

ANNEX VIII: APPENDIX D

SHORT-TERM LEACH TESTING RESULTS



Tables

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Abbreviations

Abbreviation	Definition
Ag	silver
Al	aluminum
As	arsenic
B	boron
Ba	barium
Be	beryllium
Bi	bismuth
Ca	calcium
CCME	Canadian Council of Ministers of Environment
Cd	cadmium
Cl	chlorine
Co	cobalt
Cr	chromium
Cu	copper
F	fluorine
Fe	iron
Hg	mercury
ID	identification
K	potassium
Li	lithium
Mg	magnesium
Mn	manganese
Mo	molybdenum
n	number of samples
Na	sodium
Ni	nickel
P	phosphorus
Pb	lead
S	sulphur
Sb	antimony
Se	selenium
Si	silicon
Sn	tin
SO ₄	sulphate
Sr	strontium
Ti	titanium
Tl	thallium
U	uranium
V	vanadium

Abbreviation	Definition
Zn	zinc
Zr	zirconium

Units of Measure

Unit	Definition
<	less than
≥	greater than or equal to
mg CaCO ₃ /L	milligrams calcium carbonate per litre
mg/L	milligrams per litre
pH	potential of hydrogen; provides measure of the acidity or alkalinity of a solution on a scale of 0 to 14
µg/L	micrograms per litre

**Table D-1 Shake Flask Extraction Leach Test Results, Jay Pipe Samples
Part A**

Sample ID	pH	Alkalinity	Cl	F	SO ₄	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li
Units	-	mg CaCO ₃ /L	mg/L	mg/L	mg/L	mg CaCO ₃ /L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CCME Guideline ^(a)	6.5 to 9	---	120	0.12	---	---	0.1 ^(b)	---	0.005	---	---	---	1.5 ^(c)	0.00009 ^(d)	---	---	---	0.002 ^(e)	0.3	0.001 ^(h)	---
Metasediment																					
2014-DD-002	7.52	13.7	0.9	0.14	5	6.4	0.219	0.0002	0.0520	0.00415	0.000007	0.000007	0.0555	0.000013	0.80	0.00028	0.000084	0.00111	0.077	0.00002	0.0130
2014-DD-005	7.29	12.3	0.5	0.11	9	7.9	0.180	0.0002	0.214	0.00524	0.000007	0.000007	0.0881	0.000003	1.04	0.00017	0.000110	0.00028	0.046	0.00001	0.0187
2014-DD-006	7.34	10.2	0.5	0.08	7	6.0	0.124	0.0002	0.0408	0.00324	0.000007	0.000007	0.0752	0.000004	0.80	0.00010	0.000120	0.00030	0.044	0.00001	0.0163
2014-DD-007	7.28	9.6	0.4	0.06	4	4.6	0.112	0.0002	0.0345	0.00220	0.000007	0.000007	0.0601	0.000003	0.65	0.00004	0.000162	0.00021	0.043	0.00002	0.0151
2014-DD-008	7.39	14.5	1.1	0.09	12	11.6	0.0806	0.0002	0.0217	0.00416	0.000007	0.000007	0.113	0.000003	1.60	0.00003	0.000101	0.00039	0.034	0.00001	0.0168
2014-DD-010	7.21	7.6	0.7	0.06	14	7.6	0.162	0.0002	0.0973	0.00356	0.000007	0.000007	0.0935	0.000004	1.03	0.00022	0.000203	0.00028	0.034	0.00001	0.0152
2014-DD-012	7.41	12.9	1.0	0.09	5	3.3	0.0965	0.0002	0.0144	0.00151	0.000007	0.000007	0.0917	0.000003	0.47	0.00012	0.000038	0.00026	0.032	0.00002	0.0106
2014-DD-015	7.65	25.4	0.7	0.10	9	5.9	0.141	0.0002	0.0536	0.00237	0.000007	0.000007	0.0764	0.000003	0.95	0.00011	0.000051	0.00015	0.029	0.00001	0.0108
2014-DD-017	7.64	27.4	1.4	0.08	4	9.2	0.143	0.0002	0.138	0.00101	0.000007	0.000007	0.0519	0.000003	1.61	0.00012	0.000102	0.00033	0.028	0.00003	0.0133
2014-DD-018	7.32	9.5	0.8	0.06	9	4.7	0.0811	0.0002	0.0018	0.00062	0.000013	0.000007	0.0274	0.000010	0.80	0.00011	0.000888	0.00020	0.028	0.00003	0.01225
2014-DD-019	7.73	38.5	0.7	0.06	12	28.1	0.121	0.0002	0.0014	0.00141	0.000011	0.000007	0.0239	0.000003	8.11	0.00003	0.000212	0.00018	0.018	0.00002	0.0115
2014-DD-033	7.53	11.1	1.1	0.11	4	1.7	0.150	0.0002	0.0050	0.00043	0.000007	0.000007	0.0374	0.000003	0.40	0.00011	0.000031	0.00016	0.026	0.00002	0.00310
2014-DD-035	7.41	11.5	0.4	0.12	5	3.3	0.130	0.0002	0.0023	0.00048	0.000007	0.000007	0.0414	0.000009	0.87	0.00009	0.000042	0.00032	0.025	0.00003	0.00275
2014-DD-036	7.29	12.6	1.1	0.07	7	9.8	0.0725	0.0003	0.0018	0.00053	0.000007	0.000007	0.0126	0.000016	2.66	0.00003	0.000368	0.00022	0.011	0.00003	0.00506
2014-DD-037	7.33	10.5	0.7	0.06	4	4.8	0.0383	0.0002	0.0004	0.00080	0.000008	0.000007	0.0071	0.000004	1.41	0.00003	0.000221	0.00018	0.002	0.00001	0.00461
Median	7.4	12	0.70	0.08	7.0	6.0	0.12	0.0002	0.02	0.002	0.000007	0.000007	0.06	0.000003	0.95	0.0001	0.0001	0.00026	0.03	0.00002	0.01
Minimum	7.2	8	0.40	0.06	4.0	1.7	0.04	0.0002	0.0004	0.0004	0.000007	0.000007	0.007	0.000003	0.40	0.00003	0.00003	0.00015	0.002	0.00001	0.003
Maximum	7.7	39	1.4	0.14	14	28	0.22	0.0003	0.21	0.005	0.00001	0.000007	0.11	0.00002	8.1	0.0003	0.0009	0.001	0.08	0.00003	0.02
n	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Granite																					
2014-DD-004	7.10	5.2	1.1	0.06	4	2.1	0.0160	0.0002	0.0153	0.00111	0.000007	0.000007	0.0122	0.000003	0.38	0.00003	0.000062	0.00077	0.056	0.00002	0.00224
2014-DD-021	7.54	12.6	1.0	0.06	2	2.9	0.0512	0.0002	0.0061	0.00032	0.000007	0.000007	0.0080	0.000003	0.93	0.00003	0.000062	0.00037	0.014	0.00002	0.00591
2014-DD-024	7.25	6.3	0.9	0.06	2	1.6	0.0719	0.0002	0.0039	0.00196	0.000007	0.000007	0.0070	0.000020	0.34	0.00003	0.000017	0.00060	0.027	0.00028	0.00304
2014-DD-027	7.23	8.4	1.0	0.06	5	3.9	0.0520	0.0002	0.0027	0.00052	0.000007	0.000007	0.0086	0.000007	1.02	0.00003	0.000052	0.00035	0.016	0.00018	0.00321
2014-DD-029	7.45	13.0	1.5	0.09	2	7.1	0.116	0.0002	0.0018	0.0167	0.000007	0.000007	0.0071	0.000005	1.88	0.00003	0.000024	0.00026	0.014	0.00005	0.00451
2014-DD-032	7.69	26.0	1.6	0.06	5	19.8	0.295	0.0002	0.0008	0.00160	0.000007	0.000007	0.0083	0.000003	6.50	0.00003	0.000078	0.00036	0.012	0.00003	0.00866
2014-DD-039	7.45	11.8	3.0	0.10	4	6.5	0.108	0.0002	0.0011	0.00107	0.000007	0.000007	0.0099	0.000013	2.10	0.00003	0.000070	0.00040	0.006	0.00017	0.00199
2014-DD-041	7.70	33.5	2.1	0.10	8	24.5	0.124	0.0002	0.0019	0.00144	0.000007	0.000007	0.0156	0.000004	8.52	0.00003	0.000063	0.00029	0.002	0.00003	0.00329
2014-DD-045	7.49	7.0	0.7	0.06	4	1.0	0.0115	0.0002	0.0019	0.00081	0.000010	0.000007	0.0063	0.000014	0.22	0.00003	0.000042	0.00056	0.002	0.00005	0.00208
2014-DD-052	7.46	8.9	0.7	0.07	5	1.7	0.0535	0.0002	0.0015	0.00143	0.000007	0.000007	0.0083	0.000003	0.33	0.00003	0.000045	0.00078	0.027	0.00005	0.00255
2014-DD-053	7.29	7.8	1.2	0.08	4	3.1	0.0734	0.0002	0.0011	0.00352	0.000007	0.000007	0.0116	0.000011	0.46	0.00020	0.000072	0.00067	0.075	0.00009	0.00264
2014-DD-059	7.48	20.7	1.4	0.06	5	13.9	0.0728	0.0002	0.0007	0.00062	0.000007	0.000007	0.0124	0.000009	4.71	0.00003	0.000054	0.00027	0.002	0.00004	0.00611
Median	7.46	10	1.2	0.06	4.0	3.5	0.07	0.0002	0.002	0.001	0.000007	0.000007	0.008	0.000006	0.98	0.00003	0.00006	0.0004	0.01	0.00005	0.003
Minimum	7.1	5	0.70	0.06	2.0	1.0	0.01	0.0002	0.0007	0.0003	0.000007	0.000007	0.006	0.000003	0.22	0.00003	0.00002	0.0003	0.002	0.00002	0.002
Maximum	7.7	33	3.0	0.10	8.0	25	0.30	0.0002	0.02	0.02	0.00001	0.000007	0.02	0.00002	8.5	0.0002	0.00008	0.0008	0.08	0.0003	0.009
n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

Table D-1 Shake Flask Extraction Leach Test Results, Jay Pipe Samples
Part A

Sample ID	pH	Alkalinity	Cl	F	SO ₄	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li
Units	-	mg CaCO ₃ /L	mg/L	mg/L	mg/L	mg CaCO ₃ /L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CCME Guideline ^(a)	6.5 to 9	---	120	0.12	---	---	0.1 ^(b)	---	0.005	---	---	---	1.5 ^(c)	0.00009 ^(d)	---	---	---	0.002 ^(e)	0.3	0.001 ^(h)	---
Diabase																					
2014-DD-040	7.81	26.2	0.5	0.06	4	10.7	0.187	0.0002	0.0003	0.00046	0.000007	0.000007	0.0292	0.000003	2.95	0.00003	0.000036	0.00022	0.011	0.00001	0.00172
2014-DD-049	7.63	27.1	0.5	0.06	5	15.2	0.178	0.0002	0.0002	0.00111	0.000007	0.000007	0.0312	0.000003	5.05	0.00003	0.000039	0.00028	0.004	0.00001	0.00243
Kimberlite																					
2014-DD-042	7.67	70.4	5.7	0.09	600	553	0.0019	0.0054	0.0035	0.0414	0.000007	0.000033	0.131	0.000104	82.4	0.00004	0.00160	0.00324	0.002	0.00001	0.0409
Blank	6.92	1.2	0.2	0.06	2	0.05	0.0003	0.0002	0.0002	0.00002	0.000007	0.000007	0.0002	0.000005	0.02	0.00003	0.000005	0.00041	0.002	0.00001	0.000006

Note:

0.01
0.01

Indicates parameter concentration is greater than CCME criteria.

Indicates parameter concentration is below the analytical detection limit.

a) CCME (Canadian Council of Ministers of Environment). 2014. Canadian Water Quality Guidelines for the Protection of Aquatic Life. Retrieved January 2014, from <http://ceqg-rcqe.CWQG.ca/>.

b) Aluminum guideline = 0.005 mg/L for pH < 6.5 and 0.01 mg/L for pH ≥ 6.5.

c) Boron guideline = 29 mg/L long term and 1.5 mg/L short term.

d) Cadmium guideline = 0.001 mg/L short term and hardness dependent and 0.00009 mg/L long term and hardness dependent.

e) Copper guideline is hardness dependent and is 0.002 mg/L when hardness is unknown.

f) See Part B.

g) See Part B.

h) Lead guideline is hardness dependent and is 0.001 mg/L when hardness is unknown.

i) See Part B.

n = number of samples; mg/L = milligrams per litre; mg CaCO₃/L = milligrams calcium carbonate per litre; - = unitless; --- = no guidelines; < = less than; ≥ = greater than or equal to.

**Table D-1 Shake Flask Extraction Leach Test Results, Jay Pipe Samples
Part B**

Sample ID	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
Units	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CCME Guideline ^(a)	---	---	0.026	0.073	0.025 ^(f)	0.004 ^(g)	---	0.001	---	0.0001	---	---	---	0.0008	---	---	0.015 ^(f)	---	0.03	---
Metasediment																				
2014-DD-002	1.06	0.0040	0.01	0.00301	0.0005	0.064	3.44	0.00298	2.76	0.000002	4.13	0.0063	2.23	0.000005	0.00001	0.00043	0.000047	0.00242	0.001	0.002
2014-DD-005	1.30	0.0020	0.01	0.00316	0.0013	0.025	3.69	0.00214	2.61	0.000002	6.11	0.0095	5.14	0.000005	0.00002	0.00046	0.000090	0.00174	0.001	0.002
2014-DD-006	0.966	0.0021	0.01	0.00303	0.0008	0.016	3.55	0.00111	2.03	0.000002	4.76	0.0079	4.26	0.000005	0.00003	0.00043	0.000056	0.00135	0.001	0.002
2014-DD-007	0.722	0.0017	0.01	0.00289	0.0013	0.018	3.21	0.00019	1.55	0.000002	3.23	0.0067	2.58	0.000005	0.00001	0.00048	0.000016	0.00096	0.001	0.002
2014-DD-008	1.86	0.0013	0.01	0.00376	0.0004	0.019	5.83	0.00168	1.86	0.000002	6.30	0.0170	6.21	0.000005	0.00001	0.00016	0.000114	0.00101	0.001	0.002
2014-DD-010	1.23	0.0016	0.01	0.0172	0.0021	0.012	5.25	0.00230	2.40	0.000002	6.42	0.0124	7.77	0.000017	0.00001	0.00055	0.000097	0.00173	0.001	0.002
2014-DD-012	0.522	0.0004	0.01	0.00379	0.0003	0.019	3.69	0.00201	2.20	0.000002	6.08	0.0056	2.97	0.000005	0.00003	0.00028	0.000032	0.00206	0.001	0.002
2014-DD-015	0.858	0.0010	0.01	0.00358	0.0003	0.024	5.71	0.00147	2.12	0.000002	8.47	0.0115	3.84	0.000005	0.00001	0.00027	0.000015	0.00254	0.001	0.002
2014-DD-017	1.26	0.0029	0.01	0.00539	0.0021	0.013	7.30	0.00083	1.81	0.000002	6.91	0.0187	3.24	0.000045	0.00001	0.00045	0.000016	0.00138	0.001	0.002
2014-DD-018	0.654	0.0030	0.01	0.00235	0.0056	0.017	6.04	0.00168	1.27	0.000002	5.77	0.0118	6.43	0.000036	0.00001	0.00074	0.000057	0.00028	0.001	0.002
2014-DD-019	1.90	0.0058	0.01	0.00251	0.0028	0.012	8.86	0.00066	1.48	0.000002	6.86	0.0595	7.42	0.000106	0.00001	0.00029	0.000057	0.00044	0.001	0.002
2014-DD-033	0.162	0.0010	0.01	0.00011	0.0002	0.023	1.35	0.00007	1.41	0.000002	4.34	0.0038	0.98	0.000008	0.00001	0.00169	0.000022	0.00162	0.001	0.002
2014-DD-035	0.281	0.0021	0.01	0.00008	0.0002	0.015	1.62	0.00013	1.27	0.000002	4.36	0.0075	1.83	0.000006	0.00039	0.00168	0.000024	0.00097	0.001	0.002
2014-DD-036	0.759	0.0073	0.01	0.00025	0.0041	0.009	2.40	0.00021	0.92	0.000003	2.45	0.0211	2.12	0.000039	0.00003	0.00147	0.000048	0.00065	0.001	0.002
2014-DD-037	0.316	0.0050	0.01	0.00016	0.0015	0.009	2.40	0.00004	0.74	0.000002	1.25	0.0103	1.29	0.000038	0.00002	0.00019	0.000055	0.00040	0.001	0.002
Median	0.86	0.0021	0.01	0.003	0.001	0.02	3.7	0.001	1.8	0.000002	5.8	0.01	3.2	0.000006	0.00001	0.0005	0.00005	0.001	0.001	0.002
Minimum	0.16	0.0004	0.01	0.00008	0.0002	0.009	1.4	0.00004	0.74	0.000002	1.3	0.004	0.98	0.000005	0.00001	0.0002	0.00002	0.0003	0.001	0.002
Maximum	1.9	0.007	0.01	0.02	0.006	0.06	8.9	0.003	2.8	0.000003	8.5	0.06	7.8	0.0001	0.00039	0.002	0.0001	0.003	0.001	0.002
n	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Granite																				
2014-DD-004	0.285	0.0041	0.01	0.00026	0.0003	0.045	1.42	0.00004	0.52	0.000002	1.09	0.0029	0.25	0.000005	0.00001	0.00005	0.000557	0.00039	0.001	0.002
2014-DD-021	0.144	0.0193	0.01	0.00080	0.0003	0.028	1.95	0.00004	0.82	0.000005	3.30	0.0058	0.21	0.000005	0.00001	0.00007	0.00704	0.00013	0.001	0.002
2014-DD-024	0.178	0.0042	0.01	0.00130	0.0001	0.045	2.00	0.00005	0.93	0.000004	1.37	0.0029	0.14	0.000005	0.00001	0.00086	0.00183	0.00058	0.001	0.002
2014-DD-027	0.334	0.0224	0.01	0.00045	0.0002	0.026	1.67	0.00004	0.71	0.000002	1.33	0.0054	0.09	0.000005	0.00001	0.00018	0.000996	0.00014	0.001	0.002
2014-DD-029	0.582	0.0096	0.01	0.00031	0.0001	0.022	2.38	0.00004	1.05	0.000002	1.85	0.0099	0.13	0.000005	0.00001	0.00006	0.000604	0.00015	0.001	0.002
2014-DD-032	0.854	0.0042	0.01	0.00025	0.0009	0.016	3.40	0.00013	1.64	0.000008	2.72	0.0278	2.33	0.000027	0.00002	0.00018	0.000098	0.00055	0.001	0.002
2014-DD-039	0.313	0.0053	0.01	0.00046	0.0002	0.032	1.63	0.00004	1.12	0.000004	2.82	0.0150	0.22	0.000005	0.00004	0.00044	0.00692	0.00016	0.001	0.002
2014-DD-041	0.784	0.0203	0.01	0.00038	0.0003	0.019	2.08	0.00004	1.80	0.000002	2.80	0.0259	0.23	0.000005	0.00004	0.00005	0.00140	0.00068	0.001	0.002
2014-DD-045	0.119	0.0017	0.01	0.00053	0.0001	0.043	1.75	0.00004	0.70	0.000016	1.64	0.0028	0.11	0.000010	0.00010	0.00005	0.00109	0.00132	0.002	0.002
2014-DD-052	0.214	0.0060	0.01	0.00123	0.0002	0.054	0.896	0.00004	1.49	0.000004	2.66	0.0033	0.14	0.000005	0.00003	0.00038	0.000136	0.00348	0.001	0.002
2014-DD-053	0.463	0.0068	0.01	0.00124	0.0021	0.064	1.70	0.00004	1.91	0.000008	1.83	0.0041	0.08	0.000005	0.00004	0.00059	0.000324	0.00177	0.001	0.002
2014-DD-059	0.520	0.0278	0.01	0.00028	0.0001	0.012	1.53	0.00004	1.25	0.000002	1.75	0.0203	0.11	0.000006	0.00003	0.00006	0.000780	0.00013	0.001	0.002
Median	0.32	0.006	0.01	0.0005	0.0002	0.03	1.7	0.00004	1.1	0.000004	1.8	0.006	0.14	0.000005	0.00003	0.0001	0.0009	0.0005	0.001	0.002
Minimum	0.12	0.002	0.01	0.0003	0.0001	0.01	0.90	0.00004	0.52	0.000002	1.1	0.003	0.08	0.000005	0.00001	0.0001	0.0001	0.0001	0.001	0.002
Maximum	0.85	0.03	0.01	0.001	0.002	0.06	3.4	0.0001	1.9	0.00002	3.3	0.03	2.3	0.00003	0.0001	0.0009	0.007	0.003	0.002	0.002
n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

Table D-1 Shake Flask Extraction Leach Test Results, Jay Pipe Samples
Part B

Sample ID	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
Units	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CCME Guideline ^(a)	---	---	0.026	0.073	0.025 ^(f)	0.004 ^(g)	---	0.001	---	0.0001	---	---	---	0.0008	---	---	0.015 ⁽ⁱ⁾	---	0.03	---
Diabase																				
2014-DD-040	0.813	0.0019	0.01	0.00007	0.0001	0.009	1.80	0.00010	1.96	0.000002	4.61	0.0213	0.14	0.000005	0.00003	0.00013	0.000113	0.00634	0.001	0.002
2014-DD-049	0.639	0.0037	0.01	0.00026	0.0001	0.015	2.44	0.00015	1.73	0.000006	2.52	0.0203	0.28	0.000013	0.00005	0.00006	0.000049	0.00295	0.001	0.002
Kimberlite																				
2014-DD-042	84.5	0.0731	0.01	0.411	0.123	0.009	74.6	0.0116	5.43	0.00275	60.0	1.34	293	0.000185	0.00002	0.00032	0.00210	0.00406	0.004	0.002
Blank	0.003	0.0002	0.01	0.00001	0.0001	0.009	0.002	0.00004	0.02	0.000007	0.01	0.0002	0.03	0.000005	0.00007	0.00005	0.000002	0.00001	0.001	0.002

Note:

0.01
0.01

Indicates parameter concentration is greater than CCME criteria.

Indicates parameter concentration is below the analytical detection limit.

- a) CCME (Canadian Council of Ministers of Environment), 2014. Canadian Water Quality Guidelines for the Protection of Aquatic Life. Retrieved January 2014, from <http://ceqg-rcqe.CWQG.ca/>.
- b) See Part A.
- c) See Part A.
- d) See Part A.
- e) See Part A.
- f) Nickel guideline is hardness dependent and is 0.025 mg/L when hardness is unknown.
- g) Phosphorus guideline is dependent on nature of waterbody, and is 0.004 mg/L at its lowest for ultra-oligotrophic bodies.
- h) See Part A.
- i) Uranium guideline = 0.03 mg/L long term and 0.015 mg/L short term.
- n = number of samples; mg/L = milligrams per litre; µg/L = micrograms per litre; --- = no guidelines; < = less than; ≥ = greater than or equal to.

**Table D-2 Net Acid Generation Leach Test Results, Jay Pipe Samples
Part A**

Sample ID	pH	Alkalinity	Cl	F	SO ₄	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li
Units	-	mg CaCO ₃ /L	mg/L	mg/L	mg/L	mg CaCO ₃ /L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CCME Guideline ^(a)	6.5 to 9	---	120	0.12	---	---	0.1 ^(b)	---	0.005	---	---	---	1.5 ^(c)	0.00009 ^(d)	---	---	---	0.002 ^(e)	0.3	0.001 ^(h)	---
Metasediment																					
2014-DD-002	4.82	0.2	6.1	0.06	12	25.4	0.608	0.0019	0.0179	0.0173	0.000050	0.000026	0.0678	0.000362	4.01	0.0524	0.00180	0.0113	0.113	0.00011	0.0687
2014-DD-005	4.94	6.1	6.6	0.06	4	16.8	0.461	0.0015	0.0043	0.00533	0.000019	0.000068	0.0312	0.000350	4.31	0.0691	0.00015	0.00354	0.039	0.00038	0.00547
2014-DD-006	4.79	1.7	6.2	0.06	52	34.8	0.190	0.0012	0.0419	0.0141	0.000044	0.000007	0.0718	0.000433	4.60	0.0504	0.00715	0.0137	0.040	0.00007	0.109
2014-DD-007	4.49	---	5.9	0.06	60	39.5	0.199	0.0010	0.0205	0.0317	0.000049	0.000007	0.108	0.000418	5.35	0.0463	0.0203	0.0334	0.045	0.00016	0.134
2014-DD-008	4.97	4.2	6.3	0.06	54	34.7	0.143	0.0011	0.0177	0.00700	0.000037	0.000007	0.112	0.000390	4.52	0.0488	0.00716	0.0149	0.031	0.00004	0.0819
2014-DD-010	4.56	0.1	5.8	0.06	43	26.9	0.267	0.0012	0.0477	0.0126	0.000045	0.000007	0.0765	0.000397	4.21	0.0490	0.0108	0.0293	0.052	0.00023	0.0595
2014-DD-012	4.67	0.1	5.6	0.06	34	26.9	0.206	0.0012	0.0249	0.0122	0.000026	0.000214	0.0742	0.000382	4.19	0.0523	0.00391	0.00816	0.060	0.00029	0.0741
2014-DD-015	4.79	0.1	5.0	0.06	43	31.9	0.367	0.0011	0.0314	0.0128	0.000058	0.000031	0.0596	0.000328	5.83	0.0466	0.00599	0.0181	0.094	0.00008	0.0601
2014-DD-017	4.68	0.1	5.3	0.06	59	42.3	0.221	0.0011	0.0378	0.00873	0.000148	0.000017	0.0459	0.000529	7.47	0.0490	0.0258	0.0538	0.050	0.00012	0.0734
2014-DD-018	4.06	---	5.3	0.06	59	32.4	0.202	0.0031	0.0073	0.0166	0.000250	0.000007	0.0460	0.000470	5.67	0.0453	0.0431	0.0718	0.037	0.00013	0.0738
2014-DD-019	4.77	0.1	5.3	0.06	46	44.8	0.108	0.0016	0.0105	0.00548	0.000082	0.000010	0.0262	0.000453	12.0	0.0506	0.0118	0.0190	0.037	0.00009	0.0543
2014-DD-033	4.49	---	4.9	0.06	60	27.0	0.201	0.0014	0.0129	0.0139	0.000096	0.000007	0.0338	0.000409	4.94	0.0478	0.0298	0.0724	0.042	0.00010	0.0516
2014-DD-035	4.03	---	5.0	0.06	62	31.4	0.418	0.0009	0.0090	0.0254	0.000105	0.000007	0.0334	0.000523	5.74	0.0414	0.0624	0.215	0.118	0.00005	0.0454
2014-DD-036	4.66	0.1	5.0	0.06	40	26.7	0.578	0.0010	0.0147	0.00548	0.000030	0.000007	0.0227	0.000404	5.46	0.0512	0.0203	0.0641	0.352	0.00079	0.0381
2014-DD-037	4.04	---	5.2	0.08	64	29.9	0.248	0.0008	0.0018	0.0184	0.000153	0.000007	0.0263	0.000563	5.37	0.0439	0.0631	0.141	0.055	0.00010	0.0437
Median	4.67	0.1	5.3	0.06	52	31	0.22	0.001	0.02	0.01	0.00005	0.000007	0.05	0.0004	5.4	0.05	0.01	0.03	0.05	0.0001	0.06
Minimum	4.03	0.1	4.9	0.06	4	17	0.11	0.0008	0.002	0.005	0.00002	0.000007	0.02	0.0003	4.0	0.04	0.0002	0.004	0.03	0.00004	0.005
Maximum	4.97	6.12	6.6	0.08	64	45	0.61	0.003	0.05	0.03	0.0003	0.0002	0.11	0.0006	12	0.07	0.06	0.22	0.35	0.0008	0.13
n	15	10	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Granite																					
2014-DD-004	4.79	1.2	5.7	0.06	27	31.6	0.355	0.0014	0.0733	0.0160	0.000063	0.000010	0.0710	0.000514	4.50	0.0486	0.00480	0.0130	0.084	0.00008	0.0977
2014-DD-021	5.17	12.7	4.9	0.06	4	16.4	0.557	0.0015	0.0030	0.00343	0.000085	0.000055	0.0180	0.000358	4.22	0.0607	0.000323	0.00354	0.137	0.00166	0.0186
2014-DD-024	5.19	21.5	5.1	0.06	4	16.6	0.557	0.0013	0.0020	0.00396	0.000050	0.000009	0.0168	0.000335	3.97	0.0611	0.000235	0.00306	0.198	0.00092	0.0148
2014-DD-027	5.23	21.8	5.3	0.06	4	16.8	0.428	0.0013	0.0087	0.00235	0.000040	0.000007	0.0128	0.000345	4.21	0.0627	0.000290	0.00200	0.101	0.00059	0.0134
2014-DD-029	5.11	8.6	5.3	0.06	4	17.2	0.360	0.0013	0.0015	0.00268	0.000015	0.000007	0.0321	0.000345	4.46	0.0664	0.000136	0.00157	0.066	0.00032	0.0135
2014-DD-032	4.67	0.1	5.2	0.06	39	32.0	0.319	0.0012	0.0046	0.00934	0.000016	0.000007	0.0303	0.000431	7.92	0.0508	0.0113	0.0443	0.099	0.00015	0.0288
2014-DD-039	5.10	8.5	6.2	0.06	5	17.9	0.295	0.0011	0.0011	0.00289	0.000023	0.000007	0.0139	0.000307	4.47	0.0677	0.000721	0.00379	0.055	0.00021	0.00502
2014-DD-041	4.99	4.2	6.1	0.06	9	24.1	0.356	0.0013	0.0071	0.00325	0.000013	0.000007	0.0145	0.000306	6.37	0.0581	0.00197	0.00613	0.099	0.00035	0.00856
2014-DD-045	5.36	25.8	5.1	0.06	4	17.1	0.462	0.0012	0.0015	0.00381	0.000076	0.000007	0.0201	0.000342	4.15	0.0586	0.000167	0.00184	0.176	0.00069	0.00533
2014-DD-052	5.32	23.2	5.1	0.06	4	16.7	0.306	0.0019	0.0018	0.00435	0.000037	0.000007	0.0151	0.000343	4.03	0.0636	0.000139	0.00595	0.084	0.00365	0.0100
2014-DD-053	5.31	24.1	5.5	0.06	4	17.0	0.352	0.0013	0.0016	0.00465	0.000033	0.000007	0.0159	0.000321	4.06	0.0653	0.000174	0.00175	0.093	0.00030	0.00836
2014-DD-059	5.5	30.2	5.3	0.06	5	17.9	0.379	0.0012	0.0008	0.00179	0.000024	0.000007	0.0128	0.000340	4.97	0.0602	0.000125	0.00108	0.095	0.00059	0.0170
Median	5.2	17	5.3	0.06	4	17	0.36	0.001	0.002	0.004	0.00004	0.000007	0.02	0.0003	4.3	0.06	0.0003	0.003	0.10	0.0005	0.01
Minimum	4.7	0.10	4.9	0.06	4	16	0.30	0.001	0.0008	0.002	0.00001	0.000007	0.01	0.0003	4.0	0.05	0.0001	0.001	0.06	0.00008	0.005
Maximum	5.5	30	6.2	0.06	39	32	0.56	0.002	0.07	0.02	0.00009	0.00006	0.07	0.0005	7.9	0.07	0.01	0.04	0.20	0.004	0.10
n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

**Table D-2 Net Acid Generation Leach Test Results, Jay Pipe Samples
Part A**

Sample ID	pH	Alkalinity	Cl	F	SO ₄	Hardness	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li
Units	-	mg CaCO ₃ /L	mg/L	mg/L	mg/L	mg CaCO ₃ /L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CCME Guideline ^(a)	6.5 to 9	---	120	0.12	---	---	0.1 ^(b)	---	0.005	---	---	---	1.5 ^(c)	0.00009 ^(d)	---	---	---	0.002 ^(e)	0.3	0.001 ^(h)	---
Diabase																					
2014-DD-040	6.37	43.6	4.8	0.06	17	36.6	0.0817	0.0011	0.0019	0.00056	0.000007	0.000007	0.0327	0.000279	5.84	0.0585	0.00130	0.00950	0.144	0.00006	0.00941
2014-DD-049	6.35	43.9	5.0	0.06	11	30.2	0.0216	0.0011	0.0041	0.00043	0.000007	0.000007	0.0293	0.000333	5.97	0.0537	0.00147	0.0148	0.009	0.00004	0.00810
Kimberlite																					
2014-DD-042	6.30	65.7	4.7	0.10	201	310	0.0313	0.0050	0.0230	0.0620	0.000007	0.000007	0.0361	0.000466	50.0	0.229	0.00431	0.00256	0.040	0.00006	0.0123
Blank	5.24	1,600	4.9	0.06	5	19.5	0.459	0.006	0.0005	0.00493	0.000011	0.000007	0.0128	0.000425	5.44	0.0536	0.000878	0.00358	0.206	0.00094	0.000327

Note:

0.01	Indicates parameter concentration is greater than CCME criteria.
0.01	Indicates parameter concentration is below the analytical detection limit.
---	Value to reported by laboratory.

a) CCME (Canadian Council of Ministers of Environment), 2014. Canadian Water Quality Guidelines for the Protection of Aquatic Life. Retrieved January 2014, from <http://ceqg-rcqe.CWQG.ca/>.

b) Aluminum guideline = 0.005 mg/L for pH < 6.5 and 0.01 mg/L for pH ≥ 6.5.

c) Boron guideline = 29 mg/L long term and 1.5 mg/L short term.

d) Cadmium guideline = 0.001 mg/L short term and hardness dependent and 0.00009 mg/L long term and hardness dependent.

e) Copper guideline is hardness dependent and is 0.002 mg/L when hardness is unknown.

f) See Part B.

g) See Part B.

h) Lead guideline is hardness dependent and is 0.001 mg/L when hardness is unknown.

i) See Part B.

n = number of samples; mg/L = milligrams per litre; mg CaCO₃/L = milligrams calcium carbonate per litre; - = unitless; --- = no guidelines; < = less than; ≥ = greater than or equal to.

**Table D-2 Net Acid Generation Leach Test Results, Jay Pipe Samples
Part B**

Sample ID	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
Units	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CCME Guideline ^(a)	---	---	0.026	0.073	0.025 ^(f)	0.004 ^(g)	---	0.001	---	0.0001	---	---	---	0.0008	---	---	0.015 ^(f)	---	0.03	---
Metasediment																				
2014-DD-002	3.74	0.0311	0.01	0.0167	0.0139	34.3	11.6	0.00076	7.93	0.000060	43.1	0.0210	7.06	0.000145	0.106	0.0256	0.00115	0.0215	0.003	0.002
2014-DD-005	1.47	0.0037	0.01	0.00722	0.0086	39.6	6.44	0.00023	6.42	0.000019	44.5	0.0192	2.41	0.000057	0.251	0.0129	0.00642	0.00043	0.003	0.002
2014-DD-006	5.67	0.0543	0.01	0.0210	0.0689	28.4	11.9	0.00143	8.85	0.000189	44.7	0.0272	18.9	0.000136	0.0247	0.0197	0.00194	0.0273	0.005	0.002
2014-DD-007	6.34	0.0759	0.01	0.0202	0.194	24.4	12.4	0.00154	8.59	0.000284	44.3	0.0430	27.6	0.000136	0.0195	0.0356	0.000830	0.0283	0.009	0.002
2014-DD-008	5.68	0.0378	0.01	0.0208	0.0480	28.9	11.9	0.00113	8.72	0.000138	43.5	0.0246	17.6	0.000116	0.0181	0.0167	0.00406	0.0245	0.002	0.002
2014-DD-010	3.98	0.0361	0.01	0.0248	0.0994	30.3	12.4	0.00133	7.86	0.000322	43.0	0.0265	15.7	0.000166	0.0244	0.0190	0.00192	0.0221	0.006	0.002
2014-DD-012	4.00	0.0231	0.01	0.0230	0.0283	31.9	12.0	0.00130	8.67	0.000094	44.0	0.0262	13.0	0.000108	0.0201	0.0158	0.00161	0.0225	0.004	0.002
2014-DD-015	4.23	0.0348	0.01	0.0225	0.0543	29.8	13.0	0.00104	8.00	0.000252	39.8	0.0304	15.2	0.000112	0.0551	0.0189	0.00205	0.0204	0.004	0.002
2014-DD-017	5.74	0.101	0.01	0.0241	0.163	28.8	11.6	0.00183	7.35	0.000371	40.9	0.0299	21.0	0.000301	0.0269	0.0238	0.00169	0.0197	0.064	0.002
2014-DD-018	4.43	0.105	0.01	0.0261	0.192	24.5	12.2	0.00154	7.02	0.000548	40.2	0.0363	26.9	0.000385	0.00648	0.0343	0.00170	0.0199	0.029	0.002
2014-DD-019	3.63	0.0795	0.01	0.0328	0.115	31.1	10.5	0.00107	6.49	0.000287	41.1	0.0269	19.7	0.000355	0.0215	0.0294	0.00314	0.0152	0.024	0.002
2014-DD-033	3.58	0.0852	0.01	0.0283	0.230	28.0	12.7	0.00177	6.73	0.000410	40.8	0.0318	21.0	0.000443	0.00997	0.0662	0.000749	0.0264	0.023	0.002
2014-DD-035	4.14	0.123	0.01	0.0252	0.333	24.4	13.2	0.00192	6.78	0.000555	41.0	0.0421	28.2	0.000420	0.0231	0.0704	0.000690	0.0277	0.054	0.002
2014-DD-036	3.17	0.0643	0.01	0.0229	0.155	30.9	11.0	0.00121	6.59	0.000312	40.5	0.0231	15.9	0.000364	0.215	0.105	0.00174	0.0185	0.062	0.002
2014-DD-037	4.01	0.135	0.01	0.0229	0.316	25.8	12.6	0.00239	6.39	0.000780	41.9	0.0325	29.0	0.000533	0.00738	0.135	0.00165	0.0264	0.027	0.002
Median	4.0	0.06	0.01	0.02	0.12	29	12	0.001	7.4	0.0003	42	0.03	19	0.0002	0.02	0.03	0.002	0.02	0.009	0.002
Minimum	1.5	0.0037	0.01	0.007	0.009	24	6.4	0.0002	6.4	0.00002	40	0.02	2.4	0.00006	0.006	0.01	0.0007	0.0004	0.002	0.002
Maximum	6.3	0.14	0.01	0.03	0.33	40	13	0.002	8.9	0.0008	45	0.04	29	0.0005	0.25	0.14	0.006	0.03	0.06	0.002
n	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Granite																				
2014-DD-004	4.93	0.0334	0.01	0.0235	0.0537	32.6	11.3	0.00116	7.78	0.000268	44.4	0.0261	12.0	0.000112	0.0474	0.0210	0.00273	0.0220	0.012	0.002
2014-DD-021	1.43	0.0103	0.01	0.00858	0.0099	38.7	6.90	0.00018	5.45	0.000051	41.2	0.0176	2.49	0.000171	0.517	0.0531	0.0385	0.00084	0.007	0.002
2014-DD-024	1.62	0.0096	0.01	0.00896	0.0090	37.9	6.72	0.00009	4.98	0.000027	41.4	0.0161	2.34	0.000131	0.467	0.0443	0.0118	0.00277	0.006	0.002
2014-DD-027	1.53	0.0101	0.01	0.00952	0.0079	37.5	7.86	0.00005	6.03	0.000011	40.6	0.0148	2.35	0.000095	0.290	0.0464	0.00943	0.00100	0.006	0.002
2014-DD-029	1.48	0.0062	0.01	0.0267	0.0077	38.4	6.74	0.00006	5.68	0.000019	40.9	0.0167	2.40	0.000091	0.182	0.0373	0.0105	0.00056	0.006	0.002
2014-DD-032	2.97	0.0721	0.01	0.00944	0.0517	33.1	7.94	0.00046	6.13	0.000413	41.9	0.0343	15.3	0.000279	0.0811	0.0805	0.00423	0.00836	0.063	0.002
2014-DD-039	1.64	0.0061	0.01	0.00910	0.0102	37.5	6.25	0.00021	5.94	0.000014	41.3	0.0204	2.93	0.000074	0.0769	0.0386	0.0481	0.00107	0.006	0.002
2014-DD-041	2.00	0.0159	0.01	0.00970	0.0159	37.2	6.31	0.00014	6.31	0.000034	43.6	0.0189	4.55	0.000135	0.110	0.0685	0.0184	0.00465	0.014	0.002
2014-DD-045	1.62	0.0069	0.01	0.00717	0.0099	38.9	5.94	0.00004	5.23	0.000014	44.3	0.0167	2.36	0.000085	0.316	0.0409	0.00670	0.00270	0.003	0.002
2014-DD-052	1.60	0.0204	0.01	0.00718	0.0091	38.6	6.11	0.00004	4.92	0.000037	43.8	0.0180	2.32	0.000121	0.132	0.0409	0.00349	0.00299	0.004	0.002
2014-DD-053	1.68	0.0076	0.01	0.00698	0.0124	38.9	5.97	0.00004	5.19	0.000041	43.9	0.0173	2.32	0.000093	0.222	0.0346	0.00503	0.00179	0.002	0.002
2014-DD-059	1.34	0.0077	0.01	0.00809	0.0080	38.4	6.08	0.00006	4.37	0.000016	43.9	0.0158	2.44	0.000115	0.440	0.0290	0.00572	0.00044	0.006	0.002
Median	1.6	0.01	0.01	0.009	0.01	38	6.5	0.00008	5.6	0.00003	43	0.02	2.4	0.0001	0.20	0.04	0.008	0.002	0.006	0.002
Minimum	1.3	0.006	0.01	0.007	0.008	33	5.9	0.00004	4.4	0.00001	41	0.01	2.3	0.00007	0.05	0.02	0.003	0.0004	0.002	0.002
Maximum	4.9	0.07	0.01	0.03	0.05	39	11	0.001	7.8	0.0004	44	0.03	15	0.0003	0.52	0.08	0.05	0.02	0.06	0.002
n	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

Table D-2 Net Acid Generation Leach Test Results, Jay Pipe Samples
Part B

Sample ID	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Tl	Sn	Ti	U	V	Zn	Zr
Units	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CCME Guideline ^(a)	---	---	0.026	0.073	0.025 ^(f)	0.004 ^(g)	---	0.001	---	0.0001	---	---	---	0.0008	---	---	0.015 ⁽ⁱ⁾	---	0.03	---
Diabase																				
2014-DD-040	5.34	0.0271	0.01	0.00805	0.0054	32.9	2.74	0.00269	7.99	0.000058	40.9	0.0105	6.81	0.000087	0.0140	0.132	0.00110	0.0424	0.002	0.002
2014-DD-049	3.71	0.0236	0.01	0.00834	0.0073	35.0	2.72	0.00238	6.31	0.000052	44.1	0.0097	6.05	0.000083	0.00768	0.112	0.000739	0.0231	0.002	0.002
Kimberlite																				
2014-DD-042	44.9	0.197	0.01	0.0573	0.375	26.0	13.6	0.0217	32.5	0.000111	43.7	0.511	86.4	0.001082	0.00458	0.0407	0.00298	0.0846	0.005	0.002
Blank	1.43	0.0061	0.01	0.00885	0.0388	45.9	0.579	0.00004	0.15	0.00006	44.2	0.0285	2.35	0.000025	10.7	0.00237	0.000180	0.00001	0.018	0.002

Note:

0.01	Indicates parameter concentration is greater than CCME criteria.
0.01	Indicates parameter concentration is below the analytical detection limit.

a) CCME (Canadian Council of Ministers of Environment), 2014. Canadian Water Quality Guidelines for the Protection of Aquatic Life. Retrieved January 2014, from <http://ceqg-rcqe.CWQG.ca/>.
b) See Part A.
c) See Part A.
d) See Part A.
e) See Part A.
f) Nickel guideline is hardness dependent and is 0.025 mg/L when hardness is unknown.
g) Phosphorus guideline is dependent on nature of waterbody, and is 0.004 mg/L at its lowest for ultra-oligotrophic bodies.
h) See Part A.
i) Uranium guideline = 0.03 mg/L long term and 0.015 mg/L short term.
n = number of samples; mg/L = milligrams per litre; µg/L = micrograms per litre; --- = no guidelines; < = less than; ≥ = greater than or equal to.