

Technical Memorandum

To: Chris Maurer, Washington Department of Ecology (Ecology)
From: Janet Knox, Pacific Groundwater Group (PGG)
Re: Scougal Rubber Remedial Action Update (Voluntary Cleanup Program (VCP) Site NW 1707)
Date: August 12, 2019

This technical memorandum summarizes the remedial actions conducted at Scougal Rubber between November 2017 and July 2019. Remedial action at the site focuses on the reduction of chlorinated solvent concentrations in soil and groundwater. Previous remedial actions at the site are described in other documents, including:

- *Scougal Rubber Remedial Action Update (VCP Site NW 1707) (PGG, 2017)*
- *Scougal Rubber Final Remediation Plan (PGG, 2016) and Addendum (PGG, 2016b)*
- *Scougal Rubber Remedial Action Update (VCP Site NW 1707) (PGG, 2015)*
- *Scougal Rubber Remedial Action Update (VCP Site NW 1707) (PGG, 2014)*
- *Scougal Rubber Remedial Action Update (VCP Site NW 1707) (PGG, 2013)*
- *Scougal Rubber Remedial Action Update (VCP Site NW 1707) (PGG, 2012)*
- *Scougal Rubber Remedial Action Update (VCP Site NW 1707) (PGG, 2011)*
- *Scougal Rubber Remedial Action Update (VCP Site NW 1707) (PGG, 2009)*
- *Scougal Rubber Final Remedial Action Plan (PGG, 2007)*
- *Independent Remedial Action Report (Retec, 2002)*

The work was performed using generally accepted hydrogeologic practices at this time and in this vicinity, for exclusive application to the Scougal Rubber site and for the exclusive use of Scougal Rubber. This statement is in lieu of other warranties, express or implied.

INTRODUCTION

Scougal Rubber is located in the Georgetown neighborhood of Seattle, Washington at 6239 Corson Avenue (Figure 1). Remedial efforts have been underway at the site for over 20 years and have been successful in reducing contaminant concentrations (Table 1). Source area groundwater concentrations have decreased since remediation began. For this annual update, we took a fresh look at cleanup levels for this Site, as it is similar to other chlorinated sites under Agreed Order in South Seattle with groundwater discharging to the Lower Duwamish Waterway.

As approved by Ecology for other South Seattle Sites, appropriate cleanup levels for this Site are 1) Method C cleanup levels protective of surface water and 2) groundwater screening levels protective of indoor air. As discussed in subsequent sections, groundwater at Scougal does not exceed groundwater cleanup levels protective of surface water. While groundwater concentrations exceed indoor air screening levels at four wells in paved parking areas within 10 feet of the property boundary, the Ewing Irrigation and Landscape Supply warehouse is downgradient (west) and has garage doors for loading supplies. Groundwater does not exceed cleanup or screening levels within 70 feet of the property boundary. Therefore, we find that many remedies have been conducted at Scougal for many years and based on current cleanup levels, we recommend that the Site is protective of human health and the environment.

HYDROGEOLOGIC SETTING

The Scougal property overlies fine to medium silty sands with scattered, discontinuous silt and gravel stringers. These soils are commonly observed throughout the lower Duwamish area. Depth to groundwater at the site is between 7 and 9 feet. The regional groundwater flow direction is to the southwest toward the Duwamish River, approximately 0.5 miles away (Retec 2003). Soil cores collected in 2009 identified a 6- to 12-inch thick silt layer at approximately 16 feet below ground surface (bgs) that appears to be laterally continuous within at least the alleyway area of the site.

REMEDIATION HISTORY

Petroleum- and chlorinated solvent-impacted soil was identified on the Scougal property in the late 1980s. This discovery led to remedial action at the site including removal of underground storage tanks, hotspot excavation, hydraulic containment, and operation of an air sparging soil vapor extraction (SVE) system (Retec 2002). The SVE system was designed to reduce contaminant concentrations in soil and groundwater behind the Scougal main plant and beneath the Ewing Irrigation and Landscape Supply (Ewing, former Machinists Inc.) property to the west. The SVE system was operated intermittently from 1994 through 1999.

Operation of the SVE system reduced groundwater concentrations by approximately 90 percent and had some effectiveness in soil. In 1994, trichloroethene (TCE) (1,000 ug/L)

and vinyl chloride (VC) (1,300 ug/L) concentrations at MW-14 exceeded cleanup levels. After the operation of the SVE system, concentrations of TCE and vinyl chloride had decreased, but groundwater concentrations rebounded each time the system was shut down. The SVE system was effective at reducing contaminant mass, but soil and groundwater concentrations remained above cleanup levels.

Scougal Rubber contacted Pacific Groundwater Group (PGG) in 2006 to develop a plan to further reduce contaminant concentrations to below cleanup levels. PGG performed additional site investigation in 2006 as the basis for further remediation and found concentrations as high as 110 ug/L TCE and 33 ug/L vinyl chloride in groundwater.

PGG developed a Final Remedial Action Plan to address residual contamination, submitted to Ecology in 2007. With that plan, Scougal Rubber entered the Washington Department of Ecology's Voluntary Cleanup Program (VCP) to receive Ecology's approval of the cleanup approach and to obtain a No Further Action (NFA) letter once the cleanup goals are achieved.

Upon review of the existing site documents and the Final Remedial Action Plan, Ecology provided approval of the plan on April 12, 2007. PGG then implemented the planned removal of shallow impacted soil, in-situ chemical oxidation with potassium permanganate (KMnO₄), and confirmation sampling (PGG, 2009). All confirmation soil samples within the treatment area were non-detect for chlorinated solvents. Groundwater petroleum compound concentrations were reduced to below cleanup levels. Groundwater chlorinated ethene concentrations were reduced an additional 90 percent to approximately 1 percent of the pre-remediation (1993) levels. However, TCE and vinyl chloride concentrations remained above MTCA Method A groundwater cleanup values at the end of 2008.

In 2009, PGG developed and implemented a targeted ozone injection system to further reduce concentrations. The details of this system are described in previous annual updates (PGG 2015). Briefly, between 2,500 and 3,000 pounds of ozone were delivered to groundwater sparge points¹ during ozone operations through November 2015. Ozone treatment was discontinued in 2016. In 2017, the north yard was excavated and TCE-contaminated soils were removed. Prior to replacement with clean fill, a subsurface oxidant infiltration system was installed for additional in-situ chemical oxidation (PGG, 2017). Injections of KMnO₄ began in June 2017 with six injections occurring through February 2019. Table 1 provides a timeline of the remedial investigation and actions.

GROUNDWATER MONITORING

SUPPLEMENTAL GROUNDWATER CHARACTERIZATION

In April, June, and August of 2018 as well as February and July of 2019, groundwater samples were collected from five monitoring wells located on the Scougal Rubber prop-

¹ The ozone system had intermittent down time when oxygen was delivered to sparge points without ozone. For safety, when the cabinet detects a problem, ozone production to that point is discontinued.

erty and on the adjacent Ewing property (Figure 1): MW-17 is located on the western edge of the Scougal north yard; MW-14 is located on the property boundary south of the north yard; and MW-11, MW-13, and MW-12 are located on Ewing property, west of the Scougal property (Figure 1). Table 2 shows all data for the 5 wells.

In April of 2018 MW-13 had the highest TCE concentration at 31 µg/L, but by July 2019 the concentration had decreased to 6.7 µg/L. During that same period the DCE and VC concentrations in the well both increased from below the reporting limit to at least an order of magnitude higher. This replacement of TCE with its daughter products was likely caused by dechlorination processes.

For all five monitoring events from April 2018 to July 2019, no wells exceed MTCA Method C cleanup levels for surface water in groundwater. Previous reports have provided a complete analysis of no use of groundwater for drinking water in the area, nor is it allowed by City of Seattle Ordinance.

All wells except for MW-12 were in exceedance of the Method A groundwater screening level for indoor air. MW-12 is the furthest downgradient well (70 feet from the Scougal property boundary). Further, MW-12 has not exhibited exceedances of cleanup levels since 2008.

While groundwater concentrations exceed indoor air screening levels at four wells, these wells are installed in paved parking areas within 10 feet of the property boundary. The Ewing Irrigation and Landscape Supply warehouse is downgradient (west) and has garage doors for loading supplies and therefore has significant air exchange. The concentrations below screening levels observed at MW-12 are likely representative of groundwater beneath most of the Ewing warehouse. It is therefore reasonable to assume that groundwater is protective of indoor air.

EVALUATION OF REMEDIAL ALTERNATIVES

Previous remedial efforts to address past TCE contamination of soils and groundwater in the adjacent paint booth, south area, and west area at the Scougal Rubber facility have reduced the total amount of contaminant present in the subsurface. However, because groundwater monitoring data in the north yard showed TCE concentrations exceeding MTCA Method A cleanup levels for groundwater, further remedial options were evaluated.

REMEDIAL ACTIONS

This section describes remedial application of in-situ chemical oxidation undertaken in 2018 and 2019.

In Situ Contaminant Oxidation

Preliminary lab-scale soil oxidation tests were used to estimate the natural oxidation demand in native material in the saturated zone under the north yard. The cleanup action plan involves injecting more oxidant than the stoichiometric amount required to degrade the contaminants and natural oxidant demand in soil and groundwater, providing a long contact time for the oxidant to react with residual chlorothenes (i.e. TCE, DCE, and VC) in groundwater.

In January, April, and June 2018 and February 2019, approximately 3000 gallons of 3% remediation grade KMnO₄ were injected per event into the infiltration galleries and sumps. The remediation is designed to address the extent of groundwater contamination (see Figure 2).

RECOMMENDATION

After the implementation of several remedial actions over the last two decades, Scougal groundwater concentrations do not exceed MTCA Method C cleanup levels for groundwater protective of surface water. While Scougal groundwater concentrations exceed MTCA Method B screening levels for groundwater protective of indoor air, those exceedances occur in wells located in parking lots on or within 10 feet of the Scougal property boundary with buildings that are unheated and open workspaces. Groundwater concentrations do not exceed these screening levels 70 feet downgradient from Scougal and the one building nearest Scougal is a warehouse. In summary, we find that, based on current cleanup levels, we recommend that the Site is protective of human health and the environment. Based on past reporting of soil confirmation sampling and cleanup levels achieved, we recommend the Site for No Further Action.

ATTACHMENTS:

- Figure 1. Site Map
- Figure 2. In Situ Chemical Oxidation Trench and Sump Locations

- Table 1. Remedial Investigation and Action Timeline
- Table 2. Groundwater Sampling Results Summary
- Table 3. Past Soil Sampling Results Summary

- Appendix A. Analytical Lab Reports - November 2017-July 2019 Sampling Events

REFERENCES:

Pacific Groundwater Group, 2007. *Final Remedial Action Plan, Scougal Rubber*. January 17, 2007.

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Pacific Groundwater Group, 2011. *Letter to Chris Maurer, Washington Department of Ecology, RE: Scougal Rubber Remedial Action Update (VCP Site NW 1707)*. September 20, 2011.

Pacific Groundwater Group, 2012. *Letter to Chris Maurer, Washington Department of Ecology, RE: Scougal Rubber Remedial Action Update (VCP Site NW 1707)*. December 3, 2012.

Pacific Groundwater Group, 2013. *Letter to Chris Maurer, Washington Department of Ecology, RE: Scougal Rubber Remedial Action Update (VCP Site NW 1707)*. November 13, 2013.

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Pacific Groundwater Group, 2016. *Scougal Rubber Final Remediation Plan*. November 2016.

Pacific Groundwater Group, 2016b. *Scougal Rubber Final Remediation Plan Addendum. Voluntary Cleanup Program. Terrestrial Ecological Evaluation Form*. December 2, 2016.

Pacific Groundwater Group, 2017. *Letter to Chris Maurer, Washington Department of Ecology, RE: Scougal Rubber Remedial Action Update (VCP Site NW 1707)*. December 15, 2017.

Retec, 2002. *Independent Remedial Action Report*. March 28, 2002. Retec Project Number SRC00-02417-400.

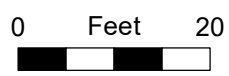
Washington Administrative Code (WAC), 2015. Chapter 173-160 WAC Minimum Standards for Construction and Maintenance of Wells.

cc: Rob Anderson, Scougal Rubber Corporation



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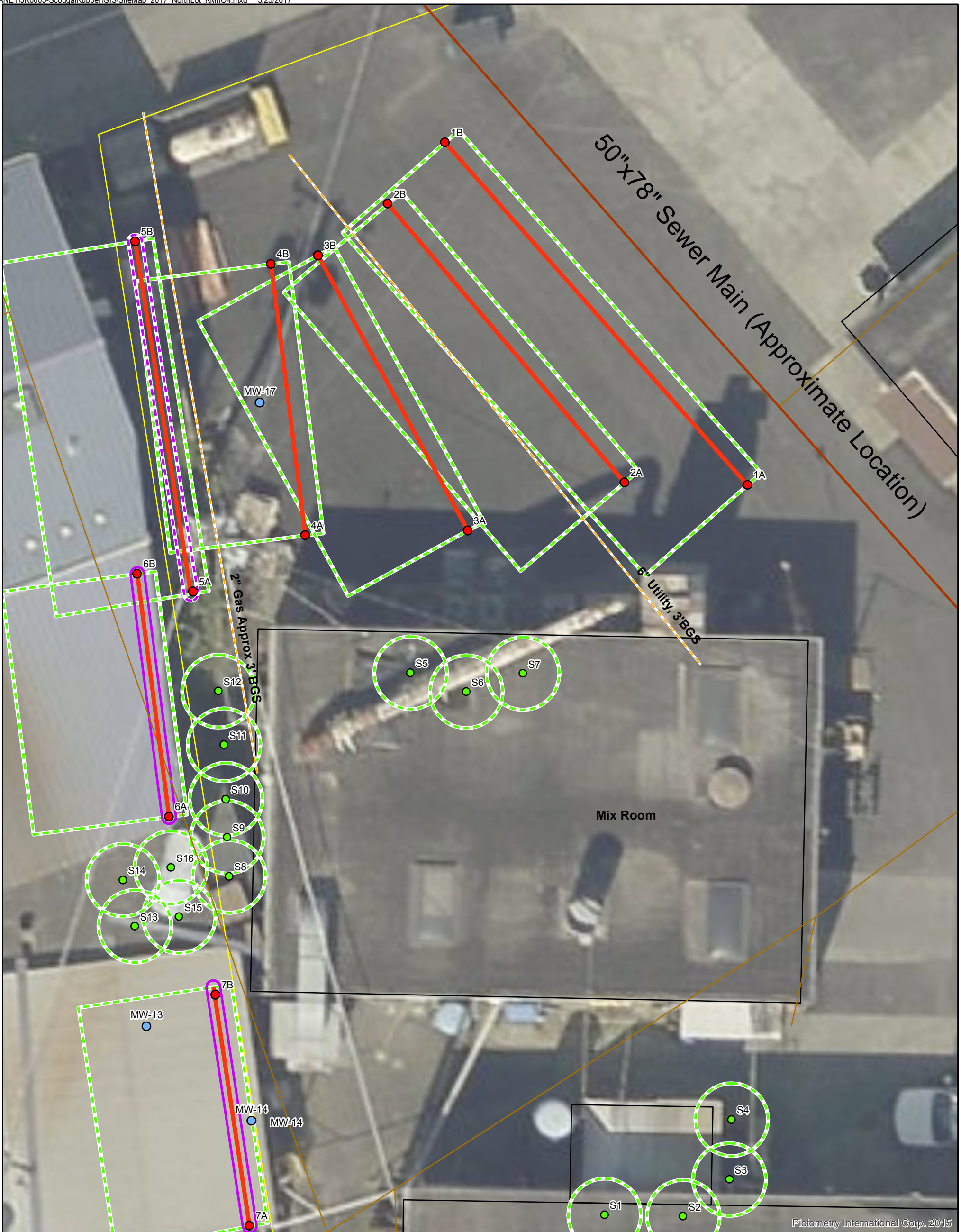
- Building Outlines
- Scougal Parcel
- Monitoring Wells



5/2018 Google Earth Aerial

Figure 1
Site Map





Pictometry International Corp. 2015

- | | |
|---|--|
| ● Approximate Sump Locations | Building Outlines |
| ● Trench Injection Points | Scougal Parcel |
| — Approximate ISCO Pipe Locations | ● 2016 Groundwater Sample |
| Ozone Zone | — Sewer/Drainage Mainlines |
| 18" Wide Trench Location | — Side Sewers/Laterals |
| 2-foot Deep Trench | Other Utilities |
| 6-foot Deep Trench | |

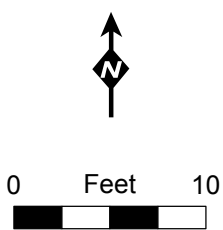


Figure 1
Potassium
Permanganate
(KMnO₄)
Delivery Points

Table 1. Remedial Investigation and Action Timeline

Scougal Rubber Corporation, Seattle, Washington

Date	Location*	Event	Result	Reference
1980s	AW EW	Contamination identified on site	Contamination recognized; finding initiated a remedial investigation and cleanup process	Retec (2002)
1992	AW	UST removal, hotspot excavation	Bulk of contaminant mass removed; soil and groundwater impacts remained	Retec (2002)
1994-1999	AW	Air sparge and soil vapor extraction	Reduced contaminant mass; soil and groundwater remained above cleanup levels	Retec (2002)
2006	AW	Soil and groundwater sampling	Contamination in alleyway area delineated; provided a baseline for remedial action	PGG (2006)
2007	AW	Soil hotspot excavation and permanganate application	Reduced soil VOC concentrations to non-detect; groundwater concentrations reduced by approximately 90%	PGG (2009)
2008	AW	Confirmation groundwater sampling	Groundwater concentration rebound noted at MW-14 to above cleanup levels	PGG (2009)
2009-2012	AW	Ozone injection in two phases	Reduced groundwater VOC concentrations to near cleanup levels (ongoing)	PGG (2015)
2009	EW	Soil and groundwater sampling	Identified remaining soil hotspot; groundwater concentrations at EW and downgradient below cleanup levels	PGG (2011)
2010	EW	Permanganate application	Reduced soil VOC concentrations to non-detect	PGG (2011)
2010-2015	EW PB NY MI	Soil and groundwater sampling	Monitored VOC concentrations	PGG (2015)
2016	NY	Soil and groundwater sampling	Identified extent of remaining VOC concentrations in excess of MTCA Method A Groundwater Cleanup Levels	PGG (2017)
2017	NY	Soil excavation	Removed NY soils to the water table	PGG (2017)
2017	NY	Excavation confirmation soil sampling	Measured soil VOC concentrations at edge of excavated area	PGG (2017)
2017	NY MI	ISCO via infiltration trenches and sumps	Created oxidizing conditions in saturated zone beneath excavated soils	PGG (2017)
2018	NY MI	ISCO via infiltration trenches and sumps	Created oxidizing conditions in saturated zone beneath excavated soils	Figure 2
2018	NY	Groundwater sampling	Monitored VOC concentrations to assess efficacy of ISCO	Table 2
2018-2019	NY MI	ISCO via infiltration trenches and sumps	Created oxidizing conditions in saturated zone beneath excavated soils	Figure 2
2019	NY	Groundwater sampling	Monitored VOC concentrations to assess efficacy of ISCO	Table 2

* Location Abbreviations: AW Alleyway; EW East Warehouse; PB Paint Booth Area; NY North Yard; MI Machinists Inc. Property

Table 2. Groundwater Sampling Results Summary

Scougal Rubber Corporation, Seattle, Washington

Data Previously Reported in 2017 Update				
Sample	Sample Date	TCE	DCE	Vinyl chloride
		Trichloroethene	cis-1,2-Dichloroethene	Vinyl chloride
		ug/L	ug/L	ug/L
Pre-Permanganate Concentrations				
MW-11	8/3/2006	9.4	8.7	U 0.2
MW-12	8/3/2006	0.2	0.4	0.7
MW-13	8/3/2006	46	11	2.6
MW-14	8/3/2006	110	26	33
MW-4	8/3/2006	3.3	U 1	U 0.2
OW-10	8/3/2006	9.6	18	3.5
Post-Permanganate Concentrations				
MW-11	6/10/2008	10	3.7	U 0.2
MW-12	6/10/2008	U 1	U 1	U 0.2
MW-14	6/10/2008	13	3.7	15
MW-11	9/5/2008	13	2.9	U 0.2
MW-12	9/5/2008	U 1	U 1	1
MW-14	9/5/2008	14	3.4	25
Ozone Install Reconnaissance Samples				
OP-10	6/29/2010	U 1	U 1	U 0.2
OP-11	6/29/2010	U 1	U 1	0.51
OP-9	6/29/2010	U 1	U 1	0.7
Ozone Operational Data				
MW-11	1/23/2009	12	U 1	U 0.2
MW-12	1/23/2009	U 1	U 1	U 0.2
MW-14	1/23/2009	41	1.3	13
MW-14	7/20/2009	19	5.8	9.2
MW-14	9/23/2009	4	1.7	1.9
MW-14	12/4/2009	3.7	1.3	0.5
MW-14	1/22/2010	1.4	1.8	1
MW-14	3/10/2010	2.3	2.3	5.7
MW-14	4/22/2010	1.6	U 1	U 0.2
MW-11	5/24/2010	U 1	U 1	U 0.2
MW-12	5/24/2010	U 1	U 1	U 0.2
MW-14	5/24/2010	3.1	U 1	1.5
MW-14	9/15/2010	U 1	U 1	U 0.2
MW-14	10/14/2010	0.89 J	U 1	1.1
MW-14	3/9/2011	1.6	0.12 J	0.08 J

MW-14	5/6/2011	1.9	0.34 J	0.15 J
MW-14	7/15/2011	0.49 J	U 1	0.1 UJ
MW-11	9/16/2011	2.6	U 1	U 0.2
MW-12	9/16/2011	U 0.5	U 1	0.89
MW-14	9/16/2011	2.8	U 1	0.69
MW-11	11/23/2011	2.5	U 1	U 0.2
MW-12	11/23/2011	0.22 J	U 1	0.32
MW-13	11/23/2011	8.4	3.3	0.6
MW-14	11/23/2011	4.2	1.5	2.1
MW-11	6/14/2013	6.8	U 1	U 0.2
MW-12	6/14/2013	U 1	U 1	U 0.2
MW-13	6/14/2013	11	U 1	0.32
MW-14	6/14/2013	5	U 1	0.44
MW-11	11/25/2014	U 1	U 1	U 0.2
MW-12	11/25/2014	U 1	U 1	U 0.2
MW-13	11/25/2014	6.2	2.8	0.29
MW-14	11/25/2014	3.9	U 1	U 0.2
East Warehouse Reconnaissance Samples				
SR-18	5/1/2009	U 1	U 1	U 0.2
SR-19	5/1/2009	U 1	U 1	U 0.2
SR-20	5/1/2009	U 1	U 1	U 0.2
SR-21	5/1/2009	1.1	U 1	U 0.2
SR-22	5/1/2009	1.1	U 1	U 0.2
SR-23	5/1/2009	U 1	1.4	U 0.2
Paint Booth Building Reconnaissance Samples				
SR-27	5/14/2013	2.7	U 1	U 0.2
SR-28	5/14/2013	5.9	U 1	U 0.2
SR-31	5/14/2013	3.5	U 1	U 0.2
2015 Extent Investigations				
SR-32	3/6/2015	6.7	U 1	U 0.2
SR-33	3/6/2015	1.9	1.9	U 0.2
SR-34	--	--	--	--
SR-35	3/6/2015	2.3	U 1	U 0.2
SR-36	3/6/2015	2.9	U 1	U 0.2
SR-37	3/6/2015	5.4	1.1	U 0.2
SR-38	3/6/2015	1.2	1.1	U 0.2
December 2016 Groundwater Sampling				
MW-11	12/15/2016	9.4	U 1	U 0.2
MW-12	12/15/2016	U 1	U 1	U 0.2
MW-13	12/15/2016	26	U 1	U 0.2
MW-14	12/15/2016	21	U 1	1
MW-17	12/15/2016	170	33	U 0.2
August 2017 Groundwater Sampling				
MW-11	8/30/2017	9.5	U 1	U 0.2
MW-12	8/30/2017	U 1	2.1	1.3
MW-13	8/30/2017	9	4.7	1.3

MW-14	8/30/2017	13	1.1	2.8
MW-17	8/30/2017	69	16	0.57
October 2017 Groundwater Sampling				
MW-12	10/13/2017	U 1	2.5	1.1
MW-13	10/13/2017	8.4	6.4	1.5
MW-14	10/13/2017	9.4	1.6	3.7

Data Collected Since 2017 Update

April 2018 Groundwater Sampling

Sample	Sample Date	TCE	DCE	Vinyl chloride
		ug/L	ug/L	ug/L
MW-11	4/11/2018	11	< 1 U	< 0.2 U
MW-12	4/11/2018	< 1 U	1.8	0.93
MW-13	4/11/2018	31	< 1 U	< 0.2 U
MW-14	4/11/2018	7.3	< 1 U	1.7
MW-17	4/11/2018	10	< 1 U	< 0.2 U

June 2018 Groundwater Sampling

Sample	Sample Date	TCE	DCE	Vinyl chloride
		ug/L	ug/L	ug/L
MW-13	6/1/2018	28	1.9	0.31
MW-17	6/1/2018	< 1 U	< 1 U	< 0.2 U
OP-4D	6/1/2018	2	8.1	3.2

August 2018 Groundwater Sampling

Sample	Sample Date	TCE	DCE	Vinyl chloride
		ug/L	ug/L	ug/L
MW-11	8/30/2018	6.8	< 1 U	< 0.2 U
MW-13	8/30/2018	8.7	12	2.2
MW-13 DUP	8/30/2018	7.4	12	2.3

February 2019 Groundwater Sampling

Sample	Sample Date	TCE	DCE	Vinyl chloride
		ug/L	ug/L	ug/L
MW-11	2/5/2019	4.1	< 1 U	< 0.2 U
MW-12	2/5/2019	< 1 U	< 1 U	0.31
MW-13	2/5/2019	3.7	12	3.2
MW-14	2/5/2019	10	< 1 U	2.1
MW-17	2/5/2019	9.9	1.1	< 0.2 U

July 2019 Groundwater Sampling

Sample	Sample Date	TCE	DCE	Vinyl chloride
		ug/L	ug/L	ug/L
MW-11	7/23/2019	6.7	< 1 U	< 0.2 U
MW-12	7/24/2019	< 1 U	< 1 U	< 0.2 U
MW-13	7/25/2019	6.7	10	2.2

MW-14	7/26/2019	7.3	1.4	3.3
MW-17	7/27/2019	15	2.6	< 0.2 U

MTCA Method C Surface Water	320	n/a	92
MTCA Method B Screening Levels for Indoor Air	1.5	n/a	0.35

1. **Bold** indicates an exceedance of MTCA Method B Indoor Air Screening Level.
There are no Method C Surface Water Cleanup Level Exceedances in groundwater.
2. U indicates the analyte is not detected at the shown reporting limit.
3. The chlorinated VOCs PCE, trans-1,2-DCE, 1,1-DCA, 1,1-DCE, 1,1,1-TCA, 1,2-DCA (EDC), chloroethane, and methylene chloride were not detected above reporting limits.

Table 3. Past Soil Sampling Results Summary

Scougal Rubber Corporation, Seattle, Washington

Sample	Date	Depth feet	PCE mg/kg	TCE mg/kg	cis-1,2-DCE mg/kg	VC mg/kg
Paint Booth Investigation						
SR-27	5/13/2013	5.1	U 0.025	U 0.03	U 0.05	U 0.05
SR-28	5/13/2013	5.5	U 0.025	U 0.03	U 0.05	U 0.05
SR-29	5/13/2013	2.5	U 0.025	0.29	U 0.05	U 0.05
SR-30	5/13/2013	2.7	0.05	0.67	U 0.05	U 0.05
SR-31	5/13/2013	5.1	0.081	0.23	U 0.05	U 0.05
2015 Extent Investigation						
SR-32	3/6/2015	5	U 0.025	U 0.02	U 0.05	U 0.05
SR-33	3/6/2015	5	U 0.025	U 0.02	U 0.05	U 0.05
SR-34	3/6/2015	5	U 0.025	U 0.02	U 0.05	U 0.05
SR-35	3/6/2015	5	U 0.025	0.029	U 0.05	U 0.05
SR-36	3/6/2015	5	U 0.025	U 0.02	U 0.05	U 0.05
SR-37	3/6/2015	5	U 0.025	U 0.02	U 0.05	U 0.05
SR-38	3/6/2015	5	U 0.025	U 0.02	U 0.05	U 0.05
SR-38	3/6/2015	7	U 0.025	U 0.02	U 0.05	U 0.05
December 2016 Soil Extent Investigation						
Sample	Sample Date	Depth feet bgs	PCE mg/kg	TCE mg/kg	DCE mg/kg	VC mg/kg
SR-57	12/14/2016	0.1 - 7	U 0.025	U 0.02	U 0.05	U 0.05
SR-58	12/14/2016	0.1 - 7	U 0.025	0.099	U 0.05	U 0.05
SR-59	12/14/2016	0.1 - 7	U 0.025	0.14	U 0.05	U 0.05
SR-60	12/14/2016	0.1 - 7	U 0.025	0.16	U 0.05	U 0.05
SR-61	12/14/2016	0.1 - 7	U 0.025	0.08	U 0.05	U 0.05
SR-62	12/14/2016	0.1 - 7	U 0.025	U 0.02	U 0.05	U 0.05
SR-63	12/14/2016	0.1 - 7	U 0.025	0.11	U 0.05	U 0.05
SR-64	12/14/2016	0.1 - 7	U 0.025	0.078	U 0.05	U 0.05
SR-65	12/14/2016	0.1 - 7	U 0.025	0.31	U 0.05	U 0.05
SR-66	12/14/2016	0.1 - 7	U 0.025	0.061	U 0.05	U 0.05
SR-67	12/14/2016	0.1 - 7	U 0.025	U 0.02	U 0.05	U 0.05
SR-68	12/14/2016	0.1 - 7	U 0.025	0.27	U 0.05	U 0.05
SR-69	12/14/2016	0.1 - 7	U 0.025	0.97	0.055	U 0.05
SR-70	12/14/2016	0.1 - 7	U 0.025	0.65	0.062	U 0.05
SR-71	12/14/2016	0.1 - 7	U 0.025	0.37	U 0.05	U 0.05
April 2017 Soil Confirmation Samples						
Sample	Sample Date	Depth feet bgs	PCE mg/kg	TCE mg/kg	DCE mg/kg	VC mg/kg
SB1	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB2	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB3	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB4	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB5	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB6	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB7	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB8	4/19/2017	3-4	U 0.025	0.04	U 0.05	U 0.05
SB9	4/19/2017	3-4	U 0.025	0.12	U 0.05	U 0.05
SB10	4/19/2017	3-4	U 0.025	0.025	U 0.05	U 0.05
SB11	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB12	4/19/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB13	4/19/2017	3-4	U 0.025	0.039	U 0.05	U 0.05
SB14	4/24/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB15	4/24/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
SB16	4/24/2017	3-4	U 0.025	0.10	U 0.05	U 0.05
SB17	4/24/2017	3-4	U 0.025	U 0.02	U 0.05	U 0.05
MTCA Cleanup Levels			0.05	0.03	8000	

1. **Bold** indicates an exceedance of MTCA Method A Cleanup Level.

2. U indicates a non-detect at the shown reporting limit.

APPENDIX A

ANALYTICAL LAB REPORTS – NOVEMBER 2017-JULY 2019 SAMPLING EVENTS

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
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fbi@isomedia.com
www.friedmanandbruya.com

September 7, 2018

Koshlan Mayer-Blackwell, Project Manger
Pacific Groundwater Group
2377 Eastlake Ave East
Seattle, WA 98102

Dear Mr Mayer-Blackwell:

Included are the results from the testing of material submitted on August 30, 2018 from the Scougal Aug 2018, F&BI 808685 project. There are 12 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: chris@pgwg.com
PGG0907R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 30, 2018 by Friedman & Bruya, Inc. from the Pacific Groundwater Group Scougal Aug 2018, F&BI 808685 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Pacific Groundwater Group</u>
808685 -01	MW-13
808685 -02	MW-11
808685 -03	MW-31

The 8260C 1,1-dichloroethane exceeded the acceptance criteria in the matrix spike sample. The laboratory control sample met the acceptance criteria, therefore the data were likely due to sample matrix effect.

All other quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-13	Client:	Pacific Groundwater Group
Date Received:	08/30/18	Project:	Scougal Aug 2018, F&BI 808685
Date Extracted:	08/31/18	Lab ID:	808685-01 x200
Date Analyzed:	09/05/18	Data File:	808685-01 x200.056
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	AP

Analyte:	Concentration ug/L (ppb)
Manganese	5,640

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-11	Client:	Pacific Groundwater Group
Date Received:	08/30/18	Project:	Scougal Aug 2018, F&BI 808685
Date Extracted:	08/31/18	Lab ID:	808685-02
Date Analyzed:	09/04/18	Data File:	808685-02.090
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	AP

Analyte:	Concentration ug/L (ppb)
Manganese	101

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal Aug 2018, F&BI 808685
Date Extracted:	08/31/18	Lab ID:	I8-568 mb2
Date Analyzed:	09/04/18	Data File:	I8-568 mb2.078
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	AP

Analyte:	Concentration ug/L (ppb)
Manganese	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID: MW-13	Client: Pacific Groundwater Group
Date Received: 08/30/18	Project: Scougal Aug 2018, F&BI 808685
Date Extracted: 08/31/18	Lab ID: 808685-01
Date Analyzed: 08/31/18	Data File: 083116.D
Matrix: Water	Instrument: GCMS9
Units: ug/L (ppb)	Operator: JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	2.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<1	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	12	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	8.7	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-11	Client:	Pacific Groundwater Group
Date Received:	08/30/18	Project:	Scougal Aug 2018, F&BI 808685
Date Extracted:	08/31/18	Lab ID:	808685-02
Date Analyzed:	08/31/18	Data File:	083117.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<1	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	6.8	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID: MW-31	Client: Pacific Groundwater Group
Date Received: 08/30/18	Project: Scougal Aug 2018, F&BI 808685
Date Extracted: 08/31/18	Lab ID: 808685-03
Date Analyzed: 08/31/18	Data File: 083118.D
Matrix: Water	Instrument: GCMS9
Units: ug/L (ppb)	Operator: JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	101	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	2.3	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<1	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	12	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	7.4	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal Aug 2018, F&BI 808685
Date Extracted:	08/31/18	Lab ID:	08-1918 mb
Date Analyzed:	08/31/18	Data File:	083115.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	95	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<1	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/07/18

Date Received: 08/30/18

Project: Scougal Aug 2018, F&BI 808685

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR DISSOLVED METALS USING EPA METHOD 6020B**

Laboratory Code: 808668-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Manganese	ug/L (ppb)	20	6,760	722 b	44 b	75-125	177 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Manganese	ug/L (ppb)	20	109	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/07/18

Date Received: 08/30/18

Project: Scougal Aug 2018, F&BI 808685

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR VOLATILES BY EPA METHOD 8260C**

Laboratory Code: 808671-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent	Acceptance
				Recovery MS	Criteria
Dichlorodifluoromethane	ug/L (ppb)	50	<1	128	55-137
Chloromethane	ug/L (ppb)	50	<10	117	61-120
Vinyl chloride	ug/L (ppb)	50	<0.2	118	61-139
Bromomethane	ug/L (ppb)	50	<1	113	20-265
Chloroethane	ug/L (ppb)	50	<1	110	55-149
Trichlorofluoromethane	ug/L (ppb)	50	<1	117	71-128
Acetone	ug/L (ppb)	250	<50	114	48-149
1,1-Dichloroethene	ug/L (ppb)	50	<1	115	71-123
Hexane	ug/L (ppb)	50	<1	105	44-139
Methylene chloride	ug/L (ppb)	50	<5	113	61-126
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	112	68-125
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	113	72-122
1,1-Dichloroethane	ug/L (ppb)	50	<1	115 vo	79-113
2,2-Dichloropropane	ug/L (ppb)	50	<1	136	48-157
cis-1,2-Dichloroethene	ug/L (ppb)	50	<1	111	63-126
Chloroform	ug/L (ppb)	50	<1	107	77-117
2-Butanone (MEK)	ug/L (ppb)	250	<10	101	70-135
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	108	70-119
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	109	75-121
1,1-Dichloropropene	ug/L (ppb)	50	<1	108	67-121
Carbon tetrachloride	ug/L (ppb)	50	<1	113	70-132
Benzene	ug/L (ppb)	50	<0.35	102	75-114
Trichloroethene	ug/L (ppb)	50	<1	102	73-122
1,2-Dichloropropane	ug/L (ppb)	50	<1	105	80-111
Bromodichloromethane	ug/L (ppb)	50	<1	106	78-117
Dibromomethane	ug/L (ppb)	50	<1	101	73-125
4-Methyl-2-pentanone	ug/L (ppb)	250	<10	99	79-140
cis-1,3-Dichloropropene	ug/L (ppb)	50	<1	103	76-120
Toluene	ug/L (ppb)	50	<1	106	73-117
trans-1,3-Dichloropropene	ug/L (ppb)	50	<1	104	75-122
1,1,2-Trichloroethane	ug/L (ppb)	50	<1	101	81-116
2-Hexanone	ug/L (ppb)	250	<10	92	74-127
1,3-Dichloropropane	ug/L (ppb)	50	<1	97	80-113
Tetrachloroethene	ug/L (ppb)	50	90	88 b	72-113
Dibromochloromethane	ug/L (ppb)	50	<1	107	69-129
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	<1	97	79-120
Chlorobenzene	ug/L (ppb)	50	<1	101	75-115
Ethylbenzene	ug/L (ppb)	50	<1	101	66-124
1,1,1,2-Tetrachloroethane	ug/L (ppb)	50	<1	115	76-130
m,p-Xylene	ug/L (ppb)	100	<2	100	63-128
o-Xylene	ug/L (ppb)	50	<1	105	64-129
Styrene	ug/L (ppb)	50	<1	101	56-142
Isopropylbenzene	ug/L (ppb)	50	<1	103	74-122
Bromoform	ug/L (ppb)	50	<1	107	49-138
n-Propylbenzene	ug/L (ppb)	50	<1	105	65-129
Bromobenzene	ug/L (ppb)	50	<1	101	70-121
1,3,5-Trimethylbenzene	ug/L (ppb)	50	<1	106	60-138
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	<1	107	79-120
1,2,3-Trichloropropane	ug/L (ppb)	50	<1	101	62-125
2-Chlorotoluene	ug/L (ppb)	50	<1	106	40-159
4-Chlorotoluene	ug/L (ppb)	50	<1	101	76-122
tert-Butylbenzene	ug/L (ppb)	50	<1	106	74-125
1,2,4-Trimethylbenzene	ug/L (ppb)	50	<1	104	59-136
sec-Butylbenzene	ug/L (ppb)	50	<1	107	69-127
p-Isopropyltoluene	ug/L (ppb)	50	<1	104	64-132
1,3-Dichlorobenzene	ug/L (ppb)	50	<1	103	77-113
1,4-Dichlorobenzene	ug/L (ppb)	50	<1	99	75-110
1,2-Dichlorobenzene	ug/L (ppb)	50	<1	108	70-120
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	<10	117	69-129
1,2,4-Trichlorobenzene	ug/L (ppb)	50	<1	113	66-123
Hexachlorobutadiene	ug/L (ppb)	50	<1	107	53-136
Naphthalene	ug/L (ppb)	50	<1	113	60-145
1,2,3-Trichlorobenzene	ug/L (ppb)	50	<1	114	59-130

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/07/18

Date Received: 08/30/18

Project: Scougal Aug 2018, F&BI 808685

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR VOLATILES BY EPA METHOD 8260C**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	ug/L (ppb)	50	129	129	50-157	0
Chloromethane	ug/L (ppb)	50	117	117	62-130	0
Vinyl chloride	ug/L (ppb)	50	117	118	70-128	1
Bromomethane	ug/L (ppb)	50	112	113	62-188	1
Chloroethane	ug/L (ppb)	50	108	109	66-149	1
Trichlorofluoromethane	ug/L (ppb)	50	116	117	70-132	1
Acetone	ug/L (ppb)	250	132	134	44-145	2
1,1-Dichloroethene	ug/L (ppb)	50	115	114	75-119	1
Hexane	ug/L (ppb)	50	106	111	51-153	5
Methylene chloride	ug/L (ppb)	50	115	112	63-132	3
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	113	111	70-122	2
trans-1,2-Dichloroethene	ug/L (ppb)	50	114	111	76-118	3
1,1-Dichloroethane	ug/L (ppb)	50	114	113	77-119	1
2,2-Dichloropropane	ug/L (ppb)	50	127	129	62-141	2
cis-1,2-Dichloroethene	ug/L (ppb)	50	111	110	76-119	1
Chloroform	ug/L (ppb)	50	107	107	78-117	0
2-Butanone (MEK)	ug/L (ppb)	250	105	118	49-147	12
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	109	112	78-114	3
1,1,1-Trichloroethane	ug/L (ppb)	50	109	110	80-116	1
1,1-Dichloropropene	ug/L (ppb)	50	107	109	78-119	2
Carbon tetrachloride	ug/L (ppb)	50	112	114	72-128	2
Benzene	ug/L (ppb)	50	102	105	75-116	3
Trichloroethene	ug/L (ppb)	50	100	104	72-119	4
1,2-Dichloropropane	ug/L (ppb)	50	104	113	79-121	8
Bromodichloromethane	ug/L (ppb)	50	105	111	76-120	6
Dibromomethane	ug/L (ppb)	50	100	105	79-121	5
4-Methyl-2-pentanone	ug/L (ppb)	250	100	114	54-153	13
cis-1,3-Dichloropropene	ug/L (ppb)	50	102	113	76-128	10
Toluene	ug/L (ppb)	50	107	109	79-115	2
trans-1,3-Dichloropropene	ug/L (ppb)	50	103	112	76-128	8
1,1,2-Trichloroethane	ug/L (ppb)	50	102	108	78-120	6
2-Hexanone	ug/L (ppb)	250	93	114	49-147	20
1,3-Dichloropropane	ug/L (ppb)	50	99	108	81-115	9
Tetrachloroethene	ug/L (ppb)	50	101	104	78-109	3
Dibromochloromethane	ug/L (ppb)	50	106	110	63-140	4
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	97	106	82-118	9
Chlorobenzene	ug/L (ppb)	50	101	104	80-113	3
Ethylbenzene	ug/L (ppb)	50	102	106	83-111	4
1,1,1,2-Tetrachloroethane	ug/L (ppb)	50	116	113	76-125	3
m,p-Xylene	ug/L (ppb)	100	100	103	84-112	3
o-Xylene	ug/L (ppb)	50	105	105	81-117	0
Styrene	ug/L (ppb)	50	100	105	83-121	5
Isopropylbenzene	ug/L (ppb)	50	104	103	81-122	1
Bromoform	ug/L (ppb)	50	105	112	40-161	6
n-Propylbenzene	ug/L (ppb)	50	104	111	81-115	7
Bromobenzene	ug/L (ppb)	50	102	110	80-113	8
1,3,5-Trimethylbenzene	ug/L (ppb)	50	105	109	83-117	4
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	106	112	79-118	6
1,2,3-Trichloropropane	ug/L (ppb)	50	100	111	74-116	10
2-Chlorotoluene	ug/L (ppb)	50	105	110	79-112	5
4-Chlorotoluene	ug/L (ppb)	50	100	107	80-116	7
tert-Butylbenzene	ug/L (ppb)	50	106	107	81-119	1
1,2,4-Trimethylbenzene	ug/L (ppb)	50	103	107	81-121	4
sec-Butylbenzene	ug/L (ppb)	50	107	110	83-123	3
p-Isopropyltoluene	ug/L (ppb)	50	105	107	81-122	2
1,3-Dichlorobenzene	ug/L (ppb)	50	103	107	80-115	4
1,4-Dichlorobenzene	ug/L (ppb)	50	98	103	77-112	5
1,2-Dichlorobenzene	ug/L (ppb)	50	107	108	79-115	1
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	118	115	62-133	3
1,2,4-Trichlorobenzene	ug/L (ppb)	50	112	109	75-119	3
Hexachlorobutadiene	ug/L (ppb)	50	112	109	70-116	3
Naphthalene	ug/L (ppb)	50	112	109	72-131	3
1,2,3-Trichlorobenzene	ug/L (ppb)	50	113	110	74-122	3

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

- a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.
- b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.
- ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.
- c - The presence of the analyte may be due to carryover from previous sample injections.
- cf - The sample was centrifuged prior to analysis.
- d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.
- dv - Insufficient sample volume was available to achieve normal reporting limits.
- f - The sample was laboratory filtered prior to analysis.
- fb - The analyte was detected in the method blank.
- fc - The compound is a common laboratory and field contaminant.
- hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.
- hs - Headspace was present in the container used for analysis.
- ht - The analysis was performed outside the method or client-specified holding time requirement.
- ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.
- j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.
- J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.
- jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.
- js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.
- lc - The presence of the analyte is likely due to laboratory contamination.
- L - The reported concentration was generated from a library search.
- nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.
- pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.
- ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.
- vo - The value reported fell outside the control limits established for this analyte.
- x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

808685

SAMPLE CHAIN OF CUSTODY

ME 08-30-18

Page # 12 of 1

Report To Koshlan Mayer-Blackwell

Company Pacific Groundwater Group

Address 2377 Eastlake Ave E

City, State, ZIP Seattle, WA 98102

Phone _____ Email Koshlan@pwg.com

SAMPLERS (signature) Koshlan Mayer-Blackwell

PROJECT NAME Scougal Aug 2018

PO # _____

REMARKS: *FF Mn Sample was field filtered @ USAW

INVOICE TO Chris@pwg.com

TURNAROUND TIME
 Standard Turnaround
 RUSH
 Rush charges authorized by: _____

SAMPLE DISPOSAL
 Dispose after 30 days
 Archive Samples
 Other _____

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED										Notes		
						TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	Total Manganese	*FF				
MW-13	Q1A-D	8/30/18	14:00	GW	4					X								
MW-11	Q2-T	8/30/18	15:30	GW	4					X				X				
MW-31	Q3-A-C	8/30/18	17:00	GW	3					X								

Samples received at 3:00

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: <u>Koshlan Mayer Blackwell</u>	<u>Koshlan Mayer Blackwell</u>	<u>P619</u>	<u>8/30/18</u>	<u>1725</u>
Received by: <u>[Signature]</u>	<u>Walt Longston</u>	<u>FBTare</u>	<u>8/30/18</u>	<u>1725</u>
Relinquished by:				
Received by:				

Friedman & Bryja, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

June 18, 2018

Koshlan Mayer-Blackwell, Project Manger
Pacific Groundwater Group
2377 Eastlake Ave East
Seattle, WA 98102

Dear Mr Mayer-Blackwell:

Included are the results from the testing of material submitted on June 5, 2018 from the Scougal Rubber JK0605.04, F&BI 806070 project. There are 10 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
PGG0618R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on June 5, 2018 by Friedman & Bruya, Inc. from the Pacific Groundwater Group Scougal Rubber JK0605.04, F&BI 806070 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Pacific Groundwater Group</u>
806070 -01	OP-4D
806070 -02	MW-17
806070 -03	MW-13

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-13	Client:	Pacific Groundwater Group
Date Received:	06/05/18	Project:	Scougal Rubber JK0605.04
Date Extracted:	06/12/18	Lab ID:	806070-03
Date Analyzed:	06/12/18	Data File:	806070-03.058
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Manganese	199

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal Rubber JK0605.04
Date Extracted:	06/12/18	Lab ID:	I8-375 mb
Date Analyzed:	06/12/18	Data File:	I8-375 mb.049
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Manganese	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	OP-4D	Client:	Pacific Groundwater Group
Date Received:	06/05/18	Project:	Scougal Rubber JK0605.04
Date Extracted:	06/05/18	Lab ID:	806070-01
Date Analyzed:	06/05/18	Data File:	060514.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	85	117
Toluene-d8	103	91	108
4-Bromofluorobenzene	98	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	3.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	8.1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	2.0
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-17	Client:	Pacific Groundwater Group
Date Received:	06/05/18	Project:	Scougal Rubber JK0605.04
Date Extracted:	06/05/18	Lab ID:	806070-02
Date Analyzed:	06/05/18	Data File:	060513.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	85	117
Toluene-d8	104	91	108
4-Bromofluorobenzene	100	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-13	Client:	Pacific Groundwater Group
Date Received:	06/05/18	Project:	Scougal Rubber JK0605.04
Date Extracted:	06/05/18	Lab ID:	806070-03
Date Analyzed:	06/05/18	Data File:	060515.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	85	117
Toluene-d8	103	91	108
4-Bromofluorobenzene	98	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.31
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	1.9
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	28
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal Rubber JK0605.04
Date Extracted:	06/05/18	Lab ID:	08-1200 mb
Date Analyzed:	06/05/18	Data File:	060512.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	85	117
Toluene-d8	104	91	108
4-Bromofluorobenzene	99	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/18/18

Date Received: 06/05/18

Project: Scougal Rubber JK0605.04, F&BI 806070

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR DISSOLVED METALS USING EPA METHOD 6020B**

Laboratory Code: 806070-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Manganese	ug/L (ppb)	20	208	87	92	75-125	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Manganese	ug/L (ppb)	20	93	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/18/18

Date Received: 06/05/18

Project: Scougal Rubber JK0605.04, F&BI 806070

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR VOLATILES BY EPA METHOD 8260C**

Laboratory Code: 806070-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	<0.2	87	90	61-139	3
Chloroethane	ug/L (ppb)	50	<1	90	92	55-149	2
1,1-Dichloroethene	ug/L (ppb)	50	<1	93	96	71-123	3
Methylene chloride	ug/L (ppb)	50	<5	92	95	61-126	3
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	97	101	72-122	4
1,1-Dichloroethane	ug/L (ppb)	50	<1	95	98	79-113	3
cis-1,2-Dichloroethene	ug/L (ppb)	50	<1	99	101	63-126	2
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	91	94	70-119	3
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	105	108	75-121	3
Trichloroethene	ug/L (ppb)	50	<1	99	101	73-122	2
Tetrachloroethene	ug/L (ppb)	50	<1	102	103	72-113	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	99	94	70-128	5
Chloroethane	ug/L (ppb)	50	98	95	66-149	3
1,1-Dichloroethene	ug/L (ppb)	50	103	99	75-119	4
Methylene chloride	ug/L (ppb)	50	117	99	63-132	17
trans-1,2-Dichloroethene	ug/L (ppb)	50	105	102	76-118	3
1,1-Dichloroethane	ug/L (ppb)	50	103	100	77-119	3
cis-1,2-Dichloroethene	ug/L (ppb)	50	106	103	76-119	3
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	99	95	78-114	4
1,1,1-Trichloroethane	ug/L (ppb)	50	112	108	80-116	4
Trichloroethene	ug/L (ppb)	50	105	99	72-119	6
Tetrachloroethene	ug/L (ppb)	50	107	103	78-109	4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

- a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.
- b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.
- ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.
- c - The presence of the analyte may be due to carryover from previous sample injections.
- cf - The sample was centrifuged prior to analysis.
- d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.
- dv - Insufficient sample volume was available to achieve normal reporting limits.
- f - The sample was laboratory filtered prior to analysis.
- fb - The analyte was detected in the method blank.
- fc - The compound is a common laboratory and field contaminant.
- hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.
- hs - Headspace was present in the container used for analysis.
- ht - The analysis was performed outside the method or client-specified holding time requirement.
- ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.
- j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.
- J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.
- jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.
- js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.
- lc - The presence of the analyte is likely due to laboratory contamination.
- L - The reported concentration was generated from a library search.
- nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.
- pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.
- ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.
- vo - The value reported fell outside the control limits established for this analyte.
- x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 13, 2019

Koshlan Mayer-Blackwell, Project Manger
Pacific Groundwater Group
2377 Eastlake Ave East
Seattle, WA 98102

Dear Mr Mayer-Blackwell:

Included are the results from the testing of material submitted on February 6, 2019 from the Scougal Feb 2019 JK0605.04, F&BI 902075 project. There are 16 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
PGG0213R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on February 6, 2019 by Friedman & Bruya, Inc. from the Pacific Groundwater Group Scougal Feb 2019 JK0605.04, F&BI 902075 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Pacific Groundwater Group</u>
902075 -01	MW-13
902075 -02	MW-11
902075 -03	MW-12
902075 -04	MW-17 + MS/MSD
902075 -05	MW-14

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW-13	Client:	Pacific Groundwater Group
Date Received:	02/06/19	Project:	Scougal Feb 2019 JK0605.04
Date Extracted:	02/07/19	Lab ID:	902075-01 x10
Date Analyzed:	02/08/19	Data File:	902075-01 x10.133
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Manganese	7,110

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW-11	Client:	Pacific Groundwater Group
Date Received:	02/06/19	Project:	Scougal Feb 2019 JK0605.04
Date Extracted:	02/07/19	Lab ID:	902075-02
Date Analyzed:	02/08/19	Data File:	902075-02.232
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Manganese	64.6

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW-12	Client:	Pacific Groundwater Group
Date Received:	02/06/19	Project:	Scougal Feb 2019 JK0605.04
Date Extracted:	02/07/19	Lab ID:	902075-03
Date Analyzed:	02/08/19	Data File:	902075-03.233
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Manganese	383

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW-17 + MS/MSD	Client:	Pacific Groundwater Group
Date Received:	02/06/19	Project:	Scougal Feb 2019 JK0605.04
Date Extracted:	02/07/19	Lab ID:	902075-04
Date Analyzed:	02/08/19	Data File:	902075-04.236
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Manganese	44.7

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	MW-14	Client:	Pacific Groundwater Group
Date Received:	02/06/19	Project:	Scougal Feb 2019 JK0605.04
Date Extracted:	02/07/19	Lab ID:	902075-05
Date Analyzed:	02/08/19	Data File:	902075-05.237
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Manganese	620

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal Feb 2019 JK0605.04
Date Extracted:	02/07/19	Lab ID:	I9-89 mb
Date Analyzed:	02/07/19	Data File:	I9-89 mb.173
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Manganese	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-13	Client:	Pacific Groundwater Group
Date Received:	02/06/19	Project:	Scougal Feb 2019 JK0605.04
Date Extracted:	02/07/19	Lab ID:	902075-01
Date Analyzed:	02/07/19	Data File:	020740.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	97	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	3.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	12
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	3.7
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-11	Client:	Pacific Groundwater Group
Date Received:	02/06/19	Project:	Scougal Feb 2019 JK0605.04
Date Extracted:	02/07/19	Lab ID:	902075-02
Date Analyzed:	02/07/19	Data File:	020741.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	102	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	4.1
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-12	Client:	Pacific Groundwater Group
Date Received:	02/06/19	Project:	Scougal Feb 2019 JK0605.04
Date Extracted:	02/07/19	Lab ID:	902075-03
Date Analyzed:	02/07/19	Data File:	020742.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

	% Recovery:	Lower Limit:	Upper Limit:
Surrogates:			
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	102	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.31
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-17 + MS/MSD	Client:	Pacific Groundwater Group
Date Received:	02/06/19	Project:	Scougal Feb 2019 JK0605.04
Date Extracted:	02/07/19	Lab ID:	902075-04
Date Analyzed:	02/07/19	Data File:	020743.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	97	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	1.1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	9.9
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-14	Client:	Pacific Groundwater Group
Date Received:	02/06/19	Project:	Scougal Feb 2019 JK0605.04
Date Extracted:	02/07/19	Lab ID:	902075-05
Date Analyzed:	02/07/19	Data File:	020744.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	102	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	2.1
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	10
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal Feb 2019 JK0605.04
Date Extracted:	02/07/19	Lab ID:	09-0208 mb
Date Analyzed:	02/07/19	Data File:	020710.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 02/13/19

Date Received: 02/06/19

Project: Scougal Feb 2019 JK0605.04, F&BI 902075

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR DISSOLVED METALS USING EPA METHOD 200.8**

Laboratory Code: 901407-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Manganese	ug/L (ppb)	20	473	173 b	205 b	70-130	17

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Manganese	ug/L (ppb)	20	102	85-115

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 02/13/19

Date Received: 02/06/19

Project: Scougal Feb 2019 JK0605.04, F&BI 902075

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR VOLATILES BY EPA METHOD 8260C**

Laboratory Code: 902075-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent	Acceptance
				Recovery MS	Criteria
Vinyl chloride	ug/L (ppb)	50	<0.2	110	61-139
Chloroethane	ug/L (ppb)	50	<1	103	55-149
1,1-Dichloroethene	ug/L (ppb)	50	<1	100	71-123
Methylene chloride	ug/L (ppb)	50	<5	99	61-126
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	100	72-122
1,1-Dichloroethane	ug/L (ppb)	50	<1	99	79-113
cis-1,2-Dichloroethene	ug/L (ppb)	50	1.1	97	63-126
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	98	70-119
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	108	75-121
Trichloroethene	ug/L (ppb)	50	9.9	96	73-122
Tetrachloroethene	ug/L (ppb)	50	<1	96	72-113

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent	Percent	Acceptance Criteria	RPD (Limit 20)
			Recovery LCS	Recovery LCSD		
Vinyl chloride	ug/L (ppb)	50	119	110	70-128	8
Chloroethane	ug/L (ppb)	50	110	102	66-149	8
1,1-Dichloroethene	ug/L (ppb)	50	111	100	75-119	10
Methylene chloride	ug/L (ppb)	50	109	98	63-132	11
trans-1,2-Dichloroethene	ug/L (ppb)	50	108	99	76-118	9
1,1-Dichloroethane	ug/L (ppb)	50	104	98	77-119	6
cis-1,2-Dichloroethene	ug/L (ppb)	50	103	97	76-119	6
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	96	97	78-114	1
1,1,1-Trichloroethane	ug/L (ppb)	50	113	106	80-116	6
Trichloroethene	ug/L (ppb)	50	94	94	72-119	0
Tetrachloroethene	ug/L (ppb)	50	97	95	78-109	2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

- a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.
- b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.
- ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.
- c - The presence of the analyte may be due to carryover from previous sample injections.
- cf - The sample was centrifuged prior to analysis.
- d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.
- dv - Insufficient sample volume was available to achieve normal reporting limits.
- f - The sample was laboratory filtered prior to analysis.
- fb - The analyte was detected in the method blank.
- fc - The analyte is a common laboratory and field contaminant.
- hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.
- hs - Headspace was present in the container used for analysis.
- ht - The analysis was performed outside the method or client-specified holding time requirement.
- ip - Recovery fell outside of control limits due to sample matrix effects.
- j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.
- J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.
- jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.
- js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.
- lc - The presence of the analyte is likely due to laboratory contamination.
- L - The reported concentration was generated from a library search.
- nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.
- pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.
- ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.
- vo - The value reported fell outside the control limits established for this analyte.
- x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
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www.friedmanandbruya.com

August 1, 2019

Janet Knox, Project Manger
Pacific Groundwater Group
2377 Eastlake Ave East
Seattle, WA 98102

Dear Ms Knox:

Included are the results from the testing of material submitted on July 24, 2019 from the Scougal Rubber, JK0605.04, F&BI 907431 project. There are 9 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
PGG0801R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on July 24, 2019 by Friedman & Bruya, Inc. from the Pacific Groundwater Group Scougal Rubber, JK0605.04, F&BI 907431 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Pacific Groundwater Group</u>
907431 -01	MW-17
907431 -02	MW-14
907431 -03	MW-11
907431 -04	MW-12
907431 -05	MW-13

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-17	Client:	Pacific Groundwater Group
Date Received:	07/24/19	Project:	Scougal Rubber, JK0605.04
Date Extracted:	07/25/19	Lab ID:	907431-01
Date Analyzed:	07/25/19	Data File:	072519.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS/AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	2.6
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	15
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-14	Client:	Pacific Groundwater Group
Date Received:	07/24/19	Project:	Scougal Rubber, JK0605.04
Date Extracted:	07/25/19	Lab ID:	907431-02
Date Analyzed:	07/25/19	Data File:	072520.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS/AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	98	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	3.3
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	1.4
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	7.3
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-11	Client:	Pacific Groundwater Group
Date Received:	07/24/19	Project:	Scougal Rubber, JK0605.04
Date Extracted:	07/25/19	Lab ID:	907431-03
Date Analyzed:	07/25/19	Data File:	072538.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS/AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	98	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	6.7
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-12	Client:	Pacific Groundwater Group
Date Received:	07/24/19	Project:	Scougal Rubber, JK0605.04
Date Extracted:	07/25/19	Lab ID:	907431-04
Date Analyzed:	07/25/19	Data File:	072539.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS/AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	99	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-13	Client:	Pacific Groundwater Group
Date Received:	07/24/19	Project:	Scougal Rubber, JK0605.04
Date Extracted:	07/25/19	Lab ID:	907431-05
Date Analyzed:	07/25/19	Data File:	072540.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS/AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	98	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	2.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	10
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	6.7
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Pacific Groundwater Group
Date Received:	Not Applicable	Project:	Scougal Rubber, JK0605.04
Date Extracted:	07/25/19	Lab ID:	09-1694 mb
Date Analyzed:	07/25/19	Data File:	072513.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS/AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/01/19

Date Received: 07/24/19

Project: Scougal Rubber, JK0605.04, F&BI 907431

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR VOLATILES BY EPA METHOD 8260C**

Laboratory Code: 907431-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent	Acceptance
				Recovery MS	Criteria
Vinyl chloride	ug/L (ppb)	50	<0.2	102	36-166
Chloroethane	ug/L (ppb)	50	<1	96	46-160
1,1-Dichloroethene	ug/L (ppb)	50	<1	98	60-136
Methylene chloride	ug/L (ppb)	50	<5	96	67-132
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	99	72-129
1,1-Dichloroethane	ug/L (ppb)	50	<1	99	70-128
cis-1,2-Dichloroethene	ug/L (ppb)	50	2.6	102	71-127
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	100	48-149
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	101	60-146
Trichloroethene	ug/L (ppb)	50	15	99 b	66-135
Tetrachloroethene	ug/L (ppb)	50	<1	99	10-226

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent	Percent	Acceptance Criteria	RPD (Limit 20)
			Recovery LCS	Recovery LCSD		
Vinyl chloride	ug/L (ppb)	50	105	107	50-154	2
Chloroethane	ug/L (ppb)	50	98	100	58-146	2
1,1-Dichloroethene	ug/L (ppb)	50	99	102	67-136	3
Methylene chloride	ug/L (ppb)	50	93	105	39-148	12
trans-1,2-Dichloroethene	ug/L (ppb)	50	101	104	68-128	3
1,1-Dichloroethane	ug/L (ppb)	50	100	102	79-121	2
cis-1,2-Dichloroethene	ug/L (ppb)	50	105	106	80-123	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	100	100	73-132	0
1,1,1-Trichloroethane	ug/L (ppb)	50	103	106	81-125	3
Trichloroethene	ug/L (ppb)	50	100	99	79-113	1
Tetrachloroethene	ug/L (ppb)	50	100	101	76-121	1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

