

APPENDIX C. ANALYTICAL METHODS AND REPORTING LIMITS

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Table C-1. Methods and RL goals for conventional analyses

Analyte	Method	Unit	RL
TSS	SM 2540 D-97	mg/L	1.0
TOC	SM 5310 B-00	mg/L	0.500
DOC	SM 5310 B-00	mg/L	0.500

DOC – dissolved organic carbon

RL – reporting limit

SM- Standard Methods

TOC – total organic carbon

TSS – total suspended solids

Table C-2. Method and RL goals for dioxins/furans

Analyte	EPA Method 1613B	
	Water (pg/L) Based on a 1-L sample	
	EDL ^a	LMCL ^b
2,3,7,8-TCDD	0.50	2.0
1,2,3,7,8-PeCDD	0.50	10.0
1,2,3,4,7,8-HxCDD	0.50	10.0
1,2,3,6,7,8-HxCDD	0.50	10.0
1,2,3,7,8,9-HxCDD	0.50	10.0
1,2,3,4,6,7,8-HpCDD	0.50	10.0
OCDD	0.50	20.0
2,3,7,8-TCDF	0.50	2.0
1,2,3,7,8-PeCDF	0.50	10.0
2,3,4,7,8-PeCDF	0.50	10.0
1,2,3,4,7,8-HxCDF	0.50	10.0
1,2,3,6,7,8-HxCDF	0.50	10.0
1,2,3,7,8,9-HxCDF	0.50	10.0
2,3,4,6,7,8-HxCDF	0.50	10.0
1,2,3,4,6,7,8-HpCDF	0.50	10.0
1,2,3,4,7,8,9-HpCDF	0.50	10.0
OCDF	0.50	20.0

^a EDL is a sample-specific DL. The value provided here is an estimate, and the sample-specific values will vary based on sample mass and the analytical conditions at the time of analysis

^b LMCL is Axys's lowest calibration limit. Detected values below the LMCL are J-qualified. The reported LMCL will be adjusted based on the sample mass of each sample.

Axys – Axys Analytical Services, Ltd.

DL – detection limit

EPA – US Environmental Protection Agency

EDL – estimated detection limit

HpCDD – heptachlorodibenzo-p-dioxin

HpCDF – heptachlorodibenzofuran

HxCDD – hexachlorodibenzo-p-dioxin

HxCDF – hexachlorodibenzofuran

LMCL – lower method calibration limit

OCDD – octachlorodibenzo-p-dioxin

OCDF – octachlorodibenzofuran

PeCDD – pentachlorodibenzo-p-dioxin

PeCDF – pentachlorodibenzofuran

RL – reporting limit

TCDD – tetrachlorodibenzo-p-dioxin

TCDF – tetrachlorodibenzofuran

Table C-3 Seep analytical methods, MDLs, RL goals, and WQC

Analyte	Method	Unit	MDL	RL	National Recommended AWQC	Washington State Criteria ^a
					Marine Aquatic Life	
					CCC (Chronic)	Chronic
Metals						
Arsenic	EPA 6020A UCT-KED	µg/L	0.022	0.200	36 ^b	36 ^b
Cadmium	EPA 6020A UCT-KED	µg/L	0.030	0.100	7.9 ^b	9.3 ^b
Chromium	EPA 6020A	µg/L	0.130	0.500	—	—
Copper	EPA 6020A UCT-KED	µg/L	0.340	0.500	3.1 ^b	3.1 ^b
Lead	EPA 6020A	µg/L	0.068	0.100	8.1 ^b	8.1 ^b
Mercury	EPA 7470A	µg/L	0.0026	0.020	0.94 ^b	0.025
Silver	EPA 6020A	µg/L	0.017	0.200	—	—
Zinc	EPA 6020A UCT-KED	µg/L	0.820	4	81 ^b	81 ^b
PAHs						
Acenaphthene	EPA 8270D-SIM	µg/L	0.00289	0.0100	—	—
Anthracene	EPA 8270D-SIM	µg/L	0.00116	0.0100	—	—
Benzo(a)anthracene	EPA 8270D-SIM	µg/L	0.000750	0.0100	—	—
Benzo(a)pyrene	EPA 8270D-SIM	µg/L	0.00248	0.0100	—	—
Benzo(b)fluoranthene	EPA 8270D-SIM	µg/L	0.000460	0.0100	—	—
Benzo(j)fluoranthene	EPA 8270D-SIM	µg/L	0.00187	0.0100	—	—
Benzo(k)fluoranthene	EPA 8270D-SIM	µg/L	0.00321	0.0100	—	—
Benzo(g,h,i)perylene	EPA 8270D-SIM	µg/L	0.00142	0.0100	—	—
Chrysene	EPA 8270D-SIM	µg/L	0.000900	0.0100	—	—
Dibenzo(a,h)anthracene	EPA 8270D-SIM	µg/L	0.00134	0.0100	—	—
Fluoranthene	EPA 8270D-SIM	µg/L	0.00171	0.0100	—	—
Fluorene	EPA 8270D-SIM	µg/L	0.00152	0.0100	—	—
Indeno(1,2,3-cd)pyrene	EPA 8270D-SIM	µg/L	0.00101	0.0100	—	—
2-Methylnaphthalene	EPA 8270D-SIM	µg/L	0.00102	0.0100	—	—
Naphthalene	EPA 8270D-SIM	µg/L	0.00131	0.0100	—	—

Table C-3 Seep analytical methods, MDLs, RL goals, and WQC

Analyte	Method	Unit	MDL	RL	National Recommended AWQC	Washington State Criteria ^a
					Marine Aquatic Life	
					CCC (Chronic)	Chronic
Phenanthrene	EPA 8270D-SIM	µg/L	0.00130	0.0100	—	—
Pyrene	EPA 8270D-SIM	µg/L	0.00118	0.0100	—	—
PCB Aroclors^c						
Aroclor 1016	Mod EPA 8082A	µg/L	0.0025	0.010 ^d	—	—
Aroclor 1221	Mod EPA 8082A	µg/L	0.0025	0.010 ^d	—	—
Aroclor 1232	Mod EPA 8082A	µg/L	0.0025	0.010 ^d	—	—
Aroclor 1242	Mod EPA 8082A	µg/L	0.0025	0.010 ^d	—	—
Aroclor 1248	Mod EPA 8082A	µg/L	0.0025	0.010 ^d	—	—
Aroclor 1254	Mod EPA 8082A	µg/L	0.0025	0.010 ^d	—	—
Aroclor 1260	Mod EPA 8082A	µg/L	0.0028	0.010 ^d	—	—
Total PCB Aroclors	Mod EPA 8082A	µg/L	—	—	0.03	0.030
SVOCs						
1,2-Dichlorobenzene	EPA 8270D	µg/L	0.231	1.00	—	—
1,2,4-Tetrachlorobenzene	EPA 8270D	µg/L	0.227	1.00	—	—
1,4-Dichlorobenzene	EPA 8270D	µg/L	0.212	1.00	—	—
2,4-Dimethylphenol	EPA 8270D	µg/L	0.350	3.00	—	—
4-Methylphenol	EPA 8270D	µg/L	0.445	2.00	—	—
Benzoic acid	EPA 8270D	µg/L	3.03	20.0	—	—
Benzyl alcohol	EPA 8270D	µg/L	0.607	2.00	—	—
Bis(2-ethylhexyl)phthalate	EPA 8270D	µg/L	0.345	3.00	—	—
Butyl benzyl phthalate	EPA 8270D	µg/L	0.320	1.00	—	—
Dibenzofuran	EPA 8270D	µg/L	0.329	1.00	—	—
Dimethyl phthalate	EPA 8270D	µg/L	0.362	1.00	—	—
Hexachlorobenzene	EPA 8270D	µg/L	0.333	1.00	—	—
n-Nitrosodiphenylamine	EPA 8270D	µg/L	0.252	1.00	—	—

Table C-3 Seep analytical methods, MDLs, RL goals, and WQC

Analyte	Method	Unit	MDL	RL	National Recommended AWQC	Washington State Criteria ^a
					Marine Aquatic Life	
					CCC (Chronic)	Chronic
Pentachlorophenol	EPA 8270D	µg/L	1.58	10.0	7.9	7.9
Phenol	EPA 8270D	µg/L	0.154	1.00	—	—
Dioxins/furans						
2,3,7,8-TCDD	EPA 1613B	pg/L	0.62 ^e	2.0	—	—

- ^a Washington State criteria include standards promulgated in WAC 173-201A. Comparison is being made to these criteria as a highly conservative screen only.
- ^b Criteria applied to dissolved fraction.
- ^c If an RL of 39 ng/L or less cannot be achieved for non-detected PCB Aroclor results in any seep sample, the archived sample for that seep will be analyzed for PCB congeners using EPA method 1668c. For individual congeners, the EDL goal will be 1.0 pg/L, and the LMCL goal will be 4.0 pg/L. EDL is a sample-specific DL. The goal value is an estimate, and the sample-specific values will vary based on sample mass and the analytical conditions at the time of analysis. LMCL is Axys's lowest calibration limit. Detected values below the LMCL are J-qualified. The reported LMCL will be adjusted based on the volume or mass of each sample.
- ^d RL value can only be achieved in the absence of matrix interferences. RL values will be elevated if interferences are present in samples.
- ^e EDL is a sample-specific DL. The value provided here is an estimate, and the sample-specific values will vary based on sample mass and the analytical conditions at the time of analysis.

ARI – Analytical Resources, Inc.

AWQC – ambient water quality criteria

Axys – Axys Analytical Services Ltd.

CCC – criterion continuous concentration

CFR – Code of Federal Regulations

DL – detection limit

EPA – US Environmental Protection Agency

EDL – estimated detection limit

LLOQ – lower limit of quantification

LMCL – lower method calibration limit

MDL – method detection limit

na – not applicable

PAH – polycyclic aromatic hydrocarbon

PCB – polychlorinated biphenyl

RL – reporting limit

ROD – Record of Decision

SIM – selective ion monitoring

SVOC – semivolatile organic compound

TCDD – tetrachlorodibenzo-*p*-dioxin

UCT-KED – universal cell technology-kinetic energy discrimination

WAC – Washington Administrative Code

WQC – water quality criteria