

Technical Memorandum



To: Mike Gross, PE, U.S. Army Corps of Engineers – Portland District

From: Mark Cecchini, Laura McWilliams, PhD, LG, and Jeff Wallace, RG

Date: July 29, 2008

Subject: First Quarter Groundwater, Seep, and Surface Water Sampling Results
Bradford Island Upland Operable Unit Remedial Investigation
Cascade Locks, OR

1.0 Introduction

The United States Army Corps of Engineers (USACE) Portland District is performing a remedial investigation/feasibility study (RI/FS) at Bradford Island at Bonneville Dam, Oregon. This memorandum describes the methods and results of the first quarter of groundwater/seep/surface water sampling at the Upland Operable Unit (OU) on the eastern portion of Bradford Island (site).

In accordance with Contract No. W9128F-04-D-0001, Task Order No. DT07, groundwater samples were collected from 15 monitoring wells at the site. Samples were also collected from two groundwater seeps on the north shore of Bradford Island. Surface water samples were collected from two locations in the Columbia River adjacent to the groundwater seeps. The locations of the monitoring wells, seeps, and surface water samples are shown in Figure 1. Monitoring wells MW-1 through MW-9 are located in the Landfill area of potential concern (APOC), and were installed in late 1990s and early 2002. MW-11 through MW-15 are newly-installed monitoring wells in the Sandblast Area AOPC. And, MW-10 is the newly-installed reference area monitoring well. This is the first groundwater sampling event to include the new wells.

All field activities were carried out in accordance with the *Draft Quality Assurance Project Plan (QAPP) Upland Operable Unit Remedial Investigation* (Upland QAPP, URS, 2008a). The Bradford Island Technical Advisory Group (TAG) is currently reviewing the Upland QAPP. Based on consultation with the TAG, the USACE elected to install the monitoring wells (URS, 2008b) and commence quarterly groundwater sampling prior to the finalization of this Upland QAPP to compress of the schedule by approximately six months.

2.0 Sampling Methodology

The following subsections describe the techniques used to collect groundwater, seep, and surface water samples at the site. This section also discusses sample handling and shipping, the method used to decontaminate field equipment and the disposition of

investigation derived waste generated by the sampling. The sampling locations are shown in Figure 1.

2.1 Groundwater Sampling Method

Prior to purging, the depth to groundwater was measured in each well using a decontaminated water level meter. As a result, water depths were measured over a period of three days at each of the two AOPCs. Table 1 summarizes the water level elevations. These data are plotted on Figures 3 (landfill area) and 4 (sandblast area). The groundwater elevations data were contoured for each of these two areas.

The volume of water in each well was calculated based on the depth to groundwater measurement and well construction data. Except in the case of MW-8, the monitoring wells were purged and the groundwater samples were collected via peristaltic pump with disposable polyethylene tubing. A decontaminated stainless steel Monsoon submersible pump with clean disposable polyethylene tubing was used to purge MW-8 due to the depth of water in MW-8. During purging temperature in degrees Celsius (°C), conductance in milliSiemens per centimeter (mS/cm), dissolved oxygen (DO) in milligrams per liter (mg/L), oxidation/reduction potential (ORP) in millivolts (mV), and pH were periodically measured using a calibrated YSI 556 water quality meter attached to the peristaltic pump with a flow-through cell. The turbidity, clarity, and color of the purge water were measured visually and recorded on the sampling form. A summary of water quality data at the site is presented in Table 2. In general, each well was purged until water quality readings stabilized¹ or until one well volume was removed if stabilization could not be achieved due to slow groundwater recharge. Groundwater sampling forms and calibration logs for the field instruments are included in Attachment A.

Once purging was completed, the flow through cell was detached from the pump outlet; the groundwater sampling team donned clean nitrile gloves and the labeled sample containers were filled. The sample bottles being analyzed for VOCs and TPH-Gx were filled first and special care was taken to avoid aerating the groundwater as it was slowly pumped into the sample container. Filtered samples (dissolved metals, cations, and anions) were collected by attaching the pump outlet to a .45 micron (µm) disposable filter and filling the required sample containers. At all wells except for MW-2 and MW-8 (see discussion in Section 4.0, below) an aliquot of unfiltered water was also collected for ferrous iron analysis using a Hach colorimetric field test kit. The results for the ferrous iron field test were recorded on the groundwater sampling sheet for each well (Attachment A), and are included in Table 2.

¹ Groundwater stabilization criteria are as follows: conductivity +/- 3% of the total range; dissolved oxygen +/- 10% of the total range or 0.2 mg/L, whichever is greater; pH +/- 0.1 units; +/-10 mV.

2.2 Seep Sampling Method

Samples were collected at two groundwater seep locations, S2 and S4 (Figure 1). Two other seeps identified during the site reconnaissance, S1 and S3, were not sampled due to insufficient flow. At each seep where samples were collected, surface water samples were also collected from the Columbia River immediately adjacent to the outflow of the seep. The surface water sampling method is described in Section 2.3.

URS field personnel used ropes to descend and lower equipment down the steep slope face on the north shore of Bradford Island in order to access seeps S2 and S4. At each seep location, a small pool was excavated out of the siltstone with a decontaminated rock hammer in order to collect water flowing from the seep. A laboratory-provided, dedicated four-ounce glass sample jar was placed in the pool with the mouth oriented such that the jar captured the water flowing from the seep (Figure 2). Time was taken to allow the suspended sediment in the pool and jar to settle prior to collecting the seep water sample.

Seep samples were collected by placing dedicated polyethylene tubing in the jar, affixing the tubing to the jar with a clamp, and pumping the water into labeled sample containers with a peristaltic pump, as shown in Figure 2. After the samples were collected at each seep, a calibrated YSI 556 water quality meter was placed in the jar. Water quality parameters for the seep water were recorded once the readings on the meter stabilized. After taking the water quality measurements, the same aliquot of unfiltered water used for ferrous iron analysis using a Hach colorimetric field test kit. Water quality readings and ferrous iron concentrations for the seep sample samples are presented in Table 2.

2.3 Surface Water Sampling Method

Two surface water samples were collected from the Columbia River adjacent to seep locations S2 and S4 (Figure 1). The surface water samples were collected by placing dedicated polyethylene tubing in open water approximately five feet offshore (north) of each seep and filling the sample containers via peristaltic pump. This distance was selected so that the intake tubing could be placed one foot below the surface of the water without disturbing the riverbed sediments. During sample collection, care was taken to avoid agitating sediment in the area of the intake tubing. After the surface water samples were collected, water quality data were collected from the sample location by placing a calibrated YSI 556 water quality meter directly into the river. An aliquot of unfiltered water was also collected for ferrous iron analysis using a Hach colorimetric field test kit. Water quality data and ferrous iron concentrations for the surface water samples are presented in Table 2.

2.4 Sample Handling and Shipping

Once a groundwater, seep, or surface water sample was collected, the sample containers were placed in a cooler with ice for preservation. Samples were labeled with a unique alpha-numeric code indicating the date that the sample was collected, the station location,

and the matrix as specified in the Upland QAPP (i.e., the seep sample collected at S4 on April 18, 2008 was labeled 080418S4SP) (URS, 2008a). At the end of each sampling day, all samples were checked for proper labeling and packed inside a trash bag that was filled with ice, goose necked, and sealed with packing tape. Temperature and trip blanks were also placed in the bag, as necessary. The bag containing the samples and ice was then placed inside a cooler supplied by the analytical laboratory along with packing material to prevent breakage of the sample containers during transit. Prior to pickup by the laboratory courier, a chain of custody (COC) form documenting sample names, sample date and time, and required analyses was completed and placed inside the coolers.

2.5 Decontamination Method

The water level meter and centrifugal pump were decontaminated prior to being used at each well. As specified in the Upland QAPP (URS, 2008a), decontamination was achieved by first submerging the equipment in a phosphate-free soap and deionized water mixture, then methanol, and finally a deionized water rinse. The equipment was thoroughly scrubbed before being submerged in the methanol. The pump was allowed to run while submerged in each stage of the decontamination process.

2.6 Investigation Derived Waste Disposal

Purge water generated during the groundwater sampling was pumped into 5-gallon buckets and transferred into labeled 55-gallon drums. The drums were staged at the Hazardous Materials Storage Area for characterization and disposal by the USACE, per the instructions of the Bonneville Dam Environmental Compliance Coordinator (ECC). Disposable sampling equipment, including tubing, filters, and jars, was treated as standard municipal waste.

3.0 Analytical Results

Fifteen groundwater samples, two seep samples, and two surface water samples were collected for laboratory analysis. Field duplicates were collected at MW-7, MW-10, and MW-11. Additional sample volume was collected at MW-5 and MW-15 so that the laboratory could run matrix spike and matrix spike duplicate samples. Groundwater, seep, and surface water samples were analyzed for the following parameters:

Depending on their location, groundwater samples were analyzed for different parameters, as described in the Upland QAPP (URS, 2008a). Groundwater, seep, and surface water samples associated with the Landfill AOPC were analyzed for total petroleum hydrocarbons (TPH), selected volatile organic compounds (VOCs), selected semivolatile organic compounds (SVOCs), butyltins, the pesticide 4-nitrophenol, and selected metals (total and dissolved). In addition, this first round of samples were analyzed for major cations and anions (dissolved concentrations), total organic carbon (TOC), and dissolved organic carbon (DOC).

The first round groundwater samples associated with the Sandblast Area AOPC were analyzed for TPH, the full suite of VOCs, selected SVOCs, n-butyltin, major cations and anions (dissolved concentrations), TOC and DOC. This analyte list will be reduced in future sampling rounds, as specified in the Upland QAPP (URS, 2008a).

As outlined in the Upland QAPP (URS, 2008a), the groundwater sample from the reference area well (MW-10) was analyzed for the complete list of metals in both the total and dissolved fractions. This first round sample was also analyzed for the organic COIs associated with the Landfill and/or Sandblast Area AOPCs, as well as the major anions (field filtered), TOC, and DOC (the cations were already included in the metals list).

Although not specified in the Upland QAPP, field-filtered samples from all of the monitoring wells, seep, and surface water samples were inadvertently analyzed for ammonia; those results are also reported herein. The complete results of the laboratory analyses are presented in Tables 3 through 6. A data quality review of the analytical results, prepared in accordance with the Upland QAPP (2008a), is provided in Attachment B.

Tables 3 through 6 include a column listing the most conservative water quality criteria for each analyte, as identified in Table 10 of the Upland QAPP (URS, 2008a). Although many of these screening criteria are not applicable to groundwater at the site (i.e., they were developed for surface water or drinking water), they are provided for reference. Concentrations are highlighted in the tables where they exceed most conservative water quality criteria. Concentrations of five analytes (benzo(b)fluoranthene, arsenic, iron, manganese, and silver) exceed the screening criteria (see Table 6). With the exception of benzo(b)fluoranthene, these analytes are naturally occurring metals that leach into groundwater from local soils, and the concentrations measured in the reference area well are interpreted as background concentrations. Therefore the concentrations of inorganic analytes measured in the primary sample from the reference area well are included in Tables 3 and 4 and only those inorganic analytes that exceed both background concentrations and the most conservative water quality criteria are highlighted in these tables.

4.0 Variances from QAPP

The groundwater sampling at Bradford Island was conducted in general accordance with the procedures described in the Upland QAPP (URS, 2008a). However, some minor variances from the procedures described in the QAPP occurred, as described below:

- At MW-8, a submersible pump was used to purge and sample the groundwater because the water level in the well was too deep to be sampled with a peristaltic pump. A rinsate blank was collected by pumping deionized water through the pump and into sample containers in order to verify the cleanliness of the submersible pump and the efficacy of the decontamination method.

- No rinsate blanks were collected from the seep sampling equipment, because the seep sampling method described in Section 3.3 used only clean dedicated sampling equipment (jar and tubing).
- VOCs and TPH-Gx samples were sent to CAS in three separate submittals and logged in by CAS as K0803288, K0803393 and K0803410. Trip blanks were inadvertently omitted when packaging the coolers from two of these submittals (K0803288 and K0803410). This problem has been remedied and trip blanks will be included in all future submittals with VOC and/or TPH-Gx analyses. The trip blank included in K0803393 was acceptable. Sample results were not qualified based on trip blanks.
- Testing for ferrous iron (using the Hach testing kit) was inadvertently omitted during sampling of monitoring wells MW-2 and MW-8.
- Samples from all stations were inadvertently analyzed for dissolved ammonia.

References

URS, 2008a. *Draft Quality Assurance Project Plan*. Upland Operable Unit Remedial Investigation, Bradford Island. May 2008.

URS, 2008b. *Groundwater Monitoring Well Installation Report*. Upland Operable Unit Remedial Investigation, Bradford Island. June 9, 2008.

Figures

Figure 1 – Bradford Island Groundwater, Seep, and Surface Water Sample Locations

Figure 2 – Seep Sample Collection

Figure 3 – Landfill and Reference Area Groundwater Elevations

Figure 4 – Sandblast Area Groundwater Elevations

Tables

Table 1 – Groundwater Elevations

Table 2 – Groundwater Field Parameters

Table 3 – Analytical Results from Wells, Seep, and Surface Water Associated with the Landfill

Table 4 – Analytical Results from Sandblast Area Wells (except VOCs)

Table 5 – VOC Analytical Results from Sandblast Area Wells

Table 6 – Analytical Results from Reference Area Well

Attachments

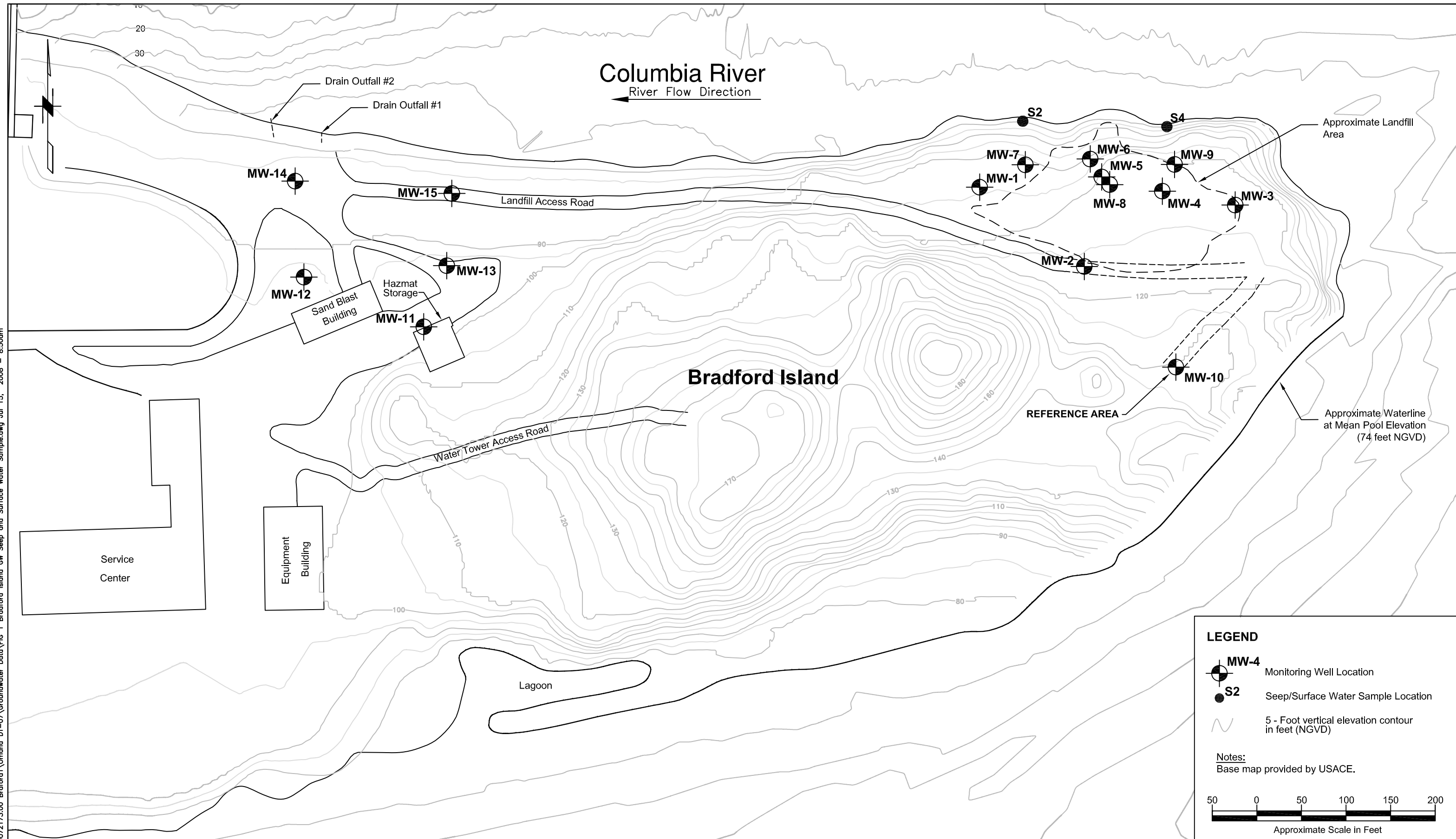
Attachment A – Field Notes, Groundwater, Seep, and Surface Water Sampling Forms

Attachment B – Quality Control Summary Report for Analytical Chemistry

FIGURES



O:\25692708 USACE\53-F0072173.00 Bradford1\Omaha DT-07\Groundwater Data\FIG 1 Bradford Island GW Seep and Surface Water Sample.dwg Jul 15, 2008 - 8:50am



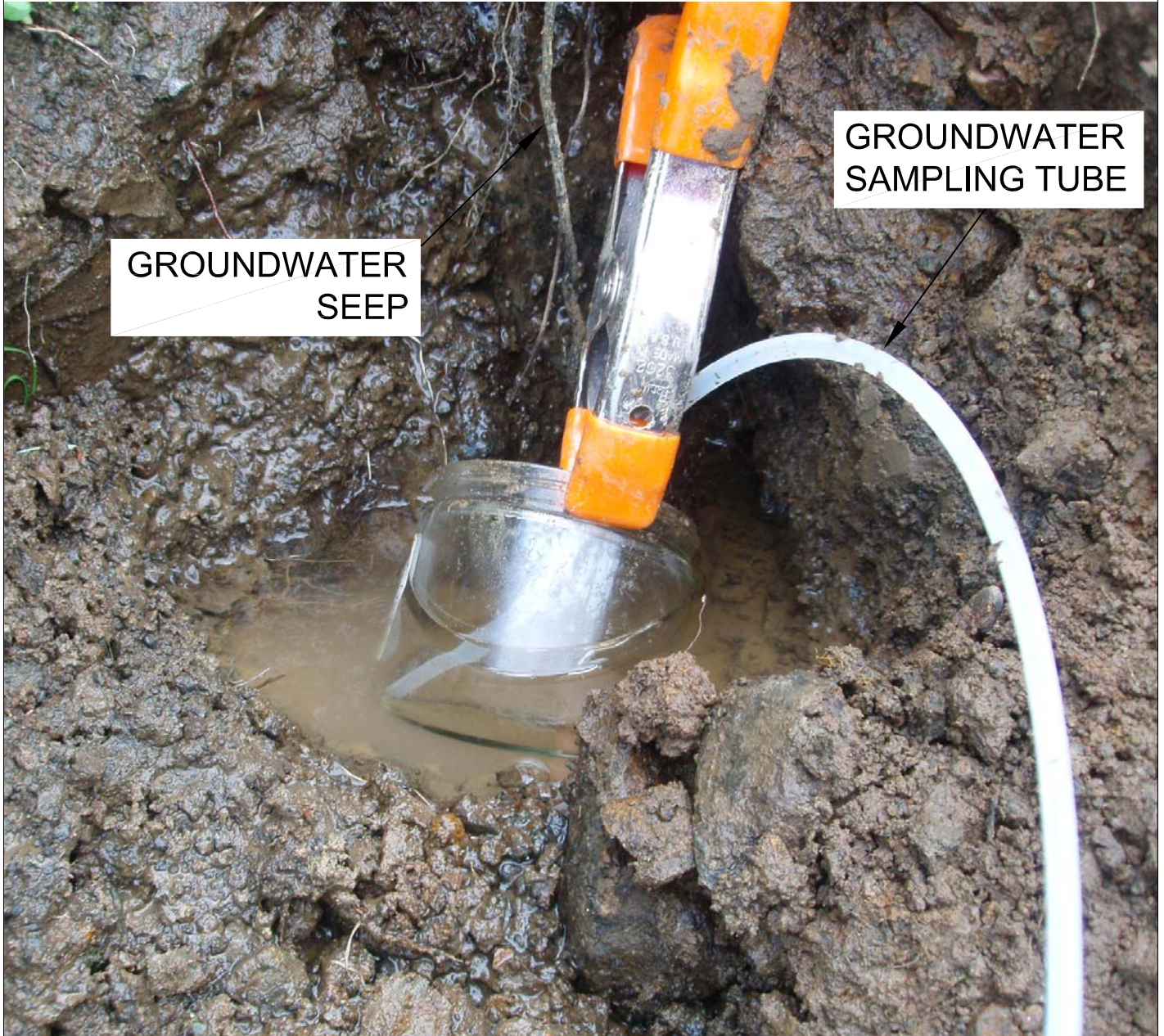
LEGEND

- MW-4 Monitoring Well Location
- S2 Seep/Surface Water Sample Location
- 5 - Foot vertical elevation contour in feet (NGVD)

Notes:
Base map provided by USACE.

50 0 50 100 150 200
Approximate Scale in Feet

JOB No. 25695767		DESIGNED: LSM	PROJ. MANAGER: JTW	URS 111 SW Columbia, Suite 1500 Portland, Oregon 97201-5814 (tel) 503-222-7200 (fax) 503-222-4292 www.urscorp.com	BRADFORD ISLAND CASCADE LOCKS, OREGON	BRADFORD ISLAND GROUNDWATER SEEP AND SURFACE WATER SAMPLE	DRAWING NUMBER: FIGURE 1	
SCALE: 1"=100'		DRAWN BY: SPB	APPROVED BY: LSM				CAD FILE NUMBER: FIG 1	
No. DATE BY REVISION		CHECKED BY:	DATE: JULY 08				SHEET: OF	REV.



SEEP SAMPLE COLLECTION

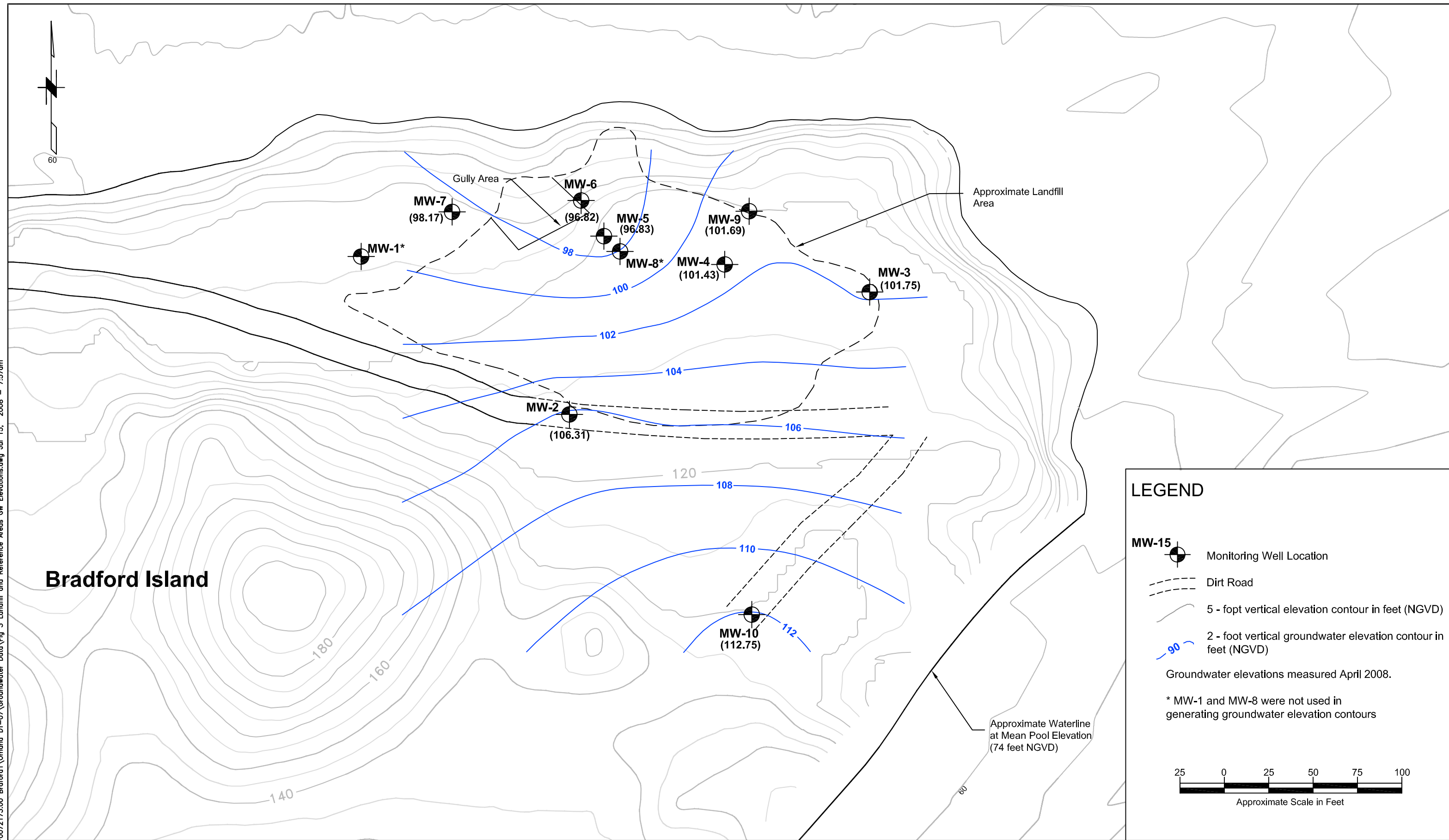
US ARMY CORPS OF ENGINEERS
BRADFORD ISLAND
CASCADE LOCKS, OREGON

JULY 2008
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FIGURE 2

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SCALE: 1"=100'	DRAWN BY: SPB	APPROVED BY: LSM
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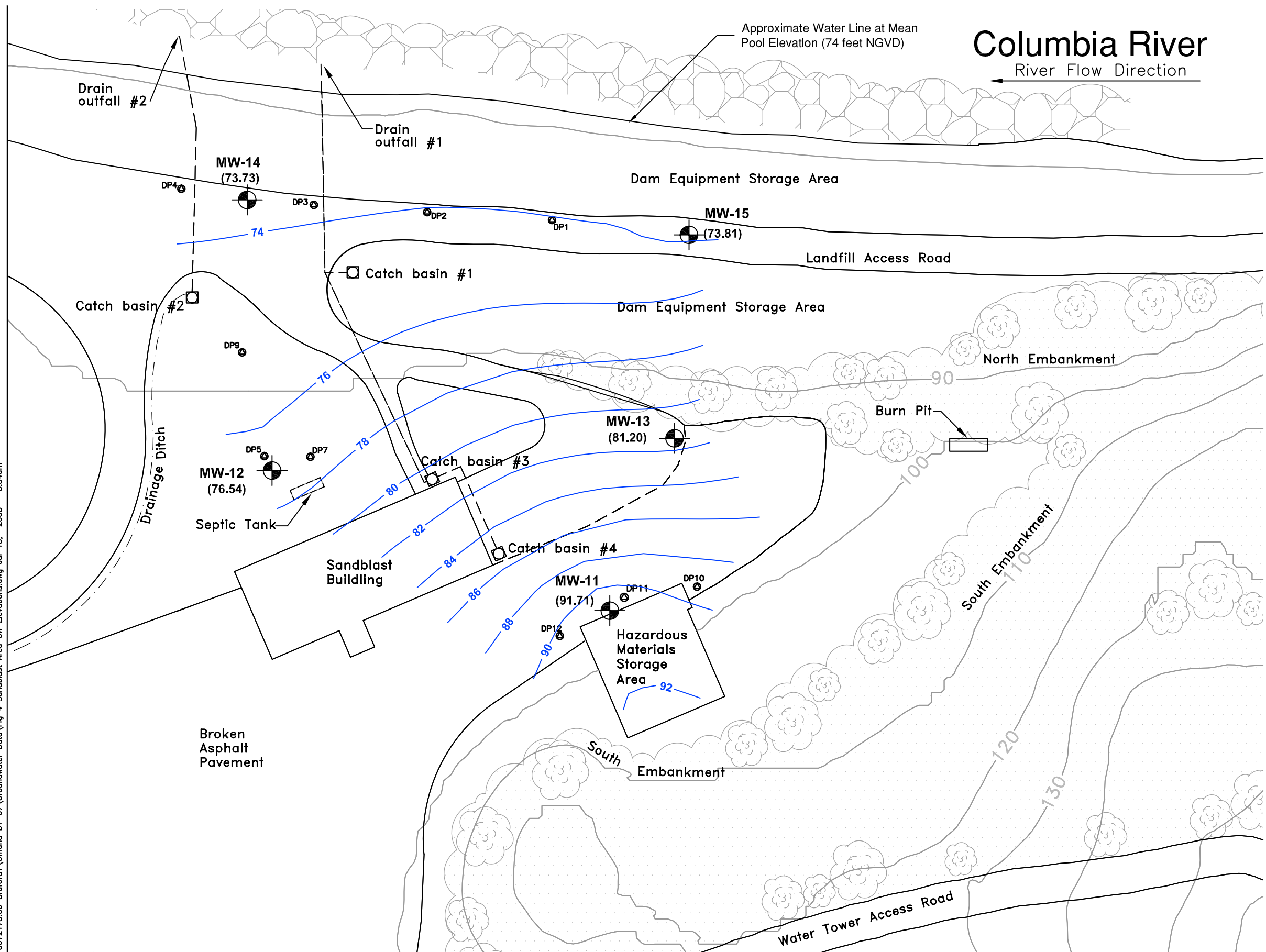
BRADFORD ISLAND

CASCADE LOCKS, OREGON

**LANDFILL AND REFERENCE AREAS
GROUNDWATER ELEVATIONS**

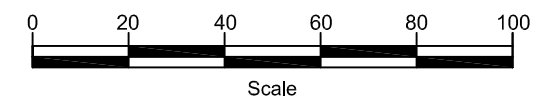
DRAWING NUMBER: FIGURE 3	
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O:\25692709 USACE\53-F0072173.00 Bradford1\Omaha DT-07\Groundwater Data\Fig 4 Sandblast Area GW Elevations.dwg Jul 15, 2008 - 8:54am



LEGEND

- MW-15** Monitoring Well Location
 - DP1** Geoprobe Boring Location
 - 10-foot vertical contour in feet above mean sea level
 - 2 foot vertical groundwater elevation contour in feet (NGVD)
- Groundwater elevations measured April 2008.



No.	DATE	BY	REVISION

JOB No. 25695767	DESIGNED: LSM	PROJ. MANAGER: JTW	
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**SANDBLAST AREA
GROUNDWATER ELEVATIONS**

DRAWING NUMBER: FIGURE 4	
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SHEET: OF	REV.

TABLES



**Table 1
Groundwater Elevations**

Bradford Island - Upland OU Remedial Investigation
1st Quarter Groundwater, Seep, Surface Water Sampling Event - April 2008

Well ID	Measuring Point Elevation (ft msl)	Total Depth (ft btc)	Depth to Water ¹ (ft btc)	Groundwater Elevation (ft msl)
Landfill AOPC				
MW-1	105.5	31.5	27.12	78.38
MW-2	116.56	34.2	10.25	106.31
MW-3	115.21	22.8	13.46	101.75
MW-4	114.79	32.2	13.36	101.43
MW-5	114.07	36.9	17.24	96.83
MW-6	113.02	33.37	16.2	96.82
MW-7	106.92	33.2	8.75	98.17
MW-8	115.29	60.3	41.63	73.66
MW-9	115.16	17.3	13.47	101.69
Reference Area				
MW-10	133.2	57.5	20.45	112.75
Sandblast Area AOPC				
MW-11	98.12	36.5	6.41	91.71
MW-12	100.62	29.55	24.08	76.54
MW-13	97.55	36.05	16.35	81.2
MW-14	86.67	23.5	12.94	73.73
MW-15	86.86	22.1	13.05	73.81

Notes:

¹ Depths to groundwater were measured over the course of one week, immediately prior to sampling each well

AOPC = area of potential concern

ft msl = feet above mean sea level

ft btc = feet below top of well casing

Table 2
Groundwater Field Parameters
Bradford Island - Upland OU Remedial Investigation
1st Quarter Groundwater, Seep, Surface Water Sampling Event - April 2008

Well ID	Temperature (°C)	Conductivity (mS/cm)	Dissolved Oxygen (DO) (mg/L)	pH	ORP (mV)	Turbidity	Ferrous Iron ¹ (mg/L)
Landfill AOPC							
MW-1	11.02	1.386	6.47	8.34	91.3	C	0
MW-2	10.23	0.273	9.22	8.62	151.5	C	--
MW-3	9.4	0.086	2.85	6.3	137.9	C	0
MW-4	10.04	0.394	0.33	6.65	113.4	C	0.2
MW-5	10.81	0.44	0.4	6.52	-55.4	C	1.6
MW-6	10.92	0.588	1.44	6.88	-156.5	C	2.7
MW-7	10.36	0.326	0.94	7.23	-171.3	SC	7
MW-8	12.68	4.123	2.29	8.21	80.1	C	--
MW-9	11.76	0.102	2.48	5.78	92.5	SC	0.3
Reference Area							
MW-10	9.77	0.183	1.56	8.36	-107.8	C	0
Sandblast Area AOPC							
MW-11	10.13	0.335	1.98	8.97	116.2	C	0
MW-12	9.5	0.234	3.71	6.74	186.2	C	0
MW-13	9.76	0.27	0.84	7.73	-89.9	C	0
MW-14	9.78	0.14	5.72	6.66	70.2	C	0
MW-15	9.73	0.159	6.57	6.38	98.1	C	0
Seep							
S2	8.18	0.16	8.54	7.37	88.5	SC - C	0
S4	9.93	0.368	9.5	6.95	281.5	C	0
Surface Water							
S2	8.28	0.132	13.12	7.58	92.6	C	0
S4	8.41	0.13	11.79	8.29	198	C	0

Notes:

Readings shown are final readings recorded prior to sampling

¹Ferrous iron concentrations determined using Hach colorimetric field test kits

AOPC = area of potential concern

-- = not measured

C = clear

SC = slightly cloudy

ORP = oxidation reduction potential

Table 3
Analytical Results from Wells, Seeps and Surface Water Associated with the Landfill
Bradford Island - Upland OU Remedial Investigation
1st Quarter Groundwater, Seep, Surface Water Sampling Event - April 2008

Well ID	MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07	MW-07 DUP	MW-08	MW-09	S2 - Seep	S2 - Surface	S4 - Seep	S4 - Surface	Most Conservative Screening Criteria ¹	Reference Area Well (MW-10)
Screen Interval (feet bgs)	19.84-29.84	22.21-32.21	10.99-20.99	8.21-28.21	10.36-35.36	25-30	5.24-30.24	5.24-30.24	52.99-57.99	15.18-20.18	-	-	-	-		
URS ID	080416MW1GW	080416MW2GW	080417MW3GW	080417MW4GW	080416MW5GW	080417MW6GW	080416MW7GW	080416MW22GW	080418MW8GW	080417MW9GW	080418S2SP	080418S2SW	080417S4 SP	080417S4 SW		
Sample Date	04/16/08	04/16/08	04/17/08	04/17/08	04/16/08	04/17/08	04/16/08	04/16/08	04/18/08	04/17/08	04/18/08	04/18/08	04/17/08	04/17/08		
Total Petroleum Hydrocarbons per NWTPH Gx/Dx Methods (µg/L)																
Gasoline Range Organics	250 U	250 U	18 J	250 U	120 J	30 J	13 J	13 J	250 U	250 U	250 U	250 U	250 U	250 U	NE	
Diesel Range Organics	110 U	120 U	110 U	110 U	490	360	120 U	110 U	15 J	65 J	120 U	110 U	120 U	120 U	NE	
Residual Range Organics	110 U	120 U	110 U	110 U	180	120 U	120 U	110 U	120 U	130	120 U	110 U	120 U	120 U	NE	
VOCs per EPA Method 8260B (µg/L)																
Chloroform	0.5 U	0.5 U	0.5 U	2.2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.22 J	0.5 U	0.5 U	0.74	0.5 U	0.17	
Tetrachloroethene (PCE)	0.5 U	0.5 U	6.8	0.25 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.6	0.15 J	0.5 U	1.7	0.5 U	0.105	
Vinyl Chloride	0.5 U	0.5 U	0.5 U	0.5 U	0.18 J	0.16 J	0.94	0.97	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.015	
SVOCs and Pesticides per EPA Method 8270C (µg/L)																
1,4-Dichlorobenzene	0.21 U	0.2 U	0.21 U	0.22 U	0.19 U	0.19 U	0.23 U	0.22 U	0.23 U	0.2 U	0.23 U	0.2 U	0.2 U	0.21 U	0.467	
4-Nitrophenol	2.1 U	2 U	2.1 U	2.2 U	1.9 U	1.9 U	2.3 U	2.2 U	2.3 U	2 U	2.3 U	2 U	2 U	2.1 U	NE	
Phenanthrene	0.21 U	0.2 U	0.21 U	0.22 U	0.21	0.19 U	0.23 U	0.22 U	0.23 U	0.2 U	0.23 U	0.2 U	0.2 U	0.21 U	NE	
Phenol	0.53 U	0.49 U	0.52 U	0.53 U	0.48 U	0.48 U	0.56 U	0.53 U	0.57 U	0.5 U	0.57 U	0.48 U	0.49 U	0.53 U	10,950	
Butyltins per Krone, et. al. (µg/L)																
Di-n-butyltin	0.05 U	0.1 U	0.02 J	0.050 U	0.05 U	0.05 U	0.05 U	0.05 U	0.050 U	0.05 U	0.05 U	0.050 U	0.05 U	0.05 U	NE	
n-Butyltin	0.05 U	0.1 U	0.05 U	0.050 U	0.05 U	0.05 U	0.05 U	0.05 U	0.087 U	0.087 U	0.087 U	0.087 U	0.05 U	0.05 U	NE	
Total Metals per EPA Methods 6010/6020 (µg/L)																
Arsenic	21.3	6.93	0.35 J	0.55	2.65	2.69	15.8	16.0	6.86	0.72 U	1.01 U	1.10 U	12.8	1.17	0.018	1.32
Iron	75.5	185	112	746	19,300	25,100	29,300	28,700	854	2,550	5,300	251	121,000	446	300	436
Lead	0.558	0.397	0.154	26.9	0.442	0.056	0.258	0.285	0.463	0.718	2.23	0.243	25.7	0.407	2.5	0.363
Manganese	3.85 U	6.74 U	6.25 U	53.2	2,210	3,280	1,430	1,460	265	103	75	11.1 U	3,240	13.6	50.0	246
Dissolved Metals per EPA Methods 6010/6020 (µg/L) (Field Filtered)																
Arsenic	19.3	7.98	0.50 U	0.50 U	2.52	2.33	10.7	10.6	7.92	1.4	0.52 U	1.01	1.0	0.87	0.018	1.33
Calcium	42,000	9,510	12,300	98,000	66,300	76,600	42,600	43,600	172,000	11,600	22,600	20,500	76,400	19,900	NE	29,500
Iron	14.6 J	20.1	5.8 J	8.8 J	18,800	24,200	25,300	26,000	5.8 J	176	14.9 J	20 U	9.7 J	9.2 J	300	9.1 J
Lead	0.281	0.05 U	0.012 J	3.5	0.014 J	0.017 J	0.05 U	0.05 U	0.05 U	0.107	0.065	0.016 J	0.018 J	0.05 U	2.5	0.012 J
Magnesium	2810	1210	4,200	7,550	21,800	25,800	16,800	16,900	13,000	2,560	5,070	6,330	16,600	6,190	NE	7,990
Manganese	0.28 U	0.12	0.55	53.1	2,200	3,200	1,440	1,470	238	48.9	5.41	0.49	1.99	0.56	50.0	214
Potassium	4620	5020	808 J	3,750	7,310	7,240	3,170	3,220	12,900	2,680	771 J	1490 J	4160	1,510 J	NE	4,810
Sodium	355,000	77,400	4,100	4,040	15,400	41,300	7,180	7,500	740,000	11,800	19,700	7,900	6,680	7,630	NE	5,440
General Chemistry Parameters																
Inorganic Anions by EPA Method 300.0 (mg/L) (Dissolved - Field Filtered)																
Bromide	0.072 J	0.1 U	0.1 U	0.1 U	0.02 J	0.029 J	0.1 U	0.1 U	0.049 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NE	0.1 U
Chloride	5.3	3.8	0.9	1.6	4.7	22.6	1.4	1.4	13.5	0.9	1.1	3.7	1.6	3.7	230000	1.8
Fluoride	0.5	0.06 J	0.20 U	0.121 J	0.12 J	0.2	0.3	0.3	0.2 U	0.2 U	0.031 J	0.147 J	0.093 J	0.15 J	2190	0.027 J
Sulfate	708	93.8	4.2	7.7	1.7	13.7	1.3	1.3	1790	16.2	13.6	14.5	20.4	14.4	NE	6.8
Nitrate/Nitrite as Nitrogen per Method 353.2 (mg/L) (Dissolved - Field Filtered)																
Nitrate+Nitrite as Nitrogen	0.47	0.026	0.570	0.320	0.050 UJ	0.150	0.050 U	0.050 U	0.050 U	0.007 J	1.110	0.360	0.180	0.44	1000	0.024 J
Alkalinity per Method SM 2320B (mg/L) (Dissolved - Field Filtered)																
Bicarbonate as CaCO3	66	96	44	287	305	356	198	195	44	46	102	76	256	76	NE	118
Carbonate as CaCO3	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NE	2 U
Organic Carbon per SM 5310 C (mg/L)																
Carbon, Dissolved Organic	2.8	1.3	1.7	4.1 J	8.7 J	9.3	8.2 J	6.9	2.9	6.1 J	2.5	2.3 J	3.5 J	2.1 J	NE	0.5
Carbon, Total Organic	2.8	1.3	1.8	3.9	9.4	9.3	7.1	7.0	2.8	4.5	2.5	2.1	3.4	2.0	NE	0.6
Ammonia per SM 4500 NH3 E (mg/L) (Dissolved - Field Filtered)																
Ammonia as Nitrogen	0.05 U	0.02 J	0.1	0.05 U	1.51	1.16	0.72	0.66	0.3	0.08	0.05 U	0.05 U	0.05 U	0.05 U	NE	0.02 J

Notes:

Bold = indicates detections above the reported MRL.

- = not analyzed

mg/L = milligrams per liter

µg/L = micrograms per liter

NE = Not Established

U = The analyte was analyzed for but not detected at or above the reported method reporting limit (MRL).

J = The result is an estimated concentration.

VOCs = Volatile Organic Compounds

SVOCs = Semivolatile Organic Compounds

Yellow background = reported concentration exceeds screening criteria (organics) or exceeds both screening criteria and reference well concentration (inorganics).

¹ = most conservative water quality criteria identified in the Upland QAPP (URS, 2008a)

Table 4
Analytical Results for Sandblast Area Wells (excluding VOCs)
Bradford Island - Upland OU Remedial Investigation
1st Quarter Groundwater, Seep, Surface Water Sampling Event - April 2008

Well ID	MW-11	MW-11 DUP	MW-12	MW-13	MW-14	MW-15	Most Conservative Screening Criteria ¹	Reference Area Well
Screen Interval (feet bgs)	26-36	26-36	16-26	26-36	13-23	12-22		
Sample ID	080415MW11GW	080415MW20GW	080415MW12GW	080414MW13GW	080414MW14GW	080414MW15GW		
Sample Date	04/15/08	04/15/08	04/15/08	04/14/08	04/14/08	04/14/08		
Total Petroleum Hydrocarbons per NWTPH Gx/Dx Methods (µg/L)								
Gasoline Range Organics	14 J	13 J	250 U	15 J	250 U	250 U	NE	250 U
Diesel Range Organics	110 U	110 U	120 U	110 U	100 U	120 U	NE	130 U
Residual Range Organics	110 U	120 U	120 U	110 U	100 U	120 U	NE	130 U
SVOCs per EPA Method 8270C (µg/L)								
Benzo(b)fluoranthene	0.21 U	-	0.018 J	0.23 U	0.22 U	0.21 U	0.0038	0.025 J
Benzo(k)fluoranthene	0.21 U	-	0.21 U	0.23 U	0.22 U	0.21 U	0.0038	0.23 U
Phenanthrene	0.21 U	-	0.21 U	0.084 J	0.22 U	0.21 U	NE	1.23 U
Butyltins per Krone, et. al. (µg/L)								
n-Butyltin	0.026 J	-	0.05 U	0.014 J	0.05 U	0.05 U	NE	0.031 J
Total Metals per EPA Methods 6010/6020 (µg/L)								
Arsenic	11.6	-	0.61	1.86	0.79	0.54	0.018	1.32
Iron	1500	-	50.4 U	55.6 U	188	163	300	436
Vanadium	5.9 J	-	1.1 J	1.0 J	1.8 J	1.4 J	183	1.4 J
Dissolved Metals per EPA Methods 6010/6020 (µg/L)								
Arsenic	8.99	-	0.61	1.79	0.84	0.51	0.018	1.33
Calcium	6690	-	30900	44300	22700	28200	NE	29,500
Iron	20 U	-	20 U	12.4 J	20 U	6.4 J	300	9.1 J
Magnesium	883	-	8430	14000	6140	7120	NE	7,990
Potassium	2610	-	2260	1480 J	1170 J	782 J	NE	4,810
Sodium	89400	-	13400	18400	6860	7620	NE	5,440
Vanadium	3.1 J	-	10 U	1.1 J	1.1 J	0.9 J	182.5	10 U
General Chemistry Parameters								
Inorganic Anions by EPA Method 300.0 (mg/L) (Dissolved - Field Filtered)								
Bromide	0.015 J	0.013 J	0.016 J	0.1 U	0.1 U	0.1 U	NE	0.1 U
Chloride	2.5	2.5	4.4	3	2.1	2.4	230,000	1.8
Fluoride	0.2	0.2	0.082 J	0.069 J	0.055 J	0.051 J	2,190	0.027 J
Sulfate	24.9	25.1	10.1	14.5	13.1	13.1	NE	6.8
Nitrate/Nitrite as Nitrogen per Method 353.2 (mg/L) (Dissolved - Field Filtered)								
Nitrate+Nitrite as Nitrogen	0.021 J	0.016 J	0.110	0.007 J	0.200	0.026 J	1,000	0.024 J
Carbonate Alkalinity per Method SM 2320B (mg/L) (Dissolved - Field Filtered)								
Carbonate as CaCO ₃	52 J	24 J	2 U	2 U	2 U	2 U	NE	2 U
Organic Carbon per SM 5310 C (mg/L)								
Carbon, Dissolved Organic	0.9	2.7 J	1.7	0.7	2.5 J	1.0	NE	0.5
Carbon, Total Organic	1.0	1.0	1.9	0.8	0.8	1.0	NE	0.6
Ammonia per SM 4500 NH₃ E (mg/L) (Dissolved - Field Filtered)								
Ammonia as Nitrogen	0.1	0.03 J	0.05 J	0.1	0.04 J	0.03 J	NE	0.02 J

Notes:

Bold = indicates detections above the reported MRL.

- = not analyzed

mg/L = milligrams per liter

µg/L = micrograms per liter

NE = Not Established

U = The analyte was analyzed for but not detected at or above the reported method reporting limit (MRL).

J = The result is an estimated concentration.

SVOCs = Semivolatile Organic Compounds

0.018 = reported concentration exceeds screening criteria (organics) or exceeds *both* screening criteria and reference well concentration (inorganic

¹ = most conservative water quality criteria identified in the Upland QAPP (URS, 2008a)

Table 5
VOC Analytical Results for Sandblast Area Wells
Bradford Island - Upland OU Remedial Investigation
1st Quarter Groundwater, Seep, Surface Water Sampling Event - April 2008

Well ID	MW-11	MW-11 DUP	MW-12	MW-13	MW-14	MW-15	Most Conservative Screening Criteria ¹
Screen Interval (feet bgs)	26-36	26-36	16-26	26-36	13-23	12-22	
Sample ID	080415MW11GW	080415MW20GW	080415MW12GW	080414MW13GW	080414MW14GW	080414MW15GW	
Sample Date	04/15/08	04/15/08	04/15/08	04/14/08	04/14/08	04/14/08	
VOCs per EPA Method 8260B (µg/L)							
1,1,1,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.432
1,1,1-Trichloroethane (TCA)	0.5 U	0.5 U	1.9	0.5 U	0.22 J	0.5 U	9,125
1,1,2,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.0553
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1995
1,1-Dichloroethane	0.5 U	0.5 U	5.0	0.5 U	0.32 J	0.5 U	1,217
1,1-Dichloroethene	0.5 U	0.5 U	2.1	0.5 U	0.5 U	0.5 U	330
1,1-Dichloropropene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NE
1,2,3-Trichlorobenzene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NE
1,2,3-Trichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.0336
1,2,4-Trichlorobenzene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	8.2
1,2,4-Trimethylbenzene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	14.6
1,2-Dibromo-3-chloropropane	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	0.000204
1,2-Dibromoethane (EDB)	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	0.00560
1,2-Dichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	49.3
1,2-Dichloroethane (EDC)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.123
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.165
1,3,5-Trimethylbenzene	5 U	5 U	5 U	5 U	5 U	5 U	12.3
1,3-Dichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	14.5
1,3-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	122
1,4-Dichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.467
2,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NE
2-Butanone (MEK)	20 U	20 U	20 U	20 U	20 U	20 U	7,065
2-Chlorotoluene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	122
2-Hexanone	20 U	20 U	20 U	20 U	20 U	20 U	NE
4-Chlorotoluene	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	NE
4-Isopropyltoluene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NE
4-Methyl-2-pentanone (MIBK)	20 U	20 U	20 U	20 U	20 U	20 U	NE
Acetone	20 U	20 U	20 U	20 U	20 U	20 U	5,475
Benzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.354
Bromobenzene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	23.3
Bromochloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NE
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NE
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	4.30
Bromomethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	8.66
Carbon Disulfide	0.24 J	0.27 J	0.2 J	0.17 J	0.12 J	0.12 J	1,043
Carbon Tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.171
Chlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	91.3
Chloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NE
Chloroform	0.18 J	0.18 J	0.5 U	0.5 U	0.5 U	0.5 U	0.17
Chloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	188
cis-1,2-Dichloroethene	0.5 U	0.5 U	550	2.0	46	0.44 J	60.8
cis-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.34
Dibromochloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.133
Dibromomethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NE
Dichlorodifluoromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	395
Dichloromethane (Methylene Chloride)	0.16 J	0.19 J	2.0 U	2.0 U	2.0 U	2.0 U	4.28
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	530
Hexachlorobutadiene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	0.44
Isopropylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	658
m,p-Xylenes	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	208
Naphthalene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	6.20
n-Butylbenzene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	60.8
n-Propylbenzene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	60.8
o-Xylene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	73,000
sec-Butylbenzene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	60.83
Styrene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1641
tert-Butylbenzene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	60.83
Tetrachloroethene (PCE)	0.5 U	0.5 U	5.1	0.36 J	1.5	1.8	0.105
Toluene	0.32 J	0.7	0.58	0.26 J	0.64	0.23 J	1,300
trans-1,2-Dichloroethene	0.5 U	0.5 U	1.7	0.5 U	0.11 J	0.5 U	107
trans-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.34
Trichloroethene (TCE)	0.5 U	0.5 U	3.2	1.9	0.82	0.27 J	2.5
Trichlorofluoromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1,288
Vinyl Acetate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	412
Vinyl Chloride	0.5 U	0.5 U	4.1	0.5 U	0.5 U	0.5 U	0.015

Notes:

Bold = indicates detections above the reported MRL.

µg/L= micrograms per liter

NE = Not Established

U = The analyte was analyzed for but not detected at or above the reported method reporting limit (MRL).

J = The result is an estimated concentration.

VOCs = Volatile Organic Compounds

60.8 = reported concentration exceeded screening criteria.

¹ = most conservative water quality criteria identified in the Upland QAPP (URS, 2008a)

Table 6
Analytical Results for Reference Area Well
Bradford Island - Upland OU Remedial Investigation
1st Quarter Groundwater, Seep, Surface Water Sampling Event - April 2008

Well ID	MW-10	MW-10 DUP	Most Conservative Screening Criteria ¹
Screen Interval (feet bgs)	47-57	47-57	
Sample ID	080415MW10GW	080415MW21GW	
Sample Date	04/15/08	04/15/08	
Total Petroleum Hydrocarbons per NWTPH Gx/Dx Methods (ug/L)			
Gasoline Range Organics	250 U	-	NE
Diesel Range Organics	130 U	-	NE
Residual Range Organics	130 U	-	NE
VOCs per EPA Method 8260B (µg/L)			
Chloroform	0.5 U	-	0.17
Tetrachloroethene (PCE)	0.5 U	-	0.105
Vinyl Chloride	0.5 U	-	0.015
SVOCs per EPA Method 8270C (µg/L)			
1,4-Dichlorobenzene	0.23 UJ	0.23 U	0.467
4-Nitrophenol	2.3 U	2.3 U	NE
Benzo(b)fluoranthene	0.025 J	0.23 U	0.0038
Benzo(k)fluoranthene	0.23 U	0.23 U	0.0038
Phenanthrene	0.23 U	0.23 U	NE
Phenol	0.56 U	0.56 U	10950
Butyltins per Krone, et. al. (µg/L)			
Di-n-butyltin	0.05 U	0.05 U	NE
n-Butyltin	0.031 J	0.038 J	NE
Total Metals per EPA Methods 6010/6020 (µg/L)			
Aluminum	212	209	36500
Antimony	0.082	0.078	5.6
Arsenic	1.32 U	1.32 U	0.018
Barium	26.5	26.5	1000
Beryllium	0.01 J	0.02 U	5.3
Cadmium	0.057 U	0.074 U	0.25
Calcium	29200	29500	NE
Chromium	0.57 U	0.57 U	11 (VI)
Cobalt	0.295	0.295	730
Copper	0.67 U	0.70 U	9.0
Iron	436 U	434 U	300
Lead	0.363 U	0.585 U	2.5
Magnesium	8290	8340	NE
Manganese	246	243	50.0
Mercury	0.2 U	0.2 U	0.626
Nickel	20 U	20 U	52.0
Potassium	4790	4810	NE
Selenium	1 U	1 U	5.0
Silver	0.184 U	0.066 U	0.1
Sodium	5640	5610	NE
Thallium	0.02 U	0.02 U	0.24
Vanadium	1.4 J	1.7 J	183
Zinc	5.5 J	6.8 J	120
Dissolved Metals per EPA Methods 6010/6020 (µg/L)			
Aluminum	2.3	2.2	36500
Antimony	0.051	0.049 J	5.6
Arsenic	1.33	1.31	0.018
Barium	22.6	23.1	1000
Beryllium	0.02 U	0.02 U	5.3
Cadmium	0.027	0.035	0.25
Calcium	29500	30100	NE
Chromium	0.18 J	0.18 J	11 (VI)
Cobalt	0.079 U	0.084 U	730
Copper	0.30 U	0.30 U	9.0
Iron	9.1 J	12.3 J	300
Lead	0.012 J	0.032 J	2.5
Magnesium	7990	8180	NE
Manganese	214	222	50.0
Mercury	0.2 U	0.2 U	0.626
Nickel	20 U	20 U	52.0
Potassium	4810	4950	NE
Selenium	1 U	1 U	5.0
Silver	0.071	0.163	0.1
Sodium	5,440 U	5,600 U	NE
Thallium	0.02 U	0.02 U	0.24
Vanadium	10 U	10 U	183
Zinc	10 U	10 U	120
General Chemistry Parameters			
Inorganic Anions by EPA Method 300.0 (mg/L) (Dissolved - Field Filtered)			
Bromide	0.1 U	-	NE
Chloride	1.8	-	230000
Fluoride	0.027 J	-	2190
Sulfate	6.8	-	NE
Nitrate/Nitrite as Nitrogen per Method 353.2 (mg/L) (Dissolved - Field Filtered)			
Nitrate+Nitrite as Nitrogen	0.024 J	-	1000
Alkalinity per Method SM 2320B (mg/L) (Dissolved - Field Filtered)			
Bicarbonate as CaCO ₃	118	-	NE
Carbonate as CaCO ₃	2 U	-	NE
Organic Carbon per SM 5310 C (mg/L)			
Carbon, Dissolved Organic	0.5	-	NE
Carbon, Total Organic	0.6	-	NE
Ammonia per SM 4500 NH₃ E (mg/L) (Dissolved - Field Filtered)			
Ammonia as Nitrogen	0.02 J	-	NE

Notes:

Bold = indicates detections above the reported MRL.

- = not analyzed

mg/L = milligrams per liter

µg/L = micrograms per liter

NE = Criteria Not Established

U = The analyte was analyzed for but not detected at or above the reported method reporting limit (MRL).

J = The result is an estimated concentration.

VOCs = Volatile Organic Compounds

SVOCs = Semivolatile Organic Compounds

0.025 J = reported concentration exceeds screening criteria.

¹ = most conservative water quality criteria identified in the Upland QAPP (URS, 2008a)

**Field Notes, Groundwater, Seep, and
Surface Water Sampling Forms**

Location Bradford Island Date 3/26/08Project / Client Upland OU / USACENicky Moody

0920 NM onsite at Sandblast building.

PURPOSE: Well development activities

from Upland OU; New wells MW-10 through MW-15. RI in accordance with QAPP.

Field notes provided in this log book.

PERSONNEL: Mark Cecchini (MC) & Nicky Moody (NM) of URS. MC overseeing Boast Longyear who are installing new wells. NM to conduct well development. (Calibrate URS YSI)TODAY'S OBJECTIVE: Develop MW-14 & MW-15 and if time permits find key to old wells and pump on them as not sampled in multiple years.

0945 Check in w/ Carlton Morris & pick up well keys from old wells.

1000 Set up on MW-15. for well development see well development form.

1150 Development complete @ MW-15. Purged ~64 gallons. Water quality parameters stabilized; Turbidity < 10 NTU.

Total Depth (ft btoe) = 22.11'

Final DTW (ft btoe) = 12.92'

1215 Cleanup at MW-15; move to Hazmat enclosure to decon pump & pump out H₂ONicky MoodyLocation Bradford Island Date 3/26/08Project / Client Upland OU / USACENicky Moodyfrom drum stored in back of truck into new drum in Enclosure. Label drum contents = MW15 / Purge H₂O1318 Completed decon of pump & switch of purge H₂O.1320 Set up on MW-14; see development form. URS Development complete @ MW-14.

Purged 60 gallons. Parameter stabilized; turbidity < 10 NTU.

TP (ft btoe) = 23.45'

Final DTW (ft btoe) = 12.32'

1520 Cleanup @ MW-14.

1550 Decon Pump & pump out purge H₂O into drums @ hazmat bldg. Label drums 3 drums total w/ purge H₂O.

1620 NM offsite

Nicky Moody

Location Bradford Island Date 4/3/08Project / Client Upland. OU RE / USACEChris Shady

915 NM onsite w/ Boart Longyear;
Pete & Brian.

930 Meet w/ Ron (USACE) for safety
meeting. Pick up badges.

945 Head to Bradford Island, meet w/ M.C (URS)
& other drillers. → installing

1000 check out location of MW-10.

Access area possibly too steep. BL moves
skid machine from MW-11 location.

Move vegetation & some mtd to make
access road more accessible. Frank Salber
(USACE) skid moving soil. Issue is
slope & soft material on slope.

1140 stop skid machine.

1150 start moving Spyder Sonic Rig. → Success.
Now still to attempt moving skid up hill
w/ Rods.

1230 NM + MC switch equipment. NM to
oversee drillers finish monuments. MC moves
up to watch drillers @ MW-10.

Zane Huckins } BL

Adam Ensign }

Dave Donnelly }

Chris ShadyLocation Bradford Island Date 4/3/08Project / Client Upland OU RE / USACEChris Shady

1315 Finished concrete work on MW-13.

1318 NM moves to set up on MW-13 for
well development.

1325 TD = 36.05 ft btoC / + 3.5" for bgs
DTW = 16.31 ft btoC.

Soft bottom → See Development Log.

1445 Boart Longyear (2H, AE, PD) offsite.

Other Boart crew still onsite.

1345 Pump ON @ MW-13; water is
highly turbid & grey/brown color.

1542 Pump off; development complete.
Purged ~60 gallons. Turbidity = 997.

1555 NM cleans up; closes drums.

1605 NM heads up to MW-10 to

see process made?

1610 NM hands over development form to MC

1618 NM off site

Chris Shady

Location Bradford Island Date 4/8/08Project / Client USACE / upland RE work**PLAN**

Nicky Moody of URS to develop newly installed MW-10 (Ref. well) on Bradford Island.

0940 NM onsite; check in w/ Carlton Morris of USACE. Pick up gate keys.

0955 Head up thru gate to MW-10.

1000 Set up at well w/ downhole pump.

BL onsite (Beart Longyear) to complete

Dave Dannelly monument for
Zane Huckins MW-10

TD = ~57' btoe (soft bottom)

DTW = 10.70' btoe

$$\frac{46.3'}{nm} \times 0.18 \text{ gal/ft} = 8.3 \text{ gallons in } nm \text{ for casing.}$$

1055 Pump on. High turbidity (1065 NTU); brown

1150 BL finished setting concrete for 3 bollards & tagging well. Now cleaning up.

1205 Pump off. Battery dead. Turbidity = Clear; no color. Pumped ~50 gallons; > 6 casing volumes.

1215 - 1300 BL assisting NM w/ moving full drum (purge H₂O) from MW-10 to drum storage area.

Nicky Moody

Location Bradford Island Date 4/8/08Project / Client Upland RE work / USACE

Nicky Moody

1320 BL offsite.

1300 - 1320 NM decons downhole pump with 3-stage system (Soap, Methanol, etc). Decon'd water level meter. cleans up. Label'd one more drum (purge H₂O from MW-10 & decon H₂O)

1325 NM returns keys to Carlton.

1330 NM offsite to URS Warehouse

1345

Nicky Moody

Location Bradford Island Date ^{NM} 3/11/08Project / Client Upland OURI / USACEMary Moody

PURPOSE: Slug Tests in newly installed monitoring wells as part of Upland OU RI.

PERSONNEL: Nicky Moody (NM) of URS and Brent Bergeron (BB) of Net Compliance Env. Svcs.

0752 NM + BB onsite at Auditorium building to get BB security cards.

0810 check in w/ Frank Salber at maintenance building.

0815 Arrive at sandblast building. H+S Talk w/ BB + NM. BB signs HASP.

0825 Set up equipment and computer at MW-14

0840 DTW = 12.47 ft btoc 0844 DTW = 12.44'

0842 TD = 23.34 ft btoc.

0855 set transducer @ 22 ft btoc
@ 53' water above transducer ^{issue}

Start first slug Test @ MW-14 Data comm

10:20:19 Start Test 2. DTW = 12.25 w/ keck

10:21:15 Drop slug (1 only) (Falling) water tape + transducer

10:30:34 Pull slug (Rising) in well

10:42:18 Stop test (Test 2 downloaded).

10:50 Decon slug + transducer.

Mary MoodyLocation Bradford Island Date 4/11/08Project / Client Upland OU RI / USACEMary Moody

1105 set up at MW-11
1110 DTW = 5.68' btoc DTW = 5.76 @ 1120

1111 TD = 36.55' btoc

1143 DTW = 5.43' btoc w/ transducer

1144 Set slug above DTW (2 Slugs)

11:46:55 Start Test 1 MW11

11:47:50 Drop Slugs. (Falling)

Will continue test until DTW reaches 90% of original DTW.

90% of 5.43' = 4.887' ^{NM}

for falling test ~~minimum~~ ^{NM} or 5.973' for rising test ^{NM}

13:14 Pull slugs out of H₂O column @ 4.90' (Rising)

13:14 Stop test 1 MW11

15:19:17 as DTW at 5.97' = 90% recovery

14:20 Walk up to MW-10 to collect DTW + TD for slug test set up.

1426 DTW = 19.78' 19.73' @ MW-10. } water level meter

1428 TD = 58.4' " }

1434 DTW = 19.84' " }

1440 Back @ MW-11 rising test still going

1500 Measure out slug length for MW-10 as working on MW-11 rising test.

Mary Moody

Location BRADFORD ISLAND

Date 4/11/08

Project / Client UPLAND OUR I / USACE

Amy Slusky

- 1520 Download Test 1 MW11
- 1537 Decon slug + transducer.
- 1540 Mob to MW-10.
- 1545 Arrive at btm of hill @ MW-11; pack up equipment.
- 1551 DTW = 19.71 ft btoe; ^{collected w/ water level meter} set up equipment
- 1402 DTW w/ transducer in well = 19.50' btoe.
- 16:05:09 Start Test 1 MW11
- 16:06:12 Drop Slug (1 only) \Rightarrow Falling head portion
90% Recovery = DTW 19.38' btoe
- 17:12:04 ^{nm} Stop Pull slug out w/ DTW @ \Rightarrow Rising head portion now.
@ 19.385'
- ~~nm STOP TEST @ MW11 DTW @~~
- 20.75' - (19.381') = 1.369' \times 0.9 = 1.232'
- 20.75' - 1.232' = 19.518' ^{nm} would be DTW
90% Recovery
- ~~STOP TEST @ MW11 w/ DTW @~~
- 20.75' - 19.50 = 1.25' \times 0.9 = 1.125'
- 20.75' - 1.125 = 19.625' = 90% using original DTW of 19.50'
- 18:15:37 STOP TEST due to time constraint.
DTW = 19.804' btoe. on transducer.

Amy Slusky

Location BRADFORD ISLAND

Date 4/11/08

Project / Client UPLAND OUR I / USACE

Amy Slusky

- 1827 Move from MW-10 to Sandblast building
- 1840 @ MW-13 DTW = 16.11' btoe } using w/ water level meter
TD = 36' btoe }
- 1849 DTW w/ transducer in well = 16.03' Reference point.
- 18:53:42 Start Test 1 MW13 (Falling portion)
- 18:54:13 Drop slug (1 only) (Falling portion)
16.03' - 15.066' = 0.964' \times 0.9 = 0.868'
- 15.066' + 0.868' = ~~15.934'~~ 15.934'
- 90% Recovery = DTW of 15.934'
- 100% " " = 16.03' w/ transducer
- 19:20:23 STOP TEST @ MW13 as DTW according to transducer @ 15.937' which is >90% recovery.
- 19:22 Download data from MW-13 & MW-10; pull slug out; decon.
- 19:25 Cleanup, decon transducer.
- 19:40 Leave MW-13 / Sandblast bldg area.
- 19:50 Offsite

Amy Slusky

Location Bradford Island Date 4/14/08Project / Client Upland O.U. RI / USACESlurry Study

- 715 NM + BM @ URS Warehouse.
- 800 NM + BM Depart URS Warehouse.
- 900 NM + BM onsite, PURPOSE: Upland O.U. RI GW Sampling
- 920 DTW = 12.94' btoe MW-14
- 922 Set up @ MW-14. For low flow GW Sampling. See SOP from Upland O.U. RI QAPP. See Monitoring Well Sampling Field Logs for additional info.
- 935 Pump on on MW-14.
- 1020 SAMPLE TIME 080414 MW14 GW @ MW-14
- 1108 Set up at MW-15
- 1120 Pump on @ MW-15
- 1200 SAMPLE TIME 080414 MW15 GW (MS/MSD)
- 1308 Set up at MW-13; catch up on field form information.
- 1330 DTW = 16.35' btoe
- 1338 Pump on MW-15
- 1415 SAMPLE TIME 080414 MW16 GW
- 1440 Cleanup BM completes Coc.
- 1515 NM + BM onsite; Call into C. Morris of USACE.

Slurry StudyLocation Bradford Island Date 4/15/08Project / Client Upland O.U. RI / USACESlurry Study

- 715: BM @ URS Warehouse
- 805: MC (Mark Cecchini) onsite @ Bradford Island
- 0835: BM onsite @ Bradford Island
- Purpose: Upland O.U. RI GW Sampling
- 0855: DTW = 6.41' @ MW-11
- Begin setup @ MW-11 for low flow GW sampling. See SOP from Upland O.U. RI QAPP. See MW-11 Sampling Log form for details.
- 0906: Pump on MW-11
- 0950 Parameters Stable @ MW11 Start Sampling. MW11 sample ID = 080415 MW11 GW Collected sample duplicate # 080415 MW20 GW
- primary sample time = 1000
- Duplicate sample time = 1020
- 1105 Finish collecting sample @ MW11. Mobilize to MW12.
- 1138 Start purging MW12. Approximately 4 feet of water in well. Well w/11, Kely purge dry.
- 1210 Parameters stable Start collecting MW12 sample # 080415 MW12 GW Labeled sample time as "1245"
1250. Finish sampling MW12. Mobilize to MW10
- DSM

Location Bradford Island Date 4/15/8
 Project / Client Barnes Dam / USACE

BPM

- 1417 Start purging MW10. Took ~ 1 hour 30 minutes to mobilize sampling gear by foot ~ 100 yds over muddy, mod steep to flat terrain. Also had difficulty getting HDPE 1/4" tubing down well due to friction within casing. Could not get tubing past ~ 40-50 BTOX.
- 1450 parameters stable. Begin collecting sample, duplicate, & MS/MSD from MW10. Labeled sample time as "1500" for primary # 080415MW10G1 KN
 & "1530" for duplicate # 080415MW21 GW
- 1625 Finished sampling MW10. Filled 25 containers. We forgot to fill up third H₂O₃ - presented 1L HDPE FOR MS/MSD on MW10. However, we may have enough volume as we collected ~ 1.8 Liters.
- 1630 Start mobilizing gear/sample bottles offsite.
- 1715 BPM/M.C. offsite. BPM will relinquish iced-samples to C. Wheeler of USG for shipping.

BPM

Location Bradford Island Date 4/16/8
 Project / Client Barnes Dam / USACE

BPM

- 0700 BPM + NM @ warehouse to load up equipment.
- 0745 Depart for Barnes Dam.
- 0820 Arrive on site @ HAZMAT PAD
- 0835 M.C. on site. BPM notifies C. Morris (USACE) that we are on site (per his request). M.C. starts doing drum inventory & double checking labels on drums, which say "hold pending analysis"
- 0855 Head to Landfill after C. Morris unlocks wetlands gate. (BPM 4-16-8)
 Start setting up on MW2.
 Calibrate YSI 556 per meter manual.
- 0933 Start purging MW2. See Monitoring Well Sampling Field Log for details
- 1007 Parameter stable @ MW2. Well has purged down past 80% initial well volume. Discuss w/ P.M. (L. McWilliams) & decide to purge at least one well volume prior sampling. We will not allow well to recharge to 80% if recharge rate is slow.
- 11015 M. Cecchini finished with drum

BPM

Location Bonneville Dam Date 4-16-8
 Project / Client Bradford Island / USACE

[Signature]

inventory & starts setting up on MW1 to sample well.

- 1030 Carlton Morris on site @ landfill to inspect cuts from drill rig crew. He expresses concern about road condition east of MW2 & up to MW10. He asks me to have Jeff Wallace (URS) to call him to discuss potential for repair. I call Jeff Wallace & leave a message for him to call Carlton.

1100 MW2 recharged to 80% of its original DTW (depth to water).

However, we have not purged 1 well volume. Continue purging MW2.

1120 Parameters stable, 1 well volume purged from MW2. Start sampling @ MW2 (Sample ID = 080416 MW2 GW & Sample time (ST) = 1030.

Carlton Morris left landfill @ ~1045. He appeared O.K. with Jeff calling him & said thank you for our concern about cuts.

1030 M. Cecchini starts purging MW1. MW1 has not recharged to level

Location Bonneville Dam Date 4-16-8
 Project / Client Bradford Island / USACE

[Signature]

Mark measured in MW1 @ late March prior to his redeveloping the well. Mark states we had ~ 8' of water in well in late March, & now we only have 5' of water in well.

1215 Finish sampling @ MW2. Mobilize to MW5.

1130 Start sampling @ MW1. Parameters stable & 1 well volume of water

purged. Sample ID = 080416 MW1 GW
 Sample time = 1130

1228 Finish collecting sample @ MW1. Mobilize (M. Cecchini) to MW7. We only filled up partial bottles to minimum requirements as MW1 was near dry, but recharging enough to continue sampling.

1255 Pump on @ MW7. Mobilize other pump to MW5.

1301 Pump on @ MW-5.

1336 Start sampling @ MW-5. Parameters stable and DTW stable. (Filling bottles)

[Signature]

Location Bonneville Dam Date 4-16-08
 Project / Client Bradford Island Upland OU/USACE

Lee Lundy

SAMPLE ID for MW-5 = 080416MW5GW
 SAMPLE TIME = 1400 Fill 3x = MS/MSD.
 NM + BM 1340 START ^(collecting bottles) SAMPLING MW-7; parameters
 stabilized. SAMPLE ID = 080416MW7GW
 SAMPLE TIME = 1345, DUP = 080416MW7ZGW
 1429 FINISH SAMPLING MW-7 (filling A
 bottles). SAMPLE TIME FOR DUP = 1355
 1500 FINISH FILLING BOTTLES @ MW-5
 CLEANED UP; talked w/ Laura McWilliams
 about method of sampling for MW-8
 as DTW is > than P-pump pump
 depth. Discuss requirement of diff.
 pump. NM calls FEI to rent down hole
 SS Proactive Pump w/ low flow controller.
 MC checks out seep survey area.
 NM + BM complete bottle inventory.
 1600 NM, BM, & MC. offsite. NM + BM
 to URS Warehouse.

Lee Lundy

Location Bonneville Dam Date 4-16-08
 Project / Client Bradford Island Upland OU/USACE

John

0700 NM & BM load up @ URS warehouse.
 0800 Arrive @ Bonneville Dam. WX is
 partly cloudy, ~ 50°F. Prep for
 sampling @ Landfill monitoring wells
 MW3, MW4, MW6 & MW9. We need
 a different pump (other than a peristaltic
 pump) to sample MW8 due to the
 greater depth to water @ MW8 (~ 44 feet).
 This pump will be delivered today. We
 will clean the pump with Alconox,
 methanol & DIW wash prior to use
 & collect a rinseate blank on steel
 pump.
 0805 - 0825 Calibrate YS + SSG
 with 1.40M water solution
 3pt pH Calibration
 DO to parametric pressure
 per meter manuals.
 0908 Start purging MW6
 0935 Parameters stable, drawdown less
 than 0.10 feet. Start collecting
 MW6 Sample # 080417MW6GW
 IT = 1000
 1005 Finish sampling MW6
John

Location Bonneville Dam Date 4-17-8
 Project / Client Bradford Island Upland OU / USACE

BBM

1010 Mobilize to MW3. Mark Cecchini is on MW4. Mark will mobilize to MW9 after he is done with MW4. Marks sample information for MW4 is as follows:

- 0940 Start sampling
- 1005 Finish sampling. ST = 1005
- Sample ID = 080417 MW4 GW

1015 Set up on MW-3 (Nicky + Brian)
 Mark sets up on MW-9.

1040 Pump ON @ MW-3

1100 Parameters stabilize @ MW-3
 commence filling bottles.

SAMPLE ID = 080417 MW3 GW

SAMPLE TIME = 1130

1130 Finish Sampling MW3. Marks information from MW4 is as follows:

- 1035 Pump on
- 1056 Pump off, well purging dry.
- 1133 Start sampling. Well purging dry (below tubing intake)

1200 BM + NM complete bottle inventory.

BBM

Location Bonneville Dam Date 4.17.08
 Project / Client Bradford Island Upland OU / USACE

BBM

1230 commence scouting of seep locations
 Seep location S had 2 seeps
 flow did not seem adequate.
 Walked over to + down to Seep S4 location. Seep S4 has higher flow.

1300 Mobilize equipment + bottles down to Seep S4. Method = using rock hammer and hand shovel to excavated small pool at 6 ft above ^{River} ~~spot~~ elevation at location that seep is appearing from side of hill. Equipment ~~was~~ was decontaminated w/ Alconox, acetone, and DI water. Seep sample collected using peristaltic pump and new, dedicated tubing. Water collected first in lab provided soil jar which is placed into excavated pool.

1310 Pump first turned on. & filling bottles.

1315 ST 080417SR/SP For seep 4 water sample.

Flow Rate of Seep = ~ 250 mL/min.

BBM

Location Bonneville Dam Date 4.17.08
 Project / Client Bradford Island Upland On/USACE
Steve Linky

1400 Finished filling bottles at seep S4
 sample; now setting up surface
 water sample @ S4.

YSE Readings on S4 SP sample.
 Temp (°C) 9.93 turbidity = clear
 Cond (µs/cm) 0.368 No color
 DO (mg/L) 9.50
 pH 6.95
 ORP (mV) 291.5

1410 Start - pump on for S4 surface
 water sample. Method ↓

1415 ST 080417 S4 SW ↓

using peri-pump + new dedicated
 tubing. Intake of tubing 3 ft
 off shore; approx. 6" from bottom
 and 10 feet from seep S4, 1' from surface.

YSE Readings on S4 SW sample
 COND (µs/cm) 0.130 Turbidity = clear
 Temp (°C) 8.41 No color
 pH 8.29
 DO 11.79
 ORP 198.0

Steve Linky

Location Bonneville Dam Date 4.17.08
 Project / Client Bradford Island Upland On/USACE
Steve Linky

1435 Finish filling bottles at S4 Surface water
 Demob equipment from S4 location
 back up hill.

Ferrous Iron Results @ S4

080417 S4 SP → Fe⁺² = 0.0 mg/L

080417 S4 SW → Fe⁺² = 0.0 mg/L

1437 Resume filling bottles at MW-9.

1458 Stop pumping as pumped dry again.

1510 BM calls L. McWilliams to discuss
 MW-9 strategy. → Close up
 well w/ tubing in place. Will
 continue filling remaining 2 liters
 tomorrow morning after recharged.

1520 Pack up equipment

1540 NM + BM move ^{purge} water to
 drums next to Hazmat Bldg.

1555 Depart dam for URS office to
 relinquish samples. Call
 Carlton Morris & let him know
 we are off & e

1635 Arrive @ URS Office; donabilize
 some equipment, samples.

Steve Linky

Location Bradford Island Date 4/18/08Project / Client Upland OU / USACEClay Leedy

- 0700 NM + BM @ URS warehouse
- 0800 NM + BM + MC onsite
- 0835 NM + BM decon FEI SS Downhole pump using SOAP, METHANOL, DI & DI RINSE b/c each step.
- 0840 PUMP back on @ MW-9 (M.C.)
NM + BM collect pump rinse sample
- 900 ST 080418 MW 30GW, Finished filling bottles @ MW-9.
- 920 Set up on MW-8 using downhole SS pumps
- 943 Pump on low flow
- 1018 Parameters stabilized; start filling bottles
- 1030 ST 080418 MW 8GW
- 1035 Finished filling bottles @ MW-8
- 1045 Cleanup @ MW-8; prep for seep sampling
Seep S2 → Method = same as w/ S4 location using dedicated sampling equipment [S2 = S1 on fig]
- 1300 ST 080418 S2 SP; 1255 Start filling bottles at seep S2 → 6" from above pool elevation & 3' away from River.
- 1330 ST 080418 S2 SW NM 4/18/08
Sample water from seep S2 has a turbidity of slightly cloudy to clear.

Clay LeedyLocation Bradford Island Date 4/18/08Project / Client Upland OU RI / USACEClay Leedy

- 1317 YSI Readings from seep S2. No Flow cell
- | | | |
|---|----------|-------------------------------|
| Temp (°C) | = 8.18 | Turbidity = |
| COND (mS/cm) | = 0.160 | |
| DO (mg/L) | = 8.54 ↓ | Flow = 2 1/2 L / Rate per min |
| pH | = 7.37 | |
| ORP (mV) | = 88.5 ↓ | |
| Ferrous Iron Hach Kit. Fe ²⁺ | = 0 | mg/L |
- 1315 Finished filling bottles from seep S2
- 1320 Set up on Surface Water sample (SW) @ SW S2 location.
- 1323 Start filling bottles for SW S2
- 1330 ST 080418 S2 SW
- 1345 YSI Readings from S.W. S2
- | | | |
|-------------------------------|---------|-------------------------|
| Temp (°C) | = 8.28 | Direct Read From River. |
| COND (mS/cm) | = 0.132 | |
| DO (mg/L) | = 13.12 | |
| pH | = 7.58 | |
| ORP (mV) | = 92.6 | |
| Ferrous Iron Fe ⁺² | = 0 | mg/L |
- 1340 Finished filling bottles from SW S2 location = Columbia River; 5ft offshore 1ft from surface; 6" off bottom.

Clay Leedy

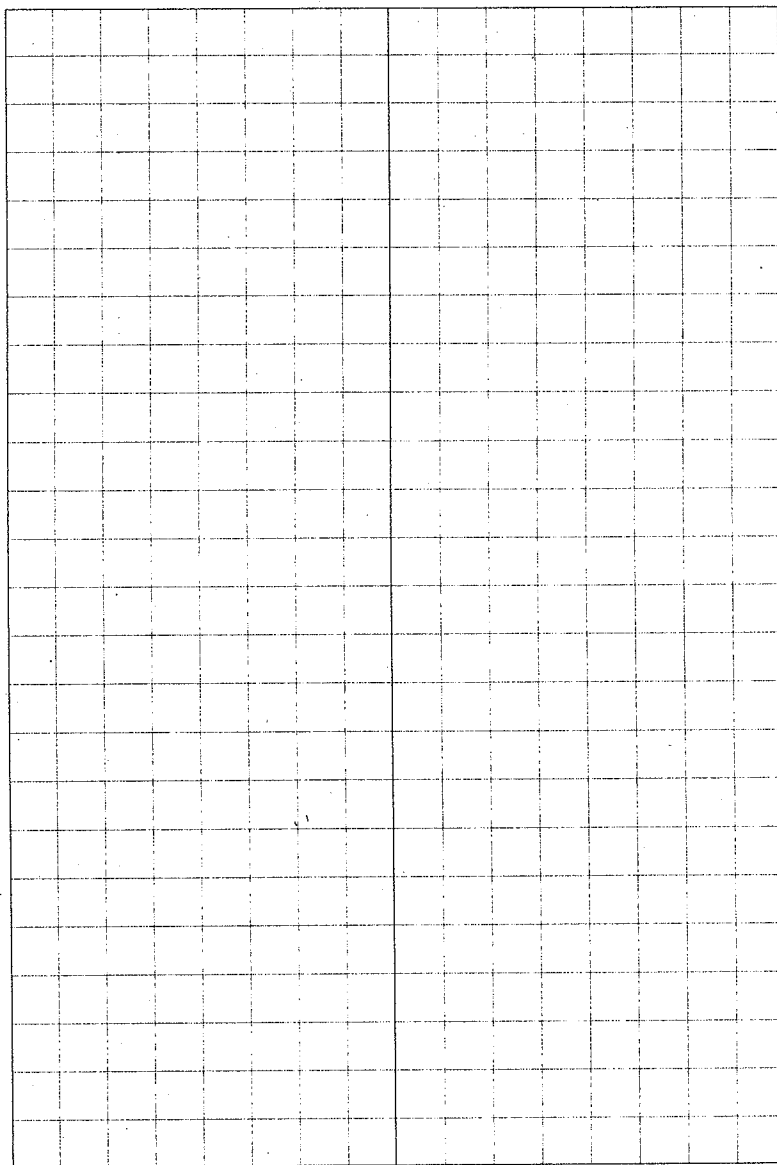
Location Bradford Island Date 4/18/08
 Project / Client Upland on RI / USACE

- 1430 Measure location of S2 =>
 ~78' along shore to West from
 MW-7.
- 1445 Measure location of S4 =>
 ~43' East of MW-6. ~25' South
 of Seep location.
- 1455 Clean up, pack up equipment.
- 1530 Hand over well keys to
 Carlton Morris.
- 1535 Hand in security badges @
 Front bldg.
- 1540 Offsite.

[Handwritten signature]

Location _____ Date _____

Project / Client _____



Monitoring Well Sampling Field Log

Well Number: MW-1
Date: 4/16/08

Project Information
 Project Name: Bradford Island
 URS Project Number: 2569 6079.00001

Sampling Information
 Field Team: M. Cecchini; N. Moody
 Purge Method: Low Flow
 Pump Intake Depth (ft btc): 25'
 Flow-Through Cell: Yes
 Sampling Method: Low Flow
 Decontamination Method: Not Applicable. Used dedicated sampling equipment
 Purge Water Disposition: Drum on site
 Field Conditions: Cloudy 50s

Comments:
 PID reading upon opening well cap: Not Measured
 Initial DTW = 27.12' btoC (WC=4.38')
 Casing volume = 0.75 gal (2.8L)
(4.38' x 0.17 gal/ft)

Well Information		Stick-up or Flush (circle one)				Screen Interval (ft bgs)
Well Diameter (in)	Drilled Well Depth		Top of Screen			
	(ft bgs)	(ft btc)	(ft bgs)	(ft btc)		
2"	37.50	31.50	20	-	20 - 36	

Sample Containers					Filtered?
Number	Type	Preservative	Analytical Parameters		
1	1L HDPE	HNO ₃	Total Metals		No
1	1L HDPE	HNO ₃	Dissolved Metals + Cations		Yes
1	1L HDPE	None	Butyltins (Krone)		No
3	40mL VOA	HCl	VOCs		No
1	1L AGB	None	SVOCs		No
1	2x500mL HDPE	H ₂ SO ₄	Anions		Yes
1	2x500mL HDPE	None	Anions		Yes
1	1L HDPE	None	TOC/DOC		No
3	40mL VOA	HCl	NWTPH-Gx		No
1	1L AGB	None	NWTPH-Dx		No

Well Purge Data											
Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (µS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks	
1030	Pump On	150	27.12		±3%	≥greater of 10% or 0.2mg/L	±0.1	±10mv	±10%	<= Stabilization Criteria	
1055	250 mL	150	27.39	10.88	1.372	8.90	8.33	165.1	SC		
1100	1.5L	150	27.55	10.73	1.374	6.80	8.29	151.3	C		
1105	2.25L	150	27.76	10.91	1.372	6.20	8.31	130.0	C		
1110	3.0L	150	28.01	10.83	1.374	5.85	8.31	111.0	C		
1115	4.35	270	28.75	10.88	1.379	6.58	8.31	99.0	C		
1120	5.70	270	28.90	10.92	1.383	6.56	8.32	89.2	C		
1125	7.0	270	29.11	11.02	1.386	6.47	8.34	91.3	C		
1205	-	-	30.32								
<p>Results for Hach Ferrrous iron test kit = 0.0 mg/L</p> <p>Filled up minimum volume required for Analytical parameters listed above (i.e., ~ 300 to 500 mL for each analyte except VOAs).</p>											
Start Sampling		1130		Sample Number:		080416 MW1 GW		Sample Time:		1130	
End Sampling		1228		Final DTW		31.25					

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Well Number: MW1
 Date: 4-16-08

Page 2 of 2

URS Project Number: 25696679.00001

Well Purge Data (continued from Page 1)

Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
Stabilization Criteria =>				-	±3%	±10%	±0.1	±10mv	±10%	
<p><i>[Handwritten scribbles and signature]</i></p> <p><i>4-16-08</i></p>										
Start Sampling										
End Sampling				Sample Number:						
				Final						

Comments

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Page 1 of 2

Well Number: MW-2

Date: 4/16/08

Project Information	
Project Name:	Bradford Island
URS Project Number:	2569 6679.00001
Sampling Information	
Field Team:	N. Mady, B. McNamara
Purge Method:	Low Flow
Pump Intake Depth (ft btc):	27 ft bloc
Flow-Through Cell:	Yes
Sampling Method:	Low Flow
Decontamination Method:	Not Applicable. Used dedicated sampling equipment
Purge Water Disposition:	Drum on site
Field Conditions:	Cloudy 50s
Comments:	
PID reading upon opening well cap: Not Measured	
Initial DTW = 10.25	
Well Depth = 34.2 ft BTC	
Feet of water = 34.2 - 10.25 = 23.95 ft	
Well Volume = 23.95 ft x 0.165 gal/ft	
Well Volume = 3.95 gallons	

Well Information		Stick-up or Flush (circle one)		Screen Interval (ft bgs)	
Well Diameter (in)	Drilled Well Depth		Top of Screen		Screen Interval (ft bgs)
	(ft bgs)	(ft btc)	(ft bgs)	(ft btc)	
2"	-	34.20	22	-	22 - 32

Sample Containers				Filtered?
Number	Type	Preservative	Analytical Parameters	
1	1L HDPE	HNO ₃	Total Metals	No
1	1L HDPE	HNO ₃	Dissolved Metals + Cations	Yes
1	1L HDPE	None	Butylins (Krone)	No
3	40mL VOA	HCl	VOCs	No
1	1L AGB	None	SVOCs	No
1	2500mL HDPE	H ₂ SO ₄	Anions	Yes
1	2500mL HDPE	None	Anions	Yes
1	1L HDPE	None	TOC/DOC	No
3	40mL VOA	HCl	NWTPH-Gx	No
1	1L AGB	None	NWTPH-Dx	No

Well Purge Data										
Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
	Pump On	0933	Initial 10.25		±3%	±greater of 10% or 0.2mg/L	±0.1	±10mv	±10%	≤ Stabilization Criteria
0934	Initial	150	10.80	9.90	0.377	11.23	7.43	163.6	Clear	
0938	~0.5	~150	11.74	9.75	0.265	8.68	7.66	141.7	Clear	
0945	~1.5	~100	12.85	9.49	0.298	8.36	8.09	129.4	Clear	
0949	~2.0	~100	13.50	9.44	0.297	8.50	8.24	129.2	Clear	
0951	~2.3	~160	13.85	9.47	0.297	8.48	8.30	129.5	Clear	
0956	~3.0	~150	14.40	9.47	0.297	8.58	8.39	127.0	Clear	
1000	~3.5	~150	15.00	9.51	0.297	8.55	8.45	113.1	Clear	
1002	~3.7	~100	15.90	9.52	0.298	8.73	8.49	110.6	Clear	
1004	~3.9	~100	15.90	9.55	0.298	8.75	8.50	110.4	Clear	
1006	~4.1	~100	16.10	9.54	0.298	8.75	8.51	111.6	Clear	
1007	Pump off	parameters stable. Allow well to recharge.								
1016	-	-	15.75							
1030	-	-	15.50							
1037	-	-	15.35							
1057	-	-	15.10							
1100	-	-	15.00							Reached 80% level of Initial DTW
1110	Pump back on	will purge one well volume & then start sampling due to slow recharge.								
1115	500		15.10	10.22	0.266	15.52	8.55	158.1	Clear	
1120	500		19.50	10.19	0.270	10.49	8.60	154.7	Clear	
Start Sampling		1126								
End Sampling		1215		Sample Number: 080416 MW2 GW			Sample Time: 1030			
			Final 26.53							

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Well Number: MW 2

Page 2 of 2

Date: 4/19/08

URS Project Number: 25696679.00001

Well Purge Data (continued from Page 1)

Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
Stabilization Criteria =>										
					±3%	±10%	±0.1	±10mv	±10%	
1125	~4 gal	500	23.80	10.23	0.273	9.22	8.62	151.5	clear	
1130		500								
1126				Removed 1 casing volume of water						Start filling bottles.
80% Calculation for MW2 recharge/Start Sampling:										
Initial DTW = 10.25 ft BTOC										
Well Depth = 34.2 ft BTOC										
Feet of water = 34.2 ft - 10.25 = 23.95 ft										
80% of 23.95 = 19.16 feet of water for 80% of Initial DTW										
Well Depth (34.20 ft btoC) - 80% level (19.16 feet) = 15.04 feet BTOC										
•• When water recharges to 15.04 feet btoC, we can start sample collection.										
Start Sampling 1126/08										
End Sampling										
Sample Number:										
Final										

Comments

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Well Number: MW-3
Date: 9/17/09

Page 1 of 2

Project Information	
Project Name:	Bradford Island
URS Project Number:	25696079.00001
Sampling Information	
Field Team:	NM, BM, MC
Purge Method:	Low Flow w/ P-Pump
Pump Intake Depth (ft btc):	16 feet
Flow-Through Cell:	YES - YSI 556
Sampling Method:	Low Flow w/ Dedic, New tubing
Decontamination Method:	Not Applicable. Used dedicated sampling equipment
Purge Water Disposition:	Drum on site
Field Conditions:	Sunny, partly 50s
Comments:	
PID reading upon opening well cap:	Not Measured
Initial DTW:	14.46' @ 10:08 tight cap.
	14.45' @ 10:25
	may have mis read tape. Likely was 13.46 & 13.45 BFM 4-28

Well Information					
Stick-up or Flush (circle one)					
Well Diameter (in)	Drilled Well Depth		Top of Screen		Screen Interval (ft bgs)
	(ft bgs)	(ft btc)	(ft bgs)	(ft btc)	
2"	-	22.8'	11	-	11 - 21

Sample Containers					Filtered?
Number	Type	Preservative	Analytical Parameters		
1	1L HDPE	HNO ₃	Total Metals		No
1	1L HDPE	HNO ₃	Dissolved Metals + Cations		Yes
1	1L HDPE	None	Est. Hg (Krone)		No
3	40mL VOA	HCl	VOCs		No
1	1L AGB	None	SVOCs		No
1	500mL HDPE	H ₂ SO ₄	Anions		Yes
1	2x500mL HDPE	None	Anions		Yes
1	0.25L HDPE	None H ₂ SO ₄	TOC/DOC		No
3	40mL VOA	HCl BSM	NWTPH-Gx		No
1	1L AGB	None	NWTPH-Dx		No
(14)					

Well Purge Data										
Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
	Pump On	1040	Initial		±3%	≥greater of 10% or 0.2mg/L	±0.1	±10mv	±10%	← Stabilization Criteria
1043	Initial	375	13.50	10.74	0.098	9.17	6.85	104.4	Clear	
1045	~2.0	375	13.50	10.13	0.098	4.21	6.62	117.0	Clear	
1046	~2.4	375	13.51	9.71	0.090	3.23	6.46	126.9	Clear	
1049	~3.5	375	13.52	9.45	0.087	3.07	6.38	133.8	Clear	
1154	5.4	375	13.52	9.40	0.086	2.89	6.34	135.4	Clear	
457	6.4	375	13.52	9.39	0.086	2.79	6.31	134.9	Clear	
1200	7.4	375	13.52	9.40	0.086	2.85	6.30	137.9	Clear	
Hach ferrous Iron test kit result = 0.0 mg/L										
Start Sampling			1100							
End Sampling			1130		Sample Number: 030417AM3 GW		Sample Time: 1130			
			13.53 ^{Final}							

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Well Number: MW3
 Date: 4-17-8

Page 2 of 2

URS Project Number: 25696679.00001

Well Purge Data (continued from Page 1)										
Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft b/c)	Temp. (°C)	Conductivity (µS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
Stabilization Criteria =>				-	±3%	±10%	±0.1	±10mv	±10%	
<p style="font-size: 2em; transform: rotate(-45deg); opacity: 0.5;">4-17-8</p>										
Start Sampling										
End Sampling				Sample Number:						
			Final							

Comments

Notes: AC = almost clear b/c = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Page 1 of 2

Well Number: MW-4

Date: 7.17.08

Project Information	
Project Name: Bradford Island	
URS Project Number: 25696679.00001	
Sampling Information	
Field Team: NM, BM, MC	
Purge Method: Low Flow w/ P-Pump	
Pump Intake Depth (ft btc): ~ 27' btc	
Flow-Through Cell: Yes	
Sampling Method: Low Flow w/ dedic. new tubing	
Decontamination Method: Not Applicable. Used dedicated sampling equipment	
Purge Water Disposition: Drum on site	
Field Conditions:	
Comments:	
PID reading upon opening well cap: Not Measured	
Initial DTW = 13.36	

Well Information		Stick-up or Flush (circle one)				Screen Interval (ft bgs)	
Well Diameter (in)	Drilled Well Depth	Top of Screen		Screen Interval (ft bgs)			
		(ft bgs)	(ft btc)	(ft bgs)	(ft btc)		
2'	-	32.2'	8	-	8 - 28		

Sample Containers					Filtered?
Number	Type	Preservative	Analytical Parameters		
1	1L HDPE	HNO3	Total Metals	No	
1	1L HDPE	HNO3	Dissolved Metals + Cations	Yes	
1	1L HDPE	None	Bioassays (Krone)	No	
3	40mL VOA	HCl	VOCs	No	
1	1L AGB	None	SVOCs	No	
1	1L HDPE	H2SO4	Anions	Yes	
1	500mL HDPE	HNO3	Anions	Yes	
1	1L HDPE	None H2SO4	TOC/DOC	No	
3	40mL VOA	HCl	NWTPH-6x	No	
1	1L AGB	None HCl	NWTPH-Dx	No	
14					

Well Purge Data										
Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (µm/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
0908	Pump On		Initial 13.36		±3%	±greater of 10% or 0.2mg/L	±0.1	±10mv	±10%	<= Stabilization Criteria
0910	0.2	280	13.37	10.60	0.408	6.22	6.81	142.5	SC	clear
0915	1.6	280	13.38	10.74	0.411	1.07	6.68	103.0	SC	clear
0920	3.0	280	13.38	10.72	0.409	0.78	6.67	103.5	C	clear
0925	4.4	280	13.38	10.29	0.402	0.47	6.66	105.4	C	"
0930	5.8	280	13.38	10.14	0.397	0.40	6.68	108.5	C	"
0935	7.2	280	13.38	10.04	0.394	0.33	6.65	113.4	C	"
Ferrous Fe test Kit result = 0.25 mg/L										
Start Sampling			0940							
End Sampling			1005							
				Sample Number: 080417MW46W			Sample Time: 1005			
			Final 13.38							

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Page 2 of 2

Well Number: MW4

Date: 4-17-8

URS Project Number: 25696679.00001

Well Purge Data (continued from Page 1)

Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
Stabilization Criteria =>				-	±3%	±10%	±0.1	±10mv	±10%	
<p style="font-size: 2em; transform: rotate(-45deg); opacity: 0.5;">NO DATA</p>										
Start Sampling										
End Sampling				Sample Number:						
			Final							

Comments

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Well Number: MW-5
 Date: 4-16-08

Page 1 of 2

Project Information	
Project Name:	<u>Bradford Island</u>
URS Project Number:	<u>25696079.00001</u>
Sampling Information	
Field Team:	<u>N. MOODY / B. Mullenbarr</u>
Purge Method:	<u>Low Flow with Peristaltic</u>
Pump Intake Depth (ft btc):	<u>30 ft btc pump</u>
Flow-Through Cell:	<u>YSI 556</u>
Sampling Method:	<u>Low Flow</u>
Decontamination Method:	<u>Not Applicable. Used dedicated sampling equipment</u>
Purge Water Disposition:	<u>Drum on site</u>
Field Conditions:	<u>SOs Cloudy</u>
Comments:	
PID reading upon opening well cap:	<u>Not Measured</u>
Initial DTW =	<u>17.24' btc.</u>

Well Information		Stick-up or Flush (circle one)		Screen Interval (ft bgs)	
Well Diameter (in)	Drilled Well Depth		Top of Screen		Screen Interval (ft bgs)
	(ft bgs)	(ft btc)	(ft bgs)	(ft btc)	
<u>2"</u>	<u>11</u>	<u>36.9</u>	<u>10</u>	<u>10</u>	<u>35</u>

Sample Containers				Filled?
Number	Type	Preservative	Analytical Parameters	
<u>3</u>	<u>1L HDPE</u>	<u>HNO₃</u>	<u>Total Metals</u>	<u>No</u>
<u>3</u>	<u>1L HDPE</u>	<u>HNO₃</u>	<u>Dissolved Metals + Cations</u>	<u>Yes</u>
<u>3</u>	<u>1L HDPE</u>	<u>None</u>	<u>Butylins (Krone)</u>	<u>No</u>
<u>9</u>	<u>40mL VOA</u>	<u>HCl</u>	<u>VOCs</u>	<u>No</u>
<u>3</u>	<u>1L AGB</u>	<u>None</u>	<u>SVOCs</u>	<u>No</u>
<u>3</u>	<u>2500mL HDPE</u>	<u>H₂SO₄</u>	<u>Anions</u>	<u>Yes</u>
<u>3</u>	<u>2500mL HDPE</u>	<u>None</u>	<u>Anions</u>	<u>Yes</u>
<u>3</u>	<u>1L HDPE</u>	<u>None</u>	<u>TOC/DOC</u>	<u>No</u>
<u>9</u>	<u>40mL VOA</u>	<u>HCl</u>	<u>NWTPH-Gx</u>	<u>No</u>
<u>3</u>	<u>0.5L AGB</u>	<u>None</u>	<u>NWTPH-Dx</u>	<u>No</u>
<u>(412)</u>				

Well Purge Data										
Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
	Pump On	<u>1259</u>	Initial		±3%	±greater of 10% or 0.2mg/L	±0.1	±10mv	±10%	≠ Stabilization Criteria
<u>1259</u>	<u>Initial</u>	<u>~350</u>	<u>17.25</u>	<u>11.68</u>	<u>0.488</u>	<u>27.00</u>	<u>6.75</u>	<u>-16.4</u>	<u>Clear</u>	
<u>1304</u>	<u>~1.0</u>	<u>~350</u>	<u>17.25</u>	<u>11.29</u>	<u>0.481</u>	<u>4.12</u>	<u>6.67</u>	<u>-34.7</u>	<u>Clear</u>	
<u>1308</u>	<u>~2.5</u>	<u>~350</u>	<u>17.25</u>	<u>11.18</u>	<u>0.475</u>	<u>1.62</u>	<u>6.62</u>	<u>-46.2</u>	<u>clear</u>	
<u>1313</u>	<u>~4.5</u>	<u>350</u>	<u>17.25</u>	<u>11.16</u>	<u>0.470</u>	<u>1.16</u>	<u>6.64</u>	<u>-51.8</u>	<u>clear</u>	
<u>1322</u>	<u>~6.2</u>	<u>300</u>	<u>17.25</u>	<u>11.46</u>	<u>0.460</u>	<u>0.58</u>	<u>6.64</u>	<u>-53.2</u>	<u>clear</u>	
<u>1328</u>	<u>~8.0</u>	<u>300</u>	<u>17.25</u>	<u>11.49</u>	<u>0.454</u>	<u>0.52</u>	<u>6.72</u>	<u>-51.7</u>	<u>clear</u>	
<u>1330</u>	<u>~8.6</u>	<u>300</u>	<u>17.25</u>	<u>11.49</u>	<u>0.450</u>	<u>0.52</u>	<u>6.65</u>	<u>-53.9</u>	<u>clear</u>	
<u>1332</u>	<u>~9.2</u>	<u>300</u>	<u>17.25</u>	<u>11.32</u>	<u>0.445</u>	<u>0.45</u>	<u>6.58</u>	<u>-55.7</u>	<u>clear</u>	
<u>1334</u>	<u>~10</u>	<u>350</u>	<u>17.25</u>	<u>10.90</u>	<u>0.442</u>	<u>0.42</u>	<u>6.50</u>	<u>-55.7</u>	<u>clear</u>	
<u>1336</u>	<u>~10.7</u>	<u>350</u>	<u>17.25</u>	<u>10.81</u>	<u>0.440</u>	<u>0.40</u>	<u>6.52</u>	<u>-55.4</u>	<u>clear</u>	
<u>14:09</u>	-	-	<u>17.25</u>							
Collected enough sample volume for <u>MS/MSD</u> Hoch Ferrous Iron Field Test Kit result = <u>1.6 mg/L</u>										
Start Sampling			<u>1336</u>							
End Sampling			<u>1500</u>	Sample Number:			<u>080416 MW5GW</u>			
			Final <u>17.25</u>				Sample Time: <u>1400</u>			

301
3pm
4-16-08

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

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URS Project Number: 25696679.00001

Well Number: MWS
Date: 4-16-06

Well Purge Data (continued from Page 1)

Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	C (r)	Turbidity (NTUs)	Clarity / Color / Remarks
Stabilization Criteria =>				-	±3%	±10%	±0.1	±1	±10%	
<p><i>[Handwritten Signature]</i> 4/16/06</p>										
Start Sampling										
End Sampling				Sample Number:						
				Final						

Comments

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Well Number: MW-6
Date: 4-17-08

Page 1 of 2

Project Information
 Project Name: Bradford Island
 URS Project Number: 25696679.00001

Sampling Information
 Field Team: NM, BM, MC
 Purge Method: Low Flow w/ P-PUMP
 Pump Intake Depth (ft btc):
 Flow-Through Cell: ~~Yes~~ Yes
 Sampling Method: Low Flow w/ dedic, new tubing
 Decontamination Method: Not Applicable. Used dedicated sampling equipment
 Purge Water Disposition: Drum on site
 Field Conditions:
 Comments:
 PID reading upon opening well cap: Not Measured
 Initial DTW = 16.20

Well Information		Stick up or Flush (circle one)		Screen Interval (ft bgs)	
Well Diameter (in)	Drilled Well Depth		Top of Screen		Screen Interval (ft bgs)
	(ft bgs)	(ft btc)	(ft bgs)	(ft btc)	
1"	33. -	33.37	25	-	25 - 30

Sample Containers				Filtered?
Number	Type	Preservative	Analytical Parameters	
1	1L HDPE	HNO ₃	Total Metals	No
1	1L HDPE	HNO ₃	Dissolved Metals + Cations	Yes
1	1L HDPE	None	Butylins (Krone)	No
3	40mL VOA	HCl	VOCs	No
1	1L AGB	None	SVOCs	No
1	600mL HDPE	H ₂ SO ₄	Anions	Yes
2	500mL HDPE	None	Anions	Yes
1	250mL HDPE	None	TOC/DOC	No
3	40mL VOA	HCl	NWTPH-Gx	No
1	1L AGB	None HCl	NWTPH-Dx	No

Well Purge Data										
Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
908	Pump On		Initial 16.20		±5%	≥greater of 10% or 0.2mg/L	±0.1	±10mv	±10%	← Stabilization Criteria
910	Initial	375	16.25	10.48	94.7A	11.22	6.83	-34.4	Clear	SI yellow color
0914	~2.0	375	16.25	10.65	0.595	2.58	6.81	-44.3	clear	SI yellow color
0918	3.75	375	16.25	10.72	0.599	2.13	6.84	-127.0	clear	↓
0921	4.1	375	16.26	10.79	0.596	2.05	6.86	-139.9	clear	↓
0923	4.8	375	16.26	10.83	0.593	2.07	6.88	-146.6	clear	↓
0928	6.6	375	16.26	10.83	0.590	1.60	6.87	-150.6	clear	↓
0930	7.3	375	16.27	10.87	0.589	1.52	6.87	-154.2	clear	↓
0932	7.9	375	16.27	10.92	0.588	1.44	6.88	-156.5	clear	↓
Hach Ferraris Iron Field test Kit result = 2.7 mg/L										
Start Sampling 0939										
End Sampling 1005			Sample Number: 080417 MW6 GW							
16:27			Sample Time: 1000							

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Well Number: MW6

Page 2 of 2

Date: 4-17-8

URS Project Number: 25696679.00001

Well Purge Data (continued from Page 1)

Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
Stabilization Criteria =>					±3%	±10%	±0.1	±10mv	±10%	
<p style="font-size: 2em; transform: rotate(-45deg); opacity: 0.5;">NO DATA</p>										
Start Sampling										
End Sampling				Sample Number:						
			Final							

Comments

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Ci = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Well Number: MW-7
Date: 4/16/08

Page 1 of 2

Project Information	
Project Name:	Bradford Island
URS Project Number:	25696679.00001
Sampling Information	
Field Team:	M. Cecchini
Purge Method:	Low Flow
Pump Intake Depth (ft btc):	~28'
Flow-Through Cell:	Yes
Sampling Method:	Low Flow w/ p-pump
Decontamination Method:	Not Applicable. Used dedicated sampling equipment
Purge Water Disposition:	Drum on site
Field Conditions:	Sos Cloudy
Comments:	
PID reading upon opening well cap:	Not Measured
Initial DTW =	8.75 (24.45' = WC)
	1 casing vol = 4.2 gal

Well Information					
(Stick-up or Flush) (circle one)					
Well Diameter (in)	Drilled Well Depth		Top of Screen		Screen Interval (ft bgs)
	(ft bgs)	(ft btc)	(ft bgs)	(ft btc)	
2"	-	33.20	5	-	5 - 30

Number	Type	Preservative	Analytical Parameters	Filtered?
	1L HDPE	HNO3	Total Metals	No
	1L HDPE	HNO3	Dissolved Metals + Cations	Yes
	1L HDPE	None	Est. Hms (Krone)	No
	40mL VOA	HCl	VOCs	No
	1L AGB	None	SVOCs	No
	500mL HDPE	H2SO4	Anions	Yes
	500mL HDPE	None	Anions	Yes
	1L HDPE	None	TOC/DOC	No
	40mL VOA	HCl	NWTPH-Gx	No
	1L AGB	None	NWTPH-Dx	No

Well Purge Data											
Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks	
1255	Pump On	1255	Initial 8.75		±3%	≥greater of 10% or 0.2mg/L	±0.1	±10mv	±10%	≤ Stabilization Criteria	
1257	~1.1	500	9.03	11.19	0.359	1.55	7.07	-112.1	Cl	orange-brown	
1302	~2.7	340	9.05	10.93	0.345	1.11	7.32	-129.3	SC	clear	
1307	~4.4	340	9.05	10.79	0.339	1.05	7.21	-133.3	SC	clear	
1312	~6.1	340	9.05	10.35	0.330	0.99	7.18	-146.4	SC	clear	
1317	~7.8	340	9.09	10.14	0.327	1.09	7.18	-151.7	Cl	orange	
1322	~9.5	340	9.10	10.34	0.328	1.08	7.23	-166.4	Cl	orange	
1327	~11.2	340	9.11	10.59	0.328	0.98	7.25	-171.9	Cl	orange-brown	
1332	~12.9	340	9.11	10.36	0.326	0.94	7.23	-171.3	SC	orange-brown	
Ferrous Iron Field Test Kit Result = 7mg/L											
Start Sampling			1340	Field Duplicate: 080416MW22GW				1355			
End Sampling			1429	Sample Number: 080416-MW76W				Sample Time: 1345			
			9.126								

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

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URS Project Number: 25696679.00001

Well Number: MW7

Date: 4-16-08

Well Purge Data (continued from Page 1)

Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
Stabilization Criteria =>				-	±3%	±10%	±0.1	±10mv	±10%	
<p><i>[Handwritten signature]</i></p> <p><i>[Handwritten signature]</i></p> <p><i>[Handwritten signature]</i></p> <p>4-16-08</p>										
Start Sampling										
End Sampling			Sample Number:							
			Final							

Comments

Notes: AC = almost clear bgs = below ground surface btc = below top of casing Cl = cloudy DTW = depth to water C = clear VC = very cloudy SC = slightly cloudy

Monitoring Well Sampling Field Log

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4-18-08
BAM

Well Number: MW-8
Date: 4/16/08

Project Information
 Project Name: Bradford Island
 URS Project Number: 2569 6679.00001
Sampling Information
 12V Stainless Steel
 Field Team: N. MOODY monsoon pump
 Purge Method: Low Flow w/ pump
 Pump Intake Depth (ft btc): 57 to 59 ft BTC
 Flow-Through Cell: Yes - YSI 556
 Sampling Method: P-Pump dedicated/new tubing
 Decontamination Method: Not Applicable Used dedicated sampling equipment
 Purge Water Disposition: Drum on site
 Field Conditions:
 Comments:
 PID reading upon opening well cap: Not Measured
 Initial DTW = 43.33 on 4-16-8
41.63 on 4-18-8
BAM 4-18-8
used centrifugal pump due to DTW. Decontam pump (Monso, DW, Methanol, DW) prior to use.

Well Information (Stick-up or Flush (circle one))

Well Diameter (in)	Drilled Well Depth		Top of Screen		Screen Interval (ft bgs)
	(ft bgs)	(ft btc)	(ft bgs)	(ft btc)	
2"	-	60.30	53"	53"	53-58

NM 4/16/08

Sample Containers

Number	Type	Preservative	Analytical Parameters	Filtered?
1	1L HDPE	HNO3	Total Metals	No
1	1L HDPE	HNO3	Dissolved Metals + Cations	Yes
1	1L HDPE	None	Butylins (Krone)	No
3	40mL VOA	HCl	VOCs	No
2	1L AQB	None	SVOCs	No
1	2x500mL HDPE	H2SO4	Anions	Yes
1	2x500mL HDPE	None	Anions	Yes
1	250mL HDPE	None H2SO4	TOC/DOC	No
3	40mL VOA	HCl	NWTPH-Gx	No
2	1L AQB	None	NWTPH-Dx	No
(16)				

Well Purge Data

Time	Volume Purged (gals)	Purge Rate (ml/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks	
0942	Pump On	1.0L/m	43.33		±3%	±greater of 10% or 0.2mg/L	±0.1	±10mv	±10%	Stabilization Criteria	
0953	Initial	55.0	43.60	10.74	3.74	4.90	7.47	109.7	Clear		
1000	1.25 gals	1000	47.39	11.61	3.992	2.87	7.89	95.3	Clear		
1005	2.5 gals	1000	52.71	12.79	4.257	2.80	8.19	82.7	Clear		
1009	3.0 gals	1000	54.00	12.36	4.104	2.42	8.20	81.2	Clear		
1010	3.25	1000	54.60	12.48	4.117	2.34	8.20	81.0	Clear		
1012	4.90	1000	55.00	12.57	4.107	2.35	8.20	80.6	Clear		
1015	5.00	1000	54.6	12.62	4.122	2.28	8.20	80.4	Clear		
1016	5.50	1000	56.2	12.68	4.123	2.29	8.21	80.1	Clear		
Lowered pump intake due to draw down within well. Pump intake from 57 to 59 ft btc											
Start Sampling		1018		Sample Number:		080418 MW8GW		Sample Time:		1030	
End Sampling		1035		Final		58.0'					

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Well Number: MW 8

Page 2 of 2

Date: 4-18-8

URS Project Number: 2569 6679.00001

Well Purge Data (continued from Page 1)

Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
Stabilization Criteria =>				-	±3%	±10%	±0.1	±10mv	±10%	
<p style="font-size: 2em; transform: rotate(-45deg); opacity: 0.5;">No Data</p>										
Start Sampling										
End Sampling				Sample Number:						
			Final							

Comments

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Page 1 of 2

Well Number: MW-9
Date: 4/17/08

Project Information
 Project Name: Bradford Island
 URS Project Number: 25696679.00001

Sampling Information
 Field Team: NM, BM, MC
 Purge Method: Low Flow w/ p-plumb
 Pump Intake Depth (ft btc): ~15.5'
 Flow-Through Cell: Yes
 Sampling Method: low flow w/ new, dedic. tooling
 Decontamination Method: Not Applicable. Used dedicated sampling equipment
 Purge Water Disposition: Drum on site
 Field Conditions:
 Comments:
 PID reading upon opening well cap: Not Measured
 Initial DTW = 13.47 (WC = 3.83')
 1 casing volume = 0.65 gal/2.46L
 Begin sampling after removing one casing volume due to slow production and drawdown.
 Collected slightly more than minimum sample volume.

Well Information (Stick-up or Flush (circle one))

Well Diameter (in)	Drilled Well Depth		Top of Screen		Screen Interval (ft bgs)
	(ft bgs)	(ft btc)	(ft bgs)	(ft btc)	
2"	-'	17.3'	15'	-'	15 - 20

Sample Containers

Number	Type	Preservative	Analytical Parameters	Filtered?
1	1L HDPE	HNO3	Total Metals	No
1	1L HDPE	HNO3	Dissolved Metals + Cations	Yes
1	1L HDPE	None	Estrogens (Krone)	No
3	40mL VOA	HCl	VOCs	No
1	1L AGB	None	SVOCs	No
1	500mL HDPE	H2SO4	Anions	Yes
1	500mL HDPE	None	Anions	Yes
1	1L HDPE	None	TOC/DOC	No
3	40mL VOA	HCl	NWTPH-Gx	No
1	1L AGB	None	NWTPH-Dy	No

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Well Purge Data

Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (µS/cm) MC	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
1035	Pump On		Initial 13.47		±3%	±greater of 10% or 0.2mg/L	±0.1	±10mv	±10%	<= Stabilization Criteria
1040	~0.5	210	14.35	10.33	0.100	6.16	6.04	78.5	SC	clear
1045	~0.9L	180	14.78	10.15	0.101	3.53	5.75	106.7	SC	clear
1050	~1.6L	100	15.16	10.08	0.104	2.31	5.70	115.5	SC	clear
1055	~2.1L	100	dry (15.5)	10.35	0.102	1.73	5.76	119.0	SC	clear
	pump off		@ 1056	to allow MW-9 to recharge above intake depth						
1124	resume purge		14.90							
1125	~2.1	100	15.04	11.79	0.100	2.20	5.78	90.9	SC	clear
1130	~2.6	100	15.27	11.76	0.102	2.48	5.78	92.5	SC	clear
1147	Stop pump after 0.5'		water level below pump intake, will resume sampling							
1437	Well recharged to 15.18'		resume sampling							
4/17 1456	Stop pumping and continue sampling on 4/18		water level below pump intake. Will return to MW-9							
4/18 0840	Resume purge for sampling MW-9, DTW: 13.82'									
										Ferrous Fe field test kit result = 0.3 mg/L
	Start Sampling	1133	4/17/08							
	End Sampling	0900	4/18/08							
		Final 15.40								Sample Number: 080417 MW96W
										Sample Time: 1150

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Well Number: MW9
 Date: 4-17-8

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URS Project Number: 25696679.00001

Well Purge Data (continued from Page 1)

Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	Clarity (m)	Turbidity (NTUs)	Clarity Remarks	Color / Remarks
Stabilization Criteria =>				-	±3%	±10%	±0.1	±10%	±10%		
<p style="font-size: 2em; transform: rotate(-45deg); opacity: 0.5;">NO DATA</p>											
Start Sampling											
End Sampling				Sample Number:							
Final											

Comments

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Well Number: MW10
Date: 04-15-08

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Project Information	
Project Name:	Bradford Island
URS Project Number:	25696679.00001
Sampling Information	
Field Team:	M. Cecchini, B. McNamee
Purge Method:	Low Flow w/ Peristaltic Pump
Pump Intake Depth (ft btc):	~40 feet bgs
Flow-Through Cell:	4x5 GSB
Sampling Method:	Low Flow
Decontamination Method:	Not Applicable. Used dedicated sampling equipment
Purge Water Disposition:	Drum on site
Field Conditions:	Rain, 290° F
Comments:	
PID reading upon opening well cap:	Not Measured
Initial DTW =	20.45
Had diff. w/ installing pump tubing due to friction on well sidewalls. Got tubing to ~40' after ~30 minutes.	

Well Information		Stick-up or Flush (circle one)			
Well Diameter (in)	Drilled Well Depth		Top of Screen		Screen Interval (ft bgs)
	(ft bgs)	(ft btc)	(ft bgs)	(ft btc)	
2	57.5	-	47	-	47-57

Sample Containers					Filtered?
Number	Type	Preservative	Analytical Parameters		
3	1L HDPE	HNO ₃	Total Metals	No	
24	1L HDPE	HNO ₃	Dissolved Metals + Cations	YES	
4	1L HDPE	None	Biotinins (Krone)	No	
3	40mL VOA	HCl	VOCs	No	
4	1L AGB	None	SVOCs	No	
1	2500mL HDPE	H ₂ SO ₄	Anions	Yes	
1	2500mL HDPE	None	Anions	Yes	
1	1L HDPE	None	TOC/DOC	No	
3	40mL VOA	HCl	NWTPH-Gx	No	
1	1L AGB	None	NWTPH-Dx	No	

Well Purge Data										
Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (µm/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
	Pump On	1417	Initial		±3%	±greater of 10% or 0.2mg/L	±0.1	±10mv	±10%	<= Stabilization Criteria
1419	2.52	300	20.82	8.85	0.185	20.0	8.37	83.4	CL	
1424	~11	300	22.80	10.02	0.187	3.24	8.37	-28.5	CL-SC	
1429	~20.5	200	23.28	9.68	0.185	2.15	8.36	-89.8	SC	
1434	~30.0	200	23.86	9.62	0.183	1.81	8.36	-105.9	SC	
1439	~4.0	200	24.16	9.72	0.183	1.63	8.36	-113.3	SC	
1444	~6.0L	200	24.64	9.76	0.183	1.52	8.37	-116.2	SC-C	
1449	~7.0L	200	24.85	9.77	0.183	1.56	8.36	-107.8	C	
Filled enough volume for MS/MSD (forgot 1 HNO ₃ ⇒ 2 total instead of 3)										
HAH Ferrous Iron test kit result = 0.0 mg/L										
Start Sampling	1555		Field Duplicate: 080415 MW21GW		Time: 1530					
End Sampling	1625		Sample Number: 080415 MW10 GW		Sample Time: 1500					
			Final							
			28.29							

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

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Well Number: MW10

Date: 4-15-02

URS Project Number: 25696679.00001

Well Purge Data (continued from Page 1)

Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
Stabilization Criteria =>					±3%	±10%	±0.1	±10mv	±10%	
<p style="font-size: 2em; transform: rotate(-45deg); opacity: 0.5;">No Data</p>										
Start Sampling										
End Sampling				Sample Number:						
			Final							

Comments

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

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Well Number: MW11

Date: 4-15-8

Project Information	
Project Name:	Bradford Island
URS Project Number:	2569 6679.00001
Sampling Information	
Field Team:	M. Cecchini, B. McNamara
Purge Method:	Low Flow w/ Peristaltic Pump
Pump Intake Depth (ft btc):	31 Feet
Flow-Through Cell:	YSI 556
Sampling Method:	Low Flow
Decontamination Method:	Not Applicable. Used dedicated sampling equipment
Purge Water Disposition:	Drum on site
Field Conditions:	Rain, 50°F
Comments:	
PID reading upon opening well cap:	Not Measured
Initial DTW =	6.4'
Feet of water =	~29.5'

Well Information			Stick-up or Flush (circle one)		
Well Diameter (in)	Drilled Well Depth		Top of Screen		Screen Interval (ft bgs)
	(ft bgs)	(ft btc)	(ft bgs)	(ft btc)	
2	36.5	—	26	—	26-36
Sample Containers					
Number	Type	Preservative	Analytical Parameters	Filtered?	
1	1L HDPE	HNO ₃	Total Metals	No	
1	1L HDPE	HNO ₃	Dissolved Metals + Cations	Yes	
1	1L HDPE	None	Butylins (Krone)	No	
6	40mL VOA	HCl	VOCs	No	
1	1L AGB	None	SVOCs	No	
2	500mL HDPE	H ₂ SO ₄	Anions	Yes	
2	500mL HDPE	None	Anions	Yes	
2	1L HDPE	None	TOC/DOC	No	
6	40mL VOA	HCl	NWTPH-Gx	No	
2	1L AGB	None	NWTPH-Dx	No	

Well Purge Data											
Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (µmhos/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks	
		0906	Initial		±3%	±greater of 10% or 0.2mg/L	±0.1	±10mv	±10%	<= Stabilization Criteria	
0910	~1.4	350	8.12	10.57	0.377	16.98	8.99	204.5	Clear		
0917	~2.8	200	10.17	10.33	0.349	4.38	8.96	160.5	clear		
0924	~4.2	200	11.5	10.34	0.343	2.82	8.98	140.2	clear		
0930	~5.1	150	12.27	10.14	0.336	2.18	8.97	126.8	clear		
0936	~6.0	150	12.81	10.15	0.336	2.09	8.97	119.4	clear		
0940	~6.9	150	13.15	10.13	0.335	1.98	8.97	116.2	clear		
0941	pump off. For recharge to 12.4' (80% original DTW) prior to sample										
0944	well recharged to 12.4'										
0948	well recharged to 12.0'										
0950	pump on for sample										
1020	pump off										
1025	↓										
1029	↓										
1030	Resume sampling										
Start Sampling			0950	Duplicate Sample # 080415 MW20GW ⇒ ST = 1020							
End Sampling				Sample Number: 080415 MW11 GW				Sample Time: 1000			
			14.18	Final							

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

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URS Project Number: 25696679.00001

Well Number: MW11
Date: 4-15-8

Well Purge Data (continued from Page 1)

Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
Stabilization Criteria =>				-	±3%	±10%	±0.1	±10mv	±10%	
<p style="font-size: 2em; transform: rotate(-45deg); opacity: 0.5;">4-15-8</p>										
Start Sampling										
End Sampling			Sample Number:							
			Final							

Comments

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Well Number: MW 12

Date: 4/15/08

Project Information	
Project Name:	Bradford Island
URS Project Number:	25696679.00001
Sampling Information	
Field Team:	M. Cecchini, B. Matsumura
Purge Method:	Low Flow w/ Resistive Pump
Pump Intake Depth (ft btc):	28 ft BTC
Flow-Through Cell:	YS ± G56
Sampling Method:	Low Flow
Decontamination Method:	Not Applicable. Used dedicated sampling equipment
Purge Water Disposition:	Drum on site
Field Conditions:	Rain, ~90°F
Comments:	
PID reading upon opening well cap:	Not Measured
Initial DTW =	24.08' btc

Well Information				Stick-up or Flush (circle one)	
Well Diameter (in)	Drilled Well Depth		Top of Screen		Screen Interval (ft bgs)
	(ft bgs)	(ft btc)	(ft bgs)	(ft btc)	
2	27	29.55	16	19.62	16 - 26
Sample Containers					
Number	Type	Preservative	Analytical Parameters	Filtered?	
1	1L HDPE	HNO ₃	Total Metals	No	
1	1L HDPE	HNO ₃	Dissolved Metals + Cations	Yes	
1	1L HDPE	None	Butyltins (Krone)	No	
3	40mL VOA	HCl	VOCs	No	
1	1L AQB	None	SVOCS	No	
1	2L 500mL HDPE	H ₂ SO ₄	Anions	Yes	
1	2L 500mL HDPE	None	Anions	Yes	
1	1L HDPE	None	TOC/DOC	No	
3	40mL VOA	HCl	NWTPH-Gx	No	
1	0.5L AQB	None	NWTPH-Dx	No	
(14)					

Well Purge Data										
Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (µS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
	Pump On	11:38	Initial 24.08		±3%	±greater of 10% or 0.2mg/L	±0.1	±10mv	±10%	<= Stabilization Criteria
1140	~0.1	250	24.27	9.55	0.244	9.01	6.37	238.6	clear	
1145	~1.1	200	24.40	10.02	0.227	4.50	6.60	222.0	clear	
1150	~2.1	200	24.53	9.85	0.231	4.04	6.70	209.1	clear	
1155	~3.1	200	24.6	9.78	0.234	4.20	6.72	201.2	clear	
1159	~4.1	200	24.73	9.81	0.235	3.88	6.74	194.2	clear	
1203	~5.1	200	24.76	9.82	0.236	3.64	6.74	189.3	clear	
1205	~5.6	200	24.78	9.67	0.236	3.62	6.74	188.1	clear	
1207	~6.1	200	24.79	9.50	0.234	3.71	6.74	186.2	clear	
1225	DTW	⇒	25.10							
Hach Ferrrous Fe test kit = 0.0 mg/L										
Start Sampling			12:10							
End Sampling			12:50	Sample Number: 080415 MW12 GW			Sample Time: 1245			
			Final 25.30							

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

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Well Number: MW12

Date: 4-15-8

URS Project Number: 25696679.00001

Well Purge Data (continued from Page 1)

Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
Stabilization Criteria =>					±3%	±10%	±0.1	±10mV	±10%	
<i>[Handwritten scribbles and a large diagonal line crossing the table]</i>										
Start Sampling										
End Sampling				Sample Number:						
			Final							

Comments

Notes: AC = almost clear bts = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Page 1 of 2

Well Number: MW13
Date: 4-14-8

Project Information
Project Name: Bradford Island
URS Project Number: 2569 6679.00001

Sampling Information
Field Team: N. Moody, B. McManara
Purge Method: Low Flow, Peristaltic Pump
Pump Intake Depth (ft btc): 31
Flow-Through Cell: YSI 556
Sampling Method: Low Flow
Decontamination Method: Not Applicable. Used dedicated sampling equipment
Purge Water Disposition: Drum on site
Field Conditions: Rain, ~50°F

Comments:
PID reading upon opening well cap: Not Measured
Initial DTW = 16.35 ft BTOC
TD = 36.05 ft BTOC
Feet of Water = 19.7 (80% = 15.76)
19.7 feet x 0.165 = 3.2 gals
Cone well Volume

Well Information			Stick-up or Flush (circle one)		Screen Interval (ft bgs)
Well Diameter (in)	Drilled Well Depth		Top of Screen		
	(ft bgs)	(ft btc)	(ft bgs)	(ft btc)	
<u>2</u>	<u>—</u>	<u>—</u>	<u>26</u>	<u>36</u>	<u>26 - 36</u>

Sample Containers				Filtered?
Number	Type	Preservative	Analytical Parameters	
<u>1</u>	<u>1L HDPE</u>	<u>HNO3</u>	<u>Total Metals</u>	<u>No</u>
<u>1</u>	<u>1L HDPE</u>	<u>HNO3</u>	<u>Dissolved Metals + Cations</u>	<u>Yes</u>
<u>1</u>	<u>1L HDPE</u>	<u>None</u>	<u>Bot. Hims (Krone)</u>	<u>No</u>
<u>3</u>	<u>40mL VOA</u>	<u>HCl</u>	<u>VOCs</u>	<u>No</u>
<u>1</u>	<u>1L AGB</u>	<u>None</u>	<u>SVOCs</u>	<u>No</u>
<u>1</u>	<u>2x500mL HDPE</u>	<u>H2SO4</u>	<u>Anions</u>	<u>Yes</u>
<u>1</u>	<u>2x500mL HDPE</u>	<u>None</u>	<u>Anions</u>	<u>Yes</u>
<u>1</u>	<u>1L HDPE</u>	<u>None</u>	<u>TOC/DOC</u>	<u>No</u>
<u>3</u>	<u>40mL VOA</u>	<u>HCl</u>	<u>NWTPH-Gx</u>	<u>No</u>
<u>1</u>	<u>0.2L AGB</u>	<u>None</u>	<u>NWTPH-Dx</u>	<u>No</u>

Well Purge Data											
Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (µS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks	
	Pump On: <u>Apr 1338</u>		Initial		±3%	±greater of 10% or 0.2mg/L	±0.1	±10mv	±10%	<= Stabilization Criteria	
<u>1344</u>	<u>1338</u>	<u>250</u>	<u>17.05</u>	<u>9.31</u>	<u>0.258</u>	<u>3.94</u>	<u>7.48</u>	<u>70.8</u>	<u>Clear</u>		
<u>1349</u>	<u>~2.0</u>	<u>200</u>	<u>17.35</u>	<u>9.01</u>	<u>0.263</u>	<u>1.08</u>	<u>7.65</u>	<u>13.1</u>	<u>Clear</u>		
<u>1355</u>	<u>~4.0</u>	<u>200</u>	<u>17.63</u>	<u>9.14</u>	<u>0.265</u>	<u>1.14</u>	<u>7.70</u>	<u>-11.5</u>	<u>Clear</u>		
<u>1402</u>	<u>~4.5</u>	<u>200</u>	<u>17.85</u>	<u>9.44</u>	<u>0.267</u>	<u>1.12</u>	<u>7.73</u>	<u>-29.2</u>	<u>Clear</u>		
<u>1406</u>	<u>~5.3</u>	<u>200</u>	<u>17.97</u>	<u>9.52</u>	<u>0.268</u>	<u>1.38</u>	<u>7.71</u>	<u>-31.5</u>	<u>Clear</u>		
<u>1408</u>	<u>~5.5</u>	<u>200</u>	<u>18.00</u>	<u>9.62</u>	<u>0.269</u>	<u>1.36</u>	<u>7.72</u>	<u>-42.4</u>	<u>Clear</u>		
<u>1410</u>	<u>~5.9</u>	<u>200</u>	<u>18.05</u>	<u>9.70</u>	<u>0.269</u>	<u>1.44</u>	<u>7.74</u>	<u>-53.5</u>	<u>Clear</u>		
<u>1412</u>	<u>~6.2</u>	<u>200</u>	<u>18.10</u>	<u>9.76</u>	<u>0.270</u>	<u>1.07</u>	<u>7.72</u>	<u>-65.3</u>	<u>Clear</u>		
<u>1414</u>	<u>~6.4</u>	<u>200</u>	<u>18.15</u>	<u>9.77</u>	<u>0.270</u>	<u>0.97</u>	<u>7.73</u>	<u>-70.7</u>	<u>Clear</u>		
<u>1416</u>	<u>~6.6</u>	<u>200</u>	<u>18.20</u>	<u>9.77</u>	<u>0.270</u>	<u>0.90</u>	<u>7.73</u>	<u>-81.2</u>	<u>Clear</u>		
<u>1418</u>	<u>~6.8</u>	<u>200</u>	<u>18.25</u>	<u>9.78</u>	<u>0.270</u>	<u>0.86</u>	<u>7.73</u>	<u>-85.7</u>	<u>Clear</u>		
<u>1420</u>	<u>~7.0</u>	<u>200</u>	<u>18.28</u>	<u>9.76</u>	<u>0.270</u>	<u>0.84</u>	<u>7.73</u>	<u>-89.9</u>	<u>Clear</u>		
		<u>Volume Purged = ~2.5 gals</u>									
		<u>HACH Ferrous Iron (Fe²⁺) field test result = 0.2 mg/L</u>									
	Start Sampling	<u>1419</u>									
	End Sampling	<u>1458</u>	Sample Number:	<u>080414 MW13 GW</u>				Sample Time:	<u>1415</u>		
		<u>18.93</u>	Final								

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Well Number: MW13

Page 2 of 2

Date: 4-13-8

URS Project Number: 2569 0679.00001

Well Purge Data (continued from Page 1)

Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
Stabilization Criteria =>				-	±3%	±10%	±0.1	±10mv	±10%	
<p><i>[Handwritten signature and scribbles across the table grid]</i></p>										
Start Sampling										
End Sampling				Sample Number:						
				Final						

Comments

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Page 1 of 2

Well Number: MW14
Date: 4-14-8

Project Information	
Project Name:	Bradford Island
URS Project Number:	2569 6679.00001
Sampling Information	
Field Team:	N. Moody, B. McNamee
Purge Method:	Low Flow
Pump Intake Depth (ft btc):	13
Flow-Through Cell:	YSI 556
Sampling Method:	Low Flow
Decontamination Method:	Not Applicable. Used dedicated sampling equipment
Purge Water Disposition:	Drum on site
Field Conditions:	Rain
Comments:	
PID reading upon opening well cap:	Not Measured
Initial DTW =	12.94
TD =	23.5
WD =	12.94
Feet of Water =	10.51 feet
10.51 feet x 0.165 gal/foot	
1 well volume =	1.73 gals

Well Information			Stick-up or <u>Flush</u> (circle one)		
Well Diameter (in)	Drilled Well Depth		Top of Screen		Screen Interval (ft bgs)
	(ft bgs)	(ft btc)	(ft bgs)	(ft btc)	
2	23	13	13	23	

Sample Containers				
Number	Type	Preservative	Analytical Parameters	Filtered?
1	1L HDPE	HNO ₃	Total Metals	No
1	1L HDPE	HNO ₃	Dissolved Metals + Cations	Yes
1	1L HDPE	None	Biotrans (Krone)	No
3	40mL VOA	HCl	VOCs	No
1	1L AGB	None	SVOCs	No
1	2x 500mL HDPE	H ₂ SO ₄	Anions	Yes
1	2x 500mL HDPE	None	Anions	Yes
1	1L HDPE	None	TOC/DOC	No
3	40mL VOA	HCl	NWTPH-Gx	No
1	0.93L AGB	None HCL	NWTPH-Dx	No

Well Purge Data										
Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp (°C)	Conductivity (µS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
			Initial		±3%	±greater of 10% or 0.2 mg/L	±0.1	±10mv	±10%	← Stabilization Criteria
	Pump On	0935								
0938	~0.5-1.0	250	12.92	10.17	0.201	7.63	6.96	80.5	Clear	
0944	~2.1	350	12.90	10.12	0.193	6.10	6.71	90.9	Clear	
0953	~4.5	300	12.90	9.91	0.143	5.84	6.67	66.9	Clear	
0958		300	12.89	9.77	0.142	5.76	6.56	68.1	Clear	
1003		300	12.89	9.74	0.140	5.74	6.63	69.7	Clear	
1008	9.0	300	12.88	9.78	0.140	5.72	6.66	70.2	Clear	
40 minutes x 0.34/min = ~12L purged & placed in drum on site										
HACH Ferrous Iron (Fe ²⁺) Field test result = 0.0 mg/L										
Start Sampling			1009							
End Sampling			1036	Sample Number: 090414 MW14 GW			Sample Time: 1020			
			Final 12.87							

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Page 2 of 2

Well Number: MW14

Date: 4-14-8

URS Project Number: 2569 6679.00001

Well Purge Data (continued from Page 1)

Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
Stabilization Criteria =>				-	±3%	±10%	±0.1	±10mv	±10%	
<p><i>[Handwritten signature]</i> <i>[Handwritten signature]</i> <i>[Handwritten signature]</i> <u>4-14-8</u></p>										
Start Sampling										
End Sampling				Sample Number:						
			Final							

Comments

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Monitoring Well Sampling Field Log

Page 1 of 2

Well Number: MW15

Date: 04-14-02

Project Information	
Project Name:	Bradford Island
URS Project Number:	2569 6079.00001
Sampling Information	
Field Team:	N. Moody, B. McNamara
Purge Method:	Low Flow, resistive pump
Pump Intake Depth (ft btc):	17
Flow-Through Cell:	YST 656
Sampling Method:	Low Flow
Decontamination Method:	Not Applicable. Used dedicated sampling equipment
Purge Water Disposition:	Drum on site
Field Conditions:	Rain, ~50°F
Comments:	
PID reading upon opening well cap:	Not Measured
Initial DTW =	13.05
TD = 22.1 DTW = 13.05 Feet of water = 9.05 x 0.165 gal/ft 1.49 gal = 1 well volume	

Well Information			Stick-up of <u>Flush</u> (circle one)		
Well Diameter (in)	Drilled Well Depth		Top of Screen		Screen Interval (ft bgs)
	(ft bgs)	(ft btc)	(ft bgs)	(ft btc)	
2	22	-	12	-	12-22

Sample Containers				Filtered?
Number	Type	Preservative	Analytical Parameters	
5	1L HDPE	HNO3	Total Metals	No
1	1L HDPE	HNO3	Dissolved Metals + Cations	Yes
1	1L HDPE	None	Butylins (Krone)	No
9	40mL VOA	HCl	VOCs	No
1	1L AQB	None	SVOCs	No
3	2x500mL HDPE	H2SO4	Anions	Yes
3	2x500mL HDPE	None	Anions	Yes
3	1L HDPE	None	TOC/DOC	No
9	40mL VOA	HCl	NWTPH-Gx	No
3	1L AQB	None-HCl	NWTPH-Dx	No

Well Purge Data										
Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (µS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
			Initial		±3%	±greater of 10% or 0.2mg/L	±0.1	±10mv	±10%	<= Stabilization Criteria
1122	~0.400	400	13.05	9.37	0.160	8.16	6.68	92.4	Clear	
1127	~2.0	~350	13.06	9.58	0.161	6.54	6.47	92.8	Clear	
1132	~4.0	~375	13.07	9.69	0.163	6.45	6.43	92.4	Clear	
1141	~8.0	~375	13.08	9.73	0.160	6.51	6.39	95.0	Clear	
1146	~10.0	380	13.09	9.73	0.159	6.57	6.38	98.1	Clear	
24 minutes @ 380 L/min = ~9 L purged & drummed on site Collected enough sample volume for MS/MSD										
Start Sampling			1150							
End Sampling			1240							
			Final 13.09	Sample Number: 080414 MW15 GW			Sample Time: 1200			

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Ferrous Iron = 0.0mg/L

MS/MSD

Monitoring Well Sampling Field Log

Well Number: MW15
 Date: 4-14-82

Page 2 of 2

URS Project Number: 2569 6679.00001

Well Purge Data: (continued from Page 1)

Time	Volume Purged (L)	Purge Rate (mL/m)	DTW (ft btc)	Temp. (°C)	Conductivity (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTUs)	Clarity / Color / Remarks
Stabilization Criteria =>										
				-	±3%	±10%	±0.1	±10mv	±10%	
 MW15 Bottle Totals 1 SAMPLE + MS/MSD 2 HNO₃ 4 2 IL HDPE No 1 Bott/Water 2 1 H₂SO₄ NO 1 L Amber 2 1 500 HCl Amber 12 6 VOLS 20 14 Sample 34 total 										
Start Sampling										
End Sampling			Sample Number:							
			Final							

Comments

Notes: AC = almost clear btc = below top of casing DTW = depth to water VC = very cloudy
 bgs = below ground surface Cl = cloudy C = clear SC = slightly cloudy

Bradford Island

Seep and Surface Water Sampling Form

Sample Number: 080418 52 SP = seep sample
 080418 52 SW = surface water sample

Date: 4/18/8

Weather Conditions: Intermittent rain, ~ 50°F

Time: SP = 1300
 SW = 1330

Analyses

<input type="checkbox"/> PCB-Aroclors	<input checked="" type="checkbox"/> VOCs	<input checked="" type="checkbox"/> TSS
<input type="checkbox"/> PCB - Congeners	<input type="checkbox"/> Pesticides	<input type="checkbox"/> Hardness
<input checked="" type="checkbox"/> Metals	<input checked="" type="checkbox"/> Butyltins	<input type="checkbox"/> pH
<input checked="" type="checkbox"/> SVOCs	<input checked="" type="checkbox"/> Diesel/Heavy Range Organics	<input checked="" type="checkbox"/> TOC
<input type="checkbox"/> PAHs	<input checked="" type="checkbox"/> Cations/Anions	<input type="checkbox"/> DOC

Sample Collection

Seep Sampling Method: Peristaltic pump. Pumped from glass jar placed in seep.

QC Samples Collected: None

Surface Water Sample Method: Peristaltic Pump - 1' below river surface

Decontamination Method: NA - Dedicated (new) pump tubing & glass jar used.

Sample Team: MC, NM, BM

Sample Location

Latitude: _____ N } Not recorded due to lack of satellite,
 Longitude: _____ W } which is likely a result of steep bank & trees

Description of Location: North bank of Bradford Island

Seep flow rate: ~ 2/3 L per minute

Water Quality Readings

pH 7.37
 Turbidity slightly cloudy to clear
 Dissolved Oxygen 8.54 mg/L
 Conductivity 0.160 mS/cm
 Reduction-Oxidation Potential 88.5 mV
 Temperature 8.18°C

Other Comments

Sampling took place from ~1045 to 1400. Difficult access.
 Reptelled down rope & walked along rocky bank to sampling
 location. Rope required to lower/rise equipment & for access.

Bradford Island

Seep and Surface Water Sampling Form

Sample Number: 08041754SP = seep sample
 08041754SW = surface water sample

Date: 4-17-08

Weather Conditions: Ptlly cloudy - Sunny, ~90° F

Time: SP = 1315
 SW = 1415

Analyses

- | | | |
|--|---|---|
| <input type="checkbox"/> PCB-Aroclors | <input checked="" type="checkbox"/> VOCs | <input checked="" type="checkbox"/> TSS |
| <input type="checkbox"/> PCB - Congeners | <input type="checkbox"/> Pesticides | <input type="checkbox"/> Hardness |
| <input checked="" type="checkbox"/> Metals | <input checked="" type="checkbox"/> Butyltins | <input type="checkbox"/> pH |
| <input checked="" type="checkbox"/> SVOCs | <input checked="" type="checkbox"/> Diesel/Heavy Range Organics | <input checked="" type="checkbox"/> TOC |
| <input type="checkbox"/> PAHs | <input checked="" type="checkbox"/> Cations/Anions | <input type="checkbox"/> DOC |

Sample Collection

Seep Sampling Method: Peristaltic pump. Pumped from glass jar placed in seep

QC Samples Collected: None

Surface Water Sample Method: Peristaltic Pump - 1' below river surface

Decontamination Method: NA - Dedicated (New) pump tubing & glass jar used

Sample Team: MC, NM, BPA

Sample Location

Latitude: _____ N } Not recorded. No satellite coverage
 Longitude: _____ W } due to steep bank & trees.

Description of Location: North bank of Bradford Island, beneath landfill

Seep flow rate: ~ 250 mL/min

Water Quality Readings

- pH: 6.95
- Turbidity: Clear
- Dissolved Oxygen: 9.50 mg/L
- Conductivity: 0.368 mS/cm
- Reduction-Oxidation Potential: 281.5 mV
- Temperature: 9.93 °C

Other Comments

Sampling took place from 1300 to 1435. Accessed seep by walking down slope (no rope needed)

Quality Control Summary Report for Analytical Chemistry

UPLAND OPERABLE UNIT REMEDIAL INVESTIGATION

QUALITY CONTROL SUMMARY REPORT FOR ANALYTICAL CHEMISTRY

1ST QUARTER UPLAND SAMPLING EVENT – APRIL 2008

JULY 2008

Prepared by:

URS

111 S.W. Columbia, Suite 1500
Portland, Oregon 97201-5850

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TABLES

TABLE 1 SAMPLING ID AND ANALYSIS SUMMARY
TABLE 2 QUALIFIER SUMMARY

1.0 Executive Summary

The overall assessment of the 1st quarter groundwater, surface water and seep sample results show the quality of the data is acceptable to support project objectives. The contracted laboratory provided all requested analyses and delivered data reports were complete. Some data were qualified as estimated and flagged with a 'J' or 'UJ'. Some data were qualified as not detected and flagged with a 'U'. All data qualifiers resulting from this review have been added to both the project database and the data tables within the main body of the attached report.

2.0 Project Description

URS collected 18 groundwater samples (15 primary and three field duplicates), two seep samples, two surface water samples and one rinsate blank during the first quarter upland sampling event on Bradford Island. Samples were collected from April 14 through April 18, 2008. Table 1 summarizes the sample location, media, URS and laboratory identification numbers and the requested analyses.

3.0 Sampling and Analytical Procedures

Samples were collected according to the Quality Assurance Project Plan (QAPP) *Draft: Upland Operable Unit Remedial Investigation* (URS 2008). All water samples were submitted to Columbia Analytical Services (CAS) located in Kelso, WA and logged in by the laboratory under four CAS sample delivery groups (K0803288, K0803320, K0803393, and K0803410). The following table lists the parameters analyzed on one or more of the samples. Table 1 summarizes the specific requested analyses for each media by URS and laboratory identification numbers. (Note: ammonia was inadvertently included on the URS COC and was analyzed by CAS; ammonia results are included in this report but are not listed in the QAPP.)

Method	Analytical Parameter
EPA 8260B	VOCs
EPA 8270C	SVOCs
EPA 6000 series	Metals
Krone (Krone 1998)	Butyltins
Total Petroleum Hydrocarbons (Ecology 1997)	Northwest Total Petroleum Hydrocarbons – Diesel Range (NWTPH-Dx) NWTPH – Gasoline Range (NWTPH-Gx)
SM 5310C	Total Organic Carbon (TOC)
SM 5310C	Dissolved Organic Carbon (DOC)

Method	Analytical Parameter
EPA 300.0	Dissolved Anions (Bromide, Chloride, Fluoride, and/or Sulfate)
EPA 353.3	Nitrate/Nitrite
EPA 2320B	Alkalinity (Carbonate and/or Bicarbonate)
SM 4500-NH3 E	Dissolved Ammonia

4.0 Data Validation

Analyses were performed in general accordance with the above-referenced methods. The analytical results for all samples were subjected to a quality assurance/quality control (QA/QC) review. This QA/QC review includes evaluation of representativeness (sample collection/handling), accuracy (spike and/or standard recoveries), analytical precision (duplicate relative percent difference), comparability (use of standard methods) and completeness (percent of usable data). Specifically, the following items were reviewed when appropriate: compliance with the QAPP, chain-of-custody (COC), laboratory case narrative, proper sample preservation and handling procedures, holding times, field/method/trip blank analyses, matrix/matrix spike duplicate recoveries, laboratory duplicate results, field duplicate results, blank spike recoveries (laboratory control samples), data completeness and format, data qualifiers assigned by the laboratory, and analyte identification. The following items were reviewed on 15% or greater of the data: initial and continuing calibrations, primary and secondary column verification, instrument calibration and a verification of the reported electronic data with the hard copy deliverable. The data were reviewed in accordance with the QAPP (URS 2008). The data results were reviewed in accordance with the criteria contained in the DoD QSM (DoD 2006) and the above-listed methods and the following EPA guidance documents in that order; EPA's *Contract Laboratory Program National Functional Guidelines (EPA NFGs) for Organic Data Review* (USEPA 1999) and EPA's *NFGs for Inorganic Data Review* (USEPA 2004). Project-specific QC criteria are listed in the QAPP.

A summary of qualifiers assigned to results in this investigation is included in Table 2. Samples are represented by their URS sample identification assigned in the field as well as the laboratory identification. The laboratory was requested to report analytical results above the method detection limit (MDL) but below the method reporting limit (MRL). These results were flagged 'J' by CAS and are not included in Table 2 for simplicity. These 'J' qualifiers are included in the database and are included in the data tables in the main body of the remedial investigation report. Qualifiers that may be assigned to the results of this investigation include the following:

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

- J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
- DNR - Do Not Report. Another result is available that is more reliable or appropriate.

Final sample results and qualifiers are presented in the analytical tables provided in the sampling report.

4.1 Chain-of-Custody, Sample Preservation and Holding Time

The COC forms indicate that samples were maintained under chain-of-custody protocols and forms were signed upon release and receipt with the exception of the COC form associated with sample delivery group K0803393. A URS signature was missing on this form; however, all samples arrived intact at CAS. Data were not qualified based on missing signature. All samples were released by URS to a CAS courier and were received and logged in by the laboratory on the same day. All coolers were submitted at temperatures within the EPA-recommended temperature of 6°C or below, with the exception of two coolers associated with sample delivery group K0803393. These coolers were logged in at temperatures of 6.5°C and 6.1°C, respectively. Data were not qualified based on these slight temperature deviations.

The TPH samples were preserved with hydrochloric acid (HCl) to extend sample holding time from 7 days (listed in QAPP) to 14 days as described in TPH-Gx and TPH-Dx methods. All samples were analyzed within the technical and contracted holding time.

4.2 Instrument Calibration

The laboratory performed initial multipoint calibrations for all target and surrogate compounds as required by the analytical methods. Initial calibrations (ICALs) and continuing calibrations (CCALs) were analyzed at the proper frequency and at the appropriate concentrations required by the methods. Instrument calibrations were acceptable for all sample analyses.

4.3 Review of Blanks

Method blanks were used to check for laboratory contamination and instrument bias. The laboratory analyzed at least one method blank for each analysis and for each analytical batch, per QAPP requirements. Qualification of samples due to method, rinsate, or trip blank contamination followed guidelines set forth in the EPA NFGs.

Organic sample results less than five times (5x) and inorganic sample results less than ten times (10x) the associated blank concentration and between the method detection limit (MDL) and the method reporting limit (MRL) were qualified as non-detect and flagged with a 'U' at the MRL. When sample results were less than 5x (or 10x) the blank concentration but above the MRL, the reported result was qualified as non-detect and flagged with a 'U'. Target compounds detected in the method blank but reported as not detected in the associated samples were not qualified. Target compounds reported with concentrations greater than 5x (or 10x) the blank concentration were not qualified. All analytical tests indicate non-detects for method blanks with the following exceptions:

Rinsate Blank:

One rinsate blank was collected by running laboratory-provided deionized water through the *Monsoon* submersible pump used to sample well MW-8 (all other wells were sampled using dedicated tubing and a peristaltic pump). Sulfate, DOC, TOC, total iron, total and dissolved lead, dissolved arsenic, total and dissolved magnesium and dissolved sodium, and di-n-butyl tin were detected in the rinsate blank at concentrations above the MDLs and below the MRLs. All detected sample results for MW-8 were greater than 10x (inorganic constituents) and 5x (organic constituents) the concentrations detected in the rinsate blank; therefore, results were not qualified based on the rinsate blank detections.

Trip Blank:

VOCs and TPH-Gx samples were sent to CAS in three separate submittals which resulted in four sample delivery groups K0803288, K0803320, K0803393 and K0803410. A trip blank was included in only one of these submittals (K0803393) and inadvertently omitted in the other two. The sample team was made aware that trip blanks are required for all samples being analyzed for VOCs per QAPP requirements. Trip blanks will be included in all future submittals with VOC and/or TPH-Gx analyses. The trip blank submitted with K0803393 was non-detect for all VOCs and TPH-Gx. Samples were not qualified based on the trip blank.

Method and Calibration Blanks (Inorganics)

- Aluminum, arsenic, barium, cadmium, chromium, copper, iron, lead and silver were detected in the method blank associated with total metals in sample delivery group K0803320 at concentrations above the MDL and below the MRL. Additionally, aluminum, cadmium, cobalt, copper and silver were detected in the calibration blanks

bracketing the samples in this delivery group, indicating a possible instrument contamination and not a preparatory contamination. Detected total metals results for the above-listed metals were greater than 10x the method blank concentrations with the exception of a few metals in samples K0803320-001 and K0803320-002. These results were qualified as not detected and flagged 'U' using the criteria described above. (See Table 2).

- Cobalt, copper, sodium and zinc were detected in the method blank associated with dissolved metals in sample delivery group K0803320 at concentrations above the MDL and below the MRL. Additionally, aluminum, cadmium, cobalt, copper and silver were detected in the calibration blanks bracketing the samples in this delivery group, indicating a possible instrument contamination and not a preparatory contamination. Detected dissolved metals results for the above-listed metals were greater than 10x the method blank concentrations with the exception of a few metals in samples K0803320-001 and K0803320-002. These results were qualified as not detected and flagged 'U' using the criteria described above. (See Table 2).
- Arsenic and iron were detected in the method blank associated with total metals and arsenic and sodium were detected in the method blank associated with dissolved metals in sample delivery group K0803410. Additionally, arsenic, lead, magnesium and sodium were detected in the calibration blanks bracketing the samples in this delivery group, indicating a possible instrument contamination and not a preparatory contamination. All detected sample results were greater than 10x the blank concentrations except arsenic in samples K0803410-002 (total), K0803410-003 (dissolved), K0803410-004 (total), K0803410-004 (dissolved), and K0803410-005 (total), lead in sample K0803410-003 (total), and magnesium in samples K0803410-003 (total) and K0803410-005 (total). Results for these samples were qualified as not detected and flagged 'U' using the criteria described above (see Table 2).
- Iron was detected in the method blank associated with the total metals in sample delivery group K0803288 at a concentration above the MDL and below the MRL. Concentrations for total iron in samples K0803288-001 and K0803288-006 were less than 10x the method blank concentration and were qualified as not detected and flagged 'U' at the reported concentration as described above.
- Sodium was detected in the method blank associated with the dissolved metals in sample delivery group K0803288 at a concentration below the MRL. All sample results were greater than 10x this concentration; therefore, data were not qualified based on this method blank detection.
- Dissolved ammonia was detected in the method blank and continuing calibration blank at concentrations above the MDL and below the MRL in the sample delivery groups K0803410 and K0803393. All sample results were greater than 10x the blank

concentrations with the exception of dissolved ammonia in samples K0803410-003, K0803410-004, K0803410-005, K0803393-001, K0803393-002, K0803393-007, K0803393-009 and K0803393-010 which were qualified as not detected and flagged 'U' at the MRL.

- Dissolved chloride and dissolved fluoride were detected in continuing calibration blanks bracketing samples in delivery groups K0803410 and K0803393. All associated sample results were greater than 10x the calibration blank concentrations with the exception of dissolved fluoride in sample K0803393-006. Fluoride in this sample was qualified as not detected and flagged 'U' at the MRL.
- Arsenic was detected in the continuing calibration blanks bracketing samples in delivery group K0803393. All detected sample results were greater than 10x the blank concentrations with the exceptions of arsenic in samples K0803393-006 (dissolved) and K0803393-007 (dissolved). The dissolved arsenic results for these samples were qualified as not detected and flagged 'U' at the MRL.
- Magnesium was detected in the method blank associated with total and dissolved metals in sample delivery group K0803393 at a concentration above the MDL but below the MRL. All detected sample results were more than 10x the blank concentration with the exceptions of K0803393-001 (total), K0803393-001 (dissolved), K0803393-002 (total), and K0803393-006 (total). Magnesium results for these samples were qualified as not detected and flagged 'U' using the criteria described above (see Table 2).

Method Blanks (Organics)

- Diesel range organics (DRO) and residual range organics (RRO) were detected in the TPH-Dx method blank (extraction lot KWG0803683) associated with sample delivery groups K0803320, K0803288 and K0803393 at concentrations above the MDLs and below the MRLs. All detected sample results were greater than 5x the blank concentrations with the exception of RRO and DRO in samples K0803393-002, K0803393-004, K0803393-005, K0803393-006, K0803393-007, K0803393-009 and K0803393-010, RRO in samples K0803288-005 and K0803393-008, and DRO in sample K0803288-006. These results were qualified as not detected and flagged 'U' at the MRL as indicated in Table 2.
- The VOC method blank associated with sample delivery group K0803288 (extraction batch KWG0803826) had detections of carbon disulfide, methylene chloride, 1,2,3-trichlorobenzene, naphthalene and hexachlorobutadiene at concentrations above the MDLs and below the MRLs. All VOCs were included in this extraction lot with the exception of methylene chloride. Associated sample results were non-detect for carbon disulfide, 1,2,3-trichlorobenzene, naphthalene and hexachlorobutadiene with the exception of carbon disulfide results which were qualified as not detected and flagged

'U' at the MRL as described above (see Table 2 for details). Methylene chloride was detected in laboratory batches KWG0803826 and KWG083972. Methylene chloride was not detected in these method blanks and no qualification was required.

4.4 Surrogate Recovery Review

Each sample analyzed for organic compounds was spiked with surrogates (system monitoring compounds). Surrogate recoveries are a measure of accuracy for the overall analysis of each individual sample. When more than one surrogate per fraction (acid or base/neutral) was spiked in the sample, SVOCs were qualified if two or more surrogate recoveries for a given fraction exceeded DoD QSM sample criteria. When only one surrogate per fraction was spiked, all sample results associated with that fraction were qualified when the surrogate recovery exceeded DoD QSM sample criteria. Surrogate recoveries were acceptable for all analyses with the following exceptions:

- The percent recovery for the SVOC surrogate 2-fluorobiphenyl was below the lower DoD QSM control limit of 50% at 49% in the MS sample associated with sample delivery group K0803320. Recoveries of 2-fluorobiphenyl in the associated QC samples (method blank, LCS and MSD) were acceptable, indicating the analytical batch was in control. Additionally, the surrogate recoveries were in control within the associated parent sample. Sample results were not qualified based on surrogate recoveries in the MS.
- One SVOC surrogate, 2,4,6-tribromophenol, was below the lower DoD QSM control limit of 40% at 36% in sample K0803410-004. Recoveries of the four other SVOC surrogates within this sample were acceptable; therefore, results were not qualified based on the low 2,4,6-tribromophenol recovery in this sample.

4.5 Laboratory Control Samples and Matrix Spike/Matrix Spike Duplicate Review

Laboratory control/laboratory control duplicate (LCS/LCSD) samples are used to monitor the laboratory's day-to-day performance of routine analytical methods independent of matrix effects and to assess accuracy for the target compounds. Matrix spike/matrix spike duplicate (MS/MSD) samples are analyzed to assess the ability of the laboratory to recover the target compounds from the sample matrix. At least one LCS and one MS/MSD for each analysis and for each batch were analyzed per method requirements.

LCS/LCSD and MS/MSD recoveries were acceptable for all analytical tests with the following exceptions:

- The SVOC MS/MSD performed on sample K0803320-001 had percent recoveries of 1,4-dichlorobenzene below the lower DoD QSM limit of 30% at 27% and 29%, respectively. Results for 1,4-dichlorobenzene were non-detect in this sample. The associated LCS and

calibration standards indicate that the analytical batch was in control. Results for 1,4-dichlorobenzene were qualified and flagged 'UJ' based on bias low MS/MSD recoveries.

- The nitrate/nitrite MS/MSD pair performed on sample K0803393-003 had recoveries below the CAS derived control limit of 90% at 81% and 83%, respectively. The LCS recovery was in control suggesting the analytical batch was in control. Nitrate/nitrite results in the parent sample (K0803393-003) were qualified as estimated and flagged 'UJ'.
- The dissolved organic carbon (DOC) MS performed on sample K0803393-003 had a recovery above the CAS derived control limit of 156% at 206%. The LCS recovery was in control suggesting the analytical batch was in control. DOC in sample K0803393-003 was qualified as estimated and flagged 'J' due to bias high MS recovery.

4.6 Duplicate Review

Field duplicates are used to evaluate the variability associated with sample collection. Relative percent difference (RPD) calculations were performed on the analytical results from the three field duplicates associated with sample locations MW-7, MW-10 and MW-11, and identified as MW-22, MW-21, and MW-20, respectively. Specific field duplicate precision control limits were not defined in the QAPP; however, all field duplicate results were below the DoD QSM laboratory precision control of 30%, with the following exception:

- The RPD for carbonate results in the MW-11 duplicate pair exceeded the 30% criteria at 74%. Both the parent (K0803288-004) and the field duplicate (K0803288-005) were qualified as estimated and flagged 'J'.
- The RPD for total lead in the MW-10 duplicate pair exceeded an RPD of 30% with 47%. Both the parent (K0803320-001) and the field duplicate (K0803320-002) results for total lead were previously qualified as estimated and flagged 'U' based on blank detections, further qualification was not necessary.

To evaluate laboratory precision, CAS performed duplicate analyses (i.e. LCS/LCSD and MS/MSD) as discussed above. No samples were qualified based exclusively on laboratory duplicate precision.

4.7 Compound Quantification

- DOC results associated with samples K0803288-002, K0803288-005, K0803393-004, K0803393-007, K0803393-009, K0803393-010, K0803410-002, and K0803410-005 were slightly higher than the TOC results. The samples were field filtered. The discrepancy could be due to sample heterogeneity or introduction of organic carbon into the sample by the sample filtration process. The DOC results for these samples were

qualified as estimated and flagged 'J' due to potential high bias. Currently, approximately 100mL of sample water is passed through the filters prior to sample collection; this volume will be increased in future sampling events to decrease the likelihood of TOC introduction by the sample filtration process.

- CAS assigned 'L' and/or 'Y' flags in reporting RRO and DRO sample results for samples K0803393-003, K0803393-007, and K0803393-008 to indicate that the chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents ('L') or the elution pattern does not match the calibration standard ('Y'). Further qualification was not necessary.

4.8 Reporting Limits

If sample results were detected at concentrations below the MRL but above the MDL, they were identified by the laboratory and flagged with a 'J'. As stated above, these flags are recorded within the database and are reported in the data tables included in the main body of this report but are not included in Table 2 of this report.

5.0 Completeness

The laboratory reported all requested analyses and the deliverable data reports were complete. Some data were qualified as estimated and flagged with a 'J' or a 'UJ'. Some data were qualified as not detected and flagged with a 'U.' A summary of qualifiers can be found in Table 2.

The electronic and .pdf versions of the deliverables were cross-checked for accuracy at a frequency of 20% or greater. Any minor discrepancies found between the deliverables were reported to CAS and corrected by updating the database to reflect the .pdf deliverable.

- *Technical Completeness* = (number of usable results/total reported results) x100
= (1,156 compliant / 1,156 total results) = 100%

All samples results are considered usable.

- *Analytical Completeness* = (number of unqualified results/total reported results) x100
= (1,083 compliant / 1,156 total results) = 94%

Data were qualified non-detect and flagged 'U' and some were qualified as estimated and flagged 'J' or 'UJ.' Data qualified 'J' due to detections between the MRL and the MRL were not included in this calculation.

- *Contract Completeness* = (number of contract compliant results/total reported results) x100

$$= (1,156 \text{ compliant} / 1,156 \text{ total results}) = 100\%$$

All samples analyzed met laboratory contract requirements.

- *Field Sampling Completeness* = (number samples collected/total reported results) x100
= (23 compliant / 23 total results) = 100%

All samples collected and submitted to CAS for analysis had acceptable results.

6.0 References

DOD 2006. Department of Defense Environmental Data Quality Workgroup. Department of Defense (DOD) Quality Systems Manual (QSM) for Environmental Laboratories. Final Version 3. January 2006. Retrieved from [http://www.navalabs.navy.mil/Archive/DoDV3.pdf] on 3/3/06

Krone 1998. Krone, C.A. et al, A Method for Analysis of Butyltin Species and Measurement of Butyltins in Sediment and English Sole Livers from Puget Sound, Environmental Conservation Division, Northwest and Alaska Fisheries Center, National Marine Fisheries Service, NOAA, November, 1998.

URS 2008. Quality Assurance Project Plan, *Draft: Upland Operable Unit Remedial Investigation*, Bradford Island, Bonneville Lock and Dam Project, Cascade Locks, Oregon. May 2008.

USEPA 2004. U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. October 2004.

USEPA 1999. U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines for Organic Data Review. October 1999.

Table 1. Sampling ID and Analysis Summary
Quality Control Summary Report for Analytical Chemistry
1st Quarter Upland Sampling Event - Collected April 2008

CAS ID	Station Number	URS ID	Collection Date	Analytes															
				Butyltins	VOCs	SVOCs	Metals (Total/Dissolved)	TPH-Dx	TPH-Gx	Nitrate/Nitrite	Anions (Br/F/Cl/SO ₄)	Alkalinity	Ammonia	TOC	DOC				
Groundwater																			
K0803288-001	MW-13	080414MW13GW	14-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803288-002	MW-14	080414MW14GW	14-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803288-003	MW-15	080414MW15GW	14-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803288-004	MW-11	080415MW11GW	15-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803288-005	MW-20 (duplicate of MW-11)	080415MW20GW	15-Apr		X			X	X	X	X	X	X	X	X	X	X	X	X
K0803288-006	MW-12	080415MW12GW	15-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803320-001	MW-10	080415MW10GW	15-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803320-002	MW-21 (duplicate of MW-10)	080415MW21GW	15-Apr	X		X	X												
K0803393-001	MW-01	080416MW1GW	16-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803393-002	MW-02	080416MW2GW	16-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803393-003	MW-05	080416MW5GW	16-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803393-004	MW-07	080416MW7GW	16-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803393-005	MW-22 (duplicate of MW-07)	080416MW22GW	16-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803393-006	MW-03	080417MW3GW	17-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803393-007	MW-04	080417MW4GW	17-Apr	X		X	X	X		X	X	X	X	X	X	X	X	X	X
K0803393-008	MW-06	080417MW6GW	17-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803393-011	Trip Blank		16-Apr		X				X										
K0803410-001	MW-08	080418MW8GW	18-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803410-002	MW-09	080417MW9GW	17-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803410-003	Rinsate Blank	080418MW30GW	18-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Seep Water																			
K0803410-004	S2	080418S2SP	18-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803393-009	S4	080417S4SP	17-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Surface Water																			
K0803410-005	S2	080418S2SW	18-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
K0803393-010	S4	080417S4SW	17-Apr	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Notes:

DOC = Dissolved Organic Carbon

SVOCs = Semi-Volatile Organic Compounds

TOC = Total Organic Carbon

TPH = Total Petroleum Hydrocarbons: Diesel Range (Dx) or Gasoline Range (Gx)

VOCs = Volatile Organic Compounds

Table 2. Qualifier Summary
Quality Control Summary Report for Analytical Chemistry
1st Quarter Upland Sampling Event - Collected April 2008

Well ID	URS ID	CAS ID	Analyte	Qualifiers	Rationale
MW-10 MW-21 (duplicate of MW-10)	080415MW10GW 080415MW21GW	K0803320-001 K0803320-002	arsenic (total)	1.32U	method blank and/or calibration blank detection
				1.32U	
			cadmium (total)	0.057U	
				0.074U	
			chromium (total)	0.57U	
				0.57U	
			copper (total)	0.67	
				0.7U	
			iron (total)	436U	
				434U	
			lead (total)	0.363U	
				0.585U	
silver (total)	0.184U				
	0.066U				
cobalt (dissolved)	0.079U				
	0.084U				
copper (dissolved)	0.30U				
	0.30U				
sodium (dissolved)	5440U				
	5600U				
zinc (dissolved)	10U				
	10U				
MW-9 S2 S2	080417MW9GW 080418S2SP 080418S2SW	K0803410-002 K0803410-004 K0803410-005	arsenic (total)	0.72U	
				1.01U	
				1.10U	
MW-30 (rinsate blank) S2	080418MW30GW 080418S2SP	K0803410-003 K0803410-004	arsenic (dissolved)	0.50U	
				0.52U	
MW-30 (rinsate blank)	080418MW30GW	K0803410-003	lead (total)	0.50U	
MW-30 (rinsate blank) S2	080418MW30GW 080418S2SW	K0803410-003 K0803410-005	magnesium (total)	0.50U	
				11.1U	
MW-30 (rinsate blank) S2 S2	080418MW30GW 080418S2SP 080418S2SW	K0803410-003 K0803410-004 K0803410-005	ammonia (dissolved)	0.05U	
				0.05U	
				0.05U	
MW-01	080416MW1GW	K0803393-001		0.05U	
MW-02	080416MW2GW	K0803393-002		0.05U	
MW-04 S4 S4	080417MW4GW 080417S4SP 080417S4SW	K0803393-007 K0803393-009 K0803393-010		0.05U	
				0.05U	
				0.05U	
MW-03	080417MW3GW	K0803393-006	arsenic (dissolved)	0.50U	
MW-04	080417MW4GW	K0803393-007		0.50U	
MW-03	080417MW3GW	K0803393-006	fluoride (dissolved)	0.20U	
MW-13 MW-12	080414MW13GW 080415MW12GW	K0803288-001 K0803288-006	iron (total)	55.6U	
				50.4U	
MW-02	080416MW2GW	K0803393-002	Diesel Range Organics (DRO)	120U	
MW-07	080416MW7GW	K0803393-004		120U	
MW-22 (duplicate of MW-07)	080416MW22GW	K0803393-005	Residual Range Organics (RRO)	120U	
				110U	
MW-03	080417MW3GW	K0803393-006		110U	
				110U	
MW-04 S4 S4	080417MW4GW 080417S4SP 080417S4SW	K0803393-007 K0803393-009 K0803393-010	Diesel Range Organics (DRO) Residual Range Organics (RRO)	110U	
				110U	
				120U	
				120U	
				120U	
				120U	
				120U	

Table 2. Qualifier Summary
 Quality Control Summary Report for Analytical Chemistry
 1st Quarter Upland Sampling Event - Collected April 2008

Well ID	URS ID	CAS ID	Analyte	Qualifiers	Rationale
MW-06	080417MW6GW	K0803393-008	RRO	120U	method blank detection
MW-20 (duplicate of MW-11)	080415MW20GW	K0803288-005		120U	
MW-12	080415MW12GW	K0803288-006	DRO	110U	
MW-01	080416MW1GW	K0803393-001	magnesium	3.85U	
MW-01	080416MW1GW	K0803393-001 Diss		0.28U	
MW-02	080416MW2GW	K0803393-002		6.74U	
MW-03	080417MW3GW	K0803393-006		6.25U	
MW-05	080416MW5GW	K0803393-003	DOC	J	MS/MSD recoveries
MW-05	080416MW5GW	K0803393-003	nitrate/nitrite	UJ	
MW-10	080415MW10GW	K0803320-001	1,4-dichlorobenzene	UJ	RPD (field duplicate)
MW-11	080415MW11GW	K0803288-004	carbonate	J	
MW-20 (duplicate of MW-11)	080415MW20GW	K0803288-005		J	
MW-14	080414MW14GW	K0803288-002	DOC	J	compound quantification
MW-20 (duplicate of MW-11)	080415MW20GW	K0803288-005			
MW-07	080416MW7GW	K0803393-004			
MW-04	080417MW4GW	K0803393-007			
S4	080417S4SP	K0803393-009			
S4	080417S4SW	K0803393-010			
MW-09	080417MW9GW	K0803410-002			
S2	080418S2SW	K0803410-005			

Note:

Not included are laboratory-assigned J flags indicating detections above the MDL and below the MRL.