PBS | Engineering + Environmental Est. 1982

January 27, 2015

Welch Foods, Inc.
Attn: Tom Brooke
401 Grandridge Boulevard
Grandview, Washington 98930

Re: December 2014 Quarterly Groundwater Monitoring Event
Former Welch Foods facility, 10 East Bruneau Avenue, Kennewick, WA
PBS Project No. 63707.000

Dear Mr. Brooke:

PBS Engineering and Environmental Inc. (PBS) is pleased to provide the results of the Quarterly Groundwater Monitoring Event (GME) conducted at the above-referenced location on December 12, 2014. As part of the quarterly monitoring program adopted for the site late in 2013, this was the fourth quarterly sampling event conducted at the site.

**Background**
In June 2006, PBS completed a Phase I Environmental Site Assessment (ESA) on the subject property, at which time the property was owned by Welch Foods and in use as a fruit juice production facility. The Phase I findings recommended a Phase II ESA to assess site soil and groundwater adjacent to a 50,000-gallon underground storage tank (UST) and the subsurface fuel lines. The UST provided fuel to power the boiler heating system for the site.

In July 2006, PBS conducted a Phase II ESA on the subject property that consisted of drilling seven soil borings to groundwater with soil and water samples collected for analysis. Soil borings were completed adjacent to the UST, fuel lines, and the shop area to the east. No contamination was observed near the tank. Soil contamination consisting of bunker fuel was detected near the UST lines to the east of the tank. Further work was recommended to characterize and cleanup the contamination.

A subsequent review of site blueprints found that two 12,000-gallon USTs had previously been located at the site and were removed in the 1980s. The findings of the Phase II indicated that the bunker fuel release was associated with the two USTs already removed. PBS oversaw excavation of the bunker fuel-contaminated soil in 2006; this material was disposed of offsite. In late 2006, the property was acquired by Lieb Properties II, LLC and remained in fruit juice production.

An Underground Storage Tank Assessment was performed in September 2007, concurrent with the closure of the 50,000-gallon bunker fuel UST originally noted in the Phase I ESA. The decommissioning/closure was performed by K. Kaser Company, with PBS oversight. Agreed Order No.

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DE 4781 requiring a Remedial Investigation (RI) and Feasibility Study (FS) by Welch was signed by Welch and the Washington Department of Ecology (Ecology) in 2007.

As part of the RI in 2008, PBS installed two monitoring wells downgradient of the former excavated area (MW-2 and MW-3) and one well in an upgradient location (MW-1) in order to evaluate if groundwater had been impacted by the bunker oil release. Quarterly groundwater sampling of the three wells took place in 2008 (four events), with no contaminants of concern detected above the Model Toxics Control Act (MTCA) Method A cleanup levels. Table 1 in the attachments to this letter presents a complete summary of the groundwater sampling done in 2008, with groundwater parameters collected at the time of sampling presented in Table 4.

In 2010, a fourth down gradient well designated as MW-4 was installed at the site that was closer to the location of the USTs removed in the 1980s. Included in the attachments is Figure 1, a site plan that shows the well locations. A second year of quarterly sampling took place during 2010-2011 (four events), with no contaminants of concern detected above the MTCA Method A cleanup levels. Table 2 in the attachments present the results of the 2010-2011 groundwater sampling, with groundwater parameters collected at the time of sampling presented in Table 4. The final quarterly groundwater monitoring at the site occurred in November 2011. No sampling was conducted in 2012.

Ecology had expressed concerns regarding the presence of residual soil contamination near the water table remaining from the 2006 soil excavation. Based on discussions with Ecology that included a meeting in October 2013, one year of quarterly monitoring was deemed the best way to assess if any remaining bunker fuel was impacting site groundwater.

**December 2014 GME**
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 and are included in Table 4.

**Sample Analysis**
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) and diesel/heavy oil (Method NWTPH-Dx). Samples were also analyzed for semivolatile organic compounds (SVOCs) by Method 8270D SIM.

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

**Results**
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 December 2014

sampling event are included in Table 3 in the attachments to this report. Applicable state cleanup criteria are included in the bottom row of this table.

Groundwater elevations were used to determine the direction of groundwater flow, which was found to be approximately North 2º East. Previous groundwater flow directions have varied from northwest to northeast, toward the Columbia River which is less than one-half mile to the north. The previous groundwater flow directions are presented in Tables 1-3. The gradient was calculated as 0.001 foot per foot.

The depth to water and groundwater flow direction were found to be similar to the findings observed during the eight previous quarterly sampling events. This indicates that hydrogeologic conditions at the site are very stable and unchanged, with groundwater continuing to flow toward the three downgradient wells.

**Conclusions**

The four compliance GMEs at the site, including the current round, have found no constituents of concern detected above the laboratory method reporting limits.

At a meeting on October 1, 2013, Ecology had stipulated that four consecutive quarters of groundwater sampling be conducted at the site. The purpose of this monitoring was to determine if impact to groundwater was occurring due to the former USTs and residual petroleum-hydrocarbon impacted soil. In accordance with the October 1, 2013, meeting, the monitoring has been completed. Based on these findings, no impact to groundwater has occurred due to the former USTs.

**Recommendations**

PBS makes the following recommendation:

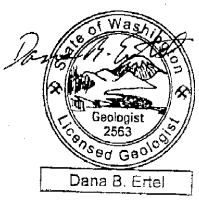
This report should be submitted to Ecology to satisfy the agreement reached on October 1, 2013, to monitor the site for one year. A No Further Action (NFA) letter should be requested from Ecology to close out the Agreed Order and provide Welch’s with an NFA letter, stating that no further action is required at the site.

**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:



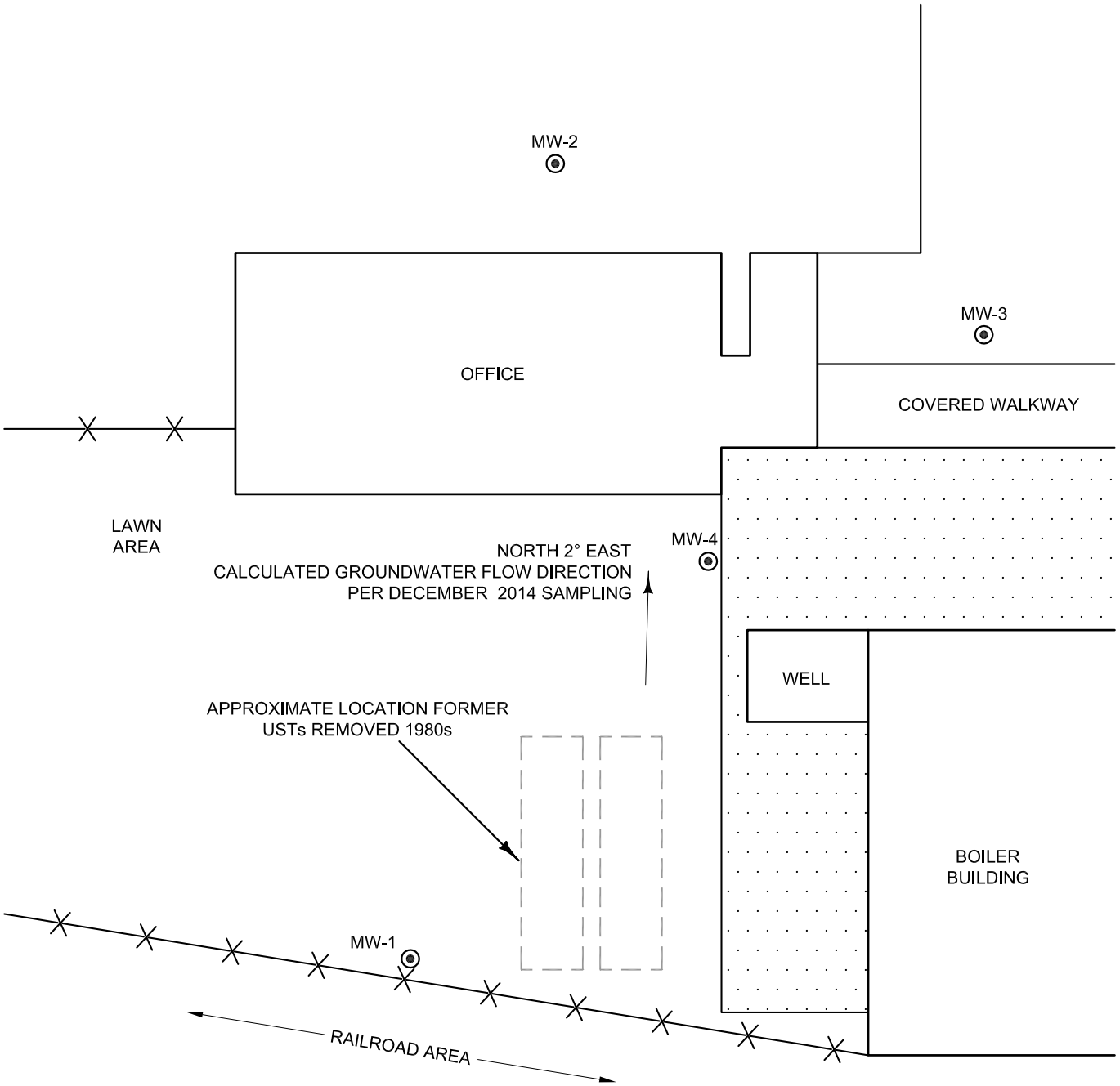

Dana Ertel, LG
PBS Project Manager
January 27, 2015

Reviewed by:
Dulcy Berri, LHG
PBS Senior Reviewer

Attachments: Figure 1
PBS Low Flow Sampling Procedure
December 2014 Groundwater Sampling Forms MW1-MW4
Tables 1-4. Groundwater Sampling Results and Parameters 2008, 2010-2011, 2013-2014
Laboratory Data and COC

# ATTACHMENT I

**Figure 1**




## LEGEND

MW-1 ⊙ MONITORING WELL NUMBER AND LOCATION

FENCE

CONCRETE

0' 10' 20' 40'

SCALE: 1" = 20'

PREPARED FOR: WELCH FOODS

PBS

| PROJECT # | DATE |
|---|---|
| 63707.000 | JAN 2015 |

# MONITORING WELL LOCATIONS

10 EAST BRUNEAU AVENUE
KENNEWICK, WASHINGTON

FIGURE
1

C:\Users\dana\Documents\CAD Files\63707 DEC 2014 FIG 1.dwg Jan 15, 2015 10:44am

# ATTACHMENT II

**PBS SOP: Low Flow Groundwater Sampling**

PBS | Engineering + Environmental

**STANDARD OPERATING PROCEDURE**
**GROUNDWATER SAMPLING USING LOW-FLOW SAMPLING TECHNIQUES**

## 1.0 BACKGROUND AND PURPOSE

Groundwater samples are collected from monitoring wells and temporary borings for analysis of physical and chemical parameters, either by using field observations and portable equipment and/or using off-site laboratory analytical methods. Groundwater is typically purged prior to sample collection to ensure that water sampled is representative of the formation. Traditional groundwater sampling methods required removal of multiple casing volumes of water, resulting in large quantities of water requiring disposal and increasing the potential for volatilization of organic compounds due to a high pump rate. The agitation from this removal could increase turbidity as well.

Low-flow purging and sampling methods were developed to minimize purge water volume and reduce the potential for contaminant volatilization. Low-flow techniques have become the industry standard for collecting a groundwater sample because the method minimizes turbidity and produces a more representative groundwater sample. Although it is preferable to use pumps dedicated to specific wells, low-flow techniques can be achieved with a portable pump.

The procedures in this Standard Operating Procedure (SOP) are specific to standard monitoring wells with a single-slotted interval. This SOP is generally acceptable for use with temporary borings.

## 2.0 EQUIPMENT LIST

1. Well lock keys
2. Groundwater Sampling Field Form
3. Electronic water level probe
4. Interface probe (if dense or light non-aqueous phase liquids are [DNAPL or LNAPL] is present)
5. Knife or scissors
6. Decontamination equipment
7. Site map and health and safety plan
8. Personal Protection Equipment (PPE) appropriate for the site
9. Submersible pump or peristaltic pump and associated equipment
10. Compressed gas source (Nitrogen or air compressor), battery source, or generator and fuel
11. Control box
12. Disposable tubing, if necessary
13. Field water quality monitoring equipment
14. Buckets or containers for purge water and drum labels
15. Sample containers, labels, packaging material

## 3.0 PROCEDURE

Low-flow techniques rely on stabilization of field water quality parameters to determine when groundwater is representative of aquifer conditions. Measurement of groundwater quality

parameters occurs in a closed system in which groundwater does not come in contact with open air; dissolved oxygen (DO), oxygen-reduction potential (ORP), and pH measurements are sensitive to reactions with the atmosphere. A flow-through cell (flow cell) serves as this closed system and is used to measure field parameters prior to collecting groundwater samples. Stabilization of selected parameters indicated that conditions are suitable for sampling to begin.

This method requires care when placing a portable pump and/or tubing in the well to minimize disturbance to the water column. Low-flow purge and sample methods call for low pumping rates (0.1 to 0.5 liter/minute) to reduce drawdown. A drawdown of less than 0.3 feet in the water column, once the pumping rate has stabilized, is desirable; however depending on the lithology, this is not always possible. At a minimum, the depth-to-water should be stabilized for three consecutive readings taken between 3 to 5 minutes apart (in conjunction with the stabilization of the other parameters).

For monitoring wells, sampling should proceed as follows:

1. Note the general condition of the well. Check well for security damage or evidence of tampering and record pertinent observations. Note any maintenance tasks that should be completed, such as well cap or padlock replacement.
2. Open the well and wait a minimum of five minutes for water levels to approach an equilibrium state with atmospheric pressure before taking any measurements.
3. Measure the depth to water relative to the marking on the well casing. If there is no mark, use the north side of the casing. Record the water level on the field form. Note if DNAPL or LNAPL is present.
4. If using a portable pump setup, slowly lower the pump or tubing to the midpoint of the screen or sample interval. Secure the pump or tubing to prevent it from moving. Skip this step if using dedicated pumps.
5. Hook up the control box, compressor or nitrogen tank with regulator, or peristaltic pump, and flow cell with field water quality monitoring equipment. Put the water level probe in the well so water levels can be measured as you are pumping. Start the pump and adjust the pumping rate to between 0.1 and 0.5 liters per minute (using a measuring cup to calculate the flow rate). Begin recording readings on the field sheet. Be sure to purge the amount of water in tubing before taking readings or a sample. Monitor water levels as well as groundwater parameters.
6. During purging, take readings every 3 to 5 minutes. Record readings on the field form. Purging is considered complete when the groundwater parameters have stabilized for three consecutive readings.

| **Field Parameter** | **Stabilization Goal** |
|---|---|
| Temperature | +/- 3% |
| Specific conductance | +/- 3% mS/cm |
| pH | +/- 0.1 pH units |
| DO | +/- 10% *or* +/- 0.3 mg/L |
| ORP | +/- 10 millivolts |
| Depth to Water | +/1 0.3 feet |

7. Measure turbidity of the sample water using field instruments prior to sample collection and upon any obvious visual changes in turbidity during sample collection.
8. The water sample must be collected before the water passes through the flow cell. Disconnect the tubing from the flow cell and directly fill the sample containers. If you are

collecting samples for volatile organic compound (VOC) analysis, you may need to decrease the pump rate; if this is the case, other samples should be collected first. Fill unpreserved bottles first. Filtered samples should be collected after all other samples have been collected.

9. Groundwater samples for dissolved metals analyses can be field filtered with a 0.45 micron filter directly connected to the tubing. Mark “field filtered” or “FF” on the bottle label, field form, and chain of custody.
10. Prior to filling or just after filling, label each bottle and make sure it is properly sealed. Place in a cooler with ice and pack for transportation.
11. As necessary, pull pump and discard tubing. Decontaminate the pump based on the SOP for the site.
12. Close and lock the well.
13. Make sure all information is completed on the groundwater field form and sign and date it.
14. Dispose of all purge and decontamination water in the appropriate containers.

For temporary borings, the goal of minimizing the drawdown may not be obtainable for the following reasons:

- The narrow temporary casing (often 1-inch PVC) can prevent monitoring groundwater level measurements (insufficient room in the temporary casing to install a water level meter)
- Excessive fines (silt and clay) may be present in the temporary screened interval because the boring has not been developed in the manner of a constructed monitoring well.
- Excessive suspended sediment in the water column may prevent a peristaltic pump from operating at a low flow rate (the peristaltic pump often quits working at very low flow rates).

For these reasons, temporary borings should be sampled by utilizing the lowest flow rate possible and monitoring field parameters as indicated above to indicate when sampling is appropriate. All other procedural steps should be completed as appropriate to a temporary boring scenario.

**References:**

Puls, R.W. and M.J. Barcelona, 1996, GROUNDWATER ISSUE PAPER: Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures; U.S. Environmental Protection Agency, EPA/540/S-95/504.

Yeskis, D. and Bernard Zavala, GROUNDWATER ISSUE PAPER: Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers, U.S. Environmental Protection Agency, EPA 542-S-02-001, May 2002

# ATTACHMENT III

**December 2014 Groundwater Sampling Forms MW1-MW-4**

PBS

**PBS Engineering & Environmental**

# GROUNDWATER SAMPLING FIELD FORM

Revised: 12/2011

**Project:**

**Project No.:** 63707

**Date:** 12/12/14

**Field Personnel:** PBS

**Monitoring Well ID:** MW-1

**Weather Conditions:** Light rain, cloudy

**Initial DTW:** 21.59

## INITIAL WELL DATA & WELL PURGING INFORMATION

*1/4 inch tubing = approx 0.0025 gallons/linear foot*

| Time (0.00 - 24:00) | Water Temperature (+/-0.50C) | Specific Conductivity (mS/cm) | Dissolved Oxygen mg/L | Water pH | ORP (mV) | Turbidity (visual) | Water Level (feet TOC) | Volume Purged (gallons) |
|---|---|---|---|---|---|---|---|---|
| 0906 | | | | | | | 21.59 | |
| 0914 | 15.56 | .520 | 6.03 | 7.02 | 37.6 | clear | 21.59 | |
| 0920 | 16.54 | .511 | 5.98 | 7.22 | 25.2 | " | " | 16.54 |
| 0930 | 16.68 | .509 | 5.94 | 7.25 | 24.9 | " | " | |
| 0932 | 16.70 | .509 | 5.95 | 7.25 | 25.4 | " | " | |
| 0934 | 16.73 | .510 | 5.90 | 7.25 | 26.0 | " | " | |
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| | | | | | | | **Total Purged =** | 4.2L |

Type of pump used (circle one): Peristaltic (Bladder) Other _____

Depth of tubing inlet (approx. feet bgs): 24'

Purge Pumping Rate (approx. ml/m): 150 ml/min.

QA/QC Sample collected (circle one):

(Duplicate) Lab QA/QC Equipment Blank (None)

Final Turbidity Reading (NTUs): 0.84

Time Sampled: 0934

Sample ID: MW-1
MW-Dup

## WELL CONDITION

Recommended Well Repairs/Additional Notes:

## FIELD OBSERVATIONS / NOTES

Screen 17-27

**Signature of Field Personnel:**

PBS

**PBS Engineering & Environmental**

# GROUNDWATER SAMPLING FIELD FORM

Revised: 12/2011

**Project:**

**Project No.:** 63207

**Date:** 12/12/14

**Field Personnel:** Dave

**Monitoring Well ID:** MW-2

**Weather Conditions:** Cloudy, 50°F

**Initial DTW:** 21.06

## INITIAL WELL DATA & WELL PURGING INFORMATION

*1/4 inch tubing = approx 0.0025 gallons/linear foot*

| Time (0.00 - 24:00) | Water Temperature (+/-0.50C) | Specific Conductivity (mS/cm) | Dissolved Oxygen mg/L | Water pH | ORP (mV) | Turbidity (visual) | Water Level (feet TOC) | Volume Purged (gallons) |
|---|---|---|---|---|---|---|---|---|
| 1336 | | | | | | | 21.06 | |
| 1342 | 16.80 | .533 | 3.22 | 7.34 | 28.9 | clear | 21.06 | |
| 1347 | 17.92 | .545 | 2.22 | 7.27 | 27.3 | " | " | |
| 1350 | 17.95 | .547 | 2.08 | 7.25 | 28.7 | " | " | |
| 1356 | 18.04 | .548 | 2.00 | 7.24 | 31.6 | " | " | |
| 1358 | 18.03 | .547 | 1.93 | 7.24 | 32.8 | " | " | |
| 1400 | 18.03 | .547 | 1.99 | 7.24 | 34.2 | " | " | |
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**Total Purged =** 3.6 L

Type of pump used (circle one): Peristaltic (Bladder) Other _____

Depth of tubing inlet (approx. feet bgs): 22.5

Purge Pumping Rate (approx. ml/m): 150ml/min

QA/QC Sample collected (circle one):

Duplicate Lab QA/QC Equipment Blank (None)

Final Turbidity Reading (NTUs): 0.82

Time Sampled: 1400

Sample ID: MW-2

## WELL CONDITION

Recommended Well Repairs/Additional Notes: Well in good condition

## FIELD OBSERVATIONS / NOTES

17-27 (22')

**Signature of Field Personnel:**

PBS

PBS Engineering & Environmental

**GROUNDWATER SAMPLING FIELD FORM**

Revised: 12/2011

Project:

Project No.: 63707

Date: 12/12/14

Field Personnel: DBE

Monitoring Well ID: MW-3

Weather Conditions: Cloudy

Initial DTW: 20.63

**INITIAL WELL DATA & WELL PURGING INFORMATION**

*1/4 inch tubing = approx 0.0025 gallons/linear foot*

| Time (0.00 - 24:00) | Water Temperature (+/-0.50C) | Specific Conductivity (mS/cm) | Dissolved Oxygen mg/L | Water pH | ORP (mV) | Turbidity (visual) | Water Level (feet TOC) | Volume Purged (gallons) |
|---|---|---|---|---|---|---|---|---|
| 1143 | | | | | | | 20.63 | |
| 1148 | 19.53 | .678 | 3.89 | 8.34 | 16.9 | clear | 20.63 | |
| 1153 | 20.62 | .685 | 3.22 | 8.32 | 15.5 | " | " | |
| 1157 | 20.94 | .688 | 3.12 | 8.30 | 15.7 | " | " | |
| 1202 | 21.09 | .696 | 3.12 | 8.27 | 17.2 | " | " | |
| 1204 | 21.15 | .693 | 3.17 | 8.24 | 18.3 | " | " | |
| 1206 | 21.15 | .692 | 3.14 | 8.27 | 19.2 | " | " | |
| 1208 | 21.16 | .691 | 3.14 | 8.27 | 19.3 | " | " | |
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| | | | | | | | Total Purged = | 3.75 L |

Type of pump used (circle one): Peristaltic (Bladder) Other _____

Depth of tubing inlet (approx. feet bgs): 22.5'

Purge Pumping Rate (approx. ml/m): 2 cam / 150 ml/min

Final Turbidity Reading (NTUs): 1.36

Time Sampled: 1208

Sample ID: MW-3

QA/QC Sample collected (circle one):

Duplicate Lab QA/QC Equipment Blank (None)

**WELL CONDITION**

Recommended Well Repairs/Additional Notes:

Well in good condition.

Had to bail out water around top of casing, noted a sheen on water

**FIELD OBSERVATIONS / NOTES**

17-27' (22.5')

Signature of Field Personnel:

PBS

PBS Engineering & Environmental

# GROUNDWATER SAMPLING FIELD FORM

Revised: 12/2011

Project:

Project No.: 63707

Date: 12/12/14

Field Personnel: DBE

Monitoring Well ID: MW-4

Weather Conditions: Light rain, Cloudy

Initial DTW: 20.45

## INITIAL WELL DATA & WELL PURGING INFORMATION

*1/4 inch tubing = approx 0.0025 gallons/linear foot*

| Time (0.00 - 24:00) | Water Temperature (+/-0.50C) | Specific Conductivity (mS/cm) | Dissolved Oxygen mg/L | Water pH | ORP (mV) | Turbidity (visual) | Water Level (feet TOC) | Volume Purged (gallons) |
|---|---|---|---|---|---|---|---|---|
| 1022 | | | | | | | 20.45 | |
| 1030 | 17.28 | .550 | 3.47 | 7.20 | 26.8 | clear | 20.45 | |
| 1035 | 17.54 | .554 | 2.42 | 7.16 | 21.5 | " | " | |
| 1040 | 17.67 | .556 | 2.25 | 7.15 | 22.0 | " | " | 2.25 DO |
| 1042 | 17.64 | .555 | 2.25 | 7.14 | 22.0 | " | " | |
| 1044 | 17.68 | .555 | 2.22 | 7.14 | 21.6 | " | " | |
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| | | | | | | Total Purged = | | 4.2L |

Type of pump used (circle one): Peristaltic (Bladder) Other _____

Depth of tubing inlet (approx. feet bgs): 28.5

Purge Pumping Rate (approx. ml/m): 190 ml/min

QA/QC Sample collected (circle one):

Duplicate Lab QA/QC Equipment Blank (None)

Final Turbidity Reading (NTUs): 0.95

Time Sampled: 1044

Sample ID: MW-4

## WELL CONDITION

Recommended Well Repairs/Additional Notes:

Well in good condition

## FIELD OBSERVATIONS / NOTES

Screen 18-28

Signature of Field Personnel:

# ATTACHMENT IV

**Tables 1-4: Groundwater Sampling Results and Parameters 2008, 2010-2011, 2013-2014**

**Table 1. 2008 Groundwater Sampling Results**
**Former Welch Foods Facility**
**Kennewick, Washington**

| Sample ID | Sampling Date | Depth to Water' | Groundwater Flow Direction | BTEX | Diesel Range | Motor Oil Range | Carcin. PAHs | NonCarc. PAHs | Naphthalene |
|---|---|---|---|---|---|---|---|---|---|
| MW-1 | 2/1/2008 | 21.35 | N4°E | <0.50/<0.50/<0.50/<0.50 | <0.14 | <0.14 | <0.50 | <0.50 | <0.050 |
| | 6/27/2008 | 20.01 | N33°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | 9/8/2008 | 19.68 | N11°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | 12/2/2008 | 19.24 | N37°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | | | | | | | | | |
| MW-2 | 2/1/2008 | 20.78 | N4°E | <0.50/<0.50/<0.50/<0.50 | <0.15 | <0.15 | <0.50 | <0.50 | <0.050 |
| | 6/27/2008 | 19.46 | N33°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | 9/6/2008 | 19.23 | N11°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | 12/2/2008 | 18.72 | N37°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | | | | | | | | | |
| MW-3 | 2/1/2008 | 20.54 | N4°E | <0.50/<0.50/<0.50/<0.50 | <0.15 | <0.15 | <0.50 | <0.50 | <0.050 |
| | 6/27/2008 | 19.06 | N33°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | 9/6/2008 | 18.76 | N11°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | 12/2/2008 | 18.33 | N37°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| MTCA Method A Cleanup Levels: | | | | 5/1000/700/1000 | 500 | 500 | 0.1 | NE | 160 |

Note: BTEX = Benzene, Toluene, Ethylbenzene, Total Xylenes
All results, lab reporting limits and MTCA Cleanup Levels are in ug/L =micrograms/Liter
Carcin. PAHs = Carcinogenic PAHs, NonCarc. = Noncarcinogenic PAHs
NE = Not Established
' = feet below top of casing

**Table 2. 2010-2011 Groundwater Sampling Results**
**Former Welch Foods Facility**
**Kennewick, Washington**

| Sample ID | Sampling Date | Depth to Water' | Groundwater Flow Direction | BTEX | Diesel Range | Motor Oil Range | Carcin. PAHs | NonCarc. PAHs | Naphthalene |
|---|---|---|---|---|---|---|---|---|---|
| MW-1 | 10/6/2010 | 19.75 | N18°E | <1/<1/<1/<3 | 73 | 300 | <0.1 | 0.11 | <0.1 |
| | 3/1/2011 | 20.56 | N12° W | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | 6/20/2011 | 20.71 | N22°E | <1/<1/<1/<3 | 66 | <250 | <0.1 | <0.1 | <0.1 |
| | 11/9/2011 | 20.88 | N9°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | | | | | | | | | |
| MW-2 | 10/6/2010 | 19.29 | N18°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | 3/1/2011 | 20.04 | N12° W | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | 6/20/2011 | 20.17 | N22°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | 11/9/2011 | 20.38 | N9°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | | | | | | | | | |
| MW-3 | 10/6/2010 | 18.87 | N18°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | 3/1/2011 | 19.59 | N12° W | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | 6/20/2011 | 19.76 | N22°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | 11/9/2011 | 19.95 | N9°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| | | | | | | | | | |
| MW-4 | 10/6/2010 | 18.65 | N18°E | <1/<1/<1/<3 | 260 | <250 | 0.24* | 1.88 | 0.33 |

| Sample ID | Sampling Date | Depth to Water' | Groundwater Flow Direction | BTEX | Diesel Range | Motor Oil Range | Carcin. PAHs | NonCarc. PAHs | Naphthalene |
|---|---|---|---|---|---|---|---|---|---|
| MW-4 | 3/1/2011 | 19.41 | N12° W | <1/<1/<1/<3 | 51 | <250 | <0.1 | <0.1 | <0.1 |
| | 6/20/2011 | 19.57 | N22°E | <1/<1/<1/<3 | 100 | <250 | <0.1 | 0.26 | <0.1 |
| | 11/9/2011 | 19.78 | N9°E | <1/<1/<1/<3 | <50 | <250 | <0.1 | <0.1 | <0.1 |
| MTCA Method A Cleanup Levels: | | | | 5/1000/700/1000 | 500 | 500 | 0.1 | NE | 160 |

Note: BTEX = Benzene, Toluene, Ethylbenzene, Total Xylenes
All results, lab reporting limits and MTCA Cleanup Levels are in ug/L =micrograms/Liter
*Only Chrysene was detected, which has a toxicity equivalency factor (TEF) of 0.01. Using the TEF results in a calculated value of 0.0024 for Chrysene, well below the cleanup level of 0.1 ug/L
Carcin. PAHs = Carcinogenic PAHs, NonCarc. = Noncarcinogenic PAHs
NE = Not Established
' = feet below top of casing

**Table 3. 2013-2014 Groundwater Sampling Results**
**Former Welch Foods Facility**
**Kennewick, Washington**

| Sample ID | Sampling Date | Depth to Water (feet below top of casing) | Groundwater Flow Direction | BTEX | Diesel Range | Motor Oil Range | Dx Total | Carcin. PAHs | NonCarc. PAHs | Naphthalene |
|---|---|---|---|---|---|---|---|---|---|---|
| MW-1 | 12/2/2013 | 21.43 | N8°W | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| MW-1 | 4/9/2014 | 23.03 | N16°W | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| MW-1 | 7/30/2014 | 20.65 | N13°W | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| MW-1 | 12/12/2014 | 21.59 | N2°E | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| | | | | | | | | | | |
| MW-2 | 12/2/2013 | 20.90 | N8°W | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| MW-2 | 4/9/2014 | 22.50 | N16°W | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| MW-2 | 7/31/2014 | 20.15 | N13°W | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| MW-DUP | 7/31/2014 | | | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| MW-2 | 12/12/2014 | 21.06 | N2°E | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| | | | | | | | | | | |
| MW-3 | 12/2/2013 | 20.46 | N8°W | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| MW-3 | 4/9/2014 | 22.05 | N16°W | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| MW-DUP | 4/9/2014 | | | <1/<1<1<3 | 93x | <250 | <300 | <0.1 | <0.1 | <0.1 |
| MW-3 | 7/31/2014 | 19.70 | N13°W | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |

| Sample ID | Sampling Date | Depth to Water (feet below top of casing) | Groundwater Flow Direction | BTEX | Diesel Range | Motor Oil Range | Dx Total | Carcin. PAHs | NonCarc. PAHs | Naphthalene |
|---|---|---|---|---|---|---|---|---|---|---|
| MW-3 | 12/12/2014 | 20.63 | N2°E | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| | | | | | | | | | | |
| MW-4 | 12/2/2013 | 20.29 | N8°W | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| MW-DUP | 12/2/2013 | | | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| MW-4 | 4/9/2014 | 21.89 | N16°W | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| MW-4 | 7/30/2014 | 19.53 | N13°W | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| MW-4 | 12/12/2014 | 20.45 | N2°E | <1/<1<1<3 | <50 | <250 | <300 | <0.1 | <0.1 | <0.1 |
| MTCA Method A Cleanup Levels: | | | | 5/1000/700/1000 | 500 | 500 | | 0.1 | NE | 160 |

Note: BTEX = Benzene, Toluene, Ethylbenzene, Total Xylenes
All results, lab reporting limits and MTCA Cleanup Levels are in ug/L =micrograms/Liter
Carcin. PAHs = Carcinogenic PAHs, NonCarc. = Noncarcinogenic PAHs
NE = Not Established
X = lab qualifier, the sample chromatograph pattern does not match the fuel standard used for quantitation

**Table 4. Groundwater Sampling Field Parameters**
**Former Welch Foods Facility**
**Kennewick, Washington**

| Sample ID | Sampling Date | Temp. (°C) | Cond. (µS/cm) | DO (mg/L) | ph | ORP (mV) |
|---|---|---|---|---|---|---|
| MW-1 | 1/24/2008 | 18 | 572 | NC | 7.48 | NC |
| MW-2 | 1/24/2008 | 17.5 | 636 | NC | 7.57 | NC |
| MW-3 | 1/24/2008 | 17.4 | 629 | NC | 7.7 | NC |
| | | | | | | |
| MW-1 | 6/27/2008 | 19.6 | 502 | NC | 7.32 | NC |
| MW-2 | 6/27/2008 | 20.2 | 609 | NC | 7.36 | NC |
| MW-3 | 6/27/2008 | 20.2 | 585 | NC | 7.42 | NC |
| | | | | | | |
| MW-1 | 9/5/2008 | 19.7 | 593 | NC | 7.34 | NC |
| MW-2 | 9/5/2008 | 20 | 602 | NC | 7.33 | NC |
| MW-3 | 9/5/2008 | 21.7 | 586 | NC | 7.36 | NC |
| | | | | | | |
| MW-1 | 12/2/2008 | 20 | 536 | NC | 7.44 | NC |
| MW-2 | 12/2/2008 | 19.9 | 611 | NC | 7.31 | NC |
| MW-3 | 12/2/2008 | 19.8 | 601 | NC | 7.37 | NC |
| | | | | | | |

| Sample ID | Sampling Date | Temp. (°C) | Cond. (µS/cm) | DO (mg/L) | ph | ORP (mV) |
|---|---|---|---|---|---|---|
| MW-1 | 10/6/2010 | 16.9 | 575 | 8.1 | 7.27 | 156 |
| MW-2 | 10/6/2010 | 17.3 | 635 | 7.9 | 7.19 | 212 |
| MW-3 | 10/6/2010 | 18.2 | 607 | 8.1 | 7.25 | 172 |
| MW-4 | 10/6/2010 | 18.8 | 734 | 7.4 | 7.19 | 134 |
| | | | | | | |
| MW-1 | 3/1/2011 | 17 | 543 | 5 | 7.33 | 269 |
| MW-2 | 3/1/2011 | 16.3 | 582 | 7.1 | 7.29 | 160 |
| MW-3 | 3/1/2011 | 16.7 | 601 | 5.6 | 7.33 | 223 |
| MW-4 | 3/1/2011 | 16.4 | 574 | 2.9 | 7.15 | 118 |
| | | | | | | |
| MW-1 | 6/20/2011 | 17.3 | 570 | NC | 7.23 | 159 |
| MW-2 | 6/20/2011 | 16.5 | 659 | NC | 7.19 | 139 |
| MW-3 | 6/20/2011 | 16.8 | 616 | NC | 7.27 | 134 |
| MW-4 | 6/20/2011 | 16.6 | 699 | NC | 7.2 | 130 |
| | | | | | | |
| MW-1 | 11/9/2011 | 16.3 | 705 | 1.2 | 7.33 | 154 |
| MW-2 | 11/9/2011 | 17.2 | 680 | 0.9 | 7.27 | 160 |

| Sample ID | Sampling Date | Temp. (°C) | Cond. (µS/cm) | DO (mg/L) | ph | ORP (mV) |
|---|---|---|---|---|---|---|
| MW-3 | 11/9/2011 | 18.2 | 670 | 0.9 | 7.33 | 186 |
| MW-4 | 11/9/2011 | 17.7 | 701 | 1.1 | 7.14 | 185 |
| | | | | | | |
| MW-1 | 12/2/2013 | 16.4 | 517 | 6.1 | 7.6 | 133.2 |
| MW-2 | 12/2/2013 | 16.5 | 556 | 2.0 | 7.8 | 106.7 |
| MW-3 | 12/2/2013 | 17.9 | 667 | 5.3 | 8.1 | 111.6 |
| MW-4 | 12/2/2013 | 17.1 | 592 | 1.5 | 7.7 | 118.6 |
| | | | | | | |
| MW-1 | 4/09/2014 | 16.24 | 638 | 7.70 | 7.20 | 196.7 |
| MW-2 | 4/09/2014 | 17.75 | 738 | 5.19 | 7.37 | 133.2 |
| MW-3 | 4/09/2014 | 20.38 | 758 | 5.22 | 7.88 | 104.4 |
| MW-4 | 4/09/2014 | 16.87 | 805 | 5.34 | 7.17 | 168.5 |
| | | | | | | |
| MW-1 | 7/30/2014 | 17.66 | 645 | 7.74 | 7.00 | 2.3 |
| MW-2 | 7/31/2014 | 18.54 | 758 | 6.26 | 7.04 | -12.6 |

| Sample ID | Sampling Date | Temp. (°C) | Cond. (µS/cm) | DO (mg/L) | ph | ORP (mV) |
|---|---|---|---|---|---|---|
| MW-3 | 7/31/2014 | 20.96 | 804 | 6.17 | 7.69 | -38.9 |
| MW-4 | 7/30/2014 | 18.73 | 796 | 3.15 | 6.97 | 10.8 |
| | | | | | | |
| MW-1 | 12/12/2014 | 16.73 | 510 | 5.90 | 7.25 | 26.0 |
| MW-2 | 12/12/2014 | 18.03 | 547 | 1.99 | 7.24 | 34.2 |
| MW-3 | 12/12/2014 | 21.16 | 691 | 3.14 | 8.23 | 19.3 |
| MW-4 | 12/12/2014 | 17.68 | 555 | 2.22 | 7.14 | 21.6 |

Note: NC = not collected

# ATTACHMENT V

**Laboratory Data and COC**

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

January 2, 2015

Dana Ertel, Project Manager
PBS Engineering and Environmental, Inc.
400 Bradley Blvd, Suite 300
Richland, WA 99352

Dear Mr. Ertel:

Included are the amended results from the testing of material submitted on December 17, 2014 from the 63707, F&BI 412288 project. Per your request, the NWTPH-Dx diesel and motor oil reporting limits for samples MW-4 and MW-Dup were lowered to match the other samples.

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
PBR1223R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

3012 16th Avenue West
Seattle, WA 98119-2029
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fbi@isomedia.com
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December 23, 2014

Dana Ertel, Project Manager
PBS Engineering and Environmental, Inc.
400 Bradley Blvd, Suite 300
Richland, WA 99352

Dear Mr. Ertel:

Included are the results from the testing of material submitted on December 17, 2014 from the 63707, F&BI 412288 project. There are 13 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
PBR1223R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 17, 2014 by Friedman & Bruya, Inc. from the PBS Engineering and Environmental 63707, F&BI 412288 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | PBS Engineering and Environmental |
|---|---|
| 412288 -01 | MW-1 |
| 412288 -02 | MW-2 |
| 412288 -03 | MW-3 |
| 412288 -04 | MW-4 |
| 412288 -05 | MW-Dup |
| 412288 -06 | Trip Blank |

All quality control requirements were acceptable.

Date of Report: 12/23/14
Date Received: 12/17/14
Project: 63707, F&BI 412288
Date Extracted: 12/17/14
Date Analyzed: 12/17/14

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

Results Reported as ug/L (ppb)

| Sample ID<br>Laboratory ID | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Surrogate (% Recovery)<br>Limit (50-150) |
|---|---|---|---|---|---|
| MW-1<br>412288-01 | <1 | <1 | <1 | <3 | 85 |
| MW-2<br>412288-02 | <1 | <1 | <1 | <3 | 85 |
| MW-3<br>412288-03 | <1 | <1 | <1 | <3 | 85 |
| MW-4<br>412288-04 | <1 | <1 | <1 | <3 | 73 |
| MW-Dup<br>412288-05 | <1 | <1 | <1 | <3 | 85 |
| Trip Blank<br>412288-06 | <1 | <1 | <1 | <3 | 83 |
| Method Blank<br>04-2512 MB | <1 | <1 | <1 | <3 | 83 |

Date of Report: 12/23/14
Date Received: 12/17/14
Project: 63707, F&BI 412288
Date Extracted: 12/17/14
Date Analyzed: 12/17/14

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx**

Results Reported as ug/L (ppb)

| Sample ID<br>Laboratory ID | Diesel Range<br>($C_{10}$-$C_{25}$) | Motor Oil Range<br>($C_{25}$-$C_{36}$) | Surrogate<br>(% Recovery)<br>(Limit 47-140) |
|---|---|---|---|
| MW-1<br>412288-01 | <50 | <250 | 98 |
| MW-2<br>412288-02 | <50 | <250 | 103 |
| MW-3<br>412288-03 | <50 | <250 | 106 |
| MW-4<br>412288-04 1/1.2 | <50 | <250 | 110 |
| MW-Dup<br>412288-05 1/1.2 | <50 | <250 | 109 |
| Method Blank<br>04-2532 MB | <50 | <250 | 95 |

## Analysis For Semivolatile Compounds By EPA Method 8270D SIM

| | | | |
|---|---|---|---|
| Client Sample ID: | MW-1 | Client: | PBS Engineering and Environmental |
| Date Received: | 12/17/14 | Project: | 63707, F&BI 412288 |
| Date Extracted: | 12/18/14 | Lab ID: | 412288-01 1/2 |
| Date Analyzed: | 12/18/14 | Data File: | 121808.D |
| Matrix: | Water | Instrument: | GCMS6 |
| Units: | ug/L (ppb) | Operator: | VM |

| Surrogates: | % Recovery: | Lower Limit: | Upper Limit: |
|---|---|---|---|
| Anthracene-d10 | 95 | 50 | 150 |
| Benzo(a)anthracene-d12 | 99 | 50 | 129 |

| Compounds: | Concentration ug/L (ppb) |
|---|---|
| Naphthalene | <0.1 |
| Acenaphthylene | <0.1 |
| Acenaphthene | <0.1 |
| Fluorene | <0.1 |
| Phenanthrene | <0.1 |
| Anthracene | <0.1 |
| Fluoranthene | <0.1 |
| Pyrene | <0.1 |
| Benz(a)anthracene | <0.1 |
| Chrysene | <0.1 |
| Benzo(a)pyrene | <0.1 |
| Benzo(b)fluoranthene | <0.1 |
| Benzo(k)fluoranthene | <0.1 |
| Indeno(1,2,3-cd)pyrene | <0.1 |
| Dibenz(a,h)anthracene | <0.1 |
| Benzo(g,h,i)perylene | <0.1 |

## Analysis For Semivolatile Compounds By EPA Method 8270D SIM

| | | | |
|---|---|---|---|
| Client Sample ID: | MW-2 | Client: | PBS Engineering and Environmental |
| Date Received: | 12/17/14 | Project: | 63707, F&BI 412288 |
| Date Extracted: | 12/18/14 | Lab ID: | 412288-02 1/2 |
| Date Analyzed: | 12/18/14 | Data File: | 121809.D |
| Matrix: | Water | Instrument: | GCMS6 |
| Units: | ug/L (ppb) | Operator: | VM |

| Surrogates: | % Recovery: | Lower Limit: | Upper Limit: |
|---|---|---|---|
| Anthracene-d10 | 94 | 50 | 150 |
| Benzo(a)anthracene-d12 | 105 | 50 | 129 |

| Compounds: | Concentration ug/L (ppb) |
|---|---|
| Naphthalene | <0.1 |
| Acenaphthylene | <0.1 |
| Acenaphthene | <0.1 |
| Fluorene | <0.1 |
| Phenanthrene | <0.1 |
| Anthracene | <0.1 |
| Fluoranthene | <0.1 |
| Pyrene | <0.1 |
| Benz(a)anthracene | <0.1 |
| Chrysene | <0.1 |
| Benzo(a)pyrene | <0.1 |
| Benzo(b)fluoranthene | <0.1 |
| Benzo(k)fluoranthene | <0.1 |
| Indeno(1,2,3-cd)pyrene | <0.1 |
| Dibenz(a,h)anthracene | <0.1 |
| Benzo(g,h,i)perylene | <0.1 |

## Analysis For Semivolatile Compounds By EPA Method 8270D SIM

| | | | |
|---|---|---|---|
| Client Sample ID: | MW-3 | Client: | PBS Engineering and Environmental |
| Date Received: | 12/17/14 | Project: | 63707, F&BI 412288 |
| Date Extracted: | 12/18/14 | Lab ID: | 412288-03 1/2 |
| Date Analyzed: | 12/18/14 | Data File: | 121810.D |
| Matrix: | Water | Instrument: | GCMS6 |
| Units: | ug/L (ppb) | Operator: | VM |

| Surrogates: | % Recovery: | Lower Limit: | Upper Limit: |
|---|---|---|---|
| Anthracene-d10 | 93 | 50 | 150 |
| Benzo(a)anthracene-d12 | 96 | 50 | 129 |

| Compounds: | Concentration ug/L (ppb) |
|---|---|
| Naphthalene | <0.1 |
| Acenaphthylene | <0.1 |
| Acenaphthene | <0.1 |
| Fluorene | <0.1 |
| Phenanthrene | <0.1 |
| Anthracene | <0.1 |
| Fluoranthene | <0.1 |
| Pyrene | <0.1 |
| Benz(a)anthracene | <0.1 |
| Chrysene | <0.1 |
| Benzo(a)pyrene | <0.1 |
| Benzo(b)fluoranthene | <0.1 |
| Benzo(k)fluoranthene | <0.1 |
| Indeno(1,2,3-cd)pyrene | <0.1 |
| Dibenz(a,h)anthracene | <0.1 |
| Benzo(g,h,i)perylene | <0.1 |

## Analysis For Semivolatile Compounds By EPA Method 8270D SIM

| | | | |
|---|---|---|---|
| Client Sample ID: | MW-4 | Client: | PBS Engineering and Environmental |
| Date Received: | 12/17/14 | Project: | 63707, F&BI 412288 |
| Date Extracted: | 12/18/14 | Lab ID: | 412288-04 1/2 |
| Date Analyzed: | 12/18/14 | Data File: | 121811.D |
| Matrix: | Water | Instrument: | GCMS6 |
| Units: | ug/L (ppb) | Operator: | VM |

| Surrogates: | % Recovery: | Lower Limit: | Upper Limit: |
|---|---|---|---|
| Anthracene-d10 | 92 | 50 | 150 |
| Benzo(a)anthracene-d12 | 95 | 50 | 129 |

| Compounds: | Concentration ug/L (ppb) |
|---|---|
| Naphthalene | <0.1 |
| Acenaphthylene | <0.1 |
| Acenaphthene | <0.1 |
| Fluorene | <0.1 |
| Phenanthrene | <0.1 |
| Anthracene | <0.1 |
| Fluoranthene | <0.1 |
| Pyrene | <0.1 |
| Benz(a)anthracene | <0.1 |
| Chrysene | <0.1 |
| Benzo(a)pyrene | <0.1 |
| Benzo(b)fluoranthene | <0.1 |
| Benzo(k)fluoranthene | <0.1 |
| Indeno(1,2,3-cd)pyrene | <0.1 |
| Dibenz(a,h)anthracene | <0.1 |
| Benzo(g,h,i)perylene | <0.1 |

## Analysis For Semivolatile Compounds By EPA Method 8270D SIM

| | | | |
|---|---|---|---|
| Client Sample ID: | MW-Dup | Client: | PBS Engineering and Environmental |
| Date Received: | 12/17/14 | Project: | 63707, F&BI 412288 |
| Date Extracted: | 12/18/14 | Lab ID: | 412288-05 1/2 |
| Date Analyzed: | 12/18/14 | Data File: | 121812.D |
| Matrix: | Water | Instrument: | GCMS6 |
| Units: | ug/L (ppb) | Operator: | VM |

| Surrogates: | % Recovery: | Lower Limit: | Upper Limit: |
|---|---|---|---|
| Anthracene-d10 | 95 | 50 | 150 |
| Benzo(a)anthracene-d12 | 93 | 50 | 129 |

| Compounds: | Concentration ug/L (ppb) |
|---|---|
| Naphthalene | <0.1 |
| Acenaphthylene | <0.1 |
| Acenaphthene | <0.1 |
| Fluorene | <0.1 |
| Phenanthrene | <0.1 |
| Anthracene | <0.1 |
| Fluoranthene | <0.1 |
| Pyrene | <0.1 |
| Benz(a)anthracene | <0.1 |
| Chrysene | <0.1 |
| Benzo(a)pyrene | <0.1 |
| Benzo(b)fluoranthene | <0.1 |
| Benzo(k)fluoranthene | <0.1 |
| Indeno(1,2,3-cd)pyrene | <0.1 |
| Dibenz(a,h)anthracene | <0.1 |
| Benzo(g,h,i)perylene | <0.1 |

## Analysis For Semivolatile Compounds By EPA Method 8270D SIM

| | | | |
|---|---|---|---|
| Client Sample ID: | Method Blank | Client: | PBS Engineering and Environmental |
| Date Received: | Not Applicable | Project: | 63707, F&BI 412288 |
| Date Extracted: | 12/18/14 | Lab ID: | 04-2501 mb2 1/2 |
| Date Analyzed: | 12/18/14 | Data File: | 121806.D |
| Matrix: | Water | Instrument: | GCMS6 |
| Units: | ug/L (ppb) | Operator: | VM |

| Surrogates: | % Recovery: | Lower Limit: | Upper Limit: |
|---|---|---|---|
| Anthracene-d10 | 93 | 50 | 150 |
| Benzo(a)anthracene-d12 | 98 | 50 | 129 |

| Compounds: | Concentration ug/L (ppb) |
|---|---|
| Naphthalene | <0.1 |
| Acenaphthylene | <0.1 |
| Acenaphthene | <0.1 |
| Fluorene | <0.1 |
| Phenanthrene | <0.1 |
| Anthracene | <0.1 |
| Fluoranthene | <0.1 |
| Pyrene | <0.1 |
| Benz(a)anthracene | <0.1 |
| Chrysene | <0.1 |
| Benzo(a)pyrene | <0.1 |
| Benzo(b)fluoranthene | <0.1 |
| Benzo(k)fluoranthene | <0.1 |
| Indeno(1,2,3-cd)pyrene | <0.1 |
| Dibenz(a,h)anthracene | <0.1 |
| Benzo(g,h,i)perylene | <0.1 |

Date of Report: 12/23/14
Date Received: 12/17/14
Project: 63707, F&BI 412288

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

Laboratory Code: 412288-01 (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 |

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Acceptance Criteria |
|---|---|---|---|---|
| Benzene | ug/L (ppb) | 50 | 83 | 72-119 |
| Toluene | ug/L (ppb) | 50 | 83 | 71-113 |
| Ethylbenzene | ug/L (ppb) | 50 | 85 | 72-114 |
| Xylenes | ug/L (ppb) | 150 | 83 | 72-113 |

Date of Report: 12/23/14
Date Received: 12/17/14
Project: 63707, F&BI 412288

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Percent Recovery LCSD | Acceptance Criteria | RPD (Limit 20) |
|---|---|---|---|---|---|---|
| Diesel Extended | ug/L (ppb) | 2,500 | 95 | 110 | 61-133 | 15 |

Date of Report: 12/23/14
Date Received: 12/17/14
Project: 63707, F&BI 412288

## QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PNA'S BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample

| Analyte | Reporting Units | Spike Level | Percent Recovery LCS | Percent Recovery LCSD | Acceptance Criteria | RPD (Limit 20) |
|---|---|---|---|---|---|---|
| Naphthalene | ug/L (ppb) | 1 | 86 | 89 | 67-116 | 3 |
| Acenaphthylene | ug/L (ppb) | 1 | 87 | 90 | 65-119 | 3 |
| Acenaphthene | ug/L (ppb) | 1 | 86 | 89 | 66-118 | 3 |
| Fluorene | ug/L (ppb) | 1 | 88 | 91 | 64-125 | 3 |
| Phenanthrene | ug/L (ppb) | 1 | 85 | 87 | 67-120 | 2 |
| Anthracene | ug/L (ppb) | 1 | 88 | 89 | 65-122 | 1 |
| Fluoranthene | ug/L (ppb) | 1 | 88 | 91 | 65-127 | 3 |
| Pyrene | ug/L (ppb) | 1 | 89 | 95 | 62-130 | 7 |
| Benz(a)anthracene | ug/L (ppb) | 1 | 93 | 97 | 60-118 | 4 |
| Chrysene | ug/L (ppb) | 1 | 90 | 94 | 66-125 | 4 |
| Benzo(b)fluoranthene | ug/L (ppb) | 1 | 88 | 89 | 55-135 | 1 |
| Benzo(k)fluoranthene | ug/L (ppb) | 1 | 88 | 96 | 62-125 | 9 |
| Benzo(a)pyrene | ug/L (ppb) | 1 | 86 | 91 | 58-127 | 6 |
| Indeno(1,2,3-cd)pyrene | ug/L (ppb) | 1 | 78 | 87 | 36-142 | 11 |
| Dibenz(a,h)anthracene | ug/L (ppb) | 1 | 73 | 79 | 37-133 | 8 |
| Benzo(g,h,i)perylene | ug/L (ppb) | 1 | 77 | 85 | 34-135 | 10 |

# Data Qualifiers & Definitions

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

412288

# SAMPLE CHAIN OF CUSTODY

ME 12/17/14

A04/V2

Page # 1 of 1

Send Report To Dana Ertel

Company PBS Environmental

Address 400 Bradley Blvd Suite 300

City, State, ZIP Richland, WA 99352

Phone # (509) 727-0873 Fax #

SAMPLERS (signature) Dana B. Ertel

PROJECT NAME/NO. 65767

PO#

REMARKS Pls Return Cooler

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

| Sample ID | Lab ID | Date Sampled | Time Sampled | Sample Type | # of containers | ANALYSES REQUESTED: TPH-Diesel | TPH-Gasoline | BTEX by 8021B | VOCs by8260 | SVOCs by 8270 | HFS | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-1 | 01A-E | 12/12/14 | | Groundwater | 5 | ✓ | | ✓ | | ✓ | | |
| MW-2 | 02 | ↓ | | ↓ | ↓ | ✓ | | ✓ | | ✓ | | |
| MW-3 | 03 | | | | | ✓ | | ✓ | | ✓ | | |
| MW-4 | 04 | | | | | ✓ | | ✓ | | ✓ | | |
| MW-DUP | 05 | | | ↓ | ↓ | ✓ | | ✓ | | ✓ | | |
| Trip Blank | 06 | | | | 1 | | | ✓ | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | Samples received at 4 °C |

| SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: Dana B. Ertel | Dana B. Ertel | PBS | 12/15/14 | |
| Received by: Nham Phan | Nham Phan | FEBT | 12/17/14 | 1030 |
| Relinquished by: | | | | |
| Received by: | | | | |


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*Fax (206) 283-5044*