

## Bottom Ash Data

2019 Week 2

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The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on January 22, 2019. The data represents bottom ash composite results for week 2 of 2019 (January 6, 2019 to January 12, 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: 15-JAN-19  
Report Date: 21-JAN-19 11:03 (MT)  
Version: FINAL

Client Phone: 604-521-1025

## Certificate of Analysis

Lab Work Order #: L2220525  
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	L2220525-1	L2220525-2	L2220525-3	L2220525-4	L2220525-5
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	09-JAN-19	09-JAN-19	09-JAN-19	09-JAN-19	09-JAN-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1902-A-1	BA1902-A-2	BA1902-A-3	BA1902-A-4	BA1902-A-5
Grouping	Analyte						
<b>SOIL</b>							
<b>Physical Tests</b>	Moisture (%)		20.2	19.9	22.1	24.9	19.5
	pH (1:2 soil:water) (pH)		11.52	11.49	11.53	11.54	11.51
<b>Metals</b>	Aluminum (Al) (mg/kg)		32500	50600	43500	39500	30600
	Antimony (Sb) (mg/kg)		116	107	130	106	119
	Arsenic (As) (mg/kg)		23.4	17.0	15.1	15.9	16.8
	Barium (Ba) (mg/kg)		657	683	671	663	652
	Beryllium (Be) (mg/kg)		0.54	0.37	0.40	0.42	0.37
	Bismuth (Bi) (mg/kg)		6.09	5.44	5.58	6.45	5.74
	Boron (B) (mg/kg)		309	323	281	231	227
	Cadmium (Cd) (mg/kg)		11.0	12.0	11.0	14.9	13.7
	Calcium (Ca) (mg/kg)		134000	128000	124000	126000	130000
	Chromium (Cr) (mg/kg)		178	221	197	129	284
	Cobalt (Co) (mg/kg)		46.9	38.5	28.1	79.0	69.5
	Copper (Cu) (mg/kg)		2020	7380	3090	2560	3750
	Iron (Fe) (mg/kg)		78900	63500	59000	79100	70700
	Lead (Pb) (mg/kg)		412	602	358	715	424
	Lithium (Li) (mg/kg)		24.0	19.5	18.4	19.9	23.7
	Magnesium (Mg) (mg/kg)		11800	11500	11200	11000	9840
	Manganese (Mn) (mg/kg)		873	1120	877	798	836
	Mercury (Hg) (mg/kg)		<0.050	0.056	<0.050	<0.050	0.074
	Molybdenum (Mo) (mg/kg)		24.9	22.2	25.7	24.4	47.4
	Nickel (Ni) (mg/kg)		391	231	163	145	220
	Phosphorus (P) (mg/kg)		11300	12600	10800	9200	12800
	Potassium (K) (mg/kg)		4910	5160	5110	4670	4300
	Selenium (Se) (mg/kg)		0.28	0.33	0.26	0.29	0.35
	Silver (Ag) (mg/kg)		5.76	4.21	10.6	4.43	4.37
	Sodium (Na) (mg/kg)		13900	14300	13900	12500	11700
	Strontium (Sr) (mg/kg)		323	300	308	308	321
Sulfur (S) (mg/kg)		11100	11300	10700	9400	10800	
Thallium (Tl) (mg/kg)		0.084	0.075	0.078	0.093	0.078	
Tin (Sn) (mg/kg)		156	113	113	143	151	
Titanium (Ti) (mg/kg)		673	1340	1500	902	453	
Tungsten (W) (mg/kg)		5.91	5.76	5.71	5.30	5.60	
Uranium (U) (mg/kg)		5.20	5.18	5.12	5.15	5.00	
Vanadium (V) (mg/kg)		49.4	48.9	45.2	44.2	42.9	
Zinc (Zn) (mg/kg)		6490	3310	6730	5790	8560	
Zirconium (Zr) (mg/kg)		1.5	2.3	2.3	2.1	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	L2220525-6 Soil 09-JAN-19 09:00 BA1902-A-6	L2220525-7 Soil 09-JAN-19 09:00 BA1902-A-7	L2220525-8 Soil 09-JAN-19 09:00 BA1902-A-8	L2220525-9 Soil 09-JAN-19 09:00 BA1902-A-9	L2220525-10 Soil 09-JAN-19 09:00 BA1902-A-10	
Grouping	Analyte					
<b>SOIL</b>						
<b>Physical Tests</b>	Moisture (%)	22.9	22.8	23.0	22.3	18.8
	pH (1:2 soil:water) (pH)	11.51	11.45	11.29	11.37	11.44
<b>Metals</b>	Aluminum (Al) (mg/kg)	38800	40900	39000	31600	35700
	Antimony (Sb) (mg/kg)	121	118	114	126	128
	Arsenic (As) (mg/kg)	16.0	19.5	16.4	19.7	17.2
	Barium (Ba) (mg/kg)	704	684	710	686	701
	Beryllium (Be) (mg/kg)	0.45	0.45	0.42	0.43	0.43
	Bismuth (Bi) (mg/kg)	11.3	5.75	5.51	5.77	6.84
	Boron (B) (mg/kg)	282	266	233	456	301
	Cadmium (Cd) (mg/kg)	10.6	10.3	10.3	10.8	10.0
	Calcium (Ca) (mg/kg)	138000	126000	131000	130000	129000
	Chromium (Cr) (mg/kg)	186	135	170	171	164
	Cobalt (Co) (mg/kg)	30.3	26.7	41.3	30.4	27.9
	Copper (Cu) (mg/kg)	2010	2000	11400	4130	1960
	Iron (Fe) (mg/kg)	68000	65900	67200	61300	77500
	Lead (Pb) (mg/kg)	304	420	354	343	2350
	Lithium (Li) (mg/kg)	18.3	59.1	19.5	21.3	19.8
	Magnesium (Mg) (mg/kg)	11300	11200	11400	12100	12700
	Manganese (Mn) (mg/kg)	802	932	979	1040	886
	Mercury (Hg) (mg/kg)	0.057	0.054	0.165	0.070	0.074
	Molybdenum (Mo) (mg/kg)	24.4	72.2	30.1	26.1	46.1
	Nickel (Ni) (mg/kg)	181	343	98.6	181	248
	Phosphorus (P) (mg/kg)	10700	10200	13200	10900	11400
	Potassium (K) (mg/kg)	4780	4830	4790	5120	4820
	Selenium (Se) (mg/kg)	0.34	0.26	0.39	0.41	0.29
	Silver (Ag) (mg/kg)	4.70	6.73	3.84	4.34	4.94
	Sodium (Na) (mg/kg)	13600	13400	13900	14100	13400
	Strontium (Sr) (mg/kg)	352	309	328	334	358
	Sulfur (S) (mg/kg)	11300	11000	11700	11200	12600
	Thallium (Tl) (mg/kg)	0.070	0.072	0.072	0.078	0.077
	Tin (Sn) (mg/kg)	135	115	145	179	206
	Titanium (Ti) (mg/kg)	995	916	657	732	859
	Tungsten (W) (mg/kg)	4.93	5.00	5.16	5.07	6.87
	Uranium (U) (mg/kg)	5.21	5.16	5.34	5.28	5.28
	Vanadium (V) (mg/kg)	54.7	45.7	46.0	45.7	44.8
	Zinc (Zn) (mg/kg)	6490	4320	3480	8030	3760
	Zirconium (Zr) (mg/kg)	1.5	1.6	1.6	1.2	1.4

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

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2220525-11	L2220525-12		
		Description	Soil	Soil		
		Sampled Date	09-JAN-19	09-JAN-19		
		Sampled Time	09:00	09:00		
		Client ID	BA1902-A-11	BA1902-A-12		
Grouping	Analyte					
<b>SOIL</b>						
<b>Physical Tests</b>	Moisture (%)	21.3	19.2			
	pH (1:2 soil:water) (pH)	11.30	11.40			
<b>Metals</b>	Aluminum (Al) (mg/kg)	36200	30300			
	Antimony (Sb) (mg/kg)	127	144			
	Arsenic (As) (mg/kg)	16.7	18.7			
	Barium (Ba) (mg/kg)	618	586			
	Beryllium (Be) (mg/kg)	0.43	0.41			
	Bismuth (Bi) (mg/kg)	6.79	5.55			
	Boron (B) (mg/kg)	390	253			
	Cadmium (Cd) (mg/kg)	14.1	11.0			
	Calcium (Ca) (mg/kg)	135000	133000			
	Chromium (Cr) (mg/kg)	163	244			
	Cobalt (Co) (mg/kg)	564	36.6			
	Copper (Cu) (mg/kg)	3630	8380			
	Iron (Fe) (mg/kg)	52900	73600			
	Lead (Pb) (mg/kg)	323	1050			
	Lithium (Li) (mg/kg)	41.2	20.1			
	Magnesium (Mg) (mg/kg)	12700	11400			
	Manganese (Mn) (mg/kg)	1030	1180			
	Mercury (Hg) (mg/kg)	0.075	0.072			
	Molybdenum (Mo) (mg/kg)	33.8	29.7			
	Nickel (Ni) (mg/kg)	217	568			
	Phosphorus (P) (mg/kg)	12100	10900			
	Potassium (K) (mg/kg)	5300	4640			
	Selenium (Se) (mg/kg)	0.37	0.31			
	Silver (Ag) (mg/kg)	14.1	5.08			
	Sodium (Na) (mg/kg)	14400	13400			
	Strontium (Sr) (mg/kg)	321	321			
	Sulfur (S) (mg/kg)	11700	10900			
	Thallium (Tl) (mg/kg)	0.074	0.072			
	Tin (Sn) (mg/kg)	730	136			
	Titanium (Ti) (mg/kg)	910	718			
	Tungsten (W) (mg/kg)	6.27	5.03			
	Uranium (U) (mg/kg)	5.23	5.09			
Vanadium (V) (mg/kg)	47.7	43.3				
Zinc (Zn) (mg/kg)	6560	3720				
Zirconium (Zr) (mg/kg)	1.8	1.4				

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

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2220525-1	L2220525-2	L2220525-3	L2220525-4	L2220525-5
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	09-JAN-19	09-JAN-19	09-JAN-19	09-JAN-19	09-JAN-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1902-A-1	BA1902-A-2	BA1902-A-3	BA1902-A-4	BA1902-A-5
Grouping	Analyte						
<b>SOIL</b>							
<b>TCLP Metals</b>	1st Preliminary pH (pH)		11.44	11.69	11.60	11.55	11.66
	2nd Preliminary pH (pH)		9.06	9.51	9.17	9.13	8.87
	Final pH (pH)		6.10	6.18	6.21	6.01	6.01
	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)		7.84	4.33	7.13	3.45	3.98
	Cadmium (Cd)-Leachable (mg/L)		0.241	0.193	0.207	0.188	0.167
	Calcium (Ca)-Leachable (mg/L)		2070	2130	2000	2060	1960
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.601	1.58	0.483	0.415	0.595
	Copper (Cu)-Leachable (mg/L)		1.50	1.36	0.771	1.38	1.51
	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	0.38
	Magnesium (Mg)-Leachable (mg/L)		132	140	130	132	128
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.44	0.57	0.48	0.43	0.52
	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)		64.7	37.7	34.1	42.9	37.6

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

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2220525-6	L2220525-7	L2220525-8	L2220525-9	L2220525-10
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	09-JAN-19	09-JAN-19	09-JAN-19	09-JAN-19	09-JAN-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1902-A-6	BA1902-A-7	BA1902-A-8	BA1902-A-9	BA1902-A-10
Grouping	Analyte						
<b>SOIL</b>							
<b>TCLP Metals</b>	1st Preliminary pH (pH)		11.58	11.51	11.65	11.62	11.53
	2nd Preliminary pH (pH)		9.27	9.19	9.22	9.18	8.93
	Final pH (pH)		6.25	6.12	6.41	6.12	6.06
	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)		3.50	2.97	3.98	4.86	4.85
	Cadmium (Cd)-Leachable (mg/L)		0.147	0.148	0.154	0.150	0.204
	Calcium (Ca)-Leachable (mg/L)		1980	1940	2030	2050	2000
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.609	1.13	0.568	0.571	0.760
	Copper (Cu)-Leachable (mg/L)		1.03	1.31	0.657	1.04	1.12
	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	119	129	131	131
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.38	0.43	0.39	0.38	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)		41.5	41.8	43.3	37.9	32.9

\* 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	L2220525-11 Soil 09-JAN-19 09:00 BA1902-A-11	L2220525-12 Soil 09-JAN-19 09:00 BA1902-A-12		
Grouping	Analyte				
<b>SOIL</b>					
<b>TCLP Metals</b>	1st Preliminary pH (pH)	11.66	11.92		
	2nd Preliminary pH (pH)	9.24	10.05		
	Final pH (pH)	6.16	6.08		
	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)	4.15	5.62		
	Cadmium (Cd)-Leachable (mg/L)	0.153	0.151		
	Calcium (Ca)-Leachable (mg/L)	1940	1930		
	Chromium (Cr)-Leachable (mg/L)	<0.25	<0.25		
	Cobalt (Co)-Leachable (mg/L)	0.925	0.588		
	Copper (Cu)-Leachable (mg/L)	1.85	1.33		
	Iron (Fe)-Leachable (mg/L)	<5.0	<5.0		
	Lead (Pb)-Leachable (mg/L)	0.42	<0.25		
	Magnesium (Mg)-Leachable (mg/L)	125	123		
	Mercury (Hg)-Leachable (mg/L)	<0.0010	<0.0010		
	Nickel (Ni)-Leachable (mg/L)	0.39	0.35		
	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)	41.3	29.4		

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



## Reference Information

## QC Samples with Qualifiers &amp; Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Chromium (Cr)	DUP-H	L2220525-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cobalt (Co)	DUP-H	L2220525-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Copper (Cu)	DUP-H	L2220525-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)	DUP-H	L2220525-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Nickel (Ni)	DUP-H	L2220525-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Tin (Sn)	DUP-H	L2220525-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Certified Reference Material	Sodium (Na)	MES	L2220525-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Certified Reference Material	Titanium (Ti)	MES	L2220525-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2220525-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2220525-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2220525-1, -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.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
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, Tl, 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-ICP-VA</b>	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).			
<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

### 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.*



L2220525-COFC

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC #

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

<b>Report To</b>			<b>Report Format / 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	Fax:	Email 2:	rjohnson4@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT						
	<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>			<b>Client / Project Information</b>			Please indicate below Filtered, Preserved or both (F, P, F/P)					
Same as Report?	<input type="checkbox"/> Yes <input type="checkbox"/> No		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 Order #											
(lab use only)											

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
BA1902-A-1		09-Jan-19	9:00	Soil	X	X		X	1
BA1902-A-2		09-Jan-19	9:00	Soil	X	X		X	1
BA1902-A-3		09-Jan-19	9:00	Soil	X	X		X	1
BA1902-A-4		09-Jan-19	9:00	Soil	X	X		X	1
BA1902-A-5		09-Jan-19	9:00	Soil	X	X		X	1
BA1902-A-6		09-Jan-19	9:00	Soil	X	X		X	1
BA1902-A-7		09-Jan-19	9:00	Soil	X	X		X	1
BA1902-A-8		09-Jan-19	9:00	Soil	X	X		X	1
BA1902-A-9		09-Jan-19	9:00	Soil	X	X		X	1
BA1902-A-10		09-Jan-19	9:00	Soil	X	X		X	1
BA1902-A-11		09-Jan-19	9:00	Soil	X	X		X	1
BA1902-A-12		09-Jan-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: Yes / No ? If Yes add SIF
<i>[Signature]</i>	15-Jan-19	08:00	BP	Jan.15	12:20	17.6 °C				