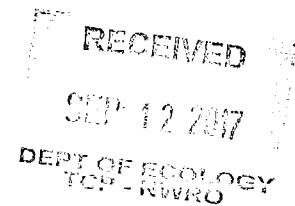


**SCS ENGINEERS**

January 10, 2003  
File No. 04202001.01

Jay Fisher  
Principal Capital Management  
801 Grand Avenue  
Des Moines, IA 50392-1370



Subject: Well Installation and Initial Groundwater Monitoring at the Former Chevron Gasoline Station Site, Meeker Square, Kent, Washington

Dear Jay:

This letter describes the installation of three groundwater monitoring wells at the former Chevron gasoline station site at the Meeker Square shopping center in Kent, Washington. This letter also describes the development and sampling of the three new wells and one existing well that remained at the site after an investigation by others (Giles and Associates) in 1998.

The wells were installed to monitor groundwater quality at the site following the removal (April 2002) of approximately 342 tons of soil contaminated with gasoline-range petroleum hydrocarbons and xylenes. To enhance the biological degradation of petroleum hydrocarbons in the groundwater, Oxygen-Release Compound<sup>®</sup> was added to the saturated soil at the base of the excavation. This remedial action was completed under the Department of Ecology's Voluntary Cleanup Program (VCP). The site's VCP identification number is NW0878.

### Background

Standard Oil (Chevron) purchased the subject site and constructed a gasoline station in 1960 and 1961. The station had two fuel island canopies, one facing each of the two adjoining streets. The underground storage tanks (USTs) were removed from the site in 1983 when the business closed. Observations made during the soil remediation excavation suggested that the former fuel supply lines were left in place and the UST excavation was filled with building debris after the tanks were removed. Soil in the suspected former UST excavation was stained gray and had an obvious gasoline odor.

Soil sample analytical results indicated that the contaminants were limited to gasoline-range petroleum hydrocarbons and xylenes. Benzene was detected in soils at the site only during an investigation conducted by others in 1998. No benzene was detected in any of the soil samples analyzed during the soil remediation project in April 2002.

In April 2002, soils contaminated above MTCA Method A soil cleanup levels were removed to the extent practical. Limited contamination was inaccessible in the saturated soil at the center of the excavation, below electrical and irrigation utilities in the east portion of the south wall, and below electrical and irrigation utilities in the west portion of the south wall. Oxygen-Release Compound<sup>®</sup> (ORC) was mixed into the saturated soil in the base of the excavation to enhance the biological degradation of the petroleum hydrocarbon contamination. The Department of Ecology issued a no further action (NFA) designation for the soil on July 29, 2002.



Depending on seasonal variations, the depth to groundwater at the site is approximately 7.5 to 10.5 feet below grade. Water level data from the wells installed during the 1998 investigation indicated a southerly groundwater flow toward West Meeker Street. The Green River is located approximately 0.4 miles farther south.

### Well Installation

Three wells were installed at the site on May 16, 2002. Two wells (OW2 and OW3) were installed as near as possible to the south edge of the property to provide information about the quality of groundwater leaving the property. One well (OW1) was installed on the west end of the soil remediation excavation. Information from well OW1 provides information about soil and groundwater quality at a location where a small amount of residual soil contamination was left in place because it was inaccessible due to the presence of buried electrical and irrigation utilities. A fourth well (MW3-GS) was already present at the site from a previous investigation undertaken by Giles & Associates in 1998.

All wells were installed using a limited-access, hollow-stem auger drill rig. The auger flights were decontaminated between borings. Logs of the borings were completed in the field.

Soil samples were collected at 5-foot intervals. Soil samples were screened with an organic vapor meter (OVM), a direct-reading instrument that can provide an indication of possible contamination. Soil samples were placed in laboratory-supplied glassware and stored in a cooler for transport to the analytical laboratory. Selected soil samples were transferred to Severn Trent Laboratory (STL) in Tacoma with standard chain-of-custody documentation.

### Soil Sample Results

From each boring, soil samples collected from the 5-foot interval were analyzed. In the case of OW3, which was at the southeast corner of the site, samples from the 10-foot and 15-foot intervals were also analyzed to help characterize inaccessible contamination that remained in place at the southeast end of the soil remediation excavation.

A summary of soil sample analytical results is provided below in Table 1. The complete laboratory report is attached.

**Table 1 Well Installation Soil Sample Analytical Results in mg/Kg (Parts per Million)**

Sample Name	Gasoline-Range TPH	BTEX Compounds			
		Benzene	Toluene	Ethylbenzene	Xylenes
OW1-5'	<4.22	<0.022	<0.043	<0.043	<0.085
OW2-5'	<4.83	<0.024	<0.049	<0.049	<0.097
OW3-5'	<b>271</b>	<b>0.168</b>	0.084	1.5	2.883
OW3-10'	<b>31</b>	<b>0.091</b>	0.015	0.104	0.181
OW3-15'	<5.04	<0.026	<0.051	<0.051	0.007
MTCA Cleanup Level	30	0.030	7	6	9

**Bold** Indicates the concentration exceeds the MTCA Method A cleanup level.

The soil sample analytical results tend to confirm the results of the confirmation sampling conducted during the soil remediation excavation; a limited amount of residual soil contamination remains beneath the southeast corner of the property. The results of the well installation soil samples further indicate that the contamination is limited in its vertical extent.

## Well Development

After allowing more that 24 hours after the wells were installed, the wells were developed by surging and bailing. Surging was performed using a surge block consisting of a length of PVC pipe with an attachment on its lower end that offered a close fit to the interior of the well casing. The wells were surged and bailed repeatedly over the course of approximately four hours. Water bailed from the wells was contained in drums at the site pending laboratory analysis and determination of disposal requirements.

## Groundwater Sampling

Measurements of the depth to groundwater were recorded at each of the three new wells and at well MW3-GS, which had been installed in 1998. The water level measurements facilitated calculating the groundwater flow direction.

On June 6, 2002, low-flow equipment (specifically, a stainless steel and Teflon bladder pump) was used to purge and sample the wells and produce groundwater samples with minimal turbidity. Groundwater quality parameters (pH, conductivity, dissolved oxygen content, and temperature) were measured during purging to evaluate when the parameters had stabilized and the wells had been sufficiently purged. The parameters were measured using a multi-probe, flow-through cell.

The groundwater samples were collected in laboratory-supplied glassware, placed on ice in a field cooler, and transported to the laboratory with standard chain-of-custody documentation. Severn Trent Laboratory (STL) in Tacoma analyzed the samples for gasoline-range total petroleum hydrocarbons (TPH) and gasoline-constituent BTEX compounds (benzene, toluene, ethylbenzene, and xylenes). STL is accredited by the Department of Ecology for the analyses performed.

## Groundwater Results

A summary of the analytical results of the first round of groundwater monitoring is provided below in Table 2. The complete analytical report is attached.

**Table 2 First Quarter (Spring 2002) Groundwater Sample Analytical Results in  $\mu\text{g/L}$  (Parts per Billion)**

Sample Name	Gasoline-Range TPH	BTEX Compounds			
		Benzene	Toluene	Ethylbenzene	Xylenes
OW1	<100	<0.5	<1	<1	<3
OW2	<100	<0.5	<1	<1	<3
OW3	<b>4,550</b>	<b>125</b>	2.62	119	464
MW3-GS	<100	<0.5	<1	<1	<3
MTCA Cleanup Level	800	5	1,000	700	1,000

**Bold** Indicates the concentration exceeds the MTCA Method A cleanup level.

The results of the first quarter of groundwater monitoring indicate that gasoline-range TPH and benzene are present in the groundwater at the southeast corner of the site (OW3). The gasoline concentration at OW3 is at a concentration of 4,550  $\mu\text{g/L}$ , which exceeds the MTCA Method A cleanup level of 800  $\mu\text{g/L}$  in groundwater. Benzene was detected in the same sample at a

concentration of 125 µg/L, which exceeds the MTCA Method A cleanup level of 5 µg/L in groundwater. The samples from OW1, OW2, and the earlier-installed MW3-GS did not contain detectable concentrations of gasoline-range TPH or gasoline-constituent BTEX compounds.

### Groundwater Flow Direction

During investigations by SCS Engineers in the spring of 2000, the locations and elevations of three, pre-existing groundwater monitoring wells were surveyed so that the gradient (slope) and direction of groundwater flow could be calculated. The three wells were installed in 1998 during an investigation by others. Two rounds of groundwater elevation measurements recorded in 2000 indicated a southerly groundwater flow direction toward West Meeker Street and the Green River. The groundwater gradient at the site was nearly flat. Two of the three pre-existing wells were decommissioned during the soil remediation activities in April 2002.

Following the soil remediation (April 2002), site restoration was completed coincident with the final efforts of a street-widening project by the City of Kent. The street project included the installation of small trees and new grass along the south edge of the property. Irrigation plumbing was installed to ensure the survival of the new plants, which had been installed in May and June at the onset of the dry season. Water trucks from the City of Kent made regular trips to the site to water the new trees along West Meeker Street.

The locations and elevations of the three new wells were surveyed in July 2002. At the same time the locations and elevations of the one surviving groundwater monitoring well (OW3-GS) was also surveyed. Measurements of the depth to groundwater have since been recorded on several occasions.

**Table 3 Groundwater Elevation Data, June 6, 2002**

Well ID	Depth to Groundwater	Surveyed Well Elevation	Water Table Elevation
OW1	7.91	99.78	91.87
OW2	8.03	99.82	91.79
OW3	7.46	99.25	91.79
MW3-GS	8.27	100.21	91.94

According to survey data and measurements of the depth to groundwater recorded in the spring of 2002, the groundwater flow direction at the former Chevron gas station site is southerly, toward West Meeker Street. The groundwater flow direction identified at the site in spring 2002 is consistent with site information from investigations in 2000.

### Conclusions

Analytical results of soil samples collected during installation of the three groundwater monitoring wells indicate that a limited amount of gasoline and benzene contamination is present in the shallow soils at the southeast corner of the property (OW3). The contaminant concentrations diminish rapidly with depth.

Based on information from the well-installation soil sampling and measurements of the depth to groundwater, it appears that the remaining soil contamination is present mainly in the unsaturated soil and the upper saturated soils, with concentrations diminishing to very near the cleanup level at 10 feet below grade. No gasoline-range TPH or benzene was detected in the soil sample collected from OW3 at 15 feet below grade.

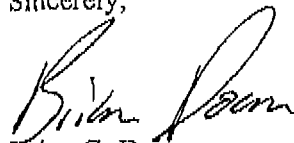
Jay Fisher  
January 10, 2003  
Page 5

Groundwater sample analytical results from the first monitoring event (summer 2002) indicate that gasoline-range TPH and benzene are present in groundwater at the southeast corner (OW3) of the former Chevron station site at concentrations that exceed their respective MTCA Method A groundwater cleanup levels. The sample from OW3 also contained detectable concentrations of toluene, ethylbenzene, and xylenes, but at concentrations significantly below their respective MTCA cleanup levels. None of the other groundwater samples contained detectable concentrations of gasoline-range TPH or gasoline-constituent BTEX compounds. The identified groundwater flow direction at the former Chevron station site at Meeker Square is south toward West Meeker Street.

The spring 2002 groundwater monitoring event represents the first of four planned, post-soil remediation monitoring events. Data collected during subsequent monitoring events will provide information on any trends associated with the contaminant concentrations and the groundwater flow direction. The next monitoring event occurred in September 2002 and is reported separately.

Thank you for the opportunity to provide our services. Please do not hesitate to call if you have any questions.

Sincerely,

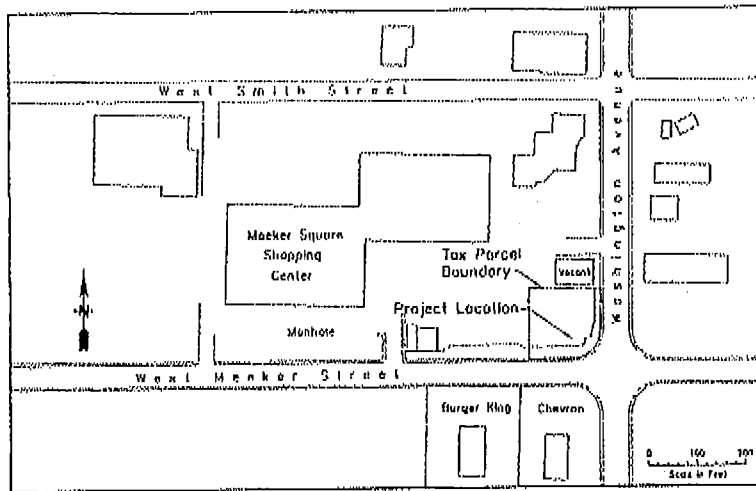


Brian G. Doan  
Project Scientist  
SCS ENGINEERS

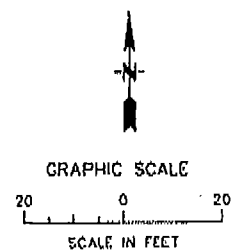
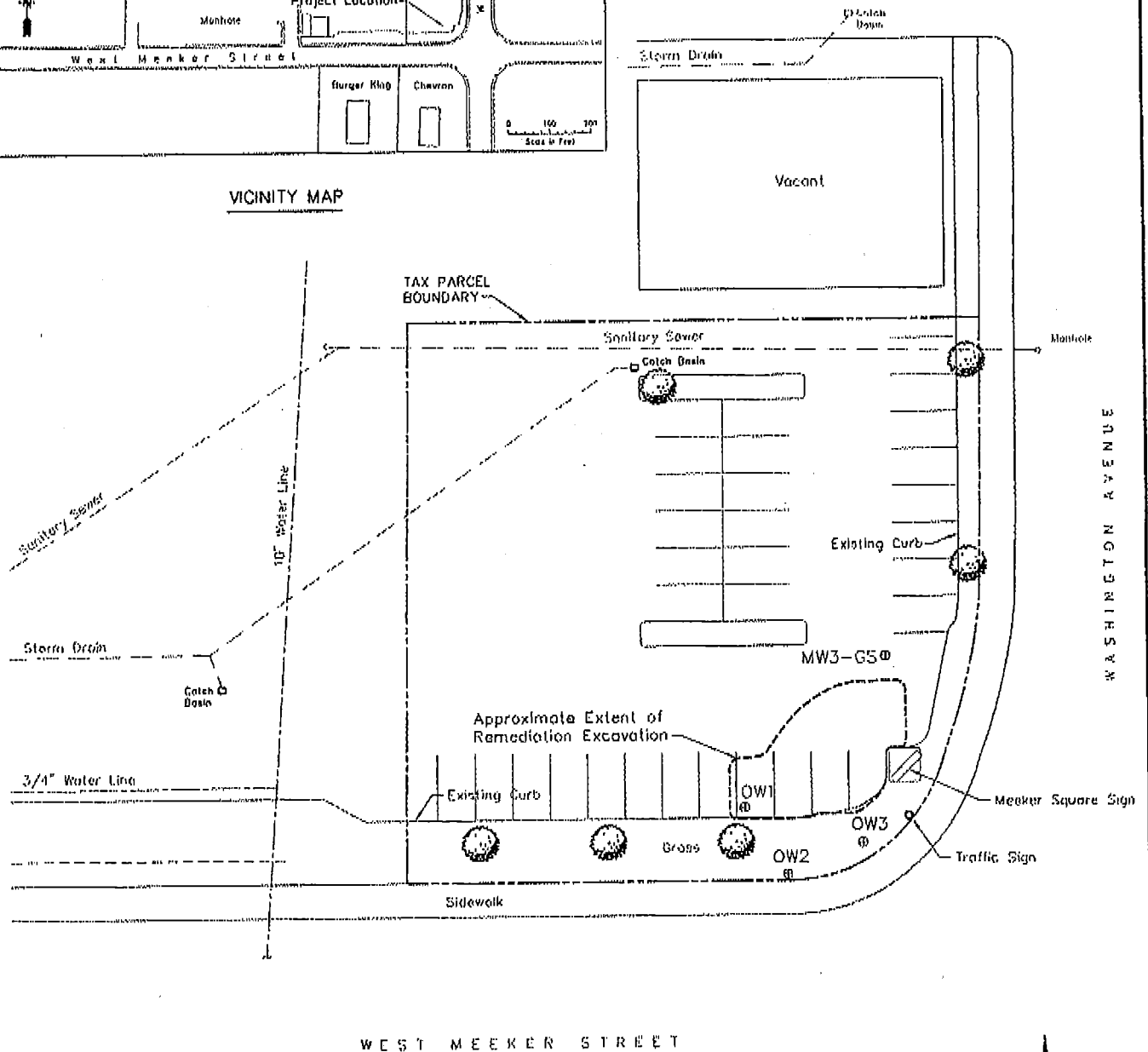


Gregory D. Holland, R.G.  
Project Director  
SCS ENGINEERS

cc: Tim Wirta, Principal Capital Management  
Grant Yang, Washington State Department of Ecology



VICINITY MAP



**SCS ENGINEERS**  
STEARNS, CONRAD AND SCHMIDT  
CONSULTING ENGINEERS, INC.

2405 140TH AVE NE, SUITE 107, BELLEVUE, WA 98005 (425) 746-4600

PROJECT NO. 04202001.01	DES BY B.D.
SCALE AS SHOWN	CHK BY G.H.
CAD FILE FIGURE 1	APP BY G.H.

SITE PLAN  
FORMER GASOLINE STATION SITE  
MEEKER SQUARE SHOPPING CENTER  
KENT, WASHINGTON

DATE JAN 2003
FIGURE 1



STL Seattle  
5755 8<sup>th</sup> Street East  
Tacoma, WA 98424

Tel: 253 922 2310  
Fax: 253 922 5047  
[www.stl-inc.com](http://www.stl-inc.com)

## TRANSMITTAL MEMORANDUM

DATE: May 30, 2002

TO: Brian Doan  
SCS Engineers  
2405 140th Ave. N. E., Suite 107  
Bellevue, WA 98005

PROJECT: Meeker Former Gas Station 04202001.01

REPORT NUMBER: 106043

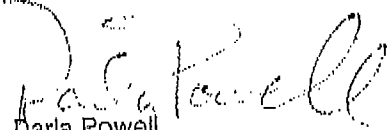
TOTAL NUMBER OF PAGES: 21

Enclosed are the test results for nine samples received at STL Seattle on May 17, 2002.

The report consists of this transmittal memo, analytical results, quality control reports, a copy of the chain-of-custody, a list of data qualifiers and analytical narrative when applicable, and a copy of any requested raw data.

Should there be any questions regarding this report, please contact me at (253) 922-2310.

Sincerely,



Darla Powell  
Project Manager

---

STL Seattle is a part of Severn Trent Laboratories, Inc.

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# STL Seattle

## Sample Identification:

<u>Lab. No.</u>	<u>Client ID</u>	<u>Date/Time Sampled</u>	<u>Matrix</u>
106043-1	OW1-5'	05-16-02 *	solid
106043-2	OW1-10'	05-16-02 *	solid
106043-3	OW1-15'	05-16-02 *	solid
106043-4	OW2-5'	05-16-02 *	solid
106043-5	OW2-10'	05-16-02 *	solid
106043-6	OW2-15'	05-16-02 *	solid
106043-7	OW3-5'	05-16-02 *	solid
106043-8	OW3-10'	05-16-02 *	solid
106043-9	OW3-15'	05-16-02 *	solid

\* - Sampling time not specified for this sample

---

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# STL Seattle

Client Name  
Project Name

SCS Engineers  
Meeker Former Gas Station  
04202001.01  
05-17-02

Date Received

## General Chemistry Parameters

Client Sample ID  
Lab ID

OW1-5'  
106043-01

Parameter	Method	Date Analyzed	Units	Result	PQL
Moisture	EPA 160.3	05-28-02	%	6.76	0.1

Client Sample ID  
Lab ID

OW2-5'  
106043-04

Parameter	Method	Date Analyzed	Units	Result	PQL
Moisture	EPA 160.3	05-28-02	%	22.71	0.1

Client Sample ID  
Lab ID

OW3-5'  
106043-07

Parameter	Method	Date Analyzed	Units	Result	PQL
Moisture	EPA 160.3	05-28-02	%	13.82	0.1

Client Sample ID  
Lab ID

OW3-10'  
106043-08

Parameter	Method	Date Analyzed	Units	Result	PQL
Moisture	EPA 160.3	05-28-02	%	22.68	0.1

Client Sample ID  
Lab ID

OW3-15'  
106043-09

Parameter	Method	Date Analyzed	Units	Result	PQL
Moisture	EPA 160.3	05-28-02	%	24.89	0.1

# STL Seattle

Client Name	SCS Engineers
Client ID:	OW1-5'
Lab ID:	106043-01
Date Received:	5/17/02
Date Prepared:	5/28/02
Date Analyzed:	5/28/02
% Solids	93.24
Dilution Factor	1

## Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	86.8		70	130
Bromofluorobenzene	93.7		80	130

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Benzene	ND	0.0211	0.00422	
Toluene	ND	0.0422	0.00676	
Ethylbenzene	ND	0.0422	0.00634	
m&p-Xylene	ND	0.0845	0.00296	
o-Xylene	ND	0.0422	0.00803	

# STL Seattle

Client Name	SCS Engineers
Client ID:	OW2-5'
Lab ID:	106043-04
Date Received:	5/17/02
Date Prepared:	5/28/02
Date Analyzed:	5/28/02
% Solids	77.29
Dilution Factor	1

## Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	75.2		70	130
Bromofluorobenzene	82		80	130

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Benzene	ND	0.0242	0.00483	
Toluene	ND	0.0483	0.00773	
Ethylbenzene	ND	0.0483	0.00725	
m&p-Xylene	ND	0.0966	0.00338	
o-Xylene	ND	0.0483	0.00918	

# STL Seattle

Client Name	SCS Engineers
Client ID:	OW3-5'
Lab ID:	106043-07
Date Received:	5/17/02
Date Prepared:	5/28/02
Date Analyzed:	5/28/02
% Solids	86.18
Dilution Factor	1

## Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	87.1		70	130
Bromofluorobenzene	125		80	130

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Benzene	0.168	0.0225	0.0045	
Toluene	0.0844	0.045	0.0072	
Ethylbenzene	1.5	0.045	0.00675	
m&p-Xylene	2.44	0.09	0.00315	
o-Xylene	0.443	0.045	0.00855	

# STL Seattle

Client Name	SCS Engineers
Client ID:	OW3-10'
Lab ID:	106043-08
Date Received:	5/17/02
Date Prepared:	5/28/02
Date Analyzed:	5/29/02
% Solids	77.32
Dilution Factor	1

## Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	74.4		70	130
Bromofluorobenzene	80.3		80	130

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Benzene	0.0914	0.0247	0.00494	
Toluene	0.0153	0.0494	0.0079	J
Ethylbenzene	0.104	0.0494	0.00741	
m&p-Xylene	0.159	0.0988	0.00346	
o-Xylene	0.0221	0.0494	0.00939	J

# STL Seattle

Client Name	SCS Engineers
Client ID:	OW3-15'
Lab ID:	106043-09
Date Received:	5/17/02
Date Prepared:	5/28/02
Date Analyzed:	5/29/02
% Solids	75.11
Dilution Factor	1

## Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	73		70	130
Bromofluorobenzene	75.1	N	80	130

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Benzene	ND	0.0252	0.00504	
Toluene	ND	0.0504	0.00806	
Ethylbenzene	ND	0.0504	0.00756	
m&p-Xylene	0.00677	0.101	0.00353	J
o-Xylene	ND	0.0504	0.00957	

# STL Seattle

Client Name	SCS Engineers
Client ID:	OW1-5'
Lab ID:	106043-01
Date Received:	5/17/02
Date Prepared:	5/28/02
Date Analyzed:	5/28/02
% Solids	93.24
Dilution Factor	1

## Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	86.4		50	150
Bromofluorobenzene	97.5		50	150

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Gasoline by NWTPH-G	ND	4.22	

# STL Seattle

Client Name	SCS Engineers
Client ID:	OW2-5'
Lab ID:	106043-04
Date Received:	5/17/02
Date Prepared:	5/28/02
Date Analyzed:	5/28/02
% Solids	77.29
Dilution Factor	1

## Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	76.2		50	150
Bromofluorobenzene	84.4		50	150

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Gasoline by NWTPH-G	ND	4.83	



# STL Seattle

Client Name	SCS Engineers
Client ID:	OW3-5'
Lab ID:	106043-07
Date Received:	5/17/02
Date Prepared:	5/28/02
Date Analyzed:	5/28/02
% Solids	86.18
Dilution Factor	1

## Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	116		50	150
Bromofluorobenzene	206	X9	50	150

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Gasoline by NWTPH-G	271	4.5	

# STL Seattle

Client Name	SCS Engineers
Client ID:	OW3-10'
Lab ID:	106043-08
Date Received:	5/17/02
Date Prepared:	5/28/02
Date Analyzed:	5/29/02
% Solids	77.32
Dilution Factor	1

## Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	78.5		50	150
Bromofluorobenzene	95.8		50	150

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Gasoline by NWTPH-G	31	4.94	

# STL Seattle

Client Name	SCS Engineers
Client ID:	OW3-15'
Lab ID:	106043-09
Date Received:	5/17/02
Date Prepared:	5/28/02
Date Analyzed:	5/29/02
% Solids	75.11
Dilution Factor	1

## Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	73.6		50	150
Bromofluorobenzene	80.7		50	150

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Gasoline by NWTPH-G	ND	5.04	

# STL Seattle

## QUALITY CONTROL REPORT

Client Sample ID: OW1-5'  
Lab ID: 106043-01  
QC Batch Number: 1054-53

### Method Blank

Parameter	Result (%)	PQL
% Moisture	ND	0.1

### Duplicate

Parameter	Sample Result (%)	Duplicate Result (%)	RPD (%)	Flag
% Moisture	6.76	6.55	0.22	

# STL Seattle

Lab ID:  
Date Received:  
Date Prepared:  
Date Analyzed:  
% Solids  
Dilution Factor

Method Blank - GB3078

5/28/02  
5/28/02

1

## Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	104		75	130
Bromofluorobenzene	99.3		80	130

Sample results are on an as received basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Benzene	ND	0.02	0.004	
Toluene	ND	0.04	0.0064	
Ethylbenzene	ND	0.04	0.006	
m&p-Xylene	ND	0.08	0.0028	
o-Xylene	ND	0.04	0.0076	

# STL Seattle

## Blank Spike/Blank Spike Duplicate Report

Lab ID: GB3078  
 Date Prepared: 5/28/02  
 Date Analyzed: 5/28/02  
 QC Batch ID: GB3078

### Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Compound Name	Blank Result (mg/kg)	Spike Amount (mg/kg)	BS Result (mg/kg)	BS % Rec.	BSD Result (mg/kg)	BSD % Rec.	RPD	Flag
Benzene	0	1	0.908	90.8	0.916	91.6	0.88	
Toluene	0	1	0.945	94.5	0.983	98.3	3.9	
Ethylbenzene	0	1	0.938	93.8	0.953	95.3	1.6	
m p-Xylene	0	2	2.02	101	2.06	103	2	
o-Xylene	0	1	1.01	101	1.03	103	2	

# STL Seattle

## Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID: OW1-5'  
 Lab ID: 106043-01  
 Date Prepared: 5/28/02  
 Date Analyzed: 5/28/02  
 QC Batch ID: GB3078

### Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Compound Name	Sample Result (mg/kg)	Spike Amount (mg/kg)	MS Result (mg/kg)	MS % Rec.	MSD Result (mg/kg)	MSD % Rec.	RPD	Flag
Benzene	0	1.05	0.859	81.5	0.862	84.9	4.1	
Toluene	0	1.05	0.919	87.2	0.887	87.4	0.23	
o-Xylene	0	1.05	0.907	86	0.919	90.5	5.1	
m-Xylene	0	2.11	1.95	92.7	1.97	96.9	4.4	
p-Xylene	0	1.05	0.971	92.1	0.984	96.9	5.1	

## STL Seattle

Lab ID:	Method Blank - GB3078
Date Received:	-
Date Prepared:	5/28/02
Date Analyzed:	5/28/02
% Solids	1
Dilution Factor	

Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	98.2		50	150
Bromofluorobenzene	104		50	150

Sample results are on an as received basis.

Analyte	Result (mg/kg)	PQL	Flags
Gasoline by NWTPH-G	ND	4	



# STL Seattle

## Blank Spike/Blank Spike Duplicate Report

Lab ID: GB3078  
Date Prepared: 5/28/02  
Date Analyzed: 5/28/02  
QC Batch ID: GB3078

### Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Compound Name	Blank Result (mg/kg)	Spike Amount (mg/kg)	BS Result (mg/kg)	BS % Rec.	BSD Result (mg/kg)	BSD % Rec.	RPD	Flag
Gasoline by NWTPH-G	0	50	48.2	96.4	48.1	96.2	-0.21	

# STL Seattle

## Duplicate Report

Client Sample ID:	OW1-5'
Lab ID:	106043-01
Date Prepared:	5/28/02
Date Analyzed:	5/28/02
QC Batch ID:	GB3078

Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Parameter Name	Sample Result (mg/kg)	Duplicate Result (mg/kg)	RPD %	Flag
Gasoline by NWTPH-G	0	0	NC	

**ATA OnSite**  
**Environmental Inc.**  
1464B NE 95th Street • Redmond, WA 98052  
Phone: (425) 883-3681 • Fax: (425) 885-4503

Company: SCS Engineers		Project No: 04200001.01		Project Name: Wheeler Farmer Gas Station		Project Manager: (other)	
<input type="checkbox"/> 2 Day <input type="checkbox"/> 3 Day <input checked="" type="checkbox"/> Standard (Hydrocarbon analyses: 5 days, All other analyses: 7 days)		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
Sample Identification	Date Sampled	Time Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
1 OW1-5'	5-16-02	5:17-02	5:17-02	5:17-02	5:17-02	5:17-02	5:17-02
2 OW1-10'							
3 OW1-15'							
4 OW2-5'							
5 OW2-10'							
6 OW2-15'							
7 OW3-5'							
8 OW3-10'							
9 OW3-15'							
RECEIVED BY: J. Palmer DATE: 5-17-02 TIME: 5:17-02 FIRM: SCS Engineers RECEIVED BY: K. Palmer DATE: 5-17-02 TIME: 5:17-02 FIRM: SCS Engineers DATE REVIEWED: 5-17-02 TIME REVIEWED: 5:17-02 FIRM REVIEWED: SCS Engineers							

**SEVERN**

**TRENT**

**SERVICES**

STL Seattle  
5755 8<sup>th</sup> Street East  
Tacoma, WA 98424

Tel: 253 922 2310  
Fax: 253 922 5047  
[www.stl-inc.com](http://www.stl-inc.com)

**TRANSMITTAL MEMORANDUM**

DATE: June 26, 2002

TO: Brian Doan  
SCS Engineers  
2405 140th Ave. N. E., Suite 107  
Bellevue, WA 98005

PROJECT: Meeker Square Former Gas Station

REPORT NUMBER: 106499

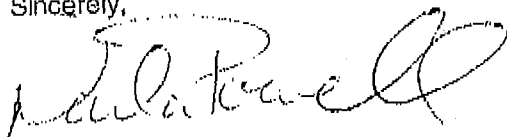
TOTAL NUMBER OF PAGES: 22

Enclosed are the test results for seven samples received at STL Seattle on June 7, 2002.

The report consists of this transmittal memo, analytical results, quality control reports, a copy of the chain-of-custody, a list of data qualifiers and analytical narrative when applicable, and a copy of any requested raw data.

Should there be any questions regarding this report, please contact me at (253) 922-2310.

Sincerely,



Darla Powell  
Project Manager

---

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# STL Seattle

## Sample Identification:

<u>Lab. No.</u>	<u>Client ID</u>	<u>Date/Time Sampled</u>	<u>Matrix</u>
106499-1	OW1	06-06-02 *	Liquid
106499-2	OW2	06-06-02 *	Liquid
106499-3	OW3	06-06-02 *	Liquid
106499-4	MW3GS	06-06-02 *	Liquid
106499-5	DUPGS	06-06-02 *	Liquid
106499-6	Decon Drum	06-06-02 *	Liquid
106499-7	Old Drums	06-06-02 *	Liquid

\* - Sampling time not specified for this sample

---

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# STL Seattle

Client Name	SCS Engineers
Client ID:	OW1
Lab ID:	106499-01
Date Received:	6/7/02
Date Prepared:	6/19/02
Date Analyzed:	6/19/02
% Solids	-
Dilution Factor	1

## Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	104		78	127
Bromofluorobenzene	116		81	135

Analyte	Result (mg/L)	PQL	MDL	Flags
Benzene	ND	0.0005	0.00016	
Toluene	ND	0.001	0.00017	
Ethylbenzene	ND	0.001	0.00018	
m&p-Xylene	ND	0.002	0.00017	
o-Xylene	ND	0.001	0.00021	

# STL Seattle

Client Name	SCS Engineers
Client ID:	OW2
Lab ID:	106499-02
Date Received:	6/7/02
Date Prepared:	6/19/02
Date Analyzed:	6/19/02
% Solids	-
Dilution Factor	1

## Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	100		78	127
Bromofluorobenzene	111		81	135

Analyte	Result (mg/L)	PQL	MDL	Flags
Benzene	ND	0.0005	0.00016	
Toluene	ND	0.001	0.00017	
Ethylbenzene	ND	0.001	0.00018	
m&p-Xylene	ND	0.002	0.00017	
o-Xylene	ND	0.001	0.00021	

# STL Seattle

Client Name	SCS Engineers
Client ID:	OW3
Lab ID:	106499-03
Date Received:	6/7/02
Date Prepared:	6/19/02
Date Analyzed:	6/19/02
% Solids	-
Dilution Factor	2

## Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	91.2		78	127
Bromofluorobenzene	93.4		81	135

Analyte	Result (mg/L)	PQL	MDL	Flags
Benzene	0.125	0.001	0.00032	
Toluene	0.00262	0.002	0.00034	
Ethylbenzene	0.119	0.002	0.00036	
m&p-Xylene	0.0443	0.004	0.00034	
o-Xylene	0.0021	0.002	0.00042	



# STL Seattle

Client Name	SCS Engineers
Client ID:	MW3GS
Lab ID:	106499-04
Date Received:	6/7/02
Date Prepared:	6/19/02
Date Analyzed:	6/19/02
% Solids	-
Dilution Factor	1

## Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	103		78	127
Bromofluorobenzene	113		81	135

Analyte	Result (mg/L)	PQL	MDL	Flags
Benzene	ND	0.0005	0.00016	
Toluene	ND	0.001	0.00017	
Ethylbenzene	ND	0.001	0.00018	
m&p-Xylene	ND	0.002	0.00017	
o-Xylene	ND	0.001	0.00021	

# STL Seattle

Client Name	SCS Engineers
Client ID:	DUPGS
Lab ID:	106499-05
Date Received:	6/7/02
Date Prepared:	6/19/02
Date Analyzed:	6/19/02
% Solids	"
Dilution Factor	2

## Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	94.1		78	127
Bromofluorobenzene	96.1		81	135

Analyte	Result (mg/L)	PQL	MDL	Flags
Benzene	0.125	0.001	0.00032	
Toluene	0.00255	0.002	0.00034	
Ethylbenzene	0.12	0.002	0.00036	
m&p-Xylene	0.0446	0.004	0.00034	
o-Xylene	0.00203	0.002	0.00042	

# STL Seattle

Client Name	SCS Engineers
Client ID:	DECON DRUM
Lab ID:	106499-06
Date Received:	6/7/02
Date Prepared:	6/19/02
Date Analyzed:	6/19/02
% Solids	"
Dilution Factor	1

## Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	98.8		78	127
Bromofluorobenzene	110		81	135

Analyte	Result (mg/L)	PQL	MDL	Flags
Benzene	0.00182	0.0005	0.00016	
Toluene	0.0906	0.001	0.00017	
Ethylbenzene	0.00253	0.001	0.00018	
m&p-Xylene	0.00706	0.002	0.00017	
o-Xylene	0.00301	0.001	0.00021	

# STL Seattle

Client Name	SCS Engineers
Client ID:	OLD DRUMS
Lab ID:	106499-07
Date Received:	6/7/02
Date Prepared:	6/19/02
Date Analyzed:	6/19/02
% Solids	-
Dilution Factor	1

## Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	99.9		78	127
Bromofluorobenzene	111		81	135

Analyte	Result (mg/L)	PQL	MDL	Flags
Benzene	ND	0.0005	0.00016	
Toluene	ND	0.001	0.00017	
Ethylbenzene	ND	0.001	0.00018	
m&p-Xylene	ND	0.002	0.00017	
o-Xylene	ND	0.001	0.00021	

# STL Seattle

Client Name	SCS Engineers
Client ID:	OW1
Lab ID:	106499-01
Date Received:	6/7/02
Date Prepared:	6/19/02
Date Analyzed:	6/19/02
% Solids	-
Dilution Factor	1

## Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	99.6		50	150
Bromofluorobenzene	105		50	150

Analyte	Result (mg/L)	PQL	Flags
Gasoline by NWTPH-G	ND	0.1	

# STL Seattle

Client Name	SCS Engineers
Client ID:	OW2
Lab ID:	106499-02
Date Received:	6/7/02
Date Prepared:	6/19/02
Date Analyzed:	6/19/02
% Solids	-
Dilution Factor	1

## Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	96.2		50	150
Bromofluorobenzene	102		50	150

Analyte	Result (mg/L)	PQL	Flags
Gasoline by NWTPH-G	ND	0.1	

# STL Seattle

Client Name	SCS Engineers
Client ID:	OW3
Lab ID:	106499-03
Date Received:	6/7/02
Date Prepared:	6/19/02
Date Analyzed:	6/19/02
% Solids	-
Dilution Factor	2

## Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	104		50	150
Bromofluorobenzene	100		50	150

Analyte	Result (mg/L)	PQL	Flags
Gasoline by NWTPH-G	4.55	0.2	

# STL Seattle

Client Name	SCS Engineers
Client ID:	MW3GS
Lab ID:	106499-04
Date Received:	6/7/02
Date Prepared:	6/19/02
Date Analyzed:	6/19/02
% Solids	"
Dilution Factor	1

## Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	98.3		50	150
Bromofluorobenzene	103		50	150

Analyte	Result (mg/L)	PQL	Flags
Gasoline by NWTPH-G	ND	0.1	



# STL Seattle

Client Name	SCS Engineers
Client ID:	DUPGS
Lab ID:	106499-05
Date Received:	6/7/02
Date Prepared:	6/19/02
Date Analyzed:	6/19/02
% Solids	-
Dilution Factor	2

## Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	106		50	150
Bromofluorobenzene	102		50	150

Analyte	Result (mg/L)	PQL	Flags
Gasoline by NWTPH-G	4.62	0.2	

# STL Seattle

Client Name	SCS Engineers
Client ID:	DECON DRUM
Lab ID:	106499-06
Date Received:	6/7/02
Date Prepared:	6/19/02
Date Analyzed:	6/19/02
% Solids	-
Dilution Factor	1

## Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	94.5		50	150
Bromofluorobenzene	101		50	150

Analyte	Result (mg/L)	PQL	Flags
Gasoline by NWTPH-G	0.445	0.1	

# STL Seattle

Client Name	SCS Engineers
Client ID:	OLD DRUMS
Lab ID:	106499-07
Date Received:	6/7/02
Date Prepared:	6/19/02
Date Analyzed:	6/19/02
% Solids	-
Dilution Factor	1

## Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	95.7		50	150
Bromofluorobenzene	101		50	150

Analyte	Result (mg/L)	PQL	Flags
Gasoline by NWTPH-G	ND	0.1	

# STL Seattle

Lab ID:	Method Blank - GB3117
Date Received:	6/19/02
Date Prepared:	6/19/02
Date Analyzed:	-
% Solids	1
Dilution Factor	

## Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	103		78	127
Bromofluorobenzene	112		81	135

Analyte	Result (mg/L)	PQL	MDL	Flags
Benzene	ND	0.0005	0.00016	
Toluene	ND	0.001	0.00017	
Ethylbenzene	ND	0.001	0.00018	
m&p-Xylene	ND	0.002	0.00017	
o-Xylene	ND	0.001	0.00021	

# STL Seattle

## Blank Spike/Blank Spike Duplicate Report

Lab ID: GB3117  
 Date Prepared: 6/19/02  
 Date Analyzed: 6/19/02  
 QC Batch ID: GB3117

### Volatile Aromatic Hydrocarbons by USEPA Method 8021B/5030B Modified

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Benzene	0	0.025	0.0258	103	0.0253	101	-2	
Toluene	0	0.025	0.0271	109	0.0269	107	-1.9	
Ethylbenzene	0	0.025	0.0268	107	0.0262	105	-1.9	
m,p-Xylene	0	0.05	0.054	108	0.0532	106	-1.9	
Xylene	0	0.025	0.0272	109	0.0274	110	0.91	

# STL Seattle

Lab ID:	Method Blank - GB3117
Date Received:	-
Date Prepared:	6/19/02
Date Analyzed:	6/19/02
% Solids	-
Dilution Factor	1

## Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	99.3		50	150
Bromofluorobenzene	102		50	150

Analyte	Result (mg/L)	PQL	Flags
Gasoline by NWTPH-G	ND	0.1	

# STL Seattle

## Blank Spike/Blank Spike Duplicate Report

Lab ID: GB3117  
Date Prepared: 6/19/02  
Date Analyzed: 6/19/02  
QC Batch ID: GB3117

### Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Gasoline by NWTPH-G	0	1.25	1.31	105	1.27	102	-2.9	

STL Seattle  
5755 8<sup>th</sup> Street East  
Tacoma, WA 98424

Tel: 253 922 2310  
Fax: 253 922 5047  
[www.stl-inc.com](http://www.stl-inc.com)



## A QUALIFIERS AND ABBREVIATIONS

- 1: This analyte was detected in the associated method blank. The analyte concentration was determined not to be significantly higher than the associated method blank (less than ten times the concentration reported in the blank).
- 2: This analyte was detected in the associated method blank. The analyte concentration in the sample was determined to be significantly higher than the method blank (greater than ten times the concentration reported in the blank).
- 1: Second column confirmation was performed. The relative percent difference value (RPD) between the results on the two columns was evaluated and determined to be  $\leq 40\%$ .
- 2: Second column confirmation was performed. The RPD between the results on the two columns was evaluated and determined to be  $> 40\%$ . The higher result was reported unless anomalies were noted.
- 1: GC/MS confirmation was performed. The result derived from the original analysis was reported.
- 2: The reported result for this analyte was calculated based on a secondary dilution factor.
- 2: The concentration of this analyte exceeded the instrument calibration range and should be considered an estimated quantity.
- 2: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.

ML: Maximum Contaminant Level

ADL: Method Detection Limit

2: See analytical narrative.

ND: Not Detected

2: L: Practical Quantitation Limit

X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be \_\_\_\_\_.

2: Contaminant does not appear to be "typical" product.

X3: Identification and quantitation of the analyte or surrogate was complicated by matrix interference.

2: 4: RPD for duplicates was outside advisory QC limits. The sample was re-analyzed with similar results. The sample matrix may be nonhomogeneous.

X4a: RPD for duplicates outside advisory QC limits due to analyte concentration near the method practical quantitation limit/detection limit.

X5: Matrix spike recovery was not determined due to the required dilution.

6: Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Sample was re-analyzed with similar results.

X7: Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Matrix interference may be indicated based on acceptable blank spike recovery and/or RPD.

X7a: Recovery and/or RPD values for this spiked analyte outside advisory QC limits due to high concentration of the analyte in the original sample.

X8: Surrogate recovery was not determined due to the required dilution.

X9: Surrogate recovery outside advisory QC limits due to matrix interference.



