APPENDIX F

CALCULATION OF HAZARDS FOR PLANTS FROM DIRECT CONTACT WITH SOILS/TAILINGS

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APPENDIX F

Plant Hazard Quotients (HQs) for Direct Contact with Soils and Tailings

Richardson Flat Tailings Site

Screening Ecological Risk Assessment

* Average concentration across all depths; duplicate/split samples averaged with field samples.

Reach	Parameter	Station ID	Conc (mg/kg)*	Plant Benchmark (mg/kg dw)		Soil HQ	
				Low	High	Low	High
Background Soils	Arsenic	RF-BG-BG1	11.0	10	100	1E+00	1E-01
Background Soils	Lead	RF-BG-BG1	47.0	50	1000	9E-01	5E-02
Background Soils	Arsenic	RF-BG-BG10	7.0	10	100	7E-01	7E-02
Background Soils	Barium	RF-BG-BG10	220.0	500	NA	4E-01	***NC***
Background Soils	Cadmium	RF-BG-BG10	0.3	4	100	6E-02	3E-03
Background Soils	Chromium	RF-BG-BG10	22.5	1	NA	***2E+01***	***NC***
Background Soils	Copper	RF-BG-BG10	15.5	100	NA	2E-01	***NC***
Background Soils	Lead	RF-BG-BG10	30.5	50	1000	6E-01	3E-02
Background Soils	Mercury	RF-BG-BG10	0.1	35	NA	1E-03	***NC***
Background Soils	Selenium	RF-BG-BG10	2.5	1	NA	***3E+00***	***NC***
Background Soils	Silver	RF-BG-BG10	2.5	2	NA	1E+00	***NC***
Background Soils	Zinc	RF-BG-BG10	93.0	50	500	***2E+00***	2E-01
Background Soils	Arsenic	RF-BG-BG2	8.1	10	100	8E-01	8E-02
Background Soils	Lead	RF-BG-BG2	26.0	50	1000	5E-01	3E-02
Background Soils	Arsenic	RF-BG-BG3	8.6	10	100	9E-01	9E-02
Background Soils	Lead	RF-BG-BG3	22.0	50	1000	4E-01	2E-02
Background Soils	Arsenic	RF-BG-BG4	9.2	10	100	9E-01	9E-02
Background Soils	Lead	RF-BG-BG4	25.0	50	1000	5E-01	3E-02
Background Soils	Arsenic	RF-BG-BG5	11.0	10	100	1E+00	1E-01
Background Soils	Lead	RF-BG-BG5	43.0	50	1000	9E-01	4E-02
Background Soils	Arsenic	RF-BG-BG6	7.0	10	100	7E-01	7E-02
Background Soils	Lead	RF-BG-BG6	30.0	50	1000	6E-01	3E-02
Background Soils	Arsenic	RF-BG-BG7	6.9	10	100	7E-01	7E-02
Background Soils	Lead	RF-BG-BG7	25.0	50	1000	5E-01	3E-02
Background Soils	Arsenic	RF-BG-BG8	14.0	10	100	1E+00	1E-01
Background Soils	Barium	RF-BG-BG8	265.0	500	NA	5E-01	***NC***
Background Soils	Cadmium	RF-BG-BG8	1.0	4	100	3E-01	1E-02
Background Soils	Chromium	RF-BG-BG8	20.0	1	NA	***2E+01***	***NC***
Background Soils	Copper	RF-BG-BG8	29.0	100	NA	3E-01	***NC***
Background Soils	Lead	RF-BG-BG8	84.0	50	1000	***2E+00***	8E-02
Background Soils	Mercury	RF-BG-BG8	0.2	35	NA	4E-03	***NC***
Background Soils	Selenium	RF-BG-BG8	2.5	1	NA	***3E+00***	***NC***
Background Soils	Silver	RF-BG-BG8	2.5	2	NA	1E+00	***NC***
Background Soils	Zinc	RF-BG-BG8	127.0	50	500	***3E+00***	3E-01
Background Soils	Arsenic	RF-BG-BG9	6.7	10	100	7E-01	7E-02
Background Soils	Lead	RF-BG-BG9	98.0	50	1000	***2E+00***	1E-01
Off-Impoundment Soils	Arsenic	RF-OF-T1A	26.0	10	100	***3E+00***	3E-01
Off-Impoundment Soils	Lead	RF-OF-T1A	470.5	50	1000	***9E+00***	5E-01
Off-Impoundment Soils	Arsenic	RF-OF-T1B	11.0	10	100	1E+00	1E-01
Off-Impoundment Soils	Lead	RF-OF-T1B	101.0	50	1000	***2E+00***	1E-01
Off-Impoundment Soils	Arsenic	RF-OF-T1C	8.5	10	100	9E-01	9E-02
Off-Impoundment Soils	Barium	RF-OF-T1C	193.5	500	NA	4E-01	***NC***
Off-Impoundment Soils	Cadmium	RF-OF-T1C	1.0	4	100	3E-01	1E-02
Off-Impoundment Soils	Chromium	RF-OF-T1C	21.5	1	NA	***2E+01***	***NC***
Off-Impoundment Soils	Copper	RF-OF-T1C	24.0	100	NA	2E-01	***NC***
Off-Impoundment Soils	Lead	RF-OF-T1C	77.0	50	1000	***2E+00***	8E-02
Off-Impoundment Soils	Mercury	RF-OF-T1C	0.1	35	NA	1E-03	***NC***
Off-Impoundment Soils	Selenium	RF-OF-T1C	2.5	1	NA	***3E+00***	***NC***
Off-Impoundment Soils	Silver	RF-OF-T1C	2.5	2	NA	1E+00	***NC***
Off-Impoundment Soils	Zinc	RF-OF-T1C	145.0	50	500	***3E+00***	3E-01
Off-Impoundment Soils	Arsenic	RF-OF-T1D	8.5	10	100	8E-01	8E-02
Off-Impoundment Soils	Lead	RF-OF-T1D	76.0	50	1000	***2E+00***	8E-02
Off-Impoundment Soils	Arsenic	RF-OF-T1E	9.1	10	100	9E-01	9E-02
Off-Impoundment Soils	Lead	RF-OF-T1E	53.3	50	1000	1E+00	5E-02
Off-Impoundment Soils	Arsenic	RF-OF-T1F	10.5	10	100	1E+00	1E-01
Off-Impoundment Soils	Lead	RF-OF-T1F	64.5	50	1000	1E+00	6E-02
Off-Impoundment Soils	Arsenic	RF-OF-T1G	9.2	10	100	9E-01	9E-02
Off-Impoundment Soils	Lead	RF-OF-T1G	46.5	50	1000	9E-01	5E-02
Off-Impoundment Soils	Arsenic	RF-OF-T1H	10.0	10	100	1E+00	1E-01
Off-Impoundment Soils	Lead	RF-OF-T1H	32.5	50	1000	7E-01	3E-02
Off-Impoundment Soils	Arsenic	RF-OF-T2A	37.0	10	100	***4E+00***	4E-01
Off-Impoundment Soils	Lead	RF-OF-T2A	471.0	50	1000	***9E+00***	5E-01
Off-Impoundment Soils	Arsenic	RF-OF-T2B	13.0	10	100	1E+00	1E-01

APPENDIX F

Plant Hazard Quotients (HQs) for Direct Contact with Soils and Tailings

Richardson Flat Tailings Site

Screening Ecological Risk Assessment

* Average concentration across all depths; duplicate/split samples averaged with field samples.

Reach	Parameter	Station ID	Conc (mg/kg)*	Plant Benchmark (mg/kg dw)		Soil HQ	
				Low	High	Low	High
Off-Impoundment Soils	Lead	RF-OF-T2B	120.5	50	1000	***2E+00***	1E-01
Off-Impoundment Soils	Arsenic	RF-OF-T2C	129.0	10	100	***1E+01***	1E+00
Off-Impoundment Soils	Lead	RF-OF-T2C	3,308.0	50	1000	***7E+01***	***3E+00***
Off-Impoundment Soils	Arsenic	RF-OF-T2D	279.5	10	100	***3E+01***	***3E+00***
Off-Impoundment Soils	Lead	RF-OF-T2D	6,070.0	50	1000	***1E+02***	***6E+00***
Off-Impoundment Soils	Arsenic	RF-OF-T2E	245.5	10	100	***2E+01***	***2E+00***
Off-Impoundment Soils	Lead	RF-OF-T2E	5,179.5	50	1000	***1E+02***	***5E+00***
Off-Impoundment Soils	Arsenic	RF-OF-T2F	11.3	10	100	1E+00	1E-01
Off-Impoundment Soils	Barium	RF-OF-T2F	233.8	500	NA	5E-01	***NC***
Off-Impoundment Soils	Cadmium	RF-OF-T2F	0.9	4	100	2E-01	9E-03
Off-Impoundment Soils	Chromium	RF-OF-T2F	21.5	1	NA	***2E+01***	***NC***
Off-Impoundment Soils	Copper	RF-OF-T2F	30.3	100	NA	3E-01	***NC***
Off-Impoundment Soils	Lead	RF-OF-T2F	112.5	50	1000	***2E+00***	1E-01
Off-Impoundment Soils	Mercury	RF-OF-T2F	0.1	35	NA	1E-03	***NC***
Off-Impoundment Soils	Selenium	RF-OF-T2F	2.5	1	NA	***3E+00***	***NC***
Off-Impoundment Soils	Silver	RF-OF-T2F	2.5	2	NA	1E+00	***NC***
Off-Impoundment Soils	Zinc	RF-OF-T2F	178.3	50	500	***4E+00***	4E-01
Off-Impoundment Soils	Arsenic	RF-OF-T2G	7.6	10	100	8E-01	8E-02
Off-Impoundment Soils	Lead	RF-OF-T2G	19.5	50	1000	4E-01	2E-02
Off-Impoundment Soils	Arsenic	RF-OF-T2H	8.0	10	100	8E-01	8E-02
Off-Impoundment Soils	Barium	RF-OF-T2H	303.0	500	NA	6E-01	***NC***
Off-Impoundment Soils	Cadmium	RF-OF-T2H	0.6	4	100	2E-01	6E-03
Off-Impoundment Soils	Chromium	RF-OF-T2H	30.5	1	NA	***3E+01***	***NC***
Off-Impoundment Soils	Copper	RF-OF-T2H	24.0	100	NA	2E-01	***NC***
Off-Impoundment Soils	Lead	RF-OF-T2H	48.0	50	1000	1E+00	5E-02
Off-Impoundment Soils	Mercury	RF-OF-T2H	0.1	35	NA	1E-03	***NC***
Off-Impoundment Soils	Selenium	RF-OF-T2H	2.5	1	NA	***3E+00***	***NC***
Off-Impoundment Soils	Silver	RF-OF-T2H	2.5	2	NA	1E+00	***NC***
Off-Impoundment Soils	Zinc	RF-OF-T2H	93.0	50	500	***2E+00***	2E-01
Off-Impoundment Soils	Arsenic	RF-OF-T2I	7.4	10	100	7E-01	7E-02
Off-Impoundment Soils	Lead	RF-OF-T2I	46.5	50	1000	9E-01	5E-02
Off-Impoundment Soils	Arsenic	RF-OF-T2J	8.5	10	100	9E-01	9E-02
Off-Impoundment Soils	Lead	RF-OF-T2J	39.5	50	1000	8E-01	4E-02
Off-Impoundment Soils	Arsenic	RF-OF-T3A	9.3	10	100	9E-01	9E-02
Off-Impoundment Soils	Lead	RF-OF-T3A	55.0	50	1000	1E+00	6E-02
Off-Impoundment Soils	Arsenic	RF-OF-T3B	37.0	10	100	***4E+00***	4E-01
Off-Impoundment Soils	Barium	RF-OF-T3B	225.5	500	NA	5E-01	***NC***
Off-Impoundment Soils	Cadmium	RF-OF-T3B	29.5	4	100	***7E+00***	3E-01
Off-Impoundment Soils	Chromium	RF-OF-T3B	20.5	1	NA	***2E+01***	***NC***
Off-Impoundment Soils	Copper	RF-OF-T3B	89.5	100	NA	9E-01	***NC***
Off-Impoundment Soils	Lead	RF-OF-T3B	812.5	50	1000	***2E+01***	8E-01
Off-Impoundment Soils	Mercury	RF-OF-T3B	3.1	35	NA	9E-02	***NC***
Off-Impoundment Soils	Selenium	RF-OF-T3B	2.5	1	NA	***3E+00***	***NC***
Off-Impoundment Soils	Silver	RF-OF-T3B	2.5	2	NA	1E+00	***NC***
Off-Impoundment Soils	Zinc	RF-OF-T3B	1,366.5	50	500	***3E+01***	***3E+00***
Off-Impoundment Soils	Arsenic	RF-OF-T3C	8.6	10	100	9E-01	9E-02
Off-Impoundment Soils	Lead	RF-OF-T3C	53.5	50	1000	1E+00	5E-02
Off-Impoundment Soils	Arsenic	RF-OF-T3D	7.5	10	100	8E-01	8E-02
Off-Impoundment Soils	Barium	RF-OF-T3D	403.0	500	NA	8E-01	***NC***
Off-Impoundment Soils	Cadmium	RF-OF-T3D	1.0	4	100	3E-01	1E-02
Off-Impoundment Soils	Chromium	RF-OF-T3D	21.3	1	NA	***2E+01***	***NC***
Off-Impoundment Soils	Copper	RF-OF-T3D	33.3	100	NA	3E-01	***NC***
Off-Impoundment Soils	Lead	RF-OF-T3D	53.5	50	1000	1E+00	5E-02
Off-Impoundment Soils	Mercury	RF-OF-T3D	0.1	35	NA	2E-03	***NC***
Off-Impoundment Soils	Selenium	RF-OF-T3D	2.5	1	NA	***3E+00***	***NC***
Off-Impoundment Soils	Silver	RF-OF-T3D	2.5	2	NA	1E+00	***NC***
Off-Impoundment Soils	Zinc	RF-OF-T3D	138.3	50	500	***3E+00***	3E-01
Off-Impoundment Soils	Arsenic	RF-OF-T3E	6.7	10	100	7E-01	7E-02
Off-Impoundment Soils	Lead	RF-OF-T3E	17.5	50	1000	4E-01	2E-02
Off-Impoundment Soils	Arsenic	RF-OF-T3F	7.5	10	100	7E-01	7E-02
Off-Impoundment Soils	Lead	RF-OF-T3F	19.0	50	1000	4E-01	2E-02
Off-Impoundment Soils	Arsenic	RF-OF-T3G	6.5	10	100	7E-01	7E-02
Off-Impoundment Soils	Lead	RF-OF-T3G	27.5	50	1000	6E-01	3E-02

APPENDIX F

Plant Hazard Quotients (HQs) for Direct Contact with Soils and Tailings

Richardson Flat Tailings Site

Screening Ecological Risk Assessment

* Average concentration across all depths; duplicate/split samples averaged with field samples.

Reach	Parameter	Station ID	Conc (mg/kg)*	Plant Benchmark (mg/kg dw)		Soil HQ	
				Low	High	Low	High
Off-Impoundment Soils	Arsenic	RF-OF-T3H	7.0	10	100	7E-01	7E-02
Off-Impoundment Soils	Lead	RF-OF-T3H	27.0	50	1000	5E-01	3E-02
Off-Impoundment Soils	Arsenic	RF-OF-T3I	9.2	10	100	9E-01	9E-02
Off-Impoundment Soils	Lead	RF-OF-T3I	25.0	50	1000	5E-01	3E-02
Off-Impoundment Soils	Arsenic	RF-OF-T3J	9.2	10	100	9E-01	9E-02
Off-Impoundment Soils	Lead	RF-OF-T3J	47.0	50	1000	9E-01	5E-02
Off-Impoundment Soils	Arsenic	SAB-1	12.0	10	100	1E+00	1E-01
Off-Impoundment Soils	Lead	SAB-1	98.0	50	1000	***2E+00***	1E-01
Off-Impoundment Soils	Arsenic	SAB-2	14.0	10	100	1E+00	1E-01
Off-Impoundment Soils	Lead	SAB-2	135.0	50	1000	***3E+00***	1E-01
Off-Impoundment Soils	Arsenic	SAB-3	11.0	10	100	1E+00	1E-01
Off-Impoundment Soils	Lead	SAB-3	75.0	50	1000	***2E+00***	8E-02
Off-Impoundment Soils	Arsenic	SAB-4	12.0	10	100	1E+00	1E-01
Off-Impoundment Soils	Lead	SAB-4	144.0	50	1000	***3E+00***	1E-01
Off-Impoundment Soils	Arsenic	SAB-5	12.0	10	100	1E+00	1E-01
Off-Impoundment Soils	Lead	SAB-5	53.0	50	1000	1E+00	5E-02
Off-Impoundment Soils	Arsenic	SAB-7	30.0	10	100	***3E+00***	3E-01
Off-Impoundment Soils	Lead	SAB-7	165.0	50	1000	***3E+00***	2E-01
Off-Impoundment Soils	Arsenic	SAB-8	23.0	10	100	***2E+00***	2E-01
Off-Impoundment Soils	Lead	SAB-8	63.0	50	1000	1E+00	6E-02
On-Impoundment Soils	Arsenic	RF-ON-1A	15.0	10	100	***2E+00***	2E-01
On-Impoundment Soils	Lead	RF-ON-1A	37.0	50	1000	7E-01	4E-02
On-Impoundment Soils	Arsenic	RF-ON-1B	9.1	10	100	9E-01	9E-02
On-Impoundment Soils	Lead	RF-ON-1B	44.0	50	1000	9E-01	4E-02
On-Impoundment Soils	Arsenic	RF-ON-1C	12.0	10	100	1E+00	1E-01
On-Impoundment Soils	Lead	RF-ON-1C	163.0	50	1000	***3E+00***	2E-01
On-Impoundment Soils	Arsenic	RF-ON-1D	10.0	10	100	1E+00	1E-01
On-Impoundment Soils	Lead	RF-ON-1D	96.0	50	1000	***2E+00***	1E-01
On-Impoundment Soils	Arsenic	RF-ON-1E	20.0	10	100	***2E+00***	2E-01
On-Impoundment Soils	Lead	RF-ON-1E	336.0	50	1000	***7E+00***	3E-01
On-Impoundment Soils	Arsenic	RF-ON-1G	121.0	10	100	***1E+01***	1E+00
On-Impoundment Soils	Lead	RF-ON-1G	3,239.0	50	1000	***6E+01***	***3E+00***
On-Impoundment Soils	Arsenic	RF-ON-2A	13.0	10	100	1E+00	1E-01
On-Impoundment Soils	Lead	RF-ON-2A	49.0	50	1000	1E+00	5E-02
On-Impoundment Soils	Arsenic	RF-ON-2B	78.0	10	100	***8E+00***	8E-01
On-Impoundment Soils	Lead	RF-ON-2B	1,155.0	50	1000	***2E+01***	1E+00
On-Impoundment Soils	Arsenic	RF-ON-2C	7.8	10	100	8E-01	8E-02
On-Impoundment Soils	Lead	RF-ON-2C	19.0	50	1000	4E-01	2E-02
On-Impoundment Soils	Arsenic	RF-ON-2D	6.8	10	100	7E-01	7E-02
On-Impoundment Soils	Lead	RF-ON-2D	19.5	50	1000	4E-01	2E-02
On-Impoundment Soils	Arsenic	RF-ON-2E	44.0	10	100	***4E+00***	4E-01
On-Impoundment Soils	Lead	RF-ON-2E	904.5	50	1000	***2E+01***	9E-01
On-Impoundment Soils	Arsenic	RF-ON-2F	82.0	10	100	***8E+00***	8E-01
On-Impoundment Soils	Lead	RF-ON-2F	2,646.0	50	1000	***5E+01***	***3E+00***
On-Impoundment Soils	Arsenic	RF-ON-2G	12.0	10	100	1E+00	1E-01
On-Impoundment Soils	Lead	RF-ON-2G	59.0	50	1000	1E+00	6E-02
On-Impoundment Soils	Aluminum	RF-ON-2H	22,600.0	50	NA	***5E+02***	***NC***
On-Impoundment Soils	Antimony	RF-ON-2H	2.5	5	NA	5E-01	***NC***
On-Impoundment Soils	Arsenic	RF-ON-2H	3.7	10	100	4E-01	4E-02
On-Impoundment Soils	Barium	RF-ON-2H	206.0	500	NA	4E-01	***NC***
On-Impoundment Soils	Cadmium	RF-ON-2H	0.5	4	100	1E-01	5E-03
On-Impoundment Soils	Chromium	RF-ON-2H	22.3	1	NA	***2E+01***	***NC***
On-Impoundment Soils	Copper	RF-ON-2H	15.0	100	NA	2E-01	***NC***
On-Impoundment Soils	Lead	RF-ON-2H	25.3	50	1000	5E-01	3E-02
On-Impoundment Soils	Mercury	RF-ON-2H	0.1	35	NA	1E-03	***NC***
On-Impoundment Soils	Selenium	RF-ON-2H	2.5	1	NA	***3E+00***	***NC***
On-Impoundment Soils	Silver	RF-ON-2H	2.5	2	NA	1E+00	***NC***
On-Impoundment Soils	Zinc	RF-ON-2H	91.3	50	500	***2E+00***	2E-01
On-Impoundment Soils	Arsenic	RF-ON-3A	49.0	10	100	***5E+00***	5E-01
On-Impoundment Soils	Barium	RF-ON-3A	210.0	500	NA	4E-01	***NC***
On-Impoundment Soils	Cadmium	RF-ON-3A	6.0	4	100	***2E+00***	6E-02
On-Impoundment Soils	Chromium	RF-ON-3A	24.0	1	NA	***2E+01***	***NC***
On-Impoundment Soils	Copper	RF-ON-3A	99.0	100	NA	1E+00	***NC***

APPENDIX F

Plant Hazard Quotients (HQs) for Direct Contact with Soils and Tailings

Richardson Flat Tailings Site

Screening Ecological Risk Assessment

* Average concentration across all depths; duplicate/split samples averaged with field samples.

Reach	Parameter	Station ID	Conc (mg/kg)*	Plant Benchmark (mg/kg dw)		Soil HQ	
				Low	High	Low	High
On-Impoundment Soils	Lead	RF-ON-3A	875.0	50	1000	***2E+01***	9E-01
On-Impoundment Soils	Mercury	RF-ON-3A	0.7	35	NA	2E-02	***NC***
On-Impoundment Soils	Selenium	RF-ON-3A	2.5	1	NA	***3E+00***	***NC***
On-Impoundment Soils	Silver	RF-ON-3A	2.5	2	NA	1E+00	***NC***
On-Impoundment Soils	Zinc	RF-ON-3A	1,010.0	50	500	***2E+01***	***2E+00***
On-Impoundment Soils	Aluminum	RF-ON-3B	22,400.0	50	NA	***4E+02***	***NC***
On-Impoundment Soils	Antimony	RF-ON-3B	2.5	5	NA	5E-01	***NC***
On-Impoundment Soils	Arsenic	RF-ON-3B	36.0	10	100	***4E+00***	4E-01
On-Impoundment Soils	Cadmium	RF-ON-3B	1.0	4	100	3E-01	1E-02
On-Impoundment Soils	Chromium	RF-ON-3B	20.0	1	NA	***2E+01***	***NC***
On-Impoundment Soils	Copper	RF-ON-3B	53.0	100	NA	5E-01	***NC***
On-Impoundment Soils	Lead	RF-ON-3B	528.5	50	1000	***1E+01***	5E-01
On-Impoundment Soils	Mercury	RF-ON-3B	0.2	35	NA	5E-03	***NC***
On-Impoundment Soils	Selenium	RF-ON-3B	2.5	1	NA	***3E+00***	***NC***
On-Impoundment Soils	Silver	RF-ON-3B	2.5	2	NA	1E+00	***NC***
On-Impoundment Soils	Zinc	RF-ON-3B	242.0	50	500	***5E+00***	5E-01
On-Impoundment Soils	Arsenic	RF-ON-3C	6.2	10	100	6E-01	6E-02
On-Impoundment Soils	Lead	RF-ON-3C	15.0	50	1000	3E-01	2E-02
On-Impoundment Soils	Aluminum	RF-ON-3D	17,600.0	50	NA	***4E+02***	***NC***
On-Impoundment Soils	Antimony	RF-ON-3D	10.0	5	NA	***2E+00***	***NC***
On-Impoundment Soils	Arsenic	RF-ON-3D	46.0	10	100	***5E+00***	5E-01
On-Impoundment Soils	Barium	RF-ON-3D	255.0	500	NA	5E-01	***NC***
On-Impoundment Soils	Cadmium	RF-ON-3D	3.5	4	100	9E-01	4E-02
On-Impoundment Soils	Chromium	RF-ON-3D	24.5	1	NA	***2E+01***	***NC***
On-Impoundment Soils	Copper	RF-ON-3D	84.5	100	NA	8E-01	***NC***
On-Impoundment Soils	Lead	RF-ON-3D	574.5	50	1000	***1E+01***	6E-01
On-Impoundment Soils	Mercury	RF-ON-3D	1.0	35	NA	3E-02	***NC***
On-Impoundment Soils	Selenium	RF-ON-3D	2.5	1	NA	***3E+00***	***NC***
On-Impoundment Soils	Silver	RF-ON-3D	2.5	2	NA	1E+00	***NC***
On-Impoundment Soils	Zinc	RF-ON-3D	748.0	50	500	***1E+01***	1E+00
On-Impoundment Soils	Aluminum	RF-ON-3E	21,800.0	50	NA	***4E+02***	***NC***
On-Impoundment Soils	Antimony	RF-ON-3E	2.5	5	NA	5E-01	***NC***
On-Impoundment Soils	Arsenic	RF-ON-3E	4.0	10	100	4E-01	4E-02
On-Impoundment Soils	Barium	RF-ON-3E	360.5	500	NA	7E-01	***NC***
On-Impoundment Soils	Cadmium	RF-ON-3E	0.3	4	100	6E-02	3E-03
On-Impoundment Soils	Chromium	RF-ON-3E	21.7	1	NA	***2E+01***	***NC***
On-Impoundment Soils	Copper	RF-ON-3E	21.3	100	NA	2E-01	***NC***
On-Impoundment Soils	Lead	RF-ON-3E	21.0	50	1000	4E-01	2E-02
On-Impoundment Soils	Mercury	RF-ON-3E	0.1	35	NA	1E-03	***NC***
On-Impoundment Soils	Selenium	RF-ON-3E	2.5	1	NA	***3E+00***	***NC***
On-Impoundment Soils	Silver	RF-ON-3E	2.5	2	NA	1E+00	***NC***
On-Impoundment Soils	Zinc	RF-ON-3E	62.0	50	500	1E+00	1E-01
On-Impoundment Soils	Arsenic	RF-ON-3F	23.0	10	100	***2E+00***	2E-01
On-Impoundment Soils	Lead	RF-ON-3F	231.0	50	1000	***5E+00***	2E-01
On-Impoundment Soils	Arsenic	RF-ON-3G	12.0	10	100	1E+00	1E-01
On-Impoundment Soils	Lead	RF-ON-3G	23.0	50	1000	5E-01	2E-02
On-Impoundment Soils	Arsenic	RF-ON-3H	7.5	10	100	8E-01	8E-02
On-Impoundment Soils	Lead	RF-ON-3H	25.0	50	1000	5E-01	3E-02
On-Impoundment Soils	Arsenic	RF-ON-3I	9.0	10	100	9E-01	9E-02
On-Impoundment Soils	Barium	RF-ON-3I	187.0	500	NA	4E-01	***NC***
On-Impoundment Soils	Cadmium	RF-ON-3I	1.0	4	100	3E-01	1E-02
On-Impoundment Soils	Chromium	RF-ON-3I	20.0	1	NA	***2E+01***	***NC***
On-Impoundment Soils	Copper	RF-ON-3I	25.0	100	NA	3E-01	***NC***
On-Impoundment Soils	Lead	RF-ON-3I	127.0	50	1000	***3E+00***	1E-01
On-Impoundment Soils	Mercury	RF-ON-3I	0.1	35	NA	1E-03	***NC***
On-Impoundment Soils	Selenium	RF-ON-3I	2.5	1	NA	***3E+00***	***NC***
On-Impoundment Soils	Silver	RF-ON-3I	2.5	2	NA	1E+00	***NC***
On-Impoundment Soils	Zinc	RF-ON-3I	209.0	50	500	***4E+00***	4E-01
On-Impoundment Soils	Arsenic	RF-ON-4A	81.0	10	100	***8E+00***	8E-01
On-Impoundment Soils	Lead	RF-ON-4A	1,350.0	50	1000	***3E+01***	1E+00
On-Impoundment Soils	Arsenic	RF-ON-4B	11.0	10	100	1E+00	1E-01
On-Impoundment Soils	Lead	RF-ON-4B	63.0	50	1000	1E+00	6E-02
On-Impoundment Soils	Aluminum	RF-ON-4C	18,900.0	50	NA	***4E+02***	***NC***

APPENDIX F

Plant Hazard Quotients (HQs) for Direct Contact with Soils and Tailings

Richardson Flat Tailings Site

Screening Ecological Risk Assessment

* Average concentration across all depths; duplicate/split samples averaged with field samples.

Reach	Parameter	Station ID	Conc (mg/kg)*	Plant Benchmark (mg/kg dw)		Soil HQ	
				Low	High	Low	High
On-Impoundment Soils	Antimony	RF-ON-4C	2.5	5	NA	5E-01	***NC***
On-Impoundment Soils	Arsenic	RF-ON-4C	12.5	10	100	1E+00	1E-01
On-Impoundment Soils	Barium	RF-ON-4C	240.0	500	NA	5E-01	***NC***
On-Impoundment Soils	Cadmium	RF-ON-4C	2.5	4	100	6E-01	3E-02
On-Impoundment Soils	Chromium	RF-ON-4C	22.5	1	NA	***2E+01***	***NC***
On-Impoundment Soils	Copper	RF-ON-4C	32.5	100	NA	3E-01	***NC***
On-Impoundment Soils	Lead	RF-ON-4C	111.5	50	1000	***2E+00***	1E-01
On-Impoundment Soils	Mercury	RF-ON-4C	0.5	35	NA	1E-02	***NC***
On-Impoundment Soils	Selenium	RF-ON-4C	2.5	1	NA	***3E+00***	***NC***
On-Impoundment Soils	Silver	RF-ON-4C	2.5	2	NA	1E+00	***NC***
On-Impoundment Soils	Zinc	RF-ON-4C	222.5	50	500	***4E+00***	4E-01
On-Impoundment Soils	Aluminum	RF-ON-4D	21,600.0	50	NA	***4E+02***	***NC***
On-Impoundment Soils	Antimony	RF-ON-4D	2.5	5	NA	5E-01	***NC***
On-Impoundment Soils	Arsenic	RF-ON-4D	6.5	10	100	7E-01	7E-02
On-Impoundment Soils	Barium	RF-ON-4D	327.0	500	NA	7E-01	***NC***
On-Impoundment Soils	Cadmium	RF-ON-4D	0.3	4	100	6E-02	3E-03
On-Impoundment Soils	Chromium	RF-ON-4D	22.5	1	NA	***2E+01***	***NC***
On-Impoundment Soils	Copper	RF-ON-4D	28.0	100	NA	3E-01	***NC***
On-Impoundment Soils	Lead	RF-ON-4D	17.5	50	1000	4E-01	2E-02
On-Impoundment Soils	Mercury	RF-ON-4D	0.1	35	NA	1E-03	***NC***
On-Impoundment Soils	Selenium	RF-ON-4D	2.5	1	NA	***3E+00***	***NC***
On-Impoundment Soils	Silver	RF-ON-4D	2.5	2	NA	1E+00	***NC***
On-Impoundment Soils	Zinc	RF-ON-4D	80.0	50	500	***2E+00***	2E-01
On-Impoundment Soils	Arsenic	RF-ON-4E	7.0	10	100	7E-01	7E-02
On-Impoundment Soils	Lead	RF-ON-4E	20.0	50	1000	4E-01	2E-02
On-Impoundment Soils	Aluminum	RF-ON-4F	21,900.0	50	NA	***4E+02***	***NC***
On-Impoundment Soils	Antimony	RF-ON-4F	2.5	5	NA	5E-01	***NC***
On-Impoundment Soils	Arsenic	RF-ON-4F	6.7	10	100	7E-01	7E-02
On-Impoundment Soils	Barium	RF-ON-4F	218.5	500	NA	4E-01	***NC***
On-Impoundment Soils	Cadmium	RF-ON-4F	0.8	4	100	2E-01	8E-03
On-Impoundment Soils	Chromium	RF-ON-4F	17.0	1	NA	***2E+01***	***NC***
On-Impoundment Soils	Copper	RF-ON-4F	24.7	100	NA	2E-01	***NC***
On-Impoundment Soils	Lead	RF-ON-4F	29.3	50	1000	6E-01	3E-02
On-Impoundment Soils	Mercury	RF-ON-4F	0.1	35	NA	3E-03	***NC***
On-Impoundment Soils	Selenium	RF-ON-4F	2.5	1	NA	***3E+00***	***NC***
On-Impoundment Soils	Silver	RF-ON-4F	2.5	2	NA	1E+00	***NC***
On-Impoundment Soils	Zinc	RF-ON-4F	185.3	50	500	***4E+00***	4E-01
On-Impoundment Soils	Aluminum	RF-ON-4G	26,100.0	50	NA	***5E+02***	***NC***
On-Impoundment Soils	Antimony	RF-ON-4G	2.5	5	NA	5E-01	***NC***
On-Impoundment Soils	Arsenic	RF-ON-4G	6.7	10	100	7E-01	7E-02
On-Impoundment Soils	Cadmium	RF-ON-4G	0.3	4	100	6E-02	3E-03
On-Impoundment Soils	Chromium	RF-ON-4G	20.0	1	NA	***2E+01***	***NC***
On-Impoundment Soils	Copper	RF-ON-4G	38.0	100	NA	4E-01	***NC***
On-Impoundment Soils	Lead	RF-ON-4G	22.7	50	1000	5E-01	2E-02
On-Impoundment Soils	Mercury	RF-ON-4G	0.1	35	NA	1E-03	***NC***
On-Impoundment Soils	Selenium	RF-ON-4G	2.5	1	NA	***3E+00***	***NC***
On-Impoundment Soils	Silver	RF-ON-4G	2.5	2	NA	1E+00	***NC***
On-Impoundment Soils	Zinc	RF-ON-4G	100.0	50	500	***2E+00***	2E-01
On-Impoundment Soils	Aluminum	RF-ON-4H	24,700.0	50	NA	***5E+02***	***NC***
On-Impoundment Soils	Antimony	RF-ON-4H	2.5	5	NA	5E-01	***NC***
On-Impoundment Soils	Arsenic	RF-ON-4H	7.0	10	100	7E-01	7E-02
On-Impoundment Soils	Cadmium	RF-ON-4H	0.3	4	100	6E-02	3E-03
On-Impoundment Soils	Chromium	RF-ON-4H	24.0	1	NA	***2E+01***	***NC***
On-Impoundment Soils	Copper	RF-ON-4H	28.0	100	NA	3E-01	***NC***
On-Impoundment Soils	Lead	RF-ON-4H	29.0	50	1000	6E-01	3E-02
On-Impoundment Soils	Mercury	RF-ON-4H	0.1	35	NA	1E-03	***NC***
On-Impoundment Soils	Selenium	RF-ON-4H	2.5	1	NA	***3E+00***	***NC***
On-Impoundment Soils	Silver	RF-ON-4H	2.5	2	NA	1E+00	***NC***
On-Impoundment Soils	Zinc	RF-ON-4H	115.0	50	500	***2E+00***	2E-01
On-Impoundment Soils	Arsenic	RF-ON-4I	17.0	10	100	***2E+00***	2E-01
On-Impoundment Soils	Lead	RF-ON-4I	344.0	50	1000	***7E+00***	3E-01
On-Impoundment Soils	Arsenic	RF-ON-5A	13.0	10	100	1E+00	1E-01
On-Impoundment Soils	Lead	RF-ON-5A	42.0	50	1000	8E-01	4E-02

APPENDIX F

Plant Hazard Quotients (HQs) for Direct Contact with Soils and Tailings

Richardson Flat Tailings Site

Screening Ecological Risk Assessment

* Average concentration across all depths; duplicate/split samples averaged with field samples.

Reach	Parameter	Station ID	Conc (mg/kg)*	Plant Benchmark (mg/kg dw)		Soil HQ	
				Low	High	Low	High
On-Impoundment Soils	Aluminum	RF-ON-5B	18,400.0	50	NA	***4E+02***	***NC***
On-Impoundment Soils	Antimony	RF-ON-5B	2.5	5	NA	5E-01	***NC***
On-Impoundment Soils	Arsenic	RF-ON-5B	4.3	10	100	4E-01	4E-02
On-Impoundment Soils	Barium	RF-ON-5B	198.0	500	NA	4E-01	***NC***
On-Impoundment Soils	Cadmium	RF-ON-5B	0.3	4	100	6E-02	3E-03
On-Impoundment Soils	Chromium	RF-ON-5B	20.5	1	NA	***2E+01***	***NC***
On-Impoundment Soils	Copper	RF-ON-5B	23.0	100	NA	2E-01	***NC***
On-Impoundment Soils	Lead	RF-ON-5B	21.5	50	1000	4E-01	2E-02
On-Impoundment Soils	Mercury	RF-ON-5B	0.1	35	NA	1E-03	***NC***
On-Impoundment Soils	Selenium	RF-ON-5B	2.5	1	NA	***3E+00***	***NC***
On-Impoundment Soils	Silver	RF-ON-5B	2.5	2	NA	1E+00	***NC***
On-Impoundment Soils	Zinc	RF-ON-5B	66.0	50	500	1E+00	1E-01
On-Impoundment Soils	Arsenic	RF-ON-5C	15.0	10	100	***2E+00***	2E-01
On-Impoundment Soils	Lead	RF-ON-5C	159.0	50	1000	***3E+00***	2E-01
On-Impoundment Soils	Aluminum	RF-ON-5D	26,100.0	50	NA	***5E+02***	***NC***
On-Impoundment Soils	Antimony	RF-ON-5D	2.5	5	NA	5E-01	***NC***
On-Impoundment Soils	Arsenic	RF-ON-5D	5.0	10	100	5E-01	5E-02
On-Impoundment Soils	Barium	RF-ON-5D	175.0	500	NA	4E-01	***NC***
On-Impoundment Soils	Cadmium	RF-ON-5D	0.3	4	100	6E-02	3E-03
On-Impoundment Soils	Chromium	RF-ON-5D	36.0	1	NA	***4E+01***	***NC***
On-Impoundment Soils	Copper	RF-ON-5D	26.0	100	NA	3E-01	***NC***
On-Impoundment Soils	Lead	RF-ON-5D	23.0	50	1000	5E-01	2E-02
On-Impoundment Soils	Mercury	RF-ON-5D	0.1	35	NA	1E-03	***NC***
On-Impoundment Soils	Selenium	RF-ON-5D	2.5	1	NA	***3E+00***	***NC***
On-Impoundment Soils	Silver	RF-ON-5D	2.5	2	NA	1E+00	***NC***
On-Impoundment Soils	Zinc	RF-ON-5D	87.5	50	500	***2E+00***	2E-01
On-Impoundment Soils	Arsenic	RF-ON-5E	2.5	10	100	3E-01	3E-02
On-Impoundment Soils	Lead	RF-ON-5E	15.0	50	1000	3E-01	2E-02
On-Impoundment Soils	Arsenic	RF-ON-5F	12.0	10	100	1E+00	1E-01
On-Impoundment Soils	Lead	RF-ON-5F	25.0	50	1000	5E-01	3E-02
On-Impoundment Soils	Arsenic	RF-ON-5G	20.0	10	100	***2E+00***	2E-01
On-Impoundment Soils	Lead	RF-ON-5G	333.0	50	1000	***7E+00***	3E-01
On-Impoundment Soils	Arsenic	RF-ON-5H	9.2	10	100	9E-01	9E-02
On-Impoundment Soils	Lead	RF-ON-5H	52.0	50	1000	1E+00	5E-02
On-Impoundment Soils	Arsenic	RF-ON-6D	17.0	10	100	***2E+00***	2E-01
On-Impoundment Soils	Lead	RF-ON-6D	135.0	50	1000	***3E+00***	1E-01
Site Tailings	Aluminum	RF-TA-TP1	2,260.0	50	NA	***5E+01***	***NC***
Site Tailings	Antimony	RF-TA-TP1	50.7	5	NA	***1E+01***	***NC***
Site Tailings	Arsenic	RF-TA-TP1	219.0	10	100	***2E+01***	***2E+00***
Site Tailings	Cadmium	RF-TA-TP1	27.3	4	100	***7E+00***	3E-01
Site Tailings	Chromium	RF-TA-TP1	8.6	1	NA	***9E+00***	***NC***
Site Tailings	Copper	RF-TA-TP1	522.2	100	NA	***5E+00***	***NC***
Site Tailings	Lead	RF-TA-TP1	4,328.3	50	1000	***9E+01***	***4E+00***
Site Tailings	Mercury	RF-TA-TP1	0.5	35	NA	1E-02	***NC***
Site Tailings	Selenium	RF-TA-TP1	4.7	1	NA	***5E+00***	***NC***
Site Tailings	Silver	RF-TA-TP1	18.5	2	NA	***9E+00***	***NC***
Site Tailings	Zinc	RF-TA-TP1	5,136.7	50	500	***1E+02***	***1E+01***
Site Tailings	Aluminum	RF-TA-TP2	3,986.7	50	NA	***8E+01***	***NC***
Site Tailings	Antimony	RF-TA-TP2	174.9	5	NA	***3E+01***	***NC***
Site Tailings	Arsenic	RF-TA-TP2	308.9	10	100	***3E+01***	***3E+00***
Site Tailings	Cadmium	RF-TA-TP2	42.6	4	100	***1E+01***	4E-01
Site Tailings	Chromium	RF-TA-TP2	30.3	1	NA	***3E+01***	***NC***
Site Tailings	Copper	RF-TA-TP2	475.1	100	NA	***5E+00***	***NC***
Site Tailings	Lead	RF-TA-TP2	5,508.3	50	1000	***1E+02***	***6E+00***
Site Tailings	Mercury	RF-TA-TP2	4.0	35	NA	1E-01	***NC***
Site Tailings	Selenium	RF-TA-TP2	10.7	1	NA	***1E+01***	***NC***
Site Tailings	Silver	RF-TA-TP2	40.8	2	NA	***2E+01***	***NC***
Site Tailings	Zinc	RF-TA-TP2	7,190.8	50	500	***1E+02***	***1E+01***
Site Tailings	Aluminum	RF-TA-TP3	1,987.2	50	NA	***4E+01***	***NC***
Site Tailings	Antimony	RF-TA-TP3	107.7	5	NA	***2E+01***	***NC***
Site Tailings	Arsenic	RF-TA-TP3	224.3	10	100	***2E+01***	***2E+00***
Site Tailings	Cadmium	RF-TA-TP3	33.8	4	100	***8E+00***	3E-01
Site Tailings	Chromium	RF-TA-TP3	18.2	1	NA	***2E+01***	***NC***

APPENDIX F

Plant Hazard Quotients (HQs) for Direct Contact with Soils and Tailings

Richardson Flat Tailings Site

Screening Ecological Risk Assessment

* Average concentration across all depths; duplicate/split samples averaged with field samples.

Reach	Parameter	Station ID	Conc (mg/kg)*	Plant Benchmark (mg/kg dw)		Soil HQ	
				Low	High	Low	High
Site Tailings	Copper	RF-TA-TP3	253.5	100	NA	***3E+00***	***NC***
Site Tailings	Lead	RF-TA-TP3	3,796.7	50	1000	***8E+01***	***4E+00***
Site Tailings	Mercury	RF-TA-TP3	16.0	35	NA	5E-01	***NC***
Site Tailings	Selenium	RF-TA-TP3	11.3	1	NA	***1E+01***	***NC***
Site Tailings	Silver	RF-TA-TP3	23.8	2	NA	***1E+01***	***NC***
Site Tailings	Zinc	RF-TA-TP3	5,865.0	50	500	***1E+02***	***1E+01***
Site Tailings	Aluminum	RF-TSDD-GL50	13,377.8	50	NA	***3E+02***	***NC***
Site Tailings	Antimony	RF-TSDD-GL50	125.5	5	NA	***3E+01***	***NC***
Site Tailings	Arsenic	RF-TSDD-GL50	197.4	10	100	***2E+01***	***2E+00***
Site Tailings	Cadmium	RF-TSDD-GL50	28.8	4	100	***7E+00***	3E-01
Site Tailings	Chromium	RF-TSDD-GL50	22.5	1	NA	***2E+01***	***NC***
Site Tailings	Copper	RF-TSDD-GL50	311.3	100	NA	***3E+00***	***NC***
Site Tailings	Lead	RF-TSDD-GL50	4,059.8	50	1000	***8E+01***	***4E+00***
Site Tailings	Mercury	RF-TSDD-GL50	2.8	35	NA	8E-02	***NC***
Site Tailings	Selenium	RF-TSDD-GL50	4.1	1	NA	***4E+00***	***NC***
Site Tailings	Silver	RF-TSDD-GL50	26.0	2	NA	***1E+01***	***NC***
Site Tailings	Zinc	RF-TSDD-GL50	5,728.8	50	500	***1E+02***	***1E+01***
Site Tailings	Aluminum	RF-TSDD-GL52	14,027.0	50	NA	***3E+02***	***NC***
Site Tailings	Antimony	RF-TSDD-GL52	253.8	5	NA	***5E+01***	***NC***
Site Tailings	Arsenic	RF-TSDD-GL52	321.8	10	100	***3E+01***	***3E+00***
Site Tailings	Cadmium	RF-TSDD-GL52	51.1	4	100	***1E+01***	5E-01
Site Tailings	Chromium	RF-TSDD-GL52	27.5	1	NA	***3E+01***	***NC***
Site Tailings	Copper	RF-TSDD-GL52	620.0	100	NA	***6E+00***	***NC***
Site Tailings	Lead	RF-TSDD-GL52	10,699.5	50	1000	***2E+02***	***1E+01***
Site Tailings	Mercury	RF-TSDD-GL52	5.5	35	NA	2E-01	***NC***
Site Tailings	Selenium	RF-TSDD-GL52	11.3	1	NA	***1E+01***	***NC***
Site Tailings	Silver	RF-TSDD-GL52	39.8	2	NA	***2E+01***	***NC***
Site Tailings	Zinc	RF-TSDD-GL52	7,818.5	50	500	***2E+02***	***2E+01***
Site Tailings	Aluminum	RF-TSDD-GL53	16,151.5	50	NA	***3E+02***	***NC***
Site Tailings	Antimony	RF-TSDD-GL53	212.8	5	NA	***4E+01***	***NC***
Site Tailings	Arsenic	RF-TSDD-GL53	319.7	10	100	***3E+01***	***3E+00***
Site Tailings	Cadmium	RF-TSDD-GL53	56.9	4	100	***1E+01***	6E-01
Site Tailings	Chromium	RF-TSDD-GL53	29.5	1	NA	***3E+01***	***NC***
Site Tailings	Copper	RF-TSDD-GL53	678.5	100	NA	***7E+00***	***NC***
Site Tailings	Lead	RF-TSDD-GL53	10,533.5	50	1000	***2E+02***	***1E+01***
Site Tailings	Mercury	RF-TSDD-GL53	10.6	35	NA	3E-01	***NC***
Site Tailings	Selenium	RF-TSDD-GL53	13.3	1	NA	***1E+01***	***NC***
Site Tailings	Silver	RF-TSDD-GL53	61.3	2	NA	***3E+01***	***NC***
Site Tailings	Zinc	RF-TSDD-GL53	9,420.0	50	500	***2E+02***	***2E+01***
Site Tailings	Aluminum	RF-TSDD-GL56	11,442.5	50	NA	***2E+02***	***NC***
Site Tailings	Antimony	RF-TSDD-GL56	89.2	5	NA	***2E+01***	***NC***
Site Tailings	Arsenic	RF-TSDD-GL56	136.3	10	100	***1E+01***	1E+00
Site Tailings	Cadmium	RF-TSDD-GL56	23.3	4	100	***6E+00***	2E-01
Site Tailings	Chromium	RF-TSDD-GL56	21.5	1	NA	***2E+01***	***NC***
Site Tailings	Copper	RF-TSDD-GL56	247.5	100	NA	***2E+00***	***NC***
Site Tailings	Lead	RF-TSDD-GL56	2,897.5	50	1000	***6E+01***	***3E+00***
Site Tailings	Mercury	RF-TSDD-GL56	1.8	35	NA	5E-02	***NC***
Site Tailings	Selenium	RF-TSDD-GL56	2.5	1	NA	***3E+00***	***NC***
Site Tailings	Silver	RF-TSDD-GL56	20.3	2	NA	***1E+01***	***NC***
Site Tailings	Zinc	RF-TSDD-GL56	4,518.5	50	500	***9E+01***	***9E+00***
Site Tailings	Aluminum	RF-TSDD-GL58	14,787.5	50	NA	***3E+02***	***NC***
Site Tailings	Antimony	RF-TSDD-GL58	58.3	5	NA	***1E+01***	***NC***
Site Tailings	Arsenic	RF-TSDD-GL58	144.0	10	100	***1E+01***	1E+00
Site Tailings	Cadmium	RF-TSDD-GL58	22.7	4	100	***6E+00***	2E-01
Site Tailings	Chromium	RF-TSDD-GL58	21.0	1	NA	***2E+01***	***NC***
Site Tailings	Copper	RF-TSDD-GL58	168.5	100	NA	***2E+00***	***NC***
Site Tailings	Lead	RF-TSDD-GL58	2,622.0	50	1000	***5E+01***	***3E+00***
Site Tailings	Mercury	RF-TSDD-GL58	2.6	35	NA	7E-02	***NC***
Site Tailings	Selenium	RF-TSDD-GL58	11.3	1	NA	***1E+01***	***NC***
Site Tailings	Silver	RF-TSDD-GL58	15.3	2	NA	***8E+00***	***NC***
Site Tailings	Zinc	RF-TSDD-GL58	3,378.0	50	500	***7E+01***	***7E+00***
Site Tailings	Aluminum	RF-TSDD-GL59	13,622.0	50	NA	***3E+02***	***NC***
Site Tailings	Antimony	RF-TSDD-GL59	168.3	5	NA	***3E+01***	***NC***

APPENDIX F

Plant Hazard Quotients (HQs) for Direct Contact with Soils and Tailings

Richardson Flat Tailings Site

Screening Ecological Risk Assessment

* Average concentration across all depths; duplicate/split samples averaged with field samples.

Reach	Parameter	Station ID	Conc (mg/kg)*	Plant Benchmark (mg/kg dw)		Soil HQ	
				Low	High	Low	High
Site Tailings	Arsenic	RF-TSDD-GL59	219.0	10	100	***2E+01***	***2E+00***
Site Tailings	Cadmium	RF-TSDD-GL59	24.0	4	100	***6E+00***	2E-01
Site Tailings	Chromium	RF-TSDD-GL59	24.0	1	NA	***2E+01***	***NC***
Site Tailings	Copper	RF-TSDD-GL59	418.5	100	NA	***4E+00***	***NC***
Site Tailings	Lead	RF-TSDD-GL59	3,834.5	50	1000	***8E+01***	***4E+00***
Site Tailings	Mercury	RF-TSDD-GL59	13.6	35	NA	4E-01	***NC***
Site Tailings	Selenium	RF-TSDD-GL59	6.1	1	NA	***6E+00***	***NC***
Site Tailings	Silver	RF-TSDD-GL59	22.8	2	NA	***1E+01***	***NC***
Site Tailings	Zinc	RF-TSDD-GL59	5,462.0	50	500	***1E+02***	***1E+01***
Site Tailings	Aluminum	RF-TSDD-GL62	17,379.5	50	NA	***3E+02***	***NC***
Site Tailings	Antimony	RF-TSDD-GL62	45.3	5	NA	***9E+00***	***NC***
Site Tailings	Arsenic	RF-TSDD-GL62	99.6	10	100	***1E+01***	1E+00
Site Tailings	Cadmium	RF-TSDD-GL62	20.1	4	100	***5E+00***	2E-01
Site Tailings	Chromium	RF-TSDD-GL62	22.5	1	NA	***2E+01***	***NC***
Site Tailings	Copper	RF-TSDD-GL62	126.5	100	NA	1E+00	***NC***
Site Tailings	Lead	RF-TSDD-GL62	1,572.0	50	1000	***3E+01***	***2E+00***
Site Tailings	Mercury	RF-TSDD-GL62	0.7	35	NA	2E-02	***NC***
Site Tailings	Selenium	RF-TSDD-GL62	5.9	1	NA	***6E+00***	***NC***
Site Tailings	Silver	RF-TSDD-GL62	11.3	2	NA	***6E+00***	***NC***
Site Tailings	Zinc	RF-TSDD-GL62	2,981.0	50	500	***6E+01***	***6E+00***