P

Site-Specific Tissue Screening Concentrations for Benthic Macroinvertebrates

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Appendix P

Site-Specific Tissue Screening Concentrations for Benthic Macroinvertebrates

This appendix includes an updated version of Table 6-42 from the final Baseline Ecological Risk Assessment (BERA) for the Red Devil Mine (RDM) site (E & E 2014). The table was augmented with site-specific tissue screening concentrations (TSCs) for benthic macroinvertebrates for cadmium, lead, and selenium. The TSCs were developed as described in Section 6.3.6.1 of the final BERA for the RDM site. Table P-1 lists the site-specific benthic-macroinvertebrate TSCs used in the BERA supplement and values used to derive them, including contaminant concentrations in benthic macroinvertebrates and surface water from Red Devil Creek and chronic water quality criteria. Hardness-dependent water quality criteria were adjusted using average hardness of Red Devil Creek surface water (104.2 mg/L as $CaCO_3$).

Reference

Ecology and Environment, Inc. (E & E). 2014. *Final Remedial Investigation Report, Red Devil Mine, Alaska,* prepared for U.S. Department of Interior, Bureau of Land Management, Anchorage Field Office, Anchorage, AK by E & E Seattle, WA.

Table P-1. Benthic Macroinvertebrate TSCs Developed from Water Quality Criteria and Site-Specific Bioconcentration Factors for Red Devil Creek Benthic Macroinvertebrates.

Analyte	Geometric Mean Concentration		BCF (L/kg)[b]			Benthic Macroinvertebrate TSC (mg/kg wet weight)[c,e]
	RDC Benthic Macroinvertebrate Composite Samples (mg/kg wet weight)[a]	RDC Filtered Surface Water (mg/L)		Value (mg/L)	Basis	
Antimony	20.23	0.018	1097	0.03	Suter and Tsao (1996), Tier II SCV	33
Arsenic	115.66	0.021	5489	0.15	EPA (2009a) WQC	823
Barium	6.29	0.029	219	0.194	MacDonald et al. (1999)	42
Beryllium	0.022	0.000006	3627	0.00066	Suter and Tsao (1996), Tier II SCV	2.4
Cadmium	0.097	0.0000048	20208	0.00025	ADEC (2008d) WQC	5.1
Chromium	0.31	0.000086	3588	0.074	EPA (2009a) WQC	266
Cobalt	--	0.000063	--	0.023	Suter and Tsao (1996), Tier II SCV	--
Copper	8.44	0.000206	40917	0.009	EPA (2009a) WQC	368
Iron	985	0.155	6338	1	EPA (2009a) WQC	6,338
Lead	0.143	0.000022	6500	0.0026	ADEC (2008d) WQC	16.9
Manganese	40.11	0.025	1630	0.12	Suter and Tsao (1996), Tier II SCV	196
Mercury	0.92	0.000007	135202	0.000012	EPA (2009a) WQC	1.6
Methylmercury[d]	0.049	1.32E-07	374497	0.0000028	Suter and Tsao (1996), Tier II SCV	1.0
Nickel	1.101	0.000627	1756	0.052	EPA (2009a) WQC	91
Selenium	2.39	0.00015	16176	0.005	EPA (2009a) WQC	81
Thallium	--	0.000002	--	0.012	Suter and Tsao (1996), Tier II SCV	--
Vanadium	0.360	0.000042	8555	0.02	Suter and Tsao (1996), Tier II SCV	171
Zinc	36.7	0.000246	149051	0.118	ADEC (2008d) WQC	17,588

Notes:

a. See Appendix H in BERA Supplement for benthos metals data.

b. BCF = (benthos concentration) / (surface water concentration) = (mg/kg) / (mg/L) = L/kg.

c. TSC = (BCF) x (chronic water quality criterion) = (L/kg) x (mg/L) = mg/kg.

d. Unfiltered surface water concentration. No filtered samples were analyzed for methylmercury.

e. See Section 6.3.6 in final RI (E&E 2014) for method of derivation.

Key:

ADEC = Alaska Department of Environmental Conservation

BCF = Bioconcentration factor (benthic macroinvertebrate concentration / surface water concentration)

EPA = Environmental Protection Agency

Gray Shading = Added for BERA Supplement for Kuskowkim River Assessment Area

L/kg = liters per kilogram

mg/kg = milligrams per kilgram

mg/L = milligrams per liter

RDC = Red Devil Creek

SCV = Secondary Chronic Value

TSC = Tissue Screening Concentration

WQC = Water Quality Criterion