

Bottom Ash Data

2018 Week 35

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on September 18, 2018. The data represents bottom ash composite results for week 35 of 2018 (August 26, 2018 to September 1, 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
5150 Riverbend Drive
Burnaby BC V3N 4V3

Date Received: 04-SEP-18
Report Date: 17-SEP-18 16:27 (MT)
Version: FINAL

Client Phone: 604-521-1025

Certificate of Analysis

Lab Work Order #: L2157779
Project P.O. #: VANCO-0000047506
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	L2157779-1	L2157779-2	L2157779-3	L2157779-4	L2157779-5
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1835-A-1	BA1835-A-2	BA1835-A-3	BA1835-A-4	BA1835-A-5
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		17.1	17.1	16.2	17.7	17.0
	pH (1:2 soil:water) (pH)		11.24	11.09	11.33	11.38	11.18
Metals	Aluminum (Al) (mg/kg)		29100	46300	28200	35600	34100
	Antimony (Sb) (mg/kg)		137	145	118	116	120
	Arsenic (As) (mg/kg)		43.1	42.5	41.7	39.4	41.4
	Barium (Ba) (mg/kg)		497	531	498	550	524
	Beryllium (Be) (mg/kg)		0.40	0.38	0.38	0.38	0.40
	Bismuth (Bi) (mg/kg)		6.48	8.72	5.20	22.9	5.01
	Boron (B) (mg/kg)		307	328	326	226	269
	Cadmium (Cd) (mg/kg)		13.9	13.0	11.1	10.9	11.1
	Calcium (Ca) (mg/kg)		134000	126000	122000	121000	123000
	Chromium (Cr) (mg/kg)		145	163	134	157	138
	Cobalt (Co) (mg/kg)		29.3	46.5	23.8	65.7	37.0
	Copper (Cu) (mg/kg)		1940	1770	1850	3970	2610
	Iron (Fe) (mg/kg)		61600	64000	57600	78900	47400
	Lead (Pb) (mg/kg)		803	946	508	1190	379
	Lithium (Li) (mg/kg)		16.9	17.9	16.9	17.9	16.3
	Magnesium (Mg) (mg/kg)		12700	13700	13100	13200	12400
	Manganese (Mn) (mg/kg)		730	952	2840	816	652
	Mercury (Hg) (mg/kg)		0.175	0.131	0.185	0.183	0.247
	Molybdenum (Mo) (mg/kg)		84.5	68.7	71.4	86.8	72.0
	Nickel (Ni) (mg/kg)		91.9	266	124	149	107
	Phosphorus (P) (mg/kg)		11500	12200	9830	10800	10400
	Potassium (K) (mg/kg)		5920	5700	6170	5860	5940
	Selenium (Se) (mg/kg)		0.39	0.35	0.29	0.32	0.28
	Silver (Ag) (mg/kg)		4.99	4.67	4.20	4.68	4.45
	Sodium (Na) (mg/kg)		16100	16600	16300	15900	16100
	Strontium (Sr) (mg/kg)		443	308	285	303	292
Sulfur (S) (mg/kg)		15300	13700	15000	14300	13500	
Thallium (Tl) (mg/kg)		0.095	0.086	0.088	0.089	0.089	
Tin (Sn) (mg/kg)		142	156	303	198	168	
Titanium (Ti) (mg/kg)		562	840	1120	706	744	
Tungsten (W) (mg/kg)		5.34	5.75	6.85	10.4	4.79	
Uranium (U) (mg/kg)		6.69	6.09	5.93	5.80	6.01	
Vanadium (V) (mg/kg)		57.8	65.1	56.1	57.6	56.3	
Zinc (Zn) (mg/kg)		3670	3800	4880	4050	3560	
Zirconium (Zr) (mg/kg)		1.2	1.6	1.9	1.4	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	L2157779-6 Soil 29-AUG-18 09:00 BA1835-A-6	L2157779-7 Soil 29-AUG-18 09:00 BA1835-A-7	L2157779-8 Soil 29-AUG-18 09:00 BA1835-A-8	L2157779-9 Soil 29-AUG-18 09:00 BA1835-A-9	L2157779-10 Soil 29-AUG-18 09:00 BA1835-A-10	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	17.8	16.8	16.9	18.1	16.6
	pH (1:2 soil:water) (pH)	11.29	11.30	11.43	11.33	11.23
Metals	Aluminum (Al) (mg/kg)	47600	29600	30800	48500	41700
	Antimony (Sb) (mg/kg)	113	113	114	114	123
	Arsenic (As) (mg/kg)	45.5	31.8	39.2	39.1	38.7
	Barium (Ba) (mg/kg)	550	605	596	573	579
	Beryllium (Be) (mg/kg)	0.36	0.40	0.43	0.40	0.47
	Bismuth (Bi) (mg/kg)	9.04	4.53	5.56	5.42	6.45
	Boron (B) (mg/kg)	255	345	398	240	331
	Cadmium (Cd) (mg/kg)	11.2	138	11.1	11.7	13.6
	Calcium (Ca) (mg/kg)	118000	119000	118000	113000	118000
	Chromium (Cr) (mg/kg)	168	209	156	174	142
	Cobalt (Co) (mg/kg)	47.6	76.7	60.6	26.2	23.9
	Copper (Cu) (mg/kg)	7550	1420	3020	1890	4090
	Iron (Fe) (mg/kg)	63600	90100	51000	52500	66400
	Lead (Pb) (mg/kg)	426	558	406	1460	1370
	Lithium (Li) (mg/kg)	20.6	17.5	22.7	19.5	20.8
	Magnesium (Mg) (mg/kg)	13200	12500	13500	13500	12700
	Manganese (Mn) (mg/kg)	1300	1050	653	1280	787
	Mercury (Hg) (mg/kg)	0.233	0.178	0.168	0.181	0.248
	Molybdenum (Mo) (mg/kg)	78.9	342	108	82.2	91.3
	Nickel (Ni) (mg/kg)	360	128	117	140	156
	Phosphorus (P) (mg/kg)	11500	10600	11100	10400	10600
	Potassium (K) (mg/kg)	5900	5250	5140	5390	5270
	Selenium (Se) (mg/kg)	0.43	0.29	0.33	0.35	0.40
	Silver (Ag) (mg/kg)	4.50	3.54	4.57	5.30	5.23
	Sodium (Na) (mg/kg)	15900	15300	15300	14800	15500
	Strontium (Sr) (mg/kg)	264	290	309	265	303
	Sulfur (S) (mg/kg)	14700	11800	12500	12700	13000
	Thallium (Tl) (mg/kg)	0.099	0.084	0.080	0.094	0.087
	Tin (Sn) (mg/kg)	210	88.5	110	135	241
	Titanium (Ti) (mg/kg)	1170	639	715	1160	1010
	Tungsten (W) (mg/kg)	6.07	5.26	6.06	6.23	6.41
	Uranium (U) (mg/kg)	6.23	5.39	5.27	5.47	5.97
	Vanadium (V) (mg/kg)	60.4	66.5	53.7	63.9	65.9
	Zinc (Zn) (mg/kg)	5430	4070	4630	5450	5670
	Zirconium (Zr) (mg/kg)	1.7	1.3	1.2	1.8	1.5

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2157779-11	L2157779-12	L2157779-13	L2157779-14	L2157779-15
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1835-A-11	BA1835-A-12	BA1835-A-8 REP 1	BA1835-A-8 REP 2	BA1835-A-8 REP 3
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		17.4	16.2			
	pH (1:2 soil:water) (pH)		11.31	11.29			
Metals	Aluminum (Al) (mg/kg)		35200	28500			
	Antimony (Sb) (mg/kg)		138	130			
	Arsenic (As) (mg/kg)		38.4	41.4			
	Barium (Ba) (mg/kg)		607	493			
	Beryllium (Be) (mg/kg)		0.46	0.39			
	Bismuth (Bi) (mg/kg)		7.13	6.68			
	Boron (B) (mg/kg)		417	270			
	Cadmium (Cd) (mg/kg)		12.4	12.6			
	Calcium (Ca) (mg/kg)		128000	127000			
	Chromium (Cr) (mg/kg)		185	183			
	Cobalt (Co) (mg/kg)		34.6	31.7			
	Copper (Cu) (mg/kg)		6710	1540			
	Iron (Fe) (mg/kg)		72000	62700			
	Lead (Pb) (mg/kg)		832	1480			
	Lithium (Li) (mg/kg)		20.8	16.8			
	Magnesium (Mg) (mg/kg)		13700	13200			
	Manganese (Mn) (mg/kg)		767	944			
	Mercury (Hg) (mg/kg)		0.250	0.173			
	Molybdenum (Mo) (mg/kg)		78.7	70.6			
	Nickel (Ni) (mg/kg)		120	115			
	Phosphorus (P) (mg/kg)		10500	11300			
	Potassium (K) (mg/kg)		5710	6000			
	Selenium (Se) (mg/kg)		0.56	0.32			
	Silver (Ag) (mg/kg)		20.0	4.93			
	Sodium (Na) (mg/kg)		16200	16400			
	Strontium (Sr) (mg/kg)		306	295			
	Sulfur (S) (mg/kg)		13700	15300			
	Thallium (Tl) (mg/kg)		0.100	0.093			
Tin (Sn) (mg/kg)		180	190				
Titanium (Ti) (mg/kg)		664	782				
Tungsten (W) (mg/kg)		6.41	5.40				
Uranium (U) (mg/kg)		6.04	6.51				
Vanadium (V) (mg/kg)		60.2	60.7				
Zinc (Zn) (mg/kg)		4580	4370				
Zirconium (Zr) (mg/kg)		1.3	1.0				

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID	Description	Sampled Date	Sampled Time	Client ID
		L2157779-16	Soil	29-AUG-18	09:00	BA1835-A-8 REP 4
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)					

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2157779-1	L2157779-2	L2157779-3	L2157779-4	L2157779-5
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1835-A-1	BA1835-A-2	BA1835-A-3	BA1835-A-4	BA1835-A-5
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.72	11.76	11.80	11.76	11.74
	2nd Preliminary pH (pH)		8.79	9.02	8.74	8.76	8.73
	Final pH (pH)		5.81	6.10	5.77	5.84	6.30
	Extraction Solution Initial pH (pH)		2.89	2.89	2.89	2.89	2.89
	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)		2.68	3.19	2.60	2.61	2.70
	Cadmium (Cd)-Leachable (mg/L)		0.182	0.619	0.163	0.180	0.211
	Calcium (Ca)-Leachable (mg/L)		1800	1880	1810	1830	1940
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.863	0.747	0.529	0.598	0.786
	Copper (Cu)-Leachable (mg/L)		1.32	1.35	1.82	1.41	0.936
	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)		169	173	160	172	183
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.61	0.63	0.55	0.44	1.19
	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)		71.1	39.6	56.1	70.3	38.3

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2157779-6	L2157779-7	L2157779-8	L2157779-9	L2157779-10
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1835-A-6	BA1835-A-7	BA1835-A-8	BA1835-A-9	BA1835-A-10
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.75	11.76	11.71	11.74	11.71
	2nd Preliminary pH (pH)		8.79	8.76	8.68	8.63	8.79
	Final pH (pH)		5.97	6.12	5.98	6.09	5.99
	Extraction Solution Initial pH (pH)		2.89	2.89	2.89	2.89	2.89
	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)		3.31	3.72	2.66	2.88	2.64
	Cadmium (Cd)-Leachable (mg/L)		0.181	0.195	0.706	0.212	0.170
	Calcium (Ca)-Leachable (mg/L)		1870	1890	1850	1940	1860
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		1.12	0.770	0.766	0.630	0.551
	Copper (Cu)-Leachable (mg/L)		1.43	1.16	1.22	1.25	1.68
	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	0.35
	Magnesium (Mg)-Leachable (mg/L)		173	184	162	180	173
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.52	0.61	0.44	0.60	0.51
	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)		37.5	32.1	54.2	40.2	37.2

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2157779-11	L2157779-12	L2157779-13	L2157779-14	L2157779-15
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18	29-AUG-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1835-A-11	BA1835-A-12	BA1835-A-8 REP 1	BA1835-A-8 REP 2	BA1835-A-8 REP 3
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.75	11.75	11.71	11.71	11.71
	2nd Preliminary pH (pH)		8.72	9.60	8.68	8.68	8.68
	Final pH (pH)		6.24	5.82	6.50	6.44	6.76
	Extraction Solution Initial pH (pH)		2.89	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)		3.33	2.62			
	Cadmium (Cd)-Leachable (mg/L)		0.211	0.233	0.376	0.163	0.159
	Calcium (Ca)-Leachable (mg/L)		1940	1780			
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25			
	Cobalt (Co)-Leachable (mg/L)		0.354	0.590			
	Copper (Cu)-Leachable (mg/L)		0.654	1.98			
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0			
	Lead (Pb)-Leachable (mg/L)		<0.25	<0.25			
	Magnesium (Mg)-Leachable (mg/L)		178	165			
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010			
	Nickel (Ni)-Leachable (mg/L)		0.42	0.92			
	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)		44.9	48.1			

* 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	L2157779-16 Soil 29-AUG-18 09:00 BA1835-A-8 REP 4			
Grouping	Analyte				
SOIL					
TCLP Metals	1st Preliminary pH (pH)	11.71			
	2nd Preliminary pH (pH)	8.68			
	Final pH (pH)	6.27			
	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)	0.267			
	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	Copper (Cu)	DUP-H	L2157779-1, -12, -2, -3, -4, -5, -6
Duplicate	Iron (Fe)	DUP-H	L2157779-1, -12, -2, -3, -4, -5, -6
Duplicate	Nickel (Ni)	DUP-H	L2157779-1, -12, -2, -3, -4, -5, -6
Duplicate	Strontium (Sr)	DUP-H	L2157779-1, -12, -2, -3, -4, -5, -6
Duplicate	Tungsten (W)	DUP-H	L2157779-1, -12, -2, -3, -4, -5, -6
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2157779-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2157779-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2157779-1, -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**
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.



L2157779-COFC

COC # _____

Page ____ of ____

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)				<input type="checkbox"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT <input type="checkbox"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT <input type="checkbox"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT							
Contact: Steve McKinney / Dan Skrypnyk				<input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax											
Address: 5150 Riverbend Drive				Email 1: smckinney@covanta.com											
Burnaby BC				Email 2: rjohnson4@covanta.com											
Phone: 604-521-1025				Email 3: dskrypnyk@covanta.com											
<input type="checkbox"/> Yes <input type="checkbox"/> No				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:				ALS Contact:											
Fax:				Sampler:											

Lab Work Order # (lab use only)		ALS Contact:			Sampler:			MET-TCLP-VA (all metals, Hg)		MOISTURE		Chrome 6		MET-CSR+FULL-VA (all metals)		Number of Containers	
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type													
BA1835-A-1		29-Aug-18	9:00	Soil	X	X			X						1		
BA1835-A-2		29-Aug-18	9:00	Soil	X	X			X						1		
BA1835-A-3		29-Aug-18	9:00	Soil	X	X			X						1		
BA1835-A-4		29-Aug-18	9:00	Soil	X	X			X						1		
BA1835-A-5		29-Aug-18	9:00	Soil	X	X			X						1		
BA1835-A-6		29-Aug-18	9:00	Soil	X	X			X						1		
BA1835-A-7		29-Aug-18	9:00	Soil	X	X			X						1		
BA1835-A-8		29-Aug-18	9:00	Soil	X	X			X						1		
BA1835-A-9		29-Aug-18	9:00	Soil	X	X			X						1		
BA1835-A-10		29-Aug-18	9:00	Soil	X	X			X						1		
BA1835-A-11		29-Aug-18	9:00	Soil	X	X			X						1		
BA1835-A-12		29-Aug-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: <i>[Signature]</i>	Date (dd-mmm-yy): 4 Sep 18	Time (hh-mm): 08:00	Received by: <i>RK</i>	Date: 04 Sep 18	Time: 11:38	Temperature: 21, 22°C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF