

Bottom Ash Data

2019 Week 12

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on April 11, 2019. The data represents bottom ash composite results for week 12 of 2019 (March 17, 2019 to March 23, 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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Burnaby BC V3N 4V3

Date Received: 26-MAR-19
Report Date: 10-APR-19 16:32 (MT)
Version: FINAL

Client Phone: 604-521-1025

Certificate of Analysis

Lab Work Order #: L2249345
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 #13-16, and have "REP" in the Client Sample ID field. Fluid determination was not performed for samples #13-16, 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	L2249345-1 Soil 20-MAR-19 09:00 BA1912-A-1	L2249345-2 Soil 20-MAR-19 09:00 BA1912-A-2	L2249345-3 Soil 20-MAR-19 09:00 BA1912-A-3	L2249345-4 Soil 20-MAR-19 09:00 BA1912-A-4	L2249345-5 Soil 20-MAR-19 09:00 BA1912-A-5	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	21.5	21.5	16.4	16.5	20.5
	pH (1:2 soil:water) (pH)	11.21	11.12	11.33	11.25	11.16
Metals	Aluminum (Al) (mg/kg)	40000	37300	31600	44500	42400
	Antimony (Sb) (mg/kg)	182	176	153	158	148
	Arsenic (As) (mg/kg)	38.1	44.5	36.0	38.1	33.2
	Barium (Ba) (mg/kg)	606	457	490	542	560
	Beryllium (Be) (mg/kg)	0.47	0.40	0.44	0.45	0.44
	Bismuth (Bi) (mg/kg)	6.35	7.59	11.1	23.0	37.7
	Boron (B) (mg/kg)	328	358	233	233	279
	Cadmium (Cd) (mg/kg)	14.1	15.9	16.6	16.7	14.0
	Calcium (Ca) (mg/kg)	171000	135000	140000	144000	146000
	Chromium (Cr) (mg/kg)	516	301	165	167	164
	Cobalt (Co) (mg/kg)	27.4	30.6	21.6	132	43.8
	Copper (Cu) (mg/kg)	3770	4360	8680	1580	1830
	Iron (Fe) (mg/kg)	74200	79500	65300	66500	50000
	Lead (Pb) (mg/kg)	672	706	648	459	483
	Lithium (Li) (mg/kg)	22.6	17.0	17.1	20.2	24.6
	Magnesium (Mg) (mg/kg)	12300	11000	11100	12100	11900
	Manganese (Mn) (mg/kg)	1000	1050	788	938	774
	Mercury (Hg) (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	34.0	30.9	39.7	31.3	31.8
	Nickel (Ni) (mg/kg)	362	261	244	203	187
	Phosphorus (P) (mg/kg)	13900	11800	12600	11800	11400
	Potassium (K) (mg/kg)	7220	6170	5940	5810	6550
	Selenium (Se) (mg/kg)	0.68	0.42	0.44	0.46	0.44
	Silver (Ag) (mg/kg)	6.32	12.5	5.23	4.96	6.21
	Sodium (Na) (mg/kg)	19900	16300	15600	15700	18800
	Strontium (Sr) (mg/kg)	412	319	437	331	351
	Sulfur (S) (mg/kg)	17000	15700	16500	16600	16200
	Thallium (Tl) (mg/kg)	0.078	0.076	0.080	0.085	0.078
	Tin (Sn) (mg/kg)	147	135	137	133	127
	Titanium (Ti) (mg/kg)	760	949	585	1170	950
	Tungsten (W) (mg/kg)	19.6	17.5	17.8	16.2	16.0
	Uranium (U) (mg/kg)	5.39	5.21	5.61	5.53	5.28
	Vanadium (V) (mg/kg)	59.6	59.5	55.2	58.0	60.3
	Zinc (Zn) (mg/kg)	4800	4410	6340	6620	4310
	Zirconium (Zr) (mg/kg)	2.7	1.9	1.7	2.2	1.6

* 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	L2249345-6 Soil 20-MAR-19 09:00 BA1912-A-6	L2249345-7 Soil 20-MAR-19 09:00 BA1912-A-7	L2249345-8 Soil 20-MAR-19 09:00 BA1912-A-8	L2249345-9 Soil 20-MAR-19 09:00 BA1912-A-9	L2249345-10 Soil 20-MAR-19 09:00 BA1912-A-10	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	20.9	21.0	21.4	21.7	21.8
	pH (1:2 soil:water) (pH)	11.15	11.19	11.33	11.13	11.38
Metals	Aluminum (Al) (mg/kg)	48800	30300	32200	42000	31600
	Antimony (Sb) (mg/kg)	149	147	143	128	172
	Arsenic (As) (mg/kg)	39.0	68.3	32.6	27.7	42.6
	Barium (Ba) (mg/kg)	526	564	519	535	478
	Beryllium (Be) (mg/kg)	0.43	0.41	0.44	0.44	0.45
	Bismuth (Bi) (mg/kg)	6.30	14.6	5.98	4.95	7.81
	Boron (B) (mg/kg)	263	329	249	231	316
	Cadmium (Cd) (mg/kg)	15.5	13.2	13.4	12.2	15.2
	Calcium (Ca) (mg/kg)	142000	128000	135000	138000	146000
	Chromium (Cr) (mg/kg)	216	153	142	594	163
	Cobalt (Co) (mg/kg)	258	22.2	22.0	212	32.3
	Copper (Cu) (mg/kg)	3170	5170	1950	1490	6400
	Iron (Fe) (mg/kg)	61500	63300	58000	51700	60000
	Lead (Pb) (mg/kg)	456	402	433	1450	564
	Lithium (Li) (mg/kg)	22.4	20.8	21.1	23.2	17.3
	Magnesium (Mg) (mg/kg)	11100	9680	11100	10600	10800
	Manganese (Mn) (mg/kg)	1040	854	746	851	816
	Mercury (Hg) (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	29.8	31.0	26.1	28.8	31.0
	Nickel (Ni) (mg/kg)	177	170	114	244	154
	Phosphorus (P) (mg/kg)	11000	11000	11200	11600	12900
	Potassium (K) (mg/kg)	5580	5930	6280	5920	5930
	Selenium (Se) (mg/kg)	0.44	0.35	0.41	0.34	0.48
	Silver (Ag) (mg/kg)	6.07	13.3	8.36	5.10	5.92
	Sodium (Na) (mg/kg)	16000	16700	16300	15100	17300
	Strontium (Sr) (mg/kg)	315	305	324	430	340
	Sulfur (S) (mg/kg)	15800	14600	14800	14200	17200
	Thallium (Tl) (mg/kg)	0.082	0.067	0.076	0.070	0.086
	Tin (Sn) (mg/kg)	122	109	161	120	165
	Titanium (Ti) (mg/kg)	941	609	654	812	604
	Tungsten (W) (mg/kg)	16.2	11.0	11.0	10.9	17.3
	Uranium (U) (mg/kg)	5.43	4.91	4.90	4.95	5.59
	Vanadium (V) (mg/kg)	63.0	52.5	54.8	55.3	58.9
	Zinc (Zn) (mg/kg)	4450	4420	4080	4550	11300
	Zirconium (Zr) (mg/kg)	2.3	1.1	1.9	1.8	1.7

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2249345-11	L2249345-12	L2249345-13	L2249345-14	L2249345-15
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	20-MAR-19	20-MAR-19	20-MAR-19	20-MAR-19	20-MAR-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1912-A-11	BA1912-A-12	BA1912-A-7 REP 1	BA1912-A-7 REP 2	BA1912-A-7 REP 3
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		20.5	22.3			
	pH (1:2 soil:water) (pH)		11.52	11.16			
Metals	Aluminum (Al) (mg/kg)		34100	42300			
	Antimony (Sb) (mg/kg)		140	151			
	Arsenic (As) (mg/kg)		33.2	38.2			
	Barium (Ba) (mg/kg)		451	505			
	Beryllium (Be) (mg/kg)		0.42	0.42			
	Bismuth (Bi) (mg/kg)		5.64	5.87			
	Boron (B) (mg/kg)		260	356			
	Cadmium (Cd) (mg/kg)		13.6	13.4			
	Calcium (Ca) (mg/kg)		127000	144000			
	Chromium (Cr) (mg/kg)		140	155			
	Cobalt (Co) (mg/kg)		23.3	30.6			
	Copper (Cu) (mg/kg)		2810	2900			
	Iron (Fe) (mg/kg)		59300	51300			
	Lead (Pb) (mg/kg)		841	490			
	Lithium (Li) (mg/kg)		16.2	18.8			
	Magnesium (Mg) (mg/kg)		9630	10500			
	Manganese (Mn) (mg/kg)		775	1100			
	Mercury (Hg) (mg/kg)		<0.050	<0.050			
	Molybdenum (Mo) (mg/kg)		24.7	30.0			
	Nickel (Ni) (mg/kg)		134	129			
	Phosphorus (P) (mg/kg)		11600	11500			
	Potassium (K) (mg/kg)		5200	6070			
	Selenium (Se) (mg/kg)		0.54	0.44			
	Silver (Ag) (mg/kg)		6.27	9.71			
	Sodium (Na) (mg/kg)		14400	16800			
	Strontium (Sr) (mg/kg)		320	351			
	Sulfur (S) (mg/kg)		14000	15200			
	Thallium (Tl) (mg/kg)		0.075	0.075			
	Tin (Sn) (mg/kg)		128	129			
	Titanium (Ti) (mg/kg)		642	1120			
	Tungsten (W) (mg/kg)		12.7	13.1			
	Uranium (U) (mg/kg)		5.13	5.10			
Vanadium (V) (mg/kg)		55.8	52.5				
Zinc (Zn) (mg/kg)		5830	4500				
Zirconium (Zr) (mg/kg)		1.8	2.7				

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID	Description	Sampled Date	Sampled Time	Client ID
		L2249345-16	Soil	20-MAR-19	09:00	BA1912-A-7 REP 4
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	L2249345-1	L2249345-2	L2249345-3	L2249345-4	L2249345-5
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	20-MAR-19	20-MAR-19	20-MAR-19	20-MAR-19	20-MAR-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1912-A-1	BA1912-A-2	BA1912-A-3	BA1912-A-4	BA1912-A-5
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.56	11.51	11.53	11.69	11.47
	2nd Preliminary pH (pH)		9.52	9.50	9.60	9.78	9.54
	Final pH (pH)		6.13	6.16	6.25	6.16	6.19
	Extraction Solution Initial pH (pH)		2.89	2.89	2.89	2.89	2.89
	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)		3.49	3.22	2.84	3.24	2.95
	Cadmium (Cd)-Leachable (mg/L)		0.141	0.316	0.236	0.185	0.176
	Calcium (Ca)-Leachable (mg/L)		2260	2230	2230	2240	2150
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.426	0.486	0.249	0.335	0.307
	Copper (Cu)-Leachable (mg/L)		0.120	0.425	0.364	0.227	0.351
	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)		144	140	142	148	137
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.76	0.52	1.01	0.61	0.55
	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)		36.7	33.6	30.7	28.4	43.7

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2249345-6	L2249345-7	L2249345-8	L2249345-9	L2249345-10
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	20-MAR-19	20-MAR-19	20-MAR-19	20-MAR-19	20-MAR-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1912-A-6	BA1912-A-7	BA1912-A-8	BA1912-A-9	BA1912-A-10
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.48	11.31	11.59	11.45	11.45
	2nd Preliminary pH (pH)		9.77	9.33	9.64	9.44	9.62
	Final pH (pH)		6.01	6.04	6.11	6.15	6.20
	Extraction Solution Initial pH (pH)		2.89	2.89	2.89	2.89	2.89
	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)		2.94	2.98	3.18	2.88	3.07
	Cadmium (Cd)-Leachable (mg/L)		0.204	1.58	0.204	0.201	0.355
	Calcium (Ca)-Leachable (mg/L)		2120	2150	2090	2200	2200
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.357	0.580	0.593	0.562	0.363
	Copper (Cu)-Leachable (mg/L)		0.882	0.208	0.877	0.129	0.330
	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	0.28	<0.25
	Magnesium (Mg)-Leachable (mg/L)		144	135	139	150	140
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.69	0.57	0.45	1.44	0.55
	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)		40.8	35.2	30.6	32.3	29.7

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2249345-11	L2249345-12	L2249345-13	L2249345-14	L2249345-15
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	20-MAR-19	20-MAR-19	20-MAR-19	20-MAR-19	20-MAR-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1912-A-11	BA1912-A-12	BA1912-A-7 REP 1	BA1912-A-7 REP 2	BA1912-A-7 REP 3
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.63	11.58	11.31	11.31	11.31
	2nd Preliminary pH (pH)		9.78	9.67	9.33	9.33	9.33
	Final pH (pH)		6.20	6.19	6.14	6.00	6.06
	Extraction Solution Initial pH (pH)		2.89	2.89	2.84	2.84	2.84
	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)		2.98	3.00			
	Cadmium (Cd)-Leachable (mg/L)		0.178	0.195	0.215	0.190	0.187
	Calcium (Ca)-Leachable (mg/L)		2270	2260			
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25			
	Cobalt (Co)-Leachable (mg/L)		0.300	0.790			
	Copper (Cu)-Leachable (mg/L)		0.499	0.668			
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0			
	Lead (Pb)-Leachable (mg/L)		<0.25	<0.25			
	Magnesium (Mg)-Leachable (mg/L)		151	147			
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010			
	Nickel (Ni)-Leachable (mg/L)		0.68	0.62			
	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)		25.8	55.2			

* 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		L2249345-16 Soil 20-MAR-19 09:00 BA1912-A-7 REP 4				
Grouping	Analyte					
SOIL						
TCLP Metals	1st Preliminary pH (pH)	11.31				
	2nd Preliminary pH (pH)	9.33				
	Final pH (pH)	6.04				
	Extraction Solution Initial pH (pH)	2.84				
	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)	0.238				
	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	Bismuth (Bi)	DUP-H	L2249345-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Chromium (Cr)	DUP-H	L2249345-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Copper (Cu)	DUP-H	L2249345-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Iron (Fe)	DUP-H	L2249345-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)	DUP-H	L2249345-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Tin (Sn)	DUP-H	L2249345-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2249345-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2249345-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2249345-1, -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.
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, 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.



Report To		Report Format / Distribution		Service Requested (Rush for routine 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	Email 1:	smckinney@covanta.com		<input type="checkbox"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT	
	Burnaby BC	Email 2:	rjohnson4@covanta.com		<input type="checkbox"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT	
Phone:	604-521-1025	Fax:			<input type="checkbox"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
	<input type="checkbox"/> Yes <input type="checkbox"/> No	Email 3:	dskrypnik@covanta.com		Analysis Request	
			brent.kirkpatrick@metrovancoouver.org			
			Sarah.Wellman@metrovancoouver.org			

Invoice To		Client / Project Information		Please indicate below Filtered, Preserved or both (F, P, F/P)	
Same as Report? <input checked="" type="checkbox"/>		Job #:			
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input type="checkbox"/> No		PO / AFE:	PO# 46693 Weekly Bottom Ash - Suite		
Company:		LSD:	(includes 2:1 pH)		
Contact:		Quote #:			
Address:		ALS Contact:			
Phone:		Sampler:			
Lab Work (lab use) L2249345-COFC					

Sample #	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Analysis Request				Number of Containers
				MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)	
BA1912-A-1	20-Mar-19	9:00	Soil	X	X		X	1
BA1912-A-2	20-Mar-19	9:00	Soil	X	X		X	1
BA1912-A-3	20-Mar-19	9:00	Soil	X	X		X	1
BA1912-A-4	20-Mar-19	9:00	Soil	X	X		X	1
BA1912-A-5	20-Mar-19	9:00	Soil	X	X		X	1
BA1912-A-6	20-Mar-19	9:00	Soil	X	X		X	1
BA1912-A-7	20-Mar-19	9:00	Soil	X	X		X	1
BA1912-A-8	20-Mar-19	9:00	Soil	X	X		X	1
BA1912-A-9	20-Mar-19	9:00	Soil	X	X		X	1
BA1912-A-10	20-Mar-19	9:00	Soil	X	X		X	1
BA1912-A-11	20-Mar-19	9:00	Soil	X	X		X	1
BA1912-A-12	20-Mar-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:
	26-Mar-19	08:00		Mar, 26	11:50	17 °C				Yes / No ? If Yes add SIF