

Bottom Ash Data

2021 Week 15

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on April 23, 2021. The data represents bottom ash composite results for week 15 of 2021 (April 4, 2021 to April 10, 2021).

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



CERTIFICATE OF ANALYSIS

Work Order : **VA21A6783**
Client : **Covanta Burnaby Renewable Energy, ULC**
Contact : Steve McKinney
Address : 5150 Riverbend Drive
Burnaby BC Canada V3N 4V3
Telephone : 604 521 1025
Project : Weekly Bottom Ash - Suite
PO : VANCO 0000050390
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : Standing Offer (BC work)
No. of samples received : 12
No. of samples analysed : 12

Page : 1 of 11
Laboratory : Vancouver - Environmental
Account Manager : Brent Mack
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : 778-370-3279
Date Samples Received : 13-Apr-2021 10:40
Date Analysis Commenced : 18-Apr-2021
Issue Date : 23-Apr-2021 10:07

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
%	percent
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior 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.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLA	Detection Limit adjusted for required dilution.



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2115-A-1	BA2115-A-2	BA2115-A-3	BA2115-A-4	BA2115-A-5
(Matrix: Soil/Solid)					Client sampling date / time	07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A6783-001	VA21A6783-002	VA21A6783-003	VA21A6783-004	VA21A6783-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	20.6	21.1	21.4	23.3	21.7	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.4	11.5	11.5	11.4	11.6	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	29700	45300	28100	28900	32800	
antimony	7440-36-0	E440	0.10	mg/kg	193	94.6	125	120	244	
arsenic	7440-38-2	E440	0.10	mg/kg	24.6	23.7	31.0	23.6	41.4	
barium	7440-39-3	E440	0.50	mg/kg	672	610	554	518	609	
beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.36	0.30	0.32	<0.50 ^{DLA}	
bismuth	7440-69-9	E440	0.20	mg/kg	7.19	7.30	8.86	7.66	583	
boron	7440-42-8	E440	5.0	mg/kg	183	208	148	174	139	
cadmium	7440-43-9	E440	0.020	mg/kg	9.77	8.00	10.0	10.9	9.38	
calcium	7440-70-2	E440	50	mg/kg	113000	123000	116000	119000	112000	
chromium	7440-47-3	E440	0.50	mg/kg	149	150	176	150	147	
cobalt	7440-48-4	E440	0.10	mg/kg	35.9	153	93.4	51.1	28.0	
copper	7440-50-8	E440	0.50	mg/kg	3120	1380	4240	1820	23500	
iron	7439-89-6	E440	50	mg/kg	77600	81200	87700	76000	70100	
lead	7439-92-1	E440	0.50	mg/kg	423	538	526	851	6010	
lithium	7439-93-2	E440	2.0	mg/kg	20.4	38.6	16.6	21.9	19.2	
magnesium	7439-95-4	E440	20	mg/kg	11200	10300	9980	10400	10100	
manganese	7439-96-5	E440	1.0	mg/kg	766	1180	1210	828	826	
mercury	7439-97-6	E510	0.0500	mg/kg	0.144	0.0717	0.0637	0.0768	0.0711	
molybdenum	7439-98-7	E440	0.10	mg/kg	17.3	18.6	21.2	27.8	16.3	
nickel	7440-02-0	E440	0.50	mg/kg	317	467	215	132	157	
phosphorus	7723-14-0	E440	50	mg/kg	7730	8320	7800	7980	8130	
potassium	7440-09-7	E440	100	mg/kg	4380	4320	4000	4290	4050	
selenium	7782-49-2	E440	0.20	mg/kg	0.32	0.36	0.37	0.45	<1.00 ^{DLA}	
silver	7440-22-4	E440.Ag	0.10	mg/kg	4.25	----	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	----	5.17	9.85	7.71	8.90	
sodium	7440-23-5	E440	50	mg/kg	14100	12500	12600	12500	14000	
strontium	7440-24-6	E440	0.50	mg/kg	276	262	249	295	271	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2115-A-1	BA2115-A-2	BA2115-A-3	BA2115-A-4	BA2115-A-5
Client sampling date / time					07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21A6783-001	VA21A6783-002	VA21A6783-003	VA21A6783-004	VA21A6783-005	
					Result	Result	Result	Result	Result	
Metals										
sulfur	7704-34-9	E440	1000	mg/kg	9800	9700	10100	10600	9900	
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.250 ^{DLA}	
tin	7440-31-5	E440	2.0	mg/kg	137	91.2	141	97.9	221	
titanium	7440-32-6	E440	1.0	mg/kg	848	950	340	542	718	
tungsten	7440-33-7	E440	0.50	mg/kg	11.1	8.17	31.2	39.6	7.95	
uranium	7440-61-1	E440	0.050	mg/kg	1.76	1.76	1.70	1.73	1.84	
vanadium	7440-62-2	E440	0.20	mg/kg	31.6	33.2	27.5	27.4	27.5	
zinc	7440-66-6	E440	2.0	mg/kg	2970	3470	5110	5400	16400	
zirconium	7440-67-7	E440	1.0	mg/kg	1.2	1.8	1.6	1.4	<5.0 ^{DLA}	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.9	12.0	11.9	11.9	12.0	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.42	9.83	9.51	9.72	9.83	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	2.87	2.87	2.87	
pH, TCLP final	----	EPP444	0.010	pH units	6.32	6.47	6.20	6.23	6.25	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	2.11	2.02	1.92	2.08	2.01	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.264	0.159	0.162	0.168	0.169	
calcium, TCLP	7440-70-2	E444	10	mg/L	2040	2110	1980	2010	2040	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.13	1.27	0.864	0.675	1.28	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.645	0.333	0.422	0.486	1.00	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	0.25	<0.25	<0.25	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	133	132	132	139	136	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.51	0.46	0.50	0.48	0.73	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2115-A-1	BA2115-A-2	BA2115-A-3	BA2115-A-4	BA2115-A-5
Client sampling date / time					07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A6783-001	VA21A6783-002	VA21A6783-003	VA21A6783-004	VA21A6783-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	44.6	35.1	39.7	38.2	50.5	50.5
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	<10

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2115-A-6	BA2115-A-7	BA2115-A-8	BA2115-A-9	BA2115-A-10
Client sampling date / time					07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21A6783-006	VA21A6783-007	VA21A6783-008	VA21A6783-009	VA21A6783-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	21.0	22.0	23.2	23.0	21.6	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.3	11.4	11.2	11.6	11.3	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	35500	33000	30100	49000	31600	
antimony	7440-36-0	E440	0.10	mg/kg	131	116	102	98.3	97.9	
arsenic	7440-38-2	E440	0.10	mg/kg	27.5	21.9	19.3	22.0	22.1	
barium	7440-39-3	E440	0.50	mg/kg	640	696	590	552	582	
beryllium	7440-41-7	E440	0.10	mg/kg	0.29	0.34	<0.50 ^{DLA}	<0.50 ^{DLA}	0.29	
bismuth	7440-69-9	E440	0.20	mg/kg	7.17	7.25	40.5	19.2	7.58	
boron	7440-42-8	E440	5.0	mg/kg	189	183	180	141	189	
cadmium	7440-43-9	E440	0.020	mg/kg	8.61	9.54	8.55	9.69	8.72	
calcium	7440-70-2	E440	50	mg/kg	109000	132000	117000	106000	121000	
chromium	7440-47-3	E440	0.50	mg/kg	153	482	153	188	298	
cobalt	7440-48-4	E440	0.10	mg/kg	25.5	26.3	61.7	28.2	27.8	
copper	7440-50-8	E440	0.50	mg/kg	3350	4340	2580	22000	4570	
iron	7439-89-6	E440	50	mg/kg	127000	62700	71000	73500	72800	
lead	7439-92-1	E440	0.50	mg/kg	363	392	400	2790	342	
lithium	7439-93-2	E440	2.0	mg/kg	15.4	17.5	26.7	40.0	19.5	
magnesium	7439-95-4	E440	20	mg/kg	10300	12100	10200	9040	9740	
manganese	7439-96-5	E440	1.0	mg/kg	888	985	910	1040	1140	
mercury	7439-97-6	E510	0.0500	mg/kg	0.108	0.0808	0.100	0.0619	0.0789	
molybdenum	7439-98-7	E440	0.10	mg/kg	28.7	50.1	16.1	18.3	20.7	
nickel	7440-02-0	E440	0.50	mg/kg	317	254	226	237	158	
phosphorus	7723-14-0	E440	50	mg/kg	7460	8590	9350	8080	8980	
potassium	7440-09-7	E440	100	mg/kg	3850	4970	4370	4160	4530	
selenium	7782-49-2	E440	0.20	mg/kg	0.31	0.33	<1.00 ^{DLA}	<1.00 ^{DLA}	0.37	
silver	7440-22-4	E440	0.10	mg/kg	6.86	4.68	20.1	22.6	7.69	
sodium	7440-23-5	E440	50	mg/kg	12100	14500	15000	12300	14600	
strontium	7440-24-6	E440	0.50	mg/kg	243	293	262	488	295	
sulfur	7704-34-9	E440	1000	mg/kg	8100	9800	11100	9500	10200	
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	<0.250 ^{DLA}	<0.250 ^{DLA}	<0.050	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2115-A-6	BA2115-A-7	BA2115-A-8	BA2115-A-9	BA2115-A-10
Client sampling date / time					07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21A6783-006	VA21A6783-007	VA21A6783-008	VA21A6783-009	VA21A6783-010	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	500	115	137	315	482	
titanium	7440-32-6	E440	1.0	mg/kg	1420	560	376	877	312	
tungsten	7440-33-7	E440	0.50	mg/kg	12.4	7.14	9.55	6.44	5.62	
uranium	7440-61-1	E440	0.050	mg/kg	1.60	1.98	1.82	2.02	1.55	
vanadium	7440-62-2	E440	0.20	mg/kg	26.4	34.1	24.9	26.6	28.7	
zinc	7440-66-6	E440	2.0	mg/kg	3100	3280	4940	15600	8460	
zirconium	7440-67-7	E440	1.0	mg/kg	1.9	1.3	<5.0 ^{DLA}	<5.0 ^{DLA}	1.9	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.9	11.9	11.9	12.0	11.9	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.93	9.66	9.93	10.1	9.29	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	2.87	2.87	2.87	
pH, TCLP final	----	EPP444	0.010	pH units	6.20	6.27	6.33	6.19	6.30	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	2.14	1.90	2.01	2.01	1.98	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.172	0.190	0.165	0.166	0.213	
calcium, TCLP	7440-70-2	E444	10	mg/L	2100	1960	2060	2040	2010	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.976	0.721	1.61	0.822	0.941	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.587	0.107	1.06	0.834	0.791	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	138	128	123	134	135	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.46	0.46	0.53	0.58	0.46	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2115-A-6	BA2115-A-7	BA2115-A-8	BA2115-A-9	BA2115-A-10
Client sampling date / time					07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00	07-Apr-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A6783-006	VA21A6783-007	VA21A6783-008	VA21A6783-009	VA21A6783-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	44.0	45.7	31.2	39.2	30.9	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2115-A-11	BA2115-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	07-Apr-2021 09:00	07-Apr-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21A6783-011	VA21A6783-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	22.1	23.8	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.4	11.4	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	26000	35100	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	118	141	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	21.5	28.0	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	494	494	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.30	0.30	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	6.84	8.80	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	148	154	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	9.46	13.8	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	105000	126000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	150	170	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	117	142	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	1910	12500	----	----	----	
iron	7439-89-6	E440	50	mg/kg	87400	58900	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	481	508	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	16.3	22.9	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	9740	10500	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	778	805	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	0.407	0.125	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	20.4	481	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	158	259	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	7800	9470	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	4190	4750	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.49	0.35	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	6.86	5.70	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	11600	13200	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	254	293	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	9600	12400	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2115-A-11	BA2115-A-12	----	----	----
Client sampling date / time					07-Apr-2021 09:00	07-Apr-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21A6783-011	VA21A6783-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	102	129	---	---	---	
titanium	7440-32-6	E440	1.0	mg/kg	312	688	---	---	---	
tungsten	7440-33-7	E440	0.50	mg/kg	8.90	9.78	---	---	---	
uranium	7440-61-1	E440	0.050	mg/kg	1.61	1.85	---	---	---	
vanadium	7440-62-2	E440	0.20	mg/kg	26.7	27.2	---	---	---	
zinc	7440-66-6	E440	2.0	mg/kg	3090	4360	---	---	---	
zirconium	7440-67-7	E440	1.0	mg/kg	1.7	2.0	---	---	---	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.9	11.9	---	---	---	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.53	10.0	---	---	---	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	---	---	---	
pH, TCLP final	----	EPP444	0.010	pH units	6.27	6.10	---	---	---	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	---	---	---	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	---	---	---	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	---	---	---	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	---	---	---	
boron, TCLP	7440-42-8	E444	0.50	mg/L	2.07	1.96	---	---	---	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.214	0.192	---	---	---	
calcium, TCLP	7440-70-2	E444	10	mg/L	2080	1990	---	---	---	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	---	---	---	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.610	0.785	---	---	---	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.09	1.43	---	---	---	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	---	---	---	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	0.32	---	---	---	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	133	132	---	---	---	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.64	0.40	---	---	---	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	---	---	---	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	---	---	---	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	---	---	---	
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	---	---	---	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2115-A-11	BA2115-A-12	----	----	----
Client sampling date / time					07-Apr-2021 09:00	07-Apr-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21A6783-011	VA21A6783-012	-----	-----	-----	
					Result	Result	---	---	---	
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	----	----	----	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	45.6	46.4	----	----	----	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	----	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA21A6783	Page	: 1 of 15
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
Contact	: Steve McKinney	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 521 1025	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 13-Apr-2021 10:40
PO	: VANCO 0000050390	Issue Date	: 23-Apr-2021 10:07
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Duplicate outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA21A6783-001	BA2115-A-1	antimony	7440-36-0	E440	60.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21A6783-001	BA2115-A-1	manganese	7439-96-5	E440	132 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21A6783-001	BA2115-A-1	molybdenum	7439-98-7	E440	82.0 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21A6783-001	BA2115-A-1	nickel	7440-02-0	E440	39.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21A6783-001	BA2115-A-1	tungsten	7440-33-7	E440	34.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21A6783-001	BA2115-A-1	zinc	7440-66-6	E440	102 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : High Silver in Soil/Solid by CRC ICPMS										
LDPE bag [CCME.AR] BA2115-A-1	E440.Ag	07-Apr-2021	21-Apr-2021	----	15 days	✓	21-Apr-2021	----	1 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag [CCME.AR] BA2115-A-1	E510	07-Apr-2021	19-Apr-2021	----	13 days	✓	20-Apr-2021	----	1 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag [CCME.AR] BA2115-A-10	E510	07-Apr-2021	19-Apr-2021	----	13 days	✓	20-Apr-2021	----	1 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag [CCME.AR] BA2115-A-11	E510	07-Apr-2021	19-Apr-2021	----	13 days	✓	20-Apr-2021	----	1 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag [CCME.AR] BA2115-A-12	E510	07-Apr-2021	19-Apr-2021	----	13 days	✓	20-Apr-2021	----	1 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag [CCME.AR] BA2115-A-2	E510	07-Apr-2021	19-Apr-2021	----	13 days	✓	20-Apr-2021	----	1 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag [CCME.AR] BA2115-A-3	E510	07-Apr-2021	19-Apr-2021	----	13 days	✓	20-Apr-2021	----	1 days	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag [CCME.AR] BA2115-A-4	E510	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag [CCME.AR] BA2115-A-5	E510	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag [CCME.AR] BA2115-A-6	E510	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag [CCME.AR] BA2115-A-7	E510	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag [CCME.AR] BA2115-A-8	E510	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag [CCME.AR] BA2115-A-9	E510	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag [CCME.AR] BA2115-A-1	E440	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag [CCME.AR] BA2115-A-10	E440	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag [CCME.AR] BA2115-A-11	E440	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag [CCME.AR] BA2115-A-12	E440	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag [CCME.AR] BA2115-A-2	E440	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag [CCME.AR] BA2115-A-3	E440	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag [CCME.AR] BA2115-A-4	E440	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag [CCME.AR] BA2115-A-5	E440	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag [CCME.AR] BA2115-A-6	E440	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag [CCME.AR] BA2115-A-7	E440	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag [CCME.AR] BA2115-A-8	E440	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag [CCME.AR] BA2115-A-9	E440	07-Apr-2021	19-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag [CCME.AR] BA2115-A-1	E144	07-Apr-2021	----	----	----		19-Apr-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag [CCME.AR] BA2115-A-10	E144	07-Apr-2021	----	----	----		19-Apr-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag [CCME.AR] BA2115-A-11	E144	07-Apr-2021	----	----	----		19-Apr-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag [CCME.AR] BA2115-A-12	E144	07-Apr-2021	----	----	----		19-Apr-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag [CCME.AR] BA2115-A-2	E144	07-Apr-2021	----	----	----		19-Apr-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag [CCME.AR] BA2115-A-3	E144	07-Apr-2021	----	----	----		19-Apr-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag [CCME.AR] BA2115-A-4	E144	07-Apr-2021	----	----	----		19-Apr-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag [CCME.AR] BA2115-A-5	E144	07-Apr-2021	----	----	----		19-Apr-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag [CCME.AR] BA2115-A-6	E144	07-Apr-2021	----	----	----		19-Apr-2021	----	----	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag [CCME.AR] BA2115-A-7	E144	07-Apr-2021	----	----	----		19-Apr-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag [CCME.AR] BA2115-A-8	E144	07-Apr-2021	----	----	----		19-Apr-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag [CCME.AR] BA2115-A-9	E144	07-Apr-2021	----	----	----		19-Apr-2021	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag [CCME.AR] BA2115-A-1	E108	07-Apr-2021	20-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag [CCME.AR] BA2115-A-10	E108	07-Apr-2021	20-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag [CCME.AR] BA2115-A-11	E108	07-Apr-2021	20-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag [CCME.AR] BA2115-A-12	E108	07-Apr-2021	20-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag [CCME.AR] BA2115-A-2	E108	07-Apr-2021	20-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag [CCME.AR] BA2115-A-3	E108	07-Apr-2021	20-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag [CCME.AR] BA2115-A-4	E108	07-Apr-2021	20-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag [CCME.AR] BA2115-A-5	E108	07-Apr-2021	20-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag [CCME.AR] BA2115-A-6	E108	07-Apr-2021	20-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag [CCME.AR] BA2115-A-7	E108	07-Apr-2021	20-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag [CCME.AR] BA2115-A-8	E108	07-Apr-2021	20-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag [CCME.AR] BA2115-A-9	E108	07-Apr-2021	20-Apr-2021	----	13 days	✔	20-Apr-2021	----	1 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2115-A-1	E512	18-Apr-2021	----	----	----		19-Apr-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2115-A-10	E512	18-Apr-2021	----	----	----		19-Apr-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2115-A-11	E512	18-Apr-2021	----	----	----		19-Apr-2021	----	13 days	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		
				Rec	Actual			Rec	Actual	Eval
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2115-A-12	E512	18-Apr-2021	----	----	----		19-Apr-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2115-A-2	E512	18-Apr-2021	----	----	----		19-Apr-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2115-A-3	E512	18-Apr-2021	----	----	----		19-Apr-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2115-A-4	E512	18-Apr-2021	----	----	----		19-Apr-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2115-A-5	E512	18-Apr-2021	----	----	----		19-Apr-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2115-A-6	E512	18-Apr-2021	----	----	----		19-Apr-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2115-A-7	E512	18-Apr-2021	----	----	----		19-Apr-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2115-A-8	E512	18-Apr-2021	----	----	----		19-Apr-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2115-A-9	E512	18-Apr-2021	----	----	----		19-Apr-2021	----	13 days	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2115-A-1	E444	18-Apr-2021	----	----	----		19-Apr-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2115-A-10	E444	18-Apr-2021	----	----	----		19-Apr-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2115-A-11	E444	18-Apr-2021	----	----	----		19-Apr-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2115-A-12	E444	18-Apr-2021	----	----	----		19-Apr-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2115-A-2	E444	18-Apr-2021	----	----	----		19-Apr-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2115-A-3	E444	18-Apr-2021	----	----	----		19-Apr-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2115-A-4	E444	18-Apr-2021	----	----	----		19-Apr-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2115-A-5	E444	18-Apr-2021	----	----	----		19-Apr-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2115-A-6	E444	18-Apr-2021	----	----	----		19-Apr-2021	180 days	13 days	✔	



Matrix: Soil/Solid

Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2115-A-7	E444	18-Apr-2021	----	----	----		19-Apr-2021	180 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2115-A-8	E444	18-Apr-2021	----	----	----		19-Apr-2021	180 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2115-A-9	E444	18-Apr-2021	----	----	----		19-Apr-2021	180 days	13 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2115-A-1	EPP444	07-Apr-2021	18-Apr-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2115-A-10	EPP444	07-Apr-2021	18-Apr-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2115-A-11	EPP444	07-Apr-2021	18-Apr-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2115-A-12	EPP444	07-Apr-2021	18-Apr-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2115-A-2	EPP444	07-Apr-2021	18-Apr-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2115-A-3	EPP444	07-Apr-2021	18-Apr-2021	----	----		----	----	----	



Matrix: **Soil/Solid**

Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2115-A-4	EPP444	07-Apr-2021	18-Apr-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2115-A-5	EPP444	07-Apr-2021	18-Apr-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2115-A-6	EPP444	07-Apr-2021	18-Apr-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2115-A-7	EPP444	07-Apr-2021	18-Apr-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2115-A-8	EPP444	07-Apr-2021	18-Apr-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2115-A-9	EPP444	07-Apr-2021	18-Apr-2021	----	----		----	----	----	

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	181390	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	181391	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	181312	1	13	7.6	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	181309	1	13	7.6	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	182654	1	1	100.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	181390	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	181391	2	12	16.6	10.0	✔
Moisture Content by Gravimetry	E144	181312	1	13	7.6	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	181309	1	13	7.6	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	182654	1	1	100.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	181291	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	181390	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	181290	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	181391	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	181312	1	13	7.6	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	181291	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	181290	1	12	8.3	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60°C) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method 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.
High Silver in Soil/Solid by CRC ICPMS	E440.Ag Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method 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.
Metals by CRC ICPMS (TCLP)	E444 Vancouver - Environmental	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl, followed by CVAAS analysis.
Mercury by CVAAS (TCLP)	E512 Vancouver - Environmental	Soil/Solid	SW 846 -1311/245.1 CVAA ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	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.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
Digestion for Silver	EP440.Ag Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)	EPP444 Vancouver - Environmental	Soil/Solid	EPA 1311	Preparation of a Toxicity Characteristic Leaching Procedure (TCLP) solid sample involves particle size reduction, homogenization, then determination of appropriate extraction fluid. A measured portion of fresh subsample is placed in an extraction bottle with the appropriate extraction fluid then tumbled in a rotary extractor for 18+/- 2 hours at 23 +/- 2 C. The liquid leachate is filtered to separate from solids then bottled and prepared for analytical tests.



QUALITY CONTROL REPORT

Work Order : VA21A6783

Page : 1 of 11

Client : Covanta Burnaby Renewable Energy, ULC
Contact : Steve McKinney
Address : 5150 Riverbend Drive
Burnaby BC Canada V3N 4V3
Telephone : 604 521 1025
Project : Weekly Bottom Ash - Suite
PO : VANCO 0000050390
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : Standing Offer (BC work)
No. of samples received : 12
No. of samples analysed : 12

Laboratory : Vancouver - Environmental
Account Manager : Brent Mack
Address : 8081 Lougheed Highway
Burnaby, British Columbia Canada V5A 1W9
Telephone : 778-370-3279
Date Samples Received : 13-Apr-2021 10:40
Date Analysis Commenced : 18-Apr-2021
Issue Date : 23-Apr-2021 10:07

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
● Matrix Spike (MS) Report; Recovery and Acceptance Limits
● Reference Material (RM) Report; Recovery and Acceptance Limits
● Method Blank (MB) Report; Recovery and Acceptance Limits
● Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Laboratory Department. Rows include Angela Ren (Team Leader - Metals), Dee Lee (Analyst), Kim Jensen (Department Manager - Metals), and Ophelia Chiu (Department Manager - Organics).

Page : 2 of 11
Work Order : VA21A6783
Client : Covanta Burnaby Renewable Energy, ULC
Project : Weekly Bottom Ash - Suite



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

= Indicates a QC result that did not meet the ALS DQO.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Soil/Solid

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 181309)											
VA21A6783-001	BA2115-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	11.4	11.4	0.263%	5%	----
Physical Tests (QC Lot: 181312)											
VA21A6783-001	BA2115-A-1	moisture	----	E144	0.25	%	20.6	21.8	5.60%	20%	----
Metals (QC Lot: 181390)											
VA21A6783-001	BA2115-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	0.144	0.101	0.0429	Diff <2x LOR	----
Metals (QC Lot: 181391)											
VA21A6783-001	BA2115-A-1	aluminum	7429-90-5	E440	50	mg/kg	29700	43000	36.6%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	193	103	60.8%	30%	DUP-H
		arsenic	7440-38-2	E440	0.10	mg/kg	24.6	27.7	11.6%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	672	630	6.37%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.31	0.08	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	7.19	7.08	1.66%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	183	185	0.807%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	9.77	8.91	9.21%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	113000	116000	2.17%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	149	201	29.6%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	35.9	31.0	14.7%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	3120	3610	14.5%	30%	----
		iron	7439-89-6	E440	50	mg/kg	77600	79700	2.72%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	423	406	4.27%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	20.4	17.5	15.2%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	11200	10800	3.70%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	766	3730	132%	30%	DUP-H
		molybdenum	7439-98-7	E440	0.10	mg/kg	17.3	41.3	82.0%	40%	DUP-H
		nickel	7440-02-0	E440	0.50	mg/kg	317	213	39.4%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	7730	9020	15.3%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	4380	4640	5.93%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.32	0.39	0.07	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	14100	13600	3.32%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	276	270	2.22%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	9800	10000	1.68%	30%	----



Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 181391) - continued											
VA21A6783-001	BA2115-A-1	thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	137	126	8.70%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	848	943	10.6%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	11.1	7.83	34.7%	30%	DUP-H
		uranium	7440-61-1	E440	0.050	mg/kg	1.76	1.76	0.114%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	31.6	31.2	1.43%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	2970	9100	102%	30%	DUP-H
		zirconium	7440-67-7	E440	1.0	mg/kg	1.2	1.8	0.6	Diff <2x LOR	----

Qualifiers

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 181312)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 181390)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 181391)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 181391) - continued						
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 182654)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 181290)						
antimony, TCLP	7440-36-0	E444	1	mg/L	<1.0	----
arsenic, TCLP	7440-38-2	E444	1	mg/L	<1.0	----
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	----
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	----
boron, TCLP	7440-42-8	E444	0.5	mg/L	<0.50	----
cadmium, TCLP	7440-43-9	E444	0.05	mg/L	<0.050	----
calcium, TCLP	7440-70-2	E444	10	mg/L	<10	----
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	----
cobalt, TCLP	7440-48-4	E444	0.05	mg/L	<0.050	----
copper, TCLP	7440-50-8	E444	0.05	mg/L	<0.050	----
iron, TCLP	7439-89-6	E444	5	mg/L	<5.0	----
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	----
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	<2.5	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	----
selenium, TCLP	7782-49-2	E444	0.1	mg/L	<0.10	----
silver, TCLP	7440-22-4	E444	0.05	mg/L	<0.050	----
thallium, TCLP	7440-28-0	E444	1	mg/L	<1.0	----
uranium, TCLP	7440-61-1	E444	0.2	mg/L	<0.20	----
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	----
TCLP Metals (QCLot: 181291)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 181309)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 181312)									
moisture	----	E144	0.25	%	50 %	99.1	90.0	110	----
Metals (QCLot: 181390)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	104	80.0	120	----
Metals (QCLot: 181391)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	102	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	104	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	100	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	91.1	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	103	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	94.3	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	99.8	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	96.2	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	100	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	100	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	96.6	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	102	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	91.9	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	102	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	97.9	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	101	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	97.3	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	98.6	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	99.5	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	101	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	103	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	101	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	97.7	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	95.9	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	101	80.0	120	----



Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 181391) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	99.9	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	97.4	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	98.7	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	101	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	101	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	103	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	103	80.0	120	----
Metals (QCLot: 182654)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	106	80.0	120	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Metals (QCLot: 181290)										
VA21A6783-001	BA2115-A-1	antimony, TCLP	7440-36-0	E444	4.9 mg/L	5 mg/L	98.1	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.7 mg/L	5 mg/L	93.7	50.0	140	----
		barium, TCLP	7440-39-3	E444	12.6 mg/L	12.5 mg/L	101	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.236 mg/L	0.25 mg/L	94.4	50.0	140	----
		boron, TCLP	7440-42-8	E444	8.67 mg/L	10 mg/L	86.7	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		calcium, TCLP	7440-70-2	E444	ND mg/L	250 mg/L	ND	50.0	140	----
		chromium, TCLP	7440-47-3	E444	1.13 mg/L	1.25 mg/L	90.7	50.0	140	----
		cobalt, TCLP	7440-48-4	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		copper, TCLP	7440-50-8	E444	2.13 mg/L	2.5 mg/L	85.3	50.0	140	----
		iron, TCLP	7439-89-6	E444	223 mg/L	250 mg/L	89.2	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.88 mg/L	10 mg/L	98.8	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	230 mg/L	250 mg/L	92.0	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.15 mg/L	2.5 mg/L	85.9	50.0	140	----
		selenium, TCLP	7782-49-2	E444	5.00 mg/L	5 mg/L	100	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.109 mg/L	0.1 mg/L	109	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.8 mg/L	5 mg/L	95.5	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.77 mg/L	5 mg/L	95.4	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.68 mg/L	0.75 mg/L	90.3	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
		zirconium, TCLP	7440-67-7	E444	9 mg/L	10 mg/L	87.8	70.0	130	----
TCLP Metals (QCLot: 181291)										
VA21A6783-001	BA2115-A-1	mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	92.1	50.0	140	----



Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 181390)									
QC-181390-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	101	70.0	130	----
Metals (QCLot: 181391)									
QC-181391-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	103	70.0	130	----
QC-181391-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	104	70.0	130	----
QC-181391-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	103	70.0	130	----
QC-181391-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	99.4	70.0	130	----
QC-181391-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	95.1	70.0	130	----
QC-181391-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	116	40.0	160	----
QC-181391-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	119	70.0	130	----
QC-181391-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	102	70.0	130	----
QC-181391-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	106	70.0	130	----
QC-181391-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	98.8	70.0	130	----
QC-181391-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	96.9	70.0	130	----
QC-181391-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	101	70.0	130	----
QC-181391-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	97.1	70.0	130	----
QC-181391-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	98.0	70.0	130	----
QC-181391-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	99.4	70.0	130	----
QC-181391-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	103	70.0	130	----
QC-181391-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	104	70.0	130	----
QC-181391-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	96.6	70.0	130	----
QC-181391-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	102	70.0	130	----
QC-181391-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	107	70.0	130	----
QC-181391-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	98.0	70.0	130	----
QC-181391-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	102	70.0	130	----
QC-181391-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	99.5	40.0	160	----
QC-181391-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	104	70.0	130	----
QC-181391-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	115	70.0	130	----
QC-181391-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	105	70.0	130	----
QC-181391-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	103	70.0	130	----

Page : 11 of 11
 Work Order : VA21A6783
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash - Suite



Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 181391) - continued									
QC-181391-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	98.7	70.0	130	----
QC-181391-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	108	70.0	130	----



Chain of Custody / Analytical Request Form

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COC # _____

Page ____ of ____

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)	
Company:	Covanta Energy	<input type="checkbox"/> Standard <input type="checkbox"/> Other <input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax		<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days) <input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
Contact:	Steve Mckinney / Dan Skrypnik	Email 1:	smckinney@covanta.com		
Address:	5150 Riverbend Drive Burnaby BC	Email 2:	rihanson4@covanta.com		
Phone:	604-521-1025 Fax: _____	Email 3:	dskrypnik@covanta.com		
		<input type="checkbox"/> Yes <input type="checkbox"/> No Email: brent.kirkpatrick@metrovancover.org Sarah.Wellman@metrovancover.org			

Invoice To Same as Report ?		Client / Project Information		Analysis Request						
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input type="checkbox"/> No		Job #:		Please indicate below Filtered, Preserved or both (F, P, F/P)						
Company:		PO / AFE: PO# 46693 Weekly Bottom Ash - Suite		MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)			Number of Containers
Contact:		LSD: (includes 2:1 pH)								
Address:										
Phone: _____ Fax: _____		Quote #:								

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
1	BA2115-A-1	07-Apr-21	9:00	Soil	X	X		X			1
2	BA2115-A-2	07-Apr-21	9:00	Soil	X	X		X			1
3	BA2115-A-3	07-Apr-21	9:00	Soil	X	X		X			1
4	BA2115-A-4	07-Apr-21	9:00	Soil	X	X		X			1
5	BA2115-A-5	07-Apr-21	9:00	Soil	X	X		X			1
6	BA2115-A-6	07-Apr-21	9:00	Soil	X	X		X			1
7	BA2115-A-7	07-Apr-21	9:00	Soil	X	X		X			1
8	BA2115-A-8	07-Apr-21	9:00	Soil	X	X		X			1
9	BA2115-A-9	07-Apr-21	9:00	Soil	X	X		X			1
10	BA2115-A-10	07-Apr-21	9:00	Soil	X	X		X			1
11	BA2115-A-11	07-Apr-21	9:00	Soil	X	X		X			1
12	BA2115-A-12	07-Apr-21	9:00	Soil	X	X		X			1

Environmental Division
Vancouver
Work Order Reference
VA21A6783



Telephone : +1 604 253-1888

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>	13-Apr-21	0800	(AI) <i>[Signature]</i>	APR 13 2021	10:40 am	18 °C				Yes / No ? If Yes add SIF