

Bottom Ash Data

2019 Week 20

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on June 4, 2019. The data represents bottom ash composite results for week 20 of 2019 (May 12, 2019 to May 18, 2019).

The bottom ash meets the requirements of Metro Vancouver's Bottom Ash Management Plan and is suitable for beneficial use during Coquitlam Landfill closure works.



Covanta Burnaby R.E., ULC
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Date Received: 21-MAY-19
Report Date: 03-JUN-19 16:04 (MT)
Version: FINAL

Client Phone: 604-521-1025

Certificate of Analysis

Lab Work Order #: L2276154
Project P.O. #: VANCO-0000048466
Job Reference:
C of C Numbers:
Legal Site Desc:

Comments: As per client request, certain samples were re-prepped from scratch and analyzed for TCLP Metals (TCLP Cd) in varying replicate amounts. Results are reported as samples #13-18, and have "REP" in the Client Sample ID field. Fluid determination was not performed for samples #13-18, as per client instructions. The prep data was taken from the original samples but is reported with the re-prepped samples for informational purposes.

Brent Mack, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2276154-1 Soil 15-MAY-19 09:00 BA1920-A-1	L2276154-2 Soil 15-MAY-19 09:00 BA1920-A-2	L2276154-3 Soil 15-MAY-19 09:00 BA1920-A-3	L2276154-4 Soil 15-MAY-19 09:00 BA1920-A-4	L2276154-5 Soil 15-MAY-19 09:00 BA1920-A-5	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	17.9	18.0	18.3	16.9	17.2
	pH (1:2 soil:water) (pH)	11.81	11.61	11.49	11.64	11.61
Metals	Aluminum (Al) (mg/kg)	33700	48700	35500	37300	38400
	Antimony (Sb) (mg/kg)	125	162	125	123	107
	Arsenic (As) (mg/kg)	37.2	36.0	34.4	41.0	31.6
	Barium (Ba) (mg/kg)	715	759	737	725	709
	Beryllium (Be) (mg/kg)	0.45	0.43	0.39	0.38	0.50
	Bismuth (Bi) (mg/kg)	6.15	8.30	104	6.62	6.46
	Boron (B) (mg/kg)	251	264	382	274	217
	Cadmium (Cd) (mg/kg)	17.3	15.5	10.8	11.2	10.8
	Calcium (Ca) (mg/kg)	140000	138000	133000	127000	132000
	Chromium (Cr) (mg/kg)	176	211	199	149	180
	Cobalt (Co) (mg/kg)	32.4	32.7	41.3	49.7	53.4
	Copper (Cu) (mg/kg)	2540	1980	11900	2170	4100
	Iron (Fe) (mg/kg)	59400	51700	52200	77200	66300
	Lead (Pb) (mg/kg)	633	1020	7020	550	484
	Lithium (Li) (mg/kg)	19.1	19.8	17.9	22.6	16.0
	Magnesium (Mg) (mg/kg)	11900	11600	11700	10900	11000
	Manganese (Mn) (mg/kg)	963	1150	892	1020	909
	Mercury (Hg) (mg/kg)	0.054	0.052	0.080	0.053	<0.050
	Molybdenum (Mo) (mg/kg)	41.8	41.0	51.3	40.6	34.6
	Nickel (Ni) (mg/kg)	120	166	279	260	321
	Phosphorus (P) (mg/kg)	10500	11100	10200	9550	10500
	Potassium (K) (mg/kg)	5560	5840	5700	5230	5240
	Selenium (Se) (mg/kg)	0.38	0.42	0.36	0.47	0.33
	Silver (Ag) (mg/kg)	4.21	4.45	4.09	4.78	6.23
	Sodium (Na) (mg/kg)	15600	17100	16500	15500	15800
	Strontium (Sr) (mg/kg)	312	328	338	335	313
	Sulfur (S) (mg/kg)	13700	13800	13400	12300	12500
	Thallium (Tl) (mg/kg)	0.055	0.058	0.068	0.059	<0.050
	Tin (Sn) (mg/kg)	178	108	202	123	350
	Titanium (Ti) (mg/kg)	865	1200	1010	1140	937
	Tungsten (W) (mg/kg)	5.92	4.64	5.40	5.12	4.25
	Uranium (U) (mg/kg)	4.77	5.19	4.83	4.53	4.50
	Vanadium (V) (mg/kg)	51.6	54.4	51.0	52.1	77.7
	Zinc (Zn) (mg/kg)	4190	4790	7440	4580	5010
	Zirconium (Zr) (mg/kg)	<1.0	1.3	<1.0	1.1	1.1

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2276154-6 Soil 15-MAY-19 09:00 BA1920-A-6	L2276154-7 Soil 15-MAY-19 09:00 BA1920-A-7	L2276154-8 Soil 15-MAY-19 09:00 BA1920-A-8	L2276154-9 Soil 15-MAY-19 09:00 BA1920-A-9	L2276154-10 Soil 15-MAY-19 09:00 BA1920-A-10	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	17.8	17.8	18.5	17.3	18.6
	pH (1:2 soil:water) (pH)	11.59	11.65	11.59	11.86	11.47
Metals	Aluminum (Al) (mg/kg)	28300	30500	29500	34300	33200
	Antimony (Sb) (mg/kg)	132	107	146	147	113
	Arsenic (As) (mg/kg)	39.0	38.7	47.1	38.9	33.7
	Barium (Ba) (mg/kg)	650	558	623	728	838
	Beryllium (Be) (mg/kg)	0.38	0.36	0.35	0.40	0.44
	Bismuth (Bi) (mg/kg)	6.55	5.24	8.71	25.4	4.98
	Boron (B) (mg/kg)	219	217	246	272	265
	Cadmium (Cd) (mg/kg)	11.1	11.0	10.5	10.3	9.91
	Calcium (Ca) (mg/kg)	132000	125000	133000	125000	131000
	Chromium (Cr) (mg/kg)	578	163	405	138	180
	Cobalt (Co) (mg/kg)	79.0	37.9	57.7	31.0	30.4
	Copper (Cu) (mg/kg)	4300	1180	10100	25500	2810
	Iron (Fe) (mg/kg)	47400	66900	51100	82300	64600
	Lead (Pb) (mg/kg)	749	1430	1230	635	1550
	Lithium (Li) (mg/kg)	21.8	18.1	18.6	18.8	18.8
	Magnesium (Mg) (mg/kg)	11300	10100	10200	11200	12300
	Manganese (Mn) (mg/kg)	871	875	811	1060	937
	Mercury (Hg) (mg/kg)	0.057	0.081	3.11	0.071	0.082
	Molybdenum (Mo) (mg/kg)	44.3	29.2	74.7	52.8	28.9
	Nickel (Ni) (mg/kg)	348	118	293	164	319
	Phosphorus (P) (mg/kg)	10800	9590	10100	10200	9190
	Potassium (K) (mg/kg)	5530	4990	5230	5330	5080
	Selenium (Se) (mg/kg)	0.37	0.34	0.31	0.65	0.42
	Silver (Ag) (mg/kg)	8.26	3.36	4.59	5.25	9.93
	Sodium (Na) (mg/kg)	15700	14800	15600	16000	14600
	Strontium (Sr) (mg/kg)	321	287	304	311	301
	Sulfur (S) (mg/kg)	12600	11700	12100	12200	11800
	Thallium (Tl) (mg/kg)	0.056	0.053	0.055	0.054	0.055
	Tin (Sn) (mg/kg)	121	132	98.2	137	217
	Titanium (Ti) (mg/kg)	912	626	660	1010	1020
	Tungsten (W) (mg/kg)	16.5	3.78	6.12	11.0	6.27
	Uranium (U) (mg/kg)	4.84	4.39	4.57	4.47	4.53
	Vanadium (V) (mg/kg)	51.3	46.7	48.0	49.7	48.8
	Zinc (Zn) (mg/kg)	4500	3790	4820	4680	4310
	Zirconium (Zr) (mg/kg)	1.0	1.3	<1.0	1.0	<1.0

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2276154-11	L2276154-12	L2276154-13	L2276154-14	L2276154-15
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	15-MAY-19	15-MAY-19	15-MAY-19	15-MAY-19	15-MAY-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1920-A-11	BA1920-A-12	BA1920-A-8 REP 1	BA1920-A-8 REP 2	BA1920-A-8 REP 3
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		17.5	17.3			
	pH (1:2 soil:water) (pH)		11.72	11.54			
Metals	Aluminum (Al) (mg/kg)		29200	39800			
	Antimony (Sb) (mg/kg)		120	105			
	Arsenic (As) (mg/kg)		40.7	29.8			
	Barium (Ba) (mg/kg)		738	819			
	Beryllium (Be) (mg/kg)		0.41	0.37			
	Bismuth (Bi) (mg/kg)		7.57	5.51			
	Boron (B) (mg/kg)		256	329			
	Cadmium (Cd) (mg/kg)		10.4	7.12			
	Calcium (Ca) (mg/kg)		135000	121000			
	Chromium (Cr) (mg/kg)		173	180			
	Cobalt (Co) (mg/kg)		31.7	21.9			
	Copper (Cu) (mg/kg)		1630	1190			
	Iron (Fe) (mg/kg)		76600	43100			
	Lead (Pb) (mg/kg)		6070	936			
	Lithium (Li) (mg/kg)		18.0	16.6			
	Magnesium (Mg) (mg/kg)		10900	9960			
	Manganese (Mn) (mg/kg)		1130	643			
	Mercury (Hg) (mg/kg)		0.070	0.051			
	Molybdenum (Mo) (mg/kg)		33.8	33.3			
	Nickel (Ni) (mg/kg)		109	135			
	Phosphorus (P) (mg/kg)		10300	11000			
	Potassium (K) (mg/kg)		5810	4860			
	Selenium (Se) (mg/kg)		0.41	0.71			
	Silver (Ag) (mg/kg)		4.32	3.92			
	Sodium (Na) (mg/kg)		16300	14700			
	Strontium (Sr) (mg/kg)		304	288			
	Sulfur (S) (mg/kg)		12800	10300			
Thallium (Tl) (mg/kg)		0.065	<0.050				
Tin (Sn) (mg/kg)		145	116				
Titanium (Ti) (mg/kg)		975	1760				
Tungsten (W) (mg/kg)		12.2	4.88				
Uranium (U) (mg/kg)		4.61	3.86				
Vanadium (V) (mg/kg)		51.2	47.3				
Zinc (Zn) (mg/kg)		4590	3790				
Zirconium (Zr) (mg/kg)		1.1	2.2				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2276154-16 Soil 15-MAY-19 09:00 BA1920-A-8 REP 4	L2276154-17 Soil 15-MAY-19 09:00 BA1920-A-8 REP 5	L2276154-18 Soil 15-MAY-19 09:00 BA1920-A-8 REP 6		
Grouping	Analyte				
SOIL					
Physical Tests	Moisture (%) pH (1:2 soil:water) (pH)				
Metals	Aluminum (Al) (mg/kg) Antimony (Sb) (mg/kg) Arsenic (As) (mg/kg) Barium (Ba) (mg/kg) Beryllium (Be) (mg/kg) Bismuth (Bi) (mg/kg) Boron (B) (mg/kg) Cadmium (Cd) (mg/kg) Calcium (Ca) (mg/kg) Chromium (Cr) (mg/kg) Cobalt (Co) (mg/kg) Copper (Cu) (mg/kg) Iron (Fe) (mg/kg) Lead (Pb) (mg/kg) Lithium (Li) (mg/kg) Magnesium (Mg) (mg/kg) Manganese (Mn) (mg/kg) Mercury (Hg) (mg/kg) Molybdenum (Mo) (mg/kg) Nickel (Ni) (mg/kg) Phosphorus (P) (mg/kg) Potassium (K) (mg/kg) Selenium (Se) (mg/kg) Silver (Ag) (mg/kg) Sodium (Na) (mg/kg) Strontium (Sr) (mg/kg) Sulfur (S) (mg/kg) Thallium (Tl) (mg/kg) Tin (Sn) (mg/kg) Titanium (Ti) (mg/kg) Tungsten (W) (mg/kg) Uranium (U) (mg/kg) Vanadium (V) (mg/kg) Zinc (Zn) (mg/kg) Zirconium (Zr) (mg/kg)				

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2276154-1	L2276154-2	L2276154-3	L2276154-4	L2276154-5
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	15-MAY-19	15-MAY-19	15-MAY-19	15-MAY-19	15-MAY-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1920-A-1	BA1920-A-2	BA1920-A-3	BA1920-A-4	BA1920-A-5
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.66	11.77	11.66	11.72	11.69
	2nd Preliminary pH (pH)		8.88	9.40	9.01	9.20	9.77
	Final pH (pH)		6.42	6.47	6.68	6.40	6.39
	Extraction Solution Initial pH (pH)		2.86	2.86	2.86	2.86	2.86
	Antimony (Sb)-Leachable (mg/L)		<1.0	<1.0	<1.0	<1.0	<1.0
	Arsenic (As)-Leachable (mg/L)		<1.0	<1.0	<1.0	<1.0	<1.0
	Barium (Ba)-Leachable (mg/L)		<2.5	<2.5	<2.5	<2.5	<2.5
	Beryllium (Be)-Leachable (mg/L)		<0.025	<0.025	<0.025	<0.025	<0.025
	Boron (B)-Leachable (mg/L)		2.57	2.70	2.72	3.01	2.74
	Cadmium (Cd)-Leachable (mg/L)		0.262	0.143	0.140	0.162	0.191
	Calcium (Ca)-Leachable (mg/L)		2010	1920	2010	2200	2000
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.381	0.450	0.326	0.553	0.641
	Copper (Cu)-Leachable (mg/L)		0.749	0.685	0.617	0.767	0.989
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0	<5.0	<5.0	<5.0
	Lead (Pb)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Magnesium (Mg)-Leachable (mg/L)		123	118	126	133	129
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.50	0.33	0.34	0.36	0.49
	Selenium (Se)-Leachable (mg/L)		<1.0	<1.0	<1.0	<1.0	<1.0
	Silver (Ag)-Leachable (mg/L)		<0.050	<0.050	<0.050	<0.050	<0.050
	Thallium (Tl)-Leachable (mg/L)		<1.0	<1.0	<1.0	<1.0	<1.0
	Vanadium (V)-Leachable (mg/L)		<0.15	<0.15	<0.15	<0.15	<0.15
	Zinc (Zn)-Leachable (mg/L)		28.7	24.9	35.4	42.8	32.2

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2276154-6	L2276154-7	L2276154-8	L2276154-9	L2276154-10
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	15-MAY-19	15-MAY-19	15-MAY-19	15-MAY-19	15-MAY-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1920-A-6	BA1920-A-7	BA1920-A-8	BA1920-A-9	BA1920-A-10
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.67	11.63	11.67	11.76	11.56
	2nd Preliminary pH (pH)		8.95	8.95	9.07	9.14	9.13
	Final pH (pH)		6.58	6.46	6.15	6.18	6.46
	Extraction Solution Initial pH (pH)		2.86	2.86	2.86	2.86	2.86
	Antimony (Sb)-Leachable (mg/L)		<1.0	<1.0	<1.0	<1.0	<1.0
	Arsenic (As)-Leachable (mg/L)		<1.0	<1.0	<1.0	<1.0	<1.0
	Barium (Ba)-Leachable (mg/L)		<2.5	<2.5	<2.5	<2.5	<2.5
	Beryllium (Be)-Leachable (mg/L)		<0.025	<0.025	<0.025	<0.025	<0.025
	Boron (B)-Leachable (mg/L)		2.57	2.77	2.71	2.83	2.37
	Cadmium (Cd)-Leachable (mg/L)		0.132	0.191	7.77	0.180	0.146
	Calcium (Ca)-Leachable (mg/L)		2010	1970	2020	2080	1930
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.286	0.272	0.942	0.525	0.544
	Copper (Cu)-Leachable (mg/L)		0.696	1.00	0.804	0.988	0.880
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0	<5.0	<5.0	<5.0
	Lead (Pb)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Magnesium (Mg)-Leachable (mg/L)		124	123	129	136	116
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.34	0.43	0.44	0.48	0.46
	Selenium (Se)-Leachable (mg/L)		<1.0	<1.0	<1.0	<1.0	<1.0
	Silver (Ag)-Leachable (mg/L)		<0.050	<0.050	<0.050	<0.050	<0.050
	Thallium (Tl)-Leachable (mg/L)		<1.0	<1.0	<1.0	<1.0	<1.0
	Vanadium (V)-Leachable (mg/L)		<0.15	<0.15	<0.15	<0.15	<0.15
	Zinc (Zn)-Leachable (mg/L)		31.0	27.3	44.2	47.8	45.8

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2276154-11	L2276154-12	L2276154-13	L2276154-14	L2276154-15
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	15-MAY-19	15-MAY-19	15-MAY-19	15-MAY-19	15-MAY-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1920-A-11	BA1920-A-12	BA1920-A-8 REP 1	BA1920-A-8 REP 2	BA1920-A-8 REP 3
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.74	11.73	11.67	11.67	11.67
	2nd Preliminary pH (pH)		8.67	8.84	9.07	9.07	9.07
	Final pH (pH)		6.47	6.56	6.13	6.09	6.08
	Extraction Solution Initial pH (pH)		2.86	2.86	2.92	2.92	2.92
	Antimony (Sb)-Leachable (mg/L)		<1.0	<1.0			
	Arsenic (As)-Leachable (mg/L)		<1.0	<1.0			
	Barium (Ba)-Leachable (mg/L)		<2.5	<2.5			
	Beryllium (Be)-Leachable (mg/L)		<0.025	<0.025			
	Boron (B)-Leachable (mg/L)		2.83	2.74			
	Cadmium (Cd)-Leachable (mg/L)		0.150	0.160	0.179	0.246	0.191
	Calcium (Ca)-Leachable (mg/L)		2080	1970			
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25			
	Cobalt (Co)-Leachable (mg/L)		0.321	0.695			
	Copper (Cu)-Leachable (mg/L)		0.734	0.756			
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0			
	Lead (Pb)-Leachable (mg/L)		<0.25	<0.25			
	Magnesium (Mg)-Leachable (mg/L)		130	121			
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010			
	Nickel (Ni)-Leachable (mg/L)		0.33	0.39			
	Selenium (Se)-Leachable (mg/L)		<1.0	<1.0			
	Silver (Ag)-Leachable (mg/L)		<0.050	<0.050			
	Thallium (Tl)-Leachable (mg/L)		<1.0	<1.0			
	Vanadium (V)-Leachable (mg/L)		<0.15	<0.15			
	Zinc (Zn)-Leachable (mg/L)		37.0	32.6			

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2276154-16	L2276154-17	L2276154-18		
		Description	Soil	Soil	Soil		
		Sampled Date	15-MAY-19	15-MAY-19	15-MAY-19		
		Sampled Time	09:00	09:00	09:00		
		Client ID	BA1920-A-8 REP 4	BA1920-A-8 REP 5	BA1920-A-8 REP 6		
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.67	11.67	11.67		
	2nd Preliminary pH (pH)		9.07	9.07	9.07		
	Final pH (pH)		6.24	6.14	6.28		
	Extraction Solution Initial pH (pH)		2.92	2.92	2.92		
	Antimony (Sb)-Leachable (mg/L)						
	Arsenic (As)-Leachable (mg/L)						
	Barium (Ba)-Leachable (mg/L)						
	Beryllium (Be)-Leachable (mg/L)						
	Boron (B)-Leachable (mg/L)						
	Cadmium (Cd)-Leachable (mg/L)		0.283	0.163	0.169		
	Calcium (Ca)-Leachable (mg/L)						
	Chromium (Cr)-Leachable (mg/L)						
	Cobalt (Co)-Leachable (mg/L)						
	Copper (Cu)-Leachable (mg/L)						
	Iron (Fe)-Leachable (mg/L)						
	Lead (Pb)-Leachable (mg/L)						
	Magnesium (Mg)-Leachable (mg/L)						
	Mercury (Hg)-Leachable (mg/L)						
	Nickel (Ni)-Leachable (mg/L)						
	Selenium (Se)-Leachable (mg/L)						
	Silver (Ag)-Leachable (mg/L)						
	Thallium (Tl)-Leachable (mg/L)						
	Vanadium (V)-Leachable (mg/L)						
	Zinc (Zn)-Leachable (mg/L)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Strontium (Sr)	DUP-H	L2276154-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Molybdenum (Mo)	DUP-H,J	L2276154-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2276154-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2276154-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2276154-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
DUP-H,J	Duplicate results outside ALS DQO, due to sample heterogeneity. Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)
Soil samples are digested with hot nitric and hydrochloric acids, followed by CVAAS analysis. This method is fully compliant with the BC SALM strong acid leachable metals digestion method.			
HG-TCLP-CVAFS-VA	Soil	Mercury by CVAAS (TCLP)	EPA 1311/245.7
This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter and analysed using atomic absorption spectrophotometry (EPA 245.7).			
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.			
Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H ₂ S) may be excluded if lost during sampling, storage, or digestion.			
MET-TCLP-CCMS-VA	Soil	Metals by ICPMS (TCLP)	EPA 1311/6020A
This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter. Instrumental analysis of the digested extract is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).			
MOISTURE-VA	Soil	Moisture content	CCME PHC in Soil - Tier 1 (mod)
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of two hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Chain of Custody / Analytic
 Canada Toll Free: 1 800 361-5868
 www.alsglobal.com



L2276154-COFC

DOC # _____
 Page _____ of _____

Report To		Report Format / Distribution		the analysis subject to availability)	
Company:	Covanta Energy	<input type="checkbox"/> Standard	<input type="checkbox"/> Other	<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)	
Contact:	Steve Mckinney / Dan Skrypnik	<input checked="" type="checkbox"/> PDF	<input type="checkbox"/> Excel	<input type="checkbox"/> Digital	<input type="checkbox"/> Fax
Address:	5150 Riverbend Drive Burnaby BC	Email 1:	smckinney@covanta.com	<input type="checkbox"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT	
Phone:	604-521-1025	Email 2:	rjohnson4@covanta.com	<input type="checkbox"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT	
	<input type="checkbox"/> Yes <input type="checkbox"/> No	Email 3:	dkrypnik@covanta.com	<input type="checkbox"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
			brent.kirkpatrick@metrovancover.org	Analysis Request	
			Sarah.Wellman@metrovancover.org		

Invoice To	Same as Report ?	Client / Project Information		Please indicate below Filtered, Preserved or both (F, P, F/P)					
Hardcopy of Invoice with Report?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Job #:							
Company:		PO / AFE:	PO# 46693 Weekly Bottom Ash - Suite						
Contact:		LSD:	(includes 2:1 pH)						
Address:		Quote #:							
Phone:									

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)	Number of Containers				
BA1920-A-1		15-May-19	9:00	Soil	X	X		X					1
BA1920-A-2		15-May-19	9:00	Soil	X	X		X					1
BA1920-A-3		15-May-19	9:00	Soil	X	X		X					1
BA1920-A-4		15-May-19	9:00	Soil	X	X		X					1
BA1920-A-5		15-May-19	9:00	Soil	X	X		X					1
BA1920-A-6		15-May-19	9:00	Soil	X	X		X					1
BA1920-A-7		15-May-19	9:00	Soil	X	X		X					1
BA1920-A-8		15-May-19	9:00	Soil	X	X		X					1
BA1920-A-9		15-May-19	9:00	Soil	X	X		X					1
BA1920-A-10		15-May-19	9:00	Soil	X	X		X					1
BA1920-A-11		15-May-19	9:00	Soil	X	X		X					1
BA1920-A-12		15-May-19	9:00	Soil	X	X		X					1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.
 Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh:mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations:
<i>[Signature]</i>	21-May-19	0800	<i>[Signature]</i>	May 21	11:27am	19° C				Yes / No ? If Yes add SIF