

Bottom Ash Data

2018 Week 7

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on March 7, 2018. The data represents bottom ash composite results for week 7 of 2018 (February 11, 2018 to February 17, 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: 20-FEB-18
Report Date: 02-MAR-18 17:30 (MT)
Version: FINAL

Client Phone: 604-521-1025

Certificate of Analysis

Lab Work Order #: L2058334
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 #13-20, and have "REP" in the Client Sample ID field. Fluid determination was not performed for samples #13-20, 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	L2058334-1 Soil 14-FEB-18 09:00 BA1807-A-1	L2058334-2 Soil 14-FEB-18 09:00 BA1807-A-2	L2058334-3 Soil 14-FEB-18 09:00 BA1807-A-3	L2058334-4 Soil 14-FEB-18 09:00 BA1807-A-4	L2058334-5 Soil 14-FEB-18 09:00 BA1807-A-5	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	21.0	20.7	21.5	21.5	19.6
	pH (1:2 soil:water) (pH)	11.67	11.48	11.34	11.68	11.18
Metals	Aluminum (Al) (mg/kg)	46100	27200	36500	35400	27200
	Antimony (Sb) (mg/kg)	113	151	160	114	111
	Arsenic (As) (mg/kg)	21.1	22.1	27.3	20.0	20.9
	Barium (Ba) (mg/kg)	557	446	514	553	544
	Beryllium (Be) (mg/kg)	0.42	0.38	0.50	0.44	0.40
	Bismuth (Bi) (mg/kg)	19.3	14.4	22.4	18.2	31.3
	Boron (B) (mg/kg)	308	219	289	239	218
	Cadmium (Cd) (mg/kg)	11.3	18.0	16.8	25.1	20.4
	Calcium (Ca) (mg/kg)	126000	128000	151000	128000	120000
	Chromium (Cr) (mg/kg)	127	149	201	154	1180
	Cobalt (Co) (mg/kg)	27.6	89.4	43.0	48.8	54.3
	Copper (Cu) (mg/kg)	4510	11000	8010	4990	5680
	Iron (Fe) (mg/kg)	43100	49500	61900	56100	60000
	Lead (Pb) (mg/kg)	437	5900	772	270	297
	Lithium (Li) (mg/kg)	32.2	15.0	20.7	19.8	18.7
	Magnesium (Mg) (mg/kg)	11300	11400	13300	10000	10500
	Manganese (Mn) (mg/kg)	791	754	969	820	1210
	Mercury (Hg) (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	52.3	57.1	63.1	121	69.5
	Nickel (Ni) (mg/kg)	143	99.3	748	126	1140
	Phosphorus (P) (mg/kg)	11300	10400	13000	10100	11000
	Potassium (K) (mg/kg)	5760	5340	6500	5380	4650
	Selenium (Se) (mg/kg)	0.48	0.54	0.55	0.58	0.38
	Silver (Ag) (mg/kg)	4.72	6.87	11.6	5.03	7.58
	Sodium (Na) (mg/kg)	15900	14600	17500	15100	13300
	Strontium (Sr) (mg/kg)	291	291	363	289	289
	Sulfur (S) (mg/kg)	14900	16400	19400	14600	14400
	Thallium (Tl) (mg/kg)	0.073	0.093	0.090	0.069	0.064
	Tin (Sn) (mg/kg)	115	101	361	109	103
	Titanium (Ti) (mg/kg)	1350	654	714	913	886
	Tungsten (W) (mg/kg)	12.2	108	19.3	13.3	15.5
	Uranium (U) (mg/kg)	6.11	4.95	5.85	4.82	4.37
	Vanadium (V) (mg/kg)	52.1	51.5	65.7	49.4	48.9
	Zinc (Zn) (mg/kg)	4480	6600	6890	3670	4950
	Zirconium (Zr) (mg/kg)	4.2	1.3	1.6	1.4	1.1

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2058334-6	L2058334-7	L2058334-8	L2058334-9	L2058334-10
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	14-FEB-18	14-FEB-18	14-FEB-18	14-FEB-18	14-FEB-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1807-A-6	BA1807-A-7	BA1807-A-8	BA1807-A-9	BA1807-A-10
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		20.4	22.9	20.9	21.9	21.4
	pH (1:2 soil:water) (pH)		11.25	11.04	11.03	10.76	11.11
Metals	Aluminum (Al) (mg/kg)		26600	28000	37700	37500	39800
	Antimony (Sb) (mg/kg)		118	139	246	137	122
	Arsenic (As) (mg/kg)		24.1	31.9	21.9	29.2	30.7
	Barium (Ba) (mg/kg)		516	498	563	495	488
	Beryllium (Be) (mg/kg)		0.39	0.46	0.49	0.39	0.47
	Bismuth (Bi) (mg/kg)		22.3	11.1	16.9	11.8	22.6
	Boron (B) (mg/kg)		243	192	379	203	261
	Cadmium (Cd) (mg/kg)		13.9	120	14.1	13.6	12.5
	Calcium (Ca) (mg/kg)		118000	119000	123000	128000	142000
	Chromium (Cr) (mg/kg)		134	126	144	136	158
	Cobalt (Co) (mg/kg)		27.6	19.6	29.7	21.6	42.5
	Copper (Cu) (mg/kg)		24400	6820	12900	1600	4440
	Iron (Fe) (mg/kg)		61200	54300	62900	47500	50500
	Lead (Pb) (mg/kg)		287	719	3100	273	617
	Lithium (Li) (mg/kg)		14.3	17.8	16.8	15.7	16.2
	Magnesium (Mg) (mg/kg)		9290	9610	11000	11600	12300
	Manganese (Mn) (mg/kg)		1570	905	1010	771	787
	Mercury (Hg) (mg/kg)		<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)		37.0	27.1	69.4	50.0	98.9
	Nickel (Ni) (mg/kg)		85.6	139	83.7	90.5	194
	Phosphorus (P) (mg/kg)		9230	8940	10900	10900	11300
	Potassium (K) (mg/kg)		4550	5730	5810	6270	6530
	Selenium (Se) (mg/kg)		0.40	0.47	0.41	0.45	0.38
	Silver (Ag) (mg/kg)		6.01	7.63	5.48	5.54	6.55
	Sodium (Na) (mg/kg)		13700	14200	15500	15300	15900
	Strontium (Sr) (mg/kg)		328	276	338	298	323
Sulfur (S) (mg/kg)		14100	15600	14200	17300	16300	
Thallium (Tl) (mg/kg)		0.062	0.055	0.070	0.064	0.070	
Tin (Sn) (mg/kg)		109	255	97.9	113	164	
Titanium (Ti) (mg/kg)		669	1080	868	1420	912	
Tungsten (W) (mg/kg)		11.1	19.2	16.3	11.6	17.0	
Uranium (U) (mg/kg)		4.32	3.87	4.75	4.17	5.18	
Vanadium (V) (mg/kg)		43.3	40.4	46.2	46.3	51.4	
Zinc (Zn) (mg/kg)		3710	4830	3770	4110	5360	
Zirconium (Zr) (mg/kg)		1.1	1.4	1.4	2.5	2.6	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2058334-11	L2058334-12	L2058334-13	L2058334-14	L2058334-15
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	14-FEB-18	14-FEB-18	14-FEB-18	14-FEB-18	14-FEB-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1807-A-11	BA1807-A-12	BA1807-A-4 REP1	BA1807-A-4 REP2	BA1807-A-4 REP3
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		22.2	20.5			
	pH (1:2 soil:water) (pH)		11.20	11.17			
Metals	Aluminum (Al) (mg/kg)		28000	32200			
	Antimony (Sb) (mg/kg)		129	122			
	Arsenic (As) (mg/kg)		24.5	22.5			
	Barium (Ba) (mg/kg)		469	517			
	Beryllium (Be) (mg/kg)		0.41	0.44			
	Bismuth (Bi) (mg/kg)		15.0	17.4			
	Boron (B) (mg/kg)		208	226			
	Cadmium (Cd) (mg/kg)		12.9	13.4			
	Calcium (Ca) (mg/kg)		128000	131000			
	Chromium (Cr) (mg/kg)		144	169			
	Cobalt (Co) (mg/kg)		42.2	37.5			
	Copper (Cu) (mg/kg)		2640	23600			
	Iron (Fe) (mg/kg)		57300	63900			
	Lead (Pb) (mg/kg)		388	376			
	Lithium (Li) (mg/kg)		15.7	16.4			
	Magnesium (Mg) (mg/kg)		10700	10300			
	Manganese (Mn) (mg/kg)		706	858			
	Mercury (Hg) (mg/kg)		<0.050	<0.050			
	Molybdenum (Mo) (mg/kg)		79.6	66.2			
	Nickel (Ni) (mg/kg)		228	155			
	Phosphorus (P) (mg/kg)		9620	10100			
	Potassium (K) (mg/kg)		5330	5370			
	Selenium (Se) (mg/kg)		0.43	0.50			
	Silver (Ag) (mg/kg)		8.25	6.51			
	Sodium (Na) (mg/kg)		14300	14400			
	Strontium (Sr) (mg/kg)		315	298			
	Sulfur (S) (mg/kg)		16900	15900			
Thallium (Tl) (mg/kg)		0.072	0.066				
Tin (Sn) (mg/kg)		150	1240				
Titanium (Ti) (mg/kg)		1080	834				
Tungsten (W) (mg/kg)		19.2	16.7				
Uranium (U) (mg/kg)		5.02	4.62				
Vanadium (V) (mg/kg)		54.3	48.7				
Zinc (Zn) (mg/kg)		4760	3850				
Zirconium (Zr) (mg/kg)		1.4	1.2				

* 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	L2058334-16 Soil 14-FEB-18 09:00 BA1807-A-4 REP4	L2058334-17 Soil 14-FEB-18 09:00 BA1807-A-12 REP1	L2058334-18 Soil 14-FEB-18 09:00 BA1807-A-12 REP2	L2058334-19 Soil 14-FEB-18 09:00 BA1807-A-12 REP3	L2058334-20 Soil 14-FEB-18 09:00 BA1807-A-12 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	L2058334-1	L2058334-2	L2058334-3	L2058334-4	L2058334-5
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	14-FEB-18	14-FEB-18	14-FEB-18	14-FEB-18	14-FEB-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1807-A-1	BA1807-A-2	BA1807-A-3	BA1807-A-4	BA1807-A-5
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.45	11.46	11.43	11.51	11.35
	2nd Preliminary pH (pH)		9.28	9.45	9.20	9.45	9.30
	Final pH (pH)		6.19	6.31	6.23	6.19	6.19
	Extraction Solution Initial pH (pH)		2.87	2.87	2.87	2.87	2.87
	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)		2.56	2.52	2.36	2.44	3.35
	Cadmium (Cd)-Leachable (mg/L)		0.156	0.150	0.230	1.14	0.194
	Calcium (Ca)-Leachable (mg/L)		2050	1990	2000	2060	2070
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.299	0.398	0.268	0.739	0.290
	Copper (Cu)-Leachable (mg/L)		1.22	0.288	0.348	1.14	1.77
	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)		121	115	119	122	122
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.43	0.53	0.44	0.72	0.66
	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)		35.4	33.1	69.8	44.0	42.4

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2058334-6	L2058334-7	L2058334-8	L2058334-9	L2058334-10
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	14-FEB-18	14-FEB-18	14-FEB-18	14-FEB-18	14-FEB-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1807-A-6	BA1807-A-7	BA1807-A-8	BA1807-A-9	BA1807-A-10
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.42	11.33	11.38	11.27	11.51
	2nd Preliminary pH (pH)		8.90	9.10	8.90	8.68	9.37
	Final pH (pH)		6.16	6.51	6.33	6.48	6.39
	Extraction Solution Initial pH (pH)		2.87	2.86	2.86	2.86	2.86
	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)		2.60	2.55	2.61	2.70	2.40
	Cadmium (Cd)-Leachable (mg/L)		0.165	0.189	0.169	0.192	0.211
	Calcium (Ca)-Leachable (mg/L)		2030	1950	1910	1960	1950
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.375	0.737	0.498	0.253	0.791
	Copper (Cu)-Leachable (mg/L)		0.951	0.364	0.123	0.679	0.993
	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)		117	107	113	112	115
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.51	0.32	0.48	0.44	0.32
	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)		37.8	38.8	39.1	34.4	31.7

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2058334-11	L2058334-12	L2058334-13	L2058334-14	L2058334-15
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	14-FEB-18	14-FEB-18	14-FEB-18	14-FEB-18	14-FEB-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1807-A-11	BA1807-A-12	BA1807-A-4 REP1	BA1807-A-4 REP2	BA1807-A-4 REP3
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.59	11.47	11.51	11.51	11.51
	2nd Preliminary pH (pH)		9.35	9.09	9.45	9.45	9.45
	Final pH (pH)		6.15	6.21	6.18	6.07	6.20
	Extraction Solution Initial pH (pH)		2.86	2.86	2.88	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)		2.33	2.25			
	Cadmium (Cd)-Leachable (mg/L)		0.456	1.04	0.221	0.177	0.237
	Calcium (Ca)-Leachable (mg/L)		1930	1920			
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25			
	Cobalt (Co)-Leachable (mg/L)		0.377	0.299			
	Copper (Cu)-Leachable (mg/L)		0.723	0.503			
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0			
	Lead (Pb)-Leachable (mg/L)		<0.25	<0.25			
	Magnesium (Mg)-Leachable (mg/L)		112	106			
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010			
	Nickel (Ni)-Leachable (mg/L)		0.71	0.47			
	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)		32.3	41.0			

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2058334-16	L2058334-17	L2058334-18	L2058334-19	L2058334-20
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	14-FEB-18	14-FEB-18	14-FEB-18	14-FEB-18	14-FEB-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1807-A-4 REP4	BA1807-A-12 REP1	BA1807-A-12 REP2	BA1807-A-12 REP3	BA1807-A-12 REP4
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.51	11.47	11.47	11.47	11.47
	2nd Preliminary pH (pH)		9.45	9.09	9.09	9.09	9.09
	Final pH (pH)		6.29	6.13	6.13	6.30	6.08
	Extraction Solution Initial pH (pH)		2.88	2.88	2.88	2.88	2.88
	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)		0.174	0.431	0.174	0.244	0.168
	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	L2058334-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Copper (Cu)	DUP-H	L2058334-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)	DUP-H	L2058334-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lithium (Li)	DUP-H	L2058334-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Molybdenum (Mo)	DUP-H	L2058334-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Nickel (Ni)	DUP-H	L2058334-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Zirconium (Zr)	DUP-H,J	L2058334-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Certified Reference Material	Sodium (Na)	MES	L2058334-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cadmium (Cd)-Leachable	MS-B	L2058334-10, -11, -12, -7, -8, -9
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2058334-1, -2, -3, -4, -5, -6
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2058334-10, -11, -12, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2058334-1, -2, -3, -4, -5, -6
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2058334-10, -11, -12, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2058334-1, -2, -3, -4, -5, -6
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2058334-10, -11, -12, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
DUP-H,J	Duplicate results outside ALS DQO, due to sample heterogeneity. Duplicate results and limits are expressed in terms of absolute difference.
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**
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	

Reference Information

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:

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 Skrypyk	<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		
Phone:	604-521-1025	Email 2:	rjohnson4@covanta.com		
Fax:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Email 3:	dskrypyk@covanta.com		
			brent.kirkpatrick@metrovancover.org		
			Sarah.Wellman@metrovancover.org		

Invoice To Same as Report ?		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:		LS contact:		Sampler:															



Sample	(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
BA1807-A-1		14-Feb-18	9:00	Soil	X	X		X	1
BA1807-A-2		14-Feb-18	9:00	Soil	X	X		X	1
BA1807-A-3		14-Feb-18	9:00	Soil	X	X		X	1
BA1807-A-4		14-Feb-18	9:00	Soil	X	X		X	1
BA1807-A-5		14-Feb-18	9:00	Soil	X	X		X	1
BA1807-A-6		14-Feb-18	9:00	Soil	X	X		X	1
BA1807-A-7		14-Feb-18	9:00	Soil	X	X		X	1
BA1807-A-8		14-Feb-18	9:00	Soil	X	X		X	1
BA1807-A-9		14-Feb-18	9:00	Soil	X	X		X	1
BA1807-A-10		14-Feb-18	9:00	Soil	X	X		X	1
BA1807-A-11		14-Feb-18	9:00	Soil	X	X		X	1
BA1807-A-12		14-Feb-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)			Observations: Yes / No ? If Yes add SIF
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	
<i>[Signature]</i>	20 Feb 18	0800	<i>[Signature]</i>	20 Feb 18	10:55	17.8/19.8C				

B