

Bottom Ash Data

2018 Week 46

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on December 4, 2018. The data represents bottom ash composite results for week 46 of 2018 (November 11, 2018 to November 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
ATTN: Steve McKinney
5150 Riverbend Drive
Burnaby BC V3N 4V3

Date Received: 21-NOV-18
Report Date: 03-DEC-18 18:25 (MT)
Version: FINAL

Client Phone: 604-521-1025

Certificate of Analysis

Lab Work Order #: L2200030
Project P.O. #: VANCO-0000047506
Job Reference: WEEKLY BOTTOM ASH - SUITE (INCLUDES 2:1
PH)
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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ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2200030-1	L2200030-2	L2200030-3	L2200030-4	L2200030-5
		Description	soil	soil	soil	soil	soil
		Sampled Date	14-NOV-18	14-NOV-18	14-NOV-18	14-NOV-18	14-NOV-18
		Sampled Time	21:00	21:00	21:00	21:00	21:00
		Client ID	BA1846-A-1	BA1846-A-2	BA1846-A-3	BA1846-A-4	BA1846-A-5
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		17.5	17.4	18.9	17.5	18.1
	pH (1:2 soil:water) (pH)		11.78	11.67	11.75	11.89	11.85
Metals	Aluminum (Al) (mg/kg)		43400	31100	38600	29900	31600
	Antimony (Sb) (mg/kg)		135	137	274	121	135
	Arsenic (As) (mg/kg)		44.7	36.6	41.8	33.1	31.1
	Barium (Ba) (mg/kg)		552	461	489	470	500
	Beryllium (Be) (mg/kg)		0.46	0.43	0.45	0.41	0.42
	Bismuth (Bi) (mg/kg)		12.7	12.6	19.9	9.72	11.9
	Boron (B) (mg/kg)		597	421	382	293	313
	Cadmium (Cd) (mg/kg)		10.3	11.8	12.1	10.5	10.7
	Calcium (Ca) (mg/kg)		138000	142000	136000	138000	139000
	Chromium (Cr) (mg/kg)		203	172	148	136	216
	Cobalt (Co) (mg/kg)		23.2	41.9	25.8	70.5	26.5
	Copper (Cu) (mg/kg)		3910	28500	3520	1860	16200
	Iron (Fe) (mg/kg)		51600	46000	46500	54500	66300
	Lead (Pb) (mg/kg)		1110	999	10800	1650	455
	Lithium (Li) (mg/kg)		17.2	20.1	26.2	22.5	16.8
	Magnesium (Mg) (mg/kg)		10800	11100	11300	12900	11600
	Manganese (Mn) (mg/kg)		707	685	927	783	697
	Mercury (Hg) (mg/kg)		<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)		23.8	36.8	27.5	27.6	40.8
	Nickel (Ni) (mg/kg)		159	127	122	95.6	546
	Phosphorus (P) (mg/kg)		12700	10300	10100	8530	9490
	Potassium (K) (mg/kg)		4880	5100	5300	4500	4730
	Selenium (Se) (mg/kg)		0.36	0.35	0.33	0.33	0.40
	Silver (Ag) (mg/kg)		3.45	4.49	4.48	8.95	4.30
	Sodium (Na) (mg/kg)		14400	14000	15600	14400	13700
	Strontium (Sr) (mg/kg)		322	314	331	313	333
Sulfur (S) (mg/kg)		13500	15100	14300	13300	14000	
Thallium (Tl) (mg/kg)		0.090	0.077	0.114	0.072	0.074	
Tin (Sn) (mg/kg)		111	143	485	120	116	
Titanium (Ti) (mg/kg)		917	601	620	315	440	
Tungsten (W) (mg/kg)		80.9	7.48	7.32	5.02	5.19	
Uranium (U) (mg/kg)		5.32	5.95	6.00	5.44	5.24	
Vanadium (V) (mg/kg)		55.4	55.9	57.1	55.3	59.4	
Zinc (Zn) (mg/kg)		3520	4710	3660	3570	8110	
Zirconium (Zr) (mg/kg)		1.2	<1.0	1.1	<1.0	<1.0	

* 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	L2200030-6 soil 14-NOV-18 21:00 BA1846-A-6	L2200030-7 soil 14-NOV-18 21:00 BA1846-A-7	L2200030-8 soil 14-NOV-18 21:00 BA1846-A-8	L2200030-9 soil 14-NOV-18 21:00 BA1846-A-9	L2200030-10 soil 14-NOV-18 21:00 BA1846-A-10	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	17.9	19.1	17.1	17.6	17.9
	pH (1:2 soil:water) (pH)	11.95	11.73	11.79	11.82	11.66
Metals	Aluminum (Al) (mg/kg)	40700	29900	38300	38000	32500
	Antimony (Sb) (mg/kg)	125	121	121	126	123
	Arsenic (As) (mg/kg)	30.5	31.0	32.8	57.4	31.2
	Barium (Ba) (mg/kg)	500	572	476	529	493
	Beryllium (Be) (mg/kg)	0.48	0.40	0.41	0.44	0.44
	Bismuth (Bi) (mg/kg)	22.5	10.0	11.0	9.78	10.9
	Boron (B) (mg/kg)	271	326	318	437	407
	Cadmium (Cd) (mg/kg)	9.93	147	113	9.65	12.5
	Calcium (Ca) (mg/kg)	139000	130000	132000	135000	139000
	Chromium (Cr) (mg/kg)	170	183	234	150	141
	Cobalt (Co) (mg/kg)	20.5	171	164	94.7	36.5
	Copper (Cu) (mg/kg)	3750	16000	4210	3250	4940
	Iron (Fe) (mg/kg)	53900	61900	59900	61100	61100
	Lead (Pb) (mg/kg)	844	1140	430	533	432
	Lithium (Li) (mg/kg)	16.4	28.1	18.4	17.6	16.9
	Magnesium (Mg) (mg/kg)	11200	11200	11300	11500	10600
	Manganese (Mn) (mg/kg)	675	908	765	861	1020
	Mercury (Hg) (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	23.0	23.0	28.9	28.0	27.6
	Nickel (Ni) (mg/kg)	129	139	1260	142	95.3
	Phosphorus (P) (mg/kg)	10700	10900	9540	9870	9710
	Potassium (K) (mg/kg)	4940	4600	4560	4760	5170
	Selenium (Se) (mg/kg)	0.31	0.35	0.32	0.26	0.38
	Silver (Ag) (mg/kg)	4.39	4.39	4.15	3.93	3.52
	Sodium (Na) (mg/kg)	14500	13500	13400	15000	15200
	Strontium (Sr) (mg/kg)	300	314	325	331	321
	Sulfur (S) (mg/kg)	14200	11900	12700	12400	13400
	Thallium (Tl) (mg/kg)	0.076	0.069	0.064	0.083	0.070
	Tin (Sn) (mg/kg)	309	416	139	134	112
	Titanium (Ti) (mg/kg)	538	560	494	715	552
	Tungsten (W) (mg/kg)	11.6	6.34	4.61	5.41	8.01
	Uranium (U) (mg/kg)	5.53	5.24	4.92	5.44	5.66
	Vanadium (V) (mg/kg)	55.4	60.0	54.0	64.3	54.0
	Zinc (Zn) (mg/kg)	4910	3840	3990	3310	6890
	Zirconium (Zr) (mg/kg)	1.0	1.0	1.7	1.2	1.1

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2200030-11 soil 14-NOV-18 21:00 BA1846-A-11	L2200030-12 soil 14-NOV-18 21:00 BA1846-A-12	L2200030-13 soil 14-NOV-18 21:00 BA1846-A-1 REP 1	L2200030-14 soil 14-NOV-18 21:00 BA1846-A-1 REP 2	L2200030-15 soil 14-NOV-18 21:00 BA1846-A-1 REP 3
Grouping	Analyte				
SOIL					
Physical Tests	Moisture (%)	17.5	17.0		
	pH (1:2 soil:water) (pH)	11.78	11.66		
Metals	Aluminum (Al) (mg/kg)	29600	35500		
	Antimony (Sb) (mg/kg)	155	113		
	Arsenic (As) (mg/kg)	32.0	32.5		
	Barium (Ba) (mg/kg)	505	564		
	Beryllium (Be) (mg/kg)	0.40	0.58		
	Bismuth (Bi) (mg/kg)	19.8	18.4		
	Boron (B) (mg/kg)	475	380		
	Cadmium (Cd) (mg/kg)	10.7	10.3		
	Calcium (Ca) (mg/kg)	136000	139000		
	Chromium (Cr) (mg/kg)	138	151		
	Cobalt (Co) (mg/kg)	77.0	23.0		
	Copper (Cu) (mg/kg)	5520	3170		
	Iron (Fe) (mg/kg)	49300	73900		
	Lead (Pb) (mg/kg)	521	456		
	Lithium (Li) (mg/kg)	23.5	16.8		
	Magnesium (Mg) (mg/kg)	10700	10800		
	Manganese (Mn) (mg/kg)	706	765		
	Mercury (Hg) (mg/kg)	<0.050	<0.050		
	Molybdenum (Mo) (mg/kg)	46.2	24.7		
	Nickel (Ni) (mg/kg)	103	383		
	Phosphorus (P) (mg/kg)	9530	8640		
	Potassium (K) (mg/kg)	4920	4790		
	Selenium (Se) (mg/kg)	0.33	0.27		
	Silver (Ag) (mg/kg)	6.42	3.70		
	Sodium (Na) (mg/kg)	14400	15400		
	Strontium (Sr) (mg/kg)	330	304		
	Sulfur (S) (mg/kg)	14200	12400		
	Thallium (Tl) (mg/kg)	0.074	0.068		
	Tin (Sn) (mg/kg)	128	134		
	Titanium (Ti) (mg/kg)	551	673		
	Tungsten (W) (mg/kg)	9.54	4.78		
	Uranium (U) (mg/kg)	5.38	5.39		
	Vanadium (V) (mg/kg)	54.2	56.8		
	Zinc (Zn) (mg/kg)	4320	7180		
	Zirconium (Zr) (mg/kg)	<1.0	1.0		

* 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	L2200030-16 soil 14-NOV-18 21:00 BA1846-A-1 REP 4	L2200030-17 soil 14-NOV-18 21:00 BA1846-A-9 REP 1	L2200030-18 soil 14-NOV-18 21:00 BA1846-A-9 REP 2	L2200030-19 soil 14-NOV-18 21:00 BA1846-A-9 REP 3	L2200030-20 soil 14-NOV-18 21:00 BA1846-A-9 REP 4
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)				

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2200030-1	L2200030-2	L2200030-3	L2200030-4	L2200030-5
		Description	soil	soil	soil	soil	soil
		Sampled Date	14-NOV-18	14-NOV-18	14-NOV-18	14-NOV-18	14-NOV-18
		Sampled Time	21:00	21:00	21:00	21:00	21:00
		Client ID	BA1846-A-1	BA1846-A-2	BA1846-A-3	BA1846-A-4	BA1846-A-5
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.69	11.68	11.77	11.72	11.65
	2nd Preliminary pH (pH)		8.86	8.61	8.60	8.87	9.37
	Final pH (pH)		6.02	6.06	6.12	6.11	6.36
	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)		4.48	6.57	4.85	4.77	4.69
	Cadmium (Cd)-Leachable (mg/L)		1.11	0.151	0.137	0.146	0.135
	Calcium (Ca)-Leachable (mg/L)		1910	2010	2010	2020	2090
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.278	0.328	0.430	0.490	0.315
	Copper (Cu)-Leachable (mg/L)		0.565	0.694	0.280	0.849	1.11
	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	0.28	<0.25
	Magnesium (Mg)-Leachable (mg/L)		121	123	124	126	131
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.52	1.22	0.53	0.48	0.49
	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)		32.5	51.1	60.8	34.6	26.8

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2200030-6	L2200030-7	L2200030-8	L2200030-9	L2200030-10
		Description	soil	soil	soil	soil	soil
		Sampled Date	14-NOV-18	14-NOV-18	14-NOV-18	14-NOV-18	14-NOV-18
		Sampled Time	21:00	21:00	21:00	21:00	21:00
		Client ID	BA1846-A-6	BA1846-A-7	BA1846-A-8	BA1846-A-9	BA1846-A-10
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.59	11.69	11.79	11.54	11.84
	2nd Preliminary pH (pH)		8.67	9.00	8.93	8.64	9.13
	Final pH (pH)		6.28	6.06	6.27	6.03	5.87
	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)		4.44	4.48	4.50	4.51	4.50
	Cadmium (Cd)-Leachable (mg/L)		0.149	0.272	0.135	1.56	0.180
	Calcium (Ca)-Leachable (mg/L)		2010	1940	1990	1980	1920
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.747	0.363	0.331	0.617	0.499
	Copper (Cu)-Leachable (mg/L)		0.783	1.63	0.976	1.18	1.17
	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)		124	121	123	127	120
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.41	0.48	0.38	0.86	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)		29.4	42.7	26.8	33.2	28.1

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2200030-11	L2200030-12	L2200030-13	L2200030-14	L2200030-15
		Description	soil	soil	soil	soil	soil
		Sampled Date	14-NOV-18	14-NOV-18	14-NOV-18	14-NOV-18	14-NOV-18
		Sampled Time	21:00	21:00	21:00	21:00	21:00
		Client ID	BA1846-A-11	BA1846-A-12	BA1846-A-1 REP 1	BA1846-A-1 REP 2	BA1846-A-1 REP 3
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.64	11.71	11.69	11.69	11.69
	2nd Preliminary pH (pH)		9.37	8.88	8.86	8.86	8.86
	Final pH (pH)		6.12	5.79	6.28	6.14	6.01
	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)		5.20	4.10			
	Cadmium (Cd)-Leachable (mg/L)		0.153	0.185	0.151	0.142	0.216
	Calcium (Ca)-Leachable (mg/L)		2090	1940			
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25			
	Cobalt (Co)-Leachable (mg/L)		0.660	0.326			
	Copper (Cu)-Leachable (mg/L)		0.961	1.26			
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0			
	Lead (Pb)-Leachable (mg/L)		<0.25	<0.25			
	Magnesium (Mg)-Leachable (mg/L)		131	121			
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010			
	Nickel (Ni)-Leachable (mg/L)		0.45	0.59			
	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)		37.3	37.5			

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2200030-16	L2200030-17	L2200030-18	L2200030-19	L2200030-20
		Description	soil	soil	soil	soil	soil
		Sampled Date	14-NOV-18	14-NOV-18	14-NOV-18	14-NOV-18	14-NOV-18
		Sampled Time	21:00	21:00	21:00	21:00	21:00
		Client ID	BA1846-A-1 REP 4	BA1846-A-9 REP 1	BA1846-A-9 REP 2	BA1846-A-9 REP 3	BA1846-A-9 REP 4
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.69	11.54	11.54	11.54	11.54
	2nd Preliminary pH (pH)		8.86	8.64	8.64	8.64	8.64
	Final pH (pH)		6.17	6.22	6.32	6.26	6.40
	Extraction Solution Initial pH (pH)		2.89	2.89	2.89	2.89	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)		0.220	0.130	0.152	0.160	0.171
	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)
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2200030-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2200030-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2200030-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
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
		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.	
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, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H ₂ S) 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	CCME PHC in Soil - Tier 1 (mod)
		This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of two hours.	
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.



Cr



L2200030-COFC

COC #

Page ___ of ___

Report To		Report		Service Requested (Rush for routine analysis subject to availability)	
Company: Covanta Energy		<input type="checkbox"/> Standard		<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)	
Contact: Steve McKinney / Dan Skrypnik		<input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax		<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT	
Address: 5150 Riverbend Drive Burnaby BC		Email 1: smckinney@covanta.com		<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT	
Phone: 604-521-1025		Email 2: rjohnson4@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
Fax: <input type="checkbox"/> Yes <input type="checkbox"/> No		Email 3: dskrypnik@covanta.com		Analysis Request	
		brent.kirkpatrick@metrovancover.org			
		Sarah.Wellman@metrovancover.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 #:		MET-TCLP-VA (all metals, Hg)	MOISTURE	Chromium 6	MET-CSR+FULL-VA (all metals)			Number of Containers
Company:		PO / AFE: PO# 46693 Weekly Bottom Ash - Suite								
Contact:		LSD: (Includes 2:1 pH)								
Address:		Quote #:								
Phone:		ALS Contact:								
Lab Work Order # (lab use only)		Sampler:								

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	Chromium 6	MET-CSR+FULL-VA (all metals)			Number of Containers
BA1846-A-1		14-Nov-18	9:00	Soil	X	X		X			1
BA1846-A-2		14-Nov-18	9:00	Soil	X	X		X			1
BA1846-A-3		14-Nov-18	9:00	Soil	X	X		X			1
BA1846-A-4		14-Nov-18	9:00	Soil	X	X		X			1
BA1846-A-5		14-Nov-18	9:00	Soil	X	X		X			1
BA1846-A-6		14-Nov-18	9:00	Soil	X	X		X			1
BA1846-A-7		14-Nov-18	9:00	Soil	X	X		X			1
BA1846-A-8		14-Nov-18	9:00	Soil	X	X		X			1
BA1846-A-9		14-Nov-18	9:00	Soil	X	X		X			1
BA1846-A-10		14-Nov-18	9:00	Soil	X	X		X			1
BA1846-A-11		14-Nov-18	9:00	Soil	X	X		X			1
BA1846-A-12		14-Nov-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)	Time (hh:mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
<i>[Signature]</i>	21-Nov-18	08:00	HA	11/21	1120P	20°C				



Cr



L2200030-COFC

COC #

Page ___ of ___

Report To		Report		Service Requested (Rush for routine analysis subject to availability)		
Company:	Covanta Energy	<input type="checkbox"/> Standard	<input checked="" type="checkbox"/> Regular (Standard Turnaround Times - Business Days)			
Contact:	Steve McKinney / Dan Skrypnik	<input checked="" type="checkbox"/> PDF	<input type="checkbox"/> Excel	<input type="checkbox"/> Digital	<input type="checkbox"/> Fax	
Address:	5150 Riverbend Drive Burnaby BC	Email 1:	smckinney@covanta.com		<input type="checkbox"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT	
Phone:	604-521-1025	Email 2:	rjohnson4@covanta.com		<input type="checkbox"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT	
	<input type="checkbox"/> Yes <input type="checkbox"/> No	Email 3:	dskrypnik@covanta.com		<input type="checkbox"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
			brent.kirkpatrick@metrovancover.org		Analysis Request	
			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:							

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Analysis Request				Number of Containers
					MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)	
BA1846-A-1		14-Nov-18	9:00	Soil	X	X		X	1
BA1846-A-2		14-Nov-18	9:00	Soil	X	X		X	1
BA1846-A-3		14-Nov-18	9:00	Soil	X	X		X	1
BA1846-A-4		14-Nov-18	9:00	Soil	X	X		X	1
BA1846-A-5		14-Nov-18	9:00	Soil	X	X		X	1
BA1846-A-6		14-Nov-18	9:00	Soil	X	X		X	1
BA1846-A-7		14-Nov-18	9:00	Soil	X	X		X	1
BA1846-A-8		14-Nov-18	9:00	Soil	X	X		X	1
BA1846-A-9		14-Nov-18	9:00	Soil	X	X		X	1
BA1846-A-10		14-Nov-18	9:00	Soil	X	X		X	1
BA1846-A-11		14-Nov-18	9:00	Soil	X	X		X	1
BA1846-A-12		14-Nov-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)	Time (hh:mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations:
<i>[Signature]</i>	21-Nov-18	08:00	HA	11/21	1120P	20°C				Yes / No ? If Yes add SIF