



October 26, 2015

Amarjit Singh
Roadrunner ARCO
1820 So. Third Avenue
Yakima, Washington 98902

Re: September 2015 In-Situ Remedial Action
PBS Project No. 63545.002

Dear Mr. Singh:

PBS Engineering and Environmental Inc. (PBS) has prepared this report to present a discussion of recent remedial action activities at the ARCO Roadrunner gasoline station and minimart in Yakima, Washington.

Physical Characteristics

The property is located at 1820 South 3rd Avenue, City of Yakima, Washington, on Yakima County Tax Parcel 181336-14032. The lot size is approximately 22,796 square feet, with a one-story convenience store and gasoline station on the site. The site is located immediately west of South 3rd Avenue and north of West Washington Avenue.

Background

PBS understands that the site has been in use as a gasoline station since the 1970s, operating three underground storage tanks (USTs). PBS was originally contacted in the fall of 2008 to provide site assessment activities as part of the decommissioning of one UST. Work performed by PBS at the Site includes the following:

- Completed an *Underground Storage Tank Decommissioning/Site Assessment Report* in March 2009. One UST was decommissioned and removed, and petroleum contamination was detected in the UST basin groundwater.
- Completed an *Underground Storage Tank Decommissioning/Site Assessment Report* in December 2009. Two USTs were decommissioned by removal and a release of petroleum to soil and groundwater was documented and reported to Ecology.
- Oxygen releasing compound EHC-O (slow-release oxygen) was emplaced in the UST basin after the last UST was removed from the site as a remedial action in 2009.
- Completed a report entitled *Site Assessment, Well Construction and Remediation Plan* in May 2010. This report presented the findings of a site investigation that included the advancement of soil borings and installation of three monitoring wells. Sampling and analysis took place for a variety of petroleum hydrocarbon contaminants of concern, including gasoline and gasoline

400 Bradley Boulevard, Suite 300, Richland, WA 99352
509.942.1600 Main
866.727.0140 Fax
www.pbsenv.com

constituents benzene, toluene, ethylbenzene, and xylenes (BTEX). Results of the groundwater sampling for one quarter (April 2010) were also included in this report. The two downgradient wells are designated monitoring wells MW-1 and MW-2. These two wells were found to be impacted with gasoline and benzene above the Model Toxics Control Act (MTCA) Method A Cleanup levels. No contaminants of concern were detected in the sample from MW-3 (upgradient) above the MTCA cleanup levels.

- In 2012, the site owner, Amarjit Singh, joined Ecology's Voluntary Cleanup Program (VCP). The site is designated as Facility ID: 89282545 and VCP# CE0382.

Petroleum Hydrocarbon Soil Impact

According to the May 2010 Site Assessment, Well Construction and Remediation Plan Report prepared by PBS, soil contamination consisting of petroleum hydrocarbons was present at the water table at a depth of 12 to 13.5 feet below ground surface in the soil boring where monitoring well MW-2 was subsequently installed.

This well was installed near the far southeast edge of the former UST basin where two USTs had been removed and extensive soil contamination had been excavated. This left-in-place soil contamination had a concentration of 2,600 milligrams per kilogram (mg/kg) gasoline, along with detectable concentrations of toluene, ethylbenzene, and xylenes.

PBS has evaluated the potential preferential flow paths such as utility corridors and determined that utility corridors are not located in the vicinity of the release zone. Furthermore, there have been no reports of other hydrocarbon releases at the subject site that could be contributing to petroleum hydrocarbon sources in the subsurface. With the majority of the contaminated soil removed in an upgradient location during the UST decommissioning in 2009, the soil left in place following the removal of the former USTs in 2009 appears to be the source of the petroleum-impacted groundwater.

Petroleum Hydrocarbon Groundwater Impact

In the initial sampling event conducted in 2010, gasoline and benzene hydrocarbons were identified in groundwater above the MTCA Method A cleanup level in monitoring well MW-2. Later sampling noted that the highest gasoline concentration in monitoring well MW-2 was observed in May 2011. This concentration was notably higher than the earlier analytical results and the sample was collected during the spring low water table time frame.

The highest groundwater elevations have consistently been observed during the late summer or fall sampling events, indicating the seasonal input of irrigation water has been a factor in rising water levels. Beginning in 2012, concentrations of BTEX have been below Method A cleanup levels, whereas gasoline concentrations have been above and below the Method A cleanup level.

Quarterly groundwater sampling was conducted twice during 2015 prior to the remedial action event. The gasoline concentration in MW-2 in April 2015 was 900 micrograms per liter (ug/L). This exceeded the MTCA Method A cleanup level of 800 ug/L when benzene is present. Benzene was not detected in this

monitoring well during this sampling event, but has been detected in the past in this well. The gasoline concentration in July 2015 was below the laboratory reporting limit of 100 ug/L.

There has been no consistent pattern with groundwater concentrations at the site. Since the EHC-O application, there have been demonstrated decreases, but despite multiple quarters of concentrations below cleanup levels, contaminant levels continue to rebound occasionally to exceed cleanup levels.

Site Conceptual Model

Monitoring well MW-2 was installed in a gravel unit below a silt layer, according to the well log prepared by PBS at the time the well was installed. The gravel unit was encountered at a depth of 8 feet, and was described as a very dense unit with some sand. Groundwater in this well has ranged from a depth of 10 feet to 13 feet. The treatment approach presented in the remedial action work plan (plan) for the site was based on the conceptual model that residual gasoline range hydrocarbons in soil are impacting the upper portion of the seasonal smear zone, resulting in continued leaching of contaminants to groundwater during the irrigation season. Much of this weathered petroleum has previously been documented to reside in the undisturbed soil located along the south and east excavation sidewalls, and may be adhered to the soil matrix.

The selected soil and groundwater remedial approach was to introduce a treatment solution to the subsurface which would contact and reduce identified contaminants to concentrations which are below the MTCA Method A Cleanup Levels.

Remedial Action Work Plan

PBS prepared a remedial action work plan (plan) in November 2014, with the selected approach an in situ chemical oxidation (ISCO) injection in the vicinity of monitoring well MW-2. This would be immediately followed by a bioremediation step, and would consist of the injection of microbes and nutrients to work with the chemical oxidation step with the purpose of degrading petroleum hydrocarbons in the subsurface at the site. This plan was reviewed and approved by the Ecology VCP site manager (email dated February 19, 2015).

The injections were designed to target the shallow groundwater zone as well as the partially saturated soil overlying the water table.

UIC Registration

Prior to conducting the ISCO injections, PBS registered with the underground injection control (UIC) program administered by Ecology. The UIC site number is 32713.

Pre-injection Nitrate, Sulfate, Iron (Fe) and Total Organic Carbon Data

Limited nitrate, sulfate, total iron and total organic carbon sampling was conducted prior to the injection. The purpose of this sampling was to collect pre-injection data as a baseline of the common geochemical indicators nitrate, sulfate and total iron. Total organic carbon is a measurement of the inorganic and organic carbon present and higher values can indicate organic compound contamination.

As presented in the following table, nitrate ranged from 0.6 to 3.0 milligrams per liter (mg/L) in the monitoring wells prior to injection. Sulfate ranged from 3.4 to 11.1 mg/L. Total iron was not detected in any of the monitoring wells above the laboratory reporting limit. Total organic carbon had a similar concentration in both monitoring wells, and was observed to be higher in monitoring well MW-2. The laboratory data is presented in Attachment I.

Table 1: Nitrate, Sulfate, and Iron Groundwater Sample Data

Monitoring Well	Date	Nitrate	Sulfate	Fe (total)	Total Organic Carbon
MW-2	11/25/2014	2.8	3.4	NA	NA
MW-3	11/25/2014	3.2	3.8	NA	NA
MW-2	12/19/2014	NA	NA	NA	1.72
MW-3	12/19/2014	NA	NA	NA	1.58
MW-1	3/05/2015	0.6	NA	<0.2	NA
MW-3	3/05/2015	2.0	NA	<0.2	NA
MW-2	3/05/2015	0.6	NA	<0.2	NA
MW-2	9/9/2015	2.9	10.5	NA	NA
MW-3	9/9/2015	3.0	11.1	NA	NA

Notes: All results are in mg/L
 <= less than laboratory reporting limit
 NA = Not Analyzed

2015 ISCO Injection

In keeping with the remedial action plan, the selected approach was to conduct a two-day injection event at the site. The initial injection would consist of a chemical injection in the vicinity of monitoring well MW-2 during the first day. This would be followed by the injection of a solution consisting of water and a microbial consortium on the second day to bioaugment the existing site microorganisms. The solution would include surfactant and nutrients. PBS and two subcontractors mobilized to the site and conducted the work during September 15-16th, 2015.

Monitoring well MW-2 is located on the east side of the site, at the edge of the asphalt access area into the gas station. A city sidewalk is located on the east side of this monitoring well. The treatment area consisted of the area on the west side of monitoring well MW-2. A site plan and the area of the injections are shown on Figure 1 in Attachment II. This area was cordoned off during all work activities.

PBS subcontractor Etec Environmental Technologies (Etec) provided the injection planning, chemical and biologic constituents for the injection, as well as on-site technical support. PBS subcontractor ESN Northwest provided a direct push drill rig to conduct the injections into the subsurface. ESN also provided a mixing tank and mixing equipment, air compressor, pump and hoses in order to conduct the injections. All on-site work was conducted under PBS oversight.

The selected ISCO approach consisted of mixing hydrogen peroxide and water to create a 3 to 5 percent solution. This step was to chemically oxidize petroleum contamination in the soil and to create high concentrations of dissolved oxygen in groundwater in the vicinity of the monitoring well. This was then injected into the subsurface using pumping equipment operated in conjunction with the drill rig.

The drill rig advanced the drill rods with an expendable metal point held in place to a depth of 16 to 17 feet. The rods were then raised slightly in order for the expendable point to be left in the bottom of the boring. A hose was attached to the drill rods at the surface and a pump was used to inject the treatment solutions. The rods were periodically raised one to one-half foot to inject over a range of depths. All borings were backfilled with medium-sized bentonite chips after removing the drilling rods.

The following table presents the hydrogen peroxide injection data for the September 2015 injection.

Table 2: Summary of Hydrogen Peroxide Injection Data

Injection point #	Approximate Location	Approximate Volume injected (gallons)	Approximate Hydrogen Peroxide Solution Strength (per cent)	Initial Injection Depth (feet)	Final Injection Depth (feet)
#1	11' west of MW-2	75	3.5	17	10
#2	3' NW of MW-2	140	3.5	16	9
#3	8' N of MW-2	100	5	16.5	9
#4	5' NE of MW-2	100	5	16	9
#5	3' south of MW-2	100	5	16	9

Approximate total hydrogen peroxide solution injected was 515 gallons. This was injected at five points ranging from 3 feet to 11 feet from monitoring well MW-2.

The second step of the remedial action consisted of a subsurface bioremediation event. The drill rig was used for the subsurface placement of a water solution containing a surfactant, microbes, and nutrients. The purpose of this step was to initiate and continue an environment suitable for bioremediation for up to 6 to 12 months. The microbes selected for this step consisted of an Etec product known as TPH Bacterial Consortium (EZT-A2™). This would provide a large population of hydrocarbon-degrading bacteria into the subsurface.

Along with the bacterial consortium, Etec provided Petrosolv Surfactant, which is described by Etec as a naturally-formulated, non-toxic, biodegradable product designed for in-situ soil desorption and dissolution of adsorbed hydrocarbons.

Also added to the solution were nutrients to stimulate biologic activity. The nutrients provided by Etec consisted of nitrogen, phosphorus, and potassium. The nitrogen compounds also act as secondary electron acceptors to help ensure continuous petroleum degradation during any temporary absences of dissolved oxygen. The following table presents the approximate quantity of microbes, surfactant and nutrients injected at each injection point during the second day.

Table 3: Summary of Microbe, Surfactant and Nutrient Injection Data

Injection point #	Approximate Location	Approximate Volume injected (gallons)	Start Injection Depth (feet)	End Injection Depth (feet)
#6	10.5' west of MW-2	100	17'	9'
#7	5' NW of MW-2	100	17'	13'
#8	11' N of MW-2	100	16'	10'
#9	5' W of MW-2	125	16'	9'
#10	5.5' SW of MW-2	125	16'	9'
#11	5.5'S-SW of MW-2	110	16'	9'

Approximately 660 total gallons of solution were injected into the six injection points on the second day. The depth range of the injections ranged from 17 feet to 9 feet, with the majority of material injected in the 12 to 14 foot depth.

Groundwater Parameters

PBS collected samples from monitoring well MW-2 on both days of the remedial action in order to monitor the groundwater parameters; samples were collected following removal of several gallons of water by bailer. The following table presents the groundwater parameters for the most recent quarterly sampling event, and the parameters as noted during both days of the remedial action event.

A notable increase in the dissolved oxygen concentration was observed using a YSI 556 probe on September 15, 2015, as compared to the previous quarterly sampling concentration. Increases in conductivity and ORP were also observed. PBS used a Myron L Ultrameter II on September 16, 2015 to collect additional groundwater parameters in monitoring well MW-2; this instrument does not feature a dissolved oxygen probe.

Table 4: Groundwater Parameters

Date	Temp.	Conductivity	pH	Dissolved Oxygen	ORP
7/24/2015*	17.2	285	6.6	6.5	161
9/15/2015	13.2	427	7.1	224	436
9/16/2015	18.8	2744	6.7	NA	264

Notes: * collected during quarterly groundwater sampling
NA = Not Analyzed

Post-Injection Groundwater Sampling and Monitoring

PBS plans to assess remediation progress during the quarterly groundwater monitoring at the site. The next event is scheduled for Fall 2015.

Sincerely,
PBS Engineering and Environmental Inc.



Dana B. Ertel, LG
October 26, 2015
Project Manager/Senior Geologist

Reviewed by
Heidi Yantz, LHG
PBS Principal Hydrogeologist

Attachments:
Attachment 1: Laboratory Data
Attachment 2: Figure 1: Site Plan and Location of the Remedial Action

ATTACHMENT I

Laboratory Data

**Northwest
Agricultural Consultants, Inc.**

2545 West Falls Avenue • Kennewick, Washington 99336 • (509) 783-7450

November 25, 2014

PBS Environmental
400 Bradley Blvd #300
Richland WA 99352

NWAC Report: 2109
Received: November 25, 2014
Tested: November 25, 2014

Site:
Project:
Sampler:

Sample ID	Sample Type	NO ₃ -N ppm	SO ₄ -S ppm
MW-2	Groundwater	2.8	3.4
MW-3	Groundwater	3.2	3.8


ppm = mg/L

BDL = Below Detection Limit

Method:

NO₃-N SM 4500 F
SO₄-S SM 3120 B

Approval



Wade Carter

NORTHWEST AGRICULTURAL CONSULTANTS
 2545 W FALLS AVE
 KENNEWICK WA 99336
 509-783-7450
 lab@nwg.com

CHAIN OF CUSTODY

Rec'd
 11/25/14
 WC @ 8:25A

Client	PBS / Dana Etel
Organization	
Street	
City, State	Richland, WA
Zip	99352
Phone	509 727-0873
Fax	
Email	

Report	Project 63545
Date Sampled	11/24/14
Date Received	

Date	Sample ID	Sample Type	Analysis	Units	Method	Tech
11/25/14	MW-2	Ground water	Nitrate/Sulfate			
11/25/14	MW-3	Ground water	Sulfate/Nitrate			

**Northwest
Agricultural Consultants, Inc.**

2545 West Falls Avenue • Kennewick, Washington 99336 • (509) 783-7450

March 6, 2015

PBS Environmental
400 Bradley Blvd #300
Richland WA 99352

NWAC Report: 2117
Received: March 5, 2015
Tested: March 5, 2015

Site:
Project:
Sampler:

Sample ID	Sample Type	NO ₃ -N ppm	Fe ppm
MW-1	Groundwater	0.6	BDL
MW-2	Groundwater	2.0	BDL
MW-3	Groundwater	0.6	BDL

ppm = mg/L

BDL = Below Detection Limit

Method:

NO₃-N SM 4500 F
Fe SM 3120 B

Detection Limit:

NO₃-N 0.2 ppm
Fe 0.2 ppm

Approval



Wade Carter

NORTHWEST AGRICULTURAL CONSULTANTS
 2545 W FALLS AVE
 KENNEWICK WA 99336
 509-783-7450
 lab@nwg.com

CHAIN OF CUSTODY

Client	PRS
Organization	
Street	400 Bradley Blvd Suite 300
City, State	Rolland WA
Zip	99352
Phone	(509) 727-0873
Fax	
Email	dana@pbsenr.com

W
 3/5
 @ 8:50 AM

Report	
Date Sampled	3/4/15
Date Received	3/5/15

Date	Sample ID	Sample Type	Analysis	Units	Method	Tech
3/4/15	MW-1	Groundwater	Nitrate Iron			
"	MW-2	"	Nitrate Iron			
"	MW-3	"	Nitrate Iron			

**Northwest
Agricultural Consultants, Inc.**

2545 West Falls Avenue • Kennewick, Washington 99336 • (509) 783-7450

September 14, 2015

PBS Environmental
400 Bradley Blvd #300
Richland WA 99352

NWAC Report: 2122
Received: Sept. 10, 2015
Tested: Sept. 10, 2015

Site:
Project:
Sampler:

Sample ID	Sample Type	NO ₃ -N ppm	SO ₄ ppm
MW-2	Groundwater	2.9	10.5
MW-3	Groundwater	3.0	11.1

ppm = mg/L

BDL = Below Detection Limit


Method:

NO₃-N SM 4500 F
SO₄ SM 3120 B

Detection Limit:

NO₃-N 0.2 ppm
SO₄ 0.2 ppm

Approval



Wade Carter



3600 Fremont Ave. N.

Seattle, WA 98103

T: (206) 352-3790

F: (206) 352-7178

info@fremontanalytical.com

Friedman & Bruya

Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 412385

Lab ID: 1412333

January 02, 2015

Attention Michael Erdahl:

Fremont Analytical, Inc. received 2 sample(s) on 12/26/2014 for the analyses presented in the following report.

Total Organic Carbon by SM 5310C

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

A handwritten signature in black ink, appearing to read "Mike Ridgeway", written in a cursive style.

Mike Ridgeway
President



Date: 01/02/2015

CLIENT: Friedman & Bruya
Project: 412385
Lab Order: 1412333

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1412333-001	MW-2	12/19/2014 12:00 AM	12/26/2014 12:06 PM
1412333-002	MW-3	12/19/2014 12:00 AM	12/26/2014 12:06 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

CLIENT: Friedman & Bruya**Project:** 412385

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.



Analytical Report

WO#: 1412333
Date Reported: 1/2/2015

CLIENT: Friedman & Bruya
Project: 412385

Lab ID: 1412333-001

Collection Date: 12/19/2014

Client Sample ID: MW-2

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Total Organic Carbon by SM 5310C

Batch ID: R18907 Analyst: KT

Total Organic Carbon	1.72	0.500		mg/L	1	12/31/2014 8:46:52 PM
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Lab ID: 1412333-002

Collection Date: 12/19/2014

Client Sample ID: MW-3

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Total Organic Carbon by SM 5310C

Batch ID: R18907 Analyst: KT

Total Organic Carbon	1.58	0.500		mg/L	1	12/31/2014 9:08:11 PM
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Qualifiers:	B Analyte detected in the associated Method Blank	D Dilution was required
	E Value above quantitation range	H Holding times for preparation or analysis exceeded
	J Analyte detected below quantitation limits	ND Not detected at the Reporting Limit
	RL Reporting Limit	S Spike recovery outside accepted recovery limits



Date: 1/2/2015

Work Order: 1412333
 CLIENT: Friedman & Bruya
 Project: 412385

QC SUMMARY REPORT
Total Organic Carbon by SM 5310C

Sample ID: MB-R18907	SampType: MBLK	Units: mg/L	Prep Date: 12/31/2014	RunNo: 18907							
Client ID: MBLKW	Batch ID: R18907		Analysis Date: 12/31/2014	SeqNo: 376261							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Total Organic Carbon ND 0.500

Sample ID: LCS-R18907	SampType: LCS	Units: mg/L	Prep Date: 12/31/2014	RunNo: 18907							
Client ID: LCSW	Batch ID: R18907		Analysis Date: 12/31/2014	SeqNo: 376262							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Total Organic Carbon 5.07 0.500 5.000 0 101 80 120

Sample ID: 1412238-001CDUP	SampType: DUP	Units: mg/L	Prep Date: 12/31/2014	RunNo: 18907							
Client ID: BATCH	Batch ID: R18907		Analysis Date: 12/31/2014	SeqNo: 376273							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Total Organic Carbon 1.18 0.500 1.213 2.76 20

Sample ID: 1412238-001CMS	SampType: MS	Units: mg/L	Prep Date: 12/31/2014	RunNo: 18907							
Client ID: BATCH	Batch ID: R18907		Analysis Date: 12/31/2014	SeqNo: 376274							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Total Organic Carbon 6.26 0.500 5.000 1.213 101 70 130

Sample ID: 1412238-001CMSD	SampType: MSD	Units: mg/L	Prep Date: 12/31/2014	RunNo: 18907							
Client ID: BATCH	Batch ID: R18907		Analysis Date: 12/31/2014	SeqNo: 376275							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Total Organic Carbon 6.19 0.500 5.000 1.213 99.5 70 130 6.262 1.20 30

Qualifiers: B Analyte detected in the associated Method Blank D Dilution was required E Value above quantitation range
 H Holding times for preparation or analysis exceeded J Analyte detected below quantitation limits ND Not detected at the Reporting Limit
 R RPD outside accepted recovery limits RL Reporting Limit S Spike recovery outside accepted recovery limits



Date: 1/2/2015

Work Order: 1412333
CLIENT: Friedman & Bruya
Project: 412385

QC SUMMARY REPORT
Total Organic Carbon by SM 5310C

Sample ID: 1412247-001EDUP	SampType: DUP	Units: mg/L			Prep Date: 12/31/2014	RunNo: 18907					
Client ID: BATCH	Batch ID: R18907				Analysis Date: 12/31/2014	SeqNo: 376290					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	1.46	0.500						1.510	3.09	20	

Sample ID: 1412247-001EMS	SampType: MS	Units: mg/L			Prep Date: 12/31/2014	RunNo: 18907					
Client ID: BATCH	Batch ID: R18907				Analysis Date: 12/31/2014	SeqNo: 376291					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	6.62	0.500	5.000	1.510	102	70	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	ND	Not detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike recovery outside accepted recovery limits

Client Name: **FB**
 Logged by: **Erica Silva**

Work Order Number: **1412333**
 Date Received: **12/26/2014 12:06:00 PM**

Chain of Custody

1. Is Chain of Custody complete? Yes No Not Present
 2. How was the sample delivered? FedEx

Log In

3. Coolers are present? Yes No NA

Samples received at appropriate temperature

4. Shipping container/cooler in good condition? Yes No
 5. Custody seals intact on shipping container/cooler? Yes No Not Required
 6. Was an attempt made to cool the samples? Yes No NA
 7. Were all coolers received at a temperature of >0°C to 10.0°C? Yes No NA
 8. Sample(s) in proper container(s)? Yes No
 9. Sufficient sample volume for indicated test(s)? Yes No
 10. Are samples properly preserved? Yes No
 11. Was preservative added to bottles? Yes No NA
 12. Is the headspace in the VOA vials? Yes No NA
 13. Did all samples containers arrive in good condition(unbroken)? Yes No
 14. Does paperwork match bottle labels? Yes No
 15. Are matrices correctly identified on Chain of Custody? Yes No
 16. Is it clear what analyses were requested? Yes No
 17. Were all holding times able to be met? Yes No

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes No NA

Person Notified:	<input type="text"/>	Date:	<input type="text"/>
By Whom:	<input type="text"/>	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text"/>		
Client Instructions:	<input type="text"/>		

19. Additional remarks:
 Client signed COC as relinquished 12/29/14

Item Information

Item #	Temp °C	Condition
Sample	1.7	Good

412385

SAMPLE CHAIN OF CUSTODY

ME 12/23/14

02/01/15

Send Report To Dana Erle

Company PRS Environmental

Address 400 Bradley Blvd Suite 300

City, State, ZIP Richland, WA 99352

Phone # (509) 727-0873 Fax #

SAMPLERS (signature) Dana R. Erle

PROJECT NAME/NO. 63545

PO#

REMARKS

01s Return Car

Page # 1 of 1

FURNAROUND 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	Pb		TOC	MTBE/EDC
MW-1	015	12/19		Ground-water	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							Dr is priority
MW-2	024	"		"	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							Dr is priority
MW-3	03	"		"	1	<input checked="" type="checkbox"/>									
Trip Blank	04				1	<input checked="" type="checkbox"/>									

Samples returned at 4 °C

Friedman & Bryna, Inc.

3012 16th Avenue West

Seattle, WA 98119-2029

Ph (206) 285-8282

Fax (206) 283-5044

FORMS\CC\CCOC.DOC

SIGNATURE

Relinquished by: Dana R. Erle

PRINT NAME

Dana R. Erle

COMPANY

PRS

DATE

12/23/14

TIME

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Received by:

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PRINT NAME

Phan Phan

COMPANY

PRS

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12/23/14

TIME

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[Signature]

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Phan Phan

COMPANY

PRS

DATE

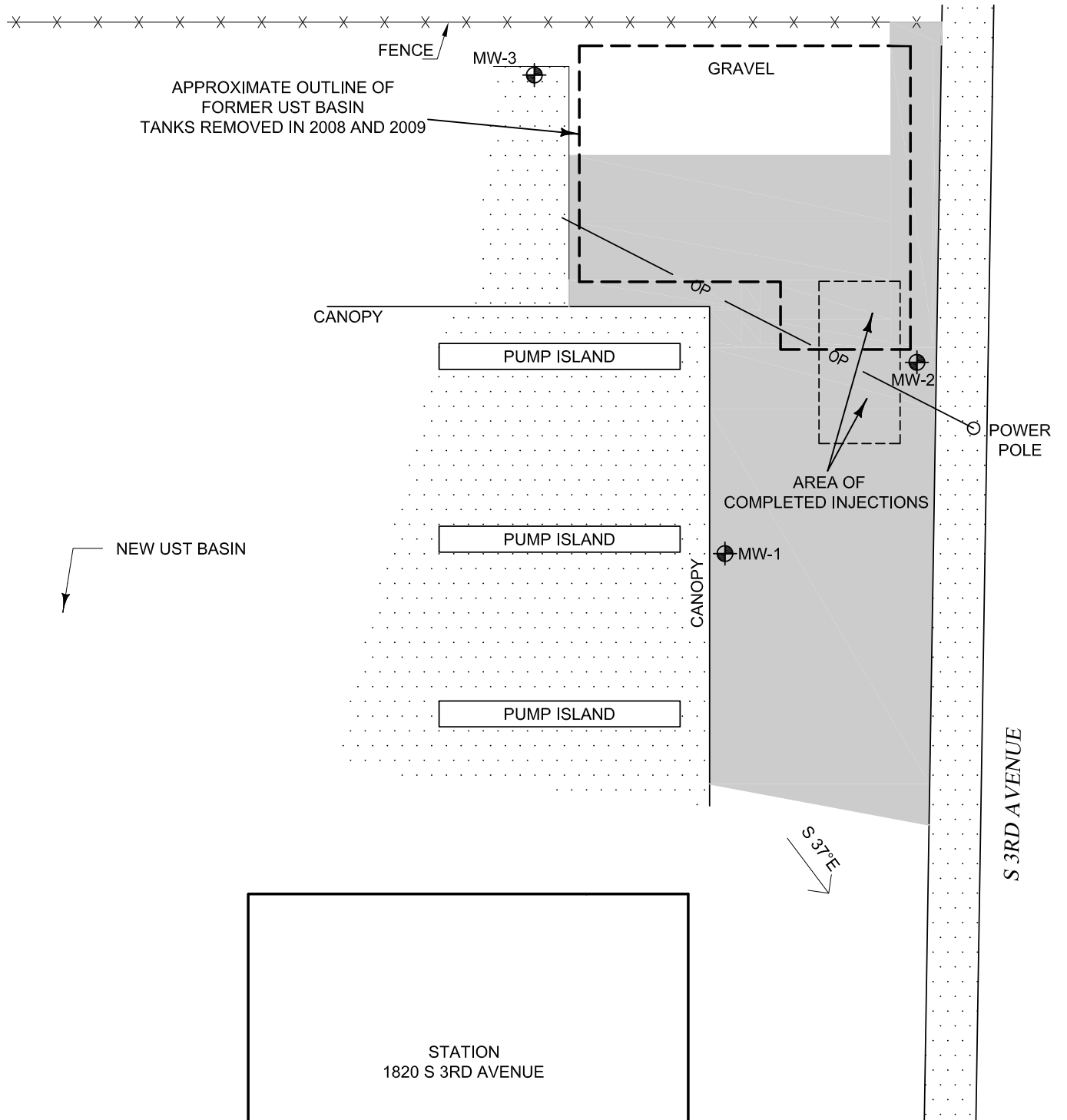
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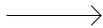
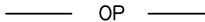


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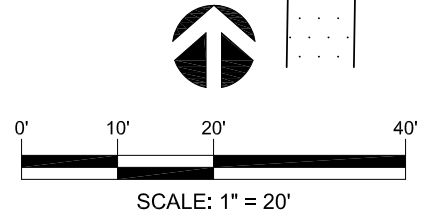
ATTACHMENT 2

Figure 1: Site Plan and Location of the Remedial Action



LEGEND

-  MW-1 MONITORING WELL NUMBER AND LOCATION
-  APPROX. GROUNDWATER FLOW DIRECTION (JULY 2015)
-  OP OVERHEAD POWER LINE
-  CONCRETE
-  ASPHALT



PREPARED FOR: ROAD RUNNER ARCO



PROJECT #
63545.000

DATE
OCT. 2015

SITE PLAN AND REMEDIAL ACTION AREA

1820 S. 3RD AVENUE
YAKIMA, WASHINGTON

FIGURE
1

C:\Users\dama\Documents\CAD Files\3-ARCO Yakima\63545-Sept 2015 remedial action drawing.dwg Oct 26, 2015 10:20am dana