

Bottom Ash Data

2019 Week 29

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on August 8, 2019. The data represents bottom ash composite results for week 29 of 2019 (July 14, 2019 to July 20, 2019).

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: 23-JUL-19
Report Date: 06-AUG-19 17:35 (MT)
Version: FINAL

Client Phone: 604-521-1025

Certificate of Analysis

Lab Work Order #: L2315392
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	L2315392-1 soil 17-JUL-19 09:00 BA1929-A-1	L2315392-2 soil 17-JUL-19 09:00 BA1929-A-2	L2315392-3 soil 17-JUL-19 09:00 BA1929-A-3	L2315392-4 soil 17-JUL-19 09:00 BA1929-A-4	L2315392-5 soil 17-JUL-19 09:00 BA1929-A-5	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	17.7	17.5	17.6	16.2	18.1
	pH (1:2 soil:water) (pH)	10.81	10.92	10.85	10.79	10.99
Metals	Aluminum (Al) (mg/kg)	30800	50400	31400	37400	35600
	Antimony (Sb) (mg/kg)	134	170	124	132	124
	Arsenic (As) (mg/kg)	19.9	21.3	20.2	23.4	21.7
	Barium (Ba) (mg/kg)	588	530	472	526	571
	Beryllium (Be) (mg/kg)	0.38	0.36	0.31	0.90	0.37
	Bismuth (Bi) (mg/kg)	6.85	25.8	6.78	188	6.54
	Boron (B) (mg/kg)	285	265	283	236	293
	Cadmium (Cd) (mg/kg)	12.4	13.0	12.3	11.6	11.5
	Calcium (Ca) (mg/kg)	114000	125000	110000	108000	123000
	Chromium (Cr) (mg/kg)	147	371	170	158	257
	Cobalt (Co) (mg/kg)	42.8	52.0	27.8	58.7	40.6
	Copper (Cu) (mg/kg)	2020	13100	4920	16100	2230
	Iron (Fe) (mg/kg)	82100	82000	64300	64700	76100
	Lead (Pb) (mg/kg)	2160	827	11500	374	597
	Lithium (Li) (mg/kg)	15.6	21.9	17.1	17.8	16.2
	Magnesium (Mg) (mg/kg)	9500	8140	8320	8080	8800
	Manganese (Mn) (mg/kg)	842	1080	763	743	886
	Mercury (Hg) (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	46.4	52.8	56.2	48.7	84.0
	Nickel (Ni) (mg/kg)	165	244	295	355	344
	Phosphorus (P) (mg/kg)	9060	10200	8500	8090	9150
	Potassium (K) (mg/kg)	4800	4590	4270	4090	4620
	Selenium (Se) (mg/kg)	0.49	0.40	0.38	0.38	0.38
	Silver (Ag) (mg/kg)	5.83	19.6	4.59	7.50	4.37
	Sodium (Na) (mg/kg)	15000	13800	13100	12900	13300
	Strontium (Sr) (mg/kg)	278	292	254	249	314
	Sulfur (S) (mg/kg)	11100	12600	10700	10700	11500
	Thallium (Tl) (mg/kg)	<0.050	<0.050	0.091	<0.050	<0.050
	Tin (Sn) (mg/kg)	154	478	285	165	149
	Titanium (Ti) (mg/kg)	552	1340	594	562	547
	Tungsten (W) (mg/kg)	3.22	3.06	2.38	3.30	3.08
	Uranium (U) (mg/kg)	3.42	3.47	3.15	3.19	3.32
	Vanadium (V) (mg/kg)	36.6	37.8	33.2	31.2	35.5
	Zinc (Zn) (mg/kg)	3410	5640	3690	6900	3980
	Zirconium (Zr) (mg/kg)	1.0	2.6	1.1	1.1	<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	L2315392-6 soil 17-JUL-19 09:00 BA1929-A-6	L2315392-7 soil 17-JUL-19 09:00 BA1929-A-7	L2315392-8 soil 17-JUL-19 09:00 BA1929-A-8	L2315392-9 soil 17-JUL-19 09:00 BA1929-A-9	L2315392-10 soil 17-JUL-19 09:00 BA1929-A-10	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	17.9	18.9	18.8	19.1	18.9
	pH (1:2 soil:water) (pH)	10.80	10.73	10.73	10.74	10.83
Metals	Aluminum (Al) (mg/kg)	44500	37100	34400	35100	35000
	Antimony (Sb) (mg/kg)	152	109	129	154	135
	Arsenic (As) (mg/kg)	27.7	19.2	23.0	21.4	22.8
	Barium (Ba) (mg/kg)	540	554	606	623	534
	Beryllium (Be) (mg/kg)	0.38	0.31	0.35	0.37	0.33
	Bismuth (Bi) (mg/kg)	8.39	7.82	106	6.83	6.86
	Boron (B) (mg/kg)	236	237	237	415	322
	Cadmium (Cd) (mg/kg)	14.4	17.2	14.8	12.3	16.3
	Calcium (Ca) (mg/kg)	120000	111000	119000	127000	118000
	Chromium (Cr) (mg/kg)	187	167	193	166	206
	Cobalt (Co) (mg/kg)	36.4	23.9	110	27.6	26.8
	Copper (Cu) (mg/kg)	7180	5640	5110	10200	5170
	Iron (Fe) (mg/kg)	71700	60700	67300	74500	68800
	Lead (Pb) (mg/kg)	719	382	324	2030	528
	Lithium (Li) (mg/kg)	18.4	13.5	20.3	15.7	30.4
	Magnesium (Mg) (mg/kg)	8670	8490	8800	9990	10100
	Manganese (Mn) (mg/kg)	1080	896	1110	802	1020
	Mercury (Hg) (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	93.7	38.4	36.4	40.1	46.8
	Nickel (Ni) (mg/kg)	408	149	119	154	182
	Phosphorus (P) (mg/kg)	8780	8610	9280	9250	9210
	Potassium (K) (mg/kg)	5190	4440	4990	4970	4790
	Selenium (Se) (mg/kg)	0.39	0.37	0.33	0.40	0.47
	Silver (Ag) (mg/kg)	10.7	5.90	3.58	4.64	3.91
	Sodium (Na) (mg/kg)	14100	14700	14600	16000	14700
	Strontium (Sr) (mg/kg)	274	238	274	291	289
	Sulfur (S) (mg/kg)	12400	10700	10200	11500	12400
	Thallium (Tl) (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Tin (Sn) (mg/kg)	669	130	114	667	146
	Titanium (Ti) (mg/kg)	858	639	681	726	912
	Tungsten (W) (mg/kg)	2.55	2.30	3.48	3.19	2.62
	Uranium (U) (mg/kg)	3.36	2.79	3.32	3.42	3.29
	Vanadium (V) (mg/kg)	36.2	31.0	34.3	53.1	41.2
	Zinc (Zn) (mg/kg)	4340	3240	5640	4010	3540
	Zirconium (Zr) (mg/kg)	1.1	<1.0	<1.0	<1.0	1.1

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2315392-11	L2315392-12	L2315392-13	L2315392-14	L2315392-15
		Description	soil	soil			
		Sampled Date	17-JUL-19	17-JUL-19			
		Sampled Time	09:00	09:00			
		Client ID	BA1929-A-11	BA1929-A-12	BA1929-A-6 REP1	BA1929-A-6 REP 2	BA1929-A-6 REP 3
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		18.2	17.5			
	pH (1:2 soil:water) (pH)		10.85	10.83			
Metals	Aluminum (Al) (mg/kg)		33800	28500			
	Antimony (Sb) (mg/kg)		112	140			
	Arsenic (As) (mg/kg)		18.8	45.2			
	Barium (Ba) (mg/kg)		480	519			
	Beryllium (Be) (mg/kg)		0.33	55.2			
	Bismuth (Bi) (mg/kg)		5.34	5.74			
	Boron (B) (mg/kg)		291	234			
	Cadmium (Cd) (mg/kg)		11.1	12.7			
	Calcium (Ca) (mg/kg)		113000	111000			
	Chromium (Cr) (mg/kg)		157	239			
	Cobalt (Co) (mg/kg)		143	50.5			
	Copper (Cu) (mg/kg)		1400	4790			
	Iron (Fe) (mg/kg)		68600	90400			
	Lead (Pb) (mg/kg)		354	635			
	Lithium (Li) (mg/kg)		19.8	14.7			
	Magnesium (Mg) (mg/kg)		8670	9060			
	Manganese (Mn) (mg/kg)		772	847			
	Mercury (Hg) (mg/kg)		<0.050	<0.050			
	Molybdenum (Mo) (mg/kg)		43.9	71.2			
	Nickel (Ni) (mg/kg)		162	284			
	Phosphorus (P) (mg/kg)		9850	8510			
	Potassium (K) (mg/kg)		4710	4750			
	Selenium (Se) (mg/kg)		0.33	0.34			
	Silver (Ag) (mg/kg)		3.98	3.85			
	Sodium (Na) (mg/kg)		14400	14300			
	Strontium (Sr) (mg/kg)		246	277			
	Sulfur (S) (mg/kg)		11000	11400			
	Thallium (Tl) (mg/kg)		<0.050	<0.050			
	Tin (Sn) (mg/kg)		186	162			
	Titanium (Ti) (mg/kg)		398	490			
	Tungsten (W) (mg/kg)		2.38	3.75			
	Uranium (U) (mg/kg)		3.02	3.48			
Vanadium (V) (mg/kg)		33.4	35.3				
Zinc (Zn) (mg/kg)		3320	6640				
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

	Sample ID Description Sampled Date Sampled Time Client ID				
	L2315392-16				
	BA1929-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	L2315392-1	L2315392-2	L2315392-3	L2315392-4	L2315392-5
		Description	soil	soil	soil	soil	soil
		Sampled Date	17-JUL-19	17-JUL-19	17-JUL-19	17-JUL-19	17-JUL-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1929-A-1	BA1929-A-2	BA1929-A-3	BA1929-A-4	BA1929-A-5
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.43	11.48	11.94	11.49	11.43
	2nd Preliminary pH (pH)		8.48	8.99	8.71	8.73	8.80
	Final pH (pH)		6.02	5.87	5.72	5.99	5.93
	Extraction Solution Initial pH (pH)		2.90	2.90	2.90	2.90	2.90
	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)		3.59	2.88	3.07	3.06	3.80
	Cadmium (Cd)-Leachable (mg/L)		0.215	0.474	0.269	0.212	0.356
	Calcium (Ca)-Leachable (mg/L)		1870	1850	1810	1880	1920
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		1.34	0.528	0.842	0.556	0.570
	Copper (Cu)-Leachable (mg/L)		1.04	0.839	0.661	0.826	0.783
	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)		106	104	98.4	111	112
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.48	0.50	0.47	0.72	0.78
	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)		36.8	40.4	34.7	46.0	44.1

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2315392-6	L2315392-7	L2315392-8	L2315392-9	L2315392-10
		Description	soil	soil	soil	soil	soil
		Sampled Date	17-JUL-19	17-JUL-19	17-JUL-19	17-JUL-19	17-JUL-19
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1929-A-6	BA1929-A-7	BA1929-A-8	BA1929-A-9	BA1929-A-10
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.47	11.39	11.43	11.37	11.41
	2nd Preliminary pH (pH)		8.80	8.72	8.80	8.71	8.59
	Final pH (pH)		5.63	5.93	6.04	6.02	5.93
	Extraction Solution Initial pH (pH)		2.90	2.90	2.90	2.90	2.90
	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)		3.58	2.95	3.35	3.36	4.31
	Cadmium (Cd)-Leachable (mg/L)		2.78	0.226	0.183	0.184	0.171
	Calcium (Ca)-Leachable (mg/L)		1800	1750	1790	1950	1930
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.492	0.519	0.619	0.446	1.08
	Copper (Cu)-Leachable (mg/L)		0.819	1.12	1.19	1.25	1.03
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0	<5.0	<5.0	<5.0
	Lead (Pb)-Leachable (mg/L)		<0.25	<0.25	0.36	<0.25	<0.25
	Magnesium (Mg)-Leachable (mg/L)		99.1	108	103	107	106
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.72	0.44	0.49	0.47	0.47
	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)		87.7	36.3	54.5	38.0	48.1

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2315392-11	L2315392-12	L2315392-13	L2315392-14	L2315392-15
		Description	soil	soil			
		Sampled Date	17-JUL-19	17-JUL-19			
		Sampled Time	09:00	09:00			
		Client ID	BA1929-A-11	BA1929-A-12	BA1929-A-6 REP1	BA1929-A-6 REP 2	BA1929-A-6 REP 3
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.41	11.42	11.47	11.47	11.47
	2nd Preliminary pH (pH)		8.52	8.76	8.80	8.80	8.80
	Final pH (pH)		5.84	6.31	5.69	5.61	5.72
	Extraction Solution Initial pH (pH)		2.90	2.90	2.86	2.86	2.86
	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)		4.59	53.0			
	Cadmium (Cd)-Leachable (mg/L)		0.209	0.187	0.205	0.423	0.288
	Calcium (Ca)-Leachable (mg/L)		1890	1990			
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25			
	Cobalt (Co)-Leachable (mg/L)		0.611	1.32			
	Copper (Cu)-Leachable (mg/L)		0.677	0.748			
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0			
	Lead (Pb)-Leachable (mg/L)		<0.25	<0.25			
	Magnesium (Mg)-Leachable (mg/L)		106	109			
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010			
	Nickel (Ni)-Leachable (mg/L)		0.58	0.51			
	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)		41.3	34.9			

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID				
	L2315392-16				
	BA1929-A-6 REP 4				
Grouping	Analyte				
SOIL					
TCLP Metals	1st Preliminary pH (pH)	11.47			
	2nd Preliminary pH (pH)	8.80			
	Final pH (pH)	5.65			
	Extraction Solution Initial pH (pH)	2.86			
	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)	0.734			
	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	Arsenic (As)	DUP-H	L2315392-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Bismuth (Bi)	DUP-H	L2315392-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cadmium (Cd)	DUP-H	L2315392-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Copper (Cu)	DUP-H	L2315392-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)	DUP-H	L2315392-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Silver (Ag)	DUP-H	L2315392-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2315392-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2315392-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2315392-1, -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)
Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.			
Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, 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.



COC # _____

Page ____ of ____

L2315392-GOFC

Report To		Report		Service Requested (Rush for routine analysis subject to availability)	
Company:	Covanta Energy	<input type="checkbox"/> Stand	Standard (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:	Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT		
Phone:	604-521-1025	Email 2:	Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT		
	<input type="checkbox"/> Yes <input type="checkbox"/> No	Email 3:	Same Day or Weekend Emergency - Contact ALS to Confirm TAT		
			Analysis Request		

Invoice To		Client / Project Information		Please indicate below Filtered, Preserved or both (F, P, F/P)					
Same as Report?		Job #:							
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input type="checkbox"/> No		PO / AFE:	PO# 46693 Weekly Bottom Ash - Suite						
Company:		LSD:	(includes 2:1 pH)						
Contact:		Quote #:							
Address:									
Phone:									
Fax:									
Lab Work Order # (lab use only)		ALS Contact:	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	Chrome 6	MET-CSR+FULL-VA (all metals)		Number of Containers
BA1929-A-1		17-Jul-19	9:00	Soil	X	X			X		1
BA1929-A-2		17-Jul-19	9:00	Soil	X	X			X		1
BA1929-A-3		17-Jul-19	9:00	Soil	X	X			X		1
BA1929-A-4		17-Jul-19	9:00	Soil	X	X			X		1
BA1929-A-5		17-Jul-19	9:00	Soil	X	X			X		1
BA1929-A-6		17-Jul-19	9:00	Soil	X	X			X		1
BA1929-A-7		17-Jul-19	9:00	Soil	X	X			X		1
BA1929-A-8		17-Jul-19	9:00	Soil	X	X			X		1
BA1929-A-9		17-Jul-19	9:00	Soil	X	X			X		1
BA1929-A-10		17-Jul-19	9:00	Soil	X	X			X		1
BA1929-A-11		17-Jul-19	9:00	Soil	X	X			X		1
BA1929-A-12		17-Jul-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:
[Signature]	23-Jul-19	0800	HA	7/23	11:46	22 °C				Yes / No ? If Yes add SIF