

Bottom Ash Data

2018 Week 5

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on February 21, 2018. The data represents bottom ash composite results for week 5 of 2018 (January 28, 2018 to February 3, 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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Date Received: 07-FEB-18
Report Date: 21-FEB-18 12:41 (MT)
Version: FINAL

Client Phone: 604-521-1025

Certificate of Analysis

Lab Work Order #: L2053963
Project P.O. #: VANCO-0000040506
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		L2053963-1 Soil 31-JAN-18 09:00 BA1805-A-1	L2053963-2 Soil 31-JAN-18 09:00 BA1805-A-2	L2053963-3 Soil 31-JAN-18 09:00 BA1805-A-3	L2053963-4 Soil 31-JAN-18 09:00 BA1805-A-4	L2053963-5 Soil 31-JAN-18 09:00 BA1805-A-5
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	21.7	21.5	22.0	21.7	22.0
	pH (1:2 soil:water) (pH)	10.59	10.64	10.52	10.65	10.71
Metals	Aluminum (Al) (mg/kg)	41300	42300	44900	30600	46700
	Antimony (Sb) (mg/kg)	148	146	134	118	590
	Arsenic (As) (mg/kg)	25.0	23.2	23.2	37.1	23.3
	Barium (Ba) (mg/kg)	704	646	551	503	631
	Beryllium (Be) (mg/kg)	0.48	0.51	0.46	0.43	0.44
	Bismuth (Bi) (mg/kg)	151	154	94.2	88.1	108
	Boron (B) (mg/kg)	380	339	367	271	451
	Cadmium (Cd) (mg/kg)	12.3	10.9	12.2	10.6	11.6
	Calcium (Ca) (mg/kg)	136000	132000	129000	119000	132000
	Chromium (Cr) (mg/kg)	163	135	327	212	180
	Cobalt (Co) (mg/kg)	26.9	32.1	37.8	23.6	143
	Copper (Cu) (mg/kg)	9350	2450	3430	4980	11500
	Iron (Fe) (mg/kg)	64300	58500	54300	62400	74800
	Lead (Pb) (mg/kg)	446	536	405	359	332
	Lithium (Li) (mg/kg)	21.7	24.5	18.6	15.8	18.3
	Magnesium (Mg) (mg/kg)	12500	10600	11200	9220	9780
	Manganese (Mn) (mg/kg)	895	834	2000	957	1120
	Mercury (Hg) (mg/kg)	0.064	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	61.5	92.1	59.0	51.5	64.0
	Nickel (Ni) (mg/kg)	109	304	253	143	119
	Phosphorus (P) (mg/kg)	12100	12600	11200	9760	12200
	Potassium (K) (mg/kg)	5630	5410	5180	4800	5690
	Selenium (Se) (mg/kg)	0.35	0.38	0.41	0.34	0.50
	Silver (Ag) (mg/kg)	10.0	10.1	17.6	13.4	7.25
	Sodium (Na) (mg/kg)	16600	15700	14600	13200	15700
	Strontium (Sr) (mg/kg)	387	338	291	271	313
Sulfur (S) (mg/kg)	14100	13400	12300	12300	14400	
Thallium (Tl) (mg/kg)	0.089	0.075	0.074	0.074	0.092	
Tin (Sn) (mg/kg)	374	111	107	110	630	
Titanium (Ti) (mg/kg)	1180	1490	910	672	905	
Tungsten (W) (mg/kg)	12.9	11.0	14.8	9.04	13.8	
Uranium (U) (mg/kg)	5.69	5.11	5.75	5.05	5.66	
Vanadium (V) (mg/kg)	52.2	45.3	48.4	41.1	48.4	
Zinc (Zn) (mg/kg)	4460	3360	4010	6300	3830	
Zirconium (Zr) (mg/kg)	1.3	2.2	1.8	1.2	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	L2053963-6 Soil 31-JAN-18 09:00 BA1805-A-6	L2053963-7 Soil 31-JAN-18 09:00 BA1805-A-7	L2053963-8 Soil 31-JAN-18 09:00 BA1805-A-8	L2053963-9 Soil 31-JAN-18 09:00 BA1805-A-9	L2053963-10 Soil 31-JAN-18 09:00 BA1805-A-10	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	20.8	20.0	19.1	19.4	21.4
	pH (1:2 soil:water) (pH)	10.65	10.61	10.65	10.72	10.78
Metals	Aluminum (Al) (mg/kg)	33800	33000	31300	34900	37500
	Antimony (Sb) (mg/kg)	155	109	110	163	115
	Arsenic (As) (mg/kg)	23.1	34.8	19.9	24.8	25.8
	Barium (Ba) (mg/kg)	580	663	538	604	594
	Beryllium (Be) (mg/kg)	0.83	0.39	0.41	0.44	0.44
	Bismuth (Bi) (mg/kg)	122	101	145	110	119
	Boron (B) (mg/kg)	347	331	331	284	366
	Cadmium (Cd) (mg/kg)	10.6	10.0	22.4	84.4	11.0
	Calcium (Ca) (mg/kg)	147000	122000	129000	120000	118000
	Chromium (Cr) (mg/kg)	179	257	161	4400	176
	Cobalt (Co) (mg/kg)	167	36.2	41.7	49.4	44.8
	Copper (Cu) (mg/kg)	1970	9580	3960	10000	4670
	Iron (Fe) (mg/kg)	52500	99300	58900	74100	65700
	Lead (Pb) (mg/kg)	529	409	1120	11200	755
	Lithium (Li) (mg/kg)	20.3	16.7	18.7	16.3	18.3
	Magnesium (Mg) (mg/kg)	12100	10500	11000	9560	10400
	Manganese (Mn) (mg/kg)	867	1740	757	1280	863
	Mercury (Hg) (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	54.5	57.6	83.8	580	73.3
	Nickel (Ni) (mg/kg)	107	164	138	2780	697
	Phosphorus (P) (mg/kg)	15600	10700	11400	10600	11400
	Potassium (K) (mg/kg)	5790	4740	4870	4820	5040
	Selenium (Se) (mg/kg)	0.47	0.35	0.43	0.39	0.53
	Silver (Ag) (mg/kg)	7.93	9.67	10.1	7.96	10.0
	Sodium (Na) (mg/kg)	16000	13200	14100	14100	14100
	Strontium (Sr) (mg/kg)	334	299	282	298	309
	Sulfur (S) (mg/kg)	15100	11100	13000	12800	12000
	Thallium (Tl) (mg/kg)	0.079	0.071	0.079	<0.10 ^{DLM}	0.076
	Tin (Sn) (mg/kg)	187	197	101	121	242
	Titanium (Ti) (mg/kg)	495	603	666	1290	1310
	Tungsten (W) (mg/kg)	15.5	11.9	9.53	18.3	22.9
	Uranium (U) (mg/kg)	5.55	4.64	5.35	5.38	5.29
	Vanadium (V) (mg/kg)	56.6	41.2	47.5	58.2	43.6
	Zinc (Zn) (mg/kg)	2540	5600	3890	4550	5820
	Zirconium (Zr) (mg/kg)	1.2	1.1	1.1	1.7	1.8

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2053963-11	L2053963-12	L2053963-13	L2053963-14	L2053963-15
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	31-JAN-18	31-JAN-18	31-JAN-18	31-JAN-18	31-JAN-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1805-A-11	BA1805-A-12	BA1805-A-11 REP1	BA1805-A-11 REP2	BA1805-A-11 REP3
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		21.2	19.6			
	pH (1:2 soil:water) (pH)		10.74	10.77			
Metals	Aluminum (Al) (mg/kg)		32200	26200			
	Antimony (Sb) (mg/kg)		138	156			
	Arsenic (As) (mg/kg)		20.3	31.8			
	Barium (Ba) (mg/kg)		484	491			
	Beryllium (Be) (mg/kg)		0.39	0.41			
	Bismuth (Bi) (mg/kg)		153	113			
	Boron (B) (mg/kg)		284	337			
	Cadmium (Cd) (mg/kg)		14.2	24.8			
	Calcium (Ca) (mg/kg)		128000	116000			
	Chromium (Cr) (mg/kg)		160	214			
	Cobalt (Co) (mg/kg)		38.8	36.3			
	Copper (Cu) (mg/kg)		1580	27400			
	Iron (Fe) (mg/kg)		73000	72500			
	Lead (Pb) (mg/kg)		571	3150			
	Lithium (Li) (mg/kg)		18.5	16.3			
	Magnesium (Mg) (mg/kg)		9910	8760			
	Manganese (Mn) (mg/kg)		980	807			
	Mercury (Hg) (mg/kg)		<0.050	<0.050			
	Molybdenum (Mo) (mg/kg)		78.5	70.3			
	Nickel (Ni) (mg/kg)		104	235			
	Phosphorus (P) (mg/kg)		13400	10300			
	Potassium (K) (mg/kg)		5160	4970			
	Selenium (Se) (mg/kg)		0.44	0.42			
	Silver (Ag) (mg/kg)		10.8	17.1			
	Sodium (Na) (mg/kg)		14200	13700			
	Strontium (Sr) (mg/kg)		332	348			
	Sulfur (S) (mg/kg)		13200	12700			
	Thallium (Tl) (mg/kg)		0.075	0.087			
	Tin (Sn) (mg/kg)		113	166			
	Titanium (Ti) (mg/kg)		419	525			
	Tungsten (W) (mg/kg)		15.6	14.9			
	Uranium (U) (mg/kg)		5.54	5.25			
Vanadium (V) (mg/kg)		45.2	43.7				
Zinc (Zn) (mg/kg)		3450	7060				
Zirconium (Zr) (mg/kg)		2.0	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	L2053963-16 Soil 31-JAN-18 09:00 BA1805-A-11 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	L2053963-1	L2053963-2	L2053963-3	L2053963-4	L2053963-5
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	31-JAN-18	31-JAN-18	31-JAN-18	31-JAN-18	31-JAN-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1805-A-1	BA1805-A-2	BA1805-A-3	BA1805-A-4	BA1805-A-5
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.33	11.37	11.38	11.31	11.36
	2nd Preliminary pH (pH)		8.64	8.60	8.61	8.88	9.11
	Final pH (pH)		6.24	6.42	6.36	6.07	6.31
	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)		4.91	3.61	4.05	3.38	3.73
	Cadmium (Cd)-Leachable (mg/L)		0.144	0.172	0.148	0.123	0.132
	Calcium (Ca)-Leachable (mg/L)		1820	1770	1820	1820	1890
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.774	0.479	1.01	0.253	0.311
	Copper (Cu)-Leachable (mg/L)		1.26	0.989	0.765	0.531	0.241
	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)		101	102	104	107	104
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.43	0.45	0.78	0.88	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)		54.1	63.9	66.4	46.7	34.9

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2053963-6	L2053963-7	L2053963-8	L2053963-9	L2053963-10
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	31-JAN-18	31-JAN-18	31-JAN-18	31-JAN-18	31-JAN-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1805-A-6	BA1805-A-7	BA1805-A-8	BA1805-A-9	BA1805-A-10
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.39	11.36	11.45	11.44	11.50
	2nd Preliminary pH (pH)		8.67	8.85	9.06	8.95	8.81
	Final pH (pH)		6.18	6.26	6.04	5.57	5.70
	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)		3.59	3.56	3.50	3.61	3.49
	Cadmium (Cd)-Leachable (mg/L)		0.470	0.149	0.429	0.194	0.173
	Calcium (Ca)-Leachable (mg/L)		1850	1840	1920	1850	1890
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		3.02	0.593	0.329	0.422	0.406
	Copper (Cu)-Leachable (mg/L)		0.673	1.03	1.80	1.49	2.51
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0	<5.0	<5.0	9.1
	Lead (Pb)-Leachable (mg/L)		<0.25	<0.25	<0.25	0.38	<0.25
	Magnesium (Mg)-Leachable (mg/L)		107	110	115	106	107
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.44	0.47	0.56	0.48	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)		38.2	53.3	37.1	51.5	83.5

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2053963-11	L2053963-12	L2053963-13	L2053963-14	L2053963-15
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	31-JAN-18	31-JAN-18	31-JAN-18	31-JAN-18	31-JAN-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1805-A-11	BA1805-A-12	BA1805-A-11 REP1	BA1805-A-11 REP2	BA1805-A-11 REP3
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.47	11.43	11.47	11.47	11.47
	2nd Preliminary pH (pH)		8.74	8.80	8.74	8.74	8.74
	Final pH (pH)		5.80	5.81	6.11	6.08	5.96
	Extraction Solution Initial pH (pH)		2.90	2.90	2.85	2.85	2.85
	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)		4.20	3.51			
	Cadmium (Cd)-Leachable (mg/L)		1.01	0.175	0.234	0.397	0.161
	Calcium (Ca)-Leachable (mg/L)		1960	1950			
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25			
	Cobalt (Co)-Leachable (mg/L)		1.03	1.26			
	Copper (Cu)-Leachable (mg/L)		1.66	1.66			
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0			
	Lead (Pb)-Leachable (mg/L)		<0.25	0.55			
	Magnesium (Mg)-Leachable (mg/L)		112	112			
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010			
	Nickel (Ni)-Leachable (mg/L)		1.15	0.55			
	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)		57.1	89.7			

* 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	L2053963-16 Soil 31-JAN-18 09:00 BA1805-A-11 REP4			
Grouping	Analyte				
SOIL					
TCLP Metals	1st Preliminary pH (pH)	11.47			
	2nd Preliminary pH (pH)	8.74			
	Final pH (pH)	5.96			
	Extraction Solution Initial pH (pH)	2.85			
	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)	0.197			
	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	Cobalt (Co)	DUP-H	L2053963-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)	DUP-H	L2053963-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lithium (Li)	DUP-H	L2053963-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Molybdenum (Mo)	DUP-H	L2053963-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Nickel (Ni)	DUP-H	L2053963-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2053963-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2053963-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2053963-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
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
This method uses a heated strong acid digestion with HNO ₃ and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. 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)
This method uses a heated strong acid digestion with HNO ₃ and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
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.



L2053963-COFC

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

COC #

Page of

Report To

Company: Covanta Energy
Contact: Steve Mckinney / Dan Skrypnyk
Address: 5150 Riverbend Drive
Burnaby BC
Phone: 604-521-1025
Fax: Yes No

Report Format / Distribution

Standard Other
PDF Excel Digital Fax
Email 1: smckinney@covanta.com
Email 2: rihohnson4@covanta.com
Email 3: dskrypnyk@covanta.com
brent.kirkpatrick@metrovancover.org
Sarah.Wellman@metrovancover.org

Service Requested (Rush for routine analysis subject to availability)

Regular (Standard Turnaround Times - Business Days)
Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
Same Day or Weekend Emergency - Contact ALS to Confirm TAT

Analysis Request

Invoice To

Same as Report?

Client / Project Information

Job #:
PO / AFE: PO# 46693 Weekly Bottom Ash - Suite
LSD: (includes 2:1 pH)
Quote #:

Please indicate below Filtered, Preserved or both (F, P, F/P)

Hardcopy of Invoice with Report? Yes No

Company:
Contact:
Address:
Phone: Fax:

Lab Work Order # (lab use only)

ALS Contact:
Sampler:

Table with columns: Sample #, Sample Identification, Date, Time, Sample Type, MET-TCLP-VA, MOISTURE, Chrome 6, MET-CSR+FULL-VA, Number of Containers. Rows BA1805-A-1 to BA1805-A-12.

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) table with fields for Date, Time, Temperature, Verified by, etc.