

SCS ENGINEERS

May 12, 2004
File No. 04202001.01

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

RECEIVED
MAY 14 2004
DEPT OF ECOLOGY

COPY

Subject: Eighth Quarter, Groundwater Monitoring Event at the Former Chevron Gasoline Station Site, Meeker Square, Kent, Washington

Dear Jay:

This letter describes the eighth round of quarterly groundwater monitoring at the former Chevron gasoline station site at the Meeker Square shopping center in Kent, Washington. The groundwater sampling was conducted on March 25, 2004.

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 and the buildings were demolished in 1983 when the business closed.

In April 2002, soils contaminated above MTCA Method A soil cleanup levels were removed to the extent practical. 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.

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® (ORC) was mixed into the saturated soil in the base of the excavation. The ORC releases oxygen to the groundwater, thereby providing an environment that is conducive to the growth of naturally-occurring microbes that can degrade the petroleum hydrocarbon contaminants in the groundwater. The Department of Ecology issued a no further action (NFA) designation for the soil on July 29, 2002.

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 by others conducted in 1998. No benzene was detected in any of the soil samples analyzed during the soil remediation project in April 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 a 1998 investigation indicated a southerly groundwater flow toward West Meeker Street. The Green River is located approximately 0.4 miles farther south.

Quarterly groundwater monitoring was initiated in June 2002. During the eight quarters of groundwater monitoring, concentrations of benzene and gasoline-range total petroleum hydrocarbons (TPH) were identified in samples collected from well OW3, located at the southeast corner of the property. No contaminants were identified in samples collected from any of the other monitoring wells at the site.

A second application of ORC was accomplished by injection on September 16, 2003, using a limited-access, direct-push sampling rig. Based on the recommendations of the ORC manufacturer, Regenesis, 450 pounds of ORC was injected at the site. The ORC was injected at eight separate points in the southeast portion of the site near the contaminated well (OW3). At each injection point the material was installed from 4 to 12 feet below grade, which provided ORC above and below the present level of the water table.

Dissolved oxygen concentrations were slightly higher when checked three days after the injection (September 19, 2003) and during the subsequent monitoring event (September 30, 2003) compared to DO readings recorded during the previous monitoring event and during the same quarter in 2002. However, the highest DO concentrations were recorded after the contaminated soil was excavated and ORC was installed in the open excavation. The exception is at OW3, on the southeast corner of the site, where a high of 0.86 mg/L DO was recorded in March 2003.

Groundwater Sampling

Four groundwater monitoring wells are present at the site; one well (MW3-GS) remains from a 1998 investigation by others, and three wells (OW1, OW2, and OW3) were installed after the 2002 soil remediation activities.

The groundwater samples were collected on March 25, 2004. Low-flow equipment (specifically, a peristaltic pump) was used to purge 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. The wells were sampled after parameter stabilization had been achieved. The parameters were measured using a multi-probe, flow-through cell. Dissolved oxygen concentrations in the wells were low, ranging from 0.44 mg/L in OW3 to 1.60 mg/L in OW2.

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 Seattle (STL) 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 for the eighth round of groundwater monitoring is provided below in Table 1. The complete analytical report is attached.

Table 1 Eighth Quarter Groundwater Sample Analytical Results in ug/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	4,660	179	<1	88	45
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 eighth 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 4,660 ug/L, which exceeds the MTCA Method A cleanup level of 800 ug/L in groundwater. Benzene was detected in the same sample at a concentration of 179 ug/L, which exceeds the MTCA Method A cleanup level of 5 ug/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

On March 25, 2004, measurements of the depth to groundwater were recorded at each of the four wells at the former Chevron site to facilitate calculating the groundwater flow direction. Depth-to-groundwater, well elevation, and the calculated water table elevations for each well are provided in Table 2.

Table 2 Groundwater Elevation Data, March 2004

Well ID	Depth to Groundwater	Surveyed Well Elevation	Water Table Elevation
OW1	8.19	99.78	91.59
OW2	8.23	99.82	91.59
OW3	7.74	99.25	91.51
MW3-GS	8.61	100.21	91.60

Based on the groundwater elevation data from the March 2004 monitoring event, the local groundwater flow direction at the former Chevron site is southeast. The gradient was relatively flat at approximately 0.0027 feet per foot.

ANNUAL REPORT

This section provides an overall evaluation of the field and chemical data for the two years of quarterly monitoring. In addition, water table elevation data are used to calculate the groundwater flow direction throughout the two-year monitoring period.

Groundwater Monitoring

Results from the eight quarterly monitoring events indicate that gasoline range TPH and BTEX compounds are present in well OW3. Table 3 presents the analytical results for OW3 from each of the eight monitoring events. Contaminants were not detected in any of the other three monitoring wells at the former gas station.

**Table 3 Annual Groundwater Sample Analytical Results for OW3 in µg/L
(parts per billion)**

OW3 Sample Date	Gasoline-Range TPH	BTEX Compounds			
		Benzene	Toluene	Ethylbenzene	Xylenes
June 6, 2003	4,550	125	2.62	119	464
Sept. 9, 2002	5,030	114	3	162	166
Dec. 9, 2002	1,790	58	<2	24	12
Mar. 26, 2003	4,110	135	<2	154	54
June 30, 2003	4,790	119	<10	114	76
Sept. 30, 2003	3,360	106	2	102	74.75
Dec. 9, 2003	3,800	111	1.62	115	73.56
Mar. 25, 2004	4,660	179	<1	88	45
MTCA Cleanup Level	800	5	1,000	700	1,000

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

The contaminant concentrations detected in OW3 remained relatively stable over the eight monitoring events except in December 2002, when the contaminant concentrations were significantly lower.

Groundwater Flow Direction

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.

Following the soil remediation in the spring of 2002, site restoration was completed coincident with the final efforts of a street-widening project by the City of Kent. Irrigation plumbing was installed to ensure the survival of new trees and other plants along the south and east edges of the property.

Groundwater elevation data from the first post-remediation groundwater monitoring event (June 2002) indicated a southerly groundwater flow direction consistent with previous data collected in 2000. Data collected subsequently have indicated occasional groundwater mounding beneath planted areas. The groundwater mounding results in localized changes to the groundwater flow direction and is likely due to the irrigation water infiltrating the planted areas on the south and

east sides of the property. The groundwater elevation data from all eight monitoring events are presented in Table 4.

Table 4 Annual Groundwater Elevation Data

Well ID		OW1	OW2	OW3	MW3-GS
Surveyed Well Elevation		99.78	99.82	99.25	100.21
Depth to Groundwater	June 2002	7.91	8.03	7.46	8.27
	Sept 2002	9.45	9.52	9.09	10.06
	Dec 2002	11.08	11.21	10.75	11.67
	March 2003	8.20	8.31	7.72	8.65
	June 2003	9.01	9.1	8.65	9.61
	Sept 2003	9.56	9.83	9.53	10.51
	Dec 2003	8.58	8.69	8.23	9.23
	March 2004	8.19	8.23	7.74	8.61
Water Table Elevation	June 2002	91.87	91.79	91.79	91.94
	Sept 2002	90.33	90.30	90.16	90.15
	Dec 2002	88.70	88.61	88.50	88.54
	March 2003	91.58	91.51	91.53	91.56
	June 2003	90.77	90.72	90.60	90.60
	Sept 2003	90.22	89.99	89.72	89.70
	Dec 2003	91.20	91.13	91.02	90.98
	March 2004	91.59	91.59	91.51	91.60

Groundwater elevation data indicate that the groundwater flow direction during six of the eight monitoring events was inconsistent with the southerly flow direction identified twice in 2000 and confirmed during the initial monitoring event in June 2002. Specifically, during the autumn and winter 2002 monitoring events and the most recent four monitoring events the groundwater flow direction has been east or southeast. The fluctuation in the apparent groundwater flow direction is suspected to be due to the change in the infiltration area, particularly during irrigation use on the planted strips to the east and the south of the former gas station.

Annual Discussion

The eight rounds of quarterly groundwater monitoring have provided valuable information about temporal changes in contaminant concentrations and the local groundwater flow direction. Groundwater contamination (gasoline-range TPH and benzene) is present at OW3, which is located where residual soil contamination was left in place after the soil-remediation project (spring 2002) because the maximum extent of the excavation was limited by buried electrical and irrigation utilities. The residual soil contamination is in an area of apparent fill material approximately 8 feet across and 6 feet deep (1 to 7 feet below grade) located above the water table. State groundwater cleanup levels are met at the other three groundwater monitoring wells at the site.

As shown on the attached graph, concentrations of gasoline-range TPH and benzene in well OW3 tend to fluctuate with the groundwater elevation. This suggests that periods of high infiltration rinse contaminants out of the residual contaminated soil in the vadose zone and contribute these contaminants to the groundwater at a rate exceeding the natural-attenuation rate of the microbes in the groundwater. This theory is supported by the presence of benzene in the groundwater more

than twenty years after the USTs were removed from the site; benzene typically degrades comparatively quickly in groundwater.

Concentrations of dissolved oxygen in the groundwater are low despite additions of ORC in June 2002 and September 2003 and regular infiltration of precipitation and irrigation water. The low concentrations of dissolved oxygen measured in the groundwater suggest that the groundwater environment is supporting natural attenuation of the petroleum contaminants. The apparently-active natural attenuation and the absence of contaminants from any of the nearby wells (despite occasional groundwater mounding in the area of residual soil contamination) suggest that the identified groundwater contamination is localized to the immediate vicinity of OW3.

The infiltration at the planted strips at the south and east edges of the property is suspected of causing groundwater mounding beneath the planted strip. Thus, the irrigation water often creates a localized change in the groundwater flow direction from south to east.

Conclusions and Recommendations

Contaminant concentrations identified in the groundwater at OW3 have been fairly consistent over the course of the two-year quarterly-monitoring program. The exception was the December 2002 monitoring event when significantly lower contaminant concentrations were identified. The December 2002 monitoring event also recorded the lowest groundwater elevation of the two-year monitoring program.

As shown in the attached graph, fluctuations in contaminant concentrations have consistently matched corresponding fluctuations in the groundwater elevation; higher contaminant concentrations have been identified when the water table is high, and lower concentrations have been identified when the water table is low.

SCS Engineers has concluded that the trend of corresponding contaminant concentrations and water table elevations is a result of residual contaminated soil in the vadose zone contributing those contaminants to the groundwater. This conclusion is supported by the following observations:

- The soil remediation in spring 2002 encountered buried electrical and irrigation utility lines at the southeast corner of the excavation. Due to the presence of these obstructions, a limited amount of residual contaminated soil was left in place above the saturated zone at the southeast corner of the remedial area. Groundwater elevation data collected during the two-year monitoring program indicate that the residual soil contamination has remained above the water table; the highest water table elevations recorded were in June 2002 at the start of the monitoring program.
- Benzene is present in the groundwater more than 20 years after the USTs were removed from the site. Benzene typically degrades comparatively quickly in the groundwater. The presence of benzene such a long time after removal of the gas station suggests fresh contributions of benzene from vadose-zone soils.
- Significant infiltration through the landscaped area at the former gas station site is indicated by the relatively wide range of water table elevations, which have varied by as much as 3.3 feet during the course of the two-year monitoring program. However, groundwater data from a piezometer located on the same property, but away from the

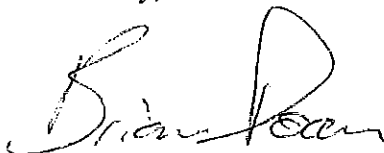
former gas station site, indicates a range in water table elevations of only 2.25 feet over the same period. The piezometer is located approximately 300 feet west of the Meeker Square gas station site in a grass-covered area subject to normal rainwater infiltration. The greater variability in water table elevations observed at the gas station site suggests significant infiltration.

Groundwater contamination by infiltration is significant because it suggests that the groundwater contamination plume is limited to the vicinity of the residual soil contamination (OW3).

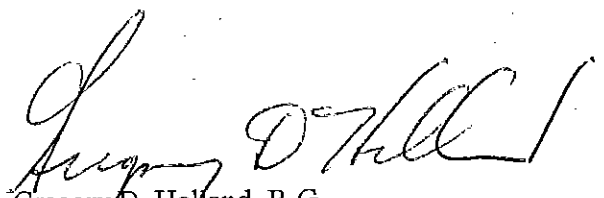
It is also significant that the concentrations of dissolved oxygen in the groundwater remain low despite two additions of ORC (in April 2002 and September 2003) and continual surface-water infiltration. The low concentrations of dissolved oxygen suggest active natural attenuation of the petroleum hydrocarbons in the groundwater environment at a rate that meets the influx of dissolved oxygen. Without natural attenuation of the contaminants, the concentrations of gasoline-range TPH and benzene would not decrease during periods of reduced infiltration and associated lower water table elevations.

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

Sincerely,

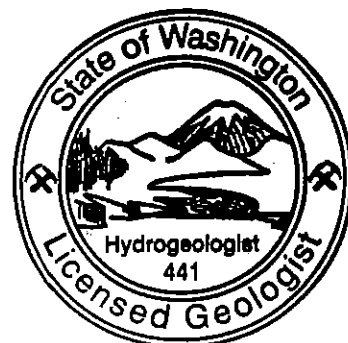


Brian G. Doan
Project Scientist
SCS ENGINEERS

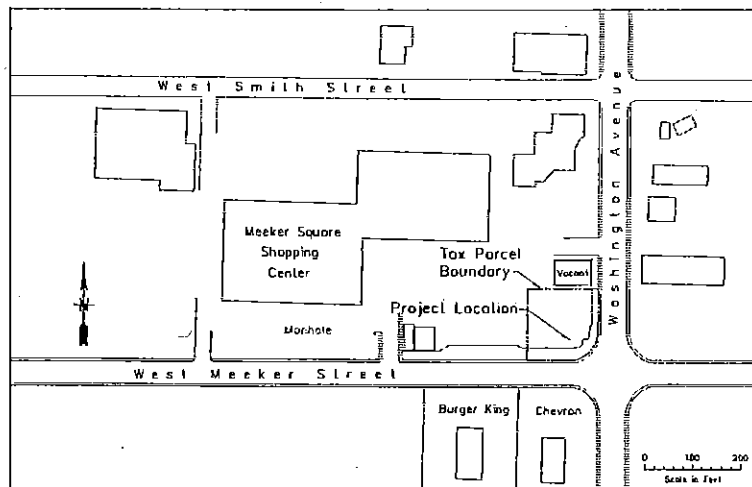


Gregory D. Helland, R.G.
Project Director
SCS ENGINEERS

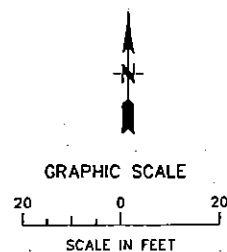
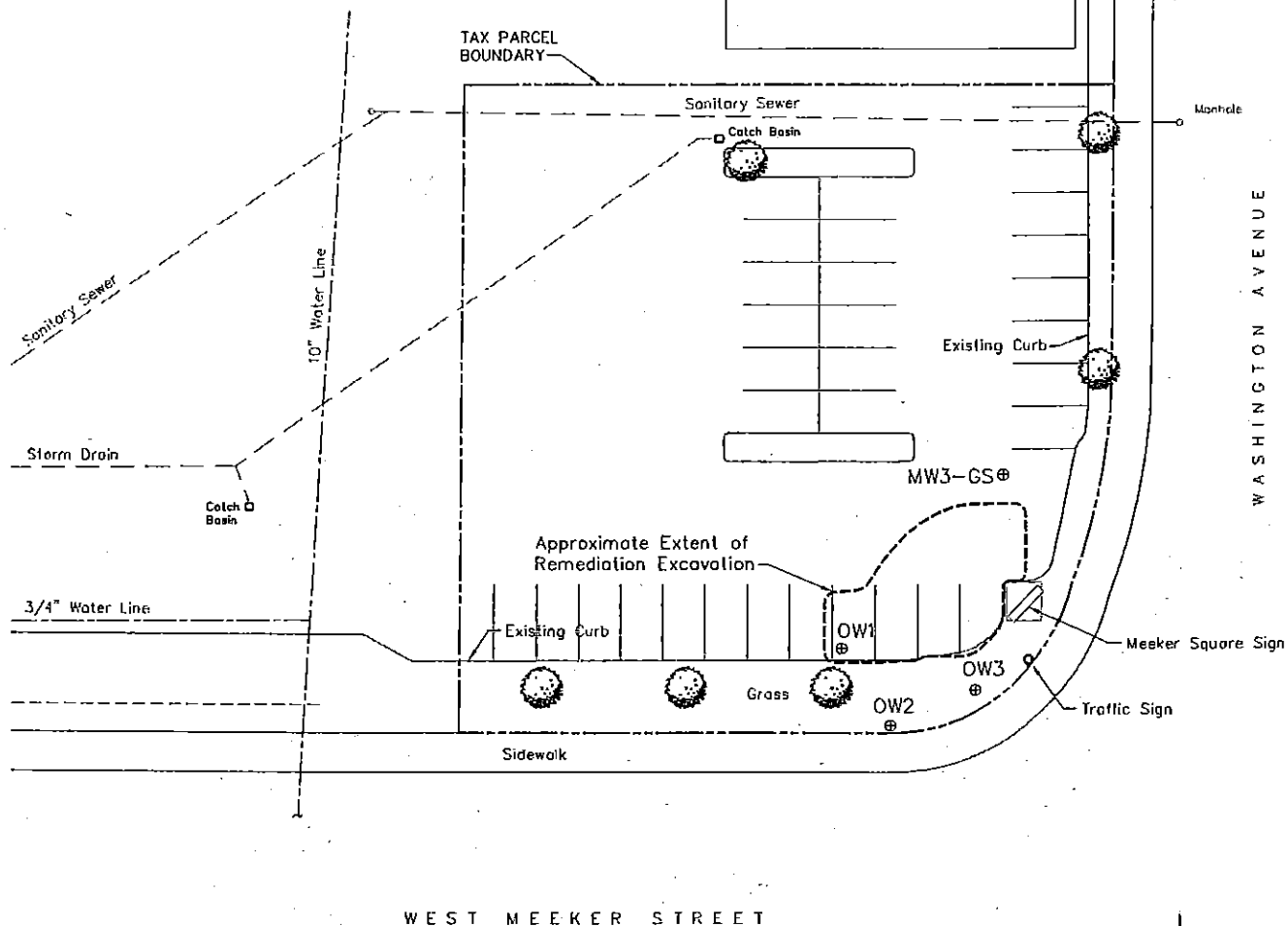
cc: Tim Wirta, Principal Real Estate Investors
Grant Yang, Washington State Department of Ecology



Gregory Dennis Helland



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

SCALE
AS SHOWN

CAD FILE
FIGURE 1

DES BY
B.D.

CHK BY
G.H.

APP BY
G.H.

SITE PLAN

FORMER GASOLINE STATION SITE
MEEKER SQUARE SHOPPING CENTER
KENT, WASHINGTON

DATE
JAN 2003

FIGURE

1

Meeker Square Gas Station
4202001.01

Depths to Groundwater			4-Jun-02
GW elev.	Well	TOC	depth to GW
91.85	OW1	99.78	7.93
91.80	OW2	99.82	8.02
91.81	OW3	99.25	7.44
91.97	MW3-GS	100.21	8.24

Depths to Groundwater			6-Jun-02
GW elev.	Well	TOC	depth to GW
91.87	OW1	99.78	7.91
91.79	OW2	99.82	8.03
91.79	OW3	99.25	7.46
91.94	MW3-GS	100.21	8.27

Depths to Groundwater			2-Jul-02
GW elev.	Well	TOC	depth to GW
91.54	OW1	99.78	8.24
91.48	OW2	99.82	8.34
91.43	OW3	99.25	7.82
91.57	MW3-GS	100.21	8.64

Depths to Groundwater			26-Jul-02
GW elev.	Well	TOC	depth to GW
91.20	OW1	99.78	8.58
91.18	OW2	99.82	8.64
91.09	OW3	99.25	8.16
91.14	MW3-GS	100.21	9.07

Depths to Groundwater			9-Sep-02
GW elev.	Well	TOC	depth to GW
90.33	OW1	99.78	9.45
90.30	OW2	99.82	9.52
90.16	OW3	99.25	9.09
90.15	MW3-GS	100.21	10.06

Depths to Groundwater			9-Dec-02
GW elev.	Well	TOC	depth to GW
88.70	OW1	99.78	11.08
88.61	OW2	99.82	11.21
88.50	OW3	99.25	10.75
88.54	MW3-GS	100.21	11.67

Depths to Groundwater			27-Mar-03
GW elev.	Well	TOC	depth to GW
91.58	OW1	99.78	8.20
91.51	OW2	99.82	8.31
91.53	OW3	99.25	7.72
91.56	MW3-GS	100.21	8.65

Depths to Groundwater			30-Jun-03
GW elev.	Well	TOC	
90.77	OW1	99.78	9.01
90.72	OW2	99.82	9.1
90.60	OW3	99.25	8.65
90.60	MW3-GS	100.21	9.61

Depths to Groundwater (September 30, 2003)			
GW elev.	Well	TOC	
90.22	OW1	99.78	9.56
89.99	OW2	99.82	9.83
89.72	OW3	99.25	9.53
89.70	MW3-GS	100.21	10.51

Depths to Groundwater (December 17, 2003)			
GW elev.	Well	TOC	
91.20	OW1	99.78	8.58
91.14	OW2	99.82	8.68
91.04	OW3	99.25	8.21
91.04	MW3-GS	100.21	9.17

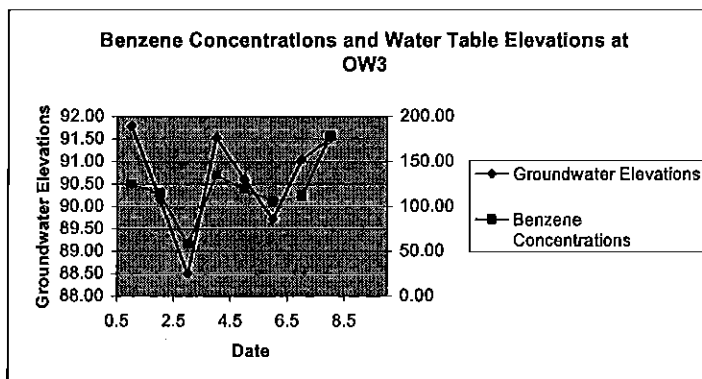
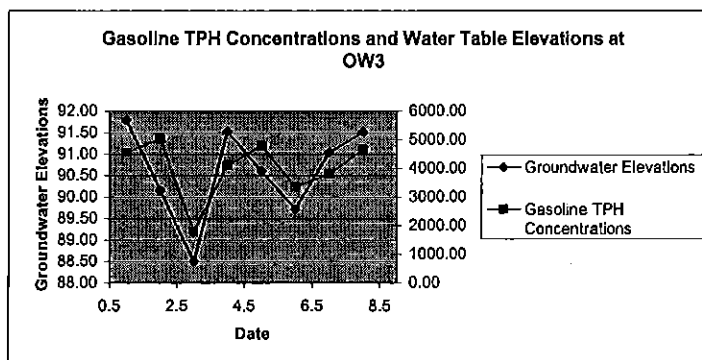
Depths to Groundwater (March 25, 2004)			
GW elev.	Well	TOC	
91.60	OW1	99.78	8.18
91.51	OW2	99.82	8.31
91.51	OW3	99.25	7.74
91.61	MW3-GS	100.21	8.6

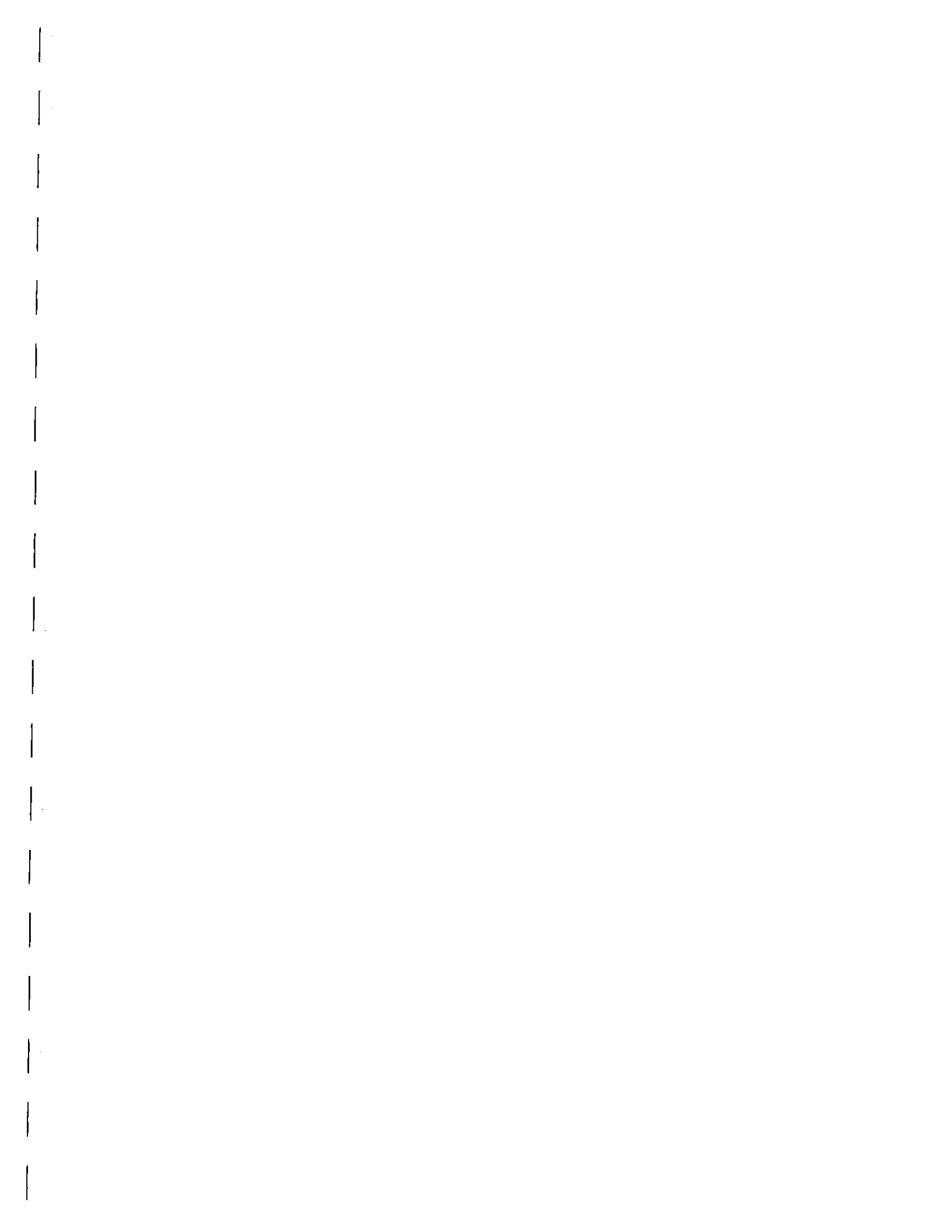
Gasoline TPH Concentrations at OW-3

6-Jun-02	4550.00
9-Sep-02	5030.00
9-Dec-02	1790.00
26-Mar-03	4110.00
30-Jun-03	4790.00
30-Sep-03	3360.00
12-Dec-03	3800.00
25-Mar-04	4660.00

Benzene Concentrations at OW-3

6-Jun-02	125.00
9-Sep-02	114.00
9-Dec-02	58.00
26-Mar-03	135.00
30-Jun-03	119.00
30-Sep-03	106.00
12-Dec-03	111.00
25-Mar-04	179.00







STL

STL Seattle
5755 8th Street East
Tacoma, WA 98424

Tel: 253 922 2310
Fax: 253 922 5047
www.stl-inc.com

TRANSMITTAL MEMORANDUM

DATE: April 13, 2004

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

PROJECT: Meeker Gas Station, WA

REPORT NUMBER: 120257

TOTAL NUMBER OF PAGES: 20

Enclosed are the test results for five samples received at STL Seattle on March 26, 2004.

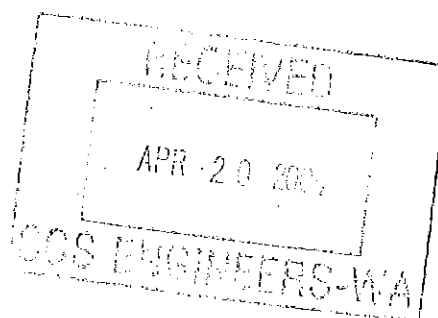
The report consists of this transmittal memo, analytical results, quality control reports, a copy of the chain-of-custody, a list of data qualifiers and analytical narrative when applicable, and a copy of any requested raw data.

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

Sincerely,

A handwritten signature in cursive script that reads "Darla Powell".

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>
120257-1	MW3-GS	03-25-04 13:38	Liquid
120257-2	OW1	03-25-04 14:09	Liquid
120257-3	OW2	03-25-04 14:43	Liquid
120257-4	OW3	03-25-04 15:14	Liquid
120257-5	Dup B	03-25-04 15:45	Liquid

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00002

STL Seattle

Client Name	SCS Engineers
Client ID:	MW3-GS
Lab ID:	120257-01
Date Received:	3/26/2004
Date Prepared:	3/30/2004
Date Analyzed:	4/1/2004
% Solids	-
Dilution Factor	1

Volatile Aromatic Hydrocarbons by USEPA Method 5030/8260B

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	106		84	122
1-Chloro-3-fluorobenzene	100		87	115
Bromofluorobenzene	97.5		87	118
Pentafluorobenzene	103		81	126

Analyte	Result (mg/L)	PQL	MRL	Flags
Benzene	ND	0.0005	0.00025	
Toluene	ND	0.001	0.0005	
Ethylbenzene	ND	0.001	0.0005	
m&p-Xylene	ND	0.002	0.001	
o-Xylene	ND	0.001	0.0005	

STL Seattle

Client Name	SCS Engineers
Client ID:	OW1
Lab ID:	120257-02
Date Received:	3/26/2004
Date Prepared:	3/30/2004
Date Analyzed:	4/1/2004
% Solids	-
Dilution Factor	1

Volatile Aromatic Hydrocarbons by USEPA Method 5030/8260B

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	105		84	122
1-Chloro-3-fluorobenzene	99.3		87	115
Bromofluorobenzene	97.3		87	118
Pentafluorobenzene	101		81	126

Analyte	Result (mg/L)	PQL	MRL	Flags
Benzene	ND	0.0005	0.00025	
Toluene	ND	0.001	0.0005	
Ethylbenzene	ND	0.001	0.0005	
m&p-Xylene	ND	0.002	0.001	
o-Xylene	ND	0.001	0.0005	

STL Seattle

Client Name	SCS Engineers
Client ID:	OW2
Lab ID:	120257-03
Date Received:	3/26/2004
Date Prepared:	3/30/2004
Date Analyzed:	4/1/2004
% Solids	-
Dilution Factor	1

Volatile Aromatic Hydrocarbons by USEPA Method 5030/8260B

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	105		84	122
1-Chloro-3-fluorobenzene	99.5		87	115
Bromofluorobenzene	96.3		87	118
Pentafluorobenzene	101		81	126

Analyte	Result (mg/L)	PQL	MRL	Flags
Benzene	ND	0.0005	0.00025	
Toluene	ND	0.001	0.0005	
Ethylbenzene	ND	0.001	0.0005	
m&p-Xylene	ND	0.002	0.001	
o-Xylene	ND	0.001	0.0005	

STL Seattle

Client Name	SCS Engineers
Client ID:	OW3
Lab ID:	120257-04
Date Received:	3/26/2004
Date Prepared:	3/30/2004
Date Analyzed:	4/1/2004
% Solids	-
Dilution Factor	5

Volatile Aromatic Hydrocarbons by USEPA Method 5030/8260B

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	106		84	122
1-Chloro-3-fluorobenzene	99.7		87	115
Bromofluorobenzene	98.2		87	118
Pentafluorobenzene	102		81	126

Analyte	Result (mg/L)	PQL	MRL	Flags
Benzene	0.179	0.0025	0.00125	
Toluene	ND	0.005	0.0025	
Ethylbenzene	0.0881	0.005	0.0025	
m&p-Xylene	0.0412	0.01	0.005	
o-Xylene	0.00427	0.005	0.0025	J

STL Seattle

Client Name	SCS Engineers
Client ID:	DUP B
Lab ID:	120257-05
Date Received:	3/26/2004
Date Prepared:	3/30/2004
Date Analyzed:	4/1/2004
% Solids	-
Dilution Factor	10

Volatile Aromatic Hydrocarbons by USEPA Method 5030/8260B

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	106		84	122
1-Chloro-3-fluorobenzene	100		87	115
Bromofluorobenzene	98.7		87	118
Pentafluorobenzene	102		81	126

Analyte	Result (mg/L)	PQL	MRL	Flags
Benzene	0.177	0.005	0.0025	
Toluene	ND	0.01	0.005	
Ethylbenzene	0.0833	0.01	0.005	
m&p-Xylene	0.0376	0.02	0.01	
o-Xylene	ND	0.01	0.005	

STL Seattle

Client Name	SCS Engineers
Client ID:	MW3-GS
Lab ID:	120257-01
Date Received:	3/26/2004
Date Prepared:	3/30/2004
Date Analyzed:	4/1/2004
% Solids	-
Dilution Factor	1

Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
a,a,a-Trifluorotoluene	110		50	150
1-Chloro-3-fluorobenzene	106		50	150
Bromofluorobenzene	103		50	150
Pentafluorobenzene	99		50	150

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

STL Seattle

Client Name	SCS Engineers
Client ID:	OW1
Lab ID:	120257-02
Date Received:	3/26/2004
Date Prepared:	3/30/2004
Date Analyzed:	4/1/2004
% Solids	-
Dilution Factor	1

Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
a,a,a-Trifluorotoluene	111		50	150
1-Chloro-3-fluorobenzene	107		50	150
Bromofluorobenzene	104		50	150
Pentafluorobenzene	98.7		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:	120257-03
Date Received:	3/26/2004
Date Prepared:	3/30/2004
Date Analyzed:	4/1/2004
% Solids	-
Dilution Factor	1

Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
a,a,a-Trifluorotoluene	110		50	150
1-Chloro-3-fluorobenzene	107		50	150
Bromofluorobenzene	104		50	150
Pentafluorobenzene	98.3		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:	120257-04
Date Received:	3/26/2004
Date Prepared:	3/30/2004
Date Analyzed:	4/1/2004
% Solids	-
Dilution Factor	5

Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
a,a,a-Trifluorotoluene	112		50	150
1-Chloro-3-fluorobenzene	108		50	150
Bromofluorobenzene	104		50	150
Pentafluorobenzene	114		50	150

Analyte	Result (mg/L)	PQL	Flags
Gasoline by NWTPH-G	4.66	0.5	

STL Seattle

Client Name	SCS Engineers
Client ID:	DUP B
Lab ID:	120257-05
Date Received:	3/26/2004
Date Prepared:	3/30/2004
Date Analyzed:	4/1/2004
% Solids	-
Dilution Factor	10

Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
a,a,a-Trifluorotoluene	111		50	150
1-Chloro-3-fluorobenzene	107		50	150
Bromofluorobenzene	104		50	150
Pentafluorobenzene	107		50	150

Analyte	Result (mg/L)	PQL	Flags
Gasoline by NWTPH-G	4.57	1	

STL Seattle

Lab ID:	Method Blank - GB3763
Date Received:	-
Date Prepared:	3/30/2004
Date Analyzed:	4/1/2004
% Solids	-
Dilution Factor	1

Volatile Aromatic Hydrocarbons by USEPA Method 5030/8260B

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
Trifluorotoluene	105		84	122
1-Chloro-3-fluorobenzene	99.9		87	115
Bromofluorobenzene	97.5		87	118
Pentafluorobenzene	102		81	126

Analyte	Result (mg/L)	PQL	MRL	Flags
Benzene	ND	0.0005	0.00025	
Toluene	ND	0.001	0.0005	
Ethylbenzene	ND	0.001	0.0005	
m&p-Xylene	ND	0.002	0.001	
o-Xylene	ND	0.001	0.0005	

STL Seattle

Blank Spike/Blank Spike Duplicate Report

Lab ID: GB3763
Date Prepared: 3/30/2004
Date Analyzed: 4/1/2004
QC Batch ID: GB3763

Volatile Aromatic Hydrocarbons by USEPA Method 5030/8260B

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	0.0155	0.018	116	0.018	116	0	
Toluene	0	0.0945	0.0792	83.8	0.0788	83.4	-0.48	
Ethylbenzene	0	0.0223	0.0181	81.2	0.0181	81.1	-0.12	
m&p-Xylene	0	0.0782	0.0635	81.2	0.0639	81.7	0.61	
o-Xylene	0	0.0314	0.0251	79.9	0.0253	80.4	0.62	

STL Seattle

Duplicate Report

Client Sample ID:	DUP B
Lab ID:	120257-05
Date Prepared:	3/30/2004
Date Analyzed:	4/1/2004
QC Batch ID:	GB3763

Volatile Aromatic Hydrocarbons by USEPA Method 5030/8260B

Parameter Name	Sample Result (mg/L)	Duplicate Result (mg/L)	RPD %	Flag
Benzene	0.177	0.169	4.6	
Toluene	0	0	NC	
Ethylbenzene	0.0833	0.0769	8.0	
m&p-Xylene	0.0376	0.0366	2.7	
o-Xylene	0	0	NC	

STL Seattle

Lab ID:	Method Blank - GB3763
Date Received:	-
Date Prepared:	3/30/2004
Date Analyzed:	4/1/2004
% Solids	-
Dilution Factor	1

Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Surrogate	% Recovery	Flags	Recovery Limits	
			Low	High
a,a,a-Trifluorotoluene	111		50	150
1-Chloro-3-fluorobenzene	108		50	150
Bromofluorobenzene	105		50	150
Pentafluorobenzene	99		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: GB3763
Date Prepared: 3/30/2004
Date Analyzed: 4/1/2004
QC Batch ID: GB3763

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	1.19	95.6	1.22	97.7	2.2	

STL Seattle

Duplicate Report

Client Sample ID:	DUP B
Lab ID:	120257-05
Date Prepared:	3/30/2004
Date Analyzed:	4/1/2004
QC Batch ID:	GB3763

Volatile Petroleum Products by WSDOE Method NWTPH-Gx Modified

Parameter Name	Sample Result (mg/L)	Duplicate Result (mg/L)	RPD %	Flag
Gasoline by NWTPH-G	4.57	4.39	4.0	

DATA QUALIFIERS AND ABBREVIATIONS

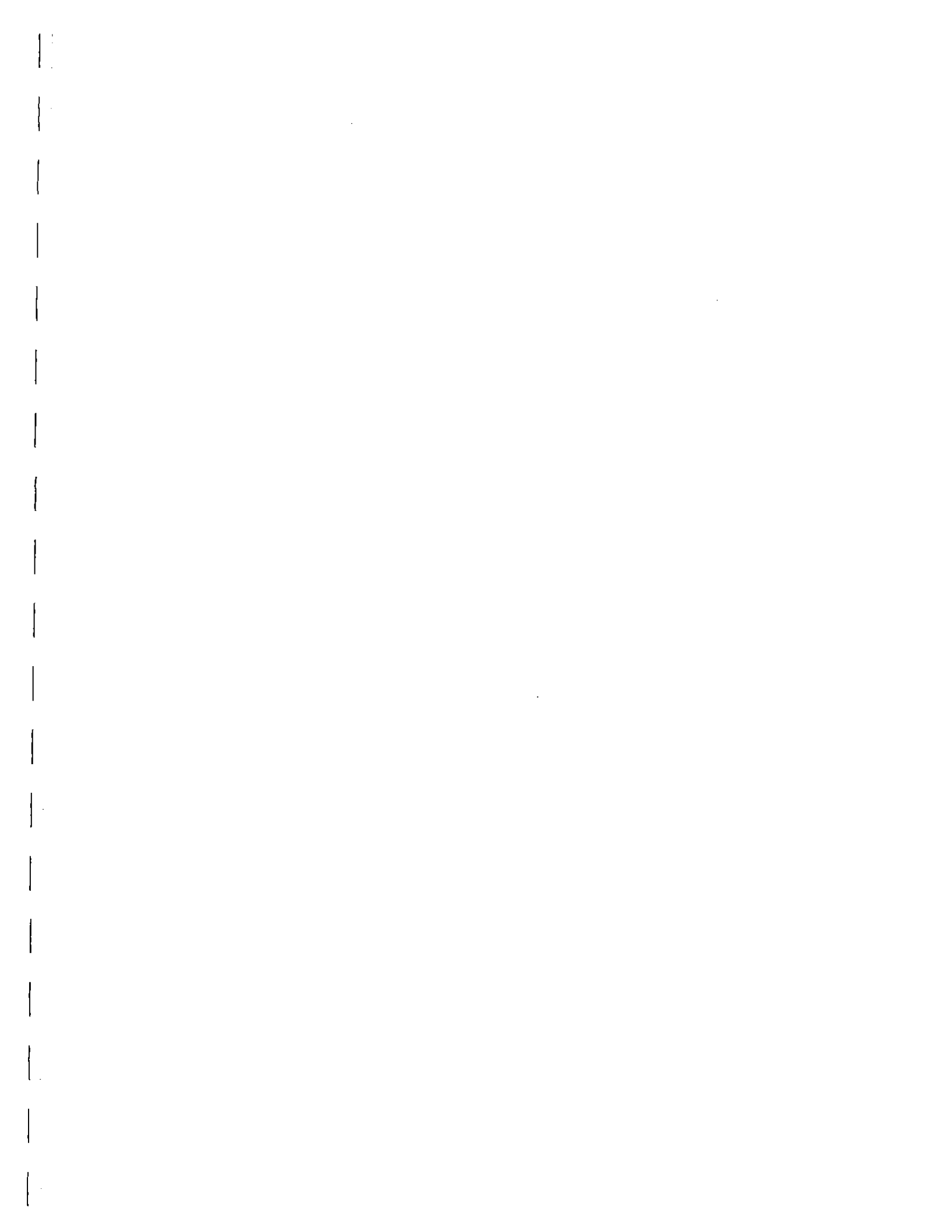
- B1: This analyte was detected in the associated method blank. The analyte concentration was determined not to be significantly higher than the associated method blank (less than ten times the concentration reported in the blank).
- B2: This analyte was detected in the associated method blank. The analyte concentration in the sample was determined to be significantly higher than the method blank (greater than ten times the concentration reported in the blank).
- C1: Second column confirmation was performed. The relative percent difference value (RPD) between the results on the two columns was evaluated and determined to be < 40%.
- C2: 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.
- C3: Second analysis confirmation was performed. The relative percent difference value (RPD) between the results on the two columns was evaluated and determined to be ≤ 30%.
- C4: Second analysis confirmation was performed. The RPD between the results on the two columns was evaluated and determined to be > 30%. The presence of this analyte was not verified per WAC 246-290-010. The original analysis was reported unless anomalies were noted.
- M: GC/MS confirmation was performed. The result derived from the original analysis was reported.
- D: The reported result for this analyte was calculated based on a secondary dilution factor.
- E: The concentration of this analyte exceeded the instrument calibration range and should be considered an estimated quantity.
- J: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.
- MCL: Maximum Contaminant Level
- MDL: Method Detection Limit
- MRL: Method Reporting Limit
- N: See analytical narrative
- ND: Not Detected
- PQL: Practical Quantitation Limit
- X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be _____.
- X2: Contaminant does not appear to be "typical" product.
- X3: Identification and quantitation of the analyte or surrogate was complicated by matrix interference.
- X4: 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.
- X6: 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.

5755 8th Street E.
Tacoma, WA 98424
Tel. 253-922-2310
Fax 253-922-5047
www.stl-inc.com

STILL SEVERN TRENT

Please provide mtCA cleanup level detection limits

STL8274-580 (12/02)



CONTROL SETTINGS:

Well Location

WELL ID: 0001

DATE: 5.25.04

WEATHER: Clear

WELL CONDITIONS:

Locked? ☒ Y ☐ N

Water in Protector? $Y(N)$

Damage? Y(N)

Comments:

SAMPLE CONTAINERS:

[illegible]

Observations (color, odor, anomalies, etc)

setting = 2

Water energy initiative

SAMPLER:

Hayley Brown

Signature

CONTROL SETTINGS:

8:31 DTW

Well Location

WELL ID: 0012

tos

Refill

DATE: 3.25.04

Intake

Discharge

WEATHER: Sunny

SOB

Pressure

WELL CONDITIONS:

Water In Protector? Y(N)

Damage? Y ☒ N ☐

Comments:

SAMPLE CONTAINERS:

3 VOA HCL presented to NINTPH S W/BTEX

[illegible]

Observations (color, odor, anomalies, etc)

Seting = 2

SAMPLER:

Haukeim Bienen

Printed Name

Signature

CONTROL SETTINGS:

Refill

Discharge

Pressure

Damage? Y N

1

3 VOLTAGE MEASURED FOR NWTG-2X N/BTFX

Well Location

± 0.2 DU
± 0.2 pH
± 0.5 Temp
± 5% SpC

[illegible]

Observations (color, odor, anomalies, etc)

$$g + f \circ g = 1, 5$$

SAMPLER: Hayley Brown
Printed Name: Hayley Brown

Signature

SCS ENGINEERS

SHEET 1 OF 1

CLIENT	PROJECT	JOB NO.
	Meekun Cleaners + Gas Station	09202001.00101
SUBJECT	BY	DATE
Water levels	ASB	3.25.04
	CHECKED	DATE

Well	DTW		
DPS	6.03		
DP2	6.26		
MW6	6.78		
MW1	7.80		
MW2	7.75		
MW5	5.64		
MW4	5.63		
MW3	4.82		
OW1	8.19	8.19	8.19
OW2	8.32	8.32	8.32
OW3	7.74		
MW3 & S	8.01	8.01	8.01

COPY

COPY

SGS ENGINEERS

GROUNDWATER SAMPLING INSTRUMENT CALIBRATION DOCUMENTATION FORM

	Temp.	Conductivity	pH	ORP/Eh	DO	Turbidity	Comments/Exceptions
Date		3.25.04	8.25.04		8.25.04	3.25.04	
Time		8:21	8:22		8:23	8:20	
Weather (sky or precip, temp)		Rain	Rain		Rain	Rain	
Barometric Pressure (*)					755		
Type of Calibration		std. solution	buffer solution		sat. am	std.	
Standard Value		445mS	7.0 / 3.95		100% 755	070 ntu = 5.54 0700 ntu = 53.5	
Pre-Cal Reading		.444uS	7.07 / 4.02		100% 753 11.09	071000 ntu = 532	
Post Cal Reading		.445uS	7.0 / 4.0		100% 755 11.45		
Discrepancy		None	None/None		None	None	
Calib. Successful?		yes	yes / yes		yes	yes	
Calibration by		HPB	HPB		HPB	HPB	
Instrument Type, ID		mp20	mp20		mp20	21008	
Calibration Location		In field	In field		In field	In field	