

Bottom Ash Data

2021 Week 19

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on May 21, 2021. The data represents bottom ash composite results for week 19 of 2021 (May 2, 2021 to May 8, 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 : **VA21A8952**
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 : 11-May-2021 12:30
Date Analysis Commenced : 13-May-2021
Issue Date : 19-May-2021 11:17

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
Monica Ko	Lab Assistant	Organics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, 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
g	grams
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
mL	millilitre
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.



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2119-A-1	BA2119-A-2	BA2119-A-3	BA2119-A-4	BA2119-A-5
(Matrix: Soil/Solid)					Client sampling date / time	05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A8952-001	VA21A8952-002	VA21A8952-003	VA21A8952-004	VA21A8952-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	19.6	19.8	20.3	19.6	20.5	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.1	11.1	11.0	11.2	11.1	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	44200	27700	36500	31300	40400	
antimony	7440-36-0	E440	0.10	mg/kg	91.9	123	106	126	126	
arsenic	7440-38-2	E440	0.10	mg/kg	23.5	25.0	30.1	37.4	28.6	
barium	7440-39-3	E440	0.50	mg/kg	572	602	614	663	639	
beryllium	7440-41-7	E440	0.10	mg/kg	0.39	0.40	0.38	0.42	0.38	
bismuth	7440-69-9	E440	0.20	mg/kg	6.05	16.1	8.29	7.59	12.4	
boron	7440-42-8	E440	5.0	mg/kg	197	246	252	201	252	
cadmium	7440-43-9	E440	0.020	mg/kg	10.4	14.3	23.1	12.8	13.4	
calcium	7440-70-2	E440	50	mg/kg	124000	136000	134000	135000	134000	
chromium	7440-47-3	E440	0.50	mg/kg	184	199	188	176	168	
cobalt	7440-48-4	E440	0.10	mg/kg	22.7	81.0	93.3	25.9	71.2	
copper	7440-50-8	E440	0.50	mg/kg	1230	2390	1540	2280	1840	
iron	7439-89-6	E440	50	mg/kg	58200	97200	71800	74600	75900	
lead	7439-92-1	E440	0.50	mg/kg	348	778	486	512	698	
lithium	7439-93-2	E440	2.0	mg/kg	20.9	23.2	23.2	20.4	33.9	
magnesium	7439-95-4	E440	20	mg/kg	11500	11400	10400	10800	11500	
manganese	7439-96-5	E440	1.0	mg/kg	843	999	815	2170	973	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	37.6	20.5	20.4	24.4	22.9	
nickel	7440-02-0	E440	0.50	mg/kg	145	101	175	111	208	
phosphorus	7723-14-0	E440	50	mg/kg	9800	10700	10600	10700	11200	
potassium	7440-09-7	E440	100	mg/kg	5030	4760	5510	5170	4990	
selenium	7782-49-2	E440	0.20	mg/kg	0.39	0.42	0.40	0.38	0.46	
silver	7440-22-4	E440	0.10	mg/kg	4.58	17.8	5.97	6.39	7.25	
sodium	7440-23-5	E440	50	mg/kg	16200	14400	15700	15400	14600	
strontium	7440-24-6	E440	0.50	mg/kg	285	306	295	302	319	
sulfur	7704-34-9	E440	1000	mg/kg	11800	13400	12700	13700	13500	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2119-A-1	BA2119-A-2	BA2119-A-3	BA2119-A-4	BA2119-A-5
Client sampling date / time					05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21A8952-001	VA21A8952-002	VA21A8952-003	VA21A8952-004	VA21A8952-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.050	0.057	0.079	0.061	0.063	
tin	7440-31-5	E440	2.0	mg/kg	91.8	142	106	122	149	
titanium	7440-32-6	E440	1.0	mg/kg	448	378	359	353	469	
tungsten	7440-33-7	E440	0.50	mg/kg	7.34	11.5	8.49	11.9	10.3	
uranium	7440-61-1	E440	0.050	mg/kg	4.28	4.73	4.53	5.13	4.95	
vanadium	7440-62-2	E440	0.20	mg/kg	46.0	46.7	43.2	50.5	49.3	
zinc	7440-66-6	E440	2.0	mg/kg	3570	4060	6290	5090	4560	
zirconium	7440-67-7	E440	1.0	mg/kg	1.8	<1.0	1.4	1.1	1.5	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.9	11.8	11.8	11.8	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.74	8.90	8.64	8.96	8.50	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.86	2.86	2.86	2.86	2.86	
pH, TCLP final	----	EPP444	0.010	pH units	5.85	6.16	6.55	6.36	6.19	
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	2.33	2.33	2.35	2.28	2.37	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.404	0.199	0.274	0.212	0.208	
calcium, TCLP	7440-70-2	E444	10	mg/L	1950	2030	1980	1980	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	0.762	0.428	1.03	1.11	1.18	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.01	0.926	1.20	0.953	1.13	
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	2.31	<0.25	<0.25	<0.25	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	140	140	142	144	145	
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	0.52	0.63	0.79	0.45	0.47	
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	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2119-A-1	BA2119-A-2	BA2119-A-3	BA2119-A-4	BA2119-A-5
Client sampling date / time					05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A8952-001	VA21A8952-002	VA21A8952-003	VA21A8952-004	VA21A8952-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
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	47.4	46.1	46.1	34.4	38.4	38.4
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	BA2119-A-6	BA2119-A-7	BA2119-A-8	BA2119-A-9	BA2119-A-10
Client sampling date / time					05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21A8952-006	VA21A8952-007	VA21A8952-008	VA21A8952-009	VA21A8952-010	
					Result	Result	Result	Result	Result	
Sample Preparation										
weight, extraction (dry)	----	EP440.Ag	0.01	g	----	0.251	----	----	----	
final volume	----	EP440.Ag	0.1	mL	----	50	----	----	----	
Physical Tests										
moisture	----	E144	0.25	%	19.6	20.1	20.0	20.8	18.0	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.2	11.1	11.1	11.1	11.2	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	40100	36600	32800	29800	29400	
antimony	7440-36-0	E440	0.10	mg/kg	143	134	192	129	146	
arsenic	7440-38-2	E440	0.10	mg/kg	30.6	27.0	33.5	28.4	32.0	
barium	7440-39-3	E440	0.50	mg/kg	642	515	539	599	562	
beryllium	7440-41-7	E440	0.10	mg/kg	0.45	0.41	0.41	0.37	0.46	
bismuth	7440-69-9	E440	0.20	mg/kg	7.85	10.8	13.6	14.6	12.8	
boron	7440-42-8	E440	5.0	mg/kg	226	210	192	226	214	
cadmium	7440-43-9	E440	0.020	mg/kg	11.3	14.9	16.5	14.2	17.3	
calcium	7440-70-2	E440	50	mg/kg	121000	136000	145000	126000	141000	
chromium	7440-47-3	E440	0.50	mg/kg	306	168	146	185	204	
cobalt	7440-48-4	E440	0.10	mg/kg	27.2	33.1	60.1	53.8	58.5	
copper	7440-50-8	E440	0.50	mg/kg	2800	2340	2830	6380	2460	
iron	7439-89-6	E440	50	mg/kg	98300	68800	70800	79200	74700	
lead	7439-92-1	E440	0.50	mg/kg	408	475	2730	478	1600	
lithium	7439-93-2	E440	2.0	mg/kg	18.5	20.6	21.7	22.3	24.0	
magnesium	7439-95-4	E440	20	mg/kg	11500	11700	11700	11800	12200	
manganese	7439-96-5	E440	1.0	mg/kg	1100	1600	925	920	984	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	36.1	20.1	21.5	20.0	22.4	
nickel	7440-02-0	E440	0.50	mg/kg	307	186	127	231	160	
phosphorus	7723-14-0	E440	50	mg/kg	10000	11500	11300	10600	10700	
potassium	7440-09-7	E440	100	mg/kg	4660	4560	5270	5060	5190	
selenium	7782-49-2	E440	0.20	mg/kg	0.39	0.43	0.63	0.45	0.53	
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	8.19	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	6.89	----	10.3	8.23	7.70	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2119-A-6	BA2119-A-7	BA2119-A-8	BA2119-A-9	BA2119-A-10
Client sampling date / time					05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21A8952-006	VA21A8952-007	VA21A8952-008	VA21A8952-009	VA21A8952-010	
					Result	Result	Result	Result	Result	
Metals										
sodium	7440-23-5	E440	50	mg/kg	14300	13200	14100	14400	14200	
strontium	7440-24-6	E440	0.50	mg/kg	278	312	324	324	352	
sulfur	7704-34-9	E440	1000	mg/kg	11900	13800	16600	13300	15600	
thallium	7440-28-0	E440	0.050	mg/kg	0.052	0.062	0.068	0.056	0.092	
tin	7440-31-5	E440	2.0	mg/kg	131	1360	148	168	319	
titanium	7440-32-6	E440	1.0	mg/kg	853	430	470	358	370	
tungsten	7440-33-7	E440	0.50	mg/kg	11.9	20.3	14.8	10.9	19.8	
uranium	7440-61-1	E440	0.050	mg/kg	4.33	5.31	5.53	4.96	5.60	
vanadium	7440-62-2	E440	0.20	mg/kg	44.4	48.8	50.0	51.3	51.9	
zinc	7440-66-6	E440	2.0	mg/kg	5410	5120	5010	6150	7430	
zirconium	7440-67-7	E440	1.0	mg/kg	1.2	1.8	1.2	1.1	1.1	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.9	11.8	11.8	11.9	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.90	9.05	8.96	9.04	9.26	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.86	2.86	2.86	2.86	2.86	
pH, TCLP final	----	EPP444	0.010	pH units	6.22	6.00	5.96	6.00	6.00	
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	2.32	2.40	2.22	2.20	2.35	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.214	0.202	0.350	0.442	0.225	
calcium, TCLP	7440-70-2	E444	10	mg/L	1900	1970	1980	1940	1990	
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	0.946	0.683	0.600	0.467	1.46	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.09	0.508	0.481	1.06	0.924	
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	0.39	<0.25	<0.25	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	149	138	139	143	138	
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	0.52	0.49	0.74	0.68	0.48	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2119-A-6	BA2119-A-7	BA2119-A-8	BA2119-A-9	BA2119-A-10
Client sampling date / time					05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00	05-May-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A8952-006	VA21A8952-007	VA21A8952-008	VA21A8952-009	VA21A8952-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<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	<0.050
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	53.0	54.2	52.0	40.1	51.0	51.0
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					Client sample ID	BA2119-A-11	BA2119-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	05-May-2021 09:00	05-May-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21A8952-011	VA21A8952-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	17.9	19.2	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.1	11.1	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	31200	26300	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	100	124	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	21.8	27.7	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	614	508	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.35	0.35	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	6.41	8.30	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	175	194	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	11.0	12.7	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	117000	121000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	143	217	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	82.5	26.4	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	1240	6290	----	----	----	
iron	7439-89-6	E440	50	mg/kg	69400	77200	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	345	502	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	22.4	26.6	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	10100	10900	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	852	990	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	17.2	17.4	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	246	247	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	10600	9600	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	4590	4100	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.37	0.34	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	5.24	6.66	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	14200	12000	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	284	278	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	9900	12400	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	0.057	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2119-A-11	BA2119-A-12	----	----	----
Client sampling date / time					05-May-2021 09:00	05-May-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21A8952-011	VA21A8952-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	106	124	---	---	---	
titanium	7440-32-6	E440	1.0	mg/kg	335	286	---	---	---	
tungsten	7440-33-7	E440	0.50	mg/kg	11.1	11.4	---	---	---	
uranium	7440-61-1	E440	0.050	mg/kg	4.09	4.53	---	---	---	
vanadium	7440-62-2	E440	0.20	mg/kg	42.3	53.1	---	---	---	
zinc	7440-66-6	E440	2.0	mg/kg	3280	3630	---	---	---	
zirconium	7440-67-7	E440	1.0	mg/kg	1.2	1.2	---	---	---	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.9	---	---	---	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.36	9.03	---	---	---	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.86	2.86	---	---	---	
pH, TCLP final	----	EPP444	0.010	pH units	6.07	6.11	---	---	---	
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	2.26	2.36	---	---	---	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.192	0.246	---	---	---	
calcium, TCLP	7440-70-2	E444	10	mg/L	2010	1960	---	---	---	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	---	---	---	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.611	0.718	---	---	---	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.632	0.343	---	---	---	
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	<0.25	---	---	---	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	144	144	---	---	---	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.57	0.60	---	---	---	
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	BA2119-A-11	BA2119-A-12	----	----	----
					Client sampling date / time	05-May-2021 09:00	05-May-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21A8952-011	VA21A8952-012	-----	-----	-----	
					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	48.6	41.3	----	----	----	
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	: VA21A8952	Page	: 1 of 14
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	: 11-May-2021 12:30
PO	: VANCO 0000050390	Issue Date	: 19-May-2021 11:17
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 Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- 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.



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 BA2119-A-7	E440.Ag	05-May-2021	17-May-2021	----	13 days	✓	18-May-2021	----	1 days		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2119-A-1	E510	05-May-2021	14-May-2021	----	10 days	✓	15-May-2021	28 days	2 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2119-A-10	E510	05-May-2021	14-May-2021	----	10 days	✓	15-May-2021	28 days	2 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2119-A-11	E510	05-May-2021	14-May-2021	----	10 days	✓	15-May-2021	28 days	2 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2119-A-12	E510	05-May-2021	14-May-2021	----	10 days	✓	15-May-2021	28 days	2 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2119-A-2	E510	05-May-2021	14-May-2021	----	10 days	✓	15-May-2021	28 days	2 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2119-A-3	E510	05-May-2021	14-May-2021	----	10 days	✓	15-May-2021	28 days	2 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 BA2119-A-4	E510	05-May-2021	14-May-2021	----	10 days	✔	15-May-2021	28 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2119-A-5	E510	05-May-2021	14-May-2021	----	10 days	✔	15-May-2021	28 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2119-A-6	E510	05-May-2021	14-May-2021	----	10 days	✔	15-May-2021	28 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2119-A-7	E510	05-May-2021	14-May-2021	----	10 days	✔	15-May-2021	28 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2119-A-8	E510	05-May-2021	14-May-2021	----	10 days	✔	15-May-2021	28 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2119-A-9	E510	05-May-2021	14-May-2021	----	10 days	✔	15-May-2021	28 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2119-A-1	E440	05-May-2021	14-May-2021	----	10 days	✔	16-May-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2119-A-10	E440	05-May-2021	14-May-2021	----	10 days	✔	16-May-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2119-A-11	E440	05-May-2021	14-May-2021	----	10 days	✔	16-May-2021	180 days	3 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 BA2119-A-12	E440	05-May-2021	14-May-2021	----	10 days	✔	16-May-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2119-A-2	E440	05-May-2021	14-May-2021	----	10 days	✔	16-May-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2119-A-3	E440	05-May-2021	14-May-2021	----	10 days	✔	16-May-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2119-A-4	E440	05-May-2021	14-May-2021	----	10 days	✔	16-May-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2119-A-5	E440	05-May-2021	14-May-2021	----	10 days	✔	16-May-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2119-A-6	E440	05-May-2021	14-May-2021	----	10 days	✔	16-May-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2119-A-7	E440	05-May-2021	14-May-2021	----	10 days	✔	16-May-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2119-A-8	E440	05-May-2021	14-May-2021	----	10 days	✔	16-May-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2119-A-9	E440	05-May-2021	14-May-2021	----	10 days	✔	16-May-2021	180 days	3 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 BA2119-A-1	E144	05-May-2021	----	----	----		13-May-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2119-A-10	E144	05-May-2021	----	----	----		13-May-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2119-A-11	E144	05-May-2021	----	----	----		13-May-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2119-A-12	E144	05-May-2021	----	----	----		13-May-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2119-A-2	E144	05-May-2021	----	----	----		13-May-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2119-A-3	E144	05-May-2021	----	----	----		13-May-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2119-A-4	E144	05-May-2021	----	----	----		13-May-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2119-A-5	E144	05-May-2021	----	----	----		13-May-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2119-A-6	E144	05-May-2021	----	----	----		13-May-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 BA2119-A-7	E144	05-May-2021	----	----	----		13-May-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2119-A-8	E144	05-May-2021	----	----	----		13-May-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2119-A-9	E144	05-May-2021	----	----	----		13-May-2021	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2119-A-1	E108	05-May-2021	14-May-2021	----	10 days	✔	18-May-2021	30 days	4 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2119-A-10	E108	05-May-2021	14-May-2021	----	10 days	✔	18-May-2021	30 days	4 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2119-A-11	E108	05-May-2021	14-May-2021	----	10 days	✔	18-May-2021	30 days	4 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2119-A-12	E108	05-May-2021	14-May-2021	----	10 days	✔	18-May-2021	30 days	4 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2119-A-2	E108	05-May-2021	14-May-2021	----	10 days	✔	18-May-2021	30 days	4 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2119-A-3	E108	05-May-2021	14-May-2021	----	10 days	✔	18-May-2021	30 days	4 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 BA2119-A-4	E108	05-May-2021	14-May-2021	----	10 days	✔	18-May-2021	30 days	4 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2119-A-5	E108	05-May-2021	14-May-2021	----	10 days	✔	18-May-2021	30 days	4 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2119-A-6	E108	05-May-2021	14-May-2021	----	10 days	✔	18-May-2021	30 days	4 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2119-A-7	E108	05-May-2021	14-May-2021	----	10 days	✔	18-May-2021	30 days	4 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2119-A-8	E108	05-May-2021	14-May-2021	----	10 days	✔	18-May-2021	30 days	4 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2119-A-9	E108	05-May-2021	14-May-2021	----	10 days	✔	18-May-2021	30 days	4 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2119-A-1	E512	14-May-2021	----	----	----		17-May-2021	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2119-A-10	E512	14-May-2021	----	----	----		17-May-2021	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2119-A-11	E512	14-May-2021	----	----	----		17-May-2021	28 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 : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2119-A-12	E512	14-May-2021	----	----	----		17-May-2021	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2119-A-2	E512	14-May-2021	----	----	----		17-May-2021	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2119-A-3	E512	14-May-2021	----	----	----		17-May-2021	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2119-A-4	E512	14-May-2021	----	----	----		17-May-2021	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2119-A-5	E512	14-May-2021	----	----	----		17-May-2021	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2119-A-6	E512	14-May-2021	----	----	----		17-May-2021	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2119-A-7	E512	14-May-2021	----	----	----		17-May-2021	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2119-A-8	E512	14-May-2021	----	----	----		17-May-2021	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2119-A-9	E512	14-May-2021	----	----	----		17-May-2021	28 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) BA2119-A-1	E444	14-May-2021	----	----	----		17-May-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2119-A-10	E444	14-May-2021	----	----	----		17-May-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2119-A-11	E444	14-May-2021	----	----	----		17-May-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2119-A-12	E444	14-May-2021	----	----	----		17-May-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2119-A-2	E444	14-May-2021	----	----	----		17-May-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2119-A-3	E444	14-May-2021	----	----	----		17-May-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2119-A-4	E444	14-May-2021	----	----	----		17-May-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2119-A-5	E444	14-May-2021	----	----	----		17-May-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2119-A-6	E444	14-May-2021	----	----	----		17-May-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) BA2119-A-7	E444	14-May-2021	----	----	----		17-May-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2119-A-8	E444	14-May-2021	----	----	----		17-May-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2119-A-9	E444	14-May-2021	----	----	----		17-May-2021	180 days	13 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2119-A-1	EPP444	05-May-2021	14-May-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2119-A-10	EPP444	05-May-2021	14-May-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2119-A-11	EPP444	05-May-2021	14-May-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2119-A-12	EPP444	05-May-2021	14-May-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2119-A-2	EPP444	05-May-2021	14-May-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2119-A-3	EPP444	05-May-2021	14-May-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: 28 day HT (e.g. Hg, CrVI) BA2119-A-4	EPP444	05-May-2021	14-May-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2119-A-5	EPP444	05-May-2021	14-May-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2119-A-6	EPP444	05-May-2021	14-May-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2119-A-7	EPP444	05-May-2021	14-May-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2119-A-8	EPP444	05-May-2021	14-May-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2119-A-9	EPP444	05-May-2021	14-May-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	196891	1	17	5.8	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	196890	1	17	5.8	5.0	✔
Moisture Content by Gravimetry	E144	196895	1	17	5.8	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	196892	1	17	5.8	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	199622	1	1	100.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	196891	2	17	11.7	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	196890	2	17	11.7	10.0	✔
Moisture Content by Gravimetry	E144	196895	1	17	5.8	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	196892	1	17	5.8	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	199622	1	1	100.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	198900	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	196891	1	17	5.8	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	198901	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	196890	1	17	5.8	5.0	✔
Moisture Content by Gravimetry	E144	196895	1	17	5.8	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	198900	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	198901	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 : **VA21A8952**

Page : 1 of 12

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 : 11-May-2021 12:30
 Date Analysis Commenced : 13-May-2021
 Issue Date : 19-May-2021 11:17

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.

Signatories	Position	Laboratory Department
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Monica Ko	Lab Assistant	Organics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia

Page : 2 of 12
Work Order : VA21A8952
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: 196892)											
VA21A8921-002	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	7.87	7.90	0.4%	5%	----
Physical Tests (QC Lot: 196895)											
VA21A8921-002	Anonymous	moisture	----	E144	0.25	%	6.35	6.39	0.705%	20%	----
Metals (QC Lot: 196890)											
VA21A8921-002	Anonymous	aluminum	7429-90-5	E440	50	mg/kg	9470 µg/g	9810	3.55%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.30 µg/g	0.27	0.03	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	4.09 µg/g	3.93	3.89%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	55.8 µg/g	50.3	10.3%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.21 µg/g	0.22	0.02	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20 µg/g	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	<5.0 µg/g	<5.0	0	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.109 µg/g	0.104	0.006	Diff <2x LOR	----
		calcium	7440-70-2	E440	50	mg/kg	5850 µg/g	6170	5.38%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	18.8 µg/g	19.1	1.56%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	6.82 µg/g	6.94	1.65%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	15.4 µg/g	13.9	10.2%	30%	----
		iron	7439-89-6	E440	50	mg/kg	18000 µg/g	18100	0.697%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	5.19 µg/g	4.93	5.02%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	7.8 µg/g	8.6	0.9	Diff <2x LOR	----
		magnesium	7439-95-4	E440	20	mg/kg	6160 µg/g	6320	2.66%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	336 µg/g	340	1.29%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	0.50 µg/g	0.46	0.04	Diff <2x LOR	----
		nickel	7440-02-0	E440	0.50	mg/kg	22.3 µg/g	24.1	7.89%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	501 µg/g	537	6.92%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	570 µg/g	580	2.50%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	<0.20 µg/g	<0.20	0	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	0.13 µg/g	0.11	0.02	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	221 µg/g	250	28	Diff <2x LOR	----
		strontium	7440-24-6	E440	0.50	mg/kg	26.1 µg/g	28.1	7.20%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	<1000 µg/g	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.051 µg/g	0.051	0.0004	Diff <2x LOR	----



Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
Metals (QC Lot: 196890) - continued											
VA21A8921-002	Anonymous	tin	7440-31-5	E440	2.0	mg/kg	<2.0 µg/g	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	741 µg/g	791	6.56%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50 µg/g	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	0.257 µg/g	0.285	0.028	Diff <2x LOR	----
		vanadium	7440-62-2	E440	0.20	mg/kg	39.1 µg/g	39.5	1.00%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	41.7 µg/g	40.5	2.76%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	2.9 µg/g	3.1	0.2	Diff <2x LOR	----
Metals (QC Lot: 196891)											
VA21A8921-002	Anonymous	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500 µg/g	<0.0500	0	Diff <2x LOR	----



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
Sample Preparation (QCLot: 199622)						
final volume	----	EP440.Ag	0.1	mL	50	----
weight, extraction (dry)	----	EP440.Ag	0.01	g	1	----
Physical Tests (QCLot: 196895)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 196890)						
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	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 196890) - continued						
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
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: 196891)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 199622)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 198900)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 198901)						
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	----

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Work Order : VA21A8952
Client : Covanta Burnaby Renewable Energy, ULC
Project : Weekly Bottom Ash - Suite





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				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 196892)									
pH (1:2 soil:water)	---	E108	---	pH units	6 pH units	99.5	95.0	105	---
Physical Tests (QCLot: 196895)									
moisture	---	E144	0.25	%	50 %	101	90.0	110	---
Metals (QCLot: 196890)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	101	80.0	120	---
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	114	80.0	120	---
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	104	80.0	120	---
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	---
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	109	80.0	120	---
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	100	80.0	120	---
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	106	80.0	120	---
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	105	80.0	120	---
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	106	80.0	120	---
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	---
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	102	80.0	120	---
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	---
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	100	80.0	120	---
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	109	80.0	120	---
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	109	80.0	120	---
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	108	80.0	120	---
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	104	80.0	120	---
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	111	80.0	120	---
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	---
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	111	80.0	120	---
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	104	80.0	120	---
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	104	80.0	120	---
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	101	80.0	120	---
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	105	80.0	120	---
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	110	80.0	120	---
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	111	80.0	120	---
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	107	80.0	120	---
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	105	80.0	120	---
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	106	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: 196890) - continued									
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	106	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	98.5	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	103	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	107	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	105	80.0	120	----
Metals (QCLot: 196891)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	90.8	80.0	120	----
Metals (QCLot: 199622)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	98.9	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: 198900)										
VA21A8952-001	BA2119-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	102	50.0	140	----
TCLP Metals (QCLot: 198901)										
VA21A8952-001	BA2119-A-1	antimony, TCLP	7440-36-0	E444	5.1 mg/L	5 mg/L	103	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.8 mg/L	5 mg/L	96.6	50.0	140	----
		barium, TCLP	7440-39-3	E444	13.3 mg/L	12.5 mg/L	106	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.241 mg/L	0.25 mg/L	96.3	50.0	140	----
		boron, TCLP	7440-42-8	E444	10.3 mg/L	10 mg/L	103	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	1.21 mg/L	1.25 mg/L	96.6	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	2.26 mg/L	2.5 mg/L	90.4	50.0	140	----
		iron, TCLP	7439-89-6	E444	239 mg/L	250 mg/L	95.7	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.93 mg/L	10 mg/L	99.3	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	279 mg/L	250 mg/L	112	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.31 mg/L	2.5 mg/L	92.3	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	0.114 mg/L	0.1 mg/L	114	50.0	140	----
		thallium, TCLP	7440-28-0	E444	5.0 mg/L	5 mg/L	99.4	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.92 mg/L	5 mg/L	98.4	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.72 mg/L	0.75 mg/L	95.6	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	94.0	70.0	130	----



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: 196890)									
QC-196890-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	106	70.0	130	----
QC-196890-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	110	70.0	130	----
QC-196890-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	122	70.0	130	----
QC-196890-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	106	70.0	130	----
QC-196890-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	114	70.0	130	----
QC-196890-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	135	40.0	160	----
QC-196890-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	100	70.0	130	----
QC-196890-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	108	70.0	130	----
QC-196890-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	114	70.0	130	----
QC-196890-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	105	70.0	130	----
QC-196890-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	103	70.0	130	----
QC-196890-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	106	70.0	130	----
QC-196890-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	111	70.0	130	----
QC-196890-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	114	70.0	130	----
QC-196890-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	110	70.0	130	----
QC-196890-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	113	70.0	130	----
QC-196890-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	111	70.0	130	----
QC-196890-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	104	70.0	130	----
QC-196890-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	102	70.0	130	----
QC-196890-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	115	70.0	130	----
QC-196890-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	106	70.0	130	----
QC-196890-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	113	70.0	130	----
QC-196890-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	105	40.0	160	----
QC-196890-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	107	70.0	130	----
QC-196890-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	126	70.0	130	----
QC-196890-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	111	70.0	130	----
QC-196890-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	107	70.0	130	----
QC-196890-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	105	70.0	130	----
QC-196890-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	112	70.0	130	----

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 Work Order : VA21A8952
 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: 196891)									
QC-196891-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	95.0	70.0	130	----



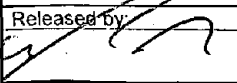

Report To			Report Format / Distribution			Service Requested (Rush for routine analysis subject to availability)					
Company: Covanta Energy			<input type="checkbox"/> Standard <input type="checkbox"/> Other			<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)					
Contact: Steve Mckinney / Dan Skrypnik			<input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax			<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT					
Address: 5150 Riverbend Drive Burnaby BC			Email 1: smckinney@covanta.com			<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT					
Phone: 604-521-1025			Email 2: rjohnson4@covanta.com			<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT					
Fax: <input type="checkbox"/> Yes <input type="checkbox"/> No			Email 3: dskrypnik@covanta.com			Analysis Request					
			brent.kirkpatrick@metrovancover.org								
			Sarah.Wellman@metrovancover.org								

Invoice To Same as Report?			Client / Project Information			Please indicate below Filtered, Preserved or both (F, P, F/P)																																		
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input type="checkbox"/> No			Job #:			<table border="1"> <tr> <td rowspan="4">MET-TCLP-VA (all metals, Hg)</td> <td rowspan="4">MOISTURE</td> <td rowspan="4">Chrome 6</td> <td rowspan="4">MET-CSR+FULL-VA (all metals)</td> <td colspan="6"></td> <td rowspan="4">Number of Containers</td> </tr> <tr> <td colspan="6"></td> </tr> <tr> <td colspan="6"></td> </tr> <tr> <td colspan="6"></td> </tr> </table>						MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)							Number of Containers																		
MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)													Number of Containers																								
Company:			PO / AFE: PO# 46693 Weekly Bottom Ash - Suite																																					
Contact:			LSD: (includes 2:1 pH)																																					
Address:			Quote #:																																					
Phone:			Fax:																																					

Lab Work Order # (lab use only)		ALS Contact:	Sampler:									
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)				Number of Containers
BA2119-A-1	Environmental Division Vancouver Work Order Reference VA21A8952  Telephone : +1 604 263 4188	05-May-21	9:00	Soil	X	X		X				1
BA2119-A-2		05-May-21	9:00	Soil	X	X		X				1
BA2119-A-3		05-May-21	9:00	Soil	X	X		X				1
BA2119-A-4		05-May-21	9:00	Soil	X	X		X				1
BA2119-A-5		05-May-21	9:00	Soil	X	X		X				1
BA2119-A-6		05-May-21	9:00	Soil	X	X		X				1
BA2119-A-7		05-May-21	9:00	Soil	X	X		X				1
BA2119-A-8		05-May-21	9:00	Soil	X	X		X				1
BA2119-A-9		05-May-21	9:00	Soil	X	X		X				1
BA2119-A-10		05-May-21	9:00	Soil	X	X		X				1
BA2119-A-11		05-May-21	9:00	Soil	X	X		X				1
BA2119-A-12		05-May-21	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): 11-May-21	Time (hh-mm): 0900	Received by: 	Date: MAY 11 2021	Time: 12:30pm	Temperature: 20 °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF