

Bottom Ash Data

2018 Week 17

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on May 16, 2018. The data represents bottom ash composite results for week 17 of 2018 (April 22, 2018 to April 28, 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
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Burnaby BC V3N 4V3

Date Received: 01-MAY-18
Report Date: 14-MAY-18 13:21 (MT)
Version: FINAL

Client Phone: 604-521-1025

Certificate of Analysis

Lab Work Order #: L2087315
Project P.O. #: VANCO-0000047506
Job Reference:
C of C Numbers:
Legal Site Desc:

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

Brent Mack, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2087315-1 Soil 25-APR-18 09:00 BA1817-A-1	L2087315-2 Soil 25-APR-18 09:00 BA1817-A-2	L2087315-3 Soil 25-APR-18 09:00 BA1817-A-3	L2087315-4 Soil 25-APR-18 09:00 BA1817-A-4	L2087315-5 Soil 25-APR-18 09:00 BA1817-A-5	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	22.0	24.0	22.3	24.4	24.4
	pH (1:2 soil:water) (pH)	10.60	10.67	10.60	10.65	10.58
Metals	Aluminum (Al) (mg/kg)	34100	42700	32600	34900	29800
	Antimony (Sb) (mg/kg)	159	149	155	173	178
	Arsenic (As) (mg/kg)	27.6	32.5	30.1	30.2	29.2
	Barium (Ba) (mg/kg)	378	470	457	441	468
	Beryllium (Be) (mg/kg)	0.42	0.43	0.41	0.46	0.42
	Bismuth (Bi) (mg/kg)	19.1	17.8	14.1	15.1	19.1
	Boron (B) (mg/kg)	252	262	252	205	229
	Cadmium (Cd) (mg/kg)	10.7	11.3	11.5	12.2	13.6
	Calcium (Ca) (mg/kg)	142000	137000	142000	143000	145000
	Chromium (Cr) (mg/kg)	169	193	158	227	147
	Cobalt (Co) (mg/kg)	19.8	23.1	30.9	290	27.5
	Copper (Cu) (mg/kg)	12400	2760	1550	13100	10800
	Iron (Fe) (mg/kg)	49500	66000	64200	46500	53800
	Lead (Pb) (mg/kg)	346	349	901	3860	846
	Lithium (Li) (mg/kg)	17.3	18.5	18.4	25.9	17.9
	Magnesium (Mg) (mg/kg)	10700	10600	11500	11100	11600
	Manganese (Mn) (mg/kg)	869	809	816	814	803
	Mercury (Hg) (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	45.5	49.4	41.1	45.5	126
	Nickel (Ni) (mg/kg)	133	112	279	122	278
	Phosphorus (P) (mg/kg)	11300	10900	10500	11300	11000
	Potassium (K) (mg/kg)	5960	5680	6020	6060	5840
	Selenium (Se) (mg/kg)	0.42	0.48	0.53	0.80	0.51
	Silver (Ag) (mg/kg)	6.87	7.72	22.3	6.30	6.99
	Sodium (Na) (mg/kg)	15600	15700	16800	16100	16100
	Strontium (Sr) (mg/kg)	302	309	288	304	332
	Sulfur (S) (mg/kg)	16000	16000	16800	17300	16900
	Thallium (Tl) (mg/kg)	0.067	0.061	0.078	0.076	0.070
	Tin (Sn) (mg/kg)	144	133	174	167	132
	Titanium (Ti) (mg/kg)	533	815	623	707	657
	Tungsten (W) (mg/kg)	13.7	19.1	9.97	11.8	22.5
	Uranium (U) (mg/kg)	4.75	5.08	5.09	5.27	5.16
	Vanadium (V) (mg/kg)	51.3	52.6	56.2	55.4	54.8
	Zinc (Zn) (mg/kg)	4760	4270	4930	4410	4960
	Zirconium (Zr) (mg/kg)	1.3	1.8	1.2	1.3	1.1

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2087315-6 Soil 25-APR-18 09:00 BA1817-A-6	L2087315-7 Soil 25-APR-18 09:00 BA1817-A-7	L2087315-8 Soil 25-APR-18 09:00 BA1817-A-8	L2087315-9 Soil 25-APR-18 09:00 BA1817-A-9	L2087315-10 Soil 25-APR-18 09:00 BA1817-A-10	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	23.4	22.7	23.8	22.5	23.4
	pH (1:2 soil:water) (pH)	10.69	10.70	10.97	10.67	10.72
Metals	Aluminum (Al) (mg/kg)	29000	31700	37600	51700	32200
	Antimony (Sb) (mg/kg)	723	160	161	146	166
	Arsenic (As) (mg/kg)	28.1	30.1	33.5	26.5	26.5
	Barium (Ba) (mg/kg)	503	464	436	404	453
	Beryllium (Be) (mg/kg)	0.46	0.50	0.41	0.40	0.39
	Bismuth (Bi) (mg/kg)	13.5	15.7	12.0	14.8	14.0
	Boron (B) (mg/kg)	246	259	228	218	241
	Cadmium (Cd) (mg/kg)	12.1	12.4	11.3	10.9	10.6
	Calcium (Ca) (mg/kg)	150000	158000	144000	137000	134000
	Chromium (Cr) (mg/kg)	175	184	170	165	146
	Cobalt (Co) (mg/kg)	108	244	37.6	36.5	21.5
	Copper (Cu) (mg/kg)	40900	6000	3590	5370	19000
	Iron (Fe) (mg/kg)	55500	51600	53200	46900	45000
	Lead (Pb) (mg/kg)	496	430	376	328	358
	Lithium (Li) (mg/kg)	24.1	28.6	19.4	18.7	16.2
	Magnesium (Mg) (mg/kg)	11300	12000	12500	10400	11200
	Manganese (Mn) (mg/kg)	784	912	931	1070	1040
	Mercury (Hg) (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	41.2	65.8	75.4	54.2	44.9
	Nickel (Ni) (mg/kg)	169	157	286	139	209
	Phosphorus (P) (mg/kg)	9830	12700	11800	10000	11100
	Potassium (K) (mg/kg)	5780	6140	5840	5650	5690
	Selenium (Se) (mg/kg)	0.51	0.53	0.43	0.56	0.45
	Silver (Ag) (mg/kg)	6.79	11.7	6.49	6.13	5.72
	Sodium (Na) (mg/kg)	16600	17900	16000	15500	16300
	Strontium (Sr) (mg/kg)	331	495	294	308	292
	Sulfur (S) (mg/kg)	16400	16900	17000	15800	16000
	Thallium (Tl) (mg/kg)	0.064	0.070	0.065	0.066	0.072
	Tin (Sn) (mg/kg)	161	151	163	132	123
	Titanium (Ti) (mg/kg)	946	528	492	744	562
	Tungsten (W) (mg/kg)	9.13	13.6	13.3	8.53	7.96
	Uranium (U) (mg/kg)	4.60	5.53	4.98	4.74	4.91
	Vanadium (V) (mg/kg)	50.5	55.2	52.9	53.0	52.9
	Zinc (Zn) (mg/kg)	4300	4620	4700	3540	5770
	Zirconium (Zr) (mg/kg)	1.1	1.0	1.7	4.0	1.2

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2087315-11	L2087315-12	L2087315-13	L2087315-14	L2087315-15
		Description	Soil	Soil			
		Sampled Date	25-APR-18	25-APR-18			
		Sampled Time	09:00	09:00			
		Client ID	BA1817-A-11	BA1817-A-12	BA1817-A-10 REP1	BA1817-A-10 REP2	BA1817-A-10 REP3
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		24.0	23.7			
	pH (1:2 soil:water) (pH)		10.84	10.73			
Metals	Aluminum (Al) (mg/kg)		30100	34400			
	Antimony (Sb) (mg/kg)		179	154			
	Arsenic (As) (mg/kg)		33.1	31.7			
	Barium (Ba) (mg/kg)		410	438			
	Beryllium (Be) (mg/kg)		0.43	0.49			
	Bismuth (Bi) (mg/kg)		14.0	13.3			
	Boron (B) (mg/kg)		263	268			
	Cadmium (Cd) (mg/kg)		11.7	12.2			
	Calcium (Ca) (mg/kg)		140000	147000			
	Chromium (Cr) (mg/kg)		182	156			
	Cobalt (Co) (mg/kg)		24.6	20.3			
	Copper (Cu) (mg/kg)		2450	15100			
	Iron (Fe) (mg/kg)		67500	54100			
	Lead (Pb) (mg/kg)		1020	1110			
	Lithium (Li) (mg/kg)		24.8	18.0			
	Magnesium (Mg) (mg/kg)		11200	11600			
	Manganese (Mn) (mg/kg)		1290	792			
	Mercury (Hg) (mg/kg)		<0.050	<0.050			
	Molybdenum (Mo) (mg/kg)		75.9	41.8			
	Nickel (Ni) (mg/kg)		173	125			
	Phosphorus (P) (mg/kg)		12200	10600			
	Potassium (K) (mg/kg)		5820	6160			
	Selenium (Se) (mg/kg)		0.46	0.47			
	Silver (Ag) (mg/kg)		6.79	5.62			
	Sodium (Na) (mg/kg)		16700	16500			
	Strontium (Sr) (mg/kg)		292	319			
	Sulfur (S) (mg/kg)		17200	16800			
	Thallium (Tl) (mg/kg)		0.068	0.072			
	Tin (Sn) (mg/kg)		139	253			
	Titanium (Ti) (mg/kg)		424	467			
	Tungsten (W) (mg/kg)		13.8	11.4			
	Uranium (U) (mg/kg)		4.95	4.84			
Vanadium (V) (mg/kg)		53.6	55.2				
Zinc (Zn) (mg/kg)		4970	4490				
Zirconium (Zr) (mg/kg)		1.5	1.4				

* 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		L2087315-16				
Grouping	Analyte	BA1817-A-10 REP4				
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	L2087315-1	L2087315-2	L2087315-3	L2087315-4	L2087315-5
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	25-APR-18	25-APR-18	25-APR-18	25-APR-18	25-APR-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1817-A-1	BA1817-A-2	BA1817-A-3	BA1817-A-4	BA1817-A-5
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.13	11.23	11.23	11.28	11.20
	2nd Preliminary pH (pH)		8.45	8.60	8.39	8.44	8.49
	Final pH (pH)		6.05	6.24	5.96	6.28	6.16
	Extraction Solution Initial pH (pH)		2.85	2.85	2.85	2.85	2.85
	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)		2.78	2.85	2.98	2.92	2.91
	Cadmium (Cd)-Leachable (mg/L)		0.203	0.137	0.184	0.202	0.153
	Calcium (Ca)-Leachable (mg/L)		2060	2070	2070	2160	2060
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.798	0.870	2.19	0.621	0.223
	Copper (Cu)-Leachable (mg/L)		1.84	0.564	2.10	1.37	1.75
	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	0.32	<0.25
	Magnesium (Mg)-Leachable (mg/L)		124	135	126	132	131
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.70	0.77	0.62	0.45	0.52
	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)		52.9	96.4	39.1	31.9	50.1

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2087315-6	L2087315-7	L2087315-8	L2087315-9	L2087315-10
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	25-APR-18	25-APR-18	25-APR-18	25-APR-18	25-APR-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1817-A-6	BA1817-A-7	BA1817-A-8	BA1817-A-9	BA1817-A-10
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.20	11.28	11.28	11.22	11.28
	2nd Preliminary pH (pH)		8.49	8.23	8.22	8.55	9.02
	Final pH (pH)		6.41	6.36	6.40	6.30	6.14
	Extraction Solution Initial pH (pH)		2.85	2.85	2.85	2.85	2.85
	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)		2.75	2.89	3.13	3.24	2.81
	Cadmium (Cd)-Leachable (mg/L)		0.172	0.206	0.140	0.156	1.61
	Calcium (Ca)-Leachable (mg/L)		2150	2130	2110	2180	2140
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.627	0.419	0.432	0.887	0.316
	Copper (Cu)-Leachable (mg/L)		1.69	0.722	0.751	1.86	1.33
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0	<5.0	<5.0	<5.0
	Lead (Pb)-Leachable (mg/L)		0.47	0.34	<0.25	0.33	<0.25
	Magnesium (Mg)-Leachable (mg/L)		134	129	137	133	131
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.60	0.49	0.48	1.03	0.47
	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)		51.0	45.4	28.8	32.1	68.5

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2087315-11	L2087315-12	L2087315-13	L2087315-14	L2087315-15
		Description	Soil	Soil			
		Sampled Date	25-APR-18	25-APR-18			
		Sampled Time	09:00	09:00			
		Client ID	BA1817-A-11	BA1817-A-12	BA1817-A-10 REP1	BA1817-A-10 REP2	BA1817-A-10 REP3
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.28	11.22	11.28	11.28	11.28
	2nd Preliminary pH (pH)		8.78	8.83	9.02	9.02	9.02
	Final pH (pH)		6.07	5.98	6.31	6.22	6.44
	Extraction Solution Initial pH (pH)		2.85	2.85	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)		3.79	2.83			
	Cadmium (Cd)-Leachable (mg/L)		0.143	0.152	0.154	0.165	0.150
	Calcium (Ca)-Leachable (mg/L)		2010	2070			
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25			
	Cobalt (Co)-Leachable (mg/L)		0.677	0.308			
	Copper (Cu)-Leachable (mg/L)		1.39	2.82			
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0			
	Lead (Pb)-Leachable (mg/L)		<0.25	0.52			
	Magnesium (Mg)-Leachable (mg/L)		127	149			
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010			
	Nickel (Ni)-Leachable (mg/L)		0.61	0.55			
	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)		42.0	49.0			

* 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	L2087315-16			
		BA1817-A-10 REP4			
Grouping	Analyte				
SOIL					
TCLP Metals	1st Preliminary pH (pH)	11.28			
	2nd Preliminary pH (pH)	9.02			
	Final pH (pH)	6.38			
	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)	0.146			
	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	Bismuth (Bi)	DUP-H	L2087315-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Chromium (Cr)	DUP-H	L2087315-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Copper (Cu)	DUP-H	L2087315-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lithium (Li)	DUP-H	L2087315-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Manganese (Mn)	DUP-H	L2087315-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2087315-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2087315-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Copper (Cu)-Leachable	MS-B	L2087315-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2087315-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
HG-200.2-CVAF-VA	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)
Soil samples are digested with hot nitric and hydrochloric acids, followed by CVAAS analysis. This method is fully compliant with the BC SALM strong acid leachable metals digestion method.			
HG-TCLP-CVAFS-VA	Soil	Mercury by CVAAS (TCLP)	EPA 1311/245.7
This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter and analysed using atomic absorption spectrophotometry (EPA 245.7).			
MET-200.2-CCMS-VA	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
This method uses a heated strong acid digestion with HNO ₃ and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.			
MET-TCLP-ICP-VA	Soil	Metals by ICPOES (TCLP)	EPA 1311/6010B
This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter and analysed using inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.			
PH-1:2-VA	Soil	pH in Soil (1:2 Soil:Water Extraction)	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



L2087315-COFC

Report To

Company: Covanta Energy
 Contact: Steve Mckinney / Dan Skrypynk
 Address: 5150 Riverbend Drive
 Burnaby BC
 Phone: 604-521-1025 Fax: _____
 Yes No

Report Format / Distribution
 Standard Other
 PDF Excel Digital Fax
 Email 1: smckinney@covanta.com
 Email 2: rjohnson4@covanta.com
 Email 3: dskrypynk@covanta.com

Service Requested (Rush for routine analysis subject to availability)
 Regular (Standard Turnaround Times - Business Days)
 Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
 Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
 Same Day or Weekend Emergency - Contact ALS to Confirm TAT

Invoice To Same as Report? Yes No
 Hardcopy of Invoice with Report? Yes No
 Company: _____
 Contact: _____
 Address: _____
 Phone: _____ Fax: _____

Client / Project Information
 Job #: _____
 PO / AFE: PO# 46693 Weekly Bottom Ash - Suite
 LSD: _____ (includes 2:1 pH)
 Quote #: _____

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

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	
BA1817-A-1		25-Apr-18	9:00	Soil	X	X		X						1
BA1817-A-2		25-Apr-18	9:00	Soil	X	X		X						1
BA1817-A-3		25-Apr-18	9:00	Soil	X	X		X						1
BA1817-A-4		25-Apr-18	9:00	Soil	X	X		X						1
BA1817-A-5		25-Apr-18	9:00	Soil	X	X		X						1
BA1817-A-6		25-Apr-18	9:00	Soil	X	X		X						1
BA1817-A-7		25-Apr-18	9:00	Soil	X	X		X						1
BA1817-A-8		25-Apr-18	9:00	Soil	X	X		X						1
BA1817-A-9		25-Apr-18	9:00	Soil	X	X		X						1
BA1817-A-10		25-Apr-18	9:00	Soil	X	X		X						1
BA1817-A-11		25-Apr-18	9:00	Soil	X	X		X						1
BA1817-A-12		25-Apr-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>	1-May-18	08:00	JL	5/1/18	11:30 AM	20 °C				