
SUBTOTAL PER EVENT:		10	34	29	29	25	25	26	29

[a] VOCs to include aromatic and chlorinated aliphatic hydrocarbons.
[b] Well head analyses include dissolved oxygen, oxidation-reduction potential, pH, temperature, and conductivity.
[c] Mobile lab analyses include chloride, carbon dioxide, alkalinity, sulfate, ferrous iron, hydrogen sulfide, and manganese.

SECTION 4

RESULTS

Because chlorinated aliphatic hydrocarbons (CAHs, or chlorinated solvents) can be used as electron acceptors under reductive dechlorination, there must be an appropriate source of carbon for microbial growth in order for this process to occur. Potential carbon sources include vegetable oil, fuel hydrocarbons, low-molecular-weight compounds (e.g., lactate, acetate, or methanol) present in natural organic matter, or less-chlorinated compounds such as vinyl chloride (VC) or DCE. Addition of vegetable oil to the groundwater at Site N-6 will serve to promote remediation of the CAH plume by providing a large quantity of substrate for microbial growth and as a means of lowering the reduction-oxidation (redox) conditions within the aquifer.

The separate-phase-nature and low solubility of vegetable oil allows for slow dissolution into groundwater, thus making it a slow-release carbon source. Vegetable oil is an inexpensive, innocuous, edible (i.e., food-grade) carbon source that is not regulated as an environmental groundwater contaminant by the USEPA. Because vegetable oil is a non-aqueous phase liquid (NAPL), the potential exists that a single, low-cost injection could provide sufficient carbon to drive reductive dechlorination for many years.

Therefore, the objective of adding vegetable oil to the subsurface at Site N-6 is to either promote or reduce those fate and transport processes that are key to maintaining contaminant mass control (i.e., plume stability) and increasing contaminant mass reduction (i.e., plume treatment). Given an understanding of the fate and transport processes likely to be involved at this site during treatment, a sampling program was designed and implemented to characterize the impact of vegetable oil addition on changes in contaminant mass and concentration.

Vegetable oil was injected at Site N-6 in August 2000 to create the redox and electron donor conditions necessary to promote the microbial reductive dechlorination of the chlorinated solvents present in groundwater at the site. A secondary benefit of vegetable oil injection is that dissolved contaminants will preferentially partition out of the groundwater and into the vegetable oil NAPL. This is beneficial because aqueous-phase chlorinated solvent concentrations are lowered until steady-state conditions are reached. This results in an initial attenuation of the dissolved phase plume. Contaminants are then released from the oil to groundwater at a rate dependent upon dissolution and/or degradation of the vegetable oil, and degradation of contaminants in the dissolved phase. In any event, contaminants are released back to groundwater within a zone of adequate substrate and optimal conditions for reductive dechlorination.

4.1 GROUNDWATER FLOW

Table 4.1 presents groundwater elevation measurements collected during baseline sampling, process monitoring events, and from annual monitoring by EnSafe. Figures 4.1 and 4.2 present groundwater elevations for the upper-fluvial deposits in July/August 2000 and July/August 2001, respectively. The monitoring network for the pilot test was designed assuming that groundwater flow was toward the north-northwest. However, groundwater elevation data collected since system installation within the treatment zone suggest a very flat groundwater potentiometric surface for both the upper and lower fluvial aquifer zones. In fact, in November 2000, there was at least some component of groundwater flow toward the south, from the injection wells toward monitoring well PES-MW1S (Table 4.2). This well was installed to monitor upgradient groundwater chemistry. Based on hydraulic data, and the geochemical data presented below, it appears that well PES-MW1S was impacted chemically by vegetable oil injection activities shortly after injection, but that the impact has decreased over time.

Groundwater flow in July/August 2001 (Figure 4.2) was toward the north-northwest, but the gradient within the treatment zone remains relatively flat compared to the overall gradient from well 007G14LF to well 007G12LF. Groundwater elevations for January 2002 (Table 4.2) are similar to pre-injection conditions, and indicate the gradient in the

TABLE 4.1
SUMMARY OF GROUNDWATER ELEVATIONS
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Identification	Date	Top of Casing Elevation (feet amsl)[b]	Screened Interval (feet bgs)[c]	Stratigraphic Interval	Depth to Water (feet)	Groundwater Elevation (feet amsl)	Depth to Oil (feet)	Oil Thickness (feet)	Corrected Water Elevation[a] (feet amsl)
Injection Wells									
PES-INJ-1S	August-00	293.44	55.0 - 65.0	Upper-Fluvial	39.92	253.52	--	--	--
	November-00	293.44	55.0 - 65.0	Upper-Fluvial	65.45	227.99	39.04	26.41	252.29
	February-01	293.44	55.0 - 65.0	Upper-Fluvial	65.37	228.07	38.89	26.48	252.43
	August-01	293.44	55.0 - 65.0	Upper-Fluvial	65.50	227.94	38.07	27.43	253.18
	January-02	294.44	55.0 - 65.1	Upper-Fluvial	65.80	228.64	37.46	28.34	254.71
PES-INJ-1D	August-00	293.44	75.0 - 85.0	Lower-Fluvial	40.16	253.28	--	--	--
	November-00	293.44	75.0 - 85.0	Lower-Fluvial	82.85	210.59	38.08	44.77	251.78
	February-01	293.44	75.0 - 85.0	Lower-Fluvial	81.11	212.33	37.95	43.16	252.04
	August-01	293.44	75.0 - 85.0	Lower-Fluvial	80.17	213.27	37.16	43.01	252.84
	January-02	293.44	75.0 - 85.0	Lower-Fluvial	79.12	214.32	36.47	42.65	253.56
PES-INJ-2S	August-00	293.20	44.8 - 54.8	Upper-Fluvial	39.55	253.65	--	--	--
	November-00	293.20	44.8 - 54.8	Upper-Fluvial	52.20	241.00	40.04	12.16	252.19
	February-01	293.20	44.8 - 54.8	Upper-Fluvial	51.55	241.65	39.93	11.62	252.34
	August-01	293.20	44.8 - 54.8	Upper-Fluvial	49.80	243.40	39.10	10.70	253.24
	January-02	293.20	44.8 - 54.8	Upper-Fluvial	48.46	244.74	38.48	9.98	253.92
PES-INJ-2D	August-00	293.21	65.0 - 75.0	Lower-Fluvial	39.74	253.47	--	--	--
	November-00	293.21	65.0 - 75.0	Lower-Fluvial	67.80	225.41	36.95	30.85	253.79
	February-01	293.21	65.0 - 75.0	Lower-Fluvial	67.50	225.71	38.50	29.00	252.39
	August-01	293.21	65.0 - 75.0	Lower-Fluvial	66.30	226.91	37.82	28.48	253.11
	January-02	293.21	65.0 - 75.0	Lower-Fluvial	62.20	231.01	37.47	24.73	253.76
PES-INJ-3S	August-00	293.09	55.0 - 65.0	Upper-Fluvial	39.52	253.57	--	--	--
	November-00	293.09	55.0 - 65.0	Upper-Fluvial	64.93	228.16	38.75	26.18	252.25
	February-01	293.09	55.0 - 65.0	Upper-Fluvial	65.00	228.09	38.65	26.35	252.33
	August-01	293.09	55.0 - 65.0	Upper-Fluvial	64.95	228.14	37.80	27.15	253.12
	January-02	293.09	55.0 - 65.0	Upper-Fluvial	64.38	228.71	37.14	27.24	253.77
PES-INJ-3D	August-00	293.12	75.0 - 85.0	Lower-Fluvial	39.84	253.28	--	--	--
	November-00	293.12	75.0 - 85.0	Lower-Fluvial	80.30	212.82	38.00	42.30	251.74
	February-01	293.12	75.0 - 85.0	Lower-Fluvial	79.50	213.62	37.90	41.60	251.89
	August-01	293.12	75.0 - 85.0	Lower-Fluvial	78.02	215.10	37.03	40.99	252.81
	January-02	293.12	75.0 - 85.0	Lower-Fluvial	77.17	215.95	36.37	40.80	253.49
PES-INJ-4S	August-00	293.44	45.4 - 55.4	Upper-Fluvial	39.73	253.71	--	--	--
	November-00	293.44	45.4 - 55.4	Upper-Fluvial	74.91	218.53	36.00	38.91	254.33
	February-01	293.44	45.4 - 55.4	Upper-Fluvial	50.10	243.34	40.25	9.85	252.40
	August-01	293.44	45.4 - 55.4	Upper-Fluvial	48.32	245.12	39.45	8.87	253.28
	January-02	293.44	45.4 - 55.4	Upper-Fluvial	47.54	245.90	39.56	7.98	253.24
PES-INJ-4D	August-00	293.40	65.0 - 75.0	Lower-Fluvial	40.04	253.36	--	--	--
	November-00	293.40	65.0 - 75.0	Lower-Fluvial	74.71	218.69	40.40	34.31	250.26
	February-01	293.40	65.0 - 75.0	Lower-Fluvial	74.65	218.75	38.59	36.06	251.93
	August-01	293.40	65.0 - 75.0	Lower-Fluvial	71.18	222.22	37.81	33.37	252.92
	January-02	293.40	65.0 - 75.0	Lower-Fluvial	70.26	223.14	37.21	33.05	253.55

TABLE 4.1 (Continued)
SUMMARY OF GROUNDWATER ELEVATIONS
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Identification	Date	Top of Casing Elevation (feet amsl)[b]	Screened Interval (feet bgs)[c]	Stratigraphic Interval	Depth to Water (feet)	Groundwater Elevation (feet amsl)	Depth to Oil (feet)	Oil Thickness (feet)	Corrected Water Elevation[a] (feet amsl)
Monitoring Wells									
PES-MW-1S	August-00	293.37	45.3 - 55.3	Upper-Fluvial	39.59	253.78	--	--	--
	November-00	293.37	45.3 - 55.3	Upper-Fluvial	40.88	252.49	--	--	--
	February-01	293.37	45.3 - 55.3	Upper-Fluvial	40.86	252.51	--	--	--
	August-01	293.37	45.3 - 55.3	Upper-Fluvial	39.97	253.40	--	--	--
	January-02	293.37	45.3 - 55.3	Upper-Fluvial	39.35	254.02	--	--	--
PES-MW-1D	August-00	293.33	70.0 - 80.0	Lower-Fluvial	39.74	253.59	--	--	--
	November-00	293.33	70.0 - 80.0	Lower-Fluvial	41.02	252.31	--	--	--
	February-01	293.33	70.0 - 80.0	Lower-Fluvial	41.06	252.27	--	--	--
	August-01	293.33	70.0 - 80.0	Lower-Fluvial	40.15	253.18	--	--	--
	January-02	293.33	70.0 - 80.0	Lower-Fluvial	39.48	253.85	--	--	--
PES-MW-2S	August-00	293.38	55.0 - 65.0	Upper-Fluvial	39.79	253.59	--	--	--
	November-00	293.38	55.0 - 65.0	Upper-Fluvial	40.25	253.13	--	--	--
	February-01	293.38	55.0 - 65.0	Upper-Fluvial	41.10	252.28	--	--	--
	August-01	293.38	55.0 - 65.0	Upper-Fluvial	40.12	253.26	--	--	--
	January-02	293.38	55.0 - 65.0	Upper-Fluvial	39.51	253.87	--	--	--
PES-MW-2D	August-00	293.32	75.0 - 85.0	Lower-Fluvial	40.05	253.27	--	--	--
	November-00	293.32	75.0 - 85.0	Lower-Fluvial	41.56	251.76	--	--	--
	February-01	293.32	75.0 - 85.0	Lower-Fluvial	41.40	251.92	--	--	--
	August-01	293.32	75.0 - 85.0	Lower-Fluvial	40.45	252.87	--	--	--
	January-02	293.32	75.0 - 85.0	Lower-Fluvial	39.89	253.43	--	--	--
PES-MW-3S	August-00	293.39	45.0 - 55.0	Upper-Fluvial	39.67	253.72	--	--	--
	November-00	293.39	45.0 - 55.0	Upper-Fluvial	41.21	252.18	--	--	--
	February-01	293.39	45.0 - 55.0	Upper-Fluvial	40.90	252.49	--	--	--
	August-01	293.39	45.0 - 55.0	Upper-Fluvial	40.08	253.31	--	--	--
	January-02	293.39	45.0 - 55.0	Upper-Fluvial	39.49	253.90	--	--	--
PES-MW-3D	August-00	293.40	65.0 - 75.0	Lower-Fluvial	39.95	253.45	--	--	--
	November-00	293.40	65.0 - 75.0	Lower-Fluvial	41.46	251.94	--	--	--
	February-01	293.40	65.0 - 75.0	Lower-Fluvial	41.10	252.30	--	--	--
	August-01	293.40	65.0 - 75.0	Lower-Fluvial	40.32	253.08	--	--	--
	January-02	293.40	65.0 - 75.0	Lower-Fluvial	39.71	253.69	--	--	--
PES-MW-4S	August-00	293.34	55.0 - 65.0	Upper-Fluvial	39.69	253.65	--	--	--
	November-00	293.34	55.0 - 65.0	Upper-Fluvial	40.84	252.50	--	--	--
	February-01	293.34	55.0 - 65.0	Upper-Fluvial	41.02	252.32	--	--	--
	August-01	293.34	55.0 - 65.0	Upper-Fluvial	40.08	253.26	--	--	--
	January-02	293.34	55.0 - 65.0	Upper-Fluvial	39.48	253.86	--	--	--
PES-MW-4D	August-00	293.34	75.0 - 85.0	Lower-Fluvial	40.09	253.25	--	--	--
	November-00	293.34	75.0 - 85.0	Lower-Fluvial	41.25	252.09	--	--	--
	February-01	293.34	75.0 - 85.0	Lower-Fluvial	41.43	251.91	--	--	--
	August-01	293.34	75.0 - 85.0	Lower-Fluvial	40.58	252.76	--	--	--
	January-02	293.34	75.0 - 85.0	Lower-Fluvial	39.95	253.39	--	--	--

TABLE 4.1 (Continued)
SUMMARY OF GROUNDWATER ELEVATIONS
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Identification	Date	Top of Casing Elevation (feet amsl)[b]	Screened Interval (feet bgs)[c]	Stratigraphic Interval	Depth to Water (feet)	Groundwater Elevation (feet amsl)	Depth to Oil (feet)	Oil Thickness (feet)	Corrected Water Elevation[a] (feet amsl)
PES-MW-5S	August-00	293.27	45.4 - 55.4	Upper-Fluvial	39.56	253.71	--	--	--
	November-00	293.27	45.4 - 55.4	Upper-Fluvial	40.55	252.72	--	--	--
	February-01	293.27	45.4 - 55.4	Upper-Fluvial	40.89	252.38	--	--	--
	August-01	293.27	45.4 - 55.4	Upper-Fluvial	39.97	253.30	--	--	--
	January-02	293.27	45.4 - 55.4	Upper-Fluvial	39.93	253.34	--	--	--
PES-MW-5D	August-00	293.27	65.0 - 75.0	Lower-Fluvial	39.91	253.36	--	--	--
	November-00	293.27	65.0 - 75.0	Lower-Fluvial	40.79	252.48	--	--	--
	February-01	293.27	65.0 - 75.0	Lower-Fluvial	41.22	252.05	--	--	--
	August-01	293.27	65.0 - 75.0	Lower-Fluvial	40.36	252.91	--	--	--
	January-02	293.27	65.0 - 75.0	Lower-Fluvial	39.81	253.46	--	--	--
PES-MW-6S	August-00	293.28	55.0 - 65.0	Upper-Fluvial	39.66	253.62	--	--	--
	November-00	293.28	55.0 - 65.0	Upper-Fluvial	40.72	252.56	--	--	--
	February-01	293.28	55.0 - 65.0	Upper-Fluvial	40.93	252.35	--	--	--
	August-01	293.28	55.0 - 65.0	Upper-Fluvial	40.07	253.21	--	--	--
	January-02	293.28	55.0 - 65.0	Upper-Fluvial	39.48	253.80	--	--	--
PES-MW-6D	August-00	293.31	75.0 - 85.0	Lower-Fluvial	40.08	253.23	--	--	--
	November-00	293.31	75.0 - 85.0	Lower-Fluvial	41.13	252.18	--	--	--
	February-01	293.31	75.0 - 85.0	Lower-Fluvial	41.36	251.95	--	--	--
	August-01	293.31	75.0 - 85.0	Lower-Fluvial	40.57	252.74	--	--	--
	January-02	293.31	75.0 - 85.0	Lower-Fluvial	39.94	253.37	--	--	--
PES-MW-7S	August-00	293.10	45.0 - 55.0	Upper-Fluvial	39.40	253.70	--	--	--
	November-00	293.10	45.0 - 55.0	Upper-Fluvial	40.30	252.80	--	--	--
	February-01	293.10	45.0 - 55.0	Upper-Fluvial	40.73	252.37	--	--	--
	August-01	293.10	45.0 - 55.0	Upper-Fluvial	39.94	253.16	--	--	--
	January-02	293.10	45.0 - 55.0	Upper-Fluvial	39.24	253.86	--	--	--
PES-MW-7D	August-00	293.08	65.0 - 75.0	Lower-Fluvial	39.85	253.23	--	--	--
	November-00	293.08	65.0 - 75.0	Lower-Fluvial	40.70	252.38	--	--	--
	February-01	293.08	65.0 - 75.0	Lower-Fluvial	41.14	251.94	--	--	--
	August-01	293.08	65.0 - 75.0	Lower-Fluvial	40.30	252.78	--	--	--
	January-02	293.08	65.0 - 75.0	Lower-Fluvial	39.75	253.33	--	--	--
PES-MW-8S	August-00	292.94	55.0 - 65.0	Upper-Fluvial	39.79	253.15	--	--	--
	November-00	292.94	55.0 - 65.0	Upper-Fluvial	40.75	252.19	--	--	--
	February-01	292.94	55.0 - 65.0	Upper-Fluvial	40.43	252.51	--	--	--
	August-01	292.94	55.0 - 65.0	Upper-Fluvial	41.15	251.79	--	--	--
	January-02	292.94	55.0 - 65.0	Upper-Fluvial	39.68	253.26	--	--	--
PES-MW-8D	August-00	292.94	75.3 - 85.3	Lower-Fluvial	39.90	253.04	--	--	--
	November-00	292.94	75.3 - 85.3	Lower-Fluvial	40.95	251.99	--	--	--
	February-01	292.94	75.3 - 85.3	Lower-Fluvial	41.13	251.81	--	--	--
	August-01	292.94	75.3 - 85.3	Lower-Fluvial	40.36	252.58	--	--	--
	January-02	292.94	75.3 - 85.3	Lower-Fluvial	39.83	253.11	--	--	--

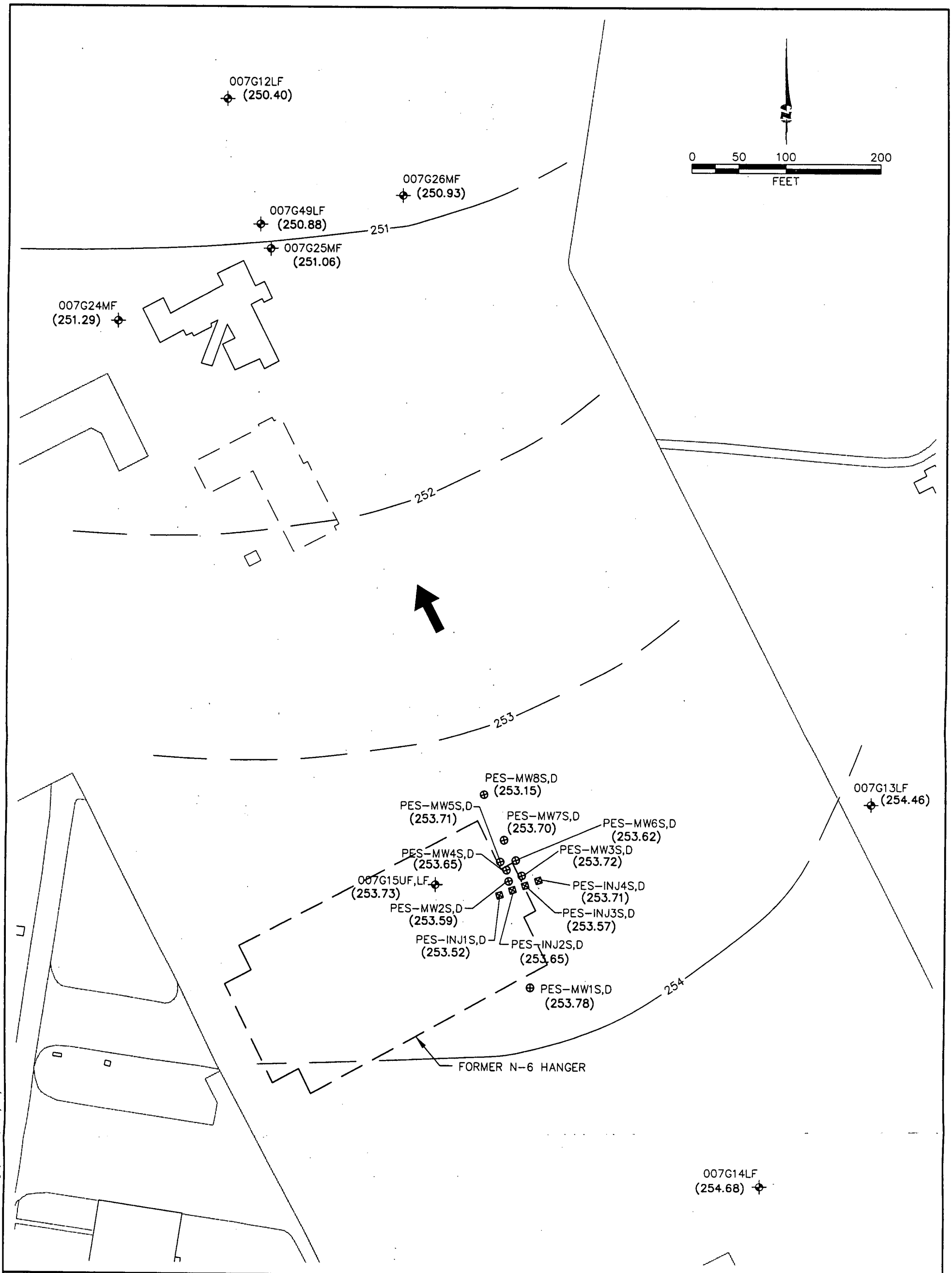
TABLE 4.1 (Continued)
SUMMARY OF GROUNDWATER ELEVATIONS
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Identification	Date	Top of Casing Elevation (feet amsl)[b]	Screened Interval (feet bgs)[c]	Stratigraphic Interval	Depth to Water (feet)	Groundwater Elevation (feet amsl)	Depth to Oil (feet)	Oil Thickness (feet)	Corrected Water Elevation[a] (feet amsl)
007G15UF	August-00	292.91	40.0 - 50.0	Upper-Fluvial	39.18	253.73	--	--	--
	November-00	292.91	40.0 - 50.0	Upper-Fluvial	40.44	252.47	--	--	--
	February-01	292.91	40.0 - 50.0	Upper-Fluvial	NM	NM	--	--	--
	August-01	292.91	40.0 - 50.0	Upper-Fluvial	39.58	253.33	--	--	--
	January-02	292.91	40.0 - 50.0	Upper-Fluvial	39.05	253.86	--	--	--
007G15LF	August-00	293.36	90.0 - 100.0	Lower-Fluvial	40.24	253.12	--	--	--
	November-00	293.36	90.0 - 100.0	Lower-Fluvial	41.45	251.91	--	--	--
	February-01	293.36	90.0 - 100.0	Lower-Fluvial	41.42	251.94	--	--	--
	August-01	293.36	90.0 - 100.0	Lower-Fluvial	40.61	252.75	--	--	--
	January-02	293.36	90.0 - 100.0	Lower-Fluvial	40.09	253.27	--	--	--
007G12LF	July-00	288.78	79.10-89.10	Lower-Fluvial	38.38	250.40	--	--	--
	July-01	288.78	79.10-89.10	Lower-Fluvial	40.13	248.65	--	--	--
007G13LF	July-00	292.96	65.20-75.20	Lower-Fluvial	38.50	254.46	--	--	--
	July-01	292.96	65.20-75.20	Lower-Fluvial	39.81	253.15	--	--	--
007G14LF	July-00	296.43	85.30-95.30	Lower-Fluvial	41.75	254.68	--	--	--
	July-01	296.43	85.30-95.30	Lower-Fluvial	43.05	253.38	--	--	--
007G24MF	July-00	289.06	60.00-70.00	Middle-Fluvial	37.77	251.29	--	--	--
	July-01	289.06	60.00-70.00	Middle-Fluvial	39.37	249.69	--	--	--
007G25MF	July-00	289.97	71.50-81.50	Middle-Fluvial	38.91	251.06	--	--	--
	July-01	289.97	71.50-81.50	Middle-Fluvial	40.58	249.39	--	--	--
007G26MF	July-00	290.13	60.00-70.00	Middle-Fluvial	39.20	250.93	--	--	--
	July-01	290.13	60.00-70.00	Middle-Fluvial	40.87	249.26	--	--	--
007G49LF	July-00	289.68	56.5-96.50	Lower-Fluvial	38.80	250.88	--	--	--
	July-01	289.68	56.5-96.50	Lower-Fluvial	40.49	249.19	--	--	--

[a] Groundwater potentiometric elevation corrected for the presence of oil using an oil specific gravity of 0.92.

[b] feet amsl indicates elevation in feet above mean sea level.

[c] feet bgs indicates depth in feet below ground surface.



LEGEND

007G14LF
- WELL SAMPLE AND WELL NUMBER

- INJECTION WELL PAIR AND NUMBER

- MONITORING WELL PAIR AND NUMBER

UF - UPPER FLUVIAL DEPOSITS WELL

LF - LOWER FLUVIAL DEPOSITS WELL

- DIRECTION OF GROUNDWATER FLOW

(253.78) - GROUNDWATER ELEVATION IN IN FEET ABOVE MEAN SEA LEVEL (ft msl)

251 - LINE OF EQUAL GROUNDWATER SURFACE ELEVATION (ft msl)

NOTE: DATA POSTED FOR LOWER OR MIDDLE FLUVIAL DEPOSITS AT WELL LOCATIONS WITHOUT UPPER FLUVIAL DATA

FIGURE 4.1

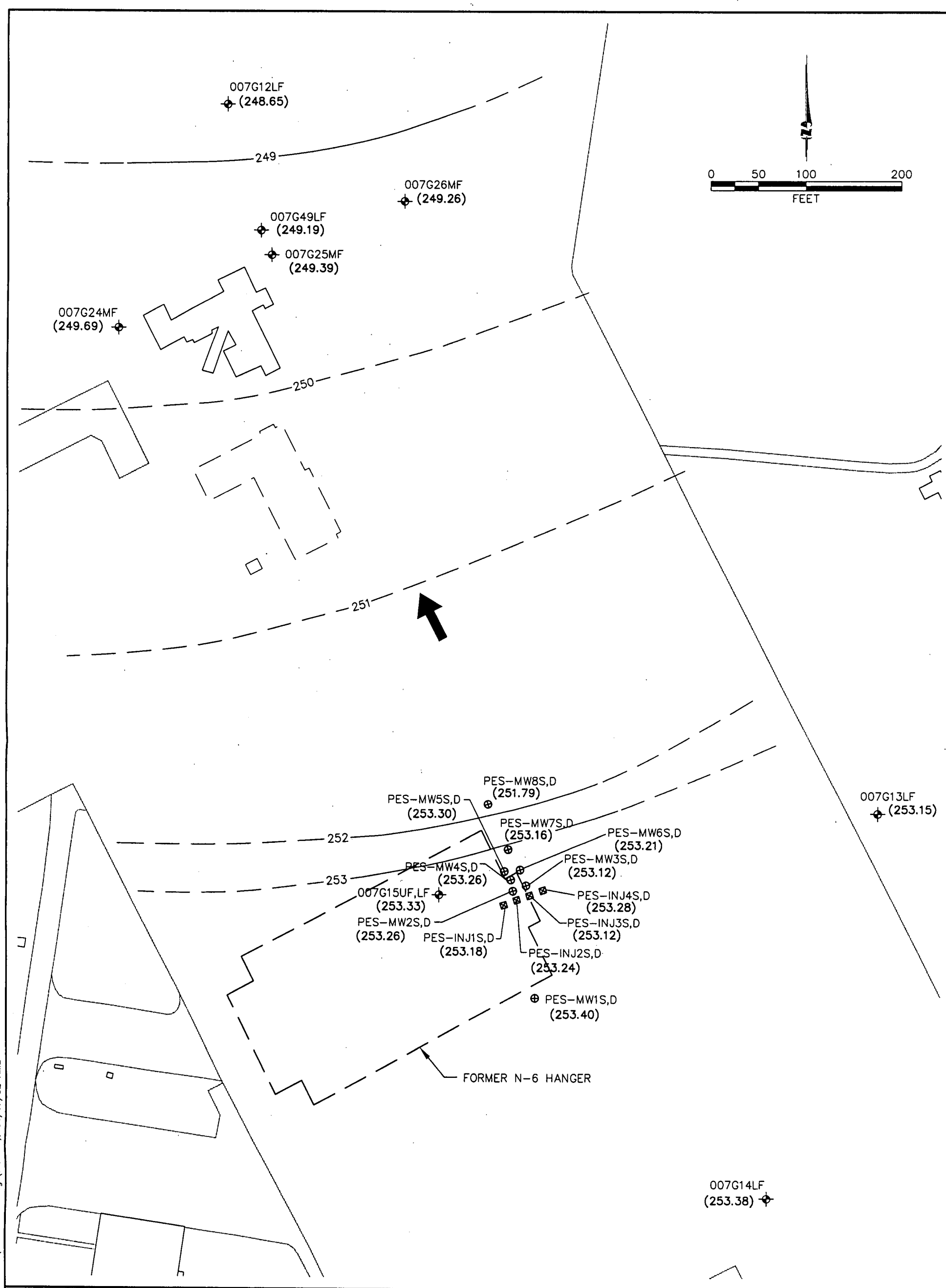
UPPER FLUVIAL DEPOSITS GROUNDWATER ELEVATIONS AUGUST 2000

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS

Denver, Colorado

S:\ES\REMED\737490\05000\FIGURES\TECHMEMO2\01DN0384.dwg (FIG 4.1), 04/04/02 AML



LEGEND

007G14LF
- WELL SAMPLE AND WELL NUMBER
- INJECTION WELL PAIR AND NUMBER
- MONITORING WELL PAIR AND NUMBER
UF - UPPER FLUVIAL DEPOSITS WELL
LF - LOWER FLUVIAL DEPOSITS WELL
- DIRECTION OF GROUNDWATER FLOW

(253.78) - GROUNDWATER ELEVATION IN IN FEET ABOVE MEAN SEA LEVEL (ft msl)

251 - LINE OF EQUAL GROUNDWATER SURFACE ELEVATION (ft msl)

NOTE: DATA POSTED FOR LOWER OR MIDDLE FLUVIAL DEPOSITS AT WELL LOCATIONS WITHOUT UPPER FLUVIAL DATA

FIGURE 4.2

UPPER FLUVIAL DEPOSITS GROUNDWATER ELEVATIONS JULY/AUGUST 2002

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

S:\ES\REMED\737490\05000\FIGURES\TECHMEMO2\01DN0384a.dwg (FIG 4.2), 04/17/02 AML

treatment zone also is toward the north-northwest. This suggests that the apparent mounding of the potentiometric surface observed in November 2000 near injection wells may be due to seasonal effects, and that the hydraulic gradient in the treatment zone still remained relatively flat in spite of any changes (i.e., decrease) in hydraulic conductivity as a result of the vegetable oil injection.

Table 4.2 presents the results of pre-injection aquifer testing and estimates of groundwater seepage velocity. The geometric mean for hydraulic conductivity values measured in the upper fluvial zone was 7.1 ft/day (2.5E-03 cm/sec), while the geometric mean for the hydraulic conductivity values measured in the lower fluvial zone was 9.0 ft/day (3.2E-03 cm/sec).

Aquifer test data collected during the January 2002 process monitoring event (post-injection) are presented in Table 4.3. The geometric mean for hydraulic conductivity values measured in the upper fluvial zone was 17 ft/day (6.0E-03 cm/sec), while the geometric mean for the hydraulic conductivity values measured in the lower fluvial zone was 6.2 ft/day (2.2E-03 cm/sec).

Comparison of the pre-injection aquifer testing data with the post-injection aquifer testing data indicates that hydraulic conductivities measured after injection are similar to the hydraulic conductivities measured prior to injection (within the same order of magnitude). Therefore, oil injection activities at Site N-6 do not appear to have an impact on the hydraulic conductivity of the aquifer matrix downgradient from the injection area. It should be noted that post-injection aquifer tests could not be completed in the injection wells due to the presence of substantial thicknesses of vegetable oil remaining after injection. As a result, the effect of vegetable oil injection on the hydraulic conductivity of the aquifer matrix in the immediate vicinity of the injection wells could not be directly assessed.

The average hydraulic gradient in July/August 2001 was approximately 0.005 ft/ft, as measured from well PES-MW1S to well 007G25MF. Given an estimated effective porosity of 27 percent, the average groundwater seepage velocity in July/August 2001

TABLE 4.2
PRE-INJECTION HYDRAULIC CONDUCTIVITIES AND AVERAGE GROUNDWATER VELOCITIES
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Monitoring Well	Test Date	Rising or Falling Test	Screened Interval (ft bgs)[a/]	Casing Inside Diameter (inches)	Static Water Level (feet btoc)	Hydraulic Conductivity (K) (ft/day)[b/]	(cm/sec)[c/]	(gpd/ft^2)[d/]	Estimated Effective Porosity	Hydraulic Gradient (ft/ft)[e/]	Maximum Groundwater Velocity (ft/yr)[f/]
Upper Fluvial Zone - Monitoring Wells											
PES-MW5S	15-Aug-00	Rise	45.4 - 55.4	2.0	39.56	3.89	1.37E-03	29.1	0.27	0.005	26.3
	15-Aug-00	Fall	45.4 - 55.4	2.0	39.56	6.96	2.46E-03	52.1	0.27	0.005	47.1
Average for PES-MW5S						5.42	1.91E-03	40.6	0.27	0.005	36.7
PES-MW8S	15-Aug-00	Rise	55.0-65.0	2.0	39.79	2.84	1.00E-03	21.2	0.27	0.005	19.2
	15-Aug-00	Fall	55.0-65.0	2.0	39.79	3.18	1.12E-03	23.8	0.27	0.005	21.5
Average for PES-MW8S						3.01	1.06E-03	22.5	0.27	0.005	20.3
Upper Fluvial Zone - Injection Wells											
PES-INJ2S	15-Aug-00	Rise	44.8-54.8	2.0	39.55	18.29	6.46E-03	136.8	0.27	0.005	123.6
	15-Aug-00	Fall	44.8-54.8	2.0	39.55	13.68	4.83E-03	102.3	0.27	0.005	92.5
Average for PES-INJ2S						15.99	5.64E-03	119.6	0.27	0.005	108.0
PES-INJ3S	15-Aug-00	Rise	55.0-65.0	2.0	39.42	9.26	3.27E-03	69.3	0.27	0.005	62.6
	15-Aug-00	Fall	55.0-65.0	2.0	39.42	9.97	3.52E-03	74.6	0.27	0.005	67.4
Average for PES-INJ3S						9.62	3.39E-03	71.9	0.27	0.005	65.0
GEOMETRIC MEAN FOR UPPER SATURATED ZONE (PRE-INJECTION)						**7.08**	**2.50E-03**	**52.9**	**0.27**	**0.005**	**47.8**

TABLE 4.2 (Continued)
PRE-INJECTION HYDRAULIC CONDUCTIVITIES AND AVERAGE GROUNDWATER VELOCITIES
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Monitoring Well	Test Date	Rising or Falling Test	Screened Interval (ft bgs)[a]	Casing Inside Diameter (inches)	Static Water Level (feet btoc)	Hydraulic Conductivity (K) (ft/day)[b]	(cm/sec)[c]	(gpd/ft²)[d]	Estimated Effective Porosity	Hydraulic Gradient (ft/ft)[e]	Maximum Groundwater Velocity (ft/yr)[f]
Lower Fluvial Zone - Monitoring Wells											
PES-MW5D	15-Aug-00	Rise	65.0-75.0	2.0	39.91	10.51	3.71E-03	78.6	0.27	0.005	71.0
	15-Aug-00	Fall	65.0-75.0	2.0	39.91	12.81	4.52E-03	95.8	0.27	0.005	86.6
Average for PES-MW5D						11.66	4.12E-03	87.2	0.27	0.005	78.8
PES-MW8D	15-Aug-00	Rise	75.3-85.3	2.0	39.90	5.07	1.79E-03	37.9	0.27	0.005	34.3
	15-Aug-00	Fall	75.3-85.3	2.0	39.90	0.04	1.52E-05	0.3	0.27	0.005	0.3
Average for PES-MW8D						2.56	9.02E-04	19.1	0.27	0.005	17.3
Lower Fluvial Zone - Injection Wells											
PES-INJ2D	15-Aug-00	Rise	65.0-75.0	2.0	39.74	21.26	7.50E-03	159.0	0.27	0.005	143.7
	15-Aug-00	Fall	65.0-75.0	2.0	39.74	20.51	7.24E-03	153.4	0.27	0.005	138.6
Average for PES-INJ2D						20.89	7.37E-03	156.2	0.27	0.005	141.2
PES-INJ3D	15-Aug-00	Rise	75.0-85.0	2.0	39.84	9.18	3.24E-03	68.7	0.27	0.005	62.1
	15-Aug-00	Fall	75.0-85.0	2.0	39.84	11.73	4.14E-03	87.7	0.27	0.005	79.3
Average for PES-INJ3D						10.46	3.69E-03	78.2	0.27	0.005	70.7
GEOMETRIC MEAN FOR LOWER SATURATED ZONE (PRE-INJECTION)						**8.98**	**3.17E-03**	**67.2**	**0.27**	**0.005**	**60.7**

[a] ft bgs = Feet below ground surface.
[b] ft/day = Feet per day.
[c] cm/sec = Centimeters per second.
[d] gpd/ft² = Gallons per day per square foot.
[e] ft/ft = Foot per foot.
[f] ft/yr = Feet per year.

TABLE 4.3
POST-INJECTION HYDRAULIC CONDUCTIVITIES AND AVERAGE GROUNDWATER FLOW VELOCITIES
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Monitoring Well	Test Date	Rising or Falling Test	Screened Interval (ft bgs)[a]	Casing Inside Diameter (inches)	Static Water Level (feet btoc)	Hydraulic Conductivity (K) (ft/day)[b]	(cm/sec)[c]	(gpd/ft²)[d]	Estimated Effective Porosity	Hydraulic Gradient (ft/ft)[e]	Maximum Groundwater Velocity (ft/yr)[f]
Upper Fluvial Zone - Monitoring Wells Post-Injection Slug Tests											
PES-MW2S	31-Jan-02	Rise	55.0-65.0	2.0	39.51	24.45	8.63E-03	182.9	0.27	0.005	165.3
	31-Jan-02	Fall	55.0-65.0	2.0	39.51	45.89	1.62E-02	343.3	0.27	0.005	310.2
Average for PES-MW2S						35.17	1.24E-02	263.1	0.27	0.005	237.7
PES-MW3S	31-Jan-02	Rise	45.0-55.0	2.0	39.49	15.77	5.57E-03	118.0	0.27	0.005	106.6
	31-Jan-02	Fall	45.0-55.0	2.0	39.49	15.99	5.64E-03	119.6	0.27	0.005	108.1
Average for PES-MW3S						15.88	5.61E-03	118.8	0.27	0.005	107.3
PES-MW5S	31-Jan-02	Fall	45.4-55.4	2.0	39.39	8.67	3.06E-03	64.9	0.27	0.005	58.6
GEOMETRIC MEAN FOR UPPER SATURATED ZONE (POST-INJECTION						**16.92**	**5.97E-03**	**126.5**	**0.27**	**0.005**	**114.4**
Lower Fluvial Zone - Monitoring Wells Post-Injection Slug Tests											
PES-MW2D	31-Jan-02	Rise	55.0-65.0	2.0	39.51	5.25	1.85E-03	39.3	0.27	0.005	35.5
	31-Jan-02	Fall	55.0-65.0	2.0	39.51	5.76	2.03E-03	43.1	0.27	0.005	38.9
Average for PES-MW2S						5.51	1.94E-03	41.2	0.27	0.005	37.2
PES-MW3D	31-Jan-02	Rise	45.0-55.0	2.0	39.49	21.38	7.55E-03	159.9	0.27	0.005	144.5
	31-Jan-02	Fall	45.0-55.0	2.0	39.49	22.17	7.83E-03	165.8	0.27	0.005	149.9
Average for PES-MW3S						21.78	7.69E-03	162.9	0.27	0.005	147.2
PES-MW5D	31-Jan-02	Fall	45.4-55.4	2.0	39.39	12.42	4.38E-03	92.9	0.27	0.005	84.0
GEOMETRIC MEAN FOR LOWER SATURATED ZONE (POST-INJECTIO						**6.15**	**2.17E-03**	**46.0**	**0.28**	**0.005**	**77.2**

[a] ft bgs = feet below ground surface.
[b] ft/day = feet per day.
[c] cm/sec = centimeters per second.
[d] gpd/ft² = gallons per day per square foot.
[e] ft/ft = foot per foot.
[f] ft/yr = feet per year.

was approximately 48 ft/yr in the upper fluvial zone and approximately 61 ft/yr in the lower fluvial zone. Therefore, the maximum distance that the effects of the oil injection in the upper and lower fluvial deposits are likely to be observed for the period of August 2000 to January 2002 is approximately 70 feet, or approximately in the vicinity of observation wells PES-MW7S/D.

4.2 SOIL SAMPLING RESULTS

Soil analytical results collected during well installation activities are summarized on Table 4.4. The complete soil analytical data package is included in Appendix A.

4.2.1 Total Organic Carbon in Soil

Partitioning of a chemical between the dissolved phase and solid phase is commonly referred to as soil adsorption, and is quantified by the soil partition coefficient or distribution coefficient (Kd), which is the proportionality constant relating the amount of chemical sorbed to soil and the concentration at equilibrium in soil. This description of the process assumes that partitioning between the sorbed and dissolved phases is completely reversible, and that the equilibrium isotherm relating the relative concentrations in the two phases is linear (Neff et al., 1994; Lyman et al., 1990). Organic matter in soil controls sorption where there is sufficient organic matter present (more than 0.1 percent organic carbon). This observation has been used as the basis for normalizing the linear partition coefficient to the concentration of total organic carbon in the soil (Karickhoff et al., 1979; Karickhoff, 1981). If the organic carbon content of the soils at Site N-6 can be characterized or estimated, these data can be used to evaluate chemical partitioning to the soil matrix. Specifically, the fraction of sorbed CAHs increases as the concentration of organic carbon in the soil increases.

A total of six soil samples were collected from two locations (PES-MW1 and PES-MW8) during the course of drilling and well installation activities at Site N-6 and sent to Microseeps, Inc. for TOC analysis via the Walkley Black Method. At each location soil samples were collected from the vertical interval where the monitoring well screens were

TABLE 4.4
SUMMARY OF ANALYTICAL RESULTS FOR SOIL
NAA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Sample Date	Sample Depth (feet bgs)[a]	TCE[b] (µg/kg)[c]	1,1-DCE[b] (µg/kg)	1,1-DCA[b] (µg/kg)	Carbon Tetrachloride (µg/kg)	Chloroform (µg/kg)	Methylene Chloride (µg/kg)	Benzene (µg/kg)	Ethylbenzene (µg/kg)	Toluene (µg/kg)	o-Xylene (µg/kg)	m&p-Xylene (µg/kg)	1,2,3-TMB[b] (µg/kg)	1,2,4-TMB[b] (µg/kg)	n-Butyl-benzene (µg/kg)	n-Propyl-benzene (µg/kg)	Naphthalene (µg/kg)	Moisture (percent)	Total Organic Carbon (mg/kg)[d]
PES-MW1S,D	18-Jul-00	45 - 46'	NA[e]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	21	<25[f]
PES-MW1S,D	18-Jul-00	55 - 56'	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	18	<25
PES-MW1S,D	18-Jul-00	65 - 66'	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	16	<25
PES-MW1S,D	18-Jul-00	75 - 76'	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	17	<25
PES-MW2S,D	1-Aug-00	20 -22'	0.93J[g]	<4.6	<4.6	<4.6	<4.6	<4.6	2.5J	2.9J	7.4	1.5J	3.2J	<4.6	2.8J	<4.6	<4.6	<4.6	22	NA
PES-MW2S,D	1-Aug-00	40 - 42'	1.1J	<4.8	<4.8	<4.8	<4.8	1.0J	<4.8	<4.8	<4.8	<4.8	<9.7	<4.8	2.9J	<4.8	<4.8	<4.8	18	NA
PES-MW2S,D	1-Aug-00	55 - 57'	37	7.0	2.0J	1.4J	7.0	0.93J	<4.4	<4.4	<4.4	<4.4	1.3J	<4.4	2.1J	<4.4	<4.4	<4.4	14	NA
PES-MW2S,D	1-Aug-00	55-57' (dup)	41	8.8	2.1J	1.7J	7.5	1.0J	<4.8	<4.8	<4.8	<4.8	<9.6	<4.8	<4.8	<4.8	<4.8	<4.8	16	NA
PES-MW3S,D	24-Jul-00	5 - 7'	46J	<430	<430	<430	<430	59J	<430	<430	38J	<430	37J	<430	<430	45J	<430	<430	18	NA
PES-MW3S,D	24-Jul-00	30 - 32'	40J	<470	<470	<470	<470	37J	<470	<470	<470	<470	<940	<470	<470	<470	<470	<470	18	NA
PES-MW3S,D	24-Jul-00	55 - 57'	23	1.9J	<4.4	2.0J	8.6	3.6J	<4.4	3.8J	3.8J	4.4J	14	1.9J	8.2	1.1J	2.1J	0.94J	12	NA
PES-MW7S,D	21-Jul-00	5 - 7'	1.6J	<5.0	<5.0	<5.0	<5.0	2.0J	<5.0	<5.0	<5.0	<5.0	2.7J	<5.0	<5.0	<5.0	<5.0	<5.0	13	NA
PES-MW7S,D	21-Jul-00	55 - 57'	8.9	1.8J	5.2	<5.0	3.0J	3.0J	<5.0	<5.0	<5.0	<5.0	3.0J	<5.0	1.8J	<5.0	<5.0	<5.0	16	NA
PES-MW8S,D	22-Jul-00	57 - 57'	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<25
PES-MW8S,D	22-Jul-00	75 - 77'	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<25
PES-INJ2S,D	20-Jul-00	12 - 14'	4.9J	<5.0	<5.0	<5.0	1.2J	2.3J	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA
PES-INJ2S,D	20-Jul-00	34 - 36'	3.9J	<5.0	<5.0	<5.0	1.6J	2.4J	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA
PES-INJ2S,D	20-Jul-00	40 - 42'	4.4J	2.4J	3.9J	<5.0	1.8J	2.6J	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA

[a] feet bgs = feet below ground surface.

[b] TCE = trichloroethene; DCE = dichloroethene; DCA = dichloroethane, TMB = trimethylbenzene.

[c] µg/kg = micrograms per kilogram.

[d] mg/kg = milligrams per kilogram.

[e] NA = not sampled.

[f] <25 indicates that the analyte was not detected above the indicated method detection limit.

[g] J indicates that the analyte was detected at a concentration above the method detection limit but below the reporting limit resulting in an estimated value.

to be placed in order to quantify concentrations of naturally-occurring organic carbon within the soil matrix.

TOC concentrations detected in soils at Site N-6 were all below the method detection limit (MDL) of 25 milligrams per liter (mg/kg). These results indicate that the subsurface soils beneath Site N-6 are relatively poor in naturally-occurring organic carbon. Therefore, significant contaminant adsorption to the soil matrix would not be expected at Site N-6.

4.2.2 Pre-Injection Extent of Chlorinated Aliphatic Hydrocarbons in Soil

Soil samples were collected at various intervals from bore holes PES-MW2, PES-MW3, PES-MW7, PES-MW8, and PES-INJ2 and sent to Microseeps, Inc. for VOC analysis via USEPA Method 8260B. VOC analytical results collected during this study indicate that there were a total of 16 contaminants detected at concentrations above the associated MDL (Table 4.1). All of the contaminants detected in soil were detected at relatively low concentrations (<100 micrograms per kilogram [μg/kg]). The maximum VOC concentration detected was 59 μg/kg of methylene chloride, which was detected in a soil sample collected from PES-MW3. The relatively low concentrations of VOCs detected in soil with respect to VOC concentrations detected in groundwater confirms that VOCs are not adsorbing to the soil matrix in significant quantity.

4.3 PRE-INJECTION EXTENT OF CHLORINATED ALIPHATIC HYDROCARBONS IN GROUNDWATER

Groundwater from the 24 newly-installed injection and monitoring wells as well as 2 existing monitoring wells were sampled prior to injection and analyzed for VOCs by Microseeps Inc., via USEPA Method 8260B. Analytical results for chlorinated compounds in groundwater collected prior to injection are summarized in Table 4.5. Laboratory analytical results for groundwater samples are included in Appendix A. In addition, Table 4.6 presents a summary of VOCs detected in groundwater samples collected by Ensafe Inc., from 1998 to 2001 as part of the base-wide long-term monitoring program.

TABLE 4.5
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER
SITE N-6 PROCESS MONITORING PROGRAM
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Date	PCE[a] (µg/L)[b]	TCE[a] (µg/L)	*cis*-1,2-DCE[a] (µg/L)	*trans*-1,2-DCE[a] (µg/L)	1,1-DCE[a] (µg/L)	Vinyl Chloride (µg/L)	1,1-DCA[a] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Methylene Chloride (µg/L)	Benzene (µg/L)	Toluene (µg/L)	n-Butyl benzene (µg/L)	1.2.3-Trichloro-benzene (µg/L)	sec-Butyl benzene (µg/L)	1,2,3-Trichloro-propane (µg/L)	1,2,4-Trichloro-benzene (µg/L)	m&p Xylenes (µg/L)	Chloro-ethane (µg/L)
MONITORING WELLS																					
PES-MW1S	25-Jul-00	<5.0[c]	150	34	1.0J[d]	15	<5.0	8.5	<5.0	<5.0	3.6J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Nov-00	<5.0	22	9.1	<5.0	23	<5.0	17	<5.0	<5.0	2.1J	<5.0	<5.0	1.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	6-Feb-01	<5.0	53	17	<5.0	26	<5.0	27	<5.0	<5.0	4.3J	<5.0	1.1J	2.1J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	6-Aug-01	<5.0	14	34	44	13	<5.0	24	<5.0	<5.0	1.1 J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	3.5 J
	29-Jan-02	<5.0	100	40	44	27	<5.0	42	<5.0	2.3J	10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW1D	6-Aug-00	<5.0	26	2.8J	<5.0	2.2J	<5.0	<5.0	<5.0	<5.0	1.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Nov-00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1.6J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	6-Feb-01	<5.0	1.2J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	2.6J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	6-Aug-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW2S	5-Aug-00	<5.0	680	4.5J	<5.0	40	<5.0	5.8	<5.0	66	110	<5.0	1.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	10-Nov-00	1.0J	1,000	14	<5.0	140	<5.0	24	<5.0	100	140	1.1J	5.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Feb-01	1.3J	1,200	18	<5.0	180	<5.0	34	<5.0	140	150	1.2J	6.6	1.3J	<5.0	21	<5.0	<5.0	<5.0	<10	<5.0
	9-Aug-01	<5.0	1,300	12	<5.0	140	<5.0	25	<5.0	62	100	<5.0	3.9J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	30-Jan-02	1.0J	1,200	250	12	310	<5.0	43	<5.0	93	130	2.6J	7.2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW2D	4-Aug-00	<5.0	180	3.6J	<5.0	110	<5.0	13	<5.0	7.5	15	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	10-Nov-00	<5.0	260	8.8	<5.0	150	<5.0	17	<5.0	8.3	29	<5.0	1.7J	1.1J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Feb-01	<5.0	220	7.7	<5.0	98	<5.0	17	<5.0	3.7J	22	<5.0	1.4J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Aug-01	<5.0	40	7.4	<5.0	23	<5.0	4.5J	<5.0	2.4J	4.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	30-Jan-02	<5.0	42	12	<5.0	44	<5.0	8.3	<5.0	1.4J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW3S	4-Aug-00	1.2J	1,600	12	<5.0	200	<5.0	32	<5.0	42	96	<5.0	4.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	10-Nov-00	<5.0	350	12	<5.0	150	<5.0	50	47	4.6J	47	1.8J	3.2J	1.3J	1.1J	1.0J	<5.0	<5.0	<5.0	<10	<5.0
	9-Feb-01	<5.0	290	14	<5.0	220	<5.0	97	1.4J	4.8J	41	1.1J	2.8J	1.0J	<5.0	<5.0	<5.0	20	<5.0	<10	<5.0
	9-Aug-01	<5.0	740	15	<5.0	380	<5.0	54	<5.0	5.7	21	<5.0	3.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	30-Jan-02	1.3J	1,000	19	<5.0	420	<5.0	66	<5.0	24	47	<5.0	5.6	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW3D	4-Aug-00	<5.0	4.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1.3J	<5.0	<5.0	<10	1.3J
	10-Nov-00	<5.0	420	9.9	<5.0	64	<5.0	13	<5.0	60	68	<5.0	1.5J	1.1J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Feb-01	<5.0	560	12	<5.0	74	<5.0	12	<5.0	100	87	<5.0	1.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Aug-01	<5.0	230	7.6	<5.0	56	<5.0	9.4	<5.0	21	48	3.0J	1.2J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	4.0J
	30-Jan-02	<5.0	160	35	<5.0	31	<5.0	4.1J	<5.0	8.3	18	3.2J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW4S	3-Aug-00	<5.0	1,600	6.4	<5.0	69	<5.0	9.7	<5.0	50	120	<5.0	2.9J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Nov-00	1.0J	1,000	13	<5.0	120	<5.0	21	<5.0	57	160	1.3J	5.1	2.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Feb-01	1.0J	990	16	<5.0	170	<5.0	30	<5.0	63	120	1.2J	5.4	1.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Aug-01	<5.0	370	13	<5.0	160	<5.0	32	<5.0	21	68	<5.0	3.2J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	30-Jan-02	1.1J	1,000	21	<5.0	310	<5.0	51	<5.0	57	89	<5.0	4.9J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW4D	3-Aug-00	<5.0	120	1.7J	<5.0	32	<5.0	6.5	<5.0	5.8	13	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	10-Nov-00	<5.0	140	3.0J	<5.0	39	<5.0	5.8	<5.0	9.1	18	<5.0	<5.0	1.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Feb-01	<5.0	95	2.9J	<5.0	34	<5.0	6.0	<5.0	7.0	16	<5.0	<5.0	1.7J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Aug-01	<5.0	110	2.2J	<5.0	27	<5.0	5.4	<5.0	7.4	15	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	30-Jan-02	<5.0	67	1.5J	<5.0	22	<5.0	4.1J	<5.0	9.1	11	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW5S	3-Aug-00	<5.0	690	5.9	<5.0	70	<5.0	37	<5.0	20	110	<5.0	2.6J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Nov-00	<5.0	220	6.9	<5.0	88	<5.0	62	<5.0	8.2	38	<5.0	1.4J	1.3J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Feb-01	<5.0	250	8.8	<5.0	120	<5.0	78	<5.0	11	40	<5.0	1.8J	1.2J	<5.0	<5.0	<5.0	21	<5.0	<10	<5.0
	8-Aug-01	<5.0	180	6.3	<5.0	92	<5.0	64	<5.0	3.3J	18	<5.0	1.1J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	30-Jan-02	<5.0	540	13	<5.0	190	<5.0	92	<5.0	24	33	<5.0	2.6J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0

TABLE 4.5 (Continued)
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER
SITE N-6 PROCESS MONITORING PROGRAM
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Date	PCE[a/] (µg/L)[b/]	TCE[a/] (µg/L)	*cis-* 1,2-DCE[a/] (µg/L)	*trans-* 1,2-DCE[a/] (µg/L)	1,1-DCE[a/] (µg/L)	Vinyl Chloride (µg/L)	1,1-DCA[a/] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Methylene Chloride (µg/L)	Benzene (µg/L)	Toluene (µg/L)	n-Butyl benzene (µg/L)	1.2.3-Trichloro-benzene (µg/L)	sec-Butyl benzene (µg/L)	1,2,3-Trichloro-propane (µg/L)	1,2,4-Trichloro-benzene (µg/L)	m&p Xylenes (µg/L)	Chloro-ethane (µg/L)
PES-MW5D	3-Aug-00	<5.0	450	4.3J	<5.0	30	<5.0	4.4J	<5.0	85	99	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Nov-00	<5.0	690	6.9	<5.0	40	<5.0	6.4	<5.0	160	130	<5.0	1.4J	2.1J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Feb-01	<5.0	700	8.1	<5.0	58	<5.0	9.2	<5.0	140	130	<5.0	1.9J	1.2J	<5.0	20	<5.0	<5.0	<5.0	<10	<5.0
	8-Aug-01	<5.0	680	8.7	<5.0	77	<5.0	13	<5.0	110	120	<5.0	1.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	30-Jan-02	<5.0	1,000	12	<5.0	160	<5.0	20	<5.0	160	140	<5.0	2.7J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW6S	4-Aug-00	1.0J	1,800	9.9	<5.0	120	<5.0	17	<5.0	270	180	1.2J	3.4J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Nov-00	1.4J	1,100	17	<5.0	160	<5.0	28	<5.0	57	140	1.2J	<5.0	1.4J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Feb-01	2.1J	920	22	36	190	<5.0	36	<5.0	<5.0	130	1.2J	6.3	<5.0	<5.0	<5.0	<5.0	19	<5.0	<10	<5.0
	8-Aug-01	1.4J	860	17	<5.0	190	<5.0	39	<5.0	49	94	<5.0	5.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	1.5J	1,200	25	<5.0	300	<5.0	62	<5.0	68	120	1.4J	6.6	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW6D	3-Aug-00	<5.0	220	4.0J	<5.0	120	<5.0	16	<5.0	6.4	17	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Nov-00	<5.0	200	4.6J	<5.0	51	<5.0	5.8	<5.0	17	28	<5.0	<5.0	1.9J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Feb-01	<5.0	150	<5.0	<5.0	36	<5.0	5.2	<5.0	12	22	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Aug-01	<5.0	88	2.4J	<5.0	32	<5.0	5.1	<5.0	6.3	12	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	74	26	<5.0	58	<5.0	8.2	<5.0	4.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW7S	2-Aug-00	1.2J	660	7.2	<5.0	16	<5.0	2.5J	<5.0	74	72	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Nov-00	<5.0	150	28	<5.0	100	<5.0	82	<5.0	6.4	23	<5.0	1.1J	1.7J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Feb-01	<5.0	95	61	<5.0	95	<5.0	84	<5.0	5.1	8.8	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Aug-01	<5.0	140	28	<5.0	110	<5.0	83	<5.0	4.0J	5.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	220	22	<5.0	170	<5.0	110	<5.0	13	16	<5.0	1.2J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW7D	2-Aug-00	2.0J	570	16	<5.0	120	<5.0	81	<5.0	20	29	<5.0	1.3J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	9-Nov-00	<5.0	980	4.5J	<5.0	20	<5.0	4.4J	<5.0	260	150	<5.0	1.6J	1.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Feb-01	<5.0	800	6.0	<5.0	23	<5.0	5.5	<5.0	210	130	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Aug-01	<5.0	670	4.5J	<5.0	27	<5.0	6.0	<5.0	200	100	<5.0	1.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	1,300	5.0J	<5.0	53	<5.0	6.9	<5.0	270	150	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW8S	2-Aug-00	<5.0	150	<5.0	<5.0	6.7	<5.0	2.2J	<5.0	8.0	27	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Nov-00	<5.0	98	1.0J	<5.0	38	<5.0	16	<5.0	8.3	17	<5.0	<5.0	1.9J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Feb-01	<5.0	100	<5.0	<5.0	40	<5.0	16	<5.0	8.1	13	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Aug-01	<5.0	61	<5.0	<5.0	33	<5.0	11	<5.0	4.8J	5.2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	220	1.2J	<5.0	72	<5.0	26	<5.0	14	15	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW8D	2-Aug-00	<5.0	380	1.4J	<5.0	7.4	<5.0	1.6J	<5.0	52	73	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Nov-00	<5.0	720	2.6J	<5.0	16	<5.0	3.6J	<5.0	97	86	<5.0	<5.0	1.9J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Feb-01	<5.0	580	<5.0	<5.0	22	<5.0	<5.0	94	96	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Aug-01	<5.0	540	3.1J	<5.0	26	<5.0	4.9J	<5.0	72	82	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	980	4.0J	<5.0	37	<5.0	6.1	<5.0	30	120	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
007G15UF	24-Jul-00	<5.0	290	14	<5.0	370	<5.0	65	<5.0	2.7J	10	<5.0	2.7J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Nov-00	<5.0	380	12	<5.0	340	<5.0	51	<5.0	3.7J	<5.0	<5.0	2.6J	2.6J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	6-Feb-01	<5.0	370	14	<5.0	330	<5.0	41	<5.0	5.8	16	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Aug-01	<5.0	310	13	<5.0	340	<5.0	50	<5.0	5.2	17	<5.0	2.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	780	23	<5.0	900	<5.0	100	<5.0	15	30	<5.0	5.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
007G15LF	25-Jul-00	<5.0	58	6.2	<5.0	3.4J	<5.0	1.0J	<5.0	19	4.8	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	8-Nov-00	<5.0	14	<5.0	<5.0	10	<5.0	2.6J	<5.0	25	6.9	<5.0	<5.0	2.2J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	6-Feb-01	<5.0	8.7	<5.0	<5.0	6.2	<5.0	2.9J	<5.0	18	6.3	<5.0	<5.0	2.6J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	7-Aug-01	<5.0	3.5J	<5.0	<5.0	3.9J	<5.0	1.2 J	<5.0	17	5.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	29-Jan-02	<5.0	36	<5.0	<5.0	6.0	<5.0	1.5J	<5.0	27	8.5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0

TABLE 4.5 (Continued)
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER
SITE N-6 PROCESS MONITORING PROGRAM
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location		Date	PCE[a] (µg/L)[b]	TCE[a] (µg/L)	*cis-* 1,2-DCE[a] (µg/L)	*trans-* 1,2-DCE[a] (µg/L)	1,1-DCE[a] (µg/L)	Vinyl Chloride (µg/L)	1,1-DCA[a] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Methylene Chloride (µg/L)	Benzene (µg/L)	Toluene (µg/L)	n-Butyl benzene (µg/L)	1.2.3-Trichloro-benzene (µg/L)	sec-Butyl benzene (µg/L)	1,2,3-Trichloro-propane (µg/L)	1,2,4-Trichloro-benzene (µg/L)	m&p Xylenes (µg/L)	Chloro-ethane (µg/L)
INJECTION WELLS																						
PES-INJ1S		5-Aug-00	<5.0	640	11	<5.0	150	<5.0	14	<5.0	20	75	1.4J	3.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-INJ1D		5-Aug-00	<5.0	55	1.7J	<5.0	9.3	<5.0	2.8J	<5.0	2.9J	5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-INJ2S		5-Aug-00	<5.0	600	14	<5.0	210	<5.0	50	<5.0	13	58	<5.0	2.9J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
		31-Jan-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	Oil	11-Nov-00	<250	170J	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<500	<250
	Oil	9-Feb-01	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<9,900	<5,000
	Oil	9-Aug-01	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<9,800	<4,900
	Oil	31-Jan-02	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<10,000	<5,000
PES-INJ2D		5-Aug-00	<5.0	140	4.0J	<5.0	40	<5.0	7.3	<5.0	2.7J	12	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
		11-Nov-00	<5.0	2.1J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	21	<5.0	<5.0	<5.0	<10	<5.0
		9-Aug-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	2.0J
		31-Jan-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
	Oil	11-Nov-00	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<500	<250
	Oil	9-Feb-01	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<10,000	<5,000
	Oil	9-Aug-01	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<9,800	<4,900
	Oil	31-Jan-02	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<10,000	<5,000
PES-INJ3S		5-Aug-00	<5.0	450	5.1	<5.0	52	<5.0	6.9	<5.0	18	42	<5.0	1.7J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10.0	<5.0
	Oil	8-Feb-01	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	<4,900	1,100J	<4,900	<4,900	<4,900	1,400J	1,400J	<4,900
	Oil	9-Aug-01	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	2,200J	1,800J	1,200J	<4,800	2,000J	<9,600	<4,800
PES-INJ3D		5-Aug-00	<5.0	80	2.4J	<5.0	43	<5.0	7.0	<5.0	1.1J	4.7J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
		9-Feb-01	<5.0	11	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	2.4J
		9-Aug-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	12
	Oil	11-Nov-00	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<500	<250
PES-INJ3D(DUP4)	**Oil**	11-Nov-00	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<500	<250
	Oil	9-Feb-01	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<10,000	<5,000
	Oil	9-Aug-01	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<10,000	<5,000
PES-INJ4S		6-Aug-00	<5.0	190	18	<5.0	170	<5.0	63	<5.0	4.8J	25	<5.0	1.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
		31-Jan-02	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<100	<50
	Oil	31-Jan-02	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<10,000	<5,000
PES-INJ4D		6-Aug-00	<5.0	560	17	<5.0	240	<5.0	75	<5.0	5.3	29	<5.0	1.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0

TABLE 4.5 (Continued)
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER
SITE N-6 PROCESS MONITORING PROGRAM
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Date	PCE[a] (µg/L)[b]	TCE[a] (µg/L)	*cis-* 1,2-DCE[a] (µg/L)	*trans-* 1,2-DCE[a] (µg/L)	1,1-DCE[a] (µg/L)	Vinyl Chloride (µg/L)	1,1-DCA[a] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Methylene Chloride (µg/L)	Benzene (µg/L)	Toluene (µg/L)	n-Butyl benzene (µg/L)	1,2,3-Trichloro-benzene (µg/L)	sec-Butyl benzene (µg/L)	1,2,3-Trichloro-propane (µg/L)	1,2,4-Trichloro-benzene (µg/L)	m&p Xylenes (µg/L)	Chloro-ethane (µg/L)
QUALITY ASSURANCE/QUALITY CONTROL																					
Field Blank	25-Jul-00	<5.0	1.2J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1.8J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Rinsate Blank	4-Aug-00	<5.0	180	1.0J	<5.0	15	<5.0	1.8J	<5.0	7.1	16	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Rinsate Blank	6-Feb-01	<5.0	22	<5.0	<5.0	<5.0	<5.0	1.9J	<5.0	3.8J	1.7J	<5.0	<5.0	1.7J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Rinsate Blank	7-Aug-01	<5.0	1.1J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Rinsate Blank	30-Jan-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	2-Aug-00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	3-Aug-00	<5.0	1.5J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1.4J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	4-Aug-00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	6-Feb-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	6-Aug-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	8-Aug-01	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	29-Jan-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	30-Jan-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Trip Blank	31-Jan-02	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
Tank Water	30-Jan-02	<5.0	180	8.8	5.5	59	<5.0	20	<5.0	27	26	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW4D MS	3-Aug-00	<5.0	180	1.5J	<5.0	95	<5.0	6.0	<5.0	5.8	12	<5.0	54	61	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW4D MSD	3-Aug-00	<5.0	190	1.7J	<5.0	98	<5.0	6.2	<5.0	5.8	12	<5.0	56	63	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW1S MS	6-Feb-01	<5.0	100	18	<5.0	74	<5.0	28	<5.0	<5.0	4.8J	<5.0	49	55	<5.0	<5.0	<5.0	<5.0	<5.0	<10	2.8J
PES-MW1S MSD	6-Feb-01	<5.0	99	18	<5.0	73	<5.0	27	<5.0	<5.0	4.3J	<5.0	49	53	<5.0	<5.0	<5.0	<5.0	<5.0	<10	2.8J
PES-MW1S MS	29-Jan-02	<5.0	190	43	51	130	<5.0	45	<5.0	2.2J	12	<5.0	69	64	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW1S MSD	29-Jan-02	<5.0	180	42	48	120	<5.0	43	<5.0	2.2J	11	<5.0	65	63	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-INJ3S MS	8-Feb-01	<10	99	<10	<10	100	<10	<10	<10	<10	<10	<10	98	100	<10	<10	<10	<10	2.4J	2.3J	<10
PES-INJ3S MSD	8-Feb-01	<10	97	<10	<10	98	<10	<10	<10	<10	<10	<10	97	100	<10	<10	<10	<10	<10	<20	<10
PES-MW3D MS	30-Jan-02	<5.0	250	50	<5.0	130	<5.0	5.4	<5.0	8.0	23	4.2J	66	63	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW3D MSD	30-Jan-02	<5.0	230	46	<5.0	120	<5.0	4.9J	<5.0	7.1	21	3.8J	61	59	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW6D MS	7-Feb-01	<5.0	210	<5.0	<5.0	85	<5.0	5.2	<5.0	13	23	<5.0	48	51	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW6D MSD	7-Feb-01	<5.0	220	<5.0	<5.0	88	<5.0	5.4	<5.0	14	25	<5.0	49	52	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW1D MS	8-Aug-01	<5.0	40	<5.0	<5.0	34	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	40	45	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW1D MSD	8-Aug-01	<5.0	<5.0	<5.0	<5.0	38	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	44	49	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW7D MS	7-Aug-01	<5.0	1,000	4.8J	<5.0	70	<5.0	6.1	<5.0	220	110	<5.0	47	50	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-MW7D MSD	7-Aug-01	<5.0	920	4.4J	<5.0	67	<5.0	5.5	<5.0	200	100	<5.0	44	46	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
PES-INJ2S MS **Oil**	9-Aug-01	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	<4,800	5,600	1,200J	<4,800	<4,800	<4,800	<4,800	<9,600	<4,800
PES-INJ2S MSD **Oil**	9-Aug-01	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	<5,000	53,000	60,000	<5,000	<5,000	<5,000	<5,000	<5,000	<10,000	<5,000

[a] PCE = tetrachloroethene; TCE = trichloroethene; DCE = dichloroethene; TCA = trichloroethane; DCA = dichloroethane.

[b] µg/L = micrograms per liter.

[c] <5 indicates that the analyte was not detected above the method detection limit indicated.

[d] J indicates that the analyte was detected at a concentration above the method detection limit but below the reporting limit resulting in an estimated value.

TABLE 4.6
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER
NSA MID-SOUTH LONGTERM MONITORING PROGRAM
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Stratigraphic Interval[b]	Date	PCE[a] (µg/L)[c]	TCE[a] (µg/L)	1,2-DCE[a] (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	1,1,1-TCA[a] (µg/L)	1,1-DCA[a] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Bromochloro -methane (µg/L)	Dichlorofuoro -methane (µg/L)	Acetone (µg/L)	Benzene (µg/L)	Semi-Volatiles BEHP[a] (µg/L)	Semi-Volatiles TPH-DRO[a] (µg/L)
PERMANENT MONITORING WELLS																		
007G12LF	LF	Mar-96	ND[d]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Aug-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA[e]	NA
		May-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Aug-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Jul-00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Aug-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
007G13LF	LF	Mar-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2J[f]	ND
		Apr-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Jul-00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Aug-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
007G14LF	LF	Mar-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8J	ND
		Aug-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Jul-00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Aug-01	ND	0.28J	0.32J*[g]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.15J	ND	ND
007G15UF	UF	Mar-96	ND	840	20J*	280	ND	ND	48J	ND	20J	70	ND	ND	ND	7J	1J	160
		Aug-96	ND	800	22J*	290	ND	ND	43J	ND	19J	63	ND	ND	ND	6J	NA	NA
		Apr-97	ND	600D[h]	20*	380D	ND	ND	67	ND	14	44	ND	ND	ND	6.6	NA	NA
		Nov-97	0.8J	580D	18*	320	ND	ND	51	ND	9.8	30	ND	ND	93	4.6J	NA	NA
		Aug-98	0.58J	580D	19*	320D	ND	ND	64	ND	4.3J	17	ND	ND	ND	4.6J	NA	NA
		Jul-00	ND	400D	ND	310D	ND	ND	51	ND	4J	10	ND	ND	ND	3J	ND	ND
		Aug-01	ND	580	15*	430	ND	ND	70	ND	8.9	22	ND	ND	ND	4.4	ND	ND
007G15LF	LF	Mar-96	ND	ND	ND	ND	ND	ND	ND	ND	20	5J	ND	ND	ND	ND	14	110
		Aug-96	ND	13	ND	6J	ND	ND	2J	ND	26	10	ND	ND	ND	ND	NA	NA
		Apr-97	ND	12	ND	6.3	ND	ND	ND	ND	27	7.4	ND	ND	ND	ND	NA	NA
		Nov-97	1.1J	12	ND	ND	ND	ND	ND	ND	2.8J	2.7J	ND	ND	ND	ND	NA	NA
		Aug-98	ND	6.5	ND	3.9J	ND	ND	ND	ND	15	5.6	ND	ND	ND	ND	NA	NA
		Jul-00	ND	11	ND	7	ND	ND	ND	ND	24J	7	ND	ND	ND	ND	NA	NA
		Aug-01	ND	3.2	ND	3.1	ND	ND	1.2	ND	22	5.1	ND	ND	ND	ND	NA	NA
007G24MF	MF	Aug-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Jul-00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Aug-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
007G25MF	MF	Aug-98	ND	18	ND	2.9J	ND	ND	ND	ND	ND	2.0J	ND	ND	ND	ND	NA	NA
		Nov-98	ND	13J	ND	2J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Jul-00	ND	27	ND	ND	ND	ND	ND	ND	ND	2J	ND	ND	ND	ND	NA	NA
		Aug-01	ND	25	0.65J	3.4	ND	ND	ND	ND	1.5	2.9	ND	ND	ND	ND	NA	NA
007G26MF	MF	Aug-98	ND	1.8J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Nov-98	ND	4J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Jul-00	ND	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
		Aug-01	ND	2.8	ND	0.73J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA

TABLE 4.6 (Continued)
SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER
NSA MID-SOUTH LONGTERM MONITORING PROGRAM
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Stratigraphic Interval[b]	Date	PCE[a] (µg/L)[c]	TCE[a] (µg/L)	1,2-DCE[a] (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	1,1,1-TCA[a] (µg/L)	1,1-DCA[a] (µg/L)	1,2-DCA (µg/L)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)	Bromochloro -methane (µg/L)	Dichlorofuoro -methane (µg/L)	Acetone (µg/L)	Benzene (µg/L)	Semi-Volatiles BEHP[a] (µg/L)	Semi-Volatiles TPH-DRO[a] (µg/L)
007G49LF	UF (58')	Jun-99	ND	2J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	MF (63')	Jun-99	ND	2J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8J	ND	NA	NA
	MF (68')	Jun-99	ND	2J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	MF (73')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6J	ND	NA	NA
	LF (78')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF (83')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF (88')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF (93')	Jun-99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF	Jul-00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	LF	Aug-01	ND	0.82J	ND	ND	ND	ND	ND	ND	0.44J	ND	ND	ND	ND	ND	NA	NA
TEMPORARY MONITORING POINTS																		
7-34	UF (45')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-35	UF (49')	Nov-95	ND	117	9.92	80	ND	ND	ND	44.2	10.3	ND	31.9	ND	ND	ND	NA	NA
7-36	MF (58')	Nov-95	ND	ND	28	ND	ND	ND	ND	ND	ND	ND	ND	6.1	ND	ND	NA	NA
7-37	MF (60')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-49	LF (34')	Nov-95	ND	8.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-50	MF (61')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-51	UF (54')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-52	UF (52')	Nov-95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-53	MF (64')	Feb-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-54	MF (58')	Feb-96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-68	UF (48')	Feb-97	ND	2.6	ND	3.2	ND	ND	1.9	ND	ND	ND	ND	ND	200	ND	NA	NA
	UF (53')	Feb-97	ND	3.7	ND	5.1	ND	ND	2.7	ND	ND	ND	ND	ND	50.9J	ND	NA	NA
	MF (58')	Feb-97	ND	1.6J	ND	4.3	ND	ND	2.4	ND	ND	ND	ND	ND	1380	ND	NA	NA
	MF (64')	Feb-97	ND	ND	ND	2.0J	ND	ND	ND	ND	17.4	27.7	ND	ND	562	ND	NA	NA
	MF (69')	Feb-97	ND	1.2J	ND	2.3J	ND	ND	ND	ND	23.2	22.4	ND	ND	ND	ND	NA	NA
	LF (73')	Feb-97	ND	8.2	5.6	ND	ND	ND	ND	ND	15.2	23.3	ND	ND	ND	ND	NA	NA
	LF (78')	Feb-97	ND	6.4	5.12	ND	ND	ND	ND	ND	6.5	8.1	ND	ND	ND	ND	NA	NA
	LF (83')	Feb-97	ND	1.3J	ND	ND	ND	ND	ND	ND	1.3J	4.1J	ND	ND	594	ND	NA	NA
	LF (88')	Feb-97	ND	ND	ND	ND	ND	ND	ND	ND	1.4J	3.9J	ND	ND	ND	ND	NA	NA
7-69	MF (60')	Feb-97	ND	1160	29.2	183	ND	ND	36.5	ND	199	180	ND	ND	ND	5.1	NA	NA
	LF (90')	Feb-97	ND	1.6J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
7-70	UF (46')	Feb-97	ND	16.9	ND	10.7	ND	ND	3.2J	ND	ND	1.9J	ND	ND	ND	ND	NA	NA
	MF (68')	Feb-97	ND	190	ND	4.3J	ND	ND	ND	ND	ND	47.4	ND	ND	ND	ND	NA	NA
	LF (88')	Feb-97	ND	38.9	ND	1.0J	ND	ND	ND	ND	3.5J	11.3	ND	ND	ND	ND	NA	NA
7-71	UF (46')	Feb-97	ND	ND	ND	ND	ND	ND	1.7J	ND	ND	ND	ND	ND	1020	ND	NA	NA
	MF (68')	Feb-97	ND	422	ND	2.7	ND	ND	ND	ND	121	60.8	ND	ND	ND	ND	NA	NA
	LF (88')	Feb-97	ND	14	ND	2.6	ND	ND	ND	ND	34.3	15.9	ND	ND	ND	ND	NA	NA
7-72	UF (46')	Feb-97	ND	16.1	ND	8.7	ND	ND	4.1	ND	ND	ND	ND	ND	ND	ND	NA	NA
	MF (68')	Feb-97	ND	122	ND	1.6J	ND	ND	ND	ND	10.3	30.6	ND	ND	ND	ND	NA	NA
	LF (90')	Feb-97	ND	8.7	ND	2.1J	ND	ND	ND	ND	28.5	21.1	ND	ND	197	ND	NA	NA
7-73	MF (68')	Feb-97	ND	15.3	ND	ND	ND	ND	ND	ND	ND	2.1J	ND	ND	164	ND	NA	NA
	LF (90')	Feb-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	44J	ND	NA	NA
7-74	MF (68')	Feb-97	ND	47.4	ND	1.4J	ND	ND	ND	ND	ND	4.3J	ND	ND	ND	ND	NA	NA
	LF (91')	Feb-97	ND	1.2J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	33J	ND	NA	NA
7-79	MF (67')	Feb-97	ND	61.2	ND	10.2	ND	ND	3.5J	ND	ND	7.2	ND	ND	ND	ND	NA	NA
7-80	MF (66')	Feb-97	ND	26.2	ND	14.2	ND	ND	ND	ND	ND	3.3J	ND	ND	ND	ND	NA	NA
	LF (87')	Feb-97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA

[a] PCE = tetrachloroethene; TCE = trichloroethene; DCE = dichloroethene; TCA = trichloroethane; DCA = dichloroethane; BEHP = bis(2-ethylhexyl)phthalate; TPH-DRO = total petroleum hydrocarbons - diesel range organics.

[b] UF = upper fluvial deposits; MF = middle fluvial deposits; LF = lower fluvial deposits.

[c] µg/L = micrograms per liter.

[d] ND = not detected.

[e] NA = not analyzed.

[f] J indicates that the analyte was detected at a concentration above the method detection limit but below the reporting limit resulting in an estimated value.

[g] * = total *cis*- and *trans*-1,2-DCE.

[h] D = data qualifier indicates analysis of diluted sample.

Baseline (pre-injection) groundwater sampling results indicate that TCE was detected at concentrations above its MDL at 25 of the 26 locations sampled, with a maximum concentration of 1,800 µg/L at location PES-MW6S. Other VOCs detected during the baseline sampling include *cis*-1,2-DCE at a maximum concentration of 34 µg/L; 1,1-DCE at a maximum concentration of 370 µg/L; 1,1-DCA at a maximum concentration of 81 µg/L; CT at a maximum concentration of 270 µg/L; and chloroform at a maximum concentration of 180 µg/L. The detection of the common CAH degradation byproducts *cis*-1,2-DCE and chloroform indicate that some reductive dechlorination is or has been active at Site N-6. Benzene also was detected sporadically during baseline sampling at low estimated concentrations (above the MDL but below the laboratory reporting limit [RL]), indicating that fuel hydrocarbons may have been released at this site in the past.

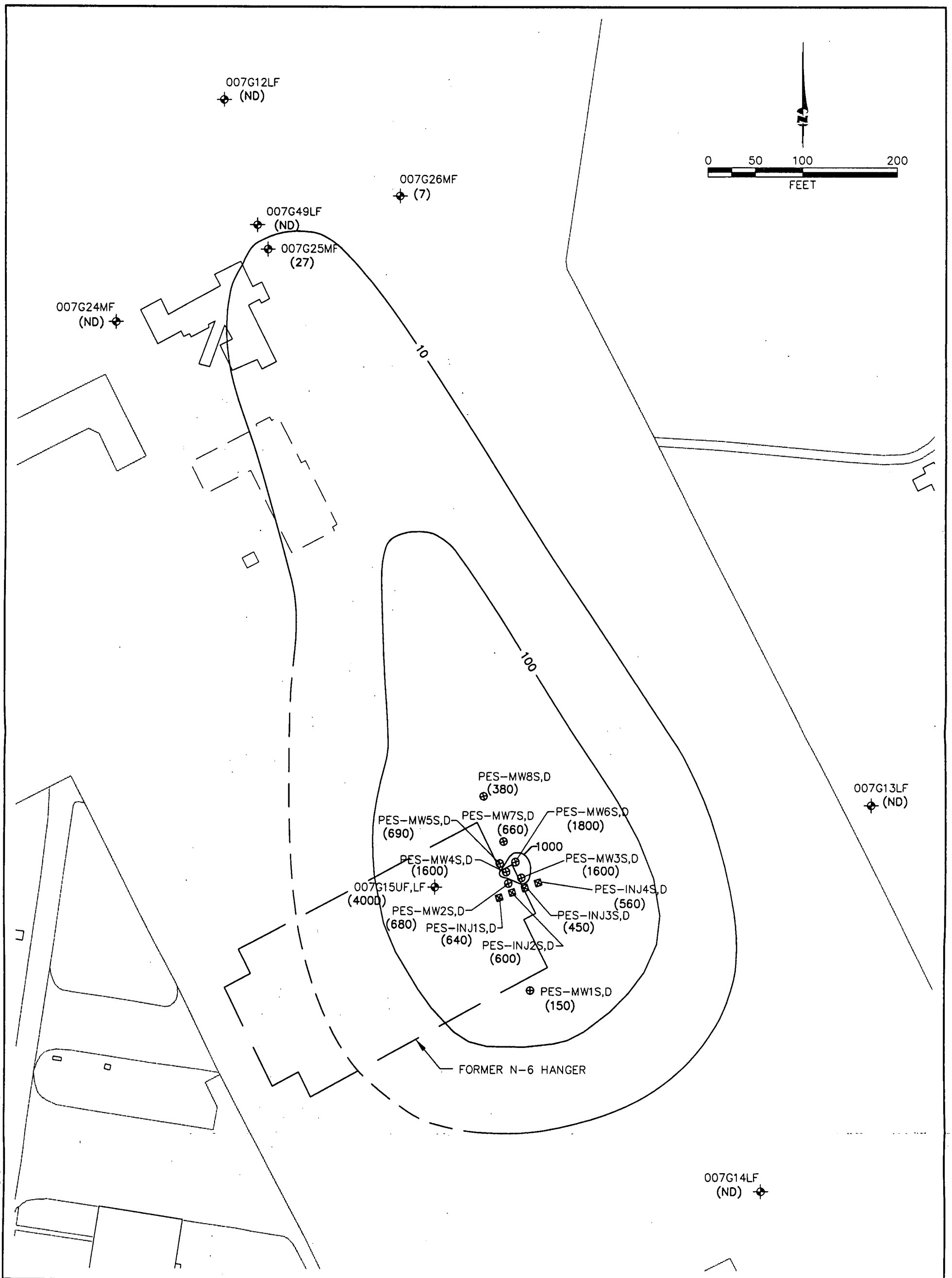
In all but two cases (*cis*-1,2-DCE and 1,1-DCE), maximum contaminant concentrations were detected in either injection wells or monitoring wells installed directly downgradient from the injection area. This area coincides with a former grassy area located at the east end of former Hanger N-6 where solvents were reportedly spread on the ground to kill weeds, and where a storm water drain runs beneath the site. Contaminant concentrations were generally higher in groundwater samples collected from shallow wells with respect to contaminant concentrations detected in associated deep wells. Concentrations of VOCs detected in wells 007G15UF and 007G15LF were consistent with historical results (Table 4.5).

The distribution of TCE (maximum concentration plotted for each well pair) prior to oil injection in July/August 2000 is shown on Figure 4.3. The highest TCE concentrations were detected in samples collected from wells downgradient from the injection area (PES-MW3S, PES-MW4S, and PES-MW6S).

4.4 POST-INJECTION PROFILE OF CHLORINATED ALIPHATIC HYDROCARBONS

4.4.1 Chlorinated Ethenes Over Time

Reductions in contaminant concentrations and changing molar fractions [i.e., declining mass fraction of TCE and increasing mass fraction of daughter products such as



LEGEND

007G14LF
- WELL SAMPLE AND WELL NUMBER
- INJECTION WELL PAIR AND NUMBER
- MONITORING WELL PAIR AND NUMBER

UF – UPPER FLUVIAL DEPOSITS WELL

LF – LOWER FLUVIAL DEPOSITS WELL

(380) – MAXIMUM TCE CONCENTRATION IN GROUNDWATER (µg/L)

ND – NOT DETECTED

D – INDICATES SAMPLE WAS DILUTED FOR ANALYSIS

100 – LINE OF EQUAL TCE CONCENTRATION (µg/L)

NOTE: THE MAXIMUM TCE CONCENTRATION IS POSTED AND CONTOURED AT LOCATIONS WITH PAIRED SCREEN INTERVALS.

FIGURE 4.3

MAXIMUM TCE CONCENTRATION IN GROUNDWATER JULY/AUGUST 2000 (PRE-INJECTION)

NSA Mid-South Site N-6
Millington, Tennessee

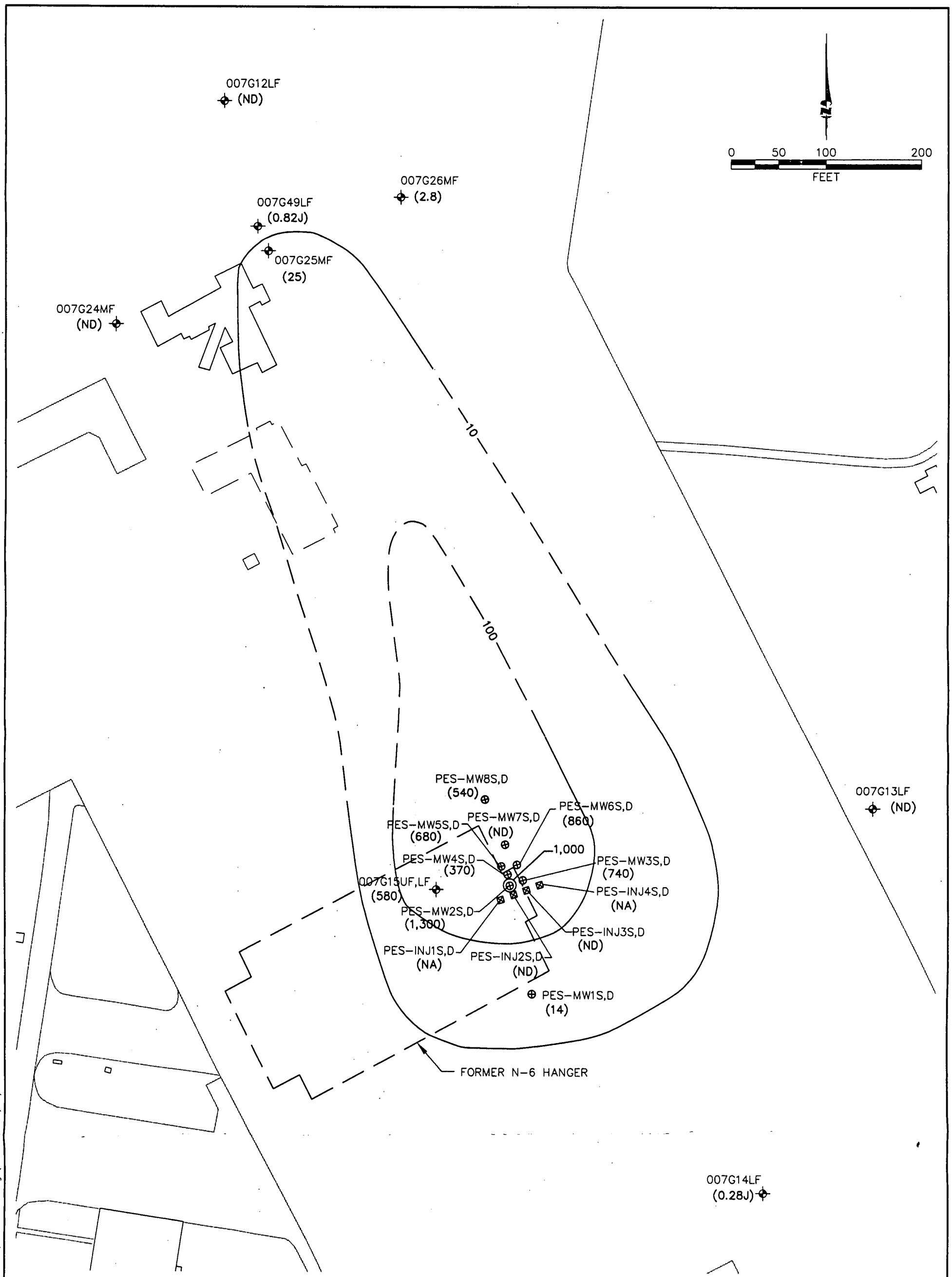
PARSONS
Denver, Colorado

S:\ES\REMED\737490\05000\FIGURES\TECHMEMO2\01DN0386.dwg (FIG 4.3), 04/17/02 AML

cis-1,2-DCE] of dissolved constituents over time can be indicative of biodegradation. Figures 4.3 and 4.4 show the distribution of TCE (maximum concentration plotted for each well pair) for pre-injection conditions (July/August 2000) and for post-injection conditions at 12 months following injection (July/August 2001), respectively. The overall plume appears to be stable, with slightly lower concentrations of TCE in July/August 2002.

Figures 4.5 and 4.6 plot concentrations of TCE and *cis*-1,2-DCE, respectively, over time in both upper and lower fluvial deposits monitoring wells. The maximum pre-injection concentration of TCE was 1,800 µg/L at location PES-MW6S, while the maximum TCE concentration measured in January 2002 was 1,200 µg/L at locations PES-MW2S and PES-MW6S. The maximum pre-injection concentration of *cis*-1,2-DCE was 34 µg/L at location PES-MW1S, while the maximum *cis*-1,2-DCE concentration measured in January 2002 was 250 µg/L at location PES-MW2S. VC was not detected at concentrations above the MDL at any of the monitoring locations during baseline sampling or process monitoring sampling events. The lack of measurable concentrations of VC in the monitoring wells indicates that either VC is not being generated, or that VC is being degraded as fast as it is generated.

Contaminant concentrations measured in the injection wells show a dramatic decline over time. The maximum concentrations of TCE measured for the injection wells was 640 µg/L at PES-INJ1S and 600 µg/L at PES-INJ2S. By January 2002, TCE was below detection limits for all samples collected from the injection wells (PES-INJ2S, PES-INJ2D, and PES-INJ4S). Concentrations of TCE and other CAHs likely attenuated more quickly than inferred by the January 2002 data. For example, contractions of TCE and 1,1-DCE decreased from 140 µg/L and 40 µg/L in August 2002 (pre-injection) to an estimated concentration of 2.1J µg/L and to less than 5 µg/L in November 2000,



LEGEND

007G14LF ⌖ – WELL SAMPLE AND WELL NUMBER

⊠ – INJECTION WELL PAIR AND NUMBER

⊕ – MONITORING WELL PAIR AND NUMBER

UF – UPPER FLUVIAL DEPOSITS WELL

LF – LOWER FLUVIAL DEPOSITS WELL

(680) – MAXIMUM TCE CONCENTRATION IN GROUNDWATER (µg/L)

ND – NOT DETECTED

NA – NOT ANALYZED

J – ESTIMATED

100 – LINE OF EQUAL TCE CONCENTRATION (µg/L)

NOTE: THE MAXIMUM TCE CONCENTRATION IS POSTED AND CONTOURED AT LOCATIONS WITH PAIRED SCREEN INTERVALS.

FIGURE 4.4

MAXIMUM TCE CONCENTRATION IN GROUNDWATER JULY/AUGUST 2001 (POST-INJECTION)

NSA Mid-South Site N-6
Millington, Tennessee

PARSONS
Denver, Colorado

S:\ES\REMED\737490\05000\FIGURES\TECHMEMO2\01DN0387a.dwg (FIG 4.4), 04/17/02 AML

FIGURE 4.5A
CONCENTRATIONS OF TCE IN UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

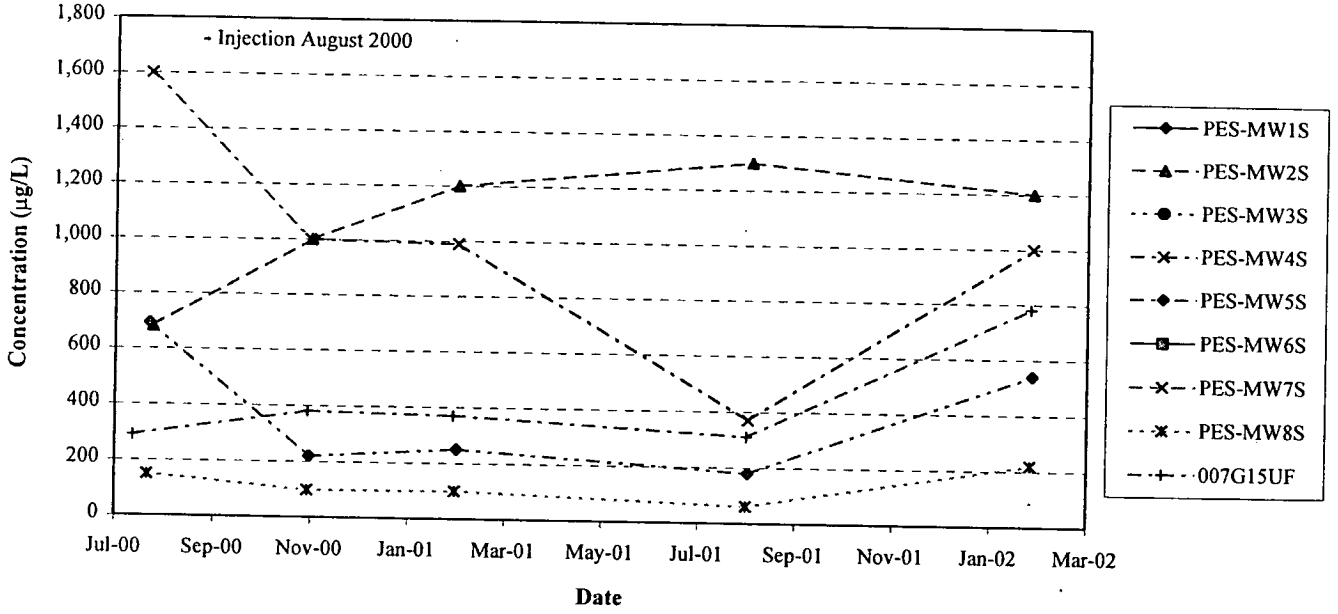


FIGURE 4.5B
CONCENTRATIONS OF TCE IN LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

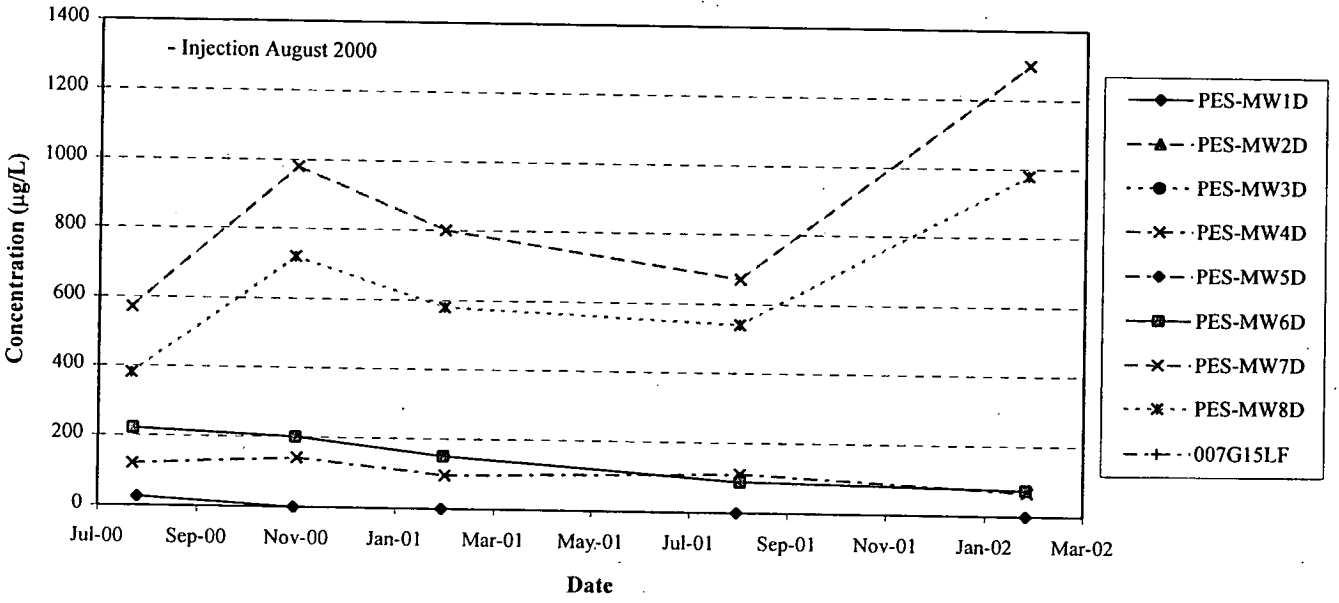


FIGURE 4.6A
CONCENTRATIONS OF cis-1,2-DCE IN UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

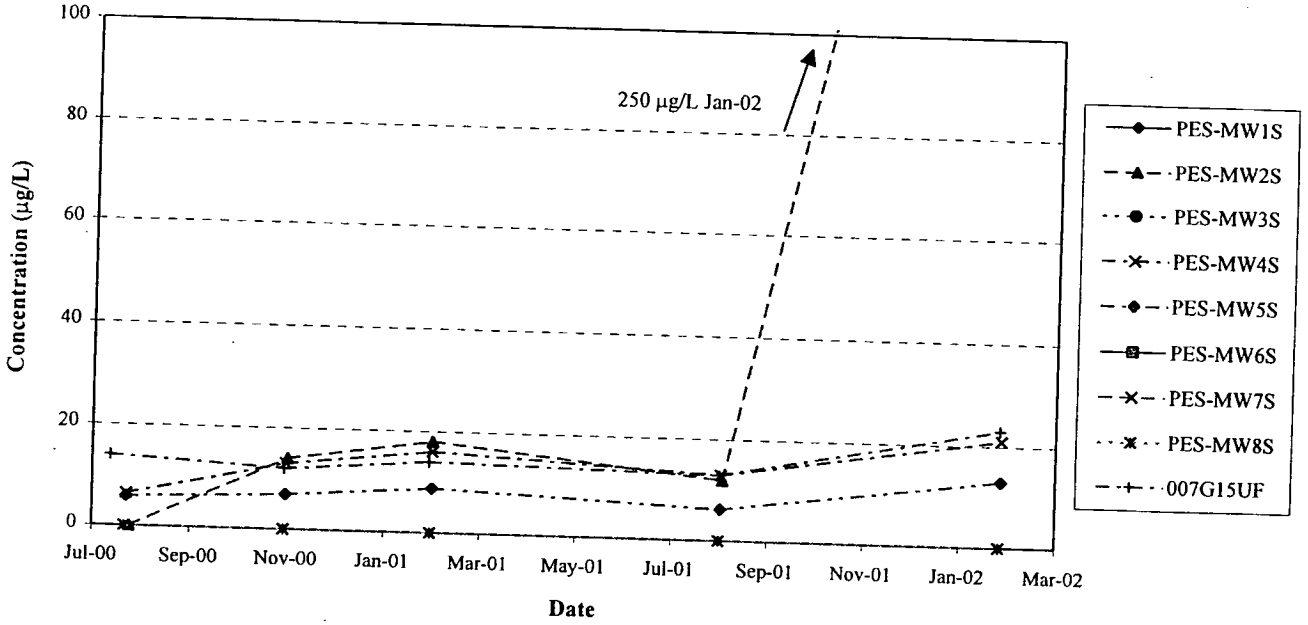
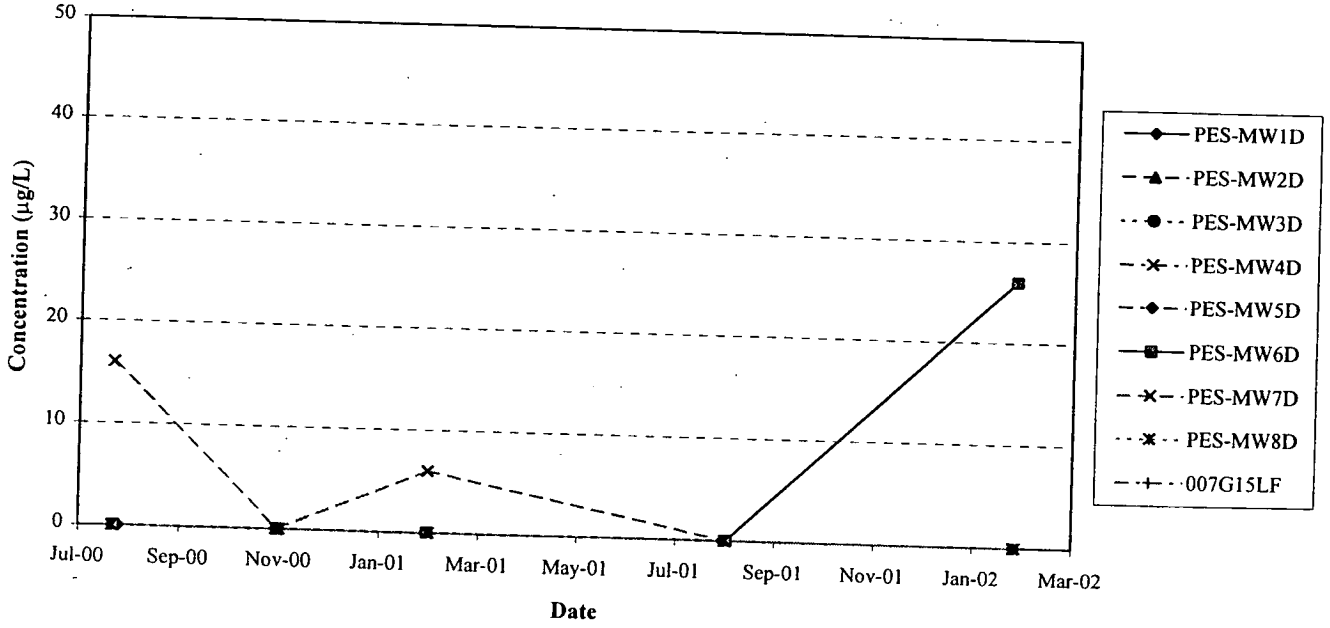


FIGURE 4.6B
CONCENTRATIONS OF cis-1,2-DCE IN LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



respectively. Without a measurable increase in concentrations *cis*-1,2-DCE, VC, or ethene at the injection well locations, it is likely that the contaminant reduction in groundwater was due to partitioning into the vegetable oil.

While there is an overall reduction in the maximum concentration of TCE detected over time, a decreasing trend in TCE concentration is not uniform for all wells. For example, an overall increase in TCE concentration from July 2000 (pre-injection) to January 2002 was observed for wells PES-MW2S, PES-MW3D, PES-MW5D, PES-MW6S, PES-MW7D, PES-MW8S, PES-MW8D, and 007G15UF.

For locations that do show a reduction in TCE concentration, it is not readily apparent whether the observed decreases are a result of biodegradation, natural variations in contaminant concentrations, or partitioning of contaminant mass into the vegetable oil NAPL. However, an increase in *cis*-1,2-DCE concentrations detected in the many of the monitoring wells indicates that the reduction on TCE concentrations may be a result of enhanced biodegradation.

The change in concentrations of VOCs in the injection wells is substantial. Difficulties were encountered sampling the injection wells due to the continual presence of vegetable oil. Therefore, not all the proposed injection sampling locations were sampled during every event. VOCs were not detected in injection wells PES-INJ2S, PES-INJ2D, and PES-INJ4 for samples collected in January 2002. In August 2001, the only VOC detected in injection wells sampled (PES-INJ2D and PES-INJ3D) was chloroethane at a concentration of 12 µg/L at well PES-INJ3D. A lack of daughter products and a lack of ethene or ethane end products suggests that the attenuation in VOCs in the injection wells is due to partitioning within the vegetable oil. Detection limits for oil samples collected from the injection wells are elevated due to matrix interferences (Table 4.4), and the extent of VOCs in oil cannot be determined with current analytical procedures.

4.4.2 Presence of Daughter Products and CAH Ratios

The presence of daughter products that were not used in Base operations, particularly *cis*-1,2-DCE, ethene, and ethane provides strong evidence that PCE and TCE have been and/or are being reductively dechlorinated at this site. Progressive transformation of PCE and TCE to ethene can be indicated by computing the molar ratio of parent compounds to daughter products at a specific location. For example, because reductive dechlorination proceeds in only one direction (i.e., TCE to *cis*-1,2-DCE and not vice versa), the molar ratio of TCE to *cis*-1,2-DCE would decrease where reductive dechlorination of TCE dominates the contaminant attenuation process. Similarly, the sequential reduction of 1,1-DCA to chloroethane to ethane, and the sequential reduction of CT to chloroform to methylene chloride to chloromethane, also would indicate progressive transformation by reductive dechlorination.

Chlorinated ethene concentration plots and molar fraction plots over time for all monitoring well locations sampled in January 2002 are included in Appendix C. The following discussion includes an evaluation of chlorinated ethene data for select monitoring locations at the site.

Changes in contaminant concentrations and molar fractions over the first 18 months of the vegetable oil injection field test exhibit highly variable trends and are not uniformly indicative of enhanced biodegradation. In fact, contaminant concentrations in some wells increased from pre-injection concentrations, likely as a result of displacement from the injection event or due to natural temporal variations in contaminant concentrations.

The initial response to the vegetable injection was pronounced at several monitoring locations. Figures 4.7 and 4.8 present plots of concentration over time and of molar fractions over time for wells PES-MW1S and PES-MW3S, respectively. For these two locations, the concentration of TCE decreased substantially after injection as measured in November 2000. However, concentrations of TCE at location PES-MW3S increased over the past three monitoring events. Concentrations of TCE at location PES-MW1S are variable, but also have increased for the last monitoring event. An initial increase in

- Injection August 2000

FIGURE 4.7A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW1S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

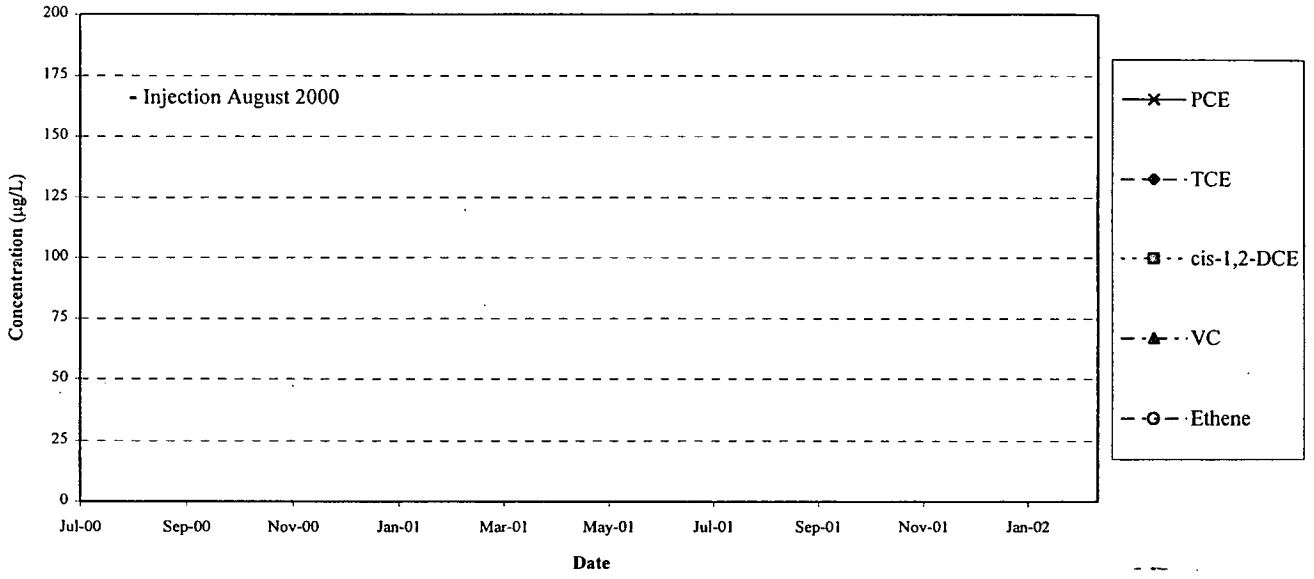


FIGURE 4.7B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW1S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

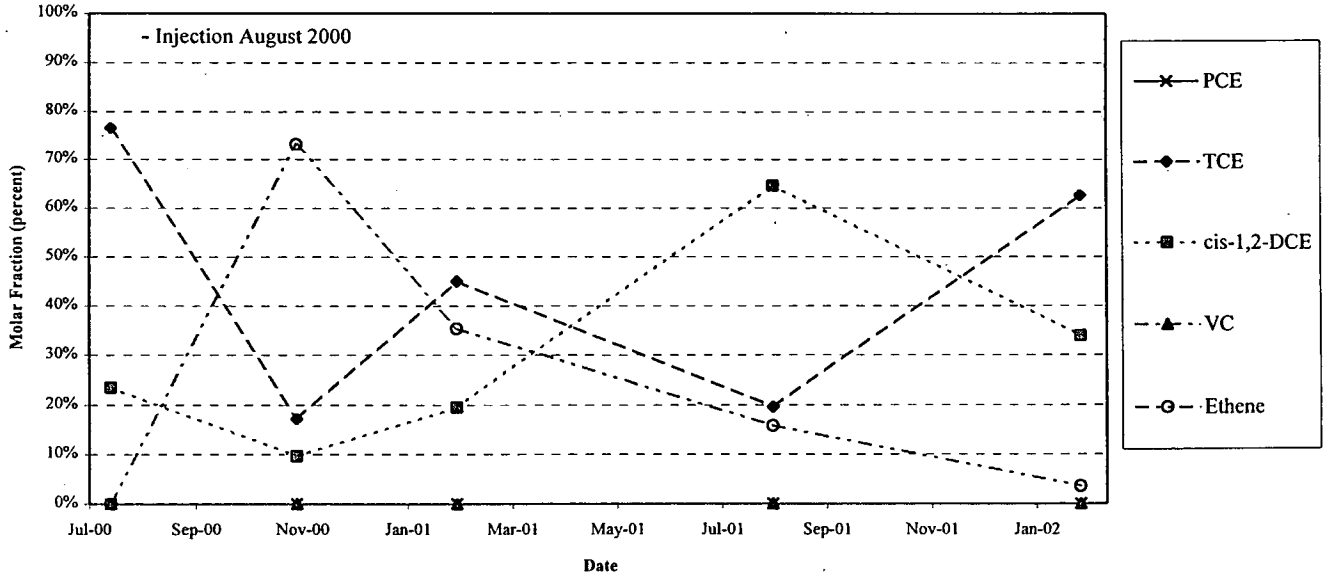


FIGURE 4.8A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW3S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

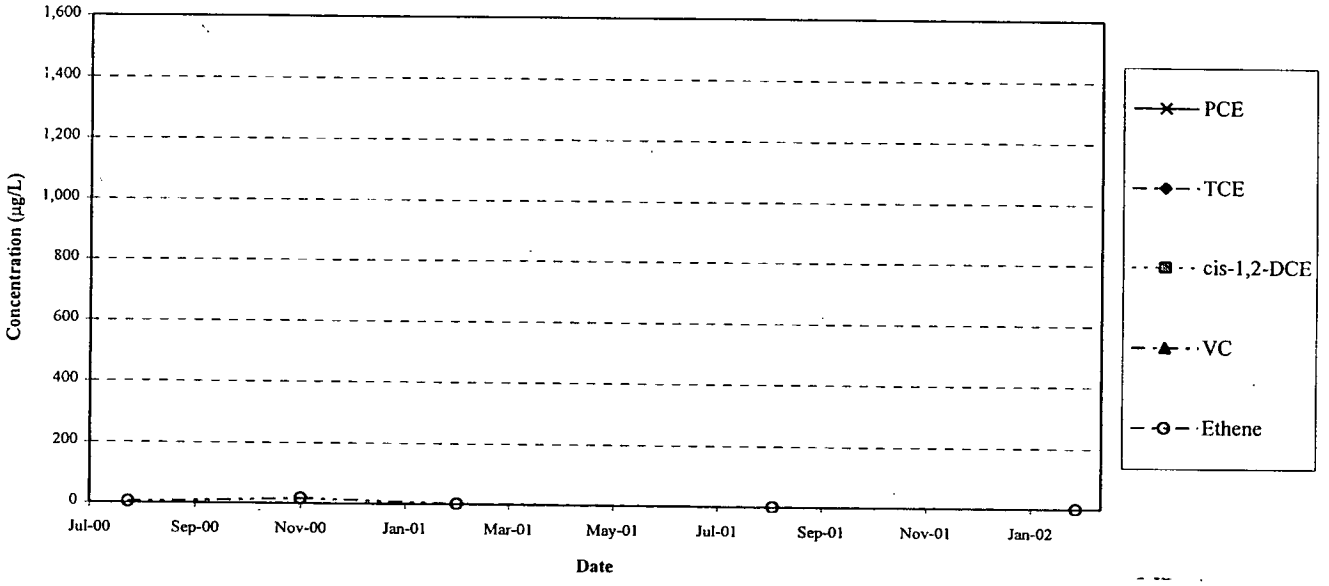
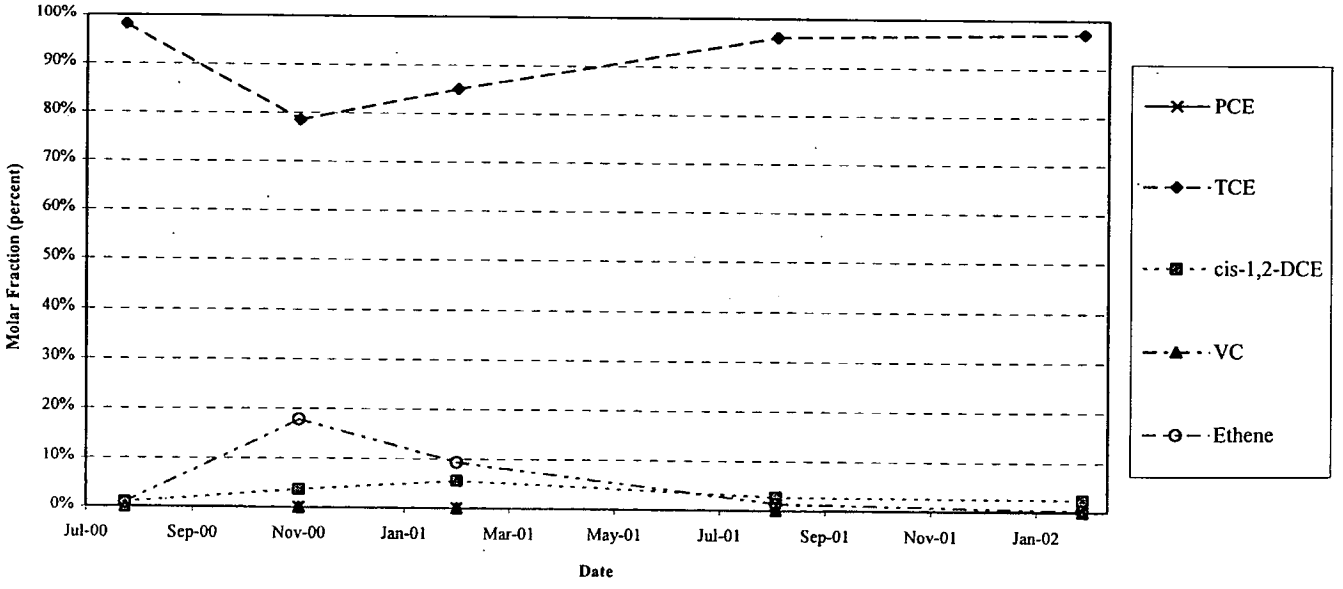


FIGURE 4.8B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW3S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



cis-1,2-DCE and ethene suggest that reductive dechlorination was initially stimulated, but that the process was not sustained. A similar trend in contaminant concentrations was also observed at monitoring location PES-MW7S (Appendix C).

Based on the ratio of the molar fraction of the parent compound TCE to the daughter products, *cis*-1,2-DCE, VC, and ethene in these wells, biodegradation may have been stimulated by vegetable oil injection. Although concentrations of VC were not detected, concentration and molar fraction of both *cis*-1,2-DCE and ethene increased at PES-MW1S, PES-MW3S, and PES-MW7S between the baseline sampling event in August 2000 and the first monitoring event in November 2000. These trends were not expected at monitoring locations PES-MW1S and PES-MW7S because they are located 100 and 50 feet from the injection locations, respectively. It is possible that these locations were impacted when the injection caused radial groundwater flow due to displacement and a temporary mounding of the groundwater potentiometric surface. Thus, the injection caused a temporary reversal in groundwater flow direction between the injection area and upgradient location PES-MW1S.

It is difficult to distinguish whether the initial changes in contaminant concentrations at these locations are due to stimulation of reductive dechlorination, or whether the initial changes were simply caused by displacement with groundwater of differing contaminant concentrations. In either event, as the groundwater system re-equilibrated and the regional groundwater flow direction was resumed, the effects of the injection at PES-MW1S and PES-MW7S are apparently rebounding toward pre-injection (i.e., baseline) conditions. While well PES-MW3S is much closer to the injection wells, it also shows the same initial changes indicative of reductive dechlorination, followed by a subsequent trend towards baseline conditions.

Figures 4.9 through 4.12 present plots of concentration over time and of molar fractions over time for wells PES-MW2S, PES-MW2D, PES-MW3D, and PES-MW6D, respectively. Concentrations of TCE at locations PES-MW2S, PES-MW2D, and PES-MW3D all initially increased after the vegetable oil injection, but by the last monitoring

FIGURE 4.9A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW2S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

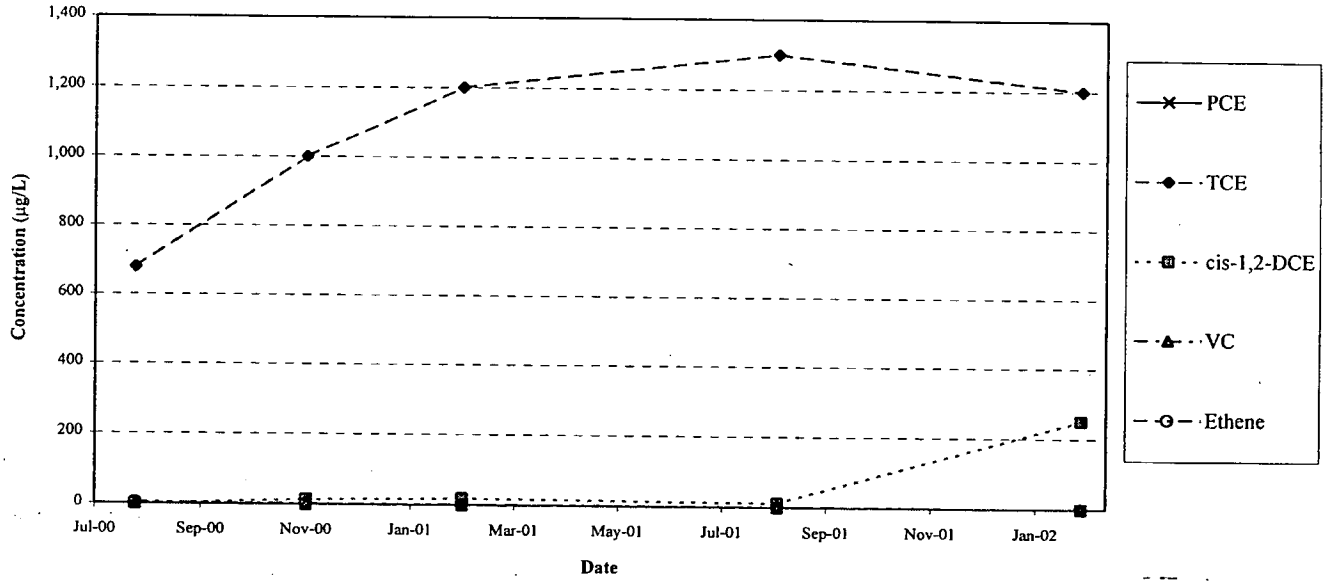


FIGURE 4.9B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW2S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

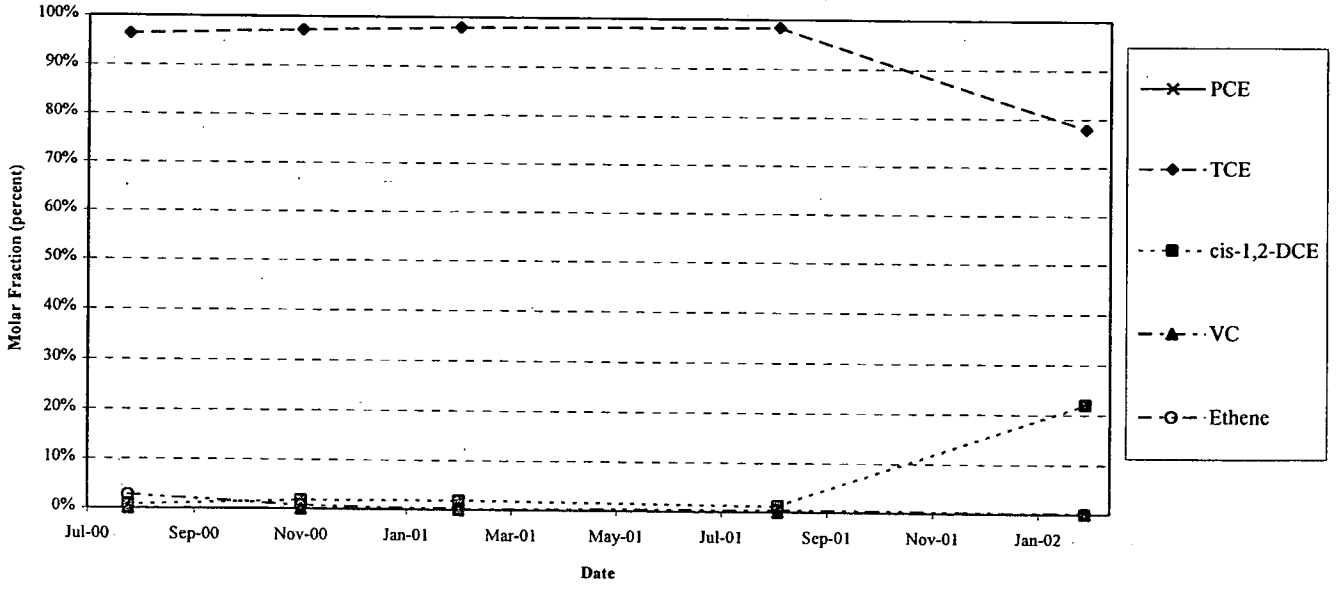


FIGURE 4.10A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW2D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

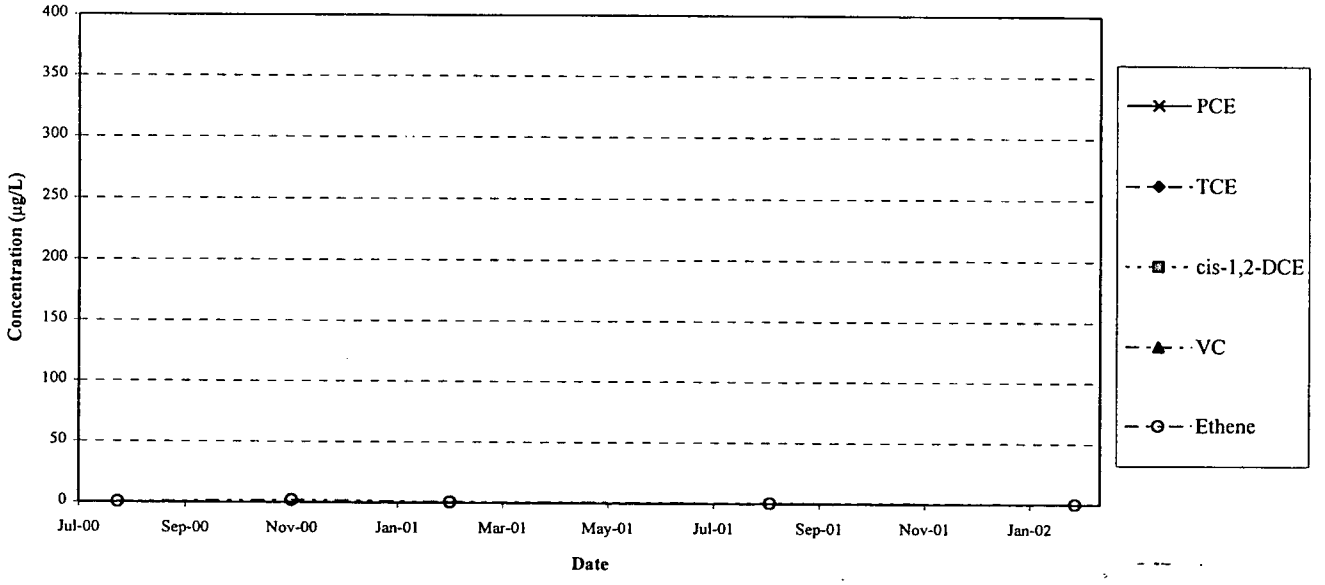


FIGURE 4.10B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW2D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

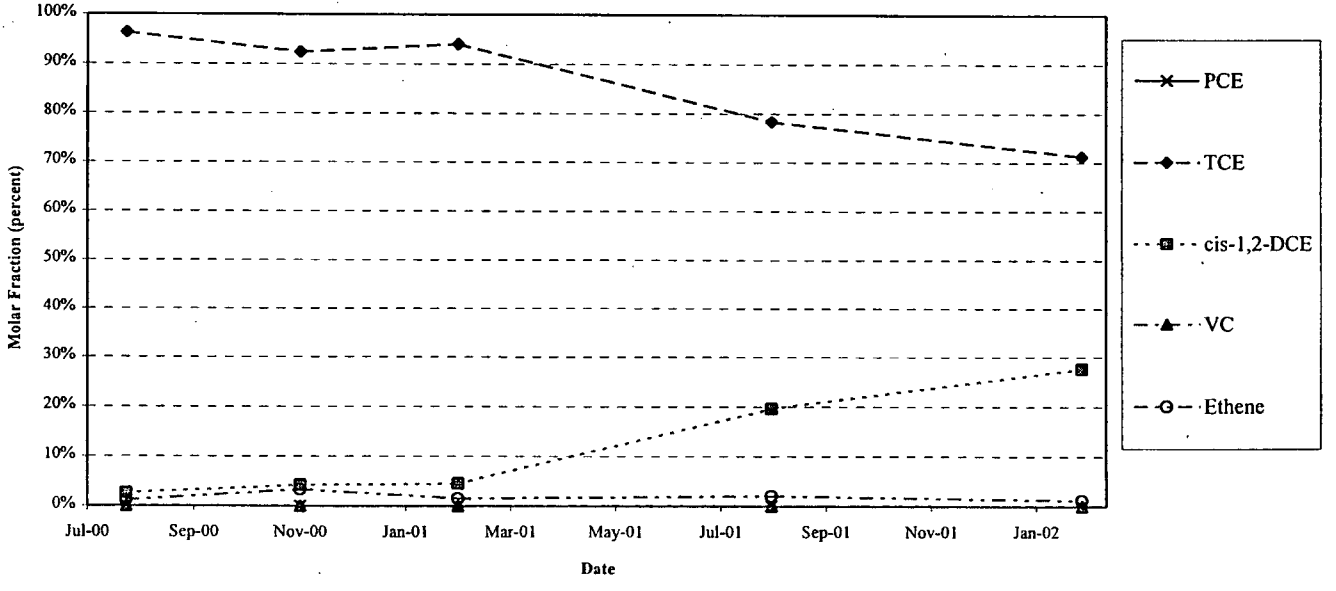


FIGURE 4.11A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW3D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

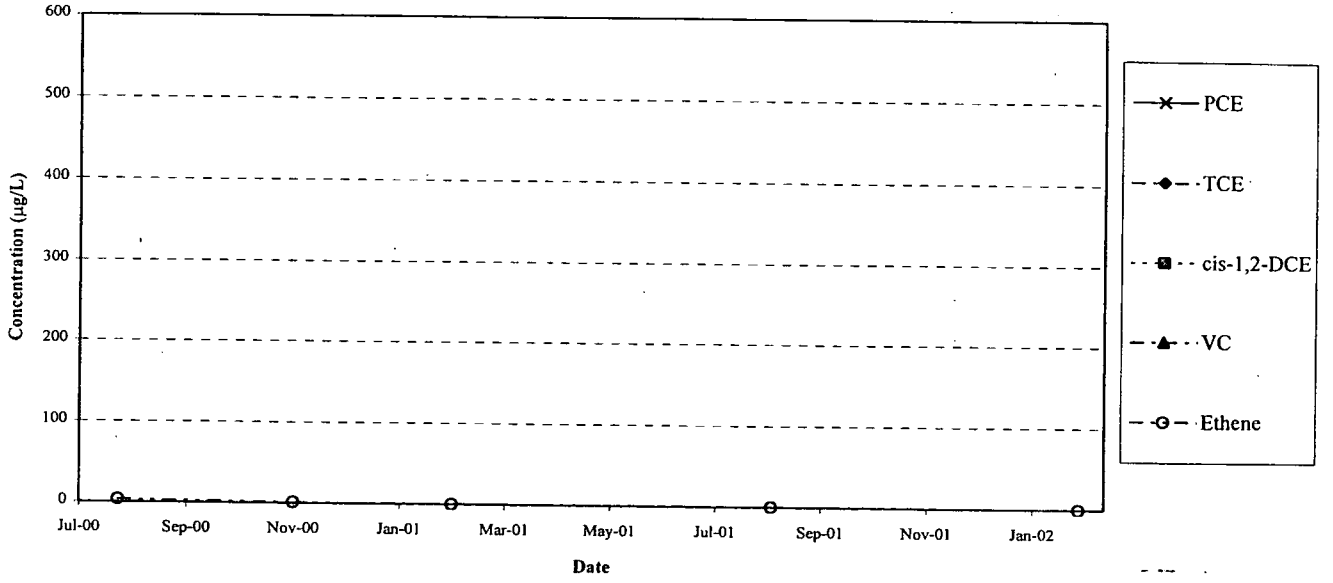


FIGURE 4.11B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW3D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

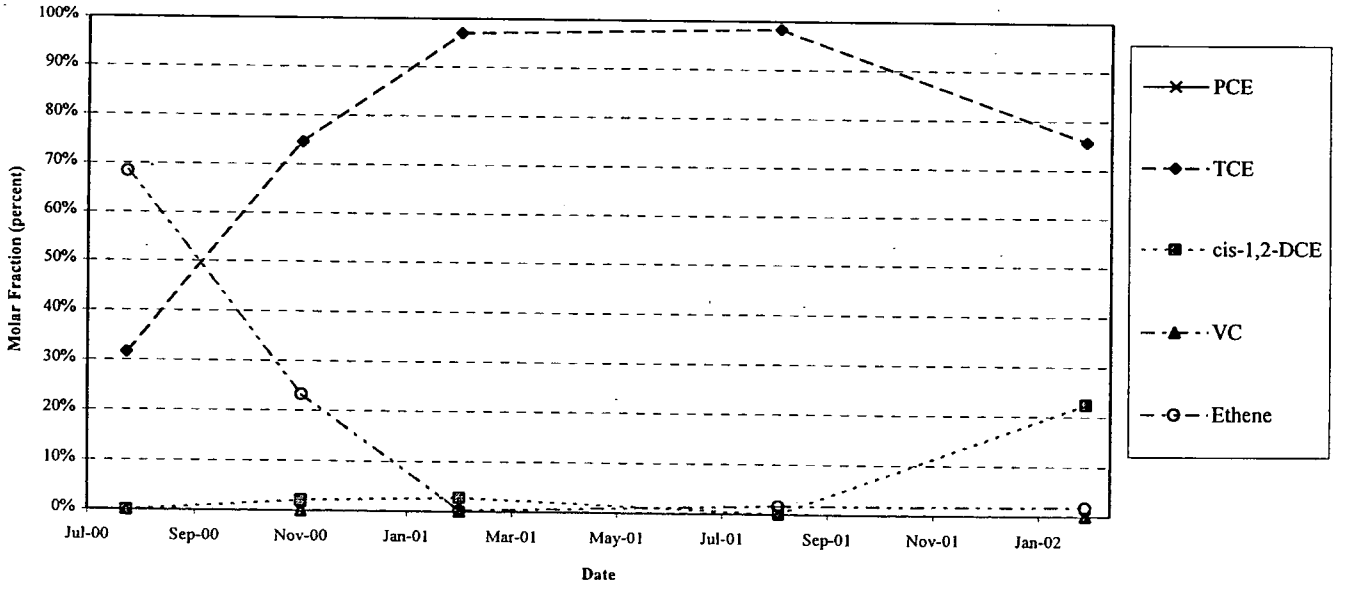


FIGURE 4.12A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW6D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

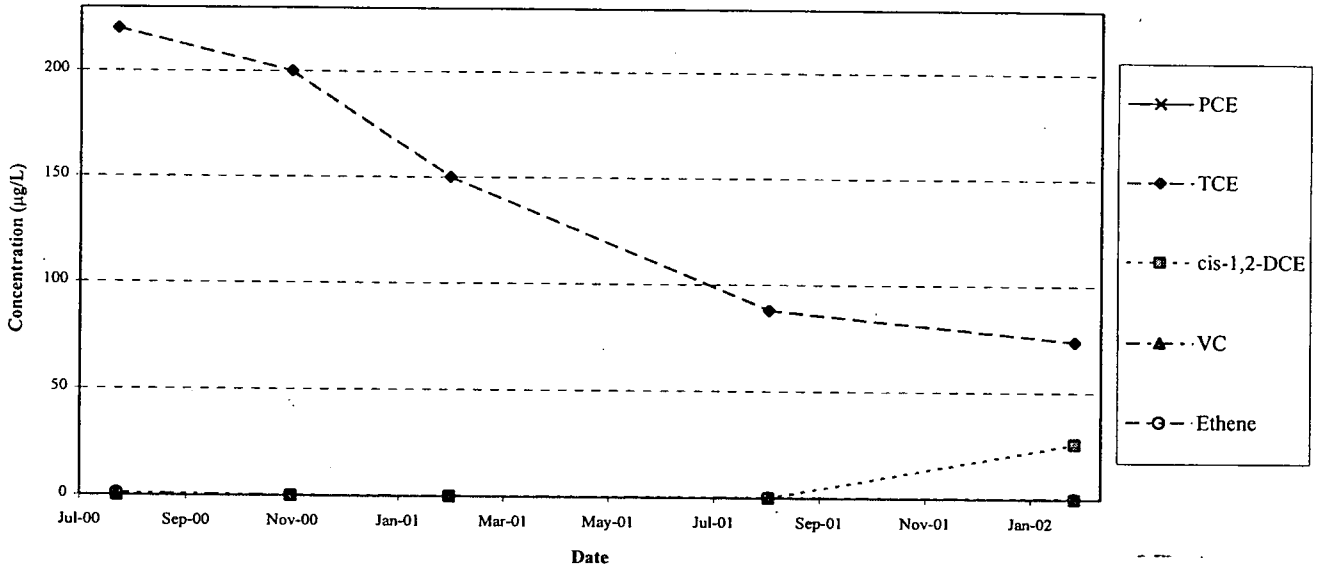
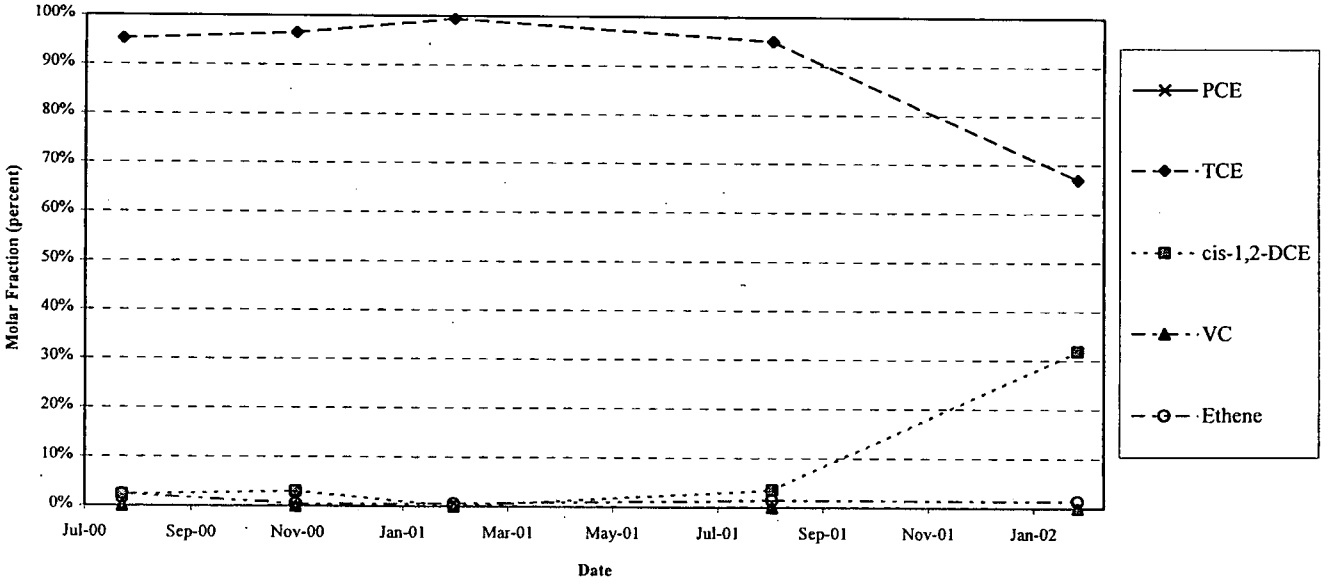


FIGURE 4.12B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW6D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



event in January 2002 the trends in TCE concentrations reversed and began to decrease. The concentration of TCE at location PES-MW6D decreased consistently for each monitoring event after the injection event. What is more notable is a measurable increase in concentration and molar fraction of *cis*-1,2-DCE between the last two monitoring events from August 2001 to January 2002. Molar fractions of *cis*-1,2-DCE for locations PES-MW2S, PES-MW3D, and PES-MW6D increased from less than 5 percent to greater than 20 percent between these two sampling events. The molar fraction of *cis*-1,2-DCE at location PES-MW2D similarly increased over the period from February 2001 to January 2002.

These data suggest that reductive dechlorination of TCE to *cis*-1,2-DCE has been stimulated sporadically across the site, although a significant lag period (12 to 18 months) was required for this to be observed. Furthermore, it is not known whether subsequent degradation of *cis*-1,2-DCE is occurring. A significant increase in VC or ethene has not been observed at these locations, suggesting that reduction of *cis*-1,2-DCE is not occurring. However, *cis*-1,2-DCE or VC can potentially be oxidized under nitrate- or iron-reducing conditions with no generation of ethene, but this is difficult to ascertain.

In summary, while trends in chlorinated ethene concentrations tended to vary from sampling event to sampling event, chlorinated ethene data indicate an overall reduction of maximum contaminant concentrations. Based on contaminant trend analysis alone, it is difficult to determine whether this reduction is due to biodegradation, partitioning of dissolved contaminants into the vegetable oil NAPL, lateral spreading of contaminants due to injection, or natural temporal variations in contaminant concentrations. Injection of vegetable oil induced a mounding of the groundwater potentiometric surface, which may have caused some lateral spreading of contaminants in groundwater and caused upgradient location PES-MW1S/D to be impacted by the vegetable oil injection. Historical concentration data from cross gradient wells 007G15UF and 007G15LF show natural fluctuation in chlorinated ethene concentrations, suggesting that some changes in contaminant concentration within the study area may be due to natural or seasonal variation in groundwater conditions. Changes in concentration and molar fraction of

TCE and *cis*-1,2-DCE between August 2001 and January 2002 indicate that reductive dechlorination has occurred at several locations, but only after a lag period of 12 to 18 months.

As a result, strict interpretation of concentration and molar ratio trends may not be the best indicator of enhanced biodegradation at the site. Other supporting evidence of enhanced biodegradation, including geochemical changes, are discussed later in this section.

4.4.3 Chlorinated Aliphatic Hydrocarbons In Oil

In addition to CAHs in groundwater, CAH concentrations in oil also were analyzed for in samples collected from locations PES-INJ2S and PES-INJ2D (November 2000 through January 2002), PES-INJ3S and PES-INJ3D (November 2000 through August 2001), and PES-INJ4S (January 2002) (Table 4.5). Unfortunately, the analyte specific MDLs for VOCs in vegetable oil (250 to 5,000 µg/L) are elevated due to interference of the vegetable oil sample matrix and the dilutions required for calibration. The only chlorinated ethene detected in oil was TCE at an estimated concentration of 170J µg/L in the November 2000 sample from injection well PES-INJ2S.

Therefore, it is not possible to determine to what extent CAHs are partitioning out of groundwater and into the vegetable oil. However, a significant decrease in CAH concentrations in groundwater has been observed over time in samples collected from injection wells PES-INJ2S, PES-INJ2D, PES-INJ3S, PES-INJ3D, and PES-INJ4S. This decreasing trend in CAH concentrations in groundwater in the injection wells suggests that CAHs are partitioning out of groundwater and into the vegetable oil and/or that VOCs in groundwater are being biodegraded.

4.5 SUBSTRATE ADDITION

Addition of vegetable oil as an organic substrate provides a source of carbon for microbial growth. Analytical evaluation of TOC, VFAs, and PLFAs provides an indication of the extent to which groundwater has been impacted by addition of the

vegetable oil, and data relevant to determining whether microbial growth has been stimulated.

4.5.1 Total Organic Carbon as an Indicator of Substrate Addition and Zone of Influence

Groundwater samples were collected from select wells during baseline sampling and process monitoring to determine the migration of dissolved vegetable oil (by measuring TOC), and to track migration of the water push that followed the oil injection (bromide). These parameters are used to determine the approximate zone of influence of the vegetable oil injection in the fluvial deposits aquifer. Analytical results for TOC and bromide in groundwater are presented in Table 4.7.

Baseline concentrations of TOC were below the method detection limit of 5 mg/L, and baseline concentrations of bromide were below the method detection limit of 2 mg/L. Following injection, elevated concentrations of TOC (i.e., greater than 5 mg/L) were observed at monitoring well locations PES-MW2S, PES-MW2D, PES-MW3D, PES-MW6D, PES-MW7S, PES-MW8S (Table 4.7). The highest levels of TOC were measured in January 2002 with 600 mg/L at PES-MW2D and 260 mg/L at PES-MW3D. Prior to January 2002 the highest concentration of TOC measured for monitoring well locations was 24 mg/L at PES-MW2S in November 2000 and 62 mg/L at PES-MW3D in August 2001. These values are relatively low compared to TOC measured in groundwater samples collected from the injection wells, which ranged from 1,200 mg/L to 2,400 mg/L (Table 4.7).

TOC data indicate that the zone of influence of the vegetable oil injection is limited primarily to the area of wells PES-MW2S, PES-MW2D, and PES-MW3D, which are located only 10 feet from the injection wells. However, the slightly elevated levels of TOC at wells PES-MW6D (9.9 mg/L), PES-MW7S (9.2 mg/L), and PES-MW8S (7.6 mg/L) suggest the presence of preferential flow paths within the fluvial deposits between the injection area and these monitoring wells located 30 to 100 feet downgradient. It also is possible that the levels of TOC at these three wells are a result of natural variation.

TABLE 4.7
SUMMARY OF GROUNDWATER GEOCHEMICAL DATA
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Sample Date	Methane (µg/L)[a]	Ethane (µg/L)	Ethene (µg/L)	TOC[b] (mg/L)[c]	Total Inorganic Carbon (mg/L)	Dissolved Oxygen (mg/L)	Nitrate + Nitrite (mg/L)	Ferrous Iron (mg/L)	Manganese (mg/L)	Sulfate (mg/L)	Hydrogen Sulfide (mg/L)	Total Alkalinity (mg/L)	Carbon Dioxide (mg/L)	Chloride (mg/L)	Bromide (mg/L)	Redox Potential (mV)[d]	pH (SU)[e]	Temperature (°C)[f]	Specific Conductivity (µs/cm)[g]
MONITORING WELLS																				
PES-MW1S	25-Jul-00	0.2	0.007	0.016	NA[h]	NA	3.4	0.029J[i]	<0.01[j]	3.3	4	0.16	112	49	5.0	NA	148	6.83	30.1	251
	7-Nov-00	430	55.0	20.0	NA	NA	0.3	0.011J	2.5	3.1	<1	0.03	84	32	2.1	NA	-163	7.33	22.7	210
	6-Feb-01	990	19.0	8.90	NA	NA	0.2	0.003J	4.8	4.8	<1	0.02	167	76	6.7	NA	-100	6.88	23.3	315
	6-Aug-01	770	6.00	2.40	NA	NA	0.5	0.086	16	7.7	<1	<0.01	179	92	26	NA	-141	6.48	28.0	350
	29-Jan-02	460	1.90	1.20	2.7J	NA	2.3	0.050J	12.15	7.7	27	0.07	136	124	87	<2.0	-47	6.40	21.2	215
PES-MW1D	6-Aug-00	19	8.06	3.43	NA	NA	0.3	0.079	3.3	0.6	<1	0.02	84	67	3.0	NA	-260	6.72	24.2	179
	8-Nov-00	56	0.720	0.420	NA	NA	0.3	0.047J	6.1	0.3	<1	0.06	87	82	NA	NA	-41	6.34	21.9	140
	6-Feb-01	82	0.085	0.150	NA	NA	0.3	0.300	2.8	<0.1	<1	0.09	76	76	2.0	NA	56	5.77	21.5	143
	6-Aug-01	30	0.054	0.420	NA	NA	1.0	0.120	0.58	<0.1	<1	<0.01	52	54	2.0	NA	63	5.80	27.6	114
	29-Jan-02	2.2	0.015	<0.005	1.8J	NA	2.1	0.130	0.36	<0.1	<1	0.07	63	82	3	<2.0	71	5.92	20.7	88
PES-MW2S	5-Aug-00	37	5.35	4.14	<5.0	NA	0.4	1.00	0.82	1.6	<1	0.01	122	87	15	<2.0	-322	6.71	25.2	319
	10-Nov-00	35	0.750	1.70	24	NA	0.3	0.200	0.57	0.2	<1	0.20	158	109	4.6	<2.0	-126	6.47	19.8	279
	8-Feb-01	40	0.210	0.530	<2.0	NA	0.4	0.039J	0.60	0.1	1	0.15	172	225	14	<2.0	-48	6.80	23.5	335
	9-Aug-01	58	0.260	1.20	6.3	NA	1.0	0.360	1.3	0.5	2	0.05	163	84	5.6	<2.0	-32	6.25	29.4	216
	30-Jan-02	570	0.160	0.360	13	710	0.4	0.160	4.5	1.2	<1	0.02	152	242	6	<2.0	-67	6.57	21.1	342
PES-MW2D	4-Aug-00	35	0.994	0.436	<5.0	NA	0.3	0.600	0.76	1.0	<1	0.02	81	121	6.2	<2.0	-15	6.26	23.5	201
	10-Nov-00	17	2.70	2.00	<2.0	NA	0.3	0.077	0.62	<0.1	<1	0.39	105	51	3.9	<2.0	46	6.42	16.7	223
	8-Feb-01	62	0.560	0.750	15	NA	0.2	0.061	8.8	2.3	26	0.42	158	180	NA	<2.0	-216	6.79	23.4	343
	9-Aug-01	640	0.220	0.550	8	NA	0.1	0.180	3.5	1.1	<1	0.06	131	86	4	<2.0	-90	6.21	24.9	175
	30-Jan-02	2,500	0.046	0.150	600	500	0.4	0.130	6.9	1.9	<1	0.21	147	200	6	<2.0	-91	6.57	20.8	245
PES-MW3S	4-Aug-00	37	4.55	2.90	<5.0	NA	1.4	0.087	0.71	2.4	5	0.13	130	130	8.4	<2.0	194	6.54	24.0	313
	10-Nov-00	130	17.0	17.0	<2.0	NA	0.3	<0.050	9.7	9.9	<1	0.07	187	77	2.0	<2.0	-134	6.90	21.3	380
	9-Feb-01	110	2.60	6.80	<2.0	NA	0.3	0.002J	16	7.6	<1	0.01	293	315	6.0	<2.0	-80	6.77	20.4	534
	9-Aug-01	910	0.450	2.10	<5.0	NA	0.7	0.060	11	3.7	<1	<0.01	202	190	5.5	<2.0	-96	6.27	29.6	278
	30-Jan-02	1,900	0.140	0.770	2.8J	850	0.9	0.050J	9.20	3.4	<1	0.01	148	384	11	<2.0	-59	6.38	21.8	321
PES-MW3D	4-Aug-00	8.6	3.54	2.08	<5.0	NA	1.3	0.330	0.79	0.9	<1	0.05	95	62	5.0	<2.0	3	6.67	23.5	224
	10-Nov-00	12	1.30	28.0	<2.0	NA	1.2	1.80	0.30	0.9	5	0.34	110	82	12	<2.0	89	6.69	16.6	200
	8-Feb-01	2.0	0.340	0.270	<2.0	NA	1.6	1.20	0.33	<0.1	1	0.08	106	90	20	<2.0	13	7.00	22.9	318
	9-Aug-01	650	0.540	0.830	62	NA	0.8	0.23	8.45	7.0	<1	0.04	177	168	4	<2.0	-124	6.53	28.9	328
	30-Jan-02	13,000	0.120	0.860	260	NA	0.7	0.050J	16.50	29.2	<1	0.02	178	458	9	<2.0	-110	6.53	21.2	702
PES-MW4S	3-Aug-00	30	7.63	4.82	<5.0	NA	1.2	0.470	1.06	2.4	<1	0.03	135	77	17	NA	-270	6.66	25.0	340
	9-Nov-00	52	1.80	4.00	<2.0	NA	0.3	0.066	2.13	0.7	<1	0.14	169	115	8	<2.0	-19	6.37	21.6	306
	8-Feb-01	70	0.370	1.10	<2.0	NA	0.2	0.057	3.00	0.3	<1	NA	160	112	10	<2.0	-2	6.51	24.2	348
	8-Aug-01	55	0.170	0.590	<5.0	NA	1.0	<0.050	1.07	NA	<1	<0.01	159	125	9	<2.0	-13	6.04	31.0	282
	30-Jan-02	74	0.170	0.220	2.6J	NA	0.7	0.080	0.15	0.2	<1	0.06	129	223	18	<2.0	4	6.39	21.2	272

TABLE 4.7 (Continued)
SUMMARY OF GROUNDWATER GEOCHEMICAL DATA
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Sample Date	Methane (µg/L)[a]	Ethane (µg/L)	Ethene (µg/L)	TOC[b] (mg/L)[c]	Total Inorganic Carbon (mg/L)	Dissolved Oxygen (mg/L)	Nitrate + Nitrite (mg/L)	Ferrous Iron (mg/L)	Manganese (mg/L)	Sulfate (mg/L)	Hydrogen Sulfide (mg/L)	Total Alkalinity (mg/L)	Carbon Dioxide (mg/L)	Chloride (mg/L)	Bromide (mg/L)	Redox Potential (mV)[d]	pH (SU)[e]	Temperature (°C)[f]	Specific Conductivity (µs/cm)[g]
PES-MW4D	3-Aug-00	8.0	2.44	1.25	<5.0	NA	0.7	0.410	0.39	4.4	<1	0.02	90	80	5	NA	-203	6.41	25.0	224
	10-Nov-00	1.6	0.420	0.200	<2.0	NA	0.5	0.470	0.59	0.6	<1	0.17	95	71	9	<2.0	90	6.41	20.4	205
	8-Feb-01	2.0	0.190	0.210	<2.0	NA	0.3	1.10	0.97	<0.1	<1	<0.01	90	91	9	<2.0	26	6.70	22..1	217
	8-Aug-01	4.9	0.170	0.700	<5.0	NA	1.1	1.50	1.38	NA	<1	0.02	98	64	10	<2.0	36	6.01	30.1	176
	30-Jan-02	46	0.068	0.150	3.1J	NA	0.9	0.690	2.05	0.9	<1	0.19	93	132	6	<2.0	-20	6.40	21.0	178
PES-MW5S	3-Aug-00	50	5.18	3.75	<5.0	NA	1.3	0.110	1.68	1.5	<1	0.02	183	111	8	NA	-250	6.71	25.4	415
	9-Nov-00	58	5.10	7.80	<2.0	NA	0.3	0.004J	11.20	3.4	<1	0.01	203	86	3	<2.0	-149	6.68	20.8	367
	8-Feb-01	65	0.980	0.980	3.2	NA	0.4	0.008J	8.36	2.3	2	0.04	280	182	10	<2.0	-75	6.60	19.9	494
	8-Aug-01	79	0.220	1.50	<5.0	NA	0.8	0.084	4.50	NA	<1	0.30	268	124	7	<2.0	-106	6.41	26.5	464
	30-Jan-02	100	0.110	0.780	2.0	NA	0.7	0.060	3.85	1.2	<1	0.02	239	252	8	<2.0	-87	6.73	21.0	417
PES-MW5D	3-Aug-00	8.3	2.60	1.63	2.7J	NA	0.8	1.70	0.23	3.5	<1	0.10	123	16	70	NA	-92	6.86	22.5	338
	9-Nov-00	13	3.60	2.70	<2.0	NA	0.2	0.810	0.01	0.4	<1	0.02	159	57	15	<2.0	91	6.64	20.3	281
	8-Feb-01	17	1.10	2.20	<2.0	NA	0.3	1.20	0.12	0.6	<1	0.06	145	76	18	<2.0	106	6.49	21.5	378
	8-Aug-01	19	0.470	1.10	<5.0	NA	0.4	1.70	<0.01	NA	<1	<0.01	140	68	20	<2.0	45	6.37	24.8	319
	30-Jan-02	25	0.250	0.290	2.1J	NA	1.2	1.70	<0.01	0.2	<1	0.01	137	128	20	<2.0	124	6.56	20.6	304
PES-MW6S	4-Aug-00	29	4.92	3.44	<5.0	NA	0.8	0.830	0.36	2.4	<1	0.03	156	88	13	NA	253	6.66	22.5	364
	9-Nov-00	58	1.00	2.70	<2.0	NA	0.3	0.180	1.47	0.3	<1	0.13	136	118	6	<2.0	87	6.26	19.3	230
	7-Feb-01	66	0.320	0.810	<2.0	NA	0.4	0.100	0.65	0.3	<1	0.01	141	153	9	<2.0	8	6.75	23.0	304
	8-Aug-01	75	0.140	0.210	<5.0	NA	0.8	0.150	0.10	NA	<1	0.03	158	104	12	<2.0	62	6.08	27.4	265
	29-Jan-02	98	0.140	0.075	2.5J	NA	0.8	0.100	<0.01	0.1	<1	0.04	183	334	9	<2.0	78	6.33	21.0	256
PES-MW6D	3-Aug-00	9.0	2.58	1.20	<5.0	NA	1.2	0.470	1.56	3.4	<1	0.10	103	94	7	NA	-158	6.45	23.6	235
	9-Nov-00	1.6	0.680	0.210	<2.0	NA	1.2	0.700	0.09	1.5	22	0.00	97	71	NA	<2.0	89	6.53	16.4	168
	7-Feb-01	2.2	0.640	0.180	<2.0	NA	1.7	0.710	0.66	0.4	2	0.31	94	149	17	<2.0	1	6.67	22.8	240
	8-Aug-01	4.9	0.330	0.280	<5.0	NA	0.9	0.460	0.38	NA	<1	<0.01	143	68	7	<2.0	10	6.25	28.4	216
	29-Jan-02	730	0.180	0.320	9.9	NA	0.7	0.070	7.55	3.1	<1	<0.01	143	268	6	<2.0	-130	6.82	20.7	269
PES-MW7S	2-Aug-00	72	3.16	2.02	<5.0	NA	1.0	0.064	0.43	1.8	<1	0.10	255	170	3	<2.0	-299	6.67	25.4	508
	9-Nov-00	67	5.60	5.90	<2.0	NA	0.3	<0.050	12.24	4.2	<1	0.04	121	136	NA	<2.0	-116	6.77	24.2	568
	7-Feb-01	68	1.30	3.10	<2.0	NA	0.3	<0.050	9.72	3.3	<1	0.05	334	280	2	<2.0	-59	6.86	21.3	563
	7-Aug-01	80	0.170	1.10	9.2	NA	0.8	0.061	5.85	NA	<1	0.02	338	102	5	<2.0	-112	6.52	26.8	524
	29-Jan-02	71	0.120	0.720	3.1J	950	1.1	0.060	3.45	1.9	<1	0.16	307	365	4	<2.0	-91	6.75	21.3	482
PES-MW7D	2-Aug-00	8.3	3.02	1.97	<5.0	NA	1.1	2.50	1.65	3.5	<1	<0.01	118	54	16	<2.0	-275	6.86	24.9	334
	9-Nov-00	18	0.640	1.50	<2.0	NA	0.3	3.00	0.16	1.1	<1	0.02	151	60	29	<2.0	32	6.70	21.1	345
	7-Feb-01	20	0.360	0.920	<2.0	NA	0.3	2.50	0.13	0.4	<1	0.08	141	67	32	<2.0	-10	7.01	23.3	429
	7-Aug-01	7.0	0.210	0.960	<5.0	NA	1.1	2.30	0.04	NA	<1	<0.01	173	58	26	<2.0	60	6.59	25.7	385
	29-Jan-02	7.9	0.270	0.130	1.9J	NA	1.0	2.40	0.01	0.0	<1	0.02	190	185	23	<2.0	74	6.80	20.8	330

TABLE 4.7 (Continued)
SUMMARY OF GROUNDWATER GEOCHEMICAL DATA
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Sample Date	Methane (µg/L)[a]	Ethane (µg/L)	Ethene (µg/L)	TOC[b] (mg/L)[c]	Total Inorganic Carbon (mg/L)	Dissolved Oxygen (mg/L)	Nitrate + Nitrite (mg/L)	Ferrous Iron (mg/L)	Manganese (mg/L)	Sulfate (mg/L)	Hydrogen Sulfide (mg/L)	Total Alkalinity (mg/L)	Carbon Dioxide (mg/L)	Chloride (mg/L)	Bromide (mg/L)	Redox Potential (mV)[d]	pH (SU)[e]	Temperature (°C)[f]	Specific Conductivity (µs/cm)[g]
PES-MW8S	2-Aug-00	14	2.29	1.47	<5.0	NA	0.5	2.00	2.01	0.2	21	0.10	202	73	21	NA	-323	6.96	24.4	505
	8-Nov-00	67	1.00	2.40	3.4	NA	0.2	0.210	4.52	0.7	<1	0.06	204	74	6	<2.0	-69	6.77	21.6	411
	7-Feb-01	100	0.320	0.790	7.9	NA	0.4	<0.050	3.72	0.0	<1	0.10	317	114	2	<2.0	-52	6.86	21.1	549
	7-Aug-01	110	0.140	0.540	<5.0	NA	0.7	0.064	2.40	NA	29	0.03	151	112	5	<2.0	-112	6.71	27.8	493
	29-Jan-02	84	0.080	0.260	2.3J	NA	1.1	0.150	1.60	0.1	26	0.16	293	129	3	<2.0	-83	7.02	21.0	479
PES-MW8D	2-Aug-00	3.1	1.00	0.402	<5.0	NA	2.2	3.00	1.53	1.9	<1	0.15	127	58	20	NA	-178	6.87	25.5	333
	8-Nov-00	8.2	1.10	1.40	<2.0	NA	0.7	0.320	2.38	0.7	23	0.20	150	142	34	<2.0	-44	6.66	21.9	375
	7-Feb-01	11	0.350	0.860	<2.0	NA	0.3	1.80	0.20	0.2	4	0.03	141	62	27	<2.0	67	6.95	21.5	400
	7-Aug-01	12	0.130	1.10	<5.0	NA	0.8	2.40	0.03	NA	<1	<0.01	156	72	23	<2.0	-1	6.54	25.9	360
	29-Jan-02	7.6	0.038	0.083	2.4J	NA	1.1	5.60	0.26	0.0	2	0.16	131	117	25	<2.0	65	6.72	20.6	315
007G15UF	25-Jul-00	40	0.028	0.097	NA	NA	0.4	0.047J	<0.01	0.1	<1	0.04	171	140	9	NA	40	6.25	28.7	412
	8-Nov-00	32	0.340	0.400	NA	NA	0.3	0.018J	0.09	0.2	1	<0.01	183	162	8	NA	123	6.11	21.1	304
	6-Feb-01	41	0.220	0.094	NA	NA	0.6	0.069	0.13	<0.1	<1	0.09	200	250	NA	NA	96	5.79	22.0	340
	7-Aug-01	18	0.130	0.079	NA	NA	1.4	0.810	<0.01	NA	<1	<0.01	197	118	10	NA	102	6.11	27.0	327
	29-Jan-02	14	0.042	0.039	NA	730	0.9	0.39	<0.01	0.1	<1	0.03	160	290	6	NA	122	6.34	21.3	292
007G15LF	25-Jul-00	13	5.72	5.62	NA	NA	0.7	1.20	<0.01	<0.1	<1	<0.01	122	74	5	NA	186	6.48	21.0	279
	8-Nov-00	0.7	0.150	0.220	NA	NA	0.8	0.120	0.13	0.0	1	0.06	140	57	41	NA	157	7.37	21.8	234
	6-Feb-01	32	0.940	0.240	NA	NA	0.8	1.90	0.85	<0.1	<1	<0.01	116	66	6	NA	80	6.58	19.5	254
	7-Aug-01	4.1	0.094	0.040	NA	NA	1.1	0.85	<0.01	<0.1	<1	<0.01	126	70	3	NA	93	6.27	23.4	228
	29-Jan-02	6.9	0.034	0.029	NA	NA	1.6	1.30	0.75	<0.1	6	0.15	153	171	4	NA	102	6.59	20.3	216
INJECTION WELLS																				
PES-INJ1S	5-Aug-00	46	18.1	10.0	<5.0	NA	0.2	0.260	3.34	8.0	<1	0.02	129	89	13	NA	-359	6.99	26.0	314
PES-INJ1D	5-Aug-00	30	5.78	2.35	<5.0	NA	0.4	0.180	2.96	4.4	<1	0.04	101	90	4	NA	-268	6.49	24.3	227
PES-INJ2S	5-Aug-00	85	5.21	2.91	<5.0	NA	0.3	0.051	2.94	1.3	<1	0.02	150	154	7	<2.0	-272	6.38	23.6	358
	31-Jan-02	2,800	0.320	1.100	1,600	770	5.1	0.060	>99	3.7	<1	0.03	246	700	18	NA	47	5.43	23.6	1,570
PES-INJ2D	5-Aug-00	19	3.70	2.13	<5.0	NA	0.6	0.800	3.50	1.4	1	0.04	101	97	10	<2.0	-144	6.55	23.0	252
	11-Nov-00	NA	NA	NA	NA	NA	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	55	5.17	17.1	1,268
	31-Jan-02	4,000	0.540	1.90	1,200	780	6.1	0.060	60.9	6.9	<1	0.03	63	317	24	<2.0	66	5.30	14.9	1,240
PES-INJ3S	5-Aug-00	18	5.06	3.02	<5.0	NA	0.6	0.360	1.41	4.3	<1	0.09	110	70	NR	<2.0	-265	6.75	22.0	263
PES-INJ3D	5-Aug-00	11	2.46	1.41	<5.0	NA	1.1	0.180	2.83	2.3	<1	0.06	88	110	6	<2.0	-167	6.37	24.2	205
	9-Feb-01	6,200	1.60	1.70	1,200	NA	1.5	0.250	>3	NA	NA	NA	NA	NA	NA	18.0	129	NA	19.3	3
PES-INJ4S	6-Aug-00	108	2.64	1.54	<5.0	NA	0.3	0.090	1.36	2.1	19	0.07	237	126	3	NA	-186	6.61	24.0	481
	31-Jan-02	2,500	0.470	2.80	2,400	NA	4.6	0.050J	>99	3.8	<1	0.29	314	500	15	NA	6	5.58	19.0	2,650
PES-INJ4D	6-Aug-00	7.6	2.09	1.09	<5.0	NA	0.9	0.087	0.47	2.4	1	0.02	110	50	5	NA	-195	6.95	23.2	248

[a] µg/L = micrograms per liter.

[b] TOC = total organic carbon.

[c] mg/L = milligrams per liter.

[d] mV = millivolts.

[e] SU = pH standard units.

[f] °C = degrees Centigrade.

[g] µs/cm = microsiemens per centimeter.

[h] NA = Not analyzed.

[i] J indicates that the analyte was detected at a concentration above the method detection limit but below the reporting limit resulting in an estimated value.

[j] <20 indicates that the analyte was not detected above the referenced method detection limit.

Elevated concentrations of bromide (greater than a detection limit of 2 mg/L) have not been detected at any downgradient monitoring well location during process monitoring sample analysis. Bromide was detected in only one injection well at a concentration of 18 mg/L at PES-INJ3D in February 2001. Only 100 gallons of water push with a bromide concentration of approximately 100 mg/L was injected into each injection well. Because bromide has not been detected downgradient from the injection wells, it does not appear the water push has migrated as a plug a measurable distance downgradient.

4.5.2 Biomass and Volatile Fatty Acids

A total of 13 samples (including one duplicate) were collected from 12 locations during the January 2002 process monitoring event and sent to Microbial Insights, Inc. for analyses of biomass (by PLFA analysis) and VFAs. The results of these analyses are summarized on Table 4.8, and the analytical report is included in Appendix A.

Biomass is estimated as the total amount of PLFA content and provides a quantitative measure of the viable microbial biomass present. Elevated concentrations of biomass are an indicator of enhanced microbial activity. Biomass estimates were elevated in injection wells PES-INJ2s, PES-INJ2D, and PES-INJ4S, and in monitoring wells PES-MW2S, PES-MW2D, and PES-MW3D. The magnitude of the biomass estimates in these wells were 1 to 2 orders of magnitude greater than background wells 007G15UF and 007G15LF, indicating that microbial activity has been stimulated in the immediate vicinity of the vegetable oil injection locations.

VFAs (or metabolic acids) are microbial degradation byproducts and are also a quantitative indicator of microbial activity. Furthermore, these primary degradation products are further utilized as fermentation products, which can produce hydrogen for potential reductive dechlorination. VFA analyses indicate that the primary metabolic byproducts of the degradation of soybean oil in injection wells PES-INJ2S, PES-INJ2D, and PES-INJ4S is acetic, propionic, and butyric acids. Lower levels of these acids were measured in monitoring wells PES-MW2S, PES-MW2D, and PES-MW3D. These wells correspond to those locations exhibiting elevated biomass estimates.

TABLE 4.8
BIOMASS AND VOLATILE FATTY ACIDS IN GROUNDWATER
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Sample Date	Total Biomass (pmoles PLFA/ml)[a]	Bacterial Biomass (pmoles PLFA/ml)	Eukaryotic Biomass (pmoles PLFA/ml)	Metabolic Acids					
					Pyruvic (mg/L)[b]	Lactic (mg/L)	Formic (mg/L)	Acetic (mg/L)	Proprionic (mg/L)	Butyric (mg/L)
MONITORING WELLS										
PES-MW1S	29-Jan-02	9	8	1	< 4 [c]	< 1	< 1	< 1	< 1	< 1
PES-MW2S	30-Jan-02	161	154	7*	< 4	< 1	< 1	10	17	< 1
PES-MW2D	30-Jan-02	51	51	0	< 4	< 1	< 1	10	10	< 1
PES-MW3S	30-Jan-02	2	2	0	< 4	< 1	< 1	< 1	< 1	< 1
PES-MW3S (Dup)	30-Jan-02	3	2	1	< 4	2	< 1	1	< 1	< 1
PES-MW3D	30-Jan-02	65	64	1	< 4	< 1	< 1	140	290	20
PES-MW4S	30-Jan-02	7	7	0	< 4	< 1	< 1	< 1	< 1	< 1
PES-MW7S	29-Jan-02	2	2	0	< 4	< 1	< 1	< 1	< 1	< 1
007G15UF	29-Jan-02	2	2	0	< 4	< 1	< 1	< 1	< 1	< 1
007G15LF	29-Jan-02	3	3	0	< 4	< 1	< 1	< 1	< 1	< 1
INJECTION WELLS										
PES-INJ2S	31-Jan-02	199	94	105*	< 4	< 1	< 1	163	586	305
PES-INJ2D	31-Jan-02	101	41	60*	< 40	< 10	< 10	157	523	200
PES-INJ4S	31-Jan-02	163	67	96*	< 40	< 10	< 10	239	845	713

* indicates that the results are effected by residual fatty acids found in vegetable oil.

[a] pmoles PLFA/ml = picomoles of phospholopid fatty acid per milliliter of sample.

[b] mg/L = milligrams per liter.

[c] "<" indicates that the analyte was below the limit of quantitation.

Based on biomass estimates and VFA measurements, the influence of the vegetable oil injection appears to be limited to the injection wells and monitoring wells PES-MW2S, PES-MW2D, and PES-MW3D. The remainder of the wells sampled for VFA analysis do not contain significant quantities of metabolic acids or biomass. Therefore, these other location may not exhibit reductive dechlorination of CAHs due to the relative absence of microbial activity.

4.5.3 Microbial Community Characterization Results

The microbial communities in groundwater from three injection wells (PES-INJ2S, PES-INJ2D, and PES-INJ4S) and nine monitoring wells (PES-MW1S, PES-MW2S, PES-MW2D, PES-MW3S, PES-MW3D, PES-MW4S, PES-MW7S, 007GL15UF, and 007GL15LF) were characterized by PLFA analysis. In addition, bacterial profiles were obtained for wells PES-INJ2D, PES-MW3S, and PES-MW2D using DGGE analysis. The following discussion is paraphrased in part from a laboratory report prepared by Microbial Insights, Inc. for samples collected from Site N-6. This laboratory report is included in Appendix A.

All samples analyzed for PLFA content contained viable microbial biomass ranging from 10,000 to 1,000,000 cells per milliliter (cells/mL) of water (Appendix A). As discussed in Section 4.5.2, PLFA results indicate that viable biomass concentrations in all three injection wells, as well as monitoring wells PES-MW2S, PES-MW2D, and PES-MW3D, were one to two orders of magnitude higher than biomass concentrations measured in the remaining six monitoring wells. This indicates that microbial populations have been enhanced by the addition of vegetable oil only as far from the injection area as PES-MW2S in the upper fluvial deposits and PES-MW3D in the lower fluvial deposits.

Bacterial profiles provided by the DGGE analysis indicate moderate to highly diverse bacterial communities in wells PES-INJ2D, PES-MW3S, and PES-MW2D. This indicates that microbial population development has been stimulated at these locations by addition of vegetable oil. The bacterial profiles in each of the three wells showed little

similarity in deoxyribonucleic acid (DNA) banding patterns suggesting that bacterial populations are widely divergent between monitoring locations.

DGGE analysis of one sample collected from PES-MW3S indicates that the microbial population in groundwater at this location is dominated by five bacterial strains. The first, and most prominent microorganism, is loosely associated with the genus *Desulfurella*. Members of the genus *Desulfurella* are sulfate-reducing bacteria, which are moderately anaerobic bacteria and that use acetate as their primary electron donor. The second most prominent microorganism is loosely associated with the genus *Bacteriodes,* which have recently been identified as organic pollutant degraders (Microbial Insights, Appendix A).

A microorganism loosely related to genus *Geobacter* represents the third most prominent microorganism at PES-MW3S. Members of the genus *Geobacter* are anaerobic, iron-reducing, gram-negative bacteria. Various studies have shown that bacteria in this genus can remove aromatic hydrocarbons, oxidize organic contaminants, and reduce metals (Microbial Insights, Appendix A). Members of the genus *Geobacter* use a variety of electron donors including hydrogen, formate, acetate, pyruvate, succinate, fumarate, and ethanol.

The fourth most prominent microorganism is loosely associated with the genus *Azoarcus*. Some members of genus *Azoarcus* are capable of denitrification and are particularly well known for being able to degrade aromatic compounds (Microbial Insights, Appendix A). Microorganisms loosely associated with genus *Clostridium* make up the fifth most prevalent bacterial strain detected at PES-MW3S. Members of the genus *Clostridium* can be found in anaerobic environments and are commonly found in soils, sewage, marine sediments, and decaying vegetation. There have been some recent publications suggesting the involvement of *Clostridium bifermentans* in the dechlorination of PCE. However, Middeldorp *et al.* (1999) listed several members of *Clostridium* that were unable to dechlorinate PCE.

The two most prominent microorganisms in PES-MW2D are closely related to sulfate-reducing bacteria *Desulfobulbus* and ammonia-oxidizing bacteria *Nitrosomonas*. The only prominent microorganism present in groundwater at PES-INJ2D are bacteria associated with the genus *Clostridium* discussed above.

DNA-based analysis techniques were used to analyze groundwater samples collected from wells PES-MW3S, PES-MW2D, and PES-INJ2D to detect the presence of the microorganism *Dehalococcoides Ethenogenes*, which is known to degrade PCE. *Dehalococcoides Ethenogenes* was detected in PES-MW3S at a concentration above the MDL of 1,000 cells/mL of water.

In summary, bacterial populations at locations PES-MW3S, PES-MW2D, and PES-INJ2D are highly variable. The primary microorganisms present are typically iron- or sulfate-reducing bacteria. Note that the presence of methanogens are not measured in PLFA analyses. As discussed previously, monitoring location PES-MW3S initially exhibited some evidence of reductive dechlorination, but recent data suggest that this location has been relatively unaffected by the vegetable oil injection (relatively low TOC, biomass, and VFA levels). However, samples from PES-MW3S do indicate the presence of *Dehalococcoides Ethenogenes*, which is known to degrade chlorinated ethenes to completion.

Locations PES-MW2D and PES-INJ2D have been impacted by vegetable oil injection and a substantial decrease in TCE concentrations has occurred at these two locations. While it is not readily apparent whether the reduction in concentration at location PES-INJ2D is due to partitioning or to reductive dechlorination, concentration and molar concentration trends at location PES-MW2D indicate that reductive dechlorination has been stimulated. Thus, the addition of vegetable oil appears to be stimulating the growth of microorganisms (possibly *Clostridium* or *Dehalococcoides Ethenogenes*) that are capable of reductive dechlorination of CAHs at the site.

4.6 GEOCHEMICAL RESULTS

Biodegradation causes measurable changes in groundwater geochemistry that can be used to evaluate the effectiveness of vegetable oil in stimulating biodegradation. For reductive dechlorination to be an efficient process, the groundwater typically must be sulfate-reducing or methanogenic. Thus, groundwater in which reductive dechlorination is occurring should have the following geochemical signature:

- Depleted concentrations of DO, nitrate, and sulfate;
- Elevated concentrations of Fe(II), Mn(II), methane, ethene, ethane, hydrogen, chloride, and alkalinity; and
- Reduced ORP.

The geochemistry of groundwater in the vicinity of the field test (Table 4.7) has changed significantly following injection of the vegetable oil. The following sections describe these changes and how the site geochemical conditions relate to potential biodegradation of CAHs.

4.6.1 Alternate Electron Acceptors and Metabolic Byproducts

Biodegradation of organic compounds, whether natural or anthropogenic, brings about measurable changes in the chemistry of groundwater in the affected area. Concentrations of compounds used as electron acceptors (e.g., DO, nitrate, and sulfate) are depleted, and byproducts of electron acceptor reduction (e.g., ferrous iron and methane) are enhanced. By measuring these changes, it is possible to evaluate through secondary lines of evidence what biological processes have been induced or enhanced by substrate addition. Results of alternate electron acceptor and metabolic byproduct analyses for Site N-6 are presented in Table 4.7. The following paragraphs discuss those parameters most useful in evaluating site biodegradation processes.

4.6.1.1 Dissolved Oxygen

Figure 4.13 shows concentrations of DO for the upper and lower fluvial deposits over time. DO concentrations decreased substantially within the upper fluvial deposits after injection. Decreases in DO within the vicinity of the injection wells were anticipated due to the electron acceptor demand imposed by the addition of vegetable oil. Decreases in the concentration of DO at locations more distant from the injection wells (e.g., PES-MW1S and PES-MW8S) may be due in part to displacement by groundwater with lower initial DO concentrations from the injection source area. Overall, DO concentrations in the upper fluvial deposits have increased slightly over the past three sampling events. With the exception of PES-MW1S, concentrations of DO in the upper fluvial deposits have remained less than 1.5 mg/L.

DO concentrations in the lower fluvial deposits aquifer were generally less than 2.0 mg/L prior to injection, and have remained relatively stable (Table 4.7 and Figure 4.13). Monitoring locations exhibiting some indications of reductive dechlorination, PES-MW2D, PES-MW3D, and PES-MW6D, had concentrations of DO less than 0.7 mg/L in January 2002.

Concentrations of DO have generally remained above 0.4 mg/L to 0.5 mg/L throughout the test area. While these conditions may be sufficient to support reductive dechlorination, it was anticipated that the vegetable oil injection would exert an electron acceptor demand sufficient to lower concentrations of DO in the treatment zone to less than 0.5 mg/L. These DO measurements suggest that an influx of relatively oxygenated groundwater may be occurring in the treatment zone. Sources of recharge may include groundwater from upgradient flow or recharge through leakage of surface water from the storm water drain that runs through the site (Figure 1.2).

4.6.1.2 Nitrate and Nitrite

After DO has been depleted in the microbiological treatment zone, nitrate may be used as an electron acceptor for anaerobic biodegradation via denitrification. Nitrate concentrations below background in areas with high organic carbon concentrations and

FIGURE 4.13A
CONCENTRATIONS OF DISSOLVED OXYGEN IN UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

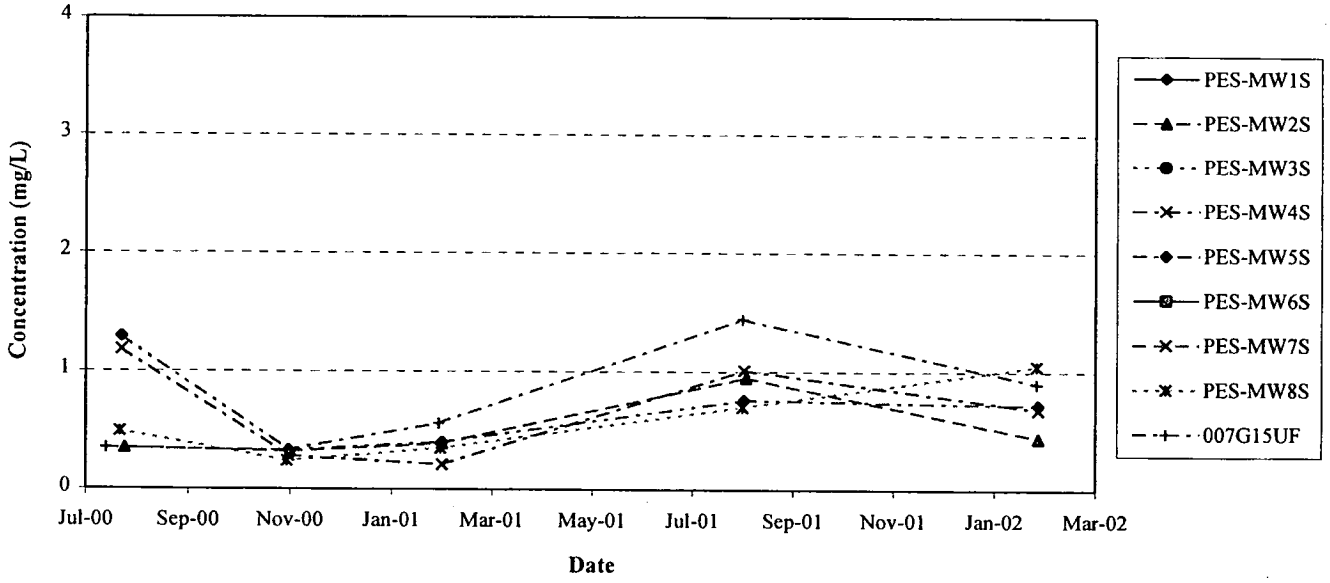
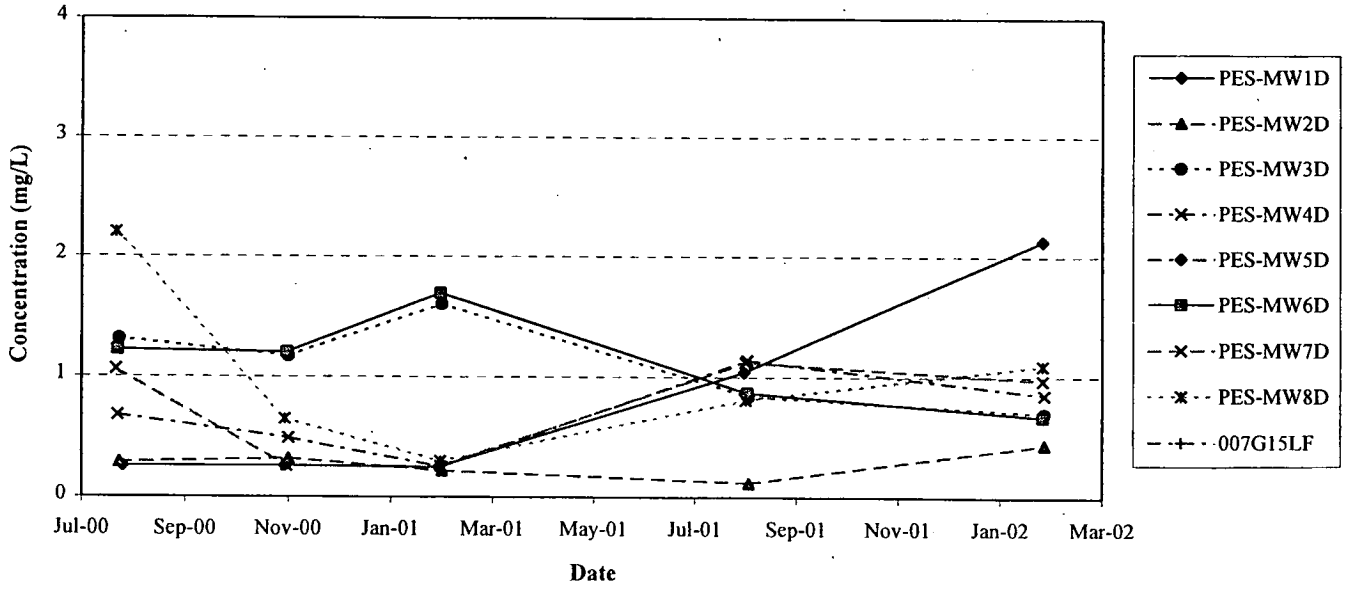


FIGURE 4.13B
CONCENTRATIONS OF DISSOLVED OXYGEN IN LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



low DO are indicative of denitrification. The oxidation of organic carbon via the process of denitrification (using nitrate as an electron acceptor) yields a relatively large amount of free energy to microbial populations. Because nitrate may compete with CAHs as an alternate electron acceptor, nitrate concentrations less than 1.0 mg/L are desired for significant reductive dechlorination to occur (USEPA, 1998).

Groundwater samples were collected from all of the newly installed monitoring wells and from existing monitoring wells 007GL15UF and 007GL15LF during all sampling events and analyzed by Microseeps, Inc. for nitrate plus nitrite (as nitrogen [N]) via USEPA Method E300.1. Because concentrations of nitrate are usually much greater than concentrations of nitrite in groundwater systems, the measure of nitrogen is a good approximation of the measure of nitrate present. Baseline concentrations using this method were less than or equal to 1.0 mg/L with the exception of samples collected from monitoring locations PES-MW5D, PES-MW7D, PES-MW8S, PES-MW8D, and 007GL15LF. The maximum baseline concentration of nitrate + nitrite was 3.0 mg/L at location PES-MW8D.

With one exception, nitrate + nitrite concentrations decreased slightly or remained relatively constant during process monitoring, with concentrations remaining less than 3.0 mg/L. The only exception was at monitoring location PES-MW8D, where the concentration of nitrate + nitrite was 5.6 mg/L in January 2002, relative to a baseline concentration of 3.0 mg/L in August 2000. However, within the treatment zone nitrate + nitrite concentrations are generally less than 1.0 mg/L, indicating that nitrate reduction is a relatively minor oxidation-reduction process at the site and should not exert an excessive electron acceptor demand.

4.6.1.3 Ferrous Iron

The reduction of ferric iron [Fe(III)] has been shown to be a major metabolic pathway for some micro-organisms (Lovley and Phillips, 1988; Chapelle, 1993). Reduction of ferric iron produces ferrous iron [Fe(II)], which is soluble in natural groundwater systems

and can be readily measured in the field. Concentrations of Fe(II) measured in groundwater samples are summarized in Table 4.7.

Concentrations of Fe(II) over time for the upper and lower fluvial aquifer zone monitoring locations are shown on Figure 4.14. In the upper fluvial deposits, Fe(II) concentrations increased sharply immediately after injection at locations PES-MW3S, PES-MW4S, and PES-MW5S. Lesser increases were observed at most of the other monitoring locations. Subsequent to the first process monitoring event, concentrations of Fe(II) began to decrease, except for locations PES-MW1S and PES-MW3S, which continued to increase. After February 2001, concentrations of Fe(II) began to decrease at PES-MW3S as well. The increase in Fe(II) concentrations immediately after oil injection indicates that iron-reduction was stimulated in the upper fluvial aquifer zone by the vegetable oil injection. The relatively gradual decline in Fe(II) concentrations during the past three performance monitoring events indicates that Fe(III) reduction is becoming a less prevalent oxidation-reduction reaction, either due to depletion of bioavailable iron or due to changes in groundwater reducing conditions that inhibit iron-reduction.

In the lower fluvial aquifer zone, a more gradual increase in Fe(II) concentrations was observed during performance monitoring sampling events for well locations PES-MW2D and PES-MW3D, PES-MW4D, and PES-MW6D. Concentrations of Fe(II) did increase for the first monitoring event at PES-MW1D, but have subsequently declined to less than baseline levels. Monitoring locations PES-MW2D, PES-MW3D, and PES-MW6D show recent evidence of reductive dechlorination. Therefore, the increase in Fe(II) concentrations at these locations suggests a possible correlation to stimulation of reductive dechlorination in the lower fluvial aquifer zone.

4.6.1.4 Sulfate

Sulfate also may be used as an electron acceptor (sulfate reduction) during microbial degradation of an organic substrate under anaerobic conditions (Grbic-Galic, 1990). Sulfate concentrations were measured in groundwater samples collected during baseline sampling and during each of the performance monitoring sampling events (Table 4.7).

FIGURE 4.14A
CONCENTRATIONS OF FERROUS IRON IN UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

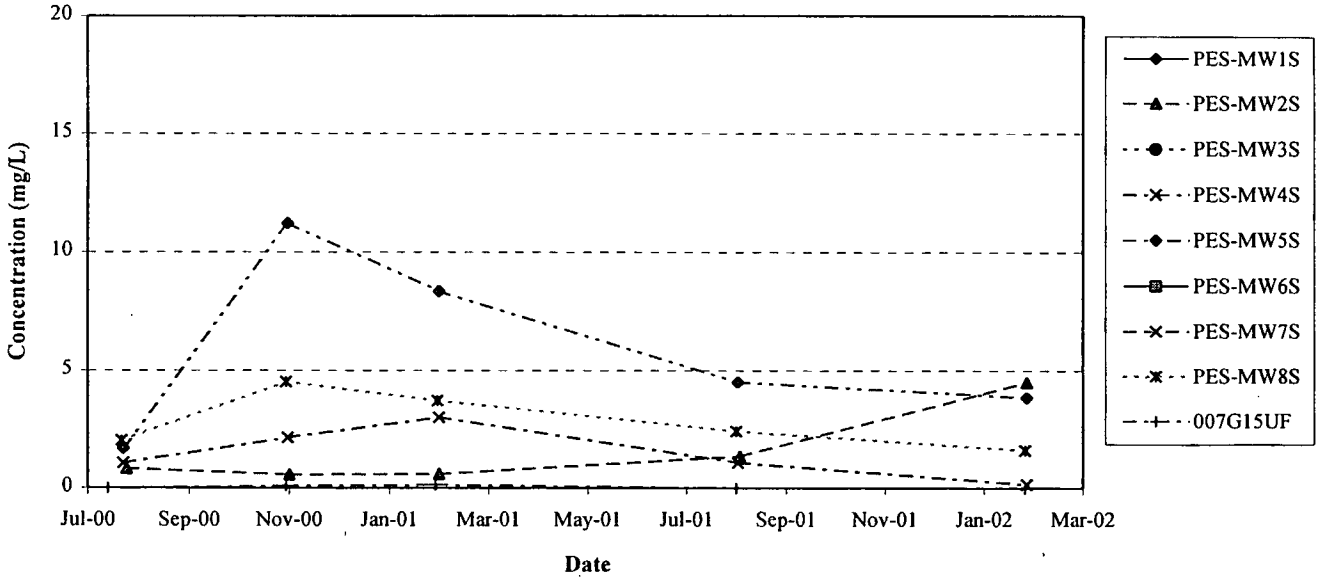
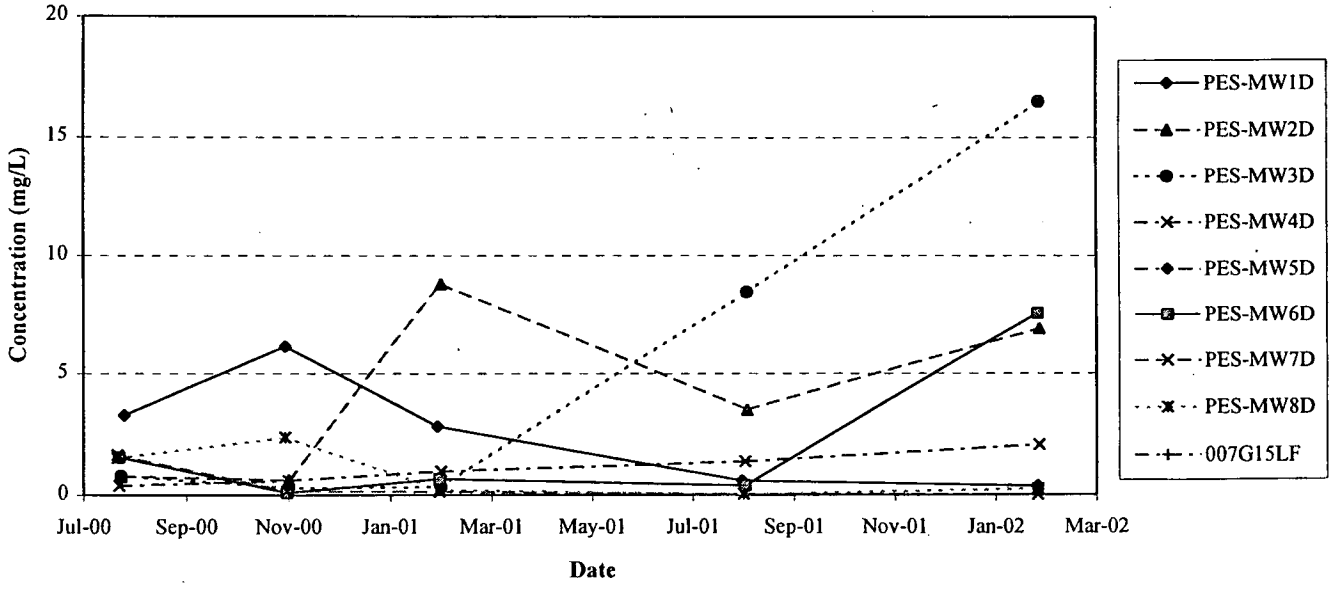


FIGURE 4.14B
CONCENTRATIONS OF FERROUS IRON IN LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



Sulfate concentrations measured during baseline sampling were generally less than 5 mg/L with the exception of samples collected from monitoring locations PES-MW8S (21 mg/L), and PES -INJ4S (19 mg/L).

With a few exceptions, sulfate concentrations detected in samples collected during performance monitoring sampling events remained less than 5 mg/L. The highest sulfate concentration detected during post-injection monitoring was 29 mg/L at upgradient location PES-MW1S in August 2001 (Table 4.7).

The overall low concentrations of sulfate detected during baseline and performance monitoring indicates that sulfate reduction is a relatively minor oxidation-reduction process at the site and should not exert an excessive electron acceptor demand with respect to CAHs.

4.6.1.5 Methane, Ethane, and Ethene in Groundwater

Although anaerobic degradation of CAHs may occur under nitrate-, iron- and sulfate-reducing conditions (Vogel *et al.*, 1987; Chapelle, 1993), the most rapid reductive dechlorination rates occur under methanogenic conditions (Bouwer, 1994). However, methanogenic organisms are known to compete with dechlorinating organisms for hydrogen (electron donor) produced by fermentation of organic substrate. Strongly elevated methane concentrations may be an indication that the majority of the organic substrate is being used to support methanogenesis, at the expense of dechlorination reactions.

Methane concentrations over time for upper and lower fluvial aquifer zone monitoring well locations are shown on Figure 4.15. Methane concentrations have increased significantly at well locations PES-MW2S, PES-MW2D, PES-MW3S, PES-MW3D, and PES-MW6D. Methane concentrations have increased from less than 100 μg/L prior to injection to a maximum of 1,900 μg/L at PES-MW3S and 13,000 at PES-MW3D in January 2002.

FIGURE 4.15A
CONCENTRATIONS OF METHANE IN
UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

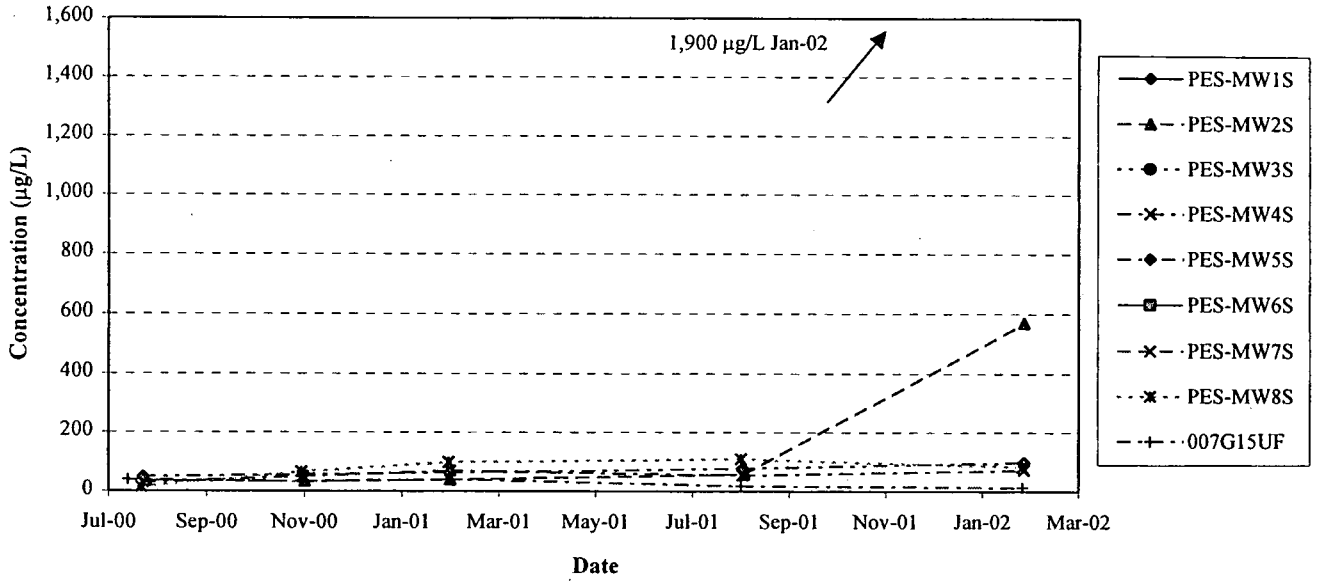
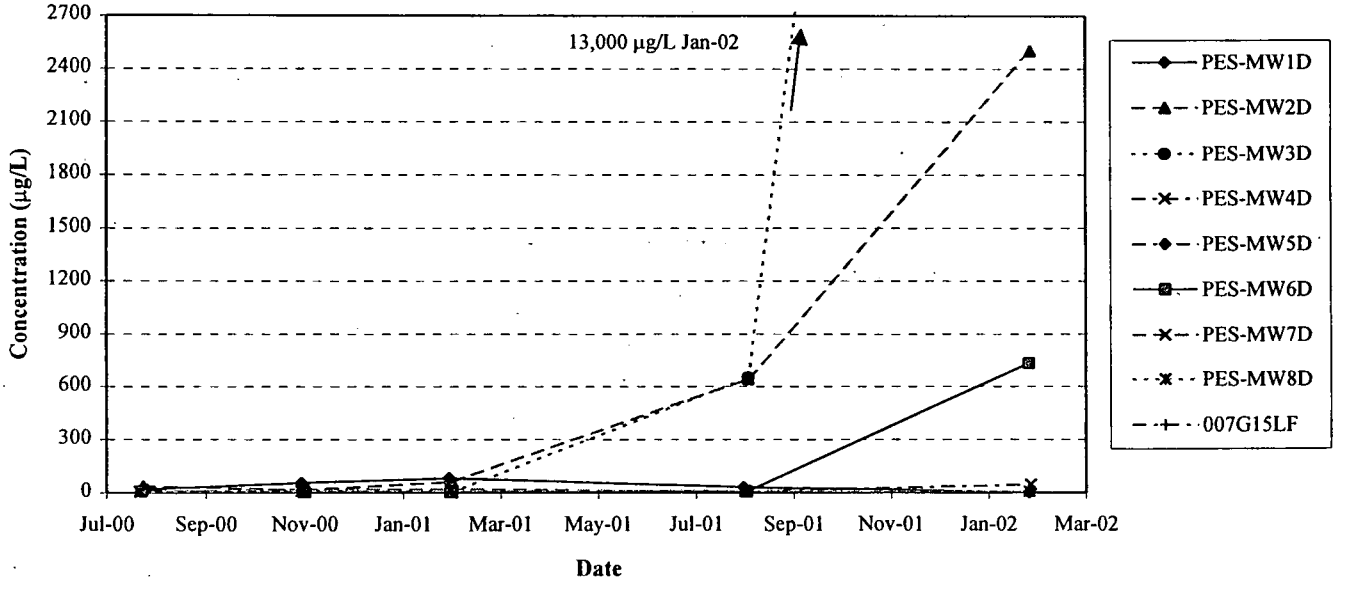


FIGURE 4.15B
CONCENTRATIONS OF METHANE IN
LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



Methane concentrations in monitoring well PES-MW1S also increased substantially shortly after injection, but have been decreasing since the February 2001 process monitoring event. This temporary increase in methane concentrations at PES-MW1S is likely related to a temporary reversal in groundwater gradient observed shortly after injection (Section 4.2). With the exception of monitoring wells PES-MW1S and PES-MW6D, the increase in methane concentrations observed at the locations listed above are limited to an area in the immediate vicinity of the injection area. The increase at location PES-MW6D is less pronounced and only occurred during the last monitoring event, indicating that the area of methanogenic activity is spreading in a downgradient direction.

Ethene and ethane are end products of reductive dechlorination. An increase in ethene and ethane concentration is a strong indication that complete degradation of chlorinated ethenes has occurred. Ethene concentrations over time for upper and lower fluvial aquifer zone monitoring well locations are shown on Figure 4.16. Initially, ethene concentrations increased from August 2000 to November 2000 at monitoring wells PES-MW1S, PES-MW2D, PES-MW3S, PES-MW3D, PES-MW5S, and PES-MW7S. However, ethene concentrations decreased in all monitoring wells and injection wells from November 2000 to January 2002. Because VC has not been detected at the site, it is not readily apparent that the initial increase in ethene concentration was a result of reductive dechlorination. Since the November 2000 sampling event, ethene concentrations have generally declined to below pre-injection concentrations. This indicates that complete dechlorination of CAHs to ethene is not occurring.

The observed long-term decreasing trends in ethene concentration coupled with the observed increasing trends in methane concentration further indicate that the injection of vegetable oil preferentially stimulated methanogenic biodegradation processes rather than reductive dechlorination processes at Site N-6.

4.6.2 ORP as an Indicator of Redox Processes

Redox potential, or ORP, is a fairly quantitative measure of the relative tendency of a solution to accept or transfer electrons. The redox potential of a groundwater system

FIGURE 4.16A
CONCENTRATIONS OF ETHENE IN
UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

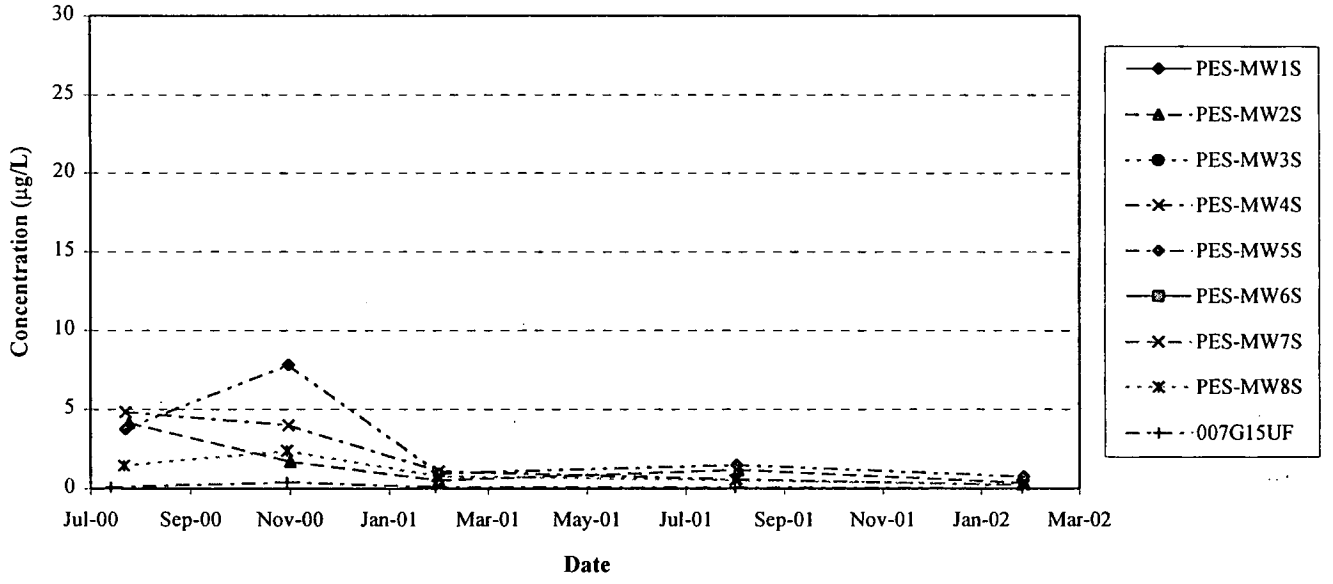
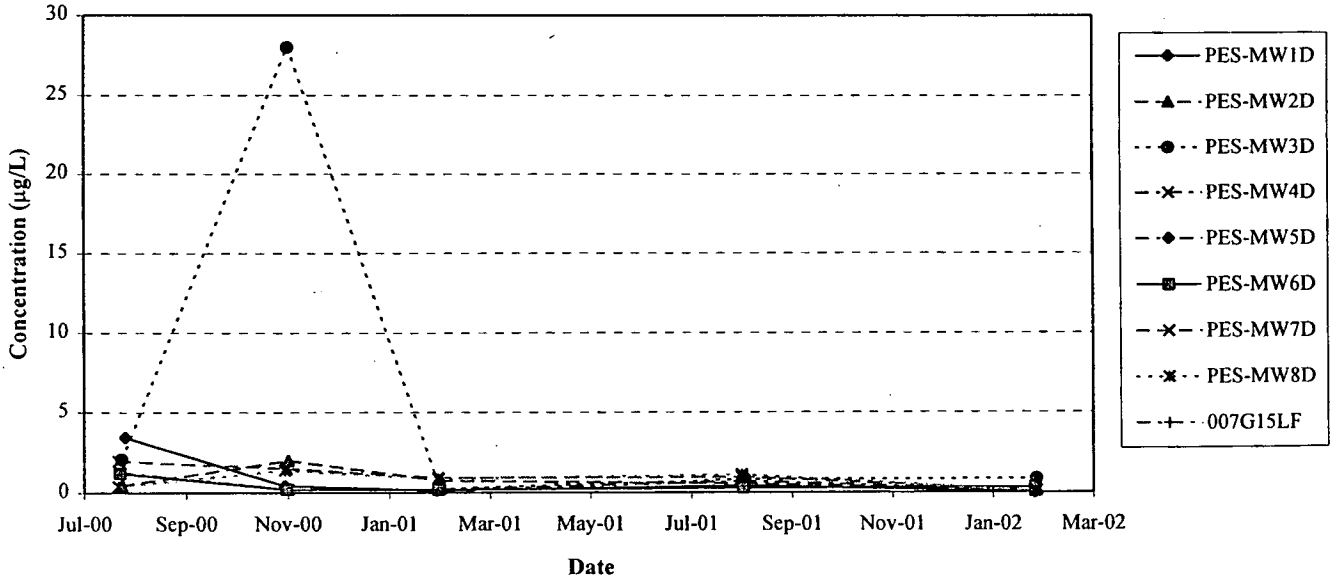


FIGURE 4.16B
CONCENTRATIONS OF ETHENE IN
LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



depends on which electron acceptors are being reduced by microbes during oxidation of organic compounds. In general, reactions yielding more energy tend to take precedence over processes that yield less energy (Stumm and Morgan, 1981; Godsey, 1994; Reinhard *et al.*, 1984). Oxygen reduction would be expected in an aerobic environment with microorganisms capable of aerobic respiration, because oxygen reduction yields significant energy (Bouwer, 1992; Chapelle, 1993). However, once the available DO is depleted and anaerobic conditions dominate the interior regions of a contaminant plume, anaerobic microorganisms can utilize other electron acceptors in the following order of preference: nitrate (denitrification), manganese (manganese reduction), ferric iron (iron reduction), sulfate (sulfate reduction), and finally carbon dioxide (methanogenesis). Each successive redox reaction provides less energy to the system, and each step down in redox energy yield is paralleled by an ecological succession of microorganisms capable of facilitating the pertinent redox reactions.

ORP values measured during baseline and performance monitoring sampling are presented in Table 4.7, and ORP values over time for upper and lower fluvial aquifer zone monitoring well locations are presented on Figure 4.17. Baseline ORP values exhibited a wide range of reducing conditions with baseline values ranging from a high of +253 millivolts (mV) to a low of -359 mV. In general, these values indicate reducing conditions ranging from aerobic oxidation to methanogenesis (USEPA, 1998). ORP values varied substantially even within the treatment zone. For example, the ORP value at PES-MW3S was +194 mV, while ORP at PES-MW2S was –322 mV. This suggests a high degree of heterogeneity in the natural reducing conditions present at the site prior to injection, with both aerobic and anaerobic conditions present.

After injection, ORP values tended to stabilize within a range from +150 to –150 mV, indicating reducing conditions typically are within the nitrate-reduction to sulfate-reduction range. Methane data indicate that, even at locations with ORP values ranging down to only -150 mV, methanogenesis is occurring at select locations. It is notable that the three locations in the lower fluvial deposits with the lowest ORP values

FIGURE 4.17A
OXIDATION/REDUCTION POTENTIAL IN UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

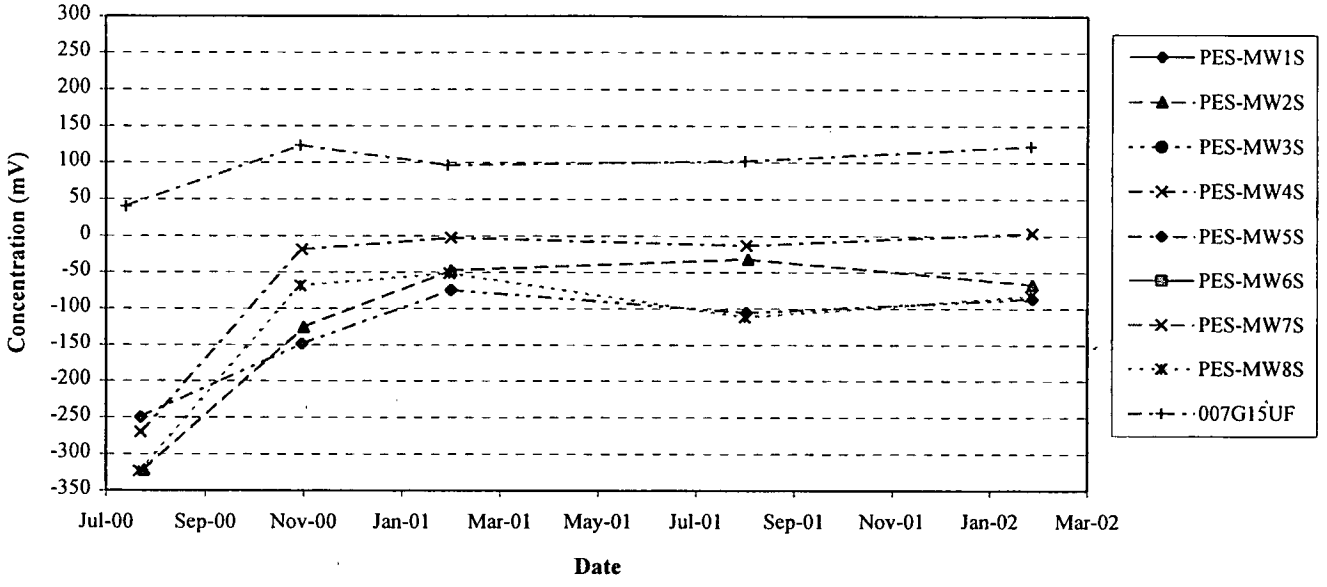
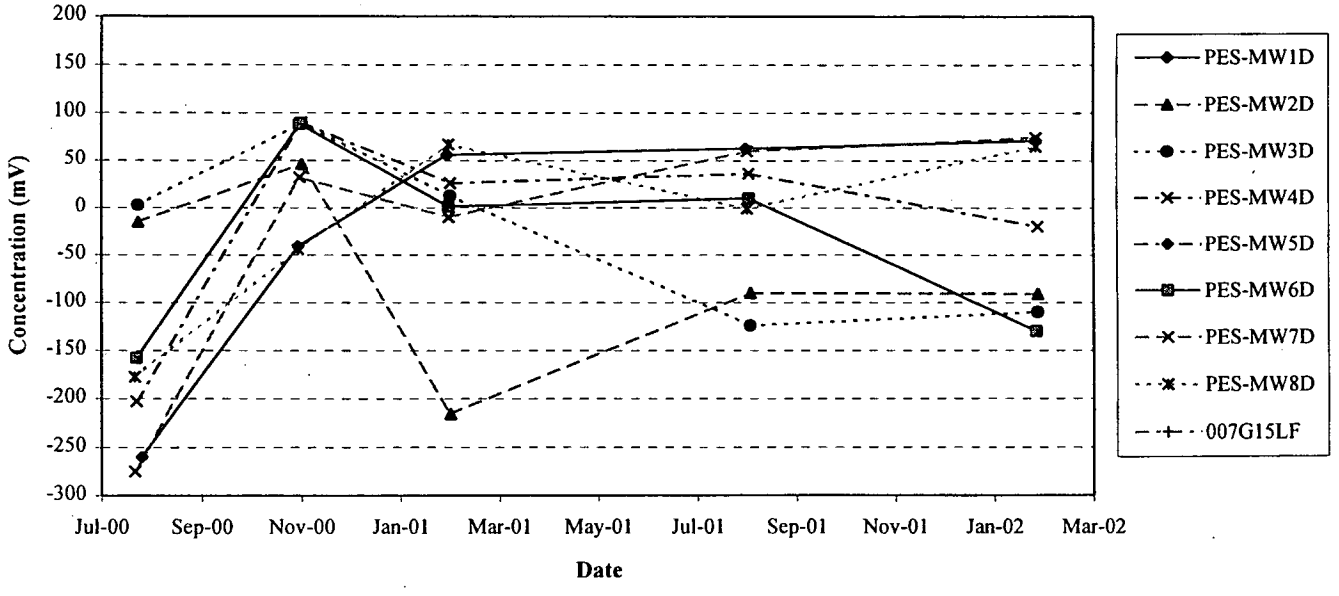


FIGURE 4.17B
OXIDATION/REDUCTION POTENTIAL IN LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



(PES-MW2D, PES-MW3D, and PES-MW6D) exhibit some evidence of dechlorination of TCE to *cis*-1,2-DCE.

However, the continued variation in the ORP values for both the upper and lower fluvial zones suggests that the impact of the vegetable oil injection is not uniform or widespread, and that the degree of heterogeneity in the reducing conditions present at the site remains relatively high.

4.6.3 Additional Geochemical Indicators

Other geochemical data collected for this evaluation can be used to further interpret and support the contaminant, electron donor, electron acceptor, and byproduct data previously discussed. These parameters provide additional qualitative indications of what processes may be operating at the site.

4.6.3.1 Chloride as an Indicator of Reductive Dechlorination

Chloride ions are removed from chlorinated solvents and enter solution during biodegradation, whether via reductive dechlorination or aerobic oxidation. Therefore, chloride concentrations in groundwater should increase above baseline levels in areas where reductive dechlorination is being stimulated.

Chloride concentrations are presented in Table 4.7, presents the concentration of chloride over time in shallow and deep monitoring wells. With the exception of PES-MW1S, chloride concentrations in the upper fluvial deposits remained relatively stable over time, with chloride concentrations remaining below 20 mg/L. The chloride concentration at PES-MW1S increased from a baseline concentration of 5 mg/L to a maximum of 87 mg/L in January 2002. The cause of this increase is not readily apparent, as changes in contaminant and geochemical concentrations indicative of biodegradation have become less pronounced at this location over time.

With few exceptions, chloride concentrations in the lower fluvial deposits (Figure 4.18) also remained relatively stable at concentrations less than 30 mg/L. Initially, the baseline chloride concentration at location PES-5MWD was elevated at a concentration

FIGURE 4.18A
CONCENTRATIONS OF CHLORIDE IN
UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

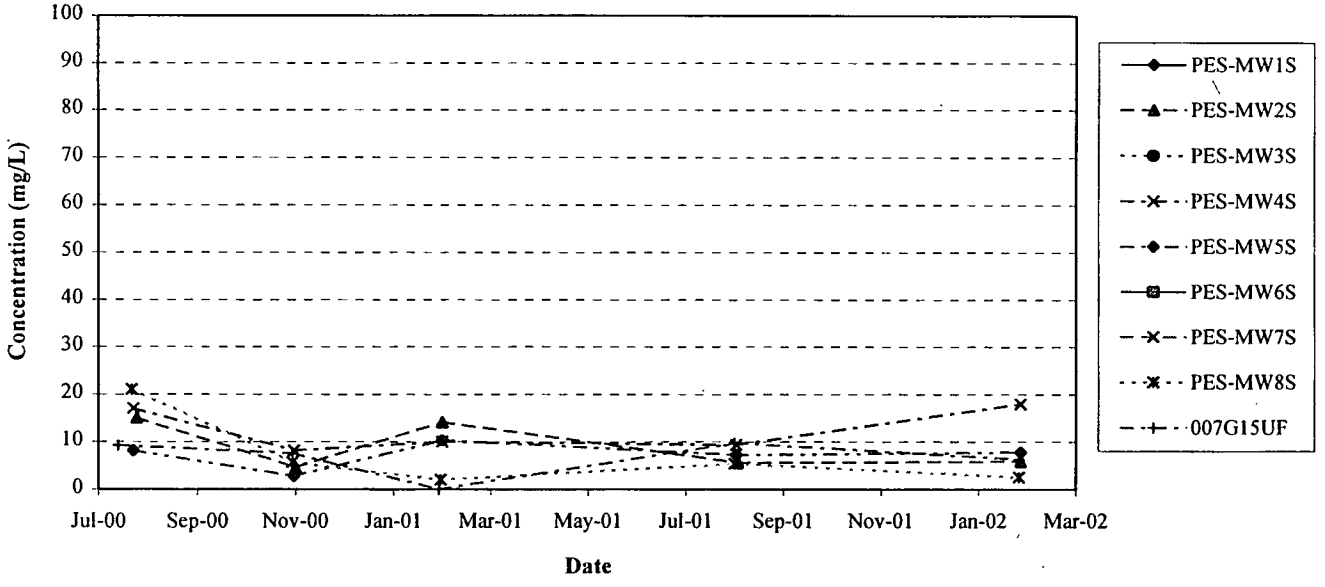
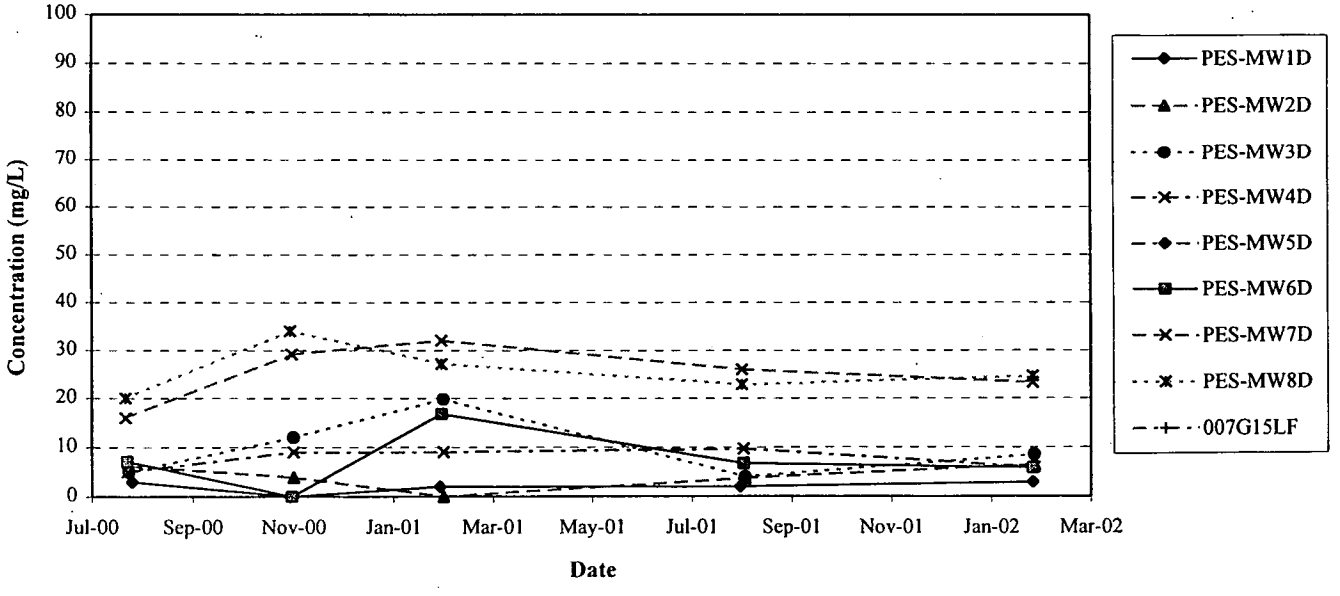


FIGURE 4.18B
CONCENTRATIONS OF CHLORIDE IN
LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



of 70 mg/L, but decreased to less than 20 mg/L during process monitoring. Overall, chloride concentrations do not suggest that reductive dechlorination of CAHs is occurring to a significant degree at the site.

4.6.3.2 Carbon Dioxide and Alkalinity

Carbon dioxide is produced during the biodegradation of organic carbon compounds. In aquifers that have carbonate minerals as part of the matrix, carbon dioxide forms carbonic acid, which dissolves these minerals, increasing the alkalinity of the groundwater. An increase in carbon dioxide and alkalinity (measured as calcium carbonate [$CaCO_3$]) in the treatment zone can be used to infer that organic carbon (i.e., vegetable oil), and possibly less-chlorinated solvents, have been destroyed through aerobic and anaerobic microbial respiration. Alkalinity also is a measure of the ability of groundwater to buffer changes in pH. Because microbial degradation produces metabolic acids, the ability of the groundwater system to buffer these acids is beneficial to maintaining pH within the optimal range for halorespirating organisms.

Total alkalinity and carbon dioxide concentrations over time for upper and lower fluvial aquifer zone monitoring well locations are shown on Figures 4.19 and 4.20, respectively. In general, an increase in alkalinity was observed for the time period from July/August 2000 (pre-injection) until February 2001. In the upper fluvial deposits, alkalinity remained variable, ranging from 129 mg/L at PES-MW4S to 307 mg/L at PES-MW7S in January 2002. A slight increase was also observed from February 2001 to January 2002 for a few of the lower fluvial deposit wells (PES-MW3D and PES-MW4D). These data suggest that some biodegradation of organic compounds has occurred, but that is not uniform or widespread.

Carbon dioxide measurements also showed an overall increase from baseline measurements, ranging from 82 mg/L at PES-MW1D to 458 mg/L at PES-MW3D in January 2002. Carbon dioxide measurements appear to be higher in the winter months when groundwater temperatures are lower, and lower in the summer months when groundwater temperatures are higher. While there may be a seasonal effect on carbon

FIGURE 4.19A
CONCENTRATIONS OF TOTAL ALKALINITY IN UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

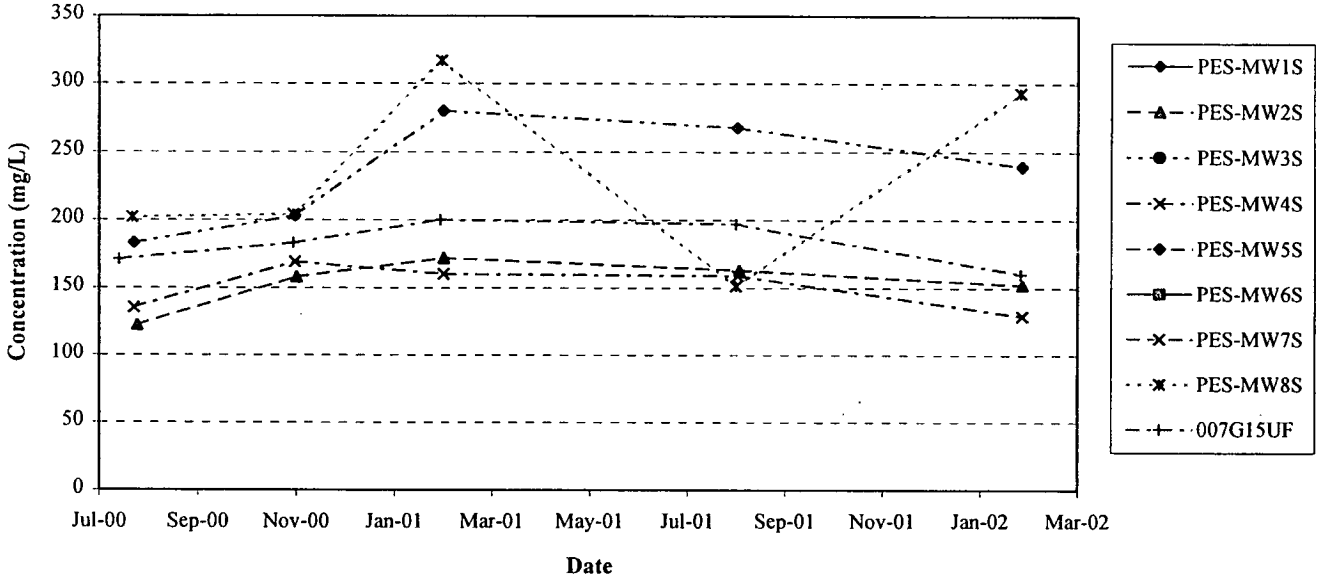


FIGURE 4.19B
CONCENTRATIONS OF TOTAL ALKALINITY IN LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

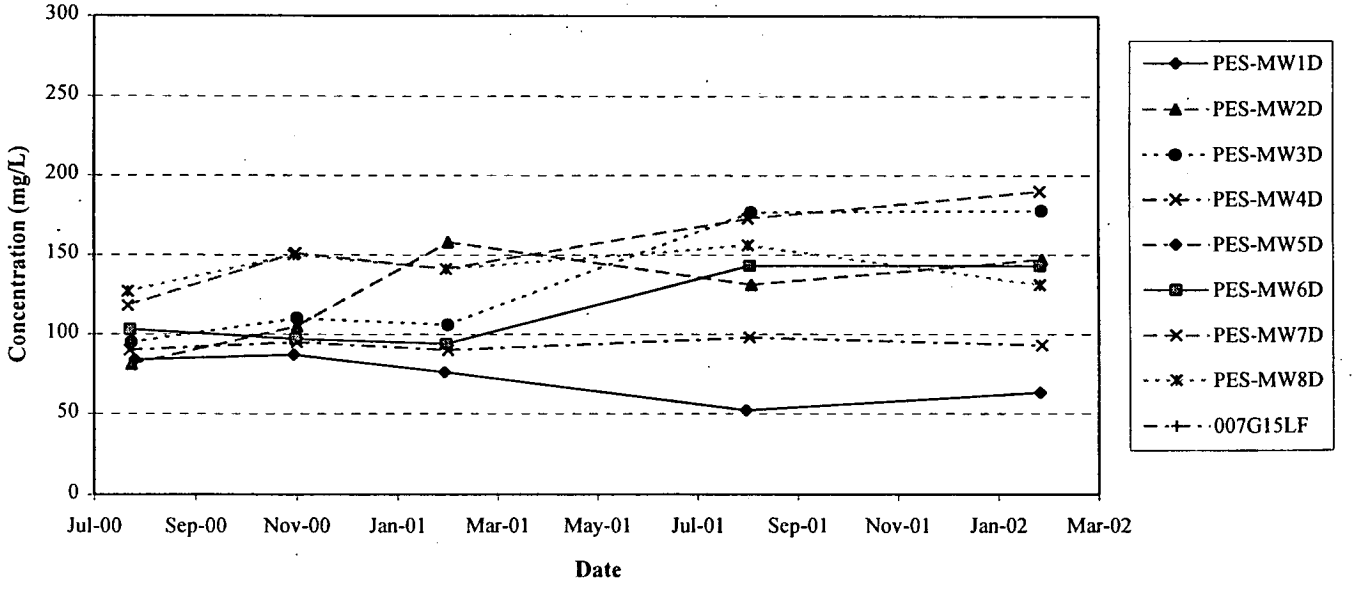


FIGURE 4.20A
CONCENTRATIONS OF CARBON DIOXIDE IN UPPER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

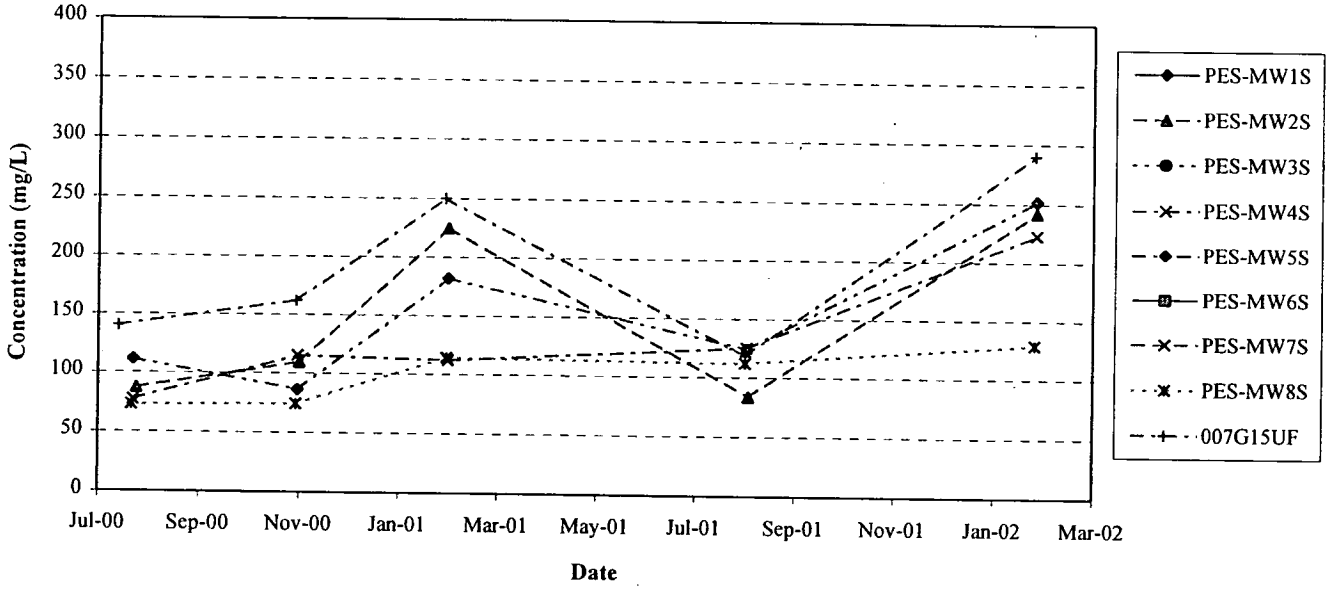
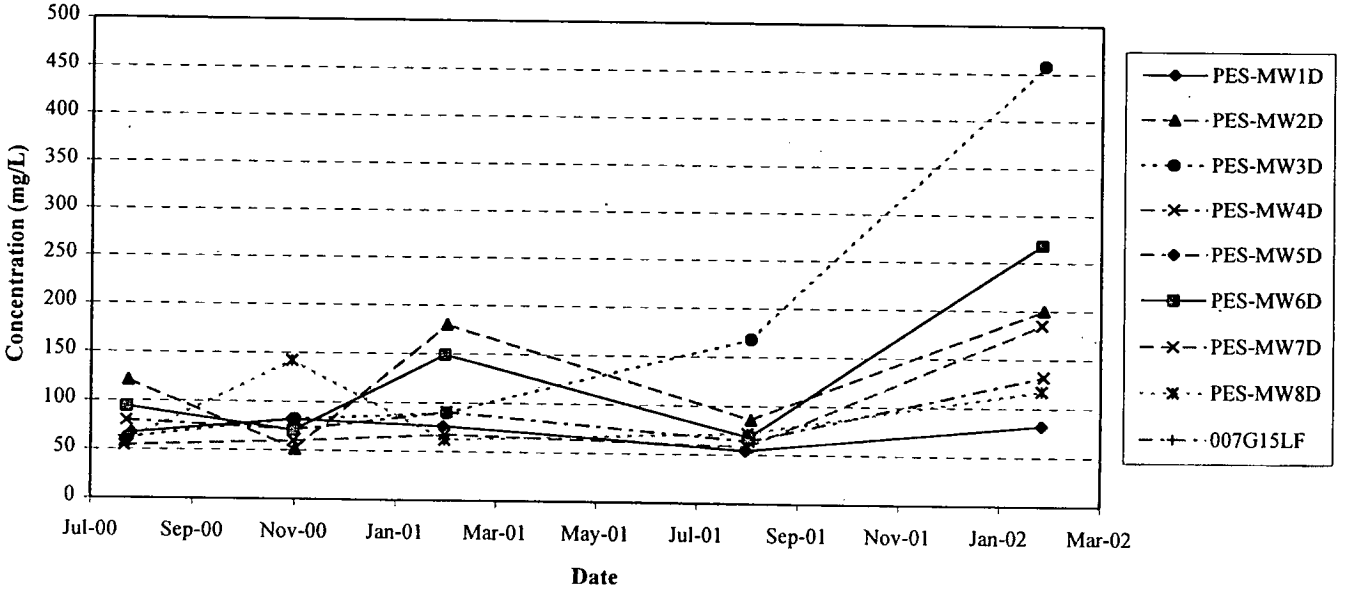


FIGURE 4.20B
CONCENTRATIONS OF CARBON DIOXIDE IN LOWER FLUVIAL DEPOSITS OVER TIME
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE



dioxide concentrations, the overall increase suggest that biodegradation has been stimulated in certain portions of the treatment area.

4.7 SUMMARY OF ENHANCED BIODEGRADATION

Changes in groundwater parameters indicate that the groundwater reducing environment has been changed by the addition of vegetable oil. However, consistent and long-term reductive dechlorination of chlorinated ethenes has not been demonstrated during the 18-month process monitoring period. Rather, it appears that only within the past two process monitoring events (August 2001 and January 2002) that reductive dechlorination of TCE to *cis*-1,2-DCE is occurring at well locations PES-MW2S, PES-MW2D, PES-MW3D, and PES-MW6D. There is currently no evidence of further reductive dechlorination to VC and ethene.

To evaluate what conditions may stimulate reductive dechlorination of CAHs at Site N-6, Table 4.9 presents select analytical, microbial, and geochemical parameters for monitoring locations where these three types of data were collected or where evidence of reductive dechlorination has occurred. Well locations where recent evidence of reductive dechlorination of TCE to *cis*-1,2-DCE has occurred (PES-MW2S, PES-MW2D, PES-MW3D, and PES-MW6D) exhibit the following characteristics:

- TOC equal to or greater than approximately 10 mg/L.
- Measurable quantities of VFAs equal to or greater than 20 mg/L (VFAs were not analyzed for PES-MW6D).
- ORP less than –60 mV.
- Ferrous iron concentration greater than 4 mg/L, sulfate concentration less than 1 mg/L, and methane concentration greater than 0.5 mg/L.
- Total biomass greater than approximately 50 pmoles PLFA/mL.

TABLE 4.9
SUMMARY OF ENHANCED BIOREMEDIATION POTENTIAL
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

Sample Location	Sample Date	Organic Carbon		Metabolic Fatty Acids			Geochemical Parameters			Dissolved Gases			Microbial Characterization			Evidence of Dechlorination
		TOC (mg/L)[a]	Total VFAs (mg/L)	Acetic (mg/L)	Proprionic (mg/L)	Butyric (mg/L)	ORP (mV)	Ferrous Iron (mg/L)	Sulfate (mg/L)	Methane (mg/L)	Ethane (µg/L)[b]	Ethene (µg/L)	Total Biomass (pmoles PLFA/ml)[c]	Indication of Dehalocoides Ethenogenes	Presence of Clostrium	
MONITORING WELLS																
PES-MW1S	29-Jan-02	2.7J[d]	ND[e]	< 1[f]	< 1	< 1	-47	12	27	0.46	1.9	1.2	9	NA	NA	inconsistent
PES-MW2S	30-Jan-02	13	27	10	17	< 1	-67	4.5	<1	0.57	0.16	0.36	161	NA	NA	TCE to DCE
PES-MW2D	30-Jan-02	600	20	10	10	< 1	-91	6.9	<1	2.5	0.046	0.15	51	negative (-)	no	TCE to DCE
PES-MW3S	30-Jan-02	2.8J	ND	< 1	< 1	< 1	-59	9.2	<1	1.9	0.14	0.77	2	positive (++)	yes	yes, than no
PES-MW3D	30-Jan-02	260	450	140	290	20	-110	17	<1	13	0.12	0.86	65	NA	NA	TCE to DCE
PES-MW4S	30-Jan-02	2.6J	ND	< 1	< 1	< 1	4	0.15	<1	0.07	0.17	0.22	7	NA	NA	none
PES-MW6D	29-Jan-02	9.9	NA	NA	NA	NA	-130	7.6	<1	0.73	0.18	0.32	NA	NA	NA	TCE to DCE
PES-MW7S	29-Jan-02	3.1J	ND	< 1	< 1	< 1	-91	3.5	<1	0.07	0.12	0.7	2	NA	NA	inconsistent
007G15UF	29-Jan-02	NA	ND	< 1	< 1	< 1	122	<0.01	<1	0.01	0.042	0.039	2	NA	NA	none
007G15LF	29-Jan-02	NA	ND	< 1	< 1	< 1	102	0.75	6.0	0.01	0.043	0.029	3	NA	NA	none
INJECTION WELLS																
PES-INJ2S	31-Jan-02	1,600	1,054	163	586	305	-	> 99	<1	2.8	0.32	1.1	199	NA	NA	unknown
PES-INJ2D	31-Jan-02	1,200	880	157	523	200	-	61	<1	4.0	0.54	1.9	101	negative (-)	yes	unknown
PES-INJ4S	31-Jan-02	2,400	1,797	239	845	713	-	> 99	<1	2.5	0.47	2.8	163	NA	NA	unknown

[a] mg/L = milligrams per liter.

[b] µg/L = micrograms per liter.

[c] pmoles PLFA/ml = picomoles of phospholopid fatty acid per milliliter of sample.

[d] J flag indicates that the concentration is estimated.

[e] ND indicates the analyte was not detected.

[f] "<" indicates that anayte was below the limit of quantitation.

In order for reductive dechlorination to be stimulated at the site it is apparent that sufficient organic substrate is required to create environmental conditions sufficiently reducing for methanogenesis to occur, while stimulating microbial growth and creating elevated levels of biomass. Injection wells PES-INJ2S, PES-INJ2D, and PES-INJ4S also exhibit these characteristics, but because contaminant concentrations have been reduced to below detection it cannot be determined whether reductive dechlorination has occurred, or whether the contaminant reduction is due solely to partitioning. Because all the wells with TOC greater than 10 mg/L demonstrated some evidence of reductive dechlorination (while those with lesser concentrations of TOC did not), it could be inferred that the contaminant reduction in the injection wells is likely a result of both reductive dechlorination and partitioning.

These data suggest that the lack of reductive dechlorination at Site N-6 is primarily a function of substrate distribution. Some changes in contaminant and geochemical concentrations suggest that reductive dechlorination was initially stimulated at locations PES-MW1S, PES-MW7S, and PES-MW3S. Locations PES-MW1S and PES-MW7S are relatively distant from the injection area relative to the other monitoring locations. Therefore, the lack of consistent evidence of reductive dechlorination at these locations suggests that those changes may have been a result of groundwater displacement immediately following injection.

It should be noted that prior to injection, ORP values indicated a very high level of aquifer environmental heterogeneity, with many localized pockets of highly reducing conditions. The historical presence of fuel hydrocarbons and *cis*-1,2-DCE suggests that some reductive dechlorination has occurred previously, likely within very localized zones. Disruption and displacement of these local groundwater zones due to injection may be the cause of some of the initial changes in contaminant and geochemical concentrations that were observed. However, this cannot be determined with confidence and therefore it may be more appropriate to look at more recent changes in contaminant and geochemical profiles (i.e., PES-MW2S, PES-MW2D, PES-MW3D, and PES-

MW6D) to determine the future potential for enhanced bioremediation by reductive dechlorination.

SECTION 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

This section presents conclusions and recommendations for the field feasibility test for enhanced *in-situ* bioremediation of chlorinated solvents via vegetable oil injection at Site N-6, Former NSA Mid-South, Tennessee.

5.1.1 Observed Changes in Site Geochemistry

Changes in geochemical conditions during process monitoring indicates that the addition of vegetable oil at Site N-6 has induced environmental conditions conducive to reductive dechlorination in the upper and lower fluvial deposits, but that these changes are not uniform nor widespread across the study area. DO concentrations decreased at many locations after injection, indicating that DO was being consumed by increased microbial activity due to substrate addition. However, concentrations of DO have generally remained above 0.4 mg/L to 0.5 mg/L throughout the test area. While these conditions may be sufficient to support reductive dechlorination, it was anticipated that the substrate addition would exert an electron acceptor demand sufficient to lower concentrations of DO in the treatment zone to less than 0.5 mg/L. The DO data suggest that an influx of relatively oxygenated groundwater may be occurring in the treatment zone.

Baseline ORP values exhibited a wide range of reducing conditions with values ranging from a high of +253 mV to a low of -359 mV. ORP values varied substantially even within the treatment zone, which is suggestive of a high degree of heterogeneity in the natural reducing conditions at the site prior to injection. Both aerobic and anaerobic conditions are locally present. After injection, ORP values tended to stabilize within a

range from +150 mV to –150 mV, indicating reducing conditions typically are within the nitrate-reduction to sulfate-reduction range. Although ORP values are not within the typical range for methanogenesis, increases in methane concentration at several locations indicate this oxidation-reduction process has been stimulated by substrate addition.

Iron and methane concentration data suggest that iron-reduction and methanogenesis are the dominant terminal electron accepting processes (TEAP) that have been stimulated at the site, and that bioavailable ferric iron and carbon dioxide are competing with CAHs as electron acceptors in site groundwater. Low initial concentrations of nitrate and sulfate along with concentration data collected during process monitoring indicate that nitrate-reduction and sulfate-reduction are not occurring at competitive levels.

5.1.2 Actual/Significant Changes in Contaminant Concentrations

After vegetable oil injection there was an overall decrease in TCE concentrations detected in groundwater. However, this decreasing trend is not uniform for all of the wells at Site N-6. Increasing TCE concentration trends have been observed for a few monitoring locations between baseline sampling and the latest process monitoring event. The greatest decrease in contaminant concentrations occurred at the injection locations, where contaminant concentrations have attenuated to less than method detection limits. It is not readily apparent whether observed decreases in TCE concentrations are a result of biodegradation, natural variations in contaminant concentrations, or partitioning of contaminant mass into the vegetable oil NAPL. However, an increase in *cis*-1,2-DCE concentrations detected in several monitoring locations (PES-MW2S, PES-MW2D, PES-MW3D, and PES-MW6D) indicates that the reduction of TCE to *cis*-1,2-DCE has occurred due to substrate addition.

5.1.3 Daughter Product Formation and Persistence

The presence of the daughter product *cis*-1,2-DCE that was not used in Base operations provides evidence that TCE is being reductively dechlorinated by halorespiration. However, consistent or long-term reductive dechlorination of chlorinated

ethenes has not been demonstrated by monitoring complete through January 2002. Only within the past two process monitoring events has reductive dechlorination of TCE to *cis*-1,2-DCE been observed at well locations PES-MW2S, PES-MW2D, PES-MW3D, and PES-MW6D. There is currently no evidence of further reductive dechlorination to VC and ethene.

Initial changes in contaminant profiles at locations PES-MW1S and PES-MW7S suggest that reductive dechlorination was initially stimulated at these locations. However, locations PES-MW1S and PES-MW7S are distant from the injection area relative to the other monitoring locations. A lack of consistent evidence of reductive dechlorination at these locations suggests that the initial changes in contaminant profiles may have been a result of groundwater displacement immediately following injection.

5.1.4 Degree of Electron Donor Utilization for Reductive Dechlorination

It appears that a significant percentage of the substrate mass may be utilized for microbially mediated oxidation-reduction processes other than reductive dechlorination of chlorinated compounds. In particular, geochemical data indicate that iron-reduction and methanogenesis may utilize a significant percentage of substrate (i.e., this mass is not being used to enhance reductive dechlorination of CAHs). However, reduction of TCE to *cis*-1,2-DCE observed at monitoring locations PES-MW2S, PES-MW2D, PES-MW3D, and PES-MW6D suggest that some reductive dechlorination is occurring in groundwater at the site.

5.1.5 Substrate Distribution and Potential for Future Reductive Dechlorination

Well locations where evidence of reductive dechlorination of TCE to *cis*-1,2-DCE has occurred exhibit the following characteristics:

- TOC equal to or greater than approximately 10 mg/L.
- Measurable quantities of VFAs equal to or greater than 20 mg/L (VFAs were not analyzed for PES-MW6D).

- ORP less than –60 mV.
- Ferrous iron concentration greater than 4 mg/L, sulfate concentration less than 1 mg/L, and methane concentration greater than 0.5 mg/L.
- Total biomass greater than approximately 50 pmoles PLFA/mL.

These conditions have not been induced across the treatment area, but have been limited mostly to the immediate injection area. In order to stimulate reductive dechlorination, sufficient organic substrate is required to create environmental conditions sufficiently reducing for methanogenesis to occur while stimulating microbial growth of dechlorinating microorganisms. Therefore, the lack of reductive dechlorination at Site N-6 is primarily a function of substrate distribution.

The potential for future reductive dechlorination and mass reduction will be a function of substrate distribution. It was assumed that dissolution of the vegetable oil would create a reaction zone extending tens of feet downgradient from the treatment zone. The reasons this has not occurred may be the result of a lack of groundwater flow due to the very low hydraulic gradient or a reduction in hydraulic conductivity caused by the saturation of the vegetable oil; and/or that the dissolved vegetable oil is rapidly degraded before migrating any substantial distance.

Finally, complete dechlorination to ethene has not been demonstrated. However, the presence of *Dehalococcoides Ethenogenes*, a bacteria which is known to degrade chlorinated ethenes to completion, has been established at the site. The potential for complete dechlorination to occur will likely depend on the growth and development of substantial populations of appropriate dechlorinating microorganisms in the presence of competing microbial processes.

5.2 RECOMMENDATIONS

Contaminant, daughter product, geochemical, and microbial data strongly suggest that the lack of reductive dechlorination at Site N-6 is primarily a function of substrate

distribution. Complete dechlorination of PCE and TCE to ethene also has not been documented, although the presence of *Dehalococcoides Ethenogenes*, a bacteria known to completely dechlorinate PCE to ethene, has been detected at the site. Until it can be demonstrated that adequate distribution of vegetable oil substrate will enhance complete biodegradation of CAHs to innocuous byproducts, further substrate addition or system expansion is not warranted. Rather, Parsons recommends redistribution of the vegetable oil substrate, additional monitoring well installation, further process monitoring, and modifications to the analytical protocol.

The continued presence of vegetable oil in the injection wells indicates that the oil is present as a free phase within the aquifer. It is possible that this oil will migrate naturally over time and/or has reduced the relative permeability of the aquifer to the degree that there is effectively little flow through the treatment zone. Therefore, Parsons recommends that a second injection event be conducted to redistribute the oil more uniformly and to re-mobilize any residual phase vegetable oil. To accomplish this, Parsons recommends a "pull-push" combination of 1) extracting free phase oil from the injection wells, 2) re-injecting the extracted oil as a dilute oil-in-water emulsion, and 3) a final water push of sufficient volume to distribute the total volume of oil at a residual saturation of less than 25 percent. This effort would be most effective using site groundwater extracted from the injection wells along with the free phase oil, or from a downgradient well (e.g., well PES-MW7S/D), in order to maintain native geochemical conditions within the treatment zone.

Alternatively, a pair of downgradient wells such as PES-MW2S/D and PES-MW3S/D, or PES-MW5S/D and PES-MW6S/D, could be used as extraction wells to create a hydraulic gradient and induce flow between the injection wells and downgradient monitoring wells. Groundwater would be extracted and then re-injected into the injection wells to create a recirculation cell between the injection and extraction locations. This scenario would attempt to pull the oil and emulsion through the treatment area. Circulation of at least two pore volumes is recommended to redistribute the vegetable oil

within the recirculation zone of influence. It is still recommended to first extract as much free oil from the injection wells as possible to mix an initial slug of dilute oil-in-water emulsion.

Although no additional fluids (other than those already in the treatment zone) would be used under this scenario, amendment of the State of Tennessee and the Shelby and Memphis County Water Quality Control Board injection permits may be necessary. Based on microbial characterization, bioaugmentation using an established microbial population from a site known to dechlorinate TCE to completion also should be considered.

Because of the degree of aquifer heterogeneity, low hydraulic gradient at the site, and elevated contaminant concentrations observed at upgradient well pair PES-MW1S/D, additional monitoring wells should be considered for the site. Parsons recommends two additional well pairs between the injection wells and upgradient well pair PES-MW1S/D. These well pairs may be distributed at approximately one-third distances between the injection wells and PES-MW1S/,D, but it also is advisable to place them proximate to the storm water drain that runs through the injection area towards PES-MW1S/D. This storm water drain is a potential source of leakage and recharge. Depending on selection of a substrate re-distribution design, additional well pairs located within the treatment zone may be warranted to evaluate reductive dechlorination within the redistribution zone. Due to the potential for preferential flow paths and because the impact of the initial injection is being observed as far downgradient as PES-MW6D, two additional well pairs are recommended at approximately 50 feet downgradient from well pair PES-MW8S/D, but placed at a sufficient distance apart (cross-gradient) to account for variations in groundwater flow direction.

Further process monitoring is necessary to determine the long-term potential for enhanced bioremediation to accelerate attenuation of the contaminant plume at Site N-6. Process monitoring is recommended prior to substrate redistribution to extend the monitoring period and provide additional evaluation of the initial test. Because

redistribution would cause changes in geochemical and contaminant concentrations simply by displacement, monitoring to establish a new baseline is recommended within 30 days of substrate redistribution. Semi-annual process monitoring is then recommended for at least 12 to 18 months to determine whether substrate redistribution was effective.

Additions to the sampling protocol also are recommended. The addition of dissolved hydrogen is recommended to further evaluate the TEAPs that are occurring across the site. Select samples for VFA and PLFA analysis are recommended to determine the change and development of microbial communities and degradation processes that contribute to reductive dechlorination. Analyses of additional nutrient parameters (total nitrogen and phosphorous) also may be warranted. Finally, aquifer testing may be beneficial to establish preferential flow paths within the treatment zone. The use of *in situ* flow meters is likely to provide more definitive data over the entire screened interval of the fluvial deposits than slug tests, which measure average hydraulic conductivities.

SECTION 6

REFERENCES

Bouwer, E.J., 1994, Bioremediation of chlorinated solvents using alternate electron acceptors. In: Handbook of Bioremediation. CRC Press, Boca Raton, FL.

Bouwer, E.J., 1992, Bioremediation of Subsurface Contaminants. In: Mitchell, R., ed.: Environmental Microbiology. Wiley-Liss, New York, New York.

Carmichael, J.K., Parks, W.S., Kingsbury, J.A., and D.E. Ladd, 1997, Hydrogeology and Groundwater Quality of Naval Support Activity Memphis, Millington, Tennessee. Water Resources Investigations Report 97-4158. U.S. Geological Survey: Nashville, Tennessee.

Chapelle, F.H., 1993. Ground-Water Microbiology and Geochemistry: John Wiley & Sons, Inc., New York, 424 p.

EnSafe, Inc. (EnSafe), 2000a, RCRA Facility Investigation Report, Naval Support Activity Memphis, AOC A, Northside Fluvial Groundwater. Revision 02. Prepared for Department of the Navy, Southern Division Naval Facilities Engineering Command, North Charleston, South Carolina. February 17.

EnSafe, 2000b, Aquifer Characterization Test Report, Area of Concern A, Naval Support Activity Mid-South, Millington, Tennessee. Revision 01. Prepared for Department of the Navy, Southern Division Naval Facilities Engineering Command, North Charleston, South Carolina. February 25.

EnSafe, 2000c, RCRA Facility Investigation Report Addendum, Naval Support Activity Memphis, AOC A, Northside Fluvial Groundwater. Revision 0. Prepared for

Department of the Navy, Southern Division Naval Facilities Engineering Command, North Charleston, South Carolina. February 17.

EnSafe, 1998, RCRA Facility Investigation Report, Naval Support Activity Memphis, AOC A, Northside Fluvial Groundwater. Revision 01. Prepared for Department of the Navy, Southern Division Naval Facilities Engineering Command, North Charleston, South Carolina. June 10.

Godsey, E.M., 1994, Microbiological and Geochemical Degradation Processes. In: Symposium on Intrinsic Bioremediation in Ground Water. Denver, Colorado. August 30 - September 1. p.35-40.

Grbic′-Galic′, D., 1990, Anaerobic microbial transformation of nonoxygenated aromatic and alicyclic compounds in soil, subsurface, and freshwater sediments. In: Bollag, J.M., and Stotzky, G., eds.: *Soil Biochemistry*: Marcel Dekker, Inc., New York, NY. p. 117-189.

Lovely, D.R., and Phillips, E.J.P., 1988, Novel Mode of Microbial Energy Metabolism: Organic Carbon Oxidation Coupled to Dissimilatory Reduction of Iron or Maganese: *Applied and Environmental Microbiology*, v. 54, no. 6, p. 1472-1480.

Parsons. 2000. Final Work Plan for Field Application to Enhance In-Situ Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Site N-6, Former Naval Support Activity mid-South, Millington, Tennessee. June.

Reinhard, M., Goodman, N.L., and Barker, J.F., 1984, Occurrence and distribution of organic chemicals in two landfill leachate plumes: *Environmental Science and Technology,* vol. 18, no. 12, p. 953-961.

Stumm, W. and Morgan, J.J., 1981, Aquatic Chemistry. John Wiley & Sons, New York, NY.

US Environmental Protection Agency (USEPA), 1998, Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater: EPA/600/R-98/128, September 1998; http://www.epa.gov/ada/reports.html.

Vogel, T.M., Criddle, C.S., and McCarty, P. L., 1987, Transformations of halogenated aliphatic compounds: *Environmental Science and Technology*, vol. 21, no. 8, p. 722-736.

APPENDIX A

ANALYTICAL DATA

APPENDIX A.1

ANALYTICAL DATA – JULY/AUGUST 2000

MICROSEEPS

Parson's Engineering Science

Project Number: 737490.03000

NSA Midsouth Site N6

Parson's Contact: Mr. Bruce Henry

Becky Hans

Microseeps Contact: Becky Hans
September 18, 2000

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

MICROSEEPS

CASE NARRATIVE

Parson's Engineering Science
NSA Midsouth Site N6
Project #: 737490.03000

The following were samples analyzed by Microseeps, Inc.

Parson's Identification Number	Lab ID number
PESINJ35	823A-043
PES-SoilComp-1	823A-044
PES-SoilComp-2	823A-045

All samples were found to be intact.

Compliance Data:

No anomalies were found during the following analyses: Bromide, Moisture Content, Ignitability, Reactivity, Corrosivity, Paint Filter Test.

Metals Data:

No anomalies were found during the following analyses: RCRA eight metals.

Organic Data:

No anomalies were found during the Volatile 8260B analyses.

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

MICROSEEPS

Client: Parsons Engineering Science Inc.
Report No: 823A/043-045
Project: 737490.03000

Report Date 09/13/00
Date Received 08/23/00

Sample ID	Date Sampled	Time Sampled	Lab ID	Parameter	Result	Units	Method Reference
PESINJ35	08/19/00	13:45	823A-043	Bromide	900	mg/L	EPA 320.1

Sample ID	Date Sampled	Time Sampled	Lab ID	Parameter	Result	Units	Method Reference
PES-SoilComp-1	8/22/00	11:00	823A-044	In-House % Solids	84	%	EPA 160.3
PES-SoilComp-1	8/22/00	11:00	823A-044	pH	6.6	S.U.	SW846 9045
PES-SoilComp-1	8/22/00	11:00	823A-044	Ignitablity	>200	degrees F	SW846 1010
PES-SoilComp-1	8/22/00	11:00	823A-044	Reactive Cyanide	<1.0	mg/kg	SW846 7.3.3.2
PES-SoilComp-1	8/22/00	11:00	823A-044	Reactive Sulfide	<100	mg/kg	SW846 73.4.1
PES-SoilComp-1	8/22/00	11:00	823A-044	Paint Filter Test	PASS	-	SW846 9095
PES-SoilComp-1	8/22/00	11:00	823A-044	Arsenic	<1.0	mg/kg	SW846 6010B
PES-SoilComp-1	8/22/00	11:00	823A-044	Barium	6.0	mg/kg	SW846 6010B
PES-SoilComp-1	8/22/00	11:00	823A-044	Cadmium	<0.50	mg/kg	SW846 6010B
PES-SoilComp-1	8/22/00	11:00	823A-044	Chromium	6.3	mg/kg	SW846 6010B
PES-SoilComp-1	8/22/00	11:00	823A-044	Lead	2.0	mg/kg	SW846 6010B
PES-SoilComp-1	8/22/00	11:00	823A-044	Mercury	<0.02	mg/kg	SW846 7471
PES-SoilComp-1	8/22/00	11:00	823A-044	Selenium	<2.0	mg/kg	SW846 6010B
PES-SoilComp-1	8/22/00	11:00	823A-044	Silver	<1.0	mg/kg	SW846 6010B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,1,1,2-Tetrachloroethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,1,1-Trichloroethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,1,2,2-Tetrachloroethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,1,2-Trichloroethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,1-Dichloroethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,1-Dichloroethene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,1-Dichloropropene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,2,3-Trichlorobenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,2,3-Trichloropropane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,2,4-Trichlorobenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,2,4-Trimethylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,2-Dibromo-3-chloropropane	<25	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,2-Dibromoethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,2-Dichlorobenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,2-Dichloroethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,2-Dichloropropane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,3,5-Trimethylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,3-Dichlorobenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,3-Dichloropropane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	1,4-Dichlorobenzene	<6.0	ug/kg	SW846 8260B

PES-SoilComp-1	8/22/00	11:00	823A-044	2,2-Dichloropropane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	2-Chlorotoluene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	4-Chlorotoluene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Benzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Bromobenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Bromochloromethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Bromodichloromethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Bromoform	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Bromomethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Carbon Tetrachloride	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Chlorobenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Chlorodibromomethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Chloroethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Chloroform	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Chloromethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	cis-1,2-Dichloroethene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	cis-1,3-Dichloropropene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Dibromomethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Dichlorodifluormethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Ethylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Isopropylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	m&p-Xylene	<12	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Methylene Chloride	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Naphthalene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	n-Butylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	n-Propylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	o-Xylene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	p-Isopropyltoluene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	sec-Butylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Styrene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	tert-Butylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Tetrachloroethene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Toluene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	trans-1,2-Dichloroethene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	trans-1,3-Dichloropropene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Trichloroethene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Trichlorofluoromethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-1	8/22/00	11:00	823A-044	Vinyl Chloride	<6.0	ug/kg	SW846 8260B

Sample ID	Date Sampled	Time Sampled	Lab ID	Parameter	Result	Units	Method Reference
PES-SoilComp-2	8/22/00	11:30	823A-045	In-House % Solids	84	%	EPA 160.3
PES-SoilComp-2	8/22/00	11:30	823A-045	pH	6.6	S.U.	SW846846 9045
PES-SoilComp-2	8/22/00	11:30	823A-045	Ignitablity	>200	degrees F	SW846 1010
PES-SoilComp-2	8/22/00	11:30	823A-045	Reactive Cyanide	<1.0	mg/kg	SW846 7.3.3.2
PES-SoilComp-2	8/22/00	11:30	823A-045	Reactive Sulfide	<100	mg/kg	SW846 73.4.1
PES-SoilComp-2	8/22/00	11:30	823A-045	Paint Filter Test	PASS	-	SW846 9095

MICROSEEPS

PES-SoilComp-2	8/22/00	11:30	823A-045	Arsenic	2.1	mg/kg	SW846 6010B
PES-SoilComp-2	8/22/00	11:30	823A-045	Barium	4.4	mg/kg	SW846 6010B
PES-SoilComp-2	8/22/00	11:30	823A-045	Cadmium	<0.50	mg/kg	SW846 6010B
PES-SoilComp-2	8/22/00	11:30	823A-045	Chromium	6.5	mg/kg	SW846 6010B
PES-SoilComp-2	8/22/00	11:30	823A-045	Lead	2.2	mg/kg	SW846 6010B
PES-SoilComp-2	8/22/00	11:30	823A-045	Mercury	<0.02	mg/kg	SW846 7471
PES-SoilComp-2	8/22/00	11:30	823A-045	Selenium	<2.0	mg/kg	SW846 6010B
PES-SoilComp-2	8/22/00	11:30	823A-045	Silver	<1.0	mg/kg	SW846 6010B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,1,1,2-Tetrachloroethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,1,1-Trichloroethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,1,2,2-Tetrachloroethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,1,2-Trichloroethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,1-Dichloroethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,1-Dichloroethene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,1-Dichloropropene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,2,3-Trichlorobenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,2,3-Trichloropropane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,2,4-Trichlorobenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,2,4-Trimethylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,2-Dibromo-3-chloropropane	<25	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,2-Dibromoethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,2-Dichlorobenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,2-Dichloroethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,2-Dichloropropane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,3,5-Trimethylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,3-Dichlorobenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,3-Dichloropropane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	1,4-Dichlorobenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	2,2-Dichloropropane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	2-Chlorotoluene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	4-Chlorotoluene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Benzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Bromobenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Bromochloromethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Bromodichloromethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Bromoform	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Bromomethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Butylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Carbon Tetrachloride	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Chlorobenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Chlorodibromomethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Chloroethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Chloroform	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Chloromethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	cis-1,2-Dichloroethene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	cis-1,3-Dichloropropene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Dibromomethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Dichlorodifluormethane	<6.0	ug/kg	SW846 8260B

MICROSEEPS

PES-SoilComp-2	8/22/00	11:30	823A-045	Ethylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Isopropylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	m&p-Xylene	<12	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Methylene Chloride	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Naphthalene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	n-Propylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	o-Xylene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	p-Isopropyltoluene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	sec-Butylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Styrene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	tert-Butylbenzene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Tetrachloroethene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Toluene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	trans-1,2-Dichloroethene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	trans-1,3-Dichloropropene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Trichloroethene	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Trichlorofluoromethane	<6.0	ug/kg	SW846 8260B
PES-SoilComp-2	8/22/00	11:30	823A-045	Vinyl Chloride	<6.0	ug/kg	SW846 8260B

NOTE: Results are reported on a dry weight basis.

Approved: Rebecca J. Hans

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

823A

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 | **Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238** | Fax No. : (412) 826-3433

Company : Parsons Engineering Science
Co. Address : 1700 Broadway, Suite 900
Proj. Manager: Bruce Henry
Proj. Location: NSA Mid-South
Proj. Number: 737490.03000
Phone # : 303-831-8100 **Fax # :** 303-831-8208

Sampler's signature : Bruce Henry

Results to : Bruce Henry, Denver CO

Invoice to :

Cooler ID	Cooler Temp.

Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	Bromide E320	VOCs 8260B	MOISTURE	8 RCRA metals	Ignitability	Reactivity	Corrosivity	Paint Filter Test	Remarks
043	PESINJ35/081900	8/19/00	1345	WTR		1	X								
044	PES-SOILCOMP-1	8/22/00	1100	Soil		5		X	X	X	X	X	X	X	
045	PES-SOILCOMP-2	8/22/00	1130	Soil		5		X	X	X	X	X	X	X	

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Bruce Henry	Parsons ES	8/22/00	1800	C Washlashi	Microseeps	8/23/00	10:20AM
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Denver, CO 80290

Order #: P0007076
Report Date: 08/08/00

Sample Identification

Lab Sample #	Client Sample ID
P0007076-01	MW1 45-46
P0007076-02	MW1 55-56
P0007076-03	MW1 65-66
P0007076-04	MW1 75-76

Approved By: Rebecca J. Hans

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Order #: P0007076
Report Date: 08/08/00

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007076-01

Sample Description	Matrix	Sampled Date/Time	Received
MW1 45-46	Solid	18 Jul. 00 13:50	20 Jul. 00

Analyte(s)	Result	PQL	Units	Method #
WetChem				
Organic Carbon	< 25	25	mg/Kg	3.2.13
OrganicsPrep				
Percent Solids	79	1.0	%	160.3

MICROSEEPS

Order #: P0007076
Report Date: 08/08/00

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007076-02

Sample Description	Matrix	Sampled Date/Time	Received
MW1 55-56	Solid	18 Jul. 00 14:00	20 Jul. 00

Analyte(s)	Result	PQL	Units	Method #
WetChem				
Organic Carbon	< 25	25	mg/Kg	3.2.13
OrganicsPrep				
Percent Solids	82	1.0	%	160.3

MICROSEEPS

Order #: P0007076
Report Date: 08/08/00

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007076-03

Sample Description	Matrix	Sampled Date/Time	Received
MW1 65-66	Solid	18 Jul. 00 14:20	20 Jul. 00

Analyte(s)	Result	PQL	Units	Method #
WetChem				
Organic Carbon	< 25	25	mg/Kg	3.2.13
OrganicsPrep				
Percent Solids	84	1.0	%	160.3

MICROSEEPS

Order #: P0007076
Report Date: 08/08/00

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007076-04

Sample Description	Matrix	Sampled Date/Time	Received
MW1 75-76	Solid	18 Jul. 00 14:50	20 Jul. 00

Analyte(s)	Result	PQL	Units	Method #
WetChem				
Organic Carbon	< 25	25	mg/Kg	3.2.13
OrganicsPrep				
Percent Solids	83	1.0	%	160.3

MICROSEEPS

P 7076

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 | **Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238** | Fax No. : (412) 826-3433

Company : Parsons Engineering Science
Co. Address : 1700 Broadway, Suite 900, Denver, CO 80290
Proj. Manager: Bruce Henry
Proj. Location: NSA Mid-South
Proj. Number: 737490.03000
Phone # : 303-831-8100 **Fax # :** 303-831-8208

Sampler's signature : Bruce M Henry

Results to : B. Henry, Denver, CO

Invoice to : B. Henry, Denver, CO

Cooler ID	Cooler Temp.

	Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	Total Organic Carbon	VOCs - 8260B							Remarks
01	MW1/45-46'	SAND	7/18/00	1350	Soil			X								
02	MW1/55-56'	SAND	7/18/00	1400	"			X								
03	MW1/65-66'	SAND	7/18/00	1420	"			X								
04	MW1/75-76'	SAND	7/18/00	1450	"			X								
	PESINJ1/35-37'	SILT	7/19/00	1030	"				X							
	PESINJ1/60-62'	SAND	7/19/00	1114	"				X							

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Bruce Henry	Parsons ES	7/19/00	5:00	C Washlashin	Microseeps	7/20/00	10:15am
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Denver, CO 80290

Order #: P0007087
Report Date: 08/03/00

Sample Identification

Lab Sample #	Client Sample ID
P0007087-01	tankwater 200700

Approved By:

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Order #: P0007087
Report Date: 08/03/00

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007087-01

Sample Description	Matrix	Sampled Date/Time	Received
tankwater 200700	Water	20 Jul. 00 15:10	21 Jul. 00

Analyte(s)	Result	PQL	Units	Method #
Volatiles				
1,1,1,2-Tetrachloroethane	<5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	<5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	<5.0	5.0	ug/L	
1,1,2-Trichloroethane	<5.0	5.0	ug/L	
1,1-Dichloroethane	<5.0	5.0	ug/L	
1,1-Dichloroethene	<5.0	5.0	ug/L	
1,1-Dichloropropene	<5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	<5.0	5.0	ug/L	
1,2,3-Trichloropropane	<5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	<5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	<5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	<20	20	ug/L	
1,2-Dibromoethane	<5.0	5.0	ug/L	
1,2-Dichlorobenzene	<5.0	5.0	ug/L	
1,2-Dichloroethane	<5.0	5.0	ug/L	
1,2-Dichloropropane	<5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	<5.0	5.0	ug/L	
1,3-Dichlorobenzene	<5.0	5.0	ug/L	
1,3-Dichloropropane	<5.0	5.0	ug/L	
1,4-Dichlorobenzene	<5.0	5.0	ug/L	
2,2-Dichloropropane	<5.0	5.0	ug/L	
2-Chlorotoluene	<5.0	5.0	ug/L	
4-Chlorotoluene	<5.0	5.0	ug/L	
Benzene	<5.0	5.0	ug/L	
Bromobenzene	<5.0	5.0	ug/L	
Bromochloromethane	<5.0	5.0	ug/L	
Bromodichloromethane	<5.0	5.0	ug/L	
Bromoform	<5.0	5.0	ug/L	
Bromomethane	<5.0	5.0	ug/L	
Carbon tetrachloride	<5.0	5.0	ug/L	

MICROSEEPS

Order #: P0007087
Report Date: 08/03/00

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007087-01

Sample Description	Matrix	Sampled Date/Time	Received
tankwater 200700	Water	20 Jul. 00 15:10	21 Jul. 00

Analyte(s)	Result	PQL	Units	Method #
Volatiles				
Chlorobenzene	<5.0	5.0	ug/L	8260B
Chlorodibromomethane	<5.0	5.0	ug/L	
Chloroethane	<5.0	5.0	ug/L	
Chloroform	<5.0	5.0	ug/L	
Chloromethane	<5.0	5.0	ug/L	
cis-1,2-Dichloroethene	<5.0	5.0	ug/L	
cis-1,3-Dichlororopene	<5.0	5.0	ug/L	
Dibromomethane	<5.0	5.0	ug/L	
Dichlorodifluoromethane	<5.0	5.0	ug/L	
Ethylbenzene	<5.0	5.0	ug/L	
Isopropylbenzene	<5.0	5.0	ug/L	
m & p-Xylene	<10	10	ug/L	
Methylene Chloride	<5.0	5.0	ug/L	
Naphthalene	<5.0	5.0	ug/L	
n-Butylbenzene	<5.0	5.0	ug/L	
n-Propylbenzene	<5.0	5.0	ug/L	
o-Xylene	<5.0	5.0	ug/L	
p-Isopropyltoluene	<5.0	5.0	ug/L	
sec-Butylbenzene	<5.0	5.0	ug/L	
Styrene	<5.0	5.0	ug/L	
tert-Butylbenzene	<5.0	5.0	ug/L	
Tetrachloroethene	<5.0	5.0	ug/L	
Toluene	33	5.0	ug/L	
trans-1,2-Dichloroethene	<5.0	5.0	ug/L	
trans-1,3-Dichloropropene	<5.0	5.0	ug/L	
Trichloroethene	<5.0	5.0	ug/L	
Trichlorofluoromethane	<5.0	5.0	ug/L	
Vinyl Chloride	<5.0	5.0	ug/L	

MICROSEEPS

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Denver, CO 80290

Order #: P0007107
Report Date: 08/21/00

Sample Identification

Lab Sample #	Client Sample ID
P0007107-01	PESMW8 57-59
P0007107-02	PESMW8 75-77
P0007107-03	007G15UF
P0007107-04	PESMW3 55-57
P0007107-06	PESMW3 5-7
P0007107-07	PESMW3 30-32

Approved By: Rebecca J. Adams

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Order #: P0007107
Report Date: 08/21/00

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007107-01

Sample Description	Matrix	Sampled Date/Time	Received
PESMW8 57-59	Solid	22 Jul. 00 8:50	25 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Organic Carbon	ND	< 25	25	mg/Kg	3.2.13

MICROSEEPS

Order #: P0007107
Report Date: 08/21/00

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007107-02

Sample Description	Matrix	Sampled Date/Time	Received
PESMW8 75-77	Solid	22 Jul. 00 9:00	25 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Organic Carbon	ND	< 25	25	mg/Kg	3.2.13

MICROSEPS

Order #: P0007107
Report Date: 08/21/00

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007107-03

Sample Description	Matrix	Sampled Date/Time	Received
007G15UF	Water	24 Jul. 00 15:05	25 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Nitrate-nitrite as N	J	0.047	0.050	mg/L dry	353.3
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L dry	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L dry	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L dry	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L dry	
1,1-Dichloroethane		65	5.0	ug/L dry	
1,1-Dichloroethene		370	50	ug/L dry	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L dry	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L dry	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L dry	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L dry	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L dry	
1,2-Dichlorobenzene	ND	<	5.0	ug/L dry	
1,2-Dichloroethane	ND	<	5.0	ug/L dry	
1,2-Dichloropropane	ND	<	5.0	ug/L dry	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L dry	
1,3-Dichlorobenzene	ND	<	5.0	ug/L dry	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L dry	
1,4-Dichlorobenzene	ND	<	5.0	ug/L dry	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L dry	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L dry	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L dry	
Benzene	J	2.7	5.0	ug/L dry	
Bromobenzene	ND	< 5.0	5.0	ug/L dry	
Bromochloromethane	ND	< 5.0	5.0	ug/L dry	
Bromodichloromethane	ND	< 5.0	5.0	ug/L dry	
Bromoform	ND	< 5.0	5.0	ug/L dry	
Bromomethane	ND	< 5.0	5.0	ug/L dry	

MICROBEAS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007107-03
Report Date: 21 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
007G15UF	Water	24 Jul. 00 15:05	25 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Carbon tetrachloride	J	2.7	5.0	ug/L dry	8260B
Chlorobenzene	ND	< 5.0	5.0	ug/L dry	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L dry	
Chloroethane	ND	< 5.0	5.0	ug/L dry	
Chloroform		10	5.0	ug/L dry	
Chloromethane	ND	< 5.0	5.0	ug/L dry	
cis-1,2-Dichloroethene		14	5.0	ug/L dry	
cis-1,3-Dichlororopene	ND	<	5.0	ug/L dry	
Dibromomethane	ND	<	5.0	ug/L dry	
Dichlorodifluoromethane	ND	<	5.0	ug/L dry	
Ethylbenzene	ND	<	5.0	ug/L dry	
Isopropylbenzene	ND	< 5.0	5.0	ug/L dry	
m & p-Xylene	ND	< 10	10	ug/L dry	
Methylene Chloride	ND	< 5.0	5.0	ug/L dry	
Naphthalene	ND	< 5.0	5.0	ug/L dry	
n-Butylbenzene	ND	< 5.0	5.0	ug/L dry	
n-Propylbenzene	ND	< 5.0	5.0	ug/L dry	
o-Xylene	ND	< 5.0	5.0	ug/L dry	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L dry	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L dry	
Styrene	ND	< 5.0	5.0	ug/L dry	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L dry	
Tetrachloroethene	ND	< 5.0	5.0	ug/L dry	
Toluene	ND	< 5.0	5.0	ug/L dry	
trans-1,2-Dichloroethene	ND	<	5.0	ug/L dry	
trans-1,3-Dichloropropene	ND	<	5.0	ug/L dry	
Trichloroethene		290	50	ug/L dry	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L dry	
Vinyl Chloride	ND	< 5.0	5.0	ug/L dry	

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007107-04
Report Date: 21 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW3 55-57	Solid	24 Jul. 00 9:40	25 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 4.4	4.4	ug/Kg	8260B
1,1,1-Trichloroethane	ND	< 4.4	4.4	ug/Kg	
1,1,2,2-Tetrachloroethane	ND	< 4.4	4.4	ug/Kg	
1,1,2-Trichloroethane	ND	< 4.4	4.4	ug/Kg	
1,1-Dichloroethane	ND	< 4.4	4.4	ug/Kg	
1,1-Dichloroethene	J	1.9	4.4	ug/Kg	
1,1-Dichloropropene	ND	< 4.4	4.4	ug/Kg	
1,2,3-Trichlorobenzene	ND	< 4.4	4.4	ug/Kg	
1,2,3-Trichloropropane	ND	< 4.4	4.4	ug/Kg	
1,2,4-Trichlorobenzene	ND	< 4.4	4.4	ug/Kg	
1,2,4-Trimethylbenzene		8.2	4.4	ug/Kg	
1,2-Dibromo-3-chloropropane	ND	< 18	18	ug/Kg	
1,2-Dibromoethane	ND	< 4.4	4.4	ug/Kg	
1,2-Dichlorobenzene	ND	< 4.4	4.4	ug/Kg	
1,2-Dichloroethane	ND	< 4.4	4.4	ug/Kg	
1,2-Dichloropropane	ND	< 4.4	4.4	ug/Kg	
1,3,5-Trimethylbenzene	J	1.9	4.4	ug/Kg	
1,3-Dichlorobenzene	ND	< 4.4	4.4	ug/Kg	
1,3-Dichloropropane	ND	< 4.4	4.4	ug/Kg	
1,4-Dichlorobenzene	ND	< 4.4	4.4	ug/Kg	
2,2-Dichloropropane	ND	< 4.4	4.4	ug/Kg	
2-Chlorotoluene	ND	< 4.4	4.4	ug/Kg	
4-Chlorotoluene	ND	< 4.4	4.4	ug/Kg	
Benzene	ND	< 4.4	4.4	ug/Kg	
Bromobenzene	ND	< 4.4	4.4	ug/Kg	
Bromochloromethane	ND	< 4.4	4.4	ug/Kg	
Bromodichloromethane	ND	< 4.4	4.4	ug/Kg	
Bromoform	ND	< 4.4	4.4	ug/Kg	
Bromomethane	ND	< 4.4	4.4	ug/Kg	
Carbon tetrachloride	J	2.0	4.4	ug/Kg	
Chlorobenzene	ND	< 4.4	4.4	ug/Kg	

MICROBETS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007107-04
Report Date: 21 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW3 55-57	Solid	24 Jul. 00 9:40	25 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorodibromomethane	ND	< 4.4	4.4	ug/Kg	8260B
Chloroethane	ND	< 4.4	4.4	ug/Kg	
Chloroform		8.6	4.4	ug/Kg	
Chloromethane	ND	< 4.4	4.4	ug/Kg	
cis-1,2-Dichloroethene	ND	< 4.4	4.4	ug/Kg	
cis-1,3-Dichlororopene	ND	< 4.4	4.4	ug/Kg	
Dibromomethane	ND	< 4.4	4.4	ug/Kg	
Dichlorodifluoromethane	ND	< 4.4	4.4	ug/Kg	
Ethylbenzene	J	3.8	4.4	ug/Kg	
Isopropylbenzene	ND	< 4.4	4.4	ug/Kg	
m & p-Xylene		14	8.8	ug/Kg	
Methylene Chloride	J	3.6	4.4	ug/Kg	
Naphthalene	J	0.94	4.4	ug/Kg	
n-Butylbenzene	J	1.1	4.4	ug/Kg	
n-Propylbenzene	J	2.1	4.4	ug/Kg	
o-Xylene	J	4.4	4.4	ug/Kg	
p-Isopropyltoluene	ND	< 4.4	4.4	ug/Kg	
sec-Butylbenzene	ND	< 4.4	4.4	ug/Kg	
Styrene	ND	< 4.4	4.4	ug/Kg	
Tetrachloroethene	ND	< 4.4	4.4	ug/Kg	
Toluene	J	3.8	4.4	ug/Kg	
trans-1,2-Dichloroethene	ND	< 4.4	4.4	ug/Kg	
trans-1,3-Dichloropropene	ND	< 4.4	4.4	ug/Kg	
Trichloroethene		23	4.4	ug/Kg	
Trichlorofluoromethane	ND	< 4.4	4.4	ug/Kg	
Vinyl Chloride	ND	< 4.4	4.4	ug/Kg	
OrganicsPrep					
Percent Solids		88	1.0	%	160.3

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007107-06
Report Date: 21 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW3 5-7	Solid	24 Jul. 00 8:14	25 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 430	430	ug/Kg	8260B
1,1,1-Trichloroethane	ND	< 430	430	ug/Kg	
1,1,2,2-Tetrachloroethane	ND	< 430	430	ug/Kg	
1,1,2-Trichloroethane	ND	< 430	430	ug/Kg	
1,1-Dichloroethane	ND	< 430	430	ug/Kg	
1,1-Dichloroethene	ND	< 430	430	ug/Kg	
1,1-Dichloropropene	ND	< 430	430	ug/Kg	
1,2,3-Trichlorobenzene	ND	< 430	430	ug/Kg	
1,2,3-Trichloropropane	ND	< 430	430	ug/Kg	
1,2,4-Trichlorobenzene	ND	< 430	430	ug/Kg	
1,2,4-Trimethylbenzene	ND	< 430	430	ug/Kg	
1,2-Dibromo-3-chloropropane	ND	< 1700	1700	ug/Kg	
1,2-Dibromoethane	ND	< 430	430	ug/Kg	
1,2-Dichlorobenzene	ND	< 430	430	ug/Kg	
1,2-Dichloroethane	ND	< 430	430	ug/Kg	
1,2-Dichloropropane	ND	< 430	430	ug/Kg	
1,3,5-Trimethylbenzene	ND	< 430	430	ug/Kg	
1,3-Dichlorobenzene	ND	< 430	430	ug/Kg	
1,3-Dichloropropane	ND	< 430	430	ug/Kg	
1,4-Dichlorobenzene	ND	< 430	430	ug/Kg	
2,2-Dichloropropane	ND	< 430	430	ug/Kg	
2-Chlorotoluene	ND	< 430	430	ug/Kg	
4-Chlorotoluene	ND	< 430	430	ug/Kg	
Benzene	ND	< 430	430	ug/Kg	
Bromobenzene	ND	< 430	430	ug/Kg	
Bromochloromethane	ND	< 430	430	ug/Kg	
Bromodichloromethane	ND	< 430	430	ug/Kg	
Bromoform	ND	< 430	430	ug/Kg	
Bromomethane	ND	< 430	430	ug/Kg	
Carbon tetrachloride	ND	< 430	430	ug/Kg	
Chlorobenzene	ND	< 430	430	ug/Kg	

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007107-06
Report Date: 21 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW3 5-7	Solid	24 Jul. 00 8:14	25 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorodibromomethane	ND	< 430	430	ug/Kg	8260B
Chloroethane	ND	< 430	430	ug/Kg	
Chloroform	ND	< 430	430	ug/Kg	
Chloromethane	ND	< 430	430	ug/Kg	
cis-1,2-Dichloroethene	ND	< 430	430	ug/Kg	
cis-1,3-Dichlororopene	ND	< 430	430	ug/Kg	
Dibromomethane	ND	< 430	430	ug/Kg	
Dichlorodifluoromethane	ND	< 430	430	ug/Kg	
Ethylbenzene	ND	< 430	430	ug/Kg	
Isopropylbenzene	ND	< 430	430	ug/Kg	
m & p-Xylene	J	37	850	ug/Kg	
Methylene Chloride	J	59	430	ug/Kg	
Naphthalene	ND	< 430	430	ug/Kg	
n-Butylbenzene	J	45	430	ug/Kg	
n-Propylbenzene	ND	< 430	430	ug/Kg	
o-Xylene	ND	< 430	430	ug/Kg	
p-Isopropyltoluene	ND	< 430	430	ug/Kg	
sec-Butylbenzene	ND	< 430	430	ug/Kg	
Styrene	ND	< 430	430	ug/Kg	
Tetrachloroethene	ND	< 430	430	ug/Kg	
Toluene	J	38	430	ug/Kg	
trans-1,2-Dichloroethene	ND	< 430	430	ug/Kg	
trans-1,3-Dichloropropene	ND	< 430	430	ug/Kg	
Trichloroethene	J	46	430	ug/Kg	
Trichlorofluoromethane	ND	< 430	430	ug/Kg	
Vinyl Chloride	ND	< 430	430	ug/Kg	
OrganicsPrep					
Percent Solids		82	1.0	%	160.3

MICROBETS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007107-07
Report Date: 21 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW3 30-32	Solid	24 Jul. 00 8:26	25 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 470	470	ug/Kg	8260B
1,1,1-Trichloroethane	ND	< 470	470	ug/Kg	
1,1,2,2-Tetrachloroethane	ND	< 470	470	ug/Kg	
1,1,2-Trichloroethane	ND	< 470	470	ug/Kg	
1,1-Dichloroethane	ND	< 470	470	ug/Kg	
1,1-Dichloroethene	ND	< 470	470	ug/Kg	
1,1-Dichloropropene	ND	< 470	470	ug/Kg	
1,2,3-Trichlorobenzene	ND	< 470	470	ug/Kg	
1,2,3-Trichloropropane	ND	< 470	470	ug/Kg	
1,2,4-Trichlorobenzene	ND	< 470	470	ug/Kg	
1,2,4-Trimethylbenzene	ND	< 470	470	ug/Kg	
1,2-Dibromo-3-chloropropane	ND	< 1900	1900	ug/Kg	
1,2-Dibromoethane	ND	< 470	470	ug/Kg	
1,2-Dichlorobenzene	ND	< 470	470	ug/Kg	
1,2-Dichloroethane	ND	< 470	470	ug/Kg	
1,2-Dichloropropane	ND	< 470	470	ug/Kg	
1,3,5-Trimethylbenzene	ND	< 470	470	ug/Kg	
1,3-Dichlorobenzene	ND	< 470	470	ug/Kg	
1,3-Dichloropropane	ND	< 470	470	ug/Kg	
1,4-Dichlorobenzene	ND	< 470	470	ug/Kg	
2,2-Dichloropropane	ND	< 470	470	ug/Kg	
2-Chlorotoluene	ND	< 470	470	ug/Kg	
4-Chlorotoluene	ND	< 470	470	ug/Kg	
Benzene	ND	< 470	470	ug/Kg	
Bromobenzene	ND	< 470	470	ug/Kg	
Bromochloromethane	ND	< 470	470	ug/Kg	
Bromodichloromethane	ND	< 470	470	ug/Kg	
Bromoform	ND	< 470	470	ug/Kg	
Bromomethane	ND	< 470	470	ug/Kg	
Carbon tetrachloride	ND	< 470	470	ug/Kg	
Chlorobenzene	ND	< 470	470	ug/Kg	

MICRO

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007107-07
Report Date: 21 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW3 30-32	Solid	24 Jul. 00 8:26	25 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorodibromomethane	ND	< 470	470	ug/Kg	8260B
Chloroethane	ND	< 470	470	ug/Kg	
Chloroform	ND	< 470	470	ug/Kg	
Chloromethane	ND	< 470	470	ug/Kg	
cis-1,2-Dichloroethene	ND	< 470	470	ug/Kg	
cis-1,3-Dichlororopene	ND	< 470	470	ug/Kg	
Dibromomethane	ND	< 470	470	ug/Kg	
Dichlorodifluoromethane	ND	< 470	470	ug/Kg	
Ethylbenzene	ND	< 470	470	ug/Kg	
Isopropylbenzene	ND	< 470	470	ug/Kg	
m & p-Xylene	ND	< 940	940	ug/Kg	
Methylene Chloride	J	37	470	ug/Kg	
Naphthalene	ND	< 470	470	ug/Kg	
n-Butylbenzene	ND	< 470	470	ug/Kg	
n-Propylbenzene	ND	< 470	470	ug/Kg	
o-Xylene	ND	< 470	470	ug/Kg	
p-Isopropyltoluene	ND	< 470	470	ug/Kg	
sec-Butylbenzene	ND	< 470	470	ug/Kg	
Styrene	ND	< 470	470	ug/Kg	
Tetrachloroethene	ND	< 470	470	ug/Kg	
Toluene	ND	< 470	470	ug/Kg	
trans-1,2-Dichloroethene	ND	< 470	470	ug/Kg	
trans-1,3-Dichloropropene	ND	< 470	470	ug/Kg	
Trichloroethene	J	40	470	ug/Kg	
Trichlorofluoromethane	ND	< 470	470	ug/Kg	
Vinyl Chloride	ND	< 470	470	ug/Kg	
OrganicsPrep					
Percent Solids		82	1.0	%	160.3

MICROBETS

Microseeps

P7107

----- PARSONS ENGINEERING SCIENCE, INC. -----
----- LOCATION: NSA MID SOUTH SITE N6 -----

Sample Names	Methane mg/l	Methane ug/l	Ethane ng/l	Ethylene ng/l	Lab ID	Date Sampled	Date Received	Date Analyzed	Analyst
007G15UF	*	40.08	28	97	X18 012	07/24/00	07/26/00	7/26/00	RCW
DETECTION LIMITS	0.07mg/l	0.015ug/l	5ng/l	5ng/l					

* Result taken from alternate detector

ANALYST INITIALS RCW

REVIEW

—— QUALITY CONTROL ——

P7107

—— PARSONS ENGINEERING SCIENCE, INC. ——
—— LOCATION: NSA MID SOUTH SITE N6 ——

CONTINUING CALIBRATION STANDARDS 07/26/00

COMPOUND	FILE ID	TRUE CONC.	MEASURED	% DIFF.
METHANE (TCD)	X18 002	5.48	5.68	3.65
METHANE (FID)	X18 003	36.66	38.99	6.36
ETHANE	X18 003	23582	23348	0.99
ETHYLENE	X18 003	26641	25413	4.61

METHOD BLANK 07/26/00

COMPOUND	FILE ID	DET. LIMIT	MEASURED
METHANE (TCD)	X18 004	0.07mg/l	ND
METHANE (FID)	X18 004	0.015ug/l	ND
ETHANE	X18 004	5ng/l	ND
ETHYLENE	X18 004	5ng/l	ND

ANALYST INITIALS RCW

REVIEW

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Denver, CO 80290

Order #: P0007095
Report Date: 08/17/00

Sample Identification

Lab Sample #	Client Sample ID
P0007095-01	PESMW7 5-7
P0007095-02	PESMW7 55-57

Approved By: Rebecca J. Hans

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007095-01
Report Date: 17 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW7 5-7	Solid	21 Jul. 00 13:50	24 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/Kg	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/Kg	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/Kg	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/Kg	
1,1-Dichloroethane	ND	< 5.0	5.0	ug/Kg	
1,1-Dichloroethene	ND	< 5.0	5.0	ug/Kg	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/Kg	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/Kg	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/Kg	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/Kg	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/Kg	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/Kg	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/Kg	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/Kg	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/Kg	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/Kg	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/Kg	
2-Chlorotoluene	ND	< 5.0	5.0	ug/Kg	
4-Chlorotoluene	ND	< 5.0	5.0	ug/Kg	
Benzene	ND	< 5.0	5.0	ug/Kg	
Bromobenzene	ND	< 5.0	5.0	ug/Kg	
Bromochloromethane	ND	< 5.0	5.0	ug/Kg	
Bromodichloromethane	ND	< 5.0	5.0	ug/Kg	
Bromoform	ND	< 5.0	5.0	ug/Kg	
Bromomethane	ND	< 5.0	5.0	ug/Kg	
Carbon tetrachloride	ND	< 5.0	5.0	ug/Kg	
Chlorobenzene	ND	< 5.0	5.0	ug/Kg	

MICROBETS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007095-01
Report Date: 17 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW7 5-7	Solid	21 Jul. 00 13:50	24 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorodibromomethane	ND	< 5.0	5.0	ug/Kg	8260B
Chloroethane	ND	< 5.0	5.0	ug/Kg	
Chloroform	ND	< 5.0	5.0	ug/Kg	
Chloromethane	ND	< 5.0	5.0	ug/Kg	
cis-1,2-Dichloroethene	ND	< 5.0	5.0	ug/Kg	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/Kg	
Dibromomethane	ND	< 5.0	5.0	ug/Kg	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/Kg	
Ethylbenzene	ND	< 5.0	5.0	ug/Kg	
Isopropylbenzene	ND	< 5.0	5.0	ug/Kg	
m & p-Xylene	J	2.7	10	ug/Kg	
Methylene Chloride	J	2.0	5.0	ug/Kg	
Naphthalene	ND	< 5.0	5.0	ug/Kg	
n-Butylbenzene	ND	< 5.0	5.0	ug/Kg	
n-Propylbenzene	ND	< 5.0	5.0	ug/Kg	
o-Xylene	ND	< 5.0	5.0	ug/Kg	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/Kg	
sec-Butylbenzene	ND	< 5.0	5.0	ug/Kg	
Styrene	ND	< 5.0	5.0	ug/Kg	
Tetrachloroethene	ND	< 5.0	5.0	ug/Kg	
Toluene	ND	< 5.0	5.0	ug/Kg	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/Kg	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/Kg	
Trichloroethene	J	1.6	5.0	ug/Kg	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/Kg	
Vinyl Chloride	ND	< 5.0	5.0	ug/Kg	
OrganicsPrep					
Percent Solids		87	1.0	%	160.3

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007095-02
Report Date: 17 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW7 55-57	Solid	21 Jul. 00 14:30	24 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/Kg	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/Kg	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/Kg	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/Kg	
1,1-Dichloroethane		5.2	5.0	ug/Kg	
1,1-Dichloroethene	J	1.8	5.0	ug/Kg	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/Kg	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/Kg	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,2,4-Trimethylbenzene	J	1.8	5.0	ug/Kg	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/Kg	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/Kg	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/Kg	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/Kg	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/Kg	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/Kg	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/Kg	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/Kg	
2-Chlorotoluene	ND	< 5.0	5.0	ug/Kg	
4-Chlorotoluene	ND	< 5.0	5.0	ug/Kg	
Benzene	ND	< 5.0	5.0	ug/Kg	
Bromobenzene	ND	< 5.0	5.0	ug/Kg	
Bromochloromethane	ND	< 5.0	5.0	ug/Kg	
Bromodichloromethane	ND	< 5.0	5.0	ug/Kg	
Bromoform	ND	< 5.0	5.0	ug/Kg	
Bromomethane	ND	< 5.0	5.0	ug/Kg	
Carbon tetrachloride	ND	< 5.0	5.0	ug/Kg	
Chlorobenzene	ND	< 5.0	5.0	ug/Kg	

MICROBATS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007095-02
Report Date: 17 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW7 55-57	Solid	21 Jul. 00 14:30	24 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorodibromomethane	ND	< 5.0	5.0	ug/Kg	8260B
Chloroethane	ND	< 5.0	5.0	ug/Kg	
Chloroform	J	3.0	5.0	ug/Kg	
Chloromethane	ND	< 5.0	5.0	ug/Kg	
cis-1,2-Dichloroethene	ND	< 5.0	5.0	ug/Kg	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/Kg	
Dibromomethane	ND	< 5.0	5.0	ug/Kg	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/Kg	
Ethylbenzene	ND	< 5.0	5.0	ug/Kg	
Isopropylbenzene	ND	< 5.0	5.0	ug/Kg	
m & p-Xylene	J	3.0	10	ug/Kg	
Methylene Chloride	J	3.0	5.0	ug/Kg	
Naphthalene	ND	< 5.0	5.0	ug/Kg	
n-Butylbenzene	ND	< 5.0	5.0	ug/Kg	
n-Propylbenzene	ND	< 5.0	5.0	ug/Kg	
o-Xylene	ND	< 5.0	5.0	ug/Kg	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/Kg	
sec-Butylbenzene	ND	< 5.0	5.0	ug/Kg	
Styrene	ND	< 5.0	5.0	ug/Kg	
Tetrachloroethene	ND	< 5.0	5.0	ug/Kg	
Toluene	ND	< 5.0	5.0	ug/Kg	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/Kg	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/Kg	
Trichloroethene		8.9	5.0	ug/Kg	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/Kg	
Vinyl Chloride	ND	< 5.0	5.0	ug/Kg	
OrganicsPrep					
Percent Solids		84	1.0	%	160.3

MICROBETS

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Denver, CO 80290

Order #: P0007088
Report Date: 08/17/00

Sample Identification

Lab Sample #	Client Sample ID
P0007088-01	PESINJZ 12-14
P0007088-02	PESINJ2 34-36
P0007088-03	PESINJ2 40-42

Approved By: Rebecca J. Hans

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007088-01
Report Date: 17 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESINJZ 12-14	Solid	20 Jul. 00 10:50	21 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/Kg	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/Kg	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/Kg	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/Kg	
1,1-Dichloroethane	ND	< 5.0	5.0	ug/Kg	
1,1-Dichloroethene	ND	< 5.0	5.0	ug/Kg	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/Kg	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/Kg	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/Kg	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/Kg	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/Kg	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/Kg	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/Kg	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/Kg	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/Kg	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/Kg	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/Kg	
2-Chlorotoluene	ND	< 5.0	5.0	ug/Kg	
4-Chlorotoluene	ND	< 5.0	5.0	ug/Kg	
Benzene	ND	< 5.0	5.0	ug/Kg	
Bromobenzene	ND	< 5.0	5.0	ug/Kg	
Bromochloromethane	ND	< 5.0	5.0	ug/Kg	
Bromodichloromethane	ND	< 5.0	5.0	ug/Kg	
Bromoform	ND	< 5.0	5.0	ug/Kg	
Bromomethane	ND	< 5.0	5.0	ug/Kg	
Carbon tetrachloride	ND	< 5.0	5.0	ug/Kg	
Chlorobenzene	ND	< 5.0	5.0	ug/Kg	

MICROBETS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007088-01
Report Date: 17 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESINJZ 12-14	Solid	20 Jul. 00 10:50	21 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorodibromomethane	ND	< 5.0	5.0	ug/Kg	8260B
Chloroethane	ND	< 5.0	5.0	ug/Kg	
Chloroform	J	1.2	5.0	ug/Kg	
Chloromethane	ND	< 5.0	5.0	ug/Kg	
cis-1,2-Dichloroethene	ND	< 5.0	5.0	ug/Kg	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/Kg	
Dibromomethane	ND	< 5.0	5.0	ug/Kg	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/Kg	
Ethylbenzene	ND	< 5.0	5.0	ug/Kg	
Isopropylbenzene	ND	< 5.0	5.0	ug/Kg	
m & p-Xylene	ND	< 10	10	ug/Kg	
Methylene Chloride	J	2.3	5.0	ug/Kg	
Naphthalene	ND	< 5.0	5.0	ug/Kg	
n-Butylbenzene	ND	< 5.0	5.0	ug/Kg	
n-Propylbenzene	ND	< 5.0	5.0	ug/Kg	
o-Xylene	ND	< 5.0	5.0	ug/Kg	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/Kg	
sec-Butylbenzene	ND	< 5.0	5.0	ug/Kg	
Styrene	ND	< 5.0	5.0	ug/Kg	
Tetrachloroethene	ND	< 5.0	5.0	ug/Kg	
Toluene	ND	< 5.0	5.0	ug/Kg	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/Kg	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/Kg	
Trichloroethene	J	4.9	5.0	ug/Kg	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/Kg	
Vinyl Chloride	ND	< 5.0	5.0	ug/Kg	

MICROBEAS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007088-02
Report Date: 17 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESINJ2 34-36	Solid	20 Jul. 00 11:00	21 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/Kg	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/Kg	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/Kg	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/Kg	
1,1-Dichloroethane	ND	< 5.0	5.0	ug/Kg	
1,1-Dichloroethene	ND	< 5.0	5.0	ug/Kg	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/Kg	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/Kg	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/Kg	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/Kg	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/Kg	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/Kg	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/Kg	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/Kg	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/Kg	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/Kg	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/Kg	
2-Chlorotoluene	ND	< 5.0	5.0	ug/Kg	
4-Chlorotoluene	ND	< 5.0	5.0	ug/Kg	
Benzene	ND	< 5.0	5.0	ug/Kg	
Bromobenzene	ND	< 5.0	5.0	ug/Kg	
Bromochloromethane	ND	< 5.0	5.0	ug/Kg	
Bromodichloromethane	ND	< 5.0	5.0	ug/Kg	
Bromoform	ND	< 5.0	5.0	ug/Kg	
Bromomethane	ND	< 5.0	5.0	ug/Kg	
Carbon tetrachloride	ND	< 5.0	5.0	ug/Kg	
Chlorobenzene	ND	< 5.0	5.0	ug/Kg	

MICROFILMED

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007088-02
Report Date: 17 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESINJ2 34-36	Solid	20 Jul. 00 11:00	21 Jul. 00

Analyt (s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorodibromomethane	ND	< 5.0	5.0	ug/Kg	8260B
Chloroethane	ND	< 5.0	5.0	ug/Kg	
Chloroform	J	1.6	5.0	ug/Kg	
Chloromethane	ND	< 5.0	5.0	ug/Kg	
cis-1,2-Dichloroethene	ND	< 5.0	5.0	ug/Kg	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/Kg	
Dibromomethane	ND	< 5.0	5.0	ug/Kg	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/Kg	
Ethylbenzene	ND	< 5.0	5.0	ug/Kg	
Isopropylbenzene	ND	< 5.0	5.0	ug/Kg	
m & p-Xylene	ND	< 10	10	ug/Kg	
Methylene Chloride	J	2.4	5.0	ug/Kg	
Naphthalene	ND	< 5.0	5.0	ug/Kg	
n-Butylbenzene	ND	< 5.0	5.0	ug/Kg	
n-Propylbenzene	ND	< 5.0	5.0	ug/Kg	
o-Xylene	ND	< 5.0	5.0	ug/Kg	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/Kg	
sec-Butylbenzene	ND	< 5.0	5.0	ug/Kg	
Styrene	ND	< 5.0	5.0	ug/Kg	
Tetrachloroethene	ND	< 5.0	5.0	ug/Kg	
Toluene	ND	< 5.0	5.0	ug/Kg	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/Kg	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/Kg	
Trichloroethene	J	3.9	5.0	ug/Kg	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/Kg	
Vinyl Chloride	ND	< 5.0	5.0	ug/Kg	

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007088-03
Report Date: 17 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESINJ2 40-42	Solid	20 Jul. 00 11:15	21 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/Kg	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/Kg	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/Kg	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/Kg	
1,1-Dichloroethane	J	3.9	5.0	ug/Kg	
1,1-Dichloroethene	J	2.4	5.0	ug/Kg	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/Kg	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/Kg	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/Kg	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/Kg	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/Kg	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/Kg	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/Kg	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/Kg	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/Kg	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/Kg	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/Kg	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/Kg	
2-Chlorotoluene	ND	< 5.0	5.0	ug/Kg	
4-Chlorotoluene	ND	< 5.0	5.0	ug/Kg	
Benzene	ND	< 5.0	5.0	ug/Kg	
Bromobenzene	ND	< 5.0	5.0	ug/Kg	
Bromochloromethane	ND	< 5.0	5.0	ug/Kg	
Bromodichloromethane	ND	< 5.0	5.0	ug/Kg	
Bromoform	ND	< 5.0	5.0	ug/Kg	
Bromomethane	ND	< 5.0	5.0	ug/Kg	
Carbon tetrachloride	ND	< 5.0	5.0	ug/Kg	
Chlorobenzene	ND	< 5.0	5.0	ug/Kg	

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007088-03
Report Date: 17 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESINJ2 40-42	Solid	20 Jul. 00 11:15	21 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorodibromomethane	ND	< 5.0	5.0	ug/Kg	8260B
Chloroethane	ND	< 5.0	5.0	ug/Kg	
Chloroform	J	1.8	5.0	ug/Kg	
Chloromethane	ND	< 5.0	5.0	ug/Kg	
cis-1,2-Dichloroethene	ND	< 5.0	5.0	ug/Kg	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/Kg	
Dibromomethane	ND	< 5.0	5.0	ug/Kg	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/Kg	
Ethylbenzene	ND	< 5.0	5.0	ug/Kg	
Isopropylbenzene	ND	< 5.0	5.0	ug/Kg	
m & p-Xylene	ND	< 10	10	ug/Kg	
Methylene Chloride	J	2.6	5.0	ug/Kg	
Naphthalene	ND	< 5.0	5.0	ug/Kg	
n-Butylbenzene	ND	< 5.0	5.0	ug/Kg	
n-Propylbenzene	ND	< 5.0	5.0	ug/Kg	
o-Xylene	ND	< 5.0	5.0	ug/Kg	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/Kg	
sec-Butylbenzene	ND	< 5.0	5.0	ug/Kg	
Styrene	ND	< 5.0	5.0	ug/Kg	
Tetrachloroethene	ND	< 5.0	5.0	ug/Kg	
Toluene	ND	< 5.0	5.0	ug/Kg	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/Kg	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/Kg	
Trichloroethene	J	4.4	5.0	ug/Kg	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/Kg	
Vinyl Chloride	ND	< 5.0	5.0	ug/Kg	

MICROSEEPS

P8030

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 | **Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238** | Fax No.: (412) 826-3433

Company: PARSONS ES
Co. Address: 1700 BROADWAY, Suite 900, DENVER CO
Proj. Manager:
Proj. Location: NSA-MIDSOUTH SITE N-6
Proj. Number: 737490.03000
Phone #: 303 831-8100 Fax #:

Sampler's signature: [signature]

Results to: BRUCE HENRY
PARSONS ES
DENVER

Invoice to:

Cooler ID	Cooler Temp.

	Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	SW8260B - VOCs	METHANE, Ethane, Ethene; AMHB	Total ORGANIC CARBON Walkley-Black	Nitrate + Nitrite E300.1	Bromide E320.1				Remarks
01	PES-MW4S/ 080300	Groundwater	8/3/00	1700		X	8	X	X	X	X					✓ 2 VIALS
02	PES-MW6D/ 080300	"	"	1845		X	8	X	X	X	X					✓
03	PES-DUP2/	"	"	0700		X	8	X	X	X	X					✓
04	PES-MW6D/ 080400 MW6S	"	8/4/00	0900		X	8	X	X	X	X					✓
05	PES-MW3D/ 080400	"	"	1100		X	9	X	X	X	X	X				✓
06	PES-MW3S/ 080400	"	"	1445		X	9	X	X	X	X	X				✓
07	Rinsate Blank	Equipment Blank	"	1520		X	4	X								? DI water. NO SAMPLE
08	TRIP BLANK		8/3/00	0600			2	X								? NO SAMPLE

8/7/00 RCW 8/8/00

Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
[signature]	PARSONS ES	8/4/00	1700	[signature]	Microseeps	11:15	
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

101

P8041

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 Fax No. : (412) 826-3433

Company : PARSONS ES
Co. Address : 1700 BROADWAY Suite 905
Proj. Manager: BRUCE HENRY 12x4
Proj. Location: NSA MIDSOUTH SITE NG
Proj. Number: 737490.03000
Phone # : 303-831-8100 Fax # :

Sampler's signature :

Results to : BRUCE HENRY PARSONS ES

Invoice to :

Cooler ID	Cooler Temp.

	Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	Sulfate	Methane Ethane Ethene	Nitrate + Nitrite	Total Organic Carbon	TBD				Remarks
01	PES-MW2D/ 080400	Groundwater	8/4/00	1700				X	X	X	X	X				
02	PES-MW2S/ 080500	"	8/5/00	1030		X		X	X	X	X	X				
03	PES-INJ1D/ 080500	"	8/5/00	1215		X		X	X	X	X					
04	PES-INJ1S/ 080500	"	"	1415		X	4	X	X	X	X					
05	PES-DUP3	"	"	0700		X		X	X	X	X					
06	PES-INJ2D/ 080500	"	"	1610		X		X	X	X	X	X				
07	PES-INJ2S/ 080500	"	"	1720		X		X	X	X	X	X				
08	PES-INJ3D/ 080500	"	"	1925		X		X	X	X	X	X				
09	PES-INJ3S/ 080500	"	"	2050		X		X	X	X	X	X				
10	PES-INJ4D/ 080600	"	8/6/00	0900		X		X	X	X	X					
11	PES-INJ4S/ 080600	"	"	1025		X		X	X	X	X					
12	PES-MW3D/ 080600	"	"	1215		X		X	X	X						

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
	PARSONS ES	8/7/00	0900		Microseeps	8/8/00	
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

P 8041

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 Fax No. : (412) 826-3433

Company : PARSONS ES

Co. Address :

Proj. Manager:

Proj. Location:

Proj. Number: 737490.03000

Phone # : Fax # :

Sampler's signature : [signature]

Results to : BRUCE HENRY

Invoice to :

Cooler ID	Cooler Temp.

	Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	Parameters Requested: SW8260B								Remarks
13	TRIPBLANK		8/4/00	0600			2	X								

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
[signature]	PARSONS ES	8/7/00	0900	Washlaski	Microseeps	8/8/00	
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

P8024

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 | Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 | Fax No. : (412) 826-3433

Company : PARSONS ES

Co. Address : 1700 BROADWAY, DENVER CO

Proj. Manager:

Proj. Location: NSA-MIDSOUTH SITE NG

Proj. Number: 737490.03000

Phone # : 303-831-8100 Fax # :

Sampler's signature :

Results to : BRUCE HENRY

Invoice to :

Cooler ID	Cooler Temp.

	Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	SW8260B	Methane, Ethane, Ethene; AM-18	Nitrate+Nitrite E300.1	Total ORGANIC CARBON	BROMIDE E320.1				Remarks
01	PES-MW8D/ 080200	Groundwater,	8/2/00	1030		X	8	X	X	X	X					
02	PES-MW8S/ 080200	"	8/2/00	1410		X	8	X	X	X	X					
09	PES-MW7D/ 080200 *	"	8/2/00	1640		X	9	X	X	X	X	X				
10	PES-MW7S/ 080200 *	"	8/2/00	1915		X	9	X	X	X	X	X				
11	PES-DUP1	"	8/2/00	0700		X	9	X	X	X	X	X				
03	PES-MW5D/ 080300	"	8/3/00	0845		X	8	X	X	X	X					
04	PES-MW5S/ 080300 *	"	8/3/00	1210		X	8	X	X	X	X					* Analysis have 080300. in name.
05	PES-MW4D/ 080300	"	8/3/00	1400		X	8	X	X	X	X					
06 MS	PES-MW4D/ 080300/MS	"	"	1400		X	4	X								Matrix Spike
07 MSD	PES-MW4D/ 080300/MSD	"	"	1400		X	4	X								Matrix Spike Duplicate.
08	TRIP BLANK		8/2/00	0600			2	X								

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
	PARSONS ES	8/3/00	1600		Microseeps	8/4/00	
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

P8012

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 | Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 | Fax No.: (412) 826-3433

Company : PARSONS ES
Co. Address : 1700 BROADWAY, DENVER CO
Proj. Manager:
Proj. Location: NSA-MIDSOUTH SITE N6
Proj. Number: 737490.03
Phone # : 303-831-8100 Fax # :

Sampler's signature :

Results to : BRUCE HENRY, PARSONS ES, DENVER

Invoice to :

Cooler ID	Cooler Temp.

	Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	SW8260B								Remarks
01	PES-MW-2/ 40-42	Soil	8/1/00	0855		X	4	X								
02	PES MW2/ 20-22	Soil	8/1/00	0846		X	4	X								
03	PES MW2/ 55-57	Soil	8/1/00	0900		X	4	X								
04	PES MW-2/ DUP	Soil	8/1/00	0700		X	4	X								

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
[signature]	PARSONS ES	8/1/00	1200	[signature]	Microseeps	8/2/00	
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

P 1120

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 | Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 | Fax No. : (412) 826-3433

Company : PARSONS ES
Co. Address :
Proj. Manager: BRUCE HENRY
Proj. Location: NSA MIDSOUTH Site N6
Proj. Number: 737490.02000
Phone # : 303-831-8100 Fax # :

Sampler's signature : Joan Bugg

Results to : BRUCE Henry PARSONS, Denver.

Invoice to :

Cooler ID	Cooler Temp.

Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	SW8260B	Nitrate, Nitrite E300.1	Methane, Ethane, Ethene						Remarks
01 PESMW15	Groundwater	7/25/00	1330		X	7	X	X	X						
03 ~~007615UF~~	"	~~7/25/00~~	~~1305~~		~~X~~										
007615LF	"	7/25/00	0940		X	7	X	X	X						
TANK	1	7/25/00	1440		X	4	X								
Field Blank 1	DI Water Blank	7/25/00	0700		X	1	X								

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Joan Bugg	PARSONS ES	7/26/00	1400	Washlaski	Microseeps	7/27/00	
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

P7101

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 | Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 | Fax No. : (412) 826-3433

Company : PARSONS ES
Co. Address : 1700 BROADWAY, Denver CO
Proj. Manager: Bruce Henry
Proj. Location: NSA MID SOUTH Site NG
Proj. Number:
Phone # : 303-831-8100 Fax # :

Sampler's signature :

Results to : PARSONS ES
1700 Broadway
Denver CO 80290
Invoice to :

Cooler ID	Cooler Temp.

	Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	SW8260B	Total Organic Carbon	Methane, Ethane, Ethene	Nitrate, Nitrite, E300.1					Remarks
01	PESMW8/	57-59 - Soil	7/22/00	0850			1		X							
02	PESMW8/	75-77 - Soil	7/22/00	0900			1		X							
03	007G15UF	Groundwater.	7/24/00	1505			7	X		X	X					
04	PESMW3/55-57		7/24/00	0840			6	X								③ Encore's sent as/for moisture
05	PESMW3/5-7		7/24/00	0814			3	X								Use 1 Encore for Moisture
06	PESMW3/30-32		7/24/00	0826			3	X								"
																"

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Susan Bridges	PARSONS ES	7/24/00	1900			7-26	830
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

Use As Moisture.

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

P7095

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 | Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 | Fax No. : (412) 826-3433

Company : PARSONS ENGINEERING SCIENCE
Co. Address : 1700 Broadway, Suite 900, Denver, CO 80021
Proj. Manager: Bruce Henry
Proj. Location: NSA Mid-South
Proj. Number: 737490.03000
Phone # : 303-831-8100 Fax # : 303-831-8208

Sampler's signature : BMH

Results to : B. Henry, Denver, CO
Invoice to : B. Henry, Denver, CO

Cooler ID	Cooler Temp.

Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	VOCs 8260B	MOISTURE							Remarks
PESMW71 5-7	SOIL	7/21/00	1350	Soil		4	X	X							
PESMW71 55-57	SOIL	7/21/00	1430	Soil		4	X	X							

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Bruce Henry	Parsons ES	7/21/00	1600	C Washlaski	Microseeps	7/24/00	
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

P7080

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 | Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 | Fax No. : (412) 826-3433

Company : Parsons Engineering Science
Co. Address : 1700 Broadway, Suite 900, Denver, CO 80290
Proj. Manager: Bruce Henry
Proj. Location: NSA Mid-South, TN
Proj. Number: 737490.03000
Phone # : 303-831-8100 Fax # : 303-831-8208

Request Rush Analysis For Sample "TANKWATER 200700" (2-Days)

Sampler's signature : BMH

Results to : Bruce Henry Denver, CO

Invoice to : Bruce Henry Denver, CO

Cooler ID	Cooler Temp.

Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	VOCs 8260B	Remarks
TANKWATER/	200700 Water	7/20/00	1510	Wtr		4	X	Please Rush Analysis
PESINJ2/	12-14 Soil	7/20/00	1050	Soil		3	X	
PESINJ2/	34-36 Soil	7/20/00	1100	Soil		3	X	Rush
PESINJ2/	40-42 Soil	7/20/00	11:15	Soil		3	X	P7087

01
02
03

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Bruce M Henry	Parsons ES	7/20/00	4:00pm	Washlasin	Microseeps	7/21/00	
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

Figure 1

RUSH ANALYSIS/NON-CONFORMANCE FORM *

Date 7/21/00 Receiver CW

Client ID. Parsons No. of Samples _____

RUSH PROJECT _____ Route to Lab Dir._____

RUSH ANALYSES Route to Dept. Dir._____

☐ 24 Hours
- ____ Alkalinity
- ____ pH
- ____ Cr^{+6}
- ____ Iodide
- ____ D.O.
- ____ Odor

☐ 48 Hours
- ____ Nitrate-Nitrite
- ____ T OR D PO_4-O
- ____ BOD
- ____ MBAS
- ____ Prep

NON-CONFORMANCE Route to Lab Dir._____

- ____ Samples received past holding time
- ____ Broken Bottles
- ____ Incorrect containers and/or preservative
- ____ Sample Identification different from COC
- ____ Labels missing or unreadable

Other: did not rec. soil jars for samples. only 3 encores per sample. NO sample I.D. is filled out on

Action: C-O-C for last 2 samples. Need a correctly

Resolved: filled out C-O-C please

Date: Please look at sample packs, info is on them. Do these samples without doing the solids per Bruce Henry

* An alternate form can be generated by the LIMS.

7/21/00 BH

Do not log in for %sld. as per client.

MICROSEEPS

Parson's Engineering Science

Project Number: 737490.03000

NSA Midsouth Site N6

Parson's Contact: Mr. Bruce Henry

Becky Hans

Microseeps Contact: Becky Hans
September 14, 2000

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

MICROSEEPS

CASE NARRATIVE

Parson's Engineering Science
NSA Midsouth Site N6
Project #: 737490.03000

The following were samples analyzed by Microseeps, Inc.

Parson's Identification Number	Lab ID number
PESINJZ 12-14	P0007088-01
PESINJ2 34-36	P0007088-02
PESINJ2 40-42	P0007088-03
PESMW7 5-7	P0007095-01
PESMW7 55-57	P0007095-02
PESMW8 57-59	P0007107-01
PESMW8 57-59	P0007107-02
PESMW8 75-77	P0007107-03
007G15UF	P0007107-04
PESMW3 55-57	P0007107-05
PESMW3 5-7	P0007107-06
PESMW3 30-32	P0007107-07
PESMW15	P0007120-01
007G15LF	P0007120-02
TANK	P0007120-03
FIELD BLANK	P0007120-04
PESMW2 40-42	P0008010-01
PESMW2 20-22	P0008010-02
PESMW2 55-57	P0008010-03
PESMW2 DUP	P0008010-04
PESMW8D 080200	P0008024-01
PESMW8S 080200	P0008024-02
PESMW5D 080300	P0008024-03
PESMW5S 080300	P0008024-04
PESMW4D 080300	P0008024-05
PESMW4D 080300 MS	P0008024-06
PESMW4D 080300 MSD	P0008024-07
TRIP BLANK	P0008024-08
PESMW7D 080200	P0008024-09
PESMW7S 080200	P0008024-10

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Parson's Identification Number	Lab ID number
PES-DUP1	P0008024-11
PESMW2D 080400	P0008030-01
PESMW2S 080500	P0008030-02
PESINJ1D 080500	P0008030-03
PESINJ1S 080500	P0008030-04
PES DUP3	P0008030-05
PESINJ2D 080500	P0008030-06
PESINJ2S 080500	P0008030-07
PESINJ3D 080500	P0008030-08
PESINJ3S 080500	P0008030-09
PESINJ4D	P0008030-10
PESINJ4S 080600	P0008030-11
PESMW1D	P0008030-12
TRIP BLANK	P0008030-13
PESMW4S 080300	P0008045-01
PESMW6D 080300	P0008045-02
PES DUP2	P0008045-03
PESMW6S 080400	P0008045-04
PESMW3D 080400	P0008045-05
PESMW3S 080400	P0008045-06
RINSATE BLANK	P0008045-07
TRIP BLANK	P0008045-08

All samples were found to be intact. Three samples arrived at Microseeps for VOC soil analyses without the appropriate jars for percent solids. These samples were PESINJ2 12-14, PESINJ2 34-36, and PESINJ2 40-42. The samples were logged in for the requested VOC analysis without the percent solids being done as per Bruce Henry. The results reported are not based on dry weight calculations.

Dissolved Light Hydrocarbons:

No anomalies were found during the analysis of dissolved light hydrocarbons.

Compliance Data:

No anomalies were found during the following analyses: Bromide, Color, Chloride, Nitrate, Nitrite, and Total Organic Carbon.

Metals Data:

No anomalies were found during the following analyses: Arsenic, Manganese, and Selenium.

MICROSEEPS

Organic Data:

Samples that were sent in for volatile analysis have been reported off of multiple dilutions. In many cases data was reported from a low level, a medium level and a high level analysis. If any analyte fell between these three dilutions, the result would be reported as an estimated concentration with a "J" flag.

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway

Denver, CO 80290

Page: Page 1 of 25
Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Sample Identification

Lab Sample #	Client Sample ID
P0008030-01	PES MW4S 080300
P0008030-02	PES MW6D 080300
P0008030-03	PES DUP2
P0008030-04	PES MW6S 080400
P0008030-05	PES MW3D 080400
P0008030-06	PES MW3S 080400
P0008030-07	RINSATE BLANK
P0008030-08	TRIP BLANK

Approved By: Rebecca J. Harris

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-01

Sample Description	Matrix	Sampled Date/Time	Received
PES MW4S 080300	Water	03 Aug. 00 17:00	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.47	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		9.7	5.0	ug/L	
1,1-Dichloroethene		69	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	J	2.9	5.0	ug/L	

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-01
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW4S 080300	Water	03 Aug. 00 17:00	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene	ND	< 5.0	5.0	ug/L	8260B
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		50	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		120	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		6.4	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-01
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW4S 080300	Water	03 Aug. 00 17:00	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		1600	50	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROBAC

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-02

Sample Description	Matrix	Sampled Date/Time	Received
PES MW6D 080300	Water	03 Aug. 00 18:45	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.47	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		16	5.0	ug/L	
1,1-Dichloroethene		120	5.0	ug/L	
1,1-Dichloropropene	ND	<5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	<5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	<5.0	5.0	ug/L	
2-Chlorotoluene	ND	<5.0	5.0	ug/L	
4-Chlorotoluene	ND	<5.0	5.0	ug/L	
Benzene	ND	< 5.0	5.0	ug/L	

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-02
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW6D 080300	Water	03 Aug. 00 18:45	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene	ND	<5.0	5.0	ug/L	8260B
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		6.4	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		17	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	4.0	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	<5.0	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	<5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	<5.0	5.0	ug/L	
p-Isopropyltoluene	ND	<5.0	5.0	ug/L	
sec-Butylbenzene	ND	<5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	<5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	

UNCORRECTED

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-02
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW6D 080300	Water	03 Aug. 00 18:45	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		220	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	<5.0	5.0	ug/L	

ADL-BOZ

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-03

Sample Description	Matrix	Sampled Date/Time	Received
PES DUP2	Water	03 Aug. 00 7:00	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.52	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	<5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	<5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	<5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	<5.0	5.0	ug/L	
1,1-Dichloroethane		10	5.0	ug/L	
1,1-Dichloroethene		70	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	<5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	<5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	<5.0	20	ug/L	
1,2-Dibromoethane	ND	<5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	J	3.0	5.0	ug/L	

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-03
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES DUP2	Water	03 Aug. 00 7:00	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene	ND	< 5.0	5.0	ug/L	8260B
Bromochloromethane	ND	<5.0	5.0	ug/L	
Bromodichloromethane	ND	<5.0	5.0	ug/L	
Bromoform	ND	<5.0	5.0	ug/L	
Bromomethane	ND	<5.0	5.0	ug/L	
Carbon tetrachloride		53	5.0	ug/L	
Chlorobenzene	ND	<5.0	5.0	ug/L	
Chlorodibromomethane	ND	<5.0	5.0	ug/L	
Chloroethane	ND	<5.0	5.0	ug/L	
Chloroform		120	5.0	ug/L	
Chloromethane	ND	<5.0	5.0	ug/L	
cis-1,2-Dichloroethene		6.8	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	J	1.2	5.0	ug/L	
Naphthalene	ND	<5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	<5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	<5.0	5.0	ug/L	
Toluene	ND	<5.0	5.0	ug/L	

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-03
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES DUP2	Water	03 Aug. 00 7:00	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		1100	50	ug/L	
Trichlorofluoromethane	ND	<5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROBIO

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-04

Sample Description	Matrix	Sampled Date/Time	Received
PES MW6S 080400	Water	04 Aug. 00 9:00	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.83	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	<5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	<5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	<5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	<5.0	5.0	ug/L	
1,1-Dichloroethane		17	5.0	ug/L	
1,1-Dichloroethene		120	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	<5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	<5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	J	3.4	5.0	ug/L	

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-04
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW6S 080400	Water	04 Aug. 00 9:00	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene	ND	< 5.0	5.0	ug/L	8260B
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		270	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		180	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		9.9	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	J	1.2	5.0	ug/L	
Naphthalene	ND	<5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	<5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	J	1.0	5.0	ug/L	
Toluene	ND	<5.0	5.0	ug/L	

MICROSEEPS

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-04
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW6S 080400	Water	04 Aug. 00 9:00	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		1800	100	ug/L	
Trichlorofluoromethane	ND	<5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROBIOTECH

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-05

Sample Description	Matrix	Sampled Date/Time	Received
PES MW3D 080400	Water	04 Aug. 00 11:00	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide	ND	< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.33	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethene	ND	< 5.0	5.0	ug/L	
1,1-Dichloropropene	ND	<5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	<5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	<5.0	5.0	ug/L	
2-Chlorotoluene	ND	<5.0	5.0	ug/L	
4-Chlorotoluene	ND	<5.0	5.0	ug/L	

MICROSEEPS

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-05
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW3D 080400	Water	04 Aug. 00 11:00	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	ND	< 5.0	5.0	ug/L	8260B
Bromobenzene	ND	<5.0	5.0	ug/L	
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride	ND	< 5.0	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform	ND	< 5.0	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	ND	<5.0	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	<10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	<5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	<5.0	5.0	ug/L	
p-Isopropyltoluene	ND	<5.0	5.0	ug/L	
sec-Butylbenzene	J	1.3	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	<5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-05
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW3D 080400	Water	04 Aug. 00 11:00	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	ND	< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene	J	4.5	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	<5.0	5.0	ug/L	

MICROBEGS

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-06

Sample Description	Matrix	Sampled Date/Time	Received
PES MW3S 080400	Water	04 Aug. 00 14:45	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Meth d #
WetChem					
Water					
Bromide	ND	< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.087	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
V latiles					
Water					
1,1,1,2-Tetrachloroethane	ND	<5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	<5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	<5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	<5.0	5.0	ug/L	
1,1-Dichloroethane		32	5.0	ug/L	
1,1-Dichloroethene		200	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	<5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	<5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	

MICROSEEP

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-06
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW3S 080400	Water	04 Aug. 00 14:45	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	4.5	5.0	ug/L	8260B
Bromobenzene	ND	< 5.0	5.0	ug/L	
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		42	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		96	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		12	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	<5.0	5.0	ug/L	
Naphthalene	ND	<5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	<5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	J	1.2	5.0	ug/L	

MICROSEEPS

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-06
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW3S 080400	Water	04 Aug. 00 14:45	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	ND	<5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		1600	100	ug/L	
Trichlorofluoromethane	ND	<5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-07
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
RINSATE BLANK	Water	04 Aug. 00 15:20	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	1.8	5.0	ug/L	
1,1-Dichloroethene		15	5.0	ug/L	
1,1-Dichloropropene	ND	<5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	<20	20	ug/L	
1,2-Dibromoethane	ND	<5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	<5.0	5.0	ug/L	
1,2-Dichloroethane	ND	<5.0	5.0	ug/L	
1,2-Dichloropropane	ND	<5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	<5.0	5.0	ug/L	
1,3-Dichloropropane	ND	<5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	<5.0	5.0	ug/L	
2,2-Dichloropropane	ND	<5.0	5.0	ug/L	
2-Chlorotoluene	ND	<5.0	5.0	ug/L	
4-Chlorotoluene	ND	<5.0	5.0	ug/L	
Benzene	ND	<5.0	5.0	ug/L	
Bromobenzene	ND	<5.0	5.0	ug/L	
Bromochloromethane	ND	<5.0	5.0	ug/L	
Bromodichloromethane	ND	<5.0	5.0	ug/L	
Bromoform	ND	<5.0	5.0	ug/L	

MOISTURE

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-07
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
RINSATE BLANK	Water	04 Aug. 00 15:20	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane	ND	<5.0	5.0	ug/L	8260B
Carbon tetrachloride		7.1	5.0	ug/L	
Chlorobenzene	ND	<5.0	5.0	ug/L	
Chlorodibromomethane	ND	<5.0	5.0	ug/L	
Chloroethane	ND	<5.0	5.0	ug/L	
Chloroform		16	5.0	ug/L	
Chloromethane	ND	<5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	1.0	5.0	ug/L	
cis-1,3-Dichlororopene	ND	<5.0	5.0	ug/L	
Dibromomethane	ND	<5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	<5.0	5.0	ug/L	
Ethylbenzene	ND	<5.0	5.0	ug/L	
Isopropylbenzene	ND	<5.0	5.0	ug/L	
m & p-Xylene	ND	<10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	<5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	<5.0	5.0	ug/L	
p-Isopropyltoluene	ND	<5.0	5.0	ug/L	
sec-Butylbenzene	ND	<5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	<5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	<5.0	5.0	ug/L	
trans-1,4-Dichloro-2-butene	ND	<20	20	ug/L	
Trichloroethene		180	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	

MILTOSTATS

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-07
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
RINSATE BLANK	Water	04 Aug. 00 15:20	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride	ND	<5.0	5.0	ug/L	8260B

MICROBEDS

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-08
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	03 Aug. 00 0:00	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	M thod #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethene	ND	< 5.0	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	ND	< 5.0	5.0	ug/L	
Bromobenzene	ND	< 5.0	5.0	ug/L	
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-08
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	03 Aug. 00 0:00	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane	ND	< 5.0	5.0	ug/L	8260B
Carbon tetrachloride	ND	< 5.0	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform	ND	< 5.0	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	J	1.4	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene	J	1.5	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	

Order #: P0008030
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008030-08
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	03 Aug. 00 0:00	07 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride	ND	< 5.0	5.0	ug/L	8260B

RECEIVED

Microseeps

P8030

----- PARSONS ENGINEERING SCIENCE, INC. -----
----- PROJECT NO.: 737490.03000 -----
----- LOCATION: NSA MID SOUTH SITE N6 -----

Sample Names	Methane mg/l	Methane ug/l	Ethane ng/l	Ethylene ng/l	Lab ID	Date Sampled	Date Received	Date Analyzed	Analyst
PES-MW4S/080300	*	29.67	7625	4821	X18 142	08/03/00	08/07/00	08/08/00	RCW
PES-MW6D/080300	*	8.974	2578	1200	X18 143	08/03/00	08/07/00	08/08/00	RCW
PES-DUP2	*	28.66	7496	4731	X18 144	08/03/00	08/07/00	08/08/00	RCW
PES-MW6S/080400	*	29.18	4924	3440	X18 145	08/04/00	08/07/00	08/08/00	RCW
PES-MW3D/080400	*	8.616	3543	2079	X18 146	08/04/00	08/07/00	08/08/00	RCW
PES-MW3S/080400	*	37.44	4546	2899	X18 147	08/04/00	08/07/00	08/08/00	RCW
DETECTION LIMITS	0.07mg/l	0.015ug/l	5ng/l	5ng/l					

* Result taken from alternate detector

ANALYST INITIALS RCW

REVIEW

---- QUALITY CONTROL ----

P8030

---- PARSONS ENGINEERING SCIENCE, INC. ----
---- PROJECT NO.: 737490.03000 ----
---- LOCATION: NSA MID SOUTH SITE N6 ----

CONTINUING CALIBRATION STANDARDS 08/08/00

COMPOUND	FILE ID	TRUE CONC.	MEASURED	% DIFF.
METHANE (TCD)	X18 121	5.48	5.26	4.06
METHANE (FID)	X18 122	36.66	38.68	5.52
ETHANE	X18 122	23582	23062	2.21
ETHYLENE	X18 122	26641	25128	5.68

METHOD BLANK 08/08/00

COMPOUND	FILE ID	DET. LIMIT	MEASURED
METHANE (TCD)	X18 123	0.07mg/l	ND
METHANE (FID)	X18 123	0.015ug/l	ND
ETHANE	X18 123	5ng/l	ND
ETHYLENE	X18 123	5ng/l	ND

ANALYST INITIALS RCW

REVIEW

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway

Denver, CO 80290

Page: Page 1 of 40
Order #: P0008041
Report Date: 09/14/00
Client Proj Na Vegetable Oil Study - Navy
Client Proj 737490. 030000

Sample Identification

Lab Sample #	Client Sample ID
P0008041-01	PES MW2D 080400
P0008041-02	PES MW2S 080500
P0008041-03	PES INJ1D 080500
P0008041-04	PES INJ1S 080500
P0008041-05	PES DUP3
P0008041-06	PES INJ2D 080500
P0008041-07	PES INJ2S 080500
P0008041-08	PES INJ3D 080500
P0008041-09	PES INJ3S 080500
P0008041-10	PES INJ4D
P0008041-11	PES INJ4S 080600
P0008041-12	PES MW1D
P0008041-13	TRIP BLANK

Approved By: Rebecca J. Hess

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Order #: P0008041
Report Date: 09/14/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-01

Sample Description	Matrix	Sampled Date/Time	Received
PES MW2D 080400	Water	04 Aug. 00 17:00	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide	ND	< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.60	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
0cis-1,3-Dichlororopene	ND	<5.0	5.0	ug/L	8260B
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		13	5.0	ug/L	
1,1-Dichloroethene		110	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	<5.0	5.0	ug/L	
1,2-Dichloroethane	ND	<5.0	5.0	ug/L	
1,2-Dichloropropane	ND	<5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	<5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	<5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	

Order #: P0008041
Report Date: 09/14/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-01
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW2D 080400	Water	04 Aug. 00 17:00	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	8260B
Benzene	ND	< 5.0	5.0	ug/L	
Bromobenzene	ND	< 5.0	5.0	ug/L	
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		7.5	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		15	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	3.6	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	N	<5.0	5.0	ug/L	
Ethylbenzene	ND	<5.0	5.0	ug/L	
Isopropylbenzene	ND	<5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	

MICROBIOLOGICAL

Order #: P0008041
Report Date: 09/14/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-01
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW2D 080400	Water	04 Aug. 00 17:00	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	ND	< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene	ND	<5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	<5.0	5.0	ug/L	
Trichloroethene		180	10	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-02

Sample Description	Matrix	Sampled Date/Time	Received
PES MW2S 080500	Water	05 Aug. 00 10:30	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide	ND	< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		1.0	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		5.8	5.0	ug/L	
1,1-Dichloroethene		40	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	

MICROBIOLOGICAL

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-02
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW2S 080500	Water	05 Aug. 00 10:30	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	1.5	5.0	ug/L	8260B
Bromobenzene	ND	< 5.0	5.0	ug/L	
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		66	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		110	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	4.5	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-02
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW2S 080500	Water	05 Aug. 00 10:30	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	ND	< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		680	100	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROBETS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-03

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ1D 080500	Water	05 Aug. 00 12:15	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.18	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	2.8	5.0	ug/L	
1,1-Dichloroethene		9.3	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	ND	< 5.0	5.0	ug/L	

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-03
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ1D 080500	Water	05 Aug. 00 12:15	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
V latiles					
Bromobenzene	ND	< 5.0	5.0	ug/L	8260B
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride	J	2.9	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		5.7	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
Chloroprene	ND	< 20	20	ug/L	
cis-1,2-Dichloroethene	J	1.7	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
m-Xylene	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	

MICROBATCH

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-03
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ1D 080500	Water	05 Aug. 00 12:15	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Tetrachloroethene	ND	< 5.0	5.0	ug/L	8260B
Toluene	ND	< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		55	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROBIOTS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-04

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ1S 080500	Water	05 Aug. 00 14:15	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.26	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		14	5.0	ug/L	
1,1-Dichloroethene		150	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	J	3.0	5.0	ug/L	
Bromobenzene	ND	< 5.0	5.0	ug/L	

MICROSTEPS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-04
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ1S 080500	Water	05 Aug. 00 14:15	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromochloromethane	ND	< 5.0	5.0	ug/L	8260B
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		20	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		75	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		11	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	J	1.4	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-04
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ1S 080500	Water	05 Aug. 00 14:15	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	8260B
Trichloroethene		640	100	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROSERTS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-05

Sample Description	Matrix	Sampled Date/Time	Received
PES DUP3	Water	05 Aug. 00 7:00	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.70	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		6.0	5.0	ug/L	
1,1-Dichloroethene		41	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	J	1.6	5.0	ug/L	

MICROSTRATA

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-05
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES DUP3	Water	05 Aug. 00 7:00	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene	ND	< 5.0	5.0	ug/L	8260B
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		69	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		110	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	4.7	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-05
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES DUP3	Water	05 Aug. 00 7:00	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		670	100	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-06

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ2D 080500	Water	05 Aug. 00 16:10	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide	ND	< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.80	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		7.3	5.0	ug/L	
1,1-Dichloroethene		40	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	<5.0	20	ug/L	
1,2-Dibromoethane	ND	<5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-06
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ2D 080500	Water	05 Aug. 00 16:10	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
V latiles					
Benzene	ND	<5.0	5.0	ug/L	8260B
Bromobenzene	ND	< 5.0	5.0	ug/L	
Bromochloromethane	ND	<5.0	5.0	ug/L	
Bromodichloromethane	ND	<5.0	5.0	ug/L	
Bromoform	ND	<5.0	5.0	ug/L	
Bromomethane	ND	<5.0	5.0	ug/L	
Carbon tetrachloride	J	2.7	5.0	ug/L	
Chlorobenzene	ND	<5.0	5.0	ug/L	
Chlorodibromomethane	ND	<5.0	5.0	ug/L	
Chloroethane	ND	<5.0	5.0	ug/L	
Chloroform		12	5.0	ug/L	
Chloromethane	ND	<5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	4.0	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	<5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	

MICROSTUDIES

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-06
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ2D 080500	Water	05 Aug. 00 16:10	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	ND	< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		140	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROBATCH

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-07

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ2S 080500	Water	05 Aug. 00 17:20	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide	ND	< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.051	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		50	5.0	ug/L	
1,1-Dichloroethene		210	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,3-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-07
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ2S 080500	Water	05 Aug. 00 17:20	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	2.9	5.0	ug/L	8260B
Bromobenzene	ND	< 5.0	5.0	ug/L	
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		13	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		58	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		14	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-07
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ2S 080500	Water	05 Aug. 00 17:20	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	ND	< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		600	100	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROBEAS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-08

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ3D 080500	Water	05 Aug. 00 19:25	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide	ND	< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.18	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		7.0	5.0	ug/L	
1,1-Dichloroethene		43	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	<20	20	ug/L	
1,2-Dibromoethane	ND	<5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-08
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ3D 080500	Water	05 Aug. 00 19:25	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	ND	<5.0	5.0	ug/L	8260B
Bromobenzene	ND	< 5.0	5.0	ug/L	
Bromochloromethane	ND	<5.0	5.0	ug/L	
Bromodichloromethane	ND	<5.0	5.0	ug/L	
Bromoform	ND	<5.0	5.0	ug/L	
Bromomethane	ND	<5.0	5.0	ug/L	
Carbon tetrachloride	J	1.1	5.0	ug/L	
Chlorobenzene	ND	<5.0	5.0	ug/L	
Chlorodibromomethane	ND	<5.0	5.0	ug/L	
Chloroethane	ND	<5.0	5.0	ug/L	
Chloroform	J	4.7	5.0	ug/L	
Chloromethane	ND	<5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	2.4	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	<5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-08
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ3D 080500	Water	05 Aug. 00 19:25	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	ND	< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		80	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROBETS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-09

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ3S 080500	Water	05 Aug. 00 20:50	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide	ND	< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.36	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		6.9	5.0	ug/L	
1,1-Dichloroethene		52	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	<20	20	ug/L	
1,2-Dibromoethane	ND	<5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-09
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ3S 080500	Water	05 Aug. 00 20:50	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	1.7	5.0	ug/L	8260B
Bromobenzene	ND	< 5.0	5.0	ug/L	
Bromochloromethane	ND	<5.0	5.0	ug/L	
Bromodichloromethane	ND	<5.0	5.0	ug/L	
Bromoform	ND	<5.0	5.0	ug/L	
Bromomethane	ND	<5.0	5.0	ug/L	
Carbon tetrachloride		18	5.0	ug/L	
Chlorobenzene	ND	<5.0	5.0	ug/L	
Chlorodibromomethane	ND	<5.0	5.0	ug/L	
Chloroethane	ND	<5.0	5.0	ug/L	
Chloroform		42	5.0	ug/L	
Chloromethane	ND	<5.0	5.0	ug/L	
cis-1,2-Dichloroethene		5.1	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	<5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	

MICROBETS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-09
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ3S 080500	Water	05 Aug. 00 20:50	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	ND	< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		450	50	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROBATCH

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-10

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ4D	Water	06 Aug. 00 9:00	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.087	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		75	5.0	ug/L	
1,1-Dichloroethene		240	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	J	1.8	5.0	ug/L	

MICROSEEPS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-10
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ4D	Water	06 Aug. 00 9:00	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Bromobenzene	ND	< 5.0	5.0	ug/L	8260B
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		5.3	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		29	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		17	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	

MICROBIOTICS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-10
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ4D	Water	06 Aug. 00 9:00	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		560	50	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROBIOS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-11

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ4S 080600	Water	06 Aug. 00 10:25	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.090	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		63	5.0	ug/L	
1,1-Dichloroethene		170	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	J	1.8	5.0	ug/L	

MICROBEAS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-11
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ4S 080600	Water	06 Aug. 00 10:25	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene	ND	< 5.0	5.0	ug/L	8260B
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride	J	4.8	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		25	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		18	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	

MICROSELECT

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-11
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES INJ4S 080600	Water	06 Aug. 00 10:25	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		190	50	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-12

Sample Description	Matrix	Sampled Date/Time	Received
PES MW1D	Water	06 Aug. 00 12:15	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.079	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethene	J	2.2	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	ND	< 5.0	5.0	ug/L	
Bromobenzene	ND	< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-12
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW1D	Water	06 Aug. 00 12:15	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Bromochloromethane	ND	< 5.0	5.0	ug/L	8260B
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride	ND	< 5.0	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform	J	1.0	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	2.8	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	

MICROBAC

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-12
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW1D	Water	06 Aug. 00 12:15	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	8260B
Trichloroethene		26	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-13
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	04 Aug. 00 6:00	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethene	ND	< 5.0	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	ND	< 5.0	5.0	ug/L	
Bromobenzene	ND	< 5.0	5.0	ug/L	
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	

MICROBETA

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-13
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	04 Aug. 00 6:00	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Bromomethane	ND	< 5.0	5.0	ug/L	8260B
Carbon tetrachloride	ND	< 5.0	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform	ND	< 5.0	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	J	1.3	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene	ND	< 5.0	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	

MDC SERVICES

Order #: P0008041
Report Date: 09/14/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008041-13
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	04 Aug. 00 6:00	08 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	M th d #
Volatiles					
Vinyl Chloride	ND	< 5.0	5.0	ug/L	8260B

MICROSEEPS

Microseeps

P8041

---- PARSONS ENGINEERING SCIENCE, INC. ----
---- PROJECT NO.: 737490.03000 ----
---- LOCATION: NSA MID SOUTH SITE N6 ----

Sample Names	Methane mg/l	Methane ug/l	Ethane ng/l	Ethylene ng/l	Lab ID	Date Sampled	Date Received	Date Analyzed	Analyst
PES-MW2D/080400	*	35.48	994	436	X18 223	08/04/00	08/08/00	08/11/00	RCW
PES-MW2S/080500	*	37.09	5346	4137	X18 224	08/05/00	08/08/00	08/11/00	RCW
PES-INJ1D/080500	*	29.55	5779	2354	X18 225	08/05/00	08/08/00	08/11/00	RCW
PES-INJ1S/080500	*	46.06	18069	10041	X18 226	08/05/00	08/08/00	08/11/00	RCW
PES-DUP3	*	21.02	5585	4217	X18 227	08/05/00	08/08/00	08/11/00	RCW
PES-INJ2D/080500	*	18.62	3703	2134	X18 228	08/05/00	08/08/00	08/11/00	RCW
PES-INJ2S/080500	*	85.34	5212	2910	X18 229	08/05/00	08/08/00	08/11/00	RCW
PES-INJ3D/080500	*	10.70	2458	1413	X18 230	08/05/00	08/08/00	08/11/00	RCW
PES-INJ3S/080500	*	17.91	5057	3023	X18 231	08/05/00	08/08/00	08/11/00	RCW
PES-INJ4D/080600	*	7.604	2093	1087	X18 232	08/06/00	08/08/00	08/11/00	RCW
PES-INJ4S/080600	*	107.7	2644	1540	X18 233	08/06/00	08/08/00	08/11/00	RCW
PES-MW1D/080600	*	18.95	8060	3433	X18 234	08/06/00	08/08/00	08/11/00	RCW
DETECTION LIMITS	0.07mg/l	0.015ug/l	5ng/l	5ng/l					

* Result taken from alternate detector

ANALYST INITIALS RCW

REVIEW

----- QUALITY CONTROL -----

P8041

----- PARSONS ENGINEERING SCIENCE, INC. -----
----- PROJECT NO.: 737490.03000 -----
----- LOCATION: NSA MID SOUTH SITE N6 -----

CONTINUING CALIBRATION STANDARDS 08/11/00

COMPOUND	FILE ID	TRUE CONC.	MEASURED	% DIFF.
METHANE (TCD)	X18 208	5.48	5.24	4.34
METHANE (FID)	X18 209	36.66	39.06	6.56
ETHANE	X18 209	23582	23301	1.19
ETHYLENE	X18 209	26641	25395	4.68
METHANE (FID) D	X18 209	36.66	37.51	2.32

METHOD BLANK 08/11/00

COMPOUND	FILE ID	DET. LIMIT	MEASURED
METHANE (TCD)	X18 210	0.07mg/l	ND
METHANE (FID)	X18 210	0.015ug/l	ND
ETHANE	X18 210	5ng/l	ND
ETHYLENE	X18 210	5ng/l	ND
METHANE (FID) D	X18 210	0.15ug/l	ND

ANALYST INITIALS RCW

REVIEW

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway

Denver, CO 80290

Page: Page 1 of 34
Order #: P0008024
Report Date: 09/05/00
Client Proj Na Vegetable Oil Study - Navy
Client Proj 737490. 030000

Sample Identification

Lab Sample #	Client Sample ID
P0008024-01	PES-MW8D 080200
P0008024-02	PES-MW8S 080200
P0008024-03	PES-MW5D 080300
P0008024-04	PES-MW5S 080300
P0008024-05	PES-MW4D 080300
P0008024-06	PES-MW4D 080300 MS
P0008024-07	PES-MW4D 080300 MSD
P0008024-08	TRIP BLANK
P0008024-09	PES-MW7D 080200
P0008024-10	PES-MW7S 080200
P0008024-11	PES-DUP1

Approved By: Rebecca J. Hans

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D 080200	Water	02 Aug. 00 10:30	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		3.0	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	1.6	5.0	ug/L	
1,1-Dichloroethene		7.4	5.0	ug/L	
1,1-Dichloropropene	ND	<5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	<20	20	ug/L	
1,2-Dibromoethane	ND	<5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	<5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	<5.0	5.0	ug/L	
1,3-Dichloropropane	ND	<5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	<5.0	5.0	ug/L	
2,2-Dichloropropane	ND	<5.0	5.0	ug/L	
2-Chlorotoluene	ND	<5.0	5.0	ug/L	
4-Chlorotoluene	ND	<5.0	5.0	ug/L	
Benzene	ND	< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-01
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D 080200	Water	02 Aug. 00 10:30	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene	ND	< 5.0	5.0	ug/L	8260B
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		52	5.0	ug/L	
Chlorobenzene	ND	<5.0	5.0	ug/L	
Chlorodibromomethane	ND	<5.0	5.0	ug/L	
Chloroethane	ND	<5.0	5.0	ug/L	
Chloroform		73	5.0	ug/L	
Chloromethane	ND	<5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	1.4	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	<5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	<5.0	5.0	ug/L	
n-Propylbenzene	ND	<5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	<5.0	5.0	ug/L	
sec-Butylbenzene	ND	<5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	<5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-01
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D 080200	Water	02 Aug. 00 10:30	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		380	50	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROSEELS

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S 080200	Water	02 Aug. 00 14:10	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		2.0	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	2.2	5.0	ug/L	
1,1-Dichloroethene		6.7	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	ND	< 5.0	5.0	ug/L	

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-02
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S 080200	Water	02 Aug. 00 14:10	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene	ND	< 5.0	5.0	ug/L	8260B
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		8.0	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		27	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	

MICROBIOLOGY

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-02
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S 080200	Water	02 Aug. 00 14:10	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		150	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-03

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5D 080300	Water	03 Aug. 00 8:45	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		1.7	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	<5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	<5.0	5.0	ug/L	
1,1-Dichloroethane	J	4.4	5.0	ug/L	
1,1-Dichloroethene		30	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	<5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	<5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	ND	< 5.0	5.0	ug/L	

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-03
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5D 080300	Water	03 Aug. 00 8:45	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene	ND	<5.0	5.0	ug/L	8260B
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		85	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		99	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	4.3	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	<10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	<5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-03
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5D 080300	Water	03 Aug. 00 8:45	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		450	50	ug/L	
Trichlorofluoromethane	ND	<5.0	5.0	ug/L	
Vinyl Chloride	ND	<5.0	5.0	ug/L	

MICROBIOTECH

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-04

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5S 080300	Water	03 Aug. 00 12:10	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.11	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		37	5.0	ug/L	
1,1-Dichloroethene		70	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	<5.0	5.0	ug/L	
1,2-Dichloropropane	ND	<5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	J	2.6	5.0	ug/L	

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-04
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5S 080300	Water	03 Aug. 00 12:10	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene	ND	< 5.0	5.0	ug/L	8260B
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		20	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		110	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		5.9	5.0	ug/L	
cis-1,3-Dichlororopene	ND	<5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	<5.0	5.0	ug/L	
Ethylbenzene	ND	<5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-04
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5S 080300	Water	03 Aug. 00 12:10	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene	ND	<5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene	ND	<5.0	5.0	ug/L	
Trichloroethene		690	50	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROBIOLOGICAL

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D 080300	Water	03 Aug. 00 14:00	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.41	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		6.5	5.0	ug/L	
1,1-Dichloroethene		32	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	ND	< 5.0	5.0	ug/L	

MICROSEP

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-05
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D 080300	Water	03 Aug. 00 14:00	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene	ND	< 5.0	5.0	ug/L	8260B
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		5.8	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		13	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	1.7	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-05
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D 080300	Water	03 Aug. 00 14:00	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		120	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROSEP

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-06
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D 080300 MS	Water	03 Aug. 00 14:00	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		6.0	5.0	ug/L	
1,1-Dichloroethene		95	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene		54	5.0	ug/L	
Bromobenzene	ND	< 5.0	5.0	ug/L	
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-06
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D 080300 MS	Water	03 Aug. 00 14:00	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane	ND	< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		5.8	5.0	ug/L	
Chlorobenzene		54	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		12	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	1.5	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene		61	5.0	ug/L	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		180	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	

MCL GEOTS

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-06
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D 080300 MS	Water	03 Aug. 00 14:00	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride	ND	< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-07
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D 080300 MSD	Water	03 Aug. 00 14:00	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		6.2	5.0	ug/L	
1,1-Dichloroethene		98	5.0	ug/L	
1,1-Dichloropropene	ND	<5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	<5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	<5.0	5.0	ug/L	
2-Chlorotoluene	ND	<5.0	5.0	ug/L	
4-Chlorotoluene	ND	<5.0	5.0	ug/L	
Benzene		56	5.0	ug/L	
Bromobenzene	ND	< 5.0	5.0	ug/L	
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-07
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D 080300 MSD	Water	03 Aug. 00 14:00	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane	ND	< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		5.8	5.0	ug/L	
Chlorobenzene		55	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		12	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	1.7	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	<5.0	5.0	ug/L	
n-Propylbenzene	ND	<5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	<5.0	5.0	ug/L	
sec-Butylbenzene	ND	<5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	<5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	
Toluene		63	5.0	ug/L	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		190	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-07
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D 080300 MSD	Water	03 Aug. 00 14:00	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride	ND	< 5.0	5.0	ug/L	8260B

MICROSELECT

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-08
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	02 Aug. 00 6:00	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	<5.0	5.0	ug/L	
1,1-Dichloroethene		<5.0	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	
Benzene	ND	< 5.0	5.0	ug/L	
Bromobenzene	ND	< 5.0	5.0	ug/L	
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-08
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	02 Aug. 00 6:00	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane	ND	< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		<5.0	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		<5.0	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		<5.0	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	J	<5.0	5.0	ug/L	
Toluene	ND	< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		<5.0	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	

MICROSTRIP

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-08
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	02 Aug. 00 6:00	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride	ND	< 5.0	5.0	ug/L	8260B

MICROSTATICS

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-09

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D 080200	Water	02 Aug. 00 16:40	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide	ND	< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		2.5	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane		81	5.0	ug/L	
1,1-Dichloroethene		120	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-09
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D 080200	Water	02 Aug. 00 16:40	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	1.3	5.0	ug/L	8260B
Bromobenzene	ND	< 5.0	5.0	ug/L	
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		20	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		29	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		16	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	J	2.0	5.0	ug/L	

MICROBAC

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-09
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D 080200	Water	02 Aug. 00 16:40	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	ND	< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		570	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROBEAS

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-10

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7S 080200	Water	02 Aug. 00 19:15	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide	ND	< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.064	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	2.5	5.0	ug/L	
1,1-Dichloroethene		16	5.0	ug/L	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-10
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7S 080200	Water	02 Aug. 00 19:15	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	ND	< 5.0	5.0	ug/L	8260B
Bromobenzene	ND	< 5.0	5.0	ug/L	
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride		74	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		72	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		7.2	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	< 5.0	5.0	ug/L	
n-Propylbenzene	ND	< 5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L	
Tetrachloroethene	J	1.2	5.0	ug/L	

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-10
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7S 080200	Water	02 Aug. 00 19:15	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	ND	< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		660	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-11

Sample Description	Matrix	Sampled Date/Time	Received
PES-DUP1	Water	02 Aug. 00 7:00	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide	ND	< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		2.2	0.050	mg/L	353.3
Total Organic Carbon	ND	< 5.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,1-Dichloroethene		5.7	5.0	ug/L	
1,1-Dichloropropene	ND	<5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	<5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene	ND	<5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene	ND	<5.0	5.0	ug/L	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
1,3-Dichloropropane	ND	<5.0	5.0	ug/L	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L	
2,2-Dichloropropane	ND	<5.0	5.0	ug/L	
2-Chlorotoluene	ND	<5.0	5.0	ug/L	
4-Chlorotoluene	ND	<5.0	5.0	ug/L	

MICROBETA

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-11
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-DUP1	Water	02 Aug. 00 7:00	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	ND	< 5.0	5.0	ug/L	8260B
Bromobenzene	ND	< 5.0	5.0	ug/L	
Bromochloromethane	ND	< 5.0	5.0	ug/L	
Bromodichloromethane	ND	< 5.0	5.0	ug/L	
Bromoform	ND	< 5.0	5.0	ug/L	
Bromomethane	ND	< 5.0	5.0	ug/L	
Carbon tetrachloride	J	4.4	5.0	ug/L	
Chlorobenzene	ND	< 5.0	5.0	ug/L	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L	
Chloroethane	ND	< 5.0	5.0	ug/L	
Chloroform		10	5.0	ug/L	
Chloromethane	ND	< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	4.6	5.0	ug/L	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L	
Dibromomethane	ND	< 5.0	5.0	ug/L	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L	
Ethylbenzene	ND	< 5.0	5.0	ug/L	
Isopropylbenzene	ND	< 5.0	5.0	ug/L	
m & p-Xylene	ND	< 10	10	ug/L	
Methylene Chloride	ND	< 5.0	5.0	ug/L	
Naphthalene	ND	< 5.0	5.0	ug/L	
n-Butylbenzene	ND	<5.0	5.0	ug/L	
n-Propylbenzene	ND	<5.0	5.0	ug/L	
o-Xylene	ND	< 5.0	5.0	ug/L	
p-Isopropyltoluene	ND	<5.0	5.0	ug/L	
sec-Butylbenzene	ND	<5.0	5.0	ug/L	
Styrene	ND	< 5.0	5.0	ug/L	
tert-Butylbenzene	ND	<5.0	5.0	ug/L	
Tetrachloroethene	ND	< 5.0	5.0	ug/L	

Order #: P0008024
Report Date: 09/05/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008024-11
Report Date: 14 Sep. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-DUP1	Water	02 Aug. 00 7:00	04 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	ND	< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L	
Trichloroethene		170	5.0	ug/L	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L	
Vinyl Chloride	ND	< 5.0	5.0	ug/L	

MICROBIOTICS

Microseeps

P8024

----- PARSONS ENGINEERING SCIENCE, INC. -----
----- PROJECT NO.: 737490.03000 -----
----- LOCATION: NSA MID SOUTH SITE N6 -----

Sample Names	Methane mg/l	Methane ug/l	Ethane ng/l	Ethylene ng/l	Lab ID	Date Sampled	Date Received	Date Analyzed	Analyst
PES-MW8D/080200	*	3.102	1002	402	X18 134	08/02/00	08/04/00	08/08/00	RCW
PES-MW8S/080200	*	13.90	2293	1465	X18 135	08/02/00	08/04/00	08/08/00	RCW
PES-MW7D/080200	*	8.290	3021	1965	X18 136	08/02/00	08/04/00	08/08/00	RCW
PES-MW7S/080200	*	71.52	3155	2022	X18 137	08/02/00	08/04/00	08/08/00	RCW
PES-DUP1	*	8.152	2974	1910	X18 138	08/02/00	08/04/00	08/08/00	RCW
PES-MW5D/080300	*	8.328	2599	1634	X18 139	08/03/00	08/04/00	08/08/00	RCW
PES-MW5S/080200	*	49.88	5180	3750	X18 140	08/03/00	08/04/00	08/08/00	RCW
PES-MW4D/080300	*	8.046	2436	1253	X18 141	08/03/00	08/04/00	08/08/00	RCW
DETECTION LIMITS	0.07mg/l	0.015ug/l	5ng/l	5ng/l					

* Result taken from alternate detector

ANALYST INITIALS RCW

REVIEW

P8024

—— QUALITY CONTROL ——

—— PARSONS ENGINEERING SCIENCE, INC. ——
—— PROJECT NO.: 737490.03000 ——
—— LOCATION: NSA MID SOUTH SITE N6 ——

CONTINUING CALIBRATION STANDARDS 08/08/00

COMPOUND	FILE ID	TRUE CONC.	MEASURED	% DIFF.
METHANE (TCD)	X18 121	5.48	5.26	4.06
METHANE (FID)	X18 122	36.66	38.68	5.52
ETHANE	X18 122	23582	23062	2.21
ETHYLENE	X18 122	26641	25128	5.68
METHANE (FID) D	X18 122	36.66	37.25	1.62

METHOD BLANK 08/08/00

COMPOUND	FILE ID	DET. LIMIT	MEASURED
METHANE (TCD)	X18 123	0.07mg/l	ND
METHANE (FID)	X18 123	0.015ug/l	ND
ETHANE	X18 123	5ng/l	ND
ETHYLENE	X18 123	5ng/l	ND
METHANE (FID) D	X18 123	0.15ug/l	ND

ANALYST INITIALS RCW

REVIEW

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Denver, CO 80290

Order #: P0008010
Report Date: 08/24/00

Sample Identification

Lab Sample #	Client Sample ID
P0008010-01	PESMW2 40-42
P0008010-02	PESMW2 20-22
P0008010-03	PESMW2 55-57
P0008010-04	PESMW2 DUP

Approved By: Rebecca J. Hemo

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008010-01
Report Date: 25 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW2 40-42	Solid	01 Aug. 00 8:55	02 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 4.8	4.8	ug/Kg	8260B
1,1,1-Trichloroethane	ND	< 4.8	4.8	ug/Kg	
1,1,2,2-Tetrachloroethane	ND	< 4.8	4.8	ug/Kg	
1,1,2-Trichloroethane	ND	< 4.8	4.8	ug/Kg	
1,1-Dichloroethane	ND	< 4.8	4.8	ug/Kg	
1,1-Dichloroethene	ND	< 4.8	4.8	ug/Kg	
1,1-Dichloropropene	ND	< 4.8	4.8	ug/Kg	
1,2,3-Trichlorobenzene	ND	< 4.8	4.8	ug/Kg	
1,2,3-Trichloropropane	ND	< 4.8	4.8	ug/Kg	
1,2,4-Trichlorobenzene	ND	<4.8	4.8	ug/Kg	
1,2,4-Trimethylbenzene	J	2.9	4.8	ug/Kg	
1,2-Dibromo-3-chloropropane	ND	< 19	19	ug/Kg	
1,2-Dibromoethane	ND	< 4.8	4.8	ug/Kg	
1,2-Dichlorobenzene	ND	< 4.8	4.8	ug/Kg	
1,2-Dichloroethane	ND	< 4.8	4.8	ug/Kg	
1,2-Dichloropropane	ND	< 4.8	4.8	ug/Kg	
1,3,5-Trimethylbenzene	ND	< 4.8	4.8	ug/Kg	
1,3-Dichlorobenzene	ND	< 4.8	4.8	ug/Kg	
1,3-Dichloropropane	ND	< 4.8	4.8	ug/Kg	
1,4-Dichlorobenzene	ND	< 4.8	4.8	ug/Kg	
2,2-Dichloropropane	ND	< 4.8	4.8	ug/Kg	
2-Chlorotoluene	ND	< 4.8	4.8	ug/Kg	
4-Chlorotoluene	ND	< 4.8	4.8	ug/Kg	
Benzene	ND	< 4.8	4.8	ug/Kg	
Bromobenzene	ND	< 4.8	4.8	ug/Kg	
Bromochloromethane	ND	< 4.8	4.8	ug/Kg	
Bromodichloromethane	ND	< 4.8	4.8	ug/Kg	
Bromoform	ND	< 4.8	4.8	ug/Kg	
Bromomethane	ND	< 4.8	4.8	ug/Kg	
Carbon tetrachloride	ND	< 4.8	4.8	ug/Kg	
Chlorobenzene	ND	< 4.8	4.8	ug/Kg	

MICROSEELS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008010-01
Report Date: 25 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW2 40-42	Solid	01 Aug. 00 8:55	02 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorodibromomethane	ND	< 4.8	4.8	ug/Kg	8260B
Chloroethane	ND	< 4.8	4.8	ug/Kg	
Chloroform	ND	< 4.8	4.8	ug/Kg	
Chloromethane	ND	< 4.8	4.8	ug/Kg	
cis-1,2-Dichloroethene	ND	< 4.8	4.8	ug/Kg	
cis-1,3-Dichlororopene	ND	< 4.8	4.8	ug/Kg	
Dibromomethane	ND	< 4.8	4.8	ug/Kg	
Dichlorodifluoromethane	ND	< 4.8	4.8	ug/Kg	
Ethylbenzene	ND	< 4.8	4.8	ug/Kg	
Isopropylbenzene	ND	< 4.8	4.8	ug/Kg	
m & p-Xylene	ND	< 9.7	9.7	ug/Kg	
Methylene Chloride	J	1.0	4.8	ug/Kg	
Naphthalene	ND	< 4.8	4.8	ug/Kg	
n-Butylbenzene	ND	< 4.8	4.8	ug/Kg	
n-Propylbenzene	ND	< 4.8	4.8	ug/Kg	
o-Xylene	ND	< 4.8	4.8	ug/Kg	
p-Isopropyltoluene	ND	< 4.8	4.8	ug/Kg	
sec-Butylbenzene	ND	< 4.8	4.8	ug/Kg	
Styrene	ND	< 4.8	4.8	ug/Kg	
Tetrachloroethene	ND	< 4.8	4.8	ug/Kg	
Toluene	ND	< 4.8	4.8	ug/Kg	
trans-1,2-Dichloroethene	ND	< 4.8	4.8	ug/Kg	
trans-1,3-Dichloropropene	ND	< 4.8	4.8	ug/Kg	
Trichloroethene	J	1.1	4.8	ug/Kg	
Trichlorofluoromethane	ND	< 4.8	4.8	ug/Kg	
Vinyl Chloride	ND	< 4.8	4.8	ug/Kg	
OrganicsPrep					
Percent Solids		82	1.0	%	160.3

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008010-02
Report Date: 25 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW2 20-22	Solid	01 Aug. 00 8:40	02 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 4.6	4.6	ug/Kg	8260B
1,1,1-Trichloroethane	ND	< 4.6	4.6	ug/Kg	
1,1,2,2-Tetrachloroethane	ND	< 4.6	4.6	ug/Kg	
1,1,2-Trichloroethane	ND	< 4.6	4.6	ug/Kg	
1,1-Dichloroethane	ND	< 4.6	4.6	ug/Kg	
1,1-Dichloroethene	ND	< 4.6	4.6	ug/Kg	
1,1-Dichloropropene	ND	< 4.6	4.6	ug/Kg	
1,2,3-Trichlorobenzene	ND	< 4.6	4.6	ug/Kg	
1,2,3-Trichloropropane	ND	< 4.6	4.6	ug/Kg	
1,2,4-Trichlorobenzene	ND	< 4.6	4.6	ug/Kg	
1,2,4-Trimethylbenzene	J	2.8	4.6	ug/Kg	
1,2-Dibromo-3-chloropropane	ND	< 18	18	ug/Kg	
1,2-Dibromoethane	ND	< 4.6	4.6	ug/Kg	
1,2-Dichlorobenzene	ND	< 4.6	4.6	ug/Kg	
1,2-Dichloroethane	ND	< 4.6	4.6	ug/Kg	
1,2-Dichloropropane	ND	< 4.6	4.6	ug/Kg	
1,3,5-Trimethylbenzene	ND	< 4.6	4.6	ug/Kg	
1,3-Dichlorobenzene	ND	< 4.6	4.6	ug/Kg	
1,3-Dichloropropane	ND	< 4.6	4.6	ug/Kg	
1,4-Dichlorobenzene	ND	< 4.6	4.6	ug/Kg	
2,2-Dichloropropane	ND	< 4.6	4.6	ug/Kg	
2-Chlorotoluene	ND	< 4.6	4.6	ug/Kg	
4-Chlorotoluene	ND	< 4.6	4.6	ug/Kg	
Benzene	J	2.5	4.6	ug/Kg	
Bromobenzene	ND	< 4.6	4.6	ug/Kg	
Bromochloromethane	ND	< 4.6	4.6	ug/Kg	
Bromodichloromethane	ND	< 4.6	4.6	ug/Kg	
Bromoform	ND	< 4.6	4.6	ug/Kg	
Bromomethane	ND	< 4.6	4.6	ug/Kg	
Carbon tetrachloride	ND	< 4.6	4.6	ug/Kg	
Chlorobenzene	ND	< 4.6	4.6	ug/Kg	

MICROSEETS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008010-02
Report Date: 25 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW2 20-22	Solid	01 Aug. 00 8:40	02 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorodibromomethane	ND	< 4.6	4.6	ug/Kg	8260B
Chloroethane	ND	< 4.6	4.6	ug/Kg	
Chloroform	ND	< 4.6	4.6	ug/Kg	
Chloromethane	ND	< 4.6	4.6	ug/Kg	
cis-1,2-Dichloroethene	ND	< 4.6	4.6	ug/Kg	
cis-1,3-Dichlororopene	ND	< 4.6	4.6	ug/Kg	
Dibromomethane	ND	< 4.6	4.6	ug/Kg	
Dichlorodifluoromethane	ND	< 4.6	4.6	ug/Kg	
Ethylbenzene	J	2.9	4.6	ug/Kg	
Isopropylbenzene	ND	< 4.6	4.6	ug/Kg	
m & p-Xylene	J	3.2	9.2	ug/Kg	
Methylene Chloride	ND	< 4.6	4.6	ug/Kg	
Naphthalene	ND	< 4.6	4.6	ug/Kg	
n-Butylbenzene	ND	< 4.6	4.6	ug/Kg	
n-Propylbenzene	ND	< 4.6	4.6	ug/Kg	
o-Xylene	J	1.5	4.6	ug/Kg	
p-Isopropyltoluene	ND	< 4.6	4.6	ug/Kg	
sec-Butylbenzene	ND	< 4.6	4.6	ug/Kg	
Styrene	ND	< 4.6	4.6	ug/Kg	
Tetrachloroethene	ND	< 4.6	4.6	ug/Kg	
Toluene		7.4	4.6	ug/Kg	
trans-1,2-Dichloroethene	ND	< 4.6	4.6	ug/Kg	
trans-1,3-Dichloropropene	ND	< 4.6	4.6	ug/Kg	
Trichloroethene	J	0.93	4.6	ug/Kg	
Trichlorofluoromethane	ND	< 4.6	4.6	ug/Kg	
Vinyl Chloride	ND	< 4.6	4.6	ug/Kg	
OrganicsPrep					
Percent Solids		78	1.0	%	160.3

MICROSEETS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008010-03
Report Date: 25 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW2 55-57	Solid	01 Aug. 00 9:00	02 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 4.4	4.4	ug/Kg	8260B
1,1,1-Trichloroethane	ND	< 4.4	4.4	ug/Kg	
1,1,2,2-Tetrachloroethane	ND	< 4.4	4.4	ug/Kg	
1,1,2-Trichloroethane	ND	< 4.4	4.4	ug/Kg	
1,1-Dichloroethane	J	2.0	4.4	ug/Kg	
1,1-Dichloroethene		7.0	4.4	ug/Kg	
1,1-Dichloropropene	ND	< 4.4	4.4	ug/Kg	
1,2,3-Trichlorobenzene	ND	< 4.4	4.4	ug/Kg	
1,2,3-Trichloropropane	ND	< 4.4	4.4	ug/Kg	
1,2,4-Trichlorobenzene	J	2.1	4.4	ug/Kg	
1,2,4-Trimethylbenzene	ND	< 4.4	4.4	ug/Kg	
1,2-Dibromo-3-chloropropane	ND	< 18	18	ug/Kg	
1,2-Dibromoethane	ND	< 4.4	4.4	ug/Kg	
1,2-Dichlorobenzene	ND	< 4.4	4.4	ug/Kg	
1,2-Dichloroethane	ND	< 4.4	4.4	ug/Kg	
1,2-Dichloropropane	ND	< 4.4	4.4	ug/Kg	
1,3,5-Trimethylbenzene	ND	< 4.4	4.4	ug/Kg	
1,3-Dichlorobenzene	ND	< 4.4	4.4	ug/Kg	
1,3-Dichloropropane	ND	< 4.4	4.4	ug/Kg	
1,4-Dichlorobenzene	ND	< 4.4	4.4	ug/Kg	
2,2-Dichloropropane	ND	< 4.4	4.4	ug/Kg	
2-Chlorotoluene	ND	< 4.4	4.4	ug/Kg	
4-Chlorotoluene	ND	< 4.4	4.4	ug/Kg	
Benzene	ND	< 4.4	4.4	ug/Kg	
Bromobenzene	ND	< 4.4	4.4	ug/Kg	
Bromochloromethane	ND	< 4.4	4.4	ug/Kg	
Bromodichloromethane	ND	< 4.4	4.4	ug/Kg	
Bromoform	ND	< 4.4	4.4	ug/Kg	
Bromomethane	ND	< 4.4	4.4	ug/Kg	
Carbon tetrachloride	J	1.4	4.4	ug/Kg	
Chlorobenzene	ND	< 4.4	4.4	ug/Kg	

MICROBETS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008010-03
Report Date: 25 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW2 55-57	Solid	01 Aug. 00 9:00	02 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorodibromomethane	ND	< 4.4	4.4	ug/Kg	8260B
Chloroethane	ND	< 4.4	4.4	ug/Kg	
Chloroform		7.0	4.4	ug/Kg	
Chloromethane	ND	< 4.4	4.4	ug/Kg	
cis-1,2-Dichloroethene	ND	< 4.4	4.4	ug/Kg	
cis-1,3-Dichlororopene	ND	< 4.4	4.4	ug/Kg	
Dibromomethane	ND	< 4.4	4.4	ug/Kg	
Dichlorodifluoromethane	ND	< 4.4	4.4	ug/Kg	
Ethylbenzene	ND	< 4.4	4.4	ug/Kg	
Isopropylbenzene	ND	< 4.4	4.4	ug/Kg	
m & p-Xylene	J	1.3	8.8	ug/Kg	
Methylene Chloride	J	0.93	4.4	ug/Kg	
Naphthalene	ND	< 4.4	4.4	ug/Kg	
n-Butylbenzene	ND	< 4.4	4.4	ug/Kg	
n-Propylbenzene	ND	< 4.4	4.4	ug/Kg	
o-Xylene	ND	< 4.4	4.4	ug/Kg	
p-Isopropyltoluene	ND	< 4.4	4.4	ug/Kg	
sec-Butylbenzene	ND	< 4.4	4.4	ug/Kg	
Styrene	ND	< 4.4	4.4	ug/Kg	
Tetrachloroethene	ND	< 4.4	4.4	ug/Kg	
Toluene	ND	< 4.4	4.4	ug/Kg	
trans-1,2-Dichloroethene	ND	< 4.4	4.4	ug/Kg	
trans-1,3-Dichloropropene	ND	< 4.4	4.4	ug/Kg	
Trichloroethene		37	4.4	ug/Kg	
Trichlorofluoromethane	ND	< 4.4	4.4	ug/Kg	
Vinyl Chloride	ND	< 4.4	4.4	ug/Kg	
OrganicsPrep					
Percent Solids		86	1.0	%	160.3

MICROSHEETS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008010-04
Report Date: 25 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW2 DUP	Solid	01 Aug. 00 7:00	02 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 4.8	4.8	ug/Kg	8260B
1,1,1-Trichloroethane	ND	< 4.8	4.8	ug/Kg	
1,1,2,2-Tetrachloroethane	ND	< 4.8	4.8	ug/Kg	
1,1,2-Trichloroethane	ND	< 4.8	4.8	ug/Kg	
1,1-Dichloroethane	J	2.1	4.8	ug/Kg	
1,1-Dichloroethene		8.8	4.8	ug/Kg	
1,1-Dichloropropene	ND	< 4.8	4.8	ug/Kg	
1,2,3-Trichlorobenzene	ND	< 4.8	4.8	ug/Kg	
1,2,3-Trichloropropane	ND	< 4.8	4.8	ug/Kg	
1,2,4-Trichlorobenzene	ND	< 4.8	4.8	ug/Kg	
1,2,4-Trimethylbenzene	ND	< 4.8	4.8	ug/Kg	
1,2-Dibromo-3-chloropropane	ND	< 19	19	ug/Kg	
1,2-Dibromoethane	ND	< 4.8	4.8	ug/Kg	
1,2-Dichlorobenzene	ND	< 4.8	4.8	ug/Kg	
1,2-Dichloroethane	ND	< 4.8	4.8	ug/Kg	
1,2-Dichloropropane	ND	< 4.8	4.8	ug/Kg	
1,3,5-Trimethylbenzene	ND	< 4.8	4.8	ug/Kg	
1,3-Dichlorobenzene	ND	< 4.8	4.8	ug/Kg	
1,3-Dichloropropane	ND	< 4.8	4.8	ug/Kg	
1,4-Dichlorobenzene	ND	< 4.8	4.8	ug/Kg	
2,2-Dichloropropane	ND	< 4.8	4.8	ug/Kg	
2-Chlorotoluene	ND	< 4.8	4.8	ug/Kg	
4-Chlorotoluene	ND	< 4.8	4.8	ug/Kg	
Benzene	ND	< 4.8	4.8	ug/Kg	
Bromobenzene	ND	< 4.8	4.8	ug/Kg	
Bromochloromethane	ND	< 4.8	4.8	ug/Kg	
Bromodichloromethane	ND	< 4.8	4.8	ug/Kg	
Bromoform	ND	< 4.8	4.8	ug/Kg	
Bromomethane	ND	< 4.8	4.8	ug/Kg	
Carbon tetrachloride	J	1.7	4.8	ug/Kg	
Chlorobenzene	ND	< 4.8	4.8	ug/Kg	

MICROBETS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0008010-04
Report Date: 25 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PESMW2 DUP	Solid	01 Aug. 00 7:00	02 Aug. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorodibromomethane	ND	< 4.8	4.8	ug/Kg	8260B
Chloroethane	ND	< 4.8	4.8	ug/Kg	
Chloroform		7.5	4.8	ug/Kg	
Chloromethane	ND	< 4.8	4.8	ug/Kg	
cis-1,2-Dichloroethene	ND	< 4.8	4.8	ug/Kg	
cis-1,3-Dichlororopene	ND	< 4.8	4.8	ug/Kg	
Dibromomethane	ND	< 4.8	4.8	ug/Kg	
Dichlorodifluoromethane	ND	< 4.8	4.8	ug/Kg	
Ethylbenzene	ND	< 4.8	4.8	ug/Kg	
Isopropylbenzene	ND	< 4.8	4.8	ug/Kg	
m & p-Xylene	ND	< 9.6	9.6	ug/Kg	
Methylene Chloride	J	1.00	4.8	ug/Kg	
Naphthalene	ND	< 4.8	4.8	ug/Kg	
n-Butylbenzene	ND	< 4.8	4.8	ug/Kg	
n-Propylbenzene	ND	< 4.8	4.8	ug/Kg	
o-Xylene	ND	< 4.8	4.8	ug/Kg	
p-Isopropyltoluene	ND	< 4.8	4.8	ug/Kg	
sec-Butylbenzene	ND	< 4.8	4.8	ug/Kg	
Styrene	ND	< 4.8	4.8	ug/Kg	
Tetrachloroethene	ND	< 4.8	4.8	ug/Kg	
Toluene	ND	< 4.8	4.8	ug/Kg	
trans-1,2-Dichloroethene	ND	< 4.8	4.8	ug/Kg	
trans-1,3-Dichloropropene	ND	< 4.8	4.8	ug/Kg	
Trichloroethene		41	4.8	ug/Kg	
Trichlorofluoromethane	ND	< 4.8	4.8	ug/Kg	
Vinyl Chloride	ND	< 4.8	4.8	ug/Kg	
OrganicsPrep					
Percent Solids		84	1.0	%	160.3

MICROSHEETS

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Denver, CO 80290

Page: Page 1 of 9
Order #: P0007120
Report Date: 08/21/00

Sample Identification

Lab Sample #	Client Sample ID
P0007120-01	PES MW15
P0007120-02	007G15LF
P0007120-03	TANK
P0007120-04	FIELD BLANK

Approved By: Rebecca J. Hans

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007120-01

Sample Description	Matrix	Sampled Date/Time	Received
PES MW15	Water	25 Jul. 00 13:30	27 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Nitrate-nitrite as N	J	0.029	0.050	mg/L dry	353.3
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L dry	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L dry	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L dry	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L dry	
1,1-Dichloroethane		8.5	5.0	ug/L dry	
1,1-Dichloroethene		15	5.0	ug/L dry	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L dry	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L dry	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L dry	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L dry	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L dry	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L dry	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L dry	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L dry	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L dry	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L dry	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L dry	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L dry	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L dry	
Benzene	ND	< 5.0	5.0	ug/L dry	
Bromobenzene	ND	< 5.0	5.0	ug/L dry	
Bromochloromethane	ND	< 5.0	5.0	ug/L dry	
Bromodichloromethane	ND	< 5.0	5.0	ug/L dry	
Bromoform	ND	< 5.0	5.0	ug/L dry	
Bromomethane	ND	< 5.0	5.0	ug/L dry	

MICROBEAS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007120-01
Report Date: 21 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES MW15	Water	25 Jul. 00 13:30	27 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Carbon tetrachloride	ND	< 5.0	5.0	ug/L dry	8260B
Chlorobenzene	ND	< 5.0	5.0	ug/L dry	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L dry	
Chloroethane	ND	< 5.0	5.0	ug/L dry	
Chloroform	J	3.6	5.0	ug/L dry	
Chloromethane	ND	< 5.0	5.0	ug/L dry	
cis-1,2-Dichloroethene		34	5.0	ug/L dry	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L dry	
Dibromomethane	ND	< 5.0	5.0	ug/L dry	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L dry	
Ethylbenzene	ND	< 5.0	5.0	ug/L dry	
Isopropylbenzene	ND	< 5.0	5.0	ug/L dry	
m & p-Xylene	ND	< 10	10	ug/L dry	
Methylene Chloride	ND	< 5.0	5.0	ug/L dry	
Naphthalene	ND	< 5.0	5.0	ug/L dry	
n-Butylbenzene	ND	< 5.0	5.0	ug/L dry	
n-Propylbenzene	ND	< 5.0	5.0	ug/L dry	
o-Xylene	ND	< 5.0	5.0	ug/L dry	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L dry	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L dry	
Styrene	ND	< 5.0	5.0	ug/L dry	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L dry	
Tetrachloroethene	ND	< 5.0	5.0	ug/L dry	
Toluene	ND	< 5.0	5.0	ug/L dry	
trans-1,2-Dichloroethene	J	1.0	5.0	ug/L dry	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L dry	
Trichloroethene		150	5.0	ug/L dry	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L dry	
Vinyl Chloride	ND	< 5.0	5.0	ug/L dry	

MICROBETS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007120-02

Sample Description	Matrix	Sampled Date/Time	Received
007G15LF	Water	25 Jul. 00 9:40	27 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Nitrate-nitrite as N		1.2	0.050	mg/L dry	353.3
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L dry	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L dry	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L dry	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L dry	
1,1-Dichloroethane	J	1.0	5.0	ug/L dry	
1,1-Dichloroethene	J	3.4	5.0	ug/L dry	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L dry	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L dry	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L dry	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L dry	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L dry	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L dry	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L dry	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L dry	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L dry	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L dry	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L dry	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L dry	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L dry	
Benzene	ND	< 5.0	5.0	ug/L dry	
Bromobenzene	ND	< 5.0	5.0	ug/L dry	
Bromochloromethane	ND	< 5.0	5.0	ug/L dry	
Bromodichloromethane	ND	< 5.0	5.0	ug/L dry	
Bromoform	ND	< 5.0	5.0	ug/L dry	
Bromomethane	ND	< 5.0	5.0	ug/L dry	

MICROBIOLOGICAL

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007120-02
Report Date: 21 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
007G15LF	Water	25 Jul. 00 9:40	27 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Carbon tetrachloride		19	5.0	ug/L dry	8260B
Chlorobenzene	ND	< 5.0	5.0	ug/L dry	
Chlorodibromomethane	ND	< 5.0	5.0	ug/L dry	
Chloroethane	ND	< 5.0	5.0	ug/L dry	
Chloroform	J	4.8	5.0	ug/L dry	
Chloromethane	ND	< 5.0	5.0	ug/L dry	
cis-1,2-Dichloroethene		6.2	5.0	ug/L dry	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L dry	
Dibromomethane	ND	< 5.0	5.0	ug/L dry	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L dry	
Ethylbenzene	ND	< 5.0	5.0	ug/L dry	
Isopropylbenzene	ND	< 5.0	5.0	ug/L dry	
m & p-Xylene	ND	< 10	10	ug/L dry	
Methylene Chloride	ND	< 5.0	5.0	ug/L dry	
Naphthalene	ND	< 5.0	5.0	ug/L dry	
n-Butylbenzene	ND	< 5.0	5.0	ug/L dry	
n-Propylbenzene	ND	< 5.0	5.0	ug/L dry	
o-Xylene	ND	< 5.0	5.0	ug/L dry	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L dry	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L dry	
Styrene	ND	< 5.0	5.0	ug/L dry	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L dry	
Tetrachloroethene	ND	< 5.0	5.0	ug/L dry	
Toluene	ND	< 5.0	5.0	ug/L dry	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L dry	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L dry	
Trichloroethene		58	5.0	ug/L dry	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L dry	
Vinyl Chloride	ND	< 5.0	5.0	ug/L dry	

MICROBEAS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007120-03
Report Date: 21 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
TANK	Water	25 Jul. 00 14:40	27 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L dry	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L dry	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L dry	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L dry	
1,1-Dichloroethane	ND	< 5.0	5.0	ug/L dry	
1,1-Dichloroethene	ND	< 5.0	5.0	ug/L dry	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L dry	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L dry	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L dry	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L dry	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L dry	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L dry	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L dry	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L dry	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L dry	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L dry	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L dry	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L dry	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L dry	
Benzene	ND	< 5.0	5.0	ug/L dry	
Bromobenzene	ND	< 5.0	5.0	ug/L dry	
Bromochloromethane	ND	< 5.0	5.0	ug/L dry	
Bromodichloromethane	ND	< 5.0	5.0	ug/L dry	
Bromoform	ND	< 5.0	5.0	ug/L dry	
Bromomethane	ND	< 5.0	5.0	ug/L dry	
Carbon tetrachloride	ND	< 5.0	5.0	ug/L dry	
Chlorobenzene	ND	< 5.0	5.0	ug/L dry	

MICROBIOS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007120-03
Report Date: 21 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
TANK	Water	25 Jul. 00 14:40	27 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorodibromomethane	ND	< 5.0	5.0	ug/L dry	8260B
Chloroethane	ND	< 5.0	5.0	ug/L dry	
Chloroform	ND	< 5.0	5.0	ug/L dry	
Chloromethane	ND	< 5.0	5.0	ug/L dry	
cis-1,2-Dichloroethene	J	3.5	5.0	ug/L dry	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L dry	
Dibromomethane	ND	< 5.0	5.0	ug/L dry	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L dry	
Ethylbenzene	ND	< 5.0	5.0	ug/L dry	
Isopropylbenzene	ND	< 5.0	5.0	ug/L dry	
m & p-Xylene	ND	< 10	10	ug/L dry	
Methylene Chloride	ND	< 5.0	5.0	ug/L dry	
Naphthalene	ND	< 5.0	5.0	ug/L dry	
n-Butylbenzene	ND	< 5.0	5.0	ug/L dry	
n-Propylbenzene	ND	< 5.0	5.0	ug/L dry	
o-Xylene	ND	< 5.0	5.0	ug/L dry	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L dry	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L dry	
Styrene	ND	< 5.0	5.0	ug/L dry	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L dry	
Tetrachloroethene	ND	< 5.0	5.0	ug/L dry	
Toluene	J	4.1	5.0	ug/L dry	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L dry	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L dry	
Trichloroethene		38	5.0	ug/L dry	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L dry	
Vinyl Chloride	ND	< 5.0	5.0	ug/L dry	

MICROBEAS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007120-04
Report Date: 21 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
FIELD BLANK	Water	25 Jul. 00 7:00	27 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
1,1,1,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L dry	8260B
1,1,1-Trichloroethane	ND	< 5.0	5.0	ug/L dry	
1,1,2,2-Tetrachloroethane	ND	< 5.0	5.0	ug/L dry	
1,1,2-Trichloroethane	ND	< 5.0	5.0	ug/L dry	
1,1-Dichloroethane	ND	< 5.0	5.0	ug/L dry	
1,1-Dichloroethene	ND	< 5.0	5.0	ug/L dry	
1,1-Dichloropropene	ND	< 5.0	5.0	ug/L dry	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L dry	
1,2,4-Trichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,2,4-Trimethylbenzene	ND	< 5.0	5.0	ug/L dry	
1,2-Dibromo-3-chloropropane	ND	< 20	20	ug/L dry	
1,2-Dibromoethane	ND	< 5.0	5.0	ug/L dry	
1,2-Dichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,2-Dichloroethane	ND	< 5.0	5.0	ug/L dry	
1,2-Dichloropropane	ND	< 5.0	5.0	ug/L dry	
1,3,5-Trimethylbenzene	ND	< 5.0	5.0	ug/L dry	
1,3-Dichlorobenzene	ND	< 5.0	5.0	ug/L dry	
1,3-Dichloropropane	ND	< 5.0	5.0	ug/L dry	
1,4-Dichlorobenzene	ND	< 5.0	5.0	ug/L dry	
2,2-Dichloropropane	ND	< 5.0	5.0	ug/L dry	
2-Chlorotoluene	ND	< 5.0	5.0	ug/L dry	
4-Chlorotoluene	ND	< 5.0	5.0	ug/L dry	
Benzene	ND	< 5.0	5.0	ug/L dry	
Bromobenzene	ND	< 5.0	5.0	ug/L dry	
Bromochloromethane	ND	< 5.0	5.0	ug/L dry	
Bromodichloromethane	ND	< 5.0	5.0	ug/L dry	
Bromoform	ND	< 5.0	5.0	ug/L dry	
Bromomethane	ND	< 5.0	5.0	ug/L dry	
Carbon tetrachloride	ND	< 5.0	5.0	ug/L dry	
Chlorobenzene	ND	< 5.0	5.0	ug/L dry	

MICROBETS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0007120-04
Report Date: 21 Aug. 00

Sample Description	Matrix	Sampled Date/Time	Received
FIELD BLANK	Water	25 Jul. 00 7:00	27 Jul. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorodibromomethane	ND	< 5.0	5.0	ug/L dry	8260B
Chloroethane	ND	< 5.0	5.0	ug/L dry	
Chloroform	J	1.8	5.0	ug/L dry	
Chloromethane	ND	< 5.0	5.0	ug/L dry	
cis-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L dry	
cis-1,3-Dichlororopene	ND	< 5.0	5.0	ug/L dry	
Dibromomethane	ND	< 5.0	5.0	ug/L dry	
Dichlorodifluoromethane	ND	< 5.0	5.0	ug/L dry	
Ethylbenzene	ND	< 5.0	5.0	ug/L dry	
Isopropylbenzene	ND	< 5.0	5.0	ug/L dry	
m & p-Xylene	ND	< 10	10	ug/L dry	
Methylene Chloride	ND	< 5.0	5.0	ug/L dry	
Naphthalene	ND	< 5.0	5.0	ug/L dry	
n-Butylbenzene	ND	< 5.0	5.0	ug/L dry	
n-Propylbenzene	ND	< 5.0	5.0	ug/L dry	
o-Xylene	ND	< 5.0	5.0	ug/L dry	
p-Isopropyltoluene	ND	< 5.0	5.0	ug/L dry	
sec-Butylbenzene	ND	< 5.0	5.0	ug/L dry	
Styrene	ND	< 5.0	5.0	ug/L dry	
tert-Butylbenzene	ND	< 5.0	5.0	ug/L dry	
Tetrachloroethene	ND	< 5.0	5.0	ug/L dry	
Toluene	ND	< 5.0	5.0	ug/L dry	
trans-1,2-Dichloroethene	ND	< 5.0	5.0	ug/L dry	
trans-1,3-Dichloropropene	ND	< 5.0	5.0	ug/L dry	
Trichloroethene	J	1.2	5.0	ug/L dry	
Trichlorofluoromethane	ND	< 5.0	5.0	ug/L dry	
Vinyl Chloride	ND	< 5.0	5.0	ug/L dry	

MICROBETS

Microseeps

P7120

----- PARSONS ENGINEERING SCIENCE, INC. -----
----- LOCATION: NSA MID SOUTH SITE N6 -----

Sample Names	Methane mg/l	Methane ug/l	Ethane ng/l	Ethylene ng/l	Lab ID	Date Sampled	Date Received	Date Analyzed	Analyst
PESMW15	*	0.205	7	16	X18 041	07/25/00	07/27/00	7/28/00	RCW
007G15LF	*	13.37	5721	5615	X18 042	07/25/00	07/27/00	7/28/00	RCW
DETECTION LIMITS	0.07mg/l	0.015ug/l	5ng/l	5ng/l					

* Result taken from alternate detector

ANALYST INITIALS RCW

REVIEW

P7120

---- QUALITY CONTROL ----

---- PARSONS ENGINEERING SCIENCE, INC. ----
---- LOCATION: NSA MID SOUTH SITE N6 ----

CONTINUING CALIBRATION STANDARDS 07/28/00

COMPOUND	FILE ID	TRUE CONC.	MEASURED	% DIFF.
METHANE (TCD)	X18 038	5.48	5.26	3.99
METHANE (FID)	X18 039	36.66	38.83	5.93
ETHANE	X18 039	23582	23240	1.45
ETHYLENE	X18 039	26641	25165	5.54

METHOD BLANK 07/28/00

COMPOUND	FILE ID	DET. LIMIT	MEASURED
METHANE (TCD)	X18 040	0.07mg/l	ND
METHANE (FID)	X18 040	0.015ug/l	ND
ETHANE	X18 040	5ng/l	ND
ETHYLENE	X18 040	5ng/l	ND

ANALYST INITIALS RCW

REVIEW

APPENDIX A.2

ANALYTICAL DATA – NOVEMBER 2000

MICROSEEPS

Parson's Engineering Science

Project Number: 737490.03000

NSA Mid South

Parson's Contact: Mr. Bruce Henry

Becky Hans

Microseeps Contact: Becky Hans
December 29, 2000

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

CASE NARRATIVE

Parson's Engineering Science
NAS Mid South
Project #: 737490.030000

The following were samples analyzed by Microseeps, Inc.

Parson's Identification Number	Lab ID number
PES-MW3S/111000	P0011113-01
PES-MW3D/111000	P0011113-02
PES-INJ2D/111000	P0011113-03
PES-INJ2D/111000	P0011113-04
PES-INJ3S/111000	P0011113-05
PES-INJ3S/111000 MS	P0011113-06
PES-INJ3S/111000 MSD	P0011113-07
PES-INJ2S/111000	P0011113-08
PES-DP4/111000	P0011113-09
FIELD BLANK 2	P0011113-10
PES-INJ3D/11113	P0011113-11
PES-MW1/110700	P0011098-01
PES-DP1/110700	P0011098-02
007GL15UF	P0011098-03
PES-MW1D/110800	P0011098-04
PES-MW1D/110800 MS	P0011098-05
PES-MW1D/110800 MSD	P0011098-06
007GL15LF	P0011098-07
PES-MW8S/110800	P0011098-08
PES-MW8S/110800 MS	P0011098-09
PES-MW8S/110800 MSD	P0011098-10
PES-MW8D/110800	P0011098-11
PES-MW7S/110800	P0011098-12
PES-MW7D/110800	P0011098-13
RINSEATE BLANK	P0011098-14
PES-MW5D/110900	P0011098-15
PES-MW5S/110900	P0011098-16
PES-MW6S/110900	P0011098-17
PES-DP2/110900	P0011098-18
PES-DP1/110900	P0011098-19
PES-MW6D/110900	P0011098-20

Dup of PES-MW1S/110700 for VOCs, Dissolved Gases & Alkalinity

Dup of PES-MW5D for VOCs

Parsons Identification Number	Lab ID Number
PES-MW4S/110900	P0011098-21
PES-MW4D/111000	P0011098-22
PES-DP3/111000	P0011098-23
FIELD BLANK 1	P0011098-24
PES-MW2D/111000	P0011098-25
PES-MW2S/111000	P011098-26

All samples were found to be intact.

Organic Data:

Samples that were sent in for volatile analysis have been reported off of multiple dilutions. In many cases data was reported from a low level, a medium level and a high level analysis. If any analyte fell between these three dilutions, the result would be reported as an estimated concentration with a "J" flag.

General Chemistry:

No anomalies were detected during any of the general chemistry analyses.

Metals:

No anomalies were detected during any of the general chemistry analyses.

Risk Analysis:

No anomalies were detected during any of the general chemistry analyses.

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway

Denver, CO 80290

Page: Page 1 of 77
Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Sample Identification

Lab Sample #	Client Sample ID
P0011098-01	PES-MW1/110700
P0011098-02	PES-DP1/110700
P0011098-03	007GL15UF
P0011098-04	PES-MW1D/110800
P0011098-05	PES-MW1D/110800 MS
P0011098-06	PES-MW1D/110800 MSD
P0011098-07	007GL15LF
P0011098-08	PES-MW8S/110800
P0011098-09	PES-MW8S/110800 MS
P0011098-10	PES-MW8S/110800MSD
P0011098-11	PES-MW8D/110800
P0011098-12	PES-MW7S/110900
P0011098-13	PES-MW7D/110900
P0011098-14	RINSEATE BLANK
P0011098-15	PES-MW5D/110900
P0011098-16	PES-MW5S/110900
P0011098-17	PES-MW6S/110900
P0011098-18	PES-DP2/110900
P0011098-19	PES-DP1/110900
P0011098-20	PES-MW6D/110900
P0011098-21	PES-MW4S/110900
P0011098-22	PES-MW4D/111000
P0011098-23	PES-DP3/111000
P0011098-24	FIELD BLANK 1
P0011098-25	PES-MW2D/111000
P0011098-26	PES-MW2S/111000

Approved By: Rebecca J. Hamo

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1/110700	Water	07 Nov. 00 16:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N	J	0.011	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		17	5.0	ug/L	
1,1-Dichloroethene		23	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-01
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1/110700	Water	07 Nov. 00 16:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromochloromethane		< 5.0	5.0	ug/L	8260B
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform	J	2.1	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		9.1	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene	J	1.8	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	

MICROSCIENCES

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-01
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1/110700	Water	07 Nov. 00 16:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	8260B
Trichloroethene		22	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		55000	5.0	ng/L	AM18
Ethene		20000	5.0	ng/L	
Methane		430	0.015	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP1/110700	Water	07 Nov. 00 7:00	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N	J	0.010	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		18	5.0	ug/L	
1,1-Dichloroethene		24	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	

MICROSTEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-02
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP1/110700	Water	07 Nov. 00 7:00	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromochloromethane		< 5.0	5.0	ug/L	8260B
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform	J	2.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		9.2	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene	J	2.2	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-02
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP1/110700	Water	07 Nov. 00 7:00	13 Nov. 00

Anaiyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	8260B
Trichloroethene		22	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		54000	5.0	ng/L	AM18
Ethene		20000	5.0	ng/L	
Methane		420	0.015	ug/L	

MICROBETS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-03

Sample Description	Matrix	Sampled Date/Time	Received
007GL15UF	Water	08 Nov. 00 10:00	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N	J	0.018	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		51	5.0	ug/L	
1,1-Dichloroethene		340	50	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene	J	2.6	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	

UNCORRECTED

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-03
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
007GL15UF	Water	08 Nov. 00 10:00	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromochloromethane		< 5.0	5.0	ug/L	8260B
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride	J	3.7	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		12	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene	J	2.6	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	

MICROBETA

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-03
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
007GL15UF	Water	08 Nov. 00 10:00	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	8260B
Trichloroethene		380	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		340	5.0	ng/L	AM18
Ethene		400	5.0	ng/L	
Methane		32	0.015	ug/L	

MICROBIOTICS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-04

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D/110800	Water	08 Nov. 00 7:55	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N	J	0.047	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	

MICROSTRIPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-04
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D/110800	Water	08 Nov. 00 7:55	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromochloromethane		< 5.0	5.0	ug/L	8260B
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene	J	1.6	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	

MICROBACTS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-04
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D/110800	Water	08 Nov. 00 7:55	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	8260B
Trichloroethene		< 5.0	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		720	5.0	ng/L	AM18
Ethene		420	5.0	ng/L	
Methane		56	0.015	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-05
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D/110800 MS	Water	08 Nov. 00 7:55	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		47	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		46	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-05
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D/110800 MS	Water	08 Nov. 00 7:55	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		48	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		53	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		47	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSTICS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-05
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D/110800 MS	Water	08 Nov. 00 7:55	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEDS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-06
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D/110800 MSD	Water	08 Nov. 00 7:55	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		47	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		47	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-06
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D/110800 MSD	Water	08 Nov. 00 7:55	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		49	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		53	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		48	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-06
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D/110800 MSD	Water	08 Nov. 00 7:55	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-07

Sample Description	Matrix	Sampled Date/Time	Received
007GL15LF	Water	08 Nov. 00 11:35	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.12	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	2.6	5.0	ug/L	
1,1-Dichloroethene		10	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	

MICROSELECTS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-07
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
007GL15LF	Water	08 Nov. 00 11:35	13 Nov. 00

Analyt (s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromochloromethane		< 5.0	5.0	ug/L	8260B
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		25	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		6.9	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene	J	2.2	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	

MICROSELECTS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-07
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
007GL15LF	Water	08 Nov. 00 11:35	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	8260B
Trichloroethene		14	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		150	5.0	ng/L	AM18
Ethene		220	5.0	ng/L	
Methane		0.71	0.015	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S/110800	Water	08 Nov. 00 14:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.21	0.050	mg/L	353.3
Total Organic Carbon		3.4	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		16	5.0	ug/L	
1,1-Dichloroethene		38	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEELS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-08
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S/110800	Water	08 Nov. 00 14:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene		< 5.0	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		8.3	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		17	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	1.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-08
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S/110800	Water	08 Nov. 00 14:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.9	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		98	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		1000	5.0	ng/L	AM18
Ethene		2400	5.0	ng/L	
Methane		67	0.015	ug/L	

MICROSEETS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-09
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S/110800 MS	Water	08 Nov. 00 14:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		18	5.0	ug/L	
1,1-Dichloroethene		96	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		46	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSTEIS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-09
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S/110800 MS	Water	08 Nov. 00 14:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		11	5.0	ug/L	
Chlorobenzene		48	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		20	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	1.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		52	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		160	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSHEETS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-09
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S/110800 MS	Water	08 Nov. 00 14:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-10
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S/110800MSD	Water	08 Nov. 00 14:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		19	5.0	ug/L	
1,1-Dichloroethene		99	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		48	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSEELS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-10
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S/110800MSD	Water	08 Nov. 00 14:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		7.9	5.0	ug/L	
Chlorobenzene		50	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		20	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	1.1	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		55	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		160	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-10
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S/110800MSD	Water	08 Nov. 00 14:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-11

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D/110800	Water	08 Nov. 00 16:20	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.32	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	3.6	5.0	ug/L	
1,1-Dichloroethene		16	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-11
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D/110800	Water	08 Nov. 00 16:20	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene		< 5.0	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		97	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		86	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	2.6	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSTATS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-11
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D/110800	Water	08 Nov. 00 16:20	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.9	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		720	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		1100	5.0	ng/L	AM18
Ethene		1400	5.0	ng/L	
Methane		8.2	0.015	ug/L	

MICROBIAS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-12

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7S/110900	Water	09 Nov. 00 8:05	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		< 0.050	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		82	5.0	ug/L	
1,1-Dichloroethene		100	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-12
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7S/110900	Water	09 Nov. 00 8:05	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	1.1	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		6.4	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		23	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		28	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-12
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7S/110900	Water	09 Nov. 00 8:05	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.7	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		150	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		5600	5.0	ng/L	AM18
Ethene		5900	5.0	ng/L	
Methane		67	0.015	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-13

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D/110900	Water	09 Nov. 00 9:20	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		3.0	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	4.4	5.0	ug/L	
1,1-Dichloroethene		20	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROBATCH

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-13
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D/110900	Water	09 Nov. 00 9:20	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	1.6	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		260	100	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		150	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	4.5	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSTATS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-13
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D/110900	Water	09 Nov. 00 9:20	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.5	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		980	100	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		640	5.0	ng/L	AM18
Ethene		1500	5.0	ng/L	
Methane		18	0.015	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-14
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
RINSEATE BLANK	Water	09 Nov. 00 10:15	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-14
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
RINSEATE BLANK	Water	09 Nov. 00 10:15	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride	J	2.2	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform	J	3.6	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene	J	1.1	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		12	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-14
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
RINSEATE BLANK	Water	09 Nov. 00 10:15	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-15

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5D/110900	Water	09 Nov. 00 13:00	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.81	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		6.4	5.0	ug/L	
1,1-Dichloroethene		40	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSTATS

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-15
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5D/110900	Water	09 Nov. 00 13:00	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	1.4	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		160	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		130	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		6.9	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSYSTEMS

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-15
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5D/110900	Water	09 Nov. 00 13:00	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	2.1	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		690	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		3600	5.0	ng/L	AM18
Ethene		2700	5.0	ng/L	
Methane		13	0.015	ug/L	

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-16

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5S/110900	Water	09 Nov. 00 11:05	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N	J	0.004	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		62	5.0	ug/L	
1,1-Dichloroethene		88	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-16
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5S/110900	Water	09 Nov. 00 11:05	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	1.4	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		8.2	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		38	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		6.9	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-16
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5S/110900	Water	09 Nov. 00 11:05	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.3	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		220	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		5100	5.0	ng/L	AM18
Ethene		7800	5.0	ng/L	
Methane		58	0.015	ug/L	

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-17

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6S/110900	Water	09 Nov. 00 14:30	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.18	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		28	5.0	ug/L	
1,1-Dichloroethene		160	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-17
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6S/110900	Water	09 Nov. 00 14:30	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene		6.2	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		57	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		140	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		17	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	1.2	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene	J	1.4	5.0	ug/L	

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-17
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6S/110900	Water	09 Nov. 00 14:30	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.4	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		1100	100	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		1000	5.0	ng/L	AM18
Ethene		2700	5.0	ng/L	
Methane		58	0.015	ug/L	

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-18

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP2/110900	Water	09 Nov. 00 18:00	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.14	0.050	mg/L	353.3
Total Organic Carbon		3.7	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		29	5.0	ug/L	
1,1-Dichloroethene		160	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-18
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP2/110900	Water	09 Nov. 00 18:00	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene		6.5	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		63	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		140	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		18	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	1.3	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene	J	1.6	5.0	ug/L	

MICROSECTS

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-18
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP2/110900	Water	09 Nov. 00 18:00	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.6	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		1200	100	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		940	5.0	ng/L	AM18
Ethene		2500	5.0	ng/L	
Methane		54	0.015	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-19

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP1/110900	Water	09 Nov. 00 7:00	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Total Organic Carbon		< 2.0	2.0	mg/L	9060

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-20

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D/110900	Water	09 Nov. 00 16:15	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.70	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		5.8	5.0	ug/L	
1,1-Dichloroethene		51	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEELS

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-20
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D/110900	Water	09 Nov. 00 16:15	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene		< 5.0	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		17	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		28	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	4.6	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSTATS

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-20
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D/110900	Water	09 Nov. 00 16:15	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.9	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		200	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		680	5.0	ng/L	AM18
Ethene		210	5.0	ng/L	
Methane		1.6	0.015	ug/L	

MICROSEETS

Order #: P0011098
Report Date: 12/19/00
Client Proj Nam Vegetable Oil Study - Navy
Client Proj # 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-21

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4S/110900	Water	09 Nov. 00 17:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.066	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		21	5.0	ug/L	
1,1-Dichloroethene		120	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-21
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4S/110900	Water	09 Nov. 00 17:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene		5.1	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		57	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		160	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		13	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	1.3	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene	J	1.0	5.0	ug/L	

MICROSTEELS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-21
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4S/110900	Water	09 Nov. 00 17:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	2.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		1000	100	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		1800	5.0	ng/L	AM18
Ethene		4000	5.0	ng/L	
Methane		52	0.015	ug/L	

MICROSEELS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-22

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D/111000	Water	10 Nov. 00 10:55	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.47	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		5.8	5.0	ug/L	
1,1-Dichloroethene		39	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEELS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-22
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D/111000	Water	10 Nov. 00 10:55	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene		< 5.0	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		9.1	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		18	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	3.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSTECS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-22
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D/111000	Water	10 Nov. 00 10:55	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.5	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		140	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		420	5.0	ng/L	AM18
Ethene		200	5.0	ng/L	
Methane		1.6	0.015	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-23

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP3/111000	Water	10 Nov. 00 8:00	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.15	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		5.4	5.0	ug/L	
1,1-Dichloroethene		34	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane	ND	< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-23
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP3/111000	Water	10 Nov. 00 8:00	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene		< 5.0	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		7.8	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		16	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	2.8	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSELECT

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-23
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP3/111000	Water	10 Nov. 00 8:00	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.3	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		120	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		450	5.0	ng/L	AM18
Ethene		270	5.0	ng/L	
Methane		1.6	0.015	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-24
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
FIELD BLANK 1	Water	10 Nov. 00 12:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane	J	1.1	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSELECTS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-24
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
FIELD BLANK 1	Water	10 Nov. 00 12:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		9.6	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene	J	1.2	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		< 5.0	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSELECTS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-24
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
FIELD BLANK 1	Water	10 Nov. 00 12:50	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-25

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2D/111000	Water	10 Nov. 00 13:45	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.077	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		17	5.0	ug/L	
1,1-Dichloroethene		150	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-25
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2D/111000	Water	10 Nov. 00 13:45	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	1.7	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		8.3	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		29	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		8.8	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-25
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2D/111000	Water	10 Nov. 00 13:45	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.1	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		260	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		2700	5.0	ng/L	AM18
Ethene		2000	5.0	ng/L	
Methane		17	0.015	ug/L	

MICROSEETS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-26

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2S/111000	Water	10 Nov. 00 12:30	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.20	0.050	mg/L	353.3
Total Organic Carbon		24	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		24	5.0	ug/L	
1,1-Dichloroethene		140	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	ND	< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-26
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2S/111000	Water	10 Nov. 00 12:30	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	5.0	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		100	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		140	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		14	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	1.1	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene	J	1.0	5.0	ug/L	

MICROBELS

Order #: P0011098
Report Date: 12/19/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011098-26
Report Date: 19 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2S/111000	Water	10 Nov. 00 12:30	13 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene		< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		1000	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		750	5.0	ng/L	AM18
Ethene		1700	5.0	ng/L	
Methane		35	0.015	ug/L	

MICROSEEPS

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway

Denver, CO 80290

Page: Page 1 of 34
Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Sample Identification

Lab Sample #	Client Sample ID
P0011113-01	PES-MW3S/111000
P0011113-02	PES-MW3D/111000
P0011113-03	PES-INJ2D/111100
P0011113-04	PES-INJ2D/111100
P0011113-05	PES-INJ3S/111100
P0011113-06	PES-INJ3S/111100 MS
P0011113-07	PES-INJ3S/111100 MSD
P0011113-08	PES-INJ2S/111100
P0011113-09	PES-DP4/111100
P0011113-10	FIELD BLANK 2
P0011113-11	PES-INJ3D/111100

Approved By: P B Phillips

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3S/111000	Water	10 Nov. 00 16:35	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		< 0.050	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		50	5.0	ug/L	
1,1-Dichloroethene		150	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene	J	1.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEELS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-01
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3S/111000	Water	10 Nov. 00 16:35	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	3.2	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride	J	4.6	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		47	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		12	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	1.8	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene	J	1.1	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSTATS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-01
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3S/111000	Water	10 Nov. 00 16:35	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.3	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		350	100	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		17000	5.0	ng/L	AM18
Ethene		17000	5.0	ng/L	
Methane		130	0.015	ug/L	

MICROSEEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D/111000	Water	10 Nov. 00 17:50	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		1.8	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		13	5.0	ug/L	
1,1-Dichloroethene		64	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-02
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D/111000	Water	10 Nov. 00 17:50	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	1.5	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		60	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		68	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		9.9	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-02
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D/111000	Water	10 Nov. 00 17:50	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.1	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		420	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		1300	5.0	ng/L	AM18
Ethene		28000	5.0	ng/L	
Methane		12	0.015	ug/L	

MICROSEEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-03
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D/111100	Water	11 Nov. 00 7:40	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-03
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D/111100	Water	11 Nov. 00 7:40	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene	J	2.1	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-03
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D/111100	Water	11 Nov. 00 7:40	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-04
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D/111100	Water	11 Nov. 00 8:13	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 250	250	ug/L	8260B
1,1,1-Trichloroethane		< 250	250	ug/L	
1,1,2,2-Tetrachloroethane		< 250	250	ug/L	
1,1,2-Trichloroethane		< 250	250	ug/L	
1,1-Dichloroethane		< 250	250	ug/L	
1,1-Dichloroethene		< 250	250	ug/L	
1,1-Dichloropropene		< 250	250	ug/L	
1,2,3-Trichlorobenzene		< 250	250	ug/L	
1,2,3-Trichloropropane		< 250	250	ug/L	
1,2,4-Trichlorobenzene		< 250	250	ug/L	
1,2,4-Trimethylbenzene		< 250	250	ug/L	
1,2-Dibromo-3-chloropropane		< 1000	1000	ug/L	
1,2-Dibromoethane		< 250	250	ug/L	
1,2-Dichlorobenzene		< 250	250	ug/L	
1,2-Dichloroethane		< 250	250	ug/L	
1,2-Dichloropropane		< 250	250	ug/L	
1,3,5-Trimethylbenzene		< 250	250	ug/L	
1,3-Dichlorobenzene		< 250	250	ug/L	
1,3-Dichloropropane		< 250	250	ug/L	
1,4-Dichlorobenzene		< 250	250	ug/L	
2,2-Dichloropropane		< 250	250	ug/L	
2-Chlorotoluene		< 250	250	ug/L	
4-Chlorotoluene		< 250	250	ug/L	
Benzene		< 250	250	ug/L	
Bromobenzene		< 250	250	ug/L	
Bromochloromethane		< 250	250	ug/L	
Bromodichloromethane		< 250	250	ug/L	
Bromoform		< 250	250	ug/L	

MICROSTEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-04
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D/111100	Water	11 Nov. 00 8:13	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 250	250	ug/L	8260B
Carbon tetrachloride		< 250	250	ug/L	
Chlorobenzene		< 250	250	ug/L	
Chlorodibromomethane		< 250	250	ug/L	
Chloroethane		< 250	250	ug/L	
Chloroform		< 250	250	ug/L	
Chloromethane		< 250	250	ug/L	
cis-1,2-Dichloroethene		< 250	250	ug/L	
cis-1,3-Dichloropropene		< 250	250	ug/L	
Dibromomethane		< 250	250	ug/L	
Dichlorodifluoromethane		< 250	250	ug/L	
Ethylbenzene		< 250	250	ug/L	
Isopropylbenzene		< 250	250	ug/L	
m & p-Xylene		< 500	500	ug/L	
Methylene Chloride		< 250	250	ug/L	
Naphthalene		< 250	250	ug/L	
n-Butylbenzene		< 250	250	ug/L	
n-Propylbenzene		< 250	250	ug/L	
o-Xylene		< 250	250	ug/L	
p-Isopropyltoluene		< 250	250	ug/L	
sec-Butylbenzene		< 250	250	ug/L	
Styrene		< 250	250	ug/L	
tert-Butylbenzene		< 250	250	ug/L	
Tetrachloroethene		< 250	250	ug/L	
Toluene		< 250	250	ug/L	
trans-1,2-Dichloroethene		< 250	250	ug/L	
trans-1,3-Dichloropropene		< 250	250	ug/L	
Trichloroethene		< 250	250	ug/L	
Trichlorofluoromethane		< 250	250	ug/L	

MICROSTEELS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-04
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D/111100	Water	11 Nov. 00 8:13	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 250	250	ug/L	8260B

MICROSERVICES

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-05
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/111100	Water	11 Nov. 00 9:46	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 250	250	ug/L	8260B
1,1,1-Trichloroethane		< 250	250	ug/L	
1,1,2,2-Tetrachloroethane		< 250	250	ug/L	
1,1,2-Trichloroethane		< 250	250	ug/L	
1,1-Dichloroethane		< 250	250	ug/L	
1,1-Dichloroethene		< 250	250	ug/L	
1,1-Dichloropropene		< 250	250	ug/L	
1,2,3-Trichlorobenzene		< 250	250	ug/L	
1,2,3-Trichloropropane		< 250	250	ug/L	
1,2,4-Trichlorobenzene		< 250	250	ug/L	
1,2,4-Trimethylbenzene		< 250	250	ug/L	
1,2-Dibromo-3-chloropropane		< 1000	1000	ug/L	
1,2-Dibromoethane		< 250	250	ug/L	
1,2-Dichlorobenzene		< 250	250	ug/L	
1,2-Dichloroethane		< 250	250	ug/L	
1,2-Dichloropropane		< 250	250	ug/L	
1,3,5-Trimethylbenzene		< 250	250	ug/L	
1,3-Dichlorobenzene		< 250	250	ug/L	
1,3-Dichloropropane		< 250	250	ug/L	
1,4-Dichlorobenzene		< 250	250	ug/L	
2,2-Dichloropropane		< 250	250	ug/L	
2-Chlorotoluene		< 250	250	ug/L	
4-Chlorotoluene		< 250	250	ug/L	
Benzene		< 250	250	ug/L	
Bromobenzene		< 250	250	ug/L	
Bromochloromethane		< 250	250	ug/L	
Bromodichloromethane		< 250	250	ug/L	
Bromoform		< 250	250	ug/L	

MICROSEEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-05
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/111100	Water	11 Nov. 00 9:46	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 250	250	ug/L	8260B
Carbon tetrachloride		< 250	250	ug/L	
Chlorobenzene		< 250	250	ug/L	
Chlorodibromomethane		< 250	250	ug/L	
Chloroethane		< 250	250	ug/L	
Chloroform		< 250	250	ug/L	
Chloromethane		< 250	250	ug/L	
cis-1,2-Dichloroethene		< 250	250	ug/L	
cis-1,3-Dichloropropene		< 250	250	ug/L	
Dibromomethane		< 250	250	ug/L	
Dichlorodifluoromethane		< 250	250	ug/L	
Ethylbenzene		< 250	250	ug/L	
Isopropylbenzene		< 250	250	ug/L	
m & p-Xylene		< 500	500	ug/L	
Methylene Chloride		< 250	250	ug/L	
Naphthalene		< 250	250	ug/L	
n-Butylbenzene		< 250	250	ug/L	
n-Propylbenzene		< 250	250	ug/L	
o-Xylene		< 250	250	ug/L	
p-Isopropyltoluene		< 250	250	ug/L	
sec-Butylbenzene		< 250	250	ug/L	
Styrene		< 250	250	ug/L	
tert-Butylbenzene		< 250	250	ug/L	
Tetrachloroethene		< 250	250	ug/L	
Toluene		< 250	250	ug/L	
trans-1,2-Dichloroethene		< 250	250	ug/L	
trans-1,3-Dichloropropene		< 250	250	ug/L	
Trichloroethene		< 250	250	ug/L	
Trichlorofluoromethane		< 250	250	ug/L	

MICROSTUDIES

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-05
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/111100	Water	11 Nov. 00 9:46	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 250	250	ug/L	8260B

MICROSEEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-06
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/111100 MS	Water	11 Nov. 00 9:46	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 250	250	ug/L	8260B
1,1,1-Trichloroethane		< 250	250	ug/L	
1,1,2,2-Tetrachloroethane		< 250	250	ug/L	
1,1,2-Trichloroethane		< 250	250	ug/L	
1,1-Dichloroethane		< 250	250	ug/L	
1,1-Dichloroethene		< 250	250	ug/L	
1,1-Dichloropropene		< 250	250	ug/L	
1,2,3-Trichlorobenzene		< 250	250	ug/L	
1,2,3-Trichloropropane		< 250	250	ug/L	
1,2,4-Trichlorobenzene		< 250	250	ug/L	
1,2,4-Trimethylbenzene		< 250	250	ug/L	
1,2-Dibromo-3-chloropropane		< 1000	1000	ug/L	
1,2-Dibromoethane		< 250	250	ug/L	
1,2-Dichlorobenzene		< 250	250	ug/L	
1,2-Dichloroethane		< 250	250	ug/L	
1,2-Dichloropropane		< 250	250	ug/L	
1,3,5-Trimethylbenzene		< 250	250	ug/L	
1,3-Dichlorobenzene		< 250	250	ug/L	
1,3-Dichloropropane		< 250	250	ug/L	
1,4-Dichlorobenzene		< 250	250	ug/L	
2,2-Dichloropropane		< 250	250	ug/L	
2-Chlorotoluene		< 250	250	ug/L	
4-Chlorotoluene		< 250	250	ug/L	
Benzene		2400	250	ug/L	
Bromobenzene		< 250	250	ug/L	
Bromochloromethane		< 250	250	ug/L	
Bromodichloromethane		< 250	250	ug/L	
Bromoform		< 250	250	ug/L	

MICROSETS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-06
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/111100 MS	Water	11 Nov. 00 9:46	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 250	250	ug/L	8260B
Carbon tetrachloride		< 250	250	ug/L	
Chlorobenzene		2400	250	ug/L	
Chlorodibromomethane		< 250	250	ug/L	
Chloroethane		< 250	250	ug/L	
Chloroform		< 250	250	ug/L	
Chloromethane		< 250	250	ug/L	
cis-1,2-Dichloroethene		< 250	250	ug/L	
cis-1,3-Dichloropropene		< 250	250	ug/L	
Dibromomethane		< 250	250	ug/L	
Dichlorodifluoromethane		< 250	250	ug/L	
Ethylbenzene		< 250	250	ug/L	
Isopropylbenzene		< 250	250	ug/L	
m & p-Xylene		< 500	500	ug/L	
Methylene Chloride		< 250	250	ug/L	
Naphthalene		< 250	250	ug/L	
n-Butylbenzene		< 250	250	ug/L	
n-Propylbenzene		< 250	250	ug/L	
o-Xylene		< 250	250	ug/L	
p-Isopropyltoluene		< 250	250	ug/L	
sec-Butylbenzene		< 250	250	ug/L	
Styrene		< 250	250	ug/L	
tert-Butylbenzene		< 250	250	ug/L	
Tetrachloroethene		< 250	250	ug/L	
Toluene		2600	250	ug/L	
trans-1,2-Dichloroethene		< 250	250	ug/L	
trans-1,3-Dichloropropene		< 250	250	ug/L	
Trichloroethene		2400	250	ug/L	
Trichlorofluoromethane		< 250	250	ug/L	

MICROSEEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-06
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/111100 MS	Water	11 Nov. 00 9:46	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 250	250	ug/L	8260B

MICROSEEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-07
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/111100 MSD	Water	11 Nov. 00 9:46	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 250	250	ug/L	8260B
1,1,1-Trichloroethane		< 250	250	ug/L	
1,1,2,2-Tetrachloroethane		< 250	250	ug/L	
1,1,2-Trichloroethane		< 250	250	ug/L	
1,1-Dichloroethane		< 250	250	ug/L	
1,1-Dichloroethene		< 250	250	ug/L	
1,1-Dichloropropene		< 250	250	ug/L	
1,2,3-Trichlorobenzene		< 250	250	ug/L	
1,2,3-Trichloropropane		< 250	250	ug/L	
1,2,4-Trichlorobenzene		< 250	250	ug/L	
1,2,4-Trimethylbenzene		< 250	250	ug/L	
1,2-Dibromo-3-chloropropane		< 1000	1000	ug/L	
1,2-Dibromoethane		< 250	250	ug/L	
1,2-Dichlorobenzene		< 250	250	ug/L	
1,2-Dichloroethane		< 250	250	ug/L	
1,2-Dichloropropane		< 250	250	ug/L	
1,3,5-Trimethylbenzene		< 250	250	ug/L	
1,3-Dichlorobenzene		< 250	250	ug/L	
1,3-Dichloropropane		< 250	250	ug/L	
1,4-Dichlorobenzene		< 250	250	ug/L	
2,2-Dichloropropane		< 250	250	ug/L	
2-Chlorotoluene		< 250	250	ug/L	
4-Chlorotoluene		< 250	250	ug/L	
Benzene		2400	250	ug/L	
Bromobenzene		< 250	250	ug/L	
Bromochloromethane		< 250	250	ug/L	
Bromodichloromethane		< 250	250	ug/L	
Bromoform		< 250	250	ug/L	

MICROSEEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-07
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/111100 MSD	Water	11 Nov. 00 9:46	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 250	250	ug/L	8260B
Carbon tetrachloride		< 250	250	ug/L	
Chlorobenzene		2500	250	ug/L	
Chlorodibromomethane		< 250	250	ug/L	
Chloroethane		< 250	250	ug/L	
Chloroform		< 250	250	ug/L	
Chloromethane		< 250	250	ug/L	
cis-1,2-Dichloroethene		< 250	250	ug/L	
cis-1,3-Dichloropropene		< 250	250	ug/L	
Dibromomethane		< 250	250	ug/L	
Dichlorodifluoromethane		< 250	250	ug/L	
Ethylbenzene		< 250	250	ug/L	
Isopropylbenzene		< 250	250	ug/L	
m & p-Xylene		< 500	500	ug/L	
Methylene Chloride		< 250	250	ug/L	
Naphthalene		< 250	250	ug/L	
n-Butylbenzene		< 250	250	ug/L	
n-Propylbenzene		< 250	250	ug/L	
o-Xylene		< 250	250	ug/L	
p-Isopropyltoluene		< 250	250	ug/L	
sec-Butylbenzene		< 250	250	ug/L	
Styrene		< 250	250	ug/L	
tert-Butylbenzene		< 250	250	ug/L	
Tetrachloroethene		< 250	250	ug/L	
Toluene		2600	250	ug/L	
trans-1,2-Dichloroethene		< 250	250	ug/L	
trans-1,3-Dichloropropene		< 250	250	ug/L	
Trichloroethene		2400	250	ug/L	
Trichlorofluoromethane		< 250	250	ug/L	

MICRO STATUS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-07
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/111100 MSD	Water	11 Nov. 00 9:46	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 250	250	ug/L	8260B

MICROSEEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-08
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/111100	Water	11 Nov. 00 9:00	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 250	250	ug/L	8260B
1,1,1-Trichloroethane		< 250	250	ug/L	
1,1,2,2-Tetrachloroethane		< 250	250	ug/L	
1,1,2-Trichloroethane		< 250	250	ug/L	
1,1-Dichloroethane		< 250	250	ug/L	
1,1-Dichloroethene		< 250	250	ug/L	
1,1-Dichloropropene		< 250	250	ug/L	
1,2,3-Trichlorobenzene		< 250	250	ug/L	
1,2,3-Trichloropropane		< 250	250	ug/L	
1,2,4-Trichlorobenzene		< 250	250	ug/L	
1,2,4-Trimethylbenzene		< 250	250	ug/L	
1,2-Dibromo-3-chloropropane		< 1000	1000	ug/L	
1,2-Dibromoethane		< 250	250	ug/L	
1,2-Dichlorobenzene		< 250	250	ug/L	
1,2-Dichloroethane		< 250	250	ug/L	
1,2-Dichloropropane		< 250	250	ug/L	
1,3,5-Trimethylbenzene		< 250	250	ug/L	
1,3-Dichlorobenzene		< 250	250	ug/L	
1,3-Dichloropropane		< 250	250	ug/L	
1,4-Dichlorobenzene		< 250	250	ug/L	
2,2-Dichloropropane		< 250	250	ug/L	
2-Chlorotoluene		< 250	250	ug/L	
4-Chlorotoluene		< 250	250	ug/L	
Benzene		< 250	250	ug/L	
Bromobenzene		< 250	250	ug/L	
Bromochloromethane		< 250	250	ug/L	
Bromodichloromethane		< 250	250	ug/L	
Bromoform		< 250	250	ug/L	

MICROBIOTEST

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-08
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/111100	Water	11 Nov. 00 9:00	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 250	250	ug/L	8260B
Carbon tetrachloride		< 250	250	ug/L	
Chlorobenzene		< 250	250	ug/L	
Chlorodibromomethane		< 250	250	ug/L	
Chloroethane		< 250	250	ug/L	
Chloroform		< 250	250	ug/L	
Chloromethane		< 250	250	ug/L	
cis-1,2-Dichloroethene		< 250	250	ug/L	
cis-1,3-Dichloropropene		< 250	250	ug/L	
Dibromomethane		< 250	250	ug/L	
Dichlorodifluoromethane		< 250	250	ug/L	
Ethylbenzene		< 250	250	ug/L	
Isopropylbenzene		< 250	250	ug/L	
m & p-Xylene		< 500	500	ug/L	
Methylene Chloride		< 250	250	ug/L	
Naphthalene		< 250	250	ug/L	
n-Butylbenzene		< 250	250	ug/L	
n-Propylbenzene		< 250	250	ug/L	
o-Xylene		< 250	250	ug/L	
p-Isopropyltoluene		< 250	250	ug/L	
sec-Butylbenzene		< 250	250	ug/L	
Styrene		< 250	250	ug/L	
tert-Butylbenzene		< 250	250	ug/L	
Tetrachloroethene		< 250	250	ug/L	
Toluene		< 250	250	ug/L	
trans-1,2-Dichloroethene		< 250	250	ug/L	
trans-1,3-Dichloropropene		< 250	250	ug/L	
Trichloroethene	J	170	250	ug/L	
Trichlorofluoromethane		< 250	250	ug/L	

MICROSTUDIES

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-08
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/111100	Water	11 Nov. 00 9:00	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 250	250	ug/L	8260B

MICROSTRESS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-09
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP4/111100	Water	11 Nov. 00 7:00	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 250	250	ug/L	8260B
1,1,1-Trichloroethane		< 250	250	ug/L	
1,1,2,2-Tetrachloroethane		< 250	250	ug/L	
1,1,2-Trichloroethane		< 250	250	ug/L	
1,1-Dichloroethane		< 250	250	ug/L	
1,1-Dichloroethene		< 250	250	ug/L	
1,1-Dichloropropene		< 250	250	ug/L	
1,2,3-Trichlorobenzene		< 250	250	ug/L	
1,2,3-Trichloropropane		< 250	250	ug/L	
1,2,4-Trichlorobenzene		< 250	250	ug/L	
1,2,4-Trimethylbenzene		< 250	250	ug/L	
1,2-Dibromo-3-chloropropane		< 1000	1000	ug/L	
1,2-Dibromoethane		< 250	250	ug/L	
1,2-Dichlorobenzene		< 250	250	ug/L	
1,2-Dichloroethane		< 250	250	ug/L	
1,2-Dichloropropane		< 250	250	ug/L	
1,3,5-Trimethylbenzene		< 250	250	ug/L	
1,3-Dichlorobenzene		< 250	250	ug/L	
1,3-Dichloropropane		< 250	250	ug/L	
1,4-Dichlorobenzene		< 250	250	ug/L	
2,2-Dichloropropane		< 250	250	ug/L	
2-Chlorotoluene		< 250	250	ug/L	
4-Chlorotoluene		< 250	250	ug/L	
Benzene		< 250	250	ug/L	
Bromobenzene		< 250	250	ug/L	
Bromochloromethane		< 250	250	ug/L	
Bromodichloromethane		< 250	250	ug/L	
Bromoform		< 250	250	ug/L	

MICROSTEELS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-09
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP4/111100	Water	11 Nov. 00 7:00	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 250	250	ug/L	8260B
Carbon tetrachloride		< 250	250	ug/L	
Chlorobenzene		< 250	250	ug/L	
Chlorodibromomethane		< 250	250	ug/L	
Chloroethane		< 250	250	ug/L	
Chloroform		< 250	250	ug/L	
Chloromethane		< 250	250	ug/L	
cis-1,2-Dichloroethene		< 250	250	ug/L	
cis-1,3-Dichloropropene		< 250	250	ug/L	
Dibromomethane		< 250	250	ug/L	
Dichlorodifluoromethane		< 250	250	ug/L	
Ethylbenzene		< 250	250	ug/L	
Isopropylbenzene		< 250	250	ug/L	
m & p-Xylene		< 500	500	ug/L	
Methylene Chloride		< 250	250	ug/L	
Naphthalene		< 250	250	ug/L	
n-Butylbenzene		< 250	250	ug/L	
n-Propylbenzene		< 250	250	ug/L	
o-Xylene		< 250	250	ug/L	
p-Isopropyltoluene		< 250	250	ug/L	
sec-Butylbenzene		< 250	250	ug/L	
Styrene		< 250	250	ug/L	
tert-Butylbenzene		< 250	250	ug/L	
Tetrachloroethene		< 250	250	ug/L	
Toluene		< 250	250	ug/L	
trans-1,2-Dichloroethene		< 250	250	ug/L	
trans-1,3-Dichloropropene		< 250	250	ug/L	
Trichloroethene		< 250	250	ug/L	
Trichlorofluoromethane		< 250	250	ug/L	

MICROSTEELS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-09
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP4/111100	Water	11 Nov. 00 7:00	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 250	250	ug/L	8260B

MICROSEEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-10
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
FIELD BLANK 2	Water	11 Nov. 00 10:40	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
V latiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane	J	1.1	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSELECTS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-10
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
FIELD BLANK 2	Water	11 Nov. 00 10:40	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		9.2	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		< 5.0	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSETS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-10
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
FIELD BLANK 2	Water	11 Nov. 00 10:40	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-11
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3D/111100	Water	11 Nov. 00 10:25	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 250	250	ug/L	8260B
1,1,1-Trichloroethane		< 250	250	ug/L	
1,1,2,2-Tetrachloroethane		< 250	250	ug/L	
1,1,2-Trichloroethane		< 250	250	ug/L	
1,1-Dichloroethane		< 250	250	ug/L	
1,1-Dichloroethene		< 250	250	ug/L	
1,1-Dichloropropene		< 250	250	ug/L	
1,2,3-Trichlorobenzene		< 250	250	ug/L	
1,2,3-Trichloropropane		< 250	250	ug/L	
1,2,4-Trichlorobenzene		< 250	250	ug/L	
1,2,4-Trimethylbenzene		< 250	250	ug/L	
1,2-Dibromo-3-chloropropane		< 1000	1000	ug/L	
1,2-Dibromoethane		< 250	250	ug/L	
1,2-Dichlorobenzene		< 250	250	ug/L	
1,2-Dichloroethane		< 250	250	ug/L	
1,2-Dichloropropane		< 250	250	ug/L	
1,3,5-Trimethylbenzene		< 250	250	ug/L	
1,3-Dichlorobenzene		< 250	250	ug/L	
1,3-Dichloropropane		< 250	250	ug/L	
1,4-Dichlorobenzene		< 250	250	ug/L	
2,2-Dichloropropane		< 250	250	ug/L	
2-Chlorotoluene		< 250	250	ug/L	
4-Chlorotoluene		< 250	250	ug/L	
Benzene		< 250	250	ug/L	
Bromobenzene		< 250	250	ug/L	
Bromochloromethane		< 250	250	ug/L	
Bromodichloromethane		< 250	250	ug/L	
Bromoform		< 250	250	ug/L	

MICROSEEPS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-11
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3D/111100	Water	11 Nov. 00 10:25	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
V latiles					
Bromomethane		< 250	250	ug/L	8260B
Carbon tetrachloride		< 250	250	ug/L	
Chlorobenzene		< 250	250	ug/L	
Chlorodibromomethane		< 250	250	ug/L	
Chloroethane		< 250	250	ug/L	
Chloroform		< 250	250	ug/L	
Chloromethane		< 250	250	ug/L	
cis-1,2-Dichloroethene		< 250	250	ug/L	
cis-1,3-Dichloropropene		< 250	250	ug/L	
Dibromomethane		< 250	250	ug/L	
Dichlorodifluoromethane		< 250	250	ug/L	
Ethylbenzene		< 250	250	ug/L	
Isopropylbenzene		< 250	250	ug/L	
m & p-Xylene		< 500	500	ug/L	
Methylene Chloride		< 250	250	ug/L	
Naphthalene		< 250	250	ug/L	
n-Butylbenzene		< 250	250	ug/L	
n-Propylbenzene		< 250	250	ug/L	
o-Xylene		< 250	250	ug/L	
p-Isopropyltoluene		< 250	250	ug/L	
sec-Butylbenzene		< 250	250	ug/L	
Styrene		< 250	250	ug/L	
tert-Butylbenzene		< 250	250	ug/L	
Tetrachloroethene		< 250	250	ug/L	
Toluene		< 250	250	ug/L	
trans-1,2-Dichloroethene		< 250	250	ug/L	
trans-1,3-Dichloropropene		< 250	250	ug/L	
Trichloroethene		< 250	250	ug/L	
Trichlorofluoromethane		< 250	250	ug/L	

MICROSTETS

Order #: P0011113
Report Date: 12/27/00
Client Proj Name: Vegetable Oil Study - Navy
Client Proj #: 737490. 030000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0011113-11
Report Date: 28 Dec. 00

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3D/111100	Water	11 Nov. 00 10:25	14 Nov. 00

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 250	250	ug/L	8260B

MICROSEEPS

P11098

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 **Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238** Fax No.: (412) 826-3433

Company : PARSONS ES
Co. Address : 1700 BROADWAY, Suite 900, Denver CO
Proj. Manager: BRUCE HENRY
Proj. Location: NSA-MIDSOUTH
Proj. Number: 737490
Phone # : 303-831-8100 **Fax # :**

Sampler's signature : Jason B

Results to : BRUCE Henry PARSONS ES

Invoice to :

Cooler ID	Cooler Temp.

Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	SW8260 - VOCS	AM18 - Methane, Ethane, Ethene	Nitrate + Nitrite	Total organic Carbon	Bromide				Remarks
17	PES-MW6S/110900	11/9/00	1430		X	7	X	X	X	X	X				
18	PES-DP2/110900	11/9/00	1800		X	7	X	X	X	X	X				
19	PES-DP1/110900	11/9/00	0700		X	2				X	X				
20	PES-MW6D/110900	11/9/00	1615		X	7	X	X	X	X	X				
21	PES-MW4S/110900	11/9/00	1750		X	7	X	X	X	X	X				
22	PES-MW4D/111000	11/10/00	1055		X	~~8~~ 7	X	X	X	X	X				
23	PES-DP3/111000	11/10/00	0800		X	7	X	X	X	X	X				
24	Field Blank 1	11/10/00	1250		X	2	X								
25	PES-MW2D/111000	11/10/00	1345		X	7	X	X	X	X	X				
26	PES-MW2S/111000	11/10/00	1230		X	7	X	X	X	X	X				

Relinquished by	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
J. B	PARSONS ES	11/10/00	1700	Washlaski	Microseeps	11/13/00	
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

P11098

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 | **Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238** | Fax No. : (412) 826-3433

Company : PARSONS ES
Co. Address : 1700 Broadway, Suite 900, Denver CO
Proj. Manager: Bruce Henry
Proj. Location: NSA-MID SOUTH
Proj. Number: 737490
Phone # : 303-831-8100 **Fax # :**

Sampler's signature : Jason Bridgman

Results to : Bruce Henry, PARSONS ES, DENVER, CO
Invoice to :

Cooler ID	Cooler Temp.

Sample ID	Sample ~~Description~~ ID	Date	Time	Comp.	Grab	# Cont.	SW8260 - VOCs	AM-18 Methane, Ethane, Ethene	Nitrate+Nitrite	Total organic Carbon	Bromide				Remarks
01	PES-MW1S/110700	11/7/00	1650		X	5	X	X	X	~~X~~ 03					
02	PES-DP1/110700	11/7/00	0700		X	5	X	X	X						
03	007GL15UF	11/8/00	1000		X	5	X	X	X						05 06
04	PES-MW1D/110800	11/8/00	0755		X	~~8~~ 9	X	X	X						MS/MSD collected for VOCs
07	007GL15LF	11/8/00	1135		X	5	X	X	X						09 10
08	PES-MW8S/110800	11/8/00	1450		X	11	X	X	X	X	X				MS/MSD collected for VOCs
11	PES-MW8D/110800	11/8/00	1620		X	7	X	X	X	X	X				
12	PES-MW7S/110900	11/9/00	0805		X	7	X	X	X	X	X				
13	PES-MW7D/110900	11/9/00	0920 ~~0855~~		X	7	X	X	X	X	X				
14	Rinsate Blank	11/9/00	1015		X	2	X								
15	PES-MW5D/110900	11/9/00	1300		X	7	X	X	X	X	X				
16	PES-MW5S/110900	11/9/00	1105		X	7	X	X	X	X	X				

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Jason Bridgman	PARSONS ES.	11/10/00	1700	[illegible]	Microseeps	11/13/00	
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

P11113

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 — Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 — Fax No.: (412) 826-3433

Company : PARSONS ES
Co. Address : 1700 BROADWAY Suite 900 Denver
Proj. Manager: BRUCE HENRY
Proj. Location: NSA MIDSOUTH
Proj. Number: 737490.04000
Phone # : 303-831-8100 Fax # : 303-831-8208

Sampler's signature : [signature]

Results to : BRUCE HENRY, PARSONS ES, Denver CO
Invoice to : BRUCE HENRY

Cooler ID	Cooler Temp.

Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	SW8260 : MATRIX = WATER	SW8260 : MATRIX = Oil	AM-18 methane, Ethane, Ethene	Nitrate + Nitrite	Bromide	Total organic Carbon			Remarks
01	PES-MW3S/111000	11/10/00	1635		X	7	X		X	X	X	X			
02	PES-MW3D/111000	11/10/00	1750		X	7	X		X	X	X	X			~~SAMPLE may contain some oil.~~ 03
03	PES-INJ2D/111100	11/11/00	0740		X	2	X								Sample may contain Some oil
04	PES-INJ2D/111100	11/11/00	0813		X	2		X							06 07
05	PES-INJ3S/111100	11/11/00	0946		X	6		X							MS and MSD collected
08	PES-INJ2S/111100	11/11/00	0900		X	2		X							
09	PES-DP4/111100	11/11/00	0700		X	2		X							
10	Field Blank 2	11/11/00	1040		X	2	X								DI Water Blank.
11	PES-INJ3D/111100	11/11/00	1025		X	2		X							

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
[signature]	PARSONS ES	11/13/00	1800	[signature]	Microseeps	11/14/00	
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

APPENDIX A.3

ANALYTICAL DATA – FEBRUARY 2001

MICROSEEPS

Parson's Engineering Science

Project Number: 737490.040000

NSA Midsouth

Parson's Contact: Mr. Bruce Henry

Becky Hans

Microseeps Contact: Becky Hans
March 16, 2001

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

CASE NARRATIVE

Parson's Engineering Science
NSA Mid south
Project #: 737490.040000

The following were samples analyzed by Microseeps, Inc.

Parson's Identification Number	Lab ID number
007GL15LF/020601	P0102098-01
007GL15UF/020601	P0102098-02
DUP-1	P0102098-03
PES-MW8S/020701	P0102098-04
PES-MW8D/020701	P0102098-05
PES-MW7S/020701	P0102098-06
PES-MW7D/020701	P0102098-07
PES-MW6D/020701	P0102098-08
PES-MW6D/020701MS	P0102098-09
PES-MW6D/020701MSD	P0102098-10
Trip Blank	P0102098-11
PES-MW1D/020601	P0102145-01
PES-MW1S/020601	P0102145-02
PES-MW1S/020601MS	P0102145-03
PES-MW1S/020601MSD	P0102145-04
007GL 15LF/020601	P0102145-05
DUP-1	P0102145-06
PES-MW6S/020701	P0102145-07
RINSATE	P0102145-08
DUP-2	P0102145-09
TRIP BLANK-2	P0102145-10
PES-MW8D/020701	P0102145-11
PES-MW5S/020801	P0102145-12
PES-MW5D/020801	P0102145-13
PES-MW3S/020801	P0102145-14
PES-MW3D/020801	P0102145-15
PES-MW4S/020801	P0102145-16
PES-MW4D/020801	P0102145-17
PES-MW2S/020801	P0102145-18
PES-MW2D/020801	P0102145-19
DUP-3	P0102145-20

MICROSEEPS

Parson's Identification Number	Lab ID number
PES-INJ3S/020801	P0102145-21
PES-INJ3S/020801MS	P0102145-22
PES-INJ3S/020801MSD	P0102145-23
PES-INJ3D/020901	P0102145-24
OIL DUP	P0102145-25
PES-INJ3D/020901	P0102145-26
PES-INJ2D/020901	P0102145-27
PES-INJ2S/020901	P0102145-28
TANK/020901	P0102145-29

All samples were found to be intact. Samples that were received on 2/8/01 had been sent with an incorrect chain-of-custody form. Parson's ES field personnel were aware of the situation and contacted Microseeps. A corrected COC was sent via facsimile.

Organic Data:

Samples that were sent in for volatile analysis have been reported off of multiple dilutions. In many cases data was reported from a low level, a medium level and a high level analysis. If any analyte fell between these three dilutions, the result would be reported as an estimated concentration with a "J" flag.

General Chemistry:

No anomalies were detected during any of the general chemistry analyses.

Metals:

No anomalies were detected during any of the general chemistry analyses.

Risk Analysis:

No anomalies were detected during any of the general chemistry analyses.

MICROSEEPS

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway

Denver, CO 80290

Page: Page 1 of 30
Order #: P0102098
Report Date: 02/26/01
Client Proj Na NSA-Midsouth
Client Proj 737490. 040000

Sample Identification

Lab Sample #	Client Sample ID
P0102098-01	007GLI5LI/020601
P0102098-02	007GL15UF/020601
P0102098-03	DUP-1
P0102098-04	PES-MW8S/020701
P0102098-05	PES-MW8D/020701
P0102098-06	PES-MW7S/020701
P0102098-07	PES-MW7D/020701
P0102098-08	PES-MW6D/020701
P0102098-09	PES-MW6D/020701 MS
P0102098-10	PES-MW6D/020701 MSD
P0102098-11	TRIP BLANK

Approved By: Rebecca Johns

NOTES: SAMPLES WERE RECD AT LAB 2-8-01 BUT WERE NOT LOGGED IN UNTIL 2-9-01 BECAUSE OF A C CLARIFICATION ABOUT MS/MSD. CW

Order #: P0102098
Report Date: 02/26/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-01

Sample Description	Matrix	Sampled Date/Time	Received
007GLI5LI/020601	Water	06 Feb. 01 15:35	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		1.9	0.050	mg/L	353.3
RiskAnalysis					
Water					
Ethane		940	5.0	ng/L	AM18
Ethene		240	5.0	ng/L	
Methane		32	0.015	ug/L	

MICROSEEPS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-02

Sample Description	Matrix	Sampled Date/Time	Received
007GL15UF/020601	Water	06 Feb. 01 17:00	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.069	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		41	5.0	ug/L	
1,1-Dichloroethene		330	50	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene	J	2.5	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-02
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
007GL15UF/020601	Water	06 Feb. 01 17:00	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromochloromethane		< 5.0	5.0	ug/L	8260B
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		5.8	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		16	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		14	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	

MICROSTECS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-02
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
007GL15UF/020601	Water	06 Feb. 01 17:00	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	8260B
Trichloroethene		370	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		220	5.0	ng/L	AM18
Ethene		94	5.0	ng/L	
Methane		41	0.015	ug/L	

MICROSEEPS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-03

Sample Description	Matrix	Sampled Date/Time	Received
DUP-1	Water	06 Feb. 01 9:00	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		2.0	0.050	mg/L	353.3
RiskAnalysis					
Water					
Ethane		880	5.0	ng/L	AM18
Ethene		220	5.0	ng/L	
Methane		25	0.015	ug/L	

MICROSEEPS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-04

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S/020701	Water	07 Feb. 01 8:00	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N	J	0.034	0.050	mg/L	353.3
Total Organic Carbon		7.9	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		16	5.0	ug/L	
1,1-Dichloroethene		40	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-04
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S/020701	Water	07 Feb. 01 8:00	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene		< 5.0	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		8.1	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		13	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-04
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S/020701	Water	07 Feb. 01 8:00	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene		< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		100	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		320	5.0	ng/L	AM18
Ethene		790	5.0	ng/L	
Methane		100	0.015	ug/L	

MICROSHEETS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-05
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D/020701	Water	07 Feb. 01 9:30	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	4.8	5.0	ug/L	
1,1-Dichloroethene		22	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		94	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-05
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D/020701	Water	07 Feb. 01 9:30	09 Feb. 01

Analyt (s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		96	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	3.4	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		580	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-05
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D/020701	Water	07 Feb. 01 9:30	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B
RiskAnalysis					
Water					
Ethane		350	5.0	ng/L	AM18
Ethene		860	5.0	ng/L	
Methane		11	0.015	ug/L	

MICROSEEPS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-06

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7S/020701	Water	07 Feb. 01 11:00	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N	J	0.026	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
V latil s					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		84	5.0	ug/L	
1,1-Dichloroethene		95	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-06
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7S/020701	Water	07 Feb. 01 11:00	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene		< 5.0	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		5.1	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		8.8	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		61	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSTATIS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-06
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7S/020701	Water	07 Feb. 01 11:00	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Toluene		< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		95	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		1300	5.0	ng/L	AM18
Ethene		3100	5.0	ng/L	
Methane		68	0.015	ug/L	

MICROSEETS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-07

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D/020701	Water	07 Feb. 01 12:35	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		2.5	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		5.5	5.0	ug/L	
1,1-Dichloroethene		23	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-07
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D/020701	Water	07 Feb. 01 12:35	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	1.4	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		210	50	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		130	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		6.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSTITS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-07
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D/020701	Water	07 Feb. 01 12:35	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene		< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		800	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		360	5.0	ng/L	AM18
Ethene		920	5.0	ng/L	
Methane		20	0.015	ug/L	

MICROSHEETS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D/020701	Water	07 Feb. 01 16:15	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.71	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		5.2	5.0	ug/L	
1,1-Dichloroethene		36	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-08
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D/020701	Water	07 Feb. 01 16:15	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene		< 5.0	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		12	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		22	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	3.3	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-08
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D/020701	Water	07 Feb. 01 16:15	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene		< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		150	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		640	5.0	ng/L	AM18
Ethene		180	5.0	ng/L	
Methane		2.2	0.015	ug/L	

MICROSEEPS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-09
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D/020701 MS	Water	07 Feb. 01 16:15	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		5.2	5.0	ug/L	
1,1-Dichloroethene		85	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		48	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSTATS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-09
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D/020701 MS	Water	07 Feb. 01 16:15	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
V latiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		13	5.0	ug/L	
Chlorobenzene		51	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		23	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	3.6	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		51	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		210	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-09
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D/020701 MS	Water	07 Feb. 01 16:15	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-10
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D/020701 MSD	Water	07 Feb. 01 16:15	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		5.4	5.0	ug/L	
1,1-Dichloroethene		88	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		49	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-10
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D/020701 MSD	Water	07 Feb. 01 16:15	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		14	5.0	ug/L	
Chlorobenzene		51	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		25	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	3.5	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		52	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		220	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-10
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D/020701 MSD	Water	07 Feb. 01 16:15	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-11
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	07 Feb. 01	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-11
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	07 Feb. 01	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
V latiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		< 5.0	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSTEEL

Order #: P0102098
Report Date: 02/26/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102098-11
Report Date: 26 Feb. 01

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	07 Feb. 01	09 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	M thod #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway

Denver, CO 80290

Page: Page 1 of 86
Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Sample Identification

Lab Sample #	Client Sample ID		
P0102145-01	PES-MW1D/020601	P0102145-15	PES-MW3D/020801
P0102145-02	PES-MW1S/020601	P0102145-16	PES-MW4S/020801
P0102145-03	PES-MW1S/020601 MS	P0102145-17	PES-MW4D/020801
P0102145-04	PES-MW1S/020601 MSD	P0102145-18	PES-MW2S/020801
		P0102145-19	PES-MW2D/020801
P0102145-05	007GL 15LF/020601	P0102145-20	DUP-3
P0102145-06	DUP-1	P0102145-21	PES-INJ3S/020801
P0102145-07	PES-MW6S/020701	P0102145-22	PES-INJ3S/020801 MS
P0102145-08	RINSATE	P0102145-23	PES-INJ3S/020801 MSD
P0102145-09	DUP-2	P0102145-24	PES-INJ3D/020901
P0102145-10	TRIP BLANK-2	P0102145-25	OIL DUP
P0102145-11	PES-MW8D/020701	P0102145-26	PES-INJ3D/020901
P0102145-12	PES-MW5S/020801	P0102145-27	PES-INJ2D/020901
P0102145-13	PES-MW5D/020801	P0102145-28	PES-INJ2S/020901
P0102145-14	PES-MW3S/020901	P0102145-29	TANK/020901

Approved By: Rebecca J. Hans

NOTES: Due to sample matrix, the oil samples were extracted and diluted to analyze. The MS/MSD were not multiplied by the extracxtion and dilution factor.

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D/020601	Water	06 Feb. 01 11:30	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.30	0.050	mg/L	353.3
V latiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	

MICROSTOPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-01
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D/020601	Water	06 Feb. 01 11:30	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromochloromethane		< 5.0	5.0	ug/L	8260B
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene	J	2.6	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	

MICROSELECTS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-01
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D/020601	Water	06 Feb. 01 11:30	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	8260B
Trichloroethene	J	1.2	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		85	5.0	ng/L	AM18
Ethene		150	5.0	ng/L	
Methane		82	0.015	ug/L	

MICROSTEELS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1S/020601	Water	06 Feb. 01 12:50	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N	J	0.003	0.050	mg/L	353.3
V latiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		27	5.0	ug/L	
1,1-Dichloroethene		26	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene	J	1.1	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	

MICROSTEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-02
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1S/020601	Water	06 Feb. 01 12:50	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
V latiles					
Bromochloromethane		< 5.0	5.0	ug/L	8260B
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane	J	3.0	5.0	ug/L	
Chloroform	J	4.3	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		17	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene	J	2.1	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-02
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1S/020601	Water	06 Feb. 01 12:50	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	8260B
Trichloroethene		53	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		19000	5.0	ng/L	AM18
Ethene		8900	5.0	ng/L	
Methane		990	0.015	ug/L	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-03
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1S/020601 MS	Water	06 Feb. 01 12:50	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
V latiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		28	5.0	ug/L	
1,1-Dichloroethene		74	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		49	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-03
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1S/020601 MS	Water	06 Feb. 01 12:50	12 Feb. 01

Analyt (s)	Flag	Result	PQL	Units	Method #
Volatil s					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		50	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane	J	2.8	5.0	ug/L	
Chloroform	J	4.8	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		18	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		55	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		100	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSELECTS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-03
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1S/020601 MS	Water	06 Feb. 01 12:50	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-04
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1S/020601 MSD	Water	06 Feb. 01 12:50	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		27	5.0	ug/L	
1,1-Dichloroethene		73	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		49	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSTEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-04
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1S/020601 MSD	Water	06 Feb. 01 12:50	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		50	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane	J	2.9	5.0	ug/L	
Chloroform	J	4.3	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		18	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		53	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		99	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSETS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-04
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1S/020601 MSD	Water	06 Feb. 01 12:50	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-05
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
007GL 15LF/020601	Water	06 Feb. 01 15:35	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	2.9	5.0	ug/L	
1,1-Dichloroethene		6.2	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSTEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-05
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
007GL 15LF/020601	Water	06 Feb. 01 15:35	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		18	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		6.3	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene	J	2.6	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		8.7	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSELECT

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-05
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
007GL 15LF/020601	Water	06 Feb. 01 15:35	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-06
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
DUP-1	Water	06 Feb. 01 9:00	12 Feb. 01

Analyt (s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	2.4	5.0	ug/L	
1,1-Dichloroethene		5.1	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-06
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
DUP-1	Water	06 Feb. 01 9:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	M th d #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		16	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		5.7	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene	J	1.5	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		7.4	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSELECT

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-06
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
DUP-1	Water	06 Feb. 01 9:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-07

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6S/020701	Water	07 Feb. 01 14:15	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.10	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		36	5.0	ug/L	
1,1-Dichloroethene		190	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		60	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSHEETS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-07
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6S/020701	Water	07 Feb. 01 14:15	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Benzene		6.3	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		130	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		22	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	1.2	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene	J	2.1	5.0	ug/L	

MICROSTEELS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-07
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6S/020701	Water	07 Feb. 01 14:15	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene		< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene		36	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		920	100	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		320	5.0	ng/L	AM18
Ethene		810	5.0	ng/L	
Methane		66	0.015	ug/L	

MICROSTATS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-08
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
RINSATE	Water	06 Feb. 01 13:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene	J	1.9	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-08
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
RINSATE	Water	06 Feb. 01 13:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride	J	3.8	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform	J	1.7	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene	J	1.7	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		22	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSEPTS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-08
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
RINSATE	Water	06 Feb. 01 13:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-09

Sample Description	Matrix	Sampled Date/Time	Received
DUP-2	Water	07 Feb. 01 7:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N	J	0.003	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
V latiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		88	5.0	ug/L	
1,1-Dichloroethene		97	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-09
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
DUP-2	Water	07 Feb. 01 7:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
V latil s					
Benzene		< 5.0	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		5.1	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		9.3	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		63	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-09
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
DUP-2	Water	07 Feb. 01 7:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Toluene	J	1.5	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		99	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		1100	5.0	ng/L	AM18
Ethene		2500	5.0	ng/L	
Methane		67	0.015	ug/L	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-10
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK-2	Water	06 Feb. 01 10:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSTECS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-10
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK-2	Water	06 Feb. 01 10:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		< 5.0	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-10
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK-2	Water	06 Feb. 01 10:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-11

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D/020701	Water	07 Feb. 01 9:30	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		1.8	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060

MICROSEALS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-12

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5S/020801	Water	08 Feb. 01 9:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N	J	0.008	0.050	mg/L	353.3
Total Organic Carbon		2.5	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		78	5.0	ug/L	
1,1-Dichloroethene		120	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSELECTS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-12
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5S/020801	Water	08 Feb. 01 9:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	1.8	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		11	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		40	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		8.8	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-12
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5S/020801	Water	08 Feb. 01 9:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.2	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		250	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		980	5.0	ng/L	AM18
Ethene		3200	5.0	ng/L	
Methane		65	0.015	ug/L	

MICROSEELS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-13

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5D/020801	Water	08 Feb. 01 7:50	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		1.2	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		9.2	5.0	ug/L	
1,1-Dichloroethene		58	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-13
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5D/020801	Water	08 Feb. 01 7:50	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Benzene	J	1.9	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		140	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		130	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		8.1	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSELECT

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-13
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5D/020801	Water	08 Feb. 01 7:50	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Toluene	J	1.2	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		700	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		1100	5.0	ng/L	AM18
Ethene		2200	5.0	ng/L	
Methane		17	0.015	ug/L	

MICROSEETS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-14

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3S/020901	Water	09 Feb. 01 7:30	12 Feb. 01

Analyt (s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N	J	0.002	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		97	5.0	ug/L	
1,1-Dichloroethene		220	100	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane	J	1.4	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEELS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-14
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3S/020901	Water	09 Feb. 01 7:30	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Benzene	J	2.8	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride	J	4.8	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		41	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		14	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	1.1	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSLETS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-14
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3S/020901	Water	09 Feb. 01 7:30	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		290	100	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		2600	5.0	ng/L	AM18
Ethene		6800	5.0	ng/L	
Methane		110	0.015	ug/L	

MICROSEETS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-15

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D/020801	Water	08 Feb. 01 17:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		1.2	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		12	5.0	ug/L	
1,1-Dichloroethene		74	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-15
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D/020801	Water	08 Feb. 01 17:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	1.8	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		100	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		87	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		12	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROBETS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-15
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D/020801	Water	08 Feb. 01 17:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	M thod #
Volatiles					
Toluene		< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		560	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		340	5.0	ng/L	AM18
Ethene		270	5.0	ng/L	
Methane		2.0	0.015	ug/L	

MICROSELECTS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-16

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4S/020801	Water	08 Feb. 01 12:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.057	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		30	5.0	ug/L	
1,1-Dichloroethene		170	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-16
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4S/020801	Water	08 Feb. 01 12:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene		5.4	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		63	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		120	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		16	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	1.2	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene	J	1.0	5.0	ug/L	

MICROBIOTS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-16
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4S/020801	Water	06 Feb. 01 12:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.8	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		990	100	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		370	5.0	ng/L	AM18
Ethene		1100	5.0	ng/L	
Methane		70	0.015	ug/L	

MICROSELECTS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-17

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D/020801	Water	08 Feb. 01 10:45	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		1.1	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
V latiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		6.0	5.0	ug/L	
1,1-Dichloroethene		34	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSELECTS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-17
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D/020801	Water	08 Feb. 01 10:45	12 Feb. 01

Analyt (s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene		< 5.0	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		7.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		16	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	2.9	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSELECTS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-17
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D/020801	Water	08 Feb. 01 10:45	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Toluene	J	1.7	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		95	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		190	5.0	ng/L	AM18
Ethene		210	5.0	ng/L	
Methane		2.0	0.015	ug/L	

MICROSELECTS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-18

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2S/020801	Water	08 Feb. 01 15:15	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N	J	0.039	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		34	5.0	ug/L	
1,1-Dichloroethene		180	50	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEETS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-18
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2S/020801	Water	08 Feb. 01 15:15	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene		6.6	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		140	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		150	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		18	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	1.2	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene	J	1.3	5.0	ug/L	

MICROSLEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-18
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2S/020801	Water	08 Feb. 01 15:15	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene		< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		1200	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		210	5.0	ng/L	AM18
Ethene		530	5.0	ng/L	
Methane		40	0.015	ug/L	

MICROSEETS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-19

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2D/020801	Water	08 Feb. 01 14:15	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.061	0.050	mg/L	353.3
Total Organic Carbon		15	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		17	5.0	ug/L	
1,1-Dichloroethene		98	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-19
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2D/020801	Water	08 Feb. 01 14:15	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Benzene	J	1.4	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride	J	3.7	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		22	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		7.7	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSTEELS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-19
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2D/020801	Water	08 Feb. 01 14:15	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene		< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		220	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		560	5.0	ng/L	AM18
Ethene		750	5.0	ng/L	
Methane		62	0.015	ug/L	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-20

Sample Description	Matrix	Sampled Date/Time	Received
DUP-3	Water	08 Feb. 01 7:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.91	0.050	mg/L	353.3
Total Organic Carbon		< 2.0	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		8.3	5.0	ug/L	
1,1-Dichloroethene		52	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-20
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
DUP-3	Water	08 Feb. 01 7:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Benzene	J	1.7	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		110	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		120	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		7.9	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSLETS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-20
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
DUP-3	Water	08 Feb. 01 7:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Toluene	J	1.2	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		800	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		1300	5.0	ng/L	AM18
Ethene		2400	5.0	ng/L	
Methane		17	0.015	ug/L	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi ≠ 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-21
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/020801	Solid	08 Feb. 01 16:10	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 4900	4900	ug/Kg	8260B
1,1,1-Trichloroethane		< 4900	4900	ug/Kg	
1,1,2,2-Tetrachloroethane		< 4900	4900	ug/Kg	
1,1,2-Trichloroethane		< 4900	4900	ug/Kg	
1,1-Dichloroethane		< 4900	4900	ug/Kg	
1,1-Dichloroethene		< 4900	4900	ug/Kg	
1,1-Dichloropropene		< 4900	4900	ug/Kg	
1,2,3-Trichlorobenzene		< 4900	4900	ug/Kg	
1,2,3-Trichloropropane		< 4900	4900	ug/Kg	
1,2,4-Trichlorobenzene	J	1400	4900	ug/Kg	
1,2,4-Trimethylbenzene		< 4900	4900	ug/Kg	
1,2-Dibromo-3-chloropropane		< 20000	20000	ug/Kg	
1,2-Dibromoethane		< 4900	4900	ug/Kg	
1,2-Dichlorobenzene		< 4900	4900	ug/Kg	
1,2-Dichloroethane		< 4900	4900	ug/Kg	
1,2-Dichloropropane		< 4900	4900	ug/Kg	
1,3,5-Trimethylbenzene		< 4900	4900	ug/Kg	
1,3-Dichlorobenzene		< 4900	4900	ug/Kg	
1,3-Dichloropropane		< 4900	4900	ug/Kg	
1,4-Dichlorobenzene		< 4900	4900	ug/Kg	
2,2-Dichloropropane		< 4900	4900	ug/Kg	
2-Chlorotoluene		< 4900	4900	ug/Kg	
4-Chlorotoluene		< 4900	4900	ug/Kg	
Benzene		< 4900	4900	ug/Kg	
Bromobenzene		< 4900	4900	ug/Kg	
Bromochloromethane		< 4900	4900	ug/Kg	
Bromodichloromethane		< 4900	4900	ug/Kg	
Bromoform		< 4900	4900	ug/Kg	

MICROSEETS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-21
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/020801	Solid	08 Feb. 01 16:10	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 4900	4900	ug/Kg	8260B
Carbon tetrachloride		< 4900	4900	ug/Kg	
Chlorobenzene		< 4900	4900	ug/Kg	
Chlorodibromomethane		< 4900	4900	ug/Kg	
Chloroethane		< 4900	4900	ug/Kg	
Chloroform		< 4900	4900	ug/Kg	
Chloromethane		< 4900	4900	ug/Kg	
cis-1,2-Dichloroethene		< 4900	4900	ug/Kg	
cis-1,3-Dichloropropene		< 4900	4900	ug/Kg	
Dibromomethane		< 4900	4900	ug/Kg	
Dichlorodifluoromethane		< 4900	4900	ug/Kg	
Ethylbenzene		< 4900	4900	ug/Kg	
Isopropylbenzene		< 4900	4900	ug/Kg	
m & p-Xylene	J	1400	9800	ug/Kg	
Methylene Chloride		< 4900	4900	ug/Kg	
Naphthalene		< 4900	4900	ug/Kg	
n-Butylbenzene	J	1100	4900	ug/Kg	
n-Propylbenzene		< 4900	4900	ug/Kg	
o-Xylene		< 4900	4900	ug/Kg	
p-Isopropyltoluene		< 4900	4900	ug/Kg	
sec-Butylbenzene		< 4900	4900	ug/Kg	
Styrene		< 4900	4900	ug/Kg	
Tetrachloroethene		< 4900	4900	ug/Kg	
Toluene		< 4900	4900	ug/Kg	
trans-1,2-Dichloroethene		< 4900	4900	ug/Kg	
trans-1,3-Dichloropropene		< 4900	4900	ug/Kg	
Trichloroethene		< 4900	4900	ug/Kg	
Trichlorofluoromethane		< 4900	4900	ug/Kg	
Vinyl Chloride		< 4900	4900	ug/Kg	

MICROBETS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-21
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/020801	Solid	08 Feb. 01 16:10	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-22
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/020801 MS	Solid	08 Feb. 01 16:10	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 10	10	ug/Kg	8260B
1,1,1-Trichloroethane		< 10	10	ug/Kg	
1,1,2,2-Tetrachloroethane		< 10	10	ug/Kg	
1,1,2-Trichloroethane		< 10	10	ug/Kg	
1,1-Dichloroethane		< 10	10	ug/Kg	
1,1-Dichloroethene		100	10	ug/Kg	
1,1-Dichloropropene		< 10	10	ug/Kg	
1,2,3-Trichlorobenzene		< 10	10	ug/Kg	
1,2,3-Trichloropropane		< 10	10	ug/Kg	
1,2,4-Trichlorobenzene	J	2.4	10	ug/Kg	
1,2,4-Trimethylbenzene		< 10	10	ug/Kg	
1,2-Dibromo-3-chloropropane		< 40	40	ug/Kg	
1,2-Dibromoethane		< 10	10	ug/Kg	
1,2-Dichlorobenzene		< 10	10	ug/Kg	
1,2-Dichloroethane		< 10	10	ug/Kg	
1,2-Dichloropropane		< 10	10	ug/Kg	
1,3,5-Trimethylbenzene		< 10	10	ug/Kg	
1,3-Dichlorobenzene		< 10	10	ug/Kg	
1,3-Dichloropropane		< 10	10	ug/Kg	
1,4-Dichlorobenzene		< 10	10	ug/Kg	
2,2-Dichloropropane		< 10	10	ug/Kg	
2-Chlorotoluene		< 10	10	ug/Kg	
4-Chlorotoluene		< 10	10	ug/Kg	
Benzene		98	10	ug/Kg	
Bromobenzene		< 10	10	ug/Kg	
Bromochloromethane		< 10	10	ug/Kg	
Bromodichloromethane		< 10	10	ug/Kg	
Bromoform		< 10	10	ug/Kg	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-22
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/020801 MS	Solid	08 Feb. 01 16:10	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 10	10	ug/Kg	8260B
Carbon tetrachloride		< 10	10	ug/Kg	
Chlorobenzene		100	10	ug/Kg	
Chlorodibromomethane		< 10	10	ug/Kg	
Chloroethane		< 10	10	ug/Kg	
Chloroform		< 10	10	ug/Kg	
Chloromethane		< 10	10	ug/Kg	
cis-1,2-Dichloroethene		< 10	10	ug/Kg	
cis-1,3-Dichloropropene		< 10	10	ug/Kg	
Dibromomethane		< 10	10	ug/Kg	
Dichlorodifluoromethane		< 10	10	ug/Kg	
Ethylbenzene		< 10	10	ug/Kg	
Isopropylbenzene		< 10	10	ug/Kg	
m & p-Xylene	J	2.3	20	ug/Kg	
Methylene Chloride		< 10	10	ug/Kg	
Naphthalene		< 10	10	ug/Kg	
n-Butylbenzene		< 10	10	ug/Kg	
n-Propylbenzene		< 10	10	ug/Kg	
o-Xylene		< 10	10	ug/Kg	
p-Isopropyltoluene		< 10	10	ug/Kg	
sec-Butylbenzene		< 10	10	ug/Kg	
Styrene		< 10	10	ug/Kg	
Tetrachloroethene		< 10	10	ug/Kg	
Toluene		100	10	ug/Kg	
trans-1,2-Dichloroethene		< 10	10	ug/Kg	
trans-1,3-Dichloropropene		< 10	10	ug/Kg	
Trichloroethene		99	10	ug/Kg	
Trichlorofluoromethane		< 10	10	ug/Kg	
Vinyl Chloride		< 10	10	ug/Kg	

MICROSTEELS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-22
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/020801 MS	Solid	08 Feb. 01 16:10	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-23
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/020801 MSD	Solid	08 Feb. 01 16:10	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 10	10	ug/Kg	8260B
1,1,1-Trichloroethane		< 10	10	ug/Kg	
1,1,2,2-Tetrachloroethane		< 10	10	ug/Kg	
1,1,2-Trichloroethane		< 10	10	ug/Kg	
1,1-Dichloroethane		< 10	10	ug/Kg	
1,1-Dichloroethene		98	10	ug/Kg	
1,1-Dichloropropene		< 10	10	ug/Kg	
1,2,3-Trichlorobenzene		< 10	10	ug/Kg	
1,2,3-Trichloropropane		< 10	10	ug/Kg	
1,2,4-Trichlorobenzene		< 10	10	ug/Kg	
1,2,4-Trimethylbenzene		< 10	10	ug/Kg	
1,2-Dibromo-3-chloropropane		< 40	40	ug/Kg	
1,2-Dibromoethane		< 10	10	ug/Kg	
1,2-Dichlorobenzene		< 10	10	ug/Kg	
1,2-Dichloroethane		< 10	10	ug/Kg	
1,2-Dichloropropane		< 10	10	ug/Kg	
1,3,5-Trimethylbenzene		< 10	10	ug/Kg	
1,3-Dichlorobenzene		< 10	10	ug/Kg	
1,3-Dichloropropane		< 10	10	ug/Kg	
1,4-Dichlorobenzene		< 10	10	ug/Kg	
2,2-Dichloropropane		< 10	10	ug/Kg	
2-Chlorotoluene		< 10	10	ug/Kg	
4-Chlorotoluene		< 10	10	ug/Kg	
Benzene		97	10	ug/Kg	
Bromobenzene		< 10	10	ug/Kg	
Bromochloromethane		< 10	10	ug/Kg	
Bromodichloromethane		< 10	10	ug/Kg	
Bromoform		< 10	10	ug/Kg	

MICROSETS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-23
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/020801 MSD	Solid	08 Feb. 01 16:10	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 10	10	ug/Kg	8260B
Carbon tetrachloride		< 10	10	ug/Kg	
Chlorobenzene		100	10	ug/Kg	
Chlorodibromomethane		< 10	10	ug/Kg	
Chloroethane		< 10	10	ug/Kg	
Chloroform		< 10	10	ug/Kg	
Chloromethane		< 10	10	ug/Kg	
cis-1,2-Dichloroethene		< 10	10	ug/Kg	
cis-1,3-Dichloropropene		< 10	10	ug/Kg	
Dibromomethane		< 10	10	ug/Kg	
Dichlorodifluoromethane		< 10	10	ug/Kg	
Ethylbenzene		< 10	10	ug/Kg	
Isopropylbenzene		< 10	10	ug/Kg	
m & p-Xylene		< 20	20	ug/Kg	
Methylene Chloride		< 10	10	ug/Kg	
Naphthalene		< 10	10	ug/Kg	
n-Butylbenzene		< 10	10	ug/Kg	
n-Propylbenzene		< 10	10	ug/Kg	
o-Xylene		< 10	10	ug/Kg	
p-Isopropyltoluene		< 10	10	ug/Kg	
sec-Butylbenzene		< 10	10	ug/Kg	
Styrene		< 10	10	ug/Kg	
Tetrachloroethene		< 10	10	ug/Kg	
Toluene		100	10	ug/Kg	
trans-1,2-Dichloroethene		< 10	10	ug/Kg	
trans-1,3-Dichloropropene		< 10	10	ug/Kg	
Trichloroethene		97	10	ug/Kg	
Trichlorofluoromethane		< 10	10	ug/Kg	
Vinyl Chloride		< 10	10	ug/Kg	

MICROSTEELS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-23
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/020801 MSD	Solid	08 Feb. 01 16:10	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					

MICROSEEDS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-24
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3D/020901	Solid	09 Feb. 01 9:50	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 5000	5000	ug/Kg	8260B
1,1,1-Trichloroethane		< 5000	5000	ug/Kg	
1,1,2,2-Tetrachloroethane		< 5000	5000	ug/Kg	
1,1,2-Trichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethene		< 5000	5000	ug/Kg	
1,1-Dichloropropene		< 5000	5000	ug/Kg	
1,2,3-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,3-Trichloropropane		< 5000	5000	ug/Kg	
1,2,4-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,4-Trimethylbenzene		< 5000	5000	ug/Kg	
1,2-Dibromo-3-chloropropane		< 20000	20000	ug/Kg	
1,2-Dibromoethane		< 5000	5000	ug/Kg	
1,2-Dichlorobenzene		< 5000	5000	ug/Kg	
1,2-Dichloroethane		< 5000	5000	ug/Kg	
1,2-Dichloropropane		< 5000	5000	ug/Kg	
1,3,5-Trimethylbenzene		< 5000	5000	ug/Kg	
1,3-Dichlorobenzene		< 5000	5000	ug/Kg	
1,3-Dichloropropane		< 5000	5000	ug/Kg	
1,4-Dichlorobenzene		< 5000	5000	ug/Kg	
2,2-Dichloropropane		< 5000	5000	ug/Kg	
2-Chlorotoluene		< 5000	5000	ug/Kg	
4-Chlorotoluene		< 5000	5000	ug/Kg	
Benzene		< 5000	5000	ug/Kg	
Bromobenzene		< 5000	5000	ug/Kg	
Bromochloromethane		< 5000	5000	ug/Kg	
Bromodichloromethane		< 5000	5000	ug/Kg	
Bromoform		< 5000	5000	ug/Kg	

MICROSTATS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-24
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3D/020901	Solid	09 Feb. 01 9:50	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Bromomethane		< 5000	5000	ug/Kg	8260B
Carbon tetrachloride		< 5000	5000	ug/Kg	
Chlorobenzene		< 5000	5000	ug/Kg	
Chlorodibromomethane		< 5000	5000	ug/Kg	
Chloroethane		< 5000	5000	ug/Kg	
Chloroform		< 5000	5000	ug/Kg	
Chloromethane		< 5000	5000	ug/Kg	
cis-1,2-Dichloroethene		< 5000	5000	ug/Kg	
cis-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Dibromomethane		< 5000	5000	ug/Kg	
Dichlorodifluoromethane		< 5000	5000	ug/Kg	
Ethylbenzene		< 5000	5000	ug/Kg	
Isopropylbenzene		< 5000	5000	ug/Kg	
m & p-Xylene		< 10000	10000	ug/Kg	
Methylene Chloride		< 5000	5000	ug/Kg	
Naphthalene		< 5000	5000	ug/Kg	
n-Butylbenzene		< 5000	5000	ug/Kg	
n-Propylbenzene		< 5000	5000	ug/Kg	
o-Xylene		< 5000	5000	ug/Kg	
p-Isopropyltoluene		< 5000	5000	ug/Kg	
sec-Butylbenzene		< 5000	5000	ug/Kg	
Styrene		< 5000	5000	ug/Kg	
Tetrachloroethene		< 5000	5000	ug/Kg	
Toluene		< 5000	5000	ug/Kg	
trans-1,2-Dichloroethene		< 5000	5000	ug/Kg	
trans-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Trichloroethene		< 5000	5000	ug/Kg	
Trichlorofluoromethane		< 5000	5000	ug/Kg	
Vinyl Chloride		< 5000	5000	ug/Kg	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-24
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3D/020901	Solid	09 Feb. 01 9:50	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatil s					

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-25
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
OIL DUP	Solid	09 Feb. 01 7:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 5000	5000	ug/Kg	8260B
1,1,1-Trichloroethane		< 5000	5000	ug/Kg	
1,1,2,2-Tetrachloroethane		< 5000	5000	ug/Kg	
1,1,2-Trichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethene		< 5000	5000	ug/Kg	
1,1-Dichloropropene		< 5000	5000	ug/Kg	
1,2,3-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,3-Trichloropropane		< 5000	5000	ug/Kg	
1,2,4-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,4-Trimethylbenzene		< 5000	5000	ug/Kg	
1,2-Dibromo-3-chloropropane		< 20000	20000	ug/Kg	
1,2-Dibromoethane		< 5000	5000	ug/Kg	
1,2-Dichlorobenzene		< 5000	5000	ug/Kg	
1,2-Dichloroethane		< 5000	5000	ug/Kg	
1,2-Dichloropropane		< 5000	5000	ug/Kg	
1,3,5-Trimethylbenzene		< 5000	5000	ug/Kg	
1,3-Dichlorobenzene		< 5000	5000	ug/Kg	
1,3-Dichloropropane		< 5000	5000	ug/Kg	
1,4-Dichlorobenzene		< 5000	5000	ug/Kg	
2,2-Dichloropropane		< 5000	5000	ug/Kg	
2-Chlorotoluene		< 5000	5000	ug/Kg	
4-Chlorotoluene		< 5000	5000	ug/Kg	
Benzene		< 5000	5000	ug/Kg	
Bromobenzene		< 5000	5000	ug/Kg	
Bromochloromethane		< 5000	5000	ug/Kg	
Bromodichloromethane		< 5000	5000	ug/Kg	
Bromoform		< 5000	5000	ug/Kg	

MICROSTETS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-25
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
OIL DUP	Solid	09 Feb. 01 7:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5000	5000	ug/Kg	8260B
Carbon tetrachloride		< 5000	5000	ug/Kg	
Chlorobenzene		< 5000	5000	ug/Kg	
Chlorodibromomethane		< 5000	5000	ug/Kg	
Chloroethane		< 5000	5000	ug/Kg	
Chloroform		< 5000	5000	ug/Kg	
Chloromethane		< 5000	5000	ug/Kg	
cis-1,2-Dichloroethene		< 5000	5000	ug/Kg	
cis-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Dibromomethane		< 5000	5000	ug/Kg	
Dichlorodifluoromethane		< 5000	5000	ug/Kg	
Ethylbenzene		< 5000	5000	ug/Kg	
Isopropylbenzene		< 5000	5000	ug/Kg	
m & p-Xylene		< 10000	10000	ug/Kg	
Methylene Chloride		< 5000	5000	ug/Kg	
Naphthalene		< 5000	5000	ug/Kg	
n-Butylbenzene		< 5000	5000	ug/Kg	
n-Propylbenzene		< 5000	5000	ug/Kg	
o-Xylene		< 5000	5000	ug/Kg	
p-Isopropyltoluene		< 5000	5000	ug/Kg	
sec-Butylbenzene		< 5000	5000	ug/Kg	
Styrene		< 5000	5000	ug/Kg	
Tetrachloroethene		< 5000	5000	ug/Kg	
Toluene		< 5000	5000	ug/Kg	
trans-1,2-Dichloroethene		< 5000	5000	ug/Kg	
trans-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Trichloroethene		< 5000	5000	ug/Kg	
Trichlorofluoromethane		< 5000	5000	ug/Kg	
Vinyl Chloride		< 5000	5000	ug/Kg	

MICROSTEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-25
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
OIL DUP	Solid	09 Feb. 01 7:00	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
V latiles					

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-26

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3D/020901	Water	09 Feb. 01 10:45	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		18	2.0	mg/L	320.1
Nitrate-nitrite as N		0.25	0.050	mg/L	353.3
Total Organic Carbon		1200	2.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Nam NSA-Midsouth
Client Proj # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-26
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3D/020901	Water	09 Feb. 01 10:45	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Benzene		< 5.0	5.0	ug/L	8260B
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane	J	2.4	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	

MICROSTEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-26
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3D/020901	Water	09 Feb. 01 10:45	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Toluene		< 5.0	5.0	ug/L	8260B
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		11	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		1600	5.0	ng/L	AM18
Ethene		1700	5.0	ng/L	
Methane		6200	0.015	ug/L	

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-27
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D/020901	Solid	09 Feb. 01 14:05	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	M th d #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 5000	5000	ug/Kg	8260B
1,1,1-Trichloroethane		< 5000	5000	ug/Kg	
1,1,2,2-Tetrachloroethane		< 5000	5000	ug/Kg	
1,1,2-Trichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethene		< 5000	5000	ug/Kg	
1,1-Dichloropropene		< 5000	5000	ug/Kg	
1,2,3-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,3-Trichloropropane		< 5000	5000	ug/Kg	
1,2,4-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,4-Trimethylbenzene		< 5000	5000	ug/Kg	
1,2-Dibromo-3-chloropropane		< 20000	20000	ug/Kg	
1,2-Dibromoethane		< 5000	5000	ug/Kg	
1,2-Dichlorobenzene		< 5000	5000	ug/Kg	
1,2-Dichloroethane		< 5000	5000	ug/Kg	
1,2-Dichloropropane		< 5000	5000	ug/Kg	
1,3,5-Trimethylbenzene		< 5000	5000	ug/Kg	
1,3-Dichlorobenzene		< 5000	5000	ug/Kg	
1,3-Dichloropropane		< 5000	5000	ug/Kg	
1,4-Dichlorobenzene		< 5000	5000	ug/Kg	
2,2-Dichloropropane		< 5000	5000	ug/Kg	
2-Chlorotoluene		< 5000	5000	ug/Kg	
4-Chlorotoluene		< 5000	5000	ug/Kg	
Benzene		< 5000	5000	ug/Kg	
Bromobenzene		< 5000	5000	ug/Kg	
Bromochloromethane		< 5000	5000	ug/Kg	
Bromodichloromethane		< 5000	5000	ug/Kg	
Bromoform		< 5000	5000	ug/Kg	

MICROSTEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-27
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D/020901	Solid	09 Feb. 01 14:05	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5000	5000	ug/Kg	8260B
Carbon tetrachloride		< 5000	5000	ug/Kg	
Chlorobenzene		< 5000	5000	ug/Kg	
Chlorodibromomethane		< 5000	5000	ug/Kg	
Chloroethane		< 5000	5000	ug/Kg	
Chloroform		< 5000	5000	ug/Kg	
Chloromethane		< 5000	5000	ug/Kg	
cis-1,2-Dichloroethene		< 5000	5000	ug/Kg	
cis-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Dibromomethane		< 5000	5000	ug/Kg	
Dichlorodifluoromethane		< 5000	5000	ug/Kg	
Ethylbenzene		< 5000	5000	ug/Kg	
Isopropylbenzene		< 5000	5000	ug/Kg	
m & p-Xylene		< 10000	10000	ug/Kg	
Methylene Chloride		< 5000	5000	ug/Kg	
Naphthalene		< 5000	5000	ug/Kg	
n-Butylbenzene		< 5000	5000	ug/Kg	
n-Propylbenzene		< 5000	5000	ug/Kg	
o-Xylene		< 5000	5000	ug/Kg	
p-Isopropyltoluene		< 5000	5000	ug/Kg	
sec-Butylbenzene		< 5000	5000	ug/Kg	
Styrene		< 5000	5000	ug/Kg	
Tetrachloroethene		< 5000	5000	ug/Kg	
Toluene		< 5000	5000	ug/Kg	
trans-1,2-Dichloroethene		< 5000	5000	ug/Kg	
trans-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Trichloroethene		< 5000	5000	ug/Kg	
Trichlorofluoromethane		< 5000	5000	ug/Kg	
Vinyl Chloride		< 5000	5000	ug/Kg	

MICROSTEELS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-27
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D/020901	Solid	09 Feb. 01 14:05	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
V latiles					

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-28
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/020901	Solid	09 Feb. 01 14:10	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 5000	5000	ug/Kg	8260B
1,1,1-Trichloroethane		< 5000	5000	ug/Kg	
1,1,2,2-Tetrachloroethane		< 5000	5000	ug/Kg	
1,1,2-Trichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethene		< 5000	5000	ug/Kg	
1,1-Dichloropropene		< 5000	5000	ug/Kg	
1,2,3-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,3-Trichloropropane		< 5000	5000	ug/Kg	
1,2,4-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,4-Trimethylbenzene		< 5000	5000	ug/Kg	
1,2-Dibromo-3-chloropropane		< 20000	20000	ug/Kg	
1,2-Dibromoethane		< 5000	5000	ug/Kg	
1,2-Dichlorobenzene		< 5000	5000	ug/Kg	
1,2-Dichloroethane		< 5000	5000	ug/Kg	
1,2-Dichloropropane		< 5000	5000	ug/Kg	
1,3,5-Trimethylbenzene		< 5000	5000	ug/Kg	
1,3-Dichlorobenzene		< 5000	5000	ug/Kg	
1,3-Dichloropropane		< 5000	5000	ug/Kg	
1,4-Dichlorobenzene		< 5000	5000	ug/Kg	
2,2-Dichloropropane		< 5000	5000	ug/Kg	
2-Chlorotoluene		< 5000	5000	ug/Kg	
4-Chlorotoluene		< 5000	5000	ug/Kg	
Benzene		< 5000	5000	ug/Kg	
Bromobenzene		< 5000	5000	ug/Kg	
Bromochloromethane		< 5000	5000	ug/Kg	
Bromodichloromethane		< 5000	5000	ug/Kg	
Bromoform		< 5000	5000	ug/Kg	

MICROSEELS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-28
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/020901	Solid	09 Feb. 01 14:10	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5000	5000	ug/Kg	8260B
Carbon tetrachloride		< 5000	5000	ug/Kg	
Chlorobenzene		< 5000	5000	ug/Kg	
Chlorodibromomethane		< 5000	5000	ug/Kg	
Chloroethane		< 5000	5000	ug/Kg	
Chloroform		< 5000	5000	ug/Kg	
Chloromethane		< 5000	5000	ug/Kg	
cis-1,2-Dichloroethene		< 5000	5000	ug/Kg	
cis-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Dibromomethane		< 5000	5000	ug/Kg	
Dichlorodifluoromethane		< 5000	5000	ug/Kg	
Ethylbenzene		< 5000	5000	ug/Kg	
Isopropylbenzene		< 5000	5000	ug/Kg	
m & p-Xylene		< 9900	9900	ug/Kg	
Methylene Chloride		< 5000	5000	ug/Kg	
Naphthalene		< 5000	5000	ug/Kg	
n-Butylbenzene		< 5000	5000	ug/Kg	
n-Propylbenzene		< 5000	5000	ug/Kg	
o-Xylene		< 5000	5000	ug/Kg	
p-Isopropyltoluene		< 5000	5000	ug/Kg	
sec-Butylbenzene		< 5000	5000	ug/Kg	
Styrene		< 5000	5000	ug/Kg	
Tetrachloroethene		< 5000	5000	ug/Kg	
Toluene		< 5000	5000	ug/Kg	
trans-1,2-Dichloroethene		< 5000	5000	ug/Kg	
trans-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Trichloroethene		< 5000	5000	ug/Kg	
Trichlorofluoromethane		< 5000	5000	ug/Kg	
Vinyl Chloride		< 5000	5000	ug/Kg	

MICROSETS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-28
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/020901	Solid	09 Feb. 01 14:10	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					

MICROSEEPS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-29
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
TANK/020901	Water	02 Feb. 01 15:45	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	3.9	5.0	ug/L	
1,1-Dichloroethene		11	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

MICROSELECTS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-29
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
TANK/020901	Water	02 Feb. 01 15:45	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride	J	4.9	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		8.1	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	1.6	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		54	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROBETS

Order #: P0102145
Report Date: 03/06/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0102145-29
Report Date: 16 Mar. 01

Sample Description	Matrix	Sampled Date/Time	Received
TANK/020901	Water	02 Feb. 01 15:45	12 Feb. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

MICROSEEPS

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 | **Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238** | Fax No. : (412) 826-3433

Company : PARSONS ES
Co. Address : 1700 Broadway STE 900 Denver CO
Proj. Manager: BRUCE Henry
Proj. Location: NSA-MID SOUTH
Proj. Number: 737490.
Phone # : 303-831-8100 **Fax # :**

Sampler's signature : [signature]

Results to : BRUCE Henry
Invoice to : Bruce Henry

Cooler ID	Cooler Temp.

Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	VOCs - SW8260B	AM18 - methane, Ethane, Ethene	Nitrate + Nitrite E300.1	Total organic Carbon SW9060	Bromide E320.1				Remarks
	PES-MW1D/020601	2-6-01	1130		X	5	X	X	X						
	PES-MW1/020601	2-6-01	1250		X	9	X	X	X						MS/MSD collected for SW8260B
	0076L 15LF/020601	2-6-01	1550		X	5	X	X	X						
	0076L 15UF/020601	2-6-01	1700		X	5	X	X	X						
	DUP-1	2-6-01	0900		X	5	X	X	X						
	PES-MW8S/020701	2-7-01	0800		X	6	X	X	X	X	X				
	PES-MW8D/020701	2-7-01	0930		X	6	X	X	X	X	X				
	PES-MW7S/020701	2-7-01	1100		X	6	X	X	X	X	X				
	PES-MW7D/020701	2-7-01	1235		X	6	X	X	X	X	X				
	PES-MW6S/020701	2-7-01	1415		X	6	X	X	X	X	X				
	Rinsate	2-7-01	1300		X	2	X								Rinsate Blank - Expect Low or ND conc.
	DUP-2	2-7-01	0700		X	6	X	X	X	X	X				

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Jason Bidgood	PARSONS	2/7/01	1700				
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 | **Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238** | Fax No. : (412) 826-3433

Company : PARSONS ES.
Co. Address : 1700 Broadway Ste 900 Denver CO
Proj. Manager: Bruce Henry
Proj. Location: NSA-MID SOUTH
Proj. Number: 737490
Phone # : 303-831-8100 **Fax # :**

Sampler's signature :

Results to : Bruce Henry

Invoice to :

Cooler ID	Cooler Temp.

Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	SW8260B	AM-18 methane Ethane Ethene	Nitrate+Nitrite E300.1	Total Org. Carbon SW9060	Bromide E320.1				Remarks
	PES-MW6D	2-7-01	1615		X	6	X	X	X	X	X				MS/MSD collected.
	Trip Blank	2-6-01	0600		X	4 ~~2~~	X								

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
[signature]	PARSONS ES	2/7/01	1700				
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

P102145

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 **Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238** Fax No. : (412) 826-3433

Company : PARSONS ES
Co. Address : Denver CO
Proj. Manager: Bruce Henry
Proj. Location: NSA-MID SOUTH
Proj. Number: 737490
Phone # : 303-831-8100 Fax # :

Sampler's signature :

Results to :

Invoice to :

Cooler ID	Cooler Temp.

	Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	SW8260B - VOCs	AM 1B - Methane, Ethane, Ethene	Nitrate+Nitrite E300.1	Total Org. Carbon SW9060M	Bromide E320.1				Remarks
✓	12	PES-MW5S/020801	2/8/01	0900		X	6	X	X	X	X	X				
✓	13	PES-MW5D/020801	2/8/01	0750		X	6	X	X	X	X	X				
✓	14	PES-MW3S/020901	2/9/01 ~~2/8/01~~	0730		X	6	X	X	X	X	X				
✓	15	PES-MW3D/020801	2/8/01	1700		X	6	X	X	X	X	X				
✓	16	PES-MW4S/020801	2/8/01	1200		X	6	X	X	X	X	X				
✓	17	PES-MW4D/020801	2/8/01	1045		X	6	X	X	X	X	X				
✓	18	PES-MW2S/020801	2/8/01	1515		X	6	X	X	X	X	X				
✓	19	PES-MW2D/020801	2/8/01	1415		X	6	X	X	X	X	X				
✓	20	DUP-3	2/8/01	0700		X	6	X	X	X	X	X				
✓✓✓	21	PES-INJ3S/020801	2/8/01	1610		X	6	X								oil sample/22MS/23MSD collected.
✓	24	PES-INJ3D/020901	2/9/01	0950		X	2	X								oil sample.
✓	25	OIL DUP	2/9/01	0700		X	2	X								oil sample

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
		2/9/01	1700		Microseeps	2/12/01	
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

P102145

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 | **Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238** | Fax No. : (412) 826-3433

Company : PARSONS ES
Co. Address : Denver
Proj. Manager: Bruce Henry
Proj. Location: NSA MIDSOUTH
Proj. Number: 737490
Phone # : 303-831-8100 **Fax # :**

Sampler's signature :

Results to :

Invoice to :

Cooler ID	Cooler Temp.

Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	SW8260B -VOCs	AM-18 - Methane, Ethane, Ethylene	Nitrate + Nitrite - E300.1	Total organic Carbon	Bromide				Remarks
26	PES-INJ 3D/020901	2/9/01	1045		X	6	X	X	X	X	X				Samples may contain Veg Oil.
27	PES-INJ2D/020901	2/9/01	1405		X	2	X								Time = 1405. - oil sample
28	PES-INJ 2S/020901	2/9/01	1410		X	2	X								oil sample
29	TANK/020901	2/2/01	1545		X	2	X								

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
		2/9/01	1700		Microseeps	2/9/01	
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

P102145

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 — **Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238** — Fax No. : (412) 826-3433

Company : PARSONS ES
Co. Address : DENVER CO
Proj. Manager: BRUCE HENRY
Proj. Location: NSA-MDSOUTH
Proj. Number: 737490
Phone # : 303-831-8100 Fax # :

Sampler's signature : [signature]

Results to : BRUCE HENRY

Invoice to :

Cooler ID	Cooler Temp.

Parameters Requested

Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	VOCs SW8260B	AM-18 methane Ethane Ethene	Nitrate+Nitrite E300.1	Total Org. Carbon SW9060M	Bromide E320.1				Remarks
01	PES-MW1D/020601	2-6-01	1130		X	5	X	X	X						
02	PES-MW1S/020601	2-6-01	1250		X	9	X	X	X						03 MS 04 MSD
05	OD7GL 15LF/020601	2-6-01	1525		X	2	X								MS MSD
9D	~~067GL 15UF/020601~~	~~2-6-01~~	~~1700~~		~~X~~										
06	DUP-1	2-6-01	0900			2	X								
	~~PES-MW8D/020701~~	~~2-7-01~~	~~0930~~			~~2~~			~~X~~	~~X~~	~~X~~	~~9B~~			
07	PES-MW6S/020701	2-7-01	1415		X	6	X	X	X	X	X				
08	Rinsate	2-7-01	1300		X	2	X								
09	DUP-2	2-7-01	0700		X	6	X	X	X	X	X				
10	TRIP BLANK-2	02-06-01	10:00			2	X								
11	PES-MW8D/020701	2/7/01	0930			2			X	X	X				

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
[signature]		2/8/01	1700	[signature]	Microseeps	2/8/01	
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

APPENDIX A.4

ANALYTICAL DATA – AUGUST 2001

MICROSEEPS

Parson's Engineering Science

Project Number: 737490.03000

NSA Midsouth Site N6

Parson's Contact: Mr. Bruce Henry

Becky Hans

Microseeps Contact: Becky Hans
September 12, 2001

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

CASE NARRATIVE

Parson's Engineering Science
NSA Midsouth Site N6
Project #: 737490.04000

The following were samples analyzed by Microseeps, Inc.

Parson's Identification Number	Lab ID number
PES-MW1D	P0108148-01
PES-MW1D MS	P0108148-02
PES-MW1D MSD	P0108148-03
PES-MW1S	P0108148-04
PES-DP1	P0108148-05
007GL15LF	P0108148-06
007GL15UF	P0108148-07
PES-MW8S	P0108148-08
PES-MW8D	P0108148-09
PES-MW7S	P0108148-10
PES-MW7D	P0108148-11
PES-MW7D MS	P0108148-12
PES-MW7D MSD	P0108148-13
RINSEATE BLANK	P0108148-14
PES-DP2	P0108148-15
TRIP BLANK	P0108148-16
PES-MW5D	P0108148-17
PES-5S	P0108148-18
PES-MW6S	P0108192-01
PES-MW6D	P0108192-02
PES-MW4D	P0108192-03
PES-MW4S	P0108192-04
PES-MW2D	P0108192-05
PES-MW2S	P0108192-06
PES-MW3S	P0108192-07
PES-MW3D	P0108192-08
PES-DP3	P0108192-09
PES-INJ2S	P0108192-10
PES-INJ2S	P0108192-11
PES-INJ2S	P0108192-12
PES-INJ2S	P0108192-13

PES-INJ2D	P0108192-14
PES-INJ2D	P0108192-15
PES-DP4	P0108192-16
PES-INJ3D	P0108192-17
PES-INJ3D	P0108192-18
PES-INJ3S	P0108192-19
PES-TANK-IDW	P0108192-20
PES-TRIP BLANK	P0108192-21

All samples were found to be intact.

Dissolved Light Hydrocarbons:

No anomalies were found during the analysis of dissolved light hydrocarbons.

Compliance Data:

No anomalies were found during the following analyses: Bromide, Color, Chloride, Nitrate, Nitrite, and Total Organic Carbon.

Metals Data:

No anomalies were found during the following analyses: Arsenic, Manganese, and Selenium.

Organic Data:

Samples that were sent in for volatile analysis have been reported off of multiple dilutions. In many cases data was reported from a low level, a medium level and a high level analysis. If any analyte fell between these three dilutions, the result would be reported as an estimated concentration with a "J" flag.

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway

Denver, CO 80290

Page: Page 1 of 55
Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Sample Identification

Lab Sample #	Client Sample ID		
P0108148-01	PES-MW1D	P0108148-16	TRIP BLANK
P0108148-02	PES-MW1D MS	P0108148-17	PES-MW5D
P0108148-03	PES-MW1D MSD	P0108148-18	PES-5S
P0108148-04	PES-MW1S		
P0108148-05	PES-DP1		
P0108148-06	007GL15LF		
P0108148-07	007GL15UF		
P0108148-08	PES-MW8S		
P0108148-09	PES-MW8D		
P0108148-10	PES-MW7S		
P0108148-11	PES-MW7D		
P0108148-12	PES-MW7D MS		
P0108148-13	PES-MW7D MSD		
P0108148-14	RINSEATE BLANK		
P0108148-15	PES-DP2		

Approved By: Becky Hens

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D	Water	06 Aug. 01 17:05	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.12	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D	Water	06 Aug. 01 17:05	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromochloromethane		< 5.0	5.0	ug/L	8260B
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D	Water	06 Aug. 01 17:05	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	8260B
Trichloroethene		< 5.0	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		54	5.0	ng/L	AM18
Ethene		420	5.0	ng/L	
Methane		30	0.015	ug/L	AM20GAX

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D MS	Water	06 Aug. 01 17:05	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		34	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		40	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D MS	Water	06 Aug. 01 17:05	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		42	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		45	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		40	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D MS	Water	06 Aug. 01 17:05	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatil s					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-03

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D MSD	Water	06 Aug. 01 17:05	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		38	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		44	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-03

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D MSD	Water	06 Aug. 01 17:05	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatil s					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		47	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		49	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		< 5.0	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-03

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D MSD	Water	06 Aug. 01 17:05	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-04

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1S	Water	06 Aug. 01 18:50	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.086	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		24	5.0	ug/L	
1,1-Dichloroethene		13	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-04

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1S	Water	06 Aug. 01 18:50	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromochloromethane		< 5.0	5.0	ug/L	8260B
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane	J	3.5	5.0	ug/L	
Chloroform	J	1.1	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		34	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		44	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-04

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1S	Water	06 Aug. 01 18:50	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	8260B
Trichloroethene		14	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		6000	5.0	ng/L	AM18
Ethene		2400	5.0	ng/L	
Methane		770	0.015	ug/L	AM20GAX

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP1	Water	06 Aug. 01 14:00	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.065	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		25	5.0	ug/L	
1,1-Dichloroethene		13	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP1	Water	06 Aug. 01. 14:00	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromochloromethane		< 5.0	5.0	ug/L	8260B
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane	J	3.5	5.0	ug/L	
Chloroform	J	1.1	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		35	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		45	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP1	Water	06 Aug. 01 14:00	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	8260B
Trichloroethene		15	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		6100	5.0	ng/L	AM18
Ethene		2500	5.0	ng/L	
Methane		700	0.015	ug/L	AM20GAX

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-06

Sample Description	Matrix	Sampled Date/Time	Received
007GL15LF	Water	07 Aug. 01 8:45	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.85	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	1.2	5.0	ug/L	
1,1-Dichloroethene	J	3.9	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-06

Sample Description	Matrix	Sampled Date/Time	Received
007GL15LF	Water	07 Aug. 01 8:45	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromochloromethane		< 5.0	5.0	ug/L	8260B
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		17	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		5.1	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-06

Sample Description	Matrix	Sampled Date/Time	Received
007GL15LF	Water	07 Aug. 01 8:45	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	8260B
Trichloroethene	J	3.5	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		94	5.0	ng/L	AM18
Ethene		40	5.0	ng/L	
Methane		4.1	0.015	ug/L	AM20GAX

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-07

Sample Description	Matrix	Sampled Date/Time	Received
007GL15UF	Water	07 Aug. 01 10:45	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.81	0.050	mg/L	353.3
V latiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5	ug/L	
1,1,2-Trichloroethane		< 5.0	5	ug/L	
1,1-Dichloroethane		50	5	ug/L	
1,1-Dichloroethene		340	50	ug/L	
1,1-Dichloropropene		< 5.0	5	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5	ug/L	
1,2,3-Trichloropropane		< 5.0	5	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5	ug/L	
1,2-Dichlorobenzene		< 5.0	5	ug/L	
1,2-Dichloroethane		< 5.0	5	ug/L	
1,2-Dichloropropane		< 5.0	5	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5	ug/L	
1,3-Dichlorobenzene		< 5.0	5	ug/L	
1,3-Dichloropropane		< 5.0	5	ug/L	
1,4-Dichlorobenzene		< 5.0	5	ug/L	
2,2-Dichloropropane		< 5.0	5	ug/L	
2-Chlorotoluene		< 5.0	5	ug/L	
4-Chlorotoluene		< 5.0	5	ug/L	
Benzene	J	2.8	5	ug/L	
Bromobenzene		< 5.0	5	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-07

Sample Description	Matrix	Sampled Date/Time	Received
007GL15UF	Water	07 Aug. 01 10:45	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromochloromethane		< 5.0	5	ug/L	8260B
Bromodichloromethane		< 5.0	5	ug/L	
Bromoform		< 5.0	5	ug/L	
Bromomethane		< 5.0	5	ug/L	
Carbon tetrachloride		5.2	5	ug/L	
Chlorobenzene		< 5.0	5	ug/L	
Chlorodibromomethane		< 5.0	5	ug/L	
Chloroethane		< 5.0	5	ug/L	
Chloroform		17	5	ug/L	
Chloromethane		< 5.0	5	ug/L	
cis-1,2-Dichloroethene		13	5	ug/L	
cis-1,3-Dichloropropene		< 5.0	5	ug/L	
Dibromomethane		< 5.0	5	ug/L	
Dichlorodifluoromethane		< 5.0	5	ug/L	
Ethylbenzene		< 5.0	5	ug/L	
Isopropylbenzene		< 5.0	5	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5	ug/L	
Naphthalene		< 5.0	5	ug/L	
n-Butylbenzene		< 5.0	5	ug/L	
n-Propylbenzene		< 5.0	5	ug/L	
o-Xylene		< 5.0	5	ug/L	
p-Isopropyltoluene		< 5.0	5	ug/L	
sec-Butylbenzene		< 5.0	5	ug/L	
Styrene		< 5.0	5	ug/L	
tert-Butylbenzene		< 5.0	5	ug/L	
Tetrachloroethene		< 5.0	5	ug/L	
Toluene		< 5.0	5	ug/L	
trans-1,2-Dichloroethene		< 5.0	5	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-07

Sample Description	Matrix	Sampled Date/Time	Received
007GL15UF	Water	07 Aug. 01 10:45	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,3-Dichloropropene		< 5.0	5	ug/L	8260B
Trichloroethene		310	50	ug/L	
Trichlorofluoromethane		< 5.0	5	ug/L	
Vinyl Chloride		< 5.0	5	ug/L	
RiskAnalysis					
Water					
Ethane		130	5.0	ng/L	AM18
Ethene		79	5.0	ng/L	
Methane		18	0.015	ug/L	AM20GAX

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S	Water	07 Aug. 01 14:00	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.064	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		11	5.0	ug/L	
1,1-Dichloroethene		33	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S	Water	07 Aug. 01 14:00	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride	J	4.8	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		5.2	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S	Water	07 Aug. 01 14:00	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		61	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		140	5.0	ng/L	AM18
Ethene		540	5.0	ng/L	
Methane		110	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		< 5.0	5.0	mg/L	9060

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-09

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D	Water	07 Aug. 01 16:10	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		2.4	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5	ug/L	
1,1,2-Trichloroethane		< 5.0	5	ug/L	
1,1-Dichloroethane	J	4.9	5	ug/L	
1,1-Dichloroethene		26	5	ug/L	
1,1-Dichloropropene		< 5.0	5	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5	ug/L	
1,2,3-Trichloropropane		< 5.0	5	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5	ug/L	
1,2-Dichlorobenzene		< 5.0	5	ug/L	
1,2-Dichloroethane		< 5.0	5	ug/L	
1,2-Dichloropropane		< 5.0	5	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5	ug/L	
1,3-Dichlorobenzene		< 5.0	5	ug/L	
1,3-Dichloropropane		< 5.0	5	ug/L	
1,4-Dichlorobenzene		< 5.0	5	ug/L	
2,2-Dichloropropane		< 5.0	5	ug/L	
2-Chlorotoluene		< 5.0	5	ug/L	
4-Chlorotoluene		< 5.0	5	ug/L	
Benzene		< 5.0	5	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-09

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D	Water	07 Aug. 01 16:10	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5	ug/L	8260B
Bromochloromethane		< 5.0	5	ug/L	
Bromodichloromethane		< 5.0	5	ug/L	
Bromoform		< 5.0	5	ug/L	
Bromomethane		< 5.0	5	ug/L	
Carbon tetrachloride		72	5	ug/L	
Chlorobenzene		< 5.0	5	ug/L	
Chlorodibromomethane		< 5.0	5	ug/L	
Chloroethane		< 5.0	5	ug/L	
Chloroform		82	5	ug/L	
Chloromethane		< 5.0	5	ug/L	
cis-1,2-Dichloroethene	J	3.1	5	ug/L	
cis-1,3-Dichloropropene		< 5.0	5	ug/L	
Dibromomethane		< 5.0	5	ug/L	
Dichlorodifluoromethane		< 5.0	5	ug/L	
Ethylbenzene		< 5.0	5	ug/L	
Isopropylbenzene		< 5.0	5	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5	ug/L	
Naphthalene		< 5.0	5	ug/L	
n-Butylbenzene		< 5.0	5	ug/L	
n-Propylbenzene		< 5.0	5	ug/L	
o-Xylene		< 5.0	5	ug/L	
p-Isopropyltoluene		< 5.0	5	ug/L	
sec-Butylbenzene		< 5.0	5	ug/L	
Styrene		< 5.0	5	ug/L	
tert-Butylbenzene		< 5.0	5	ug/L	
Tetrachloroethene		< 5.0	5	ug/L	
Toluene		< 5.0	5	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-09

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D	Water	07 Aug. 01 16:10	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5	ug/L	
Trichloroethene		540	50	ug/L	
Trichlorofluoromethane		< 5.0	5	ug/L	
Vinyl Chloride		< 5.0	5	ug/L	
RiskAnalysis					
Water					
Ethane		130	5.0	ng/L	AM18
Ethene		1100	5.0	ng/L	
Methane		12	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		< 5.0	5.0	mg/L	9060

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-10

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7S	Water	07 Aug. 01 17:25	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.061	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		83	5.0	ug/L	
1,1-Dichloroethene		110	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-10

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7S	Water	07 Aug. 01 17:25	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride	J	4.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform	J	5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		28	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-10

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7S	Water	07 Aug. 01 17:25	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
V latiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		140	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		170	5.0	ng/L	AM18
Ethene		1100	5.0	ng/L	
Methane		80	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		9.2	5.0	mg/L	9060

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-11

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D	Water	07 Aug. 01 18:45	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		2.3	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5	ug/L	
1,1,2-Trichloroethane		< 5.0	5	ug/L	
1,1-Dichloroethane		6.0	5	ug/L	
1,1-Dichloroethene		27	5	ug/L	
1,1-Dichloropropene		< 5.0	5	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5	ug/L	
1,2,3-Trichloropropane		< 5.0	5	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5	ug/L	
1,2-Dichlorobenzene		< 5.0	5	ug/L	
1,2-Dichloroethane		< 5.0	5	ug/L	
1,2-Dichloropropane		< 5.0	5	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5	ug/L	
1,3-Dichlorobenzene		< 5.0	5	ug/L	
1,3-Dichloropropane		< 5.0	5	ug/L	
1,4-Dichlorobenzene		< 5.0	5	ug/L	
2,2-Dichloropropane		< 5.0	5	ug/L	
2-Chlorotoluene		< 5.0	5	ug/L	
4-Chlorotoluene		< 5.0	5	ug/L	
Benzene	J	1.0	5	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-11

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D	Water	07 Aug. 01 18:45	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5	ug/L	8260B
Bromochloromethane		< 5.0	5	ug/L	
Bromodichloromethane		< 5.0	5	ug/L	
Bromoform		< 5.0	5	ug/L	
Bromomethane		< 5.0	5	ug/L	
Carbon tetrachloride		200	5	ug/L	
Chlorobenzene		< 5.0	5	ug/L	
Chlorodibromomethane		< 5.0	5	ug/L	
Chloroethane		< 5.0	5	ug/L	
Chloroform		100	5	ug/L	
Chloromethane		< 5.0	5	ug/L	
cis-1,2-Dichloroethene	J	4.5	5	ug/L	
cis-1,3-Dichloropropene		< 5.0	5	ug/L	
Dibromomethane		< 5.0	5	ug/L	
Dichlorodifluoromethane		< 5.0	5	ug/L	
Ethylbenzene		< 5.0	5	ug/L	
Isopropylbenzene		< 5.0	5	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5	ug/L	
Naphthalene		< 5.0	5	ug/L	
n-Butylbenzene		< 5.0	5	ug/L	
n-Propylbenzene		< 5.0	5	ug/L	
o-Xylene		< 5.0	5	ug/L	
p-Isopropyltoluene		< 5.0	5	ug/L	
sec-Butylbenzene		< 5.0	5	ug/L	
Styrene		< 5.0	5	ug/L	
tert-Butylbenzene		< 5.0	5	ug/L	
Tetrachloroethene		< 5.0	5	ug/L	
Toluene		< 5.0	5	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-11

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D	Water	07 Aug. 01 18:45	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5	ug/L	
Trichloroethene		670	50	ug/L	
Trichlorofluoromethane		< 5.0	5	ug/L	
Vinyl Chloride		< 5.0	5	ug/L	
RiskAnalysis					
Water					
Ethane		210	5.0	ng/L	AM18
Ethene		960	5.0	ng/L	
Methane		7.0	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		< 5.0	5.0	mg/L	9060

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-12

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D MS	Water	07 Aug. 01 18:45	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		6.1	5.0	ug/L	
1,1-Dichloroethene		70	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		47	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-12

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D MS	Water	07 Aug. 01 18:45	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		220	5.0	ug/L	
Chlorobenzene		48	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		110	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	4.8	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		50	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		1000	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-12

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D MS	Water	07 Aug. 01 18:45	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-13

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D MSD	Water	07 Aug. 01 18:45	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5	ug/L	
1,1,2-Trichloroethane		< 5.0	5	ug/L	
1,1-Dichloroethane		5.5	5	ug/L	
1,1-Dichloroethene		67	5	ug/L	
1,1-Dichloropropene		< 5.0	5	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5	ug/L	
1,2,3-Trichloropropane		< 5.0	5	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5	ug/L	
1,2-Dichlorobenzene		< 5.0	5	ug/L	
1,2-Dichloroethane		< 5.0	5	ug/L	
1,2-Dichloropropane		< 5.0	5	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5	ug/L	
1,3-Dichlorobenzene		< 5.0	5	ug/L	
1,3-Dichloropropane		< 5.0	5	ug/L	
1,4-Dichlorobenzene		< 5.0	5	ug/L	
2,2-Dichloropropane		< 5.0	5	ug/L	
2-Chlorotoluene		< 5.0	5	ug/L	
4-Chlorotoluene		< 5.0	5	ug/L	
Benzene		44	5	ug/L	
Bromobenzene		< 5.0	5	ug/L	
Bromochloromethane		< 5.0	5	ug/L	
Bromodichloromethane		< 5.0	5	ug/L	
Bromoform		< 5.0	5	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-13

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D MSD	Water	07 Aug. 01 18:45	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5	ug/L	8260B
Carbon tetrachloride		200	5	ug/L	
Chlorobenzene		43	5	ug/L	
Chlorodibromomethane		< 5.0	5	ug/L	
Chloroethane		< 5.0	5	ug/L	
Chloroform		100	5	ug/L	
Chloromethane		< 5.0	5	ug/L	
cis-1,2-Dichloroethene	J	4.4	5	ug/L	
cis-1,3-Dichloropropene		< 5.0	5	ug/L	
Dibromomethane		< 5.0	5	ug/L	
Dichlorodifluoromethane		< 5.0	5	ug/L	
Ethylbenzene		< 5.0	5	ug/L	
Isopropylbenzene		< 5.0	5	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5	ug/L	
Naphthalene		< 5.0	5	ug/L	
n-Butylbenzene		< 5.0	5	ug/L	
n-Propylbenzene		< 5.0	5	ug/L	
o-Xylene		< 5.0	5	ug/L	
p-Isopropyltoluene		< 5.0	5	ug/L	
sec-Butylbenzene		< 5.0	5	ug/L	
Styrene		< 5.0	5	ug/L	
tert-Butylbenzene		< 5.0	5	ug/L	
Tetrachloroethene		< 5.0	5	ug/L	
Toluene		46	5	ug/L	
trans-1,2-Dichloroethene		< 5.0	5	ug/L	
trans-1,3-Dichloropropene		< 5.0	5	ug/L	
Trichloroethene		920	5	ug/L	
Trichlorofluoromethane		< 5.0	5	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-13

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D MSD	Water	07 Aug. 01 18:45	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5	ug/L	8260B

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-14

Sample Description	Matrix	Sampled Date/Time	Received
RINSEATE BLANK	Water	07 Aug. 01 18:00	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5	ug/L	
1,1,2-Trichloroethane		< 5.0	5	ug/L	
1,1-Dichloroethane		< 5.0	5	ug/L	
1,1-Dichloroethene		< 5.0	5	ug/L	
1,1-Dichloropropene		< 5.0	5	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5	ug/L	
1,2,3-Trichloropropane		< 5.0	5	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5	ug/L	
1,2-Dichlorobenzene		< 5.0	5	ug/L	
1,2-Dichloroethane		< 5.0	5	ug/L	
1,2-Dichloropropane		< 5.0	5	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5	ug/L	
1,3-Dichlorobenzene		< 5.0	5	ug/L	
1,3-Dichloropropane		< 5.0	5	ug/L	
1,4-Dichlorobenzene		< 5.0	5	ug/L	
2,2-Dichloropropane		< 5.0	5	ug/L	
2-Chlorotoluene		< 5.0	5	ug/L	
4-Chlorotoluene		< 5.0	5	ug/L	
Benzene		< 5.0	5	ug/L	
Bromobenzene		< 5.0	5	ug/L	
Bromochloromethane		< 5.0	5	ug/L	
Bromodichloromethane		< 5.0	5	ug/L	
Bromoform		< 5.0	5	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-14

Sample Description	Matrix	Sampled Date/Time	Received
RINSEATE BLANK	Water	07 Aug. 01 18:00	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5	ug/L	8260B
Carbon tetrachloride		< 5.0	5	ug/L	
Chlorobenzene		< 5.0	5	ug/L	
Chlorodibromomethane		< 5.0	5	ug/L	
Chloroethane		< 5.0	5	ug/L	
Chloroform		< 5.0	5	ug/L	
Chloromethane		< 5.0	5	ug/L	
cis-1,2-Dichloroethene		< 5.0	5	ug/L	
cis-1,3-Dichloropropene		< 5.0	5	ug/L	
Dibromomethane		< 5.0	5	ug/L	
Dichlorodifluoromethane		< 5.0	5	ug/L	
Ethylbenzene		< 5.0	5	ug/L	
Isopropylbenzene		< 5.0	5	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5	ug/L	
Naphthalene		< 5.0	5	ug/L	
n-Butylbenzene		< 5.0	5	ug/L	
n-Propylbenzene		< 5.0	5	ug/L	
o-Xylene		< 5.0	5	ug/L	
p-Isopropyltoluene		< 5.0	5	ug/L	
sec-Butylbenzene		< 5.0	5	ug/L	
Styrene		< 5.0	5	ug/L	
tert-Butylbenzene		< 5.0	5	ug/L	
Tetrachloroethene		< 5.0	5	ug/L	
Toluene		< 5.0	5	ug/L	
trans-1,2-Dichloroethene		< 5.0	5	ug/L	
trans-1,3-Dichloropropene		< 5.0	5	ug/L	
Trichloroethene	J	1.1	5	ug/L	
Trichlorofluoromethane		< 5.0	5	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-14

Sample Description	Matrix	Sampled Date/Time	Received
RINSEATE BLANK	Water	07 Aug. 01 18:00	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5	ug/L	8260B

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-15

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP2	Water	07 Aug. 01 20:00	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.068	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		12	5.0	ug/L	
1,1-Dichloroethene		35	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-15

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP2	Water	07 Aug. 01 20:00	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		5.9	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		5.6	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-15

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP2	Water	07 Aug. 01 20:00	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		65	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		120	5.0	ng/L	AM18
Ethene		500	5.0	ng/L	
Methane		110	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		7.6	5.0	mg/L	9060

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-16

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	06 Aug. 01 12:00	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-16

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	06 Aug. 01 12:00	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		< 5.0	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-16

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	06 Aug. 01 12:00	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-17

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5D	Water	08 Aug. 01 8:55	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		1.7	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		13	5.0	ug/L	
1,1-Dichloroethene		77	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene	J	1.8	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-17

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5D	Water	08 Aug. 01 8:55	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		110	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		120	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		8.7	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-17

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5D	Water	08 Aug. 01 8:55	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		680	100	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		470	5.0	ng/L	AM18
Ethene		1100	5.0	ng/L	
Methane		19	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		< 5.0	5.0	mg/L	9060

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-18

Sample Description	Matrix	Sampled Date/Time	Received
PES-5S	Water	08 Aug. 01 9:30	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.084	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		64	5.0	ug/L	
1,1-Dichloroethene		92	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene	J	1.1	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-18

Sample Description	Matrix	Sampled Date/Time	Received
PES-5S	Water	08 Aug. 01 9:30	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride	J	3.3	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		18	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		6.3	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108148
Report Date: 09/11/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108148-18

Sample Description	Matrix	Sampled Date/Time	Received
PES-5S	Water	08 Aug. 01 9:30	09 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		180	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		220	5.0	ng/L	AM18
Ethene		1500	5.0	ng/L	
Methane		79	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		< 5.0	5.0	mg/L	9060

CHAIN - OF - CUSTODY RECORD

#2 of 2

Phone: (412) 826-5245 — Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 — Fax No. : (412) 826-3433

Company : PARSONS
Co. Address : 1700 Broadway, Denver CO
Proj. Manager: Bruce Henry
Proj. Location: NSA MID SOUTH
Proj. Number: 737490.04000
Phone # : 303-831-8100 Fax # : 303-831-8208

Sampler's signature :

Results to : Bruce Henry, PARSONS, 1700 Broadway, Denver
Invoice to :

Cooler ID	Cooler Temp.

Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	SW8260B VOCs	AM-18 methane, Ethane Ethene	353.2 Nitrate Nitrite	SW9060M Total Org Carbon	E320.1 Bromide				Remarks
17	PES-MW5D/080801	8/8/01	0855		X	7	X	X	X	X	X				
18	PES-MW5S/080801	8/8/01	0930		X	7	X	X	X	X	X				

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Jason Bidgood	PARSONS	8/8/01	1200	[illegible]	Microseeps	8/9/01	1355
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

P108148

CHAIN - OF - CUSTODY RECORD

#1 of 2

Phone: (412) 826-5245 — Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 — Fax No.: (412) 826-3433

Company: PARSONS
Co. Address: 1700 Broadway, Denver CO
Proj. Manager: Bruce Henry
Proj. Location: NSA-MID-SOUTH
Proj. Number: 737490.04000
Phone #: 303-831-8100 Fax #: 303-831-8208

Sampler's signature: J Bx

Results to: Bruce Henry, Parsons, 1700 Broadway Denver
Invoice to:

Cooler ID	Cooler Temp.

Parameters Requested

Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	SW8260B VOCs	AM18 Methane, Ethane, Ethene	B53.2 Nitrate/Nitrite	SW9060M Total Organic Carbon	E320.1 Bromide				Remarks
01	PES-MW1D/080601	8/6/01	1705		X	9 5 MS/MSD	X	X	X						02 03 MS/MSD For SW8260B
04	PES-MW1S/080601	8/6/01	1850		X	5	X	X	X						
05	PES-DP1/080601	8/6/01	1400		X	5	X	X	X						
06	007GL15LF/080701	8/7/01	0845		X	5	X	X	X						
07	007GL15UF/080701	8/7/01	1045		X	5	X	X	X						
08	PES-MW8S/080701	8/7/01	1400		X	7	X	X	X	X	X				
09	PES-MW8D/080701	8/7/01	1610		X	7	X	X	X	X	X				
10	PES-MW7S/080701	8/7/01	1725		X	7	X	X	X	X	X				
11	PES-MW7D/080701	8/7/01	1845		X	11	X	X	X	X	X				12 13 MS/MSD For SW8260B
14	Rinsate-Blank	8/7/01	1800		X	2	X								DI water Equipment Blank
15	PES-DP2/080701	8/7/01	2000		X	7	X	X	X	X	X				
16	TRIP BLANK	8/6/01	1200		X	2	X								

Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Jason Bridgett	PARSONS	8/8/01	1200	Tony Go	MicroSeeps	8/9/01	1355
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:

WHITE COPY: Accompany Samples YELLOW COPY: Laboratory File PINK COPY: Submitter

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway

Denver, CO 80290

Page: Page 1 of 64
Order #: P0108192
Report Date: 09/12/01
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Sample Identification

Lab Sample #	Client Sample ID
P0108192-01	PES-MW6S/080801
P0108192-02	PES-MW6D/080801
P0108192-03	PES-MW4D/080801
P0108192-04	PES-MW4S/080801
P0108192-05	PES-MW2D/080901
P0108192-06	PES-MW2S/080901
P0108192-07	PES-MW3S/080901
P0108192-08	PES-MW3D/080901
P0108192-09	PES-DP3/080901
P0108192-10	PES-INJ2S/080901
P0108192-11	PES-INJ2S/080901
P0108192-12	PES-INJ2S/080901
P0108192-13	PES-INJ2S/080901
P0108192-14	PES-INJ2D/080901
P0108192-15	PES-INJ2D/080901
P0108192-16	PES-DP4/080901
P0108192-17	PES-INJ3D/080901
P0108192-18	PES-INJ3D/080901
P0108192-19	PES-INJ3S/080901
P0108192-20	TANK-IDW/081001
P0108192-21	TRIP BLANK

Approved By: Becky Stone

NOTES: Samples P0108192-11, -12, -13, -15, -16, -18, and -19 have elevated detection levels due to their oily matrices.

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6S/080801	Water	08 Aug. 01 14:25	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.15	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		39	5.0	ug/L	
1,1-Dichloroethene		190	50	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		5.1	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6S/080801	Water	08 Aug. 01 14:25	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		49	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		94	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		17	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene	J	1.4	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6S/080801	Water	08 Aug. 01 14:25	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		860	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		140	5.0	ng/L	AM18
Ethene		210	5.0	ng/L	
Methane		75	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		< 5.0	5.0	mg/L	9060

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D/080801	Water	08 Aug. 01 15:35	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.46	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		5.1	5.0	ug/L	
1,1-Dichloroethene		32	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D/080801	Water	08 Aug. 01 15:35	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		6.3	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		12	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	2.4	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D/080801	Water	08 Aug. 01 15:35	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		88	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		330	5.0	ng/L	AM18
Ethene		280	5.0	ng/L	
Methane		4.9	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		< 5.0	5.0	mg/L	9060

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-03

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D/080801	Water	08 Aug. 01 16:45	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		1.5	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		5.4	5.0	ug/L	
1,1-Dichloroethene		27	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-03

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D/080801	Water	08 Aug. 01 16:45	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		7.4	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		15	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	2.2	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-03

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D/080801	Water	08 Aug. 01 16:45	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		110	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		170	5.0	ng/L	AM18
Ethene		700	5.0	ng/L	
Methane		4.9	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		< 5.0	5.0	mg/L	9060

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-04

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4S/080801	Water	08 Aug. 01 17:50	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		< 0.050	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		32	5.0	ug/L	
1,1-Dichloroethene		160	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene	J	3.2	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proj Nam NSA-Midsouth
Client Proj # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-04

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4S/080801	Water	08 Aug. 01 17:50	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		21	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		68	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		13	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-04

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4S/080801	Water	08 Aug. 01 17:50	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Meth d #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		370	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		170	5.0	ng/L	AM18
Ethene		590	5.0	ng/L	
Methane		55	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		< 5.0	5.0	mg/L	9060

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2D/080901	Water	09 Aug. 01 8:15	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.18	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	4.5	5.0	ug/L	
1,1-Dichloroethene		23	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2D/080901	Water	09 Aug. 01 8:15	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochioromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride	J	2.4	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform	J	4.5	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		7.4	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2D/080901	Water	09 Aug. 01 8:15	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		40	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		220	5.0	ng/L	AM18
Ethene		550	5.0	ng/L	
Methane		640	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		8.4	5.0	mg/L	9060

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-06

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2S/080901	Water	09 Aug. 01 9:40	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.36	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		25	5.0	ug/L	
1,1-Dichloroethene		140	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene	J	3.9	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-06

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2S/080901	Water	09 Aug. 01 9:40	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatil s					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		62	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		100	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		12	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-06

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2S/080901	Water	09 Aug. 01 9:40	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		1300	100	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		260	5.0	ng/L	AM18
Ethene		1200	5.0	ng/L	
Methane		58	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		6.3	5.0	mg/L	9060

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-07

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3S/080901	Water	09 Aug. 01 11:05	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.060	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		54	5.0	ug/L	
1,1-Dichloroethene		380	100	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene	J	3.5	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-07

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3S/080901	Water	09 Aug. 01 11:05	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		5.7	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		21	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		15	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-07

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3S/080901	Water	09 Aug. 01 11:05	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		740	100	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		450	5.0	ng/L	AM18
Ethene		2100	5.0	ng/L	
Methane		910	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		< 5.0	5.0	mg/L	9060

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D/080901	Water	09 Aug. 01 12:20	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.23	0.050	mg/L	353.3
V latiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		9.4	5.0	ug/L	
1,1-Dichloroethene		56	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene	J	1.2	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D/080901	Water	09 Aug. 01 12:20	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		21	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane	J	4.0	5.0	ug/L	
Chloroform		48	5.0	ug/L	
Chloromethane	J	4.4	5.0	ug/L	
cis-1,2-Dichloroethene		7.6	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	3.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D/080901	Water	09 Aug. 01 12:20	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		230	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		540	5.0	ng/L	AM18
Ethene		830	5.0	ng/L	
Methane		650	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		62	5.0	mg/L	9060

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-09

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP3/080901	Water	09 Aug. 01 7:00	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.28	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	4.4	5.0	ug/L	
1,1-Dichloroethene		21	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-09

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP3/080901	Water	09 Aug. 01 7:00	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride	J	2.3	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform	J	4.5	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		7.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-09

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP3/080901	Water	09 Aug. 01 7:00	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		39	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		200	5.0	ng/L	AM18
Ethene		520	5.0	ng/L	
Methane		480	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		12	5.0	mg/L	9060

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-10

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/080901	Water	09 Aug. 01 15:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-10

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/080901	Water	09 Aug. 01 15:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5.0	5.0	ug/L	8260B
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		< 5.0	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-10

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/080901	Water	09 Aug. 01 15:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-11

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/080901	Solid	09 Aug. 01 15:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 4900	4900	ug/Kg	8260B
1,1,1-Trichloroethane		< 4900	4900	ug/Kg	
1,1,2,2-Tetrachloroethane		< 4900	4900	ug/Kg	
1,1,2-Trichloroethane		< 4900	4900	ug/Kg	
1,1-Dichloroethane		< 4900	4900	ug/Kg	
1,1-Dichloroethene		< 4900	4900	ug/Kg	
1,1-Dichloropropene		< 4900	4900	ug/Kg	
1,2,3-Trichlorobenzene		< 4900	4900	ug/Kg	
1,2,3-Trichloropropane		< 4900	4900	ug/Kg	
1,2,4-Trichlorobenzene		< 4900	4900	ug/Kg	
1,2,4-Trimethylbenzene		< 4900	4900	ug/Kg	
1,2-Dibromo-3-chloropropane		< 20000	20000	ug/Kg	
1,2-Dibromoethane		< 4900	4900	ug/Kg	
1,2-Dichlorobenzene		< 4900	4900	ug/Kg	
1,2-Dichloroethane		< 4900	4900	ug/Kg	
1,2-Dichloropropane		< 4900	4900	ug/Kg	
1,3,5-Trimethylbenzene		< 4900	4900	ug/Kg	
1,3-Dichlorobenzene		< 4900	4900	ug/Kg	
1,3-Dichloropropane		< 4900	4900	ug/Kg	
1,4-Dichlorobenzene		< 4900	4900	ug/Kg	
2,2-Dichloropropane		< 4900	4900	ug/Kg	
2-Chlorotoluene		< 4900	4900	ug/Kg	
4-Chlorotoluene		< 4900	4900	ug/Kg	
Benzene		< 4900	4900	ug/Kg	
Bromobenzene		< 4900	4900	ug/Kg	
Bromochloromethane		< 4900	4900	ug/Kg	
Bromodichloromethane		< 4900	4900	ug/Kg	
Bromoform		< 4900	4900	ug/Kg	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-11

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/080901	Solid	09 Aug. 01 15:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 4900	4900	ug/Kg	8260B
Carbon tetrachloride		< 4900	4900	ug/Kg	
Chlorobenzene		< 4900	4900	ug/Kg	
Chlorodibromomethane		< 4900	4900	ug/Kg	
Chloroethane		< 4900	4900	ug/Kg	
Chloroform		< 4900	4900	ug/Kg	
Chloromethane		< 4900	4900	ug/Kg	
cis-1,2-Dichloroethene		< 4900	4900	ug/Kg	
cis-1,3-Dichloropropene		< 4900	4900	ug/Kg	
Dibromomethane		< 4900	4900	ug/Kg	
Dichlorodifluoromethane		< 4900	4900	ug/Kg	
Ethylbenzene		< 4900	4900	ug/Kg	
Isopropylbenzene		< 4900	4900	ug/Kg	
m & p-Xylene		< 9800	9800	ug/Kg	
Methylene Chloride		< 4900	4900	ug/Kg	
Naphthalene		< 4900	4900	ug/Kg	
n-Butylbenzene		< 4900	4900	ug/Kg	
n-Propylbenzene		< 4900	4900	ug/Kg	
o-Xylene		< 4900	4900	ug/Kg	
p-Isopropyltoluene		< 4900	4900	ug/Kg	
sec-Butylbenzene		< 4900	4900	ug/Kg	
Styrene		< 4900	4900	ug/Kg	
tert-Butylbenzene		< 4900	4900	ug/Kg	
Tetrachloroethene		< 4900	4900	ug/Kg	
Toluene		< 4900	4900	ug/Kg	
trans-1,2-Dichloroethene		< 4900	4900	ug/Kg	
trans-1,3-Dichloropropene		< 4900	4900	ug/Kg	
Trichloroethene		< 4900	4900	ug/Kg	
Trichlorofluoromethane		< 4900	4900	ug/Kg	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-11

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/080901	Solid	09 Aug. 01 15:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 4900	4900	ug/Kg	8260B

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-12

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/C80901	Solid	09 Aug. 01 15:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 4800	4800	ug/Kg	8260B
1,1,1-Trichloroethane		< 4800	4800	ug/Kg	
1,1,2,2-Tetrachloroethane		< 4800	4800	ug/Kg	
1,1,2-Trichloroethane		< 4800	4800	ug/Kg	
1,1-Dichloroethane		< 4800	4800	ug/Kg	
1,1-Dichloroethene		48000	4800	ug/Kg	
1,1-Dichloropropene		< 4800	4800	ug/Kg	
1,2,3-Trichlorobenzene		< 4800	4800	ug/Kg	
1,2,3-Trichloropropane		< 4800	4800	ug/Kg	
1,2,4-Trichlorobenzene		< 4800	4800	ug/Kg	
1,2,4-Trimethylbenzene		< 4800	4800	ug/Kg	
1,2-Dibromo-3-chloropropane		< 19000	19000	ug/Kg	
1,2-Dibromoethane		< 4800	4800	ug/Kg	
1,2-Dichlorobenzene		< 4800	4800	ug/Kg	
1,2-Dichloroethane		< 4800	4800	ug/Kg	
1,2-Dichloropropane		< 4800	4800	ug/Kg	
1,3,5-Trimethylbenzene		< 4800	4800	ug/Kg	
1,3-Dichlorobenzene		< 4800	4800	ug/Kg	
1,3-Dichloropropane		< 4800	4800	ug/Kg	
1,4-Dichlorobenzene		< 4800	4800	ug/Kg	
2,2-Dichloropropane		< 4800	4800	ug/Kg	
2-Chlorotoluene		< 4800	4800	ug/Kg	
4-Chlorotoluene		< 4800	4800	ug/Kg	
Benzene		50000	4800	ug/Kg	
Bromobenzene		< 4800	4800	ug/Kg	
Bromochloromethane		< 4800	4800	ug/Kg	
Bromodichloromethane		< 4800	4800	ug/Kg	
Bromoform		< 4800	4800	ug/Kg	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-12

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/080901	Solid	09 Aug. 01 15:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 4800	4800	ug/Kg	8260B
Carbon tetrachloride		< 4800	4800	ug/Kg	
Chlorobenzene		51000	4800	ug/Kg	
Chlorodibromomethane		< 4800	4800	ug/Kg	
Chloroethane		< 4800	4800	ug/Kg	
Chloroform		< 4800	4800	ug/Kg	
Chloromethane		< 4800	4800	ug/Kg	
cis-1,2-Dichloroethene		< 4800	4800	ug/Kg	
cis-1,3-Dichloropropene		< 4800	4800	ug/Kg	
Dibromomethane		< 4800	4800	ug/Kg	
Dichlorodifluoromethane		< 4800	4800	ug/Kg	
Ethylbenzene		< 4800	4800	ug/Kg	
Isopropylbenzene		< 4800	4800	ug/Kg	
m & p-Xylene		< 9600	9600	ug/Kg	
Methylene Chloride		< 4800	4800	ug/Kg	
Naphthalene		< 4800	4800	ug/Kg	
n-Butylbenzene	J	1200	4800	ug/Kg	
n-Propylbenzene		< 4800	4800	ug/Kg	
o-Xylene		< 4800	4800	ug/Kg	
p-Isopropyltoluene		< 4800	4800	ug/Kg	
sec-Butylbenzene		< 4800	4800	ug/Kg	
Styrene		< 4800	4800	ug/Kg	
tert-Butylbenzene		< 4800	4800	ug/Kg	
Tetrachloroethene		< 4800	4800	ug/Kg	
Toluene		56000	4800	ug/Kg	
trans-1,2-Dichloroethene		< 4800	4800	ug/Kg	
trans-1,3-Dichloropropene		< 4800	4800	ug/Kg	
Trichloroethene		49000	4800	ug/Kg	
Trichlorofluoromethane		< 4800	4800	ug/Kg	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-12

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/080901	Solid	09 Aug. 01 15:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 4800	4800	ug/Kg	8260B

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-13

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/080901	Solid	09 Aug. 01 15:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 5000	5000	ug/Kg	8260B
1,1,1-Trichloroethane		< 5000	5000	ug/Kg	
1,1,2,2-Tetrachloroethane		< 5000	5000	ug/Kg	
1,1,2-Trichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethene		49000	5000	ug/Kg	
1,1-Dichloropropene		< 5000	5000	ug/Kg	
1,2,3-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,3-Trichloropropane		< 5000	5000	ug/Kg	
1,2,4-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,4-Trimethylbenzene		< 5000	5000	ug/Kg	
1,2-Dibromo-3-chloropropane		< 20000	20000	ug/Kg	
1,2-Dibromoethane		< 5000	5000	ug/Kg	
1,2-Dichlorobenzene		< 5000	5000	ug/Kg	
1,2-Dichloroethane		< 5000	5000	ug/Kg	
1,2-Dichloropropane		< 5000	5000	ug/Kg	
1,3,5-Trimethylbenzene		< 5000	5000	ug/Kg	
1,3-Dichlorobenzene		< 5000	5000	ug/Kg	
1,3-Dichloropropane		< 5000	5000	ug/Kg	
1,4-Dichlorobenzene		< 5000	5000	ug/Kg	
2,2-Dichloropropane		< 5000	5000	ug/Kg	
2-Chlorotoluene		< 5000	5000	ug/Kg	
4-Chlorotoluene		< 5000	5000	ug/Kg	
Benzene		53000	5000	ug/Kg	
Bromobenzene		< 5000	5000	ug/Kg	
Bromochloromethane		< 5000	5000	ug/Kg	
Bromodichloromethane		< 5000	5000	ug/Kg	
Bromoform		< 5000	5000	ug/Kg	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-13

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/080901	Solid	09 Aug. 01 15:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5000	5000	ug/Kg	8260B
Carbon tetrachloride		< 5000	5000	ug/Kg	
Chlorobenzene		55000	5000	ug/Kg	
Chlorodibromomethane		< 5000	5000	ug/Kg	
Chloroethane		< 5000	5000	ug/Kg	
Chloroform		< 5000	5000	ug/Kg	
Chloromethane		< 5000	5000	ug/Kg	
cis-1,2-Dichloroethene		< 5000	5000	ug/Kg	
cis-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Dibromomethane		< 5000	5000	ug/Kg	
Dichlorodifluoromethane		< 5000	5000	ug/Kg	
Ethylbenzene		< 5000	5000	ug/Kg	
Isopropylbenzene		< 5000	5000	ug/Kg	
m & p-Xylene		< 10000	10000	ug/Kg	
Methylene Chloride		< 5000	5000	ug/Kg	
Naphthalene		< 5000	5000	ug/Kg	
n-Butylbenzene		< 5000	5000	ug/Kg	
n-Propylbenzene		< 5000	5000	ug/Kg	
o-Xylene		< 5000	5000	ug/Kg	
p-Isopropyltoluene		< 5000	5000	ug/Kg	
sec-Butylbenzene		< 5000	5000	ug/Kg	
Styrene		< 5000	5000	ug/Kg	
tert-Butylbenzene		< 5000	5000	ug/Kg	
Tetrachloroethene		< 5000	5000	ug/Kg	
Toluene		60000	5000	ug/Kg	
trans-1,2-Dichloroethene		< 5000	5000	ug/Kg	
trans-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Trichloroethene		52000	5000	ug/Kg	
Trichlorofluoromethane		< 5000	5000	ug/Kg	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-13

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S/080901	Solid	09 Aug. 01 15:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5000	5000	ug/Kg	8260B

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-14

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D/080901	Water	09 Aug. 01 16:15	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		65	2.0	mg/L	320.1
Nitrate-nitrite as N		0.060	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-14

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D/080901	Water	09 Aug. 01 16:15	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane	J	2.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-14

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D/080901	Water	09 Aug. 01 16:15	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		< 5.0	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		4300	5.0	ng/L	AM18
Ethene		3700	5.0	ng/L	
Methane		7300	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		24000	5.0	mg/L	9060

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-15

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D/080901	Solid	09 Aug. 01 16:15	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 4900	4900	ug/Kg	8260B
1,1,1-Trichloroethane		< 4900	4900	ug/Kg	
1,1,2,2-Tetrachloroethane		< 4900	4900	ug/Kg	
1,1,2-Trichloroethane		< 4900	4900	ug/Kg	
1,1-Dichloroethane		< 4900	4900	ug/Kg	
1,1-Dichloroethene		< 4900	4900	ug/Kg	
1,1-Dichloropropene		< 4900	4900	ug/Kg	
1,2,3-Trichlorobenzene		< 4900	4900	ug/Kg	
1,2,3-Trichloropropane		< 4900	4900	ug/Kg	
1,2,4-Trichlorobenzene		< 4900	4900	ug/Kg	
1,2,4-Trimethylbenzene		< 4900	4900	ug/Kg	
1,2-Dibromo-3-chloropropane		< 20000	20000	ug/Kg	
1,2-Dibromoethane		< 4900	4900	ug/Kg	
1,2-Dichlorobenzene		< 4900	4900	ug/Kg	
1,2-Dichloroethane		< 4900	4900	ug/Kg	
1,2-Dichloropropane		< 4900	4900	ug/Kg	
1,3,5-Trimethylbenzene		< 4900	4900	ug/Kg	
1,3-Dichlorobenzene		< 4900	4900	ug/Kg	
1,3-Dichloropropane		< 4900	4900	ug/Kg	
1,4-Dichlorobenzene		< 4900	4900	ug/Kg	
2,2-Dichloropropane		< 4900	4900	ug/Kg	
2-Chlorotoluene		< 4900	4900	ug/Kg	
4-Chlorotoluene		< 4900	4900	ug/Kg	
Benzene		< 4900	4900	ug/Kg	
Bromobenzene		< 4900	4900	ug/Kg	
Bromochloromethane		< 4900	4900	ug/Kg	
Bromodichloromethane		< 4900	4900	ug/Kg	
Bromoform		< 4900	4900	ug/Kg	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-15

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D/080901	Solid	09 Aug. 01 16:15	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 4900	4900	ug/Kg	8260B
Carbon tetrachloride		< 4900	4900	ug/Kg	
Chlorobenzene		< 4900	4900	ug/Kg	
Chlorodibromomethane		< 4900	4900	ug/Kg	
Chloroethane		< 4900	4900	ug/Kg	
Chloroform		< 4900	4900	ug/Kg	
Chloromethane		< 4900	4900	ug/Kg	
cis-1,2-Dichloroethene		< 4900	4900	ug/Kg	
cis-1,3-Dichloropropene		< 4900	4900	ug/Kg	
Dibromomethane		< 4900	4900	ug/Kg	
Dichlorodifluoromethane		< 4900	4900	ug/Kg	
Ethylbenzene		< 4900	4900	ug/Kg	
Isopropylbenzene		< 4900	4900	ug/Kg	
m & p-Xylene		< 9800	9800	ug/Kg	
Methylene Chloride		< 4900	4900	ug/Kg	
Naphthalene		< 4900	4900	ug/Kg	
n-Butylbenzene		< 4900	4900	ug/Kg	
n-Propylbenzene		< 4900	4900	ug/Kg	
o-Xylene		< 4900	4900	ug/Kg	
p-Isopropyltoluene		< 4900	4900	ug/Kg	
sec-Butylbenzene		< 4900	4900	ug/Kg	
Styrene		< 4900	4900	ug/Kg	
tert-Butylbenzene		< 4900	4900	ug/Kg	
Tetrachloroethene		< 4900	4900	ug/Kg	
Toluene		< 4900	4900	ug/Kg	
trans-1,2-Dichloroethene		< 4900	4900	ug/Kg	
trans-1,3-Dichloropropene		< 4900	4900	ug/Kg	
Trichloroethene		< 4900	4900	ug/Kg	
Trichlorofluoromethane		< 4900	4900	ug/Kg	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-15

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D/080901	Solid	09 Aug. 01 16:15	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 4900	4900	ug/Kg	8260B

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-16

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP4/080901	Solid	09 Aug. 01 14:00	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 4800	4800	ug/Kg	8260B
1,1,1-Trichloroethane		< 4800	4800	ug/Kg	
1,1,2,2-Tetrachloroethane		< 4800	4800	ug/Kg	
1,1,2-Trichloroethane		< 4800	4800	ug/Kg	
1,1-Dichloroethane		< 4800	4800	ug/Kg	
1,1-Dichloroethene		< 4800	4800	ug/Kg	
1,1-Dichloropropene		< 4800	4800	ug/Kg	
1,2,3-Trichlorobenzene		< 4800	4800	ug/Kg	
1,2,3-Trichloropropane		< 4800	4800	ug/Kg	
1,2,4-Trichlorobenzene		< 4800	4800	ug/Kg	
1,2,4-Trimethylbenzene		< 4800	4800	ug/Kg	
1,2-Dibromo-3-chloropropane		< 19000	19000	ug/Kg	
1,2-Dibromoethane		< 4800	4800	ug/Kg	
1,2-Dichlorobenzene		< 4800	4800	ug/Kg	
1,2-Dichloroethane		< 4800	4800	ug/Kg	
1,2-Dichloropropane		< 4800	4800	ug/Kg	
1,3,5-Trimethylbenzene		< 4800	4800	ug/Kg	
1,3-Dichlorobenzene		< 4800	4800	ug/Kg	
1,3-Dichloropropane		< 4800	4800	ug/Kg	
1,4-Dichlorobenzene		< 4800	4800	ug/Kg	
2,2-Dichloropropane		< 4800	4800	ug/Kg	
2-Chlorotoluene		< 4800	4800	ug/Kg	
4-Chlorotoluene		< 4800	4800	ug/Kg	
Benzene		< 4800	4800	ug/Kg	
Bromobenzene		< 4800	4800	ug/Kg	
Bromochloromethane		< 4800	4800	ug/Kg	
Bromodichloromethane		< 4800	4800	ug/Kg	
Bromoform		< 4800	4800	ug/Kg	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-16

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP4/080901	Solid	09 Aug. 01 14:00	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 4800	4800	ug/Kg	8260B
Carbon tetrachloride		< 4800	4800	ug/Kg	
Chlorobenzene		< 4800	4800	ug/Kg	
Chlorodibromomethane		< 4800	4800	ug/Kg	
Chloroethane		< 4800	4800	ug/Kg	
Chloroform		< 4800	4800	ug/Kg	
Chloromethane		< 4800	4800	ug/Kg	
cis-1,2-Dichloroethene		< 4800	4800	ug/Kg	
cis-1,3-Dichloropropene		< 4800	4800	ug/Kg	
Dibromomethane		< 4800	4800	ug/Kg	
Dichlorodifluoromethane		< 4800	4800	ug/Kg	
Ethylbenzene		< 4800	4800	ug/Kg	
Isopropylbenzene		< 4800	4800	ug/Kg	
m & p-Xylene		< 9600	9600	ug/Kg	
Methylene Chloride		< 4800	4800	ug/Kg	
Naphthalene		< 4800	4800	ug/Kg	
n-Butylbenzene		< 4800	4800	ug/Kg	
n-Propylbenzene		< 4800	4800	ug/Kg	
o-Xylene		< 4800	4800	ug/Kg	
p-Isopropyltoluene		< 4800	4800	ug/Kg	
sec-Butylbenzene		< 4800	4800	ug/Kg	
Styrene		< 4800	4800	ug/Kg	
tert-Butylbenzene		< 4800	4800	ug/Kg	
Tetrachloroethene		< 4800	4800	ug/Kg	
Toluene		< 4800	4800	ug/Kg	
trans-1,2-Dichloroethene		< 4800	4800	ug/Kg	
trans-1,3-Dichloropropene		< 4800	4800	ug/Kg	
Trichloroethene		< 4800	4800	ug/Kg	
Trichlorofluoromethane		< 4800	4800	ug/Kg	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-16

Sample Description	Matrix	Sampled Date/Time	Received
PES-DP4/080901	Solid	09 Aug. 01 14:00	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 4800	4800	ug/Kg	8260B

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-17

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3D/080901	Water	09 Aug. 01 18:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.080	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-17

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3D/080901	Water	09 Aug. 01 18:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		12	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-17

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3D/080901	Water	09 Aug. 01 18:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	8260B
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		< 5.0	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		3600	5.0	ng/L	AM18
Ethene		3400	5.0	ng/L	
Methane		9500	0.015	ug/L	AM20GAX
SampleReceiving					
Water					
Total Organic Carbon		1600	5.0	mg/L	9060

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-18

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3D/080901	Solid	09 Aug. 01 18:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
V latiles					
Solid					
1,1,1,2-Tetrachloroethane		< 5000	5000	ug/Kg	8260B
1,1,1-Trichloroethane		< 5000	5000	ug/Kg	
1,1,2,2-Tetrachloroethane		< 5000	5000	ug/Kg	
1,1,2-Trichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethene		< 5000	5000	ug/Kg	
1,1-Dichloropropene		< 5000	5000	ug/Kg	
1,2,3-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,3-Trichloropropane		< 5000	5000	ug/Kg	
1,2,4-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,4-Trimethylbenzene		< 5000	5000	ug/Kg	
1,2-Dibromo-3-chloropropane		< 20000	20000	ug/Kg	
1,2-Dibromoethane		< 5000	5000	ug/Kg	
1,2-Dichlorobenzene		< 5000	5000	ug/Kg	
1,2-Dichloroethane		< 5000	5000	ug/Kg	
1,2-Dichloropropane		< 5000	5000	ug/Kg	
1,3,5-Trimethylbenzene		< 5000	5000	ug/Kg	
1,3-Dichlorobenzene		< 5000	5000	ug/Kg	
1,3-Dichloropropane		< 5000	5000	ug/Kg	
1,4-Dichlorobenzene		< 5000	5000	ug/Kg	
2,2-Dichloropropane		< 5000	5000	ug/Kg	
2-Chlorotoluene		< 5000	5000	ug/Kg	
4-Chlorotoluene		< 5000	5000	ug/Kg	
Benzene		< 5000	5000	ug/Kg	
Bromobenzene		< 5000	5000	ug/Kg	
Bromochloromethane		< 5000	5000	ug/Kg	
Bromodichloromethane		< 5000	5000	ug/Kg	
Bromoform		< 5000	5000	ug/Kg	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-18

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3D/080901	Solid	09 Aug. 01 18:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 5000	5000	ug/Kg	8260B
Carbon tetrachloride		< 5000	5000	ug/Kg	
Chlorobenzene		< 5000	5000	ug/Kg	
Chlorodibromomethane		< 5000	5000	ug/Kg	
Chloroethane		< 5000	5000	ug/Kg	
Chloroform		< 5000	5000	ug/Kg	
Chloromethane		< 5000	5000	ug/Kg	
cis-1,2-Dichloroethene		< 5000	5000	ug/Kg	
cis-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Dibromomethane		< 5000	5000	ug/Kg	
Dichlorodifluoromethane		< 5000	5000	ug/Kg	
Ethylbenzene		< 5000	5000	ug/Kg	
Isopropylbenzene		< 5000	5000	ug/Kg	
m & p-Xylene		< 10000	10000	ug/Kg	
Methylene Chloride		< 5000	5000	ug/Kg	
Naphthalene		< 5000	5000	ug/Kg	
n-Butylbenzene		< 5000	5000	ug/Kg	
n-Propylbenzene		< 5000	5000	ug/Kg	
o-Xylene		< 5000	5000	ug/Kg	
p-Isopropyltoluene		< 5000	5000	ug/Kg	
sec-Butylbenzene		< 5000	5000	ug/Kg	
Styrene		< 5000	5000	ug/Kg	
tert-Butylbenzene		< 5000	5000	ug/Kg	
Tetrachloroethene		< 5000	5000	ug/Kg	
Toluene		< 5000	5000	ug/Kg	
trans-1,2-Dichloroethene		< 5000	5000	ug/Kg	
trans-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Trichloroethene		< 5000	5000	ug/Kg	
Trichlorofluoromethane		< 5000	5000	ug/Kg	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-18

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3D/080901	Solid	09 Aug. 01 18:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5000	5000	ug/Kg	8260B

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-19

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/080901	Solid	09 Aug. 01 18:45	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 4800	4800	ug/Kg	8260B
1,1,1-Trichloroethane		< 4800	4800	ug/Kg	
1,1,2,2-Tetrachloroethane		< 4800	4800	ug/Kg	
1,1,2-Trichloroethane		< 4800	4800	ug/Kg	
1,1-Dichloroethane		< 4800	4800	ug/Kg	
1,1-Dichloroethene		< 4800	4800	ug/Kg	
1,1-Dichloropropene		< 4800	4800	ug/Kg	
1,2,3-Trichlorobenzene	J	1800	4800	ug/Kg	
1,2,3-Trichloropropane		< 4800	4800	ug/Kg	
1,2,4-Trichlorobenzene	J	2000	4800	ug/Kg	
1,2,4-Trimethylbenzene		< 4800	4800	ug/Kg	
1,2-Dibromo-3-chloropropane		< 19000	19000	ug/Kg	
1,2-Dibromoethane		< 4800	4800	ug/Kg	
1,2-Dichlorobenzene		< 4800	4800	ug/Kg	
1,2-Dichloroethane		< 4800	4800	ug/Kg	
1,2-Dichloropropane		< 4800	4800	ug/Kg	
1,3,5-Trimethylbenzene		< 4800	4800	ug/Kg	
1,3-Dichlorobenzene		< 4800	4800	ug/Kg	
1,3-Dichloropropane		< 4800	4800	ug/Kg	
1,4-Dichlorobenzene		< 4800	4800	ug/Kg	
2,2-Dichloropropane		< 4800	4800	ug/Kg	
2-Chlorotoluene		< 4800	4800	ug/Kg	
4-Chlorotoluene		< 4800	4800	ug/Kg	
Benzene		< 4800	4800	ug/Kg	
Bromobenzene		< 4800	4800	ug/Kg	
Bromochloromethane		< 4800	4800	ug/Kg	
Bromodichloromethane		< 4800	4800	ug/Kg	
Bromoform		< 4800	4800	ug/Kg	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-19

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/080901	Solid	09 Aug. 01 18:45	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane		< 4800	4800	ug/Kg	8260B
Carbon tetrachloride		< 4800	4800	ug/Kg	
Chlorobenzene		< 4800	4800	ug/Kg	
Chlorodibromomethane		< 4800	4800	ug/Kg	
Chloroethane		< 4800	4800	ug/Kg	
Chloroform		< 4800	4800	ug/Kg	
Chloromethane		< 4800	4800	ug/Kg	
cis-1,2-Dichloroethene		< 4800	4800	ug/Kg	
cis-1,3-Dichloropropene		< 4800	4800	ug/Kg	
Dibromomethane		< 4800	4800	ug/Kg	
Dichlorodifluoromethane		< 4800	4800	ug/Kg	
Ethylbenzene		< 4800	4800	ug/Kg	
Isopropylbenzene		< 4800	4800	ug/Kg	
m & p-Xylene		< 9600	9600	ug/Kg	
Methylene Chloride		< 4800	4800	ug/Kg	
Naphthalene		< 4800	4800	ug/Kg	
n-Butylbenzene	J	2200	4800	ug/Kg	
n-Propylbenzene		< 4800	4800	ug/Kg	
o-Xylene		< 4800	4800	ug/Kg	
p-Isopropyltoluene	J	1200	4800	ug/Kg	
sec-Butylbenzene	J	1200	4800	ug/Kg	
Styrene		< 4800	4800	ug/Kg	
tert-Butylbenzene		< 4800	4800	ug/Kg	
Tetrachloroethene		< 4800	4800	ug/Kg	
Toluene		< 4800	4800	ug/Kg	
trans-1,2-Dichloroethene		< 4800	4800	ug/Kg	
trans-1,3-Dichloropropene		< 4800	4800	ug/Kg	
Trichloroethene		< 4800	4800	ug/Kg	
Trichlorofluoromethane		< 4800	4800	ug/Kg	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-19

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ3S/080901	Solid	09 Aug. 01 18:45	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
V latiles					
Vinyl Chloride		< 4800	4800	ug/Kg	8260B

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-20

Sample Description	Matrix	Sampled Date/Time	Received
TANK-IDW/081001	Water	10 Aug. 01 8:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	4.0	5.0	ug/L	
1,1-Dichloroethene		10	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene	J	1.8	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	

Order #: P0108192
Report Date: 09/12/01
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0108192-20

Sample Description	Matrix	Sampled Date/Time	Received
TANK-IDW/081001	Water	10 Aug. 01 8:30	13 Aug. 01

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromomethane	J	2.8	5.0	ug/L	8260B
Carbon tetrachloride	J	2.9	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chlorodibromomethane		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		9.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	1.7	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		<5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		55	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

P0108192

#2 of 2

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 | Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 | Fax No. : (412) 826-3433

Company : PARSONS
Co. Address : 1700 Broadway, Denver CO
Proj. Manager: Bruce Henry
Proj. Location: NSA-MID-SOUTH
Proj. Number: 737490.04000
Phone # : 303-831-8100 Fax # : 303-831-8208

Sampler's signature :

Results to : Bruce Henry

Invoice to :

Cooler ID	Cooler Temp.

Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	SW8260B-VOCs in Water	Methane, Ethane Ethene AM-18	E353.2 Nitrate-Nitrite	SW9060M TOC	E320.1 Bromide	SW8260B-VOCs in Oil			Remarks
17 & 18	PES-INJ3D/080901	8/9/01	1830		X	9	X	X	X	X	X	X			water samples may contain some oil.
19	PES-INJ3S/080901	8/9/01	1845		X	2						X			
20	TANK-IDW/081001	8/10/01	0830		X	2	X								
21	Trip Blank	8/8/01	0600		X	2	X								

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
	PARSONS	8/10/01	1400	Tracy L Day	Microseeps	8-11-01	0930
Tracy L Day	Microseeps	8-11-01	1030				

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

P0108192

CHAIN - OF - CUSTODY RECORD

#1052

Phone: (412) 826-5245 — Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 — Fax No.: (412) 826-3433

Company: PARSONS
Co. Address: 1700 Broadway, Denver CO
Proj. Manager: Bruce Henry
Proj. Location: NSA MID-SOUTH
Proj. Number: 737490.04000
Phone #: 303 831-8100 Fax #: 303-831-8208

Sampler's signature:

Results to: Bruce Henry

Invoice to:

Cooler ID	Cooler Temp.

Sample ID	Sample Description	Date	Time	~~Comp~~	Grab	# Cont.	SW8260B VOCs-WATER	AM18 Methane, Ethane, Ethene	353.2 Nitrate-Nitrite	SW9060M Tot. org Carbon	E320.1 Bromide	SW8260B VOCs-Oil			Remarks
01	PES-MW6S/080801	8/8/01	1425		X	7	X	X	X	X	X				
02	PES-MW6D/080801	8/8/01	1535	"	X	7	X	X	X	X	X				
03	PES-MW4D/080801	8/8/01	1645	"	X	7	X	X	X	X	X				
04	PES-MW4S/080801	8/8/01	1750	"	X	7	X	X	X	X	X				
05	PES-MW2D/080901	8/9/01	0815	"	X	7	X	X	X	X	X				
06	PES-MW2S/080901	8/9/01	0940	"	X	7	X	X	X	X	X				
07	PES-MW3S/080901	8/9/01	1105	"	X	7	X	X	X	X	X				
08	PES-MW3D/080901	8/9/01	1220	"	X	7	X	X	X	X	X				
09	PES-DP3/080901	8/9/01	0700	"	X	7	X	X	X	X	X				
10 + 11	PES-INJ2S/080901	8/9/01	1530		X	8	X					X			12 13 MS/MSD for 8260 oil Analysis
14 + 15	PES-INJ2D/080901	8/9/01	1615		X	9	X	X	X	X	X	X			
16	PES-DP4/080901	8/9/01	1400		X	2						X			

Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
	PARSONS	8/10/01	1400		Microseeps	8-11-01	1030
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
	Microseeps	8-11-01	1030				
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:

WHITE COPY: Accompany Samples — YELLOW COPY: Laboratory File

APPENDIX A.5

ANALYTICAL DATA – JANUARY/FEBRUARY 2002

MICROSEEPS

Parson's Engineering Science

Project Number: 737490.04000

NSA Midsouth Site

Parson's Contact: Mr. Bruce Henry

Becky Hans

Microseeps Contact: Becky Hans
February 28, 2002

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

CASE NARRATIVE

Parson's Engineering Science
NSA Midsouth Site
Project #: 737490.04000

The following were samples analyzed by Microseeps, Inc.

Parson's Identification Number	Lab ID number
PES-MW8D012902	P0201433-01
PES-MW8S012902	P0201433-02
PES-MW7S012902	P0201433-03
PES-MW7D012902	P0201433-04
PES-MW1S012902	P0201433-05
PES-MW1D012902	P0201433-06
PES-MW1MS012902	P0201433-07
PES-MW1MSD012902	P0201433-08
007GL15LF012902	P0201433-09
TRIP BLANK	P0201433-10
007GL15UF012902	P0201433-11
RINSEATE 013002	P0201447-01
PES-MW6S012902	P0201447-02
PES-MW6D012902	P0201447-03
PES-MW5D013002	P0201447-04
PES-DUP1013002	P0201447-05
PES-MW5S013002	P0201447-06
TANK WATER 013002	P0201447-07
PES-MW4D013002	P0201447-08
TRIP BLANK 013002	P0201447-09
PES-MW4S013002	P0201447-10
PES-MW3S013002	P0201447-11
PES-DUP2013002	P0201447-12
PES-MW3D013002	P0201447-13
PES-MW3D MS	P0201447-14
PES-MW3D MSD	P0201447-15
PES-MW2D013002	P0201447-16
PES-INJ2D013102	P0202020-01
PES-INJ4S013102	P0202020-02
PES-INJ4S013102 DUP	P0202020-03
PES-INJ4S013102	P0202020-05

PES-INJ2D013102	P0202020-06
PES-INJ2S013102	P0202020-07
PES-INJ2S013102	P0202020-08
TRIP BLANK	P0202020-09
PES-MW2S013102	P0202020-10

All samples were found to be intact.

Dissolved Light Hydrocarbons:

No anomalies were found during the analysis of dissolved light hydrocarbons and TIC.

Compliance Data:

No anomalies were found during the following analyses: Bromide, Color, Chloride, Nitrate, Nitrite, and Total Organic Carbon.

Metals Data:

No anomalies were found during the following analyses: Arsenic, Manganese, and Selenium.

Organic Data:

Samples that were sent in for volatile analysis have been reported off of multiple dilutions. In many cases data was reported from a low level, a medium level and a high level analysis. If any analyte fell between these three dilutions, the result would be reported as an estimated concentration with a "J" flag.

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway

Denver, CO 80290

Page: Page 1 of 31
Order #: P0201433
Report Date: 02/27/02
Client Proj Na NSA-Midsouth
Client Proj 737490. 040000

Sample Identification

Lab Sample #	Client Sample ID
P0201433-01	PES-MW8D 012902
P0201433-02	PES-MW8S 012902
P0201433-03	PES-MW7S 012902
P0201433-04	PES-MW7D 012902
P0201433-05	PES-MW1S 012902
P0201433-06	PES-MW1D 012902
P0201433-07	PES-MW 1MS 012902
P0201433-08	PES-MW 1MSD 012902
P0201433-09	007GL15LF 012902
P0201433-10	TRIP BLANK
P0201433-11	007GL15UF 012902

Approved By: Rebecca J Adams

NOTES: The VOCs were reported with J values to 1 ug/L, results reported to 5 ug/L had no reportable concentration. MS/MSD recoveries were slightly elevated and were reanalyzed with the same results.

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D 012902	Water	29 Jan. 02 10:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		5.6	0.050	mg/L	353.3
Total Organic Carbon	J	2.4	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		6.1	5.0	ug/L	
1,1-Dichloroethene		37	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D 012902	Water	29 Jan. 02 10:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		130	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		120	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	4.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

MICROTECH

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-01

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8D 012902	Water	29 Jan. 02 10:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		980	50	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		38	5.0	ng/L	AM18
Ethene		83	5.0	ng/L	
Methane		7.6	0.015	ug/L	AM20GAX

MICROBIAL

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S 012902	Water	29 Jan. 02 11:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.15	0.050	mg/L	353.3
Total Organic Carbon	J	2.3	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		26	5.0	ug/L	
1,1-Dichloroethene		72	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

MICROSTATES

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S 012902	Water	29 Jan. 02 11:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		14	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		15	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	1.2	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW8S 012902	Water	29 Jan. 02 11:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		220	5.0	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		80	5.0	ng/L	AM18
Ethene		260	5.0	ng/L	
Methane		84	0.015	ug/L	AM20GAX

MICROTECH

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-03

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7S 012902	Water	29 Jan. 02 12:15	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.060	0.050	mg/L	353.3
Total Organic Carbon	J	3.1	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		110	5.0	ug/L	
1,1-Dichloroethene		170	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene	J	1.2	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-03

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7S 012902	Water	29 Jan. 02 12:15	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		13	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		16	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		22	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-03

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7S 012902	Water	29 Jan. 02 12:15	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		220	50	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		120	5.0	ng/L	AM18
Ethene		720	5.0	ng/L	
Methane		71	0.015	ug/L	AM20GAX
TIC		950	4.0	mg/l CaCO3	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-04

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D 012902	Water	29 Jan. 02 13:00	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		2.4	0.050	mg/L	353.3
Total Organic Carbon	J	1.9	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		6.9	5.0	ug/L	
1,1-Dichloroethene		53	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-04

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D 012902	Water	29 Jan. 02 13:00	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		270	50	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		150	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-04

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW7D 012902	Water	29 Jan. 02 13:00	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		1300	50	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		270	5.0	ng/L	AM18
Ethene		130	5.0	ng/L	
Methane		7.9	0.015	ug/L	AM20GAX

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1S 012902	Water	29 Jan. 02 9:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N	J	0.050	0.050	mg/L	353.3
Total Organic Carbon	J	2.7	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		42	5.0	ug/L	
1,1-Dichloroethene		27	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1S 012902	Water	29 Jan. 02 9:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride	J	2.3	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		10	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		40	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		44	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1S 012902	Water	29 Jan. 02 9:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		100	5.0	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		1900	5.0	ng/L	AM18
Ethene		1200	5.0	ng/L	
Methane		460	0.015	ug/L	AM20GAX

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-06

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D 012902	Water	29 Jan. 02 8:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.13	0.050	mg/L	353.3
Total Organic Carbon	J	1.8	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-06

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D 012902	Water	29 Jan. 02 8:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-06

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW1D 012902	Water	29 Jan. 02 8:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		< 5.0	5.0	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		15	5.0	ng/L	AM18
Ethene		< 5.0	5.0	ng/L	
Methane		2.2	0.015	ug/L	AM20GAX

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-07

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW 1MS 012902	Water	29 Jan. 02 9:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		45	5.0	ug/L	
1,1-Dichloroethene		130	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		69	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride	J	2.2	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-07

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW 1MS 012902	Water	29 Jan. 02 9:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorobenzene		62	5.0	ug/L	8260B
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		12	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		43	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		64	5.0	ug/L	
trans-1,2-Dichloroethene		51	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		190	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW 1MSD 012902	Water	29 Jan. 02 9:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		43	5.0	ug/L	
1,1-Dichloroethene		120	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		65	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride	J	2.2	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW 1MSD 012902	Water	29 Jan. 02 9:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorobenzene		61	5.0	ug/L	8260B
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		11	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		42	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		63	5.0	ug/L	
trans-1,2-Dichloroethene		48	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		180	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-09

Sample Description	Matrix	Sampled Date/Time	Received
007GL15LF 012902	Water	29 Jan. 02 14:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		1.3	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	1.5	5.0	ug/L	
1,1-Dichloroethene		6.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-09

Sample Description	Matrix	Sampled Date/Time	Received
007GL15LF 012902	Water	29 Jan. 02 14:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromodichloromethane		< 5.0	5.0	ug/L	8260B
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		27	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		8.5	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		36	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

MICROBAC

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-09

Sample Description	Matrix	Sampled Date/Time	Received
007GL15LF 012902	Water	29 Jan. 02 14:30	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B
RiskAnalysis					
Water					
Ethane		34	5.0	ng/L	AM18
Ethene		29	5.0	ng/L	
Methane		6.9	0.015	ug/L	AM20GAX

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-10

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	29 Jan. 02	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-10

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	29 Jan. 02	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorobenzene		< 5.0	5.0	ug/L	8260B
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		< 5.0	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-11

Sample Description	Matrix	Sampled Date/Time	Received
007GL15UF 012902	Water	29 Jan. 02 15:20	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.39	0.050	mg/L	353.3
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		100	5.0	ug/L	
1,1-Dichloroethene		900	50	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		5.1	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	

MICROSTECS

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-11

Sample Description	Matrix	Sampled Date/Time	Received
007GL15UF 012902	Water	29 Jan. 02 15:20	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromodichloromethane		< 5.0	5.0	ug/L	8260B
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		15	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		30	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		23	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		780	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	

Order #: P0201433
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201433-11

Sample Description	Matrix	Sampled Date/Time	Received
007GL15UF 012902	Water	29 Jan. 02 15:20	30 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Vinyl Chloride		< 5.0	5.0	ug/L	8260B
RiskAnalysis					
Water					
Ethane		42	5.0	ng/L	AM18
Ethene		39	5.0	ng/L	
Methane		14	0.015	ug/L	AM20GAX
TIC		730	4.0	mg/l CaCO3	

ANCRLIMS

CHAIN - OF - CUSTODY RECORD

P0201433

Phone: (412) 826-5245 — **Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238** — Fax No.: (412) 826-3433

Company: Parsons
Co. Address: 1700 Broadway ste 900 Denver CO 80290
Proj. Manager: Bruce Henry
Proj. Location: NSA Mid-South
Proj. Number: 737490.04000
Phone #: 303-831-8100 **Fax #:** 303-831-8208

Sampler's signature:

Results to: Bruce Henry

Invoice to: Doug Wolfe

Cooler ID	Cooler Temp.

Parameters Requested

	Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	VOCs 8260	TOC Walkley Black	MEE AMGAY 20	Nitrate/Nitrite E353.2	Bromide E320.1	Total ~~[illegible]~~ (PAS)			Remarks
01	PES-mw8D/012902	Groundwater	1/29/02	1030			10	2	4	2	1	1				
02	PES-mw8S/012902	"	"	1130			10	2	4	2	1	1				
03	PES-mw7S/012902	"	"	1215			10	2	4	2	1	1				TIC on methane
04	PES-mw7D/012902	"	"	1300			10	2	4	2	1	1				
05	PES-mw15S/012902	"	"	0930			10	2	4	2	1	1				
06	PES-mw1D/012902	"	"	0830			10	2	4	2	1	1				Lab poured
07	PES-mw1ms/012902	"	"	0930			2	2								
08	PES-mw1msd/012902	"	"	0930			2	2								
09	007GL15LF/012902	"	"	1430			5	2		2	1					
10	Trip blank	—	NA	NA			2	2								lab poured
11	007GL15UF/012902	"	1/29/02	1520			~~7~~ 5 (PAS)	2		2	1		X (PAS)			TIC on Methane

Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Parsons	Parsons	1/29/02	1600	P Pomaybo	Microseeps	1/30/02	1055
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:

WHITE COPY: Accompany Samples — YELLOW COPY: Laboratory File — PINK COPY: Submitter

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway

Denver, CO 80290

Page: Page 1 of 44
Order #: P0201447
Report Date: 02/27/02
Client Proj Na NSA-Midsouth
Client Proj 737490. 040000

Sample Identification

Lab Sample #	Client Sample ID
P0201447-01	RINSEATE 013002
P0201447-02	PES-MW6S 012902
P0201447-03	PES-MW6D 012902
P0201447-04	PES-MW5D 013002
P0201447-05	PES-DUP1 013002
P0201447-06	PES-MW5S 013002
P0201447-07	TANK WATER 013002
P0201447-08	PES-MW4D 013002
P0201447-09	TRIP BLANK 013002
P0201447-10	PES-MW4S 013002
P0201447-11	PES-MW3S 013002
P0201447-12	PES-DUP2 013002
P0201447-13	PES-MW3D 013002
P0201447-14	PES-MW3D MS
P0201447-15	PES-MW3D MSD
P0201447-16	PES-MW2D 013002

Approved By: Rebecca J. Stans

NOTES: The VOCs were reported with J values to 1 ug/L, results reported to 5 ug/L had no reportable concentration. MS/MSD recoveries were slightly elevated and were reanalyzed with the same results.

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-01

Sample Description	Matrix	Sampled Date/Time	Received
RINSEATE 013002	Water	30 Jan. 02 7:30	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-01

Sample Description	Matrix	Sampled Date/Time	Received
RINSEATE 013002	Water	30 Jan. 02 7:30	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorobenzene		< 5.0	5.0	ug/L	8260B
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		< 5.0	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6S 012902	Water	29 Jan. 02 17:20	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.10	0.050	mg/L	353.3
Total Organic Carbon	J	2.5	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		62	5.0	ug/L	
1,1-Dichloroethene		300	50	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		6.6	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6S 012902	Water	29 Jan. 02 17:20	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		68	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		120	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		25	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	1.4	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene	J	1.5	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6S 012902	Water	29 Jan. 02 17:20	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		1200	50	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		140	5.0	ng/L	AM18
Ethene		75	5.0	ng/L	
Methane		98	0.015	ug/L	AM20GAX

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-03

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D 012902	Water	29 Jan. 02 16:30	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.070	0.050	mg/L	353.3
Total Organic Carbon		9.9	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		8.2	5.0	ug/L	
1,1-Dichloroethene		58	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-03

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D 012902	Water	29 Jan. 02 16:30	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride	J	4.8	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		26	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-03

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW6D 012902	Water	29 Jan. 02 16:30	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		74	5.0	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		180	5.0	ng/L	AM18
Ethene		320	5.0	ng/L	
Methane		730	0.015	ug/L	AM20GAX

ORIGINAL

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-04

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5D 013002	Water	30 Jan. 02 8:10	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		1.7	0.050	mg/L	353.3
Total Organic Carbon	J	2.1	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		20	5.0	ug/L	
1,1-Dichloroethene		160	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene	J	2.7	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-04

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5D 013002	Water	30 Jan. 02 8:10	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		160	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		140	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		12	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-04

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5D 013002	Water	30 Jan. 02 8:10	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		1000	100	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		250	5.0	ng/L	AM18
Ethene		290	5.0	ng/L	
Methane		25	0.015	ug/L	AM20GAX

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-DUP1 013002	Water	30 Jan. 02 8:20	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		1.5	0.050	mg/L	353.3
Total Organic Carbon	J	2.0	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		22	5.0	ug/L	
1,1-Dichloroethene		170	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene	J	2.9	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-DUP1 013002	Water	30 Jan. 02 8:20	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		170	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		150	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		13	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	1.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-DUP1 013002	Water	30 Jan. 02 8:20	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		1200	50	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		270	5.0	ng/L	AM18
Ethene		310	5.0	ng/L	
Methane		26	0.015	ug/L	AM20GAX

MICROBIOLOGICAL

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-06

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5S 013002	Water	30 Jan. 02 9:00	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.060	0.050	mg/L	353.3
Total Organic Carbon	J	2.7	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		92	5.0	ug/L	
1,1-Dichloroethene		190	50	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene	J	2.6	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-06

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5S 013002	Water	30 Jan. 02 9:00	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		24	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		33	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		13	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

MICROBACS

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-06

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW5S 013002	Water	30 Jan. 02 9:00	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		540	50	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		110	5.0	ng/L	AM18
Ethene		780	5.0	ng/L	
Methane		100	0.015	ug/L	AM20GAX

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-07

Sample Description	Matrix	Sampled Date/Time	Received
TANK WATER 013002	Water	30 Jan. 02 8:50	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		20	5.0	ug/L	
1,1-Dichloroethene		59	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		27	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-07

Sample Description	Matrix	Sampled Date/Time	Received
TANK WATER 013002	Water	30 Jan. 02 8:50	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorobenzene		< 5.0	5.0	ug/L	8260B
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		26	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		8.8	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		5.5	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		180	50	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D 013002	Water	30 Jan. 02 10:00	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.69	0.050	mg/L	353.3
Total Organic Carbon	J	3.1	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	4.1	5.0	ug/L	
1,1-Dichloroethene		22	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D 013002	Water	30 Jan. 02 10:00	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		9.1	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		11	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene	J	1.5	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4D 013002	Water	30 Jan. 02 10:00	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		67	5.0	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		68	5.0	ng/L	AM18
Ethene		150	5.0	ng/L	
Methane		46	0.015	ug/L	AM20GAX

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-09

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK 013002	Water	30 Jan. 02 10:30	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-09

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK 013002	Water	30 Jan. 02 10:30	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorobenzene		< 5.0	5.0	ug/L	8260B
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		< 5.0	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	

MICROBACS

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-10

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4S 013002	Water	30 Jan. 02 10:45	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.080	0.050	mg/L	353.3
Total Organic Carbon	J	2.6	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		51	5.0	ug/L	
1,1-Dichloroethene		310	50	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene	J	4.9	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-10

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4S 013002	Water	30 Jan. 02 10:45	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		57	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		89	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		21	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene	J	1.1	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

MICRO CHEM LAB

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-10

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW4S 013002	Water	30 Jan. 02 10:45	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		1000	50	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		170	5.0	ng/L	AM18
Ethene		220	5.0	ng/L	
Methane		74	0.015	ug/L	AM20GAX

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-11

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3S 013002	Water	30 Jan. 02 13:20	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N	J	0.050	0.050	mg/L	353.3
Total Organic Carbon	J	2.8	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		66	5.0	ug/L	
1,1-Dichloroethene		420	50	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		5.6	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-11

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3S 013002	Water	30 Jan. 02 13:20	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		24	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		47	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		19	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene	J	1.3	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-11

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3S 013002	Water	30 Jan. 02 13:20	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		1000	50	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		140	5.0	ng/L	AM18
Ethene		770	5.0	ng/L	
Methane		1900	0.015	ug/L	AM20GAX
TIC		850	4.0	mg/l CaCO3	

MICROCHEMPS

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-12

Sample Description	Matrix	Sampled Date/Time	Received
PES-DUP2 013002	Water	30 Jan. 02 13:20	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N	J	0.050	0.050	mg/L	353.3
Total Organic Carbon	J	2.9	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		80	5.0	ug/L	
1,1-Dichloroethene		450	50	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		6.9	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-12

Sample Description	Matrix	Sampled Date/Time	Received
PES-DUP2 013002	Water	30 Jan. 02 13:20	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		31	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		57	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		23	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene	J	1.5	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-12

Sample Description	Matrix	Sampled Date/Time	Received
PES-DUP2 013002	Water	30 Jan. 02 13:20	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		1100	50	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		140	5.0	ng/L	AM18
Ethene		780	5.0	ng/L	
Methane		1800	0.015	ug/L	AM20GAX

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-13

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D 013002	Water	30 Jan. 02 14:40	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N	J	0.050	0.050	mg/L	353.3
Total Organic Carbon		260	25	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	4.1	5.0	ug/L	
1,1-Dichloroethene		31	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-13

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D 013002	Water	30 Jan. 02 14:40	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		8.3	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		18	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		35	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	3.2	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-13

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D 013002	Water	30 Jan. 02 14:40	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		160	5.0	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		120	5.0	ng/L	AM18
Ethene		860	5.0	ng/L	
Methane		13000	0.015	ug/L	AM20GAX

MICROBAS

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-14

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D MS	Water	30 Jan. 02 14:40	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		5.4	5.0	ug/L	
1,1-Dichloroethene		130	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		66	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		8.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-14

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D MS	Water	30 Jan. 02 14:40	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorobenzene		61	5.0	ug/L	8260B
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		23	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		50	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	4.2	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		63	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		250	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	

MICROSTEPS

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-15

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D MSD	Water	30 Jan. 02 14:40	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane	J	4.9	5.0	ug/L	
1,1-Dichloroethene		120	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		61	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		7.1	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-15

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW3D MSD	Water	30 Jan. 02 14:40	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorobenzene		57	5.0	ug/L	8260B
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		21	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		46	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	3.8	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		59	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		230	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-16

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2D 013002	Water	30 Jan. 02 16:00	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.13	0.050	mg/L	353.3
Total Organic Carbon		600	250	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		8.3	5.0	ug/L	
1,1-Dichloroethene		44	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-16

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2D 013002	Water	30 Jan. 02 16:00	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride	J	1.4	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		12	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0201447
Report Date: 02/27/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0201447-16

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2D 013002	Water	30 Jan. 02 16:00	31 Jan. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		42	5.0	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		46	5.0	ng/L	AM18
Ethene		150	5.0	ng/L	
Methane		2500	0.015	ug/L	AM20GAX
TIC		500	4.0	mg/l CaCO3	

MICROBETA

CHAIN - OF - CUSTODY RECORD P0201447

Phone: (412) 826-5245 Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 Fax No.: (412) 826-3433

Company: Parsons
Co. Address: 1700 Broadway Ste 900 Denver, CO 80290
Proj. Manager: Bruce Henry
Proj. Location: NSA Mid-South
Proj. Number: 737490-04000
Phone #: 303-831-8100 Fax #: 303-831-8208

Sampler's signature:

Results to: Bruce Henry

Invoice to: Doug Wolfe

Cooler ID	Cooler Temp.

	Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	VOCs 8260	Bromide E320.1	nitrate/nitrite E353.2	TOC Walkley-Black	Methane/Ethane/Ethene				Remarks
01	Rinsate01 3002	Rinse blank	1/30/02	0730			2	2	X	X	X	X				TIC with MEE on
02	PES-MW65/ 012902	Groundwater	1/29/02	1720			10	2	1	1	4	2				PES-MW35/013002
03	PES-MW60/ 012902	Groundwater	1/29/02	1630			10	2	1	1	4	2				
04	PES-MW50/ 013002	"	1/30/02	0810			10	2	1	1	4	2				
05	PES-DUP1/013002	"	1/30/02	0820			10	2	1	1	4	2				
06	PES-MW55/~~013~~ 013002	"	1/30/02	0900			10	2	1	1	4	2				
07	TANKWATER/013002	"	1/30/02	0850			2	2								
08	PES-MW4D/013002	"	1/30/02	1000			10	2	1	1	4	2				
09	TRIPBLANK/013002	"	1/30/02	1030			2	2								
10	PES-MW45/013002	"	1/30/02	1045			10	2	1	1	4	2				
11	PES-MW35/013002	"	1/30/02	1320			10	2	1	1	4	2				
12	PES-DUP2/013002	"	1/30/02	1320			10	2	1	1	4	2				

Relinquished by	Company	Date	Time	Received by	Company	Date	Time
Chris Lytle	Parsons	1/30/02	1700	[illegible]	Microseeps	1/31/02	1119
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

CHAIN - OF - CUSTODY RECORD

PO201447

Phone: (412) 826-5245 Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 Fax No.: (412) 826-3433

Company: Parsons
Co. Address: 1700 Broadway Ste 900
Proj. Manager: Bruce Henry
Proj. Location: NSA Mid-South
Proj. Number: 737490.0400
Phone #: 303-831-8100 Fax #: 303-831-8208

Sampler's signature:

Results to: Bruce Henry

Invoice to: Dang Wolfe

Cooler ID	Cooler Temp.

	Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	VOCs 8260	Bromide E 320.1	Nitrate/Nitrite E 353.2	TOC Walkley-Black	Methane/Ethane/Ethane				Remarks
13	PES-MW3D/013002	Groundwater	1/30/02	1440			10 ~~10~~	~~4~~ 2	1	1	4	2				
14	PES-MW3D MS	"	1/30/02	1440			2	2								Matrix spike VOCs Only
15	PES-MW3D MSD	"	1/30/02	1440			2	2								Matrix spike Dup VOCs Only
16	PES-MW2D/013002	"	1/30/02	1600			10	2	1	1	4	2				TIC with N/E/E for ~~PES~~ PES-MW2D/013002

Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Chris Spitz	Parsons	1/30/02	1700	[illegible]	Microseeps	1/31/02	1119
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

MICROSEEPS

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway

Denver, CO 80290

Page: Page 1 of 23
Order #: P0202020
Report Date: 02/19/02
Client Proj Name: NSA-Midsouth
Client Proj #: 737490. 040000

Sample Identification

Lab Sample #	Client Sample ID
P0202020-01	PES-INJ2D 013102
P0202020-02	PES-INJ4S 013102
P0202020-03	PES-INJ4S 013102 DUP
P0202020-05	PES-INJ4S 013102
P0202020-06	PES-INJ2D 013102
P0202020-07	PES-INJ2S 013102
P0202020-08	PES-INJ2S 013102
P0202020-09	TRIP BLANK
P0202020-10	PES-MW2S 013102

Approved By: Rebecca J. Adams

NOTES: The Oil samples have elevated detection levels due to matrix interference. The water sample PES-INJ4S 013102 had elevated detection levels due to foaming.

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D 013102	Solid	31 Jan. 02 8:10	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 5000	5000	ug/Kg	8260B
1,1,1-Trichloroethane		< 5000	5000	ug/Kg	
1,1,2,2-Tetrachloroethane		< 5000	5000	ug/Kg	
1,1,2-Trichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethene		< 5000	5000	ug/Kg	
1,1-Dichloropropene		< 5000	5000	ug/Kg	
1,2,3-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,3-Trichloropropane		< 5000	5000	ug/Kg	
1,2,4-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,4-Trimethylbenzene		< 5000	5000	ug/Kg	
1,2-Dibromo-3-chloropropane		< 20000	20000	ug/Kg	
1,2-Dibromoethane		< 5000	5000	ug/Kg	
1,2-Dichlorobenzene		< 5000	5000	ug/Kg	
1,2-Dichloroethane		< 5000	5000	ug/Kg	
1,2-Dichloropropane		< 5000	5000	ug/Kg	
1,3,5-Trimethylbenzene		< 5000	5000	ug/Kg	
1,3-Dichlorobenzene		< 5000	5000	ug/Kg	
1,3-Dichloropropane		< 5000	5000	ug/Kg	
1,4-Dichlorobenzene		< 5000	5000	ug/Kg	
2,2-Dichloropropane		< 5000	5000	ug/Kg	
2-Chlorotoluene		< 5000	5000	ug/Kg	
4-Chlorotoluene		< 5000	5000	ug/Kg	
Benzene		< 5000	5000	ug/Kg	
Bromobenzene		< 5000	5000	ug/Kg	
Bromochloromethane		< 5000	5000	ug/Kg	
Bromodichloromethane		< 5000	5000	ug/Kg	
Bromoform		< 5000	5000	ug/Kg	
Bromomethane		< 5000	5000	ug/Kg	
Carbon tetrachloride		< 5000	5000	ug/Kg	

Order #: P0202020
Report Date: 02/19/02
Client Proj Nam NSA-Midsouth
Client Proj # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-01

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D 013102	Solid	31 Jan. 02 8:10	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorobenzene		< 5000	5000	ug/Kg	8260B
Chloroethane		< 5000	5000	ug/Kg	
Chloroform		< 5000	5000	ug/Kg	
Chloromethane		< 5000	5000	ug/Kg	
cis-1,2-Dichloroethene		< 5000	5000	ug/Kg	
cis-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Dibromochloromethane		< 5000	5000	ug/Kg	
Dibromomethane		< 5000	5000	ug/Kg	
Dichlorodifluoromethane		< 5000	5000	ug/Kg	
Ethylbenzene		< 5000	5000	ug/Kg	
Isopropylbenzene		< 5000	5000	ug/Kg	
m & p-Xylene		< 10000	10000	ug/Kg	
Methylene Chloride		< 5000	5000	ug/Kg	
Naphthalene		< 5000	5000	ug/Kg	
n-Butylbenzene		< 5000	5000	ug/Kg	
n-Propylbenzene		< 5000	5000	ug/Kg	
o-Xylene		< 5000	5000	ug/Kg	
p-Isopropyltoluene		< 5000	5000	ug/Kg	
sec-Butylbenzene		< 5000	5000	ug/Kg	
Styrene		< 5000	5000	ug/Kg	
tert-Butylbenzene		< 5000	5000	ug/Kg	
Tetrachloroethene		< 5000	5000	ug/Kg	
Toluene		< 5000	5000	ug/Kg	
trans-1,2-Dichloroethene		< 5000	5000	ug/Kg	
trans-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Trichloroethene		< 5000	5000	ug/Kg	
Trichlorofluoromethane		< 5000	5000	ug/Kg	
Vinyl Chloride		< 5000	5000	ug/Kg	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ4S 013102	Solid	31 Jan. 02 8:30	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 5000	5000	ug/Kg	8260B
1,1,1-Trichloroethane		< 5000	5000	ug/Kg	
1,1,2,2-Tetrachloroethane		< 5000	5000	ug/Kg	
1,1,2-Trichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethene		< 5000	5000	ug/Kg	
1,1-Dichloropropene		< 5000	5000	ug/Kg	
1,2,3-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,3-Trichloropropane		< 5000	5000	ug/Kg	
1,2,4-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,4-Trimethylbenzene		< 5000	5000	ug/Kg	
1,2-Dibromo-3-chloropropane		< 20000	20000	ug/Kg	
1,2-Dibromoethane		< 5000	5000	ug/Kg	
1,2-Dichlorobenzene		< 5000	5000	ug/Kg	
1,2-Dichloroethane		< 5000	5000	ug/Kg	
1,2-Dichloropropane		< 5000	5000	ug/Kg	
1,3,5-Trimethylbenzene		< 5000	5000	ug/Kg	
1,3-Dichlorobenzene		< 5000	5000	ug/Kg	
1,3-Dichloropropane		< 5000	5000	ug/Kg	
1,4-Dichlorobenzene		< 5000	5000	ug/Kg	
2,2-Dichloropropane		< 5000	5000	ug/Kg	
2-Chlorotoluene		< 5000	5000	ug/Kg	
4-Chlorotoluene		< 5000	5000	ug/Kg	
Benzene		< 5000	5000	ug/Kg	
Bromobenzene		< 5000	5000	ug/Kg	
Bromochloromethane		< 5000	5000	ug/Kg	
Bromodichloromethane		< 5000	5000	ug/Kg	
Bromoform		< 5000	5000	ug/Kg	
Bromomethane		< 5000	5000	ug/Kg	
Carbon tetrachloride		< 5000	5000	ug/Kg	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-02

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ4S 013102	Solid	31 Jan. 02 8:30	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorobenzene		< 5000	5000	ug/Kg	8260B
Chloroethane		< 5000	5000	ug/Kg	
Chloroform		< 5000	5000	ug/Kg	
Chloromethane		< 5000	5000	ug/Kg	
cis-1,2-Dichloroethene		< 5000	5000	ug/Kg	
cis-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Dibromochloromethane		< 5000	5000	ug/Kg	
Dibromomethane		< 5000	5000	ug/Kg	
Dichlorodifluoromethane		< 5000	5000	ug/Kg	
Ethylbenzene		< 5000	5000	ug/Kg	
Isopropylbenzene		< 5000	5000	ug/Kg	
m & p-Xylene		< 10000	10000	ug/Kg	
Methylene Chloride		< 5000	5000	ug/Kg	
Naphthalene		< 5000	5000	ug/Kg	
n-Butylbenzene		< 5000	5000	ug/Kg	
n-Propylbenzene		< 5000	5000	ug/Kg	
o-Xylene		< 5000	5000	ug/Kg	
p-Isopropyltoluene		< 5000	5000	ug/Kg	
sec-Butylbenzene		< 5000	5000	ug/Kg	
Styrene		< 5000	5000	ug/Kg	
tert-Butylbenzene		< 5000	5000	ug/Kg	
Tetrachloroethene		< 5000	5000	ug/Kg	
Toluene		< 5000	5000	ug/Kg	
trans-1,2-Dichloroethene		< 5000	5000	ug/Kg	
trans-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Trichloroethene		< 5000	5000	ug/Kg	
Trichlorofluoromethane		< 5000	5000	ug/Kg	
Vinyl Chloride		< 5000	5000	ug/Kg	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-03

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ4S 013102 DUP	Solid	31 Jan. 02 8:30	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 5000	5000	ug/Kg	8260B
1,1,1-Trichloroethane		< 5000	5000	ug/Kg	
1,1,2,2-Tetrachloroethane		< 5000	5000	ug/Kg	
1,1,2-Trichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethene		< 5000	5000	ug/Kg	
1,1-Dichloropropene		< 5000	5000	ug/Kg	
1,2,3-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,3-Trichloropropane		< 5000	5000	ug/Kg	
1,2,4-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,4-Trimethylbenzene		< 5000	5000	ug/Kg	
1,2-Dibromo-3-chloropropane		< 20000	20000	ug/Kg	
1,2-Dibromoethane		< 5000	5000	ug/Kg	
1,2-Dichlorobenzene		< 5000	5000	ug/Kg	
1,2-Dichloroethane		< 5000	5000	ug/Kg	
1,2-Dichloropropane		< 5000	5000	ug/Kg	
1,3,5-Trimethylbenzene		< 5000	5000	ug/Kg	
1,3-Dichlorobenzene		< 5000	5000	ug/Kg	
1,3-Dichloropropane		< 5000	5000	ug/Kg	
1,4-Dichlorobenzene		< 5000	5000	ug/Kg	
2,2-Dichloropropane		< 5000	5000	ug/Kg	
2-Chlorotoluene		< 5000	5000	ug/Kg	
4-Chlorotoluene		< 5000	5000	ug/Kg	
Benzene		< 5000	5000	ug/Kg	
Bromobenzene		< 5000	5000	ug/Kg	
Bromochloromethane		< 5000	5000	ug/Kg	
Bromodichloromethane		< 5000	5000	ug/Kg	
Bromoform		< 5000	5000	ug/Kg	
Bromomethane		< 5000	5000	ug/Kg	
Carbon tetrachloride		< 5000	5000	ug/Kg	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-03

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ4S 013102 DUP	Solid	31 Jan. 02 8:30	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorobenzene		< 5000	5000	ug/Kg	8260B
Chloroethane		< 5000	5000	ug/Kg	
Chloroform		< 5000	5000	ug/Kg	
Chloromethane		< 5000	5000	ug/Kg	
cis-1,2-Dichloroethene		< 5000	5000	ug/Kg	
cis-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Dibromochloromethane		< 5000	5000	ug/Kg	
Dibromomethane		< 5000	5000	ug/Kg	
Dichlorodifluoromethane		< 5000	5000	ug/Kg	
Ethylbenzene		< 5000	5000	ug/Kg	
Isopropylbenzene		< 5000	5000	ug/Kg	
m & p-Xylene		< 10000	10000	ug/Kg	
Methylene Chloride		< 5000	5000	ug/Kg	
Naphthalene		< 5000	5000	ug/Kg	
n-Butylbenzene		< 5000	5000	ug/Kg	
n-Propylbenzene		< 5000	5000	ug/Kg	
o-Xylene		< 5000	5000	ug/Kg	
p-Isopropyltoluene		< 5000	5000	ug/Kg	
sec-Butylbenzene		< 5000	5000	ug/Kg	
Styrene		< 5000	5000	ug/Kg	
tert-Butylbenzene		< 5000	5000	ug/Kg	
Tetrachloroethene		< 5000	5000	ug/Kg	
Toluene		< 5000	5000	ug/Kg	
trans-1,2-Dichloroethene		< 5000	5000	ug/Kg	
trans-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Trichloroethene		< 5000	5000	ug/Kg	
Trichlorofluoromethane		< 5000	5000	ug/Kg	
Vinyl Chloride		< 5000	5000	ug/Kg	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ4S 013102	Water	31 Jan. 02 9:00	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N	J	0.050	0.050	mg/L	353.3
Total Organic Carbon		2400	120	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 50	50	ug/L	8260B
1,1,1-Trichloroethane		< 50	50	ug/L	
1,1,2,2-Tetrachloroethane		< 50	50	ug/L	
1,1,2-Trichloroethane		< 50	50	ug/L	
1,1-Dichloroethane		< 50	50	ug/L	
1,1-Dichloroethene		< 50	50	ug/L	
1,1-Dichloropropene		< 50	50	ug/L	
1,2,3-Trichlorobenzene		< 50	50	ug/L	
1,2,3-Trichloropropane		< 50	50	ug/L	
1,2,4-Trichlorobenzene		< 50	50	ug/L	
1,2,4-Trimethylbenzene		< 50	50	ug/L	
1,2-Dibromo-3-chloropropane		< 200	200	ug/L	
1,2-Dibromoethane		< 50	50	ug/L	
1,2-Dichlorobenzene		< 50	50	ug/L	
1,2-Dichloroethane		< 50	50	ug/L	
1,2-Dichloropropane		< 50	50	ug/L	
1,3,5-Trimethylbenzene		< 50	50	ug/L	
1,3-Dichlorobenzene		< 50	50	ug/L	
1,3-Dichloropropane		< 50	50	ug/L	
1,4-Dichlorobenzene		< 50	50	ug/L	
2,2-Dichloropropane		< 50	50	ug/L	
2-Chlorotoluene		< 50	50	ug/L	
4-Chlorotoluene		< 50	50	ug/L	
Benzene		< 50	50	ug/L	
Bromobenzene		< 50	50	ug/L	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ4S 013102	Water	31 Jan. 02 9:00	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
V latiles					
Bromochloromethane		< 50	50	ug/L	8260B
Bromodichloromethane		< 50	50	ug/L	
Bromoform		< 50	50	ug/L	
Bromomethane		< 50	50	ug/L	
Carbon tetrachloride		< 50	50	ug/L	
Chlorobenzene		< 50	50	ug/L	
Chloroethane		< 50	50	ug/L	
Chloroform		< 50	50	ug/L	
Chloromethane		< 50	50	ug/L	
cis-1,2-Dichloroethene		< 50	50	ug/L	
cis-1,3-Dichloropropene		< 50	50	ug/L	
Dibromochloromethane		< 50	50	ug/L	
Dibromomethane		< 50	50	ug/L	
Dichlorodifluoromethane		< 50	50	ug/L	
Ethylbenzene		< 50	50	ug/L	
Isopropylbenzene		< 50	50	ug/L	
m & p-Xylene		< 100	100	ug/L	
Methylene Chloride		< 50	50	ug/L	
Naphthalene		< 50	50	ug/L	
n-Butylbenzene		< 50	50	ug/L	
n-Propylbenzene		< 50	50	ug/L	
o-Xylene		< 50	50	ug/L	
p-Isopropyltoluene		< 50	50	ug/L	
sec-Butylbenzene		< 50	50	ug/L	
Styrene		< 50	50	ug/L	
tert-Butylbenzene		< 50	50	ug/L	
Tetrachloroethene		< 50	50	ug/L	
Toluene		< 50	50	ug/L	
trans-1,2-Dichloroethene		< 50	50	ug/L	
trans-1,3-Dichloropropene		< 50	50	ug/L	
Trichloroethene		< 50	50	ug/L	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-05

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ4S 013102	Water	31 Jan. 02 9:00	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichlorofluoromethane		< 50	50	ug/L	8260B
Vinyl Chloride		< 50	50	ug/L	
RiskAnalysis					
Water					
Ethane		470	5.0	ng/L	AM18
Ethene		2800	5.0	ng/L	
Methane		2500	0.015	ug/L	AM20GAX

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-06

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D 013102	Water	31 Jan. 02 9:40	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.060	0.050	mg/L	353.3
Total Organic Carbon		1200	50	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-06

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D 013102	Water	31 Jan. 02 9:40	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-06

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2D 013102	Water	31 Jan. 02 9:40	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		< 5.0	5.0	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		540	5.0	ng/L	AM18
Ethene		1900	5.0	ng/L	
Methane		4000	0.015	ug/L	AM20GAX
TIC		780	4.0	mg/l CaCO3	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-07

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S 013102	Solid	31 Jan. 02 12:15	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Solid					
1,1,1,2-Tetrachloroethane		< 5000	5000	ug/Kg	8260B
1,1,1-Trichloroethane		< 5000	5000	ug/Kg	
1,1,2,2-Tetrachloroethane		< 5000	5000	ug/Kg	
1,1,2-Trichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethane		< 5000	5000	ug/Kg	
1,1-Dichloroethene		< 5000	5000	ug/Kg	
1,1-Dichloropropene		< 5000	5000	ug/Kg	
1,2,3-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,3-Trichloropropane		< 5000	5000	ug/Kg	
1,2,4-Trichlorobenzene		< 5000	5000	ug/Kg	
1,2,4-Trimethylbenzene		< 5000	5000	ug/Kg	
1,2-Dibromo-3-chloropropane		< 20000	20000	ug/Kg	
1,2-Dibromoethane		< 5000	5000	ug/Kg	
1,2-Dichlorobenzene		< 5000	5000	ug/Kg	
1,2-Dichloroethane		< 5000	5000	ug/Kg	
1,2-Dichloropropane		< 5000	5000	ug/Kg	
1,3,5-Trimethylbenzene		< 5000	5000	ug/Kg	
1,3-Dichlorobenzene		< 5000	5000	ug/Kg	
1,3-Dichloropropane		< 5000	5000	ug/Kg	
1,4-Dichlorobenzene		< 5000	5000	ug/Kg	
2,2-Dichloropropane		< 5000	5000	ug/Kg	
2-Chlorotoluene		< 5000	5000	ug/Kg	
4-Chlorotoluene		< 5000	5000	ug/Kg	
Benzene		< 5000	5000	ug/Kg	
Bromobenzene		< 5000	5000	ug/Kg	
Bromochloromethane		< 5000	5000	ug/Kg	
Bromodichloromethane		< 5000	5000	ug/Kg	
Bromoform		< 5000	5000	ug/Kg	
Bromomethane		< 5000	5000	ug/Kg	
Carbon tetrachloride		< 5000	5000	ug/Kg	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-07

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S 013102	Solid	31 Jan. 02 12:15	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorobenzene		< 5000	5000	ug/Kg	8260B
Chloroethane		< 5000	5000	ug/Kg	
Chloroform		< 5000	5000	ug/Kg	
Chloromethane		< 5000	5000	ug/Kg	
cis-1,2-Dichloroethene		< 5000	5000	ug/Kg	
cis-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Dibromochloromethane		< 5000	5000	ug/Kg	
Dibromomethane		< 5000	5000	ug/Kg	
Dichlorodifluoromethane		< 5000	5000	ug/Kg	
Ethylbenzene		< 5000	5000	ug/Kg	
Isopropylbenzene		< 5000	5000	ug/Kg	
m & p-Xylene		< 10000	10000	ug/Kg	
Methylene Chloride		< 5000	5000	ug/Kg	
Naphthalene		< 5000	5000	ug/Kg	
n-Butylbenzene		< 5000	5000	ug/Kg	
n-Propylbenzene		< 5000	5000	ug/Kg	
o-Xylene		< 5000	5000	ug/Kg	
p-Isopropyltoluene		< 5000	5000	ug/Kg	
sec-Butylbenzene		< 5000	5000	ug/Kg	
Styrene		< 5000	5000	ug/Kg	
tert-Butylbenzene		< 5000	5000	ug/Kg	
Tetrachloroethene		< 5000	5000	ug/Kg	
Toluene		< 5000	5000	ug/Kg	
trans-1,2-Dichloroethene		< 5000	5000	ug/Kg	
trans-1,3-Dichloropropene		< 5000	5000	ug/Kg	
Trichloroethene		< 5000	5000	ug/Kg	
Trichlorofluoromethane		< 5000	5000	ug/Kg	
Vinyl Chloride		< 5000	5000	ug/Kg	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S 013102	Water	31 Jan. 02 13:30	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Nitrate-nitrite as N		0.060	0.050	mg/L	353.3
Total Organic Carbon		1600	50	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	

Order #: P0202020
Report Date: 02/19/02
Client Proj Nam NSA-Midsouth
Client Proj # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S 013102	Water	31 Jan. 02 13:30	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromochloromethane		< 5.0	5.0	ug/L	8260B
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		< 5.0	5.0	ug/L	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-08

Sample Description	Matrix	Sampled Date/Time	Received
PES-INJ2S 013102	Water	31 Jan. 02 13:30	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichlorofluoromethane		< 5.0	5.0	ug/L	8260B
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		320	5.0	ng/L	AM18
Ethene		1100	5.0	ng/L	
Methane		2800	0.015	ug/L	AM20GAX
TIC		770	4.0	mg/l CaCO3	

INTERIM RESULTS

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-09

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	31 Jan. 02	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethene		< 5.0	5.0	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		< 5.0	5.0	ug/L	
Bromobenzene		< 5.0	5.0	ug/L	
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		< 5.0	5.0	ug/L	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadwav
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-09

Sample Description	Matrix	Sampled Date/Time	Received
TRIP BLANK	Water	31 Jan. 02	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Chlorobenzene		< 5.0	5.0	ug/L	8260B
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		< 5.0	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		< 5.0	5.0	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride		< 5.0	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene		< 5.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		< 5.0	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Trichloroethene		< 5.0	5.0	ug/L	
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-10

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2S 013102	Water	30 Jan. 02 17:10	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
WetChem					
Water					
Bromide		< 2.0	2.0	mg/L	320.1
Nitrate-nitrite as N		0.16	0.050	mg/L	353.3
Total Organic Carbon		13	5.0	mg/L	9060
Volatiles					
Water					
1,1,1,2-Tetrachloroethane		< 5.0	5.0	ug/L	8260B
1,1,1-Trichloroethane		< 5.0	5.0	ug/L	
1,1,2,2-Tetrachloroethane		< 5.0	5.0	ug/L	
1,1,2-Trichloroethane		< 5.0	5.0	ug/L	
1,1-Dichloroethane		43	5.0	ug/L	
1,1-Dichloroethene		310	100	ug/L	
1,1-Dichloropropene		< 5.0	5.0	ug/L	
1,2,3-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,3-Trichloropropane		< 5.0	5.0	ug/L	
1,2,4-Trichlorobenzene		< 5.0	5.0	ug/L	
1,2,4-Trimethylbenzene		< 5.0	5.0	ug/L	
1,2-Dibromo-3-chloropropane		< 20	20	ug/L	
1,2-Dibromoethane		< 5.0	5.0	ug/L	
1,2-Dichlorobenzene		< 5.0	5.0	ug/L	
1,2-Dichloroethane		< 5.0	5.0	ug/L	
1,2-Dichloropropane		< 5.0	5.0	ug/L	
1,3,5-Trimethylbenzene		< 5.0	5.0	ug/L	
1,3-Dichlorobenzene		< 5.0	5.0	ug/L	
1,3-Dichloropropane		< 5.0	5.0	ug/L	
1,4-Dichlorobenzene		< 5.0	5.0	ug/L	
2,2-Dichloropropane		< 5.0	5.0	ug/L	
2-Chlorotoluene		< 5.0	5.0	ug/L	
4-Chlorotoluene		< 5.0	5.0	ug/L	
Benzene		7.2	5.0	ug/L	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-10

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2S 013102	Water	30 Jan. 02 17:10	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Bromobenzene		< 5.0	5.0	ug/L	8260B
Bromochloromethane		< 5.0	5.0	ug/L	
Bromodichloromethane		< 5.0	5.0	ug/L	
Bromoform		< 5.0	5.0	ug/L	
Bromomethane		< 5.0	5.0	ug/L	
Carbon tetrachloride		93	5.0	ug/L	
Chlorobenzene		< 5.0	5.0	ug/L	
Chloroethane		< 5.0	5.0	ug/L	
Chloroform		130	5.0	ug/L	
Chloromethane		< 5.0	5.0	ug/L	
cis-1,2-Dichloroethene		250	100	ug/L	
cis-1,3-Dichloropropene		< 5.0	5.0	ug/L	
Dibromochloromethane		< 5.0	5.0	ug/L	
Dibromomethane		< 5.0	5.0	ug/L	
Dichlorodifluoromethane		< 5.0	5.0	ug/L	
Ethylbenzene		< 5.0	5.0	ug/L	
Isopropylbenzene		< 5.0	5.0	ug/L	
m & p-Xylene		< 10	10	ug/L	
Methylene Chloride	J	2.6	5.0	ug/L	
Naphthalene		< 5.0	5.0	ug/L	
n-Butylbenzene		< 5.0	5.0	ug/L	
n-Propylbenzene		< 5.0	5.0	ug/L	
o-Xylene		< 5.0	5.0	ug/L	
p-Isopropyltoluene		< 5.0	5.0	ug/L	
sec-Butylbenzene		< 5.0	5.0	ug/L	
Styrene		< 5.0	5.0	ug/L	
tert-Butylbenzene		< 5.0	5.0	ug/L	
Tetrachloroethene	J	1.0	5.0	ug/L	
Toluene		< 5.0	5.0	ug/L	
trans-1,2-Dichloroethene		12	5.0	ug/L	
trans-1,3-Dichloropropene		< 5.0	5.0	ug/L	

Order #: P0202020
Report Date: 02/19/02
Client Proi Nam NSA-Midsouth
Client Proi # 737490. 040000

Client Name: Parsons Engineering Science
Contact: Bruce Henry
Address: 1700 Broadway
Suite 900
Denver, CO 80290

Lab Sample #: P0202020-10

Sample Description	Matrix	Sampled Date/Time	Received
PES-MW2S 013102	Water	30 Jan. 02 17:10	01 Feb. 02

Analyte(s)	Flag	Result	PQL	Units	Method #
Volatiles					
Trichloroethene		1200	100	ug/L	8260B
Trichlorofluoromethane		< 5.0	5.0	ug/L	
Vinyl Chloride		< 5.0	5.0	ug/L	
RiskAnalysis					
Water					
Ethane		160	5.0	ng/L	AM18
Ethene		360	5.0	ng/L	
Methane		570	0.015	ug/L	AM20GAX
TIC		710	4.0	mg/l CaCO3	

NON-CONFORMANCE FORM

Date: 2/1/02 Receiver: K Romanyoo Time of Receipt: 1152

Client: PARSONS Number Samples out of Conformance: 3

Reason for Non-Conformance:

__ Samples rcvd. past holding time → Parameters

__ Broken Bottles → Description

__ Incorrect containers → Description

__ Incorrect preservative → Description

__ Sample ID different from COC → Description

__ Labels missing or unreadable → Description

__ Analysis not written on COC → Description

X Sample received not on COC → Description SEE BELOW: (see attached COC copy

__ Sample on COC not received → Description

__ Hold time not observed internally → Description

Remarks (2) CL VOAS HCl (VEG OIL) MK: PES-INJ4S/013102 MS 1/31/02 08:
(2) " " " " MSD " "

~~(1) PLASTIC (N.P) 500ml MK: PES-INJ2D/013102 1/31/02 09~~
Do they want Bromide?

Asst. Lab. Dir. Initials: Date: (See other side for resolution)

CHAIN - OF - CUSTODY RECORD

P0202020

Phone: (412) 826-5245 | Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 | Fax No.: (412) 826-3433

Company: Parsons
Co. Address: 1700 Broadway Ste 900 Denver CO 80290
Proj. Manager: Bruce Henry
Proj. Location: NSA Mid South
Proj. Number: 737490-04000
Phone #: 303-831-8100 Fax #: 303-831-8208

Sampler's signature:

Results to: Bruce Henry
Invoice to: Doug Wolfe

Cooler ID	Cooler Temp.

	Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	Vocs in Veg oil 8260	Vocs in H_2O 8260	Methane E/E	TOC Walk Black	Nitrate/Nitrite E353.2	Bromide E320.1			Remarks
01	PES-INJ2D	101 3102 Vegetable Oil	1/31/02	0810	03	04	2	X								Veg oil
02	PES-INJ4S/	013102 Vegetable oil	1/31/02	0830	MS	MSD	2	X								Veg oil
05	PES-INJ1S/	013102 Groundwater	1/31/02	0900			9		X	X	X	X				
06	PES-INJ2D/	013102 Groundwater	1/31/02	0940			9 10		X	X	X	X	X			Total Inorganic Carbon on M/E/E
07	PES-INJ2S/	013102 Vegetable Oil	1/31/02	1215			2	X								
08	PES-INJ2S/	013102 Groundwater	1/31/02	1330			9		X	X	X	X				TIC on M/E/E
09	Triplblank/	013102	—	—			2		X							lab poured
10	PES-MW25/	013002 Groundwater	1/30/02	1710			10		X	X	X	X	X			

Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
	Parsons	1/31/01	1600		Microseeps	2/1/02	1152
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:

WHITE COPY: Accompany Samples YELLOW COPY: Laboratory File PINK COPY: Submitter

microbial insights
SOLUTIONS IN MICROBIOLOGY

Bruce Henry
Parson
1700 Braodway
Suite 900
Denver, CO 80290

February 20, 2002

Dear Bruce Henry:

Enclosed is a copy of the results for the samples you sent for PLFA, DGGE, Detection of Dehalococcoides Ethenogenes and VFA Analysis from the NSA Midsouth project. Please call me if you have any questions or comments, I can be reached at (865) 573-8188.

Thank you for this opportunity to work with you.

Regards,

Gregory A. Davis
Environmental Project Manager

2340 STOCK CREEK BOULEVARD | ROCKFORD, TENNESSEE 37853-3044
865/573-8188 *phone* | 865/573-8133 *fax* | microbe@microbe.com *email* | www.microbe.com *web*

microbial insights

2340 Stock Creek Blvd.
Rockford TN 37853-3044
Phone (865) 573-8188
Fax: (865) 573-8133
Email: microbe@microbe.com

Analytical Analysis Report

Client: Parson
Bruce Henry
1700 Broadway
Suite 900
Denver, CO 80290

Phone: 303-831-8100

Fax: 303-831-8208

MI Identifier: 4PAR **Date Rec.:** 01/30/02 **Report Date:** 02/07/02

Analysis Requested: Volatile Fatty Acids

Project: NSA Mid-south

Comments:

All samples within this data package were analyzed under U.S. EPA Good Laboratory Practice Standards: Toxic Substances Control Act (40 CFR part 790). All samples were processed according to standard operating procedures. Test results submitted in this data package meet the quality assurance requirements established by Microbial Insights, Inc.

Reported by:

(Data Analyst)

Reviewed by:

(Director)

NOTICE: This report is intended only for the addressee shown above and may contain confidential or privileged information. If the recipient of this material is not the intended recipient or if you have received this in error, please notify Microbial Insights, Inc. immediately. The data and other information in this report represent only the sample(s) analyzed and are rendered upon condition that it is not to be reproduced without approval from Microbial Insights, Inc. Thank you for your cooperation.

microbial insights

2340 Stock Creek Blvd.
Rockford TN 37853-3044
Phone (865) 573-8188
Fax (865) 573-8133
Email: microbe@microbe.com

Analysis Summary Report

Sample Name	Condition		Arrival Condition	Metabolic Acids (mg/L)					
	Date Sampled	Date Received		Pyruvic	Lactic	Formic	Acetic	Proprionic	Butyric
MW7S	01/28/02	01/30/02	Good, Cold, Intact	< 4	< 1	< 1	< 1	< 1	< 1
MW1S	01/28/02	01/30/02	Good, Cold, Intact	< 4	< 1	< 1	<1	<1	< 1
007GL15LF	01/28/02	01/30/02	Good, Cold, Intact	< 4	< 1	< 1	<1	<1	<1
007GL15UF	01/28/02	01/30/02	Good, Cold, Intact	< 4	< 1	< 1	< 1	< 1	< 1
MW4S	01/28/02	01/30/02	Good, Cold, Intact	< 4	<1	< 1	<1	<1	<1
MW3S	01/28/02	01/30/02	Good, Cold, Intact	< 4	< 1	< 1	< 1	< 1	< 1
DUP2	01/28/02	01/30/02	Good, Cold, Intact	< 4	2	< 1	1	<1	< 1
MW3D	01/28/02	01/30/02	Good, Cold, Intact	< 4	< 1	< 1	140	290	20
MW2D	01/28/02	01/30/02	Good, Cold, Intact	< 4	< 1	< 1	10	10	< 1
INJ2S	01/28/02	01/30/02	Good, Cold, Intact	< 4	<1	< 1	163	586	305
INJ2D	01/28/02	01/30/02	Good, Cold, Intact	< 40	< 10	< 10	157	523	200
INJ4S	01/28/02	01/30/02	Good, Cold, Intact	< 40	< 10	< 10	239	845	713
MW2S	01/28/02	01/30/02	Good, Cold, Intact	< 4	< 1	< 1	10	17	<1

Quality Control Report

Compound	MS Recovery %	MSD Recovery %	RPD %	LCS Recovery %
Pyruvic	70	70	0	100
Lactic	114	112	2	109
Formic	99.5	98.8	0.8	92.7
Acetic	102	98.8	3	92.5
Proprionic	96	97	1.0	91.5
Butyric	112	113	0.9	91

Comments: No problems with QC.

microbial insights

2340 Stock Creek Blvd.
Rockford TN 37853-3044
Phone (865) 573-8188
Fax: (865) 573-8133
Email: microbe@microbe.com

Microbial Analysis Report

Client: Bruce Henry
Parsons
1700 Broadway Ste 900
Denver, CO 80290

Phone: (303) 831-8100

Fax: (303) 831-8208

MI Identifier: 4par **Date Rec.:** 1/31/02 **Report Date:** 2/20/02

Analysis Requested: PLFA, DGGE, Detection of *Dehalococcoides ethenogenes*

Project: NSA Midsouth 737490.04000

Comments:

All samples within this data package were analyzed under U.S. EPA Good Laboratory Practice Standards: Toxic Substances Control Act (40 CFR part 790). All samples were processed according to standard operating procedures. Test results submitted in this data package meet the quality assurance requirements established by Microbial Insights, Inc.

Reported by:

(Data Analyst)

Reviewed by:

(Director)

NOTICE: This report is intended only for the addressee shown above and may contain confidential or privileged information. If the recipient of this material is not the intended recipient or if you have received this in error, please notify Microbial Insights, Inc. immediately. The data and other information in this report represent only the sample(s) analyzed and are rendered upon condition that it is not to be reproduced without approval from Microbial Insights, Inc. Thank you for your cooperation.

microbial insights

2340 Stock Creek Blvd.
Rockford TN 37853-3044
Phone (865) 573-8188
Fax: (865) 573-8133
Email: microbe@microbe.com

Microbial Analysis Report

Executive Summary

The microbial communities from three injection wells and ten monitoring wells were characterized by phospholipid fatty acid content (PLFA Analysis). Also, bacterial profiles were obtained for samples INJ2D, MW-3S, and MW-2D by profiling a conserved region of the 16S rRNA gene using denaturing gradient gel electrophoresis (DGGE). These three samples were analyzed for the molecular detection of *Dehalococcoides ethenogenes*. Results from these analyses revealed the following:

- All thirteen samples contained viable biomass ranging between 10^4 to 10^6 cells/mL. Biomass concentrations were noticeably higher in the injection wells and those monitoring wells surrounding the injection wells (MW2S, MW2D, and MW3D).

- PLFA profiles showed that the majority of the sampling locations contained moderate to high microbial diversity. All of the Monitoring Wells (MW) were dominated by Gram-negative bacteria. High concentration of Gram negative bacteria are of interest at contaminate sites due to their ability to utilize a wide range of carbon sources and adapt quickly to a variety of environments. Certain fatty acid ratios help indicate metabolic response to environmental conditions by indicating faster turnover rates and triggered response to environmentally induced stress. Specifically, ratios indicating activity (i.e. turnover rates) showed that 007GL15LF and 007GL15UF samples had noticeably slower turnover rates than the other samples. Also, the injection wells appeared to be showing the highest indications of a metabolic response to due to changes in environmental conditions.

- Bacterial profiles provided by the DGGE analysis indicated moderate to highly diverse bacterial communities in samples INJ2D, MW-3S, and MW2D. These profiles showed little similarity in the banding patterns suggesting difference in the bacterial communities at each location. Sample MW3S contained several prominent bacterial members of which three represented rather novel organisms with only loose affiliations with certain bacterial groups. The majority of these sequences revealed the presence of anaerobic bacteria with several different genera of sulfate and iron reducing bacteria present. Also several member of the genus *Clostridium* were identified within these samples, particularly in the injection well 2D.

- Using a targeted gene detection approach confirmed the presence of *Dehalococcoides ethenogenes* in MW3S.

Quality Control Report

Compound	MS Recovery %	MSD Recovery %	RPD %	LCS Recovery %
Pyruvic	70	70	0	100
Lactic	114	112	2	109
Formic	99.5	98.8	0.8	92.7
Acetic	102	98.8	3	92.5
Proprionic	96	97	1.0	91.5
Butyric	112	113	0.9	91

Comments: No problems with QC.

microbial insights

2340 Stock Creek Blvd.
Rockford TN 37853-3044
Phone (865) 573-8188
Fax: (865) 573-8133
Email: microbe@microbe.com

Microbial Analysis Report

Client: Bruce Henry
Parsons
1700 Broadway Ste 900
Denver, CO 80290

Phone: (303) 831-8100

Fax: (303) 831-8208

MI Identifier: 4par **Date Rec.:** 1/31/02 **Report Date:** 2/20/02

Analysis Requested: PLFA, DGGE, Detection of *Dehalococcoides ethenogenes*

Project: NSA Midsouth 737490.04000

Comments:

All samples within this data package were analyzed under U.S. EPA Good Laboratory Practice Standards: Toxic Substances Control Act (40 CFR part 790). All samples were processed according to standard operating procedures. Test results submitted in this data package meet the quality assurance requirements established by Microbial Insights, Inc.

Reported by:

(Data Analyst)

Reviewed by:

(Director)

NOTICE: This report is intended only for the addressee shown above and may contain confidential or privileged information. If the recipient of this material is not the intended recipient or if you have received this in error, please notify Microbial Insights, Inc. immediately. The data and other information in this report represent only the sample(s) analyzed and are rendered upon condition that it is not to be reproduced without approval from Microbial Insights, Inc. Thank you for your cooperation.

microbial insights

2340 Stock Creek Blvd.
Rockford TN 37853-3044
Phone (865) 573-8188
Fax: (865) 573-8133
Email: microbe@microbe.com

Microbial Analysis Report

Executive Summary

The microbial communities from three injection wells and ten monitoring wells were characterized by phospholipid fatty acid content (PLFA Analysis). Also, bacterial profiles were obtained for samples INJ2D, MW-3S, and MW-2D by profiling a conserved region of the 16S rRNA gene using denaturing gradient gel electrophoresis (DGGE). These three samples were analyzed for the molecular detection of *Dehalococcoides ethenogenes*. Results from these analyses revealed the following:

- All thirteen samples contained viable biomass ranging between 10^4 to 10^6 cells/mL. Biomass concentrations were noticeably higher in the injection wells and those monitoring wells surrounding the injection wells (MW2S, MW2D, and MW3D).

- PLFA profiles showed that the majority of the sampling locations contained moderate to high microbial diversity. All of the Monitoring Wells (MW) were dominated by Gram-negative bacteria. High concentration of Gram negative bacteria are of interest at contaminate sites due to their ability to utilize a wide range of carbon sources and adapt quickly to a variety of environments. Certain fatty acid ratios help indicate metabolic response to environmental conditions by indicating faster turnover rates and triggered response to environmentally induced stress. Specifically, ratios indicating activity (i.e. turnover rates) showed that 007GL15LF and 007GL15UF samples had noticeably slower turnover rates than the other samples. Also, the injection wells appeared to be showing the highest indications of a metabolic response to due to changes in environmental conditions.

- Bacterial profiles provided by the DGGE analysis indicated moderate to highly diverse bacterial communities in samples INJ2D, MW-3S, and MW2D. These profiles showed little similarity in the banding patterns suggesting difference in the bacterial communities at each location. Sample MW3S contained several prominent bacterial members of which three represented rather novel organisms with only loose affiliations with certain bacterial groups. The majority of these sequences revealed the presence of anaerobic bacteria with several different genera of sulfate and iron reducing bacteria present. Also several member of the genus *Clostridium* were identified within these samples, particularly in the injection well 2D.

- Using a targeted gene detection approach confirmed the presence of *Dehalococcoides ethenogenes* in MW3S.

Overview of Approach:

Phospholipid Fatty Acid (PLFA) Analysis

The analysis of microbial membrane lipids, specifically phospholipid fatty acids (PLFA), is an effective tool for monitoring microbial responses to their environment. Lipids are essential cellular components of the membrane of all cells and play a role as storage materials. The PLFA profiles simultaneously contain general information about the phylogenetic identity and physiological status of microbes. The microbial membrane reflects the nature of both the intracellular components and the extracellular environmental conditions. Thus, PLFA analysis tells us what types of microbes are present in a system and how they are reacting to environmental factors (e.g., pollution or disturbance). PLFA analysis is based on the extraction and separation of lipid classes, followed by quantitative analysis using gas chromatography/mass spectrometry (GC/MS). The individual fatty acids differ in chemical composition depending on the organism and environmental conditions. PLFA analysis provides quantitative insight into three important attributes of microbial communities: viable biomass, community structure, and metabolic activity.

Denaturing gradient gel electrophoresis (DGGE)

The recovery of DNA and its subsequent analysis after polymerase chain reaction (PCR) amplification provides a powerful tool for characterizing microbial community structure that complements the PLFA analysis very effectively (5). As with PLFA analysis, numerous studies have used PCR amplification of ribosomal RNA genes (rDNA) to characterize microbial populations in a number of different environments and have demonstrated that the dominant microorganisms isolated by culture frequently do not match those identified by molecular techniques (1). Given that often only 0.1 – 10 % of visually countable bacteria in samples are cultured and previous studies have demonstrated that organisms retrieved from culturing are not necessarily the numerically dominant organisms *in situ*, the results from culture-based community structure assessments can be noticeably incomplete.

As a way to detect and identify organisms from a whole community of organisms, a recently developed tool called denaturing gradient gel electrophoresis (DGGE) analysis is used. The DGGE approach directly determines the species composition of complex microbial assemblages based on the amplification of conserved gene sequences (16S rDNA fragments for prokaryotes, 18S or 28S rDNA for eukaryotes). In DGGE analysis, differences in gene sequences among organisms allow DNA from various organisms to be physically separated in a denaturing gradient gel, thereby allowing one to generate profiles of numerically dominant bacterial community members for a sample. The profiles are visible as bands (or lines) in a gel. The banding patterns and relative intensities of the bands provide a measure of difference among the communities. Gel bands from dominant species, which constitute at least 1% of the total bacterial community, can be excised and sequenced. Sequence analysis of individual bands is used to infer the identity of the source organism based on database searches and phylogenetic methods. Phylogenetic affiliations are determined by comparing the DNA sequences retrieved from samples to DNA sequences of known bacterial sequences in national databases, such as the RDP or GenBank).

Procedures:

PLFA analysis

Lipids were recovered using a modified Bligh and Dyer method (7). Extractions were performed using one-phase chloroform-methanol-buffer extractant. Lipids were recovered, dissolved in chloroform, and fractionated on disposable silicic acid columns into neutral-, glyco-, and polar-lipid fractions. The polar lipid fraction was transesterified with mild alkali to recover the PLFA as methyl esters in hexane. PLFA were analyzed by gas chromatography with peak confirmation performed by electron impact mass spectrometry (GC/MS). PLFA nomenclature follows the pattern of A:Bω C. The "A" position identifies the total number of carbon atoms in the fatty acid. Position B is the number of double bonds from the aliphatic (ω) end of the molecule. Position "C" designates the carbon atom from the aliphatic end before

the double bond. This is followed by a "c" for *cis* or a "t" for *trans* configuration. The prefix "i" and "a" stand for *iso* and *anteiso* branching. Mid-chain branching is noted by "me," and cyclopropyl fatty acids are designated as "cy" (8). Example: 18:1ω7c is 18 carbons long with one double bond occurring at the 7th carbon atom from the ω end, and the hydrogen molecules attached to the doubly bonded carbon molecules are in the cis conformation.

DGGE analysis

Nucleic acid extraction was performed using a bead-beating method (6). Sodium phosphate buffer, chaotropic reagent, glass beads, and the sample were agitated in a microcentrifuge tube using a high-speed bead beater. Chloroform was added, mixed thoroughly, and the tube was recentrifuged. The aqueous supernatant was collected and phenol/cholroform/isoamyl alcohol (24:24:1) extracted. Glycogen was added and the DNA was precipitated from the aqueous phase with an equal volume of isopropanol. DNA was pelletted by centrifugation, washed with 80% ethanol, air-dried, and re-dissolved in Tris buffer, pH 8.0. The DNA was purified by a glass-milk DNA purification protocol using a Gene Clean™ kit as described by the manufacturer. PCR amplification of 16S rRNA gene fragments was performed as described in Muyzer *et al.* with modifications (4). Thermocycling consisted of 35 cycles of 92°C for 45 sec., 55°C for 30 sec., and 68°C for 45 sec. Using 1.25 units of Expand High Fidelity polymerase and 10 pmole each primer (forward primer contained a 40 bp GC-clamp) in a total volume of 25 µL, thermocycling was performed using a "Robocycler™" PCR block. The primers targeted eubacterial 16S rDNA regions corresponding to *E. coli* positions 341-534. A portion (20%) of each PCR product was analyzed by agarose gel electrophoresis (1.5% agarose, 1x TAE buffer) and ethidium bromide fluorescence. The amount of DNA used for DGGE was standardized to 150 ng by comparison to molecular weight standards using Alpha Imager™ software. DGGE employed a D-Code 16/16 cm gel system maintained at a constant temperature of 60°C in 6L of 0.5 x TAE buffer (20mM Tris actate, 0.5mM EDTA, pH 8.0). Denaturing gradients were formed between 30 – 65 % denaturant (with 100% denaturant defined as 7 M urea, 40% v/v formamide). Gels were electrophoresed at 35V for 16 hr. Gels were stained with ethidium bromide (0.5 mg/L) and destained twice in 0.5 x TAE for 15 min. each. Gel images were captured using an Alpha Imager™ system. The central 1mm portion of intensely fluorescing DGGE bands were excised using a razor blade and soaked in 50 µL of purified water overnight. A portion (15 µL) was used as the template in a PCR reaction as described above. The products were purified by electrophoresis through a 1.2% agarose/TAE gel followed by glass-milk extraction (Gene-Clean™ kit). Purified DNA was sequenced with an ABI-Prism automatic sequencer model 377 with dye terminators. Sequence identifications were performed using the BLASTN facility of the National Center for Biotechnology Information (http://ncbi.nlm.nih.gov/Blast) and the "Sequence Match" facility of the Ribosomal Database Project (http://www.cme.msu.edu/RDP/analyses.html).

Results and Discussion:

Biomass Content

Phospholipid fatty acids are found in the membranes of all living cells but decompose quickly upon cell death because cellular enzymes hydrolyze the phosphate group within minutes to hours of cell death (7, 9). Thus, measuring the total amount of PLFA content provides a quantitative measure of the viable microbial biomass present.

Biomass estimates (as determined by the total concentration of PLFA) indicated a response in viable biomass concentrations within in all three injection wells (INJ2S, INJ2D, and INJ4S) as well as in MW-2(S and D) and MW-3D. It should be noted, that the organic substrate used in this study (vegetable oil) contained fatty acids. Specifically vegetable oil contained high proportions of polyenoic fatty acids, which allowed us to account for the influence this may have on total biomass concentrations. In Figure 1. Residual substrate fatty acids are shown to provide an indication of where they were prevalent. Cell equivalent values showed that biomass levels were between 1-2 orders of magnitude higher in and around the injection wells.

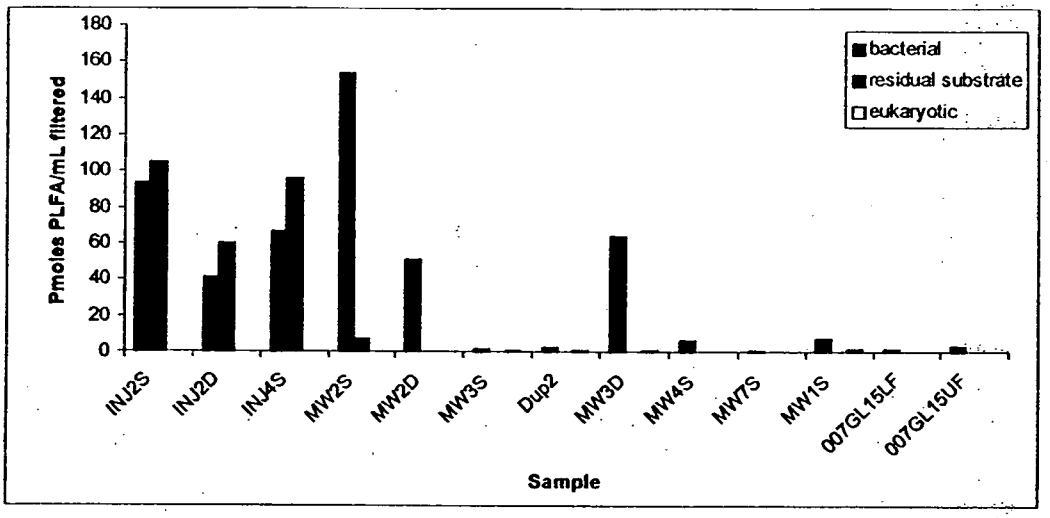


Figure 1. Biomass content is presented as the total amount of phospholipid fatty acids (PLFA) extracted from a given sample. Bacterial biomass is calculated based upon PLFA attributed specifically to bacteria, whereas eukaryotic biomass is based on PLFA associated with higher organisms.

Community Structure

The PLFA patterns derived from environmental samples provide a quantitative profile of the microbial population, which accurately mirrors differences in community composition among samples. Specific groups of microbes contain different fatty acid profiles making it possible to distinguish between them (2, 3, 8, 10). Table 1 describes the six major structural groups employed.

Table 1. Description of PLFA Structural Groups.

PLFA Structural Group	General classification
Monoenoic (Monos)	Found in Gram-negative bacteria, which can be fast growing, utilize many carbon sources, and adapt quickly to a variety of environments.
Terminally Branched Saturated (TerBrSats)	Representative of Gram-positive bacteria, but also are found in the cell membranes of some Gram-negative bacteria.
Branched Monoenoic (BrMonos)	Commonly found in the cell membranes of obligate anaerobes, such as sulfate- or iron-reducing bacteria
Mid-Chain Branched Saturated (MidBrSats)	Common in actinomycetes, sulfate-reducing bacteria, and certain Gram-positive bacteria.
Normal Saturated (Nsats)	Ubiquitous in both prokaryotic and eukaryotic organisms, though dominant fatty acids within this group will vary among organisms.
Polyenoic	Found in organisms such as fungi, protozoa, algae, higher plants, and animals.

PLFA profiles for these samples showed high proportions of the residual fatty acids from the vegetable oil were observed in the injection wells (INJ 2S, INJ2D, and INJ4S). Additionally, residual fatty acids were observed in MW2S, but not in the other closely related monitoring wells (MW2D) and MW-3). However, as mentioned above, biomass had increased in these sampling locations, thus indicating the influence of the added substrate in these wells.

Comparison of monitoring well samples indicated that all of these locations contained at least moderately diverse community structures that were primarily composed of Gram-negative bacteria. High proportions of Gram-negative bacteria are of particular interest at contaminated sites due to their ability to utilize a wide range

of carbon sources and adapt quickly to environmental conditions. Proportions of Gram-negative bacteria were highest in samples collected from MW-2 (both S; 77.2% and D; 69.7%).

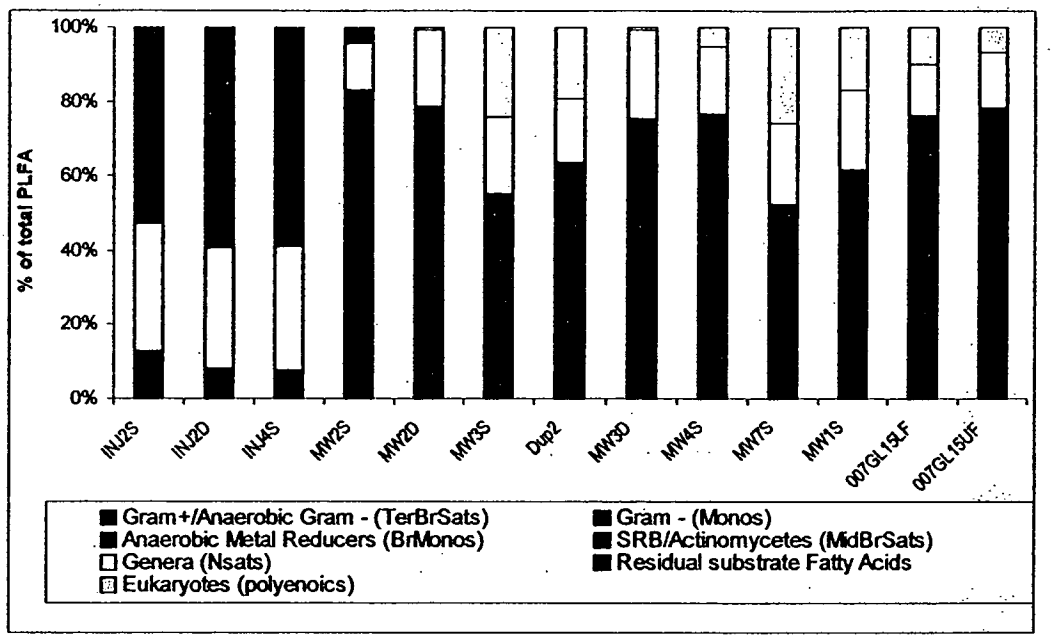


Figure 2. A comparison of the relative percentages of total PLFA structural groups in the samples analyzed. Structural groups are assigned according to PLFA chemical structure, which is related to fatty acid biosynthesis. See Table 1 for detailed descriptions of structural groups.

Evidence of sulfate or iron reducing bacteria (indicated by percentage of branched monoenoic and mid chain branched PLFA) were detected in all but the injection wells. Generally proportions of these fatty acids were highest in the 007GL15LF and 007GL15UF samples.

Metabolic Activity

Lipid composition of microorganisms is a product of metabolic pathways and thus reflects phenotypic responses of the organisms to their environment. Knowledge of specific lipid biosynthetic pathways can provide insight into the metabolic activity of the microbial community because certain fatty acids provide indications of turnover rate and physiological responses to environmental conditions. Specifically, Gram-negative bacteria form cyclopropyl fatty acids (f.a.) (cy17:0 & cy19:0) preferentially over monoenoic f.a. (16:1w7c and 18:1w7c) as the turnover rate decreases. Gram-negative bacteria also generate *trans* fatty acids to minimize the permeability of their cellular membranes as an adaptation to less favorable environments (9). In Gram negative bacteria there are two main biosynthetic pathways: one that preferentially synthesize 16:1ω7c (herein referred to as Group A Gram negative bacteria) and another that preferentially synthesize 18:1ω7c (Group B). Ratios of cy/ω7c and ω7t/ω7c can be used as quantitative indicators of how a portion or all of the Gram-negative community is responding to environmental factors (toxicity, starvation, etc.) and/or engineered treatment.

Ratios of fatty acid biomarkers that provide indication of activity (turnover rate) showed that samples collected from 007GL15LF and 007GLUF had noticeably slower turnover rates than the other samples (particularly the Group A Gram negative bacteria).

Ratios of fatty acid biomarkers that provide indications of a metabolic response to environmental condition showed that the majority of these sampling locations were showing signs of this occurring. The highest indications of a response were observed within the injection wells.

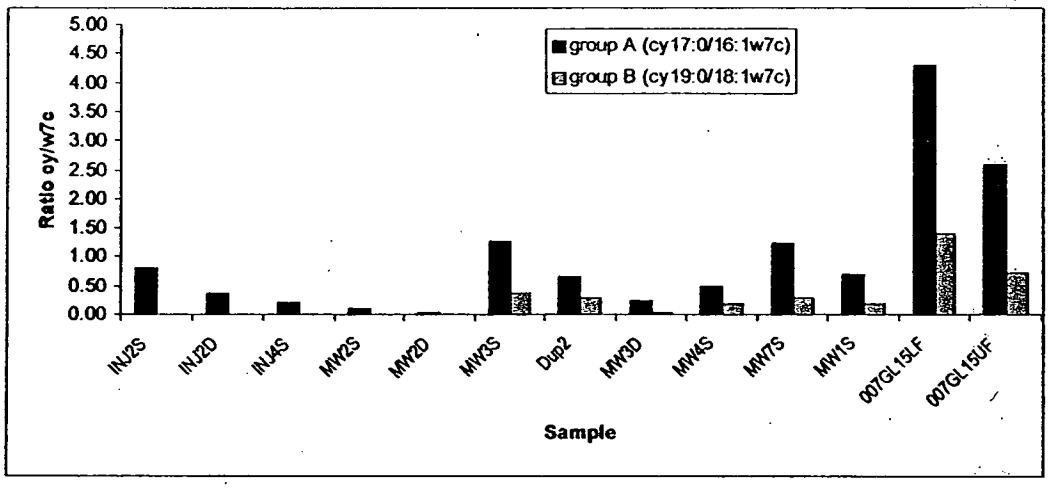


Figure 3. Growth rate of the Gram-negative community as assessed by the ratio of cyclopropyl f. a. to ω7c f. a. Specifically, 16:1ω7c and 18:1ω7c fatty acids are converted to cyclopropyl fatty acids (cy17:0 & cy19:0) as microbial growth slows (i.e., a high ratio indicates decreased turnover rate).

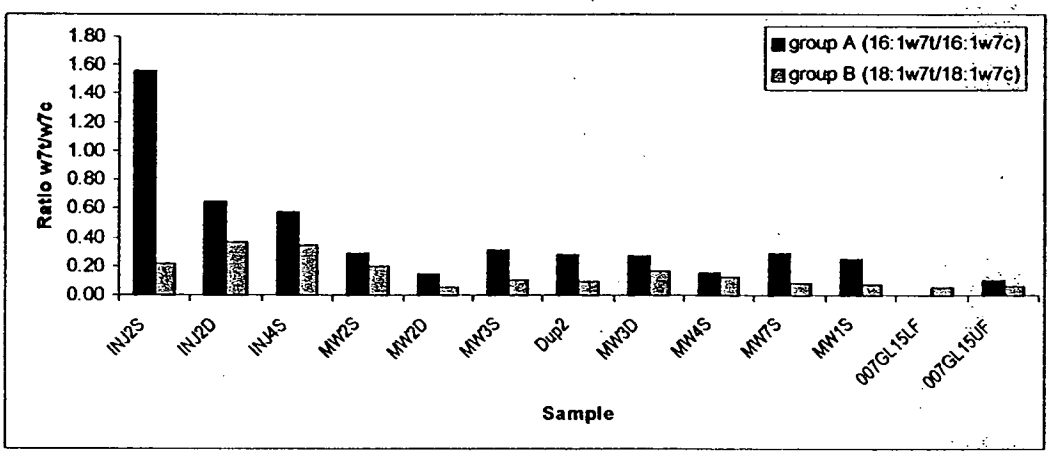


Figure 4. Adaptation of the Gram-negative community to changes in the environment is determined by the ratio of ω7t/ω7c fatty acids. Ratios (16:1ω7t/16:1ω7c and 18:1ω7t/18:1ω7c) greater than 0.1 have been shown to indicate an adaptation to a toxic or stressful environment, resulting in decreased membrane permeability.

Table 2. Summary of PLFA results.

Sample Name	Biomass (pmoles PLFA/g dry wt. of sample or ml of sample)					Community Structure (% of total PLFA)						Metabolic Activity		Physiological Response	
	Total Biomass	Cell equivalent value[1]	Bacterial biomass	Eukaryotic biomass	Ratio bacteria/ eukarya	Gram+/ anaerobic Gram - (TerBrSats)	Gram - (Monos)	Anaerobic metal reducers (BrMonos)	SRB/ Actinomycetes (MidBrSats)	Genera (Nsats)	Eukaryotes (polyenoics)	Group A Gram – (cy17:0/16:1ω7c)	Group B Gram – (cy19:0/18:1w7c)	Group A Gram – (16:1ω7t/16:1ω7c)	Group B Gram – (18:1ω7t/18:1ω7c)
PES-INJ2S/013102	199	1.88E+06	94	105*	1	3.4	9.7	0.1	0.0	34.2	52.7*	0.79	0.01	1.56	0.22
PES-INJ2D/013102	101	8.22E+05	41	60*	1	0.9	7.1	0.0	0.0	32.6	59.4*	0.36	0.01	0.64	0.37
PES-INJ4S/013102	163	1.34E+06	67	96*	1	0.8	7.0	0.1	0.0	33.2	59.0*	0.21	0.00	0.57	0.34
PES-MW2S/013102	161	3.08E+06	154	7*	22	4.9	77.2	0.5	0.5	12.6	4.4*	0.10	0.01	0.29	0.20
PES-MW2D/013002	51	1.02E+06	51	0	155	6.7	69.7	1.2	0.9	20.9	0.6	0.03	0.01	0.14	0.05
PES-MW3S/013002	2	2.73E+04	1	0	3	5.1	44.0	3.2	2.9	20.9	24.0	1.27	0.36	0.31	0.10
PES-Dup2/013002	3	4.29E+04	2	1	4	10.6	43.6	4.3	5.2	17.0	19.3	0.64	0.27	0.28	0.09
PES-MW3D/013002	65	1.28E+06	64	1	99	15.9	55.4	2.2	1.8	23.7	1.0	0.23	0.04	0.27	0.17
PES-MW4S/013002	7	1.36E+05	7	0	18	4.3	63.5	0.9	8.0	18.0	5.2	0.49	0.19	0.16	0.12
PES-MW7S/012902	2	2.27E+04	1	0	3	8.2	37.6	2.5	4.2	21.7	25.9	1.24	0.29	0.29	0.09
PES-MW1S/012902	9	1.42E+05	7	1	5	4.0	51.3	2.8	3.7	21.2	17.0	0.71	0.18	0.25	0.07
007GL15LF/012902	2	3.19E+04	2	0	9	3.1	60.1	3.2	9.7	14.0	9.9	4.30	1.41	0.00	0.06
007GL15UF/012902	3	6.41E+04	3	0	13	3.9	58.3	2.2	14.0	14.6	7.0	2.58	0.73	0.11	0.06

* results are effected by residual fatty acids found in the vegetable oil.

[1] The cell equivalent value is calculated from experiments with typical bacteria isolated from soil and water. This value is based on 2.0×10^{12} cells per gram dry weight of cells and 10^{8} picomoles of phospholipid/gram dry weight of cells. The number of cells/gram of dry weight may vary and is dependent on the environmental conditions from which the microorganisms were recovered.

Bacterial Composition

DGGE profiles were obtained from three sampling locations MW3S, MW2D, and INJ2D. These profiles suggest that all three samples contained moderate to highly diverse bacterial communities with few similarities between the different sampling locations (i.e. few bands were present in more than one sample). Two of the more prominent bands within MW3S represented two rather novel organisms. Band A represented a novel organism, which was loosely associated with genus *Desulfurella*. Members of the genus *Desulfurella* are sulfate-reducing bacteria which are moderately thermophilic anaerobic bacteria . The primary electron donor for *Desulfurella* is Acetate. Band B also represented a novel organism, but was loosely associated with *bacteriodes*. Member of *Bacteriodes* have recently been identified as organic pollutant degraders, but falling outside of the bacterial groups typically isolated for biodegradation.

Band C was closely associated with the genus *Geobacter*. Members of the genus *Geobacter* are anaerobic, iron (Fe(III))- reducing, Gram-negative bacteria. Dissimilatory Fe(III) reduction is the process in which microorganisms transfer electrons to external ferric iron [Fe(III)], reducing it to ferrous iron [Fe(II)] without assimilating the iron. Most microorganisms that reduce Fe(III) also can transfer electrons to Mn(IV), reducing it to Mn(II). Various studies have shown that bacteria in this genus can remove aromatic hydrocarbons, oxidize organic contaminants, and reduce metals. A wide variety of electron donors (hydrogen, formate, acetate, pyruvate, succinate, fumarate and ethanol) have been established for members of *Geobacter*. Band E was affiliated with the genus *Azoarcus*. Some members of the genus *Azoarcus* are capable of denitrification (converting nitrate to nitrite or nitrite to nitrous oxide), while others can convert nitrogen in the atmosphere to ammonia. Many members are found associated with plant roots (and therefore are capable of living with low amounts of oxygen), and often they grow without oxygen (anaerobic growth). Several members are particularly well known for being able to degrade aromatic compounds. Band F represented a rather novel organism, which was loosely associated with *Clostridium* (discussed below).

The two most prominent bands within MW-2D revealed the presence of organisms closely related to the sulfate reducing bacteria *Desulfobulbus* (band N) and the ammonia oxidizing bacteria *Nitrosomonas* (band M).

Several minor bands were also excised and sequenced revealing the presence of organisms related to the following genera; *Sulfurospirillum, Azoarcus (discussed above), Dechlorospirillum, Magnetospirillum* and *Azospirillum*. Members of *Sulfurospirillum are* sulfur-oxidizing bacterium capable of microaerobic growth; some species can reduce ferric iron, selenate, arsenate, thiosulfate, nitrate, fumarate, aspartate, and manganese dioxide. Member of the genera *Dechlorospirillum* have been shown to be perchlorate reducing bacteria.

Three of the five bands sequenced from INJ2D were associated with the genus *Clostridium*. Members of the genus *Clostridium* are anaerobic counterparts to the Bacilli. Some members of this genus are notable pathogens, but other members can be found in environmental samples where oxygen is absent (or at least restricted where they are growing). Clostridia are commonly found in soils, sewage, marine sediments, and decaying vegetation. As a group, they have a wide pH tolerance range (4.5 – 8.5), can use a variety of compounds as energy sources, and form drought- and oxygen-resistant spores. Some Clostridia can fix nitrogen, taking nitrogen gas (N_2) to form ammonium. While there have been some recent publications (see appendix) suggesting the involvement of *Clostridium bifermentans* in the dehalogenation of PCE, a review article published in 1999 in the bioremediation journal listed several members of *Clostridium* that were unable to dechlorinate PCE.

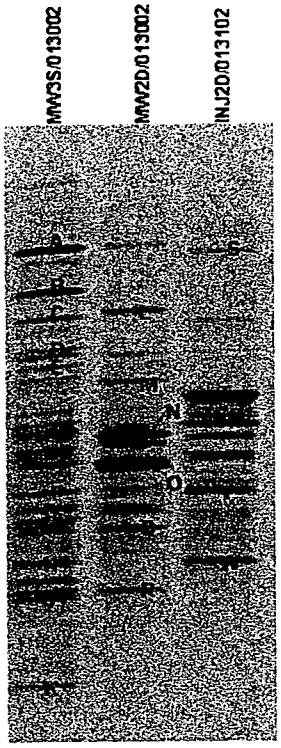


Figure 5. DGGE gel image of amplimers from a conserved region of bacterial 16S rDNA. Banding patterns and relative intensities of the recovered bands provide a measure of differences among the communities. Dominant species must constitute at least 1-2% of the total bacterial community to form a visible band. Labeled bands were excised and sequenced. Results from sequencing can be found in the following table.

Table 3. Sequence results from bands excised from Figure 7. Identifications are based on information in the Ribosomal Database Project (RDP). Similarity indices above .900 are considered excellent, those between .700-.800 are good, and those below .600 are considered to be unique sequences.

Band	Closest Match	Similarity Index	Phylogenetic Affiliation	Ref
A	Novel (Loosely associated with *Desulfurella*)	-	Delta Proteobacteria	
B	Novel (loosely associated with *Bacteriodes* group)	-	Bacteriodes	
C	*Geobacter* sp.	.827	*Desulforomonas* subgroup of Delta Proteobacteria	
D	Failed	-	-	
E	Azoarcus anaerobius	.804	Beta Proteobacteria	
F	Clostridium tetanomorphum	.586	Gram Positive Bacteria	
G	Failed	-	-	
H	Kribbella flavida	.704	Gram Positive Bacteria	
I	Pedomicrobium manganicum	.608	Alpha Proteobacteria	
J	Polyangium vitellinum	.631	Alpha Proteobacteria	
K	Novel (loosely associated with cytophaga)	-	Flexibacter-Cytophaga-Bacteroides	
L	Sulfurospirillum deleyianum	.810	Epsilon Proteobacteria	
M	*Nitrosomonas* sp.	.836	Beta Proteobacteria	
N	*Desulfobulbus* sp.	.783	Delta Proteobacteria	
O	Azoarcus sp.	.671	Beta Proteobacteria	
P	Dechlorospirillum sp.	.702	Magnetospirillum subgroup of Alpha Proteobacteria	
Q	Magnetospirillum sp.	.931	Alpha Proteobacteria	
R	Azospirillum lipoferum	.910	Alpha Proteobacteria	
S	Clostridium beijerinckii	.671	Gram Positive Bacteria	
T	Clostridium sporosphaeroides	.717	Gram Positive Bacteria	
U	Clostridium sp.	.968	Gram Positive Bacteria	
V	Failed	-	-	
W	Luteococcus japonicus	.762	Gram Positive Bacteria	

Targeted gene detection for *Dehalococcoides ethenogenes*

DNA based techniques were used to detect the presence of a PCE degrading organism, Dehalococcoides ethenogenes (using a targeted gene detection approach) within samples MW-3S, MW-2D, and INJ-2D. Results from this analysis revealed the presence of *Dehalococcoides ethenogenes* within MW-3S.

Table 4. Results from DNA amplification using primers specific for *Dehalococcoides ethenogenes*. Specific primers directed to a variable region of the 16S rRNA gene of *Dehalococcoides ethenogenes* was used to determine its presence. Sensitivity of these primers is ~10^3 cells/mL or g of sample. Presence is noted with a plus sign and the relative abundance determined by the number of plus signs (i.e. ++ is greater in abundance than +).

Sample	*Dehalococcoides ethenogenes*
MW-3S	++
MW-2D	-
INJ-2D	-

References:

1. **Amann, R. I., W. Ludwig, and K.-H. Schleifer.** 1995. Phylogenetic identification and in situ detection of individual microbial cells without cultivation. Microbiological Reviews **59**(1):143-169.

2. **Dowling, N. J. E., F. Widdel, and D. C. White.** 1986. Phospholipid ester-linked fatty acid biomarkers of acetate-oxidizing sulfate reducers and other sulfide forming bacteria. Journal of General Microbiology **132**:1815-1825.

3. **Edlund, A., P. D. Nichols, R. Roffey, and D. C. White.** 1985. Extractable and lipopolysaccharide fatty acid and hydroxy acid profiles from Desulfovibrio species. Journal of Lipid Research **26**:982-988.

4. **Muyzer, G., E. C. De Waal, and A. G. Uitterlinden.** 1993. Profiling of complex microbial populations by denaturing gradient gel electrophoresis analysis of polymerase chain reaction-amplified genes coding for 16S rRNA. Applied and Environmental Microbiology **59**(3):695-700.

5. **Stephen, J. R., Y.-J. Chang, Y. D. Gan, A. Peacock, S. Pfiffner, M. Barcelona, D. C. White, and S. J. Macnaughton.** 1999. Microbial characterization of a JP-4 fuel-contaminated site using a combined lipid biomarker/polymerase chain reaction-denaturing gradient gel electrophoresis (PCR-DGGE) based approach. Environmental Microbiology **1**(3):231-241.

6. **Stephen, J. R., Y.-J. Chang, S. J. Macnaughton, S. L. Whitaker, C. L. Hicks, K. T. Leung, C. A. Flemming, and D. C. White.** 1999. Fate of a metal-resistant inoculum in contaminated and pristine soils assessed by denaturing gradient gel electrophoresis. Environmental Toxicology and Chemistry **18**(6):1118-1123.

7. **White, D. C., W. M. Davis, J. S. Nickels, J. D. King, and R. J. Bobbie.** 1979. Determination of the sedimentary microbial biomass by extractable lipid phosphate. Oecologia **40**:51-62.

8. **White, D. C., H. C. Pinkart, and D. B. Ringelberg.** 1997. Biomass measurements: Biochemical approaches, p. 91-101. *In* C. J. Hurst, G. R. Knudsen, M. J. McInerney, L. D. Stetzenbach, and M. V. Walter (ed.), Manual of Environmental Microbiology. ASM Press, Washington.

9. **White, D. C., and D. B. Ringelberg.** 1995. Utility of signature lipid biomarker analysis in determining in situ viable biomass, community structure, and nutritional / physiological status of the deep subsurface microbiota. *In* P. S. Amy and D. L. Haldeman (ed.), The microbiology of the terrestrial subsurface. CRC Press, Boca Raton.

10. **White, D. C., J. O. Stair, and D. B. Ringelberg.** 1996. Quantitative comparisons of in situ microbial biodiversity by signature biomarker analysis. Journal of Industrial Microbiology **17**:185-196.

NCBI PubMed National Library of Medicine NLM

PubMed Nucleotide Protein Genome Structure PopSet Taxonomy OMIM B

Search PubMed for Go Clear

Limits Preview/Index History Clipboard Details

About Entrez

Display Abstract Sort Save Text Clip Add Order

Entrez PubMed
Overview
Help | FAQ
Tutorial
New/Noteworthy

PubMed Services
Journal Browser
MeSH Browser
Single Citation Matcher
Batch Citation Matcher
Clinical Queries
LinkOut
Cubby

Related Resources
Order Documents
NLM Gateway
TOXNET
Consumer Health
Clinical Alerts
ClinicalTrials.gov
PubMed Central

Privacy Policy

1: Can J Microbiol 2001 May;47(5):448-56 Related Articles, Books, LinkOut

Purification, cloning, and sequencing of an enzyme mediating the reductive dechlorination of tetrachloroethylene (PCE) from Clostridium bifermentans DPH-1.

Okeke BC, Chang YC, Hatsu M, Suzuki T, Takamizawa K.

Department of Bioprocessing, Gifu University, Japan.

An enzyme mediating the reductive dechlorination of tetrachloroethylene (PCE) from cell-free extracts of Clostridium bifermentans DPH-1 was purified, cloned, and sequenced. The enzyme catalyzed the reductive dechlorination of PCE to cis-1,2-dichloroethylene via trichloroethylene, at a Vmax and Km of 73 nmol/mg protein and 12 microM, respectively. Maximal activity was recorded at 35 degrees C and pH 7.5. Enzymatic activity was independent of metal ions but was oxygen sensitive. A mixture of propyl iodide and titanium citrate caused a light-reversible inhibition of enzymatic activity suggesting the involvement of a corrinoid cofactor. The molecular mass of the native enzyme was estimated to be approximately 70 kDa. Sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) and matrix-assisted laser desorption ionization-time of flight/mass spectrometry (MALDI-TOF/MS) revealed molecular masses of approximately 35 kDa and 35.7 kDa, respectively. A broad spectrum of chlorinated aliphatic compounds (PCE, trichloroethylene, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, 1,1-dichloroethylene, 1,2-dichloropropane, and 1,1,2-trichloroethane) was degraded. With degenerate primers designed from the N-terminal sequence (27 amino acid residues), a partial sequence (81 bp) of the encoding gene was amplified by polymerase chain reaction (PCR) and sequenced. Southern analysis of C. bifermentans genomic DNA using the PCR product as a probe revealed restriction fragment bands. A 5.0 kb ClaI fragment, harboring the relevant gene (designated pceC) was cloned (pDEHAL5) and the complete nucleotide sequence of pceC was determined. The gene showed homology mainly with microbial membrane proteins and no homology with any known dehalogenase, suggesting a distinct PCE dehalogenase.

PMID: 11400736 [PubMed - indexed for MEDLINE]

NCBI PubMed National Library of Medicine NLM

PubMed Nucleotide Protein Genome Structure PopSet Taxonomy OMIM B

Search PubMed for Go Clear

Limits Preview/Index History Clipboard Details

About Entrez

Display Abstract Sort Save Text Clip Add Order

Entrez PubMed
Overview
Help | FAQ
Tutorial
New/Noteworthy

PubMed Services
Journal Browser
MeSH Browser
Single Citation Matcher
Batch Citation Matcher
Clinical Queries
LinkOut
Cubby

Related Resources
Order Documents
NLM Gateway
TOXNET
Consumer Health
Clinical Alerts
ClinicalTrials.gov
PubMed Central

Privacy Policy

1: Bioresour Technol 2001 Jun;78(2):141-7 Related Articles, Books, LinkOut
ELSEVIER SCIENCE FULL-TEXT ARTICLE

In vitro dehalogenation of tetrachloroethylene (PCE) by cell-free extracts of Clostridium bifermentans DPH-1.

Chang YC, Okeke BC, Hatsu M, Takamizawa K.

Department of Bioprocessing, Faculty of Agriculture, Gifu University, Yanagido, Japan.

Cell-free extracts of Clostridium bifermentans DPH-1 catalyzed tetrachloroethylene (PCE) dechlorination. PCE degradation was stimulated by addition of a variety of electron donors. Ethanol (0.61 mM) was the most effective electron donor for PCE dechlorination. Maximum activity was recorded at 30 degrees C and pH 7.5. Addition of NADH as a cofactor stimulated enzymatic activity but the activity was not stimulated by addition of metal ions. When the cell-free enzyme extract was incubated in the presence of titanium citrate as a reducing agent, the dehalogenase was rapidly inactivated by propyl iodide (0.5 mM). The activity of propyliodide-reacted enzyme was restored by illumination with a 250 W lamp. The dehalogenase activity was also inhibited by cyanide. The substrate spectrum of activity included trichloroethylene (TCE), cis-1,2-dichloroethylene (cDCE), trans-dichloroethylene, 1,1-dichloroethylene, 1,2-dichloroethane, and 1,1,2-trichloroethane. The highest rate of degradation of the chlorinated aliphatic compounds was achieved with PCE, and PCE was principally degraded via TCE to cDCE. Results indicate that the dehalogenase could play a vital role in the breakdown of PCE as well as a variety of other chlorinated aliphatic compounds.

PMID: 11333032 [PubMed - indexed for MEDLINE]

Display Abstract Sort Save Text Clip Add Order

Write to the Help Desk
NCBI | NLM | NIH
Department of Health & Human Services
Freedom of Information Act | Disclaimer

APPENDIX B

FIELD TEST DATA

APPENDIX B.1

BOREHOLE LOGS

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	18 July 2000
BORING NUMBER:	PES-MW1S,D	BORING DIA.:	10-inch	DATE CMPL:	18 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.58 ft amsl
TEMPERATURE (°F):	90's °F	WEATHER:	Clear, Sunny, Hot	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	BMH/JBB
COMMENTS:	TD=81'; Screened from 70'-80'; 45-55'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
1		0 - 1.5' CONCRETE			
	CL	1.5 - 6.0' CLAY to SILTY CLAY - dark gray to		2-3'	PID Sample Depth and
		brown, mottled, reddish brown at base, stiff, slightly		3.7/2.0	Sample Readng/
5		moist, silty		4-5'	Background Reading
				4.0/1.3	
	CL/ML	6 - 11' SILTY CLAY - brown, mottled gray, stiff to		6-7'	
		firm, moist to slightly moist		2.1/0.5	
10					
	CL/ML	11 - 16' SILTY CLAY - as above, with some friable		11-12'	
		gray silt layers		2.3/0.5	
15					
	CL	16 - 18' CLAY - as above, becoming less silty and		16-17'	
		stiffer		2.1/1.5	
	CL	18 - 26' CLAY - predominately brown, occasionally			
20		mottled gray, soft, becoming very stiff at 22-26',			
		dense, slightly moist to moist		21-22'	
				2.3/1.5	
25					
	CL/ML	26 - 27' CLAY - AA		26-27'	
		27 - 30'' SILTY CLAY - becoming very silty to sandy		4.1/1.0	
30					
	CL/ML	30 - 33' SILTY to SANDY CLAY - brown, gray to			
		light gray, firm to stiff, slightly moist			
	ML/SM	33 - 36' CLAYEY SAND and SILT - light gray to			
35		gray, mottled brown, orange, and red, friable to stiff			
		and firm, slightly moist		35-36'	
	SM/ML	36 - 38' CLAYEY SILT - orangish brown, friable to		4.0/1.8	Water approx. 36-38'
		stiff, moist, sandy in part			
		38 - 41' SILTY SAND - orangish brown, soft to firm,			
40		very moist			
	SM	41- 46' SILTY SAND - orangish brown, soft, friable, wet,		41-42'	
		becoming light gray at base, well sorted, silty to fine		1.5/0.5	
		grained			
			PESMW1/		
45			45-46'	45-46'	
		46 - 48' SAND - gray, as above	TOC	1.1/0.5	
	SM/SP	48 - 54' SAND - tan to orangish brown, silty to very			
		fine grained, soft to unconsolidated, well sorted, wet			
50					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	18 July 2000
BORING NUMBER:	PES-MW1S,D	BORING DIA.:	10-inch	DATE CMPL:	18 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.58 ft amsl
TEMPERATURE (°F):	90's °F	WEATHER:	Clear, Sunny, Hot	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	BMH/JBB
COMMENTS:	TD=81'; Screened from 70'-80'; 45-55'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
51				51-52'	PID Sample Depth and
				1.4/1.0	Sample Readng/
					Background Reading
	SP/SW	54 - 56' SAND - orangish brown, unconsolidated, very		54-56'	
55		fine to coarse grained, trace gravel to 1/2-inch diameter,	PESMW1/	1.2/1.0	
		poorly sorted, wet	55 - 56'		
	SW	56 - 57' GRAVELLY SAND - as above, grading to	TOC		
		fine to coarse grained SAND			
	CL	thin CLAY lenses - 2 to 3-inches thick, light gray,			
60		very stiff, dense			
	SP/SW	60 - 65' SAND - tan to light brown, fine to medium		61-62'	
		grained, moderately to well sorted, loose, wet, micaceous		0.5/0.1	
	CL	thin CLAY lenses - light gray, very stiff, dense			
65	SW	65 - 66' GRAVELLY SAND - orangish brown to tan,	PESMW1/	65-66'	
		fine to coarse grained, gravel to 1", wet, poorly sorted	65 - 66'	0.4/0.1	
	SP/SW	66 - 76' SAND - tan to light brown, very fine to fine	TOC		
		grained, loose, unconsolidated, silty, moderately			
		sorted, micaceous, wet			
70					
				71-72'	
				0.5/0.2	
			PESMW1/		
			74-76'		
75			TOC		
	SP	76 - 80' SAND - tan to gray, orangish brown, very fine		75-76'	
		to fine grained, moderately sorted, loose to		0.6/0.3	
	CL	unconsolidated, wet, some CLAY lenses to 6-inches thick,			
	SP	light gray, mottled maroon, very stiff to firm, dense			
80					
	CL	80-81' CLAY - light gray, very stiff to firm, dense			
		TOTAL DEPTH = 81 FEET BGS			
85					
90					
95					
100					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

PARSONS ENGINEERING SCIENCE, INC.

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	01 August 2000
BORING NUMBER:	PES-MW2S,D	BORING DIA.:	10-inch	DATE CMPL:	01 August 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.60 ft amsl
TEMPERATURE (°F):	80's °F	WEATHER:	Hazy, Hot, Humid	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	JBB/SLH
COMMENTS:	TD = 87'; Screened from 75'-85'; 55-65'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
1		See description for PES-MW3, PES INJ1, PES INJ2			PID Sample Depth and
					Sample Readng/
					Background Reading
5				5-7'	
				5.6/5.6	
10				10-12'	
				5.6/5.6	
15				15-17'	
				5.6/5.6	
20			PESMW2/	20-22'	
			20-22'	7.0/5.6	
			VOCs		
25				25-27'	
				5.6/5.6	
30				30-32'	
				6.3/6.3	
35				35-37'	
				6.3/6.3	
40			PESMW2/	40-42'	
			40-42'	5.6/5.6	
			VOCs		
45				45-47'	
				5.6/5.6	
50					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

PARSONS ENGINEERING SCIENCE, INC.

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	01 August 2000
BORING NUMBER:	PES-MW2S,D	BORING DIA.:	10-inch	DATE CMPL:	01 August 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.60 ft amsl
TEMPERATURE (°F):	80's °F	WEATHER:	Hazy, Hot, Humid	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	JBB/SLH
COMMENTS:	TD=87'; Screened from 75'-85'; 55-65'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
51		See description for PES-MW3, PES INJ1, PES INJ2		50-52'	PID Sample Depth and
				8.2/5.6	Sample Readng/
					Background Reading
55			PESMW2/	55-57'	
			55-57'	9.8/5.6	
			VOCs		
			and		
			PESMW2/		
60			DUP	60-62'	
			VOCs	16.8/5.6	
65				65-67'	
				7.0/5.6	
70				70-72'	
				7.7/5.6	
75				75-77'	
				12.6/5.6	
80				80-82'	
				7.0/5.6	
85				85-87'	
				6.3/5.6	
		TOTAL DEPTH = 87 FEET BGS			
90					
95					
100					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	24 July 2000
BORING NUMBER:	PES-MW3S,D	BORING DIA.:	10-inch	DATE CMPL:	24 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.62 ft amsl
TEMPERATURE (°F):	65-75 °F	WEATHER:	Clear	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	JBB/SLH
COMMENTS:	TD=77'; Screened from 65'-75'; 45-55'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
1		0 - 1.5' CONCRETE			PID Sample Depth and
					Sample Readng/
		1.5 - 2.0' SANDY SUBSTRATE			Background Reading
5	CL	2 - 9' CLAY- silty, brown, stiff	PESMW3/	5-7'	
			5-7'	5.6/5.6	
	CL	9 - 17' CLAY - stiff, friable, silty, gray (9-11'),	VOCs		
		brown (11-17'), increasingly silty			
10				10-12'	-
				8.4/5.6	
15				15-17'	
				5.6/5.6	
	CL/ML	17 - 34' SILTY CLAY - brown, mottled, gray, firm			
20				20-22'	
				4.9/4.9	
25				25-27'	
				4.9/4.9	
30			PESMW3/	30-32'	
			30-32'	4.9/4.9	
			VOCs		
	SM/ML	34 - 36' CLAYEY SILT with SAND - fine grained,			
		silty, soft			
35				35-37'	
	CL	36 - 37' CLAY - stiff, silty		4.9/4.9	
	CL	37 - 41' CLAY, as above			
40				40-42'	Transition zone in
	ML	41 - 42' SILT - sandy, fine grained		7.0/7.0	lithology.
	CL	42 - 44' CLAY - silty with some fine sand			
	SM	44 - 47' SAND - brown, gray, fine grained, soft, silty, wet			
45				45-47'	
				4.9/4.9	
	SM	47 - 49' SAND, as above			
50					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	24 July 2000
BORING NUMBER:	PES-MW3S,D	BORING DIA.:	10-inch	DATE CMPL:	24 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.62 ft amsl
TEMPERATURE (°F):	65-75 °F	WEATHER:	Clear	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	JBB/SLH
COMMENTS:	TD=77'; Screened from 65'-75'; 45-55'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
51	SM/SP	49 - 54' SAND - fine to medium grained, some silt,		50-52'	PID Sample Depth and
		well sorted		7.7/4.9	Sample Readng/
					Background Reading
	SP/SW	54 - 57' SAND - medium to coarse grained, with some			
55		gravel, soft, wet	PESMW3/	55-57'	
			55-57'	11.4/4.9	
		57 - 58' as above	VOCs		
	SM	58 - 61' FINE SAND - silty, brown, wet			
60				60-62'	
	CL	61 - 61.5 CLAY LAYERS - approx. 5 inches thick,		18.2/6.3	
		gray, stiff			
	SM	61.5 - 68' FINE SAND - silty, soft, wet			
65				65-67'	
				10.5/7.7	
	SM	68 - 68.5' FINE SAND with little gravel			
	SM	68.5 - 75' FINE SAND - silty, several thin gravel layers,			
70		gravel 2- to 3-inch diamter, clay layers		70-72'	
				9.1/7.0	
				75-77'	
75	CL	75 - 77' CLAY - stiff, gray		8.4/7.0	
		TOTAL DEPTH = 75 FEET BGS			
80					
85					
90					
95					
100					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	21 July 2000
BORING NUMBER:	PES-MW4S,D	BORING DIA.:	10-inch	DATE CMPL:	21 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.63 ft bgs
TEMPERATURE (°F):	75 °F	WEATHER:	Overcast, breezy	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	JBB/BMH
COMMENTS:	TD=87'; Screened from 75'-85'; 55-65'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
1		0 - 1.5' CONCRETE			PID Sample Depth and
		1.5 - 2' COARSE SUBSTRATE			Sample Readng/
	CL/ML	2 - 4' SILTY CLAY - friable			Background Reading
	CL	4 - 9' CLAY - firm, brown, silty			
5				5-7'	
				6.8/6.8	
	CL	9 - 10' CLAY - silty, gray, firm			
10	CL	10 - 17' CLAY - silty, brown, mottled gray		10-12'	
				5.9/5.9	
15				15-17'	
				5.9/5.9	
	CL	17 - 20' CLAY - silty, brown, mottled gray, soft/medium			
20	CL	20 - 32' CLAY - brown, medium, little silt		20-22'	
				4.9/4.9	
25				25-27'	
				4.9/4.9	
30				30-32'	
				4.9/4.9	
	CL	32 - 37' CLAY - silty, becoming increasingly silty			
35				35-37'	
				4.9/4.9	
		37 - 38' as above			
	CL	38 - 39' CLAY - silty, firm			
	CL	39 - 43' CLAY - silty with little fine sand, soft			
40				40-42'	
				5.9/4.9	
	CL	43 - 44' CLAY - silty, firm, brown			
	SM	44 - 49' SAND - fine, silty, brown			
45				45-47'	
				7.3/4.9	
	SM	49 - 52' MEDIUM SAND - silty, soft, brwon			
50					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	21 July 2000
BORING NUMBER:	PES-MW4S,D	BORING DIA.:	10-inch	DATE CMPL:	21 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.63 ft bgs
TEMPERATURE (°F):	75 °F	WEATHER:	Overcast, breezy	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	JBB/BMH
COMMENTS:	TD=87'; Screened from 75'-85'; 55-65'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
51				50-52'	PID Sample Depth and
		52 - 55' as above		11.2/4.9	Sample Readng/
					Background Reading
55	SM	55 - 57' MEDIUM SAND with some gravel, soft, wet,		55-57'	
		0.5-foot thick clay layer at 55'		11.2/3.9	
		57 - 58' as above			
	SM	58 - 72' SAND - fine, silty, several gray stiff clay layers			
		less than 2 inches thick			
60				60-62'	
				6.3/4.9	
65				65-67'	
				6.3/4.9	
70				70-72'	
				7.3/4.3	
	CL	72 - 72.5' CLAY - gray, stiff			
	SM	72.5 - 76' SAND - fine, gray, silty			
75				75-77'	
	CL	76 - 77' CLAY - gray, stiff, pink staining		6.8/4.3	
	SM	77 - 84' FINE SAND - soft, silty, several (3) thick clay			
		layers less than 3 inches thick, gray, stiff, pink staining			
80				80-82'	
				4.4/4.4	
	CL	84 - 85' CLAY - gray, stiff, pink staining			
85	SM	85 - 87' FINE SAND, silty		85-87'	
				5.4/4.4	
		TOTAL DEPTH = 87 FEET BGS			
90					
95					
100					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	19 July 2000
BORING NUMBER:	PES-MW5S,D	BORING DIA.:	10-inch	DATE CMPL:	20 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.51 ft amsl
TEMPERATURE (°F):	90's °F	WEATHER:	Hot, sunny	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	BMH
COMMENTS:	TD=77'; Screened from 65'-75'; 45-55'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
1		0 - 1.5' CONCRETE			PID Sample Depth and
		1.5' - 2.0' COARSE SUBGRADE			Sample Readng/
	CL	2' - 7' CLAY - brown, mottled gray, stiff to firm,			Background Reading
		hard in parts, slightly moist to moist, silty, dense			
5				5-7'	
				6.7/6.7	
	CL	7 - 13' CLAY - gray, soft to firm, stiff in part,			
		moist to very moist, some silty stringers, some black			
		organic material			
10				10-12'	
				6.7/6.7	
	CL	13 - 17' CLAY - brown, mottled light gray, stiff to firm,			
		blocky, increasingly silty with some black oxidized grains			
15		or organic material, slightly moist to moist		15-17'	
				6.7/6.7	
	CL	17 - 22' CLAY - brown to dark brown, very moist, stiff,			
		silty in part			
20				20-22'	
				5.9/5.9	
	CL	22 - 27' CLAY - light to dark brown, gray, mottled,			
		stiff to very firm, moist, dense, silty in part			
25				25-27'	
				6.9/6.9	
	CL	27.- 32' CLAY - as above, becoming brown to reddish			
		brown, increasingly silty			
30				30-32'	
				6.7/6.7	
	CL/ML	32 - 37' SILTY CLAY - brown, firm to soft, stiff at top,			
		increasingly silty grading to clayey silt, moist			
35				35-37'	
				6.7/6.7	
	CL	37 - 42' SILTY CLAY - brown, mottled yellow and red,			
		stiff to very firm, dense			
40				40-42'	
				5.0/5.9	
	CL/ML	42 - 44' SILTY CLAY to CLAYEY SILT - as above,			
		becoming increasingly silty to sandy			
		44 - 50' CLAYEY SILT - sandy layers, stiff to firm,			
45		soft when sandy, very moist, mottled reddish brown		45-47'	
				5.0/6.7	
50					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

PARSONS ENGINEERING SCIENCE, INC.

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	19 July 2000
BORING NUMBER:	PES-MW5S,D	BORING DIA.:	10-inch	DATE CMPL:	20 July 2000
RIG TYPE:	Rotasonic ,	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.51 ft amsl
TEMPERATURE (°F):	90's °F	WEATHER:	Hot, sunny	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	BMH
COMMENTS:	TD=77'; Screened from 65'-75'; 45-55'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
51	ML/SM	50 - 52' SILTY SAND - clayey in part, loose, very fine		50-52'	PID Sample Depth and
		to fine grained, some clay material, wet		5.0/7.7	Sample Readng/
	SP/SM	52 - 57' SILTY SAND - brown to reddish brown, soft to			Background Reading
		loose, silty to fine grained, moderately sorted with some			
55		fine to medium grained layers, wet		55-57'	
				5.9/10.1	
	SM/CL	57 - 60' SILTY SAND - as above with 6-inch clay at 60',			
		gray, molted, moist, very stiff to hard			
60		60 - 62' SILTY SAND - as above with occasional thin		60-62'	
		2- to 3-inch clay lenses		21.8/5.0	
	SM/SP	62 - 67' SAND - silty, brown, mottled gray, very fine to			
		medium grained, moderately sorted, loose, micaceous			
		with some thin clay lenses			
65				65-67'	
				7.6/5.0	
	SW	67 - 68' GRAVELY SAND - gravel to 1-inch diameter			
	SM/SP	68 - 72' SAND - brown to gray, loose to soft, silty with			
		some clay matrix, micaceous, very fine to fine grained			
70				70-72'	
				9.2/5.0	
	SM	72 - 73' SILTY SAND - 6-inch layer of highly oxidized			
		reddish organic material, followed by thin gravel layer			
	SM/CL	SAND - gray, with a 6-inch clay layer at 75'			
75	CL	75 - 77' SAND - as above with clay 76-77'		75-77'	
				9.2/5.0	
		TOTAL DEPTH = 77 FEET BGS			
80					
85					
90					
95					
100					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	22 July 2000
BORING NUMBER:	PES-MW6S,D	BORING DIA.:	10-inch	DATE CMPL:	22 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.59 ft amsl
TEMPERATURE (°F):	High 80's °F	WEATHER:	Partly cloudy, breezy, hot	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	SLH/BMH
COMMENTS:	TD=87'; Screened from 75'-85'; 55-65'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
1		0 - 1.5' CONCRETE			PID Sample Depth and
		1.5 - 2.0' COARSE SUBSTRATE			Sample Readng/
	CL	2.0 - 5.0' CLAY - olive gray/brown, stiff, moist			Background Reading
5	CL	5 - 10' CLAY - red-brown, firm to hard, slightly moist,		5-7'	
		blocky		5.6/5.6	
10	OH	10 - 12' ORGANIC - black, slightly moist, some silt		10-12'	
				5.6/5.6	
	CL	12 - 15' CLAY - olive gray/gray, slightly moist			
15	CL/ML	15 - 20' CLAY - red brown, mottled gray, some organic		15-17'	
		clasts and iron staining, mostly dry, blocky, hard		4.9/4.9	
20	CL	20 - 22' CLAY - brown, mottled with gray, moist, soft		20-22'	
				4.9/4.2	
	CL	22 - 28' CLAY - gray, moist, soft			
25				25-27'	
				2.8/2.8	
	CL	28 - 36' CLAY - red, red brown, some gray mottling,			
		moist, soft			
30				30-32'	
				2.1/2.1	
35				35-37'	
	SM	36 - 37' FINE TO VERY FINE SAND - moist, some silt,		2.1/2.1	
		moderately sorted			
		37 - 40' CLAY - very stiff, tan to brown, mottled red,			
		almost dry			
40	CL	40 - 42' CLAY - brown/tan, mottled gray, some silt to		40-42'	
		very fine sand, moist, soft		4.9/4.2	
	SP	42 - 45' SAND - very fine silt and clay (some),			
		light brown/gray, poorly graded			
45	CL	45 - 46' CLAY - moist, soft, some silt		45-47'	
				7.0/4.2	
50					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	22 July 2000
BORING NUMBER:	PES-MW6S,D	BORING DIA.:	10-inch	DATE CMPL:	22 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.59 ft amsl
TEMPERATURE (°F):	High 80's °F	WEATHER:	Partly cloudy, breezy, hot	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	SLH/BMH
COMMENTS:	TD=87'; Screened from 75'-85'; 55-65'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
51	SW/SM	46 - 52' FINE TO VERY FINE SAND - well graded, some		50-52'	PID Sample Depth and
		silt, coarsens downward, tan/red brown		8.4/4.2	Sample Readng/
	SW	52 - 57' SAND - fine to coarse grained, coarsens			Background Reading
		downward, some gravel up to 1-inch diameter at bottom			
55				55-57'	
				11.9/4.2	
	SW/SC	57 - 60' SAND - fine to very fine grained, tan/light			
		brown, some gray clay, well graded			
60	CL/ML	60 - 62' SILTY CLAY - light brown, red, some gray clay		60-62'	
				15.4/3.5	
	SW	62 - 62.5' VERY FINE GRAINED SAND - black, well			
		graded			
	SW	62.5 - 67' SAND - fine to medium grained, well graded,			
65		tan/brown, stringers of gray clay		65-67'	
				11.2/3.5	
	SW	67 - 71' SAND - fine to coarse grained, some gravel up to			
		1 inch at 68', tan, brown			
70				70-72'	
	SW	71 - 77' SAND - fine to coarse stringers of clay, at 73-74'		7.0/4.3	
		clay with organic matter, manganese staining, black,		72-75'	
		well graded		5.6/4.3	
75					
	CH/CL	77 - 80' SAND - as above			
80	SP	80 - 80.5' CLAY - gray, stiff, hard, slightly moist		80-82'	
	SP	80.5 - 85' SAND - red, red brown, very fine to fine		2.8/2.8	
		grained, poorly graded, clean, wet			
85	CL	85 - 86.5' CLAY - stiff, wet, gray, mottled pink		85-87'	
	SW	86.5 - 87' SAND - very fine grained, gray, red, red/brown,		4.2/2.8	
		moderately sorting, iron staining			
		TOTAL DEPTH = 87 FEET BGS			
90					
95					
100					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	21 July 2000
BORING NUMBER:	PES-MW7S,D	BORING DIA.:	10-inch	DATE CMPL:	21 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.42 ft amsl
TEMPERATURE (°F):	90 °F	WEATHER:	Breezy, hot, humid	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	JBB/BMH/SLH
COMMENTS:	TD=77'; Screened from 65'-75'; 45-55'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
1		0 - 1.5' CONCRETE			PID Sample Depth and
	SP	1.5 - 6.5' SAND (Backfill)			Sample Readng/
					Background Reading
5			PES-MW7/ 5-7'	5-7'	
	CL	6.5 - 8.5' CLAY - silty, brown, firm	VOCs	2.9/2.9	
			& Moisture		
	CL	8.5 - 15' CLAY - silty, gray, friable, medium firm			
10				10-12'	
				3.9/3.9	
15	CL	15 - 17' CLAY - silty, brown, mottled gray		15-17'	
				3.9/3.9	
	CL	17 - 24' as above			
20				20-22'	
				3.4/3.4	
	CL	24 - 30' CLAY - silty, gray, medium stiff			
25				25-27'	
				4.4/4.4	
				5.4/4.9	
30	CL	30 - 37' CLAY - brown, increasingly silty		30-32'	
				4.9/4.9	
35				35-37'	
	CL	37 - 43' as above			
40				40-42'	
				4.9/3.4	
	ML	43 - 47' SILT - little clay, little very fine sand, brown			
45				45-47'	
				4.4/3.9	
	SP	47 - 55' SAND - fine, silty, soft			
50					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	21 July 2000
BORING NUMBER:	PES-MW7S,D	BORING DIA.:	10-inch	DATE CMPL:	21 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.42 ft amsl
TEMPERATURE (°F):	90 °F	WEATHER:	Breezy, hot, humid	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	JBB/BMH/SLH
COMMENTS:	TD=77'; Screened from 65'-75'; 45-55'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
51				50-52'	PID Sample Depth and
				6.7/4.9	Sample Readng/
					Background Reading
55	SP	55 - 57' SAND - medium to coarse with little gravel,	PES-MW7/	55-57'	
		soft, wet	55-57'	5.4/4.4	
		57 - 59 - as above	VOCs		
			& Moisture		
	SW	59 - 67' FINE SAND - with several (3) clay layers, firm,			
60		gray, less than or equal to 4 inches thick		60-62'	
				17.6/4.9	
65				65-67'	
				10.7/4.9	
	SM/SW	67 - 67.5' FINE SAND - some gravel, soft, wet			
	SW	67.5 - 73' FINE SAND - silty, little gravel, light brown			
70				70-72'	
				8.3/4.9	
	SW	73 - 74' as above but reddish in color			
75	SW	75 - 76' as above but brown		75-77'	
	SW	76 - 77' as above but light brown to gray in color		6.8/4.9	
		TOTAL DEPTH = 77 FEET BGS			
80					
85					
90					
95					
100					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	22 July 2000
BORING NUMBER:	PES-MW8S,D	BORING DIA.:	10-inch	DATE CMPL:	22 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.34 ft amsl
TEMPERATURE (°F):	80 °F	WEATHER:	Clear, breezy, warm	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	BMH
COMMENTS:	TD=87'; Screened from 75'-85'; 55-65'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
1		0 - 1.5' CONCRETE			PID Sample Depth and
		1.5 - 2' COARSE SUBSTRATE			Sample Readng/
	CL	2 - 5' CLAY - brown, mottled gray, dense, firm to			Background Reading
		very stiff, moist			
5		5 - 7' CLAY - as above, occasionally gray, soft, wet		5-7'	
		5 - 10' CLAY - gray to olive gray, soft to firm, blocky,		7.0/7.0	
		slightly moist to moist			
	CL	10 - 17' CLAY - brown to gray, mottled, silty in part,			
		firm to stiff, slightly moist to moist			
10				10-12'	
				7.0/7.0	
15				15-17'	
				7.0/7.0	
	CL	17 - 22' CLAY - gray and brown, mottled, occasionally			
		orangish-red layers, silty in part, soft to stiff, moist,			
		trace organic material			
20				20-22'	
				7.0/7.0	
	CL	22 - 27' CLAY - gray, moist to very moist, soft, dense			
25				25-27'	
				8.4/7.0	
		27 - 29' CLAY - as above			
	CL	29 - 33' CLAY - brown, mottled gray, stiff to firm,			
30		increasingly silty, moist		30-32'	
				7.0/7.0	
	CL	33 - 37' SILTY CLAY - mottled gray and brown, silty,			
		soft to stiff, moist, dense, some oxidized reddish brown			
35		layers		35-37'	
				7.0/7.0	
	CL/ML	37 - 42' SILTY CLAY - predominantly gray, mottled			
		brown with reddish brown oxidized stringers, very silty,			
		soft to stiff, very moist, grading to clayey silt			
40				40-42'	
				7.0/7.0	
	SM/ML	42 - 47' PREDOMINANTLY SILT - gray to reddish			
		brown, soft, clayey, grading to silt, fine to gravel sand			
		at 47'			
45				45-47'	
				7.0/7.0	
	SM/ML	47 - 50' SANDY SILT and SILTY SAND - brown to			
		reddish brown, soft, wet			
50					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	22 July 2000
BORING NUMBER:	PES-MW8S,D	BORING DIA.:	10-inch	DATE CMPL:	22 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.34 ft amsl
TEMPERATURE (°F):	80 °F	WEATHER:	Clear, breezy, warm	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	BMH
COMMENTS:	TD=87'; Screened from 75'-85'; 55-65'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
51	ML/SM	50 - 52' SANDY SILT - gray and brown, soft, wet, clayey		50-52'	PID Sample Depth and
	SW	52 - 53' GRAVELLY SAND - silty to fine grained with		6.3/6.3	Sample Readng/
		some gravel to 1/2 inch, poorly sorted, unconsolidated,			Background Reading
		loose, wet			
55	SM/SW	52 - 57' SILTY SAND - brown to reddish brown, silty to		55-57'	
		coarse grained, moderately sorted, loose to unconsolidated,	PES-MW8/	7.0/6.3	
		wet, occasional layers of gravel up to 1/2 inch	57-59'		
	SM/SW	57 - 62' SAND - brown to tan, very fine to fine grained	TOC		
		occasionally course grained, trace gravel, loose, wet,			
60		with occasional thin 2-3 inch clay layers		60-62'	
				7.7/5.6	
	SP/SM	62 - 72' SAND - brown becoming gray, very fine to fine			
		grained, occasionally medium to coarse grained, loose,			
		moderately to well sorted, with occasional 3-5 inch			
65		clay layers, silty inpart, micaeous		65-67'	
				7.7/5.6	
70				70-72'	
				9.8/5.6	
	SP/SW	72 - 77' SAND - gray, very fine to medium grained,			
		moderately sorted, loose, unconsolidated, some gravel			
		layers to 1 inch diameter, with 6 inch clay layers at 76'			
75		and 74', 78' - 6 inch clay layer, gray mottled maroon,	PES-MW8/	75-77'	
		very stiff to very firm	75-77'	14.7/5.6	
			TOC		
	SP/SM	78 - 83' SAND - light brown, occasionally mottled			
		orangish brown, micaceous, very fine to medium grained,			
80		moderately to well sorted, silty, loose, wet with 6 inch clay		80-82'	
		at 84', 4 inch at 83', 6 inch at 80', gray, mottled purple to		7.0/4.9	
		maroon, with trace black mineralized streaks, very stiff			
		to very firm, dense			
		83 - 87' SAND - fine to medium grained, moderately			
85		sorted, silty, loose, wet		85-87'	
				6.3/4.9	
		TOTAL DEPTH = 87 FEET BGS			
90					
95					
100					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

PARSONS ENGINEERING SCIENCE, INC.

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	19 July 2000
BORING NUMBER:	PES-INJ 1	BORING DIA.:	10-inch	DATE CMPL:	19 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.67 ft amsl
TEMPERATURE (°F):	90's °F	WEATHER:	Sunny, hot	DATUM:	Ground Surface
LOCATION:	NSA Mid-South	DRLG MED:	Water	GEOLOGIST:	BMH/JBB
COMMENTS:	TD=87'; Screened from 75'-85'; 55-65'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
1		0 - 1.5' CONCRETE			PID Sample Depth and
		1.5 - 2' COARSE SUBSTRATE			Sample Readng/
	CL	2 - 7' CLAY- brown to gray, stiff to firm, silty in part,			Background Reading
		mottled, slightly moist to moist		4-5'	
5				9.2/8.4	
	CL	7 - 10' CLAY - dark gray, blocky, firm to friable, dry to			
		slightly moist, silty			
				9-11'	
10	CL	10 - 17' CLAY- brown, mottled gray, very silty, slightly		15.4/8.1	
		moist to moist, stiff to firm, becoming all gray at 17'			
15				15-16'	
				6.7/6.7	
	CL	17 - 22' CLAY - brown, mottled gray, moist, firm to			
		very stiff, silty in part			
20					
	CL	22 - 27' CLAY- brown to dark brown, silty, stiff, firm,			
		moist			
25				25-27'	
				7.6/7.6	
	CL/ML	27 - 32' CLAY - as above, becoming very silty			
30				30-32'	
				6.7/6.7	
	CL/SM	32 - 37' CLAY SILT TO SILTY CLAY - brown, orange-			
		brown, soft to firm, very silty, very moist to wet,			
		becoming unconsolidated			
35			35-37'	35-37'	
			VOCs	6.7/5.9	
	CL	37 - 41' CLAY - reddish brown to brown, stiff to firm,	1015		
		moist			
40					
	CL/ML	41 - 46' SILTY CLAY - brown to orangish brown, stiff			
		to friable, becoming increasingly silty with silt at base			
45				45-47'	
	ML/SM	46 - 51' SILTY SAND - soft, loose, very fine grained,		10.1/8.4	
		wet, reddish brown			
50					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	19 July 2000
BORING NUMBER:	PES-INJ 1	BORING DIA.:	10-inch	DATE CMPL:	19 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.67 ft amsl
TEMPERATURE (°F):	90's °F	WEATHER:	Sunny, hot	DATUM:	Ground Surface
LOCATION:	NSA Mid-South	DRLG MED:	Water	GEOLOGIST:	TSMH/JBB
COMMENTS:	TD=87'; Screened from 75'-85'; 55-65'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
51	SM/SP	51 - 54' SILTY SAND - reddish brown, loose, some clay			PID Sample Depth and
		matrix, occasional 3 to 5 inch clay lenses becoming fine			Sample Readng/
		to medium grained			Background Reading
	SW	54 - 57' SAND - silty to gravel, moist, medium grained			
55		with gravel to 1/2 inch, poorly to moderately sorted, wet		55-57'	
				18.5/6.7	
	SW	57 - 61' GRAVELLY SAND - brown, fine to coarse			
		grained, with gravel to 1/2 inch, poorly sorted, loose, wet			
				59-61'	
60			60-62'	29.4/6.7	
	SM/SP	61 - 66' SAND - silty to clayey, very fine to fine grained,	VOCs		
		moderately sorted, wet, grayish brown to reddish brown	1114		
		with clay lenses 2 to 6 inches thick, gray mottled, very			
		stiff to firm, moist			
65					
	SW	66 - 67' GRAVELLY SAND - gray to dark brown, very			
	SM/SP	fine grained to gravel up to 1 inch, poorly sorted, loose,		67-69'	
		some possible dark brown mineral staining		9.2/6.7	
	CL	67 - 77' SAND - brown to reddish brown, loose, very fine			
70	SM/SP	to fine grained, silty with gray clay lenses to 6 inches			
75				75-77'	
				9.2/6.7	
	SM/SP	77 - 80' SAND - brown to reddish brown, loose, very fine			
		to fine grained, silty to clayey, mottled with 3 to 5 inch			
		clay lenses			
80	CL	80 - 84' SAND - silty, very fine to fine grained, with		80-82'	
	SM/SP	some fine to medium grained lenses, loose, mottled with		6.7/5.9	
		3 to 4 inch clay lenses (2-7 inches)			
	SP	84 - 87' SAND - brown, very fine to medium grained,			
85	CL	silty, loose, moderately to well sorted, wet, 3 to 4 inch		85-87'	
	SP	clay lenses approx. 86'		6.7/6.7	
		TOTAL DEPTH = 87 FEET BGS			
90					
95					
100					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

PARSONS ENGINEERING SCIENCE, INC.

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	20 July 2000
BORING NUMBER:	PES-INJ 2	BORING DIA.:	10-inch	DATE CMPL:	21 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.50 ft amsl
TEMPERATURE (°F):	90's °F	WEATHER:	Clear, breezy, hot	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	JBB/BMH
COMMENTS:	TD=77'; Screened from 65'-75'; 45-55'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
1		0 - 1.5' CONCRETE			PID Sample Depth and
	CL	1.5 - 5.5' CLAY- stiff, brown, mottled gray, some roots			Sample Readng/
					Background Reading
5	CL	5.5 - 7.5' CLAY - some silty, firm, brown, mottled gray		5-7'	
				1.4/1.4	
	CL	7.5 - 11.5' CLAY - silty, gray, stiff, damp, gray/light			
		brown			
10				10-12'	
	CL	11.5 - 17' CLAY - brown, silty, damp, stiff		1.4/1.4	
15				15-17'	
				1.8/1.4	
	CL	17 - 24' CLAY- brown, silty, damp, stiff			
20				20-22'	
				1.4/1.4	
	CL	24 - 25' CLAY - gray, silty, stiff, damp			
25	CL	25 - 27' CLAY - brown, silty, stiff		25-27'	
				1.8/1.4	
	CL	27 - 32' CLAY - brown, silty, stiff			
30				30-32'	
				1.4/1.4	
	CL	32 - 37' SILTY CLAY - stiff, moist, increasing in silt			
		content			
35				35-37'	
				1.4/1.4	
	CL	37 - 39' CLAY - brown, moist, stiff			
	CL	39 - 40' CLAY - brown, with pink staining			
40	CL	40 - 42' as above		40-42'	
				1.8/1.4	
	SM	42 - 47' SAND - fine with some silt, thin gray clay layer			
		1/4 inch thick at 44'			
45				45-47'	
				3.2/1.4	
	SM	47 - 54' FINE SAND - silty, brown, wet to moist			
50					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	20 July 2000
BORING NUMBER:	PES-INJ 2	BORING DIA.:	10-inch	DATE CMPL:	21 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.50 ft amsl
TEMPERATURE (°F):	90's °F	WEATHER:	Clear, breezy, hot	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	JBB/BMH
COMMENTS:	TD=77'; Screened from 65'-75'; 45-55'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
51				50-52'	PID Sample Depth and
				6.0/1.4	Sample Readng/
					Background Reading
	SM/SW	54 - 57' MEDIUM SAND - with little gravel, little silt,			
55		soft, brown, wet		55-57'	
				4.6/1.4	
	SP	57 - 59' MEDIUM SAND - some gravel, little silt			
	SM/CL	59 - 62' FINE SAND - with clay (4) layers, 1 to 3 inches			
60		thick, reddish brown		60-62'	
				9.2/1.4	
	SM/SP	62 - 67' FINE SAND - brown, silty, clay layer 1 inch			
		thick at 66'			
65				65-67'	
				3.2/1.4	
	SP/SW	67 - 68' FINE TO MEDIUM SAND - little gravel			
		68 - 70' FINE SAND - silty, soft			
70	SP/SM	70 - 72' FINE SAND - silty with little gravel		70-72'	
				2.3/1.4	
	CL	72 - 72.5' CLAY - gray with pink staining			
	SM/SP	72.5 - 74' FINE SAND - silty			
	SL	74 - 74.3' CLAY - gray, stiff, silty			
75	SM	74.3 - 76' FINE SAND - reddish brown, silty		75-77'	
	CL	76 - 77' CLAY - gray, stiff, silty, with sand		4.6/1.4	
		TOTAL DEPTH = 77 FEET BGS			
80					
85					
90					
95					
100					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	23 July 2000
BORING NUMBER:	PES-INJ 3	BORING DIA.:	10-inch	DATE CMPL:	23 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.46 ft amsl
TEMPERATURE (°F):	90's °F	WEATHER:	Breezy, sunny, hot	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	JBB/SLH
COMMENTS:	TD=87'; Screened from 75'-85'; 55-65'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
1		0 - 1.5' CONCRETE			PID Sample Depth and
		1.5 - 2' SAND - backfill			Sample Readng/
	CL/ML	2 - 8' CLAY - silt, red/brown, hard, firm, blocky, traces			Background Reading
		of very hard gray clay, roots, trace dark organic matter			
5				5-7'	
				9.8/6.3	
	CL	8 - 10' CLAY - black, gray, olive green, dry, firm, blocky			
10	CL/ML	10 - 17' SILTY CLAY - light brown, red brown, traces		10-12'	
		of gray clay, dry, firm		5.6/5.6	
15				15-17'	
				5.6/5.6	
	CL	17 - 27' CLAY - some silt, moist, soft, gray/brown,			
		mottled with organic staining (black)			
20				20-22'	
				5.6/5.6	
25				25-27'	
				5.6/5.6	
	CL/ML	27 - 34' SILTY CLAY - red, red brown, some very fine			
		grained sand, dry, iron staining			
30				30-32'	
				5.6/5.6	
	CL/CH	34 - 37' CLAY - very hard, dry, red, red brown,			
35		mottled red		35-37'	
				5.6/5.6	
		37 - 40' as above			
40	ML/SM	40 - 44' SILTY SANDY CLAY - gray, moist, soft,		40-42'	
		mottled red throughout		4.9/4.9	
	SM/SP	44 - 50' SAND - silty, red, poorly graded			
45				45-47'	
				4.9/4.9	
50					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million; volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	23 July 2000
BORING NUMBER:	PES-INJ 3	BORING DIA.:	10-inch	DATE CMPL:	23 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.46 ft amsl
TEMPERATURE (°F):	90's °F	WEATHER:	Breezy, sunny, hot	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	JBB/SLH
COMMENTS:	TD=87'; Screened from 75'-85'; 55-65'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
51	SW	50 - 57' SAND - some silt, gray, tan, well graded, some		50-52'	PID Sample Depth and
		gray clay layer interfinger, 55-57' gravel and sand		25.9/4.9	Sample Readng/
		up to 1 inch			Background Reading
55				55-57'	
				30.8/4.9	
	SW	57 - 60' as above, gravel up to 1-inch diameter			
60	SP/SM	60 - 67' SAND with silt stringers of clay throughout,		60-62'	
		tan, gray, black color 61-61.5, poorly sorted,		11.2/4.9	
		sand, very fine to fine grained			
65				65-67'	
				6.3/4.9	
	SW	67 - 69' SAND with gravel up to 1 inch in diameter, tan,			
		sand, fine to medium grained, some silt, well graded			
		69 - 74' SAND - silty, tan, light brown, very fine to fine			
70		grained, gray clay stringers throughout		70-72'	
				4.9/4.9	
	CL/ML	74 - 75' CLAY LAYER - gray, mottled pink, silty,			
75		mosit, soft		75-77'	
	SM/SW	75 - 75.5' SAND with silt and clay, large pieces of gravel		7.7/4.9	
		up to 3-inches diameter, dark red, well graded			
		75.5 - 77' CLAY - gray, mottled pink, moist, soft			
	SM/SW	77 - 87' SAND - fine to very fine grained, silty, gray,			
80		light brown, poorly sorted		80-82'	
				4.2/4.2	
	SM/CL	80 - 85' SAND - as above with gray clay layers			
85	SM/SW	85 - 87' SAND - silty with some gravel, gray clay		85-87'	
	CL	layer at 86 - 86.5'		4.2/4.2	
		TOTAL DEPTH = 87 FEET BGS			
40					
45					
50					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	23 July 2000
BORING NUMBER:	PES-INJ 4	BORING DIA.:	10-inch	DATE CMPL:	23 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.70 ft amsl
TEMPERATURE (°F):	80's °F	WEATHER:	Cloudy, cool	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	SLH
COMMENTS:	TD=77'; Screened from 65'-75'; 45-55'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
1		0 - 1.5' CONCRETE			PID Sample Depth and
		1.5 - 2' SUBSTRATE - coarse gravel			Sample Readng/
	CL	2 - 8' CLAY - red/brown/tan, stiff, dry, hard , blocky			Background Reading
5				5-7'	
				10.4/7.7	
	CL	8 - 12' CLAY - gray green, hard, slightly moist			
10				10-12'	
				16.8/10.5	
	Cl	12 - 17' CLAY - red brown, black organic traces, slightly			
		moist, mottled gray			
15				15-17'	
				19.6/7.5	
	CL	17 - 27' CLAY - gray/black, moist, soft, pliable			
20				20-22'	
				7.7/7.5	
25				25-27'	
				7.0/7.0	
	CL/ML	27 - 31' CLAY - gray/brown, soft, moist, some clasts			
		of hard clay up to 1 inch, some silt			
30				30-32'	
	CL/ML	31 - 37' CLAY - light brown, hard, moist, mottled		7.0/7.0	
		gray/white, some silt			
35				35-37'	
				7.0/7.0	
	CL/ML	37 - 41' as above, more red mottling			
40				40-42'	
	SP	41 - 47' SAND - clean, fine to medium grained, poorly		7.0/7.0	
		graded, red, gray			
45				45-47'	
				7.0/7.0	
	SM	47 - 52' SAND - silt, very fine to medium grained, tan,			
		light brown			
50					

NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

GEOLOGIC BORING LOG

JOB NUMBER:	737490	CLIENT:	NAVFAC/NSA Mid-South	DATE SPUD:	23 July 2000
BORING NUMBER:	PES-INJ 4	BORING DIA.:	10-inch	DATE CMPL:	23 July 2000
RIG TYPE:	Rotasonic	CONTRACTOR:	Alliance Environmental	ELEVATION:	293.70 ft amsl
TEMPERATURE (°F):	80's °F	WEATHER:	Cloudy, cool	DATUM:	Ground Surface
LOCATION:	Site N-6	DRLG MED:	Water	GEOLOGIST:	SLH
COMMENTS:	TD=77'; Screened from 65'-75'; 45-55'				

Depth (feet bgs)	USCS	Geologic Description	Laboratory Sample Identification	PID ppmv	Remarks
51	SM/SW	52 - 57' SAND - lots of silt and clay, medium grained,		50-52'	PID Sample Depth and
		gray, with iron oxide stain, gray clay stringers throughout,		14.0/7.0	Sample Readng/
		well graded, 55-55.5' clay, moist, soft, very compact			Background Reading
55				55-57'	
				12.6/5.0	
	SM/SW	57 - 67' as above, 57-58' clay layer, 60-60.5' clay			
60				60-62'	
				6.3/6.3	
65				65-67'	
				6.3/6.3	
	SW	67 - 70' SAND - very fine to medium grained, lots of			
		gravel up to 1 inch, light brown, moist, well graded			
70	SM	70 - 72' SAND - silt, very fine to fine grained, tan to		70-72'	
		red, iron oxide staining		5.6/5.6	
	SM/SP	72 - 73' SAND - gray/black, medium grained, silty,			
		poorly graded			
		73 - 76' CLAY - sandy, silty, gray, iron stained, mottled			
75		white and black, moist, firm		75-77'	
	SM	76 - 77' SAND - silty, flecks of mica, white/gray		4.9/4.9	
		TOTAL DEPTH = 77 FEET BGS			
80					
85					
90					
95					
100					

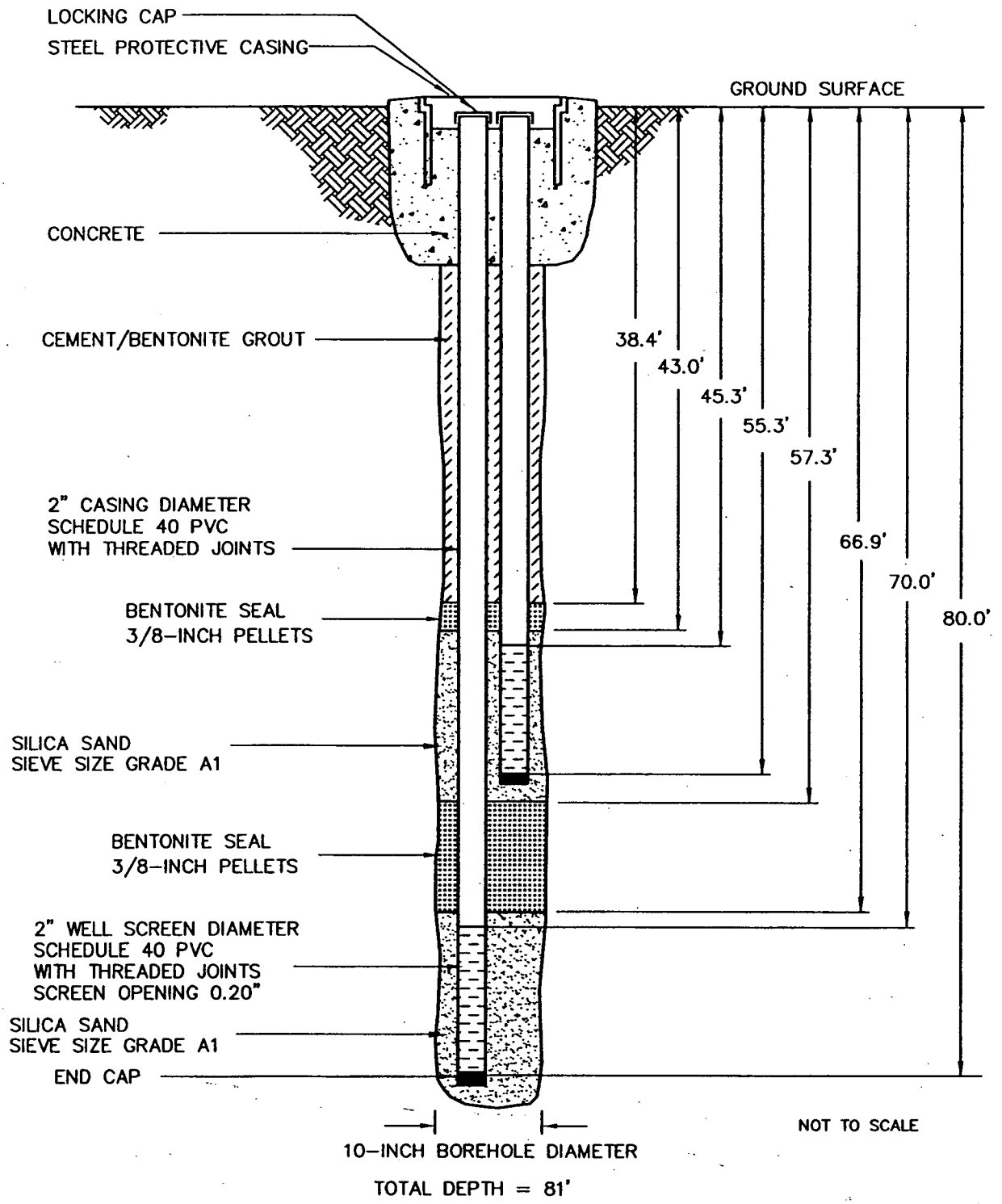
NOTES:

ft bgs - feet below ground surface
NS - not sampled
PID - photoionization detector
ppmv - parts per million, volume per volume
TOC - total organic carbon
VOC - volatile organic compounds
ft amsl - feet above mean sea level

PARSONS ENGINEERING SCIENCE, INC.

APPENDIX B.2

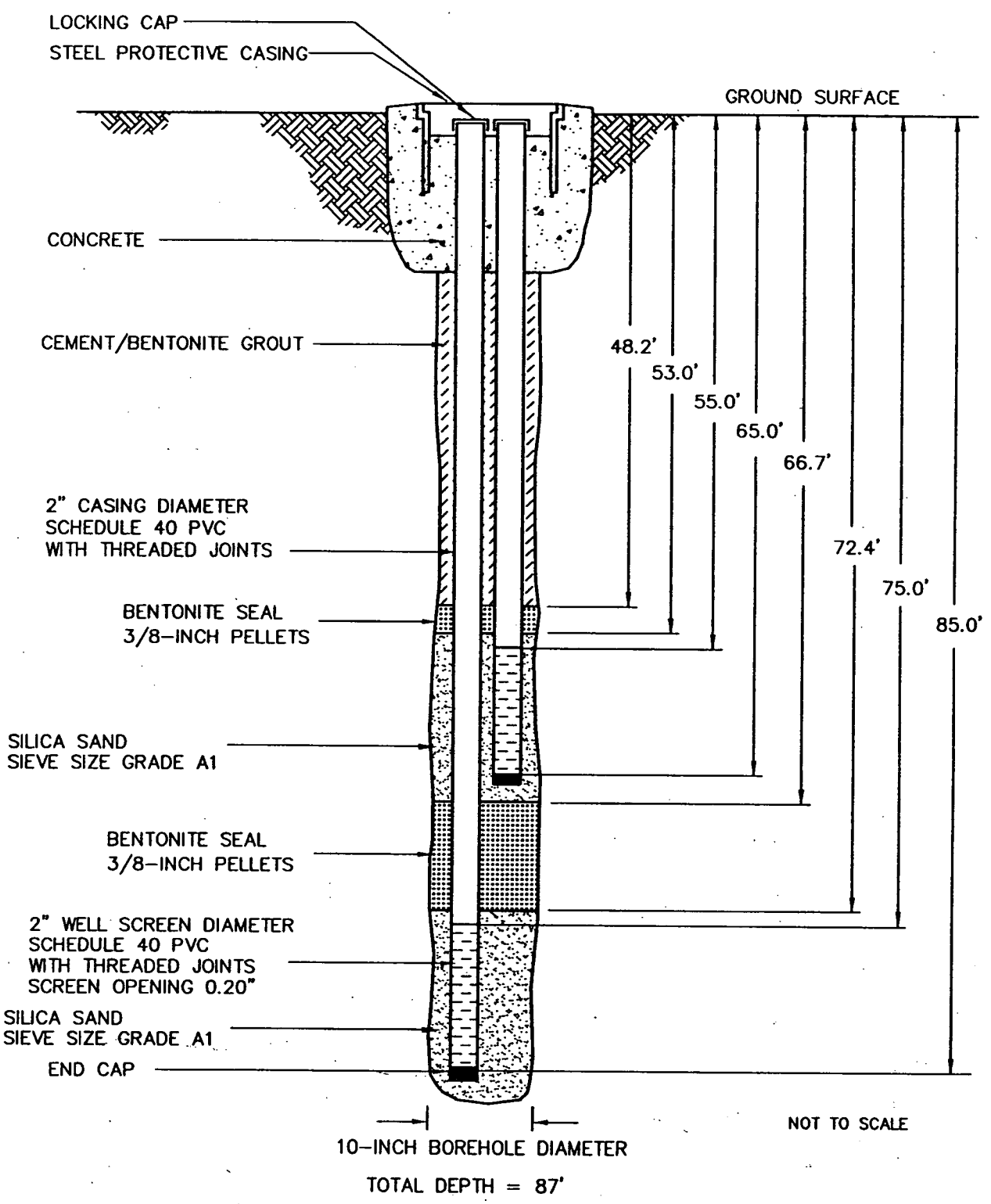
WELL CONSTRUCTION DIAGRAMS



WELL CONSTRUCTION DIAGRAM – WELL NO. PES-MW1S,D
NAVAL SUPPORT ACTIVITY MID-SOUTH
MILLINGTON, TENNESSEE

DATE: 18 JULY 2000 GEOLOGIST: BMH/JBB

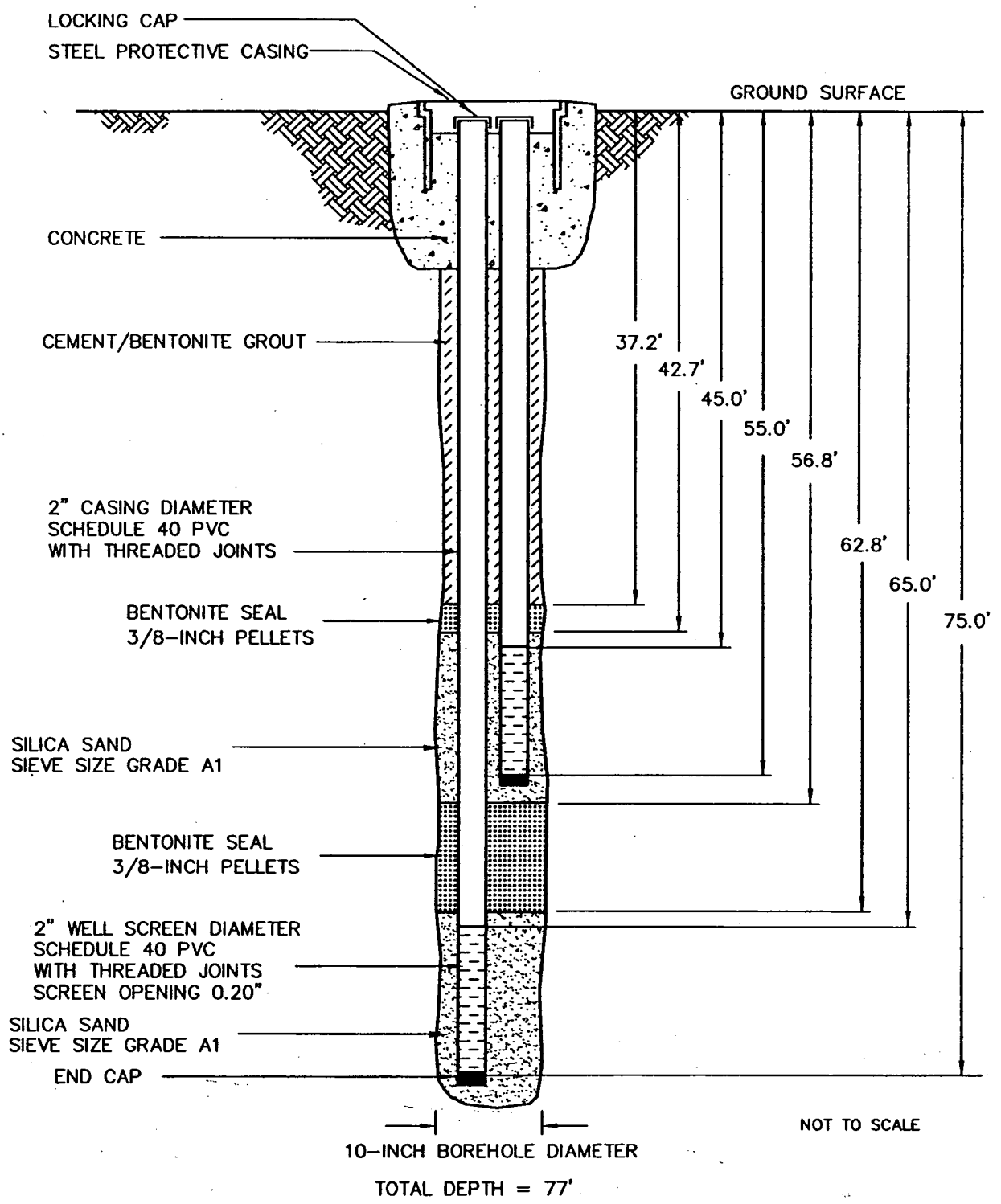
S:\ES\REMED\737490\05000\APPENDICES\WELL-LOGS\DIAG1.DWG



WELL CONSTRUCTION DIAGRAM – WELL NO. PES-MW2S,D
NAVAL SUPPORT ACTIVITY MID-SOUTH
MILLINGTON, TENNESSEE

DATE: 01 AUGUST 2000 GEOLOGIST: JBB/SLH

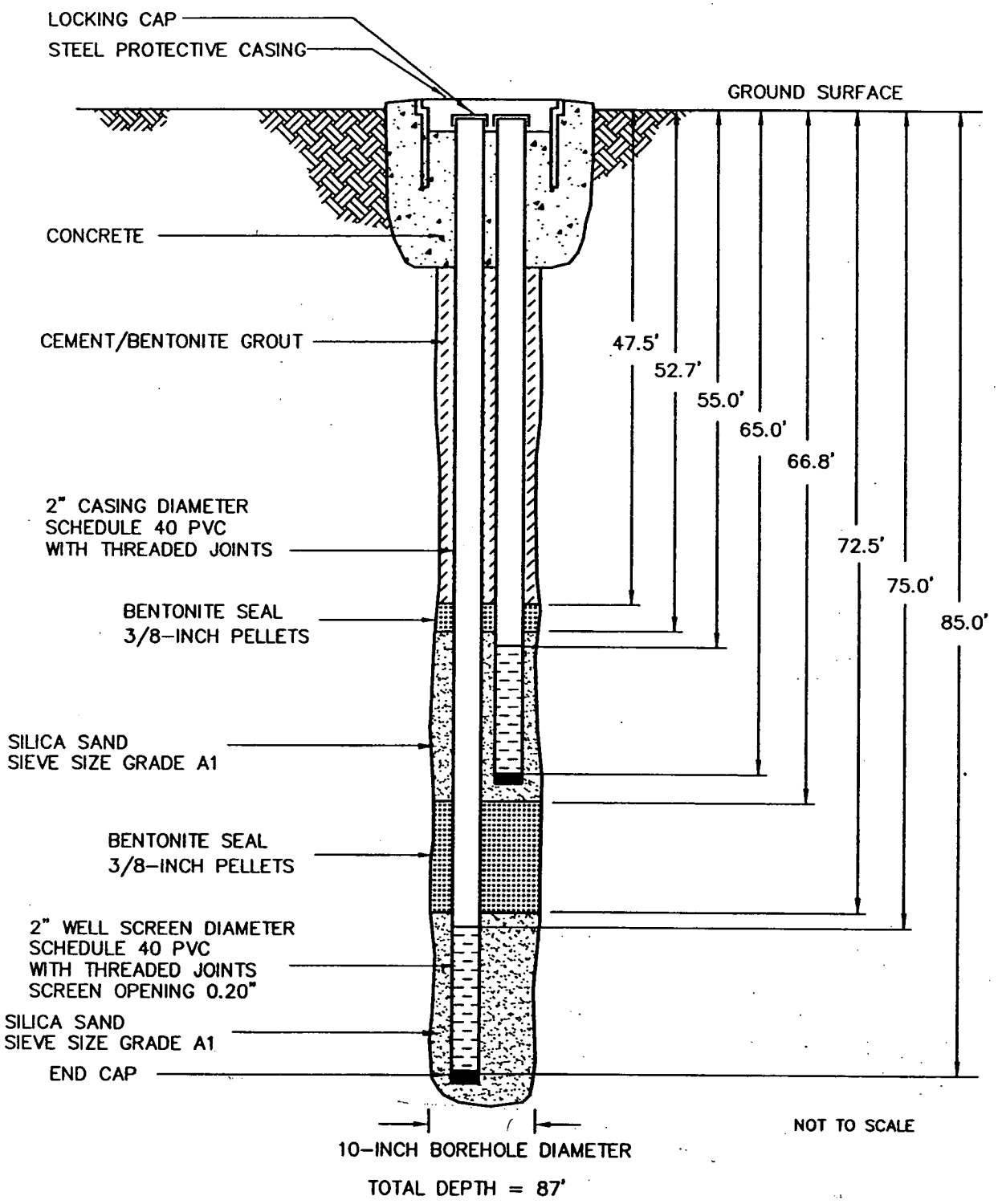
S:\ES\REMED\737490\05000\APPENDICES\WELL-LOGS\DIAG1.DWG



WELL CONSTRUCTION DIAGRAM – WELL NO. PES-MW3S,D
NAVAL SUPPORT ACTIVITY MID-SOUTH
MILLINGTON, TENNESSEE

DATE: 24 JULY 2000 GEOLOGIST: JBB/SLH

S:\ES\REMED\737490\05000\APPENDICES\WELL-LOGS\DIAG1.DWG



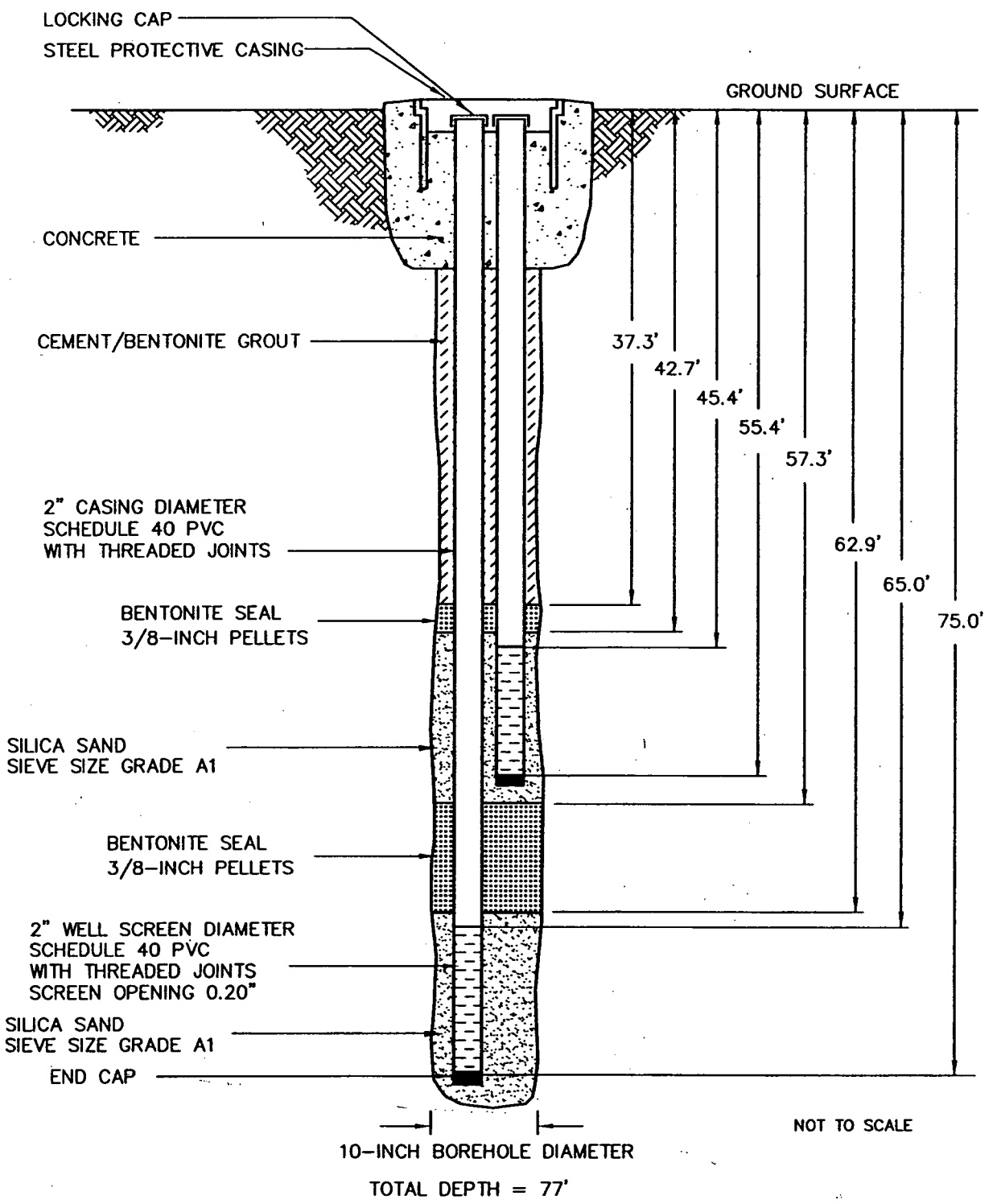
WELL CONSTRUCTION DIAGRAM – WELL NO. PES-MW4S,D

NAVAL SUPPORT ACTIVITY MID-SOUTH
MILLINGTON, TENNESSEE

DATE: 21 JULY 2000

GEOLOGIST: BMH/JBB

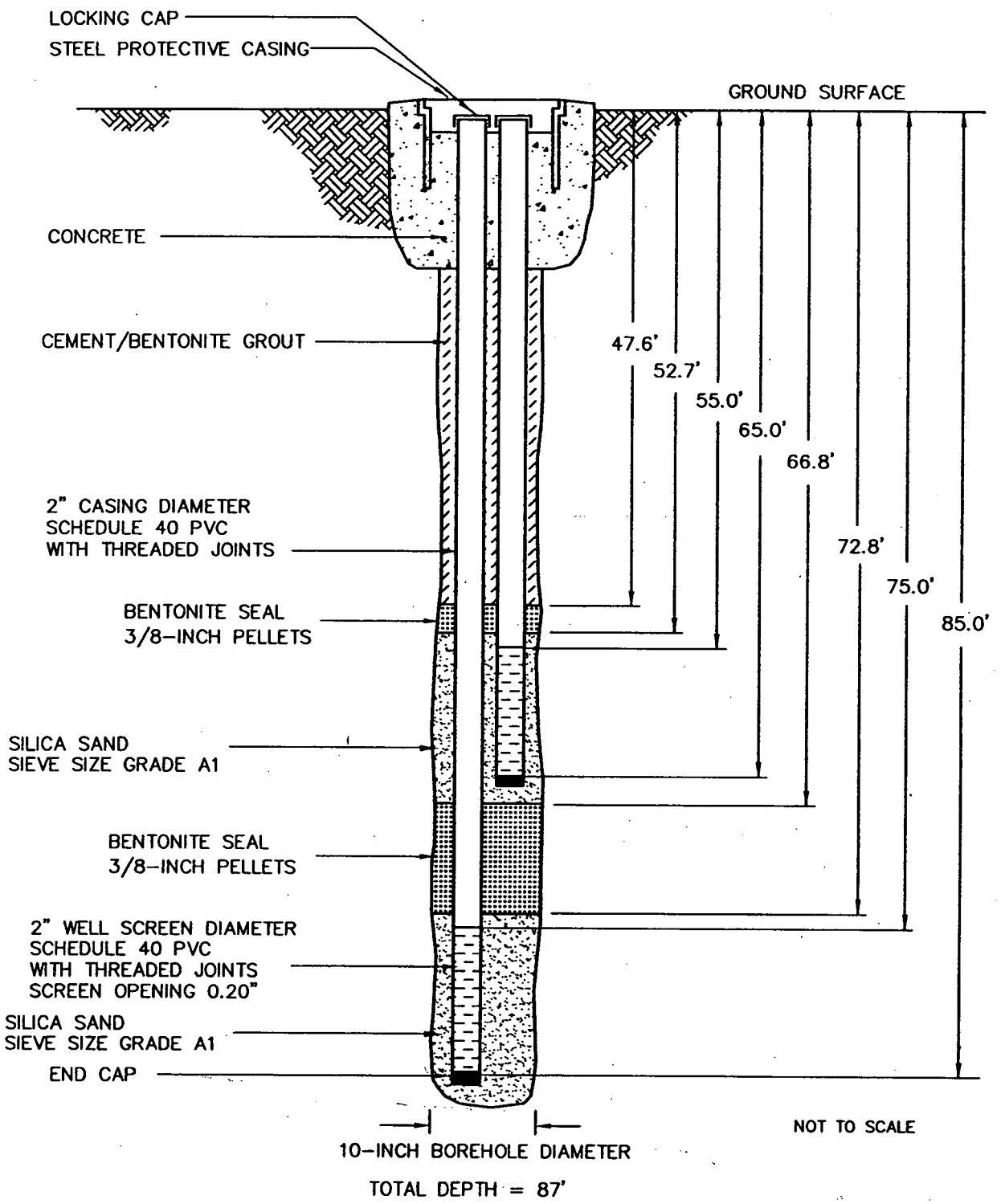
S:\ES\REMED\737490\05000\APPENDICES\WELL-LOGS\DIAG1.DWG



WELL CONSTRUCTION DIAGRAM – WELL NO. PES-MW5S,D
NAVAL SUPPORT ACTIVITY MID-SOUTH
MILLINGTON, TENNESSEE

DATE: 20 JULY 2000 GEOLOGIST: BMH/JBB

S:\ES\REMED\737490\05000\APPENDICES\WELL-LOGS\DIAG1.DWG



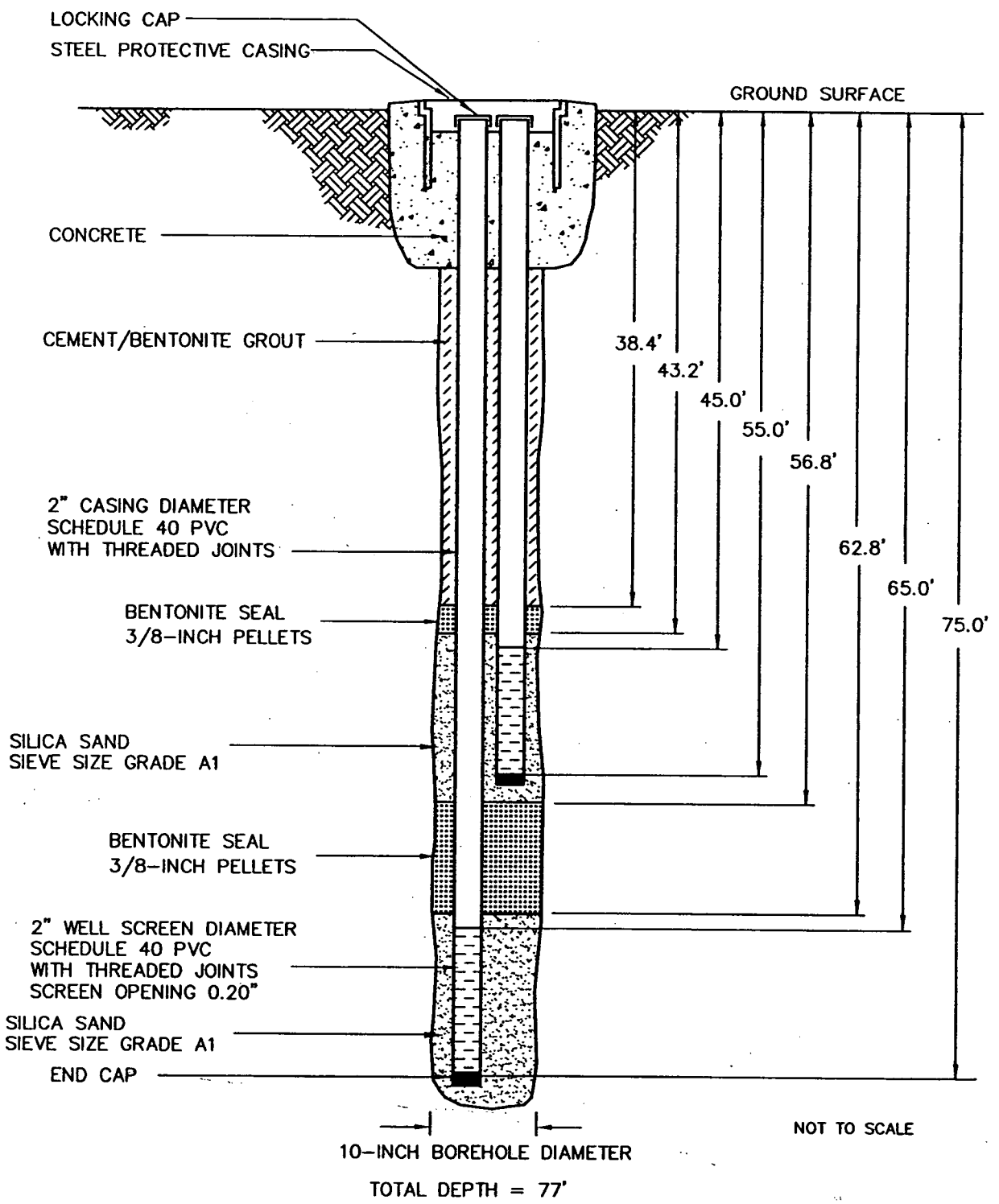
WELL CONSTRUCTION DIAGRAM – WELL NO. PES-MW6S,D

NAVAL SUPPORT ACTIVITY MID-SOUTH
MILLINGTON, TENNESSEE

DATE: 22 JULY 2000

GEOLOGIST: BMH/JBB

S:\ES\REMED\737490\05000\APPENDICES\WELL-LOGS\DIAG1.DWG

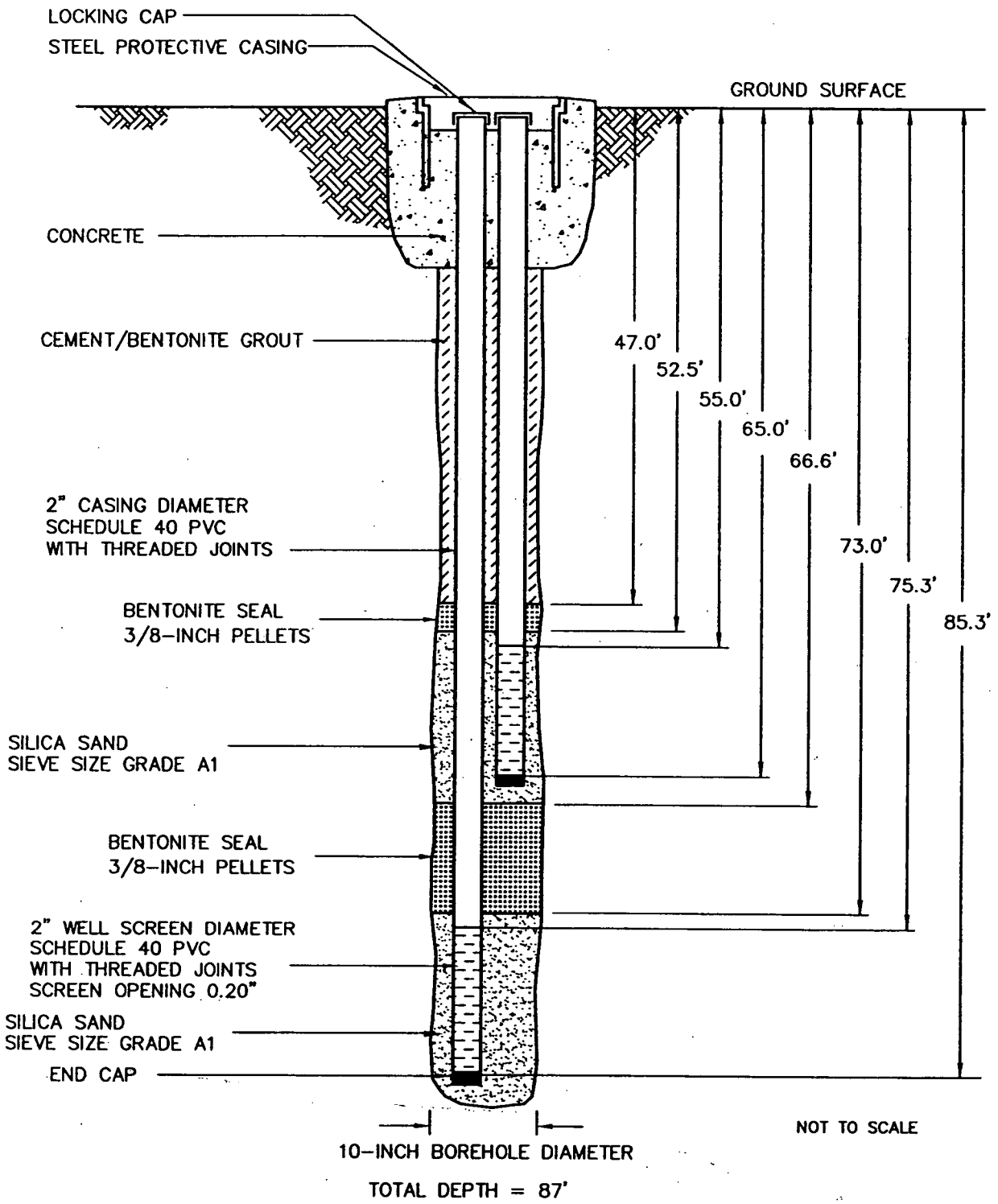


WELL CONSTRUCTION DIAGRAM – WELL NO. PES-MW7S,D
NAVAL SUPPORT ACTIVITY MID-SOUTH
MILLINGTON, TENNESSEE

DATE: 21 JULY 2000

GEOLOGIST: BMH/JBB

S:\ES\REMED\737490\05000\APPENDICES\WELL-LOGS\DIAG1.DWG

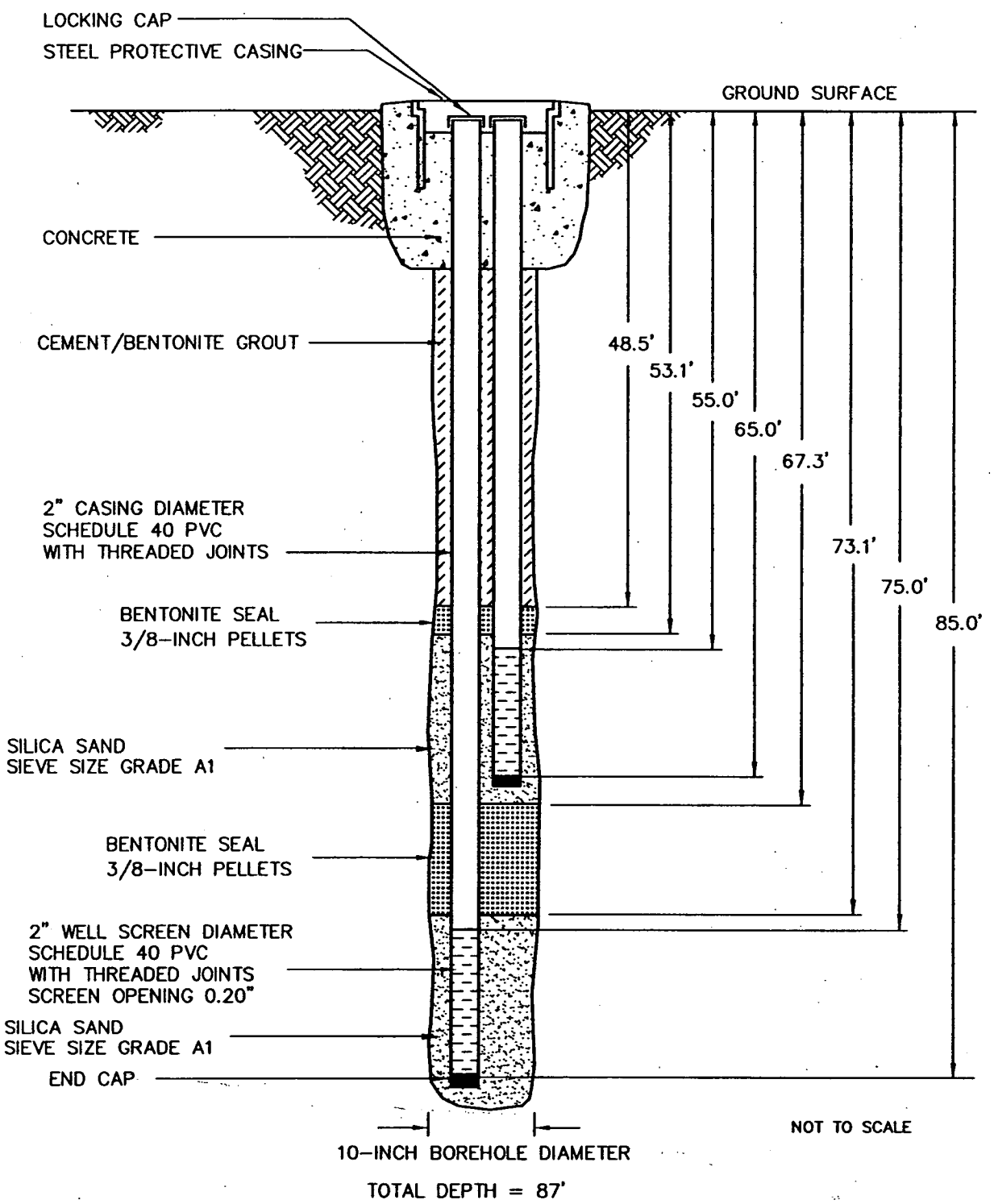


WELL CONSTRUCTION DIAGRAM – WELL NO. PES-MW8S,D
NAVAL SUPPORT ACTIVITY MID-SOUTH
MILLINGTON, TENNESSEE

DATE: 22 JULY 2000

GEOLOGIST: BMH/JBB

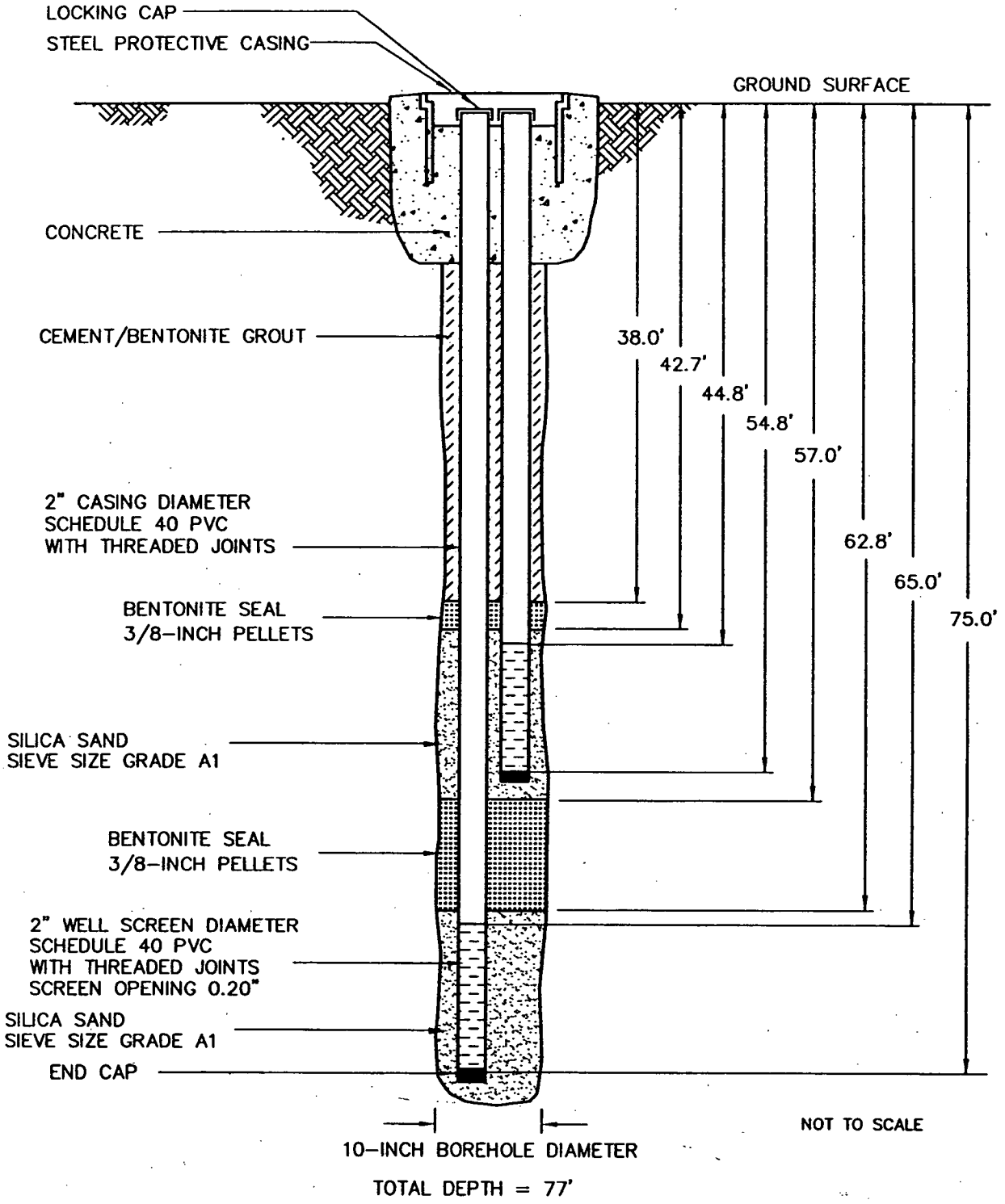
S:\ES\REMED\737490\05000\APPENDICES\WELL-LOGS\DIAG1.DWG



WELL CONSTRUCTION DIAGRAM – WELL NO. PES-INJ1S,D
NAVAL SUPPORT ACTIVITY MID-SOUTH
MILLINGTON, TENNESSEE

DATE: 19 JULY 2000 GEOLOGIST: BMH/JBB

S:\ES\REMED\737490\05000\APPENDICES\WELL-LOGS\DIAG1.DWG



WELL CONSTRUCTION DIAGRAM – WELL NO. PES-INJ2S,D

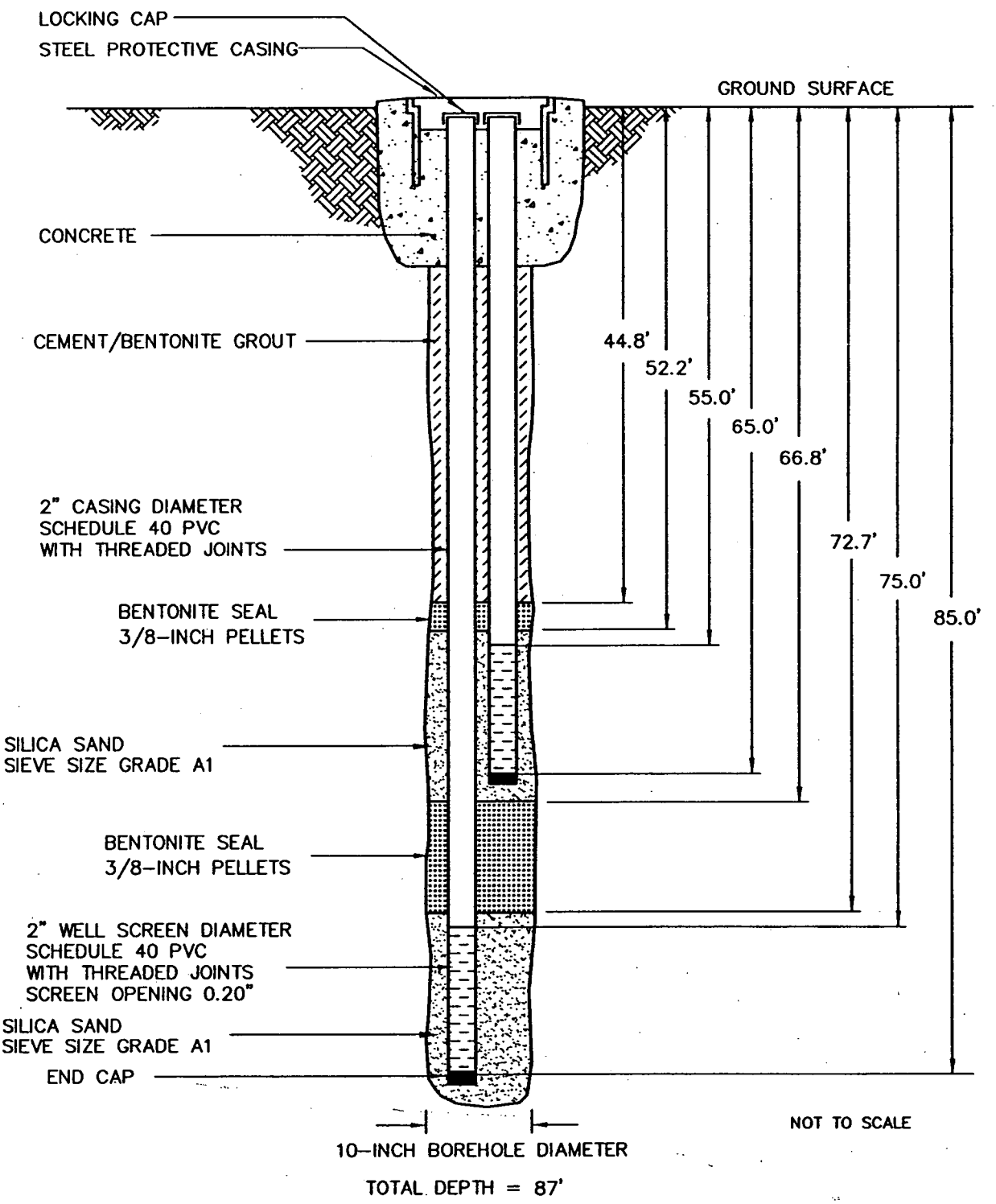
NAVAL SUPPORT ACTIVITY MID-SOUTH

MILLINGTON, TENNESSEE

DATE: 20 JULY 2000

GEOLOGIST: BMH/JBB

S:\ES\REMED\737490\05000\APPENDICES\WELL-LOGS\DIAG1.DWG

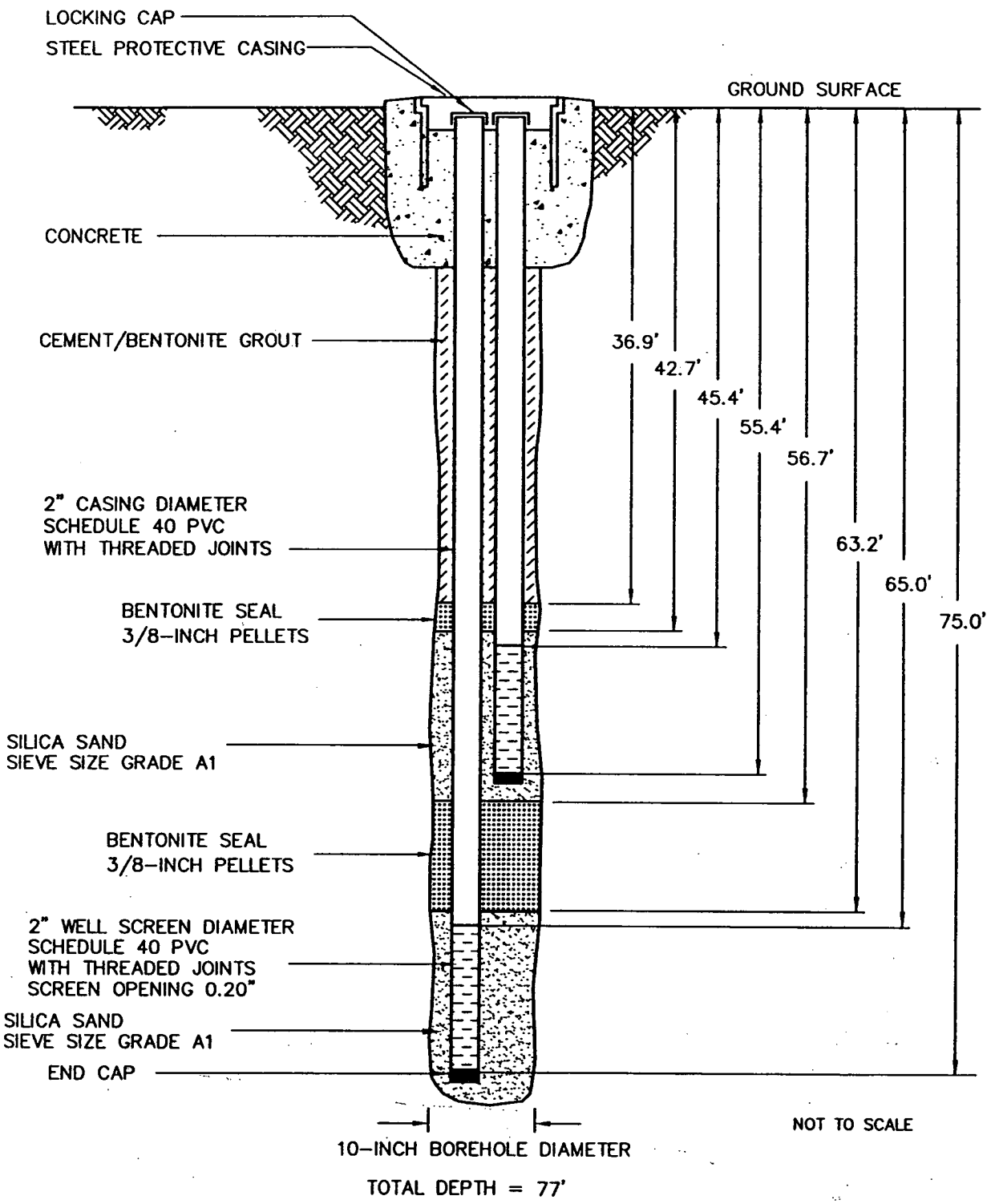


WELL CONSTRUCTION DIAGRAM – WELL NO. PES-INJ3S,D
NAVAL SUPPORT ACTIVITY MID-SOUTH
MILLINGTON, TENNESSEE

DATE: 23 JULY 2000

GEOLOGIST: BMH/JBB

S:\ES\REMED\737490\05000\APPENDICES\WELL-LOGS\DIAG1.DWG



WELL CONSTRUCTION DIAGRAM – WELL NO. PES-INJ4S,D
NAVAL SUPPORT ACTIVITY MID-SOUTH
MILLINGTON, TENNESSEE

DATE: 23 JULY 2000 GEOLOGIST: BMH/JBB

S:\ES\REMED\737490\05000\APPENDICES\WELL-LOGS\DIAG1.DWG

APPENDIX B.3

GROUNDWATER SAMPLING PLANS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-MW15

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA — BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 55.57 — Water Column (TD-WL): 16.4'

Static Water Level (WL): 39.19 ft bTOC — Casing Diameter: 2"

Casing Volume: 2.67 gallons — CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA — CV/BV

Purge Date: 7/25/00

Time	Casing No./ Bailer No./ Gallons	Temp. °C	pH	Electrical Conductivity mS/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	~~Odor~~	Visual Appearance
1236	1 gal	30.1	6.89	312.3	4.36	177		Sl cloudy.
1242	2	30.9	6.84	276	3.95	178.2		
1247	2.5	31.7	6.83	259.6	3.86	127.9		
1252	3	32.7	6.83	252.0	3.79	176.2		
1305	4	32.5	6.83	250.7	3.40	148.2		

Total Volume Removed: 4+ (gallons) 2 (casing volumes)

Weather: 90° Humid, Slight Breeze.

Date Sampled: 7/25/00 Time Sampled: 1330

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: VOCs - SW8260B; Nitrate + Nitrite E 300.1; Methane, ethane, ethene.

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	~~0.0~~ <0.1 mg/L	no color.
Manganese:	3.3 mg/L ;	8034 Violet color.
Sulfate:	4 mg/L	sl Turbid; Sample was filtered. Meth 8051.
Hydrogen Sulfide:	0.16 mg/L	no color observed,
Alkalinity:	112 mg/L	279 x 0.4 ; 40-160 mg/L Test.
Chloride:	8 mg/L below Range	49 x 4 10-40 mg/L test
Carbon Dioxide:	49 mg/L	24520.2 20-100 mg/L Range test. , 3636 N cart.
Other:		

Sampled By: JBD/SLH

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-MW1D

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 79.8' Water Column (TD-WL): 40.3
Static Water Level (WL): 39.50' Casing Diameter: 2"

Casing Volume: 6.6 gal CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA CV/BV

Purge Date: 8/6/00

Time	Casing No./ Bailer No./ (Gallons)	Temp. °C	pH	Electrical Conductivity us/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Odor	Visual Appearance
1152	5	24.7	6.79	180	0.38	-220		Clear.
1202	10	24.2	6.70	179	0.25	-250		"
1207	15	24.4	6.71	180	0.24	-259		"
1212	20	24.4	6.72	179	0.26	-266		"

Total Volume Removed: 20 (gallons) 3 (casing volumes)

Weather: 95° Clear. Humid, breezy.

Date Sampled: 8/6/00 Time Sampled: 1215

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: SW8260, Methane, Ethane, Ethene, Nitrite + Nitrate.

Field Geochemistry:	Results:	DUP.	Method/Comment:	DUP	
Ferrous Iron:	3.28	3.24	1.64 x 2	1.62 x 2	1:2 Dilution.
Manganese:	0.67	0.5 mg/L			
Sulfate:	~~[illegible]~~	<1.0			
Hydrogen Sulfide:	0.02	0.03			
Alkalinity:	84	—	100 - 400 R.		
Chloride:	3		25 x 0.1.		
Carbon Dioxide:	67	—	67 x 1 100 - 400 mg/L	N/A	
Other:					

Sampled By: J. Bidgood.

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

1.64 / 2 = 3.28 1.62 / 2 = 3.24

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-MW2S

Purging Method: bail peristaltic pump airlift other _____

Bailer Volume: NA — BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 54.3 — Water Column (TD-WL): 15.11'
Static Water Level (WL): 39.19 — Casing Diameter: 2"

Casing Volume: 2.5 gal. — CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA — CV/BV

Purge Date: 8/5/00

Time	Casing No./ Bailer No./ Gallons	Temp. °C	pH	Electrical Conductivity us/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	~~Odor~~	Visual Appearance
1009	2.5	24.8	~~8.12~~ 8.71	322	0.36	-396		
1014	5.0	25.1	6.69	321	0.35	-326		
1017	7.5	25.2	6.71	319	0.37	-322		

Total Volume Removed: 7.5 (gallons) 3 (casing volumes)

Weather: 95° Clear, Humid, Breezy.

Date Sampled: 8/5/00 Time Sampled: 1030

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: SW8260B, Methane, Ethane, Ethene, Bromide, Nitrate + Nitrite, TOC.

Field Geochemistry:	Results:	DUP	Method/Comment:
Ferrous Iron:	0.82	0.76	Light orange
Manganese:	1.6 mg/L	1.6	Violet.
Sulfate:	<40 mg/L	—	no turb
Hydrogen Sulfide:	0.01 mg/L	—	no obvious color
Alkalinity:	122 mg/L	—	100-400 mg/L test
Chloride:	15 mg/L	—	145 x 0.1
Carbon Dioxide:	87 mg/L	62 mg/L	100-400 mg/L Range test. / DUP - 20-100 Range test 311 v2
Other:			

Sampled By: JBB/SLH

Notes: – Sulfate: 50mg/L Standard analyzed - Result = 48 mg/L.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PEJ MW 2D

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 74.6' Water Column (TD-WL): 36.17

Static Water Level (WL): 39.43' Casing Diameter: 2"

Casing Volume: 5.7 gal. CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA CV/BV

Purge Date: 8/4/00

Time	Casing No./ Bailer No./ Gallons	Temp. °C	pH	Electrical Conductivity us/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Odor	Visual Appearance
1645	4	22.8	6.27	201	0.26	-6		
1650	8	23.4	6.27	202	0.27	-5		
1655	12	23.4	6.26	202	0.28	-13		
1700	16	23.5	6.25	202	0.28	-9		
1705	20	23.5	6.26	201	0.29	-15		

Total Volume Removed: 20 (gallons) 3+ (casing volumes)

Weather: _____

Date Sampled: 8/4/00 Time Sampled: 1700

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: VOCs 8260B | Methane, Ethane, Ethene
Nitrate | Bromide | TOC

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	0.76 mg/L	
Manganese:	1.0 mg/L	
Sulfate:	<1.0 mg/L	
Hydrogen Sulfide:	0.02 mg/L	no obvious odor
Alkalinity:	81 mg/L	81x1 100-400 range test
Chloride:	6.2 (<10)	62x0.1
Carbon Dioxide:	121 mg/L	121x1 100-400 mg/L test
Other:		

Sampled By: JBD/SLH

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-MW3S

Purging Method: bail peristaltic pump airlift other _____

Bailer Volume: NA — BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 64.9 — Water Column (TD-WL): 25.7'

Static Water Level (WL): 39.19 — Casing Diameter: 2"

Casing Volume: 4.2 gal — CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA — CV/BV

Purge Date: 8/4/00

Time	Casing No./ Bailer No./ Gallons	Temp. °C	pH	Electrical Conductivity us/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Odor	Visual Appearance
1334	2	25.7	6.56	300	1.50	-80		sl/turbid
1342	4	24.4	6.61	322	2.37	-83		
1348	6	24.6	6.58	307	1.78	-97		
1353	8	24.5	6.58	307	1.68	-210		
1358	10	24.5	6.57	307	1.65	-219		
1433	12	23.9	6.53	320	1.38	210		
1438	14	24.0	6.54	313	1.39	194		

Total Volume Removed: 14 (gallons) 3+ (casing volumes)

Weather: 90° Humid, Breezy.

Date Sampled: 8/4/00 Time Sampled: 1445

Sample Extraction Method: bail peristaltic pump airlift other _____

Laboratory Analytical Methods: VOCs 8260B / Methane, Ethane, Ethene
Nitrate / Bromide / TOC

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	0.71 mg/L	
Manganese:	2.4 mg/L	
Sulfate:	5 mg/L	Sample / Blank Filtered, Dozer prog 101.
Hydrogen Sulfide:	0.13 mg/L	Very Faint Blue tint.
Alkalinity:	130 mg/L	130 x 1 100-400 mg/L test.
Chloride:	8.4 <10 mg/L	84 x 0.1 10-40 mg/L test.
Carbon Dioxide:	130 mg/L	100-400 mg/L test
Other:		

Sampled By: J. Bickford / SLH

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-MW3D

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 84.5 Water Column (TD-WL): 45.0'
Static Water Level (WL): 39.50 Casing Diameter: 2"

Casing Volume: 7.3 gal. CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA CV/BV

Purge Date: 8/3/00

Time	Casing No./ Bailer No./ (Gallons)	Temp. °C	pH	Electrical Conductivity us/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	~~Odor~~	Visual Appearance
1034	5	21.6	6.72	224	1.30	31		Clear.
1039	10	22.9	6.65	223	0.97	24		
1044	15	23.3	6.67	224	1.17	21		
1049	20	23.3	6.66	224	1.26	6		
1054	25	23.5	6.67	224	1.31	3		

Total Volume Removed: 25 (gallons) 3+ (casing volumes)

Weather: 90° clear, Humid. Breeze From NE.

Date Sampled: 8/3/00 Time Sampled: 1100

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: SW8260, Methane, Ethene, Ethane, Nitrate + Nitrite. Total Organic Carbon, BROMIDE.

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	0.79 mg/L	
Manganese:	0.9 mg/L.	
Sulfate:	<1.0	
Hydrogen Sulfide:	0.05	sl. blue tint.
Alkalinity:	95 mg/L.	95 x 1 100-400 mg/L test
Chloride:	5 mg/L (<10)	45 x 0.1 10-40 mg/L test
Carbon Dioxide:	62 mg/L	Used 100-400 mg/L test - Running Low of 0.3636 N cont. of NaOH
Other:		

Sampled By: J.D. Bidgood.

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-MW 45

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 55.3 Water Column (TD-WL): 15.8'
Static Water Level (WL): 39.50 Casing Diameter: 2"

Casing Volume: 2.6 gal. CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA CV/BV

Purge Date: 8/3/00

Time	Casing No./ Bailer No./ Gallons	Temp. °C	pH	Electrical Conductivity µs/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	~~Odor~~	Visual Appearance
1633	3	24.8	6.73	339	1.27	-254		
1643	6	25.1	6.68	344	1.19	-267		
1649	9	25.0	6.66	340	1.18	-270		

Total Volume Removed: 9 (gallons) 3+ (casing volumes)

Weather: 95° Hot/Humid Sunny

Date Sampled: 8/3/00 Time Sampled: 1700

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: SW8260, Methane, Ethane, Ethene, TOC, Nitrate + Nitrite,

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	1.06 mg/L	Light orange color
Manganese:	2.4 mg/L	Violet color
Sulfate:	<40 mg/L	
Hydrogen Sulfide:	0.03 mg/L	no color obvious.
Alkalinity:	135 mg/L	135×1 100-400 mg/L test
Chloride:	17 mg/L	174×0.1 10-40 mg/L test.
Carbon Dioxide:	77 mg/L	385×0.2
Other:		

Sampled By: J. Bridgood / SLA

Notes: Well Sampled immediately after development
DUPLICATE COLLECTED - PES-DUP2, 0700, SW8260, TOC, meth, Eth, Eth, Nitrate + Nitrite
(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-MW4D

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 84.7' Water Column (TD-WL): 44.5

Static Water Level (WL): 39.85' Casing Diameter: 2"

Casing Volume: 7.3 gal CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA CV/BV

Purge Date: 8/3/00

Time	Casing No./ Bailer No./ (Gallons)	Temp. °C	pH	Electrical Conductivity us/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	~~Odor~~	Visual Appearance
1346	7.5	22.2	6.42	220	0.71	-186.2		Clear.
1352	15	24.1	6.42	223	0.58	-197		"
1357	22	25.0	6.41	224	0.68	-203		

Total Volume Removed: 22 (gallons) 3 (casing volumes)

Weather: 95° Hot, humid., clear.

Date Sampled: 8/3/00 Time Sampled: 1400

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: VOCs 8260B / Methane, Ethane, Ethene
TOC / Nitrate

Field Geochemistry:	Results:	Method/Comment:	
Ferrous Iron:	0.39 mg/L	Light orange color.	
Manganese:	4.4 mg/L		
Sulfate:	<1.0 mg/L		
Hydrogen Sulfide:	0.02 mg/L		
Alkalinity:	90 mg/L	90 x 1	100-400 mg/L test.
Chloride:	5 (<10)	48 x 0.1	10-40 mg/L test.
Carbon Dioxide:	80 mg/L	400 x 0.2	20-100 Reagent test.
Other:			

Sampled By: JBB/SLH

Notes: purged and sampled immediately after Development.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-MW5S

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 55.4 Water Column (TD-WL): 16.1'
Static Water Level (WL): 39.30 Casing Diameter: 2"

Casing Volume: 2.6 gal CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA CV/BV

Purge Date: 8/3/00

Time	Casing No./ Bailer No./ (Gallons)	Temp. °C	pH	Electrical Conductivity us/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	~~Odor~~	Visual Appearance
1131	2	25.2	6.67	412	1.52	-252		clear.
1137	4	25.4	6.69	418	1.61	-245		
1146	6	25.8	6.78	401.3	0.99	-268		
1151	8	25.2	6.68	422.8	1.35	-253		
1156	10	25.4	6.71	415	1.29	-250		

Total Volume Removed: 10 (gallons) 3+ (casing volumes)

Weather: 85°, Humid, pl cloudy.

Date Sampled: 8/3/00 Time Sampled: 1210

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: VOCs 8260B / Methane, Ethane, Ethene
Nitrate / TOC

Field Geochemistry:	Results:	Method/Comment:	
Ferrous Iron:	1.68 mg/L		
Manganese:	1.5 mg/L.		
Sulfate:	<1.0 mg/L		
Hydrogen Sulfide:	0.02 mg/L	color not obvious.	
Alkalinity:	183 mg/L.	183 x 1	100-400 mg/L Range test.
Chloride:	8.3 * out of Range	81 x 0.1	10-40 mg/L " "
Carbon Dioxide:	~~110~~ 111 mg/L	553 x 0.2	20-100 mg/L test.
Other:			

Sampled By: JTSS/SLH

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-MW5D

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 74.95' Water Column (TD-WL): 35.26'
Static Water Level (WL): 39.69' Casing Diameter: 2"

Casing Volume: 5.75 gal. CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA CV/BV

Purge Date: 8/3/00

Time	Casing No./ Bailer No./ (Gallons)	Temp. °C	pH	Electrical Conductivity ~~µS/cm~~	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Odor	Visual Appearance
0820	6	21.5	6.87	351	0.79	-68.3		
0827	12	21.9	6.86	342	0.80	-90.0		
0832	18	22.5	6.86	338	0.79	-91.7		

Total Volume Removed: 18 (gallons) 3 (casing volumes)

Weather: 80° Clear, Humid.

Date Sampled: 8/3/00 Time Sampled: 0845

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: SW8260, Dissolved Gasses (Methane, Ethene, Ethane)
Nitrate + Nitrite, Total organic Carbon.

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	0.23 mg/L	light orange color.
Manganese:	3.5 mg/L	Violet color.
Sulfate:	<1.0 mg/L.	no turbidity, user defined. Program 101.
Hydrogen Sulfide:	0.1 mg/L	
Alkalinity:	123	123 x 1 100-400 mg/L test.
Chloride:	16 mg/L	156 x .1 10-40 mg/L Range test.
Carbon Dioxide:	70 mg/L	350 x 0.2 20-100 mg/L test. 0.3636 N cart.
Other: CO_2	66 mg/L (DUP)	330 x 0.2 20-100 mg/L test. 0.3636 N cart.

Sampled By: J. Bidgood / SCH

Notes: Sampled Immediately after Development.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-MW63

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 64.7 Water Column (TD-WL): 25.3
Static Water Level (WL): 39.45 Casing Diameter: 2"

Casing Volume: 4.1 gal CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA CV/BV

Purge Date: 8/4/00

Time	Casing No./ Bailer No./ (Gallons)	Temp. °C	pH	Electrical Conductivity us/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	~~Odor~~	Visual Appearance
0843	4	22.5	6.69	364.2	0.87	248		clear
0848	8	22.5	6.66	364.9	0.84	254		"
0853	12	22.5	6.66	364.4	0.82	253		"

Total Volume Removed: 12 (gallons) 3 (casing volumes)

Weather: 80° Clear, Humid

Date Sampled: 8/4/00 Time Sampled: 0800

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: SW8260B, Methane, Ethane, Ethene, Nitrate + Nitrite, Total org. carbon.

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	0.36 mg/L	light orange color.
Manganese:	2.4 mg/L	Violet color
Sulfate:	< 1.0 mg/L	
Hydrogen Sulfide:	0.03 mg/L	no obv. color.
Alkalinity:	156 mg/L	156 x 1 100-400 mg/L Rangy test
Chloride:	13 mg/L	131 x 0.1 10-40 mg/L test Rangy
Carbon Dioxide:	88 mg/L	437 x 0.2
Other:		

Sampled By: J. B. Bidgood / SCA

Notes: Sampled Immediately Following Development.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-MW6D

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA — BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 54.5' — Water Column (TD-WL): 14.7'
Static Water Level (WL): 39.80 — Casing Diameter: 2"

Casing Volume: 2.4 gal. — CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA — CV/BV

Purge Date: 8/31/00

Time	Casing No./ Bailer No./ (Gallons)	Temp. °C	pH	Electrical Conductivity us/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	~~Odor~~	Visual Appearance
1823	2	21.3	6.49	232	1.40	-152		Clear
1828	4	22.8	6.48	220	1.12	-163		"
1834	6	23.2	6.46	234	1.26	-155		
1839	8	23.6	6.46	235	1.22	-153		

Total Volume Removed: 8 (gallons) 3.2 (casing volumes)

Weather: 70° Humid

Date Sampled: 8/31/00 Time Sampled: 1845

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: SW8260, Methane Ethane Ethene, TOC
Nitrate+Nitrite.

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	1.56 mg/L	light orange color.
Manganese:	3.4 mg/L	Violet color.
Sulfate:	<1.0 mg/L	
Hydrogen Sulfide:	0.10 mg/L	color not obvious
Alkalinity:	103	103x1. 100-400 mg/L Range test
Chloride:	7.1 = <10	71 x 0.1 10-40 mg/L test
Carbon Dioxide:	94 mg/L	469 x 0.2
Other:		

Sampled By: J Bridgood / SLH

Notes: well sampled Immediately after Purging.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-MW7S

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 55.0 Water Column (TD-WL): 15.9'
Static Water Level (WL): 39.15 Casing Diameter: 2"

Casing Volume: 2.6 gal. CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA CV/BV

Purge Date: 8/2/00

Time	Casing No./ Bailer No./ (Gallons)	Temp. °C	pH	Electrical Conductivity us/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Odor	Visual Appearance
1900	3	24.4	6.70	518	1.00	-295.3		clear
1905	6	24.9	6.70	500	1.04	-297.8		"
1910	9	25.4	6.67	508	0.96	-299		clear

Total Volume Removed: 9 (gallons) 3+ (casing volumes)

Weather: 95° Humid, Hot. Sunny.

Date Sampled: 8/2/00 Time Sampled: 1915

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: VOCs 8260B | Methane, Ethane, Ethene
Nitrate | TOC | Bromide

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	0.43 mg/L.	Light Orange Color.
Manganese:	1.8 mg/L	Light Violet color
Sulfate:	<1.0 mg/L.	no turbidity.
Hydrogen Sulfide:	0.1 mg/L	
Alkalinity:	255 mg/L.	255x1 100-400 Range test. 1.600 N cart.
Chloride:	~~27~~ -<10 out of Range.	27x.1 10-40 mg/L test.
Carbon Dioxide:	170 mg/L	170x1, 100-400 mg/L Range test. 3.636 N cart.
Other:		

Sampled By: JBB/SCH

Notes: Rate of Purge = ~1000 mL/min, Sampled Immediately after development.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-MW7D

Purging Method: bail peristaltic (pump) airlift other _____ Grundfos

Bailer Volume: NA — BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 74.6' — Water Column (TD-WL): 34.99'

Static Water Level (WL): 39.61' — Casing Diameter: 2"

Casing Volume: 5.7 gal. — CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA — CV/BV

Purge Date: 8/2/00

Time	Casing No./ Bailer No./ (Gallons)	Temp. °C	pH	Electrical Conductivity us/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	~~Odor~~	Visual Appearance
1613	10	21.3	6.90	336	1.00	-301.2		Clear.
~~1617~~		~~21.9~~		~~338.2~~		~~-297.0~~		
1623	15	24.1	6.89	314	1.07	-294		
1629	20	24.3	6.86	327	1.31	-277.5		
1635	25	24.6	6.86	328.0	1.16	-271.9		
1640	30	24.9	6.86	334.4	1.06	-275.1		

Total Volume Removed: 30 (gallons) 5 (casing volumes)

Weather: 95° Humid, P/Cloudy

Date Sampled: 8/2/00 Time Sampled: 1640

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: VOCs 8260B / Metals, Etme, Etme
Bromide / TOC / Nitrate

Field Geochemistry:	Results:	DUP.	Method/Comment:
Ferrous Iron:	1.65	1.63 mg/L	light. Rust color.
Manganese:	3.5	3.4 mg/L	Violet color.
Sulfate:	<1.0	—	no turb.
Hydrogen Sulfide:	< 0.1		
Alkalinity:	118	127. mg/L	1x118; 127x1
Chloride:	16	15 mg/L	164x0.1; 145x0.1
Carbon Dioxide:	54 mg/L	76 mg/L	(272x0.2); 381 x 0.2
Other:			

Sampled By: J. Bidgood / SLH

Notes: Duplicate Sample = PES-DUP1; 0700

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-MW85

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 61.6' Water Column (TD-WL): 21.64'
Static Water Level (WL): 39.96' Casing Diameter: 2"

Casing Volume: 3.53 gal. CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA CV/BV

Purge Date: 8/2/00

Time	Casing No./ Bailer No./ (Gallons)	Temp. °C	pH	Electrical Conductivity µs/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Odor	Visual Appearance
1123	—	26.7	7.03	487	1.75	-215.3		
1137	—	27.4	7.01	489	1.90	-235.0		
1207	—	26.9	7.04	473	1.79	-213.8		
1222	—	25.4	7.04	484	2.21	-230.9		
1230	20 gal.	23.8	7.08	478	2.06	-253.2		
1235	—	23.9	7.03	488	1.38	-282		
1256	—	23.7	7.03	498	1.76	-260.0		
1303	—	24.1	7.02	500	1.35	-307.4		
1308	—	24.2	7.00	500	0.95	-312.8		
1313	40	24.1	6.99	500	0.95	-309.1		(OVER)

Total Volume Removed: 40+ (gallons) 10 (casing volumes)

Weather: _____

Date Sampled: 8/2/00 Time Sampled: 1410

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: VOCs 8260B / Methane, Ethane, Ethene
Nitrate

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	2.01 mg/L	Light orange color.
Manganese:	0.2 mg/L	Light Violet color.
Sulfate:	21 mg/L.	Light turbidity.
Hydrogen Sulfide:	0.1 mg/L.	
Alkalinity:	202 mg/L.	202 x 1 100-400 mg/L Range test.
Chloride:	21 mg/L	~~202 x~~ 214 x 0.1
Carbon Dioxide:	73 mg/L	367 x 0.2 20-100 mg/L Range test.
Other:		

Sampled By: J. Bidgood / SCA

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-MW8D

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 85.06 Water Column (TD-WL): 45.41'
Static Water Level (WL): 39.65 Casing Diameter: 2"

Casing Volume: 7.3 gal CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA CV/BV

Purge Date: 8/2/00

Time	Casing No./ Bailer No./ (Gallons)	Temp. °C	pH	Electrical Conductivity us/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Odor	Visual Appearance
0935	3	23.1	6.78	365	3.38	-174.8		
0951	9.4	22.9	6.82	355.3	2.99	-196.3		
0956	11.4 ~~8.4~~	22.8	6.82	349	2.86	-192.5		
1007	15.8	23.5	6.85	342	2.63	-185.7		
1013	20	24.5	6.82	338	2.38	-177.9		
1024	25	25.5	6.87	333	2.20	-177.8		

Total Volume Removed: 25 (gallons) 3+ (casing volumes)

Weather: 85° Clear, sl. breeze, Humid.

Date Sampled: 8/2/00 Time Sampled: 1030

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: SW8260, Methane, ethane, ethene; Nitrate + Nitrite. Total org. Carbon;

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	1.53 mg/L	M8146 / Light orange color.
Manganese:	1.9 mg/L	Light Violet color.
Sulfate:	<1.0 mg/L	no turbidity.
Hydrogen Sulfide:	0.15 mg/L	Light Blue color.
Alkalinity:	127 mg/L	127×1 100-400 mg/L test.
Chloride:	20 mg/L	195×0.1 10-40 mg/L test.
Carbon Dioxide:	58 mg/L.	288×0.2 20-100 mg/L Titration test.
Other:		

Sampled By: J. BIDGOOD/SCI

Notes: Pump Rate = 1 gal / 2' 30" = 0.4 gal/min = 1500 ml/min

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: 007615UF

Purging Method: bail peristaltic pump airlift other _____

Bailer Volume: NA — BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 49.5 — Water Column (TD-WL): 10.95
Static Water Level (WL): 38.55 — Casing Diameter: 2"

Casing Volume: 1.79 gal — CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA — CV/BV

Purge Date: 7/25/00

Time	Casing No./ Bailer No./ Gallons	Temp. °C	pH	Electrical Conductivity mS/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	~~Odor~~	Visual Appearance
1421	½ gal	28.3	6.35	~~29~~ 413.2	2.25	87.1		sl. cloudy, brown
1429	—	27.	6.28	410.5	1.03	112.4		
1439	3	27.5	6.16	422.4	0.89	71.3		
1444	4.5	28.0	6.15	417.4	0.72	46.6		clear
1449	5	28.2	6.15	409.2	0.50	32.5		
1454	5.5	28.4	6.15	409.1	0.41	48.1		
1500	6.5+	28.7	6.15	411.9	0.35	39.8		

Total Volume Removed: 7 (gallons) 3+ (casing volumes)

Weather: _____

Date Sampled: 7/25/00 Time Sampled: 1505

Sample Extraction Method: bail peristaltic pump airlift other _____

Laboratory Analytical Methods: VOCs 8260B / methane, Ethane, Ethene
Nitrate + Nitrite

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	< 0.0	Meth. 8146 / no color.
Manganese:	0.1	8034, color not obvious.
Sulfate:	< 1.0	8051. no turbidity?
Hydrogen Sulfide:	.04	8034 / no color noticeable.
Alkalinity:	171 mg/L as $CaCO_3$	171 × 1 (Digits × Digit Multiplier) method 8203
Chloride:	9.2 mg/L Cl.	92 × 0.1 0.2256 (N H6 (NO_3)$_2$) cartridge used
Carbon Dioxide:	140 mg/L	70 × 2 3.636N cartridge - 100 mL sample.
Other:		

Sampled By: JTS0/SLA

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: 0076 15 LF

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA

BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 101

Water Column (TD-WL): 61.4

Static Water Level (WL): 39.60

Casing Diameter: 2"

Casing Volume: 10 gal

CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA

CV/BV

Purge Date: 7/25

Time	Casing No./ Bailer No./ Gallons	Temp. °C	pH	Electrical Conductivity uS/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	~~Odor~~	Visual Appearance
0919	19	21.0	6.47	283.4	0.91	214.6		
0924	22	21.1	6.51	282.0	0.75	200.6		
0929	26	21.0	6.48	280.0	0.73	191.2		
0934	30	21.0	6.48	278.8	0.68	186.4		

Total Volume Removed: 30 (gallons) 3 (casing volumes)

Weather: 80° clear.

Date Sampled: 7/25/00 Time Sampled: 0940

Sample Extraction Method: bail peristaltic [pump] airlift other _____

Laboratory Analytical Methods: SW8260
Methane, Ethane Ethene
Nitrite + Nitrate

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	<0.01	no color.
Manganese:	<0.1	no color.
Sulfate:	<1.0	No turb.
Hydrogen Sulfide:	<0.01	No odor.
Alkalinity:	122 mg/L	Titrated to - light violet Gray / 100-400 mg/L test -
Chloride:	5 mg/L out of Range	(50 x .1) 10-40 mg/L test .2256 N cont.
Carbon Dioxide:	94 mg/L - out of Range.	100-400 mg/L test. 3.63L N NaOH cont.
Other: CO_2	74 mg/L (369 x .2)	20-100 mg/L test.

Sampled By: JBB/SLA

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES INJ-1S

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 65.6 Water Column (TD-WL): 25.68
Static Water Level (WL): 39.92 Casing Diameter: 2"

Casing Volume: 4.2 CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA CV/BV

Purg Date: 8/5/00

Time	Casing No./ Bailer No./ (gallons)	Temp. °C	pH	Electrical Conductivity µs/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Odor	Visual Appearance
1605	10	24.8	7.00	314	0.17	-362		Clear
1610	20	25.2	6.99	312	0.18	-364		"
1615	30	26.0	6.99	314	0.16	-359		Clear

Total Volume Removed: 30 (gallons) 7+ (casing volumes)

Weather: 95° Humid.

Date Sampled: 8/5/00 Time Sampled: 1415

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: VOCs 8260B | Methane, Ethane, Ethane
Nitrate + Nitrite | TOC

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	3.34 mg/L	Diluted 1:2 1.67×2, Dark orange
Manganese:	8 mg/L.	Violet color
Sulfate:	<0.1 mg/L	
Hydrogen Sulfide:	0.02 mg/L.	Slight Blue tint,
Alkalinity:	129 mg/L	129×1 100-400 mg/L Range
Chloride:	13	126×0.1 10-40 mg/L Range.
Carbon Dioxide:	89 mg/L	89×1 100-400 mg/L Range test.
Other:		

Sampled By: JTBS/SLA

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

1.67
2
3.34

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES TN 3ID

Purging Method: bail peristaltic pump airlift other _____

Bailer Volume: NA — BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 84.8 — Water Column (TD-WL): 45.0'
Static Water Level (WL): 39.79 — Casing Diameter: 2"

Casing Volume: 7.3 gal. — CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA — CV/BV

Purge Date: 8/5/00

Time	Casing No./ Bailer No./ Gallons	Temp. °C	pH	Electrical Conductivity us/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	~~Odor~~	Visual Appearance
1157	~~50~~	22.4	6.62	230.	0.41	-256		Clear.
1202	~~105~~	23.5	6.50	224	0.33	-280		"
1207	7	24.3	6.49	227	0.42	-268		"

Total Volume Removed: 7+ (gallons) 1 (casing volumes)

Weather: _____

Date Sampled: 8/5/00 Time Sampled: 1215

Sample Extraction Method: bail peristaltic pump airlift other _____

Laboratory Analytical Methods: VOCs 8260B / Methane, Ethane, Ethene
Nitrate + Nitrite / TOC

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	2.96 mg/L	Dark orange color
Manganese:	4.4 mg/L	Violet color
Sulfate:	<0.1 mg/L	no turbidity
Hydrogen Sulfide:	0.04 mg/L	Slight Blue tint
Alkalinity:	101 mg/L	100 - 400 mg/L Range test
Chloride:	3.9 mg/L (<10)	10 - 40 mg/L Range
Carbon Dioxide:	90 mg/L 90x1	100 - 400 mg/L Range test
Other:		

Sampled By: JBB / SLH

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-INJ-2S

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 54.3 Water Column (TD-WL): 15.1'
Static Water Level (WL): 39.19 Casing Diameter: 2"

Casing Volume: 2.5 gal. CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA CV/BV

Purge Date: 8/5/00

Time	Casing No./ Bailer No./ (Gallons)	Temp. °C	pH	Electrical Conductivity uS/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Odor	Visual Appearance
1703	—	22.9	6.47	357	0.34	-258		Clear
1708		23.5	6.38	340	0.27	-270		"
1713	10	23.7	6.36	358	0.26	-272		"
1718	15	23.6	6.38	358	0.27	-272		"

Total Volume Removed: 15 (gallons) 6 (casing volumes)

Weather: 95° Hot/Humid, breezy.

Date Sampled: 8/5/00 Time Sampled: 1720

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: VOCs 8260B / Methane, Ethane, Ethene
Nitrate+Nitrite / TOC / Bromide

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	2.94 mg/L	Orange color.
Manganese:	1.3 mg/L.	Light violet
Sulfate:	<0.1	
Hydrogen Sulfide:	0.02 mg/L	no visible color
Alkalinity:	150 mg/L	150 x 1 100 - 400 mg/L test
Chloride:		
Carbon Dioxide:	154 mg/L.	100 - 400 mg/L Range.
Other:	7 mg/L (<10)	10 - 40 mg/L test.

Sampled By: J. Bidgood.

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES3NJ2D.

Purging Method: bail peristaltic (pump) airlift other _____

Bailer Volume: NA — BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 74.6 — Water Column (TD-WL): 35.2'
Static Water Level (WL): 39.43 — Casing Diameter: 2"

Casing Volume: 5.7 — CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA — CV/BV

Purge Date: 8/5/00

Time	Casing No./ Bailer No./ Gallons	Temp. °C	pH	Electrical Conductivity µs/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	~~Odor~~	Visual Appearance
1548	6	21.9	6.55	252	0.58	-128		Clear.
1554.	12	22.9	6.56	251	0.59	-138		
1559.	18	23.0	6.55	252	0.59	-144		

Total Volume Removed: 18 (gallons) 3 (casing volumes)

Weather: 95° Breezy, Humid.

Date Sampled: 8/5/00 Time Sampled: 1610

Sample Extraction Method: bail peristaltic (pump) airlift other _____

Laboratory Analytical Methods: SW8260, methane, Ethane, Ethene, Nitrate+Nitrite
TOC, Bromide.

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	3.50 mg/L	1.75 x 2. Diluted 1:2
Manganese:	1.4 mg/L	Violet color
Sulfate:	~~0~~ 1 mg/L	
Hydrogen Sulfide:	0.04 mg/L	no obvious color
Alkalinity:	101 mg/L	101 x 1 100-400 Range test
Chloride:	10 mg/L.	98 x 0.1 10-40 mg/L Range test
Carbon Dioxide:	97 mg/L	97 x 1 100-400 mg/L Range
Other:		

Sampled By: J. Bidgood.

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-INJ-35

Purging Method: bail peristaltic pump airlift other _____

Bailer Volume: NA BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 64.9 Water Column (TD-WL): 25.7'
Static Water Level (WL): 39.19 Casing Diameter: 2"

Casing Volume: 4.2 gal. CV=(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA CV/BV

Purge Date: 8/5/00

Time	Casing No./ Bailer No./ Gallons	Temp. °C	pH	Electrical Conductivity mS/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	~~Odor~~	Visual Appearance
2033	4	22.1	6.85	271	0.99	-234		
2038	8	22.0	6.81	275	0.86	-236		
2043	12	21.7	6.76	269	0.68	-255		
2048	16	22.0	6.75	263	0.58	-265		sl cloudy.

Total Volume Removed: 16 (gallons) 3+ (casing volumes)

Weather: _____

Date Sampled: 8/5/00 Time Sampled: 2050

Sample Extraction Method: bail peristaltic pump airlift other _____

Laboratory Analytical Methods: VOCs | Methane, Ethane, Ethene
Bromide | Nitrate+Nitrite | TOC

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	1.41 mg/L	Lt. Orange
Manganese:	4.3 mg/L	Violet
Sulfate:	<0.1 mg/L	
Hydrogen Sulfide:	0.09 mg/L	sl. Blue tint
Alkalinity:	110 mg/L	110x1 100-400 R. test.
Chloride:		
Carbon Dioxide:	70 mg/L	70x1, 100-400 R. test.
Other:		

Sampled By: J. Bidgood

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-INJ3D

Purging Method: bail peristaltic pump airlift other _____

Bailer Volume: NA — BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 84.5' — Water Column (TD-WL): 45.0

Static Water Level (WL): 39.50' — Casing Diameter: 2"

Casing Volume: 7.3 gal — CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA — CV/BV

Purge Date: 8/5/00

Time	Casing No./ Bailer No./ Gallons	Temp. °C	pH	Electrical Conductivity µS/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Odor	Visual Appearance
1856	6	21.3	6.37	201	1.31	-166		Clear
1902	12	23.3	6.38	209	1.09	-169		"
1907	18	23.8	6.35	206	1.10	-170		"
1912	24	24.2	6.37	205	1.12	-167		"

Total Volume Removed: 24 (gallons) 3 (casing volumes)

Weather: 85° breezy, clear.

Date Sampled: 8/5/00 Time Sampled: 1925

Sample Extraction Method: bail peristaltic pump airlift other _____

Laboratory Analytical Methods: VOCs / methane, Ethane, Ethene
Bromide / Nitrate / Nitrite / TOC

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	2.83 mg/L	Orange color.
Manganese:	2.3 mg/L	Violet color
Sulfate:	<0.1	
Hydrogen Sulfide:	0.06 mg/L	Color not obvious
Alkalinity:	88 mg/L	88x1 100-400 Range test
Chloride:	6 mg/L	55x0.1 10-40 mg/L
Carbon Dioxide:	110 mg/L	110x1 100-400 mg/L test
Other:		

Sampled By: J Bidgood.

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-4NJ 4S

Purging Method: bail peristaltic pump airlift other _____

Bailer Volume: NA BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total Well Depth (TD): 55.3' Water Column (TD-WL): 15.8'
Static Water Level (WL): 39.50' Casing Diameter: 2"

Casing Volume: 2.6 gal CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA CV/BV

Purge Date: 8/6/00

Time	Casing No./ Bailer No./ Gallons	Temp. °C	pH	Electrical Conductivity us/cm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Odor	Visual Appearance
1005	3	23.0	6.62	495	0.28	-179		Clear
1010	6	23.0	6.61	495	0.27	-183		"
1015	9	24.0	6.61	481	0.30	-186		"

Total Volume Removed: 9 (gallons) 3+ (casing volumes)

Weather: 90° Humid, breezy

Date Sampled: 8/6/00 Time Sampled: 1025

Sample Extraction Method: bail peristaltic pump airlift other _____

Laboratory Analytical Methods: VOCs / Methane, Ethane, Ethene
Nitrate + Nitrite / TOC

Field Geochemistry:	Results:	Method/Comment:
Ferrous Iron:	1.36 mg/L	
Manganese:	2.1 mg/L	
Sulfate:	19 mg/L	sl. turbidity.
Hydrogen Sulfide:	0.07 mg/L	
Alkalinity:	237 mg/L.	237x1
Chloride:	3.4 mg/L	34x0.1
Carbon Dioxide:	126 mg/L	630x0.2 20-100mg/L +
Other:		

Sampled By: J. Bedgood

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6
Project Number: 737490

Well Designation: PES-INJ 4D.

Purging Method: bail peristaltic pump airlift other _____

Bailer Volume: NA — BV=(ID/24)^2(L)(PI)(7.48) gallons/bailer

Total W ll Depth (TD): 74.7' — Water Column (TD-WL): 35.0'
Static Water Level (WL): 39.69' — Casing Diameter: 2"

Casing Volume: 5.7 — CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Bails/Casing Volume: NA — CV/BV

Purge Date: 8/6/00

Time	Casing No./ Bailer No./ Gallons	Temp. °C	pH	Electrical Conductivity mskm	Dissolved Oxygen (mg/L)	Redox Potential (mv)	~~Odor~~	Visual Appearance
0832	5	21.9	6.99	249	0.83	-180		clear.
0838	10	22.7	6.99	251	0.78	-202		"
0844	15	23.0	6.95	248	0.86	-202		"
0851	20	23.2	6.95	248	0.88	-195		"

Total Volume Removed: 20 (gallons) 3+ (casing volumes)

Weather: 85° clear, Humid.

Date Sampled: 8/6/00 Time Sampled: 0900

Sample Extraction Method: bail peristaltic pump airlift other _____

Laboratory Analytical Methods: SW8260; methane, ethane, ethene, TOC; Nitrate + Nitrite.

Field Geochemistry:	Results:		Method/Comment:
Ferrous Iron:	0.47 mg/L		Light orange color
Manganese:	0.4 mg/L		Violet Color
Sulfate:	1 mg/L		Sl. turb.
Hydrogen Sulfide:	0.02		no obvious color
Alkalinity:	110 mg/L		100-400 range test
Chloride:	5 mg/L	5.4 x 0.1	10-40 mg/L test
Carbon Dioxide:	46 mg/L	46 x 1	100-400 mg/L test.
Other: CO_2	50 mg/L.	250 x 0.2	20-100 mg/L test

Sampled By: JBB/SCH

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: 007GL 15UF

Weather:

Static Water Level (ft): 40.44 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0937	1	18.3	6.28	269	2.7	+85	brown
0944	3	20.4	6.21	300	0.59	+104	sl cloudy
0949	4	21.2	6.11	306	0.38	+113	
0954	5	21.1	6.11	304	0.33	+123	clear.
0958	5.5	21.2	6.10	307	0.34	+124	"

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 11/8/00 Time Sampled: 10:00

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) (2) VOA, AM-18 (MEE) (2) G.A. VOA

E300.1(Nitrate+Nitrite) (1) 100ml poly, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0 - TURBID	
Ferrous Iron:	0.09	No obvious color. (filtered)
Carbon Dioxide:	172 mg/L	
Manganese:	0.2 mg/L	little to no color (filtered)
Sulfate:	1 mg/L	(filtered)
Alkalinity:	183 mg/L	
Chloride:	7.6 mg/L (76 × 0.1)	
Other:		

Sampled By: J. Bidgood.

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: 0076L15LF

Weather: 55°F Rain, breezy.

Static Water Level (ft): 41.45 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1108	1.5	19.9	6.39	224	0.81	+157	Sl. cloudy
1113	2.5	20.5	7.03	224	0.77	+155	
1120	3.5	21.8	7.37	234	0.75	+157	
1127	4.5	22.3	7.65	238	0.71	+160	

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 11/8/00 Time Sampled: 1135

Duplicate Sample ID _____ Duplicate Date/Time _____ MS/MSD collected? _____

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1-100ml poly, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.06	no obvious color.
Ferrous Iron:	0.13 mg/L	no obvious color.
Carbon Dioxide:	285 x 0.2 = 57 mg/L	
Manganese:	0.0	No color.
Sulfate:	1.0	No turbidity obvious
Alkalinity:	140 x 1 = 140 mg/L	100-400 mg/L test. 1.600N acid.
Chloride:	41 x 0.1 = 4.1 mg/L.	
Other:		

Sampled By: J. Bidgood

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

285
28.5
570

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES - MW1 - S

Weather: 60, partly cloudy, slight breeze

Static Water Level (ft): 40.88 Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1550	1/2	19.7	7.11	194	0.84	-110	Grey
1557	1	20.0	7.21	187	0.91	-143	
1604	2.5	21.0	7.24	193	2.01	-139	sl. grey.
1611	3	19.7	7.27	181	2.00	-125	
1629	3.5	20.6	7.33	188	0.52	-160	clear
1634	4.0	22.7	7.34	212	0.34	-170	"
1639	4.5	22.7	7.33	210	0.26	-163	"

Total Volume Removed: 5 (gallons) (casing volumes)

Date Sampled: 11/7/00 Time Sampled: 16:50

Duplicate Sample ID PES-DP1 Duplicate Date/Time 0700 MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 4 40mL VOA, AM-18 (MEE) 4 40mL

E300.1(Nitrate+Nitrite) 2-100ml poly, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.03 mg/L	no obvious color.
Ferrous Iron:	2.54	orange color.
Carbon Dioxide:	0.2 x 160 units = 32 mg/L	
Manganese:	3.1 mg/L	violet color.
Sulfate:	∅ mg/L	no turbidity
Alkalinity:	84 x 1 = 84 mg/L	(1.6N cont.)
Chloride:	21 x 0.1 = 2.1 mg/L	< test range.
Other:		

Sampled By: J. Bidgood, L. Lomenskie

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: FES-MW1-D

Weather: 60° cloudy, sl. drizzle.

Static Water Level (ft): 41.02 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0729	1/2	20.1	6.39	158	0.38	+36.8	brown
0737	3	21.7	6.33	142	0.41	-19	clear.
0742	4	21.9	6.38	142	0.28	-25.1	"
0745	4.5	21.9	6.34	140	0.26	-40.5	
0750	6	21.5°	6.33	138	0.41	-40	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 11/8/00 Time Sampled: 0755

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? YES

Laboratory Analytical Methods: SW8260 (VOCs-water) 6 VOA, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1 100ml poly, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.06	
Ferrous Iron:	1/4 Dilution	1.53 x 4 = 6.12 mg/L
Carbon Dioxide:	412 x 0.2 = 82 mg/L.	
Manganese:	0.3 mg/L	very faint Violet color.
Sulfate:	0	no turbidity
Alkalinity:	87 mg/L	(87 x 1)
Chloride:	—	
Other:		

Sampled By: J. Bickford, L. Lemenskie

Notes: DTW = 41.28 @ 0743

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

1.53
4
6.12

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW2S

Weather: 40° Cloudy

Static Water Level (ft): 40.25 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1205	1	16.4	6.31	226	0.51	-85	brown
1210	2	17.1	6.49	242	0.37	-148	
1215	3	18.4	6.51	264	0.41	-155	
1220	4	19.4	6.48	273	0.34	-151	
1225	5	19.8	6.47	279	0.32	-124	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 11/10/00 Time Sampled: 1230

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? N

Laboratory Analytical Methods: SW8260 (VOCs-water) 2, AM-18 (MEE) 2

E300.1(Nitrate+Nitrite) 1, E320.1 (Bromide) 1

SW9060M (Total Org. Carbon) 1 SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	(0.20)	turbid sample - very very faint light blue color
Ferrous Iron:	0.57 mg/L	
Carbon Dioxide:	546 x 0.2 = 109.2	20-100 mg/L test
Manganese:	0.2 mg/L	v lt pink
Sulfate:	0 mg/L	
Alkalinity:	158 x 1.0 = 158	100-400 mg/L test
Chloride:	46 x 0.1 = 4.6	10-40 mg/L Test
Other:		

Sampled By: J. Bidgood

Notes: * Checked for oil prior to water level meas/pumping. Meter indicated no oil at surface. Checked w/ ORS oil/water interface Probe.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW-2D

Weather:

Static Water Level (ft): 41.56. Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1322	2	19.0	6.40	236	0.32	+152	Brown/silty.
1327	2.5	18	6.43	234	0.35	+69	
1332		17.1	6.46	226	0.34	+49	
1337	3	16.7	6.42	223	0.32	+46	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 11/10/00 Time Sampled: 1345

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? No

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA, AM-18 (MEE) 2 G.A. VOA

E300.1(Nitrate+Nitrite) 1 - 100 ml poly, E320.1 (Bromide) 1 - 500ml poly

SW9060M (Total Org. Carbon) 1 - 100ml poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.39 mg/L	turbid sample.
Ferrous Iron:	0.62 mg/L	Light orange color, turbid sample / Blank.
Carbon Dioxide:	256 × 0.2 = 51.2 mg/L	
Manganese:	0.0 mg/L	no color
Sulfate:	0	turbid Blank / sample rock.
Alkalinity:	105 × 1 = 105 mg/L	100-400 test.
Chloride:	39 × 0.1 = 3.9	10-40 mg/L test.
Other:		

Sampled By: JB, LAL

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES - MW3S

Weather:

Static Water Level (ft): 41.21 Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

	Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
AR	1554 ~~1459~~	1	15.3	7.03	188	2.56	-60	clear
AR	1559 ~~1459~~	2	15.4	7.02	220	1.92	-99	"
AR	1604 ~~1509~~	3	17.4	6.99	245	1.57	-74	"
	1615	5	16.2	6.98	288	0.96	-91	"
	1622	7	20.4	6.94	364	0.55	-96	"
	1630	9	21.3	6.90	380	0.28	-134	"

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 11/10/00 Time Sampled: 1635

Duplicate Sample ID Duplicate Date/Time MS/MSD collected?

Laboratory Analytical Methods: SW8260 (VOCs-water) 2-40 ml VOA, AM-18 (MEE) 2-40 ml G.A.VOA.
E300.1(Nitrate+Nitrite) 1-100 ml poly, E320.1 (Bromide) 1-500 ml poly
SW9060M (Total Org. Carbon) 1-100 ml poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.07 mg/L	(No obvious color)
Ferrous Iron:	2.41 x 4 = 9.68	(1:4 Dilution) orange
Carbon Dioxide:	77 x 1 = 77	100-400 mg/L Test ~~pink~~
Manganese:	9.9 mg/L	purple
Sulfate:	0 ~~0.5 mg/L~~	
Alkalinity:	187 x 1 = 187	100-400 mg/L Test
Chloride:	20 x 0.1 = 2.0	10-40 mg/L Test
Other:		

Sampled By:

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES - MW3D

Weather:

*Bailed after 2 gallons had been pumped from PES-MW3S

Static Water Level (ft): 41.46 Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1718	1	16.5	6.87	182	1.44	65	sl. brown.
1723	2	16.9	6.74	186	1.17	89.2	
1728	2.5	18.2	6.69	200	1.46	109	
1737	3	16.6	6.69	202	1.32	92	
1742	4	16.9	6.64	200	1.49	101	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 11/10/00 Time Sampled: 1750

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? NO.

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA, AM-18 (MEE) 2 GA-VOA

E300.1(Nitrate+Nitrite) 1-100ml Poly E320.1 (Bromide) 1-500 ml poly

SW9060M (Total Org. Carbon) 1-100ml poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	~~0.0~~ 0.34	no obvious color, sample sl. turbid
Ferrous Iron:	0.3	– may be interference with turbid water.
Carbon Dioxide:	412 x 0.2 = 82.4 mg/L	20-100 mg/L test.
Manganese:	0.9 mg/L	very faint violet
Sulfate:	~~0.0~~ 5 mg/L	slight turbidity
Alkalinity:	110 x 1 = 110 mg/L	100-400 mg/L test
Chloride:	121 x 0.1 = 12 mg/L	
Other:		

Sampled By:

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES- MW45

Weather:

Static Water Level (ft): 40.84 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1658	1	17.4	6.61	220	0.39	+31	H. orang-brown
1703	2	17.6	6.45	226	0.41	+25	H. brown-yellow
1708	3	18.1	6.39	276	0.42	46	
1713	4	18.8	6.40	254	0.37	-76	
1726 ~~1722~~	5	20.6	6.37	269	0.77	-57	
1735	~~6~~ 7	21.6	—	306	0.28	-19	
			USE READ FOR 1722				

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 11/9/00 Time Sampled: 1750

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2-40ml VOA, AM-18 (MEE) 2-40ml VOA.
E300.1(Nitrate+Nitrite) 1-100ml poly, E320.1 (Bromide) 1-500 ml poly
SW9060M (Total Org. Carbon) 1-100 ml poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.14 mg/L	turbid sample
Ferrous Iron:	2.13 mg/L	orange color.
Carbon Dioxide:	574 x 0.2 = 115 mg/L	
Manganese:	0.7 mg/L	light violet color
Sulfate:	0 mg/L.	no turbidity
Alkalinity:	169 x 1 = 169 mg/L	100-400 mg/L test.
Chloride:	81 x 0.1 = 8.1 mg/L	
Other:		

Sampled By: J. Bidgood

Notes: HAD Problems w/ Generator, kept quitting, stopping the pump.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

574
x2
1148

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW4D

Weather:

Static Water Level (ft): 41.25 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1012	1	17.9	6.61	208	0.37	+226	H. brown
1019	2	16.9	6.47	201	0.40	+204	"
1025	2.5	15.6	6.43	193	0.61	+110	
1030	3	14.9	6.47	188	0.63	+148	
1037	4	16.3	6.43	193	0.54	+113	
1043		20.4	6.41	+205	0.49	+90	use this one
~~1054~~	~~5~~	~~21.7~~	~~6.38~~	~~+215~~	~~1.28~~	~~+100~~	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 11/10/00 Time Sampled: 1055

Duplicate Sample ID PES-DP3/111000 Duplicate Date/Time 0800 MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 4 VOA, AM-18 (MEE) 4 VOA

E300.1(Nitrate+Nitrite) 2-100ml poly, E320.1 (Bromide) 2-500ml poly

SW9060M (Total Org. Carbon) 2-100ml poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	(0.17) <.01 turbid sample NO color	
Ferrous Iron:	0.59 mg/L.	
Carbon Dioxide:	357 x 0.2 = 71.4 mg/L	20-100ml test.
Manganese:	0.6 mg/L	Light violet color.
Sulfate:	0.0	turbid sample Blank
Alkalinity:	95x1 = 95 mg/L	100-400 range test.
Chloride:	91x0.1 = 9 mg/L.	
Other:		

Sampled By:

Notes: generator problems, pump frequently turned off because of power loss. Caused DO to increase @ 1054.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-mw55

Weather: 45° windy, cloudy.

Static Water Level (ft): 40.55 ~~40.79~~ TB Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1045	1	17.9	6.93	270	2.43	-119	cloudy
1050	2.5	19.5	6.85 ~~6.91~~	332	0.91	-130	sl. cloudy
1055	3.5	20.8	6.68	367	0.33	-149	clear
1100	4.0	20.2	6.68	366	0.39	-140	"

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 11/9/00 Time Sampled: 11:05

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA, AM-18 (MEE) 2 G.A. VOA.

E300.1(Nitrate+Nitrite) 1-100ml poly, E320.1 (Bromide) 1-500 ml poly

SW9060M (Total Org. Carbon) 1-100ml poly SW8260 (VOCs-oil)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.01	No obvious color
Ferrous Iron:	1:4 Dilution 2.8 x 4 = 11.2	orange
Carbon Dioxide:	86 x1.0 = 86	~~lt pink color~~ 100-400 mg/L Test
Manganese:	3.4	lt pink color
Sulfate:	0	No obvious color
Alkalinity:	203 X1.0 = 203	100-400 mg/L test
Chloride:	28 X0.1 = 2.8	10-40 mg/L Test
Other:		

Sampled By: J. Bidgood.

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW5D

Weather:

Static Water Level (ft): 40.79 Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1220	1	17.8	7.35	227	0.70	+68	clear
1226	2.5	19.9	6.76	266	0.50	+77	"
1235	5	20.1	6.78	274	0.37	+126	"
1245	7	20.7	6.76	284	0.22	+94	"
1252	8	20.3	6.64	281	0.22	+91	clear

Total Volume Removed: 9 (gallons) (casing volumes)

Date Sampled: 11/9/00 Time Sampled: 1300

Duplicate Sample ID PES-DP1/110900 Duplicate Date/Time 0700 MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA, AM-18 (MEE) 2 - G.A VOA

E300.1(Nitrate+Nitrite) 1-100 ml poly, E320.1 (Bromide) 2 - 500 ml poly

SW9060M (Total Org. Carbon) 2 - 100 ml poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.02 mg/L	no obvious color.
Ferrous Iron:	0.01 mg/L	very Faint orange color.
Carbon Dioxide:	283 x 0.2 = 57 mg/L	20-100 mg/L Range test.
Manganese:	0.4 mg/L.	light violet color.
Sulfate:	0.0	no turbidity.
Alkalinity:	159 x 1 = 159 mg/L	100-400 range test. 1.600N cart.
Chloride:	151 x 0.1 = 15.1 mg/L	10-40 range test 0.1600N cart
Other:		

Sampled By:

Notes: checked Redox probe reading w/ std solution and comparing to reading of spare probe.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

28.3
2
5 6.6

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES - MW65

Weather:

Static Water Level (ft): 40.72 Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1435	0.5	17.6	6.37	204	0.7	+108	v. lt. brown
1440	1.5	19.4	6.28	220	0.43	+27	
1448	3.5	18.7	6.33	230	0.49	+68	
1453	4.5	19.3	6.26	230	0.28	+87	sl cloudy
1458	5.5	19.8	6.29	236	0.32	+32	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 11/9/00 Time Sampled: 1510

Duplicate Sample ID PES-DP2 110900 Duplicate Date/Time 11/9/00 @ 1800 MS/MSD collected? N

Laboratory Analytical Methods: SW8260 (VOCs-water) 4 VOA, AM-18 (MEE) 4 - G.A. VOA

E300.1(Nitrate+Nitrite) 2-100 ml poly, E320.1 (Bromide) 2-500 ml poly

SW9060M (Total Org. Carbon) 2-100 ml poly. SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.13	v. slt discoloration / cloudy solution
Ferrous Iron:	1.47	lt. orange (peachish color)
Carbon Dioxide:	591 x 0.2 = 118.2	20-100 mg/L Test
Manganese:	0.3	v. lt pink
Sulfate:	0	No obvious color
Alkalinity:	136 x 1.0 = 136	100-400 mg/L Test
Chloride:	62 x 0.1 = 6.2	10-40 mg/L Test
Other:		

Sampled By: J. Bridgood

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW6D

Weather:

Static Water Level (ft): 41.13 Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1545	1	17.3	7.15	172	1.81	+87	Sl. cloudy/Brown
1552	1.5	16.4	6.53	168	1.20	+88.5	
1557	2	16.3	6.49	170	1.29	+90.4	
1603	2.5	16.1	6.83	175	1.60	+94.7	
1608	3	20.5	6.43	199	1.57	+99.4	
1613	3.5	21.5	6.37	214	1.58	+92.5	clear.

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 11/9/00 Time Sampled: 1615

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? No

Laboratory Analytical Methods: SW8260 (VOCs-water), AM-18 (MEE)

E300.1(Nitrate+Nitrite) , E320.1 (Bromide)

SW9060M (Total Org. Carbon) SW8260 (VOCs-oil)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.0	no obvious color
Ferrous Iron:	0.09 mg/L	very faint orange.
Carbon Dioxide:	353×0.2 = 70.6 mg/L	20-100 range test.
Manganese:	1.5 mg/L	Faint violet color.
Sulfate:	22 mg/L	slight Turbidity
Alkalinity:	97 mg/L	100-400 mg/L test, 1.6 N Cart.
Chloride:		
Other:		

Sampled By: J. Bidjood.

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW7S

Weather: 50° F Rain, Strong wind From West.

Static Water Level (ft): 40.30 Casing Diameter (in): _____

Total Well Depth (ft): _____ Casing Volume (gal) _____

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0737	.5	18.3	6.84	510	0.22	-80	lt brown
0745	1	18.2	6.84	491	0.53	-110	
0752	3	24.2	6.77	568	0.25	-116	
0757	4	21.9	6.76	493	0.26	-130	lt cloudy - clear
0802	5	21.5	6.76	478	0.22	-136	" "

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 11/9/00 Time Sampled: 0805

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? No

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA, AM-18 (MEE) 2 G.A. VOA

E300.1(Nitrate+Nitrite) 1 100 ml poly, E320.1 (Bromide) 1 500 ml poly

SW9060M (Total Org. Carbon) 1 100 ml poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.04	No obvious color
Ferrous Iron:	1:4 Dilution	3.06 x 4 = 12.24 ORANGE
Carbon Dioxide:	136 x 1.0 = 136	100-400 mg/L Test
Manganese:	4.2	med pink to violet
Sulfate:	0 mg/L	No obvious color
Alkalinity:	121 x 2.0 = 242	200-800 mg/L Test
Chloride:	x 0.1 =	10-40 mg/L Test
Other:		

Sampled By: J. Bidjood

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW7D

Weather: 40° windy,

Static Water Level (ft): 40.70 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0857	1/2	18.8	6.98	265	0.54	—	Sl. cloudy
0909	4	21.2	6.70	345	0.26	+32	"
0914	5	21.6	6.72	351	0.28	+28	clear

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 11/9/00 Time Sampled: 0920

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? No

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA, AM-18 (MEE) 2 0.4. VOA

E300.1(Nitrate+Nitrite) 1 100ml poly, E320.1 (Bromide) 1-500 ml poly

SW9060M (Total Org. Carbon) 1 100ml poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.02 mg/L.	no obvious color.
Ferrous Iron:	0.16 mg/L	
Carbon Dioxide:	298 x 0.2 = 59.6 mg/L	20-100 mg/L test 0.3636N cont. (DUP = 258 x .2 = 51.6)
Manganese:	1.1 mg/L (DUP = 1.0 mg/L)	light violet.
Sulfate:	0.0	no turbidity.
Alkalinity:	151 x 1 = 151 mg/L,	100-400 mg/L test 1.600N cont., (DUP = 160 mg/L)
Chloride:	292 x 0.1 = 29.2 mg/L	10-40 mg/L test. (DUP =
Other:		

Sampled By: J. Bickford, Lynette Lemenskie

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

29.8 / 2 / 5.96

25.8 / 2 / 51.6

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PZS-MW8S

Weather: 55° breezy, lt. rain

Static Water Level (ft): 40.75 Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1428	1	19.8	6.76	374	0.33	-69	cloudy.
1434	2.5	21.6	6.77	411	0.24	-69	sl. brown
1439	3.5	21.3	6.80	408	0.34	-76.4	sl cloudy
1445	4	21.4	6.79	417	0.35	-80	Clear

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 11/8/00 Time Sampled: 1450

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? yes

Laboratory Analytical Methods: SW8260 (VOCs-water) 6 VOA, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1 - 100 ml poly, E320.1 (Bromide) 1-100 ml poly

SW9060M (Total Org. Carbon) 1 - 100 ml poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.06	
Ferrous Iron:	1:4 Dilution (1.13) x 4 = 4.52	
Carbon Dioxide:	(74) x 1.0 = 74	100-400 mg/L Test (out of 0.3636 NaOH)
Manganese:	0.7	
Sulfate:	<1	no color
Alkalinity:	(204) x 1.0 = 204	100-400 mg/L Test
Chloride:	~~[illegible]~~ 57 x 0.1 = 5.7	10-40 mg/L Test
Other:		

Sampled By: J. Bidgood

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW8D.

Weather: 55° rain breezy.

Static Water Level (ft): 40.95 Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1600	1/2	19.5	6.92	302	1.21	~~6.92~~ -52	Sl. cloudy
1605	2.	20.9	6.85	331	1.07	-55	
1610	3.5	21.7	6.78	387	0.90	-56	
1615	4.5	21.9	6.70	388	0.71	-48	
1620	6	21.9	6.66	375	0.65	-44	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 11/8/00 Time Sampled: 1620

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA, AM-18 (MEE) 2-VOA

E300.1(Nitrate+Nitrite) 1-100ml poly, E320.1 (Bromide) 1-500ml poly

SW9060M (Total Org. Carbon) 1-100ml poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.2 mg/L	Sl. turbidity, no obv. color.
Ferrous Iron:	2.38	Duplicate = 2.21 mg/L. Orange color.
Carbon Dioxide:	~~20 mg/L~~ 142 mg/L	(142x1) 100-400 mg/L test 3.6360N cont.
Manganese:	0.7 mg/L.	Sl. turbid. very Faint violet.
Sulfate:	23 mg/L	- Filtered Sample.
Alkalinity:	150 mg/L	(150x1) 100-400 mg/L
Chloride:	85x0.4 = 34 mg/L.	40-160 mg/L test. 0.1600N cont.
Other:		

Sampled By: J. Bidgood

Notes: Pump/Tubing Decon procedure: wash in Tub of potable H_2O & Alconox, Rinse in tub w/ Potable H_2O. Rinse w/ DI, Spray w/ Isopropol., Spray w/ DI.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-INJ1S

Weather:

Static Water Level (ft): 65.45 Casing Diameter (in): 2"

Total Well Depth (ft): 65.56 Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
	NOT MEASURED						

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: — Time Sampled: —

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) —, AM-18 (MEE) —

E300.1(Nitrate+Nitrite) —, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:		
Ferrous Iron:		
Carbon Dioxide:		
Manganese:		
Sulfate:		
Alkalinity:		
Chloride:		
Other:		

Sampled By:

Notes: Oil @ 39.04' below TOC, No Water In Well.
oil level measured w/ ORS interface probe.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: ~~B~~ PES-INJ1D

Weather:

Static Water Level (ft): 82.85 Casing Diameter (in): 2"

Total Well Depth (ft): 84.80 Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
		NOT MEASURED					

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: — Time Sampled: —

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? _____

Laboratory Analytical Methods: SW8260 (VOCs-water) —, AM-18 (MEE) —

E300.1(Nitrate+Nitrite) —, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:		
Ferrous Iron:		
Carbon Dioxide:		
Manganese:		
Sulfate:		
Alkalinity:		
Chloride:		
Other:		

Sampled By: _____

Notes: 0.1 @ 38.08' below TOC, measured w/ ORS Interface probe. Not enough water in well to sample (<~~0.5~~ 5')

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: ~~PES-m~~ PES-INJ2S

Weather: 45° partly sunny.

Static Water Level (ft): 52.20' Casing Diameter (in): 2"

Total Well Depth (ft): 54.30 Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance

NOT MEASURED

Total Volume Removed: 0 (gallons) 0 (casing volumes)

Date Sampled: 11/11/00 Time Sampled: 0900

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) —, AM-18 (MEE) —

E300.1(Nitrate+Nitrite) —, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) 2-40 ml VOA

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:		
Ferrous Iron:		
Carbon Dioxide:		
Manganese:		
Sulfate:		
Alkalinity:		
Chloride:		
Other:		

Sampled By: J. Bidgood

Notes: Oil @ 40.04' below T.O.C. measured w/ ORS Interface probe. not enough water to sample (<5'). Oil sample only. only a slight Rancid oil odor.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-1NJ2D

Weather: 45° partly sunny

Static Water Level (ft): 67.8 Casing Diameter (in): 2"

Total Well Depth (ft): 74.6 Casing Volume (gal): 1 for water.

Purging Method: bail Grundfos Redi-Flo2 (WaTerra Pump) other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0721	1	17.1	5.17	1268	0.98	+55	lt brown
0725	1	16.8	5.09	1217	0.99	+62	lt brown

Total Volume Removed: 1 (gallons) _____ (casing volumes)

Date Sampled: 11/11/00 Time Sampled: 0740 - water, 0813 - oil.

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 - 40 ml VOA, AM-18 (MEE) —

E300.1(Nitrate+Nitrite) —, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) 2 - 40 ml VOA.

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:		
Ferrous Iron:		
Carbon Dioxide:		
Manganese:		
Sulfate:		
Alkalinity:		
Chloride:		
Other:		

Sampled By: J. Bidgood.

Notes: Oil @ 36.95' btoc, 7 ft of ~~oil~~ water in well casing, oil/water interface measured w/ ORS interface probe. Only a slight ~~at~~ Rancid oil odor. Oil/water mixture was purged from well prior to collecting water sample. Oil occupied tubing because tubing was lowered through the oil.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-INJ35

Weather:

Static Water Level (ft): 65.0' Casing Diameter (in): 2"

Total Well Depth (ft): 64.93 Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance

NOT MEASURED

Total Volume Removed: — (gallons) — (casing volumes)

Date Sampled: 11/11/00 Time Sampled: 0946

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? YES - for oil

Laboratory Analytical Methods: SW8260 (VOCs-water) —, AM-18 (MEE) —

E300.1(Nitrate+Nitrite) —, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) 2 - 40 ml VOA.

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:		
Ferrous Iron:		
Carbon Dioxide:		
Manganese:		
Sulfate:		
Alkalinity:		
Chloride:		
Other:		

Sampled By: J. Bidgood

Notes: Oil @ 38.75' below TOC Measured w/ ORS interface probe. Only trace Amount of water in well casing.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES - INJ3D

Weather: 45°, partly cloudy.

Static Water Level (ft): 80.30 Casing Diameter (in): _____

Total Well Depth (ft): 84.5 Casing Volume (gal) _____

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
		NOT MEASURED					

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 11/11/00 Time Sampled: 1025

Duplicate Sample ID PES-DP4 Duplicate Date/Time 11/11/00 @ 0700 MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) —, AM-18 (MEE) —

E300.1(Nitrate+Nitrite) —, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) 2 - 40 ml VOA w/ HCL.

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:		
Ferrous Iron:		
Carbon Dioxide:		
Manganese:		
Sulfate:		
Alkalinity:		
Chloride:		
Other:		

Sampled By: J. Bidgood

Notes: Oil @ 38.00' below TOC - measured w/ ORS Interface Probe

Not enough water in well to collect a sample

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES - INJ 45

Weather: ~~65° Clear~~ 9B. 35°, windy

Static Water Level (ft): 50.96' Casing Diameter (in): _____

Total Well Depth (ft): 55.3 Casing Volume (gal): _____

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance

NOT MEASURED.

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: N/A Time Sampled: N/A

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) —, AM-18 (MEE) —

E300.1(Nitrate+Nitrite) —, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:		
Ferrous Iron:		
Carbon Dioxide:		
Manganese:		
Sulfate:		
Alkalinity:		
Chloride:		
Other:		

Sampled By: _____

Notes: Oil @ 40.4' below TOC measured w/ ORS Interface probe.

NO SAMPLES COLLECTED. NOT ENOUGH WATER.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-INJ4D

Weather:

Static Water Level (ft): 74.91 Casing Diameter (in):

Total Well Depth (ft): 74.71 Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance

NOT MEASURED

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: — Time Sampled: —

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) —, AM-18 (MEE) —

E300.1(Nitrate+Nitrite) —, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:		
Ferrous Iron:		
Carbon Dioxide:		
Manganese:		
Sulfate:		
Alkalinity:		
Chloride:		
Other:		

Sampled By:

Notes: Oil @ 36.0' below TOC, measured w/ ORS ~~Interface~~ Probe. ~~Not easy~~ no water in well casing. 0.2' PVC Riser attached to well since TD was measured.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW1S

Weather: 55° clear, slight Breeze

Static Water Level (ft): 40.86 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail (Grundfos Redi-Flo2) WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1212	1.5	19.3	6.38	249.	0.54	-63	greyish color
1217	3	21.1	6.54	293	0.20	-132	
1223	3.5	20.2	6.82	290	0.24	-127	
1238	4.5	21.4	6.95	313.	0.46	-146	
1243	5.5	23.7	6.94	318	0.21	-138	
1248	~6.25	23.3	6.88	315	0.18	-100	

Total Volume Removed: 6.5 (gallons) (casing volumes)

Date Sampled: 2/6/01 Time Sampled: 1250

Duplicate Sample ID NA Duplicate Date/Time NA MS/MSD collected? yes both on VOC ~~MEE~~ SS

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOAs +2 VOAs for MS & 2 for MSD, AM-18 (MEE) 2 VOAs

E300.1(Nitrate+Nitrite) 250mL poly, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	~~0.00~~ 0.02	
Ferrous Iron:	3.30 over dilution 1:2 = 2.40 × 2 = 4.80 mg/L	orange color
Carbon Dioxide:	376 × .2 = 76 mg/L	20-100 mg/L test 0.3636N used of NaOH
Manganese:	4.8 mg/L	light violet color
Sulfate:	0.0	no color or turbidity
Alkalinity:	167 mg/L	100-400 mg/L test range
Chloride:	67 × .1 = 6.7 mg/L	10-40 mg/L test range
Other:		

Sampled By: CAS/JBB

Notes: ORION 290A, YSI 85

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW1D (Deep)

Weather: 55° Clear, Breezy

Static Water Level (ft): 41.06 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1101	1	19.5	5.79	140	0.41	90	
1106	3	20.1	5.75	145	0.37	~~73~~ 73	
1111	4	21.2	6.72	147	0.33	57	
1116	~5.25	21.5	6.20	144	0.32	~~62~~ 62	
1121	6	21.6	5.76	144	0.27	70	
1126	~6.75	21.5	5.77	143	0.25	56	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 2/6/01 Time Sampled: 1130

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1-250 ml poly, E320.1 (Bromide) N/A

SW9060M (Total Org. Carbon) N/A SW8260 (VOCs-oil) N/A

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.09	No color sl. turbidity to sample
Ferrous Iron:	3.21 - over Range, Dilution 1:2 = 1.41 x 2 = 2.82 mg/L	Orange color
Carbon Dioxide:	377 x 0.2 = 76 mg/L	20-100 mg/L test 0.363 N Conc. Sodium hydroxide
Manganese:	0.0 - -	No Violet color
Sulfate:	0.0	No turbidity
Alkalinity:	72 mg/L	100-400 mg/L test; 190 x 0.4 = 76 mg/L 40-160 mg/L test Range
Chloride:	19 x 0.1 = 2 mg/L	10-40 mg/L test Range.
Other:		

Sampled By: J. B. Good & C. Spitzer

Notes: ORION 250A - pH/Redox
YSI - Temp/D.O./conductivity

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW25

Weather: cloudy & windy ~60

Static Water Level (ft): 41.10' Casing Diameter (in): _____

Total Well Depth (ft): _____ Casing Volume (gal) _____

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
CS ~~1454~~ 1455	1	21.6	6.97	278	1.24	-67	Tan
CS ~~1459~~ 1500	2	23.1	6.88	321	0.67	-42	"
1505	3	23.0	6.84	332	0.51	-51	"
1510	4	23.6	6.80	334	0.42	-48	"
1515	5	23.5	6.80	335	0.39	-48	

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 2/8/01 Time Sampled: 1515

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? ✓

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOAs ; AM-18 (MEE) 2 VOA's

E300.1(Nitrate+Nitrite) 1-250mL poly , E320.1 (Bromide) 1-500mL poly

SW9060M (Total Org. Carbon) w/nitrate SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.15 mg/L	no color
Ferrous Iron:	CS ~~[illegible]~~ 0.6 mg/L	CS ~~[illegible]~~ very faint orange
Carbon Dioxide:	225 mg/L	100-400 mg/L test
Manganese:	0.1 mg/L	no color
Sulfate:	1 mg/L	no color or turbidity
Alkalinity:	172	
Chloride:	141 x .1 = 14.1 mg/L	10-40 range test
Other:		

Sampled By: CAS/JRB

Notes: water level measured w/ oil water interface probe.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW2D

Weather:

Static Water Level (ft): 41.40. Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1350	1	21.3	7.08	304	0.55	-122	gray color, murky
1355	2	22.5	7.00	312	0.36	-163	"
1400	3	23.2	6.90	324	0.28	-206	"
1405	4	23.3	6.82	336	0.24	-219	"
1410	5	23.4	6.79	343	0.22	-216	"

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 02/08/01 Time Sampled: 1415

Duplicate Sample ID ✓ Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOAs, AM-18 (MEE) 2 VOAs

E300.1(Nitrate+Nitrite) 1-250 mL poly, E320.1 (Bromide) 1-500 mL poly

SW9060M (Total Org. Carbon) w/ nitrate SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.42	Blue color. Duplicate 0.33 - Blue color.
Ferrous Iron:	1:4 Dilution 2.20 x 4 = 8.8 mg/L	orange color.
Carbon Dioxide:	180 mg/L	100 - 400 range test.
Manganese:	2.3 mg/L.	- light violet.
Sulfate: - See below.	21 mg/L	~~Show~~ Sample water turbid ~~probably interference~~. JB
Alkalinity:	158 mg/L	100 - 400 mg/L test.
Chloride:		
Other:	Sulfate (DUP) 26 mg/L	Slight ~~B~~ Turbidity. Sample was filtered.

Sampled By: CAS

Notes: water Level measured w/ oil/water- Interface probe - No Oil Detected
purged water has strong sulfide or methane odor.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW35

Weather: 55°F very windy cloudy chance of T-storms

Static Water Level (ft): 40.90 Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail (Grundfos Redi-Flo2) WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0705 0707	1½	20.0	6.89	536	0.41	-120	clear
0710 0712	2½	20.1	6.87	535	0.38	-58	
0715 0717	3½	20.5	6.80	537	0.36	~~56~~ -78	
0720 0722	4½	20.4	6.77	534	0.34	-86	

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: ~~2/8/00~~ 2/9/01 Time Sampled: 0730

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOAs, AM-18 (MEE) 2 VOAs

E300.1(Nitrate+Nitrite) 1-250mL poly, E320.1 (Bromide) 1-500 mL poly

SW9060M (Total Org. Carbon) w/ nitrate SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.01	no color
Ferrous Iron:	1:5 dilution 3.28 x 5 = 16.4 mg/L	orange color.
Carbon Dioxide:	315 x 1 = 315 mg/L	100 - 400 range test.
Manganese:	7.6 mg/L	Dark violet color.
Sulfate:	0	no turbidity
Alkalinity:	293 mg/L	100-400 range test.
Chloride:	58 x 0.1 = 6 mg/L.	
Other:		

Sampled By: CAS

Notes: YSI 85, ORION 290A trouble w/ redox probe, switched probes

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

3.28
5
16.40

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW3D

Weather:

Static Water Level (ft): 41.10 Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1637	1½	21.1	7.17	272	1.46	16.1	
1642	2½	22.1	7.10	310	1.86	10.5	
1647	3½	22.7	7.04	320	1.68	11.7	
1652	4½	22.9	7.00	319	1.53	15.0	
1657	5½	22.9	7.00	318	1.60	12.6	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 2/8/01 Time Sampled: 1700

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOAs, AM-18 (MEE) 2 VOAs

E300.1(Nitrate+Nitrite) 1-250 mL poly, E320.1 (Bromide) 1-500 mL poly

SW9060M (Total Org. Carbon) w/nitrate SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.08 mg/L	no color
Ferrous Iron:	0.33 mg/L	very faint orange color
Carbon Dioxide:	448 x .2 = 89.6 mg/L	20-100 test range
Manganese:	0.0	no color or turbidity
Sulfate:	1 mg/L	no turbidity
Alkalinity:	106 mg/L	100-400 test range
Chloride:	198 x .1 = 19.8 mg/L	10-70 test range
Other:		

Sampled By: CAS

Notes: redox varying drastically because ORP is close to zero & machine is confused

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES MW45

Weather: 60° windy & cloudy

Static Water Level (ft): 41.02 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1130	½	21.7	6.63	284	0.83	+24.1	rusty color
1135	1½	22.6	6.60	322	0.30	+11.5	"
1140	2½ - 3½	23.6	6.55	339.	0.24	+6	
1145	4½	24.1	6.51	344	0.21	+1.8	
1150	5	24.2	6.51	348	0.21	-2.4	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 2/8/01 Time Sampled: 1200

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOAs, AM-18 (MEE) 2 VOAs

E300.1(Nitrate+Nitrite) 1-250 mL poly, E320.1 (Bromide) 1-500 mL poly

SW9060M (Total Org. Carbon) w/ nitrate SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:		
Ferrous Iron:	3.00 mg/L	orange color
Carbon Dioxide:	560 x 0.2 = 112 mg/L	20-100 range test
Manganese:	0.3 mg/L =	light violet color
Sulfate:	0 mg/L	no turbidity
Alkalinity:	160 mg/L	100-400 Range test
Chloride:	98 x 0.1 = 10 mg/L	
Other:		

Sampled By: CAS

Notes: water level checked w/ oil/water interface, — no oil Detected.
YSI 85 Orion 290A

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: ~~MW~~ DES-MW 4D

Weather:

Static Water Level (ft): 41.43. Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1017	1	19.5	7.07	~~165.5~~ 166	1.30	+ ~~28~~ 29	
1022	2	21.0	6.84	~~188.9~~ 189	0.41	+28	
1027	3½	22.0	6.78	209	0.33	+20	
1032	4½	22.1	6.74	216.	0.27	+20	
1037	5½	22.1	6.70	217	0.25	+26	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 2/8/01 Time Sampled: 1045

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? ND

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOAs, AM-18 (MEE) 2 VOAs

E300.1(Nitrate+Nitrite) 1-250 mL poly, E320.1 (Bromide) 1-500 mL poly

SW9060M (Total Org. Carbon) w/ nitrate SW8260 (VOCs-oil)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.00	
Ferrous Iron:	0.97	light orange color.
Carbon Dioxide:	454 x 0.2 = 90.8 mg/L	
Manganese:	0.0	no color.
Sulfate:	0 mg/L.	
Alkalinity:	90 x 1 = 90 mg/L	100 - 400 Range test.
Chloride:	89 x .1 = 9 mg/L.	
Other:		

Sampled By:

Notes: Oil water Indicator signals product/oil @ ~25 ft although their is not any oil at that depth

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES ~~MW5D~~ MW5S

Weather:

Static Water Level (ft): 40.09 Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail ~~Grundfos~~ Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0845	1/2	19.7	6.60	466	1.32	-59	clear
0850	1 1/2	20.5	6.60	494	0.69	-62	"
0855	2 1/2	20.2	6.60	496	0.46	-68	"
0900	3	19.9	6.60	494	0.40	-75	"

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 02/08/01 Time Sampled: 0900

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOAs, AM-18 (MEE) 2 VOAs

E300.1(Nitrate+Nitrite) 1-250 mL poly, E320.1 (Bromide) 1-500 mL poly

SW9060M (Total Org. Carbon) w/ nitrate SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.04 mg/L	no color
Ferrous Iron:	2.09 x 4 = 8.36 mg/L	1:4 dilution orange color
Carbon Dioxide:	912 x .2 182 mg/L	20-100 test range
Manganese:	2.3 mg/L	faint pink color
Sulfate:	2. mg/L	no color or turbidity
Alkalinity:	280 mg/L	100-400 range
Chloride:	103 x .1 = 10.3 mg/L	10-40 range
Other:		

Sampled By: CAS

Notes: no oil, YSI 85, Orion 290A

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW5D

Weather: 60° F, breezy, cloudy

Static Water Level (ft): 41.22 - Sheen Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0730	½	20.0	6.35	358	0.25	+166	slight turbidity
0735	1½	21.2	6.39	382	0.27	~~+85~~ +140	
0740	2-3	20.8	6.44	375	0.27	+130	
0745	3½	21.5	6.47	378	0.27	+111	
0750	4½	21.5	6.49	378	0.27	+106	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 02/08/01 Time Sampled: 0750

Duplicate Sample ID DUP-3 Duplicate Date/Time 02/08/01 0700 MS/MSD collected? no

Laboratory Analytical Methods: SW8260 (VOCs-water) ~~2~~ 4 VOAs, AM-18 (MEE) ~~2~~ 4 VOAs

E300.1(Nitrate+Nitrite) 2-250mL poly, E320.1 (Bromide) 2-500 mL poly

SW9060M (Total Org. Carbon) w/ Nitrate SW8260 (VOCs-oil)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.06 mg/L	no color change.
Ferrous Iron:	0.12 mg/L	Light orange color.
Carbon Dioxide:	381 x 0.2 = 76 mg/L	20-100 range test.
Manganese:	0.6 mg/L	- light violet color.
Sulfate:	0. mg/L	no turbidity.
Alkalinity:	145 mg/L	100-400 range test.
Chloride:	179 x 0.1 =	18 mg/L.
Other:		

Sampled By: CAS/JBB

Notes: oil @ 41.21 water @ 41.22

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW65

Weather: 70° cloudy, breezy.

Static Water Level (ft): 40.93 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1349	1/2	20.8	6.99	247	1.78	+38	Red/silty.
1356	1	21.9	6.88	284	0.60	+20	"
1401	2.5	22.6	6.83	297	0.50	+12	"
1407	3.5	23.0	6.77	303	0.44	+8.5	Slightly cloudy
1412	4.5	23.0	6.75	304	0.40	+7.8	

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 2/7/01 Time Sampled: 1415

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA, AM-18 (MEE) 2 - VOA

E300.1(Nitrate+Nitrite) 1-250ml poly, E320.1 (Bromide) 1-500ml poly

SW9060M (Total Org. Carbon) - Same as Nitrate/Nitrite SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.01	
Ferrous Iron:	0.65 mg/L	very light orange color.
Carbon Dioxide:	153×1 = 153 mg/L	100-400 range test 3.636N COM.
Manganese:	0.3 mg/L	- very light violet color.
Sulfate:	0	no turbidity
Alkalinity:	141×1 = 141 mg/L	- 100-400 range test.
Chloride:	92×0.1 = 9 mg/L	
Other:		

Sampled By: BBD./CAS

Notes: water level checked w/ oil/water interface probe - NO oil in well.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW6D

Weather: 73° cloudy

Static Water Level (ft): 41.36' Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
~~1547~~ CS 1547	½	20.4	6.80	212.0	2.65	+10.0	rusty
~~1542~~ CS 1552	1	20.8	6.74	222.	2.22	+7.4	"
1557	1½	21.9	6.72	234	1.91	+3.5	" brown
1602	2	22.5	6.70	239	1.81	+5.8	" to clear
1607	3	22.8	6.67	240	1.69	+1.3	clear

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 2/7/01 Time Sampled: 1615

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? yes

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOAs + 2 for MS + 2 MSD, AM-18 (MEE) 2 VOAs + ~~2 for MS & 2 (MSD)~~ CS

E300.1(Nitrate+Nitrite) 1 - 250mL poly, E320.1 (Bromide) 1 - 500 mL poly

SW9060M (Total Org. Carbon) w/ Nitrate SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.31 mg/L	same color as blank
Ferrous Iron:	0.66 mg/L	faint orange color
Carbon Dioxide:	149 mg/L	100-400 test used
Manganese:	0.4 mg/L	light pink color
Sulfate:	2 mg/L	slightly cloudy
Alkalinity:	94 mg/L	100-400 test
Chloride:	168 × .1 = 16.8 mg/L	
Other:		

Sampled By: CAS

Notes: water level measured w/ oil/water interface probe - NO OIL DETECTED.
YSI 85, Orion 290A

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: ~~PES MW65~~ PES-MW75

Weather: 65° F cloudy.

Static Water Level (ft): 40.73 Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1028	1	20.3	7.11	542	0.53	-76	
1033	2	19.8	7.05	524	0.36	-37	
~~1038~~							
1041	3	18.7	6.98	521	0.45	-51	
1046	3½	18.3	6.94	519	0.44	-52	
1051	4½	18.5	6.92	524	0.50	-50	
1057	5	21.4	6.90	543	0.27	-56	
1102	5½	21.3	6.86	563	0.20	-59	

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 2-7-01 Time Sampled: 1100

Duplicate Sample ID DUP-2 Duplicate Date/Time 02/07/01 0700 MS/MSD collected? ~~X VOAS~~

Laboratory Analytical Methods: SW8260 (VOCs-water) 4 X VOAS, AM-18 (MEE) 4 X VOAS

E300.1(Nitrate+Nitrite) 250 mL poly, E320.1 (Bromide) 500 mL poly

SW9060M (Total Org. Carbon) 1 w/ nitrite SW8260 (VOCs-oil) —

Field Geochemistry: **Results:** **Method/Comment:**

Hydrogen Sulfide: 0.05 mg/L no color.

Ferrous Iron: 1:4 Dilution 2.46 × 4 = 9.72 mg/L Duplicate - 1:4 Dilution 2.55 × 4 = 10.20 mg/L

Carbon Dioxide: 280 × 1 = 280 mg/L 100 - 400 mg/L Range test. ; 270 × 1 = 270 mg/L.

Manganese: 3.3 mg/L Light violet color; Duplicate = 3.5 mg/L light violet color.

Sulfate: 0 mg/L

Alkalinity: 334 × 1 = 334 mg/L - 100-400 range test. Duplicate = 336 × 1 = 336 mg/L

Chloride: 19 × 0.1 = 1.9 mg/L 10-40 mg/L test.

Other:

Sampled By:

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

2.4L 2.55
4 × 4
7.72 10.20

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW~~08~~ 25 7D

Weather:

Static Water Level (ft): 41.14 Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1215	2	20.9	7.07	398	0.80	-11	lt brown color
1218	2 ½	21.2	7.08	399	0.40	-4	"
1221	3	21.3	7.07	405	0.30	-7	
1225	3½	22.5	7.03	420	0.29	-5	
1229	4	23.3	7.01	429	0.26	-10	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: ~~02~~ 02/07/01 Time Sampled: 1235

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOAs, AM-18 (MEE) 2 VOAs

E300.1(Nitrate+Nitrite) 1-250 mL poly, E320.1 (Bromide) 1-500 mL poly

SW9060M (Total Org. Carbon) w/ nitrate SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.08 mg/L	no color
Ferrous Iron:	0.13 mg/L	no color or very faint orange
Carbon Dioxide:	486 × 0.2 = 67.2 mg/L	20-100 test range
Manganese:	0.4 mg/L	no color
Sulfate:	0 mg/L	no color
Alkalinity:	141 mg/L	100-400 test range
Chloride:	320 × .1 = 32.0 mg/L	10-40 mg test
Other:		

Sampled By: CAS

Notes: YSI 85, Orion 290A

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW85

Weather: 56 cloudy highs in 70's today

Static Water Level (ft): 40.43 Casing Diameter (in): _____

Total Well Depth (ft): _____ Casing Volume (gal) _____

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0734	½	18.6	6.68	503	0.61	~~500~~ -22	slightly brown
0739	1½	19.9	6.75	552	0.45	-40	reddish brown
0744	2½	20.6	6.79	546	0.44	-40	"
0749	3½	20.7	6.84	544	0.38	-50	
0754	4½	21.1	6.86	549	0.35	-52	

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 08/07/01 Time Sampled: 0800

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOAs, AM-18 (MEE) 2 VOAs

E300.1(Nitrate+Nitrite) 1 250 mL poly, E320.1 (Bromide) 1 500 mL

SW9060M (Total Org. Carbon) w/ nitrate SW8260 (VOCs-oil) _____

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.10 mg/L	No color obvious
Ferrous Iron:	1:2 dilution 1.86 x 2 = 3.72 mg/L.	
Carbon Dioxide:	566 x 0.2 = 114 mg/L	20-100 range test.
Manganese:	0.04 mg/L	sl. violet color.
Sulfate:	0 mg/L	no turbidity
Alkalinity:	317 x 1.0 = 317 mg/L	100-400 range test.
Chloride:	21 x 0.1 = 2 mg/L	10-40 mg/L test.
Other:		

Sampled By: CAS/JBB

Notes: YSI 85 for DO, conductivity, & temp; Orion 290A for ORP & pH

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

1.86
2
3.72

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: ~~PES-8D~~ PES-MW8D

Weather: 65° cloudy.

Static Water Level (ft): 41.13 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0900	1/2	18.9	7.29	343	0.61	+48	rusty brown
0905	1 1/2	18.9	7.19	338	0.44	+72	"
0910	2 1/2	19.7	7.12	366	0.41	+90	no color
0915	3 1/2	20.8	7.02	397	0.38	+99.4	"
0920	4 1/2	21.4	6.99	403	0.33	+72.3	"
0925	5 1/2	21.5	6.95	400	0.30	+67	"

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 02/07/01 Time Sampled: 0930

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? No

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOAS, AM-18 (MEE) 2 VOAS

E300.1(Nitrate+Nitrite) 1 250 mL poly, E320.1 (Bromide) 1 500 mL poly

SW9060M (Total Org. Carbon) w/ Nitric SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	~~0.20 mg/L faint orange color~~	0.03 mg/L no color
Ferrous Iron:	0.20 mg/L faint orange color	
Carbon Dioxide:	309 x .2 = 62 mg/L	20-100 test range
Manganese:	0.20 mg/L - no color	
Sulfate:	4 mg/L no color slight turbidity	
Alkalinity:	141 mg/L	100-400 test range
Chloride:	272 x .1 = 27.2 mg/L	10-40 mg/L test
Other:		

Sampled By: JBB/CAS

Notes: Orion 290A and YSI 85

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: 0076L15UF

Weather: 60° cloudy

Static Water Level (ft): Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1637	1/2	18.0	6.11	272	2.03	+97	cloudy
1641	1.5	20.0	6.03	322	0.94	+91	"
1646	2	21.2	5.94	334	0.69	+92	Sl. cloudy
1651	3	21.6	5.87	336	0.55	+92	
1657	5	22.0	5.79	340	0.56	+96	"

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 2/6/01 Time Sampled: 1700

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) (2) VOA, AM-18 (MEE) (2) VOA

E300.1(Nitrate+Nitrite) (1) 250ml poly, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.09	no color
Ferrous Iron:	0.13	light orange color, no turbidity
Carbon Dioxide:	250 x 40 = 250 mg/L	100-400 mg/L test, 3.636 cart.
Manganese:	0.0 mg/L	no obvious color
Sulfate:	0.0 mg/L	no white turbidity
Alkalinity:	200 x 1 = 200 mg/L	100 - 400 mg/L Range test. 1.600 N cart.
Chloride:		
Other:		

Sampled By: J.B. Bidyak, Chris Spatzel

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: 0076L15LF

Weather: 65° F windy

Static Water Level (ft): 41.42 btoc. Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1515	1/2	19.8	6.76	270	0.87	95	brown color
1520	1.5	18.8	6.71	260	0.76	82	brown color
1525	2	19.9	6.58	260	0.67	83	"
1530	2.5	19.5	6.58	254	0.79	80	"

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 2/6/01 Time Sampled: 1535

Duplicate Sample ID DUP-1 Duplicate Date/Time 0900 MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 4 VOA's, AM-18 (MEE) 4 VOAs

E300.1(Nitrate+Nitrite) 2 250 mL Poly's, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
~~Hydrogen Sulfide~~ Sulfate:		
Ferrous Iron:	0.85 u meter reading but no noticable color, flocculant in Accuvac	
Carbon Dioxide:	330 x .2 = ~~66 mg/L~~ 66 mg/L	
Manganese:	0.00 no color	100-400 mg/L test very turbid
~~Sulfate~~ Sulfide:	0. flocculant occured in vial but no color what so ever	
Alkalinity:	116 mg/L	100-400 test
Chloride:	60 x .1 = 6 mg/L	turbid
Other:		

note written on wrong line

Sampled By: CAS/JRB

Notes: ORION 290 A, YSI 85

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-INJ 3D

Weather: 65° windy.

Static Water Level (ft): See Field Book Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: (bail) Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1040	1	19.3		2.8	1.51	+189	oily/clear.

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 2/9/01 Time Sampled: 0950

Duplicate Sample ID Oil-DUP Duplicate Date/Time 2/9/01/0700 MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1-250ml poly, E320.1 (Bromide) 1-500ml poly

SW9060M (Total Org. Carbon) w/ N+N SW8260 (VOCs-oil) ~~2~~ 4 VOA NO HCL.

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	oil in sample water.	
Ferrous Iron:	>3 mg/L bright orange.	
Carbon Dioxide:		
Manganese:		
Sulfate:		
Alkalinity:		
Chloride:		
Other:		

Sampled By: [illegible]

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

2/7/01

TO: BECKY HANS

Fax# 412-826-3433

Becky —

the Chain of Custody, For the samples you will Receive today is Incorrect. All of the sample containers did not get into the cooler that was shipped I've Faxed A correct C.O.C For the Samples you will Receive today (Thursday)

— JASON Bickford
PARSONS ES.

Corrected C.O.C.
Faxed to Becky HANS 2/7/01

CHAIN - OF - CUSTODY RECORD

Phone: (412) 826-5245 | **Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238** | Fax No. : (412) 826-3433

Company : PARSONS ES
Co. Address : Denver CO
Proj. Manager: Bruce Henry
Proj. Location: NSA-MID SOUTH
Proj. Number: 737490.04000
Phone # : 303.831.8100 **Fax # :**

Sampler's signature : [signature]

Results to : Bruce Henry

Invoice to :

Cooler ID	Cooler Temp.

Sample ID	Sample Description	Date	Time	Comp.	Grab	# Cont.	VOCs SW8260B	AM-18 Methane, Ethane, Ethene	Nitrate+Nitrite E300.1	Total Org. Carbon SW9060M	Bromide E320.1				Remarks
	0076L15LF/020601	2-6-01	1535		X	3		X	X						
	0076L15UF/020601	2-6-01	1700		X	5	X	X	X						
	DUP-1	2-6-01	0900		X	3		X	X						
	PES-MW8S/~~020601~~ 020701	2-7-01	0800		X	6	X	X	X	X	X				
	PES-MW8D/020701	2-7-01	0930		X	4	X	X							
	PES-MW7S/020701	2-7-01	1100		X	6	X	X	X	X	X				
	PES-MW7D/020701	2-7-01	1235		X	6	X	X	X	X	X				
	PES-MW6D/020701	2-7-01	1615		X	6	X	X	X	X	X				

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
[signature]	PARSONS ES	2/7/00	1700				
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW-1S

Weather: 95°F, Humid, partly cloudy, breeze from east

Static Water Level (ft): 39.97 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail (Grundfos Redi-Flo2) WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1820	0.5	25.68	6.44	378	1.16	-150	greyish
1824	1.0	26.58	6.49	362	0.78	-152	
1828	2.0	26.92	6.50	360	0.67	-148	
1832	2.5	26.69	6.48	358	0.58	-145	
1837	2.75	28.70	6.48	352	0.52	-143	
1842	3.0	27.99	6.48	350	0.50	-141	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/6/01 Time Sampled: 1850

Duplicate Sample ID PES-DP1 Duplicate Date/Time 8/6/01 1400 MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 4 VOA HCL, AM-18 (MEE) ~~2~~ 4 VOA

E300.1(Nitrate+Nitrite) 1- 125mL poly, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) N/A SW8260 (VOCs-oil) N/A

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0	no color.
Ferrous Iron:	2.67 x 6 =	16mg/L orange color 1:6 Dilution.
Carbon Dioxide:	456 x 0.2 = 92 mg/L	
Manganese:	7.7 mg/L.	violet color
Sulfate:	0	no turbidity.
Alkalinity:	179 digits x 1 mg/L/digit = 179 mg/L.	
Chloride:	132 digits x 2 (1/2 dilution) = 264 x 0.1 = 26 mg/L	
Other:		

Sampled By: JBB.

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

14
2.67
6
16.02

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW 1D

Weather: 95° F partly cloudy, Humid, Breeze From East.

Static Water Level (ft): 40.15 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1622	1.5	23.87	5.86	115	8.51	+3	silty.
1626	2.	24.83	5.81	114	7.30	+6	
1631	2.5	26.15	5.82	116	6.60	+12	
Note* 1647	3.5	34.64	5.84	117	2.76	+38	
1651	4.0	29.84	5.77	115	2.01	+48	
1656	4.25	28.44	5.77	115	1.64	+62	
1700	4.5	27.74	5.78	114	1.38	+69	
1705	5.0	27.56	5.80	114	1.04	+63	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/6/01 Time Sampled: 1705

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? yes 4 VOA

Laboratory Analytical Methods: SW8260 (VOCs-water) 6 VOA HCL, AM-18 (MEE) 2 VOA Gl. AMB.

E300.1(Nitrate+Nitrite) 1-125mL, E320.1 (Bromide) N/A

SW9060M (Total Org. Carbon) N/A SW8260 (VOCs-oil) N/A.

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.0	no color.
Ferrous Iron:	0.58	light orange color.
Carbon Dioxide:	268 x 0.2 = 54 mg/L	20-100 mg/L test. 0.3636 N NaOH
Manganese:	0.0	no color
Sulfate:	0.0	no turbidity.
Alkalinity:	52 dgts x 1 mg/L = 52 mg/L	
Chloride:	19 dgts x 0.1 = 2 mg/L.	
Other:		

Sampled By:

Notes: DO. checked w/ CHEMets D.O. Kit K7512 @ 1631 = 2 mg/L.
* DO reading high. Probe cleaned + reinserted. DO decreased significantly.
D.O. checked w/ chemetics DO. @ 1705 1.3 mg/L
(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: ~~PES-MW2D~~ AL PES-MW2S

Weather:

Static Water Level (ft): ~~40.45~~ AL 40.12 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail ~~Grundfos Red~~ Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0914	1.5	25.2	6.22	213	2.41	-41	Cloudy/brownish
0917	2	25.9	6.21	208	1.48	-35	
0920		26.6	6.21	208	1.10	-32	
0924		26.7	6.21	208	1.16	-27	
0928	2.5	28.6	6.23	209	1.00	-32	
0932		29.2	6.25	212	0.96	-34	
0935	3	29.4	6.25	216	0.95	-32	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/9/01 Time Sampled: 0940

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? NO.

Laboratory Analytical Methods: SW8260 (VOCs-water) 2-VOA vial, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1-125 mL poly, E320.1 (Bromide) 1-500 mL poly

SW9060M (Total Org. Carbon) 1-125 mL poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.05 mg/L	Light blue (slight) color
Ferrous Iron:	1.34 mg/L	Light orange color
Carbon Dioxide:	418 x 0.2 = 83.6 mg/L	(20-100 range test)
Manganese:	0.5 mg/L	Light violet color
Sulfate:	2 mg/L	Slight turbidity present
Alkalinity:	163 mg/L	(163 digit 100-400 range test)
Chloride:	56 digits x 0.1 mg/L/digit = 5.6 mg/L	(10-40 range test)
Other:		

Sampled By: ANL

Notes: Depth to water measured w/ Interface probe

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: ~~PES-MW2S~~ AL PES-MW2D

Weather:

Static Water Level (ft): ~~40.12~~ AC 46.45 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0745	1.0	24.3	5.80	149	1.84	+13	Grey, cloudy
0749	1.5	24.5	5.90	153	0.68	-41	
0752	2.0	24.7	6.02	157	0.38	-56	
0755	2.5	24.8	6.12	163	0.09	-73	
0800	2.75	24.8	6.12	168	0.11	-81	
0803	3.0	24.9	6.20	172	0.12	-88	
0807	3.5	24.9	6.21	175	0.12	-90	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/9/01 Time Sampled: 0815

Duplicate Sample ID PES-DP3 Duplicate Date/Time 0700 MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) 4 VOA HCL, AM-18 (MEE) 4 - VOA

E300.1(Nitrate+Nitrite) 2-125 ml/poly, E320.1 (Bromide) 2-500 ml poly

SW9060M (Total Org. Carbon) 2-500ml poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	* 0.06 mg/L	Lt. Blue color.
Ferrous Iron:	0.68 x 5 (1:5 dilution) = 3.5 mg/L.	DUPLICATE 1:2 dil. = 3.6 mg/L
Carbon Dioxide:	428 x 0.2 = 86 mg/L	(20-100 mg/L test)
Manganese:	1.1 mg/L	light violet color.
Sulfate:	0 mg/L.	no turbidity.
Alkalinity:	131 mg/L	(131 digits 100-400 mg/L test)
Chloride:	37 digits x 0.1 = 4 mg/L.	(10-40 mg/L test)
Other:		

Sampled By:

Notes: D.O. checked w/ chemetrics = 0.2 mg/L.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

.7
5/3.5

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW35

Weather: Overcast, hot, ~85°F, breeze from west

Static Water Level (ft): 40.08 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1038	1.5	24.6	6.24	283	1.65	-91	Grayish Turbid
1042	2.0	26.4	6.26	283	0.80	-96	
1045		26.8	6.27	283	1.07	-97	
1049	3.0	28.2	6.27	279	0.78	-99	
1053		29.0	6.26	278	0.70	-99	
1058	4.	29.6	6.27	278	0.69	-96	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/9/01 Time Sampled: 1105

Duplicate Sample ID – Duplicate Date/Time – MS/MSD collected? –

Laboratory Analytical Methods: SW8260 (VOCs-water) 2-VOA HCL, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1-125 poly, E320.1 (Bromide) 1-500mL poly

SW9060M (Total Org. Carbon) 1-125 mL poly SW8260 (VOCs-oil) –

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.0 mg/L.	no blue color.
Ferrous Iron:	2.2 × 5 = 11 mg/L	(1:5 dilution)
Carbon Dioxide:	~~704 × 0.2 mg/L/digit = (140)~~	(10-100 mg/L test) Duplicate – 190 mg 100-400 test
Manganese:	3.7 mg/L.	
Sulfate:	0.0.	
Alkalinity:	202 mg/L	(100-400 mg/L test)
Chloride:	55 × 0.1 mg/L/digit = 6 mg/L	10-40 mg/L test
Other:		

Sampled By: TBB.

Notes: D.O. w/ chemetrics test kit K7501 = 0.4 mg/L @ time of sample collection

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW3D

Weather: Overcast hot, 85°F, breeze from west

Static Water Level (ft): ~~40.08~~ 40.32 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1150	1	26.3	6.58	290	2.07	-126	Bluish gray
1155		27.0	6.58	313	1.84	-133	
1200	2.0	27.7	6.56	328	2.04	-130	
1208	2.5	28.4	6.54	334	2.05	-125	Clear
1212		28.9	6.54	331	1.07	-124	
1217	3.5	28.9	6.53	328	0.84	-124	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/9/01 Time Sampled: ~~1120~~ 1220 gB.

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA HCL, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1-125mL, E320.1 (Bromide) 1-500mL poly

SW9060M (Total Org. Carbon) 1-125mL poly. SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.04 mg/L	No blue color
Ferrous Iron:	Dilution 1:5 1.69 x 5 = 8.45 mg/L	Dilution 1:3 2.76 x 3 = 8.28 mg/L
Carbon Dioxide:	168 mg/L	(100-400 range)
Manganese:	7.0 mg/L	Violet color
Sulfate:	0.0 mg/L	no turbidity
Alkalinity:	177 mg/L	(100-400 range)
Chloride:	40 digits x 0.1 mg/L/digit = 4 mg/L	(10-40 range)
Other:		

Sampled By: AVL

Notes: DO, w/ Chemetrics = <0.05 mg/L.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: DES-MW4S

Weather: Sunny, hot, humid, 90°F, breeze from west

Static Water Level (ft): 40.08 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1726	2.0	24.1	6.07	276	11.0	-21	Cloudy
1734	2.5	27.9	6.02	280	1.27	-12	
1737		29.4	6.03	282	1.01	-14	
1741		30.4	6.03	282	1.00	-14	
1745	3.	31.0	6.04	282	1.03	-13	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/8/01 Time Sampled: 1750

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA (HCl), AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1-125 mL poly, E320.1 (Bromide) 1-500 mL poly

SW9060M (Total Org. Carbon) 1-125 mL poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.0	no blue color.
Ferrous Iron:	1.07 mg/L	Light orange color.
Carbon Dioxide:	623 digits x 0.2 = 125 mg/L	(20-100 mg/L test.), (Duplicate = 175 mg/L 100-400 mg/L test)
Manganese:	—	
Sulfate:	0.0	no turbidity
Alkalinity:	159 digits = 159 mg/L	(100-400 mg/L test)
Chloride:	93 x 0.1 = 9 mg/L	(10-40 mg/L test)
Other:	Sulfate Reagents checked w/ 50 mg/L standard, meter = 48 mg/L.	

Sampled By: BB

Notes: D.O. Checked w/ Chemetrics = 0.9, tested during sample collection.

Filtered Field Geochem sample used.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: DES-MW4D

Weather: Sunny, hot, humid, 90°F, breeze from west

Static Water Level (ft): 46.58 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1615	1.0	24.7	6.08	175	1.36	+78	Cloudy
1619	1.5	26.3	6.01	176	1.17	+71	
1623	1.75	28.2	6.00	175	1.14	+64	
1628	2.0	30.8	6.09	174	2.16	+56	
1632		30.8	6.04	175	1.30	+44	
1637	2.5	30.1	6.01	176	1.14	+36	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/8/01 Time Sampled: ~~1643~~ 1645

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA HCL, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1-125 ml poly, E320.1 (Bromide) 1-500 ml poly

SW9060M (Total Org. Carbon) 1-125 ml poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.02 mg/L	No blue color
Ferrous Iron:	1.38 mg/L	orange color
Carbon Dioxide:	319 digits × 0.2 mg/L/digit = 63.8 mg/L	(20-100 range test)
Manganese:	—	
Sulfate:	0.0 mg/L	No turbidity
Alkalinity:	98 digits × 1.0 mg/L/digit = 98 mg/L	(100-400 range test)
Chloride:	97 digits × 0.1 mg/L/digit = 9.7 mg/L	(10-40 range test)
Other:		

Sampled By: AML

Notes: 0.4 mg/L = Result of Chemetrics D.O. test.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW5S

Weather: Overcast, humid, ~85°F

Static Water Level (ft): 39.97 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0905	1/2	24.1	6.47	461	2.72	-105	clear.
0908		25.4	6.44	462	1.80	-105	
0912	1	25.8	6.43	461	1.43	-106	
0918		26.0	6.41	462	1.19	-105	
0925	1.5	25.5	6.40	455	1.04	-102	
0930	2.0	26.8	6.39	461	0.89	-101	
0935	2.5	26.5	6.41	464	0.76	-106	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/8/01 Time Sampled: 0930

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2-VOA, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1-125ml poly, E320.1 (Bromide) 1-500ml poly

SW9060M (Total Org. Carbon) 1-125mL poly, SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.3 mg/L	No blue color
Ferrous Iron:	Dilution 5:1 (10mL sample, 40mL DI water) 0.90 x 5 = 4.5 mg/L	
Carbon Dioxide:	620 mg/L/digits x .2 = 124 (20-100 range)	
Manganese:	—	
Sulfate:	0.0 mg/L	No turbidity
Alkalinity:	268 mg/L	
Chloride:	72 mg/L/digit x 0.1 digits = 7.2 mg/L	(10-40 range test)
Other:		

Sampled By: AML

Notes: D.O checked w/ Chemetrics = 0.6 mg/L 0-1 mg/L test.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW5D

Weather: 80°F Humid. Cloudy

Static Water Level (ft): 40.36 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail (Grundfos Redi-Flo2) WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0741		22.2	6.88	333	4.7	+4	turbid.
0756		24.3	6.37	320	0.44	+32	
0759	4	24.5	6.37	319	0.42	+39	
0802	5	24.8	6.37	319	0.41	+45	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/8/01 Time Sampled: 0815

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA HCL, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1-125mL poly, E320.1 (Bromide) 1-500mL poly

SW9060M (Total Org. Carbon) 1-125mL poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.00.	
Ferrous Iron:	0.00	no color.
Carbon Dioxide:	342 digits × 0.2 mg/L/digit = 68 mg/L	20-100mg/L test.
Manganese:	—	
Sulfate:	0.0	
Alkalinity:	140 digits × 1 mg/L/digit = 140 mg/L.	
Chloride:	200 digits × 0. 0.1 mg/L/digit = 20 mg/L.	
Other:	CO_2 dup = 467 × 0.2 = 94 mg/L	

Sampled By: JBB

Notes: ~~Redox probe not working properly.~~ JBB

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW06S

Weather: Hot, humid, partly cloudy 90°F

Static Water Level (ft): 40.07 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail (Grundfos Redi-Flo2) WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1359	2	27.3	6.22	253	2.03	67	Turbid.
1402		27.5	6.19	258	1.40	70	
1406		28.2	6.14	264	1.07	65	
1409	4	28.3	6.12	264	1.04	63	
1412		27.8	6.11	265	0.94	63	
1415	5	27.5	6.09	264	0.66	63	
1418	6	27.4	6.08	265	0.82	62	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/8/01 Time Sampled: 1425

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2-VOA HCL, AM-18 (MEE) 2 VOA (amber)

E300.1(Nitrate+Nitrite) 1-125 mL ~~1-250 mL~~, E320.1 (Bromide) 1-500 mL poly

SW9060M (Total Org. Carbon) 1-125 mL poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.03 mg/L	No blue color
Ferrous Iron:	0.10 mg/L	Light orange color
Carbon Dioxide:	520 digits × 0.2 mg/L/digits = 104 mg/L	(20-100 range test)
Manganese:	—	
Sulfate:	0.0 mg/L	No turbidity
Alkalinity:	158 mg/L	(100-400 range test)
Chloride:	11.5 mg/L	(10-40 range test)
Other:		

Sampled By: AML

Notes: D.O checked w/ chemetrics test @ 1417 = 0.5 mg/L.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW6D

Weather: Hot, humid, partly cloudy, 90°F

Static Water Level (ft): 40.57 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail (Grundfos Redi-Flo2) WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1504	0.5	26.0	6.43	201	7.13	+34	cloudy, brown-orange
1509	1.0	27.9	6.32	206	2.35	+47	
1512	1.5	27.8	6.30	207	1.60	+43	
1515	2.0	27.5	6.27	210	1.09	+27	
1518	2.25	27.6	6.26	212	0.92	+16	
1523	2.5	28.0	6.25	215	0.88	+11	
1526	2.75	28.4	6.25	216	0.87	+10	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/8/01 Time Sampled: 1535

Duplicate Sample ID – Duplicate Date/Time – MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2-VOA, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1-125 mL poly, E320.1 (Bromide) 1-500mL poly

SW9060M (Total Org. Carbon) 1-125 mL poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.0	
Ferrous Iron:	0.38	light orange color. (Duplicate = 0.40 mg/L)
Carbon Dioxide:	335 × 0.2 = 68 mg/L	(20-100 mg/L test) (Duplicate = 76 mg/L)
Manganese:	—	
Sulfate:	0.0	
Alkalinity:	143 digits = 143 mg/L	(100-400 mg/L test) (Duplicate = 128 mg/L.)
Chloride:	67 digits × 0.1 = 6 mg/L.	
Other:		

Sampled By: JBB

Notes: D.O. checked w/ Chemetrics. D.O. = 0.7 mg/L.
Filtered Field Geochem. w/ 0.45µ

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: ~~PES-7S~~ PES-MW7S

Weather:

Static Water Level (ft): 39.94 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail (Grundfos Redi-Flo2) WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1705	0.5	25.55	6.64	487	2.32	-118	Clear
1710	1.0	25.37	6.58	511	1.13	-111	
1713	1.5	25.88	6.55	511	0.99	-110	
1717	2.0	26.51	6.53	526	0.88	-111	
1725	3.0	26.81	6.52	524	0.76	-112	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/7/01 Time Sampled: 1725

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1-250 mL poly, E320.1 (Bromide) 1-500 mL poly

SW9060M (Total Org. Carbon) 1 250 mL poly SW8260 (VOCs-oil)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.02 mg/L	No Color
Ferrous Iron:	1:5 Dilution - 1.17 x 5 = 5.85 mg/L	Orange Color
Carbon Dioxide:	716 x 0.2 = 143 (out of range)	102 mg/L Duplicate
Manganese:	—	
Sulfate:	0.0 mg/L	No Turbidity
Alkalinity:	338 mg/L	
Chloride:	4.9 mg/L	
Other:		

Sampled By: AML

Notes: DO checked w/ Chemetrics Low Range test DO. = 0.35 mg/L

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW7D

Weather:

Static Water Level (ft): 40.30 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1825	1	24.14	6.70	369	2.16	+64	turbid.
1828		24.53	6.65	368	1.51	+63	"
1834		24.8	6.61	375	1.27	+61	
1839		25.3	6.60	384	1.16	+60	
1843		25.7	6.59	385	1.12	+60	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/7/01 Time Sampled: 1845

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? yes

Laboratory Analytical Methods: SW8260 (VOCs-water) 6 VOA, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1-125mL poly, E320.1 (Bromide) 1-500mL poly

SW9060M (Total Org. Carbon) 1-125mL poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.0	no blue color
Ferrous Iron:	0.04	no color. slightly
Carbon Dioxide:	290 digits x 0.2 = 58 mg/L.	
Manganese:	—	
Sulfate:	0.0	no turbidity.
Alkalinity:	173 digits x 1 mg/L/digit = 173 mg/L.	100-400 mg/L test.
Chloride:	260 digits x 0.1 = 26 mg/L	10-40 mg/L test.
Other:		

Sampled By: JBB

Notes: D.O. checked w/ CHEMetrics D.O. ~1. mg/L.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW8S

Weather: 90° Humid

Static Water Level (ft): 41.15 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
13:18	1/2	25.80	6.72	475	5.81	-121	
1322	1	26.71	6.73	472	1.30	-132	Clear.
1325	1.5	26.89	6.75	473	1.07	-135	
1328	2	26.92	6.74	490	0.96	-128	
1331	2.5	27.21	6.72	493	0.84	-120	very turbid
1335		27.77	6.72	493	0.76	-112	
1338	3	27.81	6.71	493	0.70	-112	

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 8/7/01 Time Sampled: 1400

Duplicate Sample ID PES-DP2 Duplicate Date/Time ~~080660~~ 080701 0800 MS/MSD collected? No

Laboratory Analytical Methods: SW8260 (VOCs-water) 4 VOA HCL, AM-18 (MEE) 4 VOA

E300.1(Nitrate+Nitrite) 2-125 mL poly, E320.1 (Bromide) 2-500 mL poly

SW9060M (Total Org. Carbon) 2-125 mL poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.03 mg/L	Light yellow color/no blue color.
Ferrous Iron:	2.40 mg/L	Light orange color.
Carbon Dioxide:	560 digits x 0.2 = 112 mg/L	
Manganese:	—	
Sulfate:	29 mg/L	Slight turbidity
Alkalinity:	151 digits = 151 mg/L	
Chloride:	54 digits x 0.1 = 5.4 mg/L	
Other:		

Sampled By: AML

Notes: D.O. check w/ 0-1 mg/L CHEMETRICS K750 kit. = 0.6

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW8D

Weather:

Static Water Level (ft): 40.36 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail (Grundfos Redi-Flo2) WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1534	1.0	24.21	6.65	336	1.76	-56	Cloudy, brownish
1537	1.5	24.65	6.59	343	1.11	-45	
1542	1.75	25.09	6.56	350	0.86	-29	
1546	2.0	25.49	6.55	356	0.83	-15	
1549	2.5	25.84	6.55	358	0.82	-4	
1552	3.0	25.91	6.54	360	0.81	-1	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/7/01 Time Sampled: 1610

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) 2-VOA, AM-18 (MEE) 2 G.A.VOA.

E300.1(Nitrate+Nitrite) 1-125mL poly, E320.1 (Bromide) 1-500 mL poly

SW9060M (Total Org. Carbon) 1-125 mL poly SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.0	no color change.
Ferrous Iron:	0.03	very light orange color
Carbon Dioxide:	357 x 0.2 = 72 mg/L.	20-100 mg/L test
Manganese:	—	
Sulfate:	0.	no turbidity.
Alkalinity:	156 digits x 1 mg/L/digits	156 mg/L
Chloride:	229 x 0.1 = 23 mg/L	
Other:	Sample Filtered w/ .45µ inline	
Sampled By:	AML	

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-INJ2S

Weather: 90° Humid Breezy

Static Water Level (ft): see field book Casing Diameter (in): 2"

Total Well Depth (ft): " " " Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 8/9/01 Time Sampled: 1530

Duplicate Sample ID PES-DP1 Duplicate Date/Time 1400 MS/MSD collected? yes

Laboratory Analytical Methods: SW8260 (VOCs-water) —, AM-18 (MEE) —

E300.1(Nitrate+Nitrite) —, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) 2,2,2,2-8 total.

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:		
Ferrous Iron:		
Carbon Dioxide:		
Manganese:		
Sulfate:		
Alkalinity:		
Chloride:		
Other:		

Sampled By: _____

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES - INJ 2D

Weather:

Static Water Level (ft): See field Book Casing Diameter (in): 2"

Total Well Depth (ft): " " " Casing Volume (gal)

Purging Method: (bail) Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
					~~0.5~~		

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 8/9/01. Time Sampled: 1615

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? no.

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA (HCL), AM-18 (MEE) 2 VOA (unpres.)

E300.1(Nitrate+Nitrite) 1 - 125 mL poly, E320.1 (Bromide) 1 - 500 mL poly

SW9060M (Total Org. Carbon) 1 - 125 mL poly SW8260 (VOCs-oil) 2 VOA (unpres.)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:		
Ferrous Iron:		
Carbon Dioxide:		
Manganese:		
Sulfate:		
Alkalinity:		
Chloride:		
Other:		

Sampled By: _____

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW3S

Weather:

Static Water Level (ft): see field book Casing Diameter (in): 2"

Total Well Depth (ft): " " " Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 730 ~~1845~~ 8/9/01 Time Sampled: 1845

Duplicate Sample ID Duplicate Date/Time MS/MSD collected?

Laboratory Analytical Methods: SW8260 (VOCs-water) —, AM-18 (MEE) —

E300.1(Nitrate+Nitrite) —, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) 2 VOA

Field Geochemistry: **Results:** **Method/Comment:**

Hydrogen Sulfide:

Ferrous Iron:

Carbon Dioxide:

Manganese:

Sulfate:

Alkalinity:

Chloride:

Other:

Sampled By:

Notes: no water in well.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-INJ3D

Weather:

Static Water Level (ft): See field Book Casing Diameter (in): 2"

Total Well Depth (ft): " " " Casing Volume (gal)

Purging Method: (bail) Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 8/7/01 Time Sampled: 1830

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1-125 mL poly, E320.1 (Bromide) 1-500 mL poly

SW9060M (Total Org. Carbon) 1-125 mL poly. SW8260 (VOCs-oil) 2 VOA (unpreserved)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:		
Ferrous Iron:		
Carbon Dioxide:		
Manganese:		
Sulfate:		
Alkalinity:		
Chloride:		
Other:		

Sampled By:

Notes: D.O. measured w/ chemetrics 0-1 mg/L test = 0.5 mg/L.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: 007GL15UF

Weather: Rainy 85° F

Static Water Level (ft): 39.58 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

	Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
	0958	1.0	24.63	6.18	336	5.54	+89	Cloudy, brownish
*	1011	2.0	26.61	6.2	341	2.59	+86	
	1017	4.0	25.20	6.15	334	2.86	+96	
	1020	4.5	25.52	6.15	332	2.51	+97	
	1025	5.0	25.25	6.11	324	0.96	+107	
	1028	5.5	26.68	6.11	328	1.35	+100	
	1032	6.0	26.79	6.11	329	1.79	+101	
	1035	6.5	26.95	6.11	327	1.44	+102	

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 8/7/01 Time Sampled: 1040

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOA HCl, AM-18 (MEE) 2 G.A. VOA

E300.1(Nitrate+Nitrite) 1-125 mL, E320.1 (Bromide) —

SW9060M (Total Org. Carbon) — SW8260 (VOCs-oil) —

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.0 ~~0.26~~ mg/L	no color
Ferrous Iron:	0.0 ~~0.27~~ AL mg/L	~~Slight orange color~~ no color * turbid sample.
Carbon Dioxide:	586 digits x 0.2 mg/L/digit = 118 mg/L	mg/L
Manganese:	—	
Sulfate:	0.0 mg/L	no turbidity
Alkalinity:	197 digits x 1.0 = 197 mg/L	
Chloride:	97 digits x 0.1 = 10 mg/L	
Other:	N/A.	

Sampled By: JBB / AL

Notes: * DO water rinsed out electrode wiped off
DO checked w/ chemetrics test @ 10:30 = 1.2 mg/L

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: 007G 15LF

Weather: Overcast, rainy, ~80°F, breeze from east

Static Water Level (ft): 40.61 Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail (Grundfos Redi-Flo2) WaTerra Pump other

	Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
	0802	0.5	21.10	6.50	238	6.51	+62	Clear
	0807	3.5	21.54	6.26	231	5.41	+67	
	0811	4.0	22.23	6.24	231	5.17	+64	
	0815	4.5	22.37	6.24	229	5.03	+66	
*	0831	6.0	23.08	6.27	229	1.63	+93	
	0835	6.5	23.01	6.27	229	1.29	+91	
	0838	7.0	23.25	6.27	229	1.15	+91	
	0842	7.5	23.44	6.27	228	1.08	+93	

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 8/7/01 Time Sampled: 0845

Duplicate Sample ID – Duplicate Date/Time – MS/MSD collected? –

Laboratory Analytical Methods: SW8260 (VOCs-water) 2 VOAS, AM-18 (MEE) 2 VOA

E300.1(Nitrate+Nitrite) 1-125 mL, E320.1 (Bromide) –

SW9060M (Total Org. Carbon) – SW8260 (VOCs-oil) –

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide: (<0.1)	0.0	no color.
Ferrous Iron: (<0.01)	0.0	no orange color.
Carbon Dioxide:	346 digits x 0.2 = 70 mg/L	20-100 range test.
Manganese: (<0.1)	0.0.	no violet color.
Sulfate: (<1)	0.0	no turbidity
Alkalinity:	126 digits x 1 mg/L/digit = 126 mg/L	
Chloride:	27 digits x 0.1 mg/L/digit = 2.7 mg/L	
Other:		

Sampled By:

Notes: D.O. checked w/ chemets test @ 0815 = 1.5 mg/L.
*DO meter cleaned + rinsed. DO readings decrease.

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

Author: Jason Bidgood at NetTalk
Date: 7/19/2001 4:05 PM
Normal
To: Bruce Henry at PARDEN
Subject: Duplicate sample in the NSA Midsouth letter report
---------- Message Contents

Bruce,

In Table 3 of the NSA Mid-South letter report the duplicate sample for PES-MW4D (August 3, 2000) is mislabeled. The duplicate was collected at well PES-MW4S. The data corresponds with the primary sample from MW4S and the Field book notes are clear as to where the duplicate was collected.

Sorry if there was a mistake on the COC.

-Jason

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW9S

Weather: Cloudy, Mild, 65-70°F

Static Water Level (ft): _____ Casing Diameter (in): 2.0"

Total Well Depth (ft): _____ Casing Volume (gal) _____

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0850	5.0	21.2	6.60	281	2.53	-124	Cloudy Gray
0855	8.0	21.1	6.60	258	2.00	-104	Slightly Cloudy
0902	10.0	21.1	6.50	236	-"-	-87	Sl. Cloudy Gray
0910	12.0	21.2	6.51	235	2.50	-64	Clear
0916	14.0	21.3	6.41	219	2.35	-51	"
0920	15.0	21.2	6.40	215	2.30	-47	"

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 1/29/02 Time Sampled: _____

Duplicate Sample ID _____ Duplicate Date/Time _____ MS/MSD collected? ✓

Laboratory Analytical Methods: SW8260 (VOCs-water) ✓, AM-~~18 (MEE)~~ ZOGAX ✓

E300.1(Nitrate+Nitrite) ✓, E320.1 (Bromide) ✓

SW9060M (Total Org. Carbon) ✓ SW8260 (VOCs-oil) _____

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.07 mg/L	
Ferrous Iron:	2.43 × 5 = 12.15 mg/L	
Carbon Dioxide:	622 × .2 = 124 mg/L	40-100 range
Manganese:	~~0.07~~ 7.7 mg/L	
Sulfate:	27 mg/L	
Alkalinity:	136 mg/L	100-400 range
Chloride:	87 mg/L	100-400 range
Other:	PLFA, VFA (Microbial Insights)	

Sampled By: BMH

Notes: Purged air at 10 gallons

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW1D

Weather: Cloudy, windy, mild, 65-70° F

Static Water Level (ft): _____ Casing Diameter (in): 2-inch

Total Well Depth (ft): _____ Casing Volume (gal) _____

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
~~0800~~	5	20.7	5.82	105	5.43	68	very light brown 183 NTU
0809	7.5	20.7	5.93	92	2.86	71	74.6 NTU
0812	9.0	20.7	5.92	90	2.57	68	38.0 NTU
0816	11.5	20.7	5.91	89	2.40	72	34.0 NTU
0819	13.0	20.7	5.91	89	2.23	72	24.0 NTU
0822	14.0	20.7	5.92	88	2.13	71	

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 1/29/02 Time Sampled: 0830

Duplicate Sample ID _____ Duplicate Date/Time _____ MS/MSD collected? _____

Laboratory Analytical Methods: SW8260 (VOCs-water) ✓, AM-18 (MEE) ✓

E300.1(Nitrate+Nitrite) ✓, E320.1 (Bromide) ✓

SW9060M (Total Org. Carbon) ✓ SW8260 (VOCs-oil) _____

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.07 mg/L	
Ferrous Iron:	0.36 mg/L	
Carbon Dioxide:	410 × .2 = 82 mg/L	20-100 mg/L
Manganese:	0.0 mg/L	
Sulfate:	0 mg/L	
Alkalinity:	63 mg/L	100-400 mg/L range
Chloride:	2.9 mg/L	10-40 mg/L range
Other:		

Sampled By: BMH

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW25

Weather:

Static Water Level (ft): Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1635	2.5	21.2	6.45	340	2.55	-46	Cloudy Grey
1643	6.0	21.1	6.50	330	0.81	-50	Sl. Cloudy
1647	9.0	21.1	6.52	332	0.66	-54	"
1650	10.0	21.1	6.53	334	0.59	-57	clear
1653	11.0	21.1	6.56	337	0.55	-61	"
1656	12.0	21.1	6.57	338	0.51	-64	"
1659	13.0	21.1	6.56	340	0.47	-66	"
1702	14.0	21.1	6.57	342	0.44	-67	"
1710	Sampling						

Total Volume Removed: 16 (gallons) (casing volumes)

Date Sampled: 1/30/01 Time Sampled:

Duplicate Sample ID NA Duplicate Date/Time NA MS/MSD collected? No

Laboratory Analytical Methods: SW8260 (VOCs-water) 2, AM-18 (MEE) 2

E300.1(Nitrate+Nitrite) 1, E320.1 (Bromide) 1

SW9060M (Total Org. Carbon) 4 SW8260 (VOCs-oil) None

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.02 mg/l	
Ferrous Iron:	1:5 dilution : 0.90 x 5 = 4.5 mg/l	
Carbon Dioxide:	242 mg/l	100-400 Range, 242 drops
Manganese:	1.2 mg/l	
Sulfate:	< 1 mg/l	
Alkalinity:	100-400 Range - 152 drops = 152 mg/l	
Chloride:	10-40 Range 59 drops = 6 mg/l	
Other:	DLFA, UFA	

Sampled By:

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW 2D

Weather: partly cloudy, 70s, calm

Static Water Level (ft): Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1530	4 gal	20.9	6.39	226	3.18	-42	cloudy grey/green
1535	5 gal	20.8	6.42	227	1.58	-57	clear, grey/green tint
1539	8 gal	20.8	6.46	227	0.92	-69	clear
1543	10 gal	20.8	6.48	228	0.67	-74	"
1547	12 gal	20.8	6.49	230	0.55	-79	"
1550	13.5 gal	20.8	6.51	233	0.52	-81	"
1554	16 gal	20.8	6.52	243	0.49	-86	"
1557	18 gal	20.8	6.56	244	0.45	-90	"
1600	20 gal	20.8	6.57	245	0.44	-91	"
← Sample							

Total Volume Removed: 20 (gallons) (casing volumes)

Date Sampled: 1/30/02 Time Sampled: 1600

Duplicate Sample ID NA Duplicate Date/Time NA MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2, AM-18 (MEE) 2

E300.1(Nitrate+Nitrite) 1, E320.1 (Bromide) 1

SW9060M (Total Org. Carbon) 4 SW8260 (VOCs-oil) NA

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.21 mg/l	
Ferrous Iron:	1:5 dilution	1.38 mg/l x 5 = 6.9 mg/l
Carbon Dioxide:	100-400 range	200 drops = 200 mg/l
Manganese:	1:2 dilution	0.9 mg/l x 2 = 1.8 mg/l 2nd trial, No dilution 1.9 mg/l
Sulfate:	<1 mg/l	
Alkalinity:	100-400 Range	147 drops = 147 mg/l
Chloride:	10-40 Range	64 drops = 6 mg/l
Other:	PLFA, VFA, DGGE	

Sampled By: BMH

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW35

Weather: mostly cloudy, 70s humid

Static Water Level (ft): _____ Casing Diameter (in): 2"

Total Well Depth (ft): _____ Casing Volume (gal) _____

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1246	.5	21.8	6.18	336	4.97	-47	light gray-pest odor
1250	3.5	21.9	6.24	337	3.04	-51	"
1253	4.5	22.0	6.31	335	2.16	-56	"
1257	5.5	21.9	6.33	334	1.71	-58	"
1302	6.5	21.9	6.35	331	1.42	-59	"
1305	7.3	22.1	6.38	329	1.23	-60	"
~~1308~~ 1312	9.5	21.9	6.38	324	1.02	-59	"
1317	10.5	21.8	6.38	321	0.93	-59	"
1320	Sample						

Total Volume Removed: 12 (gallons) _____ (casing volumes)

Date Sampled: 1/30/02 Time Sampled: 1320

Duplicate Sample ID PES-Dup2 Duplicate Date/Time _____ MS/MSD collected? —

/013002 - except DGGE

Laboratory Analytical Methods: SW8260 (VOCs-water) ✓, AM-18 (MEE) ✓

E300.1(Nitrate+Nitrite) ✓, E320.1 (Bromide) ✓

SW9060M (Total Org. Carbon) ✓ SW8260 (VOCs-oil) _____

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.01 mg/l	dup 0.03 mg/l
Ferrous Iron:	1:5 dilution Sample: 1.84 mg/l x 5 = 9.20 mg/l	Dup: 1.49 x 5 = 7.45 mg/l
Carbon Dioxide:	Sample 384 mg/l (100-400 range)	Dup 361 mg/l
Manganese:	Sample 3.4 mg/l	Dup 3.2 mg/l
Sulfate:	~~0.0~~ <1 mg/l	Dup: ~~0 m~~ <1 mg/l
Alkalinity:	100-400 range sample: 148 mg/l	Dup 146 mg/l
Chloride:	Sample: 10-40 Range: 107 drops = 11 mg/l	Dup: 98 drops 10 mg/l
Other:	PLFA, VFA, DGGE	

Sampled By: DRG

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW3D

Weather:

Static Water Level (ft): Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail (Grundfos Redi-Flo2) WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1403	2.0	21.3	6.38	727	3.12	-77	Clear
1408	4.0	21.2	6.35	750	1.73	-79	"
1413	7.0	21.2	6.34	722	1.18	-85	"
1418	9.0	21.2	6.39	723	0.90	-91	"
1423	11.0	21.2	6.46	710	0.79	-101	"
1427	12.0	21.2	6.52	700	0.73	-108	
1430	13.0	21.2	6.52	704	0.72	-109	
1433	14.0	21.2	6.53	702	0.70	-110	
1440	Sample						

Total Volume Removed: 15 (gallons) (casing volumes)

Date Sampled: 1/30/02 Time Sampled:

Duplicate Sample ID None Duplicate Date/Time None MS/MSD collected? Yes

Laboratory Analytical Methods: SW8260 (VOCs-water) ✓, AM-18 (MEE) ✓

E300.1(Nitrate+Nitrite) ✓, E320.1 (Bromide) ✓

SW9060M (Total Org. Carbon) ✓ SW8260 (VOCs-oil)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.02 mg/l	
Ferrous Iron:	1:5 dilution, 3.3 mg/l x5 = 16.5 mg/l	
Carbon Dioxide:	458 mg/l trial 2 → 431 mg/l green percipitate in both cases	
Manganese:	1:2 dilution : 14.6x2 = 29.2 mg/l	
Sulfate:	< 1 mg/l	
Alkalinity:	(100-400 Range) 178 drops = 178 mg/l	
Chloride:	85 drops (10-40 range) 9 mg/l	
Other:		

Sampled By: CAS

Notes: organic/sulfurous odor PLFA/VFAs

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

PARSONS

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW4S

Weather:

Static Water Level (ft): Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1024	1.0	21.2	6.22	251	3.41	17	v. light brown
1027	2.0	21.2	6.32	265	1.32	12	"
1030	3.0	21.2	6.36	270	0.91	3	"
1033	4.5	21.2	6.38	271	0.80	-4	"
1036	6.0	21.3	6.39	272	0.74	-3	
1039	7.5	21.2	6.39	272	0.72	-0	
1043	9.0	21.2	6.39	272	0.68	-4	

Total Volume Removed: 10 (gallons) _____ (casing volumes)

Date Sampled: 1/30/02 Time Sampled: 1045

Duplicate Sample ID _____ Duplicate Date/Time _____ MS/MSD collected? _____

Laboratory Analytical Methods: SW8260 (VOCs-water)_____, AM-18 (MEE) _____

E300.1(Nitrate+Nitrite) _____, E320.1 (Bromide)_____

SW9060M (Total Org. Carbon) _____ SW8260 (VOCs-oil) _____

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.06 mg/l	
Ferrous Iron:	1:5 dilution	0.03 mg/l x 5 0.15 mg/l
Carbon Dioxide:	223 mg/l	
Manganese:	0.2 mg/l	
Sulfate:	<1 mg/l	
Alkalinity:	100-400 range	129 drops = 129 mg/l
Chloride:	10-40 range	183 drops = 18 mg/l
Other:		

Sampled By: BMH

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW4D

Weather:

Static Water Level (ft): Casing Diameter (in): 2 Inches

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0939	1.0	20.6	6.43	171	3.43	-10	light gray + murky
0942	2.5	20.7	6.31	176	1.60	-22	"
0945	~~5.0~~ 3.0	20.8	6.32	176	1.25	-24	"
0948	~~6.0~~ 4.0	20.9	6.35	174	1.08	-20	" less turbid
0951	5.0	20.9	6.37	174	0.98	-17	"
0954	5.75	20.9	6.38	176	0.88	-18	"
0957	6.5	21.0	6.40	178	0.85	-20	v. light gray

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 1/30/02 Time Sampled: 1000

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? ✓

Laboratory Analytical Methods: SW8260 (VOCs-water) ✓, AM-18 (MEE) ✓

E300.1(Nitrate+Nitrite) ✓, E320.1 (Bromide) ✓

SW9060M (Total Org. Carbon) ✓ SW8260 (VOCs-oil)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.19 mg/l	
Ferrous Iron:	1:5 dilution	0.41 mg/l = 2.05 mg/l
Carbon Dioxide:	132 mg/l	
Manganese:	0.9 mg/l	
Sulfate:	<1	
Alkalinity:	100-400 range	93 drops = 93 mg/l
Chloride:	10-40 range	59 drops = 6 mg/l
Other:		

Sampled By: CAS

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW58

Weather: mid 60s cloudy chance of showers

Static Water Level (ft): _____ Casing Diameter (in): 2"

Total Well Depth (ft): _____ Casing Volume (gal) _____

Purging Method: bail (Grundfos Redi-Flo2) WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0832	1.5	20.8	6.63	424	4.80	-46	
0837	3.5	20.9	6.68	422	1.28	-75	
0842	5.5	21.0	6.71	419	1.00	-81	
0847	8.0	21.0	6.72	417	0.88	-83	
0849	10.0	21.0	6.72	416	0.83	-85	
0852	12.0	21.0	6.73	416	0.78	-86	
~~0855~~ 0900	15.0	21.0	6.73	417	0.72	-87	

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 1/30/02 Time Sampled: 0900

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) ✓, AM-18 (MEE) ✓

E300.1(Nitrate+Nitrite) ✓, E320.1 (Bromide) ✓

SW9060M (Total Org. Carbon) ✓ SW8260 (VOCs-oil) _____

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.02 mg/l	
Ferrous Iron:	1:5 dilution = 0.77 x 5 = 3.85 mg/l	
Carbon Dioxide:	252 mg/l, trial 2 238 mg/l	
Manganese:	1.2 mg/l	
Sulfate:	<1	
Alkalinity:	100-400 range 239 drops = 239 mg/l	
Chloride:	8 mg/l (10-40 range, 78 drops)	
Other:		

Sampled By: DRG

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MWSD

Weather:

Static Water Level (ft): Casing Diameter (in): 2.0"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
0746	3.0	20.7	6.34	304	4.10	178	Cloudy Gray
0751	5.0	20.6	6.44	305	2.62	148	Sl. Cloudy
0755	7.5	20.6	6.48	304	2.10	138	Clear
0800	10.0	20.6	6.53	304	1.54	129	"
0804	12.5	20.6	6.54	304	1.43	128	"
0808	15.0	20.6	6.56	304	1.28	125	"
0810	16.0	20.6	6.56	304	1.22	124	"

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 1/30/02 Time Sampled: 0810

Duplicate Sample ID PES-DUP1 Duplicate Date/Time 1/30 0820 MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) ✓, AM-18 (MEE) ✓

E300.1(Nitrate+Nitrite) ✓, E320.1 (Bromide) ✓

SW9060M (Total Org. Carbon) ✓ SW8260 (VOCs-oil)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	Sample: 0.01 mg/l	Duplicate 0.02 mg/l
Ferrous Iron:	5x dilution 0.00×5 = <0.01	Dup: <0.01
Carbon Dioxide:	Sample 100-400 method = 128 drops = 128 mg/l	Dup: 118 mg/l
Manganese:	Sample 0.2 mg/l	Duplicate: 0.3 mg/l
Sulfate:	~~X~~ Sample <1.0	Duplicate: 3 mg/l
Alkalinity:	Sample 100-400 range 137 drops = 137 mg/l	duplicate: 134 mg/l
Chloride:	Sample 10-40 range 202 drops = 20 mg/l	duplicate 20 mg/l
Other:		

Sampled By: BMH

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES - MW6S

Weather: overcast, humid, 60's

Static Water Level (ft): _____ Casing Diameter (in): _____

Total Well Depth (ft): _____ Casing Volume (gal) _____

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
~~1555~~ 1658	2	21.0	6.27	246	2.72	68	clear
~~1558~~ 1658	3	20.9	6.27	254	1.71	73	clear
~~1601~~ 1701	4	21.0	6.28	255	1.33	71	clear
1704	5	21.0	6.31	256	1.08	71	clear
1707	6	21.0	6.34	256	0.97	72	clear
1710	7	21.0	6.31	256	0.90	75	clear
1713	8	21.0	6.32	256	0.86	77	clear
1716	9	21.0	6.33	256	0.84	78	clear
1720	Sample						

Total Volume Removed: 10 (gallons) _____ (casing volumes)

Date Sampled: 1/29/02 Time Sampled: 1720

Duplicate Sample ID N/A Duplicate Date/Time N/A MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2, AM-18 (MEE) 2

E300.1(Nitrate+Nitrite) 1, E320.1 (Bromide) 1

SW9060M (Total Org. Carbon) 4 SW8260 (VOCs-oil) _____

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.04 mg/L	
Ferrous Iron:	0.00 mg/L	
Carbon Dioxide:	334 mg/L	100-400 range
Manganese:	0.09 mg/L	
Sulfate:	<1 mg/L	
Alkalinity:	183 mg/L	100-400 range
Chloride:	8.8 mg/L 10	10-40 range
Other:		

Sampled By: _____

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW6D

Weather:

Static Water Level (ft): Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1555	1.0	20.8	6.57	203	6.45	-27	very faint brown
1600	2.5	20.6	6.52	234	1.91	-83	
1605	4.0	20.6	6.68	236	1.07	-102	
1610	5.5	20.7	6.74	250	0.88	-114	
1615	7.0	20.7	6.79	258	0.80	-126	
1620	8.5	20.7	6.83	264	0.73	-126	
1625	10.0	20.7	6.82	269	0.67	-130	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 1/29/02 Time Sampled: 1630

Duplicate Sample ID Duplicate Date/Time MS/MSD collected?

Laboratory Analytical Methods: SW8260 (VOCs-water) ✓, AM-18 (MEE) ✓

E300.1(Nitrate+Nitrite) ✓, E320.1 (Bromide) ✓

SW9060M (Total Org. Carbon) ✓ SW8260 (VOCs-oil)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.0	
Ferrous Iron:	1.51 × 5 = 7.55 mg/L	deep orange color
Carbon Dioxide:	268 mg/L	100 - 400 range
Manganese:	3.1 mg/L	faint purple
Sulfate:	<1 mg/L	
Alkalinity:	143 mg/L	100-400 range
Chloride:	5.8 mg/L	10-40 range
Other:		

Sampled By: CAS

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PESMW7S

Weather:

Static Water Level (ft): Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1200	2.0	21.3	6.85	484	3.31	-89	Cloudy
1205	5.0	21.2	6.77	484	1.53	-94	Clear
1208	7.0	21.2	6.76	481	1.21 ~~0.48~~	-93	"
1210	8.0	21.3	6.75	482	1.13	-91	"

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 1/29/02 Time Sampled: 1215

Duplicate Sample ID none Duplicate Date/Time none MS/MSD collected? no

Laboratory Analytical Methods: SW8260 (VOCs-water) ✓, AM-18 (MEE) ✓

E300.1(Nitrate+Nitrite) ✓, E320.1 (Bromide) ✓

SW9060M (Total Org. Carbon) ✓ SW8260 (VOCs-oil)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.16 mg/L	
Ferrous Iron:	0.69 × 5 = 3.45 mg/L	
Carbon Dioxide:	365	100-400 mg/L range
Manganese:	1.9 mg/L	
Sulfate:	<1 mg/L	
Alkalinity:	307 mg/L	100-400 mg/L range
Chloride:	3.9 mg/L	10-40 mg/L range
Other:		

Sampled By: BMH

Notes: PLFA/VFAs Sampled ~~1200~~ 1215

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW7D

Weather:

Static Water Level (ft): Casing Diameter (in): 2.0"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1236	2.5	20.9	6.70	321	2.50	63	Sl. Cloudy Brn
1241	5.0	20.8	6.80	327	1.39	67	Sl. Cloudy
1246	7.5	20.8	6.80	329	1.15	70	Clear
1249	11.0	20.8	6.80	330	1.07	72	clear
1255	15.0	20.8	6.80	330	0.99	75	"
1258	16.0	20.8	6.80	330	0.97	74	"

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 1/29/02 Time Sampled: 1300

Duplicate Sample ID none Duplicate Date/Time none MS/MSD collected? none

Laboratory Analytical Methods: SW8260 (VOCs-water) ✓, AM-18 (MEE) ✓

E300.1(Nitrate+Nitrite) ✓, E320.1 (Bromide) ✓

SW9060M (Total Org. Carbon) ✓ SW8260 (VOCs-oil)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.02 mg/L	
Ferrous Iron:	0.01 mg/L	
Carbon Dioxide:	185 mg/L	100-400 range
Manganese:	0.0 mg/L	
Sulfate:	<1 mg/L	
Alkalinity:	190 mg/L	100-400 range
Chloride:	233 x .1 = 23.3 mg/L	10-40 range
Other:		

Sampled By: BMH

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW8S

Weather:

Static Water Level (ft): Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1059	1.5	21.0	7.02	458	5.81	-75	rusty brown
1102	2.5	21.0	7.02	471	3.48	-71	"
1105	5.6	21.0	7.01	479	1.99	-78	clearer than before
1108	6.0	21.0	7.01	478	1.66	-79	"
~~1112~~ 1111	7.5	21.0	7.01	479	1.41	-79	"
1114	9.5	21.0	7.01	478	1.27	-80	"
1117	10.5	21.0	7.02	479	1.16	-82	"
1120	12.0	21.0	7.02	479	1.10	-83	"
1123	13.5	21.0	7.02	479	1.05	-83	"

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 1/29/02 Time Sampled: 1130

Duplicate Sample ID Duplicate Date/Time MS/MSD collected?

Laboratory Analytical Methods: SW8260 (VOCs-water) ✓, AM-18 (MEE) ✓

E300.1(Nitrate+Nitrite) ✓, E320.1 (Bromide) ✓

SW9060M (Total Org. Carbon) SW8260 (VOCs-oil)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.16 mg/L	
Ferrous Iron:	1.60 mg/L	
Carbon Dioxide:	644 x .2 = 128.8 mg/L	20-100 mg/L Range
Manganese:	0.1 mg/L	
Sulfate:	26 mg/L	
Alkalinity:	293 mg/L	100-400 mg/L range
Chloride:	2.6 ~~26~~ mg/L	10-40 mg/L range
Other:		

Sampled By: DRG

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-MW8D

Weather: Cloudy, Mild, 70°F

Static Water Level (ft): _____ Casing Diameter (in): _____

Total Well Depth (ft): _____ Casing Volume (gal) _____

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1000	2.5	20.5	6.81	356	3.31	5.0	Cloudy Yellow
1004	5 gal.	20.5	6.77	335	2.08	30	clear, yellow tint
1008	7 gal	20.6	6.75	327	1.61	42	clear
1011	9 gal	20.6	6.74	323	1.35	54	clear
1014	11 gal	20.6	6.73	319	1.21	59	clear
1017	13 gal	20.6	6.73	317	1.12	62	clear
1020	15 gal	20.7	6.72	316	1.10	64	clear
1023	17 gal	20.6	6.72	315	1.09	65	clear
1030	sampling						

Total Volume Removed: 19 (gallons) _____ (casing volumes)

Date Sampled: 6/29/02 Time Sampled: 1030

Duplicate Sample ID N/A Duplicate Date/Time N/A MS/MSD collected? ~~N/A~~ NO

Laboratory Analytical Methods: SW8260 (VOCs-water) ✓, AM-~~18~~ 20GAX (MEE) ✓

E300.1 (Nitrate+Nitrite) ✓, E320.1 (Bromide) ✓

SW9060M (Total Org. Carbon) ✓ SW8260 (VOCs-oil) _____

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.16 mg/L	
Ferrous Iron:	0.26 mg/L	
Carbon Dioxide:	117.4 mg/L	20 - 100 range
Manganese:	0.00 mg/L	
Sulfate:	2 mg/L	
Alkalinity:	131 mg/L	100 - 400 range
Chloride:	246 x .1 = 24.6 mg/L	10-40 mg/L range
Other:		

Sampled By: _____

Notes: _____

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: 007GL15UF

Weather:

Static Water Level (ft): Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1455	2.0	21.4	6.28	296	2.41	102	Cloudy Brn
1501	4.0	21.3	6.34	293	1.33	114	Sl. Cloudy
1505	6.0	21.3	6.34	292	1.05	120	Clear
1513	8.0	21.3	6.34	293	0.91	121	"
1515	10.0	21.3	6.34	292	0.90	122	"

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 11/29/02 Time Sampled: 1520

Duplicate Sample ID — Duplicate Date/Time — MS/MSD collected? —

Laboratory Analytical Methods: SW8260 (VOCs-water) —, AM-18 (MEE) —

E300.1(Nitrate+Nitrite) ✓, E320.1 (Bromide)

SW9060M (Total Org. Carbon) SW8260 (VOCs-oil)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.03 mg/L	
Ferrous Iron:	0.0 mg/L	
Carbon Dioxide:	290 mg/L	100-400 range
Manganese:	0.1 mg/L	
Sulfate:	<1 mg/L	
Alkalinity:	160 mg/L	100-400 range
Chloride:	6.3 mg/L	10-40 range
Other:		

Sampled By:

Notes: PLFA/UFAs

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: 007 GL 15 LF

Weather:

Static Water Level (ft): Casing Diameter (in): 2"

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1407	1.5	20.8	7.26	221	8.28	103	cloudy gray
1410	2.5	20.4	6.51	222	4.67	104	
1413	3.0	20.4	6.48	220	3.16	99	
1416	4.0	20.4	6.51	218	2.38	100	sl. clearer
1419	5.0	20.3	6.55	217	1.99	100	
1422	6.0	20.3	6.57	217	1.80	101	
1425	7.5	20.3	6.58	216	1.66	101	
1428	9.0	20.3	6.59	216	1.57	102	

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 1/29/02 Time Sampled: 1430

Duplicate Sample ID Duplicate Date/Time MS/MSD collected?

Laboratory Analytical Methods: SW8260 (VOCs-water) ✓, AM-18 (MEE) ✓

E300.1(Nitrate+Nitrite) ✓, E320.1 (Bromide)

SW9060M (Total Org. Carbon) SW8260 (VOCs-oil)

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.15 mg/L	
Ferrous Iron:	0.75 mg/L	
Carbon Dioxide:	171 mg/L	100-400 range
Manganese:	<0.1 mg/L	
Sulfate:	6 mg/L	
Alkalinity:	153 mg/L	100-400 range
Chloride:	4.3 mg/L	10-40 mg/L range
Other:	PLFA, VFA also analized	

Sampled By: DRG

Notes:

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PES-INS2S

Weather:

Static Water Level (ft): Casing Diameter (in): 2

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1330	—	23.6	5.43	1570	~~5.12~~	47	milky white/yellow
					5.09		

Total Volume Removed: (gallons) (casing volumes)

Date Sampled: 8/31/02 Time Sampled: 1330

Duplicate Sample ID NA Duplicate Date/Time NA MS/MSD collected? NO

Laboratory Analytical Methods: SW8260 (VOCs-water) 2, AM-18 (MEE) 2

E300.1(Nitrate+Nitrite) 1, E320.1 (Bromide) 0

SW9060M (Total Org. Carbon) 4 SW8260 (VOCs-oil) 2

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.03 mg/l	
Ferrous Iron:	1:30 dilution out of range >99 mg/l	
Carbon Dioxide:	200-1000 Range 273 drops - Green percipitate (546 mg/l)	pink color 350 drops (700 mg/l)
Manganese:	3.7 mg/l	
Sulfate:	<1 mg/l	
Alkalinity:	100-400 range - 246 drops = 246 mg/l	
Chloride:	10-40 range 180 drops = 18 mg/l	
Other:		

Sampled By:

Notes: VOCs in oil 1215
PLFA, VFA 1330

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PESINJ2D

Weather:

Static Water Level (ft): Casing Diameter (in):

Total Well Depth (ft): Casing Volume (gal)

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1138	–	14.9	5.30	1240	6.13	66	Clear

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 1/31/02 Time Sampled: 0940

Duplicate Sample ID _____ Duplicate Date/Time _____ MS/MSD collected? _____

Laboratory Analytical Methods: SW8260 (VOCs-water)_____, AM-18 (MEE) _____

E300.1(Nitrate+Nitrite) _____, E320.1 (Bromide)_____

SW9060M (Total Org. Carbon) _____ SW8260 (VOCs-oil) _____

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.03 mg/l	
Ferrous Iron:	1:30 dilution : 2.03 x 30 = 60.9 mg/l	
Carbon Dioxide:	100 - 400 range 317 drops = 317 mg/l	
Manganese:	6.9 mg/l	
Sulfate:	<1 mg/l	
Alkalinity:	100 - 400 range ~~317 drops 317 mg/l~~ 63 drops = 63 mg/l	2nd trial: 68 mg/l
Chloride:	10 - 40 range 243 drops = 24.3 mg/l	
Other:		

Sampled By:

Notes: ALFA | DGGE | VFAs (0940

VOCs 8260B - 0.11 (0810)

(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

WELL SAMPLING RECORD

Project Name: NSA Mid-South Site N-6 Project Number: 737490

Well Designation: PESINJ45

Weather: Cloudy, Cool, 60°F

Static Water Level (ft): _____ Casing Diameter (in): 2.0"

Total Well Depth (ft): _____ Casing Volume (gal) _____

Purging Method: bail Grundfos Redi-Flo2 WaTerra Pump other _____

Time	Vol. Purged (Gal.)	Temp. (°C)	pH (SU)	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Visual Appearance
1040	–	18.8	5.55	2650	5.05	7	Clear
1045	–	19.0	5.58	2650	4.58	6	"
NOTE:	Sample collected & held to separate Oil, oil						
	Filtered from sample (i.e., sample aerated)						

Total Volume Removed: _____ (gallons) _____ (casing volumes)

Date Sampled: 1/31/02 Time Sampled: 0900

Duplicate Sample ID _____ Duplicate Date/Time _____ MS/MSD collected? _____

Laboratory Analytical Methods: SW8260 (VOCs-water) ✓, AM-18 (MEE) ✓

E300.1(Nitrate+Nitrite) ✓, E320.1 (Bromide) _____

SW9060M (Total Org. Carbon) ✓ SW8260 (VOCs-oil) _____

Field Geochemistry:	**Results:**	**Method/Comment:**
Hydrogen Sulfide:	0.29 mg/l	
Ferrous Iron:	1:5 dilution out of range, 1:10 dil out of range, 1:20 out of range 1:30: > 99 mg/l	→ out of range
Carbon Dioxide:	100-400 Range greenish percipitate at 500 drops, slight pink at 600 drops > 500 mg/l	
Manganese:	3.8 mg/l	
Sulfate:	< 1 mg/l	
Alkalinity:	100-400 Range – 314 mg/l	
Chloride:	10-40 Range 153 drops = 15.3 mg/l	
Other:		

Sampled By: BMH / DRG

Notes: 1/30/02 - Purged ~ 2 gallons oil ~ 2 gallons water
1/31/02 - Purged additional 1/2 gallon oil
Oil appeared medium brown / gold - slightly weathered
(Wellhead Condition, Elevation Datum, Repairs, Decon, Preservatives, etc.)

Also: PLFA / VFAs

Oil - VOCs w/ MS/MSD at 0830

Volume for field Geochemistry was filtered

APPENDIX B.4

AQUIFER TEST DATA

Client: **United States Navy**

Project: **Verification against Bouwer & Rice (1976) Data**

Project No.:

Well No.: **PES-MW2S**

Test Date: **January 31, 2002**

Formation Tested: **Upper Fluvial Aquifer Zone**

Rising (R) or Falling (F) Head Test: **Rising**

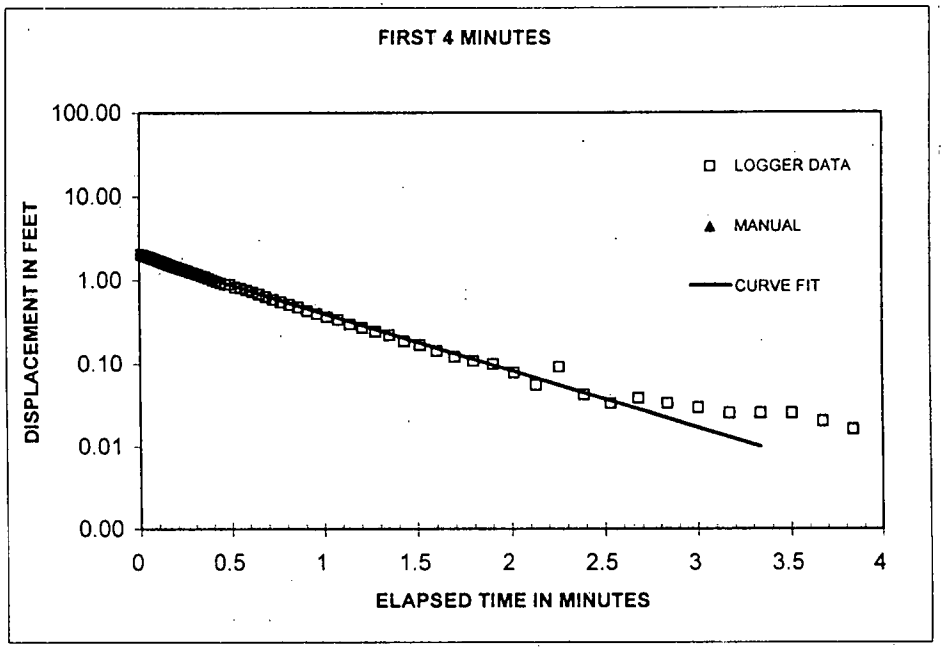
Logger Data File:

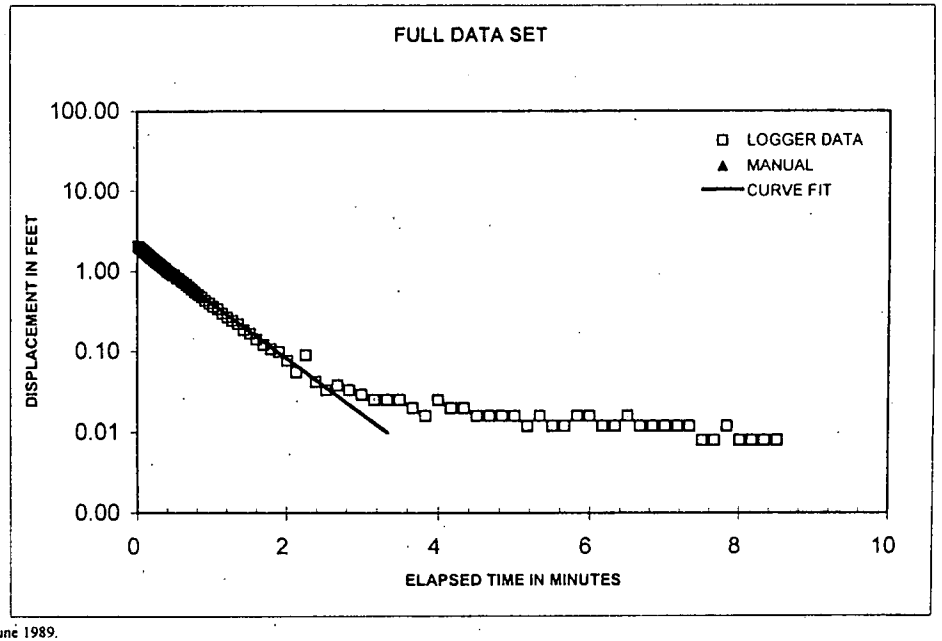
Hydraulic conductivity	8.63E-03	cm/sec
	1.70E-02	ft/min
	24.45	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.51	feet
Depth to bottom of screen (from ground level)	65.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	1.940	feet
ΔH at time t (Y_t)	0.400	feet
Time	1.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.51	1204.26	*SW*		
25.49	776.94	*H*	120.00	*L/Rw*
55	1676.40	*Ts*	0.56	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	5.48	*Ln[(D-H)/Rw]'*
45.49	1386.54	*D*	5.48	*Ln[(D-H)/Rw]*
1.94	59.13	Y_0	3.78	equation (8)
0.4	12.19	Y_t	4.34	equation (9)
	60.00	*t (seconds)*	3.78	*Ln(Re/Rw)*
	0.30	*n*	8.6E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.

Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

Client: **United States Navy**

Project: **Verification against Bouwer & Rice (1976) Data**

Project No.:

Well No.: **PES-MW2S**

Test Date: **January 31, 2002**

Formation Tested: **Upper Fluvial Aquifer Zone**

Rising (R) or Falling (F) Head Test: **Falling**

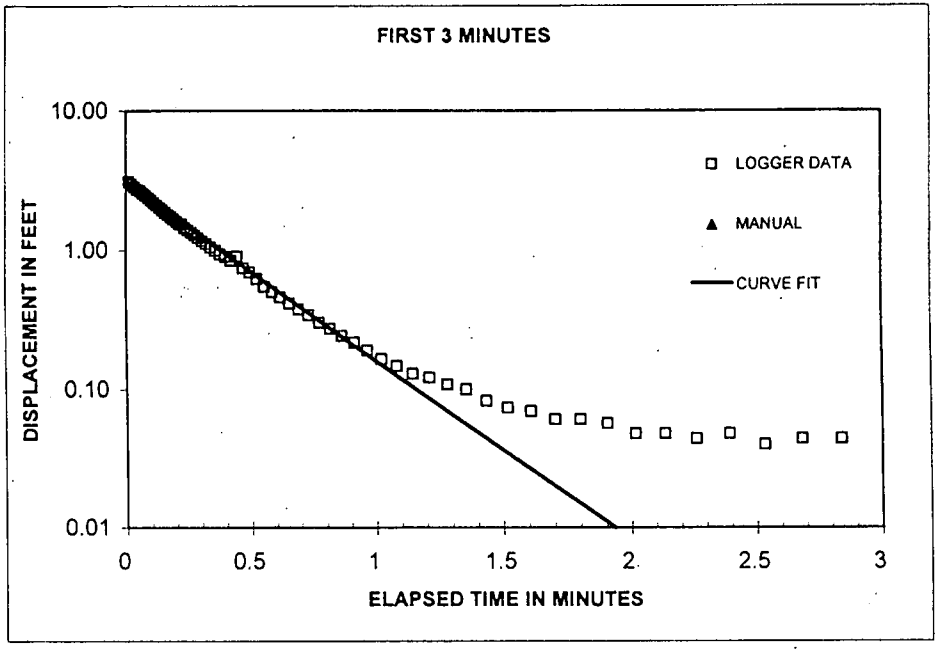
Logger Data File:

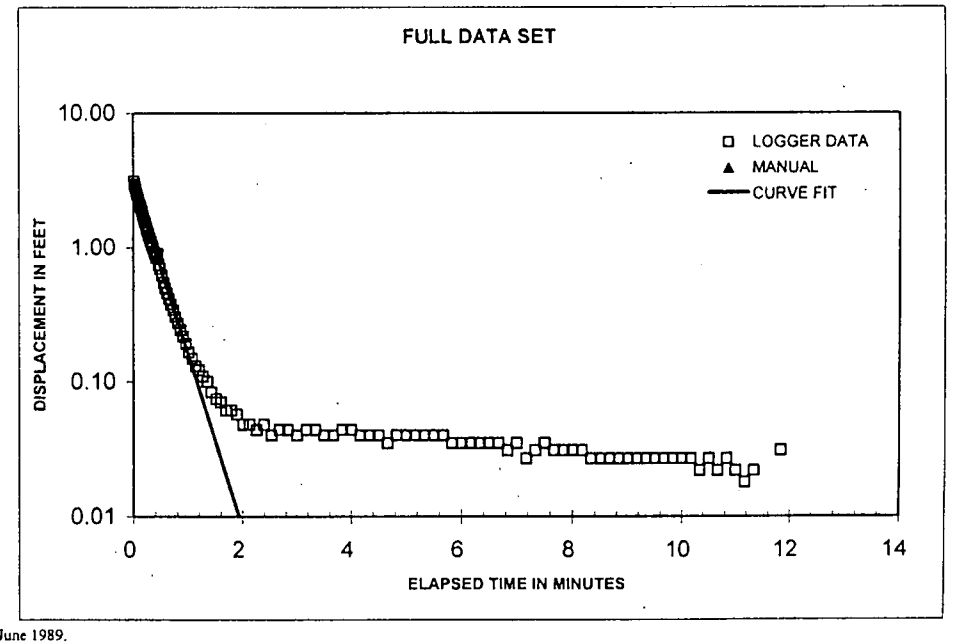
Hydraulic conductivity 1.62E-02 cm/sec
3.19E-02 ft/min
45.89 ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.51	feet
Depth to bottom of screen (from ground level)	65.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	3.100	feet
ΔH at time t (Y_t)	0.160	feet
Time	1.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.51	1204.26	*SW*		
25.49	776.94	*H*	120.00	*L/Rw*
55	1676.40	*Ts*	0.56	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	5.48	*Ln[(D-H)/Rw]'*
45.49	1386.54	*D*	5.48	*Ln[(D-H)/Rw]*
3.1	94.49	Y_0	3.78	equation (8)
0.16	4.88	Y_t	4.34	equation (9)
	60.00	*t (seconds)*	3.78	*Ln(Re/Rw)*
	0.30	*n*	1.6E-02	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

Client: **United States Navy**

Project: **Verification against Bouwer & Rice (1976) Data**

Project No.:

Well No.: **PES-MW3S**

Test Date: **January 31, 2002**

Formation Tested: **Upper Fluvial Aquifer Zone**

Rising (R) or Falling (F) Head Test: **Rising**

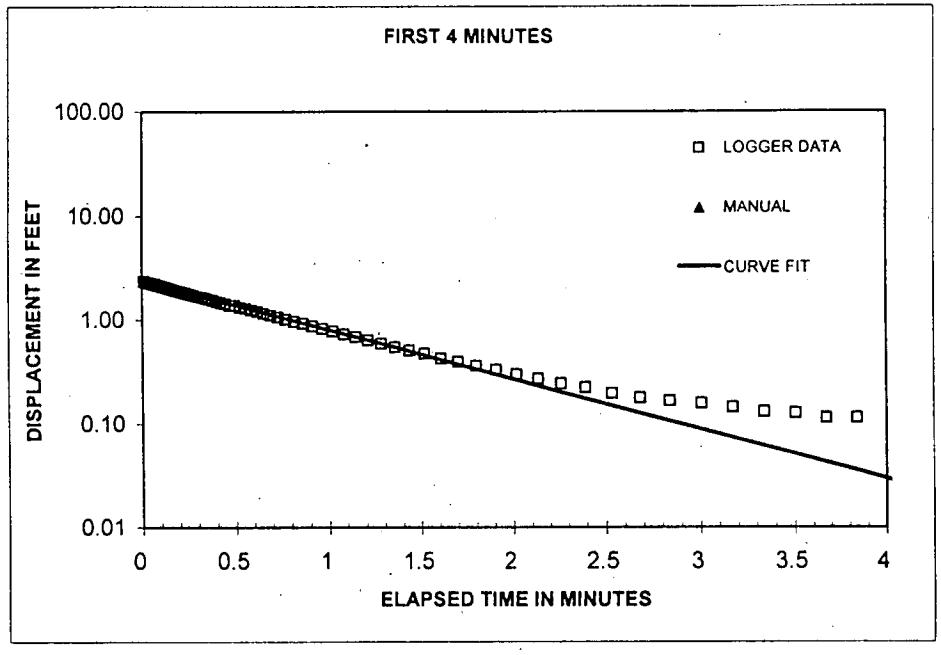
Logger Data File:

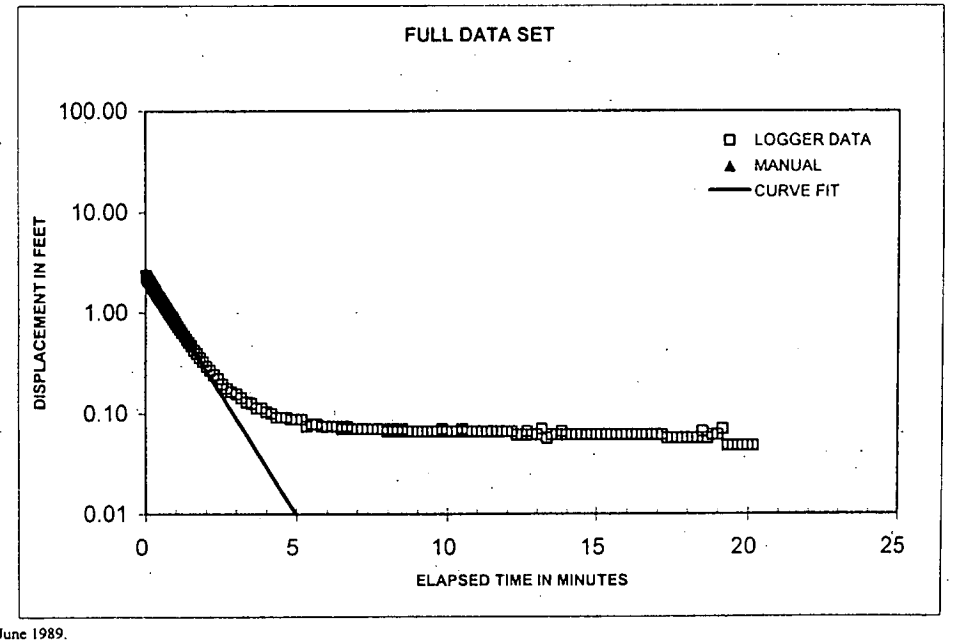
Hydraulic conductivity	5.56E-03	cm/sec
	1.10E-02	ft/min
	15.77	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.49	feet
Depth to bottom of screen (from ground level)	55.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	2.400	feet
ΔH at time t (Y_t)	0.800	feet
Time	1.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.49	1203.66	*SW*		
15.51	472.74	*H*	120.00	*L/Rw*
45	1371.60	*Ts*	0.34	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	5.89	*Ln[(D-H)/Rw]'*
45.51	1387.14	*D*	5.89	*Ln[(D-H)/Rw]*
2.4	73.15	Y_o	3.50	equation (8)
0.8	24.38	Y_t	4.02	equation (9)
	60.00	*t (seconds)*	3.50	*Ln(Re/Rw)*
	0.30	*n*	5.6E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

Client: **United States Navy**

Project: **Verification against Bouwer & Rice (1976) Data**

Project No.:

Well No.: **PES-MW3S**

Test Date: **January 31, 2002**

Formation Tested: **Upper Fluvial Aquifer Zone**

Rising (R) or Falling (F) Head Test: **Falling**

Logger Data File:

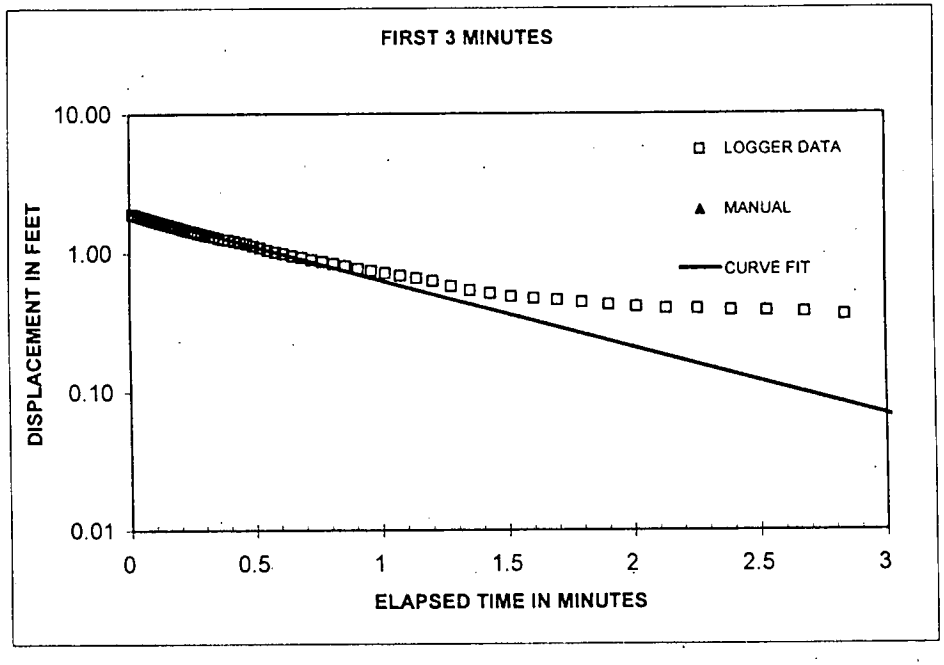
Hydraulic conductivity

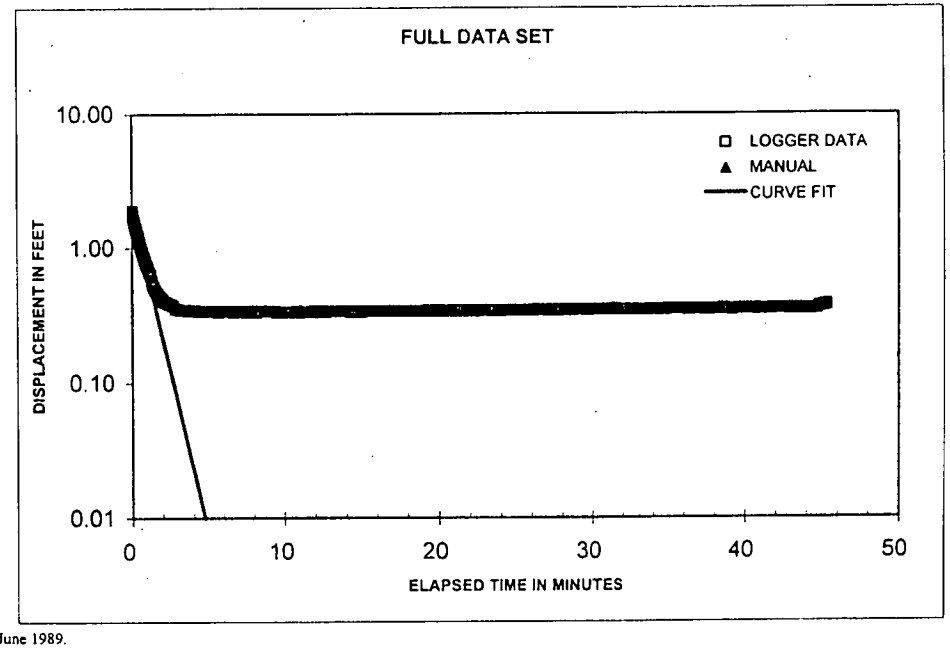
5.64E-03	cm/sec
1.11E-02	ft/min
15.99	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.49	feet
Depth to bottom of screen (from ground level)	55.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	1.950	feet
ΔH at time t (Y_t)	0.640	feet
Time	1.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.49	1203.66	*SW*		
15.51	472.74	*H*	120.00	*L/Rw*
45	1371.60	*Ts*	0.34	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	5.89	*Ln[(D-H)/Rw]'*
45.51	1387.14	*D*	5.89	*Ln[(D-H)/Rw]*
1.95	59.44	Y_0	3.50	equation (8)
0.64	19.51	Y_t	4.02	equation (9)
	60.00	*t (seconds)*	3.50	*Ln(Re/Rw)*
	0.30	*n*	5.6E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

Client: **United States Navy**

Project: **Verification against Bouwer & Rice (1976) Data**

Project No.:

Well No.: **PES-MW5S**

Test Date: **January 31, 2002**

Formation Tested: **Upper Fluvial Aquifer Zone**

Rising (R) or Falling (F) Head Test: **Falling**

Logger Data File:

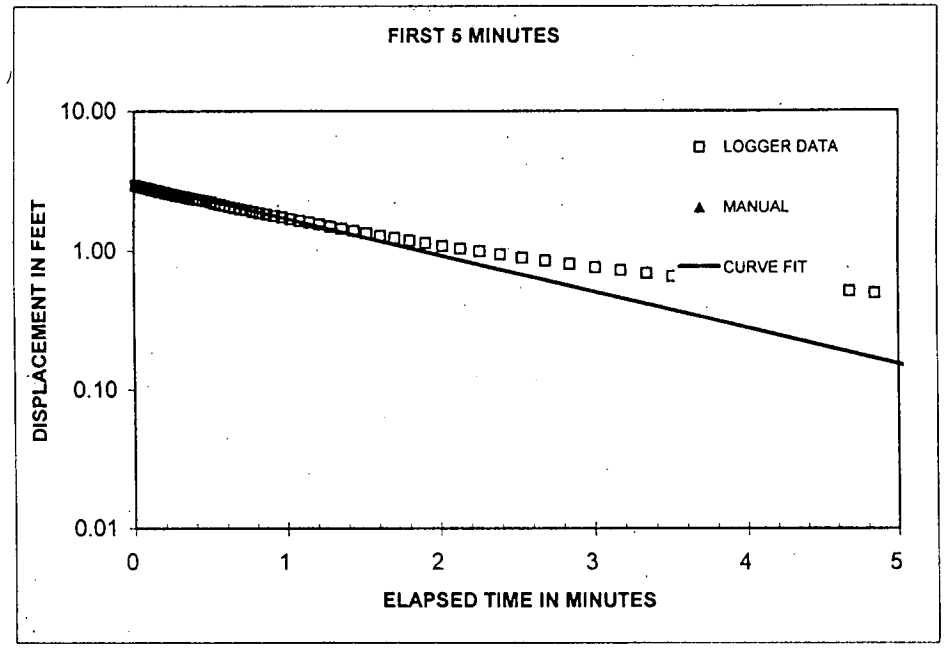
Hydraulic conductivity

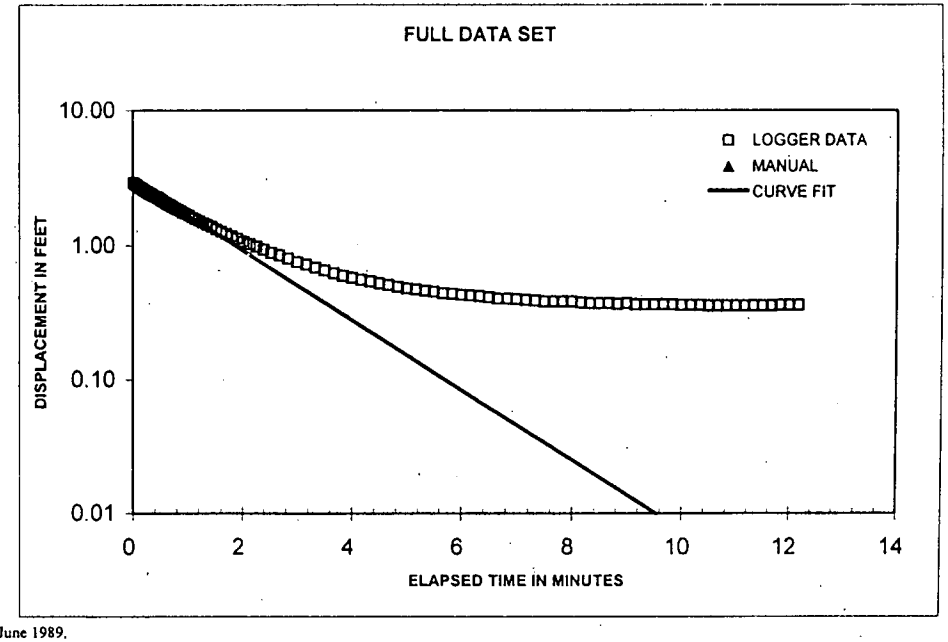
3.06E-03	cm/sec
6.02E-03	ft/min
8.67	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.39	feet
Depth to bottom of screen (from ground level)	55.40	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	3.100	feet
ΔH at time t (Y_t)	1.700	feet
Time	1.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.39	1200.61	*SW*		
16.01	487.98	*H*	120.00	*L/Rw*
45.4	1383.79	*Ts*	0.35	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	5.87	*Ln[(D-H)/Rw]'*
45.61	1390.19	*D*	5.87	*Ln[(D-H)/Rw]*
3.1	94.49	Y_0	3.52	equation (8)
1.7	51.82	Y_t	4.04	equation (9)
	60.00	*t (seconds)*	3.52	*Ln(Re/Rw)*
	0.30	*n*	3.1E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

Client: **United States Navy**

Project: **Verification against Bouwer & Rice (1976) Data**

Project No.:

Well No.: **PES-MW2D**

Test Date: **January 31, 2002**

Formation Tested: **Lower Fluvial Aquifer Zone**

Rising (R) or Falling (F) Head Test: **Rising**

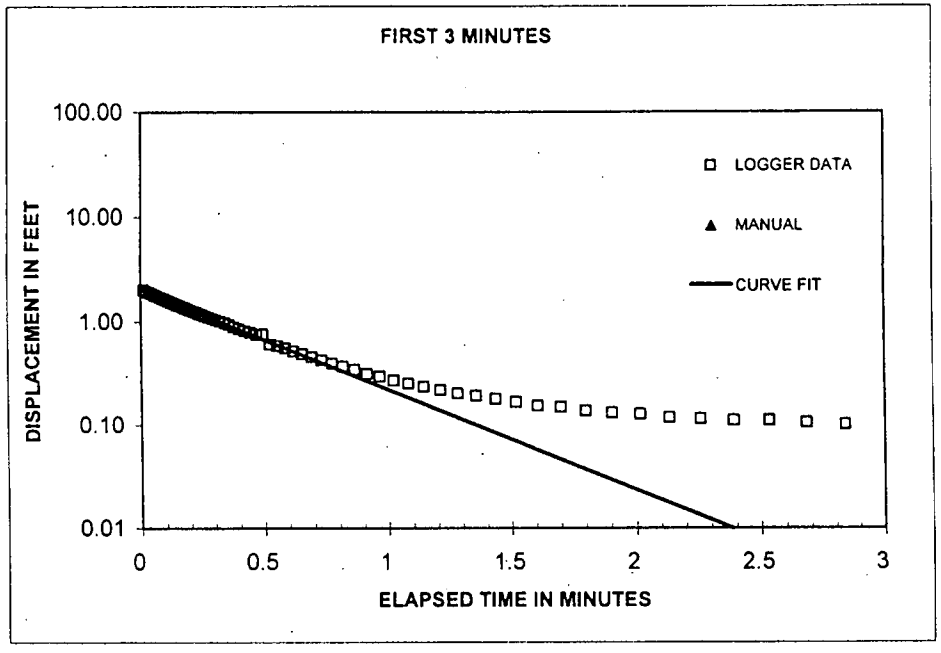
Logger Data File:

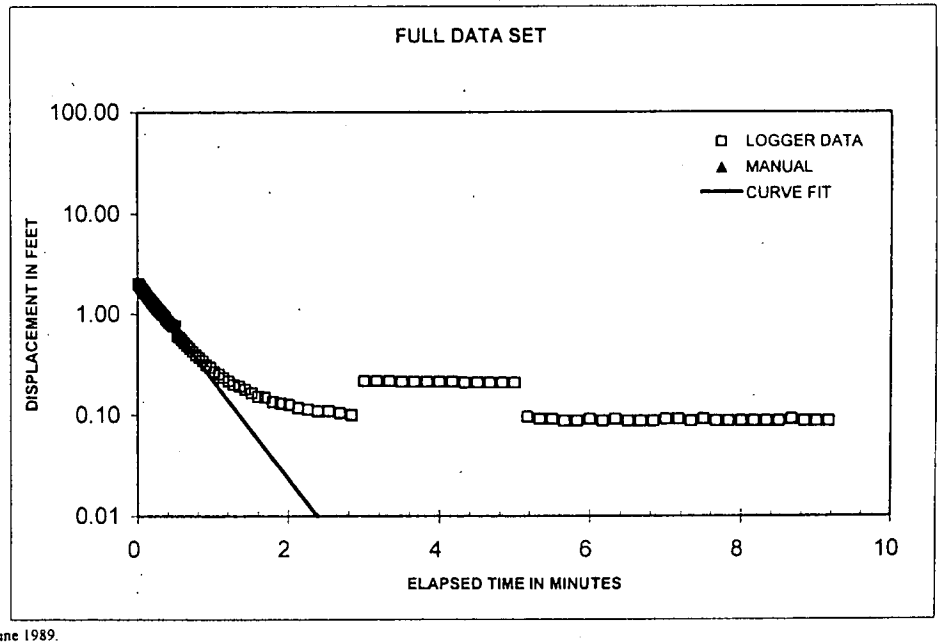
Hydraulic conductivity 1.85E-03 cm/sec
3.64E-03 ft/min
5.25 ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.89	feet
Depth to bottom of screen (from ground level)	85.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	2.060	feet
ΔH at time t (Y_t)	0.220	feet
Time	1.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.89	1215.85	*SW*		
45.11	1374.95	*H*	120.00	*L/Rw*
75	2286.00	*Ts*	1.00	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.083	2.54	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	#NUM!	*Ln[(D-H)/Rw]'*
45.11	1374.95	*D*	#NUM!	*Ln[(D-H)/Rw]*
2.06	62.79	Y_0	#NUM!	equation (8)
0.22	6.71	Y_t	4.69	equation (9)
	60.00	*t (seconds)*	4.69	*Ln(Re/Rw)*
	0.30	*n*	1.9E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.

Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

Client: **United States Navy**

Project: **Verification against Bouwer & Rice (1976) Data**

Project No.:

Well No.: **PES-MW2D**

Test Date: **January 31, 2002**

Formation Tested: **Lower Fluvial Aquifer Zone**

Rising (R) or Falling (F) Head Test: **Falling**

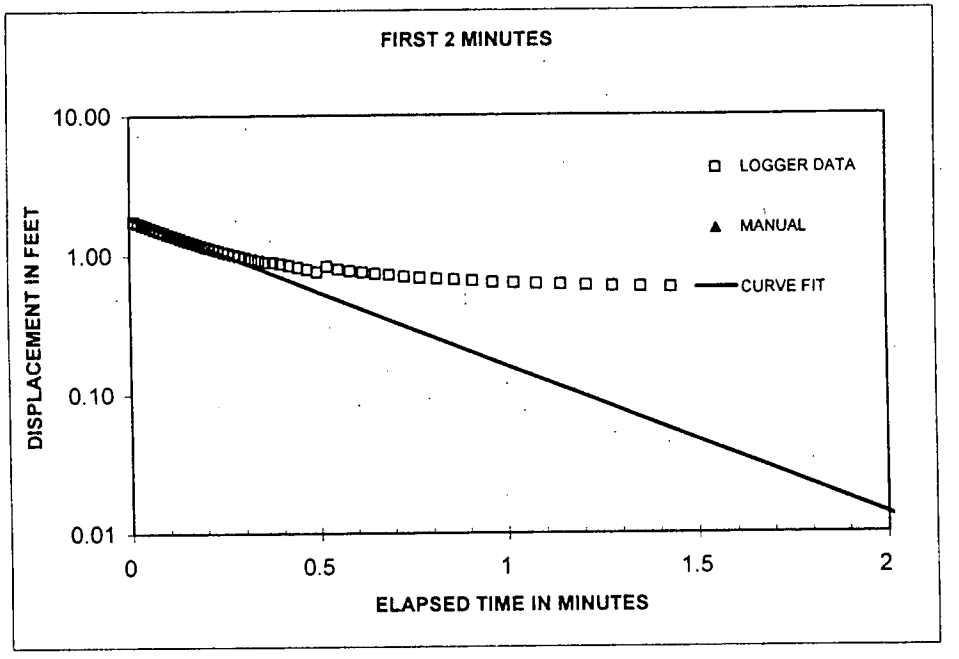
Logger Data File:

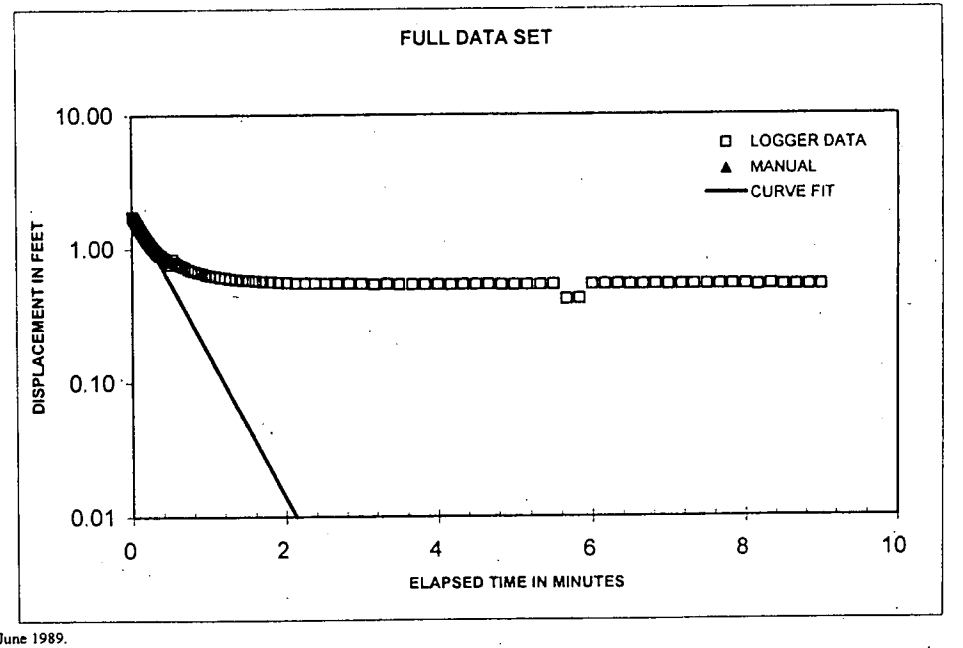
Hydraulic conductivity 2.03E-03 cm/sec
4.00E-03 ft/min
5.76 ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.89	feet
Depth to bottom of screen (from ground level)	85.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	1.860	feet
ΔH at time t (Y_t)	0.160	feet
Time	1.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.89	1215.85	*SW*		
45.11	1374.95	*H*	120.00	*L/Rw*
75	2286.00	*Ts*	1.00	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.083	2.54	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	#NUM!	*Ln[(D-H)/Rw]'*
45.11	1374.95	*D*	#NUM!	*Ln[(D-H)/Rw]*
1.86	56.69	Y_0	#NUM!	equation (8)
0.16	4.88	Y_t	4.69	equation (9)
	60.00	*t (seconds)*	4.69	*Ln(Re/Rw)*
	0.30	*n*	2.0E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

Client: **United States Navy**

Project: **Verification against Bouwer & Rice (1976) Data**

Project No.:

Well No.: **PES-MW3D**

Test Date: **January 31, 2002**

Formation Tested: **Lower Fluvial Aquifer Zone**

Rising (R) or Falling (F) Head Test: **Rising**

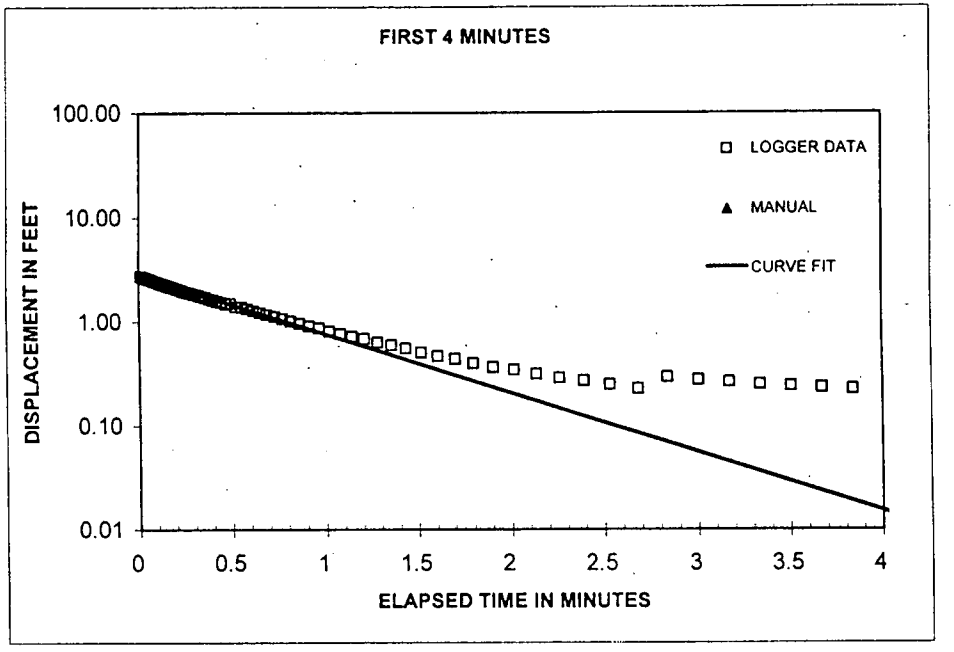
Logger Data File:

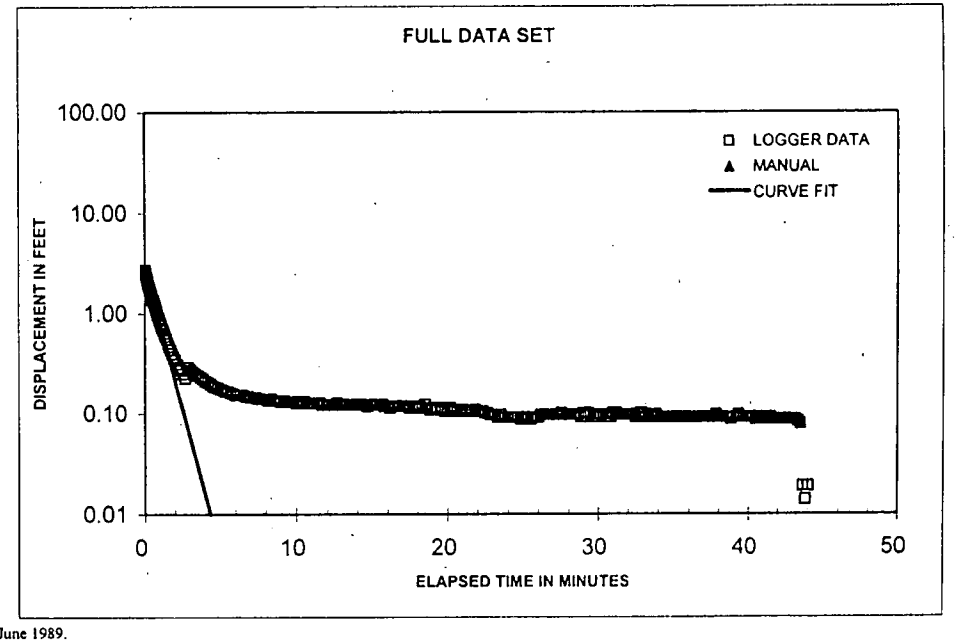
Hydraulic conductivity 7.54E-03 cm/sec
1.48E-02 ft/min
21.38 ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.71	feet
Depth to bottom of screen (from ground level)	75.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	2.800	feet
ΔH at time t (Y_t)	0.760	feet
Time	1.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.71	1210.36	*SW*		
35.29	1075.64	*H*	120.00	*L/Rw*
65	1981.20	*Ts*	0.78	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	4.79	*Ln[(D-H)/Rw]'*
45.29	1380.44	*D*	4.79	*Ln[(D-H)/Rw]*
2.8	85.34	Y_0	4.00	equation (8)
0.76	23.16	Y_t	4.54	equation (9)
	60.00	*t (seconds)*	4.00	*Ln(Re/Rw)*
	0.30	*n*	7.5E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research, vol 12, no. 3, June 1976.

Client: **United States Navy**

Project: **Verification against Bouwer & Rice (1976) Data**

Project No.:

Well No.: **PES-MW3D**

Test Date: **January 31, 2002**

Formation Tested: **Lower Fluvial Aquifer Zone**

Rising (R) or Falling (F) Head Test: **Falling**

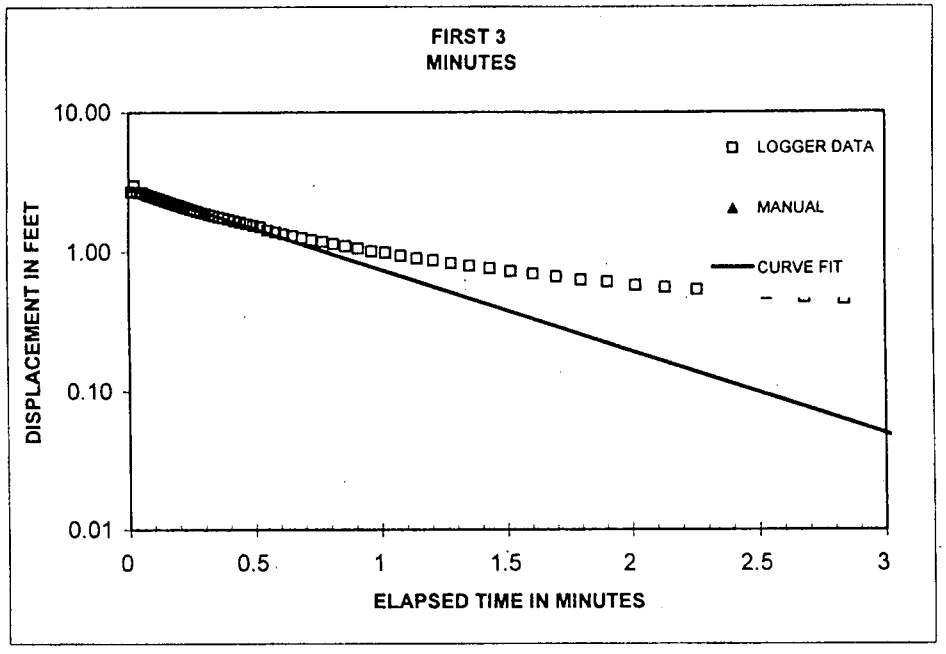
Logger Data File:

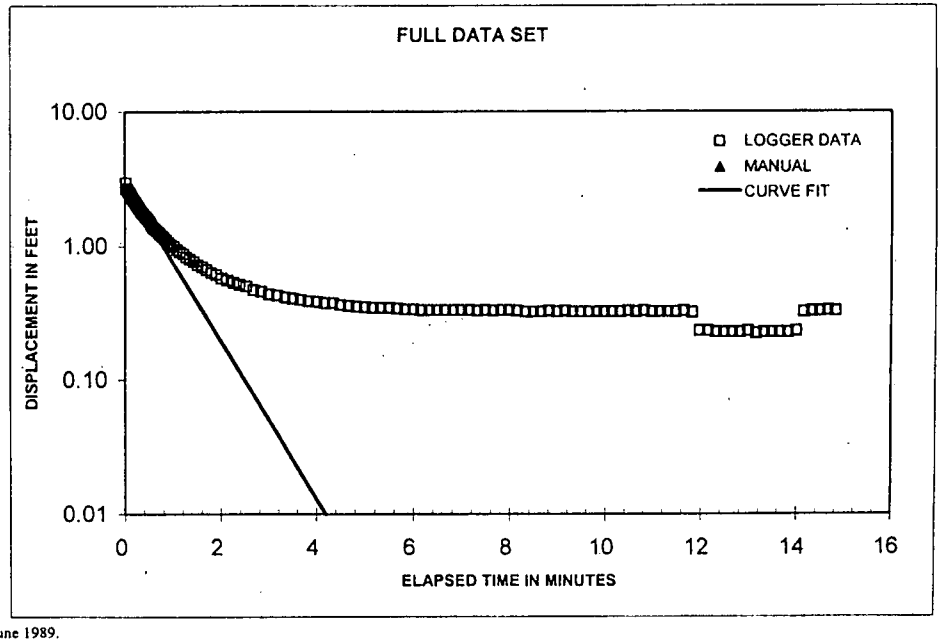
Hydraulic conductivity: 7.82E-03 cm/sec; 1.54E-02 ft/min; 22.17 ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.71	feet
Depth to bottom of screen (from ground level)	75.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	2.900	feet
ΔH at time t (Y_t)	0.750	feet
Time	1.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.71	1210.36	*SW*		
35.29	1075.64	*H*	120.00	*L/Rw*
65	1981.20	*Ts*	0.78	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	4.79	*Ln[(D-H)/Rw]'*
45.29	1380.44	*D*	4.79	*Ln[(D-H)/Rw]*
2.9	88.39	Y_o	4.00	equation (8)
0.75	22.86	Y_t	4.54	equation (9)
	60.00	*t (seconds)*	4.00	*Ln(Re/Rw)*
	0.30	*n*	7.8E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.

Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

Client: **United States Navy**

Project: **Verification against Bouwer & Rice (1976) Data**

Project No.:

Well No.: **PES-MW5D**

Test Date: **January 31, 2002**

Formation Tested: **Lower Fluvial Aquifer Zone**

Rising (R) or Falling (F) Head Test: **Falling**

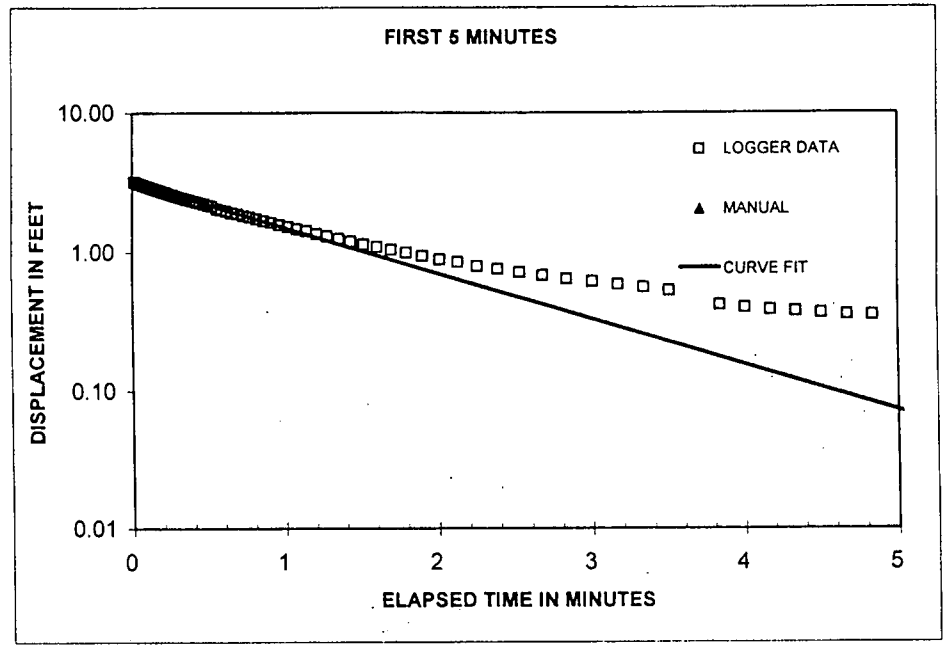
Logger Data File:

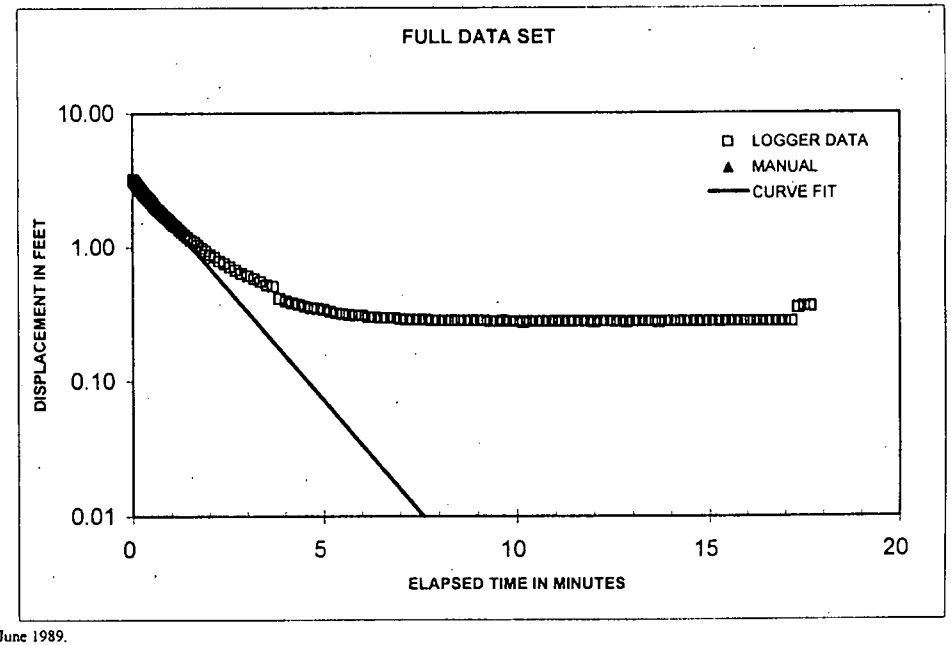
Hydraulic conductivity 4.38E-03 cm/sec
8.62E-03 ft/min
12.42 ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.81	feet
Depth to bottom of screen (from ground level)	75.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	3.200	feet
ΔH at time t (Y_t)	1.500	feet
Time	1.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.81	1213.41	*SW*		
35.19	1072.59	*H*	120.00	*L/Rw*
65	1981.20	*Ts*	0.78	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	4.79	*Ln[(D-H)/Rw]'*
45.19	1377.39	*D*	4.79	*Ln[(D-H)/Rw]*
3.2	97.54	Y_0	4.00	equation (8)
1.5	45.72	Y_t	4.54	equation (9)
	60.00	*t (seconds)*	4.00	*Ln(Re/Rw)*
	0.30	*n*	4.4E-03	equation (5)





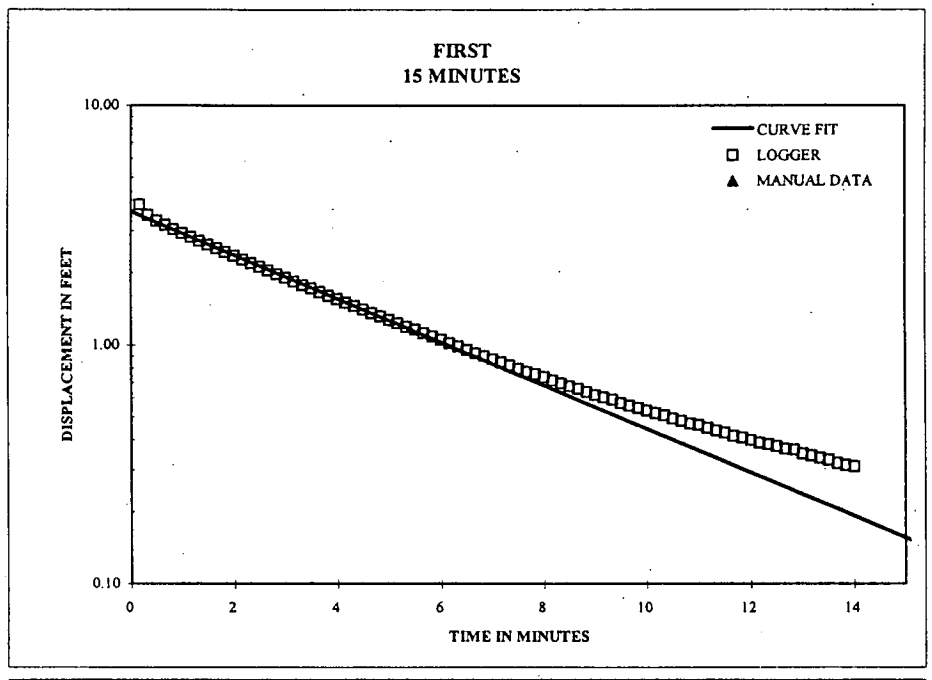
Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

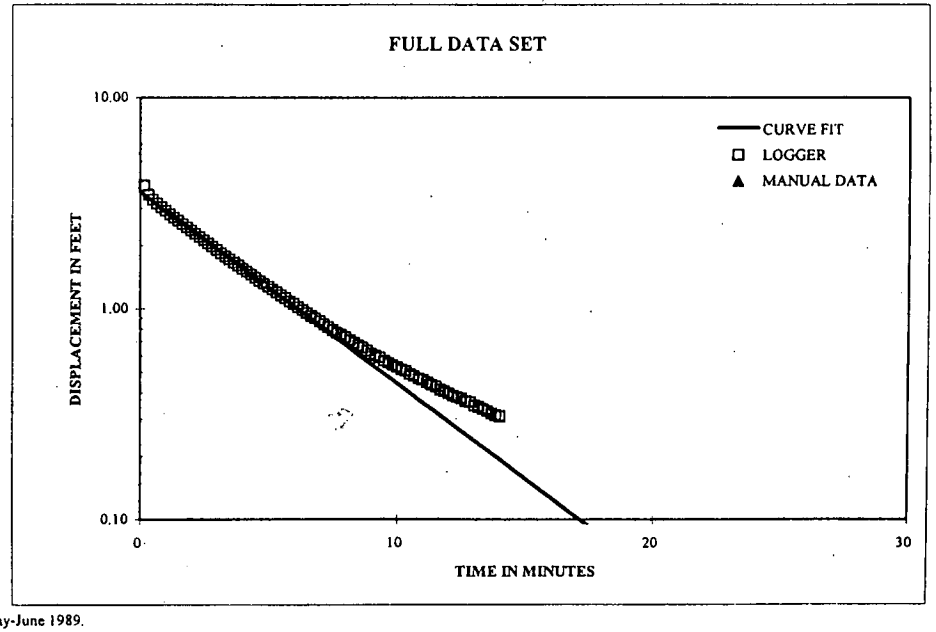
Client: Naval Support Activity Mid-South
Project: Site N-6 Enhanced Bioremediation
Project No.: 737490
Well No.: PES-MW5S
Test Date: 15-Aug-00
Formation: Upper Saturated Zone
Rising (R) or Falling (F) Head Test: Rising Head
Logger Data File: PES-MW5SR.xls
Hydraulic conductivity 1.37E-03 cm/sec
2.70E-03 ft/min
3.8852 ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.56	feet
Depth to bottom of screen (from ground level)	55.40	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	90.00	feet
Porosity of filter pack	0.40	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	3.600	feet
ΔH at time t (Y_t)	0.400	feet
Time	10.50	min

Bouwer-Rice Parameters

feet	cm		cm	
39.56	1205.79	*SW*		
15.84	482.80	*H*	120.00	*L/Rw*
45.4	1383.79	*Ts*	0.31	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.271	8.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	6.03	*Ln[(D-H)/Rw]'*
50.44	1537.41	*D*	6.00	*Ln[(D-H)/Rw]*
3.6	109.73	Y_0	3.50	equation (8)
0.4	12.19	Y_t	4.03	equation (9)
	630.00	*t (seconds)*	3.50	*Ln(Re/Rw)*
	0.40	*n*	1.4E-03	equation (5)





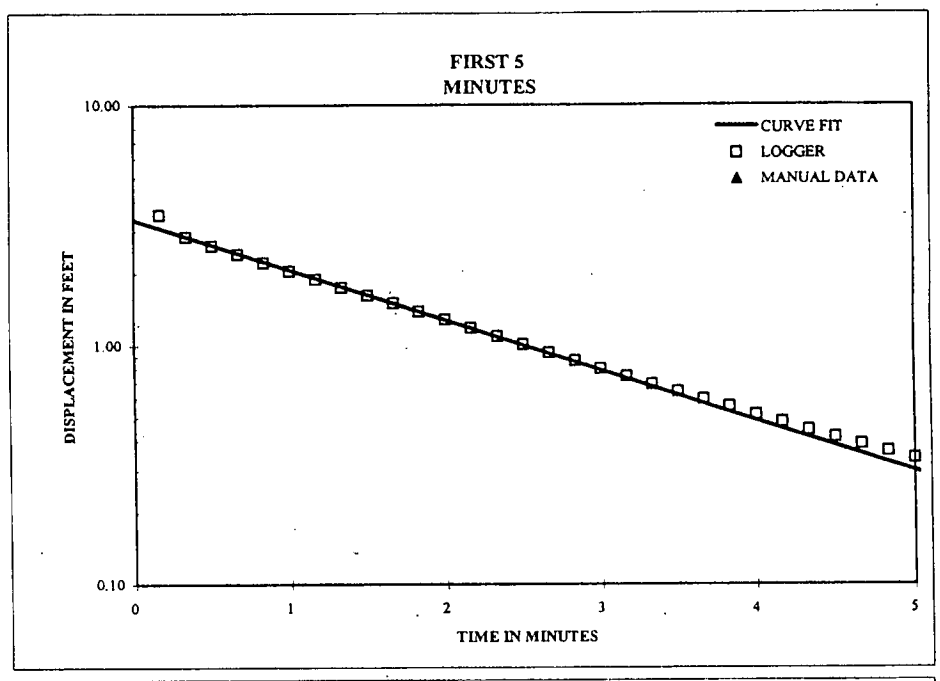
Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

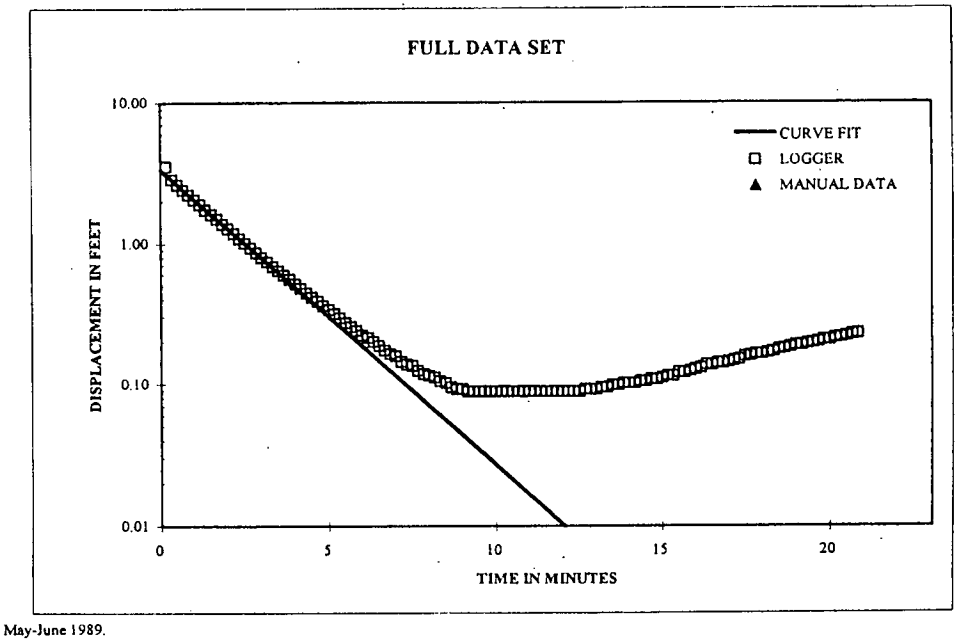
Client: United States Navy
Project: Site N-6 Enhanced Bioremediation
Project No.: 737490
Well No.: PES-MW5S
Test Date: 15-Aug-00
Formation: Upper Saturated Zone
Rising (R) or Falling (F) Head Test: Falling Head
Logger Data File: PES-MW5SF.xls
Hydraulic conductivity 2.45E-03 cm/sec
4.83E-03 ft/min
6.9507 ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.56	feet
Depth to bottom of screen (from ground level)	55.40	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	3.350	feet
ΔH at time t (Y_t)	0.300	feet
Time	5.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.56	1205.79	*SW*		
15.84	482.80	*H*	120.00	*L/Rw*
45.4	1383.79	*Ts*	0.35	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	5.87	*Ln[(D-H)/Rw]'*
45.44	1385.01	*D*	5.87	*Ln[(D-H)/Rw]*
3.35	102.11	Y_0	3.51	equation (8)
0.3	9.14	Y_t	4.03	equation (9)
	300.00	*t (seconds)*	3.51	*Ln(Re/Rw)*
	0.30	*n*	2.5E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

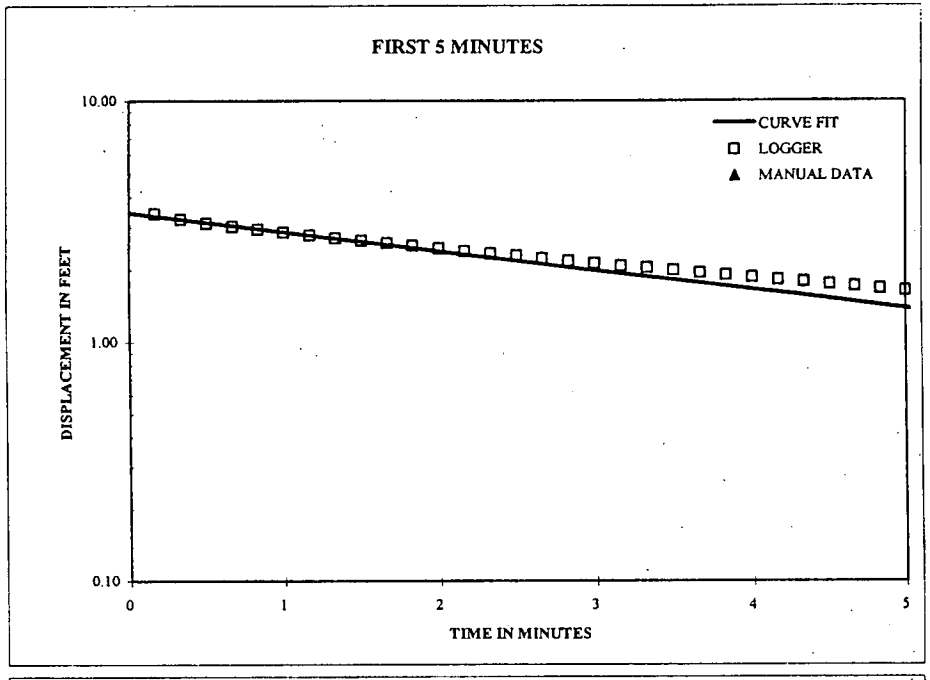
Client: **United States Navy**
Project: **Site N-6 Enhanced Bioremediation**
Project No.: **737490**
Well No.: **PES-MW8S**
Test Date: **15-Aug-00**
Formation: **Upper Saturated Zone**
Rising (R) or Falling (F) Head Test: **Rising Head**
Logger Data File: **PES-MW8SR.xls**

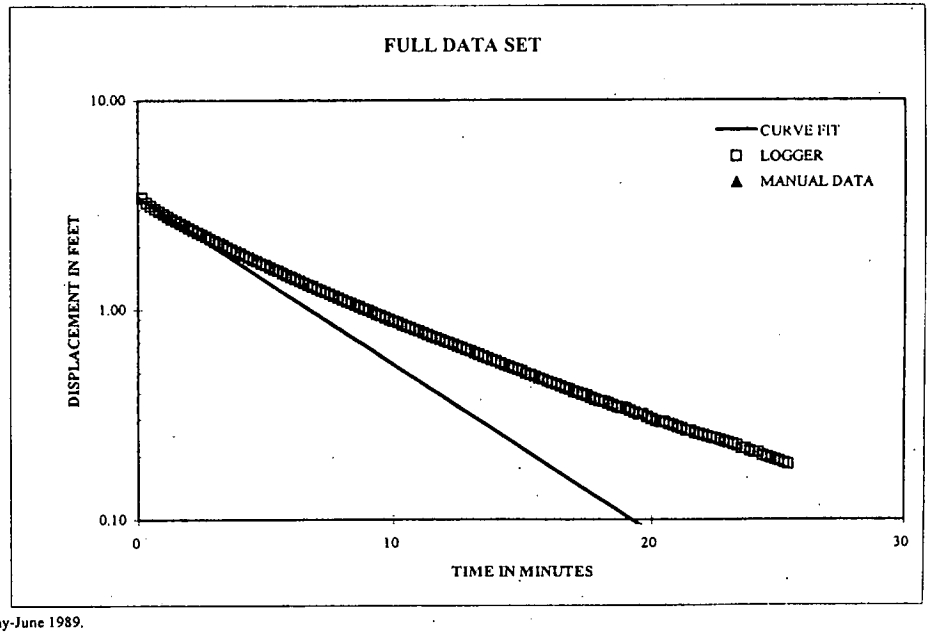
Hydraulic conductivity	1.00E-03	cm/sec
	1.98E-03	ft/min
	2.8444	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.79	feet
Depth to bottom of screen (from ground level)	65.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	3.450	feet
ΔH at time t (Y_t)	0.500	feet
Time	10.50	min

Bouwer-Rice Parameters

feet	cm		cm	
39.79	1212.80	*SW*		
25.21	768.40	*H*	120.00	*L/Rw*
55	1676.40	*Ts*	0.56	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	5.48	*Ln[(D-H)/Rw]'*
45.21	1378.00	*D*	5.48	*Ln[(D-H)/Rw]*
3.45	105.16	Y_0	3.77	equation (8)
0.5	15.24	Y_t	4.33	equation (9)
	630.00	*t (seconds)*	3.77	*Ln(Re/Rw)*
	0.30	*n*	1.0E-03	equation (5)





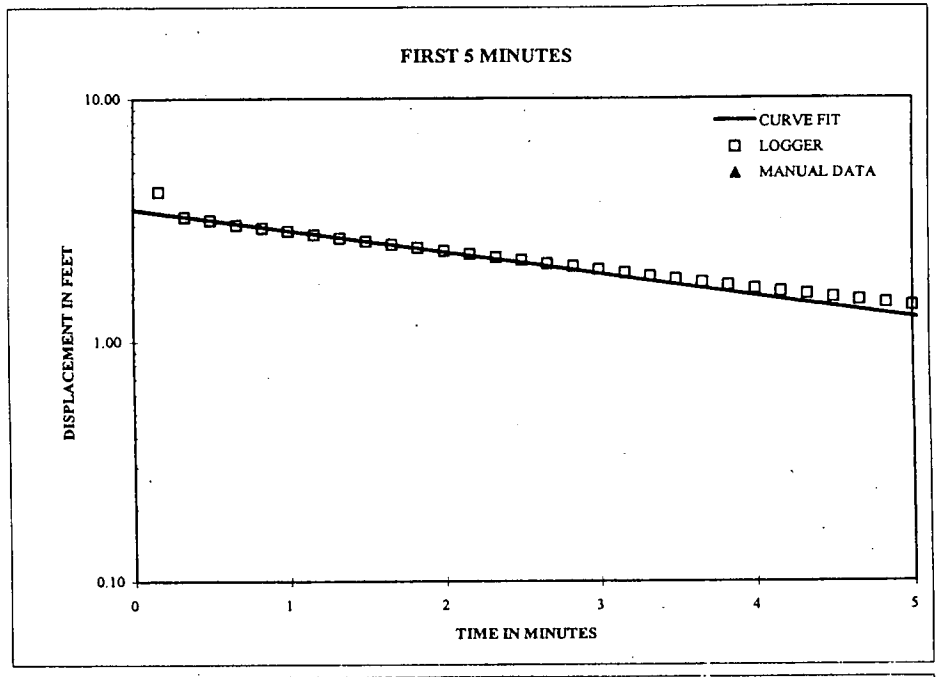
Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

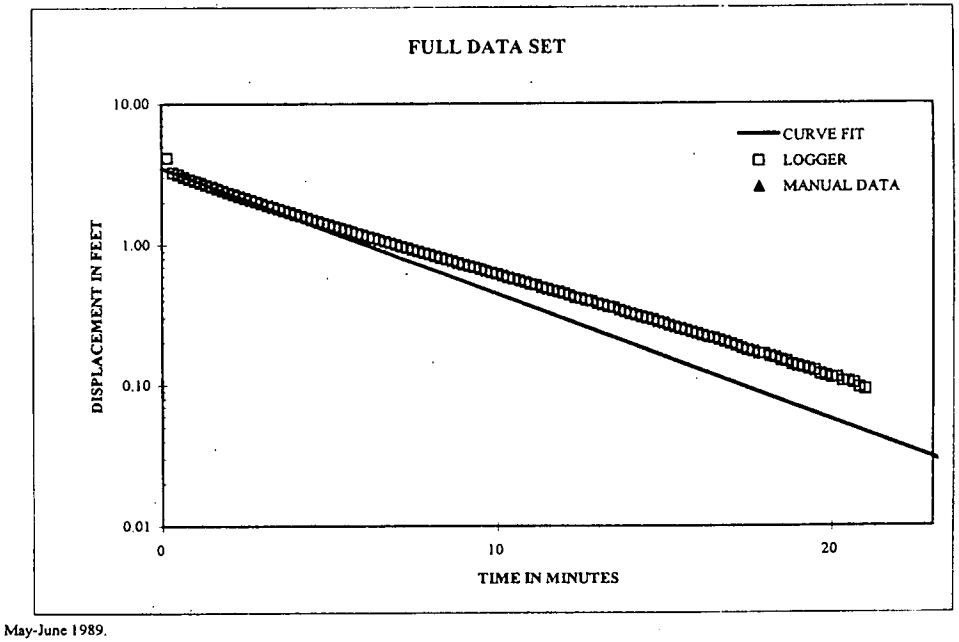
Client: United States Navy
Project: Site N-6 Enhanced Bioremediation
Project No.: 737490
Well No.: PES-MW8S
Test Date: 15-Aug-00
Formation: Upper Saturated Zone
Rising (R) or Falling (F) Head Test: Falling Head
Logger Data File: PES-MW8SF.xls
Hydraulic conductivity 1.12E-03 cm/sec
2.21E-03 ft/min
3.1841 ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.79	feet
Depth to bottom of screen (from ground level)	65.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	3.500	feet
ΔH at time t (Y_t)	1.250	feet
Time	5.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.79	1212.80	*SW*		
25.21	768.40	*H*	120.00	*L/Rw*
55	1676.40	*Ts*	0.56	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	5.48	*Ln[(D-H)/Rw]'*
45.21	1378.00	*D*	5.48	*Ln[(D-H)/Rw]*
3.5	106.68	Y_o	3.77	equation (8)
1.25	38.10	Y_t	4.33	equation (9)
	300.00	*t (seconds)*	3.77	*Ln(Re/Rw)*
	0.30	*n*	1.1E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

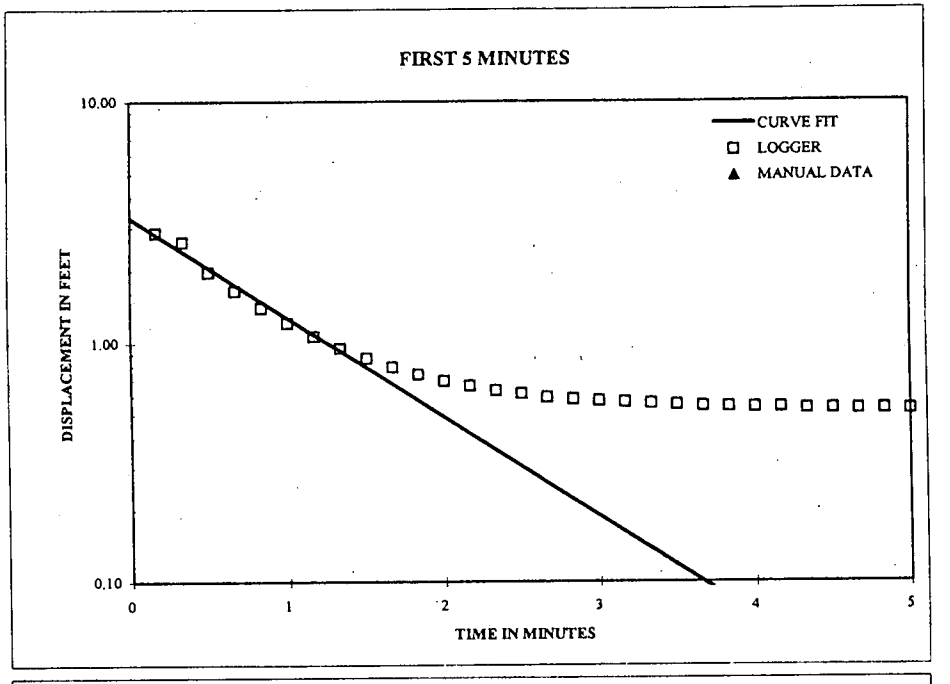
Client: United States Navy
Project: Site N-6 Enhanced Bioremediation
Project No.: 737490
Well No.: PES-INJ2S
Test Date: 15-Aug-00
Formation: Upper Saturated Zone
Rising (R) or Falling (F) Head Test: Falling
Logger Data File: PES-INJ2S.xls

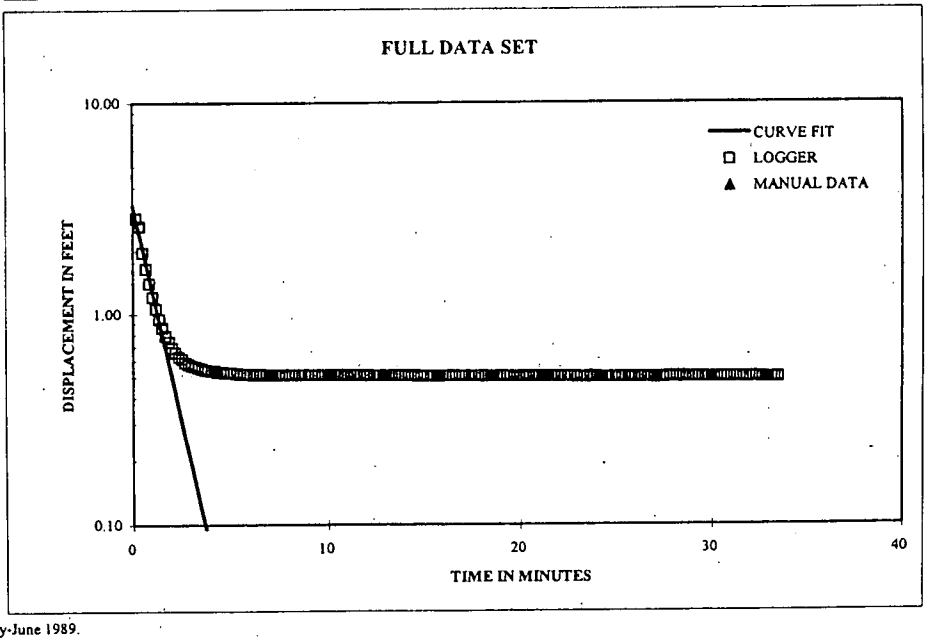
Hydraulic conductivity	4.83E-03	cm/sec
	9.50E-03	ft/min
	13.6802	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.55	feet
Depth to bottom of screen (from ground level)	54.80	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	3.300	feet
ΔH at time t (Y_t)	0.100	feet
Time	3.66	min

Bouwer-Rice Parameters

feet	cm		cm	
39.55	1205.48	*SW*		
15.25	464.82	*H*	120.00	*L/Rw*
44.8	1365.50	*Ts*	0.34	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	5.89	*Ln[(D-H)/Rw]'*
45.45	1385.32	*D*	5.89	*Ln[(D-H)/Rw]*
3.3	100.58	Y_0	3.49	equation (8)
0.1	3.05	Y_t	4.01	equation (9)
	219.60	*t (seconds)*	3.49	*Ln(Re/Rw)*
	0.30	*n*	4.8E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

Client: **United States Navy**

Project: **Verification against Bouwer & Rice (1976) Data**

Project No.:

Well No.: **PES-INJ2S**

Test Date: **August 15, 2000**

Formation Tested: **Upper Fluvial Aquifer Zone**

Rising (R) or Falling (F) Head Test: **Rising**

Logger Data File: **PES INJ2S Rise.xls**

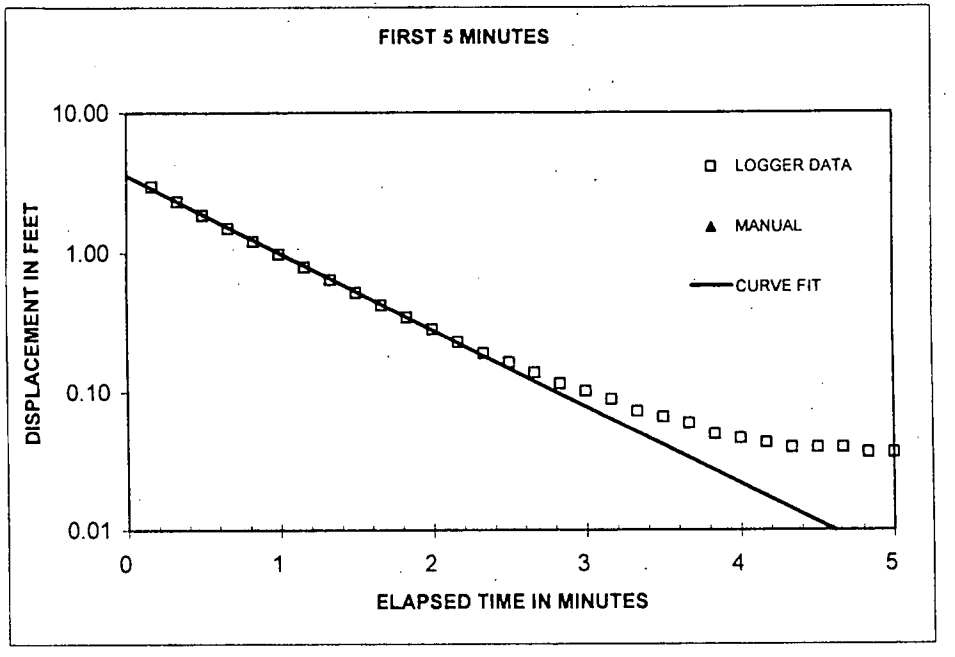
Hydraulic conductivity

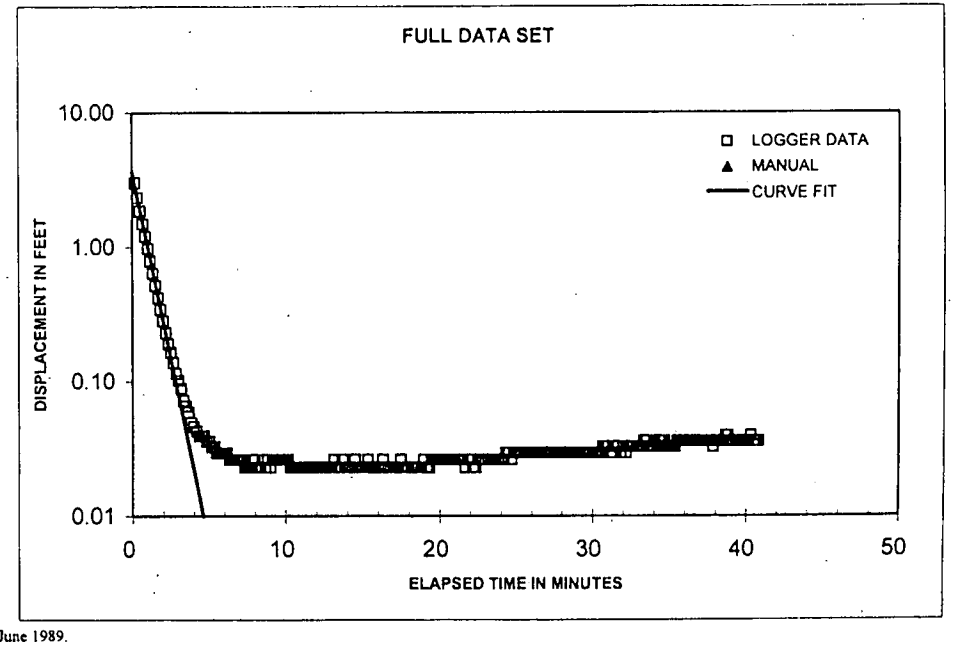
	6.45E-03	cm/sec
	1.27E-02	ft/min
	18.29	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.55	feet
Depth to bottom of screen (from ground level)	54.80	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	3.600	feet
ΔH at time t (Y_t)	0.280	feet
Time	2.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.55	1205.48	*SW*		
15.25	464.82	*H*	120.00	*L/Rw*
44.8	1365.50	*Ts*	0.34	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	5.89	*Ln[(D-H)/Rw]'*
45.45	1385.32	*D*	5.89	*Ln[(D-H)/Rw]*
3.6	109.73	Y_o	3.49	equation (8)
0.28	8.53	Y_t	4.01	equation (9)
	120.00	*t (seconds)*	3.49	*Ln(Re/Rw)*
	0.30	*n*	6.5E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

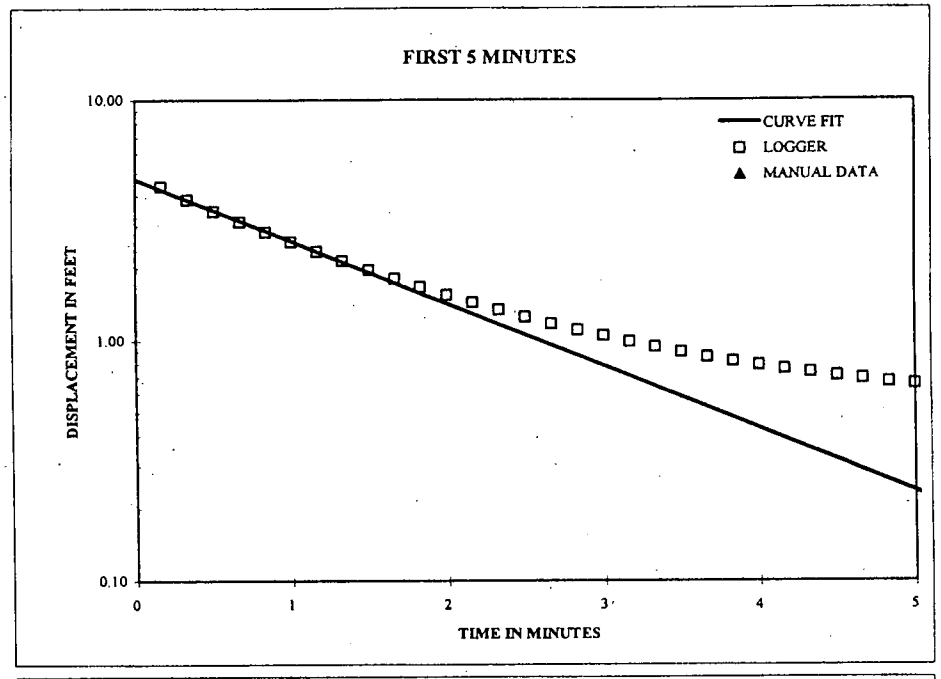
Client: **United States Navy**
Project: **Site N-6 Enhanced Bioremediation**
Project No.: **737490**
Well No.: **PES-INJ3S**
Test Date: **15-Aug-00**
Formation: **Upper Saturated Zone**
Rising (R) or Falling (F) Head Test: **Rising**
Logger Data File: **PES-INJ3S RISE.xls**

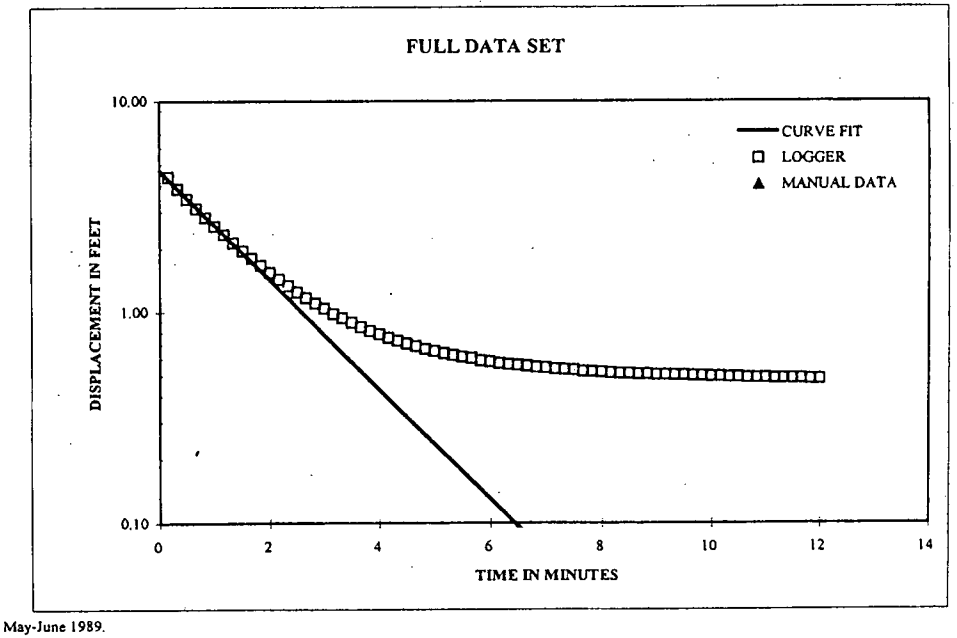
Hydraulic conductivity	3.27E-03	cm/sec
	6.43E-03	ft/min
	9.2572	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.52	feet
Depth to bottom of screen (from ground level)	65.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	4.700	feet
ΔH at time t (Y_t)	0.430	feet
Time	4.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.52	1204.57	*SW*		
25.48	776.63	*H*	120.00	*L/Rw*
55	1676.40	*Ts*	0.56	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	5.48	*Ln[(D-H)/Rw]'*
45.48	1386.23	*D*	5.48	*Ln[(D-H)/Rw]*
4.7	143.26	Y_0	3.78	equation (8)
0.43	13.11	Y_t	4.34	equation (9)
	240.00	*t (seconds)*	3.78	*Ln(Re/Rw)*
	0.30	*n*	3.3E-03	equation (5)



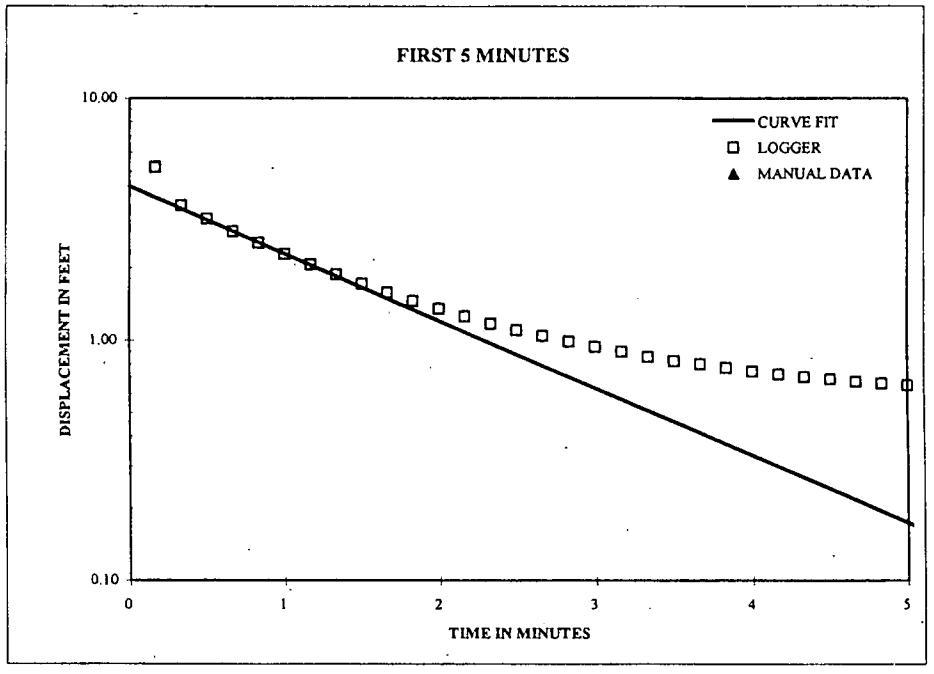


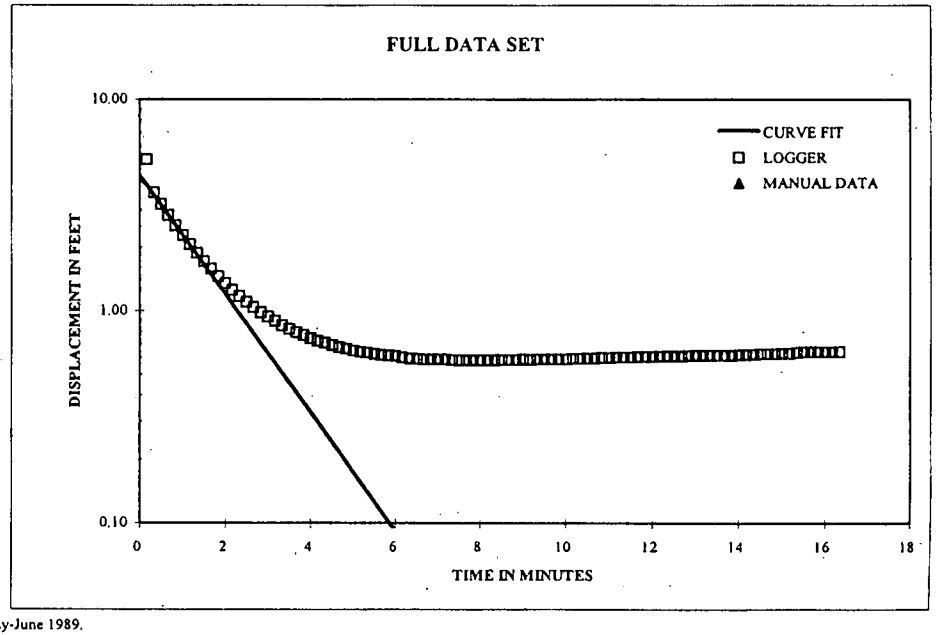
Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

Client: United States Navy
Project: Site N-6 Enhanced Bioremediation
Project No.: 737490
Well No.: PES-INJ3S
Test Date: 15-Aug-00
Formation: Upper Saturated Zone
Rising (R) or Falling (F) Head Test: Falling Head
Logger Data File: PES-INJ3S FALL.xls
Hydraulic conductivity 3.52E-03 cm/sec
6.92E-03 ft/min
9.9701 ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.52	feet
Depth to bottom of screen (from ground level)	65.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	4.350	feet
ΔH at time t (Y_t)	1.200	feet
Time	2.00	min

Bouwer-Rice Parameters				
feet	cm		cm	
39.52	1204.57	*SW*		
25.48	776.63	*H*	120.00	*L/Rw*
55	1676.40	*Ts*	0.56	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	5.48	*Ln[(D-H)/Rw]'*
45.48	1386.23	*D*	5.48	*Ln[(D-H)/Rw]*
4.35	132.59	Y_0	3.78	equation (8)
1.2	36.58	Y_t	4.34	equation (9)
	120.00	*t (seconds)*	3.78	*Ln(Re/Rw)*
	0.30	*n*	3.5E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

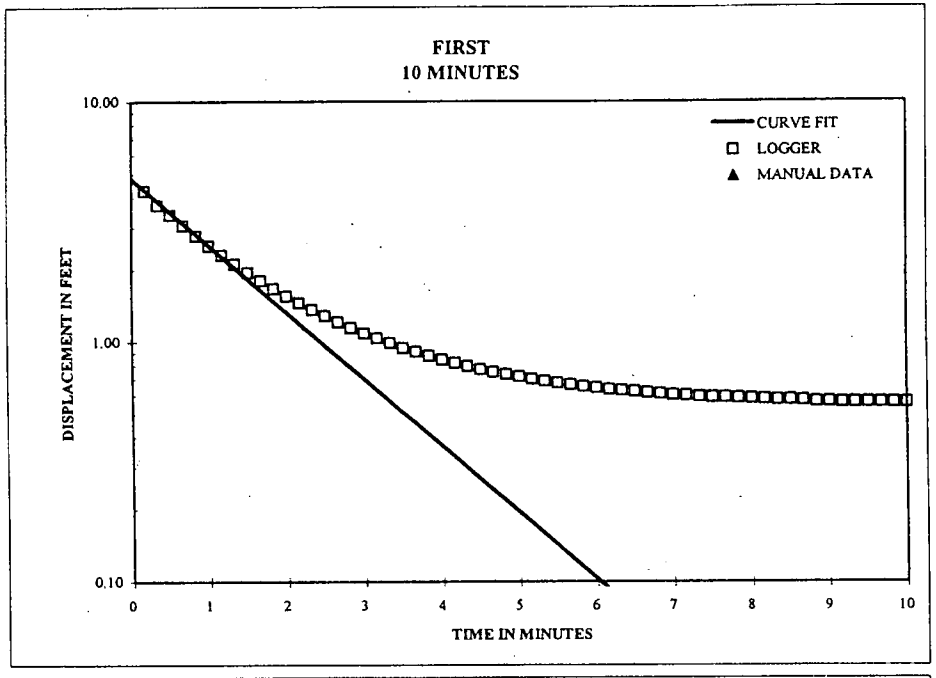
Client: United States Navy
Project: Site N-6 Enhanced Bioremediation
Project No.: 737490
Well No.: PES-MW5D
Test Date: 15-Aug-00
Formation: Lower Saturated Zone
Rising (R) or Falling (F) Head Test: Rising Head
Logger Data File: PES-MW5DR.xls

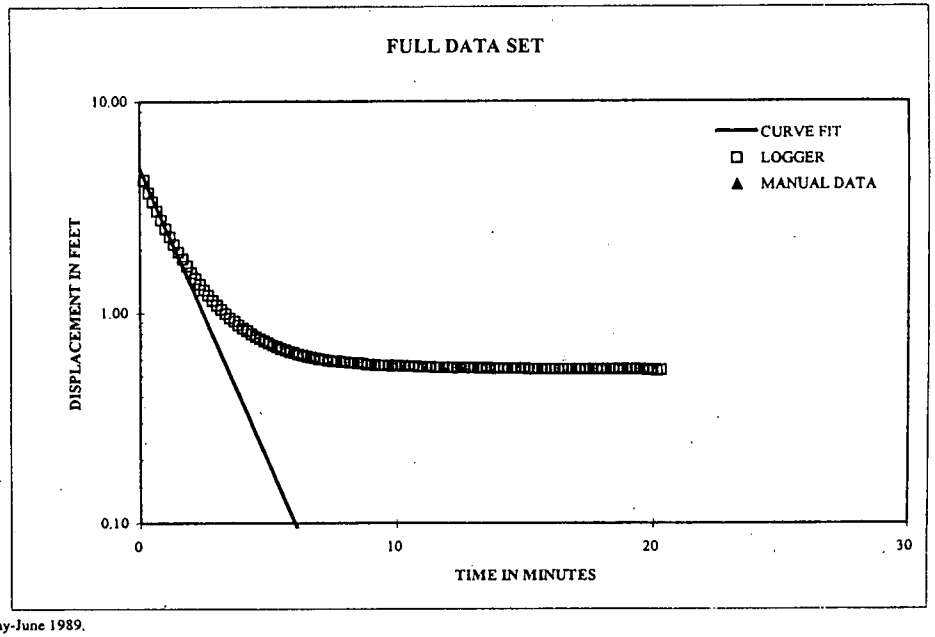
Hydraulic conductivity	3.71E-03	cm/sec
	7.30E-03	ft/min
	10.5128	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.91	feet
Depth to bottom of screen (from ground level)	75.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	4.800	feet
ΔH at time t (Y_t)	0.700	feet
Time	3.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.91	1216.46	*SW*		
35.09	1069.54	*H*	120.00	*L/Rw*
65	1981.20	*Ts*	0.78	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	4.79	*Ln[(D-H)/Rw]'*
45.09	1374.34	*D*	4.79	*Ln[(D-H)/Rw]*
4.8	146.30	Y_o	4.00	equation (8)
0.7	21.34	Y_t	4.54	equation (9)
	180.00	*t (seconds)*	4.00	*Ln(Re/Rw)*
	0.30	*n*	3.7E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

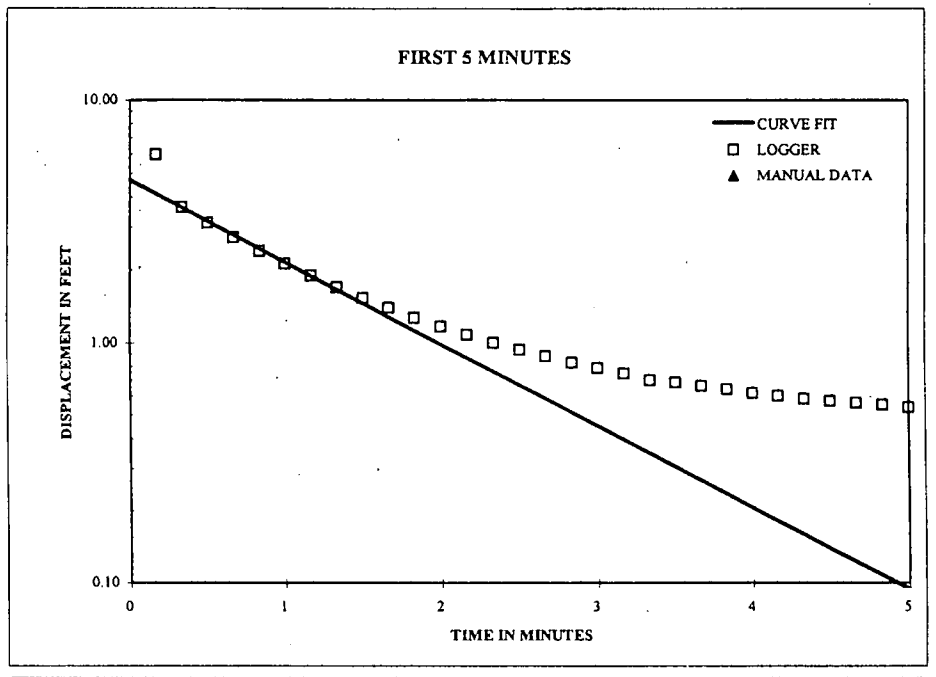
Client: **United States Navy**
Project: **Site N-6 Enhanced Bioremediation**
Project No.: **737490**
Well No.: **PES-MW5D**
Test Date: **15-Aug-00**
Formation: **Lower Saturated Zone**
Rising (R) or Falling (F) Head Test: **Falling Head**
Logger Data File: **PES-MW5DF.xls**

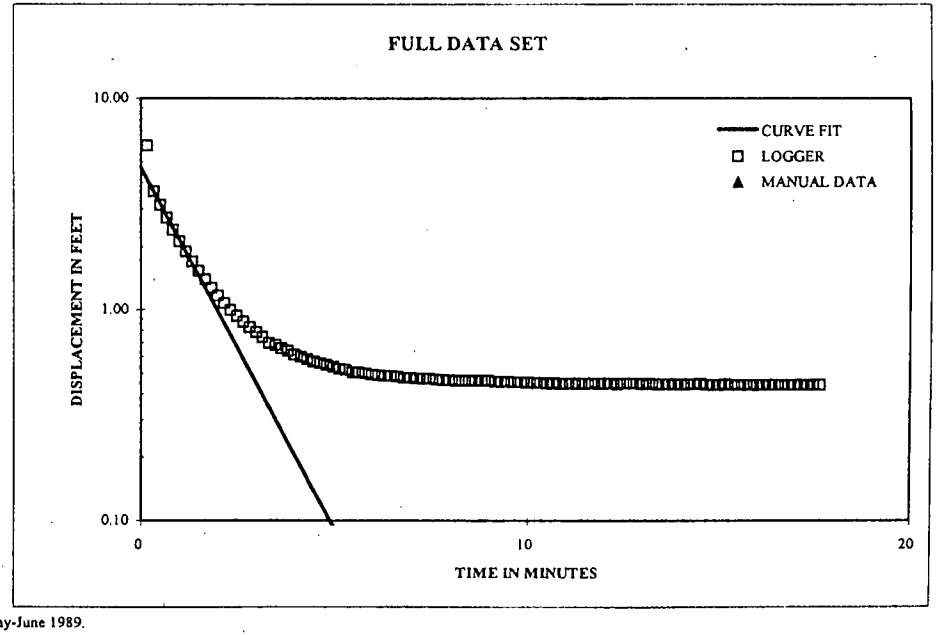
Hydraulic conductivity		
	4.52E-03	cm/sec
	8.90E-03	ft/min
	12.8115	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.91	feet
Depth to bottom of screen (from ground level)	75.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	4.700	feet
ΔH at time t (Y_t)	2.150	feet
Time	1.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.91	1216.46	*SW*		
35.09	1069.54	*H*	120.00	*L/Rw*
65	1981.20	*Ts*	0.78	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	4.79	*Ln[(D-H)/Rw]'*
45.09	1374.34	*D*	4.79	*Ln[(D-H)/Rw]*
4.7	143.26	Y_0	4.00	equation (8)
2.15	65.53	Y_t	4.54	equation (9)
	60.00	*t (seconds)*	4.00	*Ln(Re/Rw)*
	0.30	*n*	4.5E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

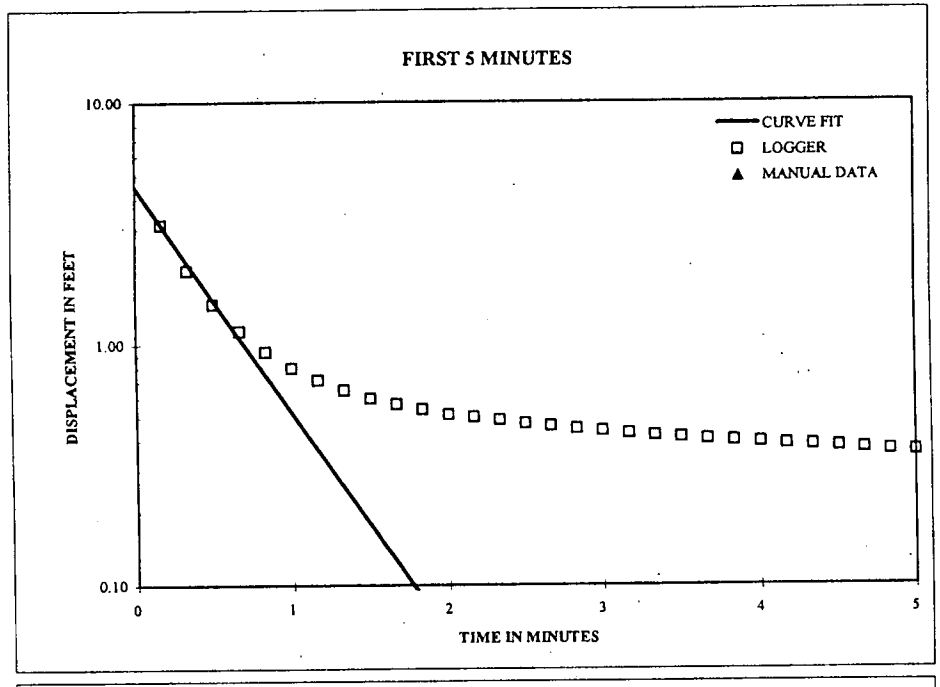
Client: United States Navy
Project: Site N-6 Enhanced Bioremediation
Project No.: 737490
Well No.: PES-MW8D
Test Date: 15-Aug-00
Formation: Lower Saturated Zone
Rising (R) or Falling (F) Head Test: Rising Head
Logger Data File: PES-MW8DR.xls

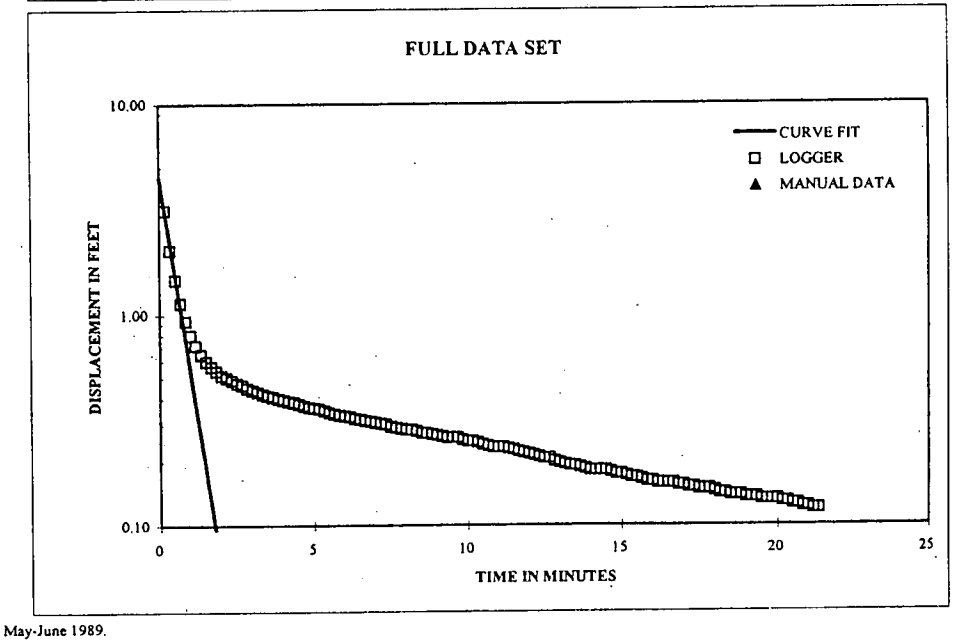
Hydraulic conductivity	1.79E-03	cm/sec
	3.52E-03	ft/min
	5.0693	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.90	feet
Depth to bottom of screen (from ground level)	85.30	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	4.500	feet
ΔH at time t (Y_t)	0.060	feet
Time	2.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.9	1216.15	*SW*		
45.4	1383.79	*H*	120.00	*L/Rw*
75.3	2295.14	*Ts*	1.01	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.083	2.54	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	#NUM!	*Ln[(D-H)/Rw]'*
45.1	1374.65	*D*	#NUM!	*Ln[(D-H)/Rw]*
4.5	137.16	Y_0	#NUM!	equation (8)
0.06	1.83	Y_t	4.70	equation (9)
	120.00	*t (seconds)*	4.70	*Ln(Re/Rw)*
	0.30	*n*	1.8E-03	equation (5)





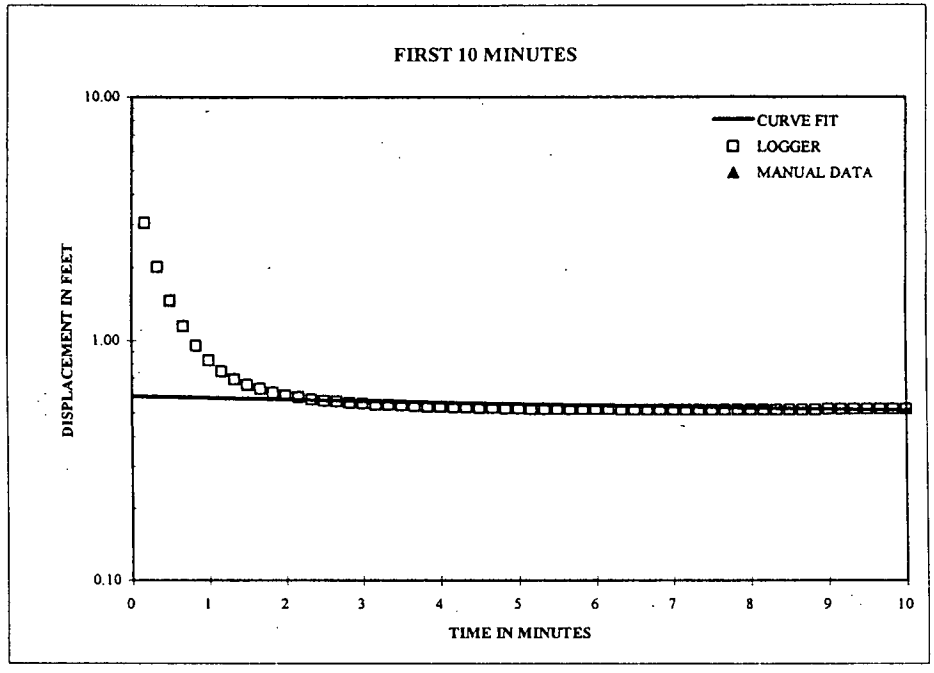
Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

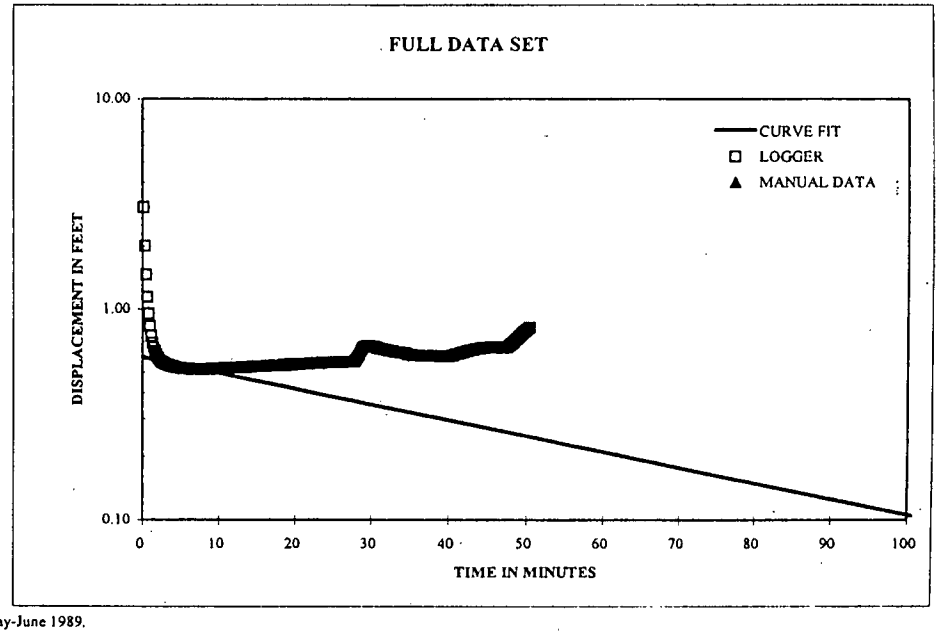
Client: Naval Support Activity Mid-South
Project: Site N-6 Enhanced Bioremediation
Project No.: 737490
Well No.: PES-MW8D
Test Date: 15-Aug-00
Formation: Upper Saturated Zone
Rising (R) or Falling (F) Head Test: Falling Head
Logger Data File: PES-MW8DF.xls
Hydraulic conductivity 1.42E-05 cm/sec
2.80E-05 ft/min
0.0403 ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.90	feet
Depth to bottom of screen (from ground level)	85.30	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	90.00	feet
Porosity of filter pack	0.40	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	0.590	feet
ΔH at time t (Y_t)	0.250	feet
Time	50.01	min

Bouwer-Rice Parameters

feet	cm,		cm	
39.9	1216.15	*SW*		
45.4	1383.79	*H*	120.00	*L/Rw*
75.3	2295.14	*Ts*	0.91	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.083	2.54	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	4.03	*Ln[(D-H)/Rw]'*
50.1	1527.05	*D*	4.03	*Ln[(D-H)/Rw]*
0.59	17.98	Y_0	4.20	equation (8)
0.25	7.62	Y_t	4.70	equation (9)
	3000.60	*t (seconds)*	4.70	*Ln(Re/Rw)*
	0.40	*n*	1.4E-05	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

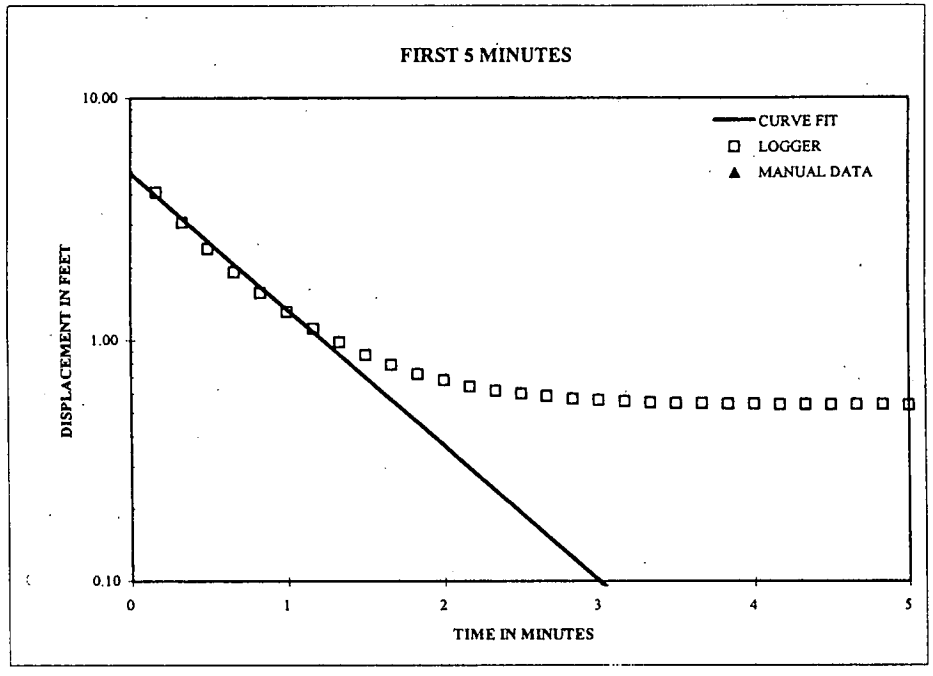
Client: United States Navy
Project: Site N-6 Enhanced Bioremediation
Project No.: 737490
Well No.: PES-INJ2D
Test Date: 15-Aug-00
Formation: Lower Saturated Zone
Rising (R) or Falling (F) Head Test: Rising
Logger Data File: PES-INJ2D RISE.xls

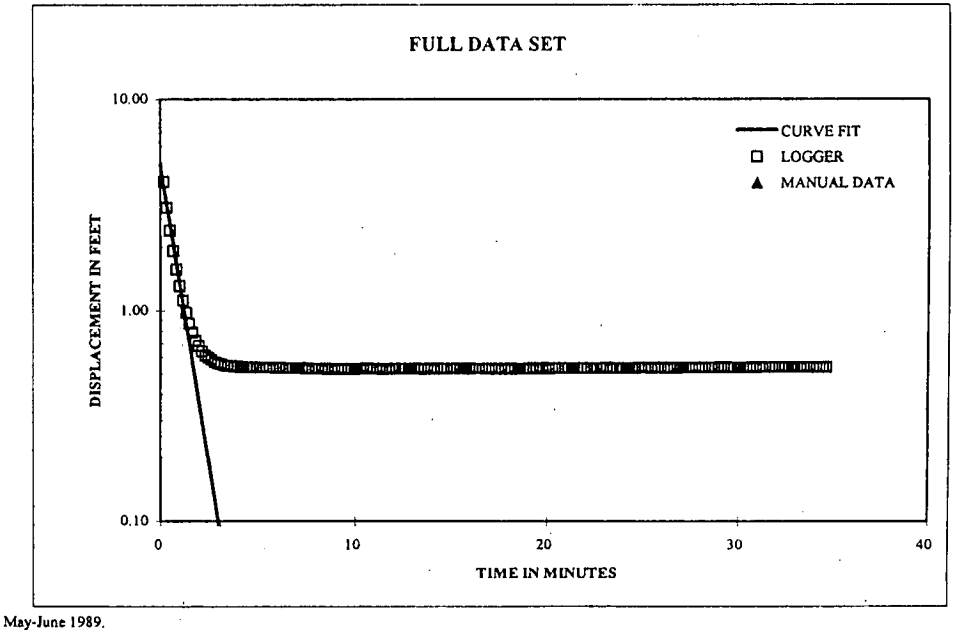
Hydraulic conductivity	7.50E-03	cm/sec
	1.48E-02	ft/min
	21.2631	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.74	feet
Depth to bottom of screen (from ground level)	75.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	4.900	feet
ΔH at time t (Y_t)	0.100	feet
Time	3.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.74	1211.28	*SW*		
35.26	1074.72	*H*	120.00	*L/Rw*
65	1981.20	*Ts*	0.78	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	4.79	*Ln[(D-H)/Rw]'*
45.26	1379.52	*D*	4.79	*Ln[(D-H)/Rw]*
4.9000001	149.35	Y_0	4.00	equation (8)
0.1	3.05	Y_t	4.54	equation (9)
	180.00	*t (seconds)*	4.00	*Ln(Re/Rw)*
	0.30	*n*	7.5E-03	equation (5)





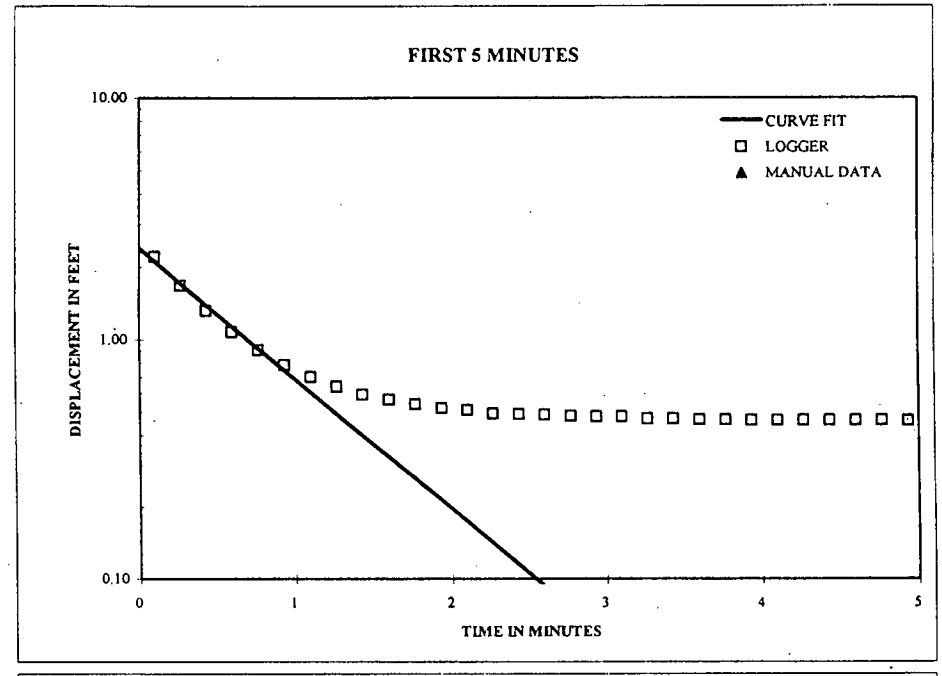
Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research, vol 12, no. 3, June 1976.

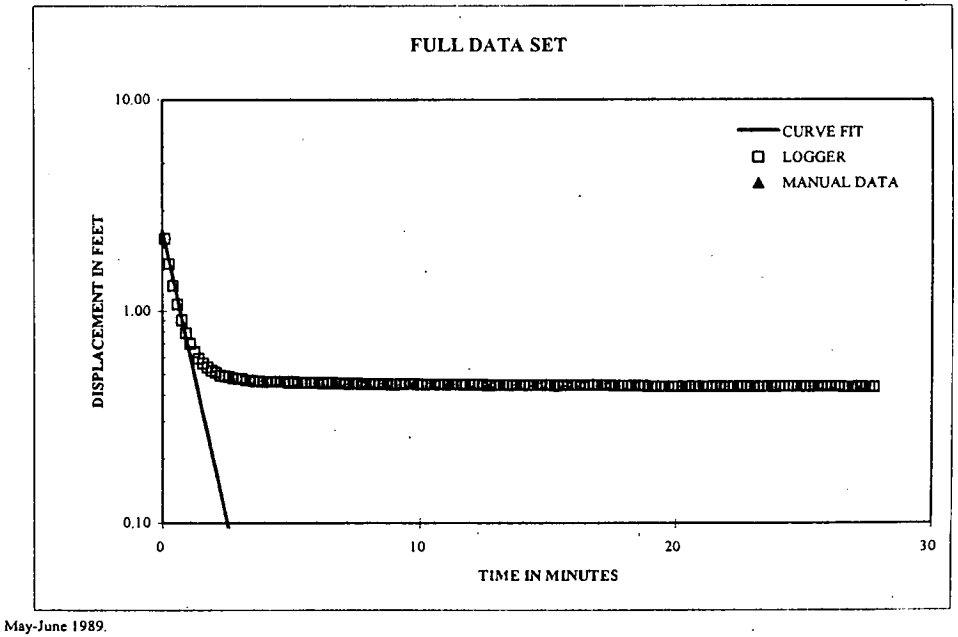
Client: United States Navy
Project: Site N-6 Enhanced Bioremediation
Project No.: 737490
Well No.: PES-INJ2D
Test Date: 15-Aug-00
Formation: Lower Saturated Zone
Rising (R) or Falling (F) Head Test: Falling Head
Logger Data File: PES-INJ2D FALL.xls
Hydraulic conductivity 7.23E-03 cm/sec
1.42E-02 ft/min
20.5079 ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.74	feet
Depth to bottom of screen (from ground level)	75.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	2.400	feet
ΔH at time t (Y_t)	0.100	feet
Time	2.54	min

Bouwer-Rice Parameters

feet	cm		cm	
39.74	1211.28	*SW*		
35.26	1074.72	*H*	120.00	*L/Rw*
65	1981.20	*Ts*	0.78	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.239	7.27	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	4.79	*Ln[(D-H)/Rw]'*
45.26	1379.52	*D*	4.79	*Ln[(D-H)/Rw]*
2.4	73.15	Y_0	4.00	equation (8)
0.1	3.05	Y_t	4.54	equation (9)
	152.40	*t (seconds)*	4.00	*Ln(Re/Rw)*
	0.30	*n*	7.2E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

Client: United States Navy

Project: Verification against Bouwer & Rice (1976) Data

Project No.: 737490

Well No.: PES-INJ3D

Test Date: August 15, 2000

Formation Tested: Lower Saturated Zone

Rising (R) or Falling (F) Head Test: Falling

Logger Data File:

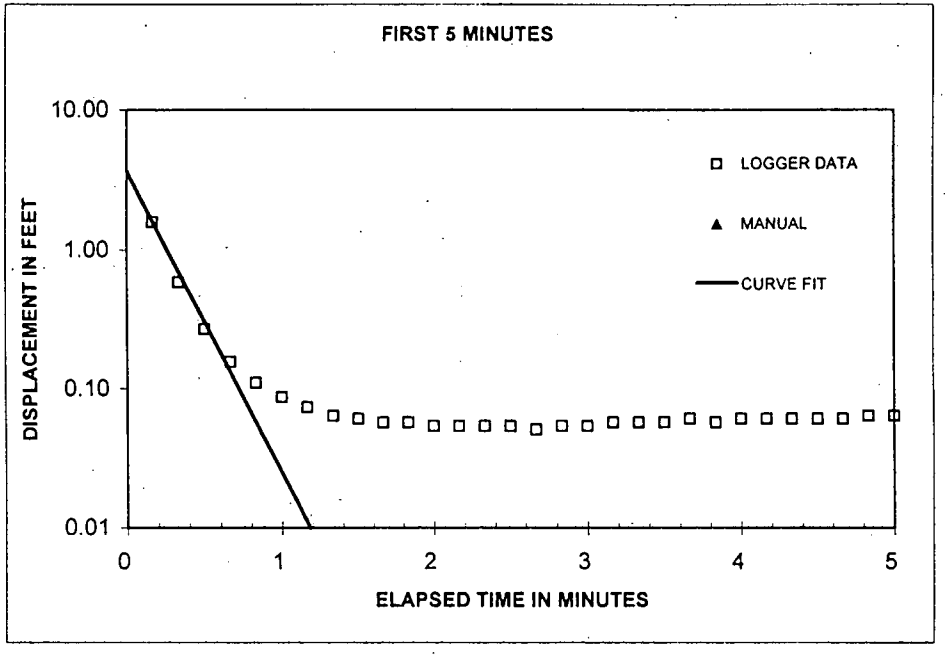
Hydraulic conductivity

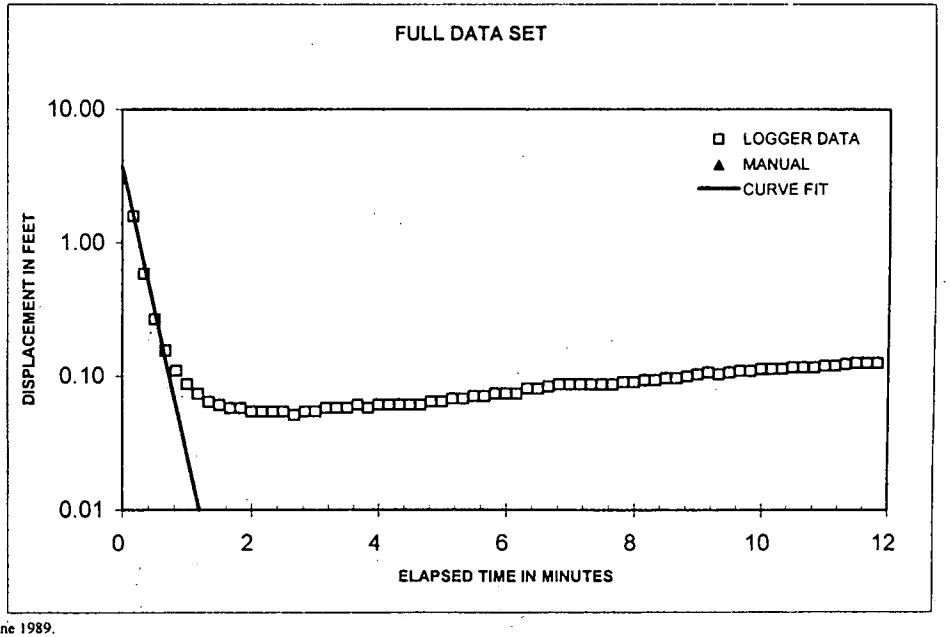
4.14E-03	cm/sec
8.14E-03	ft/min
11.73	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.84	feet
Depth to bottom of screen (from ground level)	85.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	3.700	feet
ΔH at time t (Y_t)	0.025	feet
Time	1.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.84	1214.32	*SW*		
45.16	1376.48	*H*	120.00	*L/Rw*
75	2286.00	*Ts*	1.00	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.083	2.54	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	#NUM!	*Ln[(D-H)/Rw]'*
45.16	1376.48	*D*	#NUM!	*Ln[(D-H)/Rw]*
3.7	112.78	Y_o	#NUM!	equation (8)
0.025	0.76	Y_t	4.69	equation (9)
	60.00	*t (seconds)*	4.69	*Ln(Re/Rw)*
	0.30	*n*	4.1E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

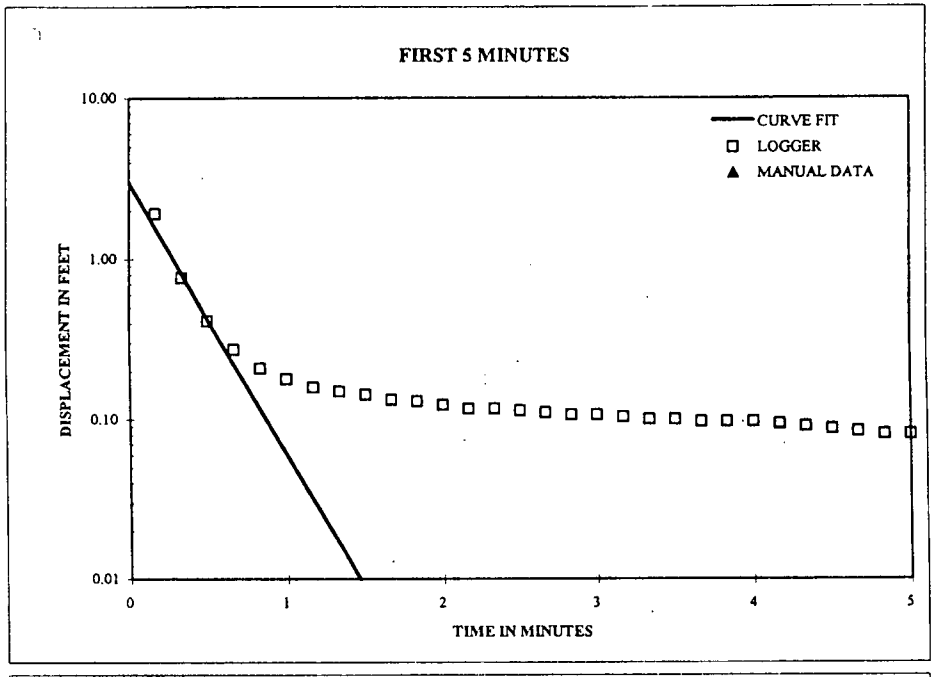
Client: United States Navy
Project: Site N-6 Enhanced Bioremediation
Project No.: 737490
Well No.: PES-INJ3D
Test Date: 15-Aug-00
Formation: Lower Saturated Zone
Rising (R) or Falling (F) Head Test: Rising
Logger Data File: PES-INJ3D RISE.xls

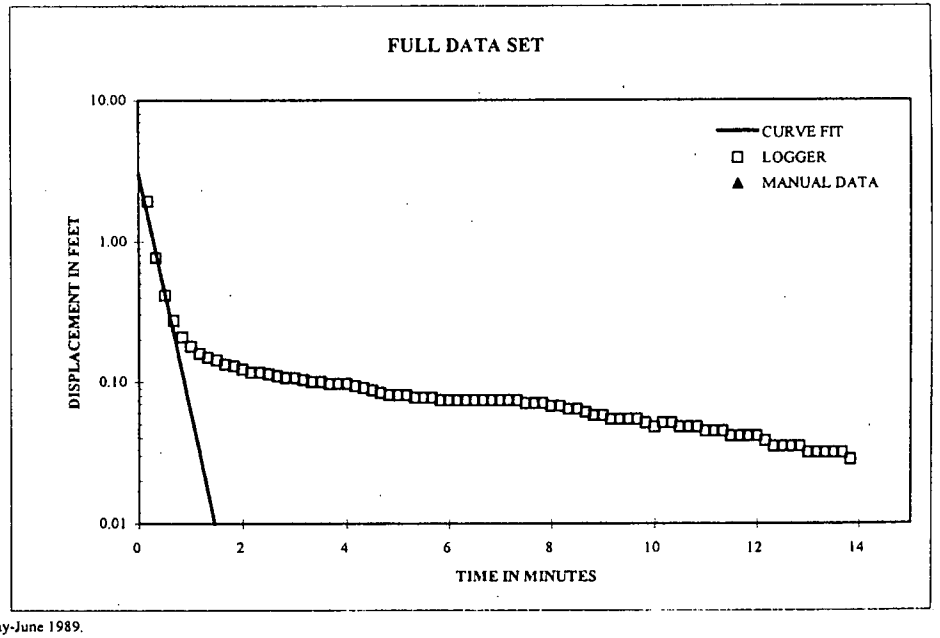
Hydraulic conductivity	3.24E-03	cm/sec
	6.38E-03	ft/min
	9.1801	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	39.84	feet
Depth to bottom of screen (from ground level)	85.00	feet
Boring diameter	10.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	85.00	feet
Porosity of filter pack	0.30	
Slug diameter (optional)		inches
Slug length (optional)		feet
Theoretical ΔH at time zero (Y_0)	0.00	feet
Actual ΔH at time zero (Y_0)	3.000	feet
ΔH at time t (Y_t)	0.060	feet
Time	1.00	min

Bouwer-Rice Parameters

feet	cm		cm	
39.84	1214.32	*SW*		
45.16	1376.48	*H*	120.00	*L/Rw*
75	2286.00	*Ts*	1.00	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.083	2.54	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	#NUM!	*Ln[(D-H)/Rw]'*
45.16	1376.48	*D*	#NUM!	*Ln[(D-H)/Rw]*
3	91.44	Y_0	#NUM!	equation (8)
0.06	1.83	Y_t	4.69	equation (9)
	60.00	*t (seconds)*	4.69	*Ln(Re/Rw)*
	0.30	*n*	3.2E-03	equation (5)





Bouwer, Herman. 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol. 27, no. 3, May-June 1989.
Bouwer, H. and R.C. Rice. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research. vol 12, no. 3, June 1976.

APPENDIX C

CONCENTRATION AND MOLAR FRACTION PLOTS

TABLE C.1
MOLAR FRACTION OF CHLORINATED ALIPHATIC HYDROCARBONS IN GROUNDWATER
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

		PCE[a]				TCE[a]				cis-1,2-DCE[a]				VC[a]				Ethene			
Well ID	Date	Concentration (µg/L[b])	Molar Weight (g/mol)[c]	Molar Concentration (mol/L[d])	Molar Fraction (percent)	Concentration (µg/L)	Molar Weight (g/mol)	Molar Concentration (mol/L)	Molar Fraction (percent)	Concentration (µg/L)	Molar Weight (g/mol)	Molar Concentration (mol/L)	Molar Fraction (percent)	Concentration (µg/L)	Molar Weight (g/mol)	Molar Concentration (mol/L)	Molar Fraction (percent)	Concentration (µg/L)	Molar Weight (g/mol)	Molar Concentration (mol/L)	Molar Fraction (percent)
PES-MW1S	25-Jul-00	0	165.834	0.00E+00	0.0%	150	131.38894	1.14E-06	76.5%	34	96.94388	3.51E-07	23.5%	0	62.49882	0.00E+00	0.0%	0.02	28.05376	5.70E-10	0.04%
	7-Nov-00	0	165.834	0.00E+00	0.0%	22	131.38894	1.67E-07	17.2%	9.1	96.94388	9.39E-08	9.6%	0	62.49882	0.00E+00	0.0%	20	28.05376	7.13E-07	73.18%
	6-Feb-01	0	165.834	0.00E+00	0.0%	53	131.38894	4.03E-07	45.0%	17	96.94388	1.75E-07	19.6%	0	62.49882	0.00E+00	0.0%	8.9	28.05376	3.17E-07	35.41%
	6-Aug-01	0	165.834	0.00E+00	0.0%	14	131.38894	1.07E-07	19.6%	34	96.94388	3.51E-07	64.6%	0	62.49882	0.00E+00	0.0%	2.4	28.05376	8.56E-08	15.76%
	29-Jan-02	0	165.834	0.00E+00	0.0%	100	131.38894	7.61E-07	62.6%	40	96.94388	4.13E-07	33.9%	0	62.49882	0.00E+00	0.0%	1.2	28.05376	4.28E-08	3.52%
PES-MW1D	6-Aug-00	0	165.834	0.00E+00	0.0%	26	131.38894	1.98E-07	56.7%	2.8	96.94388	2.89E-08	8.3%	0	62.49882	0.00E+00	0.0%	3.4	28.05376	1.22E-07	35.05%
	8-Nov-00	0	165.834	0.00E+00	0.0%	0	131.38894	0.00E+00	0.0%	0	96.94388	0.00E+00	0.0%	0	62.49882	0.00E+00	0.0%	0.42	28.05376	1.50E-08	0.00%
	6-Feb-01	0	165.834	0.00E+00	0.0%	1.2	131.38894	9.13E-09	63.1%	0	96.94388	0.00E+00	0.0%	0	62.49882	0.00E+00	0.0%	0.15	28.05376	5.35E-09	36.93%
	6-Aug-01	0	165.834	0.00E+00	0.0%	0	131.38894	0.00E+00	0.0%	0	96.94388	0.00E+00	0.0%	0	62.49882	0.00E+00	0.0%	0.42	28.05376	1.50E-08	100.00%
	29-Jan-02	0	165.834	0.00E+00	0.0%	0	131.38894	0.00E+00	0.0%	0	96.94388	0.00E+00	0.0%	0	62.49882	0.00E+00	0.0%	0	28.05376	0.00E+00	0.00%
PES-MW2S	5-Aug-00	0	165.834	0.00E+00	0.0%	680	131.38894	5.18E-06	96.4%	4.5	96.94388	4.64E-08	0.9%	0	62.49882	0.00E+00	0.0%	4.1	28.05376	1.47E-07	2.75%
	10-Nov-00	1	165.834	6.03E-09	0.1%	1000	131.38894	7.61E-06	97.3%	14	96.94388	1.44E-07	1.8%	0	62.49882	0.00E+00	0.0%	1.7	28.05376	6.06E-08	0.77%
	8-Feb-01	0	165.834	0.00E+00	0.0%	1200	131.38894	9.13E-06	97.9%	17	96.94388	1.75E-07	1.9%	0	62.49882	0.00E+00	0.0%	0.53	28.05376	1.89E-08	0.20%
	9-Aug-01	0	165.834	0.00E+00	0.0%	1300	131.38894	9.89E-06	98.3%	12	96.94388	1.24E-07	1.2%	0	62.49882	0.00E+00	0.0%	1.2	28.05376	4.28E-08	0.43%
	30-Jan-02	1	165.834	6.03E-09	0.0%	1200	131.38894	9.13E-06	77.9%	250	96.94388	2.58E-06	22.0%	0	62.49882	0.00E+00	0.0%	0.36	28.05376	1.28E-08	0.11%
PES-MW2D	4-Aug-00	0	165.834	0.00E+00	0.0%	180	131.38894	1.37E-06	96.3%	3.6	96.94388	3.71E-08	2.6%	0	62.49882	0.00E+00	0.0%	0.44	28.05376	1.55E-08	1.09%
	10-Nov-00	0	165.834	0.00E+00	0.0%	260	131.38894	1.98E-06	92.4%	8.8	96.94388	9.08E-08	4.2%	0	62.49882	0.00E+00	0.0%	2.0	28.05376	7.13E-08	3.33%
	8-Feb-01	0	165.834	0.00E+00	0.0%	220	131.38894	1.67E-06	94.0%	7.7	96.94388	7.94E-08	4.5%	0	62.49882	0.00E+00	0.0%	0.75	28.05376	2.67E-08	1.50%
	6-Aug-01	0	165.834	0.00E+00	0.0%	40	131.38894	3.04E-07	78.3%	7.4	96.94388	7.63E-08	19.6%	0	62.49882	0.00E+00	0.0%	0.22	28.05376	7.84E-09	2.02%
	30-Jan-02	0	165.834	0.00E+00	0.0%	42	131.38894	3.20E-07	71.2%	12	96.94388	1.24E-07	27.6%	0	62.49882	0.00E+00	0.0%	0.15	28.05376	5.35E-09	1.19%
PES-MW3S	4-Aug-00	1.2	165.834	7.24E-09	0.1%	1600	131.38894	1.22E-05	98.1%	12	96.94388	1.24E-07	1.0%	0	62.49882	0.00E+00	0.0%	2.9	28.05376	1.03E-07	0.83%
	10-Nov-00	0	165.834	0.00E+00	0.0%	350	131.38894	2.66E-06	78.5%	12	96.94388	1.24E-07	3.6%	0	62.49882	0.00E+00	0.0%	17	28.05376	6.06E-07	17.86%
	9-Feb-01	0	165.834	0.00E+00	0.0%	290	131.38894	2.21E-06	85.1%	14	96.94388	1.44E-07	5.6%	0	62.49882	0.00E+00	0.0%	6.8	28.05376	2.42E-07	9.34%
	9-Aug-01	0	165.834	0.00E+00	0.0%	740	131.38894	5.63E-06	96.1%	15	96.94388	1.55E-07	2.6%	0	62.49882	0.00E+00	0.0%	2.1	28.05376	7.49E-08	1.28%
	30-Jan-02	1.3	165.834	7.84E-09	0.1%	1000	131.38894	7.61E-06	97.1%	19	96.94388	1.96E-07	2.5%	0	62.49882	0.00E+00	0.0%	0.77	28.05376	2.74E-08	0.35%
PES-MW3D	4-Aug-00	0	165.834	0.00E+00	0.0%	4.5	131.38894	3.42E-08	31.6%	0	96.94388	0.00E+00	0.0%	0	62.49882	0.00E+00	0.0%	2.1	28.05376	7.41E-08	68.39%
	10-Nov-00	0	165.834	0.00E+00	0.0%	420	131.38894	3.20E-06	74.6%	9.0	96.94388	9.28E-08	2.2%	0	62.49882	0.00E+00	0.0%	28	28.05376	9.98E-07	23.28%
	8-Feb-01	0	165.834	0.00E+00	0.0%	560	131.38894	4.26E-06	97.0%	12	96.94388	1.24E-07	2.8%	0	62.49882	0.00E+00	0.0%	0.27	28.05376	9.62E-09	0.22%
	9-Aug-01	0	165.834	0.00E+00	0.0%	230	131.38894	1.75E-06	98.3%	0	96.94388	0.00E+00	0.0%	0	62.49882	0.00E+00	0.0%	0.83	28.05376	2.96E-08	1.66%
	30-Jan-02	0	165.834	0.00E+00	0.0%	160	131.38894	1.22E-06	75.7%	35	96.94388	3.61E-07	22.4%	0	62.49882	0.00E+00	0.0%	0.86	28.05376	3.07E-08	1.90%
PES-MW4S	3-Aug-00	0	165.834	0.00E+00	0.0%	1600	131.38894	1.22E-05	98.1%	6.4	96.94388	6.60E-08	0.5%	0	62.49882	0.00E+00	0.0%	4.8	28.05376	1.72E-07	1.38%
	9-Nov-00	1.0	165.834	6.03E-09	0.1%	1000	131.38894	7.61E-06	96.4%	13	96.94388	1.34E-07	1.7%	0	62.49882	0.00E+00	0.0%	4.0	28.05376	1.43E-07	1.81%
	8-Feb-01	1.0	165.834	6.03E-09	0.1%	990	131.38894	7.53E-06	97.3%	16	96.94388	1.65E-07	2.1%	0	62.49882	0.00E+00	0.0%	1.1	28.05376	3.92E-08	0.51%
	8-Aug-01	0	165.834	0.00E+00	0.0%	370	131.38894	2.82E-06	94.8%	13	96.94388	1.34E-07	4.5%	0	62.49882	0.00E+00	0.0%	0.59	28.05376	2.10E-08	0.71%
	30-Jan-02	1.1	165.834	6.63E-09	0.1%	1000	131.38894	7.61E-06	97.1%	21	96.94388	2.17E-07	2.8%	0	62.49882	0.00E+00	0.0%	0.22	28.05376	7.84E-09	0.10%
PES-MW4D	3-Aug-00	0	165.834	0.00E+00	0.0%	120	131.38894	9.13E-07	93.6%	1.7	96.94388	1.75E-08	1.8%	0	62.49882	0.00E+00	0.0%	1.3	28.05376	4.47E-08	4.58%
	10-Nov-00	0	165.834	0.00E+00	0.0%	140	131.38894	1.07E-06	96.5%	3.0	96.94388	3.09E-08	2.8%	0	62.49882	0.00E+00	0.0%	0.2	28.05376	7.13E-09	0.65%
	8-Feb-01	0	165.834	0.00E+00	0.0%	95	131.38894	7.23E-07	95.1%	2.9	96.94388	2.99E-08	3.9%	0	62.49882	0.00E+00	0.0%	0.21	28.05376	7.49E-09	0.98%
	8-Aug-01	0	165.834	0.00E+00	0.0%	110	131.38894	8.37E-07	94.6%	2.2	96.94388	2.27E-08	2.6%	0	62.49882	0.00E+00	0.0%	0.70	28.05376	2.50E-08	2.82%
	30-Jan-02	0	165.834	0.00E+00	0.0%	67	131.38894	5.10E-07	96.1%	1.5	96.94388	1.55E-08	2.9%	0	62.49882	0.00E+00	0.0%	0.15	28.05376	5.35E-09	1.01%
PES-MW5S	3-Aug-00	0	165.834	0.00E+00	0.0%	690	131.38894	5.25E-06	96.4%	5.9	96.94388	6.09E-08	1.1%	0	62.49882	0.00E+00	0.0%	3.75	28.05376	1.34E-07	2.45%
	9-Nov-00	0	165.834	0.00E+00	0.0%	220	131.38894	1.67E-06	82.7%	6.9	96.94388	7.12E-08	3.5%	0	62.49882	0.00E+00	0.0%	7.8	28.05376	2.78E-07	13.74%
	8-Feb-01	0	165.834	0.00E+00	0.0%	250	131.38894	1.90E-06	93.8%	8.8	96.94388	9.08E-08	4.5%	0	62.49882	0.00E+00	0.0%	0.98	28.05376	3.49E-08	1.72%
	8-Aug-01	0	165.834	0.00E+00	0.0%	180	131.38894	1.37E-06	92.0%	6.3	96.94388	6.50E-08	4.4%	0	62.49882	0.00E+00	0.0%	1.5	28.05376	5.35E-08	3.59%
	30-Jan-02	0	165.834	0.00E+00	0.0%	540	131.38894	4.11E-06	96.2%	13	96.94388	1.34E-07	3.1%	0	62.49882	0.00E+00	0.0%	0.78	28.05376	2.78E-08	0.65%

TABLE C.1 (Continued)
MOLAR FRACTION OF CHLORINATED ALIPHATIC HYDROCARBONS IN GROUNDWATER
NSA MID-SOUTH SITE N-6
MILLINGTON, TENNESSEE

		PCE[a]				TCE[a]				cis-1,2-DCE[a]				VC[a]				Ethene			
Well ID	Date	Concentration (µg/L[b])	Molar Weight (g/mol)[c]	Molar Concentration (mol/L[d])	Molar Fraction (percent)	Concentration (µg/L)	Molar Weight (g/mol)	Molar Concentration (mol/L)	Molar Fraction (percent)	Concentration (µg/L)	Molar Weight (g/mol)	Molar Concentration (mol/L)	Molar Fraction (percent)	Concentration (µg/L)	Molar Weight (g/mol)	Molar Concentration (mol/L)	Molar Fraction (percent)	Concentration (µg/L)	Molar Weight (g/mol)	Molar Concentration (mol/L)	Molar Fraction (percent)
PES-MW5D	3-Aug-00	0	165.834	0.00E+00	0.0%	450	131.38894	3.42E-06	97.1%	4.3	96.94388	4.44E-08	1.3%	0	62.49882	0.00E+00	0.0%	1.6	28.05376	5.82E-08	1.65%
	9-Nov-00	0	165.834	0.00E+00	0.0%	690	131.38894	5.25E-06	96.9%	6.9	96.94388	7.12E-08	1.3%	0	62.49882	0.00E+00	0.0%	2.7	28.05376	9.62E-08	1.78%
	8-Feb-01	0	165.834	0.00E+00	0.0%	700	131.38894	5.33E-06	97.0%	8.1	96.94388	8.36E-08	1.5%	0	62.49882	0.00E+00	0.0%	2.2	28.05376	7.84E-08	1.43%
	8-Aug-01	0	165.834	0.00E+00	0.0%	680	131.38894	5.18E-06	97.6%	8.7	96.94388	8.97E-08	1.7%	0	62.49882	0.00E+00	0.0%	1.1	28.05376	3.92E-08	0.74%
	30-Jan-02	0	165.834	0.00E+00	0.0%	1000	131.38894	7.61E-06	98.3%	12	96.94388	1.24E-07	1.6%	0	62.49882	0.00E+00	0.0%	0.29	28.05376	1.03E-08	0.13%
PES-MW6S	4-Aug-00	1.0	165.834	6.03E-09	0.0%	1800	131.38894	1.37E-05	98.3%	9.9	96.94388	1.02E-07	0.7%	0	62.49882	0.00E+00	0.0%	3.4	28.05376	1.23E-07	0.88%
	9-Nov-00	1.4	165.834	8.44E-09	0.1%	1100	131.38894	8.37E-06	96.8%	17	96.94388	1.75E-07	2.0%	0	62.49882	0.00E+00	0.0%	2.7	28.05376	9.62E-08	1.11%
	7-Feb-01	2.1	165.834	1.27E-08	0.2%	920	131.38894	7.00E-06	96.3%	22	96.94388	2.27E-07	3.1%	0	62.49882	0.00E+00	0.0%	0.81	28.05376	2.89E-08	0.40%
	8-Aug-01	1.4	165.834	8.44E-09	0.1%	860	131.38894	6.55E-06	97.2%	17	96.94388	1.75E-07	2.6%	0	62.49882	0.00E+00	0.0%	0.21	28.05376	7.49E-09	0.11%
	29-Jan-02	1.5	165.834	9.05E-09	0.1%	1200	131.38894	9.13E-06	97.1%	25	96.94388	2.58E-07	2.7%	0	62.49882	0.00E+00	0.0%	0.08	28.05376	2.67E-09	0.03%
PES-MW6D	3-Aug-00	0	165.834	0.00E+00	0.0%	220	131.38894	1.67E-06	95.2%	4.0	96.94388	4.13E-08	2.3%	0	62.49882	0.00E+00	0.0%	1.2	28.05376	4.28E-08	2.43%
	9-Nov-00	0	165.834	0.00E+00	0.0%	200	131.38894	1.52E-06	96.5%	4.6	96.94388	4.75E-08	3.0%	0	62.49882	0.00E+00	0.0%	0.21	28.05376	7.49E-09	0.47%
	7-Feb-01	0	165.834	0.00E+00	0.0%	150	131.38894	1.14E-06	99.4%	0	96.94388	0.00E+00	0.0%	0	62.49882	0.00E+00	0.0%	0.18	28.05376	6.42E-09	0.56%
	8-Aug-01	0	165.834	0.00E+00	0.0%	88	131.38894	6.70E-07	95.1%	2.4	96.94388	2.48E-08	3.5%	0	62.49882	0.00E+00	0.0%	0.28	28.05376	9.98E-09	1.42%
	29-Jan-02	0	165.834	0.00E+00	0.0%	74	131.38894	5.63E-07	66.8%	26	96.94388	2.68E-07	31.8%	0	62.49882	0.00E+00	0.0%	0.32	28.05376	1.14E-08	1.35%
PES-MW7S	2-Aug-00	1.2	165.834	7.24E-09	0.1%	660	131.38894	5.02E-06	97.0%	7.2	96.94388	7.43E-08	1.4%	0	62.49882	0.00E+00	0.0%	2.0	28.05376	7.21E-08	1.39%
	9-Nov-00	0	165.834	0.00E+00	0.0%	150	131.38894	1.14E-06	69.6%	28	96.94388	2.89E-07	17.6%	0	62.49882	0.00E+00	0.0%	5.9	28.05376	2.10E-07	12.82%
	7-Feb-01	0	165.834	0.00E+00	0.0%	95	131.38894	7.23E-07	49.4%	61	96.94388	6.29E-07	43.0%	0	62.49882	0.00E+00	0.0%	3.1	28.05376	1.11E-07	7.55%
	7-Aug-01	0	165.834	0.00E+00	0.0%	140	131.38894	1.07E-06	76.5%	28	96.94388	2.89E-07	20.7%	0	62.49882	0.00E+00	0.0%	1.1	28.05376	3.92E-08	2.81%
	29-Jan-02	0	165.834	0.00E+00	0.0%	220	131.38894	1.67E-06	86.9%	22	96.94388	2.27E-07	11.8%	0	62.49882	0.00E+00	0.0%	0.72	28.05376	2.57E-08	1.33%
PES-MW7D	2-Aug-00	2.0	165.834	1.21E-08	0.3%	570	131.38894	4.34E-06	94.6%	16	96.94388	1.65E-07	3.6%	0	62.49882	0.00E+00	0.0%	2.0	28.05376	7.00E-08	1.53%
	9-Nov-00	0	165.834	0.00E+00	0.0%	980	131.38894	7.46E-06	98.7%	4.5	96.94388	4.64E-08	0.6%	0	62.49882	0.00E+00	0.0%	1.5	28.05376	5.35E-08	0.71%
	7-Feb-01	0	165.834	0.00E+00	0.0%	800	131.38894	6.09E-06	98.5%	6.0	96.94388	6.19E-08	1.0%	0	62.49882	0.00E+00	0.0%	0.92	28.05376	3.28E-08	0.53%
	7-Aug-01	0	165.834	0.00E+00	0.0%	760	131.38894	5.78E-06	98.6%	4.5	96.94388	4.64E-08	0.8%	0	62.49882	0.00E+00	0.0%	0.96	28.05376	3.42E-08	0.58%
	29-Jan-02	0	165.834	0.00E+00	0.0%	1300	131.38894	9.89E-06	99.4%	5.0	96.94388	5.16E-08	0.5%	0	62.49882	0.00E+00	0.0%	0.13	28.05376	4.63E-09	0.05%
PES-MW8S	2-Aug-00	0	165.834	0.00E+00	0.0%	150	131.38894	1.14E-06	95.6%	0	96.94388	0.00E+00	0.0%	0	62.49882	0.00E+00	0.0%	1.5	28.05376	5.22E-08	4.37%
	8-Nov-00	0	165.834	0.00E+00	0.0%	98	131.38894	7.46E-07	88.6%	1.0	96.94388	1.03E-08	1.2%	0	62.49882	0.00E+00	0.0%	2.4	28.05376	8.56E-08	10.16%
	7-Feb-01	0	165.834	0.00E+00	0.0%	100	131.38894	7.61E-07	96.4%	0	96.94388	0.00E+00	0.0%	0	62.49882	0.00E+00	0.0%	0.79	28.05376	2.82E-08	3.57%
	7-Aug-01	0	165.834	0.00E+00	0.0%	61	131.38894	4.64E-07	96.0%	0	96.94388	0.00E+00	0.0%	0	62.49882	0.00E+00	0.0%	0.54	28.05376	1.92E-08	3.98%
	29-Jan-02	0	165.834	0.00E+00	0.0%	220	131.38894	1.67E-06	98.7%	1.2	96.94388	1.24E-08	0.7%	0	62.49882	0.00E+00	0.0%	0.26	28.05376	9.27E-09	0.55%
PES-MW8D	2-Aug-00	0	165.834	0.00E+00	0.0%	380	131.38894	2.89E-06	99.0%	1.4	96.94388	1.44E-08	0.5%	0	62.49882	0.00E+00	0.0%	0.40	28.05376	1.43E-08	0.49%
	8-Nov-00	0	165.834	0.00E+00	0.0%	720	131.38894	5.48E-06	98.6%	2.6	96.94388	2.68E-08	0.5%	0	62.49882	0.00E+00	0.0%	1.4	28.05376	4.99E-08	0.90%
	7-Feb-01	0	165.834	0.00E+00	0.0%	580	131.38894	4.41E-06	99.3%	0	96.94388	0.00E+00	0.0%	0	62.49882	0.00E+00	0.0%	0.86	28.05376	3.07E-08	0.69%
	7-Aug-01	0	165.834	0.00E+00	0.0%	540	131.38894	4.11E-06	98.3%	3.1	96.94388	3.20E-08	0.8%	0	62.49882	0.00E+00	0.0%	1.1	28.05376	3.92E-08	0.94%
	29-Jan-02	0	165.834	0.00E+00	0.0%	980	131.38894	7.46E-06	99.4%	4.0	96.94388	4.13E-08	0.5%	0	62.49882	0.00E+00	0.0%	0.08	28.05376	2.96E-09	0.04%
007G15UF	24-Jul-00	0	165.834	0.00E+00	0.0%	290	131.38894	2.21E-06	93.7%	14	96.94388	1.44E-07	6.1%	0	62.49882	0.00E+00	0.0%	0.10	28.05376	3.46E-09	0.15%
	8-Nov-00	0	165.834	0.00E+00	0.0%	380	131.38894	2.89E-06	95.4%	12	96.94388	1.24E-07	4.1%	0	62.49882	0.00E+00	0.0%	0.40	28.05376	1.43E-08	0.47%
	6-Feb-01	0	165.834	0.00E+00	0.0%	370	131.38894	2.82E-06	95.0%	14	96.94388	1.44E-07	4.9%	0	62.49882	0.00E+00	0.0%	0.09	28.05376	3.35E-09	0.11%
	7-Aug-01	0	165.834	0.00E+00	0.0%	310	131.38894	2.36E-06	94.6%	13	96.94388	1.34E-07	5.4%	0	62.49882	0.00E+00	0.0%	0.02	28.05376	6.42E-10	0.03%
	29-Jan-02	0	165.834	0.00E+00	0.0%	780	131.38894	5.94E-06	96.1%	23	96.94388	2.37E-07	3.8%	0	62.49882	0.00E+00	0.0%	0.04	28.05376	1.39E-09	0.02%
007G15LF	25-Jul-00	0	165.834	0.00E+00	0.0%	58	131.38894	4.41E-07	62.6%	6.2	96.94388	6.40E-08	9.1%	0	62.49882	0.00E+00	0.0%	5.6	28.05376	2.00E-07	28.37%
	8-Nov-00	0	165.834	0.00E+00	0.0%	14	131.38894	1.07E-07	93.1%	0	96.94388	0.00E+00	0.0%	0	62.49882	0.00E+00	0.0%	0.22	28.05376	7.84E-09	6.86%
	6-Feb-01	0	165.834	0.00E+00	0.0%	8.7	131.38894	6.62E-08	88.6%	0	96.94388	0.00E+00	0.0%	0	62.49882	0.00E+00	0.0%	0.24	28.05376	8.56E-09	11.44%
	7-Aug-01	0	165.834	0.00E+00	0.0%	3.5	131.38894	2.66E-08	94.9%	0	96.94388	0.00E+00	0.0%	0	62.49882	0.00E+00	0.0%	0.04	28.05376	1.43E-09	5.08%
	29-Jan-02	0	165.834	0.00E+00	0.0%	36	131.38894	2.74E-07	99.6%	0	96.94388	0.00E+00	0.0%	0	62.49882	0.00E+00	0.0%	0.03	28.05376	1.03E-09	0.38%

NOTE: Non-detects are listed as zero for plotting purposes.

[a] PCE = tetrachloroethene; TCE = trichloroethene; DCE = dichloroethene; VC = vinyl chloride; CAH = chlorinated aliphatic hydrocarbon

[b] µg/L = micrograms per liter

[c] g/mol = grams per mol

[d] mol/L = moles per liter

FIGURE C.1A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW1S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

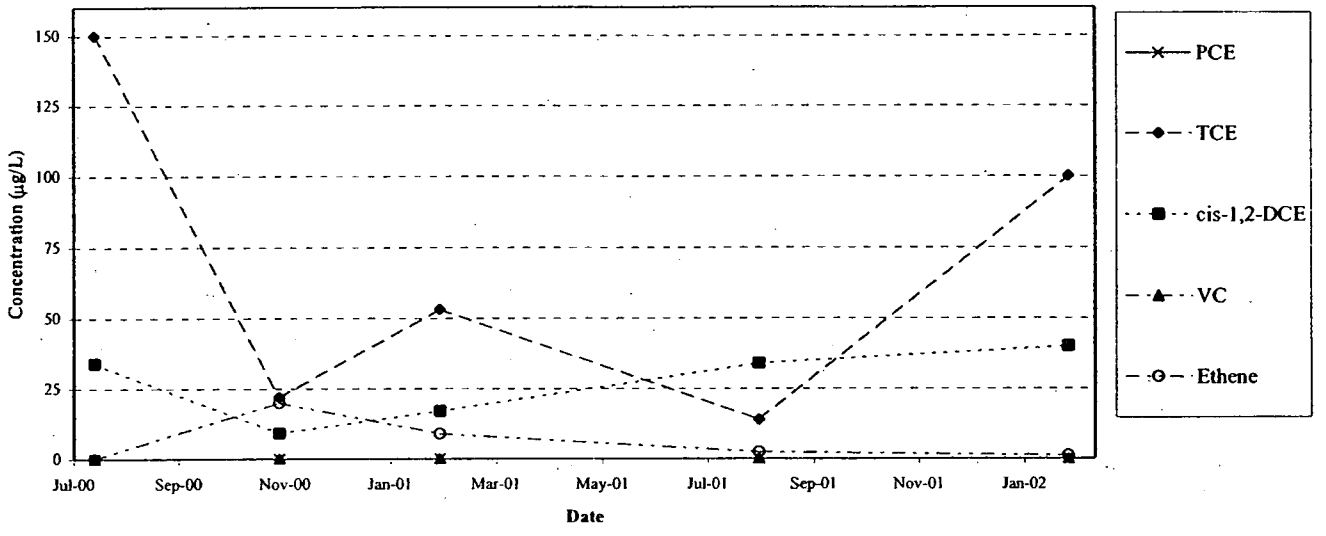


FIGURE C.1B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW1S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

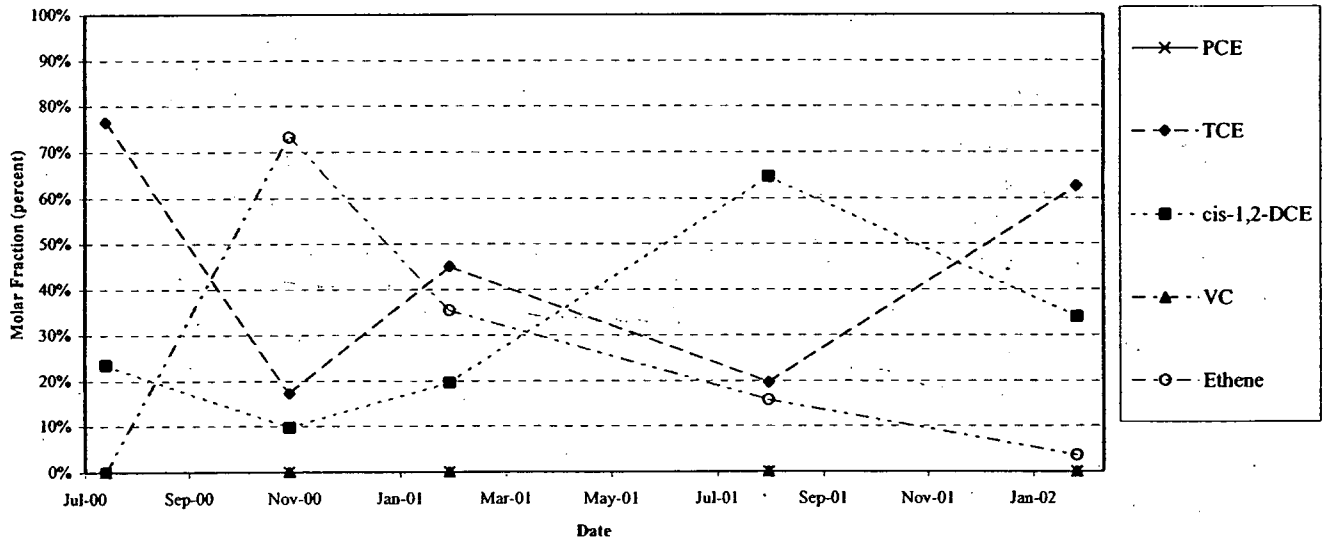


FIGURE C.2A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW1D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

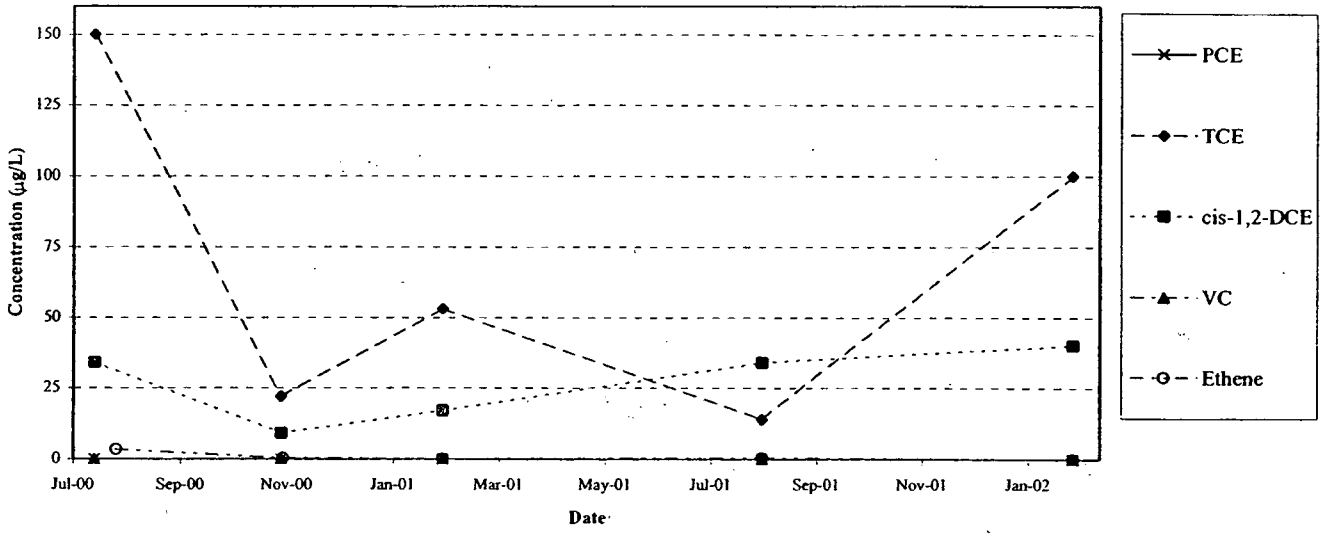


FIGURE C.2B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW1D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

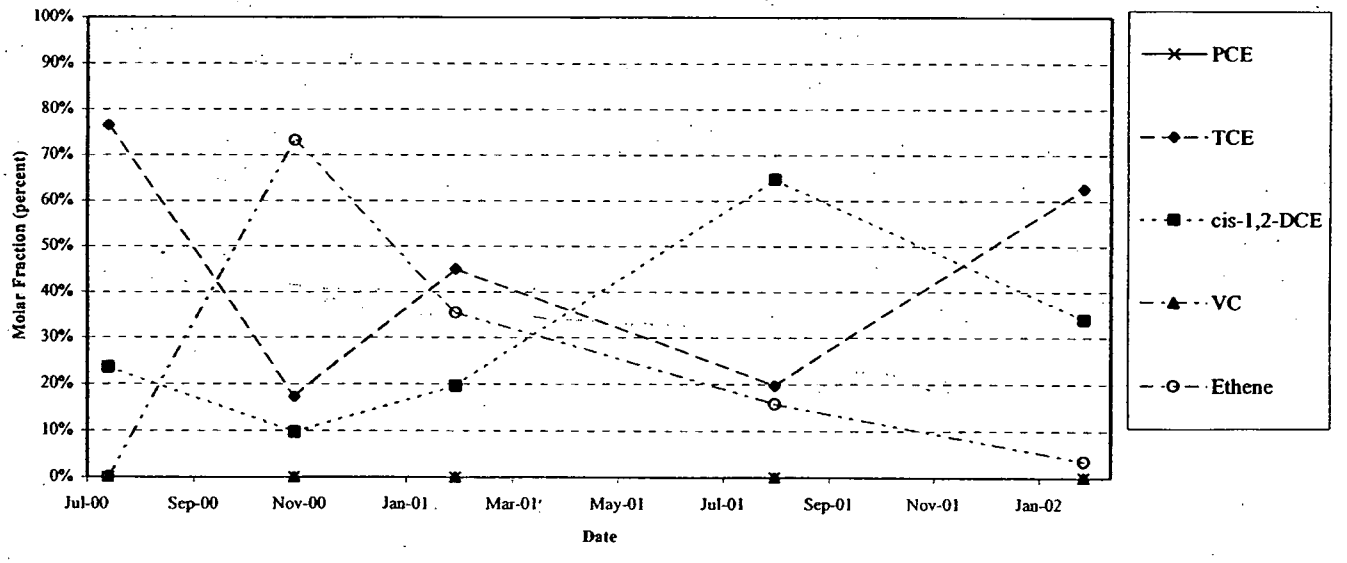


FIGURE C.3A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW2S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

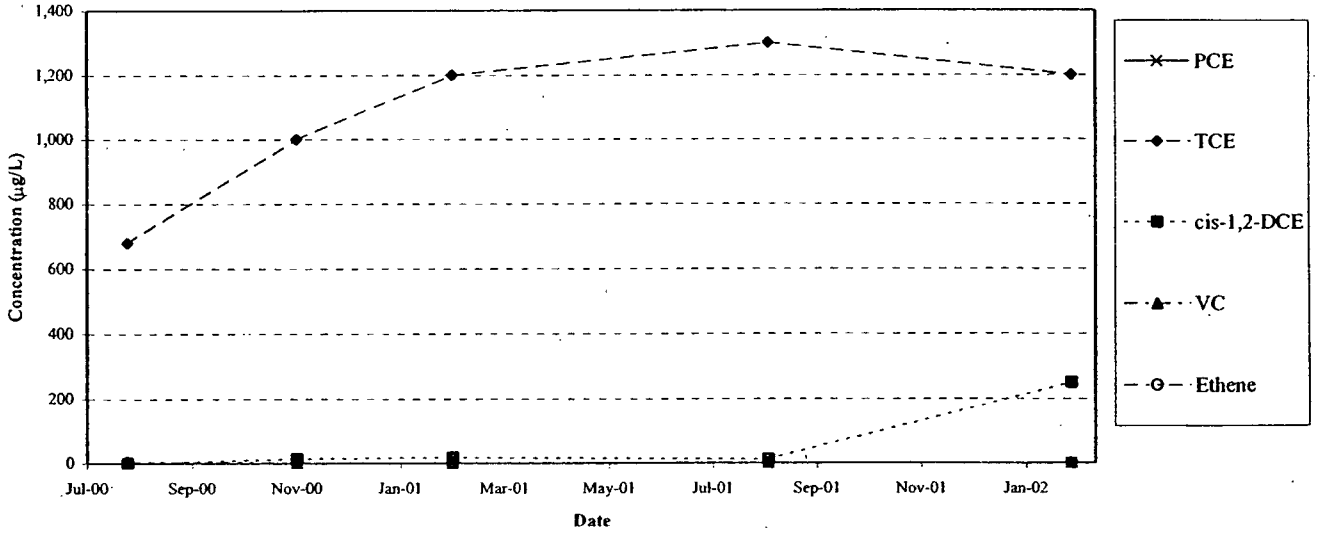


FIGURE C.3B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW2S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

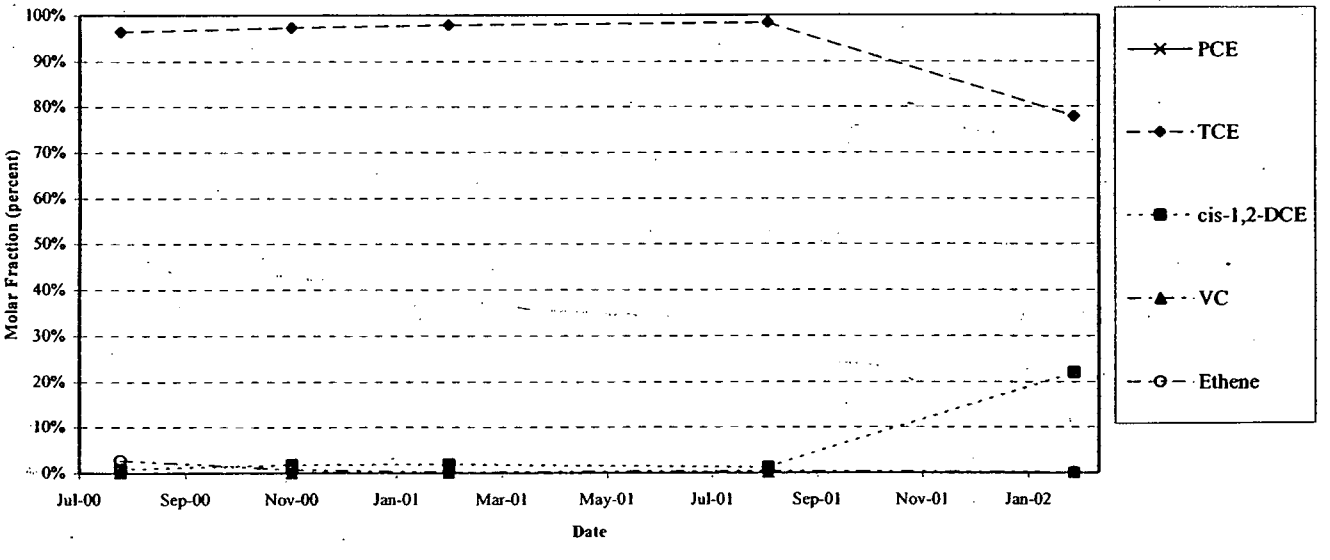


FIGURE C.4A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW2D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

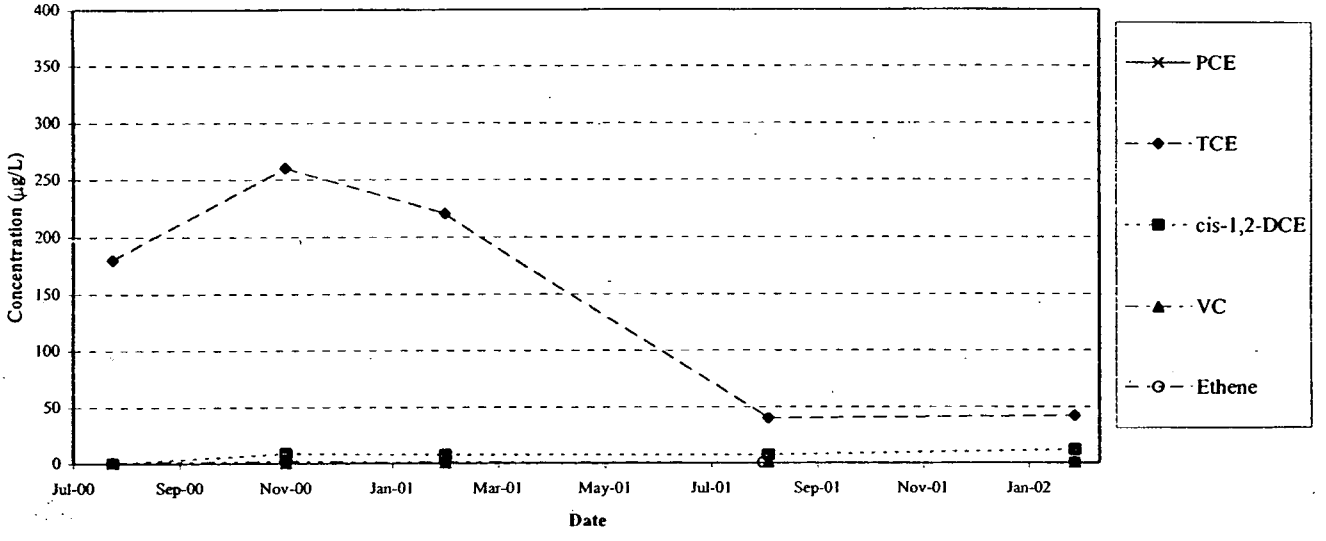


FIGURE C.4B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW2D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

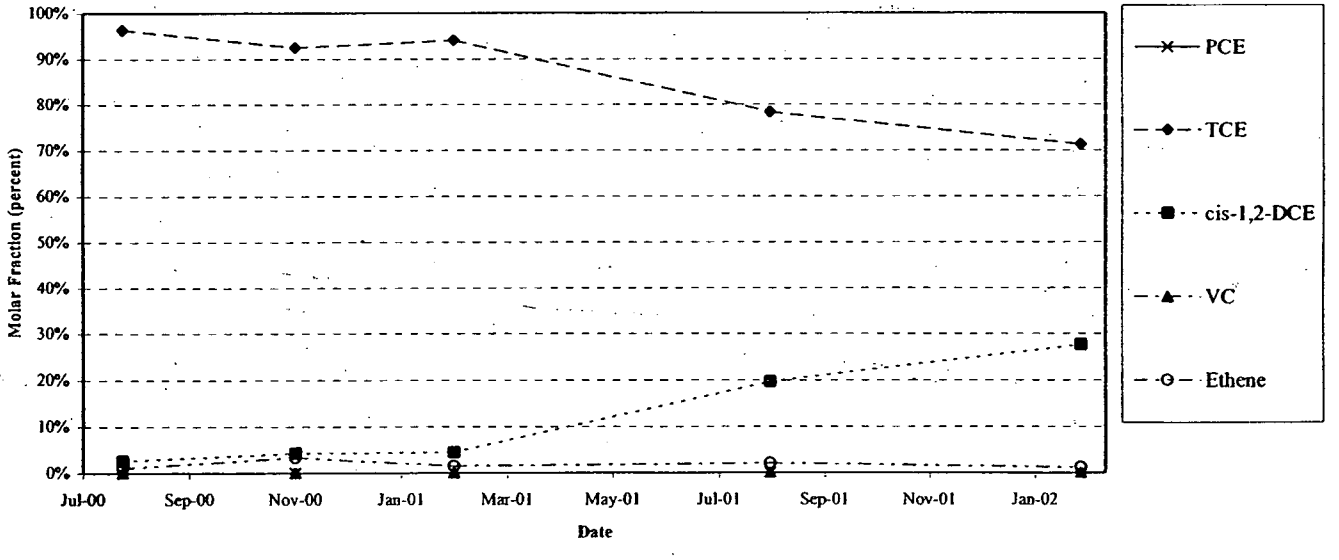


FIGURE C.5A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW3S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

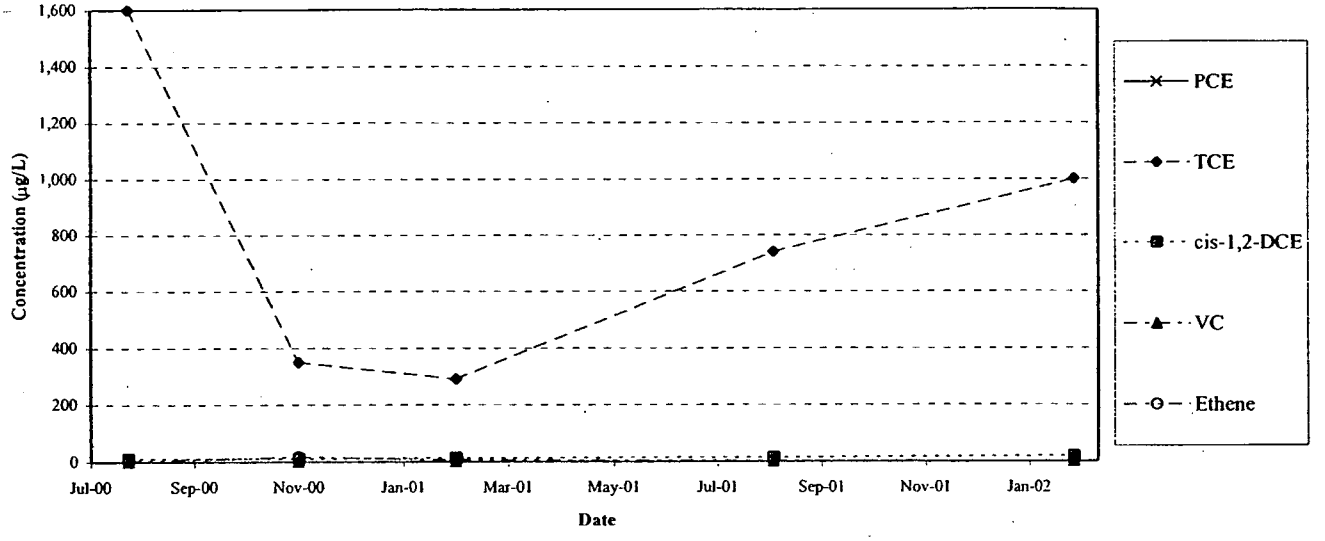


FIGURE C.5B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW3S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

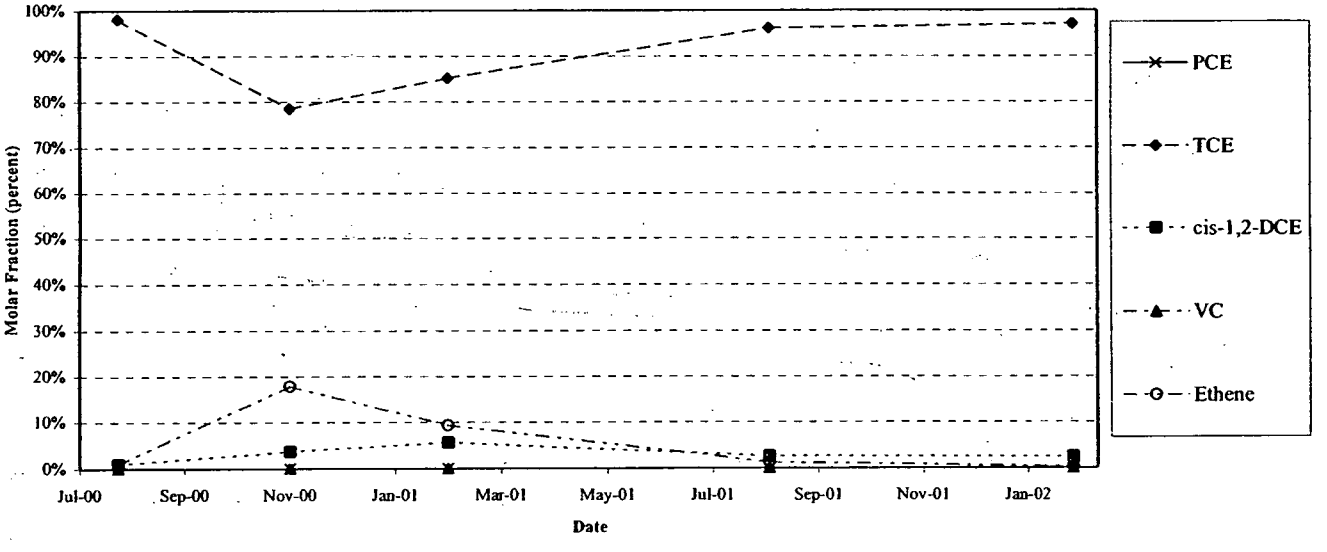


FIGURE C.6A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW3D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

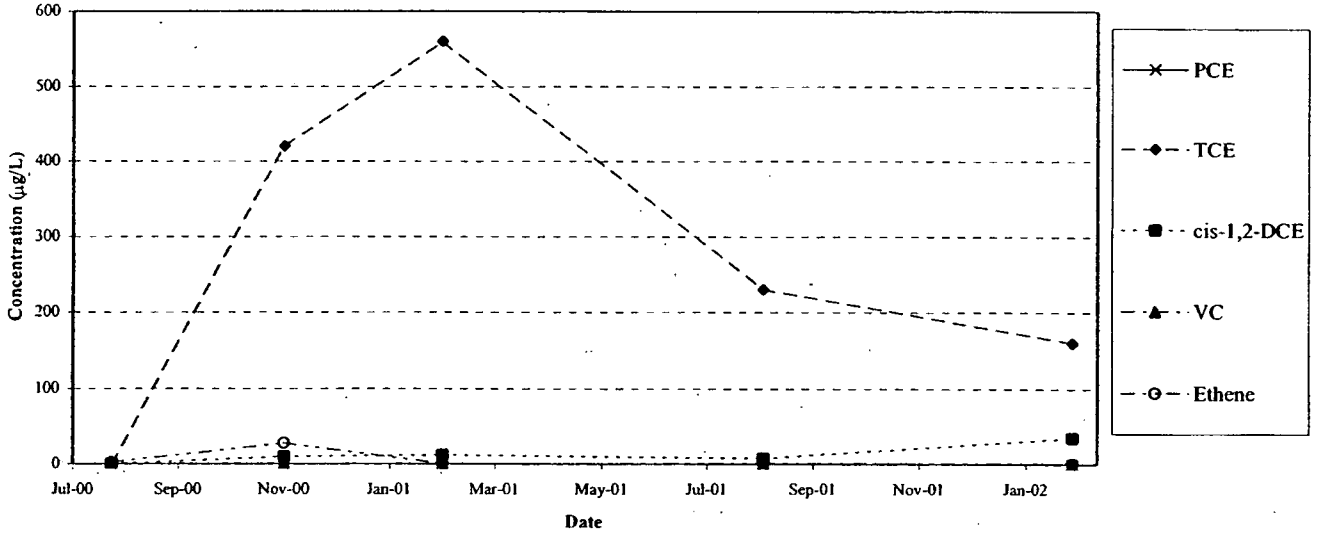


FIGURE C.6B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW3D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

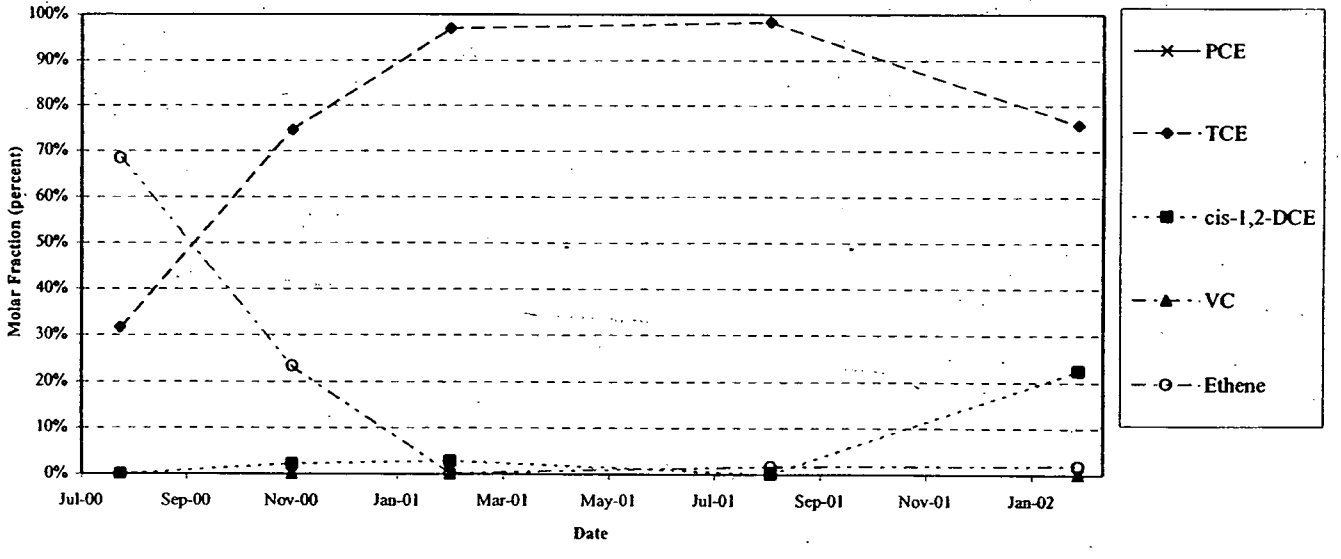


FIGURE C.7A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW4S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

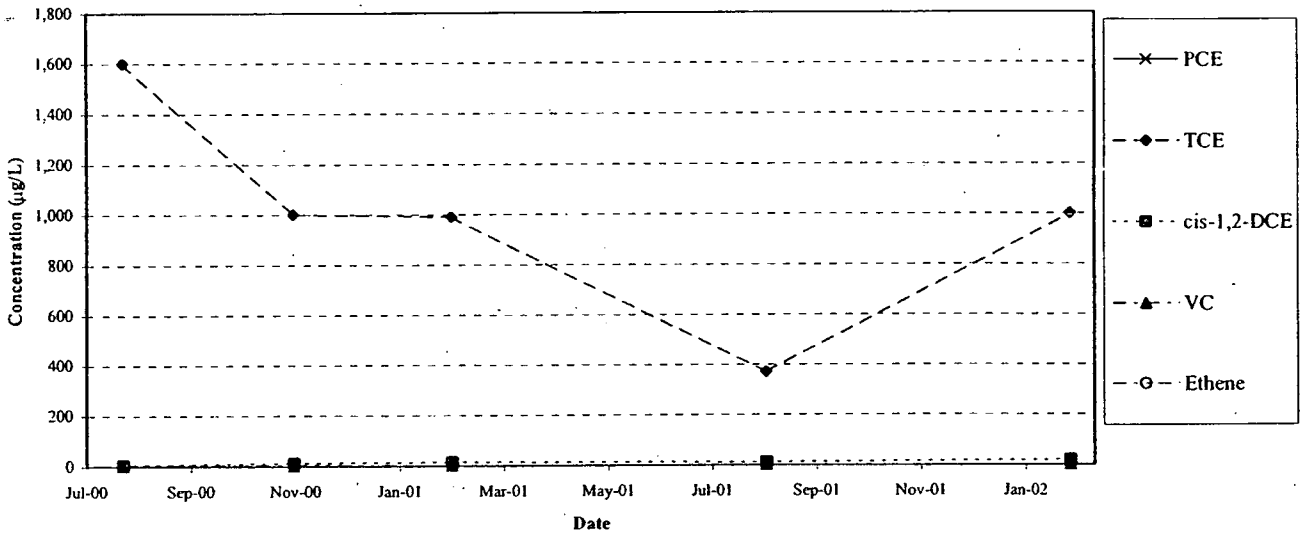


FIGURE C.7B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW4S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

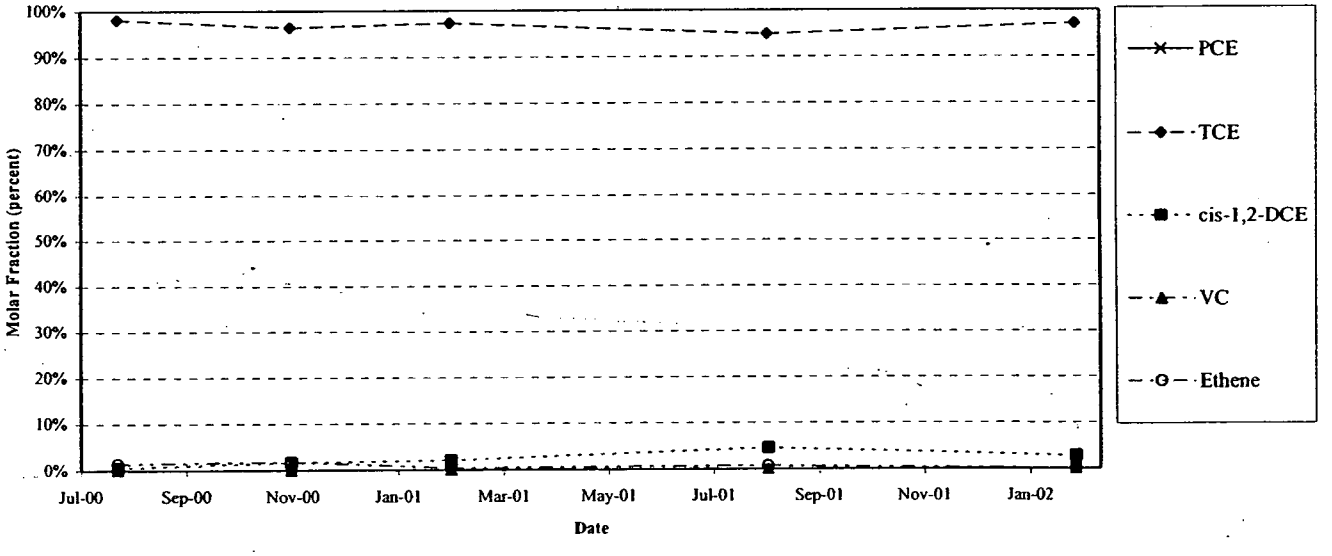


FIGURE C.8A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW4D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

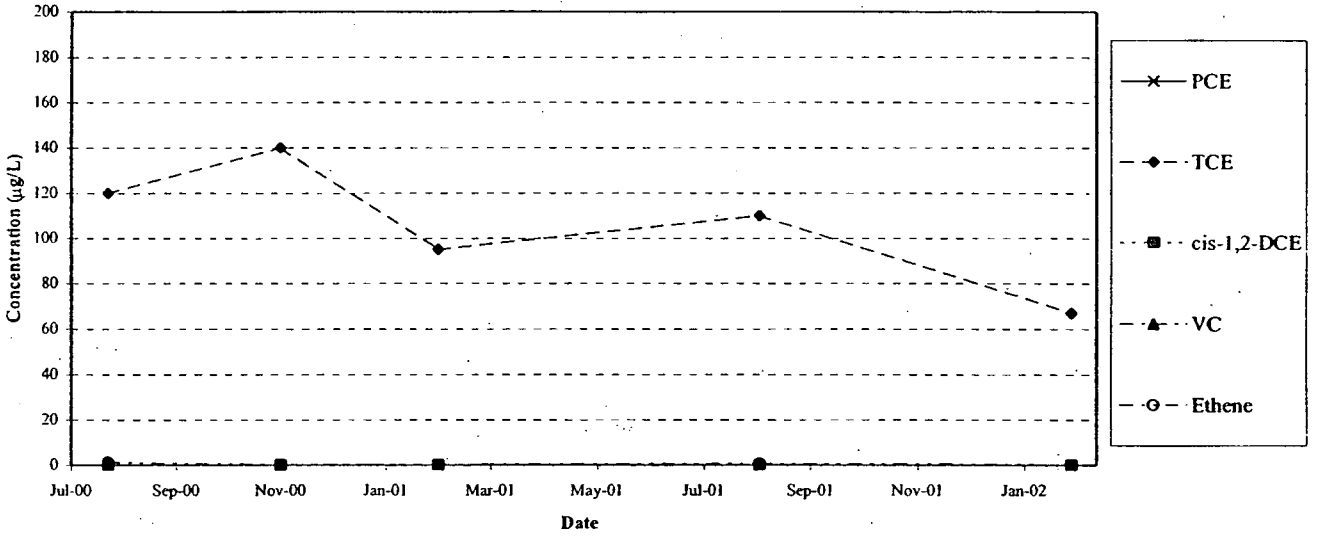


FIGURE C.8B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW4D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

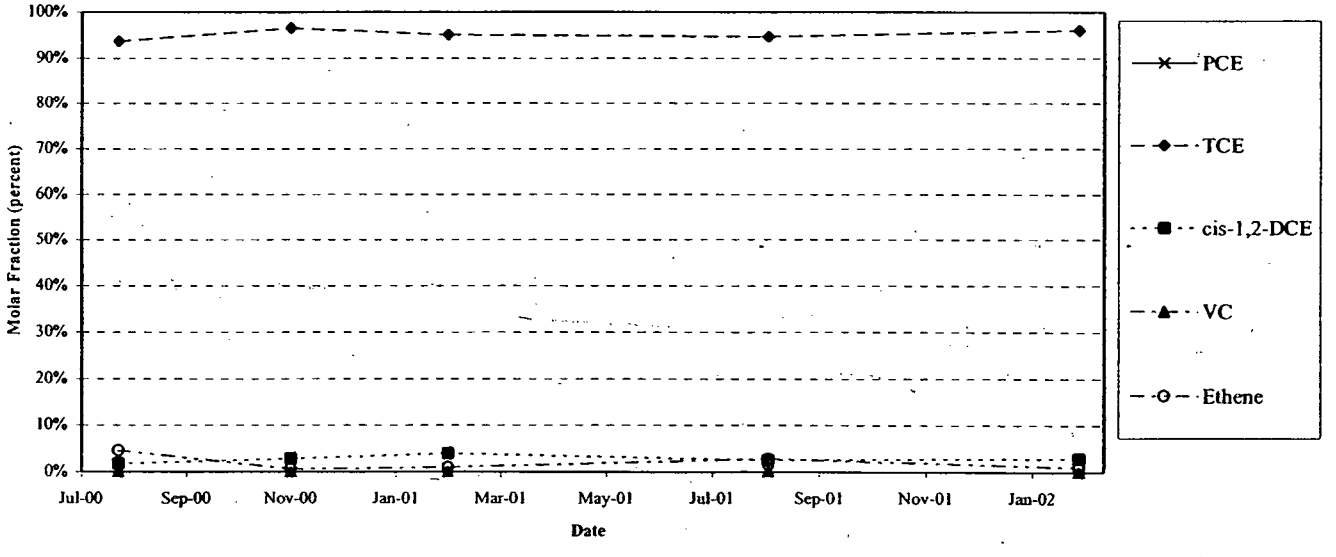


FIGURE C.9A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW5S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

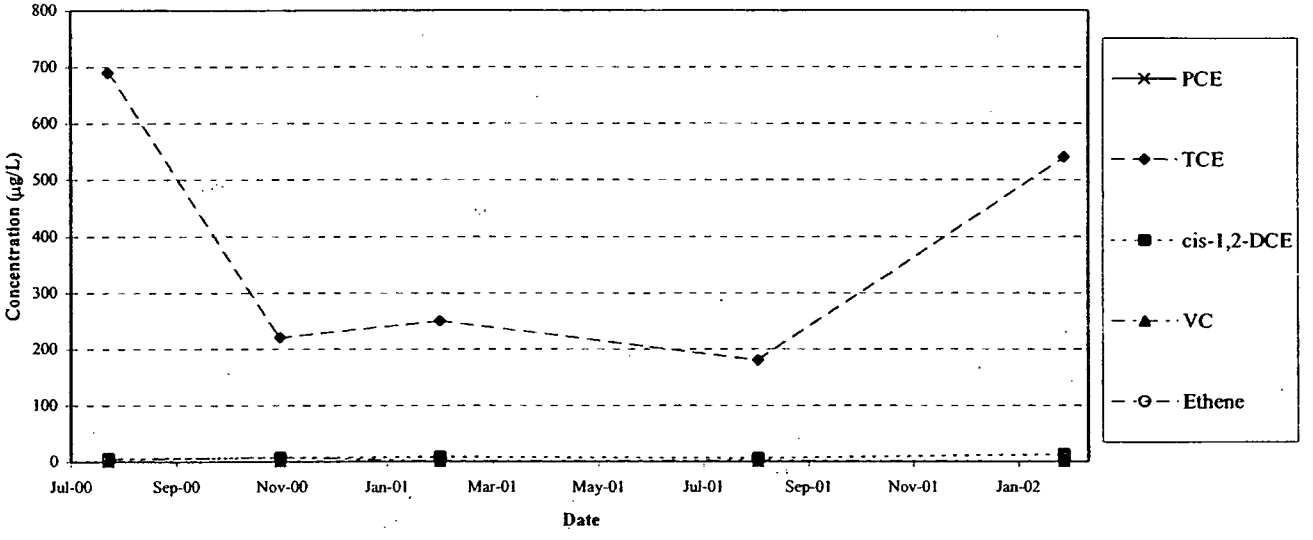


FIGURE C.9B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW5S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

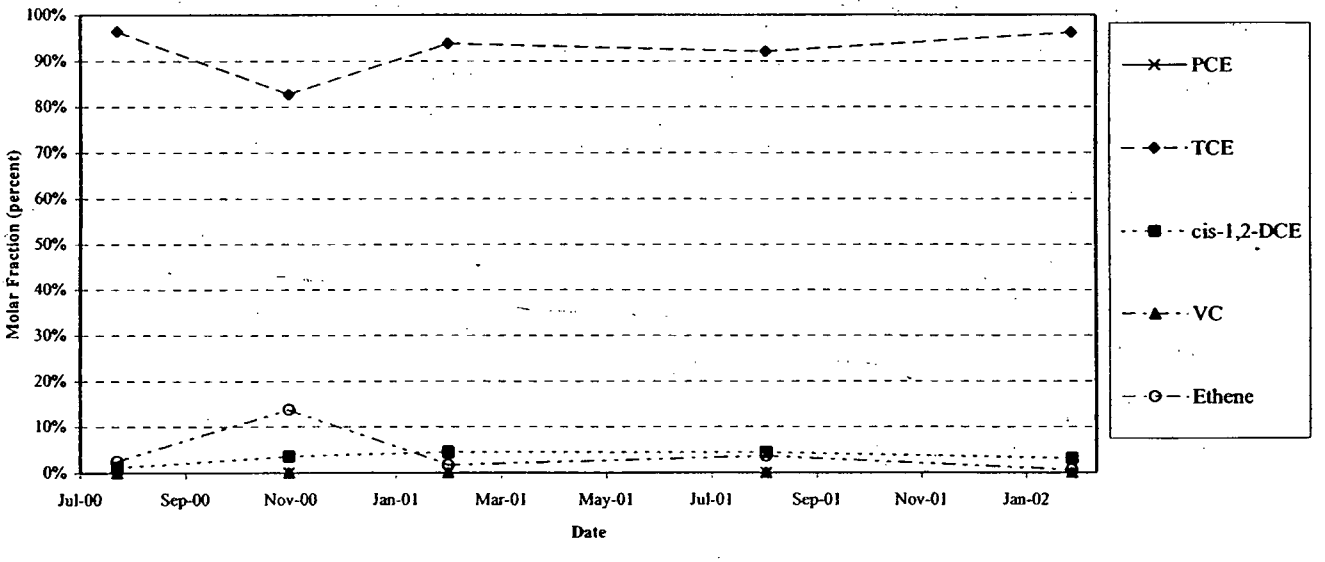


FIGURE C.10A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW5D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

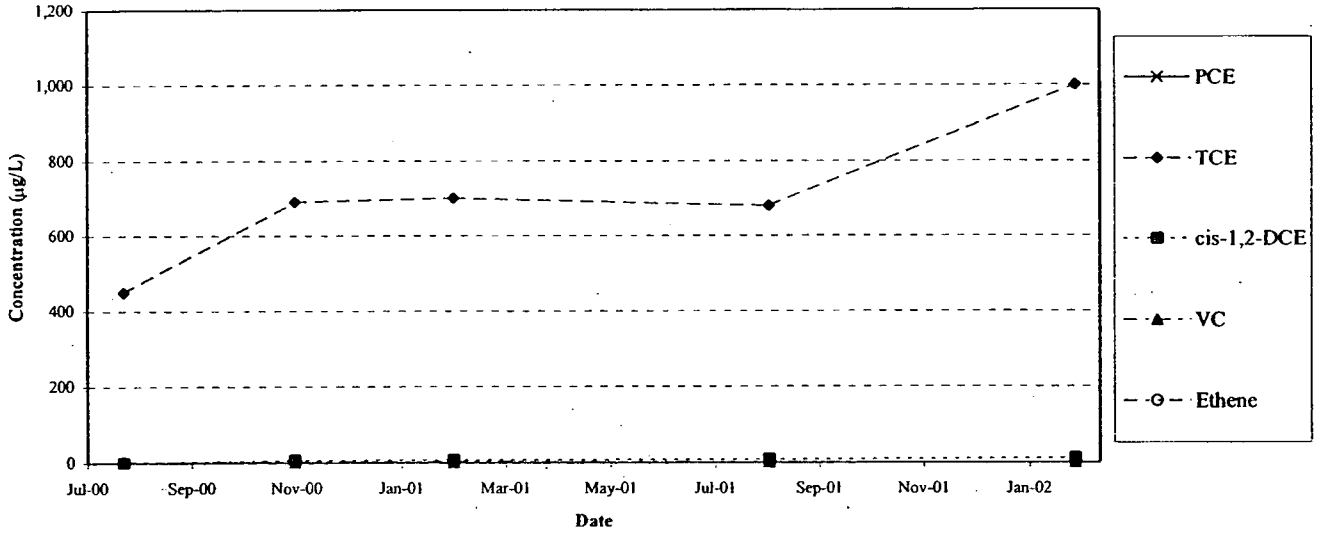


FIGURE C.10B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW5D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

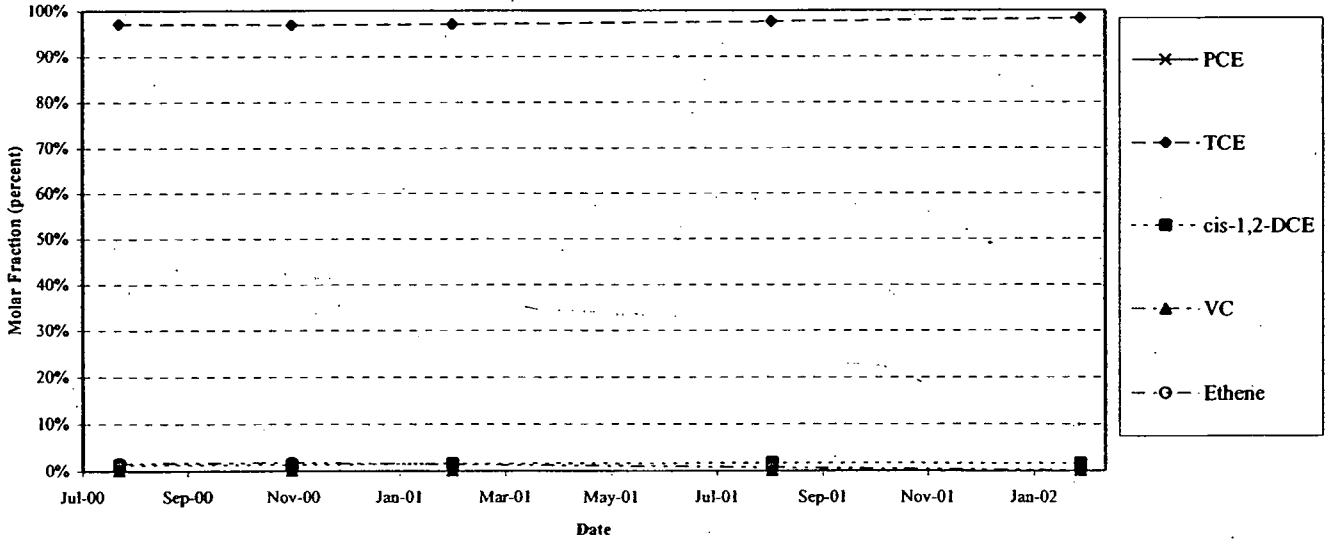


FIGURE C.11A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW6S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

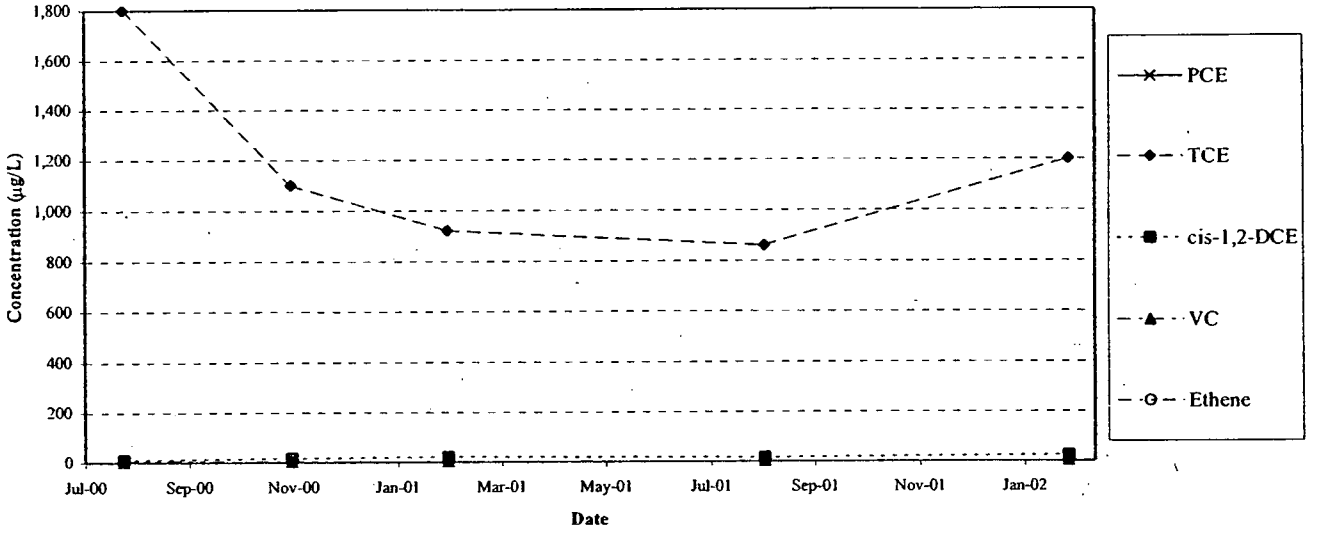


FIGURE C.11B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW6S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

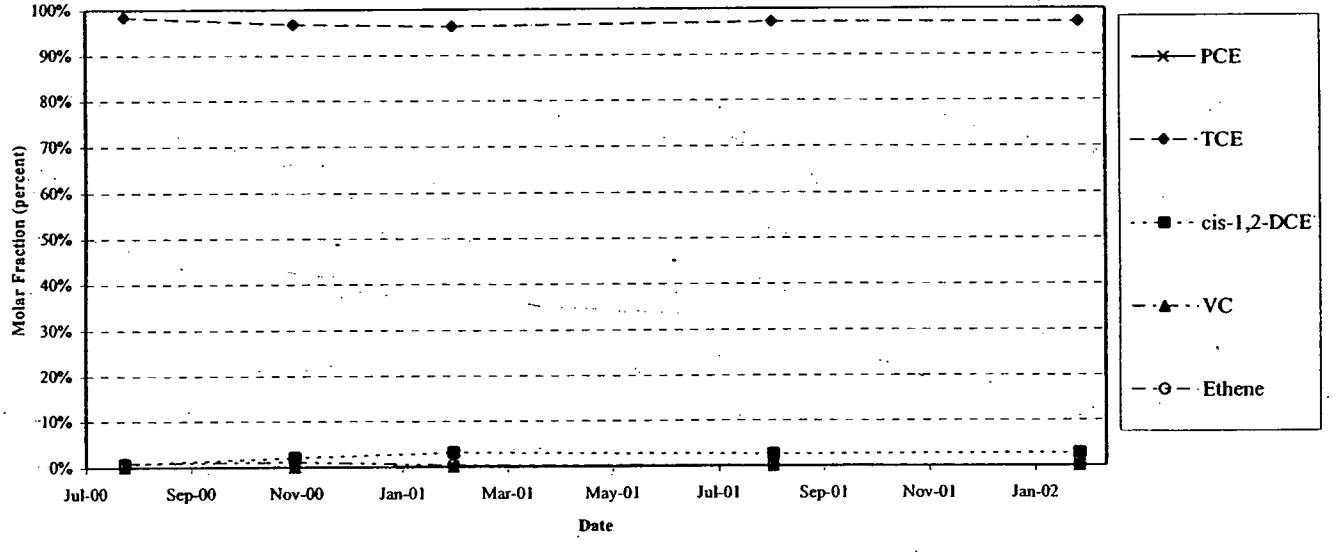


FIGURE C.12A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW6D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

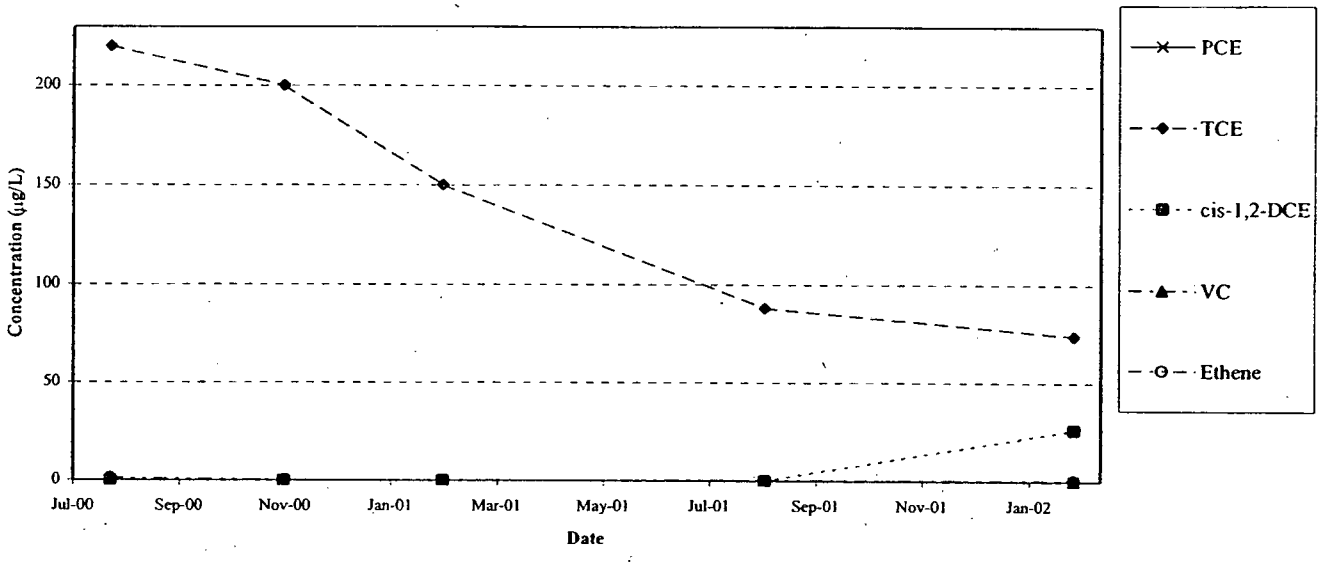


FIGURE C.12B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW6D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

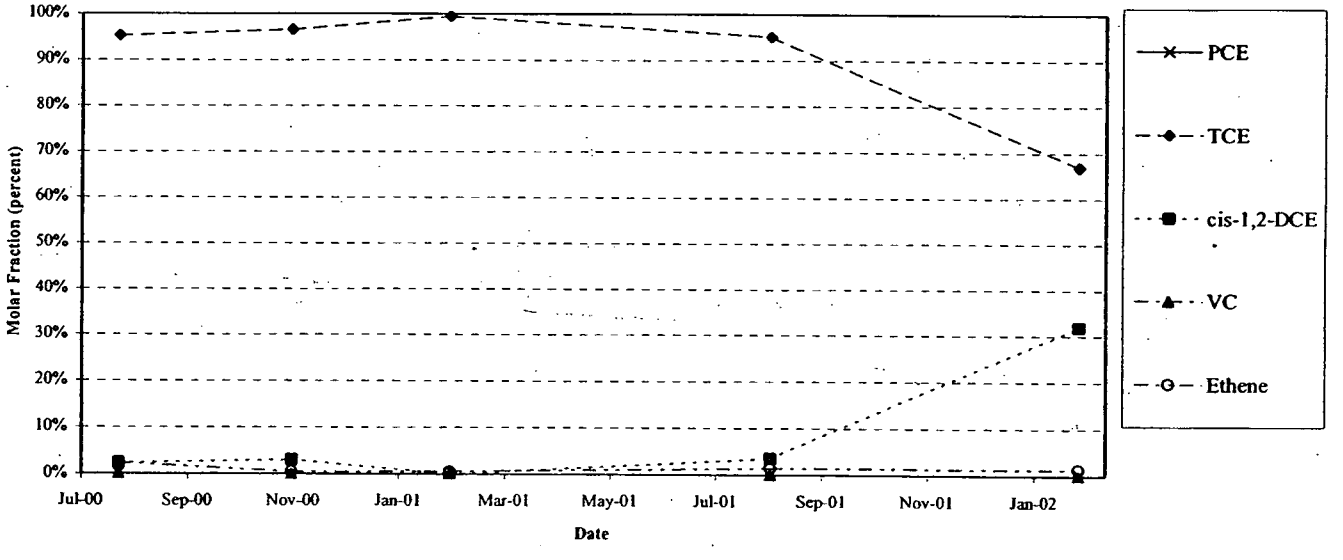


FIGURE C.13A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW7S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

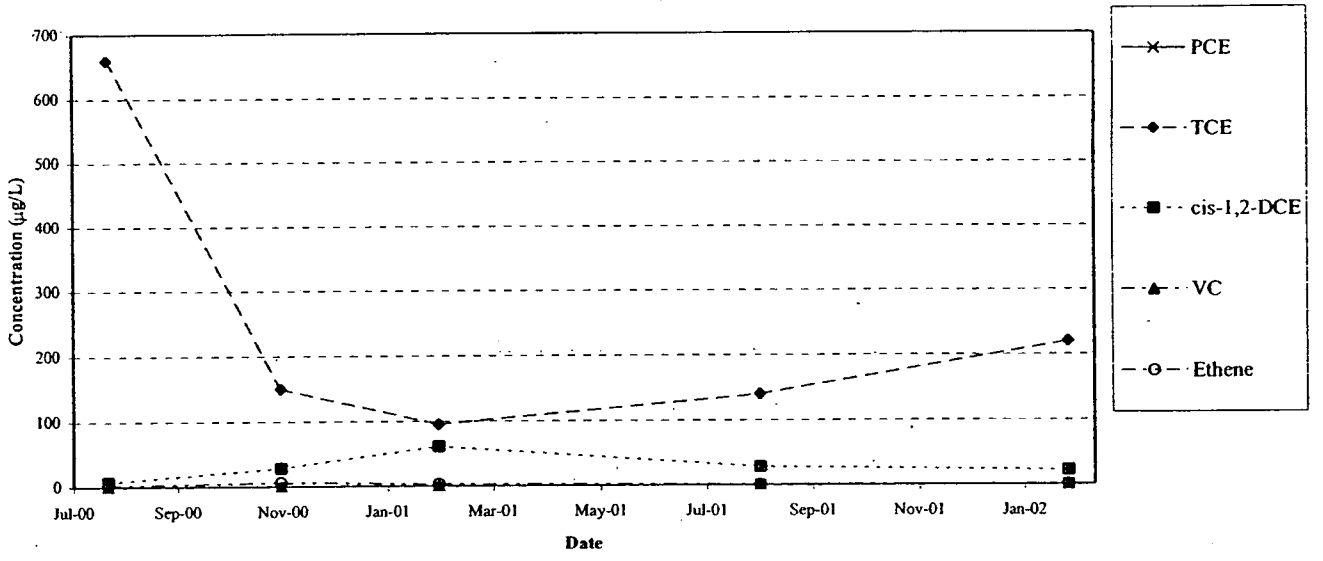


FIGURE C.13B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW7S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

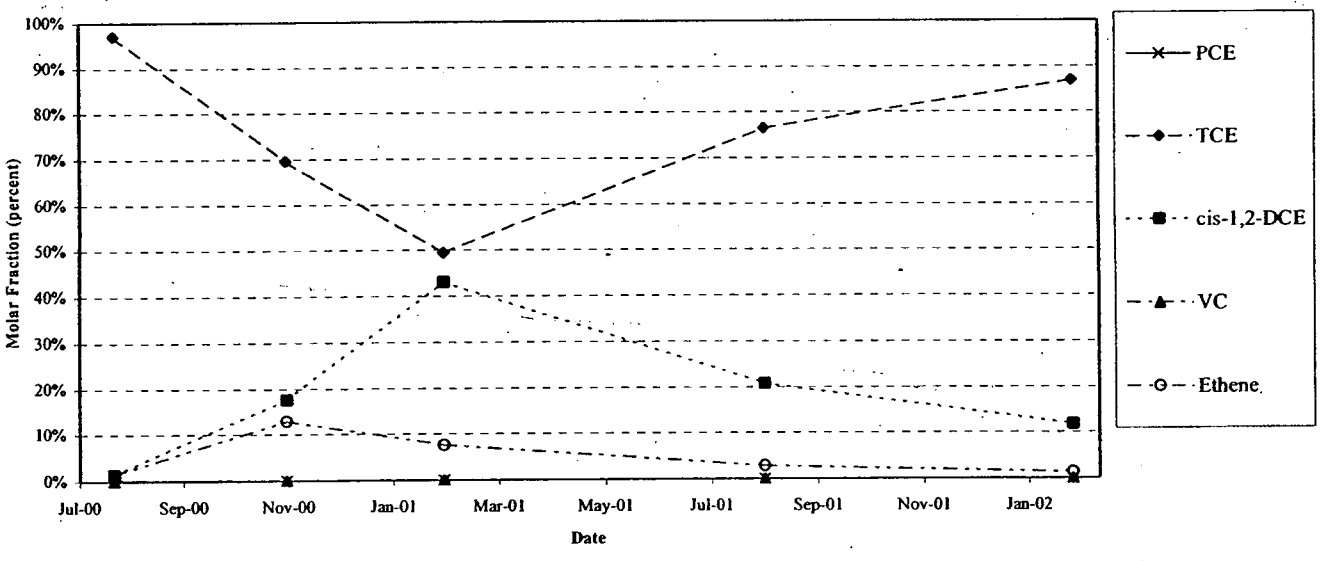


FIGURE C.14A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW7D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

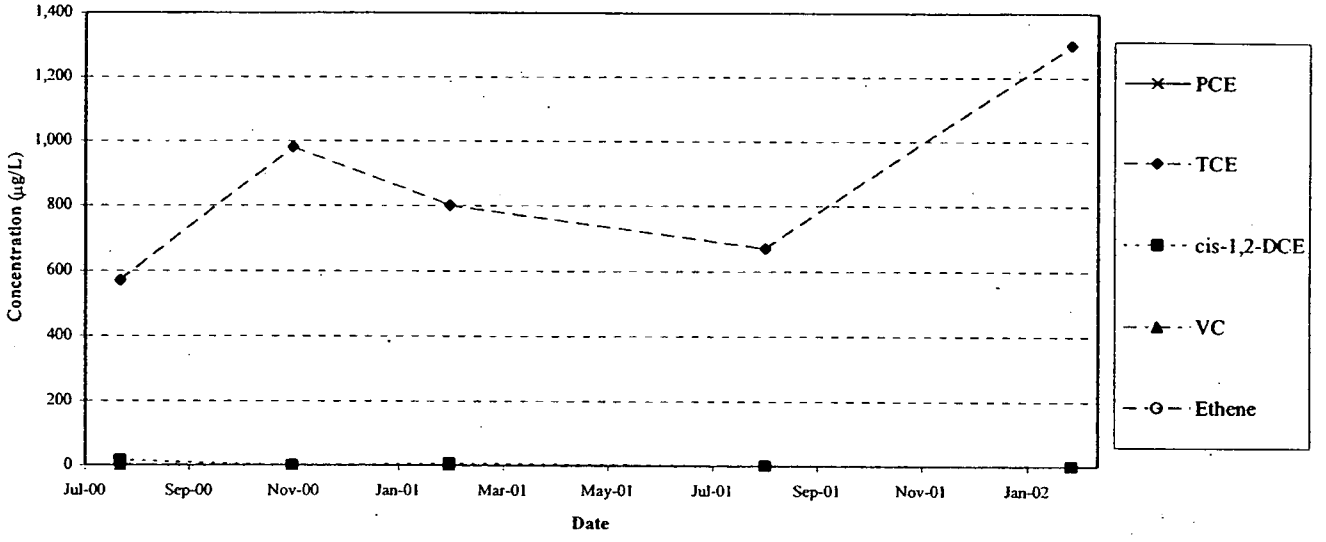


FIGURE C.14B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW7D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

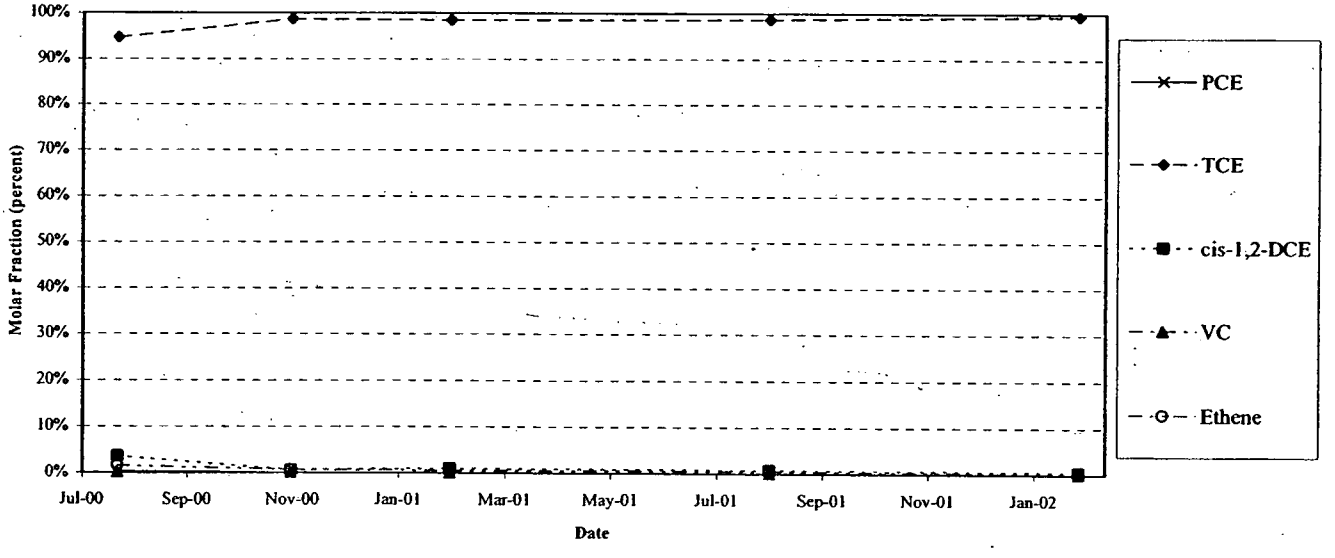


FIGURE C.15A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW8S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

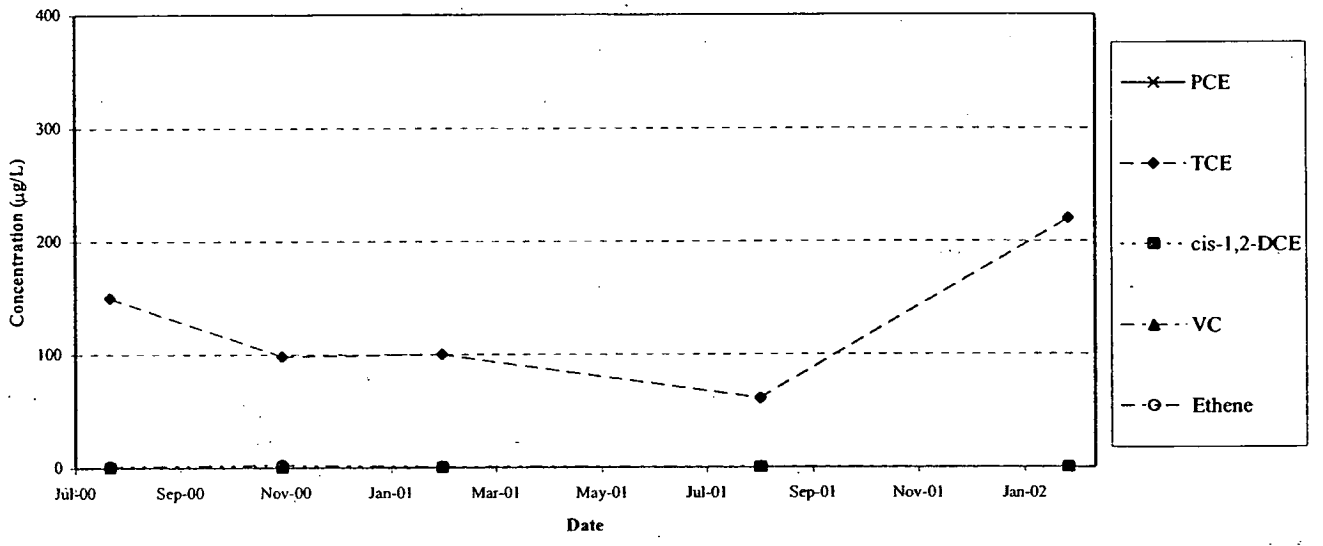


FIGURE C.15B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW8S
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

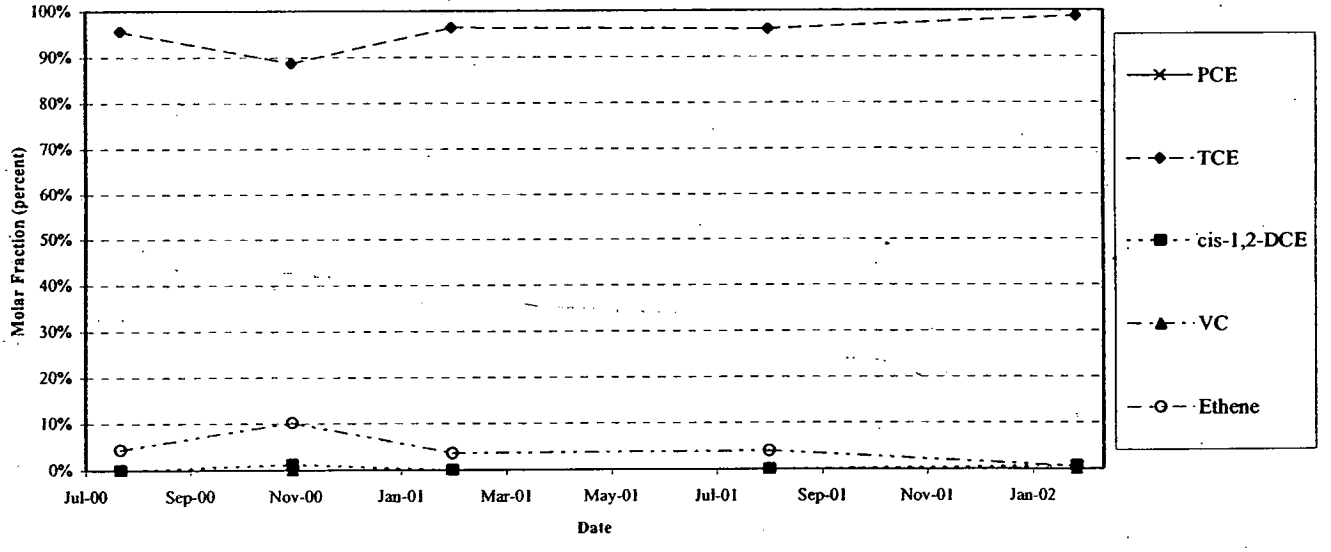


FIGURE C.16A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL PES-MW8D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

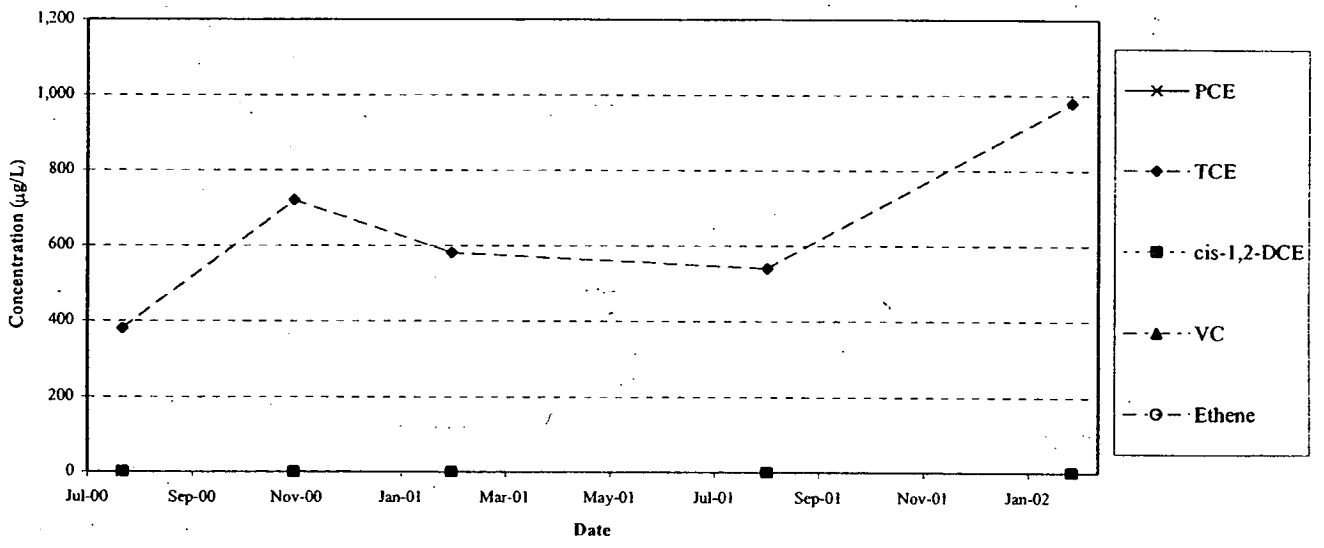


FIGURE C.16B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL PES-MW8D
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

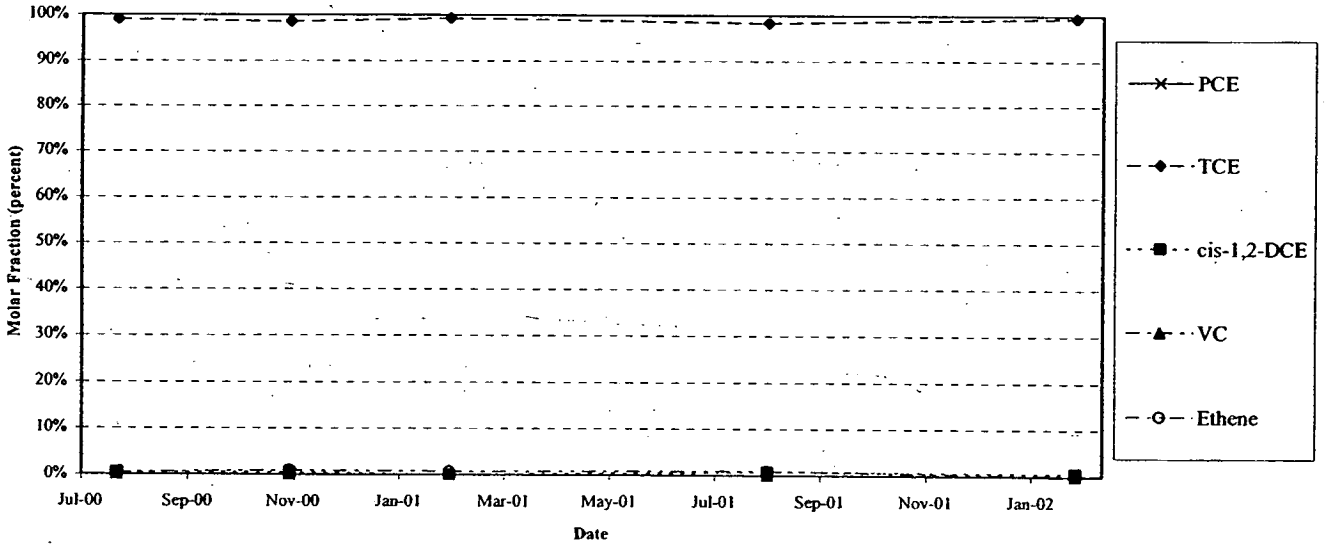


FIGURE C.17A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL 007G15UF
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

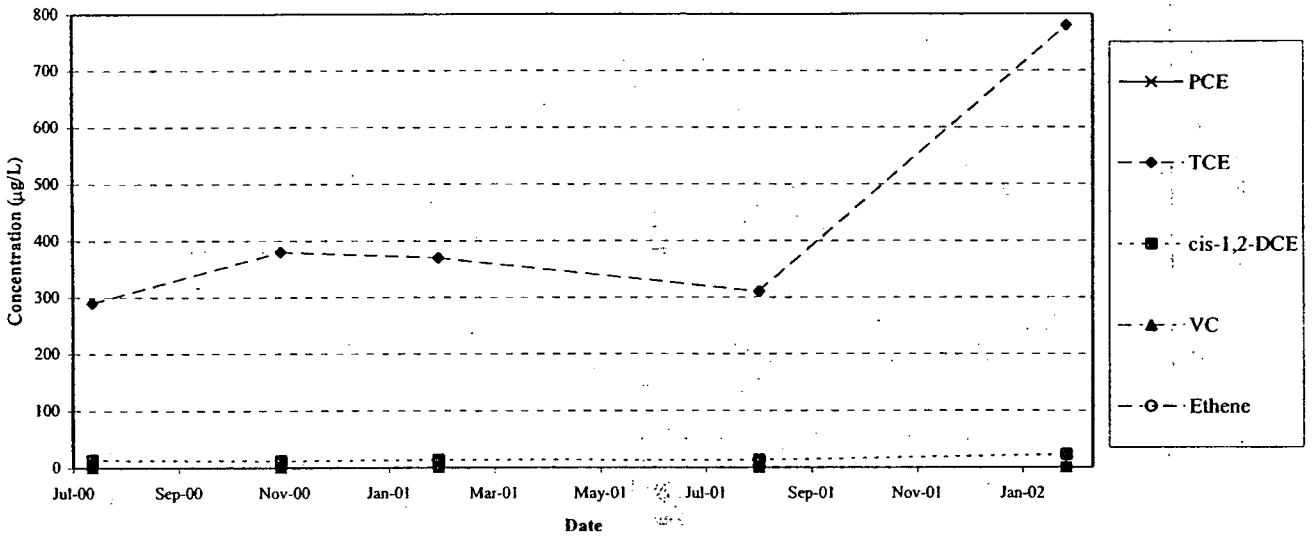


FIGURE C.17B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL 007G15UF
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

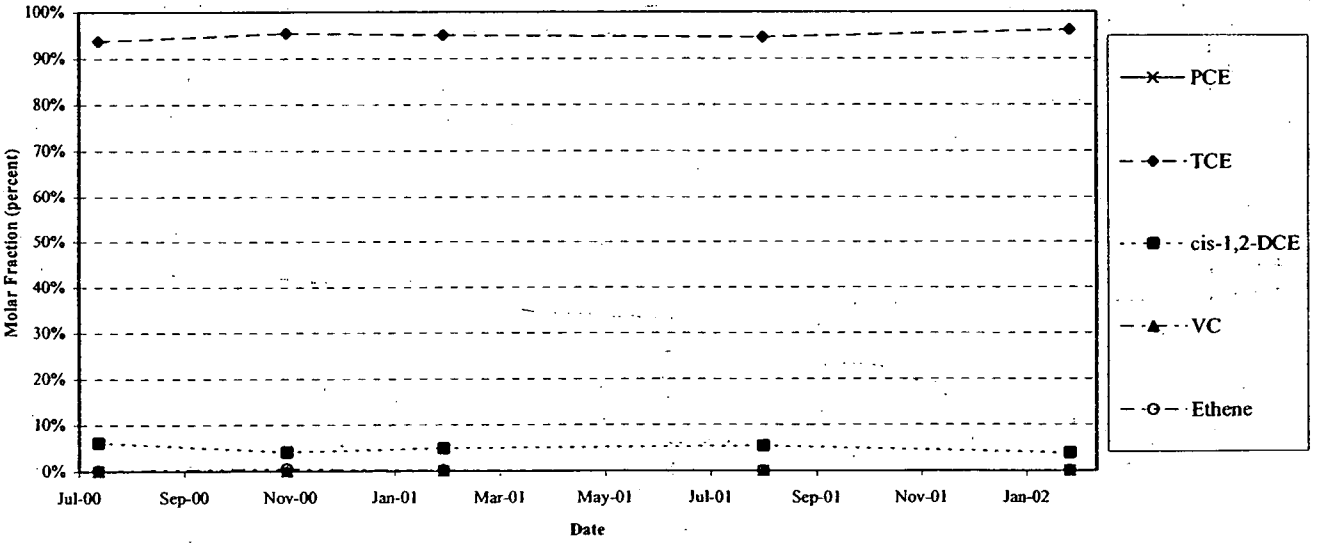


FIGURE C.18A
CONCENTRATIONS OF SELECT CHLORINATED ETHENES OVER TIME
WELL 007G15LF
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE

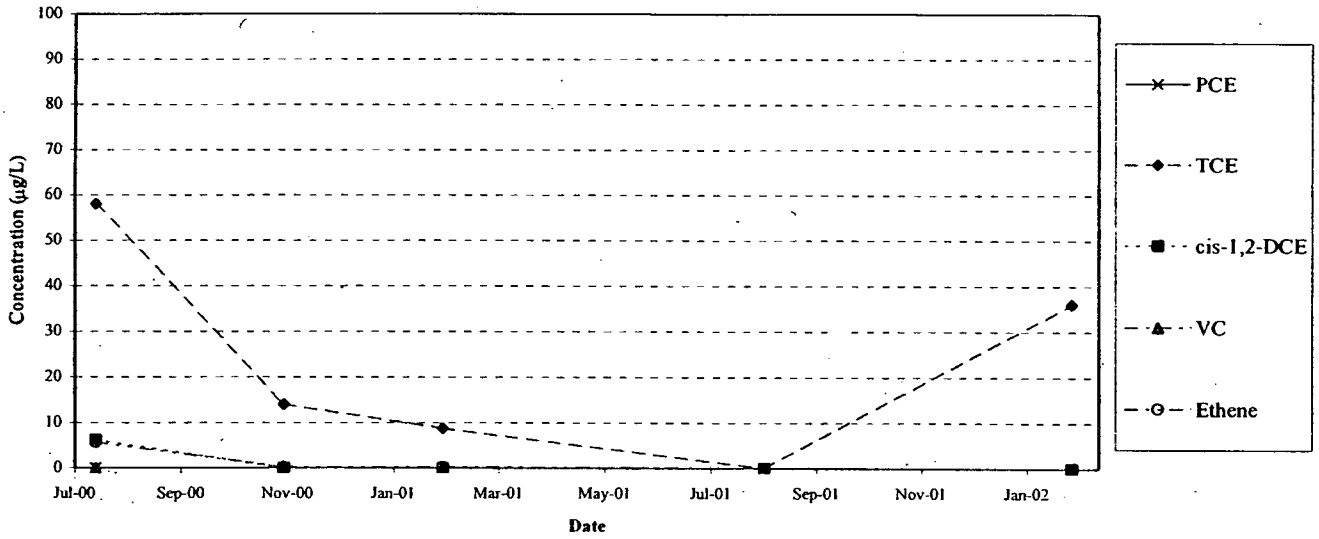
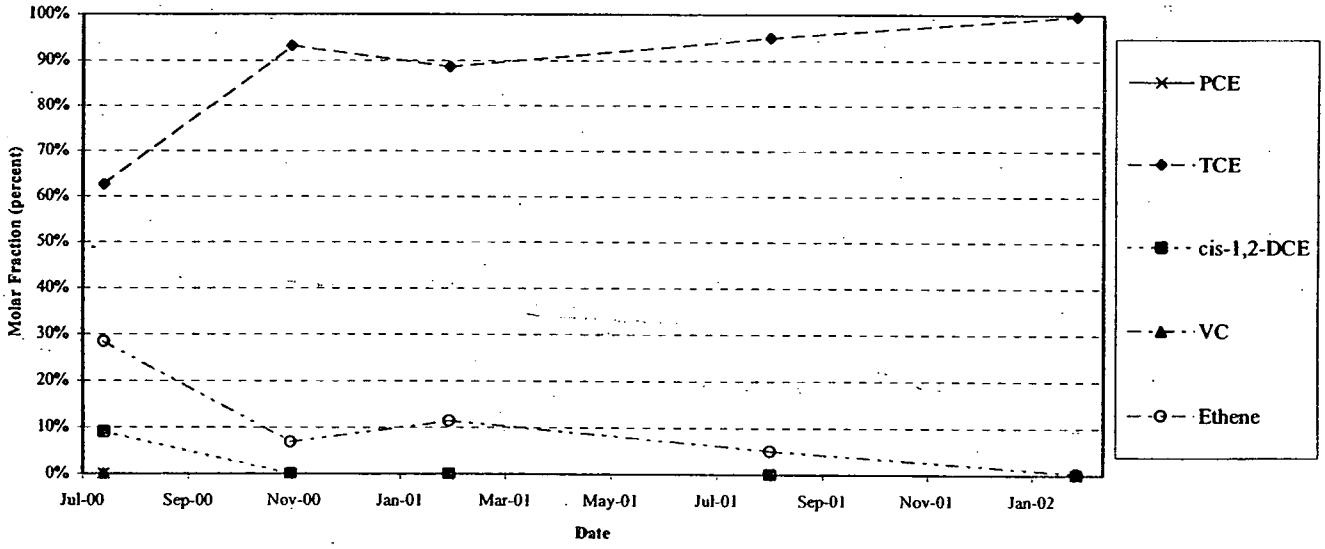



FIGURE C.18B
MOLAR FRACTION OF CHLORINATED ETHENES
AT WELL 007G15LF
NSA MIDSOUTH SITE N-6
MILLINGTON TENNESEE