

Bottom Ash Data

2018 Week 40

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on October 25, 2018. The data represents bottom ash composite results for week 40 of 2018 (September 30, 2018 to October 6, 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
ATTN: Steve McKinney
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Date Received: 09-OCT-18
Report Date: 24-OCT-18 17:46 (MT)
Version: FINAL

Client Phone: 604-521-1025

Certificate of Analysis

Lab Work Order #: L2177672
Project P.O. #: VANCO-0000047506
Job Reference:
C of C Numbers:
Legal Site Desc: 46693 Weekly Bottom Ash -Suite

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	L2177672-1	L2177672-2	L2177672-3	L2177672-4	L2177672-5
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	03-OCT-18	03-OCT-18	03-OCT-18	03-OCT-18	03-OCT-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1840-A-1	BA1840-A-2	BA1840-A-3	BA1840-A-4	BA1840-A-5
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		19.2	19.7	19.2	19.8	20.3
	pH (1:2 soil:water) (pH)		11.16	11.24	11.32	11.12	11.23
Metals	Aluminum (Al) (mg/kg)		45400	38000	45800	36200	30500
	Antimony (Sb) (mg/kg)		107	125	107	123	121
	Arsenic (As) (mg/kg)		23.9	29.1	30.1	30.0	28.1
	Barium (Ba) (mg/kg)		609	648	716	726	672
	Beryllium (Be) (mg/kg)		0.39	0.39	0.42	0.39	0.34
	Bismuth (Bi) (mg/kg)		4.23	4.91	4.87	4.49	5.84
	Boron (B) (mg/kg)		291	247	277	255	400
	Cadmium (Cd) (mg/kg)		11.7	12.1	10.3	9.83	74.6
	Calcium (Ca) (mg/kg)		123000	121000	119000	124000	117000
	Chromium (Cr) (mg/kg)		134	135	177	204	126
	Cobalt (Co) (mg/kg)		176	85.1	222	21.4	21.1
	Copper (Cu) (mg/kg)		3160	2630	2360	3110	1130
	Iron (Fe) (mg/kg)		48600	65500	69800	72700	61300
	Lead (Pb) (mg/kg)		512	478	567	492	475
	Lithium (Li) (mg/kg)		32.6	17.5	16.3	17.2	14.7
	Magnesium (Mg) (mg/kg)		11500	12500	10600	11200	13000
	Manganese (Mn) (mg/kg)		781	944	1000	860	697
	Mercury (Hg) (mg/kg)		<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)		1380	143	137	112	96.9
	Nickel (Ni) (mg/kg)		112	124	126	115	148
	Phosphorus (P) (mg/kg)		10400	9390	11300	10300	12500
	Potassium (K) (mg/kg)		4790	4830	4700	5170	4770
	Selenium (Se) (mg/kg)		0.39	0.54	0.35	0.49	0.39
	Silver (Ag) (mg/kg)		7.11	4.94	24.2	6.00	20.7
	Sodium (Na) (mg/kg)		15500	15300	15700	16000	16400
	Strontium (Sr) (mg/kg)		363	315	298	330	324
Sulfur (S) (mg/kg)		14000	12200	10900	11900	11300	
Thallium (Tl) (mg/kg)		0.059	0.059	0.057	0.061	0.054	
Tin (Sn) (mg/kg)		92.2	154	200	111	112	
Titanium (Ti) (mg/kg)		1530	994	886	983	647	
Tungsten (W) (mg/kg)		11.8	11.2	14.3	9.40	19.7	
Uranium (U) (mg/kg)		3.98	3.94	3.91	4.11	3.98	
Vanadium (V) (mg/kg)		47.9	44.7	43.9	46.8	43.4	
Zinc (Zn) (mg/kg)		3160	3790	7470	3720	4080	
Zirconium (Zr) (mg/kg)		2.7	1.5	1.6	1.1	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	L2177672-6 Soil 03-OCT-18 09:00 BA1840-A-6	L2177672-7 Soil 03-OCT-18 09:00 BA1840-A-7	L2177672-8 Soil 03-OCT-18 09:00 BA1840-A-8	L2177672-9 Soil 03-OCT-18 09:00 BA1840-A-9	L2177672-10 Soil 03-OCT-18 09:00 BA1840-A-10
Grouping	Analyte				
SOIL					
Physical Tests	Moisture (%)	19.7	20.0	19.4	20.3
	pH (1:2 soil:water) (pH)	11.26	11.75	11.38	11.41
Metals	Aluminum (Al) (mg/kg)	35900	49100	51500	33400
	Antimony (Sb) (mg/kg)	126	130	115	115
	Arsenic (As) (mg/kg)	25.7	30.3	25.6	28.1
	Barium (Ba) (mg/kg)	730	679	659	611
	Beryllium (Be) (mg/kg)	0.38	0.38	0.44	0.41
	Bismuth (Bi) (mg/kg)	10.9	5.19	6.50	4.55
	Boron (B) (mg/kg)	302	216	208	316
	Cadmium (Cd) (mg/kg)	9.79	9.37	12.7	9.41
	Calcium (Ca) (mg/kg)	125000	119000	123000	112000
	Chromium (Cr) (mg/kg)	148	158	132	302
	Cobalt (Co) (mg/kg)	26.1	57.6	109	57.0
	Copper (Cu) (mg/kg)	1410	5090	1900	3160
	Iron (Fe) (mg/kg)	61300	64700	58000	65100
	Lead (Pb) (mg/kg)	548	456	481	645
	Lithium (Li) (mg/kg)	15.8	15.6	19.9	20.4
	Magnesium (Mg) (mg/kg)	11600	10500	10700	10800
	Manganese (Mn) (mg/kg)	812	790	770	969
	Mercury (Hg) (mg/kg)	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	105	89.3	104	110
	Nickel (Ni) (mg/kg)	378	103	100	183
	Phosphorus (P) (mg/kg)	9830	9740	11500	9730
	Potassium (K) (mg/kg)	4960	4720	4560	4880
	Selenium (Se) (mg/kg)	0.39	0.38	0.38	0.69
	Silver (Ag) (mg/kg)	5.79	12.0	4.66	5.52
	Sodium (Na) (mg/kg)	15800	14300	15200	13300
	Strontium (Sr) (mg/kg)	360	317	331	560
	Sulfur (S) (mg/kg)	11700	10600	11100	11200
	Thallium (Tl) (mg/kg)	0.064	0.061	0.060	0.061
	Tin (Sn) (mg/kg)	145	132	125	141
	Titanium (Ti) (mg/kg)	1010	1420	1220	1960
	Tungsten (W) (mg/kg)	16.3	11.3	13.9	12.5
	Uranium (U) (mg/kg)	4.09	3.96	3.89	3.75
	Vanadium (V) (mg/kg)	46.6	45.8	45.6	47.5
	Zinc (Zn) (mg/kg)	4680	5080	4440	4510
	Zirconium (Zr) (mg/kg)	1.1	2.3	2.6	2.7

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2177672-11	L2177672-12	L2177672-13	L2177672-14	L2177672-15
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	03-OCT-18	03-OCT-18	03-OCT-18	03-OCT-18	03-OCT-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1840-A-11	BA1840-A-12	BA1840-A-12 REP1	BA1840-A-12 REP2	BA1840-A-12 REP3
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		18.3	19.5			
	pH (1:2 soil:water) (pH)		11.23	11.39			
Metals	Aluminum (Al) (mg/kg)		34700	36400			
	Antimony (Sb) (mg/kg)		105	109			
	Arsenic (As) (mg/kg)		25.7	29.9			
	Barium (Ba) (mg/kg)		579	548			
	Beryllium (Be) (mg/kg)		0.46	0.39			
	Bismuth (Bi) (mg/kg)		4.12	5.35			
	Boron (B) (mg/kg)		280	248			
	Cadmium (Cd) (mg/kg)		8.75	9.72			
	Calcium (Ca) (mg/kg)		111000	113000			
	Chromium (Cr) (mg/kg)		140	298			
	Cobalt (Co) (mg/kg)		20.2	176			
	Copper (Cu) (mg/kg)		22700	2050			
	Iron (Fe) (mg/kg)		51700	72900			
	Lead (Pb) (mg/kg)		550	486			
	Lithium (Li) (mg/kg)		19.6	36.6			
	Magnesium (Mg) (mg/kg)		9790	10900			
	Manganese (Mn) (mg/kg)		805	870			
	Mercury (Hg) (mg/kg)		<0.050	<0.050			
	Molybdenum (Mo) (mg/kg)		132	116			
	Nickel (Ni) (mg/kg)		238	161			
	Phosphorus (P) (mg/kg)		10300	10400			
	Potassium (K) (mg/kg)		4840	4810			
	Selenium (Se) (mg/kg)		0.40	0.40			
	Silver (Ag) (mg/kg)		12.5	4.49			
	Sodium (Na) (mg/kg)		14300	14200			
	Strontium (Sr) (mg/kg)		277	295			
	Sulfur (S) (mg/kg)		10800	10900			
	Thallium (Tl) (mg/kg)		0.054	0.054			
Tin (Sn) (mg/kg)		160	104				
Titanium (Ti) (mg/kg)		827	719				
Tungsten (W) (mg/kg)		11.1	12.2				
Uranium (U) (mg/kg)		3.68	3.67				
Vanadium (V) (mg/kg)		45.7	43.2				
Zinc (Zn) (mg/kg)		4030	4730				
Zirconium (Zr) (mg/kg)		1.3	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			
	L2177672-16 Soil 03-OCT-18 09:00 BA1840-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	L2177672-1	L2177672-2	L2177672-3	L2177672-4	L2177672-5
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	03-OCT-18	03-OCT-18	03-OCT-18	03-OCT-18	03-OCT-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1840-A-1	BA1840-A-2	BA1840-A-3	BA1840-A-4	BA1840-A-5
Grouping	Analyte						
SOIL							
Speciated Metals	Hexavalent Chromium (mg/kg)		0.12				
TCLP Metals	1st Preliminary pH (pH)		11.36	11.37	11.28	11.35	11.38
	2nd Preliminary pH (pH)		7.77	7.99	8.55	8.70	8.58
	Final pH (pH)		6.04	6.05	5.99	6.28	6.45
	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)		3.12	3.42	3.17	4.25	3.65
	Cadmium (Cd)-Leachable (mg/L)		0.138	0.161	0.163	0.139	0.195
	Calcium (Ca)-Leachable (mg/L)		1700	1730	1710	1780	1880
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.330	0.469	0.421	0.372	0.532
	Copper (Cu)-Leachable (mg/L)		1.32	2.00	1.52	0.893	0.670
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0	<5.0	<5.0	<5.0
	Lead (Pb)-Leachable (mg/L)		0.53	<0.25	0.43	<0.25	<0.25
	Magnesium (Mg)-Leachable (mg/L)		108	105	101	106	111
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.77	0.38	0.57	0.46	0.39
	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)		33.6	49.9	49.7	84.4	41.6

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2177672-6	L2177672-7	L2177672-8	L2177672-9	L2177672-10
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	03-OCT-18	03-OCT-18	03-OCT-18	03-OCT-18	03-OCT-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1840-A-6	BA1840-A-7	BA1840-A-8	BA1840-A-9	BA1840-A-10
Grouping	Analyte						
SOIL							
Speciated Metals	Hexavalent Chromium (mg/kg)						
TCLP Metals	1st Preliminary pH (pH)	11.30	11.32	11.35	11.34	11.39	
	2nd Preliminary pH (pH)	7.67	8.52	8.82	8.94	7.89	
	Final pH (pH)	6.07	5.99	6.24	6.12	6.21	
	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)	3.13	3.25	3.16	3.44	3.30	
	Cadmium (Cd)-Leachable (mg/L)	0.140	0.161	0.172	0.143	0.241	
	Calcium (Ca)-Leachable (mg/L)	1740	1760	1780	1820	1840	
	Chromium (Cr)-Leachable (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25	
	Cobalt (Co)-Leachable (mg/L)	0.979	0.411	0.564	0.322	1.40	
	Copper (Cu)-Leachable (mg/L)	1.38	1.19	1.11	0.920	1.18	
	Iron (Fe)-Leachable (mg/L)	<5.0	<5.0	<5.0	<5.0	<5.0	
	Lead (Pb)-Leachable (mg/L)	0.84	<0.25	<0.25	<0.25	<0.25	
	Magnesium (Mg)-Leachable (mg/L)	109	108	107	110	112	
	Mercury (Hg)-Leachable (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Nickel (Ni)-Leachable (mg/L)	0.41	0.47	0.61	0.48	1.41	
	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)	32.3	36.2	41.4	38.4	51.8	

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2177672-11	L2177672-12	L2177672-13	L2177672-14	L2177672-15
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	03-OCT-18	03-OCT-18	03-OCT-18	03-OCT-18	03-OCT-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1840-A-11	BA1840-A-12	BA1840-A-12 REP1	BA1840-A-12 REP2	BA1840-A-12 REP3
Grouping	Analyte						
SOIL							
Speciated Metals	Hexavalent Chromium (mg/kg)						
TCLP Metals	1st Preliminary pH (pH)	11.29	11.37	11.37	11.37	11.37	11.37
	2nd Preliminary pH (pH)	8.17	7.71	7.71	7.71	7.71	7.71
	Final pH (pH)	6.02	6.23	6.24	6.34	6.38	6.38
	Extraction Solution Initial pH (pH)	2.88	2.88	2.89	2.89	2.89	2.89
	Antimony (Sb)-Leachable (mg/L)	<1.0	<1.0				
	Arsenic (As)-Leachable (mg/L)	<1.0	<1.0				
	Barium (Ba)-Leachable (mg/L)	<2.5	<2.5				
	Beryllium (Be)-Leachable (mg/L)	<0.025	<0.025				
	Boron (B)-Leachable (mg/L)	3.53	3.56				
	Cadmium (Cd)-Leachable (mg/L)	0.196	1.32	0.698	0.235	0.128	
	Calcium (Ca)-Leachable (mg/L)	1770	1910				
	Chromium (Cr)-Leachable (mg/L)	<0.25	<0.25				
	Cobalt (Co)-Leachable (mg/L)	0.950	0.617				
	Copper (Cu)-Leachable (mg/L)	1.66	0.276				
	Iron (Fe)-Leachable (mg/L)	<5.0	<5.0				
	Lead (Pb)-Leachable (mg/L)	0.99	<0.25				
	Magnesium (Mg)-Leachable (mg/L)	105	113				
	Mercury (Hg)-Leachable (mg/L)	<0.0010	<0.0010				
	Nickel (Ni)-Leachable (mg/L)	0.55	1.88				
	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)	52.3	57.9				

* 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	L2177672-16 Soil 03-OCT-18 09:00 BA1840-A-12 REP4			
Grouping	Analyte				
SOIL					
Speciated Metals	Hexavalent Chromium (mg/kg)				
TCLP Metals	1st Preliminary pH (pH)	11.37			
	2nd Preliminary pH (pH)	7.71			
	Final pH (pH)	6.55			
	Extraction Solution Initial pH (pH)	2.89			
	Antimony (Sb)-Leachable (mg/L)				
	Arsenic (As)-Leachable (mg/L)				
	Barium (Ba)-Leachable (mg/L)				
	Beryllium (Be)-Leachable (mg/L)				
	Boron (B)-Leachable (mg/L)				
	Cadmium (Cd)-Leachable (mg/L)	0.127			
	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	Cadmium (Cd)	DUP-H	L2177672-1, -2, -3, -4, -5, -6, -7, -8
Duplicate	Cobalt (Co)	DUP-H	L2177672-1, -2, -3, -4, -5, -6, -7, -8
Duplicate	Copper (Cu)	DUP-H	L2177672-1, -2, -3, -4, -5, -6, -7, -8
Duplicate	Iron (Fe)	DUP-H	L2177672-1, -2, -3, -4, -5, -6, -7, -8
Duplicate	Lithium (Li)	DUP-H	L2177672-1, -2, -3, -4, -5, -6, -7, -8
Duplicate	Molybdenum (Mo)	DUP-H	L2177672-1, -2, -3, -4, -5, -6, -7, -8
Duplicate	Nickel (Ni)	DUP-H	L2177672-1, -2, -3, -4, -5, -6, -7, -8
Duplicate	Tin (Sn)	DUP-H	L2177672-1, -2, -3, -4, -5, -6, -7, -8
Duplicate	Titanium (Ti)	DUP-H	L2177672-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Cadmium (Cd)-Leachable	MS-B	L2177672-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2177672-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2177672-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2177672-1, -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**
CR-CR6-3060-ED	Soil	Chromium, Hexavalent (Cr +6)	APHA 3500-CR C, EPA 3060A ALKALINE
		Field moist samples are digested with a sodium hydroxide/sodium carbonate solution. After cooling and filtration, the rinsate is adjusted to pH 9, and injected on an ion chromatograph to separate the hexavalent chromium ion. A post column color reaction with diphenylcarbohydrazide and absorbance measurement at 530 nm completes the quantitation.	
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)
		Soil samples are digested with hot nitric and hydrochloric acids, followed by CVAAS analysis. This method is fully compliant with the BC SALM strong acid leachable metals digestion method.	
HG-TCLP-CVAFS-VA	Soil	Mercury by CVAAS (TCLP)	EPA 1311/245.7
		This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter and analysed using atomic absorption spectrophotometry (EPA 245.7).	
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
		Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.	
		Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.	
MET-TCLP-ICP-VA	Soil	Metals by ICPOES (TCLP)	EPA 1311/6010B
		This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter and analysed using inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).	
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
		This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.	
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
		This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.	

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Reference Information

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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
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.



L2177672-COFC

COC # _____

Page _____ of _____

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

Invoice To Same as Report? <input type="checkbox"/> Yes <input type="checkbox"/> No			Client / Project Information			Please indicate below Filtered, Preserved or both (F, P, F/P)					
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input type="checkbox"/> No			Job #:								
Company:			PO / AFE: PO# 46693 Weekly Bottom Ash - Suite								
Contact:			LSD: (includes 2:1 pH)								
Address:			Quote #:								
Phone: _____			Fax: _____								

Lab Work Order # (lab use only)		ALS Contact:	Sampler:								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)				
BA1840-A-1		03-Oct-18	9:00	Soil	X	X	X	X				1
BA1840-A-2		03-Oct-18	9:00	Soil	X	X		X				1
BA1840-A-3		03-Oct-18	9:00	Soil	X	X		X				1
BA1840-A-4		03-Oct-18	9:00	Soil	X	X		X				1
BA1840-A-5		03-Oct-18	9:00	Soil	X	X		X				1
BA1840-A-6		03-Oct-18	9:00	Soil	X	X		X				1
BA1840-A-7		03-Oct-18	9:00	Soil	X	X		X				1
BA1840-A-8		03-Oct-18	9:00	Soil	X	X		X				1
BA1840-A-9		03-Oct-18	9:00	Soil	X	X		X				1
BA1840-A-10		03-Oct-18	9:00	Soil	X	X		X				1
BA1840-A-11		03-Oct-18	9:00	Soil	X	X		X				1
BA1840-A-12		03-Oct-18	9:00	Soil	X	X		X				1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
 By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.
 Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy): 9-Oct-18	Time (hh-mm): 07:00	Received by: HA	Date: 10/9	Time: 12:10p	Temperature: 26 °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF