Shell Mart McKenzie Automotive Groundwater Monitoring Results, April 2019: Data Summary Report

Environmental Assessment Program
Publication Number: 21-03-002
Authored by: Jacob D. Carnes

Abstract

In March 1994, a petroleum release at the Shell Mart McKenzie Automotive in Morton, Washington was reported to the Washington State Department of Ecology (Ecology). Due to the location and size of the release, an emergency response was initiated by Ecology's Spills Program. That response included the removal of 2 underground tanks and some of the adjacent contaminated soil.

Groundwater monitoring conducted in March 1994 and May 1996 confirmed the presence of petroleum hydrocarbons at concentrations exceeding (not meeting) applicable Model Toxics Control Act (MTCA) Method A cleanup levels in the shallow groundwater underlying the site.

In April 2019, Ecology collected samples from 3 monitoring wells to assess current petroleum hydrocarbon concentrations in groundwater at the Shell Mart McKenzie Automotive site. A fourth monitoring well on site could not be located. Because the monitoring wells had not been sampled since the 1990s, Ecology redeveloped the wells in March 2019.

Results from the 2019 monitoring show that contaminant concentrations at the site have decreased to below the MTCA Method A cleanup levels. Benzene, toluene, ethylbenzene, and xylene (BTEX) compounds, and gasoline and diesel range petroleum hydrocarbons, were not detected in any of the sampled wells. Lead was detected in one well (MW-4) at a concentration of 0.67 µg/L, which is below the cleanup level of 15 µg/L.

The analytical results meet the measurement quality objectives described in the 2019 Quality Assurance Project Plan.

Publication Information

This report is available on the Department of Ecology's website at:
https://apps.ecology.wa.gov/publications/SummaryPages/2103002.html.

Data for this project are available in Ecology's EIM Database. Study ID: FS29172624.

The Activity Tracker Code for this study is 18-006.

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Water Resource Inventory Area (WRIA) and 8-digit Hydrologic Unit Code (HUC) numbers for the study area: WRIA 26.

Contact Information

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Background

Shell Mart McKenzie Automotive was a gasoline station and convenience store located at 103 2nd Street in downtown Morton, Washington (Figure 1). It is currently an automotive shop.

In March 1994, a petroleum release of approximately 3200 gallons of regular (leaded) gasoline was reported to Ecology. Ecology's Spills Program initiated an emergency response to minimize the immediate threat to the health and welfare of nearby businesses and community.

The emergency response included the removal of 2 underground storage tanks (4000-gallon regular/leaded gasoline and 4000-gallon unleaded gasoline) and some of the adjacent contaminated soil. Three tanks were left in place: a 1000-gallon tank and 2 older tanks (2000-3000 gallons) from a previous station. (Oberlander, 1994)

Four monitoring wells were installed during the 1994 emergency response. Olympus Environmental, Inc., the contractor that completed the emergency response, sampled all 4 monitoring wells in March 1994. Gasoline floating on top of groundwater was observed in well MW-4 along the west side of the property.

In May 1996, Wayne Coppel, a consultant for a prospective buyer of the site, sampled well MW-4. The results of that sample showed the continued presence of petroleum contamination exceeding Model Toxics Control Act (MTCA) Method A cleanup levels.

Data from the 2 previous sampling events are summarized in Appendix A. Activity at the site has been limited since the late 1990s.

Methods and Results

In March 2018, Ecology visited Shell Mart McKenzie Automotive to prepare for groundwater sampling by locating the monitoring wells, assessing their condition, and measuring water levels. Three of the 4 wells (MW-1, MW-2, MW-4) were located. The fourth monitoring well (MW-3) could not be located.

In July 2018, Ecology returned to re-develop the monitoring wells. However, low water levels prevented re-development at that time.

In March 2019, Ecology successfully re-developed the 3 located monitoring wells by surging the wells with a surge block, followed by pumping water from the well. Wells MW-1 and MW-2 were re-developed by pumping the well until drawdown stabilized. MW-4 was purged dry, allowed to recover, and purged dry again. Well re-development was necessary to improve recovery rates after the wells sat dormant since the 1990s.

In April 2019, Ecology sampled groundwater from wells MW-1, MW-2, and MW-4. MW-3 was not sampled because it could not be located. The wells were sampled in accordance with the site-specific Quality Assurance Project Plan (QAPP) (Marti, 2019) and Ecology's standard operating procedures (SOPs) noted in the QAPP, including EAP052 (Marti, 2016a) and EAP078 (Marti, 2016b).

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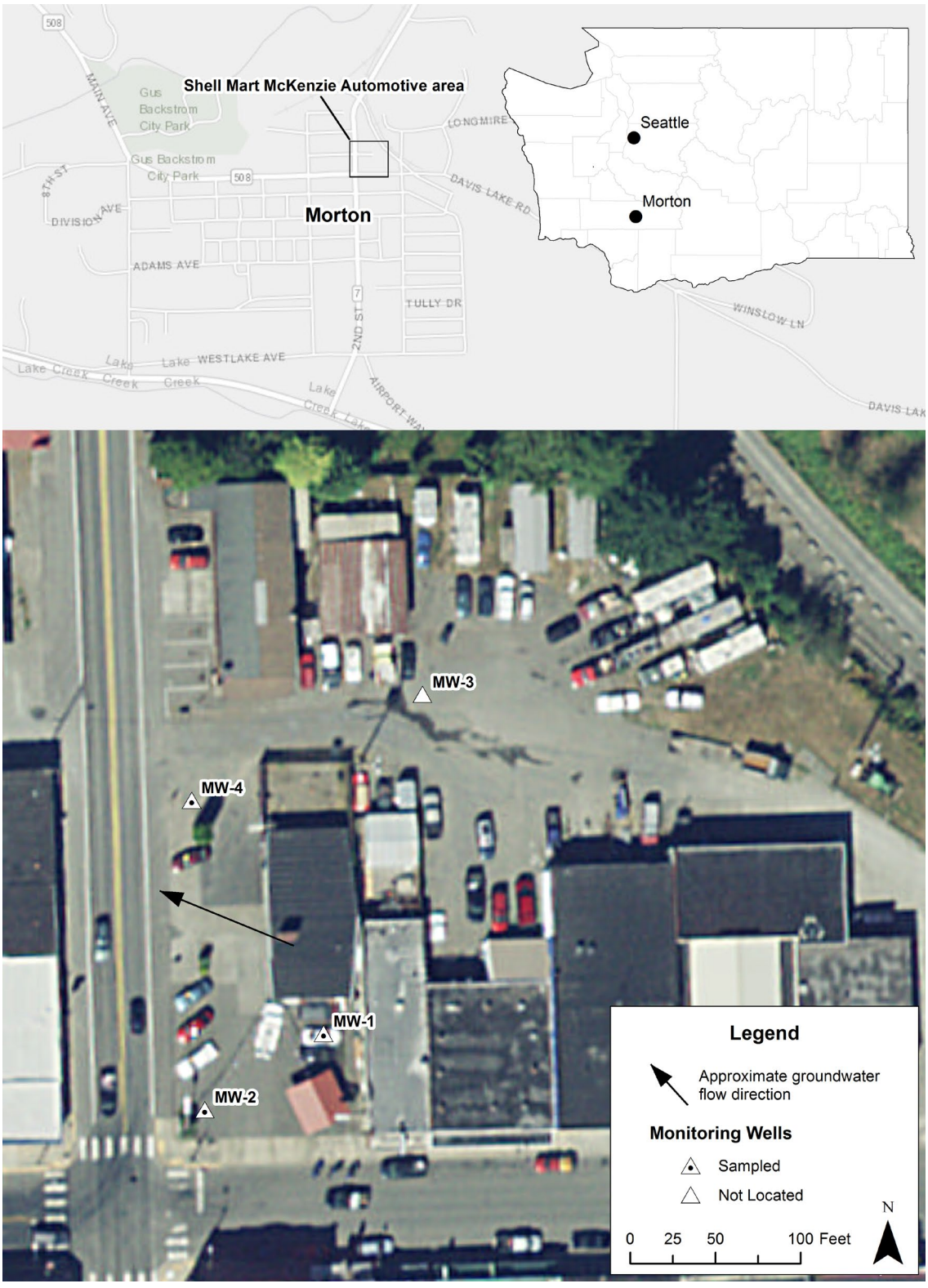

Figure 1. Location of Shell Mart McKenzie Automotive and 4 monitoring wells.

Ecology employed industry-standard low-flow sampling techniques. Because the wells are low yielding and slow to recover, each well was purged and sampled using a peristaltic pump with dedicated tubing. The pump tubing intake was placed near the bottom of the screen and the wells were purged at a rate of 0.5 liter/minute, or less.

Before sampling, wells were purged through a continuous flow cell until field parameters (pH, temperature, specific conductance, dissolved oxygen, and oxidation reduction potential) stabilized, as specified in SOP EAP078 (Marti, 2016b). The QAPP states that the optimal draw-down during sampling should not exceed 0.3 ft. This goal was met in wells MW-1 and MW-2. In MW-4 the water level was drawn down by 1.75 ft. before stabilizing.

Samples were collected in clean laboratory-supplied bottles and submitted for analysis of benzene, toluene, ethylbenzene, and xylene (BTEX), total petroleum hydrocarbons as gasoline and diesel (TPH-G and TPH-D), and lead. Unfiltered samples for total lead were collected at all 3 sampled monitoring wells. At MW-4 a filtered sample was also collected for analysis of dissolved lead. This filtered sample was collected because the water produced from MW-4 was visibly turbid. Field personnel did not have access to a turbidity meter for this sampling trip. All samples were analyzed by Ecology's Manchester Environmental Laboratory.

Stabilized field measurements are presented in Table 1. Tables 2 and 3 summarize analytical results.

A field duplicate sample was collected from well MW-4. The relative percent difference (RPD[1]) calculated for the duplicate results ranged from 0% to less than 5%, meeting the measurement quality objectives established in the QAPP (Marti, 2019). All other measurement quality objectives for analytical measurements listed in the QAPP were also met.

Neither BTEX compounds nor petroleum hydrocarbons were detected in the 3 wells sampled in April 2019. Total lead was detected in well MW-4 at a concentration near the reporting limit. Dissolved phase lead was not detected in MW-4. Results for all analytes in all 3 wells, including total lead in MW-4, were below the MTCA Method A Cleanup Levels (Tables 2 and 3).

The chain of custody form is included in Appendix B. The analytical reports from Manchester Environmental Laboratory are included in Appendix C. Analytical results for this project are available at Ecology's Environmental Information Management System and can be viewed on the project's summary page.

[1] RPD is the difference between replicate sample results, divided by the replicate mean, expressed as a percentage. This calculation provides a measure of the overall sampling and analytical precision. Precision estimates are influenced by the random error introduced by collection and measurement procedures, and by the natural variability of the concentrations in the media being sampled.

Table 1. Field measurements collected prior to sampling, April 2019.

Well ID	Well Depth (feet, bgs)	Ground-water Elevation (feet)	pH (Standard Units)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)
MW-1	25.2	938.53	4.8	68	9.3	104
MW-2	25.1	938.12	5.1	171	7.4	89
MW-4	26.3	937.52	4.8	151	3.3	87

bgs: below ground surface

Table 2. Analytical results for BTEX compounds, April 2019.

Well ID	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)
MW-1	1U	1U	1U	2U	1U
MW-2	1U	1U	1U	2U	1U
MW-4	1U	1U	1U	2U	1U
MW-4A	1U	1U	1U	2U	1U
MTCA Cleanup Level	*5*	*1000*	*700*	*1000[a]*	*1000[a]*

U: Analyte was not detected at or above the reported value.

[a] The cleanup level is 1000 µg/L total xylenes (m,p-Xylene + o-Xylene).

Table 3. Analytical results for total petroleum hydrocarbons and lead, April 2019.

Well ID	TPH-G (µg/L)	TPH-D (µg/L)	Total Lead (µg/L)	Dissolved Lead (µg/L)
MW-1	70U	150U	0.1U	--
MW-2	70U	150U	0.1U	--
MW-4	70U	150U	0.67	0.02U
MW-4A	70U	150U	0.70	0.02U
MTCA Cleanup Level	*800-1000[a]*	*500*	*15*	*15*

U: Analyte was not detected at or above the reported value.

[a] MTCA Method A Cleanup Level for Gasoline is 800 µg/L if benzene is present in groundwater and 1000 µg/L if benzene is not detectable in groundwater.

Conclusions and Recommendations

Analytical results from the April 2019 groundwater monitoring show that all 3 wells sampled met the applicable MTCA Method A cleanup levels. Dissolved phase BTEX compounds, and gasoline and diesel range petroleum hydrocarbons, were not detected in any of the sampled wells. Total lead was detected in well MW-4 at a concentration near the reporting limit. Dissolved phase lead was not detected in MW-4. A fourth monitoring well on site was not sampled because it could not be located.

The 3 monitoring wells were purged and sampled in accordance with low-flow sampling procedures outlined in the QAPP (Marti, 2019). However, minimal water level drawdown in well MW-4 could not be achieved. The water level was drawn down by 1.75 ft. before stabilizing.

Any future groundwater monitoring at the Shell Mart McKenzie Automotive site should prioritize locating and sampling monitoring well MW-3.

References

Coppel, W. 1996. Correspondence to Dave Jansen, Section Manager for Ecology's Toxics Cleanup Program, Southwest Regional Office. Regarding Former Shell Station at 103 2nd St. Morton, WA. July 17, 1996.

Ecology. 1996. Correspondence to Wayne Coppell, Environmental Consultant. Regarding Former Shell Station at 103 2nd St. Morton, WA. Sept. 10, 1996.

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Marti, P. 2016a. Standard Operating Procedure EAP052, Version 1.2: Manual Well-Depth and Depth-to-Water Measurements. Washington State Department of Ecology, Olympia. https://apps.ecology.wa.gov/publications/SummaryPages/1803215.html

Marti, P. 2016b. Standard Operating Procedure EAP078, Version 2.0: Collecting Groundwater Samples for Volatiles and other Organic Compounds from Monitoring Wells. Washington State Department of Ecology, Olympia. https://ecology.wa.gov/Quality

Oberlander, J. 1994. Morton LUST, March 1994 – May 1994, McKenzie Automotive Shell Mini Mart. Washington State Department of Ecology April 17, 1994. Memo to the File.

Olympus Environmental, Inc. 1994. Site Characterization Report – McKenzie Automotive/Shell, 103 Second and Main, Morton, Washington. July 29, 1994. Olympus WO# 94-5000.

Appendix A. Previous Analytical Results

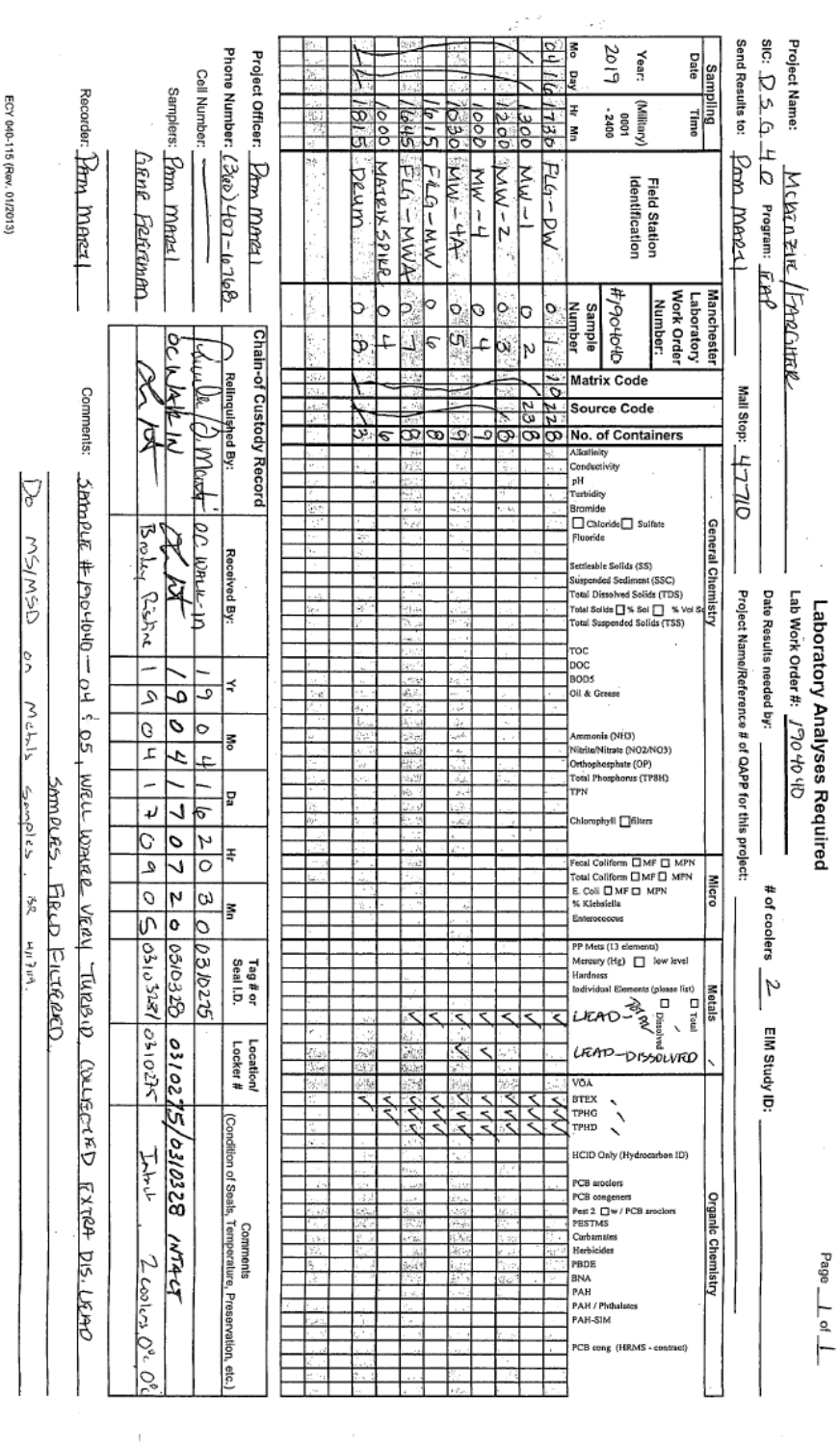
Table A1. Analytical data collected by Olympus (1994) and Coppel (1996).

Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Xylenes (µg/L)	TPH-G (mg/L)	Lead (µg/L)
MW-1	3/17/1994	38	30	7	82	1.1	7
MW-2	3/17/1994	nd	nd	nd	nd	nd	56
MW-3	3/17/1994	nd	2	nd	11	nd	86
MW-4	3/17/1994	90,000	160,000E	23,000	130,000	1,300	150
MW-4	5/30/1996	7,500	18,000	12,000	7,200	100	na

E - The concentration of this analyte exceeded the calibration range.
nd - Analyte not detected.
na - Analyte not analyzed.

Appendix B. Chain of Custody Forms

Following are chain of custody forms for the April 2019 sampling that included the Shell Mart McKenzie Automotive groundwater samples, as well as groundwater samples from a separate site.



Laboratory Analyses Required

Project Name: McKenzie/Fairchild
SIC: 5541 Program: ERP
Send Results to: Pam Marcel Mail Stop: 47710
Lab Work Order #: 190410
Date Results needed by:
# of coolers 2
EIM Study ID:
Project Name/Reference # of QAPP for this project:
Page 1 of 1

Chain-of-Custody Record

Project Officer: Pam Marcel
Phone Number: (360) 407-6768
Cell Number:
Samplers: Pam Marcel, Gene Petterman
Recorder: Pam Marcel

Sampling Date	Time	Field Station Identification	Manchester Laboratory Work Order Number: #190410 Sample Number	Matrix Code	Source Code	No. of Containers	Yr	Mo	Da	Hr	Mn	Tag # or Seal I.D.	Location/ Locker #	Comments (Condition of Seals, Temperature, Preservation, etc.)
04/16	1730	FLG-DW	01	2	2	6	19	04	16	20	30	03103225		
	1300	MW-1	02	2	3	6	19	04	17	07	20	03103250	03102725/03103328	INTACT
	1200	MW-2	03	2	3	6	19	04	17	09	05	03103327	03102K	Intact, 2 coolers 0°C, 0°C
	1000	MW-4	04	2	3	9								
	1030	MW-4A	05	2	3	9								
	1615	FLG-MW	06	2	3	8								
	1645	FLG-MW4A	07	2	3	8								
	1000	Matrix Spike	04	2	3	6								
	1815	Dup	08	2	3	6								

Chain-of Custody Record	Relinquished By:	Received By:
	Gene Petterman	OC Walker
	OC Walker	Becky Richie
	Becky Richie	

Comments: Sample # 190410-04 & 05, Well Water very turbid (collected extra dis. lead

Samples, field filtered

Do MS/MSD on Mells samples, BR 4/17/19.

Metals: PP Mets (13 elements); Mercury (Hg) ☐ low level; Hardness; Individual Elements (please list) ☐ Total ☐ Dissolved; LEAD - TOTAL; LEAD - DISSOLVED

Organic Chemistry: VOA; BTEX; TPHG; TPHD; HCID Only (Hydrocarbon ID); PCB aroclors; PCB congeners; Pest 2 ☐ w / PCB aroclors; PESTMS; Carbamates; Herbicides; PBDE; BNA; PAH; PAH / Phthalates; PAH-SIM; PCB cong (HRMS - contract)

General Chemistry: Alkalinity; Conductivity; pH; Turbidity; Bromide; ☐ Chloride ☐ Sulfate; Fluoride; Settleable Solids (SS); Suspended Sediment (SSC); Total Dissolved Solids (TDS); Total Solids ☐ % Sol ☐ % Vol Sc; Total Suspended Solids (TSS); TOC; DOC; BOD5; Oil & Grease; Ammonia (NH3); Nitrite/Nitrate (NO2/NO3); Orthophosphate (OP); Total Phosphorus (TP8H); TPN; Chlorophyll ☐ filters

Micro: Fecal Coliform ☐ MF ☐ MPN; Total Coliform ☐ MF ☐ MPN; E. Coli ☐ MF ☐ MPN; % Klebsiella; Enterococcus

ECY 040-115 (Rev. 01/2013)

Washington State Department of Ecology
Manchester Environmental Laboratory
Cooler Receipt and Preservation Form

Project Name: McKenzie / Farglher

WO#: 1904040 # of coolers: 2

Delivered by (circle): FedEx UPS (MEL-Courier) Client Other Describe if "other": _____

For any parameters out of compliance, list affected samples in table on next page.

(Cooler temperature MUST be measured upon opening)

Temperature of each cooler (criterion: ≤6°C: 0°C, 0°C

or ≤10°C for microbiology samples, only.)

Did cooler(s) arrive at the proper temperature? (Yes) No N/A

If "No", list samples affected on Page 2.

Receipt at MEL

Date and time: 4/17/19 9:05

Signature: Body Lisa

Were all samples removed?

(Yes) No If so; List analyses removed: _____

Remainder of samples unloaded by someone else?

Yes No (NA)

If yes, sign and date

Date and time: ___/___/___ ___:___

Signature: _____

Check:

1a. Are Custody Seal(s) Present?	(Yes)	No	
1b. If so, are Custody Seal(s) Intact?	(Yes)	No	NA
2. Was LAR present, correct, and complete?	(Yes)	No	
3. Was chain-of-custody section properly filled out (complete, in ink, signed, etc.)?	(Yes)	No	
4. Did all bottles arrive in good condition (unbroken, no leakage)?	(Yes)	No	
5. Do sample tags on bottles match the LAR paperwork?	(Yes)	No	
6. Were all sample labels complete (i.e.: analysis, sample date, etc.)?	(Yes)	No	
7. Were the samples in correct container for analysis?	(Yes)	No	
8. Were the samples preserved to the proper pH?	(Yes)	No	NA
9. Did all samples arrive within holding time?	(Yes)	No	
10. Did all samples arrive with more than ½ of the hold time left for analysis?	(Yes)	No	
11. If "No", was the analyst notified? Yes No	If so, who? _____		
12. Were VOA/TPHG vials received without bubbles/headspace?	(Yes)	No	NA

Headspace → "hs" (>6 mm) (Write "HS" on container if bubble size exceeds 6 mm.)

Did you contact the project officer for any problems? (Yes) No ~~NA~~

(Include details on next page.)

BC 4/18/19

Washington State Department of Ecology
Manchester Environmental Laboratory
Cooler Receipt and Preservation Form

WO#: 1904040 Receipt date and time: 4/17/19 9:05

How were discrepancies resolved? *List any discrepancies and their resolution below.*

Sample numbers	Analysis	Comments

Other notes of clarification from project officer and/or analysts.

Perform MS/MSD on Total and Dissolved lead samples as per project officer. (See attached email). BM 4/18/19.

Page 2 of 2 Y:\QA Forms

Appendix C. Analytical Reports

Following are analytical laboratory reports from Manchester Environmental Laboratory on the results of the April 2019 groundwater sampling at Shell Mart McKenzie Automotive and at a separate site.

DEPARTMENT OF ECOLOGY
Manchester Environmental Laboratory
7411 Beach Drive East • Port Orchard, Washington 98366-8204

Case Narrative

April 22, 2019

To: Marti, Pam

Project: Mckenzie Auto & Fargher Lake Grocery

Work Order: 1904040

Subject: Volatile Petroleum Products

From: Dolores Montgomery

Sample Receipt

Enclosed are the TPHG results for the samples received by MEL on April 17, 2019. All samples were received in acceptable condition unless noted in Analyst Comments. All samples were prepared and analyzed within holding times unless noted in Analyst Comments.

Analytical Methods

These samples were prepared, analyzed, and verified by MEL according to the submitted chain-of-custody and MEL's procedures. A Sample Correlation Table with batch summary is located in Appendix A. The samples were:

- extracted following a modification of method SW5030B.
- analyzed following a modification of method NWTPH-GX.

Analyst Comments

None noted.

Sample Qualification

The samples were qualified according to MEL's procedures. The table in Appendix B summarizes the manual qualifiers added by MEL. All results reported below the method reporting limit (RL) were automatically qualified as estimates, but not included in Appendix B. The qualifiers are defined in Appendix C.

Sample Verification

All analyses met QC acceptance criteria except as noted in Appendix D. All analytes met linearity requirements unless noted in Appendix E.

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Volatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: FLG-DW**

Work Order: 1904040	**Lab ID #: 1904040-01**	**Batch ID: B19D116**
Project Officer: Marti, Pam	**Collected: 4/16/2019**	**Prepared: 4/17/2019**
Initial Vol: 5 mL	**Prep Method: SW5030B**	**Analyzed: 4/17/2019**
Final Vol: 5 mL	**Analysis Method: NWTPH-GX**	**Matrix: Water**
		Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
86290-81-5	Gasoline	0.070	U	0.070	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	22.3	24.0	93	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	50.7	56.0	91	70-130

Authorized by: _____ **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Volatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: MW-1**

Work Order: 1904040	**Lab ID #: 1904040-02**	**Batch ID: B19D116**
Project Officer: Marti, Pam	**Collected: 4/16/2019**	**Prepared: 4/17/2019**
Initial Vol: 5 mL	**Prep Method: SW5030B**	**Analyzed: 4/17/2019**
Final Vol: 5 mL	**Analysis Method: NWTPH-GX**	**Matrix: Water**
		Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
86290-81-5	Gasoline	0.070	U	0.070	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	22.4	24.0	93	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	49.9	56.0	89	70-130

Authorized by: DLL **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Volatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: MW-2**

Work Order: 1904040	**Lab ID #: 1904040-03**	**Batch ID: B19D116**
Project Officer: Marti, Pam	**Collected: 4/16/2019**	**Prepared: 4/17/2019**
Initial Vol: 5 mL	**Prep Method: SW5030B**	**Analyzed: 4/17/2019**
Final Vol: 5 mL	**Analysis Method: NWTPH-GX**	**Matrix: Water**
		Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
86290-81-5	Gasoline	0.070	U	0.070	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	22.3	24.0	93	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	49.5	56.0	88	70-130

Authorized by: _____ **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Volatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: MW-4**

Work Order: 1904040	**Lab ID #: 1904040-04**	**Batch ID: B19D116**
Project Officer: Marti, Pam	**Collected: 4/16/2019**	**Prepared: 4/17/2019**
Initial Vol: 5 mL	**Prep Method: SW5030B**	**Analyzed: 4/17/2019**
Final Vol: 5 mL	**Analysis Method: NWTPH-GX**	**Matrix: Water**
		Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
86290-81-5	Gasoline	0.070	U	0.070	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	22.4	24.0	93	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	51.5	56.0	92	70-130

Authorized by: _____ **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Volatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: MW-4A**

Work Order: 1904040	**Lab ID #: 1904040-05**	**Batch ID: B19D116**
Project Officer: Marti, Pam	**Collected: 4/16/2019**	**Prepared: 4/17/2019**
Initial Vol: 5 mL	**Prep Method: SW5030B**	**Analyzed: 4/17/2019**
Final Vol: 5 mL	**Analysis Method: NWTPH-GX**	**Matrix: Water**
		Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
86290-81-5	Gasoline	0.070	U	0.070	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	22.2	24.0	93	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	50.7	56.0	90	70-130

Authorized by: _____ **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Volatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: FLG-MW**

Work Order: 1904040	**Lab ID #: 1904040-06**	**Batch ID: B19D116**
Project Officer: Marti, Pam	**Collected: 4/16/2019**	**Prepared: 4/17/2019**
Initial Vol: 5 mL	**Prep Method: SW5030B**	**Analyzed: 4/17/2019**
Final Vol: 5 mL	**Analysis Method: NWTPH-GX**	**Matrix: Water**
		Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
86290-81-5	Gasoline	0.070	U	0.070	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	25.7	24.0	107	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	58.3	56.0	104	70-130

Authorized by: _____ **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Volatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: FLG-MWA**

Work Order: 1904040	**Lab ID #: 1904040-07**	**Batch ID: B19D116**
Project Officer: Marti, Pam	**Collected: 4/16/2019**	**Prepared: 4/17/2019**
Initial Vol: 5 mL	**Prep Method: SW5030B**	**Analyzed: 4/17/2019**
Final Vol: 5 mL	**Analysis Method: NWTPH-GX**	**Matrix: Water**
		Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
86290-81-5	Gasoline	0.070	U	0.070	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	25.4	24.0	106	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	58.7	56.0	105	70-130

Authorized by: _____ **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Volatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **QC Type : Method Blank**

Work Order: Batch QC	**Lab ID #: B19D116-BLK1**	**Batch ID: B19D116**
Project Officer: Marti, Pam	**Prep Method: SW5030B**	**Prepared: 4/17/2019**
Initial Vol: 5 mL	**Analysis Method: NWTPH-GX**	**Analyzed: 4/17/2019**
Final Vol: 5 mL	**Source Field ID: B19D116-BLK1**	**Matrix: Water**
		Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
86290-81-5	Gasoline	0.070	U	0.070	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	22.6	24.0	94	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	51.4	56.0	92	70-130

Authorized by: DL **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Volatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **QC Type : LCS**

Work Order: Batch QC	**Lab ID #: B19D116-BS1**	**Batch ID: B19D116**
Project Officer: Marti, Pam	**Prep Method: SW5030B**	**Prepared: 4/17/2019**
Initial Vol: 5 mL	**Analysis Method: NWTPH-GX**	**Analyzed: 4/17/2019**
Final Vol: 5 mL	**Source Field ID: B19D116-BS1**	**Matrix: Water**
		Units: %

Analyte	Result	Spike Level	RL	%Rec	%Rec Limits
Gasoline	0.661	0.750	0.070	88	70-130

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	24.1	24.0	100	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	55.4	56.0	99	70-130

Authorized by: _____ **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Volatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery — **QC Type : LCS Dup**

Work Order: Batch QC	**Lab ID #: B19D116-BSD1**	**Batch ID: B19D116**
Project Officer: Marti, Pam	**Prep Method: SW5030B**	**Prepared: 4/17/2019**
Initial Vol: 5 mL	**Analysis Method: NWTPH-GX**	**Analyzed: 4/17/2019**
Final Vol: 5 mL	**Source Field ID: B19D116-BSD1**	**Matrix: Water**
		Units: %

Analyte	Sample Result	Spike Level	%Rec	RPD	%Rec Limits	RPD Limit
Gasoline	0.681	0.750	91	3	70-130	40

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	24.2	24.0	101	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	53.2	56.0	95	70-130

Authorized by: _____ **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Volatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery — **QC Type : Matrix Spike**

Work Order: Batch QC	**Lab ID #: B19D116-MS1**	**Batch ID: B19D116**
Project Officer: Marti, Pam	**Prep Method: SW5030B**	**Prepared: 4/17/2019**
Initial Vol: 5 mL	**Analysis Method: NWTPH-GX**	**Analyzed: 4/17/2019**
Final Vol: 5 mL	**Source Field ID: B19D116-MS1**	**Matrix: Water**
	Source Lab ID #: 1904040-04	**Units: %**

Analyte	Result	Spike Level	Source Result	%Rec	%Rec Limits
Gasoline	0.648	0.750	0.00	86	70-130

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	22.5	24.0	94	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	50.9	56.0	91	70-130

Authorized by: DV — **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Volatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **QC Type : Matrix Spike Dup**

Work Order: Batch QC	Lab ID #: B19D116-MSD1	Batch ID: B19D116
Project Officer: Marti, Pam	Prep Method: SW5030B	Prepared: 4/17/2019
Initial Vol: 5 mL	Analysis Method: NWTPH-GX	Analyzed: 4/17/2019
Final Vol: 5 mL	Source Field ID: B19D116-MSD1	Matrix: Water
	Source Lab ID #: 1904040-04	Units: %

Analyte	Sample Result	Spike Level	Source Result	%Rec	RPD	%Rec Limits	RPD Limit
Gasoline	0.639	0.750	0.00	85	1	70-130	40

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	22.9	24.0	95	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	51.6	56.0	92	70-130

Authorized by: _____ **Release Date:** 04/22/19

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Appendix A
Sample Correlation Table

Batch ID: B19D116 **Prep Method:** SW5030B

Prepared: 4/17/2019 **Analysis Method:** NWTPH-GX

Field ID	MEL ID
FLG-DW	1904040-01
MW-1	1904040-02
MW-2	1904040-03
MW-4	1904040-04
MW-4A	1904040-05
FLG-MW	1904040-06
FLG-MWA	1904040-07
Blank	B19D116-BLK1
LCS	B19D116-BS1
LCS Dup	B19D116-BSD1
Matrix Spike (MW-4)	B19D116-MS1
Matrix Spike Dup (MW-4)	B19D116-MSD1

Appendix B
Manual Qualification Table

WO: 1904040	**Analysis:** TPHG

No manual qualifiers were added to the samples or batch QC.

Appendix C
Data Qualifier Definitions

Code	Definition
E	Reported result is an estimate because it exceeds the calibration range.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
NAF	Not analyzed for.
NC	Not calculated.
REJ	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
U	The analyte was not detected at or above the reported sample quantitation limit.
UJ	The analyte was not detected at or above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately measure the analyte in the sample.
bold	The analyte was present in the sample. (Visual aid to locate detected compounds on the analytical report.)

Appendix D
QC Exceptions Report

Lab ID	Analyte	Exception
No QC exceptions reported.		

QC Exceptions determined using unrounded QC results but are reported as integers throughout this analytical report.
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Appendix E
Initial Calibration Exceptions Report

Calibration ID: B8C2801 **Analysis:** TPHG

LabNumber	Analyte	QC Exception

No ICAL exceptions.

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DEPARTMENT OF ECOLOGY
Manchester Environmental Laboratory
7411 Beach Drive East • Port Orchard, Washington 98366-8204

Case Narrative

April 30, 2019

To: Marti, Pam

Project: Mckenzie Auto & Fargher Lake Grocery

Work Order: 1904040

Subject: Semivolatile Petroleum Products

From: Karin Bailey KB

Sample Receipt

Enclosed are the TPHD results for the samples received by MEL on April 17, 2019. All samples were received in acceptable condition unless noted in Analyst Comments. All samples were prepared and analyzed within holding times unless noted in Analyst Comments.

Analytical Methods

These samples were prepared, analyzed, and verified by MEL according to the submitted chain-of-custody and MEL's procedures. A Sample Correlation Table with batch summary is located in Appendix A. The samples were:

- extracted following a modification of method SW3535A.
- analyzed following a modification of method NWTPH-DX.

Analyst Comments

TPHD by GCFID. Samples 1904040-01, -06, -07 had results for Diesel above the reporting limit, but the sample chromatograms didn't match the chromatogram of the Diesel standard.

Sample Qualification

The samples were qualified according to MEL's procedures. The table in Appendix B summarizes the manual qualifiers added by MEL. All results reported below the method

reporting limit (RL) were automatically qualified as estimates, but not included in Appendix B. The qualifiers are defined in Appendix C.

Sample Verification

All analyses met QC acceptance criteria except as noted in Appendix D. All analytes met linearity requirements unless noted in Appendix E.

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Semivolatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: FLG-DW**

Work Order: 1904040	**Lab ID #: 1904040-01**	**Batch ID: B19D136**
Project Officer: Marti, Pam	**Collected: 4/16/2019**	**Prepared: 4/17/2019**
Initial Vol: 1010 mL	**Prep Method: SW3535A**	**Analyzed: 4/24/2019**
Final Vol: 3 mL	**Analysis Method: NWTPH-DX**	**Matrix: Water**
		Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
68476-34-6	**#2 Diesel**	**0.15**		**0.15**	
NULL	Lube Oil	0.37	U	0.37	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
629-99-2	Pentacosane	0.203	0.218	93	50-150

Authorized by: VB **Release Date:** 4/30/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Semivolatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: MW-1**

Work Order: 1904040
Project Officer: Marti, Pam
Initial Vol: 995 mL
Final Vol: 3 mL

Lab ID #: 1904040-02
Collected: 4/16/2019
Prep Method: SW3535A
Analysis Method: NWTPH-DX

Batch ID: B19D136
Prepared: 4/17/2019
Analyzed: 4/24/2019
Matrix: Water
Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
68476-34-6	#2 Diesel	0.15	U	0.15	
NULL	Lube Oil	0.38	U	0.38	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
629-99-2	Pentacosane	0.218	0.221	99	50-150

Authorized by: KB **Release Date:** 4/30/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Semivolatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: MW-2**

Work Order: 1904040
Project Officer: Marti, Pam
Initial Vol: 1000 mL
Final Vol: 3 mL

Lab ID #: 1904040-03
Collected: 4/16/2019
Prep Method: SW3535A
Analysis Method: NWTPH-DX

Batch ID: B19D136
Prepared: 4/17/2019
Analyzed: 4/24/2019
Matrix: Water
Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
68476-34-6	#2 Diesel	0.15	U	0.15	
NULL	Lube Oil	0.38	U	0.38	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
629-99-2	Pentacosane	0.234	0.220	106	50-150

Authorized by: KB **Release Date:** 4/30/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Semivolatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: MW-4**

Work Order: 1904040	**Lab ID #: 1904040-04**	**Batch ID: B19D136**
Project Officer: Marti, Pam	**Collected: 4/16/2019**	**Prepared: 4/17/2019**
Initial Vol: 1010 mL	**Prep Method: SW3535A**	**Analyzed: 4/24/2019**
Final Vol: 3 mL	**Analysis Method: NWTPH-DX**	**Matrix: Water**
		Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
68476-34-6	#2 Diesel	0.15	U	0.15	
NULL	Lube Oil	0.37	U	0.37	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
629-99-2	Pentacosane	0.223	0.218	102	50-150

Authorized by: KB **Release Date:** 4/30/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Semivolatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: MW-4A**

Work Order: 1904040	**Lab ID #: 1904040-05**	**Batch ID: B19D136**
Project Officer: Marti, Pam	**Collected: 4/16/2019**	**Prepared: 4/17/2019**
Initial Vol: 1005 mL	**Prep Method: SW3535A**	**Analyzed: 4/24/2019**
Final Vol: 3 mL	**Analysis Method: NWTPH-DX**	**Matrix: Water**
		Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
68476-34-6	#2 Diesel	0.15	U	0.15	
NULL	Lube Oil	0.37	U	0.37	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
629-99-2	Pentacosane	0.218	0.219	100	50-150

Authorized by: LB **Release Date:** 4/30/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Semivolatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: FLG-MW**

Work Order: 1904040
Project Officer: Marti, Pam
Initial Vol: 1010 mL
Final Vol: 3 mL

Lab ID #: 1904040-06
Collected: 4/16/2019
Prep Method: SW3535A
Analysis Method: NWTPH-DX

Batch ID: B19D136
Prepared: 4/17/2019
Analyzed: 4/24/2019
Matrix: Water
Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
68476-34-6	#2 Diesel	0.28		0.15	
NULL	Lube Oil	0.37	U	0.37	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
629-99-2	Pentacosane	0.220	0.218	101	50-150

Authorized by: KB Release Date: 4/30/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Semivolatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: FLG-MWA**

Work Order: 1904040	**Lab ID #: 1904040-07**	**Batch ID: B19D136**
Project Officer: Marti, Pam	**Collected: 4/16/2019**	**Prepared: 4/17/2019**
Initial Vol: 1000 mL	**Prep Method: SW3535A**	**Analyzed: 4/24/2019**
Final Vol: 3 mL	**Analysis Method: NWTPH-DX**	**Matrix: Water**
		Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
68476-34-6	#2 Diesel	0.31		0.15	
NULL	Lube Oil	0.38	U	0.38	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
629-99-2	Pentacosane	0.217	0.220	99	50-150

Authorized by: KB **Release Date:** 4/30/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Semivolatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery **QC Type : Method Blank**

Work Order: Batch QC
Project Officer: Marti, Pam
Initial Vol: 1000 mL
Final Vol: 3 mL

Lab ID #: B19D136-BLK1
Prep Method: SW3535A
Analysis Method: NWTPH-DX
Source Field ID: B19D136-BLK1

Batch ID: B19D136
Prepared: 4/17/2019
Analyzed: 4/24/2019
Matrix: Water
Units: mg/L

CAS#	Analyte	Result	Qualifier	RL	MDL
68476-34-6	#2 Diesel	0.15	U	0.15	
NULL	Lube Oil	0.38	U	0.38	

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
629-99-2	Pentacosane	0.218	0.220	99	50-150

Authorized by: KB Release Date: 4/30/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Semivolatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery — **QC Type : LCS**

Work Order: Batch QC	**Lab ID #: B19D136-BS1**	**Batch ID: B19D136**
Project Officer: Marti, Pam	**Prep Method: SW3535A**	**Prepared: 4/17/2019**
Initial Vol: 1000 mL	**Analysis Method: NWTPH-DX**	**Analyzed: 4/24/2019**
Final Vol: 3 mL	**Source Field ID: B19D136-BS1**	**Matrix: Water**
		Units: %

Analyte	Result	Spike Level	RL	%Rec	%Rec Limits
#2 Diesel	2.54	3.00	0.15	85	70-130

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
629-99-2	Pentacosane	0.215	0.220	98	50-150

Authorized by: VB **Release Date:** 4/30/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
Semivolatile Petroleum Products

Project: Mckenzie Auto & Fargher Lake Grocery — **QC Type : LCS Dup**

Work Order: Batch QC
Project Officer: Marti, Pam
Initial Vol: 1000 mL
Final Vol: 3 mL

Lab ID #: B19D136-BSD1
Prep Method: SW3535A
Analysis Method: NWTPH-DX
Source Field ID: B19D136-BSD1

Batch ID: B19D136
Prepared: 4/17/2019
Analyzed: 4/24/2019
Matrix: Water
Units: %

Analyte	Sample Result	Spike Level	%Rec	RPD	%Rec Limits	RPD Limit
#2 Diesel	2.67	3.00	89	5	70-130	40

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
629-99-2	Pentacosane	0.209	0.220	95	50-150

Authorized by: LB — Release Date: 4/30/19

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Appendix A
Sample Correlation Table

Batch ID: B19D136 **Prep Method:** SW3535A

Prepared: 4/17/2019 **Analysis Method:** NWTPH-DX

Field ID	MEL ID
FLG-DW	1904040-01
MW-1	1904040-02
MW-2	1904040-03
MW-4	1904040-04
MW-4A	1904040-05
FLG-MW	1904040-06
FLG-MWA	1904040-07
Blank	B19D136-BLK1
LCS	B19D136-BS1
LCS Dup	B19D136-BSD1

Appendix B
Manual Qualification Table

WO: 1904040	**Analysis:** TPHD

No manual qualifiers were added to the samples or batch QC.

Appendix C
Data Qualifier Definitions

Code	Definition
E	Reported result is an estimate because it exceeds the calibration range.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
NAF	Not analyzed for.
NC	Not calculated.
REJ	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
U	The analyte was not detected at or above the reported sample quantitation limit.
UJ	The analyte was not detected at or above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately measure the analyte in the sample.
bold	The analyte was present in the sample. (Visual aid to locate detected compounds on the analytical report.)

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Appendix D
QC Exceptions Report

Lab ID	Analyte	Exception

No QC exceptions reported.

QC Exceptions determined using unrounded QC results but are reported as integers throughout this analytical report.

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Appendix E
Initial Calibration Exceptions Report

Calibration ID: B9D0402 **Analysis:** TPHD

LabNumber	Analyte	QC Exception

No ICAL exceptions.

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DEPARTMENT OF ECOLOGY
Manchester Environmental Laboratory
7411 Beach Drive East • Port Orchard, Washington 98366-8204

Case Narrative

April 22, 2019

To: Marti, Pam

Project: Mckenzie Auto & Fargher Lake Grocery

Work Order: 1904040

Subject: BTEX

From: Dolores Montgomery DEL

Sample Receipt

Enclosed are the BTEX results for the samples received by MEL on April 17, 2019. All samples were received in acceptable condition unless noted in Analyst Comments. All samples were prepared and analyzed within holding times unless noted in Analyst Comments.

Analytical Methods

These samples were prepared, analyzed, and verified by MEL according to the submitted chain-of-custody and MEL's procedures. A Sample Correlation Table with batch summary is located in Appendix A. The samples were:

- extracted following a modification of method SW5030B.
- analyzed following a modification of method SW8021B.

Analyst Comments

None noted.

Sample Qualification

The samples were qualified according to MEL's procedures. The table in Appendix B summarizes the manual qualifiers added by MEL. All results reported below the method reporting limit (RL) were automatically qualified as estimates, but not included in Appendix B. The qualifiers are defined in Appendix C.

Sample Verification

All analyses met QC acceptance criteria except as noted in Appendix D. All analytes met linearity requirements unless noted in Appendix E.

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
BTEX

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: FLG-DW**

Work Order: 1904040
Project Officer: Marti, Pam
Initial Vol: 5 mL
Final Vol: 5 mL

Lab ID #: 1904040-01
Collected: 4/16/2019
Prep Method: SW5030B
Analysis Method: SW8021B

Batch ID: B19D139
Prepared: 4/18/2019
Analyzed: 4/18/2019
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
71-43-2	Benzene	1.00	U	1.00	0.258
100-41-4	Ethylbenzene	1.00	U	1.00	0.106
179601-23-1	m,p-Xylene	2.00	U	2.00	0.240
95-47-6	o-Xylene	1.00	U	1.00	0.177
108-88-3	Toluene	1.00	U	1.00	0.145

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	24.0	24.0	100	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	59.6	56.0	106	70-130

Authorized by: _____ **Release Date:** 04/21/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
BTEX

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: MW-1**

Work Order: 1904040
Project Officer: Marti, Pam
Initial Vol: 5 mL
Final Vol: 5 mL

Lab ID #: 1904040-02
Collected: 4/16/2019
Prep Method: SW5030B
Analysis Method: SW8021B

Batch ID: B19D139
Prepared: 4/18/2019
Analyzed: 4/18/2019
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
71-43-2	Benzene	1.00	U	1.00	0.258
100-41-4	Ethylbenzene	1.00	U	1.00	0.106
179601-23-1	m,p-Xylene	2.00	U	2.00	0.240
95-47-6	o-Xylene	1.00	U	1.00	0.177
108-88-3	Toluene	1.00	U	1.00	0.145

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	24.2	24.0	101	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	58.4	56.0	104	70-130

Authorized by: _____ **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
BTEX

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: MW-2**

Work Order: 1904040
Project Officer: Marti, Pam
Initial Vol: 5 mL
Final Vol: 5 mL

Lab ID #: 1904040-03
Collected: 4/16/2019
Prep Method: SW5030B
Analysis Method: SW8021B

Batch ID: B19D139
Prepared: 4/18/2019
Analyzed: 4/18/2019
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
71-43-2	Benzene	1.00	U	1.00	0.258
100-41-4	Ethylbenzene	1.00	U	1.00	0.106
179601-23-1	m,p-Xylene	2.00	U	2.00	0.240
95-47-6	o-Xylene	1.00	U	1.00	0.177
108-88-3	Toluene	1.00	U	1.00	0.145

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	23.9	24.0	100	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	57.1	56.0	102	70-130

Authorized by: _____ Release Date: 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
BTEX

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: MW-4**

Work Order: 1904040	**Lab ID #: 1904040-04**	**Batch ID: B19D139**
Project Officer: Marti, Pam	**Collected: 4/16/2019**	**Prepared: 4/18/2019**
Initial Vol: 5 mL	**Prep Method: SW5030B**	**Analyzed: 4/18/2019**
Final Vol: 5 mL	**Analysis Method: SW8021B**	**Matrix: Water**
		Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
71-43-2	Benzene	1.00	U	1.00	0.258
100-41-4	Ethylbenzene	1.00	U	1.00	0.106
179601-23-1	m,p-Xylene	2.00	U	2.00	0.240
95-47-6	o-Xylene	1.00	U	1.00	0.177
108-88-3	Toluene	1.00	U	1.00	0.145

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	23.7	24.0	99	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	56.9	56.0	102	70-130

Authorized by: DN **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
BTEX

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: MW-4A**

Work Order: 1904040
Project Officer: Marti, Pam
Initial Vol: 5 mL
Final Vol: 5 mL

Lab ID #: 1904040-05
Collected: 4/16/2019
Prep Method: SW5030B
Analysis Method: SW8021B

Batch ID: B19D139
Prepared: 4/18/2019
Analyzed: 4/18/2019
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
71-43-2	Benzene	1.00	U	1.00	0.258
100-41-4	Ethylbenzene	1.00	U	1.00	0.106
179601-23-1	m,p-Xylene	2.00	U	2.00	0.240
95-47-6	o-Xylene	1.00	U	1.00	0.177
108-88-3	Toluene	1.00	U	1.00	0.145

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	24.2	24.0	101	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	57.6	56.0	103	70-130

Authorized by: _____ **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
BTEX

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: FLG-MW**

Work Order: 1904040
Project Officer: Marti, Pam
Initial Vol: 5 mL
Final Vol: 5 mL

Lab ID #: 1904040-06
Collected: 4/16/2019
Prep Method: SW5030B
Analysis Method: SW8021B

Batch ID: B19D139
Prepared: 4/18/2019
Analyzed: 4/18/2019
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
71-43-2	Benzene	48.3		1.00	0.258
100-41-4	Ethylbenzene	32.6		1.00	0.106
179601-23-1	m,p-Xylene	16.3		2.00	0.240
95-47-6	o-Xylene	1.55		1.00	0.177
108-88-3	Toluene	5.04		1.00	0.145

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	26.4	24.0	110	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	70.4	56.0	126	70-130

Authorized by: _____ Release Date: 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
BTEX

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: FLG-MWA**

Work Order: 1904040
Project Officer: Marti, Pam
Initial Vol: 5 mL
Final Vol: 5 mL

Lab ID #: 1904040-07
Collected: 4/16/2019
Prep Method: SW5030B
Analysis Method: SW8021B

Batch ID: B19D139
Prepared: 4/18/2019
Analyzed: 4/18/2019
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
71-43-2	Benzene	47.6		1.00	0.258
100-41-4	Ethylbenzene	35.0		1.00	0.106
179601-23-1	m,p-Xylene	17.3		2.00	0.240
95-47-6	o-Xylene	1.59		1.00	0.177
108-88-3	Toluene	5.22		1.00	0.145

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	28.0	24.0	117	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	75.6	56.0	135	70-130

Authorized by: _____ Release Date: 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
BTEX

Project: Mckenzie Auto & Fargher Lake Grocery **Field ID: DRUM**

Work Order: 1904040	**Lab ID #: 1904040-08**	**Batch ID: B19D139**
Project Officer: Marti, Pam	**Collected: 4/16/2019**	**Prepared: 4/18/2019**
Initial Vol: 5 mL	**Prep Method: SW5030B**	**Analyzed: 4/18/2019**
Final Vol: 5 mL	**Analysis Method: SW8021B**	**Matrix: Water**
		Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
71-43-2	**Benzene**	**2.63**		**1.00**	**0.258**
100-41-4	**Ethylbenzene**	**2.31**		**1.00**	**0.106**
179601-23-1	**m,p-Xylene**	**1.84**	**J**	**2.00**	**0.240**
95-47-6	**o-Xylene**	**0.651**	**J**	**1.00**	**0.177**
108-88-3	Toluene	1.00	U	1.00	0.145

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	23.9	24.0	99	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	64.3	56.0	115	70-130

Authorized by: _____ **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
BTEX

Project: Mckenzie Auto & Fargher Lake Grocery **QC Type : Method Blank**

Work Order: Batch QC
Project Officer: Marti, Pam
Initial Vol: 5 mL
Final Vol: 5 mL

Lab ID #: B19D139-BLK1
Prep Method: SW5030B
Analysis Method: SW8021B
Source Field ID: B19D139-BLK1

Batch ID: B19D139
Prepared: 4/18/2019
Analyzed: 4/18/2019
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
71-43-2	Benzene	1.00	U	1.00	0.258
100-41-4	Ethylbenzene	1.00	U	1.00	0.106
179601-23-1	m,p-Xylene	2.00	U	2.00	0.240
95-47-6	o-Xylene	1.00	U	1.00	0.177
108-88-3	Toluene	1.00	U	1.00	0.145

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	24.3	24.0	101	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	58.8	56.0	105	70-130

Authorized by: _____ **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
BTEX

Project: Mckenzie Auto & Fargher Lake Grocery **QC Type : LCS**

Work Order: Batch QC	**Lab ID #: B19D139-BS1**	**Batch ID: B19D139**
Project Officer: Marti, Pam	**Prep Method: SW5030B**	**Prepared: 4/18/2019**
Initial Vol: 5 mL	**Analysis Method: SW8021B**	**Analyzed: 4/18/2019**
Final Vol: 5 mL	**Source Field ID: B19D139-BS1**	**Matrix: Water**
		Units: %

Analyte	Result	Spike Level	RL	%Rec	%Rec Limits
Benzene	10.0	10.0	1.00	100	70-130
Ethylbenzene	9.6	10.0	1.00	96	70-130
m,p-Xylene	18.3	20.0	2.00	91	70-130
o-Xylene	9.3	10.0	1.00	93	70-130
Toluene	9.8	10.0	1.00	98	70-130

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	24.1	24.0	101	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	58.7	56.0	105	70-130

Authorized by: _____ **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
BTEX

Project: Mckenzie Auto & Fargher Lake Grocery — **QC Type : LCS Dup**

Work Order: Batch QC
Project Officer: Marti, Pam
Initial Vol: 5 mL
Final Vol: 5 mL

Lab ID #: B19D139-BSD1
Prep Method: SW5030B
Analysis Method: SW8021B
Source Field ID: B19D139-BSD1

Batch ID: B19D139
Prepared: 4/18/2019
Analyzed: 4/18/2019
Matrix: Water
Units: %

Analyte	Sample Result	Spike Level	%Rec	RPD	%Rec Limits	RPD Limit
Benzene	10.4	10.0	104	4	70-130	40
Ethylbenzene	10.1	10.0	101	5	70-130	40
m,p-Xylene	19.3	20.0	96	5	70-130	40
o-Xylene	9.7	10.0	97	4	70-130	40
Toluene	10.2	10.0	102	5	70-130	40

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	24.4	24.0	102	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	58.2	56.0	104	70-130

Authorized by: DR — **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
BTEX

Project: Mckenzie Auto & Fargher Lake Grocery — **QC Type : Matrix Spike**

Work Order: Batch QC	**Lab ID #: B19D139-MS1**	**Batch ID: B19D139**
Project Officer: Marti, Pam	**Prep Method: SW5030B**	**Prepared: 4/18/2019**
Initial Vol: 5 mL	**Analysis Method: SW8021B**	**Analyzed: 4/18/2019**
Final Vol: 5 mL	**Source Field ID: B19D139-MS1**	**Matrix: Water**
	Source Lab ID #: 1904040-04	**Units: %**

Analyte	Result	Spike Level	Source Result	%Rec	%Rec Limits
Benzene	10.4	10.0	0.0	104	70-130
Ethylbenzene	9.9	10.0	0.0	99	70-130
m,p-Xylene	19.0	20.0	0.0	95	70-130
o-Xylene	9.6	10.0	0.0	96	70-130
Toluene	10.2	10.0	0.0	102	70-130

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	24.0	24.0	100	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	56.6	56.0	101	70-130

Authorized by: DR **Release Date:** 04/22/19

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Report for
BTEX

Project: Mckenzie Auto & Fargher Lake Grocery **QC Type : Matrix Spike Dup**

Work Order: Batch QC
Project Officer: Marti, Pam
Initial Vol: 5 mL
Final Vol: 5 mL

Lab ID #: B19D139-MSD1
Prep Method: SW5030B
Analysis Method: SW8021B
Source Field ID: B19D139-MSD1
Source Lab ID #: 1904040-04

Batch ID: B19D139
Prepared: 4/18/2019
Analyzed: 4/18/2019
Matrix: Water
Units: %

Analyte	Sample Result	Spike Level	Source Result	%Rec	RPD	%Rec Limits	RPD Limit
Benzene	10.7	10.0	0.0	107	3	70-130	50
Ethylbenzene	10.2	10.0	0.0	102	3	70-130	50
m,p-Xylene	19.6	20.0	0.0	98	3	70-130	50
o-Xylene	9.9	10.0	0.0	99	3	70-130	50
Toluene	10.5	10.0	0.0	105	3	70-130	50

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Rec.	% Rec. Limits
540-36-3	1,4-Difluorobenzene	24.1	24.0	100	70-130
615-59-8	Benzene, 1,4-dibromo-2-methyl	59.4	56.0	106	70-130

Authorized by: _____ **Release Date:** 04/22/19

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Appendix A
Sample Correlation Table

Batch ID: B19D139 **Prep Method:** SW5030B

Prepared: 4/18/2019 **Analysis Method:** SW8021B

Field ID	MEL ID
FLG-DW	1904040-01
MW-1	1904040-02
MW-2	1904040-03
MW-4	1904040-04
MW-4A	1904040-05
FLG-MW	1904040-06
FLG-MWA	1904040-07
DRUM	1904040-08
Blank	B19D139-BLK1
LCS	B19D139-BS1
LCS Dup	B19D139-BSD1
Matrix Spike (MW-4)	B19D139-MS1
Matrix Spike Dup (MW-4)	B19D139-MSD1

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Appendix B
Manual Qualification Table

WO: 1904040	**Analysis:** BTEX

No manual qualifiers were added to the samples or batch QC.

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Appendix C
Data Qualifier Definitions

Code	Definition
E	Reported result is an estimate because it exceeds the calibration range.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
NAF	Not analyzed for.
NC	Not calculated.
REJ	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
U	The analyte was not detected at or above the reported sample quantitation limit.
UJ	The analyte was not detected at or above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately measure the analyte in the sample.
bold	The analyte was present in the sample. (Visual aid to locate detected compounds on the analytical report.)

Appendix D
QC Exceptions Report

Lab ID	Analyte	Exception
1904040-07	surr: Benzene, 1,4-dibromo-2-methyl-	Exceeds upper control limit

QC Exceptions determined using unrounded QC results but are reported as integers throughout this analytical report.

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Appendix E
Initial Calibration Exceptions Report

Calibration ID: B8C2801		**Analysis:** TPHG
LabNumber	**Analyte**	**QC Exception**

No ICAL exceptions.

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Manchester Environmental Laboratory
7411 Beach Drive E, Port Orchard, Washington 98366

Case Narrative - Metals

April 22, 2019

Project: Mckenzie Auto & Fargher Lake Grocery

Work Order: 1904040

Project Manager: Marti, Pam

By: Dean Momohara

Summary

The laboratory followed EPA 200.8 for the preparation and analysis of trace metals.

All analyses requested were evaluated by established regulatory quality assurance guidelines.

Sample Information

The samples were received at the Manchester Laboratory on 4/17/2019. The samples were received in good condition and were properly preserved. Seven samples were received and assigned laboratory identification numbers 01 to 07.

Holding Times

The laboratory performed all analyses within their hold times.

Calibration

The instruments were calibrated following the appropriate methods. All initial and continuing calibration verification checks were within the acceptance limits. All initial and continuing calibration blank checks were within the acceptance limits. All standard residuals were within acceptance limits. All r-values were within acceptance limits. The instruments were calibrated with NIST traceable standards and verified to be in calibration with a second source NIST traceable standard.

Method Blanks

No analytically significant levels of analyte were detected in the method blanks associated with these samples.

Laboratory Control Samples

All laboratory control sample recoveries were within the acceptance limits.

Replicates

All associated duplicate relative percent differences of samples with concentrations greater than 5 times the reporting limit were within the acceptance limits.

Matrix Spikes

All matrix spike recoveries were within the acceptance limits.

Internal Standards

All internal standard recoveries were within the acceptance limits.

Other Quality Assurance Measures and Issues

U - The analyte was not detected at or above the reported result.

bold - The analyte was present in the sample. (Visual Aid to locate detected compounds on report sheet.)

Please call Dean Momohara at (360) 871-8808 to further discuss this project.

cc: Project File

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
Lead

Project Name: Mckenzie Auto & Fargher Lake Grocery

Project Officer: Marti, Pam
Work Order: 1904040
Analyte: Lead

Prep Method: EPA200.2
Prepared: 04/18/19
Batch ID: B19D121

Analysis Method: EPA200.8
Matrix: Water
Units: ug/L

Sample #	Sample ID	Result	Qualifier	RL	MDL	Collected	Analyzed
1904040-01	**FLG-DW**	**0.33**		0.10	0.02	04/16/19	04/19/19
1904040-02	MW-1	0.10	U	0.10	0.02	04/16/19	04/19/19
1904040-03	MW-2	0.10	U	0.10	0.02	04/16/19	04/19/19
1904040-04	**MW-4**	**0.67**		0.10	0.02	04/16/19	04/19/19
1904040-05	**MW-4A**	**0.70**		0.10	0.02	04/16/19	04/19/19
1904040-06	FLG-MW	0.10	U	0.10	0.02	04/16/19	04/19/19
1904040-07	FLG-MWA	0.10	U	0.10	0.02	04/16/19	04/19/19

QC Results for Batch ID: B19D121

Method Blank	Sample ID	Result	Qualifer	RL	MDL
B19D121-BLK1	Blank	0.10	U	0.10	0.02

Sample #	QC Sample	Result	Spike Level	Source Sample	Source Result	%Rec	%Rec Limits	RPD	RPD Limit
B19D121-BS1	LCS	25.3	25.0			101	85-115		
B19D121-BSD1	LCS Dup	25.1	25.0			100	85-115	0.9	20
B19D121-MS1	Matrix Spike	25.7	25.0	1904040-04	0.666	100	75-125		
B19D121-MSD1	Matrix Spike Dup	25.9	25.0	1904040-04	0.666	101	75-125	0.5	20

Authorized by: DH **Release Date:** 4/22/19 **Page 1 of 2**

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Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
Lead, Dissolved

Project Name: Mckenzie Auto & Fargher Lake Grocery

Project Officer: Marti, Pam
Work Order: 1904040
Analyte: Lead

Prep Method:
Prepared: 04/19/19
Batch ID: B19D145

Analysis Method: EPA200.8
Matrix: Water
Units: ug/L

Sample #	Sample ID	Result	Qualifier	RL	MDL	Collected	Analyzed
1904040-04	MW-4	0.020	U	0.020	0.007	04/16/19	04/19/19
1904040-05	MW-4A	0.020	U	0.020	0.007	04/16/19	04/19/19

QC Results for Batch ID: B19D145

Method Blank	Sample ID	Result	Qualifer	RL	MDL
B19D145-BLK1	Blank	0.020	U	0.020	0.007

Sample #	QC Sample	Result	Spike Level	Source Sample	Source Result	%Rec	%Rec Limits	RPD	RPD Limit
B19D145-BS1	LCS	9.81	10.0			98	85-115		
B19D145-BSD1	LCS Dup	9.84	10.0			98	85-115	0.3	20
B19D145-MS1	Matrix Spike	19.4	20.0	1904040-04	0.020 U	97	75-125		
B19D145-MSD1	Matrix Spike Dup	19.5	20.0	1904040-04	0.020 U	98	75-125	0.7	20

Authorized by: DM **Release Date:** 4/22/19 **Page 2 of 2**

C:\PROGRAM FILES (X86)\PROMIUM\ELEMENT\FORMAT\MEL_METALS_V1.4.0.RPT 4/22/2019