

**FINAL
CLEANUP ACTION PLAN
FOR PETROLEUM-IMPACTED
SOIL AND GROUNDWATER**

at

**2737 West Commodore Way
Seattle, Washington**

Prepared for

Time Oil Company

May 2003

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CONTENTS

1.	INTRODUCTION	1-1
1.1	CLEANUP ACTION PLAN OBJECTIVE	1-1
1.2	CLEANUP ACTION PLAN ORGANIZATION	1-1
2.	PROPERTY DESCRIPTION AND PREVIOUS INVESTIGATIONS	2-1
2.1	PROPERTY DESCRIPTION	2-1
2.2	PROPERTY OPERATION	2-1
2.3	PREVIOUS INVESTIGATIONS	2-1
2.3.1	1991 UST Removal	2-2
2.3.2	1999 UST Investigation	2-2
2.3.3	2000 Phase I Environmental Site Assessment	2-3
2.3.4	2001 Phase II Investigation	2-4
2.3.4.1	Former LUST Area Investigation	2-4
2.3.4.2	Lower Tank Yard Investigation	2-5
2.3.5	2001 Phase III Environmental Site Assessment	2-6
2.3.5.1	Former LUST Area Investigation	2-6
2.3.5.2	Lower Tank Yard Investigation	2-7
2.3.6	2002 Former PCP/Diesel Mixing Area Soil Removal	2-7
2.3.7	2002 Lower Tank Yard Investigation	2-8
2.3.8	Quarterly Groundwater Sampling	2-9
3.	REMEDIAL TECHNOLOGY ALTERNATIVES	3-1
3.1	REMEDIAL ALTERNATIVES EVALUATED FOR CONTAMINATED SOIL AND GROUNDWATER	3-1
3.1.1	Bioventing	3-1
3.1.2	Free-phase Hydrocarbon Recovery	3-2
3.1.3	Air Sparging and Soil Vapor Extraction	3-3
3.1.4	Dual Phase Extraction	3-4
3.2	SELECTED REMEDIAL ALTERNATIVE FOR CONTAMINATED SOIL AND GROUNDWATER	3-5
3.3	REMEDIAL ALTERNATIVES EVALUATED FOR CONTAMINATED OVERLAYING SILT LAYER	3-6
4.	DUAL PHASE EXTRACTION PILOT TEST	4-1
4.1	OBJECTIVES AND SCOPE	4-1
4.2	PRE-PILOT TEST SAMPLING RESULTS	4-2
4.3	TEST EQUIPMENT AND SYSTEM CONFIGURATION	4-2
4.4	TEST PROCEDURES	4-3
4.4.1	Baildown and Recovery Test	4-3

CONTENTS (CONTINUED)

4.4.2	Pre-test Baseline Monitoring	4-3
4.4.3	Step Test	4-4
4.5	PILOT TEST RESULTS	4-5
4.5.1	Step Test	4-5
4.5.2	Radius of Influence	4-6
4.5.3	Radius of Depression	4-6
4.5.4	Water and Product Recharge	4-7
4.5.5	Extracted Vapor Analysis	4-7
4.5.5.1	Tedlar [®] Bag Samples	4-8
4.5.5.2	Summa Canister Samples	4-8
4.5.5.3	PSCAA Requirements	4-9
4.6	POST-PILOT TEST GROUNDWATER SAMPLING RESULTS	4-10
4.7	PILOT TEST CONCLUSIONS	4-10
5.	SITE CONCEPTUAL MODEL AND CLEANUP LEVELS	5-1
5.1	SITE CONCEPTUAL MODEL	5-1
5.1.1	Site Geology and Hydrology	5-1
5.1.2	Extent of Contamination	5-3
5.1.3	Potential Exposure Pathways and Receptors	5-3
5.1.3.1	Potential Exposure Pathways	5-3
5.1.3.2	Potential Receptors	5-4
5.2	CLEANUP STANDARDS	5-5
6.	PROJECT REQUIREMENTS	6-1
6.1	INSTITUTIONAL CONTROLS	6-1
6.2	APPLICABLE STATE AND FEDERAL LAWS	6-1
6.2.1	Cleanup Standards	6-1
6.2.2	Waste Management and Disposal	6-2
6.2.3	Air Quality Regulations	6-2
6.2.4	Water Quality Protection Regulations	6-3
6.2.5	General Environmental Protection Regulations	6-4
6.3	OPERATIONS AND MAINTENANCE	6-4
7.	RECOMMENDED CLEANUP ALTERNATIVE	7-1
7.1	PROPOSED EXTRACTION SYSTEM	7-1
7.1.1	Extraction Wells	7-1
7.1.2	Monitoring Wells	7-2
7.1.3	Extraction System Components	7-2
7.1.3.1	Extraction Pump	7-2

CONTENTS (CONTINUED)

7.1.3.2	Liquid/Vapor and Oil/Water Separators	7-2
7.1.3.3	Groundwater Treatment System	7-2
7.1.3.4	Vapor Treatment System	7-3
8.	SCHEDULE	8-1
9.	REFERENCES	9-1
APPENDIX A	BORING LOGS	
APPENDIX B	LABORATORY ANALYTICAL RESULTS	
APPENDIX C	PILOT TEST PHOTOGRAPHS	
APPENDIX D	NOAA SCREENING QUICK REFERENCE TABLES	

FIGURES

- Figure 1-1.** Location of Property at 2737 West Commodore Way, Seattle, Washington
- Figure 2-1.** Layout of Property at 2737 West Commodore Way, Seattle, Washington
- Figure 2-2.** 1991 Sampling Locations at 2737 West Commodore Way
- Figure 2-3.** 1999 Sampling Locations at 2737 West Commodore Way
- Figure 2-4.** 2001 Phase II Sampling Locations at 2737 West Commodore Way
- Figure 2-5.** 2001 Phase III Sampling Locations at 2737 West Commodore Way
- Figure 2-6.** 2002 Lower Tank Yard Investigation Sampling Locations at 2737 West Commodore Way
- Figure 2-7.** Benzene-Impacted Groundwater, October 2002
- Figure 2-8.** Gasoline-Impacted Groundwater, October 2002
- Figure 2-9.** Diesel-Impacted Groundwater, October 2002
- Figure 3-1.** Typical Single-Tube DPE System
- Figure 3-2.** Typical Single-Tube DPE Extraction Well
- Figure 4-1.** Locations of DPE Pilot Test Extraction and Monitoring Wells
- Figure 4-2.** Cross Section Beneath DPE Pilot Test Area
- Figure 5-1.** Potentiometric Surface, Measured October 2002
- Figure 5-2.** Geologic Cross Section Locations
- Figure 5-3.** Cross Section Beneath Former LUST Area
- Figure 5-4.** Cross Section Through Western Portion of Lower Tank Yard and Former Loading Rack
- Figure 5-5.** Cross Sections North and West of Lower Tank Yard
- Figure 5-6.** Fence Diagram Beneath Former Loading Rack
- Figure 7-1.** Proposed Full-Scale DPE System Configuration

TABLES

- Table 2-1.** Analytical Results from 1999 Soil Samples Above Cleanup Levels
- Table 2-2.** Analytical Results from 1999 Groundwater and Boring Water Samples
- Table 2-3.** Well Construction Details
- Table 2-4.** Analytical Results from 2001 Phase II Soil Samples Above Cleanup Levels
- Table 2-5.** Analytical Results from 2001 Phase II Groundwater Samples Above Cleanup Levels

TABLES (CONTINUED)

- Table 2-6.** Analytical Results from 2001 Phase III Soil Samples Above Cleanup Levels
- Table 2-7.** Analytical Results from 2001 Phase III Groundwater Samples Above Cleanup Levels
- Table 2-8.** Analytical Results from 2002 Lower Tank Yard Investigation Soil Samples Above Cleanup Levels – MTBE, BTEX, Napthalene, and Hexane
- Table 2-9.** Analytical Results from 2002 Lower Tank Yard Investigation Soil Samples Above Cleanup Levels – Fuel, BTEX, and Lead
- Table 2-10.** PAH Analytical Results from 2002 Lower Tank Yard Investigation Soil Samples
- Table 2-11.** VPH and EPH Analytical Results from 2002 Lower Tank Yard Investigation Soil Samples
- Table 2-12.** Summary of Quarterly Groundwater Monitoring Analytical Results Above Cleanup Levels
- Table 4-1.** Analytical Results from Pre-DPE Pilot Test Soil Samples Above Cleanup Levels
- Table 4-2.** Analytical Results from Pre-DPE Pilot Test Groundwater Samples Above Cleanup Levels
- Table 4-3.** Analytical Results from DPE Pilot Test Air Samples
- Table 4-4.** Analytical Results from Post-DPE Pilot Test Groundwater Samples Above Cleanup Levels

ACRONYMS AND ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirements
AS/SVE	air sparging and soil vapor extraction
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
bgs	below ground surface
BINMIC	Ballard Interbay Northend Manufacturing and Industrial Center
BMPs	Best Management Practices
CAA	Clean Air Act
CAP	Cleanup Action Plan
CCC	criteria continuous concentration
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CGI	combustible gas indicator
CL	clay
CMC	criteria maximum concentration
cPAH	carcinogenic polyaromatic hydrocarbon
CWA	Clean Water Act
DPE	dual phase extraction
Ecology	Washington State Department of Ecology
ESA	Environmental Site Assessment
Foster Wheeler Environmental	Foster Wheeler Environmental Corporation
FR	Federal Register
GAC	granular activated carbon
gph	gallons per hour
IT	IT Corporation
LNAPL	layer of light, non-aqueous phase liquid
LUST	leaking underground storage tank
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram

ACRONYMS AND ABBREVIATIONS (CONTINUED)

mg/L	milligrams per liter
ML	silty material
MTCA	Model Toxics Control Act
NESHAPS	National Emission Standards Hazardous Air Pollutants
NOC	Notice of Construction
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NWTPH	Northwest Total Petroleum Hydrocarbons
ORNL	Oak Ridge National Laboratory
PAH	polyaromatic hydrocarbon
PCP	pentachlorophenol
ppm	parts per million
Property	2737 West Commodore Way
PSCAA	Puget Sound Clean Air Agency
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SM	silty sand
SQuiRT	Screening Quick Reference Tables
SVE	soil vapor extraction
SW	sandy aquifer
SWPPP	Stormwater Pollution Prevention Plan
TOC	Time Oil Company
UST	underground storage tank
WAC	Washington Administrative Code

1. INTRODUCTION

This Cleanup Action Plan (CAP) describes the independent remedial action that will be performed at the Time Oil Company (TOC) parcel (Property) located at 2737 West Commodore Way, Seattle, Washington (Figure 1-1). The independent remedial action is designed to address subsurface soil and groundwater contamination at the Property. This CAP was prepared in general accordance with the Washington State Model Toxics Control Act (MTCA) WAC 173-340-380.

1.1 CLEANUP ACTION PLAN OBJECTIVE

The purpose of this CAP is to present a concise history of previous investigations conducted at the Property, a description of impacted media, proposed remedial actions, and a rationale for such actions. The CAP addresses proposed remedial actions for two areas of the Property, the Former Leaking Underground Storage Tank (LUST) Area and the Lower Tank Yard, and focuses solely on petroleum-impacted soil and groundwater.

1.2 CLEANUP ACTION PLAN ORGANIZATION

The CAP is organized into the following sections:

- Section 1 – Introduction
- Section 2 – Description and summary of previous investigations
- Section 3 – Remedial technology alternatives considered for the Property
- Section 4 – Description of the dual phase extraction (DPE) pilot test
- Section 5 – Conceptual model of the Property and cleanup levels
- Section 6 – Project requirements, such as institutional controls, applicable or relevant and appropriate requirements (ARARs), and maintenance requirements
- Section 7 – Description of the proposed remedial action
- Section 8 – Schedule for implementation
- Section 9 – References
- Appendix A – Boring Logs
- Appendix B – Laboratory Analytical Results
- Appendix C – Pilot Test Photographs
- Appendix D – NOAA Screening Quick Reference Tables (SQuiRT)

2. PROPERTY DESCRIPTION AND PREVIOUS INVESTIGATIONS

The following sections describe the Property and typical operations and summarize previously conducted investigations.

2.1 PROPERTY DESCRIPTION

The Property runs from West Commodore Way south to the Burlington Northern rail line (Figure 2-1). Most of the Property is paved, except for the area of the former rail lines behind the warehouse and the tank yard located on the east side of the Property. A two-story office building is located in the center of the Property adjacent to West Commodore Way. The tank yard is divided into two sections: the Lower Tank Yard and the Upper Tank Yard. The Lower Tank Yard contains six aboveground storage tanks (ASTs), while the Upper Tank Yard contains eight ASTs that are larger in volume than those in the Lower Tank Yard. The surfaces of both tank yards consist of unpaved gravel with patches of grass.

2.2 PROPERTY OPERATION

Operation of the TOC Property as a petroleum storage and transfer facility was discontinued in October 2001. The ASTs and pipelines have been purged of petroleum products, appropriately cleaned, and are currently empty. At this time, the Property is used for TOC administrative offices, and there are no plans to use the facility for petroleum storage and/or transfer again.

2.3 PREVIOUS INVESTIGATIONS

The Former LUST Area, located north of the office building, has been the focus of several investigations. In this area, historical releases from underground storage tanks (USTs) used to store petroleum products have impacted subsurface soil and groundwater. In addition, several ASTs located on the east side of the Property in the Lower Tank Yard have had minor leaks along their lower perimeters over the years. Figure 2-1 shows a layout of the facility, including the locations of the Former LUST Area, the Former Loading Rack Area, and the Lower Tank Yard. The following sections describe the results of previous investigations conducted in these areas.

2.3.1 1991 UST Removal

In September 1991, three USTs were removed from the Property, including a 4,000-gallon unleaded gasoline tank, a 2,500-gallon diesel fuel tank, and a 1,500-gallon regular (leaded) gasoline tank (TOC 1991). Figure 2-2 shows the locations of the former USTs and soil sampling locations.

The 2,500-gallon diesel fuel and 1,500-gallon leaded gasoline tanks were part of a baffled system (one 4,000-gallon tank) that was installed in 1980. Following removal of the USTs, a new 4,000-gallon UST was installed at the same location. This new tank is baffled to provide two compartments (one 3,000-gallon compartment and one 1,000-gallon compartment) and is therefore registered with Washington State Department of Ecology (Ecology) as two tanks. Two new fuel dispensers were also installed.

The TOC report from 1991 indicates that the soil in the excavation appeared discolored and that a hydrocarbon odor was evident. In addition, water with a hydrocarbon sheen was encountered at a depth of 18 feet below ground surface (bgs). Efforts to excavate the petroleum-impacted soil were impeded by the proximity of the TOC building to the excavation and the presence of groundwater in the excavation space. Water samples were not collected, but soil samples indicated that the highest concentration [12,000 parts per million (ppm)] of hydrocarbons was present in surface soils beneath the former fuel dispensers (east side of the building).

2.3.2 1999 UST Investigation

Additional site assessment activities were conducted in 1999, including the drilling of nine soil borings and installation of five groundwater monitoring wells (IT [IT Corporation] 2000). The locations of the 1999 borings are shown in Figure 2-3. Soil boring logs included in the IT report indicate that soil composition beneath the Property from the surface to approximately 20 to 25 feet bgs consists of sands and silts, with varying amounts of clay and gravel. Very dense, dry clay underlies this sand/silt unit and acts as an aquitard.

Table 2-1 presents a summary of the analytical results for soil samples with petroleum hydrocarbon concentrations above the MTCA Method A cleanup levels for unrestricted land use (Ecology 2001). Several soil samples contained gasoline and diesel at concentrations above the cleanup levels. The elevated concentrations of gasoline ranged from 381 milligrams per kilogram (mg/kg) to 755,000 mg/kg. Concentrations of benzene in soil samples above the cleanup level of 0.03 mg/kg ranged from 2.12 mg/kg to 5,590 mg/kg.

Several soil samples also exceeded the cleanup levels for toluene, ethylbenzene, and total xylenes.

Groundwater was encountered in eight of the nine borings and in all of the monitoring wells. Depth to groundwater ranged from 14 to 17 feet bgs. When water was sampled from the borings and wells in September 1999, only one well (01MW-01) did not contain detectable concentrations of hydrocarbons.

Table 2-2 provides a summary of the analytical results from the groundwater monitoring well and boring water samples collected in 1999. In September 1999, well 01MW-05 contained floating product with an apparent thickness of 0.78 feet; consequently, this well was not sampled. The concentrations of gasoline in wells 01MW-01, 01MW-02, 01MW-03, and 01MW-04 ranged from non-detect (01MW-01) to 27,200 micrograms per liter ($\mu\text{g/L}$) (01MW-03), and diesel ranged from non-detect (01MW-01) to 1,320 $\mu\text{g/L}$ (01MW-04). Heavy oil was not detected in any of the monitoring wells. Benzene concentrations ranged from non-detect (01MW-01) to 11,300 $\mu\text{g/L}$ (01MW-03). Toluene was detected above the MTCA Method A cleanup level in well 01MW-04, and wells 01MW-02, 01MW-03, and 01MW-04 contained concentrations of xylenes above the MTCA Method A cleanup levels. Total lead exceeded the cleanup level in every well except 01MW-01, with the highest concentration (130 $\mu\text{g/L}$) detected in 01MW-04. Most of the elevated concentrations were located near the northeast corner of the office building. The IT report recommended additional site characterization.

2.3.3 2000 Phase I Environmental Site Assessment

In the summer of 2000, Foster Wheeler Environmental completed Phase I Environmental Site Assessments (ESAs) of seven properties owned by TOC, one of which was 2737 West Commodore Way. The purpose of these investigations was to identify the possible presence of hazardous substances or petroleum products under conditions that indicate a past, existing, or future threat of release into structures, ground, groundwater, or surface water around each property. Investigational results and a records review are presented in the Environmental Site Assessment: Phase I at 2737 West Commodore Way (Foster Wheeler Environmental 2000). Following the Phase I ESA, the conclusion was reached that several past operations on the Property may have resulted in a "recognized environmental condition," as defined by the American Society for Testing and Materials (ASTM) Method E 1527-00.

2.3.4 2001 Phase II Investigation

Following Phase I ESA activities at the Property, further investigation activities were conducted to evaluate subsurface conditions in certain areas, including the Former LUST Area and the Lower Tank Yard (Foster Wheeler Environmental 2001a). Phase II field activities completed throughout the Property in November and December of 2000 consisted of soil borings, hand auger screening borings, well installation, soil and groundwater sampling, and surveying. Figure 2-4 shows the sampling locations at the Property and Table 2-3 describes well construction information. Summaries of petroleum-impacted soil and groundwater samples above cleanup levels are presented in Tables 2-4 and 2-5, respectively. Findings of the Former LUST Area and the Lower Tank Yard are discussed below.

2.3.4.1 Former LUST Area Investigation

During this phase of investigation, two soil borings (SB-35 and SB-36) were drilled in the Former LUST Area and two monitoring wells (01MW-08 and 01MW-09) were installed at the same locations. Well 01MW-08 (SB-35) is located west of the Former LUST Area, while 01MW-09 (SB-36) is to the south. Both borings were advanced to a depth of 25 feet, and groundwater was encountered at approximately 20 feet bgs. Both wells were screened across the water table within the shallow water-bearing zone, with the bottoms of the wells above a dry, impermeable clay/silt layer.

During sampling of soil boring SB-35, gasoline was detected above the MTCA Method A cleanup level for unrestricted soil at a depth of 5 feet and a concentration of 192 mg/kg. Gasoline and diesel were detected above cleanup levels at a depth of 15 feet bgs and concentrations of 1,640 mg/kg and 9,440 mg/kg, respectively. In soil boring SB-36, gasoline, ethylbenzene, xylenes, and diesel exceeded their respective cleanup levels at a depth of 15 feet bgs. Lead was not detected above the MTCA Method A cleanup level.

Gasoline and BTEX were detected during groundwater sampling above the MTCA Method A cleanup levels in monitoring wells 01MW-02, 01MW-03, 01MW-04, and 01MW-09. Diesel concentrations exceeded the MTCA Method A cleanup level in 01MW-01 through 01MW-04 and 01MW-09. Groundwater samples were not collected from 01MW-05 at this time because more than 5 feet of free-phase floating fuel was present in the well. Lead was not detected above the method reporting limits.

Following sampling, it was concluded that petroleum-impacted soil in SB-35, which is present at depths ranging from 5 to 15 feet, is related to the historic use of the underground

barrel transfer system, which transferred barrels of fuel from the Property to the dock across the street in the 1940s. The petroleum-impacted soil in SB-35 is not related, however, to the nearby UST. The soil contamination throughout the Former LUST Area is believed to be a result of contaminated groundwater, because (with the exception of SB-35) the samples showing elevated concentrations occurred below 15 feet bgs and the soil exceedances were at the water table.

The highest concentration of petroleum-impacted groundwater beneath the Former LUST Area during the Phase II ESA was found in 01MW-02, which is located near the fuel loading facility where a tanker truck accidentally released over 1,000 gallons of gasoline. This historical release, in combination with the former LUSTs, may represent the primary source of contaminated groundwater beneath this area.

2.3.4.2 Lower Tank Yard Investigation

During the Phase II ESA for the Property, nine soil borings (SB-01 through SB-05, SB-18 through SB-20, and SB-24) were drilled in the Lower Tank Yard and one monitoring well (01MW-12) was installed at boring SB-24. Five of the nine borings were screening borings drilled using a hand auger in the vicinity of the Former Pentachlorophenol (PCP)/Diesel Mixing Area in the southwest corner of the Lower Tank Yard, and the remaining four were drilled around the ASTs in the Lower Tank Yard. The borings were advanced to depths of between 4 and 35 feet, and groundwater was encountered between 3 and 15 feet bgs. Well 01MW-12 was screened across the water table within the shallow water-bearing zone, with the bottom of the well above a dry, impermeable clay/silt layer.

Of the four soil borings drilled among the ASTs within the Lower Tank Yard, gasoline was detected at concentrations above the MTCA Method A cleanup level in the top 5 feet of SB-19 and at a depth of 10 feet in SB-24. Diesel was detected at concentrations above cleanup level at a depth of 2 feet in both SB-19 and SB-24. Lead was not detected above the cleanup level in any of the samples.

Of the five hand auger screening borings collected near the Former PCP/Diesel Mixing Area, diesel- and oil-impacted soil was present in SB-03 at depths of 0.6 feet and 2 feet, and in SB-04 at a depth of 2 feet. Gasoline was also detected above the MTCA Method A cleanup level in the 2-foot-deep samples collected from SB-02, SB-03, and SB-04. The total carcinogenic polyaromatic hydrocarbons (cPAHs) in SB-03 and SB-04 exceeded the MTCA Method A cleanup level of 1 mg/kg at depths of 0 to 2 feet and 0 to 5 feet, respectively.

One surface sample (SS-04) also exceeded the cleanup level for cPAHs. The field notes did not document the presence of materials indicating a petroleum release.

The groundwater sample collected from 01MW-12 contained concentrations of benzene (98.4 µg/L) above the MTCA Method A cleanup level for groundwater. Diesel and gasoline were also detected above the cleanup levels at concentrations of 1.07 mg/L and 802 µg/L, respectively.

2.3.5 2001 Phase III Environmental Site Assessment

The Phase III ESA (Foster Wheeler Environmental 2001d) was conducted in July 2001 to further evaluate subsurface conditions in specific areas identified during the Phase II ESA. Field activities completed at 2737 West Commodore Way for Phase III included soil borings, near-subsurface soil sampling, well installation, soil sampling, groundwater sampling, fuel characterization, and surveying in five different areas on the Property, including the Former PCP/Diesel Mixing Area in the Lower Tank Yard and the Former LUST Area. Figure 2-5 shows the sampling locations at the Property and Table 2-3 describes well construction information. Summaries of petroleum-impacted soil and groundwater concentrations above cleanup levels are presented in Tables 2-6 and 2-7, respectively. Findings of the Former LUST Area and the Lower Tank Yard are discussed below.

2.3.5.1 Former LUST Area Investigation

During this phase of investigation, one soil boring (SB-60) was drilled east of the Former LUST Area and monitoring well 01MW-16 was then installed at the same location. The boring was advanced to a depth of 22.5 feet. Groundwater was encountered at a depth of approximately 18 feet bgs.

Following sampling of soil from SB-60, gasoline (1,240 mg/kg), benzene (1.68 mg/kg), xylenes (10.2 mg/kg), and diesel (11,400 mg/kg) were detected above the MTCA Method A cleanup levels for unrestricted soil at a depth of 15 feet. The sample from the 20-foot depth did not show concentrations of analytes above the reporting limits. Lead was not detected above the MTCA Method A level. Because the soil contamination was found near the water table, the contamination may be the result of groundwater influence rather than contaminated soil.

Following sampling of groundwater from 01MW-16, gasoline (11,000 µg/L) and diesel (11.1 mg/L) were detected at concentrations above cleanup levels.

2.3.5.2 Lower Tank Yard Investigation

During the Phase III ESA for the Property, six soil borings (SB-52 through SB-57) were drilled in the Former PCP/Diesel Mixing Area of the Lower Tank Yard and one monitoring well (01MW-14) was installed. With the exception of SB-57, the borings were advanced to depths of between 12 and 15 feet, and groundwater was encountered between 8 and 11.5 feet bgs. SB-57 was a shallow subsurface sample, collected after removal of the upper 18 inches of overburden. The 1-inch-diameter well (01MW-14) was screened across the water table within the shallow water-bearing zone, with the bottom of the well above a dry, impermeable clay/silt layer.

Diesel- and gasoline-impacted soil was identified near the Former PCP/Diesel Mixing Area in SB-52, SB-55, and SB-56 at depths ranging from 2.5 to 6 feet. The samples collected from a depth of 10 feet in each boring did not show concentrations of petroleum contaminants above MTCA levels for unrestricted soil.

When sampled, well 01MW-14 was found to contain approximately 6.7 feet of product with no measurable groundwater present. A product sample was collected for fuel characterization. The lab concluded that the majority of the material present in the sample is indicative of a middle distillate such as diesel fuel #2 or heating oil. The report also concluded that low-level degraded gasoline may have impacted the sample. Carcinogenic PAHs exceeded the cleanup level (1 mg/kg) in SB-56 at a depth of 2.5 feet. Based on the findings presented above and previous investigations, it appears that petroleum-impacted soil is generally limited to the upper 5 feet in the Lower Tank Yard.

2.3.6 2002 Former PCP/Diesel Mixing Area Soil Removal

In mid-September 2002, approximately 70 cubic yards of soil were removed from the Former PCP/Diesel Mixing Area. The purpose of the removal action was to excavate PCP-impacted soil from the area. The result was an excavated area approximately 60 feet by 24 feet in size that ranged in depth from approximately 6 to 18 inches and up to 5 to 7 feet in two locations. During this time, monitoring well 01MW-14 was removed, as its location coincided with one of the two areas requiring an excavation depth of 5 feet. Confirmation samples were collected at the conclusion of the excavation activities to document the successful removal. The soil removal action succeeded in eliminating surface

contamination of PCP-impacted soil and soil affected by petroleum products identified in previous investigations. Ecology issued a determination of "No Further Action" for PCP-impacted surface soils in January 2003 (Ecology 2003)

2.3.7 2002 Lower Tank Yard Investigation

In support of this CAP, nine additional 4-inch wells were installed in and around the Lower Tank Yard. Five wells were installed in the Lower Tank Yard. Two wells were installed on the west side of the former manifold area, one well was installed just north of the former manifold area outside of the Lower Tank Yard, and three wells were installed between the office building and the Lower Tank Yard. Seven soil borings were also drilled near the Former Loading Rack Area just north of the Lower Tank Yard. The locations of the wells and borings are shown in Figure 2-6. Well construction details are presented in Table 2-3 and boring logs are located in Appendix A.

Analytical results for fuel analyses conducted on the soil samples collected in December 2002 are presented in Tables 2-8 through 2-11. For the initial evaluation, the analytical results were compared to the MTCA Method A soil cleanup levels for unrestricted land use. The results are summarized below:

- Gasoline was detected above the cleanup level in every boring except 01MW-21 and 01MW-22. Thirty-one of the 62 samples collected exceeded the cleanup level. None of the samples collected at depths greater than 15 feet, with the exception of the borings in the Former Loading Rack Area, showed concentrations of gasoline above the cleanup level.
- Benzene was detected above the cleanup level in every boring except 01MW-21, 01MW-22, and LR06. Twenty-eight of the 62 samples exceeded the cleanup level. With the exception of the borings in the Former Loading Rack Area, only two borings (01MW24 and 01MW-29) showed concentrations of benzene above the cleanup level at a depth of 20 feet bgs.
- Toluene was detected above the cleanup level in borings 01MW-26, 01MW-27, 01MW-28, LR02, LR03, and LR05. Nine of the 62 samples exceeded the cleanup level. None of the samples collected at the bottoms of the borings, with the exception of the borings in the Former Loading Rack Area, showed concentrations of toluene above the cleanup level.

- Ethylbenzene was detected above the cleanup level in borings 01MW-24, 01MW-26, 01MW-27, and 01MW-28, and in every "LR" boring except LR06. Fourteen of the 62 samples collected exceeded the cleanup level. None of the samples collected at the bottoms of the borings, with the exception of the borings in the Former Loading Rack Area, showed concentrations of ethylbenzene above the cleanup level.
- Total xylenes were detected above the cleanup level in borings 01MW-24, 01MW-26, 01MW-27, and 01MW-28, and every "LR" boring except LR06. Sixteen of the 62 samples exceeded the cleanup level. None of the samples collected at depth, with the exception of the borings in the Former Loading Rack Area, showed concentrations of total xylenes above the cleanup level.
- Diesel was detected above the cleanup level in borings 01MW-24, 01MW-26, 01MW-27, and 01MW-28, and every "LR" boring except LR06 and LR07. Twenty-one of the 62 samples exceeded the cleanup level. None of the samples collected at depth, with the exception of the borings in the Former Loading Rack Area, showed concentrations of diesel above the cleanup level.
- Oil was not detected above the cleanup level in any of the soil borings.

While drilling the borings and wells for this investigation, a shallow silt layer was found above the water table in an area covering a large portion of the Lower Tank Yard and north of the Lower Tank Yard. Visual observations and sampling and analysis of the layer revealed that the layer is highly contaminated with petroleum hydrocarbons. Further details of the results of this investigation are discussed in Section 5.1.

2.3.8 Quarterly Groundwater Sampling

Groundwater samples are collected at the Property on a quarterly basis (January, April, July, and October). The first quarterly sampling event occurred in July 2001 (Foster Wheeler Environmental 2001d). Figures 2-7 through 2-9 show the extent of impacted groundwater beneath the Property as measured during the most recent sampling event in October 2002. In general, groundwater concentrations are consistent over time. There appear to be two distinct sources of petroleum hydrocarbon-impacted groundwater beneath the site. One source may be near the Former LUST Area, where gasoline and benzene concentrations are the highest, and another distinct source appears to originate in the tank yard and extend to the north and through the Lower Tank Yard to the Former Loading Rack Area (Figure 2-1).

Floating product is commonly found in wells 01MW-05, 01MW-10, and 01MW-16. The fuel thicknesses vary depending on the quarter, but have been measured as thick as 5.13 feet (01MW-05, January 2002). Trace levels of fuel are often seen in wells 01MW-09, 01MW-18, 01MW-23, 01MW-25, 01MW-28, and 01MW-29.

A summary of analytical results from all of the quarterly groundwater sampling events conducted through October 2002 is presented in Table 2-12.

3. REMEDIAL TECHNOLOGY ALTERNATIVES

A number of technologies can be implemented to remediate of petroleum hydrocarbon-contaminated soil and groundwater, depending on the goals and requirements specified for the cleanup. The following sections discuss possible soil and groundwater remedial alternatives and their applicability for the Property.

3.1 REMEDIAL ALTERNATIVES EVALUATED FOR CONTAMINATED SOIL AND GROUNDWATER

Remedial technologies evaluated include bioventing, free-phase hydrocarbon recovery, air sparging combined with soil vapor extraction, and dual phase extraction (DPE). The strengths and weaknesses of each technology are discussed in the following sections.

3.1.1 Bioventing

Bioventing refers to the process of in situ biodegradation of contaminants in soil, enhanced by soil venting via air injection or air extraction. In bioventing, the intent is to use air movement to provide oxygen for aerobic degradation of the contaminants using either indigenous or introduced microorganisms and, if necessary, nutrients. The bioventing technology has been used particularly for in situ treatment of petroleum distillate fuel hydrocarbons, such as jet fuel, gasoline, and diesel. In examining the basic premise of bioventing, the applicability of the technology to the site must consider how biodegradable the soil contaminants are and if the site environmental and/or physical conditions are favorable. The environmental conditions, such as the nutrient level, moisture, and pH, control the microbial activity level in the soil. If these conditions are favorable, the biodegradation process will be accomplished effectively. The physical conditions are evaluated by the ability to move air through the soil matrix. This is a function of the permeability, homogeneity, and water saturation of the soil.

This technology is applicable to the Former LUST Area and the Lower Tank Yard in that a majority of the petroleum hydrocarbon constituents found in the soil is sufficiently biodegradable. In addition, the vadose zone is adequate in depth to support microbial activity. If the depth to groundwater is less than 10 feet, groundwater upwelling can occur within bioventing wells under vacuum pressure, which can potentially occlude screens and reduce or eliminate vacuum-induced soil vapor flow (and therefore the oxygen needed for

aerobic degradation). Also, as shown in boring logs, the stratigraphy in the Former LUST Area should be sufficient in terms of permeability to convey air through the unsaturated zone. In the Lower Tank Yard near wells 01MW-21 through 01MW-23 and just north of the Lower Tank Yard near the Former Loading Rack Area, however, a shallow silt layer has been found above the water table (Sections 2.3.7 and 5.1). A denser clay layer has also been observed on the west side of the Former Loading Rack Area in borings LR02 through LR04. Due to the fine-grained nature of the soils in these layers, the effectiveness of bioventing may be reduced in that air may not be able to travel between the vadose zone above and below the less-permeable layers.

While bioventing may assist in remediating the vadose zone of the Former LUST Area and possibly portions of the Lower Tank Yard, it would not have any effect on the groundwater contamination or free product present. As the groundwater level fluctuates in the unsaturated zone, the free product may even create a highly concentrated "smear" that may eliminate any microorganisms that exist or are added to the soil. Previous analytical results from some sampling locations in the area have shown concentrations of contaminants in the soil that are high enough (petroleum constituent concentrations greater than 25,000 ppm) to be toxic or inhibit the growth and reproduction of the bacteria responsible for biodegradation.

In addition, the air flow rates used in bioventing must be relatively low to provide only enough oxygen to sustain microbial activity. Therefore, because volatile compounds are biodegraded as vapors move slowly through biologically active soil and because the contaminant concentrations are so high, remediation of the vadose zone would occur slowly.

3.1.2 Free-phase Hydrocarbon Recovery

Free-phase hydrocarbon recovery can be accomplished using a variety of equipment, including skimmer units and vacuum-enhanced recovery pumps. Skimmer units are commonly used to remove a relatively thin, but persistent, layer of light, non-aqueous phase liquid (LNAPL) from wells or open trench systems. The design of most skimmer units allows for the intake line to be set at the product/water interface. Accordingly, when the intake line is properly adjusted (either manually or automatically), the skimmers will remove free product accumulated in the wells while minimizing groundwater extraction. The vacuum-enhanced free-hydrocarbon recovery systems utilize a common pumping technique used in construction dewatering projects, where the vacuum is exerted through a "drop tube" lowered to within the product zone in a sealed well casing. According to

Battelle (1995), application of vacuum in such a well increases the product recovery rates by increasing the hydraulic gradient and the aquifer transmissivity. The hydraulic gradient is increased as a result of developing a cone of reduced pressure around the well, thus promoting a horizontal flow of fluids across the pressure-induced gradient. The increase in transmissivity is caused by an increase of flow along the more permeable horizontal flow lines and by the decrease in the local pressure above the aquifer that causes an increase in the saturated thickness of the aquifer.

Although vacuum-enhanced recovery systems improve the product recovery rates over that of the skimmer units, they also result in proportionally more groundwater extraction. Therefore, the choice between vacuum-enhanced versus skimmer systems usually depends on the site-specific conditions that control the effectiveness of each of these technologies and the costs.

Advantages of free-phase hydrocarbon recovery technology include the lack of air or water treatment equipment required following removal of free product from the subsurface; no discharge permits are required; removal of free product may allow remediation by natural attenuation to occur (via biodegradation, dilution, etc.); and a relatively low capital cost.

In the Former LUST Area and the Lower Tank Yard, free-phase hydrocarbon recovery would likely be successful at recovering the free product LNAPL that exists above the groundwater. This technology would achieve removal of the source of contamination relatively quickly, but it would be limited to the recovery rate of the groundwater contamination. However, this technology alone would have no direct impact on the vadose zone or groundwater. The application of vacuum-enhanced recovery would lower the water table and thus increase the "smear" area.

3.1.3 Air Sparging and Soil Vapor Extraction

Air sparging is an in situ remedial technology in which air is injected into the aquifer. The injected air traverses both horizontally and vertically in pores through the soil column and removes contaminants adsorbed to soils and dissolved in groundwater by volatilization. The injected air enables a phase transfer of volatile contaminants to the vapor phase so that the contaminant is vented into the unsaturated zone. Air sparging is most often implemented in conjunction with a vapor extraction system. Soil vapor extraction (SVE) wells use vacuum to create a negative pressure in the unsaturated zone, which induces the controlled flow of air and thus the migration and removal of volatile and some semivolatile contaminants from

the soil. The combined technology of air sparging and soil vapor extraction (AS/SVE) is designed to operate at high flow rates to maximize stripping of volatile contaminants.

For the TOC site, the overall effectiveness of an AS/SVE system would be limited due to the presence of free product. While the petroleum hydrocarbons would volatilize with the addition of air, air sparging is not meant for highly concentrated masses of hydrocarbons, such as an LNAPL. Air injected into the groundwater would have to travel through the free product, which would likely induce migration and spread contaminants further into the vadose zone and make little progress in remediating the source of the contamination.

An SVE system alone, however, would aid in the remediation of the Former LUST Area and the Lower Tank Yard due to the volatile nature of the contaminants present. While SVE would most likely be successful at recovering the contaminants adsorbed to soil in the vadose zone, this technology alone would have a limited effect on the contaminant concentrations in groundwater or the free product present.

3.1.4 Dual Phase Extraction

DPE, also referred to as multi-phase extraction, vacuum-enhanced extraction, or sometimes bioslurping, uses a high vacuum system to remove combinations of contaminated groundwater, separate-phase petroleum product, and hydrocarbon vapors from the subsurface. Extracted phases are collected and treated for disposal, or re-injected to the subsurface (where permissible under applicable state laws). The recovery rates for liquids and soil gas vary throughout the DPE process depending on the characteristics of on-site soil and contaminants. In general, the slurping action removes a large portion of free hydrocarbons floating over the groundwater table during the initial stage of pumping. The soil gas vacuum gradient developed around the extraction wells results in an increased accumulation of product around the wells; however, as the volume of the floating product decreases, the roles of SVE and bioventing in remediating the vadose zone soil improve.

Overall, DPE is most suitable for shallow aquifers (less than 25 feet below surface) to accommodate the suction lift of an average pump and is more effective in aquifers with moderate to high permeability. Both of these conditions exist in the Former LUST Area and the Lower Tank Yard on the Property.

There are two possible DPE applications: single-tube DPE, which extracts both vapor and liquid through a single tube at a high vacuum; or double-tube DPE, which extracts vapor by high vacuum but removes liquid via a downwell pump (either submerged or skimmer,

depending on project requirements and site conditions). Both DPE applications offer the advantage of enhanced well inflow by application of high vacuum, but they also require significant aboveground handling and treatment equipment for the vapor and liquid flows. Benefits and drawbacks of the two types of DPE technologies are as follows:

<u>Technology</u>	<u>Pros</u>	<u>Cons</u>
Single-tube DPE	<ol style="list-style-type: none"> 1. Extracts two phases simultaneously 2. Treats smear zone (via vapor extraction and bioventing) 3. Effective in low permeability soils 	<ol style="list-style-type: none"> 1. Significant aboveground treatment equipment investment and footprint 2. Air and water discharge permits required 3. Operationally demanding 4. Pilot testing and site data required for design
Double-tube DPE	<ol style="list-style-type: none"> 1. No liquid/vapor separator, some reduction in footprint of aboveground treatment equipment 2. Treats smear zone (via vapor extraction and bioventing) 3. Effective for fluctuating water tables or wide-ranging soil permeability 	<ol style="list-style-type: none"> 1. Additional cost for skimmer pumps 2. More equipment to operate and maintain 3. Air and water discharge permits required 4. Pilot testing and site data required for design

3.2 SELECTED REMEDIAL ALTERNATIVE FOR CONTAMINATED SOIL AND GROUNDWATER

To achieve the goal of remediating the maximum amount of contamination in the soil and groundwater beneath the Former LUST Area and the Lower Tank Yard in the most efficient manner possible, DPE is the most effective alternative. DPE combines the advantages of skimming, including relatively fast removal of free product to prevent further migration of contaminants in the saturated and unsaturated zones, with the vapor extraction technique of SVE to remediate the vadose zone soil. In addition, by using a high-vacuum system to remove free product, the water table will be lowered, which will expose more media to SVE. Provided the conditions in the vadose zone are supportive of microbial activity, DPE may also allow biodegradation to occur in the unsaturated zone in a manner similar to bioventing, only with higher vacuum. Also, while DPE does not target groundwater for remediation, a vacuum-enhanced recovery system will cause some groundwater to be removed and, when treated with aboveground equipment, remediated along with the free product and vapors. Removal of the LNAPL and remediation of the vadose zone, with the

AST demolition activities, will result in source removal and also aid in the restoration of groundwater.

Of the two possible DPE applications, single-tube DPE would be the more appropriate for the site. Double-tube DPE can be more expensive because additional equipment is required and can be more effective for sites with a wide range of conditions. The Former LUST Area has such a slow aquifer recharge rate that the additional expense for varying conditions is not necessary. A typical single-tube DPE system and a typical single-tube DPE well are shown in Figures 3-1 and 3-2, respectively.

The following sections of this Cleanup Action Plan are based on the selection of single-tube DPE as the preferred technology for remediation of the Former LUST Area and the Lower Tank Yard and present pilot-scale test results and plans for implementation of a full-scale DPE system.

3.3 REMEDIAL ALTERNATIVES EVALUATED FOR CONTAMINATED OVERLAYING SILT LAYER

As discussed in Section 2.3.7, a silt layer exists above the water table throughout most of the Lower Tank Yard and north of the Lower Tank Yard. Due to the less permeable properties of this portion of the subsurface, the remedial technologies discussed previously will not function effectively. Therefore, additional action must be taken in this area. Soil impacted above the cleanup levels in this area will be excavated and thermally treated.

4. DUAL PHASE EXTRACTION PILOT TEST

A DPE pilot test was conducted in the Former LUST Area of the Property in general accordance with the pilot test work plan (Foster Wheeler Environmental 2001b) and the proposal for field activities (Foster Wheeler Environmental 2001c). Field activities specific to the DPE step test commenced on July 8, 2002, and final demobilization was complete on July 18, 2002. The following sections describe the objectives of the pilot test, the results of the fieldwork, and the evaluations completed following analysis of the test results.

4.1 OBJECTIVES AND SCOPE

The primary objective of the DPE pilot test was to evaluate the effectiveness of the DPE technology as a corrective action alternative for petroleum-impacted soil and groundwater. The secondary objective of the pilot test was to gather and analyze data to further define subsurface conditions, determine potential extraction flow rates, and ascertain effluent vapor stream compositions in order to optimize the equipment design and operating conditions for a full-scale DPE system.

The scope of work for the DPE pilot test consisted of the following activities:

- **Soil borings and well installation**—Three monitoring wells were installed in the vicinity of 01MW-05. Wells 01MW-18, 01MW-19, and 01MW-20 were installed on March 11, 2002, specifically for the DPE pilot test. Well 01MW-18 was installed as the pilot test extraction well and wells 01MW-19 and 01MW-20 were installed for potential future use as DPE extraction points and as monitoring points during the pilot test. All three wells are 4 inches in diameter and screened across the water table from 25 to 5 feet bgs within the shallow, water-bearing zone.
- **Baildown and recovery test**—A baildown test was performed prior to DPE testing on well 01MW-05 to remove all free product from the well and to measure the rate of recovery of product back into the well. This test provided an estimate of the natural rate of recovery, free from vacuum enhancement, as well as an estimate of the lower bound of the rate of product flow into 01MW-05.
- **Baseline monitoring**—Prior to any DPE testing, water and product levels were measured in all of the site wells to gather baseline data.

- **DPE step test**—The DPE step test was performed to measure vacuum-enhanced recovery at two different drop tube depths within the DPE well. The goal of the short-term operation (first step, drop tube set at 20 feet bgs in well 01MW-18) was to evaluate vacuum and groundwater level responses in nearby monitoring wells. The long-term operation (second step) was run at the maximum vacuum and flow setting and with the drop tube at its maximum depth of 23 feet bgs. Following the DPE test, groundwater recovery was monitored in wells 01MW-18 and 01MW-20.

4.2 PRE-PILOT TEST SAMPLING RESULTS

As discussed above, three monitoring wells were installed north of the office building prior to performing the DPE pilot test. Table 4-1 includes a summary of analytical results from soil boring samples taken during well installation. The data show that the soil was not widely impacted by petroleum products. The exceedances at depths of 15 and 20 feet bgs are most likely related to groundwater interferences. Following installation and development of these wells, groundwater samples were collected from eight monitoring wells located between the office building and West Commodore Way. A summary of groundwater analytical results is presented in Table 4-2. The data show the extent of diesel- and gasoline-impacted groundwater above MTCA cleanup levels.

Laboratory reports of analytical results for soil boring and groundwater samples taken prior to the pilot test are included in Appendix B.

4.3 TEST EQUIPMENT AND SYSTEM CONFIGURATION

The treatment area was located north of the Lower Tank Yard in the vicinity of the overhead fuel loading rack. The equipment used during the DPE pilot test consisted of the DPE equipment train (provided by H₂Oil), a trailer-mounted generator, and a 21,000-gallon storage tank for groundwater extracted from the Former LUST Area. The DPE equipment train included a drop tube that was inserted into the DPE extraction well and a hose that connected the drop tube to the treatment system. Once extracted and conveyed to the treatment area, the liquid/vapor mixture was collected in a separator, where the product and groundwater were accumulated prior to being pumped to the storage tank. While the pilot test system did not include an oil/water separator, the configuration of the level sensors in the liquid/vapor separator allowed extracted product to be accumulated and removed following the test. Vapors from the liquid/vapor separator were routed through two 55-gallon granular activated carbon (GAC) vessels for treatment.

To remove any volatile contaminants from the groundwater that had been pumped into the storage tank, the groundwater in the tank was air sparged. A vacuum pump was then used to withdraw the air containing volatilized contaminants from the tank and pump it to a vapor phase GAC unit separate from the one used for effluent vapors from the DPE liquid/vapor separator. The sparged liquid in the storage tank was pumped through two liquid phase GAC units to remove any contaminants not volatilized during air sparging.

Appendix C includes photographs taken of the DPE system and the aboveground equipment required for remediation of the various phases withdrawn from the subsurface of the Former LUST Area. Figure 4-1 displays the DPE extraction well (01MW-18) and the wells that were monitored during the pilot test.

4.4 TEST PROCEDURES

4.4.1 Baildown and Recovery Test

The baildown and recovery test was performed prior to DPE testing on June 3 and 4, 2002, using well 01MW-05 under static conditions. The test consisted of withdrawing all free product from the well with a peristaltic pump, transporting the petroleum hydrocarbon product to a 5-gallon bucket for disposal, and measuring the timed rate of LNAPL recovery back into the well. Product thickness measurements were taken with an oil/water interface probe. Prior to withdrawal, the initial product thickness was measured to be 5.64 feet. Following withdrawal of all product from 01MW-05, 0.71 feet of product came back into the well within approximately 23 hours.

This test provided an estimate of the natural rate of product recovery, free from vacuum enhancement, as well as an estimate of the lower bound of the rate of product flow into 01MW-05. This represents the lower bound because, in addition to using vacuum to withdraw product, a DPE system creates a cone of depression; therefore, product will flow via gravity into the extraction wells used for the DPE system. With a baildown test, however, there is no gravitational or vacuum influence.

4.4.2 Pre-test Baseline Monitoring

Prior to commencement of the DPE step test on July 8, 2002, water and product levels were measured for 15 of the wells shown in Figure 4-1 using an oil/water interface probe. This was done to document site hydrologic conditions surrounding the Former LUST Area prior

to application of vacuum to the subsurface, as well as to compare pre-test and post-test LNAPL thicknesses.

Product was encountered in five of the fifteen measured wells including wells 01MW-05, 01MW-09, 01MW-10, 01MW-16, and 01MW-18. The product thickness was greatest in 01MW-05 at 2.77 feet, followed by well 01MW-16 at 1.36 feet. Measured product thicknesses are included in Figure 4-1, and a cross-section parallel to West Commodore Way displaying the measured static water levels is included as Figure 4-2.

4.4.3 Step Test

The DPE step test was performed on well 01MW-18 and consisted of two steps: one with the drop tube set at 20 feet below the top of the well casing and the second with the drop tube set at 23 feet below the top of the well casing. The first step was conducted on July 8, 2002, for approximately 15 hours at the maximum flow rate and vacuum possible. During the first 4 hours of the test, vacuum measurements were taken with a magnehelic gauge every 15 minutes from each of six monitoring wells (01MW-03, 01MW-04, 01MW-05, 01MW-19, 01MW-09, and 01MW-20) that were located in the vicinity of 01MW-18. Once vacuum steady state was reached within the six wells, vacuum measurements were stopped. For the duration of the test, water and product levels were measured via an interface probe and recorded every 30 minutes. These data were used to determine whether steady-state DPE operation had been reached and the radius of influence of extraction well 01MW-18 at a drop tube depth of 20 feet.

Throughout the entire test, hourly DPE system measurements of the system flow rate, the vacuum in well 01MW-18, the system vacuum, the reading from a water flow totalizer, and the vapor contaminant concentrations at both the entrance and the exit to the GAC vapor treatment unit were recorded. In addition, two vapor samples were withdrawn from the extraction treatment system prior to entrance into the GAC units to evaluate vapor contaminant concentrations in support of full-scale system design.

The second step of the step test, with the drop tube set at 23 feet below the top of the casing for well 01MW-18, was conducted for almost 47 hours, beginning on July 9, 2002. As with the first step, vacuum measurements were taken every 15 to 30 minutes from each of six monitoring wells during the first 5 hours of the test. Once vacuum steady state was reached within the six wells, vacuum measurements were stopped and then water and product levels were measured via an interface probe and recorded every 30 minutes and eventually every 2

hours. These data were used to determine at what point steady state DPE operation had been reached and the radius of influence of the extraction well at a drop tube depth of 23 feet.

During the second step, the same system flow and vacuum conditions were recorded on an hourly basis. Throughout this portion of the test, two vapor samples were withdrawn from the extraction treatment system prior to entrance into the GAC units.

Following the step test, water recovery was monitored on a short-term basis and product recovery was monitored on a long-term basis. To determine the length of time it took the groundwater to recover back to steady state, water levels were measured in wells 01MW-18 and 01MW-20 every 30 seconds to 15 minutes for almost 3 hours. Product levels were measured in all of the wells on the Property following the DPE step test and continue to be measured in all of the wells every quarter concurrent with quarterly groundwater monitoring.

4.5 PILOT TEST RESULTS

The following sections describe the results from the DPE pilot test. Laboratory reports of analytical results for samples taken prior to and during the pilot test are included in Appendix B. Tables 4-1, 4-2, and 4-3 include summaries of soil, groundwater, and vapor analytical results, respectively.

4.5.1 Step Test

The first step of the step test, performed with the DPE drop tube set at 20 feet below the top of the casing for well 01MW-18, was conducted at an average liquid flow rate of 40 gallons per hour (gph) and an average vapor flow rate of 26 cubic feet per minute (cfm). The total volume of hydrocarbons and water recovered during the first step of the test was approximately 1,000 gallons. Typical extraction well and system vacuums were 11 and 21 inches of mercury, respectively.

The second step of the step test, performed with the DPE drop tube set at 23 feet below the top of the extraction well casing, was conducted at an average liquid flow rate of 41 gph and an average vapor flow rate of 14 cfm. The vapor flow rate during the second step was lower than the first due to an adjustment made to the system's relief valve, which terminated the inflow of ambient air to the treatment system. The total volume of water and product recovered during the second step test was approximately 2,800 gallons. During this step,

typical extraction well and system vacuums were approximately 15 and 26 inches of mercury, respectively.

4.5.2 Radius of Influence

The radius of vacuum influence was measured in the vadose zone using monitoring wells 01MW-03, 01MW-04, 01MW-05, 01MW-09, 01MW-19, and 01MW-20. These are the six wells that surround 01MW-18. Vacuum monitoring was performed during both steps of the step test from the start of each test until a vacuum steady state was reached. Typically, the estimated limit of vacuum influence to induce air flow is set at 0.1 inches of water negative pressure. To be conservative, a second limit of vacuum influence at 0.5 inches of water was considered to account for the site heterogeneity.

Between the first and second step test, the radius of vacuum influence increased only slightly. However, with a limit of either 0.1 or 0.5 inches of water, the radius of influence for both tests expanded beyond the wells that were monitored, with the exception of 01MW-04. The vacuum measured in well 01MW-04 was zero, which is assumed to be because the subsurface in the area where the well is situated consists of backfill, used following the removal of two USTs located north of the office building. The backfill material is more permeable than the natural subsurface materials in the area; therefore, a vacuum applied to the subsurface will preferentially withdraw vapors through the backfill material and not the well. In addition, well 01MW-20 showed an unusually high vacuum, most likely due to a very low permeability at that location. Excluding wells 01MW-04 and 01MW-20, the radius of vacuum influence, determined by graphing the steady state vacuum data and applying an exponential trendline to the graph, is approximately 50 feet with a limit of 0.5 inches of water negative pressure and a drop tube depth of 23 feet bgs.

4.5.3 Radius of Depression

The radius of depression of the water table was determined via steady state fluid level measurements in 14 wells during both steps of the step test. Figure 4-2 includes a cross section parallel to West Commodore Way showing the static water levels, steady state water levels with the drop tube at 20 feet bgs, and steady state water levels with the drop tube at 23 feet bgs in 6 of the 14 wells monitored. Based on water levels measured with an interface probe and taking into account the average water level fluctuations due to weather (e.g., changes in barometric pressure, rainfall) and subsurface heterogeneity, the radius of depression is approximately 45 feet around 01MW-18 for a limit of 0.5 feet in depth.

4.5.4 Water and Product Recharge

Following the step test, water levels were measured in wells 01MW-18 and 01MW-20 for almost 3 hours. In this time, the water level in 01MW-18 increased by almost 4.5 feet and the level in 01MW-20 increased by approximately 0.9 feet. However, the water levels did not return to the levels measured prior to the DPE step test in this time period. Although the differences in pre-test and post-test levels may be influenced by changing weather and subsurface conditions, 01MW-18 and 01MW-20 water levels were approximately 0.8 and 0.6 feet below initial fluid levels, respectively, at the cessation of the monitoring activities.

Due to water table fluctuations with time and varied subsurface geology, product recovery rates were much more difficult, if not impossible, to determine. Prior to the step test, product was measured in wells 01MW-05, 01MW-09, 01MW-10, 01MW-16, and 01MW-18. Only two of these wells, 01MW-05 and 01MW-09, were located within the radius of depression of 10MW-18 (45 feet). The product thickness measurements collected from 01MW-05 and 01MW-09 during the pilot test did not indicate a discernible pattern in product thickness reduction. This may be attributed to a slow rate of product transfer between the wells or continuous recharge of product in the vicinity of 01MW-05 during the test.

Following the step test, product was extracted directly from wells 01MW-05, 01MW-09, 01MW-10, and 01MW-16. A week after product extraction from the wells, product had flowed back into 01MW-05, -10, and -16, although the product thicknesses in 01MW-05 and 01MW-16 prior to product extraction were many times greater than those measured following product extraction. The product thickness measured in 01MW-10 was close to pre-extraction thicknesses. Well 01MW-09 had only trace amounts of product a week and a half after product was extracted from the well. When monitoring was performed on the well 3 months later (October 21, 2002), however, the product level in 01MW-09 was almost 6 times the product thickness measured prior to the DPE pilot test. When wells 01MW-05 and 01MW-10 were measured in October 2002, the product thicknesses in 01MW-05 and 01MW-16 had increased to over half of their pre-pilot test levels, while the thickness in 01MW-10 decreased significantly.

4.5.5 Extracted Vapor Analysis

Throughout the DPE step test, vapor contaminant concentrations were measured on an hourly basis using a combustible gas indicator (CGI) at both the entrance and the exit to the

GAC treatment units. At the entrance to the treatment units, gas concentrations were initially monitored by disconnecting the tubing leading to the GAC units and measuring concentrations in the moving vapor stream. Because this method yielded lower than expected vapor concentrations, the method was modified during the second step of the step test. At this time, the moving vapor stream was collected in a Tedlar[®] bag, which was then measured via the CGI. This method eliminated the need to measure directly from a moving vapor stream and also yielded results that were higher and likely more accurate than previously measured values (e.g., the peak values observed during the first and second steps were 4.7 ppm versus 385 ppm, respectively).

The CGI was used for continuous monitoring so that qualitative information could be obtained about the GAC unit influent stream and to ensure that the GAC unit effluent stream was suitable for release into the atmosphere. The data collected from the CGI showed that the GAC unit was successful in remediating measurable concentrations of vapors; however, quantitative vapor concentration data was needed to evaluate treatment options for the full-scale system design. Therefore, seven pre-treatment vapor samples were also collected during the DPE pilot test and analyzed. Three samples were collected in Tedlar[®] bags and analyzed by North Creek Analytical, Inc. for gasoline-range hydrocarbons and BTEX per modified method Northwest Total Petroleum Hydrocarbons (NWTPH). The remaining four samples were collected in Summa canisters and analyzed by Performance Analytical, Inc. for total gaseous non-methane organics as methane per modified EPA Method 25C, C₂ – C₁₀ hydrocarbons per modified EPA Method TO-3, and BTEX per EPA Method TO-15.

4.5.5.1 Tedlar[®] Bag Samples

All Tedlar[®] bag samples were collected during extraction from well 01MW-18. One sample was collected following system start-up, one sample was collected prior to lowering the DPE drop tube from 20 to 23 feet, and the last sample was collected during the second step of the DPE step test once steady state was reached for the wellhead vacuum measurements. Laboratory analytical results are summarized in Table 4-3.

4.5.5.2 Summa Canister Samples

These four samples were collected during extraction from wells 01MW-18, 01MW-09, 01MW-10, and 01MW-05 prior to system shutdown, allowing an evaluation of extracted vapor representative of a full-scale extraction system. Because the extraction from wells

01MW-09, 01MW-10, and 01MW-05 were of short duration (non-steady state), the sample results presented in Table 4-3 are likely lower than results expected at steady state flow. This is due to the cone of depression that allows soil vapor flow to desiccate previously saturated and partially saturated soils in the smear zone, resulting in volatilization and removal by the extraction system.

4.5.5.3 PSCAA Requirements

The Puget Sound Clean Air Agency (PSCAA) regulates air emission sources in the Puget Sound area. Regulation 1, Article 6, Section 6.03 (c) states that a Notice of Construction (NOC) application and an Order of Approval are not required for the following sources, provided that sufficient records are kept to document the exemption:

(94) Soil and groundwater remediation projects involving <15 pounds per year of benzene or vinyl chloride, <500 pounds per year of perchloroethylene, and <1,000 pounds per year of toxic air contaminants.

Based on calculations using vapor contaminant concentrations prior to entrance into the GAC treatment unit (Table 4-3), the total quantity of benzene extracted during the step test and during product extraction from four additional wells was approximately 0.3 pound. This value is significantly below the 15 pound per year threshold.

Additional toxic air contaminants that fall under PSCAA regulations were detected in the vapor samples taken during product extraction from the DPE well and wells 01MW-05, 01MW-09, 01MW-10, and 01MW-16. Following is a list of each PSCAA-regulated toxic air contaminant detected and an estimate of the total quantities extracted:

- Toluene – 0.23 pounds
- Ethylbenzene – 0.05 pounds
- Xylenes – 0.20 pounds
- Butane – 2.0 pounds
- Pentane – 3.3 pounds
- Hexane – 2.6 pounds
- Heptane – 2.3 pounds
- Octane – 1.2 pounds
- Nonane – 0.52 pounds

The PSCAA requirement for the above contaminants is that the sum of the above quantities does not exceed 1,000 pounds per year. The sum of the quantities above is approximately 12.5 pounds. Therefore, because the benzene and toxic air contaminant totals are lower than the discharge requirements set by PSCAA, an NOC application was not needed for this pilot test. In addition, note that the vapor samples were collected prior to treatment of the vapor stream with a vapor-phase GAC system arranged in series. It is expected that vapor samples collected from the GAC unit effluent stream would have resulted in concentrations below the method detection limits for all organic constituents.

4.6 POST-PILOT TEST GROUNDWATER SAMPLING RESULTS

Following completion of the DPE pilot test, water samples were collected and analyzed as part of the July quarterly groundwater monitoring. Results from this monitoring event are included in Foster Wheeler Environmental 2002 and summarized in Table 4-4. During the July monitoring event, wells 01MW-05, 01MW-09, and 01MW-18 (among others) were not monitored because floating product was present in the wells at the time of sampling. In general, the wells showed little differences between pre- and post-test sampling. Well 01MW-04 was an exception in that the concentrations of gasoline and benzene increased.

4.7 PILOT TEST CONCLUSIONS

Conclusions reached following the DPE pilot test are summarized as follows:

- The average vapor extraction rate from well 01MW-18 during the long-term test was approximately 13 cfm.
- The average extraction rate of groundwater/product during the long-term test was 41 gallons per hour.
- The vacuum radius of influence for the long-term test was approximately 50 feet (based on a limit of 0.5 inches of water negative pressure).
- The groundwater extraction radius of depression for the long-term test was approximately 45 feet.
- No vacuum influence was measured in well 01MW-04 at any time during the pilot test, even though the well is located within the estimated vacuum radius of influence. The backfill placed during former UST removal actions likely creates a short circuit for air flow in this area. However, groundwater was influenced by the DPE system in this area.

5. SITE CONCEPTUAL MODEL AND CLEANUP LEVELS

Washington Administrative Code (WAC) 173-340-700 requires the development of a site conceptual model to describe the subsurface conditions, fate and transport of potential contaminants, and identification of potential exposure pathways and receptors. The following sections present the site conceptual model for the Property and proposed cleanup levels.

5.1 SITE CONCEPTUAL MODEL

The site conceptual model is based on the current understanding of the site geology and hydrology, the extent of contamination, and potential exposure pathways and receptors.

5.1.1 Site Geology and Hydrology

The Puget Sound Basin is a convex-eastward basin lying between the Cascade Range and the Olympic Mountains (coastal range). The basin is open to the north and connects to the Pacific Ocean via the Strait of Juan de Fuca. The Puget Sound Basin was inundated with continental ice during the Pliocene. At least five major advances and several lesser advances are recorded (Galster and Laparde 1991). The result of these advances was the deposition of several glacial and nonglacial accumulations. The most common unit, and the one most applicable to the Property, is the Vashon Drift. The Vashon Drift is divided into the Lawton Clay, Esperance Sand, Vashon Till, and Recessional deposits. The Lawton Clay, characterized by laminated dark gray clay and light gray silt, forms the basal unit and represents the deposition of sediments in a lake that formed as the Puget lobe advanced south and blocked the northern part of the Puget Sound Basin. The upper contact of the Lawton is generally transitional with the Esperance Sand, which represents the advance outwash of the Vashon glacier. It is commonly a fine to medium sand, with silt beds and lenticular channel deposits of gravel (Galster and Laparde 1991). The Vashon Till is a basal lodgement till that mantles much of Seattle and generally ranges from gravelly, sandy silt to silty sand with varied amounts of clay and scattered cobbles and boulders.

In general, the upper 10 to 15 feet of the Property consists of silty, fine-grained sand with occasional minor gravel (possibly Vashon Till). The material is dry, dense, tan to gray, and odorless. From a depth of 15 to 25 feet, the Property consists of well-sorted, fine-grained sand (possibly Esperance Sand). The color changes from brown to gray, with a slight

increase in grain size at the water table. A fine-grained silt/clay (possibly Lawton Clay or transition zone) was encountered at depths ranging from 20 to 25 feet in nearly every boring at the site.

Groundwater at the Property flows toward the north, as shown in Figure 5-1. The gradient across the Property is approximately 0.03 feet per foot. Over the last 2 years, the water levels have not shown any significant changes in elevations. The unpaved tank yard area has groundwater elevations that are approximately 10 feet higher than the surrounding paved areas; therefore, the tank yard may serve as a recharge area.

Cross sections of the site are provided in the report documenting Phase II field activities (Foster Wheeler Environmental 2001a). Additional cross sections have been created based on the most recent field activities. Figure 5-2 provides a key showing the locations of the cross sections, which are presented in Figures 5-3 through 5-6.

Figure 5-3 includes a cross section parallel to West Commodore Way using the perimeter wells. In general, the borings show well-sorted sand to silty sand overlain by a thin layer of gravel in places. Impermeable silt was found in most of the deeper borings at a depth of about 25 feet. The silt layer encountered in boring SB-38 was unusual in its thickness (20 to 35 feet bgs).

Figure 5-4 shows a south to north cross section across the Lower Tank Yard (01MW-21) toward the Former Loading Rack Area and West Commodore Way (LR05). In general, the upper 8 feet of each boring consists of a silty material (ML). Near the Former Loading Rack Area, the upper silt layer is replaced by silty sand (SM) or clay (CL). The sandy aquifer (SW) is fairly consistent but shows a decrease in elevation to the north of the Lower Tank Yard. The underlying clay aquitard was encountered at depths of 19 to 22 feet in every boring drilled to those depths. The overlying fine-grained silty material throughout the area appears to limit vertical migration.

Figure 5-5 displays a south to north cross section to the west of the Lower Tank Yard (01MW-26) toward the Former Loading Rack Area. The stratigraphy here is similar to the Lower Tank Yard, with the exception of a thinner sandy aquifer and a thicker upper fine-grained sequence (silt and silty sand). Also evident is a clay layer in the upper 3 to 8 feet of the subsurface (borings 01MW-28 and LR03). The clay aquitard is visible at a depth of approximately 19 feet in borings 01MW-26 through 01MW-28.

Figure 5-6 shows a fence diagram based on the borings that surround the Former Loading Rack Area. Most of these borings were completed when groundwater was encountered at approximately 15 feet. The upper 10 feet of almost every boring consists of fine-grained materials (silty sand, silt, or clay). A thin layer of gravel was encountered in the upper 4 feet of borings LR02 and LR03. A sand aquifer was contacted at a depth of 10 feet in almost every boring. LR02 and LR03 showed silty sand from 10 feet bgs to 15 feet bgs. The diagram also indicates a 5-foot-thick layer of clay in LR02, LR03, and LR04. One boring (LR01) was drilled to a depth of 20 feet to confirm the presence of the impermeable clay (aquitarde material). This clay is assumed to be present at a similar depth throughout an area consisting of the Lower Tank Yard and north of the Lower Tank Yard.

5.1.2 Extent of Contamination

Based on soil borings completed during site investigation activities discussed in Section 2.3, the soil contamination in the Former LUST Area and the Lower Tank Yard appears to be limited to the upper 10 to 15 feet of the soil column, residing mostly in silt or silty sand materials. The soil within the aquifer does not appear to be impacted nor does the underlying impermeable clay (aquitarde).

Based on the October 2002 groundwater sampling results, groundwater with gasoline concentrations above MTCA Method A cleanup levels extends from the Lower Tank Yard across the Former Loading Rack Area and northwest towards the Former LUST Area (Figure 2-8). Benzene- and diesel-impacted groundwater appears to be limited to the Former LUST Area just south of West Commodore Way (Figures 2-7 and 2-9, respectively).

5.1.3 Potential Exposure Pathways and Receptors

The following sections describe potential exposure pathways and receptors at the site. The exposure pathways and receptors help define the site conceptual model and provide vital information for developing acceptable cleanup levels.

5.1.3.1 Potential Exposure Pathways

The primary exposure pathways for soil are through dermal contact, ingestion, and vapor inhalation. Most of the Property is paved, which prohibits site workers from coming into contact with the subsurface soil. Therefore, based on current conditions of the Property, dermal contact, ingestion, and soil vapor exposure are expected to be minimal. The surface of the Lower Tank Yard is not paved; however, with the exception of the upper 5 feet of soil

in boring 01MW-23, the soil does not appear to be impacted by petroleum products. The other two borings in the Lower Tank Yard, 01MW-24 and 01MW-25, are located in the concrete-lined area that previously contained the manifold system.

Groundwater flowing from the Lower Tank Yard and the Former Loading Rack Area discharges to surface water in the Lake Washington Ship Canal. There are no known intervening seeps, springs, or marshy areas that could lead to exposure to human or terrestrial receptors. In addition, the groundwater beneath the site is not used as a potable source. Therefore, direct human exposure to groundwater at the Property is highly unlikely for the following reasons:

- The groundwater does not serve as a current source of drinking water (WAC 173-340-720(2)(a)).
- The groundwater is not considered a potential future source of drinking water because it does not meet the state standards for a sustainable yield of 0.5 gallons per minute (WAC 173-340-720(2)(b)(i)).
- Due to the proximity of the Property to nearby surface waters, it is not suitable as a domestic water supply (WAC 173-340-720(2)(d)).

5.1.3.2 Potential Receptors

The Lake Washington Ship Canal is a freshwater system connected to the Puget Sound (saltwater) via the Ballard Locks. The primary ecological receptors of concern are aquatic organisms associated with surface waters in the Lake Washington Ship Canal. Aquatic organisms are treated as primary receptors because they could have an immediate, direct, and continuous exposure by way of a primary uptake route (i.e., direct contact). Higher trophic level organisms (birds and mammals) could be exposed to chemicals discharged to surface waters by dermal contact, ingestion of water, and ingestion of secondarily contaminated media such as food or sediments. In general, risks to higher trophic level organisms are negligible by dermal contact or ingestion of water. Rather, these organisms are primarily affected by chemical accumulation in food or sediments.

Chemicals in groundwater discharged into the Lake Washington Ship Canal could affect aquatic organisms through direct exposure and uptake. To assess this possibility, risk-based ecological screening values for aquatic receptors were compiled from the SQUIRT (Buchman 1999) and Oak Ridge National Laboratory's (ORNL) screening benchmarks for aquatic receptors (Suter and Tsao 1996; Sample et al. 1996; Efromyson et al. 1997). The

SQuiRT values (provided in Appendix D) were developed by the Coastal Protection and Restoration Division of NOAA to identify potential impacts to coastal resources and habitats that could be affected by hazardous waste sites. For surface waters, the SQuiRT values are based on acute and chronic values for both freshwater and saltwater. Acute refers to the highest level for a 1-hour average exposure, not to be exceeded more than once every 3 years, and is also known as a criteria maximum concentration (CMC). Chronic refers to the highest level for a 4-day average exposure, not to be exceeded more than once every 3 years, and is also known as a criteria continuous concentration (CCC).

The SQuiRT values are intended for preliminary screening purposes only; they do not represent official NOAA policy and do not constitute criteria or cleanup levels. SQuiRT values for trace elements are based on filtered samples (dissolved concentrations). NOAA also uses these tables to screen groundwater concentrations; however, for comparisons with groundwater concentrations, NOAA uses 10 times the applicable screening value or, if available, suitable site-specific dilution factors to account for the dilution expected during migration and upon discharge of groundwater to surface water (Buchman 1999).

5.2 CLEANUP STANDARDS

TOC proposes to use MTCA Method A cleanup levels for unrestricted soil use (WAC 173-340-900, Table 740-1) for initial site activities. These levels may be conservative based on the current zoning of the property (industrial), but will also provide TOC with more options in regards to future land development without land use restrictions. Groundwater cleanup levels are based on applicable regulations, guidance, and the site conceptual model. NOAA SQuiRT values will be used for benzene, toluene, and ethylbenzene. In the absence of a NOAA SQuiRT value, the default MTCA Method A Cleanup Level for Groundwater (WAC 173-340-900, Table 720-1) will be used. The MTCA Method A values for groundwater are conservative in that they are designed for the protection of drinking water. Because the aquifer is not used for that purpose, nor is it likely to be used as such in the future, these values may not be applicable. After the full-scale DPE system has been installed, new cleanup levels for soil and groundwater may be proposed that are more site-specific and risk-based.

6. PROJECT REQUIREMENTS

6.1 INSTITUTIONAL CONTROLS

MTCA requires the identification of institutional controls associated with the Cleanup Action Plan (WAC 173-340-380(1)(a)(vi)). Institutional controls are defined as measures undertaken to limit or prohibit activities that may interfere with the integrity of an interim or cleanup action or that may result in exposure to hazardous substances on site (WAC 173-340-440). For the proposed remedial actions, the following institutional controls will be applied at the Property:

- The treatment system will be kept in a secured area behind a fence with a locked gate. Access will be restricted to authorized personnel.
- The Property is currently zoned as industrial and is located in the Ballard Interbay Northend Manufacturing and Industrial Center (BINMIC) corridor. The BINMIC planning committee is working with the city to help properties in the area retain their industrial zoning.
- The proposed system will require periodic maintenance, also identified as a form of institutional control.

6.2 APPLICABLE STATE AND FEDERAL LAWS

Applicable local, state, and federal laws and regulations for the proposed cleanup action are summarized below. These regulations are identified based on the information known at the current step in the cleanup process (this does not preclude subsequent identification of applicable local, state, and federal laws). The regulations have been grouped in similar protection standards for ease in tracking and implementation.

6.2.1 Cleanup Standards

Model Toxics Control Act (WAC 173-340). MTCA is Washington State's contaminated site cleanup law. Through MTCA, Ecology established cleanup standards and regulations to protect citizens and the environment. This statute and implementing regulations are applied to the selection of cleanup actions, the institutional controls, and the cleanup standards for the chemical contamination. This CAP has been prepared in accordance with MTCA requirements, including the cleanup levels presented therein.

Washington State Surface Water Quality Standards (WAC 173-201A). These standards establish the maximum concentration levels for constituents in surface waters of the state. These standards are to be considered in conjunction with MTCA cleanup levels for cleanup projects.

Washington State Ground Water Quality Standards (WAC 173-200). These standards establish the maximum concentration levels for constituents in groundwater of the state. These standards are to be considered in conjunction with MTCA cleanup levels for cleanup projects.

6.2.2 Waste Management and Disposal

State Hazardous Waste Management Act (RCW 70.105A), Dangerous Waste Regulations (WAC 173-303), and the Resource Conservation and Recovery Act (RCRA) Regulations (40 CFR 261-268). These regulations establish the requirements for hazardous waste identification, accumulation, manifesting, transport, storage, and disposal. These requirements are applicable if hazardous or dangerous waste is generated.

Washington State Solid Waste Minimal Functional Standards (WAC 173-304) and King County Solid Waste Regulations (Title 10). These regulations cover the handling, management, and disposal of solid wastes in Washington and King County. The minimum standards that need to be met for solid wastes are established in these regulations.

U.S. Department of Transportation Hazardous Materials Regulations (49 CFR 100-185). These regulations establish the requirements for handling, packaging, labeling, marking, and recordkeeping for transportation of hazardous materials, which include hazardous substances and hazardous waste.

6.2.3 Air Quality Regulations

Federal Clean Air Act (CAA) (40 CFR 50-99) and Washington State CAA (RCW 70.94; WAC 173-400-491). These regulations establish the ambient air quality standards and emissions standards for air pollutants in Washington, including the National Emission Standards Hazardous Air Pollutants (NESHAPS, CAA).

PSCAA Regulations I and III. PSCAA implements requirements for the Federal CAA and the Washington State CAA throughout the Puget Sound air basin, which includes King County. Regulations I and III establish the regulatory requirements for new source

permitting and operating permits, emissions standards and monitoring, ambient air quality standards, toxic air sources and NESHAPs, source specific emission standards, asbestos standards, and demolition requirements.

6.2.4 Water Quality Protection Regulations

Clean Water Act (CWA), Stormwater National Pollutant Discharge Elimination System (NPDES) Regulations (40 CFR 122.28; 64 FR 68720). In March 2003, the Stormwater Phase II regulations under the CWA become effective. These regulations require construction activities that are an acre or more in size to obtain coverage under the Stormwater General NPDES Permit for Construction Activities. At this time, project activities are not anticipated to cover an acre or more in area; however, in the event project activities do meet this trigger, coverage under this permit will be obtained via a Notice of Intent (NOI) filed with Ecology. In addition, a Stormwater Pollution Prevention Plan (SWPPP) will be prepared and implemented. If the project site remains less than an acre, Best Management Practices (BMPs) will be implemented to minimize any potential impact and pollution runoff to stormwater.

King County Wastewater Discharge Permit (RCW 90.48; WAC 173-216; King County Code 28.84.060 Ordinance No. 11034). Wastewater Discharge Permit 7689-01 governs the discharge of wastewater from the TOC Property into the sanitary sewer system located on the site. If wastewater is proposed for discharge into the sanitary sewer system as part of this project, all applicable requirements of the discharge permit will be implemented, including monitoring and recordkeeping.

Minimum Standards for Construction and Maintenance of Wells (WAC 173-160). These standards establish the minimum requirements for the construction and decommissioning of all wells in Washington. Any wells constructed and installed or decommissioned as part of this project will meet these regulatory requirements, including the filing of an NOI and construction requirements.

Rules and Regulations Governing the Regulation and Licensing of Well Contractors and Operators (WAC 173-162). A well operator license is required for all operators engaged in constructing or decommissioning water wells. Only current licensed drillers will be used in the event of installation of any wells, including resource protection wells.

6.2.5 General Environmental Protection Regulations

State Environmental Policy Act (SEPA) (WAC 197-11). As required by WAC 197-11-250(c), independent remedial actions are subject to the requirements of SEPA, including preparation of a SEPA checklist, identification of environmental impacts, and an environmental review.

6.3 OPERATIONS AND MAINTENANCE

Prior to implementation of a full-scale DPE system, an Operation and Maintenance plan will be prepared in accordance with the requirements of WAC 173-340-400(4)(c). The plan will assure effective operations of the system under both normal and emergency conditions.

7. RECOMMENDED CLEANUP ALTERNATIVE

Based on an evaluation of available treatment technologies and the results of the DPE pilot scale test, the recommended cleanup alternative for the Former LUST Area and the Lower Tank Yard on the Property is a full-scale DPE system. Installation of the system will follow site preparation activities, which will likely include excavation and treatment of petroleum-contaminated soil from the vadose zone in heavily contaminated, fine-grained areas of the site.

Detailed plans for implementation of the remedial action as required by WAC 173-340-400 will be completed at a later date. The detailed plans will be included in an engineering design report that contains system plans and specifications and operation and maintenance requirements.

7.1 PROPOSED EXTRACTION SYSTEM

The proposed full-scale DPE system will utilize existing and new wells as extraction points. Extraction wells will be manifolded to a common trunk line and connected to a system that includes an extraction pump, water/vapor separator, transfer pump, equalization tank, oil/water separator, water treatment system, and vapor treatment system. A conceptual layout of the full-scale system is shown in Figure 7-1.

7.1.1 Extraction Wells

Based on historical groundwater sampling data and the extraction radius of influence from the pilot scale test, it is estimated that at least 7 to 10 extraction wells will be required for the full-scale system (Figure 7-1). Extraction well locations will be based on the presence of free-phase product in wells and the concentration of contaminants in groundwater. The drop tube for each well will be height-adjustable, which will allow for each well's extraction rate to be optimized based on depth to groundwater, the presence of free-phase product, and the rate of groundwater extraction. All wells will be connected to a common collection pipe for delivery of the extracted liquid and vapor to the treatment system. Each extraction well will be fitted with a manual valve, allowing control of the overall extraction rate and therefore the radius of influence.

7.1.2 Monitoring Wells

Existing groundwater monitoring wells not used as extraction wells will be used as system monitoring points. This will allow for measurement of groundwater levels and subsurface vacuums, as well as for the collection of groundwater samples for evaluation of contaminant concentrations.

7.1.3 Extraction System Components

A general description of the treatment system components is presented below. Final system configuration and sizing will be completed prior to implementation of the full-scale system, and will be included in the engineering plans and specifications.

7.1.3.1 Extraction Pump

The extraction pump will be sized based on the total number of extraction wells and estimated flow rates. Potential pump types include oil sealed liquid ring or rotary lobe blowers. The final pump selection will be based on the expected system vacuum, operation and maintenance considerations, and the possibility of emulsification of free product.

7.1.3.2 Liquid/Vapor and Oil/Water Separators

A liquid/vapor separator will accumulate groundwater and free-phase product. When liquid levels trigger the high-level switch on the separator, a liquid transfer pump will transfer accumulated liquid to a coalescing plate oil/water separator. Separated free-phase product will be stored in a small tank connected to the oil/water separator, which will be monitored and pumped out as necessary for disposal or recycling. The separators and transfer pump will be sized based on anticipated liquid recovery rates.

7.1.3.3 Groundwater Treatment System

Water from the oil/water separator will be transferred by gravity to a batch tank for storage prior to treatment. Water will be treated using a counter-current tray stripper. Sizing of the tray stripper will be based on an evaluation of allowable effluent concentrations in the treated water and the removal efficiency of the oil/water separator. The discharge location will be evaluated during the design phase, but may include delivery to a nearby sanitary sewer under permit with King County Metro.

7.1.3.4 Vapor Treatment System

Vapor from the initial liquid/vapor separator and the tray stripper will be treated prior to discharge into the atmosphere. The initial treatment unit will likely include an oxidizer, but the treatment method may transition to vapor-phase GAC and/or direct discharge when vapor concentrations decrease to appropriate levels. The vapor treatment system(s) will be selected and sized based on anticipated vapor extraction rates.

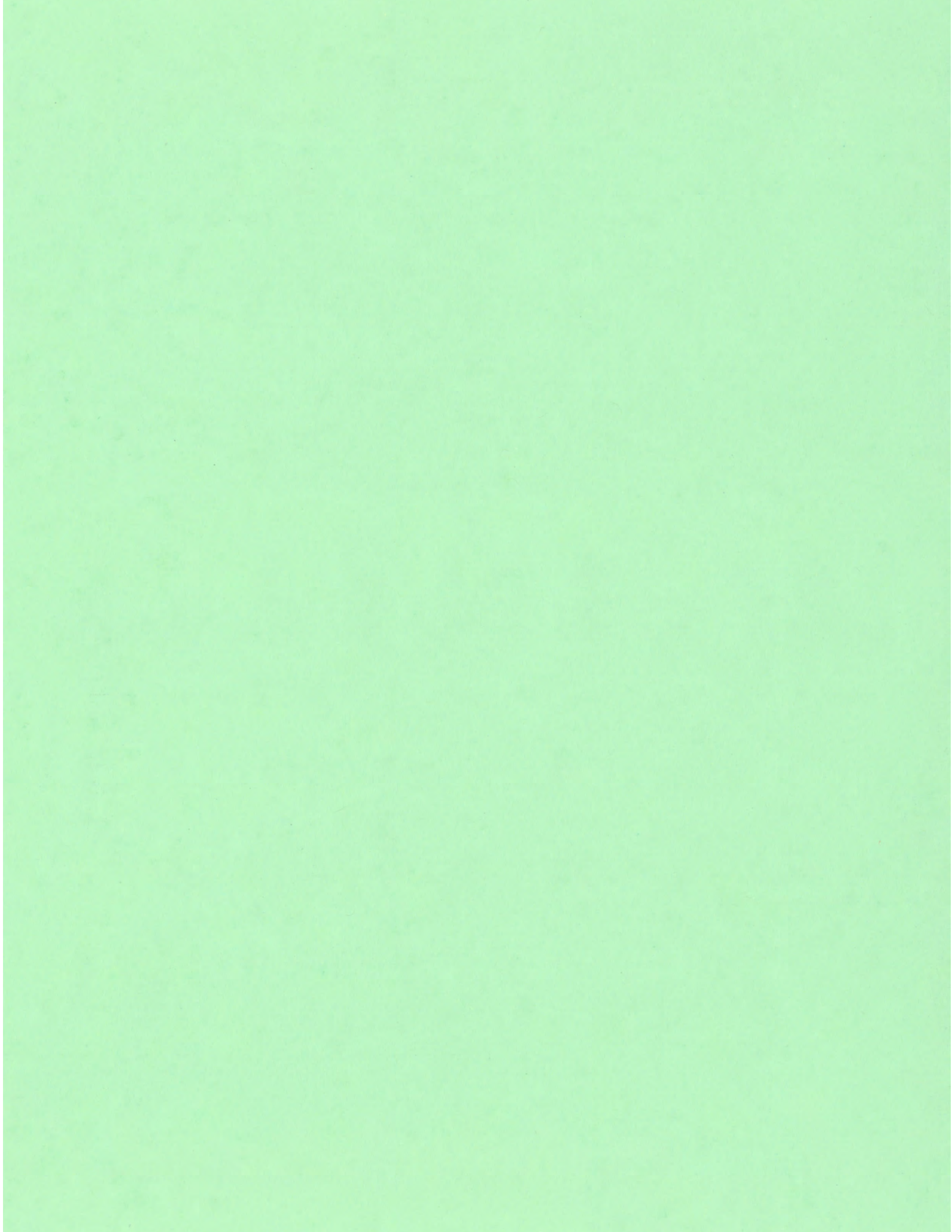
8. SCHEDULE

CAP implementation is currently scheduled for the fall of 2003. The schedule may change due to weather or conflicting subcontractor schedules. A detailed schedule will be provided when the engineering design report is complete.

9. REFERENCES

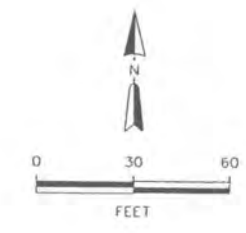
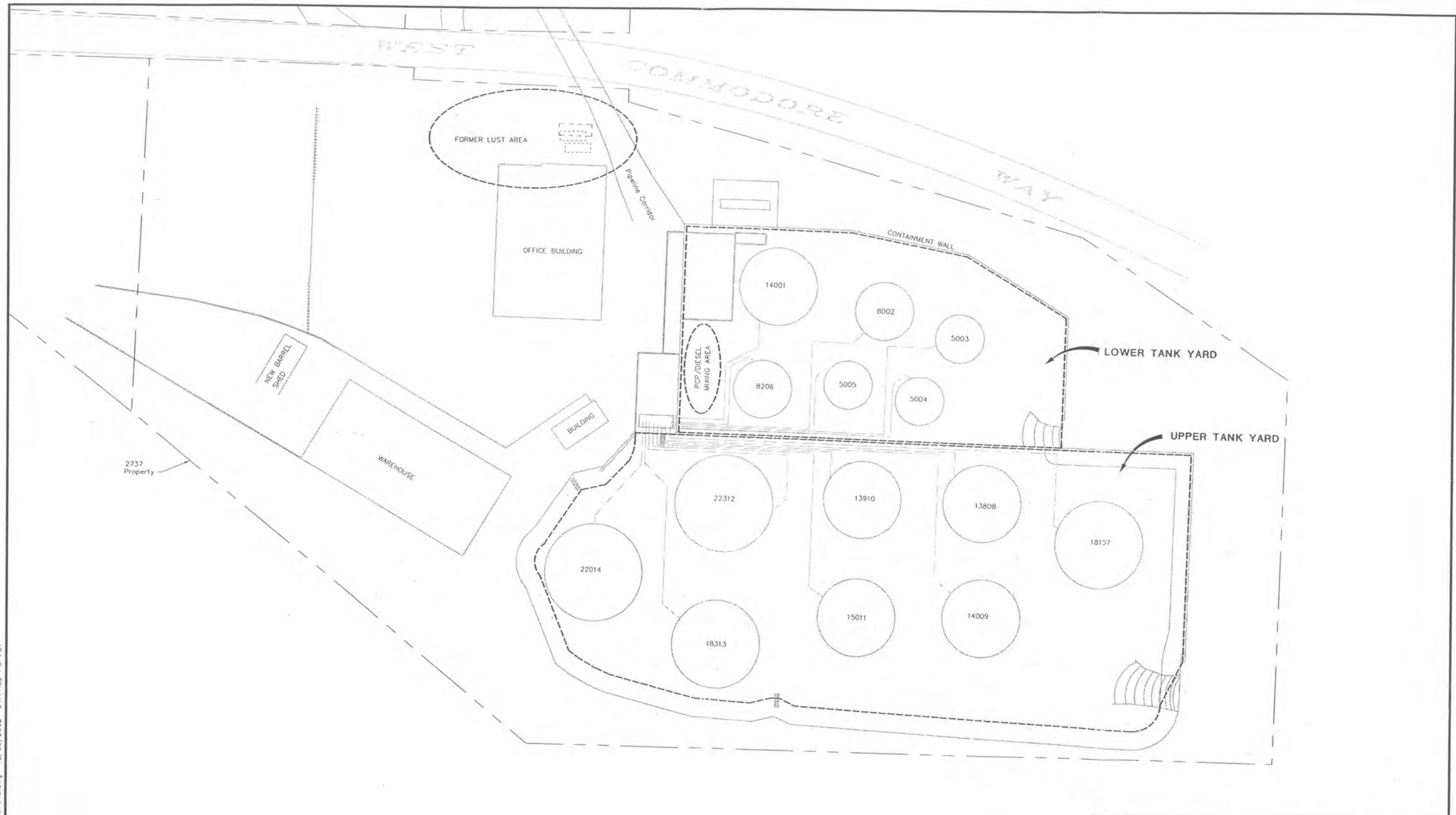
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FIGURES

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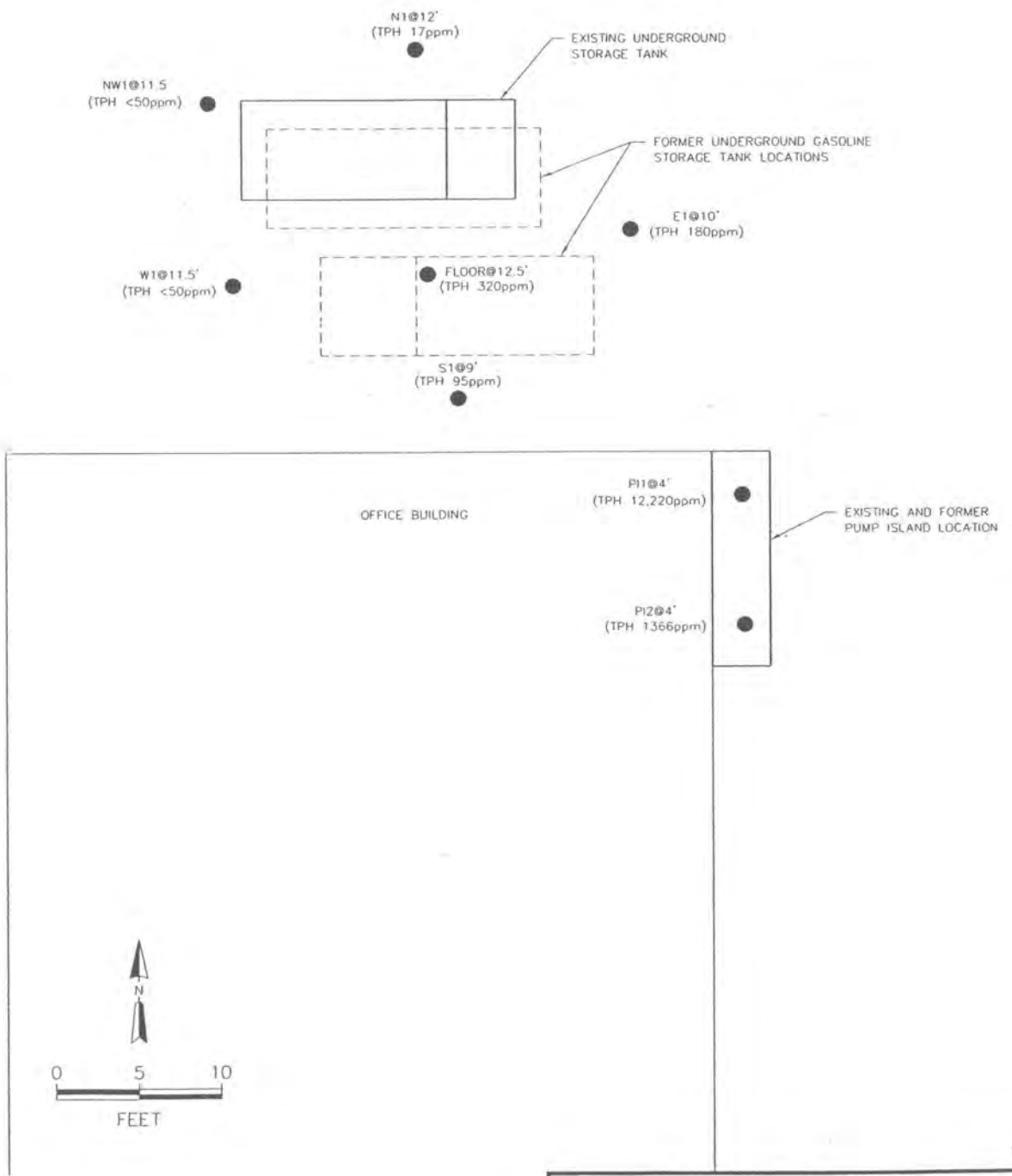
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Figure 2-1
Layout of Property at
2737 West Commodore Way
Seattle, Washington

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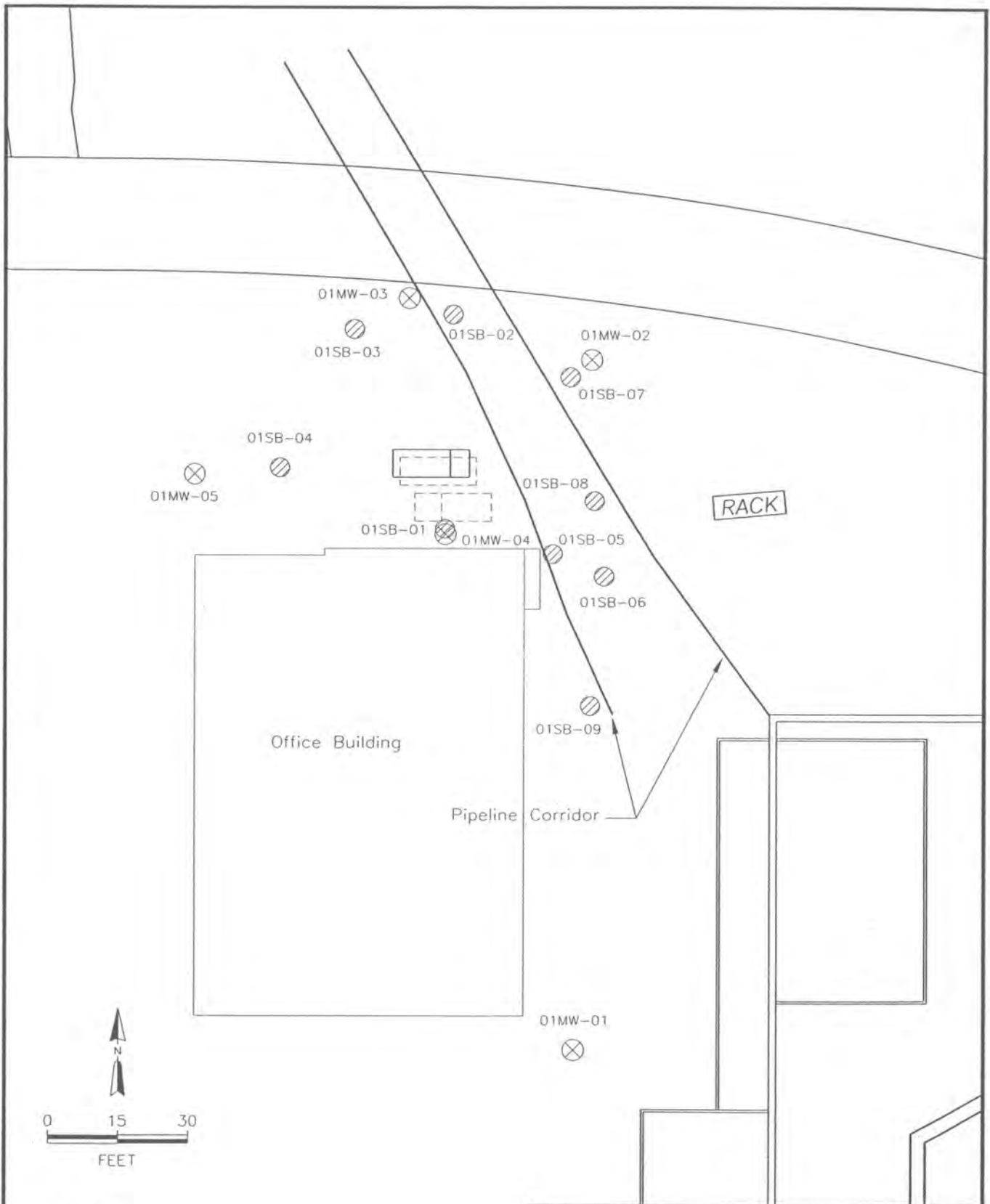
LEGEND

N1@12' ● APPROXIMATE SAMPLING LOCATION WITH RESPECTIVE DEPTH AND TPH CONCENTRATION (TPH 17 ppm)

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Figure 2-2
1991 Sampling Locations
2737 West Commodore Way

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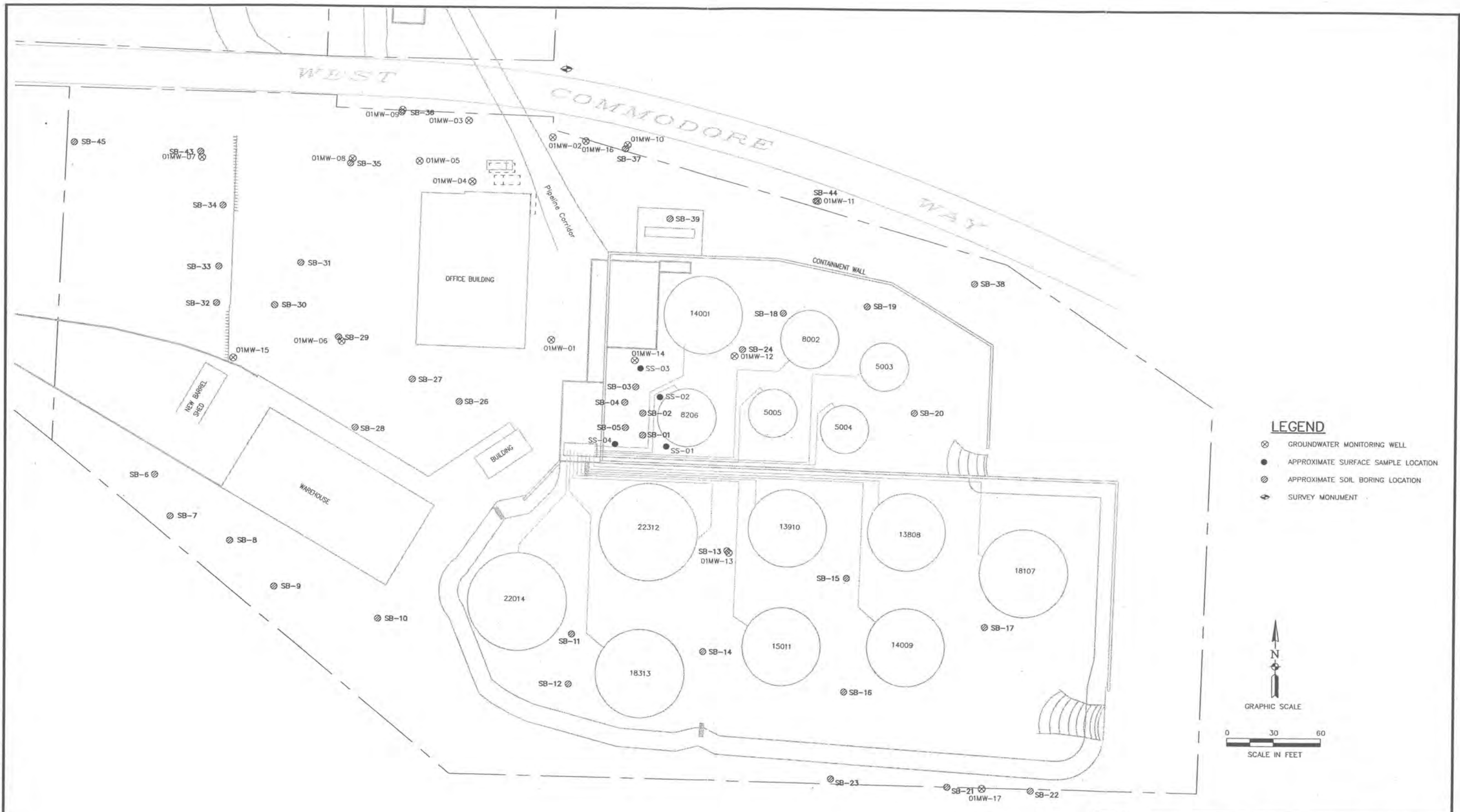
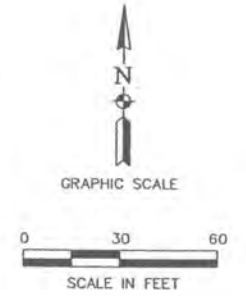
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Figure 2-3
1999 Sampling Locations
2737 West Commodore Way
Seattle, Washington

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- LEGEND**
- ⊗ GROUNDWATER MONITORING WELL
 - APPROXIMATE SURFACE SAMPLE LOCATION
 - ⊙ APPROXIMATE SOIL BORING LOCATION
 - ◆ SURVEY MONUMENT

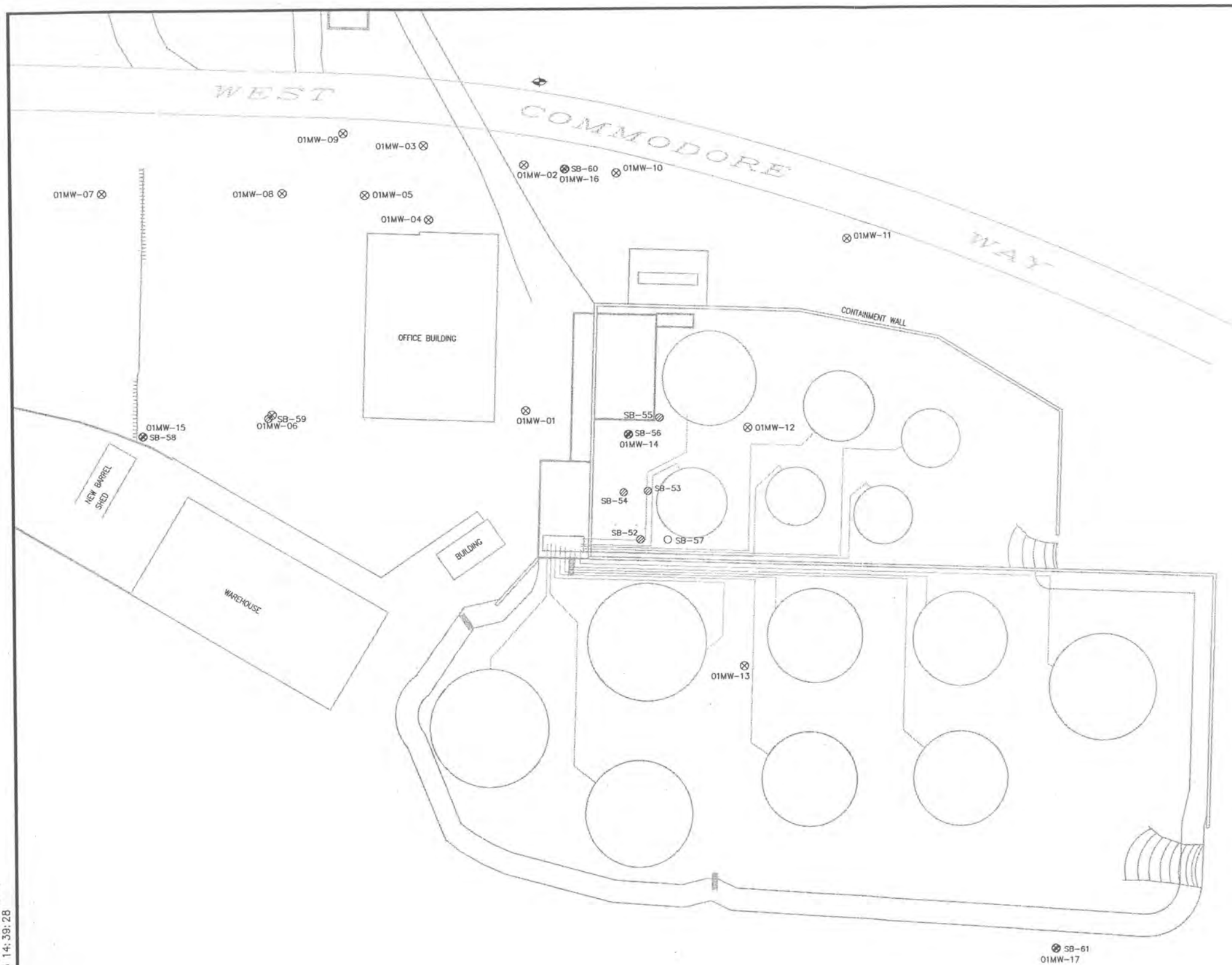


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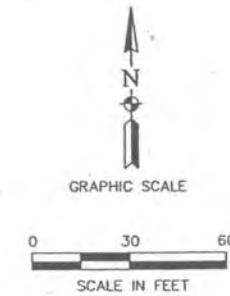
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Figure 2-4
 2001 Phase II Sampling Locations
 2737 West Commodore Way
 Seattle, Washington

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- LEGEND**
- ⊗ GROUNDWATER MONITORING WELL
 - ⊙ APPROXIMATE SOIL BORING LOCATION
 - APPROXIMATE NEAR-SURFACE SAMPLE LOCATION
 - ⬮ SURVEY MONUMENT

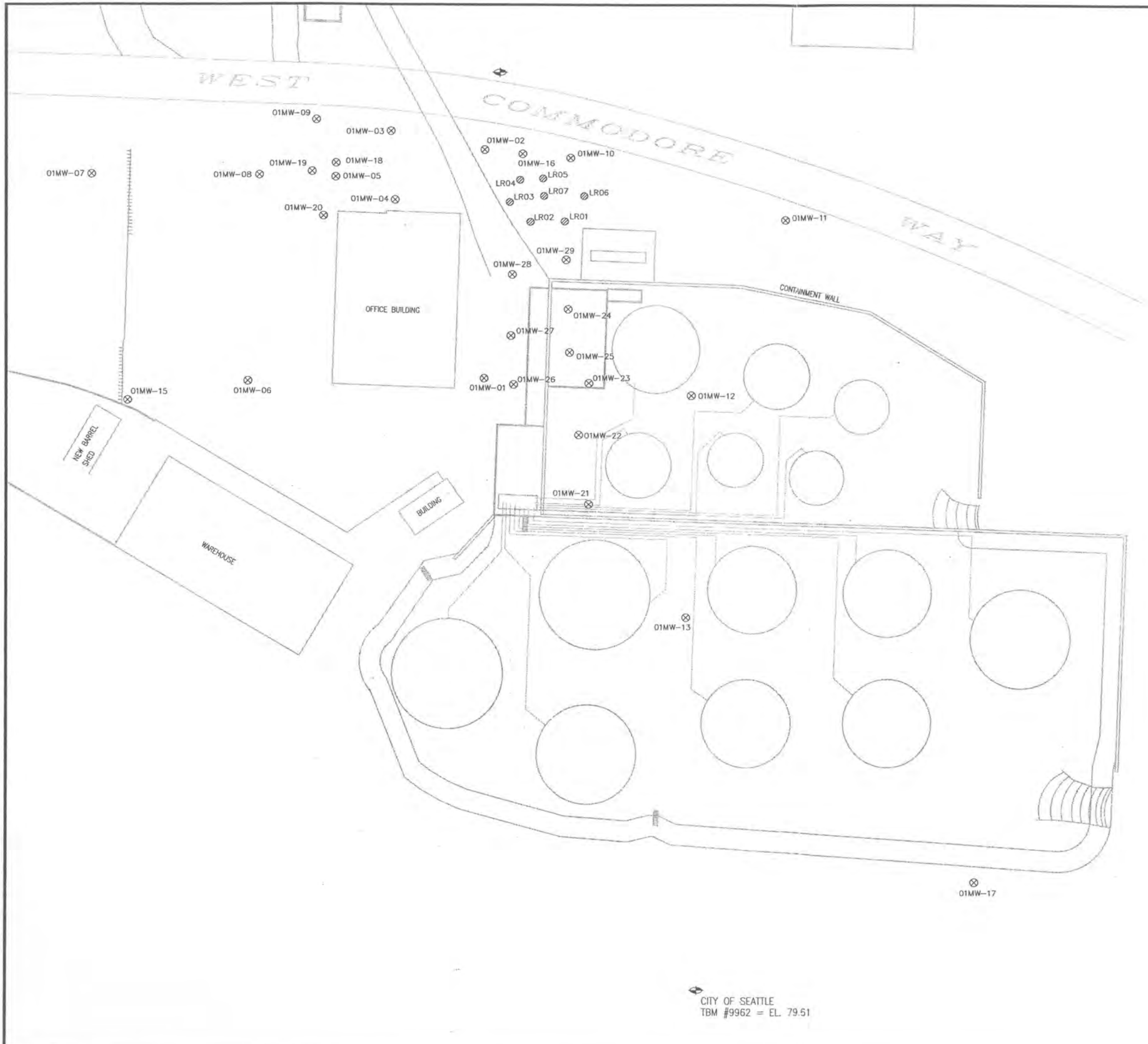


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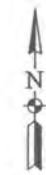
Figure 2-5
2001 Phase III Sampling Locations
2737 West Commodore Way
Seattle, Washington

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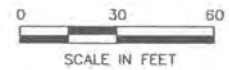


LEGEND

- ⊗ GROUNDWATER MONITORING WELL
- ⊙ APPROXIMATE SOIL BORING LOCATION
- ⬆ SURVEY MONUMENT



GRAPHIC SCALE

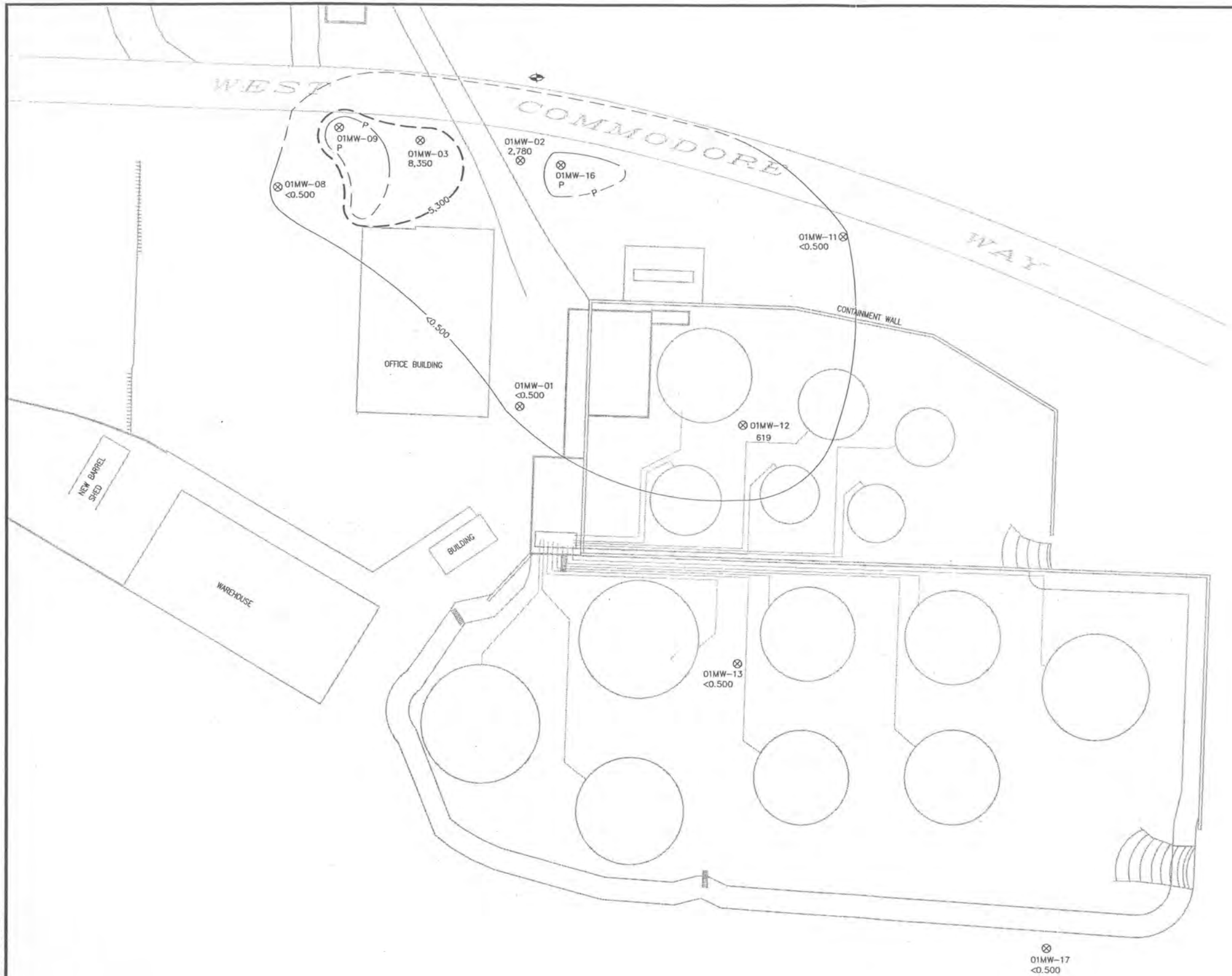


CITY OF SEATTLE
 TBM #9962 = EL. 79.51

FOSTER WHEELER
ENVIRONMENTAL CORPORATION

Figure 2-6
 2002 Lower Tank Yard Investigation
 Boring and Well Locations
 2737 West Commodore Way
 Seattle, Washington

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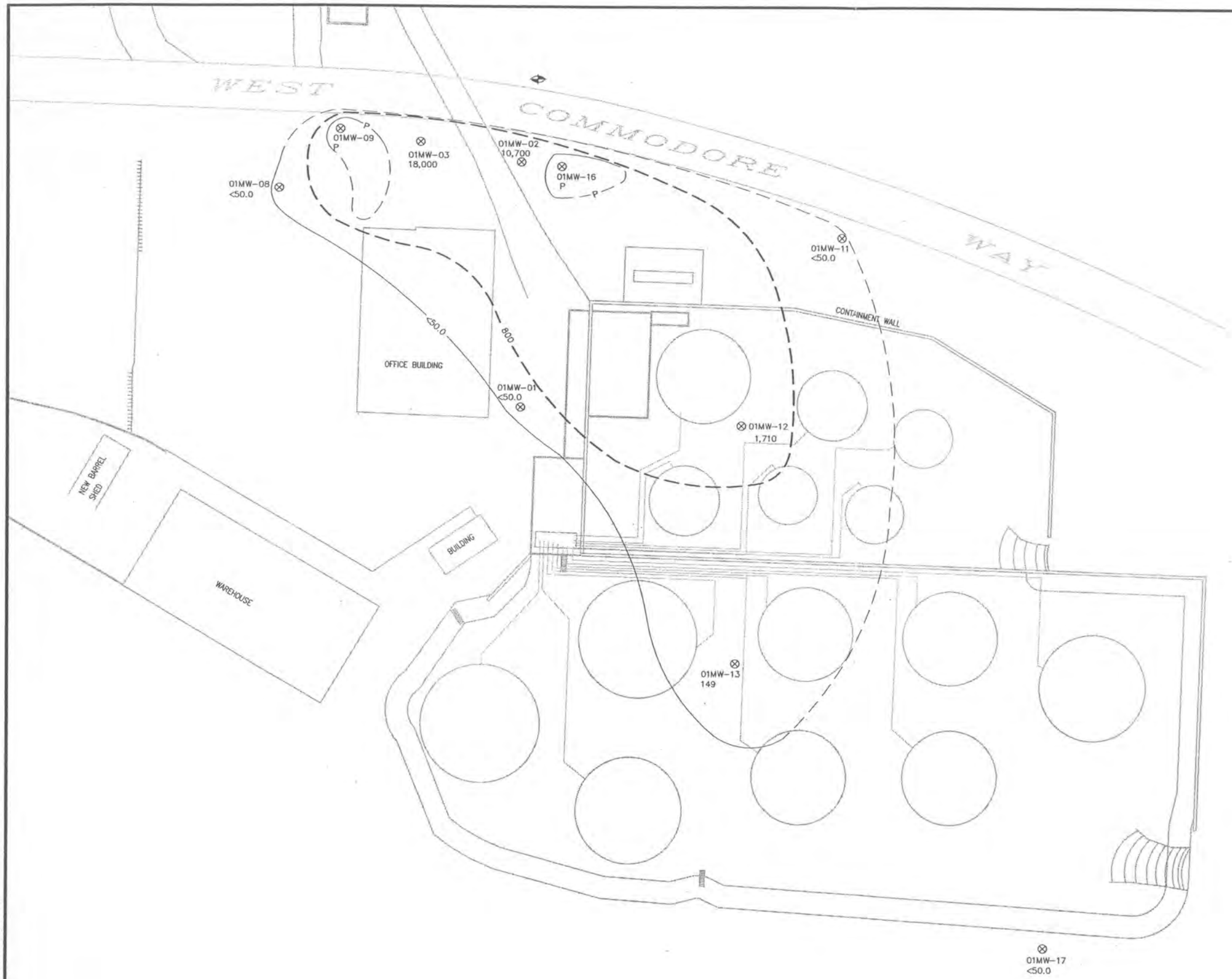
LEGEND

- 22.85 ⊗ GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION (FEET MSL)
- ⊕ SURVEY MONUMENT
- P PRODUCT IN WELL
- - - <math><0.500</math> BENZENE CONCENTRATION CONTOUR (μg/L), DASHED WHERE INFERRED
- NOAA SQUIRT™ FRESHWATER CONTINUOUS CONCENTRATION (5,300 μg/L)

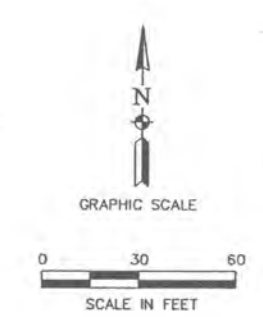
⊕ CITY OF SEATTLE
TBM #9962 = EL. 79.61

**FOSTER  WHEELER
ENVIRONMENTAL CORPORATION**

Figure 2-7
Benzene-Impacted Groundwater,
October 2002
2737 West Commodore Way
Seattle, Washington



- LEGEND**
- 22.85 ⊗ GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION (FEET MSL)
 - ⊕ SURVEY MONUMENT
 - P PRODUCT IN WELL
 - 50.0 GASOLINE CONCENTRATION CONTOUR (µg/L), DASHED WHERE INFERRED
 - 800 MTCVA METHOD A CLEANUP LEVEL (800 µg/L) FOR GASOLINE WITH BENZENE PRESENT



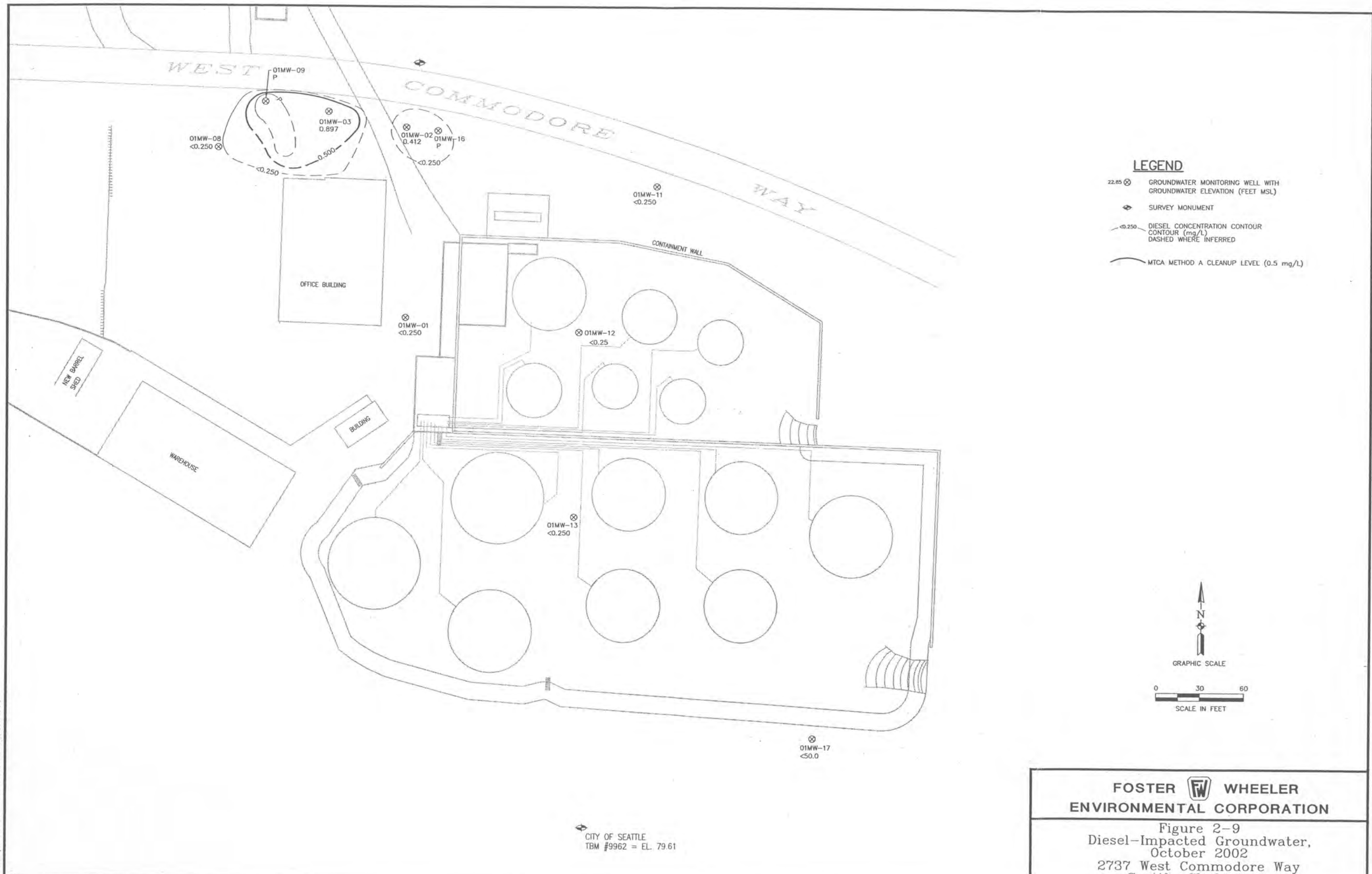
⊕ CITY OF SEATTLE
TBM #9962 = EL. 79.61

FOSTER WHEELER
ENVIRONMENTAL CORPORATION

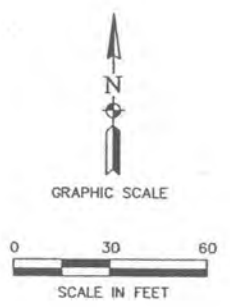
Figure 2-8
Gasoline-Impacted Groundwater,
October 2002
2737 West Commodore Way
Seattle, Washington

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PLOT/UPDATE: JAN 22 2003 13:43:08

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PLOT/UPDATE: JAN 22 2003 13:46:14



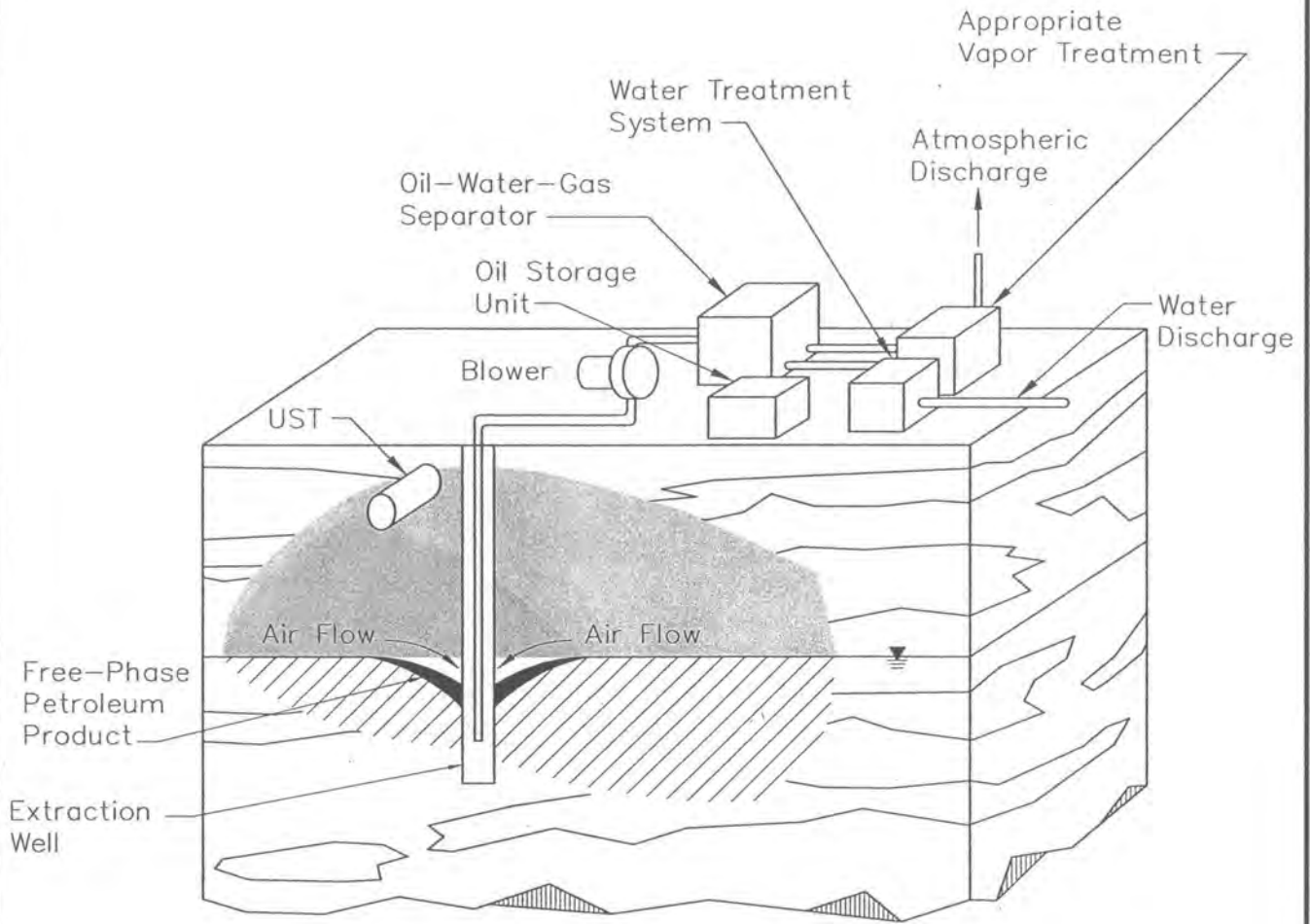
- LEGEND**
- 22.85 ⊗ GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION (FEET MSL)
 - ⊕ SURVEY MONUMENT
 - 0.250 DIESEL CONCENTRATION CONTOUR (mg/L)
DASHED WHERE INFERRED
 - MTCA METHOD A CLEANUP LEVEL (0.5 mg/L)



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ENVIRONMENTAL CORPORATION




Figure 2-9
Diesel-Impacted Groundwater,
October 2002
2737 West Commodore Way
Seattle, Washington

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TBM #9962 = EL. 79.61



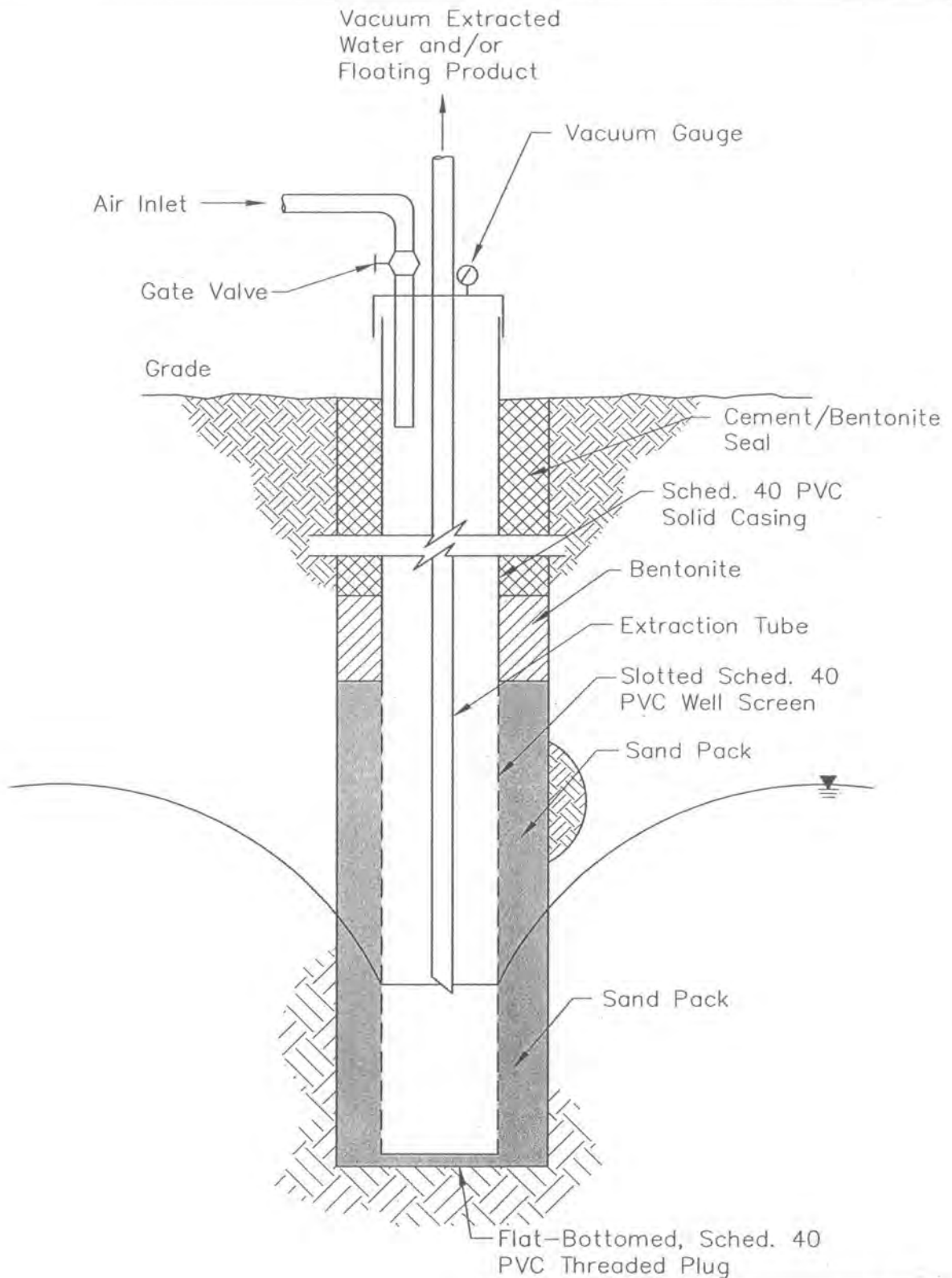
LEGEND

NOTE
Source: EPA 1995

-  VAPOR PHASE
-  ADSORBED PHASE
-  DISSOLVED PHASE

**FOSTER  WHEELER
ENVIRONMENTAL CORPORATION**

Figure 3-1
Typical Single-Tube
DPE System
2737 West Commodore Way
Seattle, Washington

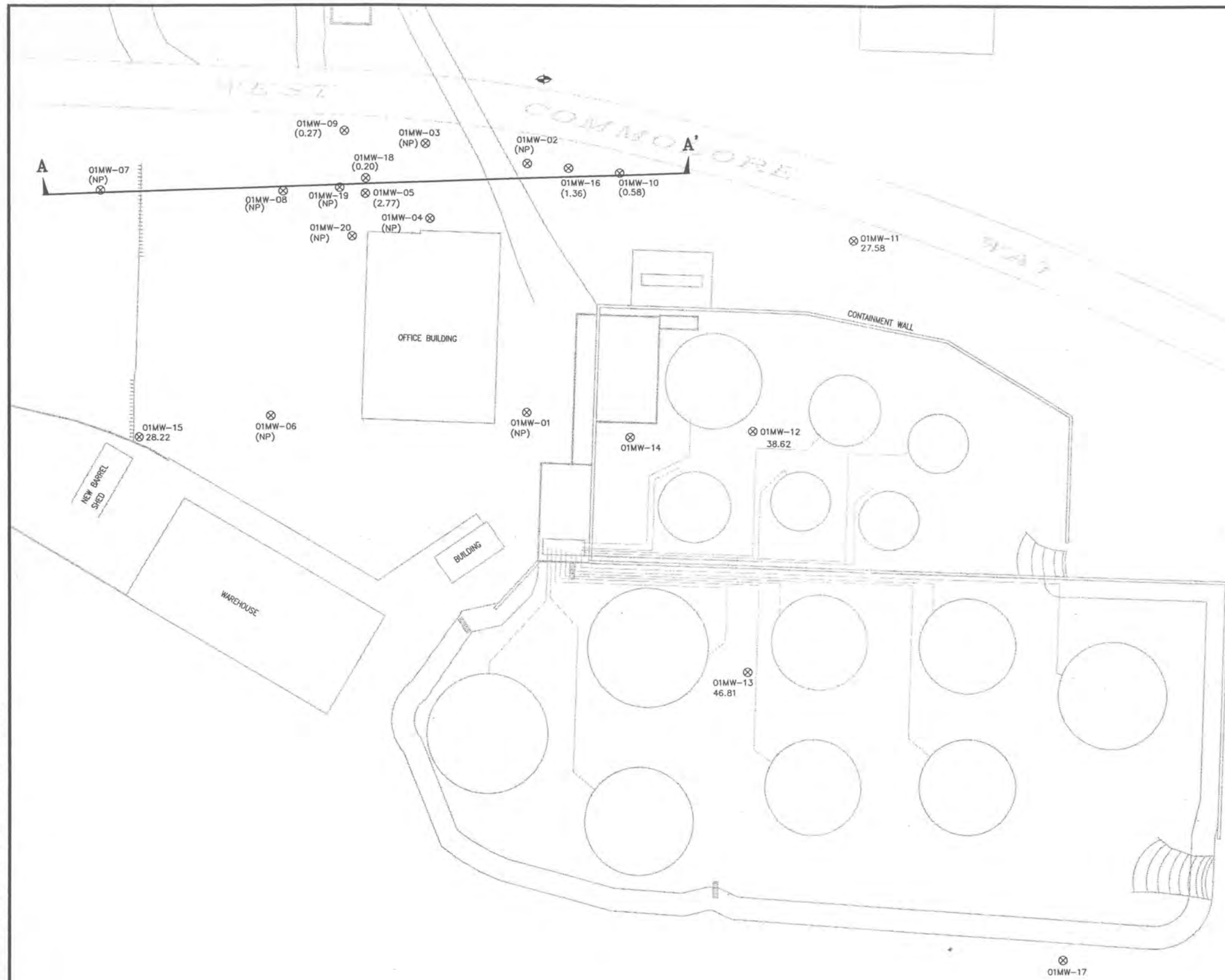


NOTE
Source: EPA 1995

**FOSTER  WHEELER
ENVIRONMENTAL CORPORATION**

Figure 3-2
Typical Single-Tube DPE
Extraction Well
2737 West Commodore Way
Seattle, Washington

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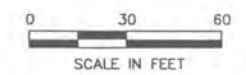


LEGEND

- ⊗ GROUNDWATER MONITORING WELL
- ⬮ SURVEY MONUMENT
- (0.27) BASELINE PRODUCT THICKNESS (FT)
- (NP) NO PRODUCT

NOTE

PRODUCT THICKNESS MEASURED ON JULY 8, 2002

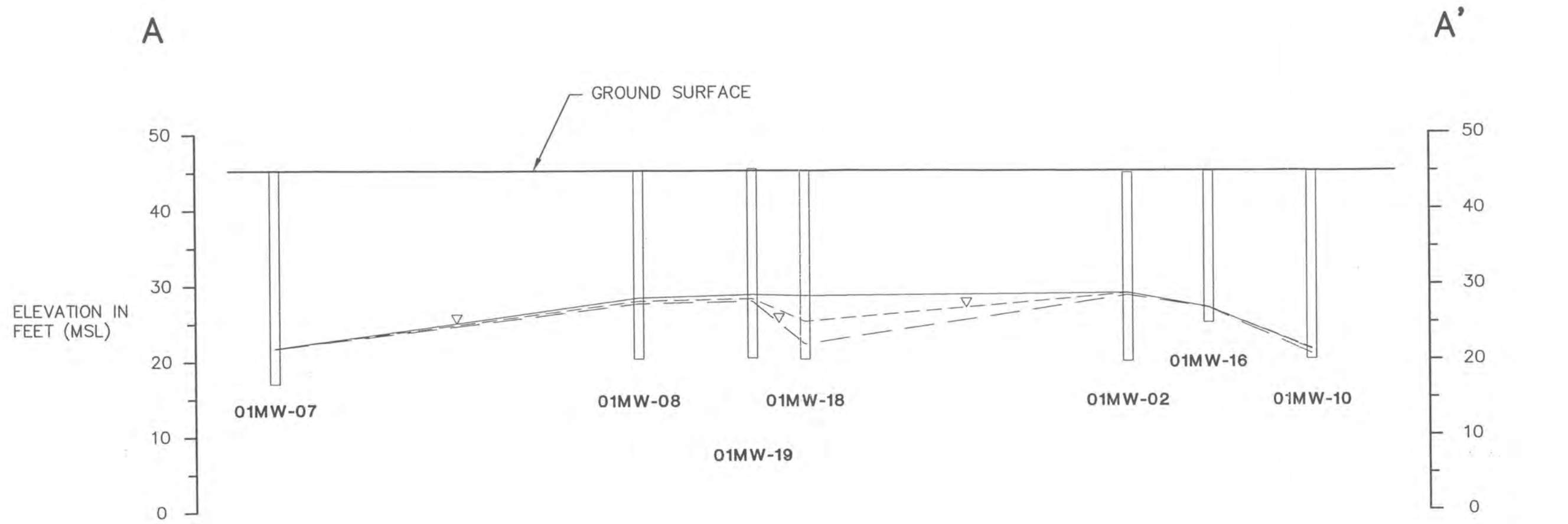


**FOSTER  WHEELER
ENVIRONMENTAL CORPORATION**

Figure 4-1
DPE Pilot Test System Configuration
2737 West Commodore Way
Seattle, Washington

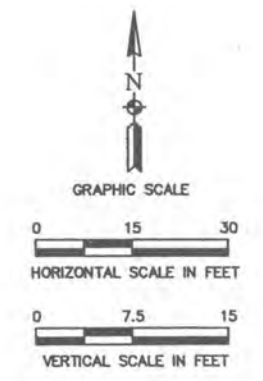
⬮ CITY OF SEATTLE
TBM #9962 = EL. 79.61

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LEGEND

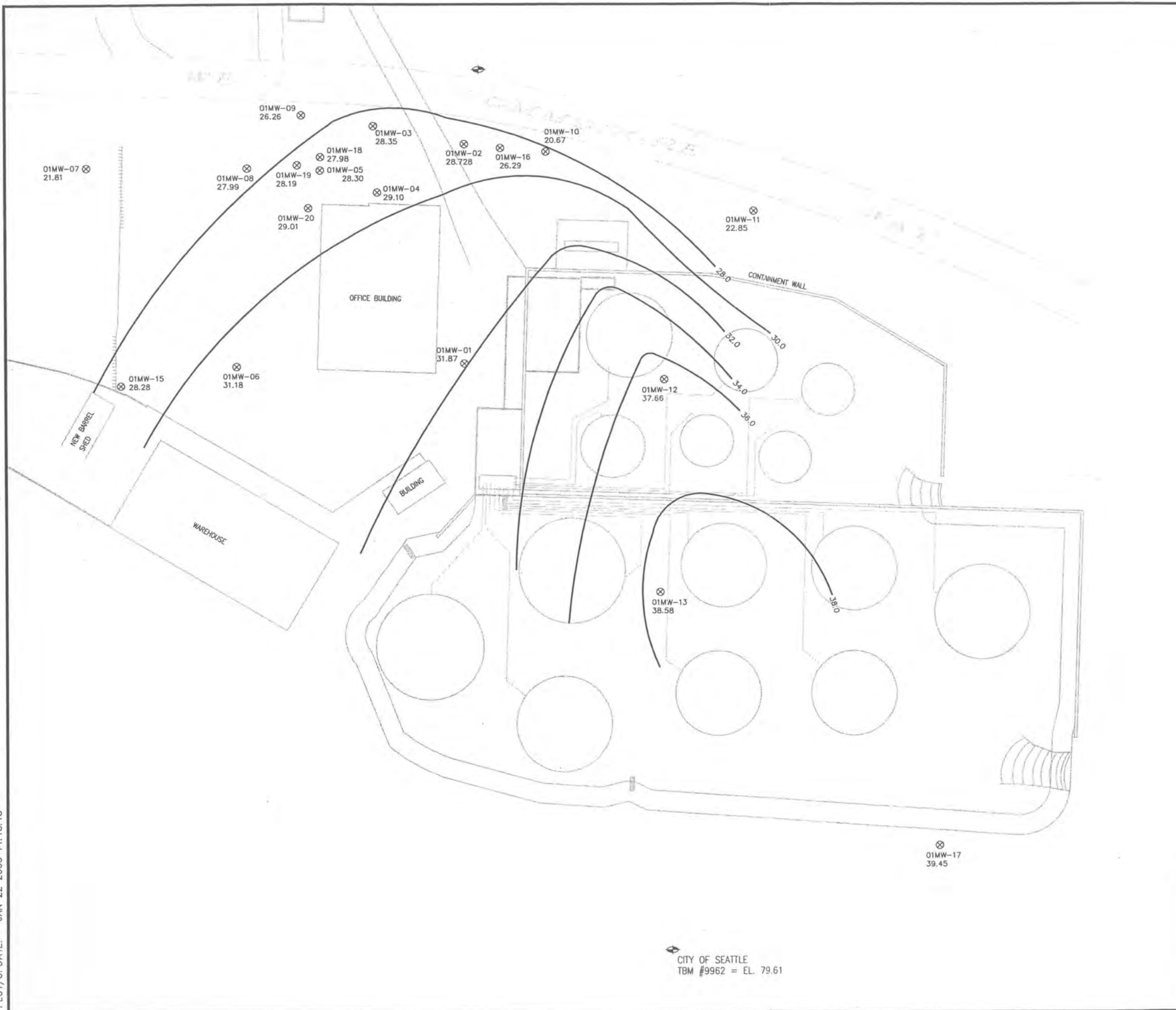
- ▽ — APPROXIMATE LOCATION OF STATIC WATER TABLE
- - - ▽ - - - APPROXIMATE LOCATION OF WATER TABLE WITH DRAWDOWN AT 20 FT BELOW THE TOP OF CASING OF 01MW-18
- . - . ▽ - . - . APPROXIMATE LOCATION OF WATER TABLE WITH DRAWDOWN AT 23 FT BELOW THE TOP OF CASING OF 01MW-18



FOSTER WHEELER
ENVIRONMENTAL CORPORATION

Figure 4-2
 Cross Section Beneath DPE Pilot
 Test Area
 2737 West Commodore Way
 Seattle, Washington

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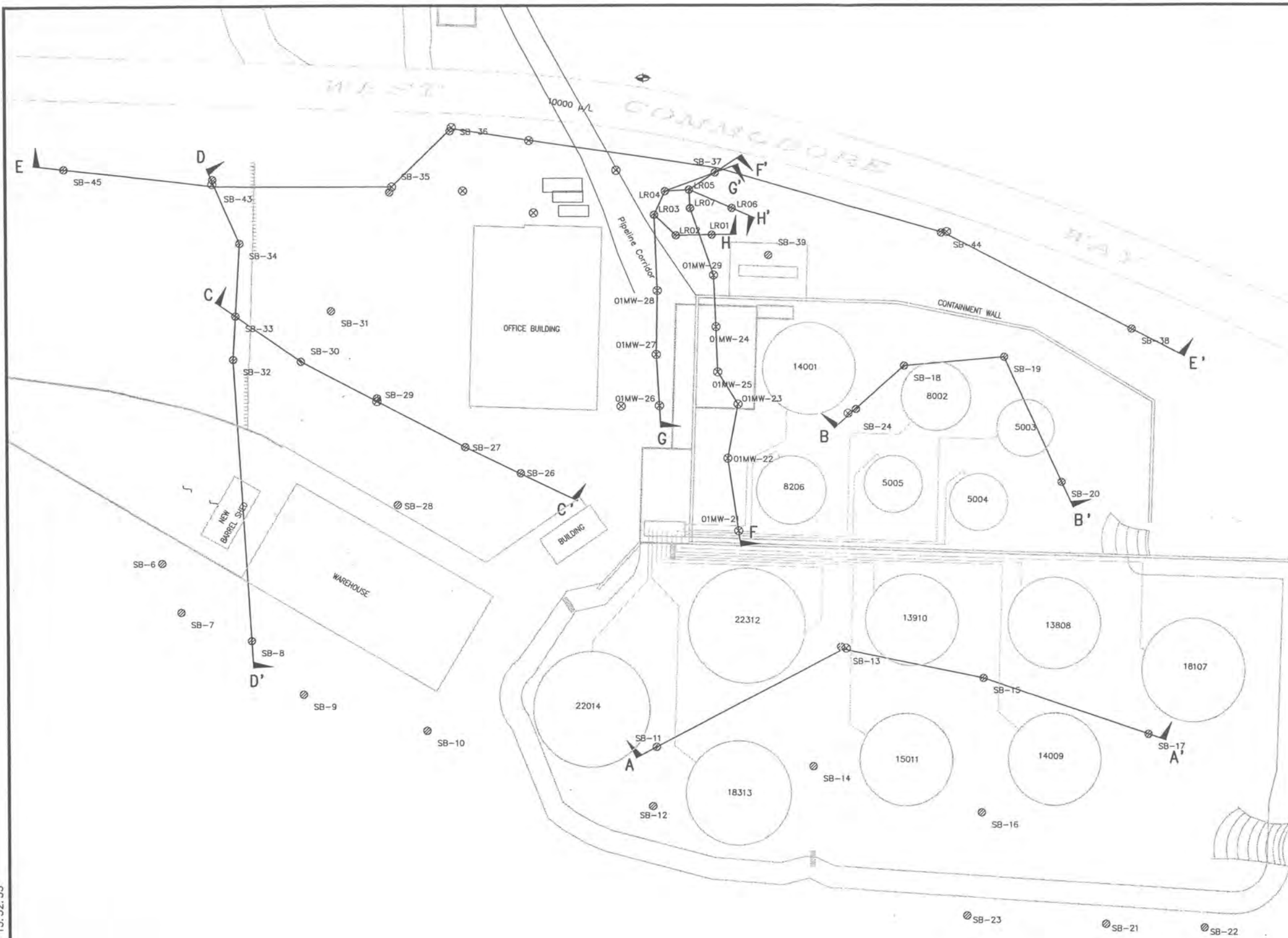
LEGEND

- 22.85 ⊗ GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION (FEET MSL)
- ⊕ SURVEY MONUMENT
- 38.0 EQUIPOTENTIAL CONTOUR (FEET MSL), DASHED WHERE INFERRED (CONTOUR INTERVAL 2.0 FEET)

FOSTER W WHEELER
ENVIRONMENTAL CORPORATION

Figure 5-1
Potentiometric Surface
Measured October 2002
2737 West Commodore Way
Seattle, Washington

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 PLOT/UPDATE: JAN 17 2003 15:52:35

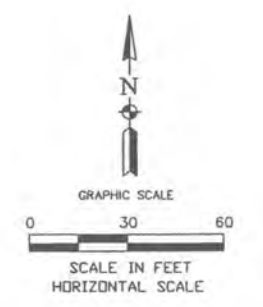


LEGEND

- ◆ SURVEY MONUMENT
- APPROXIMATE SOIL BORING LOCATION
- ⊗ GROUNDWATER MONITORING WELL

NOTES

CROSS SECTION A-A' THROUGH D-D' INCLUDED IN FOSTER WHEELER ENVIRONMENTAL 2001a.

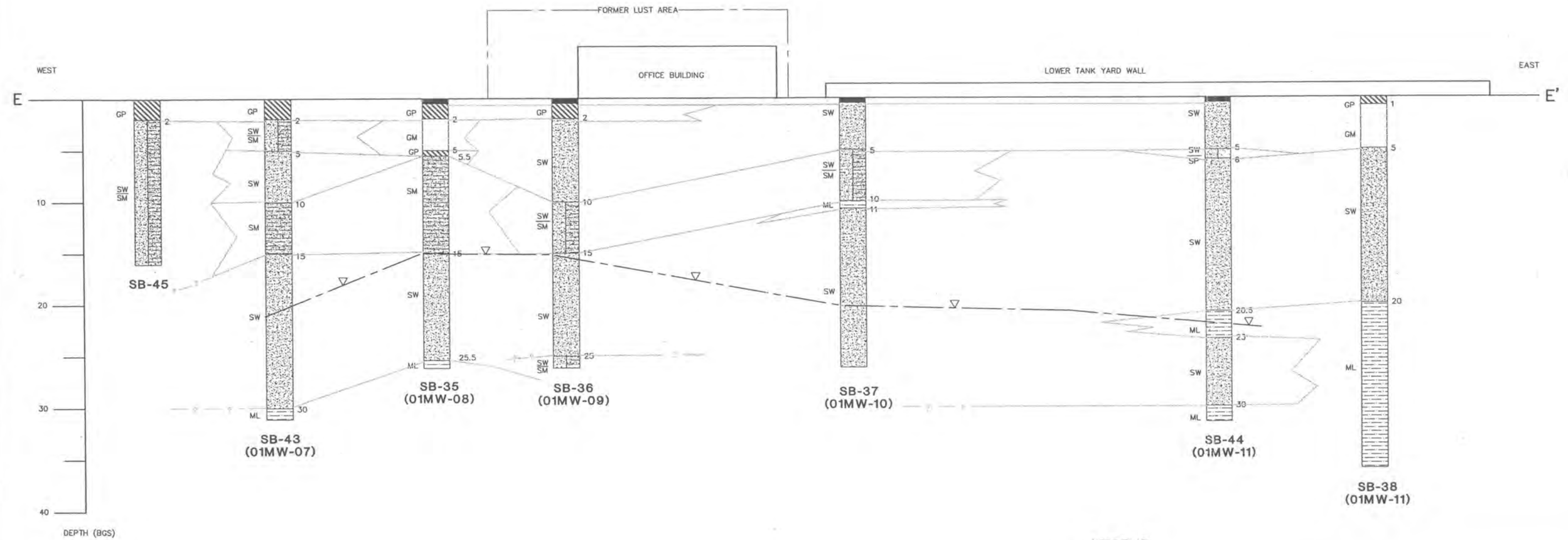


FOSTER  WHEELER ENVIRONMENTAL CORPORATION

Figure 5-2
 Site Conceptual Model Plan View
 2737 West Commodore Way
 Seattle, Washington

CITY OF SEATTLE
 TBM #9962 = EL. 79.61

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 PLOT/UPDATE: JAN 16 2003 14:49:44



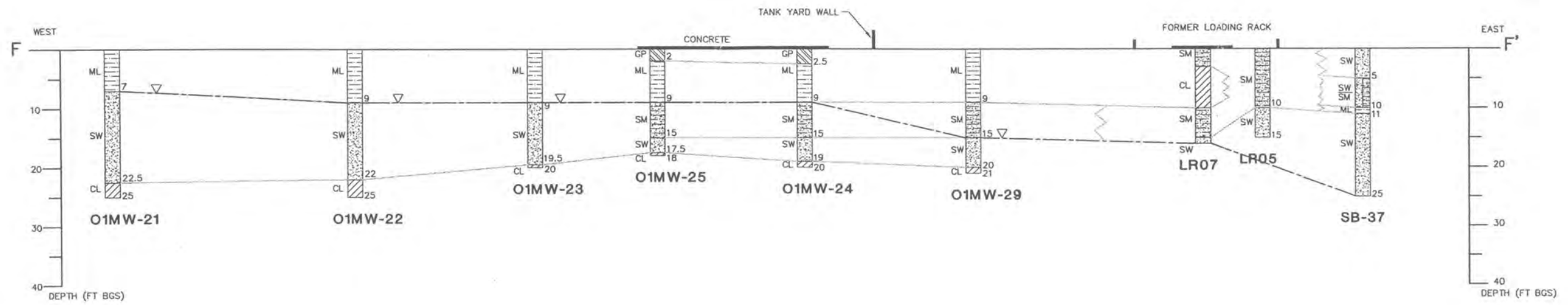
NOTE
 SECTION NOT TO SCALE HORIZONTALLY

LEGEND

- | | | | |
|--|---------------------------------|--|-------------------------------------|
| | GP - POORLY SORTED GRAVEL | | SW - WELL-SORTED SAND |
| | GM - POORLY SORTED SILTY GRAVEL | | ML - SILT |
| | SM - SILTY SAND | | SP - POORLY SORTED SAND |
| | ASPHALT/CONCRETE | | APPROXIMATE LOCATION OF WATER TABLE |

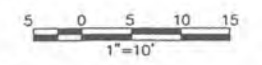
FOSTER WHEELER
ENVIRONMENTAL CORPORATION

Figure 5-3
 Cross Section beneath
 Former LUST Area
 2737 West Commodore Way
 Seattle, Washington



LEGEND

- | | | | |
|--|---------------------------|--|-------------------------------------|
| | GP - POORLY SORTED GRAVEL | | SW - WELL-SORTED SAND |
| | CL - INORGANIC CLAY | | ML - SILT |
| | SM - SILTY SAND | | SP - POORLY SORTED SAND |
| | ASPHALT/CONCRETE | | APPROXIMATE LOCATION OF WATER TABLE |

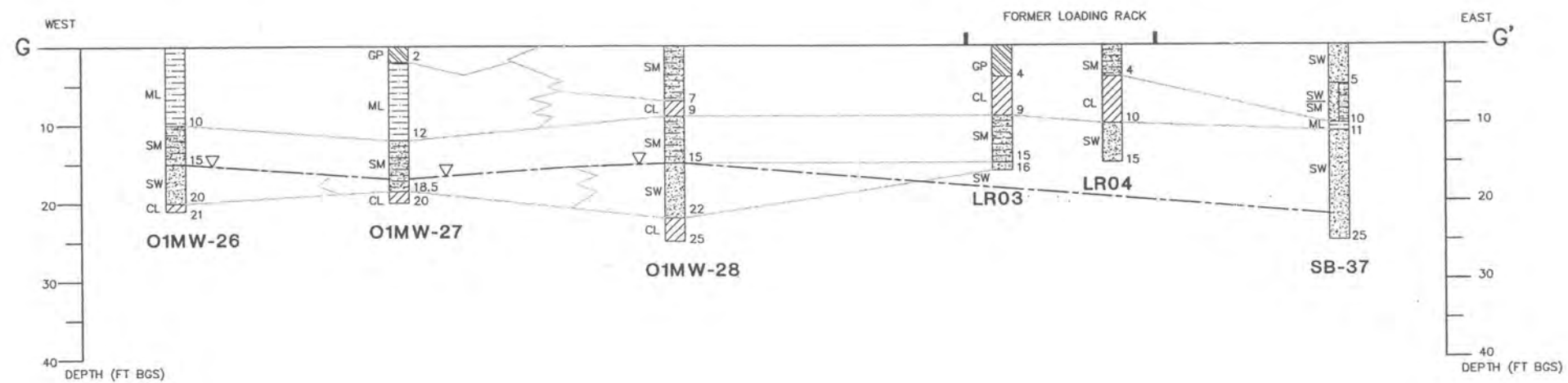


FOSTER WHEELER
ENVIRONMENTAL CORPORATION

Figure 5-4
 Cross Section through Western Portion of
 Lower Tank Yard and Former Loading Rack
 2737 West Commodore Way
 Seattle, Washington

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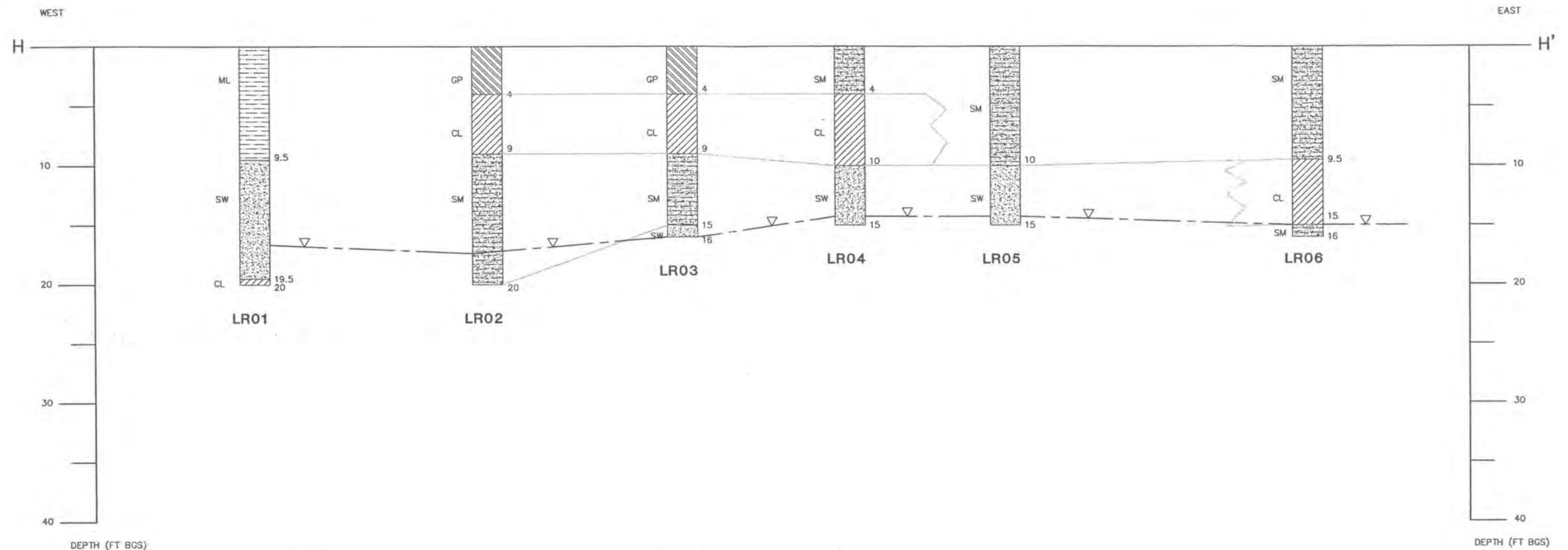
LEGEND

- | | |
|---|---|
|  GP - POORLY SORTED GRAVEL |  SW - WELL-SORTED SAND |
|  CL - INORGANIC CLAY |  ML - SILT |
|  SM - SILTY SAND |  SP - POORLY SORTED SAND |
|  APPROXIMATE LOCATION OF WATER TABLE | |



**FOSTER  WHEELER
 ENVIRONMENTAL CORPORATION**

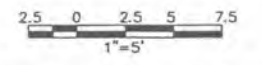
Figure 5-5
 Cross Section North and West
 of Lower Tank Yard
 2737 West Commodore Way
 Seattle, Washington



NOTE
CLAY ALSO IN LR07 AT SAME DEPTHS

LEGEND

	GP - POORLY SORTED GRAVEL		SW - WELL-SORTED SAND
	CL - INORGANIC CLAY		ML - SILT
	SM - SILTY SAND		SP - POORLY SORTED SAND
			APPROXIMATE LOCATION OF WATER TABLE



FOSTER WHEELER
ENVIRONMENTAL CORPORATION

Figure 5-6
Fence Diagram Around
Former Loading Rack
2737 West Commodore Way
Seattle, Washington

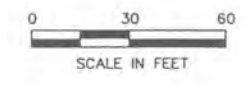
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LEGEND

- ⊗ GROUNDWATER MONITORING WELL
- ⊕ SURVEY MONUMENT
- EXTRACTION WELL WITH 45 FOOT RADIUS OF DEPRESSION



FOSTER  WHEELER
ENVIRONMENTAL CORPORATION

Figure 7-1
Proposed DPE System Configuration
2737 West Commodore Way
Seattle, Washington

⊕ CITY OF SEATTLE
TBM #9962 = EL. 79.61

TABLES

Table 2-1. Analytical Results from 1999 Soil Samples Above Cleanup Levels

	Depth (feet)	Gasoline (mg/kg)		Diesel (mg/kg)	Oil (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl- benzene (mg/kg)	Total Xylene (mg/kg)
		30 ^{2/}	100 ^{3/}						
MTCA^{1/}				2,000	2,000	0.03	7	6	9
01SB-05	10	2,360		2,450	< 126	< 2.5	33.5	31	190
01SB-08	12.5	3,650		33,900	< 1,030	9.96	< 5.0	20.9	73.4
01SB-09	2.5	381		1,780	514	2.12	< 0.2	< 1.4	< 1.2
01SB-09	7.0	2,360		24,800	< 525	3.45	8.11	11.9	32.1
01SB-09	12.5	755,000		15,000	< 525	5,590	26,200	9,500	55,800
01SB-09	18	3,970		5,870	< 525	5.26	10.5	13.7	61.5

Notes:

Detections above cleanup levels are indicated in *bold italics*.

1/ MTCA Method A cleanup levels for unrestricted land use

2/ All other gasoline mixtures

3/ Gasoline mixtures without benzene and the total of ethylbenzene, toluene, and xylene < 1% of the gasoline mixture

< symbol indicates result is less than method reporting limit

mg/kg = milligrams per kilogram

Table 2-2. Analytical Results from 1999 Groundwater and Boring Water Samples

	Date	Total lead (µg/L)	Gasoline (µg/L)		Diesel (µg/L)	Oil (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl- benzene (µg/L)	Total Xylene (µg/L)
			800 ^{2/}	1,000 ^{3/}						
MTCA ^{1/}		15	800 ^{2/}	1,000 ^{3/}	500	500	5,300 ^{4/}	1,000	700	1,000
01MW-01	9/28/99	4.15	< 50.0		< 50.0	< 1,000	< 0.500	<0.500	<0.500	<1.00
01MW-02	9/28/99	84.9	12,200		714	< 500	3,880	525	230	1,100
01MW-03	9/28/99	87	27,200		944	< 500	11,300	405	398	1,590
01MW-04	9/28/99	130	18,900		1,320	< 500	4,370	1,150	606	2,780
01SB-01	6/6/99	--	9,000		7,560	< 500	2,280	579	106	483
01SB-02	6/6/99	--	1,120		965	< 500	25.1	13.5	19.8	43.6
01SB-03	6/6/99	--	881		< 250	< 500	147	5.58	24.6	68
01SB-04	6/6/99	--	11,000		7,120	< 500	547	847	358	1,630
01SB-05	6/6/99	--	42,900		8,710	1,010	9,580	6,600	657	3,050
01SB-07	6/6/99	--	5,360		4,180	577	1,360	270	139	586
01SB-08	6/6/99	--	3,410		9,550	< 2,500	1,160	93.3	60.5	218
01SB-09	6/6/99	--	54,800		12,800	1,060	11,000	7,510	840	4,570

Notes:

Detections above cleanup levels are indicated in **bold italics**.

1/ MTCA Method A cleanup levels, unless otherwise noted

2/ Benzene present in groundwater

3/ No detectable benzene in groundwater

4/ NOAA SQuiRT value for freshwater maximum concentrations

< symbol indicates result is less than method reporting limit

µg/L = micrograms per liter

mg/L = milligrams per liter

Table 2-3. Well Construction Details

Well	Coordinates		Top of Casing Elevation (Feet msl)	Ground Elevation (Feet msl)	Total Depth of Boring (Feet bgs)	Total Depth of Well (Feet bgs)	Depth of Screen Interval (Feet bgs)	Elevation of Screen Interval (Feet msl)
	Northing (Feet)	Easting (Feet)						
01MW-01	245454.6	1256198.2	46.48	46.76	25.00	25.25	10 - 25	36.76 - 21.76
01MW-02	245585.0	1256198.5	44.78	45.15	25.00	24.91	10 - 25	35.15 - 20.15
01MW-03	245597.6	1256160.5	44.35	44.75	25.20	25.15	10 - 25	34.75 - 19.75
01MW-04	245563.1	1256163.1	45.08	45.56	25.00	24.90	10 - 25	35.56 - 20.56
01MW-05	245569.3	1256114.0	45.40	45.77	25.00	24.88	10 - 25	35.77 - 20.77
01MW-06	245452.7	1256064.6	47.74	48.23	25	25.10	10 - 25	38.23 - 23.23
01MW-07	245570.7	1255975.9	45.17	45.53	30	28.17	15 - 30	30.53 - 15.53
01MW-08	245570.5	1256071.0	45.21	45.63	25	24.93	10 - 25	35.63 - 20.63
01MW-09	245602.1	1256103.0	43.91	44.37	25	24.70	10 - 25	34.37 - 19.37
01MW-10	245580.4	1256247.0	45.02	45.35	25	24.90	10 - 25	35.35 - 20.35
01MW-11	245545.1	1256368.9	46.10	46.45	30	29.90	15 - 30	31.45 - 16.45
01MW-12	245444.9	1256316.1	45.84	46.29	20	20.00	5 - 20	40.84 - 25.84
01MW-13	245317.3	1256313.3	46.36	46.81	20	19.88	15 - 20	31.81 - 26.81
01MW-14	245441.7	1256252.4	46.15	46.15	15	15.00	5 - 15	41.15 - 31.15
01MW-15	245441.3	1255996.4	50.89	50.89	302	30.00	10 - 30	40.89 - 20.89
01MW-16	245582.7	1256220.0	44.95	44.95	22.5	20.00	10 - 20	34.95 - 24.95
01MW-17	245166.9	1256477.5	59.42	59.42	30	30.00	15 - 30	44.42 - 29.42
01MW-18	245577.3	1256114.2	45.18	45.68	26.5	25.00	5 - 20	40.68 - 25.68
01MW-19	245572.5	1256100.6	45.35	45.85	31.5	25.00	5 - 20	40.85 - 25.78
01MW-20	245547.0	1256107.1	46.27	46.77	26.5	25.00	5 - 20	41.77 - 26.77
01MW-21	245382.3	1256257.4	46.21	46.52	23.5	22.92	5 - 22	41.21 - 23.79
01MW-22	245422.2	1256251.7	46.11	46.47	25	24.70	5 - 24	41.11 - 21.91
01MW-23	245451.9	1256257.4	45.81	46.11	20.5	19.45	5 - 19	40.81 - 26.86
01MW-24	245494.0	1256245.7	N/A	44.59	21	19.40	5 - 19	39.59 - 25.69
01MW-25	245469.4	1256246.5	N/A	44.61	20.5	17.32	5 - 16	39.61 - 28.29
01MW-26	245451.1	1256215.0	46.24	46.71	20.5	19.85	5 - 19	41.24 - 27.39
01MW-27	245479.0	1256213.5	46.33	46.70	21.5	19.65	5 - 19	41.33 - 27.68
01MW-28	245513.8	1256214.2	45.54	46.30	25.5	24.61	5 - 24	40.54 - 21.93
01MW-29	245522.2	1256244.6	45.57	45.92	20.5	19.75	5 - 19	40.57 - 26.82

Notes:

Horizontal datum = Washington State Plane Coordinate System (North Zone), NAD 83/91

Vertical datum = NAVD 88

N/A = top of casing data not measured due to presence of surface water

Table 2-4. Analytical Results from 2001 Phase II Soil Samples Above Cleanup Levels
 (Page 1 of 2)

Sample	Gasoline (mg/kg)		Benzene (mg/kg)	Ethylbenzene (mg/kg)	Xylene (mg/kg)	PCP (mg/kg)	Diesel (mg/kg)	Oil (mg/kg)	CPAHs (mg/kg)
MTCA ^{1/}	30 ^{2/}	100 ^{3/}	0.03	6	9	8.33 ^{4/}	2,000	2,000	1
Upper Rail Line Spur									
SB-22-5	266		< 0.250	< 0.250	< 0.500	na	19.4	< 25.0	na
SB-22-10	293		< 0.250	< 0.250	< 0.500	na	6,490	< 525	na
Upper Tank Yard									
SB-13-2	9,340		14.3	54.8	< 75.0	na	10,600	1,500	na
SB-15-2	902		< 0.500	< 3.00	< 6.00	na	2,910	265	na
Lower Tank Yard									
SB-19-2	1,500		< 1.00	< 1.70	< 8.00	na	4,070	< 275	na
SB-19-5	960		< 0.500	< 0.500	< 6.00	na	1,340	< 75.0	na
SB-24-2	58.4		< 0.0500	< 0.0643	< 0.164	na	2,610	< 1030	na
SB-24-10	252		< 0.236	< 0.910	< 1.34	na	366	60.9	na
PCP/Diesel Mixing Area (Lower Tank Yard)									
SB-02-2	217		< 0.200	< 0.200	< 0.400	< 0.250	1,400	158	0.23
SB-03-0.6	< 5.00		< 0.0500	< 0.0500	< 0.100	202	2,010	4,780	1.08
SB03A (2 ft)	1,670		< 1.00	< 7.00	< 16.2	< 0.500	14,700	6,350	4.53
SB-04-0.6	na		na	na	na	803	na	na	2.67
SB-04-2	513		< 0.250	< 0.470	< 0.875	1.26	5,670	2,320	1.70
SB-04-5	8.42		< 0.0500	< 0.0500	< 0.100	20.9	217	260	8.09
SS-01	na		na	na	na	3.87	na	na	1.75
SS-03	na		na	na	na	< 2.50	na	na	1.75
SS-04	na		na	na	na	< 0.500	na	na	9.26
Former Rail Line Spur Behind Warehouse									
SB-07-5	1,240		2.17	7.6	18.2	< 0.250	1,190	783	na
Former Barrel Shed									
SB-27-5	121		< 0.100	< 0.100	< 0.314	na	1,190	< 525	0.35
SB-29-2	536		< 0.500	< 0.500	< 1.83	na	3,220	1,160	1.75
SB-29-5	393		< 0.200	< 0.560	< 1.12	na	1,930	488	0.7
SB-30-2	5,120		< 1.00	< 9.12	< 33.0	na	832	< 275	0.18
SB-31-2	577		< 0.512	< 0.824	< 2.52	na	11,400	7,730	na

Table 2-4. Analytical Results from 2001 Phase II Soil Samples Above Cleanup Levels
 (Page 2 of 2)

Sample	Gasoline (mg/kg)		Benzene (mg/kg)	Ethylbenzene (mg/kg)	Xylene (mg/kg)	PCP (mg/kg)	Diesel (mg/kg)	Oil (mg/kg)	cPAHs (mg/kg)
MTCA ^{1/}	30 ^{2/}	100 ^{3/}	0.03	6	9	8.33 ^{4/}	2,000	2,000	1
Former AST Area									
SB-32-5	<i>216</i>		< 0.200	< 0.200	< 0.508	na	15.7	< 25.0	na
SB-45-2	<i>3,940</i>		< 2.50	< 25.0	< 85.0	na	<i>2,500</i>	<i>2,800</i>	na
SB-45-5	<i>557</i>		< 0.500	< 0.500	< 1.30	na	<i>2,200</i>	< 75.0	na
Former LUST Area									
SB-35-5	<i>192</i>		< 0.100	< 0.780	< 1.72	na	1,190	631	na
SB-35-15	<i>1,640</i>		< 1.00	< 2.38	< 11.0	na	<i>9,440</i>	1,160	na
SB-36-15	<i>4,340</i>		< 7.70	<i>33.8</i>	<i>171</i>	na	<i>11,300</i>	< 275	na
West Commodore Way Perimeter									
SB-37-10	<i>1,080</i>		< 1.00	< 2.40	< 2.10	na	<i>5,770</i>	< 275	na
SB-37-15	< 5.00		< 0.0500	< 0.0500	< 0.100	na	<i>9,130</i>	< 275	na
SB-39-2	34.8		< 0.0500	0.167	0.567	na	<i>2,440</i>	460	na
SB-39-5	<i>605</i>		< 0.280	< 1.68	< 3.24	na	1,300	157	na

Notes:

Detections above cleanup levels are indicated in *bold italics*.

1/ MTCA Method A cleanup levels for unrestricted land use

2/ All other gasoline mixtures

3/ Gasoline mixtures without benzene and the total of ethylbenzene, toluene, and xylene < 1% of the gasoline mixture

4/ MTCA Method B carcinogenic cleanup level

< symbol indicates result is less than method reporting limit

na = No analysis requested

mg/kg = milligrams per kilogram

Table 2-5. Analytical Results from 2001 Phase II Groundwater Samples Above Cleanup Levels

Sample	Date	PCP (µg/L)	Lead (µg/L)	Gasoline (µg/L)	Diesel (mg/L)	Oil (mg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)
MTCA ^{1/}		15 ^{2/}	15	800 ^{3/}	0.500	0.500	5	1,000	700	1,000
Former LUST Area										
01MW-01	11/16/00	na	< 0.00100	75.2	<i>1.65</i>	< 0.500	0.924	1.46	< 0.500	193
01MW-02	11/16/00	na	< 0.00100	<i>12,700</i>	<i>5.00</i>	< 0.500	<i>3,300</i>	<i>1,010</i>	331	<i>1,510</i>
01MW-03	11/16/00	na	< 0.00100	<i>3,620</i>	<i>1.65</i>	< 0.500	<i>1,020</i>	26.9	63.6	210
01MW-04	11/16/00	na	< 0.00100	<i>7,930</i>	<i>1.86</i>	< 0.500	<i>71.2</i>	402	570	<i>2,840</i>
01MW-08	12/1/00	na	< 0.00100	< 50.0	0.404	< 0.500	< 5.00	< 0.500	< 0.500	< 1.00
01MW-09	12/1/00	na	< 0.00100	<i>2,210</i>	<i>1.07</i>	< 0.500	<i>302</i>	143	65.2	333
Former Barrel Shed Area										
01MW-06	11/30/00	1.80	< 0.00100	87.4	< 0.250	< 0.500	< 1.08	< 0.500	< 0.500	< 1.00
Former AST Area										
01MW-07	12/1/00	na	< 0.00100	< 50.0	< 0.250	< 0.500	< 5.00	< 0.500	< 0.500	< 1.00
West Commodore Way Perimeter										
01MW-11	12/1/00	na	< 0.00100	< 50.0	<i>0.504</i>	< 0.500	< 0.500	< 0.500	< 0.500	< 1.00
Lower Tank Yard Area										
01MW-12	12/5/00	na	< 0.00100	<i>802</i>	<i>1.07</i>	< 0.500	<i>98.4</i>	11.0	17.4	24.6
Upper Tank Yard Area										
01MW-13	12/5/00	na	< 0.00100	254	<i>3.94</i>	<i>0.513</i>	< 0.500	0.694	< 0.817	< 1.23

Notes:

Detections above cleanup levels are indicated in *bold italics*.

1/ MTCA Method A cleanup levels for groundwater, unless otherwise noted

2/ NOAA SQuiRT value for freshwater continuous concentrations

3/ Benzene present in groundwater

< symbol indicates result is less than method reporting limit

na = No analysis requested

µg/L = micrograms per liter

mg/L = milligrams per liter

Table 2-6. Analytical Results from 2001 Phase III Soil Samples Above Cleanup Levels

Sample	PCP (mg/kg)	Diesel (mg/kg)	Gas (mg/kg)	Benzene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	cPAHs (mg/kg)
MTCA ^{1/}	8.33 ^{2/}	2,000	30 ^{3/} 100 ^{4/}	0.03	6	9	1.0
Former PCP/Diesel Mixing Area (Lower Tank Yard Area)							
SB-52-2.5	<0.0500	4,180	1,410	<1.00	1.42	2.18	0.1187
SB-55-6	0.174	370	185	<0.200	0.811	3.06	0.0572
SB-56-2.5	<0.500	28,300	5,100	10.2	29.3	75.6	2.624
SB-56-5	8.88	2,040	4,060	9.36	22.3	60.5	0.736
SB-57-1.5	<0.0500	3,970	2,590	0.387	18.2	8.85	0.189
Former Barrel Shed Area							
SB-59-5	<0.500	4,950	799	<1.00	1.94	<2.00	na
West Commodore Way Perimeter Area							
SB-60-15	na	11,400	1,240	1.68	4.04	10.2	0.0000

Notes:

Detections above cleanup levels are indicated in *bold italics*.

1/ MTCA Method A level for unrestricted land use

2/ MTCA Method B carcinogenic level

3/ All other gasoline mixtures

4/ Gasoline mixtures without benzene and the total of ethylbenzene, toluene, and xylene <1% of the gasoline mixture.

< symbol indicates that result is less than method reporting limit

na = No analysis requested

mg/kg = milligrams per kilogram

Table 2-7. Analytical Results from 2001 Phase III Groundwater Samples Above Cleanup Levels

Sample	Diesel (mg/L)	Gas ($\mu\text{g/L}$)		Benzene ($\mu\text{g/L}$)	Xylenes ($\mu\text{g/L}$)
MTCA ^{1/}	0.5	800^{2/}	1,000^{3/}	5,300^{4/}	1,000
Former LUST Area					
01MW-01	<i>1.11</i>	< 50.0		< 0.500	< 1.00
01MW-02	<i>5.01</i>	<i>14,800</i>		<i>6,900</i>	<i>1,110</i>
01MW-03	<i>2.84</i>	<i>24,500</i>		<i>11,900</i>	515
01MW-04	<i>1.79</i>	<i>6,460</i>		1,210	<i>1,470</i>
01MW-07	<i>1.45</i>	< 50.0		< 0.500	< 1.00
01MW-08	<i>0.662</i>	< 50.0		< 0.500	< 1.00
01MW-09	<i>5.72</i>	<i>1,830</i>		213	230
West Commodore Way Perimeter Area					
01MW-11	<i>1.53</i>	< 50.0		< 0.500	< 1.00
01MW-16A	<i>11.1</i>	<i>11,000</i>		3,910	891
01MW-16B	<i>9.62</i>	<i>9,390</i>		3,700	745
Lower Tank Yard Area					
01MW-12	<i>6.55</i>	<i>1,350</i>		482	26.4
Upper Tank Yard Area					
01MW-13	<i>3.90</i>	221		1.26	2.31
Former Barrel Shed Area					
01MW-06	<i>0.718</i>	< 50.0		< 0.500	< 1.00
New Barrel Shed Area					
01MW-15	0.484	< 50.0		< 0.500	< 1.00
Upper Rail Line Spur Area					
01MW-17	<i>0.884</i>	< 50.0		< 0.500	< 1.00

Notes:

Detections above cleanup levels are indicated in *bold italics*.

1/ MTCA Method A cleanup level, unless otherwise noted

2/ Gasoline range with benzene present

3/ Gasoline range without benzene present

4/ NOAA SQuiRT value for freshwater maximum concentration

< symbol indicates that result is less than method reporting limit

na = No analysis requested

$\mu\text{g/L}$ = micrograms per liter

mg/L = milligrams per liter

Table 2-8. Analytical Results from 2002 Lower Tank Yard Investigation Soil Samples Above Cleanup Levels – MTBE, BTEX, Napthalene, and Hexane

Sample	MTBE (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	m,p-Xylene (mg/kg)	o-Xylene (mg/kg)	Napthalene (mg/kg)	n-Hexane (mg/kg)
MTCA ^{1/}	0.1	0.03	7	6	9	9	5	
Lower Tank Yard								
01MW-21-5	<0.100	<0.0100	<0.0100	<0.0100	<0.0200	<0.0100	<0.0100	<0.0200
01MW-23-5	<0.100	<i>0.314</i>	<0.0100	0.705	0.872	0.290	3.67	0.91
01MW-24-5	<0.100	<i>0.495</i>	0.0358	1.95	2.84	2.22	1.86	3.37
01MW-29-5	<0.100	<0.0100	<0.0100	0.398	<0.0200	<0.0100	0.104	0.105
Former Loading Rack								
LR01-5	<0.100	<i>0.390</i>	<0.0100	<0.0100	<0.0200	<0.0100	<0.0100	3.39
LR03-5	<0.100	<0.0100	<0.0100	<0.0100	<0.0200	<0.0100	<0.0100	0.0642
LR05-5	<0.100	<i>0.542</i>	<0.0100	0.732	0.0870	<0.0100	<0.0100	1.45
LR07-5	<0.100	<0.0100	<0.0100	0.540	0.639	<0.0100	1.80	1.59

Notes:

Detections above cleanup levels are indicated in *bold italics*.

1/ MTCA Method A cleanup level for unrestricted land use

< symbol indicates that result is less than method reporting limit

mg/kg = milligrams per kilogram

Table 2-9. Analytical Results from 2002 Lower Tank Yard Investigation Soil Samples Above Cleanup Levels – Fuel, BTEX, and Lead (Page 1 of 2)

Sample	Gas (mg/kg)		Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylene (mg/kg)	Diesel (mg/kg)	Oil (mg/kg)	Lead (mg/kg)
	30	100	0.03	7	6	9	2,000	2,000	250
Lower Tank Yard									
01MW-21-5	<5.00	<0.0300	<0.0500	<0.0500	<0.100	14.0	< 25.0	7.17	
01MW-21-10	<5.00	<0.0300	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	2.39	
01MW-21-15	<5.00	<0.0300	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	2.08	
01MW-21-20	<5.00	<0.0300	<0.0500	<0.0500	< 0.100	21.5	< 25.0	2.29	
01MW-21-23	<5.00	<0.0300	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	5.08	
01MW-22-5	<5.00	<0.0300	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	3.98	
01MW-22-10	<5.00	<0.0300	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	2.29	
01MW-22-15	<5.00	0.219	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	2.10	
01MW-22-20	<5.00	0.210	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	1.88	
01MW-22-25	<5.00	<0.0300	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	4.19	
01MW-23-5	732	0.817	<0.200	2.90	6.03	681	114	5.29	
01MW-23-10	<5.00	<0.0300	<0.0500	<0.0500	< 0.100	32.5	< 25.0	2.52	
01MW-23-15	5.71	<0.0300	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	2.11	
01MW-23-20	<5.00	<0.0300	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	5.15	
01MW-24-5	2,200	4.35	<1.00	14.7	41.3	3,000	149 ^{2j}	13.9	
01MW-24-10	28.4 ^{3j}	<0.0300	<0.0500	<0.0500	< 0.100	419	< 25.0	3.44	
01MW-24-15	<5.00	0.103	<0.0500	<0.0500	< 0.100	11.8	< 25.0	2.82	
01MW-24-20	<5.00	0.0454	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	5.36	
01MW-25-5	<5.00	0.0491	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	2.98	
01MW-25-10	176^{3j}	0.0658	<0.0500	0.272	0.740	< 10.0	< 25.0	5.89	
01MW-25-15	<5.00	<0.0300	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	1.92	
01MW-25-18	<5.00	<0.0300	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	5.60	
01MW-26-5	681	<0.300	<0.500	3.63	6.50	< 10.0	< 25.0	10.30	
01MW-26-10	3,990^{3j}	4.29	9.69	28.2	112	14,100	< 2500	7.66	
01MW-26-15	1,430	<0.600	1.15	8.68	37.4	7,000	< 500	278	
01MW-26-20	<5.00	<0.0300	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	5.54	
01MW-27-5	5,510	182	37.7	36.4	168	7,410	< 500	30.6	
01MW-27-10	2,370^{3j}	8.21	16.0	15.0	51.0	11,100	651	11.40	
01MW-27-15	177	0.265	< 0.200	0.316	0.402	3,810	< 500	3.03	
01MW-27-20	<5.00	<0.0300	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	4.71	
01MW-28-5	46.5	<0.0300	<0.0500	0.0516	0.101	1,840	< 250	9.33	
01MW-28-10	1,170^{3j}	<0.300	5.92	13.2	73.9	19,300	< 2500	3.13	
01MW-28-15	2,870	9.82	18.2	24.9	111	2,810	< 500	2.71	
01MW-28-20	<5.00	<0.0300	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	1.96	
01MW-28-25	<5.00	<0.0300	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	4.30	
01MW-29-5	127^{3j}	<0.0300	<0.0500	0.339	0.405	50.0	< 25.0	6.62	

Table 2-9. Analytical Results from 2002 Lower Tank Yard Investigation Soil Samples above Cleanup Levels – Fuel, BTEX, and Lead (Page 2 of 2)

Sample	Gas		Benzene	Toluene	Ethylbenzene	Xylene	Diesel	Oil	Lead
	(mg/kg)		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
MTCA ^{1/}	30	100	0.03	7	6	9	2,000	2,000	250
01MW-29-10	122 ^{3/}		<0.0300	<0.0500	0.310	1.10 ^{4/}	75.2	< 25.0	2.30
01MW-29-15	297 ^{3/}		<i>0.109</i>	0.114	1.19	2.01	312.0	< 25.0	2.43
01MW-29-20	<5.00		<i>0.289</i>	<0.0500	<0.0500	< 0.100	< 10.0	< 25.0	5.65
Former Loading Rack									
LR01-5	251 ^{3/}		<i>0.129</i>	<0.200	0.545	0.502	<i>7,440</i>	< 250	3.52
LR01-10	178 ^{3/}		<0.0300	<0.0500	0.742	1.44 ^{4/}	<i>2,670</i>	< 250	2.30
LR01-15	1,420 ^{3/}		<i>0.885</i>	5.80	<i>6.91</i>	<i>21.9</i>	<i>13,500</i>	< 2500	6.93
LR01-20	5.01		<i>1.40</i>	0.0509	0.0837	< 0.100	< 10.0	< 25.0	4.81
LR02-5	<5.00		<0.0300	<0.0500	<0.0500	< 0.100	280	< 25.0	7.04
LR02-10	1,140		<i>0.831</i>	<i>8.46</i>	<i>6.20</i>	<i>19.9</i>	<i>11,700</i>	< 2500	2.34
LR02-15	1,320		<i>1.10</i>	<i>8.56</i>	<i>7.42</i>	<i>23.5</i>	<i>19,500</i>	< 2500	2.27
LR02-20	51.9		<i>0.0871</i>	0.171	0.265	0.728	< 10.0	< 25.0	1.79
LR03-5	59.7		< 0.0600	< 0.100	< 0.100	< 0.200	219	< 25.0	6.14
LR03-10	1,460		<i>1.51</i>	<i>12.4</i>	<i>11.5</i>	<i>24.2</i>	<i>18,800</i>	< 2500	3.07
LR03-15	1,860		<i>6.70</i>	<i>24.5</i>	<i>12.3</i>	<i>53.5</i>	<i>17,500</i>	< 2500	2.29
LR04-5	<5.00		<0.0300	<0.0500	<0.0500	< 0.100	<i>7,970</i>	< 500	2.45
LR04-10	827		<i>0.320</i>	0.615	4.26	6.57	<i>7,060</i>	< 1000	2.44
LR04-15	2,850		<i>4.87</i>	4.96	<i>13.2</i>	<i>50.1</i>	<i>27,700</i>	< 5000	3.57
LR05-5	663		<0.300	<0.500	2.43	2.82	<i>2,990</i>	< 500	4.33
LR05-10	1,320		<i>2.23</i>	<i>7.44</i>	<i>9.51</i>	<i>33.9</i>	<i>14,600</i>	< 2500	2.58
LR05-15	935		< 0.600	1.91	4.82	<i>20.5</i>	<i>5,780</i>	< 500	3.69
LR06-5	38.1		<0.0300	<0.0500	0.130	0.191	17.6	< 500	4.05
LR06-10	<5.00		<0.0300	<0.0500	<0.0500	< 0.100	317	< 1000	5.32
LR06-15	5.71		<0.0300	<0.0500	<0.0500	0.127	10.3	< 1000	4.19
LR07-5	1,490		<i>1.13</i>	<0.500	4.02	2.30	<i>4,230</i>	< 25.0	5.03
LR07-10	534		<0.300	0.550	2.80	6.64	<i>5,840</i>	< 25.0	2.32
LR07-15	1,370		<i>2.52</i>	3.48	<i>6.67</i>	<i>29.1</i>	<i>11,400</i>	< 25.0	9.03

Notes:

Detections above cleanup levels are indicated in *bold italics*.

1/ MTCA Method A cleanup level for unrestricted land use

2/ Heavy oil range organics present are due to hydrocarbons eluting primarily in the diesel range

3/ Results reported for the gas range are primarily due to overlap from diesel range hydrocarbons

4/ The analyte concentration may be artificially elevated due to coeluting compounds or components

< symbol indicates that result is less than method reporting limit

mg/kg = milligrams per kilogram

Table 2-10. PAH Analytical Results from 2002 Lower Tank Yard Investigation Soil Samples

	01MW-23-5 (mg/kg)	01MW-24-5 (mg/kg)	LR03-5 (mg/kg)	LR07-5 (mg/kg)
MTCA^{1/}	1.0	1.0	1.0	1.0
Acenaphthene	< 0.0500	< 0.0100	0.172	5.23
Acenaphthylene	< 0.0500	< 0.0100	< 0.0100	3.07
Anthracene	0.384	0.243	0.056	< 0.0100
<i>Benzo(a)anthracene</i>	< 0.0500	0.0123	0.0123	< 0.0100
<i>Benzo(a)pyrene</i>	< 0.0500	< 0.0100	< 0.0100	< 0.0100
<i>Benzo(b)fluoranthene</i>	< 0.0500	< 0.0100	< 0.0100	< 0.0100
Benzo(g,h,i)perylene	< 0.0500	< 0.0100	< 0.0100	< 0.0100
<i>Benzo(k)fluoranthene</i>	< 0.0500	< 0.0100	< 0.0100	< 0.0100
<i>Chrysene</i>	0.108	0.0336	0.0351	< 0.0100
<i>Dibenz(a,h)anthracene</i>	< 0.0500	< 0.0100	< 0.0100	< 0.0100
Fluoranthene	0.072	0.0312	0.0312	< 0.0100
Fluorene	< 0.0500	0.522	0.0937	4.15
<i>Indeno(1,2,3-cd)pyrene</i>	< 0.0500	< 0.0100	< 0.0100	< 0.0100
1-Methylnaphthalene	5.08	5.78	0.78	
2-Methylnaphthalene	8.51	10.4	1.39	72.9
Naphthalene	1.84	2.79	0.0619	4.48
Phenanthrene	1.28	0.847	0.227	8.21
Pyrene	0.352	0.107	0.0167	< 0.0100
Total cPAHs	0.108	0.0459	0.0474	0.0350

Notes:

cPAHs are *italicized*.

Total cPAHs include sum of detections. Half of reporting limit used for non-detects.

1/ Total cPAHs MTCA Method A cleanup level

< symbol indicates that result is less than method reporting limit

mg/kg = milligrams per kilogram

**Table 2-11. VPH and EPH Analytical Results from 2002 Lower Tank Yard Investigation
 Soil Samples**

	01MW-21-5 (mg/kg)	01MW-23-5 (mg/kg)	01MW-24-5 (mg/kg)	01MW-29-5 (mg/kg)	LR01-5 (mg/kg)	LR03-5 (mg/kg)	LR05-5 (mg/kg)	LR07-5 (mg/kg)
Volatile Petroleum Hydrocarbons								
C5-C6 Aliphatics	< 5.00	< 20.0	< 25.0	< 5.00	< 50.0	< 5.00	< 50.0	< 50.0
C6-C8 Aliphatics	< 5.00	43.1	46.1	< 5.00	94.9	< 5.00	< 50.0	< 50.0
C8-C10 Aliphatics	< 5.00	89.9	97.7	< 5.00	145	< 5.00	61.7	< 50.0
C10-C12 Aliphatics	< 5.00	141	138	7.99	258	11.3	104	162
C8-C10 Aromatics	< 5.00	87.6	85.9	< 5.00	123	< 5.00	68.4	< 50.0
C10-C12 Aromatics	< 5.00	230	157	9.35	490	23.4	237	275
C12-C13 Aromatics	< 5.00	289	217	15.5	939	63.4	558	487
Total VPH	< 5.00	880	742	32.9	2050	98.1	968	924
Extractable Petroleum Hydrocarbons								
C8-C10 Aliphatics	< 5.00	42.9	60.0	7.55	105	8.49	42.0	22.6
C10-C12 Aliphatics	< 5.00	149	168	22.3	400	42.3	151	201
C12-C16 Aliphatics	< 5.00	484	512	49.8	1460	204	669	563
C16-C21 Aliphatics	< 5.00	330	284	24.3	924	134	480	262
C21-C34 Aliphatics	< 5.00	112	63.9	< 5.00	< 50.0	8.98	44.1	47.4
C10-C12 Aromatics	< 5.00	42.9	42.3	5.87	165	12.2	35.9	41.7
C12-C16 Aromatics	< 5.00	163	153	26.4	1140	127	224	185
C16-C21 Aromatics	< 5.00	260	178	23.1	1540	139	452	214
C21-C34 Aromatics	< 5.00	93.5	20.6	< 5.00	< 50.0	< 50.0	36.3	29.4
EPH	< 5.00	1680	1480	159	5730	677	2130	1570

Notes:

< symbol indicates that result is less than method reporting limit

mg/kg = milligrams per kilogram

VPH = volatile petroleum hydrocarbons

EPH = extractable petroleum hydrocarbons

Table 2-12. Summary of Quarterly Groundwater Monitoring Analytical Results Above Cleanup Levels (Page 1 of 3)

Sample	Date	PCP (µg/L)	Diesel (mg/L)	Oil (mg/L)	Gas (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)	Total Lead (µg/L)	Dissolved Lead (µg/L)
MTCA ^{1/}		15 ^{2/}	0.5	0.5	800 ^{3/} 1,000 ^{4/}	5,300 ^{5/}	17,500 ^{5/}	32,000 ^{5/}	1,000	15	15
01MW-01	Jul-01	3.94	1.11	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	na
01MW-01	Oct-01	3.55	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-01	Jan-02	2.02	< 0.250	< 0.500	51.5	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-01	Apr-02	2.84	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-01	Jul-02	6.84	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-01A	Oct-02	6.37	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	na	na
01MW-01B	Oct-02	7.13	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	na	na
01MW-02	Jul-01	na	5.01	< 1.50	14,800	6,900	162	262	1,110	< 1.00	na
01MW-02	Oct-01	< 0.500	0.264	< 0.500	10,100	4,290	71.2	159	741	< 1.00	< 1.00
01MW-02	Jan-02	< 0.500	0.330	< 0.500	13,000	3,280	645	373	1,610	< 1.00	< 1.00
01MW-02	Apr-02	< 0.500	0.479	< 0.500	27,500	11,200	658	340	1,390	< 1.00	< 1.00
01MW-02A	Jul-02	< 0.500	0.377	< 0.500	17,500	7,060	250	230	970	< 1.00	< 1.00
01MW-02B	Jul-02	< 0.500	0.294	< 0.500	17,600	6,380	230	212	892	< 1.00	< 1.00
01MW-02	Oct-02	na	0.412	< 0.500	10,700	2,780	888	303	1,580	na	na
01MW-03	Jul-01	na	2.84	< 1.50	24,500	11,900	238	414	515	< 1.00	na
01MW-03A	Oct-01	< 0.500	0.491	< 0.500	18,500	11,700	82.1	237	138	< 1.00	< 1.00
01MW-03B	Oct-01	2.24	0.379	< 0.500	9,200	4,330	39.9	114	66.3	< 1.00	< 1.00
01MW-03A	Jan-02	< 0.500	0.443	< 0.500	1,070	98.8	4.56	7.94	9.53	< 1.00	< 1.00
01MW-03B	Jan-02	< 0.500	0.440	< 0.500	1,070	98.3	4.45	8.28	9.36	< 1.00	< 1.00
01MW-03A	Apr-02	< 0.500	0.427	< 0.500	753	50.8	3.68	9.85	9.23	< 1.00	< 1.00
01MW-03B	Apr-02	< 0.500	0.463	< 0.500	751	62.7	4.65	12.2	11.1	1.17	< 1.00
01MW-03	Jul-02	< 0.500	0.512	< 0.500	21,000	8,990	416	324	588	< 1.00	< 1.00
01MW-03	Oct-02	na	0.897	< 0.500	18,000	8,350	97.5	244	671	na	na
01MW-04	Jul-01	na	1.79	< 1.50	6,460	1,210	204	134	1,470	< 1.00	na
01MW-04	Oct-01	< 0.500	0.398	< 0.500	4,020	68.1	82.3	261	1,130	< 1.00	< 1.00
01MW-04	Jan-02	< 0.500	< 0.250	< 0.500	5,920	< 25.0	123	486	2,030	< 1.00	< 1.00
01MW-04	Apr-02	< 0.500	< 0.250	< 0.500	840	< 1.25	10.7	76	342	< 1.00	< 1.00
01MW-04	Jul-02	< 0.500	< 0.250	< 0.500	17,300	4,130	1,360	309	1,470	< 1.00	< 1.00
01MW-04	Oct-02	na	na	na	na	na	na	na	na	na	na
01MW-06	Jul-01	2.17	0.718	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	na
01MW-06	Oct-01	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-06	Jan-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-06	Apr-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-06	Jul-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-06	Oct-02	na	na	na	na	na	na	na	na	na	na

Table 2-12. Summary of Quarterly Groundwater Monitoring Analytical Results Above Cleanup Levels (Page 2 of 3)

Sample	Date	PCP (µg/L)	Diesel (mg/L)	Oil (mg/L)	Gas (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)	Total Lead (µg/L)	Dissolved Lead (µg/L)	
MTCA ^{1/}		15 ^{2/}	0.5	0.5	800 ^{3/} , 1,000 ^{4/}	5,300 ^{5/}	17,500 ^{5/}	32,000 ^{5/}	1,000	15	15	
01MW-07	Jul-01	na	1.45	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	na	
01MW-07	Oct-01	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	1.11	< 1.00	
01MW-07	Jan-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00	
01MW-07	Apr-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00	
01MW-07	Jul-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00	
01MW-07	Oct-02	na	na	na	na	na	na	na	na	na	na	
01MW-08	Jul-01	na	0.662	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	na	
01MW-08	Oct-01	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00	
01MW-08	Jan-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00	
01MW-08	Apr-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00	
01MW-08	Jul-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00	
01MW-08	Oct-02	na	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	na	na	
01MW-09	Jul-01	na	5.72	< 0.500	1,830	213	114	48.1	230	< 1.00	< 1.00	
01MW-09	Oct-01	< 0.500	0.336	< 0.500	6,940	1,030	422	247	1,250	1.16	< 1.00	
01MW-09	Jan-02	< 0.500	< 0.250	< 0.500	480	67.2	32.4	17.6	81.1	1.01	3.58	
01MW-09	Apr-02	< 0.500	< 0.250	< 0.500	860	134	37	25.0	106	1.16	< 1.00	
01MW-09	Jul-02	No Sample Collected Due to Product										
01MW-09	Oct-02	na	No Sample Collected Due to Product							na	na	
01MW-11	Jul-01	na	1.53	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	na	
01MW-11	Oct-01	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00	
01MW-11	Jan-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00	
01MW-11	Apr-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00	
01MW-11	Jul-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00	
01MW-11	Oct-02	na	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	na	na	
01MW-12	Jul-01	na	6.55	< 1.50	1,350	482	8.84	14.0	26.4	< 1.00	na	
01MW-12	Oct-01	1.68	0.731	< 0.500	1,300	385	9.22	14.0	24.8	< 1.00	< 1.00	
01MW-12	Jan-02	< 0.500	< 0.250	< 0.500	1,130	360	8.11	11.7	22.1	< 1.00	< 1.00	
01MW-12	Apr-02	< 0.500	< 0.250	< 0.500	1,600	545	7.37	11.9	21.7	< 1.00	< 1.00	
01MW-12	Jul-02	< 0.500	< 0.250	< 0.500	1,720	671	9.65	15.8	24.9	< 1.00	< 1.00	
01MW-12	Oct-02	na	< 0.250	< 0.500	1,710	619	7.70	9.31	18.0	na	na	
01MW-13	Jul-01	na	3.90	< 1.50	221	1.26	< 0.500	< 0.500	2.31	< 1.00	na	
01MW-13	Oct-01	2.73	1.29	< 0.500	207	1.28	< 0.500	< 0.500	2.06	< 1.00	< 1.00	
01MW-13	Jan-02	< 0.500	< 0.250	< 0.500	160	< 0.500	< 0.500	< 0.500	1.62	< 1.00	< 1.00	
01MW-13	Apr-02	< 0.500	< 0.250	< 0.500	204	0.978	< 0.500	0.533	2.00	< 1.00	< 1.00	
01MW-13	Jul-02	< 0.500	< 0.250	< 0.500	304	1.19	< 0.500	< 0.500	2.86	< 1.00	< 1.00	
01MW-13	Oct-02	na	< 0.250	< 0.500	149	< 0.500	< 0.500	< 0.500	1.55	na	na	

Table 2-12. Summary of Quarterly Groundwater Monitoring Analytical Results Above Cleanup Levels (Page 3 of 3)

Sample	Date	PCP (µg/L)	Diesel (mg/L)	Oil (mg/L)	Gas (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)	Total Lead (µg/L)	Dissolved Lead (µg/L)
MTCA ^{1/}		15 ^{2/}	0.5	0.5	800 ^{3/} 1,000 ^{4/}	5,300 ^{5/}	17,500 ^{5/}	32,000 ^{5/}	1,000	15	15
01MW-15	Jul-01	1.66	0.484	<0.500	< 50.0	< 0.500	< 0.500	< 0.500	<1.00	< 1.00	na
01MW-15	Oct-01	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-15	Jan-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-15	Apr-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-15	Jul-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-15	Oct-02	na	na	na	na	na	na	na	na	na	na
01MW-16A	Jul-01	2.54	11.1	<2.50	11,000	3,910	123	261	891	< 1.00	na
01MW-16B	Jul-01	2.09	9.62	<2.50	9,390	3,700	122	209	745	< 1.00	< 1.00
01MW-16	Oct-01	< 0.500	0.448	< 0.500	11,500	3,670	113	274	984	< 1.00	< 1.00
01MW-16	Jan-02	< 0.500	0.674	< 0.500	13,400	5,300	116	250	906	< 1.00	< 1.00
01MW-16	Apr-02	No Sample Collected Due to Product									
01MW-16	Jul-02	No Sample Collected Due to Product									
01MW-16	Oct-02	na	No Sample Collected Due to Product							na	na
01MW-17	Jul-01	<0.500	0.884	<0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	na
01MW-17	Oct-01	1.65	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-17	Jan-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-17	Apr-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-17	Jul-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00	< 1.00
01MW-17	Oct-02	na	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	na	na
01MW-18	Jul-02	No Sample Collected Due to Product									
01MW-19	Jul-02	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	2.88	< 1.00
01MW-20	Jul-02	< 0.500	< 0.250	< 0.500	16,700	1,640	1,390	468	2,840	3.45	< 1.00

Notes:

- Detections above cleanup levels are indicated in **bold italics**.
- 1/ MTCA Method A cleanup level, unless otherwise noted
- 2/ NOAA SQuiRT value for freshwater continuous concentration
- 3/ MTCA Method A gasoline range with benzene present
- 4/ MTCA Method A gasoline range without benzene present
- 5/ NOAA SQuiRT value for freshwater maximum concentration
- < symbol indicates result is less than method reporting limit
- na = No analysis requested
- mg/L = milligrams per liter
- µg/L = micrograms per liter

Table 4-1. Analytical Results from Pre-DPE Pilot Test Soil Samples Above Cleanup Levels

Sample	Diesel (mg/kg)	Oil (mg/kg)	Gas (mg/kg)		Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Lead (mg/kg)
			30	100					
MTCA ^{1/}	2,000	2,000	30	100	0.03	7	6	9	250
SB-65-5	< 10.0	< 25.0	< 5.00		< 0.0300	< 0.0500	< 0.0500	< 0.100	4.17
SB-65-10	< 10.0	< 25.0	< 5.00		< 0.0300	< 0.0500	< 0.0500	< 0.100	4.96
SB-65-15	676	< 25.0	278		< 0.0300	0.519	1.74	6.47	4.35
SB-65-20	< 10.0	< 25.0	220		0.317	0.703	1.53	6.37	2.08
SB-65-25	< 10.0	< 25.0	< 5.00		< 0.0300	< 0.0500	< 0.0500	< 0.100	5.94
SB-65-30	< 10.0	< 25.0	< 5.00		< 0.0300	< 0.0500	< 0.0500	< 0.100	4.02
SB-66-5	42.9	70.1	< 5.00		< 0.0300	< 0.0500	< 0.0500	< 0.100	55.50
SB-66-10	17.9	29.3	< 5.00		< 0.0300	< 0.0500	< 0.0500	< 0.100	18.90
SB-66-15	< 10.0	< 25.0	11.2		0.292	< 0.0500	0.118	2.52	2.53
SB-66-20	< 10.0	< 25.0	< 5.00		< 0.0300	< 0.0500	< 0.0500	0.136	2.44
SB-66-25	< 10.0	< 25.0	< 5.00		< 0.0300	< 0.0500	< 0.0500	< 0.100	6.14
SB-67-5	112	75.2	< 5.00		< 0.0300	< 0.0500	< 0.0500	< 0.100	21.1
SB-67-10	< 10.0	< 25.0	< 5.00		< 0.0300	< 0.0500	< 0.0500	< 0.100	5.18
SB-67-15	< 10.0	< 25.0	7.23		< 0.0300	0.230	0.149	0.843	2.47
SB-67-20	< 10.0	< 25.0	< 5.00		< 0.0300	< 0.0500	< 0.0500	< 0.100	2.34
SB-67-25	< 10.0	< 25.0	< 5.00		< 0.0300	< 0.0500	< 0.0500	< 0.100	5.58

Notes:

Detections above cleanup levels are indicated in **bold italics**.

SB-65 completed as well 01MW-18

SB-66 completed as well 01MW-19

SB-67 completed as well 01MW-20

1/ MTCA Method A cleanup level for unrestricted land use

< symbol indicates result is less than method reporting limit

mg/kg = milligram per kilogram

Table 4-2. Analytical Results from Pre-DPE Pilot Test Groundwater Samples Above Cleanup Levels

Sample	PCP ($\mu\text{g/L}$)	Diesel (mg/L)	Oil (mg/L)	Gasoline ($\mu\text{g/L}$)		Benzene ($\mu\text{g/L}$)	Toluene (mg/L)	Ethyl- benzene ($\mu\text{g/L}$)	Xylenes (mg/L)	Total Lead ($\mu\text{g/L}$)	Dissolved Lead ($\mu\text{g/L}$)
				800 ^{3/}	1,000 ^{4/}						
MTCA ^{1/}	15 ^{2/}	0.5	5,300 ^{5/}	800 ^{3/}	1,000 ^{4/}	5,300 ^{5/}	17,500 ^{5/}	32,000 ^{5/}	1,000	15	15
01MW-02	< 0.500	3.81	0.560	21,600		6,620	528	310	1,380	< 1.00	< 1.00
01MW-03	< 0.500	1.75	< 0.500	14,300		5,270	72.7	134	207	< 1.00	< 1.00
01MW-04	< 0.500	0.655	< 0.500	6,630		22.8	78.0	341	1,440	< 1.00	< 1.00
01MW-05	< 0.500	2.71	< 0.500	16,500		1,670	1,390	417	2,080	< 1.00	< 1.00
01MW-09	< 0.500	1.75	< 0.500	8,080		985	465	223	1,050	1.19	< 1.00
01MW-18	< 0.500	2.12	< 0.500	22,300		3,000	1,360	593	3,180	1.97	1.26
01MW-19	< 0.500	0.597	< 0.500	341		2.94	24.4	14.0	58.2	< 1.00	< 1.00
01MW-20	< 0.500	2.25	< 0.500	31,500		3,910	2,880	768	4,500	1.36	< 1.00

Notes:

Detections above cleanup levels are indicated in **bold italics**.

1/ MTCA Method A cleanup level, unless otherwise noted

2/ NOAA SQuiRT value for freshwater continuous concentrations

3/ MTCA Method A gasoline range with benzene present

4/ Gasoline range without benzene present

5/ NOAA SQuiRT value for freshwater maximum concentration

< symbol indicates that result is less than method reporting limit

$\mu\text{g/L}$ = micrograms per liter

mg/L = milligrams per liter

Table 4-3. Analytical Results from DPE Pilot Test Air Samples

Sample	Date Sampled	Time Sampled	Non-Methane Organics as Methane (ppm _v)	C ₂ as Ethane (ppb _v)	C ₃ as Propane (ppb _v)	C ₄ as Butane (ppb _v)	C ₅ as n-Pentane (ppb _v)	C ₆ as n-Hexane (ppb _v)	C ₇ as n-Heptane (ppb _v)	C ₈ as n-Octane (ppb _v)	C ₉ as n-Nonane (ppb _v)	C ₁₀ as n-Decane (ppb _v)	Gasoline (ppm _v)	Benzene (ppm _v)	Toluene (ppm _v)	Ethylbenzene (ppm _v)	Xylenes (ppm _v)
01MW-18SVO1	7/08/02	17:30	--	--	--	--	--	--	--	--	--	--	776	5.27	3.33	3.43	12.9
01MW-18SVO2	7/09/02	08:15	--	--	--	--	--	--	--	--	--	--	482	4.90	3.38	1.85	6.74
01MW-18SVO3	7/09/02	16:30	--	--	--	--	--	--	--	--	--	--	1,580	12.3	10.6	5.72	20.7
MW-18	7/11/02	08:00	11,000	8,200	< 2,500	210,000	440,000	340,000	310,000	180,000	79,000	27,000	--	55	47	9.6	41.2
MW-9	7/11/02	12:30	48,000	14,000	6,500	570,000	1,500,000	1,600,000	1,400,000	670,000	220,000	61,000	--	53	44	8.7	36.1
MW-10	7/11/02	14:28	70,000	84,000	72,000	2,500,000	1,700,000	1,200,000	1,100,000	690,000	320,000	120,000	--	93	35	14	55
MW-5	7/12/02	06:53	8,400	3,200	< 2,500	210,000	480,000	310,000	200,000	80,000	27,000	13,000	--	10	11	1.3	5.5

Notes:

Analytical results reported in ppm and ppb are on a volume per volume basis.

Samples taken after 7/09/02 at 10:40 may have higher contaminant concentrations due to the closure of a relief valve.

< symbol indicates that result is less than method reporting limit

-- = parameter not analyzed

Table 4-4. Analytical Results from Post-DPE Pilot Test Groundwater Samples Above Cleanup Levels

Sample	PCP ($\mu\text{g/L}$)	Diesel (mg/L)	Oil (mg/L)	Gasoline ($\mu\text{g/L}$)		Benzene ($\mu\text{g/L}$)	Toluene (mg/L)	Ethyl- benzene ($\mu\text{g/L}$)	Xylenes (mg/L)	Total Lead ($\mu\text{g/L}$)	Dissolved Lead ($\mu\text{g/L}$)
MTCA ^{1/}	15 ^{2/}	0.5	0.5	800 ^{3/}	1,000 ^{4/}	5,300 ^{5/}	17,500 ^{5/}	32,000 ^{5/}	1,000	15	15
01MW-02	< 0.500	0.377	< 0.500	17,500	7,060	250	230	970	< 1.00	< 1.00	
01MW-03	< 0.500	0.512	< 0.500	21,000	8,990	416	324	588	< 1.00	< 1.00	
01MW-04	< 0.500	0.461	< 0.500	17,300	4,130	1,360	309	1,470	< 1.00	< 1.00	
01MW-19	< 0.500	< 0.250	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	2.88	< 1.00	
01MW-20	< 0.500	0.378	< 0.500	16,700	1,640	1,390	468	2,840	3.45	< 1.00	

Notes:

Detections above cleanup levels are indicated in **bold italics**.

Wells 01MW-05, -09, and -18 were not sampled at this time due to the presence of product.

1/ MTCA Method A cleanup level, unless otherwise noted

2/ NOAA SQuiRT value for freshwater continuous concentrations

3/ MTCA Method A gasoline range with benzene present

4/ Gasoline range without benzene present

5/ NOAA SQuiRT value for freshwater maximum concentration

< symbol indicates that result is less than method reporting limit

$\mu\text{g/L}$ = micrograms per liter

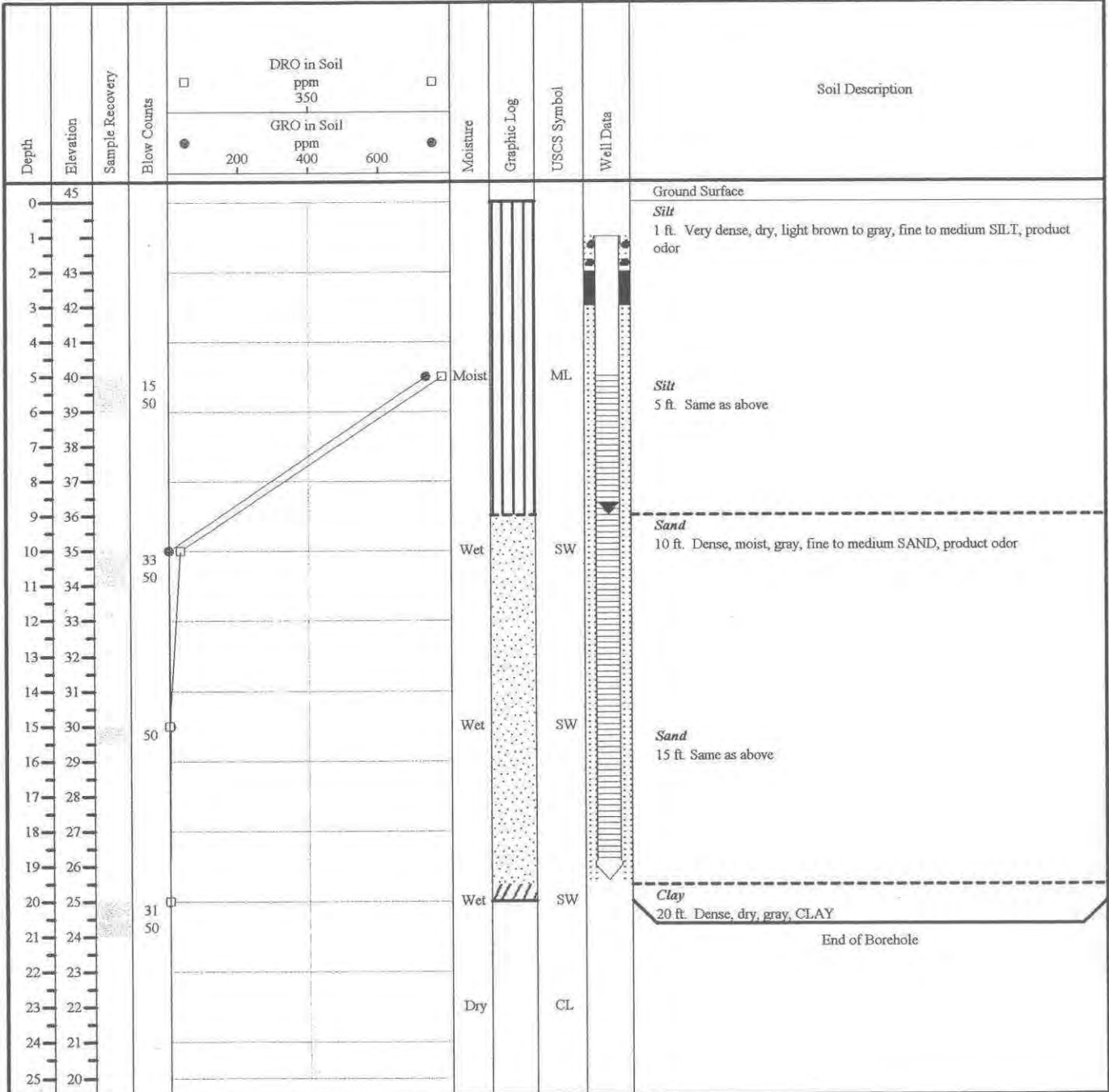
mg/L = milligrams per liter

APPENDIX A
BORING LOGS

FOSTER WHEELER ENVIRONMENTAL

PROJECT NAME: CAP Well Installation
BORING NUMBER: 01MW-23
LOCATION: 2737 West Commodore Way
AREA: Lower Tank Yard
CLIENT: Time Oil Company
SITE MANAGER: Scott Sloan, RG

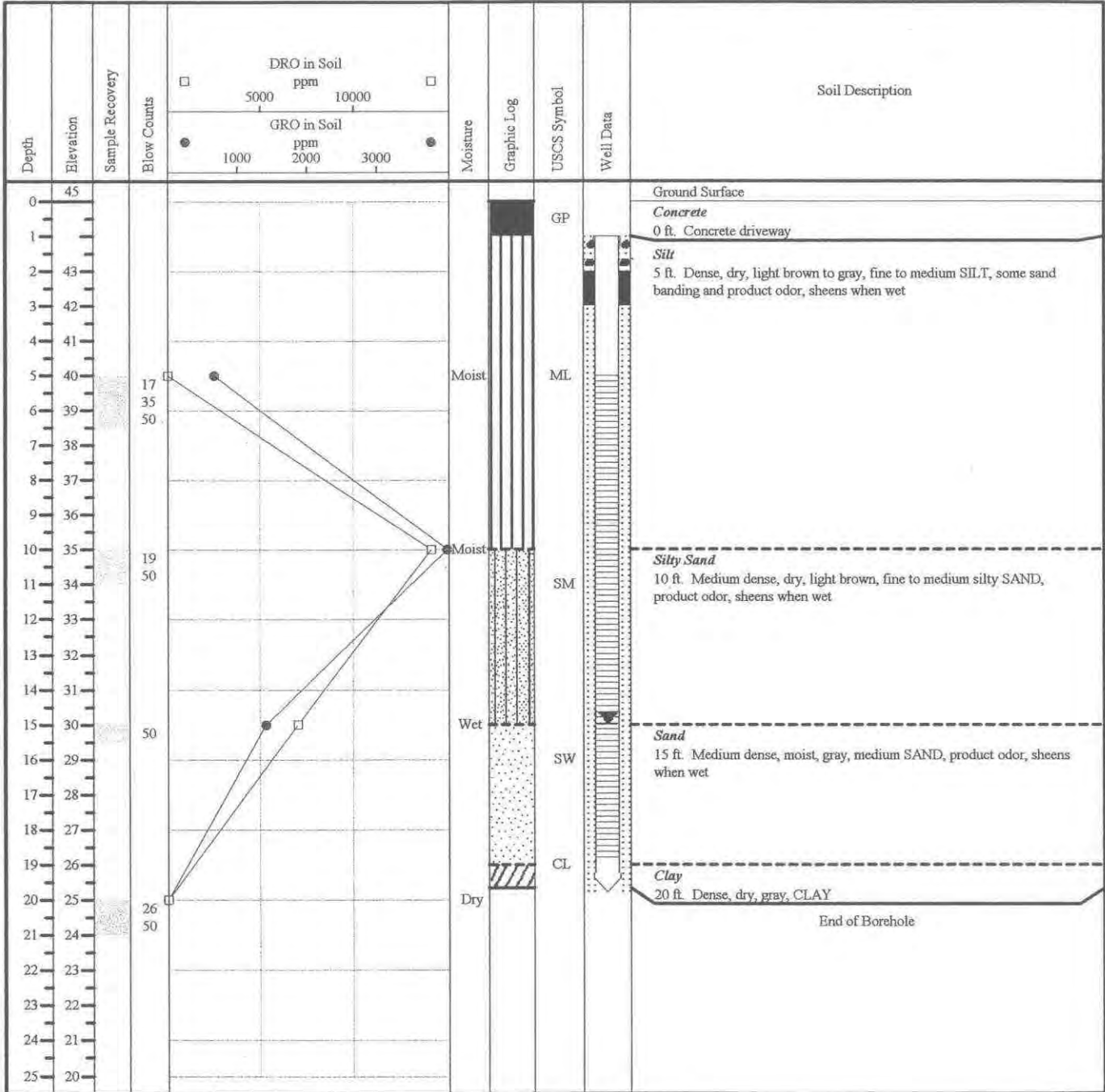
DRILLING METHOD: 4-inch HSA
DRILLING CONTRACTOR: Cascade Drilling
DATE/TIME STARTED: 12/02/02 1440
DATE/TIME COMPLETED: 12/02/02 1600
TOTAL DEPTH: 20 ft
WATER DEPTH: 9 ft



FOSTER WHEELER ENVIRONMENTAL

PROJECT NAME: CAP Well Installation
BORING NUMBER: 01MW-26
LOCATION: 2737 West Commodore Way
AREA: West of Lower Tank Yard
CLIENT: Time Oil Company
SITE MANAGER: Scott Sloan, RG

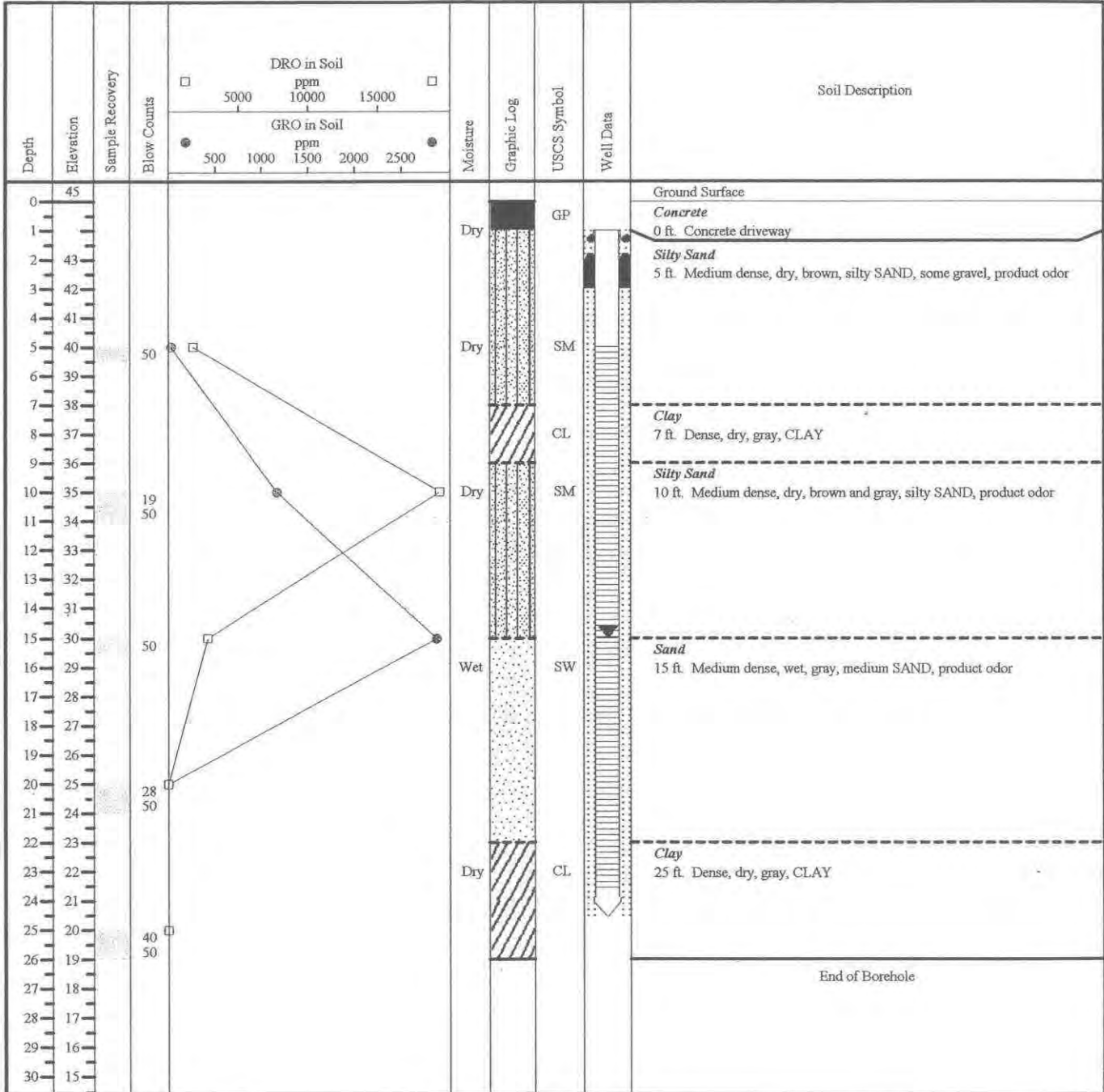
DRILLING METHOD: 4-inch HSA
DRILLING CONTRACTOR: Cascade Drilling
DATE/TIME STARTED: 12/04/02 0815
DATE/TIME COMPLETED: 12/04/02 0940
TOTAL DEPTH: 20 ft
WATER DEPTH: 15 ft



FOSTER WHEELER ENVIRONMENTAL

PROJECT NAME: CAP Well Installation
BORING NUMBER: 01MW-28
LOCATION: 2737 West Commodore Way
AREA: West of Lower Tank Yard
CLIENT: Time Oil Company
SITE MANAGER: Scott Sloan, RG

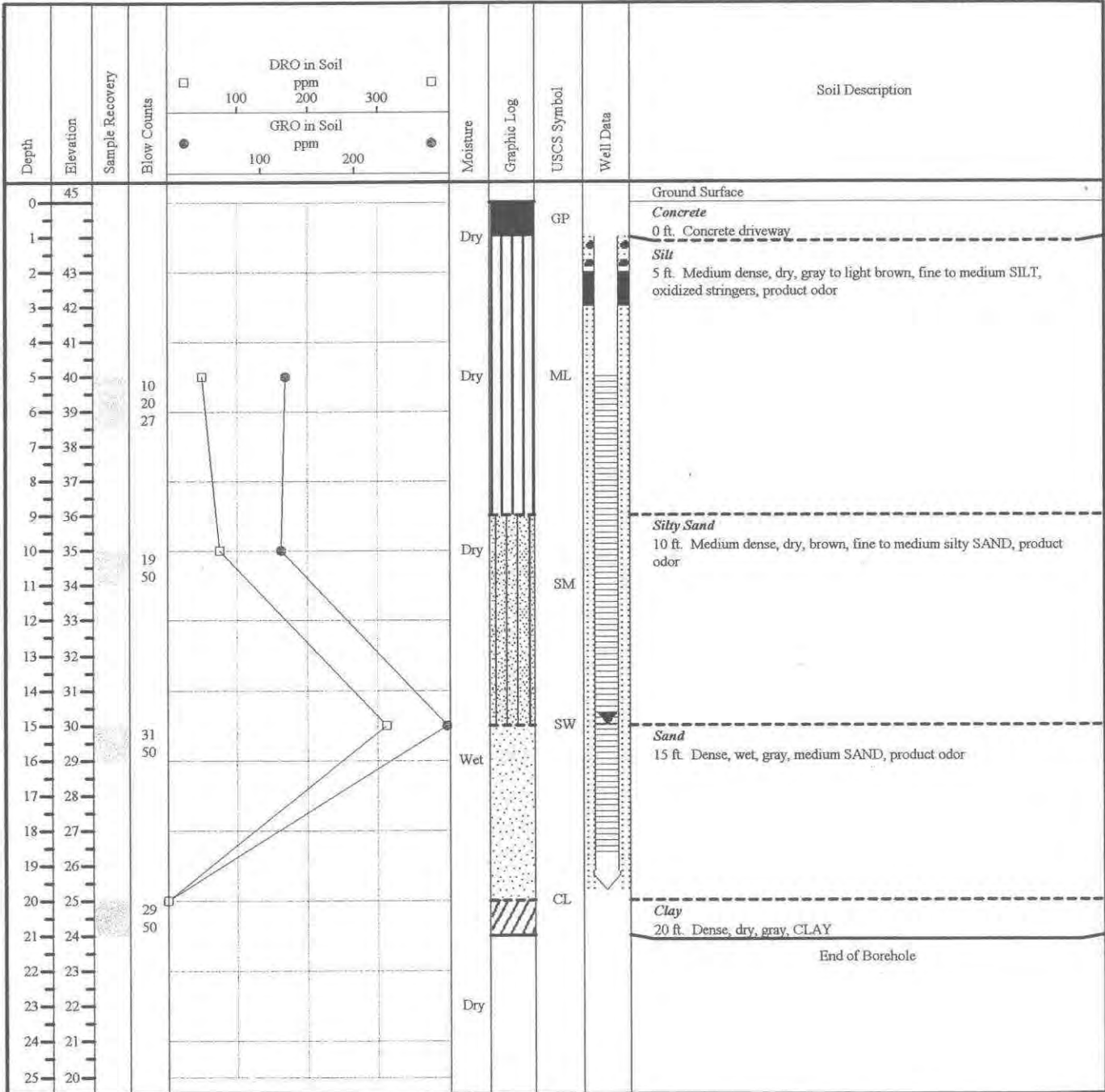
DRILLING METHOD: 4-inch HSA
DRILLING CONTRACTOR: Cascade Drilling
DATE/TIME STARTED: 12/05/02 1415
DATE/TIME COMPLETED: 12/05/02 1530
TOTAL DEPTH: 25 ft
WATER DEPTH: 14 ft



FOSTER WHEELER ENVIRONMENTAL

PROJECT NAME: CAP Well Installation
BORING NUMBER: 01MW-29
LOCATION: 2737 West Commodore Way
AREA: West of Lower Tank Yard
CLIENT: Time Oil Company
SITE MANAGER: Scott Sloan, RG

DRILLING METHOD: 4-inch HSA
DRILLING CONTRACTOR: Cascade Drilling
DATE/TIME STARTED: 12/05/02 1415
DATE/TIME COMPLETED: 12/05/02 1530
TOTAL DEPTH: 25 ft
WATER DEPTH: 14 ft



APPENDIX B
LABORATORY ANALYTICAL RESULTS

DPE Pilot Test Well Analytical Results – March 2002

Pre-DPE Pilot Test Groundwater Sample Analytical Results – July 2002

DPE Pilot Test Air Sample Analytical Results – July 2002

CAP Well Analytical Results – December 2002

Time Oil Company
Cleanup Action Plan for
Petroleum-Impacted Soil and Groundwater
2737 West Commodore Way

May 2003

**DPE PILOT TEST WELL
ANALYTICAL RESULTS**

MARCH 2002



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541.383.9310 fax 541.382.7588

12 July 2002

Bryan Graham
Foster Wheeler Environmental Corporation
12100 NE 195th St
Bothell, WA/USA 98011
RE: DPE Pilot Test

Enclosed are the results of analyses for samples received by the laboratory on 07/09/02 11:05. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Amar Gill
Project Manager



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Pilot Test
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 07/12/02 16:09

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
01MW18SVO1	B2G0143-01	Air	07/08/02 17:30	07/09/02 11:05
01MW18SVO2	B2G0143-02	Air	07/09/02 08:15	07/09/02 11:05

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

North Creek Analytical, Inc.
Environmental Laboratory Network



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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Pilot Test
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 07/12/02 16:09

**Gasoline Hydrocarbons (Benzene to Napthalene) and BTEX in Air by NWTPH-G and EPA 8021B
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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01MW18SVO1 (B2G0143-01) Air Sampled: 07/08/02 17:30 Received: 07/09/02 11:05

Gasoline Range Hydrocarbons	3290	50.0	mg/m ³ Air	5	2G11005	07/11/02	07/11/02	NWTPH Modified	
Benzene	17.1	0.500	"	"	"	"	"	"	
Toluene	12.8	0.500	"	"	"	"	"	"	
Ethylbenzene	15.1	0.500	"	"	"	"	"	"	
Xylenes (total)	57.0	1.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	186 %	58-131			"	"	"	"	S-04
Surrogate: 4-BFB (PID)	102 %	63-129			"	"	"	"	
Gasoline Range Hydrocarbons (v/v)	776	11.8	ppmv	5	"	"	"	"	
Benzene (v/v)	5.27	0.154	"	"	"	"	"	"	
Toluene (v/v)	3.33	0.130	"	"	"	"	"	"	
Ethylbenzene (v/v)	3.43	0.114	"	"	"	"	"	"	
Xylenes, total (v/v)	12.9	0.227	"	"	"	"	"	"	

01MW18SVO2 (B2G0143-02) Air Sampled: 07/09/02 08:15 Received: 07/09/02 11:05

Gasoline Range Hydrocarbons	2050	50.0	mg/m ³ Air	5	2G11005	07/11/02	07/11/02	NWTPH Modified	
Benzene	15.9	0.500	"	"	"	"	"	"	
Toluene	12.9	0.500	"	"	"	"	"	"	
Ethylbenzene	8.14	0.500	"	"	"	"	"	"	
Xylenes (total)	29.7	1.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	145 %	58-131			"	"	"	"	S-04
Surrogate: 4-BFB (PID)	97.0 %	63-129			"	"	"	"	
Gasoline Range Hydrocarbons (v/v)	482	11.8	ppmv	5	"	"	"	"	
Benzene (v/v)	4.90	0.154	"	"	"	"	"	"	
Toluene (v/v)	3.38	0.130	"	"	"	"	"	"	
Ethylbenzene (v/v)	1.85	0.114	"	"	"	"	"	"	
Xylenes, total (v/v)	6.74	0.227	"	"	"	"	"	"	

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Page 2 of 5



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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Pilot Test
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 07/12/02 16:09

Gasoline Hydrocarbons (Benzene to Napthalene) and BTEX in Air by NWTPH-G and EPA 8021B - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch 2G11005: Prepared 07/11/02 Using EPA 5030B (P/T)

Blank (2G11005-BLK1)

Gasoline Range Hydrocarbons	ND	10.0	mg/m ³ Air							
Gasoline Range Hydrocarbons (v/v)	ND	2.36	ppmv							
Benzene	ND	0.100	mg/m ³ Air							
Benzene (v/v)	ND	0.0308	ppmv							
Toluene	ND	0.100	mg/m ³ Air							
Toluene (v/v)	ND	0.0261	ppmv							
Ethylbenzene	ND	0.100	mg/m ³ Air							
Ethylbenzene (v/v)	ND	0.0227	ppmv							
Xylenes (total)	ND	0.200	mg/m ³ Air							
Xylenes, total (v/v)	ND	0.0454	ppmv							
ate: 4-BFB (FID)	9.27		mg/m ³ Air	9.60		96.6	58-131			
Surrogate: 4-BFB (PID)	9.63		"	9.60		100	63-129			

LCS (2G11005-BS1)

Gasoline Range Hydrocarbons	64.0	10.0	mg/m ³ Air	100		64.0	50-150			
Surrogate: 4-BFB (FID)	8.77		"	9.60		91.4	58-131			

LCS (2G11005-BS2)

Benzene	1.80	0.100	mg/m ³ Air	2.00		90.0	50-150			
Toluene	1.78	0.100	"	2.00		89.0	50-150			
Ethylbenzene	1.72	0.100	"	2.00		86.0	50-150			
Xylenes (total)	5.40	0.200	"	6.00		90.0	50-150			
Surrogate: 4-BFB (PID)	9.99		"	9.60		104	63-129			

LCS Dup (2G11005-BSD1)

Gasoline Range Hydrocarbons	52.4	10.0	mg/m ³ Air	100		52.4	50-150	19.9	50	
Surrogate: 4-BFB (FID)	7.73		"	9.60		80.5	58-131			

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

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Page 3 of 5



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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Pilot Test
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 07/12/02 16:09

Gasoline Hydrocarbons (Benzene to Napthalene) and BTEX in Air by NWTPH-G and EPA 8021B - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch 2G11005: Prepared 07/11/02 Using EPA 5030B (P/T)

LCS Dup (2G11005-BSD2)

Benzene	1.71	0.100	mg/m ³ Air	2.00		85.5	50-150	5.13	50	
Toluene	1.65	0.100	"	2.00		82.5	50-150	7.58	50	
Ethylbenzene	1.62	0.100	"	2.00		81.0	50-150	5.99	50	
Xylenes (total)	5.13	0.200	"	6.00		85.5	50-150	5.13	50	
<i>Surrogate: 4-BFB (PID)</i>	<i>11.1</i>		<i>"</i>	<i>9.60</i>		<i>116</i>	<i>63-129</i>			

Duplicate (2G11005-DUP1)

Source: B2G0143-01

Gasoline Range Hydrocarbons	2950	1000	mg/m ³ Air		3290			10.9	30	
<i>Surrogate: 4-BFB (FID)</i>	<i>10.2</i>		<i>"</i>	<i>9.60</i>		<i>106</i>	<i>58-131</i>			

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Pilot Test
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 07/12/02 16:09

Notes and Definitions

- S-04 The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

North Creek Analytical - Bothell

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Amar Gill, Project Manager

North Creek Analytical, Inc.
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15 July 2002

Bryan Graham
Foster Wheeler Environmental Corporation
12100 NE 195th St
Bothell, WA/USA 98011
RE: DPE Pilot Test

Enclosed are the results of analyses for samples received by the laboratory on 07/10/02 10:40. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Amar Gill
Project Manager



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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Pilot Test
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 07/15/02 13:40

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
01MW18SV03	B2G0173-01	Air	07/09/02 16:30	07/10/02 10:40

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

North Creek Analytical, Inc.
Environmental Laboratory Network



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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Pilot Test
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 07/15/02 13:40

Gasoline Hydrocarbons (Benzene to Napthalene) and BTEX in Air by NWTPH-G and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW18SV03 (B2G0173-01) Air Sampled: 07/09/02 16:30 Received: 07/10/02 10:40									
Gasoline Range Hydrocarbons	6690	50.0	mg/m³ Air	5	2G11005	07/11/02	07/11/02	NWTPH Modified	
Benzene	40.0	0.500	"	"	"	"	"	"	
Toluene	40.6	0.500	"	"	"	"	"	"	
Ethylbenzene	25.2	0.500	"	"	"	"	"	"	
Xylenes (total)	91.3	1.00	"	"	"	"	"	"	
<i>Surrogate: 4-BFB (FID)</i>	<i>%</i>	<i>58-131</i>			<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>S-02</i>
<i>Surrogate: 4-BFB (PID)</i>	<i>107 %</i>	<i>63-129</i>			<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
Gasoline Range Hydrocarbons (v/v)	1580	11.8	ppmv	5	"	"	"	"	
Benzene (v/v)	12.3	0.154	"	"	"	"	"	"	
Toluene (v/v)	10.6	0.130	"	"	"	"	"	"	
Ethylbenzene (v/v)	5.72	0.114	"	"	"	"	"	"	
Xylenes, total (v/v)	20.7	0.227	"	"	"	"	"	"	

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

North Creek Analytical, Inc.
Environmental Laboratory Network



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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Pilot Test
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 07/15/02 13:40

Gasoline Hydrocarbons (Benzene to Napthalene) and BTEX in Air by NWTPH-G and EPA 8021B - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch 2G11005: Prepared 07/11/02 Using EPA 5030B (P/T)

Blank (2G11005-BLK1)

Gasoline Range Hydrocarbons	ND	10.0	mg/m ³ Air							
Gasoline Range Hydrocarbons (v/v)	ND	2.36	ppmv							
Benzene	ND	0.100	mg/m ³ Air							
Benzene (v/v)	ND	0.0308	ppmv							
Toluene	ND	0.100	mg/m ³ Air							
Toluene (v/v)	ND	0.0261	ppmv							
Ethylbenzene	ND	0.100	mg/m ³ Air							
Ethylbenzene (v/v)	ND	0.0227	ppmv							
Xylenes (total)	ND	0.200	mg/m ³ Air							
Xylenes, total (v/v)	ND	0.0454	ppmv							
Surrogate: 4-BFB (FID)	9.27		mg/m ³ Air	9.60		96.6	58-131			
Surrogate: 4-BFB (PID)	9.63		"	9.60		100	63-129			

LCS (2G11005-BS1)

Gasoline Range Hydrocarbons	64.0	10.0	mg/m ³ Air	100		64.0	50-150			
Surrogate: 4-BFB (FID)	8.77		"	9.60		91.4	58-131			

LCS (2G11005-BS2)

Benzene	1.80	0.100	mg/m ³ Air	2.00		90.0	50-150			
Toluene	1.78	0.100	"	2.00		89.0	50-150			
Ethylbenzene	1.72	0.100	"	2.00		86.0	50-150			
Xylenes (total)	5.40	0.200	"	6.00		90.0	50-150			
Surrogate: 4-BFB (PID)	9.99		"	9.60		104	63-129			

LCS Dup (2G11005-BSD1)

Gasoline Range Hydrocarbons	52.4	10.0	mg/m ³ Air	100		52.4	50-150	19.9	50	
Surrogate: 4-BFB (FID)	7.73		"	9.60		80.5	58-131			

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

North Creek Analytical, Inc.
 Environmental Laboratory Network



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
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 503.906.9200 fax 503.906.9210
 Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
 541.383.9310 fax 541.382.7588

Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Pilot Test
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 07/15/02 13:40

Gasoline Hydrocarbons (Benzene to Napthalene) and BTEX in Air by NWTPH-G and EPA 8021B - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2G11005: Prepared 07/11/02 Using EPA 5030B (P/T)

LCS Dup (2G11005-BSD2)

Benzene	1.71	0.100	mg/m ³ Air	2.00		85.5	50-150	5.13	50	
Toluene	1.65	0.100	"	2.00		82.5	50-150	7.58	50	
Ethylbenzene	1.62	0.100	"	2.00		81.0	50-150	5.99	50	
Xylenes (total)	5.13	0.200	"	6.00		85.5	50-150	5.13	50	
Surrogate: 4-BFB (PID)	11.1		"	9.60		116	63-129			

Duplicate (2G11005-DUP1)

Source: B2G0143-01

Gasoline Range Hydrocarbons	2950	1000	mg/m ³ Air		3290			10.9	30	
Surrogate: 4-BFB (FID)	10.2		"	9.60		106	58-131			

North Creek Analytical - Bothell

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Amar Gill, Project Manager

North Creek Analytical, Inc.
Environmental Laboratory Network



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Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
 541.383.9310 fax 541.382.7588

Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Pilot Test
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 07/15/02 13:40

Notes and Definitions

- S-02 The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Environmental Laboratory Network



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LABORATORY REPORT

Client:	TIME OIL COMPANY	Date of Report:	08/01/02
Address:	2737 W. Commodore Way	Date Received:	07/16/02
	Seattle, WA 98199-1233	PAI Project No:	P2201336
Contact:	Mr. Scott Sloan	Purchase Order:	01-600-A

Client Project ID: Seattle Terminal DPE Test/01-600

Four (4) Stainless Steel Summa Canisters labeled:

"MW-18" "MW-9" "MW-10" "MW-5"

The samples were received at the laboratory under chain of custody on July 16, 2002. The samples were received intact. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time that they were received at the laboratory.

Total Gaseous Non-Methane Organics Analysis

The samples were analyzed for total gaseous non-methane organics according to modified EPA Method 25C. The analyses included a single sample injection (method modification) analyzed by gas chromatography using flame ionization detection/total combustion analysis.

Hydrocarbon Analysis

The samples were also analyzed for C₂ through C₁₀ hydrocarbons per modified EPA Method TO-3 using a gas chromatograph equipped with a flame ionization detector (FID).

Reviewed and Approved:

Wade Henton
Senior Chemist

Reviewed and Approved:

Ku-Jih Chen
Principal Chemist



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BTEX Analysis

The samples were also analyzed by combined gas chromatography/mass spectrometry (GC/MS) for benzene, toluene, ethylbenzene and total xylenes. The analyses were performed according to the methodology outlined in EPA Method TO-15. The analyses were performed by gas chromatography/mass spectrometry, utilizing a direct cryogenic trapping technique. The analytical system used was comprised of a Hewlett Packard Model 5973 GC/MS/DS interfaced to a Tekmar AutoCan Elite whole air inlet system/cryogenic concentrator. A 100% Dimethylpolysiloxane capillary column (RT_x-1, Restek Corporation, Bellefonte, PA) was used to achieve chromatographic separation.

The results of analyses are given on the attached data sheets.



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RESULTS OF ANALYSIS

Page 1 of 1

Client: Time Oil Company
Client Project ID: Seattle Terminal DPE Test/01-600

PAI Project ID: P2201336

Total Gaseous Non-Methane Organics as Methane

Test Code: Modified EPA Method 25C
Instrument ID: HP5890A/FID/TCA
Analyst: Annie Calvagna
Sampling Media: Summa Canister(s)
Test Notes:

Date(s) Collected: 7/11 - 7/12/02
Date Received: 7/16/02
Date Analyzed: 7/19/02
Volume(s) Analyzed: 0.50 ml
0.0585 ml

Client Sample ID	PAI Sample ID	D.F.	Total Gaseous Non-Methane Organics as Methane Concentration in ppmV		Data Qualifier
			Result	MRL	
MW-18	P2201336-001	1.24	11,000	1.0	
MW-9	P2201336-002	1.27	48,000	8.5	
MW-10	P2201336-003	1.31	70,000	8.5	
MW-5	P2201336-004	1.24	8,400	1.0	
7-5	P2201336-004DUP	1.24	8,400	1.0	
Method Blank	P020719-MB	1.00	ND	1.0	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RC Date: 7/30/02



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RESULTS OF ANALYSIS

Page 1 of 1

Client: Time Oil Company
Client Sample ID: MW-18
Client Project ID: Seattle Terminal DPE Test/01-600

PAI Project ID: P2201336
PAI Sample ID: P2201336-001

Test Code: Modified EPA Method TO-3
Instrument ID: HP GC 6890A/FID #7
Analyst: Michelle Sakamoto
Sampling Media: Summa Canister
Test Notes:
Container ID: SC00416

Date Collected: 7/11/02
Date Received: 7/16/02
Date Analyzed: 7/23/02
Volume(s) Analyzed: 1.0 ml

Pi 1 = 0.0

Pf 1 = 3.5

D.F. = 1.24

Compound	Result ppbV	MRL ppbV	Data Qualifier
C ₂ as Ethane	8,200	2,500	
C ₃ as Propane	ND	2,500	
C ₄ as n-Butane	210,000	2,500	
C ₅ as n-Pentane	440,000	2,500	
C ₆ as n-Hexane	340,000	2,500	
C ₇ as n-Heptane	310,000	2,500	
C ₈ as n-Octane	180,000	5,000	
C ₉ as n-Nonane	79,000	5,000	
C ₁₀ as n-Decane	27,000	5,000	

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Page No.:

4



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RESULTS OF ANALYSIS

Page 1 of 1

Client: Time Oil Company
Client Sample ID: MW-9
Client Project ID: Seattle Terminal DPE Test/01-600

PAI Project ID: P2201336
PAI Sample ID: P2201336-002

Test Code: Modified EPA Method TO-3
Instrument ID: HP GC 6890A/FID #7
Analyst: Michelle Sakamoto
Sampling Media: Summa Canister
Test Notes:
Container ID: SC00101

Date Collected: 7/11/02
Date Received: 7/16/02
Date Analyzed: 7/23/02
Volume(s) Analyzed: 0.50 ml

Pi 1 = -0.4

Pf 1 = 3.5

D.F. = 1.27

Compound	Result ppbV	MRL ppbV	Data Qualifier
C ₂ as Ethane	14,000	5,000	
C ₃ as Propane	6,500	5,000	
C ₄ as n-Butane	570,000	5,000	
C ₅ as n-Pentane	1,500,000	5,000	
C ₆ as n-Hexane	1,600,000	5,000	
C ₇ as n-Heptane	1,400,000	5,000	
C ₈ as n-Octane	670,000	10,000	
C ₉ as n-Nonane	220,000	10,000	
C ₁₀ as n-Decane	61,000	10,000	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

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Verified By: RS Date: 7/30/02

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RESULTS OF ANALYSIS

Page 1 of 1

Client: Time Oil Company
Client Sample ID: MW-10
Client Project ID: Seattle Terminal DPE Test/01-600

PAI Project ID: P2201336
PAI Sample ID: P2201336-003

Test Code: Modified EPA Method TO-3
Instrument ID: HP GC 6890A/FID #7
Analyst: Michelle Sakamoto
Sampling Media: Summa Canister
Test Notes:
Container ID: SC00071

Date Collected: 7/11/02
Date Received: 7/16/02
Date Analyzed: 7/23/02
Volume(s) Analyzed: 0.10 ml

Pi 1 = -0.8 Pf 1 = 3.5

D.F. = 1.31

Compound	Result ppbV	MRL ppbV	Data Qualifier
C ₂ as Ethane	84,000	25,000	
C ₃ as Propane	72,000	25,000	
C ₄ as n-Butane	2,500,000	25,000	
C ₅ as n-Pentane	1,700,000	25,000	
C ₆ as n-Hexane	1,200,000	25,000	
C ₇ as n-Heptane	1,100,000	25,000	
C ₈ as n-Octane	690,000	50,000	
C ₉ as n-Nonane	320,000	50,000	
C ₁₀ as n-Decane	120,000	50,000	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RC Date: 7/30/02



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RESULTS OF ANALYSIS

Page 1 of 1

Client: Time Oil Company
Client Sample ID: MW-10
Client Project ID: Seattle Terminal DPE Test/01-600

PAI Project ID: P2201336
PAI Sample ID: P2201336-003DUP

Test Code: Modified EPA Method TO-3
Instrument ID: HP GC 6890A/FID #7
Analyst: Michelle Sakamoto
Sampling Media: Summa Canister
Test Notes:
Container ID: SC00071

Date Collected: 7/11/02
Date Received: 7/16/02
Date Analyzed: 7/23/02
Volume(s) Analyzed: 0.10 ml

Pi 1 = -0.8 Pf 1 = 3.5

D.F. = 1.31

Compound	Result ppbV	MRL ppbV	Data Qualifier
C ₂ as Ethane	84,000	25,000	
C ₃ as Propane	73,000	25,000	
C ₄ as n-Butane	2,500,000	25,000	
C ₅ as n-Pentane	1,700,000	25,000	
C ₆ as n-Hexane	1,200,000	25,000	
C ₇ as n-Heptane	1,100,000	25,000	
C ₈ as n-Octane	690,000	50,000	
C ₉ as n-Nonane	320,000	50,000	
C ₁₀ as n-Decane	130,000	50,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RC Date: 7/30/02

Page No.:

7



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RESULTS OF ANALYSIS

Page 1 of 1

Client: Time Oil Company
Client Sample ID: MW-5
Client Project ID: Seattle Terminal DPE Test/01-600

PAI Project ID: P2201336
PAI Sample ID: P2201336-004

Test Code: Modified EPA Method TO-3
Instrument ID: HP GC 6890A/FID #7
Analyst: Michelle Sakamoto
Sampling Media: Summa Canister
Test Notes:
Container ID: SC00194

Date Collected: 7/12/02
Date Received: 7/16/02
Date Analyzed: 7/23/02
Volume(s) Analyzed: 1.0 ml

Pi 1 = 0.0 Pf 1 = 3.5

D.F. = 1.24

Compound	Result ppbV	MRL ppbV	Data Qualifier
C ₂ as Ethane	3,200	2,500	
C ₃ as Propane	ND	2,500	
C ₄ as n-Butane	210,000	2,500	
C ₅ as n-Pentane	480,000	2,500	
C ₆ as n-Hexane	310,000	2,500	
C ₇ as n-Heptane	200,000	2,500	
C ₈ as n-Octane	80,000	5,000	
C ₉ as n-Nonane	27,000	5,000	
C ₁₀ as n-Decane	13,000	5,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RC Date: 7/30/02



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RESULTS OF ANALYSIS

Page 1 of 1

Client: Time Oil Company
Client Sample ID: Method Blank
Client Project ID: Seattle Terminal DPE Test/01-600

PAI Project ID: P2201336
PAI Sample ID: P020723-MB

Test Code: Modified EPA Method TO-3
Instrument ID: HP GC 6890A/FID #7
Analyst: Michelle Sakamoto
Sampling Media: Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 7/23/02
Volume(s) Analyzed: 250.0 ml

D.F. = 1.00

Compound	Result ppbV	MRL ppbV	Data Qualifier
C ₂ as Ethane	ND	10	
C ₃ as Propane	ND	10	
C ₄ as n-Butane	ND	10	
C ₅ as n-Pentane	ND	10	
C ₆ as n-Hexane	ND	10	
C ₇ as n-Heptane	ND	10	
C ₈ as n-Octane	ND	20	
C ₉ as n-Nonane	ND	20	
C ₁₀ as n-Decane	ND	20	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RG Date: 7/30/02

Page No.:

9



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RESULTS OF ANALYSIS

Page 1 of 1

Client: Time Oil Company

Client Sample ID: MW-18

Client Project ID: Seattle Terminal DPE Test/01-600

PAI Project ID: P2201336

PAI Sample ID: P2201336-001

Test Code: EPA TO-15

Instrument ID: HP5973/Tekmar AUTOCAN Elite

Analyst: Svetlana Walsh/Wade Henton

Sampling Media: Summa Canister

Test Notes:

Container ID: SC00416

Date Collected: 7/11/02

Date Received: 7/16/02

Date(s) Analyzed: 7/19/02

Volume(s) Analyzed: 0.20 ml(s)

Pi 1 = 0.0

Pf 1 = 3.5

D.F. = 1.24

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
71-43-2	Benzene	180	5.0	55	1.6	
108-88-3	Toluene	180	5.0	47	1.3	
100-41-4	Ethylbenzene	42	5.0	9.6	1.2	
136777-61-2	<i>m,p</i> -Xylenes	150	5.0	33	1.2	
95-47-6	<i>o</i> -Xylene	35	5.0	8.2	1.2	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RG Date: 7/30/02



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RESULTS OF ANALYSIS

Page 1 of 1

Client: Time Oil Company
Client Sample ID: MW-9
Client Project ID: Seattle Terminal DPE Test/01-600

PAI Project ID: P2201336
PAI Sample ID: P2201336-002

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh/Wade Henton
Sampling Media: Summa Canister
Test Notes:
Container ID: SC00101

Date Collected: 7/11/02
Date Received: 7/16/02
Date(s) Analyzed: 7/19/02
Volume(s) Analyzed: 0.10 ml(s)

Pi 1 = -0.4 Pf 1 = 3.5

D.F. = 1.27

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
71-43-2	Benzene	170	10	53	3.1	
108-88-3	Toluene	170	10	44	2.7	
100-41-4	Ethylbenzene	38	10	8.7	2.3	
6777-61-2	<i>m,p</i> -Xylenes	130	10	29	2.3	
95-47-6	<i>o</i> -Xylene	31	10	7.1	2.3	

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Verified By: RG Date: 7/30/02



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RESULTS OF ANALYSIS

Page 1 of 1

Client: Time Oil Company
Client Sample ID: MW-10
Client Project ID: Seattle Terminal DPE Test/01-600

PAI Project ID: P2201336
PAI Sample ID: P2201336-003

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh/Wade Henton
Sampling Media: Summa Canister
Test Notes:
Container ID: SC00071

Date Collected: 7/11/02
Date Received: 7/16/02
Date(s) Analyzed: 7/20/02
Volume(s) Analyzed: 0.10 ml(s)

Pi 1 = -0.8 Pf 1 = 3.5

D.F. = 1.31

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
71-43-2	Benzene	300	10	93	3.1	
108-88-3	Toluene	130	10	35	2.7	
100-41-4	Ethylbenzene	61	10	14	2.3	
136777-61-2	<i>m,p</i> -Xylenes	180	10	41	2.3	
95-47-6	<i>o</i> -Xylene	63	10	14	2.3	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

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RESULTS OF ANALYSIS

Page 1 of 1

Client: Time Oil Company
Client Sample ID: MW-5
Client Project ID: Seattle Terminal DPE Test/01-600

PAI Project ID: P2201336
PAI Sample ID: P2201336-004

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh/Wade Henton
Sampling Media: Summa Canister
Test Notes:
Container ID: SC00194

Date Collected: 7/12/02
Date Received: 7/16/02
Date(s) Analyzed: 7/22/02
Volume(s) Analyzed: 0.40 ml(s)

Pi 1 = 0.0 Pf 1 = 3.5

D.F. = 1.24

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
71-43-2	Benzene	33	2.5	10	0.78	
108-88-3	Toluene	41	2.5	11	0.66	
100-41-4	Ethylbenzene	5.9	2.5	1.3	0.58	
6777-61-2	<i>m,p</i> -Xylenes	19	2.5	4.3	0.58	
95-47-6	<i>o</i> -Xylene	5.4	2.5	1.2	0.58	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

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Verified By: RG Date: 7/30/02



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RESULTS OF ANALYSIS

Page 1 of 1

Client: Time Oil Company
Client Sample ID: Method Blank
Client Project ID: Seattle Terminal DPE Test/01-600

PAI Project ID: P2201336
PAI Sample ID: P020719-MB

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh/Wade Henton
Sampling Media: Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date(s) Analyzed: 7/19/02
Volume(s) Analyzed: 1.00 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
71-43-2	Benzene	ND	1.0	ND	0.31	
108-88-3	Toluene	ND	1.0	ND	0.27	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
136777-61-2	<i>m,p</i> -Xylenes	ND	1.0	ND	0.23	
95-47-6	<i>o</i> -Xylene	ND	1.0	ND	0.23	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.



Performance Analytical Inc.

Air Quality Laboratory
A Division of Columbia Analytical Services, Inc.
An Employee Owned Company

RESULTS OF ANALYSIS

Page 1 of 1

Client: Time Oil Company
Client Sample ID: Method Blank
Client Project ID: Seattle Terminal DPE Test/01-600

PAI Project ID: P2201336
PAI Sample ID: P020722-MB

Test Code: EPA TO-15
Instrument ID: HP5973/Tekmar AUTOCAN Elite
Analyst: Svetlana Walsh/Wade Henton
Sampling Media: Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date(s) Analyzed: 7/22/02
Volume(s) Analyzed: 1.00 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m ³	MRL µg/m ³	Result ppbV	MRL ppbV	Data Qualifier
71-43-2	Benzene	ND	1.0	ND	0.31	
108-88-3	Toluene	ND	1.0	ND	0.27	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
107-75-3	<i>m,p</i> -Xylenes	ND	1.0	ND	0.23	
95-47-6	<i>o</i> -Xylene	ND	1.0	ND	0.23	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RG Date: 7/30/02

Performance Analytical Inc.
Sample Acceptance Check Form

Client: Time Oil Company Work order: P2201336

Subject: Seattle Terminal DPE Test / 01-600

Sample(s) received on: 7/16/02 Date opened: 7/16/02 by LC

Note: This form is used for all samples received by PAI. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client or as required by the method/SOP.

- | | | Yes | No | N/A |
|---|---|-------------------------------------|-------------------------------------|-------------------------------------|
| 1 | Were custody seals on outside of cooler/Box? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | Location of seal(s)? _____ Sealing Lid? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Were signature and date included? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Were seals intact? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Were custody seals on outside of sample container? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | Location of seal(s)? _____ Sealing Lid? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Were signature and date included? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Were seals intact? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2 | Were sample containers marked with client sample ID? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 | Did sample containers arrive in good condition? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 | Were chain-of-custody papers used and filled out? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 | Did sample container labels and/or tags agree with custody papers? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 | Was sample volume received adequate for analysis? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7 | Are samples within specified holding times? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8 | Was proper temperature (thermal preservation) of cooler at receipt adhered to? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Cooler Temperature <u>NA</u> °C | | | |
| | Blank Temperature <u>NA</u> °C | | | |
| 9 | Is pH (acid) preservation necessary, according to method/SOP or Client specified information | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | Is there a client indication that the submitted samples are pH (acid) preserved? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Were VOA vials checked for presence/absence of air bubbles? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Lab Sample ID	Required pH	pH (as received, if required)	VOA Headspace (Presence/Absence)
P2201336-001			NA
P2201336-002			NA
P2201336-003			NA
P2201336-004			NA

State any discrepancies: (include lab sample ID numbers): _____

Performance Analytical Inc.

Air Quality Laboratory
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2665 Park Center Drive, Suite D
 Simi Valley, California 93065
 Phone (805) 526-7161
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**Chain of Custody Record
 Analytical Services Request**

Client / Address	Project Name	Analyses		PAI Project No.						
		TNMC	BTEX							
Time Oil Co. - Scott Sloan 2737 W. Commodore Way Seattle, WA 98199-1233	Seattle Terminal DPE Test	C2-C10 hydrocarbons		P2201336						
Phone (206) 286-6457 Fax (206) 285-7833	Project Number 01-600			Temp _____ Cooler / Blank _____						
Email Address ssloan@timeoil.com	Sampling Location Before Lead Carbon									
Contact Scott Sloan	P.O. # / Billing Information PAI/01-600-A									
Client Sample ID	Lab Sample No.	Date Collected	Time Collected	Sampled (Signature)	Type of Sample	Container ID (Serial #)	Flow Controller (Serial #)	Sample Volume (Liters)	Expected Turnaround Time	Comments (e.g., preservative or specific instructions)
MW-18	001	7/11/02	08:00	<i>Scott Sloan</i>	X	00012	<i>MS</i>		Standard (10 Business Days) 24hr. 48hr. 7day 4Day 5Day	SC00416
MW-9	002	7/11/02	12:30		X	00482				SC00101
MW-10	003	7/11/02	14:28		X	00077				SC00071
MW-5	004	7/12/02	06:53		X	00474				SC00194
Relinquished by: (Signature)	Date: 7/12/02	Received by: (Signature)	Date: 7/11/02	Time: 10:30am	Time: 1000	Additional Comments: Please FAX results to (206) 285-7833				
Relinquished by: (Signature)	Date:	Received by: (Signature)	Date:	Time:	Time:					
Relinquished by: (Signature)	Date:	Received by: (Signature)	Date:	Time:	Time:					

Time Oil Company
Cleanup Action Plan for
Petroleum-Impacted Soil and Groundwater
2737 West Commodore Way

May 2003

**PRE-DPE PILOT TEST GROUNDWATER SAMPLE ANALYTICAL
RESULTS
JULY 2002**



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
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17 July 2002

Bryan Graham
Foster Wheeler Environmental Corporation
12100 NE 195th St
Bothell, WA/USA 98011
RE: Dre Pre-Sampling

Enclosed are the results of analyses for samples received by the laboratory on 07/02/02 17:10. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Amar Gill
Project Manager



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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/17/02 10:32

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
01MWTB	B2G0050-01	Water	07/02/02 08:00	07/02/02 17:10
01MW02	B2G0050-02	Water	07/02/02 09:00	07/02/02 17:10
01MW03	B2G0050-03	Water	07/02/02 09:30	07/02/02 17:10
01MW09	B2G0050-04	Water	07/02/02 10:00	07/02/02 17:10
01MW04	B2G0050-05	Water	07/02/02 10:30	07/02/02 17:10
01MW19	B2G0050-06	Water	07/02/02 13:30	07/02/02 17:10
01MW20	B2G0050-07	Water	07/02/02 14:15	07/02/02 17:10

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

**North Creek Analytical, Inc.
 Environmental Laboratory Network**



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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: Dre Pre-Sampling Project Number: 2306.3312.0002.00003 Project Manager: Bryan Graham	Reported: 07/17/02 10:32
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Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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01MWTB (B2G0050-01) Water **Sampled: 07/02/02 08:00** **Received: 07/02/02 17:10**

Gasoline Range Hydrocarbons	ND	50.0	ug/l	1	2G12004	07/12/02	07/12/02	NWTPH-Gx/8021B	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	87.9 %	57-125			"	"	"	"	
Surrogate: 4-BFB (PID)	86.0 %	62-120			"	"	"	"	

01MW02 (B2G0050-02) Water **Sampled: 07/02/02 09:00** **Received: 07/02/02 17:10**

Gasoline Range Hydrocarbons	21600	250	ug/l	5	2G12004	07/12/02	07/12/02	NWTPH-Gx/8021B	
Benzene	6620	50.0	"	100	"	"	07/12/02	"	
Toluene	528	50.0	"	"	"	"	"	"	
Ethylbenzene	310	2.50	"	5	"	"	07/12/02	"	
Xylenes (total)	1380	5.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	101 %	57-125			"	"	"	"	
Surrogate: 4-BFB (PID)	84.2 %	62-120			"	"	"	"	

01MW03 (B2G0050-03) Water **Sampled: 07/02/02 09:30** **Received: 07/02/02 17:10**

Gasoline Range Hydrocarbons	14300	5000	ug/l	100	2G12004	07/12/02	07/12/02	NWTPH-Gx/8021B	
Benzene	5270	50.0	"	"	"	"	"	"	
Toluene	72.7	50.0	"	"	"	"	"	"	
Ethylbenzene	134	50.0	"	"	"	"	"	"	
Xylenes (total)	207	100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	90.4 %	57-125			"	"	"	"	
Surrogate: 4-BFB (PID)	84.8 %	62-120			"	"	"	"	

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/17/02 10:32

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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01MW09 (B2G0050-04) Water Sampled: 07/02/02 10:00 Received: 07/02/02 17:10

Gasoline Range Hydrocarbons	8080	5000	ug/l	100	2G12004	07/12/02	07/12/02	NWTPH-Gx/8021B	
Benzene	985	50.0	"	"	"	"	"	"	"
Toluene	465	50.0	"	"	"	"	"	"	"
Ethylbenzene	223	50.0	"	"	"	"	"	"	"
Xylenes (total)	1050	100	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	89.6 %	57-125			"	"	"	"	
Surrogate: 4-BFB (PID)	86.5 %	62-120			"	"	"	"	

01MW04 (B2G0050-05) Water Sampled: 07/02/02 10:30 Received: 07/02/02 17:10

Gasoline Range Hydrocarbons	6630	50.0	ug/l	1	2G12004	07/12/02	07/12/02	NWTPH-Gx/8021B	
Benzene	22.8	0.500	"	"	"	"	"	"	
Toluene	78.0	0.500	"	"	"	"	"	"	
Ethylbenzene	341	10.0	"	20	"	"	07/12/02	"	
Xylenes (total)	1440	20.0	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	158 %	57-125			"	"	07/12/02	"	S-04
Surrogate: 4-BFB (PID)	119 %	62-120			"	"	"	"	

01MW19 (B2G0050-06) Water Sampled: 07/02/02 13:30 Received: 07/02/02 17:10

Gasoline Range Hydrocarbons	341	50.0	ug/l	1	2G12004	07/12/02	07/12/02	NWTPH-Gx/8021B	
Benzene	2.94	0.500	"	"	"	"	"	"	
Toluene	24.4	0.500	"	"	"	"	"	"	
Ethylbenzene	14.0	0.500	"	"	"	"	"	"	
Xylenes (total)	58.2	1.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	92.1 %	57-125			"	"	"	"	
Surrogate: 4-BFB (PID)	92.5 %	62-120			"	"	"	"	

North Creek Analytical - Bothell

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Amar Gill, Project Manager

North Creek Analytical, Inc.
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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/17/02 10:32

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW20 (B2G0050-07) Water Sampled: 07/02/02 14:15 Received: 07/02/02 17:10									
Gasoline Range Hydrocarbons	31500	2500	ug/l	50	2G12004	07/12/02	07/12/02	NWTPH-Gx/8021B	
Benzene	3910	25.0	"	"	"	"	"	"	
Toluene	2880	25.0	"	"	"	"	"	"	
Ethylbenzene	768	25.0	"	"	"	"	"	"	
Xylenes (total)	4500	50.0	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	93.8 %	57-125			"	"	"	"	
Surrogate: 4-BFB (PID)	87.7 %	62-120			"	"	"	"	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/17/02 10:32

Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW02 (B2G0050-02) Water Sampled: 07/02/02 09:00 Received: 07/02/02 17:10									
Diesel Range Hydrocarbons	3.81	0.250	mg/l	1	2G06005	07/06/02	07/10/02	NWTPH-Dx	D-06
Lube Oil Range Hydrocarbons	0.560	0.500	"	"	"	"	"	"	
Surrogate: 2-FBP	95.7 %	52-126			"	"	"	"	
Surrogate: Octacosane	83.6 %	53-122			"	"	"	"	
01MW03 (B2G0050-03) Water Sampled: 07/02/02 09:30 Received: 07/02/02 17:10									
Diesel Range Hydrocarbons	1.75	0.250	mg/l	1	2G06005	07/06/02	07/10/02	NWTPH-Dx	D-06
Lube Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surrogate: 2-FBP	82.3 %	52-126			"	"	"	"	
Surrogate: Octacosane	78.7 %	53-122			"	"	"	"	
01MW09 (B2G0050-04) Water Sampled: 07/02/02 10:00 Received: 07/02/02 17:10									
Diesel Range Hydrocarbons	1.75	0.250	mg/l	1	2G06005	07/06/02	07/10/02	NWTPH-Dx	D-06
Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surrogate: 2-FBP	80.3 %	52-126			"	"	"	"	
Surrogate: Octacosane	81.3 %	53-122			"	"	"	"	
01MW04 (B2G0050-05) Water Sampled: 07/02/02 10:30 Received: 07/02/02 17:10									
Diesel Range Hydrocarbons	0.655	0.250	mg/l	1	2G06005	07/06/02	07/10/02	NWTPH-Dx	D-08
Lube Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surrogate: 2-FBP	76.4 %	52-126			"	"	"	"	
Surrogate: Octacosane	78.0 %	53-122			"	"	"	"	
01MW19 (B2G0050-06) Water Sampled: 07/02/02 13:30 Received: 07/02/02 17:10									
Diesel Range Hydrocarbons	0.597	0.250	mg/l	1	2G06005	07/06/02	07/10/02	NWTPH-Dx	D-06
Lube Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surrogate: 2-FBP	80.3 %	52-126			"	"	"	"	
Surrogate: Octacosane	80.7 %	53-122			"	"	"	"	

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: Dre Pre-Sampling Project Number: 2306.3312.0002.00003 Project Manager: Bryan Graham	Reported: 07/17/02 10:32
--	--	------------------------------------

Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW20 (B2G0050-07) Water Sampled: 07/02/02 14:15 Received: 07/02/02 17:10									
Diesel Range Hydrocarbons	2.25	0.250	mg/l	1	2G06005	07/06/02	07/10/02	NWTPH-Dx	D-06
Lube Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	"
Surrogate: 2-FBP	82.6 %	52-126			"	"	"	"	
Surrogate: Octacosane	80.7 %	53-122			"	"	"	"	

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/17/02 10:32

Total Metals by EPA 6000/7000 Series Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW02 (B2G0050-02) Water Sampled: 07/02/02 09:00 Received: 07/02/02 17:10									
Lead	ND	0.00100	mg/l	1	2G03006	07/03/02	07/08/02	EPA 6020	
01MW03 (B2G0050-03) Water Sampled: 07/02/02 09:30 Received: 07/02/02 17:10									
Lead	ND	0.00100	mg/l	1	2G03006	07/03/02	07/08/02	EPA 6020	
01MW09 (B2G0050-04) Water Sampled: 07/02/02 10:00 Received: 07/02/02 17:10									
Lead	0.00119	0.00100	mg/l	1	2G03006	07/03/02	07/08/02	EPA 6020	
01MW04 (B2G0050-05) Water Sampled: 07/02/02 10:30 Received: 07/02/02 17:10									
Lead	ND	0.00100	mg/l	1	2G03006	07/03/02	07/08/02	EPA 6020	
01MW19 (B2G0050-06) Water Sampled: 07/02/02 13:30 Received: 07/02/02 17:10									
Lead	ND	0.00100	mg/l	1	2G03006	07/03/02	07/08/02	EPA 6020	
01MW20 (B2G0050-07) Water Sampled: 07/02/02 14:15 Received: 07/02/02 17:10									
	0.00136	0.00100	mg/l	1	2G03006	07/03/02	07/08/02	EPA 6020	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/17/02 10:32

Dissolved Metals by EPA 6000/7000 Series Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW02 (B2G0050-02) Water Sampled: 07/02/02 09:00 Received: 07/02/02 17:10									
Lead	ND	0.00100	mg/l	1	2G03023	07/03/02	07/03/02	EPA 6020	
01MW03 (B2G0050-03) Water Sampled: 07/02/02 09:30 Received: 07/02/02 17:10									
Lead	ND	0.00100	mg/l	1	2G03023	07/03/02	07/03/02	EPA 6020	
01MW09 (B2G0050-04) Water Sampled: 07/02/02 10:00 Received: 07/02/02 17:10									
Lead	ND	0.00100	mg/l	1	2G03023	07/03/02	07/03/02	EPA 6020	
01MW04 (B2G0050-05) Water Sampled: 07/02/02 10:30 Received: 07/02/02 17:10									
Lead	ND	0.00100	mg/l	1	2G03023	07/03/02	07/03/02	EPA 6020	
01MW19 (B2G0050-06) Water Sampled: 07/02/02 13:30 Received: 07/02/02 17:10									
Lead	ND	0.00100	mg/l	1	2G03023	07/03/02	07/03/02	EPA 6020	
01MW20 (B2G0050-07) Water Sampled: 07/02/02 14:15 Received: 07/02/02 17:10									
Lead	ND	0.00100	mg/l	1	2G03023	07/03/02	07/03/02	EPA 6020	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/17/02 10:32

Pentachlorophenol by GC/MS with Selected Ion Monitoring
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW02 (B2G0050-02) Water Sampled: 07/02/02 09:00 Received: 07/02/02 17:10									
Pentachlorophenol	ND	0.500	ug/l	1	2G08004	07/08/02	07/16/02	EPA 8270 Mod	
Surrogate: 2,4,6-TBP	112 %	22-162			"	"	"	"	
01MW03 (B2G0050-03) Water Sampled: 07/02/02 09:30 Received: 07/02/02 17:10									
Pentachlorophenol	ND	0.500	ug/l	1	2G08004	07/08/02	07/11/02	EPA 8270 Mod	
Surrogate: 2,4,6-TBP	98.5 %	22-162			"	"	"	"	
01MW09 (B2G0050-04) Water Sampled: 07/02/02 10:00 Received: 07/02/02 17:10									
Pentachlorophenol	ND	0.500	ug/l	1	2G08004	07/08/02	07/11/02	EPA 8270 Mod	
Surrogate: 2,4,6-TBP	104 %	22-162			"	"	"	"	
01MW04 (B2G0050-05) Water Sampled: 07/02/02 10:30 Received: 07/02/02 17:10									
Pentachlorophenol	ND	0.500	ug/l	1	2G08004	07/08/02	07/11/02	EPA 8270 Mod	
Surrogate: 2,4,6-TBP	102 %	22-162			"	"	"	"	
01MW19 (B2G0050-06) Water Sampled: 07/02/02 13:30 Received: 07/02/02 17:10									
Pentachlorophenol	ND	0.500	ug/l	1	2G08004	07/08/02	07/11/02	EPA 8270 Mod	
Surrogate: 2,4,6-TBP	100 %	22-162			"	"	"	"	
01MW20 (B2G0050-07) Water Sampled: 07/02/02 14:15 Received: 07/02/02 17:10									
Pentachlorophenol	ND	0.500	ug/l	1	2G08004	07/08/02	07/11/02	EPA 8270 Mod	
Surrogate: 2,4,6-TBP	101 %	22-162			"	"	"	"	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/17/02 10:32

**Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B - Quality Control
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2G12004: Prepared 07/12/02 Using EPA 5030B (P/T)

Blank (2G12004-BLK1)

Gasoline Range Hydrocarbons	ND	50.0	ug/l							
Benzene	ND	0.500	"							
Toluene	ND	0.500	"							
Ethylbenzene	ND	0.500	"							
Xylenes (total)	ND	1.00	"							
Surrogate: 4-BFB (FID)	39.9		"	48.0		83.1	57-125			
Surrogate: 4-BFB (PID)	41.1		"	48.0		85.6	62-120			

LCS (2G12004-BS1)

Gasoline Range Hydrocarbons	416	50.0	ug/l	502		82.9	80-120			
Benzene	6.77	0.500	"	6.20		109	80-120			
Toluene	32.4	0.500	"	37.4		86.6	80-120			
Ethylbenzene	8.54	0.500	"	8.94		95.5	80-120			
Xylenes (total)	41.2	1.00	"	43.7		94.3	80-120			
Surrogate: 4-BFB (FID)	40.0		"	48.0		83.3	57-125			
Surrogate: 4-BFB (PID)	40.4		"	48.0		84.2	62-120			

LCS Dup (2G12004-BSD1)

Gasoline Range Hydrocarbons	434	50.0	ug/l	502		86.5	80-120	4.24	25	
Benzene	6.77	0.500	"	6.20		109	80-120	0.00	40	
Toluene	32.4	0.500	"	37.4		86.6	80-120	0.00	40	
Ethylbenzene	8.54	0.500	"	8.94		95.5	80-120	0.00	40	
Xylenes (total)	41.2	1.00	"	43.7		94.3	80-120	0.00	40	
Surrogate: 4-BFB (FID)	41.7		"	48.0		86.9	57-125			
Surrogate: 4-BFB (PID)	40.6		"	48.0		84.6	62-120			

Matrix Spike (2G12004-MS1)

Source: B2G0001-01

Gasoline Range Hydrocarbons	460	50.0	ug/l	502	ND	91.6	70-130			
Benzene	7.32	0.500	"	6.20	ND	118	80-120			
Toluene	33.7	0.500	"	37.4	ND	90.1	68-114			
Ethylbenzene	8.86	0.500	"	8.94	ND	98.0	80-120			
Xylenes (total)	42.5	1.00	"	43.7	ND	96.4	80-120			
Surrogate: 4-BFB (FID)	41.8		"	48.0		87.1	57-125			
Surrogate: 4-BFB (PID)	40.0		"	48.0		83.3	62-120			

North Creek Analytical - Bothell

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Page 10 of 16



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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/17/02 10:32

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2G12004: Prepared 07/12/02 Using EPA 5030B (P/T)

Matrix Spike Dup (2G12004-MSD1)

Source: B2G0001-01

Gasoline Range Hydrocarbons	429	50.0	ug/l	502	ND	85.5	70-130	6.97	25	
Benzene	6.74	0.500	"	6.20	ND	109	80-120	8.25	40	
Toluene	31.2	0.500	"	37.4	ND	83.4	68-114	7.70	40	
Ethylbenzene	8.17	0.500	"	8.94	ND	90.3	80-120	8.10	40	
Xylenes (total)	39.2	1.00	"	43.7	ND	88.8	80-120	8.08	40	
Surrogate: 4-BFB (FID)	43.1		"	48.0		89.8	57-125			
Surrogate: 4-BFB (PID)	40.1		"	48.0		83.5	62-120			

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
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 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/17/02 10:32

Semivolatle Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up) - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch 2G06005: Prepared 07/06/02 Using EPA 3520C

Blank (2G06005-BLK1)

Diesel Range Hydrocarbons	ND	0.250	mg/l							
Lube Oil Range Hydrocarbons	ND	0.500	"							
Surrogate: 2-FBP	0.268		"	0.320		83.8	52-126			
Surrogate: Octacosane	0.272		"	0.320		85.0	53-122			

LCS (2G06005-BS1)

Diesel Range Hydrocarbons	1.81	0.250	mg/l	2.00		90.5	60-122			
Surrogate: 2-FBP	0.277		"	0.320		86.6	52-126			

LCS Dup (2G06005-BSD1)

Diesel Range Hydrocarbons	1.84	0.250	mg/l	2.00		92.0	60-122	1.64	40	
Surrogate: 2-FBP	0.280		"	0.320		87.5	52-126			

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/17/02 10:32

Total Metals by EPA 6000/7000 Series Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2G03006: Prepared 07/03/02 Using EPA 3020A										
Blank (2G03006-BLK1)										
Lead	ND	0.00100	mg/l							
LCS (2G03006-BS1)										
Lead	0.0780	0.00100	mg/l	0.0800		97.5	80-120			
LCS Dup (2G03006-BSD1)										
Lead	0.0805	0.00100	mg/l	0.0800		101	80-120	3.15	20	
Matrix Spike (2G03006-MS1) Source: B2G0023-01										
Lead	0.0840	0.00100	mg/l	0.0800	0.00440	99.5	75-125			
Matrix Spike Dup (2G03006-MSD1) Source: B2G0023-01										
Lead	0.0831	0.00100	mg/l	0.0800	0.00440	98.4	75-125	1.08	20	
Spike (2G03006-PS1) Source: B2G0023-01										
Lead	0.215	0.00100	mg/l	0.200	0.00440	105	80-120			

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: Dre Pre-Sampling Project Number: 2306.3312.0002.00003 Project Manager: Bryan Graham	Reported: 07/17/02 10:32
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Dissolved Metals by EPA 6000/7000 Series Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2G03023: Prepared 07/03/02 Using EPA 3005A										
Blank (2G03023-BLK1)										
Lead	ND	0.00100	mg/l							
LCS (2G03023-BS1)										
Lead	0.197	0.00100	mg/l	0.200		98.5	80-120			
LCS Dup (2G03023-BSD1)										
Lead	0.198	0.00100	mg/l	0.200		99.0	80-120	0.506	20	
Matrix Spike (2G03023-MS1) Source: B2G0050-02										
Lead	0.211	0.00100	mg/l	0.200	ND	106	75-125			
Matrix Spike Dup (2G03023-MSD1) Source: B2G0050-02										
Lead	0.212	0.00100	mg/l	0.200	ND	106	75-125	0.473	20	
Post Spike (2G03023-PS1) Source: B2G0050-02										
Lead	0.210	0.00100	mg/l	0.200	ND	105	75-125			

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 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/17/02 10:32

Pentachlorophenol by GC/MS with Selected Ion Monitoring - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch 2G08004: Prepared 07/08/02 Using EPA 3520C

Blank (2G08004-BLK1)

Pentachlorophenol	ND	0.500	ug/l							
Surrogate: 2,4,6-TBP	44.9		"	50.0		89.8	22-162			

LCS (2G08004-BS1)

Pentachlorophenol	9.78	0.500	ug/l	20.0		48.9	20-128			
Surrogate: 2,4,6-TBP	40.0		"	50.0		80.0	22-162			

LCS Dup (2G08004-BSD1)

Pentachlorophenol	9.16	0.500	ug/l	20.0		45.8	20-128	6.55	50	
Surrogate: 2,4,6-TBP	34.7		"	50.0		69.4	22-162			

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: Dre Pre-Sampling Project Number: 2306.3312.0002.00003 Project Manager: Bryan Graham	Reported: 07/17/02 10:32
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Notes and Definitions

- D-06 The sample chromatographic pattern does not resemble the fuel standard used for quantitation.
- D-08 Results in the diesel organics range are primarily due to overlap from a gasoline range product.
- S-04 The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

North Creek Analytical - Bothell

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F 924-9200
F 906-9200
F 383-9310
F 382-7588

CHAIN OF CUSTODY REPORT

Work Order #: BZ60050

CLIENT: TIME OIL COMPANY
 REPORT TO: SUE GLENN (111 BUKAHAM @ FRENCH)
 ADDRESS: 2977 W COMMODORE WAY SEATTLE WA 98199
 PHONE: 206.286.6457 FAX: 206.286.6457

INVOICE TO: SAME AS LEFT

P.O. NUMBER: _____

PROJECT NAME: DRE PRE-SAMPLING
 PROJECT NUMBER: 2306.3912.001.0005
 SAMPLED BY: PAKASHIYI / JEFFEK

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	REQUESTED ANALYSES							MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WO ID
		TPH-DX	TPH-DX	PCP	TOTAL LEAD	DISSOLVER LEAD						
1. 01MW7B	07/20/02 0800	X	X	X	X	X	X	X	1	BZ60050-01	01	
2. 01MW02	0900	X	X	X	X	X	X	X	7		02	
3. 01MW03	0930	X	X	X	X	X	X	X	7		03	
4. 01MW09	1000	X	X	X	X	X	X	X	7		04	
5. 01MW04	1030	X	X	X	X	X	X	X	7		05	
6. 01MW19	1330	X	X	X	X	X	X	X	7		06	
7. 01MW20	1415	X	X	X	X	X	X	X	7		07	
8. Unknown	7/2/02 12:00								1	Hold	08	
9.												
10.												
11.												
12. 1												
13.												
14.												
15.												

Revised Chain of Custody

Samples were not @ 2-6C Upon Receipt

RELIQUISHED BY: *Tommy* DATE: 07/02/02
 PRINT NAME: JEFFEK FIRM: ENREC TIME: _____
 RECEIVED BY: *CO STAFFS* DATE: 7/12/12
 PRINT NAME: BRANNY TONY FIRM: NMA TIME: 17:10
 RECEIVED BY: _____ DATE: _____
 PRINT NAME: _____ FIRM: _____ TIME: _____

ADDITIONAL REMARKS: * DISSOLVER LEAD FIELD FILTERED (0.45 MICRON GEOTECH DISPIT A FILTER)

DATE: 7/12/12
 TIME: 17:10
 DATE: _____
 TIME: _____

W/P 12.0
 PAGE: 01 OF 01



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16 July 2002

Bryan Graham
Foster Wheeler Environmental Corporation
12100 NE 195th St
Bothell, WA/USA 98011
RE: Dre Pre-Sampling

Enclosed are the results of analyses for samples received by the laboratory on 07/03/02 12:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Amar Gill', is written over a horizontal line.

Amar Gill
Project Manager



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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: Dre Pre-Sampling Project Number: 2306.3312.0002.00003 Project Manager: Bryan Graham	Reported: 07/16/02 17:00
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ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
01MWTB2	B2G0100-01	Water	07/03/02 08:10	07/03/02 12:00
01MW18	B2G0100-02	Water	07/03/02 08:30	07/03/02 12:00
01MW05	B2G0100-03	Water	07/03/02 08:45	07/03/02 12:00

North Creek Analytical - Bothell

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Amar Gill, Project Manager

North Creek Analytical, Inc.
Environmental Laboratory Network



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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/16/02 17:00

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MWTB2 (B2G0100-01) Water Sampled: 07/03/02 08:10 Received: 07/03/02 12:00									
Gasoline Range Hydrocarbons	ND	50.0	ug/l	1	2G11004	07/11/02	07/11/02	NWTPH-Gx/8021B	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	84.2 %	57-125			"	"	"	"	
Surrogate: 4-BFB (PID)	86.5 %	62-120			"	"	"	"	
01MW18 (B2G0100-02) Water Sampled: 07/03/02 08:30 Received: 07/03/02 12:00									
Gasoline Range Hydrocarbons	22300	2500	ug/l	50	2G11004	07/11/02	07/11/02	NWTPH-Gx/8021B	
Benzene	3000	25.0	"	"	"	"	"	"	
Toluene	1360	25.0	"	"	"	"	"	"	
Ethylbenzene	593	25.0	"	"	"	"	"	"	
Xylenes (total)	3180	50.0	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	87.5 %	57-125			"	"	"	"	
Surrogate: 4-BFB (PID)	87.1 %	62-120			"	"	"	"	
01MW05 (B2G0100-03) Water Sampled: 07/03/02 08:45 Received: 07/03/02 12:00									
Gasoline Range Hydrocarbons	16500	500	ug/l	10	2G11004	07/11/02	07/11/02	NWTPH-Gx/8021B	
Ethylbenzene	417	5.00	"	"	"	"	"	"	
Xylenes (total)	2080	10.0	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	98.1 %	57-125			"	"	"	"	
Surrogate: 4-BFB (PID)	91.9 %	62-120			"	"	"	"	
01MW05 (B2G0100-03RE1) Water Sampled: 07/03/02 08:45 Received: 07/03/02 12:00									
Benzene	1670	25.0	ug/l	50	2G12006	07/11/02	07/12/02	NWTPH-Gx/8021B	
Toluene	1390	25.0	"	"	"	"	"	"	
Surrogate: 4-BFB (PID)	93.8 %	62-120			"	"	"	"	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/16/02 17:00

Semivolatle Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW18 (B2G0100-02) Water Sampled: 07/03/02 08:30 Received: 07/03/02 12:00									
Diesel Range Hydrocarbons	2.12	0.250	mg/l	1	2G06005	07/06/02	07/10/02	NWTPH-Dx	D-06
Lube Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surrogate: 2-FBP	82.0 %	52-126			"	"	"	"	
Surrogate: Octacosane	77.0 %	53-122			"	"	"	"	
01MW05 (B2G0100-03) Water Sampled: 07/03/02 08:45 Received: 07/03/02 12:00									
Diesel Range Hydrocarbons	2.71	0.250	mg/l	1	2G06005	07/06/02	07/10/02	NWTPH-Dx	D-06
Lube Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surrogate: 2-FBP	86.9 %	52-126			"	"	"	"	
Surrogate: Octacosane	84.9 %	53-122			"	"	"	"	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
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 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/16/02 17:00

Total Metals by EPA 6000/7000 Series Methods
North Creek Analytical - Bothell

Analyte	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
	Result	Limit							
01MW18 (B2G0100-02) Water Sampled: 07/03/02 08:30 Received: 07/03/02 12:00									
Lead	0.00197	0.00100	mg/l	1	2G08026	07/08/02	07/09/02	EPA 6020	
01MW05 (B2G0100-03) Water Sampled: 07/03/02 08:45 Received: 07/03/02 12:00									
Lead	ND	0.00100	mg/l	1	2G08026	07/08/02	07/09/02	EPA 6020	

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/16/02 17:00

Dissolved Metals by EPA 6000/7000 Series Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
01MW18 (B2G0100-02) Water Sampled: 07/03/02 08:30 Received: 07/03/02 12:00										
Lead	0.00126	0.00100		mg/l	1	2G09009	07/09/02	07/09/02	EPA 6020	
01MW05 (B2G0100-03) Water Sampled: 07/03/02 08:45 Received: 07/03/02 12:00										
Lead	ND	0.00100		mg/l	1	2G09009	07/09/02	07/09/02	EPA 6020	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: Dre Pre-Sampling Project Number: 2306.3312.0002.00003 Project Manager: Bryan Graham	Reported: 07/16/02 17:00
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**Pentachlorophenol by GC/MS with Selected Ion Monitoring
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW18 (B2G0100-02) Water Sampled: 07/03/02 08:30 Received: 07/03/02 12:00									
Pentachlorophenol	ND	0.500	ug/l	1	2G08004	07/08/02	07/11/02	EPA 8270 Mod	
Surrogate: 2,4,6-TBP	95.4 %	22-162			"	"	"	"	
01MW05 (B2G0100-03) Water Sampled: 07/03/02 08:45 Received: 07/03/02 12:00									
Pentachlorophenol	ND	0.500	ug/l	1	2G08004	07/08/02	07/11/02	EPA 8270 Mod	
Surrogate: 2,4,6-TBP	107 %	22-162			"	"	"	"	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/16/02 17:00

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2G11004: Prepared 07/11/02 Using EPA 5030B (P/T)

Blank (2G11004-BLK1)

Gasoline Range Hydrocarbons	ND	50.0	ug/l							
Benzene	ND	0.500	"							
Toluene	ND	0.500	"							
Ethylbenzene	ND	0.500	"							
Xylenes (total)	ND	1.00	"							
Surrogate: 4-BFB (FID)	36.2		"	48.0		75.4	57-125			
Surrogate: 4-BFB (PID)	41.3		"	48.0		86.0	62-120			

LCS (2G11004-BS1)

Gasoline Range Hydrocarbons	425	50.0	ug/l	502		84.7	80-120			
Benzene	6.89	0.500	"	6.20		111	80-120			
Toluene	32.8	0.500	"	37.4		87.7	80-120			
Ethylbenzene	8.59	0.500	"	8.94		96.1	80-120			
Xylenes (total)	41.4	1.00	"	43.7		94.7	80-120			
Surrogate: 4-BFB (FID)	40.9		"	48.0		85.2	57-125			
Surrogate: 4-BFB (PID)	40.2		"	48.0		83.8	62-120			

LCS Dup (2G11004-BSD1)

Gasoline Range Hydrocarbons	441	50.0	ug/l	502		87.8	80-120	3.70	25	
Benzene	6.34	0.500	"	6.20		102	80-120	8.31	40	
Toluene	30.4	0.500	"	37.4		81.3	80-120	7.59	40	
Ethylbenzene	7.96	0.500	"	8.94		89.0	80-120	7.61	40	
Xylenes (total)	38.3	1.00	"	43.7		87.6	80-120	7.78	40	
Surrogate: 4-BFB (FID)	45.5		"	48.0		94.8	57-125			
Surrogate: 4-BFB (PID)	40.3		"	48.0		84.0	62-120			

Matrix Spike (2G11004-MS1)

Source: B2F0750-10

Gasoline Range Hydrocarbons	497	50.0	ug/l	502	ND	99.0	70-130			
Benzene	6.89	0.500	"	6.20	ND	111	80-120			
Toluene	31.8	0.500	"	37.4	ND	84.6	68-114			
Ethylbenzene	8.40	0.500	"	8.94	ND	94.0	80-120			
Xylenes (total)	40.5	1.00	"	43.7	ND	92.7	80-120			
Surrogate: 4-BFB (FID)	45.8		"	48.0		95.4	57-125			
Surrogate: 4-BFB (PID)	39.9		"	48.0		83.1	62-120			

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/16/02 17:00

**Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B - Quality Control
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2G11004: Prepared 07/11/02 Using EPA 5030B (P/T)

Matrix Spike Dup (2G11004-MSD1)

Source: B2F0750-10

Gasoline Range Hydrocarbons	467	50.0	ug/l	502	ND	93.0	70-130	6.22	25	
Benzene	6.43	0.500	"	6.20	ND	104	80-120	6.91	40	
Toluene	32.5	0.500	"	37.4	ND	86.5	68-114	2.18	40	
Ethylbenzene	8.48	0.500	"	8.94	ND	94.9	80-120	0.948	40	
Xylenes (total)	41.1	1.00	"	43.7	ND	94.1	80-120	1.47	40	
Surrogate: 4-BFB (FID)	43.9		"	48.0		91.5	57-125			
Surrogate: 4-BFB (PID)	40.0		"	48.0		83.3	62-120			

Batch 2G12006: Prepared 07/12/02 Using EPA 5030B (P/T)

Blank (2G12006-BLK1)

Gasoline Range Hydrocarbons	ND	50.0	ug/l							
Benzene	ND	0.500	"							
Toluene	ND	0.500	"							
Ethylbenzene	ND	0.500	"							
Xylenes (total)	ND	1.00	"							
Surrogate: 4-BFB (FID)	40.4		"	48.0		84.2	57-125			
Surrogate: 4-BFB (PID)	44.6		"	48.0		92.9	62-120			

LCS (2G12006-BS1)

Gasoline Range Hydrocarbons	449	50.0	ug/l	502		89.4	80-120			
Benzene	6.76	0.500	"	6.20		109	80-120			
Toluene	35.1	0.500	"	37.4		93.9	80-120			
Ethylbenzene	8.97	0.500	"	8.94		100	80-120			
Xylenes (total)	42.7	1.00	"	43.7		97.7	80-120			
Surrogate: 4-BFB (FID)	44.7		"	48.0		93.1	57-125			
Surrogate: 4-BFB (PID)	42.9		"	48.0		89.4	62-120			

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/16/02 17:00

**Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B - Quality Control
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limits	RPD	RPD Limit	Notes
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Batch 2G12006: Prepared 07/12/02 Using EPA 5030B (P/T)

LCS Dup (2G12006-BSD1)

Gasoline Range Hydrocarbons	505	50.0	ug/l	502		101	80-120	11.7	25	
Benzene	6.70	0.500	"	6.20		108	80-120	0.892	40	
Toluene	33.9	0.500	"	37.4		90.6	80-120	3.48	40	
Ethylbenzene	8.78	0.500	"	8.94		98.2	80-120	2.14	40	
Xylenes (total)	41.6	1.00	"	43.7		95.2	80-120	2.61	40	
Surrogate: 4-BFB (FID)	47.4		"	48.0		98.8	57-125			
Surrogate: 4-BFB (PID)	42.5		"	48.0		88.5	62-120			

Matrix Spike (2G12006-MS1)

Source: B2G0029-03

Gasoline Range Hydrocarbons	490	50.0	ug/l	502	ND	97.6	70-130			
Benzene	7.06	0.500	"	6.20	ND	114	80-120			
Toluene	35.6	0.500	"	37.4	ND	95.2	68-114			
Ethylbenzene	9.05	0.500	"	8.94	ND	101	80-120			
Xylenes (total)	43.1	1.00	"	43.7	ND	98.6	80-120			
Surrogate: 4-BFB (FID)	46.6		"	48.0		97.1	57-125			
Surrogate: 4-BFB (PID)	42.0		"	48.0		87.5	62-120			

Matrix Spike Dup (2G12006-MSD1)

Source: B2G0029-03

Gasoline Range Hydrocarbons	455	50.0	ug/l	502	ND	90.6	70-130	7.41	25	
Benzene	6.77	0.500	"	6.20	ND	109	80-120	4.19	40	
Toluene	34.4	0.500	"	37.4	ND	92.0	68-114	3.43	40	
Ethylbenzene	8.64	0.500	"	8.94	ND	96.6	80-120	4.64	40	
Xylenes (total)	41.4	1.00	"	43.7	ND	94.7	80-120	4.02	40	
Surrogate: 4-BFB (FID)	47.4		"	48.0		98.8	57-125			
Surrogate: 4-BFB (PID)	42.4		"	48.0		88.3	62-120			

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Page 9 of 14



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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: Dre Pre-Sampling Project Number: 2306.3312.0002.00003 Project Manager: Bryan Graham	Reported: 07/16/02 17:00
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Semivolatle Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up) - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch 2G06005: Prepared 07/06/02 Using EPA 3520C

Blank (2G06005-BLK1)

Diesel Range Hydrocarbons	ND	0.250	mg/l							
Lube Oil Range Hydrocarbons	ND	0.500	"							
Surrogate: 2-FBP	0.268		"	0.320		83.8	52-126			
Surrogate: Octacosane	0.272		"	0.320		85.0	53-122			

LCS (2G06005-BS1)

Diesel Range Hydrocarbons	1.81	0.250	mg/l	2.00		90.5	60-122			
Surrogate: 2-FBP	0.277		"	0.320		86.6	52-126			

LCS Dup (2G06005-BSD1)

Diesel Range Hydrocarbons	1.84	0.250	mg/l	2.00		92.0	60-122	1.64	40	
Surrogate: 2-FBP	0.280		"	0.320		87.5	52-126			

North Creek Analytical - Bothell

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Amar Gill, Project Manager

North Creek Analytical, Inc.
Environmental Laboratory Network

Page 10 of 14



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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: Dre Pre-Sampling Project Number: 2306.3312.0002.00003 Project Manager: Bryan Graham	Reported: 07/16/02 17:00
--	--	-----------------------------

**Total Metals by EPA 6000/7000 Series Methods - Quality Control
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2G08026: Prepared 07/08/02 Using EPA 3020A										
Blank (2G08026-BLK1)										
Lead	ND	0.00100	mg/l							
LCS (2G08026-BS1)										
Lead	0.0773	0.00100	mg/l	0.0800		96.6	80-120			
LCS Dup (2G08026-BSD1)										
Lead	0.0792	0.00100	mg/l	0.0800		99.0	80-120	2.43	20	
Matrix Spike (2G08026-MS1) Source: B2G0058-15										
Lead	0.0761	0.00100	mg/l	0.0800	ND	94.7	75-125			
Matrix Spike Dup (2G08026-MSD1) Source: B2G0058-15										
Lead	0.0799	0.00100	mg/l	0.0800	ND	99.5	75-125	4.87	20	
spike (2G08026-PS1) Source: B2G0058-15										
Lead	0.207	0.00100	mg/l	0.200	ND	103	80-120			

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/16/02 17:00

Dissolved Metals by EPA 6000/7000 Series Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch 2G09009: Prepared 07/09/02 Using EPA 3005A

Blank (2G09009-BLK1)

Lead	ND	0.00100	mg/l							
------	----	---------	------	--	--	--	--	--	--	--

LCS (2G09009-BS1)

Lead	0.191	0.00100	mg/l	0.200		95.5	80-120			
------	-------	---------	------	-------	--	------	--------	--	--	--

LCS Dup (2G09009-BS1)

Lead	0.191	0.00100	mg/l	0.200		95.5	80-120	0.00	20	
------	-------	---------	------	-------	--	------	--------	------	----	--

Matrix Spike (2G09009-MS1)

Source: B2G0100-02

Lead	0.197	0.00100	mg/l	0.200	0.00126	97.9	75-125			
------	-------	---------	------	-------	---------	------	--------	--	--	--

Matrix Spike Dup (2G09009-MS1)

Source: B2G0100-02

Lead	0.197	0.00100	mg/l	0.200	0.00126	97.9	75-125	0.00	20	
------	-------	---------	------	-------	---------	------	--------	------	----	--

Post Spike (2G09009-PS1)

Source: B2G0100-02

Lead	0.196	0.00100	mg/l	0.200	0.00126	97.4	75-125			
------	-------	---------	------	-------	---------	------	--------	--	--	--

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: Dre Pre-Sampling Project Number: 2306.3312.0002.00003 Project Manager: Bryan Graham	Reported: 07/16/02 17:00
--	--	-----------------------------

Pentachlorophenol by GC/MS with Selected Ion Monitoring - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2G08004: Prepared 07/08/02 Using EPA 3520C										
Blank (2G08004-BLK1)										
Pentachlorophenol	ND	0.500	ug/l							
Surrogate: 2,4,6-TBP	44.9		"	50.0		89.8	22-162			
LCS (2G08004-BS1)										
Pentachlorophenol	9.78	0.500	ug/l	20.0		48.9	20-128			
Surrogate: 2,4,6-TBP	40.0		"	50.0		80.0	22-162			
LCS Dup (2G08004-BSD1)										
Pentachlorophenol	9.16	0.500	ug/l	20.0		45.8	20-128	6.55	50	
Surrogate: 2,4,6-TBP	34.7		"	50.0		69.4	22-162			

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: Dre Pre-Sampling
 Project Number: 2306.3312.0002.00003
 Project Manager: Bryan Graham

Reported:
 07/16/02 17:00

Notes and Definitions

- D-06 The sample chromatographic pattern does not resemble the fuel standard used for quantitation.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

North Creek Analytical - Bothell

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Amar Gill, Project Manager

**North Creek Analytical, Inc.
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J6-9210
FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order #: **D265100**

CLIENT: TIME OIL COMPANY
 REPORT TO: Scott Sloan (cc: PLANTON C FURNE)
 ADDRESS: 2737 W COMMODORE WAY
 PHONE: 206 286 6457 FAX:
 PROJECT NAME: DREPS
 PROJECT NUMBER: 23063312-00200003
 SAMPLED BY: PG/JS

INVOICE TO: SAME AS LEFT
 P.O. NUMBER:

TURNAROUND REQUEST in Business Days*
 Organic & Inorganic Analyses: 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 <1
 Petroleum Hydrocarbon Analyses: 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 <1
 STD. OTHER:

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	REQUESTED ANALYSES										COMMENTS	NCA WO ID		
		TPH or TPH in BRX	TPP	TPP	TPP	TPP	TPP	TPP	TPP	TPP	TPP				
1. <u>01MW182</u>	<u>070302</u>	X	X	X	X	X	X	X	X	X	X	X	<u>W</u>	<u>1</u>	<u>W01</u>
2. <u>01MW18</u>	<u>↓</u>	X	X	X	X	X	X	X	X	X	X	X	<u>L</u>	<u>7</u>	<u>W02</u>
3. <u>01MW05</u>	<u>↓</u>	X	X	X	X	X	X	X	X	X	X	X	<u>L</u>	<u>7</u>	<u>W03</u>
4.															
5.															
6.															
7.															
8.															
9.															
10.															
11.															
12.															
13.															
14.															
15.															

RECEIVED BY: Scott Sloan DATE: 7/3/02
 PRINT NAME: Scott Sloan TIME: 12:00
 RECEIVED BY: Scott Sloan DATE: 7/3/02
 PRINT NAME: Scott Sloan TIME: 12:00
 FIRM: FURNE
 FIRM: FURNE
 ADDITIONAL REMARKS: FIELD FILTERED DISCOVERED LEAD
 DATE: 7/3/02
 TIME: 12:00
 TEMP: 15.3
 PAGE 1 OF 1

Time Oil Company
Cleanup Action Plan for
Petroleum-Impacted Soil and Groundwater
2737 West Commodore Way

May 2003

**DPE PILOT TEST AIR SAMPLE
ANALYTICAL RESULTS
JULY 2002**



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19 March 2002

Bryan Graham
Foster Wheeler Environmental Corporation
12100 NE 195th St
Bothell, WA/USA 98011
RE: DPE

Enclosed are the results of analyses for samples received by the laboratory on 03/12/02 09:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Amar Gill
Project Manager



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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE
 Project Number: 2306.3312.0004.00001
 Project Manager: Bryan Graham

Reported:
 03/19/02 13:39

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SB_65_5	B2C0219-01	Soil	03/11/02 09:25	03/12/02 09:00
SB_65_10	B2C0219-02	Soil	03/11/02 09:50	03/12/02 09:00
SB_65_15	B2C0219-03	Soil	03/11/02 10:15	03/12/02 09:00
SB_65_20	B2C0219-04	Soil	03/11/02 10:35	03/12/02 09:00
SB_65_25	B2C0219-05	Soil	03/11/02 10:50	03/12/02 09:00
SB_65_30	B2C0219-06	Soil	03/11/02 11:20	03/12/02 09:00
SB_66_5	B2C0219-07	Soil	03/11/02 13:05	03/12/02 09:00
SB_66_10	B2C0219-08	Soil	03/11/02 13:15	03/12/02 09:00
SB_66_15	B2C0219-09	Soil	03/11/02 13:30	03/12/02 09:00
SB_66_20	B2C0219-10	Soil	03/11/02 13:40	03/12/02 09:00
SB_66_25	B2C0219-11	Soil	03/11/02 13:50	03/12/02 09:00
SR_67_5	B2C0219-12	Soil	03/11/02 15:10	03/12/02 09:00
SB_67_10	B2C0219-13	Soil	03/11/02 15:30	03/12/02 09:00
SB_67_15	B2C0219-14	Soil	03/11/02 15:45	03/12/02 09:00
SB_67_20	B2C0219-15	Soil	03/11/02 16:00	03/12/02 09:00
SB_67_25	B2C0219-16	Soil	03/11/02 16:15	03/12/02 09:00

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Project Number: 2306.3312.0004.00001 Project Manager: Bryan Graham	Reported: 03/19/02 13:39
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Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SB_65_5 (B2C0219-01) Soil Sampled: 03/11/02 09:25 Received: 03/12/02 09:00									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2C15018	03/15/02	03/16/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	"
Toluene	ND	0.0500	"	"	"	"	"	"	"
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	"
Xylenes (total)	ND	0.100	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	89.0 %	50-147			"	"	"	"	
Surrogate: 4-BFB (PID)	96.4 %	54-123			"	"	"	"	
SB_65_10 (B2C0219-02) Soil Sampled: 03/11/02 09:50 Received: 03/12/02 09:00									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2C15018	03/15/02	03/16/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	"
Toluene	ND	0.0500	"	"	"	"	"	"	"
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	"
Xylenes (total)	ND	0.100	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	88.1 %	50-147			"	"	"	"	
Surrogate: 4-BFB (PID)	98.2 %	54-123			"	"	"	"	
SB_65_15 (B2C0219-03) Soil Sampled: 03/11/02 10:15 Received: 03/12/02 09:00									
Gasoline Range Hydrocarbons	278	20.0	mg/kg dry	4	2C15018	03/15/02	03/17/02	NWTPH-Gx/8021B	
Benzene	ND	0.120	"	"	"	"	"	"	
Toluene	0.519	0.200	"	"	"	"	"	"	
Ethylbenzene	1.74	0.200	"	"	"	"	"	"	
Xylenes (total)	6.47	0.400	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	50-147			"	"	"	"	S-02
Surrogate: 4-BFB (PID)	150 %	54-123			"	"	"	"	S-04

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation Project: DPE
 12100 NE 195th St Project Number: 2306.3312.0004.00001
 Bothell WA/USA, 98011 Project Manager: Bryan Graham Reported: 03/19/02 13:39

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SB_65_20 (B2C0219-04) Soil Sampled: 03/11/02 10:35 Received: 03/12/02 09:00									
Gasoline Range Hydrocarbons	220	5.00	mg/kg dry	1	2C15018	03/15/02	03/16/02	NWTPH-Gx/8021B	
Benzene	0.317	0.0300	"	"	"	"	"	"	
Toluene	0.703	0.0500	"	"	"	"	"	"	
Ethylbenzene	1.53	0.0500	"	"	"	"	"	"	
Xylenes (total)	6.37	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	50-147			"	"	"	"	S-02
Surrogate: 4-BFB (PID)	127 %	54-123			"	"	"	"	S-04
SB_65_25 (B2C0219-05) Soil Sampled: 03/11/02 10:50 Received: 03/12/02 09:00									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2C15018	03/15/02	03/16/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
es (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	89.7 %	50-147			"	"	"	"	
Surrogate: 4-BFB (PID)	102 %	54-123			"	"	"	"	
SB_65_30 (B2C0219-06) Soil Sampled: 03/11/02 11:20 Received: 03/12/02 09:00									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2C15018	03/15/02	03/16/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	81.5 %	50-147			"	"	"	"	
Surrogate: 4-BFB (PID)	98.0 %	54-123			"	"	"	"	

Q-34

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE
 Project Number: 2306.3312.0004.00001
 Project Manager: Bryan Graham

Reported:
 03/19/02 13:39

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
SB_66_5 (B2C0219-07) Soil Sampled: 03/11/02 13:05 Received: 03/12/02 09:00 Q-34										
Gasoline Range Hydrocarbons	ND	5.00		mg/kg dry	1	2C15018	03/15/02	03/16/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300		"	"	"	"	"	"	
Toluene	ND	0.0500		"	"	"	"	"	"	
Ethylbenzene	ND	0.0500		"	"	"	"	"	"	
Xylenes (total)	ND	0.100		"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	86.2 %	50-147				"	"	"	"	
Surrogate: 4-BFB (PID)	95.2 %	54-123				"	"	"	"	
SB_66_10 (B2C0219-08) Soil Sampled: 03/11/02 13:15 Received: 03/12/02 09:00										
Gasoline Range Hydrocarbons	ND	5.00		mg/kg dry	1	2C15018	03/15/02	03/16/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300		"	"	"	"	"	"	
Toluene	ND	0.0500		"	"	"	"	"	"	
Ethylbenzene	ND	0.0500		"	"	"	"	"	"	
Xylenes (total)	ND	0.100		"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	87.1 %	50-147				"	"	"	"	
Surrogate: 4-BFB (PID)	93.9 %	54-123				"	"	"	"	
SB_66_15 (B2C0219-09) Soil Sampled: 03/11/02 13:30 Received: 03/12/02 09:00										
Gasoline Range Hydrocarbons	11.2	5.00		mg/kg dry	1	2C15018	03/15/02	03/16/02	NWTPH-Gx/8021B	
Benzene	0.292	0.0300		"	"	"	"	"	"	
Toluene	ND	0.0500		"	"	"	"	"	"	
Ethylbenzene	0.118	0.0500		"	"	"	"	"	"	
Xylenes (total)	2.52	0.100		"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	89.7 %	50-147				"	"	"	"	
Surrogate: 4-BFB (PID)	97.5 %	54-123				"	"	"	"	

North Creek Analytical - Bothell

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Page 4 of 22



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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Project Number: 2306.3312.0004.00001 Project Manager: Bryan Graham	Reported: 03/19/02 13:39
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Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SB_66_20 (B2C0219-10) Soil **Sampled: 03/11/02 13:40** **Received: 03/12/02 09:00**

Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2C15018	03/15/02	03/17/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	"
Toluene	ND	0.0500	"	"	"	"	"	"	"
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	"
Xylenes (total)	0.136	0.100	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	84.7 %	50-147			"	"	"	"	"
Surrogate: 4-BFB (PID)	96.5 %	54-123			"	"	"	"	"

SB_66_25 (B2C0219-11) Soil **Sampled: 03/11/02 13:50** **Received: 03/12/02 09:00**

Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2C15018	03/15/02	03/17/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	"
Toluene	ND	0.0500	"	"	"	"	"	"	"
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	"
es (total)	ND	0.100	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	83.7 %	50-147			"	"	"	"	"
Surrogate: 4-BFB (PID)	92.9 %	54-123			"	"	"	"	"

SB_67_5 (B2C0219-12) Soil **Sampled: 03/11/02 15:10** **Received: 03/12/02 09:00**

Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2C15018	03/15/02	03/17/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	"
Toluene	ND	0.0500	"	"	"	"	"	"	"
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	"
Xylenes (total)	ND	0.100	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	87.4 %	50-147			"	"	"	"	"
Surrogate: 4-BFB (PID)	91.6 %	54-123			"	"	"	"	"

North Creek Analytical - Bothell

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Project: DPE
 Project Number: 2306.3312.0004.00001
 Project Manager: Bryan Graham

Reported:
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Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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SB_67_10 (B2C0219-13) Soil Sampled: 03/11/02 15:30 Received: 03/12/02 09:00

Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2C15018	03/15/02	03/17/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	"
Toluene	ND	0.0500	"	"	"	"	"	"	"
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	"
Xylenes (total)	ND	0.100	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	91.6 %	50-147			"	"	"	"	"
Surrogate: 4-BFB (PID)	101 %	54-123			"	"	"	"	"

SB_67_15 (B2C0219-14) Soil Sampled: 03/11/02 15:45 Received: 03/12/02 09:00

Gasoline Range Hydrocarbons	7.23	5.00	mg/kg dry	1	2C15018	03/15/02	03/17/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	"
Toluene	0.230	0.0500	"	"	"	"	"	"	"
Ethylbenzene	0.149	0.0500	"	"	"	"	"	"	"
Xylenes (total)	0.843	0.100	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	89.6 %	50-147			"	"	"	"	"
Surrogate: 4-BFB (PID)	96.5 %	54-123			"	"	"	"	"

SB_67_20 (B2C0219-15) Soil Sampled: 03/11/02 16:00 Received: 03/12/02 09:00

Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2C15018	03/15/02	03/17/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	"
Toluene	ND	0.0500	"	"	"	"	"	"	"
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	"
Xylenes (total)	ND	0.100	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	83.6 %	50-147			"	"	"	"	"
Surrogate: 4-BFB (PID)	92.9 %	54-123			"	"	"	"	"

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Foster Wheeler Environmental Corporation
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 Bothell WA/USA, 98011

Project: DPE
 Project Number: 2306.3312.0004.00001
 Project Manager: Bryan Graham

Reported:
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Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SB_67_25 (B2C0219-16) Soil Sampled: 03/11/02 16:15 Received: 03/12/02 09:00									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2C15018	03/15/02	03/17/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	86.1 %	50-147			"	"	"	"	
Surrogate: 4-BFB (PID)	90.9 %	54-123			"	"	"	"	

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Project: DPE
 Project Number: 2306.3312.0004.00001
 Project Manager: Bryan Graham

Reported:
 03/19/02 13:39

Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SB_65_5 (B2C0219-01) Soil Sampled: 03/11/02 09:25 Received: 03/12/02 09:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2C13027	03/13/02	03/15/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	84.9 %	50-150			"	"	"	"	
Surrogate: Octacosane	88.2 %	50-150			"	"	"	"	
SB_65_10 (B2C0219-02) Soil Sampled: 03/11/02 09:50 Received: 03/12/02 09:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2C13027	03/13/02	03/15/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	65.3 %	50-150			"	"	"	"	
Surrogate: Octacosane	66.3 %	50-150			"	"	"	"	
SB_65_15 (B2C0219-03) Soil Sampled: 03/11/02 10:15 Received: 03/12/02 09:00									
Diesel Range Hydrocarbons	676	10.0	mg/kg dry	1	2C13027	03/13/02	03/15/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	113 %	50-150			"	"	"	"	
Surrogate: Octacosane	106 %	50-150			"	"	"	"	
SB_65_20 (B2C0219-04) Soil Sampled: 03/11/02 10:35 Received: 03/12/02 09:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2C13027	03/13/02	03/15/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	94.6 %	50-150			"	"	"	"	
Surrogate: Octacosane	94.6 %	50-150			"	"	"	"	
SB_65_25 (B2C0219-05) Soil Sampled: 03/11/02 10:50 Received: 03/12/02 09:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2C13027	03/13/02	03/15/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	67.9 %	50-150			"	"	"	"	
Surrogate: Octacosane	68.1 %	50-150			"	"	"	"	

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
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Project: DPE
 Project Number: 2306.3312.0004.00001
 Project Manager: Bryan Graham

Reported:
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Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SB_65_30 (B2C0219-06) Soil Sampled: 03/11/02 11:20 Received: 03/12/02 09:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2C13027	03/13/02	03/15/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	71.2 %	50-150			"	"	"	"	
Surrogate: Octacosane	74.8 %	50-150			"	"	"	"	
SB_66_5 (B2C0219-07) Soil Sampled: 03/11/02 13:05 Received: 03/12/02 09:00									
Diesel Range Hydrocarbons	42.9	10.0	mg/kg dry	1	2C13027	03/13/02	03/15/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	70.1	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	101 %	50-150			"	"	"	"	
Surrogate: Octacosane	104 %	50-150			"	"	"	"	
SB_66_10 (B2C0219-08) Soil Sampled: 03/11/02 13:15 Received: 03/12/02 09:00									
Diesel Range Hydrocarbons	17.9	10.0	mg/kg dry	1	2C13027	03/13/02	03/15/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	29.3	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	73.0 %	50-150			"	"	"	"	
Surrogate: Octacosane	74.5 %	50-150			"	"	"	"	
SB_66_15 (B2C0219-09) Soil Sampled: 03/11/02 13:30 Received: 03/12/02 09:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2C13027	03/13/02	03/15/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	77.7 %	50-150			"	"	"	"	
Surrogate: Octacosane	80.8 %	50-150			"	"	"	"	
SB_66_20 (B2C0219-10) Soil Sampled: 03/11/02 13:40 Received: 03/12/02 09:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2C13027	03/13/02	03/15/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	84.1 %	50-150			"	"	"	"	
Surrogate: Octacosane	87.1 %	50-150			"	"	"	"	

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Project: DPE
 Project Number: 2306.3312.0004.00001
 Project Manager: Bryan Graham

Reported:
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**Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SB_66_25 (B2C0219-11) Soil Sampled: 03/11/02 13:50 Received: 03/12/02 09:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2C13027	03/13/02	03/15/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	70.8 %	50-150			"	"	"	"	
Surrogate: Octacosane	65.9 %	50-150			"	"	"	"	
SB_67_5 (B2C0219-12) Soil Sampled: 03/11/02 15:10 Received: 03/12/02 09:00									
Diesel Range Hydrocarbons	112	10.0	mg/kg dry	1	2C13027	03/13/02	03/15/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	75.2	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	82.7 %	50-150			"	"	"	"	
Surrogate: Octacosane	82.7 %	50-150			"	"	"	"	
SB_67_10 (B2C0219-13) Soil Sampled: 03/11/02 15:30 Received: 03/12/02 09:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2C13027	03/13/02	03/15/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	78.6 %	50-150			"	"	"	"	
Surrogate: Octacosane	79.4 %	50-150			"	"	"	"	
SB_67_15 (B2C0219-14) Soil Sampled: 03/11/02 15:45 Received: 03/12/02 09:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2C13027	03/13/02	03/15/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	94.5 %	50-150			"	"	"	"	
Surrogate: Octacosane	97.6 %	50-150			"	"	"	"	
SB_67_20 (B2C0219-15) Soil Sampled: 03/11/02 16:00 Received: 03/12/02 09:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2C13027	03/13/02	03/15/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	81.8 %	50-150			"	"	"	"	
Surrogate: Octacosane	84.8 %	50-150			"	"	"	"	

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Foster Wheeler Environmental Corporation
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Project: DPE
 Project Number: 2306.3312.0004.00001
 Project Manager: Bryan Graham

Reported:
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Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
North Creek Analytical - Bothell

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								

SB_67_25 (B2C0219-16RE1) Soil Sampled: 03/11/02 16:15 Received: 03/12/02 09:00

Diesel Range Hydrocarbons	ND	10.0		mg/kg dry	1	2C15024	03/15/02	03/18/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0		"	"	"	"	"	"	
Surrogate: 2-FBP	81.5 %	50-150				"	"	"	"	
Surrogate: Octacosane	84.4 %	50-150				"	"	"	"	

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Project: DPE
 Project Number: 2306.3312.0004.00001
 Project Manager: Bryan Graham

Reported:
 03/19/02 13:39

Total Metals by EPA 6000/7000 Series Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SB_65_5 (B2C0219-01) Soil Sampled: 03/11/02 09:25 Received: 03/12/02 09:00									
Lead	4.17	0.360	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	
SB_65_10 (B2C0219-02) Soil Sampled: 03/11/02 09:50 Received: 03/12/02 09:00									
Lead	4.96	0.350	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	
SB_65_15 (B2C0219-03) Soil Sampled: 03/11/02 10:15 Received: 03/12/02 09:00									
Lead	4.35	0.269	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	
SB_65_20 (B2C0219-04) Soil Sampled: 03/11/02 10:35 Received: 03/12/02 09:00									
Lead	2.08	0.307	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	
SB_65_25 (B2C0219-05) Soil Sampled: 03/11/02 10:50 Received: 03/12/02 09:00									
Lead	5.94	0.357	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	
SB_65_30 (B2C0219-06) Soil Sampled: 03/11/02 11:20 Received: 03/12/02 09:00									
Lead	4.02	0.391	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	
SB_66_5 (B2C0219-07) Soil Sampled: 03/11/02 13:05 Received: 03/12/02 09:00									
Lead	55.5	0.272	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	
SB_66_10 (B2C0219-08) Soil Sampled: 03/11/02 13:15 Received: 03/12/02 09:00									
Lead	18.9	0.388	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	
SB_66_15 (B2C0219-09) Soil Sampled: 03/11/02 13:30 Received: 03/12/02 09:00									
Lead	2.53	0.301	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	

North Creek Analytical - Bothell

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Page 12 of 22



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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE
 Project Number: 2306.3312.0004.00001
 Project Manager: Bryan Graham

Reported:
 03/19/02 13:39

**Total Metals by EPA 6000/7000 Series Methods
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SB_66_20 (B2C0219-10) Soil Sampled: 03/11/02 13:40 Received: 03/12/02 09:00									
Lead	2.44	0.307	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	
SB_66_25 (B2C0219-11) Soil Sampled: 03/11/02 13:50 Received: 03/12/02 09:00									
Lead	6.14	0.333	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	
SB_67_5 (B2C0219-12) Soil Sampled: 03/11/02 15:10 Received: 03/12/02 09:00									
Lead	21.1	0.336	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	
SB_67_10 (B2C0219-13) Soil Sampled: 03/11/02 15:30 Received: 03/12/02 09:00									
Lead	5.18	0.279	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	
SB_67_15 (B2C0219-14) Soil Sampled: 03/11/02 15:45 Received: 03/12/02 09:00									
Lead	2.47	0.260	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	
SB_67_20 (B2C0219-15) Soil Sampled: 03/11/02 16:00 Received: 03/12/02 09:00									
Lead	2.34	0.376	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	
SB_67_25 (B2C0219-16) Soil Sampled: 03/11/02 16:15 Received: 03/12/02 09:00									
Lead	5.58	0.327	mg/kg dry	1	2C15010	03/15/02	03/18/02	EPA 6020	

North Creek Analytical - Bothell

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Project: DPE
 Project Number: 2306.3312.0004.00001
 Project Manager: Bryan Graham

Reported:
 03/19/02 13:39

Physical Parameters by APHA/ASTM/EPA Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SB_65_5 (B2C0219-01) Soil Sampled: 03/11/02 09:25 Received: 03/12/02 09:00									
Dry Weight	89.6	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	
SB_65_10 (B2C0219-02) Soil Sampled: 03/11/02 09:50 Received: 03/12/02 09:00									
Dry Weight	80.8	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	
SB_65_15 (B2C0219-03) Soil Sampled: 03/11/02 10:15 Received: 03/12/02 09:00									
Dry Weight	85.1	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	
SB_65_20 (B2C0219-04) Soil Sampled: 03/11/02 10:35 Received: 03/12/02 09:00									
Dry Weight	83.0	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	
SB_65_25 (B2C0219-05) Soil Sampled: 03/11/02 10:50 Received: 03/12/02 09:00									
Dry Weight	82.1	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	
SB_65_30 (B2C0219-06) Soil Sampled: 03/11/02 11:20 Received: 03/12/02 09:00									
Dry Weight	78.6	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	
SB_66_5 (B2C0219-07) Soil Sampled: 03/11/02 13:05 Received: 03/12/02 09:00									
Dry Weight	83.7	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	
SB_66_10 (B2C0219-08) Soil Sampled: 03/11/02 13:15 Received: 03/12/02 09:00									
Dry Weight	80.9	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	
SB_66_15 (B2C0219-09) Soil Sampled: 03/11/02 13:30 Received: 03/12/02 09:00									
Dry Weight	82.3	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Project Number: 2306.3312.0004.00001 Project Manager: Bryan Graham	Reported: 03/19/02 13:39
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**Physical Parameters by APHA/ASTM/EPA Methods
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SB_66_20 (B2C0219-10) Soil Sampled: 03/11/02 13:40 Received: 03/12/02 09:00									
Dry Weight	81.5	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	
SB_66_25 (B2C0219-11) Soil Sampled: 03/11/02 13:50 Received: 03/12/02 09:00									
Dry Weight	81.3	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	
SB_67_5 (B2C0219-12) Soil Sampled: 03/11/02 15:10 Received: 03/12/02 09:00									
Dry Weight	83.9	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	
SB_67_10 (B2C0219-13) Soil Sampled: 03/11/02 15:30 Received: 03/12/02 09:00									
Dry Weight	81.7	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	
SB_67_15 (B2C0219-14) Soil Sampled: 03/11/02 15:45 Received: 03/12/02 09:00									
Dry Weight	83.2	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	
SB_67_20 (B2C0219-15) Soil Sampled: 03/11/02 16:00 Received: 03/12/02 09:00									
Dry Weight	80.8	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	
SB_67_25 (B2C0219-16) Soil Sampled: 03/11/02 16:15 Received: 03/12/02 09:00									
Dry Weight	79.3	1.00	%	1	2C13015	03/13/02	03/14/02	BSOPSPL003R07	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Project Number: 2306.3312.0004.00001 Project Manager: Bryan Graham	Reported: 03/19/02 13:39
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Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2C15018: Prepared 03/15/02 Using EPA 5030B (P/T)

Blank (2C15018-BLK1)

Gasoline Range Hydrocarbons	ND	5.00	mg/kg							
Benzene	ND	0.0300	"							
Toluene	ND	0.0500	"							
Ethylbenzene	ND	0.0500	"							
Xylenes (total)	ND	0.100	"							
Surrogate: 4-BFB (FID)	3.87		"	4.00		96.8	50-147			
Surrogate: 4-BFB (PID)	3.95		"	4.00		98.8	54-123			

LCS (2C15018-BS1)

Gasoline Range Hydrocarbons	27.6	5.00	mg/kg	27.5		100	80-120			
Benzene	0.351	0.0300	"	0.330		106	80-120			
Toluene	1.78	0.0500	"	1.96		90.8	80-120			
Ethylbenzene	0.484	0.0500	"	0.460		105	80-120			
Xylenes (total)	2.24	0.100	"	2.28		98.2	80-120			
Surrogate: 4-BFB (FID)	4.31		"	4.00		108	50-147			
Surrogate: 4-BFB (PID)	3.87		"	4.00		96.8	54-123			

LCS Dup (2C15018-BSD1)

Gasoline Range Hydrocarbons	28.2	5.00	mg/kg	27.5		103	80-120	2.15	40	
Benzene	0.383	0.0300	"	0.330		116	80-120	8.72	40	
Toluene	1.95	0.0500	"	1.96		99.5	80-120	9.12	40	
Ethylbenzene	0.528	0.0500	"	0.460		115	80-120	8.70	40	
Xylenes (total)	2.46	0.100	"	2.28		108	80-120	9.36	40	
Surrogate: 4-BFB (FID)	4.38		"	4.00		110	50-147			
Surrogate: 4-BFB (PID)	4.20		"	4.00		105	54-123			

Matrix Spike (2C15018-MS1)

Source: B2C0219-01

Gasoline Range Hydrocarbons	28.7	5.00	mg/kg dry	30.7	ND	90.1	53-120			
Benzene	0.380	0.0300	"	0.368	ND	103	64-130			
Toluene	1.95	0.0500	"	2.19	ND	89.0	66-130			
Ethylbenzene	0.533	0.0500	"	0.514	ND	104	72-130			
Xylenes (total)	2.47	0.100	"	2.54	ND	96.4	73-130			
Surrogate: 4-BFB (FID)	4.28		"	4.47		95.7	50-147			
Surrogate: 4-BFB (PID)	4.07		"	4.47		91.1	54-123			

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE
 Project Number: 2306.3312.0004.00001
 Project Manager: Bryan Graham

Reported:
 03/19/02 13:39

**Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B - Quality Control
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2C15018: Prepared 03/15/02 Using EPA 5030B (P/T)

Matrix Spike Dup (2C15018-MSD1)

Source: B2C0219-01

Gasoline Range Hydrocarbons	28.1	5.00	mg/kg dry	30.7	ND	88.1	53-120	2.11	40	
Benzene	0.381	0.0300	"	0.368	ND	104	64-130	0.263	40	
Toluene	1.95	0.0500	"	2.19	ND	89.0	66-130	0.00	40	
Ethylbenzene	0.530	0.0500	"	0.514	ND	103	72-130	0.564	40	
Xylenes (total)	2.46	0.100	"	2.54	ND	96.0	73-130	0.406	40	
Surrogate: 4-BFB (FID)	4.31		"	4.47		96.4	50-147			
Surrogate: 4-BFB (PID)	4.11		"	4.47		91.9	54-123			

North Creek Analytical - Bothell

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Page 17 of 22



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**Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up - Quality Control
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	Limit	RPD	RPD Limit	Notes
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Batch 2C13027: Prepared 03/13/02 Using EPA 3550B

Blank (2C13027-BLK1)

Diesel Range Hydrocarbons	ND	10.0	mg/kg							
Lube Oil Range Hydrocarbons	ND	25.0	"							
Surrogate: 2-FBP	9.39		"	10.7		87.8	50-150			
Surrogate: Octacosane	9.44		"	10.7		88.2	50-150			

LCS (2C13027-BS1)

Diesel Range Hydrocarbons	71.1	10.0	mg/kg	66.7		107	50-150			
Surrogate: 2-FBP	11.3		"	10.7		106	50-150			

LCS Dup (2C13027-BSD1)

Diesel Range Hydrocarbons	50.1	10.0	mg/kg	66.7		75.1	50-150	34.7	50	
Surrogate: 2-FBP	10.4		"	10.7		97.2	50-150			

Duplicate (2C13027-DUP1)

Source: B2C0219-03

Diesel Range Hydrocarbons	879	10.0	mg/kg dry		676			26.1	50	
Lube Oil Range Hydrocarbons	ND	25.0	"		ND			17.6	50	
Surrogate: 2-FBP	11.5		"	12.3		93.5	50-150			
Surrogate: Octacosane	10.5		"	12.3		85.4	50-150			

Batch 2C15024: Prepared 03/15/02 Using EPA 3550B

Blank (2C15024-BLK1)

Diesel Range Hydrocarbons	ND	10.0	mg/kg							
Lube Oil Range Hydrocarbons	ND	25.0	"							
Surrogate: 2-FBP	9.44		"	10.7		88.2	50-150			
Surrogate: Octacosane	9.63		"	10.7		90.0	50-150			

North Creek Analytical - Bothell

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 Bothell WA/USA, 98011

Project: DPE
 Project Number: 2306.3312.0004.00001
 Project Manager: Bryan Graham

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 03/19/02 13:39

Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2C15024: Prepared 03/15/02 Using EPA 3550B

LCS (2C15024-BS1)

Diesel Range Hydrocarbons	59.3	10.0	mg/kg	66.7		88.9	50-150			
Surrogate: 2-FBP	10.6		"	10.7		99.1	50-150			

LCS Dup (2C15024-BSD1)

Diesel Range Hydrocarbons	56.6	10.0	mg/kg	66.7		84.9	50-150	4.66	50	
Surrogate: 2-FBP	10.9		"	10.7		102	50-150			

Duplicate (2C15024-DUP1)

Source: B2C0301-06

Diesel Range Hydrocarbons	ND	10.0	mg/kg dry		ND				50	
Lube Oil Range Hydrocarbons	ND	25.0	"		ND			2.29	50	
Surrogate: 2-FBP	11.5		"	12.6		91.3	50-150			
Surrogate: Octacosane	11.9		"	12.6		94.4	50-150			

North Creek Analytical - Bothell

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Page 19 of 22



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Reported:
 03/19/02 13:39

Total Metals by EPA 6000/7000 Series Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2C15010: Prepared 03/15/02 Using EPA 3050B										
Blank (2C15010-BLK1)										
Lead	ND	0.500	mg/kg							
LCS (2C15010-BS1)										
Lead	40.3	0.500	mg/kg	39.6		102	80-120			
LCS Dup (2C15010-BSD1)										
Lead	38.8	0.500	mg/kg	37.7		103	80-120	3.79	20	
Matrix Spike (2C15010-MS1) Source: B2C0282-01										
Lead	38.7	0.410	mg/kg dry	36.1	2.53	100	70-130			
Matrix Spike Dup (2C15010-MSD1) Source: B2C0282-01										
Lead	34.3	0.352	mg/kg dry	31.0	2.53	102	70-130	12.1	20	

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 03/19/02 13:39

Notes and Definitions

- Q-34 The sample container submitted for volatile analysis had either headspace or air bubbles greater than 1/4 inch in diameter.
- S-02 The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.
- S-04 The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

North Creek Analytical - Bothell

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Page 22 of 22



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Physical Parameters by APHA/ASTM/EPA Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch 2C13015: Prepared 03/13/02 Using Dry Weight

Blank (2C13015-BLK1)

Dry Weight	100	1.00	%							
------------	-----	------	---	--	--	--	--	--	--	--

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

North Creek Analytical, Inc.
Environmental Laboratory Network

Page 21 of 22

Quantitation Report

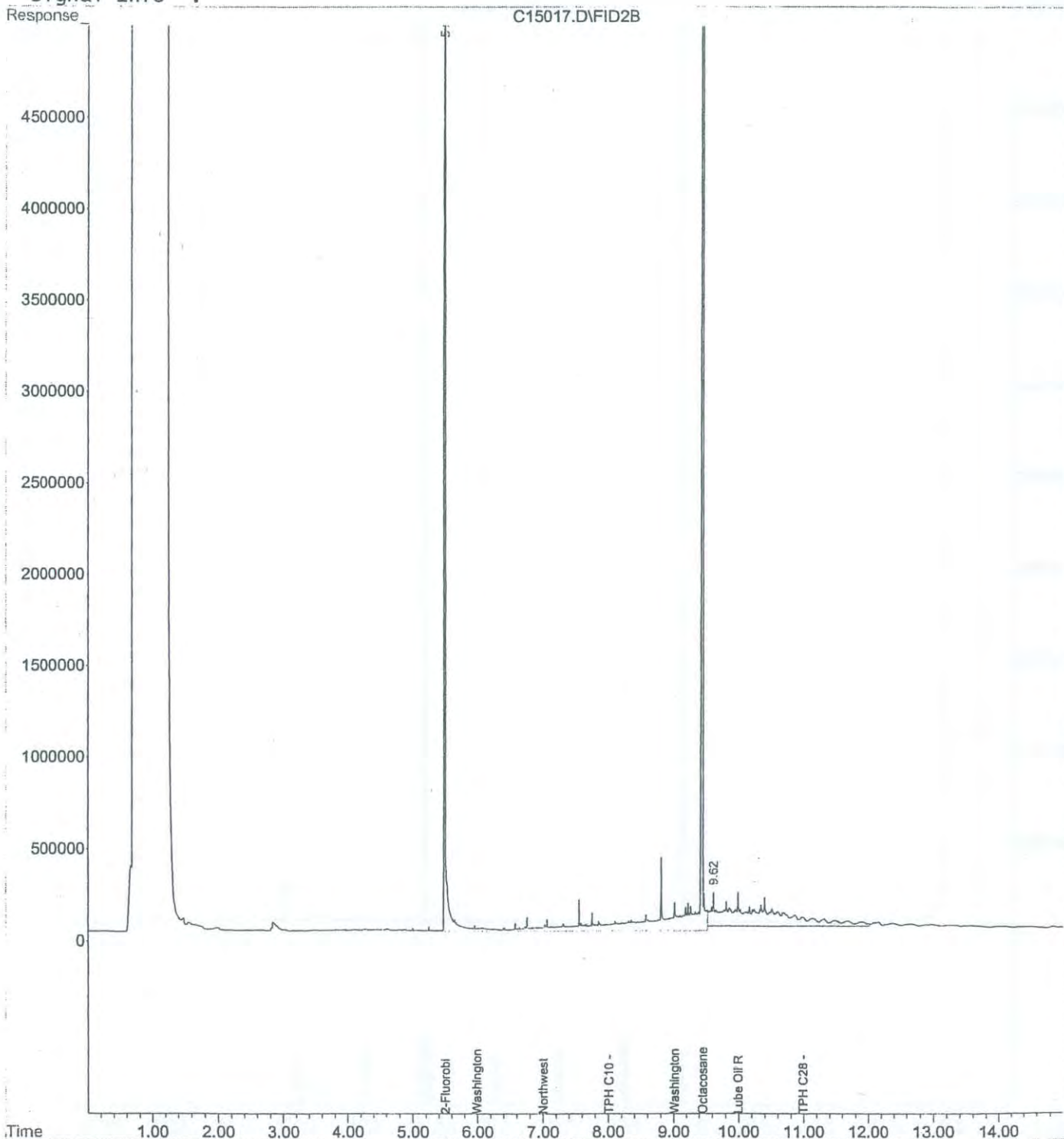
Data File : C:\HPCHEM\4\DATA.SEC\C15017.D
Acq On : 3-15-02 10:47:15 AM
Sample : b2c0219-01
Misc : 1x nw-dx sg s
IntFile : SURR.E
Quant Time: Mar 15 11:02 2002

Vial: 11
Operator: EDL
Inst : GC #7
Multiplr: 1.00

Quant Results File: 07002!7B.RES

Quant Method : C:\HPCHEM\4\METHODS\07002!7B.M (Chemstation Integrator)
Title : TPH-D Front
Last Update : Tue Mar 12 08:22:48 2002
Response via : Multiple Level Calibration
DataAcq Meth : 07002!7A.M

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report

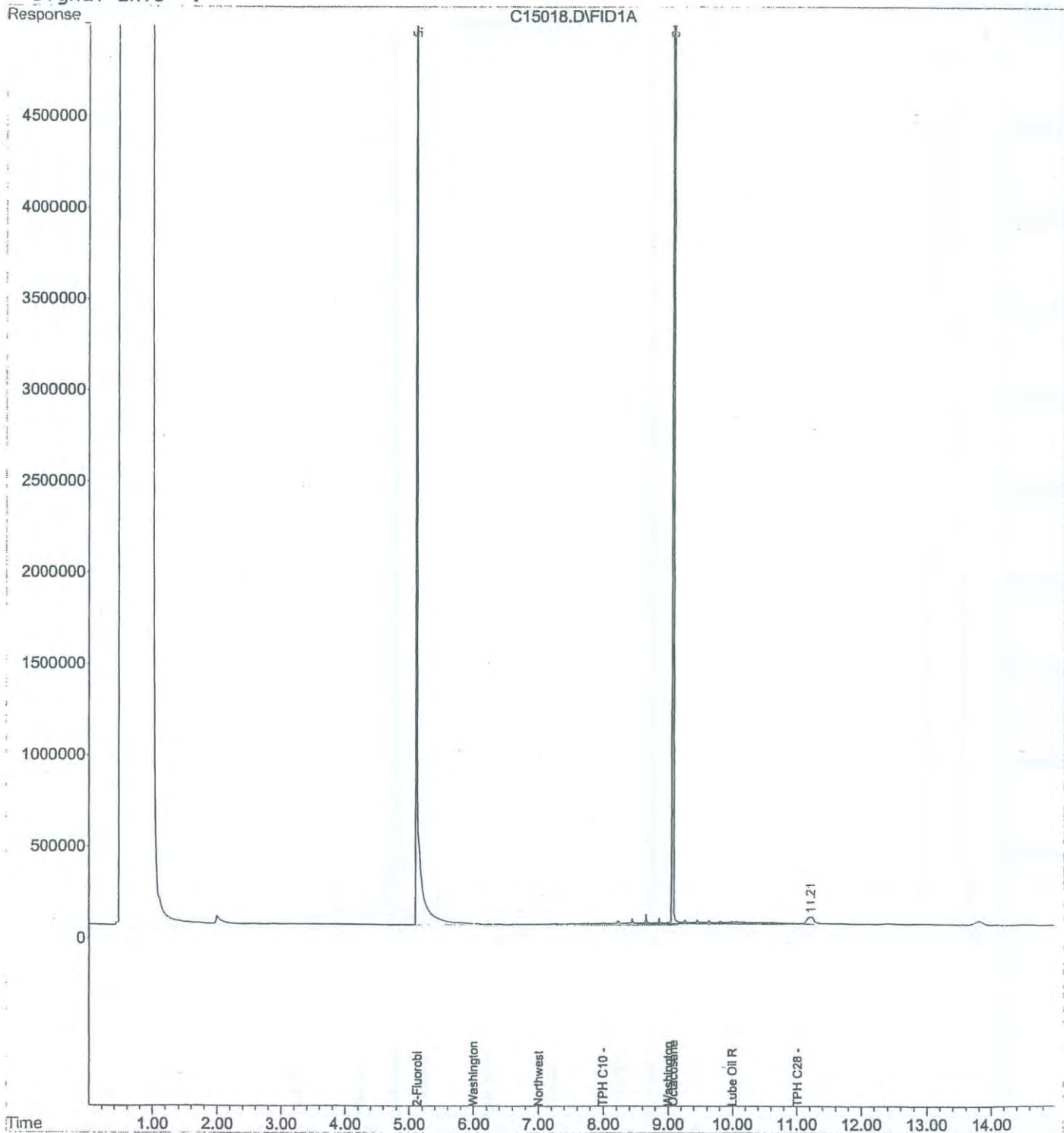
Data File : C:\HPCHEM\4\DATA\C15018.D
Acq On : 3-15-02 10:47:15 AM
Sample : b2c0219-02
Misc : 1x nw-dx sg s
IntFile : SURR.E

Vial: 12
Operator: EDL
Inst : GC #7
Multiplr: 1.00

Quant Time: Mar 15 11:02 2002 Quant Results File: 07002!7A.RES

Quant Method : C:\HPCHEM\4\METHODS\07002!7A.M (Chemstation Integrator)
Title : TPH-D Front
Last Update : Tue Mar 12 07:42:52 2002
Response via : Multiple Level Calibration
DataAcq Meth : 07002!7A.M

Volume Inj. :
Signal Phase :
Signal Info :



QUANTITATION REPORT

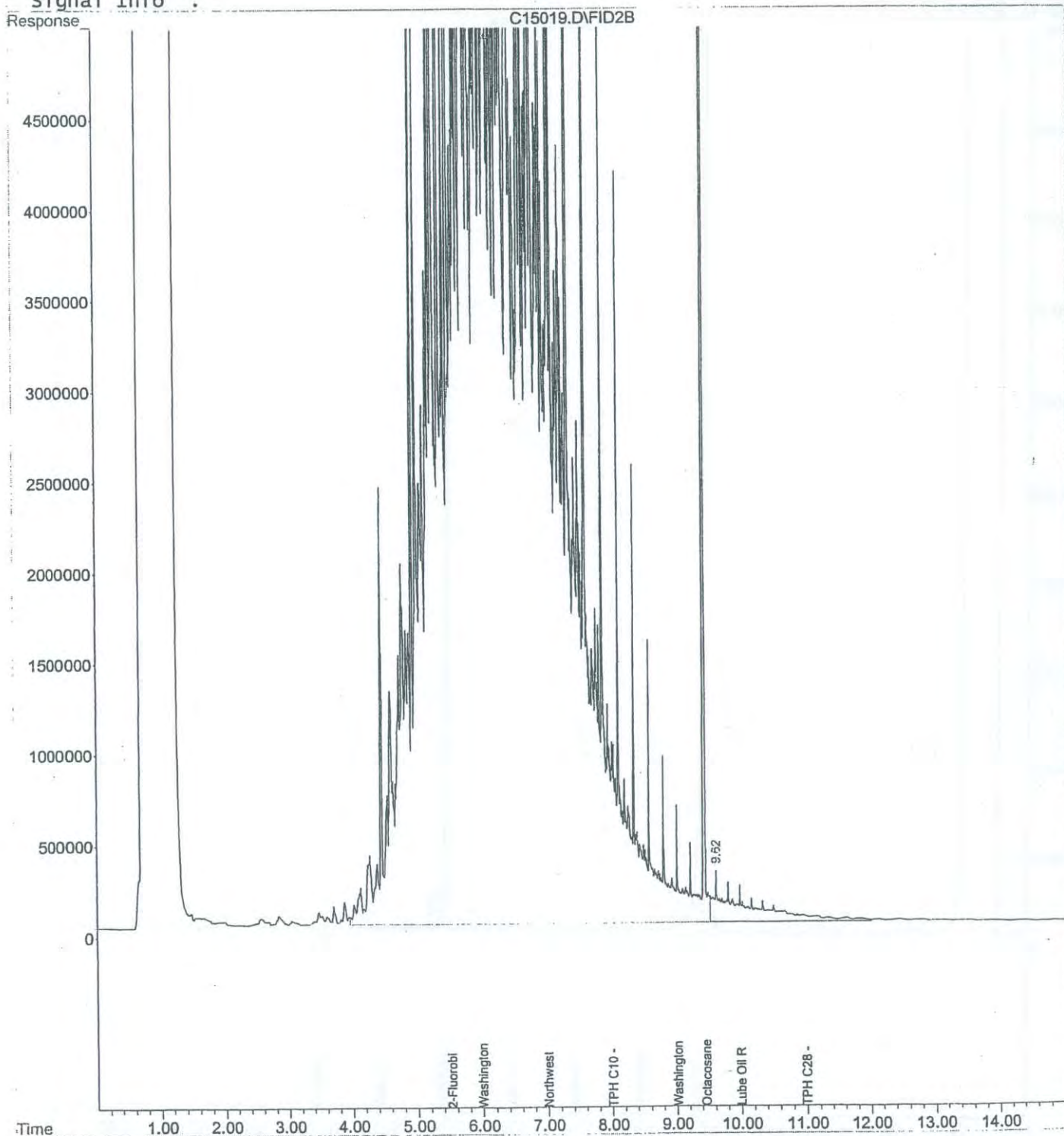
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Acq On : 3-15-02 11:09:42 AM
Sample : b2c0219-03
Misc : 1x nw-dx sg s
IntFile : SURR.E
Quant Time: Mar 15 12:41 2002

vial: 13
Operator: EDL
Inst : GC #7
Multiplr: 1.00

Quant Results File: 07002!7B.RES

Quant Method : C:\HPCHEM\4\METHODS\07002!7B.M (Chemstation Integrator)
Title : TPH-D Front
Last Update : Tue Mar 12 08:22:48 2002
Response via : Multiple Level Calibration
DataAcq Meth : 07002!7A.M

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report

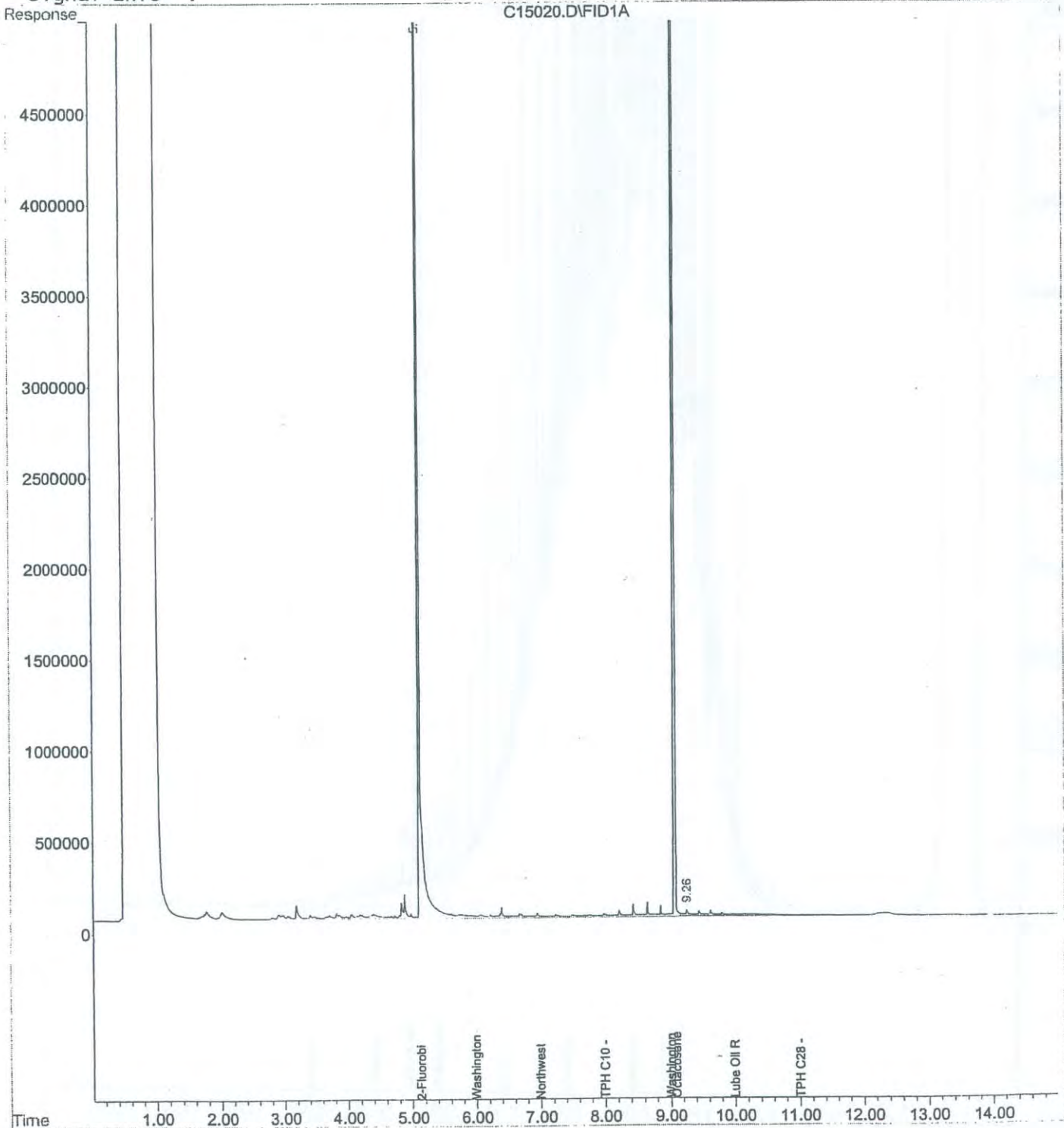
Data File : C:\HPCHEM\4\DATA\C15020.D
Acq On : 3-15-02 11:09:42 AM
Sample : b2c0219-04
Misc : 1x nw-dx sg s
IntFile : SURR.E
Quant Time: Mar 15 11:24 2002

Vial: 14
Operator: EDL
Inst : GC #7
Multiplr: 1.00

Quant Results File: 07002!7A.RES

Quant Method : C:\HPCHEM\4\METHODS\07002!7A.M (Chemstation Integrator)
Title : TPH-D Front
Last Update : Tue Mar 12 07:42:52 2002
Response via : Multiple Level Calibration
DataAcq Meth : 07002!7A.M

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report

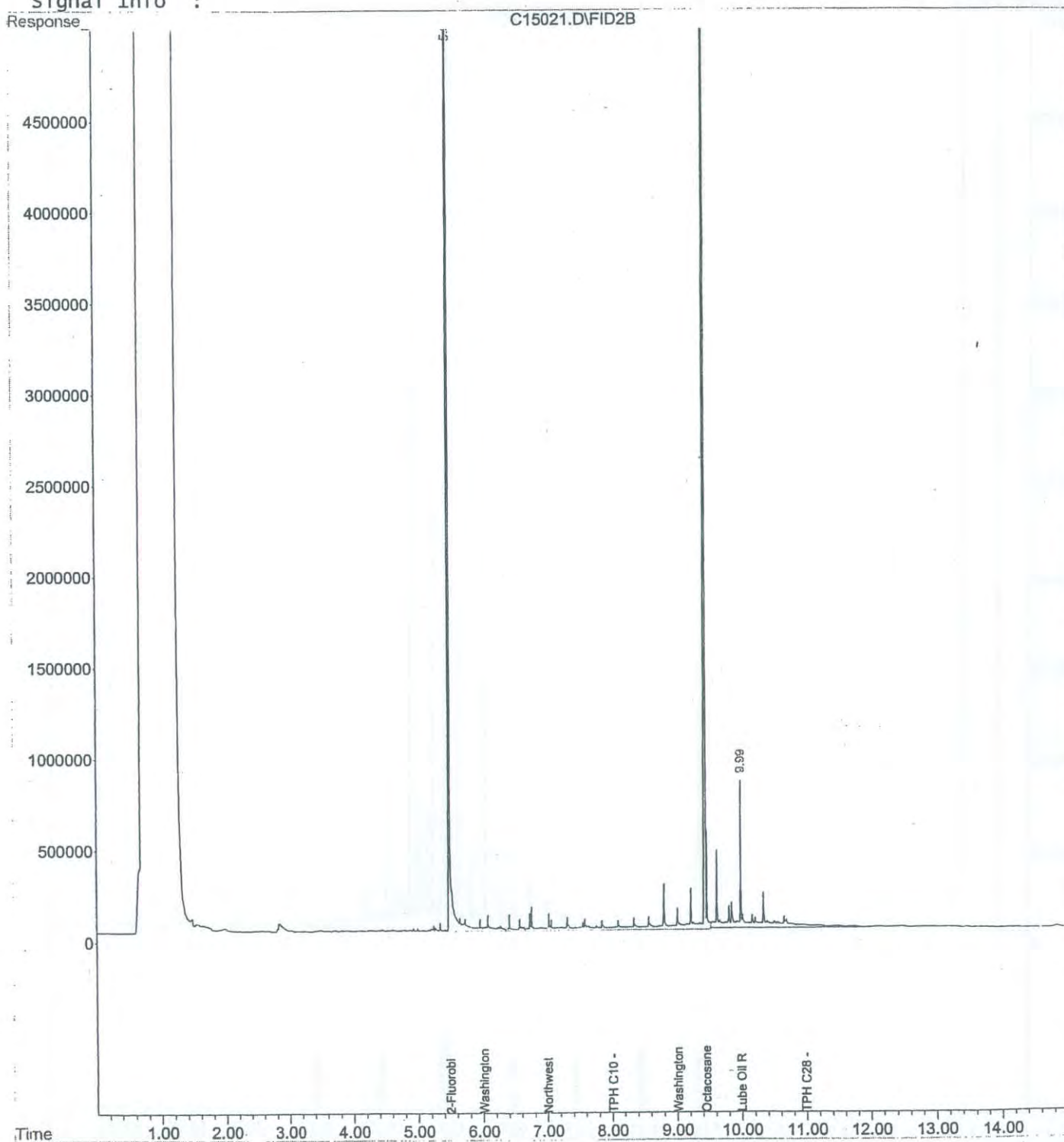
Data File : C:\HPCHEM\4\DATA.SEC\C15021.D
Acq On : 3-15-02 11:32:04 AM
Sample : b2c0219-05
Misc : 1x nw-dx sg s
IntFile : SURR.E
Quant Time: Mar 15 11:47 2002

Vial: 15
Operator: EDL
Inst : GC #7
Multiplr: 1.00

Quant Results File: 07002!7B.RES

Quant Method : C:\HPCHEM\4\METHODS\07002!7B.M (Chemstation Integrator)
Title : TPH-D Front
Last Update : Tue Mar 12 08:22:48 2002
Response via : Multiple Level Calibration
DataAcq Meth : 07002!7A.M

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report

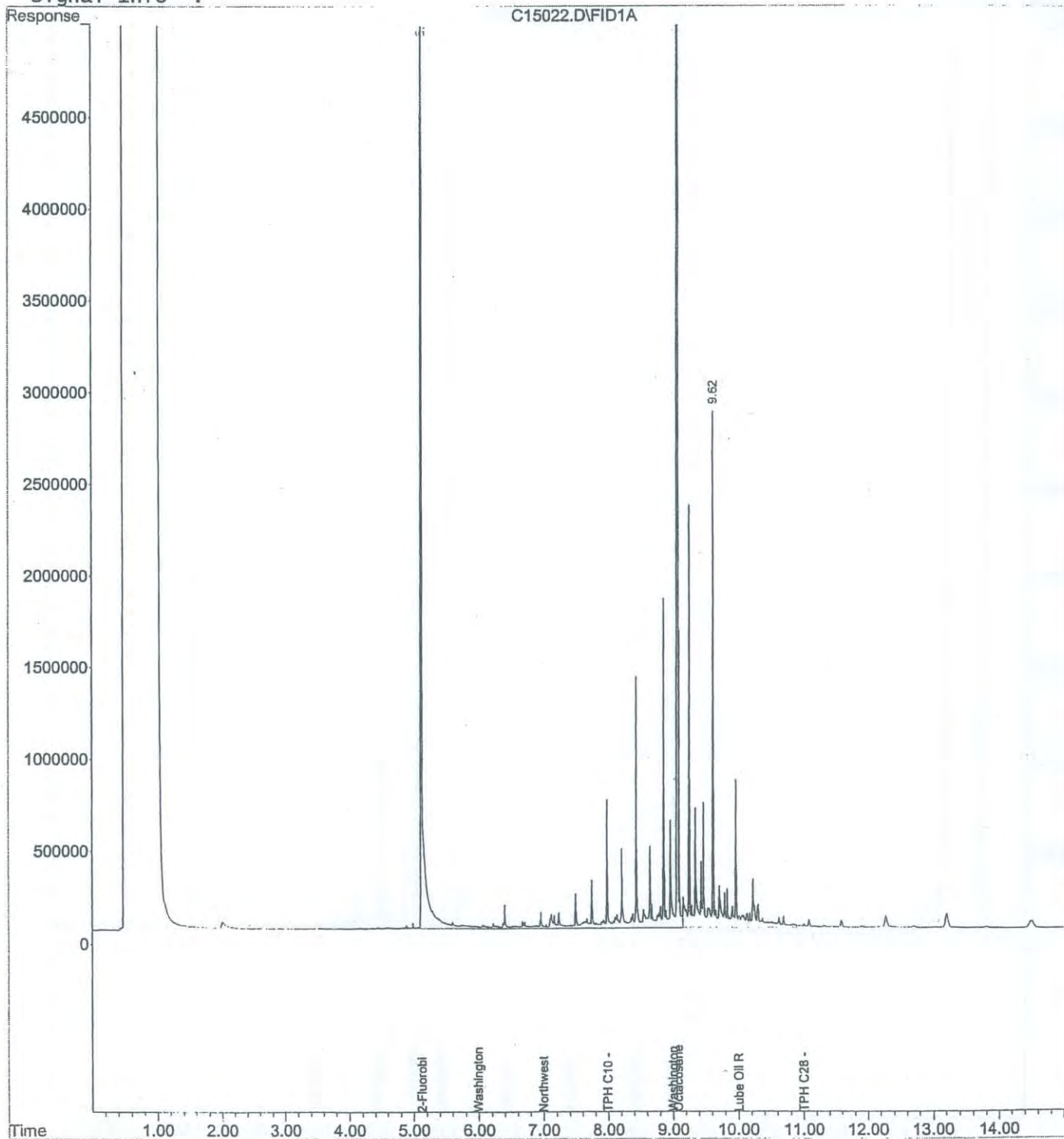
Data File : C:\HPCHEM\4\DATA\C15022.D
Acq On : 3-15-02 11:32:04 AM
Sample : b2c0219-06
Misc : 1x nw-dx sg s
IntFile : SURR.E
Quant Time: Mar 15 11:47 2002

Vial: 16
Operator: EDL
Inst : GC #7
Multiplr: 1.00

Quant Results File: 07002!7A.RES

Quant Method : C:\HPCHEM\4\METHODS\07002!7A.M (Chemstation Integrator)
Title : TPH-D Front
Last Update : Tue Mar 12 07:42:52 2002
Response via : Multiple Level Calibration
DataAcq Meth : 07002!7A.M

Volume Inj. :
Signal Phase :
Signal Info :



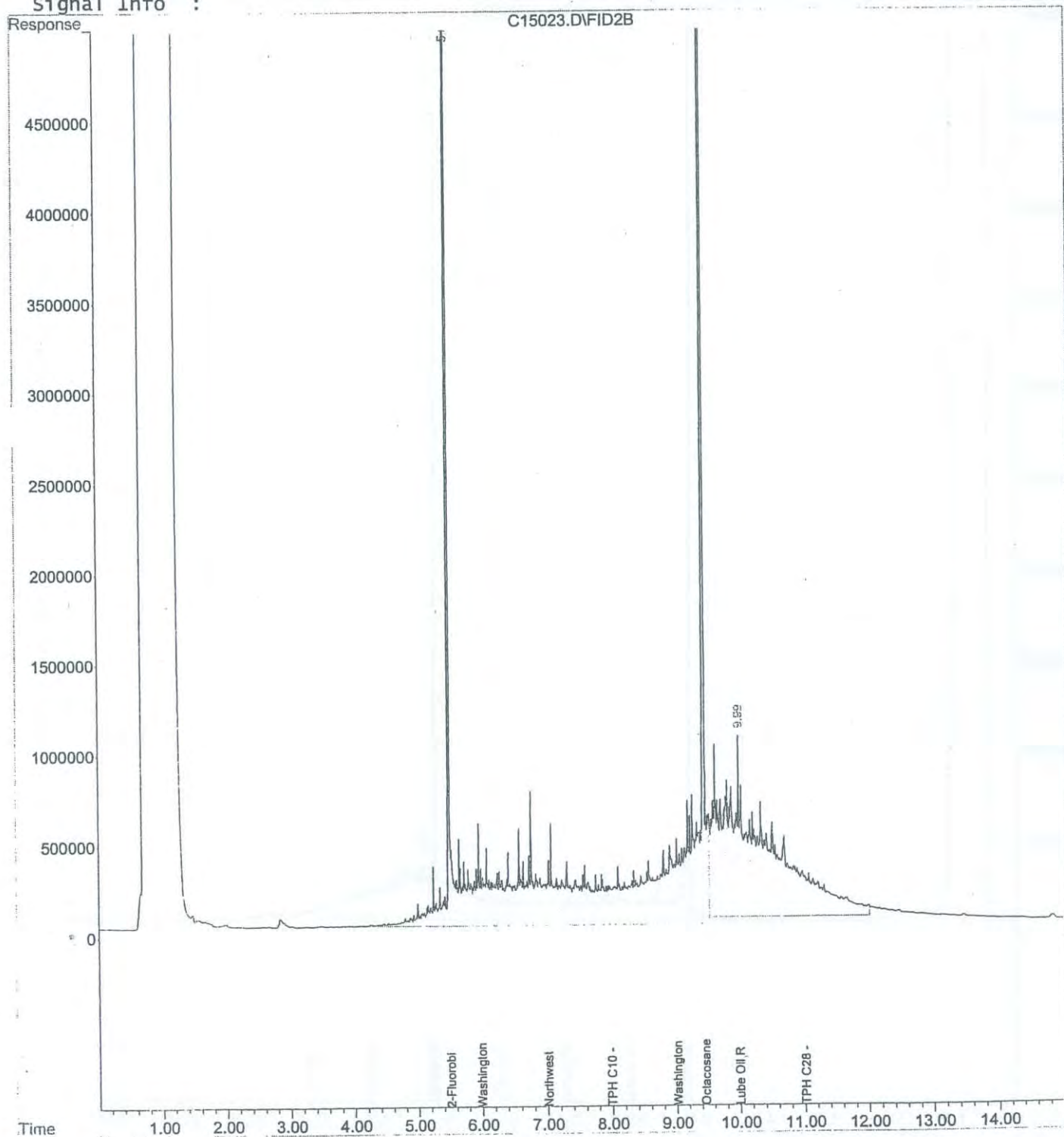
Quantitation Report

Data File : C:\HPCHEM\4\DATA.SEC\C15023.D
Acq On : 3-15-02 11:54:04 AM
Sample : b2c0219-07
Misc : 1x nw-dx sg s
IntFile : SURR.E
Quant Time: Mar 15 12:09 2002

Vial: 17
Operator: EDL
Inst : GC #7
Multiplr: 1.00

Quant Method : C:\HPCHEM\4\METHODS\07002!7B.M (Chemstation Integrator)
Title : TPH-D Front
Last Update : Tue Mar 12 08:22:48 2002
Response via : Multiple Level Calibration
DataAcq Meth : 07002!7A.M

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report

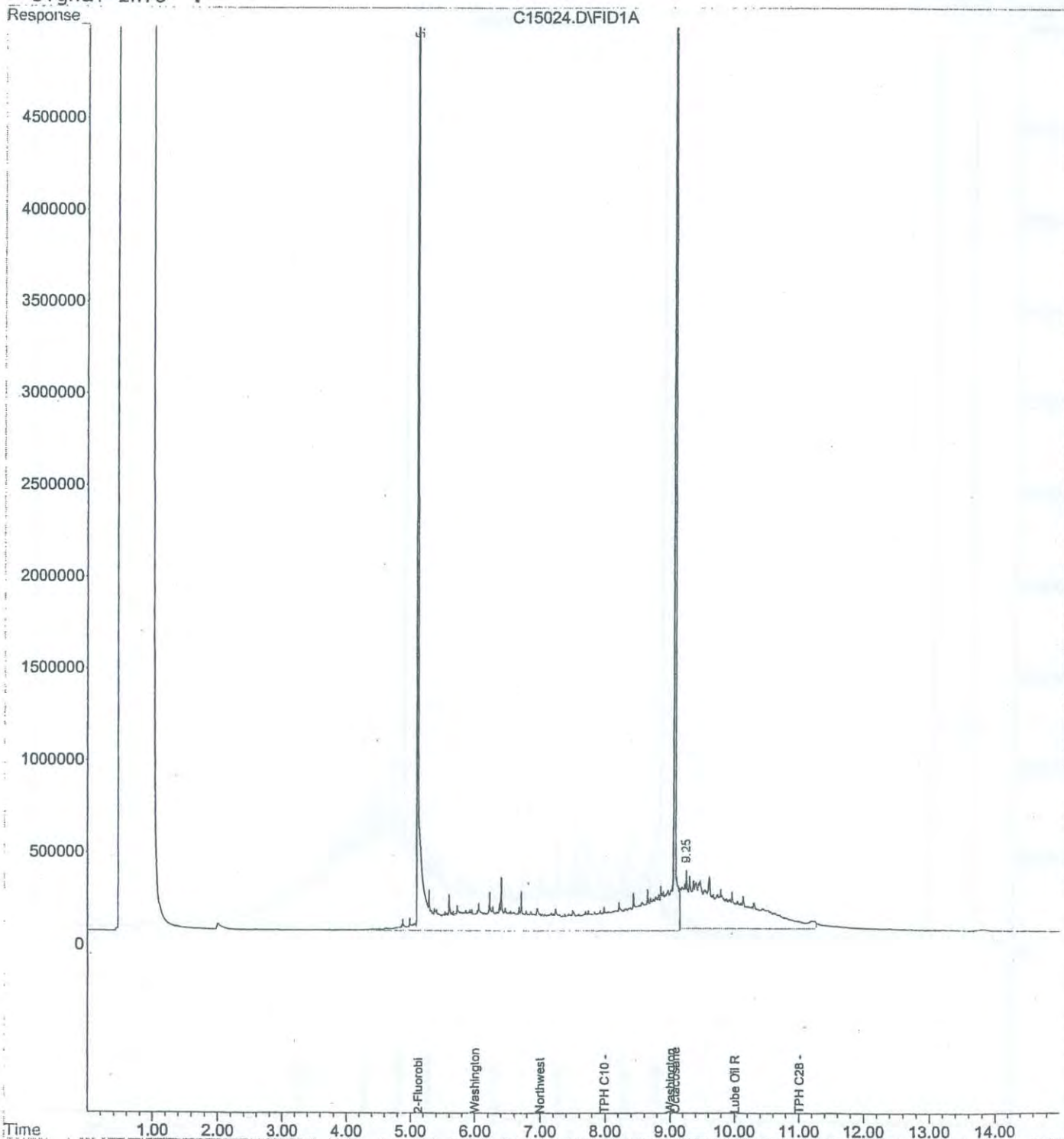
Data File : C:\HPCHEM\4\DATA\C15024.D
Acq On : 3-15-02 11:54:04 AM
Sample : b2c0219-08
Misc : 1x nw-dx sg s
IntFile : SURR.E
Quant Time: Mar 15 12:09 2002

Vial: 18
Operator: EDL
Inst : GC #7
Multiplr: 1.00

Quant Results File: 07002!7A.RES

Quant Method : C:\HPCHEM\4\METHODS\07002!7A.M (Chemstation Integrator)
Title : TPH-D Front
Last Update : Tue Mar 12 07:42:52 2002
Response via : Multiple Level Calibration
DataAcq Meth : 07002!7A.M

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report

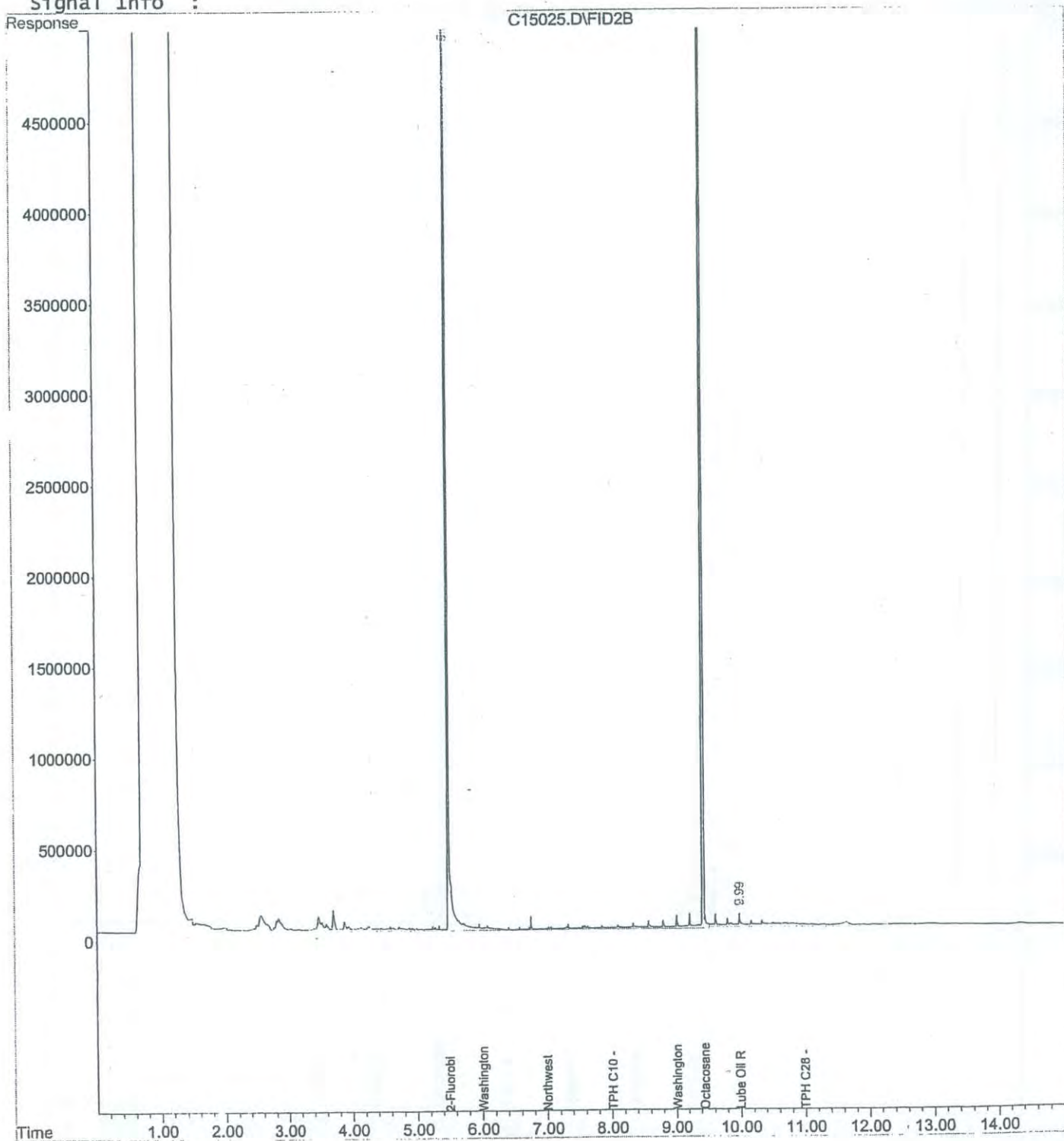
Data File : C:\HPCHEM\4\DATA.SEC\C15025.D
Acq On : 3-15-02 12:16:04 PM
Sample : b2c0219-09
Misc : 1x nw-dx sg s
IntFile : SURR.E
Quant Time: Mar 15 12:31 2002

Vial: 19
Operator: EDL
Inst : GC #7
Multiplr: 1.00

Quant Results File: 07002!7B.RES

Quant Method : C:\HPCHEM\4\METHODS\07002!7B.M (Chemstation Integrator)
Title : TPH-D Front
Last Update : Tue Mar 12 08:22:48 2002
Response via : Multiple Level Calibration
DataAcq Meth : 07002!7A.M

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report

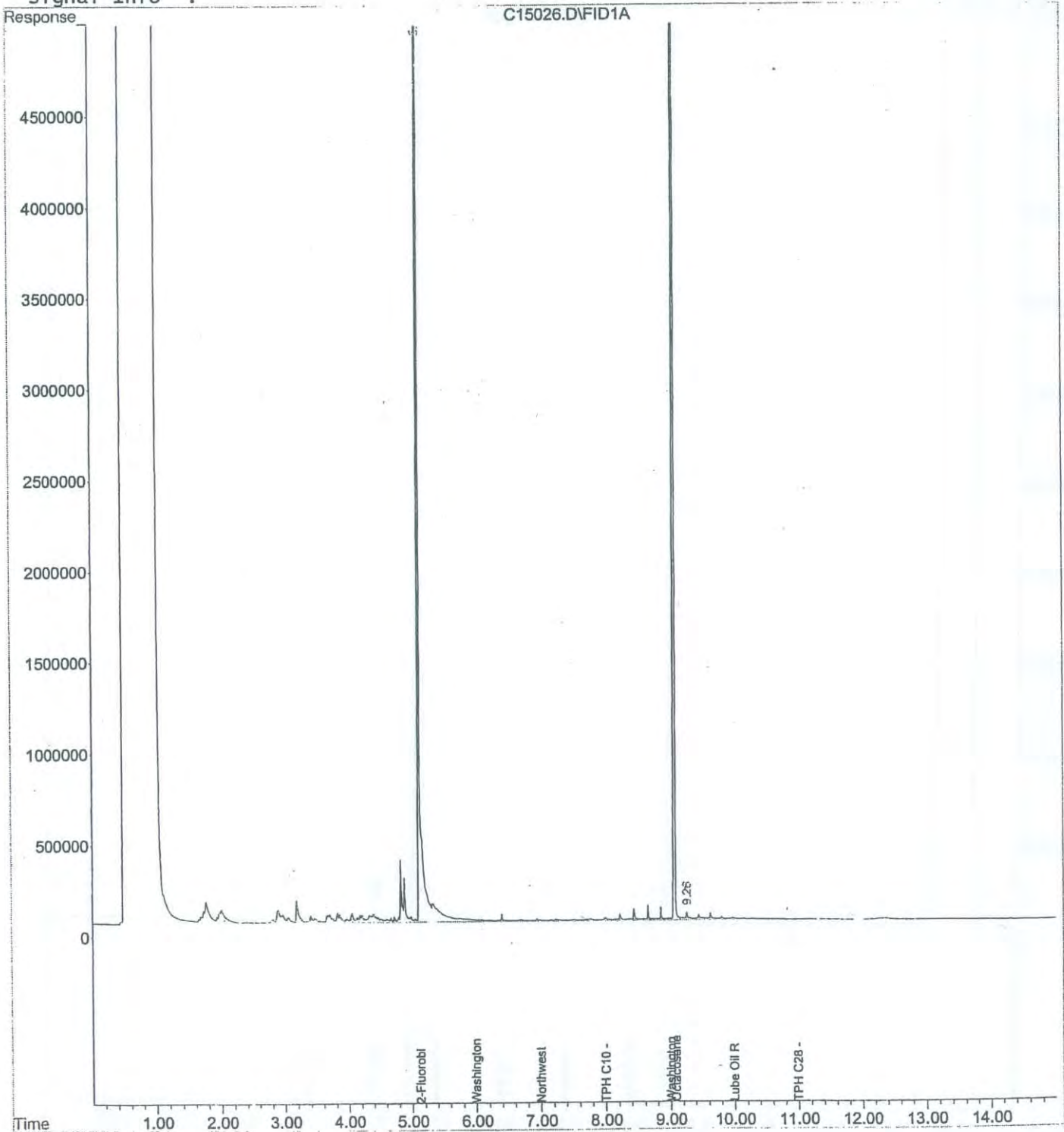
Data File : C:\HPCHEM\4\DATA\C15026.D
Acq On : 3-15-02 12:16:04 PM
Sample : b2c0219-10
Misc : 1x nw-dx sg s
IntFile : SURR.E
Quant Time: Mar 15 12:31 2002

Vial: 20
Operator: EDL
Inst : GC #7
Multiplr: 1.00

Quant Results File: 07002!7A.RES

Quant Method : C:\HPCHEM\4\METHODS\07002!7A.M (Chemstation Integrator)
Title : TPH-D Front
Last Update : Tue Mar 12 07:42:52 2002
Response via : Multiple Level Calibration
DataAcq Meth : 07002!7A.M

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report

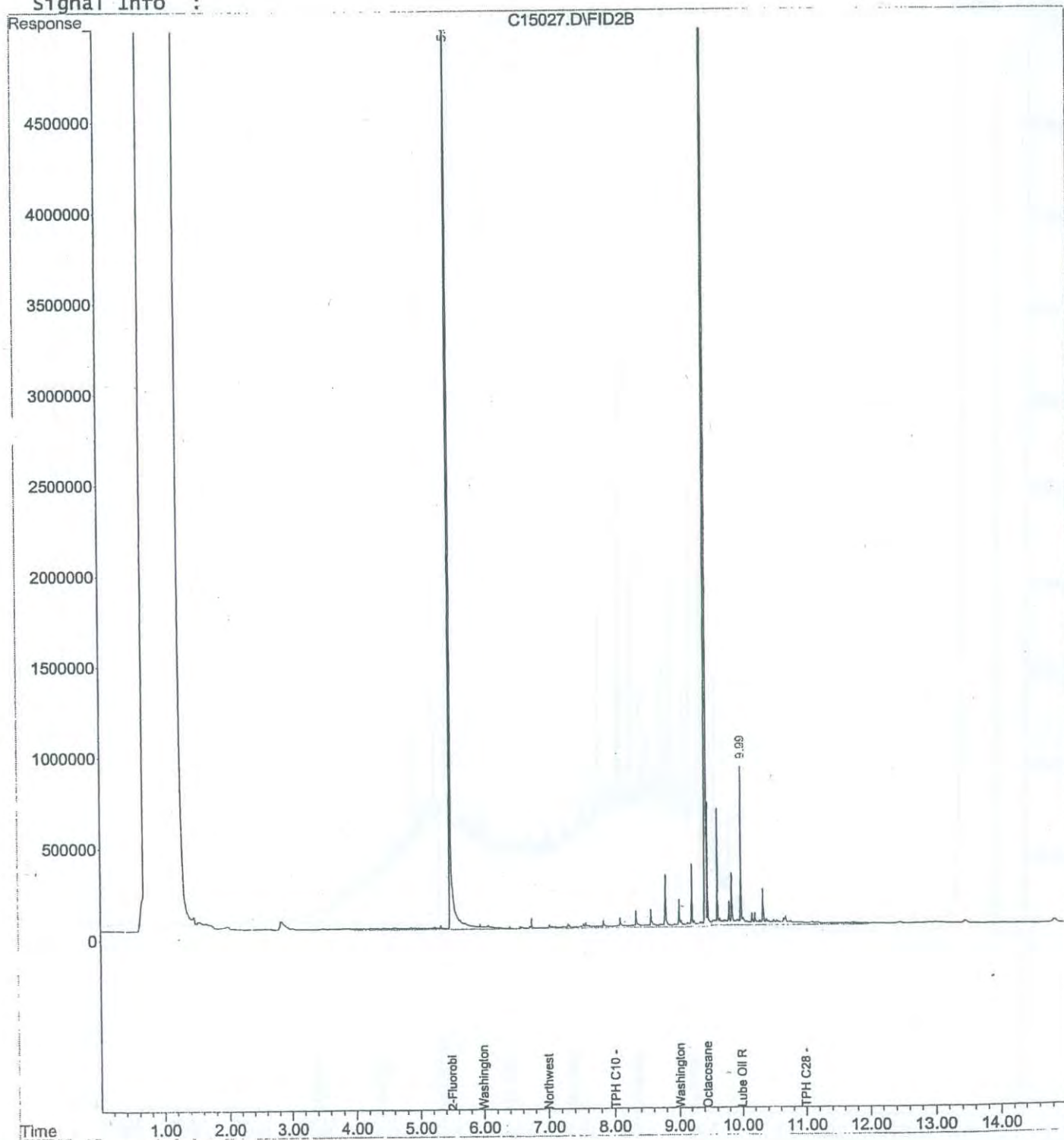
Data File : C:\HPCHEM\4\DATA.SEC\C15027.D
Acq On : 3-15-02 12:38:03 PM
Sample : b2c0219-11
Misc : 1x nw-dx sg s
IntFile : SURR.E
Quant Time: Mar 15 12:53 2002

vial: 21
Operator: EDL
Inst : GC #7
Multiplr: 1.00

Quant Results File: 07002!7B.RES

Quant Method : C:\HPCHEM\4\METHODS\07002!7B.M (Chemstation Integrator)
Title : TPH-D Front
Last Update : Tue Mar 12 08:22:48 2002
Response via : Multiple Level Calibration
DataAcq Meth : 07002!7A.M

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report

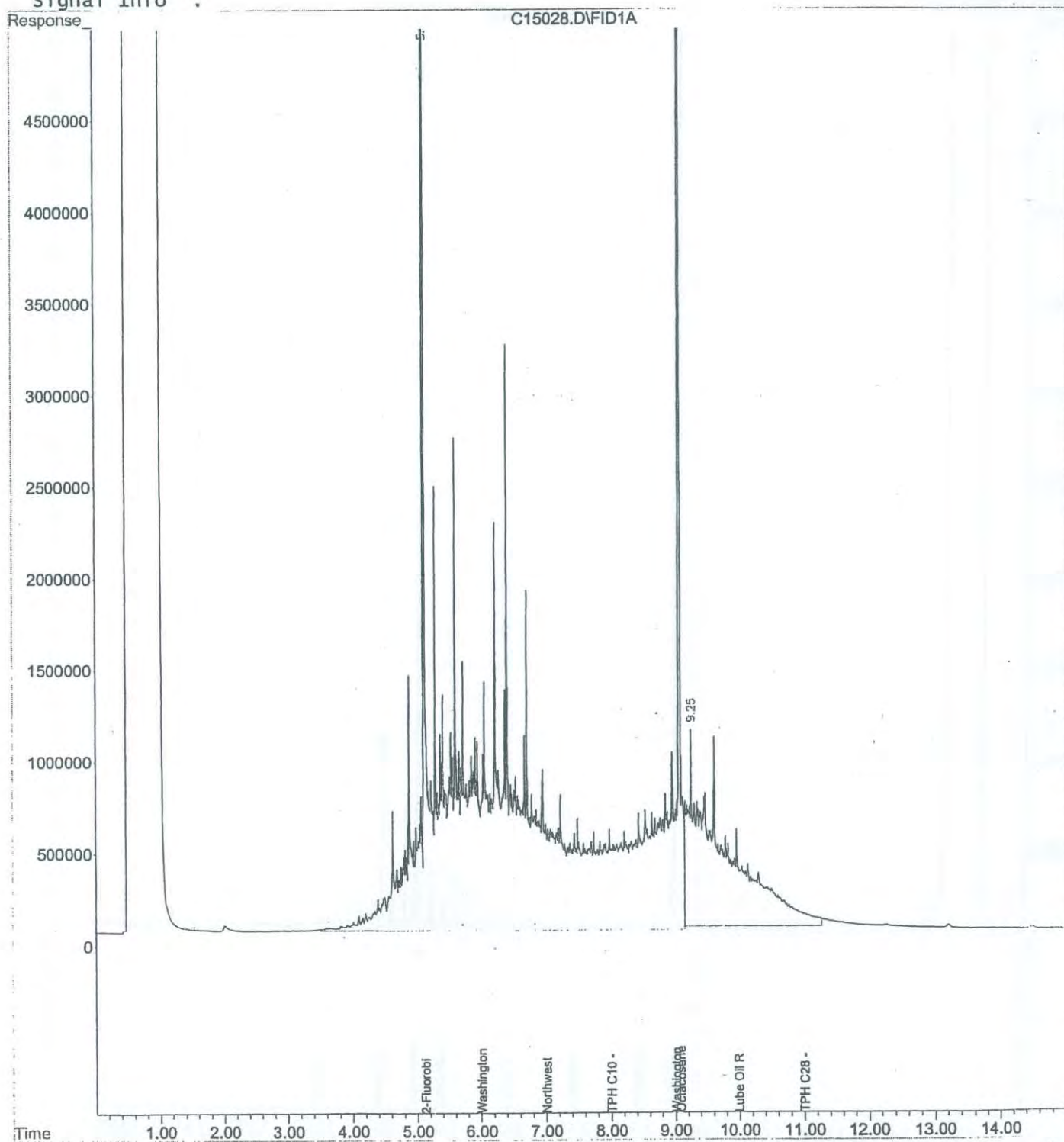
Data File : C:\HPCHEM\4\DATA\C15028.D
Acq On : 3-15-02 12:38:03 PM
Sample : b2c0219-12
Misc : 1x nw-dx sg s
IntFile : SURR.E
Quant Time: Mar 15 12:53 2002

Vial: 22
Operator: EDL
Inst : GC #7
Multiplr: 1.00

Quant Results File: 0700217A.RES

Quant Method : C:\HPCHEM\4\METHODS\0700217A.M (Chemstation Integrator)
Title : TPH-D Front
Last Update : Tue Mar 12 07:42:52 2002
Response via : Multiple Level Calibration
DataAcq Meth : 0700217A.M

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report

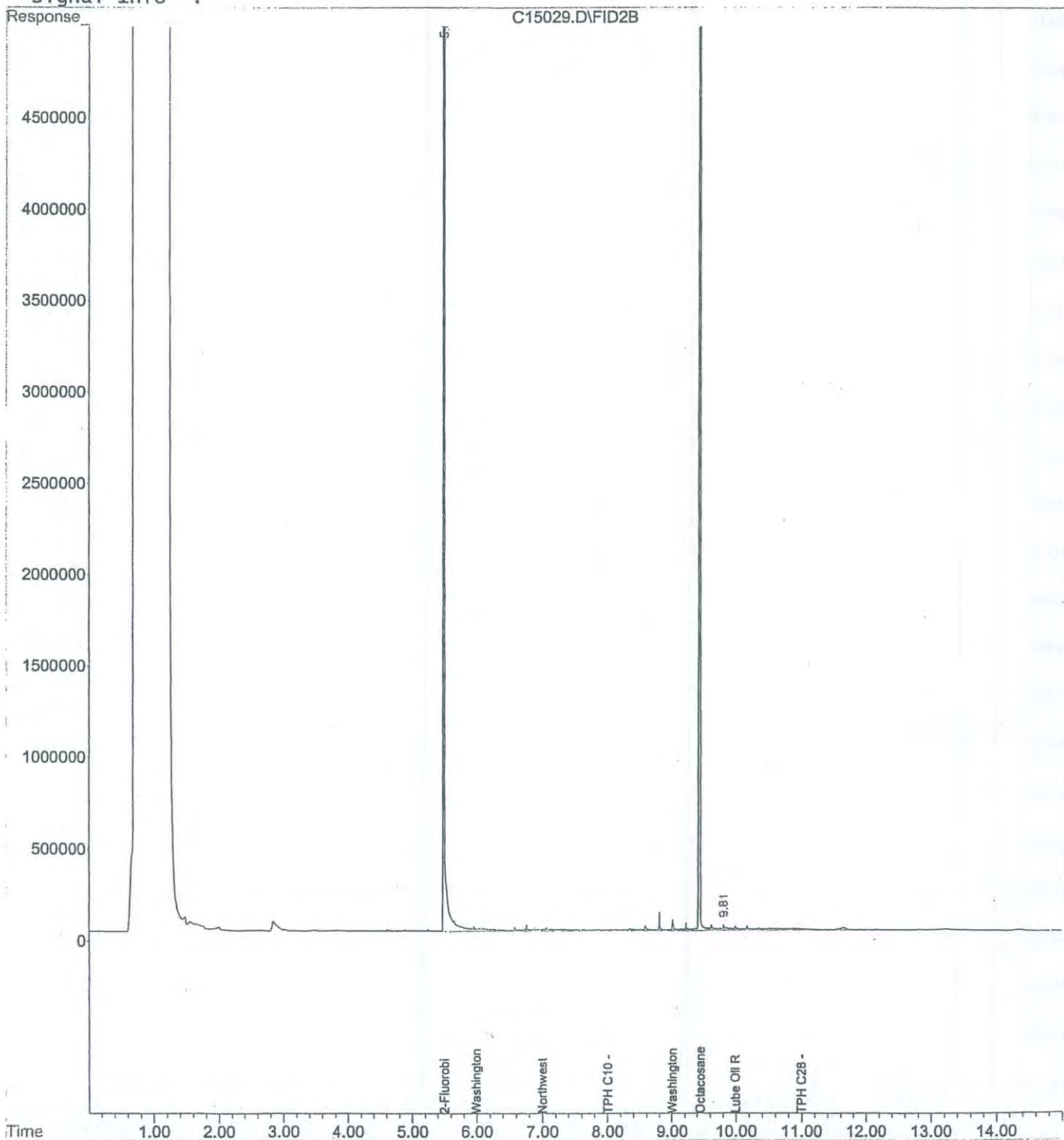
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Acq On : 3-15-02 1:00:22 PM
Sample : b2c0219-13
Misc : 1x nw-dx sg s
IntFile : SURR.E
Quant Time: Mar 15 13:15 2002

Vial: 23
Operator: EDL
Inst : GC #7
Multiplr: 1.00

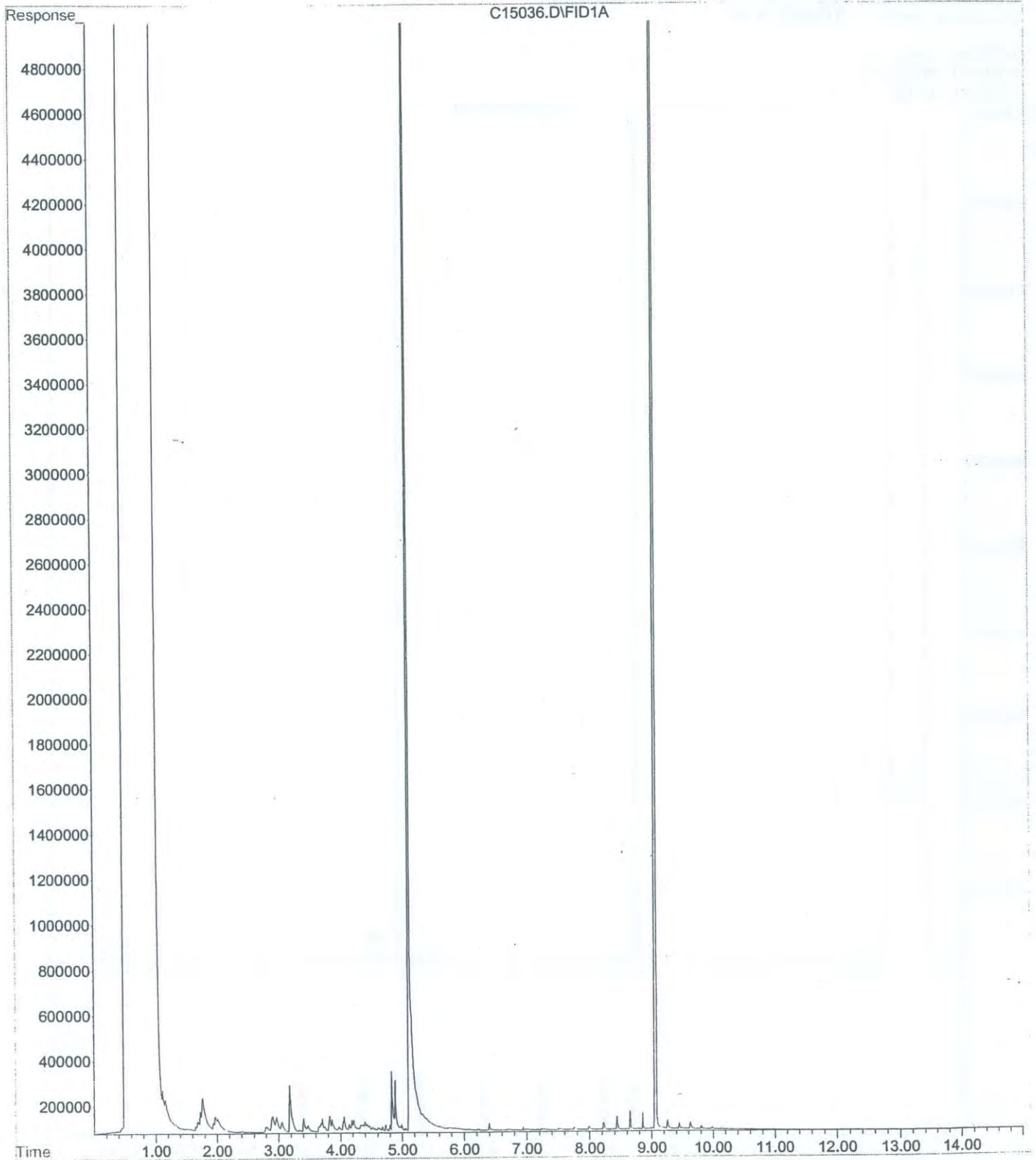
Quant Results File: 07002!7B.RES

Quant Method : C:\HPCHEM\4\METHODS\07002!7B.M (Chemstation Integrator)
Title : TPH-D Front
Last Update : Tue Mar 12 08:22:48 2002
Response via : Multiple Level Calibration
DataAcq Meth : 07002!7A.M

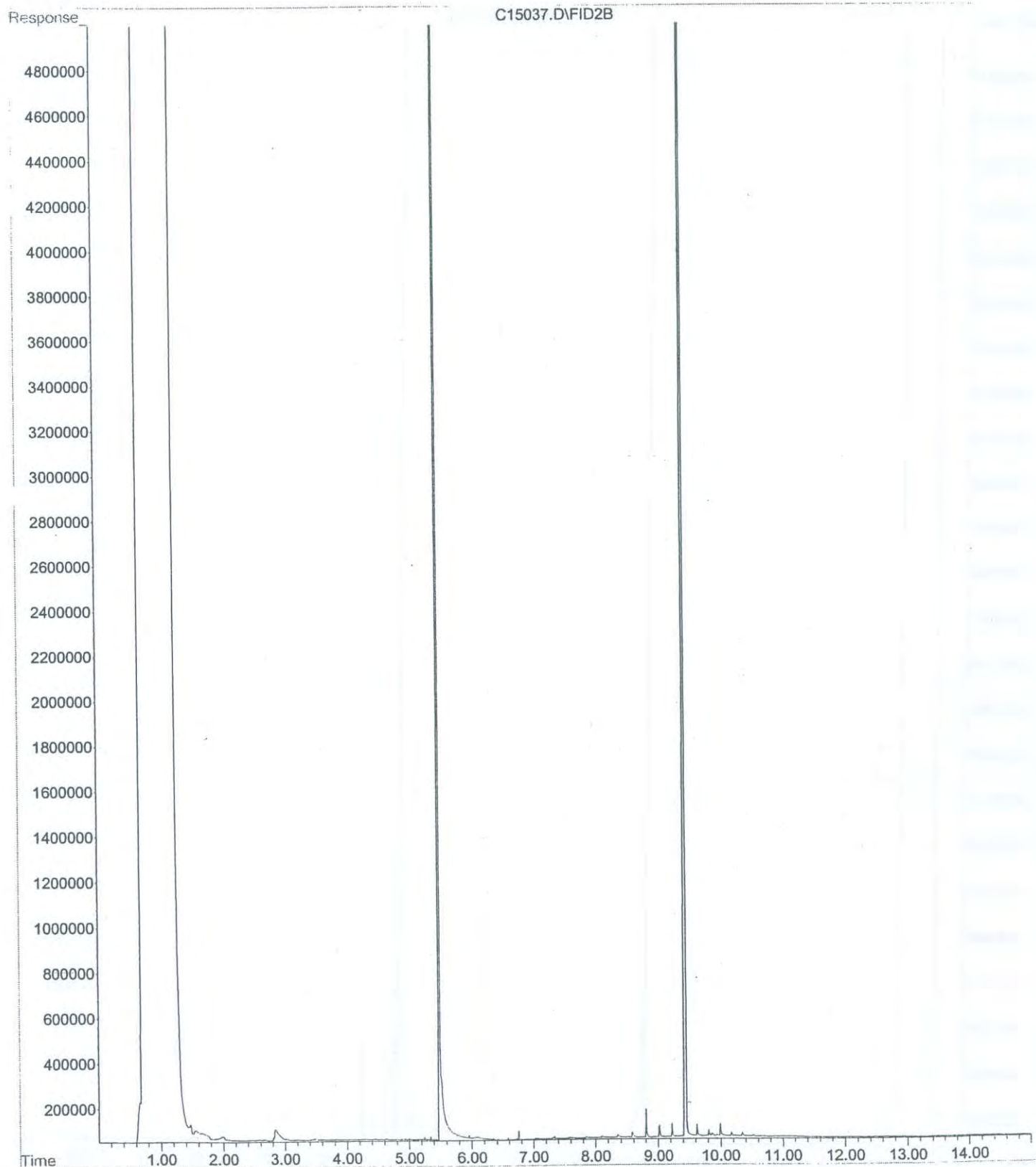
Volume Inj. :
Signal Phase :
Signal Info :



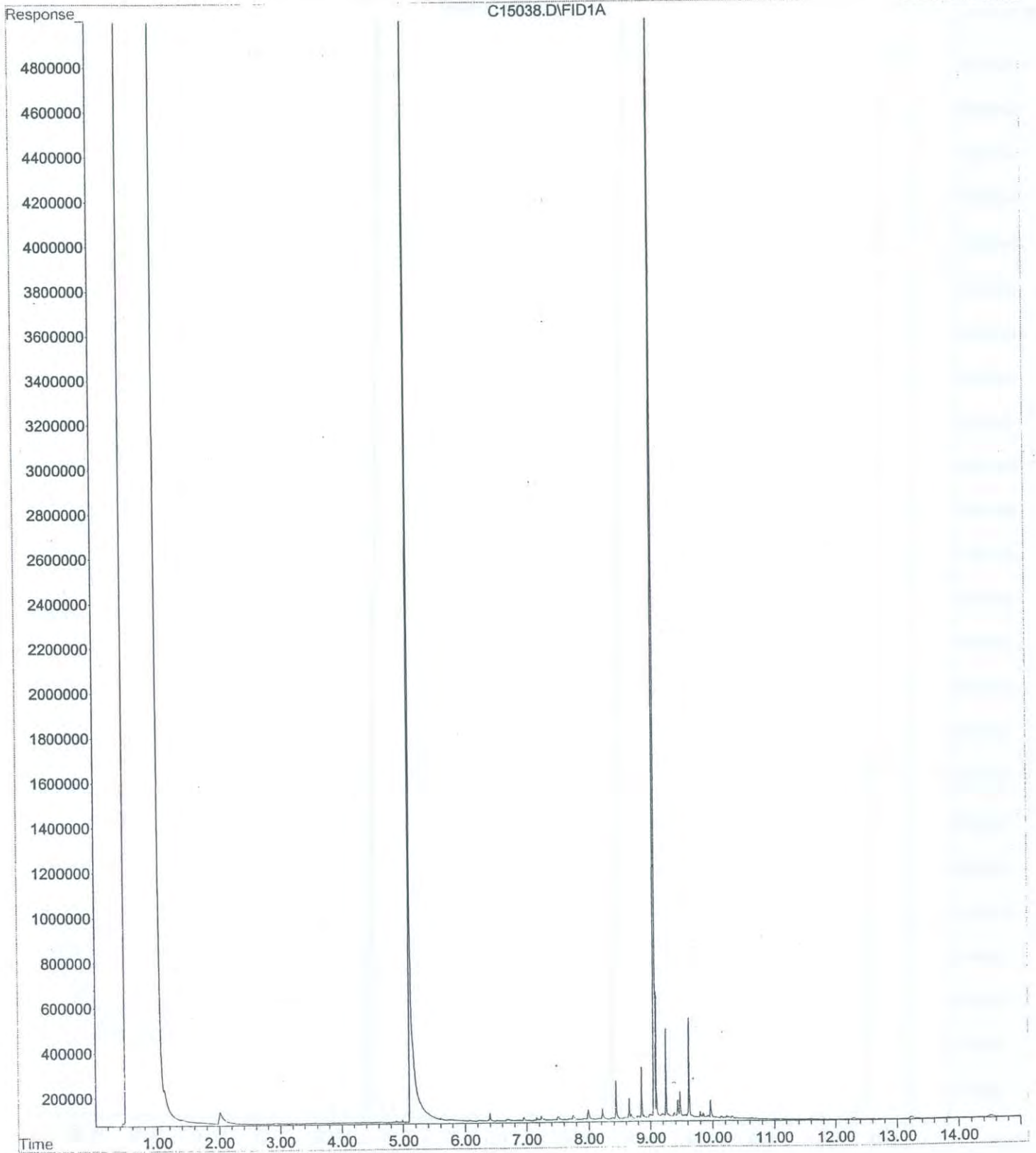
File : C:\HPCHEM\4\DATA\031502\C15036.D
Operator : EDL
Acquired : 3-15-02 2:06:52 PM using AcqMethod 07002!7A.M
Instrument : GC #7
Sample Name: b2c0219-14
Misc Info : 1x nw-dx sg s
Vial Number: 24



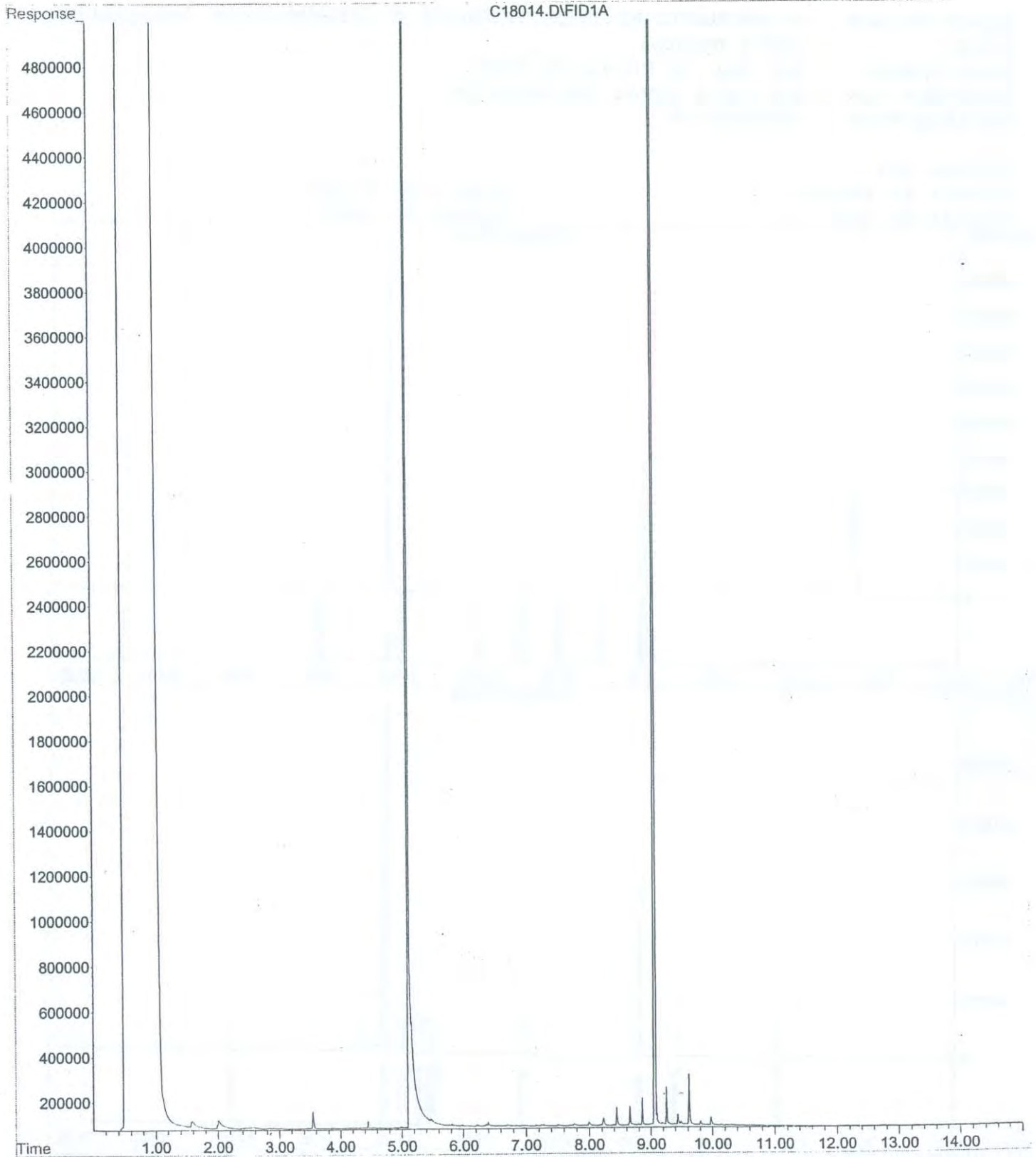
File : C:\HPCHEM\4\DATA\031502\C15037.D
Operator : EDL
Acquired : 3-15-02 2:28:57 PM using AcqMethod 07002!7A.M
Instrument : GC #7
Sample Name: b2c0219-15
Misc Info : 1x nw-dx sg s
Vial Number: 25



File : C:\HPCHEM\4\DATA\031502\C15038.D
Operator : EDL
Acquired : 3-15-02 2:28:57 PM using AcqMethod 07002!7A.M
Instrument : GC #7
Sample Name: b2c0219-16
Misc Info : 1x nw-dx sg s
Vial Number: 26



File : C:\HPCHEM\4\DATA\C18014.D
Operator : EDL
Acquired : 3-18-02 8:56:43 AM using AcqMethod 07002!7A.M
Instrument : GC #7
Sample Name: b2c0219-16re1
Misc Info : 1x nw-dx sg s
Vial Number: 8

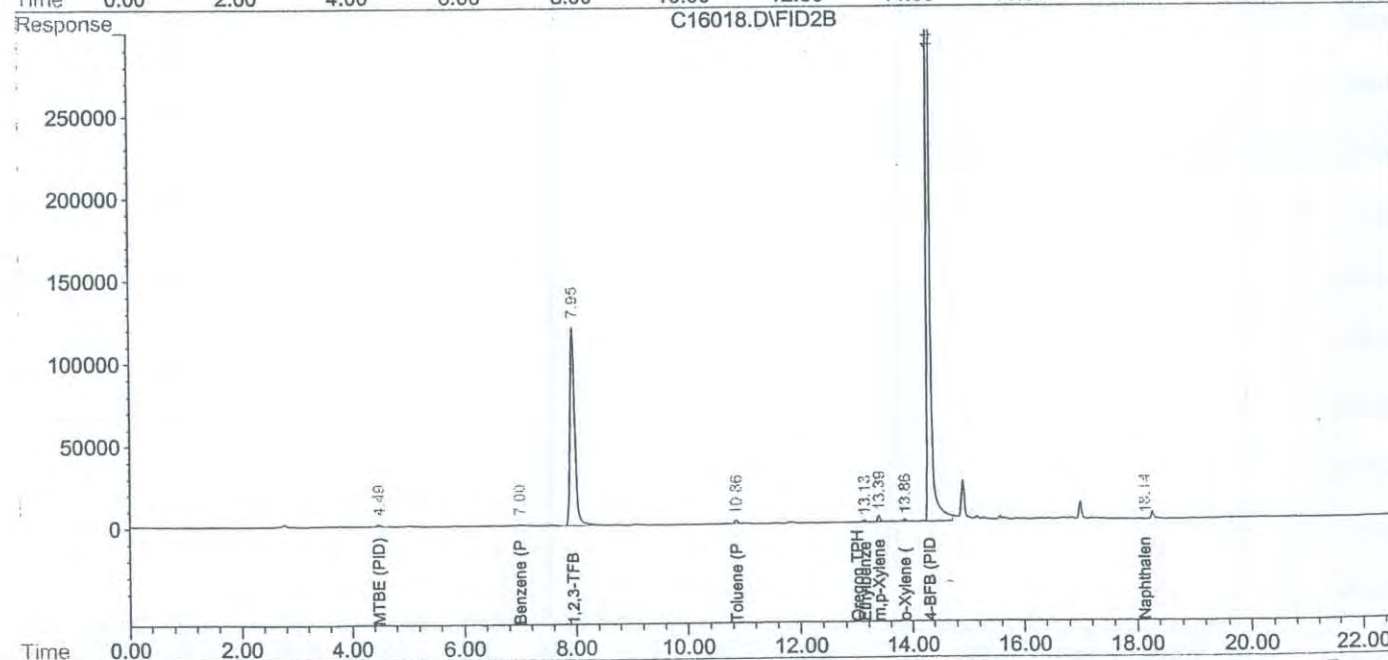
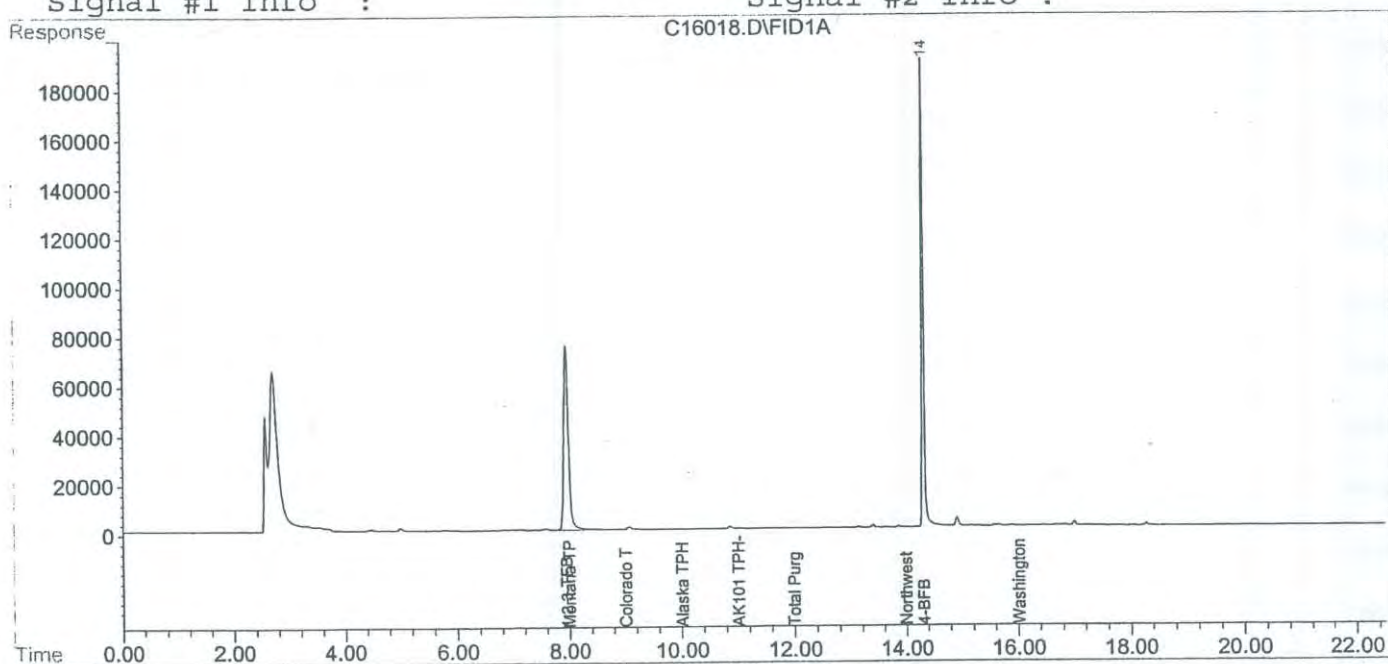


Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031602\C16018.D\FID1A.CH Vial: 18
Signal #2 : D:\HPCHEM\3\DATA\031602\C16018.D\FID2B.CH
Acq On : 16 Mar 2002 17:05 Operator: bd
Sample : B2C0219-01 Inst : GC #6
Misc : 1x 100uL Multiplr: 1.00
IntFile Signal #1: SURR.E IntFile Signal #2: SURR2.E
Quant Time: Mar 16 17:27 2002 Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)
Title : TPH-G Method
Last Update : Sat Mar 16 08:42:32 2002
Response via : Multiple Level Calibration
DataAcq Meth : TEST0202.M

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

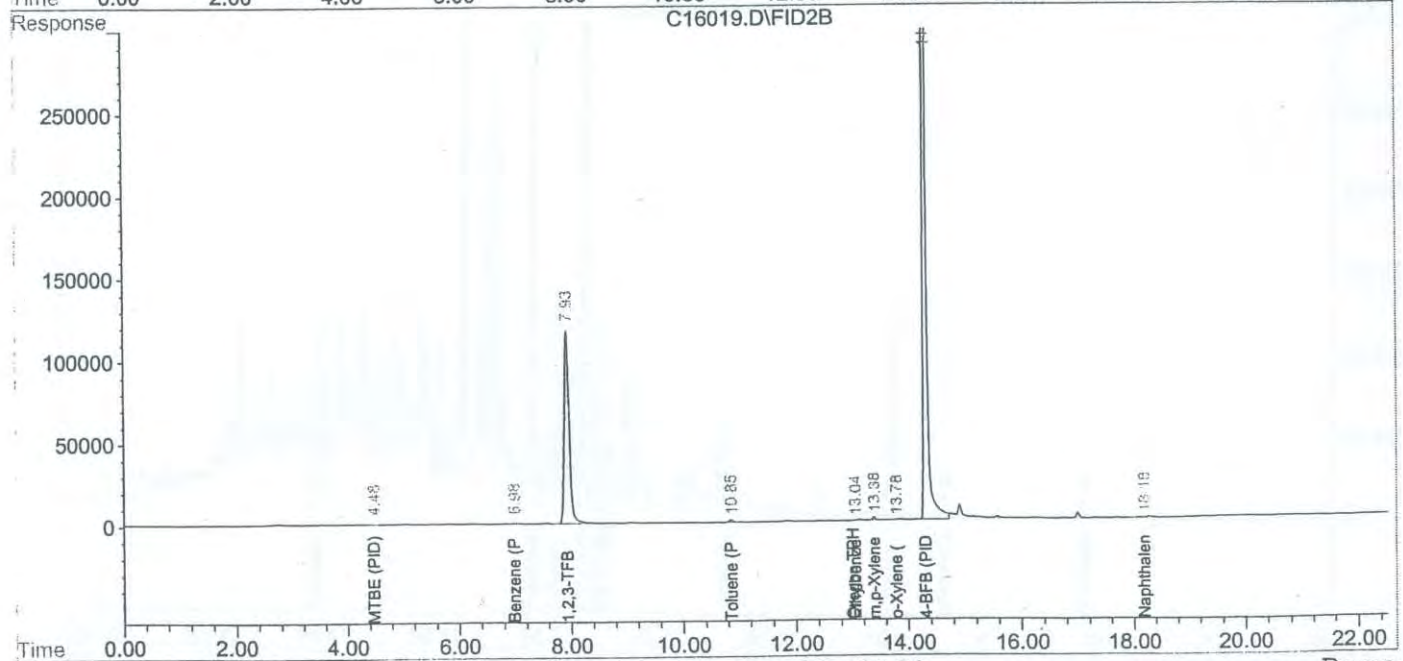
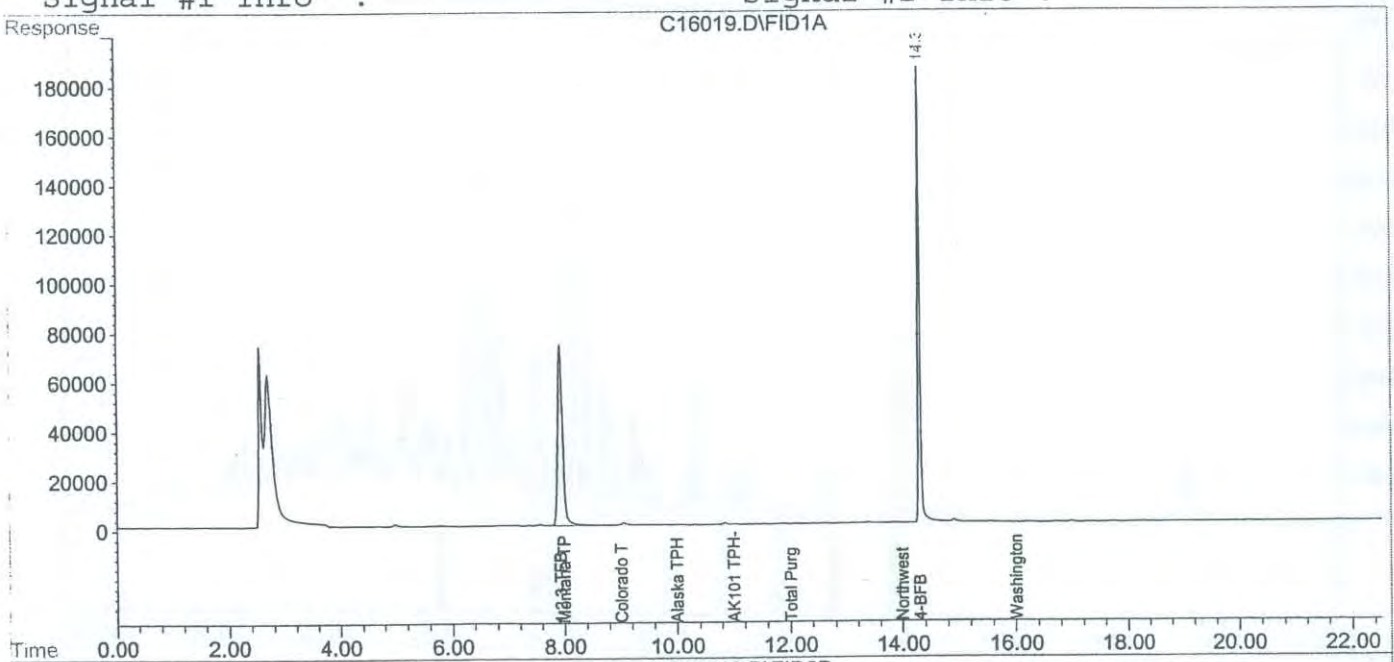


Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031602\C16019.D\FID1A.CH Vial: 19
Signal #2 : D:\HPCHEM\3\DATA\031602\C16019.D\FID2B.CH
Acq On : 16 Mar 2002 17:34 Operator: bd
Sample : B2C0219-02 Inst : GC #6
Misc : 1x 100uL Multiplr: 1.00
IntFile Signal #1: SURR.E IntFile Signal #2: SURR2.E
Quant Time: Mar 16 17:56 2002 Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)
Title : TPH-G Method
Last Update : Sat Mar 16 08:42:32 2002
Response via : Multiple Level Calibration
DataAcq Meth : TEST0202.M

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

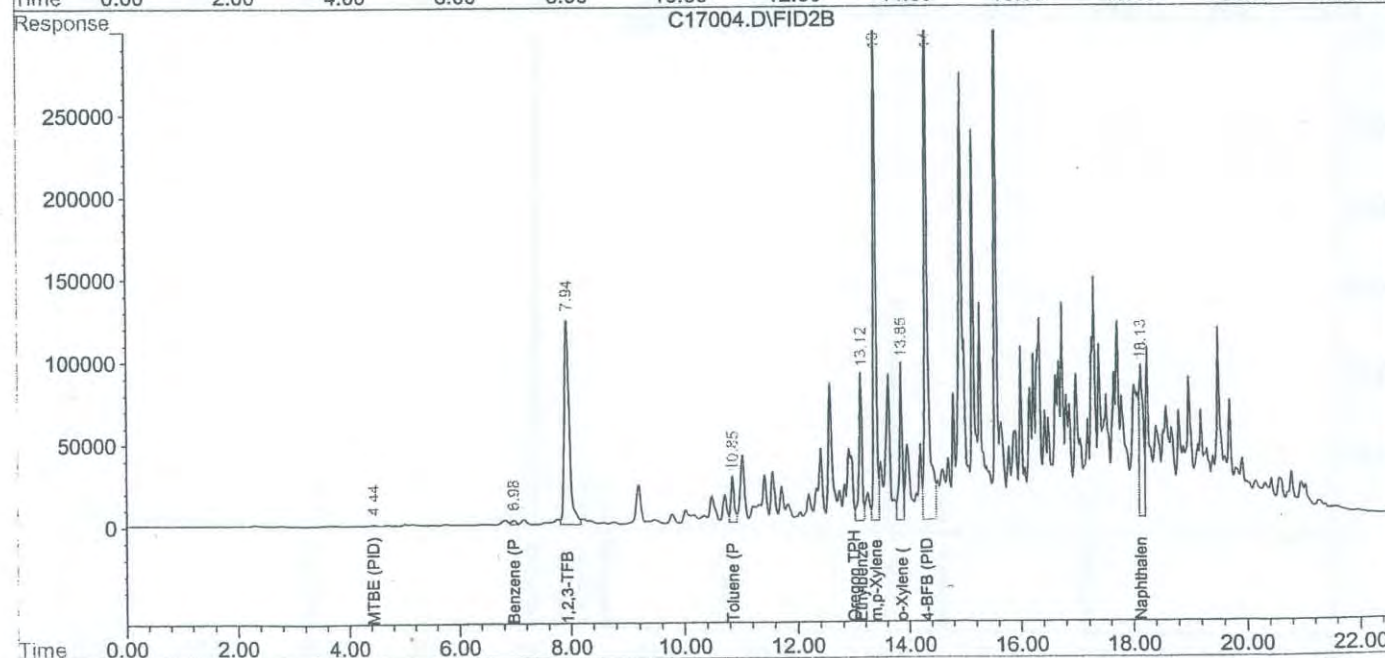
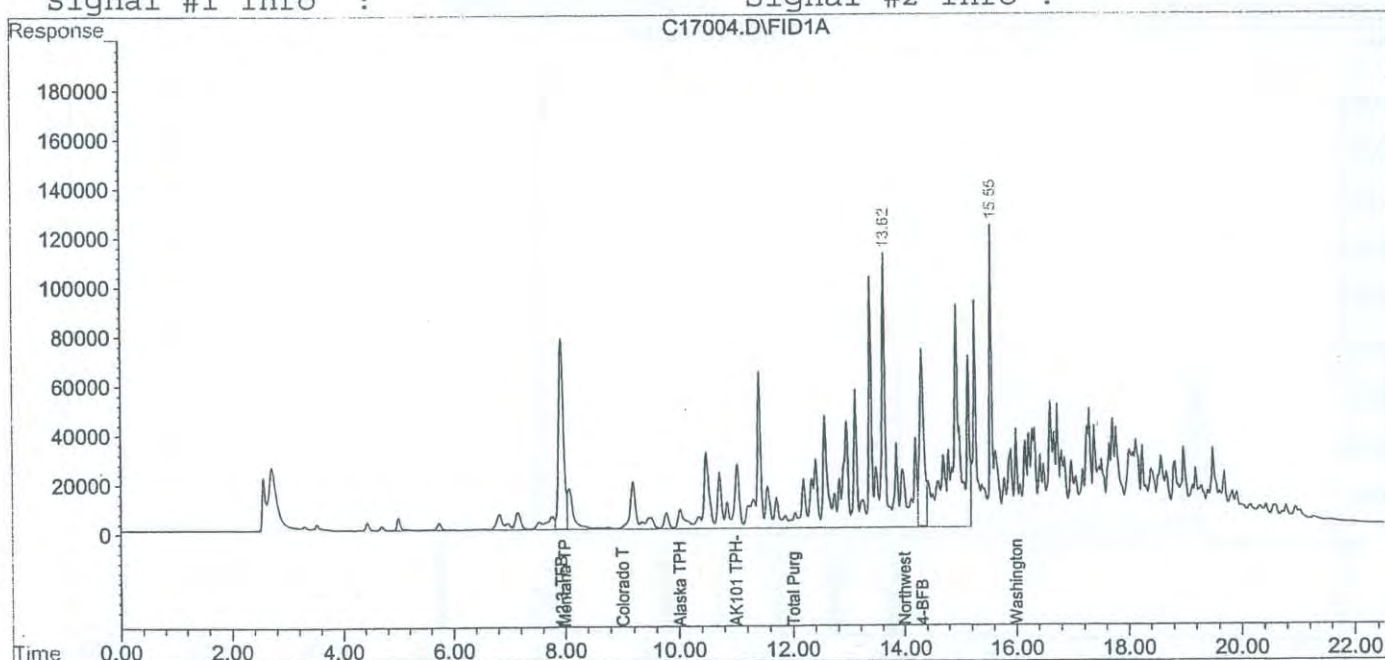


Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031702\C17004.D\FID1A.CH Vial: 4
Signal #2 : D:\HPCHEM\3\DATA\031702\C17004.D\FID2B.CH
Acq On : 17 Mar 2002 8:25 Operator: bd
Sample : B2C0219-03 r1 Inst : GC #6
Misc : 4x 25uL Multiplr: 1.00
IntFile Signal #1: SURR.E IntFile Signal #2: SURR2.E
Quant Time: Mar 17 8:48 2002 Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)
Title : TPH-G Method
Last Update : Sat Mar 16 08:42:32 2002
Response via : Multiple Level Calibration
DataAcq Meth : TEST0202.M

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

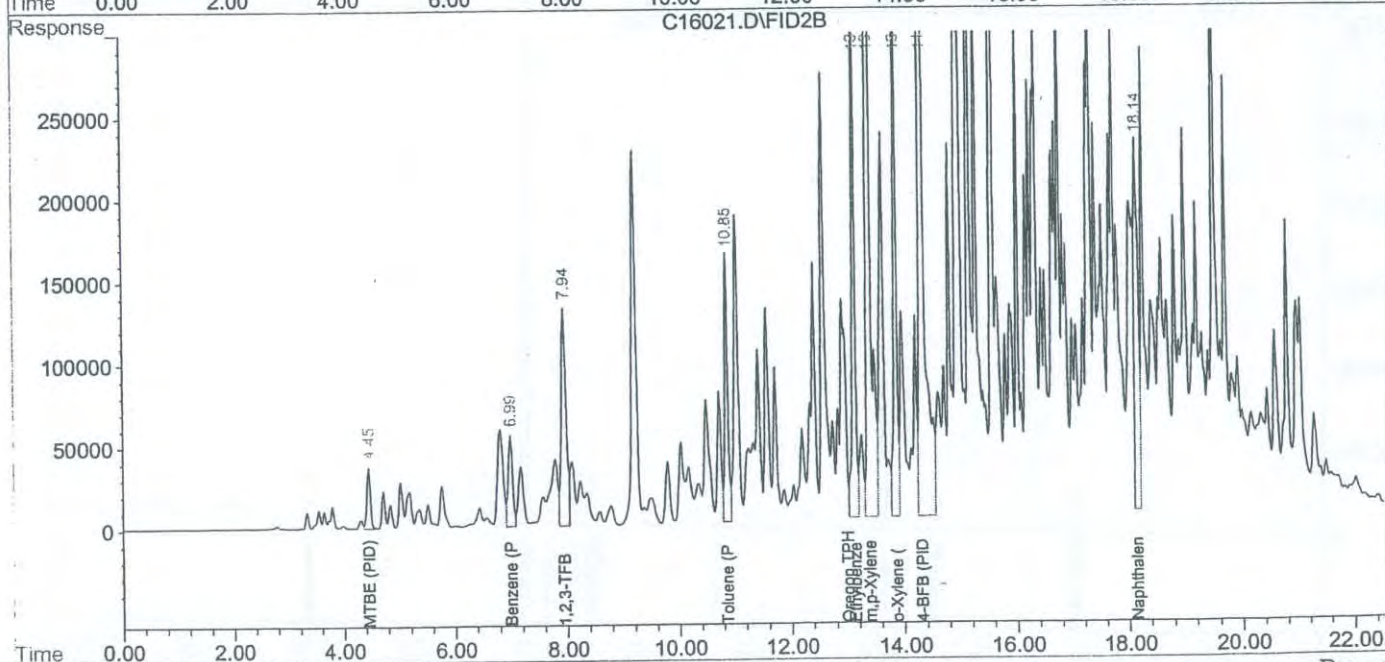
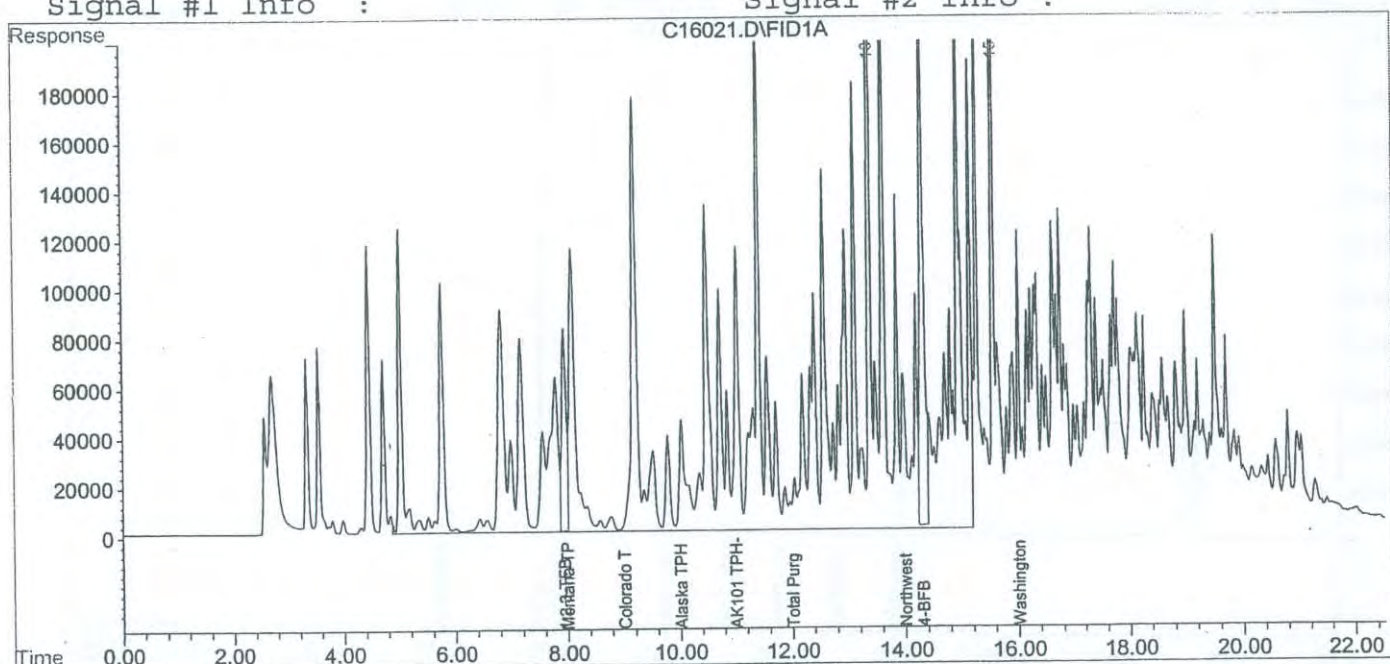


Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031602\C16021.D\FID1A.CH Vial: 21
Signal #2 : D:\HPCHEM\3\DATA\031602\C16021.D\FID2B.CH
Acq On : 16 Mar 2002 18:31 Operator: bd
Sample : B2C0219-04 Inst : GC #6
Misc : 1x 100uL Multiplr: 1.00
IntFile Signal #1: SURR.E IntFile Signal #2: SURR2.E
Quant Time: Mar 16 18:54 2002 Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)
Title : TPH-G Method
Last Update : Sat Mar 16 08:42:32 2002
Response via : Multiple Level Calibration
DataAcq Meth : TEST0202.M

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

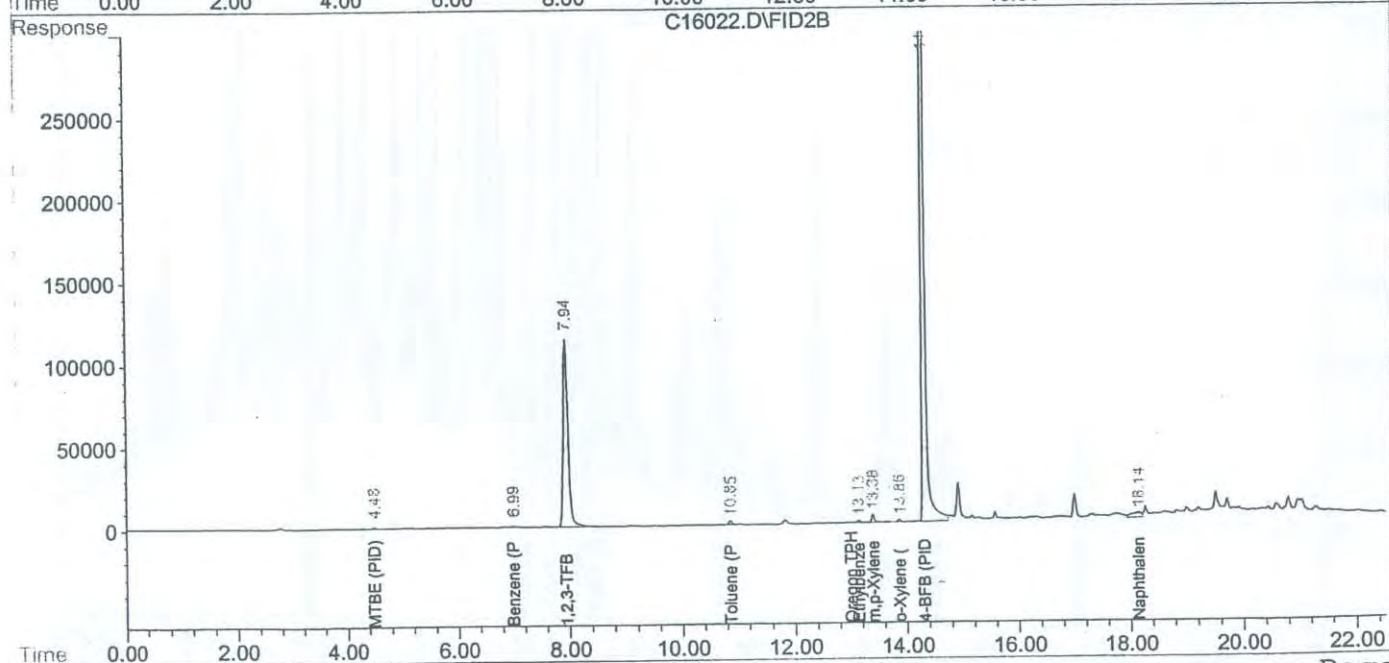
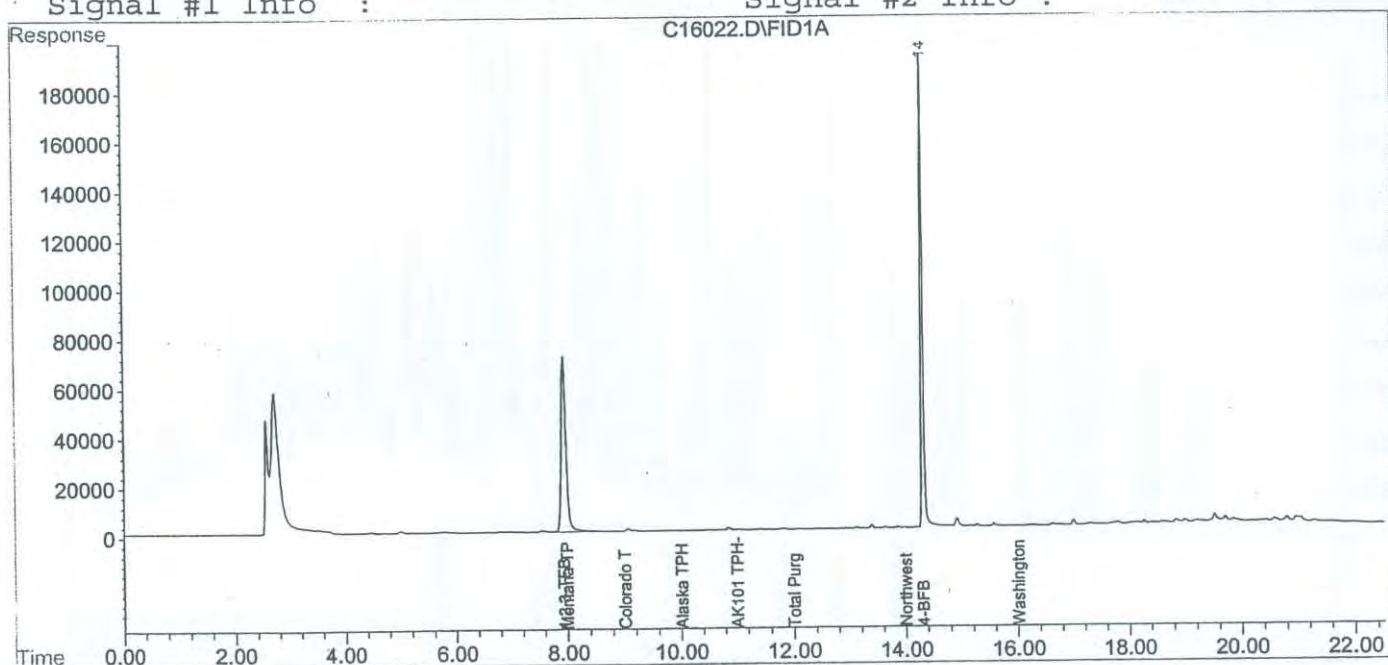


Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031602\C16022.D\FID1A.CH Vial: 22
Signal #2 : D:\HPCHEM\3\DATA\031602\C16022.D\FID2B.CH
Acq On : 16 Mar 2002 19:00 Operator: bd
Sample : B2C0219-05 Inst : GC #6
Misc : 1x 100uL Multiplr: 1.00
IntFile Signal #1: SURR.E IntFile Signal #2: SURR2.E
Quant Time: Mar 16 19:23 2002 Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)
Title : TPH-G Method
Last Update : Sat Mar 16 08:42:32 2002
Response via : Multiple Level Calibration
DataAcq Meth : TEST0202.M

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

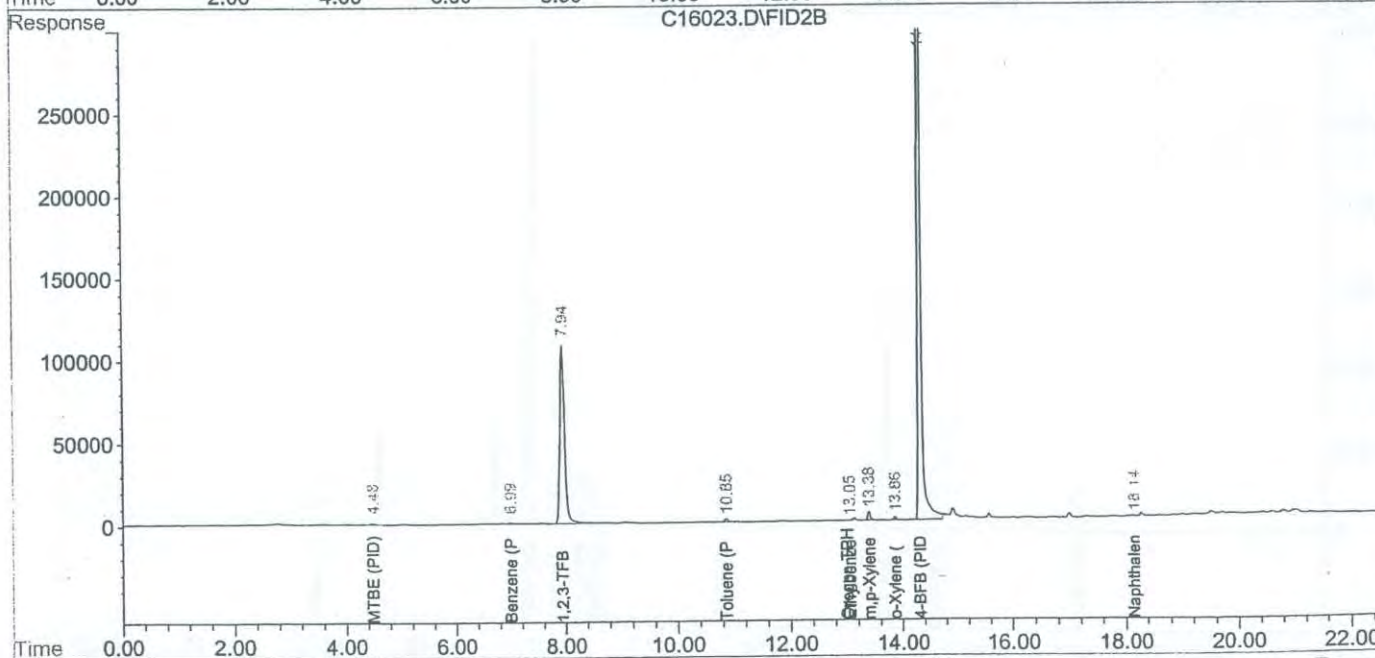
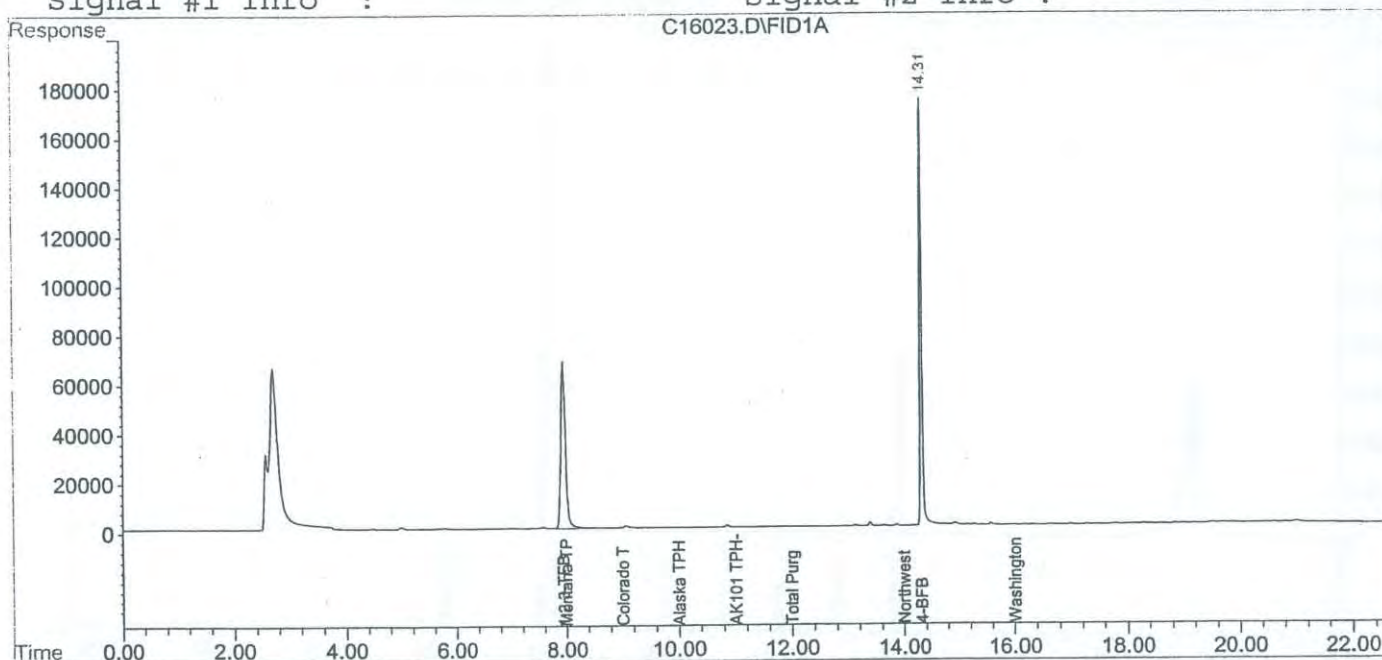


Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031602\C16023.D\FID1A.CH Vial: 23
Signal #2 : D:\HPCHEM\3\DATA\031602\C16023.D\FID2B.CH
Acq On : 16 Mar 2002 19:29 Operator: bd
Sample : B2C0219-06 Inst : GC #6
Misc : 1x 100uL Multiplr: 1.00
IntFile Signal #1: SURR.E IntFile Signal #2: SURR2.E
Quant Time: Mar 16 19:52 2002 Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)
Title : TPH-G Method
Last Update : Sat Mar 16 08:42:32 2002
Response via : Multiple Level Calibration
DataAcq Meth : TEST0202.M

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

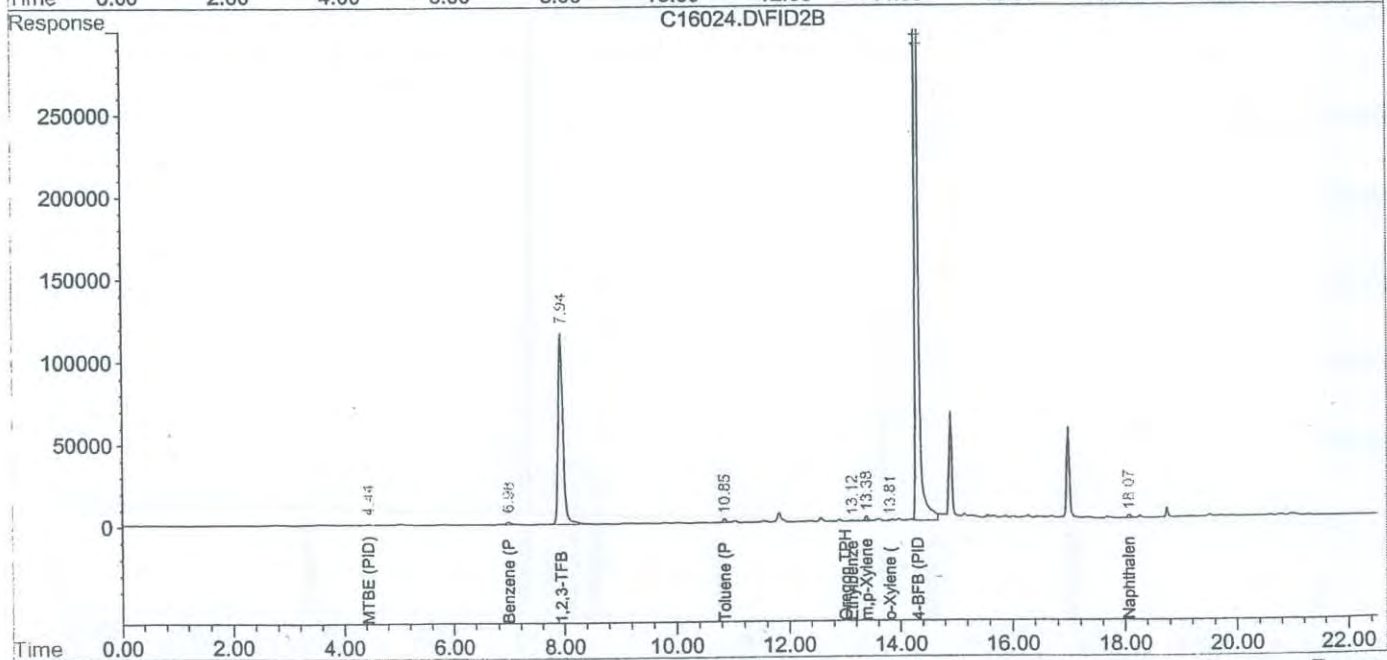
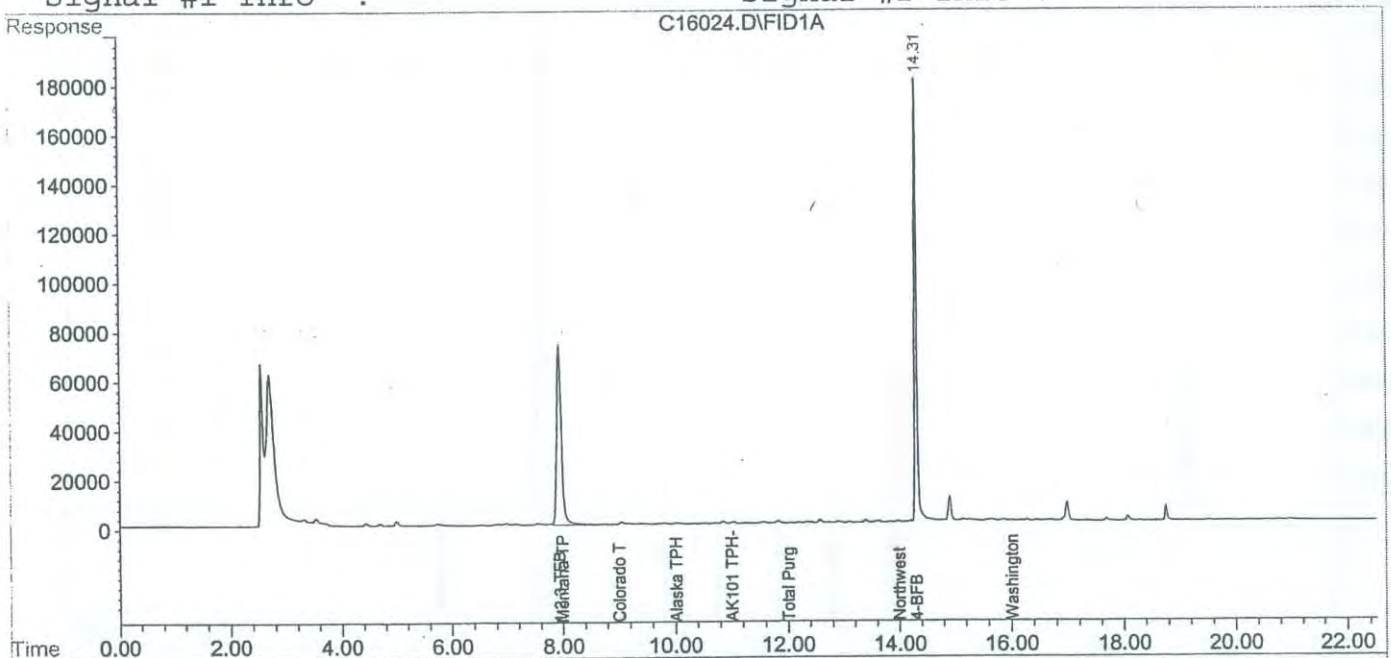


Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031602\C16024.D\FID1A.CH Vial: 24
Signal #2 : D:\HPCHEM\3\DATA\031602\C16024.D\FID2B.CH
Acq On : 16 Mar 2002 19:58 Operator: bd
Sample : B2C0219-07 Inst : GC #6
Misc : 1x 100uL Multiplr: 1.00
IntFile Signal #1: SURR.E IntFile Signal #2: SURR2.E
Quant Time: Mar 16 20:20 2002 Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)
Title : TPH-G Method
Last Update : Sat Mar 16 08:42:32 2002
Response via : Multiple Level Calibration
DataAcq Meth : TEST0202.M

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

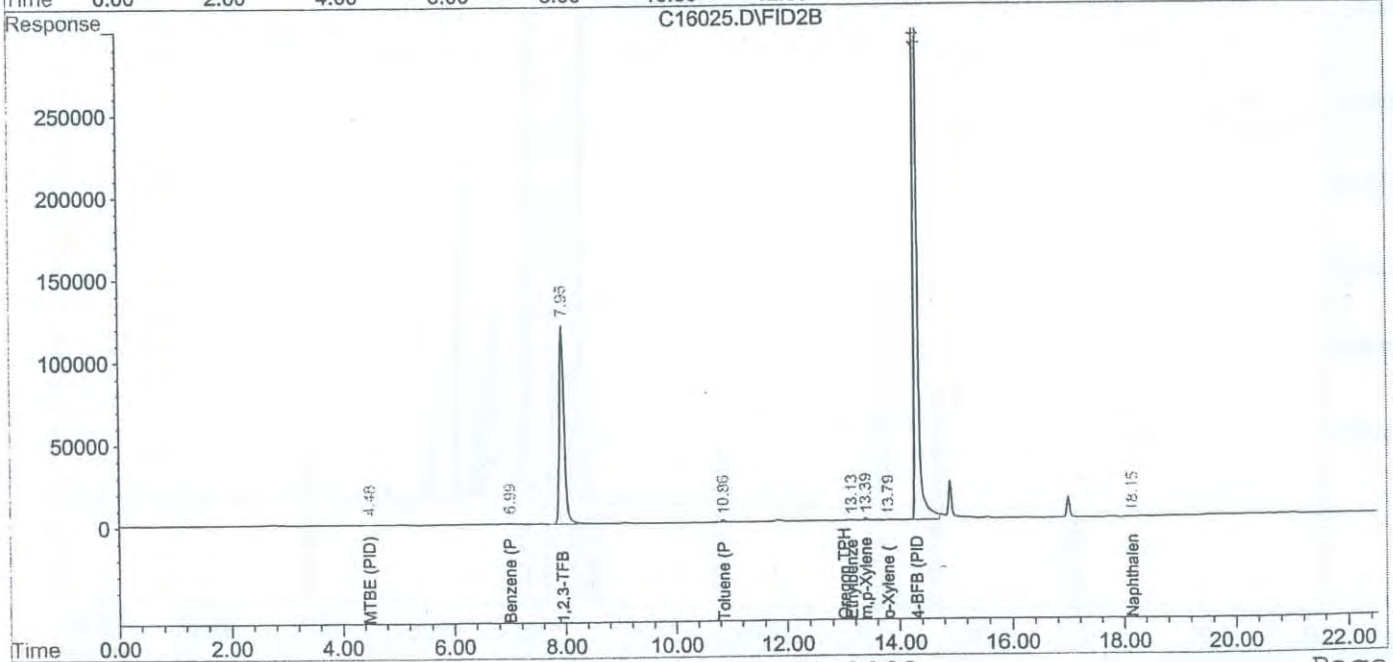
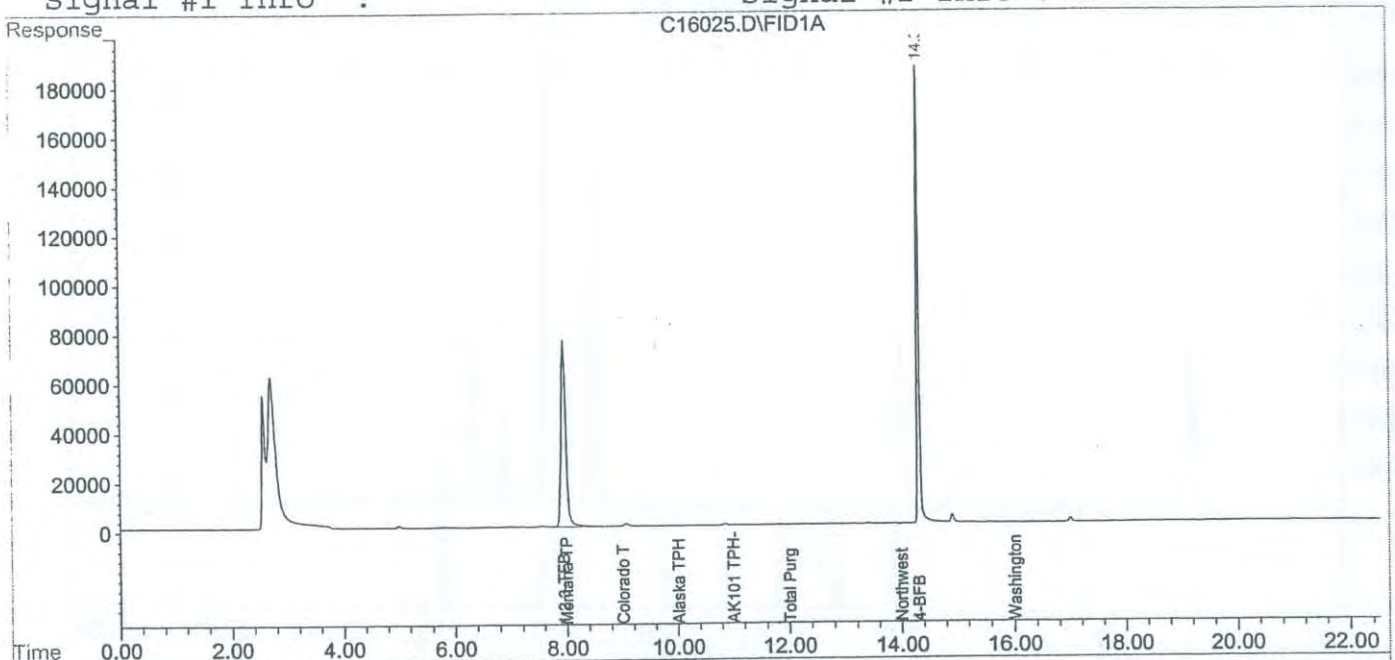


Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031602\C16025.D\FID1A.CH Vial: 25
Signal #2 : D:\HPCHEM\3\DATA\031602\C16025.D\FID2B.CH
Acq On : 16 Mar 2002 20:26 Operator: bd
Sample : B2C0219-08 Inst : GC #6
Misc : 1x 100uL Multiplr: 1.00
IntFile Signal #1: SURR.E IntFile Signal #2: SURR2.E
Quant Time: Mar 16 20:49 2002 Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)
Title : TPH-G Method
Last Update : Sat Mar 16 08:42:32 2002
Response via : Multiple Level Calibration
DataAcq Meth : TEST0202.M

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031602\C16026.D\FID1A.CH Vial: 26

Signal #2 : D:\HPCHEM\3\DATA\031602\C16026.D\FID2B.CH

Acq On : 16 Mar 2002 20:55

Operator: bd

Sample : B2C0219-09

Inst : GC #6

Misc : 1x 100uL

Multiplr: 1.00

IntFile Signal #1: SURR.E

IntFile Signal #2: SURR2.E

Quant Time: Mar 16 21:18 2002

Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)

Title : TPH-G Method

Last Update : Sat Mar 16 08:42:32 2002

Response via : Multiple Level Calibration

DataAcq Meth : TEST0202.M

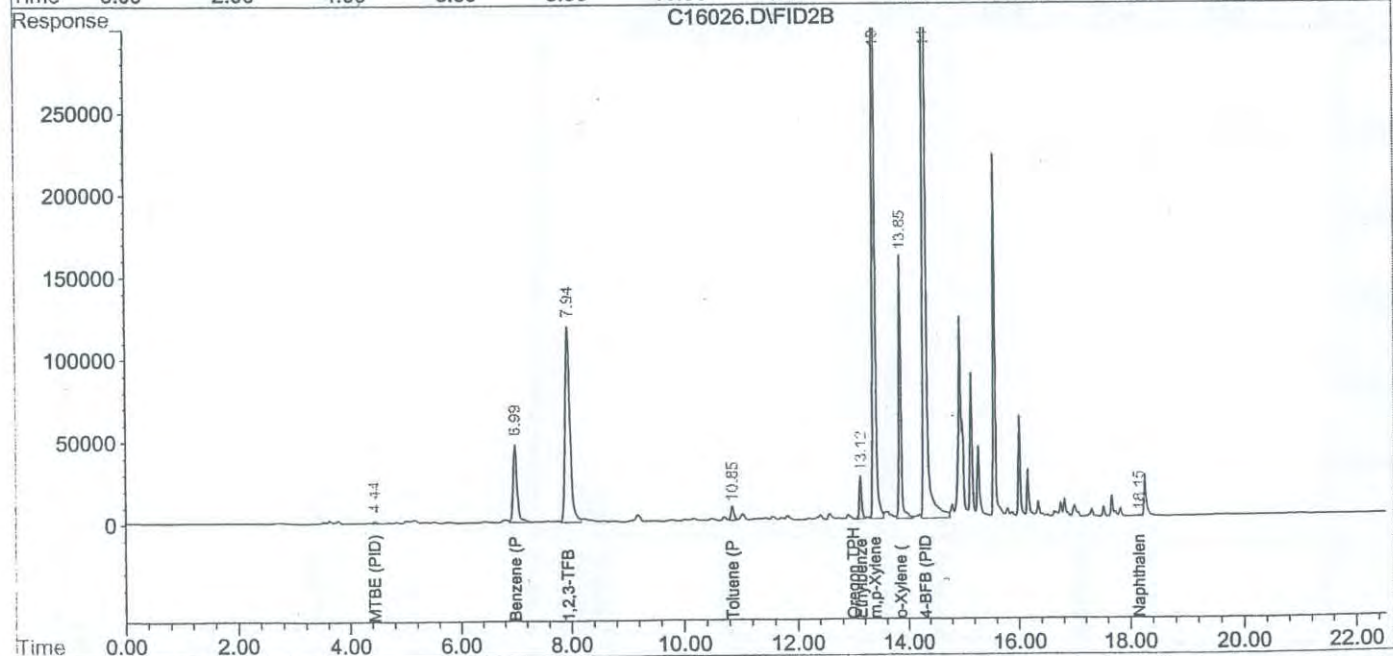
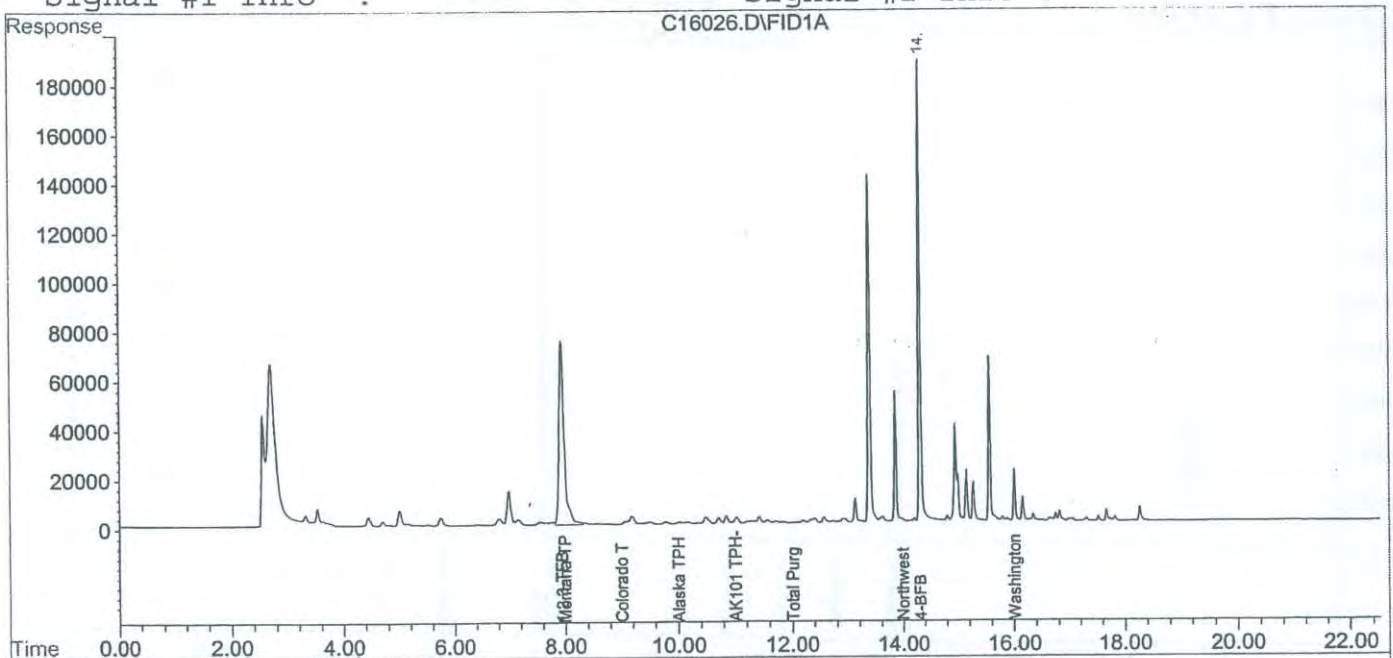
Volume Inj. :

Signal #1 Phase :

Signal #2 Phase:

Signal #1 Info :

Signal #2 Info :

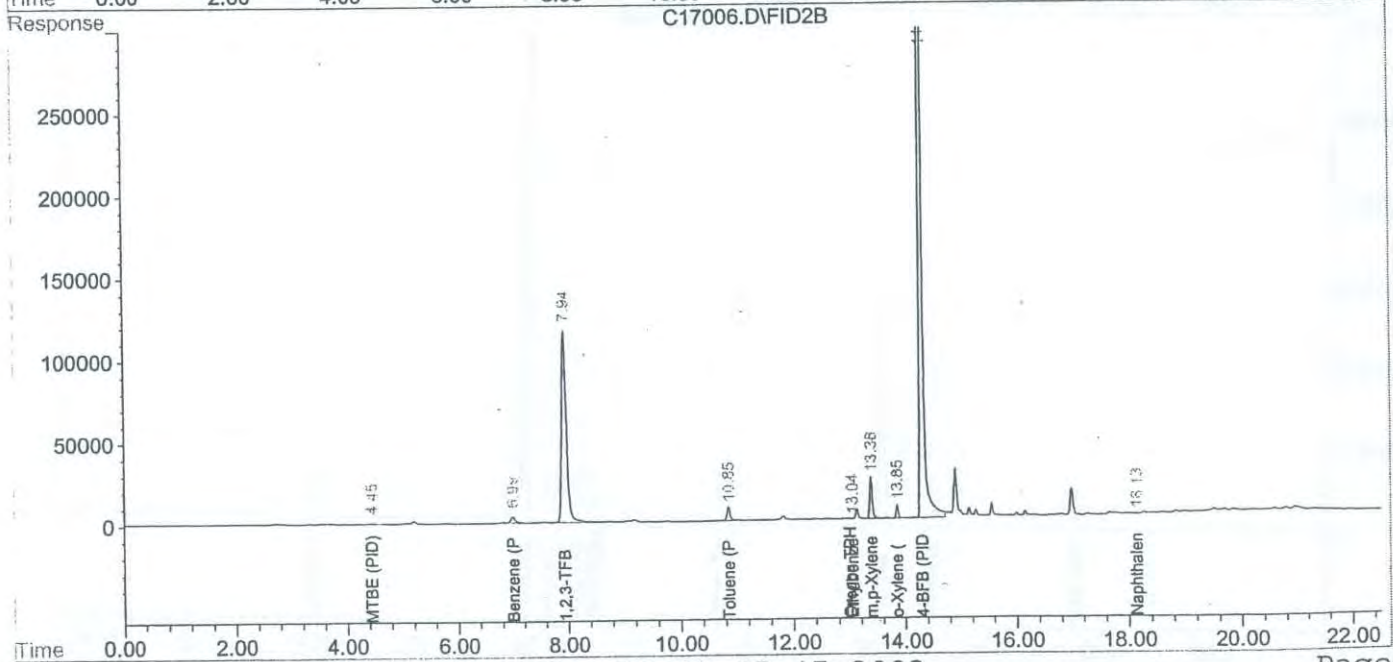
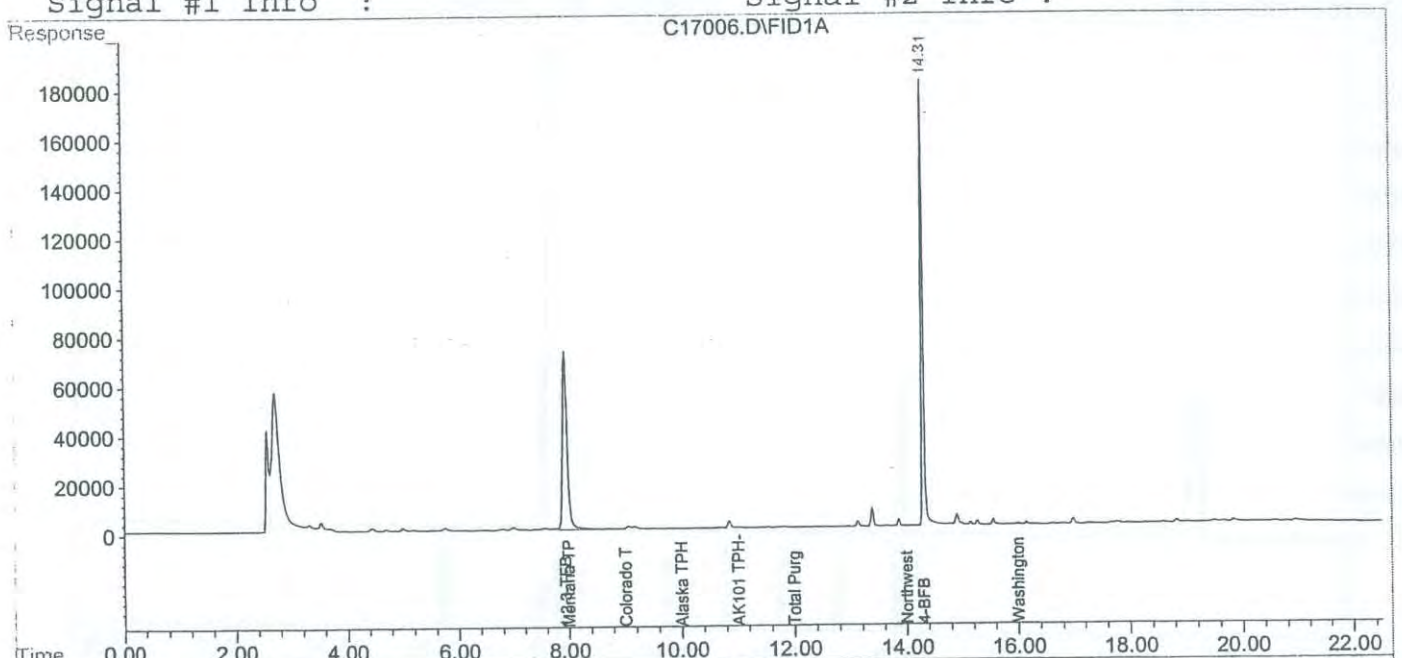


Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031702\C17006.D\FID1A.CH Vial: 6
 Signal #2 : D:\HPCHEM\3\DATA\031702\C17006.D\FID2B.CH
 Acq On : 17 Mar 2002 9:22 Operator: bd
 Sample : B2C0219-10 Inst : GC #6
 Misc : 1x 100uL Multiplr: 1.00
 IntFile Signal #1: SURR.E IntFile Signal #2: SURR2.E
 Quant Time: Mar 17 9:45 2002 Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)
 Title : TPH-G Method
 Last Update : Sat Mar 16 08:42:32 2002
 Response via : Multiple Level Calibration
 DataAcq Meth : TEST0202.M

Volume Inj. :
 Signal #1 Phase : Signal #2 Phase:
 Signal #1 Info : Signal #2 Info :

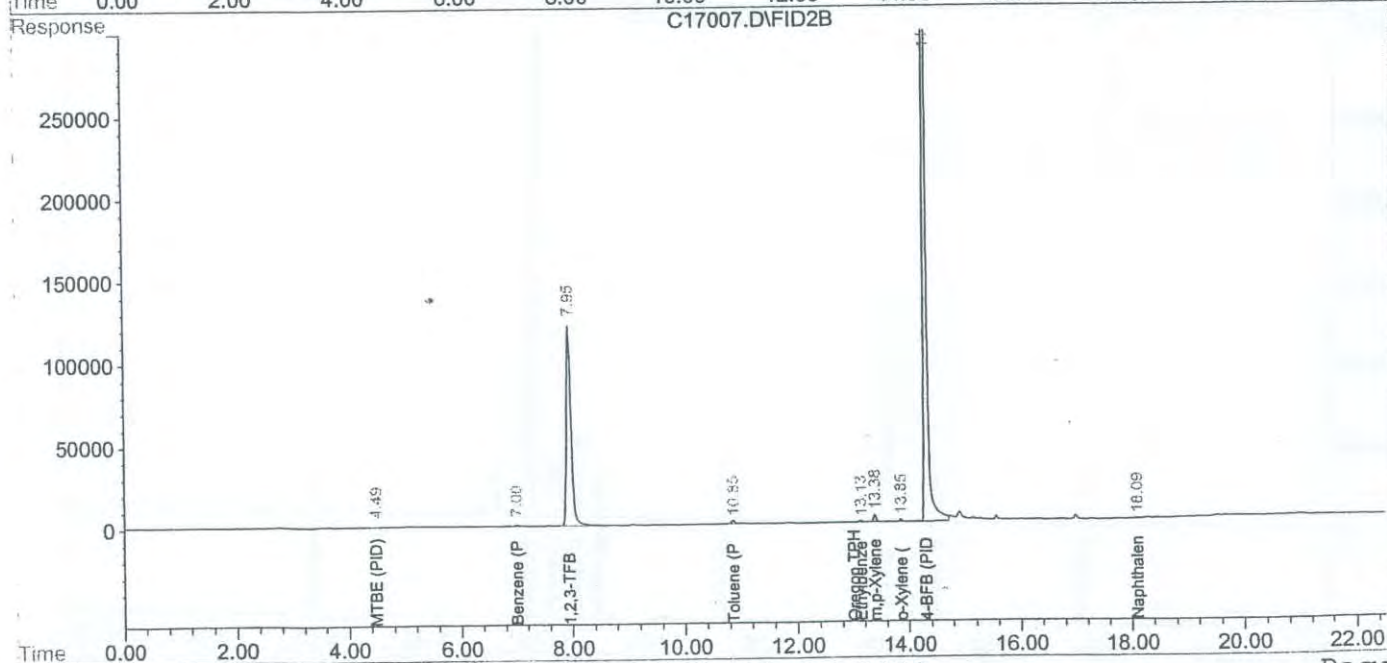
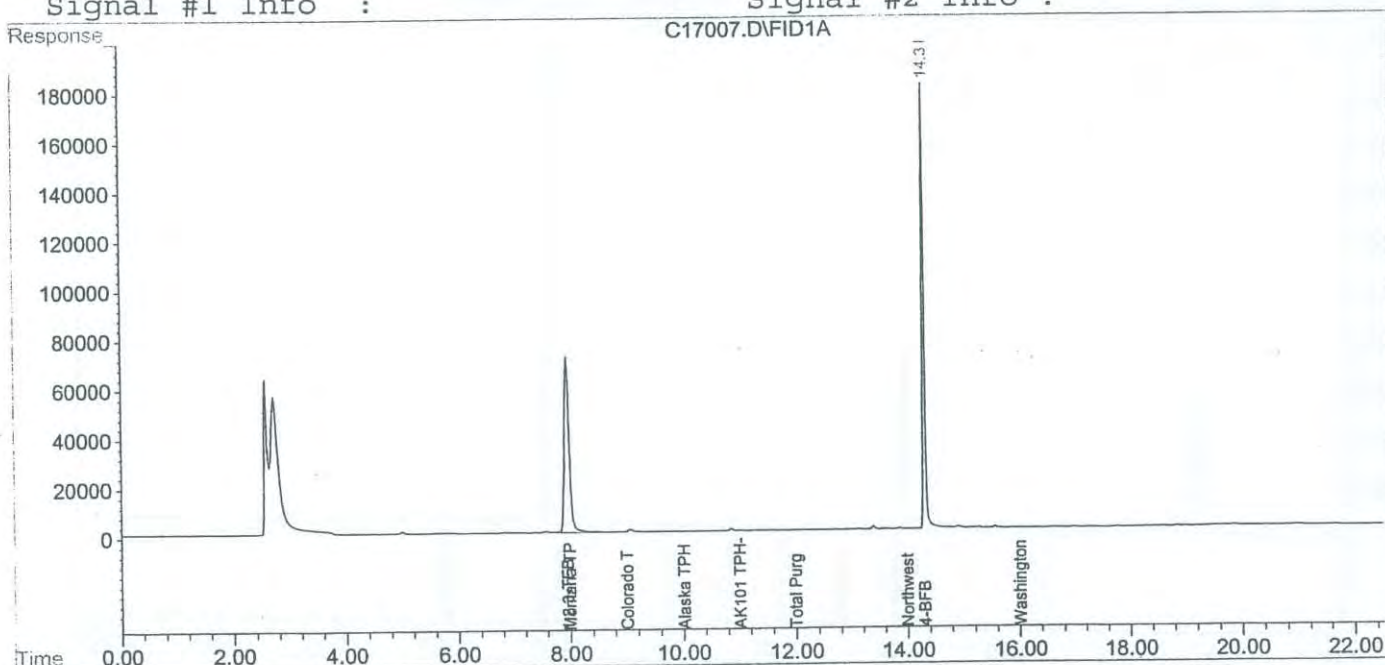


Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031702\C17007.D\FID1A.CH Vial: 7
Signal #2 : D:\HPCHEM\3\DATA\031702\C17007.D\FID2B.CH
Acq On : 17 Mar 2002 9:51 Operator: bd
Sample : B2C0219-11 Inst : GC #6
Misc : 1x 100uL Multiplr: 1.00
IntFile Signal #1: SURRE IntFile Signal #2: SURRE
Quant Time: Mar 17 10:14 2002 Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)
Title : TPH-G Method
Last Update : Sat Mar 16 08:42:32 2002
Response via : Multiple Level Calibration
DataAcq Meth : TEST0202.M

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

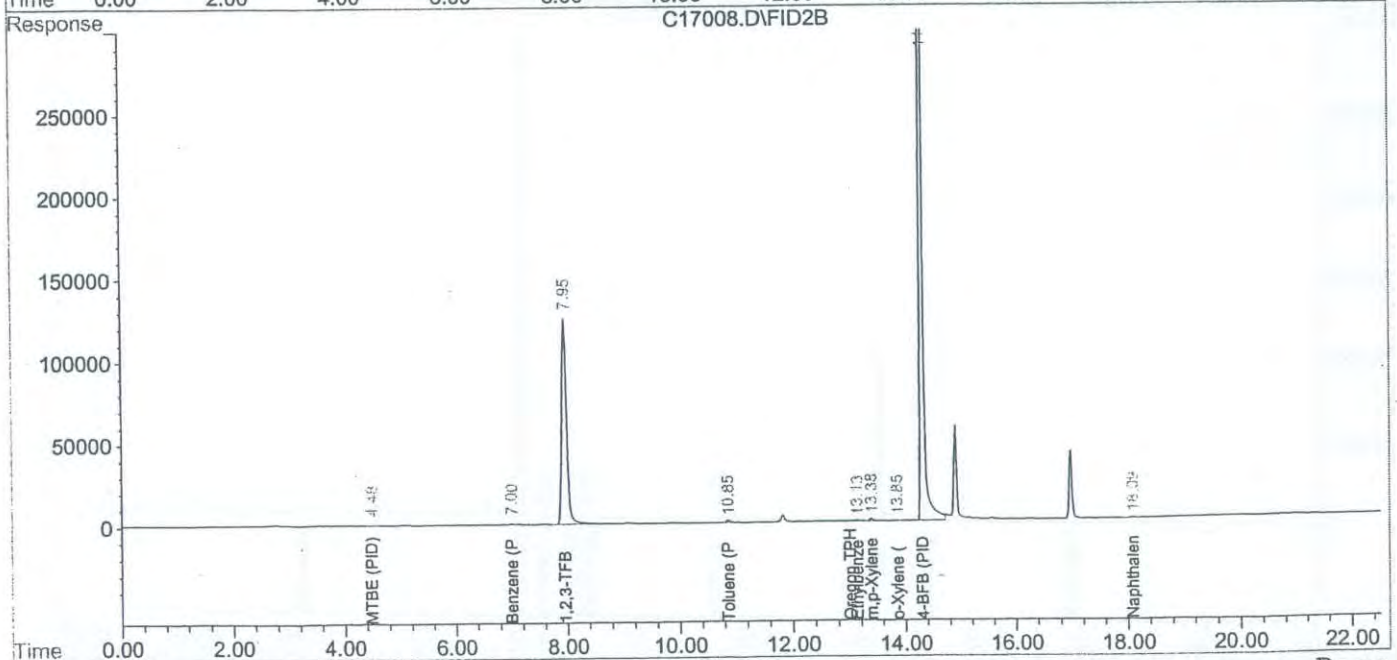
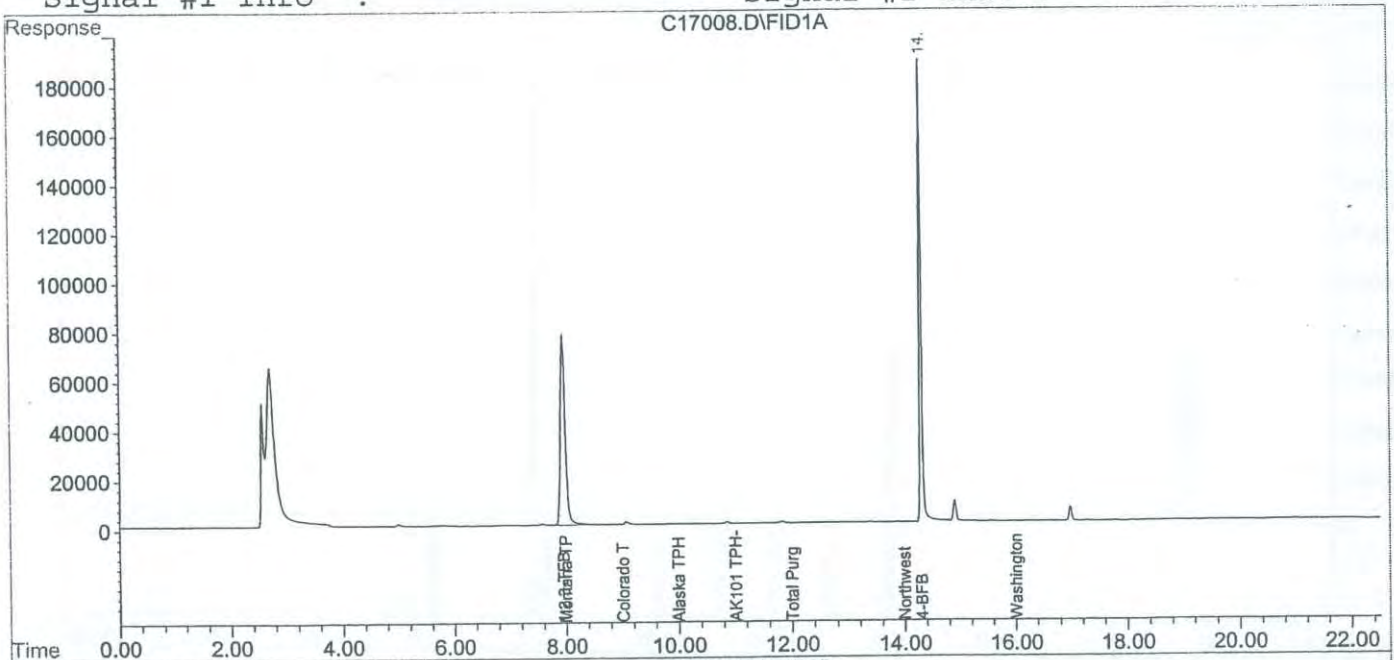


Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031702\C17008.D\FID1A.CH Vial: 8
Signal #2 : D:\HPCHEM\3\DATA\031702\C17008.D\FID2B.CH
Acq On : 17 Mar 2002 10:20 Operator: bd
Sample : B2C0219-12 Inst : GC #6
Misc : 1x 100uL Multiplr: 1.00
IntFile Signal #1: SURR.E IntFile Signal #2: SURR2.E
Quant Time: Mar 17 10:43 2002 Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)
Title : TPH-G Method
Last Update : Sat Mar 16 08:42:32 2002
Response via : Multiple Level Calibration
DataAcq Meth : TEST0202.M

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

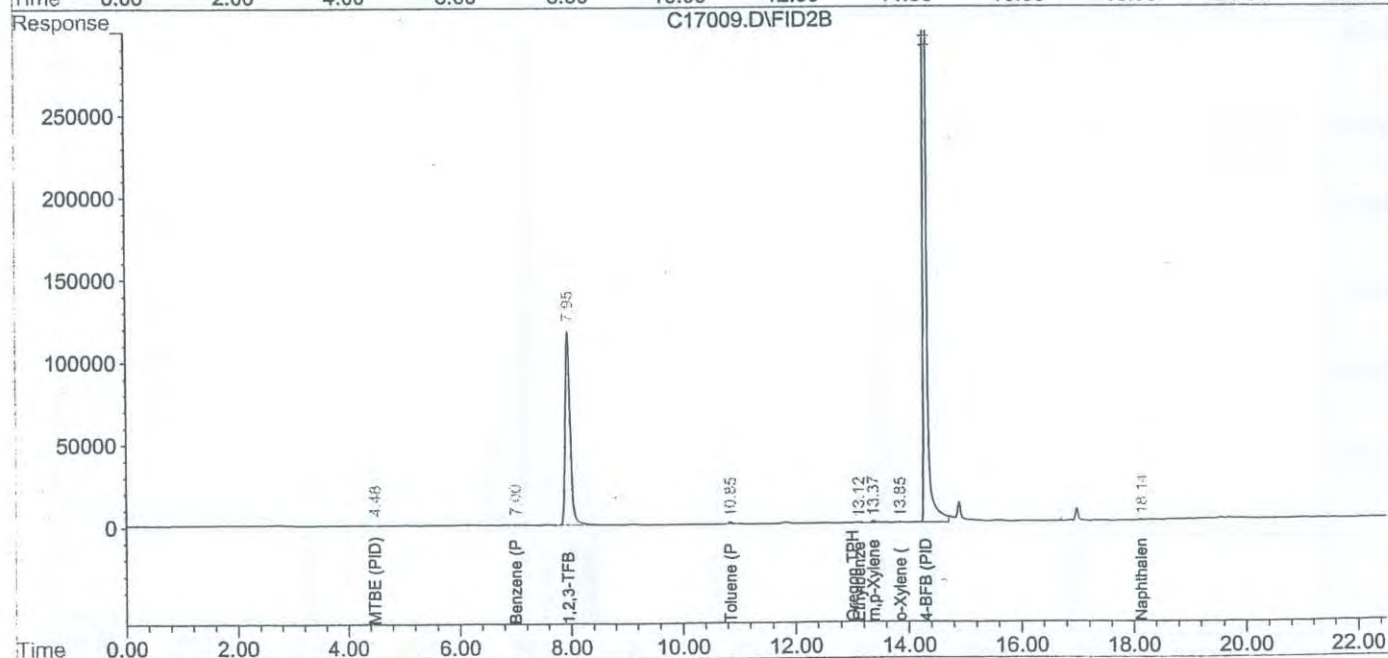
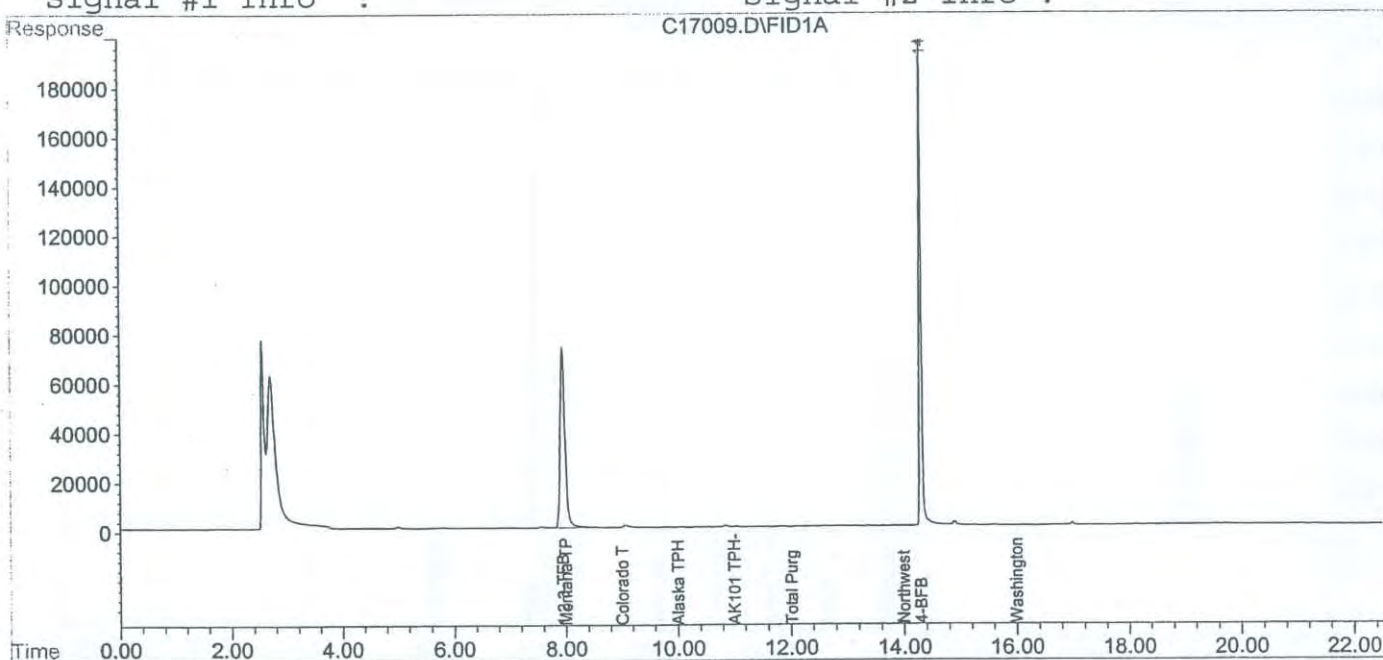


Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031702\C17009.D\FID1A.CH Vial: 9
Signal #2 : D:\HPCHEM\3\DATA\031702\C17009.D\FID2B.CH
Acq On : 17 Mar 2002 10:49 Operator: bd
Sample : B2C0219-13 Inst : GC #6
Misc : 1x 100uL Multiplr: 1.00
IntFile Signal #1: SURR.E IntFile Signal #2: SURR2.E
Quant Time: Mar 17 11:12 2002 Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)
Title : TPH-G Method
Last Update : Sat Mar 16 08:42:32 2002
Response via : Multiple Level Calibration
DataAcq Meth : TEST0202.M

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

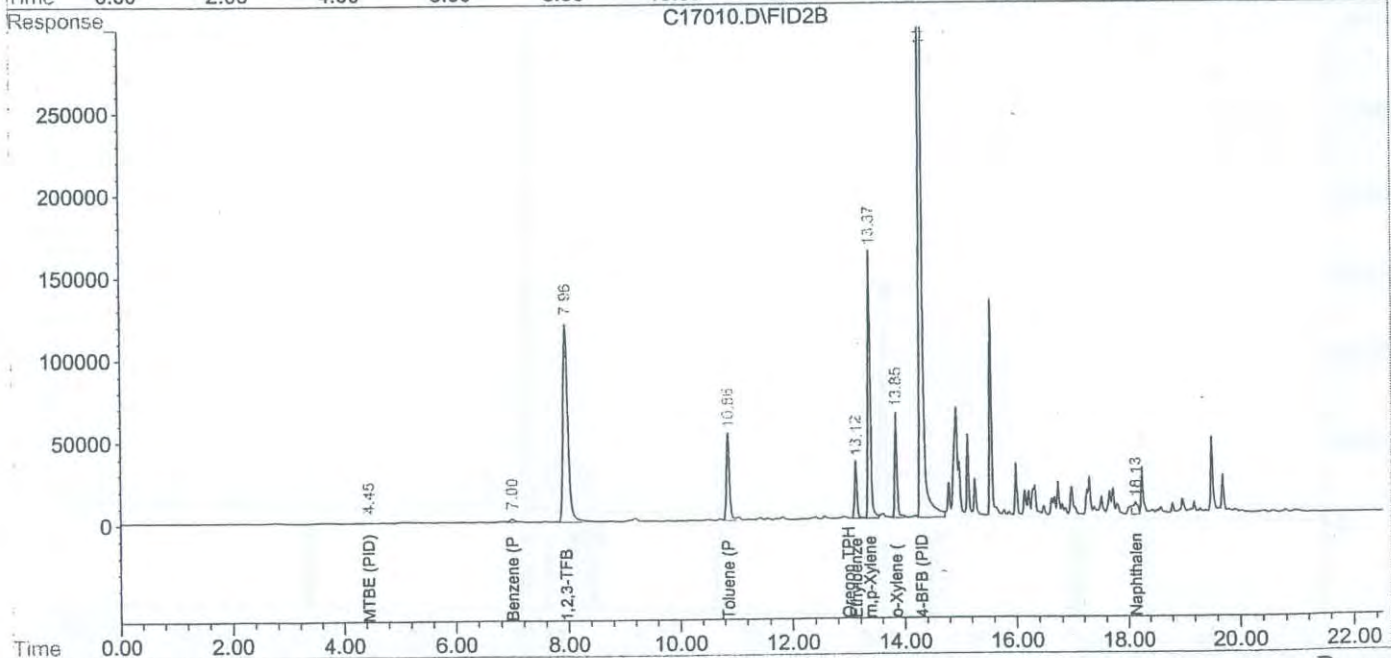
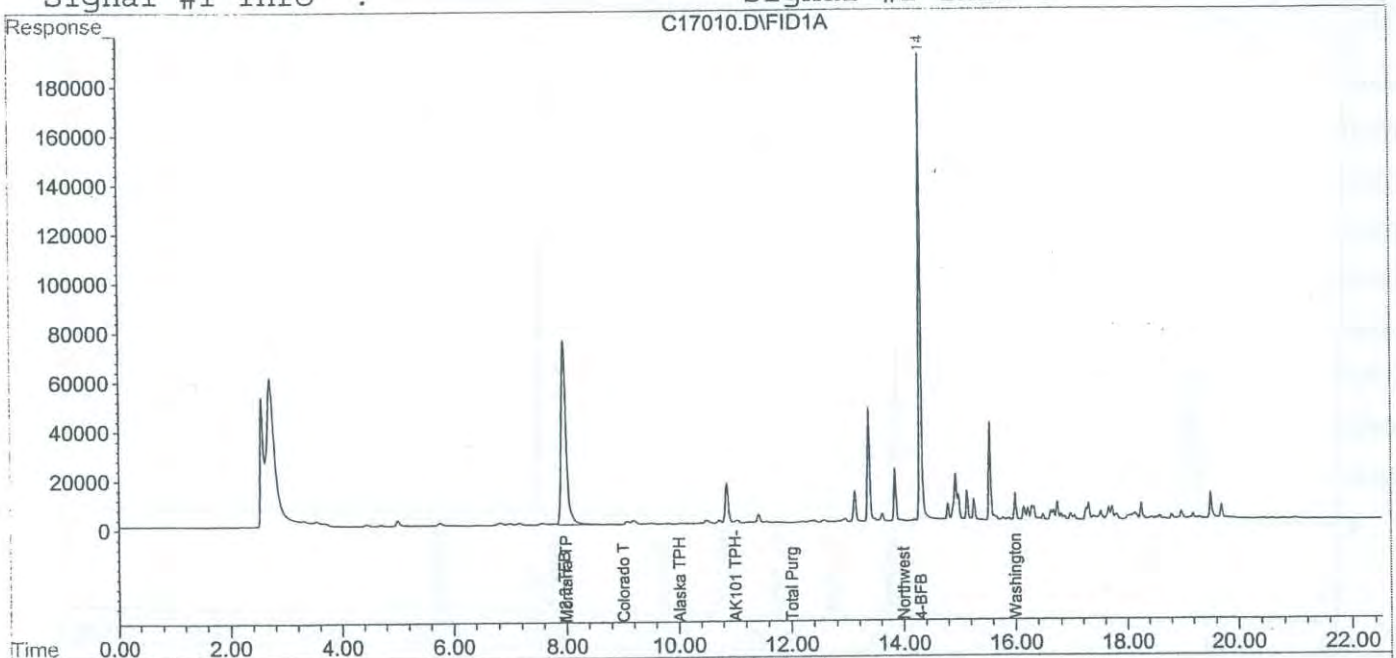


Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031702\C17010.D\FID1A.CH Vial: 10
Signal #2 : D:\HPCHEM\3\DATA\031702\C17010.D\FID2B.CH
Acq On : 17 Mar 2002 11:18 Operator: bd
Sample : B2C0219-14 Inst : GC #6
Misc : 1x 100uL Multiplr: 1.00
IntFile Signal #1: SURR.E IntFile Signal #2: SURR2.E
Quant Time: Mar 17 11:41 2002 Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)
Title : TPH-G Method
Last Update : Sat Mar 16 08:42:32 2002
Response via : Multiple Level Calibration
DataAcq Meth : TEST0202.M

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

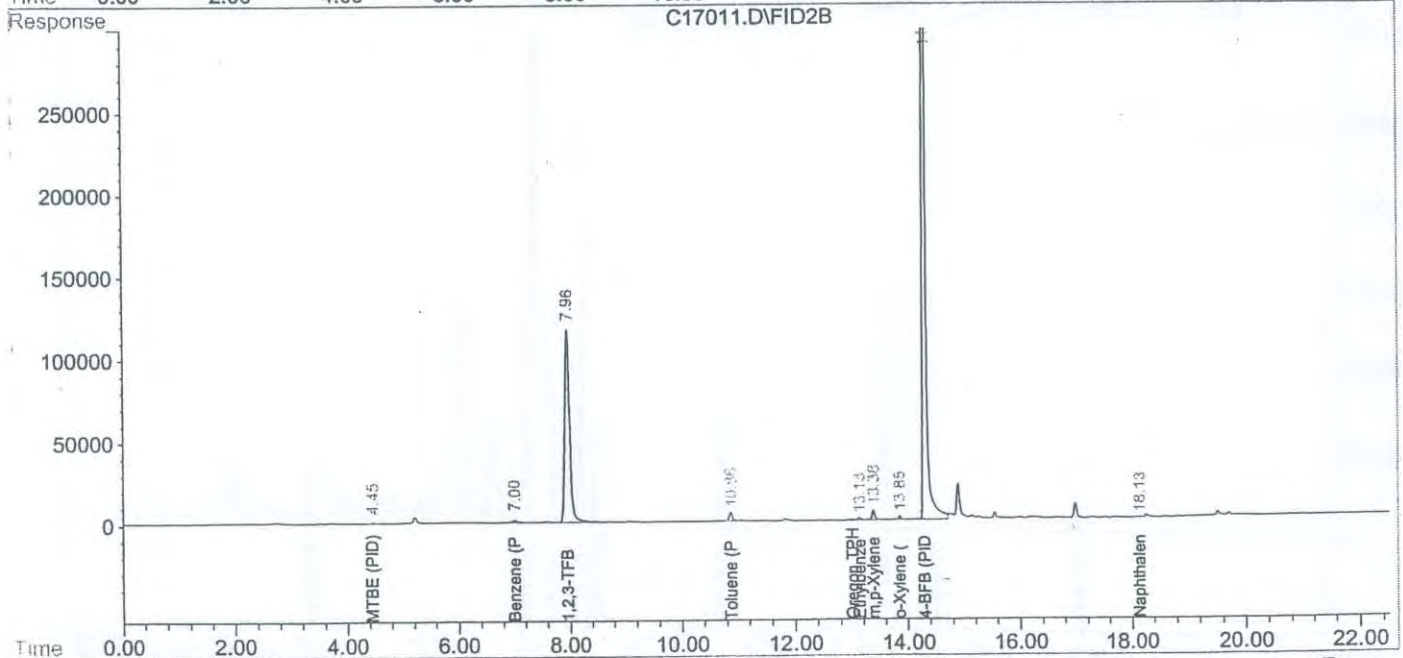
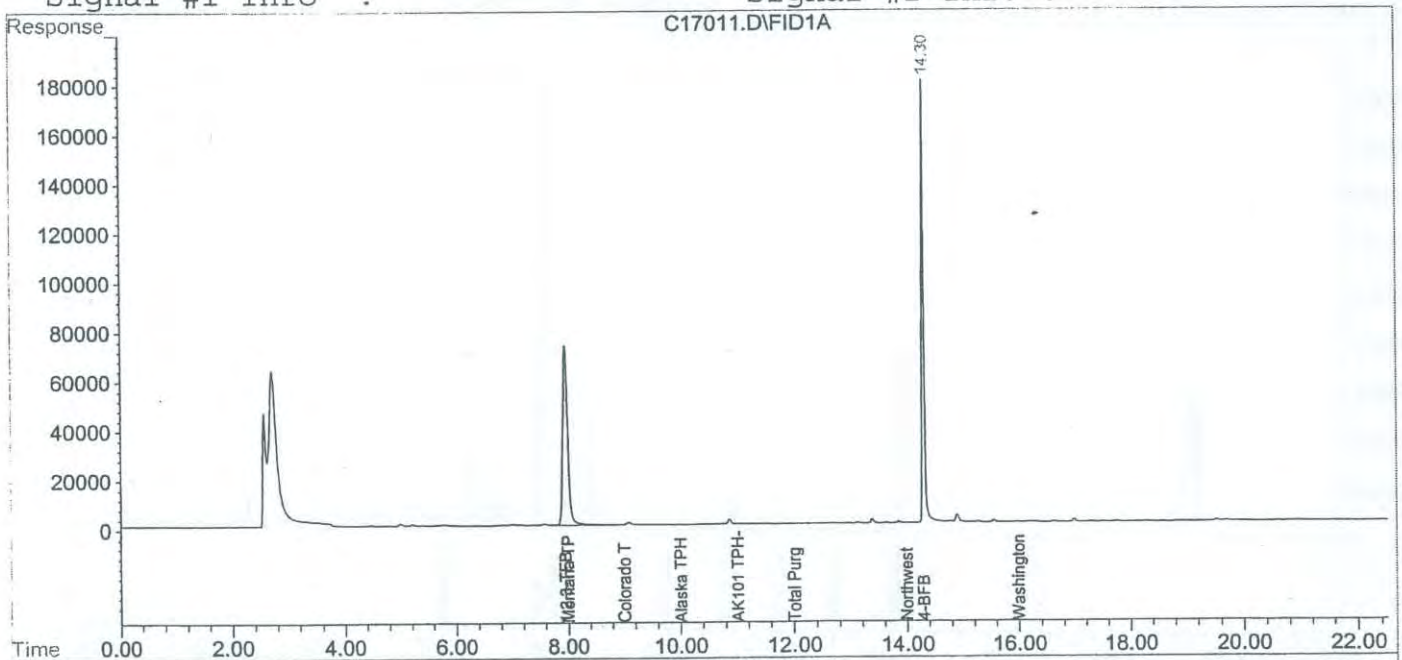


Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031702\C17011.D\FID1A.CH Vial: 11
Signal #2 : D:\HPCHEM\3\DATA\031702\C17011.D\FID2B.CH
Acq On : 17 Mar 2002 11:47 Operator: bd
Sample : B2C0219-15 Inst : GC #6
Misc : 1x 100uL Multiplr: 1.00
IntFile Signal #1: SURR.E IntFile Signal #2: SURR2.E
Quant Time: Mar 17 12:09 2002 Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)
Title : TPH-G Method
Last Update : Sat Mar 16 08:42:32 2002
Response via : Multiple Level Calibration
DataAcq Meth : TEST0202.M

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :

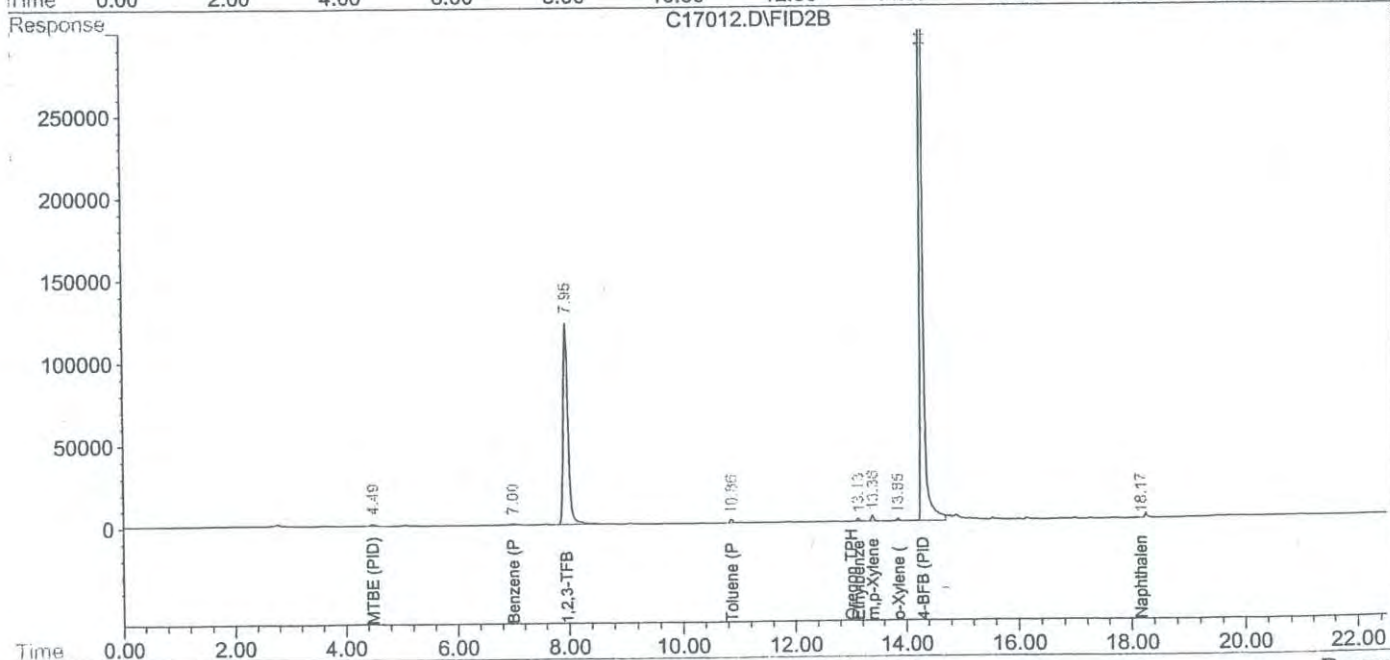
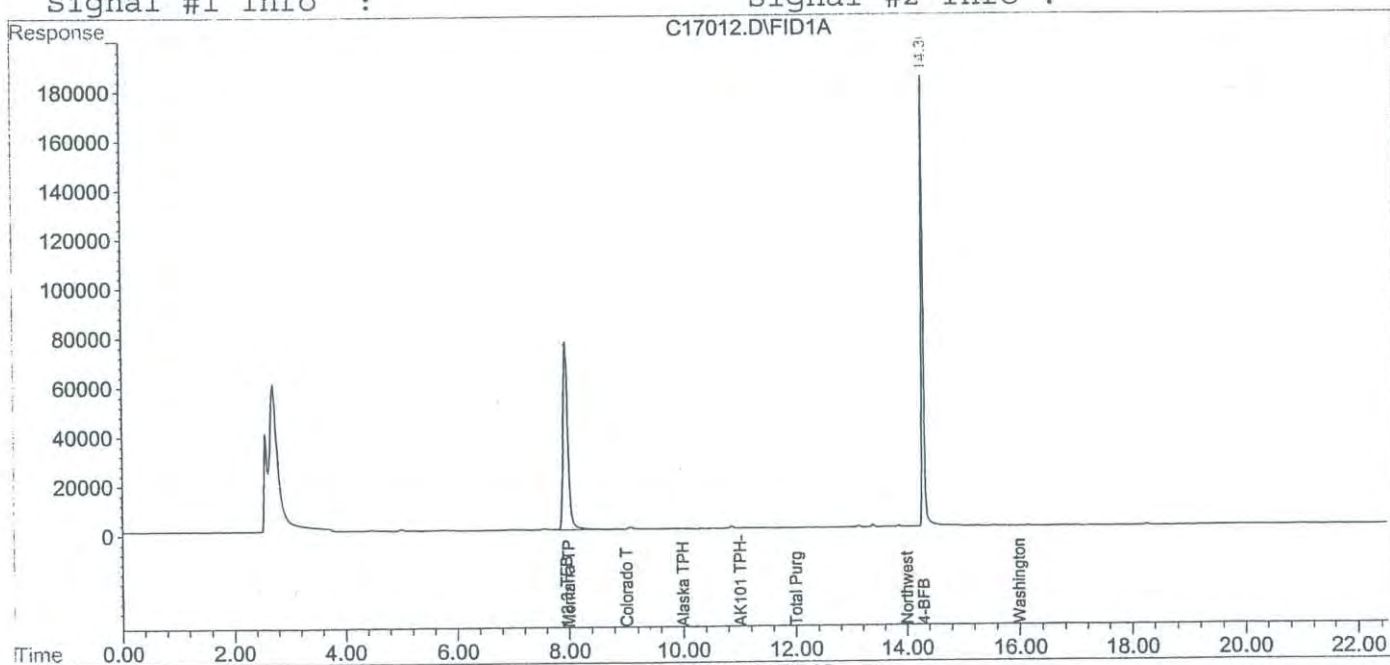


Quantitation Report

Signal #1 : D:\HPCHEM\3\DATA\031702\C17012.D\FID1A.CH Vial: 12
Signal #2 : D:\HPCHEM\3\DATA\031702\C17012.D\FID2B.CH
Acq On : 17 Mar 2002 12:15 Operator: bd
Sample : B2C0219-16 Inst : GC #6
Misc : 1x 100uL Multiplr: 1.00
IntFile Signal #1: SURR.E IntFile Signal #2: SURR2.E
Quant Time: Mar 17 12:38 2002 Quant Results File: TEST0202.RES

Quant Method : D:\HPCHEM\3\METHODS\TEST0202.M (Chemstation Integrator)
Title : TPH-G Method
Last Update : Sat Mar 16 08:42:32 2002
Response via : Multiple Level Calibration
DataAcq Meth : TEST0202.M

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :





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 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

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 (503) 906-9200 FAX 9210
 (541) 383-9310 FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order #: **B26219**

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses
 10 7 5 4 3 2 1 <1

Petroleum Hydrocarbon Analyses
 15 4 3 2 1 <1

STD. OTHER

Please Specify

*Turnaround Request less than standard may incur Rush Charges.

INVOICE TO:

SAME AS LEFT

CLIENT: TIME R/L COMPANY
 REPORT TO: SCOTT SLAN (BIRMINGHAM FINELINE)
 ADDRESS: 2737 W LUMBERPORT WAY
 SEATTLE WA 98149
 PHONE: 206 256 6157 FAX:
 PROJECT NAME: DPE
 PROJECT NUMBER: 2306.3312
 SAMPLED BY: J. RIGGINS / JSPECK

P.O. NUMBER:

REQUESTED ANALYSES

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NORTH BX	NORTH BX + BULK	TOTAL LEAD	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WO ID
1. SB-65-5	03.11.02 0925	X	X	X	S	3	B26219	01
2. SB-65-10	0950	X	X	X		2		02
3. SB-65-15	1015	X	X	X		2		03
4. SB-65-20	1035	X	X	X		2		04
5. SB-65-25	1050	X	X	X		2		05
6. SB-65-30	1120	X	X	X		2		06
7. SB-66-5	1705	X	X	X		2		07
8. SB-66-10	1315	X	X	X		2		08
9. SB-66-15	1330	X	X	X		2		09
10. SB-66-20	1340	X	X	X		2		10
11. SB-66-25	1350	X	X	X		2		11
12. SB-67-5	1510	X	X	X		2		12
13. SB-67-10	1530	X	X	X		2		13
14. SB-67-15	1545	X	X	X		2		14
15. SB-67-20	1600	X	X	X		2		15

RECEIVED BY: *Carlynn Nichols* DATE: 03/12/02
 PRINT NAME: *Carlynn Nichols* TIME: 0900
 FIRM: *FARENC*

RECEIVED BY: DATE: DATE: 07/14/02
 PRINT NAME: PRINT NAME: TIME: 9:00
 FIRM: *NCA*

RECEIVED BY: DATE: DATE:
 PRINT NAME: PRINT NAME: TIME: TIME:

RELINQUISHED BY: *Jeffrey Speck*
 PRINT NAME: *JEFFREY SPECK*

RELINQUISHED BY: DATE: DATE:
 PRINT NAME: PRINT NAME: TIME: TIME:

ADDITIONAL REMARKS: *8 oz Glass Jar: TPH dx / 751 LEAD*
1 oz Glass Jar: TPH dx - BTEX
W/D

TEMP: *3.3* PAGE 1 OF 2



North Creek Analytical, Inc.
Environmental Laboratory Network
www.ncalabs.com

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(509) 924-9200 FAX 924-9290
(503) 906-9200 FAX 906-9210
(541) 383-9310 FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order #: BZC0219

CLIENT: *TRANE DR COMPANY*
REPORT TO: *SIST STAN (BLOOMINGTON)*
ADDRESS: *2747 W COMPTON BLVD WY
SEATTLE WA 98149*
PHONE: *206 286 6457* FAX:

INVOICE TO: *SAM L AS LEFT*
P.O. NUMBER:

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses
 7 5 4 3 2 1 <1

Petroleum Hydrocarbon Analyses
 5 4 3 2 1 <1

STD. OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

REQUESTED ANALYSES

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	METH. BY	METH. DX	TOTAL LEAD	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WO ID
1. <i>SB-67-25</i>	<i>03.11.02 1615</i>	<i>METH. BY</i>	<i>METH. DX</i>	<i>X</i>	<i>S</i>	<i>2</i>	<i>BZC0219</i>	<i>16</i>
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								
13.								
14.								
15.								

RECEIVED BY: *Gregory Nichols*
PRINT NAME: *Gregory Nichols*
DATE: *03/14/02*
TIME: *9:10*

RECEIVED BY: *TCM*
PRINT NAME: *TCM*
DATE: *03/14/02*
TIME: *9:10*

RECEIVED BY: *TCM*
PRINT NAME: *TCM*
DATE: *03/14/02*
TIME: *9:10*

RECEIVED BY: *TCM*
PRINT NAME: *TCM*
DATE: *03/14/02*
TIME: *9:10*

RECEIVED BY: *TCM*
PRINT NAME: *TCM*
DATE: *03/14/02*
TIME: *9:10*

RECEIVED BY: *TCM*
PRINT NAME: *TCM*
DATE: *03/14/02*
TIME: *9:10*

RECEIVED BY: *TCM*
PRINT NAME: *TCM*
DATE: *03/14/02*
TIME: *9:10*

RECEIVED BY: *TCM*
PRINT NAME: *TCM*
DATE: *03/14/02*
TIME: *9:10*

RECEIVED BY: *TCM*
PRINT NAME: *TCM*
DATE: *03/14/02*
TIME: *9:10*

RECEIVED BY: *TCM*
PRINT NAME: *TCM*
DATE: *03/14/02*
TIME: *9:10*

ADDITIONAL RE S: *802 GLASS JAR: TPA. 02 - TOT LEAD*
402 GLASS JAR: TPA. Lx + BTEX
WIN
TERM: *32*
PAGE: *2*
OF: *2*

CAP WELL ANALYTICAL RESULTS

DECEMBER 2002



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
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503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 3209 Denali Street, Anchorage, AK 99503
907.334.9338 fax 907.334.9339

17 December 2002

Bryan Graham
Foster Wheeler Environmental Corporation
12100 NE 195th St
Bothell, WA/USA 98011
RE: DPE Extraction Well Construction

Enclosed are the results of analyses for samples received by the laboratory on 12/02/02 18:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Amar Gill
Project Manager



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Anchorage 3209 Denali Street, Anchorage, AK 99503
 907.334.9338 fax 907.334.9339

Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 12:54
--	--	------------------------------------

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
01MW21-5	B2L0025-01	Soil	12/02/02 08:50	12/02/02 18:00
01MW21-10	B2L0025-02	Soil	12/02/02 09:05	12/02/02 18:00
01MW21-15	B2L0025-03	Soil	12/02/02 09:15	12/02/02 18:00
01MW21-20	B2L0025-04	Soil	12/02/02 09:30	12/02/02 18:00
01MW21-23	B2L0025-05	Soil	12/02/02 09:45	12/02/02 18:00
01MW22-5	B2L0025-06	Soil	12/02/02 11:30	12/02/02 18:00
01MW22-10	B2L0025-07	Soil	12/02/02 11:45	12/02/02 18:00
01MW22-15	B2L0025-08	Soil	12/02/02 12:05	12/02/02 18:00
01MW22-20	B2L0025-09	Soil	12/02/02 12:15	12/02/02 18:00
01MW22-25	B2L0025-10	Soil	12/02/02 12:25	12/02/02 18:00
01MW23-5	B2L0025-11	Soil	12/02/02 15:05	12/02/02 18:00
1W23-10	B2L0025-12	Soil	12/02/02 15:15	12/02/02 18:00
01MW23-15	B2L0025-13	Soil	12/02/02 15:30	12/02/02 18:00
01MW23-20	B2L0025-14	Soil	12/02/02 15:45	12/02/02 18:00

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

North Creek Analytical, Inc.
Environmental Laboratory Network



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 Anchorage 3209 Denali Street, Anchorage, AK 99503
 907.334.9338 fax 907.334.9339

Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 12:54

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW21-5 (B2L0025-01) Soil Sampled: 12/02/02 08:50 Received: 12/02/02 18:00									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L06030	12/06/02	12/09/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	"
Toluene	ND	0.0500	"	"	"	"	"	"	"
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	"
Xylenes (total)	ND	0.100	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	76.2 %	59-125			"	"	"	"	"
Surrogate: 4-BFB (PID)	91.4 %	64-125			"	"	"	"	"
01MW21-10 (B2L0025-02) Soil Sampled: 12/02/02 09:05 Received: 12/02/02 18:00									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L06030	12/06/02	12/09/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	"
Toluene	ND	0.0500	"	"	"	"	"	"	"
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	"
Xylenes (total)	ND	0.100	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	75.4 %	59-125			"	"	"	"	"
Surrogate: 4-BFB (PID)	82.0 %	64-125			"	"	"	"	"
01MW21-15 (B2L0025-03) Soil Sampled: 12/02/02 09:15 Received: 12/02/02 18:00									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L06030	12/06/02	12/09/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	"
Toluene	ND	0.0500	"	"	"	"	"	"	"
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	"
Xylenes (total)	ND	0.100	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	71.2 %	59-125			"	"	"	"	"
Surrogate: 4-BFB (PID)	79.6 %	64-125			"	"	"	"	"

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Amar Gill, Project Manager

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 503.906.9200 fax 503.906.9210
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Foster Wheeler Environmental Corporation
 2100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 12:54

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
	Result	Limit							
MW21-20 (B2L0025-04) Soil Sampled: 12/02/02 09:30 Received: 12/02/02 18:00									
Asoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L06030	12/06/02	12/09/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Xylylene	ND	0.0500	"	"	"	"	"	"	
Aromatics (total)	ND	0.100	"	"	"	"	"	"	
surrogate: 4-BFB (FID)	74.5 %	59-125			"	"	"	"	
surrogate: 4-BFB (PID)	80.6 %	64-125			"	"	"	"	
MW21-23 (B2L0025-05) Soil Sampled: 12/02/02 09:45 Received: 12/02/02 18:00									
Asoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L06030	12/06/02	12/09/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Xylylene	ND	0.0500	"	"	"	"	"	"	
Aromatics (total)	ND	0.100	"	"	"	"	"	"	
surrogate: 4-BFB (FID)	79.6 %	59-125			"	"	"	"	
surrogate: 4-BFB (PID)	88.9 %	64-125			"	"	"	"	
MW22-5 (B2L0025-06) Soil Sampled: 12/02/02 11:30 Received: 12/02/02 18:00									
Asoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L06030	12/06/02	12/09/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Xylylene	ND	0.0500	"	"	"	"	"	"	
Aromatics (total)	ND	0.100	"	"	"	"	"	"	
surrogate: 4-BFB (FID)	72.7 %	59-125			"	"	"	"	
surrogate: 4-BFB (PID)	81.0 %	64-125			"	"	"	"	

North Creek Analytical - Bothell

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Omar Gill, Project Manager

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 12:54
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Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1MW23-15 (B2L0025-13) Soil Sampled: 12/02/02 15:30 Received: 12/02/02 18:00									
Gasoline Range Hydrocarbons	5.71	5.00	mg/kg dry	1	2L06030	12/06/02	12/09/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	83.6 %	59-125			"	"	"	"	
Surrogate: 4-BFB (PID)	85.4 %	64-125			"	"	"	"	
1MW23-20 (B2L0025-14) Soil Sampled: 12/02/02 15:45 Received: 12/02/02 18:00									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L06030	12/06/02	12/09/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	74.0 %	59-125			"	"	"	"	
Surrogate: 4-BFB (PID)	87.1 %	64-125			"	"	"	"	

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 12:54

Volatile Petroleum Hydrocarbons by WDOE TPH Policy Method
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW21-5 (B2L0025-01) Soil Sampled: 12/02/02 08:50 Received: 12/02/02 18:00									
C5-C6 Aliphatics	ND	5.00	mg/kg dry	1	2L12002	12/12/02	12/12/02	WA MTCA-VPH	
C6-C8 Aliphatics	ND	5.00	"	"	"	"	"	"	
C8-C10 Aliphatics	ND	5.00	"	"	"	"	"	"	
C10-C12 Aliphatics	ND	5.00	"	"	"	"	"	"	
C8-C10 Aromatics	ND	5.00	"	"	"	"	"	"	
C10-C12 Aromatics	ND	5.00	"	"	"	"	"	"	
C12-C13 Aromatics	ND	5.00	"	"	"	"	"	"	
Total VPH (TVPH)	ND	5.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	98.2 %	60-140			"	"	"	"	
Surrogate: 4-BFB (PID)	90.4 %	60-140			"	"	"	"	
01MW23-5 (B2L0025-11) Soil Sampled: 12/02/02 15:05 Received: 12/02/02 18:00									
6 Aliphatics	ND	20.0	mg/kg dry	4	2L12002	12/12/02	12/12/02	WA MTCA-VPH	
C6-C8 Aliphatics	43.1	20.0	"	"	"	"	"	"	
C8-C10 Aliphatics	89.9	20.0	"	"	"	"	"	"	
C10-C12 Aliphatics	141	20.0	"	"	"	"	"	"	
C8-C10 Aromatics	87.6	20.0	"	"	"	"	"	"	
C10-C12 Aromatics	230	20.0	"	"	"	"	"	"	
C12-C13 Aromatics	289	20.0	"	"	"	"	"	"	
Total VPH (TVPH)	880	20.0	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	60-140			"	"	"	"	S-02
Surrogate: 4-BFB (PID)	162 %	60-140			"	"	"	"	S-04

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 12:54
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**Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW21-5 (B2L0025-01) Soil Sampled: 12/02/02 08:50 Received: 12/02/02 18:00									
Diesel Range Hydrocarbons	14.0	10.0	mg/kg dry	1	2L05037	12/05/02	12/06/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	71.6 %	42-110			"	"	"	"	
Surrogate: Octacosane	78.4 %	57-123			"	"	"	"	
01MW21-10 (B2L0025-02) Soil Sampled: 12/02/02 09:05 Received: 12/02/02 18:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L05037	12/05/02	12/06/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	67.8 %	42-110			"	"	"	"	
Surrogate: Octacosane	73.9 %	57-123			"	"	"	"	
01MW21-15 (B2L0025-03) Soil Sampled: 12/02/02 09:15 Received: 12/02/02 18:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L05037	12/05/02	12/06/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	64.7 %	42-110			"	"	"	"	
Surrogate: Octacosane	76.2 %	57-123			"	"	"	"	
01MW21-20 (B2L0025-04) Soil Sampled: 12/02/02 09:30 Received: 12/02/02 18:00									
Diesel Range Hydrocarbons	21.5	10.0	mg/kg dry	1	2L05037	12/05/02	12/06/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	69.6 %	42-110			"	"	"	"	
Surrogate: Octacosane	76.3 %	57-123			"	"	"	"	
01MW21-23 (B2L0025-05) Soil Sampled: 12/02/02 09:45 Received: 12/02/02 18:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L05037	12/05/02	12/06/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	62.5 %	42-110			"	"	"	"	
Surrogate: Octacosane	66.2 %	57-123			"	"	"	"	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 12:54
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**Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW22-5 (B2L0025-06) Soil Sampled: 12/02/02 11:30 Received: 12/02/02 18:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L05037	12/05/02	12/06/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	69.2 %	42-110			"	"	"	"	
Surrogate: Octacosane	76.3 %	57-123			"	"	"	"	
01MW22-10 (B2L0025-07) Soil Sampled: 12/02/02 11:45 Received: 12/02/02 18:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L05037	12/05/02	12/06/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	58.3 %	42-110			"	"	"	"	
Surrogate: Octacosane	65.7 %	57-123			"	"	"	"	
01MW22-15 (B2L0025-08) Soil Sampled: 12/02/02 12:05 Received: 12/02/02 18:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L05037	12/05/02	12/06/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	63.1 %	42-110			"	"	"	"	
Surrogate: Octacosane	70.2 %	57-123			"	"	"	"	
01MW22-20 (B2L0025-09) Soil Sampled: 12/02/02 12:15 Received: 12/02/02 18:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L05037	12/05/02	12/06/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	64.4 %	42-110			"	"	"	"	
Surrogate: Octacosane	73.8 %	57-123			"	"	"	"	
01MW22-25 (B2L0025-10) Soil Sampled: 12/02/02 12:25 Received: 12/02/02 18:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L05037	12/05/02	12/06/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	62.8 %	42-110			"	"	"	"	
Surrogate: Octacosane	74.2 %	57-123			"	"	"	"	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 12:54

Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW23-5 (B2L0025-11) Soil Sampled: 12/02/02 15:05 Received: 12/02/02 18:00									
Diesel Range Hydrocarbons	681	20.0	mg/kg dry	2	2L05037	12/05/02	12/07/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	114	25.0	"	1	"	"	12/06/02	"	
Surrogate: 2-FBP	94.6 %	42-110			"	"	12/07/02	"	
Surrogate: Octacosane	78.3 %	57-123			"	"	12/06/02	"	
01MW23-10 (B2L0025-12) Soil Sampled: 12/02/02 15:15 Received: 12/02/02 18:00									
Diesel Range Hydrocarbons	32.5	10.0	mg/kg dry	1	2L05037	12/05/02	12/06/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	75.3 %	42-110			"	"	"	"	
Surrogate: Octacosane	77.5 %	57-123			"	"	"	"	
01MW23-15 (B2L0025-13) Soil Sampled: 12/02/02 15:30 Received: 12/02/02 18:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L05037	12/05/02	12/06/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	67.9 %	42-110			"	"	"	"	
Surrogate: Octacosane	77.3 %	57-123			"	"	"	"	
01MW23-20 (B2L0025-14) Soil Sampled: 12/02/02 15:45 Received: 12/02/02 18:00									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L05037	12/05/02	12/06/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	66.2 %	42-110			"	"	"	"	
Surrogate: Octacosane	74.5 %	57-123			"	"	"	"	

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 12:54
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**Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method
 North Creek Analytical - Bothell**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
01MW21-5 (B2L0025-01) Soil Sampled: 12/02/02 08:50 Received: 12/02/02 18:00										
C8-C10 Aliphatics	ND	5.00		mg/kg dry	1	2L10030	12/10/02	12/12/02	WA MTCA-EPH	
C10-C12 Aliphatics	ND	5.00		"	"	"	"	"	"	
C12-C16 Aliphatics	ND	5.00		"	"	"	"	"	"	
C16-C21 Aliphatics	ND	5.00		"	"	"	"	"	"	
C21-C34 Aliphatics	ND	5.00		"	"	"	"	"	"	
C10-C12 Aromatics	ND	5.00		"	"	"	"	12/12/02	"	
C12-C16 Aromatics	ND	5.00		"	"	"	"	"	"	
C16-C21 Aromatics	ND	5.00		"	"	"	"	"	"	
C21-C34 Aromatics	ND	5.00		"	"	"	"	"	"	
Extractable Petroleum Hydrocarbons	ND	5.00		"	"	"	"	12/12/02	"	
Surrogate: 2-FBP	77.2 %	50-150				"	"	12/12/02	"	
Surrogate: Octacosane	86.8 %	50-150				"	"	12/12/02	"	
Surrogate: Undecane	60.5 %	30-150				"	"	"	"	
01MW23-5 (B2L0025-11) Soil Sampled: 12/02/02 15:05 Received: 12/02/02 18:00										
C8-C10 Aliphatics	42.9	5.00		mg/kg dry	1	2L10030	12/10/02	12/12/02	WA MTCA-EPH	
C10-C12 Aliphatics	149	5.00		"	"	"	"	"	"	
C12-C16 Aliphatics	484	5.00		"	"	"	"	"	"	
C16-C21 Aliphatics	330	5.00		"	"	"	"	"	"	
C21-C34 Aliphatics	112	5.00		"	"	"	"	"	"	
C10-C12 Aromatics	42.9	5.00		"	"	"	"	12/12/02	"	
C12-C16 Aromatics	163	5.00		"	"	"	"	"	"	
C16-C21 Aromatics	260	5.00		"	"	"	"	"	"	
C21-C34 Aromatics	93.5	5.00		"	"	"	"	"	"	
Extractable Petroleum Hydrocarbons	1680	5.00		"	"	"	"	12/12/02	"	
Surrogate: 2-FBP	101 %	50-150				"	"	12/12/02	"	
Surrogate: Octacosane	87.0 %	50-150				"	"	12/12/02	"	
Surrogate: Undecane	129 %	30-150				"	"	"	"	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 12:54
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Polynuclear Aromatic Hydrocarbons by GC/MS-SIM
North Creek Analytical - Bothell

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
01MW23-5 (B2L0025-11) Soil Sampled: 12/02/02 15:05 Received: 12/02/02 18:00										
Acenaphthene	ND	0.0500		mg/kg dry	5	2L10030	12/10/02	12/12/02	8270-SIM	
Acenaphthylene	ND	0.0500		"	"	"	"	"	"	
Anthracene	0.384	0.0500		"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.0500		"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.0500		"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.0500		"	"	"	"	"	"	
Benzo (ghi) perylene	ND	0.0500		"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.0500		"	"	"	"	"	"	
Chrysene	0.108	0.0500		"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.0500		"	"	"	"	"	"	
Fluoranthene	0.0720	0.0500		"	"	"	"	"	"	
Fluorene	ND	0.0500		"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.0500		"	"	"	"	"	"	
1-Methylnaphthalene	5.08	0.0500		"	"	"	"	"	"	
2-Methylnaphthalene	8.51	0.200		"	20	"	"	12/16/02	"	
Naphthalene	1.84	0.0500		"	5	"	"	12/12/02	"	
Phenanthrene	1.28	0.0500		"	"	"	"	"	"	
Pyrene	0.352	0.0500		"	"	"	"	"	"	
Surrogate: p-Terphenyl-d14	90.0 %	42-141				"	"	"	"	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 12:54
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**Total Metals by EPA 6000/7000 Series Methods
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW21-5 (B2L0025-01) Soil Sampled: 12/02/02 08:50 Received: 12/02/02 18:00									
Lead	7.17	0.500	mg/kg dry	1	2L06004	12/06/02	12/09/02	EPA 6020	
01MW21-10 (B2L0025-02) Soil Sampled: 12/02/02 09:05 Received: 12/02/02 18:00									
Lead	2.39	0.500	mg/kg dry	1	2L06004	12/06/02	12/09/02	EPA 6020	
01MW21-15 (B2L0025-03) Soil Sampled: 12/02/02 09:15 Received: 12/02/02 18:00									
Lead	2.08	0.500	mg/kg dry	1	2L06004	12/06/02	12/09/02	EPA 6020	
01MW21-20 (B2L0025-04) Soil Sampled: 12/02/02 09:30 Received: 12/02/02 18:00									
Lead	2.29	0.500	mg/kg dry	1	2L06004	12/06/02	12/09/02	EPA 6020	
01MW21-23 (B2L0025-05) Soil Sampled: 12/02/02 09:45 Received: 12/02/02 18:00									
Lead	5.08	0.500	mg/kg dry	1	2L06004	12/06/02	12/09/02	EPA 6020	
01MW22-5 (B2L0025-06) Soil Sampled: 12/02/02 11:30 Received: 12/02/02 18:00									
Lead	3.98	0.500	mg/kg dry	1	2L06004	12/06/02	12/09/02	EPA 6020	
01MW22-10 (B2L0025-07) Soil Sampled: 12/02/02 11:45 Received: 12/02/02 18:00									
Lead	2.29	0.500	mg/kg dry	1	2L06004	12/06/02	12/09/02	EPA 6020	
01MW22-15 (B2L0025-08) Soil Sampled: 12/02/02 12:05 Received: 12/02/02 18:00									
Lead	2.10	0.500	mg/kg dry	1	2L06004	12/06/02	12/09/02	EPA 6020	
01MW22-20 (B2L0025-09) Soil Sampled: 12/02/02 12:15 Received: 12/02/02 18:00									
Lead	1.88	0.500	mg/kg dry	1	2L06004	12/06/02	12/09/02	EPA 6020	

North Creek Analytical - Bothell

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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 12:54

Total Metals by EPA 6000/7000 Series Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
01MW22-25 (B2L0025-10) Soil Sampled: 12/02/02 12:25 Received: 12/02/02 18:00										
Lead	4.19	0.500		mg/kg dry	1	2L06004	12/06/02	12/09/02	EPA 6020	
01MW23-5 (B2L0025-11) Soil Sampled: 12/02/02 15:05 Received: 12/02/02 18:00										
Lead	5.29	0.500		mg/kg dry	1	2L06004	12/06/02	12/09/02	EPA 6020	
01MW23-10 (B2L0025-12) Soil Sampled: 12/02/02 15:15 Received: 12/02/02 18:00										
Lead	2.52	0.500		mg/kg dry	1	2L06004	12/06/02	12/09/02	EPA 6020	
01MW23-15 (B2L0025-13) Soil Sampled: 12/02/02 15:30 Received: 12/02/02 18:00										
Lead	2.11	0.500		mg/kg dry	1	2L06004	12/06/02	12/09/02	EPA 6020	
01MW23-20 (B2L0025-14) Soil Sampled: 12/02/02 15:45 Received: 12/02/02 18:00										
Lead	5.15	0.500		mg/kg dry	1	2L06004	12/06/02	12/09/02	EPA 6020	

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 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 12:54

BTEX, MTBE, Naphthalene, and n-Hexane by WA VPH
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW21-5 (B2L0025-01) Soil Sampled: 12/02/02 08:50 Received: 12/02/02 18:00									
Methyl tert-butyl ether	ND	0.100	mg/kg dry	1	2L05020	12/05/02	12/06/02	EPA 8260B	
Benzene	ND	0.0100	"	"	"	"	"	"	
Toluene	ND	0.0100	"	"	"	"	"	"	
Ethylbenzene	ND	0.0100	"	"	"	"	"	"	
m,p-Xylene	ND	0.0200	"	"	"	"	"	"	
o-Xylene	ND	0.0100	"	"	"	"	"	"	
Naphthalene	ND	0.0100	"	"	"	"	"	"	
n-Hexane	ND	0.0200	"	"	"	"	"	"	
Surrogate: 1,2-DCA-d4	93.4 %	57-139			"	"	"	"	
Surrogate: Toluene-d8	84.4 %	66-122			"	"	"	"	
Surrogate: 4-BFB	75.6 %	62-121			"	"	"	"	

W23-5 (B2L0025-11) Soil Sampled: 12/02/02 15:05 Received: 12/02/02 18:00									
Methyl tert-butyl ether	ND	0.100	mg/kg dry	1	2L05020	12/05/02	12/06/02	EPA 8260B	
Benzene	0.314	0.0100	"	"	"	"	"	"	
Toluene	ND	0.0100	"	"	"	"	"	"	
Ethylbenzene	0.705	0.0100	"	"	"	"	"	"	
m,p-Xylene	0.872	0.0200	"	"	"	"	"	"	
o-Xylene	0.290	0.0100	"	"	"	"	"	"	
Naphthalene	3.67	0.0100	"	"	"	"	"	"	
n-Hexane	0.906	0.0200	"	"	"	"	"	"	
Surrogate: 1,2-DCA-d4	95.2 %	57-139			"	"	"	"	
Surrogate: Toluene-d8	87.3 %	66-122			"	"	"	"	
Surrogate: 4-BFB	85.2 %	62-121			"	"	"	"	

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 12:54

Physical Parameters by APHA/ASTM/EPA Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW21-5 (B2L0025-01) Soil Sampled: 12/02/02 08:50 Received: 12/02/02 18:00									
Dry Weight	80.1	1.00	%	1	2L06044	12/06/02	12/07/02	BSOPSPL003R07	
01MW21-10 (B2L0025-02) Soil Sampled: 12/02/02 09:05 Received: 12/02/02 18:00									
Dry Weight	82.8	1.00	%	1	2L06044	12/06/02	12/07/02	BSOPSPL003R07	
01MW21-15 (B2L0025-03) Soil Sampled: 12/02/02 09:15 Received: 12/02/02 18:00									
Dry Weight	81.7	1.00	%	1	2L06044	12/06/02	12/07/02	BSOPSPL003R07	
01MW21-20 (B2L0025-04) Soil Sampled: 12/02/02 09:30 Received: 12/02/02 18:00									
Dry Weight	78.4	1.00	%	1	2L06044	12/06/02	12/07/02	BSOPSPL003R07	
01MW21-23 (B2L0025-05) Soil Sampled: 12/02/02 09:45 Received: 12/02/02 18:00									
Dry Weight	80.6	1.00	%	1	2L06044	12/06/02	12/07/02	BSOPSPL003R07	
01MW22-5 (B2L0025-06) Soil Sampled: 12/02/02 11:30 Received: 12/02/02 18:00									
Dry Weight	79.2	1.00	%	1	2L06044	12/06/02	12/07/02	BSOPSPL003R07	
01MW22-10 (B2L0025-07) Soil Sampled: 12/02/02 11:45 Received: 12/02/02 18:00									
Dry Weight	78.9	1.00	%	1	2L06044	12/06/02	12/07/02	BSOPSPL003R07	
01MW22-15 (B2L0025-08) Soil Sampled: 12/02/02 12:05 Received: 12/02/02 18:00									
Dry Weight	82.9	1.00	%	1	2L06044	12/06/02	12/07/02	BSOPSPL003R07	
01MW22-20 (B2L0025-09) Soil Sampled: 12/02/02 12:15 Received: 12/02/02 18:00									
Dry Weight	80.0	1.00	%	1	2L06044	12/06/02	12/07/02	BSOPSPL003R07	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 12:54

Physical Parameters by APHA/ASTM/EPA Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW22-25 (B2L0025-10) Soil Sampled: 12/02/02 12:25 Received: 12/02/02 18:00									
Dry Weight	80.9	1.00	%	1	2L06044	12/06/02	12/07/02	BSOPSPL003R07	
01MW23-5 (B2L0025-11) Soil Sampled: 12/02/02 15:05 Received: 12/02/02 18:00									
Dry Weight	83.4	1.00	%	1	2L06044	12/06/02	12/07/02	BSOPSPL003R07	
01MW23-10 (B2L0025-12) Soil Sampled: 12/02/02 15:15 Received: 12/02/02 18:00									
Dry Weight	83.5	1.00	%	1	2L06044	12/06/02	12/07/02	BSOPSPL003R07	
01MW23-15 (B2L0025-13) Soil Sampled: 12/02/02 15:30 Received: 12/02/02 18:00									
Dry Weight	82.2	1.00	%	1	2L06044	12/06/02	12/07/02	BSOPSPL003R07	
01MW23-20 (B2L0025-14) Soil Sampled: 12/02/02 15:45 Received: 12/02/02 18:00									
Dry Weight	78.2	1.00	%	1	2L06044	12/06/02	12/07/02	BSOPSPL003R07	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 12:54
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**Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B - Quality Control
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L06030: Prepared 12/06/02 Using EPA 5030B (P/T)

Blank (2L06030-BLK1)

Gasoline Range Hydrocarbons	ND	5.00	mg/kg							
Benzene	ND	0.0300	"							
Toluene	ND	0.0500	"							
Ethylbenzene	ND	0.0500	"							
Xylenes (total)	ND	0.100	"							
Surrogate: 4-BFB (FID)	3.28		"	4.00		82.0	59-125			
Surrogate: 4-BFB (PID)	3.70		"	4.00		92.5	64-125			

LCS (2L06030-BS1)

Gasoline Range Hydrocarbons	24.7	5.00	mg/kg	27.5		89.8	80-120			
Benzene	0.365	0.0300	"	0.340		107	80-120			
Toluene	1.90	0.0500	"	2.08		91.3	80-120			
Ethylbenzene	0.491	0.0500	"	0.490		100	80-120			
Xylenes (total)	2.44	0.100	"	2.41		101	80-120			
Surrogate: 4-BFB (FID)	3.90		"	4.00		97.5	59-125			
Surrogate: 4-BFB (PID)	3.56		"	4.00		89.0	64-125			

LCS Dup (2L06030-BSD1)

Gasoline Range Hydrocarbons	25.6	5.00	mg/kg	27.5		93.1	80-120	3.58	40	
Benzene	0.367	0.0300	"	0.340		108	80-120	0.546	40	
Toluene	1.90	0.0500	"	2.08		91.3	80-120	0.00	40	
Ethylbenzene	0.490	0.0500	"	0.490		100	80-120	0.204	40	
Xylenes (total)	2.44	0.100	"	2.41		101	80-120	0.00	40	
Surrogate: 4-BFB (FID)	3.97		"	4.00		99.2	59-125			
Surrogate: 4-BFB (PID)	3.56		"	4.00		89.0	64-125			

Matrix Spike (2L06030-MS1)

Source: B2L0025-02

Gasoline Range Hydrocarbons	24.9	5.00	mg/kg dry	33.2	0.615	73.1	53-120			
Benzene	0.388	0.0300	"	0.411	0.00889	92.2	71-119			
Toluene	1.98	0.0500	"	2.52	0.0153	78.0	57-108			
Ethylbenzene	0.499	0.0500	"	0.592	ND	84.3	72-114			
Xylenes (total)	2.50	0.100	"	2.91	ND	85.9	68-112			
Surrogate: 4-BFB (FID)	3.90		"	4.83		80.7	59-125			
Surrogate: 4-BFB (PID)	3.76		"	4.83		77.8	64-125			

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Page 18 of 31



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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
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Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L06030: Prepared 12/06/02 Using EPA 5030B (P/T)

Matrix Spike Dup (2L06030-MSD1)

Source: B2L0025-02

Gasoline Range Hydrocarbons	23.9	5.00	mg/kg dry	33.2	0.615	70.1	53-120	4.10	40	
Benzene	0.383	0.0300	"	0.411	0.00889	91.0	71-119	1.30	40	
Toluene	1.96	0.0500	"	2.52	0.0153	77.2	57-108	1.02	40	
Ethylbenzene	0.493	0.0500	"	0.592	ND	83.3	72-114	1.21	40	
Xylenes (total)	2.46	0.100	"	2.91	ND	84.5	68-112	1.61	40	
Surrogate: 4-BFB (FID)	3.77		"	4.83		78.1	59-125			
Surrogate: 4-BFB (PID)	3.62		"	4.83		74.9	64-125			

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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 12:54

**Volatile Petroleum Hydrocarbons by WDOE TPH Policy Method - Quality Control
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L12002: Prepared 12/12/02 Using EPA 5030B (P/T)

Blank (2L12002-BLK1)

C5-C6 Aliphatics	ND	5.00	mg/kg							
C6-C8 Aliphatics	ND	5.00	"							
C8-C10 Aliphatics	ND	5.00	"							
C10-C12 Aliphatics	ND	5.00	"							
C8-C10 Aromatics	ND	5.00	"							
C10-C12 Aromatics	ND	5.00	"							
C12-C13 Aromatics	ND	5.00	"							
Total VPH (TVPH)	ND	5.00	"							
Surrogate: 4-BFB (FID)	4.24		"	4.00		106	60-140			
Surrogate: 4-BFB (PID)	3.70		"	4.00		92.5	60-140			

LCS (2L12002-BS1)

Total VPH (TVPH)	11.3	5.00	mg/kg	10.0		113	70-130			
Surrogate: 4-BFB (FID)	4.86		"	4.00		122	60-140			
Surrogate: 4-BFB (PID)	3.93		"	4.00		98.2	60-140			

LCS Dup (2L12002-BSD1)

Total VPH (TVPH)	11.0	5.00	mg/kg	10.0		110	70-130	2.69	25	
Surrogate: 4-BFB (FID)	3.33		"	4.00		83.2	60-140			
Surrogate: 4-BFB (PID)	3.02		"	4.00		75.5	60-140			

Matrix Spike (2L12002-MS1)

Source: B2L0158-09

Total VPH (TVPH)	17.9	5.00	mg/kg dry	13.4	0.00	134	70-130			Q-01
Surrogate: 4-BFB (FID)	5.26		"	5.36		98.1	60-140			
Surrogate: 4-BFB (PID)	4.88		"	5.36		91.0	60-140			

Matrix Spike Dup (2L12002-MSD1)

Source: B2L0158-09

Total VPH (TVPH)	14.7	5.00	mg/kg dry	13.4	0.00	110	70-130	19.6	25	
Surrogate: 4-BFB (FID)	5.13		"	5.36		95.7	60-140			
Surrogate: 4-BFB (PID)	5.01		"	5.36		93.5	60-140			

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 12:54

Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L05037: Prepared 12/05/02 Using EPA 3550B

Blank (2L05037-BLK1)

Diesel Range Hydrocarbons	ND	10.0	mg/kg							
Lube Oil Range Hydrocarbons	ND	25.0	"							
Surrogate: 2-FBP	7.66		"	10.7		71.6	42-110			
Surrogate: Octacosane	8.18		"	10.7		76.4	57-123			

LCS (2L05037-BS1)

Diesel Range Hydrocarbons	56.8	10.0	mg/kg	66.7		85.2	59-109			
Surrogate: 2-FBP	8.45		"	10.7		79.0	42-110			

LCS Dup (2L05037-BSD1)

Diesel Range Hydrocarbons	66.0	10.0	mg/kg	66.7		99.0	59-109	15.0	50	
Surrogate: 2-FBP	10.2		"	10.7		95.3	42-110			

Duplicate (2L05037-DUP1)

Source: B2L0025-02

Diesel Range Hydrocarbons	ND	10.0	mg/kg dry		4.68			1.29	50	
Lube Oil Range Hydrocarbons	ND	25.0	"		ND			NA	50	
Surrogate: 2-FBP	8.45		"	12.9		65.5	42-110			
Surrogate: Octacosane	9.56		"	12.9		74.1	57-123			

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 12:54

Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limit	RPD RPD	Limit	Notes
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Batch 2L10030: Prepared 12/10/02 Using EPA 3545

Blank (2L10030-BLK1)

C8-C10 Aliphatics	ND	5.00	mg/kg							
C10-C12 Aliphatics	ND	5.00	"							
C12-C16 Aliphatics	ND	5.00	"							
C16-C21 Aliphatics	ND	5.00	"							
C21-C34 Aliphatics	ND	5.00	"							
C10-C12 Aromatics	ND	5.00	"							
C12-C16 Aromatics	ND	5.00	"							
C16-C21 Aromatics	ND	5.00	"							
C21-C34 Aromatics	ND	5.00	"							
Extractable Petroleum Hydrocarbons	ND	5.00	"							
Surrogate: 2-FBP	10.7		"	13.4		79.9	50-150			
Surrogate: Octacosane	11.9		"	13.4		88.8	50-150			
Surrogate: Undecane	7.87		"	13.8		57.0	30-150			

LCS (2L10030-BS1)

Extractable Petroleum Hydrocarbons	111	5.00	mg/kg	167		66.5	30-120			
Surrogate: 2-FBP	10.7		"	13.4		79.9	50-150			
Surrogate: Octacosane	12.0		"	13.4		89.6	50-150			
Surrogate: Undecane	8.55		"	13.8		62.0	30-150			

LCS Dup (2L10030-BSD1)

Extractable Petroleum Hydrocarbons	115	5.00	mg/kg	167		68.9	30-120	3.54	40	
Surrogate: 2-FBP	10.9		"	13.4		81.3	50-150			
Surrogate: Octacosane	12.7		"	13.4		94.8	50-150			
Surrogate: Undecane	8.78		"	13.8		63.6	30-150			

Matrix Spike (2L10030-MS1)

Source: B2L0025-01

Extractable Petroleum Hydrocarbons	132	5.00	mg/kg dry	208	0.00	63.5	30-120			
Surrogate: 2-FBP	11.4		"	16.7		68.3	50-150			
Surrogate: Octacosane	14.3		"	16.7		85.6	50-150			
Surrogate: Undecane	10.0		"	17.2		58.1	30-150			

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 12:54
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Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L10030: Prepared 12/10/02 Using EPA 3545

Matrix Spike Dup (2L10030-MSD1)

Source: B2L0025-01

Extractable Petroleum Hydrocarbons	105	5.00	mg/kg dry	208	0.00	50.5	30-120	22.8	40	
Surrogate: 2-FBP	11.1		"	16.7		66.5	50-150			
Surrogate: Octacosane	12.8		"	16.7		76.6	50-150			
Surrogate: Undecane	9.22		"	17.2		53.6	30-150			

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 12:54

Polynuclear Aromatic Hydrocarbons by GC/MS-SIM - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L10030: Prepared 12/10/02 Using EPA 3545

Blank (2L10030-BLK1)

Acenaphthene	ND	0.0100	mg/kg							
Acenaphthylene	ND	0.0100	"							
Anthracene	ND	0.0100	"							
Benzo (a) anthracene	ND	0.0100	"							
Benzo (a) pyrene	ND	0.0100	"							
Benzo (b) fluoranthene	ND	0.0100	"							
Benzo (ghi) perylene	ND	0.0100	"							
Benzo (k) fluoranthene	ND	0.0100	"							
Chrysene	ND	0.0100	"							
Dibenz (a,h) anthracene	ND	0.0100	"							
Fluoranthene	ND	0.0100	"							
Fluorene	ND	0.0100	"							
Indeno (1,2,3-cd) pyrene	ND	0.0100	"							
1-Methylnaphthalene	ND	0.0100	"							
2-Methylnaphthalene	ND	0.0100	"							
Naphthalene	ND	0.0100	"							
Phenanthrene	ND	0.0100	"							
Pyrene	ND	0.0100	"							
Surrogate: p-Terphenyl-d14	0.255		"	0.267		95.5	42-141			

LCS (2L10030-BS1)

Acenaphthene	0.242	0.0100	mg/kg	0.333		72.7	50-150			
Acenaphthylene	0.301	0.0100	"	0.333		90.4	50-150			
Anthracene	0.256	0.0100	"	0.333		76.9	50-150			
Benzo (a) anthracene	0.253	0.0100	"	0.333		76.0	50-150			
Benzo (a) pyrene	0.244	0.0100	"	0.333		73.3	50-150			
Benzo (b) fluoranthene	0.232	0.0100	"	0.333		69.7	50-150			
Benzo (ghi) perylene	0.236	0.0100	"	0.333		70.9	50-150			
Benzo (k) fluoranthene	0.241	0.0100	"	0.333		72.4	50-150			
Chrysene	0.289	0.0100	"	0.333		86.8	54-112			
Dibenz (a,h) anthracene	0.218	0.0100	"	0.333		65.5	50-150			
Fluoranthene	0.277	0.0100	"	0.333		83.2	50-150			
Fluorene	0.259	0.0100	"	0.333		77.8	51-107			
Indeno (1,2,3-cd) pyrene	0.238	0.0100	"	0.333		71.5	42-112			

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 12:54
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Polynuclear Aromatic Hydrocarbons by GC/MS-SIM - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L10030: Prepared 12/10/02 Using EPA 3545

LCS (2L10030-BS1)

Naphthalene	0.241	0.0100	mg/kg	0.333		72.4	50-150			
Phenanthrene	0.263	0.0100	"	0.333		79.0	50-150			
Pyrene	0.254	0.0100	"	0.333		76.3	50-150			
Surrogate: p-Terphenyl-d14	0.237		"	0.267		88.8	42-141			

LCS Dup (2L10030-BSD1)

Acenaphthene	0.240	0.0100	mg/kg	0.333		72.1	50-150	0.830	25	
Acenaphthylene	0.293	0.0100	"	0.333		88.0	50-150	2.69	25	
Anthracene	0.268	0.0100	"	0.333		80.5	50-150	4.58	25	
Benzo (a) anthracene	0.276	0.0100	"	0.333		82.9	50-150	8.70	25	
Benzo (a) pyrene	0.256	0.0100	"	0.333		76.9	50-150	4.80	25	
(b) fluoranthene	0.197	0.0100	"	0.333		59.2	50-150	16.3	25	
Benzo (ghi) perylene	0.288	0.0100	"	0.333		86.5	50-150	19.8	25	
Benzo (k) fluoranthene	0.313	0.0100	"	0.333		94.0	50-150	26.0	25	Q-07
Chrysene	0.294	0.0100	"	0.333		88.3	54-112	1.72	37	
Dibenz (a,h) anthracene	0.267	0.0100	"	0.333		80.2	50-150	20.2	25	
Fluoranthene	0.330	0.0100	"	0.333		99.1	50-150	17.5	25	
Fluorene	0.259	0.0100	"	0.333		77.8	51-107	0.00	43	
Indeno (1,2,3-cd) pyrene	0.291	0.0100	"	0.333		87.4	42-112	20.0	32	
Naphthalene	0.249	0.0100	"	0.333		74.8	50-150	3.27	25	
Phenanthrene	0.295	0.0100	"	0.333		88.6	50-150	11.5	25	
Pyrene	0.322	0.0100	"	0.333		96.7	50-150	23.6	25	
Surrogate: p-Terphenyl-d14	0.250		"	0.267		93.6	42-141			

Matrix Spike (2L10030-MS1)

Source: B2L0025-01

Acenaphthene	0.270	0.0100	mg/kg dry	0.416	ND	64.9	50-150			
Acenaphthylene	0.330	0.0100	"	0.416	ND	79.3	50-150			
Anthracene	0.290	0.0100	"	0.416	ND	69.7	50-150			
Benzo (a) anthracene	0.273	0.0100	"	0.416	0.00166	65.2	50-150			
Benzo (a) pyrene	0.234	0.0100	"	0.416	ND	56.2	50-150			
Benzo (b) fluoranthene	0.182	0.0100	"	0.416	ND	43.8	50-150			Q-02
Benzo (ghi) perylene	0.262	0.0100	"	0.416	ND	63.0	50-150			
Benzo (k) fluoranthene	0.219	0.0100	"	0.416	ND	52.6	50-150			
Chrysene	0.280	0.0100	"	0.416	ND	67.3	29-143			

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 12:54
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Polynuclear Aromatic Hydrocarbons by GC/MS-SIM - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	Limit	RPD	RPD Limit	Notes
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Batch 2L10030: Prepared 12/10/02 Using EPA 3545

Matrix Spike (2L10030-MS1)				Source: B2L0025-01						
Dibenz (a,h) anthracene	0.263	0.0100	mg/kg dry	0.416	ND	63.2	50-150			
Fluoranthene	0.286	0.0100	"	0.416	ND	68.8	50-150			
Fluorene	0.287	0.0100	"	0.416	ND	69.0	36-134			
Indeno (1,2,3-cd) pyrene	0.275	0.0100	"	0.416	ND	66.1	19-138			
Naphthalene	0.285	0.0100	"	0.416	0.00416	67.5	50-150			
Phenanthrene	0.303	0.0100	"	0.416	0.00416	71.8	50-150			
Pyrene	0.267	0.0100	"	0.416	ND	64.2	50-150			
Surrogate: p-Terphenyl-d14	0.269		"	0.333		80.8	42-141			

Matrix Spike Dup (2L10030-MSD1)				Source: B2L0025-01						
Acenaphthene	0.235	0.0100	mg/kg dry	0.416	ND	56.5	50-150	13.9	25	
Acenaphthylene	0.298	0.0100	"	0.416	ND	71.6	50-150	10.2	25	
Anthracene	0.254	0.0100	"	0.416	ND	61.1	50-150	13.2	25	
Benzo (a) anthracene	0.250	0.0100	"	0.416	0.00166	59.7	50-150	8.80	25	
Benzo (a) pyrene	0.220	0.0100	"	0.416	ND	52.9	50-150	6.17	25	
Benzo (b) fluoranthene	0.174	0.0100	"	0.416	ND	41.8	50-150	4.49	25	Q-02
Benzo (ghi) perylene	0.227	0.0100	"	0.416	ND	54.6	50-150	14.3	25	
Benzo (k) fluoranthene	0.264	0.0100	"	0.416	ND	63.5	50-150	18.6	25	
Chrysene	0.255	0.0100	"	0.416	ND	61.3	29-143	9.35	44	
Dibenz (a,h) anthracene	0.226	0.0100	"	0.416	ND	54.3	50-150	15.1	25	
Fluoranthene	0.255	0.0100	"	0.416	ND	61.3	50-150	11.5	25	
Fluorene	0.259	0.0100	"	0.416	ND	62.3	36-134	10.3	52	
Indeno (1,2,3-cd) pyrene	0.240	0.0100	"	0.416	ND	57.7	19-138	13.6	43	
Naphthalene	0.253	0.0100	"	0.416	0.00416	59.8	50-150	11.9	25	
Phenanthrene	0.266	0.0100	"	0.416	0.00416	62.9	50-150	13.0	25	
Pyrene	0.250	0.0100	"	0.416	ND	60.1	50-150	6.58	25	
Surrogate: p-Terphenyl-d14	0.245		"	0.333		73.6	42-141			

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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 12:54

Total Metals by EPA 6000/7000 Series Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2L06004: Prepared 12/06/02 Using EPA 3050B										
Blank (2L06004-BLK1)										
Lead	ND	0.500	mg/kg							
LCS (2L06004-BS1)										
Lead	41.0	0.500	mg/kg	40.4		101	80-120			
LCS Dup (2L06004-BSD1)										
Lead	42.2	0.500	mg/kg	40.0		106	80-120	2.88	20	
Matrix Spike (2L06004-MS1) Source: B2L0065-01										
Lead	52.1	0.500	mg/kg dry	44.2	5.18	106	62-137			
Matrix Spike Dup (2L06004-MSD1) Source: B2L0065-01										
Lead	48.6	0.500	mg/kg dry	43.8	5.18	99.1	62-137	6.95	30	
Matrix Spike (2L06004-PS1) Source: B2L0065-01										
Lead	55.8	0.500	mg/kg dry	54.2	5.18	93.4	75-125			

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 12:54

BTEX, MTBE, Naphthalene, and n-Hexane by WA VPH - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L05020: Prepared 12/05/02 Using EPA 5030B [MeOH]

Blank (2L05020-BLK1)

Methyl tert-butyl ether	ND	0.100	mg/kg							
Benzene	ND	0.0100	"							
Toluene	ND	0.0100	"							
Ethylbenzene	ND	0.0100	"							
m,p-Xylene	ND	0.0200	"							
o-Xylene	ND	0.0100	"							
Naphthalene	ND	0.0100	"							
n-Hexane	ND	0.0200	"							
Surrogate: 1,2-DCA-d4	3.94		"	4.00		98.5	57-139			
Surrogate: Toluene-d8	3.53		"	4.00		88.2	66-122			
Surrogate: 4-BFB	3.26		"	4.00		81.5	62-121			

Blank (2L05020-BLK2)

Methyl tert-butyl ether	ND	0.100	mg/kg							
Benzene	ND	0.0100	"							
Toluene	ND	0.0100	"							
Ethylbenzene	ND	0.0100	"							
m,p-Xylene	ND	0.0200	"							
o-Xylene	ND	0.0100	"							
Naphthalene	ND	0.0100	"							
n-Hexane	ND	0.0200	"							
Surrogate: 1,2-DCA-d4	4.16		"	4.00		104	57-139			
Surrogate: Toluene-d8	3.73		"	4.00		93.2	66-122			
Surrogate: 4-BFB	3.26		"	4.00		81.5	62-121			

LCS (2L05020-BS1)

Benzene	1.05	0.0100	mg/kg	1.00		105	73-133			
Toluene	0.986	0.0100	"	1.00		98.6	68-130			
Surrogate: 1,2-DCA-d4	4.62		"	4.00		116	57-139			
Surrogate: Toluene-d8	3.92		"	4.00		98.0	66-122			
Surrogate: 4-BFB	3.41		"	4.00		85.2	62-121			

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 12:54
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BTEX, MTBE, Naphthalene, and n-Hexane by WA VPH - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch 2L05020: Prepared 12/05/02 Using EPA 5030B [MeOH]

LCS Dup (2L05020-BSD1)

Benzene	1.04	0.0100	mg/kg	1.00		104	73-133	0.957	20	
Toluene	0.983	0.0100	"	1.00		98.3	68-130	0.305	20	
Surrogate: 1,2-DCA-d4	4.63		"	4.00		116	57-139			
Surrogate: Toluene-d8	3.90		"	4.00		97.5	66-122			
Surrogate: 4-BFB	3.49		"	4.00		87.2	62-121			

Matrix Spike (2L05020-MS1)

Source: B2L0068-06

Benzene	1.07	0.0100	mg/kg dry	1.25	ND	85.6	62-138			
Toluene	1.10	0.0100	"	1.25	ND	88.0	44-133			
Surrogate: 1,2-DCA-d4	4.93		"	4.99		98.8	57-139			
Surrogate: Toluene-d8	4.34		"	4.99		87.0	66-122			
Surrogate: 4-BFB	3.92		"	4.99		78.6	62-121			

Matrix Spike Dup (2L05020-MSD1)

Source: B2L0068-06

Benzene	1.00	0.0100	mg/kg dry	1.25	ND	80.0	62-138	6.76	25	
Toluene	0.997	0.0100	"	1.25	ND	79.8	44-133	9.82	25	
Surrogate: 1,2-DCA-d4	4.84		"	4.99		97.0	57-139			
Surrogate: Toluene-d8	4.09		"	4.99		82.0	66-122			
Surrogate: 4-BFB	3.77		"	4.99		75.6	62-121			

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Environmental Laboratory Network

Page 29 of 31



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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 12:54
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Physical Parameters by APHA/ASTM/EPA Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting	Units	Spike Level	Source	%REC		RPD	Limit	Notes
		Limit			Result	%REC	Limits			
Batch 2L06044: Prepared 12/06/02 Using Dry Weight										
Blank (2L06044-BLK1)										
Dry Weight	99.8	1.00	%							

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 12:54
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Notes and Definitions

- Q-01 The spike recovery for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.
- Q-02 The spike recovery for this QC sample is outside of NCA established control limits due to sample matrix interference.
- Q-07 The RPD value for this QC sample is above the established control limit. Review of associated QC indicates the high RPD does not represent an out-of-control condition for the batch.
- S-02 The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.
- S-04 The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

North Creek Analytical - Bothell

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Amar Gill, Project Manager

**North Creek Analytical, Inc.
Environmental Laboratory Network**



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North Creek Analytical, Inc.
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(541) 383-9310

FAX: 924-9290
906-9210
382-7588

CHAIN OF CUSTODY REPORT

Work Order #: **62 L0025**

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses
 7 5 4 3 2 1 <1

Petroleum Hydrocarbon Analyses
 5 4 3 2 1 <1

STD. OTHER Please Specify

CLIENT: TIME OIL COMPANY

REPORT TO: SCOTT SLOAN (EE: BARRHAM & FRENCH)

ADDRESS: 2737 WEST COMMODORE WAY SEATTLE WA 98199

PHONE: 206.286.6457 FAX:

PROJECT NAME: DPE EXTRACTION WELL INSTALLATION

PROJECT NUMBER:

SAMPLED BY: J SPEL

INVOICE TO: GAME AS LEFT

P.O. NUMBER:

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	REQUESTED ANALYSES			MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WO ID
		NWTPH-GX	NWTPH-DX	TOTAL LEAD				
1. 01MW21-5	12022 0850	X	X	X	S	2		01
2. 01MW21-10	0905	X	X	X				02
3. 01MW21-15	0915	X	X	X				03
4. 01MW21-20	0930	X	X	X				04
5. 01MW21-23	0945	X	X	X				05
6. 01MW22-5	1130	X	X	X				06
7. 01MW22-10	1145	X	X	X				07
8. 01MW22-15	1205	X	X	X				08
9. 01MW22-20	1215	X	X	X				09
10. 01MW22-25	1225	X	X	X				10
11. 01MW23-5	1505	X	X	X				11
12. 01MW23-10	1515	X	X	X				12
13. 01MW23-15	1530	X	X	X				13
14. 01MW23-20	1545	X	X	X				14
15.								

*Turnaround Requests less than standard may incur Rush Charges.

RECEIVED BY: JEFF SPEL

DATE: 120202

TIME: 1800

FIRM: FWENC

RECEIVED BY: [Signature]

DATE: 12022

TIME: 800

FIRM: NCA

PRINT NAME: FRANK TONTI

RECEIVED BY: [Signature]

DATE: [Blank]

TIME: [Blank]

FIRM: [Blank]

PRINT NAME: [Blank]

RECEIVED BY: [Signature]

DATE: 12022

TIME: 800

FIRM: NCA

PRINT NAME: [Blank]

RECEIVED BY: [Signature]

DATE: [Blank]

TIME: [Blank]

FIRM: [Blank]

PRINT NAME: [Blank]

ADDITIONAL REMARKS: 8 02 JAN: DIESEL AND TOTAL LEAD 8 02 JAN: GAS/BTEX

TEMP: 5.3

W/O

DATE: 12/2/02

TIME: 800

FIRM: NCA

PRINT NAME: [Blank]

RECEIVED BY: [Signature]

DATE: [Blank]

TIME: [Blank]

FIRM: [Blank]

PRINT NAME: [Blank]

ADDITIONAL REMARKS: 8 02 JAN: DIESEL AND TOTAL LEAD 8 02 JAN: GAS/BTEX

TEMP: 5.3

W/O

DATE: 12/2/02

TIME: 800

FIRM: NCA

PRINT NAME: [Blank]

RECEIVED BY: [Signature]

DATE: [Blank]

TIME: [Blank]

FIRM: [Blank]

PRINT NAME: [Blank]



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17 December 2002

Bryan Graham
Foster Wheeler Environmental Corporation
12100 NE 195th St
Bothell, WA/USA 98011
RE: DPE Extraction Well Construction

Enclosed are the results of analyses for samples received by the laboratory on 12/03/02 17:52. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Amar Gill
Project Manager



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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
01 MW 24-5	B2L0046-01	Soil	12/03/02 08:30	12/03/02 17:52
01 MW 24-10	B2L0046-02	Soil	12/03/02 08:40	12/03/02 17:52
01 MW 24-15	B2L0046-03	Soil	12/03/02 08:50	12/03/02 17:52
01 MW 24-20	B2L0046-04	Soil	12/03/02 09:05	12/03/02 17:52
01 MW 25-5	B2L0046-05	Soil	12/03/02 10:55	12/03/02 17:52
01 MW 25-10	B2L0046-06	Soil	12/03/02 11:05	12/03/02 17:52
01 MW 25-15	B2L0046-07	Soil	12/03/02 11:20	12/03/02 17:52
01 MW 25-18	B2L0046-08	Soil	12/03/02 11:30	12/03/02 17:52
01 MW 29-5	B2L0046-09	Soil	12/03/02 13:30	12/03/02 17:52
01 MW 29-10	B2L0046-10	Soil	12/03/02 13:40	12/03/02 17:52
01 MW 29-15	B2L0046-11	Soil	12/03/02 13:50	12/03/02 17:52
MW 29-20	B2L0046-12	Soil	12/03/02 14:00	12/03/02 17:52
LR01-5	B2L0046-13	Soil	12/03/02 15:10	12/03/02 17:52
LR01-10	B2L0046-14	Soil	12/03/02 15:15	12/03/02 17:52
LR01-15	B2L0046-15	Soil	12/03/02 15:30	12/03/02 17:52
LR01-20	B2L0046-16	Soil	12/03/02 15:40	12/03/02 17:52

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01 MW 24-5 (B2L0046-01) Soil Sampled: 12/03/02 08:30 Received: 12/03/02 17:52									
Gasoline Range Hydrocarbons	2200	100	mg/kg dry	20	2L09029	12/09/02	12/09/02	NWTPH-Gx/8021B	
Benzene	4.35	0.600	"	"	"	"	"	"	
Toluene	ND	1.00	"	"	"	"	"	"	
Ethylbenzene	14.7	1.00	"	"	"	"	"	"	
Xylenes (total)	41.3	2.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-01
Surrogate: 4-BFB (PID)	%	64-125			"	"	"	"	S-01
01 MW 24-10 (B2L0046-02) Soil Sampled: 12/03/02 08:40 Received: 12/03/02 17:52									
Gasoline Range Hydrocarbons	28.4	5.00	mg/kg dry	1	2L09029	12/09/02	12/09/02	NWTPH-Gx/8021B	G-01
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	101 %	59-125			"	"	"	"	
Surrogate: 4-BFB (PID)	96.6 %	64-125			"	"	"	"	
01 MW 24-15 (B2L0046-03) Soil Sampled: 12/03/02 08:50 Received: 12/03/02 17:52									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L09029	12/09/02	12/10/02	NWTPH-Gx/8021B	
Benzene	0.103	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	77.9 %	59-125			"	"	"	"	
Surrogate: 4-BFB (PID)	83.7 %	64-125			"	"	"	"	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 13:03
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Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01 MW 24-20 (B2L0046-04) Soil Sampled: 12/03/02 09:05 Received: 12/03/02 17:52									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L09029	12/09/02	12/10/02	NWTPH-Gx/8021B	
Benzene	0.0454	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	76.1 %	59-125			"	"	"	"	
Surrogate: 4-BFB (PID)	83.3 %	64-125			"	"	"	"	
01 MW 25-5 (B2L0046-05) Soil Sampled: 12/03/02 10:55 Received: 12/03/02 17:52									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L09029	12/09/02	12/10/02	NWTPH-Gx/8021B	
Benzene	0.0491	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	79.7 %	59-125			"	"	"	"	
Surrogate: 4-BFB (PID)	91.1 %	64-125			"	"	"	"	
01 MW 25-10 (B2L0046-06) Soil Sampled: 12/03/02 11:05 Received: 12/03/02 17:52									
Gasoline Range Hydrocarbons	176	5.00	mg/kg dry	1	2L09029	12/09/02	12/10/02	NWTPH-Gx/8021B	G-01
Benzene	0.0658	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	0.272	0.0500	"	"	"	"	"	"	
Xylenes (total)	0.740	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	181 %	59-125			"	"	"	"	S-04
Surrogate: 4-BFB (PID)	108 %	64-125			"	"	"	"	

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 13:03
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**Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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01 MW 25-15 (B2L0046-07) Soil Sampled: 12/03/02 11:20 Received: 12/03/02 17:52

Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L09029	12/09/02	12/10/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	73.6 %	59-125			"	"	"	"	
Surrogate: 4-BFB (PID)	79.2 %	64-125			"	"	"	"	

01 MW 25-18 (B2L0046-08) Soil Sampled: 12/03/02 11:30 Received: 12/03/02 17:52

Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L09029	12/09/02	12/10/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	83.2 %	59-125			"	"	"	"	
Surrogate: 4-BFB (PID)	96.0 %	64-125			"	"	"	"	

01 MW 29-5 (B2L0046-09) Soil Sampled: 12/03/02 13:30 Received: 12/03/02 17:52

Gasoline Range Hydrocarbons	127	5.00	mg/kg dry	1	2L09029	12/09/02	12/10/02	NWTPH-Gx/8021B	G-01
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	0.339	0.0500	"	"	"	"	"	"	
Xylenes (total)	0.405	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-02
Surrogate: 4-BFB (PID)	120 %	64-125			"	"	"	"	

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01 MW 29-10 (B2L0046-10) Soil Sampled: 12/03/02 13:40 Received: 12/03/02 17:52									
Gasoline Range Hydrocarbons	122	5.00	mg/kg dry	1	2L09029	12/09/02	12/10/02	NWTPH-Gx/8021B	G-01
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	0.310	0.0500	"	"	"	"	"	"	
Xylenes (total)	1.10	0.100	"	"	"	"	"	"	I-06
Surrogate: 4-BFB (FID)	178 %	59-125			"	"	"	"	S-04
Surrogate: 4-BFB (PID)	126 %	64-125			"	"	"	"	S-04
01 MW 29-15 (B2L0046-11) Soil Sampled: 12/03/02 13:50 Received: 12/03/02 17:52									
Gasoline Range Hydrocarbons	297	5.00	mg/kg dry	1	2L09029	12/09/02	12/10/02	NWTPH-Gx/8021B	G-01
Benzene	0.109	0.0300	"	"	"	"	"	"	
Toluene	0.114	0.0500	"	"	"	"	"	"	I-06
Ethylbenzene	1.19	0.0500	"	"	"	"	"	"	
Xylenes (total)	2.01	0.100	"	"	"	"	"	"	I-06
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-02
Surrogate: 4-BFB (PID)	129 %	64-125			"	"	"	"	S-04
01 MW 29-20 (B2L0046-12) Soil Sampled: 12/03/02 14:00 Received: 12/03/02 17:52									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L09029	12/09/02	12/10/02	NWTPH-Gx/8021B	
Benzene	0.289	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	86.7 %	59-125			"	"	"	"	
Surrogate: 4-BFB (PID)	97.0 %	64-125			"	"	"	"	

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Foster Wheeler Environmental Corporation
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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR01-5 (B2L0046-13) Soil Sampled: 12/03/02 15:10 Received: 12/03/02 17:52									
Gasoline Range Hydrocarbons	251	20.0	mg/kg dry	4	2L09029	12/09/02	12/10/02	NWTPH-Gx/8021B	G-01
Benzene	0.129	0.120	"	"	"	"	"	"	
Toluene	ND	0.200	"	"	"	"	"	"	
Ethylbenzene	0.545	0.200	"	"	"	"	"	"	
Xylenes (total)	0.502	0.400	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-02
Surrogate: 4-BFB (PID)	140 %	64-125			"	"	"	"	S-04
LR01-10 (B2L0046-14) Soil Sampled: 12/03/02 15:15 Received: 12/03/02 17:52									
Gasoline Range Hydrocarbons	178	5.00	mg/kg dry	1	2L09029	12/09/02	12/10/02	NWTPH-Gx/8021B	G-01
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	0.742	0.0500	"	"	"	"	"	"	
Xylenes (total)	1.44	0.100	"	"	"	"	"	"	I-0
Surrogate: 4-BFB (FID)	192 %	59-125			"	"	"	"	S-04
Surrogate: 4-BFB (PID)	121 %	64-125			"	"	"	"	
LR01-15 (B2L0046-15) Soil Sampled: 12/03/02 15:30 Received: 12/03/02 17:52									
Gasoline Range Hydrocarbons	1420	50.0	mg/kg dry	10	2L09029	12/09/02	12/10/02	NWTPH-Gx/8021B	G-01
Benzene	0.885	0.300	"	"	"	"	"	"	
Toluene	5.80	0.500	"	"	"	"	"	"	
Ethylbenzene	6.91	0.500	"	"	"	"	"	"	
Xylenes (total)	21.9	1.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-01
Surrogate: 4-BFB (PID)	%	64-125			"	"	"	"	S-01

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 13:03
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Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR01-20 (B2L0046-16) Soil Sampled: 12/03/02 15:40 Received: 12/03/02 17:52									
Gasoline Range Hydrocarbons	5.01	5.00	mg/kg dry	1	2L09029	12/09/02	12/10/02	NWTPH-Gx/8021B	
Benzene	1.40	0.0300	"	"	"	"	"	"	
Toluene	0.0509	0.0500	"	"	"	"	"	"	
Ethylbenzene	0.0837	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	85.2 %	59-125			"	"	"	"	
Surrogate: 4-BFB (PID)	91.4 %	64-125			"	"	"	"	

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 13:03
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Volatile Petroleum Hydrocarbons by WDOE TPH Policy Method
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01 MW 24-5 (B2L0046-01) Soil Sampled: 12/03/02 08:30 Received: 12/03/02 17:52									
C5-C6 Aliphatics	ND	25.0	mg/kg dry	5	2L12002	12/12/02	12/12/02	WA MTCA-VPH	
C6-C8 Aliphatics	46.1	25.0	"	"	"	"	"	"	
C8-C10 Aliphatics	97.7	25.0	"	"	"	"	"	"	
C10-C12 Aliphatics	138	25.0	"	"	"	"	"	"	
C8-C10 Aromatics	85.9	25.0	"	"	"	"	"	"	
C10-C12 Aromatics	157	25.0	"	"	"	"	"	"	
C12-C13 Aromatics	217	25.0	"	"	"	"	"	"	
Total VPH (TVPH)	742	25.0	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	60-140			"	"	"	"	S-02
Surrogate: 4-BFB (PID)	134 %	60-140			"	"	"	"	

01 MW 29-5 (B2L0046-09) Soil Sampled: 12/03/02 13:30 Received: 12/03/02 17:52									
C5-C6 Aliphatics	ND	5.00	mg/kg dry	1	2L12002	12/12/02	12/12/02	WA MTCA-VPH	
C6-C8 Aliphatics	ND	5.00	"	"	"	"	"	"	
C8-C10 Aliphatics	ND	5.00	"	"	"	"	"	"	
C10-C12 Aliphatics	7.99	5.00	"	"	"	"	"	"	
C8-C10 Aromatics	ND	5.00	"	"	"	"	"	"	
C10-C12 Aromatics	9.35	5.00	"	"	"	"	"	"	
C12-C13 Aromatics	15.5	5.00	"	"	"	"	"	"	
Total VPH (TVPH)	32.9	5.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	113 %	60-140			"	"	"	"	
Surrogate: 4-BFB (PID)	88.4 %	60-140			"	"	"	"	

LR01-5 (B2L0046-13) Soil Sampled: 12/03/02 15:10 Received: 12/03/02 17:52									
C5-C6 Aliphatics	ND	50.0	mg/kg dry	10	2L12002	12/12/02	12/12/02	WA MTCA-VPH	
C6-C8 Aliphatics	94.9	50.0	"	"	"	"	"	"	
C8-C10 Aliphatics	145	50.0	"	"	"	"	"	"	
C10-C12 Aliphatics	258	50.0	"	"	"	"	"	"	
C8-C10 Aromatics	123	50.0	"	"	"	"	"	"	
C10-C12 Aromatics	490	50.0	"	"	"	"	"	"	
C12-C13 Aromatics	939	50.0	"	"	"	"	"	"	
Total VPH (TVPH)	2050	50.0	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	60-140			"	"	"	"	S-01
Surrogate: 4-BFB (PID)	%	60-140			"	"	"	"	S-01

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01 MW 24-5 (B2L0046-01) Soil Sampled: 12/03/02 08:30 Received: 12/03/02 17:52									
Diesel Range Hydrocarbons	3000	100	mg/kg dry	10	2L05037	12/05/02	12/07/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	149	25.0	"	1	"	"	12/06/02	"	D-10
Surrogate: 2-FBP	85.5 %	42-110			"	"	12/07/02	"	
Surrogate: Octacosane	68.9 %	57-123			"	"	12/06/02	"	
01 MW 24-10 (B2L0046-02) Soil Sampled: 12/03/02 08:40 Received: 12/03/02 17:52									
Diesel Range Hydrocarbons	419	20.0	mg/kg dry	2	2L05037	12/05/02	12/07/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	1	"	"	12/07/02	"	
Surrogate: 2-FBP	84.8 %	42-110			"	"	12/07/02	"	
Surrogate: Octacosane	81.8 %	57-123			"	"	12/07/02	"	
01 MW 24-15 (B2L0046-03) Soil Sampled: 12/03/02 08:50 Received: 12/03/02 17:52									
Diesel Range Hydrocarbons	11.8	10.0	mg/kg dry	1	2L05037	12/05/02	12/07/02	NWTPH-Dx	
Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	64.5 %	42-110			"	"	"	"	
Surrogate: Octacosane	75.0 %	57-123			"	"	"	"	
01 MW 24-20 (B2L0046-04) Soil Sampled: 12/03/02 09:05 Received: 12/03/02 17:52									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L06029	12/06/02	12/09/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	54.3 %	42-110			"	"	"	"	
Surrogate: Octacosane	64.2 %	57-123			"	"	"	"	
01 MW 25-5 (B2L0046-05) Soil Sampled: 12/03/02 10:55 Received: 12/03/02 17:52									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L06029	12/06/02	12/09/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	64.7 %	42-110			"	"	"	"	
Surrogate: Octacosane	75.3 %	57-123			"	"	"	"	

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 13:03
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**Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01 MW 25-10 (B2L0046-06) Soil Sampled: 12/03/02 11:05 Received: 12/03/02 17:52									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L06029	12/06/02	12/09/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	56.7 %	42-110			"	"	"	"	
Surrogate: Octacosane	67.7 %	57-123			"	"	"	"	
01 MW 25-15 (B2L0046-07) Soil Sampled: 12/03/02 11:20 Received: 12/03/02 17:52									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L06029	12/06/02	12/09/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	76.9 %	42-110			"	"	"	"	
Surrogate: Octacosane	86.6 %	57-123			"	"	"	"	
01 MW 25-18 (B2L0046-08) Soil Sampled: 12/03/02 11:30 Received: 12/03/02 17:52									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L06029	12/06/02	12/09/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	58.9 %	42-110			"	"	"	"	
Surrogate: Octacosane	68.2 %	57-123			"	"	"	"	
01 MW 29-5 (B2L0046-09) Soil Sampled: 12/03/02 13:30 Received: 12/03/02 17:52									
Diesel Range Hydrocarbons	50.0	10.0	mg/kg dry	1	2L06029	12/06/02	12/09/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	57.3 %	42-110			"	"	"	"	
Surrogate: Octacosane	62.3 %	57-123			"	"	"	"	
01 MW 29-10 (B2L0046-10) Soil Sampled: 12/03/02 13:40 Received: 12/03/02 17:52									
Diesel Range Hydrocarbons	75.2	10.0	mg/kg dry	1	2L06029	12/06/02	12/09/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	55.3 %	42-110			"	"	"	"	
Surrogate: Octacosane	60.9 %	57-123			"	"	"	"	

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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01 MW 29-15 (B2L0046-11) Soil Sampled: 12/03/02 13:50 Received: 12/03/02 17:52									
Diesel Range Hydrocarbons	312	10.0	mg/kg dry	1	2L06029	12/06/02	12/09/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	85.0 %	42-110			"	"	"	"	
Surrogate: Octacosane	73.3 %	57-123			"	"	"	"	
01 MW 29-20 (B2L0046-12) Soil Sampled: 12/03/02 14:00 Received: 12/03/02 17:52									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L06029	12/06/02	12/09/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	68.0 %	42-110			"	"	"	"	
Surrogate: Octacosane	76.3 %	57-123			"	"	"	"	
LR01-5 (B2L0046-13) Soil Sampled: 12/03/02 15:10 Received: 12/03/02 17:52									
Diesel Range Hydrocarbons	7440	400	mg/kg dry	40	2L06029	12/06/02	12/09/02	NWTPH-Dx	
Oil Range Hydrocarbons	ND	1000	"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110			"	"	"	"	S-01
Surrogate: Octacosane	78.8 %	57-123			"	"	"	"	
LR01-10 (B2L0046-14) Soil Sampled: 12/03/02 15:15 Received: 12/03/02 17:52									
Diesel Range Hydrocarbons	2670	100	mg/kg dry	10	2L06029	12/06/02	12/09/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	250	"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110			"	"	"	"	S-01
Surrogate: Octacosane	79.4 %	57-123			"	"	"	"	
LR01-15 (B2L0046-15) Soil Sampled: 12/03/02 15:30 Received: 12/03/02 17:52									
Diesel Range Hydrocarbons	13500	1000	mg/kg dry	100	2L06029	12/06/02	12/09/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	2500	"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110			"	"	"	"	S-01
Surrogate: Octacosane	%	57-123			"	"	"	"	S-01

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
North Creek Analytical - Bothell

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
LR01-20 (B2L0046-16) Soil Sampled: 12/03/02 15:40 Received: 12/03/02 17:52										
Diesel Range Hydrocarbons	ND	10.0		mg/kg dry	1	2L06029	12/06/02	12/09/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0		"	"	"	"	"	"	
<i>Surrogate: 2-FBP</i>	54.4 %	42-110				"	"	"	"	
<i>Surrogate: Octacosane</i>	58.8 %	57-123				"	"	"	"	

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 12100 NE 195th St
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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01 MW 24-5 (B2L0046-01) Soil Sampled: 12/03/02 08:30 Received: 12/03/02 17:52									
C8-C10 Aliphatics	60.0	5.00	mg/kg dry	1	2L10030	12/10/02	12/12/02	WA MTCA-EPH	
C10-C12 Aliphatics	168	5.00	"	"	"	"	"	"	
C12-C16 Aliphatics	512	5.00	"	"	"	"	"	"	
C16-C21 Aliphatics	284	5.00	"	"	"	"	"	"	
C21-C34 Aliphatics	63.9	5.00	"	"	"	"	"	"	
C10-C12 Aromatics	42.3	5.00	"	"	"	"	12/13/02	"	
C12-C16 Aromatics	153	5.00	"	"	"	"	"	"	
C16-C21 Aromatics	178	5.00	"	"	"	"	"	"	
C21-C34 Aromatics	20.6	5.00	"	"	"	"	"	"	
Extractable Petroleum Hydrocarbons	1480	5.00	"	"	"	"	12/12/02	"	
Surrogate: 2-FBP	97.6 %	50-150			"	"	12/13/02	"	
Surrogate: Octacosane	92.7 %	50-150			"	"	12/12/02	"	
Surrogate: Undecane	141 %	30-150			"	"	"	"	
01 MW 29-5 (B2L0046-09) Soil Sampled: 12/03/02 13:30 Received: 12/03/02 17:52									
C8-C10 Aliphatics	7.55	5.00	mg/kg dry	1	2L10030	12/10/02	12/13/02	WA MTCA-EPH	
C10-C12 Aliphatics	22.3	5.00	"	"	"	"	"	"	
C12-C16 Aliphatics	49.8	5.00	"	"	"	"	"	"	
C16-C21 Aliphatics	24.3	5.00	"	"	"	"	"	"	
C21-C34 Aliphatics	ND	5.00	"	"	"	"	"	"	
C10-C12 Aromatics	5.87	5.00	"	"	"	"	12/13/02	"	
C12-C16 Aromatics	26.4	5.00	"	"	"	"	"	"	
C16-C21 Aromatics	23.1	5.00	"	"	"	"	"	"	
C21-C34 Aromatics	ND	5.00	"	"	"	"	"	"	
Extractable Petroleum Hydrocarbons	159	5.00	"	"	"	"	12/13/02	"	
Surrogate: 2-FBP	78.4 %	50-150			"	"	12/13/02	"	
Surrogate: Octacosane	90.4 %	50-150			"	"	12/13/02	"	
Surrogate: Undecane	64.5 %	30-150			"	"	"	"	

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Foster Wheeler Environmental Corporation
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 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR01-5 (B2L0046-13) Soil Sampled: 12/03/02 15:10 Received: 12/03/02 17:52									
C8-C10 Aliphatics	105	50.0	mg/kg dry	10	2L10030	12/10/02	12/13/02	WA MTCA-EPH	
C10-C12 Aliphatics	400	50.0	"	"	"	"	"	"	
C12-C16 Aliphatics	1460	50.0	"	"	"	"	"	"	
C16-C21 Aliphatics	924	50.0	"	"	"	"	"	"	
C21-C34 Aliphatics	ND	50.0	"	"	"	"	"	"	
C10-C12 Aromatics	165	50.0	"	"	"	"	12/15/02	"	
C12-C16 Aromatics	1140	50.0	"	"	"	"	"	"	
C16-C21 Aromatics	1540	50.0	"	"	"	"	"	"	
C21-C34 Aromatics	ND	50.0	"	"	"	"	"	"	
Extractable Petroleum Hydrocarbons	5730	50.0	"	"	"	"	12/13/02	"	
Surrogate: 2-FBP	106 %	50-150			"	"	12/15/02	"	
Surrogate: Octacosane	73.2 %	50-150			"	"	12/13/02	"	
Surrogate: Undecane	%	30-150			"	"	"	"	S-01

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Polynuclear Aromatic Hydrocarbons by GC/MS-SIM
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01 MW 24-5 (B2L0046-01) Soil Sampled: 12/03/02 08:30 Received: 12/03/02 17:52									
Acenaphthene	ND	0.0100	mg/kg dry	1	2L10030	12/10/02	12/12/02	8270-SIM	
Acenaphthylene	ND	0.0100	"	"	"	"	"	"	
Anthracene	0.243	0.0100	"	"	"	"	"	"	
Benzo (a) anthracene	0.0123	0.0100	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.0100	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.0100	"	"	"	"	"	"	
Benzo (ghi) perylene	ND	0.0100	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.0100	"	"	"	"	"	"	
Chrysene	0.0336	0.0100	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.0100	"	"	"	"	"	"	
Fluoranthene	0.0312	0.0100	"	"	"	"	"	"	
Fluorene	0.522	0.0100	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.0100	"	"	"	"	"	"	
1-Methylnaphthalene	5.78	0.200	"	20	"	"	12/16/02	"	
2-Methylnaphthalene	10.4	0.200	"	"	"	"	"	"	
Naphthalene	2.79	0.200	"	"	"	"	"	"	
Phenanthrene	0.847	0.0100	"	1	"	"	12/12/02	"	
Pyrene	0.107	0.0100	"	"	"	"	"	"	
Surrogate: p-Terphenyl-d14	96.6 %	42-141			"	"	"	"	

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 13:03
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**Total Metals by EPA 6000/7000 Series Methods
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01 MW 24-5 (B2L0046-01) Soil Sampled: 12/03/02 08:30 Received: 12/03/02 17:52									
Lead	13.9	0.500	mg/kg dry	1	2L06020	12/06/02	12/09/02	EPA 6020	
01 MW 24-10 (B2L0046-02) Soil Sampled: 12/03/02 08:40 Received: 12/03/02 17:52									
Lead	3.44	0.500	mg/kg dry	1	2L06020	12/06/02	12/09/02	EPA 6020	
01 MW 24-15 (B2L0046-03) Soil Sampled: 12/03/02 08:50 Received: 12/03/02 17:52									
Lead	2.82	0.500	mg/kg dry	1	2L06020	12/06/02	12/09/02	EPA 6020	
01 MW 24-20 (B2L0046-04) Soil Sampled: 12/03/02 09:05 Received: 12/03/02 17:52									
Lead	5.36	0.500	mg/kg dry	1	2L06020	12/06/02	12/09/02	EPA 6020	
01 MW 25-5 (B2L0046-05) Soil Sampled: 12/03/02 10:55 Received: 12/03/02 17:52									
Lead	2.98	0.500	mg/kg dry	1	2L06020	12/06/02	12/09/02	EPA 6020	
01 MW 25-10 (B2L0046-06) Soil Sampled: 12/03/02 11:05 Received: 12/03/02 17:52									
Lead	5.89	0.500	mg/kg dry	1	2L06020	12/06/02	12/09/02	EPA 6020	
01 MW 25-15 (B2L0046-07) Soil Sampled: 12/03/02 11:20 Received: 12/03/02 17:52									
Lead	1.92	0.500	mg/kg dry	1	2L06020	12/06/02	12/09/02	EPA 6020	
01 MW 25-18 (B2L0046-08) Soil Sampled: 12/03/02 11:30 Received: 12/03/02 17:52									
Lead	5.60	0.500	mg/kg dry	1	2L06020	12/06/02	12/09/02	EPA 6020	
01 MW 29-5 (B2L0046-09) Soil Sampled: 12/03/02 13:30 Received: 12/03/02 17:52									
Lead	6.62	0.500	mg/kg dry	1	2L06020	12/06/02	12/09/02	EPA 6020	

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 13:03
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**Total Metals by EPA 6000/7000 Series Methods
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01 MW 29-10 (B2L0046-10) Soil Sampled: 12/03/02 13:40 Received: 12/03/02 17:52									
Lead	2.30	0.500	mg/kg dry	1	2L06020	12/06/02	12/09/02	EPA 6020	
01 MW 29-15 (B2L0046-11) Soil Sampled: 12/03/02 13:50 Received: 12/03/02 17:52									
Lead	2.43	0.500	mg/kg dry	1	2L06020	12/06/02	12/10/02	EPA 6020	
01 MW 29-20 (B2L0046-12) Soil Sampled: 12/03/02 14:00 Received: 12/03/02 17:52									
Lead	5.65	0.556	mg/kg dry	1	2L06020	12/06/02	12/10/02	EPA 6020	
LR01-5 (B2L0046-13) Soil Sampled: 12/03/02 15:10 Received: 12/03/02 17:52									
Lead	3.52	0.500	mg/kg dry	1	2L06020	12/06/02	12/10/02	EPA 6020	
LR01-10 (B2L0046-14) Soil Sampled: 12/03/02 15:15 Received: 12/03/02 17:52									
Lead	2.30	0.500	mg/kg dry	1	2L06020	12/06/02	12/10/02	EPA 6020	
LR01-15 (B2L0046-15) Soil Sampled: 12/03/02 15:30 Received: 12/03/02 17:52									
Lead	6.93	0.500	mg/kg dry	1	2L06020	12/06/02	12/10/02	EPA 6020	
LR01-20 (B2L0046-16) Soil Sampled: 12/03/02 15:40 Received: 12/03/02 17:52									
Lead	4.81	0.500	mg/kg dry	1	2L06020	12/06/02	12/10/02	EPA 6020	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 13:03
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**BTEX, MTBE, Naphthalene, and n-Hexane by WA VPH
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01 MW 24-5 (B2L0046-01) Soil Sampled: 12/03/02 08:30 Received: 12/03/02 17:52									
Methyl tert-butyl ether	ND	0.100	mg/kg dry	1	2L05020	12/05/02	12/06/02	EPA 8260B	
Benzene	0.495	0.0100	"	"	"	"	"	"	
Toluene	0.0358	0.0100	"	"	"	"	"	"	
Ethylbenzene	1.95	0.0100	"	"	"	"	"	"	
m,p-Xylene	2.84	0.0200	"	"	"	"	"	"	
o-Xylene	2.22	0.0100	"	"	"	"	"	"	
Naphthalene	1.86	0.0100	"	"	"	"	"	"	
n-Hexane	3.37	0.0200	"	"	"	"	"	"	
Surrogate: 1,2-DCA-d4	96.7 %	57-139			"	"	"	"	
Surrogate: Toluene-d8	86.6 %	66-122			"	"	"	"	
Surrogate: 4-BFB	85.8 %	62-121			"	"	"	"	

01 MW 29-5 (B2L0046-09) Soil Sampled: 12/03/02 13:30 Received: 12/03/02 17:52									
Methyl tert-butyl ether	ND	0.100	mg/kg dry	1	2L05020	12/05/02	12/06/02	EPA 8260B	
Benzene	ND	0.0100	"	"	"	"	"	"	
Toluene	ND	0.0100	"	"	"	"	"	"	
Ethylbenzene	0.398	0.0100	"	"	"	"	"	"	
m,p-Xylene	ND	0.0200	"	"	"	"	"	"	
o-Xylene	ND	0.0100	"	"	"	"	"	"	
Naphthalene	0.104	0.0100	"	"	"	"	"	"	
n-Hexane	0.105	0.0200	"	"	"	"	"	"	
Surrogate: 1,2-DCA-d4	95.8 %	57-139			"	"	"	"	
Surrogate: Toluene-d8	86.2 %	66-122			"	"	"	"	
Surrogate: 4-BFB	82.2 %	62-121			"	"	"	"	

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

BTEX, MTBE, Naphthalene, and n-Hexane by WA VPH
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR01-5 (B2L0046-13) Soil Sampled: 12/03/02 15:10 Received: 12/03/02 17:52									
Methyl tert-butyl ether	ND	0.100	mg/kg dry	1	2L05020	12/05/02	12/06/02	EPA 8260B	
Benzene	0.390	0.0100	"	"	"	"	"	"	
Toluene	ND	0.0100	"	"	"	"	"	"	
Ethylbenzene	ND	0.0100	"	"	"	"	"	"	
m,p-Xylene	ND	0.0200	"	"	"	"	"	"	
o-Xylene	ND	0.0100	"	"	"	"	"	"	
Naphthalene	ND	0.0100	"	"	"	"	"	"	
n-Hexane	3.39	0.0200	"	"	"	"	"	"	
Surrogate: 1,2-DCA-d4	98.4 %	57-139			"	"	"	"	
Surrogate: Toluene-d8	86.3 %	66-122			"	"	"	"	
Surrogate: 4-BFB	85.9 %	62-121			"	"	"	"	

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Physical Parameters by APHA/ASTM/EPA Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01 MW 24-5 (B2L0046-01) Soil Sampled: 12/03/02 08:30 Received: 12/03/02 17:52									
Dry Weight	81.2	1.00	%	1	2L09021	12/09/02	12/10/02	BSOPSPL003R07	
01 MW 24-10 (B2L0046-02) Soil Sampled: 12/03/02 08:40 Received: 12/03/02 17:52									
Dry Weight	80.4	1.00	%	1	2L09021	12/09/02	12/10/02	BSOPSPL003R07	
01 MW 24-15 (B2L0046-03) Soil Sampled: 12/03/02 08:50 Received: 12/03/02 17:52									
Dry Weight	82.6	1.00	%	1	2L09021	12/09/02	12/10/02	BSOPSPL003R07	
01 MW 24-20 (B2L0046-04) Soil Sampled: 12/03/02 09:05 Received: 12/03/02 17:52									
Dry Weight	81.6	1.00	%	1	2L09021	12/09/02	12/10/02	BSOPSPL003R07	
01 MW 25-5 (B2L0046-05) Soil Sampled: 12/03/02 10:55 Received: 12/03/02 17:52									
Dry Weight	80.4	1.00	%	1	2L09021	12/09/02	12/10/02	BSOPSPL003R07	
01 MW 25-10 (B2L0046-06) Soil Sampled: 12/03/02 11:05 Received: 12/03/02 17:52									
Dry Weight	81.4	1.00	%	1	2L09021	12/09/02	12/10/02	BSOPSPL003R07	
01 MW 25-15 (B2L0046-07) Soil Sampled: 12/03/02 11:20 Received: 12/03/02 17:52									
Dry Weight	79.3	1.00	%	1	2L09021	12/09/02	12/10/02	BSOPSPL003R07	
01 MW 25-18 (B2L0046-08) Soil Sampled: 12/03/02 11:30 Received: 12/03/02 17:52									
Dry Weight	80.7	1.00	%	1	2L09021	12/09/02	12/10/02	BSOPSPL003R07	
01 MW 29-5 (B2L0046-09) Soil Sampled: 12/03/02 13:30 Received: 12/03/02 17:52									
Dry Weight	80.2	1.00	%	1	2L09021	12/09/02	12/10/02	BSOPSPL003R07	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Physical Parameters by APHA/ASTM/EPA Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01 MW 29-10 (B2L0046-10) Soil Sampled: 12/03/02 13:40 Received: 12/03/02 17:52									
Dry Weight	91.6	1.00	%	1	2L09021	12/09/02	12/10/02	BSOPSPL003R07	
01 MW 29-15 (B2L0046-11) Soil Sampled: 12/03/02 13:50 Received: 12/03/02 17:52									
Dry Weight	83.2	1.00	%	1	2L09021	12/09/02	12/10/02	BSOPSPL003R07	
01 MW 29-20 (B2L0046-12) Soil Sampled: 12/03/02 14:00 Received: 12/03/02 17:52									
Dry Weight	80.8	1.00	%	1	2L09021	12/09/02	12/10/02	BSOPSPL003R07	
LR01-5 (B2L0046-13) Soil Sampled: 12/03/02 15:10 Received: 12/03/02 17:52									
Dry Weight	81.6	1.00	%	1	2L09021	12/09/02	12/10/02	BSOPSPL003R07	
LR01-10 (B2L0046-14) Soil Sampled: 12/03/02 15:15 Received: 12/03/02 17:52									
Dry Weight	91.5	1.00	%	1	2L09021	12/09/02	12/10/02	BSOPSPL003R07	
LR01-15 (B2L0046-15) Soil Sampled: 12/03/02 15:30 Received: 12/03/02 17:52									
Dry Weight	83.9	1.00	%	1	2L09022	12/09/02	12/10/02	BSOPSPL003R07	
LR01-20 (B2L0046-16) Soil Sampled: 12/03/02 15:40 Received: 12/03/02 17:52									
Dry Weight	83.4	1.00	%	1	2L09022	12/09/02	12/10/02	BSOPSPL003R07	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L09029: Prepared 12/09/02 Using EPA 5030B (P/T)

Blank (2L09029-BLK1)

Gasoline Range Hydrocarbons	ND	5.00	mg/kg							
Benzene	ND	0.0300	"							
Toluene	ND	0.0500	"							
Ethylbenzene	ND	0.0500	"							
Xylenes (total)	ND	0.100	"							
Surrogate: 4-BFB (FID)	3.81		"	4.00		95.2	59-125			
Surrogate: 4-BFB (PID)	4.17		"	4.00		104	64-125			

LCS (2L09029-BS1)

Gasoline Range Hydrocarbons	27.6	5.00	mg/kg	27.5		100	80-120			
Benzene	0.386	0.0300	"	0.340		114	80-120			
Toluene	2.01	0.0500	"	2.08		96.6	80-120			
Ethylbenzene	0.511	0.0500	"	0.490		104	80-120			
Xylenes (total)	2.52	0.100	"	2.41		105	80-120			
Surrogate: 4-BFB (FID)	3.98		"	4.00		99.5	59-125			
Surrogate: 4-BFB (PID)	3.91		"	4.00		97.8	64-125			

LCS Dup (2L09029-BSD1)

Gasoline Range Hydrocarbons	27.7	5.00	mg/kg	27.5		101	80-120	0.362	40	
Benzene	0.387	0.0300	"	0.340		114	80-120	0.259	40	
Toluene	2.01	0.0500	"	2.08		96.6	80-120	0.00	40	
Ethylbenzene	0.512	0.0500	"	0.490		104	80-120	0.196	40	
Xylenes (total)	2.52	0.100	"	2.41		105	80-120	0.00	40	
Surrogate: 4-BFB (FID)	4.05		"	4.00		101	59-125			
Surrogate: 4-BFB (PID)	3.94		"	4.00		98.5	64-125			

Matrix Spike (2L09029-MS1)

Source: B2L0046-10

Gasoline Range Hydrocarbons	257	5.00	mg/kg dry	30.0	122	450	53-120			Q-02
Benzene	0.454	0.0300	"	0.371	0.0197	117	71-119			
Toluene	2.11	0.0500	"	2.28	0.0201	91.7	57-108			
Ethylbenzene	1.19	0.0500	"	0.535	0.310	164	72-114			Q-02
Xylenes (total)	4.84	0.100	"	2.63	1.10	142	68-112			Q-02
Surrogate: 4-BFB (FID)	ND		"	4.37			59-125			S-02
Surrogate: 4-BFB (PID)	5.81		"	4.37		133	64-125			S-04

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 13:03
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**Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B - Quality Control
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L09029: Prepared 12/09/02 Using EPA 5030B (P/T)

Matrix Spike Dup (2L09029-MSD1)

Source: B2L0046-10

Gasoline Range Hydrocarbons	179	5.00	mg/kg dry	30.0	122	190	53-120	35.8	40	Q-02
Benzene	0.399	0.0300	"	0.371	0.0197	102	71-119	12.9	40	
Toluene	2.05	0.0500	"	2.28	0.0201	89.0	57-108	2.88	40	
Ethylbenzene	0.936	0.0500	"	0.535	0.310	117	72-114	23.9	40	Q-02
Xylenes (total)	3.95	0.100	"	2.63	1.10	108	68-112	20.3	40	
Surrogate: 4-BFB (FID)	8.37		"	4.37		192	59-125			S-04
Surrogate: 4-BFB (PID)	5.41		"	4.37		124	64-125			

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Volatile Petroleum Hydrocarbons by WDOE TPH Policy Method - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L12002: Prepared 12/12/02 Using EPA 5030B (P/T)

Blank (2L12002-BLK1)

C5-C6 Aliphatics	ND	5.00	mg/kg							
C6-C8 Aliphatics	ND	5.00	"							
C8-C10 Aliphatics	ND	5.00	"							
C10-C12 Aliphatics	ND	5.00	"							
C8-C10 Aromatics	ND	5.00	"							
C10-C12 Aromatics	ND	5.00	"							
C12-C13 Aromatics	ND	5.00	"							
Total VPH (TVPH)	ND	5.00	"							
Surrogate: 4-BFB (FID)	4.24		"	4.00		106	60-140			
Surrogate: 4-BFB (PID)	3.70		"	4.00		92.5	60-140			

LCS (2L12002-BS1)

Total VPH (TVPH)	11.3	5.00	mg/kg	10.0		113	70-130			
Surrogate: 4-BFB (FID)	4.86		"	4.00		122	60-140			
Surrogate: 4-BFB (PID)	3.93		"	4.00		98.2	60-140			

LCS Dup (2L12002-BSD1)

Total VPH (TVPH)	11.0	5.00	mg/kg	10.0		110	70-130	2.69	25	
Surrogate: 4-BFB (FID)	3.33		"	4.00		83.2	60-140			
Surrogate: 4-BFB (PID)	3.02		"	4.00		75.5	60-140			

Matrix Spike (2L12002-MS1)

Source: B2L0158-09

Total VPH (TVPH)	17.9	5.00	mg/kg dry	13.4	0.00	134	70-130			Q-01
Surrogate: 4-BFB (FID)	5.26		"	5.36		98.1	60-140			
Surrogate: 4-BFB (PID)	4.88		"	5.36		91.0	60-140			

Matrix Spike Dup (2L12002-MSD1)

Source: B2L0158-09

Total VPH (TVPH)	14.7	5.00	mg/kg dry	13.4	0.00	110	70-130	19.6	25	
Surrogate: 4-BFB (FID)	5.13		"	5.36		95.7	60-140			
Surrogate: 4-BFB (PID)	5.01		"	5.36		93.5	60-140			

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L05037: Prepared 12/05/02 Using EPA 3550B

Blank (2L05037-BLK1)

Diesel Range Hydrocarbons	ND	10.0	mg/kg							
Lube Oil Range Hydrocarbons	ND	25.0	"							
Surrogate: 2-FBP	7.66		"	10.7		71.6	42-110			
Surrogate: Octacosane	8.18		"	10.7		76.4	57-123			

LCS (2L05037-BS1)

Diesel Range Hydrocarbons	56.8	10.0	mg/kg	66.7		85.2	59-109			
Surrogate: 2-FBP	8.45		"	10.7		79.0	42-110			

LCS Dup (2L05037-BSD1)

Diesel Range Hydrocarbons	66.0	10.0	mg/kg	66.7		99.0	59-109	15.0	50	
Surrogate: 2-FBP	10.2		"	10.7		95.3	42-110			

Duplicate (2L05037-DUP1)

Source: B2L0025-02

Diesel Range Hydrocarbons	ND	10.0	mg/kg dry		4.68			1.29	50	
Lube Oil Range Hydrocarbons	ND	25.0	"		ND			NA	50	
Surrogate: 2-FBP	8.45		"	12.9		65.5	42-110			
Surrogate: Octacosane	9.56		"	12.9		74.1	57-123			

Batch 2L06029: Prepared 12/06/02 Using EPA 3550B

Blank (2L06029-BLK1)

Diesel Range Hydrocarbons	ND	10.0	mg/kg							
Lube Oil Range Hydrocarbons	ND	25.0	"							
Surrogate: 2-FBP	6.70		"	10.7		62.6	42-110			
Surrogate: Octacosane	8.19		"	10.7		76.5	57-123			

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limits	RPD	RPD Limit	Notes
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Batch 2L06029: Prepared 12/06/02 Using EPA 3550B

LCS (2L06029-BS1)

Diesel Range Hydrocarbons	48.0	10.0	mg/kg	66.7		72.0	59-109			
Surrogate: 2-FBP	8.24		"	10.7		77.0	42-110			

LCS Dup (2L06029-BS1)

Diesel Range Hydrocarbons	43.0	10.0	mg/kg	66.7		64.5	59-109	11.0	50	
Surrogate: 2-FBP	7.00		"	10.7		65.4	42-110			

Duplicate (2L06029-DUP1)

Source: B2L0046-04

Diesel Range Hydrocarbons	ND	10.0	mg/kg dry		ND			NA	50	
Lube Oil Range Hydrocarbons	ND	25.0	"		ND			NA	50	
Surrogate: 2-FBP	8.01		"	12.9		62.1	42-110			
Surrogate: Octacosane	8.90		"	12.9		69.0	57-123			

North Creek Analytical - Bothell

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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	RPD	RPD	Notes
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Batch 2L10030: Prepared 12/10/02 Using EPA 3545

Blank (2L10030-BLK1)

C8-C10 Aliphatics	ND	5.00	mg/kg						
C10-C12 Aliphatics	ND	5.00	"						
C12-C16 Aliphatics	ND	5.00	"						
C16-C21 Aliphatics	ND	5.00	"						
C21-C34 Aliphatics	ND	5.00	"						
C10-C12 Aromatics	ND	5.00	"						
C12-C16 Aromatics	ND	5.00	"						
C16-C21 Aromatics	ND	5.00	"						
C21-C34 Aromatics	ND	5.00	"						
Extractable Petroleum Hydrocarbons	ND	5.00	"						
Surrogate: 2-FBP	10.7		"	13.4		79.9	50-150		
Surrogate: Octacosane	11.9		"	13.4		88.8	50-150		
Surrogate: Undecane	7.87		"	13.8		57.0	30-150		

LCS (2L10030-BS1)

Extractable Petroleum Hydrocarbons	111	5.00	mg/kg	167		66.5	30-120		
Surrogate: 2-FBP	10.7		"	13.4		79.9	50-150		
Surrogate: Octacosane	12.0		"	13.4		89.6	50-150		
Surrogate: Undecane	8.55		"	13.8		62.0	30-150		

LCS Dup (2L10030-BSD1)

Extractable Petroleum Hydrocarbons	115	5.00	mg/kg	167		68.9	30-120	3.54	40
Surrogate: 2-FBP	10.9		"	13.4		81.3	50-150		
Surrogate: Octacosane	12.7		"	13.4		94.8	50-150		
Surrogate: Undecane	8.78		"	13.8		63.6	30-150		

Matrix Spike (2L10030-MS1)

Source: B2L0025-01

Extractable Petroleum Hydrocarbons	132	5.00	mg/kg dry	208	0.00	63.5	30-120		
Surrogate: 2-FBP	11.4		"	16.7		68.3	50-150		
Surrogate: Octacosane	14.3		"	16.7		85.6	50-150		
Surrogate: Undecane	10.0		"	17.2		58.1	30-150		

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 13:03
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Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L10030: Prepared 12/10/02 Using EPA 3545

Matrix Spike Dup (2L10030-MSD1)

Source: B2L0025-01

Extractable Petroleum Hydrocarbons	105	5.00	mg/kg dry	208	0.00	50.5	30-120	22.8	40	
Surrogate: 2-FBP	11.1		"	16.7		66.5	50-150			
Surrogate: Octacosane	12.8		"	16.7		76.6	50-150			
Surrogate: Undecane	9.22		"	17.2		53.6	30-150			

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Page 28 of 36



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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
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Polynuclear Aromatic Hydrocarbons by GC/MS-SIM - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L10030: Prepared 12/10/02 Using EPA 3545

Blank (2L10030-BLK1)

Acenaphthene	ND	0.0100	mg/kg							
Acenaphthylene	ND	0.0100	"							
Anthracene	ND	0.0100	"							
Benzo (a) anthracene	ND	0.0100	"							
Benzo (a) pyrene	ND	0.0100	"							
Benzo (b) fluoranthene	ND	0.0100	"							
Benzo (ghi) perylene	ND	0.0100	"							
Benzo (k) fluoranthene	ND	0.0100	"							
Chrysene	ND	0.0100	"							
Dibenz (a,h) anthracene	ND	0.0100	"							
Fluoranthene	ND	0.0100	"							
Fluorene	ND	0.0100	"							
Indeno (1,2,3-cd) pyrene	ND	0.0100	"							
1-Methylnaphthalene	ND	0.0100	"							
2-Methylnaphthalene	ND	0.0100	"							
Naphthalene	ND	0.0100	"							
Phenanthrene	ND	0.0100	"							
Pyrene	ND	0.0100	"							
Surrogate: p-Terphenyl-d14	0.255		"	0.267		95.5	42-141			

LCS (2L10030-BS1)

Acenaphthene	0.242	0.0100	mg/kg	0.333		72.7	50-150			
Acenaphthylene	0.301	0.0100	"	0.333		90.4	50-150			
Anthracene	0.256	0.0100	"	0.333		76.9	50-150			
Benzo (a) anthracene	0.253	0.0100	"	0.333		76.0	50-150			
Benzo (a) pyrene	0.244	0.0100	"	0.333		73.3	50-150			
Benzo (b) fluoranthene	0.232	0.0100	"	0.333		69.7	50-150			
Benzo (ghi) perylene	0.236	0.0100	"	0.333		70.9	50-150			
Benzo (k) fluoranthene	0.241	0.0100	"	0.333		72.4	50-150			
Chrysene	0.289	0.0100	"	0.333		86.8	54-112			
Dibenz (a,h) anthracene	0.218	0.0100	"	0.333		65.5	50-150			
Fluoranthene	0.277	0.0100	"	0.333		83.2	50-150			
Fluorene	0.259	0.0100	"	0.333		77.8	51-107			
Indeno (1,2,3-cd) pyrene	0.238	0.0100	"	0.333		71.5	42-112			

North Creek Analytical - Bothell

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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
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Polynuclear Aromatic Hydrocarbons by GC/MS-SIM - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L10030: Prepared 12/10/02 Using EPA 3545

LCS (2L10030-BS1)

Naphthalene	0.241	0.0100	mg/kg	0.333		72.4	50-150			
Phenanthrene	0.263	0.0100	"	0.333		79.0	50-150			
Pyrene	0.254	0.0100	"	0.333		76.3	50-150			
Surrogate: p-Terphenyl-d14	0.237		"	0.267		88.8	42-141			

LCS Dup (2L10030-BSD1)

Acenaphthene	0.240	0.0100	mg/kg	0.333		72.1	50-150	0.830	25	
Acenaphthylene	0.293	0.0100	"	0.333		88.0	50-150	2.69	25	
Anthracene	0.268	0.0100	"	0.333		80.5	50-150	4.58	25	
Benzo (a) anthracene	0.276	0.0100	"	0.333		82.9	50-150	8.70	25	
Benzo (a) pyrene	0.256	0.0100	"	0.333		76.9	50-150	4.80	25	
Benzo (b) fluoranthene	0.197	0.0100	"	0.333		59.2	50-150	16.3	25	
Benzo (ghi) perylene	0.288	0.0100	"	0.333		86.5	50-150	19.8	25	
Benzo (k) fluoranthene	0.313	0.0100	"	0.333		94.0	50-150	26.0	25	Q-07
Chrysene	0.294	0.0100	"	0.333		88.3	54-112	1.72	37	
Dibenz (a,h) anthracene	0.267	0.0100	"	0.333		80.2	50-150	20.2	25	
Fluoranthene	0.330	0.0100	"	0.333		99.1	50-150	17.5	25	
Fluorene	0.259	0.0100	"	0.333		77.8	51-107	0.00	43	
Indeno (1,2,3-cd) pyrene	0.291	0.0100	"	0.333		87.4	42-112	20.0	32	
Naphthalene	0.249	0.0100	"	0.333		74.8	50-150	3.27	25	
Phenanthrene	0.295	0.0100	"	0.333		88.6	50-150	11.5	25	
Pyrene	0.322	0.0100	"	0.333		96.7	50-150	23.6	25	
Surrogate: p-Terphenyl-d14	0.250		"	0.267		93.6	42-141			

Source: B2L0025-01

Matrix Spike (2L10030-MS1)

Acenaphthene	0.270	0.0100	mg/kg dry	0.416	ND	64.9	50-150			
Acenaphthylene	0.330	0.0100	"	0.416	ND	79.3	50-150			
Anthracene	0.290	0.0100	"	0.416	ND	69.7	50-150			
Benzo (a) anthracene	0.273	0.0100	"	0.416	0.00166	65.2	50-150			
Benzo (a) pyrene	0.234	0.0100	"	0.416	ND	56.2	50-150			
Benzo (b) fluoranthene	0.182	0.0100	"	0.416	ND	43.8	50-150			Q-02
Benzo (ghi) perylene	0.262	0.0100	"	0.416	ND	63.0	50-150			
Benzo (k) fluoranthene	0.219	0.0100	"	0.416	ND	52.6	50-150			
Chrysene	0.280	0.0100	"	0.416	ND	67.3	29-143			

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
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Polynuclear Aromatic Hydrocarbons by GC/MS-SIM - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L10030: Prepared 12/10/02 Using EPA 3545

Matrix Spike (2L10030-MS1)

Source: B2L0025-01

Dibenz (a,h) anthracene	0.263	0.0100	mg/kg dry	0.416	ND	63.2	50-150			
Fluoranthene	0.286	0.0100	"	0.416	ND	68.8	50-150			
Fluorene	0.287	0.0100	"	0.416	ND	69.0	36-134			
Indeno (1,2,3-cd) pyrene	0.275	0.0100	"	0.416	ND	66.1	19-138			
Naphthalene	0.285	0.0100	"	0.416	0.00416	67.5	50-150			
Phenanthrene	0.303	0.0100	"	0.416	0.00416	71.8	50-150			
Pyrene	0.267	0.0100	"	0.416	ND	64.2	50-150			
Surrogate: p-Terphenyl-d14	0.269		"	0.333		80.8	42-141			

Matrix Spike Dup (2L10030-MSD1)

Source: B2L0025-01

Acenaphthene	0.235	0.0100	mg/kg dry	0.416	ND	56.5	50-150	13.9	25	
Acenaphthylene	0.298	0.0100	"	0.416	ND	71.6	50-150	10.2	25	
Acenaphthene	0.254	0.0100	"	0.416	ND	61.1	50-150	13.2	25	
Benzo (a) anthracene	0.250	0.0100	"	0.416	0.00166	59.7	50-150	8.80	25	
Benzo (a) pyrene	0.220	0.0100	"	0.416	ND	52.9	50-150	6.17	25	
Benzo (b) fluoranthene	0.174	0.0100	"	0.416	ND	41.8	50-150	4.49	25	Q-02
Benzo (ghi) perylene	0.227	0.0100	"	0.416	ND	54.6	50-150	14.3	25	
Benzo (k) fluoranthene	0.264	0.0100	"	0.416	ND	63.5	50-150	18.6	25	
Chrysene	0.255	0.0100	"	0.416	ND	61.3	29-143	9.35	44	
Dibenz (a,h) anthracene	0.226	0.0100	"	0.416	ND	54.3	50-150	15.1	25	
Fluoranthene	0.255	0.0100	"	0.416	ND	61.3	50-150	11.5	25	
Fluorene	0.259	0.0100	"	0.416	ND	62.3	36-134	10.3	52	
Indeno (1,2,3-cd) pyrene	0.240	0.0100	"	0.416	ND	57.7	19-138	13.6	43	
Naphthalene	0.253	0.0100	"	0.416	0.00416	59.8	50-150	11.9	25	
Phenanthrene	0.266	0.0100	"	0.416	0.00416	62.9	50-150	13.0	25	
Pyrene	0.250	0.0100	"	0.416	ND	60.1	50-150	6.58	25	
Surrogate: p-Terphenyl-d14	0.245		"	0.333		73.6	42-141			

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Total Metals by EPA 6000/7000 Series Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2L06020: Prepared 12/06/02 Using EPA 3050B										
Blank (2L06020-BLK1)										
Lead	ND	0.556	mg/kg							
LCS (2L06020-BS1)										
Lead	37.1	0.500	mg/kg	38.5		96.4	80-120			
LCS Dup (2L06020-BSD1)										
Lead	39.4	0.500	mg/kg	40.4		97.5	80-120	6.01	20	
Matrix Spike (2L06020-MS1) Source: B2L0046-01										
Lead	58.0	0.500	mg/kg dry	52.4	13.9	84.2	62-137			
Matrix Spike Dup (2L06020-MSD1) Source: B2L0046-01										
Lead	58.9	0.500	mg/kg dry	49.7	13.9	90.5	62-137	1.54	30	
Post Spike (2L06020-PS1) Source: B2L0046-01										
Lead	73.7	0.500	mg/kg dry	64.8	13.9	92.3	75-125			

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 13:03
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BTEX, MTBE, Naphthalene, and n-Hexane by WA VPH - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L05020: Prepared 12/05/02 Using EPA 5030B [MeOH]

Blank (2L05020-BLK1)

Methyl tert-butyl ether	ND	0.100	mg/kg							
Benzene	ND	0.0100	"							
Toluene	ND	0.0100	"							
Ethylbenzene	ND	0.0100	"							
m,p-Xylene	ND	0.0200	"							
o-Xylene	ND	0.0100	"							
Naphthalene	ND	0.0100	"							
n-Hexane	ND	0.0200	"							
Surrogate: 1,2-DCA-d4	3.94		"	4.00		98.5	57-139			
Surrogate: Toluene-d8	3.53		"	4.00		88.2	66-122			
Surrogate: 4-BFB	3.26		"	4.00		81.5	62-121			

Blank (2L05020-BLK2)

Methyl tert-butyl ether	ND	0.100	mg/kg							
Benzene	ND	0.0100	"							
Toluene	ND	0.0100	"							
Ethylbenzene	ND	0.0100	"							
m,p-Xylene	ND	0.0200	"							
o-Xylene	ND	0.0100	"							
Naphthalene	ND	0.0100	"							
n-Hexane	ND	0.0200	"							
Surrogate: 1,2-DCA-d4	4.16		"	4.00		104	57-139			
Surrogate: Toluene-d8	3.73		"	4.00		93.2	66-122			
Surrogate: 4-BFB	3.26		"	4.00		81.5	62-121			

LCS (2L05020-BS1)

Benzene	1.05	0.0100	mg/kg	1.00		105	73-133			
Toluene	0.986	0.0100	"	1.00		98.6	68-130			
Surrogate: 1,2-DCA-d4	4.62		"	4.00		116	57-139			
Surrogate: Toluene-d8	3.92		"	4.00		98.0	66-122			
Surrogate: 4-BFB	3.41		"	4.00		85.2	62-121			

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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

BTEX, MTBE, Naphthalene, and n-Hexane by WA VPH - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L05020: Prepared 12/05/02 Using EPA 5030B [MeOH]

LCS Dup (2L05020-BSD1)

Benzene	1.04	0.0100	mg/kg	1.00		104	73-133	0.957	20	
Toluene	0.983	0.0100	"	1.00		98.3	68-130	0.305	20	
Surrogate: 1,2-DCA-d4	4.63		"	4.00		116	57-139			
Surrogate: Toluene-d8	3.90		"	4.00		97.5	66-122			
Surrogate: 4-BFB	3.49		"	4.00		87.2	62-121			

Matrix Spike (2L05020-MS1)

Source: B2L0068-06

Benzene	1.07	0.0100	mg/kg dry	1.25	ND	85.6	62-138			
Toluene	1.10	0.0100	"	1.25	ND	88.0	44-133			
Surrogate: 1,2-DCA-d4	4.93		"	4.99		98.8	57-139			
Surrogate: Toluene-d8	4.34		"	4.99		87.0	66-122			
Surrogate: 4-BFB	3.92		"	4.99		78.6	62-121			

Matrix Spike Dup (2L05020-MSD1)

Source: B2L0068-06

Benzene	1.00	0.0100	mg/kg dry	1.25	ND	80.0	62-138	6.76	25	
Toluene	0.997	0.0100	"	1.25	ND	79.8	44-133	9.82	25	
Surrogate: 1,2-DCA-d4	4.84		"	4.99		97.0	57-139			
Surrogate: Toluene-d8	4.09		"	4.99		82.0	66-122			
Surrogate: 4-BFB	3.77		"	4.99		75.6	62-121			

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Reported: 12/17/02 13:03
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Physical Parameters by APHA/ASTM/EPA Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2L09021: Prepared 12/09/02 Using Dry Weight										
Blank (2L09021-BLK1)										
Dry Weight	99.9	1.00	%							
Batch 2L09022: Prepared 12/09/02 Using Dry Weight										
Blank (2L09022-BLK1)										
Dry Weight	100	1.00	%							

North Creek Analytical - Bothell

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Amar Gill, Project Manager

North Creek Analytical, Inc.
Environmental Laboratory Network



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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Reported:
 12/17/02 13:03

Notes and Definitions

- D-10 The heavy oil range organics present are due to hydrocarbons eluting primarily in the diesel range.
- G-01 Results reported for the gas range are primarily due to overlap from diesel range hydrocarbons.
- I-06 The analyte concentration may be artificially elevated due to coeluting compounds or components.
- Q-01 The spike recovery for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.
- Q-02 The spike recovery for this QC sample is outside of NCA established control limits due to sample matrix interference.
- Q-07 The RPD value for this QC sample is above the established control limit. Review of associated QC indicates the high RPD does not represent an out-of-control condition for the batch.
- S-01 The surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interferences.
- S-02 The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.
- S-04 The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

North Creek Analytical - Bothell

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Amar Gill, Project Manager



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CHAIN OF CUSTODY REPORT

Work Order #: **B2LD046**

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses
 10 7 5 4 3 2 1 <1

Petroleum Hydrocarbon Analyses
 10 7 5 4 3 2 1 <1

STD. OTHER Please Specify

INVOICE TO: **SAME AS LEFT**

P.O. NUMBER:

CLIENT: **TIME OIL COMPANY**

REPORT TO: **SCOTT SLOAN (cc BRANHAM FINEC)**

ADDRESS: **2737 W CUMMINGS NY SEATTLE WA 98199**

PHONE: **206 286 6457** FAX:

PROJECT NAME: **DPE EMI**

PROJECT NUMBER:

SAMPLED BY: **TSPELLE**

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	REQUESTED ANALYSES			MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WO ID
		NWPH.OX	TOTAL LEAD	NWPH (X)				
1. LR01-5	120302 1510	X	X	X	S	2	-13	
2. LR01-10	1515	X	X	X	L	1	-14	
3. LR01-15	1530	X	X	X	L	1	-15	
4. LR01-20	1540	X	X	X	L	1	-16	
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								
13.								
14.								
15.								

RELINQUISHED BY: **JEFF SPECK** FIRM: **FUEL** RECEIVED BY: **BRANHAM TOARY** FIRM: **NEA**

PRINT NAME: DATE: **120302** TIME: **1752** PRINT NAME: DATE: **12/30** TIME: **1752**

RELINQUISHED BY: FIRM: RECEIVED BY: FIRM:

PRINT NAME: DATE: TIME: PRINT NAME: DATE: TIME:

ADDITIONAL REMARKS: **8 02 JAN: TPH OR 4 TOTAL LEAD**
4 02 JAN: TPH GX/BTEX

COC REV. 3/99

TEMP: PAGE 2 OF 2

*Turnaround Requests less than standard may incur Rush Charges.



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07 January 2003

Bryan Graham
Foster Wheeler Environmental Corporation
12100 NE 195th St
Bothell, WA/USA 98011
RE: DPE Extraction Well Construction

Enclosed are the results of analyses for samples received by the laboratory on 12/04/02 18:48. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Amar Gill
Project Manager



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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Amended Report
 Issued: 01/07/03 08:11

ANALYTICAL REPORT FOR SAMPLES - Amended

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
LR02-5	B2L0108-01	Soil	12/04/02 13:40	12/04/02 18:48
LR02-10	B2L0108-02	Soil	12/04/02 13:50	12/04/02 18:48
LR02-15	B2L0108-03	Soil	12/04/02 14:00	12/04/02 18:48
LR02-20	B2L0108-04	Soil	12/04/02 14:10	12/04/02 18:48
LR03-5	B2L0108-05	Soil	12/04/02 14:50	12/04/02 18:48
LR03-10	B2L0108-06	Soil	12/04/02 15:00	12/04/02 18:48
LR03-15	B2L0108-07	Soil	12/04/02 15:05	12/04/02 18:48
LR04-5	B2L0108-08	Soil	12/04/02 15:35	12/04/02 18:48
LR04-10	B2L0108-09	Soil	12/04/02 15:45	12/04/02 18:48
LR04-15	B2L0108-10	Soil	12/04/02 15:55	12/04/02 18:48
LR05-5	B2L0108-11	Soil	12/04/02 16:35	12/04/02 18:48
05-10	B2L0108-12	Soil	12/04/02 16:45	12/04/02 18:48
05-15	B2L0108-13	Soil	12/04/02 16:55	12/04/02 18:48
01MW26-5	B2L0108-14	Soil	12/04/02 08:30	12/04/02 18:48
01MW26-10	B2L0108-15	Soil	12/04/02 08:45	12/04/02 18:48
01MW26-15	B2L0108-16	Soil	12/04/02 08:55	12/04/02 18:48
01MW26-20	B2L0108-17	Soil	12/04/02 09:10	12/04/02 18:48
01MW27-5	B2L0108-18	Soil	12/04/02 10:35	12/04/02 18:48
01MW27-10	B2L0108-19	Soil	12/04/02 10:45	12/04/02 18:48
01MW27-15	B2L0108-20	Soil	12/04/02 11:00	12/04/02 18:48
01MW27-20	B2L0108-21	Soil	12/04/02 11:10	12/04/02 18:48

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Amended Report
 Issued: 01/07/03 08:11

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR02-5 (B2L0108-01) Soil Sampled: 12/04/02 13:40 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L11002	12/11/02	12/11/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	97.2 %	59-125			"	"	"	"	
Surrogate: 4-BFB (PID)	107 %	64-125			"	"	"	"	
LR02-10 (B2L0108-02) Soil Sampled: 12/04/02 13:50 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	1140	50.0	mg/kg dry	10	2L11002	12/11/02	12/11/02	NWTPH-Gx/8021B	G-01
Benzene	0.831	0.300	"	"	"	"	"	"	
Toluene	8.46	0.500	"	"	"	"	"	"	
Ethylbenzene	6.20	0.500	"	"	"	"	"	"	
Xylenes (total)	19.9	1.00	"	"	"	"	"	"	I-0c
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-01
Surrogate: 4-BFB (PID)	%	64-125			"	"	"	"	S-01
LR02-15 (B2L0108-03) Soil Sampled: 12/04/02 14:00 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	1320	50.0	mg/kg dry	10	2L11002	12/11/02	12/11/02	NWTPH-Gx/8021B	G-01
Benzene	1.10	0.300	"	"	"	"	"	"	
Toluene	8.56	0.500	"	"	"	"	"	"	
Ethylbenzene	7.42	0.500	"	"	"	"	"	"	
Xylenes (total)	23.5	1.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-01
Surrogate: 4-BFB (PID)	%	64-125			"	"	"	"	S-01

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation
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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Amended Report
 Issued: 01/07/03 08:11

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR02-20 (B2L0108-04) Soil Sampled: 12/04/02 14:10 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	51.9	5.00	mg/kg dry	1	2L11002	12/11/02	12/11/02	NWTPH-Gx/8021B	G-01
Benzene	0.0871	0.0300	"	"	"	"	"	"	
Toluene	0.171	0.0500	"	"	"	"	"	"	
Ethylbenzene	0.265	0.0500	"	"	"	"	"	"	
Xylenes (total)	0.728	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	111 %	59-125			"	"	"	"	
Surrogate: 4-BFB (PID)	99.0 %	64-125			"	"	"	"	
LR03-5 (B2L0108-05) Soil Sampled: 12/04/02 14:50 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	59.7	10.0	mg/kg dry	2	2L11002	12/11/02	12/12/02	NWTPH-Gx/8021B	G-01
Benzene	ND	0.0600	"	"	"	"	"	"	
Toluene	ND	0.100	"	"	"	"	"	"	
Ethylbenzene	0.152	0.100	"	"	"	"	"	"	
Xylenes (total)	ND	0.200	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	127 %	59-125			"	"	"	"	S-04
Surrogate: 4-BFB (PID)	108 %	64-125			"	"	"	"	
LR03-10 (B2L0108-06) Soil Sampled: 12/04/02 15:00 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	1460	100	mg/kg dry	20	2L11002	12/11/02	12/11/02	NWTPH-Gx/8021B	G-01
Benzene	1.51	0.600	"	"	"	"	"	"	
Toluene	12.4	1.00	"	"	"	"	"	"	
Ethylbenzene	11.5	1.00	"	"	"	"	"	"	
Xylenes (total)	24.2	2.00	"	"	"	"	"	"	I-06
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-01
Surrogate: 4-BFB (PID)	%	64-125			"	"	"	"	S-01

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Amended Report
 Issued: 01/07/03 08:11

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR03-15 (B2L0108-07) Soil Sampled: 12/04/02 15:05 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	1860	100	mg/kg dry	20	2L11002	12/11/02	12/11/02	NWTPH-Gx/8021B	G-01
Benzene	6.70	0.600	"	"	"	"	"	"	
Toluene	24.5	1.00	"	"	"	"	"	"	
Ethylbenzene	12.3	1.00	"	"	"	"	"	"	
Xylenes (total)	53.5	2.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-01
Surrogate: 4-BFB (PID)	%	64-125			"	"	"	"	S-01
LR04-5 (B2L0108-08) Soil Sampled: 12/04/02 15:35 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L11002	12/11/02	12/11/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	96.4 %	59-125			"	"	"	"	
Surrogate: 4-BFB (PID)	103 %	64-125			"	"	"	"	
LR04-10 (B2L0108-09) Soil Sampled: 12/04/02 15:45 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	827	50.0	mg/kg dry	10	2L11002	12/11/02	12/11/02	NWTPH-Gx/8021B	G-01
Benzene	0.320	0.300	"	"	"	"	"	"	
Toluene	0.615	0.500	"	"	"	"	"	"	
Ethylbenzene	4.26	0.500	"	"	"	"	"	"	
Xylenes (total)	6.57	1.00	"	"	"	"	"	"	I-06
Surrogate: 4-BFB (FID)	197 %	59-125			"	"	"	"	S-06
Surrogate: 4-BFB (PID)	168 %	64-125			"	"	"	"	S-06

North Creek Analytical - Bothell

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Amar Gill, Project Manager

North Creek Analytical, Inc.
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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Amended Report
 Issued: 01/07/03 08:11

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR04-15 (B2L0108-10) Soil Sampled: 12/04/02 15:55 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	2850	50.0	mg/kg dry	10	2L11002	12/11/02	12/11/02	NWTPH-Gx/8021B	
Benzene	4.87	0.300	"	"	"	"	"	"	
Toluene	4.96	0.500	"	"	"	"	"	"	
Ethylbenzene	13.2	0.500	"	"	"	"	"	"	
Xylenes (total)	50.1	1.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-01
Surrogate: 4-BFB (PID)	%	64-125			"	"	"	"	S-01
LR05-5 (B2L0108-11) Soil Sampled: 12/04/02 16:35 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	663	50.0	mg/kg dry	10	2L11002	12/11/02	12/11/02	NWTPH-Gx/8021B	G-01
Benzene	ND	0.300	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	2.43	0.500	"	"	"	"	"	"	
Xylenes (total)	2.82	1.00	"	"	"	"	"	"	I-06
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-01
Surrogate: 4-BFB (PID)	163 %	64-125			"	"	"	"	S-06
LR05-10 (B2L0108-12) Soil Sampled: 12/04/02 16:45 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	1320	100	mg/kg dry	20	2L11002	12/11/02	12/11/02	NWTPH-Gx/8021B	G-01
Benzene	2.23	0.600	"	"	"	"	"	"	
Toluene	7.44	1.00	"	"	"	"	"	"	
Ethylbenzene	9.51	1.00	"	"	"	"	"	"	
Xylenes (total)	33.9	2.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-01
Surrogate: 4-BFB (PID)	187 %	64-125			"	"	"	"	S-06

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Amended Report Issued: 01/07/03 08:11
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**Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR05-15 (B2L0108-13) Soil Sampled: 12/04/02 16:55 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	935	100	mg/kg dry	20	2L11002	12/11/02	12/11/02	NWTPH-Gx/8021B	G-01
Benzene	ND	0.600	"	"	"	"	"	"	
Toluene	1.91	1.00	"	"	"	"	"	"	
Ethylbenzene	4.82	1.00	"	"	"	"	"	"	
Xylenes (total)	20.5	2.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-01
Surrogate: 4-BFB (PID)	%	64-125			"	"	"	"	S-01
01MW26-5 (B2L0108-14) Soil Sampled: 12/04/02 08:30 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	681	50.0	mg/kg dry	10	2L11002	12/11/02	12/12/02	NWTPH-Gx/8021B	
Benzene	ND	0.300	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	3.63	0.500	"	"	"	"	"	"	
Xylenes (total)	6.50	1.00	"	"	"	"	"	"	I-0
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-01
Surrogate: 4-BFB (PID)	154 %	64-125			"	"	"	"	S-06
01MW26-10 (B2L0108-15) Soil Sampled: 12/04/02 08:45 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	3990	100	mg/kg dry	20	2L11002	12/11/02	12/12/02	NWTPH-Gx/8021B	
Benzene	4.29	0.600	"	"	"	"	"	"	
Toluene	9.69	1.00	"	"	"	"	"	"	
Ethylbenzene	28.2	1.00	"	"	"	"	"	"	
Xylenes (total)	112	2.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-01
Surrogate: 4-BFB (PID)	%	64-125			"	"	"	"	S-01

North Creek Analytical - Bothell

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Amar Gill, Project Manager

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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Amended Report
 Issued: 01/07/03 08:11

Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
01MW26-15 (B2L0108-16) Soil Sampled: 12/04/02 08:55 Received: 12/04/02 18:48										
Gasoline Range Hydrocarbons	1430	100		mg/kg dry	20	2L11002	12/11/02	12/12/02	NWTPH-Gx/8021B	G-01
Benzene	ND	0.600		"	"	"	"	"	"	
Toluene	1.15	1.00		"	"	"	"	"	"	
Ethylbenzene	8.68	1.00		"	"	"	"	"	"	
Xylenes (total)	37.4	2.00		"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	59-125				"	"	"	"	S-01
Surrogate: 4-BFB (PID)	%	64-125				"	"	"	"	S-01
01MW26-20 (B2L0108-17) Soil Sampled: 12/04/02 09:10 Received: 12/04/02 18:48										
Gasoline Range Hydrocarbons	ND	5.00		mg/kg dry	1	2L11002	12/11/02	12/12/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300		"	"	"	"	"	"	
Toluene	ND	0.0500		"	"	"	"	"	"	
Ethylbenzene	ND	0.0500		"	"	"	"	"	"	
Xylenes (total)	ND	0.100		"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	88.8 %	59-125				"	"	"	"	
Surrogate: 4-BFB (PID)	96.3 %	64-125				"	"	"	"	
01MW27-5 (B2L0108-18) Soil Sampled: 12/04/02 10:35 Received: 12/04/02 18:48										
Gasoline Range Hydrocarbons	5510	100		mg/kg dry	20	2L11002	12/11/02	12/12/02	NWTPH-Gx/8021B	
Benzene	182	1.50		"	50	"	"	12/12/02	"	
Toluene	37.7	1.00		"	20	"	"	12/12/02	"	
Ethylbenzene	36.4	1.00		"	"	"	"	"	"	
Xylenes (total)	168	2.00		"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	59-125				"	"	"	"	S-01
Surrogate: 4-BFB (PID)	%	64-125				"	"	"	"	S-01

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Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW27-10 (B2L0108-19) Soil Sampled: 12/04/02 10:45 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	2370	100	mg/kg dry	20	2L11002	12/11/02	12/12/02	NWTPH-Gx/8021B	
Benzene	8.21	0.600	"	"	"	"	"	"	
Toluene	16.0	1.00	"	"	"	"	"	"	
Ethylbenzene	15.0	1.00	"	"	"	"	"	"	
Xylenes (total)	51.0	2.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	59-125			"	"	"	"	S-01
Surrogate: 4-BFB (PID)	%	64-125			"	"	"	"	S-01
01MW27-15 (B2L0108-20) Soil Sampled: 12/04/02 11:00 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	177	20.0	mg/kg dry	4	2L11002	12/11/02	12/12/02	NWTPH-Gx/8021B	G-01
Benzene	0.265	0.120	"	"	"	"	"	"	
Toluene	ND	0.200	"	"	"	"	"	"	
Ethylbenzene	0.316	0.200	"	"	"	"	"	"	
Xylenes (total)	0.402	0.400	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	165 %	59-125			"	"	"	"	S-04
Surrogate: 4-BFB (PID)	106 %	64-125			"	"	"	"	
01MW27-20 (B2L0108-21) Soil Sampled: 12/04/02 11:10 Received: 12/04/02 18:48									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	2L11009	12/11/02	12/11/02	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	80.0 %	59-125			"	"	"	"	
Surrogate: 4-BFB (PID)	86.6 %	64-125			"	"	"	"	

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 Project Number: Not Provided
 Project Manager: Bryan Graham

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Volatile Petroleum Hydrocarbons by WDOE TPH Policy Method
North Creek Analytical - Bothell

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
LR03-5 (B2L0108-05) Soil Sampled: 12/04/02 14:50 Received: 12/04/02 18:48										
C5-C6 Aliphatics	ND	5.00		mg/kg dry	1	2L12002	12/12/02	12/12/02	WA MTCA-VPH	
C6-C8 Aliphatics	ND	5.00		"	"	"	"	"	"	
C8-C10 Aliphatics	ND	5.00		"	"	"	"	"	"	
C10-C12 Aliphatics	11.3	5.00		"	"	"	"	"	"	
C8-C10 Aromatics	ND	5.00		"	"	"	"	"	"	
C10-C12 Aromatics	23.4	5.00		"	"	"	"	"	"	
C12-C13 Aromatics	63.4	5.00		"	"	"	"	"	"	
Total VPH (TVPH)	98.1	5.00		"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	119 %	60-140				"	"	"	"	
Surrogate: 4-BFB (PID)	98.6 %	60-140				"	"	"	"	
LR05-5 (B2L0108-11) Soil Sampled: 12/04/02 16:35 Received: 12/04/02 18:48										
C6 Aliphatics	ND	50.0		mg/kg dry	10	2L12002	12/12/02	12/12/02	WA MTCA-VPH	
C8 Aliphatics	ND	50.0		"	"	"	"	"	"	
C8-C10 Aliphatics	61.7	50.0		"	"	"	"	"	"	
C10-C12 Aliphatics	104	50.0		"	"	"	"	"	"	
C8-C10 Aromatics	68.4	50.0		"	"	"	"	"	"	
C10-C12 Aromatics	237	50.0		"	"	"	"	"	"	
C12-C13 Aromatics	558	50.0		"	"	"	"	"	"	
Total VPH (TVPH)	968	50.0		"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	%	60-140				"	"	"	"	S-01
Surrogate: 4-BFB (PID)	170 %	60-140				"	"	"	"	S-06

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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Amended Report
 Issued: 01/07/03 08:11

Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR02-5 (B2L0108-01) Soil Sampled: 12/04/02 13:40 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	280	10.0	mg/kg dry	1	2L07002	12/07/02	12/10/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	65.4 %	42-110			"	"	"	"	
Surrogate: Octacosane	57.8 %	57-123			"	"	"	"	
LR02-10 (B2L0108-02) Soil Sampled: 12/04/02 13:50 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	11700	1000	mg/kg dry	100	2L07002	12/07/02	12/10/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	2500	"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110			"	"	"	"	S-01
Surrogate: Octacosane	%	57-123			"	"	"	"	S-01
LR02-15 (B2L0108-03) Soil Sampled: 12/04/02 14:00 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	19500	1000	mg/kg dry	100	2L07002	12/07/02	12/10/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	2500	"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110			"	"	"	"	S-01
Surrogate: Octacosane	%	57-123			"	"	"	"	S-01
LR02-20 (B2L0108-04) Soil Sampled: 12/04/02 14:10 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	70.8 %	42-110			"	"	"	"	
Surrogate: Octacosane	80.8 %	57-123			"	"	"	"	
LR03-5 (B2L0108-05) Soil Sampled: 12/04/02 14:50 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	219	10.0	mg/kg dry	1	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	74.2 %	42-110			"	"	"	"	
Surrogate: Octacosane	79.9 %	57-123			"	"	"	"	

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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Amended Report
 Issued: 01/07/03 08:11

Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
North Creek Analytical - Bothell

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
LR03-10 (B2L0108-06) Soil Sampled: 12/04/02 15:00 Received: 12/04/02 18:48										
Diesel Range Hydrocarbons	18800	1000		mg/kg dry	100	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	2500		"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110				"	"	"	"	S-01
Surrogate: Octacosane	%	57-123				"	"	"	"	S-01
LR03-15 (B2L0108-07) Soil Sampled: 12/04/02 15:05 Received: 12/04/02 18:48										
Diesel Range Hydrocarbons	17500	1000		mg/kg dry	100	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	2500		"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110				"	"	"	"	S-01
Surrogate: Octacosane	83.6 %	57-123				"	"	"	"	
LR04-5 (B2L0108-08) Soil Sampled: 12/04/02 15:35 Received: 12/04/02 18:48										
Diesel Range Hydrocarbons	7970	200		mg/kg dry	20	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	500		"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110				"	"	"	"	S-01
Surrogate: Octacosane	91.4 %	57-123				"	"	"	"	
LR04-10 (B2L0108-09) Soil Sampled: 12/04/02 15:45 Received: 12/04/02 18:48										
Diesel Range Hydrocarbons	7060	400		mg/kg dry	40	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	1000		"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110				"	"	"	"	S-01
Surrogate: Octacosane	%	57-123				"	"	"	"	S-01
LR04-15 (B2L0108-10) Soil Sampled: 12/04/02 15:55 Received: 12/04/02 18:48										
Diesel Range Hydrocarbons	27700	2000		mg/kg dry	200	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	5000		"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110				"	"	"	"	S-01
Surrogate: Octacosane	%	57-123				"	"	"	"	S-01

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Amended Report Issued: 01/07/03 08:11
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Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR05-5 (B2L0108-11) Soil Sampled: 12/04/02 16:35 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	2990	200	mg/kg dry	20	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	500	"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110			"	"	"	"	S-01
Surrogate: Octacosane	81.1 %	57-123			"	"	"	"	
LR05-10 (B2L0108-12) Soil Sampled: 12/04/02 16:45 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	14600	1000	mg/kg dry	100	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	2500	"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110			"	"	"	"	S-01
Surrogate: Octacosane	%	57-123			"	"	"	"	S-01
LR05-15 (B2L0108-13) Soil Sampled: 12/04/02 16:55 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	5780	200	mg/kg dry	20	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	500	"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110			"	"	"	"	S-01
Surrogate: Octacosane	88.9 %	57-123			"	"	"	"	
01MW26-5 (B2L0108-14) Soil Sampled: 12/04/02 08:30 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	79.4 %	42-110			"	"	"	"	
Surrogate: Octacosane	82.3 %	57-123			"	"	"	"	
01MW26-10 (B2L0108-15) Soil Sampled: 12/04/02 08:45 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	14100	1000	mg/kg dry	100	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	2500	"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110			"	"	"	"	S-01
Surrogate: Octacosane	77.5 %	57-123			"	"	"	"	

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Amended Report
 Issued: 01/07/03 08:11

Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW26-15 (B2L0108-16) Soil Sampled: 12/04/02 08:55 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	7000	200	mg/kg dry	20	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	500	"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110			"	"	"	"	S-01
Surrogate: Octacosane	84.8 %	57-123			"	"	"	"	
01MW26-20 (B2L0108-17) Soil Sampled: 12/04/02 09:10 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	62.2 %	42-110			"	"	"	"	
Surrogate: Octacosane	72.4 %	57-123			"	"	"	"	
01MW27-5 (B2L0108-18) Soil Sampled: 12/04/02 10:35 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	7410	200	mg/kg dry	20	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	500	"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110			"	"	"	"	S-01
Surrogate: Octacosane	77.3 %	57-123			"	"	"	"	
01MW27-10 (B2L0108-19) Soil Sampled: 12/04/02 10:45 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	11100	200	mg/kg dry	20	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	651	500	"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110			"	"	"	"	S-01
Surrogate: Octacosane	100 %	57-123			"	"	"	"	
01MW27-15 (B2L0108-20) Soil Sampled: 12/04/02 11:00 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	3810	200	mg/kg dry	20	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	500	"	"	"	"	"	"	
Surrogate: 2-FBP	%	42-110			"	"	"	"	S-01
Surrogate: Octacosane	91.3 %	57-123			"	"	"	"	

North Creek Analytical - Bothell

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Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW27-20 (B2L0108-21) Soil Sampled: 12/04/02 11:10 Received: 12/04/02 18:48									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	2L10028	12/10/02	12/11/02	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	59.8 %	42-110			"	"	"	"	
Surrogate: Octacosane	71.9 %	57-123			"	"	"	"	

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 Issued: 01/07/03 08:11

Extractable Petroleum Hydrocarbons by WDOE TPH Policy Method
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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LR03-5 (B2L0108-05) Soil Sampled: 12/04/02 14:50 Received: 12/04/02 18:48

C8-C10 Aliphatics	8.49	5.00	mg/kg dry	1	2L10030	12/10/02	12/13/02	WA MTCA-EPH	
C10-C12 Aliphatics	42.3	5.00	"	"	"	"	"	"	"
C12-C16 Aliphatics	204	5.00	"	"	"	"	"	"	"
C16-C21 Aliphatics	134	5.00	"	"	"	"	"	"	"
C21-C34 Aliphatics	8.98	5.00	"	"	"	"	"	"	"
C10-C12 Aromatics	12.2	5.00	"	"	"	"	12/13/02	"	"
C12-C16 Aromatics	127	5.00	"	"	"	"	"	"	"
C16-C21 Aromatics	139	5.00	"	"	"	"	"	"	"
C21-C34 Aromatics	ND	5.00	"	"	"	"	"	"	"
Extractable Petroleum Hydrocarbons	677	5.00	"	"	"	"	12/13/02	"	"
Surrogate: 2-FBP	83.9 %	50-150			"	"	12/13/02	"	"
Surrogate: Octacosane	87.5 %	50-150			"	"	12/13/02	"	"
Surrogate: Undecane	80.9 %	30-150			"	"	"	"	"

LR05-5 (B2L0108-11) Soil Sampled: 12/04/02 16:35 Received: 12/04/02 18:48

C8-C10 Aliphatics	42.0	5.00	mg/kg dry	1	2L10030	12/10/02	12/13/02	WA MTCA-EPH	
C10-C12 Aliphatics	151	5.00	"	"	"	"	"	"	"
C12-C16 Aliphatics	669	5.00	"	"	"	"	"	"	"
C16-C21 Aliphatics	480	5.00	"	"	"	"	"	"	"
C21-C34 Aliphatics	44.1	5.00	"	"	"	"	"	"	"
C10-C12 Aromatics	35.9	5.00	"	"	"	"	12/15/02	"	"
C12-C16 Aromatics	224	5.00	"	"	"	"	"	"	"
C16-C21 Aromatics	452	5.00	"	"	"	"	"	"	"
C21-C34 Aromatics	36.3	5.00	"	"	"	"	"	"	"
Extractable Petroleum Hydrocarbons	2130	5.00	"	"	"	"	12/13/02	"	"
Surrogate: 2-FBP	119 %	50-150			"	"	12/15/02	"	"
Surrogate: Octacosane	85.5 %	50-150			"	"	12/13/02	"	"
Surrogate: Undecane	76.5 %	30-150			"	"	"	"	"

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Polynuclear Aromatic Hydrocarbons by GC/MS-SIM
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR03-5 (B2L0108-05) Soil Sampled: 12/04/02 14:50 Received: 12/04/02 18:48									
Acenaphthene	0.172	0.0100	mg/kg dry	1	2L10030	12/10/02	12/12/02	8270-SIM	
Acenaphthylene	ND	0.0100	"	"	"	"	"	"	
Anthracene	0.0560	0.0100	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.0100	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.0100	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.0100	"	"	"	"	"	"	
Benzo (ghi) perylene	ND	0.0100	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.0100	"	"	"	"	"	"	
Chrysene	0.0351	0.0100	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.0100	"	"	"	"	"	"	
Fluoranthene	ND	0.0100	"	"	"	"	"	"	
Fluorene	0.0937	0.0100	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.0100	"	"	"	"	"	"	
1-Methylnaphthalene	0.780	0.0100	"	"	"	"	"	"	
2-Methylnaphthalene	1.39	0.0100	"	"	"	"	"	"	
Naphthalene	0.0619	0.0100	"	"	"	"	"	"	
Phenanthrene	0.227	0.0100	"	"	"	"	"	"	
Pyrene	0.0167	0.0100	"	"	"	"	"	"	
Surrogate: p-Terphenyl-d14	95.5 %	42-141			"	"	"	"	

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 Project Manager: Bryan Graham

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Total Metals by EPA 6000/7000 Series Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR02-5 (B2L0108-01) Soil Sampled: 12/04/02 13:40 Received: 12/04/02 18:48									
Lead	7.04	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
LR02-10 (B2L0108-02) Soil Sampled: 12/04/02 13:50 Received: 12/04/02 18:48									
Lead	2.34	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
LR02-15 (B2L0108-03) Soil Sampled: 12/04/02 14:00 Received: 12/04/02 18:48									
Lead	2.27	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
LR02-20 (B2L0108-04) Soil Sampled: 12/04/02 14:10 Received: 12/04/02 18:48									
Lead	1.79	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
LR03-5 (B2L0108-05) Soil Sampled: 12/04/02 14:50 Received: 12/04/02 18:48									
Lead	6.14	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
LR03-10 (B2L0108-06) Soil Sampled: 12/04/02 15:00 Received: 12/04/02 18:48									
Lead	3.07	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
LR03-15 (B2L0108-07) Soil Sampled: 12/04/02 15:05 Received: 12/04/02 18:48									
Lead	2.29	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
LR04-5 (B2L0108-08) Soil Sampled: 12/04/02 15:35 Received: 12/04/02 18:48									
Lead	2.45	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
LR04-10 (B2L0108-09) Soil Sampled: 12/04/02 15:45 Received: 12/04/02 18:48									
Lead	2.44	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	

North Creek Analytical - Bothell

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Total Metals by EPA 6000/7000 Series Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR04-15 (B2L0108-10) Soil Sampled: 12/04/02 15:55 Received: 12/04/02 18:48									
Lead	3.57	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
LR05-5 (B2L0108-11) Soil Sampled: 12/04/02 16:35 Received: 12/04/02 18:48									
Lead	4.33	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
LR05-10 (B2L0108-12) Soil Sampled: 12/04/02 16:45 Received: 12/04/02 18:48									
Lead	2.58	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
LR05-15 (B2L0108-13) Soil Sampled: 12/04/02 16:55 Received: 12/04/02 18:48									
Lead	3.69	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
01MW26-5 (B2L0108-14) Soil Sampled: 12/04/02 08:30 Received: 12/04/02 18:48									
Lead	10.3	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
01MW26-10 (B2L0108-15) Soil Sampled: 12/04/02 08:45 Received: 12/04/02 18:48									
Lead	7.66	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
01MW26-15 (B2L0108-16) Soil Sampled: 12/04/02 08:55 Received: 12/04/02 18:48									
Lead	278	1.00	mg/kg dry	2	2L13036	12/13/02	12/17/02	EPA 6020	
01MW26-15 (B2L0108-16RE1) Soil Sampled: 12/04/02 08:55 Received: 12/04/02 18:48									
Lead	11.8	0.500	mg/kg dry	1	2L23028	12/20/02	12/23/02	EPA 6020	
01MW26-20 (B2L0108-17) Soil Sampled: 12/04/02 09:10 Received: 12/04/02 18:48									
Lead	5.54	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	

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Total Metals by EPA 6000/7000 Series Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
01MW27-5 (B2L0108-18) Soil Sampled: 12/04/02 10:35 Received: 12/04/02 18:48									
Lead	30.6	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
01MW27-10 (B2L0108-19) Soil Sampled: 12/04/02 10:45 Received: 12/04/02 18:48									
Lead	11.4	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
01MW27-15 (B2L0108-20) Soil Sampled: 12/04/02 11:00 Received: 12/04/02 18:48									
Lead	3.03	0.500	mg/kg dry	1	2L13036	12/13/02	12/16/02	EPA 6020	
01MW27-20 (B2L0108-21) Soil Sampled: 12/04/02 11:10 Received: 12/04/02 18:48									
Lead	4.71	0.500	mg/kg dry	1	2L12040	12/12/02	12/13/02	EPA 6020	

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BTEX, MTBE, Naphthalene, and n-Hexane by WA VPH
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR03-5 (B2L0108-05) Soil Sampled: 12/04/02 14:50 Received: 12/04/02 18:48									
Methyl tert-butyl ether	ND	0.100	mg/kg dry	1	2L05020	12/05/02	12/06/02	EPA 8260B	
Benzene	ND	0.0100	"	"	"	"	"	"	
Toluene	ND	0.0100	"	"	"	"	"	"	
Ethylbenzene	ND	0.0100	"	"	"	"	"	"	
m,p-Xylene	ND	0.0200	"	"	"	"	"	"	
o-Xylene	ND	0.0100	"	"	"	"	"	"	
Naphthalene	ND	0.0100	"	"	"	"	"	"	
n-Hexane	0.0642	0.0200	"	"	"	"	"	"	
Surrogate: 1,2-DCA-d4	98.4 %	57-139			"	"	"	"	
Surrogate: Toluene-d8	88.6 %	66-122			"	"	"	"	
Surrogate: 4-BFB	84.7 %	62-121			"	"	"	"	

LR05-5 (B2L0108-11) Soil Sampled: 12/04/02 16:35 Received: 12/04/02 18:48									
Methyl tert-butyl ether	ND	0.100	mg/kg dry	1	2L05020	12/05/02	12/06/02	EPA 8260B	
Benzene	0.542	0.0100	"	"	"	"	"	"	
Toluene	ND	0.0100	"	"	"	"	"	"	
Ethylbenzene	0.732	0.0100	"	"	"	"	"	"	
m,p-Xylene	0.0870	0.0200	"	"	"	"	"	"	
o-Xylene	ND	0.0100	"	"	"	"	"	"	
Naphthalene	ND	0.0100	"	"	"	"	"	"	
n-Hexane	1.45	0.0200	"	"	"	"	"	"	
Surrogate: 1,2-DCA-d4	94.1 %	57-139			"	"	"	"	
Surrogate: Toluene-d8	84.6 %	66-122			"	"	"	"	
Surrogate: 4-BFB	84.2 %	62-121			"	"	"	"	

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Amended Report
 Issued: 01/07/03 08:11

Physical Parameters by APHA/ASTM/EPA Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR02-5 (B2L0108-01) Soil Sampled: 12/04/02 13:40 Received: 12/04/02 18:48									
Dry Weight	79.8	1.00	%	1	2L10020	12/10/02	12/11/02	BSOPSPL003R07	
LR02-10 (B2L0108-02) Soil Sampled: 12/04/02 13:50 Received: 12/04/02 18:48									
Dry Weight	91.4	1.00	%	1	2L10020	12/10/02	12/11/02	BSOPSPL003R07	
LR02-15 (B2L0108-03) Soil Sampled: 12/04/02 14:00 Received: 12/04/02 18:48									
Dry Weight	82.8	1.00	%	1	2L10020	12/10/02	12/11/02	BSOPSPL003R07	
LR02-20 (B2L0108-04) Soil Sampled: 12/04/02 14:10 Received: 12/04/02 18:48									
Dry Weight	81.6	1.00	%	1	2L10020	12/10/02	12/11/02	BSOPSPL003R07	
LR03-5 (B2L0108-05) Soil Sampled: 12/04/02 14:50 Received: 12/04/02 18:48									
Dry Weight	79.7	1.00	%	1	2L10020	12/10/02	12/11/02	BSOPSPL003R07	
LR03-10 (B2L0108-06) Soil Sampled: 12/04/02 15:00 Received: 12/04/02 18:48									
Dry Weight	89.0	1.00	%	1	2L10020	12/10/02	12/11/02	BSOPSPL003R07	
LR03-15 (B2L0108-07) Soil Sampled: 12/04/02 15:05 Received: 12/04/02 18:48									
Dry Weight	83.0	1.00	%	1	2L10020	12/10/02	12/11/02	BSOPSPL003R07	
LR04-5 (B2L0108-08) Soil Sampled: 12/04/02 15:35 Received: 12/04/02 18:48									
Dry Weight	84.4	1.00	%	1	2L10020	12/10/02	12/11/02	BSOPSPL003R07	
LR04-10 (B2L0108-09) Soil Sampled: 12/04/02 15:45 Received: 12/04/02 18:48									
Dry Weight	90.6	1.00	%	1	2L10020	12/10/02	12/11/02	BSOPSPL003R07	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Amended Report Issued: 01/07/03 08:11
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Physical Parameters by APHA/ASTM/EPA Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LR04-15 (B2L0108-10) Soil Sampled: 12/04/02 15:55 Received: 12/04/02 18:48									
Dry Weight	83.9	1.00	%	1	2L10020	12/10/02	12/11/02	BSOPSPL003R07	
LR05-5 (B2L0108-11) Soil Sampled: 12/04/02 16:35 Received: 12/04/02 18:48									
Dry Weight	81.0	1.00	%	1	2L10020	12/10/02	12/11/02	BSOPSPL003R07	
LR05-10 (B2L0108-12) Soil Sampled: 12/04/02 16:45 Received: 12/04/02 18:48									
Dry Weight	87.0	1.00	%	1	2L10020	12/10/02	12/11/02	BSOPSPL003R07	
LR05-15 (B2L0108-13) Soil Sampled: 12/04/02 16:55 Received: 12/04/02 18:48									
Dry Weight	83.5	1.00	%	1	2L10021	12/10/02	12/11/02	BSOPSPL003R07	
01MW26-5 (B2L0108-14) Soil Sampled: 12/04/02 08:30 Received: 12/04/02 18:48									
Dry Weight	75.6	1.00	%	1	2L10021	12/10/02	12/11/02	BSOPSPL003R07	
01MW26-10 (B2L0108-15) Soil Sampled: 12/04/02 08:45 Received: 12/04/02 18:48									
Dry Weight	89.1	1.00	%	1	2L10021	12/10/02	12/11/02	BSOPSPL003R07	
01MW26-15 (B2L0108-16) Soil Sampled: 12/04/02 08:55 Received: 12/04/02 18:48									
Dry Weight	81.1	1.00	%	1	2L10021	12/10/02	12/11/02	BSOPSPL003R07	
01MW26-20 (B2L0108-17) Soil Sampled: 12/04/02 09:10 Received: 12/04/02 18:48									
Dry Weight	78.7	1.00	%	1	2L10021	12/10/02	12/11/02	BSOPSPL003R07	
01MW27-5 (B2L0108-18) Soil Sampled: 12/04/02 10:35 Received: 12/04/02 18:48									
Dry Weight	89.8	1.00	%	1	2L10021	12/10/02	12/11/02	BSOPSPL003R07	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Amended Report
 Issued: 01/07/03 08:11

Physical Parameters by APHA/ASTM/EPA Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
01MW27-10 (B2L0108-19) Soil Sampled: 12/04/02 10:45 Received: 12/04/02 18:48										
Dry Weight	89.6	1.00		%	1	2L10021	12/10/02	12/11/02	BSOPSPL003R07	
01MW27-15 (B2L0108-20) Soil Sampled: 12/04/02 11:00 Received: 12/04/02 18:48										
Dry Weight	84.7	1.00		%	1	2L10021	12/10/02	12/11/02	BSOPSPL003R07	
01MW27-20 (B2L0108-21) Soil Sampled: 12/04/02 11:10 Received: 12/04/02 18:48										
Dry Weight	79.8	1.00		%	1	2L10021	12/10/02	12/11/02	BSOPSPL003R07	

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Amended Report Issued: 01/07/03 08:11
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Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limit	RPD	RPD Limit	Notes
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Batch 2L11002: Prepared 12/11/02 Using EPA 5030B (P/T)

Blank (2L11002-BLK1)

Gasoline Range Hydrocarbons	ND	5.00	mg/kg							
Benzene	ND	0.0300	"							
Toluene	ND	0.0500	"							
Ethylbenzene	ND	0.0500	"							
Xylenes (total)	ND	0.100	"							
Surrogate: 4-BFB (FID)	4.15		"	4.00		104	59-125			
Surrogate: 4-BFB (PID)	4.25		"	4.00		106	64-125			

LCS (2L11002-BS1)

Gasoline Range Hydrocarbons	26.9	5.00	mg/kg	27.5		97.8	80-120			
Benzene	0.350	0.0300	"	0.340		103	80-120			
Toluene	1.73	0.0500	"	2.08		83.2	80-120			
Ethylbenzene	0.465	0.0500	"	0.490		94.9	80-120			
Xylenes (total)	2.16	0.100	"	2.41		89.6	80-120			
Surrogate: 4-BFB (FID)	4.16		"	4.00		104	59-125			
Surrogate: 4-BFB (PID)	3.97		"	4.00		99.2	64-125			

LCS Dup (2L11002-BS1)

Gasoline Range Hydrocarbons	29.8	5.00	mg/kg	27.5		108	80-120	10.2	40	
Benzene	0.373	0.0300	"	0.340		110	80-120	6.36	40	
Toluene	1.85	0.0500	"	2.08		88.9	80-120	6.70	40	
Ethylbenzene	0.494	0.0500	"	0.490		101	80-120	6.05	40	
Xylenes (total)	2.30	0.100	"	2.41		95.4	80-120	6.28	40	
Surrogate: 4-BFB (FID)	4.40		"	4.00		110	59-125			
Surrogate: 4-BFB (PID)	3.98		"	4.00		99.5	64-125			

Matrix Spike (2L11002-MS1)

Source: B2L0108-08

Gasoline Range Hydrocarbons	31.5	5.00	mg/kg dry	32.6	1.11	93.2	53-120			
Benzene	0.342	0.0300	"	0.403	ND	84.9	71-119			
Toluene	1.77	0.0500	"	2.47	0.0142	71.1	57-108			
Ethylbenzene	0.462	0.0500	"	0.580	ND	79.7	72-114			
Xylenes (total)	2.27	0.100	"	2.85	ND	79.6	68-112			
Surrogate: 4-BFB (FID)	4.26		"	4.74		89.9	59-125			
Surrogate: 4-BFB (PID)	3.31		"	4.74		69.8	64-125			

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation
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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

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Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L11002: Prepared 12/11/02 Using EPA 5030B (P/T)

Matrix Spike Dup (2L11002-MSD1)

Source: B2L0108-08

Gasoline Range Hydrocarbons	28.6	5.00	mg/kg dry	32.6	1.11	84.3	53-120	9.65	40	
Benzene	0.340	0.0300	"	0.403	ND	84.4	71-119	0.587	40	
Toluene	1.86	0.0500	"	2.47	0.0142	74.7	57-108	4.96	40	
Ethylbenzene	0.477	0.0500	"	0.580	ND	82.2	72-114	3.19	40	
Xylenes (total)	2.37	0.100	"	2.85	ND	83.2	68-112	4.31	40	
Surrogate: 4-BFB (FID)	4.13		"	4.74		87.1	59-125			
Surrogate: 4-BFB (PID)	3.40		"	4.74		71.7	64-125			

Batch 2L11009: Prepared 12/11/02 Using EPA 5030B (P/T)

Blank (2L11009-BLK1)

Gasoline Range Hydrocarbons	ND	5.00	mg/kg							
Benzene	ND	0.0300	"							
Toluene	ND	0.0500	"							
Ethylbenzene	ND	0.0500	"							
Xylenes (total)	ND	0.100	"							
Surrogate: 4-BFB (FID)	3.41		"	4.00		85.2	59-125			
Surrogate: 4-BFB (PID)	3.99		"	4.00		99.8	64-125			

LCS (2L11009-BS1)

Gasoline Range Hydrocarbons	26.0	5.00	mg/kg	27.5		94.5	80-120			
Benzene	0.365	0.0300	"	0.340		107	80-120			
Toluene	1.89	0.0500	"	2.08		90.9	80-120			
Ethylbenzene	0.490	0.0500	"	0.490		100	80-120			
Xylenes (total)	2.40	0.100	"	2.41		99.6	80-120			
Surrogate: 4-BFB (FID)	4.10		"	4.00		102	59-125			
Surrogate: 4-BFB (PID)	3.74		"	4.00		93.5	64-125			

North Creek Analytical - Bothell

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Volatile Petroleum Products and BTEX by NWTPH-Gx and EPA 8021B - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L11009: Prepared 12/11/02 Using EPA 5030B (P/T)

LCS Dup (2L11009-BSD1)

Gasoline Range Hydrocarbons	26.1	5.00	mg/kg	27.5		94.9	80-120	0.384	40	
Benzene	0.375	0.0300	"	0.340		110	80-120	2.70	40	
Toluene	1.95	0.0500	"	2.08		93.8	80-120	3.13	40	
Ethylbenzene	0.502	0.0500	"	0.490		102	80-120	2.42	40	
Xylenes (total)	2.50	0.100	"	2.41		104	80-120	4.08	40	
Surrogate: 4-BFB (FID)	4.05		"	4.00		101	59-125			
Surrogate: 4-BFB (PID)	3.70		"	4.00		92.5	64-125			

Matrix Spike (2L11009-MS1)

Source: B2L0132-10

Gasoline Range Hydrocarbons	24.4	5.00	mg/kg dry	33.7	0.616	70.6	53-120			
Benzene	0.380	0.0300	"	0.416	0.00717	89.6	71-119			
Toluene	2.00	0.0500	"	2.55	0.00766	78.1	57-108			
Ethylbenzene	0.523	0.0500	"	0.600	ND	87.2	72-114			
Xylenes (total)	2.57	0.100	"	2.95	ND	87.1	68-112			
Surrogate: 4-BFB (FID)	3.98		"	4.90		81.2	59-125			
Surrogate: 4-BFB (PID)	3.95		"	4.90		80.6	64-125			

Matrix Spike Dup (2L11009-MSD1)

Source: B2L0132-10

Gasoline Range Hydrocarbons	25.8	5.00	mg/kg dry	33.7	0.616	74.7	53-120	5.58	40	
Benzene	0.389	0.0300	"	0.416	0.00717	91.8	71-119	2.34	40	
Toluene	2.06	0.0500	"	2.55	0.00766	80.5	57-108	2.96	40	
Ethylbenzene	0.525	0.0500	"	0.600	ND	87.5	72-114	0.382	40	
Xylenes (total)	2.65	0.100	"	2.95	ND	89.8	68-112	3.07	40	
Surrogate: 4-BFB (FID)	4.16		"	4.90		84.9	59-125			
Surrogate: 4-BFB (PID)	4.13		"	4.90		84.3	64-125			

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Project: DPE Extraction Well Construction
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 Project Manager: Bryan Graham

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 Issued: 01/07/03 08:11

Volatile Petroleum Hydrocarbons by WDOE TPH Policy Method - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L12002: Prepared 12/12/02 Using EPA 5030B (P/T)

Blank (2L12002-BLK1)

C5-C6 Aliphatics	ND	5.00	mg/kg							
C6-C8 Aliphatics	ND	5.00	"							
C8-C10 Aliphatics	ND	5.00	"							
C10-C12 Aliphatics	ND	5.00	"							
C8-C10 Aromatics	ND	5.00	"							
C10-C12 Aromatics	ND	5.00	"							
C12-C13 Aromatics	ND	5.00	"							
Total VPH (TVPH)	ND	5.00	"							
Surrogate: 4-BFB (FID)	4.24		"	4.00		106	60-140			
Surrogate: 4-BFB (PID)	3.70		"	4.00		92.5	60-140			

(2L12002-BS1)

Total VPH (TVPH)	11.3	5.00	mg/kg	10.0		113	70-130			
Surrogate: 4-BFB (FID)	4.86		"	4.00		122	60-140			
Surrogate: 4-BFB (PID)	3.93		"	4.00		98.2	60-140			

LCS Dup (2L12002-BSD1)

Total VPH (TVPH)	11.0	5.00	mg/kg	10.0		110	70-130	2.69	25	
Surrogate: 4-BFB (FID)	3.33		"	4.00		83.2	60-140			
Surrogate: 4-BFB (PID)	3.02		"	4.00		75.5	60-140			

Matrix Spike (2L12002-MS1)

Source: B2L0158-09

Total VPH (TVPH)	17.9	5.00	mg/kg dry	13.4	0.00	134	70-130			Q-01
Surrogate: 4-BFB (FID)	5.26		"	5.36		98.1	60-140			
Surrogate: 4-BFB (PID)	4.88		"	5.36		91.0	60-140			

Matrix Spike Dup (2L12002-MSD1)

Source: B2L0158-09

Total VPH (TVPH)	14.7	5.00	mg/kg dry	13.4	0.00	110	70-130	19.6	25	
Surrogate: 4-BFB (FID)	5.13		"	5.36		95.7	60-140			
Surrogate: 4-BFB (PID)	5.01		"	5.36		93.5	60-140			

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 Project Manager: Bryan Graham

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Semivolatle Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L07002: Prepared 12/07/02 Using EPA 3550B

Blank (2L07002-BLK1)

Diesel Range Hydrocarbons	ND	10.0	mg/kg							
Lube Oil Range Hydrocarbons	ND	25.0	"							
Surrogate: 2-FBP	5.95		"	10.7		55.6	42-110			
Surrogate: Octacosane	6.83		"	10.7		63.8	57-123			

LCS (2L07002-BS1)

Diesel Range Hydrocarbons	44.3	10.0	mg/kg	66.7		66.4	59-109			
Surrogate: 2-FBP	6.44		"	10.7		60.2	42-110			

LCS Dup (2L07002-BSD1)

Diesel Range Hydrocarbons	52.5	10.0	mg/kg	66.7		78.7	59-109	16.9	50	
Surrogate: 2-FBP	7.48		"	10.7		69.9	42-110			

Duplicate (2L07002-DUP1)

Source: B2L0149-05

Diesel Range Hydrocarbons	183	50.0	mg/kg dry		194			5.84	50	
Lube Oil Range Hydrocarbons	967	125	"		1080			11.0	50	
Surrogate: 2-FBP	8.58		"	13.7		62.6	42-110			
Surrogate: Octacosane	10.2		"	13.7		74.5	57-123			

Batch 2L10028: Prepared 12/10/02 Using EPA 3550B

Blank (2L10028-BLK1)

Diesel Range Hydrocarbons	ND	10.0	mg/kg							
Lube Oil Range Hydrocarbons	ND	25.0	"							
Surrogate: 2-FBP	7.80		"	10.7		72.9	42-110			
Surrogate: Octacosane	8.60		"	10.7		80.4	57-123			

North Creek Analytical - Bothell

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 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Amended Report
 Issued: 01/07/03 08:11

Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	RPD	RPD Limit	Notes
Batch 2L10028: Prepared 12/10/02 Using EPA 3550B									
LCS (2L10028-BS1)									
Diesel Range Hydrocarbons	56.8	10.0	mg/kg	66.7		85.2		59-109	
Surrogate: 2-FBP	9.48		"	10.7		88.6		42-110	
LCS Dup (2L10028-BSD1)									
Diesel Range Hydrocarbons	54.1	10.0	mg/kg	66.7		81.1	4.87	59-109 50	
Surrogate: 2-FBP	8.69		"	10.7		81.2		42-110	
Duplicate (2L10028-DUP1) Source: B2L0108-15									
Diesel Range Hydrocarbons	14900	1000	mg/kg dry		14100		5.52	50	
Lube Oil Range Hydrocarbons	ND	2500	"		ND		NA	50	
Surrogate: 2-FBP	ND		"	12.1				42-110	S-01
Surrogate: Octacosane	9.99		"	12.1		82.6		57-123	

North Creek Analytical - Bothell

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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

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 Issued: 01/07/03 08:11

Polynuclear Aromatic Hydrocarbons by GC/MS-SIM - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L10030: Prepared 12/10/02 Using EPA 3545

Blank (2L10030-BLK1)

Acenaphthene	ND	0.0100	mg/kg							
Acenaphthylene	ND	0.0100	"							
Anthracene	ND	0.0100	"							
Benzo (a) anthracene	ND	0.0100	"							
Benzo (a) pyrene	ND	0.0100	"							
Benzo (b) fluoranthene	ND	0.0100	"							
Benzo (ghi) perylene	ND	0.0100	"							
Benzo (k) fluoranthene	ND	0.0100	"							
Chrysene	ND	0.0100	"							
Dibenz (a,h) anthracene	ND	0.0100	"							
Fluoranthene	ND	0.0100	"							
Fluorene	ND	0.0100	"							
Indeno (1,2,3-cd) pyrene	ND	0.0100	"							
1-Methylnaphthalene	ND	0.0100	"							
2-Methylnaphthalene	ND	0.0100	"							
Naphthalene	ND	0.0100	"							
Phenanthrene	ND	0.0100	"							
Pyrene	ND	0.0100	"							
Surrogate: p-Terphenyl-d14	0.255		"	0.267		95.5	42-141			

LCS (2L10030-BS1)

Acenaphthene	0.242	0.0100	mg/kg	0.333		72.7	50-150			
Acenaphthylene	0.301	0.0100	"	0.333		90.4	50-150			
Anthracene	0.256	0.0100	"	0.333		76.9	50-150			
Benzo (a) anthracene	0.253	0.0100	"	0.333		76.0	50-150			
Benzo (a) pyrene	0.244	0.0100	"	0.333		73.3	50-150			
Benzo (b) fluoranthene	0.232	0.0100	"	0.333		69.7	50-150			
Benzo (ghi) perylene	0.236	0.0100	"	0.333		70.9	50-150			
Benzo (k) fluoranthene	0.241	0.0100	"	0.333		72.4	50-150			
Chrysene	0.289	0.0100	"	0.333		86.8	54-112			
Dibenz (a,h) anthracene	0.218	0.0100	"	0.333		65.5	50-150			
Fluoranthene	0.277	0.0100	"	0.333		83.2	50-150			
Fluorene	0.259	0.0100	"	0.333		77.8	51-107			
Indeno (1,2,3-cd) pyrene	0.238	0.0100	"	0.333		71.5	42-112			

North Creek Analytical - Bothell

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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

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 Issued: 01/07/03 08:11

Polynuclear Aromatic Hydrocarbons by GC/MS-SIM - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L10030: Prepared 12/10/02 Using EPA 3545

LCS (2L10030-BS1)

Naphthalene	0.241	0.0100	mg/kg	0.333		72.4	50-150			
Phenanthrene	0.263	0.0100	"	0.333		79.0	50-150			
Pyrene	0.254	0.0100	"	0.333		76.3	50-150			
Surrogate: p-Terphenyl-d14	0.237		"	0.267		88.8	42-141			

LCS Dup (2L10030-BSD1)

Acenaphthene	0.240	0.0100	mg/kg	0.333		72.1	50-150	0.830	25	
Acenaphthylene	0.293	0.0100	"	0.333		88.0	50-150	2.69	25	
Anthracene	0.268	0.0100	"	0.333		80.5	50-150	4.58	25	
Benzo (a) anthracene	0.276	0.0100	"	0.333		82.9	50-150	8.70	25	
Benzo (a) pyrene	0.256	0.0100	"	0.333		76.9	50-150	4.80	25	
Benzo (b) fluoranthene	0.197	0.0100	"	0.333		59.2	50-150	16.3	25	
Benzo (ghi) perylene	0.288	0.0100	"	0.333		86.5	50-150	19.8	25	
Benzo (k) fluoranthene	0.313	0.0100	"	0.333		94.0	50-150	26.0	25	Q-07
Chrysene	0.294	0.0100	"	0.333		88.3	54-112	1.72	37	
Dibenz (a,h) anthracene	0.267	0.0100	"	0.333		80.2	50-150	20.2	25	
Fluoranthene	0.330	0.0100	"	0.333		99.1	50-150	17.5	25	
Fluorene	0.259	0.0100	"	0.333		77.8	51-107	0.00	43	
Indeno (1,2,3-cd) pyrene	0.291	0.0100	"	0.333		87.4	42-112	20.0	32	
Naphthalene	0.249	0.0100	"	0.333		74.8	50-150	3.27	25	
Phenanthrene	0.295	0.0100	"	0.333		88.6	50-150	11.5	25	
Pyrene	0.322	0.0100	"	0.333		96.7	50-150	23.6	25	
Surrogate: p-Terphenyl-d14	0.250		"	0.267		93.6	42-141			

Matrix Spike (2L10030-MS1)

Source: B2L0025-01

Acenaphthene	0.270	0.0100	mg/kg dry	0.416	ND	64.9	50-150			
Acenaphthylene	0.330	0.0100	"	0.416	ND	79.3	50-150			
Anthracene	0.290	0.0100	"	0.416	ND	69.7	50-150			
Benzo (a) anthracene	0.273	0.0100	"	0.416	0.00166	65.2	50-150			
Benzo (a) pyrene	0.234	0.0100	"	0.416	ND	56.2	50-150			
Benzo (b) fluoranthene	0.182	0.0100	"	0.416	ND	43.8	50-150			Q-02
Benzo (ghi) perylene	0.262	0.0100	"	0.416	ND	63.0	50-150			
Benzo (k) fluoranthene	0.219	0.0100	"	0.416	ND	52.6	50-150			
Chrysene	0.280	0.0100	"	0.416	ND	67.3	29-143			

North Creek Analytical - Bothell

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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Amended Report
 Issued: 01/07/03 08:11

Polynuclear Aromatic Hydrocarbons by GC/MS-SIM - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L10030: Prepared 12/10/02 Using EPA 3545

Matrix Spike (2L10030-MS1) **Source: B2L0025-01**

Dibenz (a,h) anthracene	0.263	0.0100	mg/kg dry	0.416	ND	63.2	50-150			
Fluoranthene	0.286	0.0100	"	0.416	ND	68.8	50-150			
Fluorene	0.287	0.0100	"	0.416	ND	69.0	36-134			
Indeno (1,2,3-cd) pyrene	0.275	0.0100	"	0.416	ND	66.1	19-138			
Naphthalene	0.285	0.0100	"	0.416	0.00416	67.5	50-150			
Phenanthrene	0.303	0.0100	"	0.416	0.00416	71.8	50-150			
Pyrene	0.267	0.0100	"	0.416	ND	64.2	50-150			
<i>Surrogate: p-Terphenyl-d14</i>	<i>0.269</i>		<i>"</i>	<i>0.333</i>		<i>80.8</i>	<i>42-141</i>			

Matrix Spike Dup (2L10030-MSD1) **Source: B2L0025-01**

Acenaphthene	0.235	0.0100	mg/kg dry	0.416	ND	56.5	50-150	13.9	25	
Acenaphthylene	0.298	0.0100	"	0.416	ND	71.6	50-150	10.2	25	
Anthracene	0.254	0.0100	"	0.416	ND	61.1	50-150	13.2	25	
Benzo (a) anthracene	0.250	0.0100	"	0.416	0.00166	59.7	50-150	8.80	25	
Benzo (a) pyrene	0.220	0.0100	"	0.416	ND	52.9	50-150	6.17	25	
Benzo (b) fluoranthene	0.174	0.0100	"	0.416	ND	41.8	50-150	4.49	25	Q-02
Benzo (ghi) perylene	0.227	0.0100	"	0.416	ND	54.6	50-150	14.3	25	
Benzo (k) fluoranthene	0.264	0.0100	"	0.416	ND	63.5	50-150	18.6	25	
Chrysene	0.255	0.0100	"	0.416	ND	61.3	29-143	9.35	44	
Dibenz (a,h) anthracene	0.226	0.0100	"	0.416	ND	54.3	50-150	15.1	25	
Fluoranthene	0.255	0.0100	"	0.416	ND	61.3	50-150	11.5	25	
Fluorene	0.259	0.0100	"	0.416	ND	62.3	36-134	10.3	52	
Indeno (1,2,3-cd) pyrene	0.240	0.0100	"	0.416	ND	57.7	19-138	13.6	43	
Naphthalene	0.253	0.0100	"	0.416	0.00416	59.8	50-150	11.9	25	
Phenanthrene	0.266	0.0100	"	0.416	0.00416	62.9	50-150	13.0	25	
Pyrene	0.250	0.0100	"	0.416	ND	60.1	50-150	6.58	25	
<i>Surrogate: p-Terphenyl-d14</i>	<i>0.245</i>		<i>"</i>	<i>0.333</i>		<i>73.6</i>	<i>42-141</i>			

North Creek Analytical - Bothell

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Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

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Total Metals by EPA 6000/7000 Series Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	%REC Limits	RPD RPD	RPD Limit	Notes
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Batch 2L12040: Prepared 12/12/02 Using EPA 3050B

Blank (2L12040-BLK1)

Lead ND 0.500 mg/kg

LCS (2L12040-BS1)

Lead 41.3 0.500 mg/kg 40.4 102 80-120

LCS Dup (2L12040-BSD1)

Lead 42.0 0.500 mg/kg 40.8 103 80-120 1.68 20

Matrix Spike (2L12040-MS1)

Source: B2L0225-01

Lead 45.7 0.500 mg/kg dry 42.9 1.49 103 62-137

Matrix Spike Dup (2L12040-MSD1)

Source: B2L0225-01

Lead 45.3 0.500 mg/kg dry 42.5 1.49 103 62-137 0.879 30

Matrix Spike (2L12040-PS1)

Source: B2L0225-01

Lead 55.3 0.500 mg/kg dry 52.6 1.49 102 75-125

Batch 2L13036: Prepared 12/13/02 Using EPA 3050B

Blank (2L13036-BLK1)

Lead ND 0.500 mg/kg

LCS (2L13036-BS1)

Lead 41.9 0.500 mg/kg 41.7 100 80-120

LCS Dup (2L13036-BSD1)

Lead 42.6 0.500 mg/kg 41.7 102 80-120 1.66 20

North Creek Analytical - Bothell

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Foster Wheeler Environmental Corporation 12100 NE 195th St Bothell WA/USA, 98011	Project: DPE Extraction Well Construction Project Number: Not Provided Project Manager: Bryan Graham	Amended Report Issued: 01/07/03 08:11
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Total Metals by EPA 6000/7000 Series Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L13036: Prepared 12/13/02 Using EPA 3050B

Matrix Spike (2L13036-MS1)					Source: B2L0108-01					
Lead	58.1	0.500	mg/kg dry	50.6	7.04	101	62-137			
Matrix Spike Dup (2L13036-MSD1)					Source: B2L0108-01					
Lead	60.2	0.500	mg/kg dry	52.7	7.04	101	62-137	3.55	30	
Post Spike (2L13036-PS1)					Source: B2L0108-01					
Lead	74.7	0.500	mg/kg dry	68.8	7.04	98.3	75-125			

Batch 2L23028: Prepared 12/20/02 Using EPA 3050B

Blank (2L23028-BLK1)										
Lead	ND	0.500	mg/kg							
LCS (2L23028-BS1)										
Lead	36.2	0.500	mg/kg	41.2		87.9	80-120			
LCS Dup (2L23028-BSD1)										
Lead	35.3	0.500	mg/kg	40.4		87.4	80-120	2.52	20	
Matrix Spike (2L23028-MS1)					Source: B2L0108-16RE1					
Lead	57.7	0.500	mg/kg dry	51.9	11.8	88.4	62-137			
Matrix Spike Dup (2L23028-MSD1)					Source: B2L0108-16RE1					
Lead	56.4	0.500	mg/kg dry	50.3	11.8	88.7	62-137	2.28	30	
Post Spike (2L23028-PS1)					Source: B2L0108-16RE1					
Lead	65.5	0.500	mg/kg dry	61.6	11.8	87.2	75-125			

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 Project Manager: Bryan Graham

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BTEX, MTBE, Naphthalene, and n-Hexane by WA VPH - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2L05020: Prepared 12/05/02 Using EPA 5030B [MeOH]

Blank (2L05020-BLK1)

Methyl tert-butyl ether	ND	0.100	mg/kg							
Benzene	ND	0.0100	"							
Toluene	ND	0.0100	"							
Ethylbenzene	ND	0.0100	"							
m,p-Xylene	ND	0.0200	"							
o-Xylene	ND	0.0100	"							
Naphthalene	ND	0.0100	"							
n-Hexane	ND	0.0200	"							
Surrogate: 1,2-DCA-d4	3.94		"	4.00		98.5	57-139			
Surrogate: Toluene-d8	3.53		"	4.00		88.2	66-122			
Surrogate: 4-BFB	3.26		"	4.00		81.5	62-121			

Blank (2L05020-BLK2)

Methyl tert-butyl ether	ND	0.100	mg/kg							
Benzene	ND	0.0100	"							
Toluene	ND	0.0100	"							
Ethylbenzene	ND	0.0100	"							
m,p-Xylene	ND	0.0200	"							
o-Xylene	ND	0.0100	"							
Naphthalene	ND	0.0100	"							
n-Hexane	ND	0.0200	"							
Surrogate: 1,2-DCA-d4	4.16		"	4.00		104	57-139			
Surrogate: Toluene-d8	3.73		"	4.00		93.2	66-122			
Surrogate: 4-BFB	3.26		"	4.00		81.5	62-121			

LCS (2L05020-BS1)

Benzene	1.05	0.0100	mg/kg	1.00		105	73-133			
Toluene	0.986	0.0100	"	1.00		98.6	68-130			
Surrogate: 1,2-DCA-d4	4.62		"	4.00		116	57-139			
Surrogate: Toluene-d8	3.92		"	4.00		98.0	66-122			
Surrogate: 4-BFB	3.41		"	4.00		85.2	62-121			

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Foster Wheeler Environmental Corporation
 12100 NE 195th St
 Bothell WA/USA, 98011

Project: DPE Extraction Well Construction
 Project Number: Not Provided
 Project Manager: Bryan Graham

Amended Report
 Issued: 01/07/03 08:11

BTEX, MTBE, Naphthalene, and n-Hexane by WA VPH - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch 2L05020: Prepared 12/05/02 Using EPA 5030B [MeOH]

LCS Dup (2L05020-BSD1)

Benzene	1.04	0.0100	mg/kg	1.00		104	73-133	0.957	20	
Toluene	0.983	0.0100	"	1.00		98.3	68-130	0.305	20	
Surrogate: 1,2-DCA-d4	4.63		"	4.00		116	57-139			
Surrogate: Toluene-d8	3.90		"	4.00		97.5	66-122			
Surrogate: 4-BFB	3.49		"	4.00		87.2	62-121			

Matrix Spike (2L05020-MS1)

Source: B2L0068-06

Benzene	1.07	0.0100	mg/kg dry	1.25	ND	85.6	62-138			
Toluene	1.10	0.0100	"	1.25	ND	88.0	44-133			
Surrogate: 1,2-DCA-d4	4.93		"	4.99		98.8	57-139			
Surrogate: Toluene-d8	4.34		"	4.99		87.0	66-122			
Surrogate: 4-BFB	3.92		"	4.99		78.6	62-121			

Matrix Spike Dup (2L05020-MSD1)

Source: B2L0068-06

Benzene	1.00	0.0100	mg/kg dry	1.25	ND	80.0	62-138	6.76	25	
Toluene	0.997	0.0100	"	1.25	ND	79.8	44-133	9.82	25	
Surrogate: 1,2-DCA-d4	4.84		"	4.99		97.0	57-139			
Surrogate: Toluene-d8	4.09		"	4.99		82.0	66-122			
Surrogate: 4-BFB	3.77		"	4.99		75.6	62-121			

North Creek Analytical - Bothell

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Amended Report
 Issued: 01/07/03 08:11

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2L10020: Prepared 12/10/02 Using Dry Weight										
Blank (2L10020-BLK1)										
Dry Weight	100	1.00	%							
Batch 2L10021: Prepared 12/10/02 Using Dry Weight										
Blank (2L10021-BLK1)										
Dry Weight	99.8	1.00	%							

North Creek Analytical - Bothell

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Amended Report
 Issued: 01/07/03 08:11

Notes and Definitions

- G-01 Results reported for the gas range are primarily due to overlap from diesel range hydrocarbons.
- I-06 The analyte concentration may be artificially elevated due to coeluting compounds or components.
- Q-01 The spike recovery for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.
- Q-02 The spike recovery for this QC sample is outside of NCA established control limits due to sample matrix interference.
- Q-07 The RPD value for this QC sample is above the established control limit. Review of associated QC indicates the high RPD does not represent an out-of-control condition for the batch.
- Q-34 The sample container submitted for volatile analysis had either headspace or air bubbles greater than 1/4 inch in diameter.
- S-01 The surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interferences.
- S-04 The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
- S-06 The recovery of this surrogate is outside control limits due to sample dilution required from high analyte concentration and/or matrix interferences.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

North Creek Analytical - Bothell

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CHAIN OF CUSTODY REPORT

Work Order #: **B210188**

CLIENT: **SEA TIME OIL COMPANY**

REPORT TO: **SLOTT SLOAN (cc: BAAHAM@FWENC)**

ADDRESS: **2937 W COMMODORE WY SEATTLE WA 98199**

PHONE: **206-286-6457** FAX:

PROJECT NAME: **DPE GWL**

PROJECT NUMBER: **DPE - EXTRACTION WELL INSTALLATION**

SAMPLED BY: **J SPELL**

INVOICE TO: **SAME AS LEFT**

P.O. NUMBER:

TURNAROUND REQUEST in Business Days*
 Organic & Inorganic Analyses: 7 5 4 3 2 1 <1
 STD. 4 3 2 1 <1
 Petroleum Hydrocarbon Analyses: 4 3 2 1 <1
 STD. 4 3 2 1 <1
 OTHER: Please Specify

*Turnaround Requests less than standard may incur Rush Charges

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	REQUESTED ANALYSES				MATRIX (W.S.O)	# OF CONT.	COMMENTS	NCA W/ ID
		NWTOH-DK	TOTAL LEAD	NWTPH-CX	BTEX				
1. 01MW26-5	120402 0830	X	X	X	X	S	Z		14
2. 01MW26-10	0845	X	X	X	X				15
3. 01MW26-15	0855	X	X	X	X				16
4. 01MW26-20	0910	X	X	X	X				17
5. 01MW27-5	1035	X	X	X	X				18
6. 01MW27-10	1045	X	X	X	X				19
7. 01MW27-15	1100	X	X	X	X				20
8. 01MW27-20	1110	X	X	X	X				21
9.									
10.									
11.									
12.									
13.									
14.									
15.									

RECEIVED BY: **JEFF SPELL** DATE: **120402** TIME: **1848**

PRINT NAME: **JEFF SPELL** FIRM: **FWENC**

RECEIVED BY: **BRAM TONTY** DATE: **120402** TIME: **1848**

PRINT NAME: **BRAM TONTY** FIRM: **NCA**



APPENDIX C

PILOT TEST PHOTOGRAPHS

- C.1 DPE WELL 01MW-18 WITH STINGER EXTRACTION POINT
SET AT 20 FEET BELOW TOP OF CASING

- C.2 DPE WELL 01MW-18 WITH STINGER EXTRACTION POINT
SET AT 23 FEET BELOW TOP OF CASING

- C.3 DPE EFFLUENT STREAM TREATMENT SYSTEM –
OIL/WATER SEPARATOR AND ACTIVATED CARBON
UNITS

- C.4 HOLDING TANK FOR EFFLUENT WATER STREAM FROM
OIL/WATER SEPARATOR



Photograph C.1 DPE Well 01MW-18 with Stinger Extraction Point Set at 20 feet below Top of Casing



Photograph C.2 DPE Well 01MW-18 with Stinger Extraction Point Set at 23 feet below Top of Casing



Photograph C.3 DPE Effluent Stream Treatment System – Oil/Water Separator and Activated Carbon Units



Photograph C.4 Holding Tank for Effluent Water Stream from Oil/Water Separator

APPENDIX D

NOAA SCREENING QUICK REFERENCE TABLES



Screening Quick Reference Tables

This set of NOAA **Screening Quick Reference Tables**, or **SQUIRTs**, presents screening concentrations for inorganic and organic contaminants in various environmental media. Guidelines for sample preservation and options for laboratory analytical techniques are also included.

The **SQUIRT** cards were developed for internal use by the Coastal Protection & Restoration Division (CPR) of NOAA. The CPR Division identifies potential impacts to coastal resources and habitats likely to be affected by hazardous waste sites. To initially identify substances which may threaten resources of concern to NOAA, environmental concentrations are compared to these screening levels. These tables are intended for preliminary screening purposes only; they do not represent official NOAA policy and do not constitute criteria or clean-up levels. NOAA does not endorse their use for any other purposes. Screening levels are reported with the number of significant figures they were originally reported with.

Further guidance on the recommended application of various screening guidelines is provided in the supporting source documentation (listed on the last page of each section). Users of the **SQUIRT** cards are strongly encouraged to review supporting documentation to determine appropriateness for their specific use.

The **SQUIRT** card set is organized into the following sections:

- Inorganics in Solids (freshwater and marine sediment, plus soil)
- Inorganics in Water (groundwater and surface water)
- Organics in Water and Solids
- Analytical Methods for Inorganics
- Analytical Methods for Organics
- Guidelines for Sample Collection & Storage

For surface water samples, the CPR Division compares measured contaminant concentrations to their applicable, EPA Ambient Water Quality Criteria (AWQC) for the protection of aquatic organisms. Because releases from hazardous waste sites are often continuous and long-term, concentrations are compared directly with the chronic AWQC, when available. **SQUIRTs** for trace element AWQCs have been updated to show values for just filtered samples, as well as the formulae to calculate exact criteria for elements whose criteria are hardness-dependent. Groundwater concentrations are also screened against AWQC. However, given the dilution expected during migration and upon discharge of groundwater to surface water, CPRD uses 10 times the applicable AWQC for screening. If available, suitable site-specific dilution factors are used. Maximum Contaminant Levels (MCLs), applicable to drinking water sources and secondary MCLs applicable to groundwater, are also provided on the **SQUIRT** cards.

Promulgated criteria similar to the AWQC are generally not available for contaminated soils or sediments. For screening purposes, inorganic contaminant levels in soils are compared to the average concentrations found in natural soils of the United States. Organic compounds in soil are screened against risk-based Canadian soil standards. Soil standards for different land use categories are listed to provide perspective. Soil values are not used by NOAA to estimate aquatic exposures. NOAA screens soil concentrations only to estimate which contaminants may be elevated and thus represent potential contaminant sources to aquatic habitats of concern.

Multiple sediment screening values have been included in the NOAA **SQUIRTs** to help portray the entire spectrum of concentrations which have been associated with various probabilities of adverse biological effects. This spectrum ranges from presumably non-toxic e.g., trace metal levels reported to represent non-anthropogenically



Screening Quick Reference Table for Inorganics in Solids

These tables were developed for internal use for screening purposes only; they do not represent official NOAA policy and do not constitute criteria or clean-up levels. All attempts have been made to ensure accuracy; however, NOAA is not liable for errors. Values are subject to changes as new data become available.

(values in ppb dry weight)

COMPOUND	FRESHWATER SEDIMENT					MARINE SEDIMENT			SOIL		
	"Background" 1	Lowest ARCS H ₂ azteca TEL	Threshold Effects Level (TEL)	Probable Effects Level (PEL)	Upper 2 Threshold (UET)	Threshold Effects Level (TEL)	Effects Range Low (ERL)	Probable Effects Level (PEL)	Effects Range Median (ERM)	Apparent 3 Threshold (AET)	Background Geometric Mean

Predicted Toxicity Gradient:

Increasing

Increasing

ALUMINUM (Al) (%)	0.26%	2.55%										
ANTIMONY (Sb)	160				3,000 M	7,240	8,200	41,600	70,000	1.8% N	4.7%	0.5- >10%
ARSENIC (As)	1,100	10,798	5,900	17,000	17,000 I					9,300 E	480	bd-8,800
BARIUM (Ba)	700									35,000 B	5,200	bd-97,000
CADMIUM (Cd)	100-300	583	596	3,530	3,000 I	676	1,200	4,210	9,600	48,000 A	440,000	10,000-0.5%
CHROMIUM (Cr)	7,000-13,000	36,286	37,300	90,000	95,000 H	52,300	81,000	160,400	370,000	62,000 N	37,000	1000-0.2%
COBALT (Co)	10,000									10,000 N	6,700	bd-70,000
COPPER (Cu)	10,000-25,000	28,012	35,700	197,000	86,000 I	18,700	34,000	108,200	270,000	390,000 MO	17,000	bd-700,000
IRON (Fe) (%)	0.99-1.8%	18.84%			4% I					22% N	1.8%	0.01- >10%
LEAD (Pb)	4,000-17,000	37,000	35,000	91,300	127,000 H	30,240	46,700	112,180	218,000	400,000 B	16,000	bd-700,000
MANGANESE (Mn)	400,000	630,000			1,100,000 I					260,000 N	330,000	bd-0.7%
MERCURY (Hg)	4-51		174	486	560 M	130	150	696	710	410 M	58	bd-4,600
NICKEL (Ni)	9,900	19,514	18,000	35,900	43,000 H	15,900	20,900	42,800	51,600	110,000 EL	13,000	bd-700,000
SELENIUM (Se)	290									1,000 A	260	bd-4,300
SILVER (Ag)	<500				4,500 H	730	1,000	1,770	3,700	3,100 B		bd-0.3%
STRONTIUM (Sr)	49,000										120,000	bd-10,000
TIN (Sn)	5,000									> 3,400 N as TBT	890	bd-500,000
YANADIUM (V)	50,000				520,000 M	124,000	150,000	271,000	410,000	410,000 I	58,000	bd-500,000
ZINC (Zn)	7,000-38,000	98,000	123,100	315,000	130,000 M					4,500 MO	48,000	bd-0.29%
SULFIDES												

- "Background" values are derived from a compilation of sources, but come primarily from Int. Joint Comm. Sediment Subcommittee (1988).
- Entry is lowest, reliable value among a compilation of AET levels: I - Infaunal community impacts; H - Hyalidella azteca bioassay; M - Microtox bioassay
- Entry is lowest value among AET levels: I - Infaunal community impacts; A - Amphipod; B - Bivalve; M - Microtox; O - Oyster larvae; E - Echinoderm larvae; L - Larval max; or, N - Nematodes bioassays

SOURCES: FOR MORE INFORMATION CONTACT: 2

Sediments:

FTI Environ. Serv., Contaminated Sediments Criteria Rpt., 1989; Wash. Dept. Ecol. Publ. 95-308, 1995 and 97-322a, 1997; J. Great Lakes Res. 22(3):624-638, 1996; Grice & Waidow, Puget Sound Dredged Disposal Analysis Rpt., 1996; Environ. Manage. 19(1):81-97, 1996; The AET Approach: Briefing Rpt. to the EPA SAB, Sept. 1988; Int. Joint Comm., Procedures for Assessment of Contaminated Sediment in the Great Lakes, 1986; Ecorox. (5):253-278, 1996; EPA Rpt. 905-R96-008, Sept. 1996; WAC Chapter 173-204; J. Great Lakes Res. 22(3):602-623, 1996.

Soil:

Shacklette and Boemgen 1984; USGS Prof. Paper 1270; bd denotes below detection limits.

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Screening Quick Reference Table for Inorganics in Water

(values in ppb)

These tables were developed for internal use for screening purposes only; they do not represent official NOAA policy and do not constitute criteria or clean-up levels. All attempts have been made to ensure accuracy; however, NOAA is not liable for errors. Values are subject to changes as new data become available.

TRACE ELEMENT	GROUND WATER		SURFACE WATER		NOTES	
	Maximum Contaminant Levels (MCLs)	Freshwater CMC "acute"	CCC "chronic"	Marine CMC "acute"		CCC "chronic"
ALUMINUM (Al)	50-200*	pH 750 88 p	pH 87 30 p	1500 p 2319*	500 p	→ denotes changes from previous to recent recommended values (i.e., previous → new). Where there was no previous value, → denotes the new recommendation. For pH 6.5 to 9.0 and expressed as total recoverable.
ANTIMONY (Sb)	6	88 p	30 p	1500 p	500 p	
ARSENIC (As**)	≤ 50	850*	→ 150	2319*	→ 36	LOELs from 50 FR 30789. Toxicity values derived for arsenic III are now applied to total arsenic.
ARSENIC, total	50	→ 340	→ 150	→ 69	→ 36	
BARIUM (Ba)	2000					LOELs from 45 FR 79326.
BERYLLIUM (Be)	4	130*	5.3*	43 → 42	9.3	Marine values represent change to filtered basis.
CADMIUM (Cd)	5	3.9 → 4.3†	1.1 → 2.2†	43 → 42	9.3	Marine values represent change to filtered basis.
CHROMIUM (Cr**)	≤ 100	1700 → 570†	210 → 74†	10300*	50	Marine values represent change to filtered basis.
CHROMIUM (Cr**)	≤ 100	16	11	1079 → 1100	50	
CHROMIUM, total	100	18 → 13†	12 → 9†	2.9 → 4.8	→ 3.1	
COPPER (Cu)	1300 p	18 → 13†	1000	2.9 → 4.8	→ 3.1	
IRON (Fe)	300	83 → 65†	3.2 → 2.5†	217 → 210	8.5 → 8.1	Values represent change to filtered basis.
LEAD (Pb)	15 p	83 → 65†	3.2 → 2.5†	217 → 210	8.5 → 8.1	
MANGANESE (Mn)	50*					
MERCURY (Hg)	2	2.4 → 1.4	0.012 → 0.77	2.1 → 1.8	0.025 → 0.94	Derived from inorganic, but applied to total mercury. Does not account for food web uptake.
NICKEL (Ni)	100	1400 → 470†	160 → 52†	75 → 74	8.3 → 8.2	Marine values represent change to filtered basis.
PHOSPHORUS (P)						For elemental phosphorus.
SELENIUM (Se)	50	13-186 total	5 total	294 → 290	71	Freshwater CMC depends on ratio of selenite to selenate. Marine values represent change to filtered basis. Marine CCC does not account for food web uptake, so monitor fish community if > 5.0 µg/L. CMCs has been divided by two to be comparable to 1985 derivations.
SILVER (Ag)	100*	4.1 → 1.7†	0.12	2.3 → 0.95	0.01	LOELs from 45 FR 79340.
THALLIUM (Tl)	2	1400*	40*	2130*	0.01	
Tin as TBT		0.46	0.063	0.37		
ZINC (Zn)	5000*	120†	110 → 120†	95 → 90	86 → 81	Marine values represent change to filtered basis.
Hydrogen Sulfide Cyanide, free (CN)	200	22	5.2	1	1	

p - proposed * - Lowest Observable Effect Level (not a criterion) • - National Secondary Drinking Water Regulations • - CMC has been halved to be comparable to criteria derived using 1985 Guidelines

† - Expressed as dissolved (passing filtered through a 0.45 µm filter) and calculated from total recoverable by applying a conversion factor except as noted.

‡ - Hardness-dependent value with 25 mg/L as minimum & 400 mg/L as maximum calcium carbonate; value entered is for 100 mg/L calcium carbonate. Use equations to determine exact criteria.

For salinity between 1 and 10 ppt, use the more stringent of either fresh or marine values.



Screening Quick Reference Table for Inorganics in Water

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(values in ppb)

HARDNESS CALCULATIONS

UNFILTERED TO FILTERED CALCULATIONS

TRACE ELEMENT	FOR FILTERED FRESHWATER CRITERIA		CONVERSION FACTORS		
	CMC	CCC	Fresh CMC	Fresh CCC	Marine CMC/CCC
ARSENIC (As)	CMC = $e^{1.128 [\ln(\text{hardness})]} - 3.6867$	CCC = $e^{0.7952 [\ln(\text{hardness})]} - 2.715$	CF = 1; CF = $1.136672 - 0.041838 [\ln(\text{hardness})]$	CF = 1 CF = $1.101672 - 0.041838 [\ln(\text{hardness})]$	CF = 1 CF = 0.994
CADMIUM (Cd)	CMC = $e^{0.8191 [\ln(\text{hardness})]} + 3.7256$	CCC = $e^{0.819 [\ln(\text{hardness})]} + 0.6848$	CF = 0.316	CF = 0.980	CF = 0.993
CHROMIUM III (Cr ⁺³)	CMC = $e^{0.9422 [\ln(\text{hardness})]} - 1.7$	CCC = $e^{0.8545 [\ln(\text{hardness})]} - 1.702$	CF = 0.982	CF = 0.960	CF = 0.83
CHROMIUM VI (Cr ⁺⁶)	CMC = $e^{1.273 [\ln(\text{hardness})]} - 1.46$	CCC = $e^{1.273 [\ln(\text{hardness})]} - 4.705$	CF = 0.960	SAME AS CMC	CF = 0.951
COPPER (Cu)	CMC = $e^{0.846 [\ln(\text{hardness})]} + 2.255$	CCC = $e^{0.846 [\ln(\text{hardness})]} + 0.0594$	CF = 1.46203 - 0.145712 [$\ln(\text{hardness})$]	CF = 0.85	CF = 0.85
LEAD (Pb)	CMC = $e^{1.72 [\ln(\text{hardness})]} - 6.52$	CCC = No criteria	CF = 0.85	CF = 0.998	CF = 0.998
MERCURY (Hg)	CMC = $e^{0.8473 [\ln(\text{hardness})]} + 0.884$	CCC = $e^{0.8473 [\ln(\text{hardness})]} + 0.884$	The freshwater criteria are expressed as total recoverable; a CF of 0.922 may be used.	CF = 0.986	CF = 0.946
NICKEL (Ni)					
SELENIUM (Se)					
SILVER (Ag)					
ZINC (Zn)					

Freshwater criterion for certain metals are expressed as a function of hardness (mg/L) in the water column. The values shown on page 3 assume 100 mg/L. Values for a different hardness may be calculated using the above equations to arrive at a CMC or CCC for filtered samples. Hardness may range from 25 to 400 mg/L as calcium carbonate. For hardness outside this range, use 25 and 400 mg/L as the minimum and maximum value allowed.

Criteria for most metals are expressed as standards for samples filtered through 0.45 µm filter (i.e., "dissolved"). To convert unfiltered concentrations to filtered, multiply the unfiltered concentration value by the appropriate Conversion Factor (CF) above. For cadmium and lead, the conversion factor itself is hardness-dependent. For salinity between 1 and 10 ppt, use the more stringent of either fresh or marine values.

CMC - Criteria Maximum Concentration is the highest level for a 1-hour average exposure not to be exceeded more than once every three years, and is synonymous with "acute."
 CCC - Criteria Continuous Concentration is the highest level for a 4-day average exposure not to be exceeded more than once every three years, and is synonymous with "chronic."

Sources:

- MCL EPA 810-F-94-001A
EPA 570/9-91-019FS
- AWQC: Fed. Reg. 4 May 1995, Vol. 60 (36): 22223-22237; Fed. Reg. 10 Dec 1998 Vol. 63 (237): 68353 - 68364
US EPA, Quality Criteria for Water Summary 1994,
EPA Health and Ecological Criteria Division

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Screening Quick Reference Table for Organics

(All sediment and soil values in ppb dry weight, except as noted)

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CHEMICAL	CAS NO.	WATER				SEDIMENT				SOIL										
		Maximum Contam- inant Level	Ambient Water Quality Criteria ¹ Freshwater CMC CCC	Marine CMC CCC	Lowest ARCa H azards TEL	Threshold Effects Level (TEL)	Probable Effects Level (PEL)	Upper 2 Effects Threshold (UET)	Threshold Effects Level (TEL)		Effects Range- Low (ERL)	Effects Range- Median (ERM)	Probable Effects Level (PEL)	Apparent 5 Effects Threshold (AET)	Agri- 4 cultural Target	Urban 4 park / Residential Target				
CHLORINATED DIOXINS & PCBS																				
TCDD 2,3,7,8-	1746016	0.00003	<0.01*	<0.00001*	10	0.03	31.62	34.1	277	0.00881H	26 M	21.55	22.7	180	188.79	0.0036 N	130 M	500	5000	
POLYCHLORINATED BIPHENYLS	1356363	0.5	2	0.014	10	0.03	31.62	34.1	277	0.00881H	26 M	21.55	22.7	180	188.79	0.0036 N	130 M	500	5000	
SEMIVOLATILES																				
BENZIDINE	82675		2500*																	
BENZOIC ACID	65850																			
BENZYL ALCOHOL	100516																			
CHLORANILINE 4-	106478		250°C	50°C	160°C	129°C				5100 H										
DIBENZOFURAN	132649																			
DIPHENYLHYDRAZINE 1,2-	122667		270*																	
ISOPHORONE	79591																			
SEMIVOLATILE, NITROAROMATICS																				
DINITROTOLUENE 2,4-	121142			230*	590* S	370* S														
NITROBENZENE	98963		390*		6680*															
N-NITRODIPHENYLAMINE	66306		27000*		3300000°C															
SEMIVOLATILE, ORGANOCHLORINES			5850C*																	
ALDRIN	509002		1.5 2	0.65 2	0.045 2	0.002 2	4.5	8.9	401	301	2.26	0.5	6	4.79	9.5 AE	2.8 A				
CHLORFANE	57749		1.2 2	0.00215 2	0.045 2	0.002 2	4.5	8.9	401	301	2.26	0.5	6	4.79	9.5 AE	2.8 A				
CHLOROPHTHALENE 2-	91587		1600°C		7.5°C		3.54	8.51	601	1.22	2	20	7.81	161						
P,P-DDD (TDE)	72548		0.6*		3.6*		3.54	8.51	601	1.22	2	20	7.81	161						
P,P-DDE	72559		1050*		14*		1.42	6.75	501	2.07	1	27	374.17	91						
P,P-DDT	50293		0.55 2	0.0005 2	0.065 2	0.0005 2	6.98	4450	501	1.19	1.58	46.1	51.7	11 B						
DDT, total							6.98	4450	501	1.19	1.58	46.1	51.7	11 B						
DIELDRIIN ‡	60571		0.24	0.056	0.355 2	0.00095 2	2.85	6.67	3001	0.715	0.02	8	4.3	1.9 E						
ENDOSULFAN (α + β)	115297		0.11 2	0.028 2	0.017 2	0.00435 2	2.67	62.4	5001											
ENDRIIN ‡	72206		0.086	0.036	0.0185 2	0.00115 2	2.67	62.4	5001											
HEPTACHLOR	76446		0.26 2	0.0019 2	0.0285 2	0.0018 2	0.6	2.74	301											
HEPTACHLOR EPOXIDE	1024575		0.2 2	0.0019 2	0.0285 2	0.0018 2	0.6	2.74	301											
HEXACHLOROBENZENE	116741		6 P	3.68 P	160°C	129°C			1001											
HEXACHLOROCYCLOHEXANE	67665		90*	9.3*	32*				1001											
HEXACHLOROCYCLOHEXANE (9HCl)	600751		100*	0.34*	0.34*				1001											

‡ - EPA Proposed Criteria, based on Equilibrium Partitioning, for Dieldrin are 11,000 and 20,000, and for Endrin are 4,200 and 760 µg/kg O.C. in freshwater and marine sediment, respectively.

- 1 - proposed; * - Lowest Observable Effect Level; C - value for chemical class; S - value for summation of isomers; 2 - CMC has been halved to be comparable to criteria derived by 1985 Guidelines.
- 2 - Entry is lowest, reliable value among AET tests, on 1% TOC basis; I - Infantal community impacts; M - Microtox bioassay; H - Hyalidella azteca bioassay; T - value on dry weight basis.
- 3 - Entry is lowest value among AET tests; I - Infantal community impacts; A - Amphipod; B - Bivalve; M - Microtox; O - Oyster larvae; E - Echinoderm larvae; L - Larval maki; or N - Nematode bioassays.
- 4 - Residues greater than target require remediation to levels below target for applicable land use in British Columbia; A denotes a soil value intended to protect adjacent, aquatic habitat.



Screening Quick Reference Table for Organics

(All sediment and soil values in ppb dry weight, except as noted)

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CHEMICAL	CAS NO.	Maximum Contaminant Level	WATER				SEDIMENT				SOIL				
			Ambient Water Quality Criteria ¹		Freshwater Sediment		Marine Sediment		Apparent ³ Effects Threshold (AET)	Apt- ⁴ cultural Target		Urban ⁴ part / Residential Target			
			Freshwater CMC	CCC	FW CMC	CCC	Marine CMC	CCC					Effects Range-Low (ERL)	Effects Range-Median (ERM)	Probable Effects Level (PEL)
HEXACHLOROCYCLOPENTADIENE	77474	50	7 ²	5.2 ²	7 ²	0.94	1.38	91	0.32	0.99	73 BL	> 4.8N			
HEXACHLOROETHANE	67721	0.2	980 ²	540 ²	940 ²										
LINDANE	56889	40	0.95	0.08	0.08										
METHOXYCHLOR	72495			0.03											
MIREX	2505555			0.001				800 I							
PENTACHLOROBENZENE	600955		250 ² C	50 ² C	160 ² C									100	1000
TETRACHLOROBENZENE 1,2,4,5-	95945		250 ² C	50 ² C	160 ² C									100	1000
TOXAPHENE	8001952	3	0.73	0.0002	0.21										
SEMIVOLATILE, ORGANOPHOSPHATES															
CHLORPYRIFOS	2821052		0.083	0.041	0.11										
MALATHION	121755		0.065	0.1	0.11										
PARATHION MIXTURE	56302			0.013											
SEMIVOLATILE, PHENOLICS															
CHLOROPHENOL 2-	95979		4380 ²		4850 ² C									8 A	50
DICHLOROPHENOL 2,4-	120932		2020 ²		365 ²									5 A	50
DIMETHYLPHENOL 2,4-	105679		2120 ²											18 N	100
DINITROPHENOL	51285		230 ² C		150 ² C									100	1000
METHYL PHENOL 2- [O-CREOSOL]	95497				4850 ² C									8 B	100
METHYL PHENOL 4- [P-CREOSOL]	106445				4850 ² C									100 B	100
NITROPHENOL 4-	100027				4850 ² C									100	1000
PENTACHLOROPHENOL [at pH 7.6†]	67865	1.0 P	230 ² C	150 ² C	4850 ² C			48 t H						17 B	35 A pH
PHENOL	109852		19 pH	15 pH	13									130 E	100
TETRACHLOROPHENOL 2,3,4,6-	56902		10200 ²	2560 ²	5800 ²									31	50
TRICHLOROPHENOL 2,4,5-	95954		100 P	63 P	240 P									61	50
TRICHLOROPHENOL 2,4,6-	65062			970 ²	440 ²									61	50
SEMIVOLATILE, PHTHALATES															
BUTYL BENZYL PHTHALATE	85607		940 ² C	37C	2944 ² C									63 M	
DI[2-ETHYLHEXYL] PHTHALATE	117817	6	400 P	360 P	400 P			750 tM	182.16	2646.51				1300 I	
DIETHYL PHTHALATE	64662		940 ² C	37C	2944 ² C									6 BL	
DIMETHYL PHTHALATE	131113		940 ² C	37C	2944 ² C									6 B	
DI-N-OCTYL PHTHALATE	117840		940 ² C	37C	2944 ² C									61 BL	
DI-N-BUTYL PHTHALATE	64742		940 ² C	37C	2944 ² C			110 H						58 BL	

† - For PCP, freshwater CMC = 61,005pph and CCC = 61,005pph - 5.134

- 1 - p - proposed; * - Lowest Observable Effect Level; C - value for chemical class; S - value for summation of isomers; 2 - CMC has been halved to be comparable to criteria derived by 1985 Guidelines.
- 2 - Entry is lowest, reliable value among AET tests on 1% TOC basis; I - Infantal community impacts; M - Microtox bioassay; H - Hyalella azteca bioassay; t - value on dry weight basis.
- 3 - Entry is lowest value among AET tests; I - Infantal community impacts; A - Amphipod; B - Bivalve; M - Microtox; O - Oyster larvae; E - Echinoderm larvae; L - Larval inks; or, N - Neartres bioassays.
- 4 - Residues greater than target require remediation to levels below target for applicable land use in British Columbia; 'A' denotes a soil value intended to protect adjacent, aquatic habitats.



Screening Quick Reference Table for Organics

(all sediment and soil values in ppb dry weight, except as noted)

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CHEMICAL	CAS No.	Maximum Contaminant Level	WATER		SEDIMENT		Freshwater TEL	Sediment TEL	Upper 2 Effects Threshold (UET)	Threshold Effects Level (TEL)	Effects Range-Low (ERL)	Effects Range-Median (ERM)	Probable Effects Level (PEL)	Apparent 3 Effects Threshold (AET)	Agri- 4 cultural Target	Urban 4 part / Residential Target
			Ambient Water Quality Criteria 1 Freshwater CMC	Marine CMC	Marine CCC	Sediment CCC										
DICHLOROETHANE 1,2-	107062	70	118000*	20000*	113000*										100	5000
DICHLOROETHYLENE 1,2-cis	540560	100	118000*	224000*S	224000*S										100	5000
DICHLOROETHYLENE 1,2-trans	166605	100	118000*	224000*S	224000*S										100	5000
DICHLOROPROPENE	542756	700	6060*S	244*S	790*S										100	5000
ETHYL BENZENE	100414	700	32000*	20000*	430*										100	5000
ETHYLENE DICHLORIDE	107062	5	118000*	20000*	113000*										100	5000
METHYLENE CHLORIDE	75092	5	11000*C	1100*	12000*C										100	5000
PENTACHLOROETHANE	76017	5	7240*	1100*	390*										100	5000
PROPYLENE DICHLORIDE	76975	5	23000*S	5700*S	10300*S										100	5000
STYRENE	100425	100	9320*S	2400*	9020*										100	5000
TETRACHLOROETHANE	79345	5	9320*S	2400*	10200*										100	5000
TETRACHLOROETHANE 1,1,2,2-	127154	5	5280*	840*	6300*										100	5000
TOLUENE	106593	1000	17500*	840*	5000*										100	5000
TRICHLOROETHENE 1,2,4-	102021	70	250*C	50*C	160*C										100	5000
TRICHLOROETHANE 1,1,1-	71856	200	18000*S	18000*S	31200*										100	5000
TRICHLOROETHANE 1,1,2-	79005	5	18000*S	9400*	2000*										100	5000
TRICHLOROETHYLENE	79016	5	45000*	21900*	2000*										65 A	65 A
TRICHLOROFUOROMETHANE	75694	7	11000*C	12000*C	6400*C										4 BL	5000
VINYLDIENE CHLORIDE	75354	7	11800*S	224000*S	224000*S										100	5000
XYLENE	1330207	10000													100	5000
VOLATILES, NITRILES																
ACROLEIN	107026		68*	21*	55*											
ACRYLONITRILE	107131		7550*	2600*												

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 2 Entry is lowest, reliable value among AET tests, on 1% TOC basis; I - Infaunal community impacts; M - Microtox bioassay; H - Hyalidella azteca bioassay; t - value on dry weight basis.
 3 Entry is lowest value among AET tests; I - Infaunal community impacts; A-Amphipod; B-Bivalve; M-Microtox; O-Oyster larvae; E-Echinoderm larvae; L-Larval max; or, N-Nearshore bioassays.
 4 Residues greater than target require remediation to levels below target for applicable land use in British Columbia. 'A' denotes a soil value intended to protect adjacent, aquatic habitat.

Sources:

Water: EPA 810-F-94-001A; EPA 570/9-91-019F5; Fed. Reg. 4 May 1995, Vol. 60 (86): 22223-22237; Fed. Reg. 10 Dec 1998, Vol. 63 (237): 68363 - 68364; EPA, Quality Criteria for Water Summary 1994, EPA Health and Ecological Criteria Div., EPA 905-R-96-008, Sept. 1996; J. Great Lakes Res 22(3):624-638, 1996; Wash. Dep. Ecol. Publ. 95-308, 1995 and 97-323a, 1997; Environ. Manage. 19(1): 81 - 97, 1996; The AET Approach: Briefing Rpt. to the EPA SAB, September 1988; Gries & Waldow, Pudget Sound Dredged Disposal Analysis Rept., 1996; Ecolox. (5):253-278, 1996; WAC Chapter 173-204
Soil: British Columbia Regulation 375/96, Contaminated Sites Regulation, June 13, 1997.

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Options For Selection of Analytical Methods: Inorganics

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TRACE ELEMENT	OTHER I	FLAME AA	FURNACE AA	ICP	EXTRACTION METHODS	Soil / Sediment
ALUMINUM (Al)	6800	7020	7010 2	6010B 6020A	Water 3005A 3010A 3015A	3050B 3051A
ANTIMONY (Sb)	6200(60) 6800	7040	7041 7062 3	6010B 6020A	3005A 3015A	3050B 3051A
ARSENIC (As)	6200(60) 7063 7061A 3	7080A	7081 3	6010B 6020A	3005A 3010A 3015A 7063	3050B 3051A
BARIUM (Ba)	6800	7090	7091	6010B 6020A	3005A 3010A 3015A	3050B 3051A
BERYLLIUM (Be)	6200 6800	7130	7131A	6010B 6020A	3005A 3010A 3015A 3020A	3050B 3051A
CADMIUM (Cd)	6200 6800	7140	7140	6010B 6020A	3005A 3010A 3015A	3050B 3051A
CALCIUM (Ca)	6200 6800	7190	7191	6010B 6020A	3005A 3010A 3015A 3020A	3050B 3051A
CHROMIUM (Cr), total	6200(200) 6800	7200	7201	6010B 6020A	3005A 3010A 3015A 3020A	3050B 3051A
CHROMIUM+6 (Cr+6)	7195 - 7199 3	7210	7211 3	6010B 6020A	3005A 3010A 3015A	3050B 3051A
COBALT (Co)	6200(390)	7380	7381 3	6010B 6020A	3005A 3010A 3015A	3050B 3051A
COPPER (Cu)	6200(85) 6800	7420	7421	6010B 6020A	3005A 3010A 3015A 3020A	3050B 3051A
IRON (Fe)	6200 6800	7450	7450	6010B 6020A	3005A 3010A 3015A	3050B 3051A
LEAD (Pb)	6200(45) 6800	7460	7461	6010B 6020A	3005A 3010A 3015A	3050B 3051A
MANGANESE (Mn)	6800			6020A	7470A 7472 3015A	3051A 7471B 7473 7474
MERCURY (Hg)	6200(240)					
MOLYBDENUM (Mo)	4500(0.5) 6200 6800 7470A	7480	7481	6010B	3005A 3010A 3015A 3020A	3050B 3051A
NICKEL (Ni)	7471B 7472 7473 7474 3	7520	7521	6010B 6020A	3005A 3010A 3015A	3050B 3051A
POTASSIUM (K)	6200(100) 6800	7610	7610	6010B 6020A	3005A 3010A 3015A	3050B 3051A
SELENIUM (Se)	6200 6800 7741A 7742 3	7760A	7740	6010B 6020A	3005A 3010A 3015A	3050B 3051A
SILVER (Ag)	6200 6800	7770	7761 3	6010B 6020A	3005A 3010A 3015A	3051A 7760 7761
SODIUM (Na)	6200(30) 6800	7780	7841	6010B	3005A 3010A 3015A	3050B 3051A
STRONTIUM (Sr)	6200 6800	7840	7841	6010B 6020A	3005A 3010A 3015A 3020A	3050B 3051A
THALLIUM (Tl)	6200(65)	7870	7911	6010B 6020A	3005A 3010A 3015A 3020A	3050B 3051A
TIN (Sn)	6200 6800	7910	7911 3	6010B 6020A	3005A 3010A 3015A	3050B 3051A
VANADIUM (V)	6200 6800	7950	7951 3	6010B 6020A	3005A 3010A 3015A	3050B 3051A
ZINC (Zn)	6200(80) 6800					
CYANIDE (HCN)	9010B - 9014 3					

- Method 6200 is Portable X-Ray; 6800 is Elemental/Isotope Mass Spec; 4500 is Immunoassay; 7063 is ASV; where available, soil detection limits in ppm are in parentheses.
- Except as noted, most individual procedures are proposed to be integrated into Method 7000B or 7010.
- Includes various methods. Follow the extraction procedure detailed in the individual determinative method.

Sources:

All method numbers refer to EPA SW-846, Volume III with changes as proposed for Volume IV.
ICP's advantage is that it allows simultaneous or rapid sequential determination of many elements, but suffers from interferences. AA determinations are normally completed as single element analyses. ICP and Flame AA have comparable detection limits (within a factor of 4), but ICP-MS (6020A) can drastically improve the detection limits (e.g., an order of magnitude lower). Furnace AA generally exhibits lower detection limits than ICP or Flame-AA, and offers more control over unwanted matrix components. X-RAY and Immunoassays allow field determinations.

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Guidelines for Sample Collection & Storage

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MATERIAL	CONTAINER ¹	PRESERVATION	MAXIMUM HOLDING TIME	SAMPLE SIZE
INORGANICS				
CHROMIUM *6 (Cr*6)	P,G	Cool, 4°C	24 hours	400 mL/200 g
MERCURY (Hg)	P,G	HNO ₃ , to pH <2	28 days	400 mL/200 g
METALS, except Cr*6 and Hg	P,G	HNO ₃ , to pH <2	6 months	600 mL/200 g
CYANIDE by method no. 9010	P,G	Cool 4°C, pH >12 See method 9010	14 days	1000 mL
ALPHA, BETA, AND RADIUM RADIATION	P,G	HNO ₃ to pH <2	6 months	1000 mL
ORGANICS				
BENZIDINES	G, TLC	Cool, 4°C	7 days until extraction, 40 days after extraction	1000 mL
CHLORINATED HYDROCARBONS	G, TLC	Cool, 4°C/3	7 days until extraction, 40 days after extraction	1000 mL
DIOXINS AND FURANS	G, TLC	Cool, 4°C/3	30 days until extraction, 45 days after extraction	1000 mL
HALOETHERS	G, TLC	Cool, 4°C/3	7 days until extraction, 40 days after extraction	1000 mL
NITRILES	G, TLC	Cool, 4°C/3	14 days	
NITROSAMINES	G, TLC	Cool, 4°C/3	7 days until extraction, 40 days after extraction	1000 mL
NITROAROMATICS AND CYCLIC KETONES	G, TLC	Cool, 4°C/3	7 days until extraction, 40 days after extraction	1000 mL
OIL and GREASE	G	Cool, 4°C/2	28 days	100 mL
TOTAL ORGANIC CARBON, by method no. 9060	P,G	Cool, 4°C/2 store in the dark	28 days	500 mL
TOTAL ORGANIC HALIDES by method no. 9020 / 9021	G, TLC	Cool, 4°C/2	28 days	1000 mL/250 mL
PCBs	G, TLC	Cool, 4°C	7 days until extraction, 40 days after extraction	1000 mL/250 mL
PESTICIDES	G, TLC	Cool, 4°C	7 days until extraction, 40 days after extraction	1000 mL
PHENOLS	G, TLC	Cool, 4°C/3	7 days until extraction, 40 days after extraction	1000 mL
PHTHALATE ESTERS	G, TLC	Cool, 4°C	7 days until extraction, 40 days after extraction	1000 mL
POLYNUCLEAR AROMATIC HYDROCARBONS	G, TLC	Cool, 4°C/3 store in the dark	7 days until extraction, 40 days after extraction	1000 mL/250 mL
PURGEABLE AROMATIC HYDROCARBONS	VOA	Cool, 4°C/2,3	14 days	40 mL
PURGEABLE HALOCARBONS	VOA	Cool, 4°C/3	14 days	40 mL

- 1 P - Polyethylene; G - Amber glass containers; TLC - Teflon-lined cap; VOA - Volatile organic analyte vial of amber glass with teflon-lined septum.
- 2 Adjust to pH <2 with H₂SO₄, HCl, or solid NaHSO₄.
- 3 Free chlorine must be removed before addition of HCl by exact addition of Na₂S₂O₃.

SOURCES:

EPA SW846

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Screening Quick Reference Tables

impacted, background) to toxic levels. Screening with conservative, lower-threshold values (e.g., TELs) ensures, with a high degree of confidence, that any contaminant sources eliminated from future consideration pose no potential threat. Conversely, it does not necessarily predict toxicity. Upper thresholds (e.g., PELs) identify compounds which are more probably elevated to toxic levels.

Sediment quality benchmarks have been derived in a variety of ways for varying predictive goals. They are not interchangeable. Nor should they be applied without a reasonable understanding of their development, their performance, and their limitations.

For sediment-associated contaminants, dry weight concentrations are screened against published sediment quality benchmarks. Some benchmarks are available only on a TOC normalized basis, and are footnoted as such. Separate values are provided for either freshwater or estuarine and marine sediments.

The Effects Range-Low (ERLs) and Effects Range-Median (ERMs) plus the marine Threshold Effects Levels (TELS) and Probable Effects Levels (PELs) are based upon a similar data compilations, but use different calculations. The ERL is calculated as the lower 10th percentile concentration of the available sediment toxicity data which has been screened for only those samples which were identified as toxic by original investigators. It is not an LC₁₀. Since the ERL is at the low end of a range of levels at which effects were observed in the studies compiled, it represents the value at which toxicity may begin to be observed in sensitive species. The ERM is simply the median concentration of the compilation of just toxic samples. It is not an LC₅₀. The TEL is calculated as the geometric mean of the 15th percentile concentration of the toxic effects data set and the median of the no-effect data set; as such, it represents the concentration below which adverse effects are expected to occur only rarely. The PEL, as the geometric mean of the 50% of impacted, toxic samples

and the 85% of the non-impacted samples, is the level above which adverse effects are frequently expected. Freshwater TEL/PELs are based on benthic community metrics and toxicity tests results.

Apparent Effect Thresholds (AETs) relate chemical concentrations in sediments to synoptic biological indicators of injury (i.e., sediment bioassays or diminished benthic infaunal abundance). Individual AETs are essentially equivalent to the concentration observed in the highest non-toxic sample. As such, they represent the concentration above which adverse biological impacts would always be expected by that biological indicator due to exposure to that contaminant alone. Conversely, adverse impacts are known to occur at levels below the AET. Only the lowest of the potential AETs is listed. AET values were developed for use in Puget Sound (Washington) and are not easily compared directly to other benchmarks based on single-chemical models and broader data sources. **SQUIRT** cards have been updated with interim AET values which are subject to change.

For freshwater sediments, the Upper Effects Threshold (UET) was derived by NOAA as the lowest AET from a compilation of endpoint analogous to the marine AET endpoints. The UETs for organic contaminants are generally listed for a sediment containing 1% TOC.

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"Buchman, M. F., 1999. NOAA Screening Quick Reference Tables, NOAA HAZMAT Report 99-1, Seattle WA, Coastal Protection and Restoration Division, National Oceanic and Atmospheric Administration, 12 pages."