



July 29, 2008

Mike Gross
U.S. Army Corps of Engineers, Portland District
333 SW First Avenue
PO Box 2946
Portland, Oregon 97208-2946

Subject: River Operable Unit Remedial Investigation Data Summary Report
Bradford Island
Bonneville Dam Forebay, Cascade Locks, Oregon
Contract No W9128F-04-D-0001, Task Order No. DT06

Dear Mr. Gross:

Please find the analytical results for the post-removal action samples collected in February and March 2008. A summary of the sample collection was provided in the May 12, 2008 *Memorandum: Post-Removal Sample Collection*. The forebay and reference area sediment, clam, crayfish and water samples were analyzed in general accordance with the *Quality Assurance Project Plan, River Operable Unit Remedial Investigation*.

This summary report consists of the following:

- Sample location maps
- Tabulated data for each sample analyzed
- Quality control summary reports for analytical chemistry for sediment, tissue and water matrices, discussing the laboratory data quality and usability

The original laboratory data deliverables both the .pdf and electronic versions are available upon request.

This information will be utilized in the remedial investigation and risk assessment as provided in the *RI/FS Management Plan*.

Sincerely,
URS CORPORATION

Jeff Wallace, R.G.
Project Manager

Attachments:

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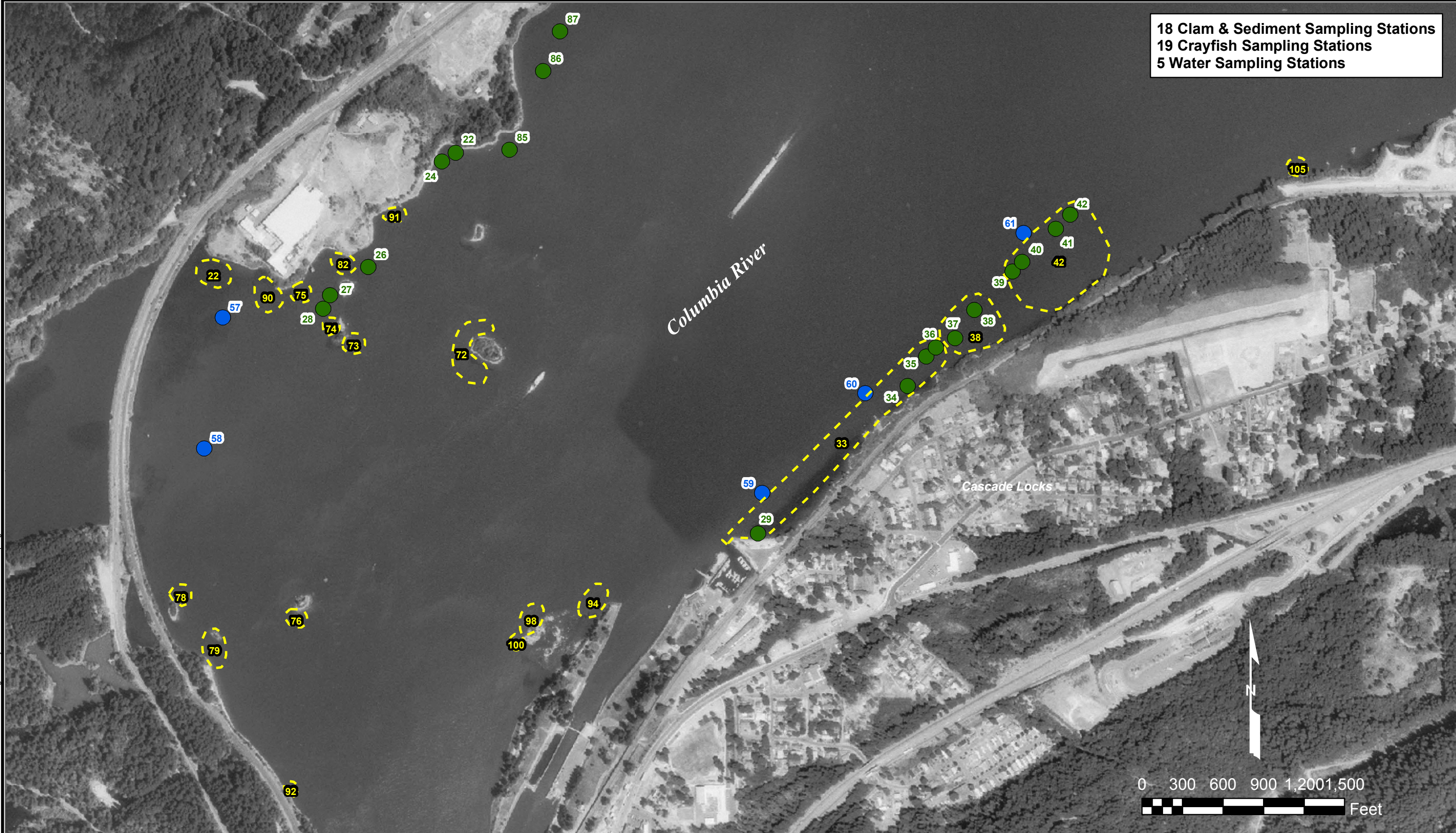
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Quality Control Summary Reports for Analytical Chemistry

- Sediment Samples
- Tissue Samples
- Water Samples

18 Clam & Sediment Sampling Stations
 19 Crayfish Sampling Stations
 5 Water Sampling Stations

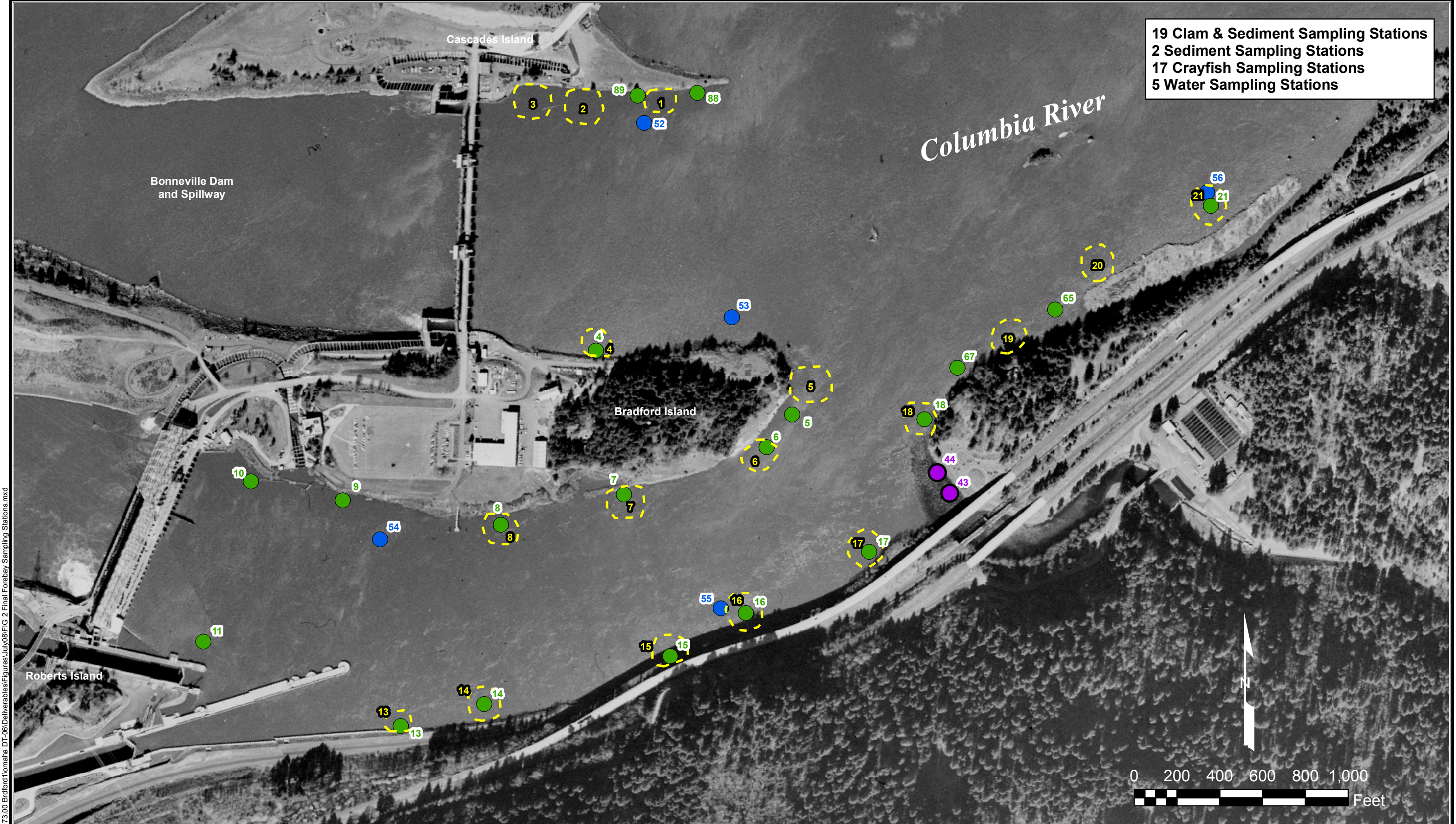


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Explanation

- Clam & Sediment Sampling Station
- Crayfish Sampling Station
- Water Sampling Station

JOB No. 25696528	DESIGNED: CW	PROJ. ENGINEER: -		BRADFORD ISLAND	REFERENCE SAMPLING STATIONS	DRAWING NUMBER: FIGURE 1
Imagery provided by USACE	DRAWN BY: SB	APPROVED BY: JTW	111 S.W. Columbia, Suite 1500 Portland, Oregon 97201 (tel) 503-222-7200 (fax) 503-222-4292	CASCADE LOCKS, OREGON		GIS FILE NUMBER: Fig 1
	CHECKED BY: -	DATE: JULY 2008				SHEET:



19 Clam & Sediment Sampling Stations
 2 Sediment Sampling Stations
 17 Crayfish Sampling Stations
 5 Water Sampling Stations

O:\25692709 USACE\53-F0072\773.00 Bradford\1omaha DT-06\Deliverables\Figures\July08\Fig 2 Final Forebay Sampling Stations.mxd

Explanation	
●	Clam & Sediment Sampling Station
●	Sediment Sampling Station
●	Water Sampling Station
 	Crayfish Sampling Station

JOB No. 25696528	DESIGNED: CW	PROJ. ENGINEER: -
Imagery provided by USACE	DRAWN BY: SB	APPROVED BY: JTW
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FOREBAY SAMPLING STATIONS

DRAWING NUMBER: FIGURE 2	
GIS FILE NUMBER: Fig 2	
SHEET:	REV.

6 Sediment Sampling Stations



Explanation
 Sediment Sampling Station

JOB No. 25696528	DESIGNED: CW	PROJ. ENGINEER: -
Imagery provided by USACE	DRAWN BY: SB	APPROVED BY: JTW
	CHECKED BY: -	DATE: JULY 2008

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BRADFORD ISLAND
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DOWNSTREAM SAMPLING STATIONS

DRAWING NUMBER: FIGURE 3	
GIS FILE NUMBER: Fig 3	
SHEET:	REV.

O:\25692709_USACE\53-F0072173_00_Brdford\Tomaha DT-06\Deliverables\Figures\July08\FIG 3 Downstream Sampling Stations.mxd

Table 1
Sediment PCB Analytical Results and Screening Criteria

Bradford Island - Remedial Investigation
Post-Removal Action Samples - Forebay
February/March 2008 Sampling Event

Sample Station	URS ID	Lab ID	Sample Date	Basis	Moisture (%)	Polychlorinated Biphenyls (units = µg/kg or ppb)										Total PCBs ² (as Aroclors)		
						EPA SW-846 8082												
						Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268				
04	08022604SD	K0801328-022	2/26/08	D	48.70	10 U	20 U	10 U	10 U	10 U	27	10 U	10 U	10 U	27			
05	08031905SD	K0802371-005	3/19/08	D	28.00	7.0 U	14 U	7.0 U	7.0 U	7.0 U	7.0 U	7.0 U	7.0 U	7.0 U	14 U			
06	08031806SD	K0802371-006	3/18/08	D	30.50	7.2 U	15 U	7.2 U	7.2 U	7.2 U	4.6 J	7.2 U	7.2 U	7.2 U	4.6 J			
07	08021507SD	K0801328-007	2/15/08	D	39.70	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U			
08	08021508SD	K0801328-009	2/15/08	D	34.60	9.8 U	20 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	20 U			
09	08021409SD	K0801328-004	2/14/08	D	42.20	9.9 U	20 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	20 U			
10	08021410SD	K0801328-005	2/14/08	D	46.90	10 U	21 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	21 U			
11	08021411SD	K0801328-006	2/14/08	D	47.50	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U			
13	08031713SD	K0802371-001	3/17/08	D	42.00	8.5 U	17 U	8.5 U	8.5 U	8.5 U	8.5 U	8.5 U	8.5 U	8.5 U	17 U			
14	08031814SD	K0802371-004	3/18/08	D	27.00	6.9 U	14 U	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U	14 U			
15	08022115SD	K0801328-012	2/21/08	D	44.80	9.9 U	20 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	20 U			
16	08022116SD	K0801328-013	2/21/08	D	40.30	10.0 U	20 U	10.0 U	10.0 U	10.0 U	10 U	10.0 U	10.0 U	10.0 U	20 U			
17	08022117SD	K0801328-011	2/21/08	D	46.80	9.9 U	29 U	18 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	29 U			
18	08021118SD	K0801328-003	2/11/08	D	39.10	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U			
21	08021221SD	K0801328-002	2/12/08	D	40.80	10.0 U	20 U	14.0 U	10.0 U	10.0 U	10 U	10.0 U	10.0 U	10.0 U	20 U			
65	08022965SD	K0802371-009	2/29/08	D	30.90	7.3 U	15 U	7.3 U	7.3 U	7.3 U	7.3 U	7.3 U	7.3 U	7.3 U	15 U			
67	08030367SD	K0802371-010	3/3/08	D	26.10	6.7 U	14 U	6.7 U	6.7 U	6.7 U	6.7 U	6.7 U	6.7 U	6.7 U	14 U			
88	08031788SD	K0802371-003	3/17/08	D	22.20	6.4 U	13 U	6.4 U	6.4 U	6.4 U	6.4 U	6.4 U	6.4 U	6.4 U	13 U			
89	08031789SD	K0802371-002	3/17/08	D	29.70	7.0 U	14 U	7.0 U	7.0 U	7.0 U	7.0 U	7.0 U	7.0 U	7.0 U	14 U			
ODEQ Sediment Bioaccumulation SLVs (2007)¹ (µg/kg dry)						Birds (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	1.8		
						Mammals (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	44
						Fish (Freshwater)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	22
						Humans (Subsistence)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0.046

Notes:

µg/kg = microgram per kilogram

D = Dry Weight

EPA = U.S. Environmental Protection Agency

MRL = Method reporting limit

MDL = Method detection limit

NE = Not Established

ODEQ = Oregon Department of Environmental Quality

CAS = Columbia Analytical Services

SLVs = screening level values

J = The reported value is an estimate.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

 = The reported concentration exceeded one or more screening criteria listed.

1 = Table A-1 in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, ODEQ, Final January 31, 2007.

2 = PCB Aroclors summed using all non-detect values as zero. If all values were non-detect the highest non-detect value was reported.

Table 2
Sediment PCB Analytical Results and Screening Criteria

Bradford Island - Remedial Investigation
 Post-Removal Action Samples - Reference Area
 February/March 2008 Sampling Event

Sample Station	URS ID	Lab ID	Sample Date	Basis	Moisture (%)	Polychlorinated Biphenyls (units = µg/kg or ppb)										Total PCBs ² (as Aroclors)
						EPA SW-846 8082										
						Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268		
22	08030522SD	K0801769-010	3/5/08	D	44.30	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U	
24	08030524SD	K0801769-011	3/5/08	D	44.20	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U	
26	08030426SD	K0801769-005	3/4/08	D	41.00	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U	
27	08030427SD	K0801769-006	3/4/08	D	49.40	9.6 U	20 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	20 U	
28	08030428SD	K0801769-007	3/4/08	D	50.20	11 U	21 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	21 U	
29	08022229SD	K0801769-021	2/22/08	D	40.50	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U	
34	08022534SD	K0801769-024	2/25/08	D	41.10	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U	
35	08022535SD	K0801769-023	2/25/08	D	37.40	10 U	20 U	10 U	16 U	10 U	10 U	10 U	10 U	10 U	20 U	
36	08022536SD	K0801769-022	2/25/08	D	35.90	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U	
37	08022637SD	K0801769-025	2/26/08	D	41.80	10 U	20 U	11 U	14 U	10 U	10 U	10 U	10 U	10 U	20 U	
38	08022738SD	K0801769-026	2/27/08	D	40.50	13 U	20 U	12 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U	
39	08022739SD	K0801769-027	2/27/08	D	33.10	9.9 U	20 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	20 U	
40	08022740SD	K0801769-028	2/27/08	D	43.00	10 U	20 U	10 U	13 U	10 U	10 U	10 U	10 U	10 U	20 U	
41	08022741SD	K0801769-029	2/27/08	D	31.60	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U	
42	08022742SD	K0801769-030	2/27/08	D	30.20	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U	
85	08030685SD	K0801769-017	3/6/08	D	43.90	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U	
86	08030686SD	K0801769-009	3/6/08	D	42.20	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U	
87	08030687SD	K0801769-018	3/6/08	D	46.10	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U	
ODEQ Sediment Bioaccumulation SLVs (2007)¹ (µg/kg dry)						Birds (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	1.8
						Mammals (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	44
						Fish (Freshwater)	NE	NE	NE	NE	NE	NE	NE	NE	NE	22
						Humans (Subsistence)	NE	NE	NE	NE	NE	NE	NE	NE	NE	0.046

Notes:

µg/kg = microgram per kilogram

D = Dry Weight

EPA = U.S. Environmental Protection Agency

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2 = PCB Aroclors summed using all non-detect values as zero. If all values were non-detect the highest non-detect value was reported.

Table 3
Sediment PCB Analytical Results and Screening Criteria

Bradford Island - Remedial Investigation
 Post-Removal Action Samples - Eagle Creek and Downstream Sites
 February/March 2008 Sampling Event

Sample Station	URS ID	Lab ID	Sample Date	Basis	Moisture (%)	Polychlorinated Biphenyls (units = µg/kg or ppb)										Total PCBs ² (as Aroclors)		
						EPA SW-846 8082												
						Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268				
Eagle Creek																		
43	08032043SD	K0802371-007	3/20/08	D	31.70	7.4 U	15 U	7.4 U	7.4 U	76	7.4 U	7.4 U	7.4 U	7.4 U	76			
44	08032044SD	K0802371-008	3/20/08	D	30.90	7.3 U	15 U	7.3 U	7.3 U	7.3 U	7.3 U	7.3 U	7.3 U	7.3 U	15 U			
Downstream																		
46	080031046SD	K0802371-011	3/10/08	D	28.50	7.0 U	14 U	7 U	7.0 U	7.0 U	7.0 U	7.0 U	7.0 U	7.0 U	14 U			
47	080031047SD	K0802371-012	3/10/08	D	27.90	7.0 U	14 U	7 U	7.0 U	7.0 U	7.0 U	7.0 U	7.0 U	7.0 U	14 U			
48	080031048SD	K0802371-013	3/10/08	D	31.00	7.1 U	15 U	7.1 U	7.1 U	7.1 U	7.1 U	7.1 U	7.1 U	7.1 U	15 U			
49	080031049SD	K0802371-014	3/10/08	D	31.90	7.3 U	15 U	7.3 U	7.3 U	7.3 U	7.3 U	7.3 U	7.3 U	7.3 U	15 U			
50	080031150SD	K0802371-015	3/11/08	D	43.10	8.8 U	18 U	8.8 U	8.8 U	8.8 U	8.8 U	8.8 U	8.8 U	8.8 U	18 U			
51	080031151SD	K0802371-016	3/11/08	D	31.00	7.3 U	15 U	7.3 U	7.3 U	7.3 U	7.3 U	7.3 U	7.3 U	7.3 U	15 U			
ODEQ Sediment Bioaccumulation SLVs (2007)¹ (µg/kg dry)						Birds (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	1.8		
						Mammals (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	44
						Fish (Freshwater)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	22
						Humans (Subsistence)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0.046

Notes:

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2 = PCB Aroclors summed using all non-detect values as zero. If all values were non-detect the highest non-detect value was reported.

Table 4
Sediment Metal Analytical Results and Screening Criteria

Bradford Island - Remedial Investigation
Post-Removal Action Samples - Forebay
February/March 2008 Sampling Event

Parameter						Metals (EPA SW-846) (units = mg/kg or ppm)															
Method						6010B	6020	6020	6010B	6020	6020	6010B	6020	6020	6020	7471A	6020	6020	6010B	6010B	
Sample Station	URS ID	Lab ID	Sample Date	Basis	Moisture (%)	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury (total, inorganic)	Nickel	Thallium	Vanadium	Zinc	
04	08022604SD	K0801328-022	2/26/08	D	48.70	11,200	0.18 J	3.2	121.0	0.367	0.509	16.0	7.6	20.3	10.50	0.264	11.8	0.172	35.1	86.1	
05	08031905SD	K0802371-005	3/19/08	D	28.00	11,300	0.06 UJ	1.4	53.1	0.215	0.121 U	24.1	8.8	19.9	3.30	0.016	12.8	0.108 U	40.3	57.4	
06	08031806SD	K0802371-006	3/18/08	D	30.50	10,800	0.04 J	2.2	71.2	0.295	0.175	16.9	10.8	24.4	5.03	0.023	13.8	0.132 U	45.0	58.2	
07	08021507SD	K0801328-007	2/15/08	D	39.70	22,900	0.14 J	5.4	202.0	0.597	0.429	33.5	10.3	33.1	9.03	0.102	16.4	0.218	59.3	83.4	
08	08021508SD	K0801328-009	2/15/08	D	34.60	13,500	0.15 J	4.2	147.0	0.398	0.430	18.4	7.9	19.9	8.53	0.117	12.6	0.203	37.9	81.9	
09	08021409SD	K0801328-004	2/14/08	D	42.20	13,300	0.21 J	2.7	123.0	0.369	0.694	18.5	7.4	19.1	10.10	0.174	11.5	0.207	37.4	88.9	
10	08021410SD	K0801328-005	2/14/08	D	46.90	14,200	0.24 J	2.9	126.0	0.437	0.691	17.6	7.6	24.0	10.10	0.306	12.2	0.182	37.1	87.9	
11	08021411SD	K0801328-006	2/14/08	D	47.50	16,500	0.21 J	3.1	134.0	0.468	0.719	20.9	8.5	23.6	11.30	0.244	15.1	0.194	45.2	97.2	
13	08031713SD	K0802371-001	3/17/08	D	42.00	13,500	0.28 J	3.1	118.0	0.385	0.531	20.0	9.3	19.4	10.00	0.008	19.0	0.193	49.5	113.0	
14	08031814SD	K0802371-004	3/18/08	D	27.00	15,600	0.12 J	3.5	188.0	0.251	0.307	26.8	15.1	18.4	7.04	0.041	51.5	0.179	30.9	59.3	
15	08022115SD	K0801328-012	2/21/08	D	44.80	14,600	0.20 J	2.9	141	0.425	0.652	21.6	10.0	21.0	10.3	0.109	17.8	0.197	54.7	104.0	
16	08022116SD	K0801328-013	2/21/08	D	40.30	13,100	0.20 J	2.7	120	0.417	0.690	19.2	8.04	20.9	11.0	0.373	14.2	0.196	45.2	97.9	
17	08022117SD	K0801328-011	2/21/08	D	46.80	11,000	0.15 J	2.3	99	0.334	0.460	15.3	7.24	16.5	8.13	0.263	13.0	0.135	36.5	69.0	
18	08021118SD	K0801328-003	2/11/08	D	39.10	12,400	0.15 J	5.4	128	0.398	0.396	20.7	8.78	20.1	16.80	0.091 J	13.4	0.158	39.1	78.2	
21	08021221SD	K0801328-002	2/12/08	D	40.80	12,100	0.20 J	3.3	129	0.390	0.579	17.8	8.31	19.5	10.60	0.167	14.2	0.187	36.9	94.1	
65	08022965SD	K0802371-009	2/29/08	D	30.90	12,500	0.16 J	2.9	112.0	0.307	0.423	18.4	6.7	14.9	10.70	0.118 J	11.4	0.178	36.5	101.0	
67	08030367SD	K0802371-010	3/3/08	D	26.10	14,400	0.04 J	3.2	80	0.331	0.115	27.1	9.0	27.0	4.3	0.022	16.1	0.130 U	29.5	50.3	
88	08031788SD	K0802371-003	3/17/08	D	22.20	10,400	0.14 J	2.8	125	0.270	0.312	15.9	7.12	15.6	7.6	0.043	11.6	0.143	35.5	86.3	
89	08031789SD	K0802371-002	3/17/08	D	29.70	9,000	0.09 J	2.0	86	0.228	0.256	10.1	4.82	11.3	5.28	0.036	6.4	0.113 U	27.5	59.1	
ODEQ Sediment Bioaccumulation SLVs (2007)¹ (mg/kg dry)						Birds (Individual)	NE	NE	7.00	NE	NE	1.00	NE	NE	NE	17	0.070	NE	NE	NE	NE
						Mammals (Individual)	NE	NE	7.00	NE	NE	1.00	NE	NE	NE	17	0.070	NE	NE	NE	NE
						Fish (Freshwater)	NE	NE	7.00	NE	NE	1.00	NE	NE	NE	17	0.070	NE	NE	NE	NE
						Humans (Subsistence)	NE	NE	7.00	NE	NE	1.00	NE	NE	NE	17	0.070	NE	NE	NE	NE

Notes:

mg/kg = milligram per kilogram

D = Dry Weight

EPA = U.S. Environmental Protection Agency

MRL = Method reporting limit

MDL = Method detection limit

NE = Not Established

ODEQ = Oregon Department of Environmental Quality

CAS = Columbia Analytical Services

SLVs = screening level values

J = The reported value is an estimate.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

 = The reported concentration exceeded one or more screening criteria listed.

1 = Table A-1 in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, ODEQ, Final January 31, 2007.

Table 5
Sediment Metal Analytical Results and Screening Criteria

Bradford Island - Remedial Investigation
Post-Removal Action Samples - Reference Area
February/March 2008 Sampling Event

Parameter						Metals (EPA SW-846) (units = mg/kg or ppm)																			
Sample Station	URS ID	Lab ID	Sample Date	Basis	Moisture (%)	Method																			
						6010B	6020	6020	6010B	6020	6020	6010B	6020	6020	6020	7471A	6020	6020	6010B	6010B					
						Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury (total, inorganic)	Nickel	Thallium	Vanadium	Zinc					
22	08030522SD	K0801769-010	3/5/08	D	44.30	21,300	0.20 J	3.7	207.0	0.540	0.467	19.5	10.7	33.9	10.50	0.130	14.0	0.240	46.1 J	75.9					
24	08030524SD	K0801769-011	3/5/08	D	44.20	18,200	0.21 J	4.0	205.0	0.552	0.411	17.9	11.4	37.5	10.00	0.108	14.1	0.234	50.9 J	70.2					
26	08030426SD	K0801769-005	3/4/08	D	41.00	33,000	0.32 J	5.7	247.0	0.633	0.368	23.3	14.7	40.0	15.10	0.063	17.1	0.360	55.4 J	82.3					
27	08030427SD	K0801769-006	3/4/08	D	49.40	20,700	0.52 J	4.1	225.0	0.621	0.444	23.2	12.6	45.7	11.10	0.196	17.0	0.280	50.9 J	74.7					
28	08030428SD	K0801769-007	3/4/08	D	50.20	29,800	0.22 J	5.0	242.0	0.694	0.592	23.3	13.3	43.1	14.10	0.130	17.2	0.318	66.5 J	88.9					
29	08022229SD	K0801769-021	2/22/08	D	40.50	11,500	0.34 J	3.6	109.0	0.319	0.593	19.0	7.7	17.2	10.30	0.225 J	14.9	0.236	42.6 J	82.7					
34	08022534SD	K0801769-024	2/25/08	D	41.10	15,100	0.35 J	3.4	146.0	0.379	0.748	27.2	10.8	20.1	11.50	0.154 J	25.6	0.245	40.5 J	93.6					
35	08022535SD	K0801769-023	2/25/08	D	37.40	9,890	0.37 J	3.6	124.0	0.310	0.536	16.5	7.2	14.6	11.00	0.193 J	12.9	0.205	30.3 J	92.1					
36	08022536SD	K0801769-022	2/25/08	D	35.90	10,100	0.26 J	3.7	120.0	0.283	0.508	16.6	7.1	14.4	11.30	0.120 J	11.9	0.208	33.5 J	98.5					
37	08022637SD	K0801769-025	2/26/08	D	41.80	11,200	0.26 J	4.5	123.0	0.328	0.523	16.9	7.9	15.7	13.20	0.101 J	13.7	0.234	41.9 J	109.0					
38	08022738SD	K0801769-026	2/27/08	D	40.50	10,100	0.25 J	3.8	101.0	0.298	0.478	15.6	6.9	14.2	11.20	0.114 J	11.8	0.197	37.2 J	93.3					
39	08022739SD	K0801769-027	2/27/08	D	33.10	9,380	0.22 J	3.7	98.5	0.274	0.398	15.8	6.6	13.7	11.40	0.119 J	11.6	0.185	31.8 J	94.6					
40	08022740SD	K0801769-028	2/27/08	D	43.00	10,700	0.19 J	3.8	117.0	0.303	0.413	18.2	7.1	13.6	11.60	0.167 J	12.3	0.208	33.4 J	101.0					
41	08022741SD	K0801769-029	2/27/08	D	31.60	8,550	0.16 J	3.4	104.0	0.244	0.332	13.5	6.1	10.5	9.59	0.087 J	11.2	0.172	30.4 J	88.0					
42	08022742SD	K0801769-030	2/27/08	D	30.20	7,380	0.15 J	3.0	86	0.194	0.262	12.8	5.7	8.2	8.7	0.041	9.9	0.145	25.7 J	85.1					
85	08030685SD	K0801769-017	3/6/08	D	43.90	33,500	0.18 J	5.1	312	0.748	0.449	27.3	15.20	47.8	13.10	0.087	18.2	0.337	76.9 J	76.1					
86	08030686SD	K0801769-009	3/6/08	D	42.20	22,100	0.27 J	6.0	201	0.522	0.484	23.0	10.00	30.7	11.70	0.166	13.3	0.233	50.4 J	81.2					
87	08030687SD	K0801769-018	3/6/08	D	46.10	29,400	0.29 J	5.4	231	0.628	0.558	26.5	12.90	39.2	13.40	0.128	16.1	0.346	66.3 J	89.3					
ODEQ Sediment Bioaccumulation SLVs (2007)¹ (mg/kg dry)						Birds (Individual)	NE	NE	7.00	NE	NE	1.00	NE	NE	NE	17	0.070	NE	NE	NE	NE				
						Mammals (Individual)	NE	NE	7.00	NE	NE	1.00	NE	NE	NE	17	0.070	NE	NE	NE	NE	NE	NE	NE	
						Fish (Freshwater)	NE	NE	7.00	NE	NE	1.00	NE	NE	NE	17	0.070	NE	NE	NE	NE	NE	NE	NE	NE
						Humans (Subsistence)	NE	NE	7.00	NE	NE	1.00	NE	NE	NE	17	0.070	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

mg/kg = milligram per kilogram

D = Dry Weight

EPA = U.S. Environmental Protection Agency

MRL = Method reporting limit

MDL = Method detection limit

NE = Not Established

ODEQ = Oregon Department of Environmental Quality

CAS = Columbia Analytical Services

SLVs = screening level values

J = The reported value is an estimate.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

 = The reported concentration exceeded one or more screening criteria listed.

¹ = Table A-1 in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, ODEQ, Final January 31, 2007.

Table 6
Sediment Metal Analytical Results and Screening Criteria
Bradford Island - Remedial Investigation
Post-Removal Action Samples - Eagle Creek and Downstream Sites
February/March 2008 Sampling Event

Parameter						Metals (EPA SW-846) (units = mg/kg or ppm)																		
Method						6010B	6020	6020	6010B	6020	6020	6010B	6020	6020	6020	6020	7471A	6020	6020	6010B	6010B			
Sample Station	URS ID	Lab ID	Sample Date	Basis	Moisture (%)	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury (total, inorganic)	Nickel	Thallium	Vanadium	Zinc				
Eagle Creek																								
43	08032043SD	K0802371-007	3/20/08	D	31.70	16,300	0.04 J	0.7	74.4	0.353	0.075 U	20.2	11.0	16.6	4.19	0.007	19.9	0.156 U	70.3	52.7				
44	08032044SD	K0802371-008	3/20/08	D	30.90	18,000	0.08 J	3.2	110.0	0.371	0.131 U	23.5	9.9	24.8	10.90	0.029	15.6	0.122 U	62.5	65.1				
Downstream																								
46	080031046SD	K0802371-011	3/10/08	D	28.50	20,700	0.24 J	5.8	161.0	0.444	0.209	25.0	10.1	20.0	8.18	0.034	12.5	0.163	65.0	67.7				
47	080031047SD	K0802371-012	3/10/08	D	27.90	10,600	0.06 J	3.7	96.5	0.288	0.290	16.1	7.1	12.5	8.50	0.033	13.2	0.165	43.8	79.6				
48	080031048SD	K0802371-013	3/10/08	D	31.00	11,100	0.08 J	2.5	99.0	0.286	0.229	20.1	6.9	13.3	6.67	0.069	13.0	0.122 U	44.6	56.7				
49	080031049SD	K0802371-014	3/10/08	D	31.90	10,600	0.12 J	2.8	124.0	0.300	0.345	19.7	8.1	14.5	11.60	0.048	13.6	0.205	47.4	105.0				
50	080031150SD	K0802371-015	3/11/08	D	43.10	18,800	0.23 J	3.3	172.0	0.472	0.791	22.8	8.5	20.9	12.70	0.136	14.1	0.234	49.8	117.0				
51	080031151SD	K0802371-016	3/11/08	D	31.00	21,600	0.40 J	5.7	140.0	0.513	0.308	29.9	11.5	24.1	9.00	0.058	15.2	0.178	73.5	70.5				
ODEQ Sediment Bioaccumulation SLVs (2007)¹ (mg/kg dry)						Birds (Individual)	NE	NE	7.00	NE	NE	1.00	NE	NE	NE	17	0.070	NE	NE	NE	NE			
						Mammals (Individual)	NE	NE	7.00	NE	NE	1.00	NE	NE	NE	17	0.070	NE	NE	NE	NE	NE	NE	NE
						Fish (Freshwater)	NE	NE	7.00	NE	NE	1.00	NE	NE	NE	17	0.070	NE	NE	NE	NE	NE	NE	NE
						Humans (Subsistence)	NE	NE	7.00	NE	NE	1.00	NE	NE	NE	17	0.070	NE	NE	NE	NE	NE	NE	NE

Notes:

mg/kg = milligram per kilogram

D = Dry Weight

EPA = U.S. Environmental Protection Agency

MRL = Method reporting limit

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NE = Not Established

ODEQ = Oregon Department of Environmental Quality

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SLVs = screening level values

J = The reported value is an estimate.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

 = The reported concentration exceeded one or more screening criteria listed.

1 = Table A-1 in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, ODEQ, Final January 31, 2007.

Table 7
Sediment SVOCs Analytical Results and Screening Criteria

Bradford Island - Remedial Investigation
Pre-Removal Action Samples - Forebay
February/March 2008 Sampling Event

Parameter Method						Semivolatle Organic Compounds (units = ug/kg or ppb)																								
						EPA 8270C SIM																								
Sample Station	URS ID	Lab ID	Sample Date	Basis	Moisture (%)	Acenaphthene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl) Phthalate	Butyl Benzyl Phthalate	Carbazole	Chrysene	Dibenz(a,h)anthracene	Di-n-butyl Phthalate	Di-n-octyl Phthalate	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	p-cresol (4-Methylphenol)	Phenanthrene	Pyrene					
04	08022604SD	K0801328-022	2/26/08	D	48.70	10 U	10 U	3.9 J	4.4 J	6.1 J	3.9 J	2.5 J	340	10 U	10 U	7.8 J	10 U	10.0 U	10 U	5.5 J	10.0 U	3.3 J	10 U	3.3 J	5.6 J					
05	08031905SD	K0802371-005	3/19/08	D	28.00	10 U	10 U	1.6 J	1.7 J	10 U	10 U	10 U	150 U	7.2 U	10 U	1.8 J	10 U	11.0 U	10 U	3.0 J	10.0 U	10 U	10 U	1.4 J	2.4 J					
06	08031806SD	K0802371-006	3/18/08	D	30.50	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	140 U	6.8 U	9.8 U	1.5 J	9.8 U	6.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	1.8 J					
07	08021507SD	K0801328-007	2/15/08	D	39.70	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	200 U	9.9 U	9.9 U	1.4 J	9.9 U	9.9 U	9.9 U	2.5 J	9.9 U	9.9 U	4.8 J	3.4 J	2.0 J					
08	08021508SD	K0801328-009	2/15/08	D	34.60	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	200 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U					
09	08021409SD	K0801328-004	2/14/08	D	42.20	9.9 U	9.9 U	2.7 J	4.5 J	5.8 J	3.3 J	9.9 U	200 U	9.9 U	9.9 U	4.2 J	9.9 U	9.9 U	9.9 U	3.7 J	9.9 U	3.2 J	9.9 U	1.8 J	3.5 J					
10	08021410SD	K0801328-005	2/14/08	D	46.90	9.9 U	9.9 U	2.3 J	3.0 J	4.1 J	2.9 J	9.9 U	200 U	9.9 U	9.9 U	4.1 J	9.9 U	9.9 U	9.9 U	3.8 J	9.9 U	2.2 J	9.9 U	1.9 J	3.7 J					
11	08021411SD	K0801328-006	2/14/08	D	47.50	10 U	2.0 J	7.4 J	7.5 J	9.1 J	4.4 J	3.3 J	200 U	10 U	10 U	9.3 J	10 U	10.0 U	10 U	10.0	10.0 U	4.7 J	10 U	7.1 J	12					
13	08031713SD	K0802371-001	3/17/08	D	42.00	9.8 U	2.7 J	12	6.1 J	6 J	3.5 J	4.9 J	160 U	9.8 U	1.4 J	20	9.8 U	11.0 U	9.8 U	5.3 J	9.8 U	3.6 J	6.5 J	5.4 J	8.9 J					
14	08031814SD	K0802371-004	3/18/08	D	27.00	9.9 U	9.9 U	2.2 J	2.0 J	9.9 U	9.9 U	9.9 U	150 U	7.3 U	9.9 U	2.4 J	9.9 U	10.0 U	9.9 U	3.2 J	9.9 U	9.9 U	7.3 J	2.1 J	3.2 J					
15	08022115SD	K0801328-012	2/21/08	D	44.80	10 U	10 U	2.1 J	10 U	10 U	10 U	10 U	140 J	10 U	10 U	3.4 J	10 U	10.0 U	10 U	4.0 J	10.0 U	10 U	10 U	4.6 J	5.3 J					
16	08022116SD	K0801328-013	2/21/08	D	40.30	9.9 U	1.9 J	5.9 J	6.5 J	8.0 J	5.0 J	3.1 J	38 J	9.9 U	9.9 U	7.6 J	9.9 U	9.9 U	9.9 U	9.7 J	9.9 U	5.4 J	21	5.0 J	11					
17	08022117SD	K0801328-011	2/21/08	D	46.80	10 U	1.9 J	6.0 J	7.2 J	7.5 J	6.2 J	10 U	200 U	10 U	10 U	7.9 J	10 U	10.0 U	10 U	12	10 U	5.7 J	10 U	7.4 J	17					
18	08021118SD	K0801328-003	2/11/08	D	39.10	10 U	10 U	2.0 J	2.6 J	4.0 J	2.6 J	10 U	200 U	10 U	10 U	3.2 J	10 U	10.0 U	10 U	4.8 J	10.0 U	2.5 J	10 U	2.9 J	4.8 J					
21	08021221SD	K0801328-002	2/12/08	D	40.80	10 U	10 U	10.0 U	10 U	10.0 U	10 U	10 U	200 U	10 U	10 U	1.8 J	10 U	10.0 U	10 U	2.7 J	10.0 U	10.0 U	10 U	10 U	2.2 J					
65	08022965SD	K0802371-009	2/29/08	D	30.90	9.9 U	1.5 J	7.0 J	6.1 J	5.6 J	4.2 J	3.2 J	140 U	9.9 U	9.9 U	12	9.9 U	6.9 U	9.9 U	4.6 J	9.9 U	4.1 J	11	2.2 J	4.4 J					
67	08030367SD	K0802371-010	3/3/08	D	26.10	9.9 U	9.9 U	9.9 U	10 U	9.9 U	9.9 U	9.9 U	150 U	7.3 U	9.9 U	9.9 U	9.9 U	8.3 U	9.9 U	9.9 U	9.9 U	9.9 U	10 U	9.9 U	9.9 U					
88	08031788SD	K0802371-003	3/17/08	D	22.20	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	200 U	9.8 U	9.8 U	1.7 J	9.8 U	14.0 U	9.8 U	2.6 J	9.8 U	9.8 U	10 U	1.7 J	2.2 J					
89	08031789SD	K0802371-002	3/17/08	D	29.70	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	200 U	9.8 U	9.8 U	9.8 U	9.8 U	14.0 U	9.8 U	9.8 U	10 U	9.8 U	18	9.8 U	10 U					
ODEQ Sediment Bioaccumulation SLVs (2007)¹ (µg/kg dry)						Birds (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE			
						Mammals (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	360,000	NE	NE	NE	NE	NE	NE
						Fish (Freshwater)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	37,000	NE	NE	NE	NE	NE	NE
						Humans (Subsistence)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	62,000	NE	NE	NE	NE	NE	NE

Notes:

µg/kg = microgram per kilogram

D = Dry Weight

EPA = U.S. Environmental Protection Agency

MRL = Method reporting limit

MDL = Method detection limit

NE = Not Established

ODEQ = Oregon Department of Environmental Quality

CAS = Columbia Analytical Services

SIM = select ion monitoring

SLVs = screening level values

J = The reported value is an estimate.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

UJ = The reported concentration exceeded one or more screening criteria listed.

¹ = Table A-1 in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, ODEQ, Final January 31, 2007.

Table 8
Sediment SVOCs Analytical Results and Screening Criteria

Bradford Island - Remedial Investigation
Pre-Removal Action Samples - Reference Area
February/March 2008 Sampling Event

Parameter Method						Semivolatile Organic Compounds (units = ug/kg or ppb)																							
Sample Station	URS ID	Lab ID	Sample Date	Basis	Moisture (%)	EPA 8270C SIM																							
						Acenaphthene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl) Phthalate	Butyl Benzyl Phthalate	Carbazole	Chrysene	Dibenz(a,h)anthracene	Di-n-butyl Phthalate	Di-n-octyl Phthalate	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	p-cresol (4-Methylphenol)	Phenanthrene	Pyrene				
22	08030522SD	K0801769-010	3/5/08	D	44.30	10 U	10 U	1.8 J	1.6 J	10 U	10 U	10 U	6.6 J	10 U	10 U	9.7 J	10 U	5.2 J	10 U	3.6 J	10.0 UJ	10 UJ	210	2.3 J	2.6 J				
24	08030524SD	K0801769-011	3/5/08	D	44.20	10 U	10 U	1.6 J	10 U	10 U	10 U	10 U	4.9 J	10 U	10 U	2.1 J	10 U	4.1 J	10 U	2.6 J	10.0 UJ	10 UJ	170	2.2 J	1.7 J				
26	08030426SD	K0801769-005	3/4/08	D	41.00	9.9 U	9.9 U	2.3 J	3.2 J	4.4 J	4.7 J	9.9 U	29 J	9.9 U	9.9 U	3.7 J	9.9 U	9.9 UJ	9.9 U	6.4 J	9.9 UJ	3.3 J	7.1 J	3.6 J	7.0 J				
27	08030427SD	K0801769-006	3/4/08	D	49.40	9.5 U	9.5 U	3.6 J	9.5 U	4.8 J	3.2 J	9.5 U	6.7 J	2.5 J	9.5 U	3.5 J	9.5 U	6.3 J	9.5 U	6.2 J	9.5 UJ	2.7 J	130	3.3 J	4.5 J				
28	08030428SD	K0801769-007	3/4/08	D	50.20	11 U	11 U	3.6 J	4.8 J	5.8 J	3.6 J	11 U	11 J	11 U	11 U	4.9 J	11 U	7.4 J	11 U	6.1 J	11.0 UJ	3.2 J	120	2.1 J	4.9 J				
29	08022229SD	K0801769-021	2/22/08	D	40.50	10 U	10 U	3.3 J	3.8 J	5 J	3.5 J	10 U	15 J	10 U	10 U	4 J	10 U	10.0 UJ	10 U	10 UJ	10.0 UJ	10 UJ	9.1 J	3.7 J	4.9 J				
34	08022534SD	K0801769-024	2/25/08	D	41.10	10 U	10 U	2.9 J	10 U	5.5 J	3.6 J	10 U	7.5 J	10 U	10 U	4.4 J	10 U	7.8 J	10 U	5.1 J	10.0 UJ	10 UJ	4.5 J	3.0 J	4.8 J				
35	08022535SD	K0801769-023	2/25/08	D	37.40	10 U	2.3 J	2.2 J	10 U	3.7 J	2.7 J	10 U	11 J	10 U	10 U	3.1 J	10 U	6.4 J	10 U	5.6 J	10.0 UJ	2.2 J	10 U	2.3 J	3.3 J				
36	08022536SD	K0801769-022	2/25/08	D	35.90	9.9 U	9.9 U	3.3 J	6.2 J	8.3 J	7.9 J	9.9 U	11 J	9.9 U	9.9 U	4.8 J	9.9 U	5.8 J	9.9 U	5.5 J	9.9 UJ	8.8 J	6.3 J	3.2 J	7.1 J				
37	08022637SD	K0801769-025	2/26/08	D	41.80	10 U	10 U	3.9 J	4.6 J	6.9 J	4.6 J	10 U	5.5 J	10 U	10 U	4.8 J	10 U	4.7 J	10 U	9.7 J	10.0 UJ	4.9 J	10 U	4.4 J	7.8 J				
38	08022738SD	K0801769-026	2/27/08	D	40.50	10 U	10 U	2.5 J	10 U	4.2 J	10 U	10 U	5.9 J	10 U	10 U	3.2 J	10 U	8.6 J	10 U	4.1 J	10.0 UJ	2.3 J	10 U	2.6 J	3.6 J				
39	08022739SD	K0801769-027	2/27/08	D	33.10	10 U	10 U	10 U	10 U	10 U	10 U	10 U	6.8 J	3.8 J	10 U	10 U	10 U	4.6 J	10 U	2.3 J	10.0 UJ	10 UJ	10 U	10 U	2.1 J				
40	08022740SD	K0801769-028	2/27/08	D	43.00	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	9.8 U	7.5 J	9.8 U	9.8 U	1.9 J	9.8 U	11.0 J	9.8 U	2.3 J	9.8 UJ	9.8 UJ	9.8 U	1.3 J	1.8 J				
41	08022741SD	K0801769-029	2/27/08	D	31.60	9.8 U	1.4 J	10	11	17	7.3 J	5 J	6.8 J	9.8 U	9.8 U	9.8	9.8 U	3.8 J	9.8 U	31.0 J	9.8 UJ	8.4 J	9.8 U	5.9 J	23 J				
42	08022742SD	K0801769-030	2/27/08	D	30.20	9.9 U	9.9 U	9.9 U	10 U	9.9 U	9.9 U	9.9 U	5.7 J	9.9 U	9.9 U	9.9 U	9.9 U	3.5 J	9.9 U	9.9 UJ	9.9 UJ	9.9 UJ	10 U	9.9 U	1.5 J				
85	08030685SD	K0801769-017	3/6/08	D	43.90	10 U	10 U	10.0 U	2.8 J	3.6 J	10 U	10 U	110 J	10 U	10 U	10 U	10 U	10.0 UJ	10 U	10 UJ	10 UJ	10 UJ	5.5 J	1.9 J	2.7 J				
86	08030686SD	K0801769-009	3/6/08	D	42.20	9.9 U	9.9 U	1.8 J	9.9 U	2.7 J	9.9 U	9.9 U	5.8 J	9.9 U	9.9 U	2.4 J	9.9 U	4.1 J	9.9 U	3.6 J	9.9 UJ	9.9 UJ	6.6 J	2.0 J	2.1 J				
87	08030687SD	K0801769-018	3/6/08	D	46.10	10 UJ	10 UJ	3.0 J	2.6 J	3.5 J	2.3 J	10 UJ	15.0 J	10 UJ	10 UJ	3.1 J	10 UJ	4.3 J	10 UJ	5.0 J	10.0 UJ	2.0 J	7.9 J	3.6 J	4.9 J				
ODEQ Sediment Bioaccumulation SLVs (2007)¹ (ug/kg dry)						Birds (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE			
						Mammals (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	360,000	NE	NE	NE	NE	NE	NE
						Fish (Freshwater)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	37,000	NE	NE	NE	NE	NE	NE
						Humans (Subsistence)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	62,000	NE	NE	NE	NE	NE	NE

Notes:

ug/kg = microgram per kilogram

D = Dry Weight

EPA = U.S. Environmental Protection Agency

MRL = Method reporting limit

MDL = Method detection limit

NE = Not Established

ODEQ = Oregon Department of Environmental Quality

CAS = Columbia Analytical Services

SIM = select ion monitoring

SLVs = screening level values

J = The reported value is an estimate.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

 = The reported concentration exceeded one or more screening criteria listed.

¹ = Table A-1 in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, ODEQ, Final January 31, 2007.

Table 9
Sediment SVOCs Analytical Results and Screening Criteria
Bradford Island - Remedial Investigation
Post-Removal Action Samples - Eagle Creek and Downstream Sites
February/March 2008 Sampling Event

Parameter Method						Semivolatile Organic Compounds (units = ug/kg or ppb)																								
Sample Station	URS ID	Lab ID	Sample Date	Basis	Moisture (%)	EPA 8270C SIM																								
						Acenaphthene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl) Phthalate	Butyl Benzyl Phthalate	Carbazole	Chrysene	Dibenz(a,h)anthracene	Di-n-butyl Phthalate	Di-n-octyl Phthalate	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	p-cresol (4-Methylphenol)	Phenanthrene	Pyrene					
Eagle Creek																														
43	08032043SD	K0802371-007	3/20/08	D	31.70	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	140 U	6.8 U	9.9 U	1.8 J	9.9 U	6.8 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	9.9 U	2.3 J	3.4 J				
44	08032044SD	K0802371-008	3/20/08	D	30.90	9.9 U	2.6 J	6.6 J	7.1 J	11	5.0 J	3.4 J	140 U	6.9 U	2.2 J	13	9.9 U	7.7 U	9.9 U	11	9.9 U	4.6 J	9.9 U	6.5 J	17					
Downstream																														
46	080031046SD	K0802371-011	3/10/08	D	28.50	10 U	2.7 J	9.6 J	11	9.7 J	5.8 J	4.2 J	150 U	10 U	10 U	9.6 J	10 U	7.9 U	10 U	20	10.0 U	6.3 J	10 U	4.8 J	20					
47	080031047SD	K0802371-012	3/10/08	D	27.90	9.7 U	9.7 U	1.7 J	1.9 J	9.7 U	9.7 U	9.7 U	140 U	9.7 U	9.7 U	1.6 J	9.7 U	7.6 U	9.7 U	2.9 J	9.7 U	9.7 U	9.7 U	9.7 U	2.6 J					
48	080031048SD	K0802371-013	3/10/08	D	31.00	9.7 U	9.7 U	1.8 J	9.7 U	9.7 U	9.7 U	9.7 U	140 U	9.7 U	9.7 U	9.7 U	9.7 U	10.0 U	9.7 U	9.7 U	9.7 U	9.7 U	9.7 U	9.7 U	1.8 J					
49	080031049SD	K0802371-014	3/10/08	D	31.90	9.9 U	9.9 U	3.3 J	4.3 J	4.5 J	2.8 J	9.9 U	140 U	6.8 U	9.9 U	3.5 J	9.9 U	7.0 U	9.9 U	4.3 J	9.9 U	2.8 J	9.9 U	2.2 J	4.6 J					
50	080031150SD	K0802371-015	3/11/08	D	43.10	9.9 U	3.1 J	12	14	16	6.8 J	6.5 J	120 U	9.9 U	1.6 J	18	2.3 J	5.6 U	9.9 U	22	9.9 U	8.2 J	130	4.9 J	21					
51	080031151SD	K0802371-016	3/11/08	D	31.00	9.8 U	1.6 J	3.7 J	4.5 J	3.3 J	9.8 U	9.8 U	140 U	9.8 U	9.8 U	3.4 J	9.8 U	6.8 U	9.8 U	6.2 J	9.8 U	9.8 U	3.4 J	4.0 J	6.4 J					
ODEQ Sediment Bioaccumulation SLVs (2007)¹ (µg/kg dry)						Birds (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE			
						Mammals (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	360,000	NE	NE	NE	NE	NE	NE	NE
						Fish (Freshwater)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	37,000	NE	NE	NE	NE	NE	NE	NE
						Humans (Subsistence)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	62,000	NE	NE	NE	NE	NE	NE	NE

Notes:

µg/kg = microgram per kilogram

D = Dry Weight

EPA = U.S. Environmental Protection Agency

MRL = Method reporting limit

MDL = Method detection limit

NE = Not Established

ODEQ = Oregon Department of Environmental Quality

CAS = Columbia Analytical Services

SIM = select ion monitoring

SLVs = screening level values

J = The reported value is an estimate.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

J = The reported concentration exceeded one or more screening criteria listed.

¹ = Table A-1 in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, ODEQ, Final January 31, 2007.

Table 10
Sediment Grain Size Results
Bradford Island - Remedial Investigation
Post-Removal Action Samples - Forebay
February/March 2008 Sampling Event

Sample Station	URS ID	Lab ID	Sample Date	%Gravel (>2.00 mm)	%Sand, Very Coarse (1.00 - 2.00 mm)	%Sand, Coarse (0.50 - 1.00 mm)	%Sand, Medium (0.25 - 0.50 mm)	%Sand, Fine (0.125 - 0.25 mm)	%Sand, Very Fine (0.0625 - 0.125 mm)	%Silt (0.039 - 0.0625 mm)	%Clay (<0.039 mm)
04	08022604SD	K0801328-022	2/26/08	0.29	0.38	0.83	5.87	33.3	23.1	40.4	7.59
05	08031905SD	K0802371-005	3/19/08	31.0	17.6	23.9	16.4	6.58	2.74	6.5	1.66
06	08031806SD	K0802371-006	3/18/08	32.5	8.42	16.3	17.4	11.6	5.08	7.4	1.22
07	08021507SD	K0801328-007	2/15/08	26.7	8.5	9.36	17.8	18.9	6.12	16.0	3.67
08	08021508SD	K0801328-009	2/15/08	18.2	4.82	4.96	10	30.8	11.3	17.5	5.6
09	08021409SD	K0801328-004	2/14/08	0.6	0.28	0.71	1.78	14.1	30.3	44.8	6.99
10	08021410SD	K0801328-005	2/14/08	1.9	0.66	0.66	2.06	9.54	18.9	62.3	12.9
11	08021411SD	K0801328-006	2/14/08	0.4	0.23	0.55	1.53	10.1	24.3	52.4	11.3
13	08031713SD	K0802371-001	3/17/08	2.0	3.36	4.42	7.39	25.6	27.2	30.0	4.12
14	08031814SD	K0802371-004	3/18/08	40.0	13.7	16.4	8.63	8.36	4.77	9.0	1.04
15	08022115SD	K0801328-012	2/21/08	4.61	0.89	1.36	8.82	36.7	24.6	28.3	5.57
16	08022116SD	K0801328-013	2/21/08	0.5	0.26	0.58	2.73	15.2	28.1	40.4	9.88
17	08022117SD	K0801328-011	2/21/08	1.19	0.95	2.32	9.88	19.8	25.3	34.8	7.13
18	08021118SD	K0801328-003	2/11/08	3.69	1.96	3.67	18.1	31.9	18.6	22.1	4.75
21	08021221SD	K0801328-002	2/12/08	19.3	1.0	1.4	4.86	22	17.9	34.8	8.06
65	08022965SD	K0802371-009	2/29/08	0.2	0.21	0.54	5.14	43.6	18.3	22.3	4.6
67	08030367SD	K0802371-010	3/3/08	20.7	10.6	20.2	19.6	8.95	4.72	10.7	4.21
88	08031788SD	K0802371-003	3/17/08	47.9	6.39	7.02	15.6	12.1	3.53	6.35	0.86
89	08031789SD	K0802371-002	3/17/08	66.2	4.7	9.54	12.2	8.8	1.92	2.86	0.46

Table 11
Sediment Grain Size Results
Bradford Island - Remedial Investigation
Post-Removal Action Samples - Reference Area
February/March 2008 Sampling Event

Sample Station	URS ID	Lab ID	Sample Date	%Gravel (>2.00 mm)	%Sand, Very Coarse (1.00 - 2.00 mm)	%Sand, Coarse (0.50 - 1.00 mm)	%Sand, Medium (0.25 - 0.50 mm)	%Sand, Fine (0.125 - 0.25 mm)	%Sand, Very Fine (0.0625 - 0.125 mm)	%Silt (0.039 - 0.0625 mm)	%Clay (<0.039 mm)
22	08030522SD	K0801769-010	3/5/08	0.29	0.77	3.21	8.44	12	24.6	50.1	4.16
24	08030524SD	K0801769-011	3/5/08	3.17	2.99	3.77	3.34	10.9	28.5	51.0	7.22
26	08030426SD	K0801769-005	3/4/08	8.84	8.44	8.71	5.06	6.01	20.7	38.5	3.82
27	08030427SD	K0801769-006	3/4/08	36.40	4.84	2.26	1.78	4.8	19.5	51.7	4.97
28	08030428SD	K0801769-007	3/4/08	0.25	0.23	0.56	1.11	4.66	25.4	64.9	6.56
29	08022229SD	K0801769-021	2/22/08	0.66	0.38	1.44	5.9	6.71	29	54.8	4.26
34	08022534SD	K0801769-024	2/25/08	1.39	1.74	2.83	7.3	13.9	26.2	43.9	7.39
35	08022535SD	K0801769-023	2/25/08	1.37	0.01	1.16	5.68	37.6	18.2	31.6	4.18
36	08022536SD	K0801769-022	2/25/08	0.18	0.28	0.47	2.77	43.6	18.4	29.1	3.78
37	08022637SD	K0801769-025	2/26/08	0.00	0.05	0.71	5.09	49	17.8	30.6	3.41
38	08022738SD	K0801769-026	2/27/08	0.22	0.35	0.67	5.56	45.9	18.9	30.1	3.5
39	08022739SD	K0801769-027	2/27/08	0.06	0.13	0.45	11.1	47.7	12	25.7	4.38
40	08022740SD	K0801769-028	2/27/08	1.23	0.21	0.52	14	46.6	9.2	22.3	2.89
41	08022741SD	K0801769-029	2/27/08	0.00	0.11	0.42	36.3	38.3	7.21	16.3	2.94
42	08022742SD	K0801769-030	2/27/08	0.02	0.07	0.47	47.9	40.5	3.87	7.3	1.65
85	08030685SD	K0801769-017	3/6/08	10.8	2.59	1.61	1.45	10	33.4	36.2	6.16
86	08030686SD	K0801769-009	3/6/08	18.8	8.47	3.24	2.02	5.43	18.3	43.1	4.49
87	08030687SD	K0801769-018	3/6/08	1.47	2.0	1.46	1.36	5.77	25.2	60.6	4.8

Table 12
Sediment Grain Size Results
Bradford Island - Remedial Investigation
Post-Removal Action Samples - Eagle Creek and Downstream Sites
February/March 2008 Sampling Event

Sample Station	URS ID	Lab ID	Sample Date	%Gravel (>2.00 mm)	%Sand, Very Coarse (1.00 - 2.00 mm)	%Sand, Coarse (0.50 - 1.00 mm)	%Sand, Medium (0.25 - 0.50 mm)	%Sand, Fine (0.125 - 0.25 mm)	%Sand, Very Fine (0.0625 - 0.125 mm)	%Silt (0.039 - 0.0625 mm)	%Clay (<0.039 mm)
Eagle Creek											
43	08032043SD	K0802371-007	3/20/08	15.2	10.9	27.7	27.5	14.5	2.23	2.0	0.47
44	08032044SD	K0802371-008	3/20/08	37.4	9.7	13.3	13.9	14.6	5.84	6.1	0.92
Downstream											
46	080031046SD	K0802371-011	3/10/08	0.1	0.16	0.33	11.59	65.3	20.6	0.02	8.74
47	080031047SD	K0802371-012	3/10/08	0.6	2.42	15.6	43.8	26.7	3.89	8.1	0.44
48	080031048SD	K0802371-013	3/10/08	1.7	1.03	1.57	31.1	35.6	9.19	15.1	1.97
49	080031049SD	K0802371-014	3/10/08	0.5	0.38	0.63	6.31	66.4	16.2	5.3	1.31
50	080031150SD	K0802371-015	3/11/08	1.5	2.02	2.86	2.92	10.2	35.7	39.1	5.76
51	080031151SD	K0802371-016	3/11/08	4.6	6.61	10.3	24.4	30.1	9.35	9.7	1.22

Table 13
Sediment TOC and TPH-DX Analytical Results

Bradford Island - Remedial Investigation
 Post-Removal Action Samples - Forebay
 February/March 2008 Sampling Event

Sample Station	URS ID	Lab ID	Sample Date	Parameter	TOC	TPH-Dx	
				Method	PSEP (units = %)	NWTPH (units = mg/kg or ppm)	
				Basis	Total Organic Carbon	Diesel Range Organics	Residual Range Organics
04	08022604SD	K0801328-022	2/26/08	D	1.01	21	98 J
05	08031905SD	K0802371-005	3/19/08	D	1.54	2.6 J	140 U
06	08031806SD	K0802371-006	3/18/08	D	0.24	4.7 J	150 U
07	08021507SD	K0801328-007	2/15/08	D	0.51	16 J	71 J
08	08021508SD	K0801328-009	2/15/08	D	0.56	13 J	55 J
09	08021409SD	K0801328-004	2/14/08	D	1.25	22	120 J
10	08021410SD	K0801328-005	2/14/08	D	1.5	27	150 J
11	08021411SD	K0801328-006	2/14/08	D	1.42	28	160 J
13	08031713SD	K0802371-001	3/17/08	D	1.19	11 J	180 U
14	08031814SD	K0802371-004	3/18/08	D	1.54	4.6 J	140 U
15	08022115SD	K0801328-012	2/21/08	D	1.06	24	170 J
16	08022116SD	K0801328-013	2/21/08	D	1.25	26	150 J
17	08022117SD	K0801328-011	2/21/08	D	1.62	54	180 J
18	08021118SD	K0801328-003	2/11/08	D	0.86	10 J	62 J
21	08021221SD	K0801328-002	2/12/08	D	1.16	10 J	67 J
65	08022965SD	K0802371-009	2/29/08	D	0.61	9.3 J	150 U
67	08030367SD	K0802371-010	3/3/08	D	0.11	3.1 J	140 U
88	08031788SD	K0802371-003	3/17/08	D	0.3	7.9 J	130 U
89	08031789SD	K0802371-002	3/17/08	D	0.21	4 J	150 U

Notes:

mg/kg = milligram per kilogram

D = Dry Weight

MRL = Method reporting limit

MDL = Method detection limit

CAS = Columbia Analytical Services

PSEP = Puget Sound Estuary Program Protocol

NWTPH = Northwest Total Petroleum Hydrocarbons Method

TPH-Dx = Total Petroleum Hydrocarbons-Diesel Range

J = The reported value is an estimate.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

Table 14
Sediment TOC and TPH-DX Analytical Results

Bradford Island - Remedial Investigation
 Post-Removal Action Samples - Reference Area
 February/March 2008 Sampling Event

Sample Station	URS ID	Lab ID	Sample Date	Parameter	TOC	TPH-Dx			
				Method	PSEP (units = %)	NWTPH (units = mg/kg or ppm)			
				Basis	Total Organic Carbon	Diesel Range Organics		Residual Range Organics	
22	08030522SD	K0801769-010	3/5/08	D	1.19	12	J	34	J
24	08030524SD	K0801769-011	3/5/08	D	1.02	9.8	J	180	U
26	08030426SD	K0801769-005	3/4/08	D	1.07	18		52	J
27	08030427SD	K0801769-006	3/4/08	D	1.24	25		73	J
28	08030428SD	K0801769-007	3/4/08	D	1.67	15	J	47	J
29	08022229SD	K0801769-021	2/22/08	D	0.91	15	J	41	J
34	08022534SD	K0801769-024	2/25/08	D	1.48	31		100	J
35	08022535SD	K0801769-023	2/25/08	D	0.73	7	J	160	U
36	08022536SD	K0801769-022	2/25/08	D	0.7	16	J	34	J
37	08022637SD	K0801769-025	2/26/08	D	0.66	9.7	J	41	J
38	08022738SD	K0801769-026	2/27/08	D	0.64	11	J	29	J
39	08022739SD	K0801769-027	2/27/08	D	0.55	11	J	29	J
40	08022740SD	K0801769-028	2/27/08	D	0.59	31		50	J
41	08022741SD	K0801769-029	2/27/08	D	0.51	8.1	J	150	U
42	08022742SD	K0801769-030	2/27/08	D	0.29	7.4	J	150	U
85	08030685SD	K0801769-017	3/6/08	D	1.28	31		73	J
86	08030686SD	K0801769-009	3/6/08	D	0.81	11	J	180	U
87	08030687SD	K0801769-018	3/6/08	D	1.03	13	J	32	J

Notes:

mg/kg = milligram per kilogram

D = Dry Weight

MRL = Method reporting limit

MDL = Method detection limit

CAS = Columbia Analytical Services

PSEP = Puget Sound Estuary Program Protocol

NWTPH = Northwest Total Petroleum Hydrocarbons Method

TPH-Dx = Total Petroleum Hydrocarbons-Diesel Range

J = The reported value is an estimate.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

Table 15
Sediment TOC and TPH-DX Analytical Results
Bradford Island - Remedial Investigation
Post-Removal Action Samples - Eagle Creek and Downstream Sites
February/March 2008 Sampling Event

Sample Station	URS ID	Lab ID	Sample Date	Parameter	TOC	TPH-Dx			
				Method	PSEP (units = %)	NWTPH (units = mg/kg or ppm)			
				Basis	Total Organic Carbon	Diesel Range Organics		Residual Range Organics	
Eagle Creek									
43	08032043SD	K0802371-007	3/20/08	D	0.23	2.9	J	150	U
44	08032044SD	K0802371-008	3/20/08	D	0.57	13	J	150	U
Downstream									
46	080031046SD	K0802371-011	3/10/08	D	0.36	8.2	J	140	U
47	080031047SD	K0802371-012	3/10/08	D	0.34	8.1	J	140	U
48	080031048SD	K0802371-013	3/10/08	D	0.36	8.7	J	150	U
49	080031049SD	K0802371-014	3/10/08	D	0.75	5.9	J	150	U
50	080031150SD	K0802371-015	3/11/08	D	1.15	21		180	U
51	080031151SD	K0802371-016	3/11/08	D	0.52	25		150	U

Notes:

mg/kg = milligram per kilogram

D = Dry Weight

MRL = Method reporting limit

MDL = Method detection limit

CAS = Columbia Analytical Services

PSEP = Puget Sound Estuary Program Protocol

NWTPH = Northwest Total Petroleum Hydrocarbons Method

TPH-Dx = Total Petroleum Hydrocarbons-Diesel Range

J = The reported value is an estimate.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

Table 16
Clam Tissue PCB Analytical Results and Screening Criteria
 Bradford Island - Remedial Investigation
 Post-Removal Action Samples - Forebay
 February/March 2008 Sampling Event

Sample Station	URS ID	Lab ID	Sample Date	Moisture (%)	Total Lipids (%)	Parameter Method	Polychlorinated Biphenyls (units = µg/kg or ppb)										Total PCBs ⁴ (as Aroclors)
							EPA SW-846 8082										
							Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268		
04	08022604TC	K0801325-010	2/26/2008	78.9	14.2	D	82.0 U	93.0 U	190 U	230 U	47.0 U	580 J	47.0 U	47.0 U	47.0 U	580 J	
05	08031905TC	K0802503-006	3/19/2008	79.0	14.3	D	47.0 U	94.0 U	47.0 U	47.0 U	47.0 U	110 J	47.0 U	47.0 U	47.0 U	110 J	
06	08031806TC	K0802503-001	3/18/2008	79.3	14.2	D	49.0 U	97.0 U	49.0 U	49.0 U	49.0 U	150 J	49.0 U	49.0 U	49.0 U	150 J	
07	08021507TC	K0801325-004	2/15/2008	82.6	14.9	D	110 U	120 U	160 U	200 U	150 U	430 U	61.0 U	57.0 U	57.0 U	430 U	
08	08021508TC	K0801325-005	2/15/2008	82.9	15.0	D	140 U	120 U	150 U	170 U	71.0 U	320 U	58.0 U	58.0 U	58.0 U	320 U	
09	08021409TC	K0801325-006	2/14/2008	82.2	12.8	D	130 U	110 U	170 U	170 U	54.0 U	280 U	54.0 U	54.0 U	54.0 U	280 U	
10	08021410TC	K0801325-008	2/14/2008	84.6	13.2	D	150 U	130 U	220 U	120 U	72.0 U	240 U	64.0 U	64.0 U	64.0 U	240 U	
11	08021411TC	K0801325-007	2/14/2008	83.4	15.4	D	130 U	130 U	220 U	120 U	61.0 U	190 U	61.0 U	61.0 U	61.0 U	220 U	
13	08031713TC	K0802503-002	3/17/2008	80.6	13.7	D	51.0 U	110 U	51.0 U	51.0 U	51.0 U	120	51.0 U	51.0 U	51.0 U	120	
14	08031814TC	K0802503-003	3/18/2008	80.3	14.0	D	50.0 U	100 U	50.0 U	50.0 U	50.0 U	110	50.0 U	50.0 U	50.0 U	110	
15	08022115TC	K0801325-012	2/21/2008	82.1	14.6	D	110 U	120 U	200 U	95.0 U	56.0 U	180 U	56.0 U	56.0 U	56.0 U	200 U	
16	08022116TC	K0801325-013	2/21/2008	83.7	14.0	D	99.0 U	130 U	180 U	89.0 U	61.0 U	190 U	61.0 U	61.0 U	61.0 U	190 U	
17	08022117TC	K0801325-014	2/21/2008	84.2	13.6	D	110 U	130 U	200 U	95.0 U	63.0 U	180 U	63.0 U	63.0 U	63.0 U	200 U	
18	08021118TC	K0801325-003	2/12/2008	82.5	13.6	D	95.0 U	120 U	130 U	130 U	57.0 U	160 U	57.0 U	57.0 U	57.0 U	160 U	
21	08021221TC	K0801325-002	2/12/2008	82.4	13.7	D	85.0 U	120 U	110 U	57.0 U	56.0 U	170 U	56.0 U	56.0 U	56.0 U	170 U	
65	08022965TC	K0802503-008	2/29/2008	78.0	15.1	D	45.0 U	89.0 U	45.0 U	45.0 U	45.0 U	97.0	45.0 U	45.0 U	45.0 U	97.0	
67	08030367TC	K0802503-007	3/3/2008	76.7	15.9	D	43.0 U	86.0 U	43.0 U	43.0 U	43.0 U	90.0	43.0 U	43.0 U	43.0 U	90.0	
88	08031788TC	K0802503-004	3/17/2008	80.2	14.2	D	51.0 U	110 U	51.0 U	51.0 U	51.0 U	120	51.0 U	51.0 U	51.0 U	120	
89	08031789TC	K0802503-005	3/17/2008	80.6	13.3	D	51.0 U	110 U	51.0 U	51.0 U	51.0 U	110	51.0 U	51.0 U	51.0 U	110	
04	08022604TC	K0801325-010	2/26/2008	78.9	3.00	W	18.0 U	20.0 U	40.0 U	48.0 U	9.80 U	120 J	9.80 U	9.8 U	9.80 U	120 J	
05	08031905TC	K0802503-006	3/19/2008	79.0	3.00	W	9.90 U	20.0 U	9.90 U	9.90 U	9.90 U	23.0 J	9.90 U	9.9 U	9.90 U	23.0 J	
06	08031806TC	K0802503-001	3/18/2008	79.3	2.90	W	10.0 U	20.0 U	10.0 U	10.0 U	10.0 U	32.0 J	10.0 U	10.0 U	10.0 U	32.0 J	
07	08021507TC	K0801325-004	2/15/2008	82.6	2.60	W	19.0 U	20.0 U	27.0 U	35.0 U	26.0 U	74.0 U	11.0 U	9.9 U	9.90 U	74.0 U	
08	08021508TC	K0801325-005	2/15/2008	82.9	2.60	W	23.0 U	20.0 U	25.0 U	29.0 U	13.0 U	55.0 U	9.80 U	9.8 U	9.80 U	55.0 U	
09	08021409TC	K0801325-006	2/14/2008	82.2	2.30	W	23.0 U	20.0 U	30.0 U	30.0 U	9.60 U	49.0 U	9.60 U	9.6 U	9.60 U	49.0 U	
10	08021410TC	K0801325-008	2/14/2008	84.6	2.00	W	23.0 U	20.0 U	34.0 U	19.0 U	12.0 U	36.0 U	9.90 U	9.9 U	9.90 U	36.0 U	
11	08021411TC	K0801325-007	2/14/2008	83.4	2.60	W	21.0 U	20.0 U	36.0 U	19.0 U	10.0 U	32.0 U	10.0 U	10.0 U	10.0 U	36.0 U	
13	08031713TC	K0802503-002	3/17/2008	80.6	2.70	W	9.90 U	20.0 U	9.90 U	9.90 U	9.90 U	22.0	9.90 U	9.9 U	9.90 U	22.0	
14	08031814TC	K0802503-003	3/18/2008	80.3	2.80	W	9.90 U	20.0 U	9.90 U	9.90 U	9.90 U	22.0	9.90 U	9.9 U	9.90 U	22.0	
15	08022115TC	K0801325-012	2/21/2008	82.1	2.60	W	19.0 U	20.0 U	35.0 U	17.0 U	9.90 U	32.0 U	9.90 U	9.9 U	9.90 U	35.0 U	
16	08022116TC	K0801325-013	2/21/2008	83.7	2.30	W	17.0 U	20.0 U	30.0 U	15.0 U	9.80 U	30.0 U	9.80 U	9.8 U	9.80 U	30.0 U	
17	08022117TC	K0801325-014	2/21/2008	84.2	2.20	W	17.0 U	20.0 U	31.0 U	15.0 U	10.0 U	28.0 U	10.0 U	10.0 U	10.0 U	31.0 U	
18	08021118TC	K0801325-003	2/12/2008	82.5	2.40	W	17.0 U	20.0 U	23.0 U	22.0 U	9.90 U	28.0 U	9.90 U	9.9 U	9.90 U	28.0 U	
21	08021221TC	K0801325-002	2/12/2008	82.4	2.40	W	15.0 U	20.0 U	19.0 U	10.0 U	9.80 U	30.0 U	9.80 U	9.8 U	9.80 U	30.0 U	
65	08022965TC	K0802503-008	2/29/2008	78.0	3.30	W	9.80 U	20.0 U	9.80 U	9.80 U	9.80 U	21.0	9.80 U	9.8 U	9.80 U	21.0	
67	08030367TC	K0802503-007	3/3/2008	76.7	3.70	W	10.0 U	20.0 U	10.0 U	10.0 U	10.0 U	21.0	10.0 U	10.0 U	10.0 U	21.0	
88	08031788TC	K0802503-004	3/17/2008	80.2	2.80	W	10.0 U	20.0 U	10.0 U	10.0 U	10.0 U	23.0	10.0 U	10.0 U	10.0 U	23.0	
89	08031789TC	K0802503-005	3/17/2008	80.6	2.60	W	9.90 U	20.0 U	9.90 U	9.90 U	9.90 U	21.0	9.90 U	9.9 U	9.90 U	21.0	
ODEQ ATLS for Fish/Shellfish (2007) ¹ (µg/kg wet)							Birds (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	35	
							Mammals (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	880	
							Humans ³	NE	NE	NE	NE	NE	NE	NE	NE	0.57	
ODEQ CTLs for Fish/Shellfish (2007) ² (µg/kg wet)							Freshwater	NE	NE	NE	NE	NE	NE	NE	NE	430	

Notes:

µg/kg = microgram per kilogram
 ATL = Acceptable Tissue Levels
 CTL = Critical Tish Level
 NE = Not Established
 - = Not Analyzed
 CAS = Columbia Analytical Services
 D = Dry Weight
 W = Wet Weight
 ODEQ = Oregon Department of Environmental Quality
 EPA = U.S. Environmental Projection Agency
 MDL = Method detection limit

MRL = Method reporting limit

1 = Table A-3a in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, Oregon Department of Environmental Quality (ODEQ), Final January 31, 2007.

2 = Table A-4 in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, Oregon Department of Environmental Quality (ODEQ), Final January 31, 2007.

3 = Lowest values of either carcinogen or non-carcinogen criteria.

4 = PCB Aroclors summed using all non-detect values as zero.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

J = The reported value is an estimate.

☐ = The reported concentration exceeded one or more screening criteria listed.

Table 17
Clam Tissue PCB Analytical Results and Screening Criteria
Bradford Island - Remedial Investigation
Post-Removal Action Samples - Reference Area
February/March 2008 Sampling Event

Sample Station	URS ID	Lab ID	Sample Date	Moisture (%)	Total Lipids (%)	Parameter	Polychlorinated Biphenyls (units = µg/kg or ppb)										Total PCBs ⁴ (as Aroclors)	
						Method	EPA SW-846 8082											
						Basis	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268			
22	08030522TC	K0801772-012	3/5/2008	78.3	13.4	D	60.0 U	92.0 U	84.0 U	57.0 U	46.0 U	170	46.0 U	46.0 U	46.0 U	170		
24	08030524TC	K0801772-011	3/5/2008	81.1	13.9	D	57.0 U	110 U	93.0 U	51.0 U	51.0 U	160	51.0 U	51.0 U	51.0 U	160		
26	08030426TC	K0801772-018	3/4/2008	78.0	13.4	D	48.0 U	90.0 U	96.0 U	48.0 U	45.0 U	160	45.0 U	45.0 U	45.0 U	160		
27	08030427TC	K0801772-019	3/4/2008	78.0	14.2	D	54.0 U	90.0 U	120 U	55.0 U	45.0 U	170	45.0 U	45.0 U	45.0 U	170		
28	08030428TC	K0801772-014	3/4/2008	80.4	13.8	D	50.0 U	100 U	90.0 U	57.0 U	50.0 U	170	50.0 U	50.0 U	50.0 U	170		
29	08022229TC	K0801772-020	2/22/2008	78.2	13.9	D	56.0 U	90.0 U	120 U	58.0 U	45.0 U	150	45.0 U	45.0 U	45.0 U	150		
34	08022534TC	K0801772-021	2/25/2008	79.6	13.6	D	55.0 U	98.0 U	120 U	64.0 U	49.0 U	160	49.0 U	49.0 U	49.0 U	160		
35	08022535TC	K0801772-001	2/25/2008	76.6	15.3	D	43.0 U	85.0 U	120 U	58.0 U	43.0 U	160	43.0 U	43.0 U	43.0 U	160		
36	08022536TC	K0801772-002	2/25/2008	76.3	14.8	D	42.0 U	84.0 U	78.0 U	54.0 U	42.0 U	160	42.0 U	42.0 U	42.0 U	160		
37	08022637TC	K0801772-003	2/26/2008	78.2	14.4	D	46.0 U	91.0 U	130 U	46.0 U	46.0 U	160	46.0 U	46.0 U	46.0 U	160		
38	08022738TC	K0801772-004	2/27/2008	77.4	14.2	D	64.0 U	88.0 U	160 U	50.0 U	44.0 U	160	44.0 U	44.0 U	44.0 U	160		
39	08022739TC	K0801772-005	2/27/2008	77.2	14.0	D	63.0 U	84.0 U	150 U	46.0 U	42.0 U	170	42.0 U	42.0 U	42.0 U	170		
40	08022740TC	K0801772-006	2/27/2008	77.7	14.8	D	53.0 U	90.0 U	95.0 U	45.0 U	45.0 U	170	45.0 U	45.0 U	45.0 U	170		
41	08022741TC	K0801772-007	2/27/2008	78.0	14.8	D	60.0 U	89.0 U	140 U	63.0 U	45.0 U	180	45.0 U	45.0 U	45.0 U	180		
42	08022742TC	K0801772-010	2/27/2008	79.2	14.9	D	57.0 U	96.0 U	95.0 U	48.0 U	48.0 U	170	48.0 U	48.0 U	48.0 U	170		
85	08030685TC	K0801772-015	3/6/2008	79.6	14.0	D	66.0 U	97.0 U	140 U	49.0 U	49.0 U	170	49.0 U	49.0 U	49.0 U	170		
86	08030686TC	K0801772-016	3/6/2008	79.4	13.1	D	55.0 U	96.0 U	120 U	48.0 U	48.0 U	150	48.0 U	48.0 U	48.0 U	150		
87	08030687TC	K0801772-017	3/6/2008	77.9	14.1	D	46.0 U	91.0 U	120 U	46.0 U	46.0 U	150	46.0 U	46.0 U	46.0 U	150		
22	08030522TC	K0801772-012	3/5/2008	78.3	2.90	W	13.0 U	20.0 U	19.0 U	13.0 U	10.0 U	36.0	10.0 U	10.0 U	10.0 U	36.0		
24	08030524TC	K0801772-011	3/5/2008	81.1	2.60	W	11.0 U	20.0 U	18.0 U	9.70 U	9.70 U	30.0	9.70 U	9.70 U	9.70 U	30.0		
26	08030426TC	K0801772-018	3/4/2008	78.0	3.00	W	11.0 U	20.0 U	22.0 U	11.0 U	9.90 U	35.0	9.90 U	9.90 U	9.90 U	35.0		
27	08030427TC	K0801772-019	3/4/2008	78.0	3.10	W	12.0 U	20.0 U	27.0 U	12.0 U	9.90 U	37.0	9.90 U	9.90 U	9.90 U	37.0		
28	08030428TC	K0801772-014	3/4/2008	80.4	2.70	W	9.80 U	20.0 U	18.0 U	12.0 U	9.80 U	33.0	9.80 U	9.80 U	9.80 U	33.0		
29	08022229TC	K0801772-020	2/22/2008	78.2	3.00	W	13.0 U	20.0 U	26.0 U	13.0 U	9.80 U	32.0	9.80 U	9.80 U	9.80 U	32.0		
34	08022534TC	K0801772-021	2/25/2008	79.6	2.80	W	12.0 U	20.0 U	23.0 U	13.0 U	9.90 U	32.0	9.90 U	9.90 U	9.90 U	32.0		
35	08022535TC	K0801772-001	2/25/2008	76.6	3.60	W	9.90 U	20.0 U	28.0 U	14.0 U	9.90 U	37.0	9.90 U	9.90 U	9.90 U	37.0		
36	08022536TC	K0801772-002	2/25/2008	76.3	3.50	W	9.90 U	20.0 U	19.0 U	13.0 U	9.90 U	38.0	9.90 U	9.90 U	9.90 U	38.0		
37	08022637TC	K0801772-003	2/26/2008	78.2	3.10	W	9.90 U	20.0 U	29.0 U	9.90 U	9.90 U	35.0	9.90 U	9.90 U	9.90 U	35.0		
38	08022738TC	K0801772-004	2/27/2008	77.4	3.20	W	15.0 U	20.0 U	35.0 U	12.0 U	9.90 U	37.0	9.90 U	9.90 U	9.90 U	37.0		
39	08022739TC	K0801772-005	2/27/2008	77.2	3.20	W	15.0 U	20.0 U	33.0 U	11.0 U	9.60 U	38.0	9.60 U	9.60 U	9.60 U	38.0		
40	08022740TC	K0801772-006	2/27/2008	77.7	3.30	W	12.0 U	20.0 U	22.0 U	10.0 U	10.0 U	37.0	10.0 U	10.0 U	10.0 U	37.0		
41	08022741TC	K0801772-007	2/27/2008	78.0	3.30	W	14.0 U	20.0 U	31.0 U	14.0 U	9.80 U	39.0	9.80 U	9.80 U	9.80 U	39.0		
42	08022742TC	K0801772-010	2/27/2008	79.2	3.10	W	12.0 U	20.0 U	20.0 U	10.0 U	10.0 U	35.0	10.0 U	10.0 U	10.0 U	35.0		
85	08030685TC	K0801772-015	3/6/2008	79.6	2.80	W	14.0 U	20.0 U	28.0 U	9.90 U	9.90 U	34.0	9.90 U	9.90 U	9.90 U	34.0		
86	08030686TC	K0801772-016	3/6/2008	79.4	2.70	W	12.0 U	20.0 U	24.0 U	9.90 U	9.90 U	31.0	9.90 U	9.90 U	9.90 U	31.0		
87	08030687TC	K0801772-017	3/6/2008	77.9	3.10	W	10.0 U	20.0 U	26.0 U	10.0 U	10.0 U	33.0	10.0 U	10.0 U	10.0 U	33.0		
ODEQ ATLs for Fish/Shellfish (2007) ¹ (µg/kg wet)						Birds (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	35	
						Mammals (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	880
						Humans ³	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0.57
ODEQ CTLs for Fish/Shellfish (2007) ² (µg/kg wet)						Freshwater	NE	NE	NE	NE	NE	NE	NE	NE	NE	430		

Notes:

µg/kg = microgram per kilogram
ATL = Acceptable Tissue Levels
CTL = Critical Tissue Levels
NE = Not Established
- = Not Analyzed
CAS = Columbia Analytical Services
D = Dry Weight
W = Wet Weight
ODEQ = Oregon Department of Environmental Quality
EPA = U.S. Environmental Protection Agency
MDL = Method detection limit

MRL = Method reporting limit

1 = Table A-3a in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, Oregon Department of Environmental Quality (ODEQ), Final January 31, 2007.

2 = Table A-4 in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, Oregon Department of Environmental Quality (ODEQ), Final January 31, 2007.

3 = Lowest values of either carcinogen or non-carcinogen criteria.

4 = PCB Aroclors summed using all non-detect values as zero.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

JJ = The analyte was not detected. The reported sample quantification limit is an estimate.

J = The reported value is an estimate.

 = The reported concentration exceeded one or more screening criteria listed.

Table 22
Crayfish Tissue PCB Analytical Results and Screening Criteria
Bradford Island - Remedial Investigation
Post-Removal Action Samples - Forebay
February/March 2008 Sampling Event

Sample Station	URS ID	Lab ID	Sample Date	Moisture (%)	Total Lipids (%)	Parameter Method	Polychlorinated Biphenyls (units = µg/kg or ppb)										Total PCBs ⁴ (as Aroclors)	
							EPA SW-846 8082											
							Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268			
01	08021901CF	K0801458-005	2/19/2008	70.4	3.90	D	34.0 U	67.0 U	34.0 U	34.0 U	34.0 U	34.0 U	34.0 U	34.0 U	34.0 U	34.0 U	67.0 U	
02	08021902CF	K0801458-006	2/19/2008	68.4	5.30	D	32.0 U	63.0 U	32.0 U	32.0 U	32.0 U	32.0 U	32.0 U	32.0 U	32.0 U	32.0 U	63.0 U	
03	08022003CF	K0801458-007	2/20/2008	73.6	2.40	D	38.0 U	75.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	75.0 U	
04	08021904CF	K0801458-008	2/19/2008	73.9	2.10	D	38.0 U	76.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	76.0 U	
05	08021505CF	K0801458-009	2/15/2008	70.1	4.60	D	33.0 U	66.0 U	33.0 U	33.0 U	33.0 U	33.0 U	33.0 U	33.0 U	33.0 U	33.0 U	66.0 U	
06	08021406CF	K0801458-001	2/14/2008	72.1	3.90	D	36.0 U	72.0 U	36.0 U	36.0 U	36.0 U	67.0 U	59.0 U	36.0 U	36.0 U	36.0 U	72.0 U	
07	08021407CF	K0801458-003	2/14/2008	72.5	2.20	D	36.0 U	72.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	72.0 U	
08	08021408CF	K0801458-002	2/14/2008	72.7	2.70	D	37.0 U	73.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	73.0 U	
13	08021413CF	K0801458-004	2/14/2008	73.6	3.10	D	38.0 U	75.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	75.0 U	
14	08022014CF	K0801458-010	2/20/2008	73.3	2.20	D	36.0 U	72.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	72.0 U	
15	08021915CF	K0801458-011	2/19/2008	72.4	3.20	D	35.0 U	70.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	70.0 U	
16	08022216CF	K0801458-020	2/22/2008	72.5	3.90	D	36.0 U	72.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	72.0 U	
17	08021917CF	K0801458-012	2/19/2008	75.1	1.90	D	40.0 U	80.0 U	40.0 U	40.0 U	40.0 U	40.0 U	40.0 U	40.0 U	40.0 U	40.0 U	80.0 U	
18	08021918CF	K0801458-013	2/19/2008	74.1	2.80	D	37.0 U	74.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	74.0 U	
19	08021919CF	K0801458-014	2/19/2008	72.4	3.40	D	36.0 U	71.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	71.0 U	
20	08021920CF	K0801458-015	2/19/2008	74.4	2.80	D	38.0 U	76.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	76.0 U	
21	08021921CF	K0801458-016	2/19/2008	72.0	2.60	D	35.0 U	70.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	70.0 U	
01	08021901CF	K0801458-005	2/19/2008	70.4	1.20	W	9.90 U	20.0 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	20.0 U	
02	08021902CF	K0801458-006	2/19/2008	68.4	1.70	W	10.0 U	20.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	20.0 U	
03	08022003CF	K0801458-007	2/20/2008	73.6	0.620	W	9.90 U	20.0 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	20.0 U	
04	08021904CF	K0801458-008	2/19/2008	73.9	0.550	W	9.90 U	20.0 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	20.0 U	
05	08021505CF	K0801458-009	2/15/2008	70.1	1.40	W	9.80 U	20.0 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	20.0 U	
06	08021406CF	K0801458-001	2/14/2008	72.1	1.10	W	10.0 U	20.0 U	10.0 U	10.0 U	10.0 U	19.0 U	17.0 U	10.0 U	10.0 U	10.0 U	20.0 U	
07	08021407CF	K0801458-003	2/14/2008	72.5	0.610	W	9.90 U	20.0 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	20.0 U	
08	08021408CF	K0801458-002	2/14/2008	72.7	0.740	W	9.90 U	20.0 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	20.0 U	
13	08021413CF	K0801458-004	2/14/2008	73.6	0.820	W	9.80 U	20.0 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	20.0 U	
14	08022014CF	K0801458-010	2/20/2008	73.3	0.580	W	9.60 U	20.0 U	9.60 U	9.60 U	9.60 U	9.60 U	9.60 U	9.60 U	9.60 U	9.60 U	20.0 U	
15	08021915CF	K0801458-011	2/19/2008	72.4	0.870	W	9.60 U	20.0 U	9.60 U	9.60 U	9.60 U	9.60 U	9.60 U	9.60 U	9.60 U	9.60 U	20.0 U	
16	08022216CF	K0801458-020	2/22/2008	72.5	1.10	W	9.90 U	20.0 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	20.0 U	
17	08021917CF	K0801458-012	2/19/2008	75.1	0.480	W	10.0 U	20.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	20.0 U	
18	08021918CF	K0801458-013	2/19/2008	74.1	0.730	W	9.60 U	20.0 U	9.60 U	9.60 U	9.60 U	9.60 U	9.60 U	9.60 U	9.60 U	9.60 U	20.0 U	
19	08021919CF	K0801458-014	2/19/2008	72.4	0.930	W	9.80 U	20.0 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	20.0 U	
20	08021920CF	K0801458-015	2/19/2008	74.4	0.710	W	9.80 U	20.0 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	20.0 U	
21	08021921CF	K0801458-016	2/19/2008	72.0	0.720	W	9.80 U	20.0 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	20.0 U	
ODEQ ATLs for Fish/Shellfish (2007) ¹ (µg/kg wet)						Birds (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	35	
						Mammals (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	880
						Humans ³	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0.57
ODEQ CTLs for Fish/Shellfish (2007) ² (µg/kg wet)						Freshwater	NE	NE	NE	NE	NE	NE	NE	NE	NE	430		

Notes:

µg/kg = microgram per kilogram
ATL = Acceptable Tissue Levels
CTL = Critical Tish Level
NE = Not Established
- = Not Analyzed
CAS = Columbia Analytical Services
D = Dry Weight
W = Wet Weight
ODEQ = Oregon Department of Environmental Quality
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4 = PCB Aroclors summed using all non-detect values as zero.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

J = The reported value is an estimate.

= The reported concentration exceeded one or more screening criteria listed.

Table 23
Crayfish Tissue PCB Analytical Results and Screening Criteria
Bradford Island - Remedial Investigation
Post-Removal Action Samples - Reference Area
February/March 2008 Sampling Event

Parameter							Polychlorinated Biphenyls (units = µg/kg or ppb)									
Method SW-846 8082																
Sample Station	URS ID	Lab ID	Sample Date	Moisture (%)	Total Lipids (%)	Basis	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268	Total PCBs ⁴ (as Aroclors)
22	08022622CF	K0802375-024	2/26/2008	72.4	1.70	D	35.0 U	69.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	69.0 U
33	08022233CF	K0802375-025	2/26/2008	73.6	2.60	D	38.0 U	75.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	38.0 U	75.0 U
38	08021838CF	K0802375-003	2/18/2008	71.8	1.60	D	68.0 U	140 U	68.0 U	68.0 U	68.0 U	68.0 U	68.0 U	68.0 U	68.0 U	140 U
42	08022842CF	K0802375-004	2/28/2008	71.9	3.40	D	36.0 U	71.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	71.0 U
72	08030372CF	K0802375-005	3/3/2008	51.8	1.70	D	21.0 U	42.0 U	21.0 U	21.0 U	21.0 U	21.0 U	21.0 U	21.0 U	21.0 U	42.0 U
73	08030373CF	K0802375-006	3/3/2008	71.1	3.30	D	33.0 U	66.0 U	33.0 U	33.0 U	33.0 U	33.0 U	33.0 U	33.0 U	33.0 U	66.0 U
74	08030374CF	K0802375-007	3/3/2008	75.2	2.20	D	40.0 U	80.0 U	40.0 U	40.0 U	40.0 U	40.0 U	40.0 U	40.0 U	40.0 U	80.0 U
75	08030375CF	K0802375-008	3/3/2008	74.5	1.50	D	39.0 U	77.0 U	39.0 U	39.0 U	39.0 U	39.0 U	39.0 U	39.0 U	39.0 U	77.0 U
76	08030376CF	K0802375-009	3/3/2008	70.2	2.30	D	34.0 U	68.0 U	34.0 U	34.0 U	34.0 U	34.0 U	34.0 U	34.0 U	34.0 U	68.0 U
78	08030378CF	K0802375-010	3/3/2008	71.1	2.80	D	35.0 U	69.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	69.0 U
79	08030379CF	K0802375-011	3/3/2008	70.8	4.10	D	34.0 U	67.0 U	34.0 U	34.0 U	34.0 U	34.0 U	34.0 U	34.0 U	34.0 U	67.0 U
82	08030382CF	K0802375-012	3/3/2008	71.5	2.50	D	35.0 U	70.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	70.0 U
90	08031290CF	K0802375-013	3/12/2008	73.9	0.880	D	36.0 U	72.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	36.0 U	72.0 U
91	08031291CF	K0802375-014	3/12/2008	69.5	2.70	D	66.0 U	140 U	66.0 U	66.0 U	66.0 U	66.0 U	66.0 U	66.0 U	66.0 U	140 U
92	08031292CF	K0802375-015	3/12/2008	73.1	2.10	D	37.0 U	74.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	74.0 U
94	08031294CF	K0802375-016	3/12/2008	72.9	1.80	D	37.0 U	73.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	73.0 U
98	08031298CF	K0802375-017	3/12/2008	74.5	1.70	D	40.0 U	79.0 U	40.0 U	40.0 U	40.0 U	40.0 U	40.0 U	40.0 U	40.0 U	79.0 U
100	080312100CF	K0802375-018	3/12/2008	72.7	2.80	D	37.0 U	73.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	37.0 U	73.0 U
105	080314105CF	K0802375-019	3/14/2008	74.4	2.70	D	49.0 U	98.0 U	49.0 U	49.0 U	49.0 U	49.0 U	49.0 U	49.0 U	49.0 U	98.0 U
22	08022622CF	K0802375-024	2/26/2008	72.4	0.480	W	9.40 U	19.0 U	9.40 U	9.40 U	9.40 U	9.40 U	9.40 U	9.40 U	9.40 U	19.0 U
33	08022233CF	K0802375-025	2/26/2008	73.6	0.680	W	9.90 U	20.0 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	20.0 U
38	08021838CF	K0802375-003	2/18/2008	71.8	0.440	W	20.0 U	39.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	39.0 U
42	08022842CF	K0802375-004	2/28/2008	71.9	0.950	W	10.0 U	20.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	20.0 U
72	08030372CF	K0802375-005	3/3/2008	51.8	0.800	W	10.0 U	20.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	20.0 U
73	08030373CF	K0802375-006	3/3/2008	71.1	0.950	W	9.50 U	19.0 U	9.50 U	9.50 U	9.50 U	9.50 U	9.50 U	9.50 U	9.50 U	19.0 U
74	08030374CF	K0802375-007	3/3/2008	75.2	0.550	W	9.90 U	20.0 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	20.0 U
75	08030375CF	K0802375-008	3/3/2008	74.5	0.370	W	9.80 U	20.0 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	20.0 U
76	08030376CF	K0802375-009	3/3/2008	70.2	0.700	W	10.0 U	20.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	20.0 U
78	08030378CF	K0802375-010	3/3/2008	71.1	0.820	W	10.0 U	20.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	20.0 U
79	08030379CF	K0802375-011	3/3/2008	70.8	1.20	W	9.80 U	20.0 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	9.80 U	20.0 U
82	08030382CF	K0802375-012	3/3/2008	71.5	0.700	W	10.0 U	20.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	20.0 U
90	08031290CF	K0802375-013	3/12/2008	73.9	0.230	W	9.40 U	19.0 U	9.40 U	9.40 U	9.40 U	9.40 U	9.40 U	9.40 U	9.40 U	19.0 U
91	08031291CF	K0802375-014	3/12/2008	69.5	0.810	W	20.0 U	40.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	40.0 U
92	08031292CF	K0802375-015	3/12/2008	73.1	0.560	W	9.90 U	20.0 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	20.0 U
94	08031294CF	K0802375-016	3/12/2008	72.9	0.500	W	9.90 U	20.0 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	20.0 U
98	08031298CF	K0802375-017	3/12/2008	74.5	0.420	W	10.0 U	20.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	20.0 U
100	080312100CF	K0802375-018	3/12/2008	72.7	0.760	W	9.90 U	20.0 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	9.90 U	20.0 U
105	080314105CF	K0802375-019	3/14/2008	74.4	0.700	W	13.0 U	25.0 U	13.0 U	13.0 U	13.0 U	13.0 U	13.0 U	13.0 U	13.0 U	25.0 U
ODEQ ATLs for Fish/Shellfish (2007)¹ (µg/kg wet)						Birds (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	35
						Mammals (Individual)	NE	NE	NE	NE	NE	NE	NE	NE	NE	880
						Humans³	NE	NE	NE	NE	NE	NE	NE	NE	NE	0.57
ODEQ CTLs for Fish/Shellfish (2007)² (µg/kg wet)						Freshwater	NE	NE	NE	NE	NE	NE	NE	NE	430	

Notes:

µg/kg = microgram per kilogram

ATL = Acceptable Tissue Levels

CTL = Critical Tish Level

NE = Not Established

- = Not Analyzed

CAS = Columbia Analytical Services

D = Dry Weight

W = Wet Weight

ODEQ = Oregon Department of Environmental Quality

EPA = U.S. Environmental Protection Agency

MDL = Method detection limit

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2 = Table A-4 in Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment, Oregon Department of Environmental Quality (ODEQ), Final January 31, 2007.

3 = Lowest values of either carcinogen or non-carcinogen criteria.

4 = PCB Aroclors summed using all non-detect values as zero.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

UU = The analyte was not detected. The reported sample quantification limit is an estimate.

J = The reported value is an estimate.

☐ = The reported concentration exceeded one or more screening criteria listed.

Table 28
Grab Water Total Metals Analytical Results
Bradford Island - Remedial Investigation
Post-Removal Action Samples
February/March 2008 Sampling Event

Parameter				Total Metals (µg/L)																		
Method				6010B	6010B	6020	6010B	6020	6020	6010B	6010B	6020	6020	7470A	6010B	6020	6010B	6010B				
Sample Station	URS ID	Lab ID	Sample Date	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Nickel	Thallium	Vanadium	Zinc				
52	08021252SW	K0801289-001	2/12/08	145.0 U	50.0 U	0.810	22.0	0.009	0.013	5.00 U	10.0 U	0.670	0.079	0.200 U	20.0 U	0.033	10.0 U	10.0 U				
53	08022453SW	K0801530-003	2/24/08	91.0	50.0 U	0.930	25.0	0.020 U	0.017 J	5.00 U	10.0 U	0.670	0.175	0.200 U	20.0 U	0.026	10.0 U	10.0 U				
54	08021354SW	K0801289-002	2/13/08	152 U	50.0 U	0.880	23.0	0.003	0.009	5.00 U	10.0 U	0.670	0.087	0.200 U	20.0 U	0.031	10.0 U	10.0 U				
55	08022555SW	K0801530-005	2/25/08	99.0	50.0 U	0.920	24.0	0.020 U	0.019 J	5.00 U	10.0 U	0.790	0.108	0.200 U	20.0 U	0.028	10.0 U	10.0 U				
56	08022156SW	K0801530-001	2/21/08	141	50.0 U	1.01	27.0	0.020 U	0.013 J	5.00 U	10.0 U	0.720	0.140	0.200 U	20.0 U	0.028	10.0 U	10.0 U				
57	08022757SW	K0801530-009	2/27/08	98.0	50.0 U	0.930	21.0	0.020 U	0.008 J	5.00 U	10.0 U	0.600	0.058	0.200 U	20.0 U	0.020	10.0 U	10.0 U				
62 (duplicate 57)	08022762SW	K0801530-007	2/27/08	84.0	50.0 U	0.890	21.0	0.020 U	0.012 J	5.00 U	2.00 J	0.610	0.058	0.200 U	20.0 U	0.021	10.0 U	10.0 U				
58	08030758SW	K0802104-001	3/7/08	118	50.0 U	1.05 U	22.1	0.020 U	0.020 U	5.00 U	10.0 U	0.770	0.203	0.200 U	20.0 U	0.020 U	10.0 U	10.0 U				
59	08022959SW	K0801765-001	2/29/08	123	50.0 U	1.22	25.0	0.021	0.021	5.00 U	10.0 U	0.710	0.091	0.200 U	20.0 U	0.037 U	10.0 U	10.0 U				
60	08030460SW	K0801765-003	3/4/08	99.7	9.30 J	1.25	25.3	0.009 J	0.020 U	5.00 U	10.0 U	0.760	0.077	0.200 U	20.0 U	0.024 U	10.0 U	10.0 U				
61	08030661SW	K0801765-005	3/6/08	115	50.0 U	1.22	25.6	0.011 J	0.020 U	2.00 J	10.0 U	0.830	0.092	0.200 U	20.0 U	0.027 U	10.0 U	10.0 U				
EPA NRWQC (2006) (µg/L) ¹				Chronic				NE	NE	150	NE	NE	0.25	74 (Cr ⁺³) 11 (Cr ⁺⁶)	NE	9.0	2.5	0.77	52	NE	NE	120
				Human Health (Water+Organism)				NE	NE	0.018	NE	NE	NE	NE	NE	1300	NE	NE	610	0.24	NE	NE

Notes:

EPA = Environmental Protection Agency

µg/L = microgram per liter

MDL = Method detection limit

MRL = Method reporting limit

CAS = Columbia Analytical Services

1 = EPA National Recommended Water Quality Criteria, 2006.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

J = The reported value is an estimate.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

 = The reported concentration exceeded one or more screening criteria listed.

Table 29
Grab Water Dissolved Metals Analytical Results

Bradford Island - Remedial Investigation
Post-Removal Action Samples
February/March 2008 Sampling Event

Parameter				Dissolved Metals (µg/L)															
Method				6010B	6010B	6020	6010B	6020	6020	6010B	6010B	6020	6020	7470A	6010B	6020	6010B	6010B	
Sample Station	URS ID	Lab ID	Sample Date	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Nickel	Thallium	Vanadium	Zinc	
52	08021252SW	K0801289-001	2/12/08	50.0 U	50.0 U	0.720	21.0	0.003	0.008	5.00 U	10.0 U	0.520	0.036	0.200 U	20.0 U	0.030	10.0 U	7.50	
53	08022453SW	K0801530-003	2/24/08	50.0 U	50.0 U	0.890	24.0	0.020 U	0.020 U	5.00 U	10.0 U	0.450	0.022	0.200 U	20.0 U	0.024	10.0 U	10.0 U	
54	08021354SW	K0801289-002	2/13/08	50.0 U	50.0 U	0.820	22.0	0.004	0.020 U	5.00 U	10.0 U	0.440	0.020 U	0.200 U	20.0 U	0.031	10.0 U	10.0 U	
55	08022555SW	K0801530-005	2/25/08	50.0 U	50.0 U	0.940	23.0	0.020 U	0.020 U	5.00 U	10.0 U	0.480	0.014 J	0.200 U	20.0 U	0.023	10.0 U	10.0 U	
56	08022156SW	K0801530-001	2/21/08	50.0 U	50.0 U	0.890	24.0	0.020 U	0.010 J	5.00 U	10.0 U	0.460	0.020 U	0.200 U	20.0 U	0.024	10.0 U	10.0 U	
57	08022757SW	K0801530-009	2/27/08	50.0 U	50.0 U	0.870	21.0	0.020 U	0.020 U	5.00 U	2.20 J	0.440	0.014 J	0.200 U	20.0 U	0.019 J	10.0 U	10.0 U	
62 (duplicate 57)	08022762SW	K0801530-007	2/27/08	27.0 J	50.0 U	1.00	22.0	0.020 U	0.020 U	5.00 U	10.0 U	0.460	0.020 U	0.200 U	20.0 U	0.018 J	10.0 U	10.0 U	
58	08030758SW	K0802104-001	3/7/08	50.0 U	50.0 U	U	22.2	0.020 U	0.020 U	5.00 U	10.0 U	0.550	0.015	0.200 U	20.0 U	0.020	10.0 U	10.0 U	
59	08022959SW	K0801765-001	2/29/08	50.0 U	50.0 U	1.26	23.5	0.020 U	0.020 U	5.00 U	10.0 U	0.550	0.020 U	0.200 U	20.0 U	0.024 U	10.0 U	10.0 U	
60	08030460SW	K0801765-003	3/4/08	50.0 U	50.0 U	1.10 U	23.3	0.020 U	0.020 U	5.00 U	10.0 U	0.600	0.020 U	0.200 U	20.0 U	0.020 U	10.0 U	10.0 U	
61	08030661SW	K0801765-005	3/6/08	50.0 U	50.0 U	1.14 U	23.5	0.020 U	0.020 U	5.00 U	10.0 U	0.610	0.024	0.200 U	20.0 U	0.020 U	10.0 U	10.0 U	
EPA NRWQC (2006) (µg/L) ¹				Chronic	NE	NE	150	NE	NE	0.25	74 (Cr ⁺³) 11 (Cr ⁺⁶)	NE	9.0	2.5	0.77	52	NE	NE	120
				Human Health (Water+Organism)	NE	NE	0.018	NE	NE	NE	NE	NE	1300	NE	NE	610	0.24	NE	NE

Notes:

EPA = Environmental Protection Agency

µg/L = microgram per liter

MDL = Method detection limit

MRL = Method reporting limit

CAS = Columbia Analytical Services

1 = EPA National Recommended Water Quality Criteria, 2006.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

J = The reported value is an estimate.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

 = The reported concentration exceeded one or more screening criteria listed.

Table 30
Grab Water TPH, Anions, and Organic Carbon Analytical Results

Bradford Island - Remedial Investigation
 Post-Removal Action Samples
 February/March 2008 Sampling Event

Parameter				Total TPH-Dx		Dissolved TPH-Dx		Anions			Organic Carbon		
Method				NWTPH (units = µg/L)		NWTPH (units = µg/L)		353.2 (units = mg/L)	300.0 (units = mg/L)		415.1 (units = mg/L)		
Sample Station	URS ID	Lab ID	Sample Date	Diesel Range Organics	Residual Range Organics	Diesel Range Organics	Residual Range Organics	Nitrate/Nitrite	Chloride	Sulfate	DOC	TOC	
52	08021252SW	K0801289-001	2/12/08	15.0 J	110 U	15.0 J	120 U	0.200	3.20	13.3	2.10	1.90	
53	08022453SW	K0801530-003	2/24/08	100 U	100 U	14.0 J	100 U	0.300	4.20	14.7	1.80	1.80	
54	08021354SW	K0801289-002	2/13/08	15.0 J	110 U	28.0 J	120 U	0.200	2.90	13.8	1.80	1.80	
55	08022555SW	K0801530-005	2/25/08	100 U	100 U	46.0 J	100 U	0.200	3.30	14.7	1.70	1.90	
56	08022156SW	K0801530-001	2/21/08	100 U	100 U	18.0 J	100 U	0.200	3.30	14.9	1.80	1.70	
57	08022757SW	K0801530-009	2/27/08	100 U	100 U	100 U	100 U	0.200	3.30	13.9	1.70	1.70	
62 (duplicate 57)	08022762SW	K0801530-007	2/27/08	100 U	100 U	100 U	100 U	0.200	3.30	14.0	1.70	1.70	
58	08030758SW	K0802104-001	3/7/08	110 U	110 U	110 U	110 U	0.250	3.20	13.9	1.80	1.90	
59	08022959SW	K0801765-001	2/29/08	13.0 J	24.0 J	100 U	24.0 J	0.290	3.50	14.5	1.80	1.80	
60	08030460SW	K0801765-003	3/4/08	14.0 J	22.0 J	13.0 J	20.0 J	0.300	3.50	14.3	1.80	2.00	
61	08030661SW	K0801765-005	3/6/08	19.0 J	71.0 J	110 U	21.0 J	0.310	3.30	14.5	2.30	2.10	
EPA NRWQC (2006) (mg/L)¹				Chronic		NE	NE	NE	NE	NE	23	NE	NE
				Human Health (Water+Organism)		NE	NE	NE	NE	10	NE	NE	NE

Notes:

EPA = Environmental Protection Agency

µg/L = microgram per liter

mg/L = milligram per liter

DOC = Dissolved Organic Carbon

TOC = Total Organic Carbon

TPH-Dx = Total Petroleum Hydrocarbons-Diesel Range

NWTPH = Northwest Total Petroleum Hydrocarbons Method

MDL = Method detection limit

MRL = Method reporting limit

CAS = Columbia Analytical Services

1 = EPA National Recommended Water Quality Criteria, 2006.

U = The analyte was not detected at or above the CAS MDL. The non-detect values reported in this table are CAS MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

J = The reported value is an estimate.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

 = The reported concentration exceeded one or more screening criteria listed.

Table 31
Infiltrax High Volume Water PAH and Phthalate Ester Analytical Results and Screening Criteria

Bradford Island - Remedial Investigation
 Post-Removal Action Samples
 February/March 2008 Sampling Event

Parameter				Polynuclear Aromatic Hydrocarbons (PAHs) (units = ng/L or ppt)											Semivolatile Organic Compounds (SVOCs)					
Method				Axys Labs Method MLA-021											Axys Labs Method MLA-027					
Sample Station	URS ID	Lab ID	Sample Date	Acenaphthene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(j,k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Bis(2-ethylhexyl) Phthalate	Butyl Benzyl Phthalate	Di-n-butyl Phthalate	Di-n-octyl Phthalate	
Column Fraction																				
52	08021252X	L10998-1	2/12/08	0.706	0.075 U	0.012 U	0.025 U	0.017 U	0.012 U	0.019 U	0.051	0.021 U	0.516 U	0.013 U	1.39	11.8 U	0.418 U	1.97 U	0.314 U	
53	08022453X	L10998-2	2/24/08	1.12	0.079 U	0.008 J-EMPC	0.015 U	0.011 U	0.014 U	0.016 U	0.039	0.019 U	0.538 U	0.015 U	1.27	10.5 U	0.316 U	0.800 U	0.154 U	
54	08021354X	L10998-3	2/13/08	0.894	0.057 U	0.008	0.027 U	0.018 U	0.010 U	0.021 U	0.049	0.014 U	0.561 U	0.010 U	1.50	8.77 U	2.290 U	0.925 U	0.852 U	
55	08022555X	L10998-4	2/25/08	1.26	0.103 U	0.015	0.016 U	0.011 U	0.019 U	0.012 U	0.051	0.021 U	0.562 U	0.020 U	1.28	7.92 U	0.273 U	0.574 U	0.126 U	
56	08022156X	L10998-5	2/21/08	1.03	0.080 U	0.012	0.013 U	0.009 J-EMPC	0.020 U	0.010 U	0.046	0.011 U	0.572 U	0.020 U	1.39	6.52 U	0.260 U	0.562 U	0.110 U	
57	08022757X	L10998-6	2/27/08	1.28	0.085 U	0.009 J-EMPC	0.017 U	0.012 U	0.020 U	0.014 U	0.039	0.018 U	0.485 U	0.022 U	1.26	17.0 U	0.450 U	0.657 U	0.187 U	
58	08030758X	L10998-7	3/7/08	0.862	0.069 U	0.018 U	0.015 U	0.010 U	0.012 U	0.011 U	0.048	0.022 U	0.591 U	0.013 U	1.20	15.5 U	0.501 U	0.733 U	0.202 U	
59	08022959X	L10998-8	2/29/08	2.41	0.133 U	0.016	0.020 U	0.015 U	0.015 U	0.016 U	0.046	0.016 U	0.626	0.016 U	1.52	9.13 U	0.322 U	0.642 U	0.155 U	
60	08030460X	L10998-9	3/4/08	1.57	0.080 U	0.016	0.017 U	0.011 U	0.016 U	0.012 U	0.066	0.015 U	0.630	0.018 U	1.46	5.77 U	0.299 U	0.626 U	0.099 U	
61	08030661X	L10998-10	3/6/08	0.971	0.059 U	0.012	0.013 U	0.009 U	0.020 U	0.009 U	0.056	0.018 U	0.620	0.022 U	1.23	8.37 U	0.263 U	0.517 U	0.091 U	
Filter Fraction																				
52	08021252X	L11001-1	2/12/08	0.033 U	0.032	0.052 U	0.044 U	0.071	0.039 U	0.043 U	0.084 U	0.019 U	0.143	0.046 U	0.092 U	4.51 U	0.198 U	0.266 U	0.249 U	
53	08022453X	L11001-2	2/24/08	0.028 U	0.027	0.029 U	0.047 U	0.033 U	0.024 U	0.032 U	0.063 U	0.025 U	0.120	0.031 U	0.107 U	3.74 U	0.157 U	0.281 U	0.096 U	
54	08021354X	L11001-3	2/13/08	0.015 U	0.029	0.048 U	0.046 U	0.077 J-EMPC	0.052 U	0.050 U	0.113	0.040 U	0.194	0.037 U	0.105 U	4.63 U	0.155 U	0.247 U	0.160 U	
55	08022555X	L11001-4	2/25/08	0.019 U	0.018	0.030 U	0.022 U	0.042 U	0.029 U	0.038 U	0.073 U	0.023 U	0.112	0.029 U	0.066 U	3.47 U	0.150 U	0.200 U	0.208 U	
56	08022156X	L11001-5	2/21/08	0.028 U	0.032	0.048 U	0.058 U	0.083	0.041 U	0.044 U	0.125	0.024 U	0.212	0.037 U	0.188	3.41 U	0.181 U	0.303 U	0.139 U	
57	08022757X	L11001-6	2/27/08	0.016 U	0.011	0.021 U	0.020 U	0.024 U	0.025 U	0.022 U	0.045 U	0.022 U	0.079 U	0.028 U	0.057 U	2.76 U	0.203 U	0.290 U	0.129 U	
58	08030758X	L11001-7	3/7/08	0.026 U	0.019	0.021 U	0.023 U	0.023 U	0.017 U	0.021 U	0.059 U	0.029 U	0.101	0.019 U	0.088 U	6.76 U	5.47 U	0.548 U	1.09 U	
59	08022959X	L11001-8	2/29/08	0.021 U	0.017	0.028 U	0.030 U	0.033 U	0.022 U	0.033 U	0.073 U	0.018 U	0.129	0.015 U	0.072 U	2.75 U	0.158 U	0.243 U	0.120 U	
60	08030460X	L11001-9	3/4/08	0.033 U	0.022	0.037 U	0.039 U	0.056	0.034 U	0.034 U	0.083 U	0.022 U	0.139	0.033 U	0.108 U	13.0 U	0.452 U	0.595 U	0.285 U	
61	08030661X	L11001-10	3/6/08	0.014 U	0.024	0.038 U	0.041 U	0.051	0.040 U	0.055 U	0.093 U	0.022 U	0.163	0.042 U	0.114 U	5.01 U	0.402 U	0.324 U	0.180 U	
EPA NRWQC (2006)				Chronic	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	
(ng/L)¹				Human Health (Water+Organism)	670,000	8,300,000	3.8	3.8	3.8	NE	3.8 ²	3.8	3.8	130,000	3.8	NE	1,200	1,500,000	2,000,000	NE

Notes:

ng/L = nanogram per Liter

ppt = parts per trillion

MDL = Method detection limit

MRL = Method reporting limit

NE = Not Established

Axys = Axys Analytical Services

EPA = Environmental Protection Agency

SLVs = screening level values

1 = EPA National Recommended Water Quality Criteria, 2006. These SLVs are for the total phase of the analyte in the water column, which is calculated by adding respective column and filter fractions results for each sample.

2 = SLV is for Benzo(k)fluoranthene.

U = The analyte was not detected at or above the Axys MDL. The non-detect values reported in this table are Axys MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

J = The reported value is an estimate.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

J-EMPC = The analyte was not positively identified; the associated numerical value is the Estimated Maximum Potential Concentration.

 = The reported concentration exceeded one or more screening criteria listed.

Table 32
Infiltrax High Volume Water PCB Congener Analysis Results
Summary of PCB Congener Totals

Bradford Island - Remedial Investigation
 Post-Removal Action Samples
 February/March 2008 Sampling Event

Sample Station	URS ID	Total PCBs Filter (Particulate Fraction) (pg/L)	Total PCBs Column (Dissolved Fraction) (pg/L)	Total PCBs (Particulate+Dissolved Fractions) (pg/L)
52	08021252XAD	14.5	97.5	112
53	08022453XAD	55.5	153	209
54	08021354XAD	60.9	95.5	156
55	08022555XAD	22.4	154	177
56	08022156XAD	26.3	138	164
57	08022757XAD	24.0	153	177
58	08030758XAD	21.0	109	130
59	08022959XAD	22.5	149	172
60	08030460XAD	26.5	145	172
61	08030661XAD	25.4	123	148
EPA NRWQC (2006) for total PCBs (pg/L)¹			Chronic	14,000
			Human Health (Water+Organism)	64

Notes:

High volume water samples were collected using Infiltrax 300 sampling system supplied by Axys Environmental Systems. Water is pumped through a glass-wound filter and XAD resin column, each phase representing particulate and dissolved fractions, respectively.

Reported concentrations are calculated using total volume of water filtered.

Total PCBs are calculated by summing all 209 congeners, excluding results flagged as U, UJ, or J-EMPC.

Full list of congeners reported in tables 33 through 36.

EPA = Environmental Protection Agency

¹ = EPA National Recommended Water Quality Criteria, 2006. These SLVs are for total constituents in the water column.

 = The reported concentration exceeded one or more screening criteria listed.

Table 35
Infiltrax High Volume Water PCB Congener Analysis Results - Stations 58 and 59
Bradford Island - Remedial Investigation
Post-Removal Action Samples
February/March 2008 Sampling Event

IUPAC #	COELUTING CONGENERS ¹	08030758XAD L11001-7 (Filter)	08030758XAD L10998-7 (Column)	08022959XAD L11001-8 (Filter)	08022959XAD L10998-8 (Column)
119	86 + 87 + 97 + 108 + 119 + 125	C86	C86	C86	C86
120		0.005	0.002	0.004	0.0023 U
121		0.0012 U	0.0019 U	0.0023 U	0.0025 U
122		0.007	0.004 J-EMPC	0.0062 U	0.004 U
123		0.019 U	0.014 U	0.02 U	0.009 U
124	107 + 124	C107	C107	C107	C107
125	86 + 87 + 97 + 108 + 119 + 125	C86	C86	C86	C86
126		0.007 U	0.006 U	0.0063 U	0.0039 U
127		0.0037 U	0.0029 U	0.0057 U	0.0039 U
128	128 + 166	0.127 C	0.044 C	0.137 C	0.044 C
129	129 + 138 + 160 + 163	1.04 C	0.375 C	1.04 C	0.351 C
130		0.049	0.02	0.053	0.02
131		0.007	0.0034 U	0.01 J-EMPC	0.004 J-EMPC
132		0.2	0.111	0.213	0.091
133		0.011 J-EMPC	0.005 U	0.014	0.006 U
134	134 + 143	0.025 C J-EMPC	0.021 C J-EMPC	0.033 C	0.018 C J-EMPC
135	135 + 151 + 154	0.237 C	0.133 C	0.247 C	0.111 C
136		0.061	0.043	0.063	0.032
137		0.037	0.012	0.035 J-EMPC	0.016
138	129 + 138 + 160 + 163	C129	C129	C129	C129
139	139 + 140	0.012 C	0.0031 C U	0.014 C J-EMPC	0.006 C J-EMPC
140	139 + 140	C139	C139	C139	C139
141		0.1	0.044	0.089	0.037
142		0.0043 U	0.0034 U	0.0027 U	0.0013 U
143	134 + 143	C134	C134	C134	C134
144		0.025	0.015	0.027	0.01 J-EMPC
145		0.0009 U	0.0013 U	0.0011 U	0.0011 U
146		0.161	0.061	0.156	0.059
147	147 + 149	0.634 C	0.322 C	0.644 C	0.288 C
148		0.001 J-EMPC	0.0016 U	0.0013 U	0.0014 U
149	147 + 149	C147	C147	C147	C147
150		0.001 J-EMPC	0.0012 U	0.002 J-EMPC	0.0011 U
151	135 + 151 + 154	C135	C135	C135	C135
152		0.0008 U	0.001 J-EMPC	0.001 U	0.001 U
153	153 + 168	1.18 C	0.406 C	1.19 C	0.327 C
154	135 + 151 + 154	C135	C135	C135	C135
155		0.003 U	0.001 U	0.003 U	0.012 U
156	156 + 157	0.094 C	0.036 C U	0.099 C	0.032 C U
157	156 + 157	C156	C156	C156	C156
158		0.074	0.031	0.073	0.027
159		0.005 J-EMPC	0.002 J-EMPC	0.008	0.002
160	129 + 138 + 160 + 163	C129	C129	C129	C129
161		0.0031 U	0.0024 U	0.0019 U	0.0009 U
162		0.0032 U	0.0023 U	0.003 J-EMPC	0.002 J-EMPC
163	129 + 138 + 160 + 163	C129	C129	C129	C129
164		0.048 J-EMPC	0.022	0.044	0.022
165		0.0034 U	0.0027 U	0.0022 U	0.0011 U
166	128 + 166	C128	C128	C128	C128
167		0.057	0.018 U	0.056	0.015 U
168	153 + 168	C153	C153	C153	C153
169		0.0034 U	0.0024 U	0.002 U	0.001 U
170		0.106	0.025 U	0.132	0.022 U
171	171 + 173	0.04 C J-EMPC	0.009 C	0.05 C	0.01 C
172		0.024	0.006	0.025	0.005 J-EMPC
173	171 + 173	C171	C171	C171	C171
174		0.108	0.036	0.128	0.034
175		0.009	0.002 J-EMPC	0.009 J-EMPC	0.0011 U
176		0.017 J-EMPC	0.005	0.02	0.006 J-EMPC
177		0.09	0.023	0.104	0.024
178		0.033 J-EMPC	0.012 J-EMPC	0.044 J-EMPC	0.012
179		0.068	0.019	0.068	0.022 J-EMPC
180	180 + 193	0.321 C	0.105 C	0.369 C	0.087 C
181		0.002	0.0015 U	0.002 J-EMPC	0.0011 U
182		0.0008 U	0.0015 U	0.001 U	0.003 U
183	183 + 185	0.119 C	0.032 C	0.131 C	0.03 C
184		0.002 J-EMPC	0.0012 U	0.001	0.001
185	183 + 185	C183	C183	C183	C183
186		0.0008 U	0.0012 U	0.001 U	0.0009 U
187		0.276	0.09	0.319	0.105
188		0.002 U	0.0011 U	0.001 U	0.006 U
189		0.004 U	0.0021 U	0.006 U	0.002 U
190		0.043 J-EMPC	0.008	0.045	0.007 J-EMPC
191		0.005 J-EMPC	0.0012 U	0.001 U	0.0009 U
192		0.0008 U	0.0013 U	0.0011 U	0.001 U
193	180 + 193	C180	C180	C180	C180
194		0.048	0.029	0.054	0.019 J-EMPC
195		0.018	0.009	0.029	0.005
196		0.031	0.03	0.036	0.016
197	197 + 200	0.01 C	0.009 C	0.014 C J-EMPC	0.006 C
198	198 + 199	0.075 C	0.086 C	0.093 C	0.054 C
199	198 + 199	C198	C198	C198	C198
200	197 + 200	C197	C197	C197	C197
201		0.008	0.008	0.012	0.005
202		0.021	0.015 U	0.024 J-EMPC	0.016 U
203		0.064	0.076	0.084	0.037
204		0.001 J-EMPC	0.0013 U	0.0008 U	0.0009 U
205		0.004 U	0.002 U	0.004 U	0.002 U
206		0.039	0.04	0.047	0.027 J-EMPC
207		0.007 J-EMPC	0.013	0.007	0.005 U
208		0.02 U	0.027	0.022 U	0.015 U
209		0.048	0.016 U	0.062	0.012 U
Total PCBs ² (pg/L)		21.0	109	22.5	149
Total PCBs - Filter+Column (pg/L)			130		172

Notes:

All congener results are in units of pg/L (picograms/Liter)

PCBs = Polychlorinated Biphenyls

MDL = Method detection limit

MRL = Method reporting limit

Axys = Axys Analytical Services

C = concentration represents coeluting congeners

U = The analyte was not detected at or above the Axys MDL. The non-detect values reported in this table are Axys MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

J = The reported value is an estimate.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

J-EMPC = The analyte was not positively identified; the associated numerical value is the Estimated Maximum Potential Concentration.

1= When two or more congeners can not be resolved in the chromatogram they are considered to be 'coeluting' and are reported as a single concentration. This concentration is reported once for all the coeluting congeners, to eliminate possible errors during congener summation.

2=Total PCBs are calculated by summing all 209 congeners, excluding results flagged as U, UJ, or J-EMPC.

Table 36
Infiltrax High Volume Water PCB Congener Analysis Results - Stations 60 and 61
Bradford Island - Remedial Investigation
Post-Removal Action Samples
February/March 2008 Sampling Event

IUPAC #	COELUTING CONGENERS ¹	08030460XAD L11001-9 (Filter)	08030460XAD L10998-9 (Column)	08030661XAD L11001-10 (Filter)	08030661XAD L10998-10 (Column)
119	86 + 87 + 97 + 108 + 119 + 125	C86	C86	C86	C86
120		0.004	0.002 J-EMPC	0.002	0.002 J-EMPC
121		0.0014 U	0.0016 U	0.0011 U	0.0018 U
122		0.009	0.005 J-EMPC	0.008	0.0066 U
123		0.026 U	0.014 U	0.026 U	0.011 U
124	107 + 124	C107	C107	C107	C107
125	86 + 87 + 97 + 108 + 119 + 125	C86	C86	C86	C86
126		0.008 U	0.0041 U	0.008 U	0.007 U
127		0.0051 U	0.0041 U	0.0041 U	0.0064 U
128	128 + 166	0.146 C	0.045 C	0.156 C	0.049 C
129	129 + 138 + 160 + 163	1.28 C	0.381 C	1.11 C	0.388 C
130		0.057	0.02	0.058	0.021
131		0.012 J-EMPC	0.003 J-EMPC	0.01 J-EMPC	0.005
132		0.226	0.091	0.247	0.106
133		0.013	0.004 U	0.017	0.007 U
134	134 + 143	0.032 C	0.016 C	0.035 C	0.019 C
135	135 + 151 + 154	0.278 C	0.127 C	0.285 C	0.128 C
136		0.071	0.035	0.07	0.036
137		0.047	0.01	0.048	0.017
138	129 + 138 + 160 + 163	C129	C129	C129	C129
139	139 + 140	0.016 C	0.005 C J-EMPC	0.016 C	0.007 C J-EMPC
140	139 + 140	C139	C139	C139	C139
141		0.116	0.037	0.122	0.042 J-EMPC
142		0.0042 U	0.0023 U	0.0034 U	0.0019 U
143	134 + 143	C134	C134	C134	C134
144		0.027	0.015	0.033	0.015
145		0.0008 U	0.0006 U	0.0008 U	0.0009 U
146		0.183	0.063	0.167	0.063
147	147 + 149	0.778 C	0.298 C	0.725 C	0.307 C
148		0.0008 U	0.0008 U	0.002	0.0011 U
149	147 + 149	C147	C147	C147	C147
150		0.0008 U	0.002 J-EMPC	0.001 J-EMPC	0.0008 U
151	135 + 151 + 154	C135	C135	C135	C135
152		0.0008 U	0.001 J-EMPC	0.0008 U	0.0008 U
153	153 + 168	1.52 C	0.356 C	1.26 C	0.402 C
154	135 + 151 + 154	C135	C135	C135	C135
155		0.004 U	0.001 U	0.003 U	0.002 U
156	156 + 157	0.115 C	0.03 C U	0.104 C	0.034 C U
157	156 + 157	C156	C156	C156	C156
158		0.083	0.025	0.084	0.031
159		0.005	0.0017 U	0.007 J-EMPC	0.002
160	129 + 138 + 160 + 163	C129	C129	C129	C129
161		0.003 U	0.0016 U	0.0024 U	0.0013 U
162		0.0031 U	0.0018 U	0.003 J-EMPC	0.0014 U
163	129 + 138 + 160 + 163	C129	C129	C129	C129
164		0.053	0.02	0.055	0.021
165		0.0033 U	0.0019 U	0.0027 U	0.0015 U
166	128 + 166	C128	C128	C128	C128
167		0.07	0.016 U	0.06	0.018 U
168	153 + 168	C153	C153	C153	C153
169		0.0032 U	0.0016 U	0.0024 U	0.0014 U
170		0.123	0.019 U	0.14	0.02 U
171	171 + 173	0.054 C	0.009 C	0.054 C	0.005 C J-EMPC
172		0.027	0.006 J-EMPC	0.031	0.005
173	171 + 173	C171	C171	C171	C171
174		0.131	0.031	0.145	0.033
175		0.008 J-EMPC	0.001 J-EMPC	0.008	0.002
176		0.021	0.0005 U	0.02	0.004 J-EMPC
177		0.112	0.021	0.11	0.024
178		0.042	0.011	0.037	0.009
179		0.077	0.018	0.07	0.018
180	180 + 193	0.392 C	0.07 C J-EMPC	0.389 C	0.078 C
181		0.002 J-EMPC	0.0008 U	0.002 J-EMPC	0.001 U
182		0.003 U	0.001 U	0.0008 U	0.001 U
183	183 + 185	0.142 C	0.026 C	0.122 C	0.031 C
184		0.002 J-EMPC	0.001 J-EMPC	0.002 J-EMPC	0.0007 U
185	183 + 185	C183	C183	C183	C183
186		0.0008 U	0.0006 U	0.0008 U	0.0008 U
187		0.349	0.09	0.323	0.098
188		0.003 U	0.001 U	0.001 U	0.0007 U
189		0.004 U	0.002 U	0.005 U	0.0014 U
190		0.048	0.008	0.05 J-EMPC	0.01
191		0.007	0.001 J-EMPC	0.006	0.002 J-EMPC
192		0.0008 U	0.0006 U	0.0008 U	0.0009 U
193	180 + 193	C180	C180	C180	C180
194		0.052	0.01	0.069	0.016 J-EMPC
195		0.024	0.004 J-EMPC	0.033	0.005 J-EMPC
196		0.036	0.009 J-EMPC	0.041	0.011
197	197 + 200	0.013 C J-EMPC	0.004 C	0.013 C	0.007 C
198	198 + 199	0.087 C	0.029 C	0.096 C	0.046 C
199	198 + 199	C198	C198	C198	C198
200	197 + 200	C197	C197	C197	C197
201		0.01 J-EMPC	0.004	0.013 J-EMPC	0.006 J-EMPC
202		0.028 J-EMPC	0.008 U	0.029	0.01 U
203		0.078	0.021	0.073	0.032
204		0.0008 U	0.0006 U	0.0008 U	0.0008 U
205		0.005 U	0.001 U	0.006 U	0.002 U
206		0.056	0.01	0.048	0.014 J-EMPC
207		0.006	0.0037 U	0.007 J-EMPC	0.005 J-EMPC
208		0.021 U	0.007 U	0.02 U	0.011 U
209		0.064	0.01 U	0.062	0.009 U
Total PCBs ² (pg/L)		26.5	145	25.4	123
Total PCBs - Filter+Column (pg/L)			172		148

Notes:

All congener results are in units of pg/L (picograms/Liter)

PCBs = Polychlorinated Biphenyls

MDL = Method detection limit

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Axys = Axys Analytical Services

C = concentration represents coeluting congeners

U = The analyte was not detected at or above the Axys MDL. The non-detect values reported in this table are Axys MRLs. If an analyte was detected above the MDL, but below the MRL, that analyte was qualified and flagged 'J'.

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1= When two or more congeners can not be resolved in the chromatogram they are considered to be 'coeluting' and are reported as a single concentration. This concentration is reported once for all the coeluting congeners, to eliminate possible errors during congener summation.

2=Total PCBs are calculated by summing all 209 congeners, excluding results flagged as U, UJ, or J-EMPC.

RIVER OPERABLE UNIT REMEDIAL INVESTIGATION REPORT

QUALITY CONTROL SUMMARY REPORT FOR ANALYTICAL CHEMISTRY

SEDIMENT – FEBRUARY/MARCH 2008 SAMPLING EVENT

JULY 2008

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TABLES

Table 1 Sediment Sample ID and Analysis Summary Following Report
Table 2 Sediment Qualifier Summary Following Report

1.0 Executive Summary

The overall assessment of the sediment sample results shows the quality of the data is acceptable to support project objectives. The contracted laboratory provided results for all requested analyses and laboratory data reports were complete. Some data were qualified as estimated and flagged 'J' or 'UJ'. Some data were qualified as not detected and flagged '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 River Operable Unit Remedial Investigation Report.

2.0 Project Description

URS collected and authorized analysis of 45 sediment samples during the remedial investigation near Bradford Island at Bonneville Dam between February 11 and March 20, 2008. Table 1 summarizes the sample locations, media, URS and analytical laboratory identification numbers and the requested analyses.

3.0 Sampling and Analytical Procedures

Samples were collected according to the Quality Assurance Project Plan (QAPP) *River Operable Unit Remedial Investigation* (URS 2007). Deviations from the QAPP (i.e. number and volume per each pre-determined sample location) are addressed in the Post-Removal Sample Collection Memorandum (URS 2008). Deviations in sample locations and sample size do not affect data usability. All sediment samples were submitted to Columbia Analytical Services (CAS) located in Kelso, WA and were assigned to one of three CAS sample delivery group identification numbers (K0801328, K0801769, or K0802371). Not all samples logged in under these sample delivery groups were authorized for analysis (i.e. only samples meeting project criteria were selected for analysis). Sediment was submitted in laboratory-provided 8oz glass containers, and each sample consisted of two to ten sample containers depending on availability of sample media at each location. CAS composited and homogenized all sample containers from each location using a mechanical mixer prior to subaliquoting for individual analyses. The remaining sediment is archived (frozen to -20°C) at CAS for potential future analyses.

The following table lists the parameters analyzed on one or more of the samples. Table 1 summarizes the specific requested analyses for each sample by URS and laboratory identification numbers.

Method	Analytical Parameter
EPA 8082M	Polychlorinated Biphenyls (PCBs) as Aroclors
EPA 6000/7000 series	Metals
EPA 8270C	Semi-Volatile Organic Compounds (SVOCs)
NWTPH-Dx (Ecology 1997)	Northwest Total Petroleum Hydrocarbons – Diesel and Residual Range (NWTPH-Dx)

Method	Analytical Parameter
Plumb (Plumb 1981)	Total Organic Carbon (TOC)
Gravimetric (EPA 1983)	Percent Solids
PSEP (PSEP 1996)	Grain Size

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, initial and continuing calibrations, quantitation limits, 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 for 15% or greater of the data: 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 2007). The data results were reviewed in accordance with the criteria specified in the DoD QSM (DoD 2006), 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 (URS 2007).

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 included in the main body of this 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 value 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

URS frequently submitted sediment samples to CAS throughout the six-week collection period. CAS archived all sample sediment by freezing to -20°C until authorization was given by URS to begin homogenization and analysis. The chain-of-custody (COC) forms indicate that samples were maintained under proper chain-of-custody and forms were signed upon release and receipt. All samples were sent via CAS courier in wet ice 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. Due to the length of the sampling event (six weeks) and the multitude of COC forms for sediment, CAS has included COC forms for the entire sampling event but not in every deliverable, therefore the COC forms must be evaluated concurrently for the three sediment sample delivery groups. Additionally, one of the COC forms associated with sample delivery group K0802371 was inadvertently left out, URS received this COC form from CAS as part of the sample confirmation and it is acceptable. It has been included as an addendum to the original K0802371 data deliverable.

The sample dates for the following three samples were misreported within the data reports, listed below and in Table 1 are the correct sample collection dates.

- K0801328-003 – February 11, 2008
- K0802371-015 – March 11, 2008
- K0802371-016 – March 11, 2008

Holding times listed in the QAPP were not explicit in specifying times for samples archived frozen with the exception of PCBs. Holding times listed in the Washington State Department of Ecology's document *The Development of Sediment Sampling and Analysis Plans* (Ecology 2008) were used for comparison (as shown below).

Quality Control Summary Report

Analytical Parameter	Hold Time (Table 10, Ecology 2008)
Polychlorinated Biphenyls (PCBs)	1 year (Frozen, -18°C) (as reported in QAPP)
Metals	1 year (Frozen, -18°C)
Mercury	28 days (Frozen, -18°C)
Semi-Volatile Organic Compounds (SVOCs)	1 year (Frozen, -18°C)
Northwest Total Petroleum Hydrocarbons – Diesel Range (NWTPH-Dx)	6 months (Frozen, -18°C)
Total Organic Carbon (TOC)	6 months (Frozen, -18°C)
Percent Solids	6 months (Frozen, -18°C)
Grain Size	6 months (4°C) (as reported in QAPP)

All sediment samples were analyzed within the above-listed holding times with the following exception:

- The 28-day hold time for mercury was exceeded for sample K0801328-003 by one day and sample K0802371-009 by three days. These sample results were flagged 'J' due to hold time exceedance.

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 performed with the following exception:

- One of the five CCALs for Aroclor 1016 measured on the confirmation column exceeded the DoD QSM percent difference (%D) limits of $\pm 20\%$ in the ICAL value at 21%. The CCAL for the primary column and the remaining four CCALs (primary and confirmation columns) were acceptable. Aroclor 1016 was not detected in any associated project samples in this sequence. No qualifiers were assigned to the data based on this ICAL.

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 batch, per QAPP requirements. Field blanks were not collected as part of this analytical program. Qualification of samples due to method blank contamination followed guidelines set forth in the EPA NFGs.

Organic sample results less than five times (5x) and inorganic sample results (or common laboratory organic contaminants such as phthalates) less than ten times (10x) the method 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 for phthalates) the blank concentration but above the MRL, the reported result was qualified as non-detect and flagged '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. For solid matrices reported in both wet and dry weight concentrations, the above-noted guidelines were applied using the wet weight results and any qualifiers assigned were also assigned to the dry weight results. All analytes were reported as not detected in the associated method blanks with the following exceptions:

- Residual range organics (RRO) were detected in the method blank associated with sample delivery group K0802371. All associated sample results were detected at concentrations less than 5x the method blank concentration and between the MRL and MDL and were flagged 'U' at the MRL.
- Di-n-butyl phthalate, butyl benzyl phthalate and bis(2-ethylhexyl) phthalate were detected in the method blanks associated with sample delivery groups K0802371 and K0801328. All samples had at least one of these phthalates detected at concentrations less than 10x the method blank concentrations. The associated results were flagged 'U' according to the criteria outlined above (see Table 2 for specific analytes in each sample).
- Metals (aluminum, cadmium, cobalt, copper, lead, thallium) were detected at concentrations between the MDL and the MRL in the method blank associated with sample delivery group K0802371. All sample results were greater than 10x the method blank concentrations with the exceptions of cadmium in samples K0802371-005, K0802371-007, K0802371-008 and K0802371-010 and thallium in samples K0802371-002, K0802371-005, K0802371-006, K0802371-007 and K0802371-008, K0802371-010 and K0802371-013. These results were flagged 'U' according to the criteria outlined above (see Table 2).
- Copper was detected in the method blank associated with sample delivery group K0801328 at a concentration between the MDL and the MRL. All sample results were more than 10x the method blank concentration; therefore, data were not qualified based on this method blank detection.
- Aluminum and thallium were detected in the method blank associated with sample delivery group K0801769. Thallium was detected at a concentration between the MDL and the MRL and aluminum was detected at a concentration above the MRL. All sample concentrations were more than 10x the method blank concentration; therefore, data were not qualified based on this method blank detection.

- TPH results associated with sample delivery group K0801769 were analyzed in two extraction batches. Method blanks associated with both extraction batches had detections between the MDLs and the MRLs. Extraction batch KWG0803324 had a detection of diesel range organics (DRO). All associated DRO results were more than 5x the method blank concentration; therefore, data were not qualified based on this method blank detection. Extraction batch KWG0803155 had a detection of residual range organics (RRO). Samples K0801769-009, K0801769-011, K0801769-023, K0801769-029, and K0801769-030 had RRO concentrations less than 5x the method blank concentration and were flagged 'U' at the respective MRLs.

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, PAHs and/or 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 SVOC surrogate recovery for 2-fluorobiphenyl in sample K0801769-018 was below the lower DoD QSM limit of 45% at 39%. While above the lower control limits, surrogate recoveries for phenol-d6 and nitrobenzene-d5 were comparatively low with recoveries of 43% and 41% respectively, in this sample. All detected SVOC results in sample K0801769-018 were previously flagged 'J' by the laboratory due to detections between the MDL and the MRL. All SVOCs reported as not detected in this sample were qualified as estimated and flagged 'UJ' based on low recoveries for three of the four surrogate compounds. These low recoveries appear to be isolated within this single 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 were performed for each analysis and for each batch per method requirements.

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

- The percent recoveries for antimony in all three of the of the MS/MSD pairs associated with the three sample delivery groups were below lower DoD QSM control limit of 80%.
 - K0802371-001: MS/MSD = 44% and 30%, respectively.
 - K0801328-004: MS/MSD = 36.5% and 40.7%, respectively.
 - K0801769-021: MS/MSD = 41.5% and 43.3%, respectively.

All associated LCS and post-digestion spike recoveries indicate analytical batches were in control. All associated antimony results were reported at concentrations between the MDL and the MRL and are flagged 'J.' Further qualification is not required; however, the antimony concentrations represented in these samples are potentially biased low.

- The percent recovery for aluminum in the MS performed on sample K0801769-21 exceeded DoD QSM criteria; however, the aluminum concentration in this sample was greater than 4x the spike concentration, thereby preventing accurate evaluation of the spike recovery. The data were not qualified based on MS recoveries for aluminum.
- The percent recoveries for mercury and vanadium in the MSD performed on sample K0801769-21 exceeded DoD QSM criteria. The percent recoveries in the MS and post-digestion spike and the relative percent differences (RPDs) for the MS/MSD pair were within acceptance criteria. The samples were not qualified based on these MSD recoveries.
- The percent recoveries for many SVOCs in the MS performed on sample K0802371-013 were low. The percent recoveries in the MSD were all within control limits; however, due to the low MS recoveries, the RPDs for the MS/MSD pair are above the DoD QSM control limit. The MS recovery losses appear to be isolated to this single MS and appear to be an error in the MS sampling and not a matrix interference because the MSD recoveries are acceptable for sample K0802371-013. Data was not qualified based on the MS or RPD recoveries.
- The percent recoveries for acenaphthene, fluorene, anthracene, and fluoranthene were below the DoD QSM lower limits in the MS performed on sample K0801769-021. The percent recoveries in the MSD and RPDs for MS/MSD pair were within the control limits. Fluorene and fluoranthene also had low recoveries in the associated LCS (as stated below). Only fluorene and fluoranthene were qualified and flagged 'UJ' in sample K0801769-021 based on the low MS recoveries and low LCS recoveries for this QC batch. Acenaphthene and anthracene were not qualified solely on MS recoveries.
- The LCS associated with K0801769 had percent recoveries below the DoD QSM lower limits for fluorene, di-n-butyl phthalate and fluoranthene. The results for these analytes were qualified as estimated and flagged 'J' or 'UJ' for all samples in sample delivery group K0801769 unless previously qualified as estimated based on reported concentrations between the associated MDLs and MRLs.

4.6 Duplicate Review

Field duplicates were not collected during this sampling event due to the statistical nature of the sampling event (as discussed in detail in the QAPP). To evaluate laboratory precision, CAS performed duplicate analyses (i.e. LCS/LCSD and MS/MSD) as discussed above. All values were acceptable with the following exceptions:

- The RPD for bis(2-ethylhexyl) phthalate for the MS/MSD pair performed on sample K0801769-021 was outside the 30% control limit at 62%. This analyte was previously qualified as estimated and flagged with a 'J' due to the concentration between the MDL and the MRL. Further qualification is not required based on the RPD.
- The RPDs for pyrene and indeno(1,2,3-cd)pyrene for the LCS/LCSD pair associated with sample delivery group K0801769 were above the 30% DoD QSM control limit at 36% and 32%, respectively. All associated detections for pyrene in this sample delivery group with the exception of K0801769-029 were previously flagged 'J' due to detections between the MDL and the MRL. Further qualification of these results was unnecessary. The result for pyrene in sample K0801769 -029 was qualified as estimated and flagged 'J'. All reported concentrations for indeno(1,2,3-cd)pyrene were likewise previously qualified as estimated and flagged with a 'J' due to detections between the MDL and the MRL. Results reported as not detected were qualified as estimated and flagged 'UJ'.

4.7 Compound Quantification

All second column confirmation performed by CAS on Method 8082 were acceptable.

4.8 Reporting Limits

If sample concentrations were detected below the MRL but above the MDL, they were qualified as estimated by the laboratory and flagged with a 'J'. All laboratory J-flagged results are considered estimates. 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.

5.0 Completeness

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

The electronic and portable delivery format (.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 useable results/total reported results) x100
= (2,315 compliant / 2,315 total results) = 100%

All samples results are considered useable.

- *Analytical Completeness* = (number of unqualified results/total reported results) x100
= (2162 compliant / 2,315 total results) = 93%

Data were qualified non-detect 'U' and some as estimated 'UJ' or 'J'. 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
= (2,313 compliant / 2,315 total results) = 99%

All samples analyzed met laboratory contract requirements with the exception of two samples analyzed outside of the 28 day hold time for mercury. Due to the staged sampling event, sample authorization was not given to CAS until a few days prior to the hold time expiration for these samples.

- *Field Sampling Completeness* = (number samples collected/total reported results) x100
= (45 compliant / 45 total results) = 100%

All samples collected and submitted to CAS for analysis had a complete set of results. All samples had sufficient sample volume to analyze the full analyte list as detailed in the QAPP.

6.0 References

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PSEP 1996. Puget Sound Estuary Program *Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound*, January 1996 and subsequent chapter revisions.

URS 2008. Memorandum: *Post-Removal Sample Collection*, Bradford Island Disposal Site, Bonneville Dam Forebay – Cascade Locks, Oregon May 12, 2008

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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. Sediment Sample ID and Analysis Summary

Quality Control Summary Report for Analytical Chemistry

February/March 2008 Sampling Event

Station	URS ID	DATE COLLECTED	CAS ID	Anaytes						
				PCB (Aroclors)	SVOCs	Metals	TPH-Dx	%Solids	TOC	Grain Size
Sediment - Forebay										
4	08022604SD	26-Feb	K0801328-022	X	X	X	X	X	X	X
7	08021507SD	15-Feb	K0801328-007	X	X	X	X	X	X	X
8	08021508SD	15-Feb	K0801328-009	X	X	X	X	X	X	X
9	08021409SD	14-Feb	K0801328-004	X	X	X	X	X	X	X
10	08021410SD	14-Feb	K0801328-005	X	X	X	X	X	X	X
11	08021411SD	14-Feb	K0801328-006	X	X	X	X	X	X	X
15	08022115SD	21-Feb	K0801328-012	X	X	X	X	X	X	X
16	08022116SD	21-Feb	K0801328-013	X	X	X	X	X	X	X
17	08022117SD	21-Feb	K0801328-011	X	X	X	X	X	X	X
18	08021118SD	11-Feb	K0801328-003	X	X	X	X	X	X	X
21	08021221SD	12-Feb	K0801328-002	X	X	X	X	X	X	X
5	08031905SD	19-Mar	K0802371-005	X	X	X	X	X	X	X
6	08031806SD	18-Mar	K0802371-006	X	X	X	X	X	X	X
13	08031713SD	17-Mar	K0802371-001	X	X	X	X	X	X	X
14	08031814SD	18-Mar	K0802371-004	X	X	X	X	X	X	X
65	08022965SD	29-Feb	K0802371-009	X	X	X	X	X	X	X
67	08030367SD	3-Mar	K0802371-010	X	X	X	X	X	X	X
88	08031788SD	17-Mar	K0802371-003	X	X	X	X	X	X	X
89	08031789SD	17-Mar	K0802371-002	X	X	X	X	X	X	X
Sediment - Reference Area										
22	08030522SD	5-Mar	K0801769-010	X	X	X	X	X	X	X
24	08030524SD	5-Mar	K0801769-011	X	X	X	X	X	X	X
26	08030426SD	4-Mar	K0801769-005	X	X	X	X	X	X	X
27	08030427SD	4-Mar	K0801769-006	X	X	X	X	X	X	X
28	08030428SD	4-Mar	K0801769-007	X	X	X	X	X	X	X
29	08022229SD	22-Feb	K0801769-021	X	X	X	X	X	X	X
34	08022534SD	25-Feb	K0801769-024	X	X	X	X	X	X	X
35	08022535SD	25-Feb	K0801769-023	X	X	X	X	X	X	X
36	08022536SD	25-Feb	K0801769-022	X	X	X	X	X	X	X
37	08022637SD	26-Feb	K0801769-025	X	X	X	X	X	X	X
38	08022738SD	27-Feb	K0801769-026	X	X	X	X	X	X	X
39	08022739SD	27-Feb	K0801769-027	X	X	X	X	X	X	X
40	08022740SD	27-Feb	K0801769-028	X	X	X	X	X	X	X
41	08022741SD	27-Feb	K0801769-029	X	X	X	X	X	X	X
42	08022742SD	27-Feb	K0801769-030	X	X	X	X	X	X	X
85	08030685SD	6-Mar	K0801769-017	X	X	X	X	X	X	X
86	08030686SD	6-Mar	K0801769-009	X	X	X	X	X	X	X
87	08030687SD	6-Mar	K0801769-018	X	X	X	X	X	X	X
Sediment - Downstream										
46	08031046SD	10-Mar	K0802371-011	X	X	X	X	X	X	X
47	08031047SD	10-Mar	K0802371-012	X	X	X	X	X	X	X
48	08031048SD	10-Mar	K0802371-013	X	X	X	X	X	X	X
49	08031049SD	10-Mar	K0802371-014	X	X	X	X	X	X	X
50	08031150SD	11-Mar	K0802371-015	X	X	X	X	X	X	X
51	08031151SD	11-Mar	K0802371-016	X	X	X	X	X	X	X
Sediment - Eagle Creek										
43	08032043SD	20-Mar	K0802371-007	X	X	X	X	X	X	X
44	08032044SD	20-Mar	K0802371-008	X	X	X	X	X	X	X

Table 2. Sediment Qualifer Summary
Quality Control Summary Report for Analytical Chemistry
February/March 2008 Sampling Event

CAS ID	URS ID	Station Number	Analyte	Qualifer	Rational
K0801328-003	08021118SD	18	mercury	J	Hold time
K0802371-009	08022965SD	65			
K0802371-005	08031905SD	5	cadmium	0.121U	MB detection
K0802371-007	08032043SD	43		0.75U	
K0802371-008	08032044SD	44		0.131U	
K0802371-010	08030367SD	67		0.115U	
K0802371-002	08031789SD	89	thallium	0.113U	MB detection
K0802371-005	08031905SD	5		0.108U	
K0802371-006	08031806SD	6		0.132U	
K0802371-007	08032043SD	43		0.156U	
K0802371-008	08032044SD	44		0.122U	
K0802371-010	08030367SD	67		0.130U	
K0802371-013	08031048SD	48		0.122U	
K0802371-002	08031789SD	89	di-n-butyl phthalate butyl benzyl phthalate bis (2-ethylhexyl) phthalate	14U 9.8U 200U	MB detection
K0802371-003	08031788SD	88		14U 9.8U 200U	
K0802371-004	08031814SD	14		10U 7.3U 150U	
K0802371-005	08031905SD	5		11U 7.2U 150U	
K0802371-006	08031806SD	6		6.8U 6.8U 140U	
K0802371-007	08032043SD	43		6.8U 6.8U 140U	
K0802371-008	08032044SD	44		7.7U 6.9U 140U	
K0802371-010	08030367SD	67		8.3U 7.3U 150U	
K0802371-014	08031049SD	49		7.0U 6.8U 140U	
K0802371-001	08031713SD	13		di-n-butyl phthalate bis (2-ethylhexyl) phthalate	
K0802371-009	08022965SD	65	6.9U 140U		
K0802371-011	08031046SD	46	7.9U 150U		
K0802371-012	08031047SD	47	7.6U 140U		

Table 2. Sediment Qualifer Summary
Quality Control Summary Report for Analytical Chemistry
February/March 2008 Sampling Event

CAS ID	URS ID	Station Number	Analyte	Qualifer	Rational
K0802371-013	08031048SD	48	di-n-butyl phthalate bis (2-ethylhexyl) phthalate	10U 140U	MB detection
K0802371-015	08031150SD	50		5.6U 120U	
K0802371-016	08031151SD	51		6.8U 140U	
K0801328-002	08021221SD	21		10U 200U	
K0801328-003	08021118SD	18		10U 200U	
K0801328-004	08021409SD	9		9.9U 200U	
K0801328-005	08021410SD	10		9.9U 200U	
K0801328-006	08021411SD	11		10U 200U	
K0801328-007	08021507SD	7		9.9U 200U	
K0801328-009	08021508SD	8		9.8U 200U	
K0801328-011	08022117SD	17		10U 200U	
K0801328-012	08022115SD	15	di-n-butyl phthalate	10U	MB detection
K0801328-013	08022116SD	16		9.9U	
K0801328-022	08022604SD	4		10U	
K0802371-001	08031713SD	13	Residual Range Organics (RRO)	180U	MB detection
K0802371-002	08031789SD	89		150U	
K0802371-003	08031788SD	88		130U	
K0802371-004	08031814SD	14		140U	
K0802371-005	08031905SD	5		140U	
K0802371-006	08031806SD	6		150U	
K0802371-007	08032043SD	43		150U	
K0802371-008	08032044SD	44		150U	
K0802371-009	08022965SD	65		150U	
K0802371-010	08030367SD	67		140U	
K0802371-011	08031046SD	46		140U	
K0802371-012	08031047SD	47		140U	
K0802371-013	08031048SD	48		150U	
K0802371-014	08031049SD	49		150U	
K0802371-015	08031150SD	50		180U	
K0802371-016	08031151SD	51		150U	
K0801769-009	08030686SD	86		180U	
K0801769-011	08030524SD	24		180U	
K0801769-023	08022535SD	35		160U	
K0801769-029	08022741SD	41		150U	
K0801769-030	08022742SD	42	150U		
K0801769-018	08030687SD	87	SVOCs	J/UJ	Surrogate Recovery

Table 2. Sediment Qualifer Summary
 Quality Control Summary Report for Analytical Chemistry
 February/March 2008 Sampling Event

CAS ID	URS ID	Station Number	Analyte	Qualifer	Rational
K0801769-021	08022229SD	29	fluorene fluoranthene	J/UJ	MS recovery
K0801769-005	08030426SD	26	fluorene di-n-butyl phthalate fluoranthene	J/UJ	LCS recovery
K0801769-006	08030427SD	27			
K0801769-007	08030428SD	28			
K0801769-009	08030686SD	86			
K0801769-010	08030522SD	22			
K0801769-011	08030524SD	24			
K0801769-017	08030685SD	85			
K0801769-018	08030687SD	87			
K0801769-021	08022229SD	29			
K0801769-022	08022536SD	36			
K0801769-023	08022535SD	35			
K0801769-024	08022534SD	34			
K0801769-025	08022637SD	37			
K0801769-026	08022738SD	38			
K0801769-027	08022739SD	39			
K0801769-028	08022740SD	40			
K0801769-029	08022741SD	41			
K0801769-030	08022742SD	42			
K0801769-029	08022741SD	41	Pyrene	J	LCS/LCSD RPD
K0801769-009	08030686SD	86	indeno(1,2,3-cd) pyrene	UJ	LCS/LCSD RPD
K0801769-010	08030522SD	22			
K0801769-011	08030524SD	24			
K0801769-017	08030685SD	85			
K0801769-021	08022229SD	29			
K0801769-024	08022534SD	34			
K0801769-027	08022739SD	39			
K0801769-028	08022740SD	40			
K0801769-030	08022742SD	42			

Notes:

Not included are laboratory-assigned J flags indicating detections above the MDL and below the MRL.
 Concentrations are reported in dry wet.

RIVER OPERABLE UNIT REMEDIAL INVESTIGATION REPORT

QUALITY CONTROL SUMMARY REPORT FOR ANALYTICAL CHEMISTRY

CLAM AND CRAYFISH TISSUE – FEBRUARY/MARCH 2008 SAMPLING EVENT

JULY 2008

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TABLES

Table 1 Clam and Crayfish Sample ID and Analysis Summary Following Report
Table 2 Clam and Crayfish Qualifier Summary Following Report

1.0 Executive Summary

The overall assessment of the tissue sample results shows the quality of the data is acceptable to support project objectives. The contracted laboratories 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 River Operable Unit Remedial Investigation Report.

2.0 Project Description

URS collected and authorized analysis of 36 crayfish and 37 clam samples (for a total of 73 tissue samples) during the remedial investigation near Bradford Island at Bonneville Dam between February 11 and March 19, 2008. Table 1 summarizes the sample locations, media, URS and analytical laboratory identification numbers, and the requested analyses.

3.0 Sampling and Analytical Procedures

Samples were collected according to the Quality Assurance Project Plan (QAPP) *River Operable Unit Remedial Investigation* (URS 2007). Deviations from the sampling collection (i.e. number and volume per each pre-determined sample location) are addressed in the Post-Removal Sample Collection Memorandum (URS 2008). Deviations in sample locations and sample size do not affect data usability. Three crayfish samples (08021902CF, 08022003CF and 080314105CF) had insufficient sample volume to complete SVOC and PAH analyses as indicated in Table 1. The remaining 70 tissue samples had sufficient volume to analyze those analytes listed in the QAPP.

All samples were submitted to Columbia Analytical Services (CAS) located in Kelso, WA and logged in by the laboratory under five CAS sample delivery groups (K0801325, K0801458, K0801772, K0802375 and K0802503). Not all samples logged in under these sample delivery groups were authorized for analysis (i.e only tissue samples meeting project criteria were selected for analysis). The following table lists the parameters analyzed on one or more of the samples. Table 1 summarizes the specific analyses requested for each sample by URS and the corresponding laboratory identification numbers. (Note: SVOCs and PAHs were analyzed separately for tissue matrices and are discussed separately in this report).

Method	Analytical Parameter
EPA 8082M	Polychlorinated Biphenyls (PCBs) as Aroclors
EPA 6000/7000 series	Metals

Method	Analytical Parameter
EPA 1631-Modified	Methyl Mercury
EPA 8270C-SIM	Semi-Volatile Organic Compounds (SVOCs)
EPA 8270C-SIM	Polynuclear Aromatic Hydrocarbons (PAHs)
Puget Sound Estuary Program (PSEP 1996)	Percent Lipids
Freeze Dry	Percent Solids

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, initial and continuing calibrations, quantitation limits, 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: 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 2007). 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 above-mentioned 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 included 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

Clam samples were stored on ice prior to shucking by URS and then archived by freezing to -20°C in laboratory-provided 16oz glass containers prior submission to CAS. Crayfish were euthanized by freezing, and then they were weighed and measured prior to submission to CAS in laboratory-provided 16oz glass containers. URS frequently submitted both clam and crayfish samples to CAS throughout the six-week collection period. CAS archived all sample tissue frozen (-20°C) until authorization was given by URS to begin homogenization and analysis.

The chain-of-custody (COC) forms indicate that samples were maintained under chain-of-custody protocols and forms were signed upon release and receipt. All samples were sent via CAS courier in wet ice 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.

All samples were analyzed within the technical and contracted holding time with the following exceptions:

- The QAPP specified hold time is 28 days (frozen) for both mercury and methyl mercury. The short hold time of 28 days for inorganic mercury is due to the loss of analyte from evaporation. The DoD QSM does not stipulate hold times for methyl mercury; therefore, 28 days was selected as a conservative value for the QAPP. CAS lyophilizes (freeze dries) a portion of all tissue samples for mercury, methyl mercury and percent solid

analyses. All tissue samples were freeze-dried prior to the typical 28 day hold time. The DoD QSM does not stipulate hold times for samples preserved by freeze drying. However, EPA Method 1631 (*Total Mercury in Tissue, Sludge, Sediment and Soil by Acid Digestion*) states freeze dried tissue can be stored unrefrigerated in a low-mercury atmosphere for a maximum of 1 year. There is no specific hold time guidance for methyl mercury analysis on freeze dried samples; however, the 1 year hold time stated above was deemed appropriate for methyl mercury as well. Tissue samples were not flagged based on hold time due to the samples being freeze dried prior to analysis.

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 tissue sample analyses performed with the following exception:

- The ICAL for di-n-octyl phthalate exceeded the individual DoD QSM relative standard deviation (RSD) limit of $\leq 15\%$ at 17.5%. The alternate criteria presented both in the DoD QSM (p.139) and EPA guidance was met. Additionally, the CCALs for this analyte were within the control limits. No qualification was assigned to the data based on this ICAL.

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. Field blanks were not collected as part of this analytical program. Qualification of samples due to method blank contamination followed guidelines set forth in the EPA NFGs.

Organic sample results less than five times (5x) and inorganic sample results (or common laboratory organic contaminants such as phthalates) less than ten times (x10) the method 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. For solid matrices reported in both wet and dry weight concentrations, these guidelines were applied using wet weight results and any flags applied were also applied to the dry weight

results. All analytical tests indicate non-detects for method blanks with the following exceptions:

Clams

- Di-n-butyl phthalate was detected in the method blanks associated with sample delivery groups K0801325 and K0801772 at a concentration above the MRL (K0801325) and at a concentration below the MRL (K0801772). Samples K0801325-002, K0801325-006, K0801772-015, and K0801772-016 had results for di-n-butyl phthalate less than 10x the method blank concentration and were between the MDL and the MRL. These results were qualified as not detected and flagged 'U' at the MRL.
- PAHs in sample delivery group K0802503 were reextracted due to low surrogate recoveries (discussed below). The method blank associated with the reextraction (laboratory batch KWG0803570) had low-level detections for anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3,-cd)pyrene, dibenzo(a,h)anthracene and benzo(g,h,i)perylene. The concentrations for the above-noted PAHs in the samples associated with this method blank (all samples in sample delivery group K0802503 and samples K0801772-010 and K0801772-020 (reextracts)) were greater than 5x the method blank concentrations, with the exception a few analytes in samples K0802503-002 and K0802503-005 (see Table 2). The results for PAHs with concentrations less than 5x the method blank concentrations in samples K0802503-002 and K0802503-005 are qualified as not detected and flagged with a 'U'.

Crayfish

- Mercury was detected in the method blank associated with sample delivery group K0802375 at a concentration above the MDL, but below the MRL. All sample results were greater than 10x this concentration; therefore, data were not qualified based on this method blank detection.
- Di-n-butyl phthalate was detected in the method blank associated with sample delivery group K0801458 at a concentration above the MRL. Samples K0801458-003, K0801458-004, K0801458-008, K0801458-010, K0801458-012, K0801458-015 and K0801458-016 had concentrations for di-n-butyl phthalate less than 10x the method blank concentration and were qualified as not detected and flagged 'U' as described above and as indicated in Table 2.
- Di-n-butyl phthalate was detected in the method blank associated with sample delivery group K0802375 at a concentration below the MRL. Samples K0802375-003, K0802375-007, K0802375-008, K0802375-010, K0802375-012 through K0802375-018, K0802375-024 and K0802375-025 had concentrations for di-n-butyl phthalate less than

10x the method blank concentration and were qualified as not detected and flagged 'U' as described above and as indicated in Table 2.

- Fluoranthene, pyrene and benzo(g,h,i)perylene were detected in the method blank associated with sample delivery group K0802375 at concentrations between the MDL and the MRL. All associated sample results for these analytes were reported at concentrations between the MDL and the MRL; therefore, results less than 5x the method blank concentration were qualified as not detected and flagged 'U' at the MRL (see Table 2 for specifics).

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. As noted above, PAHs and SVOCs were analyzed separately for all tissue matrices and both analyses utilized three surrogates. When more than one surrogate per fraction (acid or base/neutral) was spiked in the sample, PAHs and/or 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:

Clams

- The percent recoveries for PAH surrogates fluorene-d10 and fluoranthene-d10 were below the lower DoD QSM control limit of 60% for some samples in extraction batch KWG0803121 associated with sample delivery group K0801772 (as shown below).

	<u>fluorene-d10</u>	<u>fluoranthene-d10</u>
K0801772-004	52	56
K0801772-010	34	32
K0801772-019	48	53
K0801772-020	36	44

PAHs in this sample delivery group were reported from a combination of an undiluted analysis and a 5x dilution and the surrogates fluorene-d10 and fluoranthene-d10 for those above-listed samples were outside control limits for both runs (those shown above are from the full-strength run). All PAHs for these samples were qualified and flagged 'J/UJ' based on surrogate recoveries.

- The PAH surrogate recoveries associated with sample delivery group K0802503 were below the DoD QSM control limits (extraction batch KWG0803122). The entire analytical batch was reextracted for PAHs under extraction batch KWG0803570. All results were reported from the secondary analysis; therefore, the original results were flagged 'DNR'. All surrogate recoveries in the secondary analysis were acceptable with

the exception of fluorene-d10 and fluoranthene-d10 in sample K0802503-004 which had recoveries below the lower DoD QSM control limit of 60%. Results for sample K0802503-004 were reported from a combination of an undiluted analysis and a 5x dilution. The surrogate fluorene-d10 was below the lower control limit in both runs and fluoranthene-d10 was below the limit in the 5x dilution (most PAHs are reported from the 5x dilution). All PAH sample results were flagged 'UJ/J' for sample K0802503-004 based on surrogate recoveries.

- The percent recovery for the PAH surrogates fluoranthene-d10 and terphenyl-d14 in sample K0801325-012 were below the lower DoD QSM limits of 60% and 30% with recoveries of 59% and 24%, respectively. All PAHs in sample K0801325-012 were flagged 'J/UJ' to indicate potential low bias.

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:

Clams

- The MS/MSD performed on sample K0802503-005 had percent recoveries above DoD QSM limits for di-n-octyl phthalate and di-n-butyl phthalate. Both analytes were non-detect in the parent sample. The associated LCS and calibration standards indicate that the analytical batch was in control. Therefore, results for di-n-octyl phthalate and di-n-butyl phthalate were not qualified based on MS/MSD recoveries.
- The MSD percent recovery for sample K0802503-005 was below the DoD QSM control limit of 45% for bis(2-ethylhexyl) phthalate at 43%. Additionally, the RPD for the MS/MSD pair was above the 30% control limit at 33%. The associated MS, LCS and calibration standards indicate that the analytical batch was in control. The sample result for bis(2-ethylhexyl) phthalate was qualified as estimated and flagged 'J' in sample K0802503-005 due to the MSD and RPD results.
- MS/MSD percent recoveries were above the upper control limits for di-n-butyl phthalate and di-n-octyl phthalate in the MS/MSD performed on sample K0801772-007. The associated phthalates were non-detect in the parent sample. The associated MS, LCS and

calibration standards indicate that the analytical batch was in control. Analytical results for K0801772-007 were not qualified based on potential bias high MS recoveries.

- MS/MSD percent recoveries were above the upper control limit for di-n-butyl phthalate, butyl benzyl phthalate, bis(2-ethylhexyl) phthalate, and di-n-octyl phthalate in the MS/MSD performed on sample K0801325-005. The associated phthalates were non-detect in the parent sample with the exception of bis(2-ethylhexyl)phthalate which was previously qualified 'J' by the laboratory due to sample results being between the MRL and the MDL. No further qualification was necessary.
- LCS/LCSD percent recoveries associated with sample delivery group K0801325 were above the upper control limit for di-n-butyl phthalate, butyl benzyl phthalate, and di-n-octyl phthalate. The associated phthalates were not detected above the MRL in the associated samples. There were detections reported between the MDL and the MRL for di-n-butyl phthalate in samples K0801325-002 and K0801325-006; however, these detections were previously flagged 'J' by the laboratory. Further estimation of the data due to the potential high bias based on the LCS/LCSD recoveries was not necessary.

Crayfish

- MS/MSDs for copper were analyzed on four crayfish samples (two each from sample delivery groups K0802375 and K0801458). Either one or both of the MS/MSD recoveries in each of the four pairs were below the DoD QSM lower control limit of 80%, with values ranging from 58.5% to 77.4%. Associated QA/QC including LCS, SRM, post-spike and calibration standards indicate that the analytical batch was in control. All copper results in the crayfish samples were flagged 'J' to indicate the potential low bias in this matrix.
- An MS/MSD for aluminum was analyzed in sample K0802375-005 and had recoveries below the DoD limit of 80% at 67.8% and 62.2%, respectively. An MS/MSD analyzed for mercury in sample K0802375-007 had recoveries below the DoD QSM limit of 80% at 66.4% and 73.8%, respectively. Associated QA/QC including LCS, SRM, post-digestion spike and calibration standards indicate that the analytical batches were in control. MS/MSDs analyzed in similar crayfish matrixes were within control limits; therefore, only the parent samples were flagged 'J' to indicate potential low bias for aluminum and mercury in these samples.
- An MS/MSD analyzed for lead in sample K0801458-020 had percent recoveries below the DoD QSM limit of 80% at 73.2% and 75.2%, respectively. Associated QA/QC including LCS, SRM, post-digestion spike and calibration standards indicate that the analytical batch was in control. MS/MSDs analyzed in similar crayfish matrixes were within control limits, therefore only the parent sample was flagged 'J' to indicate potential low bias for lead in this sample.

- The MSD performed on sample K0802375-007 had percent recoveries below the DoD QSM limit of 80% for aluminum at 64.3% and copper at 65.9%. The MS, RPD and other QA/QC criteria were in control for this sample. The sample results were not flagged based solely on the MSD percent recoveries for aluminum and copper.
- The MS performed on sample K0802375-008 had a percent recovery below the DoD QSM limit of 80% for lead at 77.6% and the MS performed on sample K0802375-013 had a percent recovery below the lower limit of 80% for zinc at 72.9%. The MSDs, RPDs, and other QA/QC criteria were in control for these samples. The sample results were not flagged based solely on the MS percent recoveries.
- The percent recovery for lead in one of the standard reference material (SRM) samples (N.R.C.C Dorm-2) was slightly above the CAS control limits of 0.091 mg/kg with a concentration of 0.095 mg/kg in sample delivery group K0801458. The associated QA/QC samples including SRM (N.R.C.C. Tort-2) and the LCS indicate the analysis was in control. Data were not qualified based on the SRM recovery.

4.6 Duplicate Review

Field duplicates were not collected during this sampling event due to the statistical nature of the sampling event (as discussed in detail in the QAPP). 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 duplicate precision.

4.7 Compound Quantification

Clam and Crayfish

- During the second column confirmation performed by CAS on Method 8082, the sample results for K0802503-001, K0802503-006, and K0801325-010 exceeded the confirmation column agreement criterion of RPD < 40% for Aroclor 1254 and were flagged 'P' by the laboratory. The lower of the results from the analyses on the two columns was selected for reporting due to the apparent interferences observed in the chromatogram for the column with the higher concentration. The sample results for Aroclor 1254 were qualified as estimated and flagged 'J' in the above listed samples.
- Two SRM samples were used to evaluate copper. One SRM (N.R.C.C Dorm-2) associated with sample delivery group K0801772 was above the CAS control limit (i.e. 3.23 mg/kg versus the control of 3.00 mg/kg). The concentration of copper in this SRM is near the sensitivity limit of the instrument. The LCS, MS, calibrations and the second SRM (31.2 mg/kg) were within control limits. Samples were not qualified due to the SRM recovery.

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.

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.

Samples K0801772-010 and K0801772-020 were reextracted and reanalyzed in extraction lot KWG0803570. The primary results were flagged 'DNR' and data were reported from the reextracted analyses.

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 useable results/total reported results) x100
= (3,371 compliant / 3,371 total results) = 100%

All samples results are considered usable. In the case of the few samples reextracted and reanalyzed, the original samples flagged 'DNR' were not included in these calculations.

- *Analytical Completeness* = (number of unqualified results/total reported results) x100
= (3,174 compliant / 3,371 total results) = 94%

Data were qualified non-detect and flagged 'U' and some 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
= (3,371 compliant /3,371 total results) = 100%

All samples analyzed met laboratory contract requirements.

- *Field Sampling Completeness* =(number samples collected/total reported results) x100
= (70 compliant / 73 total results) = 96%

All samples collected and submitted to CAS for analysis had acceptable results with the exception of the 3 crayfish samples which had inadequate sample volume for the SVOC analyses.

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.navy.mil/Archive/DoDV3.pdf] on 3/3/06
- PSEP 1996. Puget Sound Estuary Program *Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound*, January 1996 and subsequent chapter revisions.
- URS 2008. Memorandum: *Post-Removal Sample Collection*, Bradford Island Disposal Site, Bonneville Dam Forebay – Cascade Locks, Oregon May 12, 2008
- URS 2007. Quality Assurance Project Plan, *River Operable Unit Remedial Investigation*, Bradford Island, Bonneville Lock and Dam Project, Cascade Locks, Oregon. September 2007.
- 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. Clam and Crayfish Sample ID and Analysis Summary
 Quality Control Summary Report for Analytical Chemistry
 February/March 2008 Sampling Event

Station Number	URS ID	DATE COLLECTED	CAS ID	Anaytes						
				PCB (Aroclors)	SVOCS	PAHs	Metals	Methyl Mercury	%Lipids	%Solids
Clam - Forebay										
4	08022604TC	19-Feb	K0801325-010	X	X	X	X	X	X	X
7	08021507TC	15-Feb	K0801325-004	X	X	X	X	X	X	X
8	08021508TC	15-Feb	K0801325-005	X	X	X	X	X	X	X
9	08021409TC	14-Feb	K0801325-006	X	X	X	X	X	X	X
10	08021410TC	14-Feb	K0801325-008	X	X	X	X	X	X	X
11	08021411TC	14-Feb	K0801325-007	X	X	X	X	X	X	X
15	08022115TC	21-Feb	K0801325-012	X	X	X	X	X	X	X
16	08022116TC	21-Feb	K0801325-013	X	X	X	X	X	X	X
17	08022117TC	21-Feb	K0801325-014	X	X	X	X	X	X	X
18	08021118TC	11-Feb	K0801325-003	X	X	X	X	X	X	X
21	08021221TC	12-Feb	K0801325-002	X	X	X	X	X	X	X
5	08031905TC	19-Mar	K0802503-006	X	X	X	X	X	X	X
6	08031806TC	18-Mar	K0802503-001	X	X	X	X	X	X	X
13	08031713TC	17-Mar	K0802503-002	X	X	X	X	X	X	X
14	08031814TC	14-Mar	K0802503-003	X	X	X	X	X	X	X
65	08022965TC	29-Feb	K0802503-008	X	X	X	X	X	X	X
67	08030367TC	3-Mar	K0802503-007	X	X	X	X	X	X	X
88	08031788TC	17-Mar	K0802503-004	X	X	X	X	X	X	X
89	08031789TC	17-Mar	K0802503-005	X	X	X	X	X	X	X
Clam - Reference Area										
22	08030522TC	5-Mar	K0801772-012	X	X	X	X	X	X	X
24	08030524TC	5-Mar	K0801772-011	X	X	X	X	X	X	X
26	08030427TC	4-Mar	K0801772-018	X	X	X	X	X	X	X
27	08030426TC	4-Mar	K0801772-019	X	X	X	X	X	X	X
28	08030428TC	4-Mar	K0801772-014	X	X	X	X	X	X	X
29	08022229TC	22-Feb	K0801772-020	X	X	X	X	X	X	X
34	08022534TC	25-Feb	K0801772-021	X	X	X	X	X	X	X
35	08022535TC	25-Feb	K0801772-001	X	X	X	X	X	X	X
36	08022536TC	25-Feb	K0801772-002	X	X	X	X	X	X	X
37	08022637TC	26-Feb	K0801772-003	X	X	X	X	X	X	X
38	08022738TC	27-Feb	K0801772-004	X	X	X	X	X	X	X
39	08022739TC	27-Feb	K0801772-005	X	X	X	X	X	X	X
40	08022740TC	27-Feb	K0801772-006	X	X	X	X	X	X	X
41	08022741TC	27-Feb	K0801772-007	X	X	X	X	X	X	X
42	08022742TC	27-Feb	K0801772-010	X	X	X	X	X	X	X
85	08030685TC	6-Mar	K0801772-015	X	X	X	X	X	X	X
86	08030686TC	6-Mar	K0801772-016	X	X	X	X	X	X	X
87	08030687TC	6-Mar	K0801772-017	X	X	X	X	X	X	X
Crayfish - Forebay										
1	08021901CF	19-Feb	K0801458-005	X	X	X	X	X	X	X
2	08021902CF	19-Feb	K0801458-006	X			X	X	X	X
3	08022003CF	20-Feb	K0801458-007	X			X	X	X	X
4	08021904CF	19-Feb	K0801458-008	X	X	X	X	X	X	X
5	08021505CF	15-Feb	K0801458-009	X	X	X	X	X	X	X

Table 1. Clam and Crayfish Sample ID and Analysis Summary
 Quality Control Summary Report for Analytical Chemistry
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Station Number	URS ID	DATE COLLECTED	CAS ID	Anaytes						
				PCB (Aroclors)	SVOCs	PAHs	Metals	Methyl Mercury	%Lipids	%Solids
6	08021406CF	14-Feb	K0801458-001	X	X	X	X	X	X	X
7	08021407CF	14-Feb	K0801458-003	X	X	X	X	X	X	X
8	08021408CF	14-Feb	K0801458-002	X	X	X	X	X	X	X
13	08021413CF	14-Feb	K0801458-004	X	X	X	X	X	X	X
14	08022014CF	20-Feb	K0801458-010	X	X	X	X	X	X	X
15	08021915CF	19-Feb	K0801458-011	X	X	X	X	X	X	X
16	08022216CF	22-Feb	K0801458-020	X	X	X	X	X	X	X
17	08021917CF	19-Feb	K0801458-012	X	X	X	X	X	X	X
18	08021918CF	19-Feb	K0801458-013	X	X	X	X	X	X	X
19	08021919CF	19-Feb	K0801458-014	X	X	X	X	X	X	X
20	08021920CF	19-Feb	K0801458-015	X	X	X	X	X	X	X
21	08021921CF	19-Feb	K0801458-016	X	X	X	X	X	X	X
Crayfish - Reference Area										
22	08022622CF	19-Feb	K0802375-024	X	X	X	X	X	X	X
33	08022233CF	19-Feb	K0802375-025	X	X	X	X	X	X	X
38	08021838CF	20-Feb	K0802375-003	X	X	X	X	X	X	X
42	08022842CF	19-Feb	K0802375-004	X	X	X	X	X	X	X
72	08030372CF	15-Feb	K0802375-005	X	X	X	X	X	X	X
73	08030373CF	14-Feb	K0802375-006	X	X	X	X	X	X	X
74	08030374CF	14-Feb	K0802375-007	X	X	X	X	X	X	X
75	08030375CF	14-Feb	K0802375-008	X	X	X	X	X	X	X
76	08030376CF	14-Feb	K0802375-009	X	X	X	X	X	X	X
78	08030378CF	20-Feb	K0802375-010	X	X	X	X	X	X	X
79	08030379CF	19-Feb	K0802375-011	X	X	X	X	X	X	X
82	08030382CF	22-Feb	K0802375-012	X	X	X	X	X	X	X
90	08031290CF	19-Feb	K0802375-013	X	X	X	X	X	X	X
91	08031291CF	19-Feb	K0802375-014	X	X	X	X	X	X	X
92	08031292CF	19-Feb	K0802375-015	X	X	X	X	X	X	X
94	08031294CF	12-Mar	K0802375-016	X	X	X	X	X	X	X
98	08031298CF	12-Mar	K0802375-017	X	X	X	X	X	X	X
100	080312100CF	19-Feb	K0802375-018	X	X	X	X	X	X	X
105	080314105CF	19-Feb	K0802375-019	X			X	X	X	X

Notes:

SVOCs and PAHs are analyzed separately for tissue matrices.

= insufficient tissue volume to analyze SVOCs and PAHs

Table 2. Clam and Crayfish Qualifer Summary
Quality Control Summary Report for Analytical Chemistry
February/March 2008 Sampling Event

Station Number	URS ID	CAS ID	Analyte	Qualifer	Rational		
Clam							
21	08021221TC	K0801325-002	di-n-butyl phthalate	40U	MB detection		
9	08021409TC	K0801325-006		56U			
85	08030685TC	K0801772-015		35U			
86	08030686TC	K0801772-016		38U			
89	08031789TC	K0802503-005	benzo(b)fluoranthene benzo(k)fluoranthene benzo(a)pyrene indeno(1,2,3-cd)pyrene dibenzo(a,h)anthracene benzo(g,h,i)perylene	0.74U 0.58U 0.86U 0.26U 0.11U 0.38U	MB detection		
13	08031713TC	K0802503-002	benzo(g,h,i)perylene	0.56U	MB detection		
38	08022738TC	K0801772-004	acenaphthene fluorene	J/UJ	PAH surrogate recovery (fluorene-d10 and fluoranthene-d10)		
42	08022742TC	K0801772-010	phenanthrene anthracene fluoranthene pyrene				
27	08030426TC	K0801772-019	benzo(a)anthracene chrysene				
29	08022229TC	K0801772-020	benzo(a)fluoranthene benzo(k)fluoranthene benzo(a)pyrene				
88	08031788TC	K0802503-004	indeno(1,2,3-cd)pyrene dibenzo(a,h)anthracene benzo(g,h,i)perylene				
15	08022115TC	K0801325-012	PAHs (see list above)			J/UJ	PAH surrogate recovery (fluorene-d10 and terphenyl-d14)
4	08022604TC	K0801325-010	Aroclor 1254	J	second column confirmation		
5	08031905TC	K0802503-006					
6	08031806TC	K0802503-001					
89	08031789TC	K0802503-005	bis(2-ethylhexyl) phthalate	J	MSD and RPD recoveries		
42	08022742TC	K0801772-010	PAHs	DNR	Report data from reextraction		
29	08022229TC	K0801772-020					
PAH results in K0802503							
Crayfish							
4	08021904CF	K0801458-008	di-n-butyl phthalate	180U	MB detection		
7	08021407CF	K0801458-003		58U			
13	08021413CF	K0801458-004		39U			
14	08022014CF	K0801458-010		48U			
20	08021920CF	K0801458-015		37U			
21	08021921CF	K0801458-016		38U			
17	08021917CF	K0801458-012		76U			
38	08021838CF	K0802375-003		92U			
74	08030374CF	K0802375-007		110U			
75	08030375CF	K0802375-008		79U			
78	08030378CF	K0802375-010		45U			
82	08030382CF	K0802375-012		70U			
90	08031290CF	K0802375-013		73U			
91	08031291CF	K0802375-014		40U			
92	08031292CF	K0802375-015		38U			
94	08031294CF	K0802375-016		55U			
98	08031298CF	K0802375-017		57U			
100	080312100CF	K0802375-018		39U			
22	08022622CF	K0802375-024		80U			
33	08022233CF	K0802375-025		50U			
22	08022622CF	K0802375-024		fluoranthene pyrene		0.49U	MB detection
33	08022233CF	K0802375-025					
38	08021838CF	K0802375-003	fluoranthene pyrene	0.50U	MB detection		
42	08022842CF	K0802375-004					
91	08031291CF	K0802375-014					
92	08031292CF	K0802375-015					
94	08031294CF	K0802375-016					
73	08030373CF	K0802375-006					

Table 2. Clam and Crayfish Qualifer Summary
 Quality Control Summary Report for Analytical Chemistry
 February/March 2008 Sampling Event

Station Number	URS ID	CAS ID	Analyte	Qualifer	Rational
72	08030372CF	K0802375-005	fluoranthene pyrene benzo(g,h,i)perylene	0.48U	MB detection
74	08030374CF	K0802375-007	fluoranthene pyrene benzo(g,h,i)perylene	0.50U	
75	0803075CF	K0802375-008	fluoranthene pyrene	0.48U	
76	08030376CF	K0802375-009	fluoranthene pyrene	0.49U	
78	08030378CF	K0802375-010			
79	08030379CF	K0802375-011			
82	08030382CF	K0802375-012			
90	08031290CF	K0802375-013	fluoranthene pyrene	0.45U	
98	08031298CF	K0802375-017	fluoranthene pyrene benzo(g,h,i)perylene	0.49U	
100	080312100CF	K0802375-018	fluoranthene pyrene	0.49U	
1	08021901CF	K0801458-005	copper	J	MS/MSD recoveries
2	08021902CF	K0801458-006			
3	08022003CF	K0801458-007			
4	08021904CF	K0801458-008			
5	08021505CF	K0801458-009			
6	08021406CF	K0801458-001			
7	08021407CF	K0801458-003			
8	08021408CF	K0801458-002			
13	08021413CF	K0801458-004			
14	08022014CF	K0801458-010			
15	08021915CF	K0801458-011			
16	08022216CF	K0801458-020			
17	08021917CF	K0801458-012			
18	08021918CF	K0801458-013			
19	08021919CF	K0801458-014			
20	08021920CF	K0801458-015			
21	08021921CF	K0801458-016			
22	08022622CF	K0802375-024			
33	08022233CF	K0802375-025			
38	08021838CF	K0802375-003			
42	08022842CF	K0802375-004			
72	08030372CF	K0802375-005			
73	08030373CF	K0802375-006			
74	08030374CF	K0802375-007			
75	08030375CF	K0802375-008			
76	08030376CF	K0802375-009			
78	08030378CF	K0802375-010			
79	08030379CF	K0802375-011			
82	08030382CF	K0802375-012			
90	08031290CF	K0802375-013			
91	08031291CF	K0802375-014			
92	08031292CF	K0802375-015			
94	08031294CF	K0802375-016			
98	08031298CF	K0802375-017			
100	080312100CF	K0802375-018			
105	080314105CF	K0802375-019			
16	08022216CF	K0801458-020	lead	J	MS/MSD recoveries
72	08030372CF	K0802375-005	aluminum		
74	08030374CF	K0802375-007	mercury		

Notes:

Not included are laboratory-assigned J flags indicating detections above the MDL and below the MRL.
 Concentrations are reported in weight wet.

RIVER OPERABLE UNIT REMEDIAL INVESTIGATION REPORT

QUALITY CONTROL SUMMARY REPORT FOR ANALYTICAL CHEMISTRY

WATER – FEBRUARY/MARCH 2008 SAMPLING EVENT

JULY 2008

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1.0 Executive Summary

The overall assessment of the grab water and high volume water sample results shows the quality of the data is acceptable to support project objectives. The contracted laboratories provided all requested analyses and delivered data reports were complete. Some data were qualified as estimated 'J' or 'J-EMPC' and some as non-detect '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 River Operable Unit Remedial Investigation Report.

2.0 Project Description

URS collected and authorized analysis of 11 grab water samples (10 primary and one field duplicate) and 11 high volume water samples (10 primary and one field blank) during the remedial investigation near Bradford Island at Bonneville Dam between February 11 and March 20, 2008. Tables 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) *River Operable Unit Remedial Investigation* (URS 2007). Deviations from the QAPP protocol were not necessary, specific details of the sample collection are addressed in the Post-Removal Sample Collection Memorandum (URS 2008). Briefly, high-volume water samples were collected using an Infiltrax 300 Organic Sampling System (Infiltrax) supplied by Axys Environmental Systems in Sidney, British Columbia, Canada. Water is pumped in series through a wound-glass filter to remove particulate-bound analytes, and through a column packed with macroporous resin (XAD resin) where dissolved-phase analytes are absorbed. During this field effort, approximately 600 liters of water were filtered for each sample. The filter and column at each sample location were analyzed separately to represent the particulate and dissolved phase of the water column. Flow rate was measured both on the Infiltrax's internal digital flow meter and verified periodically by hand using a graduated cylinder and a stopwatch. The reported concentrations are calculated using the total volume from the digital flow meter. Additionally, grab water samples were collected at each sample station using a peristaltic pump and dedicated tubing.

All Infiltrax samples were submitted to Axys Analytical Services, Ltd. Located in Sidney, British Columbia (Axys) for analysis. Grab water samples were sent to Columbia Analytical Services (CAS) located in Kelso, WA. Axys uses specialized methods to analyze PAHs and phthalate esters, these methods are modeled after EPA Method 1668A, in that target concentrations are determined by either isotope dilution or isotopically labeled internal standards using high resolution gas chromatography/low resolution mass spectroscopy (HRGC/LRMS). Sample-specific detection limits are also calculated similar to EPA 1668A.

Axys provides details about these methods in the case narratives within the data deliverables. The PAH and phthalate ester data qualifiers applied during this review are similar to those applied to the congener data.

The following table lists the parameters analyzed on one or more of the samples. Axys was not able to analyze for two analytes in the project-specific SVOC list (carbazole and p-cresol), the remaining four analytes in the project-specific SVOC list were phthalate esters and therefore, Axys refers to the SVOCs as phthalates esters in the reporting of the data. For clarity, the SVOCs are referred to as phthalate esters in this report. Table 1 summarizes the specific requested analyses for each media by URS and laboratory identification numbers.

Method	Analytical Parameter
EPA 1668A (Axys MLA-010) – HRGC/HRMS	Polychlorinated Biphenyls (PCBs) – Congeners
Axys MLA-021 – HRGC/LRMS	Polycyclic Aromatic Hydrocarbons (PAHs)
Axys MLA-027 – HRGC/LRMS	SVOCs (Phthalate Esters)
NWTPH-Dx (Ecology 1997)	Northwest Total Petroleum Hydrocarbons – Diesel Range (NWTPH-Dx)
415.1	Total Organic Carbon (TOC)
415.1	Dissolved Organic Carbon (DOC)
EPA 300.0	Chloride, Sulfate
EPA 353.2	Nitrate/Nitrite

HR – High Resolution
 LR – Low Resolution
 GC – Gas Chromatography
 MS – Mass Spectrometry

4.0 Data Validation

Analyses were performed in general accordance with the above reference 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, initial and continuing calibrations, quantitation limits, 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 will be reviewed on 15% or greater of the data: 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 Quality Assurance Project Plan (QAPP) *River Operable Unit Remedial Investigation* (URS 2007). Additionally, because the QAPP-referenced *Department of Defense Quality Systems Manual* does not discuss PCB congeners, the data review process utilized guidance from EPA's *Contract Laboratory Program National Functional Guidelines (EPA NFGs) for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review (September 2005)* and *EPA Region 10 Standard Operating Procedure (SOP) for the Validation of Method 1668 Toxic, Dioxin-like*. For the specialized PAH and phthalate ester method developed by Axys, laboratory derived quality criteria in conjunction with the above listed guidance were used in this review.

All remaining non-congener data results were reviewed in accordance with the criteria contained in the DoD QSM (DoD QSM, 2006) and the above listed methods and the following EPA guidance documents in that order; EPA's *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 above mentioned QAPP. A summary of qualifiers assigned to results in this investigation as part of this review is included in Table 2. Samples are referenced by both by their URS sample identification assigned in the field as well as the laboratory identification. CAS 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 Kelso and are not included in Table 2. Non-detect values for PCBs, PAHs and SVOCs (phthalate esters) as analyzed by Axys are reported at their respective sample-specific detection limits as discussed above. 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.
- J-EMPC – The analyte was not positively identified; the associated numerical value is the **Estimated Maximum Potential Concentration** of the analyte in the sample used only for PCB congener results.
- 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

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

Grab Water Samples

The chain-of-custody (COC) forms indicate that samples were maintained under chain of custody and forms were signed upon release and receipt, with the exception of one COC form associated with sample delivery group K0802104. This COC form was not signed by URS upon release to the sample courier, the sample courier did sign the COC and all samples arrived intact at the laboratory. Data within this sample delivery group were not qualified based on missing COC signature.

All samples were sent via CAS courier in wet ice and were received and logged in the same day. All coolers were submitted at temperatures within the EPA-recommended temperature of 6°C or below. Data were not qualified based COC or cooler temperature.

The QAPP stated unpreserved sample containers would be used for TPH samples, however HCl preserved containers were used to extend the holding time from 7 to 14 days per guidance from the NWTPH method. All water samples were analyzed within the technical and contracted holding times.

Infiltrax Samples

Infiltrax columns and filters were stored at or below 6°C by URS until the completion of the last Infiltrax sampling event. All Infiltrax samples were shipped with gel ice packs via FedEx to Axys on March 17, 2008. The chain-of-custody (COC) forms indicate that samples were maintained under chain of custody, and forms were signed upon release and receipt. All Infiltrax samples were analyzed within the technical holding times.

4.2 Instrument Calibration

The laboratory performed initial multipoint calibrations for all target and surrogate compounds as required by the analytical methods. Initial calibrations (ICAL) and continuing calibrations (CCAL) were analyzed at the proper frequency and at the appropriate concentrations required by the methods.

Grab Water

Instrument calibrations were acceptable for all samples analyses performed.

Infiltrax (congeners)

Initial calibrations (ICALs) and continuing calibration verifications (CCVs) were reviewed for PCB congener analyses. The laboratory performed initial multipoint calibrations for all target and surrogate compounds as required by the Method 1668A. ICALs, CCVs and OPR (ongoing precision recovery) standards were analyzed at the proper frequency and at the appropriate concentrations required by EPA Method 1668A. All calibration compounds analyzed associated with the Infiltrax samples meet the acceptance criteria as listed in Method 1668A.

Infiltrax (PAHs and phthalate esters)

ICAL and CCVs were reviewed for PAHs and phthalate esters. Similar to Method 1668A the ICAL is performed using a series of solutions including the suite of labeled surrogates and recovery standards that encompass the working concentration range of the instrument. CCVs are analyzed bracketing the samples as well as once every twelve hours. All calibration compounds analyzed associated with the Infiltrax samples meet Axys derived acceptance criteria.

Labeled Internal Standard Recovery Review (Infiltrax samples only)

PCB congeners

PCB congener samples were spiked with labeled internal standards prior to extraction or cleanup. These standards are used to quantitate target congeners and the calculations of target compound concentrations are designed to compensate for low extraction and/or cleanup efficiencies. In addition, their recovery is measured against labeled injection standards added after extraction and cleanup to evaluate extraction and/or cleanup efficiency which could affect sensitivity and could also affect accuracy for target compounds not quantitated against a chemically identical, isotopically labeled standard. The percent recovery of the labeled standards is compared with the limits set forth in EPA Method 1668A. All recoveries were acceptable.

Cleanup standards are added prior to cleanup and quantitated using injection standards added just prior to analysis to evaluate cleanup efficiency. The cleanup standards were within the 30-135% control limits set by EPA Method 1668A.

PAHs and phthalate esters

Similar to the above mentioned Method 1668A, labeled standards are spiked into the sample prior to the beginning of analysis. These labeled standards (called 'surrogates' within the Axys data packages) are deuterated versions of the PAH and phthalate ester parent analytes. All samples are recovery-corrected based on the concentration of these labeled standards. The percent recovery of these deuterated standards were within Axys derived control limits with the following exceptions:

- d4-dimethyl phthalate associated with sample L10998-4 was below the Axys control limit of 40% with 33.5%. As stated above all results are recovery corrected, therefore the results for dimethyl phthalate were not flagged based this labeled standard recovery.

Cleanup standards are not used for PAH and phthalate ester analysis.

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 batch, per QAPP requirements. Qualification of samples due to method or field blank contamination followed guidelines set forth in the EPA NFGs .

Grab Water

For organic and inorganic analyses, sample results less than five times (5x) (or 10x for phthalates) the method blank or field blank concentration and between the method detection limit (MDL) and the method reporting limits (MRL) were flagged as non-detect 'U' at the MRL. When sample results were less than 5x (or 10x for phthalates) the blank concentration but above the MRL, the reported result was qualified as non-detect 'U'. Target compounds detected in the method but reported as not detected in the associated samples were not qualified. Target compounds reported with concentrations greater than 5x the blank concentration were not qualified. For inorganic analyses initial and continuing calibration blanks were examined in addition to the standard method blank samples. Field blanks were not collected for the grab water during this sampling event. All analytical tests indicate non-detects for method blanks with the following exceptions:

- Chloride was detected in the method blank below the MRL in sample delivery group K0801765. All sample results were above 5x the method blank concentration therefore, data were not qualified based on this method blank detection.
- Arsenic, beryllium, copper and thallium were detected in the continuing calibration blank (CCB) below the MRLs in sample delivery group K0801765. All associated detected results were greater than 10x the CCB concentrations with the exception of arsenic in samples K0801765-003 Diss and K0801765-005 Diss, cadmium in samples K0801765-003 and K0801765-005 and thallium in samples K0801765-001, K0801765-001 Diss, K0801765-003, K0801765-003 Diss, K0801765-005 and K0801765-005 Diss. Results for these samples were flagged 'U' following guidance described above.
- Aluminum, antimony, mercury and nickel were detected below the MRLs in the method blank and beryllium was detected below the MRL in the continuing calibration blank in sample delivery group K0801289. All associated detected results were greater than 10x the MB concentrations with the exception of aluminum in sample K0801289-001, K0801289-001 Diss, K0801289-002 and K0801289-002 Diss, results for aluminum were flagged 'U' at the MRL.
- Antimony and mercury were detected below the MRLs in the method blank in sample delivery group K0801530. All samples results were non-detect for mercury. All associated detected results for antimony were below the MRL and above the MDL. Detected results for antimony for samples K0801530-005, K0801530-005 Diss and K0801530-009 were flagged 'U' at the MRL.

- Residual Range Organics (RRO) were detected below the MRL in the method blank in sample delivery groups K0801289 and K0801530. Samples results detected below 5x the MB concentration and below the MRL and were flagged 'U' at the MRL.
- Arsenic, beryllium, cadmium, copper and thallium were detected in the continuing calibration blank (CCB) below the MRLs in sample delivery group K0802104. All associated detected results were greater than 10x the CCB concentrations with the exception of arsenic in samples K0802104-001 and K0802104-001 Diss, cadmium in sample K0802104-001 and thallium in sample K0802104-001. Results for these samples were flagged 'U' as described above.

Infiltrax

Sample results that were reported as detected at a concentration less than five times (5x) (or 10x for phthalates) the associated method blank concentration were flagged 'U' or non-detect at the reported concentration. Target compounds reported with concentrations greater than 5x (or 10x for phthalates) the laboratory or field blank concentration were not qualified. Target compounds detected in the method blank but reported as not detected in the associated samples were not qualified.

Method 1668A stipulates using a method blank as similar to the sample matrix as possible. Method blanks were prepared using clean filters and XAD resin. Method blank analytical results were non-detects with the exception of some PCB congeners and phthalate esters.

A field blank was collected on the Infiltrax to measure background levels of chemicals of potential concern in the atmosphere, instrument tubing and XAD column and filters. The field blank was collected by pumping laboratory provided deionized (6 liters) water through the Infiltrax system. Field blank analytical results were non-detects with the exception of some PCB congeners, PAHs and phthalate esters.

The sample concentrations in the data deliverables are reported as picograms per liter (pg/L) or absolute picograms measured divided by volume (in liters) pumped through the Infiltrax system. Since the volume of each sample varies and the method blank and field blank do not have comparable volumes to the samples, both the blank comparisons were performed using the absolute picograms concentrations. Picograms concentrations were calculated by multiplying the total volume (in liters) by the reported concentration in pg/L. Tables 4 and 5 indicate the results that were qualified non-detect 'U' based on method blank and field blank concentrations.

4.4 Surrogate Recovery Review

Each sample analyzed for organic compounds other than the HRGC/HRMS and HRGC/LRMS analyses was spiked with surrogates (system monitoring compounds) prior to extraction. Surrogate recoveries are a measure of accuracy for the overall analysis of each individual sample. Surrogate recoveries were acceptable for all analyses with the following exceptions:

- Surrogates o-terphenyl and n-triacontane in the LCS standard for NWTPH in sample delivery group K0802104 had recoveries above control limits of 150% with 152% and

155% respectively. All samples were non-detect, therefore data were not qualified based on the potential high bias indicated by the recoveries of the surrogates.

- Surrogate recoveries for o-terphenyl and n-triacontane in the LCS associated with the NWTPH analysis for sample delivery group K0801289 were below the lower control limits of 50%. The duplicate LCS and all other surrogate recoveries within project samples were within the control limits, the bias low recoveries appears to be isolated to the single LCS sample, data were not qualified based on surrogate recoveries in the LCS.

4.5 Infiltrax Sampling Recovery Standards

Analytes can both adsorb and desorb from the XAD resin during the high volume sampling process. In order to understand analyte retention on the XAD resin during sampling, labeled standards are spiked onto the Infiltrax columns prior to sample collection. Axys spiked carbon-13 labeled PCBs (PCB 31, PCB 95 and PCB 153) as well as deuterated anthracene (d10-anthracene) onto the Infiltrax columns prior to shipment to URS. High recoveries of these labeled standards suggest little to no net loss of adsorbed analytes on the XAD column during this sampling event. The recoveries of these analytes shown in Table 6 and are presented in the Axys data deliverables as 'client standards'.

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

Laboratory control samples (LCS) are used to monitor the laboratory's day-to-day performance of routine analytical methods, independent of matrix effects and to assess accuracy of the analysis 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 per method requirements. MS/MSD samples are not required for PCB congener analysis and not used for PAHs and phthalate esters as analyzed per Axys method. Ongoing precision and recovery (OPR) samples are used in place of LCS to monitor laboratory performance.

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

- The LCS associated with the NWTPH-Dx analysis in sample delivery group K0801269 had low surrogate recoveries as discussed above. LCS recoveries for this LCS sample were also low. The low recoveries appear to be isolated with the LCS, the duplicate LCS recoveries were within control limits and the associated surrogates in the samples were acceptable. NWTPH-Dx results were not considered to need qualification as estimated based on the LCS recoveries.
- OPR recovery of acenaphthene was over the Axys derived control limit of 130% with 152% in DPW25236, all associated sample results for acenaphthene in the XAD filters were non-detect. Therefore, data was not qualified based on the potential high bias indicated by the high OPR recovery.

4.7 Duplicate Review

A field duplicate was collected at one grab water sampling location by simultaneously filling duplicate sets of laboratory-provided sample containers to verify acceptable field sampling techniques and representativeness of sample aliquots to the medium sampled. Field duplicates were not collected for the Infiltrax samples. The RPD for field duplicates was calculated when both sample results were greater than 5x the reporting limit. Field duplicate precision was acceptable.

To evaluate laboratory precision, CAS performed duplicate analyses (i.e. LCS/LCSD and MS/MSD) as discussed above. All values were expectable with the following exceptions:

- As previously discussed the LCS for NWTPH-Dx in sample delivery group K0801289 had low recoveries, resulting in RPD values for the LCS/LCSD pair being outside the control limits. The data were not considered to need qualification as estimated due to the LCS recoveries and likewise the RPD values for the reasons described above under LCS evaluation.

4.8 Compound Quantification

As detailed in Table 2, some congener results were qualified as non-detect due to method blank contamination. Results were qualified as non-detect at the MRL; therefore, these non-detect results do not have elevated detection limits which should be considered by the data user as part of evaluating the data for end-use objectives.

The internal standard method is used to calculate concentrations of PCB congeners that do not have chemically identical labeled standards. The internal standard method is dependent upon consistent detector response over the calibration range. If the detector response varies, concentrations can be biased high or low based on variations in the detector sensitivity. During congener analysis, PFK (perfluorokerosene) is used as a lock mass reference standard to measure changes in detector sensitivity. Each lock mass must not vary more than 20% throughout its respective retention time window as required by Method 1668A. Variations of more than 20% indicate the presence of a co-eluting interference or decreased sensitivity. A slight deviation was seen in the lock mass spectra associated with the mono-chlorinated PCBs in the XAD filter samples (DPWG25357). This deviation in lock mass did not effect the quantification of the target PCBs. No congener results were qualified based on lock mass variations.

4.9 Compound Identification

Ion abundance ratios are used to identify PCB congeners, PAHs and phthalate esters. Results that met all other qualitative identification criteria but were more than 15% different from the theoretical ion abundance criterion for PCBs as set by EPA Method 1668A are flagged in the laboratory report with a 'K' flag. PAHs and phthalate esters with relative ion abundance ratios

greater than 20% different from the opening calibration values are flagged 'K'. Those results flagged 'K' with ion abundance ratios outside the identified quantitation criteria are considered estimated maximum possible concentrations (EMPC) and were re-flagged 'J-EMPC' during this review. If the analyte result was previously qualified 'U' by method blank detection, the result retained the 'U' qualifier and it was not qualified further because an ion ratio was out of limits (there is no ion ratio criterion for non-detects). J-EMPC qualifiers are shown in Tables 4 and 5, the database has been updated and the flags will appear in any future data tables that are created from the project database.

Ion ratios outside the control limits are generally a consequence of co-eluting interferences to either one or both quantitation peaks. In these cases, Axys chose to use the quantitation peak areas as recorded; no adjustments were made to force the peaks to match the theoretical ion abundance ratios. EMPC results should be considered by the data users as part of evaluating the data for end-use objectives.

4.9 Reporting Limits

If sample concentrations were detected below the MRL but above the MDL, they were identified by CAS and flagged estimated, 'J'. This laboratory flag was carried over to a "J" as the URS Review Qualifier and is recorded in the database and in the data tables included in the main body of this report.

5.0 Completeness

The laboratory reported all requested analyses and the deliverable data reports were complete. Some results were considered to be estimated and were qualified 'J', 'J-EMPC' and others were considered non-detects, 'U', based on blank contamination. A summary of qualifiers can be found in Tables 2 through 5.

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 the associated laboratory and corrected by updating the database to reflect the .pdf deliverable.

- *Technical Completeness* = (number of useable results/total reported results) x100
= (5,742 compliant / 5,742 total results) = 100%

All samples results are considered useable.

- *Analytical Completeness* = (number of unqualified results/total reported results) x100
= (4,732 compliant / 5,742 total results) = 82%

Data were qualified non-detect 'U' and some as estimated 'J' of 'J-EMPC'. 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
= (5,742 compliant /5,742 total results) = 99%

All samples analyzed met laboratory contract requirements.

- *Field Sampling Completeness* =(number samples collected/total reported results) x100
11 grab water + 22 Infiltrax = 33 samples collected
=(33 compliant / 33 total results) =100%

All samples collected and submitted to CAS and Axys for analysis had a complete set of results. All samples had sufficient sample volume to analyze the full analyte list as detailed in the QAPP.

6.0 References

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URS 2007. Quality Assurance Project Plan, *River Operable Unit Remedial Investigation*, Bradford Island, Bonneville Lock and Dam Project, Cascade Locks, Oregon. September 2007.

USEPA 2005. U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review. September 2005.

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Table 1. Infiltrax Water Sample ID and Analysis Summary

Quality Control Summary Report for Analytical Chemistry

February/March 2008 Sampling Event

Station Number	URS ID	Date Collected	Axys ID (Filter)	Axys ID (Column)	PCB (congeners)	PAHs	SVOCs (Phthalate Esters)
52	08021252XAD	12-Feb-08	L11001-1	L10998-1	X	X	X
53	08022453XAD	24-Feb-08	L11001-2	L10998-2	X	X	X
54	08021354XAD	13-Feb-08	L11001-3	L10998-3	X	X	X
55	08022555XAD	25-Feb-08	L11001-4	L10998-4	X	X	X
56	08022156XAD	21-Feb-08	L11001-5	L10998-5	X	X	X
57	08022757XAD	27-Feb-08	L11001-6	L10998-6	X	X	X
58	08030758XAD	7-Mar-08	L11001-7	L10998-7	X	X	X
59	08022959XAD	29-Feb-08	L11001-8	L10998-8	X	X	X
60	08030460XAD	4-Mar-08	L11001-9	L10998-9	X	X	X
61	08030661XAD	6-Mar-08	L11001-10	L10998-10	X	X	X
Field Blank	080306FBXAD	6-Mar-08	L11001-11	L10998-11	X	X	X

Notes:

Columns and filters analyzed separately.

Axys Data Package Identification Numbers

(Axys reported the four phthalates separately from the PAHs)

DPWG25235 PAHs - Column Phase

DPWG25236 PAHs - Filter Phase

DPWG25265 SVOCs (Phthalate Esters) - Filter Phase

DPWG25339 SVOCs (Phthalate Esters) - Column Phase

DPWG25357 Congeners - Filter Phase

DPWG25531 Congeners - Column Phase

DPWG25552 Reanalysis of Ester - Column Phase

Table 2. Grab Water Sample ID and Analysis Summary

Quality Control Summary Report for Analytical Chemistry

February/March 2008 Sampling Event

Station Number	URS ID	Date Collected	CAS ID	Analytes						
				Metals (Total)	Metals (Dissolved)	TPH-Dx (Total)	TPH-Dx (Dissolved)	Anions (Chloride, Sulfate, Nitrate/Nitrite)	TOC	DOC
52	08021252SW	12-Feb-08	K0801289-001	X		X		X	X	
	08021252SW-F		K0801289-001 Diss		X		X			X
53	08022453SW	24-Feb-08	K0801530-003	X		X		X	X	
	08022453SW-F		K0801530-003 Diss		X		X			X
54	08021354SW	13-Feb-08	K0801289-002	X		X		X	X	
	08021354SW-F		K0801289-002 Diss		X		X			X
55	08022555SW	25-Feb-08	K0801530-005	X		X		X	X	
	08022555SW-F		K0801530-005 Diss		X		X			X
56	08022156SW	21-Feb-08	K0801530-001	X		X		X	X	
	08022156SW-F		K0801530-001 Diss		X		X			X
57	08022757SW	27-Feb-08	K0801530-009	X		X		X	X	
	08022757SW-F		K0801530-009 Diss		X		X			X
58	08030758SW	7-Mar-08	K0802104-001	X		X		X	X	
	08030758SW-F		K0802104-001 Diss		X		X			X
59	08022959SW	29-Feb-08	K0801765-001	X		X		X	X	
	08022959SW-F		K0801765-001 Diss		X		X			X
60	08030460SW	4-Mar-08	K0801765-003	X		X		X	X	
	08030460SW-F		K0801765-003 Diss		X		X			X
61	08030661SW	6-Mar-08	K0801765-005	X		X		X	X	
	08030661SW-F		K0801765-005 Diss		X		X			X
62 (duplicate of 57)	08022762SW	27-Feb-08	K0801530-007	X		X		X	X	
	08022762SW-F		K0801530-007 Diss		X		X			X

Table 3. Summary of Qualifiers for Grab Water Samples

Quality Control Summary Report for Analytical Chemistry

February/March 2008 Sampling Event

CAS ID	URS ID	Analyte	Qualifier	Rational
K0801289-001	08021252SW	aluminum	145U	method blank detection
K0801289-001 Diss	08021252SW-F		50U	
K0801289-002	08021354SW		152U	
K0801289-002 Diss	08021354SW-F		50U	
K0801530-005	08022555SW	antimony	50U	
K0801530-005 Diss	08022555SW-F		50U	
K0801530-009	08022757SW		50U	
K0801289-001	08021252SW	residual range organics (RRO)	110U	
K0801289-001 Diss	08021252SW-F		120U	
K0801289-002	08021354SW		110U	
K0801289-002 Diss	08021354SW-F		120U	
K0801530-001 Diss	08022156SW-F		100U	
K0801530-003	08022453SW		100U	
K0801530-005	08022555SW		100U	
K0801530-005 Diss	08022555SW-F		100U	
K0801530-007	08022762SW		100U	
K0801530-007 Diss	08022762SW-F		100U	
K0801530-009	08022757SW		100U	
K0801530-009 Diss	08022757SW-F		100U	
K0801765-003 Diss	0803060SW-F	arsenic	1.10U	continuing calibration blank detection
K0801765-005 Diss	08030661SW-F		1.14U	
K0802104-001	08030758SW		1.05U	
K0802104-001 Diss	08030758SW-F		1.15U	
K0801765-003	0803060SW	cadmium	0.020U	
K0801765-005	08030661SW		0.020U	
K0802104-001	08030758SW		0.020U	
K0801765-001	08022959SW	thallium	0.037U	
K0801765-001 Diss	08022959SW-F		0.024U	
K0801765-003	0803060SW		0.024U	
K0801765-003 Diss	0803060SW-F		0.020U	
K0801765-005	08030661SW		0.027U	
K0801765-005 Diss	08030661SW-F		0.020U	
K0802104-001	08030758SW		0.020U	

Table 4. Summary of Qualifiers for Infiltrax Samples (PAHs and Phthalate Esters)

Quality Control Summary Report for Analytical Chemistry

February/March 2008 Sampling Event

Parameter Method			Polynuclear Aromatic Hydrocarbons (PAHs) (units = ng/L or ppt) Axys Labs Method MLA-021															Phthalate Esters (units = ng/L or ppt) Axys Labs Method MLA-027						
Sample Station	URS ID	Lab ID	Acenaphthene Lab Qualifier URS Review Qualifier	Anthracene Lab Qualifier URS Review Qualifier	Benz(a)anthracene Lab Qualifier URS Review Qualifier	Benzo(a)pyrene Lab Qualifier URS Review Qualifier	Benzo(b)fluoranthene Lab Qualifier URS Review Qualifier	Benzo(g,h,i)perylene Lab Qualifier URS Review Qualifier	Benzo(j,k)fluoranthenes Lab Qualifier URS Review Qualifier	Chrysene Lab Qualifier URS Review Qualifier	Dibenz(a,h)anthracene Lab Qualifier URS Review Qualifier	Fluoranthene Lab Qualifier URS Review Qualifier	Indeno(1,2,3-cd)pyrene Lab Qualifier URS Review Qualifier	Phenanthrene Lab Qualifier URS Review Qualifier	Bis(2-ethylhexyl) Phthalate Lab Qualifier URS Review Qualifier	Butyl Benzyl Phthalate Lab Qualifier URS Review Qualifier	Di-n-butyl Phthalate Lab Qualifier URS Review Qualifier	Di-n-octyl Phthalate Lab Qualifier URS Review Qualifier						
Column Fraction																								
P52	08021252X	L10998-1	0.706	0.08 K U	0.01 U		0.02 U		0.02 U		0.01 U		0.02 U		0.52 U	0.01 U	1.39	11.8 U	0.42 U	1.97 U	0.31 K U			
P53	08022453X	L10998-2	1.12	0.08 K U	0.01 K J-EMPC	0.02 U	0.01 U		0.01 U		0.02 U		0.02 U		0.54 U	0.01 U	1.27	10.5 U	0.32 U	0.8 U	0.15 U			
P54	08021354X	L10998-3	0.894	0.06 K U	0.01		0.03 U		0.02 U		0.01 U		0.02 U		0.56 U	0.01 U	1.5	8.77 U	2.29 K U	0.93 U	0.85 U			
P55	08022555X	L10998-4	1.26	0.1 K U	0.02		0.02 U		0.01 U		0.02 U		0.01 U		0.56 U	0.02 U	1.28	7.92 U	0.27 U	0.57 U	0.13 U			
P56	08022156X	L10998-5	1.03	0.08 K U	0.01		0.01 U		0.01 K J-EMPC		0.02 U		0.01 U		0.57 U	0.02 U	1.39	6.52 U	0.26 U	0.56 U	0.11 U			
P57	08022757X	L10998-6	1.28	0.08 K U	0.01 K J-EMPC	0.02 U	0.01 U		0.02 U		0.01 U		0.02 U		0.49 U	0.02 U	1.26	17 U	0.45 U	0.66 U	0.19 U			
P58	08030758X	L10998-7	0.862	0.07 K U	0.02 U		0.01 U		0.01 U		0.01 U		0.01 U		0.59 U	0.01 U	1.2	15.5 U	0.50 U	0.73 U	0.20 U			
P59	08022959X	L10998-8	2.41	0.13 K U	0.02		0.02 U		0.01 U		0.02 U		0.02 U		0.63 U	0.02 U	1.52	9.13 U	0.32 U	0.64 K U	0.16 K U			
P60	08030460X	L10998-9	1.57	0.08 K U	0.02		0.02 U		0.01 U		0.02 U		0.01 U		0.63 U	0.02 U	1.46	5.77 U	0.30 U	0.63 U	0.10 K U			
P61	08030661X	L10998-10	0.971	0.06 K U	0.01		0.01 U		0.01 U		0.02 U		0.01 U		0.62 U	0.02 U	1.23	8.37 U	0.26 U	0.52 U	0.09 U			
Filter Fraction																								
P52	08021252X	L11001-1	0.0329 U	0.03	0.05 K U		0.04 U		0.07 U		0.04 U		0.04 U		0.14 U	0.05 K U	0.09 U	4.51 U	0.20 U	0.27 U	0.25 K U			
53	08022453X	L11001-2	0.0282 U	0.03	0.03 U		0.05 U		0.03 U		0.02 U		0.03 U		0.12 U	0.03 K U	0.11 U	3.74 U	0.16 U	0.28 U	0.1 K U			
54	08021354X	L11001-3	0.015 U	0.03	0.05 U		0.05 U		0.08 K J-EMPC		0.05 U		0.05 U		0.11 U	0.04 K U	0.11 U	4.63 U	0.16 U	0.25 U	0.16 K U			
55	08022555X	L11001-4	0.0191 U	0.02	0.03 U		0.02 K U		0.04 U		0.03 K U		0.04 U		0.07 U	0.03 K U	0.07 U	3.47 U	0.15 U	0.2 U	0.21 K U			
56	08022156X	L11001-5	0.0275 U	0.03	0.05 U		0.06 K U		0.08 U		0.04 K U		0.04 U		0.13 U	0.04 K U	0.19 U	3.41 U	0.18 U	0.3 U	0.14 U			
57	08022757X	L11001-6	0.0161 U	0.01	0.02 U		0.02 U		0.02 U		0.03 K U		0.02 U		0.05 U	0.03 K U	0.06 U	2.76 U	0.20 U	0.29 U	0.13 K U			
58	08030758X	L11001-7	0.0262 U	0.02	0.02 U		0.02 U		0.02 K U		0.02 U		0.02 U		0.10 U	0.02 U	0.09 U	6.76 U	5.47 K U	0.55 U	1.1 K U			
59	08022959X	L11001-8	0.0213 U	0.02	0.03 U		0.03 K U		0.03 K U		0.02 K U		0.03 U		0.07 U	0.01 U	0.07 U	2.75 U	0.16 U	0.24 U	0.12 K U			
60	08030460X	L11001-9	0.0328 U	0.02	0.04 U		0.04 U		0.06 U		0.03 K U		0.03 U		0.08 U	0.03 K U	0.11 U	13 U	0.45 K U	0.6 U	0.29 K U			
61	08030661X	L11001-10	0.0141 U	0.02	0.04 U		0.04 U		0.05 U		0.04 K U		0.06 U		0.09 U	0.04 K U	0.11 U	5.01 U	0.40 K U	0.32 U	0.18 K U			

Notes:

J = The reported value is an estimate.

J-EMPC = The analyte was not positively identified; the associated numerical value is the Estimated Maximum Potential Concentration.

K = Peak detected but did not meet quantification criteria; the reported value may be interpreted as an 'estimated' maximum possible concentration.

NE = Not Established

ng/L = nanogram per Liter

ppt = parts per trillion

U = The analyte was not detected above the reported MRL.

UJ = The analyte was not detected. The reported sample quantification limit is an estimate.

Table 5c. Summary of Qualifiers for Infiltrax Samples (Congeners)

Quality Control Summary Report for Analytical Chemistry
February/March 2008 Sampling Event

IUPAC #	COELUTING CONGENERS ¹	08030661XAD L10998-10 (Column)	Lab Qualifier	URS Review Qualifier	08030758XAD L10998-7 (Column)	Lab Qualifier	URS Review Qualifier
1		0.18			0.185		
2		0.237			0.236		
3		0.155			0.135		
4		0.391			0.392		
5		0.009	K	J-EMPC	0.013		
6		0.103			0.106		
7		0.033		U	0.037		U
8		0.462			0.501		
9		0.038			0.037		
10		0.016			0.017		
11		107			91.6		
12	12 + 13	0.0055	C U		0.385	C	
13	12 + 13		C12			C12	
14		0.0052	U		0.01		
15		0.737			0.761		
16		0.302			0.289		
17		0.243			0.25		
18	18 + 30	0.657	C		0.646	C	
19		0.09			0.091		
20	20 + 28	0.728	C		1.02	C	
21	21 + 33	0.286	C		0.0022	C U	
22		0.282			0.267		
23		0.002	K	U	0.0025	U	
24		0.013			0.012		
25		0.043	K	J-EMPC	0.049		
26	26 + 29	0.121	C		0.124	C	
27		0.052			0.054		
28	20 + 28		C20			C20	
29	26 + 29		C26			C26	
30	18 + 30		C18			C18	
31		0.588			0.612		
32		0.136			0.149		
33	21 + 33		C21			C21	
34		0.006	K	U	0.003	K	U
35		0.103			0.091		
36		0.022			0.021		
37		0.146			0.146		
38		0.004			0.013	K	J-EMPC
39		0.005	K	J-EMPC	0.005		
40	40 + 41 + 71	0.229	C		0.219	C	
41	40 + 41 + 71		C40			C40	
42		0.125			0.123		
43		0.02			0.021		
44	44 + 47 + 65	0.736	C		0.801	C	
45	45 + 51	0.105	C		0.11	C	
46		0.031			0.033		
47	44 + 47 + 65		C44			C44	
48		0.0015	U		0.002	U	
49	49 + 69	0.294	C		0.3	C	
50	50 + 53	0.094	C		0.092	C	
51	45 + 51		C45			C45	
52		0.0014	U		0.99		
53	50 + 53		C50			C50	
54		0.001		U	0.0014	U	
55		0.008			0.008		
56		0.165			0.14		
57		0.0062	U		0.0068	U	
58		0.0065	U		0.0069	U	
59	59 + 62 + 75	0.048	C		0.052	C	
60		0.089			0.075		
61	61 + 70 + 74 + 76	0.783	C		0.791	C	
62	59 + 62 + 75		C59			C59	
63		0.018			0.016		
64		0.213			0.217		
65	44 + 47 + 65		C44			C44	
66		0.318			0.313		
67		0.014			0.013	K	J-EMPC
68		0.0066	U		0.017		U
69	49 + 69		C49			C49	
70	61 + 70 + 74 + 76		C61			C61	
71	40 + 41 + 71		C40			C40	
72		0.0061	U		0.0068	U	
73		0.012			0.0015	U	
74	61 + 70 + 74 + 76		C61			C61	
75	59 + 62 + 75		C59			C59	
76	61 + 70 + 74 + 76		C61			C61	
77		0.08			0.092		
78		0.0068	U		0.0067	U	
79		0.011			0.021		
80		0.0055	U		0.0061	U	
81		0.0066	U		0.007	U	
82		0.057			0.061		
83	83 + 99	0.324	C		0.342	C	
84		0.165			0.175		
85	85 + 116 + 117	0.104	C		0.101	C	
86	86 + 87 + 97 + 108 + 119 + 125	0.468	C		0.482	C	
87	86 + 87 + 97 + 108 + 119 + 125		C86			C86	
88	88 + 91	0.076	C		0.08	C	
89		0.005	K	J-EMPC	0.004	K	J-EMPC
90	90 + 101 + 113	0.649	C		0.675	C	
91	88 + 91		C88			C88	
92		0.125			0.125		
93	93 + 95 + 98 + 100 + 102	0.637	C		0.691	C	
94		0.003			0.0027	U	
95	93 + 95 + 98 + 100 + 102		C93			C93	
96		0.004	K	J-EMPC	0.004	K	J-EMPC
97	86 + 87 + 97 + 108 + 119 + 125		C86			C86	
98	93 + 95 + 98 + 100 + 102		C93			C93	
99	83 + 99		C83			C83	
100	93 + 95 + 98 + 100 + 102		C93			C93	
101	90 + 101 + 113		C90			C90	
102	93 + 95 + 98 + 100 + 102		C93			C93	
103		0.005	K	J-EMPC	0.004		
104		0.0009	U		0.0009	U	
105		0.16			0.178		
106		0.0061	U		0.003	U	
107	107 + 124	0.024	C K	J-EMPC	0.019	C	
108	86 + 87 + 97 + 108 + 119 + 125		C86			C86	
109		0.034			0.033		
110	110 + 115	0.781	C		0.74	C	
111		0.0018	U		0.0018	U	
112		0.0018	U		0.0018	U	
113	90 + 101 + 113		C90			C90	
114		0.009		U	0.011		U
115	110 + 115		C110			C110	

Table 5c. Summary of Qualifiers for Infiltrax Samples (Congeners)

Quality Control Summary Report for Analytical Chemistry
February/March 2008 Sampling Event

IUPAC #	COELUTING CONGENERS ¹	08030661XAD L10998-10 (Column)	Lab Qualifier	URS Review Qualifier	08030758XAD L10998-7 (Column)	Lab Qualifier	URS Review Qualifier
116	85 + 116 + 117		C85			C85	
117	85 + 116 + 117		C85			C85	
118		0.552			0.593		
119	86 + 87 + 97 + 108 + 119 + 125		C86			C86	
120		0.002	K	J-EMPC	0.002		
121		0.0018	U		0.0019	U	
122		0.0066	U		0.004	K	J-EMPC
123		0.011		U	0.014	K	U
124	107 + 124		C107			C107	
125	86 + 87 + 97 + 108 + 119 + 125		C86			C86	
126		0.007	K	U	0.006		U
127		0.0064	U		0.0029	U	
128	128 + 166	0.049	C		0.044	C	
129	129 + 138 + 160 + 163	0.388	C		0.375	C	
130		0.021			0.02		
131		0.005			0.0034	U	
132		0.106			0.111		
133		0.007	K	U	0.005	K	U
134	134 + 143	0.019	C		0.021	C K	J-EMPC
135	135 + 151 + 154	0.128	C		0.133	C	
136		0.036			0.043		
137		0.017			0.012		
138	129 + 138 + 160 + 163		C129			C129	
139	139 + 140	0.007	C K	J-EMPC	0.0031	C U	
140	139 + 140		C139			C139	
141		0.042	K	J-EMPC	0.044		
142		0.0019	U		0.0034	U	
143	134 + 143		C134			C134	
144		0.015			0.015		
145		0.0009	U		0.0013	U	
146		0.063			0.061		
147	147 + 149	0.307	C		0.322	C	
148		0.0011	U		0.0016	U	
149	147 + 149		C147			C147	
150		0.0008	U		0.0012	U	
151	135 + 151 + 154		C135			C135	
152		0.0008	U		0.001	K	J-EMPC
153	153 + 168	0.402	C		0.406	C	
154	135 + 151 + 154		C135			C135	
155		0.002		U	0.001		U
156	156 + 157	0.034	C	U	0.036	C	U
157	156 + 157		C156			C156	
158		0.031			0.031		
159		0.002			0.002	K	J-EMPC
160	129 + 138 + 160 + 163		C129			C129	
161		0.0013	U		0.0024	U	
162		0.0014	U		0.0023	U	
163	129 + 138 + 160 + 163		C129			C129	
164		0.021			0.022		
165		0.0015	U		0.0027	U	
166	128 + 166		C128			C128	
167		0.018	K	U	0.018		U
168	153 + 168		C153			C153	
169		0.0014	U		0.0024	U	
170		0.02	K	U	0.025	K	U
171	171 + 173	0.005	C K	J-EMPC	0.009	C	
172		0.005			0.006		
173	171 + 173		C171			C171	
174		0.033			0.036		
175		0.002			0.002	K	J-EMPC
176		0.004	K	J-EMPC	0.005		
177		0.024			0.023		
178		0.009			0.012	K	J-EMPC
179		0.018			0.019		
180	180 + 193	0.078	C		0.105	C	
181		0.001	U		0.0015	U	
182		0.001	K	U	0.0015	U	
183	183 + 185	0.031	C		0.032	C	
184		0.0007	U		0.0012	U	
185	183 + 185		C183			C183	
186		0.0008	U		0.0012	U	
187		0.098			0.09		
188		0.0007	U		0.0011	U	
189		0.0014	U		0.0021	U	
190		0.01			0.008		
191		0.002	K	J-EMPC	0.0012	U	
192		0.0009	U		0.0013	U	
193	180 + 193		C180			C180	
194		0.016	K	J-EMPC	0.029		
195		0.005	K	J-EMPC	0.009		
196		0.011			0.03		
197	197 + 200	0.007	C		0.009	C	
198	198 + 199	0.046	C		0.086	C	
199	198 + 199		C198			C198	
200	197 + 200		C197			C197	
201		0.006	K	J-EMPC	0.008		
202		0.01	K	U	0.015	K	U
203		0.032			0.076		
204		0.0008	U		0.0013	U	
205		0.002	K	U	0.002	K	U
206		0.014	K	J-EMPC	0.04		
207		0.005	K	J-EMPC	0.013		
208		0.011		U	0.027		
209		0.009		U	0.016	K	U

Notes:

All results are in units of pg/L (picograms/Liter)

C = concentration represents coeluting congeners

U = The analyte was not detected above the reported sample quantification limit.

J = The reported value is an estimate.

J-EMPC = The analyte was not positively identified; the associated numerical value is the Estimated Maximum Potential Concentration.

K = A peak was detected that did not meet all criteria for identification as the target analyte; the reported value is the estimated maximum possible concentration of analyte present.

Non-detect values reported at the analytical reporting limit

PCBs = Polychlorinated Biphenyls

RL = method reporting limit

¹= When two or more congeners can not be resolved in the chromatogram they are considered to be 'coeluting' and are reported as a single concentration. This concentration is reported once for all the coeluting congeners, to eliminate possible errors during congener summation.

Table 5f. Summary of Qualifiers for Infiltrax Samples (Congeners)

Quality Control Summary Report for Analytical Chemistry
February/March 2008 Sampling Event

IUPAC #	COELUTING CONGENERS ¹	08030661XAD L11001-10 (Filter)	Lab Qualifier	URS Review Qualifier	08030758XAD L11001-7 (Filter)	Lab Qualifier	URS Review Qualifier
117	85 + 116 + 117		C85			C85	
118		1.22			0.932		
119	86 + 87 + 97 + 108 + 119 + 125		C86			C86	
120		0.002			0.005		
121		0.0011	U		0.0012	U	
122		0.008			0.007		
123		0.026	K	U	0.019	K	U
124	107 + 124		C107			C107	
125	86 + 87 + 97 + 108 + 119 + 125		C86			C86	
126		0.008	K	U	0.007		U
127		0.0041	U		0.0037	U	
128	128 + 166	0.156	C		0.127	C	
129	129 + 138 + 160 + 163	1.11	C		1.04	C	
130		0.058			0.049		
131		0.01	K	J-EMPC	0.007		
132		0.247			0.2		
133		0.017			0.011	K	J-EMPC
134	134 + 143	0.035	C		0.025	C K	J-EMPC
135	135 + 151 + 154	0.285	C		0.237	C	
136		0.07			0.061		
137		0.048			0.037		
138	129 + 138 + 160 + 163		C129			C129	
139	139 + 140	0.016	C		0.012	C	
140	139 + 140		C139			C139	
141		0.122			0.1		
142		0.0034	U		0.0043	U	
143	134 + 143		C134			C134	
144		0.033			0.025		
145		0.0008	U		0.0009	U	
146		0.167			0.161		
147	147 + 149	0.725	C		0.634	C	
148		0.002			0.001	K	J-EMPC
149	147 + 149		C147			C147	
150		0.001	K	J-EMPC	0.001	K	J-EMPC
151	135 + 151 + 154		C135			C135	
152		0.0008	U		0.0008	U	
153	153 + 168	1.26	C		1.18	C	
154	135 + 151 + 154		C135			C135	
155		0.003	K	U	0.003	K	U
156	156 + 157	0.104	C		0.094	C	
157	156 + 157		C156			C156	
158		0.084			0.074		
159		0.007	K	J-EMPC	0.005	K	J-EMPC
160	129 + 138 + 160 + 163		C129			C129	
161		0.0024	U		0.0031	U	
162		0.003	K	J-EMPC	0.0032	U	
163	129 + 138 + 160 + 163		C129			C129	
164		0.055			0.048	K	J-EMPC
165		0.0027	U		0.0034	U	
166	128 + 166		C128			C128	
167		0.06			0.057		
168	153 + 168		C153			C153	
169		0.0024	U		0.0034	U	
170		0.14			0.106		
171	171 + 173	0.054	C		0.04	C K	J-EMPC
172		0.031			0.024		
173	171 + 173		C171			C171	
174		0.145			0.108		
175		0.008			0.009		
176		0.02			0.017	K	J-EMPC
177		0.11			0.09		
178		0.037			0.033	K	J-EMPC
179		0.07			0.068		
180	180 + 193	0.389	C		0.321	C	
181		0.002	K	J-EMPC	0.002		
182		0.0008	U		0.0008	U	
183	183 + 185	0.122	C		0.119	C	
184		0.002	K	J-EMPC	0.002	K	J-EMPC
185	183 + 185		C183			C183	
186		0.0008	U		0.0008	U	
187		0.323			0.276		
188		0.001		U	0.002	K	U
189		0.005	K	U	0.004	K	U
190		0.05	K	J-EMPC	0.043	K	J-EMPC
191		0.006			0.005	K	J-EMPC
192		0.0008	U		0.0008	U	
193	180 + 193		C180			C180	
194		0.069			0.048		
195		0.033			0.018		
196		0.041			0.031		
197	197 + 200	0.013	C		0.01	C	
198	198 + 199	0.096	C		0.075	C	
199	198 + 199		C198			C198	
200	197 + 200		C197			C197	
201		0.013	K	J-EMPC	0.008		
202		0.029			0.021		
203		0.073			0.064		
204		0.0008	U		0.001	K	J-EMPC
205		0.006		U	0.004	K	U
206		0.048			0.039		
207		0.007	K	J-EMPC	0.007	K	J-EMPC
208		0.02		U	0.02		U
209		0.062			0.048		

Notes:

All results are in units of pg/L (picograms/Liter)

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U = The analyte was not detected above the reported sample quantification limit.

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J-EMPC = The analyte was not positively identified; the associated numerical value is the Estimated Maximum Potential Concentration.

K = A peak was detected that did not meet all criteria for identification as the target analyte; the reported value is the estimated maximum possible concentration of analyte present.

Non-detect values reported at the analytical reporting limit

PCBs = Polychlorinated Biphenyls

RL = method reporting limit

¹ = When two or more congeners can not be resolved in the chromatogram they are considered to be 'coeluting' and are reported as a single concentration. This concentration is reported once for all the coeluting congeners, to eliminate possible errors during congener summation.

Table 6. Infiltrax Sampling Recovery Standards
Quality Control Summary Report for Analytical Chemistry
February/March 2008 Sampling Event

Station Number	URS ID	Date Collected	Alys ID (Column)	Anthracene-d10	PCB 31L	PCB 95L	PCB 153L
				% recovery			
52	08021252XAD	12-Feb-08	L10998-1	106	100	101	91.1
53	08022453XAD	24-Feb-08	L10998-2	105	94.1	93.8	96.4
54	08021354XAD	13-Feb-08	L10998-3	105	106	95.2	95.7
55	08022555XAD	25-Feb-08	L10998-4	105	96.3	94.3	95.8
56	08022156XAD	21-Feb-08	L10998-5	103	101	90.0	93.7
57	08022757XAD	27-Feb-08	L10998-6	105	92.6	93.7	94.1
58	08030758XAD	7-Mar-08	L10998-7	101	97.5	99.8	99.7
59	08022959XAD	29-Feb-08	L10998-8	104	89.1	96.3	88.4
60	08030460XAD	4-Mar-08	L10998-9	101	92.7	91.7	91
61	08030661XAD	6-Mar-08	L10998-10	104	90.4	94.4	96.1
Field Blank	080306FBXAD	6-Mar-08	L10998-11	111	95.6	102	93.9

Notes:

Alys spiked carbon-13 labeled PCBs and deuterated anthracene onto the Infiltrax columns prior to shipment to URS. High recoveries of these standards indicate little to no loss of adsorbed analytes during the sampling event.