

## Bottom Ash Data

2019 Week 6

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The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on February 21, 2019. The data represents bottom ash composite results for week 6 of 2019 (February 3, 2019 to February 9, 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.



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Date Received: 12-FEB-19  
Report Date: 20-FEB-19 12:46 (MT)  
Version: FINAL

Client Phone: 604-521-1025

## Certificate of Analysis

Lab Work Order #: L2231858  
Project P.O. #: VANCO-0000048466  
Job Reference:  
C of C Numbers:  
Legal Site Desc:

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Brent Mack, B.Sc.  
Account Manager

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## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2231858-1	L2231858-2	L2231858-3	L2231858-4	L2231858-5
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	06-FEB-19	06-FEB-19	06-FEB-19	06-FEB-19	06-FEB-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1906-A-1	BA1906-A-2	BA1906-A-3	BA1906-A-4	BA1906-A-5
Grouping	Analyte						
<b>SOIL</b>							
<b>Physical Tests</b>	Moisture (%)		22.2	22.7	22.5	22.3	20.9
	pH (1:2 soil:water) (pH)		11.86	10.99	11.18	11.02	11.09
<b>Metals</b>	Aluminum (Al) (mg/kg)		32400	32800	40500	45600	27600
	Antimony (Sb) (mg/kg)		122	192	153	177	131
	Arsenic (As) (mg/kg)		36.2	25.8	26.7	29.4	23.6
	Barium (Ba) (mg/kg)		525	501	538	567	500
	Beryllium (Be) (mg/kg)		0.42	0.36	0.44	0.48	0.41
	Bismuth (Bi) (mg/kg)		6.97	8.05	8.08	10.7	8.82
	Boron (B) (mg/kg)		224	352	301	260	622
	Cadmium (Cd) (mg/kg)		10.5	15.5	14.0	17.3	12.6
	Calcium (Ca) (mg/kg)		129000	119000	139000	149000	128000
	Chromium (Cr) (mg/kg)		489	402	156	189	156
	Cobalt (Co) (mg/kg)		20.1	46.2	17.5	26.2	44.3
	Copper (Cu) (mg/kg)		1500	5100	7800	5000	1410
	Iron (Fe) (mg/kg)		54200	77000	54300	60600	52400
	Lead (Pb) (mg/kg)		355	606	1070	493	437
	Lithium (Li) (mg/kg)		15.5	16.4	35.2	20.2	18.6
	Magnesium (Mg) (mg/kg)		18100	11900	15500	14300	13500
	Manganese (Mn) (mg/kg)		690	969	915	1440	760
	Mercury (Hg) (mg/kg)		<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)		35.6	107	56.5	58.5	47.6
	Nickel (Ni) (mg/kg)		245	335	247	141	197
	Phosphorus (P) (mg/kg)		9390	10400	10900	11600	11100
	Potassium (K) (mg/kg)		4680	5340	5680	6670	5730
	Selenium (Se) (mg/kg)		0.38	0.43	0.44	0.61	0.42
	Silver (Ag) (mg/kg)		4.60	4.55	11.3	7.24	9.63
	Sodium (Na) (mg/kg)		15200	16200	16000	19500	18000
	Strontium (Sr) (mg/kg)		273	481	287	316	562
Sulfur (S) (mg/kg)		14600	16300	16700	21100	16500	
Thallium (Tl) (mg/kg)		0.070	0.078	0.084	0.089	0.071	
Tin (Sn) (mg/kg)		118	1800	199	142	969	
Titanium (Ti) (mg/kg)		1360	1330	1280	1310	660	
Tungsten (W) (mg/kg)		14.1	19.0	30.7	18.1	12.9	
Uranium (U) (mg/kg)		4.31	4.65	5.03	5.68	4.66	
Vanadium (V) (mg/kg)		45.2	48.9	49.9	56.7	44.4	
Zinc (Zn) (mg/kg)		4770	4500	4580	5560	4560	
Zirconium (Zr) (mg/kg)		1.6	2.2	2.3	1.8	1.3	

\* 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	L2231858-6 Soil 06-FEB-19 09:00 BA1906-A-6	L2231858-7 Soil 06-FEB-19 09:00 BA1906-A-7	L2231858-8 Soil 06-FEB-19 09:00 BA1906-A-8	L2231858-9 Soil 06-FEB-19 09:00 BA1906-A-9	L2231858-10 Soil 06-FEB-19 09:00 BA1906-A-10	
Grouping	Analyte					
<b>SOIL</b>						
<b>Physical Tests</b>	Moisture (%)	22.5	22.7	23.1	22.9	21.6
	pH (1:2 soil:water) (pH)	11.09	11.09	11.02	10.97	11.34
<b>Metals</b>	Aluminum (Al) (mg/kg)	36100	47900	34600	31800	30700
	Antimony (Sb) (mg/kg)	154	142	150	131	150
	Arsenic (As) (mg/kg)	26.4	25.6	37.9	26.1	25.0
	Barium (Ba) (mg/kg)	510	549	454	517	441
	Beryllium (Be) (mg/kg)	0.42	0.41	0.42	0.41	0.37
	Bismuth (Bi) (mg/kg)	39.0	7.58	8.20	6.52	9.65
	Boron (B) (mg/kg)	264	231	337	283	180
	Cadmium (Cd) (mg/kg)	15.1	24.1	16.5	11.9	14.9
	Calcium (Ca) (mg/kg)	132000	132000	129000	129000	124000
	Chromium (Cr) (mg/kg)	149	246	490	145	132
	Cobalt (Co) (mg/kg)	44.9	28.7	57.9	89.1	198
	Copper (Cu) (mg/kg)	3740	2720	3520	2680	1940
	Iron (Fe) (mg/kg)	53500	63900	66400	60200	50100
	Lead (Pb) (mg/kg)	1250	564	3770	646	538
	Lithium (Li) (mg/kg)	20.6	19.7	19.6	19.1	19.4
	Magnesium (Mg) (mg/kg)	14100	14400	13400	15200	16200
	Manganese (Mn) (mg/kg)	771	1710	969	782	652
	Mercury (Hg) (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	77.7	55.4	55.8	48.7	55.4
	Nickel (Ni) (mg/kg)	812	198	390	240	335
	Phosphorus (P) (mg/kg)	10100	10800	10900	10200	10400
	Potassium (K) (mg/kg)	6050	5830	5600	5270	6010
	Selenium (Se) (mg/kg)	0.45	0.47	0.48	0.43	0.69
	Silver (Ag) (mg/kg)	6.46	4.85	8.03	4.30	5.54
	Sodium (Na) (mg/kg)	17500	17100	17600	15700	17200
	Strontium (Sr) (mg/kg)	284	296	288	272	267
	Sulfur (S) (mg/kg)	17800	17100	19700	15300	18400
	Thallium (Tl) (mg/kg)	0.088	0.094	0.136	0.068	0.080
	Tin (Sn) (mg/kg)	153	142	163	126	114
	Titanium (Ti) (mg/kg)	1210	1630	893	1110	1330
	Tungsten (W) (mg/kg)	13.6	28.5	22.1	15.8	18.9
	Uranium (U) (mg/kg)	5.03	4.88	4.84	4.48	4.77
	Vanadium (V) (mg/kg)	50.0	52.2	54.1	56.5	43.2
	Zinc (Zn) (mg/kg)	4080	6330	6540	3260	4560
	Zirconium (Zr) (mg/kg)	1.5	2.3	1.6	1.6	1.7

\* 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	L2231858-11 Soil 06-FEB-19 09:00 BA1906-A-11	L2231858-12 Soil 06-FEB-19 09:00 BA1906-A-12		
Grouping	Analyte				
<b>SOIL</b>					
<b>Physical Tests</b>	Moisture (%)	21.4	22.1		
	pH (1:2 soil:water) (pH)	11.20	11.18		
<b>Metals</b>	Aluminum (Al) (mg/kg)	34300	30000		
	Antimony (Sb) (mg/kg)	176	139		
	Arsenic (As) (mg/kg)	29.6	22.4		
	Barium (Ba) (mg/kg)	520	479		
	Beryllium (Be) (mg/kg)	0.45	0.43		
	Bismuth (Bi) (mg/kg)	10.4	6.96		
	Boron (B) (mg/kg)	220	183		
	Cadmium (Cd) (mg/kg)	15.4	12.6		
	Calcium (Ca) (mg/kg)	141000	129000		
	Chromium (Cr) (mg/kg)	164	139		
	Cobalt (Co) (mg/kg)	62.9	47.8		
	Copper (Cu) (mg/kg)	5080	1230		
	Iron (Fe) (mg/kg)	79700	66100		
	Lead (Pb) (mg/kg)	564	1800		
	Lithium (Li) (mg/kg)	22.9	22.0		
	Magnesium (Mg) (mg/kg)	15200	14100		
	Manganese (Mn) (mg/kg)	886	1110		
	Mercury (Hg) (mg/kg)	<0.050	<0.050		
	Molybdenum (Mo) (mg/kg)	54.1	68.4		
	Nickel (Ni) (mg/kg)	1150	170		
	Phosphorus (P) (mg/kg)	11800	9990		
	Potassium (K) (mg/kg)	6350	5300		
	Selenium (Se) (mg/kg)	0.50	0.38		
	Silver (Ag) (mg/kg)	6.58	4.13		
	Sodium (Na) (mg/kg)	18200	15600		
	Strontium (Sr) (mg/kg)	290	327		
	Sulfur (S) (mg/kg)	20100	16000		
	Thallium (Tl) (mg/kg)	0.088	0.076		
	Tin (Sn) (mg/kg)	207	122		
	Titanium (Ti) (mg/kg)	1020	1170		
	Tungsten (W) (mg/kg)	16.1	13.2		
	Uranium (U) (mg/kg)	5.32	4.50		
	Vanadium (V) (mg/kg)	51.1	44.0		
	Zinc (Zn) (mg/kg)	7000	4010		
	Zirconium (Zr) (mg/kg)	1.9	1.6		

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

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2231858-1	L2231858-2	L2231858-3	L2231858-4	L2231858-5
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	06-FEB-19	06-FEB-19	06-FEB-19	06-FEB-19	06-FEB-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1906-A-1	BA1906-A-2	BA1906-A-3	BA1906-A-4	BA1906-A-5
Grouping	Analyte						
<b>SOIL</b>							
<b>TCLP Metals</b>	1st Preliminary pH (pH)		11.44	11.27	11.36	11.40	11.37
	2nd Preliminary pH (pH)		9.92	9.64	9.67	9.71	9.58
	Final pH (pH)		6.42	6.16	6.27	6.36	6.14
	Extraction Solution Initial pH (pH)		2.88	2.88	2.88	2.88	2.88
	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)		2.98	3.07	2.94	3.36	2.80
	Cadmium (Cd)-Leachable (mg/L)		0.243	0.227	0.240	0.166	0.246
	Calcium (Ca)-Leachable (mg/L)		1970	2060	2120	2060	2020
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.509	0.285	0.759	0.645	0.345
	Copper (Cu)-Leachable (mg/L)		0.283	0.398	0.146	0.063	0.119
	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)		176	164	181	184	170
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.52	0.51	0.54	1.25	0.65
	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)		35.1	40.8	35.6	43.0	46.0

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

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2231858-6	L2231858-7	L2231858-8	L2231858-9	L2231858-10
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	06-FEB-19	06-FEB-19	06-FEB-19	06-FEB-19	06-FEB-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1906-A-6	BA1906-A-7	BA1906-A-8	BA1906-A-9	BA1906-A-10
Grouping	Analyte						
<b>SOIL</b>							
<b>TCLP Metals</b>	1st Preliminary pH (pH)		11.38	11.34	11.35	11.36	11.34
	2nd Preliminary pH (pH)		10.01	9.77	9.83	9.74	9.73
	Final pH (pH)		5.91	6.44	6.33	6.28	6.29
	Extraction Solution Initial pH (pH)		2.88	2.88	2.88	2.88	2.88
	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)		2.82	3.27	3.41	4.40	2.79
	Cadmium (Cd)-Leachable (mg/L)		0.210	0.193	0.184	0.205	1.00
	Calcium (Ca)-Leachable (mg/L)		2010	2160	2080	2090	1980
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.510	0.444	0.536	0.424	0.559
	Copper (Cu)-Leachable (mg/L)		0.149	0.289	0.389	0.238	0.642
	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	0.32	<0.25
	Magnesium (Mg)-Leachable (mg/L)		153	182	165	171	173
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.65	0.70	0.51	0.77	0.48
	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)		54.2	25.5	33.9	47.8	41.0

\* 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	L2231858-11 Soil 06-FEB-19 09:00 BA1906-A-11	L2231858-12 Soil 06-FEB-19 09:00 BA1906-A-12		
Grouping	Analyte				
<b>SOIL</b>					
<b>TCLP Metals</b>	1st Preliminary pH (pH)	11.49	11.37		
	2nd Preliminary pH (pH)	9.84	9.95		
	Final pH (pH)	6.30	6.36		
	Extraction Solution Initial pH (pH)	2.88	2.88		
	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)	2.95	3.19		
	Cadmium (Cd)-Leachable (mg/L)	0.201	0.316		
	Calcium (Ca)-Leachable (mg/L)	2150	2120		
	Chromium (Cr)-Leachable (mg/L)	<0.25	<0.25		
	Cobalt (Co)-Leachable (mg/L)	0.445	0.301		
	Copper (Cu)-Leachable (mg/L)	0.456	0.357		
	Iron (Fe)-Leachable (mg/L)	<5.0	<5.0		
	Lead (Pb)-Leachable (mg/L)	<0.25	<0.25		
	Magnesium (Mg)-Leachable (mg/L)	175	173		
	Mercury (Hg)-Leachable (mg/L)	<0.0010	<0.0010		
	Nickel (Ni)-Leachable (mg/L)	0.63	0.58		
	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)	50.5	53.6		

\* 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	Chromium (Cr)	DUP-H	L2231858-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cobalt (Co)	DUP-H	L2231858-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Copper (Cu)	DUP-H	L2231858-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)	DUP-H	L2231858-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lithium (Li)	DUP-H	L2231858-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Magnesium (Mg)	DUP-H	L2231858-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Molybdenum (Mo)	DUP-H	L2231858-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Nickel (Ni)	DUP-H	L2231858-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Silver (Ag)	DUP-H	L2231858-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cadmium (Cd)-Leachable	MS-B	L2231858-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2231858-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2231858-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2231858-1, -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**
<b>HG-200.2-CVAF-VA</b>	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.			
<b>HG-TCLP-CVAFS-VA</b>	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).			
<b>MET-200.2-CCMS-VA</b>	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 <sub>2</sub> S) may be excluded if lost during sampling, storage, or digestion.			
<b>MET-TCLP-CCMS-VA</b>	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).			
<b>MOISTURE-VA</b>	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.			
<b>PH-1:2-VA</b>	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

## Reference Information

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### Chain of Custody Numbers:

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#### 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.*



L2231858-COFC

Custody / Analytical Request Form

1-800-668-9878

www.alsglobal.com

COC #

Page \_\_\_ of \_\_\_

<b>Report To</b>			<b>Distribution</b>			<b>Service Requested</b> (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			<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT											
Address: 5150 Riverbend Drive Burnaby BC			Email 1: smckinney@covanta.com			<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT											
Phone: 604-521-1025			Email 2: rjohnson4@covanta.com			<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT											
Fax: <input type="checkbox"/> Yes <input type="checkbox"/> No			Email 3: dskrypnik@covanta.com			<b>Analysis Request</b>											
			brent.kirkpatrick@metrovancover.org														
			Sarah.Wellman@metrovancover.org														

<b>Invoice To</b> Same as Report?			<b>Client / Project Information</b>			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:																	

Lab Work Order # (lab use only)		ALS Contact:	Sampler:													Number of Containers
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)								
BA1906-A-1		06-Feb-19	9:00	Soil	X	X		X							1	
BA1906-A-2		06-Feb-19	9:00	Soil	X	X		X							1	
BA1906-A-3		06-Feb-19	9:00	Soil	X	X		X							1	
BA1906-A-4		06-Feb-19	9:00	Soil	X	X		X							1	
BA1906-A-5		06-Feb-19	9:00	Soil	X	X		X							1	
BA1906-A-6		06-Feb-19	9:00	Soil	X	X		X							1	
BA1906-A-7		06-Feb-19	9:00	Soil	X	X		X							1	
BA1906-A-8		06-Feb-19	9:00	Soil	X	X		X							1	
BA1906-A-9		06-Feb-19	9:00	Soil	X	X		X							1	
BA1906-A-10		06-Feb-19	9:00	Soil	X	X		X							1	
BA1906-A-11		06-Feb-19	9:00	Soil	X	X		X							1	
BA1906-A-12		06-Feb-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: <i>[Signature]</i>	Date (dd-mmm-yy): 12-Feb-19	Time (hh:mm): 08:00	Received by: CW	Date: Feb 12	Time: 21:20	Temperature: 21.7 °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF