



Engineering +  
Environmental

December 12, 2013

Washington Department of Ecology  
Mr. Norm Hepner PE  
15 W. Yakima Avenue Suite 200  
Yakima, Washington 98902

Re: Mabton Minimart Addendum Report  
PBS Project No. 63165.000

Dear Mr. Hepner:

This report provides additional information and data to the Site Characterization and Remedial Action Report (Site Characterization report) prepared by PBS Engineering and Environmental (PBS) in November, 2013. The Site Characterization report was submitted to you as documentation of the soil and groundwater investigation conducted by PBS at the Mabton Minimart (site). The additional information contained within this report presents additional quarterly groundwater monitoring data and a further evaluation of the soil remedial action data that was collected during the removal of diesel-impacted soil at the site.

### **Background**

The Mabton minimart is currently in use as a gasoline station and minimart. No vehicle maintenance currently takes place, and PBS understands that no maintenance has taken place in the past. There are in-service underground storage tanks (USTs) to the west of the building beneath a concrete pad. Fuel dispensers are located immediately adjacent to the USTs and on the east side of the minimart.

At the time of initial building construction in the 1960s, there were three USTs located on the west side of the building, with dispensers reportedly on the south and east sides. In March 1994 these three USTs were decommissioned by removal, according to the *LUST Closure/Interim Remedial Action Report* prepared by White Shield Inc. (White Shield). Soil sampling conducted during tank removal revealed gasoline impact to soil at the base and east wall of the excavation. This petroleum-contaminated soil (PCS) was removed by excavation to a depth of approximately 18 feet. Soil sampling was conducted by White Shield and several samples were found with gasoline range hydrocarbons including benzene, toluene, ethylbenzene and xylenes at elevated concentrations. No groundwater sampling or assessment of the subsurface fuel lines was undertaken at that time.

In response to Washington State Department of Ecology (Ecology) requirement for groundwater characterization and fuel line characterization at the site, PBS prepared a work plan in 2012 to perform a groundwater investigation and investigate the former UST basin and fuel lines. Ecology also recommended that the site be enrolled into the Voluntary Cleanup Program (VCP). An important feature of the program is that it allows owners, through a technical consultation process with Ecology, to apply for

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and receive a No Further Action (NFA) letter once Ecology has reviewed the cleanup documentation and is satisfied the cleanup has been successfully conducted. The objective of this project is to meet cleanup criteria and obtain a NFA determination from Ecology. Notification that RE Powell's voluntary application was received by Ecology and accepted was presented in a letter dated February 7, 2012. The site is designated as Facility #23115157 and VCP # CE0359.

### **Soil Remedial Action Data Discussion**

PBS used a combination of hand augering and a truck-mounted geoprobe rig to advance soil borings in the vicinity of the fuel lines and dispensers and collect soil samples. The hand augering was done within the first 4 to 5 feet below the surface to collect shallow subsurface samples and in order to check for buried fuel lines and utilities.

All the soil samples were initially analyzed by the Northwest Total Petroleum Hydrocarbons-hydrocarbon identification (NWTPH-HCID) method. NWTPH-HCID laboratory results are reported as detected or not detected. If hydrocarbons are detected in the gasoline, diesel, or heavy oil range, then further specific analytical methods are used to quantify the detected hydrocarbon.

There is an out-of-use diesel dispenser on the south side of the minimart building located on a concrete former fuel island. Soil boring B13 was drilled on the south side of the former fuel island, and boring B-14 was drilled on the north side. In both of these borings, the sample at a depth of 2 feet had a motor oil range detection. The HCID screening results for the samples collected from these two borings were included in Table 6 in the Site Characterization report. Figure 2 from the Site Characterization report that shows the out-of-use dispenser and soil boring locations is included as an attachment to this report.

Follow up analyses was performed on both samples and the sample from the north side of the former dispenser had a concentration of 2800 mg/kg motor oil range hydrocarbons, which exceeded the Method A cleanup level for heavy oil of 2000 mg/kg. The sample from boring B13 on the south side had an estimated concentration of 250 mg/kg. This did not exceed the Method A cleanup level. The follow up sample results for both these borings were included in Table 8 in the Site Characterization Report. Both these samples were also analyzed for lead; with the maximum concentration of lead detected in B14 at a concentration of 110 mg/kg, as shown in Table 6. This does not exceed the MTCA Method A cleanup level for lead of 250 mg/kg.

Samples from a depth of 4 feet in boring B13 and B14 did not have any hydrocarbon detection. Two additional soil borings, S12 and S19, had been drilled in the vicinity during the overall investigation. Boring B12 was drilled 20 feet to the northwest, and boring S19 was drilled 6 feet south of the westerly former dispenser island that the out-of-use pump was located on. All the samples collected from borings B12 and B19 were analyzed for HCID and all analytical results were non-detect. Thus the extent of contamination appeared to be limited to the area in the immediate vicinity of the out-of-use diesel dispenser and appeared to be limited in depth.

In late August, 2013, PBS and RE Powell subcontractor Alba Excavating (Alba) met at the site to excavate the diesel-impacted soil. Alba used a backhoe along with hand excavation to dig on both sides of the diesel dispenser, with blackish fuel impacted soil encountered under the dispenser. This was hand excavated into the backhoe bucket and removed. Hand excavation also took place northerly along a subsurface diesel line where a fuel odor was noted. Excavation continued until all visible evidence of hydrocarbon staining and odor was removed. This blackish impacted soil was stockpiled onto plastic at the northwest end of the site.

PBS collected three soil samples after all field indications of soil contamination had been excavated, designated as S1 through S3. PBS also collected three soil samples from the excavated soil stockpile, designated as S4 through S6, and one sample of the gravelly backfill material. All the samples were analyzed for HCID, with sample information and HCID results presented in the following table.

Sample ID	Location/Depth (feet)	PID	HCID		
			Gasoline	Diesel	Heavy Oil
S1	Collected under out-of-use diesel dispenser/3	0	ND	ND	ND
S2	4' north and 1' west of east end of pump island/3	0	ND	ND	ND
S3	Collected under subsurface diesel line/2	0	ND	ND	ND
S4	South side of stockpiled soil	0	ND	D	ND
S5	West side of stockpiled soil	0	ND	D	ND
S6	East side of stockpiled soil	0	ND	D	ND
S7	Backfill material	0	ND	ND	ND

Notes: D = Detected  
 ND = Not Detected

Based on the detection of diesel in samples S4, S5, and S6, and as part of the planned landfilling of the soil, followup analyses were performed on these samples. The additional analytical results are presented in the following table.

Sample ID	Location	Gasoline Range	Diesel Range	Motor Oil Range
S4	South side of stockpiled soil	NA	240	<250

Sample ID	Location	Gasoline Range	Diesel Range	Motor Oil Range
S5	West side of stockpiled soil	NA	130	<250
S6	East side of stockpiled soil	5.2	1,000	<250
MTCA Method A Cleanup Levels		30/100	2000	2000

Notes: Sample results are in milligrams per kilogram (mg/kg) for gasoline, diesel and motor oil  
 NA = Not Analyzed

Soil sample S6 had the highest diesel range hydrocarbons of the three stockpiled soil samples. This sample also had a gasoline concentration of 5.2 milligrams per kilogram (mg/kg). This sample was also analyzed for BTEX and the results are presented in the table below.

Sample ID	Location	Gasoline Range	B	T	E	X
S6	East side of stockpiled soil	5.2	<0.02	<0.02	<0.02	<0.02
MTCA Method A Cleanup Levels		30/100*	0.03	7	6	9

Notes<= Below laboratory method reporting limits  
 All results, lab reporting limits and MTCA Cleanup Levels are in milligrams per kilogram  
 \*The 100 mg/kg cleanup level for gasoline is applicable when no benzene is detected

Based on the above analytical findings, sample S6 appears to represent a worst-case (most contaminated) sample of the impacted soil underlying the out-of-use diesel dispenser. There were no detections of petroleum hydrocarbons in any of the three confirmatory samples collected after soil cleanup was judged to have been completed. A low concentration of gasoline was detected in sample S6, but no BTEX. The laboratory report with the BTEX data is included in this report as an attachment.

The gasoline and diesel concentrations were below the MTCA Method A soil cleanup levels. All the stockpiled soil was hauled to a regulated landfill for disposal. Based on these findings, PBS has concluded that all petroleum hydrocarbon impacted soil was successfully removed.

**November 2013 Groundwater Sampling**

On November 22, 2013, PBS performed a fourth quarterly groundwater sampling event. Prior to sampling the depth to water was measured in each well using an interface meter. PBS sampled the monitoring wells following PBS' standard operating procedure for low-flow sampling, which is included as an attachment to this report. Also attached to this report are the groundwater sampling data sheets.

Groundwater samples were collected in laboratory-prepared sample containers and stored in a cooler with ice. Groundwater parameters for conductivity, pH, temperature, oxidation reduction potential (ORP), and dissolved oxygen were collected at the time of sampling

The collected samples were submitted to the Friedman and Bruya Laboratory in Seattle, Washington, within specified holding times. The samples were analyzed for gasoline (method NWTPH-Gx), benzene, toluene, ethylbenzene, and xylenes (BTEX, EPA Method 8260C), selected volatile organic compounds (VOCs) methyl-tertiary-butyl ether (MTBE), ethylene dibromide (EDB), ethylene dichloroethane (EDC), by Method 8260C, and lead, by Method 200.8.

The laboratory analytical report is included with this report as an attachment.

### **Results and Discussion**

Quarterly groundwater samples showed that none of the contaminants of concern were detected above laboratory method reporting limits in any of the four wells.

Analytical results for the November 2013 sampling are included in the enclosed Tables 1 and 2 in the attachments to this report. Applicable state cleanup criteria are included in the bottom row of these tables.

### **Groundwater Flow Direction**

As part of the site investigation, the wells were surveyed by a Washington licensed surveyor, Mackay and Sposito of Kennewick, Washington. The top of casing (TOC) elevations based on the NAVD88 datum are presented in Table 1 in the attachments to this report. Depth to water below the TOC is also presented in this table.

Based on the survey data and water level gauging, the groundwater flow direction in November 2013 was observed to be approximately North 02° West. This finding is in keeping with the site topography, which slopes very mildly to the north, toward the Yakima River. The hydraulic gradient was found to be 0.007 foot per foot, which is slightly higher than the previous three quarters.

### **Findings and Conclusions**

#### ***Soil***

No BTEX was found in soil sample S6, collected from the diesel impacted soil excavated from the vicinity of an out-of-use diesel dispenser. This soil had elevated concentrations of diesel and a low detection of gasoline, and is considered to be a worst-case sample in respect to having the highest concentration of petroleum hydrocarbons. None of the three samples collected after the visibly contaminated soil were removed had any detections of gasoline, diesel, or heavy oil, and therefore the likelihood of any BTEX impact to subsurface soil is considered unlikely.

### **Groundwater**

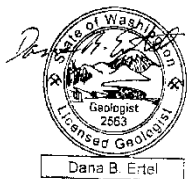
The groundwater sampling conducted in November 2013 was the fourth quarterly groundwater monitoring event at the site. No contaminants of concern have been detected above the Model Toxics Cleanup Act Method A cleanup levels during any quarterly monitoring event. Based on these findings, the use, storage and handling of petroleum hydrocarbons on site is not considered to have impacted groundwater to the extent requiring additional investigation or cleanup.

### **Limitations**

This work was performed in accordance with the generally accepted practices of consultants undertaking similar studies at the same time and in the same geographical area. PBS observed a degree of care and skill generally exercised by other consultants under similar circumstances and conditions. Findings and conclusions must be considered not as scientific certainties, but as opinions based on professional judgment concerning the significance of the data gathered during the course of monitoring. The site as a whole may have other contamination that was not characterized by this study. PBS is not able to represent that the site or adjoining land contain no hazardous waste, oil or other latent conditions beyond that detected or observed by PBS. Other than this, no warranty is implied or intended.

We appreciate the opportunity to provide this report. If you have any questions or need further services please contact us at 509.735.2698.

Prepared and submitted by:



Dana Ertel, LG  
PBS Project Manager  
December 12, 2013

Reviewed by:  
Ken Nogeire, LHG  
PBS Senior Geologist

Attachments: Figure 2  
Soil Laboratory Data and COC  
Groundwater Sampling Forms  
Tables 1 and 2. 2012-2013 Monitor Well Groundwater Sampling Results Mabton Minimart  
Groundwater Laboratory Data and COC

**ATTACHMENT I**

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**Figure 2: Monitoring Well and Soil Boring Locations**

(RR PROPERTY)

IN-USE FUEL DISPENSERS AND UNDERGROUND STORAGE TANKS

MW-3 (B5)

MW-4 (B6)

GRAVEL

B1

B11

B9

MW-1 (B2)

B8

B20

B3

B10

ONE STORY MINIMART

IN USE FUEL DISPENSERS

MW-2 (B4)

APPROXIMATE EXTENT OF FORMER UST BASIN

GRAVEL

B12

FORMER FUEL DISPENSERS

B7

OUT-OF-USE DIESEL DISPENSER

B14

B13

FORMER FUEL DISPENSERS

B19

B15


B16


HIGHWAY 22


MAIN STREET

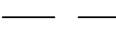
### LEGEND

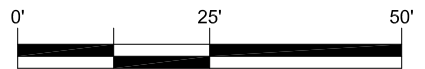
MW-1  MONITORING WELL AND NUMBER

B7  SOIL BORING AND NUMBER

 ASPHALT

 CONCRETE

 UNDERGROUND LINE (APPROXIMATE LOCATION)



APPROX. SCALE: 1" = 25'

PREPARED FOR: RE POWELL INC.

L:\Projects\63000\63100-63199\63165 RE Powell Mabton\DRAWINGS\2007 25 scale 63165 Phase II Drawing (w\_fields).dwg Nov 06, 2013 10:41am



PROJECT #  
63165.000  
DATE  
OCT 2013

## MONITORING WELL & SOIL BORING LOCATIONS

453 MAIN STREET  
MABTON, WASHINGTON

FIGURE

2

**ATTACHMENT II**

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**Soil Laboratory Data and COC**

FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.  
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September 19, 2013

Dana Ertel, Project Manager  
PBS Engineering and Environmental, Inc.  
320 N. Johnson St. Suite 700  
Kennewick, WA 99336

Dear Mr. Ertel:

Included are the additional results from the testing of material submitted on August 29, 2013 from the 63165, F&BI 308471 project. There are 4 pages included in this report.

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  
PBS0919R.DOC

FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 29, 2013 by Friedman & Bruya, Inc. from the PBS Engineering and Environmental 63165, F&BI 308471 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>PBS Engineering and Environmental</u>
308471 -01	S1
308471 -02	S2
308471 -03	S3
308471 -04	S4
308471 -05	S5
308471 -06	S6

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/19/13  
Date Received: 08/29/13  
Project: 63165, F&BI 308471  
Date Extracted: 08/30/13  
Date Analyzed: 08/30/13

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES  
FOR BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES  
USING METHOD 8021B**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl Benzene</u>	<u>Total Xylenes</u>	<u>Surrogate (% Recovery)</u> (Limit 50-150)
S6 308471-06	<0.02	<0.02	<0.02	<0.06	99
Method Blank 03-1662 MB	<0.02	<0.02	<0.02	<0.06	97

FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

Date of Report: 09/19/13  
 Date Received: 08/29/13  
 Project: 63165, F&BI 308471

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES  
 FOR BENZENE, TOLUENE, ETHYLBENZENE, AND  
 XYLENES USING EPA METHOD 8021B**

Laboratory Code: 308473-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Toluene	mg/kg (ppm)	<0.02	<0.02	nm
Ethylbenzene	mg/kg (ppm)	<0.02	<0.02	nm
Xylenes	mg/kg (ppm)	<0.06	<0.06	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	84	66-121
Toluene	mg/kg (ppm)	0.5	86	72-128
Ethylbenzene	mg/kg (ppm)	0.5	87	69-132
Xylenes	mg/kg (ppm)	1.5	88	69-131

**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.

A1 - More than one compound of similar molecule structure was identified with equal probability.

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 this range fell outside of acceptance criteria. The value reported is an estimate.

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

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

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. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The result is below normal reporting limits. 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 analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is 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 compound indicated 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 in a container not approved by the method. The value reported should be considered an estimate.

pr - The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

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.



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**ATTACHMENT III**  
**Groundwater Sampling Forms**









**ATTACHMENT IV**

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**Table 1 and 2: 2012-2013 Monitor Well Groundwater Sampling Results Mabton Minimart**

**Table 1. 2012-2013 Monitor Well Groundwater Sampling Results  
Mabton Minimart  
Mabton, Washington**

Sample ID	Sampling Date	TOC' (Mean Seal Level)	Depth to Water'	GW Depth' (NAVD88)	Temp. (°C)	Cond. (µS/cm)	DO (mg/L)	ph	ORP (mV)	Lead	Gas	BTEX
MW-1	10/23/2012	718.84	27.39	691.45	15.26	NC	4.12	7.27	93	<1	<100	<1/<1/<1/<3
MW-1 (DUP)	10/23/2012									<1	<100	<1/<1/<1/<3
MW-1	1/30/2013		27.71	691.13	14.64	824	4.03	7.36	0.3	<1	<100	<1/<1/<1/<3
MW-1	5/8/2013		28.85	689.99	16.97	1364	4.24	6.88	-50.3	<1	<100	<1/<1/<1/<3
MW-1	11/22/2013		27.32	691.52	14.54	781	4.98	7.65	45.9	<1	<100	<1/<1/<1/<3
MW-2	10/22/2012	718.72	27.23	691.49	13.64	NC	9.11	7.14	93	NA	<100	<1/<1/<1/<3
MW-2	1/29/2013		27.58	691.14	14.39	684	4.09	7.36	-4.1	<1	<100	<1/<1/<1/<3
MW-2	5/7/2013		28.69	690.03	16.51	713	8.09	6.57	-22.4	<1	<100	<1/<1/<1/<3
MW-2	11/22/2013		27.23	691.49	13.78	694	6.60	7.48	57.5	<1	<100	<1/<1/<1/<3
MW-3	10/23/2012	718.79	27.47	691.39	14.20	NC	2.17	7.20	80	<1	<100	<1/<1/<1/<3
MW-3	1/30/2013		27.83	690.96	14.38	898	4.66	7.62	-4.9	<1	<100	<1/<1/<1/<3
MW-3 (DUP)	1/30/2013									<1	<100	<1/<1/<1/<3
MW-3	5/8/2013		29.04	689.75	17.45	1014	5.30	6.70	-32.0	NA	110	<1/2.9/<1/<3
MW-3	11/22/2013		27.53	691.26	14.58	930	1.52	7.40	46	<1	<100	<1/<1/<1/<3

Sample ID	Sampling Date	TOC' (Mean Seal Level)	Depth to Water'	GW Depth' (NAVD88)	Temp. (°C)	Cond. (µS/cm)	DO (mg/L)	ph	ORP (mV)	Lead	Gas	BTEX
MW-3 (DUP)	11/22/2013									<1	<100	<1/<1/<1/<3
MW-4	10/22/2012	719.09	27.74	691.35	14.66	NC	8.72	7.35	110	NA	<100	<1/<1/<1/<3
MW-4	1/29/2013		28.08	691.01	14.05	673	4.10	7.60	-3.3	<1	<100	<1/<1/<1/<3
MW-4	5/8/2013		29.36	689.73	18.53	736	7.05	6.91	-26.7	<1	<100	<1/<1/<1/<3
MW-4 (DUP)	5/8/2013									<1	<100	<1/<1/<1/<3
MW-4	11/22/2013		27.73	691.31	14.19	701	6.24	7.61	55.7	<1	<100	<1/<1/<1/<3
MTCA Method A Cleanup Levels:										15	800/1000*	5/1000/700/1000

Note: BTEX = Benzene, Toluene, Ethylbenzene, Total Xylenes

All results, lab reporting limits and MTCA Cleanup Levels are in ug/L =micrograms/Liter

\*The 1,000 ug/L cleanup level for gasoline is applicable when no benzene is detected

MW-DUP is duplicate sample

NC= Not Collected

NA= Not Analyzed

**Table 2. Monitor Well Fuel Additive /PAHs Testing Results  
Mabton Minimart  
Mabton, Washington**

Sample ID	Sampling Date	EDB	EDC	MTBE	Carcinogenic PAHs (Includes benzo(a)pyrene)
MW-1	10/23/2012	<0.01	NA	NA	<.1
MW-1	1/30/2013	<0.01	<1	<1	
MW-1	5/8/2013	NA	1.1	NA	
MW-1	11/22/2013	<1	<1	<1	
MW-2	10/22/2012	NA	NA	NA	<.1
MW-2	1/29/2013	NA	NA	NA	
MW-2	5/7/2013	NA	NA	NA	
MW-2	11/22/2013	<1	<1	<1	
MW-3	10/23/2012	NA	NA	NA	<.1
MW-3	1/30/2013	NA	NA	NA	
MW-3	5/8/2013	NA	NA	<1	
MW-3	11/22/2013	<1	<1	<1	
MW-DUP	11/22/2013	<1	<1	<1	
MW-4	10/22/2012	NA	NA	NA	<.1
MW-4	1/29/2013	<0.01	<1	<1	
MW-4	5/8/2013	NA	NA	NA	
MW-4	11/22/2013	<1	<1	<1	
MTCA Method A Cleanup Levels:		0.01	5	20	0.1**

Notes: < = Below laboratory method reporting limits

Carcinogenic PAHs are benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz[a,h]anthracene, indeno(1,2,3-cd)pyrene

\*\*= This is the applicable cleanup level for the total for all 7 carcinogenic PAHs

NA= Not Analyzed

**ATTACHMENT V**

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**Groundwater Laboratory Report and COC**

FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

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Eric Young, B.S.

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December 9, 2013

Dana Ertel, Project Manager  
PBS Engineering and Environmental, Inc.  
320 N. Johnson St. Suite 700  
Kennewick, WA 99336

Dear Mr. Ertel:

Included are the results from the testing of material submitted on November 26, 2013 from the 63165.000, F&BI 311512 project. There are 19 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  
PBS1209R.DOC

FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on November 26, 2013 by Friedman & Bruya, Inc. from the PBS Engineering and Environmental 63165.000, F&BI 311512 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>PBS Engineering and Environmental</u>
311512 -01	MW-1
311512 -02	MW-2
311512 -03	MW-3
311512 -04	MW-4
311512 -05	MW-Dup
311512 -06	Trip Blank

EDC in the 8260C laboratory control sample and laboratory control sample duplicate exceeded the acceptance criteria. The analyte was not detected in the sample, therefore the data were acceptable.

All other quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/09/13  
 Date Received: 11/26/13  
 Project: 63165.000, F&BI 311512  
 Date Extracted: 11/27/13  
 Date Analyzed: 11/27/13

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
 FOR BENZENE, TOLUENE, ETHYLBENZENE,  
 XYLENES AND TPH AS GASOLINE  
 USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl Benzene</u>	<u>Total Xylenes</u>	<u>Gasoline Range</u>	<u>Surrogate (% Recovery)</u> (Limit 52-124)
MW-1 311512-01	<1	<1	<1	<3	<100	87
MW-2 311512-02	<1	<1	<1	<3	<100	89
MW-3 311512-03	<1	<1	<1	<3	<100	87
MW-4 311512-04	<1	<1	<1	<3	<100	87
MW-Dup 311512-05	<1	<1	<1	<3	<100	86
Trip Blank 311512-06	<1	<1	<1	<3	<100	87
Method Blank 03-2406 MB	<1	<1	<1	<3	<100	85

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ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-1	Client:	PBS Engineering and Environmental
Date Received:	11/26/13	Project:	63165.000, F&BI 311512
Date Extracted:	12/05/13	Lab ID:	311512-01
Date Analyzed:	12/05/13	Data File:	311512-01.066
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower	Upper
Holmium	98	Limit:	Limit:
		60	125

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

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-2	Client:	PBS Engineering and Environmental
Date Received:	11/26/13	Project:	63165.000, F&BI 311512
Date Extracted:	12/05/13	Lab ID:	311512-02
Date Analyzed:	12/05/13	Data File:	311512-02.069
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower	Upper
Holmium	93	Limit:	Limit:
		60	125

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

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-3	Client:	PBS Engineering and Environmental
Date Received:	11/26/13	Project:	63165.000, F&BI 311512
Date Extracted:	12/05/13	Lab ID:	311512-03
Date Analyzed:	12/05/13	Data File:	311512-03.070
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower	Upper
Holmium	91	Limit:	Limit:
		60	125

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

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-4	Client:	PBS Engineering and Environmental
Date Received:	11/26/13	Project:	63165.000, F&BI 311512
Date Extracted:	12/05/13	Lab ID:	311512-04
Date Analyzed:	12/05/13	Data File:	311512-04.071
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower	Upper
Holmium	94	Limit:	Limit:
		60	125

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

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-Dup	Client:	PBS Engineering and Environmental
Date Received:	11/26/13	Project:	63165.000, F&BI 311512
Date Extracted:	12/05/13	Lab ID:	311512-05
Date Analyzed:	12/05/13	Data File:	311512-05.072
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower	Upper
Holmium	92	Limit:	Limit:
		60	125

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

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	PBS Engineering and Environmental
Date Received:	11/26/13	Project:	63165.000, F&BI 311512
Date Extracted:	12/05/13	Lab ID:	I3-833 mb
Date Analyzed:	12/05/13	Data File:	I3-833 mb.064
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower	Upper
Holmium	85	Limit:	Limit:
		60	125

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

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-1	Client:	PBS Engineering and Environmental
Date Received:	11/26/13	Project:	63165.000, F&BI 311512
Date Extracted:	11/27/13	Lab ID:	311512-01
Date Analyzed:	11/27/13	Data File:	112709.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	115	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1
1,2-Dibromoethane (EDB)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-2	Client:	PBS Engineering and Environmental
Date Received:	11/26/13	Project:	63165.000, F&BI 311512
Date Extracted:	11/27/13	Lab ID:	311512-02
Date Analyzed:	11/27/13	Data File:	112710.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	50	150
Toluene-d8	102	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1
1,2-Dibromoethane (EDB)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-3	Client:	PBS Engineering and Environmental
Date Received:	11/26/13	Project:	63165.000, F&BI 311512
Date Extracted:	11/27/13	Lab ID:	311512-03
Date Analyzed:	11/27/13	Data File:	112711.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	110	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1
1,2-Dibromoethane (EDB)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-4	Client:	PBS Engineering and Environmental
Date Received:	11/26/13	Project:	63165.000, F&BI 311512
Date Extracted:	11/27/13	Lab ID:	311512-04
Date Analyzed:	11/27/13	Data File:	112712.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	102	50	150

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1
1,2-Dibromoethane (EDB)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-Dup	Client:	PBS Engineering and Environmental
Date Received:	11/26/13	Project:	63165.000, F&BI 311512
Date Extracted:	11/27/13	Lab ID:	311512-05
Date Analyzed:	11/27/13	Data File:	112713.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	109	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	101	50	150

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1
1,2-Dibromoethane (EDB)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	PBS Engineering and Environmental
Date Received:	11/26/13	Project:	63165.000, F&BI 311512
Date Extracted:	11/27/13	Lab ID:	03-2450 mb
Date Analyzed:	11/27/13	Data File:	112707.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	109	50	150
Toluene-d8	103	50	150
4-Bromofluorobenzene	103	50	150

Compounds:	Concentration ug/L (ppb)
Methyl t-butyl ether (MTBE)	<1
1,2-Dichloroethane (EDC)	<1
1,2-Dibromoethane (EDB)	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/09/13

Date Received: 11/26/13

Project: 63165.000, F&BI 311512

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE,  
XYLENES, AND TPH AS GASOLINE  
USING EPA METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 311490-02 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent	
			Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	95	65-118
Toluene	ug/L (ppb)	50	95	72-122
Ethylbenzene	ug/L (ppb)	50	94	73-126
Xylenes	ug/L (ppb)	150	93	74-118
Gasoline	ug/L (ppb)	1,000	95	69-134

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/09/13

Date Received: 11/26/13

Project: 63165.000, F&BI 311512

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

Laboratory Code: 311512-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	ug/L (ppb)	10	<1	102	101	79-121	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	ug/L (ppb)	10	104	83-115

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/09/13

Date Received: 11/26/13

Project: 63165.000, F&BI 311512

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

Laboratory Code: 311536-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	103	68-125
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	105	78-113
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	<1	102	83-114

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/09/13

Date Received: 11/26/13

Project: 63165.000, F&BI 311512

**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)
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	110	111	70-122	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	115 vo	117 vo	79-109	2
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	108	108	85-113	0

**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.

A1 - More than one compound of similar molecule structure was identified with equal probability.

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 this range fell outside of acceptance criteria. The value reported is an estimate.

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

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

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. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The result is below normal reporting limits. 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 analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is 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 compound indicated 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 in a container not approved by the method. The value reported should be considered an estimate.

pr - The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

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.

Send Report To Dana Eitel / PRS  
 Company PRS  
 Address 320 No. Johnson St. Suite 700  
 City, State, ZIP Kennebick, WA 99336  
 Phone # (509) 727-0873 Fax # \_\_\_\_\_

SAMPLERS (signature) Dana Eitel  
 PROJECT NAME/NO. 63165-08 PO# \_\_\_\_\_  
 REMARKS Pls Return Cooler

TURNAROUND TIME  
 Standard (2 Weeks)  
 RUSH  
 Rush charges authorized by \_\_\_\_\_  
 SAMPLE DISPOSAL  
 Dispose after 30 days  
 Return samples  
 Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	ANALYSES REQUESTED							Notes	
						TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	Lead		Mn/Pb/Cd/Cr
MW-1	01A-F	11/22/13		Ground-water	5	✓	✓	✓	✓	✓	✓	✓		
MW-2	02	↓		↓	↓	✓	✓	✓	✓	✓	✓	✓		
MW-3	03	↓		↓	↓	✓	✓	✓	✓	✓	✓	✓		
MW-4	04	↓		↓	↓	✓	✓	✓	✓	✓	✓	✓		
MW-Dug	05	↓		↓	↓	✓	✓	✓	✓	✓	✓	✓		
Trip Blank	06	↓		↓	↓	✓	✓	✓	✓	✓	✓	✓		

Samples received at 12:00

Friedman & Bryna, Inc.  
 3012 16th Avenue West  
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 Ph. (206) 285-8282  
 Fax (206) 283-5044  
 FORMS\COC\COC.DOC

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Relinquished by: <u>Dana Eitel</u>		Dana Eitel		PRS		11/25/13	
Received by: <u>Megan Phelan</u>		Megan Phelan		PRST		11/25/13	1330
Relinquished by:							
Received by:							