

Bottom Ash Data

2018 Week 15

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on April 30, 2018. The data represents bottom ash composite results for week 15 of 2018 (April 8, 2018 to April 14, 2018).

The bottom ash meets the requirements of Metro Vancouver's Bottom Ash Management Plan and is suitable for beneficial use during Coquitlam Landfill closure works.



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

Date Received: 17-APR-18
Report Date: 30-APR-18 13:51 (MT)
Version: FINAL

Client Phone: 604-521-1025

Certificate of Analysis

Lab Work Order #: L2080996
Project P.O. #: VANCO-0000047506
Job Reference:
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 24-APR-18 17:47

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	L2080996-1 SOIL 11-APR-18 09:00 BA1815-A-1	L2080996-2 SOIL 11-APR-18 09:00 BA1815-A-2	L2080996-3 SOIL 11-APR-18 09:00 BA1815-A-3	L2080996-4 SOIL 11-APR-18 09:00 BA1815-A-4	L2080996-5 SOIL 11-APR-18 09:00 BA1815-A-5	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	22.5	21.0	23.3	22.8	21.9
	pH (1:2 soil:water) (pH)	11.94	12.14	11.59	12.03	11.99
Metals	Aluminum (Al) (mg/kg)	32800	39200	39700	35000	34700
	Antimony (Sb) (mg/kg)	129	87.3	107	107	127
	Arsenic (As) (mg/kg)	26.0	20.3	26.4	23.2	30.2
	Barium (Ba) (mg/kg)	612	617	697	637	653
	Beryllium (Be) (mg/kg)	0.39	0.39	0.39	0.38	0.38
	Bismuth (Bi) (mg/kg)	45.4	12.3	7.61	19.7	6.76
	Boron (B) (mg/kg)	215	225	240	244	300
	Cadmium (Cd) (mg/kg)	11.3	7.48	14.9	9.35	13.1
	Calcium (Ca) (mg/kg)	137000	126000	141000	137000	133000
	Chromium (Cr) (mg/kg)	131	161	328	158	721
	Cobalt (Co) (mg/kg)	31.3	28.8	59.5	74.5	38.8
	Copper (Cu) (mg/kg)	2250	8600	2480	4060	3990
	Iron (Fe) (mg/kg)	46600	82600	57800	74800	78800
	Lead (Pb) (mg/kg)	526	3160	915	353	940
	Lithium (Li) (mg/kg)	18.8	16.1	18.1	33.5	15.4
	Magnesium (Mg) (mg/kg)	10600	11600	12000	10400	11000
	Manganese (Mn) (mg/kg)	885	1670	746	791	1020
	Mercury (Hg) (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	39.7	29.4	32.7	36.9	94.9
	Nickel (Ni) (mg/kg)	84.0	123	183	980	475
	Phosphorus (P) (mg/kg)	10100	9670	9710	11500	10200
	Potassium (K) (mg/kg)	5300	4510	5530	5270	5530
	Selenium (Se) (mg/kg)	0.41	0.32	0.97	0.37	1.32
	Silver (Ag) (mg/kg)	3.68	3.17	3.77	4.85	3.64
	Sodium (Na) (mg/kg)	15000	13800	16100	15200	15300
	Strontium (Sr) (mg/kg)	292	914	324	317	319
	Sulfur (S) (mg/kg)	10900	10200	11100	11700	11700
	Thallium (Tl) (mg/kg)	<0.10 ^{DLM}	<0.10 ^{DLM}	<0.10 ^{DLM}	<0.10 ^{DLM}	<0.10 ^{DLM}
	Tin (Sn) (mg/kg)	99.0	103	102	132	121
	Titanium (Ti) (mg/kg)	1070	1330	1380	731	1220
	Tungsten (W) (mg/kg)	12.4	5.71	5.38	7.70	57.5
	Uranium (U) (mg/kg)	4.71	3.62	4.22	4.54	4.83
	Vanadium (V) (mg/kg)	45.3	41.2	54.4	47.3	54.4
	Zinc (Zn) (mg/kg)	2830	3980	2970	4340	5170
	Zirconium (Zr) (mg/kg)	1.5	1.5	1.6	1.0	2.3

* 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	L2080996-6 SOIL 11-APR-18 09:00 BA1815-A-6	L2080996-7 SOIL 11-APR-18 09:00 BA1815-A-7	L2080996-8 SOIL 11-APR-18 09:00 BA1815-A-8	L2080996-9 SOIL 11-APR-18 09:00 BA1815-A-9	L2080996-10 SOIL 11-APR-18 09:00 BA1815-A-10	
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	20.8	22.2	22.9	24.6	17.8
	pH (1:2 soil:water) (pH)	11.44	12.02	12.18	11.49	12.03
Metals	Aluminum (Al) (mg/kg)	34800	31600	45600	43800	29200
	Antimony (Sb) (mg/kg)	140	123	97.4	101	144
	Arsenic (As) (mg/kg)	22.4	26.6	22.7	27.5	22.6
	Barium (Ba) (mg/kg)	656	628	684	633	610
	Beryllium (Be) (mg/kg)	0.30	0.37	0.38	0.37	0.38
	Bismuth (Bi) (mg/kg)	7.87	19.5	8.22	8.85	7.09
	Boron (B) (mg/kg)	281	236	266	223	245
	Cadmium (Cd) (mg/kg)	7.68	10.3	9.27	9.10	8.97
	Calcium (Ca) (mg/kg)	113000	134000	136000	134000	138000
	Chromium (Cr) (mg/kg)	2640	186	143	343	143
	Cobalt (Co) (mg/kg)	42.8	169	29.5	26.5	43.0
	Copper (Cu) (mg/kg)	41000	2420	5680	9080	2220
	Iron (Fe) (mg/kg)	72500	65900	58300	66900	52400
	Lead (Pb) (mg/kg)	1820	346	405	297	626
	Lithium (Li) (mg/kg)	18.4	19.7	26.1	16.9	17.1
	Magnesium (Mg) (mg/kg)	10500	10200	12200	11500	10600
	Manganese (Mn) (mg/kg)	988	858	835	1580	627
	Mercury (Hg) (mg/kg)	<0.050	0.050	0.060	<0.050	<0.050
	Molybdenum (Mo) (mg/kg)	315	33.4	31.9	27.2	40.8
	Nickel (Ni) (mg/kg)	1770	210	230	151	107
	Phosphorus (P) (mg/kg)	9750	10700	11000	9570	10300
	Potassium (K) (mg/kg)	4490	5190	5430	5270	5200
	Selenium (Se) (mg/kg)	0.32	0.32	0.41	0.36	0.34
	Silver (Ag) (mg/kg)	4.10	3.99	4.57	3.84	11.5
	Sodium (Na) (mg/kg)	15100	14800	15700	14300	14900
	Strontium (Sr) (mg/kg)	453	338	370	295	332
	Sulfur (S) (mg/kg)	9500	11600	11600	10500	11400
	Thallium (Tl) (mg/kg)	<0.10	<0.10 ^{DLM}	0.187	<0.10 ^{DLM}	<0.10 ^{DLM}
	Tin (Sn) (mg/kg)	282	135	2460	116	102
	Titanium (Ti) (mg/kg)	1070	953	1380	1560	954
	Tungsten (W) (mg/kg)	10.2	5.76	6.56	6.19	5.73
	Uranium (U) (mg/kg)	3.44	4.21	4.79	4.14	4.12
	Vanadium (V) (mg/kg)	45.2	47.3	46.6	45.3	41.2
	Zinc (Zn) (mg/kg)	3960	8740	29000	4340	3070
	Zirconium (Zr) (mg/kg)	1.2	1.1	2.0	2.1	1.7

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2080996-11	L2080996-12	L2080996-13	L2080996-14	L2080996-15
		Description	SOIL	SOIL	SOIL	SOIL	SOIL
		Sampled Date	11-APR-18	11-APR-18	11-APR-18	11-APR-18	11-APR-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1815-A-11	BA1815-A-12	BA1815-A-2 REP 1	BA1815-A-2 REP 2	BA1815-A-2 REP 3
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		23.0	22.5			
	pH (1:2 soil:water) (pH)		11.91	12.14			
Metals	Aluminum (Al) (mg/kg)		32400	47600			
	Antimony (Sb) (mg/kg)		106	108			
	Arsenic (As) (mg/kg)		22.3	22.8			
	Barium (Ba) (mg/kg)		588	620			
	Beryllium (Be) (mg/kg)		0.48	0.36			
	Bismuth (Bi) (mg/kg)		37.5	8.08			
	Boron (B) (mg/kg)		288	205			
	Cadmium (Cd) (mg/kg)		8.66	10.3			
	Calcium (Ca) (mg/kg)		130000	140000			
	Chromium (Cr) (mg/kg)		124	166			
	Cobalt (Co) (mg/kg)		24.7	22.8			
	Copper (Cu) (mg/kg)		9820	1610			
	Iron (Fe) (mg/kg)		63700	46600			
	Lead (Pb) (mg/kg)		322	294			
	Lithium (Li) (mg/kg)		16.0	16.4			
	Magnesium (Mg) (mg/kg)		11000	10800			
	Manganese (Mn) (mg/kg)		763	761			
	Mercury (Hg) (mg/kg)		<0.050	<0.050			
	Molybdenum (Mo) (mg/kg)		24.6	50.8			
	Nickel (Ni) (mg/kg)		151	125			
	Phosphorus (P) (mg/kg)		11400	10700			
	Potassium (K) (mg/kg)		5220	5650			
	Selenium (Se) (mg/kg)		0.34	0.35			
	Silver (Ag) (mg/kg)		3.68	3.99			
	Sodium (Na) (mg/kg)		14400	15500			
	Strontium (Sr) (mg/kg)		293	316			
	Sulfur (S) (mg/kg)		10900	11400			
	Thallium (Tl) (mg/kg)		<0.050	<0.10 ^{DLM}			
	Tin (Sn) (mg/kg)		120	98.6			
	Titanium (Ti) (mg/kg)		972	1250			
Tungsten (W) (mg/kg)		5.77	6.50				
Uranium (U) (mg/kg)		4.20	4.42				
Vanadium (V) (mg/kg)		43.9	51.3				
Zinc (Zn) (mg/kg)		3320	2870				
Zirconium (Zr) (mg/kg)		1.3	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			
	L2080996-16 SOIL 11-APR-18 09:00 BA1815-A-2 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	L2080996-1	L2080996-2	L2080996-3	L2080996-4	L2080996-5
		Description	SOIL	SOIL	SOIL	SOIL	SOIL
		Sampled Date	11-APR-18	11-APR-18	11-APR-18	11-APR-18	11-APR-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1815-A-1	BA1815-A-2	BA1815-A-3	BA1815-A-4	BA1815-A-5
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.77	11.90	11.68	11.85	11.84
	2nd Preliminary pH (pH)		10.32	10.51	10.00	10.21	10.25
	Final pH (pH)		6.55	6.38	6.20	6.64	6.32
	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)		3.21	2.94	3.46	3.57	3.03
	Cadmium (Cd)-Leachable (mg/L)		0.234	1.38	0.188	0.131	0.137
	Calcium (Ca)-Leachable (mg/L)		2140	2050	1960	2040	2050
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.713	0.248	0.530	0.167	0.264
	Copper (Cu)-Leachable (mg/L)		1.04	1.12	1.34	0.845	1.12
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0	<5.0	<5.0	<5.0
	Lead (Pb)-Leachable (mg/L)		<0.25	0.36	<0.25	<0.25	0.37
	Magnesium (Mg)-Leachable (mg/L)		108	105	104	103	105
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.40	0.48	0.54	0.48	0.37
	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)		40.1	29.6	59.9	35.2	31.6

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2080996-6	L2080996-7	L2080996-8	L2080996-9	L2080996-10
		Description	SOIL	SOIL	SOIL	SOIL	SOIL
		Sampled Date	11-APR-18	11-APR-18	11-APR-18	11-APR-18	11-APR-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1815-A-6	BA1815-A-7	BA1815-A-8	BA1815-A-9	BA1815-A-10
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.73	11.74	11.85	11.47	11.76
	2nd Preliminary pH (pH)		9.81	9.94	10.28	9.24	9.57
	Final pH (pH)		6.21	6.05	6.18	6.09	5.96
	Extraction Solution Initial pH (pH)		2.86	2.86	2.86	2.84	2.84
	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)		3.35	2.97	2.68	3.45	2.36
	Cadmium (Cd)-Leachable (mg/L)		0.180	0.138	0.136	0.168	0.133
	Calcium (Ca)-Leachable (mg/L)		1970	1910	1980	2050	1980
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25	<0.25	<0.25	<0.25
	Cobalt (Co)-Leachable (mg/L)		0.391	0.411	0.330	0.403	0.732
	Copper (Cu)-Leachable (mg/L)		1.29	0.633	1.29	1.57	1.29
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0	<5.0	<5.0	<5.0
	Lead (Pb)-Leachable (mg/L)		0.41	<0.25	0.34	0.27	<0.25
	Magnesium (Mg)-Leachable (mg/L)		101	98.7	99.3	109	108
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Nickel (Ni)-Leachable (mg/L)		0.42	0.78	0.51	0.34	0.41
	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)		39.9	42.3	33.1	36.9	45.2

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2080996-11	L2080996-12	L2080996-13	L2080996-14	L2080996-15
		Description	SOIL	SOIL	SOIL	SOIL	SOIL
		Sampled Date	11-APR-18	11-APR-18	11-APR-18	11-APR-18	11-APR-18
		Sampled Time	09:00	09:00	09:00	09:00	09:00
		Client ID	BA1815-A-11	BA1815-A-12	BA1815-A-2 REP 1	BA1815-A-2 REP 2	BA1815-A-2 REP 3
Grouping	Analyte						
SOIL							
TCLP Metals	1st Preliminary pH (pH)		11.73	11.81	11.90	11.90	11.90
	2nd Preliminary pH (pH)		9.65	9.84	10.51	10.51	10.51
	Final pH (pH)		5.97	6.29	5.84	6.15	6.13
	Extraction Solution Initial pH (pH)		2.84	2.84	2.85	2.85	2.85
	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)		3.23	3.27			
	Cadmium (Cd)-Leachable (mg/L)		0.174	0.158	0.158	0.170	0.175
	Calcium (Ca)-Leachable (mg/L)		1950	2030			
	Chromium (Cr)-Leachable (mg/L)		<0.25	<0.25			
	Cobalt (Co)-Leachable (mg/L)		0.207	0.221			
	Copper (Cu)-Leachable (mg/L)		1.06	0.908			
	Iron (Fe)-Leachable (mg/L)		<5.0	<5.0			
	Lead (Pb)-Leachable (mg/L)		0.45	<0.25			
	Magnesium (Mg)-Leachable (mg/L)		104	109			
	Mercury (Hg)-Leachable (mg/L)		<0.0010	<0.0010			
	Nickel (Ni)-Leachable (mg/L)		0.49	0.53			
	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)		31.1	26.5			

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2080996-16			
		SOIL			
		11-APR-18			
		09:00			
		BA1815-A-2 REP 4			
Grouping	Analyte				
SOIL					
TCLP Metals	1st Preliminary pH (pH)	11.90			
	2nd Preliminary pH (pH)	10.51			
	Final pH (pH)	6.11			
	Extraction Solution Initial pH (pH)	2.85			
	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	Bismuth (Bi)	DUP-H	L2080996-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Copper (Cu)	DUP-H	L2080996-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Iron (Fe)	DUP-H	L2080996-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Nickel (Ni)	DUP-H	L2080996-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Strontium (Sr)	DUP-H	L2080996-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Tungsten (W)	DUP-H	L2080996-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Certified Reference Material	Titanium (Ti)	MES	L2080996-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2080996-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Calcium (Ca)-Leachable	MS-B	L2080996-10, -11, -12, -9
Matrix Spike	Cobalt (Co)-Leachable	MS-B	L2080996-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2080996-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Zinc (Zn)-Leachable	MS-B	L2080996-10, -11, -12, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
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

ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Reference Information

VA

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.



L2080996-COFC

Report To: Covanta Energy
Company: Steve McKinney / Dan Skrypnik
Address: 5150 Riverbend Drive, Burnaby BC
Phone: 604-521-1025
Report Format / Distribution: PDF, Excel, Digital, Fax
Service Requested: Regular (Standard Turnaround Times - Business Days)
Analysis Request

Invoice To: Same as Report?
Hardcopy of Invoice with Report?
Company:
Contact:
Address:
Phone:
Client / Project Information:
Job #:
PO / AFE: PO# 46693 Weekly Bottom Ash - Suite
LSD: (includes 2:1 pH)
Quote #:

Table with columns: Sample #, Sample Identification, Date, Time, Sample Type, MET-TCLP-VA, MOISTURE, Chrome 6, MET-CSR+FULL-VA, Number of Containers. Contains 12 rows of sample data.

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.

SHIPMENT RELEASE (client use) / SHIPMENT RECEPTION (lab use only) / SHIPMENT VERIFICATION (lab use only)
Released by: [Signature] Date: 17-APR-18 Time: 08:00
Received by: [Signature] Date: APR 17 2018 Time: 11:40 AM Temperature: 20.20 C