INTERIM REMEDIAL ACTION REPORT: SURFACTANT-ENHANCED RECOVERY STATUS UPDATE

Former Chevron Service Station No. 209335
1225 North 45th Street
Seattle, Washington

June 21, 2013

Prepared for:
Washington State Department of Ecology
Toxics Cleanup Program
3190 160th Ave SE
Bellevue, Washington 98008-5452

On Behalf of:
Chevron Environmental Management Company
6101 Bollinger Canyon Road
San Ramon, California 94583-5186

By:
Science Applications International Corporation
18912 North Creek Parkway Ste. 101
Bothell, Washington 98011

SAIC

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18912 North Creek Parkway, Ste. 101
Bothell, WA 98011

Ruth Otteman, LG
Project Manager

Dan Halpert
Environmental Engineer

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APPENDIX

ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
Chevron EMC	Chevron Environmental Management Company
CUL	Cleanup level
CDF	Controlled Density Fill
Ecology	Washington State Department of Ecology
EPA	Environmental Protection Agency
gpm	Gallons per minute
LNAPL	Light non-aqueous phase liquid
MSDS	Material Safety Data Sheet
MTCA	Model Toxics Control Act
SAIC	Science Applications International Corporation
TPH-DRO	Total petroleum hydrocarbons as diesel-range organics
TPH-GRO	Total petroleum hydrocarbons as gasoline-range organics
TPH-HRO	Total petroleum hydrocarbons as heavy oil-range organics
UIC	Underground Injection Control
UST	Underground storage tank
VCP	Voluntary Cleanup Program

1.0 INTRODUCTION

Science Applications International Corporation (SAIC), on behalf of Chevron Environmental Management Company (Chevron EMC), is pleased to submit this *Interim Remedial Action Report: Surfactant-Enhanced Recovery Status Update* detailing the surfactant injection remedial activities performed at the former Chevron Service Station No. 209335 located at 1225 North 45th Street in Seattle, Washington ("the site"). The site is currently enrolled in the Washington State Department of Ecology (Ecology) Voluntary Cleanup Program (VCP) under VCP No. NW1415.

2.0 BACKGROUND

2.1 SITE DESCRIPTION

The former Chevron Service Station (No. 209335) is located at 1225 45th Street, Seattle, Washington (Figure 1). Current features include a seven-story, mixed-use retail/residential building. The site is bounded to the north by single-family residences and a multistory mixed retail/residential building, to the east by Stone Way North, to the south by Big Wheels Auto Parts and a residential neighborhood with single-family dwellings, and to the west by a residential neighborhood.

2.2 FACILITY HISTORY

According to archive records, a gasoline service station and service garage operated at this location beginning in approximately 1935. The original station included two 1,000-gallon fuel underground storage tanks (USTs), one 550-gallon UST, and one hydraulic hoist. Standard Oil Company (a predecessor of Chevron) purchased the property in 1954. In 1956, the original station was redeveloped, and one 3,000-gallon UST, one 2,000 gallon UST, and one 550-gallon UST were installed. In 1969, the service station building and service garage were removed. Chevron sold the property in 1978 to the Seattle Housing Authority (SHA). The SHA subsequently sold the Chevron property and the property adjacent to the west (the former Wallingford Medical building) to the Housing Resources Group (HRG) in 2005.

The site has been developed by HRG into a seven-story, mixed-use retail/residential building with an underground parking garage, spanning the footprint of the former Chevron facility and the former Wallingford Medical Building properties. During the redevelopment, soil was removed site-wide to a depth of 13 feet below ground surface (bgs) and twenty large-diameter bucket auger borings were drilled in areas with remaining contamination to remove impacted soil to approximately 42 feet bgs. The bucket auger borings were subsequently backfilled with controlled density fill (CDF). Approximately 2,460 tons of impacted soil was removed.

Following the building redevelopment in November 2005, three groundwater monitoring wells (MW-6, MW-7, and MW-8) were installed within the underground parking garage on the north and east portions of the property. In December 2006, two additional wells (MW-9 and MW-10) were installed downgradient from the property.

During development of monitoring wells MW-6 through MW-8 in February 2006, approximately 0.5 feet of light non-aqueous phase liquid (LNAPL) was detected in MW-7. The LNAPL was removed during well development, and weekly bailing of LNAPL from MW-7 was implemented

in early February 2006. LNAPL thickness declined over time but was still present when bailing events ceased in August 2006. LNAPL bailing events were discontinued due to concerns expressed by HRG about residents occupying the building and the storage of recovered LNAPL on the property.

Groundwater samples have been collected from on-site wells since 1993 on a quarterly schedule. The LNAPL present in MW-7 has ranged in thickness between 0.00 (May 2007) to 1.26 feet (November 2010).

2.3 GEOLOGY AND HYDROGEOLOGY

The regional geology of the site includes deposits from advancing and retreating glaciers. These deposits consist of a sequence of sand, silt, and gravel that were likely associated with glacial drift. The site is located on the Seattle Drift Plain, which was formed during the last period of continental glaciation.

The local geology is characterized by the environmental borings that have been drilled at the site. The ground surface at the boring locations is overlain by 4 to 6 inches of concrete. The material underlying the concrete is typically comprised of dense to very dense, well-graded, fine- to medium-grained sand with some silt and rounded gravel, extending from approximately 8.5 to 20 feet bgs. Underlying this layer is a thick layer of very dense, brown to light brown, poorly graded, fine- to medium-grained sand that is present to the total depth explored of approximately 45.5 feet bgs.

The site is underlain by a relatively deep, productive, water-table aquifer that occurs in a poorly graded sand layer. During drilling, saturated soils were typically encountered at depths of approximately 38 feet bgs within the poorly graded sand layer. This is consistent with historic groundwater levels, which were on average approximately 37 feet bgs. Groundwater levels fluctuate between 34 and 40 feet bgs with a gradient toward the southeast.

Subsequent to the remediation activities in 2005, LNAPL had been observed in monitoring well MW-7 up to 1.26 feet thick. Groundwater measurements and analytical data indicate that neither the LNAPL plume nor the dissolved-phase hydrocarbon plume extend to down-gradient monitoring well MW-8. The LNAPL observed in monitoring well MW-7 appears to be a remnant of LNAPL saturated soil that was left behind in the annular space between the bucket-auger borings. The CDF-filled bucket-auger borings likely confine the LNAPL plume to the north, east, and west.

An LNAPL recovery test was conducted on September 10, 2010, when approximately 1.5 gallons of LNAPL and water mixture was bailed from monitoring well MW-7. Initial LNAPL thickness was recorded at 0.56 foot. After removing the LNAPL, depth-to-water and depth-to-product measurements were recorded at sporadic intervals for 3 hours. After 3 hours, the LNAPL thickness was recorded at 0.38 foot.

3.0 PURPOSE

In October through November 2009, in response to a request by Ecology, Chevron EMC enrolled this site and several others which have LNAPL present into the VCP. The purpose of this surfactant injection and extraction remedial action was to reduce and/or eliminate the reoccurring presence of LNAPL within the vicinity of monitoring well MW-7.

4.0 SURFACTANT TREATMENT

4.1 PRE-INJECTION GROUNDWATER SAMPLING

Prior to injection activities, groundwater samples and field parameters were collected from downgradient monitoring wells MW-6 and MW-8. No sample was collected from MW-7 due to the presence of LNAPL. Samples were analyzed for:

- Gasoline-range hydrocarbons (TPH-GRO) by Ecology Method NWTPH-Gx;
- Diesel- and heavy oil-range hydrocarbons (TPH-DRO and TPH-HRO) by Ecology Method NWTPH-D extended with silica gel cleanup; and
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency (EPA) Method 8021B.

Field parameters were also collected prior to sampling and including pH, conductivity, dissolved oxygen, and oxygen-reduction potential. Laboratory analytical and field parameters are summarized in Tables 1 and 2. The laboratory analysis report is provided as Attachment A.

4.2 SURFACTANT INJECTION

Injection activities occurred on March 18, 2013. Prior to performing injection activities, SAIC obtained an Underground Injection Control (UIC) permit from Ecology to inject surfactant in the subsurface. The injected solution was a 4 to 5 percent surfactant solution composed of non-ionic surfactant mixed with potable water. The surfactant used is water-based, nontoxic, and biodegradable in aerobic and anaerobic conditions. The Material Safety Data Sheet (MSDS) for the surfactant solution is included as Appendix B. The surfactant solution was pre-mixed in an appropriate sized poly-tank and gravity fed at a low flow rate into monitoring well MW-7. The injection rate was adjusted to ensure the fluid levels remained below the top of the screened interval and the hydraulic head did not exceed a few feet.

Groundwater was collected periodically in monitoring wells MW-6 and MW-8 during surfactant injection to determine the radius of influence and ensure that LNAPL did not migrate offsite or to nearby wells prior to the extraction period (Table 3). This was done by collecting groundwater periodically from monitoring wells MW-6 and MW-8 with a bailer and placing it in a glass sample jar. The field test for the presence of surfactant was a qualitative visual analysis, based on observation of suds when a sample was shaken vigorously in a sample bottle.

Surfactant injection was continued until 100 gallons of solution was injected into monitoring well MW-7. Following the injection, no surfactant solution was visible in monitoring wells MW-6 or MW-8. Surfactant was injected into well MW-7 for 45 minutes, which yields a flow rate of approximately 2.22 gallons per minute (gpm). The locations of all site wells, including the surfactant injection/extraction well are presented on Figure 2.

4.3 SURFACTANT AND LNAPL EXTRACTION

On March 19th through 21st, 2013, a Waterra ® inertial pump was used to extract the surfactant and emulsified LNAPL from MW-7. Monitoring wells MW-6 and MW-8 were periodically gauged to estimate the radius of influence. Extraction continued until 327 gallons were removed from MW-7. Depth to water measurements and time during extraction activities are presented on Table 4. Due to high production from monitoring well MW-7, a little over three times the volume of injected surfactant was recovered from the application well.

4.4 POST-SURFACTANT EXTRACTION GROUNDWATER SAMPLING

After extraction activities, groundwater levels were allowed to recover and samples were collected from monitoring wells MW-6, MW-7, and MW-8. Samples were transported via overnight air courier to Eurofins Lancaster Laboratories in Lancaster, Pennsylvania for analysis. Groundwater samples were analyzed for:

- TPH-GRO by Ecology Method NWTPH-Gx;
- TPH-DRO and TPH-HRO by Ecology Method NWTPH-D extended with silica gel cleanup; and
- BTEX by EPA Method 8021B.

Field parameters were also collected prior to sampling and including pH, conductivity, dissolved oxygen, and oxygen-reduction potential. Laboratory analytical results and field parameters are summarized in Tables 1 and 2. The laboratory analysis report is provided as Appendix A.

4.5 INVESTIGATION DERIVED WASTE

All extraction water and decontamination liquids generated during field activities were contained in seven 55-gallon DOT approved drums on-site for temporary storage. Each drum was labeled immediately before waste was placed into the drum using a standard hazardous waste label. Each container was covered and secured after every addition of waste, and each container was sealed with a lockable, bolt-on ring prior to demobilization from the site. A containment structure with a lining of plastic sheeting was constructed in the event of a drum leak.

On March 25, 2013, seven 55-gallon DOT approved drums were collected and transported by Emerald Services to Tacoma, Washington for disposal.

5.0 ANALYTICAL RESULTS

As identified in the previous sections, groundwater sampling was conducted prior to surfactant injection on March 18, 2013, and upon completion of extraction activities on March 22, 2013. Results of groundwater monitoring between March 18, 2013 and March 22, 2013 are presented in Table 1 and are summarized below:

- Both before and after injection, groundwater samples collected in monitoring well MW-6 were below laboratory detection limits for MTCA Method A CULs for all petroleum constituents.

- Monitoring well MW-7 contained 0.17 ft of LNAPL on March 18, 2013 and was not sampled. Immediately following the extraction process, concentrations of TPH-GRO were 99,000 µg/L, concentrations of TPH-DRO were 5,200 µg/L, concentrations of benzene were 12 µg/L, concentrations of toluene were 1,600 µg/L, concentrations of ethylbenzene were 1,700 µg/L, and concentrations of total xylenes were 17,000 µg/L.

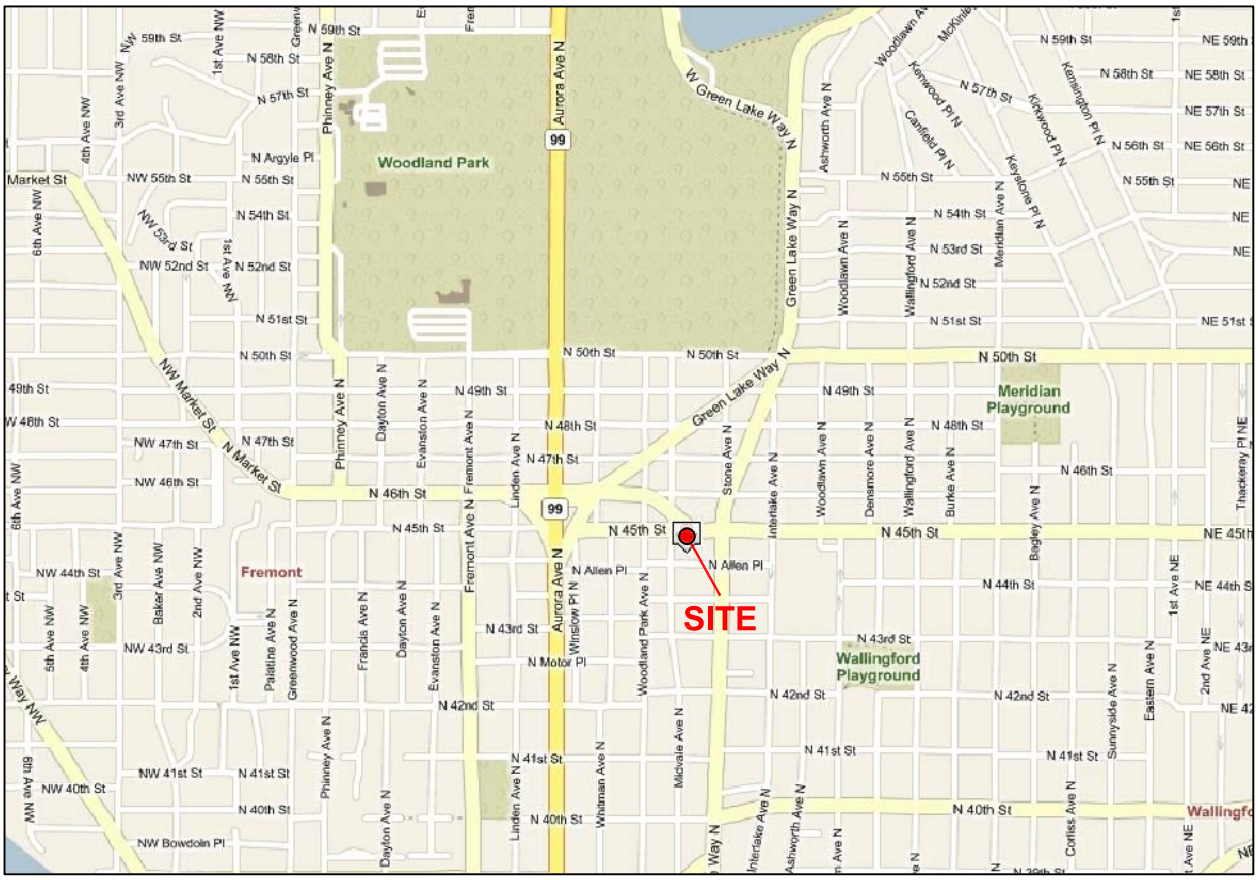
- Both before and after injection, samples collected from monitoring well MW-8 were below MTCA Method A CULs for all petroleum constituents but above laboratory detection limits for TPH-GRO, ethylbenzene, and total xylenes.

6.0 CONCLUSIONS

Approximately 100 gallons of surfactant mixture was gravity fed into monitoring well MW-7 on March 18, 2013. On March 22, 2013 approximately 327 gallons of surfactant/LNAPL mixture that was removed from monitoring well MW-7 and was disposed of by Emerald Services. A high production rate from groundwater monitoring well MW-7 enabled the speed and quantity of extraction at this site.

The effectiveness of the surfactant treatment will be evaluated by monitoring hydrocarbon concentrations as part of the ongoing quarterly site monitoring. Groundwater samples will be collected quarterly from monitoring wells MW-6, MW-7, and MW-8 and analyzed for petroleum constituents during the year following the treatment. The treatment will be considered to be a success if LNAPL decreases or disappears in monitoring well MW-7 or if sampling indicates that significant hydrocarbon mass was removed by the treatment. If LNAPL thicknesses and hydrocarbon concentrations recover to pre-treatment amounts, a second surfactant injection event may be considered.

Figures



Maps Provided by Seattle.gov

SAIC®

Former Chevron Service Station No. 209335
1225 North 45th Street
Seattle, Washington

FIGURE 1
Vicinity Map

FILE NAME:	DATE:
209335 Vicinity Map.dwg	6/21/2013

NORTH 45TH STREET

Sidewalk

MW-6

MW-7

MW-8

Stoneway
Apartments

Sidewalk

STONE WAY NORTH

Residence

Residence

Residence

Residence

Parking Lot (Asphalt)

Big Wheel Auto Parts

Sidewalk

Beso del Sol Restaurant/
Natural Health Clinic

MW-9

Parking Lot

MW-10

NORTH ALLEN PLACE

Legend

Surfactant Injection/Extraction Monitoring Well Location

Groundwater Monitoring Well

Historical Groundwater Flow Direction

N

0 20 40

Feet

SAIC

Former Chevron Service Station No. 209335
1225 North 45th Street
Seattle, Washington

FIGURE 2
Surfactant Injection/Extraction
Monitoring Well Location

DATE: 6/21/2013

DRAWING: 209335 Site Map.dwg

Tables

TABLE 1

GROUNDWATER MONITORING DATA AND ANALYTICAL RESULTS[1]
FORMER CHEVRON SERVICE STATION NO. 209335
1225 North 45th Street
Seattle, Washington
Concentrations reported in µg/L

Well ID/ Date	TOC[2] (ft.)	DTP (ft.)	DTW (ft.)	LNAPLT (ft.)	GWE[3] (ft.)	TPH-DRO	TPH-HRO	TPH-GRO	Benzene	Toluene	Ethyl-benzene	Total Xylenes
MW-6												
3/18/13	197.18	--	26.63	0.00	170.55	<30	<71	120	<0.5	<0.5	<0.5	<1.5
3/22/13	197.18	--	26.71	0.00	170.47	<31	<72	100	<0.5	<0.5	<0.5	<1.5
MW-7												
3/18/13	197.42	27.01	27.18	0.17	170.38	NOT SAMPLED DUE TO THE PRESENSE OF LNAPL						
3/22/13	197.42	--	27.03	0.00	170.39	**5,200**	<69	**99,000**	**12**	**1,600**	**1,700**	**17,000**
MW-8												
3/18/13	197.35	--	27.06	0.00	170.29	<30	<70	320	<0.5	<0.5	29	22
3/22/13	197.35	--	27.13	0.00	170.22	<29	<68	360	<0.5	<0.5	29	22
Trip Blank												
3/18/13	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<1.5
3/22/13	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<1.5
Standard Laboratory Reporting Limits:						--	--	50	0.5	0.5	0.5	1.5
MTCA Method A Cleanup Levels:						500	500	800/1,000	5	1,000	700	1,000
Current Method:						NWTPH-Dx+Extended[4]		NWTPH-Gx	USEPA 8021B			

Abbreviations:

TOC = Top of casing
DTP = Depth to product
DTW = Depth to water
LNAPL = Light non-aqueous phase liquid
LNAPLT = LNAPL thickness
GWE = Groundwater elevation
(ft.) = Feet
TPH = Total petroleum hydrocarbons
TPH-DRO = TPH as diesel-range organics
TPH-HRO = TPH as heavy oil-range organics
TPH-GRO = TPH as gasoline-range organics
MTCA = Model Toxics Control Act
USEPA = United States Environmental Protection Agency
-- = Not measured/not analyzed
µg/L = Micrograms per liter

Notes:

1 Analytical results in bold font indicate concentrations exceed MTCA Method A cleanup levels.
2 TOC elevations have been surveyed in feet relative to the 1988 North American Vertical Datum as of April 2011.
3 When LNAPL is present, GWE has been corrected using the following formula: GWE = [(TOC - DTW) + (LNAPLT x 0.80)].
4 Analyzed with silica-gel clean up.

TABLE 2
GROUNDWATER FIELD PARAMETERS
FORMER CHEVRON SERVICE STATION NO. 209335
1225 North 45th Street
Seattle, Washington

Well ID/ Date	pH	Conductivity	Dissolved Oxygen	Oxygen-Reduction Potential
MW-6				
3/18/13	6.39	25.7	8.32	219.0
3/22/13	6.77	14.3	5.49	139.7
MW-7				
3/22/13	7.12	-15.0	1.35	-100.1
MW-8				
3/18/13	6.37	24.0	8.67	130.9
3/22/13	6.72	8.2	2.04	61.7

Notes:

Conductivity measured in millisiemens per centimeter (ms/cm).
Dissolved oxygen measured in milligrams per liter (mg/L).
Oxygen-reduction potential measured in millivolts (mVolts).

TABLE 3
SURFACTANT INJECTION SUMMARY
FORMER CHEVRON SERVICE STATION NO. 209335
1225 North 45th Street
Seattle, Washington

Date	Time	Well ID	Volume of Surfactant Injected (gal)	Depth to Water (ft BTOC)
3/18/2013	1005	MW-6	0	26.63
		MW-7		27.18
		MW-8		27.06
	1020	MW-6	~50	26.62
		MW-7		27.20
		MW-8		27.10
	1035	MW-6	~80	26.68
		MW-7		27.09
		MW-8		27.10
	1050	MW-6	~100	26.69
		MW-7		27.62
		MW-8		27.10

Abbreviations:
ft BTOC = Feet below top of casing
gal = Gallons
~ = Approximate amount

TABLE 4
SURFACTANT EXTRACTION SUMMARY
FORMER CHEVRON SERVICE STATION NO. 209335
1225 North 45th Street
Seattle, Washington

Date	Time	Well ID	Volume of Surfactant Extracted (gal)	Depth to Water (ft BTOC)
3/19/2013	0900	MW-6	0	26.67
		MW-7		27.00
		MW-8		27.12
	1300	MW-6	47	26.60
		MW-7		27.00
		MW-8		27.12
	1440	MW-6	94	26.72
		MW-7		--
		MW-8		27.11
	1550	MW-6	112	26.64
		MW-7		27.06
		MW-8		27.10
3/20/2013	1115	MW-6	140	26.69
		MW-7		27.13
		MW-8		27.03
	1425	MW-6	187	26.69
		MW-7		27.13
		MW-8		27.25
	1620	MW-6	210	26.71
		MW-7		27.36
		MW-8		27.14
3/21/2013	1030	MW-6	234	26.69
		MW-7		27.06
		MW-8		27.13
	1350	MW-6	281	26.65
		MW-7		27.06
		MW-8		27.12
	1600	MW-6	327	26.71
		MW-7		--
		MW-8		27.12

Abbreviations:
ft BTOC = Feet below top of casing
gal = Gallons
-- = Not measured/not analyzed
~ = Approximate amount

Appendix A
Laboratory Analysis Report

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2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-656-2300 Fax: 717-656-2681 • www.lancasterlabs.com

Analysis Report

ANALYTICAL RESULTS

Prepared by:

Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

Prepared for:

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

March 29, 2013

Project: 209335

Submittal Date: 03/19/2013
Group Number: 1376239
PO Number: 0015119898
Release Number: HORNE
State of Sample Origin: WA

Client Sample Description	Lancaster Labs (LLI) #
MW-8-031813 Grab Groundwater	6986984
MW-6-031813 Grab Groundwater	6986985
TB-1-031813 Water	6986986

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC COPY TO SAIC Attn: Ruth Otteman

Respectfully Submitted,

Jill M. Parker
Senior Specialist

(717) 556-7262

Sample Description: MW-8-031813 Grab Groundwater
Facility# 209335
1225 N. 45th Street - Seattle, WA

LLI Sample # WW 6986984
LLI Group # 1376239
Account # 11255

Project Name: 209335

Collected: 03/18/2013 08:45 by SB

Submitted: 03/19/2013 09:15
Reported: 03/29/2013 08:27

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

93358

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**ug/l**	**ug/l**	
08274	NWTPH-Gx water C7-C12	n.a.	320	50	1
GC Volatiles	**SW-846 8021B**		**ug/l**	**ug/l**	
02102	Benzene	71-43-2	N.D.	0.5	1
02102	Ethylbenzene	100-41-4	29	0.5	1
02102	Toluene	108-88-3	N.D.	0.5	1
02102	Total Xylenes	1330-20-7	22	1.5	1
GC Petroleum Hydrocarbons w/Si	**ECY 97-602 NWTPH-Dx modified**		**ug/l**	**ug/l**	
12005	DRO C12-C24 w/Si Gel	n.a.	N.D.	30	1
12005	HRO C24-C40 w/Si Gel	n.a.	N.D.	70	1

The reverse surrogate, capric acid, is present at <1%.

General Sample Comments

State of Washington Lab Certification No. C259

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08274	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	13079A53A	03/20/2013 21:56	Marie D John	1
02102	Method 8021 Water Master	SW-846 8021B	1	13079A53A	03/20/2013 21:56	Marie D John	1
01146	GC VOA Water Prep	SW-846 5030B	1	13079A53A	03/20/2013 21:56	Marie D John	1
12005	NWTPH-Dx water w/ 10g Si Gel	ECY 97-602 NWTPH-Dx modified	1	130810012A	03/27/2013 20:11	Lisa A Reinert	1
12007	NW Dx water w/ 10g column	ECY 97-602 NWTPH-Dx 06/97	1	130810012A	03/22/2013 11:30	Olivia Arosemena	1

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2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 •717-656-2300 Fax:717-656-2681• www.lancasterlabs.com

Analysis Report

Sample Description: MW-6-031813 Grab Groundwater
Facility# 209335
1225 N. 45th Street - Seattle, WA

LLI Sample # WW 6986985
LLI Group # 1376239
Account # 11255

Project Name: 209335

Collected: 03/18/2013 09:30 by SB

Submitted: 03/19/2013 09:15
Reported: 03/29/2013 08:27

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

93356

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**ug/l**	**ug/l**	
08274	NWTPH-Gx water C7-C12	n.a.	120	50	1
GC Volatiles	**SW-846 8021B**		**ug/l**	**ug/l**	
02102	Benzene	71-43-2	N.D.	0.5	1
02102	Ethylbenzene	100-41-4	N.D.	0.5	1
02102	Toluene	108-88-3	N.D.	0.5	1
02102	Total Xylenes	1330-20-7	N.D.	1.5	1
GC Petroleum Hydrocarbons w/Si	**ECY 97-602 NWTPH-Dx modified**		**ug/l**	**ug/l**	
12005	DRO C12-C24 w/Si Gel	n.a.	N.D.	30	1
12005	HRO C24-C40 w/Si Gel	n.a.	N.D.	71	1

The reverse surrogate, capric acid, is present at <1%.

General Sample Comments

State of Washington Lab Certification No. C259

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08274	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	13079A53A	03/20/2013 22:23	Marie D John	1
02102	Method 8021 Water Master	SW-846 8021B	1	13079A53A	03/20/2013 22:23	Marie D John	1
01146	GC VOA Water Prep	SW-846 5030B	1	13079A53A	03/20/2013 22:23	Marie D John	1
12005	NWTPH-Dx water w/ 10g Si Gel	ECY 97-602 NWTPH-Dx modified	1	130810012A	03/27/2013 20:34	Lisa A Reinert	1
12007	NW Dx water w/ 10g column	ECY 97-602 NWTPH-Dx 06/97	1	130810012A	03/22/2013 11:30	Olivia Arosemena	1

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Analysis Report

Sample Description: TB-1-031813 Water
Facility# 209335
1225 N. 45th Street - Seattle, WA

LLI Sample # WW 6986986
LLI Group # 1376239
Account # 11255

Project Name: 209335

Collected: 03/18/2013 13:00

Submitted: 03/19/2013 09:15
Reported: 03/29/2013 08:27

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

9335T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**ug/l**	**ug/l**	
08274	NWTPH-Gx water C7-C12	n.a.	N.D.	50	1
GC Volatiles	**SW-846 8021B**		**ug/l**	**ug/l**	
02102	Benzene	71-43-2	N.D.	0.5	1
02102	Ethylbenzene	100-41-4	N.D.	0.5	1
02102	Toluene	108-88-3	N.D.	0.5	1
02102	Total Xylenes	1330-20-7	N.D.	1.5	1

General Sample Comments

State of Washington Lab Certification No. C259

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08274	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	13079A53A	03/20/2013 19:42	Marie D John	1
02102	Method 8021 Water Master	SW-846 8021B	1	13079A53A	03/20/2013 19:42	Marie D John	1
01146	GC VOA Water Prep	SW-846 5030B	1	13079A53A	03/20/2013 19:42	Marie D John	1

Quality Control Summary

Client Name: Chevron Group Number: 1376239
Reported: 03/29/13 at 08:27 AM

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 13079A53A	Sample number(s): 6986984-6986986							
Benzene	N.D.	0.5	ug/l	101	98	80-120	3	30
Ethylbenzene	N.D.	0.5	ug/l	103	100	80-120	3	30
NWTPH-Gx water C7-C12	N.D.	50.	ug/l	103	99	75-135	4	30
Toluene	N.D.	0.5	ug/l	100	97	80-120	3	30
Total Xylenes	N.D.	1.5	ug/l	105	102	80-120	3	30
Batch number: 130810012A	Sample number(s): 6986984-6986985							
DRO C12-C24 w/Si Gel	N.D.	30.	ug/l	75	77	32-117	3	20
HRO C24-C40 w/Si Gel	N.D.	70.	ug/l					

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: Method 8021 Water Master
Batch number: 13079A53A

	Trifluorotoluene-P	Trifluorotoluene-F
6986984	81	77
6986985	80	79
6986986	80	79
Blank	80	80
LCS	81	86
LCSD	80	86
Limits:	51-120	63-135

Analysis Name: NWTPH-Dx water w/ 10g Si Gel
Batch number: 130810012A

	Orthoterphenyl
6986984	88
6986985	87
Blank	87
LCS	88
LCSD	94

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Chevron Group Number: 1376239
Reported: 03/29/13 at 08:27 AM

Surrogate Quality Control

Limits: 50-150

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Chevron Northwest Region Analysis Request/Chain of Custody

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Acct. # 11255 Group # 1370239 Sample # 6986984-86
Instructions on reverse side correspond with circled numbers.

SCR #: _____

(1) Client Information

Facility # 20-9335 WBS NWRTB-00-209335-LAB
Site Address 1225 45th Street, Seattle, WA
Chevron PM Horne Lead Consultant SAIC
Consultant/Office Bothell, WA
Consultant Project Mgr. Otteman
Consultant Phone # 425-482-3328
Sampler Braun / Halpert

(4) Matrix: ☐ Soil ☐ Sediment ☒ Water (☒ Ground ☐ Potable ☐ NPDES ☐ Surface) ☐ Oil ☐ Air ☐ Sediment

(3) ☐ Composite

(2) Sample Identification	Collected Date	Collected Time	(3) Grab	Total Number of Containers	(5) BTEX + 8021	BTEX + Naphth	8260	8260 full scan	Oxygenates	NWTPH GX	NWTPH DX	Silica Gel Cleanup	Lead Total	Lead Diss.	Method	WAVPH	WAEPH
MW-8-031813	3/18/13	0845	☒	5	☒	☐	☐	☐	☐	☒	☒	☒	☐	☐	☐	☐	☐
MW-6-031813	3/18/13	0930	☒	5	☒	☐	☐	☐	☐	☒	☒	☒	☐	☐	☐	☐	☐
TB-1-031813	3/18/13	1300	☒	2	☒	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐

(5) Analyses Requested

- ☐ Results in Dry Weight
- ☐ J value reporting needed
- ☐ Must meet lowest detection limits possible for 8260 compounds
- ☐ 8021 MTBE Confirmation
- ☐ Confirm MTBE + Naphthalene
- ☐ Confirm highest hit by 8260
- ☐ Confirm all hits by 8260
- ☐ Run _____ oxy's on highest hit
- ☐ Run _____ oxy's on all hits

(6) Remarks

DRH 3/18/13

(7) Turnaround Time Requested (TAT) (please circle)

Standard | ~~5 day~~ 2 | 4 day
72 hour | 48 hour | 24 hour

(8) Data Package Options (please circle if required)

Type I - Full | Type VI (Raw Data)

Relinquished by	Date	Time	Received by	Date	Time
[signature]	3/18/13	1300			
Relinquished by	Date	Time	Received by	Date	Time

Relinquished by Commerical Carrier: UPS _____ FedEx X Other _____

Received by: Pat Gu — Date 3/19/13 — Time 0915

Temperature Upon Receipt 1.2 °C

Custody Seals Intact? Yes No

(9)

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

< less than - The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

J estimated value – The result is ≥ the Method Detection Limit (MDL) and < the Limit of Quantitation (LOQ).

ppm parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas.

ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

U.S. EPA CLP Data Qualifiers:

Organic Qualifiers

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quantitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike sample not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	Correlation coefficient for MSA <0.995

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR part 136 Table II as “analyze immediately” are not performed within 15 minutes.

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Analysis Report

ANALYTICAL RESULTS

Prepared by:

Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

Prepared for:

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

April 04, 2013

Project: 209335

Submittal Date: 03/23/2013
Group Number: 1377588
PO Number: 0015119898
Release Number: HORNE
State of Sample Origin: WA

Client Sample Description	Lancaster Labs (LLI) #
MW-6-032213 Grab Groundwater	6994512
MW-7-032213 Grab Groundwater	6994513
MW-8-032213 Grab Groundwater	6994514
TB-1-032213 Water	6994515

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC COPY TO SAIC Attn: Ruth Otteman

Respectfully Submitted,

Jill M. Parker
Senior Specialist

(717) 556-7262

Sample Description: MW-6-032213 Grab Groundwater
Facility# 209335
1225 45th Street - Seattle, WA

LLI Sample # WW 6994512
LLI Group # 1377588
Account # 11255

Project Name: 209335

Collected: 03/22/2013 11:20 by SB

Submitted: 03/23/2013 09:30
Reported: 04/04/2013 10:48

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

45S06

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**ug/l**	**ug/l**	
08274	NWTPH-Gx water C7-C12	n.a.	100	50	1
GC Volatiles	**SW-846 8021B**		**ug/l**	**ug/l**	
02102	Benzene	71-43-2	N.D.	0.5	1
02102	Ethylbenzene	100-41-4	N.D.	0.5	1
02102	Toluene	108-88-3	N.D.	0.5	1
02102	Total Xylenes	1330-20-7	N.D.	1.5	1
GC Petroleum Hydrocarbons w/Si	**ECY 97-602 NWTPH-Dx modified**		**ug/l**	**ug/l**	
12005	DRO C12-C24 w/Si Gel	n.a.	N.D.	31	1
12005	HRO C24-C40 w/Si Gel	n.a.	N.D.	72	1

The reverse surrogate, capric acid, is present at <1%.

General Sample Comments

State of Washington Lab Certification No. C259

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08274	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	13087A53A	03/28/2013 21:22	Catherine J Schwarz	1
02102	Method 8021 Water Master	SW-846 8021B	1	13087A53A	03/28/2013 21:22	Catherine J Schwarz	1
01146	GC VOA Water Prep	SW-846 5030B	1	13087A53A	03/28/2013 21:22	Catherine J Schwarz	1
12005	NWTPH-Dx water w/ 10g Si Gel	ECY 97-602 NWTPH-Dx modified	1	130870028A	04/01/2013 21:21	Christine E Dolman	1
12007	NW Dx water w/ 10g column	ECY 97-602 NWTPH-Dx 06/97	1	130870028A	03/29/2013 15:30	Seth A Farrier	1

Sample Description: MW-7-032213 Grab Groundwater
Facility# 209335
1225 45th Street - Seattle, WA

LLI Sample # WW 6994513
LLI Group # 1377588
Account # 11255

Project Name: 209335

Collected: 03/22/2013 11:45 by SB

Submitted: 03/23/2013 09:30
Reported: 04/04/2013 10:48

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

45S07

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**ug/l**	**ug/l**	
08274	NWTPH-Gx water C7-C12	n.a.	99,000	2,500	50
GC Volatiles	**SW-846 8021B**		**ug/l**	**ug/l**	
02102	Benzene	71-43-2	12	2.5	5
02102	Ethylbenzene	100-41-4	1,700	25	50
02102	Toluene	108-88-3	1,600	25	50
02102	Total Xylenes	1330-20-7	17,000	75	50
GC Petroleum Hydrocarbons w/Si	**ECY 97-602 NWTPH-Dx modified**		**ug/l**	**ug/l**	
12005	DRO C12-C24 w/Si Gel	n.a.	5,200	29	1
12005	HRO C24-C40 w/Si Gel	n.a.	N.D.	69	1

Due to the presence of fuel in the sample extract, capric acid recovery can not be determined.

General Sample Comments

State of Washington Lab Certification No. C259

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08274	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	13087A53A	03/29/2013 12:41	Catherine J Schwarz	50
02102	Method 8021 Water Master	SW-846 8021B	1	13087A53A	03/29/2013 04:05	Catherine J Schwarz	5
02102	Method 8021 Water Master	SW-846 8021B	1	13087A53A	03/29/2013 12:41	Catherine J Schwarz	50
01146	GC VOA Water Prep	SW-846 5030B	1	13087A53A	03/29/2013 04:05	Catherine J Schwarz	5
01146	GC VOA Water Prep	SW-846 5030B	2	13087A53A	03/29/2013 12:41	Catherine J Schwarz	50
12005	NWTPH-Dx water w/ 10g Si Gel	ECY 97-602 NWTPH-Dx modified	1	130870028A	04/01/2013 21:44	Christine E Dolman	1
12007	NW Dx water w/ 10g column	ECY 97-602 NWTPH-Dx 06/97	1	130870028A	03/29/2013 15:30	Seth A Farrier	1

Sample Description: MW-8-032213 Grab Groundwater
Facility# 209335
1225 45th Street - Seattle, WA

LLI Sample # WW 6994514
LLI Group # 1377588
Account # 11255

Project Name: 209335

Collected: 03/22/2013 12:30 by SB

Submitted: 03/23/2013 09:30
Reported: 04/04/2013 10:48

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

45S08

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**ug/l**	**ug/l**	
08274	NWTPH-Gx water C7-C12	n.a.	360	50	1
GC Volatiles	**SW-846 8021B**		**ug/l**	**ug/l**	
02102	Benzene	71-43-2	N.D.	0.5	1
02102	Ethylbenzene	100-41-4	29	0.5	1
02102	Toluene	108-88-3	N.D.	0.5	1
02102	Total Xylenes	1330-20-7	22	1.5	1
GC Petroleum Hydrocarbons w/Si	**ECY 97-602 NWTPH-Dx modified**		**ug/l**	**ug/l**	
12005	DRO C12-C24 w/Si Gel	n.a.	N.D.	29	1
12005	HRO C24-C40 w/Si Gel	n.a.	N.D.	68	1

The reverse surrogate, capric acid, is present at <1%.

General Sample Comments

State of Washington Lab Certification No. C259

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08274	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	13087A53A	03/28/2013 21:49	Catherine J Schwarz	1
02102	Method 8021 Water Master	SW-846 8021B	1	13087A53A	03/28/2013 21:49	Catherine J Schwarz	1
01146	GC VOA Water Prep	SW-846 5030B	1	13087A53A	03/28/2013 21:49	Catherine J Schwarz	1
12005	NWTPH-Dx water w/ 10g Si Gel	ECY 97-602 NWTPH-Dx modified	1	130870028A	04/01/2013 22:06	Christine E Dolman	1
12007	NW Dx water w/ 10g column	ECY 97-602 NWTPH-Dx 06/97	1	130870028A	03/29/2013 15:30	Seth A Farrier	1

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Analysis Report

Sample Description: TB-1-032213 Water
Facility# 209335
1225 45th Street - Seattle, WA

LLI Sample # WW 6994515
LLI Group # 1377588
Account # 11255

Project Name: 209335

Collected: 03/22/2013 13:30

Submitted: 03/23/2013 09:30
Reported: 04/04/2013 10:48

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

45STB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**ug/l**	**ug/l**	
08274	NWTPH-Gx water C7-C12	n.a.	N.D.	50	1
GC Volatiles	**SW-846 8021B**		**ug/l**	**ug/l**	
02102	Benzene	71-43-2	N.D.	0.5	1
02102	Ethylbenzene	100-41-4	N.D.	0.5	1
02102	Toluene	108-88-3	N.D.	0.5	1
02102	Total Xylenes	1330-20-7	N.D.	1.5	1

General Sample Comments

State of Washington Lab Certification No. C259

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08274	NWTPH-Gx water C7-C12	ECY 97-602 NWTPH-Gx	1	13087A53A	03/28/2013 20:02	Catherine J Schwarz	1
02102	Method 8021 Water Master	SW-846 8021B	1	13087A53A	03/28/2013 20:02	Catherine J Schwarz	1
01146	GC VOA Water Prep	SW-846 5030B	1	13087A53A	03/28/2013 20:02	Catherine J Schwarz	1

Quality Control Summary

Client Name: Chevron Group Number: 1377588
Reported: 04/04/13 at 10:48 AM

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 13087A53A	Sample number(s): 6994512-6994515							
Benzene	N.D.	0.5	ug/l	102	102	80-120	0	30
Ethylbenzene	N.D.	0.5	ug/l	104	105	80-120	1	30
NWTPH-Gx water C7-C12	N.D.	50.	ug/l	100	99	75-135	2	30
Toluene	N.D.	0.5	ug/l	101	102	80-120	1	30
Total Xylenes	N.D.	1.5	ug/l	107	108	80-120	1	30
Batch number: 130870028A	Sample number(s): 6994512-6994514							
DRO C12-C24 w/Si Gel	N.D.	30.	ug/l	68	68	32-117	0	20
HRO C24-C40 w/Si Gel	N.D.	70.	ug/l					

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: Method 8021 Water Master
Batch number: 13087A53A

	Trifluorotoluene-P	Trifluorotoluene-F
6994512	80	77
6994513	81	83
6994514	80	78
6994515	80	78
Blank	79	79
LCS	80	84
LCSD	80	85
Limits:	51-120	63-135

Analysis Name: NWTPH-Dx water w/ 10g Si Gel
Batch number: 130870028A

	Orthoterphenyl
6994512	92
6994513	119
6994514	106
Blank	95

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Chevron Group Number: 1377588
Reported: 04/04/13 at 10:48 AM

Surrogate Quality Control

LCS	92
LCSD	93
Limits:	50-150

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Chevron Northwest Region Analysis Request/Chain of Custody

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Acct. # 11255 Group # 1377588 Sample # 694512-15

For Lancaster Laboratories use only

Instructions on reverse side correspond with circled numbers.

SCR #: _____

1 Client Information

Facility # 20-9335 WBS NWRTB-00-209335-LAB

Site Address 1225, 45th St, Seattle, WA

Chevron PM Horne Lead Consultant SAIC

Consultant/Office Bothell, WA

Consultant Project Mgr. Otteman

Consultant Phone # 425-482-3328

Sampler Brown/Halpert

2 Sample Identification

Sample Identification	Collected Date	Collected Time	3 Grab	Composite	4 Matrix: Soil	Sediment	Water: Ground	Potable	NPDES	Surface	Oil	Air	Total Number of Containers	5 Analyses Requested: BTEX + MTBE 8021	8260	Naphth	8260 full scan	Oxygenates	NWTPH GX	NWTPH DX	Silica Gel Cleanup	Lead	Total	Diss.	Method	WAVPH	WAEPH
MW-6-032213	03/22/13	1120	✓				✓						5		✓				✓	✓							
MW-7-032213	↓	1145	✓				✓						5		✓				✓	✓							
MW-8-032213	↓	1230	✓				✓						5		✓				✓	✓							
TB-1-032213	↓	1330	✓				✓						2		✓				✓								

6 Remarks

- ☐ Results in Dry Weight
- ☐ J value reporting needed
- ☐ Must meet lowest detection limits possible for 8260 compounds
- ☐ 8021 MTBE Confirmation
- ☐ Confirm MTBE + Naphthalene
- ☐ Confirm highest hit by 8260
- ☐ Confirm all hits by 8260
- ☐ Run _____ oxy's on highest hit
- ☐ Run _____ oxy's on all hits

7 Turnaround Time Requested (TAT) (please circle)

Standard | 5 day | 4 day | 72 hour | 48 hour | 24 hour

8 Data Package Options (please circle if required)

Type I - Full | Type VI (Raw Data)

Relinquished by	Date	Time	Received by	Date	Time
Dan Halpert	3/22/13	1400		3/22/13	14:00
Relinquished by	Date	Time	Received by	Date	Time
Relinquished by Commerical Carrier: UPS ____ FedEx ✓ Other ____			Received by	Date 3/23/13	Time 0930

Temperature Upon Receipt 2.7 °C

Custody Seals Intact? Yes No

9

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

< less than - The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

J estimated value – The result is ≥ the Method Detection Limit (MDL) and < the Limit of Quantitation (LOQ).

ppm parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas.

ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

U.S. EPA CLP Data Qualifiers:

Organic Qualifiers

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quantitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike sample not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	Correlation coefficient for MSA <0.995

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR part 136 Table II as “analyze immediately” are not performed within 15 minutes.

Appendix B
Material Safety Data Sheet - Surfactant

International Chemical Systems, Inc.

ENVIRONMENTAL CHEMICAL SOLUTIONS

"Delivering Solutions to the Customer"

MATERIAL SAFETY DATA SHEET
HYDROCARBON DESORPTION AGENT

RELEASE

GOLD CREW HIT-E001

Emergency: 1-877-253-2665

SECTION I - GENERAL INFORMATION

Name:	Release, Gold Crew HIT-E-001, Hydrocarbon Desorption Agent
Manufacturer	Environmental Chemical Solutions P.O. Box 2029 Gig Harbor, WA 98335 Tel: (877) 253-2665 Fax: (253) 853-1340 www.ecschem.com
Generic Description	Water Based, Biodegradable, Wetting Agents & Surfactants
HMIS Code	Health 0, Fire 0, Reactivity 0
HMIS Key	4 = Extreme, 3 = High, 2 = Moderate, 1 = Slight, 0 = Insignificant
D.O.T. Class	Not regulated; not hazardous
Formula:	Proprietary

SECTION II - HAZARDOUS INGREDIENTS

This product does not contain any hazardous ingredients as defined by CERCLA and California's Prop. 65

SECTION III - PHYSICAL & CHEMICAL CHARACTERISTICS

Flash Point:	None	Melting Point:	32F
Specific Gravity:	1.0175 ±.01	Vapor Pressure mm/Hg:	NA
Pounds Per Gallon	8.46	Vapor Density Air 1:	NA
Solubility in Water	Complete	Reactivity with Water:	No
Viscosity	15 Centipoise	Surface Tension @ 5%:	27.7 Dyne/cm at 25°C
Evaporation Rate:	>1 as compared to Water	pH:	10.0 ±.5
Appearance:	Clear Liquid Unless Dyed	Fire Extinguisher Media:	NA
Odor:	Light Fragrance	Fire Fighting Procedures:	NA

SECTION IV - Fire and Explosion Data

Special Fire Fighting Procedures	NA	Percent Volatile by Volume	NA
Unusual Fire and Explosion Hazards	None	Flammable Limit	NA
Solvent for Clean-Up	Water	Auto Ignite Temperature	NA
Flash Point	NA	Fire Extinguisher Media	NA

SECTION V - SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be taken in Handling and Storage: Use good normal hygiene.
Precautions to be taken in case of Spill or Leak -
Small spills. Soak up with absorbent materials.
Large spills: dike and contain. Remove with vacuum truck or pump to storage/salvage vessel. Soak up residue with absorbent materials.

Waste Disposal Procedures: Dispose in an approved disposal area or in a manner that complies with all local, state, and federal regulations.

SECTION VI - HEALTH HAZARDS

Threshold Limit Values: NA

Signs and Symptoms of Over Exposure-

Acute: Moderate eye irritation. Skin: Causes redness, edema, drying of skin.
Chronic: Pre-existing skin and eye disorders may be aggravated by contact with this product.

Medical Conditions Generally Aggravated by Exposure: Unknown

Carcinogen: No

Emergency First Aid Procedures -

Eyes: Flush thoroughly with water for 15 minutes. Get medical attention.
Skin: Remove contaminated clothing. Wash exposed areas with soap and water. Wash clothing before reuse. Get attention if irritation develops.
Ingestion: Get medical attention.
Inhalation: None considered necessary.

SECTION VII - SPECIAL PROTECTION INFORMATION

Respiratory Protection:	Not necessary	Ventilation Required:	Normal
Local Exhaust Required:	No	Protective Clothing:	Gloves, safety glasses, wash clothing before reuse.

SECTION VIII - PHYSICAL HAZARDS

Stability:	Stable	Incompatible Substances:	None known
Polymerization:	No	Hazardous Decomposition Products:	NA

SECTION IX - TRANSPORT & STORAGE

DOT Class	: Not Regulated/Non Hazardous	Freeze Temperature	: 28°F
Storage	: 35°F-120°F	Freeze Harm	: None
Shelf Life	: Approximately one year unopened		

SECTION X - REGULATORY INFORMATION

The Information on this Material Safety Data Sheet reflects the latest information and data that we have on hazards, properties, and handling of this product under the recommended conditions of use. Any use of this product or method of application, which is not described on the Product label or in this Material Safety Data Sheet is the sole responsibility of the user. This Material Safety Data Sheet was prepared to comply with the OSHA Hazardous Communication Regulation.

All information appearing herein is based upon data obtained by the manufacturer and technical sources. Judgments as to the suitability of information herein for the purchaser's purposes are necessarily purchaser's responsibility. Therefore, although reasonable care has been taken in the preparation of this information, ICS, ECS or Gold Crew, or its distributors extends no warrantees, makes no representations and assumes no responsibility as to the suitability of such information for application to purchasers intended purposes or for consequences of its use.

