

Bottom Ash Data

2019 Week 40

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on October 24, 2019. The data represents bottom ash composite results for week 40 of 2019 (September 29, 2019 to October 5, 2019).

The bottom ash meets the requirements of Metro Vancouver's Bottom Ash Management Plan and is suitable for disposal.



Covanta Burnaby R.E., ULC
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Date Received: 08-OCT-19
Report Date: 24-OCT-19 13:14 (MT)
Version: FINAL

Client Phone: 604-521-1025

Certificate of Analysis

Lab Work Order #: L2361764
Project P.O. #: VANCO-0000048466
Job Reference:
C of C Numbers:
Legal Site Desc:

Comments:

As per client request, certain samples were re-prepped from scratch and analyzed for TCLP Metals (TCLP Cd) in varying replicate amounts. Results are reported as samples #13-16, and have "REP" in the Client Sample ID field. Fluid determination was not performed for samples #13-16, as per client instructions. The prep data was taken from the original samples but is reported with the re-prepped samples for informational purposes.

Brent Mack, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2361764-1 Soil 02-OCT-19 09:00 BA1940-A-1	L2361764-2 Soil 02-OCT-19 09:00 BA1940-A-2	L2361764-3 Soil 02-OCT-19 09:00 BA1940-A-3	L2361764-4 Soil 02-OCT-19 09:00 BA1940-A-4	L2361764-5 Soil 02-OCT-19 09:00 BA1940-A-5
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	19.0	19.5	18.7	19.9	21.1
	pH (1:2 soil:water) (pH)	10.84	10.88	11.31	11.44	11.30
Metals	Aluminum (Al) (mg/kg)	37800	40000	29800	29000	32200
	Antimony (Sb) (mg/kg)	112	155	108	103	150
	Arsenic (As) (mg/kg)	28.1	30.6	24.4	21.9	23.3
	Barium (Ba) (mg/kg)	588	693	499	470	474
	Beryllium (Be) (mg/kg)	0.38	0.41	0.35	0.34	0.32
	Bismuth (Bi) (mg/kg)	5.87	7.21	7.29	6.47	8.85
	Boron (B) (mg/kg)	445	322	214	262	291
	Cadmium (Cd) (mg/kg)	12.2	12.4	11.0	14.5	34.0
	Calcium (Ca) (mg/kg)	135000	137000	106000	106000	107000
	Chromium (Cr) (mg/kg)	146	222	366	132	140
	Cobalt (Co) (mg/kg)	48.2	634	28.3	56.0	26.7
	Copper (Cu) (mg/kg)	3470	8550	4750	6690	7770
	Iron (Fe) (mg/kg)	53900	54100	50600	53800	45400
	Lead (Pb) (mg/kg)	554	445	627	689	1050
	Lithium (Li) (mg/kg)	19.3	40.8	18.1	18.9	17.0
	Magnesium (Mg) (mg/kg)	11400	12400	9040	8730	9600
	Manganese (Mn) (mg/kg)	906	986	718	621	579
	Mercury (Hg) (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	76.1	59.6	65.6	196	64.4
	Nickel (Ni) (mg/kg)	129	152	305	484	129
	Phosphorus (P) (mg/kg)	8800	9880	8260	8230	8910
	Potassium (K) (mg/kg)	5370	5600	5040	4710	4950
	Selenium (Se) (mg/kg)	0.34	0.39	0.45	0.45	0.46
	Silver (Ag) (mg/kg)	6.55	5.35	4.13	5.44	9.05
	Sodium (Na) (mg/kg)	16200	17200	12300	12500	13100
	Strontium (Sr) (mg/kg)	302	322	261	246	253
	Sulfur (S) (mg/kg)	11300	13000	10300	10900	10800
Thallium (Tl) (mg/kg)	<0.050	0.067	0.053	0.054	0.051	
Tin (Sn) (mg/kg)	122	123	110	127	412	
Titanium (Ti) (mg/kg)	648	869	540	547	528	
Tungsten (W) (mg/kg)	8.96	9.01	5.62	5.12	8.29	
Uranium (U) (mg/kg)	4.60	4.82	4.32	4.12	4.35	
Vanadium (V) (mg/kg)	58.3	60.0	56.7	49.5	63.8	
Zinc (Zn) (mg/kg)	4470	4920	4350	8050	3230	
Zirconium (Zr) (mg/kg)	1.5	1.6	1.4	1.2	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	L2361764-6 Soil 02-OCT-19 09:00 BA1940-A-6	L2361764-7 Soil 02-OCT-19 09:00 BA1940-A-7	L2361764-8 Soil 02-OCT-19 09:00 BA1940-A-8	L2361764-9 Soil 02-OCT-19 09:00 BA1940-A-9	L2361764-10 Soil 02-OCT-19 09:00 BA1940-A-10	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	20.9	20.3	20.5	19.3	18.7
	pH (1:2 soil:water) (pH)	11.46	11.30	11.28	11.30	11.31
Metals	Aluminum (Al) (mg/kg)	28200	30400	33700	36000	29800
	Antimony (Sb) (mg/kg)	110	101	107	105	108
	Arsenic (As) (mg/kg)	26.4	23.6	30.8	30.7	24.0
	Barium (Ba) (mg/kg)	468	522	486	423	417
	Beryllium (Be) (mg/kg)	0.35	0.33	0.34	0.35	0.34
	Bismuth (Bi) (mg/kg)	8.76	6.12	6.49	12.8	5.98
	Boron (B) (mg/kg)	240	353	231	217	204
	Cadmium (Cd) (mg/kg)	12.5	13.0	13.4	13.2	20.7
	Calcium (Ca) (mg/kg)	107000	98800	112000	109000	103000
	Chromium (Cr) (mg/kg)	333	149	2460	167	148
	Cobalt (Co) (mg/kg)	85.7	25.0	54.9	67.3	34.4
	Copper (Cu) (mg/kg)	4170	1690	10700	1880	4780
	Iron (Fe) (mg/kg)	52900	72200	60300	47600	51300
	Lead (Pb) (mg/kg)	1600	752	384	680	686
	Lithium (Li) (mg/kg)	21.8	17.2	26.7	19.9	17.2
	Magnesium (Mg) (mg/kg)	10000	8890	10200	9120	8490
	Manganese (Mn) (mg/kg)	891	817	916	711	840
	Mercury (Hg) (mg/kg)	<0.050	0.122	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	71.9	91.4	99.6	60.8	70.7
	Nickel (Ni) (mg/kg)	278	213	1620	173	167
	Phosphorus (P) (mg/kg)	8760	8270	9840	8460	9360
	Potassium (K) (mg/kg)	5020	4640	4940	4980	4640
	Selenium (Se) (mg/kg)	0.37	0.37	0.49	0.43	0.57
	Silver (Ag) (mg/kg)	5.19	4.11	7.10	3.94	4.69
	Sodium (Na) (mg/kg)	13300	12500	13100	13300	12400
	Strontium (Sr) (mg/kg)	230	245	254	278	226
	Sulfur (S) (mg/kg)	10500	10400	12500	11200	10300
	Thallium (Tl) (mg/kg)	<0.050	<0.050	0.079	0.056	0.057
	Tin (Sn) (mg/kg)	228	1280	112	89.6	103
	Titanium (Ti) (mg/kg)	476	662	675	691	318
	Tungsten (W) (mg/kg)	5.91	4.71	9.06	4.36	4.23
	Uranium (U) (mg/kg)	4.06	4.18	4.70	4.10	4.12
	Vanadium (V) (mg/kg)	48.7	63.1	67.8	51.8	53.1
	Zinc (Zn) (mg/kg)	4490	3320	5810	3440	3830
	Zirconium (Zr) (mg/kg)	1.3	1.2	1.6	2.8	1.6

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2361764-11	L2361764-12	L2361764-13	L2361764-14	L2361764-15
		Description	Soil	Soil			
		Sampled Date	02-OCT-19	02-OCT-19			
		Sampled Time	09:00	09:00			
		Client ID	BA1940-A-11	BA1940-A-12	BA1940-A-11 REP 1	BA1940-A-11 REP 2	BA1940-A-11 REP 3
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		20.9	19.5			
	pH (1:2 soil:water) (pH)		11.50	11.37			
Metals	Aluminum (Al) (mg/kg)		26200	35500			
	Antimony (Sb) (mg/kg)		104	116			
	Arsenic (As) (mg/kg)		33.4	27.1			
	Barium (Ba) (mg/kg)		538	471			
	Beryllium (Be) (mg/kg)		0.32	0.32			
	Bismuth (Bi) (mg/kg)		13.7	6.42			
	Boron (B) (mg/kg)		200	217			
	Cadmium (Cd) (mg/kg)		10.7	12.6			
	Calcium (Ca) (mg/kg)		101000	110000			
	Chromium (Cr) (mg/kg)		142	143			
	Cobalt (Co) (mg/kg)		111	25.0			
	Copper (Cu) (mg/kg)		2980	4340			
	Iron (Fe) (mg/kg)		67200	56400			
	Lead (Pb) (mg/kg)		403	632			
	Lithium (Li) (mg/kg)		17.3	25.6			
	Magnesium (Mg) (mg/kg)		9360	9330			
	Manganese (Mn) (mg/kg)		825	640			
	Mercury (Hg) (mg/kg)		0.287	0.081			
	Molybdenum (Mo) (mg/kg)		50.6	63.2			
	Nickel (Ni) (mg/kg)		266	140			
	Phosphorus (P) (mg/kg)		8470	9430			
	Potassium (K) (mg/kg)		4560	4710			
	Selenium (Se) (mg/kg)		0.36	0.39			
	Silver (Ag) (mg/kg)		3.40	4.34			
	Sodium (Na) (mg/kg)		11700	12800			
	Strontium (Sr) (mg/kg)		225	251			
	Sulfur (S) (mg/kg)		10200	11600			
	Thallium (Tl) (mg/kg)		0.051	0.057			
	Tin (Sn) (mg/kg)		109	97.0			
	Titanium (Ti) (mg/kg)		1010	560			
	Tungsten (W) (mg/kg)		5.81	5.18			
	Uranium (U) (mg/kg)		4.04	4.28			
Vanadium (V) (mg/kg)		47.7	52.5				
Zinc (Zn) (mg/kg)		3580	6420				
Zirconium (Zr) (mg/kg)		1.2	1.8				

* 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				
	L2361764-16				
	BA1940-A-11 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)				

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2361764-1	L2361764-2	L2361764-3	L2361764-4	L2361764-5
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	02-OCT-19	02-OCT-19	02-OCT-19	02-OCT-19	02-OCT-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1940-A-1	BA1940-A-2	BA1940-A-3	BA1940-A-4	BA1940-A-5
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.56	11.50	11.60	11.49	11.59
	2nd Preliminary pH (pH)		8.65	8.91	8.69	8.87	8.64
	Final pH (pH)		6.24	6.31	6.25	6.19	6.45
	Extraction Solution Initial pH (pH)		2.86	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)		2.82	2.59	2.58	2.62	2.59
	Cadmium (Cd)-Leachable (mg/L)		0.196	0.183	0.256	0.217	0.239
	Calcium (Ca)-Leachable (mg/L)		1800	1760	1800	1720	1830
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		1.77	9.63	0.405	0.614	0.456
	Copper (Cu)-Leachable (mg/L)		0.914	1.17	0.554	1.04	0.926
	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)		110	111	108	103	105
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.86	0.51	0.52	0.61	0.56
	Selenium (Se)-Leachable (mg/L)		<0.10	<0.10	<0.10	<0.10	<0.10
	Silver (Ag)-Leachable (mg/L)		<0.050	<0.050	<0.050	<0.050	<0.050
	Thallium (Tl)-Leachable (mg/L)		<1.0	<1.0	<1.0	<1.0	<1.0
	Vanadium (V)-Leachable (mg/L)		<0.15	<0.15	<0.15	<0.15	<0.15
	Zinc (Zn)-Leachable (mg/L)		38.9	36.5	37.6	32.6	130

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2361764-6	L2361764-7	L2361764-8	L2361764-9	L2361764-10
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	02-OCT-19	02-OCT-19	02-OCT-19	02-OCT-19	02-OCT-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1940-A-6	BA1940-A-7	BA1940-A-8	BA1940-A-9	BA1940-A-10
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.63	11.67	11.61	11.56	11.62
	2nd Preliminary pH (pH)		9.04	9.22	9.10	9.09	8.78
	Final pH (pH)		6.45	6.37	6.34	6.23	6.22
	Extraction Solution Initial pH (pH)		2.86	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)		3.74	3.07	2.70	2.65	3.04
	Cadmium (Cd)-Leachable (mg/L)		0.193	0.164	0.175	0.200	0.208
	Calcium (Ca)-Leachable (mg/L)		1910	1880	1810	1760	1830
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.611	0.715	0.531	0.517	1.19
	Copper (Cu)-Leachable (mg/L)		0.792	0.822	0.775	0.810	0.716
	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)		109	109	104	104	107
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.53	1.01	0.42	0.57	0.43
	Selenium (Se)-Leachable (mg/L)		<0.10	<0.10	<0.10	<0.10	<0.10
	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)		61.8	26.0	51.3	32.6	32.5

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2361764-11	L2361764-12	L2361764-13	L2361764-14	L2361764-15
		Description	Soil	Soil			
		Sampled Date	02-OCT-19	02-OCT-19			
		Sampled Time	09:00	09:00			
		Client ID	BA1940-A-11	BA1940-A-12	BA1940-A-11 REP 1	BA1940-A-11 REP 2	BA1940-A-11 REP 3
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.61	11.67	11.57	11.57	11.57
	2nd Preliminary pH (pH)		8.70	8.68	8.82	8.82	8.82
	Final pH (pH)		6.10	6.24	6.39	6.41	6.26
	Extraction Solution Initial pH (pH)		2.86	2.86	2.90	2.90	2.90
	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)		3.80	3.50			
	Cadmium (Cd)-Leachable (mg/L)		1.48 ^{RRV}	0.170	0.209	0.190	0.246
	Calcium (Ca)-Leachable (mg/L)		1950	1850			
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25			
	Cobalt (Co)-Leachable (mg/L)		0.593	0.438			
	Copper (Cu)-Leachable (mg/L)		0.790	0.950			
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0			
	Lead (Pb)-Leachable (mg/L)		<0.25	<0.25			
	Magnesium (Mg)-Leachable (mg/L)		117	108			
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010			
	Nickel (Ni)-Leachable (mg/L)		0.53	0.58			
	Selenium (Se)-Leachable (mg/L)		<0.10	<0.10			
	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	40.1			

* 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	L2361764-16			
		BA1940-A-11 REP 4			
Grouping	Analyte				
SOIL					
TCLP Metals	1st Preliminary pH (pH)	11.57			
	2nd Preliminary pH (pH)	8.82			
	Final pH (pH)	6.38			
	Extraction Solution Initial pH (pH)	2.90			
	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)	0.295			
	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	Antimony (Sb)	DUP-H	L2361764-1, -2
Duplicate	Cadmium (Cd)	DUP-H	L2361764-10, -11, -12, -3, -4, -5, -6, -7, -8, -9
Duplicate	Chromium (Cr)	DUP-H	L2361764-1, -2
Duplicate	Vanadium (V)	DUP-H	L2361764-1, -2
Duplicate	Zirconium (Zr)	DUP-H	L2361764-1, -2
Matrix Spike	Cadmium (Cd)-Leachable	MS-B	L2361764-13, -14, -15, -16
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2361764-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2361764-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2361764-1, -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.
RRV	Reported Result Verified By Repeat Analysis

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)
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-CCMS-VA	Soil	Metals by ICPMS (TCLP)	EPA 1311/6020A
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. Instrumental analysis of the digested extract is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).			
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 "pH, Electrometric in Soil and Sediment - Prescriptive Method", Rev. 2005, Section B Physical, Inorganic and Misc. Constituents, BC Environmental Laboratory Manual. 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.



L2361764-COFC

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

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)					
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: dskrypyk@covanta.com			Analysis Request					
Fax: <input type="checkbox"/> Yes <input type="checkbox"/> No			brent.kirkpatrick@metrovancover.org								
			Sarah.Welman@metrovancover.org								

Invoice To Same as Report? <input checked="" type="checkbox"/>			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 #:			<table border="1"> <tr> <td rowspan="4">MET-TCLP-VA (all metals, Hg)</td> <td rowspan="4">MOISTURE</td> <td rowspan="4">Chrome 6</td> <td rowspan="4">MET-CSR+FULL-VA (all metals)</td> <td colspan="6">Number of Containers</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>						MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)	Number of Containers																							
MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 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:																																				

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)	Number of Containers					
1	BA1940-A-1	02-Oct-19	9:00	Soil	X	X		X						1
	BA1940-A-2	02-Oct-19	9:00	Soil	X	X		X						1
	BA1940-A-3	02-Oct-19	9:00	Soil	X	X		X						1
	BA1940-A-4	02-Oct-19	9:00	Soil	X	X		X						1
	BA1940-A-5	02-Oct-19	9:00	Soil	X	X		X						1
	BA1940-A-6	02-Oct-19	9:00	Soil	X	X		X						1
	BA1940-A-7	02-Oct-19	9:00	Soil	X	X		X						1
	BA1940-A-8	02-Oct-19	9:00	Soil	X	X		X						1
	BA1940-A-9	02-Oct-19	9:00	Soil	X	X		X						1
	BA1940-A-10	02-Oct-19	9:00	Soil	X	X		X						1
	BA1940-A-11	02-Oct-19	9:00	Soil	X	X		X						1
12	BA1940-A-12	02-Oct-19	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:
	8 Oct 19	0900				20 °C	RD	at 8, 19	11:35	Yes / No ? if Yes add SIF