



Covanta Burnaby R.E., ULC
ATTN: Steve McKinney
5150 Riverbend Drive
Burnaby BC V3N 4V3

Date Received: 05-MAR-19
Report Date: 21-MAR-19 12:20 (MT)
Version: FINAL

Client Phone: 604-521-1025

Certificate of Analysis

Lab Work Order #: L2239968
Project P.O. #: VANCO-0000048466
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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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 Description Sampled Date Sampled Time Client ID	L2239968-1 Soil 27-FEB-19 09:00 BA1909-A-1	L2239968-2 Soil 27-FEB-19 09:00 BA1909-A-2	L2239968-3 Soil 27-FEB-19 09:00 BA1909-A-3	L2239968-4 Soil 27-FEB-19 09:00 BA1909-A-4	L2239968-5 Soil 27-FEB-19 09:00 BA1909-A-5	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	21.1	20.5	20.3	19.4	19.0
	pH (1:2 soil:water) (pH)	10.93	11.13	11.31	11.16	11.11
Metals	Aluminum (Al) (mg/kg)	30300	36100	35900	34500	39500
	Antimony (Sb) (mg/kg)	171	104	119	101	689
	Arsenic (As) (mg/kg)	16.8	20.5	17.6	16.5	19.5
	Barium (Ba) (mg/kg)	650	676	592	595	707
	Beryllium (Be) (mg/kg)	0.37	0.36	0.42	0.46	0.43
	Bismuth (Bi) (mg/kg)	5.44	6.13	5.84	14.2	15.6
	Boron (B) (mg/kg)	299	491	245	218	283
	Cadmium (Cd) (mg/kg)	8.83	8.71	13.3	8.71	7.85
	Calcium (Ca) (mg/kg)	115000	117000	124000	113000	115000
	Chromium (Cr) (mg/kg)	134	358	162	322	155
	Cobalt (Co) (mg/kg)	53.6	72.5	413	65.3	136
	Copper (Cu) (mg/kg)	37600	3780	5400	6040	1110
	Iron (Fe) (mg/kg)	50500	61800	59600	50900	91300
	Lead (Pb) (mg/kg)	517	512	10800	689	344
	Lithium (Li) (mg/kg)	19.2	32.3	20.6	18.6	40.6
	Magnesium (Mg) (mg/kg)	9220	10100	9760	9770	9560
	Manganese (Mn) (mg/kg)	769	774	811	1180	909
	Mercury (Hg) (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	36.4	36.8	37.0	36.3	41.7
	Nickel (Ni) (mg/kg)	259	168	208	311	14300
	Phosphorus (P) (mg/kg)	10100	9690	11200	9890	9030
	Potassium (K) (mg/kg)	4900	4490	5070	4700	4310
	Selenium (Se) (mg/kg)	0.41	0.34	0.33	1.36	0.53
	Silver (Ag) (mg/kg)	7.26	4.44	4.13	5.41	3.33
	Sodium (Na) (mg/kg)	16900	15100	16400	14300	16200
	Strontium (Sr) (mg/kg)	304	275	281	551	768
	Sulfur (S) (mg/kg)	11000	10700	12100	11300	9300
	Thallium (Tl) (mg/kg)	0.064	0.089	0.099	0.068	0.057
	Tin (Sn) (mg/kg)	174	130	1120	136	375
	Titanium (Ti) (mg/kg)	793	1150	685	1270	1200
	Tungsten (W) (mg/kg)	6.48	5.42	6.14	5.66	4.89
	Uranium (U) (mg/kg)	5.15	4.73	5.26	5.10	4.54
	Vanadium (V) (mg/kg)	52.0	47.6	51.9	52.2	46.3
	Zinc (Zn) (mg/kg)	3570	3650	3790	2920	2810
	Zirconium (Zr) (mg/kg)	1.1	1.5	1.3	1.7	1.7

* 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	L2239968-6 Soil 27-FEB-19 09:00 BA1909-A-6	L2239968-7 Soil 27-FEB-19 09:00 BA1909-A-7	L2239968-8 Soil 27-FEB-19 09:00 BA1909-A-8	L2239968-9 Soil 27-FEB-19 09:00 BA1909-A-9	L2239968-10 Soil 27-FEB-19 09:00 BA1909-A-10	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	20.5	22.8	19.1	18.1	23.0
	pH (1:2 soil:water) (pH)	11.42	11.21	11.30	11.00	10.99
Metals	Aluminum (Al) (mg/kg)	36400	30600	29300	33400	45200
	Antimony (Sb) (mg/kg)	86.1	94.8	96.1	93.8	110
	Arsenic (As) (mg/kg)	15.3	19.0	18.8	15.7	19.1
	Barium (Ba) (mg/kg)	597	572	612	669	540
	Beryllium (Be) (mg/kg)	0.36	0.59	0.40	0.40	0.40
	Bismuth (Bi) (mg/kg)	5.41	5.16	5.10	7.10	5.60
	Boron (B) (mg/kg)	303	244	229	261	324
	Cadmium (Cd) (mg/kg)	10.8	15.8	23.6	12.4	10.3
	Calcium (Ca) (mg/kg)	122000	124000	129000	121000	122000
	Chromium (Cr) (mg/kg)	140	160	129	181	152
	Cobalt (Co) (mg/kg)	37.7	39.9	223	484	27.2
	Copper (Cu) (mg/kg)	1110	13200	2600	8760	3250
	Iron (Fe) (mg/kg)	75900	66500	65200	56200	65200
	Lead (Pb) (mg/kg)	319	526	612	551	336
	Lithium (Li) (mg/kg)	26.8	19.9	23.9	36.5	20.9
	Magnesium (Mg) (mg/kg)	10000	10300	10300	9310	9980
	Manganese (Mn) (mg/kg)	904	941	707	711	904
	Mercury (Hg) (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	89.5	39.8	38.5	34.8	38.2
	Nickel (Ni) (mg/kg)	123	197	160	114	130
	Phosphorus (P) (mg/kg)	10100	10200	10500	9440	10500
	Potassium (K) (mg/kg)	4120	5530	4630	4550	4970
	Selenium (Se) (mg/kg)	0.31	0.28	0.26	0.36	0.38
	Silver (Ag) (mg/kg)	3.55	7.20	3.45	4.35	5.02
	Sodium (Na) (mg/kg)	14500	16800	14700	14500	15700
	Strontium (Sr) (mg/kg)	281	288	496	287	313
	Sulfur (S) (mg/kg)	10200	11600	11300	9800	13200
	Thallium (Tl) (mg/kg)	0.057	0.090	0.066	0.063	0.062
	Tin (Sn) (mg/kg)	91.0	579	118	206	105
	Titanium (Ti) (mg/kg)	721	720	752	1010	1120
	Tungsten (W) (mg/kg)	4.48	5.39	5.37	5.92	5.96
	Uranium (U) (mg/kg)	4.76	5.23	5.06	4.93	5.19
	Vanadium (V) (mg/kg)	49.3	59.8	47.4	48.2	55.0
	Zinc (Zn) (mg/kg)	2770	8860	3800	3010	3330
	Zirconium (Zr) (mg/kg)	1.6	1.3	1.1	1.3	2.0

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2239968-11	L2239968-12	L2239968-13	L2239968-14	L2239968-15
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	27-FEB-19	27-FEB-19	27-FEB-19	27-FEB-19	27-FEB-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1909-A-11	BA1909-A-12	BA1909-A-6 REP 1	BA1909-A-6 REP 2	BA1909-A-6 REP 3
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		18.0	19.9			
	pH (1:2 soil:water) (pH)		11.00	10.95			
Metals	Aluminum (Al) (mg/kg)		55000	43200			
	Antimony (Sb) (mg/kg)		114	88.2			
	Arsenic (As) (mg/kg)		17.7	17.5			
	Barium (Ba) (mg/kg)		668	638			
	Beryllium (Be) (mg/kg)		0.41	0.38			
	Bismuth (Bi) (mg/kg)		5.72	6.50			
	Boron (B) (mg/kg)		290	218			
	Cadmium (Cd) (mg/kg)		12.1	9.93			
	Calcium (Ca) (mg/kg)		129000	121000			
	Chromium (Cr) (mg/kg)		258	158			
	Cobalt (Co) (mg/kg)		42.1	35.0			
	Copper (Cu) (mg/kg)		1880	1470			
	Iron (Fe) (mg/kg)		70500	80700			
	Lead (Pb) (mg/kg)		369	362			
	Lithium (Li) (mg/kg)		19.2	21.8			
	Magnesium (Mg) (mg/kg)		12500	9990			
	Manganese (Mn) (mg/kg)		1000	881			
	Mercury (Hg) (mg/kg)		<0.050	<0.050			
	Molybdenum (Mo) (mg/kg)		40.9	40.0			
	Nickel (Ni) (mg/kg)		159	103			
	Phosphorus (P) (mg/kg)		11100	10200			
	Potassium (K) (mg/kg)		4700	4610			
	Selenium (Se) (mg/kg)		0.35	0.33			
	Silver (Ag) (mg/kg)		3.63	4.07			
	Sodium (Na) (mg/kg)		15100	15400			
	Strontium (Sr) (mg/kg)		503	275			
	Sulfur (S) (mg/kg)		11500	11400			
	Thallium (Tl) (mg/kg)		0.066	0.067			
	Tin (Sn) (mg/kg)		107	131			
	Titanium (Ti) (mg/kg)		1510	1220			
	Tungsten (W) (mg/kg)		5.26	5.35			
	Uranium (U) (mg/kg)		5.37	5.38			
Vanadium (V) (mg/kg)		58.4	50.6				
Zinc (Zn) (mg/kg)		3110	3570				
Zirconium (Zr) (mg/kg)		3.2	1.9				

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID			
	L2239968-16 Soil 27-FEB-19 09:00 BA1909-A-6 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	L2239968-1	L2239968-2	L2239968-3	L2239968-4	L2239968-5
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	27-FEB-19	27-FEB-19	27-FEB-19	27-FEB-19	27-FEB-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1909-A-1	BA1909-A-2	BA1909-A-3	BA1909-A-4	BA1909-A-5
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.31	11.35	11.47	11.39	11.47
	2nd Preliminary pH (pH)		8.55	8.97	9.00	8.79	9.42
	Final pH (pH)		6.13	6.05	6.10	5.98	6.41
	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)		2.87	3.01	3.46	2.66	3.12
	Cadmium (Cd)-Leachable (mg/L)		0.196	0.149	0.184	0.135	0.150
	Calcium (Ca)-Leachable (mg/L)		1920	1890	1890	1890	1980
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		1.10	0.732	0.620	0.816	0.546
	Copper (Cu)-Leachable (mg/L)		1.05	0.714	1.20	1.02	0.650
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0	<5.0	<5.0	<5.0
	Lead (Pb)-Leachable (mg/L)		<0.25	<0.25	0.38	<0.25	<0.25
	Magnesium (Mg)-Leachable (mg/L)		120	123	124	115	118
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.51	0.63	1.22	0.85	0.63
	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)		34.3	59.9	37.9	50.6	52.5

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2239968-6	L2239968-7	L2239968-8	L2239968-9	L2239968-10
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	27-FEB-19	27-FEB-19	27-FEB-19	27-FEB-19	27-FEB-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1909-A-6	BA1909-A-7	BA1909-A-8	BA1909-A-9	BA1909-A-10
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.64	11.65	11.55	11.41	11.53
	2nd Preliminary pH (pH)		9.66	10.02	9.64	9.59	9.56
	Final pH (pH)		6.13	6.37	6.44	6.68	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	<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)		2.89	3.20	2.88	2.83	3.27
	Cadmium (Cd)-Leachable (mg/L)		1.65	0.212	0.235	0.152	0.159
	Calcium (Ca)-Leachable (mg/L)		1900	1970	1910	1990	1870
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.429	0.848	0.634	0.803	0.465
	Copper (Cu)-Leachable (mg/L)		1.27	1.61	1.17	1.10	1.67
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0	<5.0	<5.0	<5.0
	Lead (Pb)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Magnesium (Mg)-Leachable (mg/L)		117	114	118	116	118
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.47	0.50	0.54	0.43	0.62
	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)		62.2	77.9	88.7	38.9	56.4

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2239968-11	L2239968-12	L2239968-13	L2239968-14	L2239968-15
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	27-FEB-19	27-FEB-19	27-FEB-19	27-FEB-19	27-FEB-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1909-A-11	BA1909-A-12	BA1909-A-6 REP 1	BA1909-A-6 REP 2	BA1909-A-6 REP 3
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.44	11.41	11.64	11.64	11.64
	2nd Preliminary pH (pH)		9.07	9.03	9.66	9.66	9.66
	Final pH (pH)		6.09	6.20	6.02	5.86	5.88
	Extraction Solution Initial pH (pH)		2.89	2.89	2.88	2.88	2.88
	Antimony (Sb)-Leachable (mg/L)		<1.0	<1.0			
	Arsenic (As)-Leachable (mg/L)		<1.0	<1.0			
	Barium (Ba)-Leachable (mg/L)		<2.5	<2.5			
	Beryllium (Be)-Leachable (mg/L)		<0.025	<0.025			
	Boron (B)-Leachable (mg/L)		3.32	3.08			
	Cadmium (Cd)-Leachable (mg/L)		0.141	0.168	0.197	0.149	0.139
	Calcium (Ca)-Leachable (mg/L)		1930	1940			
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25			
	Cobalt (Co)-Leachable (mg/L)		0.474	0.728			
	Copper (Cu)-Leachable (mg/L)		0.680	1.13			
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0			
	Lead (Pb)-Leachable (mg/L)		<0.25	<0.25			
	Magnesium (Mg)-Leachable (mg/L)		131	120			
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010			
	Nickel (Ni)-Leachable (mg/L)		0.56	0.54			
	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)		39.7	41.1			

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2239968-16 Soil 27-FEB-19 09:00 BA1909-A-6 REP 4			
Grouping	Analyte				
SOIL					
TCLP Metals	1st Preliminary pH (pH)	11.64			
	2nd Preliminary pH (pH)	9.66			
	Final pH (pH)	5.96			
	Extraction Solution Initial pH (pH)	2.88			
	Antimony (Sb)-Leachable (mg/L)				
	Arsenic (As)-Leachable (mg/L)				
	Barium (Ba)-Leachable (mg/L)				
	Beryllium (Be)-Leachable (mg/L)				
	Boron (B)-Leachable (mg/L)				
	Cadmium (Cd)-Leachable (mg/L)	0.174			
	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	L2239968-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Chromium (Cr)	DUP-H	L2239968-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cobalt (Co)	DUP-H	L2239968-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Copper (Cu)	DUP-H	L2239968-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Iron (Fe)	DUP-H	L2239968-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Nickel (Ni)	DUP-H	L2239968-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2239968-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2239968-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2239968-1, -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**
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-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 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

Reference Information

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.



L2239968-COFC

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

COC #

Page ___ of ___

Report To		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 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@metrovancoouver.org		Analysis Request	
			Sarah.Wellman@metrovancoouver.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:		Sampler:	
Lab Work Order #					
(lab use only)					

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)	
BA1909-A-1		27-Feb-19	9:00	Soil	X	X		X	1
BA1909-A-2		27-Feb-19	9:00	Soil	X	X		X	1
BA1909-A-3		27-Feb-19	9:00	Soil	X	X		X	1
BA1909-A-4		27-Feb-19	9:00	Soil	X	X		X	1
BA1909-A-5		27-Feb-19	9:00	Soil	X	X		X	1
BA1909-A-6		27-Feb-19	9:00	Soil	X	X		X	1
BA1909-A-7		27-Feb-19	9:00	Soil	X	X		X	1
BA1909-A-8		27-Feb-19	9:00	Soil	X	X		X	1
BA1909-A-9		27-Feb-19	9:00	Soil	X	X		X	1
BA1909-A-10		27-Feb-19	9:00	Soil	X	X		X	1
BA1909-A-11		27-Feb-19	9:00	Soil	X	X		X	1
BA1909-A-12		27-Feb-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:
<i>[Signature]</i>	5-Mar-19	07:30	<i>[Signature]</i>	MAR - 5 2019	11:20 AM	19.518°C				Yes / No ? If Yes add SIF

B



L2239968-COFC

Bottom Ash Worksheet

Date sample composited (DD/MM/YYYY)	MAR. 4/19
Person doing the sampling	D. O'NEILL
Total Sample Weight before processing, kg	72.6 KG
Weight of Material >3/8", kg	15.2 KG.
Weight of Material that cannot be processed to <3/8" (metal, wood, etc), kg	11.7 KG.
Final Total weight of Processed Bottom Ash, kg	60.9 KG.

Return this form with the filled Weekly Bottom Ash Composite Sample containers

Completely fill twelve (12) 500ml sample containers and label each with "Bottom Ash" and the week the ash composite is from, i.e. "June 9-15, 2019"



L2239968-COFC

25.7

33.4	159.7
	18.7
	29.4
	29.9
	28.2
	26.2
	27.3
23.4	
10.0	