

Bottom Ash Data

2018 Week 41

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on November 2, 2018. The data represents bottom ash composite results for week 41 of 2018 (October 7, 2018 to October 13, 2018).

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: 16-OCT-18
Report Date: 31-OCT-18 14:12 (MT)
Version: FINAL

Client Phone: 604-521-1025

Certificate of Analysis

Lab Work Order #: L2181471
Project P.O. #: VANCO-0000047506
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		L2181471-1 SOIL 10-OCT-18 09:00 BA1841-A-1	L2181471-2 SOIL 10-OCT-18 09:00 BA1841-A-2	L2181471-3 SOIL 10-OCT-18 09:00 BA1841-A-3	L2181471-4 SOIL 10-OCT-18 09:00 BA1841-A-4	L2181471-5 SOIL 10-OCT-18 09:00 BA1841-A-5
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	21.1	20.0	20.0	19.2	21.1
	pH (1:2 soil:water) (pH)	10.51	10.66	10.74	10.84	10.85
Metals	Aluminum (Al) (mg/kg)	54900	49200	36700	39600	38500
	Antimony (Sb) (mg/kg)	157	196	162	154	185
	Arsenic (As) (mg/kg)	39.8	42.0	41.4	71.5	39.1
	Barium (Ba) (mg/kg)	517	518	478	507	500
	Beryllium (Be) (mg/kg)	0.43	0.56	0.47	0.45	0.47
	Bismuth (Bi) (mg/kg)	19.5	15.4	16.0	13.6	18.4
	Boron (B) (mg/kg)	443	452	313	373	410
	Cadmium (Cd) (mg/kg)	13.0	15.5	12.2	12.4	12.9
	Calcium (Ca) (mg/kg)	125000	143000	125000	130000	135000
	Chromium (Cr) (mg/kg)	155	208	179	244	154
	Cobalt (Co) (mg/kg)	22.6	33.2	49.9	25.0	56.0
	Copper (Cu) (mg/kg)	2040	9330	4500	5060	11700
	Iron (Fe) (mg/kg)	66700	69700	67500	75300	56800
	Lead (Pb) (mg/kg)	1010	987	2340	806	967
	Lithium (Li) (mg/kg)	18.9	22.1	19.1	18.9	19.7
	Magnesium (Mg) (mg/kg)	11400	11800	10700	11700	12700
	Manganese (Mn) (mg/kg)	969	878	810	1330	755
	Mercury (Hg) (mg/kg)	0.054	0.135	0.079	0.071	0.065
	Molybdenum (Mo) (mg/kg)	63.8	54.4	40.8	54.2	49.8
	Nickel (Ni) (mg/kg)	342	386	237	410	154
	Phosphorus (P) (mg/kg)	12100	11300	10400	11100	12000
	Potassium (K) (mg/kg)	5480	6220	5800	5980	5830
	Selenium (Se) (mg/kg)	0.46	0.93	0.49	0.59	0.47
	Silver (Ag) (mg/kg)	5.27	5.99	6.08	8.82	18.2
	Sodium (Na) (mg/kg)	15700	16200	15300	16300	15200
	Strontium (Sr) (mg/kg)	310	359	366	321	316
	Sulfur (S) (mg/kg)	13500	15200	13400	13600	13900
	Thallium (Tl) (mg/kg)	0.113	0.095	0.074	0.080	0.094
	Tin (Sn) (mg/kg)	153	616	178	134	512
	Titanium (Ti) (mg/kg)	1010	972	804	724	609
	Tungsten (W) (mg/kg)	14.5	17.5	13.1	13.9	16.4
	Uranium (U) (mg/kg)	5.44	5.95	5.00	5.22	5.54
	Vanadium (V) (mg/kg)	51.2	54.7	52.2	53.7	52.4
	Zinc (Zn) (mg/kg)	10800	7470	7570	6580	7220
	Zirconium (Zr) (mg/kg)	1.5	1.4	1.1	1.2	1.0

* 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	L2181471-6 SOIL 10-OCT-18 09:00 BA1841-A-6	L2181471-7 SOIL 10-OCT-18 09:00 BA1841-A-7	L2181471-8 SOIL 10-OCT-18 09:00 BA1841-A-8	L2181471-9 SOIL 10-OCT-18 09:00 BA1841-A-9	L2181471-10 SOIL 10-OCT-18 09:00 BA1841-A-10
Grouping	Analyte				
SOIL					
Physical Tests	Moisture (%)	20.3	20.6	20.0	19.7
	pH (1:2 soil:water) (pH)	10.77	10.77	10.85	10.86
Metals	Aluminum (Al) (mg/kg)	40400	42400	32500	41800
	Antimony (Sb) (mg/kg)	150	180	162	142
	Arsenic (As) (mg/kg)	38.6	39.3	36.5	32.3
	Barium (Ba) (mg/kg)	547	532	521	529
	Beryllium (Be) (mg/kg)	0.43	0.42	0.44	0.41
	Bismuth (Bi) (mg/kg)	16.1	66.7	12.3	34.2
	Boron (B) (mg/kg)	491	335	333	311
	Cadmium (Cd) (mg/kg)	17.9	40.4	15.3	12.7
	Calcium (Ca) (mg/kg)	126000	120000	130000	125000
	Chromium (Cr) (mg/kg)	212	187	180	149
	Cobalt (Co) (mg/kg)	155	41.6	149	86.5
	Copper (Cu) (mg/kg)	1710	6740	1830	4190
	Iron (Fe) (mg/kg)	83500	99900	77400	67200
	Lead (Pb) (mg/kg)	2090	792	1480	15500
	Lithium (Li) (mg/kg)	20.9	19.5	22.8	22.4
	Magnesium (Mg) (mg/kg)	12100	11400	12000	11000
	Manganese (Mn) (mg/kg)	848	1120	803	739
	Mercury (Hg) (mg/kg)	0.086	0.075	<0.050	0.056
	Molybdenum (Mo) (mg/kg)	38.1	62.8	52.9	42.6
	Nickel (Ni) (mg/kg)	282	135	172	156
	Phosphorus (P) (mg/kg)	10900	10500	11800	11200
	Potassium (K) (mg/kg)	5560	6120	5870	5300
	Selenium (Se) (mg/kg)	0.45	1.24	0.71	0.47
	Silver (Ag) (mg/kg)	6.79	12.7	6.60	9.21
	Sodium (Na) (mg/kg)	15200	15600	15100	14100
	Strontium (Sr) (mg/kg)	307	376	301	339
	Sulfur (S) (mg/kg)	12600	13500	13300	12400
	Thallium (Tl) (mg/kg)	0.078	0.077	0.082	0.175
	Tin (Sn) (mg/kg)	189	2180	161	402
	Titanium (Ti) (mg/kg)	754	850	505	732
	Tungsten (W) (mg/kg)	12.2	16.4	16.3	13.8
	Uranium (U) (mg/kg)	5.28	5.28	5.32	5.31
	Vanadium (V) (mg/kg)	64.3	50.1	48.7	50.6
	Zinc (Zn) (mg/kg)	7010	5390	9070	6650
	Zirconium (Zr) (mg/kg)	1.1	1.3	<1.0	1.2

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2181471-11 SOIL 10-OCT-18 09:00 BA1841-A-11	L2181471-12 SOIL 10-OCT-18 09:00 BA1841-A-12	L2181471-13 BA1841-A-5 REP1	L2181471-14 BA1841-A-5 REP2	L2181471-15 BA1841-A-5 REP3
Grouping	Analyte				
SOIL					
Physical Tests	Moisture (%)	21.7	20.6		
	pH (1:2 soil:water) (pH)	10.72	10.71		
Metals	Aluminum (Al) (mg/kg)	38500	40800		
	Antimony (Sb) (mg/kg)	164	188		
	Arsenic (As) (mg/kg)	36.5	42.9		
	Barium (Ba) (mg/kg)	521	485		
	Beryllium (Be) (mg/kg)	0.45	0.42		
	Bismuth (Bi) (mg/kg)	21.9	20.4		
	Boron (B) (mg/kg)	380	316		
	Cadmium (Cd) (mg/kg)	13.8	13.2		
	Calcium (Ca) (mg/kg)	134000	128000		
	Chromium (Cr) (mg/kg)	150	159		
	Cobalt (Co) (mg/kg)	47.2	21.8		
	Copper (Cu) (mg/kg)	7370	1430		
	Iron (Fe) (mg/kg)	73200	62000		
	Lead (Pb) (mg/kg)	779	888		
	Lithium (Li) (mg/kg)	20.4	18.5		
	Magnesium (Mg) (mg/kg)	12700	11500		
	Manganese (Mn) (mg/kg)	837	1160		
	Mercury (Hg) (mg/kg)	0.058	0.070		
	Molybdenum (Mo) (mg/kg)	53.0	44.6		
	Nickel (Ni) (mg/kg)	166	161		
	Phosphorus (P) (mg/kg)	10900	11700		
	Potassium (K) (mg/kg)	6120	5400		
	Selenium (Se) (mg/kg)	0.45	0.76		
	Silver (Ag) (mg/kg)	7.88	9.86		
	Sodium (Na) (mg/kg)	15700	14600		
	Strontium (Sr) (mg/kg)	324	316		
	Sulfur (S) (mg/kg)	14200	13300		
	Thallium (Tl) (mg/kg)	0.078	0.086		
	Tin (Sn) (mg/kg)	157	123		
	Titanium (Ti) (mg/kg)	858	866		
	Tungsten (W) (mg/kg)	13.0	14.6		
	Uranium (U) (mg/kg)	5.62	5.74		
	Vanadium (V) (mg/kg)	58.3	52.9		
	Zinc (Zn) (mg/kg)	5370	6170		
	Zirconium (Zr) (mg/kg)	1.4	1.4		

* 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				
	L2181471-16 BA1841-A-5 REP4				
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)				

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2181471-1	L2181471-2	L2181471-3	L2181471-4	L2181471-5
		Description	SOIL	SOIL	SOIL	SOIL	SOIL
		Sampled Date	10-OCT-18	10-OCT-18	10-OCT-18	10-OCT-18	10-OCT-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1841-A-1	BA1841-A-2	BA1841-A-3	BA1841-A-4	BA1841-A-5
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.27	11.28	11.24	11.39	11.36
	2nd Preliminary pH (pH)		8.25	8.47	8.17	8.59	8.23
	Final pH (pH)		5.91	5.86	5.72	6.04	5.88
	Extraction Solution Initial pH (pH)		2.90	2.90	2.90	2.90	2.90
	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)		4.73	4.35	27.4	4.95	4.48
	Cadmium (Cd)-Leachable (mg/L)		0.167	0.190	0.162	0.230	4.41
	Calcium (Ca)-Leachable (mg/L)		2000	1820	1800	1960	1940
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.333	0.273	0.448	0.573	0.520
	Copper (Cu)-Leachable (mg/L)		0.650	0.998	1.92	0.476	0.171
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0	<5.0	<5.0	<5.0
	Lead (Pb)-Leachable (mg/L)		<0.25	0.32	0.72	0.58	0.66
	Magnesium (Mg)-Leachable (mg/L)		143	118	124	133	134
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.55	0.50	0.47	1.00	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)		60.4	46.7	62.1	67.5	71.4

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2181471-6	L2181471-7	L2181471-8	L2181471-9	L2181471-10
		Description	SOIL	SOIL	SOIL	SOIL	SOIL
		Sampled Date	10-OCT-18	10-OCT-18	10-OCT-18	10-OCT-18	10-OCT-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1841-A-6	BA1841-A-7	BA1841-A-8	BA1841-A-9	BA1841-A-10
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.38	11.36	11.36	11.37	11.38
	2nd Preliminary pH (pH)		8.03	8.14	8.41	8.64	8.45
	Final pH (pH)		5.56	5.92	5.89	5.88	5.73
	Extraction Solution Initial pH (pH)		2.90	2.90	2.90	2.90	2.90
	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)		4.27	4.92	4.61	4.62	4.44
	Cadmium (Cd)-Leachable (mg/L)		0.182	0.219	0.168	0.168	0.191
	Calcium (Ca)-Leachable (mg/L)		1820	1930	1880	1960	1930
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.304	0.456	0.382	0.277	0.405
	Copper (Cu)-Leachable (mg/L)		1.38	1.49	0.304	1.25	1.60
	Iron (Fe)-Leachable (mg/L)		5.3	<5.0	<5.0	<5.0	<5.0
	Lead (Pb)-Leachable (mg/L)		1.08	<0.25	0.28	0.30	3.87
	Magnesium (Mg)-Leachable (mg/L)		122	138	130	132	129
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.51	0.71	0.82	0.54	0.59
	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)		78.1	64.5	74.0	62.1	62.7

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2181471-11	L2181471-12	L2181471-13	L2181471-14	L2181471-15
		Description	SOIL	SOIL			
		Sampled Date	10-OCT-18	10-OCT-18			
		Sampled Time	09:00	09:00			
		Client ID	BA1841-A-11	BA1841-A-12	BA1841-A-5 REP1	BA1841-A-5 REP2	BA1841-A-5 REP3
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.39	11.32	11.36	11.36	11.36
	2nd Preliminary pH (pH)		8.68	8.37	8.23	8.23	8.23
	Final pH (pH)		6.08	5.90	6.14	6.13	6.19
	Extraction Solution Initial pH (pH)		2.90	2.90	2.89	2.89	2.89
	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)		4.54	4.89			
	Cadmium (Cd)-Leachable (mg/L)		0.166	0.406	0.146	0.179	0.154
	Calcium (Ca)-Leachable (mg/L)		2030	1970			
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25			
	Cobalt (Co)-Leachable (mg/L)		1.63	1.05			
	Copper (Cu)-Leachable (mg/L)		0.439	0.372			
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0			
	Lead (Pb)-Leachable (mg/L)		<0.25	<0.25			
	Magnesium (Mg)-Leachable (mg/L)		143	135			
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010			
	Nickel (Ni)-Leachable (mg/L)		0.98	0.77			
	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)		78.5	55.5			

* 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				
	L2181471-16 BA1841-A-5 REP4				
Grouping	Analyte				
SOIL					
TCLP Metals	1st Preliminary pH (pH)	11.36			
	2nd Preliminary pH (pH)	8.23			
	Final pH (pH)	6.20			
	Extraction Solution Initial pH (pH)	2.89			
	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)	0.233			
	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	Silver (Ag)	DUP-H	L2181471-2
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2181471-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2181471-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2181471-1, -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**
AG-200.2-A-CCMS-VA	Soil	Elevated Ag in Soil by CRC ICPMS	EPA 200.2/6020A
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.			
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-ICP-VA	Soil	Metals by ICPOES (TCLP)	EPA 1311/6010B
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 inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six 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.



L2181471-COFC

of Custody / Analytical Request Form
 Canada Toll Free: 1 800 668 9878
 www.alsglobal.com

COC # _____

Page ____ of ____

Report To		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 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:	dskrypnik@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? <input type="checkbox"/> Yes <input type="checkbox"/> No		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:		Fax:							

Lab Work Order # (lab use only)		ALS Contact:	Sampler:									
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
BA1841-A-1		10-Oct-18	9:00	Soil	X	X		X				1
BA1841-A-2		10-Oct-18	9:00	Soil	X	X		X				1
BA1841-A-3		10-Oct-18	9:00	Soil	X	X		X				1
BA1841-A-4		10-Oct-18	9:00	Soil	X	X		X				1
BA1841-A-5		10-Oct-18	9:00	Soil	X	X		X				1
BA1841-A-6		10-Oct-18	9:00	Soil	X	X		X				1
BA1841-A-7		10-Oct-18	9:00	Soil	X	X		X				1
BA1841-A-8		10-Oct-18	9:00	Soil	X	X		X				1
BA1841-A-9		10-Oct-18	9:00	Soil	X	X		X				1
BA1841-A-10		10-Oct-18	9:00	Soil	X	X		X				1
BA1841-A-11		10-Oct-18	9:00	Soil	X	X		X				1
BA1841-A-12		10-Oct-18	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>	16-Oct-18	08:00	A2 JC	Oct 16 2018	10:38 AM	20,20C				Yes / No ? If Yes add SIF