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4660 KITSAP WAY, SUITE A
BREMERTON, WA 98312-2357
T. 360.377.0014 F. 360.479.5961
www.parametrix.com

TECHNICAL MEMORANDUM

Date:	September 1, 2010
To:	Steve Teel – Department of Ecology
From:	David Dinkuhn, P.E. – Parametrix
Subject:	Solid Wood Incorporated Site Quarterly Groundwater Monitoring Results, Quarter 6, May 2010
cc:	Kip Summers – City of Olympia David Hanna – City of Olympia Tom Morrill – City of Olympia
Project Number:	235-1577-024
Project Name:	Solid Wood Incorporated (West Bay Park) Site RI/FS and Interim Action

SOLID WOOD INCORPORATED SITE – QUARTER 6 GROUNDWATER MONITORING AND SEEP SAMPLING RESULTS, MAY 2010

This technical memorandum presents results for the sixth round of quarterly groundwater monitoring conducted under the ongoing Remedial Investigation/Feasibility Study (RI/FS) at the Solid Wood Incorporated Site in Olympia, Washington. Quarterly groundwater monitoring is being conducted in accordance with the site's Agreed Order (No. DE-08-TCPSR-5415) and the RI/FS work plan (Parametrix 2008). In addition to the groundwater sampling, two groundwater seeps located adjacent to the former wood burner area were sampled to assess post-cleanup conditions.

QUARTER 6 GROUNDWATER SAMPLING

Groundwater samples were collected from three monitoring wells (MW-08 through MW-10) located in the vicinity of the former wood burner (see Figure 1 located at the end of this technical memorandum). The purpose of the wells is to monitor groundwater conditions in the vicinity of Area D, which was cleaned up during the Interim Action performed in the summer of 2009 (Parametrix 2010).

Groundwater samples were collected on May 3, 2010, using a peristaltic pump and low-flow purging/sampling techniques. Prior to sampling, the wells were purged until measured water quality parameters stabilized according to criteria specified in the RI/FS work plan. Upon stabilization, groundwater samples were collected into the appropriate containers. The final set of water quality parameter measurements along with approximate sampling times are provided in Table 1. All samples were collected on an outgoing tide. A tide chart for May 3, 2010, at Olympia, Washington; boring logs; and field data sheets are attached.

Table 1. Final Water Quality Parameters

Well ID	Date/Time	pH (units)	Conductivity (mS/cm)	Dissolved Oxygen (mg/l)	Temperature (ºC)	Turbidity (NTU)	Redox (mV)	Salinity (%)
MW-08	5/3/10 at 1332	7.08	69.0	–	11.5	<1	-332	4.0
MW-09	5/3/10 at 1416	7.07	53.9	–	11.3	<1	-371	3.5
MW-10	5/3/10 at 1455	6.51	63.3	–	11.1	<1	-271	4.0

Notes:

Endash (–) = Dissolved oxygen levels were not measured due to equipment failure.

mS/cm = millisiemens per centimeter.

mg/l = milligrams per liter.

ºC = degrees Celsius.

NTU = nephelometric turbidity units.

mV = millivolts.

% = percent.

Groundwater samples were submitted to Onsite Environmental of Redmond, Washington, for chemical analysis of priority pollutant metals (total and dissolved) and chloride. A summary of the sampling results is presented in Table 2 (page 3). Table 2 also includes remedial levels (RLs) for groundwater as established in the RI/FS work plan. A Quality Assurance/Quality Control (QA/QC) data review memorandum and the laboratory data report are attached.

The depth to groundwater was measured in each well to provide data used to develop inferred elevation contours as shown on Figure 1. The measurements were collected within a 1-hour period to give a representative snapshot of groundwater elevations. Figure 1 also shows inferred groundwater flow directions based on the elevation contours.

SEEP SAMPLING

Seeps 4 and 5 (Figure 1) were sampled concurrently with the wells between the hours of 14:30 and 15:30 on May 3, 2010. Shallow depressions were excavated by hand in the beach sediments below each seep location to provide a sample collection point. Suspended sediments were allowed to settle prior to sample collection resulting in samples that were generally clear. Samples were collected with a peristaltic pump and new polyethylene tubing. Care was taken during collection to prevent the introduction of suspended sediments in the samples. Dissolved metals samples were collected using an in-line 0.45-micron disposable filter.

The seep samples were also submitted to Onsite Environmental for analysis of total and dissolved priority pollutant metals. A summary of the seep sample results is presented in Table 3 (page 5).

Table 2. Solid Wood Incorporated Site RI/FS Quarter 6 Groundwater Results, May 2010

	Well ID:		MW-08		MW-09			MW-10		
	Date Sampled:		2/3/10	5/3/10	2/3/10	2/3/10[a]	5/3/10	2/3/10	5/3/10	5/3/10[a]
ANALYTE	**Units**	**RL**								
TOTAL METALS										
Antimony	µg/l	6[b]	6U	0.50U	6U	6U	0.50U	6U	0.50U	0.50U
Arsenic	µg/l	5	*6.5U*	1.8U	5U	5U	0.50U	*7.5U*	2.0U	2.5U
Beryllium	µg/l	4[b]	4U	0.50U	4U	4U	0.50U	4U	0.50U	0.50U
Cadmium	µg/l	5	5U	0.50U	5U	5U	0.50U	5U	0.50U	0.50U
Chromium	µg/l	50	50U	1.3	50U	50U	0.98	50U	1.4	1.4
Copper	µg/l	2.4[c]	5.4	5.1	4	3.4	2.7	6.8	4.5	4.5
Lead	µg/l	8.1[c]	8U	0.50U	8U	8U	0.50U	8U	0.50U	0.50U
Mercury	µg/l	0.025[c]	*0.038U*	0.025U	*0.038U*	*0.038U*	0.025	*0.038U*	0.025U	0.025U
Nickel	µg/l	8.2[c]	9.8	15	11	11	11	13	14	13
Selenium	µg/l	50[b]	50U	8.0U	50U	50U	1.6U	50U	2.5U	4.5U
Silver	µg/l	1.9[c]	1.9U	0.50U	1.9U	1.9U	0.50U	1.9U	0.50U	0.50U
Thallium	µg/l	0.47[c]	0.45U	*0.50U*	0.45U	0.45U	*0.50U*	0.45U	*0.50U*	0.50U
Zinc	µg/l	81[c]	80U	18	80U	80U	8.7	80U	12	11
DISSOLVED METALS										
Antimony	µg/l	6[b]	6U	0.50U	6U	6U	0.50U	6U	0.50U	0.50U
Arsenic	µg/l	5	*8U*	1.4U	*6U*	5U	0.50U	*7.5U*	0.50U	2.2U
Beryllium	µg/l	4[b]	4U	0.50U	4U	4U	0.50U	4U	0.50U	0.50U
Cadmium	µg/l	5	5U	0.50U	5U	5U	0.50U	5U	0.50U	0.50U
Chromium	µg/l	50	50U	0.66	50U	50U	0.50U	50U	0.76	0.66
Copper	µg/l	2.4[c]	5.5	4.9	4.1	3.4	3.3	5.9	4.8	4.5
Lead	µg/l	8.1[c]	8U	0.50U	8U	8U	0.50U	8U	0.50U	0.50U
Mercury	µg/l	0.025[c]	*0.038U*	0.025U	*0.038U*	*0.038U*	0.025U	*0.038U*	0.025U	0.025U
Nickel	µg/l	8.2[c]	12	11	11	8.9	9.0	11	11	10
Selenium	µg/l	50[b]	50U	6.0U	50U	50U	2.0U	50U	5.0U	4.0U

(Table Continues)

Table 2. Solid Wood Incorporated Site RI/FS Quarter 6 Groundwater Results, May 2010 (Continued)

	Well ID:		MW-08		MW-09			MW-10		
	Date Sampled:		2/3/10	5/3/10	2/3/10	2/3/10[a]	5/3/10	2/3/10	5/3/10	5/3/10[a]
ANALYTE	**Units**	**RL**								
DISSOLVED METALS (Continued)										
Silver	µg/l	1.9[c]	1.9U	0.50U	1.9U	1.9U	0.50U	1.9U	0.50U	0.50U
Thallium	µg/l	0.47[c]	0.45U	*0.50U*	0.45U	0.45U	*0.50U*	0.45U	*0.50U*	0.50U
Zinc	µg/l	81[c]	80U	15J	80U	80U	6.3J	80U	8J	11
GENERAL CHEMISTRY										
Chloride	mg/l	–	11,000	12,000	8,600	8,400	8,500	13,000	10,000	9,600

[a] Duplicate Sample.

[b] State and federal groundwater maximum contaminant level (MCL).

[c] Surface water applicable or relevant and appropriate requirement (ARAR).

Notes: *italics* = PQL exceeds screening level.

Endash (–) = Not analyzed.

J = Analyte was detected; the reported quantity should be considered an estimate.

mg/l = milligrams per liter.

RL = Remedial level.

µg/l = micrograms per liter.

U = Not detected at given practical quantitation limit (PQL).

Exceeds screening level.

Table 3. Solid Wood Incorporated Site RI/FS Seep Sample Results, May 2010

ANALYTE	Units	RL	Seep ID: SEEP4 Date Sampled: 1/14/09	SEEP4 5/3/10	SEEP5 1/14/09	SEEP5 5/3/10
TOTAL METALS						
Antimony	µg/l	6[a]	5.6U	0.50U	5.6U	0.50U
Arsenic	µg/l	5	3.3U	1.6	3.3U	1.2
Beryllium	µg/l	4[a]	4.0U	0.50U	4.0U	0.50U
Cadmium	µg/l	5	4.4U	0.50U	4.4U	0.50U
Chromium	µg/l	50	11U	1.0	11U	0.50U
Copper	µg/l	2.4[b]	5.9	1.1	8.4	3.8
Lead	µg/l	8.1[b]	1.1U	0.50U	1.1U	0.57
Mercury	µg/l	0.025[b]	*0.125U*	0.025U	*0.125U*	*0.025U*
Nickel	µg/l	8.2[b]	14	3.1	8.1	5.8
Selenium	µg/l	50[a]	28U	1.0U	28U	1.0U
Silver	µg/l	1.9[b]	1.9U	0.50U	1.9U	0.50U
Thallium	µg/l	0.47[b]	0.47U	*0.50U*	0.47U	*0.50U*
Zinc	µg/l	81[b]	69U	5.0	69U	5.0
DISSOLVED METALS						
Antimony	µg/l	6[a]	5.6U	0.50U	5.6U	0.50U
Arsenic	µg/l	5	3.3U	1.7	3.3U	1.3
Beryllium	µg/l	4[a]	4.0U	0.50U	4.0U	0.50U
Cadmium	µg/l	5	4.4U	0.50U	4.4U	0.50U
Chromium	µg/l	50	11U	0.75	11U	0.55
Copper	µg/l	2.4[b]	4.0	1.0	13	3.4
Lead	µg/l	8.1[b]	1.1U	0.50U	1.1U	0.50U
Mercury	µg/l	0.025[b]	*0.125U*	0.025U	*0.125U*	0.025U
Nickel	µg/l	8.2[b]	13	3.0	8.5	4.0
Selenium	µg/l	50[a]	28U	1.0U	28U	1.2U
Silver	µg/l	1.9[b]	1.9U	0.50U	1.9U	0.50U
Thallium	µg/l	0.47[b]	0.47U	*0.50U*	0.47U	*0.50U*
Zinc	µg/l	81[b]	69U	2.6J	69U	3.5J
GENERAL CHEMISTRY						
Chloride	mg/L	–	4,200	1,500	4,200	4,000

[a] State and federal groundwater maximum contaminant level (MCL).

[b] Surface water applicable or relevant and appropriate requirement (ARAR).

Notes: *italics* = PQL exceeds screening level.
mg/l = milligrams per liter.
J = Analyte was detected; the reported quantity should be considered an estimate.
RL = Remedial level.
µg/l = micrograms per liter.
U = Not detected at given practical quantitation limit (PQL).

Exceeds screening level.

DISCUSSION AND RECOMMENDATIONS

As shown in Table 2, constituents that exceeded RLs in the samples from the monitoring wells consist of copper and nickel. The concentrations present in the samples are similar to those reported during Quarter 5 sampling (February 2010). The apparent source of these metals was ash at the former wood burner area that contained elevated levels of copper, lead, nickel, zinc, and dioxins. All ash was successfully removed during the Interim Action (IA; Parametrix 2010) and is no longer a contributing source of copper and nickel to groundwater. The lack of a decreasing trend in copper and nickel in the wells suggests that these metals may be present as a result of area background conditions. One possible source for the background metals in groundwater is infiltrating stormwater runoff from upgradient developed areas that contains metals from anthropogenic sources such as brake pad dust.

Parametrix recommends that no assessment for background conditions in groundwater be made at this time. Further evaluation of groundwater concentrations will be conducted following the 7th quarterly sampling event. It is possible that a decreasing trend may be seen, indicating that the concentrations are not due to background. The addition of dissolved organic carbon analyses is recommended for the groundwater samples. Dissolved organic carbon can bind to dissolved metals and lessen their bioavailability. Dissolved organic carbon data will allow for an assessment of this possibility.

Table 3 shows that copper and nickel are also of concern in Seeps 4 and 5. Comparison of current seep results to those of previous sampling (January 2009) indicates that a distinct reduction in concentrations has occurred (an average of 65 percent reduction). The only constituent that exceeds the RLs is copper in Seep 5. These results indicate that removal of buried metal debris from Area E during the IA was a success in terms of improving local groundwater quality. The remaining copper concentrations in Seep 5 may also be a result of background conditions as discussed above. Parametrix recommends that Seep 5 be resampled during a future quarterly groundwater monitoring event. The seep samples should be analyzed for total and dissolved copper, chloride, and dissolved organic carbon.

REFERENCES

Parametrix. 2008. Work plan for remedial investigation/feasibility study and interim action, Solid Wood Incorporated Site (West Bay Park). Prepared for City of Olympia Parks, Arts, and Recreation Department. October.

Parametrix. 2009. Technical Memorandum – RI/FS and IA work plan addendum No. 2 – seep sampling and storm drain line survey results and approaches to address metals in seeps. Prepared for City of Olympia Parks, Arts, and Recreation Department. June 15.

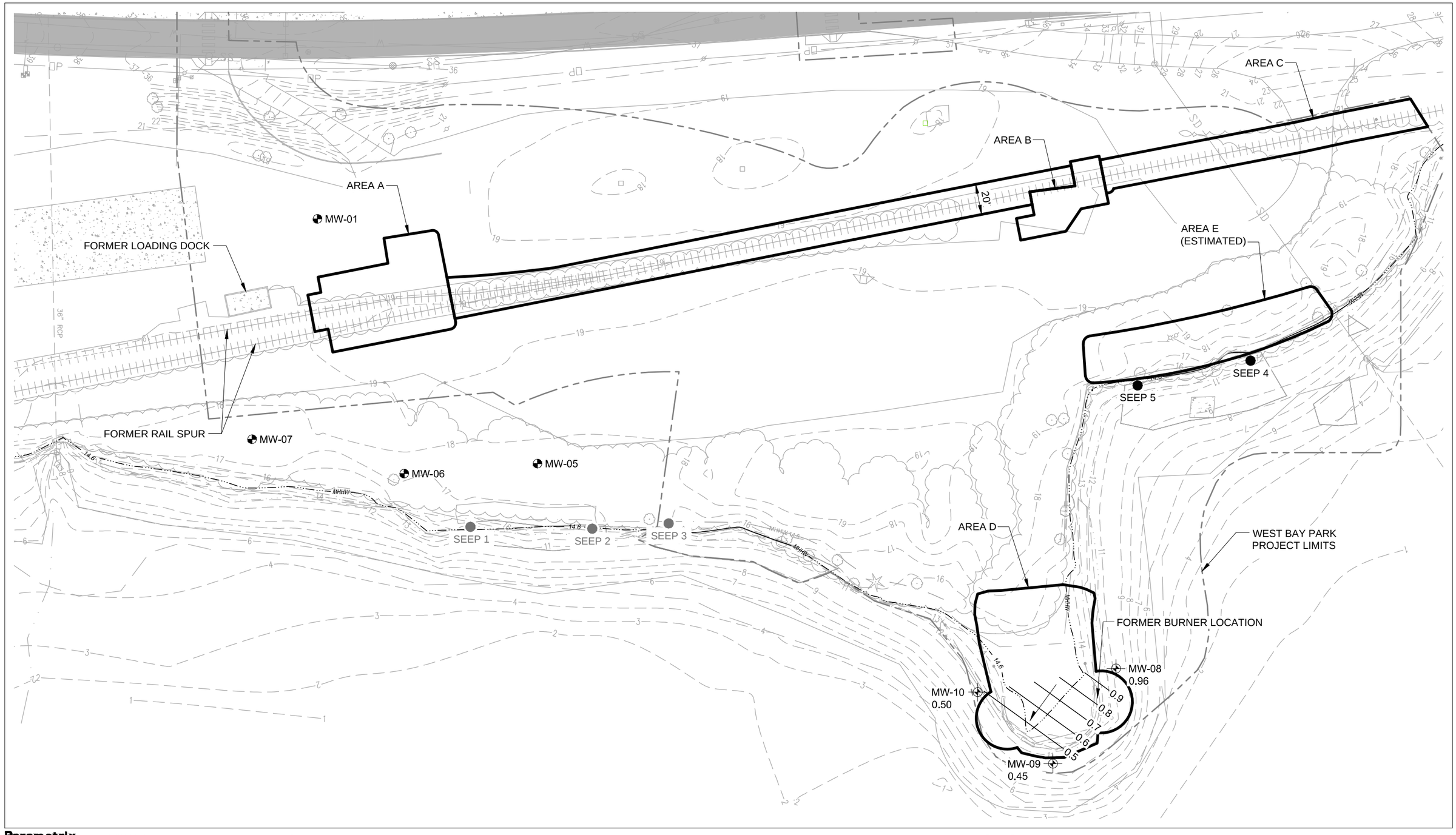
Parametrix. 2010. Draft Solid Wood Incorporated Site (West Bay Park) interim action report. Prepared for City of Olympia Parks, Arts, and Recreation Department. March.

ATTACHMENTS

A Figure 1
B Groundwater Field Data Sheets
C Tide Chart
D Boring Logs
E Data Validation Technical Memorandum
F Laboratory Report

ATTACHMENT A

Figure 1



Parametrix DATE: 06/03/10 2:18pm FILE: BR1577024P04T03_F-3

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SCALE IN FEET

LEGEND

- INTERIM ACTION AREAS FROM SUMMER 2009 CLEANUP ACTIVITIES
- EXISTING MONITORING WELL NOT SAMPLED
- SEEP LOCATION SAMPLED
- SEEPS SAMPLED PREVIOUSLY DURING THE RI
- 10 — INFERRED GROUND WATER SURFACE ELEVATION CONTOUR
- MW-10 0.50 — MONITORING WELL SAMPLED AND GROUNDWATER ELEVATION MEASURED 5/5/10
- GROUNDWATER FLOW

NOTES

1. CONTOUR DATUM: MLLW
2. TOPOGRAPHY SHOWN BASED IN PRE-PARK CONSTRUCTION CONDITIONS.

Figure 1
Solid Wood Incorporated Site
(West Bay Park)
Olympia, Washington
Qtr 6 GW Surface Elevation Contours
May 2010

ATTACHMENT B

Groundwater Field Data Sheets

Parametrix, Inc.

Well #: MW-08
Sample #: WB-GW-MW08-0090

Groundwater Sampling Field Data Sheet

Project Number 235-1577-024
Project Name West Bay
Project Address
Client Name City of Olympia

Date 5/3/10
Location MW-08
Sampled By L. Lindl
Purged By L. Lindl

Casing Diameter: 2" ___ X 4" (outer) ___ 6" ___ Other x 3/4" inner

Depth to Water (feet) 0.96
Depth of Well (feet) 14.77
Reference Point (surveyors notch/etc) TOC (outer)
Date/Time Sampled 5/3/10 1340

Purge Vol. Meas.Method measuring/stop watch
Date Purged 5/3/10
Purge Time (from/to) 1316 - 1332
300 ml/min, 200 ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) ___ Actual Purge Volume (gallons) ___

TIME (2400 hr)	WATER LEVEL (feet)	pH (units) ± 0.1	COND (mS/cm) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10%	ORP (mV)	CUM. VOL. (gal)	Sal (ppt)
1316	2.52	7.10	60.3	0.69	11.7	0.0*	-304		4.0
1320	2.57	7.08	65.5	0.0	11.7	0.0*	-316		4.0
1324	2.48	7.06	66.0	0.0	11.7	0.0*	-324		4.0
1328	2.60	7.06	66.5	0.0	11.6	0.0*	-328		4.0
1332	2.58	7.08	69.0	0.0	11.5	0.0*	-332	1.5 gal	4.0

Purge Equipment peristaltic
Sampling Equipment same

Laboratory Onsite
Chain-of-Custody (yes/no) YES
Shipment Method Courier

Date Sent to Lab 5/4/10
Field QC Sample Number N/A
Split with (name(s)/organization) N/A

Well Integrity Good
Remarks Water in monument
Signature

Page 1 of 1

* blinking valve, visual <10 NTU: clear

Parametrix, Inc.

Well #: MW-09
Sample #: _____

Groundwater Sampling Field Data Sheet

WB-GW-MW09-0090

Project Number	235-1577-024	Date	5/3/10
Project Name	West Bay	Location	MW-09
Project Address		Sampled By	L. Linde
Client Name	City of Olympia	Purged By	L. Linde

Casing Diameter: 2" ~~X~~ outer 4" ____ 6" ____ Other X 3/4" inner

Depth to Water (feet)	0.45	Purge Vol. Meas.Method	meas cup/stopwatch
Depth of Well (feet)	14.77	Date Purged	5/3/10
Reference Point (surveyors notch/etc)	TOC (outer)	Purge Time (from/to)	1400 - 1416
Date/Time Sampled	5/3/10 1425		300 ml/min, 175 ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (feet)	pH (units) ± 0.1	COND (mS/cm) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10%	ORP (mV)	CUM. VOL. (gal)	Sal (‰)
1400	2.80	7.07	55.1	0.42	11.3	0.0*	-352		3.6
1404	3.31	7.07	54.6	0.0	11.3	0.0*	-364		3.5
1408	3.29	7.07	54.2	0.0	11.3	0.0*	-367		3.5
1412	3.34	7.07	54.0	0.0	11.3	0.0*	-369		3.5
1416	3.35	7.07	53.9	0.0	11.3	0.0*	-371	1.5 gal	3.5

Purge Equipment	peristaltic	Sampling Equipment	same
Laboratory	Onsite	Date Sent to Lab	5/4/10
Chain-of-Custody (yes/no)	YES	Field QC Sample Number	N/A
Shipment Method	Courier	Split with (name(s)/organization)	N/A

Well Integrity: Good
Remarks: Water in monument
Signature: _____ Page 1 of 1

* blinking value, < 10 NTU: clear

Parametrix, Inc.

Well #: MW10
Sample #: WB-GW-MW10-0080

Groundwater Sampling Field Data Sheet

Project Number	235-1577-024	Date	5/3/10
Project Name	West Bay	Location	MW-10
Project Address		Sampled By	L. Linde
Client Name	City of Olympia	Purged By	L. Linde

Casing Diameter: 2" ____ X 4" outer ____ 6" ____ Other X 3/4" inner

Depth to Water (feet)	0.50	Purge Vol. Meas.Method	meas cup / stop watch
Depth of Well (feet)	9.77	Date Purged	5/3/10
Reference Point (surveyors notch/etc)	TOC (outer)	Purge Time (from/to)	1439 - 1455
Date/Time Sampled	5/3/10 1500		300 ml/min, 200 ml/min

Purge Volume Calculation: $(\pi r^2 h)(7.48\ gal/ft^3)$(# Casing volumes)
Purge Volume (gallons) for 2" = (0.16)(h)(#Cv); 4" = (0.653)(h)(#Cv); 6" = (1.48)(h)(#Cv)
Calculated Purge Volume (gallons) _____ Actual Purge Volume (gallons) _____

TIME (2400 hr)	WATER LEVEL (feet)	pH (units) ± 0.1	COND (mS/cm) ± 3%	DO (mg/L) ±10%	TEMP °C	TURB. ±10%	ORP (mV)	CUM. VOL. (gal)	Salt (ppt)
1439	2.35	6.46	59.6	0.41	11.1	0.0*	-293		3.9
1443	2.55	6.48	62.3	0.0	11.1	0.0*	-279		4.0
1447	—	6.50	63.7	0.0	11.1	0.0*	-269		4.0
1451	2.45	6.50	63.6	0.0	11.1	0.0*	-270		4.0
1455	2.46	6.51	63.3	0.0	11.1	0.0*	-271	1.5 gal	4.0

Purge Equipment	Onsite Peristaltic	Sampling Equipment	Peristaltic
Laboratory	Peristaltic	Date Sent to Lab	5/4/10
Chain-of-Custody (yes/no)	YES	Field QC Sample Number	WB-GW-MW10-1080
Shipment Method	Courier	Split with (name(s)/organization)	N/A

Well Integrity	Good
Remarks	Water in monument
Signature	[signature]

Page ____ of 1

* blinking value, <10 NTU: clear

ATTACHMENT C

Tide Chart

Tides for Olympia, Budd Inlet starting with May 1, 2010.

Day		High /Low	Tide Time	Height Feet	Sunrise Sunset	Moon	Time	% Moon Visible
Sa	1	Low	2:35 AM	7.2	5:56 AM	Set	7:47 AM	93
	1	High	7:15 AM	13.4	8:22 PM			
	1	Low	2:27 PM	-2.2				
	1	High	9:43 PM	15.0				
Su	2	Low	3:30 AM	7.5	5:54 AM	Rise	12:25 AM	87
	2	High	7:58 AM	12.5	8:24 PM	Set	8:46 AM	
	2	Low	3:10 PM	-1.5				
	2	High	10:32 PM	14.6				
M	3	Low	4:32 AM	7.6	5:52 AM	Rise	1:07 AM	79
	3	High	8:47 AM	11.6	8:25 PM	Set	9:49 AM	
	3	Low	3:56 PM	-0.6				
	3	High	11:22 PM	14.2				
Tu	4	Low	5:44 AM	7.3	5:51 AM	Rise	1:40 AM	71
	4	High	9:44 AM	10.7	8:26 PM	Set	10:55 AM	
	4	Low	4:44 PM	0.4				
W	5	High	12:14 AM	13.8	5:49 AM	Rise	2:07 AM	62
	5	Low	7:05 AM	6.8	8:28 PM	Set	12:00 PM	
	5	High	10:53 AM	9.8				
	5	Low	5:38 PM	1.4				

Return to the Washington selection page, the FAQs/definitions page, the region selection page, the script licensing page, or to the home page.

For information on regulations for fishing in Washington contact: Washington Department of Fish and Wildlife

Typhoons, Hurricanes, etc., are NOT included in the predictions. Tidal current direction changes and tide high and low time predictions can be very different. Tide predictions are PREDICTIONS, they can be wrong so use common sense.

ATTACHMENT D

Boring Logs

Parametrix *inspired people - inspired solutions - making a difference*

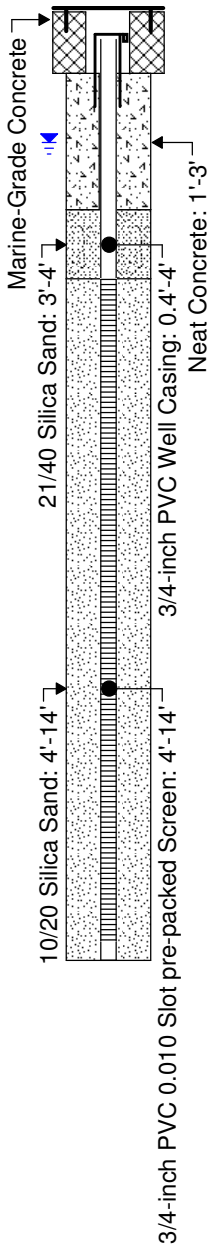
Log ID: MW-08/BCC757

Project Name: West Bay RI/FS
Project #: 235-1577-024
Location: Burner Point
Coordinates: N47°03'10.2" / W122°54'41.6"

Drilling Company: ESN Northwest
Drilling Method: Direct Push
Logged by: L. Linde
Checked by: M. Marshall, L.G.

Drilling Dates: 1-21-2010
Boring Depth: 14 ft
Depth to Water: 2 ft
Ground Elevation: ~11 ft

Depth (ft)	Lithologic Symbol	Description/Classification of Materials	Sample Details: PID (ppm)	Sample Details: Sample ID	Sample Details: Recovery	Boring Diagram	Lithologic Symbol	Depth (ft)
0		Ground Surface						0
		Imported Gravel and Cobble (Fill) Brown						
5								5
10		**Sand (Native)** Gray, shells, easy drilling						10
		Bottom of boring at 14 feet below ground surface.						
15								15
20								20



Parametrix *inspired people - inspired solutions - making a difference*

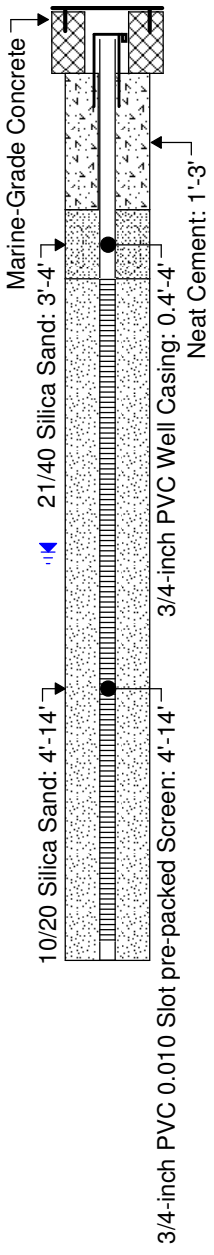
Log ID: MW-09/BCC758

Project Name: West Bay RI/FS
Project #: 235-1577-024
Location: Burner Point
Coordinates: N47°03'09.8" / W122°54'40.6"

Drilling Company: ESN Northwest
Drilling Method: Direct Push
Logged by: L. Linde
Checked by: M. Marshall, L.G.

Drilling Dates: 1-21-2010
Boring Depth: 14 ft
Depth to Water: 8 ft
Ground Elevation: ~9 ft

Depth (ft)	Lithologic Symbol	Description/Classification of Materials	Sample Details: PID (ppm)	Sample Details: Sample ID	Sample Details: Recovery	Boring Diagram	Lithologic Symbol	Depth (ft)
0		Ground Surface						0
		Imported Gravel and Cobble (Fill) Brown						
5								5
10								10
		Bottom of boring at 14 feet below ground surface.						
15								15
20								20



Parametrix *inspired people - inspired solutions - making a difference*

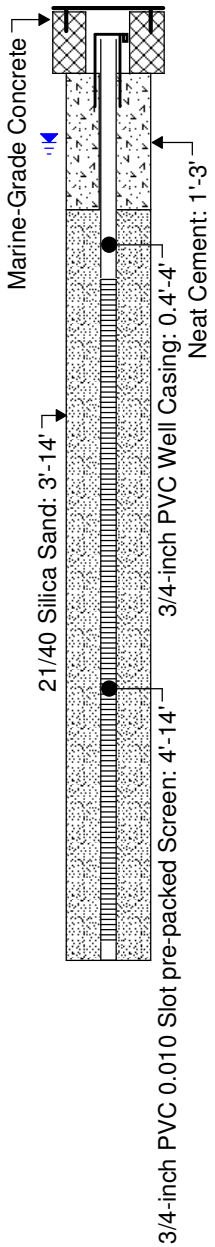
Log ID: MW-10/BCC759

Project Name: West Bay RI/FS
Project #: 235-1577-024
Location: Burner Point
Coordinates: N47°03'09.3" / W122°54'41.3"

Drilling Company: ESN Northwest
Drilling Method: Direct Push
Logged by: L. Linde
Checked by: M. Marshall, L.G.

Drilling Dates: 1-22-2010
Boring Depth: 14 ft
Depth to Water: 2 ft
Ground Elevation: 12 ft

Depth (ft)	Lithologic Symbol	Description/Classification of Materials	Sample Details: PID (ppm)	Sample Details: Sample ID	Sample Details: Recovery	Boring Diagram	Lithologic Symbol	Depth (ft)
0		Ground Surface						0
		Imported Gravel and Cobble (Fill) Brown						
5								5
10		Hard drilling, difficult to advance						10
		Sand (Native) Gray, shells, easy drilling						
		Bottom of boring at 14 feet below ground surface.						
15								15
20								20



ATTACHMENT E

Data Validation Technical Memorandum

Parametrix ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

411 108th AVENUE NE, SUITE 1800
BELLEVUE, WA 98004-5571
T. 425.458.6200 F. 425.458.6363
www.parametrix.com

TECHNICAL MEMORANDUM

Date:	May 18, 2010
To:	Project File
From:	Annika Deutsch
Subject:	Quality Assurance/Quality Control Review for West Bay
cc:	David Dinkuhn
Project Number:	235-1577-024 (04/04)
Project Name:	West Bay Second Quarter 2010 Groundwater Monitoring

INTRODUCTION

This technical memorandum summarizes the results of an internal quality assurance/quality control (QA/QC) review of analytical results for groundwater samples collected on May 3, 2010. Eight groundwater samples (including a field duplicate [WB-GW-MW10-1080]) were submitted to OnSite Environmental, Inc. (Redmond, WA) for analysis.

All groundwater samples from monitoring wells (MW) were analyzed for total and dissolved priority pollutant metals and chloride. Unfiltered groundwater samples from seeps were analyzed for total priority pollutant metals and chloride. Filtered groundwater samples from seeps were analyzed for dissolved priority pollutant metals.

Final laboratory data were submitted to Parametrix via a Tier II-type data report (On-Site Laboratory Reference Number 1005-007). All data and analytical QC elements were reviewed against laboratory and method QC criteria, and qualifiers were applied where judged appropriate.

DATA REVIEW SUMMARY

All samples collected were prepared and analyzed using standard methods. All method holding times were met: All analyses requested on the COC were conducted. Specific PQLs were requested on the COC. These were met, with some exceptions for arsenic and selenium results, which had elevated PQLs due to matrix interference.

No laboratory method blank contamination was observed.

Field duplicate results were acceptable, with the exception of dissolved zinc (relative percent difference [RPD] = 32% [limit = 25%]). All dissolved zinc results were qualified as estimated "J" as a result.

The case narrative notes that the laboratory duplicate for total zinc is outside of control limits. The laboratory duplicate for dissolved chromium also exceeded control limits. All other QC results were acceptable; therefore, no data was qualified as a result of this exceedance.

All other analytical QC results were in control, indicating acceptable analytical accuracy and precision. Table 1 summarizes all data qualified based on this review (i.e., does not include laboratory qualified data).

Table 1. Qualified West Bay Groundwater Data

Sample ID	Matrix	Analyte	Result	Qualifier	Reason
WB-GW-MW08-0090	Groundwater	Zinc	15 µg/L	J	Field duplicate RPD out of control.
WB-GW- MW09-0090	Groundwater	Zinc	6.3 µg/L	J	Field duplicate RPD out of control.
WB-GW-MW10-0080	Groundwater	Zinc	8.0 µg/L	J	Field duplicate RPD out of control.
WB-GW-MW10-1080	Groundwater	Zinc	11 µg/L	J	Field duplicate RPD out of control.
WB-GW-SEEP5-FILT	Groundwater	Zinc	3.5 µg/L	J	Field duplicate RPD out of control.
WB-GW- SEEP4-FILT	Groundwater	Zinc	2.6 µg/L	J	Field duplicate RPD out of control.

J Analyte was detected; the reported concentration should be considered an estimate due to field duplicate RPD out of control.

CONCLUSION

All samples were analyzed within holding times, and appropriate standard methods were used. No laboratory method blank contamination was observed. Analytical accuracy and precision were determined to be generally acceptable based on this review. Field duplicate results were acceptable, with the exception of zinc as noted. All data reported should be considered valid as qualified and acceptable for further use.

ATTACHMENT F

Laboratory Report

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

May 14, 2010

David Dinkuhn
Parametrix, Inc.
4660 Kitsap Way, Suite A
Bremerton, WA 98312

Re: Analytical Data for Project 235-1577-024
Laboratory Reference No. 1005-007

Dear David:

Enclosed are the analytical results and associated quality control data for samples submitted on May 4, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

Case Narrative

Samples were collected on May 3, 2010 and received by the laboratory on May 4, 2010. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Total Metals EPA 200.8/7470A Analysis

The practical quantitation limit for Arsenic is elevated for samples WB-GW-MW08-0090, WB-GW-MW10-0080 and WB-GW-MW10-1080 due to interferences present in the sample.

The practical quantitation limit for Selenium is elevated for samples WB-GW-MW08-0090, WB-GW-MW09-0090, WB-GW-MW10-0080 and WB-GW-MW10-1080 due to interferences present in the sample.

The duplicate RPD for Zinc is outside control limits due to the inherently high percentage variability of samples that are within five times the detection limit.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Dissolved Metals EPA 200.8/7470A Analysis

The practical quantitation limit for Arsenic is elevated for samples WB-GW-MW08-0090, WB-GW-MW10-0080 and WB-GW-MW10-1080 due to interferences present in the sample.

The practical quantitation limit for Selenium is elevated for samples WB-GW-MW08-0090, WB-GW-MW09-0090, WB-GW-MW10-0080 and WB-GW-MW10-1080 due to interferences present in the sample.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

TOTAL METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-007-01					
Client ID:	**WB-GW-MW08-0090**					
Antimony	**ND**	0.50	200.8	5-7-10	5-10-10	
Arsenic	**ND**	1.8	200.8	5-7-10	5-10-10	
Beryllium	**ND**	0.50	200.8	5-7-10	5-11-10	
Cadmium	**ND**	0.50	200.8	5-7-10	5-7-10	
Chromium	**1.3**	0.50	200.8	5-7-10	5-7-10	
Copper	**5.1**	1.0	200.8	5-7-10	5-11-10	
Lead	**ND**	0.50	200.8	5-7-10	5-10-10	
Mercury	**ND**	0.025	7470A	5-10-10	5-10-10	
Nickel	**15**	0.50	200.8	5-7-10	5-11-10	
Selenium	**ND**	8.0	200.8	5-7-10	5-10-10	
Silver	**ND**	0.50	200.8	5-7-10	5-12-10	
Thallium	**ND**	0.50	200.8	5-7-10	5-10-10	
Zinc	**18**	2.5	200.8	5-7-10	5-11-10	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

TOTAL METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-007-02					
Client ID:	**WB-GW-MW09-0090**					
Antimony	**ND**	0.50	200.8	5-7-10	5-10-10	
Arsenic	**ND**	0.50	200.8	5-7-10	5-10-10	
Beryllium	**ND**	0.50	200.8	5-7-10	5-11-10	
Cadmium	**ND**	0.50	200.8	5-7-10	5-7-10	
Chromium	**0.98**	0.50	200.8	5-7-10	5-7-10	
Copper	**2.7**	1.0	200.8	5-7-10	5-11-10	
Lead	**ND**	0.50	200.8	5-7-10	5-10-10	
Mercury	**ND**	0.025	7470A	5-10-10	5-10-10	
Nickel	**11**	0.50	200.8	5-7-10	5-11-10	
Selenium	**ND**	1.6	200.8	5-7-10	5-10-10	
Silver	**ND**	0.50	200.8	5-7-10	5-12-10	
Thallium	**ND**	0.50	200.8	5-7-10	5-10-10	
Zinc	**8.7**	2.5	200.8	5-7-10	5-11-10	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

TOTAL METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-007-03					
Client ID:	**WB-GW-MW10-0080**					
Antimony	**ND**	0.50	200.8	5-7-10	5-10-10	
Arsenic	**ND**	2.0	200.8	5-7-10	5-10-10	
Beryllium	**ND**	0.50	200.8	5-7-10	5-11-10	
Cadmium	**ND**	0.50	200.8	5-7-10	5-7-10	
Chromium	**1.4**	0.50	200.8	5-7-10	5-7-10	
Copper	**4.5**	1.0	200.8	5-7-10	5-11-10	
Lead	**ND**	0.50	200.8	5-7-10	5-10-10	
Mercury	**ND**	0.025	7470A	5-10-10	5-10-10	
Nickel	**14**	0.50	200.8	5-7-10	5-11-10	
Selenium	**ND**	2.5	200.8	5-7-10	5-10-10	
Silver	**ND**	0.50	200.8	5-7-10	5-12-10	
Thallium	**ND**	0.50	200.8	5-7-10	5-10-10	
Zinc	**12**	2.5	200.8	5-7-10	5-11-10	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

TOTAL METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-007-04					
Client ID:	**WB-GW-MW10-1080**					
Antimony	**ND**	0.50	200.8	5-7-10	5-10-10	
Arsenic	**ND**	2.5	200.8	5-7-10	5-10-10	
Beryllium	**ND**	0.50	200.8	5-7-10	5-11-10	
Cadmium	**ND**	0.50	200.8	5-7-10	5-7-10	
Chromium	**1.4**	0.50	200.8	5-7-10	5-7-10	
Copper	**4.5**	1.0	200.8	5-7-10	5-11-10	
Lead	**ND**	0.50	200.8	5-7-10	5-10-10	
Mercury	**ND**	0.025	7470A	5-10-10	5-10-10	
Nickel	**13**	0.50	200.8	5-7-10	5-11-10	
Selenium	**ND**	4.5	200.8	5-7-10	5-10-10	
Silver	**ND**	0.50	200.8	5-7-10	5-12-10	
Thallium	**ND**	0.50	200.8	5-7-10	5-10-10	
Zinc	**11**	2.5	200.8	5-7-10	5-11-10	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

TOTAL METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-007-05					
Client ID:	**WB-GW-SEEP4-0000**					
Antimony	**ND**	0.50	200.8	5-7-10	5-10-10	
Arsenic	**1.6**	0.50	200.8	5-7-10	5-10-10	
Beryllium	**ND**	0.50	200.8	5-7-10	5-11-10	
Cadmium	**ND**	0.50	200.8	5-7-10	5-7-10	
Chromium	**1.0**	0.50	200.8	5-7-10	5-7-10	
Copper	**1.1**	1.0	200.8	5-7-10	5-11-10	
Lead	**ND**	0.50	200.8	5-7-10	5-10-10	
Mercury	**ND**	0.025	7470A	5-10-10	5-10-10	
Nickel	**3.1**	0.50	200.8	5-7-10	5-11-10	
Selenium	**ND**	1.0	200.8	5-7-10	5-10-10	
Silver	**ND**	0.50	200.8	5-7-10	5-12-10	
Thallium	**ND**	0.50	200.8	5-7-10	5-10-10	
Zinc	**5.0**	2.5	200.8	5-7-10	5-11-10	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

TOTAL METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-007-06					
Client ID:	**WB-GW-SEEP5-0000**					
Antimony	**ND**	0.50	200.8	5-7-10	5-10-10	
Arsenic	**1.2**	0.50	200.8	5-7-10	5-10-10	
Beryllium	**ND**	0.50	200.8	5-7-10	5-11-10	
Cadmium	**ND**	0.50	200.8	5-7-10	5-7-10	
Chromium	**1.4**	0.50	200.8	5-7-10	5-7-10	
Copper	**3.8**	1.0	200.8	5-7-10	5-11-10	
Lead	**0.57**	0.50	200.8	5-7-10	5-10-10	
Mercury	**ND**	0.025	7470A	5-10-10	5-10-10	
Nickel	**5.8**	0.50	200.8	5-7-10	5-11-10	
Selenium	**ND**	1.0	200.8	5-7-10	5-7-10	
Silver	**ND**	0.50	200.8	5-7-10	5-12-10	
Thallium	**ND**	0.50	200.8	5-7-10	5-10-10	
Zinc	**5.0**	2.5	200.8	5-7-10	5-11-10	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL

Date Extracted:	5-7-10
Date Analyzed:	5-7,10,11&12-10
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0507W1

Analyte	Method	Result	PQL
Antimony	200.8	**ND**	0.50
Arsenic	200.8	**ND**	0.50
Beryllium	200.8	**ND**	0.50
Cadmium	200.8	**ND**	0.50
Chromium	200.8	**ND**	0.50
Copper	200.8	**ND**	1.0
Lead	200.8	**ND**	0.50
Nickel	200.8	**ND**	0.50
Selenium	200.8	**ND**	1.0
Silver	200.8	**ND**	0.50
Thallium	200.8	**ND**	0.50
Zinc	200.8	**ND**	2.5

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

TOTAL METALS
EPA 7470A
METHOD BLANK QUALITY CONTROL

Date Extracted:	5-10-10
Date Analyzed:	5-10-10
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0510W1

Analyte	Method	Result	PQL
Mercury	7470A	**ND**	0.025

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL

Date Extracted: 5-7-10
Date Analyzed: 5-7,10,11&12-10

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-007-05

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Antimony	**ND**	**ND**	NA	0.50	
Arsenic	**1.64**	**1.55**	5	0.50	
Beryllium	**ND**	**ND**	NA	0.50	
Cadmium	**ND**	**ND**	NA	0.50	
Chromium	**1.01**	**1.10**	9	0.50	
Copper	**1.12**	**1.16**	4	1.0	
Lead	**ND**	**ND**	NA	0.50	
Nickel	**3.06**	**3.46**	12	0.50	
Selenium	**ND**	**ND**	NA	1.0	
Silver	**ND**	**ND**	NA	0.50	
Thallium	**ND**	**ND**	NA	0.50	
Zinc	**4.97**	**ND**	NA	2.5	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

TOTAL METALS
EPA 7470A
DUPLICATE QUALITY CONTROL

Date Extracted: 5-10-10
Date Analyzed: 5-10-10

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-050-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Mercury	**ND**	**ND**	NA	0.025	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

TOTAL METALS
EPA 200.8
MS/MSD QUALITY CONTROL

Date Extracted: 5-7-10
Date Analyzed: 5-7,10,11&12-10

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-007-05

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Antimony	100	**85.3**	85	**76.0**	76	12	
Arsenic	100	**103**	102	**98.5**	97	5	
Beryllium	100	**92.6**	93	**86.9**	87	6	
Cadmium	100	**90.2**	90	**91.8**	92	2	
Chromium	100	**87.6**	87	**95.3**	94	8	
Copper	100	**95.9**	95	**89.6**	88	7	
Lead	100	**95.9**	96	**92.9**	93	3	
Nickel	100	**102**	99	**96.8**	94	5	
Selenium	100	**97.7**	98	**90.7**	91	7	
Silver	100	**96.0**	96	**96.1**	96	0	
Thallium	100	**97.8**	98	**94.8**	95	3	
Zinc	100	**97.7**	93	**92.2**	87	6	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

TOTAL METALS
EPA 7470A
MS/MSD QUALITY CONTROL

Date Extracted: 5-10-10
Date Analyzed: 5-10-10

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-050-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Mercury	6.25	**5.34**	85	**5.39**	86	1	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

DISSOLVED METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-007-01					
Client ID:	**WB-GW-MW08-0090**					
Antimony	**ND**	0.50	200.8		5-11-10	
Arsenic	**ND**	1.4	200.8		5-11-10	
Beryllium	**ND**	0.50	200.8		5-6-10	
Cadmium	**ND**	0.50	200.8		5-11-10	
Chromium	**0.66**	0.50	200.8		5-7-10	
Copper	**4.9**	1.0	200.8		5-7-10	
Lead	**ND**	0.50	200.8		5-6-10	
Mercury	**ND**	0.025	7470A		5-10-10	
Nickel	**11**	0.50	200.8		5-7-10	
Selenium	**ND**	6.0	200.8		5-11-10	
Silver	**ND**	0.50	200.8		5-12-10	
Thallium	**ND**	0.50	200.8		5-6-10	
Zinc	**15**	6.3	200.8		5-11-10	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

DISSOLVED METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-007-02					
Client ID:	**WB-GW-MW09-0090**					
Antimony	**ND**	0.50	200.8		5-11-10	
Arsenic	**ND**	0.50	200.8		5-11-10	
Beryllium	**ND**	0.50	200.8		5-6-10	
Cadmium	**ND**	0.50	200.8		5-11-10	
Chromium	**ND**	0.50	200.8		5-7-10	
Copper	**3.3**	1.0	200.8		5-7-10	
Lead	**ND**	0.50	200.8		5-6-10	
Mercury	**ND**	0.025	7470A		5-10-10	
Nickel	**9.0**	0.50	200.8		5-7-10	
Selenium	**ND**	2.0	200.8		5-11-10	
Silver	**ND**	0.50	200.8		5-12-10	
Thallium	**ND**	0.50	200.8		5-6-10	
Zinc	**6.3**	2.5	200.8		5-11-10	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

DISSOLVED METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-007-03					
Client ID:	**WB-GW-MW10-0080**					
Antimony	**ND**	0.50	200.8		5-11-10	
Arsenic	**ND**	2.2	200.8		5-11-10	
Beryllium	**ND**	0.50	200.8		5-6-10	
Cadmium	**ND**	0.50	200.8		5-11-10	
Chromium	**0.76**	0.50	200.8		5-7-10	
Copper	**4.8**	1.0	200.8		5-7-10	
Lead	**ND**	0.50	200.8		5-6-10	
Mercury	**ND**	0.025	7470A		5-10-10	
Nickel	**11**	0.50	200.8		5-7-10	
Selenium	**ND**	5.0	200.8		5-11-10	
Silver	**ND**	0.50	200.8		5-12-10	
Thallium	**ND**	0.50	200.8		5-6-10	
Zinc	**8.0**	2.5	200.8		5-11-10	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

DISSOLVED METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-007-04					
Client ID:	**WB-GW-MW10-1080**					
Antimony	**ND**	0.50	200.8		5-11-10	
Arsenic	**ND**	2.2	200.8		5-11-10	
Beryllium	**ND**	0.50	200.8		5-6-10	
Cadmium	**ND**	0.50	200.8		5-11-10	
Chromium	**0.66**	0.50	200.8		5-7-10	
Copper	**4.5**	1.0	200.8		5-7-10	
Lead	**ND**	0.50	200.8		5-6-10	
Mercury	**ND**	0.025	7470A		5-10-10	
Nickel	**10**	0.50	200.8		5-7-10	
Selenium	**ND**	4.0	200.8		5-11-10	
Silver	**ND**	0.50	200.8		5-12-10	
Thallium	**ND**	0.50	200.8		5-6-10	
Zinc	**11**	2.5	200.8		5-11-10	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
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DISSOLVED METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-007-07					
Client ID:	**WB-GW-SEEP5-FILT**					
Antimony	**ND**	0.50	200.8		5-11-10	
Arsenic	**1.3**	0.50	200.8		5-11-10	
Beryllium	**ND**	0.50	200.8		5-6-10	
Cadmium	**ND**	0.50	200.8		5-11-10	
Chromium	**0.55**	0.50	200.8		5-7-10	
Copper	**3.4**	1.0	200.8		5-7-10	
Lead	**ND**	0.50	200.8		5-6-10	
Mercury	**ND**	0.025	7470A		5-10-10	
Nickel	**4.0**	0.50	200.8		5-7-10	
Selenium	**ND**	1.2	200.8		5-11-10	
Silver	**ND**	0.50	200.8		5-12-10	
Thallium	**ND**	0.50	200.8		5-6-10	
Zinc	**3.5**	2.5	200.8		5-11-10	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

DISSOLVED METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-007-08					
Client ID:	**WB-GW-SEEP4-FILT**					
Antimony	**ND**	0.50	200.8		5-11-10	
Arsenic	**1.7**	0.50	200.8		5-11-10	
Beryllium	**ND**	0.50	200.8		5-6-10	
Cadmium	**ND**	0.50	200.8		5-11-10	
Chromium	**0.75**	0.50	200.8		5-7-10	
Copper	**1.0**	1.0	200.8		5-7-10	
Lead	**ND**	0.50	200.8		5-6-10	
Mercury	**ND**	0.025	7470A		5-10-10	
Nickel	**3.0**	0.50	200.8		5-7-10	
Selenium	**ND**	1.0	200.8		5-11-10	
Silver	**ND**	0.50	200.8		5-12-10	
Thallium	**ND**	0.50	200.8		5-6-10	
Zinc	**2.6**	2.5	200.8		5-11-10	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL

Date Analyzed: 5-6,7,11&12-10

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0506D1&SB0507D1

Analyte	Method	Result	PQL
Antimony	200.8	**ND**	0.50
Arsenic	200.8	**ND**	0.50
Beryllium	200.8	**ND**	0.50
Cadmium	200.8	**ND**	0.50
Chromium	200.8	**ND**	0.50
Copper	200.8	**ND**	0.50
Lead	200.8	**ND**	0.50
Nickel	200.8	**ND**	0.50
Selenium	200.8	**ND**	1.0
Silver	200.8	**ND**	0.50
Thallium	200.8	**ND**	0.50
Zinc	200.8	**ND**	2.5

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

DISSOLVED METALS
EPA 7470A
METHOD BLANK QUALITY CONTROL

Date Analyzed: 5-10-10

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0507F1

Analyte	Method	Result	PQL
Mercury	7470A	**ND**	0.025

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL

Date Analyzed: 5-6,7,11&12-10

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-007-08

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Antimony	**ND**	**ND**	NA	0.50	
Arsenic	**1.65**	**1.67**	1	0.50	
Beryllium	**ND**	**ND**	NA	0.50	
Cadmium	**ND**	**ND**	NA	0.50	
Chromium	**0.746**	**0.580**	25	0.50	**C**
Copper	**1.02**	**ND**	NA	0.50	
Lead	**ND**	**ND**	NA	0.50	
Nickel	**2.99**	**2.49**	18	0.50	
Selenium	**ND**	**ND**	NA	1.0	
Silver	**ND**	**ND**	NA	0.50	
Thallium	**ND**	**ND**	NA	0.50	
Zinc	**2.59**	**2.70**	4	2.5	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

DISSOLVED METALS
EPA 7470A
DUPLICATE QUALITY CONTROL

Date Analyzed: 5-10-10

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-050-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Mercury	**ND**	**ND**	NA	0.025	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

DISSOLVED METALS
EPA 200.8
MS/MSD QUALITY CONTROL

Date Analyzed: 5-6,7,11&12-10

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-007-08

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Antimony	100	**93.1**	93	**93.3**	93	0	
Arsenic	100	**102**	100	**96.1**	94	6	
Beryllium	80	**77.1**	96	**78.3**	98	2	
Cadmium	100	**92.8**	93	**87.5**	88	6	
Chromium	100	**83.6**	83	**83.2**	82	0	
Copper	100	**96.0**	95	**97.6**	97	2	
Lead	80	**74.4**	93	**74.1**	93	0	
Nickel	100	**97.6**	95	**100**	97	2	
Selenium	100	**98.2**	98	**93.7**	94	5	
Silver	100	**97.9**	98	**77.2**	77	24	
Thallium	80	**75.1**	94	**75.0**	94	0	
Zinc	80	**84.1**	102	**84.8**	103	1	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
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DISSOLVED METALS
EPA 7470A
MS/MSD QUALITY CONTROL

Date Analyzed: 5-10-10

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-050-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Mercury	6.25	**5.39**	86	**5.42**	87	1	

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

CHLORIDE
SM 4500-Cl E

Date Analyzed: 5-10-10

Matrix: Water

Units: mg /L

Client ID	Lab ID	**Result**	PQL
WB-GW-MW08-0090	05-007-01	**12000**	400
WB-GW-MW09-0090	05-007-02	**8500**	200
WB-GW-MW10-0080	05-007-03	**10000**	400
WB-GW-MW10-1080	05-007-04	**9600**	200
WB-GW-SEEP4-0000	05-007-05	**1500**	40
WB-GW-SEEP5-0000	05-007-06	**4000**	100

Date of Report: May 14, 2010
Samples Submitted: May 4, 2010
Laboratory Reference: 1005-007
Project: 235-1577-024

CHLORIDE
SM 4500-Cl E
QUALITY CONTROL

Date Analyzed: 5-10-10

Matrix: Water
Units: mg /L

METHOD BLANK QUALITY CONTROL

Lab ID	Result	PQL
MB0510W1	ND	2.0

SPIKE BLANK QUALITY CONTROL

Lab ID	Result	Spiked Amount	Percent Recovery	Control Limit	Flag
SB0510W1	57.0	50.0	114	95-127	

MATRIX SPIKE QUALITY CONTROL

Lab ID	Result	Spiked Amount	Percent Recovery	Control Limit	Flag
05-007-05	1550				
Matrix Spike	2610	1000	106	97-124	

DUPLICATE QUALITY CONTROL

Lab ID	Result	Duplicate Result	RPD	Control Limit	Flag
05-007-05	1550	1500	3	12	

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Parametrix
Project Number: 235-1577-024
Project Name: West Bay Qtrly GW
Project Manager: D. Dinkuhn
Sampled by: L. Linde / D. Dinkuhn

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day
☐ 2 Day ☐ 3 Day
☒ Standard (7 working days)
(TPH analysis 5 working days)
☐ 5/12 (other)

Laboratory Number: 05-007

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	Tot. AP metals	Diss. AP metals*	Chloride				% Moisture
1	WB-GW-MW08-0090	5/3/10	1340	GW	3														X	X	X				
2	WB-GW-MW09-0090		1425																						
3	WB-GW-MW10-0080		1500																						
4	WB-GW-MW10-1080		1505																						
5	WB-GW-SEEP4-0000		1500		2																				
6	WB-GW-SEEP5-0000		1430		2																				
7	WB-GW-SEEP5-FILT		1430		1															X					
8	WB-GW-SEEP4-FILT		1500		1															X					

	Signature	Company	Date	Time
Relinquished by	Jacob Linde	Parametrix	5/4/10	0820
Received by	Bri Hardy	Parametrix	5/4/10	0820
Relinquished by	Bri Hardy	Parametrix	5/4/10	1008
Received by	Ken Lawrence	Speedy Msgr	5/4/10	10:05
Relinquished by	Ken Lawrence	" "	"	1230
Received by		Client Fed Ex	5/4/10	1230
Reviewed by/Date		Reviewed by/Date		

Comments/Special Instructions:

* Field filtered - PQLs

EIM EDDs

Sb, As, Be, Cd, Cr, Pb, Ni, Ag + Tl = 0.5 ug/l
Se, Cu = 1 ug/l
Zn = 2.5 ug/l
Hg = 0.038 ug/l

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Client Copy