APPENDIX G RISK CHARACTERIZATION RESULTS

Appendix G-1: Concentration Ratios for Criteria Air Contaminants at Individual Receptor Locations within the LSA Predicted for Project Case

X	Y	Description	24h PM_{10}	24h $PM_{2.5}$	Annual $PM_{2.5}$
Residential Locations					
625731	6062745	Telkwa Elementary	0.0177	0.0100	0.00392
625732	6062821	The Ark Playday Center	0.0173	0.00966	0.00367
624899	6061799	Tot Spot Family Day Care	0.0254	0.0142	0.00530
621359	6055187	Residence	0.208	0.0644	0.0205
621347	6057296	Residence	0.143	0.0558	0.0194
621148	6057784	Residence	0.0879	0.0396	0.0141
621219	6057843	Residence	0.0877	0.0381	0.0138
621246	6057883	Residence	0.0865	0.0374	0.0136
621260	6058012	Residence	0.0827	0.0359	0.0127
621151	6058015	Residence	0.0839	0.0369	0.0125
621236	6058089	Residence	0.0816	0.0353	0.0122
621248	6058191	Residence	0.0794	0.0342	0.0116
621330	6058317	Residence	0.0757	0.0322	0.0110
624495	6057858	Residence	0.0736	0.0370	0.0128
624887	6057904	Residence	0.0811	0.0441	0.0115
624310	6058125	Residence	0.0793	0.0338	0.0117
624317	6058312	Residence	0.0795	0.0343	0.0105
624301	6058433	Residence	0.0789	0.0342	0.00986
624413	6058467	Residence	0.0757	0.0330	0.00964
624542	6058470	Residence	0.0726	0.0318	0.00959
624516	6058298	Residence	0.0741	0.0322	0.0105
624666	6058350	Residence	0.0707	0.0316	0.0102
624709	6058331	Residence	0.0705	0.0328	0.0103
624755	6058337	Residence	0.0701	0.0336	0.0104
624833	6058269	Residence	0.0705	0.0367	0.0108
624946	6058333	Residence	0.0694	0.0376	0.0107
625055	6058312	Residence	0.0726	0.0402	0.0110
625125	6058347	Residence	0.0730	0.0406	0.0110
625140	6058498	Residence	0.0666	0.0369	0.0108
625012	6058547	Residence	0.0656	0.0335	0.0102
624917	6058542	Residence	0.0660	0.0320	0.00990
624848	6058478	Residence	0.0675	0.0323	0.00993
624738	6058471	Residence	0.0684	0.0305	0.00973
624533	6058522	Residence	0.0721	0.0317	0.00935
624511	6059467	Residence	0.0453	0.0197	0.00749
624728	6060340	Residence	0.0330	0.0162	0.00598
624551	6060520	Residence	0.0354	0.0177	0.00603
624633	6060666	Residence	0.0313	0.0155	0.00544
624707	6060548	Residence	0.0308	0.0151	0.00550
624750	6060645	Residence	0.0283	0.0138	0.00518
624811	6060513	Residence	0.0293	0.0141	0.00530
624835	6060701	Residence	0.0276	0.0133	0.00489
625027	6060650	Residence	0.0275	0.0127	0.00462
624985	6060414	Residence	0.0298	0.0138	0.00508
625166	6060570	Residence	0.0278	0.0124	0.00453
625110	6060346	Residence	0.0300	0.0135	0.00494
625293	6060420	Residence	0.0287	0.0125	0.00454
625211	6060248	Residence	0.0306	0.0134	0.00491
625238	6060113	Residence	0.0321	0.0140	0.00513
625493	6060254	Residence	0.0298	0.0130	0.00452
625561	6060138	Residence	0.0308	0.0135	0.00458
625808	6060035	Residence	0.0312	0.0137	0.00455
629422	6059314	Residence	0.0269	0.0134	0.00427
629376	6059417	Residence	0.0256	0.0126	0.00369
629311	6059475	Residence	0.0254	0.0125	0.00360
629162	6059498	Residence	0.0264	0.0131	0.00403
628542	6058933	Residence	0.217	0.0792	0.0548

Appendix G-1: Concentration Ratios for Criteria Air Contaminants at Individual Receptor Locations within the LSA Predicted for Project Case

X	Y	Description	24h PM_{10}	24h $PM_{2.5}$	Annual $PM_{2.5}$
628318	6058826	Residence	0.106	0.0558	0.0311
628475	6058809	Residence	0.159	0.0611	0.0475
628469	6058607	Residence	0.117	0.0583	0.0318
630293	6058896	Residence	0.0319	0.0175	0.00417
630568	6058612	Residence	0.0463	0.0259	0.00562
630843	6058516	Residence	0.0346	0.0197	0.00422
630943	6058355	Residence	0.0363	0.0212	0.00468
630925	6057608	Residence	0.0619	0.0384	0.00618
631013	6057550	Residence	0.0584	0.0365	0.00603
630907	6057496	Residence	0.0629	0.0391	0.00600
630457	6057731	Residence	0.0634	0.0343	0.00634
630474	6057528	Residence	0.0559	0.0312	0.00529
621045	6057791	Residence	0.0884	0.0404	0.0138
621147	6057863	Residence	0.0865	0.0387	0.0135
621311	6058287	Residence	0.0766	0.0327	0.0111
624652	6058012	Residence	0.0728	0.0380	0.0119
624618	6058496	Residence	0.0706	0.0311	0.00950
624949	6060663	Residence	0.0276	0.0129	0.00473
630914	6058404	Residence	0.0359	0.0208	0.00455
630879	6058459	Residence	0.0353	0.0203	0.00439
629378	6058797	Residence	0.127	0.0881	0.0529
629404	6059357	Residence	0.0263	0.0130	0.00399
626743	6062021	Cabin	0.0191	0.00967	0.00313
620350	6055101	Horsemen Camp	0.499	0.172	0.0615

Notes:

$PM_{2.5}$ = Particulate matter equal to or less than 2.5 micrometer in diameter

PM_{10} = Particulate matter equal to or less than 10 micrometer in diameter

h = hour

d = day

Appendix G-2: Risk Characterization for Recreational Land User Toddler under Baseline Conditions

Non-Metal COPC	Estimated Daily Dose for Recreational Land User Toddler (mg/kg BW/day)							Toxicity Reference Value (mg/kg BW/day)	Hazard Quotient (unitless) for Recreational Land User Toddler						
	Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)		Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)
Aluminum	0.0000021	0.00055	0.014	0.00018	0.0054	0.064	0.085	0.29	0.0000071	0.0019	0.050	0.00062	0.019	**0.22**	**0.29**
Arsenic	0.000000017	0.0000026	0.0000069	0.00000026	0.000016	0.0032	0.0032	0.0003	0.000056	0.0087	0.023	0.00086	0.055	**11**	**11**
Barium	0.000000060	0.00028	0.00019	0.000024	0.00097	0.032	0.033	0.2	0.00000030	0.0014	0.00095	0.00012	0.0048	0.16	0.17
Boron	0.00000047	0.000055	0.0000022	0.000000028	0.0013	NA	0.0014	0.2	0.0000023	0.00028	0.000011	0.00000014	0.0066	-	0.0069
Cadmium	0.0000000023	0.000000041	0.00000034	0.00000000043	0.000022	0.0011	0.0011	0.001	0.0000023	0.000041	0.00034	0.00000043	0.022	**1.1**	**1.1**
Chromium	0.000000023	0.0000014	0.000019	0.0000023	0.000053	0.0010	0.0011	0.002	0.000012	0.00072	0.0093	0.0012	0.027	**0.51**	**0.54**
Cobalt	0.0000000047	0.00000028	0.0000093	0.00000012	0.00016	0.00045	0.00061	0.0014	0.0000033	0.00020	0.0067	0.000083	0.11	**0.32**	**0.44**
Iron	0.0000023	0.00064	0.027	0.00034	0.046	0.42	0.50	0.7	0.0000032	0.00091	0.039	0.00049	0.066	**0.60**	**0.71**
Lithium	0.00000023	0.0000047	0.000010	0.00000013	0.000078	0.0013	0.0014	0.002	0.00012	0.0023	0.0050	0.000063	0.039	**0.67**	**0.72**
Manganese	0.00000024	0.000041	0.00080	0.000010	0.0049	0.21	0.21	0.0250	0.0000096	0.0017	0.032	0.00040	0.20	**8.2**	**8.5**
Mercury	0.0000000023	0.000000014	0.000000042	0.000000052	0.000030	0.00019	0.00022	0.0003	0.0000078	0.000047	0.00014	0.00017	0.10	**0.62**	**0.73**
Molybdenum	0.0000000023	0.0000016	0.00000063	0.0000000079	0.00019	0.011	0.011	0.005	0.00000047	0.00033	0.00013	0.0000016	0.038	**2.2**	**2.2**
Nickel	0.000000023	0.0000014	0.000016	0.0000018	0.0040	0.0094	0.013	0.0013	0.000018	0.0011	0.012	0.0014	**3.1**	**7.2**	**10**
Selenium	0.000000047	0.00000026	0.00000013	0.0000000017	0.00045	0.0047	0.0052	0.006	0.0000078	0.000043	0.000022	0.00000028	0.075	**0.79**	**0.86**
Strontium	0.00000013	0.00061	0.000044	0.00000055	0.043	NA	0.043	0.6	0.00000022	0.0010	0.000074	0.00000092	0.071	-	0.072
Thallium	0.0000000047	0.000000028	0.000000052	0.00000000065	0.0000032	0.000032	0.000036	0.000088	0.000053	0.00032	0.00059	0.0000074	0.036	**0.37**	**0.41**
Zinc	0.00000034	0.0000084	0.000081	0.000010	0.036	0.42	0.45	0.48	0.00000072	0.000017	0.00017	0.000021	0.075	**0.87**	**0.94**

Notes:

COPC = contaminant of potential concern

"NA" = COPC concentration not available for pathway

"-" = not calculated

BW = body weight

Hazard quotients greater than 0.2 are shaded grey.

Appendix G-3: Risk Characterization for Indigenous and Non-Indigenous Resident Land User Toddler under Baseline Conditions

Non-Metal COPC	Estimated Daily Dose for Resident Toddler (mg/kg BW/day)							Toxicity Reference Value (mg/kg BW/day)	Hazard Quotient (unitless) for Resident Toddler						
	Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)		Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)
Aluminum	0.000013	0.00070	0.094	0.0012	0.0068	0.064	0.17	0.3	0.000046	0.0024	0.32	0.0041	0.024	0.22	0.58
Arsenic	0.00000011	0.000024	0.000045	0.0000017	0.000018	0.0032	0.0032	0.0003	0.00037	0.080	0.15	0.0056	0.060	**11**	**11**
Barium	0.00000039	0.0031	0.0012	0.00015	0.0039	0.032	0.040	0.2	0.0000019	0.016	0.0062	0.00077	0.020	0.16	0.20
Boron	0.0000030	0.0031	0.000015	0.00000018	0.0028	NA	0.0060	0.2	0.000015	0.016	0.000073	0.00000091	0.014	-	0.030
Cadmium	0.000000015	0.00000069	0.0000022	0.0000000028	0.000033	0.0011	0.0011	0.001	0.000015	0.00069	0.0022	0.0000028	0.033	**1.1**	**1.1**
Chromium	0.00000015	0.000032	0.00012	0.000015	0.000066	0.0010	0.0012	0.002	0.000076	0.016	0.060	0.0075	0.033	0.51	0.62
Cobalt	0.000000030	0.0000095	0.000061	0.00000076	0.00016	0.00045	0.00068	0.0014	0.000022	0.0068	0.043	0.00054	0.12	0.32	0.49
Iron	0.000015	0.0016	0.18	0.0022	0.051	0.42	0.65	0.7	0.000021	0.0022	0.25	0.0032	0.072	0.60	0.93
Lithium	0.0000015	0.000091	0.000065	0.00000082	0.000090	0.0013	0.0016	0.002	0.00076	0.045	0.033	0.00041	0.045	0.67	0.79
Manganese	0.0000016	0.0016	0.0052	0.000065	0.012	0.21	0.22	0.0250	0.000062	0.066	0.21	0.0026	0.48	**8.2**	**9.0**
Mercury	0.000000015	0.00000017	0.00000027	0.00000034	0.000031	0.00019	0.00022	0.0003	0.000051	0.00056	0.00091	0.0011	0.10	0.62	0.73
Molybdenum	0.000000015	0.000032	0.0000041	0.000000051	0.00023	0.011	0.011	0.005	0.0000030	0.0065	0.00082	0.000010	0.045	**2.2**	**2.2**
Nickel	0.00000015	0.000032	0.00010	0.000011	0.0041	0.0094	0.014	0.0013	0.00012	0.025	0.078	0.0088	**3.2**	**7.2**	**10**
Selenium	0.00000030	0.0000064	0.00000086	0.000000011	0.00045	0.0047	0.0052	0.006	0.000051	0.0011	0.00014	0.0000018	0.076	0.79	0.86
Strontium	0.00000087	0.0040	0.00029	0.0000036	0.047	NA	0.052	0.60	0.0000015	0.0066	0.00048	0.0000060	0.079	-	0.086
Thallium	0.000000030	0.00000018	0.00000034	0.0000000042	0.0000033	0.000032	0.000036	0.000088	0.00035	0.0021	0.0039	0.000048	0.038	0.37	0.41
Zinc	0.0000022	0.00016	0.00053	0.000066	0.038	0.42	0.46	0.48	0.0000047	0.00034	0.0011	0.00014	0.079	0.87	0.95

Notes:

COPC = contaminant of potential concern

"NA" = COPC concentration not available for pathway

"-" = not calculated

BW = body weight

Hazard quotients greater than 1 are shaded grey.

Appendix G-4: Risk Characterization for Recreational Land User Adult Under Baseline Conditions

Non-Metal COPC	Estimated Daily Dose for Recreational Land User Adult (mg/kg BW/day)							Toxicity Reference Value (mg/kg BW/day)	Hazard Quotient (unitless) for Recreational Land User Adult						
	Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)		Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)
Aluminum	0.00000096	0.00032	0.00084	0.00011	0.0025	0.025	0.029	0.29	0.0000033	0.0011	0.0029	0.00037	0.0086	0.087	0.100
Arsenic	0.0000000079	0.0000015	0.00000040	0.00000015	0.0000076	0.0010	0.0011	0.0003	0.000026	0.0051	0.0013	0.00052	0.025	**3.5**	**3.5**
Barium	0.000000028	0.00016	0.000011	0.000014	0.00045	0.012	0.013	0.2	0.00000014	0.00081	0.000055	0.000071	0.0022	0.061	0.064
Boron	0.00000022	0.000032	0.00000013	0.000000017	0.00061	NA	0.00064	0.20	0.0000011	0.00016	0.00000065	0.000000084	0.0031	-	0.0032
Cadmium	0.0000000011	0.000000024	0.000000020	0.00000000026	0.000010	0.00044	0.00045	0.001	0.0000011	0.000024	0.000020	0.00000026	0.010	**0.44**	**0.45**
Chromium	0.000000011	0.00000084	0.0000011	0.0000014	0.000025	0.00043	0.00045	0.002	0.0000055	0.00042	0.00054	0.00069	0.012	**0.21**	**0.23**
Cobalt	0.0000000022	0.00000016	0.00000054	0.000000070	0.000073	0.00018	0.00025	0.0014	0.0000016	0.00012	0.00039	0.000050	0.052	0.13	0.18
Iron	0.0000011	0.00037	0.0016	0.00020	0.021	0.18	0.20	0.7	0.0000015	0.00053	0.0023	0.00029	0.030	**0.25**	**0.29**
Lithium	0.00000011	0.0000027	0.00000059	0.000000075	0.000036	0.00054	0.00058	0.002	0.000055	0.0014	0.00029	0.000038	0.018	**0.27**	**0.29**
Manganese	0.00000011	0.000024	0.000047	0.0000060	0.0023	0.083	0.086	0.0250	0.0000045	0.00097	0.0019	0.00024	0.091	**3.3**	**3.4**
Mercury	0.0000000011	0.0000000082	0.0000000024	0.000000031	0.000014	0.000066	0.000080	0.0003	0.0000036	0.000027	0.0000081	0.00010	0.047	**0.22**	**0.27**
Molybdenum	0.0000000011	0.00000095	0.000000037	0.0000000047	0.000088	0.0042	0.0043	0.005	0.00000022	0.00019	0.0000074	0.00000094	0.018	**0.84**	**0.86**
Nickel	0.000000011	0.00000082	0.00000091	0.0000011	0.0019	0.0040	0.0059	0.0013	0.0000084	0.00063	0.00070	0.00081	**1.4**	**3.1**	**4.5**
Selenium	0.000000022	0.00000015	0.0000000077	0.00000000099	0.00021	0.0020	0.0022	0.006	0.0000038	0.000026	0.0000014	0.00000017	0.037	**0.35**	**0.39**
Strontium	0.000000063	0.00035	0.0000026	0.00000033	0.020	NA	0.020	0.60	0.00000010	0.00059	0.0000043	0.00000055	0.033	-	0.033
Thallium	0.0000000022	0.000000016	0.0000000030	0.00000000039	0.0000015	0.000013	0.000014	0.000025	0.000087	0.00065	0.00012	0.000016	0.060	**0.52**	**0.58**
Zinc	0.00000016	0.0000049	0.0000047	0.0000060	0.017	0.17	0.19	0.57	0.00000028	0.0000086	0.0000083	0.000011	0.029	**0.30**	**0.33**

Notes:

COPC = contaminant of potential concern

"NA" = COPC concentration not available for pathway

"-" = not calculated

BW = body weight

Hazard quotients greater than 0.2 are shaded grey.

Appendix G-5: Risk Characterization for Indigenous and Non-Indigenous Resident Land User Adult under Baseline Conditions

Non-Metal COPC	Estimated Daily Dose for Resident Adult (mg/kg BW/day)							Toxicity Reference Value (mg/kg BW/day)	Hazard Quotient (unitless) for Resident Land User Adult						
	Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)		Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)
Aluminum	0.0000062	0.00041	0.0055	0.00070	0.0032	0.025	0.035	0.3	0.000022	0.0014	0.019	0.0024	0.011	0.087	0.12
Arsenic	0.000000051	0.000014	0.0000026	0.0000010	0.0000084	0.0010	0.0011	0.0003	0.00017	0.047	0.0087	0.0034	0.028	**3.5**	**3.6**
Barium	0.00000018	0.0018	0.000072	0.000092	0.0019	0.012	0.016	0.20	0.00000090	0.0092	0.00036	0.00046	0.0096	0.061	0.080
Boron	0.0000014	0.0018	0.00000085	0.00000011	0.0014	NA	0.0032	0.20	0.0000071	0.0091	0.0000042	0.00000054	0.0068	-	0.016
Cadmium	0.0000000071	0.00000040	0.00000013	0.0000000017	0.000016	0.00044	0.00045	0.001	0.0000071	0.00040	0.00013	0.0000017	0.016	0.44	0.45
Chromium	0.000000071	0.000019	0.0000070	0.0000090	0.000031	0.00043	0.00049	0.002	0.000035	0.0094	0.0035	0.0045	0.016	0.21	0.25
Cobalt	0.000000014	0.0000056	0.0000035	0.00000045	0.000076	0.00018	0.00026	0.0014	0.000010	0.0040	0.0025	0.00032	0.055	0.13	0.19
Iron	0.0000069	0.00091	0.010	0.0013	0.024	0.18	0.21	0.7	0.0000098	0.0013	0.015	0.0019	0.034	0.25	0.30
Lithium	0.00000071	0.000053	0.0000038	0.00000049	0.000042	0.00054	0.00064	0.002	0.00035	0.027	0.0019	0.00024	0.021	0.27	0.32
Manganese	0.00000073	0.00096	0.00031	0.000039	0.0058	0.083	0.090	0.0250	0.000029	0.038	0.012	0.0016	0.23	**3.3**	**3.6**
Mercury	0.0000000071	0.000000098	0.000000016	0.00000020	0.000014	0.000066	0.000081	0.0003	0.000024	0.00033	0.000053	0.00068	0.048	0.22	0.27
Molybdenum	0.0000000071	0.000019	0.00000024	0.000000031	0.00011	0.0042	0.0043	0.005	0.0000014	0.0038	0.000048	0.0000061	0.021	0.84	0.87
Nickel	0.000000071	0.000019	0.0000059	0.0000069	0.0019	0.0040	0.0059	0.0013	0.000055	0.014	0.0045	0.0053	**1.5**	**3.1**	**4.6**
Selenium	0.00000014	0.0000037	0.000000050	0.0000000064	0.00021	0.0020	0.0022	0.006	0.000025	0.00066	0.0000088	0.0000011	0.037	0.35	0.39
Strontium	0.00000041	0.0023	0.000017	0.0000022	0.022	NA	0.024	0.60	0.00000068	0.0038	0.000028	0.0000036	0.037	-	0.041
Thallium	0.000000014	0.00000011	0.000000020	0.0000000025	0.0000016	0.000013	0.000015	0.000025	0.00057	0.0042	0.00079	0.00010	0.062	0.52	0.59
Zinc	0.0000010	0.000095	0.000031	0.000039	0.018	0.17	0.19	0.57	0.0000018	0.00017	0.000054	0.000069	0.031	0.30	0.33

Notes:

COPC = contaminant of potential concern

"NA" = COPC concentration not available for pathway

"-" = not calculated

BW = body weight

Hazard quotients greater than 1 are shaded grey.

Appendix G-6: Risk Characterization for Recreational Land User Toddler under Operation Conditions

Non-Metal COPC	Estimated Daily Dose for Recreational Land User Toddler (mg/kg BW/day)							Toxicity Reference Value (mg/kg BW/day)	Hazard Quotient (unitless) for Recreational Land User Toddler						
	Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)		Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)
Aluminum	0.0000064	0.00061	0.015	0.00018	0.0000000	0.064	0.0000000	0.3	0.000022	0.0021	0.050	0.00063	0.024	**0.22**	**0.29**
Arsenic	0.000000020	0.0000028	0.0000072	0.00000027	0.000018	0.0032	0.0032	0.0003	0.000066	0.0094	0.024	0.00090	0.061	**11**	**11**
Barium	0.00000011	0.00029	0.00019	0.000024	0.0010	0.032	0.033	0.2	0.00000057	0.0015	0.00095	0.00012	0.0051	0.16	0.17
Boron	0.00000047	0.000079	0.000013	0.00000016	0.0026	NA	0.0027	0.20	0.0000024	0.00039	0.000063	0.00000079	0.013	-	0.013
Cadmium	0.0000000027	0.000000051	0.00000040	0.00000000050	0.000025	0.0011	0.0011	0.001	0.0000027	0.000051	0.00040	0.00000050	0.025	**1.1**	**1.1**
Chromium	0.000000031	0.0000018	0.000019	0.0000024	0.000065	0.0010	0.0011	0.002	0.000016	0.00088	0.0095	0.0012	0.033	**0.51**	**0.55**
Cobalt	0.0000000074	0.00000041	0.0000095	0.00000012	0.00017	0.00045	0.00062	0.0014	0.0000053	0.00029	0.0068	0.000084	0.12	**0.32**	**0.44**
Iron	0.0000084	0.00079	0.027	0.00034	0.055	0.42	0.51	0.7	0.000012	0.0011	0.039	0.00049	0.079	**0.60**	**0.72**
Lithium	NA	0.000018	0.000010	0.00000013	0.00015	0.0013	0.0015	0.002	-	0.0090	0.0050	0.000063	0.074	**0.67**	**0.76**
Manganese	0.00000037	0.000051	0.00081	0.000010	0.0051	0.21	0.21	0.0250	0.000015	0.0020	0.032	0.00041	**0.20**	**8.2**	**8.5**
Mercury	0.0000000062	0.000000013	0.000000095	0.00000012	0.000055	0.00019	0.00024	0.0003	0.000021	0.000044	0.00032	0.00040	0.18	**0.62**	**0.81**
Molybdenum	0.0000000034	0.0000020	0.00000069	0.0000000086	0.00023	0.011	0.011	0.005	0.00000067	0.00040	0.00014	0.0000017	0.046	**2.2**	**2.2**
Nickel	0.000000030	0.0000019	0.000016	0.0000018	0.0041	0.0094	0.014	0.0013	0.000023	0.0015	0.012	0.0014	**3.2**	**7.2**	**10**
Selenium	0.000000047	0.00000085	0.0000012	0.000000015	0.0012	0.0047	0.0059	0.006	0.0000078	0.00014	0.00019	0.0000024	0.20	**0.79**	**0.98**
Strontium	0.00000015	0.00071	0.000047	0.00000059	0.044	NA	0.044	0.60	0.00000024	0.0012	0.000078	0.00000098	0.073	-	0.074
Thallium	0.000000013	0.000000038	0.00000017	0.0000000021	0.000013	0.000032	0.000046	0.000088	0.00014	0.00043	0.0019	0.000024	0.15	**0.37**	**0.52**
Zinc	0.00000038	0.0000095	0.000089	0.000011	0.038	0.42	0.46	0.48	0.00000080	0.000020	0.00018	0.000023	0.079	**0.87**	**0.95**

Notes:

COPC = contaminant of potential concern

"NA" = COPC concentration not available for pathway

"-" = not calculated

BW = body weight

Hazard quotients greater than 0.2 are shaded grey.

Appendix G-7: Risk Characterization for Indigenous and Non-Indigenous Resident Land User Toddler under Operation Conditions

Non-Metal COPC	Estimated Daily Dose for Resident Toddler (mg/kg BW/day)							Toxicity Reference Value (mg/kg BW/day)	Hazard Quotient (unitless) for Resident Toddler						
	Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)		Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)
Aluminum	0.000041	0.00076	0.095	0.0012	0.0000	0.064	0.0000	0.3	0.00014	0.0026	0.33	0.0041	0.030	0.22	0.57
Arsenic	0.00000013	0.000024	0.000047	0.0000018	0.000020	0.0032	0.0032	0.0003	0.00043	0.081	0.16	0.0058	0.067	**11**	**11**
Barium	0.00000074	0.0032	0.0012	0.00016	0.0040	0.032	0.040	0.20	0.0000037	0.016	0.0062	0.00078	0.020	0.16	0.20
Boron	0.0000031	0.0032	0.000082	0.0000010	0.0041	NA	0.0074	0.20	0.000015	0.016	0.00041	0.0000051	0.021	-	0.037
Cadmium	0.000000018	0.00000070	0.0000026	0.0000000032	0.000037	0.0011	0.0011	0.001	0.000018	0.00070	0.0026	0.0000032	0.037	**1.1**	**1.1**
Chromium	0.00000020	0.000033	0.00012	0.000016	0.000079	0.0010	0.0013	0.002	0.00010	0.016	0.062	0.0078	0.040	0.51	0.63
Cobalt	0.000000048	0.0000096	0.000061	0.00000077	0.00017	0.00045	0.00069	0.0014	0.000034	0.0069	0.044	0.00055	0.12	0.32	0.49
Iron	0.000054	0.0017	0.18	0.0022	0.060	0.42	0.67	0.7	0.000078	0.0024	0.25	0.0032	0.086	0.60	0.95
Lithium	NA	0.00010	0.000065	0.00000082	0.00016	0.0013	0.0017	0.002	-	0.052	0.033	0.00041	0.080	0.67	0.84
Manganese	0.0000024	0.0017	0.0053	0.000066	0.012	0.21	0.22	0.0250	0.000097	0.066	0.21	0.0026	0.49	**8.2**	**9.0**
Mercury	0.000000041	0.00000017	0.00000062	0.00000077	0.000056	0.00019	0.00024	0.0003	0.00014	0.00056	0.0021	0.0026	0.19	0.62	0.82
Molybdenum	0.000000022	0.000033	0.0000045	0.000000056	0.00027	0.011	0.011	0.005	0.0000044	0.0066	0.00089	0.000011	0.053	**2.2**	**2.2**
Nickel	0.00000019	0.000033	0.00010	0.000012	0.0042	0.0094	0.014	0.0013	0.00015	0.025	0.081	0.0092	**3.2**	**7.2**	**11**
Selenium	0.00000031	0.0000070	0.0000076	0.000000095	0.0012	0.0047	0.0059	0.006	0.000051	0.0012	0.0013	0.000016	0.20	0.79	0.99
Strontium	0.00000095	0.0046	0.00030	0.0000038	0.048	NA	0.053	0.60	0.0000016	0.0077	0.00051	0.0000063	0.081	-	0.089
Thallium	0.000000082	0.00000025	0.0000011	0.000000014	0.000014	0.000032	0.000048	0.000088	0.00093	0.0028	0.013	0.00016	0.16	0.37	0.54
Zinc	0.0000025	0.00016	0.00058	0.000072	0.040	0.42	0.46	0.48	0.0000052	0.00034	0.0012	0.00015	0.083	0.87	0.95

Notes:

COPC = contaminant of potential concern

"NA" = COPC concentration not available for pathway

"-" = not calculated

BW = body weight

Hazard quotients greater than 1 are shaded grey.

Appendix G-8: Risk Characterization for Recreational Land User Adult under Operation Conditions

Non-Metal COPC	Estimated Daily Dose for Recreational Land User Adult (mg/kg BW/day)							Toxicity Reference Value (mg/kg BW/day)	Hazard Quotient (unitless) for Recreational Land User Adult						
	Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)		Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)
Aluminum	0.0000030	0.00035	0.00085	0.00011	0.0033	0.025	0.030	0.3	0.000010	0.0012	0.0029	0.00038	0.011	0.087	0.099
Arsenic	0.0000000093	0.0000017	0.00000042	0.00000016	0.0000085	0.0010	0.0011	0.0003	0.000031	0.0055	0.0014	0.00054	0.028	**3.5**	**3.5**
Barium	0.000000053	0.00017	0.000011	0.000014	0.00047	0.012	0.013	0.2	0.00000027	0.00085	0.000056	0.000071	0.0023	0.061	0.064
Boron	0.00000022	0.000046	0.00000074	0.000000094	0.0012	NA	0.0012	0.20	0.0000011	0.00023	0.0000037	0.00000047	0.0060	-	0.0062
Cadmium	0.0000000013	0.000000030	0.000000023	0.00000000030	0.000012	0.00044	0.00045	0.001	0.0000013	0.000030	0.000023	0.00000030	0.012	**0.44**	**0.45**
Chromium	0.000000014	0.0000010	0.0000011	0.0000014	0.000030	0.00043	0.00046	0.002	0.0000072	0.00051	0.00056	0.00071	0.015	**0.21**	**0.23**
Cobalt	0.0000000034	0.00000024	0.00000055	0.000000071	0.000077	0.00018	0.00026	0.0014	0.0000025	0.00017	0.00039	0.000051	0.055	0.13	0.18
Iron	0.0000039	0.00046	0.0016	0.00020	0.026	0.18	0.20	0.700	0.0000056	0.00066	0.0023	0.00029	0.037	**0.25**	**0.29**
Lithium	NA	0.000011	0.00000059	0.000000075	0.000069	0.00054	0.00062	0.002	-	0.0053	0.00029	0.000038	0.035	**0.27**	**0.31**
Manganese	0.00000017	0.000029	0.000047	0.0000061	0.0024	0.083	0.086	0.0250	0.0000069	0.0012	0.0019	0.00024	0.094	**3.3**	**3.4**
Mercury	0.0000000029	0.0000000078	0.0000000056	0.000000071	0.000025	0.000066	0.000092	0.0003	0.0000097	0.000026	0.000019	0.00024	0.085	**0.22**	**0.31**
Molybdenum	0.0000000016	0.0000012	0.000000040	0.0000000052	0.00011	0.0042	0.0043	0.005	0.00000031	0.00024	0.0000080	0.0000010	0.021	**0.84**	**0.87**
Nickel	0.000000014	0.0000011	0.00000094	0.0000011	0.0019	0.0040	0.0059	0.0013	0.000011	0.00085	0.00072	0.00084	**1.5**	**3.1**	**4.6**
Selenium	0.000000022	0.00000050	0.000000068	0.0000000088	0.00055	0.0020	0.0025	0.006	0.0000038	0.000087	0.000012	0.0000015	0.096	**0.35**	**0.44**
Strontium	0.000000068	0.00042	0.0000027	0.00000035	0.020	NA	0.021	0.60	0.00000011	0.00069	0.0000046	0.00000058	0.034	-	0.034
Thallium	0.0000000059	0.000000022	0.0000000099	0.0000000013	0.0000060	0.000013	0.000019	0.000025	0.00023	0.00089	0.00040	0.000051	**0.24**	**0.52**	**0.76**
Zinc	0.00000018	0.0000055	0.0000052	0.0000066	0.017	0.17	0.19	0.57	0.00000031	0.0000097	0.0000091	0.000012	0.031	**0.30**	**0.33**

Notes:

COPC = contaminant of potential concern

"NA" = COPC concentration not available for pathway

"-" = not calculated

BW = body weight

Hazard quotients greater than 0.2 are shaded grey.

Appendix G-9: Risk Characterization for Indigenous and non-Indigenous Resident Land User Adult under Operation Conditions

Non-Metal COPC	Estimated Daily Dose for Resident Adult (mg/kg BW/day)							Toxicity Reference Value (mg/kg BW/day)	Hazard Quotient (unitless) for Resident Adult						
	Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)		Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)
Aluminum	0.000019	0.00044	0.0055	0.00071	0.0043	0.025	0.036	0.3	0.000067	0.0015	0.019	0.0024	0.014	0.087	0.12
Arsenic	0.000000060	0.000014	0.0000027	0.0000010	0.0000094	0.0010	0.0011	0.0003	0.00020	0.047	0.0091	0.0035	0.031	**3.5**	**3.6**
Barium	0.00000035	0.0018	0.000072	0.000093	0.0019	0.012	0.016	0.20	0.0000017	0.0092	0.00036	0.00046	0.0097	0.061	0.081
Boron	0.0000014	0.0018	0.0000048	0.00000061	0.0020	NA	0.0038	0.20	0.0000071	0.0092	0.000024	0.0000031	0.0098	-	0.019
Cadmium	0.0000000082	0.00000041	0.00000015	0.0000000019	0.000017	0.00044	0.00046	0.001	0.0000082	0.00041	0.00015	0.0000019	0.017	0.44	0.46
Chromium	0.000000094	0.000019	0.0000072	0.0000093	0.000037	0.00043	0.00050	0.002	0.000047	0.0095	0.0036	0.0046	0.019	0.21	0.25
Cobalt	0.000000022	0.0000056	0.0000036	0.00000046	0.000081	0.00018	0.00027	0.0014	0.000016	0.0040	0.0026	0.00033	0.058	0.13	0.19
Iron	0.000025	0.00100	0.010	0.0013	0.028	0.18	0.22	0.7	0.000036	0.0014	0.015	0.0019	0.040	0.25	0.31
Lithium	NA	0.000061	0.0000038	0.00000049	0.000075	0.00054	0.00068	0.002	-	0.030	0.0019	0.00024	0.037	0.27	0.34
Manganese	0.0000011	0.00097	0.00031	0.000039	0.0059	0.083	0.091	0.0250	0.000045	0.039	0.012	0.0016	0.24	**3.3**	**3.6**
Mercury	0.000000019	0.000000098	0.000000036	0.00000046	0.000026	0.000066	0.000093	0.0003	0.000063	0.00033	0.00012	0.0015	0.086	0.22	0.31
Molybdenum	0.000000010	0.000019	0.00000026	0.000000033	0.00013	0.0042	0.0044	0.005	0.0000020	0.0038	0.000052	0.0000067	0.025	0.84	0.87
Nickel	0.000000091	0.000019	0.0000061	0.0000071	0.0019	0.0040	0.0060	0.0013	0.000070	0.015	0.0047	0.0055	**1.5**	**3.1**	**4.6**
Selenium	0.00000014	0.0000041	0.00000044	0.000000057	0.00055	0.0020	0.0025	0.006	0.000025	0.00072	0.000078	0.0000100	0.096	0.35	0.45
Strontium	0.00000044	0.0027	0.000018	0.0000023	0.023	NA	0.025	0.60	0.00000074	0.0045	0.000030	0.0000038	0.038	-	0.042
Thallium	0.000000038	0.00000014	0.000000064	0.0000000083	0.0000064	0.000013	0.000020	0.000025	0.0015	0.0058	0.0026	0.00033	0.26	0.52	0.78
Zinc	0.0000012	0.000095	0.000034	0.000043	0.018	0.17	0.19	0.57	0.0000020	0.00017	0.000059	0.000076	0.032	0.30	0.34

Notes:

COPC = contaminant of potential concern

"NA" = COPC concentration not available for pathway

"-" = not calculated

BW = body weight

Hazard quotients greater than 1 are shaded grey.

Appendix G-10: Risk Characterization for Recreational Land User Toddler under Closure Conditions

Non-Metal COPC	Estimated Daily Dose for Recreational Land User Toddler (mg/kg BW/day)							Toxicity Reference Value (mg/kg BW/day)	Hazard Quotient (unitless) for Recreational Land User Toddler						
	Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)		Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)
Aluminum	0.0000021	0.00064	0.015	0.00018	0.0068	0.064	0.086	0.3	0.0000071	0.0022	0.050	0.00063	0.023	**0.22**	**0.30**
Arsenic	0.000000017	0.0000049	0.0000072	0.00000027	0.000018	0.0032	0.0032	0.0003	0.000056	0.016	0.024	0.00090	0.061	**11**	**11**
Barium	0.000000060	0.00030	0.00019	0.000024	0.0010	0.032	0.033	0.2	0.00000030	0.0015	0.00095	0.00012	0.0050	0.16	0.17
Boron	0.00000047	0.00026	0.000013	0.00000016	0.0026	NA	0.0029	0.20	0.0000023	0.0013	0.000063	0.00000079	0.013	-	0.014
Cadmium	0.0000000023	0.00000019	0.00000040	0.00000000050	0.000051	0.0011	0.0011	0.001	0.0000023	0.00019	0.00040	0.00000050	0.051	**1.1**	**1.1**
Chromium	0.000000023	0.0000033	0.000019	0.0000024	0.000068	0.0010	0.0011	0.002	0.000012	0.0016	0.0095	0.0012	0.034	**0.51**	**0.55**
Cobalt	0.0000000047	0.0000045	0.0000095	0.00000012	0.00026	0.00045	0.00072	0.0014	0.0000033	0.0032	0.0068	0.000084	0.19	**0.32**	**0.52**
Iron	0.0000023	0.00074	0.027	0.00034	0.050	0.42	0.50	0.7	0.0000032	0.0011	0.039	0.00049	0.071	**0.60**	**0.72**
Lithium	0.00000023	0.00014	0.000010	0.00000013	0.00041	0.0013	0.0019	0.002	0.00012	0.071	0.0050	0.000063	**0.21**	**0.67**	**0.95**
Manganese	0.00000024	0.000100	0.00081	0.000010	0.0077	0.21	0.21	0.0250	0.0000096	0.0040	0.032	0.00041	**0.31**	**8.2**	**8.6**
Mercury	0.0000000023	0.000000014	0.000000095	0.00000012	0.000051	0.00019	0.00024	0.0003	0.0000078	0.000046	0.00032	0.00040	0.17	**0.62**	**0.79**
Molybdenum	0.0000000023	0.0000094	0.00000069	0.0000000086	0.00025	0.011	0.011	0.005	0.00000047	0.0019	0.00014	0.0000017	0.050	**2.2**	**2.2**
Nickel	0.000000023	0.0000087	0.000016	0.0000018	0.0041	0.0094	0.014	0.0013	0.000018	0.0067	0.012	0.0014	**3.2**	**7.2**	**10**
Selenium	0.000000047	0.0000072	0.0000012	0.000000015	0.0012	0.0047	0.0059	0.006	0.0000078	0.0012	0.00019	0.0000024	0.20	**0.79**	**0.98**
Strontium	0.00000013	0.0017	0.000047	0.00000059	0.045	NA	0.047	0.60	0.00000022	0.0029	0.000078	0.00000098	0.075	-	0.078
Thallium	0.0000000047	0.0000014	0.00000017	0.0000000021	0.000047	0.000032	0.000081	0.000088	0.000053	0.016	0.0019	0.000024	**0.53**	**0.37**	**0.92**
Zinc	0.00000034	0.000014	0.000089	0.000011	0.039	0.42	0.46	0.48	0.00000072	0.000029	0.00018	0.000023	0.081	**0.87**	**0.95**

Notes:

COPC = contaminant of potential concern

"NA" = COPC concentration not available for pathway

"-" = not calculated

BW = body weight

Hazard quotients greater than 0.2 are shaded grey.

Appendix G-11: Risk Characterization for Indigenous and Non-Indigenous Resident Land User Toddler under Closure Conditions

Non-Metal COPC	Estimated Daily Dose for Resident Toddler (mg/kg BW/day)							Toxicity Reference Value (mg/kg BW/day)	Hazard Quotient (unitless) for Resident Toddler						
	Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)		Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)
Aluminum	0.000013	0.00091	0.095	0.0012	0.0082	0.064	0.17	0.3	0.000046	0.0031	0.33	0.0041	0.028	0.22	0.58
Arsenic	0.00000011	0.000032	0.000047	0.0000018	0.000020	0.0032	0.0033	0.0003	0.00037	0.11	0.16	0.0058	0.067	**11**	**11**
Barium	0.00000039	0.0031	0.0012	0.00016	0.0040	0.032	0.040	0.20	0.0000019	0.015	0.0062	0.00078	0.020	0.16	0.20
Boron	0.0000030	0.0035	0.000082	0.0000010	0.0041	NA	0.0077	0.20	0.000015	0.017	0.00041	0.0000051	0.021	-	0.038
Cadmium	0.000000015	0.0000012	0.0000026	0.0000000032	0.000063	0.0011	0.0011	0.001	0.000015	0.0012	0.0026	0.0000032	0.063	**1.1**	**1.1**
Chromium	0.00000015	0.000034	0.00012	0.000016	0.000081	0.0010	0.0013	0.002	0.000076	0.017	0.062	0.0078	0.041	0.51	0.63
Cobalt	0.000000030	0.000024	0.000061	0.00000077	0.00027	0.00045	0.00080	0.0014	0.000022	0.017	0.044	0.00055	0.19	0.32	0.57
Iron	0.000015	0.0017	0.18	0.0022	0.055	0.42	0.66	0.7	0.000021	0.0024	0.25	0.0032	0.078	0.60	0.94
Lithium	0.0000015	0.00036	0.000065	0.00000082	0.00042	0.0013	0.0022	0.002	0.00076	0.18	0.033	0.00041	0.21	0.67	**1.1**
Manganese	0.0000016	0.0017	0.0053	0.000066	0.015	0.21	0.23	0.0250	0.000062	0.066	0.21	0.0026	0.59	**8.2**	**9.1**
Mercury	0.000000015	0.00000042	0.00000062	0.00000077	0.000052	0.00019	0.00024	0.0003	0.000051	0.0014	0.0021	0.0026	0.17	0.62	0.80
Molybdenum	0.000000015	0.000058	0.0000045	0.000000056	0.00029	0.011	0.011	0.005	0.0000030	0.012	0.00089	0.000011	0.057	**2.2**	**2.2**
Nickel	0.00000015	0.000056	0.00010	0.000012	0.0042	0.0094	0.014	0.0013	0.00012	0.043	0.081	0.0092	**3.2**	**7.2**	**11**
Selenium	0.00000030	0.000027	0.0000076	0.000000095	0.0012	0.0047	0.0059	0.006	0.000051	0.0046	0.0013	0.000016	0.20	0.79	0.99
Strontium	0.00000087	0.011	0.00030	0.0000038	0.050	NA	0.061	0.60	0.0000015	0.019	0.00051	0.0000063	0.083	-	0.10
Thallium	0.000000030	0.0000089	0.0000011	0.000000014	0.000047	0.000032	0.000089	0.000088	0.00035	0.10	0.013	0.00016	0.53	0.37	**1.0**
Zinc	0.0000022	0.00017	0.00058	0.000072	0.041	0.42	0.46	0.48	0.0000047	0.00036	0.0012	0.00015	0.085	0.87	0.96

Notes:

COPC = contaminant of potential concern

"NA" = COPC concentration not available for pathway

"-" = not calculated

BW = body weight

Hazard quotients greater than 1 are shaded grey.

Appendix G-12: Risk Characterization for Recreational Land User Adult under Closure Conditions

Non-Metal COPC	Estimated Daily Dose for Recreational Land User Adult (mg/kg BW/day)							Toxicity Reference Value (mg/kg BW/day)	Hazard Quotient (unitless) for Recreational Land User Adult						
	Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)		Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)
Aluminum	0.00000096	0.00037	0.00085	0.00011	0.0032	0.025	0.030	0.29	0.0000033	0.0013	0.0029	0.00038	0.011	0.087	0.10
Arsenic	0.0000000079	0.0000028	0.00000042	0.00000016	0.0000085	0.0010	0.0011	0.0003	0.000026	0.0095	0.0014	0.00054	0.028	**3.5**	**3.5**
Barium	0.000000028	0.00018	0.000011	0.000014	0.00047	0.012	0.013	0.2	0.00000014	0.00088	0.000056	0.000071	0.0023	0.061	0.064
Boron	0.00000022	0.00015	0.00000074	0.000000094	0.0012	NA	0.0014	0.20	0.0000011	0.00075	0.0000037	0.00000047	0.0060	-	0.0068
Cadmium	0.0000000011	0.00000011	0.000000023	0.00000000030	0.000024	0.00044	0.00046	0.001	0.0000011	0.00011	0.000023	0.00000030	0.024	**0.44**	**0.46**
Chromium	0.000000011	0.0000019	0.0000011	0.0000014	0.000032	0.00043	0.00046	0.002	0.0000055	0.00095	0.00056	0.00071	0.016	**0.21**	**0.23**
Cobalt	0.0000000022	0.0000027	0.00000055	0.000000071	0.00012	0.00018	0.00030	0.0014	0.0000016	0.0019	0.00039	0.000051	0.088	0.13	**0.22**
Iron	0.0000011	0.00043	0.0016	0.00020	0.023	0.18	0.20	0.7	0.0000015	0.00061	0.0023	0.00029	0.033	**0.25**	**0.29**
Lithium	0.00000011	0.000083	0.00000059	0.000000075	0.00019	0.00054	0.00081	0.002	0.000055	0.041	0.00029	0.000038	0.096	**0.27**	**0.41**
Manganese	0.00000011	0.000058	0.000047	0.0000061	0.0036	0.083	0.087	0.0250	0.0000045	0.0023	0.0019	0.00024	0.14	**3.3**	**3.5**
Mercury	0.0000000011	0.0000000081	0.0000000056	0.000000071	0.000024	0.000066	0.000090	0.0003	0.0000036	0.000027	0.000019	0.00024	0.079	**0.22**	**0.30**
Molybdenum	0.0000000011	0.0000055	0.000000040	0.0000000052	0.00012	0.0042	0.0043	0.005	0.00000022	0.0011	0.0000080	0.0000010	0.023	**0.84**	**0.87**
Nickel	0.000000011	0.0000051	0.00000094	0.0000011	0.0019	0.0040	0.0059	0.0013	0.0000084	0.0039	0.00072	0.00084	**1.5**	**3.1**	**4.6**
Selenium	0.000000022	0.0000042	0.000000068	0.0000000088	0.00055	0.0020	0.0025	0.006	0.0000038	0.00073	0.000012	0.0000015	0.096	**0.35**	**0.45**
Strontium	0.000000063	0.0010	0.0000027	0.00000035	0.021	NA	0.022	0.60	0.00000010	0.0017	0.0000046	0.00000058	0.035	-	0.036
Thallium	0.0000000022	0.00000080	0.0000000099	0.0000000013	0.000022	0.000013	0.000035	0.000025	0.000087	0.032	0.00040	0.000051	**0.87**	**0.52**	**1.4**
Zinc	0.00000016	0.0000080	0.0000052	0.0000066	0.018	0.17	0.19	0.57	0.00000028	0.000014	0.0000091	0.000012	0.032	**0.30**	**0.34**

Notes:

COPC = contaminant of potential concern

"NA" = COPC concentration not available for pathway

"-" = not calculated

BW = body weight

Hazard quotients greater than 0.2 are shaded grey.

Appendix G-13: Risk Characterization for Indigenous and Non-Indigenous Resident Land User Adult under Closure Conditions

Non-Metal COPC	Estimated Daily Dose for Resident Adult (mg/kg BW/day)							Toxicity Reference Value (mg/kg BW/day)	Hazard Quotient (unitless) for Resident Adult						
	Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)		Inhalation	Drinking Water	Soil Ingestion	Dermal Contact With Soil	Ingestion of Subsistence Foods	Ingestion of Market Foods	Total (All Exposure Routes)
Aluminum	0.0000062	0.00053	0.0055	0.00071	0.0039	0.025	0.036	0.3	0.000022	0.0018	0.019	0.0024	0.013	0.087	0.12
Arsenic	0.000000051	0.000019	0.0000027	0.0000010	0.0000093	0.0010	0.0011	0.0003	0.00017	0.062	0.0091	0.0035	0.031	**3.5**	**3.6**
Barium	0.00000018	0.0018	0.000072	0.000093	0.0019	0.012	0.016	0.20	0.00000090	0.0090	0.00036	0.00046	0.0097	0.061	0.080
Boron	0.0000014	0.0020	0.0000048	0.00000061	0.0020	NA	0.0040	0.20	0.0000071	0.010	0.000024	0.0000031	0.0098	-	0.020
Cadmium	0.0000000071	0.00000068	0.00000015	0.0000000019	0.000030	0.00044	0.00047	0.001	0.0000071	0.00068	0.00015	0.0000019	0.030	0.44	0.47
Chromium	0.000000071	0.000020	0.0000072	0.0000093	0.000038	0.00043	0.00050	0.002	0.000035	0.0098	0.0036	0.0046	0.019	0.21	0.25
Cobalt	0.000000014	0.000014	0.0000036	0.00000046	0.00013	0.00018	0.00032	0.0014	0.000010	0.010	0.0026	0.00033	0.090	0.13	0.23
Iron	0.0000069	0.00098	0.010	0.0013	0.025	0.18	0.22	0.7	0.0000098	0.0014	0.015	0.0019	0.036	0.25	0.31
Lithium	0.00000071	0.00021	0.0000038	0.00000049	0.00020	0.00054	0.00095	0.002	0.00035	0.10	0.0019	0.00024	0.099	0.27	0.47
Manganese	0.00000073	0.00097	0.00031	0.000039	0.0071	0.083	0.092	0.0250	0.000029	0.039	0.012	0.0016	0.28	**3.3**	**3.7**
Mercury	0.0000000071	0.00000024	0.000000036	0.00000046	0.000024	0.000066	0.000091	0.0003	0.000024	0.00082	0.00012	0.0015	0.080	0.22	0.30
Molybdenum	0.0000000071	0.000034	0.00000026	0.000000033	0.00013	0.0042	0.0044	0.005	0.0000014	0.0068	0.000052	0.0000067	0.027	0.84	0.88
Nickel	0.000000071	0.000033	0.0000061	0.0000071	0.0020	0.0040	0.0060	0.0013	0.000055	0.025	0.0047	0.0055	**1.5**	**3.1**	**4.6**
Selenium	0.00000014	0.000016	0.00000044	0.000000057	0.00055	0.0020	0.0026	0.006	0.000025	0.0028	0.000078	0.0000100	0.096	0.35	0.45
Strontium	0.00000041	0.0066	0.000018	0.0000023	0.023	NA	0.030	0.60	0.00000068	0.011	0.000030	0.0000038	0.039	-	0.050
Thallium	0.000000014	0.0000052	0.000000064	0.0000000083	0.000022	0.000013	0.000040	0.000025	0.00057	0.21	0.0026	0.00033	0.87	0.52	**1.6**
Zinc	0.0000010	0.00010	0.000034	0.000043	0.019	0.17	0.19	0.57	0.0000018	0.00018	0.000059	0.000076	0.033	0.30	0.34

Notes:

COPC = contaminant of potential concern

"NA" = COPC concentration not available for pathway

"-" = not calculated

BW = body weight

Hazard quotients greater than 1 are shaded grey.

Appendix G-14: Estimated Lifetime Average Daily Dose and Incremental Lifetime Cancer Risk for Arsenic via Ingestion of Drinking Water for Each Age Group during Baseline

	Infant	Toddler	Child	Teen	Adult
Water IR (HC 2019)	0.3	0.6	0.8	1	1.5
ED (HC 2019)	0.5	4.5	7	8	60
BW (HC 2019)	8.2	16.5	32.9	59.7	70.7
LADD per Lifestage, Recreational	1.64E-08	1.46E-07	1.52E-07	1.20E-07	1.14E-06
LADD per Lifestage, Residential	1.52E-07	1.36E-06	1.41E-06	1.11E-06	1.06E-05
ADAF (HC 2013)	10	5	3	2	1
ILCR for Each Lifestage, Recreational	2.94E-07	1.32E-06	8.22E-07	4.31E-07	2.05E-06
ILCR for Each Lifestage, Residential	2.73E-06	**1.22E-05**	7.63E-06	4.00E-06	**1.90E-05**
TOTAL ILCR of All Lifestages, Recreational	2.94E-07	1.61E-06	2.43E-06	2.86E-06	4.91E-06
TOTAL ILCR of All Lifestages, Residential	2.73E-06	**1.50E-05**	**2.26E-05**	**2.66E-05**	**4.56E-05**

Notes:

ADAF = Age-dependant adjustment factor (unitless)

BW = Body weight (kg)

ED = Age Group Duration (years)

*ILCR = Incremental lifetime cancer risk; ILCRwater = S (LADD * SF * ADAF)*

SF = Slope Factor (Arsenic SF = 1.8)

*LADD = Lifetime average daily dose (mg/kg-day); LADD = (C * IR * AF * ED) / (BW * 80 years)*

AF = Medium-specific absorption Factor

C = Arsenic concentration (mg/L)

IR = Ingestion Rate (L/day)

Health Canada (HC). 2013. Federal Contaminated Sites Action Plan. Interim Guidance on Human Health Risk Assessment for Short-Term Exposure to Carcinogens at Contaminated Sites. Ottawa. ON.

Health Canada (HC). 2019. Guidance for Evaluating Human Health Impacts in Environmental Assessments: Human Health Risk Assessment. Ottawa, ON.

Grey and bolded numbers exceed the Health Canada threshold of 1x10-5 incremental lifetime cancer risk.

Appendix G-15: Estimated Lifetime Average Daily Dose and Incremental Lifetime Cancer Risk for Arsenic via Ingestion of Drinking Water for Each Age Group during Operation and Closure

	Operation					Closure				
	Infant	Toddler	Child	Teen	Adult	Infant	Toddler	Child	Teen	Adult
Water IR (HC 2019)	0.3	0.6	0.8	1	1.5	0.3	0.6	0.8	1	1.5
ED (HC 2019)	0.5	4.5	7	8	60	0.5	4.5	7	8	60
BW (HC 2019)	8.2	16.5	32.9	59.7	70.7	8.2	16.5	32.9	59.7	70.7
LADD per Lifestage, Recreational	1.78E-08	1.59E-07	1.66E-07	1.31E-07	1.24E-06	3.06E-08	2.74E-07	2.85E-07	2.24E-07	2.13E-06
LADD per Lifestage, Residential	1.53E-07	1.37E-06	1.43E-06	1.12E-06	1.07E-05	2.00E-07	1.78E-06	1.86E-06	1.46E-06	1.39E-05
ADAF (HC 2013)	10	5	3	2	1	10	5	3	2	1
ILCR for Each Lifestage, Recreational	3.21E-07	1.44E-06	8.96E-07	4.70E-07	2.23E-06	5.50E-07	2.46E-06	1.54E-06	8.07E-07	3.83E-06
ILCR for Each Lifestage, Residential	2.76E-06	**1.23E-05**	7.70E-06	4.04E-06	**1.92E-05**	3.59E-06	**1.61E-05**	**1.00E-05**	5.26E-06	**2.50E-05**
TOTAL ILCR of All Lifestages, Recreational	3.21E-07	1.76E-06	2.65E-06	3.12E-06	5.35E-06	5.50E-07	3.01E-06	4.55E-06	5.36E-06	9.19E-06
TOTAL ILCR of All Lifestages, Residential	2.76E-06	**1.51E-05**	**2.28E-05**	**2.68E-05**	**4.60E-05**	3.59E-06	**1.97E-05**	**2.97E-05**	**3.49E-05**	**5.99E-05**

Notes:

ADAF = Age-dependant adjustment factor (unitless)

BW = Body weight (kg)

ED = Age Group Duration (years)

*ILCR = Incremental lifetime cancer risk; ILCRwater = S (LADD * SF * ADAF)*

SF = Slope Factor (Arsenic SF = 1.8)

*LADD = Lifetime average daily dose (mg/kg-day); LADD = (C * IR * AF * ED) / (BW * 80 years)*

AF = Medium-specific absorption Factor

C = Arsenic concentration (mg/L)

IR = Ingestion Rate (L/day)

Health Canada (HC). 2013. Federal Contaminated Sites Action Plan. Interim Guidance on Human Health Risk Assessment for Short-Term Exposure to Carcinogens at Contaminated Sites. Ottawa. ON.

Health Canada (HC). 2019. Guidance for Evaluating Human Health Impacts in Environmental Assessments: Human Health Risk Assessment. Ottawa, ON.

Grey and bolded numbers exceed the Health Canada threshold of 1x10-5 incremental lifetime cancer risk.

Appendix G-16: Estimated Lifetime Average Daily Dose and Incremental Lifetime Cancer Risk for Arsenic via Inadvertent Ingestion of Soil for Each Age Group during Baseline

	Infant	Toddler	Child	Teen	Adult
Soil IR (HC 2019)	0.00002	0.00008	0.00002	0.00002	0.00002
ED (HC 2019)	0.5	4.5	7	8	60
BW (HC 2019)	8.2	16.5	32.9	59.7	70.7
LADD per Lifestage, Recreational	2.17E-08	3.88E-07	7.56E-08	4.76E-08	3.02E-07
LADD per Lifestage, Residential	1.41E-07	2.52E-06	4.91E-07	3.10E-07	1.96E-06
ADAF (HC 2013)	10	5	3	2	1
ILCR for Each Lifestage, Recreational	3.90E-07	3.49E-06	4.08E-07	1.71E-07	5.43E-07
ILCR for Each Lifestage, Residential	2.54E-06	**2.27E-05**	2.65E-06	1.11E-06	3.53E-06
TOTAL ILCR of All Lifestages, Recreational	3.90E-07	3.88E-06	4.29E-06	4.46E-06	5.00E-06
TOTAL ILCR of All Lifestages, Residential	2.54E-06	**2.52E-05**	**2.79E-05**	**2.90E-05**	**3.25E-05**

Notes:

ADAF = Age-dependant adjustment factor (unitless)

BW = Body weight (kg)

ED = Age Group Duration (years)

*ILCR = Incremental lifetime cancer risk; ILCRsoil = S (LADD * SF * ADAF)*

SF = Slope Factor (Arsenic SF = 1.8)

*LADD = Lifetime average daily dose (mg/kg-day); LADD = (C * IR * AF * ED) / (BW * 80 years)*

AF = Medium-specific absorption Factor

C = Arsenic concentration (mg/kg)

IR = Ingestion Rate (kg/day)

Health Canada (HC). 2013. Federal Contaminated Sites Action Plan. Interim Guidance on Human Health Risk Assessment for Short-Term Exposure to Carcinogens at Contaminated Sites. Ottawa. ON.

Health Canada (HC). 2019. Guidance for Evaluating Human Health Impacts in Environmental Assessments: Human Health Risk Assessment. Ottawa, ON.

Grey and bolded numbers exceed the Health Canada threshold of 1x10-5 incremental lifetime cancer risk.

Appendix G-17: Estimated Lifetime Average Daily Dose and Incremental Lifetime Cancer Risk for Arsenic via Inadvertent Ingestion of Soil for Each Age Group during Operation and Closure

	Operation					Closure				
	Infant	Toddler	Child	Teen	Adult	Infant	Toddler	Child	Teen	Adult
Soil IR (HC 2019)	0.00002	0.00008	0.00002	0.00002	0.00002	0.00002	0.00008	0.00002	0.00002	0.00002
ED (HC 2019)	0.5	4.5	7	8	60	0.5	4.5	7	8	60
BW (HC 2019)	8.2	16.5	32.9	59.7	70.7	8.2	16.5	32.9	59.7	70.7
LADD per Lifestage, Recreational	2.26E-08	4.05E-07	7.89E-08	4.97E-08	3.15E-07	2.26E-08	4.05E-07	7.89E-08	4.97E-08	3.15E-07
LADD per Lifestage, Residential	1.47E-07	2.63E-06	5.13E-07	3.23E-07	2.05E-06	1.47E-07	2.63E-06	5.13E-07	3.23E-07	2.05E-06
ADAF (HC 2013)	10	5	3	2	1	10	5	3	2	1
ILCR for Each Lifestage, Recreational	4.07E-07	3.64E-06	4.26E-07	1.79E-07	5.66E-07	4.07E-07	3.64E-06	4.26E-07	1.79E-07	5.66E-07
ILCR for Each Lifestage, Residential	2.65E-06	**2.37E-05**	2.77E-06	1.16E-06	3.68E-06	2.65E-06	**2.37E-05**	2.77E-06	1.16E-06	3.68E-06
TOTAL ILCR of All Lifestages, Recreational	4.07E-07	4.05E-06	4.47E-06	4.65E-06	5.22E-06	4.07E-07	4.05E-06	4.47E-06	4.65E-06	5.22E-06
TOTAL ILCR of All Lifestages, Residential	2.65E-06	**2.63E-05**	**2.91E-05**	**3.02E-05**	**3.39E-05**	2.65E-06	**2.63E-05**	**2.91E-05**	**3.02E-05**	**3.39E-05**

Notes:

ADAF = Age-dependant adjustment factor (unitless)

BW = Body weight (kg)

ED = Age Group Duration (years)

*ILCR = Incremental lifetime cancer risk; ILCRsoil = S (LADD * SF * ADAF)*

SF = Slope Factor (Arsenic SF = 1.8)

*LADD = Lifetime average daily dose (mg/kg-day); LADD = (C * IR * AF * ED) / (BW * 80 years)*

AF = Medium-specific absorption Factor

C = Arsenic concentration (mg/kg)

IR = Ingestion Rate (kg/day)

Health Canada (HC). 2013. Federal Contaminated Sites Action Plan. Interim Guidance on Human Health Risk Assessment for Short-Term Exposure to Carcinogens at Contaminated Sites. Ottawa. ON.

Health Canada (HC). 2019. Guidance for Evaluating Human Health Impacts in Environmental Assessments: Human Health Risk Assessment. Ottawa, ON.

Grey and bolded numbers exceed the Health Canada threshold of 1x10-5 incremental lifetime cancer risk.

Appendix G-18: Estimated Lifetime Average Daily Dose of Arsenic via Ingestion of Subsistence Foods for Each Age Group during Baseline

Life-stage	Duration in Years	Lifetime Average Daily Dose for Age Group from Ingestion of Subsistence Foods (mg/kg BW/day)											Total Dose from Subsistence Foods only (not including Garden Produce) – Recreational Receptor (mg/kg BW/day)	Total Dose from Subsistence Foods only (including Garden Produce) – Residential Receptor (mg/kg BW/day)	Total Dose from Subsistence and Background Market Foods (not including Garden Produce) – Recreational Receptor (mg/kg BW/day)	Total Dose from Subsistence and Background Market Foods (including Garden Produce) – Residential Receptor (mg/kg BW/day)
		Dose from Moose Meat	Dose from Moose Organs	Dose from Mule Deer Meat	Dose from Mule Deer Organs	Dose from American Black Bear	Dose from Grouse	Dose from Snowshoe Hare	Dose from Rainbow Trout	Dose from Berries	Dose from Garden Produce (Leaves) [4]	Background Dose from Market Food [mg/kg BW/day]				
Infant [1]	0.5									5.72E-09	2.05E-08	1.30E-06	5.72E-09	2.62E-08	1.31E-06	1.33E-06
Toddler	4.5	4.70E-07	1.60E-07	5.35E-08	1.62E-07	8.41E-10	4.42E-09	5.88E-11	4.84E-08	2.57E-08	9.22E-08	3.49E-05	9.25E-07	1.02E-06	3.59E-05	3.59E-05
Child [2]	7	3.65E-07	1.24E-07	4.15E-08	1.25E-07	6.52E-10	3.43E-09	4.56E-11	3.75E-08	2.00E-08	7.15E-08	3.21E-05	7.17E-07	7.89E-07	3.29E-05	3.29E-05
Teen [3]	8	4.59E-07	1.56E-07	5.22E-08	1.58E-07	8.21E-10	4.32E-09	5.74E-11	4.73E-08	2.51E-08	9.61E-08	2.38E-05	9.04E-07	1.00E-06	2.48E-05	2.48E-05
Adult	60	2.91E-06	9.91E-07	3.31E-07	1.00E-06	5.20E-09	2.74E-08	3.64E-10	2.99E-07	1.59E-07	6.09E-07	1.59E-04	5.72E-06	6.33E-06	1.65E-04	1.65E-04

Notes:

[1] Infants are assumed to not be eating meat and therefore only berries and vegetables were used to calculate LADD.

[2] Children are assumed to have the same consumption rate and frequencies as toddlers.

[3] Teens are assumed to have the same consumption rate and frequency as adults.

[4] The IR of vegetables in Richardson (1997) was adjusted by a factor of 0.1 to account for garden produce only, as per CCME 2006, as the IR in Richardson 1997 includes vegetables from store and garden sources.

Appendix G-19: Estimated Lifetime Average Daily Dose of Arsenic via Ingestion of Subsistence Foods for Each Age Group during Operation

Life-stage	Duration in Years	Lifetime Average Daily Dose for Age Group from Ingestion of Subsistence Foods (mg/kg BW/day)											Total Dose from Subsistence Foods only (not including Garden Produce) – Recreational Receptor (mg/kg BW/day)	Total Dose from Subsistence Foods only (including Garden Produce) – Residential Receptor (mg/kg BW/day)	Total Dose from Subsistence and Background Market Foods (not including Garden Produce) – Recreational Receptor (mg/kg BW/day)	Total Dose from Subsistence and Background Market Foods (including Garden Produce) – Residential Receptor (mg/kg BW/day)
		Dose from Moose Meat	Dose from Moose Organs	Dose from Mule Deer Meat	Dose from Mule Deer Organs	Dose from American Black Bear	Dose from Grouse	Dose from Snowshoe Hare	Dose from Rainbow Trout	Dose from Berries	Dose from Garden Produce (Leaves) [4]	Background Dose from Market Food [mg/kg BW/day]				
Infant [1]	0.5									8.86E-09	2.32E-08	1.30E-06	8.86E-09	3.21E-08	1.31E-06	1.33E-06
Toddler	4.5	5.17E-07	1.76E-07	5.90E-08	1.79E-07	9.75E-10	4.92E-09	6.49E-11	5.64E-08	3.99E-08	1.04E-07	3.49E-05	1.03E-06	1.14E-06	3.60E-05	3.61E-05
Child [2]	7	4.01E-07	1.37E-07	4.57E-08	1.38E-07	7.56E-10	3.81E-09	5.03E-11	4.38E-08	3.09E-08	8.10E-08	3.21E-05	8.01E-07	8.82E-07	3.29E-05	3.30E-05
Teen [3]	8	5.05E-07	1.72E-07	5.76E-08	1.74E-07	9.53E-10	4.80E-09	6.33E-11	5.51E-08	3.90E-08	1.09E-07	2.38E-05	1.01E-06	1.12E-06	2.49E-05	2.50E-05
Adult	60	3.20E-06	1.09E-06	3.65E-07	1.10E-06	6.03E-09	3.04E-08	4.01E-10	3.49E-07	2.47E-07	6.89E-07	1.59E-04	6.39E-06	7.08E-06	1.65E-04	1.66E-04

Notes:

[1] Infants are assumed to not be eating meat and therefore only berries and vegetables were used to calculate LADD.

[2] Children are assumed to have the same consumption rate and frequencies as toddlers.

[3] Teens are assumed to have the same consumption rate and frequency as adults.

[4] The IR of vegetables in Richardson (1997) was adjusted by a factor of 0.1 to account for garden produce only, as per CCME 2006, as the IR in Richardson 1997 includes vegetables from store and garden sources.

Appendix G-20: Estimated Lifetime Average Daily Dose of Arsenic via Ingestion of Subsistence Foods for Each Age Group during Closure

Life-stage	Duration in Years	Lifetime Average Daily Dose for Age Group from Ingestion of Subsistence Foods (mg/kg BW/day)											Total Dose from Subsistence Foods only (not including Garden Produce) – Recreational Receptor (mg/kg BW/day)	Total Dose from Subsistence Foods only (including Garden Produce) – Residential Receptor (mg/kg BW/day)	Total Dose from Subsistence and Background Market Foods (not including Garden Produce) – Recreational Receptor (mg/kg BW/day)	Total Dose from Subsistence and Background Market Foods (including Garden Produce) – Residential Receptor (mg/kg BW/day)
		Dose from Moose Meat	Dose from Moose Organs	Dose from Mule Deer Meat	Dose from Mule Deer Organs	Dose from American Black Bear	Dose from Grouse	Dose from Snowshoe Hare	Dose from Rainbow Trout	Dose from Berries	Dose from Garden Produce (Leaves) [4]	Background Dose from Market Food [mg/kg BW/day]				
Infant [1]	0.5									5.74E-09	2.06E-08	1.30E-06	5.74E-09	2.63E-08	1.31E-06	1.33E-06
Toddler	4.5	4.84E-07	1.65E-07	5.51E-08	1.66E-07	1.18E-09	4.54E-09	6.04E-11	1.27E-07	2.58E-08	9.26E-08	3.49E-05	1.03E-06	1.12E-06	3.60E-05	3.61E-05
Child [2]	7	3.76E-07	1.28E-07	4.27E-08	1.29E-07	9.14E-10	3.52E-09	4.68E-11	9.86E-08	2.00E-08	7.18E-08	3.21E-05	7.99E-07	8.70E-07	3.29E-05	3.30E-05
Teen [3]	8	4.73E-07	1.61E-07	5.38E-08	1.63E-07	1.15E-09	4.43E-09	5.90E-11	1.24E-07	2.52E-08	9.65E-08	2.38E-05	1.01E-06	1.10E-06	2.49E-05	2.50E-05
Adult	60	3.00E-06	1.02E-06	3.41E-07	1.03E-06	7.29E-09	2.81E-08	3.73E-10	7.87E-07	1.60E-07	6.11E-07	1.59E-04	6.37E-06	6.98E-06	1.65E-04	1.66E-04

Notes:

[1] Infants are assumed to not be eating meat and therefore only berries and vegetables were used to calculate LADD.

[2] Children are assumed to have the same consumption rate and frequencies as toddlers.

[3] Teens are assumed to have the same consumption rate and frequency as adults.

[4] The IR of vegetables in Richardson (1997) was adjusted by a factor of 0.1 to account for garden produce only, as per CCME 2006, as the IR in Richardson 1997 includes vegetables from store and garden sources.

Appendix G-21: Incremental Lifetime Cancer Risk from Ingestion of Arsenic in Subsistence Foods for Each Age Group during Baseline

Lifestage	ADAF	Incremental Lifetime Cancer Risk for Each Age Group from Ingestion of Subsistence Foods (mg/kg BW/day)																			
		ILCR from Moose Meat		ILCR from Moose Organs		ILCR from Mule Deer Meat		ILCR from Mule Deer Organs		ILCR from American Black Bear		ILCR from Grouse		ILCR from Snowshoe Hare		ILCR from Rainbow Trout		ILCR from Berries		ILCR from Garden Produce (Leaves)		ILCR from Market Food (mg/kg BW/day)	
		for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Sum of Age Groups		for Individual Age Group	for Sum of Age Groups
Infant	10																	1.03E-07	1.03E-07	3.69E-07	3.69E-07	**2.34E-05**	**2.34E-05**
Toddler	5	4.23E-06	4.23E-06	1.44E-06	1.44E-06	4.81E-07	4.81E-07	1.46E-06	1.46E-06	7.57E-09	7.57E-09	3.98E-08	3.98E-08	5.29E-10	5.29E-10	4.36E-07	4.36E-07	2.32E-07	3.35E-07	8.30E-07	1.20E-06	**3.14E-04**	**3.38E-04**
Child	3	1.97E-06	6.20E-06	6.71E-07	2.11E-06	2.24E-07	7.05E-07	6.77E-07	2.13E-06	3.52E-09	1.11E-08	1.85E-08	5.83E-08	2.46E-10	7.76E-10	2.03E-07	6.38E-07	1.08E-07	4.42E-07	3.86E-07	1.58E-06	**1.74E-04**	**5.11E-04**
Teen	2	1.65E-06	7.85E-06	5.63E-07	2.68E-06	1.88E-07	8.94E-07	5.69E-07	2.70E-06	2.96E-09	1.40E-08	1.56E-08	7.39E-08	2.07E-10	9.82E-10	1.70E-07	8.08E-07	9.05E-08	5.33E-07	3.46E-07	1.93E-06	**8.59E-05**	**5.97E-04**
Adult	1	5.24E-06	**1.31E-05**	1.78E-06	4.46E-06	5.96E-07	1.49E-06	1.80E-06	4.50E-06	9.36E-09	2.34E-08	4.93E-08	1.23E-07	6.55E-10	1.64E-09	5.39E-07	1.35E-06	2.87E-07	8.19E-07	1.10E-06	3.03E-06	**2.86E-04**	**8.83E-04**

Lifestage	ADAF	Total ILCR from Subsistence Foods (not including Garden Produce) – Recreational Receptor* (mg/kg BW/day)	Total ILCR from Subsistence Foods (including Garden Produce) – Residential Receptor* (mg/kg BW/day)	ILCR from Subsistence and Background Foods (not including Garden Produce) – Recreational Receptor (mg/kg BW/day)	ILCR from Subsistence and Background Foods (including Garden Produce) – Residential Receptor (mg/kg BW/day)
		for Sum of Age Groups	for Sum of Age Groups	for Sum of Age Groups	for Sum of Age Groups
Infant	10	1.03E-07	4.72E-07	**2.35E-05**	**2.39E-05**
Toddler	5	8.43E-06	9.63E-06	**3.46E-04**	**3.47E-04**
Child	3	**1.23E-05**	**1.39E-05**	**5.24E-04**	**5.25E-04**
Teen	2	**1.56E-05**	**1.75E-05**	**6.13E-04**	**6.15E-04**
Adult	1	**2.59E-05**	**2.89E-05**	**9.09E-04**	**9.12E-04**

Notes:

** Infants are assumed to not be eating meat and therefore only berries and vegetables were used to calculate the total ILCR.*

Arsenic Slope Factor = 1.8

ADAF = Age-dependent Adjustment Factor (Health Canada 2013)

ILCR = Incremental Lifetime Cancer Risk

Results exceeding the Health Canada threshold of $1x10^{-5}$ incremental lifetime cancer risk are bolded and shaded grey.

Appendix G-22: Incremental Lifetime Cancer Risk from Ingestion of Arsenic in Subsistence Foods for Each Age Group during Operation

Lifestage	ADAF	Incremental Lifetime Cancer Risk for Each Age Group from Ingestion of Subsistence Foods (mg/kg BW/day)																			
		ILCR from Moose Meat		ILCR from Moose Organs		ILCR from Mule Deer Meat		ILCR from Mule Deer Organs		ILCR from American Black Bear		ILCR from Grouse		ILCR from Snowshoe Hare		ILCR from Rainbow Trout		ILCR from Berries		ILCR from Garden Produce (Leaves)		ILCR from Market Food (mg/kg BW/day)	
		for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups
Infant	10																	1.60E-07	1.60E-07	4.18E-07	4.18E-07	**2.34E-05**	**2.34E-05**
Toddler	5	4.65E-06	4.65E-06	1.58E-06	1.58E-06	5.31E-07	5.31E-07	1.60E-06	1.60E-06	8.78E-09	8.78E-09	4.42E-08	4.42E-08	5.84E-10	5.84E-10	5.08E-07	5.08E-07	3.59E-07	5.19E-07	9.40E-07	1.36E-06	**3.14E-04**	**3.38E-04**
Child	3	2.16E-06	6.82E-06	7.37E-07	2.32E-06	2.47E-07	7.78E-07	7.47E-07	2.35E-06	4.08E-09	1.29E-08	2.06E-08	6.48E-08	2.72E-10	8.55E-10	2.36E-07	7.44E-07	1.67E-07	6.86E-07	4.37E-07	1.80E-06	**1.74E-04**	**5.11E-04**
Teen	2	1.82E-06	8.63E-06	6.19E-07	2.94E-06	2.07E-07	9.85E-07	6.27E-07	2.98E-06	3.43E-09	1.63E-08	1.73E-08	8.21E-08	2.28E-10	1.08E-09	1.98E-07	9.42E-07	1.40E-07	8.26E-07	3.92E-07	2.19E-06	**8.59E-05**	**5.97E-04**
Adult	1	5.76E-06	**1.44E-05**	1.96E-06	4.90E-06	6.57E-07	1.64E-06	1.99E-06	4.96E-06	1.09E-08	2.72E-08	5.47E-08	1.37E-07	7.22E-10	1.81E-09	6.28E-07	1.57E-06	4.44E-07	1.27E-06	1.24E-06	3.43E-06	**2.86E-04**	**8.83E-04**

Lifestage	ADAF	Total ILCR from Subsistence Foods (not including Garden Produce) – Recreational Receptor* (mg/kg BW/day)	Total ILCR from Subsistence Foods (including Garden Produce) – Residential Receptor* (mg/kg BW/day)	ILCR from Subsistence and Background Foods (not including Garden Produce) – Recreational Receptor (mg/kg BW/day)	ILCR from Subsistence and Background Foods (including Garden Produce) – Residential Receptor (mg/kg BW/day)
		for Sum of Age Groups	for Sum of Age Groups	for Sum of Age Groups	for Sum of Age Groups
Infant	10	1.60E-07	5.77E-07	**2.36E-05**	**2.46E-05**
Toddler	5	9.45E-06	**1.08E-05**	**3.47E-04**	**3.49E-04**
Child	3	**1.38E-05**	**1.56E-05**	**5.25E-04**	**5.27E-04**
Teen	2	**1.74E-05**	**1.96E-05**	**6.15E-04**	**6.17E-04**
Adult	1	**2.89E-05**	**3.23E-05**	**9.12E-04**	**9.16E-04**

Notes:

** Infants are assumed to not be eating meat and therefore only berries and vegetables were used to calculate the total ILCR.*

Arsenic Slope Factor = 1.8

ADAF = Age-dependent Adjustment Factor (Health Canada 2013)

ILCR = Incremental Lifetime Cancer Risk

Results exceeding the Health Canada threshold of $1x10^{-5}$ incremental lifetime cancer risk are bolded and shaded grey.

Appendix G-23: Incremental Lifetime Cancer Risk from Ingestion of Arsenic in Subsistence Foods for Each Age Group during Closure

Lifestage	ADAF	Incremental Lifetime Cancer Risk for Each Age Group from Ingestion of Subsistence Foods (mg/kg BW/day)																			
		ILCR from Moose Meat		ILCR from Moose Organs		ILCR from Mule Deer Meat		ILCR from Mule Deer Organs		ILCR from American Black Bear		ILCR from Grouse		ILCR from Snowshoe Hare		ILCR from Rainbow Trout		ILCR from Berries		ILCR from Garden Produce (Leaves)		ILCR from Background Market Foods	
		for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups	for Individual Age Group	for Sum of Age Groups
Infant	10																	1.03E-07	1.03E-07	3.70E-07	3.70E-07	**2.34E-05**	**2.34E-05**
Toddler	5	4.36E-06	4.36E-06	1.48E-06	1.48E-06	4.96E-07	4.96E-07	1.50E-06	1.50E-06	1.06E-08	1.06E-08	4.08E-08	4.08E-08	5.43E-10	5.43E-10	1.14E-06	1.14E-06	2.33E-07	3.36E-07	8.33E-07	1.20E-06	**3.14E-04**	**3.38E-04**
Child	3	2.03E-06	6.39E-06	6.91E-07	2.18E-06	2.31E-07	7.26E-07	6.97E-07	2.20E-06	4.94E-09	1.55E-08	1.90E-08	5.98E-08	2.53E-10	7.96E-10	5.32E-07	1.68E-06	1.08E-07	4.44E-07	3.88E-07	1.59E-06	**1.74E-04**	**5.11E-04**
Teen	2	1.70E-06	8.09E-06	5.80E-07	2.76E-06	1.94E-07	9.20E-07	5.85E-07	2.78E-06	4.14E-09	1.97E-08	1.60E-08	7.58E-08	2.12E-10	1.01E-09	4.47E-07	2.12E-06	9.09E-08	5.35E-07	3.47E-07	1.94E-06	**8.59E-05**	**5.97E-04**
Adult	1	5.39E-06	**1.35E-05**	1.84E-06	4.59E-06	6.13E-07	1.53E-06	1.85E-06	4.63E-06	1.31E-08	3.28E-08	5.05E-08	1.26E-07	6.72E-10	1.68E-09	1.42E-06	3.54E-06	2.88E-07	8.23E-07	1.10E-06	3.04E-06	**2.86E-04**	**8.83E-04**

Lifestage	ADAF	Total ILCR from Subsistence Foods (not including Garden Produce) – Recreational Receptor* (mg/kg BW/day)	Total ILCR from Subsistence Foods (including Garden Produce) – Residential Receptor* (mg/kg BW/day)	ILCR from Subsistence and Background Foods (not including Garden Produce) – Recreational Receptor (mg/kg BW/day)	ILCR from Subsistence and Background Foods (including Garden Produce) – Residential Receptor (mg/kg BW/day)
		for Sum of Age Groups	for Sum of Age Groups	for Sum of Age Groups	for Sum of Age Groups
Infant	10	1.03E-07	4.74E-07	**2.35E-05**	**2.44E-05**
Toddler	5	9.37E-06	**1.06E-05**	**3.47E-04**	**3.48E-04**
Child	3	**1.37E-05**	**1.53E-05**	**5.25E-04**	**5.27E-04**
Teen	2	**1.73E-05**	**1.92E-05**	**6.15E-04**	**6.16E-04**
Adult	1	**2.88E-05**	**3.18E-05**	**9.12E-04**	**9.15E-04**

Notes:

** Infants are assumed to not be eating meat and therefore only berries and vegetables were used to calculate the total ILCR.*

Arsenic Slope Factor = 1.8

ADAF = Age-dependent Adjustment Factor (Health Canada 2013)

ILCR = Incremental Lifetime Cancer Risk

Results exceeding the Health Canada threshold of $1x10^{-5}$ incremental lifetime cancer risk are bolded and shaded grey.

Appendix G-24: Lifetime Average Daily Dose and Incremental Lifetime Cancer Risk from Arsenic Obtained via Ingestion of Market Foods

Lifestage	Infant	Toddler	Child	Teen	Adult
LADD (mg/kg BW-day)	1.30×10^{-6}	3.49×10^{-5}	3.21×10^{-5}	2.38×10^{-5}	1.59×10^{-5}
ILCR (mg/kg BW-day)	2.34×10^{-5}	3.14×10^{-4}	1.74×10^{-4}	8.59×10^{-5}	2.86×10^{-4}

Appendix G-25: Estimated Lifetime Average Daily Dose and Incremental Lifetime Cancer Risk from Arsenic via Dermal Soil Contact during Baseline

	Infant	Toddler	Child	Teen	Adult
ED (HC 2019)	0.5	4.5	7	8	60
SA of Hands (HC 2019)	320	430	590	800	890
SA of Body minus Hands (HC 2019)	3300	5700	9550	14670	16750
Soil Loading Rate Hands	0.0000001	0.0000001	0.0000001	0.0000001	0.0000001
Soil Loading Rate Other than Hands	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
BW (HC 2019)	8.2	16.5	32.9	59.7	70.7
LADD, Recreational	2.11E-09	1.45E-08	1.75E-08	1.62E-08	1.16E-07
LADD, Residential	1.37E-08	9.45E-08	1.14E-07	1.05E-07	7.54E-07
ADAF (HC 2013)	10	5	3	2	1
ILCR for Each Lifestage, Recreational	3.80E-08	1.31E-07	9.46E-08	5.83E-08	2.09E-07
ILCR for Each Lifestage, Residential	2.47E-07	8.50E-07	6.15E-07	3.79E-07	1.36E-06
TOTAL ILCR of All Lifestages, Recreational	3.80E-08	1.69E-07	2.63E-07	3.22E-07	5.31E-07
TOTAL ILCR of All Lifestages, Residential	2.47E-07	1.10E-06	1.71E-06	2.09E-06	3.45E-06

Notes:

ADAF = Age-dependant adjustment factor (unitless)

BW = Body weight (kg)

ED = Age Group Duration (years)

*ILCR = Incremental lifetime cancer risk; $ILCR_{soil}$ = S (LADD * SF * ADAF)*

SF = Slope Factor (Arsenic SF = 1.8)

*LADD = Lifetime average daily dose (mg/kg-day); LADD = (C_S x (SAH + SAB) x EF x ED x D2 (days/7d) × D3 (weeks/52w))/(BW*80yrs)*

C_S = COPC concentration in soil (mg/kg)

D = Duration

EF = Exposure Frequency = 1 event/day

SA = Surface Area exposed for loading (cm²)

Health Canada (HC). 2013. Federal Contaminated Sites Action Plan. Interim Guidance on Human Health Risk Assessment for Short-Term Exposure to Carcinogens at Contaminated Sites. Ottawa. ON.

Health Canada (HC). 2019. Guidance for Evaluating Human Health Impacts in Environmental Assessments: Human Health Risk Assessment. Ottawa, ON.

Grey and bolded numbers exceed the Health Canada threshold of $1x10^{-5}$ incremental lifetime cancer risk.

Appendix G-26: Estimated Lifetime Average Daily Dose and Incremental Lifetime Cancer Risk from Arsenic via Dermal Soil Contact during Operation and Closure

	Operation					Closure				
	Infant	Toddler	Child	Teen	Adult	Infant	Toddler	Child	Teen	Adult
ED (HC 2019)	0.5	4.5	7	8	60	0.5	4.5	7	8	60
SA of Hands (HC 2019)	320	430	590	800	890	320	430	590	800	890
SA of Body minus Hands (HC 2019)	3300	5700	9550	14670	16750	3300	5700	9550	14670	16750
Soil Loading Rate Hands	0.0000001	0.0000001	0.0000001	0.0000001	0.0000001	0.0000001	0.0000001	0.0000001	0.0000001	0.0000001
Soil Loading Rate Other than Hands	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
BW (HC 2019)	8.2	16.5	32.9	59.7	70.7	8.2	16.5	32.9	59.7	70.7
LADD, Recreational	2.20E-09	1.52E-08	1.83E-08	1.69E-08	1.21E-07	2.20E-09	1.52E-08	1.83E-08	1.69E-08	1.21E-07
LADD, Residential	1.43E-08	9.86E-08	1.19E-07	1.10E-07	7.87E-07	1.43E-08	9.86E-08	1.19E-07	1.10E-07	7.87E-07
ADAF (HC 2013)	10	5	3	2	1	10	5	3	2	1
ILCR for Each Lifestage, Recreational	3.97E-08	1.37E-07	9.87E-08	6.08E-08	2.18E-07	3.97E-08	1.37E-07	9.87E-08	6.08E-08	2.18E-07
ILCR for Each Lifestage, Residential	2.58E-07	8.87E-07	6.42E-07	3.95E-07	1.42E-06	2.58E-07	8.87E-07	6.42E-07	3.95E-07	1.42E-06
TOTAL ILCR of All Lifestages, Recreational	3.97E-08	1.76E-07	2.75E-07	3.36E-07	5.54E-07	3.97E-08	1.76E-07	2.75E-07	3.36E-07	5.54E-07
TOTAL ILCR of All Lifestages, Residential	2.58E-07	1.15E-06	1.79E-06	2.18E-06	3.60E-06	2.58E-07	1.15E-06	1.79E-06	2.18E-06	3.60E-06

Notes:

ADAF = Age-dependant adjustment factor (unitless)

BW = Body weight (kg)

ED = Age Group Duration (years)

*ILCR = Incremental lifetime cancer risk; $ILCR_{soil}$ = S (LADD * SF * ADAF)*

SF = Slope Factor (Arsenic SF = 1.8)

*LADD = Lifetime average daily dose (mg/kg-day); LADD = (C_S x (SAH + SAB) x EF x ED x D2 (days/7d) × D3 (weeks/52w))/(BW*80yrs)*

C_S = COPC concentration in soil (mg/kg)

D = Duration

EF = Exposure Frequency = 1 event/day

SA = Surface Area exposed for loading (cm^2)

Health Canada (HC). 2013. Federal Contaminated Sites Action Plan. Interim Guidance on Human Health Risk Assessment for Short-Term Exposure to Carcinogens at Contaminated Sites. Ottawa. ON.

Health Canada (HC). 2019. Guidance for Evaluating Human Health Impacts in Environmental Assessments: Human Health Risk Assessment. Ottawa, ON.

Grey and bolded numbers exceed the Health Canada threshold of $1x10^{-5}$ incremental lifetime cancer risk.